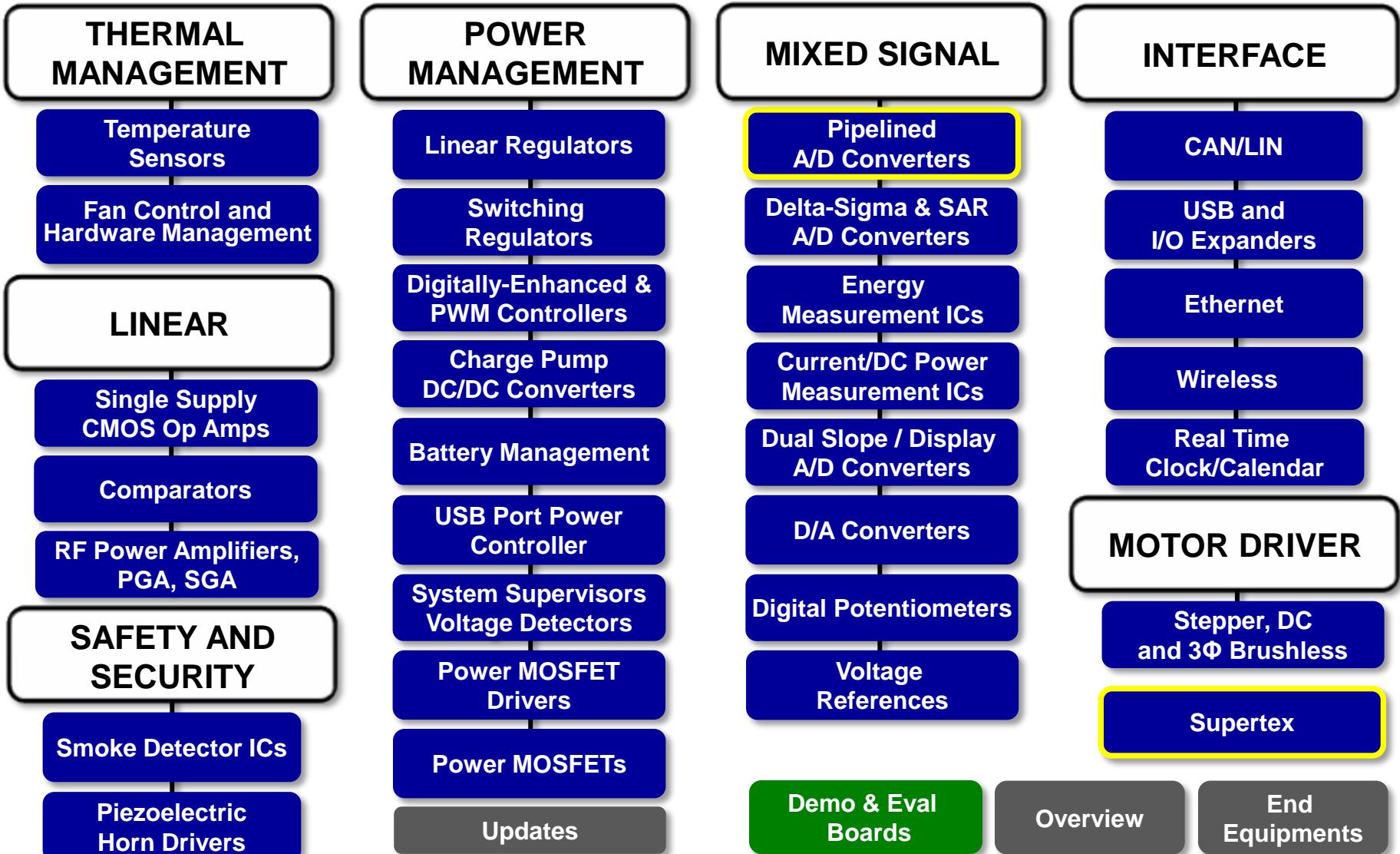


Analog & Interface Products



Click on boxes to navigate



Treelink Updates

The latest version of Treelink is available on the Microchip website at www.microchip.com/treelink

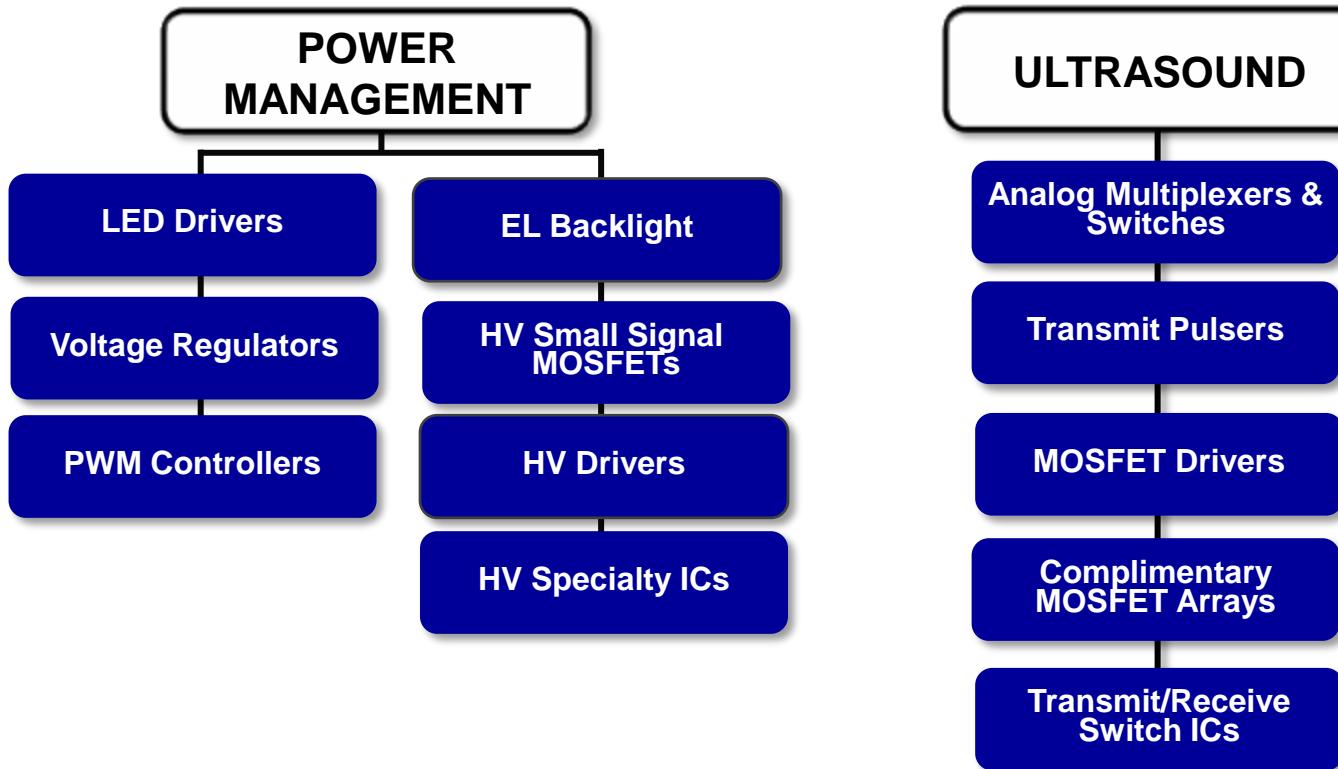
Click here for the latest Treelink

To receive notification on updates to the Treelink presentation, sign up for RSS feeds by visiting the RSS webpage. Choose “*Recently Updated Product Selection Tools*” under “*Selection Tools:*” for Treelink updates.

Sign up for RSS feeds

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Supertex Broad Market & Key Segment Products



Pipelined A/D Converters

Standard Pipelined ADCs

16-bit

MCP37231-200
200 Msps, 8-ch mux

14-bit

MCP37221-200
200 Msps, 8-ch mux

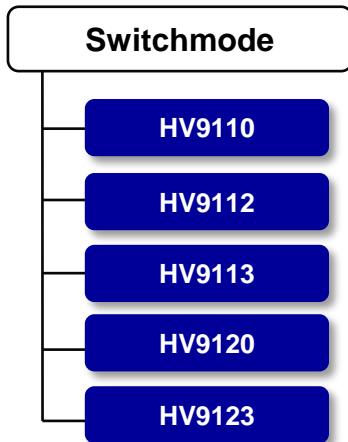
ADC with Integrated Digital Down-converter

MCP37D31-200
200 Msps, 16-bit, 8-ch mux
Digital Down-converter

MCP37D21-200
200 Msps, 14-bit, 8-ch mux
Digital Down-converter

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PWM Controllers



MOSFET Arrays

N-Channel

TD9944
240BV_{DSS}, 6Ω R_{DS(ON)}

Complementary

TC1550
N-CH: 500V BV_{DSS}, 2Ω R_{DS(ON)}
P-CH: -500V BV_{DSS}, 125Ω R_{DS(ON)}

TC2320
N-CH: 200V BV_{DSS}, 7Ω R_{DS(ON)}
P-CH: -200V BV_{DSS}, 12Ω R_{DS(ON)}

TC6215
N-CH: 150V BV_{DSS}, 4Ω R_{DS(ON)}
P-CH: -150V BV_{DSS}, 7Ω R_{DS(ON)}

TC6320
N-CH: 200V BV_{DSS}, 7Ω R_{DS(ON)}
P-CH: -200V BV_{DSS}, 8Ω R_{DS(ON)}

TC7920
N-CH: 200V BV_{DSS}, 13Ω R_{DS(ON)}
P-CH: -200V BV_{DSS}, 15Ω R_{DS(ON)}

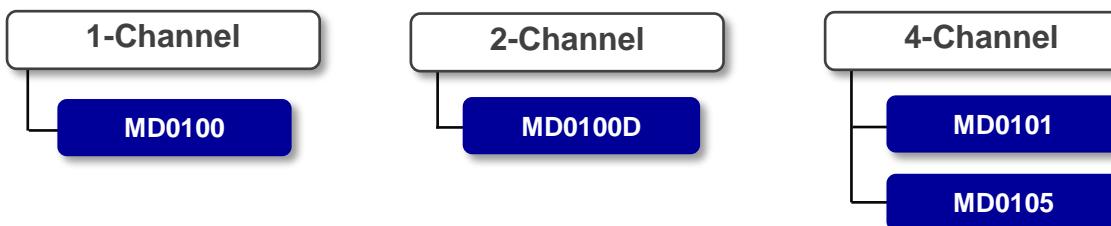
TC8020
N-CH: 200V BV_{DSS}, 8Ω R_{DS(ON)}
P-CH: -200V BV_{DSS}, 9.5Ω R_{DS(ON)}

TC8220
N-CH: 200V BV_{DSS}, 5.3Ω R_{DS(ON)}
P-CH: -200V BV_{DSS}, 6.5Ω R_{DS(ON)}

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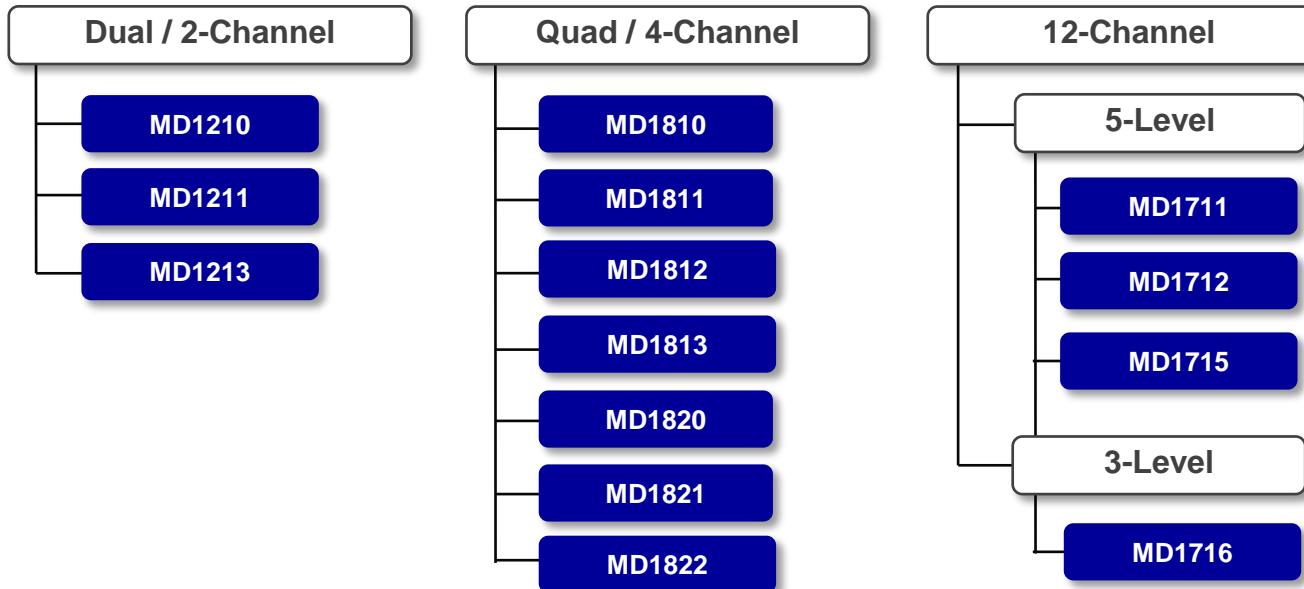


Ultrasound Transmit/Receive Switch ICs



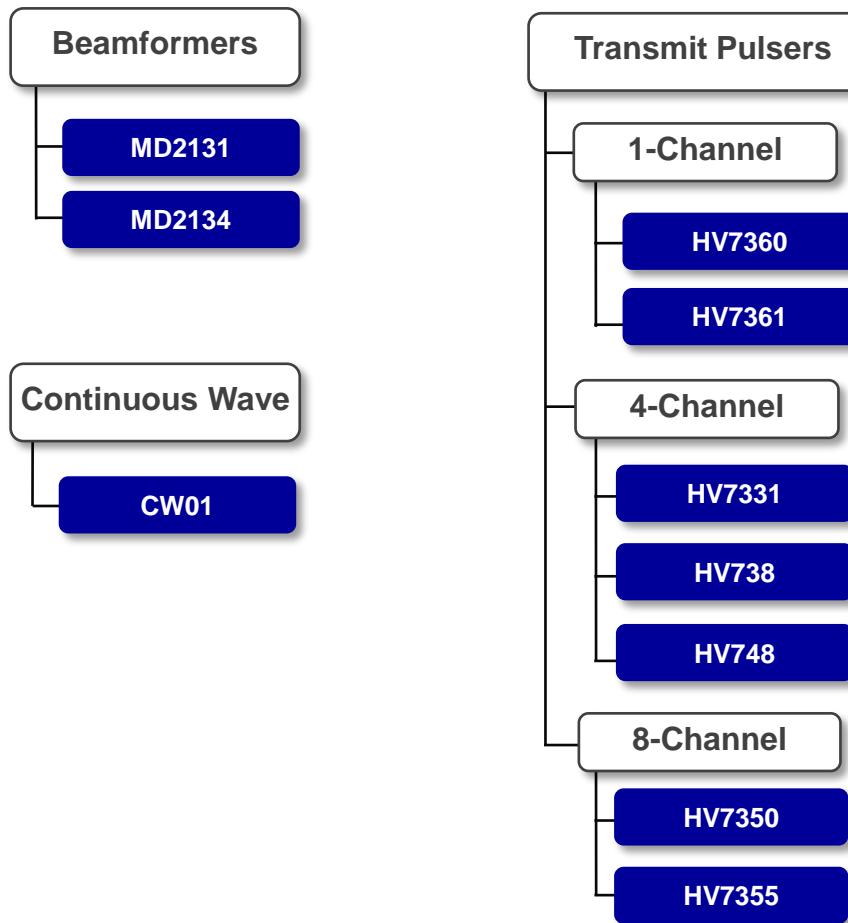
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Ultrasound MOSFET Drivers



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Ultrasound Transmit ICs



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Ultrasound Analog Multiplexers & Switches

6-Channel

SPDT

HV209

8-Channel

SPDT

HV2733

SPST

HV2201 / HV2301

HV2321

HV20220

HV20320

HV232

HV2221

HV230

HV214

HV219

3:1 MUX

HV2661 / HV2761

16-Channel

SPDT

HV2808

SPST

HV2601 / HV2701

HV2631 / HV2731

HV2605 / HV2705

HV20822

HV238

2:1 MUX

HV2801 / HV2901

24-Channel

SPST

HV2662 / HV2762

32-Channel

2:1 & 4:1 MUX

HV2809

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HV Specialty ICs

Electronic Line Switches

HT18

HT19

Lens Drivers

HV892

Relay Driver

HV9901

Fan Controller

HV7100

DC/DC Controller

HV9150

Ring Generators

HV430

HV461

High Side Current Monitors

HV7800

HV7801

HV7802

Fault Protection

FP0100

Level Translators

HT0440

HT0740

<< BACK

HV Drivers

Source-Sink Outputs

Push-Pull

HV3418

HV507

HV513

HV518

HV5308

HV5408

HV574

HV57708

HV57908

HV5812

HV66

HV6810

HV7022

HV7224

HV7620

HV9308

HV9408

HV9808

Push-Pull H-Bridge

HV508

MEMS Drivers/ HV Array Amplifiers

HV254

HV256

HV257

HV264

Sink Only Outputs

Open Drain N-Channel

HV5122

HV5222

HV5522

HV5523

HV5530

HV5622

HV5623

HV5630

Open Drain P-Channel

HV57009

EL Backlight Drivers

Single Lamp

HV816

HV823

HV825

HV830

HV833

HV857

HV857L

HV859

HV860

Inductorless

HV850

HV852

HV853

16-Segment

HV509

HV528

Offline

HV809

Dual Lamp

HV861

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MICROCHIP

LED Drivers

General Purpose

HV9801A

HV9803B

HV9861A

HV9910B

HV9910C

HV9918

HV9919B

HV9921/2/3

HV9925

HV9930

HV9931

Backlighting

HV9803

HV9911

HV9912

HV9961

HV9963

HV9967B

HV9980

HV9982

HV9989

Sequential Linear

CL8800

CL8801

Automotive

AT9917

AT9919

AT9932

AT9933

Linear Regulators

CL2

CL25

CL220

CL320

CL325

CL330

CL520

CL525

CL6

CL7

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MICROCHIP

MOSFETs

**Depletion
Mode**

Products

**N-Channel
Enhancement Mode**

Products

**P-Channel
Enhancement Mode**

Products

<< BACK

P-Channel Enhancement Mode MOSFETs

P-Channel

Vertical

VP0104
-40V BV_{DSS} , 8Ω $R_{DS(ON)}$

VP0106
-60V BV_{DSS} , 8Ω $R_{DS(ON)}$

VN0109
-90V BV_{DSS} , 8Ω $R_{DS(ON)}$

VP0550
-500V BV_{DSS} , 125Ω $R_{DS(ON)}$

VP0808
-80V BV_{DSS} , 5Ω $R_{DS(ON)}$

VP2106
-60V BV_{DSS} , 12Ω $R_{DS(ON)}$

VP2110
-100V BV_{DSS} , 12Ω $R_{DS(ON)}$

VP2206
-60V BV_{DSS} , 0.9Ω $R_{DS(ON)}$

VP2450
-500V BV_{DSS} , 30Ω $R_{DS(ON)}$

VP3203
-30V BV_{DSS} , 0.6Ω $R_{DS(ON)}$

Low Threshold

TP0604
-40V BV_{DSS} , 2Ω $R_{DS(ON)}$

TP0610
-60V BV_{DSS} , 10Ω $R_{DS(ON)}$

TP0620
-200V BV_{DSS} , 12Ω $R_{DS(ON)}$

TP2104
-40V BV_{DSS} , 6Ω $R_{DS(ON)}$

TP2424
-240V BV_{DSS} , 8Ω $R_{DS(ON)}$

TP2435
-350V BV_{DSS} , 15Ω $R_{DS(ON)}$

TP2502
-20V BV_{DSS} , 2Ω $R_{DS(ON)}$

TP2510
-100V BV_{DSS} , 3.5Ω $R_{DS(ON)}$

TP2520
-200V BV_{DSS} , 12Ω $R_{DS(ON)}$

TP2522
-220V BV_{DSS} , 12Ω $R_{DS(ON)}$

TP2535
-350V BV_{DSS} , 25Ω $R_{DS(ON)}$

TP2540
-400V BV_{DSS} , 25Ω $R_{DS(ON)}$

TP2635
-350V BV_{DSS} , 15Ω $R_{DS(ON)}$

TP2640
-400V BV_{DSS} , 15Ω $R_{DS(ON)}$

TP5322
-220V BV_{DSS} , 12Ω $R_{DS(ON)}$

TP5335
-350V BV_{DSS} , 30Ω $R_{DS(ON)}$

Lateral

LP0701
-16.5V BV_{DSS} , 1.5Ω $R_{DS(ON)}$

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N-Channel Enhancement Mode MOSFETs

N-Channel

Vertical

2N6660 60V BV_{DSS} , 3Ω $R_{DS(ON)}$	VN0606 60V BV_{DSS} , 3Ω $R_{DS(ON)}$	VN2450 500V BV_{DSS} , 13Ω $R_{DS(ON)}$
2N6661 90V BV_{DSS} , 4Ω $R_{DS(ON)}$	VN0808 80V BV_{DSS} , 4Ω $R_{DS(ON)}$	VN2460 600V BV_{DSS} , 20Ω $R_{DS(ON)}$
2N7000 60V BV_{DSS} , 5Ω $R_{DS(ON)}$	VN1206 120V BV_{DSS} , 6Ω $R_{DS(ON)}$	VN3205 50V BV_{DSS} , 0.3Ω $R_{DS(ON)}$
2N7002 60V BV_{DSS} , 7.5Ω $R_{DS(ON)}$	VN2106 60V BV_{DSS} , 4Ω $R_{DS(ON)}$	VN4012 400V BV_{DSS} , 12Ω $R_{DS(ON)}$
2N7008 60V BV_{DSS} , 7.5Ω $R_{DS(ON)}$	VN2110 100V BV_{DSS} , 4Ω $R_{DS(ON)}$	
VN0104 40V BV_{DSS} , 3Ω $R_{DS(ON)}$	VN2210 100V BV_{DSS} , 0.35Ω $R_{DS(ON)}$	
VN0106 60V BV_{DSS} , 3Ω $R_{DS(ON)}$	VN2222 60V BV_{DSS} , 7.5Ω $R_{DS(ON)}$	
VN0109 90V BV_{DSS} , 3Ω $R_{DS(ON)}$	VN2224 240V BV_{DSS} , 1.25Ω $R_{DS(ON)}$	
VN0300 30V BV_{DSS} , 1.2Ω $R_{DS(ON)}$	VN2406 240V BV_{DSS} , 6Ω $R_{DS(ON)}$	
VN0550 500V BV_{DSS} , 60Ω $R_{DS(ON)}$	VN2410 240V BV_{DSS} , 10Ω $R_{DS(ON)}$	

Low Threshold

TN0104 40V BV_{DSS} , 1.8Ω $R_{DS(ON)}$	TN2425 250V BV_{DSS} , 3.5Ω $R_{DS(ON)}$
TN0106 60V BV_{DSS} , 3Ω $R_{DS(ON)}$	TN2435 350V BV_{DSS} , 6Ω $R_{DS(ON)}$
TN0110 100V BV_{DSS} , 3Ω $R_{DS(ON)}$	TN2501 18V BV_{DSS} , 2.5Ω $R_{DS(ON)}$
TN0604 40V BV_{DSS} , 0.75Ω $R_{DS(ON)}$	TN2504 40V BV_{DSS} , 1Ω $R_{DS(ON)}$
TN0606 60V BV_{DSS} , 1.5Ω $R_{DS(ON)}$	TN2510 100V BV_{DSS} , 1.5Ω $R_{DS(ON)}$
TN0610 100V BV_{DSS} , 1.5Ω $R_{DS(ON)}$	TN2524 240V BV_{DSS} , 6Ω $R_{DS(ON)}$
TN0620 200V BV_{DSS} , 6Ω $R_{DS(ON)}$	TN2540 400V BV_{DSS} , 12Ω $R_{DS(ON)}$
TN0702 20V BV_{DSS} , 1.3Ω $R_{DS(ON)}$	TN2640 400V BV_{DSS} , 5Ω $R_{DS(ON)}$
TN2106 60V BV_{DSS} , 2.5Ω $R_{DS(ON)}$	TN5325 250V BV_{DSS} , 7Ω $R_{DS(ON)}$
TN2124 240V BV_{DSS} , 15Ω $R_{DS(ON)}$	TN5335 350V BV_{DSS} , 15Ω $R_{DS(ON)}$
TN2130 300V BV_{DSS} , 25Ω $R_{DS(ON)}$	

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Depletion Mode MOSFETs

N-Channel

Vertical

DN1509
90V BV_{DSX} , 6Ω $R_{DS(ON)}$

DN2450
500V BV_{DSX} , 10Ω $R_{DS(ON)}$

DN2470
700V BV_{DSX} , 42Ω $R_{DS(ON)}$

DN2530
300V BV_{DSX} , 12Ω $R_{DS(ON)}$

DN2535
350V BV_{DSX} , 25Ω $R_{DS(ON)}$

DN2540
400V BV_{DSX} , 25Ω $R_{DS(ON)}$

DN2625
250V BV_{DSX} , 3.5Ω $R_{DS(ON)}$

DN3135
350V BV_{DSX} , 35Ω $R_{DS(ON)}$

DN3145
450V BV_{DSX} , 60Ω $R_{DS(ON)}$

DN3525
250V BV_{DSX} , 10Ω $R_{DS(ON)}$

DN3535
350V BV_{DSX} , 10Ω $R_{DS(ON)}$

DN3545
450V BV_{DSX} , 20Ω $R_{DS(ON)}$

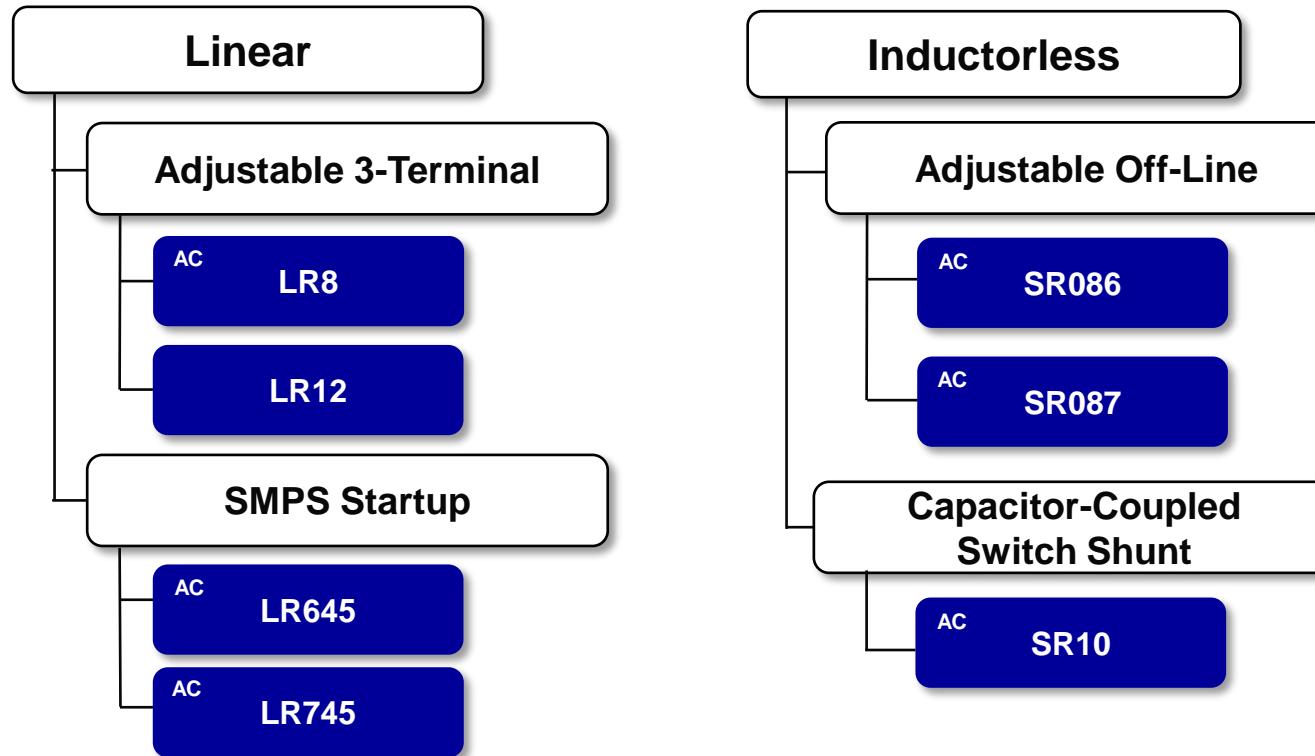
DN3765
650V BV_{DSX} , 8.0Ω $R_{DS(ON)}$

Lateral

LND01
9V BV_{DSX} , 1.4V $R_{DS(ON)}$

LND150
500V BV_{DSX} , 1000V $R_{DS(ON)}$

Voltage Regulators

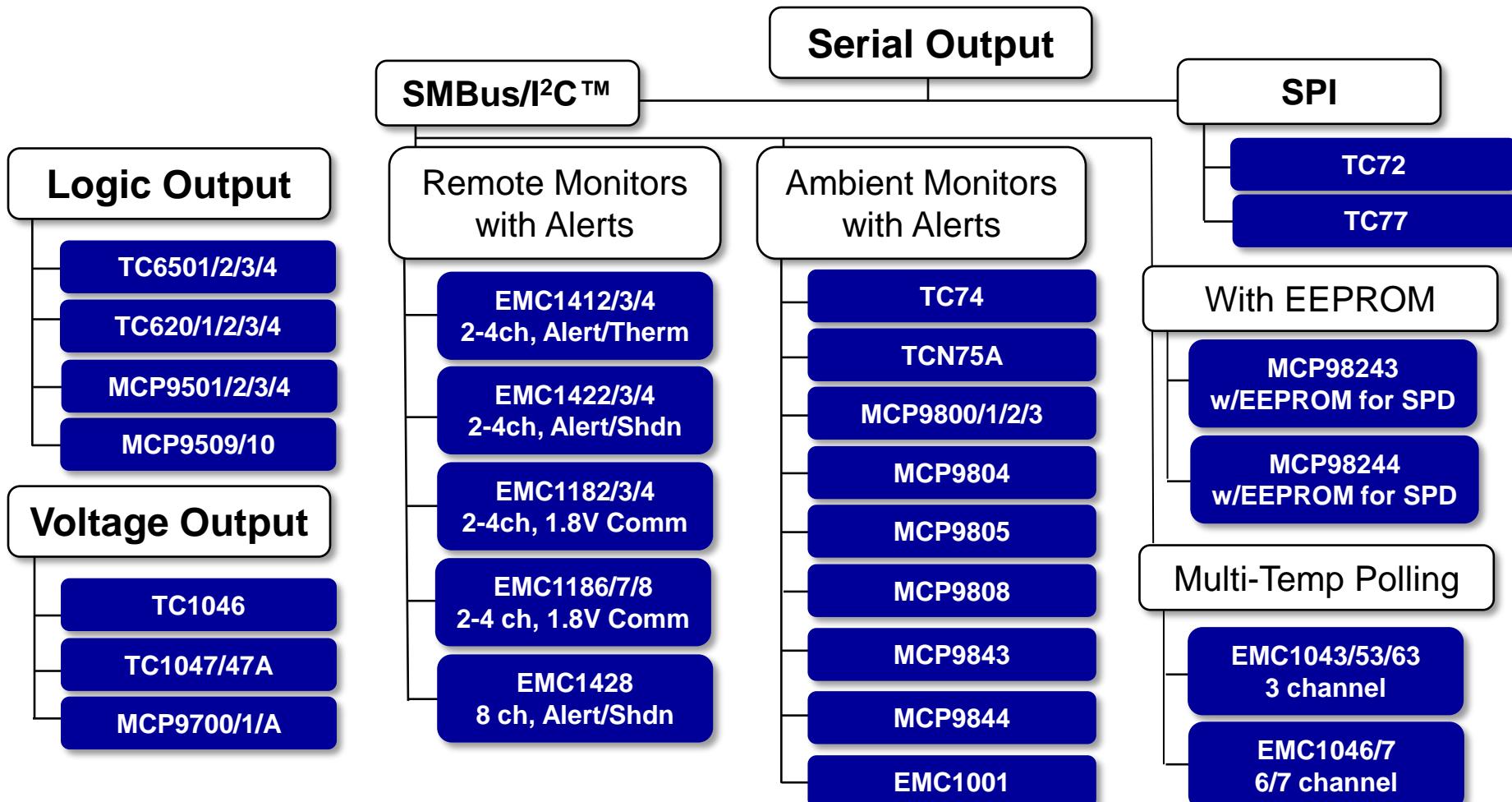


AC = Offline Capable

**Voltage Regulator
Demo & Eval Boards**

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Temperature Sensors



Fan Control and Hardware Management

Closed Loop Fan Controllers With SMBus/I2C

PWM Drive,
Multi-Temp &
Hardware Mgt

EMC2103
Single Fan

EMC2113
Single Fan

EMC2104
Dual Fan

Linear Drive,
Multi-Temp &
Hardware Mgt

EMC2112
Single Fan

EMC2105
Single Fan

EMC2106
Dual Fan

PWM Fan
Speed
Controllers

EMC2301
Single Fan

EMC2302
Dual Fan

EMC2303
Triple Fan

EMC2305
Five Fan

Open Loop Fan Controllers

SMBus/I2C
and Alert

EMC2101 Single
Int & Remote Tmp

EMC6D103S
Triple Hardware Mgt

EMC2300
Triple Hardware Mgt

TC654/55
Dual Thermistor Input

TC664/65
Single Thermistor Input

With Alert

TC642/6/7/8/9
Single ,Thermistor Input

TC642/6/7/8/9B
Single, Thermister &
Restart

TC650/1/2/3
Single, Integrated Tmp

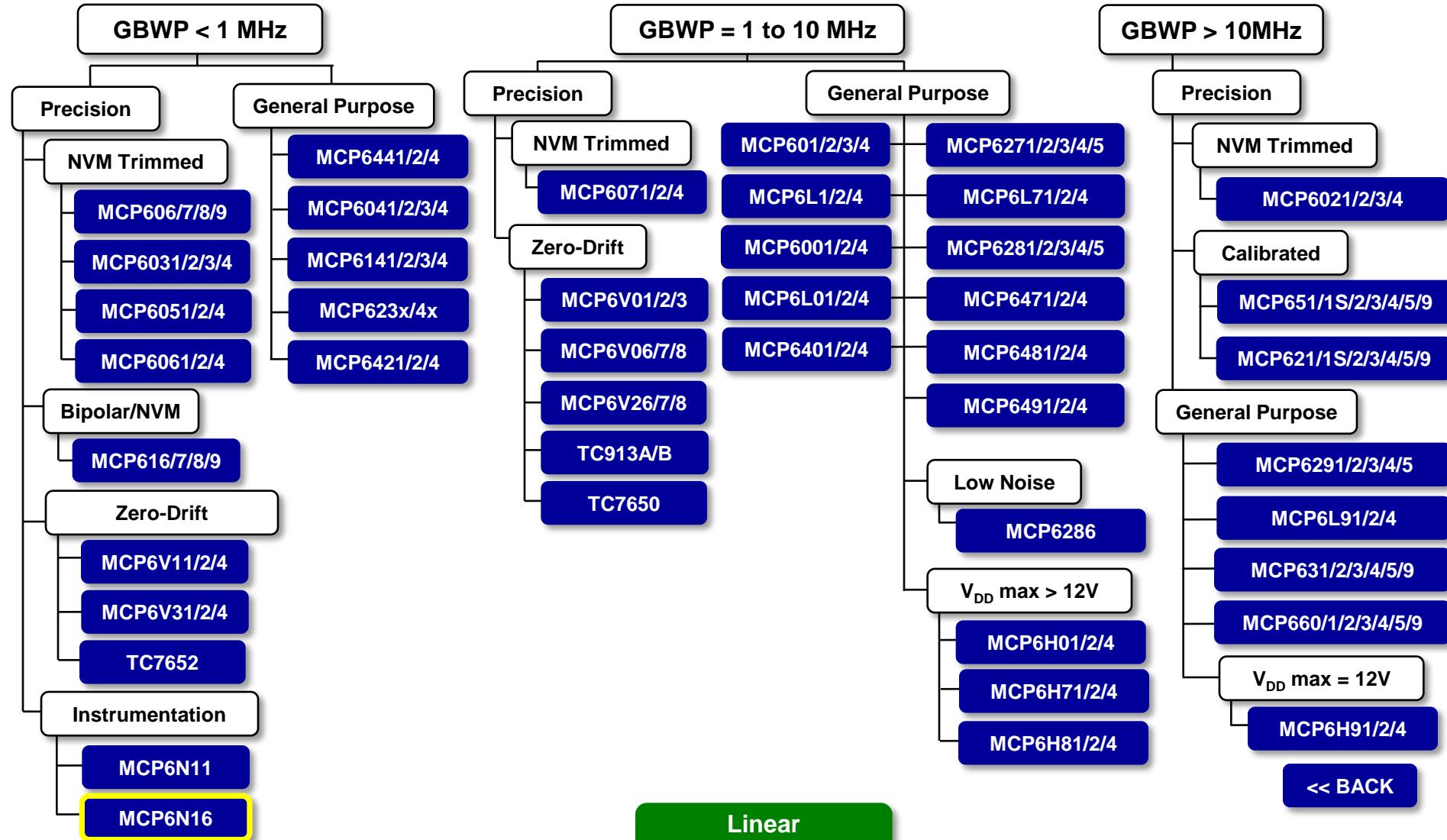
Fan Fault Detection/Prediction

TC670

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Operational Amplifiers



Linear Demo & Eval Boards

PGA/SGA and RF Amplifiers

Programmable Gain Amplifiers

MCP6S21
1-ch, low offset

MCP6S22
2-ch, low offset

MCP6S26
6-ch, low offset

MCP6S28
8-ch, low offset

MCP6S91
1-ch, low cost

MCP6S92/3
2-ch, low cost

Selectable Gain Amplifiers

MCP6G01
1-ch, fixed gain

MCP6G02
2-ch, fixed gain

MCP6G03
1-ch, chip select

MCP6G04
4-ch, fixed gain

Power Amplifiers

2.4 GHz PA
11/b/g/n

Pout*
~18 dBm

Pout*
18 – 22 dBm

Pout*
>22 dBm

RF Matched

5 GHz PA
11/a/n

Pout*
18 – 21 dBm

Pout*
>21 dBm

Front End Modules

2.4 GHz 11b/g/n
PA+LNA or PA+SW

2.4 GHz 11b/g/n
PA+SW+LNA

2.4 GHz 256QAM
FEM PA+SW+LNA

5 GHz 11a/n/ac
PA+SW+LNA

LNA

2.4 GHz

*Pout measured @ 3% EVM, using 802.11a or 11g OFDM

Comparators

Push-Pull Output

4 μ s Prop Delay

MCP6541/2/3/4

MCP65R41

50ns Prop Delay

MCP6561/2/4

Open Drain Output

4 μ s Prop Delay

MCP6546/7/8/9

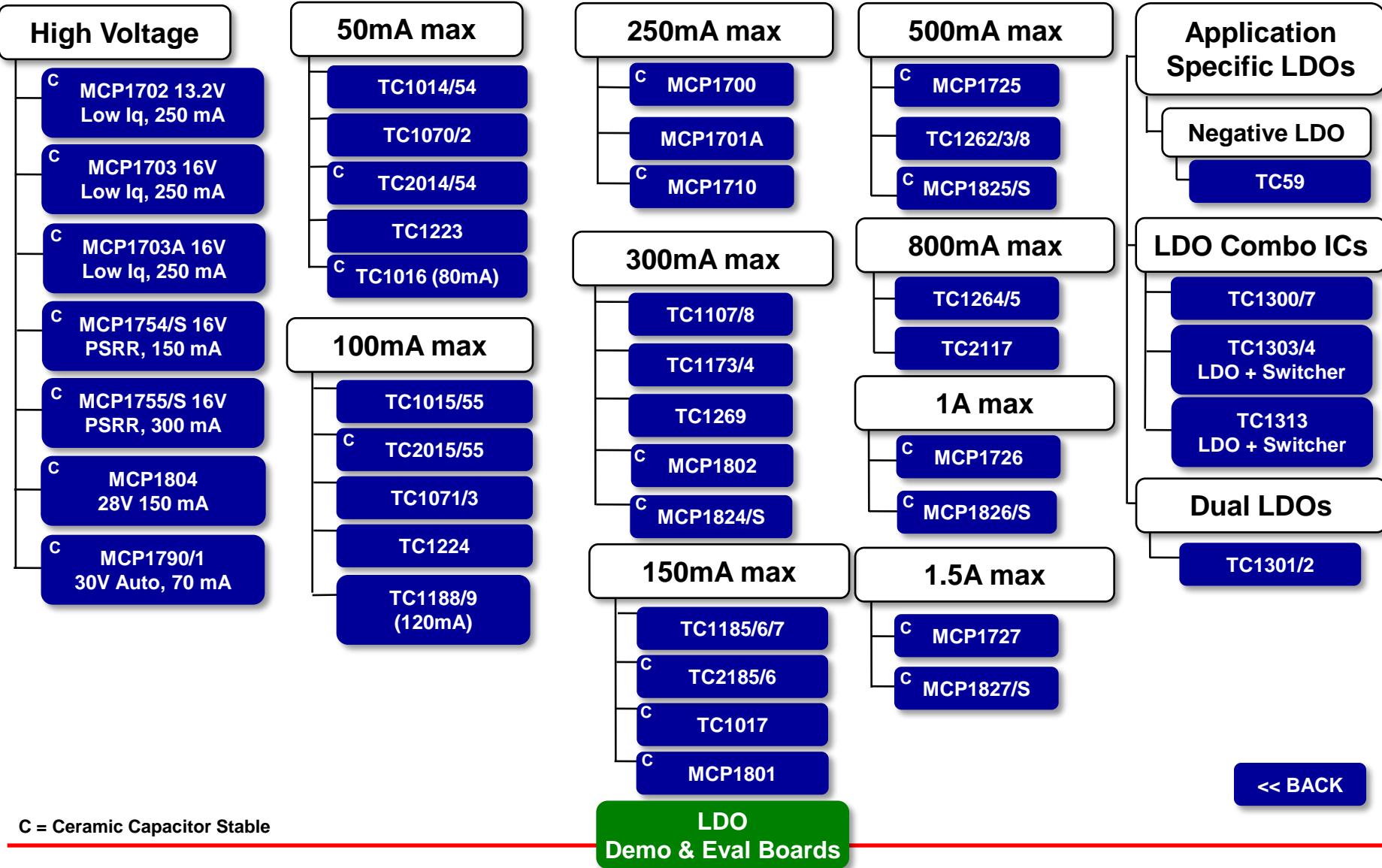
MCP65R46

50ns Prop Delay

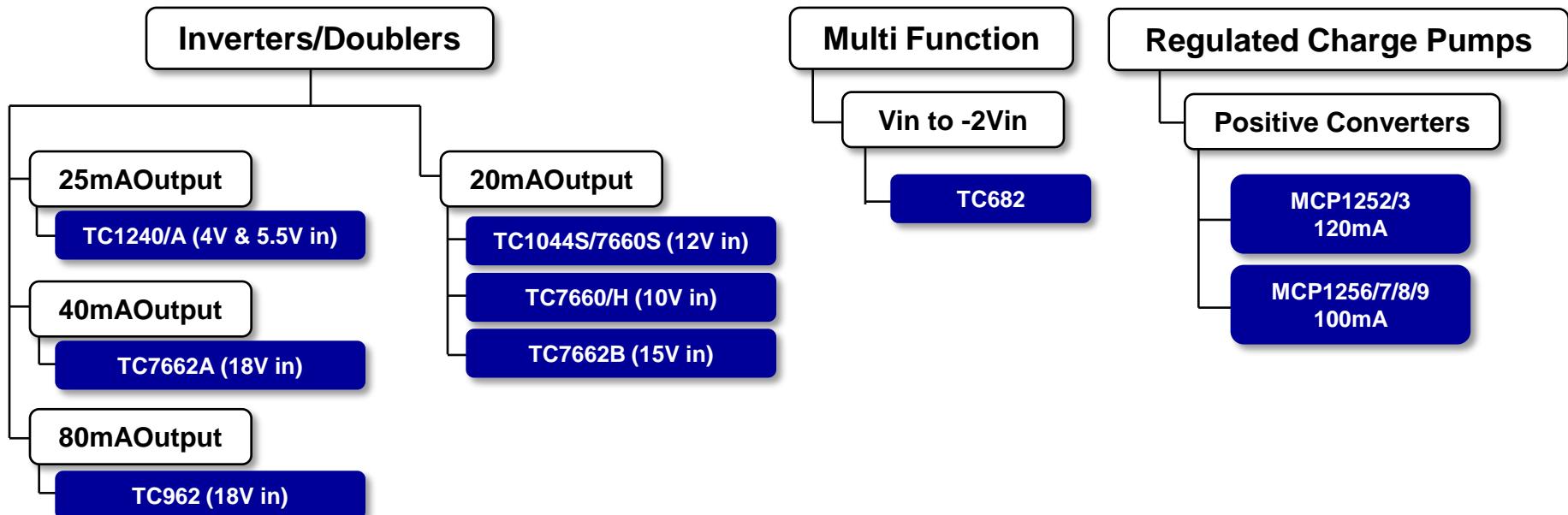
MCP6566/7/9

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Low-Dropout Regulators



Charge Pumps



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Switching Regulators

Buck (step down) PWM

MCP1612
1A, 1.4MHz

MCP16301/H
30V/36V, 0.6A

MCP16312
30V, 1A

MCP16331
50V, >0.5A

Buck (step down) PFM/PWM

TC120
0.6A, 300kHz

TC105
1A, 300kHz

MCP1601
0.5A, Sync

MCP1602
2.0 MHz, 500 mA
w/Power-Good

MCP1603
0.5A, Sync, TSOT

MCP16321
24V, 1A

MCP16311
30V, 1A

MCP16322
24V, 2A

MCP16323
18V, 3A

Boost (step up) PFM/PWM

MCP1643
1.6A LED Driver

MCP1623/4
500 kHz, 425 mA

MCP1640/40B/40C/40D
500 kHz, 800 mA

MCP16251/2
500 kHz, 650 mA

MCP1661 32Vout
500 kHz, 1.3A Switch

MCP1662 LED Driver
500 kHz, 1.3A Switch

TC115
0.14A

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MICROCHIP

Digitally-Enhanced and PWM Controllers

Digitally-Enhanced Power Analog Controllers

MCP19110/1
32V Enhanced Power Analog Controller w/ Synchronous Driver Step-Down Topologies

MCP19114/5
42V Enhanced Power Analog Controller w/ Synchronous Driver Step-Up Topologies

Synchronous, Step-Down PWM Controllers

MCP19035
30V Standalone incl. LDO and Integrated MOSFET Driver

Asynchronous PWM Controllers

MCP1630/V
High Speed, MCU-adaptable

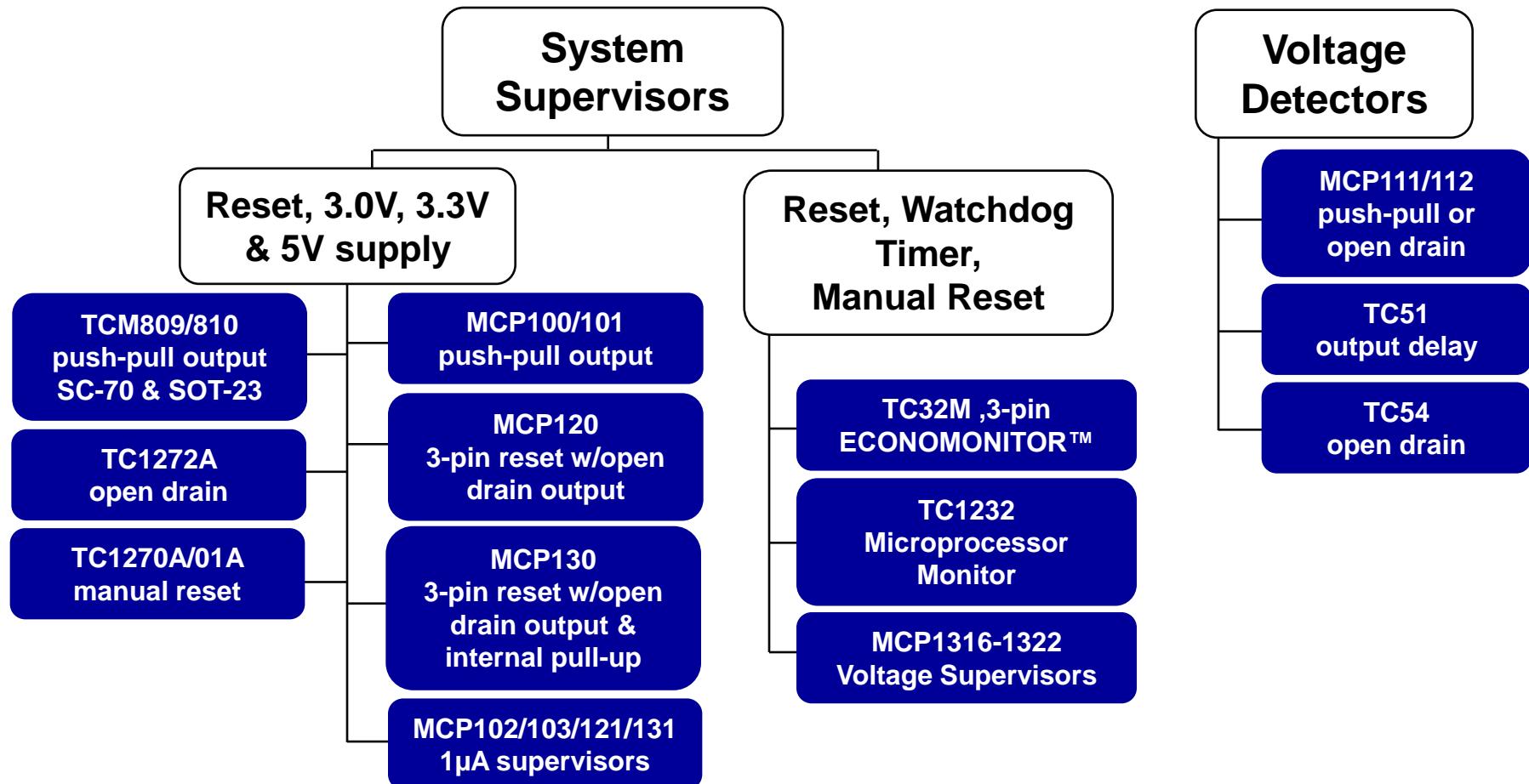
MCP1631/V
HV version incl. LDO for 16V Operation

MCP1632
300kHz/600kHz Controller

MCP1650/1/2/3
750kHz Controller

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System Supervisors



Voltage Detectors

- MCP111/112 push-pull or open drain
- TC51 output delay
- TC54 open drain

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MOSFET Drivers

0.5A Peak Output

TC1410/N
single

MCP1401/2

1A Peak Output

TC1411/N
single

1.2A Peak Output

TC1426/7/8
dual

TC4467/8/9
quad

1.5A Peak Output

Single

TC4403
floating load

TC4626/7
w/ voltage Tripler

TC4431/2
30V high/low, 3A
source / 1.5A sink

MCP1415/6 'Tiny'

Dual

TC426/7/8, TC4426/7/8

TC4426A/27A/28A
matched delay

TC4404/5
split output, open drain

2A Peak Output

TC1412/N single

MCP14628

MCP14700
dual input

MCP14E6/7/8
w/ Enable

3A Peak Output

TC1413/N single

TC4423/4/5 dual

TC4423A/4A/5A
dual

MCP14E9/10/11
w/ Enable

4A Peak Output

MCP14E3/4/5
w/ Enable 4.0A

4.5A Peak Output

MCP1403/4/5 4.5A
dual

6A Peak Output

TC429/TC4420/9
single

MCP1406/7 single

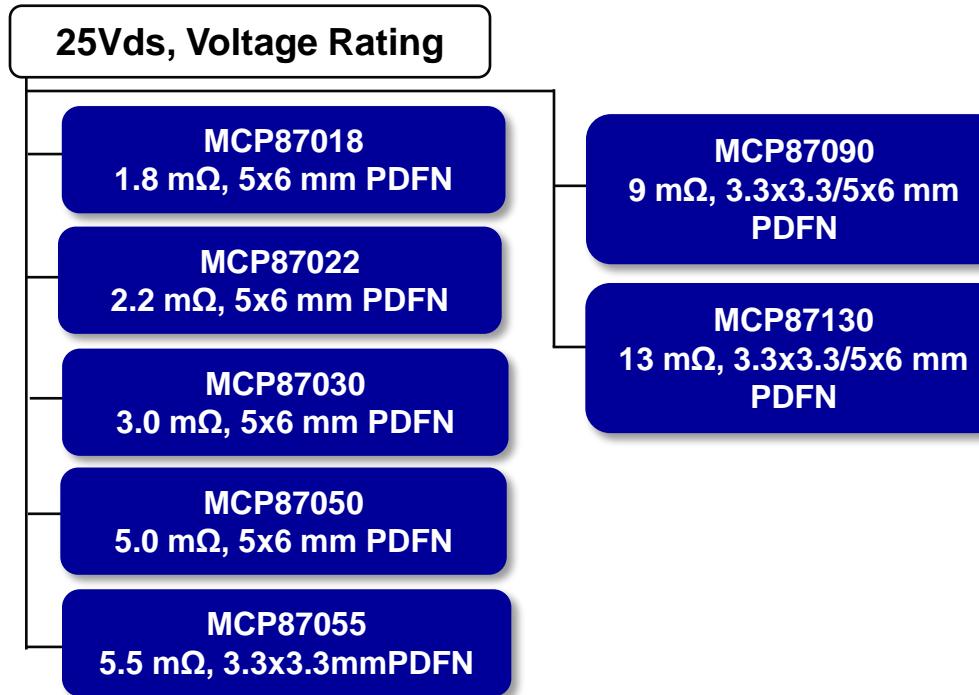
>6A Peak Output

TC4421A/2A
single, 9A

TC4451/52 single,
12A

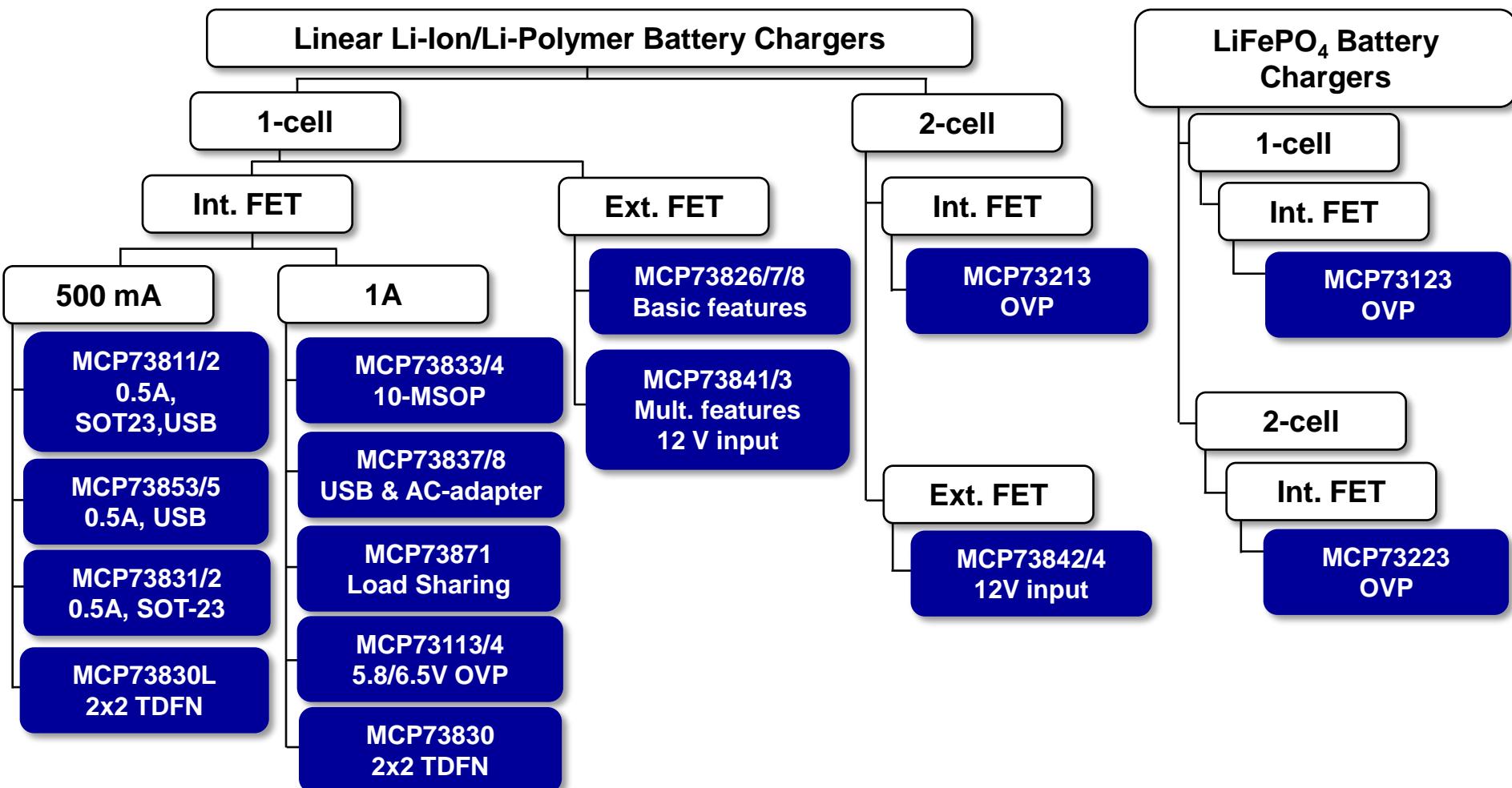
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Power MOSFETs



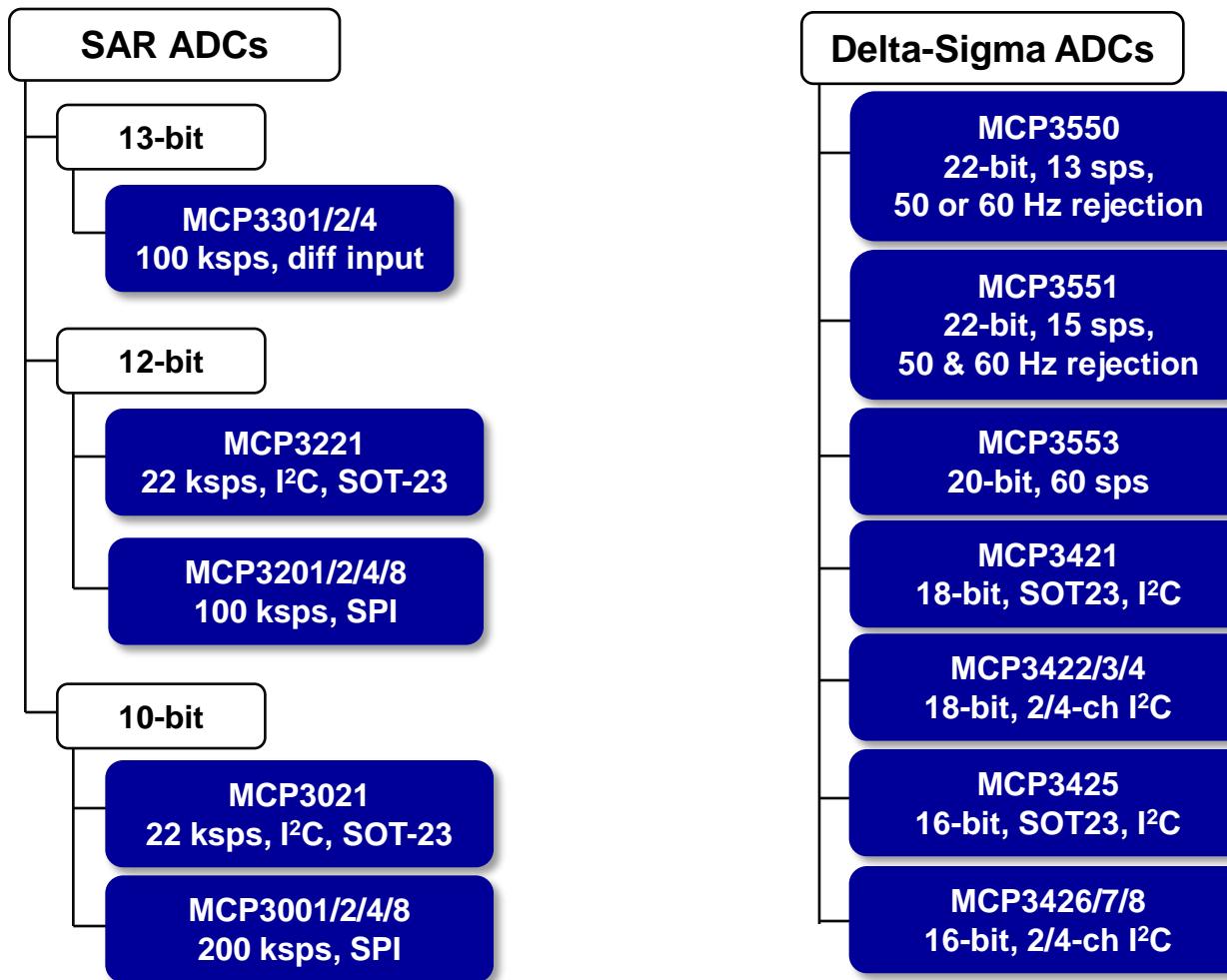
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Battery Chargers



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Delta-Sigma / SAR A/D Converters



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Dual Slope / Display A/D Converters

Dual Slope ADCs

- TC500/A/10/14
17-bit, programmable resolution, diff input
- TC7109/A
12-bit + sign, diff input

Display ADCs

BCD/Binary

- TC14433/A
BCD, 3½ digit res.
- TC850
Binary, 15-bit res.

LCD

- TC7106/A/7116/A/ 7126/A
3½ digit resolution
- TC7129
4½ digit resolution

LED

- TC7107/A/7117/A
3½ digit resolution

Energy Measurement ICs

Energy Meter ICs

MCP39F501
Power Monitoring IC
4000:1 dynamic range

MCP3905A
500:1 dynamic range,
PGA 1:16

MCP3905L
500:1 dynamic range,
PGA 1:16, low pwr

MCP3906A
1000:1 dynamic range,
PGA 1:32

MCP3909
1000:1 dynamic range,
PGA 1:16, SPI interface

Energy Measurement AFE

MCP3918
1-Ch AFE

MCP3910
2-Ch AFE

MCP3911
2-Ch AFE

MCP3919
3-Ch AFE

MCP3919
3-Ch AFE

MCP3912
4-Ch AFE

MCP3914
8-Ch AFE

MCP3901
5V 2-Ch AFE

MCP3903
5V 6-Ch AFE

System on Chip

PIC18F86/87J72

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Current/DC Power Measurement ICs

Current/DC Power w/ Temp Measurement

EMC1701
Current/DC Power w/Ambient Temp

EMC1702
Current/DC Power w/Ambient Temp & 1 Temperature Remote

EMC1704
Current/DC Power w/Ambient Temp & 3 Temperature Remotes

Current/DC Power Measurement

PAC1710
Single High Side Sensor for Current/DC Power Measurement

PAC1720
Dual High Side Sensor for Current/DC Power Measurement

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USB Port Power Controllers

Host Free Controller

UCS1001

- 9-Built in charger emulation profiles
- 2.5A Integrated Vbus power switch
- USB 2.0 Data switch

Programmable Controllers

UCS1002

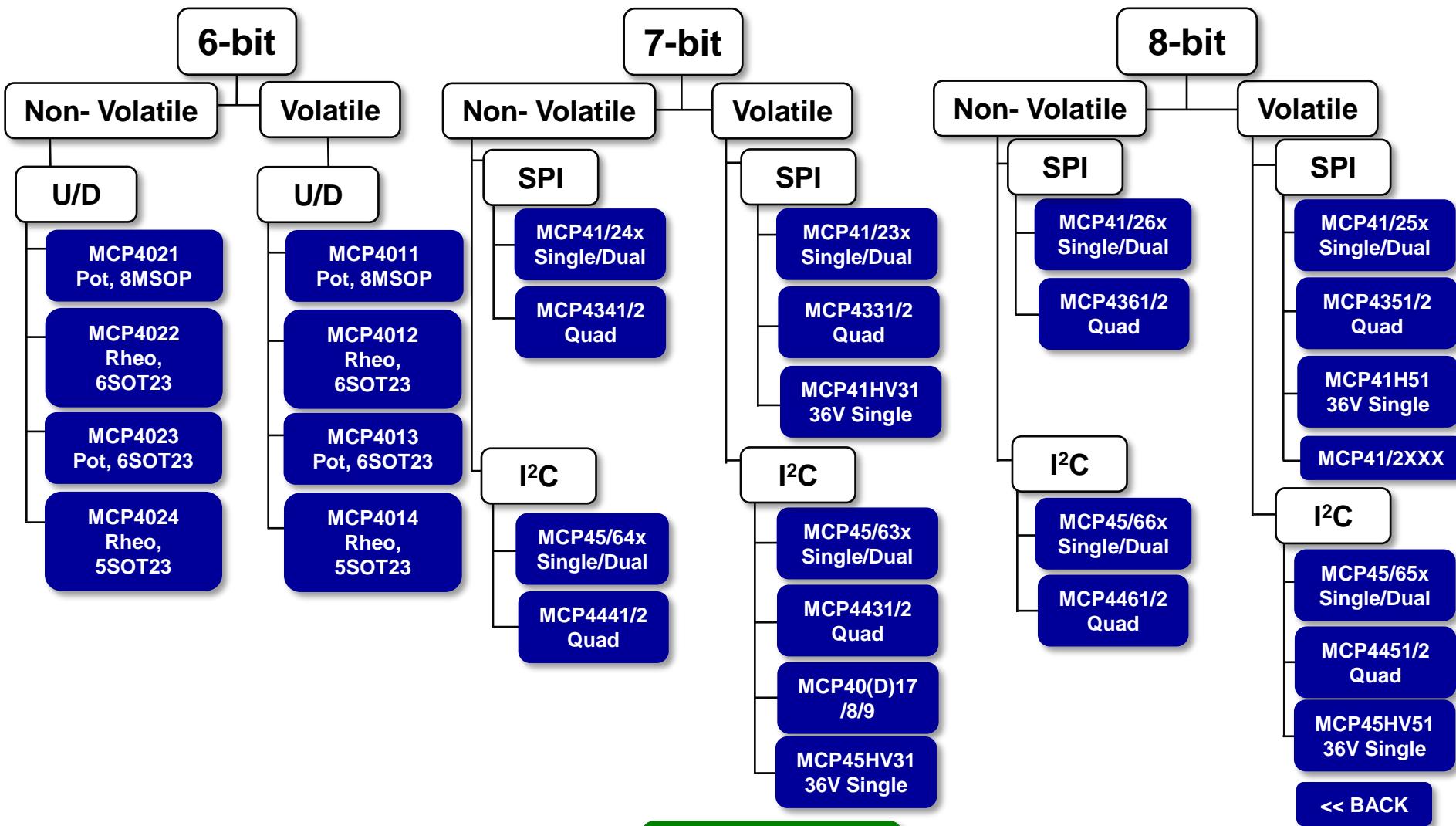
- 9-Built in charger emulation profiles
- 1 Programmable profile
- 2.5A Integrated Vbus power switch
- USB 2.0 Data switch
- Highest current algorithm available with SLA

UCS81001/2 Automotive

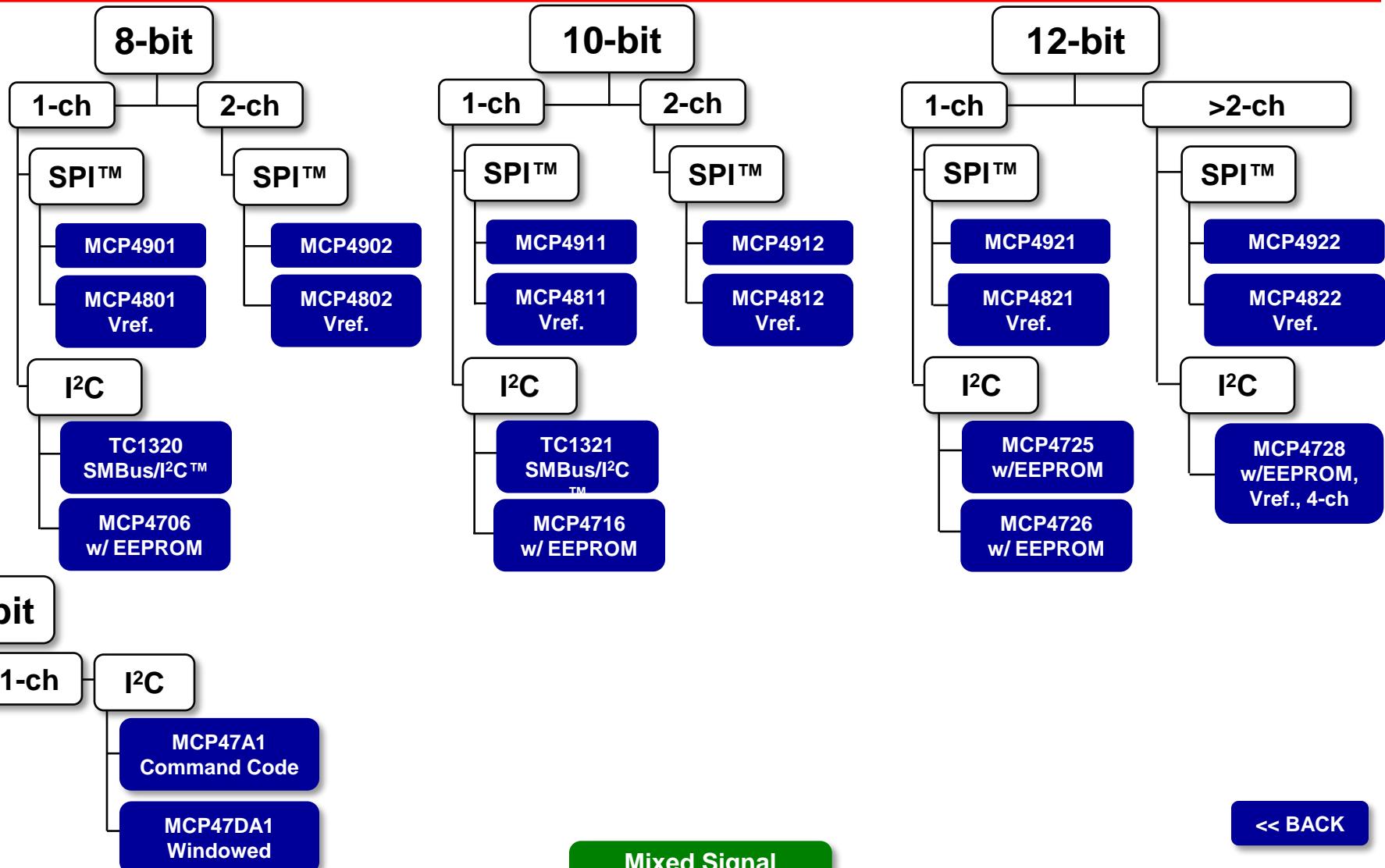
- 9-Built in charger emulation profiles
- 1 Programmable profile
- 2.5A Integrated Vbus power switch
- USB 2.0 Data switch
- Highest current algorithm available with SLA

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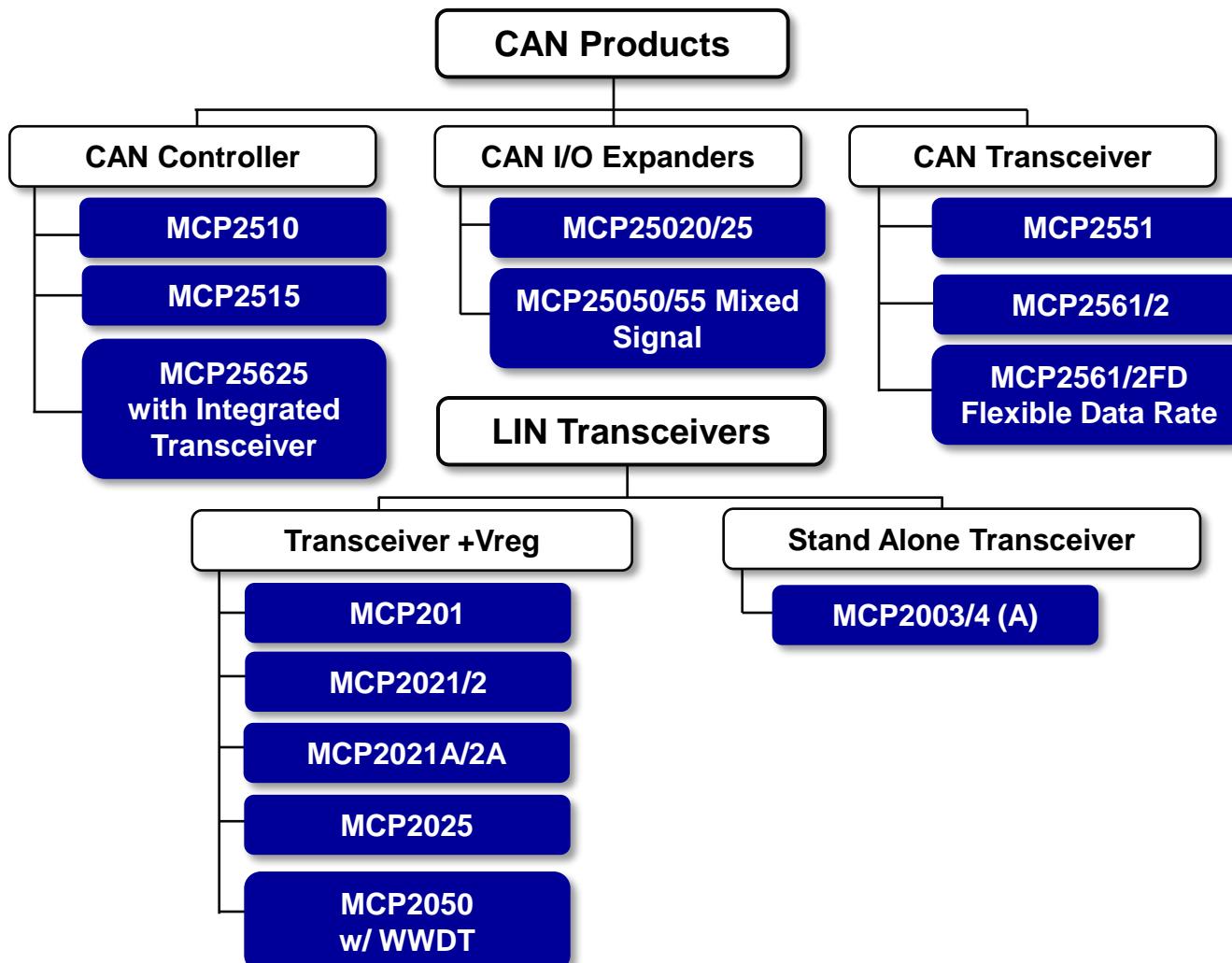
Digital Potentiometers



D/A Converters

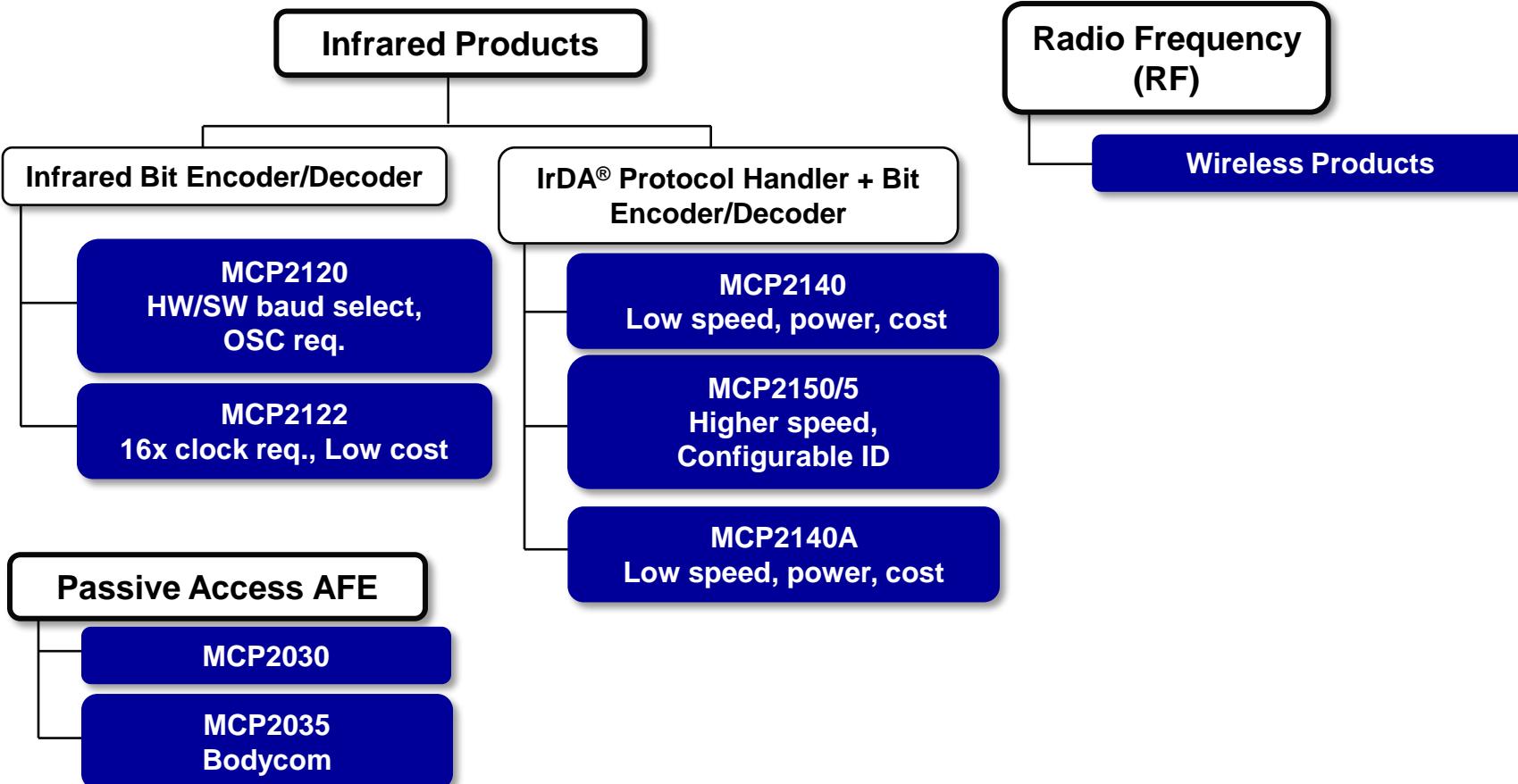


CAN and LIN Products



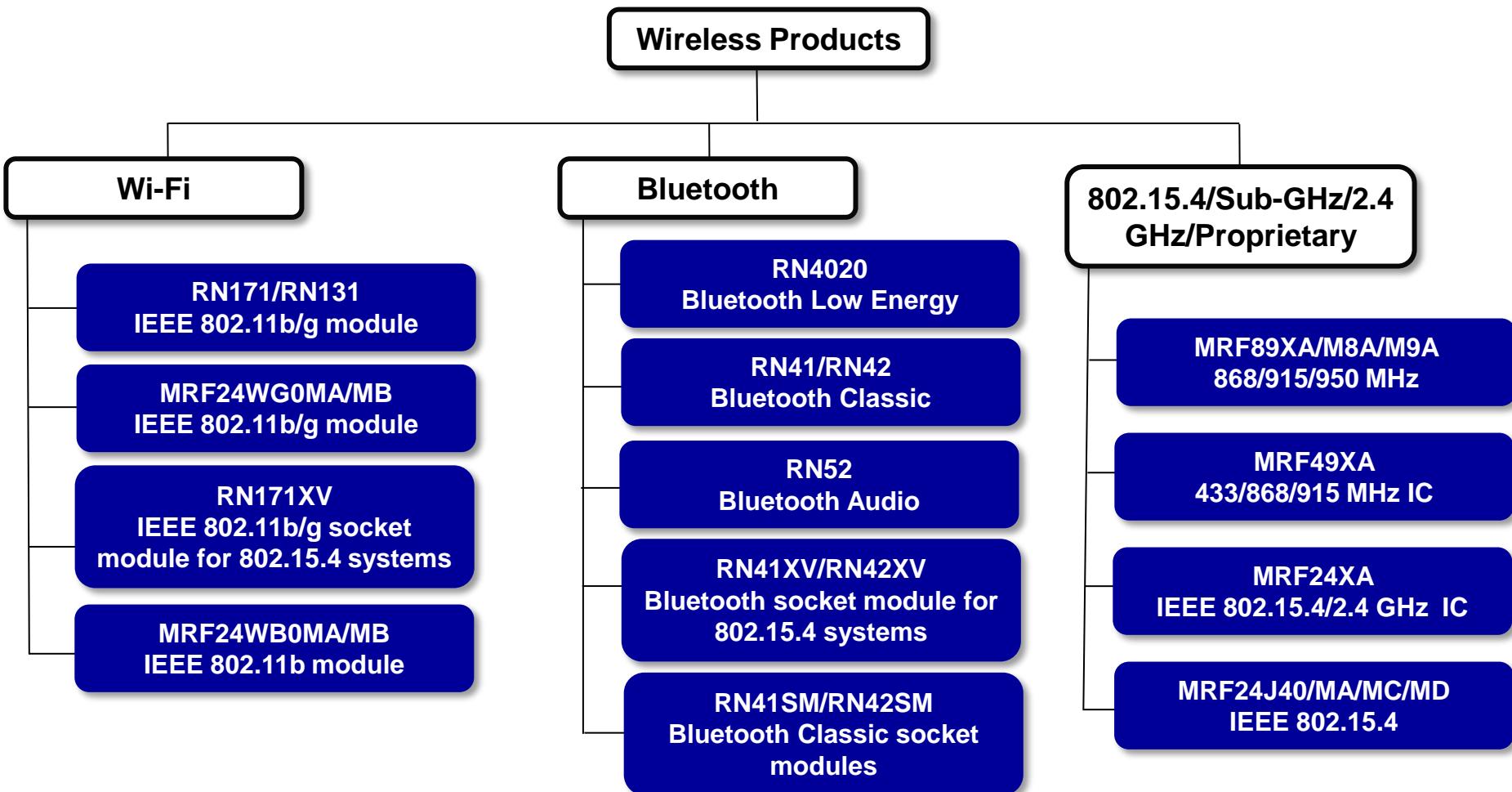
<< BACK

Wireless Interface Products



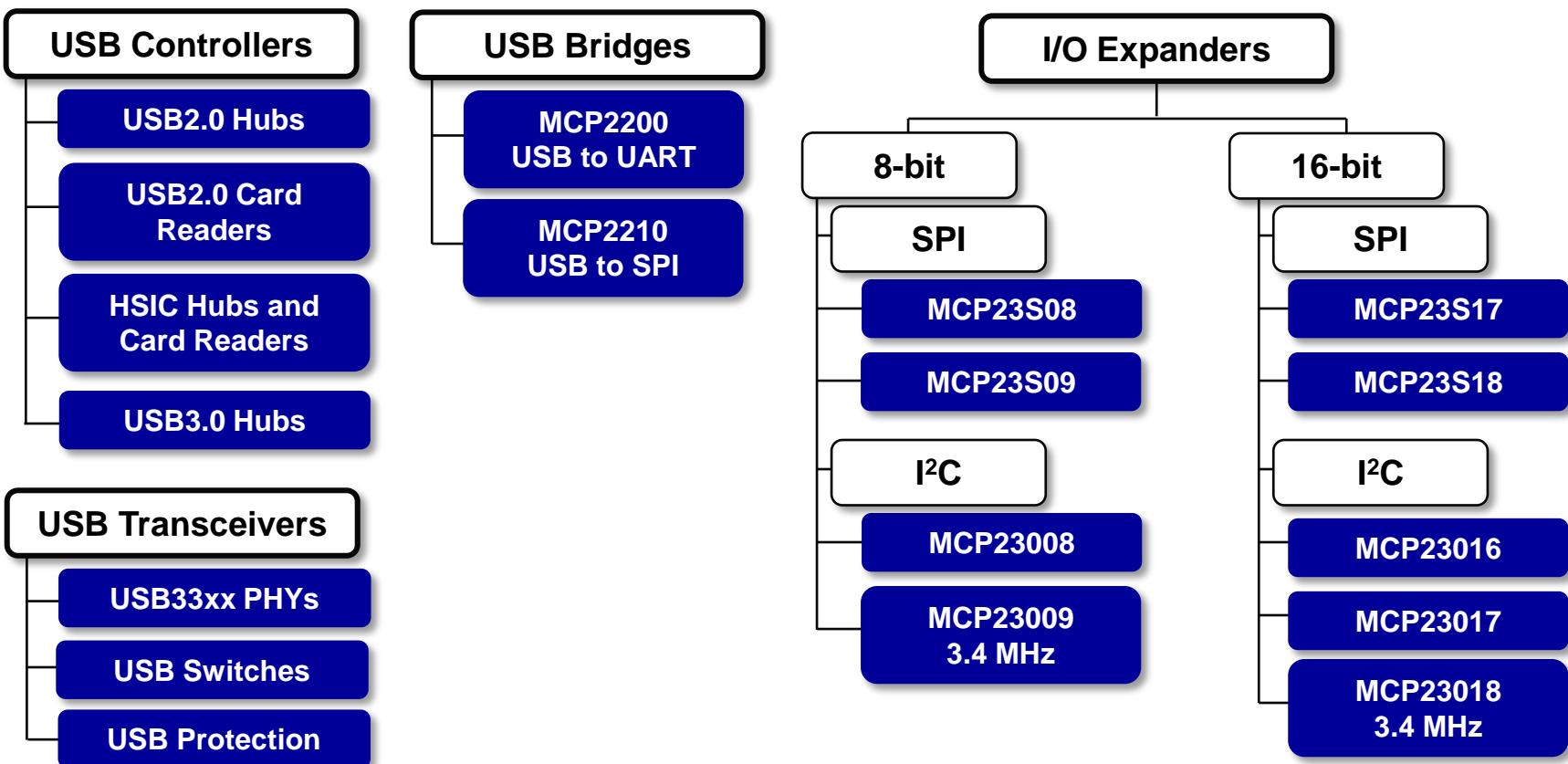
[<< BACK](#)

Wireless Products



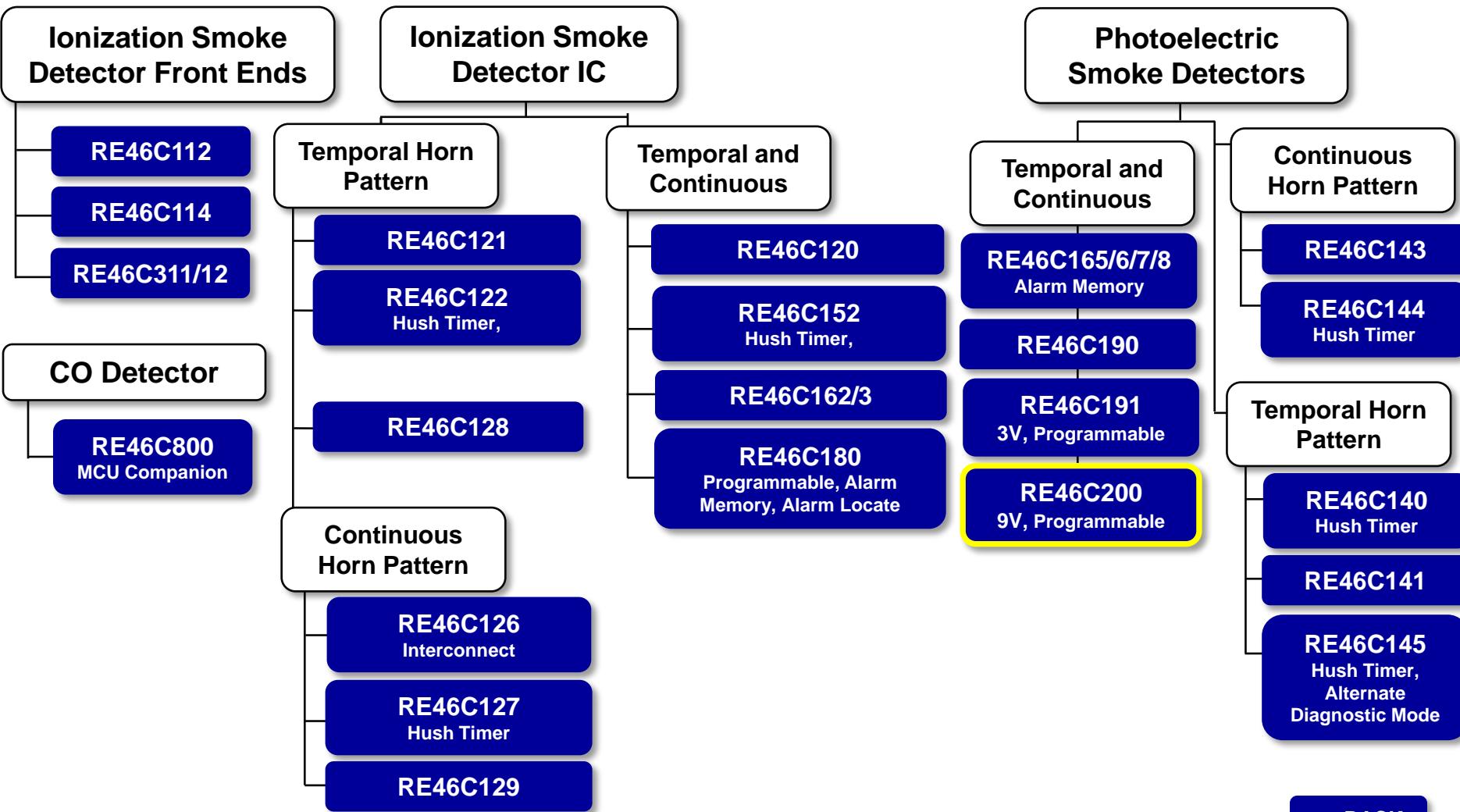
<< BACK

USB and I/O Expanders

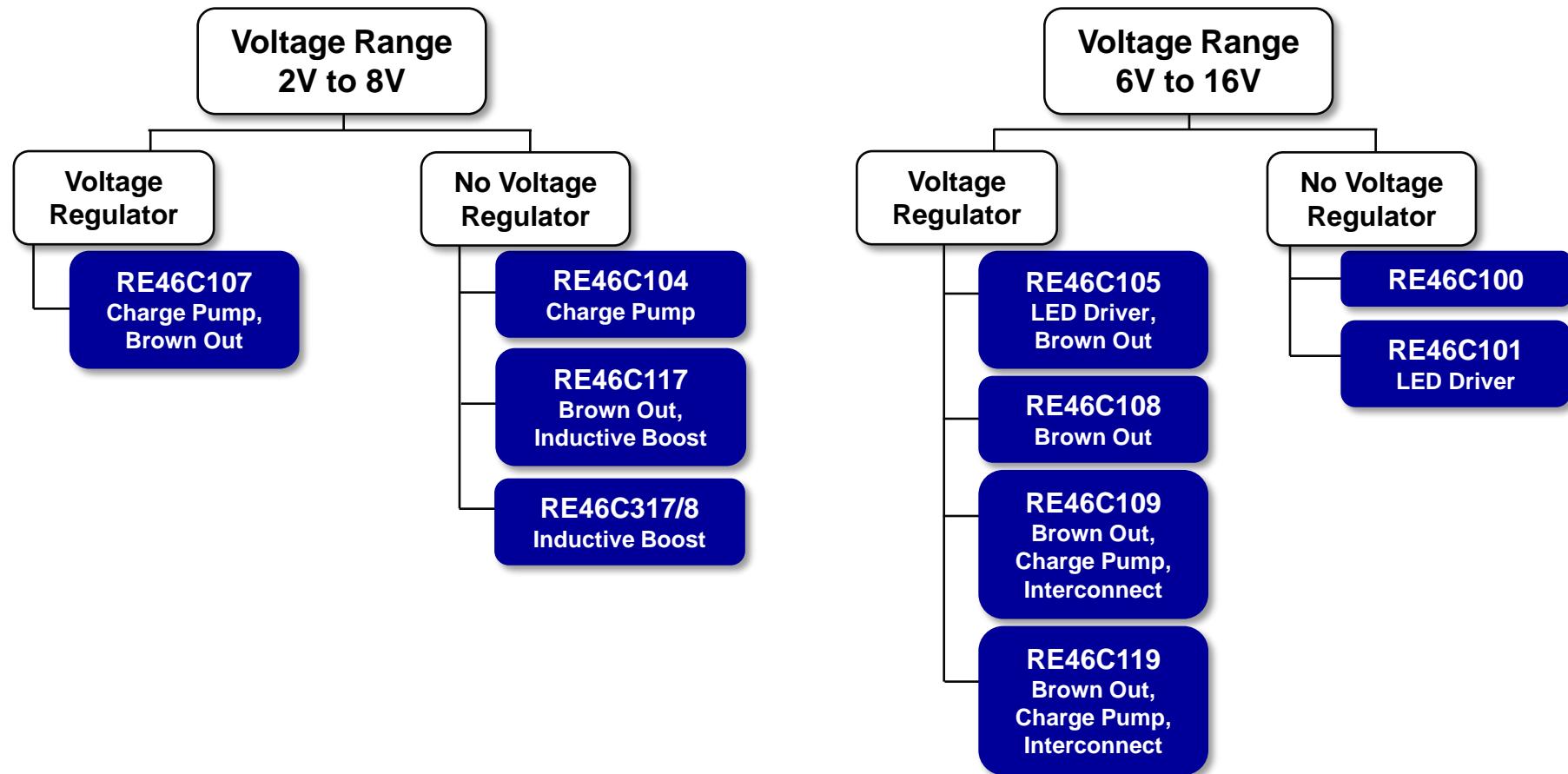


<< BACK

Smoke Detector ICs



Piezoelectric Horn Drivers



Ethernet

Ethernet Controller

ENC424J600/
ENC624J600

ENC28J60

LAN9217/18

LAN9220/21

USB to Ethernet Controller

LAN7500

LAN951X

LAN9500A

LAN9730

ARCNET Controllers

COM20019/20/22

Ethernet Transceivers

LAN8710A

LAN8740A/1A/2A

LAN8810/20

Ethernet Switches

LAN9303/M

LAN931X

<< BACK

Motor Driver ICs

Dual H-Bridge Motor Driver

MTS62C19A
10V – 40V, 750mA

MTS2916A
10V – 40V, 750mA

3Φ Brushless Motor Driver

MCP8063
2V – 14V, 1.5A

MTD6501C/G
2V – 14V, 800mA

MTD6501D
2V – 14V, 500mA

MTD6502B
2V – 5.5V, 750mA

MTD6505
2V – 5V, 750mA
Adj. km

3Φ Brushless Motor MOSFET Gate Driver

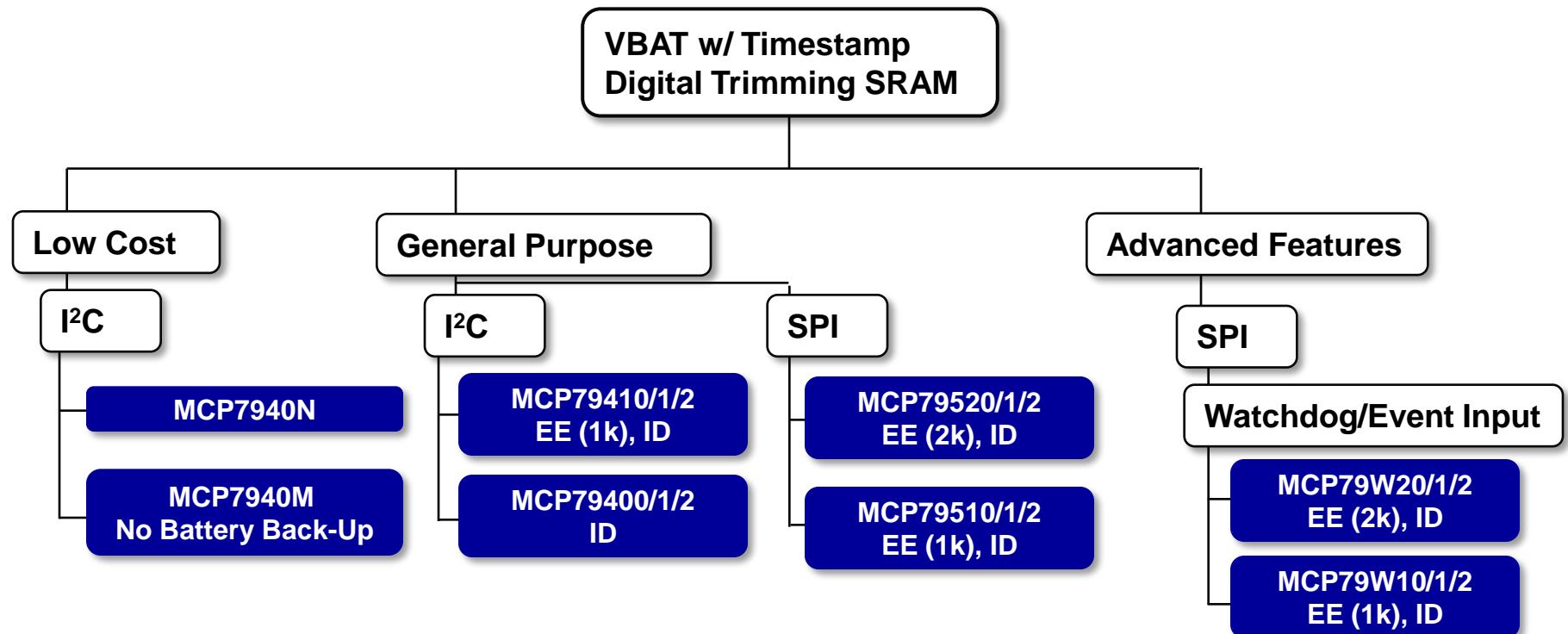
MCP8024
6V – 28V,
48V Load Dump
Op Amp & Vreg

MCP8025
6V – 19, 48V Load
Dump
Op Amp x 1 & Vreg

MCP8026
6V – 28V, 48V Load
Dump
Op Amp x 3 & Vreg

[<< BACK](#)

Real Time Clock/Calendar



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Analog & Interface Demo and Eval Boards

ADCs

Battery Management

CAN and LIN

Current/DC Power
Measurement ICs

DACs/Digital
Potentiometers

Energy Measurement

Ethernet

Fan Control

Real Time
Clock/Calendar

Linear

LDO/Charge Pumps

Motor Drive

Interface

Wireless Products

Switching Regulators

Switching Controllers

Safety & Security

Thermal Management

General Purpose

Voltage Regulators

USB Port Power
Controllers

CAD/CAE Schematic
Symbols & Footprints

EL Backlight Drivers

LED Drivers

HV Specialty & Driver

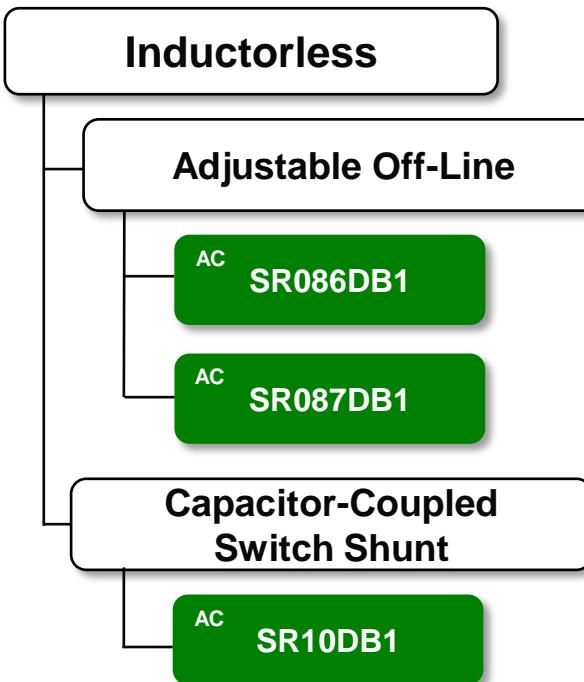
Ultrasound Transmit IC

Ultrasound MOSFET
Drivers

Ultrasound T/R Switch

<< BACK

Voltage Regulator Demo and Eval Boards



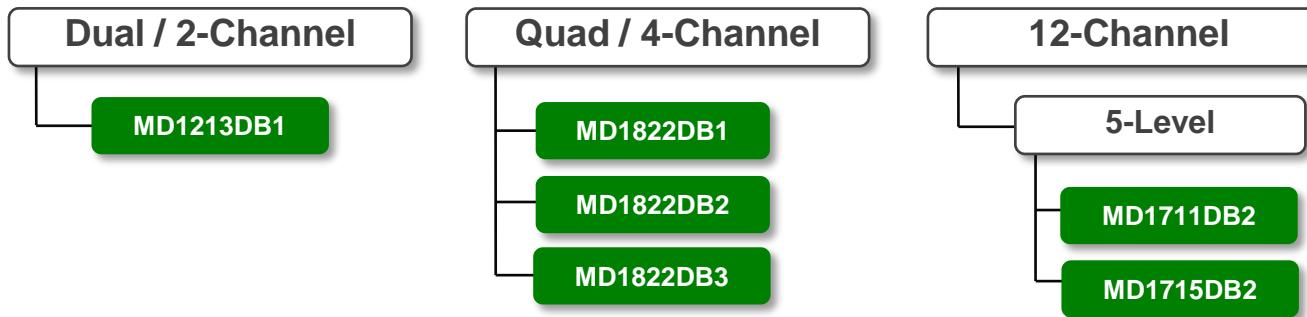
AC = Offline Capable

[<< BACK to Voltage Regulators](#)

[<< BACK to Demo Boards](#)



Ultrasound MOSFET Driver Demo and Eval Boards





EL Backlight Driver Demo and Eval Boards

Single Lamp

HV816DB2

HV816DB3

HV823DB1

HV825DB1

HV830DB1

HV833DB1

HV857DB1

HV857LDB1

HV859DB1

HV860DB1

Dual Lamp

HV861DB1

Inductorless

HV852DB1

HV853DB1

Offline

HV809DB2

Thermal Demo and Eval Boards

Serial Output

TC77 PICtail™
Demo Board

TC72 PICtail™
Demo Board

MCP9800 PICtail™
Demo Board

MCP9800 Data
Logger Demo Board 2

MCP9800 Data
Logger Demo Board

MCP9800 Temp
Sensor Demo Bd

Thermocouple Ref.
Design

EMC1043/53 Eval
Board

EMC1043C Eval
Board w/ Off-Board
Diode

EMC1412 Eval Board

Voltage Output

MCP9700 PICtail™
Demo Board

TC1047A PICtail™
Demo Board

MCP9700 Thermistor
Demo Board

General Purpose

PT100 RTD Eval Board

PICKit Serial SPI
Demo Board

PICKit Serial I2C Demo
Board



Fan Control Demo and Eval Boards

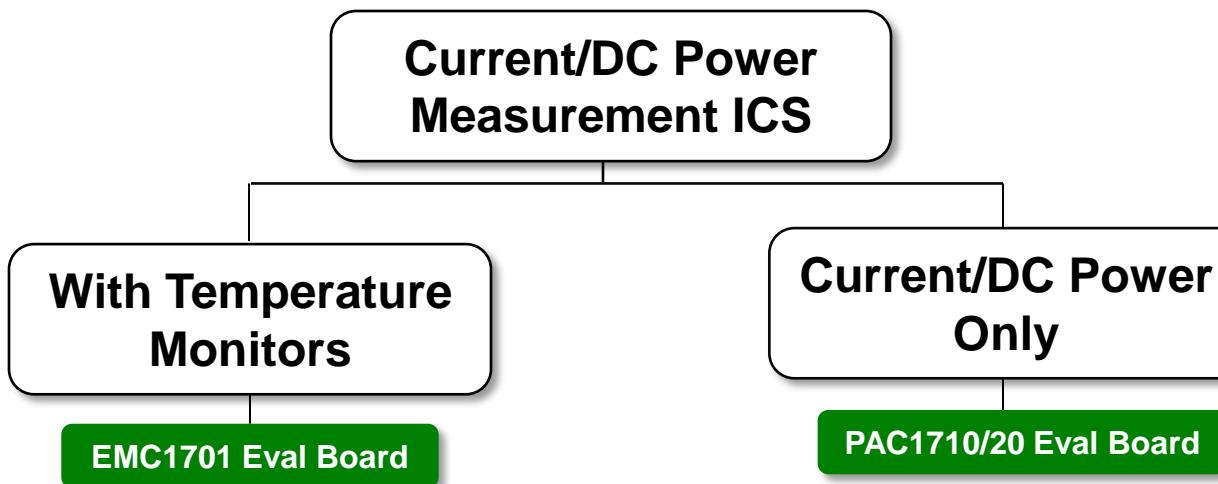
Open Loop Fan
Controllers

With SMBus/I2C
and Alert

EMC2101 Eval Board



Current/DC Power Sensor Demo and Eval Boards



[<< BACK to Current/DC Power Products](#)

[<< BACK to Demo Boards](#)



USB Port Power Controller Demo & Eval Boards

Host Free
Controller

UCS1001 Evaluation
Board

Programmable
Controllers

UCS1002 Evaluation
Board

[<< BACK to USB Port Power
Controller Products](#)

[<< BACK to Demo Boards](#)

Linear Demo and Eval Tools

PGA

MCP6SX2 Photodiode
PICtail™ Demo Board

MCP6SX2 Thermistor
PICtail™ Demo Board

MCP6S22 PICtail™ Demo
Board

MCP6S2X Eval Board

PICKit Serial SPI Demo
Board

General Purpose

Signal Analysis PICtail™
Daughter Board

Op Amp

MCP6V01 Thermocouple Auto-
Zeroed Reference Design

MCP6V01 Input Offset Demo
Board

MCP651 Input Offset
Evaluation Board

MCP6031 Photodiode PICtail
Plus Demo Board

MCP661 Line Driver Demo
Board

MCP6N11/MCP6V2x
Wheatstone Bridge Ref Design

MCP6421 EMIRR Eval Board

Humidity Sensor PICtail™
Demo Board

Active Filter Demo Board Kit

MCP6XXX Amplifier
Evaluation Board 1

MCP6XXX Amplifier
Evaluation Board 2

MCP6XXX Amplifier
Evaluation Board 3

MCP6XXX Amplifier
Evaluation Board 4

MCP6H04 Evaluation Board



Wireless Demo and Eval Tools

Wireless Evaluation Boards

Wi-Fi

Bluetooth

Sub-GHz/2.4
GHz/Proprietary/MiWi

802.15.4/ZigBee/MiWi



Wireless Demo and Eval Tools

RN Wi-Fi

RN-171-EK / RN-131-EK

RN-171-PICTail / RN-131-PICTail

RN-XV-EK1
(Eval Kit for the RNXV module series)

RN-XV-RD2
(Reference design for the RNXV module series)

MRF Wi-Fi

Wi-Fi G Demo Board
(DV102412)

Wi-Fi G PICTail / PICTail Plus (AC164149)



Wireless Demo and Eval Tools

Bluetooth - Data

RN-4020-PICtail

RN-41-EK
RN-42-EK

RN41APL-EVAL
RN42APL-EVAL

RN-42-HID-RD1

Bluetooth - Audio

RN52 Bluetooth
Audio
Evaluation Kit
(RN-52-EK)

Bluetooth HCI + PIC32

PIC32 Bluetooth Audio
Development Kit
(DV320032)



RF Wireless Transceivers Demo and Eval Tools

MRF49XA

MRF49XA PICtail
Plus Daughter Board
– 433.92 MHz
(AC164137-1)

MRF49XA PICtail
Plus Daughter Board
– 868/915 MHz
(AC164137-2)

MRF89XA

MRF89XAM8A
PICtail/PICtail Plus
Daughter Board
(AC164138-1)

ZENA Wireless
Adapter – 915 MHz
(AC182015-3)

ZENA Wireless
Adapter – 868 MHz
(AC182015-2)

MRF89XAM8A

8-bit Wireless
Development Kit –
868 MHz
(DM182015-2)

MiWi Demo Kit – 868
MHz (DM182016-2)

MRF89XAM9A

MRF89XAM9A
PICtail/PICtail Plus
Daughter Board
(AC164138-2)

8-bit Wireless
Development Kit –
915 MHz
(DM182015-3)

MiWi Demo Kit – 915
MHz (DM182016-3)

Wireless Network
Software

[<< BACK to Wireless Products](#)

[<< BACK](#)



RF Wireless Transceivers Demo and Eval Tools

MRF24J40

Remote Control
Demo Board with
ZENA Wireless
Adapter
(DM240315-2)

ZENA Wireless
Adapter – 2.4 GHz
(AC182015-1)

PICDEM Z

MRF24J40MA

MiWi Protocol to
Wi-Fi Wireless Demo
Kit (DM182018)

MiWi Demo Kit – 2.4
GHz (DM182016-1)

8-bit Wireless
Development Kit –
2.4 GHz
(DM182015-1)

MRF24J40MA PICtail
Plus - 2.4 GHz RF
Card (AC164134)

MRF24J40MA PICtail
/ PICtail Plus
(AC164134-1)

MRF24XA

MRF24XA PICtail /
PICtail Plus
Daughter Board
(AC164152-1)

MRF24J40MC

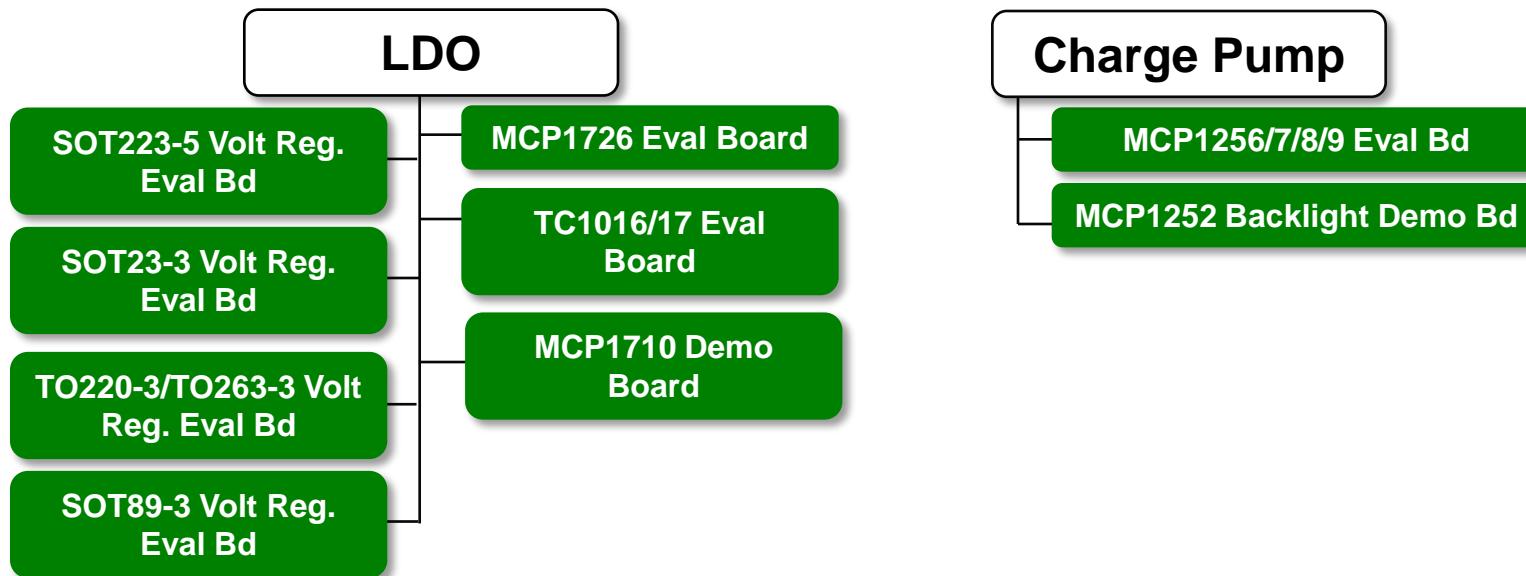
MRF24J40MC PICtail
/ PICtail Plus
Daughter Board
(AC164143)

Wireless Network
Software

<< BACK to Wireless Products

<< BACK

LDO and Charge Pumps Demo and Eval Boards



Switching Regulator Demo and Eval Boards

Buck

MCP1612 Eval Board

MCP1601 Eval Board

TC1303B Demo Bd

TC1303C Demo Bd

MCP1603 Buck
Conv. Eval Bd

MCP1603 Tiny
Reference Design

MCP1602 Eval Board

MCP16301 600mA
Demo Board

MCP16301 5V, 600mA
Low Noise Eval Board

MCP16301 300 mA
D2PAK Demo Board

MCP16321 Eval Board

MCP16322 Eval Board

MCP16323 Eval Board

MCP16311/2 Sync.
Buck Eval Board

MCP16331 Buck
Converter Eval Board

Boost

MCP1640 Sync Boost
Conv. Eval Board

MCP1640 Single Quad-
A Battery Boost
Reference Design

MCP1640 12V/50mA
Two Cells Input
Reference Design

MCP1643 1.6A LED
Driver Eval Board

MCP16251 & MCP1640B
Synchronous Boost
Eval Board

MCP1662 LED Driver
Eval Board

MCP1661 HV
Boost/SEPIC Board

Buck-Boost

MCP16301 HV
Buck-Boost Demo Bd

MCP16301 High
Voltage Cuk LED
Driver Board

Battery Management Demo and Eval Boards

Li-Ion Battery Charger

MCP73831 Eval Kit

MCP73855 Eval Board

MCP7382x Eval Board

MCP73113 Eval Board

MCP7383x Li-Ion System Power Path Management Ref. Design

MCP73871 Demo Board with Voltage Prop. Current Control

MCP73833 Eval Board

MCP73x23 LiFePO₄ Batt.
Charger Eval Board

MCP73837/8 AC/USB Dual Input Battery Charger Eval Bd

MCP73213 OVP Dual Cell Li-Ion Batt. Charger Eval Brd

PWM Controller Based

MCP1630 Li-Ion Battery Charger Reference Design

MCP1630 Li-Ion Battery Charger Multi-Bay Ref. Design

MCP1630 NiMH Battery Charger Demo Board

MCP1630V Bidirectional 4-cell Li-Ion Charger Ref Design

MCP1630 NiMH Battery Charger Reference Design

MCP1631HV Multi-Chemistry Battery Charger Ref. Design

MCP1631HV Digitally Controlled Prog. Current Source Ref. Design



Digital Pots and D/A Converter Demo Boards

Digital Pots

- MCP4XXX Daughter Board
- MCP401x/2x Eval Board
- MCP401x Eval Board
- MCP42xx Eval Board
- MCP43xx Eval Board
- MCP46xx Eval Board
- MCP42xxx MXDEV Daughter Board
- MCP42XX PICtail Plus Daughter Board
- MCP46XX PICtail Plus Daughter Board

General Purpose

- Mixed Signal PICtail™ Demo Bd
- MXDEV Eval System
- PICKit Serial SPI Demo Board
- PICKit Serial I2C Demo Board

D/A Converter

- MCP4725 Eval Board
- MCP4725 12-bit NV DAC PICtail™ Daughter Board
- MCP47x6 PICtail™ Plus Daughter Board
- MCP4728 Eval board

[<< BACK to DAC Products](#)

[<< BACK to Digital Pot Products](#)

[<< BACK to Demo Boards](#)

Energy Measurement

Reference Designs

MCP3905A Energy Meter

MCP3909 3-Phase Energy Meter

MCP3909 and dsPIC33F 3-Phase Energy Meter

MCP3909 and PIC18F85J90 Single Phase Energy Meter

PIC18F87J72 Energy Monitoring PICtail Plus DB

PIC18F87J72 Single Phase Energy Meter

MCP3901 PIC18F65J90 Shunt Meter

MCP3911 PIC18F85K90 Anti-Tamper Meter

MCP6L2 PIC18F66J93 Low Cost Meter

MCP39F501 Demo Board

MCP39F501 Power Monitor PICtail™ Board

Evaluation Boards

MCP3910 Eval board

MCP3911 Eval board

MCP3919 Eval board

MCP3912 Eval board

MCP3913 Eval board

MCP3914 Eval board

MCP3901 Eval board

MCP3903 Eval board

MCP3909 Eval board

MCP3905A Eval Board

PIC18F87J72 Eval Board

A/D Converter Demo Boards

Pipelined ADC

MCP37XXX Evaluation Board

MCP37XXX Data Capture Card

Delta-Sigma ADC

MCP3421 Battery Fuel Gauge Demo Board

MCP3421 Weight Scale Demo Board

MCP3421 SOT-23 Eval Board

MCP342x Eval Boards

MCP3551 PICtail™ Demo Board

MCP355X Tiny App. Sensor Demo Board

MCP355X Sensor App. Dev Board

Thermocouple Ref. Design

SAR ADC

MCP3221 PICtail™ Demo Board

MCP3201/02 MXDEV Daughter Board

MCP3204/08 MXDEV Daughter Board

[<< BACK to Pipelined A/D Converters](#)

[<< BACK to Delta-Sigma & SAR A/D Converters](#)

[<< BACK to Demo Boards](#)

Interface Demo and Eval Boards

I/O Expander

MCP23x17 Eval Board

MCP23x08 Eval Board

GPIO Expander Keypad
Demo Board

PICKit Serial SPI Demo
Board

PICKit Serial I²C™ Demo
Board

Infrared

MCP212x Developer's
Daughter Board

MCP215x/40 Developer's
Daughter Board

MCP2140 Wireless Temp
Demo Board

MCP215x Data Logger
Demo Board

MCP2150 Demo Board

USB Bridges

MCP2221 Breakout
Module

MCP2200 USB to
RS232 demo board

MCP2200
Breakout Module

MCP2210
Breakout Module

MCP2210 Eval Board

Passive Access AFE

MCP2030 Bidirectional
Comm. Demo Kit

USB Controllers

USB Eval Boards

Ethernet Demo and Eval Boards

Ethernet

PICTail Ethernet
Board

PHY/Switch/Controller
Eval Boards

Ethernet Eval Boards

LANCheck

CAN and LIN Demo and Eval Boards

CAN

- MCP2515/2510 Developer's Kit
- MCP2515 PICtail™ Demo Board
- MCP250xx Developer's Kit
- MCP2515 PICtail™ Plus Demo Board
- MCP2515 CAN Bus Monitor Demo Board

LIN

- ECAN/LIN PICtail Plus Daughter Board
- PICDEM CAN-LIN Demo Boards
- LIN Serial Analyzer
- Automotive Ambient Lighting Module

Switching Controller Demo and Eval Boards

DC/DC Conversion

MCP1630 Dual Output Buck Converter Reference Design

MCP1630, 1A Bias Supply Demo Board

MCP1630 Automotive Boost Conv Demo Board

MCP1630 Coupled Induct. Boost Conv Demo Board

MCP1630 Boost Mode LED Driver Demo Board

MCP1630 Automotive, Triple Conv. Demo Board

MCP1632 300 kHz Boost Converter Demo Board

MCP1650 SEPIC Power Supply Demo Board

MCP1650 Multiple White LED Demo Board

MCP1650 Eval Board

MCP19035 300 kHz Eval Board

MCP19035 600 kHz Eval Board

MCP19111 Eval Board

MCP19114 Flyback Standalone Eval Board

Battery Management

MCP1630 Li-Ion Battery Charger Reference Design

MCP1630 Li-Ion Battery Charger Multi-Bay Reference Design

MCP1630 NiMH Battery Charger Demo Board

MCP1630V Bidirectional 4-cell Li-Ion Charger Ref Design

MCP1631HV Multi-Chemistry Battery Charger Ref. Design

MCP1631HV Digitally Controlled Prog. Current Source Ref. Design



Safety & Security

Smoke Detector

RE46C190 Demo Board

[**<< BACK to Smoke Detector Products**](#)

[**<< BACK to Demo Boards**](#)



MICROCHIP

Motor Drive

Dual H-Bridge Driver

**MTS2916A Dual Full-Bridge
Stepper Motor Drive Eval
Board**

3Φ BLDC Motor Controller

**MTD6505 3-Phase BLDC
Sensorless Fan Controller
Demo Board**

**MCP8024 BLDC Motor Driver
Evaluation Board**

**MCP8063 12V Sensorless Fan
Controller Demo Kit**

**MCP8025 BLDC Motor Driver
Evaluation Board**

[**<< BACK to Motor Drive Products**](#)

[**<< BACK to Demo Boards**](#)

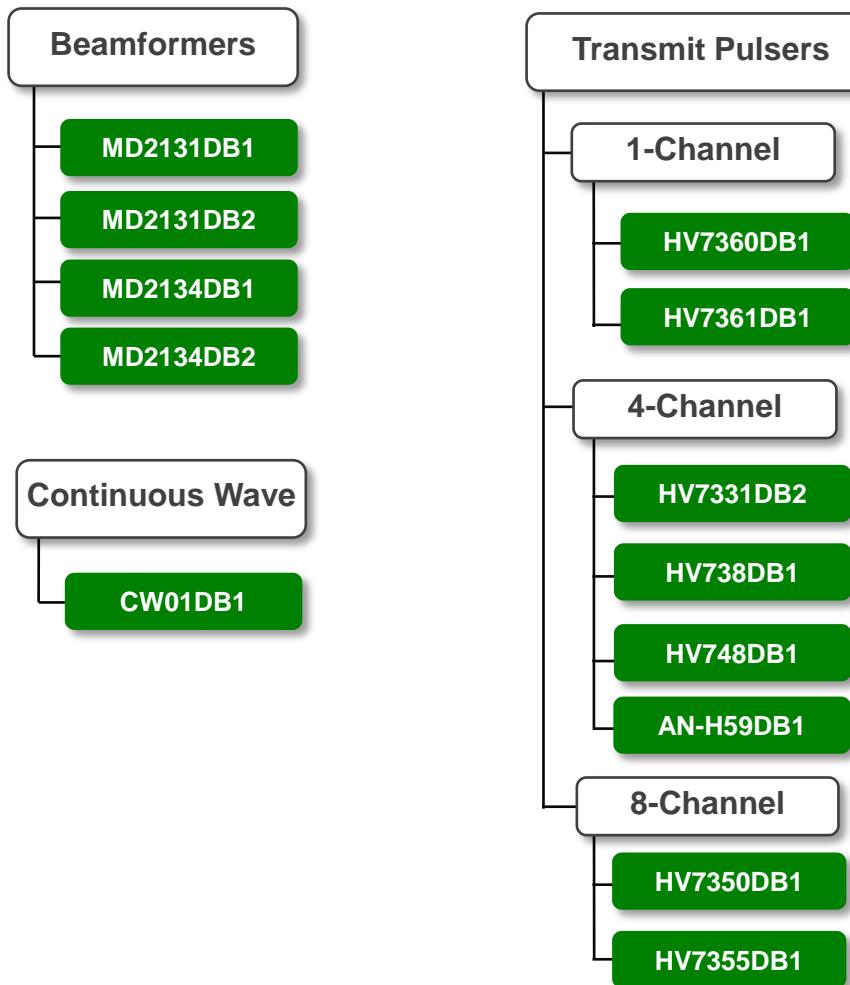


Real Time Clock/Calendar

MCP7941X RTCC PICtail Plus
Daughter Board

MCP795XX RTCC PICtail Plus
Daughter Board

Ultrasound Transmit IC Demo and Eval Boards





Ultrasound Transmit/Receive Switch Demo and Eval Boards

1-Channel

MD0100DB1

4-Channel

MD0101DB1

[<< BACK to Ultrasound Transmit/Receive Switch ICs](#)

[<< BACK to Demo Boards](#)

HV Specialty IC Demo and Eval Boards

Lens Drivers

HV892DB1

Fan Controller

HV7100DB1

MEMS Drivers/
HV Array Amplifiers

HV254DB1

HV256DB1

HV257DB2

HV264DB1

DC/DC Controller

HV9150DB1

LED Driver Demo and Eval Boards

General Purpose

HV9910BDB1

HV9910BDB2

HV9910BDB3

HV9910BDB7

HV9918DB1

HV9919BDB1

HV9921DB1

HV9922DB1

HV9922DB2

HV9923DB1

HV9925DB1

HV9930DB1

HV9930DB2

HV9931DB1

HV9931DB2

HV9931DB5

Backlighting

HV9861ADB1

HV9861ADB2

HV9911DB1

HV9911DB2

HV9911DB3

HV9911DB4

HV9912DB1

HV9961DB1

HV9980DB1

HV9982DB1

HV9967BDB1

Automotive

AT9919DB1

AT9933DB1

General Purpose Demo and Eval Boards

**14-pin SOIC/TSSOP/PDIP
Eval Board**

**8-pin SOIC/MSOP/TSSOP/PDIP
Eval Board**

5 and 6-pin SOT-23 Eval Board

3-pin SOT-23 Eval Board

PICKit Serial SPI Demo Board

PICKit Serial I²C Demo Board

Magnetic Field Evaluation Board

Electrical Field Evaluation Board

**PSRR and Digital Noise
Evaluation Board**

[**<< BACK to Supervisor Products**](#)

[**<< BACK to Comparator Products**](#)

[**<< BACK to MOSFET Driver Products**](#)

[**<< BACK to Demo Boards**](#)



MICROCHIP

Appendix

Product Pages





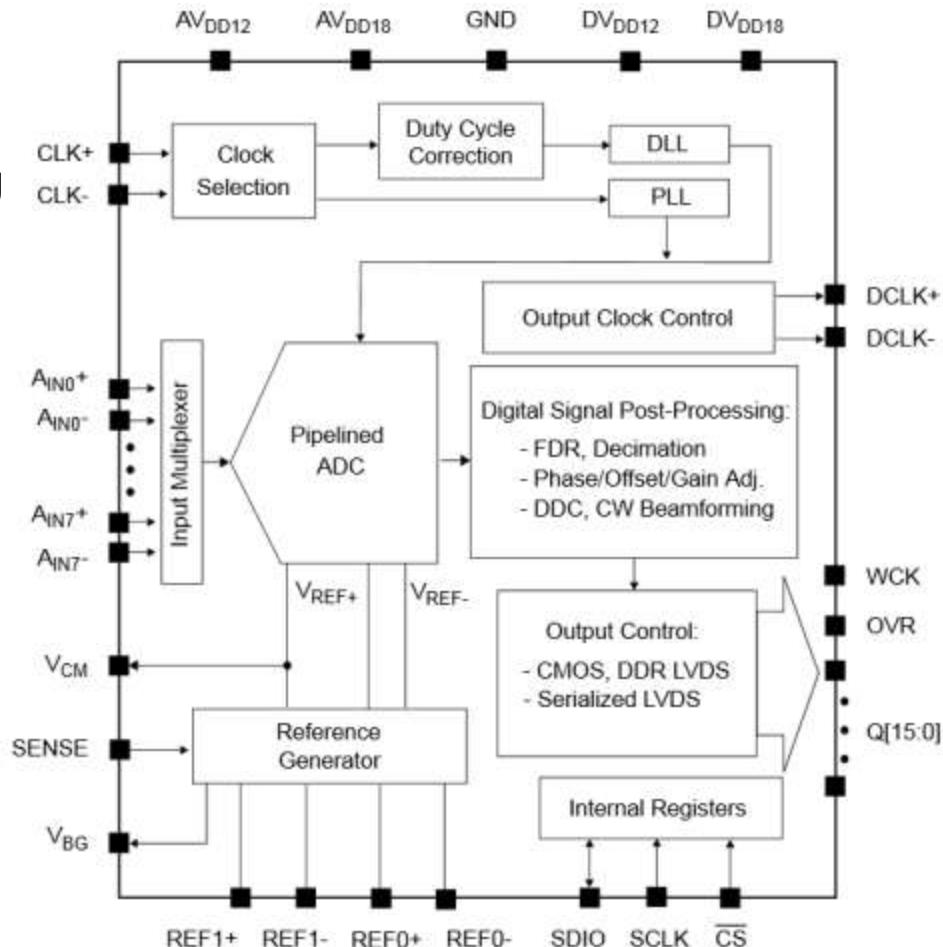
MICROCHIP

MCP37D31-200

Online
Datasheet

Features:

- 16-bit pipelined ADC
- 200 Msps sampling rate
- Low power 490 mW operation at full sampling rate, including LVDS digital I/O
 - 80 mW Standby, 33 mW Shutdown
- >74.7 dBFS SNR at 200 Msps
- >90 dBFS SFDR at 200 Msps
- Internal Digital Down-converter (DDC)
- Decimation filters for improved SNR
- Phase, offset and gain adjust of individual channels
- 8-channel mux
- Fractional delay recovery for time-delay corrections in multi-channel operations (dual/octal-channel modes)
- Input channel bandwidth of 500 MHz
- Output data in serial DDR LVDS or CMOS
- Configuration via SPI
- Industrial temperature range -40°C to +85°C
- VTLA-124 package (9 mm x 9 mm x 0.9 mm)



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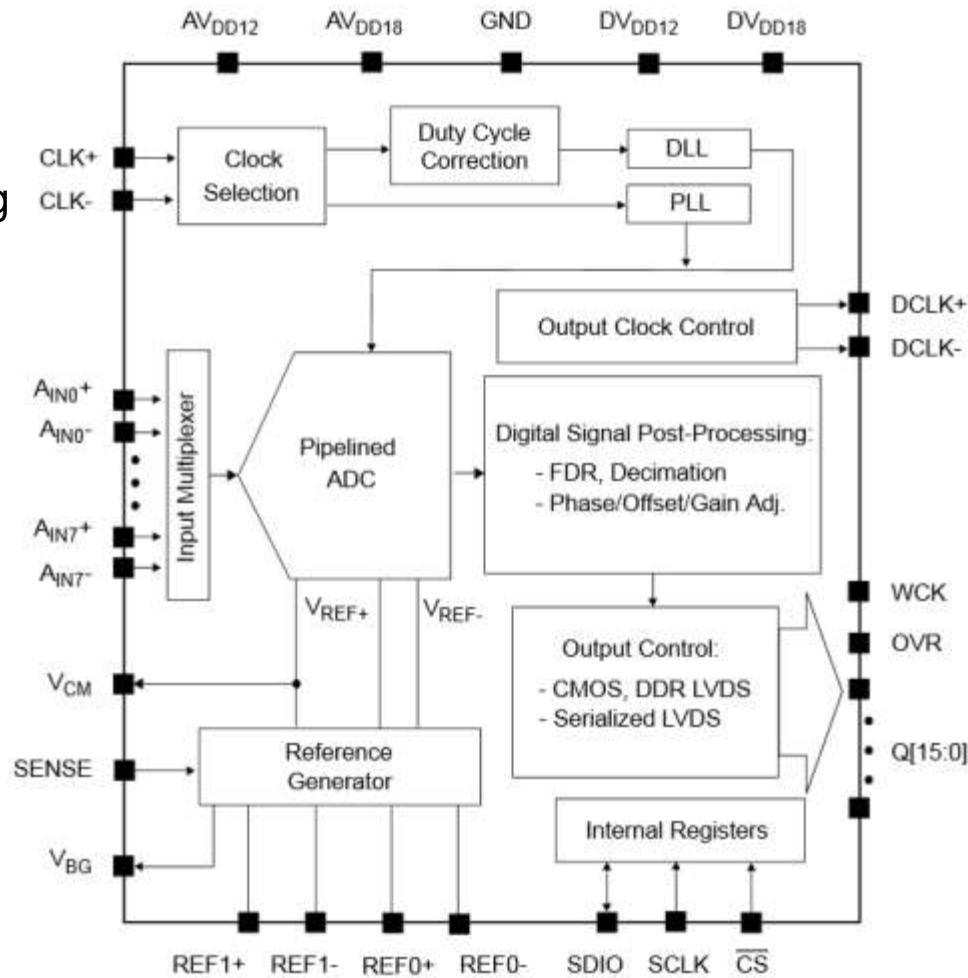
MICROCHIP

MCP37231-200

Online
Datasheet

Features:

- 16-bit pipelined ADC
- 200 Msps sampling rate
- Low power 490 mW operation at full sampling rate, including LVDS digital I/O
 - 80 mW Standby, 33 mW Shutdown
- >74.7 dBFS SNR at 200 Msps
- >90 dBFS SFDR at 200 Msps
- Decimation filters for improved SNR
- Phase, offset and gain adjust of individual channels
- 8-channel mux
- Fractional delay recovery for time-delay corrections in multi-channel operations (dual/octal-channel modes)
- Input channel bandwidth of 500 MHz
- Output data in serial DDR LVDS or CMOS
- Configuration via SPI
- Industrial temperature range -40°C to +85°C
- VTLA-124 package (9 mm x 9 mm x 0.9 mm)



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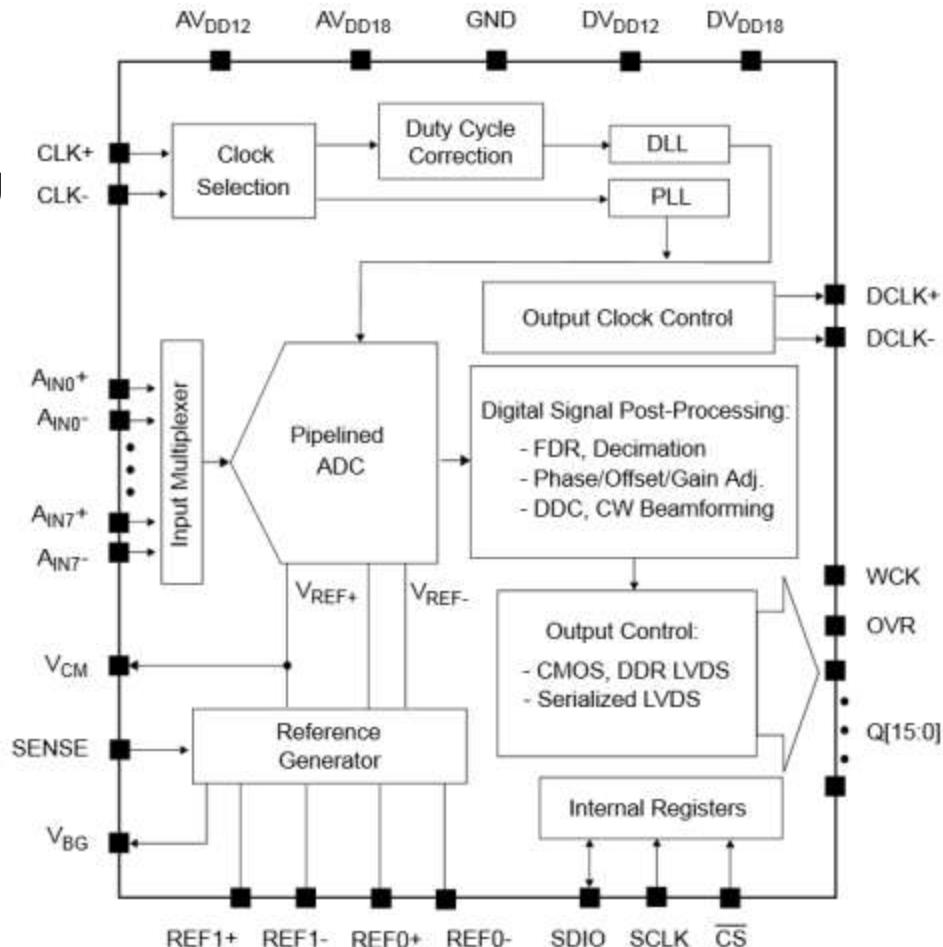
MICROCHIP

MCP37D21-200

Online
Datasheet

Features:

- 14-bit pipelined ADC
- 200 Msps sampling rate
- Low power 490 mW operation at full sampling rate, including LVDS digital I/O
 - 80 mW Standby, 33 mW Shutdown
- >74.2 dBFS SNR at 200 Msps
- >90 dBFS SFDR at 200 Msps
- Internal Digital Down-converter (DDC)
- Decimation filters for improved SNR
- Phase, offset and gain adjust of individual channels
- 8-channel mux
- Fractional delay recovery for time-delay corrections in multi-channel operations (dual/octal-channel modes)
- Input channel bandwidth of 500 MHz
- Output data in serial DDR LVDS or CMOS
- Configuration via SPI
- Industrial temperature range -40°C to +85°C
- VTLA-124 package (9 mm x 9 mm x 0.9 mm)



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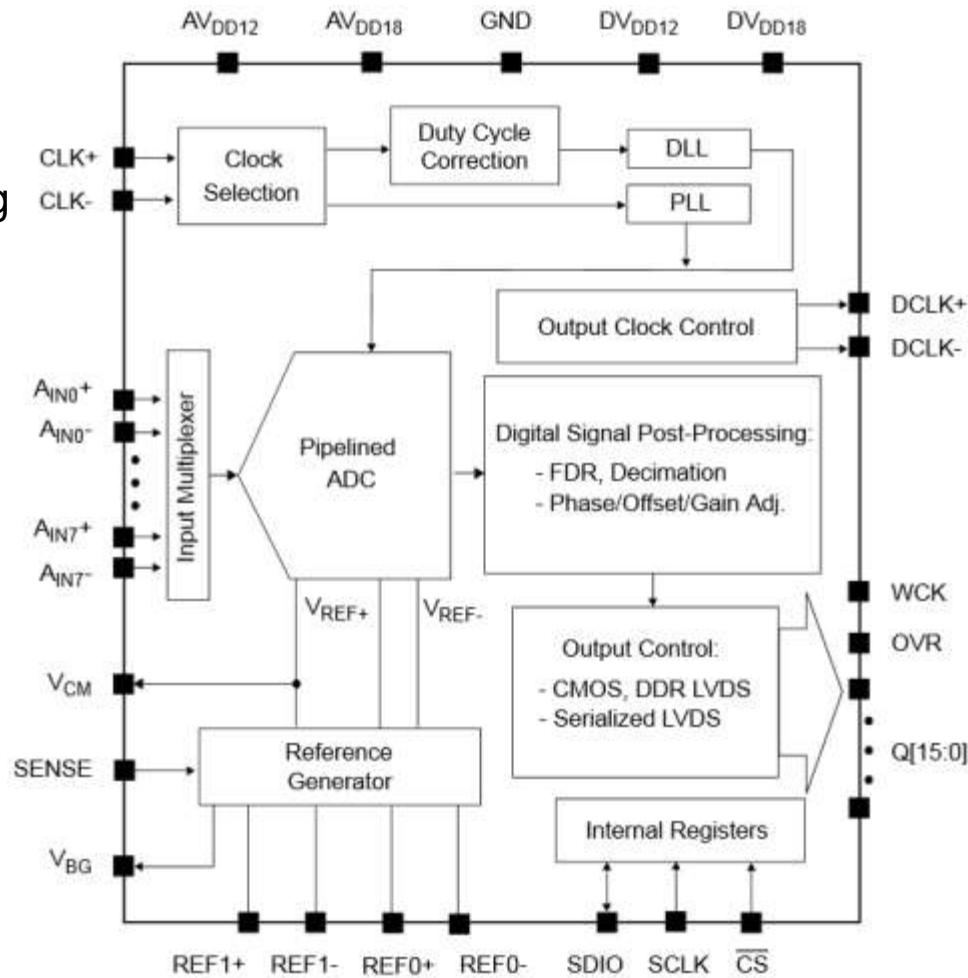
MICROCHIP

MCP37221-200

Online
Datasheet

Features:

- 14-bit pipelined ADC
- 200 Msps sampling rate
- Low power 490 mW operation at full sampling rate, including LVDS digital I/O
 - 80 mW Standby, 33 mW Shutdown
- >74.2 dBFS SNR at 200 Msps
- >90 dBFS SFDR at 200 Msps
- Decimation filters for improved SNR
- Phase, offset and gain adjust of individual channels
- 8-channel mux
- Fractional delay recovery for time-delay corrections in multi-channel operations (dual/octal-channel modes)
- Input channel bandwidth of 500 MHz
- Output data in serial DDR LVDS or CMOS
- Configuration via SPI
- Industrial temperature range -40°C to +85°C
- VTLA-124 package (9 mm x 9 mm x 0.9 mm)



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MICROCHIP

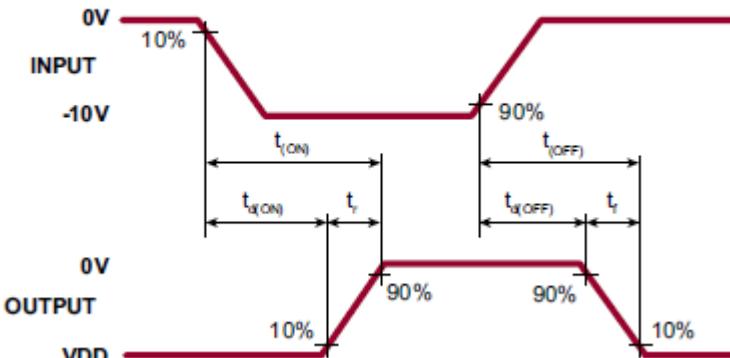
LP0701

Online
Datasheet

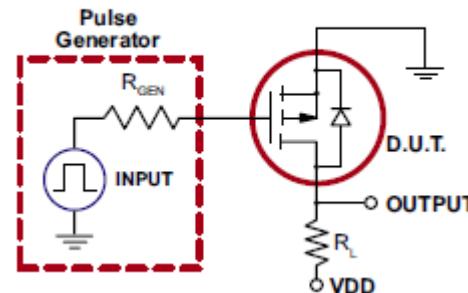
Features:

- BV_{DSS} : -16.5V min
- $R_{DS(ON)}$: 1.5Ω max
- Ultra-low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Freedom from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOIC-8

Switching Waveform



Test Circuit



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MICROCHIP

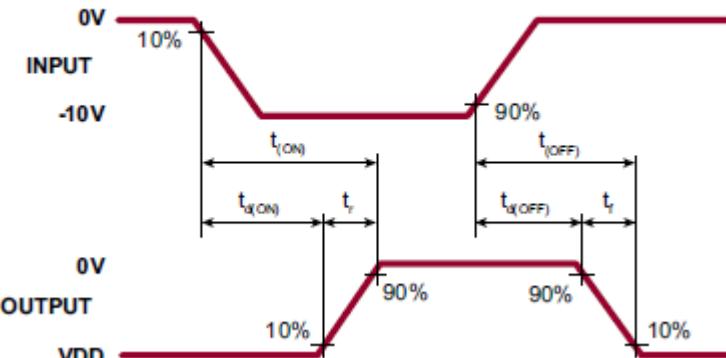
TP0604

Online
Datasheet

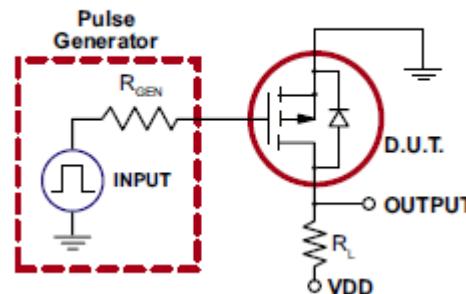
Features:

- BV_{DSS} : -40V min
- $R_{DS(ON)}$: 2.0 Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 95pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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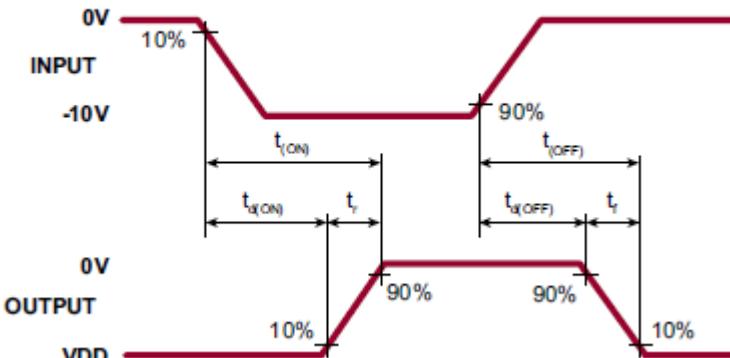
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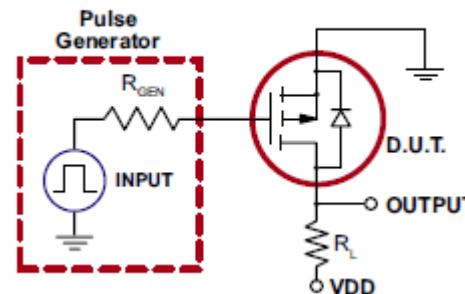
Features:

- BV_{DSS} : -60V min
- $R_{DS(ON)}$: 10Ω max
- High input impedance and high gain
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- Free from secondary breakdown
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23

Switching Waveform



Test Circuit



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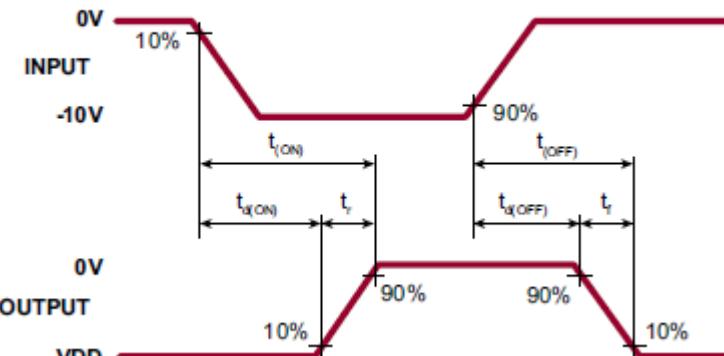
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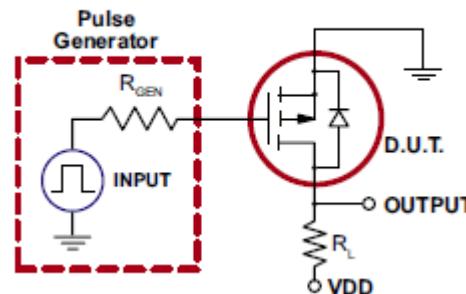
Features:

- BV_{DSS} : -200V min
- $R_{DS(ON)}$: 12Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 85pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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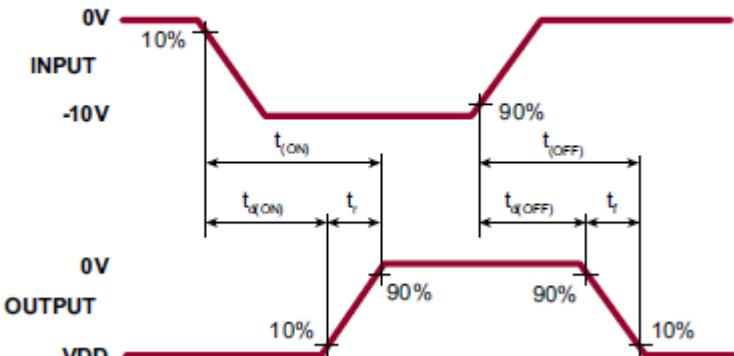
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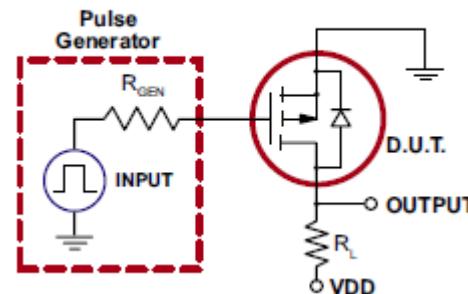
Features:

- BV_{DSS} : -40V min
- $R_{DS(ON)}$: 6.0 Ω max
- High input impedance and high gain
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- Free from secondary breakdown
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-23

Switching Waveform



Test Circuit



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MICROCHIP

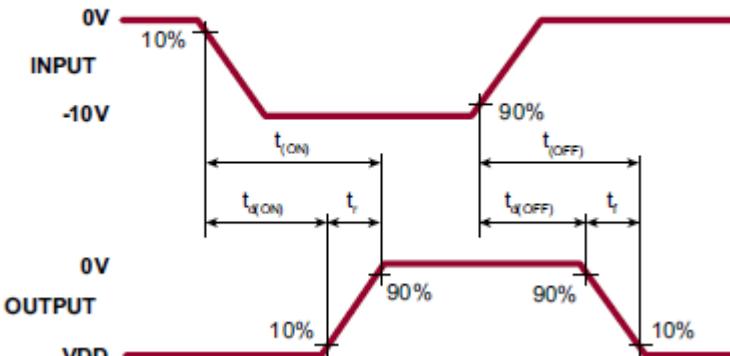
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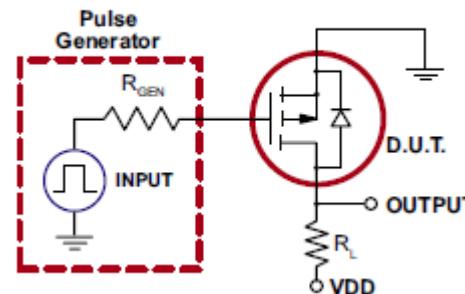
Features:

- BV_{DSS} : -240V min
- $R_{DS(ON)}$: 8.0 Ω max
- Low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
 -55°C to $+150^{\circ}\text{C}$
- Package Option: SOT-89

Switching Waveform



Test Circuit



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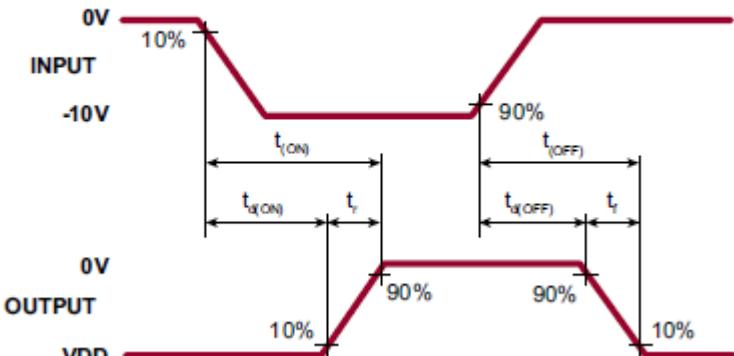
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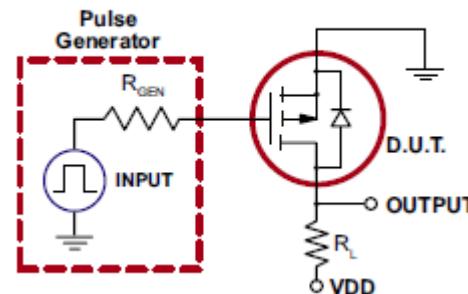
Features:

- BV_{DSS} : -350V min
- $R_{DS(ON)}$: 15Ω max
- Low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
 $-55^{\circ}C$ to $+150^{\circ}C$
- Package Option: SOT-89

Switching Waveform



Test Circuit



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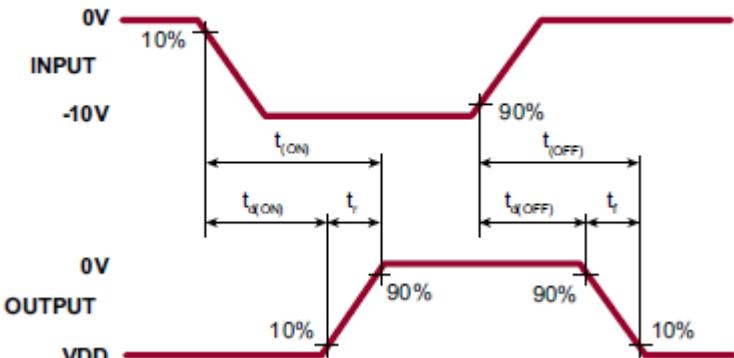
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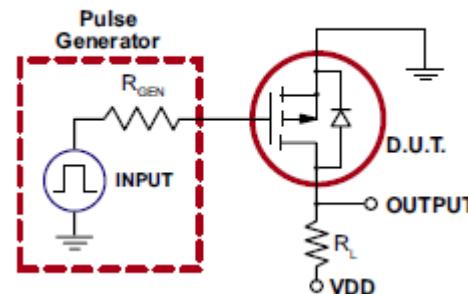
Features:

- BV_{DSS} : -20V min
- $R_{DS(ON)}$: 2.0 Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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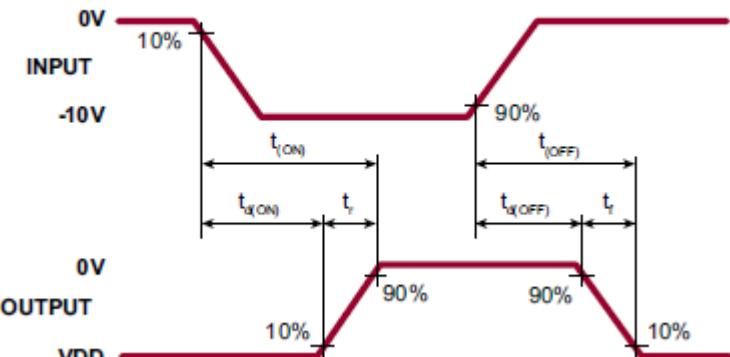
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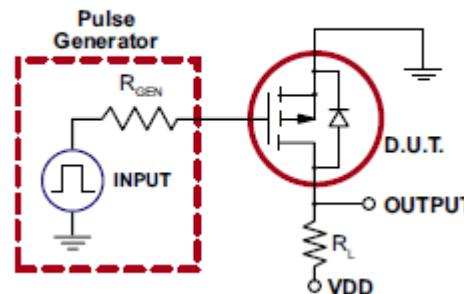
Features:

- BV_{DSS} : -100V min
- $R_{DS(ON)}$: 3.5Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

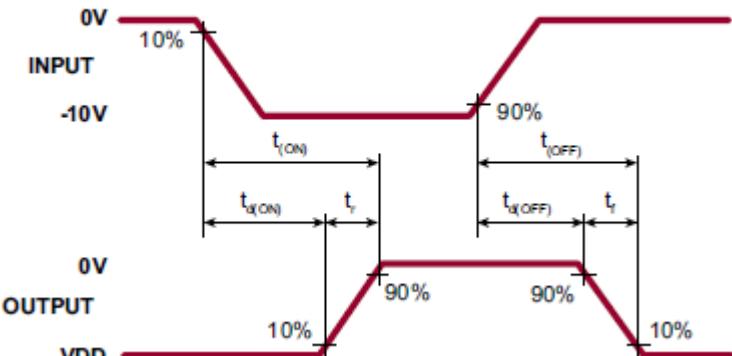
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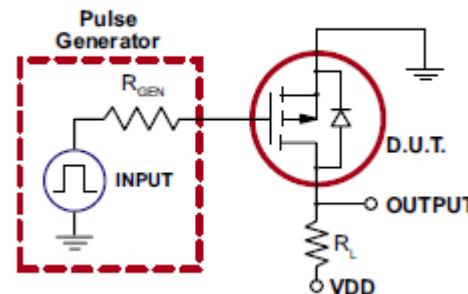
Features:

- BV_{DSS} : -200V min
- $R_{DS(ON)}$: 12Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

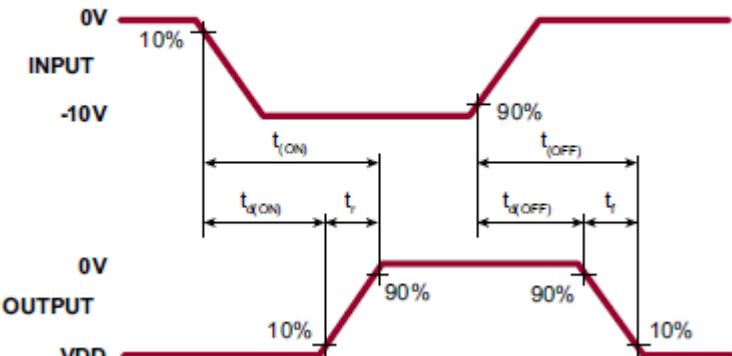
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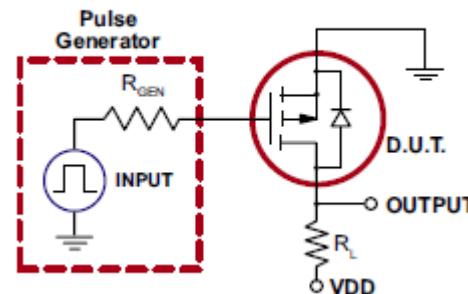
Features:

- BV_{DSS} : -220V min
- $R_{DS(ON)}$: 12Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

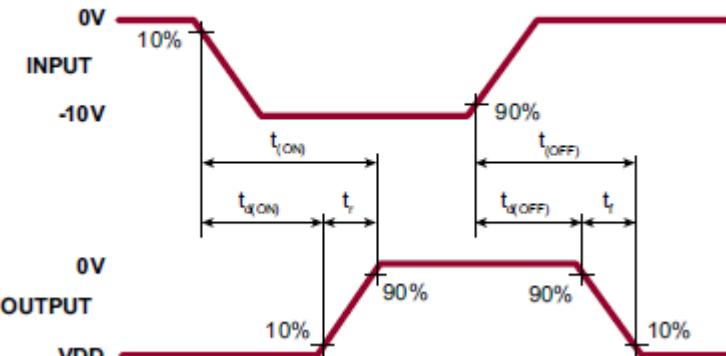
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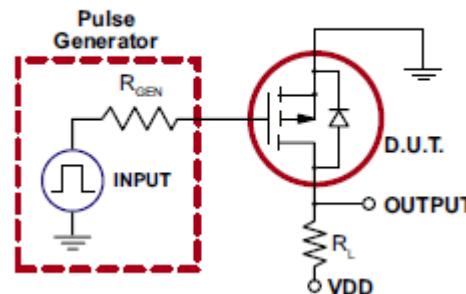
Features:

- BV_{DSS} : -350V min
- $R_{DS(ON)}$: 25Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 60pF typ
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

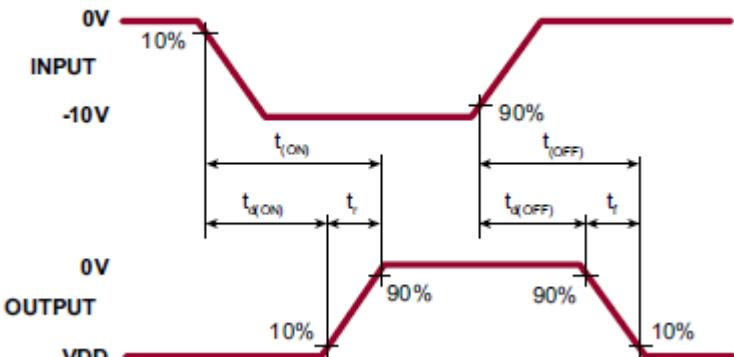
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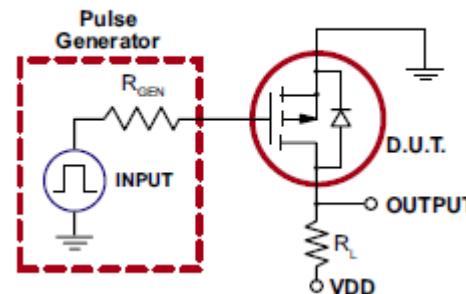
Features:

- BV_{DSS} : -400V min
- $R_{DS(ON)}$: 25Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 60pF typ
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, TO-92, SOT89

Switching Waveform



Test Circuit



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MICROCHIP

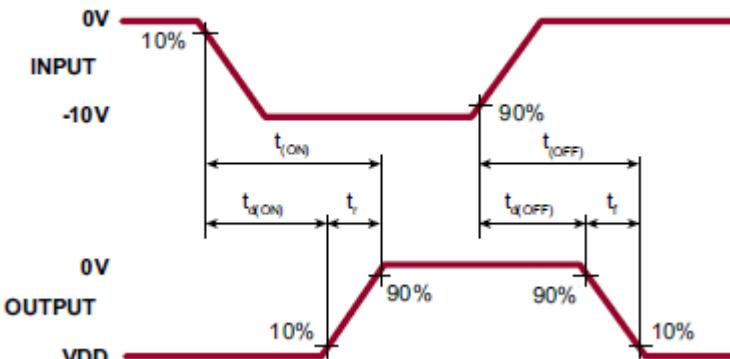
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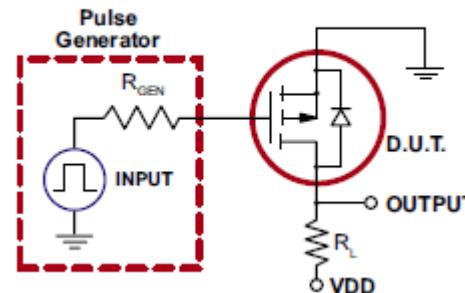
Features:

- BV_{DSS} : -350V min
- $R_{DS(ON)}$: 15Ω max
- Low threshold: -2.0V max
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

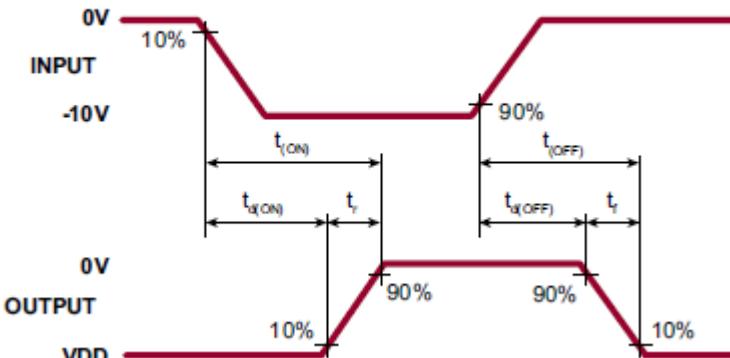
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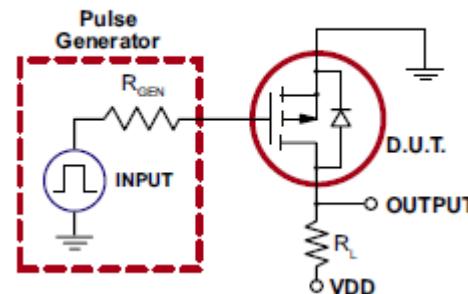
Features:

- BV_{DSS} : -400V min
- $R_{DS(ON)}$: 15Ω max
- Low threshold: -2.0V max
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit

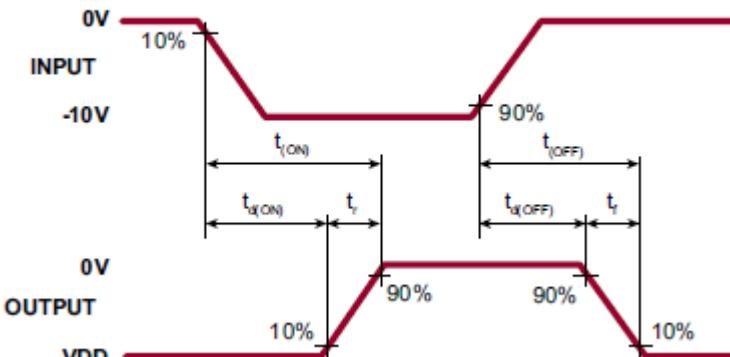


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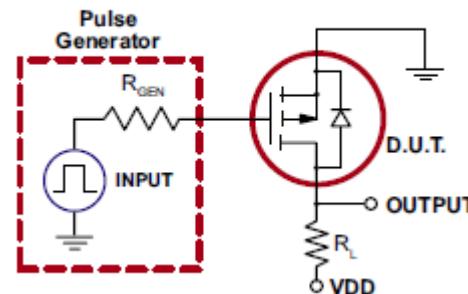
Features:

- BV_{DSS} : -220V min
- $R_{DS(ON)}$: 12Ω max
- Low threshold: -2.4V max
- High input impedance
- Low input capacitance: 110pf max
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-23

Switching Waveform



Test Circuit





MICROCHIP

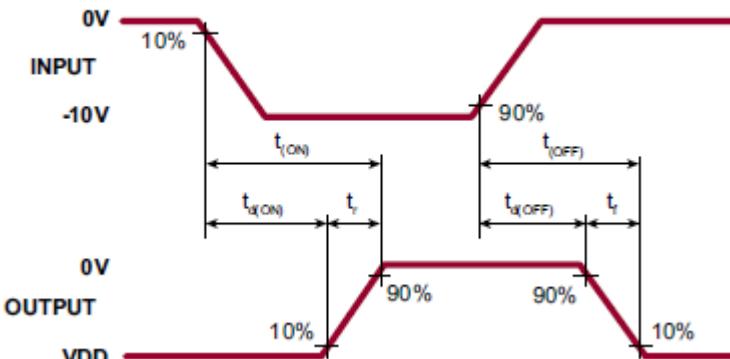
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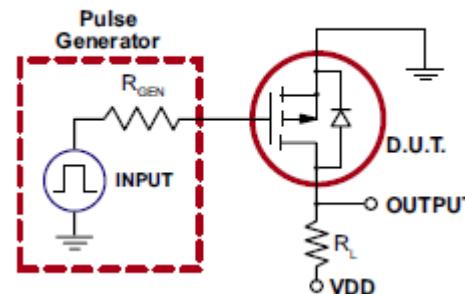
Features:

- BV_{DSS} : -350V min
- $R_{DS(ON)}$: 30Ω max
- High input impedance and high gain
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- Free from secondary breakdown
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23

Switching Waveform



Test Circuit



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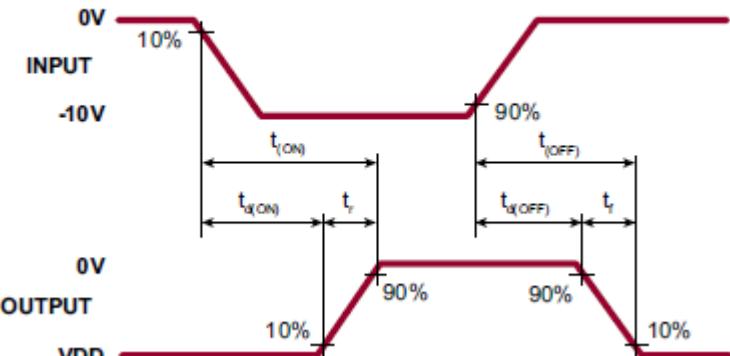
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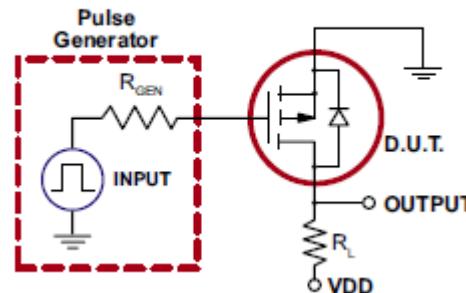
Features:

- BV_{DSS} : -40V min
- $R_{DS(ON)}$: 8.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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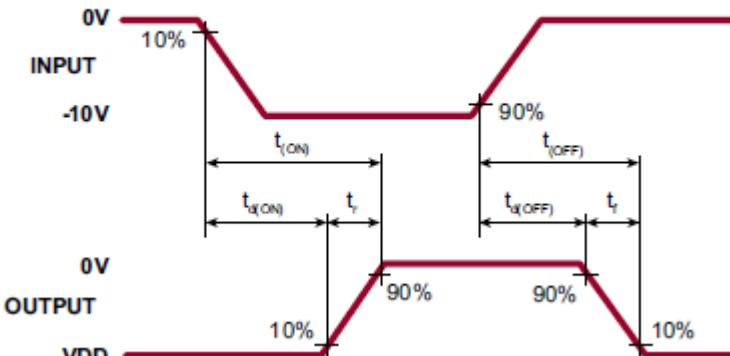
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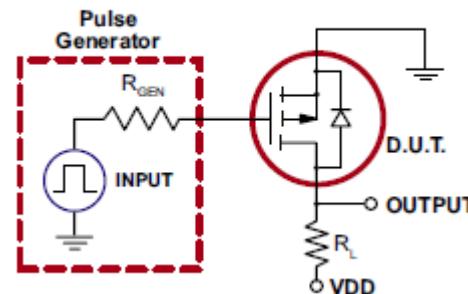
Features:

- BV_{DSS} : -60V min
- $R_{DS(ON)}$: 8.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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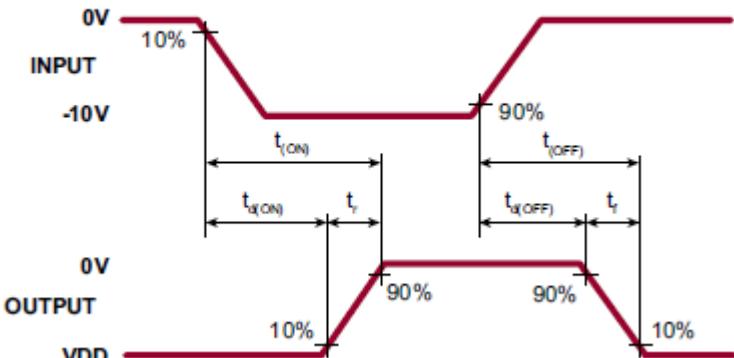
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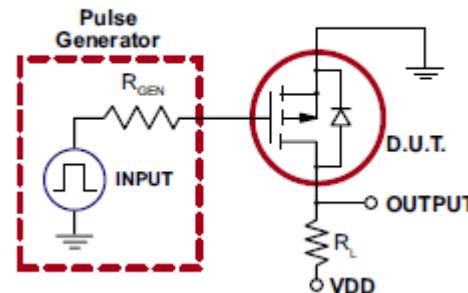
Features:

- BV_{DSS} : -90V min
- $R_{DS(ON)}$: 8.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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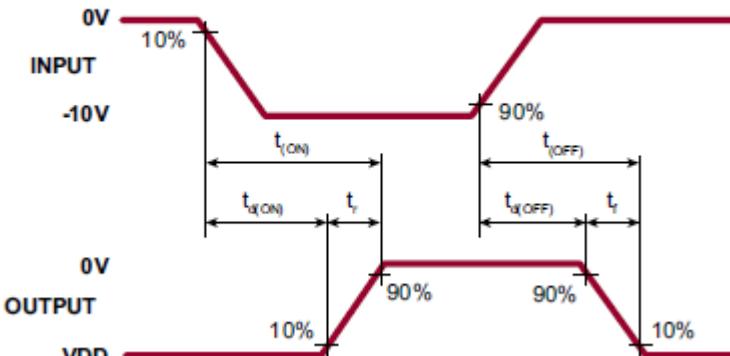
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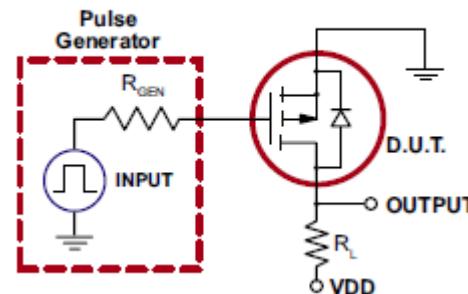
Features:

- BV_{DSS} : -500V min
- $R_{DS(ON)}$: 125Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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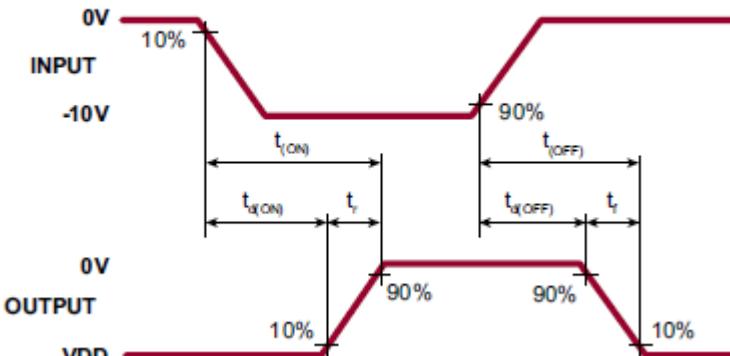
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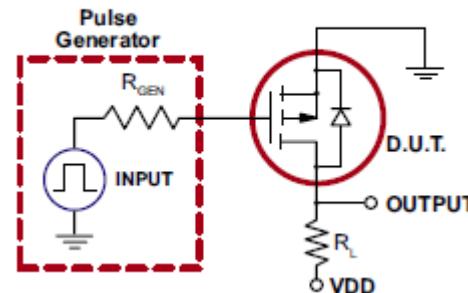
Features:

- BV_{DSS} : -80V min
- $R_{DS(ON)}$: 5.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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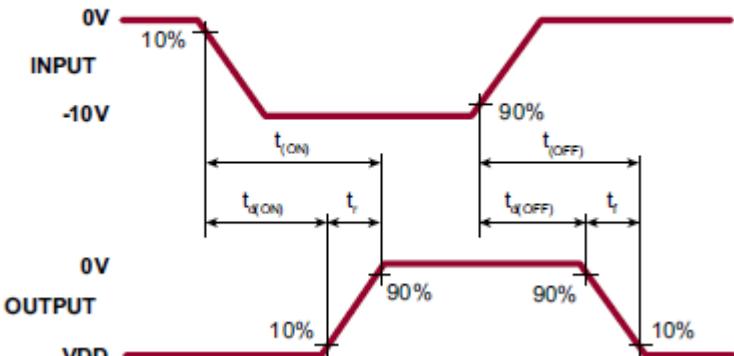
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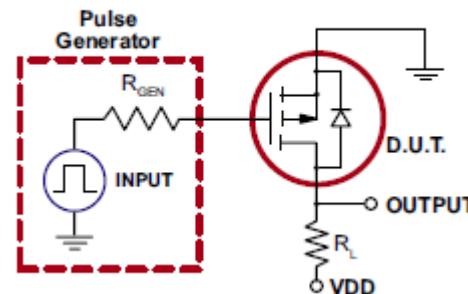
Features:

- BV_{DSS} : -60V min
- $R_{DS(ON)}$: 12Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

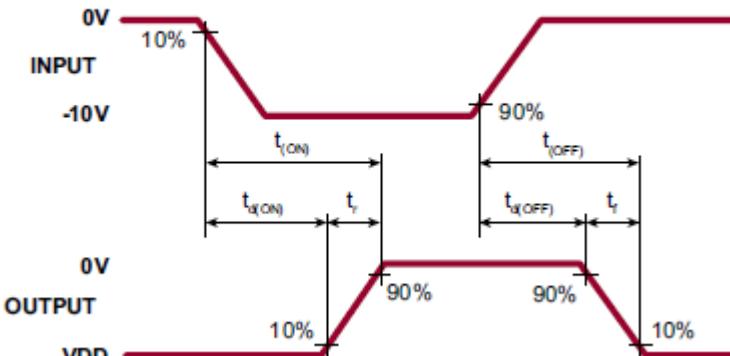
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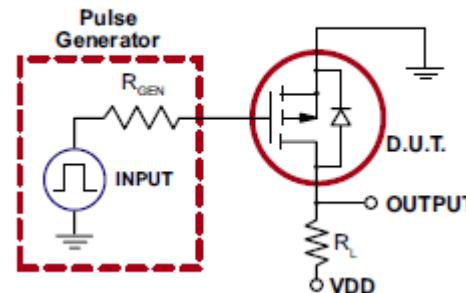
Features:

- BV_{DSS} : -100V min
- $R_{DS(ON)}$: 12Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23

Switching Waveform



Test Circuit



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MICROCHIP

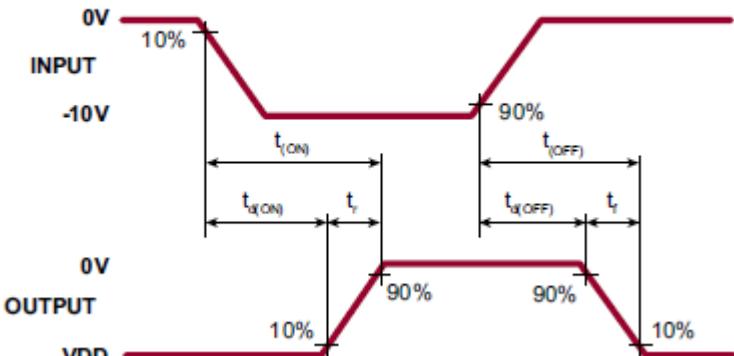
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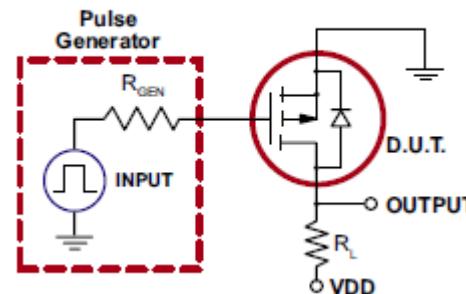
Features:

- BV_{DSS} : -60V min
- $R_{DS(ON)}$: 0.9Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-to-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-39, TO-92

Switching Waveform



Test Circuit



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MICROCHIP

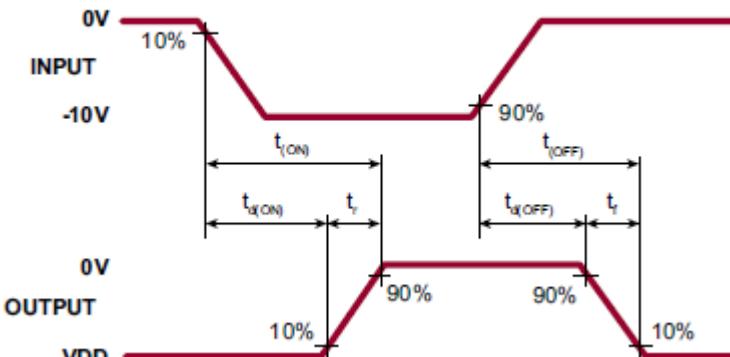
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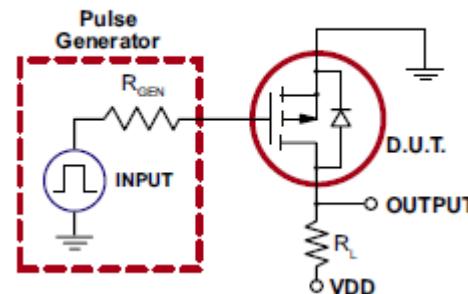
Features:

- BV_{DSS} : -500V min
- $R_{DS(ON)}$: 30Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-to-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

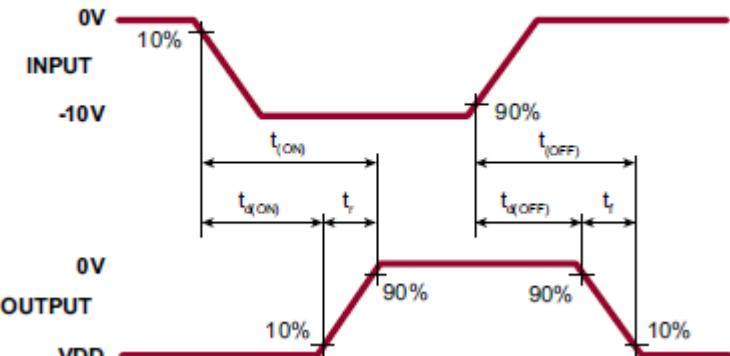
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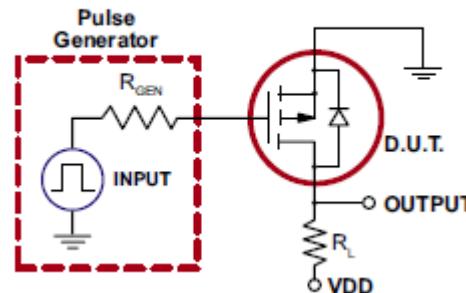
Features:

- BV_{DSS} : -30V min
- $R_{DS(ON)}$: 0.6Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-to-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

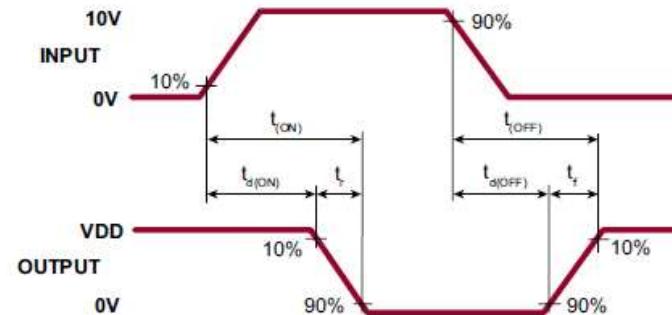
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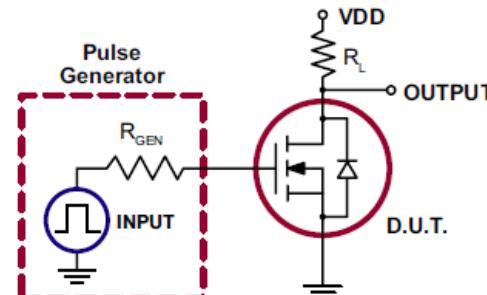
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 3.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-39 Metal Can

Switching Waveform



Test Circuit



<< BACK



MICROCHIP

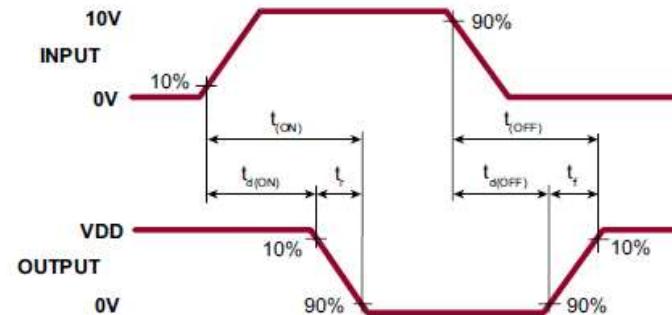
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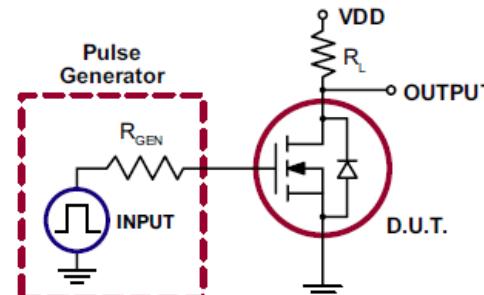
Features:

- BV_{DSS} : 90V min
- $R_{DS(ON)}$: 4.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-39 metal can

Switching Waveform



Test Circuit



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MICROCHIP

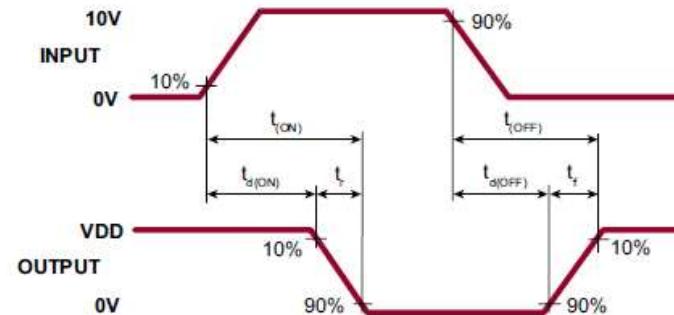
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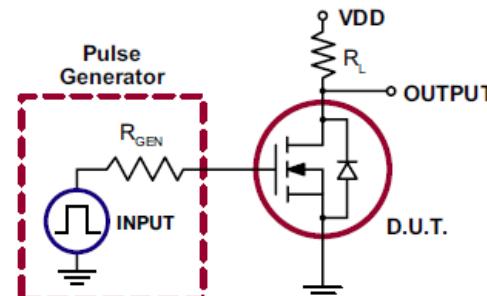
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 5.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

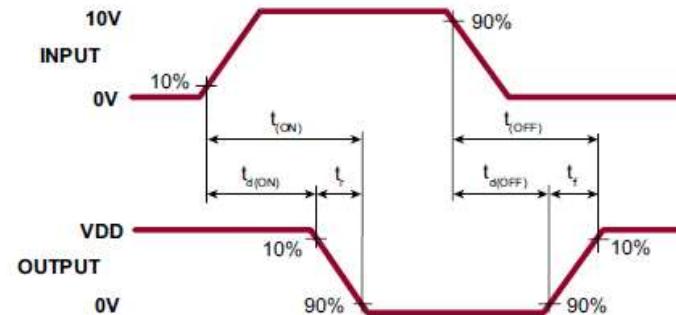
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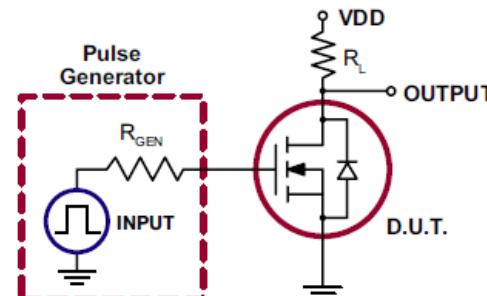
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 7.5Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23 (TO-236AB)

Switching Waveform



Test Circuit



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MICROCHIP

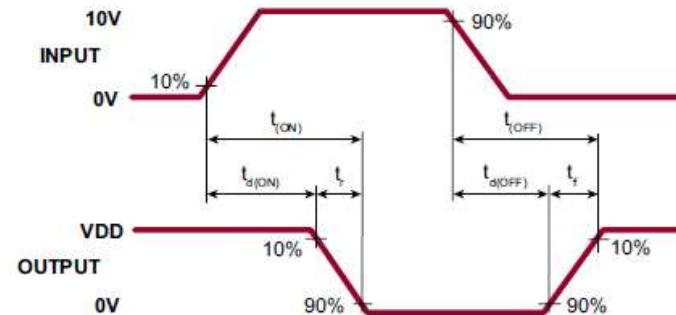
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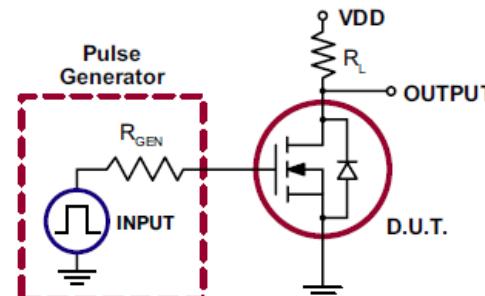
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 7.5Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

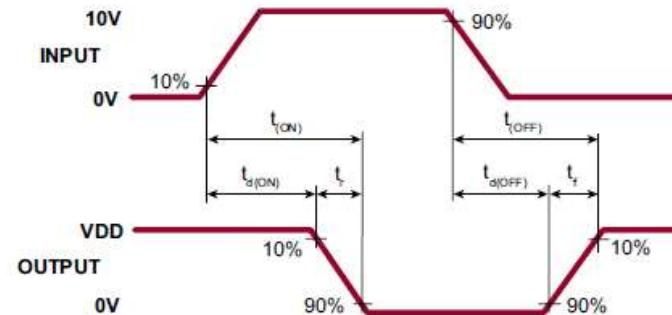
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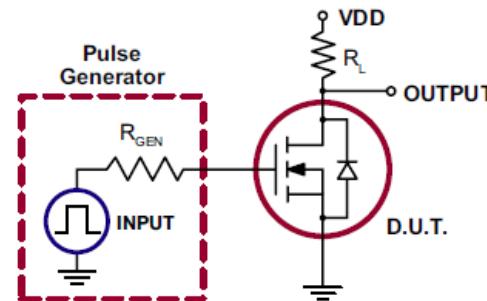
Features:

- BV_{DSS} : 40V min
- $R_{DS(ON)}$: 1.8 Ω max for TO-92 pkg
- $R_{DS(ON)}$: 2.0 Ω max for SOT-89 pkg
- Low threshold: 1.6V max
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

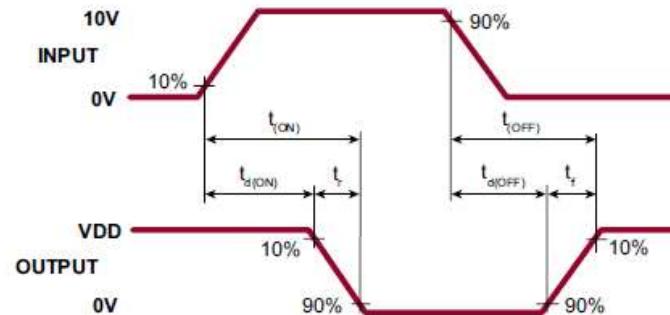
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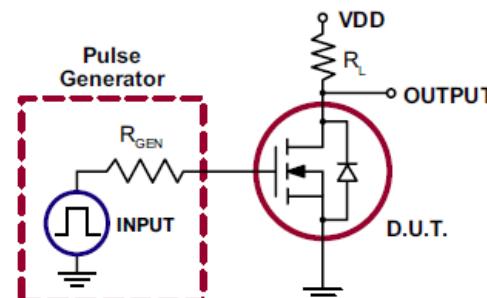
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 3.0 Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 50pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

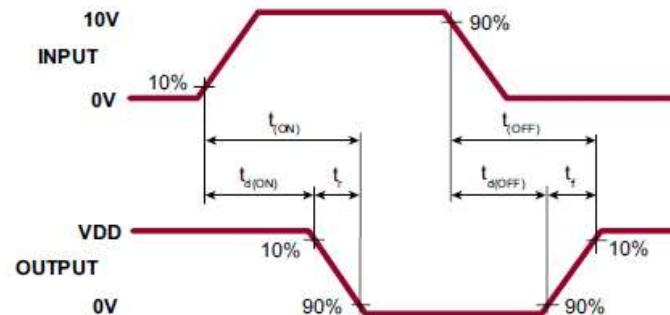
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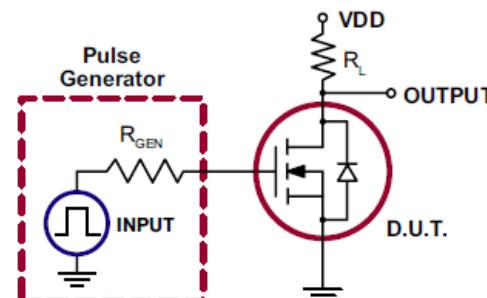
Features:

- BV_{DSS} : 100V min
- $R_{DS(ON)}$: 3.0 Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 50pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

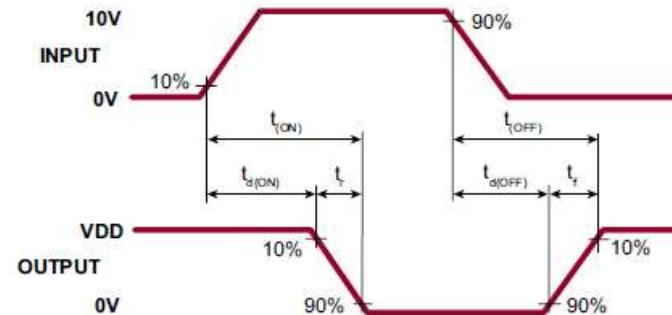
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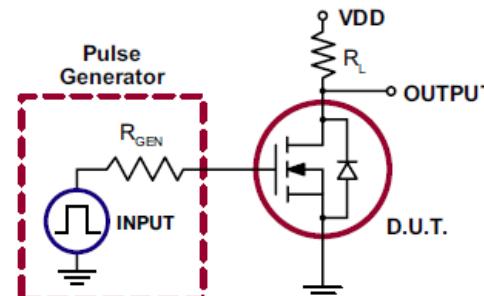
Features:

- BV_{DSS} : 40V min
- $R_{DS(ON)}$: 0.75Ω max
- Low threshold: 1.6V max
- High input impedance
- Low input capacitance: 140pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

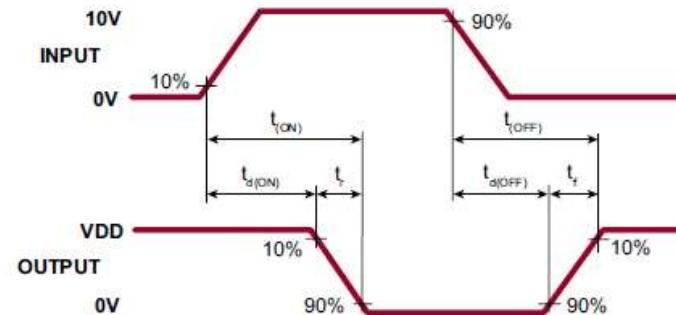
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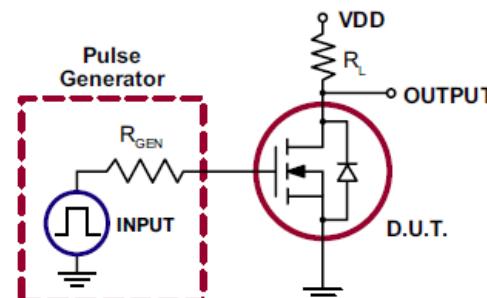
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 1.5Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 100pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

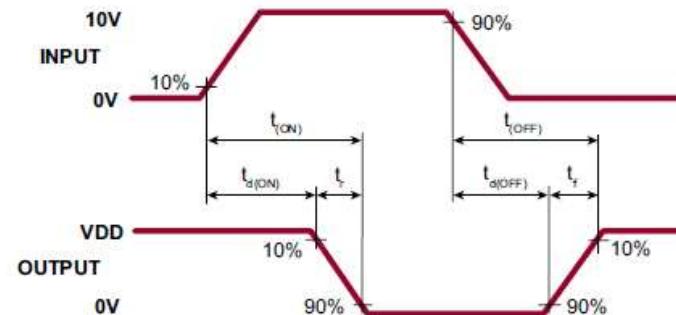
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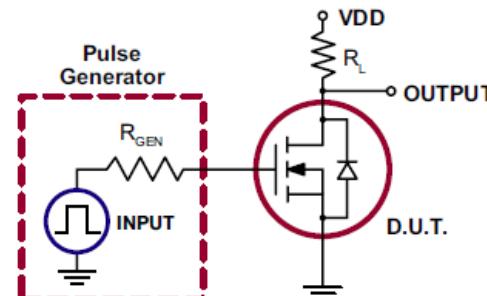
Features:

- BV_{DSS} : 100V min
- $R_{DS(ON)}$: 1.5Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 100pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

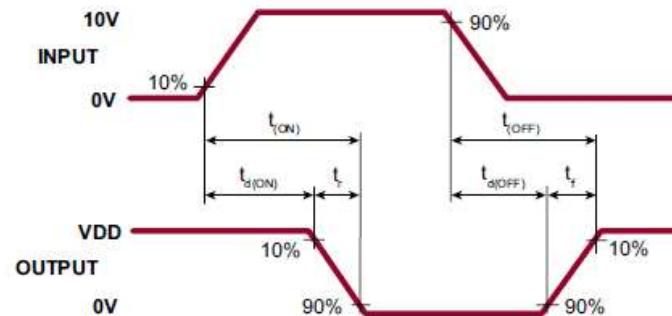
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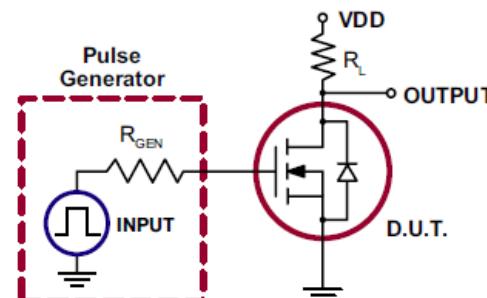
Features:

- BV_{DSS} : 200V min
- $R_{DS(ON)}$: 6.0 Ω max
- Low threshold: 1.6V max
- High input impedance
- Low input capacitance: 110pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

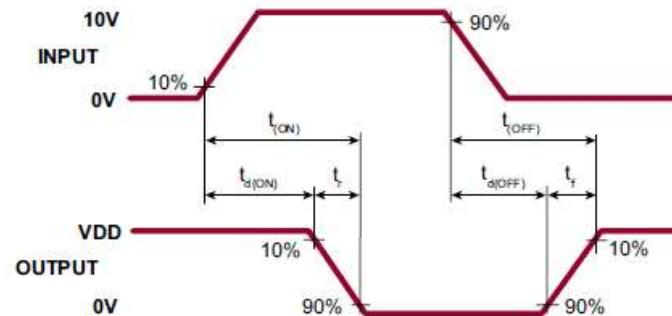
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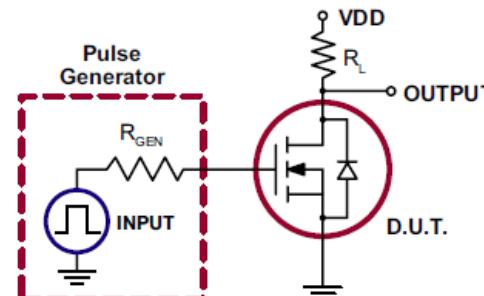
Features:

- BV_{DSS} : 20V min
- $R_{DS(ON)}$: 1.3Ω max
- Low threshold: 1.6V max
- High input impedance
- Low input capacitance: 130pF typ
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

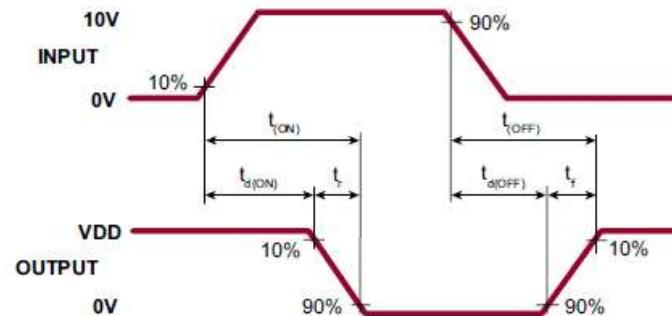
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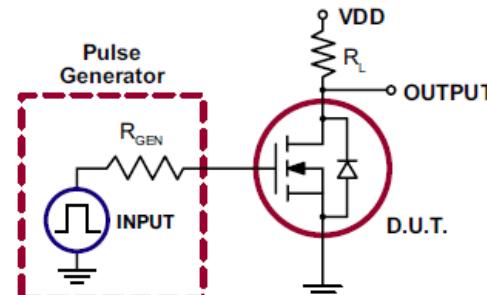
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 2.5Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-23

Switching Waveform



Test Circuit



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MICROCHIP

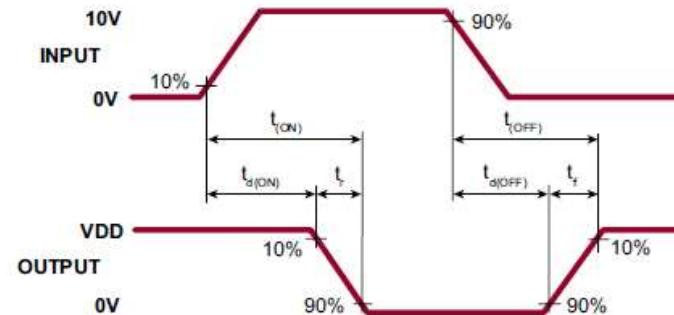
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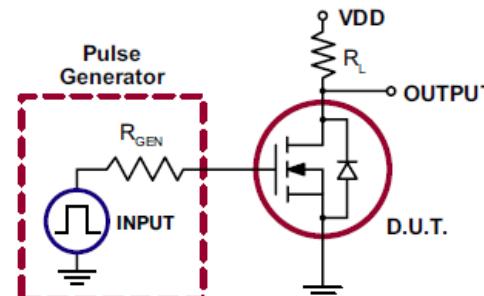
Features:

- BV_{DSS} : 240V min
- $R_{DS(ON)}$: 15Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23

Switching Waveform



Test Circuit



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MICROCHIP

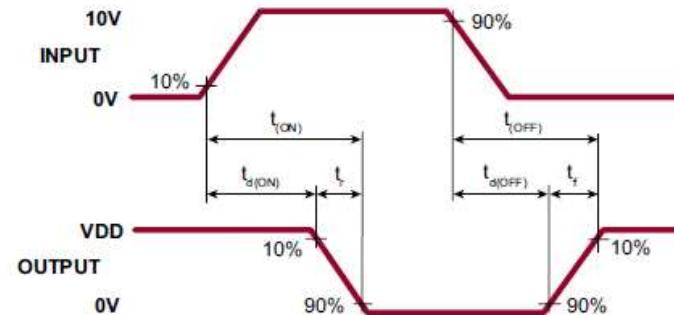
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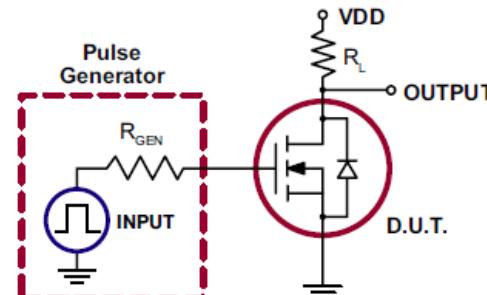
Features:

- BV_{DSS} : 300V min
- $R_{DS(ON)}$: 25Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23

Switching Waveform



Test Circuit



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MICROCHIP

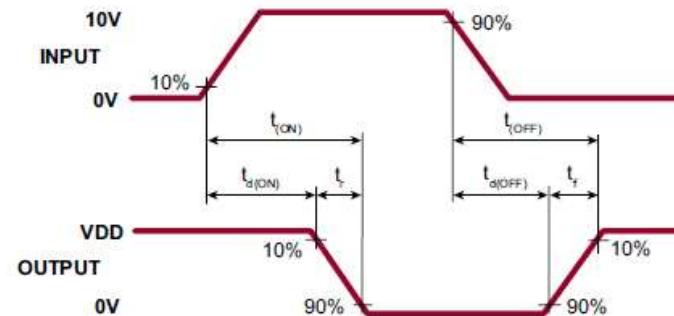
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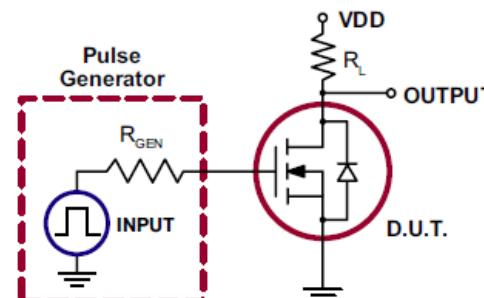
Features:

- BV_{DSS} : 250V min
- $R_{DS(ON)}$: 3.5Ω max
- Low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

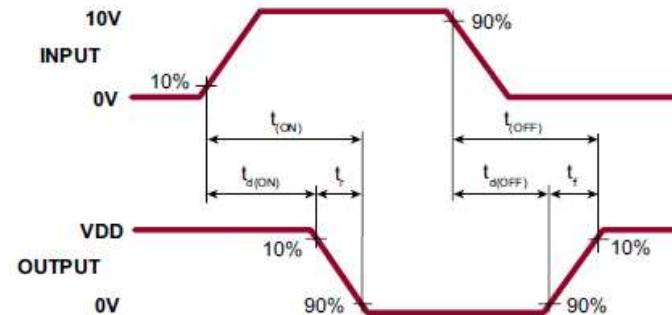
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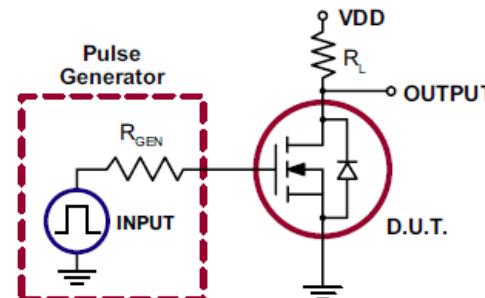
Features:

- BV_{DSS} : 350V min
- $R_{DS(ON)}$: 6.0 Ω max
- Low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
 -55°C to $+150^{\circ}\text{C}$
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

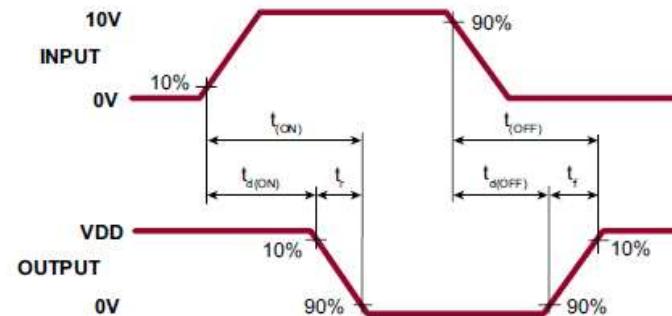
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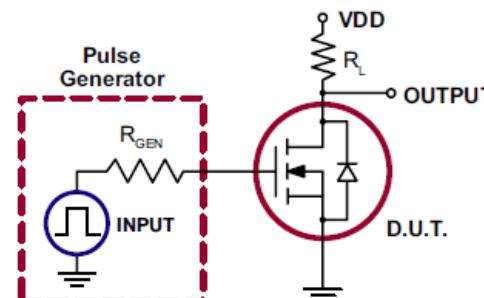
Features:

- BV_{DSS} : 18V min
- $R_{DS(ON)}$: 2.5Ω max
- Low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

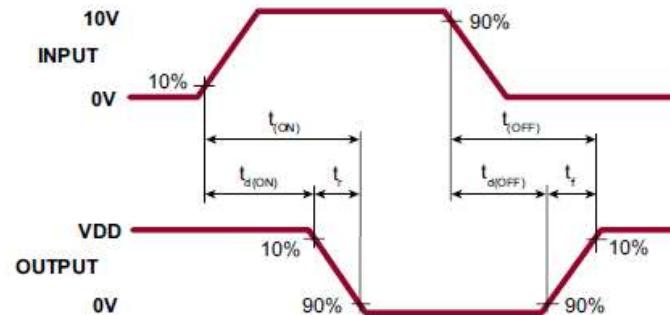
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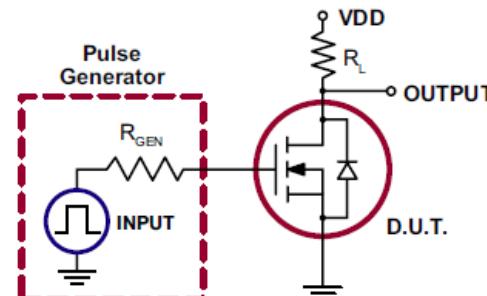
Features:

- BV_{DSS} : 40V min
- $R_{DS(ON)}$: 1.0 Ω max
- Low threshold: 1.6V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

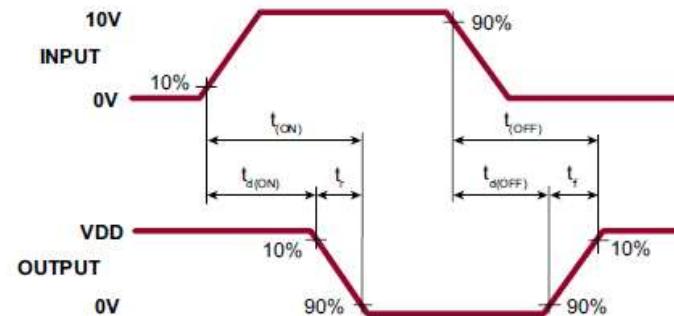
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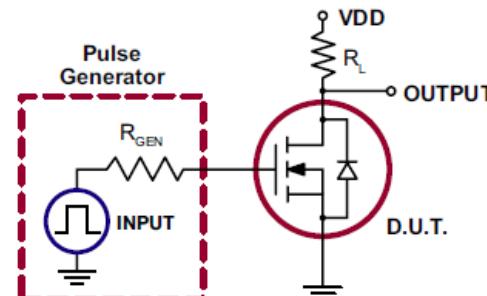
Features:

- BV_{DSS} : 100V min
- $R_{DS(ON)}$: 1.5Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

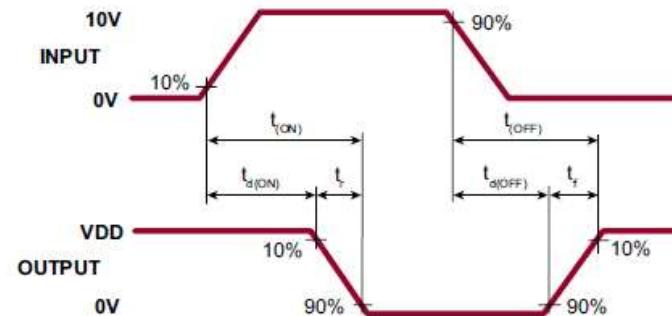
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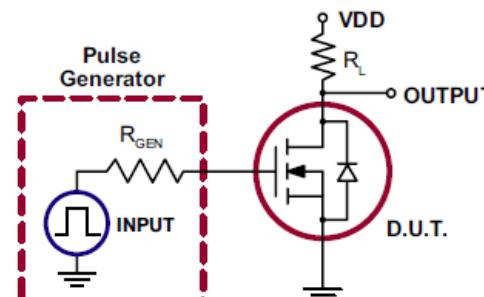
Features:

- BV_{DSS} : 240V min
- $R_{DS(ON)}$: 6.0 Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

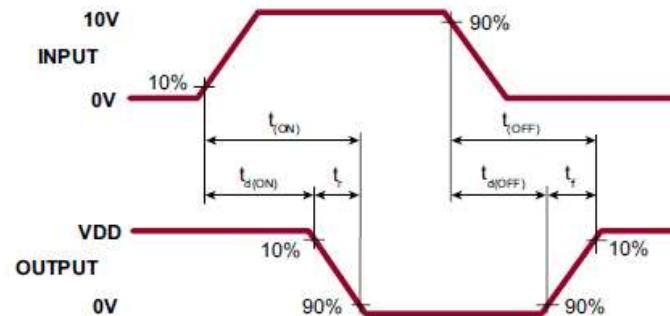
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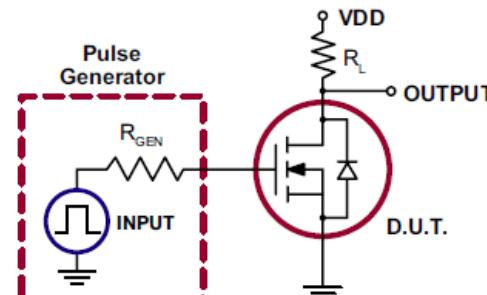
Features:

- BV_{DSS} : 400V min
- $R_{DS(ON)}$: 12Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

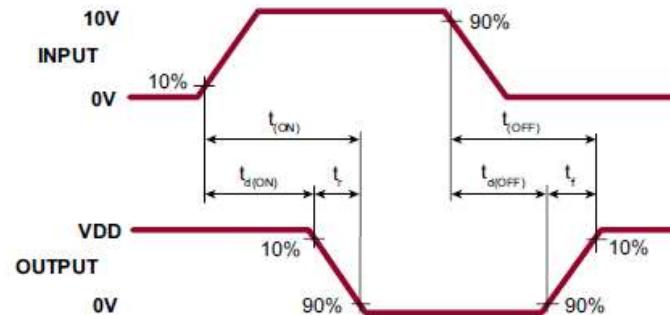
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Datasheet

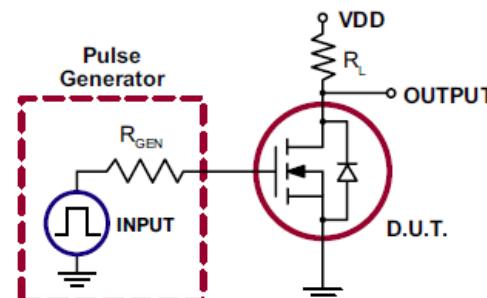
Features:

- BV_{DSS} : 400V min
- $R_{DS(ON)}$: 5.0 Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-252, TO-92, SOIC-8

Switching Waveform



Test Circuit

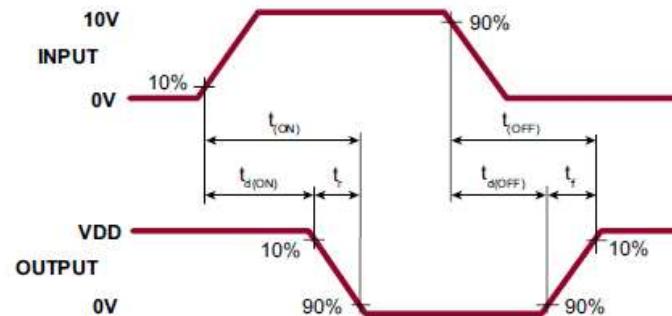


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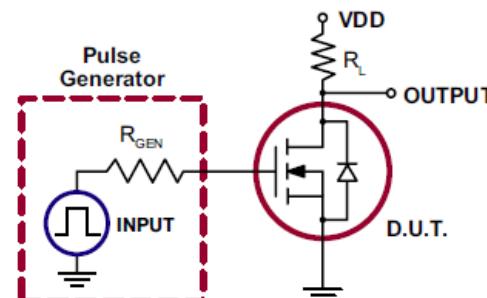
Features:

- BV_{DSS} : 250V min
- $R_{DS(ON)}$: 7.0 Ω max
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23, TO-92, SOT-89

Switching Waveform



Test Circuit





MICROCHIP

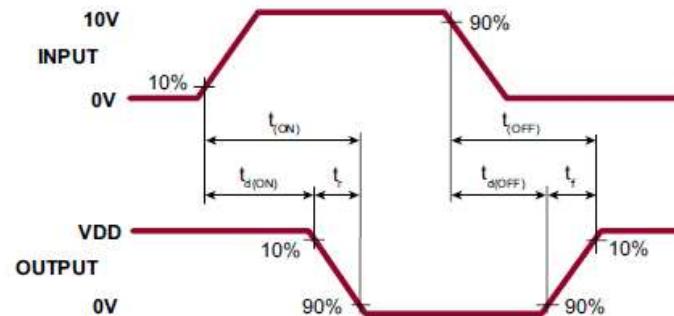
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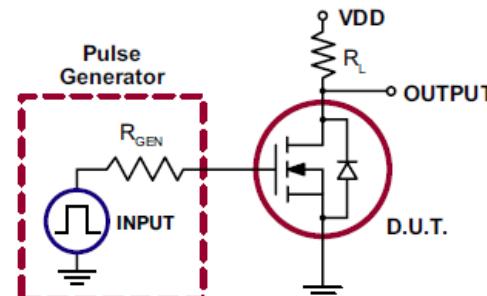
Features:

- BV_{DSS} : 350V min
- $R_{DS(ON)}$: 15Ω max
- Low threshold
- High input impedance
- Low input capacitance
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOT-23, SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

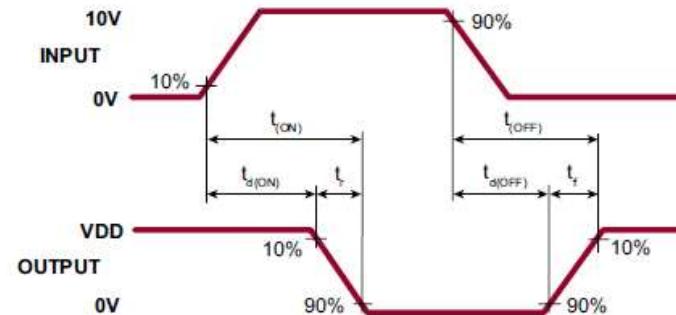
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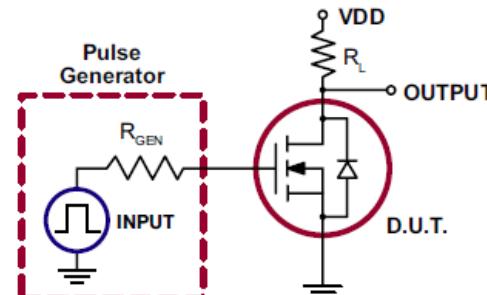
Features:

- BV_{DSS} : 40V min
- $R_{DS(ON)}$: 3.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

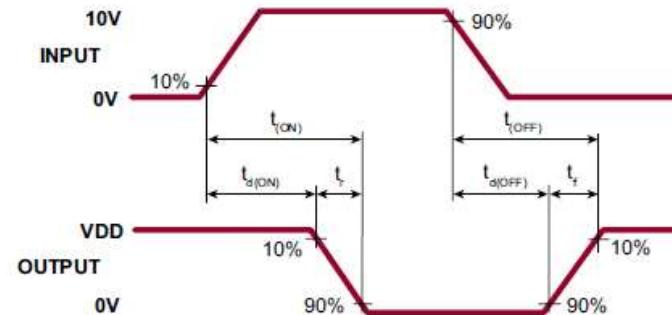
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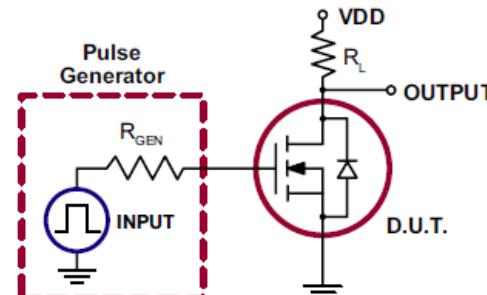
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 3.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

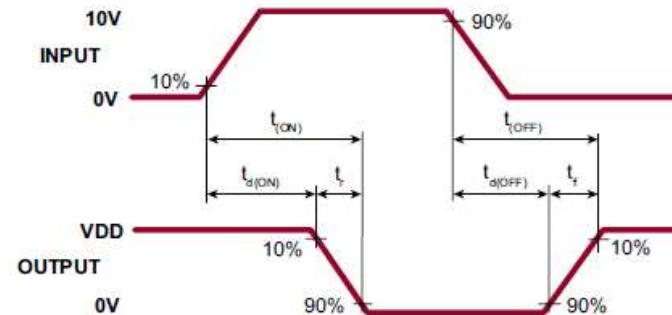
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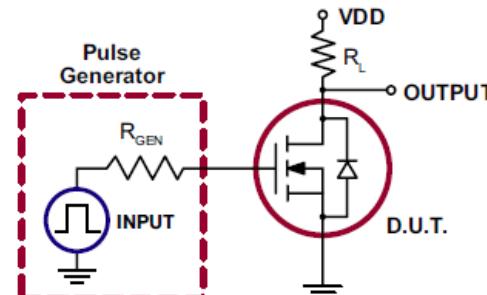
Features:

- BV_{DSS} : 90V min
- $R_{DS(ON)}$: 3.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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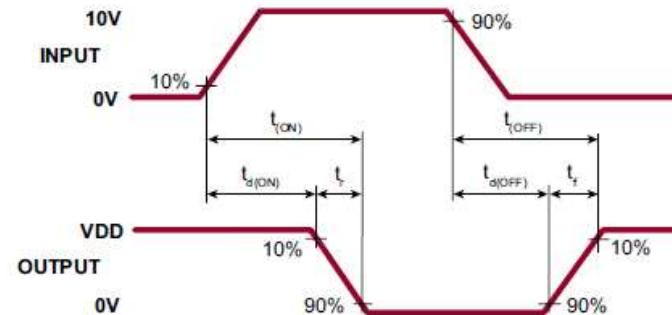
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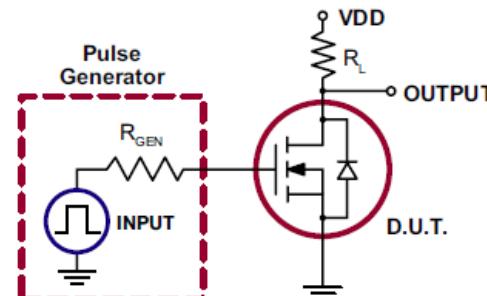
Features:

- BV_{DSS} : 30V min
- $R_{DS(ON)}$: 1.2 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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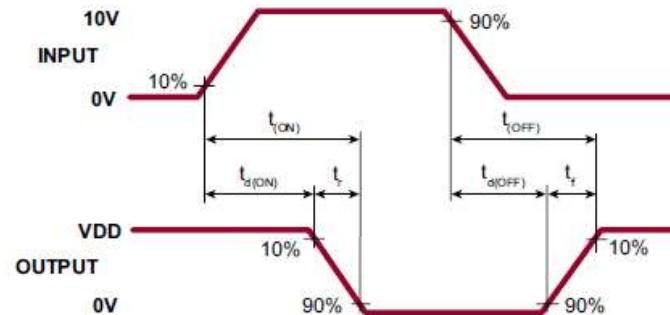
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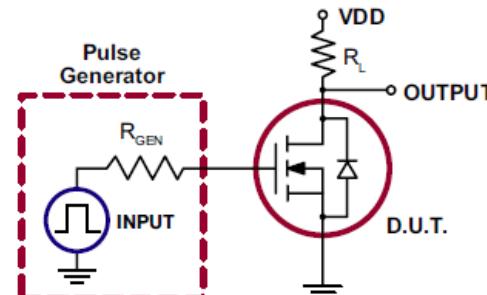
Features:

- BV_{DSS} : 500V min
- $R_{DS(ON)}$: 60 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

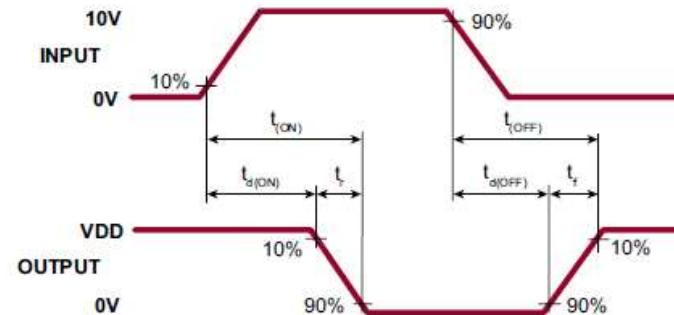
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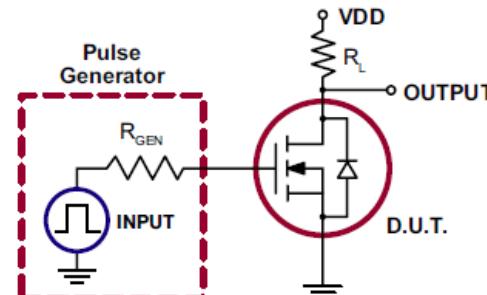
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 3.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

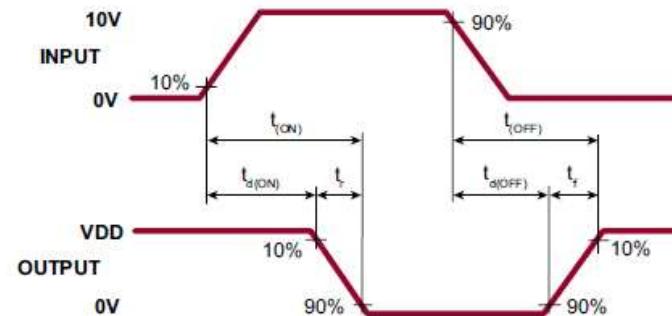
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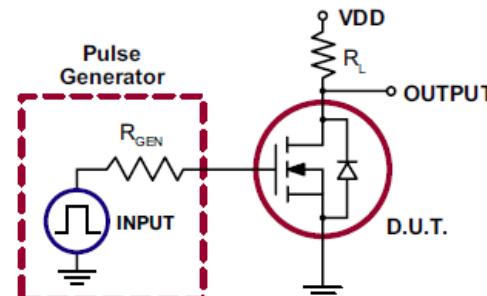
Features:

- BV_{DSS} : 80V min
- $R_{DS(ON)}$: 4.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

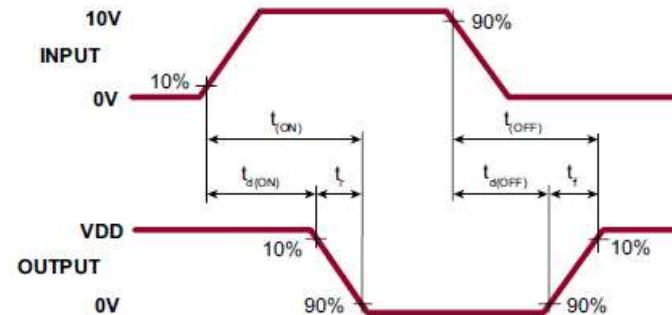
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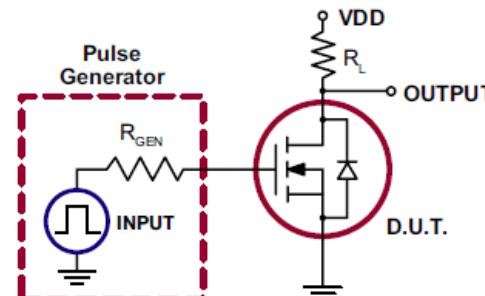
Features:

- BV_{DSS} : 120V min
- $R_{DS(ON)}$: 6.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

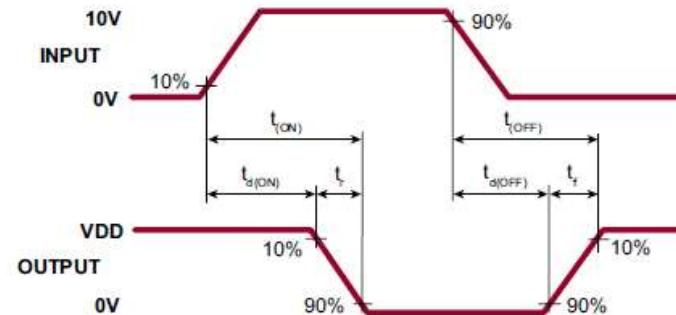
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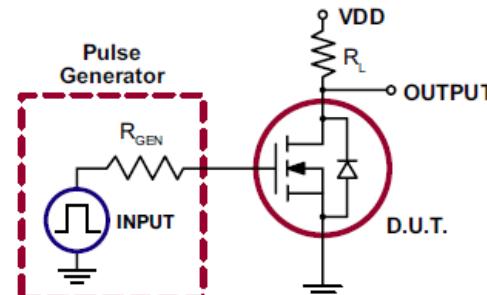
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 4.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

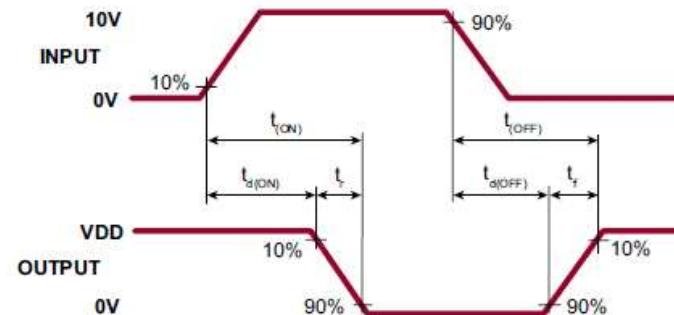
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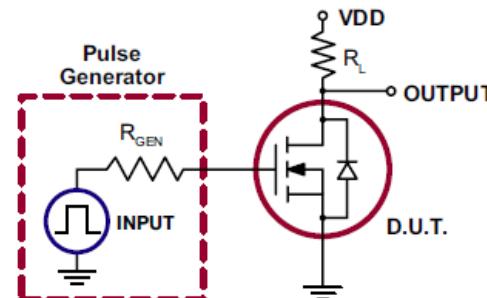
Features:

- BV_{DSS} : 100V min
- $R_{DS(ON)}$: 4.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- High input impedance and high gain
- Operating Temperature Range:
 -55°C to $+150^{\circ}\text{C}$
- Package Option: SOT-23

Switching Waveform



Test Circuit



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MICROCHIP

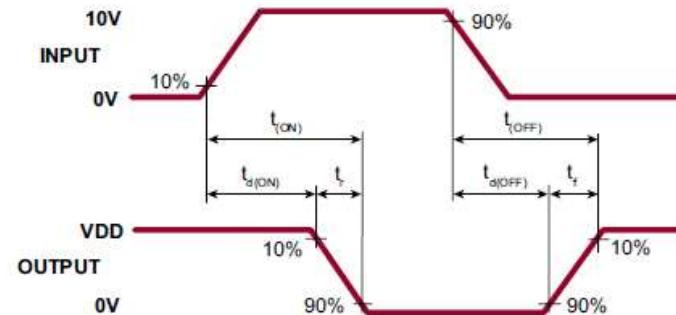
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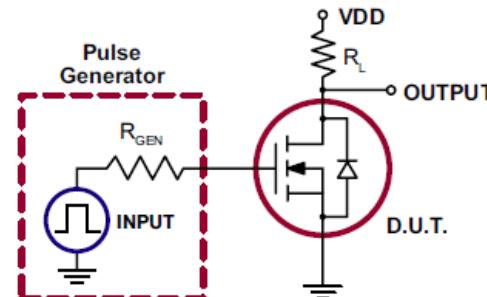
Features:

- BV_{DSS} : 100V min
- $R_{DS(ON)}$: 0.35Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-39, TO-92

Switching Waveform



Test Circuit



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MICROCHIP

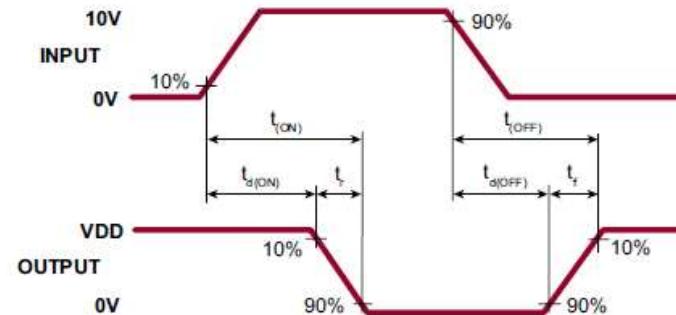
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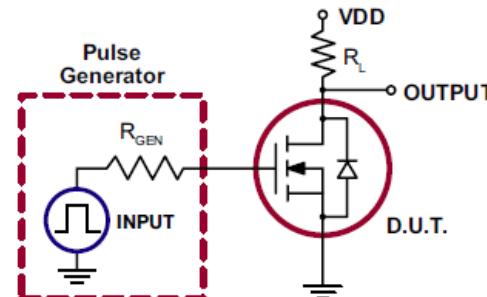
Features:

- BV_{DSS} : 60V min
- $R_{DS(ON)}$: 7.5Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

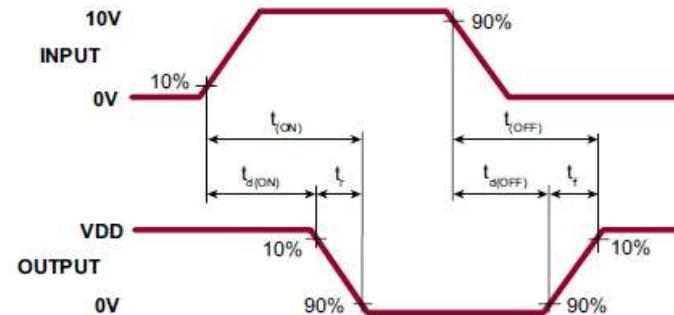
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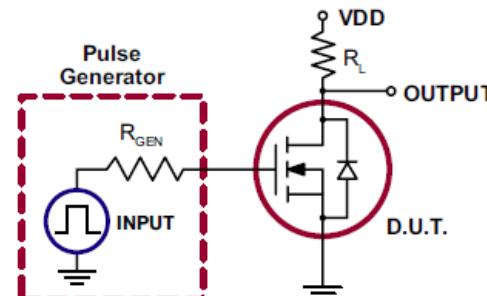
Features:

- BV_{DSS} : 240V min
- $R_{DS(ON)}$: 1.25Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

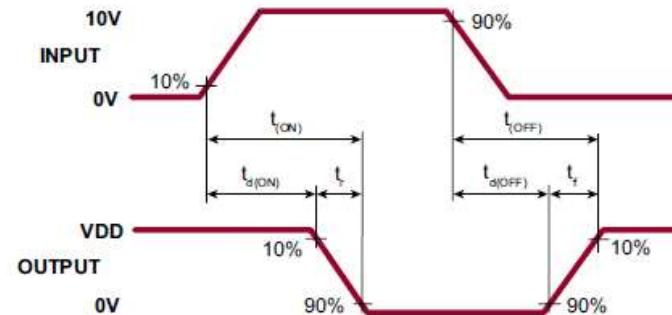
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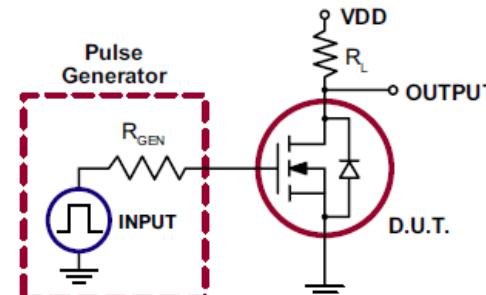
Features:

- BV_{DSS} : 240V min
- $R_{DS(ON)}$: 6.0 Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

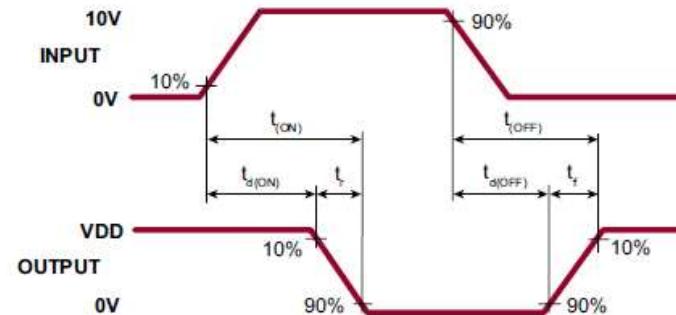
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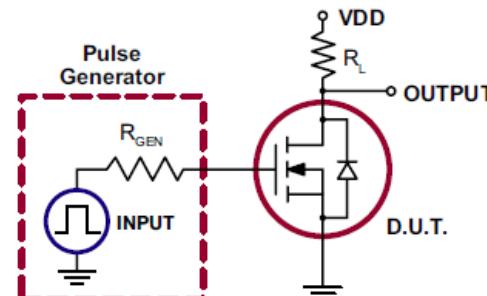
Features:

- BV_{DSS} : 240V min
- $R_{DS(ON)}$: 10Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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MICROCHIP

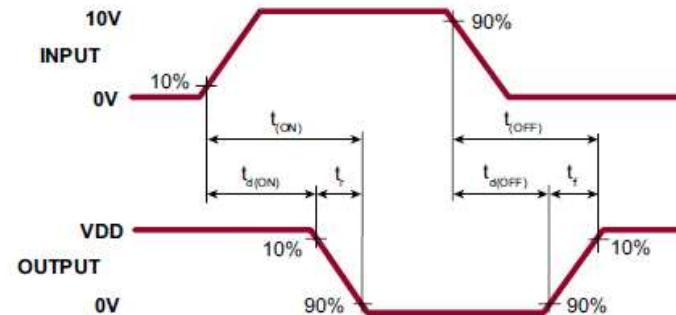
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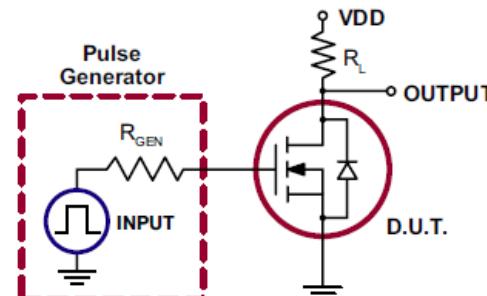
Features:

- BV_{DSS} : 500V min
- $R_{DS(ON)}$: 13Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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MICROCHIP

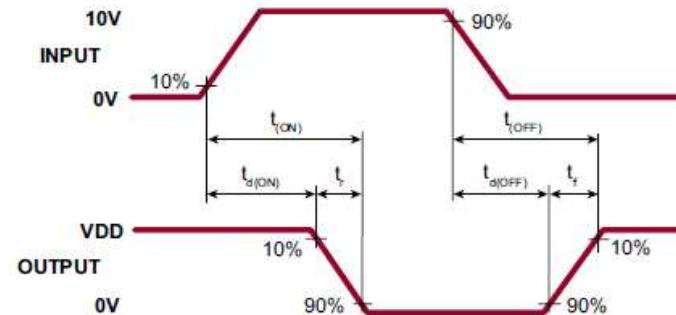
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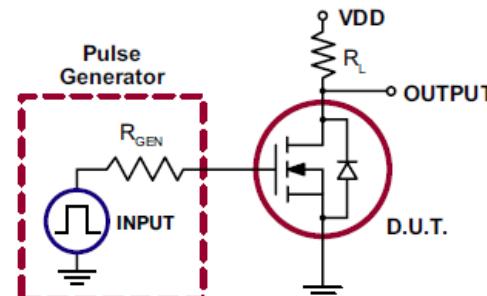
Features:

- BV_{DSS} : 600V min
- $R_{DS(ON)}$: 20Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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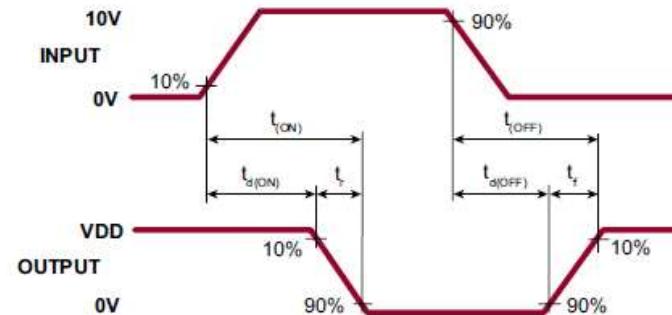
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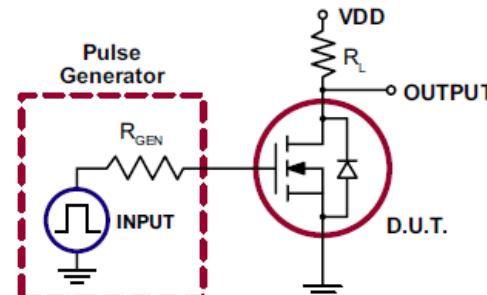
Features:

- BV_{DSS} : 50V min
- $R_{DS(ON)}$: 0.3Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92, SOT-89

Switching Waveform



Test Circuit



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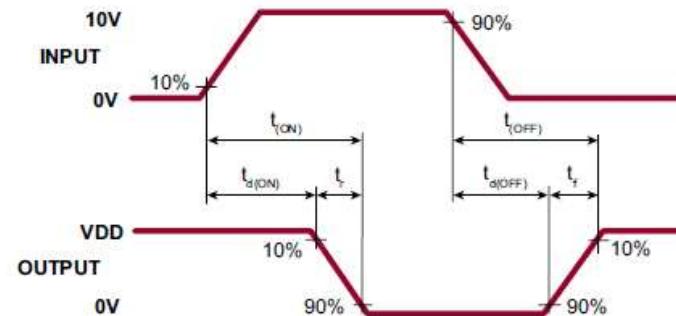
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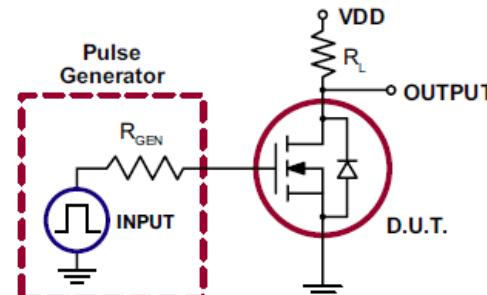
Features:

- BV_{DSS} : 400V min
- $R_{DS(ON)}$: 12Ω max
- Free from secondary breakdown
- Low power drive requirement
- Ease of paralleling
- Low C_{ISS} and fast switching speeds
- Excellent thermal stability
- Integral source-drain diode
- High input impedance and high gain
- Operating Temperature Range:
-55°C to +150°C
- Package Option: TO-92

Switching Waveform



Test Circuit



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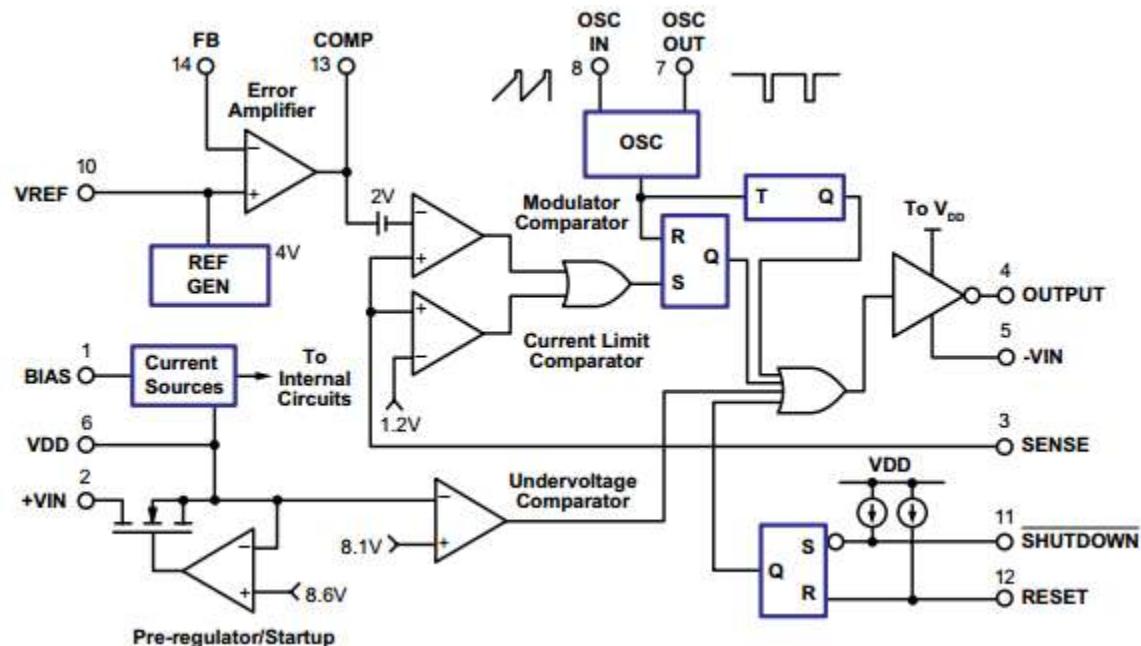
MICROCHIP

HV9110

Online
Datasheet

Features:

- 10 to 120V input voltage range
- Current-mode control
- High efficiency
- Up to 1.0MHz internal oscillator
- Internal start-up circuit
- Low internal noise
- 50% maximum duty cycle
- Operating Temperature Range:
-55°C to +125°C
- Package Option: SOIC-14



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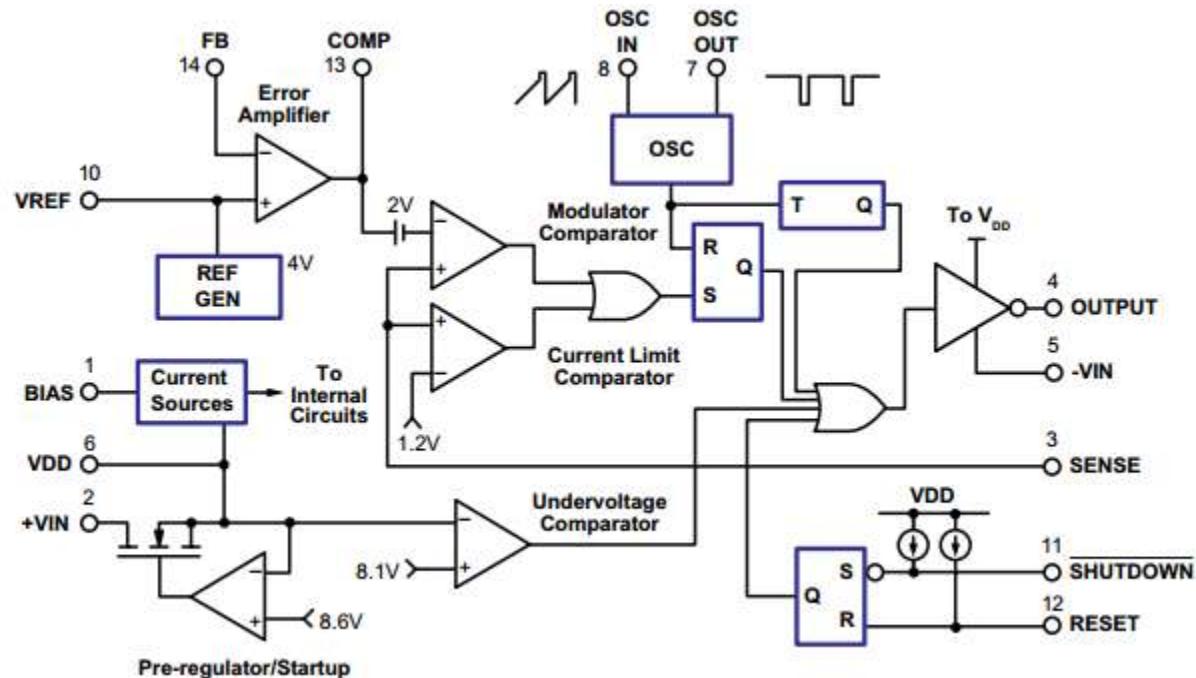
MICROCHIP

HV9112

Online
Datasheet

Features:

- 9.0 to 80V input voltage range
- Current-mode control
- High efficiency
- Up to 1.0MHz internal oscillator
- Internal start-up circuit
- Low internal noise
- 50% maximum duty cycle
- Operating Temperature Range:
-55°C to +125°C
- Package Option: SOIC-14



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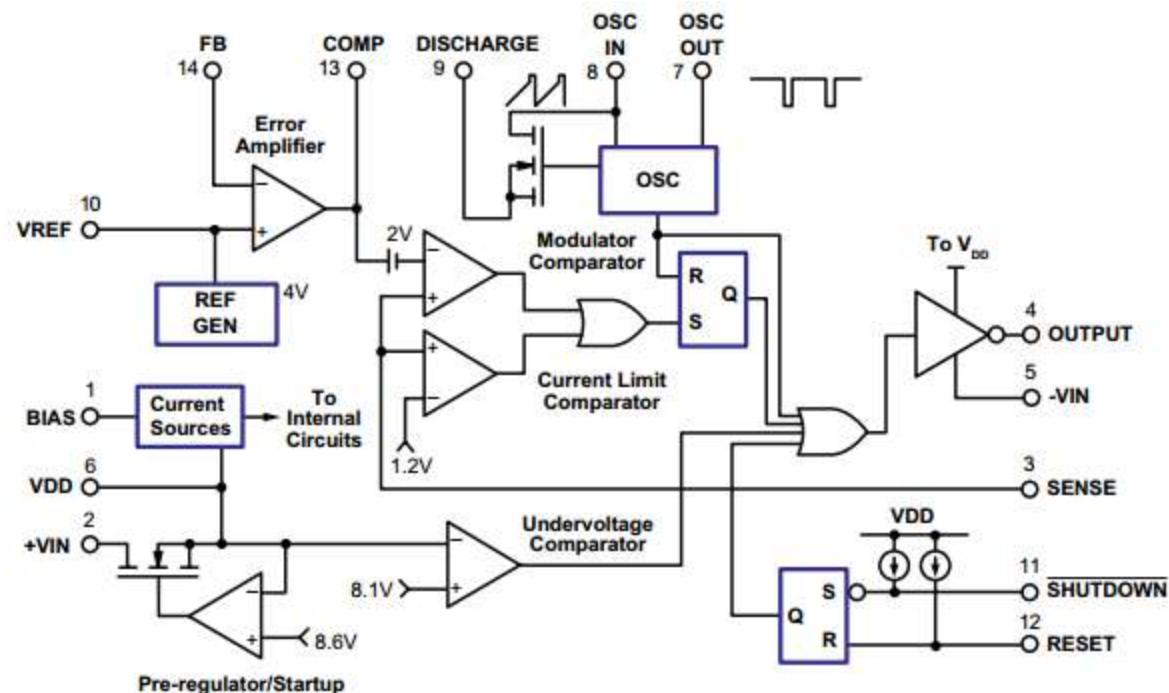
MICROCHIP

HV9113

Online
Datasheet

Features:

- 10 to 120V input voltage range
- Current-mode control
- High efficiency
- Up to 1.0MHz internal oscillator
- Internal start-up circuit
- Low internal noise
- 99% maximum duty cycle
- Operating Temperature Range:
-55°C to +125°C
- Package Option: SOIC-14



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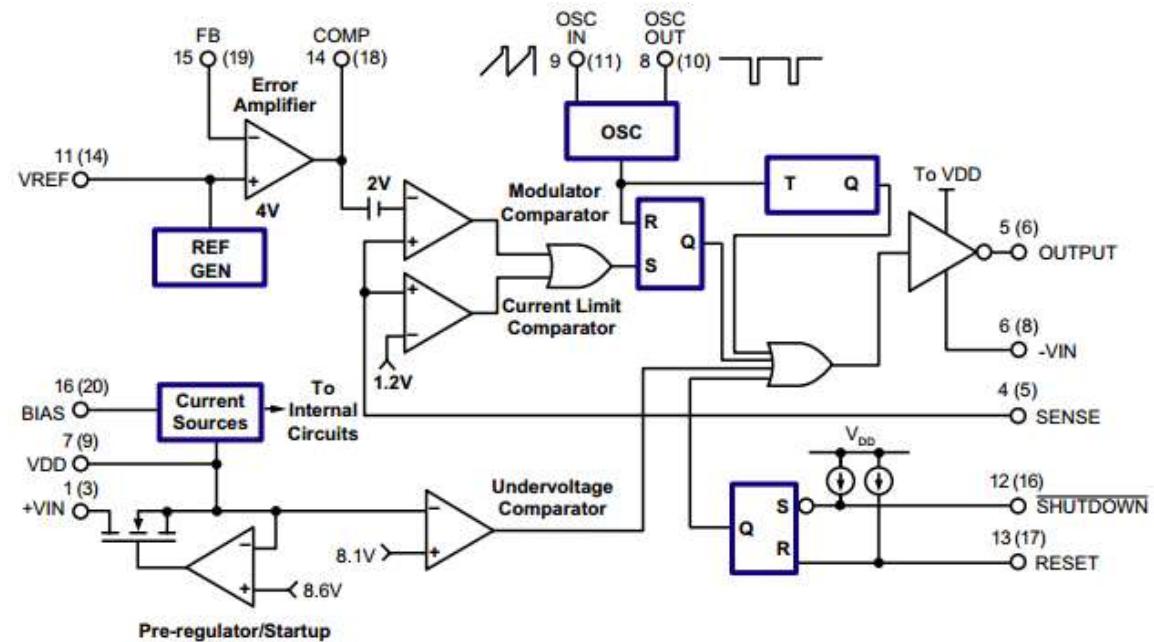
MICROCHIP

HV9120

Online
Datasheet

Features:

- 10 to 450V input voltage range
- <1.3mA supply current
- >1.0MHz clock
- >20:1 dynamic range @ 500KHz
- 49% Maximum duty cycle version
- Low internal noise
- Operating Temperature Range:
-55°C to +125°C
- Package Option: SOIC-16



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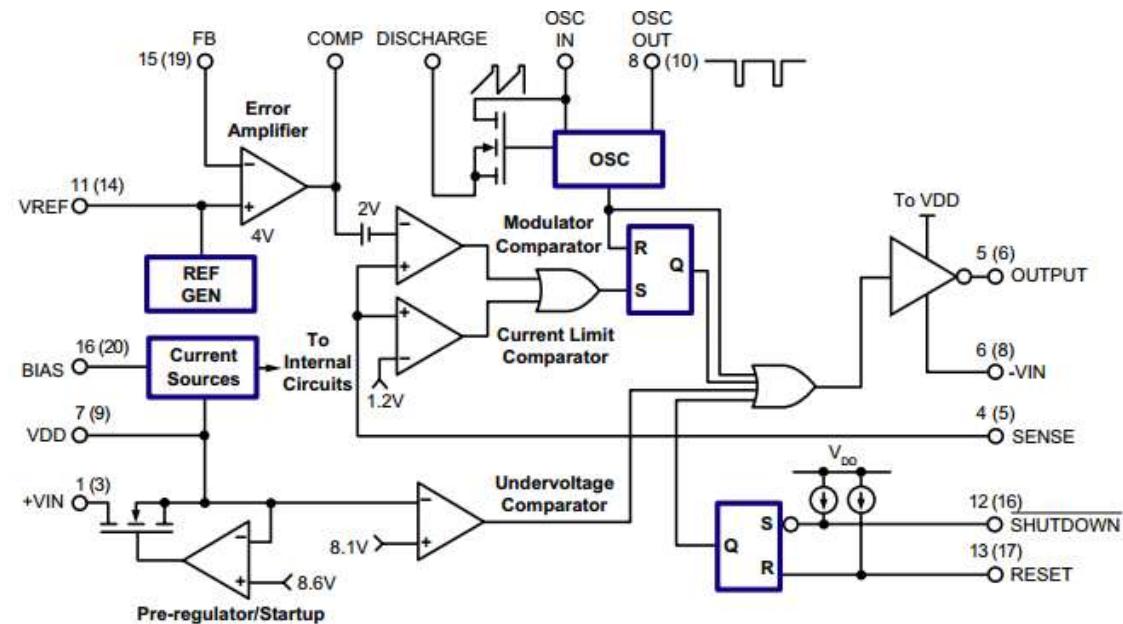
MICROCHIP

HV9123

Online
Datasheet

Features:

- 10 to 450V input voltage range
- <1.3mA supply current
- >1.0MHz clock
- >20:1 dynamic range @ 500kHz
- 99% Maximum duty cycle version
- Low internal noise
- Operating Temperature Range:
-55°C to +125°C
- Package Option: SOIC-16



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MICROCHIP

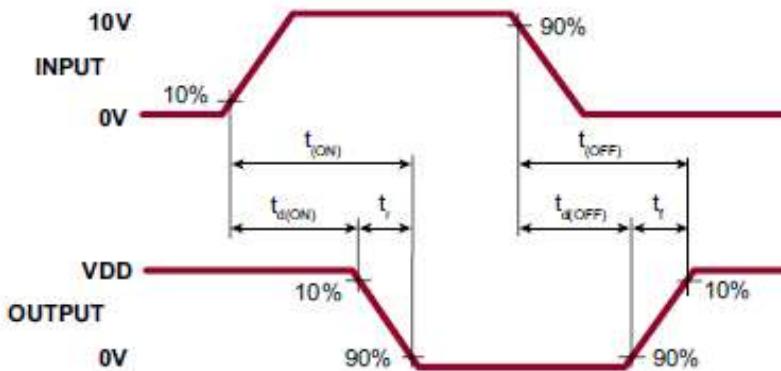
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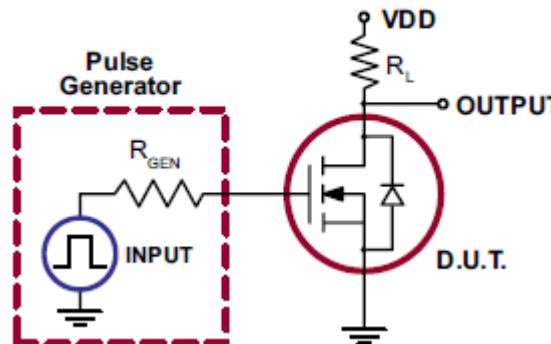
Features:

- BV_{DSS} : 240V min
- $R_{DS(ON)}$: 6Ω max
- Dual N-channel devices
- Low threshold: 2.0V max
- High input impedance
- Low input capacitance: 125pF max
- Fast switching speeds
- Low on-resistance
- Free from secondary breakdown
- Low input and output leakage
- Operating Temperature Range:
 -55°C to $+150^{\circ}\text{C}$
- Package Option: SOIC-8

Switching Waveform



Test Circuit



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MICROCHIP

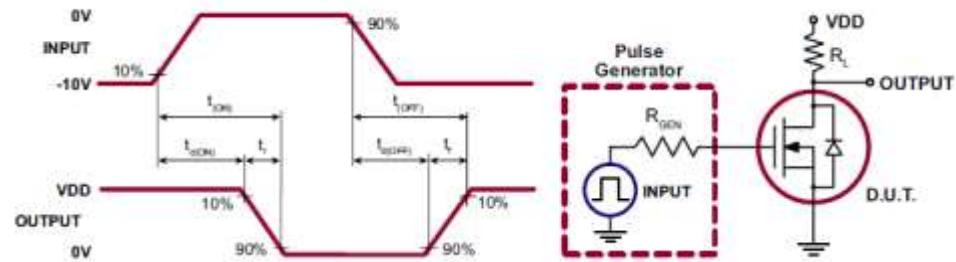
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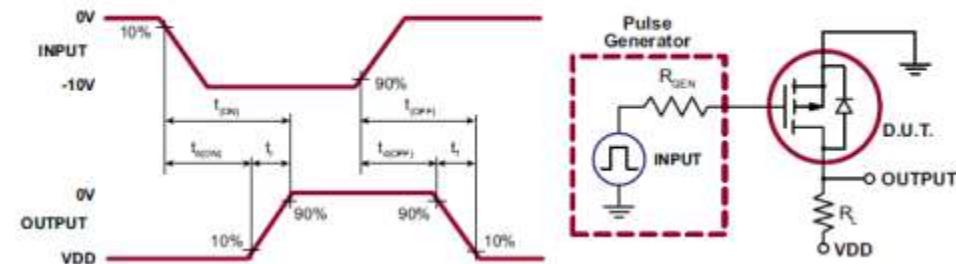
Features:

- N-Channel
 - BV_{DSS} : 500V min, $R_{DS(ON)}$: 60Ω max
- P-Channel
 - BV_{DSS} : -500V min, $R_{DS(ON)}$: 125Ω max
- Independent N- and P-channels
- Electrically isolated N- and P-channels
- Low input capacitance
- Fast switching speeds
- Free from secondary breakdowns
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOIC-8

N-Channel Switching Waveform and Test Circuit



P-Channel Switching Waveform and Test Circuit



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MICROCHIP

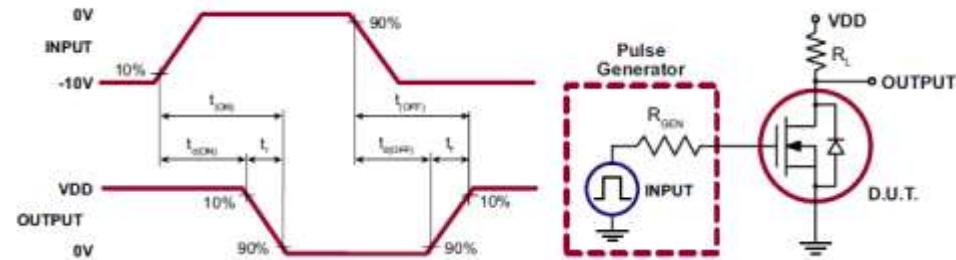
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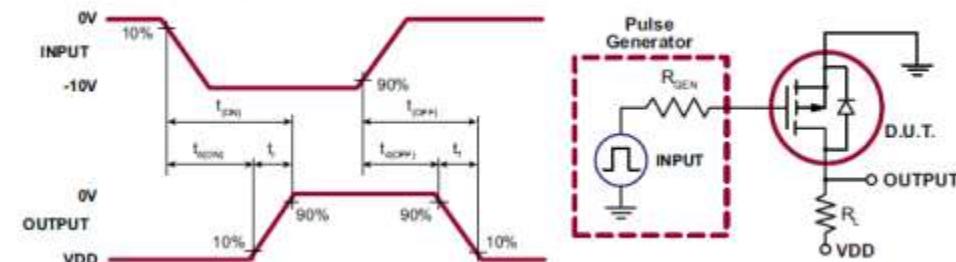
Features:

- N-Channel
 - BV_{DSS} : 200V min, $R_{DS(ON)}$: 7.0 Ω max
- P-Channel
 - BV_{DSS} : -200V min, $R_{DS(ON)}$: 12 Ω max
- Low threshold
- Low on-resistance
- Low input capacitance
- Fast switching speeds
- Freedom from secondary breakdown
- Low input and output leakage
- Independent, electrically isolated N- and P-channels
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOIC-8

N-Channel Switching Waveform and Test Circuit



P-Channel Switching Waveform and Test Circuit



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MICROCHIP

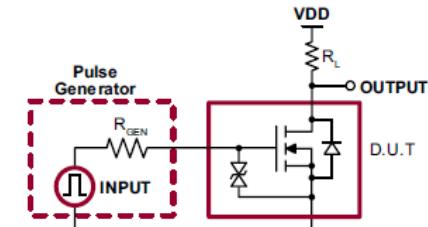
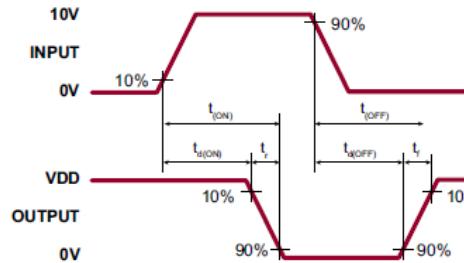
TC6215

Online
Datasheet

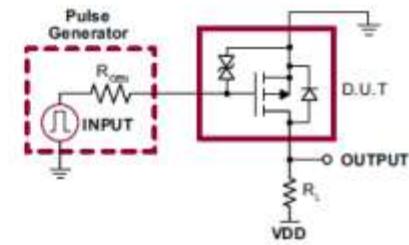
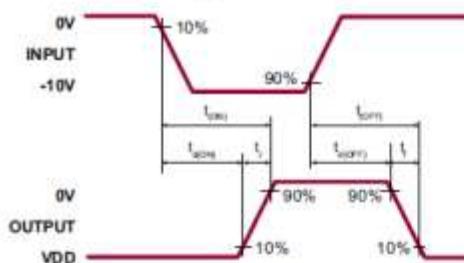
Features:

- N-Channel
 - BV_{DSS} : 150V min, $R_{DS(ON)}$: 4.0 Ω max
- P-Channel
 - BV_{DSS} : -150V min, $R_{DS(ON)}$: 7.0 Ω max
- Back to back gate-source Zener diodes
- Guaranteed RDS(ON) at 4.0V gate drive
- Low threshold and low on-resistance
- Independent N- and P-channels
- Electrically isolated N- and P-channels
- Low input capacitance
- Fast switching speeds
- Free from secondary breakdowns
- Low input and output leakage
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOIC-8

N-Channel Switching Waveform and Test Circuit



P-Channel Switching Waveform and Test Circuit

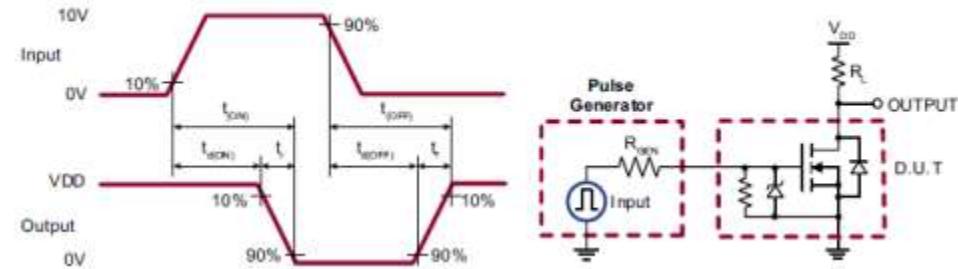


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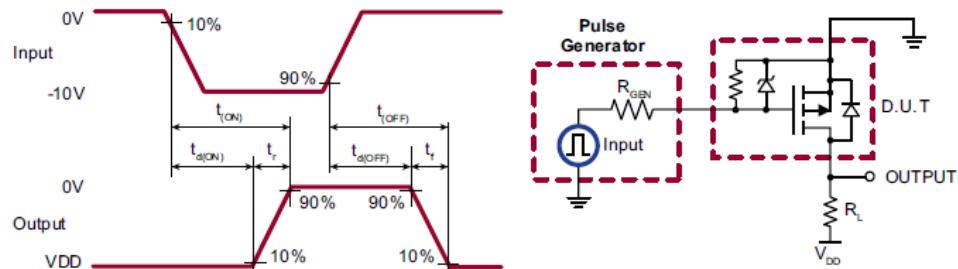
Features:

- N-Channel
 - BV_{DSS} : 200V min, $R_{DS(ON)}$: 7.0 Ω max
- P-Channel
 - BV_{DSS} : -200V min, $R_{DS(ON)}$: 8.0 Ω max
- Integrated GATE-to-SOURCE resistor
- Integrated GATE-to-SOURCE Zener diode
- Low threshold and low on-resistance
- Low input capacitance
- Fast switching speeds
- Free from secondary breakdown
- Low input and output leakage
- Independent, electrically isolated N- and P-channels
- Operating Temperature Range:
-55°C to +150°C
- Package Option: SOIC-8, VDFN-8

N-Channel Switching Waveform and Test Circuit



P-Channel Switching Waveform and Test Circuit





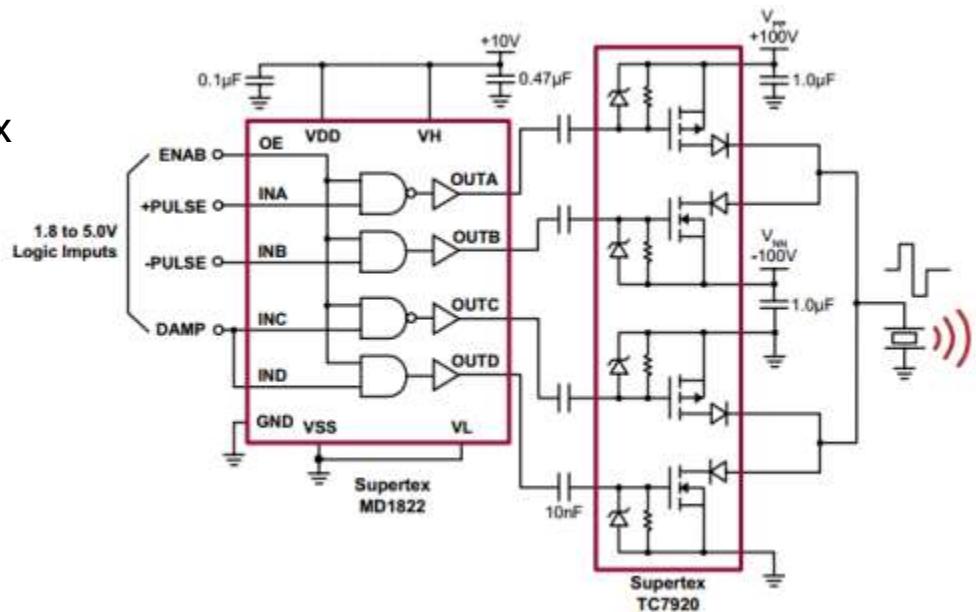
MICROCHIP

TC7920

Online
Datasheet

Features:

- N-Channel
 - BV_{DSS} : 200V min, $R_{DS(ON)}$: 7.0 Ω max
- P-Channel
 - BV_{DSS} : -200V min, $R_{DS(ON)}$: 8.0 Ω max
- High voltage Vertical DMOS technology
- Integrated drain output high voltage diodes
- Integrated gate-to-source resistor
- Integrated gate-to-source Zener diode
- Low threshold, Low on-resistance
- Low input & output capacitance
- Fast switching speeds
- Electrically isolated N- and P-MOSFET pairs
- Operating Temperature Range:
-55°C to +150°C
- Package Option: VDFN-12



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MICROCHIP

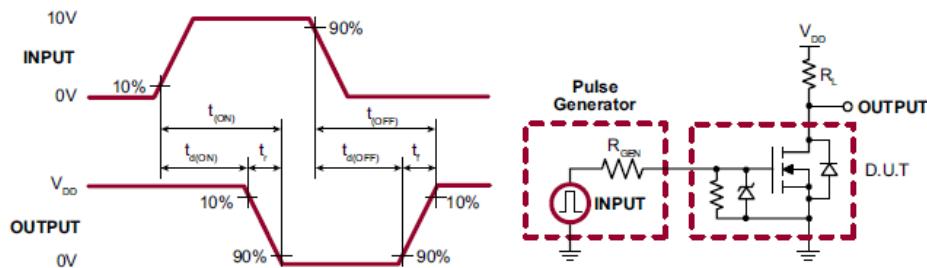
TC8020

Online
Datasheet

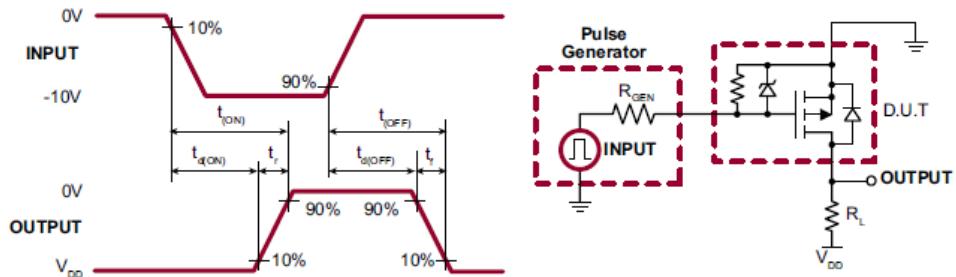
Features:

- N-Channel
 - BV_{DSS} : 200V min, $R_{DS(ON)}$: 8.0 Ω max
- P-Channel
 - BV_{DSS} : -200V min, $R_{DS(ON)}$: 9.5 Ω max
- High voltage, vertical DMOS technology
- Integrated gate-to-source resistor
- Integrated gate-to-source Zener diode
- Typical peak output +/-3.5A at 50V
- Low threshold, low on-resistance
- Low input & output capacitance
- Fast switching speeds
- Electrically isolated N- and P-MOSFET pairs
- Operating Temperature Range:
-55°C to +150°C
- Package Option: VQFN-56

N-Channel Switching Waveform and Test Circuit



P-Channel Switching Waveform and Test Circuit



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MICROCHIP

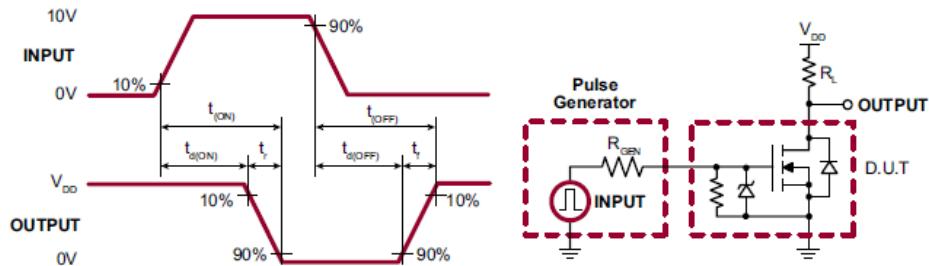
TC8220

Online
Datasheet

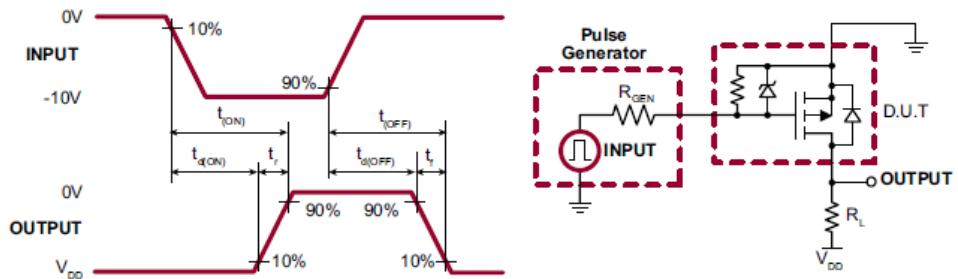
Features:

- N-Channel
 - BV_{DSS} : 200V min, $R_{DS(ON)}$: 5.3Ω max
- P-Channel
 - BV_{DSS} : -200V min, $R_{DS(ON)}$: 6.5Ω max
- High voltage, vertical DMOS technology
- Integrated gate-to-source resistor
- Integrated gate-to-source Zener diode
- Typical peak output +/-3.5A at 50V
- Low threshold, low on-resistance
- Low input & output capacitance
- Fast switching speeds
- Electrically isolated N- and P-MOSFET pairs
- Operating Temperature Range:
-55°C to +150°C
- Package Option: VDFN-12

N-Channel Switching Waveform and Test Circuit



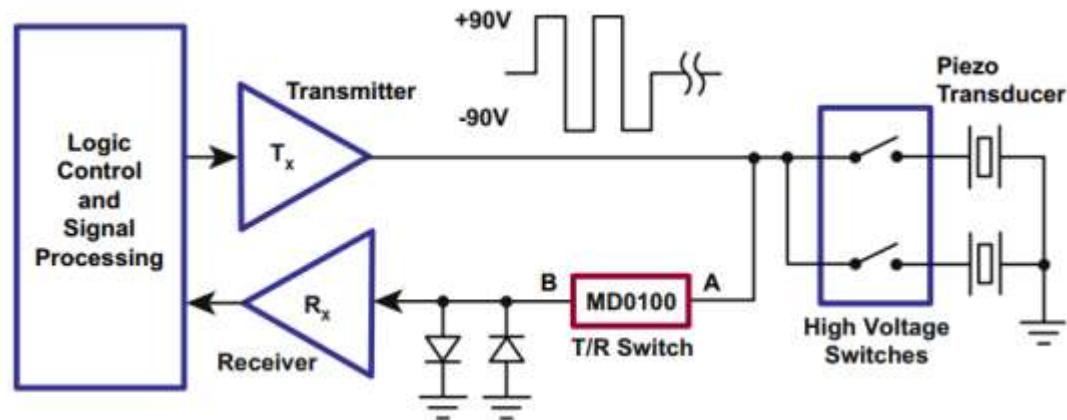
P-Channel Switching Waveform and Test Circuit



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Features:

- Up to $\pm 100V$ input voltage protection
- Low on resistance - 15Ω typical
- Fast switching speed
- Effectively, a simple two terminal device
- No external supplies needed
- Dual & single channel versions of device
- Operating Temperature Range:
 0°C to $+125^{\circ}\text{C}$
- Package Option: DFN-8, SOT-89





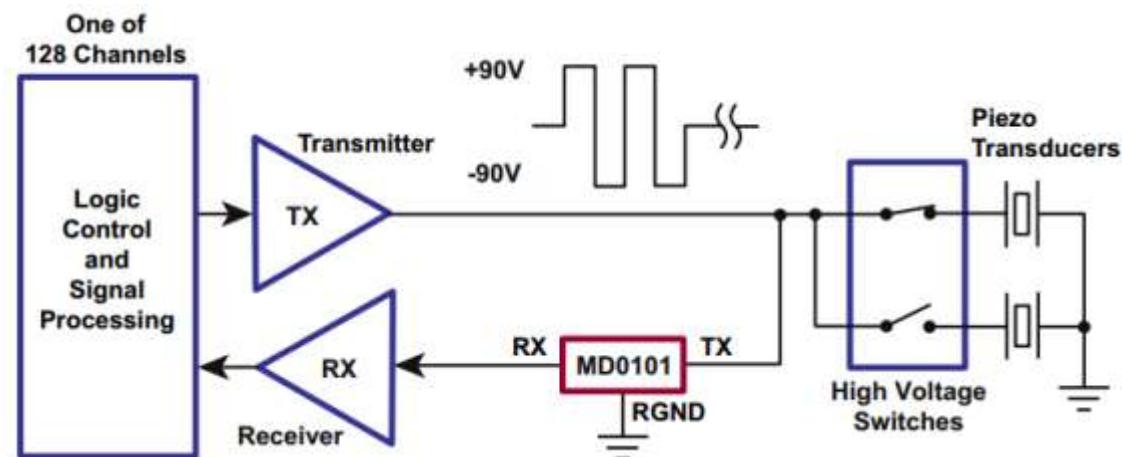
MICROCHIP

MD0101

Online
Datasheet

Features:

- Up to $\pm 100V$ input voltage protection
- Low on resistance - 15Ω typical
- Integrated clamp diodes
- Fast switching speed
- Four electrically isolated channels
- No external supplies needed
- Operating Temperature Range:
 0°C to $+125^{\circ}\text{C}$
- Package Option: DFN-18



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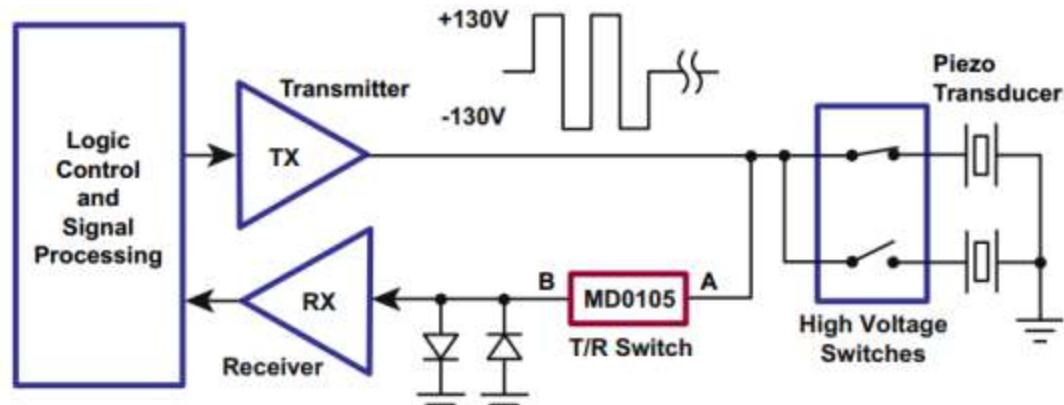
MICROCHIP

MD0105

Online
Datasheet

Features:

- Up to $\pm 130V$ input voltage protection
- Low on resistance - 15Ω typical
- Fast switching speed
- Four electrically isolated channels
- No external supplies needed
- Operating Temperature Range:
 0°C to $+125^{\circ}\text{C}$
- Package Option: DFN-18



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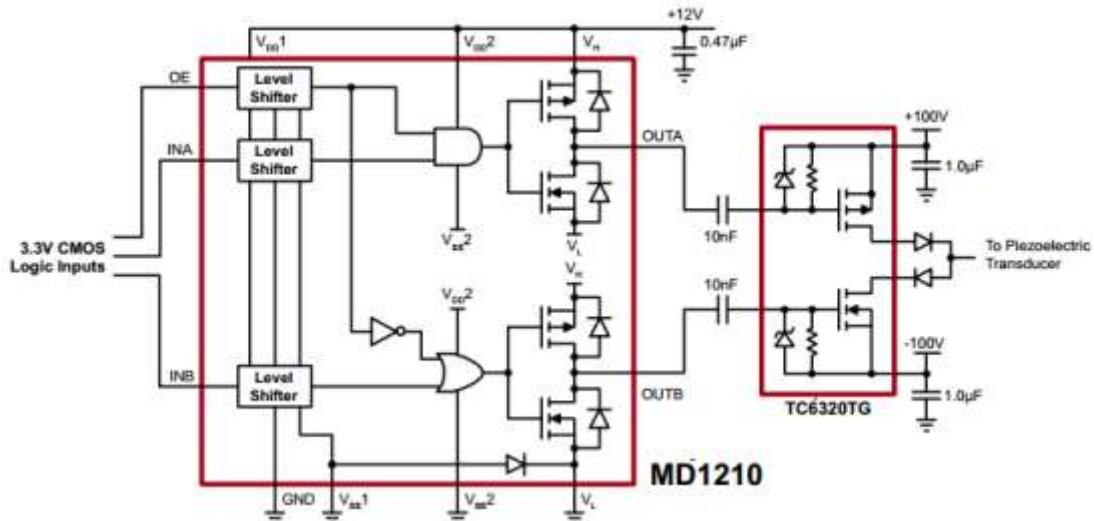
MICROCHIP

MD1210

[Online Datasheet](#)

Features:

- 6ns rise and fall time with 1000pF load
- 2.0A peak output source/sink current
- 1.2V to 5.0V input CMOS compatible
- 4.5V to 13V single positive supply voltage
- Smartlogic threshold
- Low jitter design
- Two matched channels
- Outputs can swing below ground
- Low inductance package
- Thermally-enhanced package
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-12



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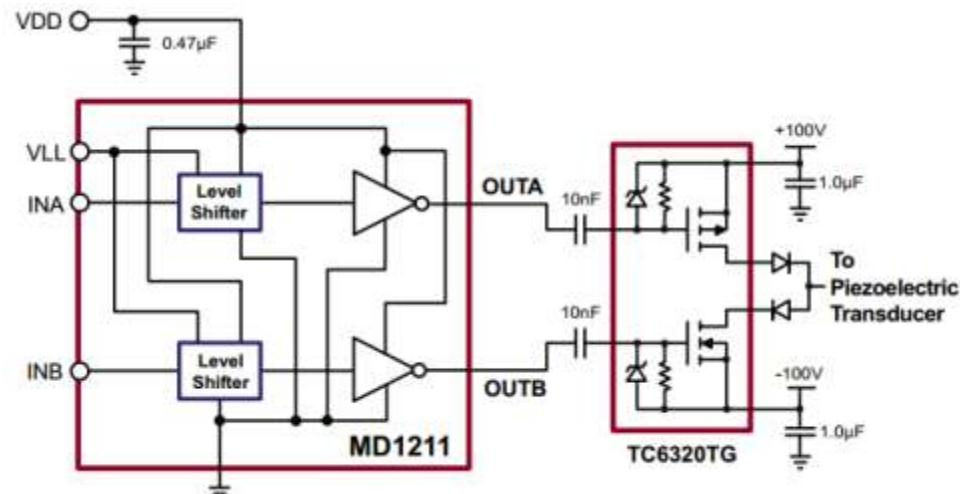
MICROCHIP

MD1211

Online
Datasheet

Features:

- 10ns average rise and fall time with 1000pF load
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 4.5 to 13V total supply voltage
- Dual matched channels
- Reduced clock skew
- Low input capacitance
- Operating Temperature Range:
-20°C to +85°C
- Package Option: SOIC-8



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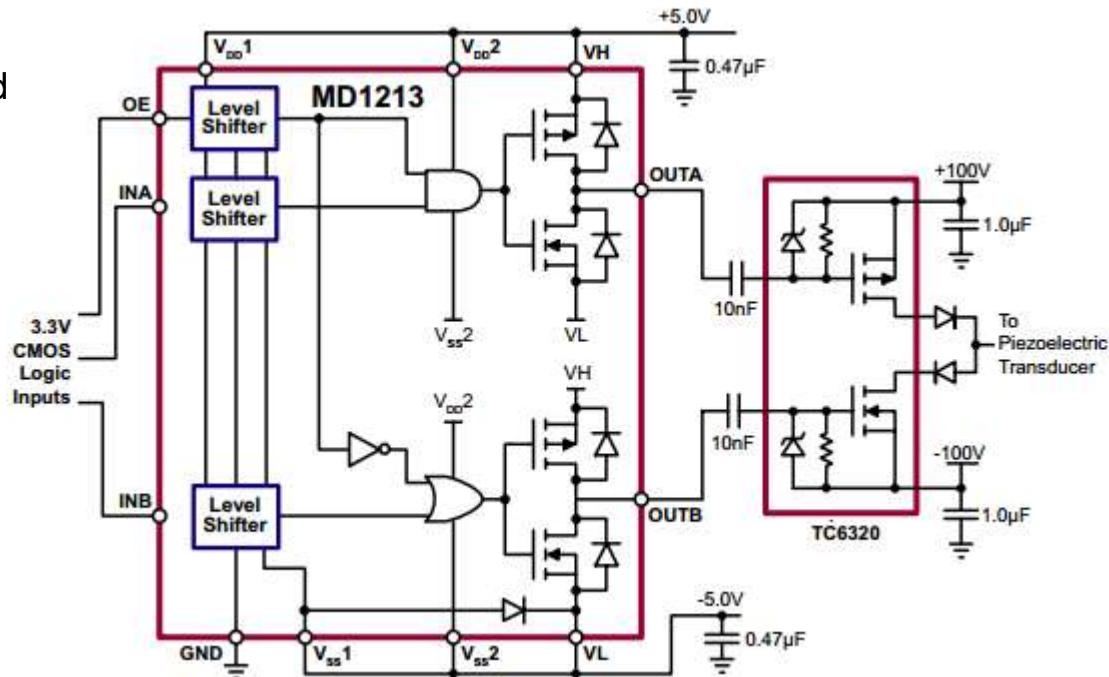
MICROCHIP

MD1213

Online
Datasheet

Features:

- 6.0ns rise and fall time with 1000pF load
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 4.5 to 13V total supply voltage
- Smart logic threshold
- Low jitter design
- Two matched channels
- Outputs can swing below ground
- Low inductance package
- Thermally-enhanced package
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-12



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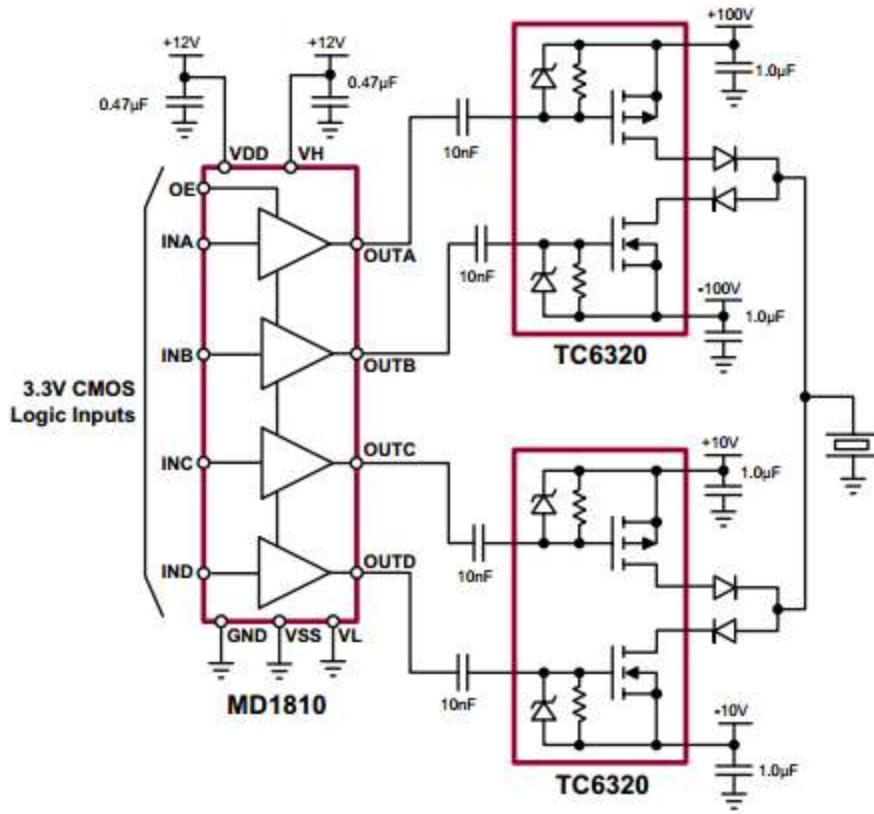
MICROCHIP

MD1810

Online
Datasheet

Features:

- 6.0ns rise and fall time with 1000pF load
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 5.0 to 12V total supply voltage
- Smart logic threshold
- Low jitter design
- Four matched channels
- Outputs can swing below ground
- Output is high impedance when disabled
- Low inductance package
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-16



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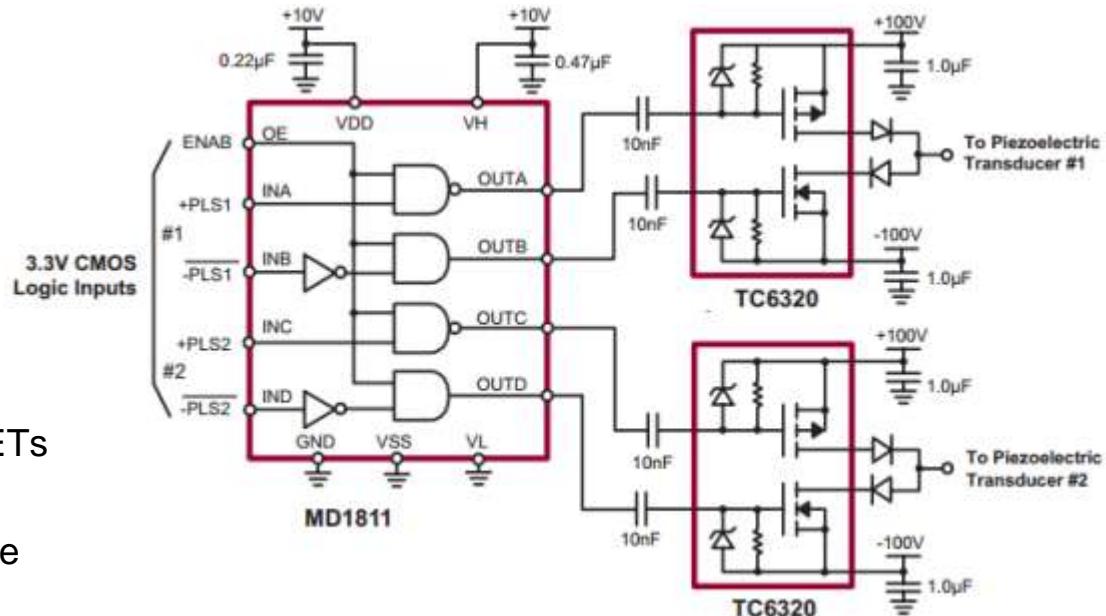
MICROCHIP

MD1811

Online
Datasheet

Features:

- 6.0ns rise and fall time
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 5.0 to 12V total supply voltage
- Smart logic threshold
- Low jitter design
- Quad matched channels
- Drives two P- and two N-channel MOSFETs
- Outputs can swing below ground
- Low inductance quad flat no-lead package
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-16



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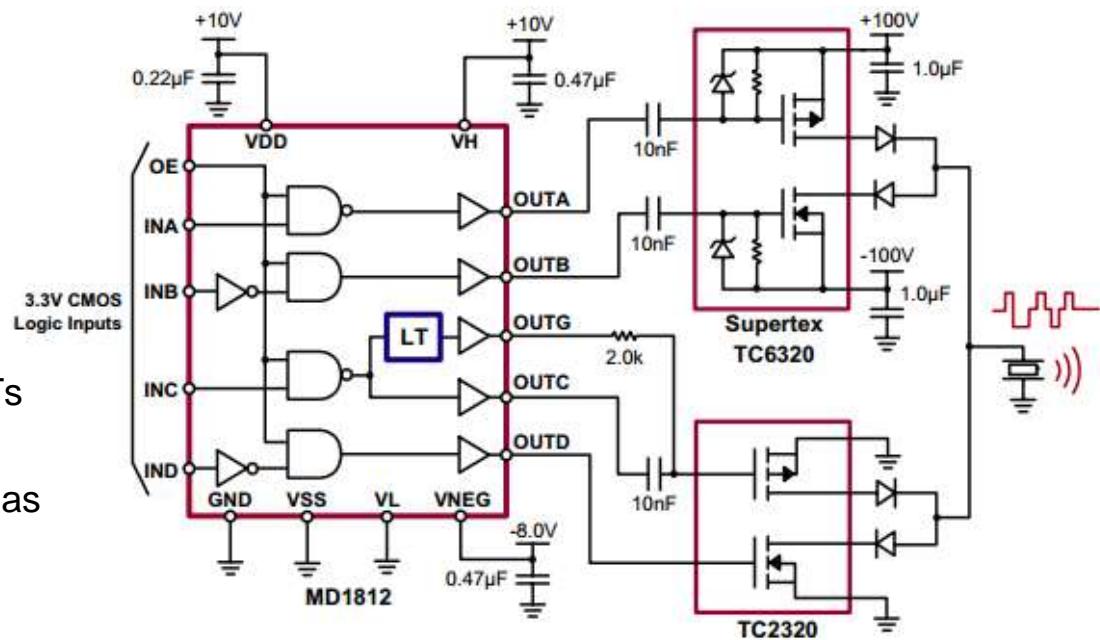
MICROCHIP

MD1812

Online
Datasheet

Features:

- 6.0ns rise and fall time
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- Smart logic threshold
- Low jitter design
- Quad matched channels
- Drives two N and two P-channel MOSFETs
- Outputs can swing below ground
- Built-in level translator for negative gate bias
- User-defined damping for return-to-zero application
- Low inductance quad flat no-lead package
- Operating Temperature Range:
-25°C to +125°C
- Package Option: QFN-16



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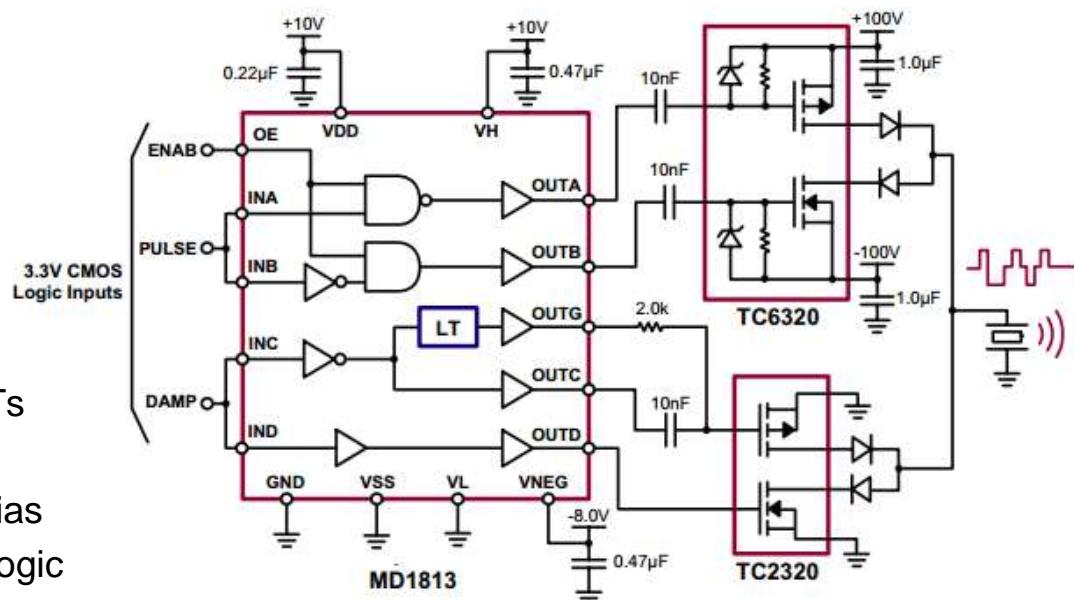
MICROCHIP

MD1813

Online
Datasheet

Features:

- 6ns rise and fall time
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- Smart Logic threshold
- Low jitter design
- Quad matched channels
- Drives two N and two P-channel MOSFETs
- Outputs can swing below ground
- Built-in level translator for negative gate bias
- Non-inverting gate driver OUTD for easy logic
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-16



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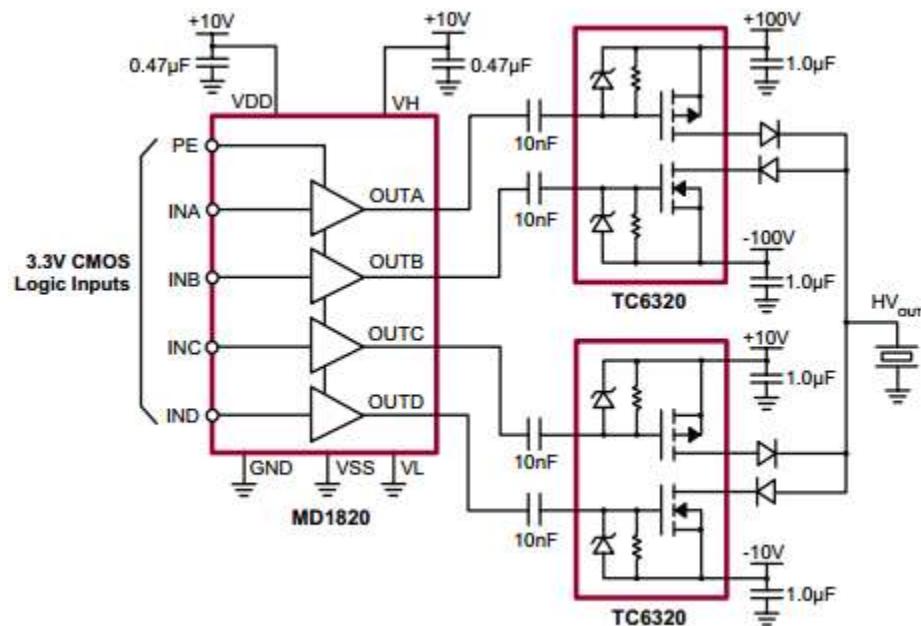
MICROCHIP

MD1820

Online
Datasheet

Features:

- Non-inverting, four channel MOSFET driver
- 6.0ns rise and fall time
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 5.0 to 10V total supply voltage
- Smart logic threshold
- Low jitter design
- Four matched channels
- Drives two P- and two N-channel MOSFETs
- Outputs can swing below ground
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-16



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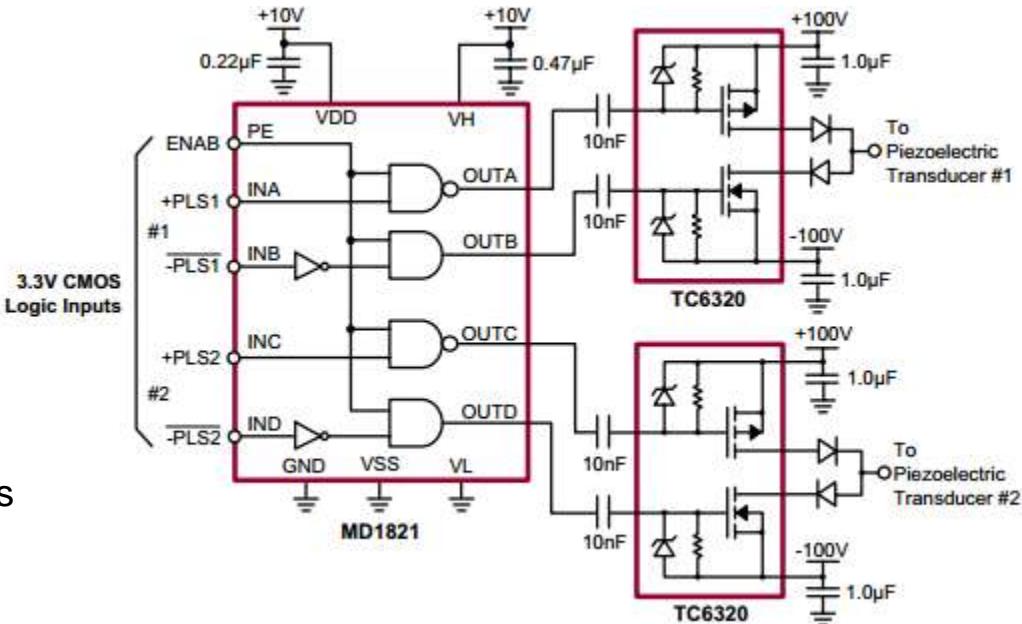
MICROCHIP

MD1821

Online
Datasheet

Features:

- Inverting MOSFET driver
- 6.0ns rise and fall time
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 5.0 to 10V total supply voltage
- Smart logic threshold
- Low jitter design
- Four matched channels
- Drives two P- and two N-channel MOSFETs
- Outputs can swing below ground
- Operating Temperature Range:
20°C to +85°C
- Package Option: QFN-16



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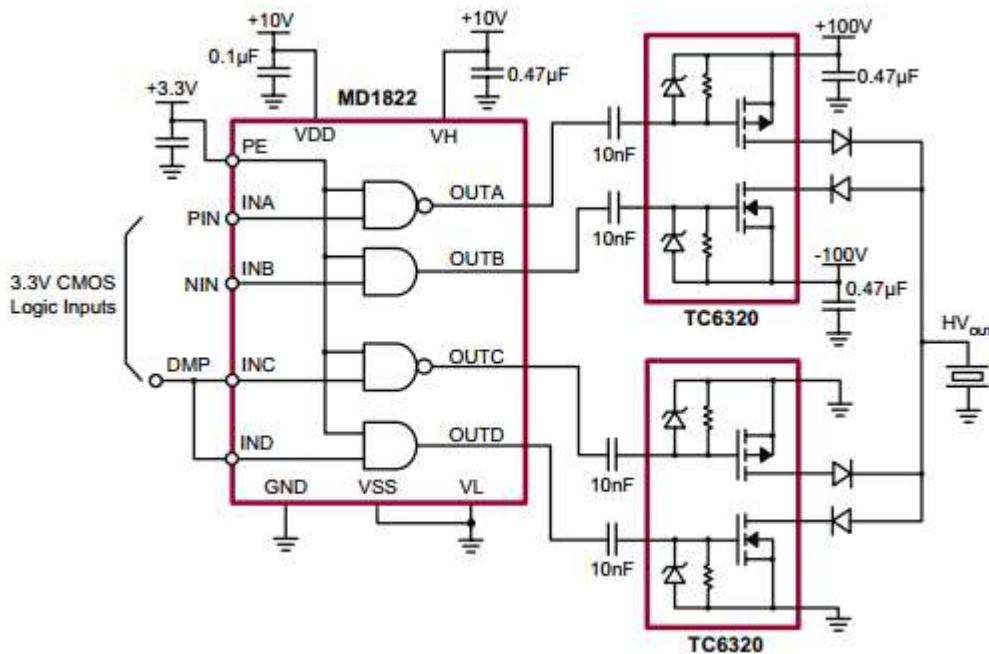
MICROCHIP

MD1822

Online
Datasheet

Features:

- Mixed inversion MOSFET driver
- 6.0ns rise and fall time
- 2.0A peak output source/sink current
- 1.8 to 5.0V input CMOS compatible
- 5.0 to 10V total supply voltage
- Smart logic threshold
- Low jitter design
- Four matched channels
- Drives two P- and two N-channel MOSFETs
- Outputs can swing below ground
- Operating Temperature Range:
-20°C to +85°C
- Package Option: QFN-16



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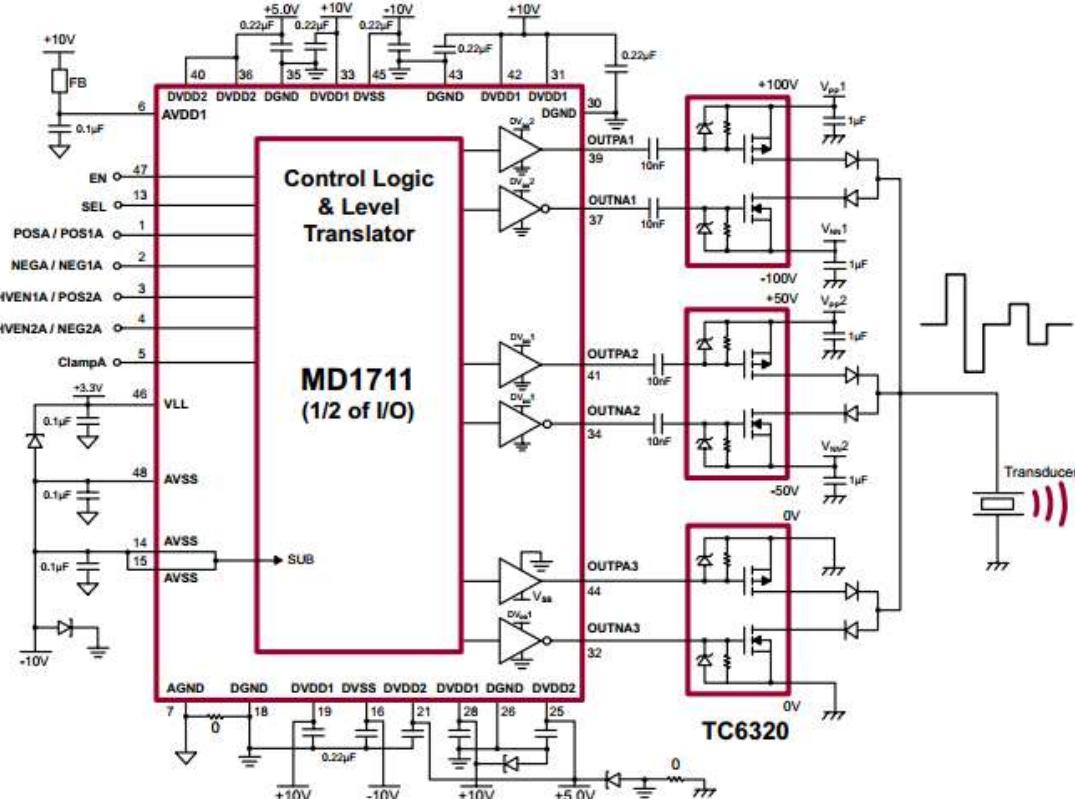


MD1711

Online
Datasheet

Features:

- Drives two ultrasound transducer channels
 - Generates 5-level waveform
 - Drives 12 high voltage MOSFETs
 - $\pm 2.0\text{A}$ source and sink peak current
 - Up to 20MHz output frequency
 - 12V/ns slew rate
 - $\pm 3\text{ns}$ matched delay times
 - Second harmonic is less than -40dB
 - Two separate gate drive voltages
 - 1.8 to 3.3V CMOS logic interface
 - Operating Temperature Range:
0°C to +125°C
 - Package Option: LQFP-48, QFN-48



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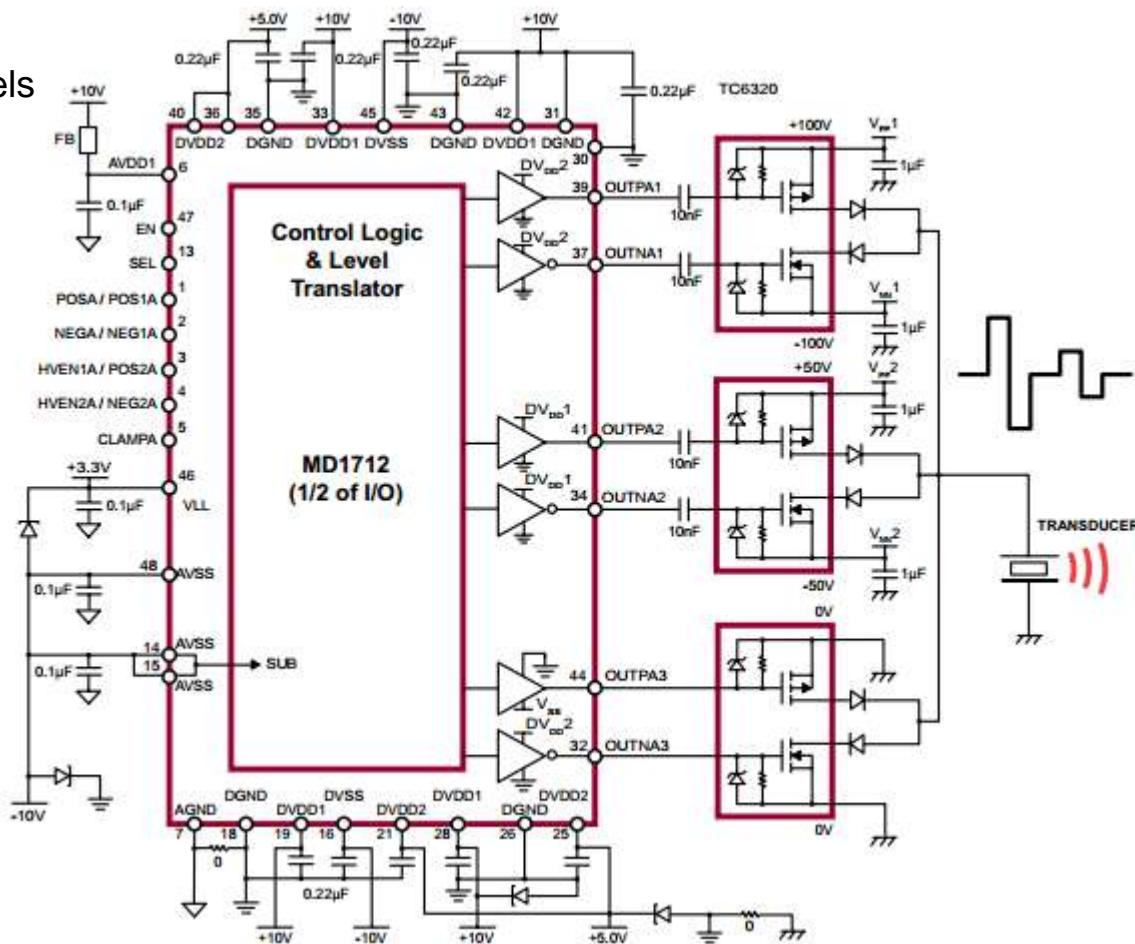
MICROCHIP

MD1712

Online
Datasheet

Features:

- Drives two ultrasound transducer channels
- Generates five-level waveform
- Drives 12 high voltage MOSFETs
- $\pm 2.0A$ source and sink peak current
- Up to 20MHz output frequency
- 12V/ns slew rate
- $\pm 3.0\text{ns}$ matched delay times
- Second harmonic is less than -40dB
- Two separate gate drive voltages
- 1.8 to 3.3V CMOS logic interface
- Operating Temperature Range:
 0°C to $+125^\circ\text{C}$
- Package Option: LQFP-48, QFN-48



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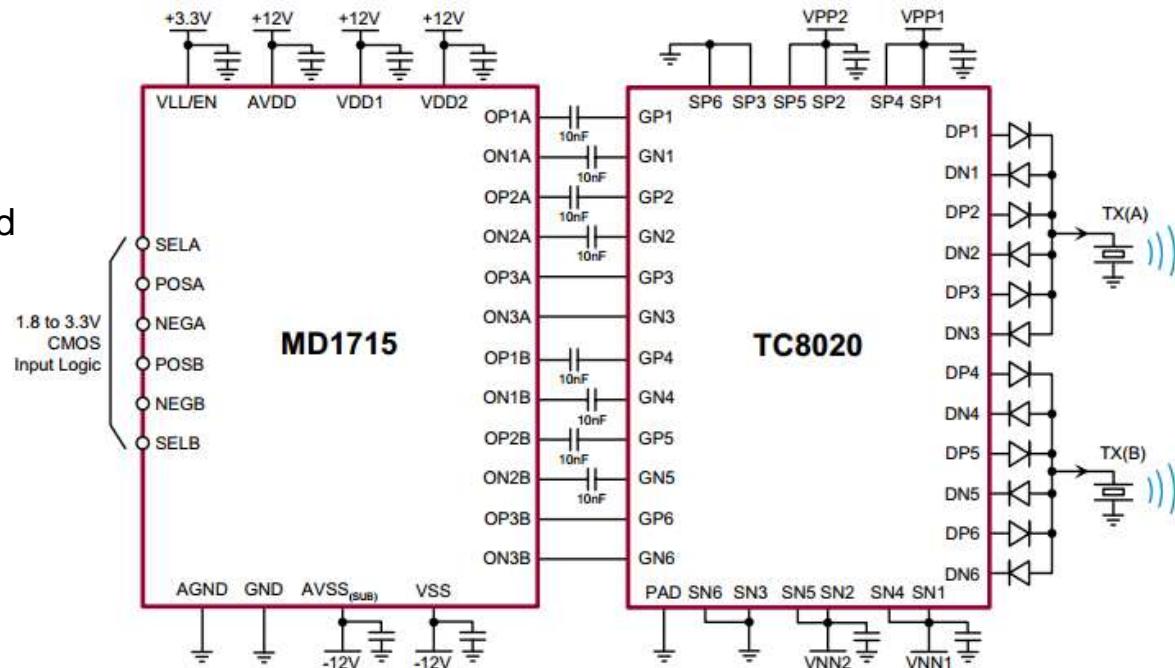
MICROCHIP

MD1715

Online
Datasheet

Features:

- Advanced CMOS technology
- ± 4.75 to $12.9V$ gate drive voltage
- 2A output source and sink current
- 6.5ns rise and fall time with $1nF$ load
- 10ns propagation delay
- $\pm 2ns$ matched delay times
- 12 matched channels
- 1.8V to 3.3V CMOS logic interface
- Smart logic threshold
- Low inductance package
- Operating Temperature Range:
 $0^{\circ}C$ to $+70^{\circ}C$
- Package Option: QFN-40



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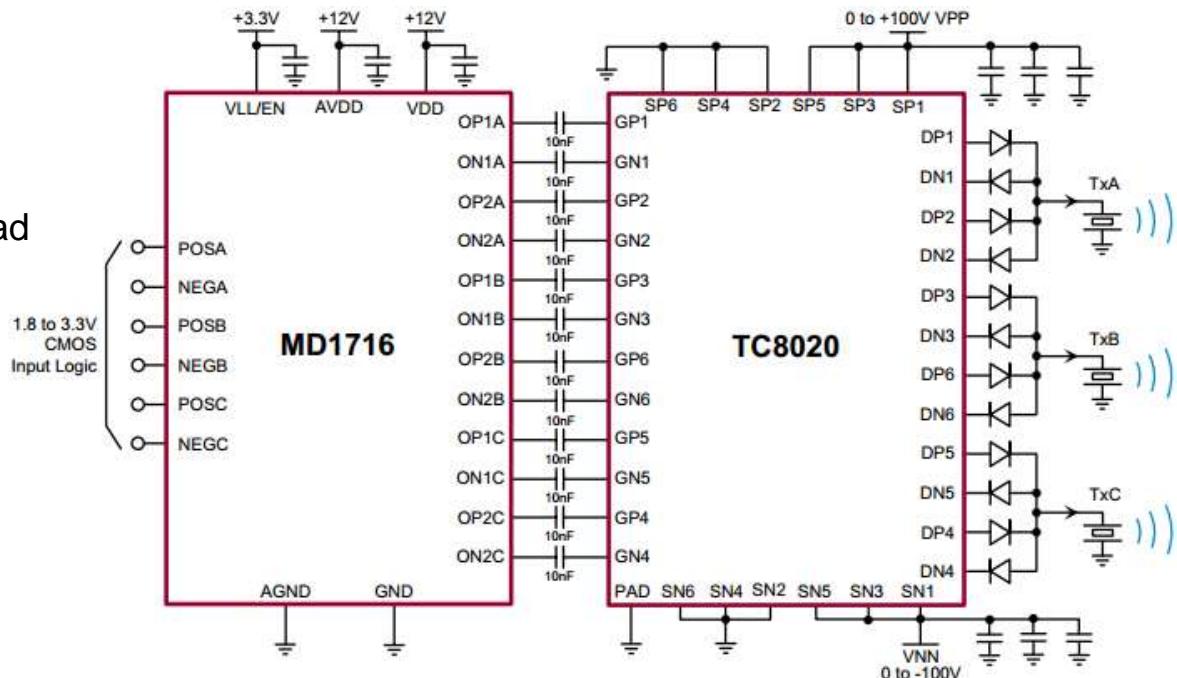
MICROCHIP

MD1716

Online
Datasheet

Features:

- Advanced CMOS technology
- 4.5 to 12.5V power supply voltage
- 2.0A output source and sink current
- 6.5ns rise and fall time with 1.0nF load
- 10ns propagation delay
- ± 2 ns matched delay times
- 12 matched channels
- 1.8 to 3.3V CMOS logic interface
- Smart logic threshold
- Operating Temperature Range:
 0°C to $+125^{\circ}\text{C}$
- Package Option: QFN-40



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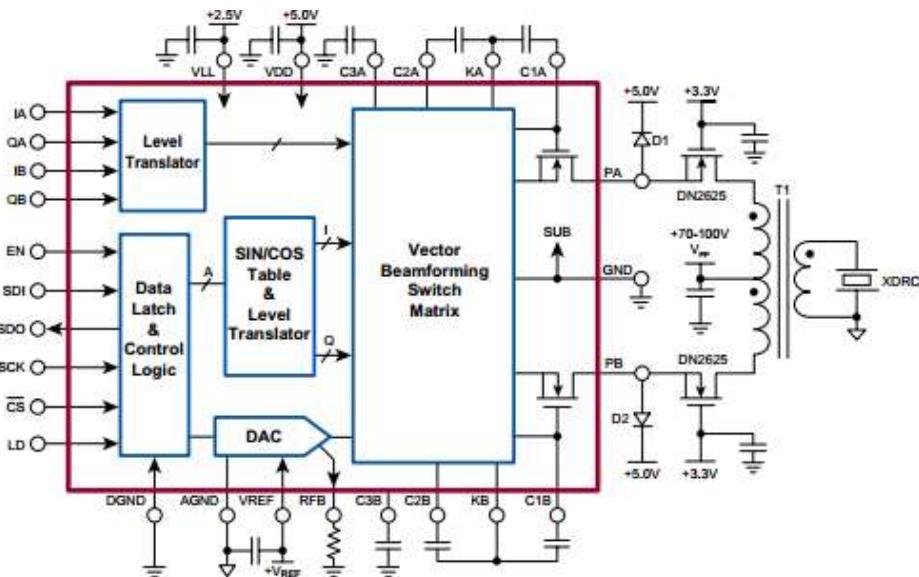
MICROCHIP

MD2131

Online
Datasheet

Features:

- High resolution transmitting waveform
- Up to 3.0A push-pull source-driving current
- 230VP-P maximum output, uses two DN2625 FETs
- Angle vector beamforming I-Q switcher matrix
- 8-bit apodization DAC and 7.5° angular resolution
- Flexible frequency-resolution trade-off
- Programmable aperture windowing
- 250MHz maximum sampling rate
- 25MHz ultrasound maximum frequency
- PWM modulation push-pull current source
- Focusing phase adjustment & chirp waveform
- Fast SPI interface
- 2.5V CMOS logic interface
- +5.0V single power supply
- Low second order harmonic distortions
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-40



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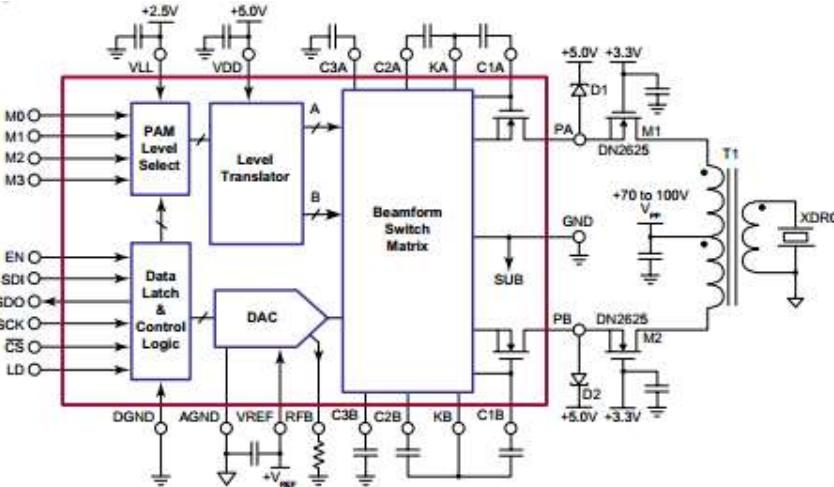
MICROCHIP

MD2134

Online
Datasheet

Features:

- Multiple-level ultrasound pulser
- Fast switching current source for push-pull topology
- 250MHz maximum frequency, 4.0ns input to output delay
- 15 independent programmable output level registers
- Pulse amplitude modulation (PAM) with 8-bit resolution
- 8-bit apodization DAC for peak output current via SPI
- Very low second order harmonic distortion
- Picoseconds time-jitter from input to output
- Fast SPI write and read-back of level & DAC registers
- +5.0V power supply, 2.5V CMOS logic interface
- Drives DN2625 MOSFETs output up to 230VP-P
- Programmable aperture windowing
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-40



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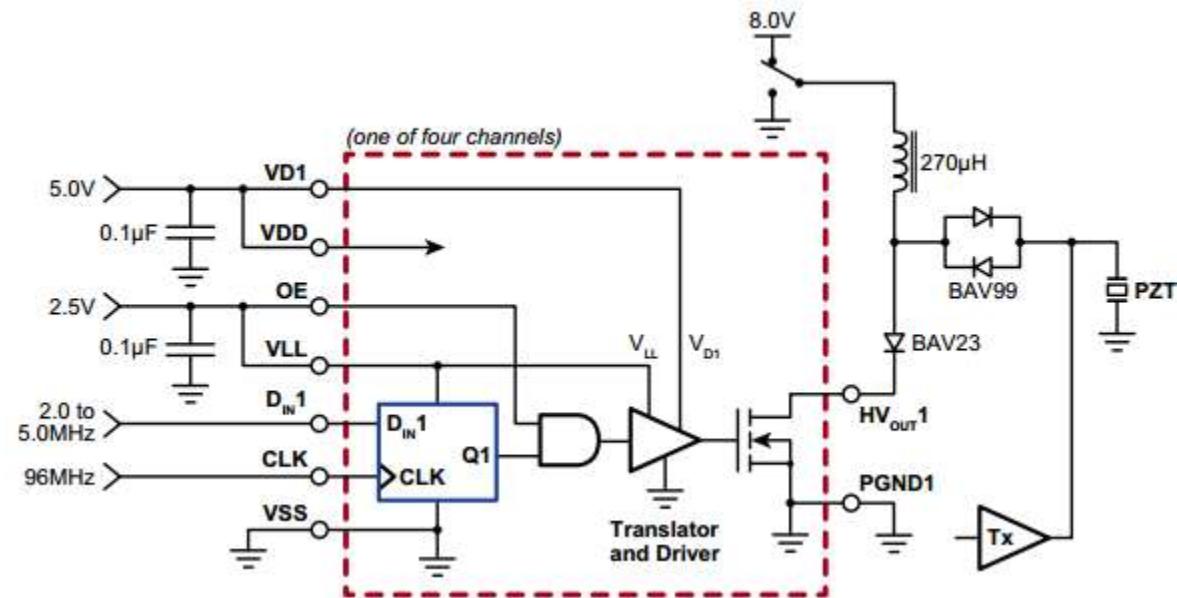
MICROCHIP

CW01

Online
Datasheet

Features:

- Low phase noise
- 100V open drain N-channel
- High speed D flip-flop
- High speed MOSFET gate driver
- Up to 200MHz clock input
- VDD and VLL undervoltage lockout
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-24



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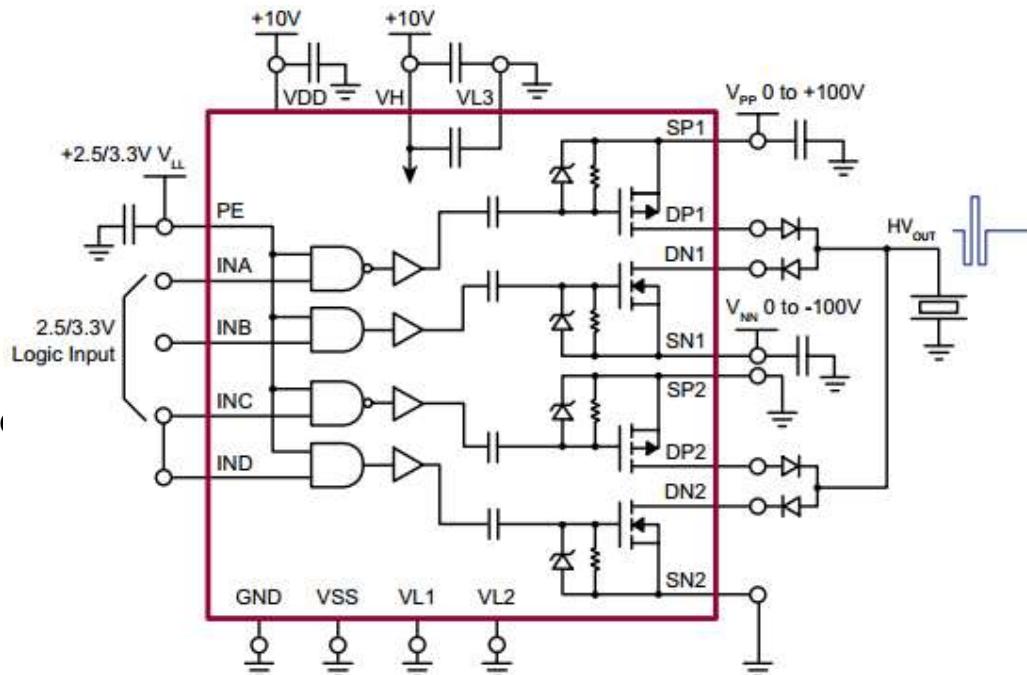
MICROCHIP

HV7360

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- High density integration AC coupled pulser
- 0 to ± 100 V output voltage
- ± 2.5 A source and sink minimum pulse current
- Up to 35MHz operating frequency
- 2.0ns matched delay times
- 2.5, 3.3 or 5.0V CMOS logic interface
- Low power consumption and very simple to use
- Operating Temperature Range:
 0°C to $+70^{\circ}\text{C}$
- Package Option: LFGA-22



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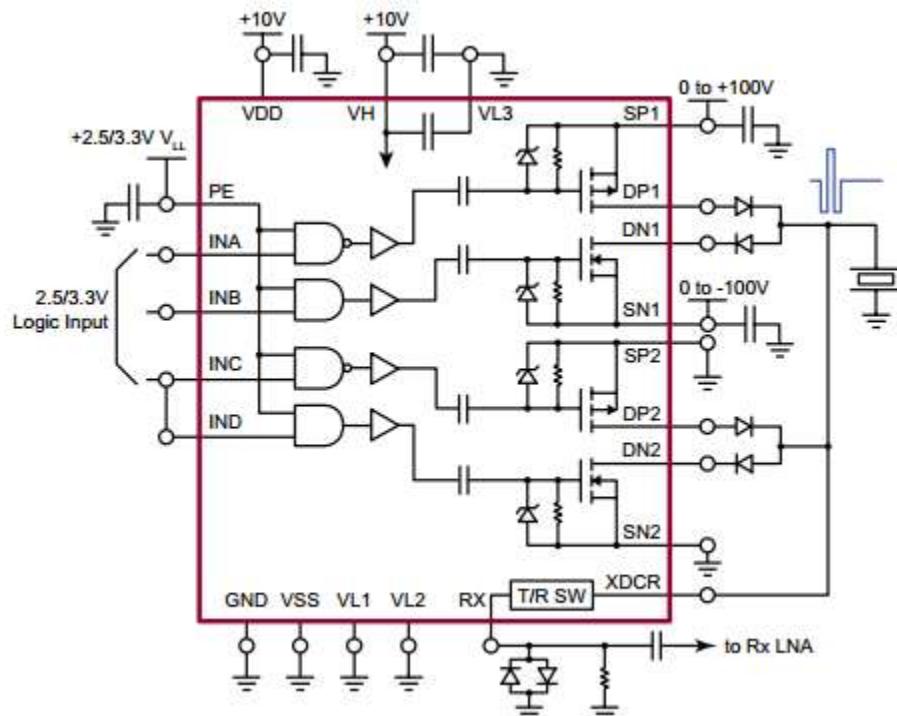
MICROCHIP

HV7361

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- High density integration AC coupled pulser
- 0 to ± 100 V output voltage
- ± 2.5 A source and sink minimum pulse current
- Up to 35MHz operating frequency
- 2.0ns matched delay times
- 2.5, 3.3 or 5.0V CMOS logic interface
- Built-in two terminal, low noise T/R switch
- Low power consumption and very simple to use
- Operating Temperature Range:
 0°C to $+70^{\circ}\text{C}$
- Package Option: LFGA-22



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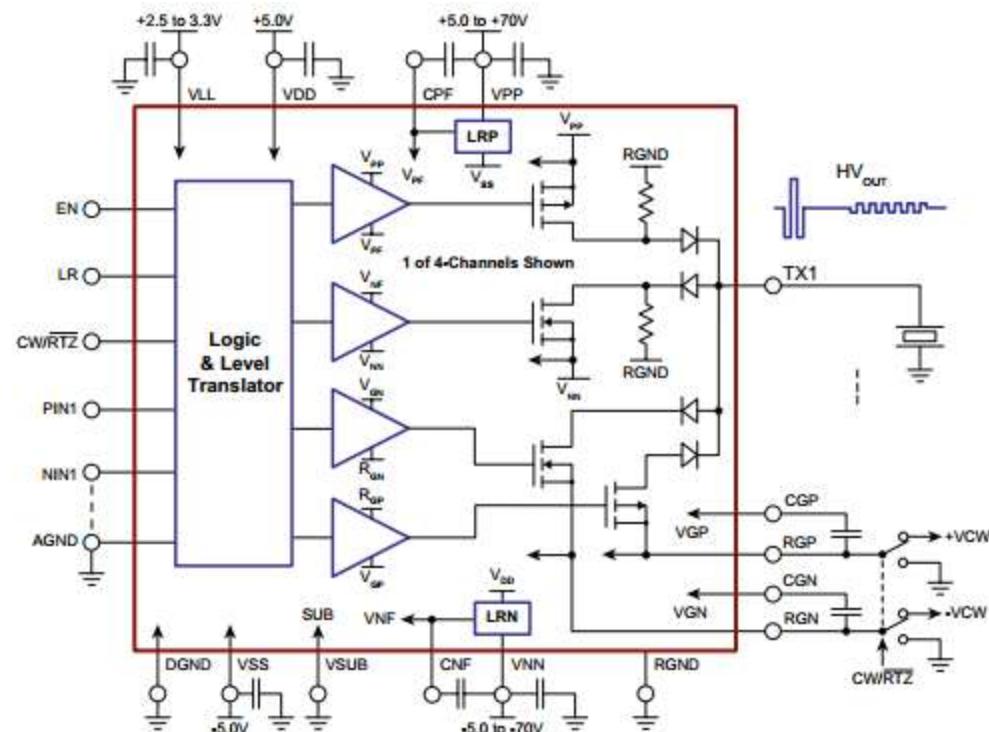
MICROCHIP

HV7331

Online
Datasheet

Features:

- HVCMOS technology for high performance
- High density integrated ultrasound transmitter
- 0 to $\pm 70\text{V}$ output voltage
- $\pm 2.0\text{A}$ source and sink minimum pulse current
- Up to 20MHz operation frequency
- $\pm 2.5\text{ns}$ matched delay times
- 2.5 to 5.0V CMOS logic interface
- Built-in output drain diode and bleed resistors
- CW/RTZ Doppler quick switching
- Two damping mode options
- Operating Temperature Range:
 0°C to $+70^\circ\text{C}$
- Package Option: QFN-64



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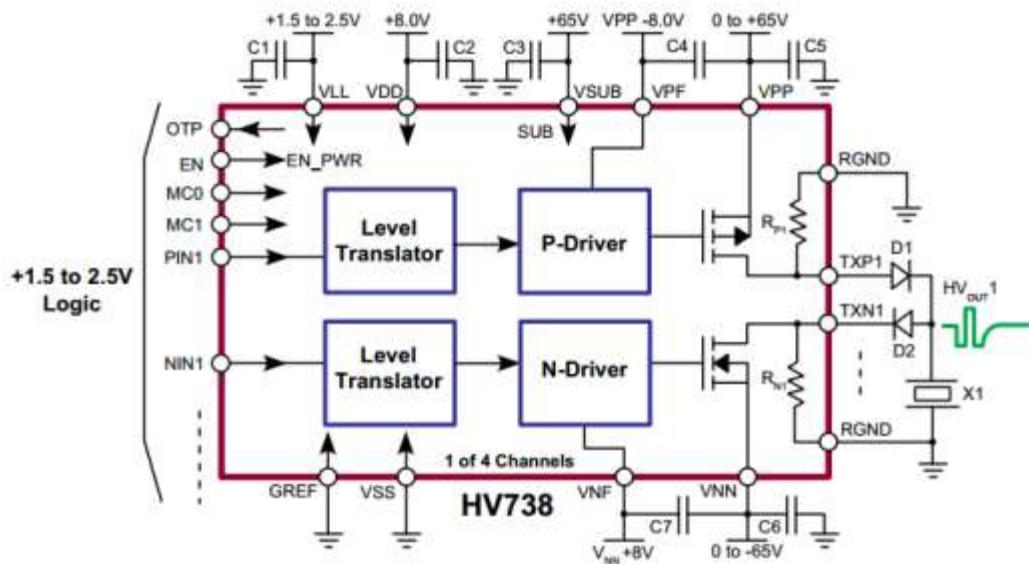
MICROCHIP

HV738

Online
Datasheet

Features:

- HVCMOS technology for high performance
- High density integration ultrasound transmitter
- 0 to $\pm 65\text{V}$ output voltage
- $\pm 750\text{mA}$ source and sink current in Pulse mode
- $\pm 110\text{mA}$ source and sink current in CW mode
- Up to 20MHz operating frequency
- Matched delay times
- 1.2 to 5.0V CMOS logic interface
- Built-in output drain bleed resistors
- Operating Temperature Range:
 0°C to $+70^\circ\text{C}$
- Package Option: QFN-48



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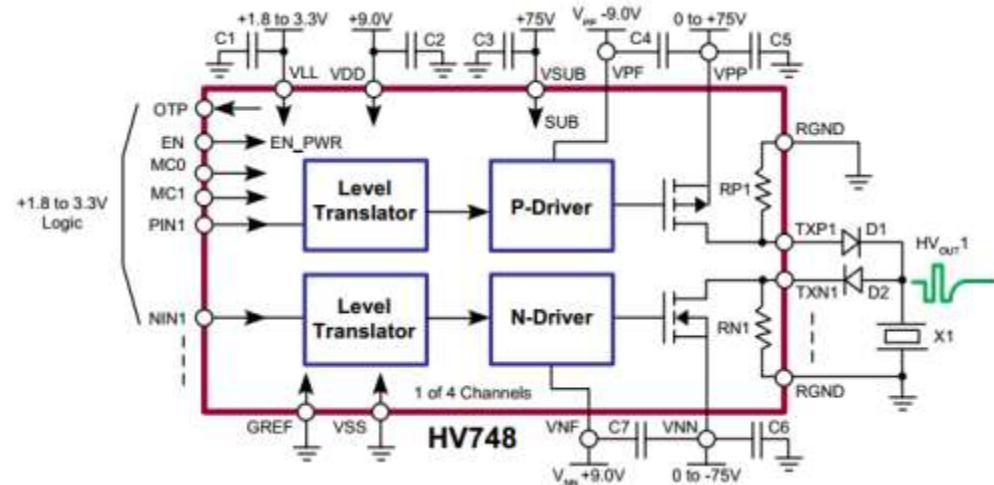
MICROCHIP

HV748

Online
Datasheet

Features:

- HVCMOS technology for high performance
- High density integration ultrasound transmitter
- 0 to $\pm 75\text{V}$ output voltage
- $\pm 1.25\text{A}$ source and sink current in pulse mode
- $\pm 400\text{mA}$ source and sink current in CW mode
- Up to 20MHz operating frequency
- Matched delay times
- 1.2V to 5.0V CMOS logic interface
- Built-in output drain bleed resistors
- Operating Temperature Range:
 0°C to $+70^\circ\text{C}$
- Package Option: QFN-48



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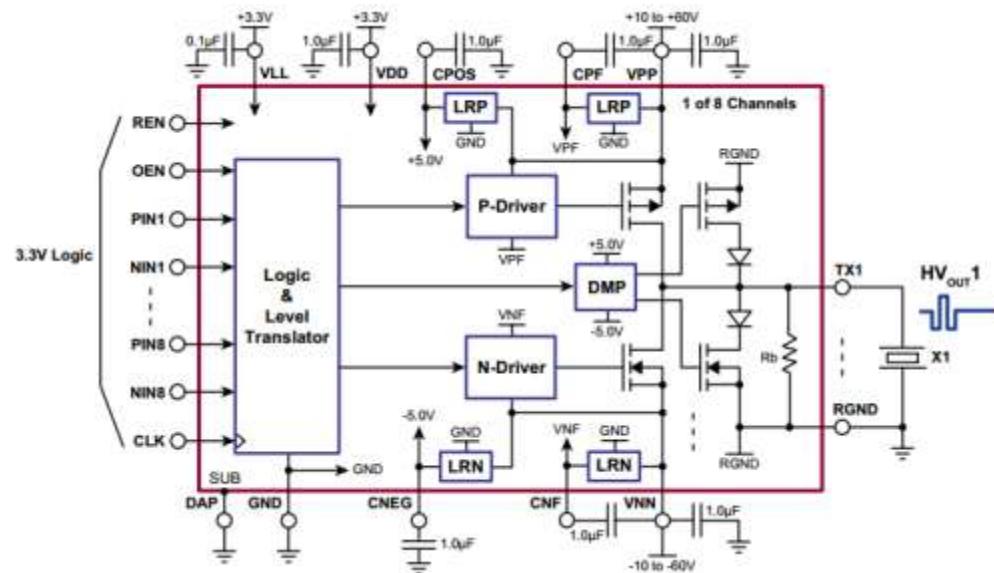
MICROCHIP

HV7350

Online
Datasheet

Features:

- HVCMOS technology for high performance
- High density integrated ultrasound transmitter
- 0 to $\pm 60V$ output voltage
- $\pm 1.0A$ source and sink current in pulse mode
- $\pm 1.0A$ source and sink current in RTZ mode
- Up to 20MHz operating frequency
- Matched delay times
- Optional clock re-alignment
- 3.3V CMOS logic interface and reference
- +3.3V low voltage supply for VDD
- Built-in linear regulators for floating gate driver
- Built-in output drain diodes & bleed resistors
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-56



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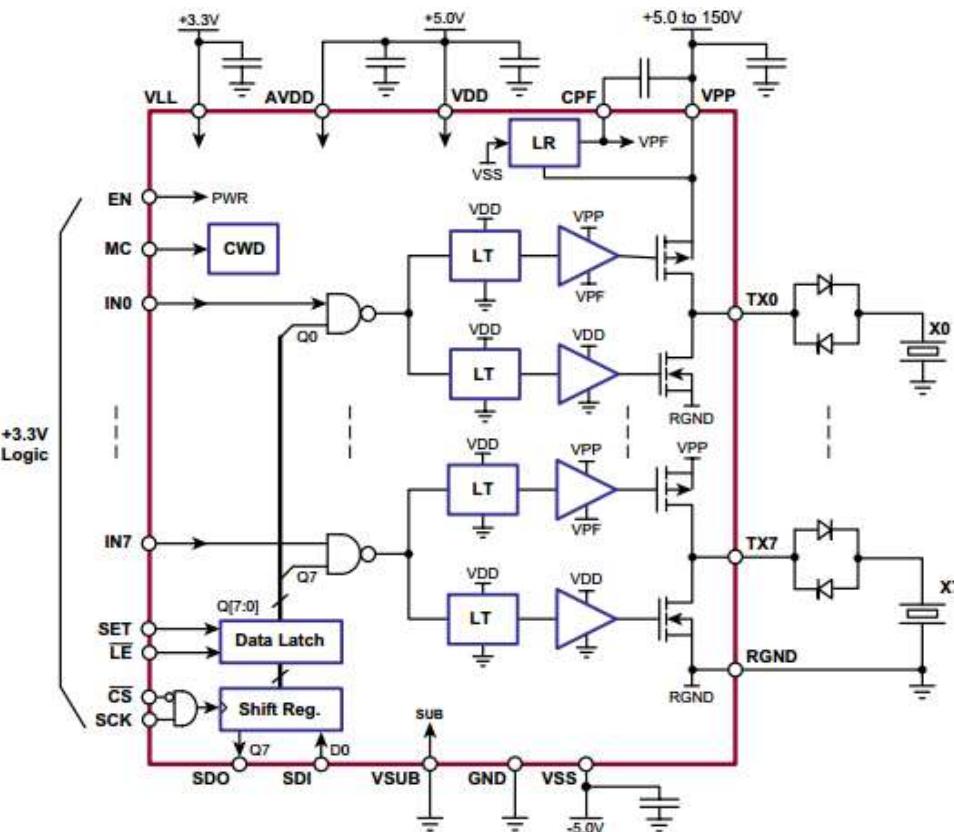
MICROCHIP

HV7355

Online
Datasheet

Features:

- HVCMOS technology for high performance
- High density integrated ultrasound transmitter
- 0 to +150V output voltage
- $\pm 1.5A$ source and sink current (min.)
- $\pm 300mA$ current in CW mode
- Up to 18MHz operating frequency
- Matched delay times
- Built-in gate driver floating voltage regulator
- 2.5 to 3.3V CMOS logic interface
- Operating Temperature Range:
 0°C to $+70^{\circ}\text{C}$
- Package Option: QFN-56



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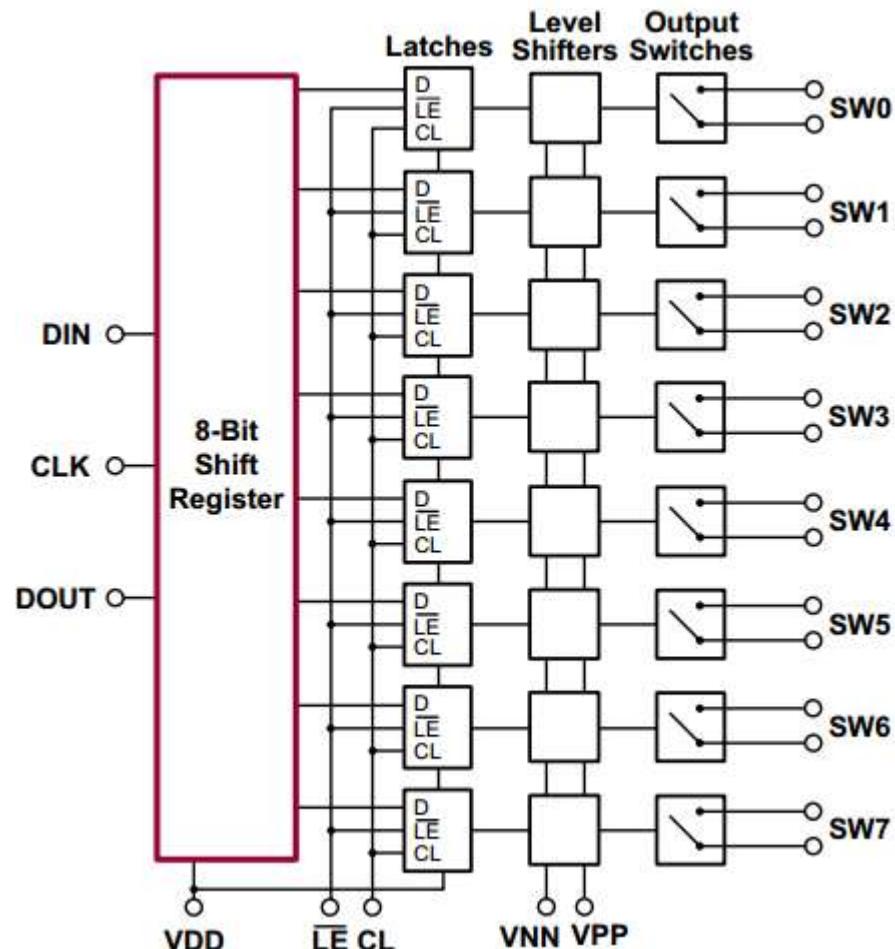
MICROCHIP

HV20220

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Very low quiescent power dissipation (-10 μ A)
- Output on-resistance typically 22 Ω
- Low parasitic capacitances
- DC to 50MHz small signal frequency response
- -60dB typical output off isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- On-chip shift register, latch and clear logic circuitry
- Flexible high voltage supplies
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48, PLCC-28



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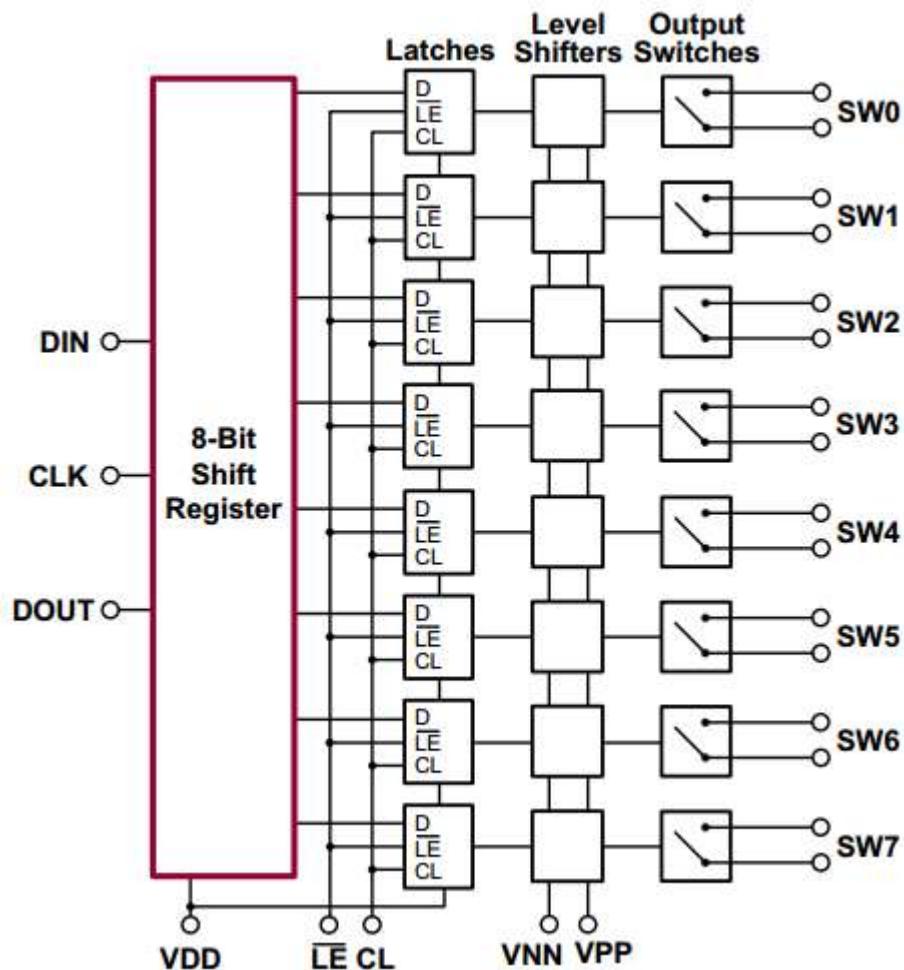
MICROCHIP

HV20320

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Very low quiescent power dissipation (-10 μ A)
- Output on-resistance typically 22 Ω
- Low parasitic capacitances
- DC to 50MHz small signal frequency response
- -60dB typical output off isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- On-chip shift register, latch and clear logic circuitry
- Flexible high voltage supplies
- Operating Temperature Range:
0°C to +70°C
- Package Option: PLCC-28



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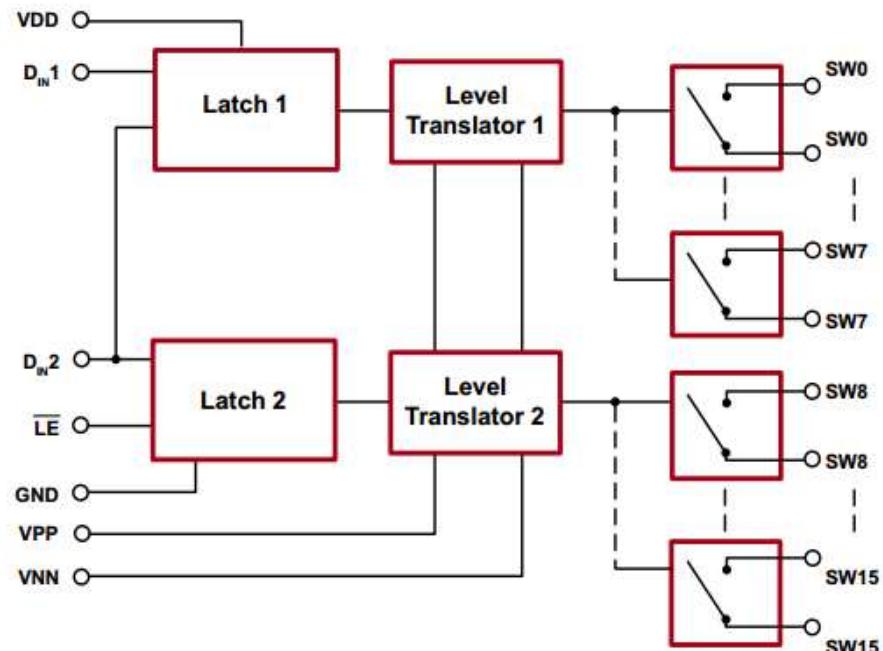
MICROCHIP

HV20822

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- 220V operating conditions
- Output on-resistance typically 22Ω
- 5.0 and 12.0V CMOS logic compatibility
- Very low quiescent current consumption (-
 $10\mu A$)
- -45dB min off isolation at 7.5MHz
- Low parasitic capacitance
- Excellent noise immunity
- Flexible high voltage supplies
- Operating Temperature Range:
 $0^{\circ}C$ to $+70^{\circ}C$
- Package Option: LQFP-48



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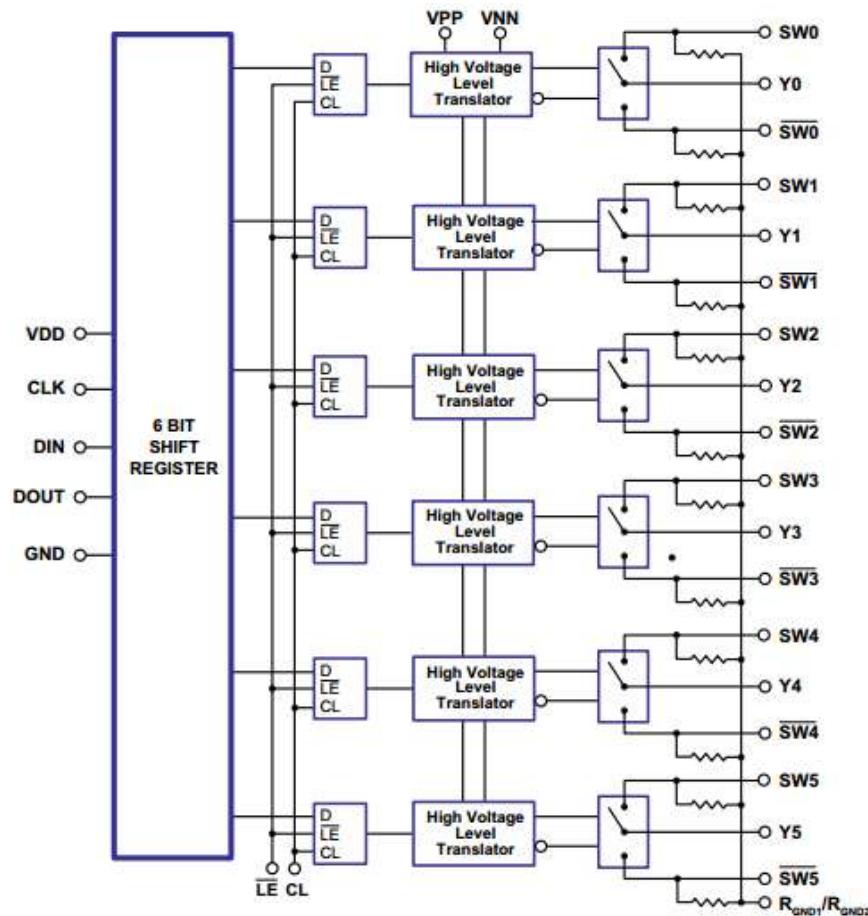
MICROCHIP

HV209

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Operating voltage of up to 200V
- Output on-resistance typically 22Ω
- Integrated bleed resistors on the outputs
- 5.0V to 12.0V CMOS logic compatibility
- Very low quiescent current consumption
- -58dB typical off isolation at 5.0MHz
- Low parasitic capacitance
- Excellent noise immunity
- Flexible high voltage supplies
- Operating Temperature Range:
 0°C to $+70^{\circ}\text{C}$
- Package Option: LQFP-48



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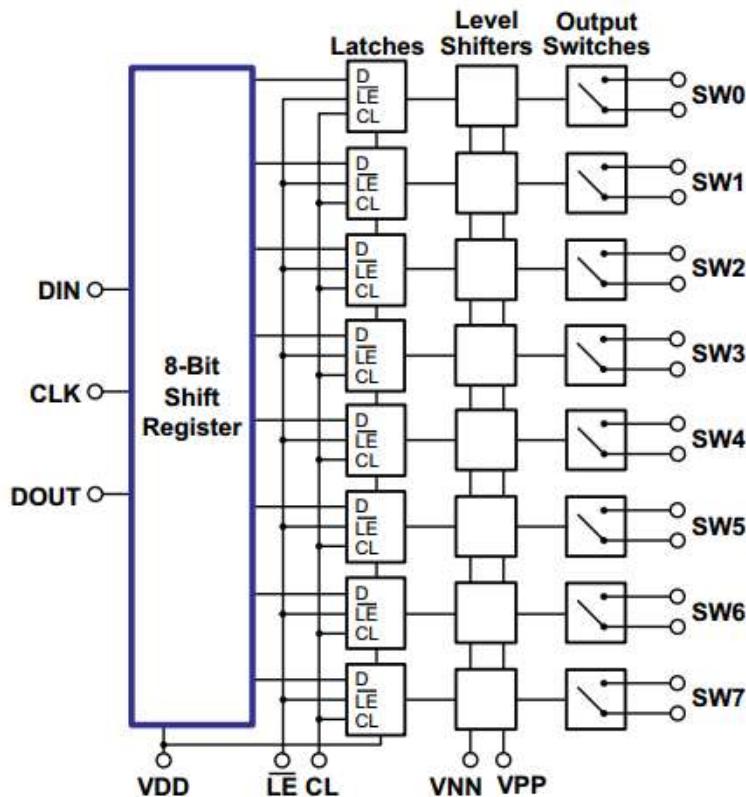
MICROCHIP

HV214

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Very low quiescent power dissipation
- Low parasitic capacitances
- DC to 50MHz small signal frequency response
- -60dB typical output off isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- On-chip shift register, latch and clear logic circuitry
- Flexible high voltage supplies
- Surface mount packages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48, PLCC-28



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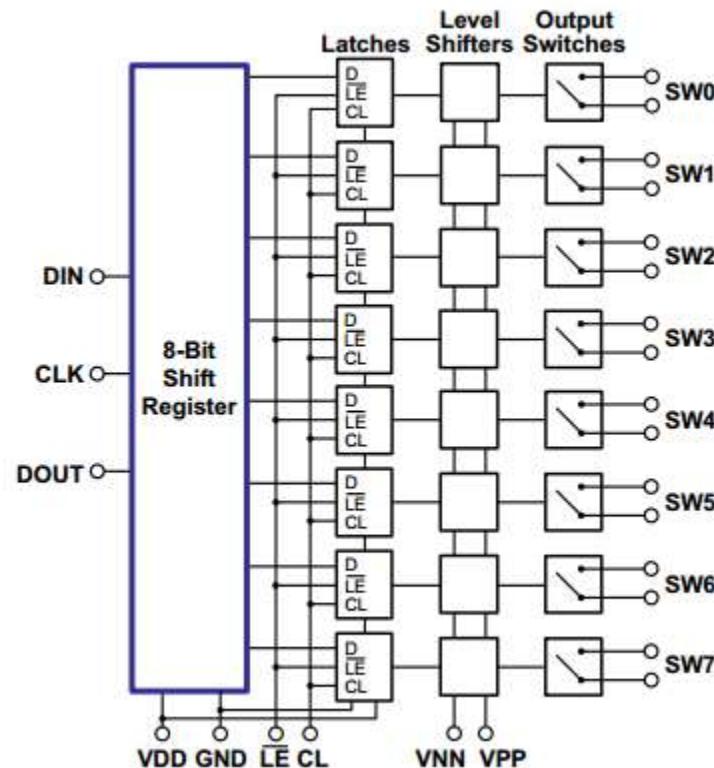
MICROCHIP

HV219

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Very low quiescent power dissipation
- Output on-resistance typically 11Ω
- Low parasitic capacitance
- DC to 50MHz small signal frequency response
- -60dB typical off-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Serial shift register logic control with latches
- Flexible operating supply voltages
- Surface mount packages
- Operating Temperature Range:
 0°C to $+70^{\circ}\text{C}$
- Package Option: LQFP-48, PLCC-28



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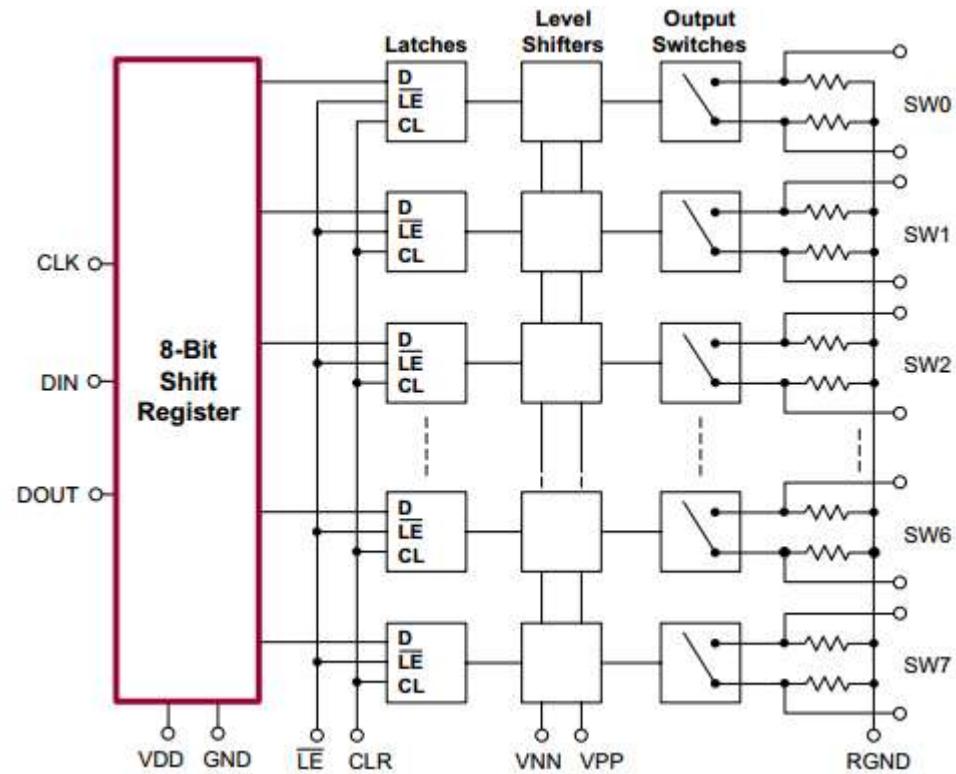
MICROCHIP

HV2201 / HV2301

Online
Datasheet

Features:

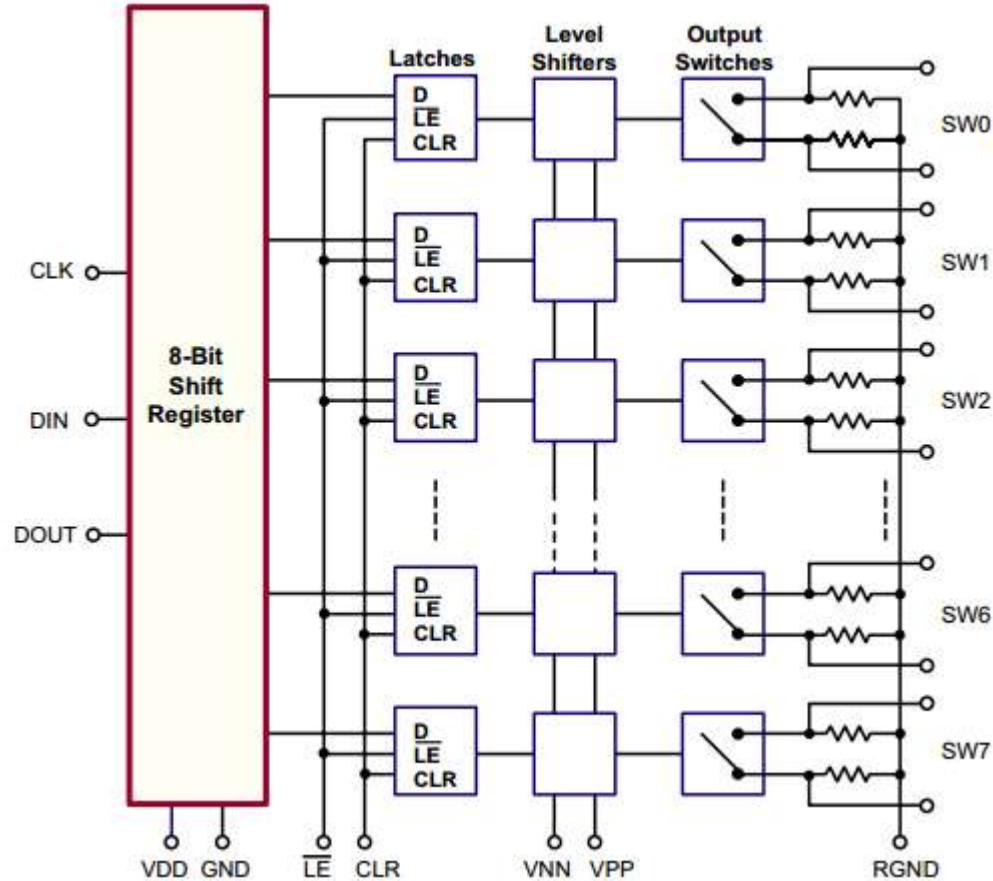
- HV2201 without bleed resistors
- HV2301 with integrated bleed resistors
- HVCMOS technology for high performance
- 8 Channels of high voltage analog switch
- 3.3 or 5.0V CMOS input logic level
- 20MHz data shift clock frequency
- Very low quiescent power dissipation
- Low parasitic capacitance
- DC to 50MHz analog signal frequency
- -60dB typical off-isolation at 5MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48, PLCC-28



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Features:

- HV2221 without bleed resistors
- HV2321 with bleed resistors
- Low on-resistance, 14Ω max.
- HVCMOS technology for high performance
- 3.3 or 5.0V CMOS input logic level
- 20MHz data shift clock frequency
- Very low quiescent power dissipation
- Low parasitic capacitance
- DC to 50MHz small signal frequency response
- -60dB typical off-isolation at 5MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48





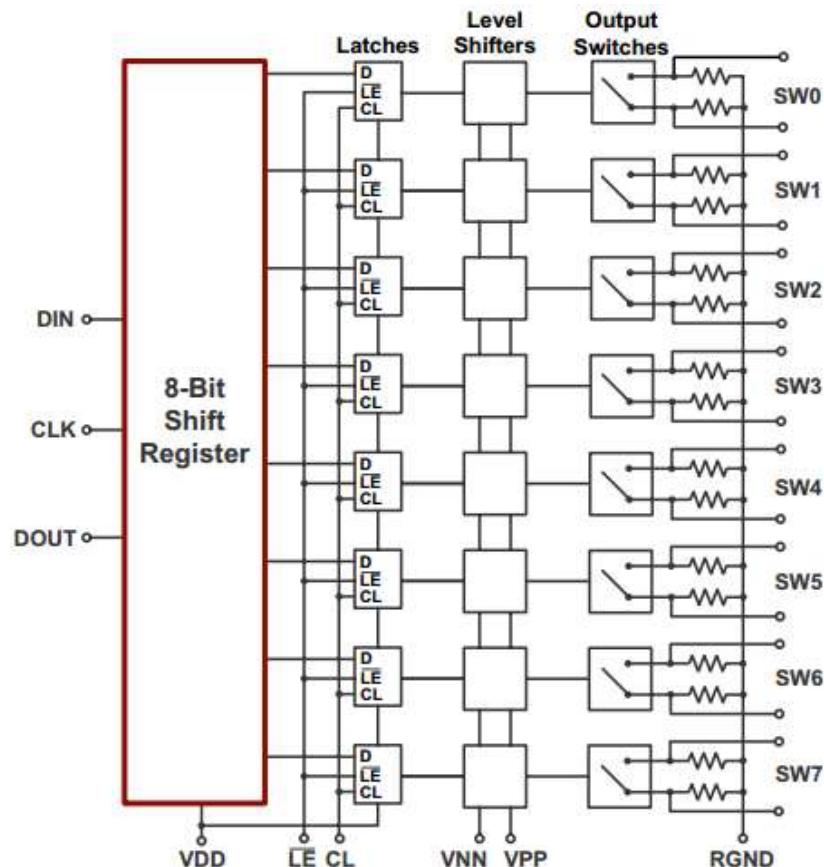
MICROCHIP

HV230

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Very low quiescent power dissipation (-10 μ A max.)
- Output on-resistance typically (22 Ω typ.)
- Integrated bleed resistors on the outputs
- Low parasitic capacitances
- DC to 50MHz small signal frequency response
- 60dB typical output OFF isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- ON-chip shift register, latch and clear logic circuitry
- Flexible high voltage supplies
- Operating Temperature Range:
0°C to +70°C
- Package Option: LLGA-26



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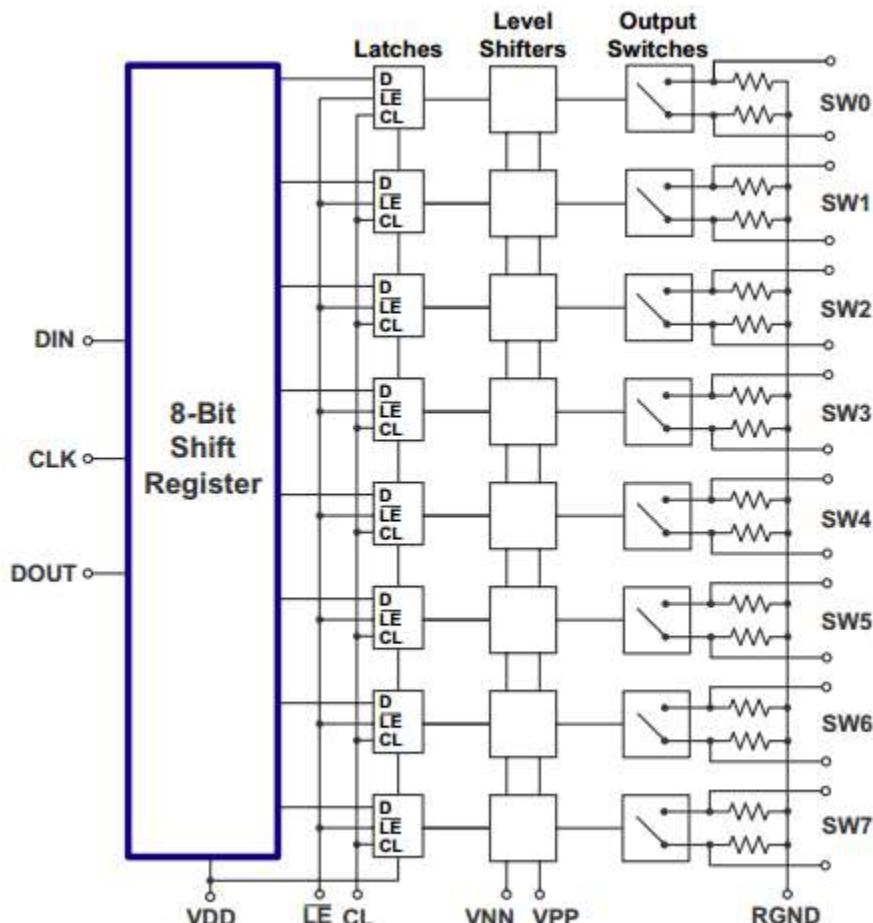
MICROCHIP

HV232

Online
Datasheet

Features:

- HVCMOS® technology for high performance
- Very low quiescent power dissipation ($10\mu A$ max.)
- Output on-resistance (22Ω typ.)
- Integrated bleed resistors on the outputs
- Low parasitic capacitances
- DC to 50MHz small signal frequency response
- -60dB typical output off isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- On-chip shift register, latch and clear logic circuitry
- Flexible high voltage supplies
- Operating Temperature Range:
 $0^{\circ}C$ to $+70^{\circ}C$
- Package Option: LQFP-48, PLCC-28



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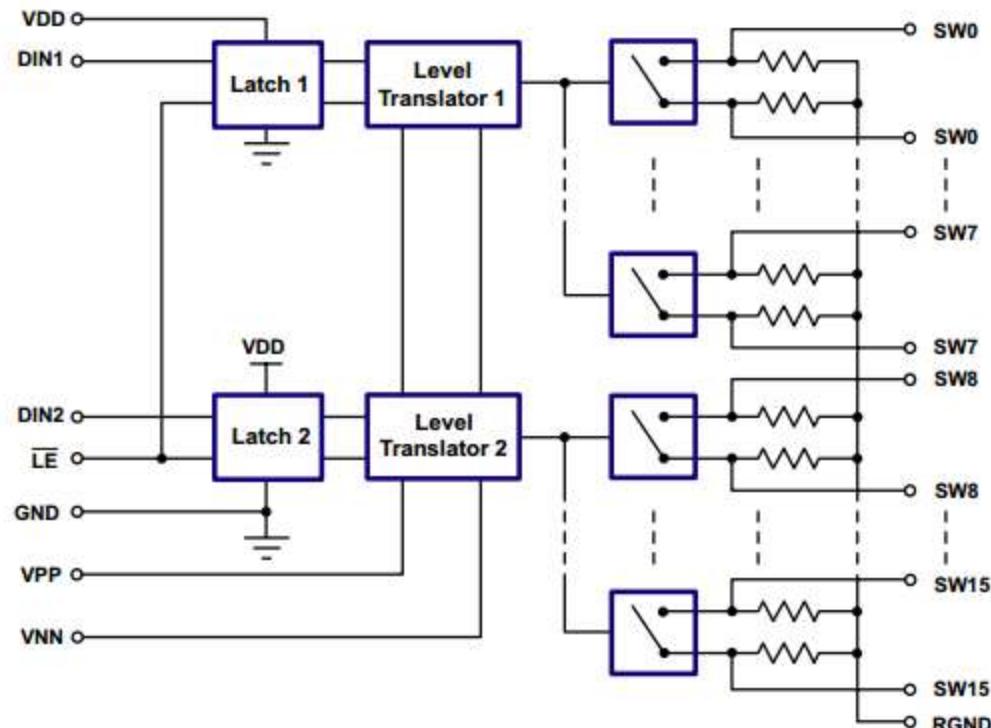
MICROCHIP

HV238

Online
Datasheet

Features:

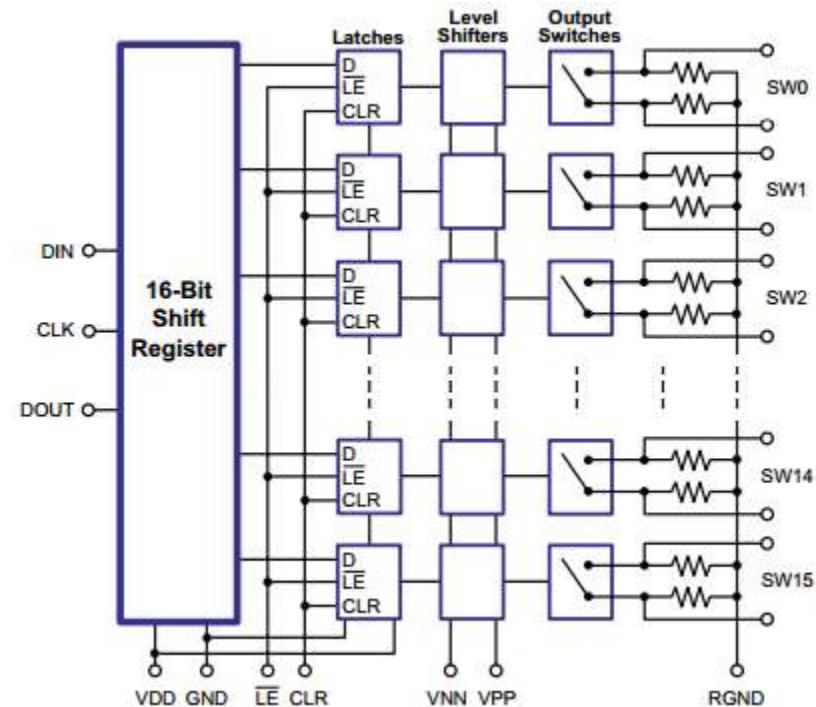
- HVCMOS® technology for high performance
- 220V operating conditions
- Output on-resistance typically 22Ω
- Integrated bleed resistors on the outputs
- 5.0 and 12.0V CMOS logic compatibility
- Very low quiescent power dissipation ($-10\mu A$)
- $-45dB$ min off isolation at 7.5MHz
- Low parasitic capacitance
- Excellent noise immunity
- Flexible operating supply voltages
- Operating Temperature Range:
 $0^{\circ}C$ to $+70^{\circ}C$
- Package Option: LQFP-48



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Features:

- HV2601 without bleed resistors
- HV2701 with bleed resistors
- HVCMOS technology for high performance
- Integrated bleed resistors on the outputs
- 16-channel high voltage analog switch
- 3.3V input logic level compatible
- 20MHz data shift clock frequency
- Very low quiescent power dissipation (-10 μ A)
- Low parasitic capacitance
- DC to 50MHz small signal frequency response
- -60dB typical OFF-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48, Bumped Die





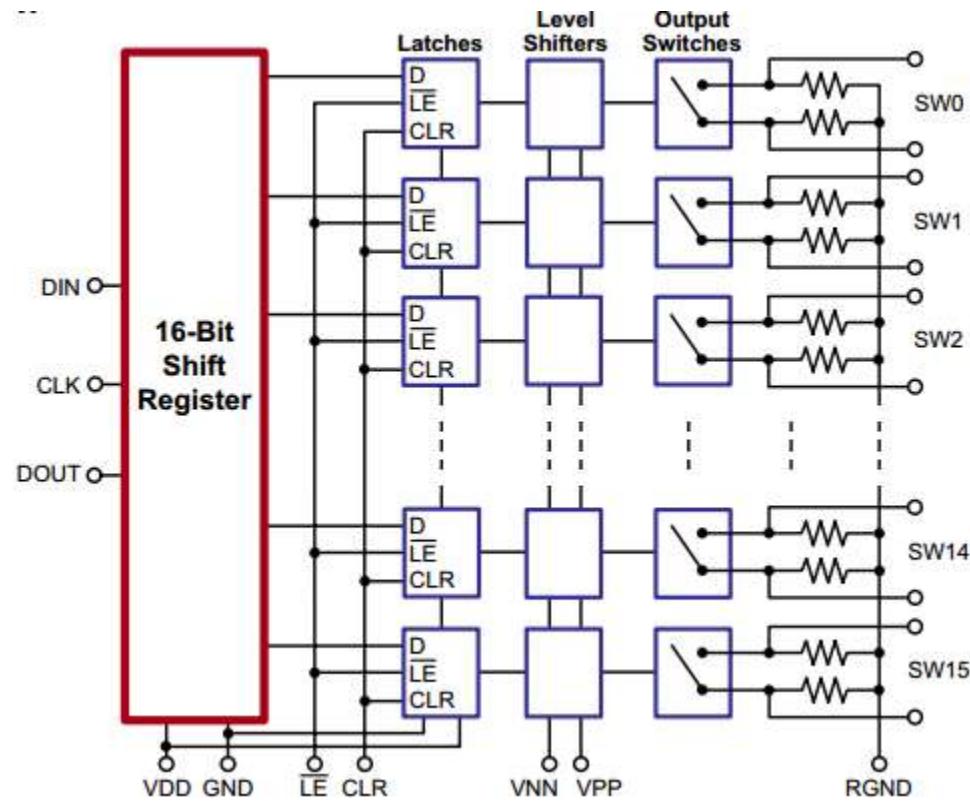
MICROCHIP

HV2605 / HV2705

Online
Datasheet

Features:

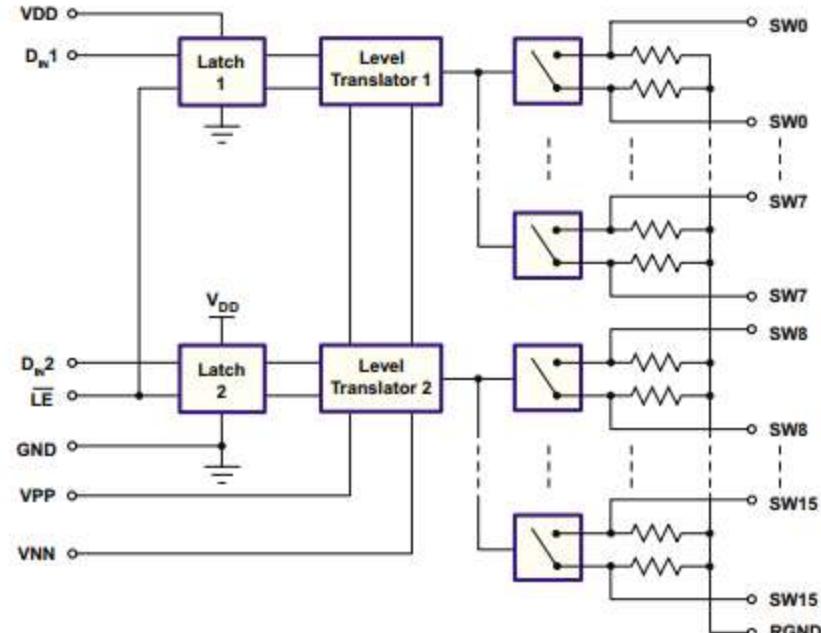
- HV2605 is without bleed resistors
- HV2705 is with bleed resistors
- HVCMOS technology for high performance
- Integrated bleed resistors on the outputs
- 16-channel high voltage analog switch
- 3.3V input logic level compatible
- 20MHz data shift clock frequency
- Very low quiescent power dissipation (-10 μ A)
- Low parasitic capacitance
- DC to 50MHz small signal frequency response
- -60dB typical off-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Low harmonic distortion
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48



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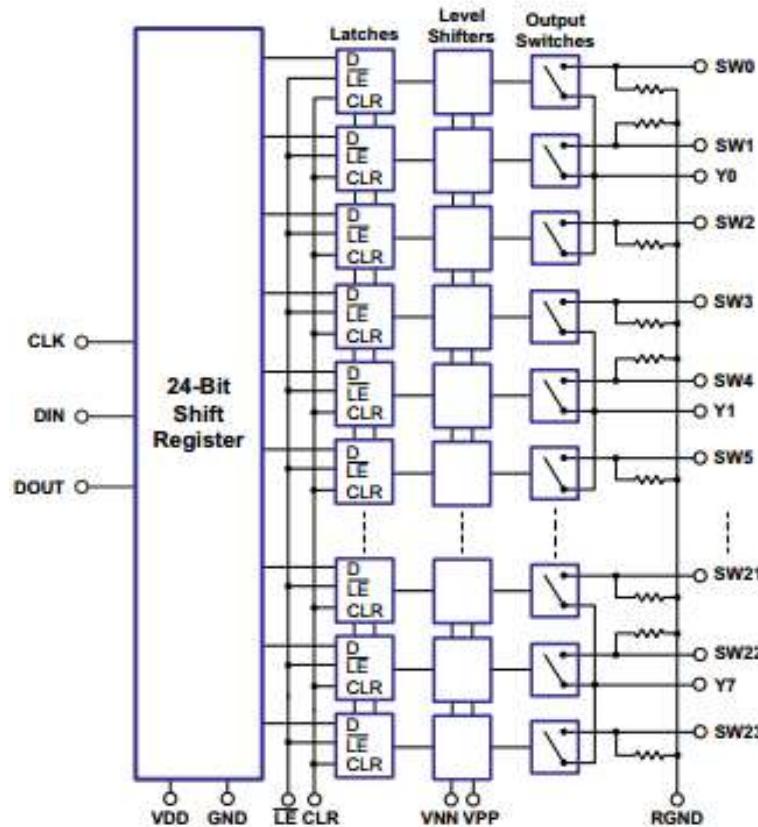
Features:

- HV2631 without bleed resistors
- HV2731 with bleed resistors
- HVCMOS® technology for high performance
- 220V operating conditions
- 22Ω typical output on-resistance
- Integrated bleed resistors on the outputs
- 3.3V and 5.0V CMOS logic compatibility
- Very low quiescent power dissipation (-10µA)
- -45dB min off isolation at 7.5MHz
- Low parasitic capacitance
- Excellent noise immunity
- Flexible operating supply voltages
- 48-lead LQFP package
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48



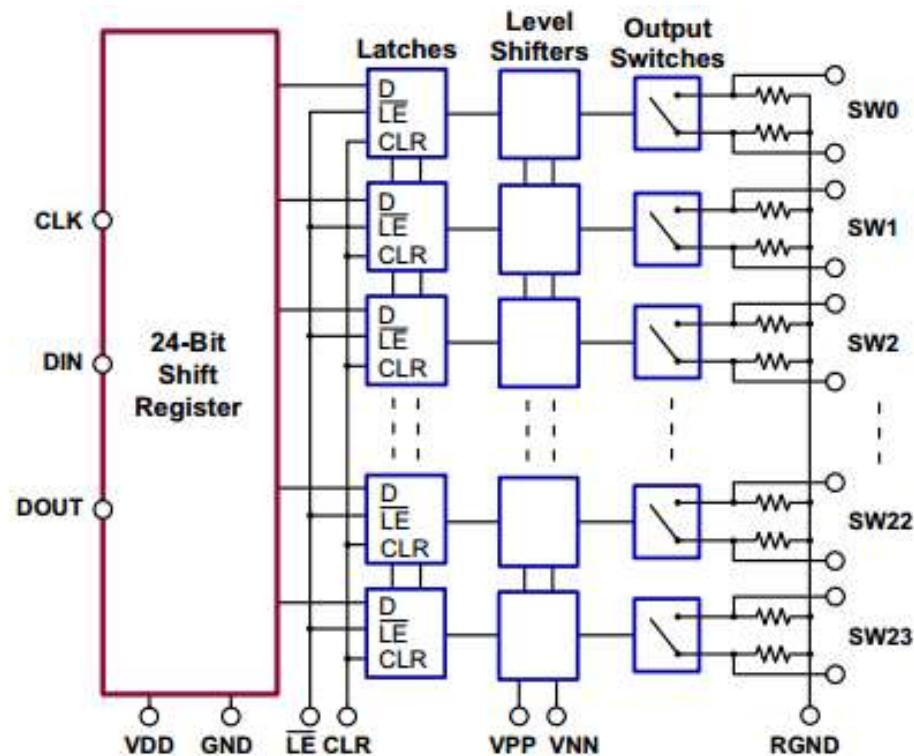
Features:

- HV2661 without bleed resistors
- HV2761 with bleed resistors
- 24-channel high voltage analog switch
- Integrated bleed resistors on the outputs
- 3.3 or 5.0V CMOS input logic level
- 3:1 MUX-deMUX with 8 states
- 20MHz data shift clock frequency
- HVCMOS technology for high performance
- Very low quiescent power dissipation, 10µA
- Low parasitic capacitance
- DC to 50MHz analog signal frequency
- -60dB typical OFF-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48



Features:

- HV2662 without bleed resistors
- HV2762 with bleed resistors
- 24 Channels of high voltage analog switch
- Integrated bleed resistors on the outputs
- 3.3 or 5.0V CMOS input logic level
- 24 Channel SPST configuration
- 20MHz data shift clock frequency
- HVCMOS technology for high performance
- Very low quiescent power dissipation - (10µA)
- Low parasitic capacitance
- DC to 50MHz analog signal frequency
- -60dB typical OFF-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LFGA-64





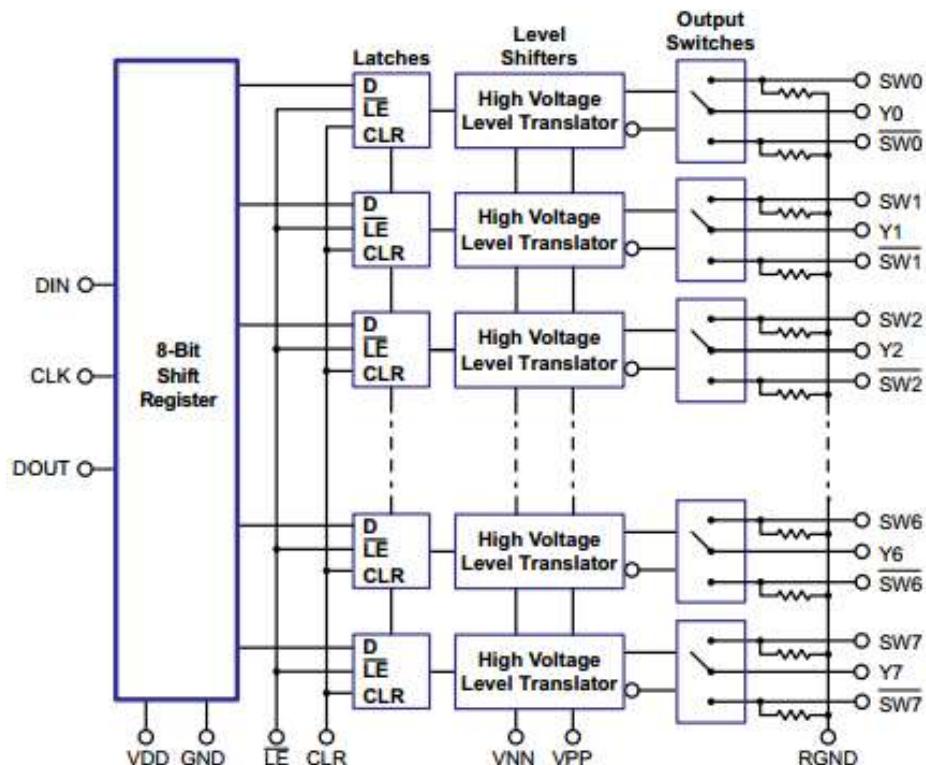
MICROCHIP

HV2733

Online
Datasheet

Features:

- Low harmonic distortion
- Integrated bleed resistors on the outputs
- 3.3 or 5.5V CMOS input logic level
- 20MHz data shift clock frequency
- HVCMOS technology for high performance
- Very low quiescent power dissipation (-10 μ A)
- Low parasitic capacitance
- DC to 50MHz small signal frequency response
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: LQFP-48



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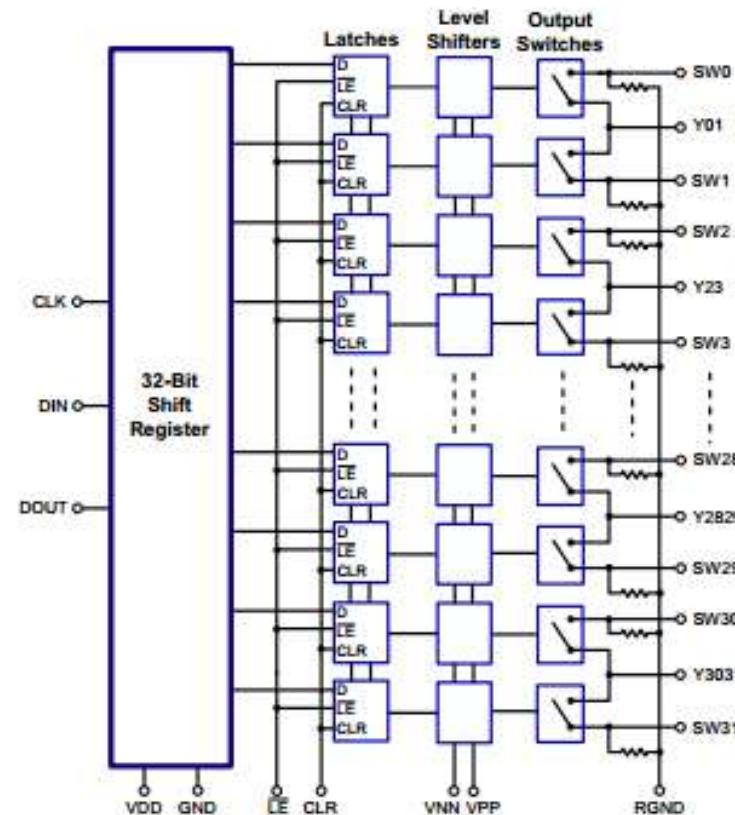
MICROCHIP

HV2801 / HV2901

Online
Datasheet

Features:

- HV2801 without bleed resistors
- HV2901 with bleed resistors
- 32-channel high voltage analog switch
- Integrated bleed resistors on the outputs
- 2:1 Multiplexer / Demultiplexer
- 3.3V or 5.0V CMOS input logic level
- 20MHz data shift clock frequency
- HVCMOS technology for high performance
- Very low quiescent power dissipation -10 μ A
- Low parasitic capacitance
- DC to 50MHz analog signal frequency
- -60dB typical OFF-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Cascadable serial data register with latches
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-64



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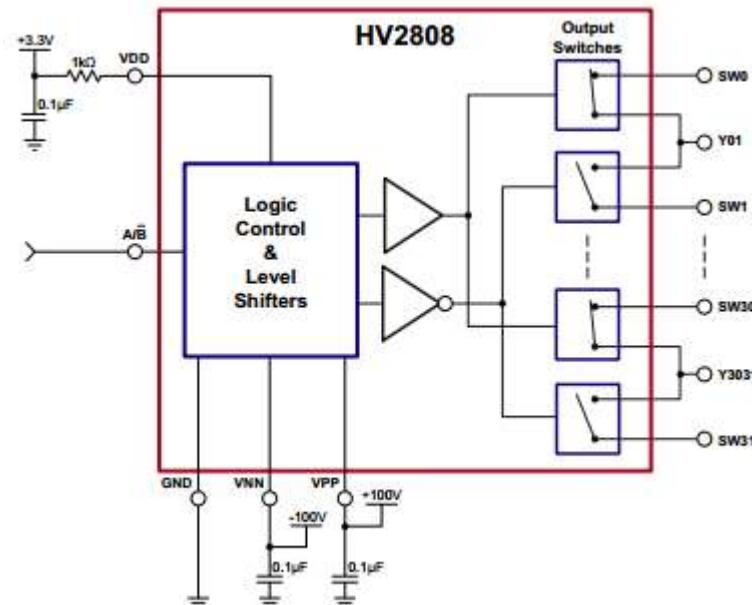
MICROCHIP

HV2808

Online
Datasheet

Features:

- 32 Channels of high voltage analog switch
- 2:1 Multiplexer / Demultiplexer
- 3.3 or 5.0V CMOS input logic level
- HVCMOS technology for high performance
- Very low quiescent power dissipation -10 μ A
- Low parasitic capacitance
- DC to 50MHz analog signal frequency
- -60dB typical OFF-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-56



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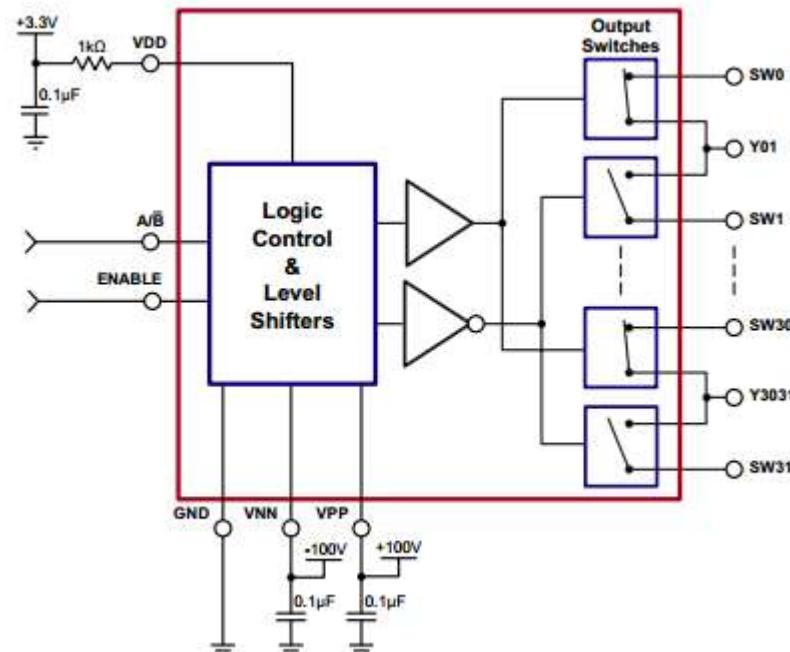
MICROCHIP

HV2809

Online
Datasheet

Features:

- 32-channel high voltage analog switch
- 2:1 multiplexer/demultiplexer
- Enable control for all-OFF state
- 3.3 or 5.0V CMOS input logic level
- HVCMOS technology for high performance
- Very low quiescent power dissipation, 10 μ A
- Low parasitic capacitance
- DC to 50MHz analog signal frequency
- -60dB typical OFF-isolation at 5.0MHz
- CMOS logic circuitry for low power
- Excellent noise immunity
- Flexible operating supply voltages
- Operating Temperature Range:
0°C to +70°C
- Package Option: QFN-56



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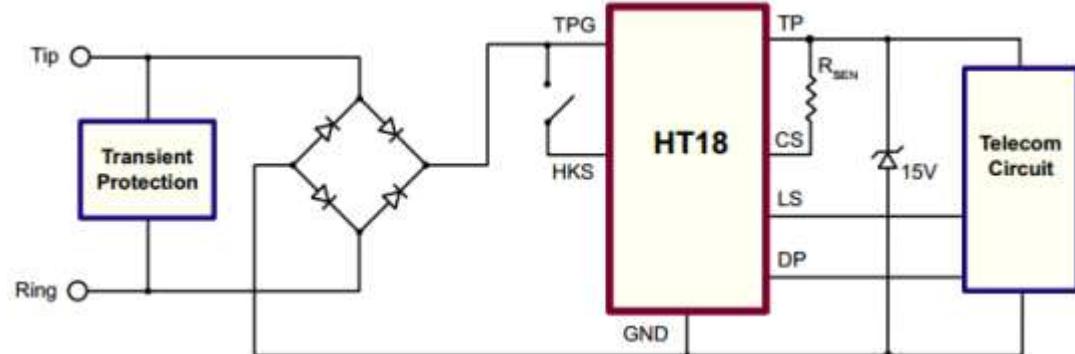
MICROCHIP

HT18

Online
Datasheet

Features:

- 350V breakdown voltage
- 18Ω maximum switch resistance
- Current limiting protection
- Operates at 2.3V input
- Operating Temperature Range:
-0°C to +150°C
- Package Option: SOIC-8



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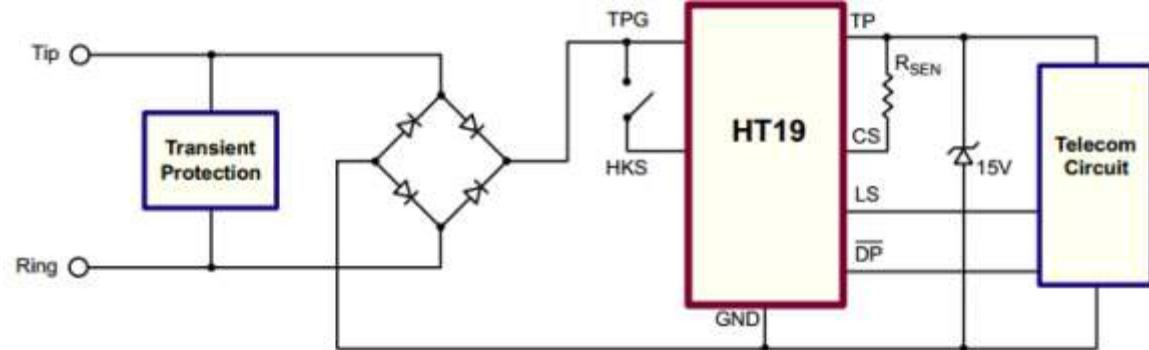
MICROCHIP

HT19

Online
Datasheet

Features:

- 350V breakdown voltage
- 18Ω maximum switch resistance
- Current limiting protection
- Operates at 2.3V input
- Operating Temperature Range:
-0°C to +150°C
- Package Option: SOIC-8



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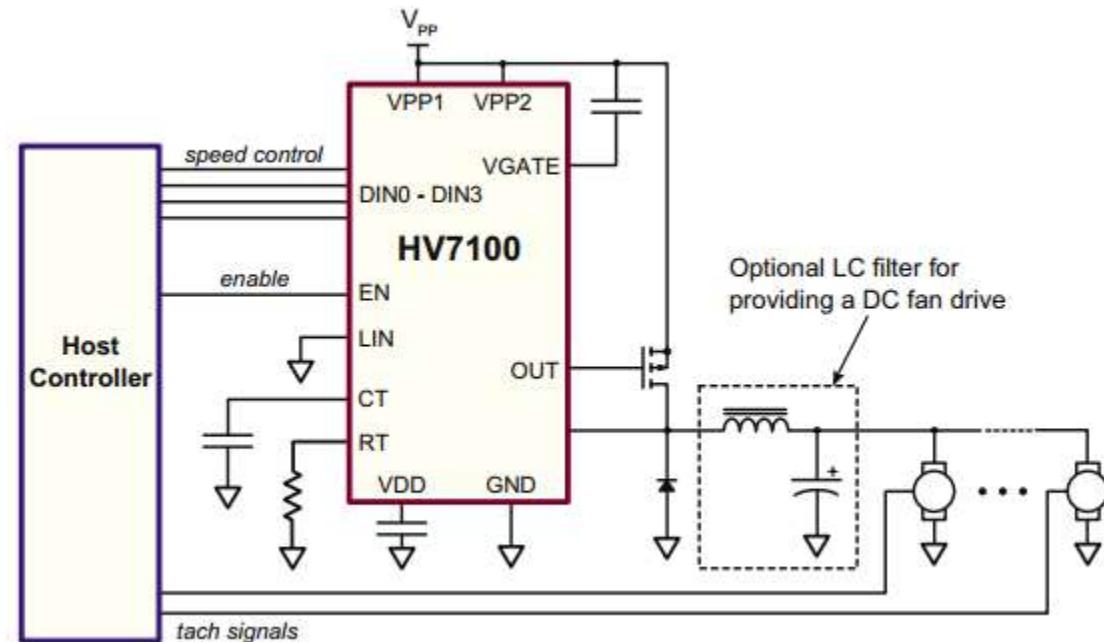
MICROCHIP

HV7100

Online
Datasheet

Features:

- High-side drive allows use of tachs
- Direct interface to host controller
- Noise-immune linear speed control
- 4-bit digital speed control
- Operates from single +24/+48V supply
- Programmable PWM frequency
- Undervoltage lockout
- Operating Temperature Range:
-40°C to +85°C
- Package Option: SOIC-14



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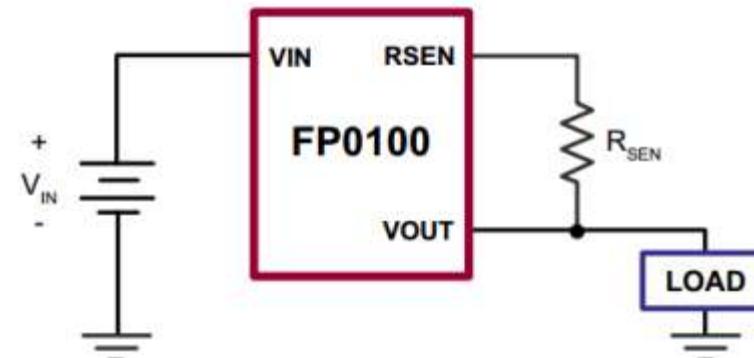
MICROCHIP

FP0100

Online
Datasheet

Features:

- Up to 100V input voltage protection
- Low on resistance – 4.0Ω typical
- Fast switching speed
- No external supplies needed
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: SOT-89



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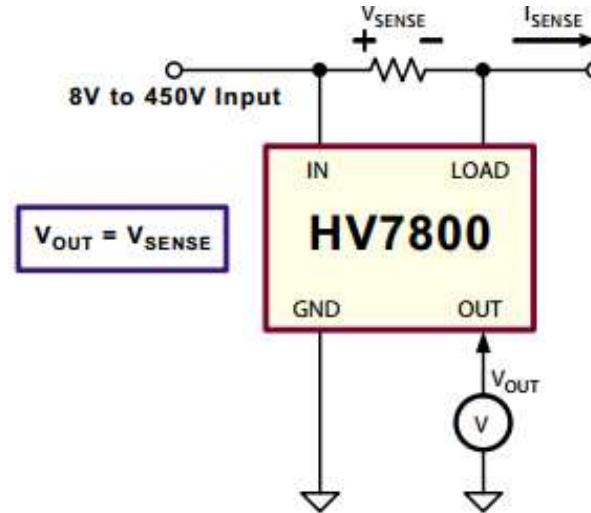
MICROCHIP

HV7800

Online
Datasheet

Features:

- Supply voltage 8.0 to 450V
- Voltage output device
- Typical gain $1.0 \pm 1\%$
- Max VSENSE 500mV
- Fast rise and fall times, 700ns to 2.0 μ s
- Maximum quiescent current 50 μ A
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: 5L SOT-23



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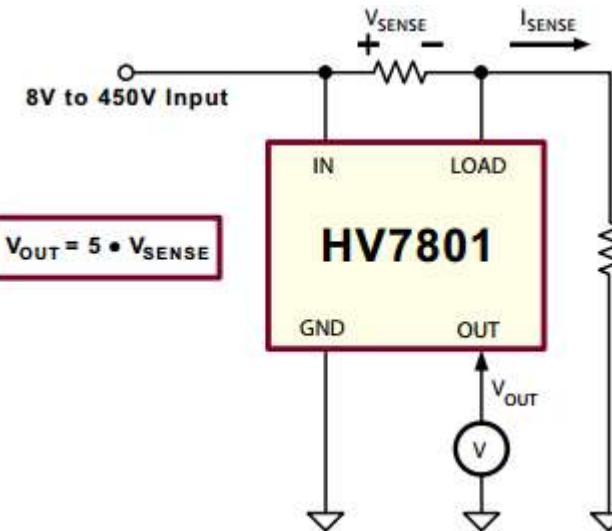
MICROCHIP

HV7801

Online
Datasheet

Features:

- Supply voltage 8.0 to 450V
- Voltage output device
- Typical gain $5.0 \pm 1\%$
- Max VSENSE 500mV
- Fast rise and fall times, 700ns to 2.0 μ s
- Maximum quiescent current 50 μ A
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: 5L SOT-23



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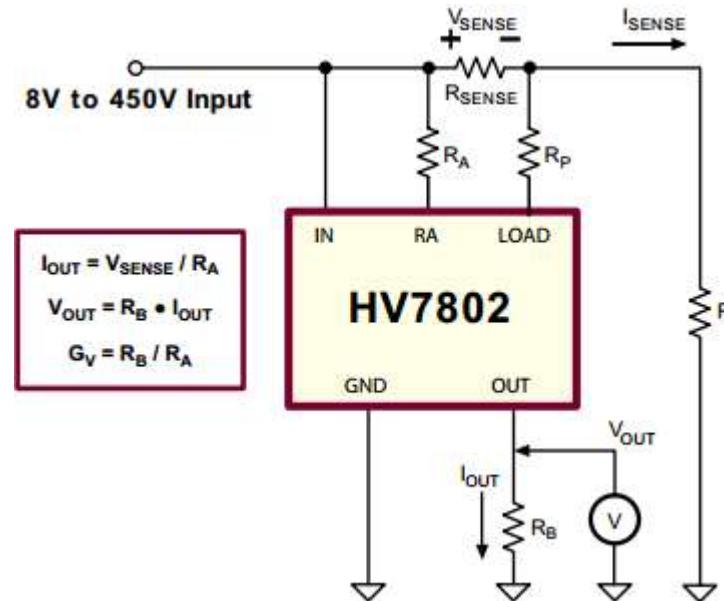
MICROCHIP

HV7802

Online
Datasheet

Features:

- Supply voltage 8V to 450V
- Configurable as a current or voltage output device
- Maximum sense amplifier offset of 15mV
- Max VSENSE of 500mV
- Fast rise and fall times, from 700ns to 2.0 μ s
- Maximum quiescent current of 50 μ A
- Operating Temperature Range: -40°C to +125°C
- Package Option: MSOP-8



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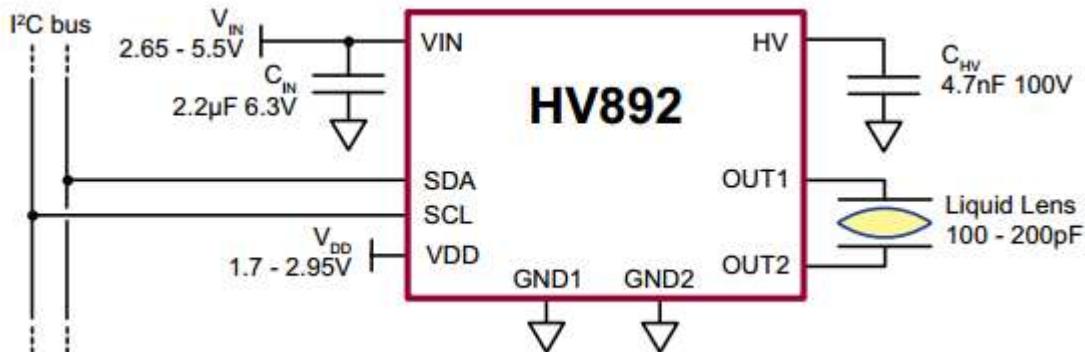
MICROCHIP

HV892

Online
Datasheet

Features:

- Drives capacitive loads up to 200pF
- Programmable drive amplitude (compatible with 40VRMS to 60VRMS lenses)
- On-chip boost converter
- No external inductor
- I²C interface
- Low operating current ($\leq 20\text{mA}$)
- Low standby current ($\leq 1.0\mu\text{A}$)
- Controlled drive edge reduces EMI
- Operating Temperature Range: -40°C to +85°C
- Package Option: WDFN-10



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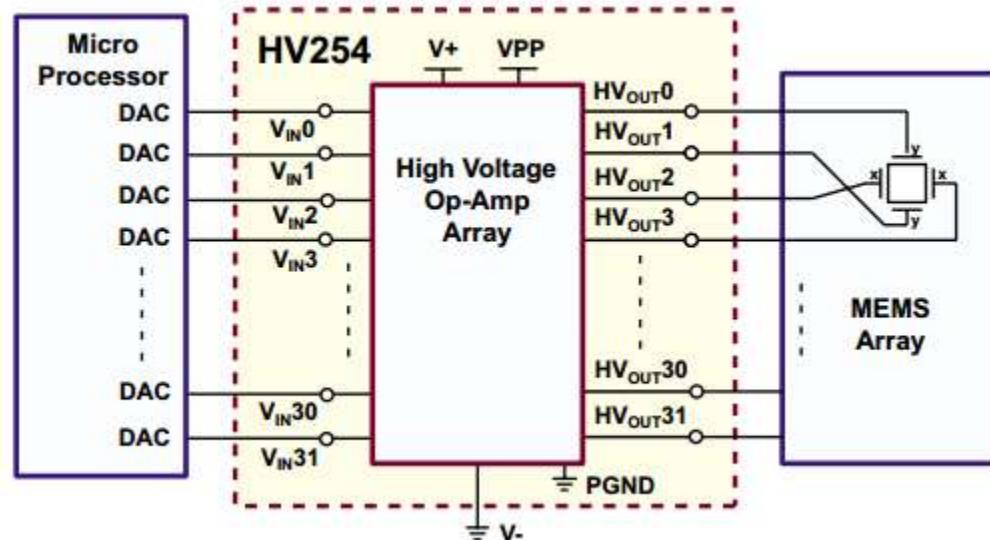
MICROCHIP

HV254

Online
Datasheet

Features:

- 32 independent high voltage amplifiers
- Up to 250V output voltage
- 3.0V/ μ s typical output slew rate
- Very low operating current (typically 45 μ A per channel)
- High value internal feedback resistors
- Fixed gain of 50V/V
- Integrated silicon diode for temperature sensing
- Operating Temperature Range:
-10°C to +125°C
- Package Option: MQFP-100



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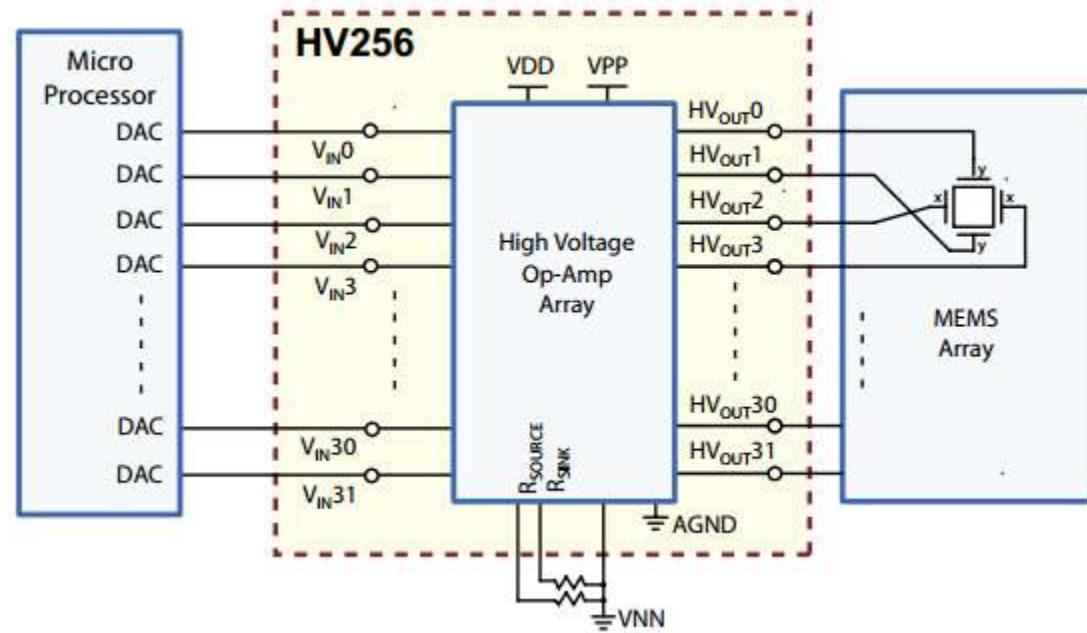
MICROCHIP

HV256

Online
Datasheet

Features:

- 32 independent high voltage amplifiers
- 300V operating voltage
- 295V output voltage
- 2.2V/ μ s typical output slew rate
- Adjustable output current source limit
- Adjustable output current sink limit
- Internal closed loop gain of 72V/V
- 12M Ω feedback impedance
- Operating Temperature Range:
-10°C to +85°C
- Package Option: MQFP-100



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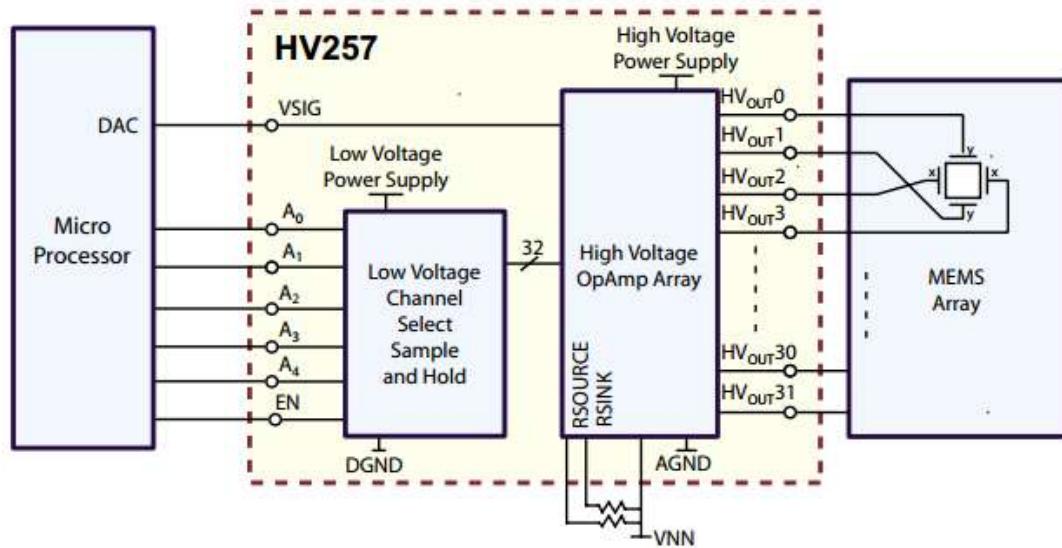
MICROCHIP

HV257

Online
Datasheet

Features:

- 32 independent high voltage amplifiers
- 300V operating voltage
- 295V output voltage
- 2.2V/ μ s typical output slew rate
- Adjustable output current source limit
- Adjustable output current sink limit
- Internal closed loop gain of 72V/V
- 12M Ω feedback impedance
- Layout ideal for die applications
- Operating Temperature Range:
-10°C to +85°C
- Package Option: MQFP-100



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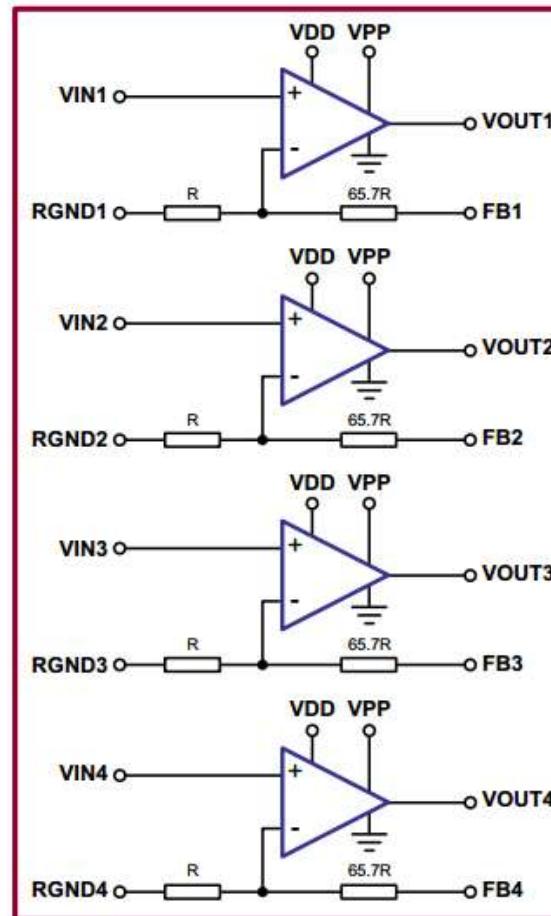
MICROCHIP

HV264

Online
Datasheet

Features:

- Four independent high voltage amplifiers
- 190V output swing
- 9.0V/ μ s typical output slew rate
- Fixed gain of 66.7V/V
- High value internal feedback resistors
- Very low operating current
- Operating Temperature Range:
-40°C to +100°C
- Package Option: TSSOP-24



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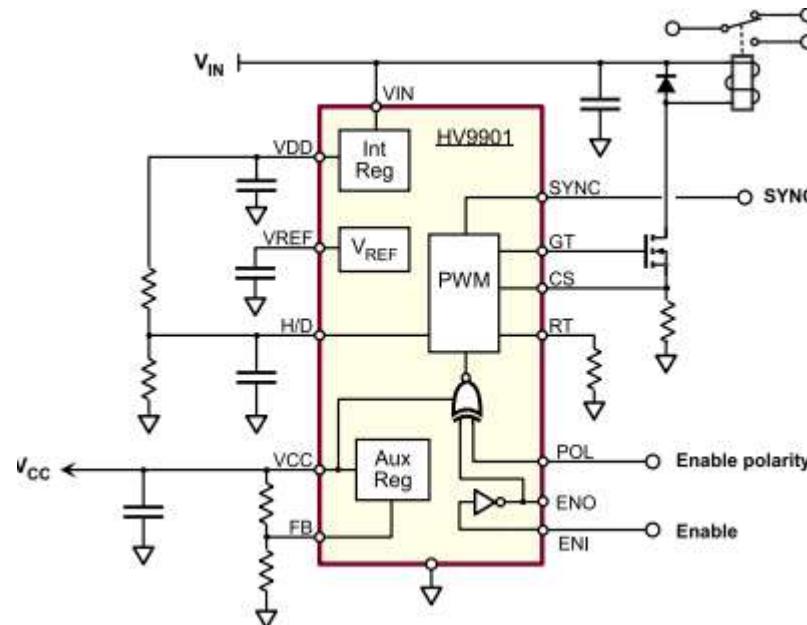
MICROCHIP

HV9901

Online
Datasheet

Features:

- 10 to 450V input voltage range
- Energy saving hold current mode
- Adjustable microcontroller supply
- Low supply current <1.0mA
- Constant current coil
- Programmable pull-in current, pull-in time, and hold current
- Efficient PWM operation using the relay coils' inductance
- Operating Temperature Range: -40°C to +85°C
- Package Option: SOIC-16



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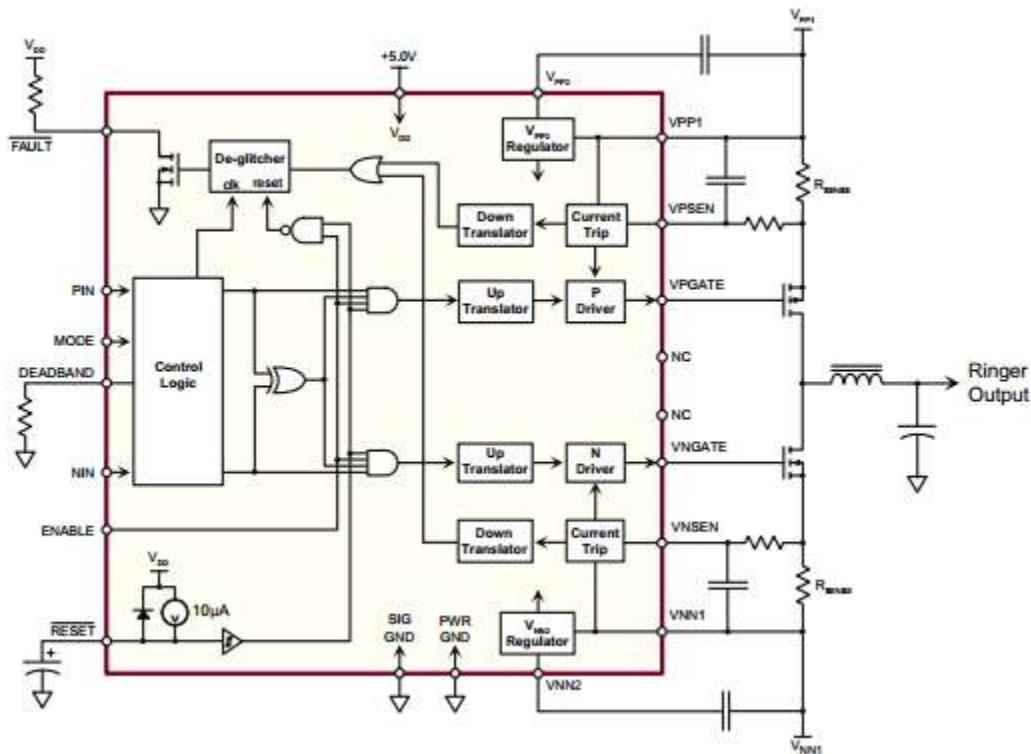


HV430

Online Datasheet

Features:

- 105Vrms ring signal
 - Output over current protection
 - 5.0V CMOS logic control
 - Logic enable/disable to save power
 - Adjustable deadband in single-control mode
 - Power-on reset
 - Fault output for problem detection
 - Operating Temperature Range:
-40°C to +85°C
 - Package Option: SOIC-20 (300mil)



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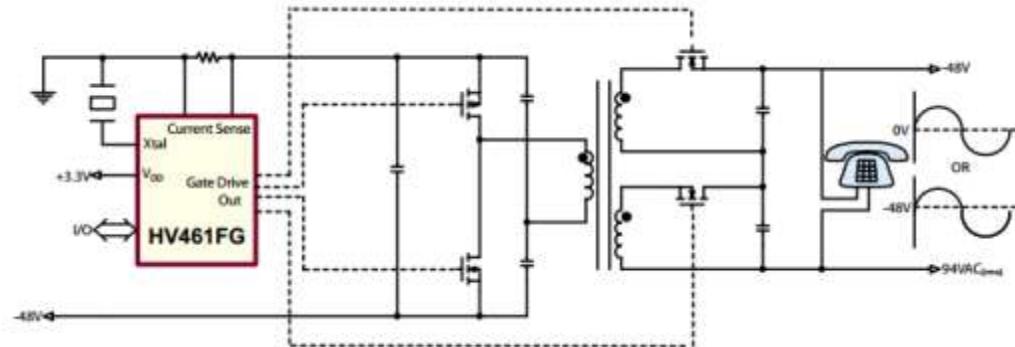
MICROCHIP

HV461

Online
Datasheet

Features:

- 3.3V operation, logic inputs 3.3V & 5.0V compatible
- Digital control of ring frequency, amplitude and offset
- Control via 8-bit bus or via individual inputs
- 8 built-in ring frequencies: 12, 16^{2/3}, 20, 25, 33^{1/3}, 40, 50, 60Hz
- External ring frequency input
- Low distortion sine wave synthesizer
- AC-only, AC+DC, or DC-only ringer output
- Adjustable over-current protection
- Internal precision voltage references
- Power-on reset and undervoltage lockout for hotswap capability
- Sync output with adjustable lead time for synchronizing ringing relays
- Fault output for problem detection
- Open or closed loop operation
- Efficient 4-quadrant operation
- Zero-cross turn-on with zero-cross turn-off option
- Operating Temperature Range:
-40°C to +85°C
- Package Option: LQFP-48



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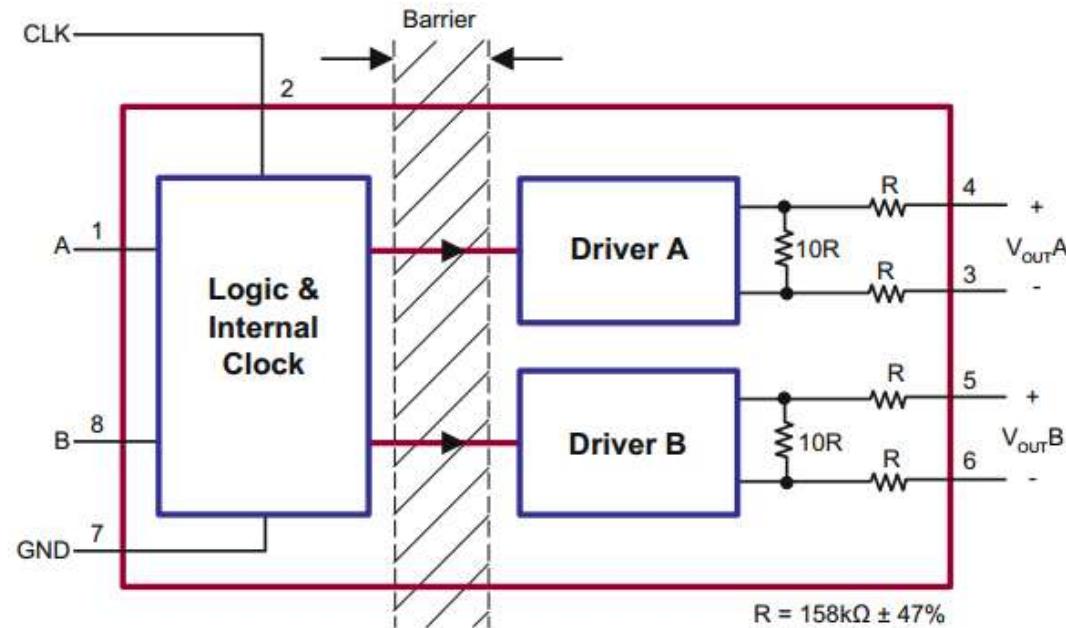
MICROCHIP

HT0440

Online
Datasheet

Features:

- $\pm 400V$ input to output isolation
- $\pm 700V$ isolation between outputs
- No external voltage supply required
- Dual isolated output drivers
- Option of internal or external clock
- Operating Temperature Range:
 -40°C to $+85^{\circ}\text{C}$
- Package Option: VDFN-10, SOIC-8



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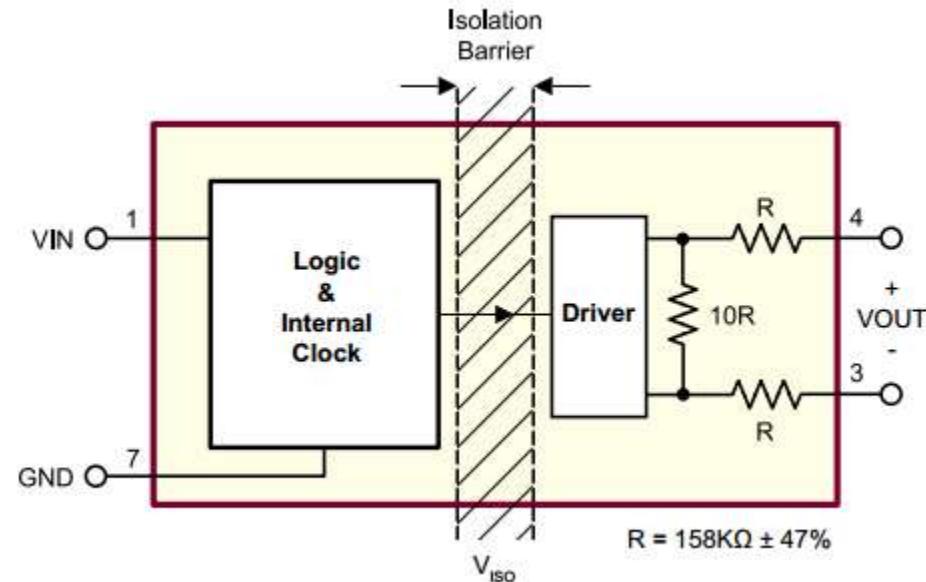
MICROCHIP

HT0740

Online
Datasheet

Features:

- $\pm 400V$ input to output isolation
- Low input logic current, $500\mu A$ max
- No external voltage supply required
- Floating isolated output drivers
- 5.0V logic compatible
- Operating Temperature Range:
 $-40^{\circ}C$ to $+85^{\circ}C$
- Package Option: SOIC-8



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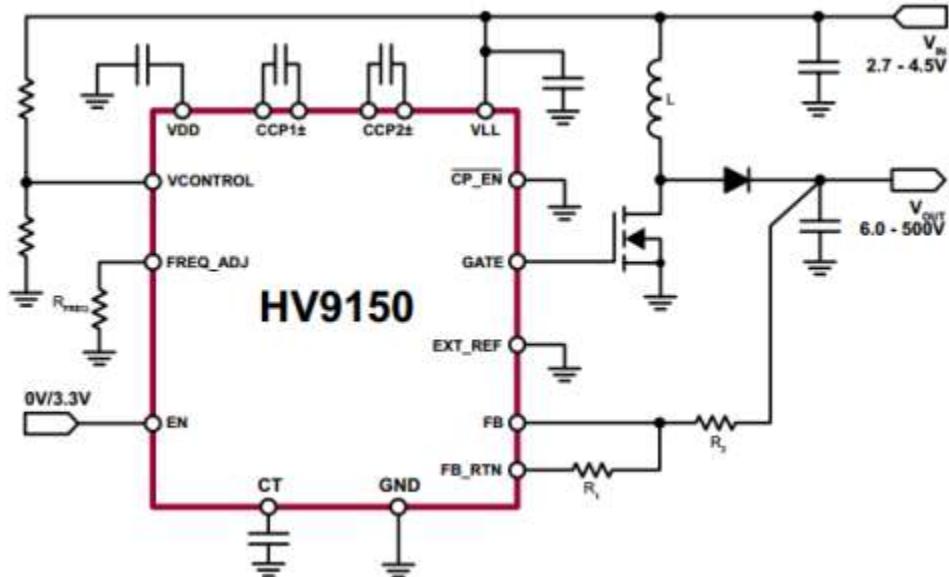
MICROCHIP

HV9150

Online
Datasheet

Features:

- Wide output voltage range: 6V to 500V
- Low input voltage: 2.7V
- 5W maximum output power with external MOSFET driver
- Built-in charge pump converter for the gate driver
- Programmable switching frequency from 40kHz to 400kHz
- Four programmable duty cycles from 50% to 87.5%
- FB return ground switch for power savings applications
- Built-in delay timer for internal protection
- Non-isolated DC/DC converter
- Processed with HVCMOS® technology
- Operating Temperature Range:
-25°C to +125°C
- Package Option: QFN-16



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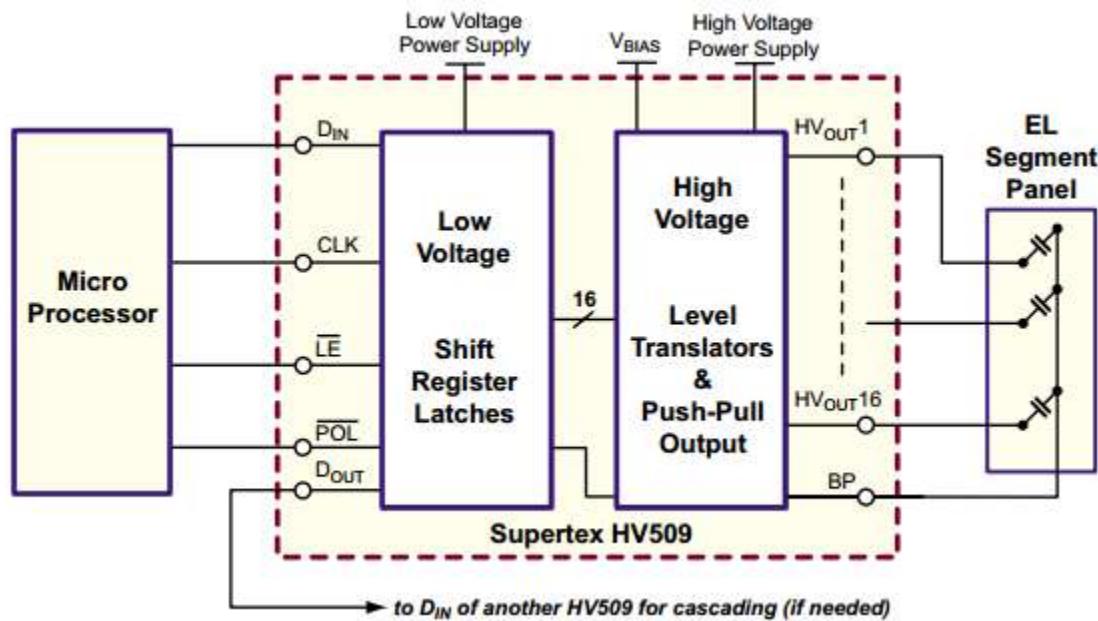
MICROCHIP

HV509

Online
Datasheet

Features:

- Output voltage up to +200V
- Shift register speed 500kHz @ $V_{DD} = 2.0V$
- 16 high voltage outputs
- High voltage backplane driver
- CMOS input levels
- Operating Temperature Range:
 $-40^{\circ}C$ to $+125^{\circ}C$
- Package Option: VQFN-32



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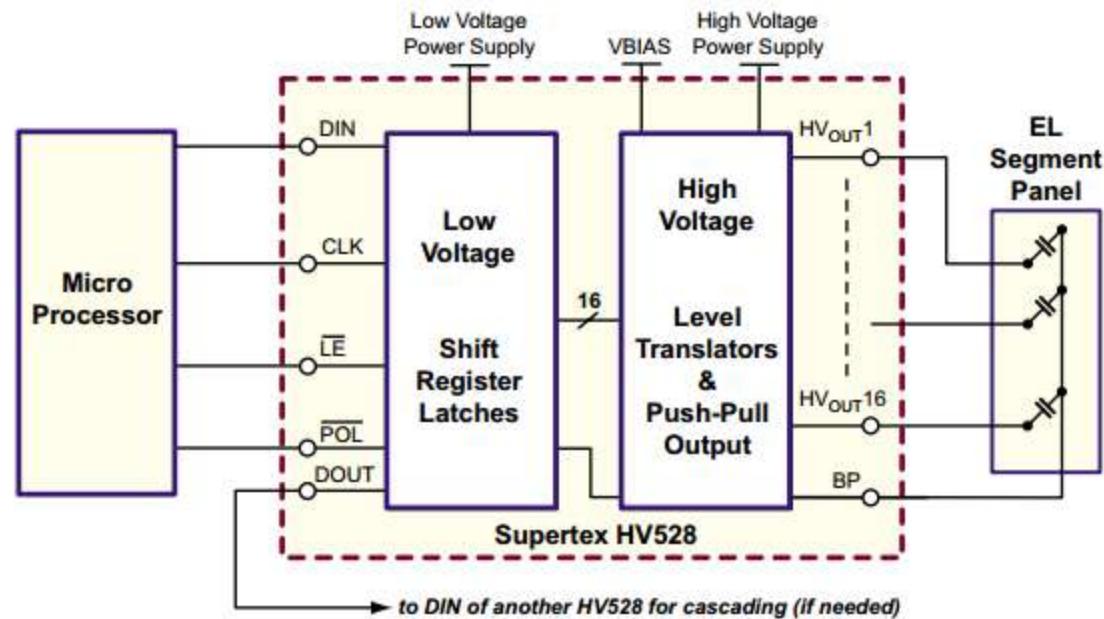
MICROCHIP

HV528

Online
Datasheet

Features:

- Output voltage up to +200V
- Shift register speed 500kHz @ VDD = 1.7V
- 16 high voltage outputs
- High voltage backplane driver
- CMOS input levels
- Operating Temperature Range: -40°C to +125°C
- Package Option: VQFN-32



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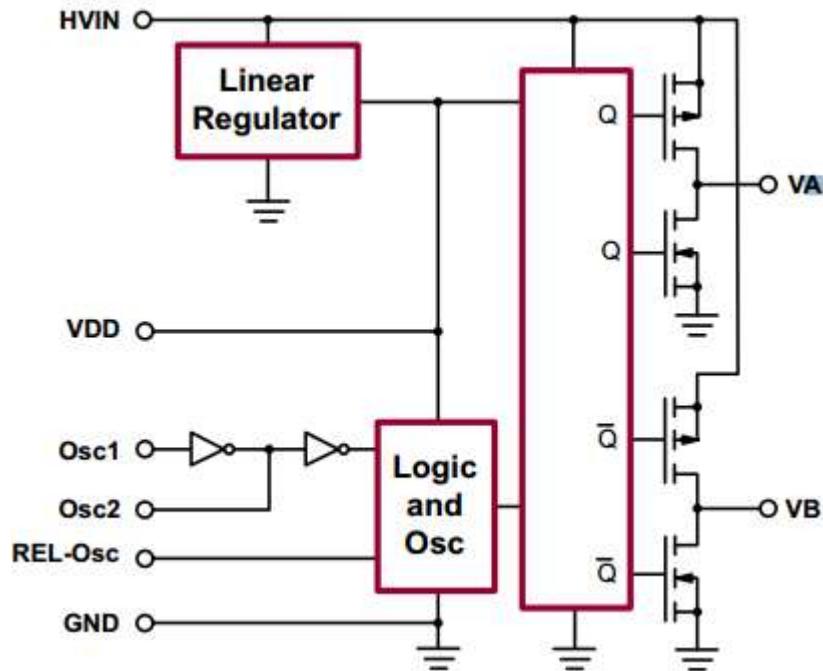
MICROCHIP

HV809

Online
Datasheet

Features:

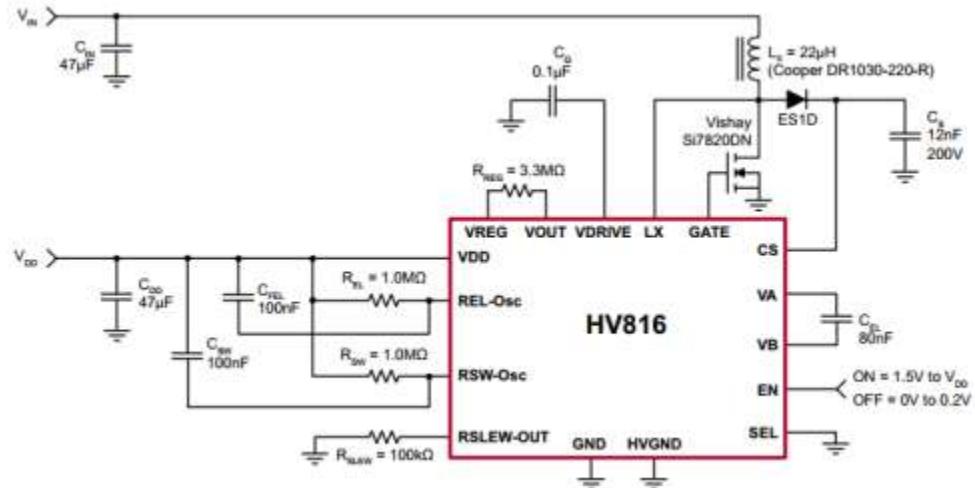
- Input voltage up to 200V DC
- 400V peak-to-peak output voltage
- Output load up to 350nF (100in² for 3.5nF/in² lamp)
- Adjustable output lamp frequency
- Adjustable on/off pulsing frequency
- Operating Temperature Range:
-25°C to +85°C
- Package Option: SOIC-8, SOIC-8 w/HS



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Features:

- 360V_{PP} output voltage for high brightness
- Large output load capability of up to 150nF
- 2.7 to 5.5V operating supply voltage
- Single lithium ion cell compatible
- Adjustable output regulation for dimming
- External switching MOSFET
- Low audible noise
- Output discharge slew rate control
- 1.5V logic
- Dedicated Enable pin
- Two EL frequency controls
- Independent lamp and converter frequency setting
- Split supply capability
- Operating Temperature Range:
-40°C to +125°C
- Package Option: QFN-16





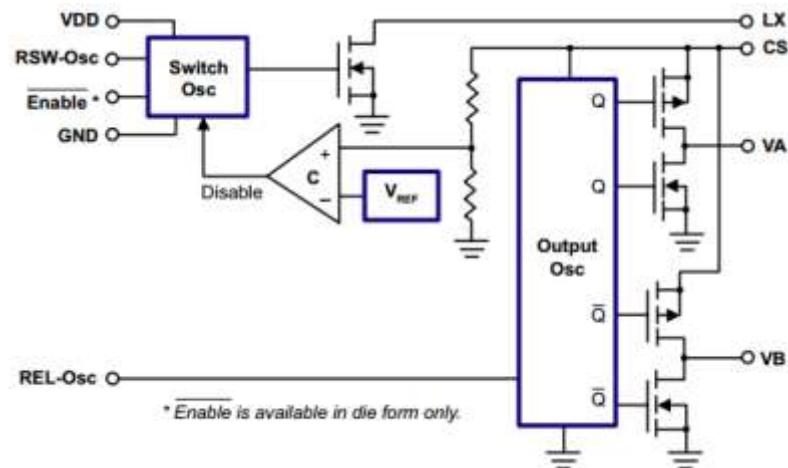
MICROCHIP

HV823

Online
Datasheet

Features:

- 2.0 to 9.5V operating supply voltage
- DC to AC conversion
- 180V peak-to-peak typical output voltage
- Large output load capability typically 50nF
- Permits the use of high-resistance elastomeric lamp components
- Adjustable output lamp frequency to control lamp color, lamp life, and power consumption
- Adjustable converter frequency to eliminate harmonics and optimize power consumption
- Enable/disable function
- Low current draw under no load condition
- Operating Temperature Range:
-25°C to +85°C
- Package Option: SOIC-8



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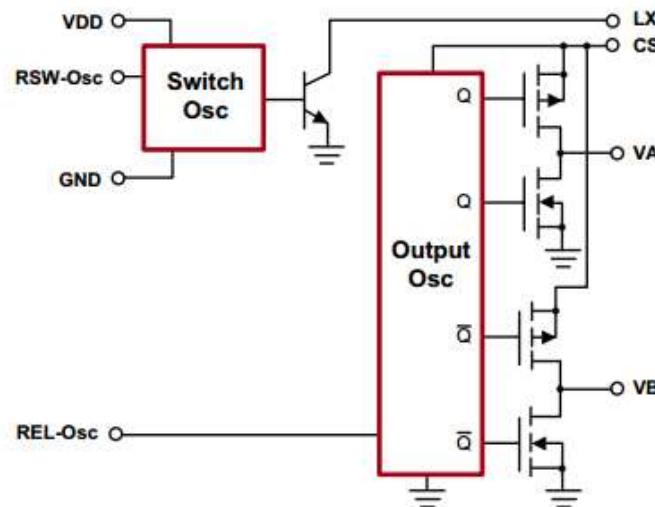
MICROCHIP

HV825

Online
Datasheet

Features:

- 1.0 to 1.6V operating supply voltage
- DC to AC conversion
- Output load of typically up to 6.0nF
- Adjustable output lamp frequency
- Adjustable converter frequency
- Enable function
- Operating Temperature Range:
-25°C to +85°C
- Package Option: SOIC-8, MSOP-8



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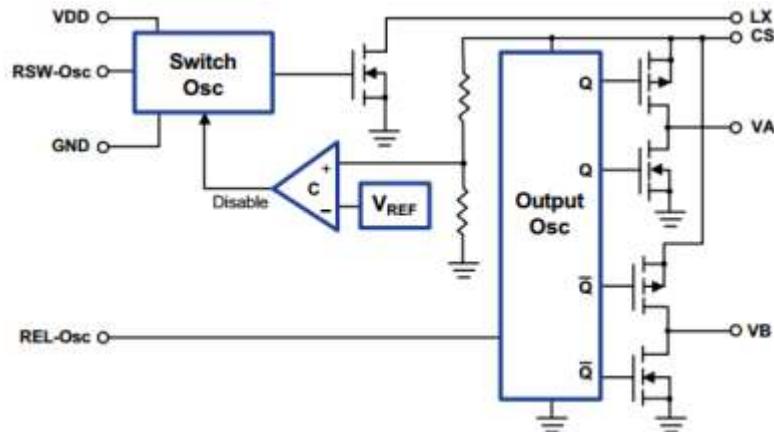
MICROCHIP

HV830

Online
Datasheet

Features:

- 2.0 to 9.5V operating supply voltage
- DC to AC conversion
- 200V peak-to-peak typical output voltage
- Large output load capability typically 50nF
- Permits the use of high-resistance elastomeric lamp components
- Adjustable output lamp frequency to control lamp color, lamp life, and power consumption
- Enable/disable function
- Low current draw under no load condition
- Very low standby current - 30nA typical
- Operating Temperature Range:
-25°C to +85°C
- Package Option: SOIC-8, MSOP-8



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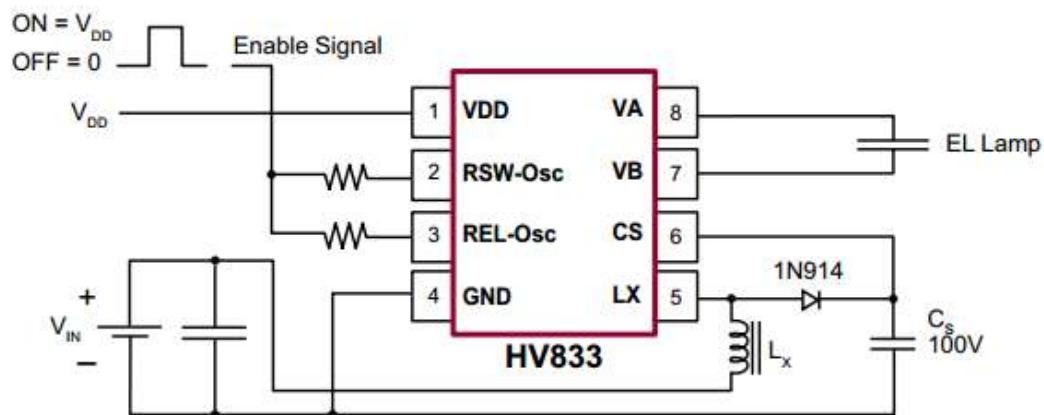
MICROCHIP

Online
Datasheet

HV833

Features:

- 1.8 to 6.5V operating supply voltage
- DC to AC conversion
- Separately adjustable lamp and converter frequency
- Output voltage regulation
- Enable/disable function
- Patented output timing for high efficiency
- <100nA shutdown current
- Split supply capability
- LCD backlighting
- Operating Temperature Range:
-40°C to +85°C
- Package Option: MSOP-8



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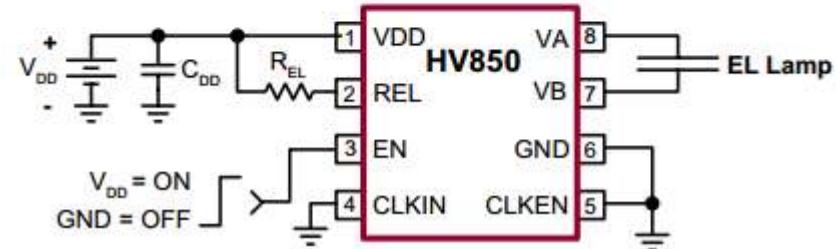
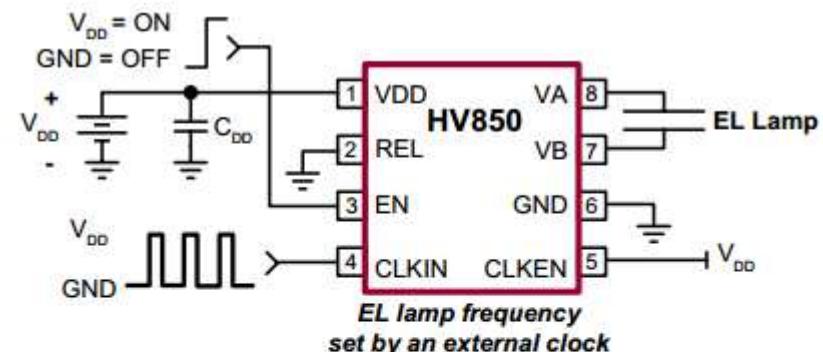
MICROCHIP

HV850

Online
Datasheet

Features:

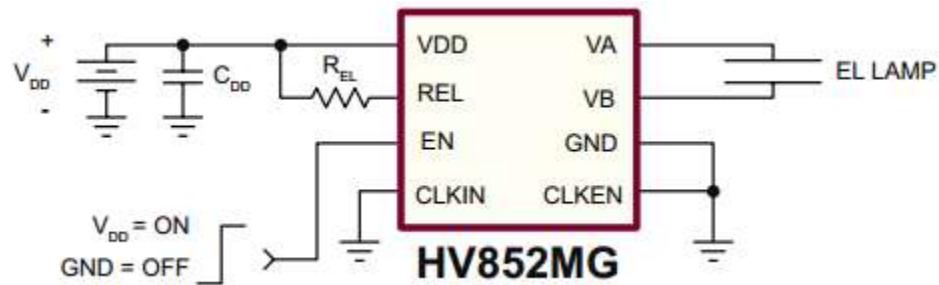
- No external components required when using an external EL clock frequency
- EL frequency can be set by an external resistor
- Low noise
- DC to AC converter
- Drives up to 5.0nF load (approx. 1.5in² lamp)
- Output voltage regulation
- Enable function
- EL Lamp dimming
- Operating Temperature Range:
-25°C to +85°C
- Package Option: MSOP-8



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Features:

- No external components required when using an external EL clock frequency
- EL frequency can be set by an external resistor
- Low Noise
- DC to AC converter
- Drives up to 5.3nF (approx. 1.5in² lamp) load
- Output voltage regulation
- Enable function
- EL Lamp dimming
- Operating Temperature Range:
-25°C to +85°C
- Package Option: MSOP-8, WDFN-10





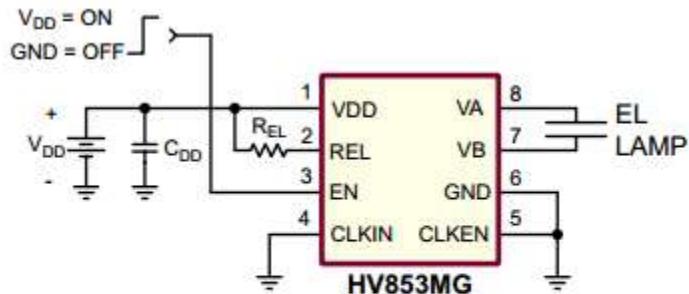
MICROCHIP

HV853

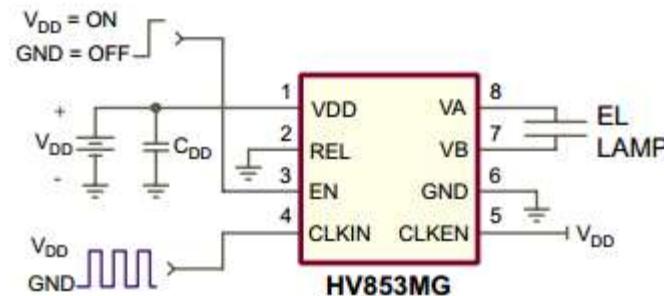
Online
Datasheet

Features:

- No external components required when using an external EL clock frequency
- Audible noise reduction with improved EMI
- EL frequency can be set by an external resistor
- DC to AC converter
- Drives up to 5.3nF (approx. 1.5in² lamp) load
- Output voltage regulation
- Enable function
- EL Lamp dimming
- Operating Temperature Range:
-25°C to +85°C
- Package Option: MSOP-8, WDFN-10



EL Lamp Frequency set by R_{EL}



EL Lamp Frequency set by External Clock

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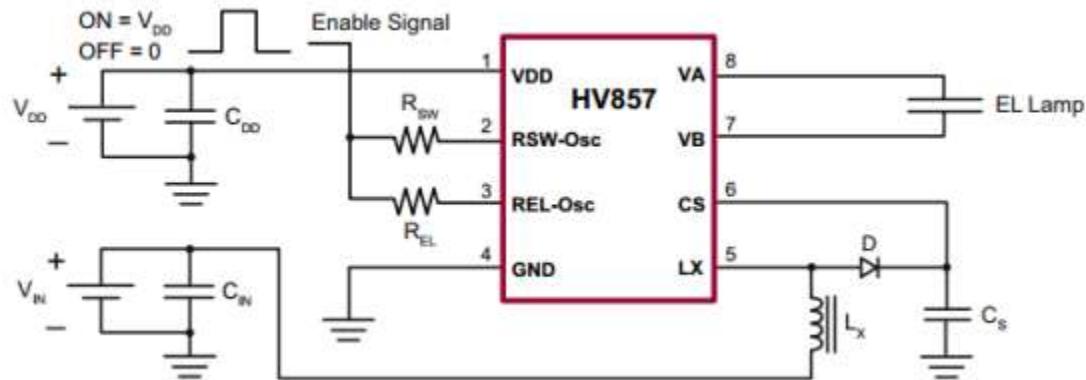
MICROCHIP

HV857

Online
Datasheet

Features:

- Patented audible noise reduction
- Patented lamp aging compensation
- Patented output timing for high efficiency
- 190 V_{PP} output voltage for higher brightness
- Single cell lithium ion compatible
- 150nA shutdown current
- Wide input voltage range 1.8V to 5.0V
- Separately adjustable lamp and converter frequencies
- Output voltage regulation
- Split supply capability
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WDFN-8, MSOP-8



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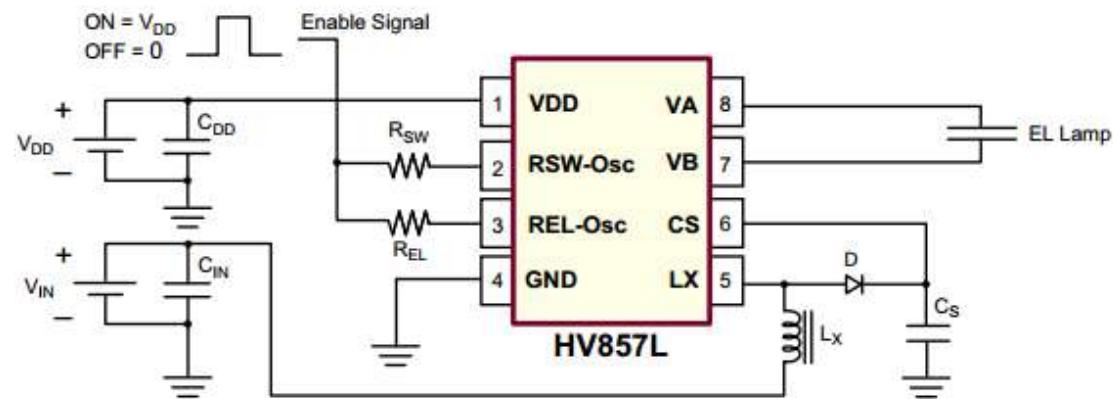
MICROCHIP

HV857L

Online
Datasheet

Features:

- Audible noise reduction
- 190 VPP output voltage for higher brightness
- Single cell lithium ion compatible
- 150nA shutdown current
- Wide input voltage range 1.8V to 5.0V
- Separately adjustable lamp and converter frequencies
- Output voltage regulation
- Split supply capability
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WDFN-8, MSOP-8



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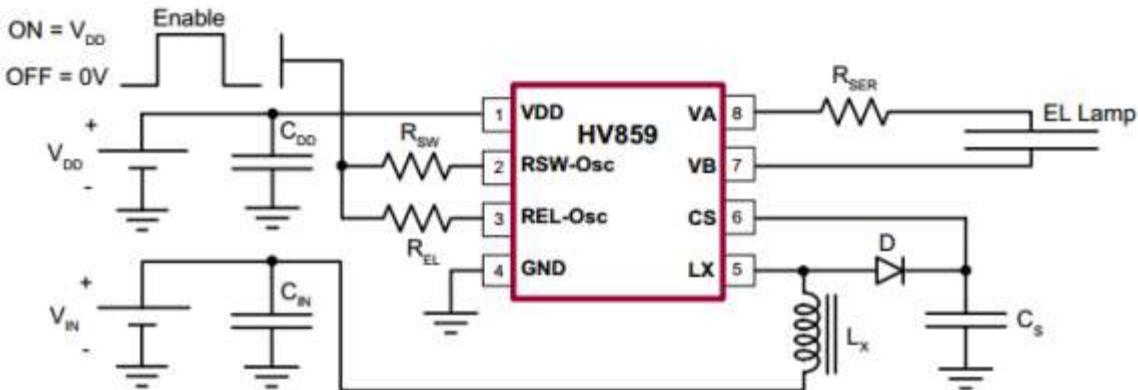
MICROCHIP

HV859

Online
Datasheet

Features:

- Patented audible noise reduction
- Patented lamp aging compensation
- Patented output timing for high efficiency
- 210 V_{PP} output voltage for higher brightness
- Single cell lithium ion compatible
- 150nA shutdown current
- Wide input voltage range 1.8 to 5.0V
- Separately adjustable lamp and converter frequencies
- Output voltage regulation
- Split supply capability
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WDFN-8, MSOP-8



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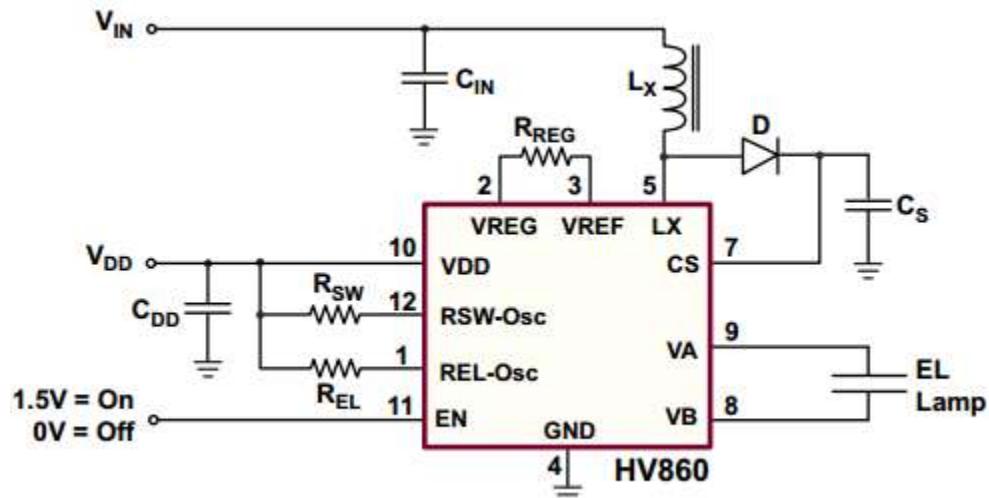
MICROCHIP

HV860

Online
Datasheet

Features:

- Adjustable output regulation for dimming
- 220VPP output voltage for higher brightness
- Single cell lithium ion compatible
- 150nA shutdown current
- Separately adjustable lamp and converter frequencies
- Split supply capability
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WQFN-12



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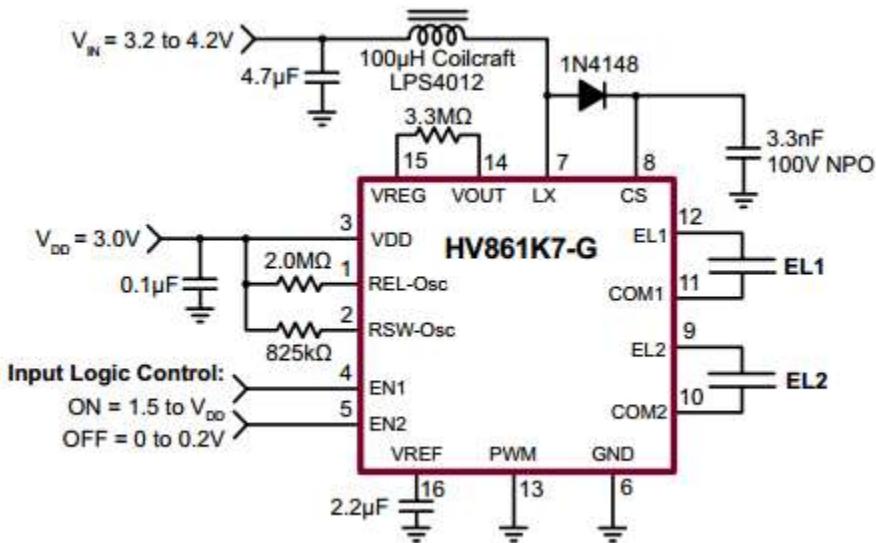
MICROCHIP

HV861

Online
Datasheet

Features:

- Adjustable output regulation for dimming
- Lamp fade-in/fade-out capability
- Low audible noise
- 180VPP output voltage for higher brightness
- 1.5V enable input logic high
- Single cell lithium ion compatible
- One miniature inductor to power both lamps
- Separately adjustable lamp and converter frequencies
- Split supply capability
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WQFN-16



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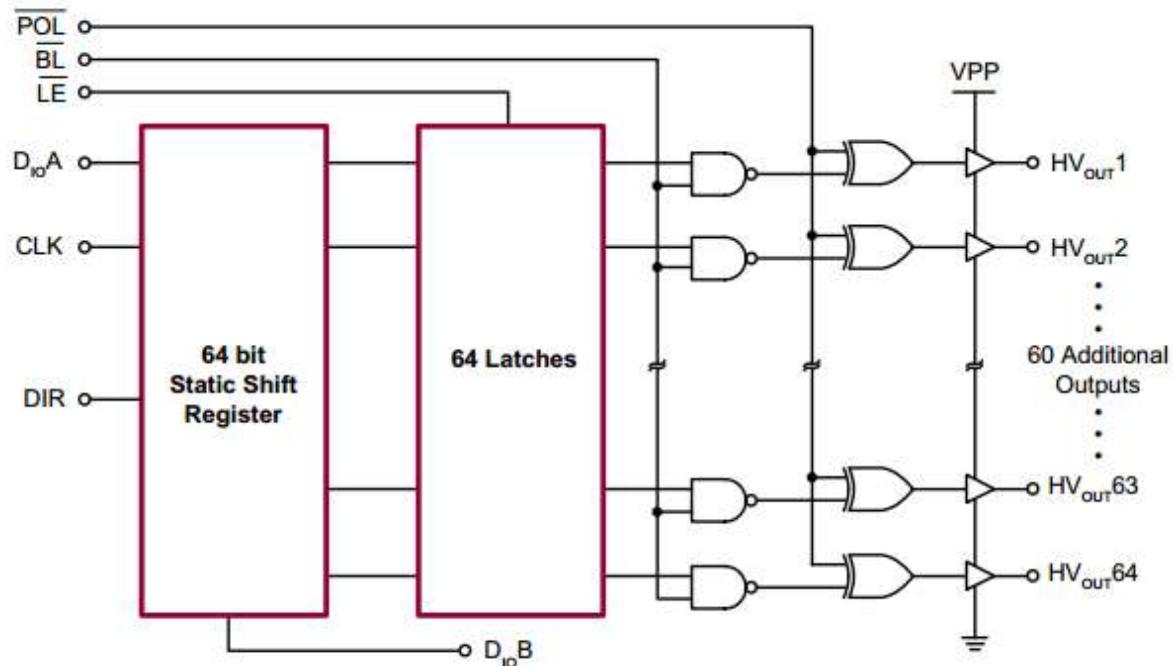
MICROCHIP

HV3418

Online
Datasheet

Features:

- Output voltages to 180V
- Low power level shifting
- Shift register speed:
 - 6.0MHz @ VDD = 5.0V
 - 12MHz @ VDD = 12V
- Latched data outputs
- Output polarity and blanking
- CMOS compatible inputs
- Forward and reverse shifting option
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-80



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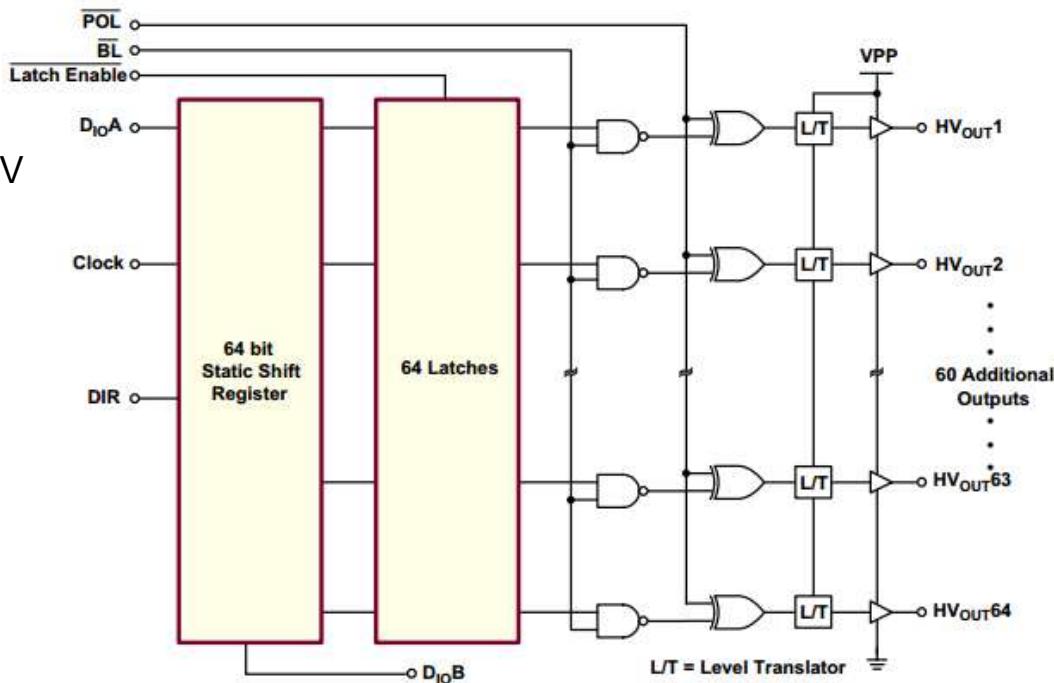
MICROCHIP

HV507

Online
Datasheet

Features:

- Operating output voltages to 300V
- Low power level shifting from 5.0 to 300V
- Shift register speed: 8.0MHz @ VDD = 5.0V
- 64 latched data outputs
- Output polarity and blanking
- CMOS compatible inputs
- Forward and reverse shifting options
- Operating Temperature Range:
0°C to +70°C
- Package Option: PQFP-80



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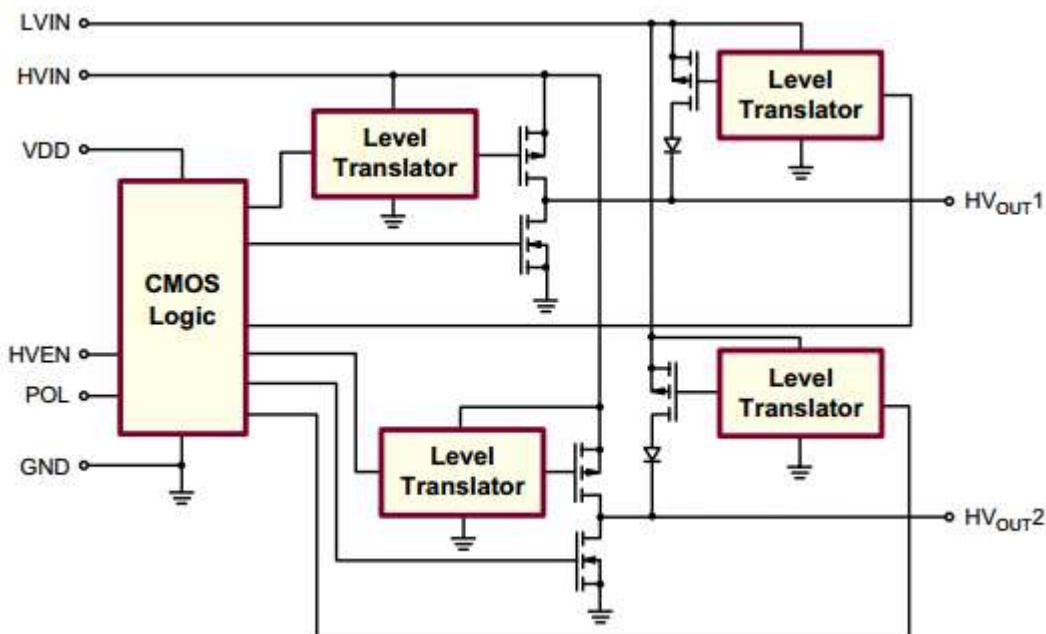
MICROCHIP

HV508

Online
Datasheet

Features:

- Logic-selectable output voltage
- 100nF drive capability
- Up to 90V_{P-P}
- 25µs response time
- Operating Temperature Range:
-5°C to +60°C
- Package Option: SOIC-8



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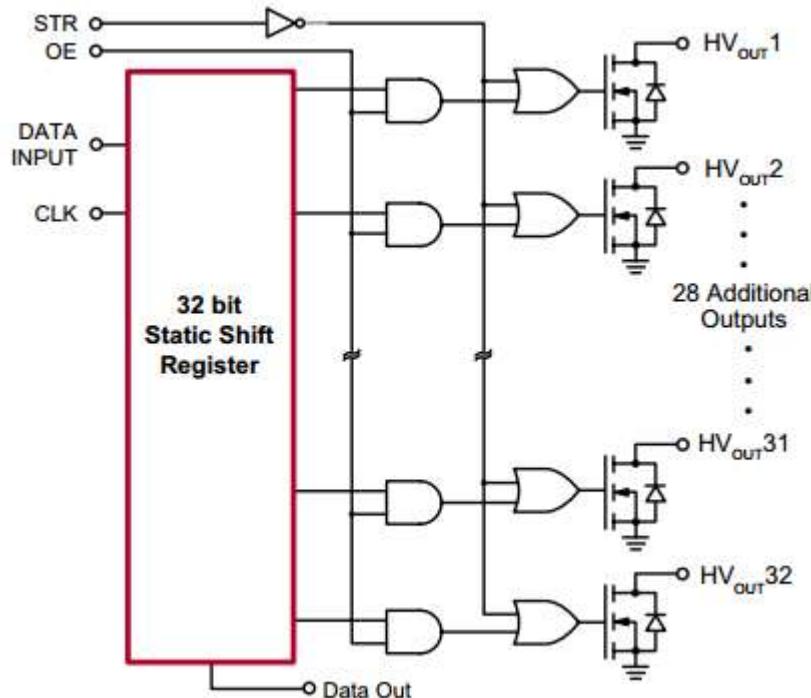
MICROCHIP

HV5122

Online
Datasheet

Features:

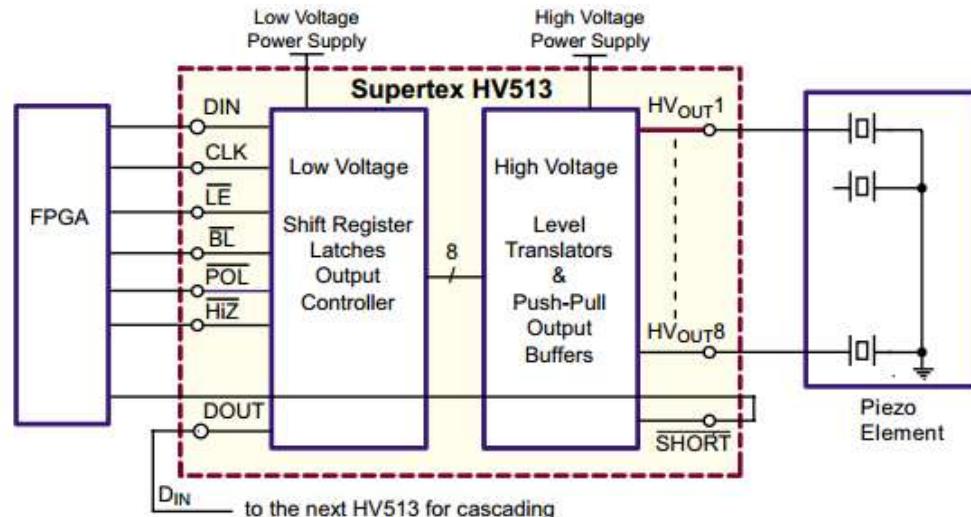
- Output voltages to 225V using a ramped supply voltage
- SINK current minimum 100mA
- Shift register speed 8.0MHz
- Strobe and enable inputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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Features:

- Operating output voltage of 250V
- Low power level shifting from 5.0 to 250V
- Shift register speed 8.0MHz @ VDD = 5.0V
- 8 latch data outputs
- Output polarity and blanking
- Output short circuit detect
- Output high-Z control
- CMOS compatible inputs
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WQFN-32, SOIC-24 (300mil)





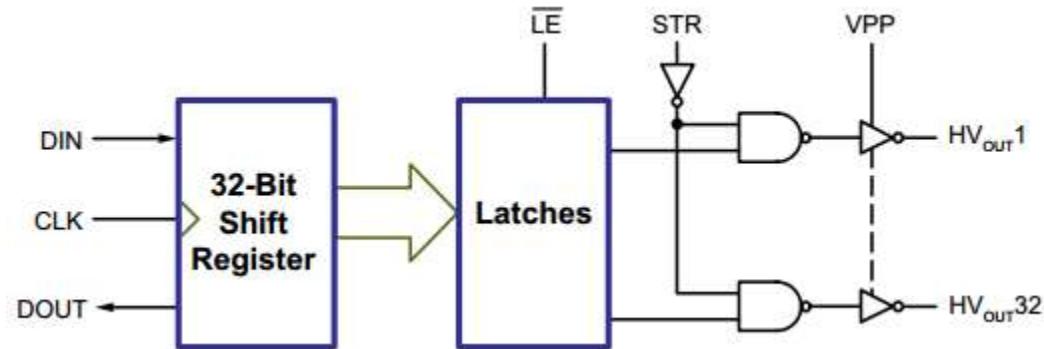
MICROCHIP

HV518

Online
Datasheet

Features:

- 32 output lines
- 90V output swing
- Active pull-down
- Latches on all outputs
- Up to 6.0MHz @ VDD = 5.0V
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PDIP-40, PLCC-44



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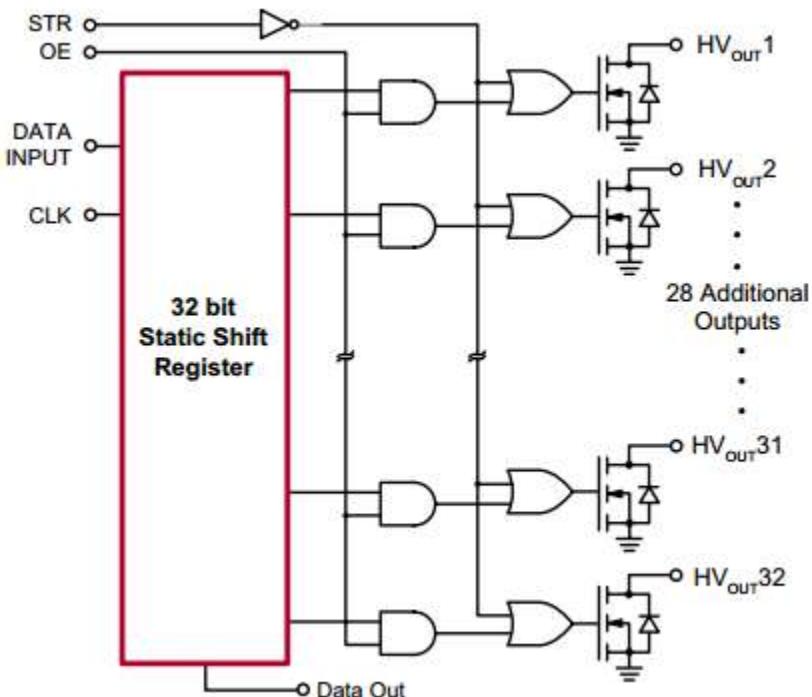
MICROCHIP

HV5222

Online
Datasheet

Features:

- Output voltages to 225V using a ramped supply voltage
- SINK current minimum 100mA
- Shift register speed 8.0MHz
- Strobe and enable inputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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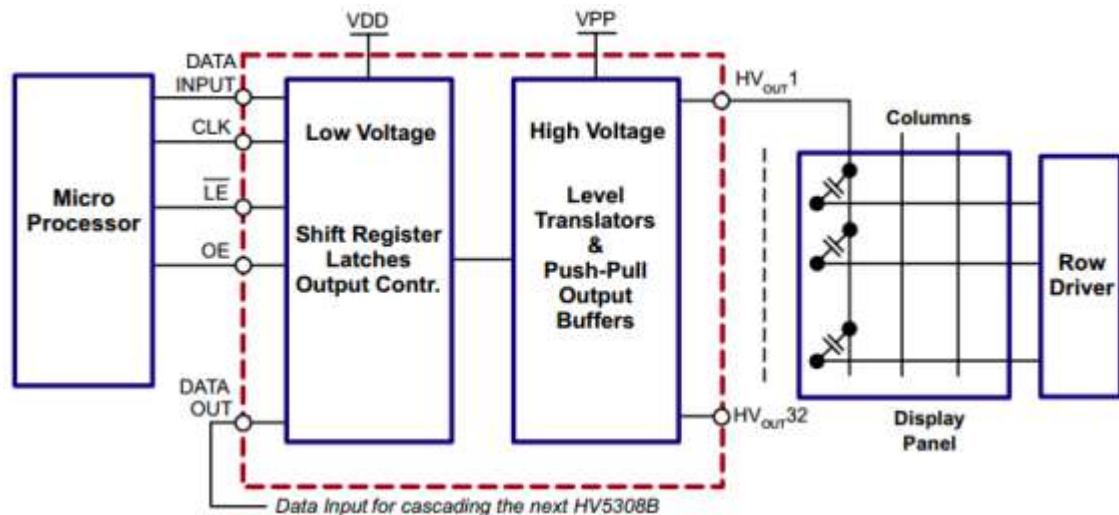
MICROCHIP

HV5308

Online
Datasheet

Features:

- Processed with HVCMOS® technology
- Low power level shifting
- Source/sink current minimum 20mA
- Shift register speed 8.0MHz
- Latched data outputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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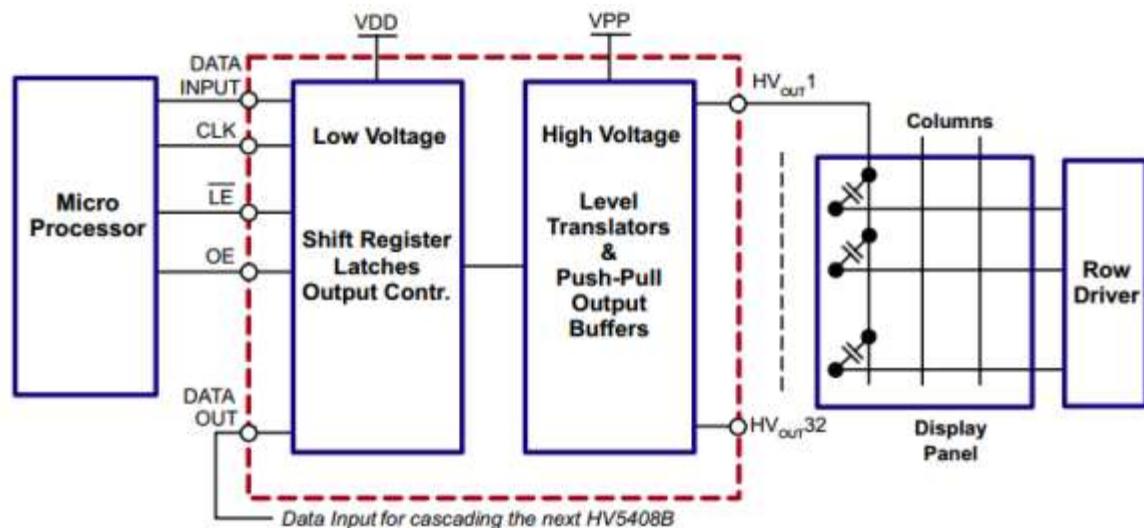
MICROCHIP

HV5408

Online
Datasheet

Features:

- Processed with HVCMOS® technology
- Low power level shifting
- SOURCE/SINK current minimum 20mA
- Shift register speed 8.0MHz
- Latched data outputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range: -40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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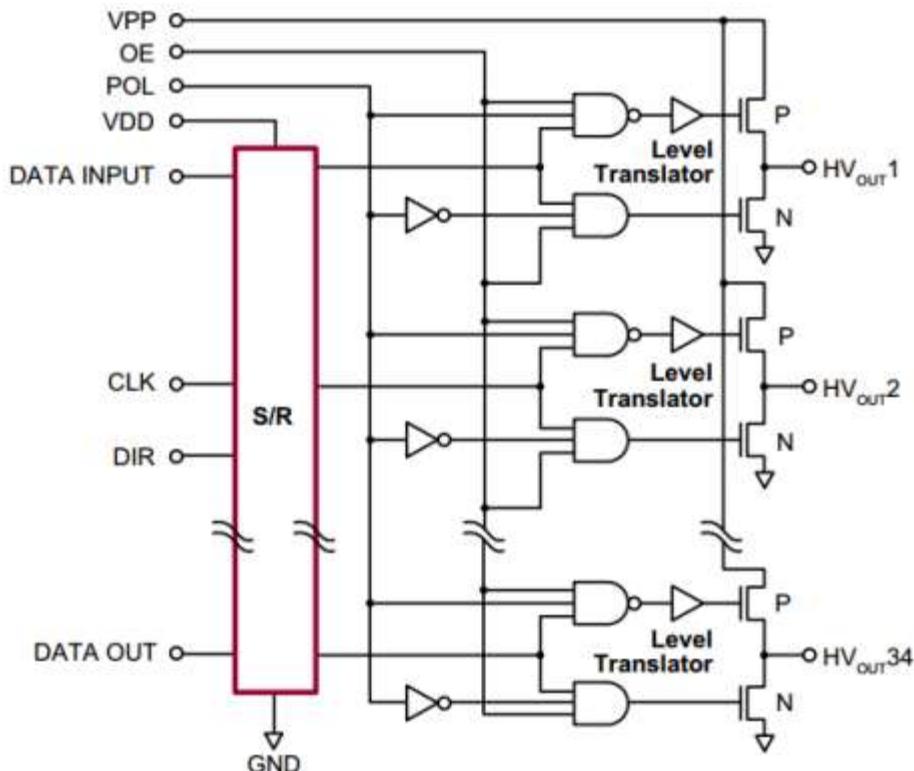
MICROCHIP

HV7022

Online
Datasheet

Features:

- HVCMOS® technology
- Symmetric row drive (reduces latent imaging in ACTFEL displays)
- Output voltage up to +230V
- Low power level shifting
- Source/sink current minimum 70mA
- Shift register speed 4.0MHz
- Pin-programmable shift direction
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PLCC-44



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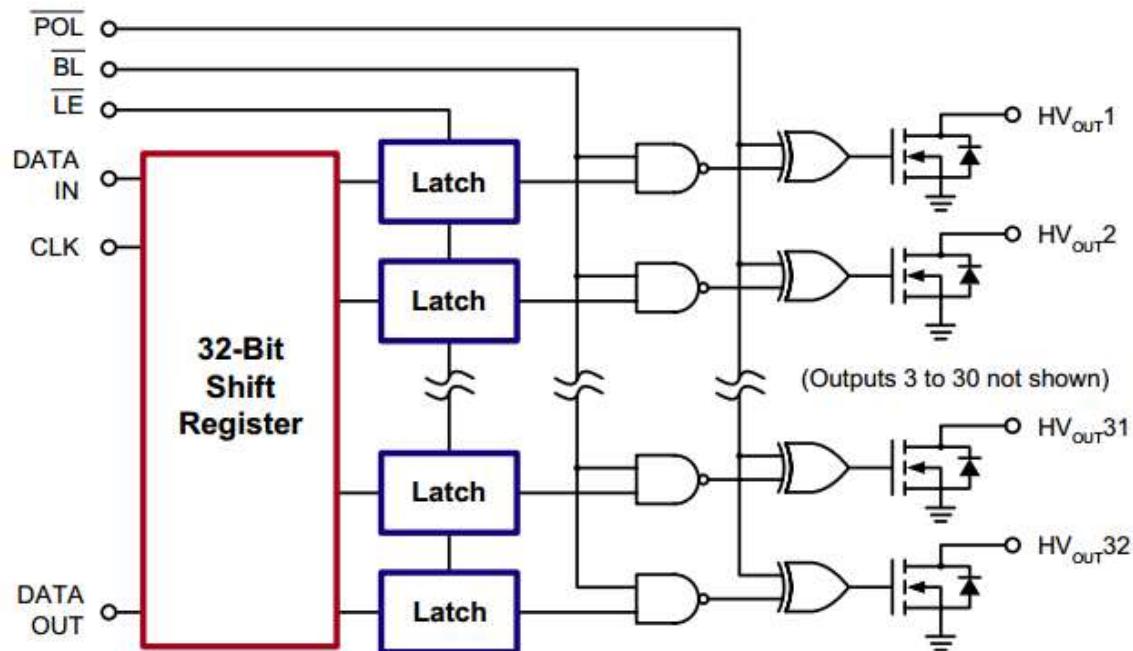
MICROCHIP

HV5522

Online
Datasheet

Features:

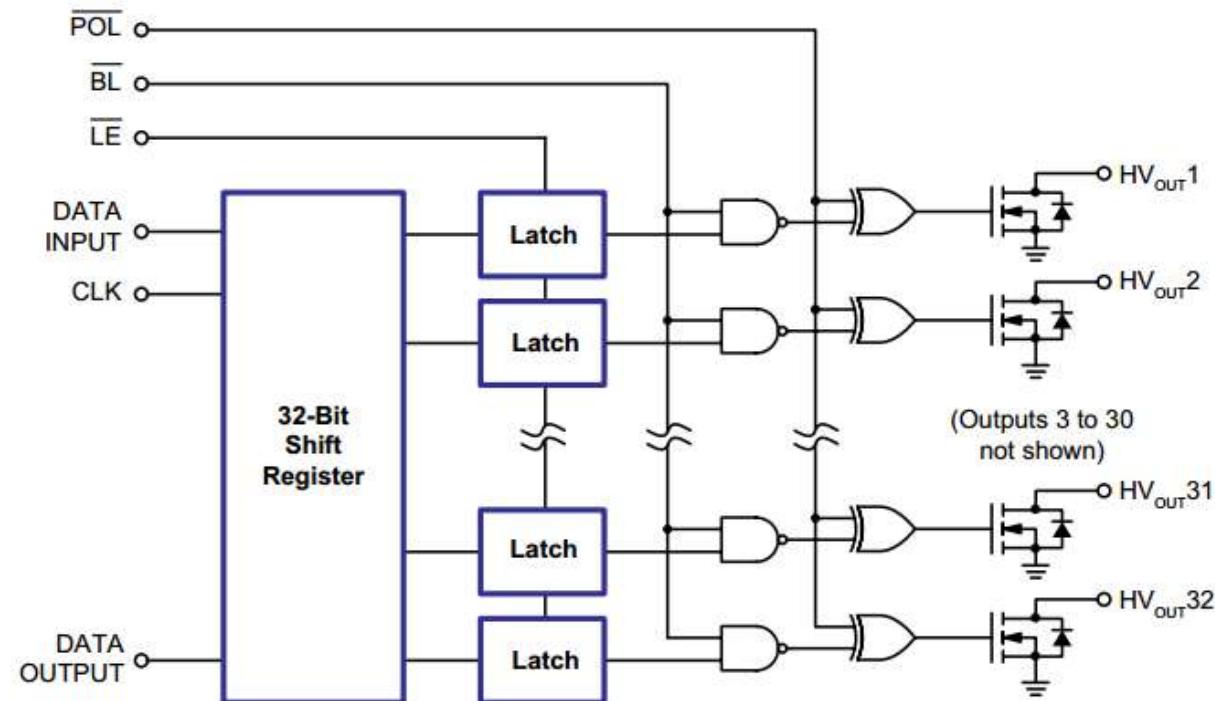
- Sink current minimum 100mA
- Shift register speed 8.0MHz
- Polarity and blanking inputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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Features:

- Sink current minimum 100mA
- Shift register speed 16MHz
- Polarity and blanking inputs
- CMOS compatible inputs
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WQFN-44





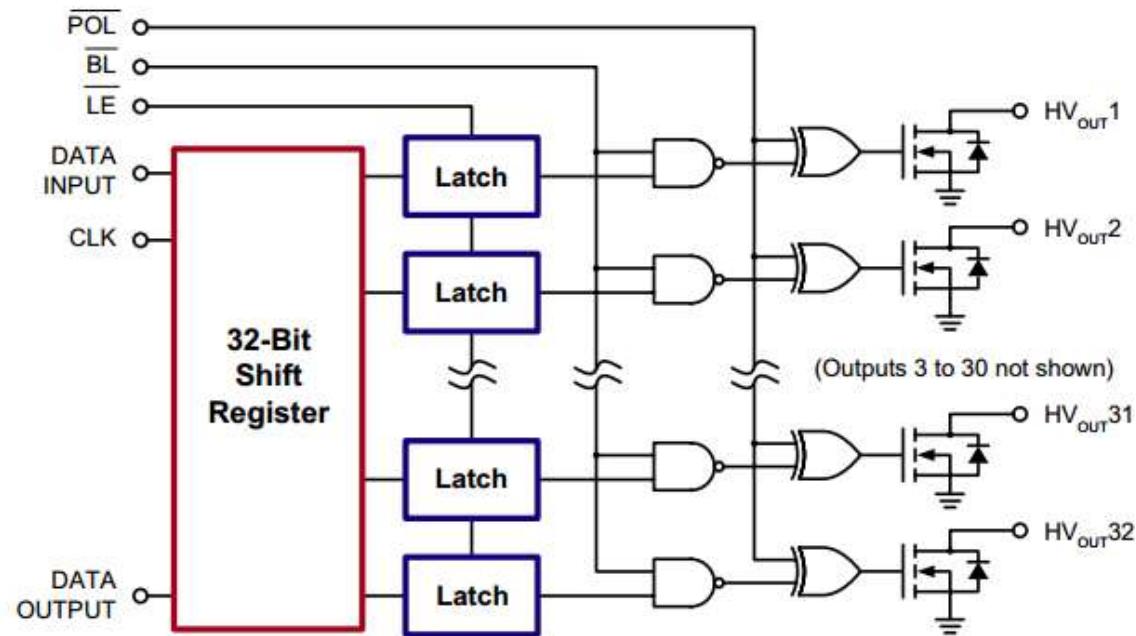
MICROCHIP

HV5530

Online
Datasheet

Features:

- Sink current minimum 100mA
- Shift register speed 8.0MHz
- Polarity and blanking inputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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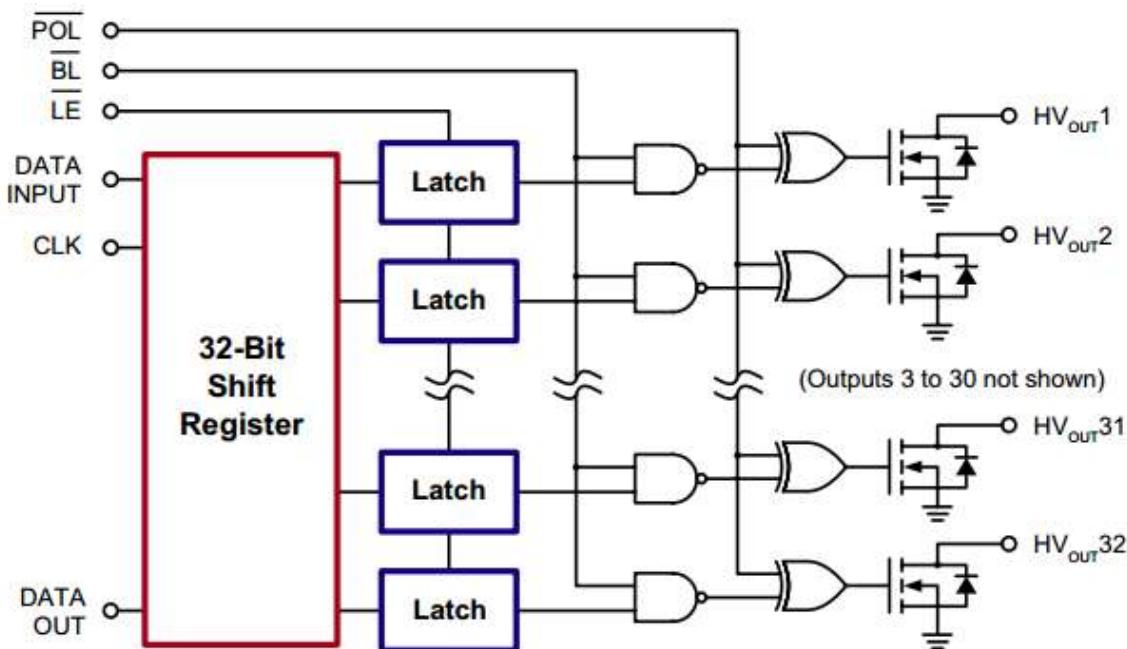
MICROCHIP

HV5622

Online
Datasheet

Features:

- Sink current minimum 100mA
- Shift register speed 8.0MHz
- Polarity and blanking inputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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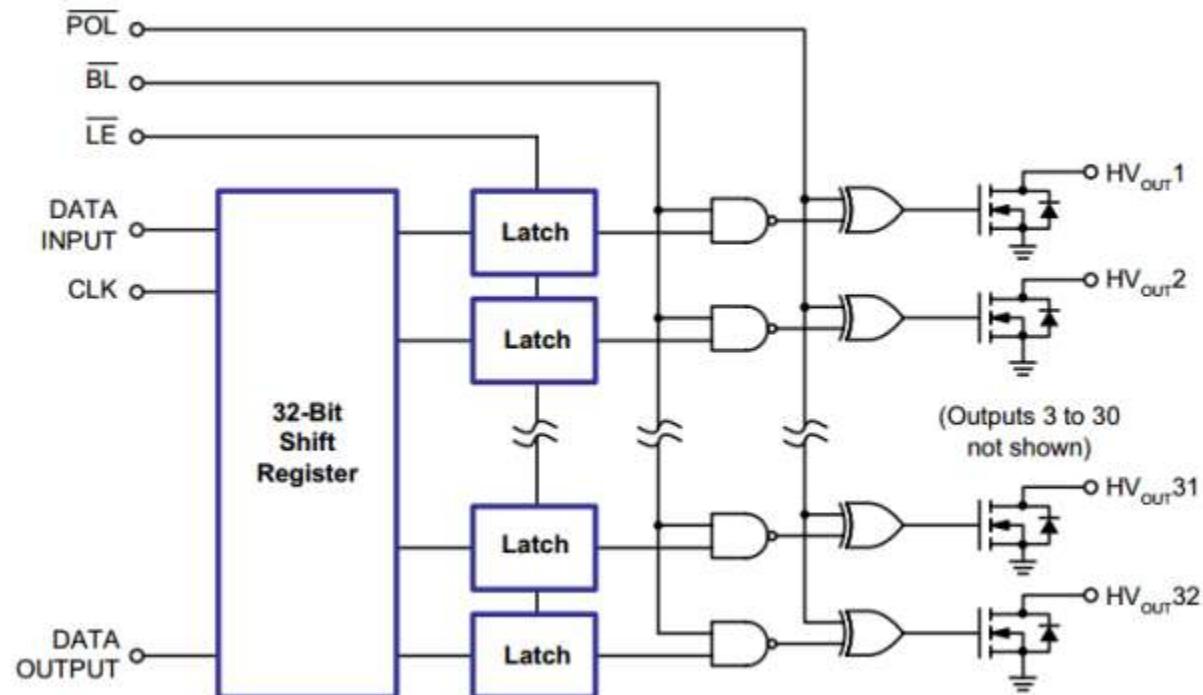
MICROCHIP

HV5623

Online
Datasheet

Features:

- Sink current minimum 100mA
- Shift register speed 16MHz
- Polarity and blanking inputs
- CMOS compatible inputs
- Operating Temperature Range:
-40°C to +85°C
- Package Option: WQFN-44



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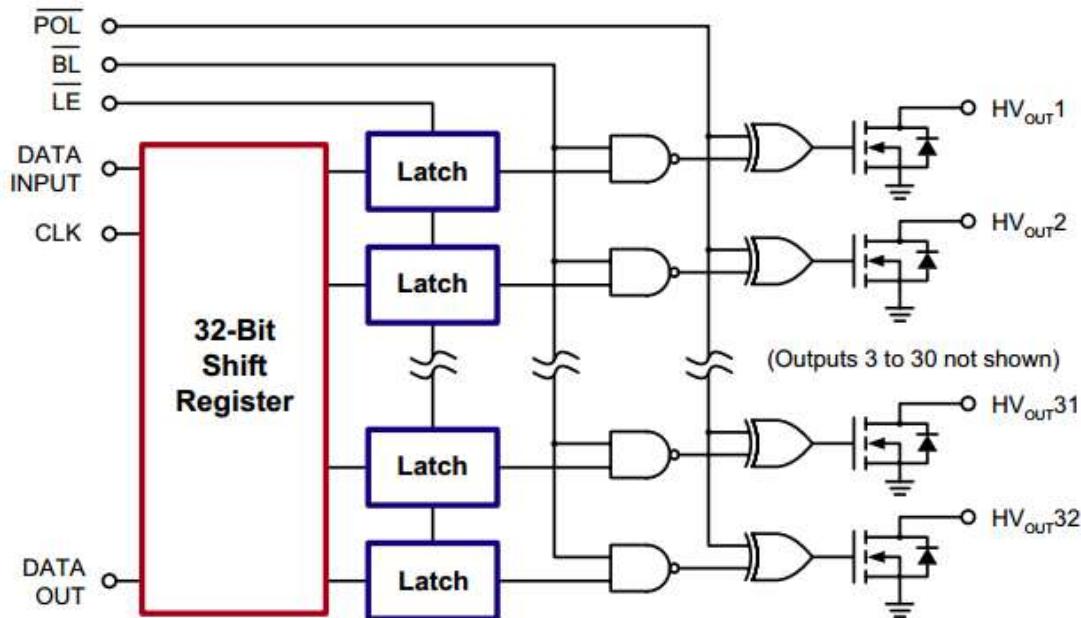
MICROCHIP

HV5630

Online
Datasheet

Features:

- Sink current minimum 100mA
- Shift register speed 8.0MHz
- Polarity and blanking inputs
- CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PLCC-44



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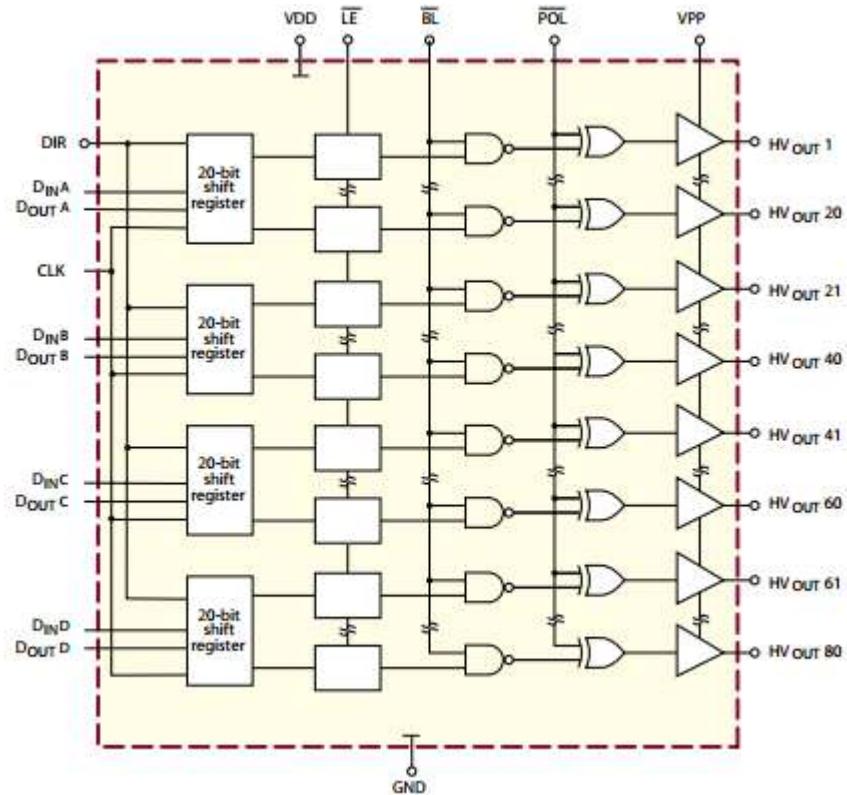
MICROCHIP

HV574

Online
Datasheet

Features:

- 5.0V CMS Logic
- Output voltage up to 80V
- Low power level shifting
- 100MHz equivalent data rate using four dynamic shift registers
- Latched data outputs
- Forward and reverse shifting options (DIR pin)
- Diode to VPP allows efficient power recovery
- Outputs may be hot switched
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-100



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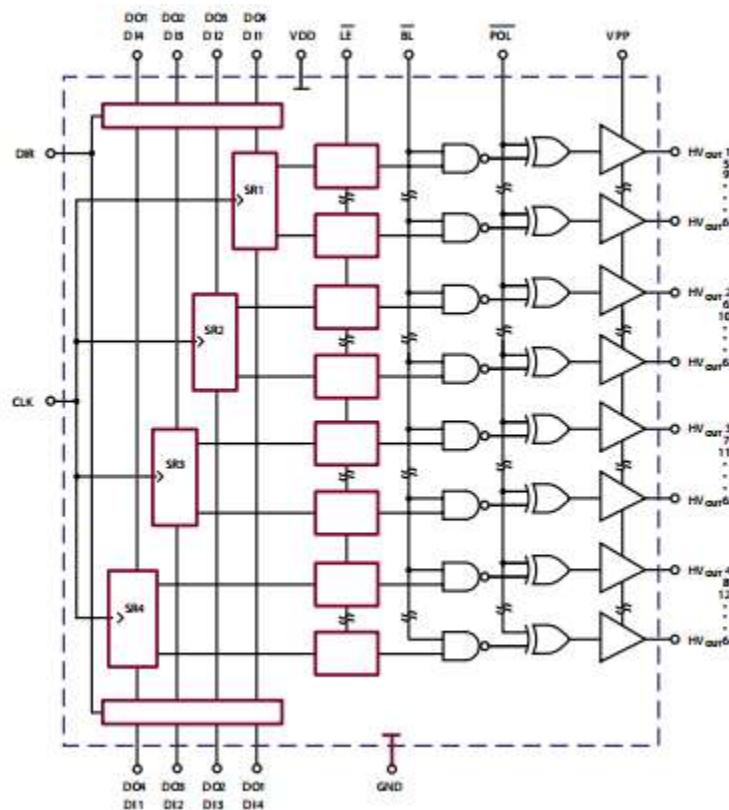
MICROCHIP

HV57708

Online
Datasheet

Features:

- 5.0V CMS Logic
- Output voltage up to +80V
- Low power level shifting
- 32MHz equivalent data rate
- Latched data outputs
- Forward and reverse shifting options (DIR pin)
- Diode to VPP allows efficient power recovery
- Outputs may be hot switched
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-80



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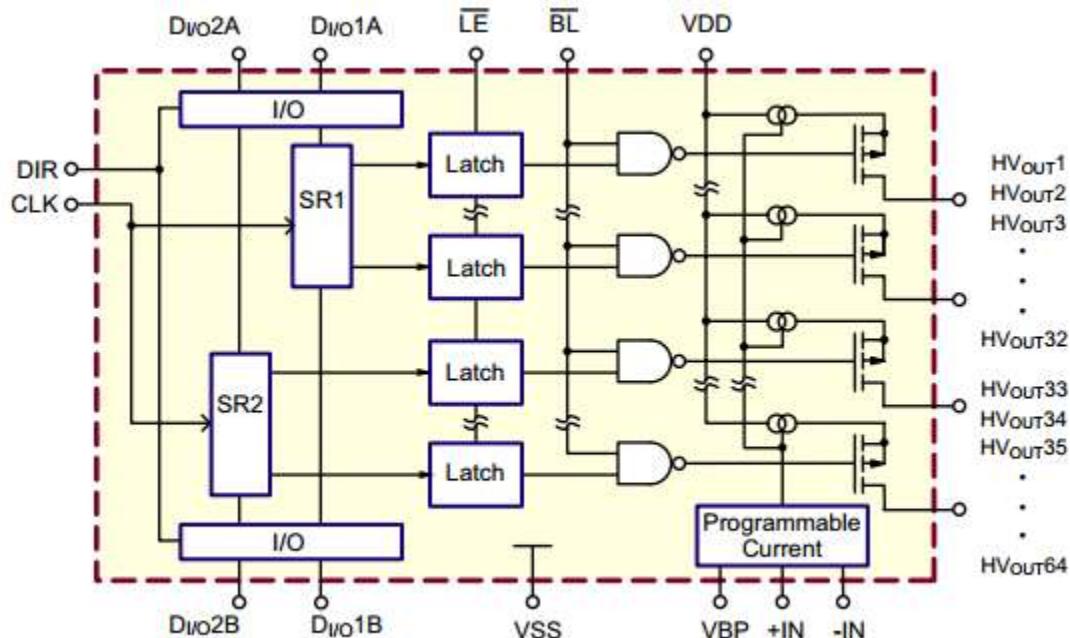
MICROCHIP

HV57009

Online
Datasheet

Features:

- 5.0V CMOS Logic
- Output voltage up to -85V
- Output current source control
- 16MHz equivalent data rate
- Latched data outputs
- Forward and reverse shifting options (DIR pin)
- Diode to VDD allows efficient power recovery
- Operating Temperature Range: -40°C to +85°C
- Package Option: PQFP-44



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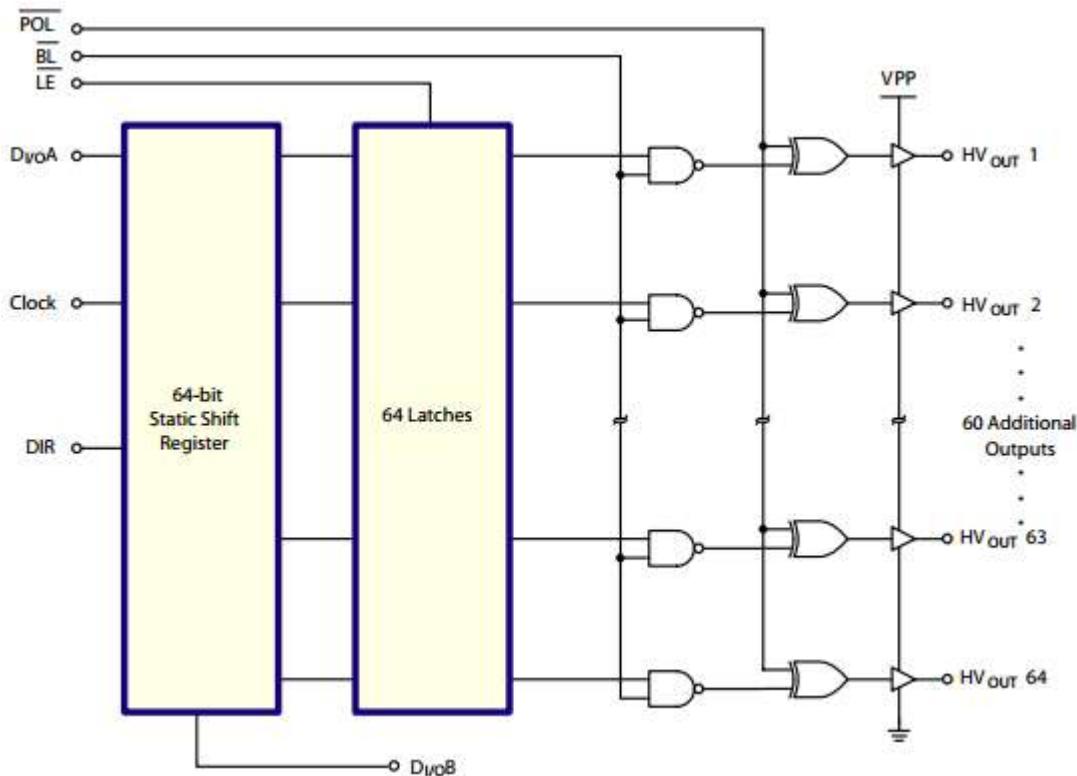
MICROCHIP

HV57908

Online
Datasheet

Features:

- 5.0V CMS Logic
- Output voltage up to +80V
- Low power level shifting
- 8.0MHz data rate
- Latched data outputs
- Forward and reverse shifting options (DIR pin)
- Diode to VPP allows efficient power recovery
- Outputs may be hot switched
- Operating Temperature Range: -40°C to +85°C
- Package Option: PQFP-80



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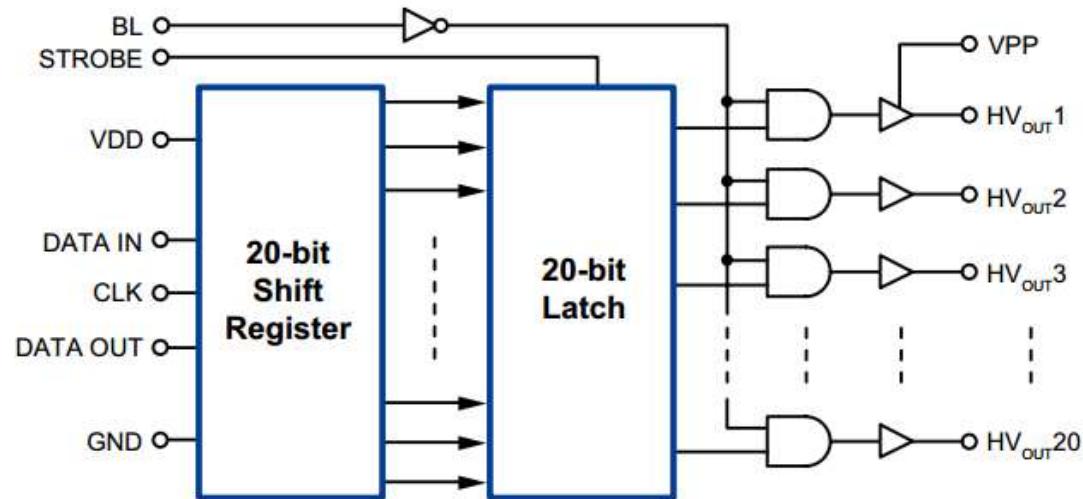
MICROCHIP

HV5812

Online
Datasheet

Features:

- Operating voltage up to 80V
- High speed source driver
- 5.0V CMOS logic circuitry
- Up to 5.0MHz data input rate
- Excellent noise immunity
- Flexible high voltage supplies
- Operating Temperature Range:
-40°C to +125°C
- Package Option: PDIP-28, PLCC-28,
SOIC-28 (300mil)



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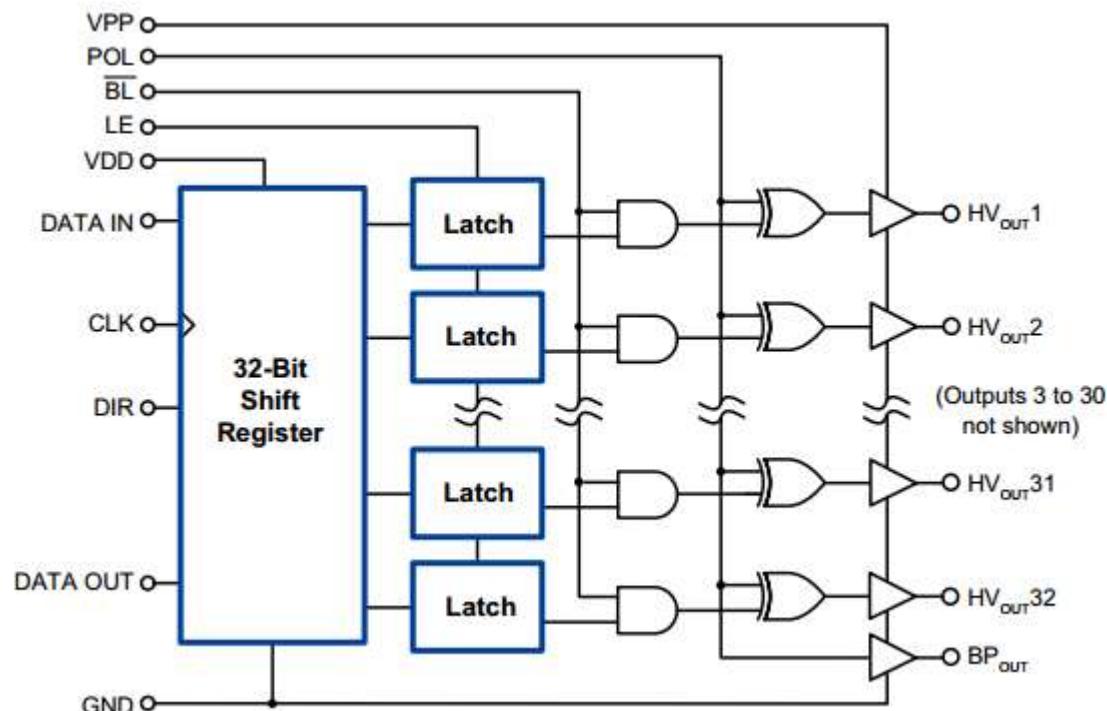
MICROCHIP

HV66

Online
Datasheet

Features:

- 32 push-pull CMOS output up to 60V
- Low power level shifting
- Shift register speed 5.0MHz
- Latched data outputs
- Bidirectional shift register (DIR)
- Backplane output
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44, PLCC-44



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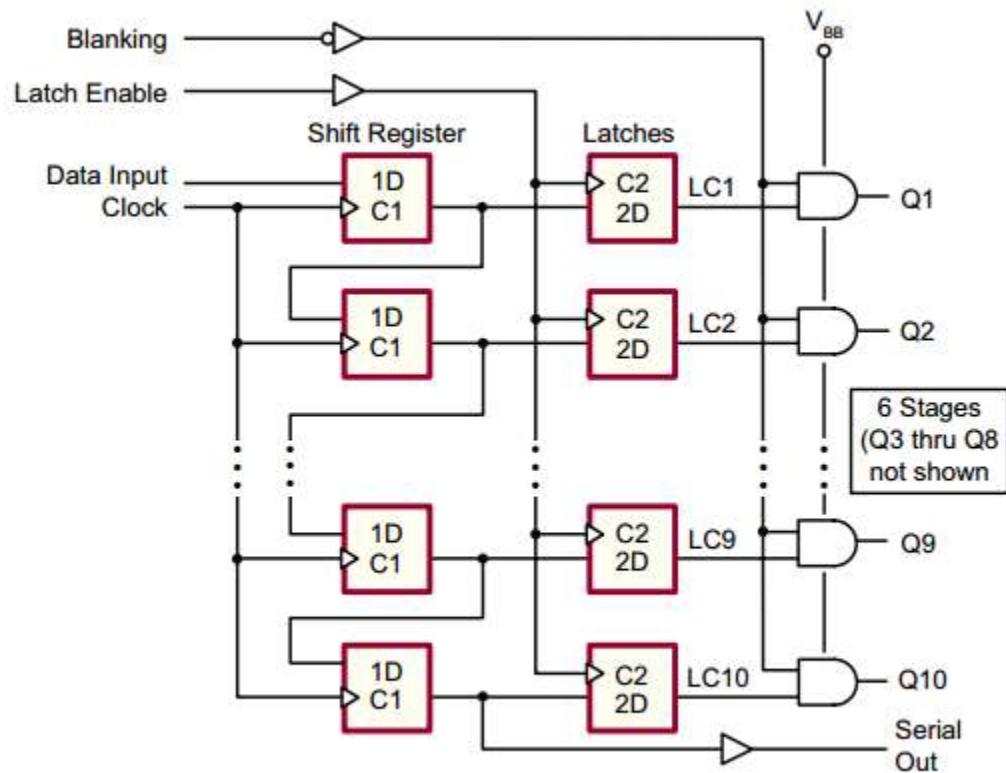
MICROCHIP

HV6810

Online
Datasheet

Features:

- High output voltage 80V
- High speed 5MHz @5.0VDD
- Low power IBB $\leq 0.1\text{mA}$ (all high)
- Active pull down $100\mu\text{A}$ min @ 25°C
- Output source current 25mA @ 60V
 V_{BB}
- Each device drives 10 lines
- High-speed serially-shifted data input
- 5.0V CMOS-compatible inputs
- Latches on all driver outputs
- Operating Temperature Range:
 -45°C to $+85^{\circ}\text{C}$
- Package Option: SOIC-20 (300mil)



Logic Diagram (positive logic)

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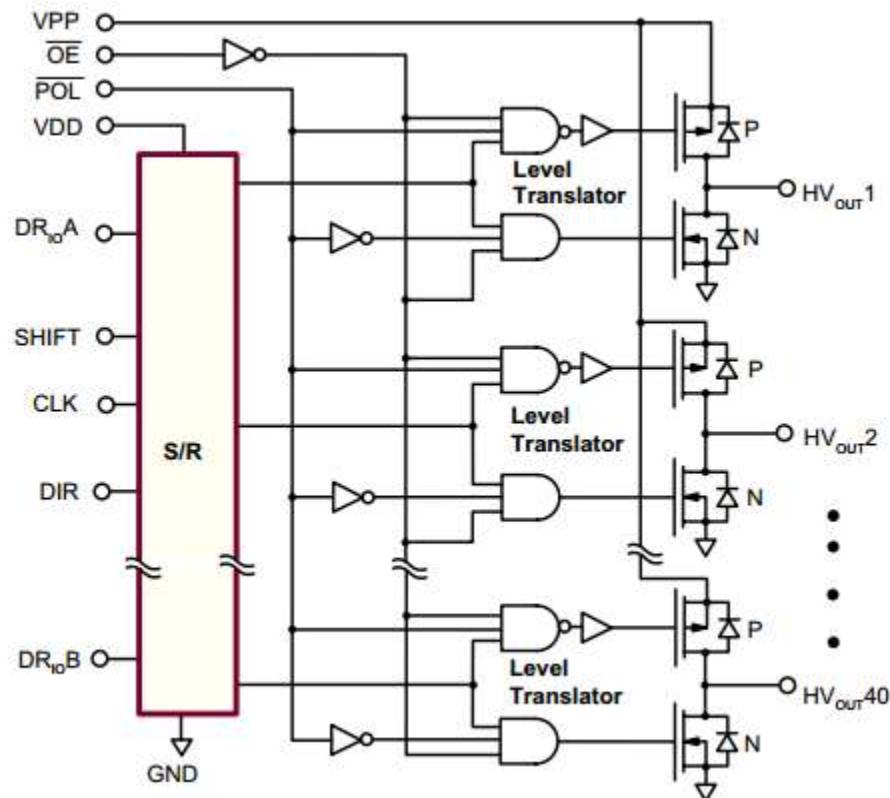
MICROCHIP

HV7224

Online
Datasheet

Features:

- Symmetric row drive (reduces latent imaging in ACTFEL displays)
- Output voltage up to +240V
- Low power level shifting
- Source/sink current minimum 70mA
- Shift register speed 3.0MHz
- Pin-programmable shift direction
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-64



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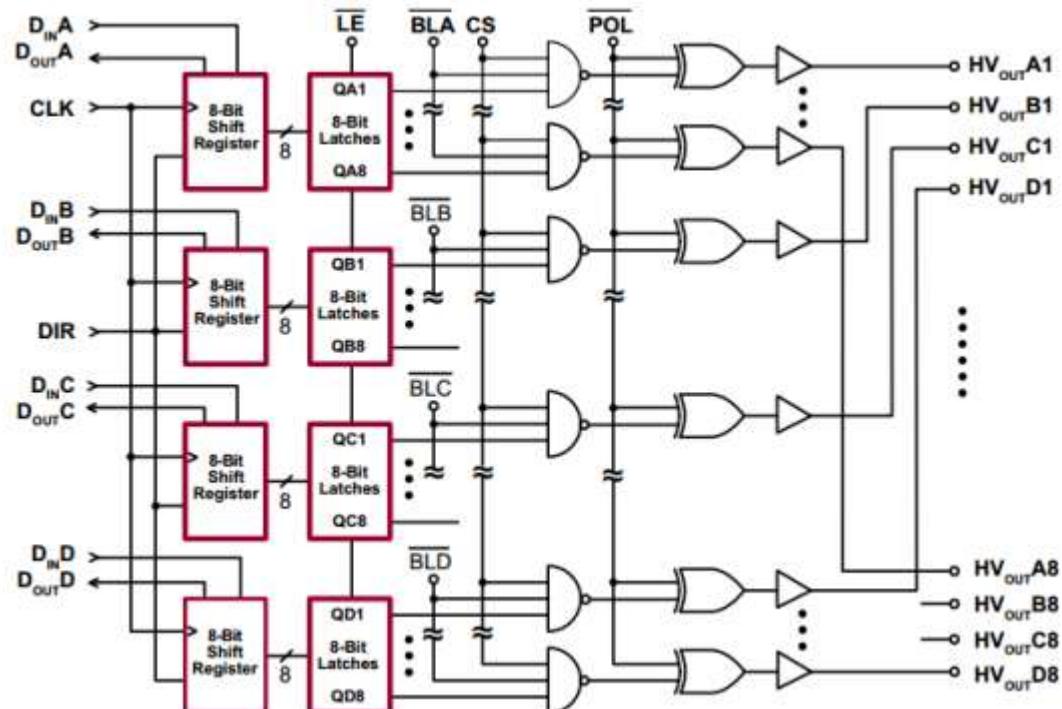
MICROCHIP

HV7620

Online
Datasheet

Features:

- 5.0V logic and 12V supply rail
- Output voltage up to +200V
- Low power level shifting
- Source/sink current minimum 50mA
- 40MHz equivalent data rate
- Latched data outputs
- Forward and reverse shifting options
- Chip select
- Polarity function
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-64



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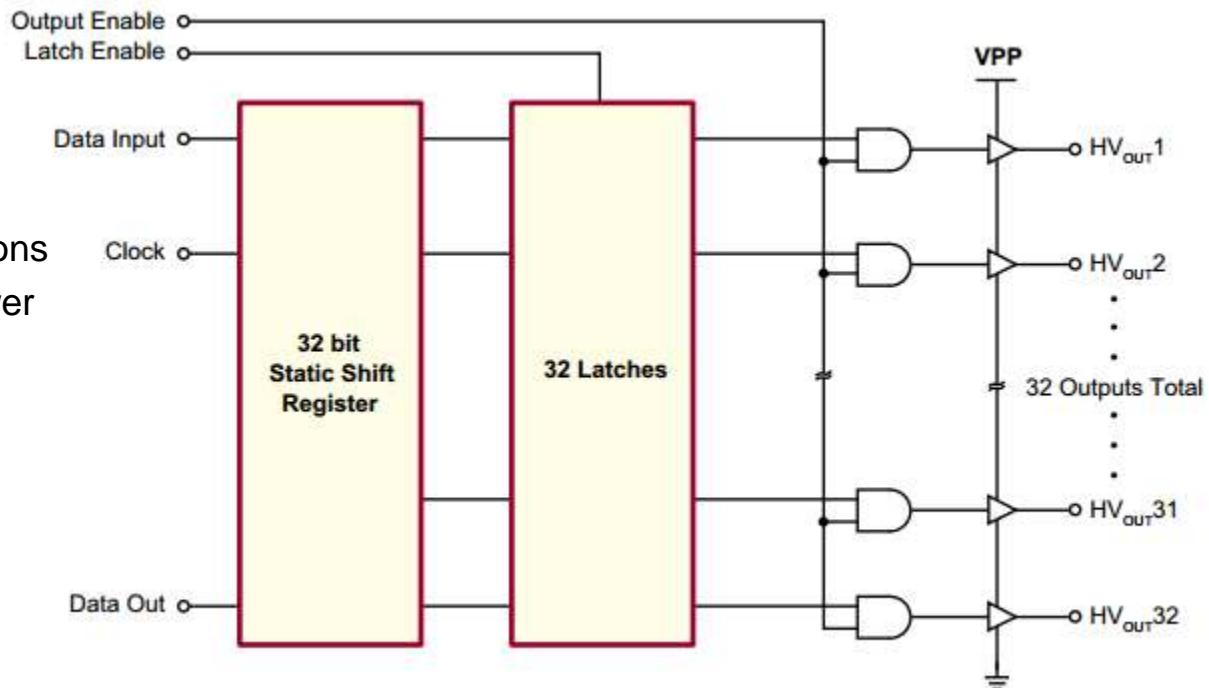
MICROCHIP

HV9308

Online
Datasheet

Features:

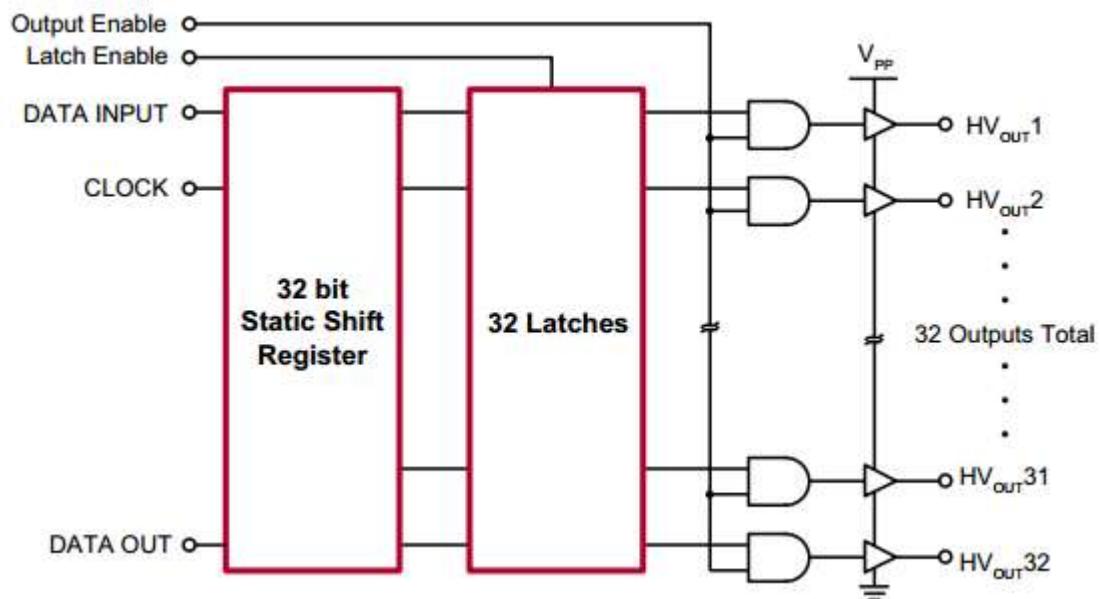
- Low power level shifting
- Shift register speed 8.0MHz
- Latched data outputs
- 5.0V CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44



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Features:

- Output voltages up to 80V
- Low power level shifting
- Shift register speed 8.0MHz
- Latched data outputs
- 5.0V CMOS compatible inputs
- Forward and reverse shifting options
- Diode to V_{PP} allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44





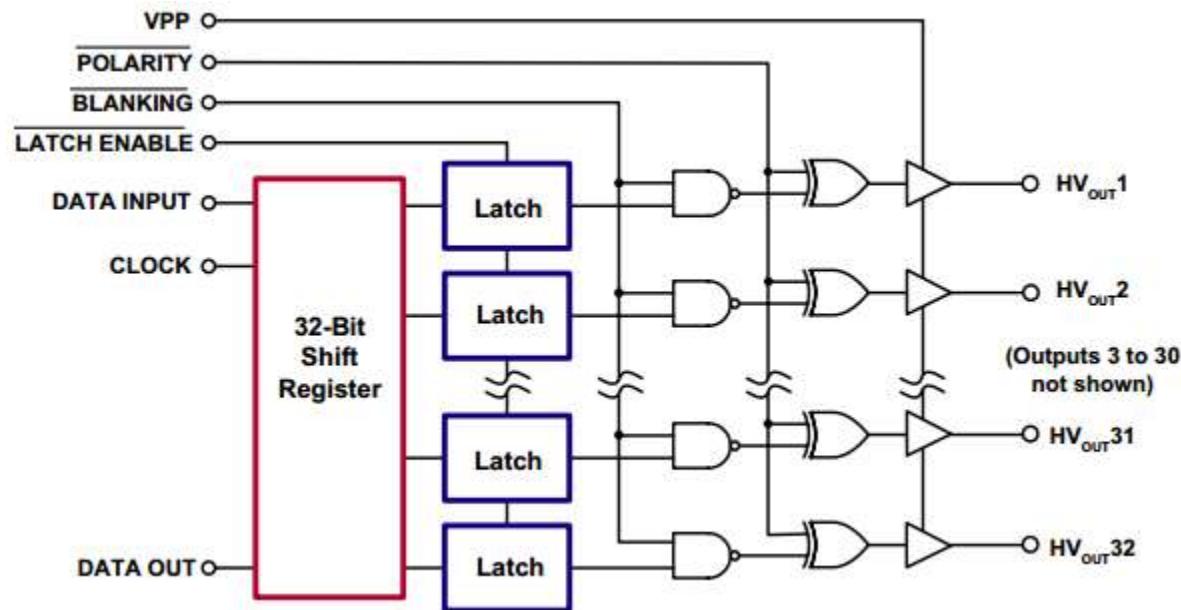
MICROCHIP

HV9808

Online
Datasheet

Features:

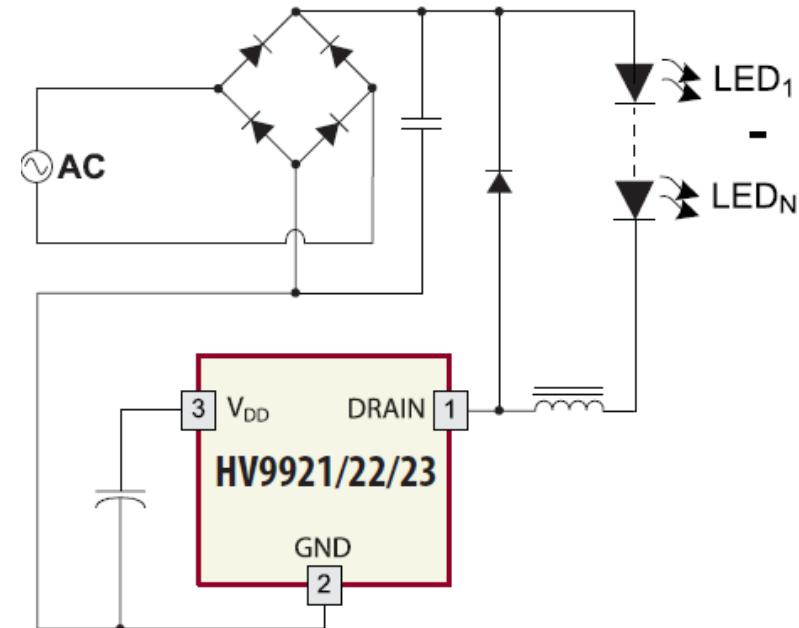
- Output voltages up to 80V
- Low power level shifting
- Shift register speed 8.0MHz
- Latched data outputs
- 5.0V CMOS compatible inputs
- Forward and reverse shifting options
- Diode to VPP allows efficient power recovery
- Operating Temperature Range:
-40°C to +85°C
- Package Option: PQFP-44



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Features:

- Constant Output Current
 - 20mA HV9921
 - 50mA HV9922
 - 30mA HV9923
- Universal 85 - 265VAC Operation
- Fixed OFF-Time Buck Converter
- Internal 475V Power MOSFET
- Operating Temperature Range:
-40°C to +125°C
- Package Options: TO-92, SOT-89





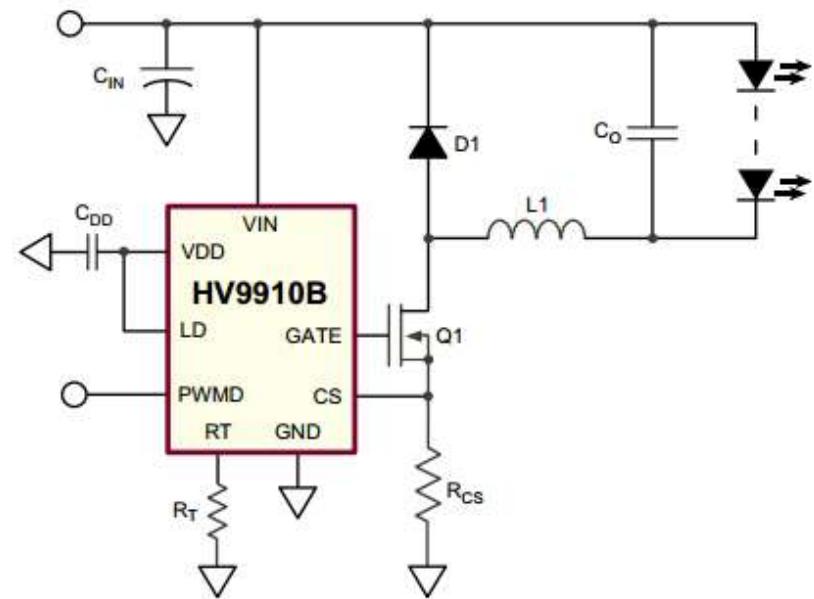
MICROCHIP

HV9910B

Online
Datasheet

Features:

- Switch mode controller for single switch LED drivers
- Open loop peak current controller
- Internal 8.0 to 450V linear regulator
- Constant frequency or constant off-time operation
- Linear and PWM dimming capability
- Requires few external components for operation
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOIC-8, SOIC-16



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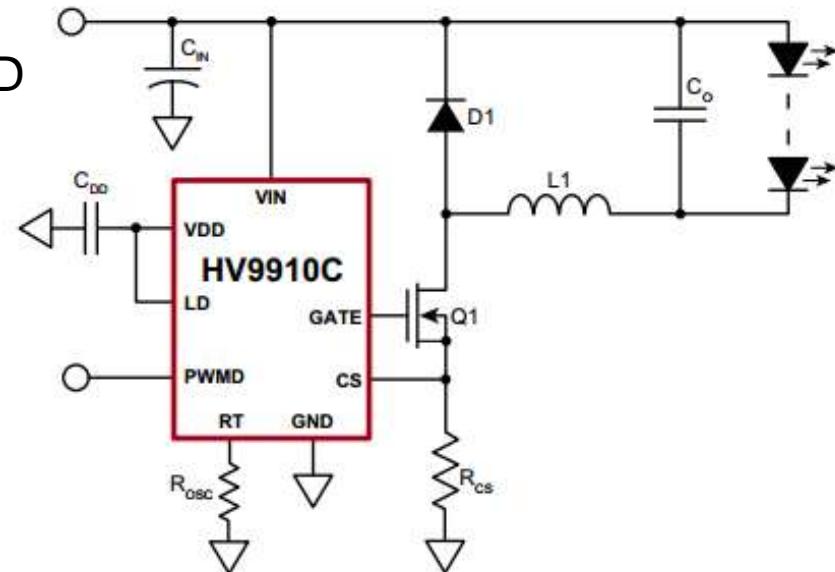
MICROCHIP

HV9910C

Online
Datasheet

Features:

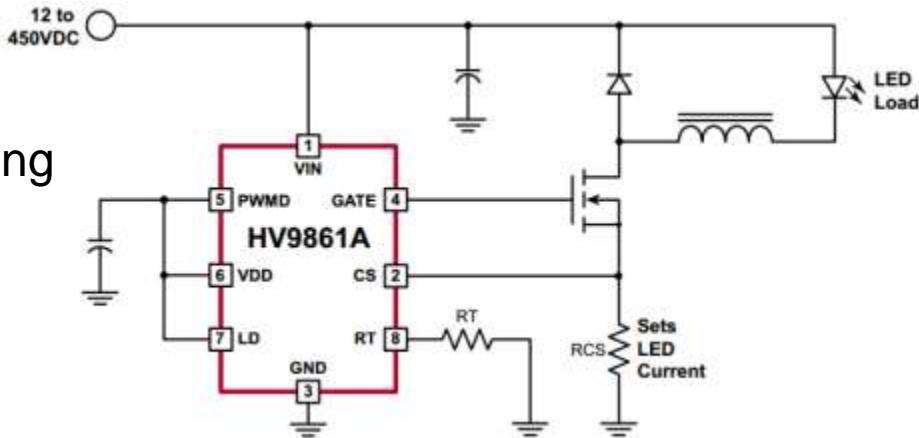
- Switch mode controller for single switch LED drivers
- Open loop peak current controller
- Internal 15 to 450V linear regulator
- Constant frequency or constant off-time operation
- Linear and PWM dimming capability
- Requires few external components for operation
- Over-temperature protection
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOIC-8, SOIC-16,
SOIC-8 w/HS



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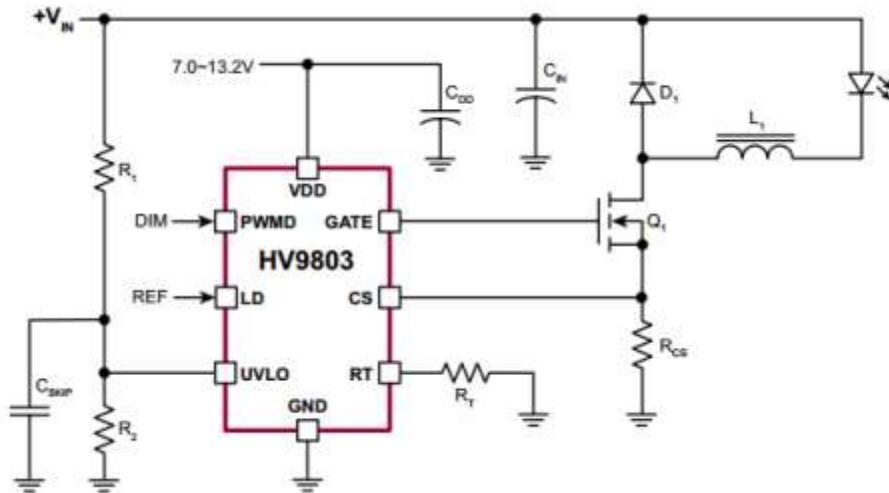
Features:

- Fast average current control
- Programmable constant off-time switching
- PWM / linear dimming input
- Output short circuit protection with skip mode
- Operating Temperature Range:
-40°C to +125°C
- Package Options: SOIC-8, SOIC-16



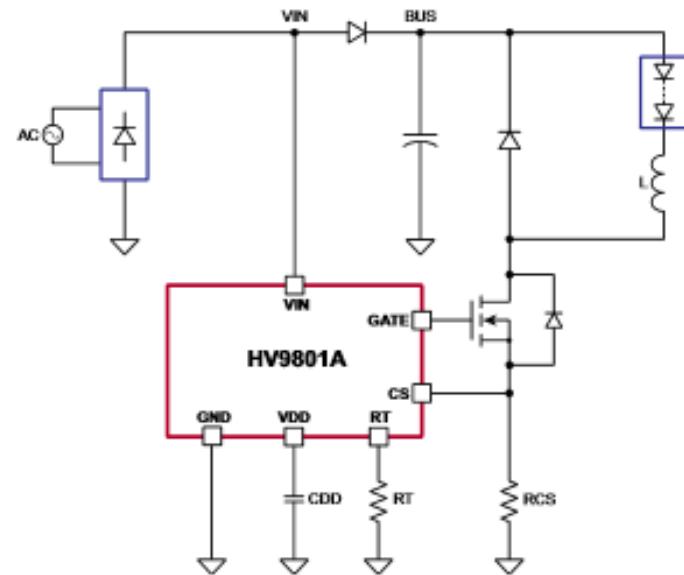
Features:

- Fast average current control
- Correction for propagation delay and offset voltage
- Fixed off-time switching mode
- Linear dimming input
- PWM dimming input
- Output short circuit protection with programmable skip mode
- Input under-voltage shutdown
- Operating Temperature Range:
-40°C to +150°C
- Package Options: SOIC-8



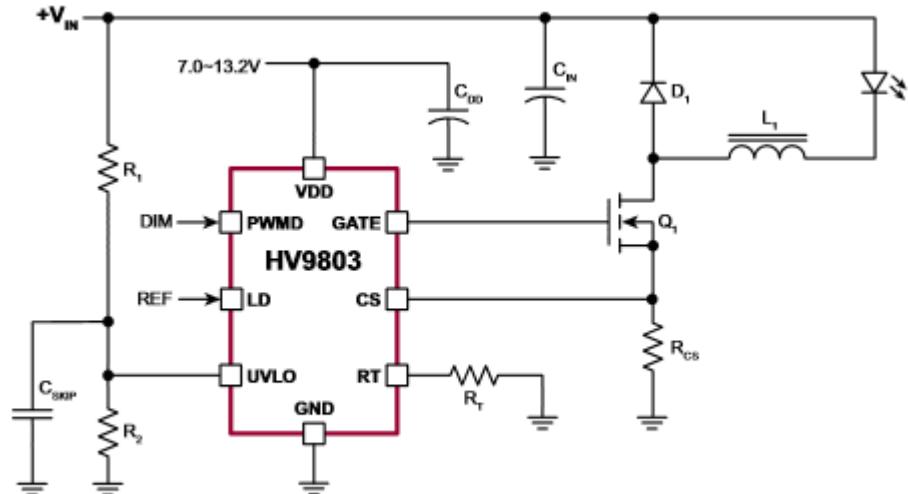
Features:

- Four level switch dimming
- Very accurate current regulator
- Output over-current/short circuit protection
- IC over-temperature protection
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: SOIC-8, SOIC-16



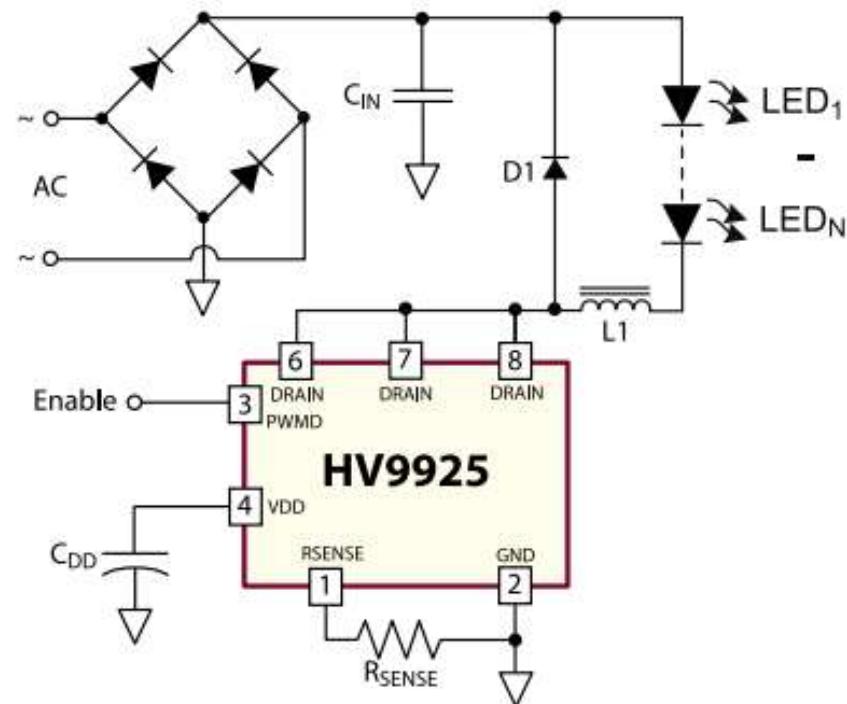
Features:

- Fast average current control
- Correction for propagation delay and offset voltage
- Fixed off-time switching mode
- Linear dimming input
- PWM dimming input
- Output short circuit protection
- Input under-voltage shutdown
- Operating Temperature Range:
-40°C to +125°C
- Package Option: SOIC-8



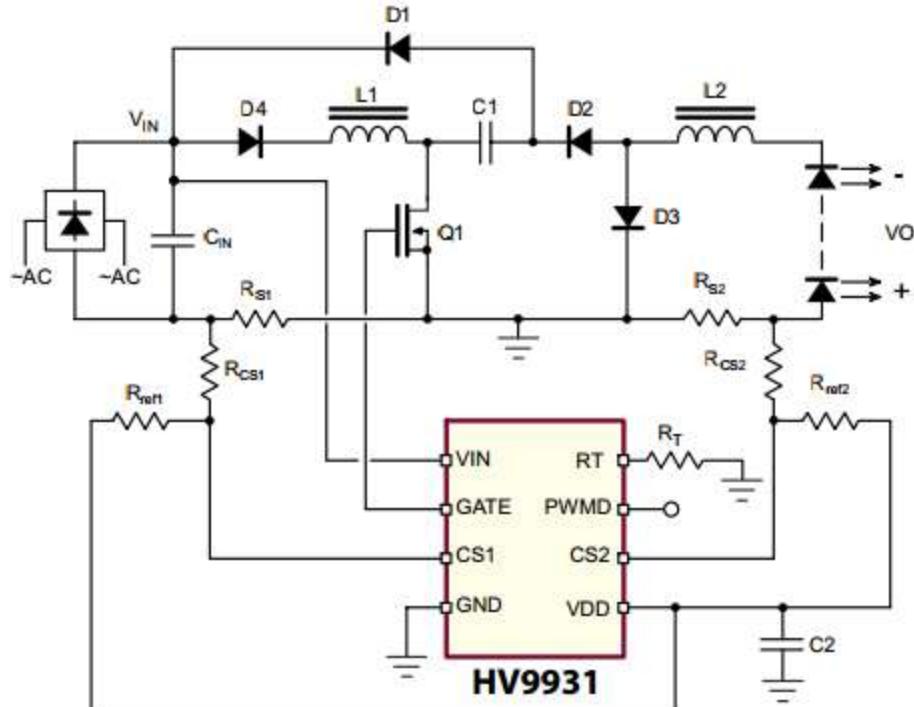
Features:

- Programmable output current to 50mA
- PWM dimming / enable
- Universal 85 - 264VAC operation
- Fixed off-time buck converter
- Internal 475V power MOSFET
- Over-temperature protection with hysteresis
- Operating Temperature Range:
-40°C to +125°C
- Package Option: SOIC-8 w/Heat Slug



Features:

- Constant output current
- Large step-down ratio
- Unity power factor
- Low input current harmonic distortion
- Fixed frequency or fixed off-time operation
- Internal 450V linear regulator
- Input and output current sensing
- Input current limit
- Enable, PWM and phase dimming
- Operating Temperature Range:
-40°C to +125°C
- Package Option: SOIC-8 w/Heat Slug





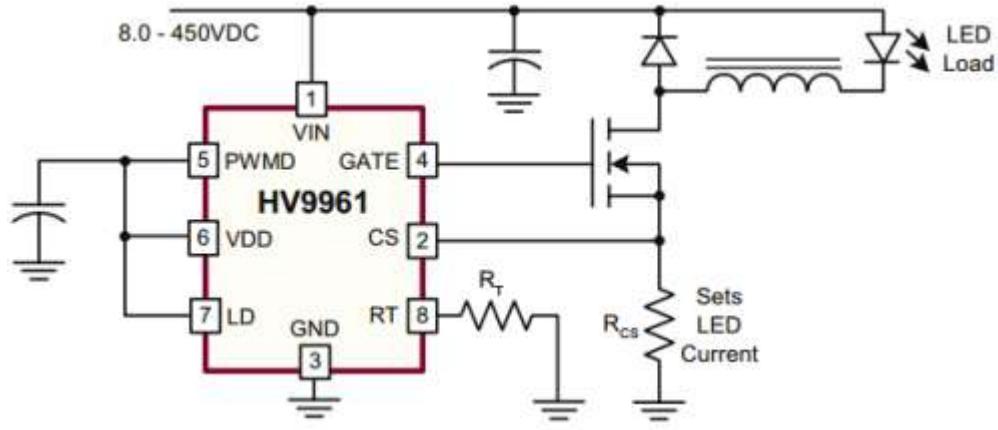
MICROCHIP

HV9961

Online
Datasheet

Features:

- Fast average current control
- Programmable constant off-time switching
- Linear dimming input
- PWM dimming input
- Output short circuit protection with skip mode
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: SOIC-8, SOIC-16



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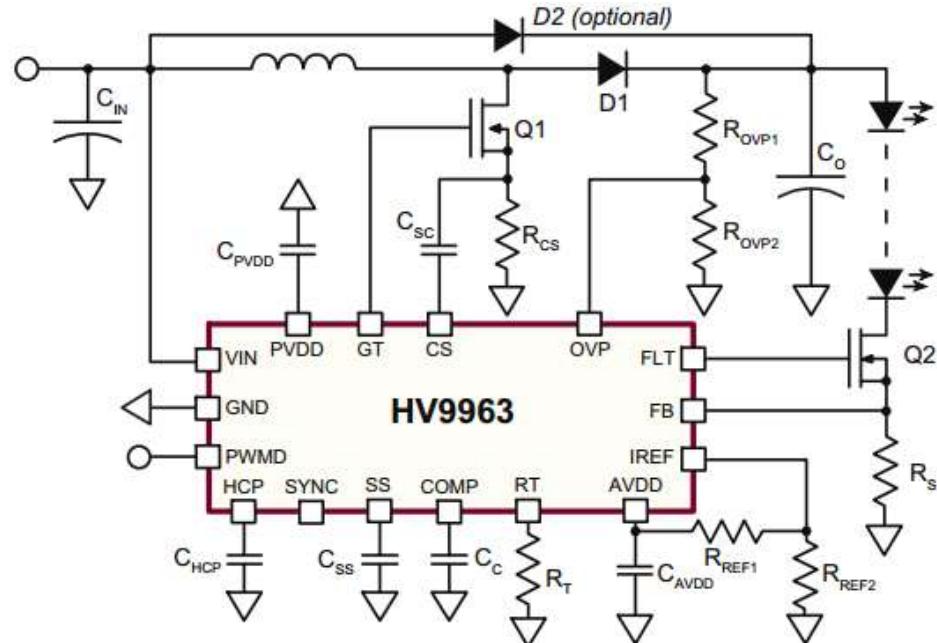
MICROCHIP

HV9963

Online
Datasheet

Features:

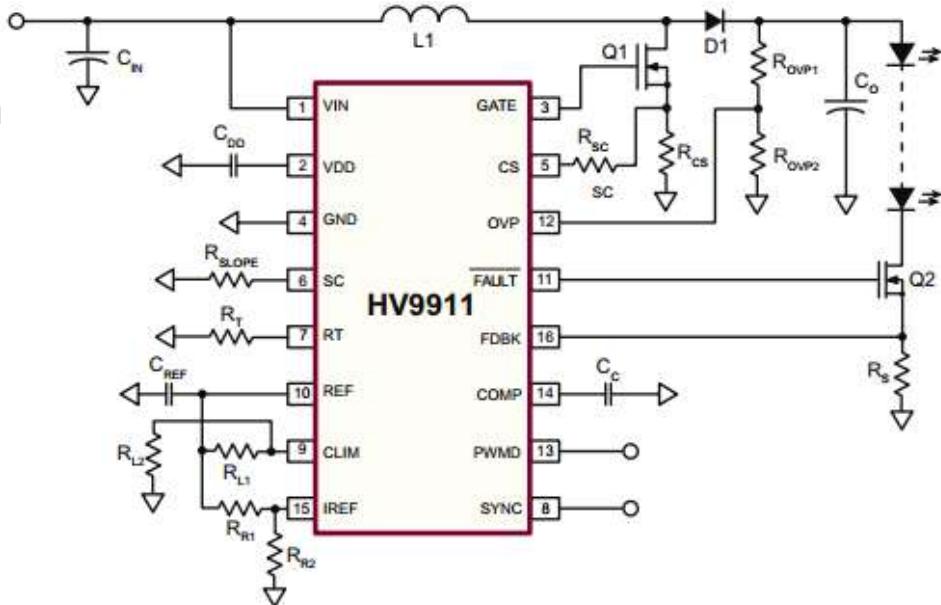
- Switch mode controller for single switch converters: Buck, Boost, Buck-boost and SEPIC
- High output current accuracy
- High PWM dimming ratio (>5000:1)
- Internal 40V linear regulator
- Internal $\pm 2\%$ voltage reference
- Constant frequency operation with sync capability
- Programmable soft start
- 10V GATE drivers
- Hiccup mode protection for both short circuit and open circuit conditions
- Operating Temperature Range: -40°C to +150°C
- Package Options: SOIC-16



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Features:

- Switch mode controller for single switch drivers: Buck, Boost, Buck-boost, and SEPIC
- Closed loop control of output current
- High PWM dimming ratio
- Programmable slope compensation
- Enable & PWM dimming
- Output short circuit & over voltage protection
- Synchronization capability
- Programmable MOSFET current limit
- Operating Temperature Range:
-40°C to +125°C
- Package Option: SOIC-8, SOIC-16





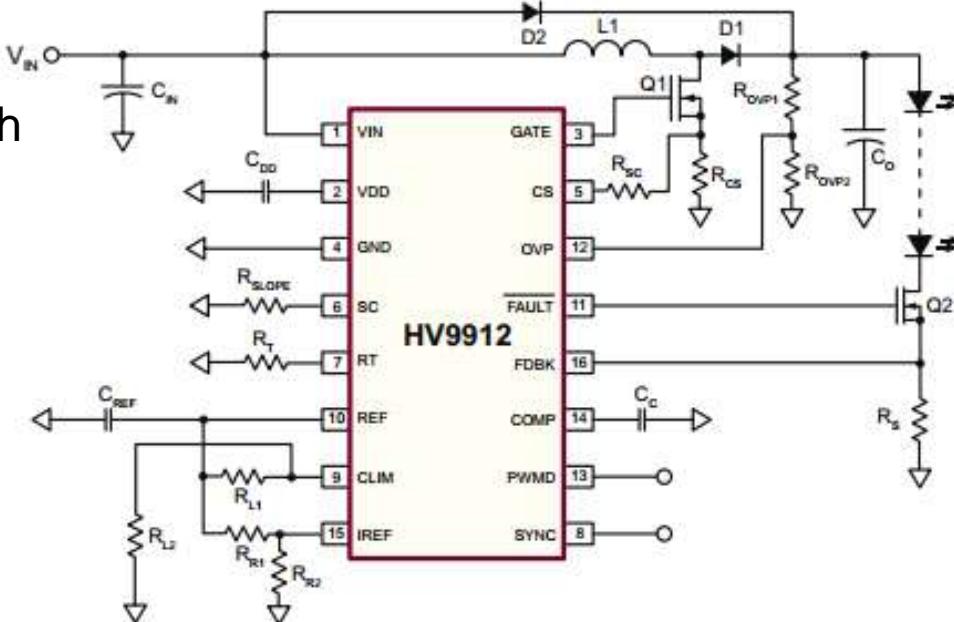
MICROCHIP

HV9912

Online
Datasheet

Features:

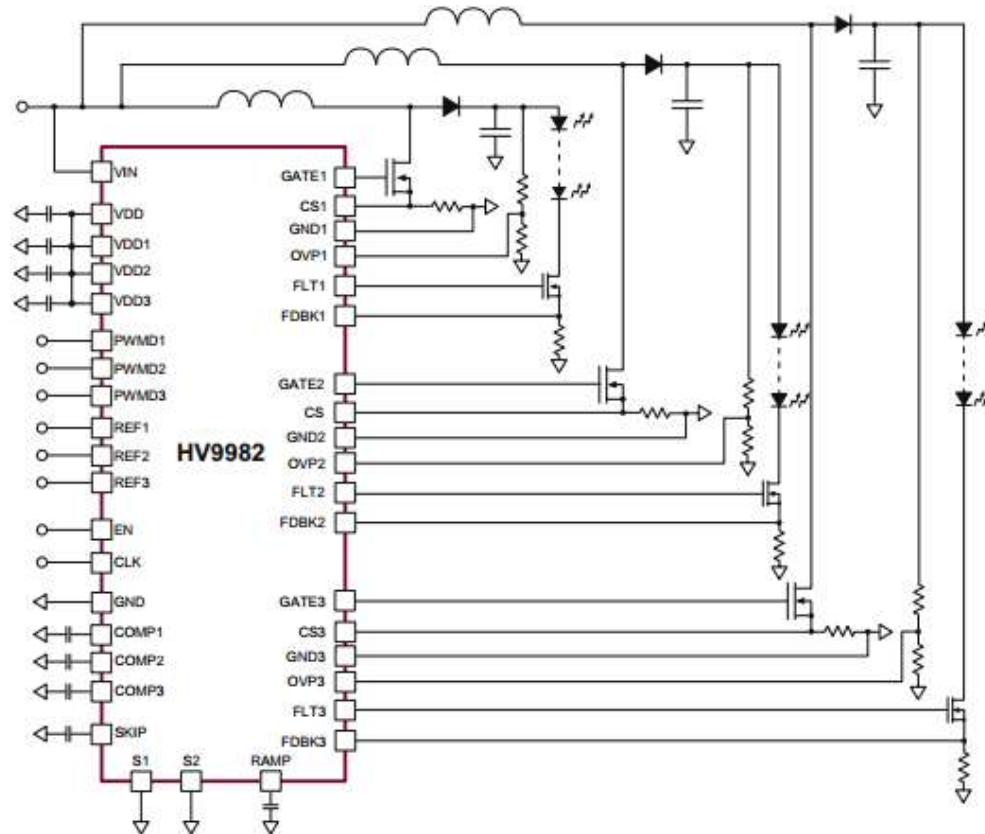
- Switch mode controller for single switch drivers: Buck, Boost, Buck-boost, and SEPIC
- Works with high side current sensors
- Closed loop control of output current
- High PWM dimming ratio
- Programmable slope compensation
- Linear & PWM dimming
- Hiccup mode protection for both short circuit and open circuit conditions
- Synchronization capability
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: SOIC-16



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Features:

- Closed loop control of output current:
Buck, Boost, SEPIC
- High PWM dimming ratio
- Internal 40V linear regulator
- Constant frequency operation
- Programmable slope compensation
- Linear and PWM dimming
- Output short circuit protection
- Output over voltage protection
- Hiccup mode protection
- Analog control of PWM dimming
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: VQFN-40 (6x6)



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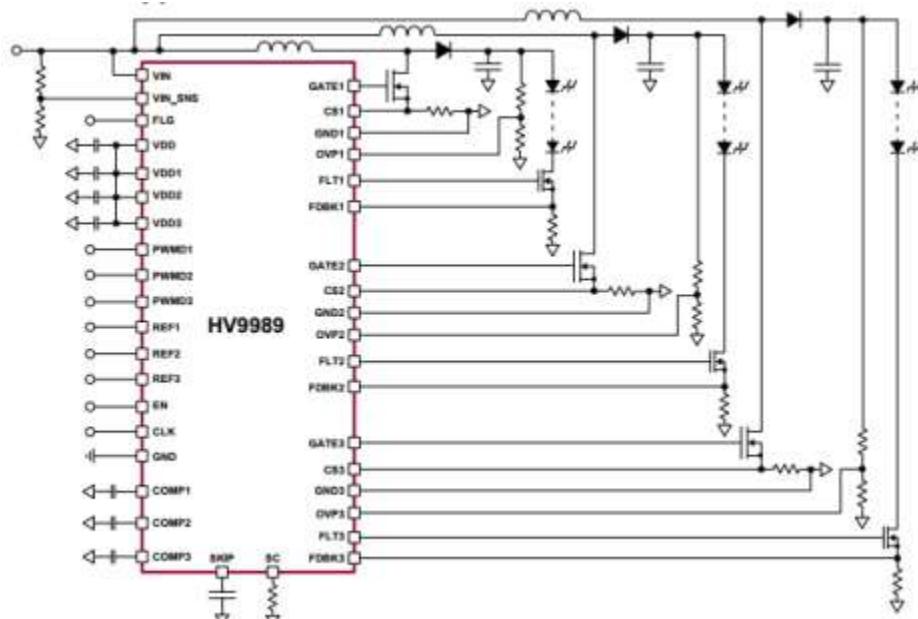
MICROCHIP

HV9989

Online
Datasheet

Features:

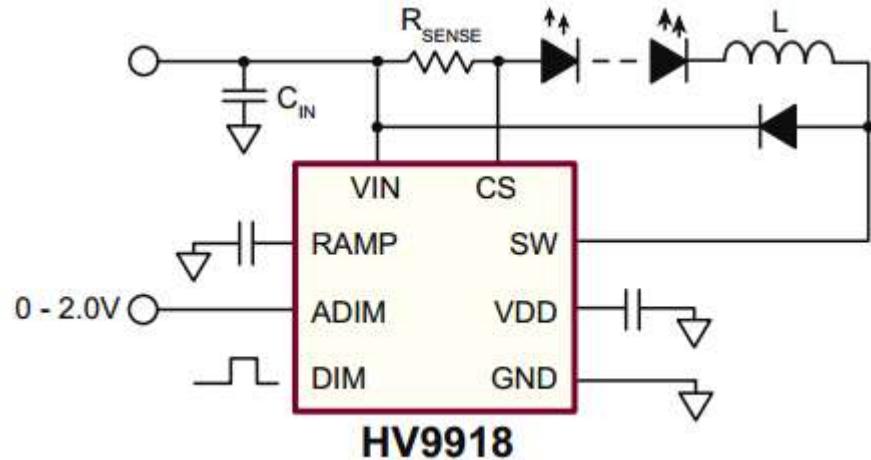
- Three out-of-phase constant-current boost converters
- Current loop closed with submicrosecond PWM dimming pulses supports PWM dimming >20kHz
- Internal 40V linear regulator
- External clock input
- External individual reference inputs
- Individual PWM dimming inputs
- Programmable slope compensation +0.2A/-0.4A gate drivers
- Independent short circuit protection with hiccup for each channel
- Latching output open-circuit protection
- Operating Temperature Range: -40°C to +150°C
- Package Options: VQFN-40



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Features:

- Hysteretic control with high-side current sensing
- Integrated 40V 1.0Ω MOSFET
- >90% Efficiency
- Wide input voltage range: 4.5 to 40V
- ±5% LED current accuracy
- Up to 2.0MHz switching frequency
- Adjustable constant LED current
- Analog or PWM control signal for PWM dimming
- Over-temperature protection
- Operating Temperature Range:
-40°C to +125°C
- Package Option: WDFN-8 (3x3)





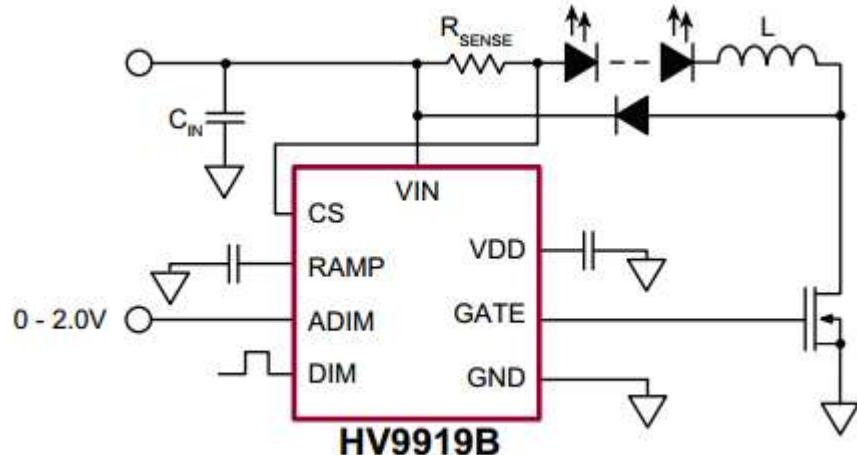
MICROCHIP

HV9919B

Online
Datasheet

Features:

- Hysteretic control with high-side current sensing
- Wide input voltage range: 4.5 to 40V
- >90% Efficiency
- Typical $\pm 5\%$ LED current accuracy
- Up to 2.0MHz switching frequency
- Adjustable constant LED current
- Analog or PWM control signal for PWM dimming
- Over-temperature protection
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: WDFN-8 (3x3)



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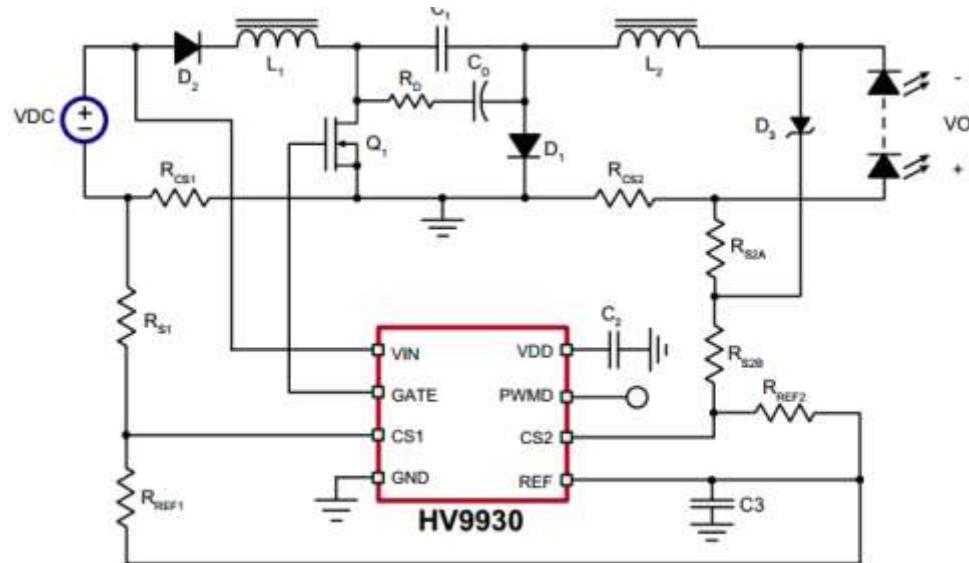


HV9930

Online Datasheet

Features:

- Constant output current LED driver
 - Steps output voltage up or down
 - Low EMI
 - Variable frequency operation
 - Internal 8.0 - 200V linear regulator
 - Input and output current sensing
 - Input current limit
 - Enable & PWM dimming
 - Operating Temperature Range:
-40°C to +125°C
 - Package Option: SOIC-8



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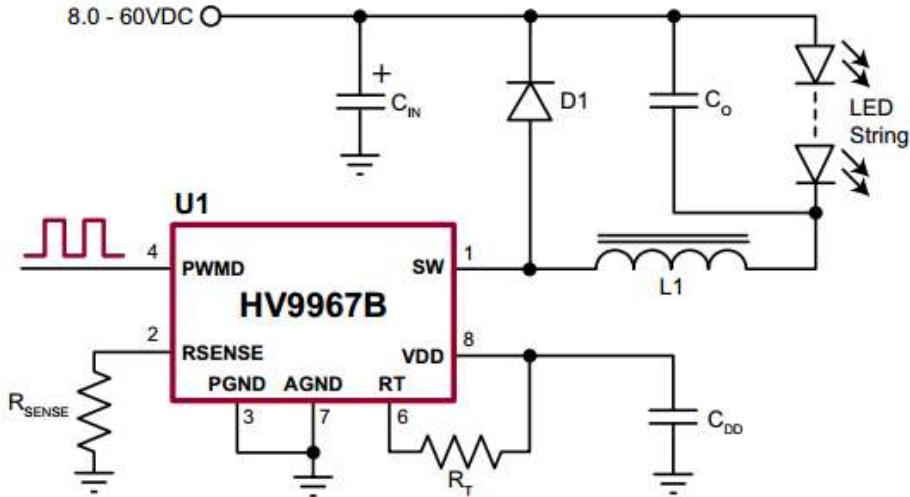
MICROCHIP

HV9967B

Online
Datasheet

Features:

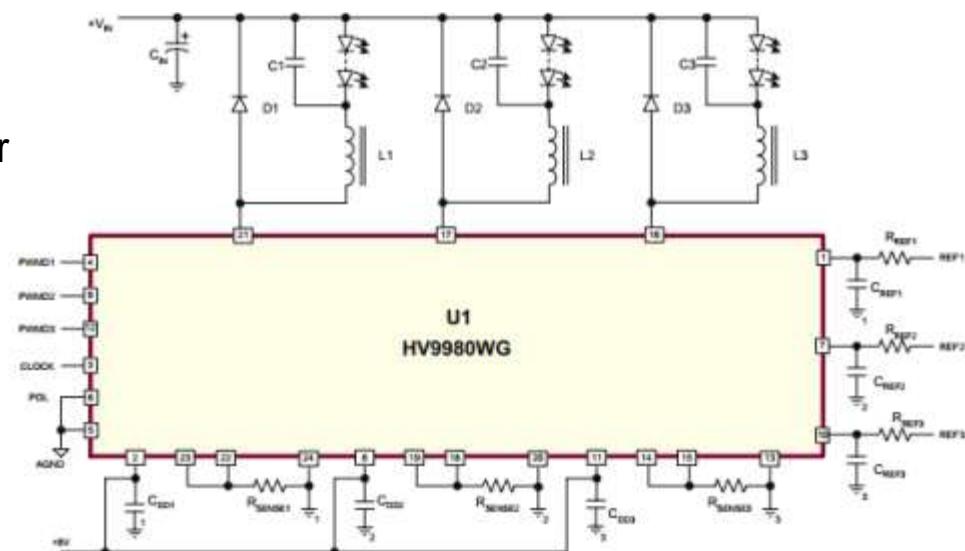
- 3% accurate LED current
- Integrated 60V, 0.8Ω MOSFET
- Low sensitivity to external component variation
- Single resistor LED current setting
- Fixed off-time control
- PWM dimming input
- Output short circuit protection with skip mode
- Over-temperature protection
- Operating Temperature Range:
 -40°C to $+150^{\circ}\text{C}$
- Package Options: DFN-8, MSOP-8



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Features:

- Integrated 200V, 25Ω (typ.) MOSFETs
- Programmable output current to 80mA per channel
- TTL compatible PWM dimming inputs
- 3-Phase synchronous operation
- Leading edge blanking
- Short circuit protection with skip mode
- Over-temperature protection
- Operating Temperature Range:
-40°C to +150°C
- Package Options: SOIC-24 (300mil)





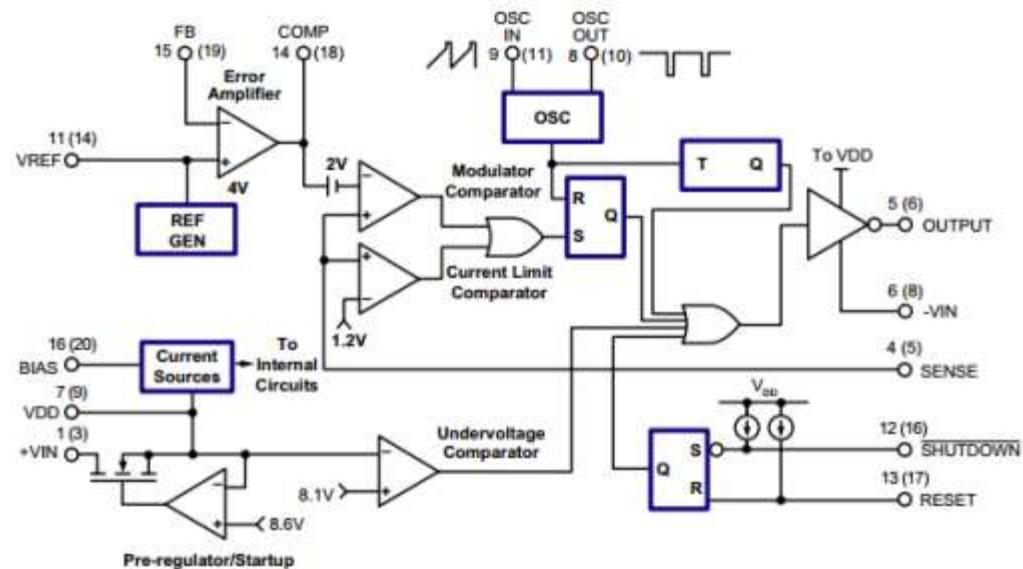
MICROCHIP

HV9120

Online
Datasheet

Features:

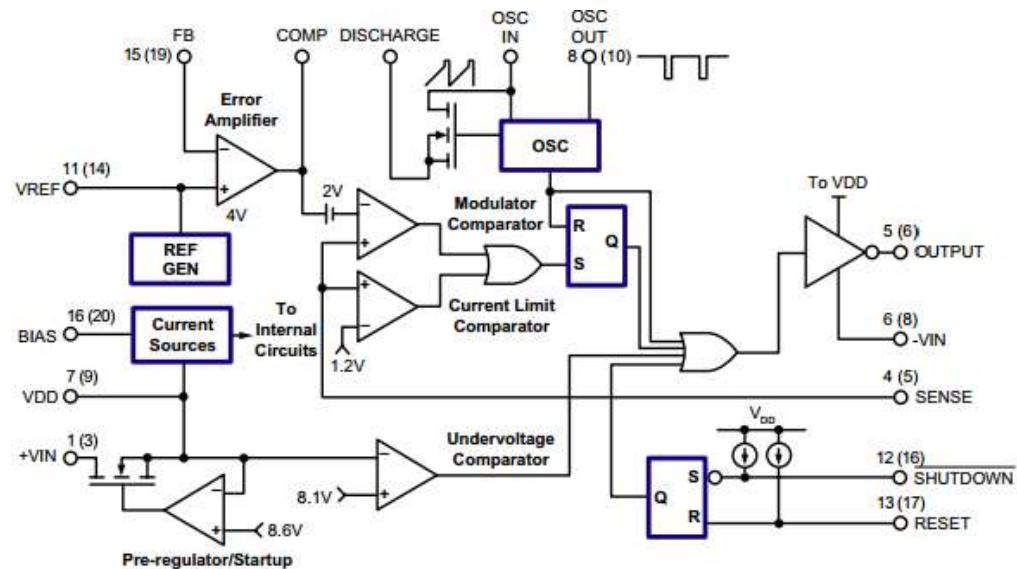
- 10 to 450V input voltage range
- <1.3mA supply current
- >1.0MHz clock
- >20:1 dynamic range @ 500KHz
- 49% Maximum duty cycle version
- Low internal noise
- Operating Temperature Range:
-40°C to +125°C
- Package Options: SOIC-16, PDIP-16



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Features:

- 10 to 450V input voltage range
- <1.3mA supply current
- >1.0MHz clock
- >20:1 dynamic range @ 500KHz
- 99% Maximum duty cycle version
- Low internal noise
- Operating Temperature Range:
-40°C to +125°C
- Package Options: SOIC-16, PDIP-16





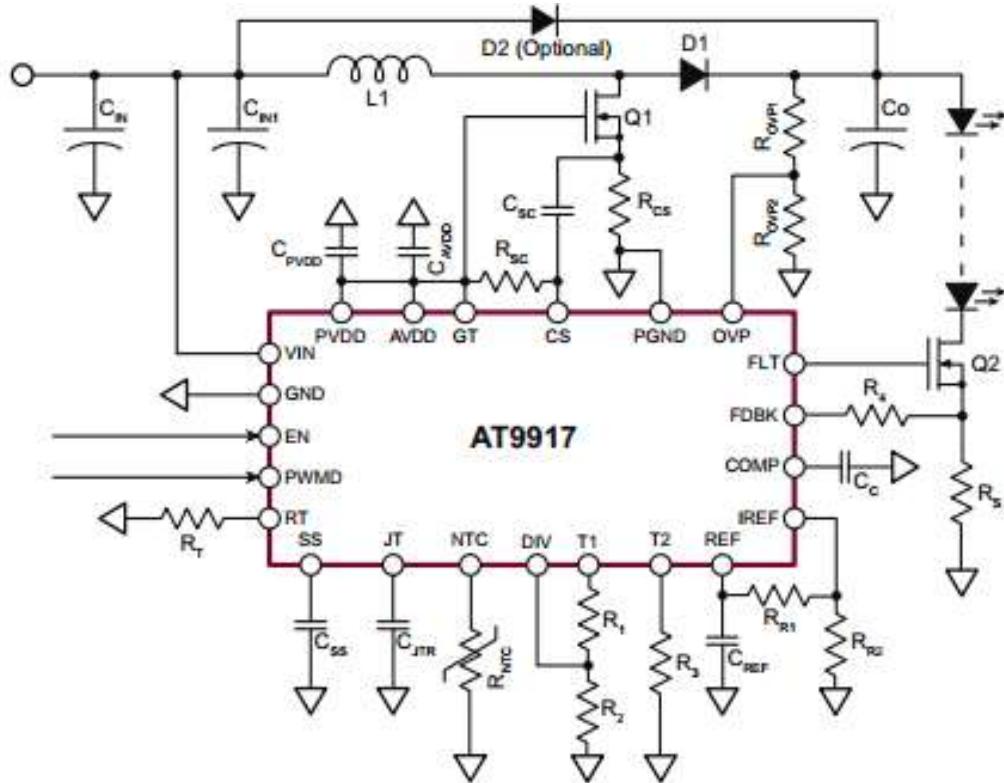
MICROCHIP

AT9917

Online
Datasheet

Features:

- Switch mode controller for boost, SEPIC & buck converters
- Closed loop control of output current
- Constant frequency operation with programmable slope compensation
- Linear and PWM dimming
- Programmable jitter to reduce EMI
- Output short circuit & over voltage protection
- Programmable hiccup timer
- Temperature fold-back with external NTC resistor
- Meets AEC-Q100 requirements
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: TSSOP-24



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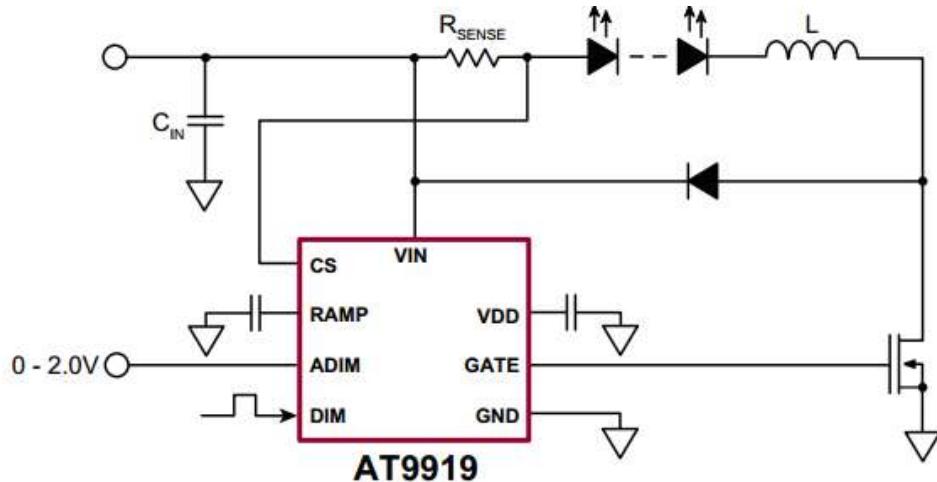
MICROCHIP

AT9919

Online
Datasheet

Features:

- Hysteretic control with high-side current sensing
- Wide input voltage range: 4.5 to 40V
- >90% Efficiency
- Typical $\pm 5\%$ LED current accuracy
- Up to 2.0MHz switching frequency
- Adjustable constant LED current
- Analog or PWM control signal for PWM dimming
- Over-temperature protection
- Meets AEC-Q100 requirements
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Option: WDFN-8 (3x3)



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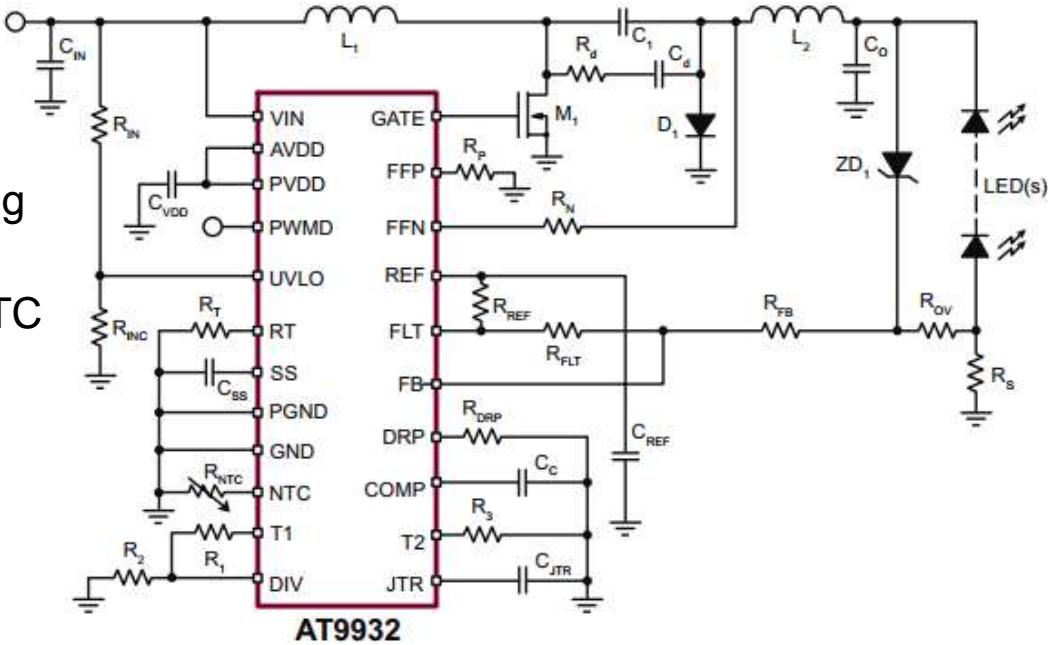
MICROCHIP

AT9932

Online
Datasheet

Features:

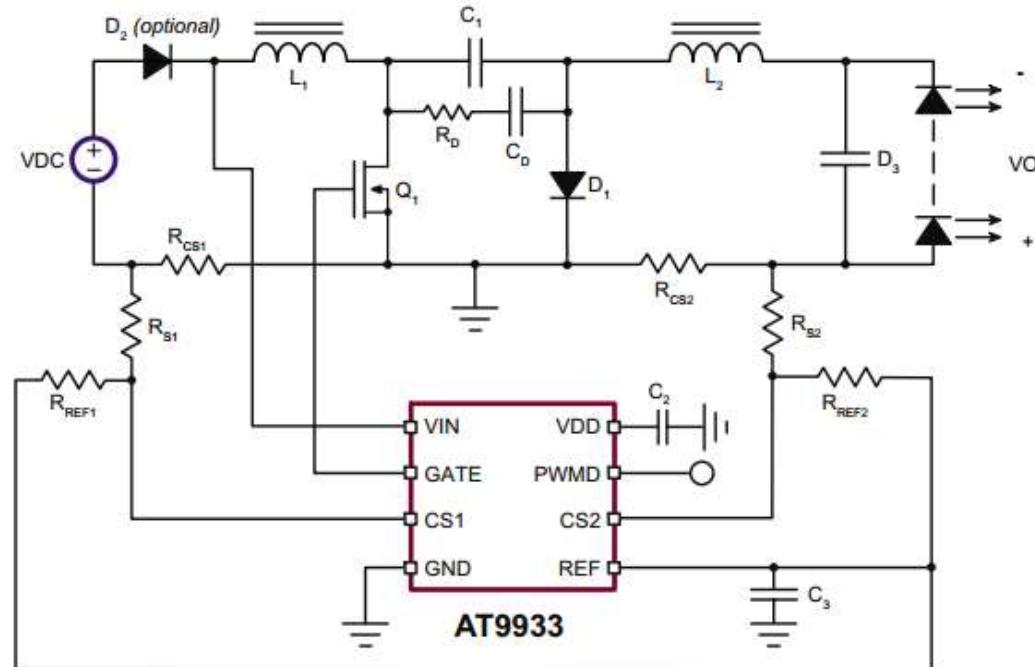
- Constant output current
- Steps output voltage up or down
- Externally programmable fixed switching frequency
- Temperature fold-back with external NTC resistor
- Internal 40V voltage regulator
- $\pm 1A$ MOSFET gate driver
- Short LED & Open LED protection
- Input under voltage protection
- Enable & PWM dimming
- Trimmed reference ($\pm 3\%$ accurate)
- Meets AEC-Q100 requirements
- Operating Temperature Range:
 -40°C to $+125^\circ\text{C}$
- Package Option: TSSOP-24



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Features:

- Constant current LED Driver
- Steps input voltage up or down
- Low EMI
- Variable frequency operation
- Internal 75V linear regulator
- Input and output current sensing
- Input current limit
- Enable & PWM dimming
- Meets AEC-Q100 requirements
- Operating Temperature Range:
-40°C to +125°C
- Package Option: TSSOP-24





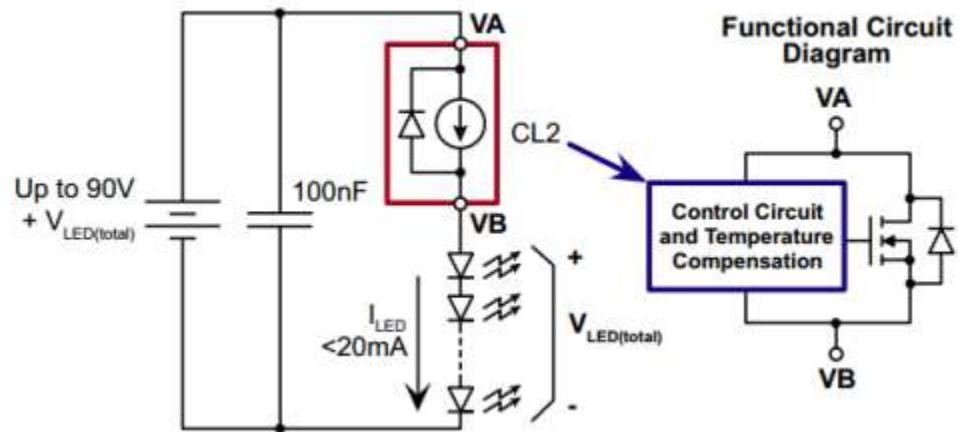
MICROCHIP

CL2

Online
Datasheet

Features:

- 5.0 to 90V operating range (VA-B)
- 20mA $\pm 10\%$ at 5.0 - 90V
- 0.01%/°C typical temperature coefficient
- Can be paralleled for higher current
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOT-89, TO-252
(D-PAK), TO-92



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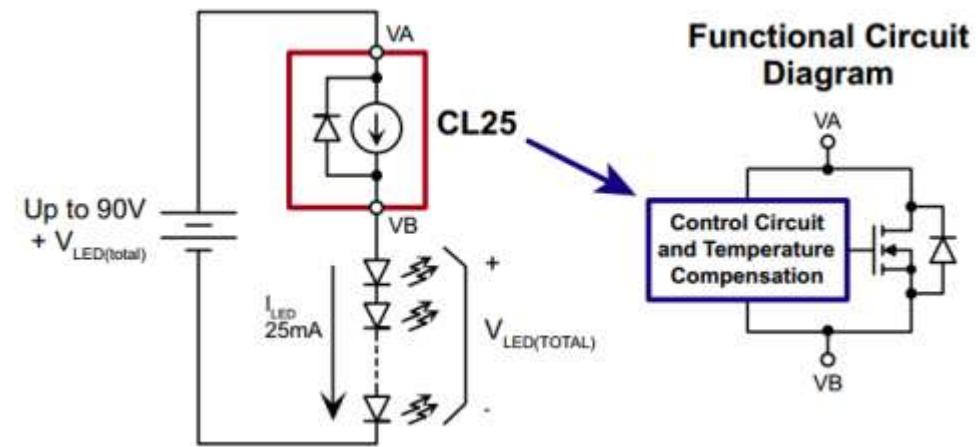
MICROCHIP

CL25

Online
Datasheet

Features:

- 5.0 - 90V operating range (VA-B)
- 25mA $\pm 10\%$ at 5.0 - 90V
- 0.01%/°C typical temperature coefficient
- No external components (two terminal device)
- Can be paralleled for higher current
- Operating Temperature Range:
-40°C to +125°C
- Package Options: SOT-89, TO-92



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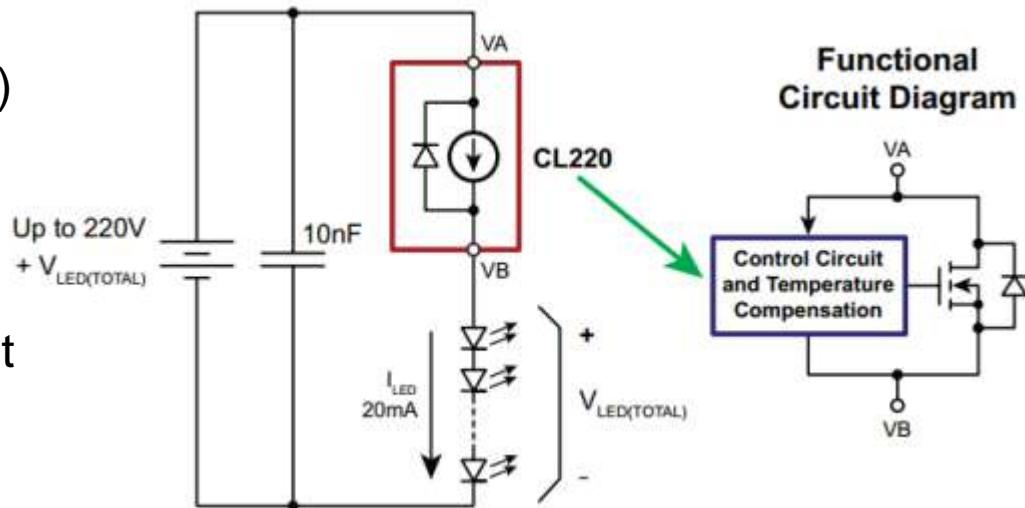
MICROCHIP

Online
Datasheet

CL220

Features:

- 5.0 to 220V operating range (VA-B)
- 20mA $\pm 10\%$ at 5.0 - 160V
- 0.01%/°C typical temperature coefficient
- Can be paralleled for higher current
- Operating Temperature Range:
-40°C to +125°C
- Package Options: TO-252 (DPAK),
TO-220



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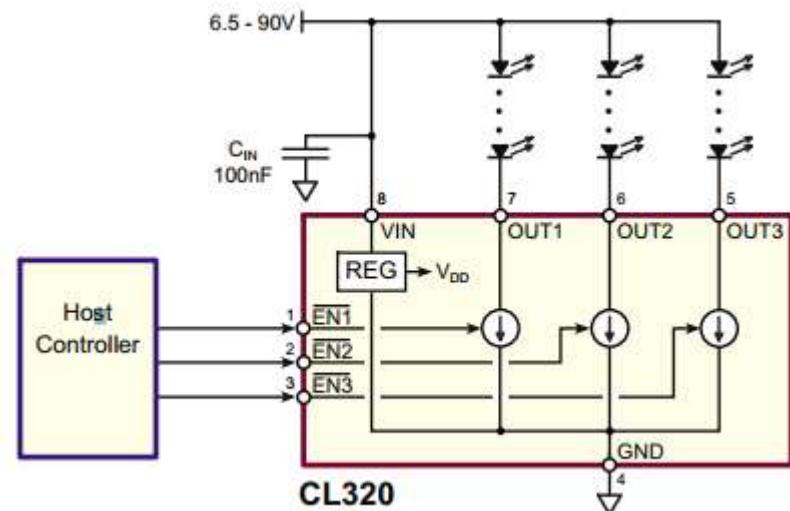
MICROCHIP

CL320

Online
Datasheet

Features:

- $\pm 6.0\%$ current accuracy @ 4.0 -15V
- 90V standoff voltage
- Separate enable pins for each channel allow for PWM dimming
- Over-temperature protection
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOIC-8 w/Heat Slug



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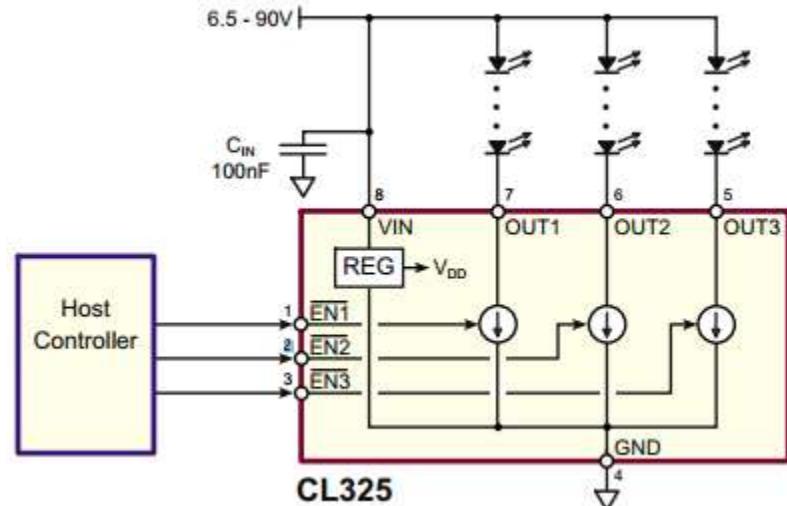
MICROCHIP

CL325

Online
Datasheet

Features:

- $\pm 6\%$ current accuracy @ 4.0 -15V
- 90V standoff voltage
- Separate enable pins for each channel allow for PWM dimming
- Over-temperature protection
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOIC-8 w/Heat Slug



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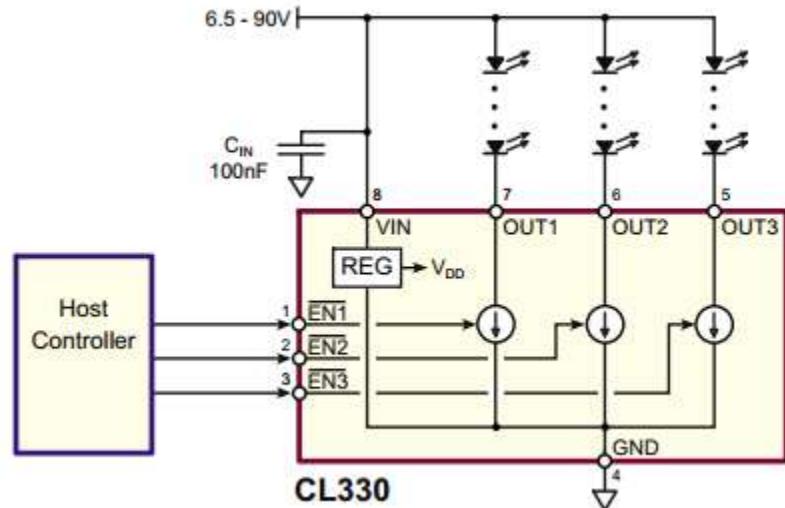
MICROCHIP

CL330

Online
Datasheet

Features:

- $\pm 6.0\%$ current accuracy @ 4.0 -15V
- 90V standoff voltage
- Separate enable pins for each channel allow for PWM dimming
- Over-temperature protection
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOIC-8 w/Heat Slug



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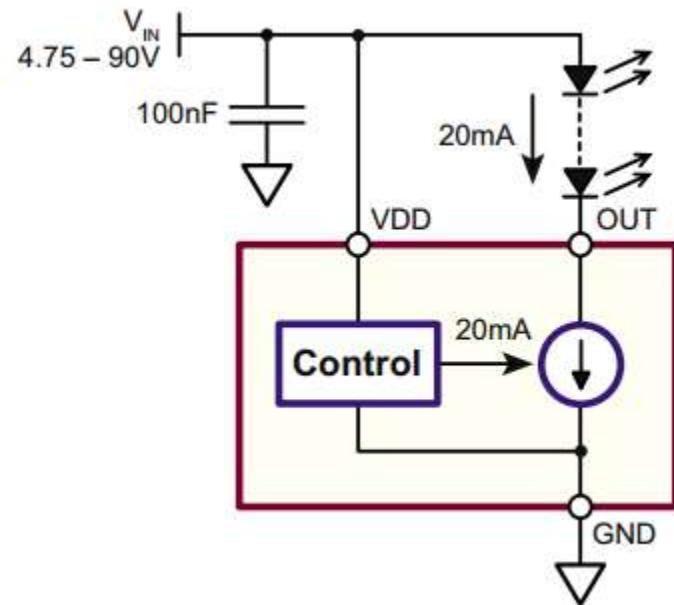
MICROCHIP

CL520

Online
Datasheet

Features:

- 20mA $\pm 10\%$ constant current drive
- 1.0V dropout
- 90V rating for transient immunity
- Temperature compensated
- 4.75 - 90V supply range
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: TO-252 (DPAK), TO-92



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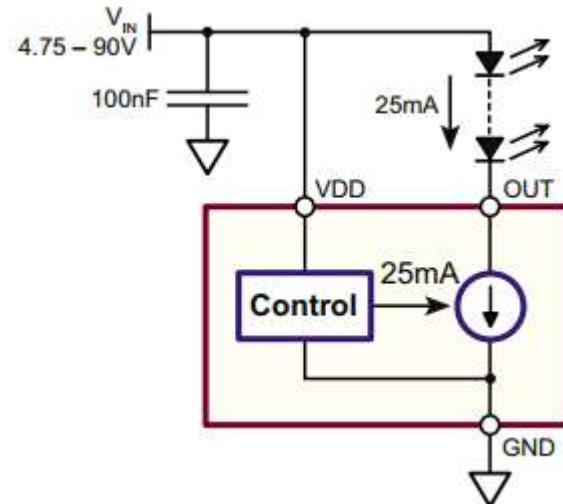
MICROCHIP

CL525

Online
Datasheet

Features:

- 25mA $\pm 10\%$ constant current drive
- 1.0V dropout
- 90V rating for transient immunity
- Temperature compensated
- 4.75 - 90V supply range
- Operating Temperature Range:
-40°C to +125°C
- Package Options: TO-252 (DPAK), TO-92



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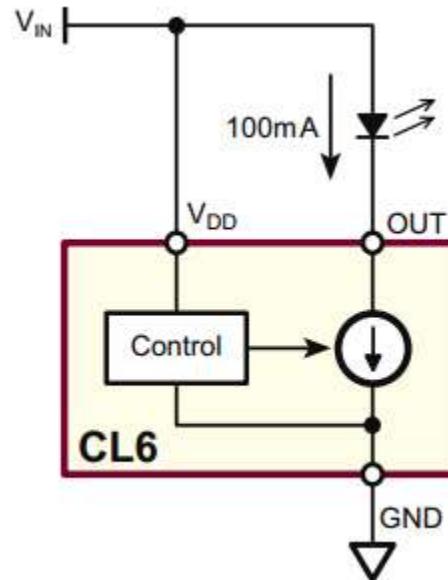
MICROCHIP

CL6

Online
Datasheet

Features:

- 100mA $\pm 5\%$ constant current drive
- Built-in reverse polarity protection
- Dimmable via PWM supply
- Over temperature protection
- Tab ground allows direct heat sinking to chassis
- 90V max rating for transient immunity
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: TO-252 (DPAK), TO-220



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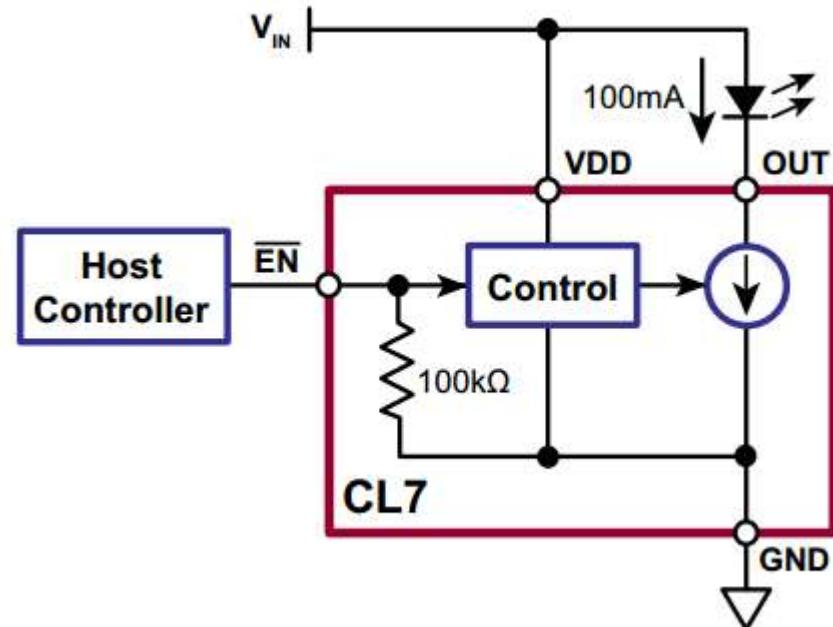
MICROCHIP

CL7

Online
Datasheet

Features:

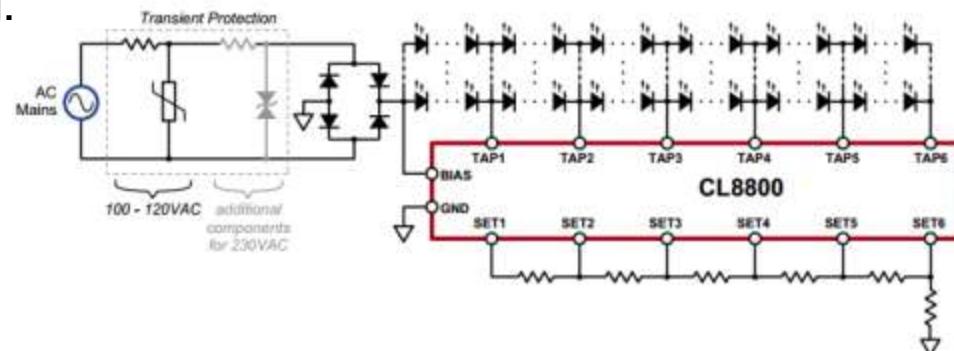
- 100mA $\pm 5\%$ constant current drive
- Built-in reverse polarity protection
- Logic level enable
- Dimmable via EN pin
- Over temperature protection
- 90V max rating for transient immunity
- Operating Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Package Options: SOIC-8 w/Heat Slug



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Features:

- Minimal component count (base config: CL8800 + 6 resistors + diode bridge)
- No magnetics, no capacitors
- Up to 7.5W output (13W w/ heat sink)
- >110Lm/W using efficient LEDs
- 85% typical electrical efficiency
- >0.95 power factor
- <20% THD line current
- Low conducted EMI w/o filters
- 85% LED luminous utilization
- Phase dimmer compatible with an RC network
- Operating Temperature Range:
-40°C to +125°C
- Package Options: VQFN-33 (6x6)





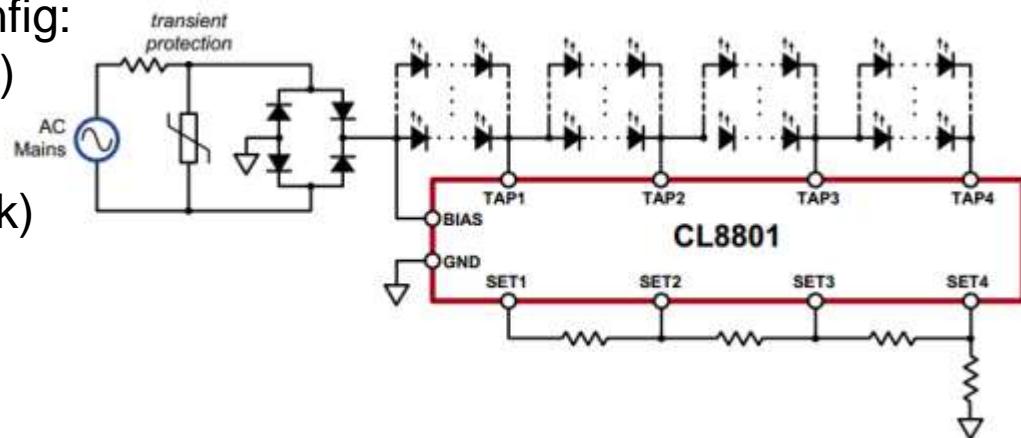
MICROCHIP

CL8801

Online
Datasheet

Features:

- Minimal component count (base config:
CL8801 + 4 resistors + diode bridge)
- No magnetics, no capacitors
- Up to 7.5W output (13W w/ heat sink)
- >110Lm/W using efficient LEDs
- 85% typical electrical efficiency
- >0.95 power factor
- <30% THD line current
- Low conducted EMI w/o filters
- 85% LED luminous utilization
- Phase dimmer compatible with an RC network
- Operating Temperature Range:
-40°C to +125°C
- Package Options: VQFN-33 (6x6)



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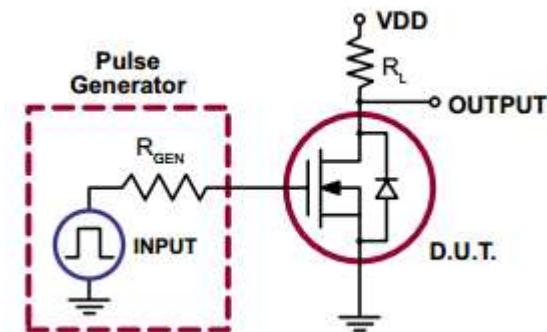
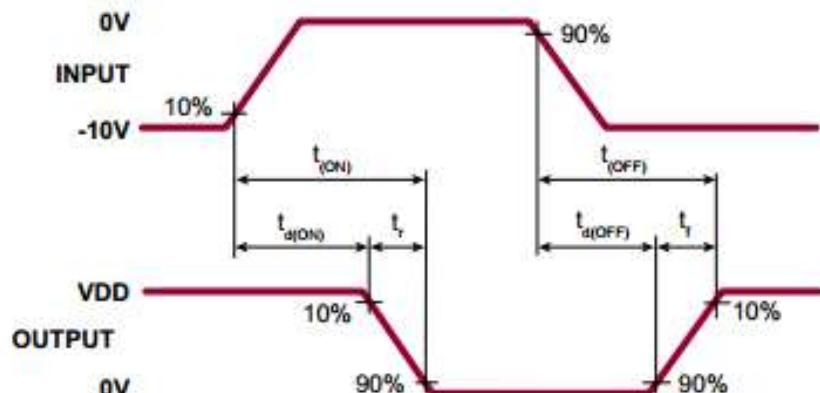
MICROCHIP

DN1509

Online
Datasheet

Features:

- 90V $BV_{DSX(\min)}$
- $6.0\Omega R_{DSON(max)}$
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: 3L SOT-89, 5L SOT-23



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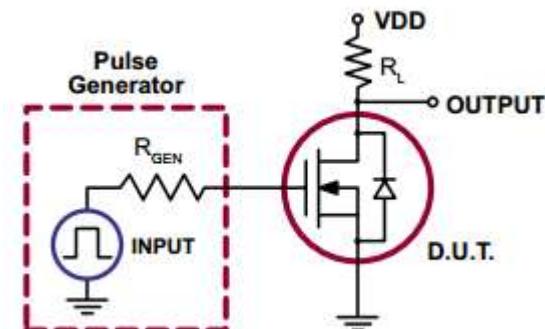
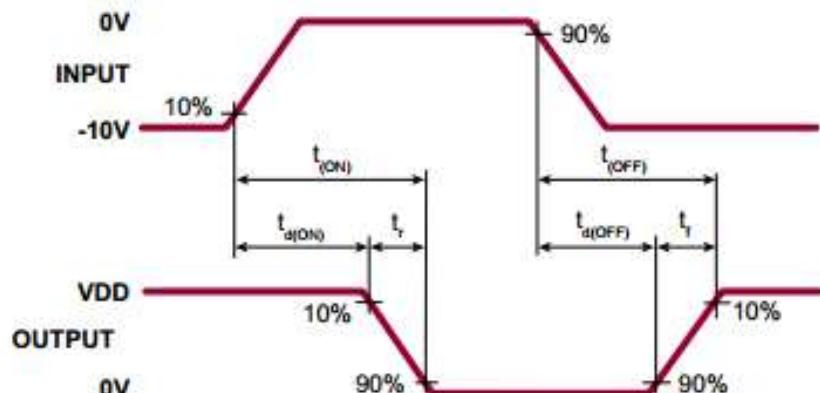
MICROCHIP

DN2450

Online
Datasheet

Features:

- 500V $BV_{DSX(\min)}$
- $10\Omega R_{DSON(\max)}$
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-252 (DPAK), SOT-89



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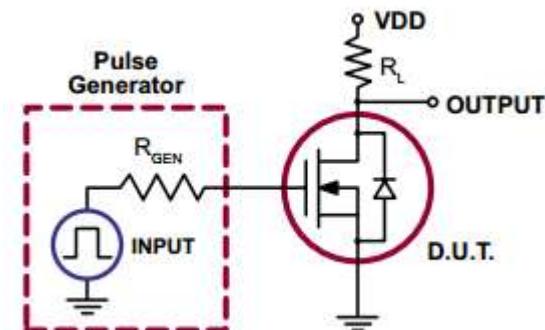
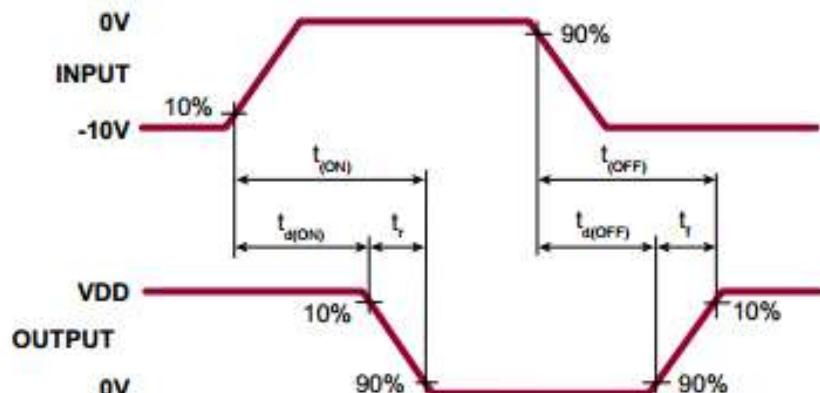
MICROCHIP

DN2470

Online
Datasheet

Features:

- 700V $BV_{DSX(\min)}$
- $42\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-252 (DPAK)



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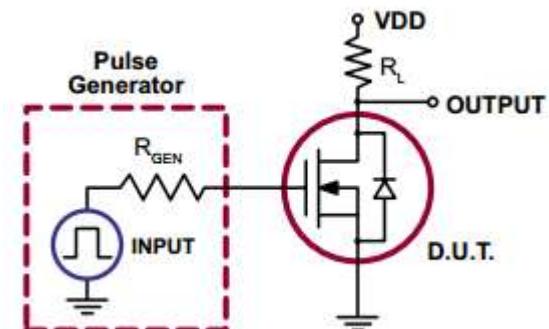
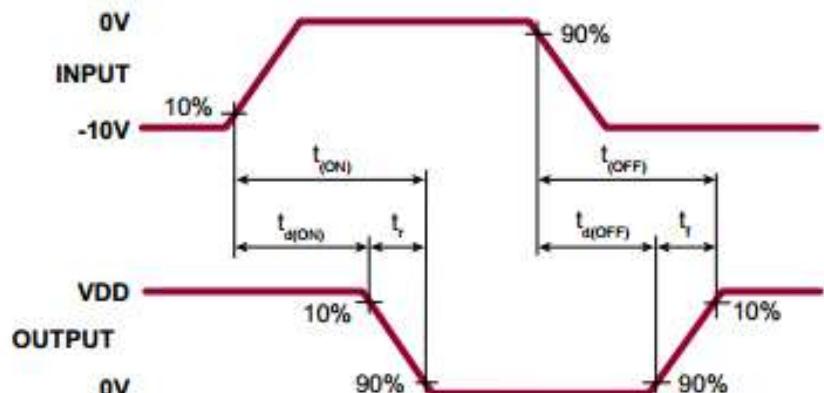
MICROCHIP

DN2530

Online
Datasheet

Features:

- 300V $BV_{DSX(\min)}$
- $12\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-92, SOT-89



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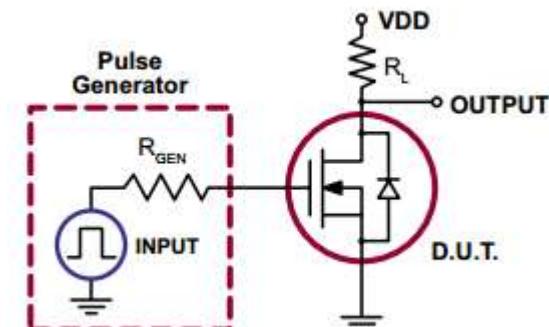
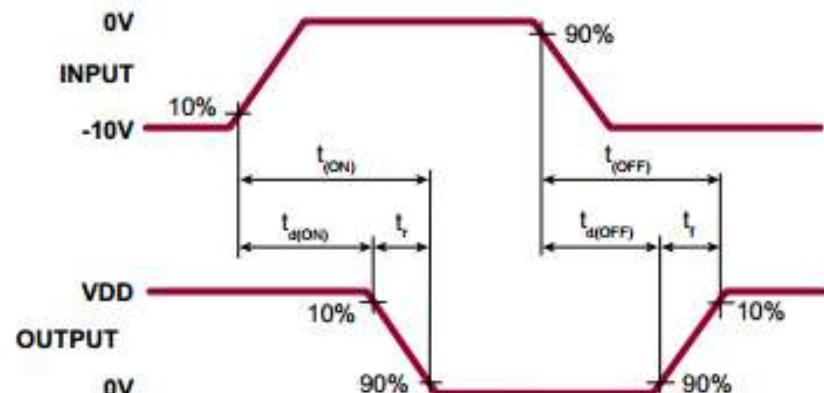
MICROCHIP

DN2535

Online
Datasheet

Features:

- 350V $BV_{DSX(\min)}$
- $25\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-92, TO-220



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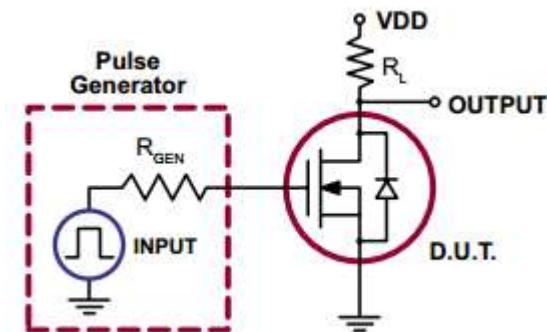
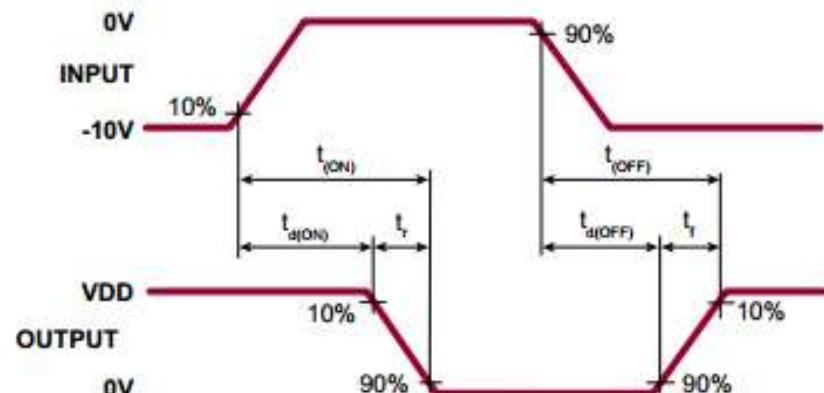
MICROCHIP

DN2540

Online
Datasheet

Features:

- 400V $BV_{DSX(\min)}$
- $25\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-92, TO-220, SOT-89



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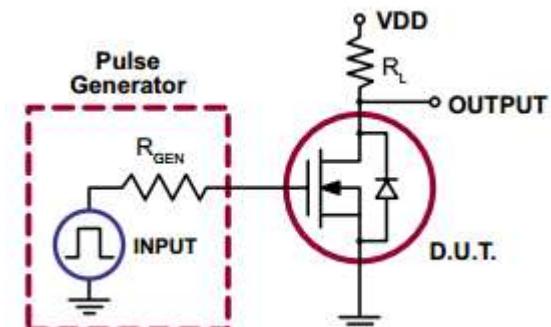
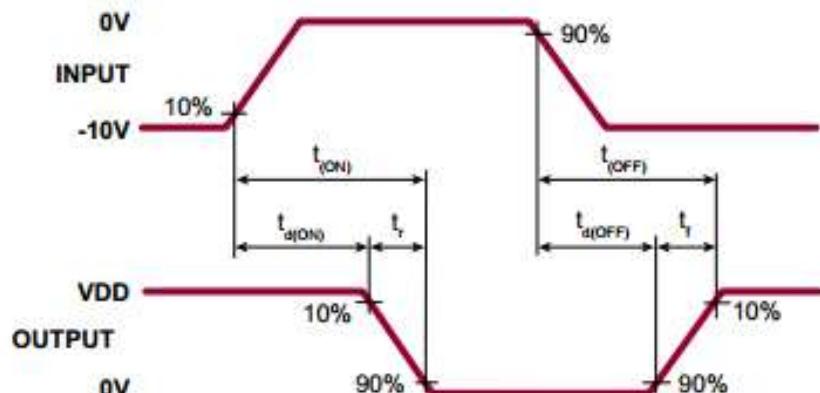
MICROCHIP

DN2625

Online
Datasheet

Features:

- 250V $BV_{DSX(\min)}$
- $3.5\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-252 (DPAK)



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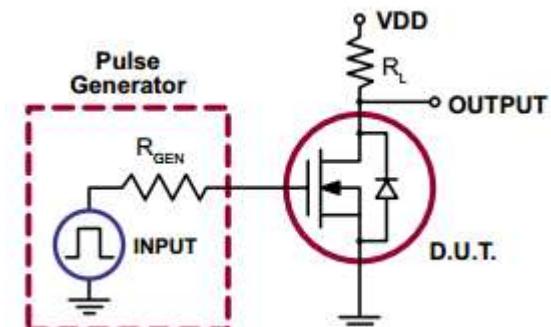
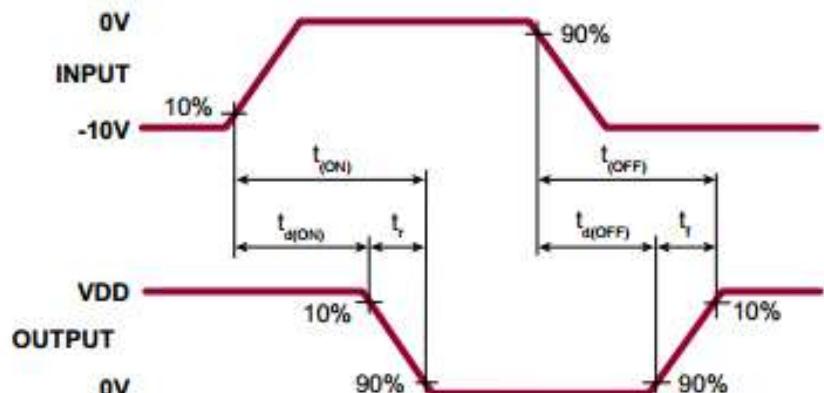
MICROCHIP

DN3135

Online
Datasheet

Features:

- 350V $BV_{DSX(\min)}$
- $35\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: SOT-23, SOT-89



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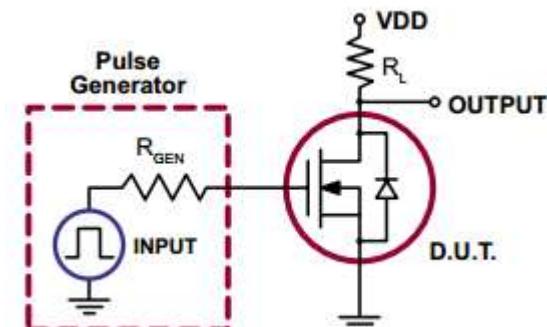
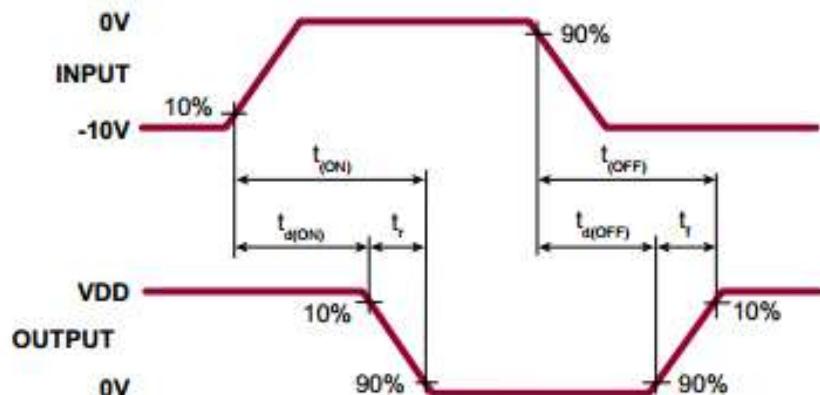
MICROCHIP

DN3145

Online
Datasheet

Features:

- 450V $BV_{DSX(\min)}$
- $60\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: SOT-89



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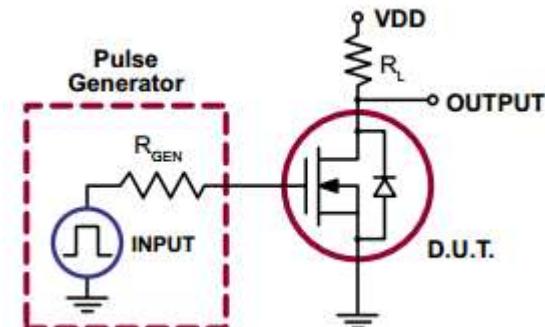
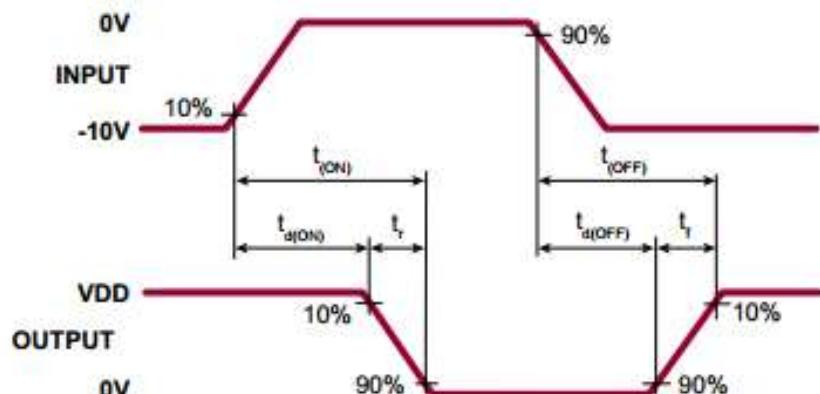
MICROCHIP

DN3525

Online
Datasheet

Features:

- 250V $BV_{DSX(\min)}$
- $6.0\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: SOT-89



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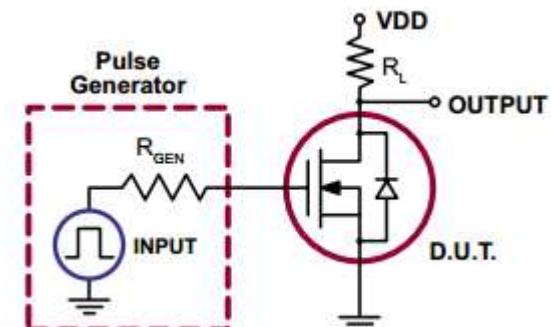
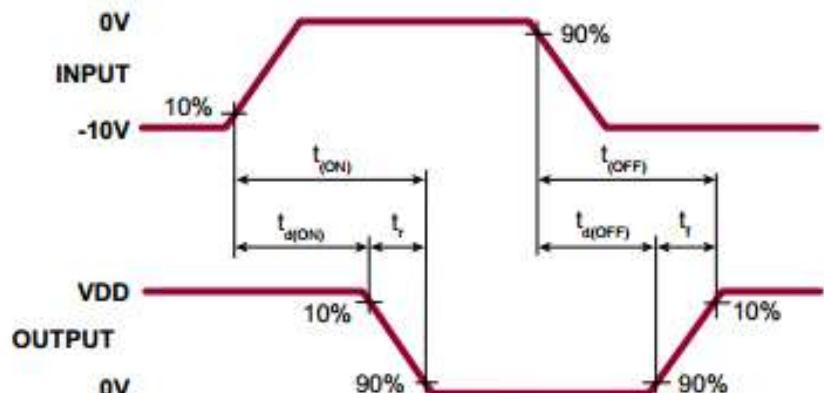
MICROCHIP

DN3535

Online
Datasheet

Features:

- 350V $BV_{DSX(\min)}$
- $10\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: SOT-89



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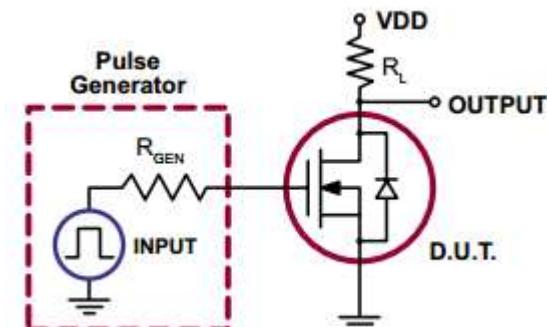
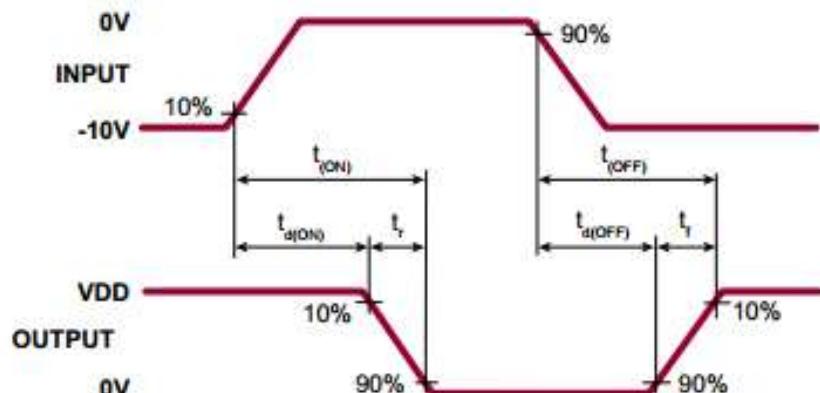
MICROCHIP

DN3545

Online
Datasheet

Features:

- 450V $BV_{DSX(\min)}$
- $20\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-92, SOT-89



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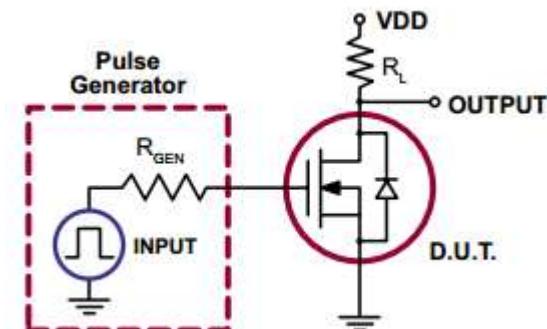
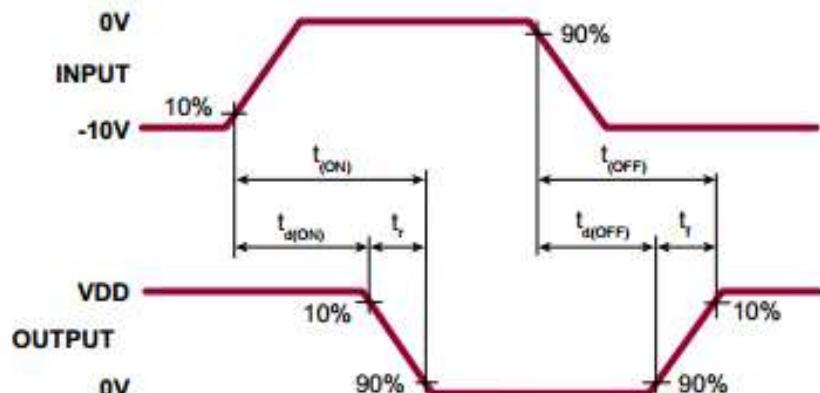
MICROCHIP

DN3765

Online
Datasheet

Features:

- 650V $BV_{DSX(\min)}$
- $8.0\Omega R_{DSON}$ (max)
- High Input Impedance
- Low Input Capacitance
- Fast Switching Speeds
- Low On-Resistance
- Free from Secondary Breakdown
- Low Input and Output Leaks
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: TO-252 (DPAK)



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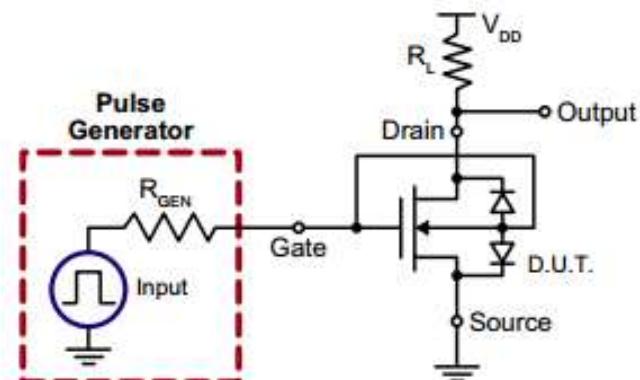
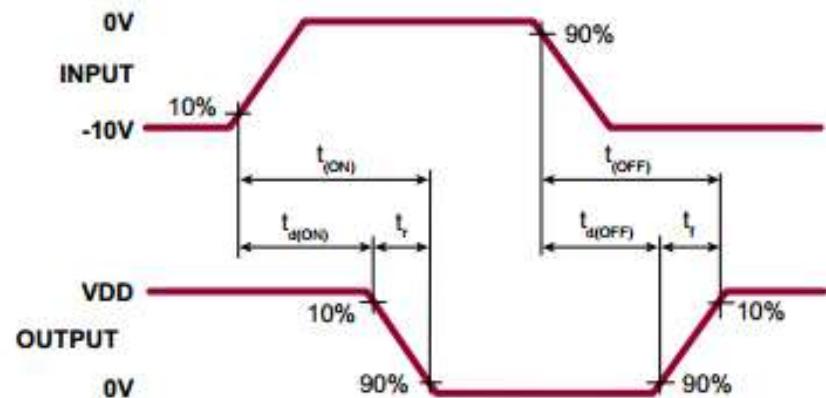
MICROCHIP

LND01

Online
Datasheet

Features:

- 9.0V $BV_{DSX(min)}$
- $1.4\Omega R_{DSON}$ (max)
- Bi-directional
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speeds
- High Input Impedance and High Gain
- Low Power Drive Requirement
- Ease of Parallelizing
- Operating Temperature Range: $-55^{\circ}C$ to $+150^{\circ}C$
- RoHS Compliant Package: 5L SOT-23



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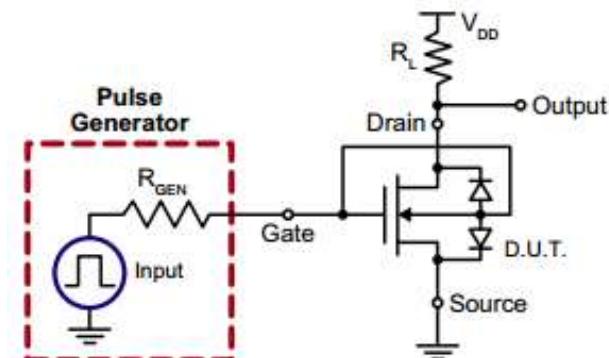
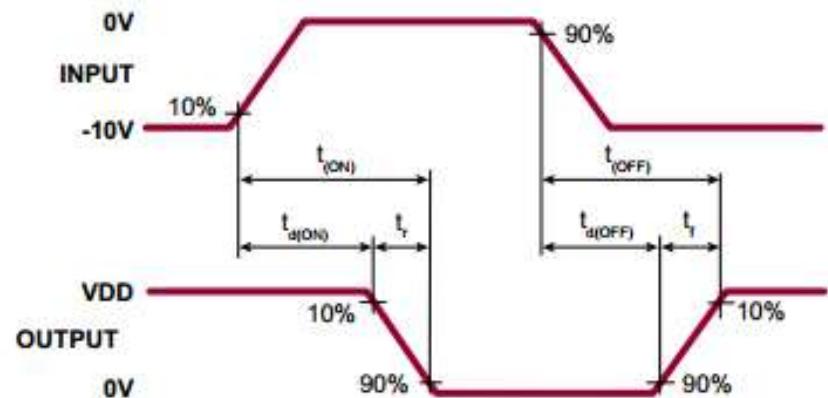
MICROCHIP

LND150

Online
Datasheet

Features:

- 500V $BV_{DSX(\min)}$
- $1000\Omega R_{DSON}$ (max)
- Bi-directional
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speeds
- High Input Impedance and High Gain
- Low Power Drive Requirement
- Ease of Parallelizing
- Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$
- RoHS Compliant Package: SOT-23, TO-92, SOT-89



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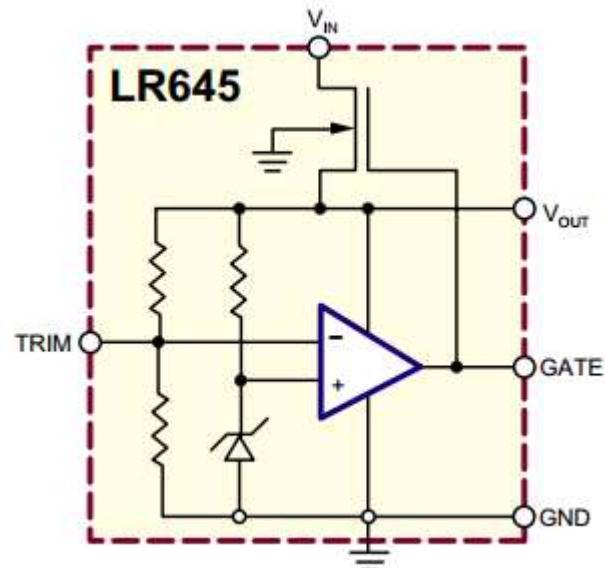
MICROCHIP

LR645

Online
Datasheet

Features:

- Accepts Inputs from 15V to 450V
- Output currents up to 3.0mA continuous, 30mA peak
- Supply Current Typically 50 μ A
- Line regulation typically 0.1mV/V
- Output can be trimmed from 8.0 to 12V
- Output current can be increased to 150mA with external FET
- Operating Temperature Range: -55°C to +150°C
- Package Options: SOIC-8, TO-92, TO-220, SOT-89



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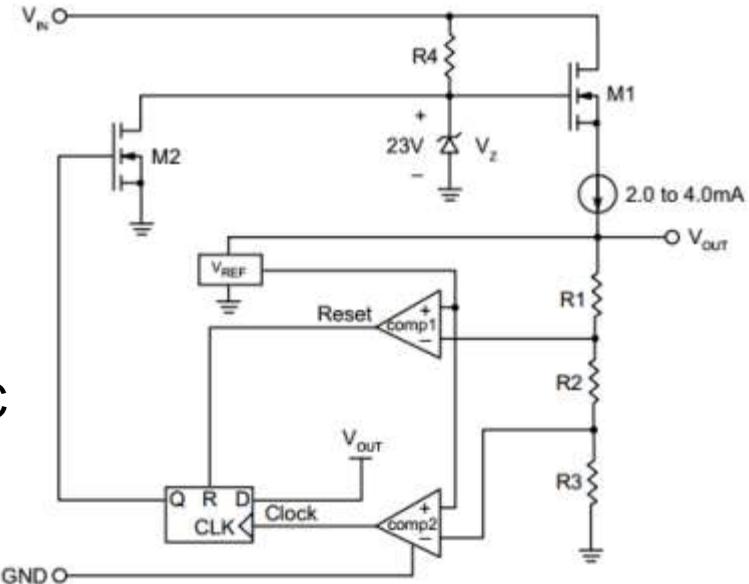
MICROCHIP

LR745

Online
Datasheet

Features:

- Accepts Inputs from 35V to 450V
- Output Current Limiting
- For PWM ICs with Start-up Threshold Voltage of 13.9V – 18.0V
- Very Low Power Consumption After Start-up
- Operating Temperature Range: -55^oC to +150^oC
- Package Options: TO-92, SOT-89



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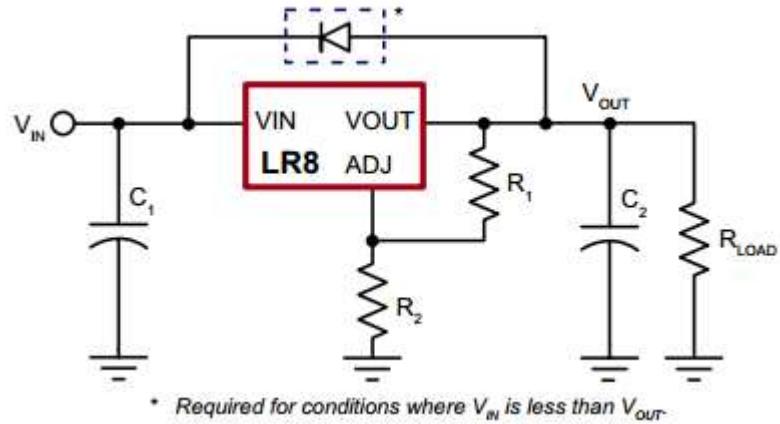
MICROCHIP

LR8

Online
Datasheet

Features:

- 13.2V - 450V input voltage range
- Adjustable 1.2V - 440V output regulation
- 5% output voltage tolerance
- Output current limiting
- 10 μ A typical ADJ current
- Internal junction temperature limiting
- Operating Temperature Range: -55 $^{\circ}$ C to +150 $^{\circ}$ C
- Package Options: TO-252 (DPAK), TO-92, SOT-89



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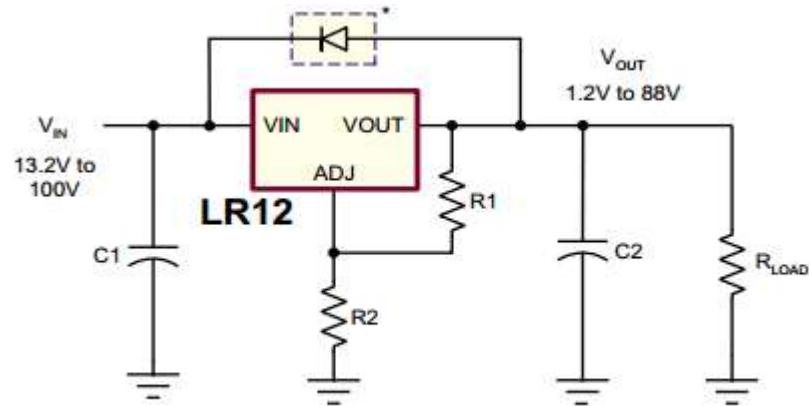
MICROCHIP

LR12

Online
Datasheet

Features:

- 13.2V to 100V input voltage range
- Stable with 100nF output capacitor
- Adjustable 1.2V to 88V output regulation
- 5% reference voltage tolerance
- Output current limiting, 50mA min.
- 10 μ A typical ADJ current
- Over temperature protection
- Operating Temperature Range: -55 $^{\circ}$ C to +150 $^{\circ}$ C
- Package Options: TO-252 (DPAK), TO-92, SOIC-8



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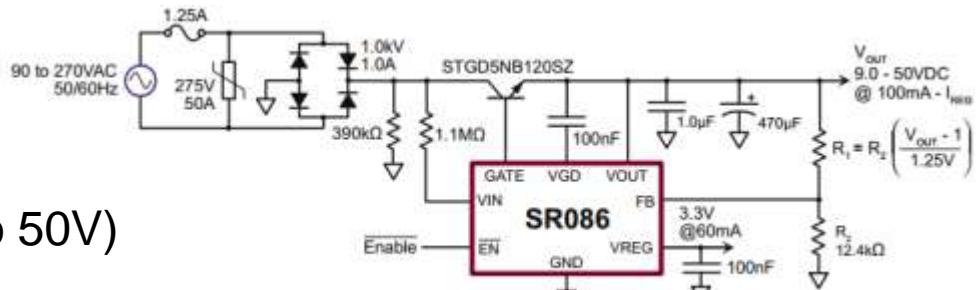
MICROCHIP

SR086

Online
Datasheet

Features:

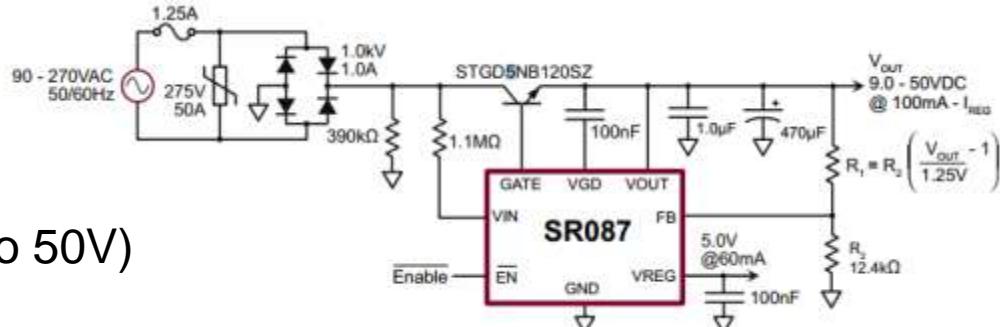
- Efficient operation without magnetics
- No high voltage capacitors
- Adjustable main output voltage (9.0 to 50V)
- Additional 3.3V internal regulator
- Up to 100mA combined output current
- Single BOM for 120VAC/230VAC
- Built-in soft start
- Less than 200mW standby power
- Operating Temperature Range: -40°C to +125°C
- Package Options: SOIC-8 w/Heat Slug



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Features:

- Efficient operation without magnetics
- No high voltage capacitors
- Adjustable main output voltage (9.0 to 50V)
- Additional 5.0V internal regulator
- Up to 100mA combined output current
- Single BOM for 120VAC/230VAC
- Built-in soft start
- Less than 200mW standby power
- Operating Temperature Range: -40°C to +125°C
- Package Options: SOIC-8 w/Heat Slug





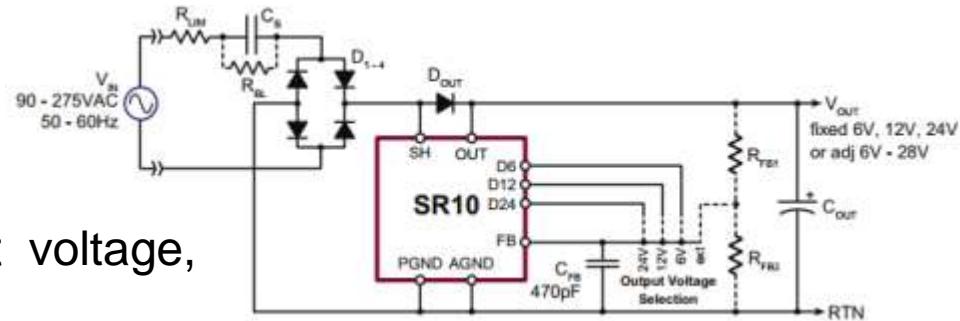
MICROCHIP

SR10

Online
Datasheet

Features:

- Efficiencies up to 75% at 20mA
- Less than 20mW standby power
- Optional 6.0V, 12V or 24V fixed output voltage, or adjustable from 6.0V to 28V
- Output current scalable up to 50mA
- 120VAC to 240VAC input
- No magnetics
- Inherent short circuit protection
- Operating Temperature Range: -40^oC to +125^oC
- Package Options: SOIC-8



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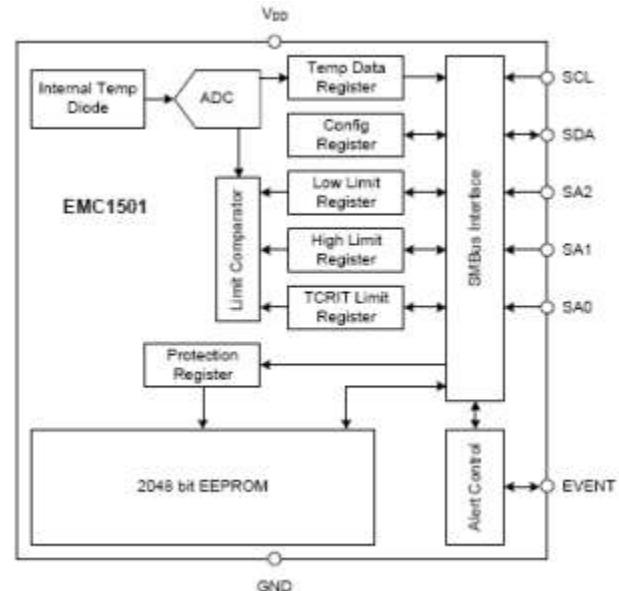
MICROCHIP

EMC1501

Online
Datasheet

Features:

- Meets JEDEC Standard TSE2002av (JC42.4) for Serial Presence Detect with Temperature Sensor
- Integrated 2kbit EEPROM
- Software EEPROM protection
- Event Pin
- Internal Temperature Monitor
 - 1°C accuracy (25°C to 100°C)
- Programmable High, Low, and TCRIT Limits
- SMBus 2.0 and I²C Compliant interface
- 8-pin 2x3 TDFN



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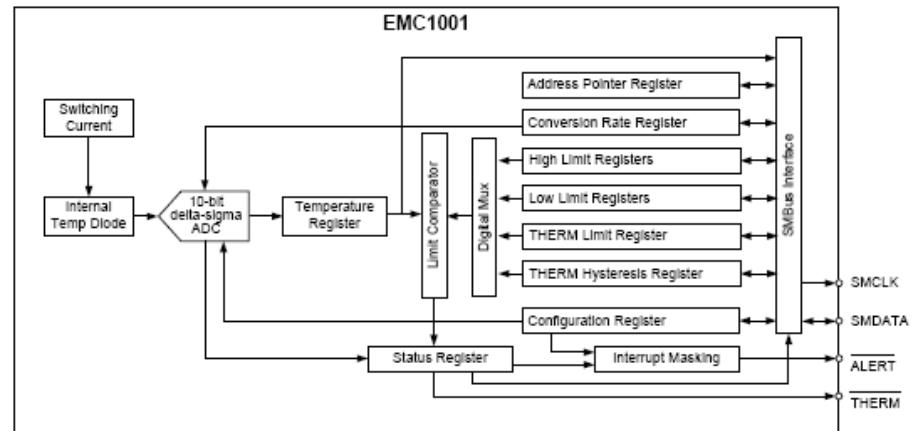
MICROCHIP

EMC1001

Online
Datasheet

Features:

- Self Contained Internal Temperature Sensor
 - 0.25°C resolution
 - ±1.5°C Accuracy (40°C to 85°C)
- Maskable Interrupt
- One-shot Command during standby
- Programmable Temperature Conversion Rate
- SMBus 2.0 Interface
 - Address selected by external resistor
- 3.0V – 3.6V Operation
- 6-pin SOT-23



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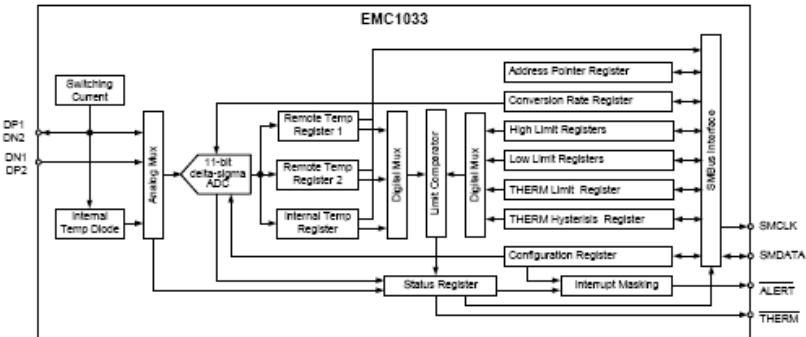
MICROCHIP

EMC1033

Online
Datasheet

Features:

- Resistance Error Correction
- Ideality Factor Configuration
- Remote Thermal Zones
 - $\pm 1.0^\circ\text{C}$ Accuracy (40°C to 80°C)
 - 0.125°C resolution
- Internal Thermal Zone
 - $\pm 3.0^\circ\text{C}$ Accuracy (0°C to 85°C)
- Maskable Interrupt
- One-shot Command during standby
- Programmable Temperature Conversion Rate
- Extended temperature (-64°C to 191°C) available
- Over-limit Filtering with Consecutive Counter
- SMBus Interface
- 8-pin TSSOP



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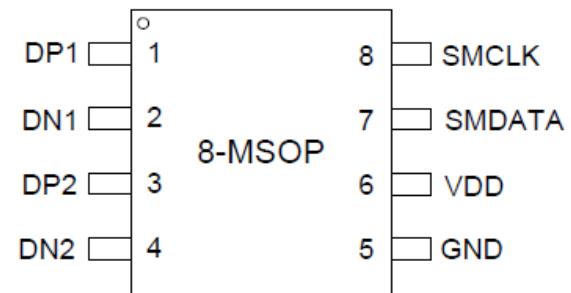
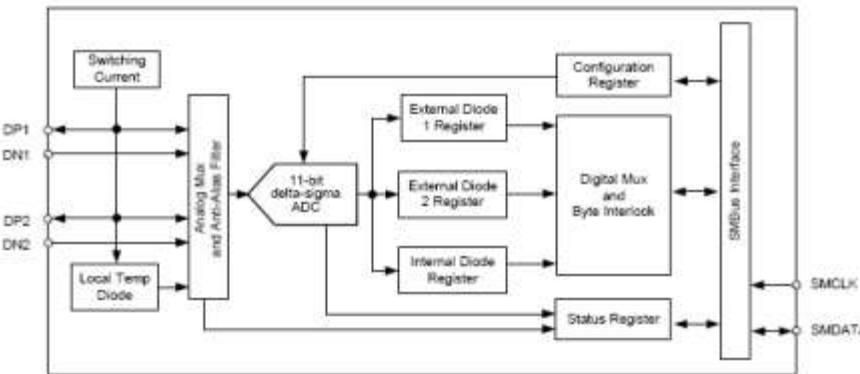
MICROCHIP

EMC1043/53/63

Online
Datasheet

Features:

- 3 Channel temperature sensor
- Supports two external temperature diodes
 - $\pm 1.0^\circ\text{C}$ Accuracy (40°C to 80°C)
 - 0.125°C Resolution
 - Ideality Factor Configuration
 - Accepts 2200pF Cap Across Ext Diodes
 - Optional Resistive Error Correction on External Diode
 - Resistance Error Correction
 - EMC1063, powers up disabled
 - Beta Compensation for substrate diodes
 - EMC1043, ch 2 powers up disabled
 - EMC1053, both channels power up disabled
 - EMC1063, does not have beta compensation
- Internal Temperature Diode
 - $\pm 3^\circ\text{C}$ Accuracy (0°C to 85°C)
 - 0.125°C Resolution
- Low Power Operation, $4\mu\text{A}$ in standby
- Programmable Conversion Rate
- Reports Hotter of Two Diodes with Dual-core CPU
- 3.0V – 3.6V Operation
- SMBus 2.0 Interface
- 8-pin MSOP



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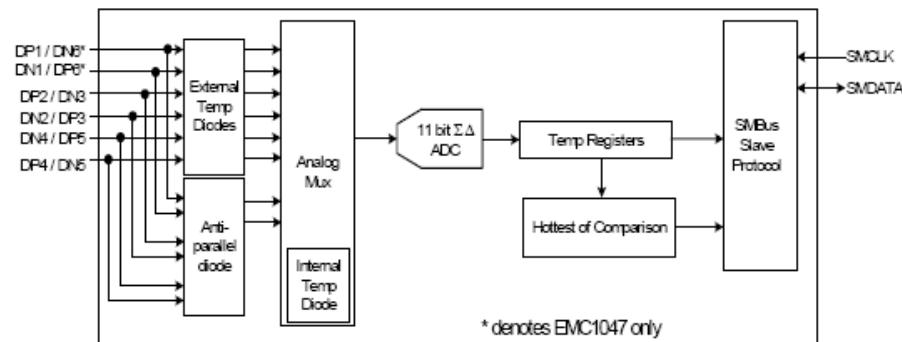
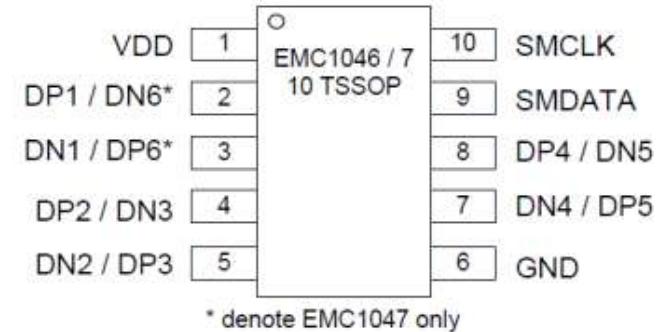
MICROCHIP

EMC1046/7

Online
Datasheet

Features:

- 6 / 7 (EMC1046/EMC1047) channel temp sensor
- Supports diodes requiring the BJT or transistor model such as substrate and CPU diodes
- Resistance Error Correction
- Up to six External Temperature Monitors
 - $\pm 1^\circ\text{C}$ Accuracy ($60^\circ\text{C} < T_{\text{DIODE}} < 100^\circ\text{C}$)
 - 0.125°C Resolution
 - Supports up to 2.2nF filter capacitor
 - Anti-parallel diodes for extra diode support and compact design
- Internal Temperature Monitor
 - $\pm 2^\circ\text{C}$ accuracy
- 3.3V Operation
- 10-pin TSSOP



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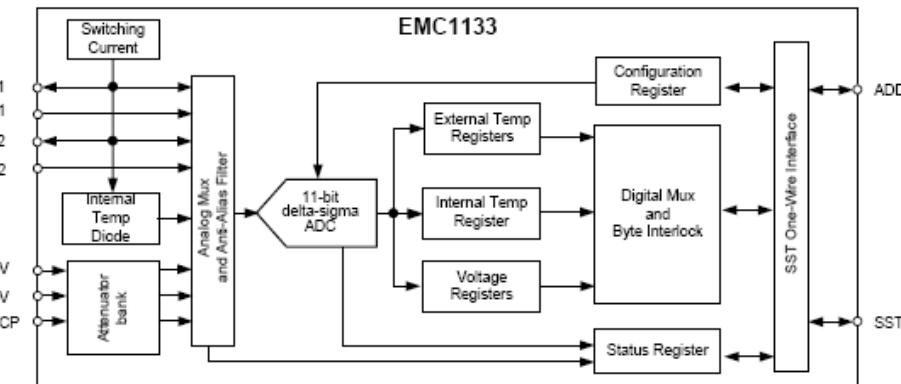
MICROCHIP

EMC1133

Online
Datasheet

Features:

- 3.0V – 3.6V Operation
- Single Wire Interface (SST based)
 - SST 1.0 compliant
 - Supports FCS Abort functionality
- Resistance Error Correction
- Ideality Configuration
- Beta Compensation
- Two External Temperature Monitors
 - 0.125°C Resolution
 - $\pm 1^\circ\text{C}$ Accuracy (50°C to 70°C)
 - Diode Fault Reporting
 - Second External Diode
- Internal Temperature Monitor
 - Range -40°C to +125°C
 - 0.125°C resolution
 - $\pm 2^\circ\text{C}$ Accuracy (40°C to 70°C)
- Three Voltage Monitors: 3.3V, 2.5V, VCCP inputs
- 10-pin MSOP



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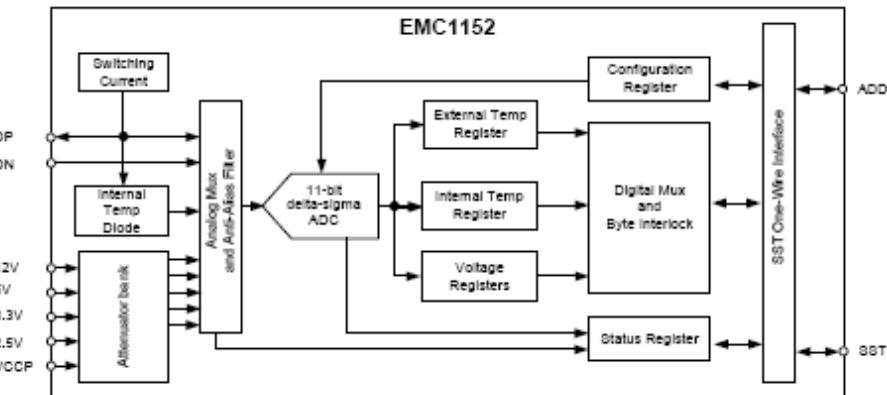
MICROCHIP

EMC1152

Online
Datasheet

Features:

- 3.0V – 3.6V Operation
- Single Wire Interface (SST based)
 - SST 1.0 compliant
 - Supports FCS Abort functionality
- Resistance Error Correction
- Ideality Configuration
- Beta Compensation
- External Temperature Monitors
 - 0.125°C Resolution
 - $\pm 1^\circ\text{C}$ Accuracy (50°C to 70°C)
 - Diode Fault Reporting
- Internal Temperature Monitor
 - Range -40°C to +125°C
 - 0.125°C resolution
 - $\pm 2^\circ\text{C}$ Accuracy (40°C to 70°C)
- Voltage Monitors:
 - 12V, 5V, 3.3V, 2.5V, VCCP inputs
- 10-pin MSOP



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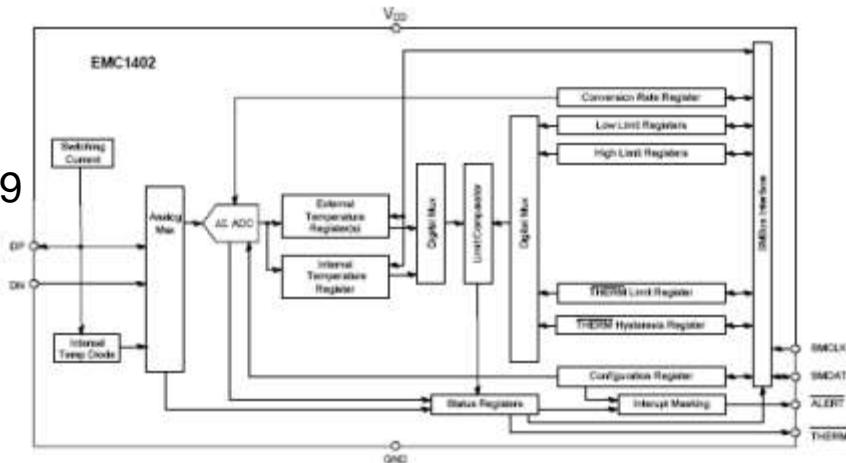
MICROCHIP

EMC1402

Online
Datasheet

Features:

- 3.3V Operation
- Support for diodes requiring BJT/transistor model
 - 45nm, 65nm, and 90nm CPU thermal diodes
- Pin compatible with ADM1032, MAX6649, and LM99
- Automatically determines external diode type
- Resistance Error Correction
- External Temperature Monitors
 - $\pm 1^\circ\text{C}$ Accuracy ($60^\circ\text{C} < T_{\text{DIODE}} < 100^\circ\text{C}$)
 - 0.125°C resolution
- Internal Temperature Monitor
 - $\pm 2^\circ\text{C}$ accuracy
- Programmable temperature limits for ALERT# and THERM#
- 8-pin MSOP



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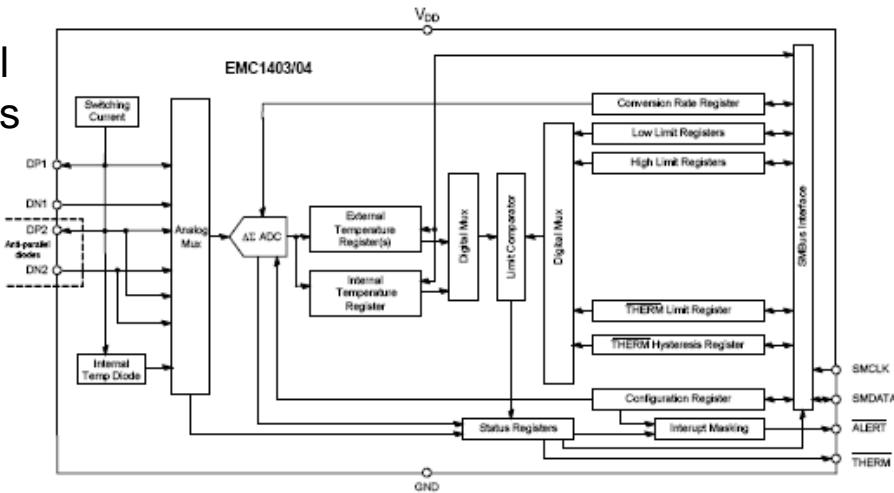
MICROCHIP

EMC1403/4

Online
Datasheet

Features:

- 3.3V Operation
- Support for diodes requiring BJT/transistor model
 - 45nm, 65nm, and 90nm CPU thermal diodes
- Automatically determines external diode type
- Resistance Error Correction
- External Temperature Monitors
 - $\pm 1^\circ\text{C}$ Accuracy ($60^\circ\text{C} < T_{\text{DIODE}} < 100^\circ\text{C}$)
 - 0.125°C resolution
 - Anti-parallel diodes for extra diode support
- Internal Temperature Monitor
 - $\pm 2^\circ\text{C}$ accuracy
- Programmable temperature limits for ALERT# and THERM#
- 10-pin 3x3 DFN, MSOP and 14-pin SOIC



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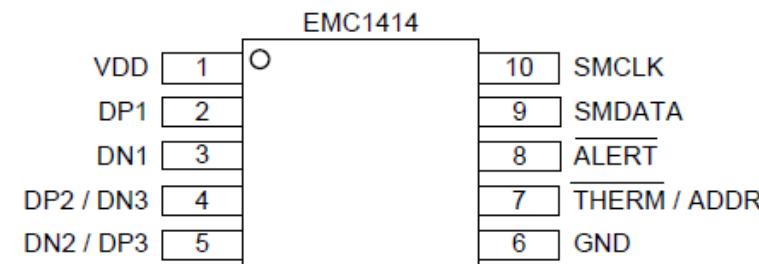
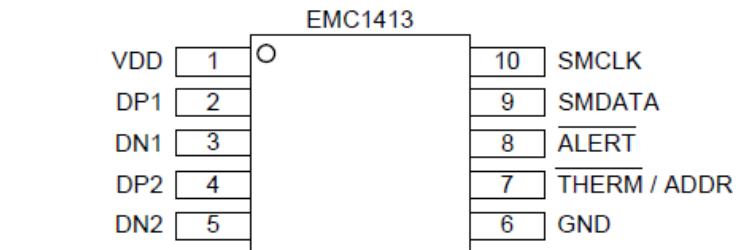
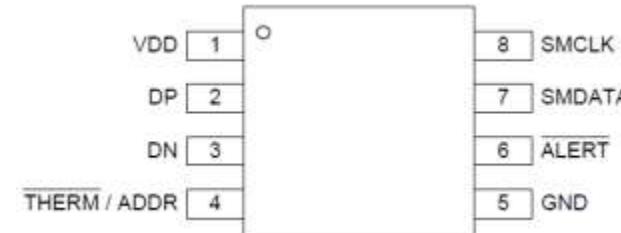
MICROCHIP

EMC1412/3/4

Online
Datasheet

Features:

- 2 Channel temperature sensor (EMC1412)
- 3 Channel temperature sensor (EMC1413)
- 4 Channel temperature sensor (EMC1414)
- Remote temperature sensors (1,2,or 3 channels)
 - Automatically determines external diode type
 - Supports BJT/transistor model for substrate diode
 - Resistance Error Correction
- EMC1412 compatible w ADM1032, MAX6649, LM99
- External temperature monitor accuracy
 - $\pm 1^\circ\text{C}$ Accuracy ($20^\circ\text{C} < T_{\text{DIODE}} < 110^\circ\text{C}$)
 - 0.125°C resolution
 - Supports up to 2.2nF diode filter capacitor
- Internal temperature monitor accuracy
 - $\pm 1^\circ\text{C}$ accuracy
 - 0.125°C resolution
- Programmable temperature limits for ALERT# and THERM#
- Programmable or fixed SMBus/I2C Address
- 3.3V Operation
- 8-pin 2x3 TDFN, MSOP; 10-pin DFN, MSOP



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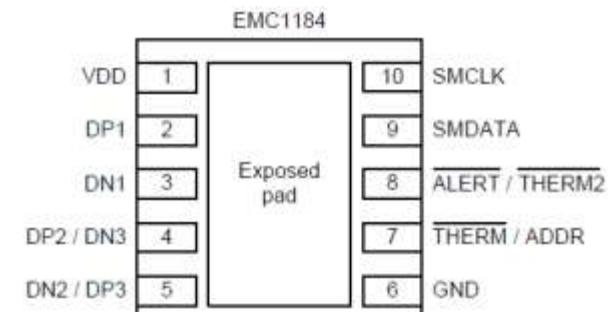
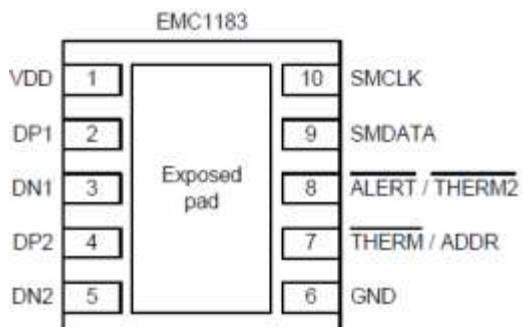
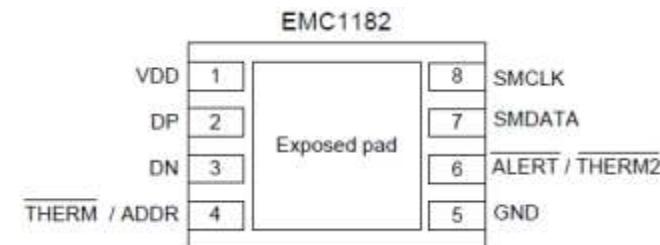
MICROCHIP

EMC1182/3/4

Online
Datasheet

Features:

- 2 Channel temperature sensor (EMC1182)
- 3 Channel temperature sensor (EMC1183)
- 4 Channel temperature sensor (EMC1184)
- Remote temperature sensors (1,2,or 3 channels)
 - Automatically determines external diode type
 - Supports BJT/transistor model for substrate diode
 - Resistance Error Correction
- EMC1412 compatible w ADM1032, MAX6649, LM99
- External temperature monitor accuracy
 - $\pm 1^\circ\text{C}$ Accuracy ($20^\circ\text{C} < T_{\text{DIODE}} < 110^\circ\text{C}$)
 - 0.125°C resolution
 - Supports up to 2.2nF diode filter capacitor
- Internal temperature monitor accuracy
 - $\pm 1^\circ\text{C}$ accuracy
 - 0.125°C resolution
- Programmable temperature limits for ALERT# and THERM#
- Programmable or fixed SMBus/I2C Address
- 3.3V Operation
- 8-pin 2x3 TDFN, MSOP; 10-pin 3x3 DFN



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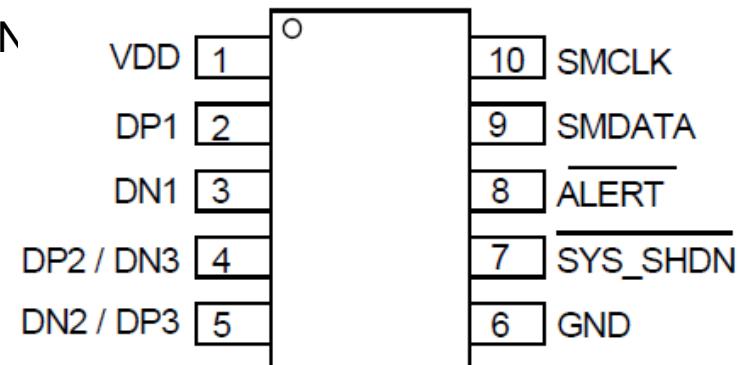
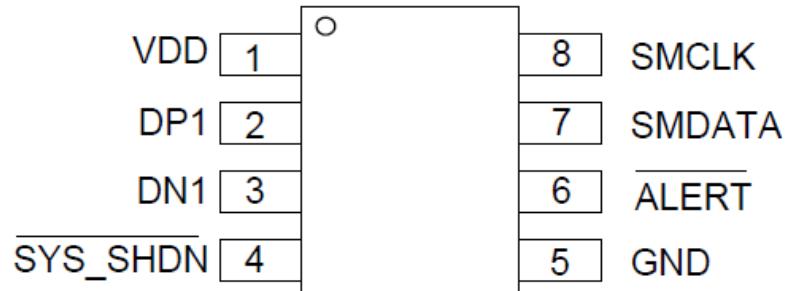
MICROCHIP

EMC1422/3/4

Online
Datasheet

Features:

- 2 Channel temperature sensor (EMC1422)
- 3 Channel temperature sensor (EMC1423)
- 4 Channel temperature sensor (EMC1424)
- Remote temperature sensors (1,2,or 3 channels)
 - Automatically determines external diode type
 - Supports BJT/transistor model for substrate diode
 - Resistance Error Correction
- EMC1422 compatible with ADM1032, MAX6649, LM99
- Hardware Thermal Shutdown with dedicated SYS_SHDN
 - Configured range 77°C to 112°C in 1°C steps
 - Cannot be disabled or modified by software
- External temperature monitor accuracy
 - $\pm 1^\circ\text{C}$ Accuracy ($60^\circ\text{C} < T_{\text{DIODE}} < 100^\circ\text{C}$)
 - 0.125°C resolution
 - Anti-parallel diodes for extra diode support
- Internal temperature monitor accuracy
 - $\pm 2^\circ\text{C}$ accuracy
- Programmable temperature limits for ALERT#
- 3.3V Operation
- 8-pin MSOP, 10-pin MSOP



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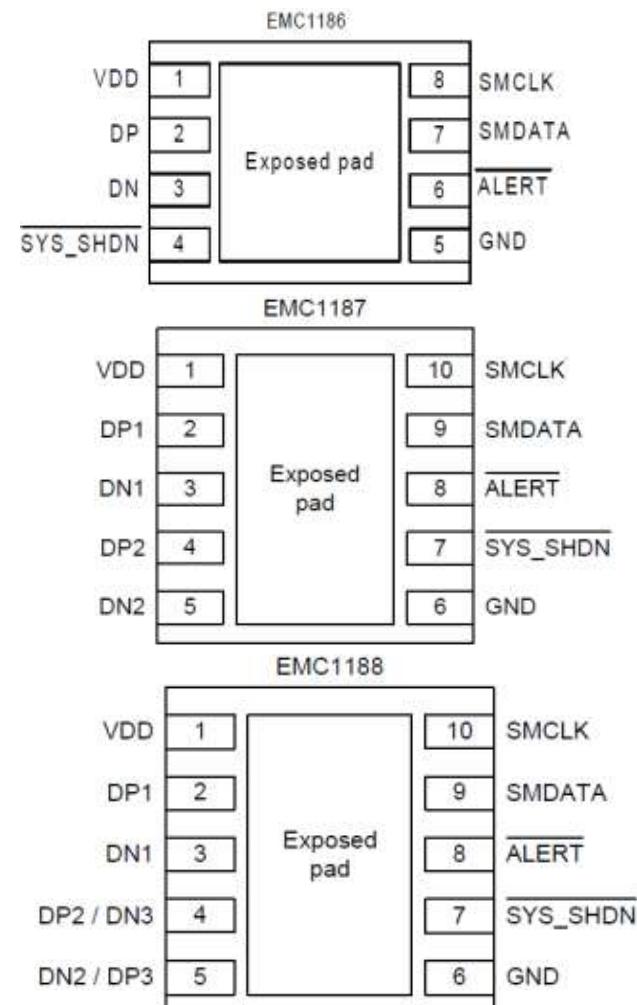
MICROCHIP

EMC1186/7/8

Online
Datasheet

Features:

- 2 Channel temperature sensor (EMC1186)
- 3 Channel temperature sensor (EMC1187)
- 4 Channel temperature sensor (EMC1188)
- Remote temperature sensors (1,2,or 3 channels)
 - Automatically determines external diode type
 - Supports BJT/transistor model for substrate diode
 - Resistance Error Correction
- EMC1422 compatible with ADM1032, MAX6649, LM99
- Hardware Thermal Shutdown with dedicated SYS_SHDN
 - Configured range 77°C to 112°C in 1°C steps
 - Cannot be disabled or modified by software
- External temperature monitor accuracy
 - $\pm 1^\circ\text{C}$ Accuracy ($60^\circ\text{C} < T_{\text{DIODE}} < 100^\circ\text{C}$)
 - 0.125°C resolution
 - Anti-parallel diodes for extra diode support
- Internal temperature monitor accuracy
 - $\pm 2^\circ\text{C}$ accuracy
- Programmable temperature limits for ALERT#
- 3.3V Operation
- 8-pin 2x3 TDFN, 10-pin 3x3 DFN



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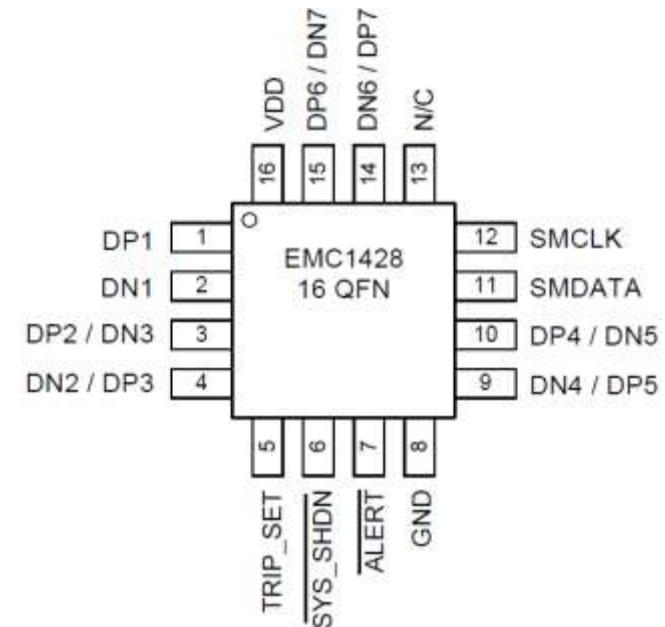
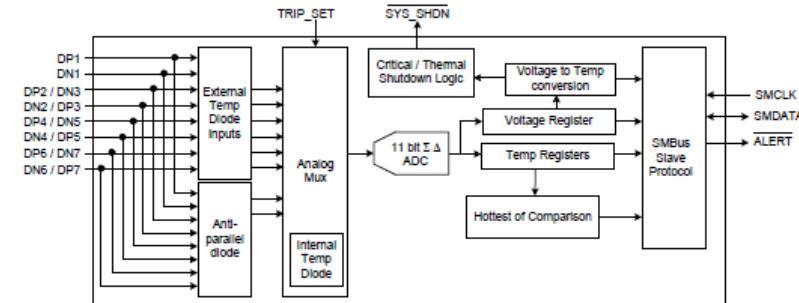
MICROCHIP

EMC1428

Online
Datasheet

Features:

- 8 Channel temperature sensor
- Hardware Thermal Shutdown
 - Triggers dedicated SYS_SHDN pin
 - Configured range 77°C to 112°C in 1°C steps
 - Cannot be disabled or modified by software
- Support for diodes requiring BJT/transistor model
- Designed to support 45nm, 65nm and 90nm processors
- Resistance Error Correction
- Up to 7 External Temperature Monitors
 - $\pm 1^\circ\text{C}$ Accuracy ($60^\circ\text{C} < T_{\text{DIODE}} < 100^\circ\text{C}$)
 - 0.125°C resolution
 - Supports up to 2.2nF diode filter capacitor
 - Anti-parallel diodes for extra diode support
- Internal Temperature Monitor
 - $\pm 2^\circ\text{C}$ accuracy
- Programmable temperature limits for ALERT#
- 3.3V Operation
- 16-pin 4x4 QFN



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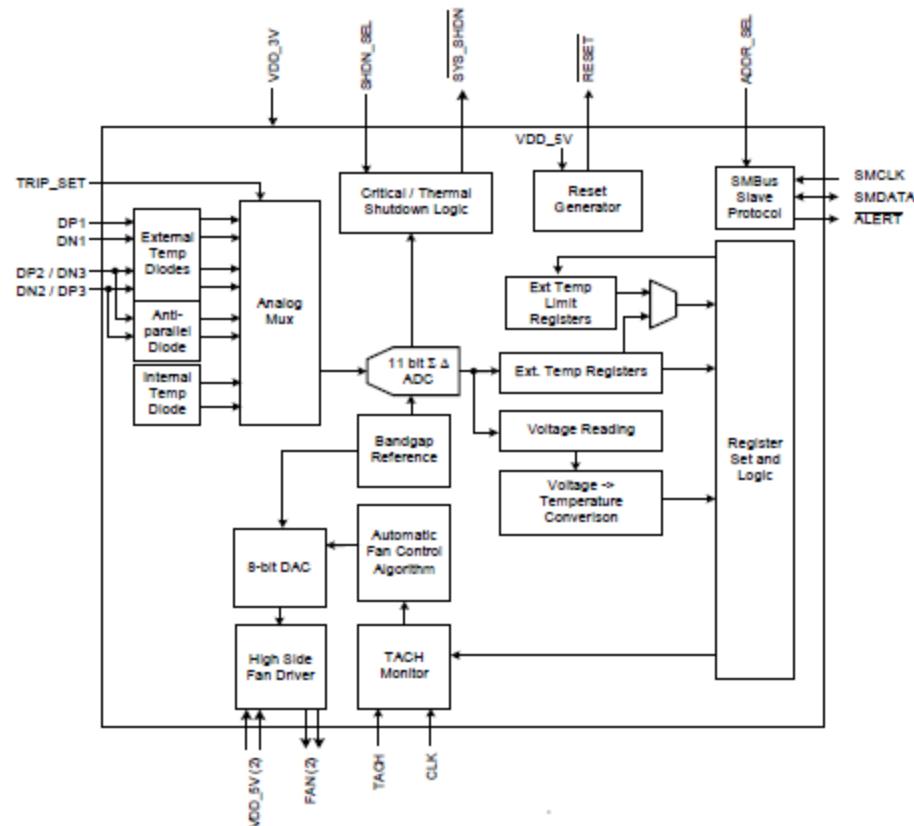
MICROCHIP

EMC2112

Online
Datasheet

Features:

- 3.0 – 3.6V Supply Voltage
- Closed-Loop RPM-Based Fan Controller
 - 1% accuracy with external clock input
 - 3% accuracy with internal clock
 - Internal clock can be used as a source
 - Aging fan detection
- Integrated Linear Fan Driver
 - 600mA drive capability
- HW Thermal Shutdown (SYS_SHDN#)
- Reset Function (RESET#) On 5V Supply
- Up to Three Remote Thermal Zones
 - $\pm 1^\circ\text{C}$ accuracy (60°C to 100°C)
 - 0.125°C resolution
 - Designed to support 45nm, 65nm, and 90nm CPU Diodes
 - Eliminates temperature offset due to series resistance from PCB traces and thermal 'Diode'
- I2C/SMBus Interface
- 20-pin 4x4 QFN package



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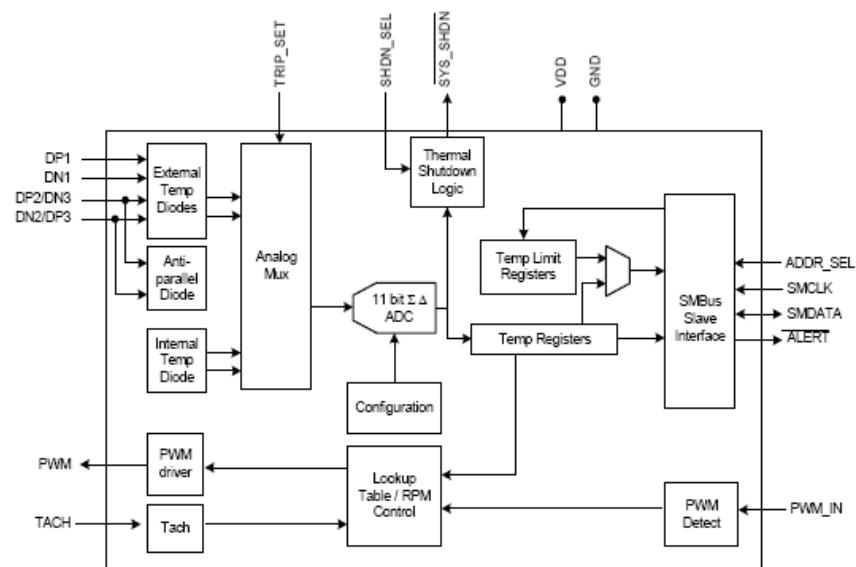
MICROCHIP

EMC2113

Online
Datasheet

Features:

- Programmable Fan Control circuit
 - 4-wire fan compatible
 - Both low and high frequency PWM
- RPM-based fan control algorithm
 - 2% accurate from 500 – 16k RPM
- Temperature Look-Up Table
 - Eight steps that incorporate up to four temperature zones
- Up to Three External Temperature Channels
- Hardware Programmable Thermal Shutdown
- Internal Temperature Monitor
- 3.3V Supply Voltage
- Open-drain interrupt pin
- SMBus 2.0 Interface
- 16-pin 4x4 QFN package



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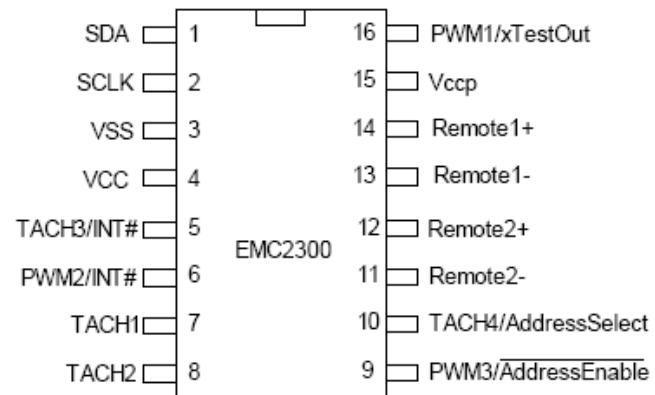
MICROCHIP

EMC2300

Online
Datasheet

Features:

- 3.3 Volt Operation
- Fan Control
 - 3 PWM Outputs
 - 4 Fan Tachometer Inputs
 - High frequency fan support for 4 wire fans
 - One fan can be controlled up to 3 temp zones
- Power Saving Modes
- Temperature Monitor
 - Two remote thermal diodes $\pm 3^{\circ}\text{C}$ accuracy
 - Internal ambient temperature measurement
 - Limit comparison of all monitored values
- Voltage Monitor
- XNOR Tree Test Mode
- SMBus 2.0 Interface
- 16-pin SSOP



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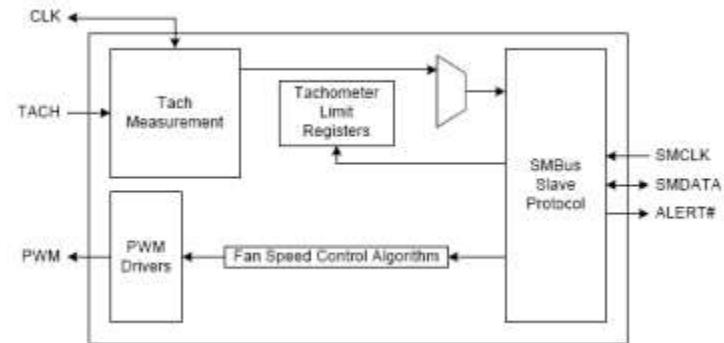
MICROCHIP

EMC2301

Online
Datasheet

Features:

- Programmable Fan Control circuit
 - 4-wire fan compatible
 - High and low speed PWM
 - Optional detection of aging fans
 - Fan Spin Up Control and Ramp Rate Control
 - Alert on fan stall
- Watchdog Timer
- RPM-based fan control algorithm
 - 0.5% accuracy from 500 – 16k RPM (ext. xtal)
 - 1% accuracy from 500 – 16k RPM (int. clock)
- SMBUS 2.0 Interface
- CLK Pin can provide a clock source output
- 8-pin MSOP



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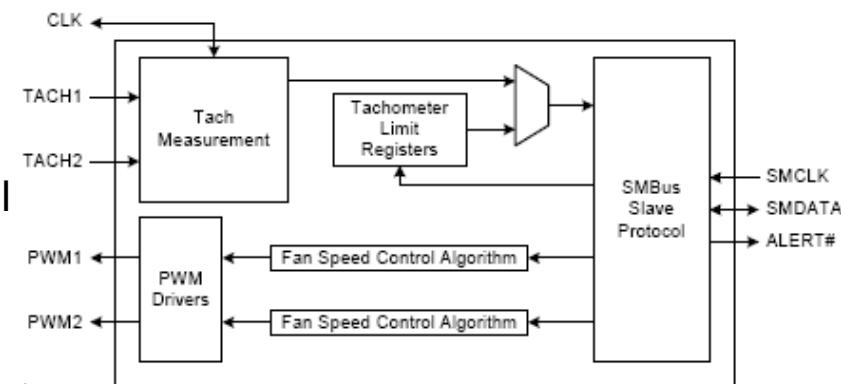
MICROCHIP

EMC2302

Online
Datasheet

Features:

- Two Programmable Fan Control circuits
 - 4-wire fan compatible
 - High and low speed PWM
 - Optional detection of aging fans
 - Fan Spin Up Control and Ramp Rate Control
 - Alert on fan stall
- Watchdog Timer
- RPM-based fan control algorithm
 - 0.5% accuracy from 500 – 16k RPM (ext. xtal)
 - 1% accuracy from 500 – 16k RPM (int. clock)
- SMBUS 2.0 Interface
- CLK Pin can provide a clock source output
- 10-pin MSOP



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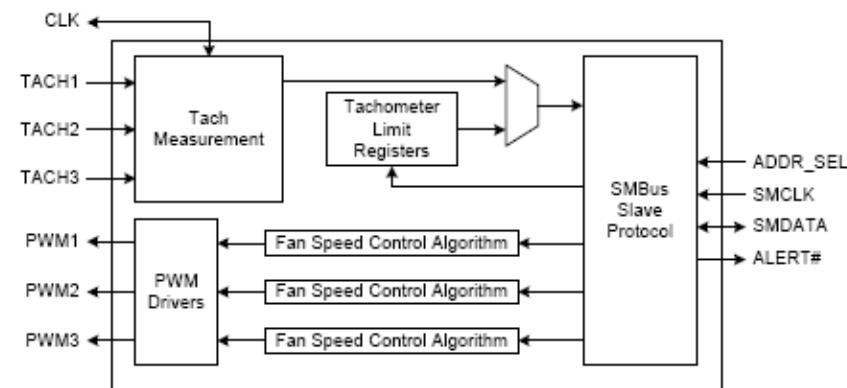
MICROCHIP

EMC2303

Online
Datasheet

Features:

- Three Programmable Fan Control circuits
 - 4-wire fan compatible
 - High and low speed PWM
 - Optional detection of aging fans
 - Fan Spin Up Control and Ramp Rate Control
 - Alert on fan stall
- Watchdog Timer
- RPM-based fan control algorithm
 - 0.5% accuracy from 500 – 16k RPM (ext. xtal)
 - 1% accuracy from 500 – 16k RPM (int. clock)
- SMBUS 2.0 Interface
- CLK Pin can provide a clock source output
- 12-pin 4x4 QFN



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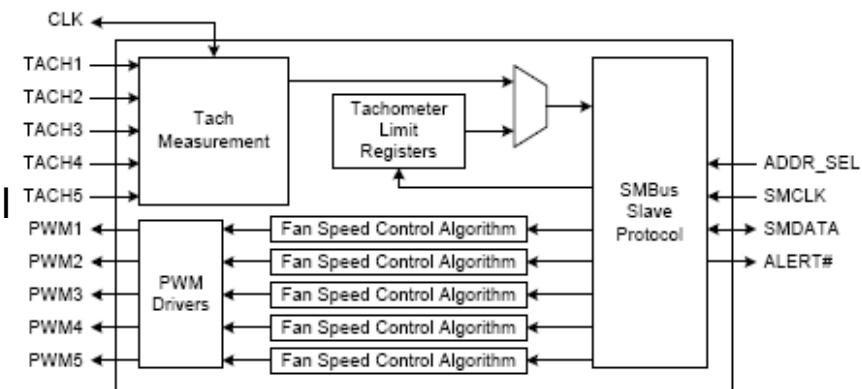
MICROCHIP

EMC2305

Online
Datasheet

Features:

- Five Programmable Fan Control circuits
 - 4-wire fan compatible
 - High and low speed PWM
 - Optional detection of aging fans
 - Fan Spin Up Control and Ramp Rate Control
 - Alert on fan stall
- Watchdog Timer
- RPM-based fan control algorithm
 - 0.5% accuracy from 500 – 16k RPM (ext. xtal)
 - 1% accuracy from 500 – 16k RPM (int. clock)
- SMBUS 2.0 Interface
- CLK Pin can provide a clock source output
- 16-pin 4x4 QFN



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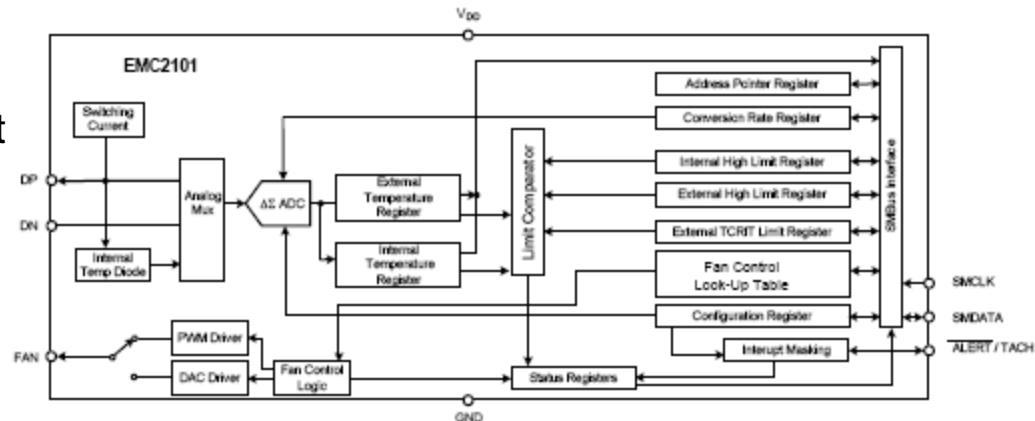
MICROCHIP

EMC2101

Online
Datasheet

Features:

- 3.3V Operation
- Automatic Beta Compensation
- Resistance Error Correction
- Self-programming with EEPROM
- Selectable PWM or DAC fan driver output
- Temperature Monitors
 - External channel $\pm 1^\circ\text{C}$ accuracy
 - Internal channel $\pm 2^\circ\text{C}$ accuracy
- SMBus 2.0 Interface
- 8-pin MSOP and SOIC



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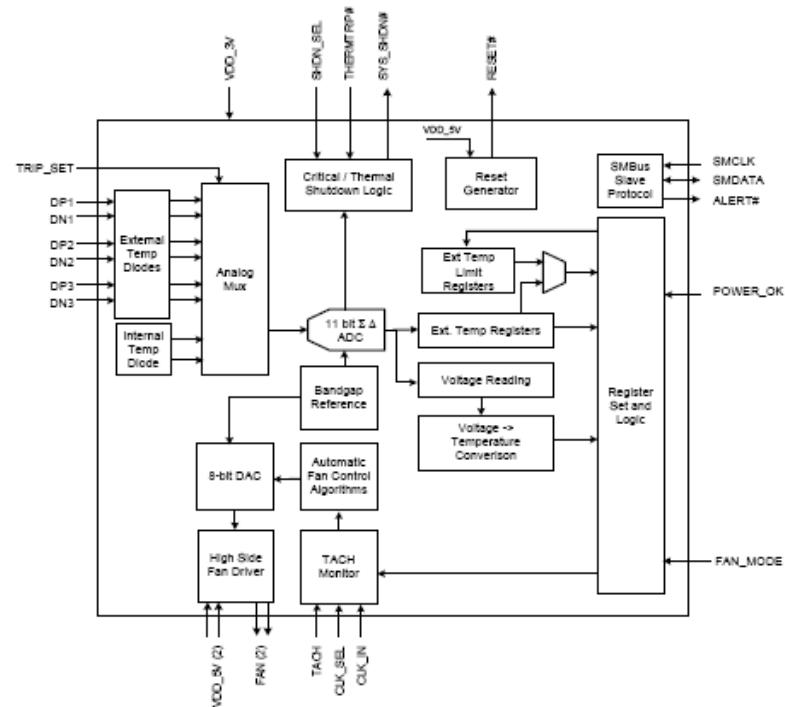
MICROCHIP

EMC2102

Online
Datasheet

Features:

- Supports 45nm, 65nm, 90nm CPU Diodes
- Supports BJT and transistor models
- 3.0 – 3.6V Operation
- Closed-loop RMP based Fan Controller
- Integrated Linear Fan Driver
 - 600 mA drive capability
- HW Thermal Shutdown
- Reset Function on 5V Supply
- Three Remote Thermal Zones
 - $\pm 1^\circ\text{C}$ accuracy (60°C to 100°C)
 - 1°C Resolution
- Resistance Error Correction
- 28-pin 5x5 QFN



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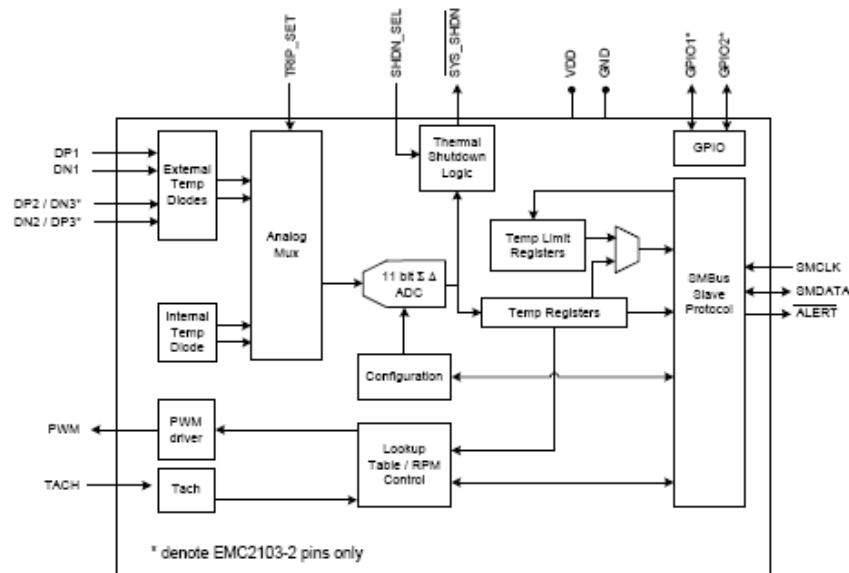
MICROCHIP

EMC2103

Online
Datasheet

Features:

- 3.3V Operation
- Programmable Fan Control circuit
 - 4-wire fan compatible
 - High and low frequency PWM
- RPM-based fan control algorithm
 - 2.5% accuracy from 500 – 16k RPM
- Temperature Look-up Table
 - Controls fan speed or PWM drive
 - Supports DTS data from CPU
- Up to Three External Temperature Channels
 - Supports 45nm, 65nm, 90nm CPU Diodes
 - Supports BJT and transistor models
 - Resistance error correction
 - Supports discrete transistors (i.e. 2N3904)
 - $\pm 1^\circ\text{C}$ accuracy (60°C to 100°C)
 - 0.125°C Resolution
- Hardware Programmable Thermal Shutdown
- Internal Temperature Monitor
- SMBus 2.0 Interface
- 12-pin 4x4 QFN and 16-pin 4x4 QFN



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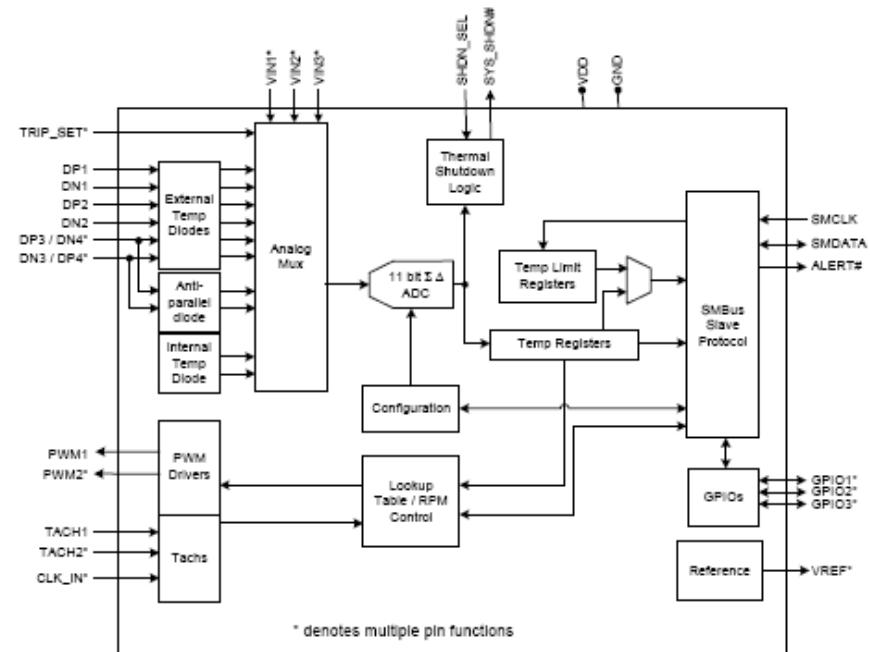
MICROCHIP

EMC2104

Online
Datasheet

Features:

- 3.3V Operation
- Two Programmable Fan Control circuit
 - 4-wire fan compatible
 - High and low frequency PWM
- RPM-based fan control algorithm
 - 2.5% accuracy from 500 – 16k RPM
- Temperature Look-up Table
 - Controls fan speed or PWM drive
 - Supports DTS data from CPU
- Up to Four External Temperature Channels
 - Supports 45nm, 65nm, 90nm CPU Diodes
 - Supports BJT and transistor models
 - Resistance error correction
 - $\pm 1^\circ\text{C}$ accuracy (60°C to 100°C)
 - 0.125°C Resolution
- Up to three thermister compatible voltage inputs
- Hardware Programmable Thermal Shutdown
- Internal Temperature Monitor
- SMBus 2.0 Interface
- 20-pin 4x4 QFN



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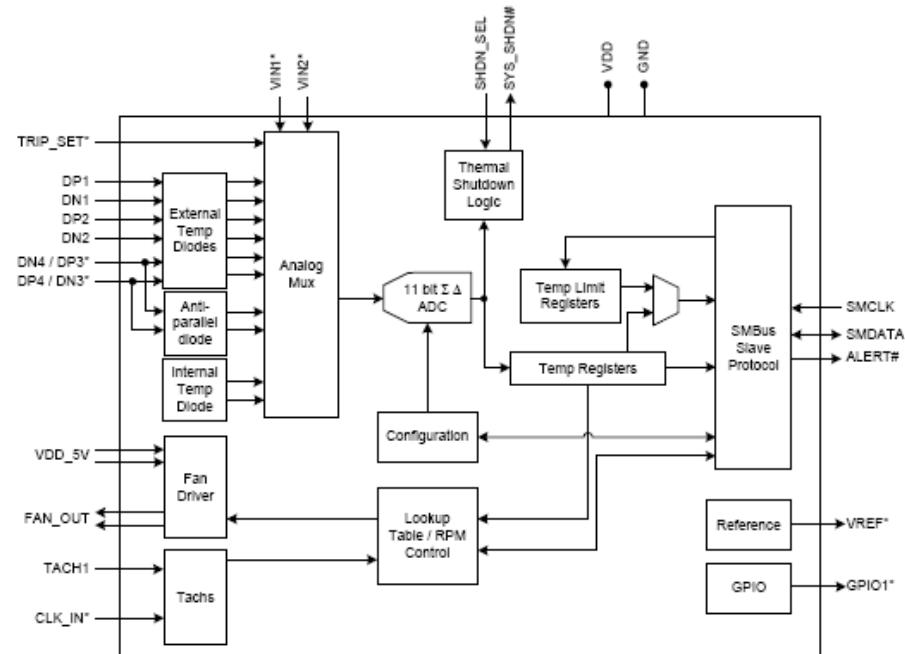
MICROCHIP

EMC2105

Online
Datasheet

Features:

- 3.3V Operation
- Programmable Fan Control circuit
 - 600 mA, 5V, high side fan driver
- RPM based fan control algorithm
 - 2% accuracy from 500 – 16k RPM
- Temperature Look-up Table
 - 1 to 4 thermal zones
 - Controls fan speed or fan drive
 - Allows external data to control fan drivers including two DTS channels
- Up to Four External Temperature Channels
 - Supports 45nm, 65nm, 90nm CPU Diodes
 - Supports BJT and transistor models
 - Resistance error correction
 - $\pm 1^\circ\text{C}$ accuracy (60°C to 100°C)
 - 0.125°C Resolution
- SMBus 2.0 Interface
- 20-pin 4x4 QFN



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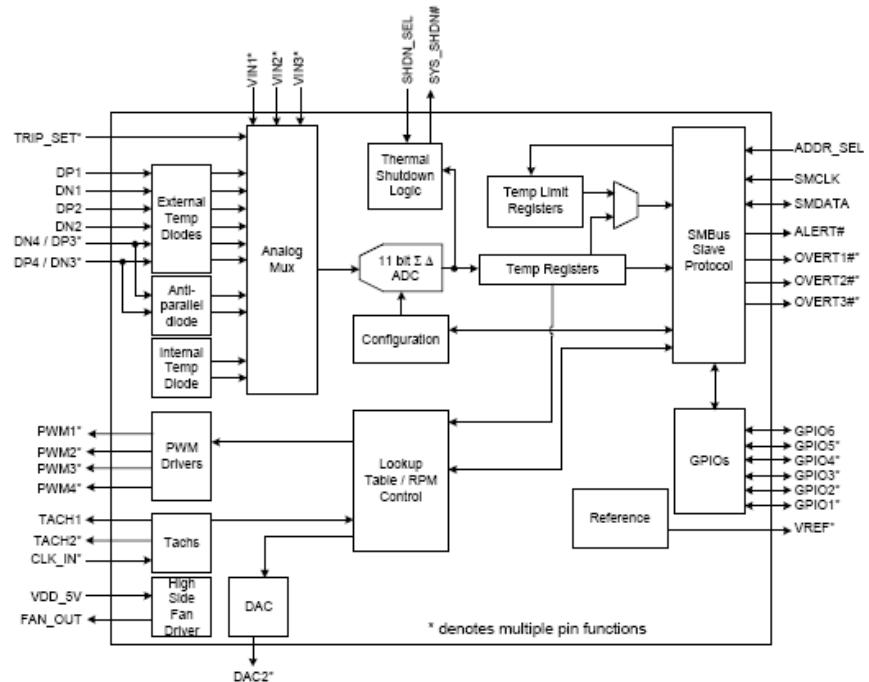
MICROCHIP

EMC2106

Online
Datasheet

Features:

- 3.3V Operation
- Two Programmable Fan Control circuit
 - 4-wire fan compatible
 - High and Low speed PWM
 - 600 mA, 5V, high side fan driver
- RPM based fan control algorithm
 - 2% accuracy from 500 – 16k RPM
- Temperature Look-up Table
 - 1 to 4 thermal zones
 - Controls fan speed or fan drive
 - Allows external data to control fan drivers including two DTS channels
- Up to Four External Temperature Channels
 - Supports 45nm, 65nm, 90nm CPU Diodes
 - Supports BJT and transistor models
 - Resistance error correction
 - $\pm 1^\circ\text{C}$ accuracy (60°C to 100°C)
 - 0.125°C Resolution
- SMBus 2.0 Interface
- 28-pin 5x5 QFN



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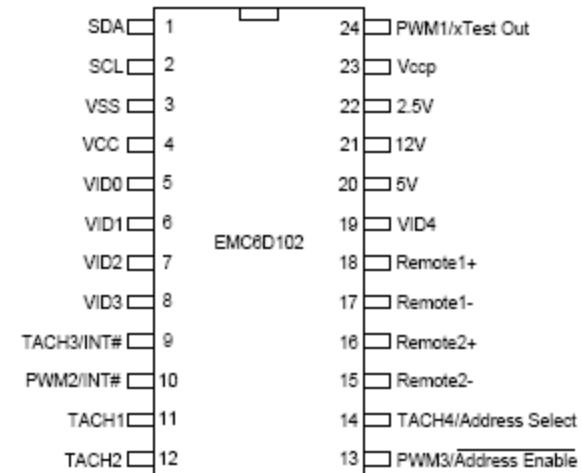
MICROCHIP

EMC6D102

Online
Datasheet

Features:

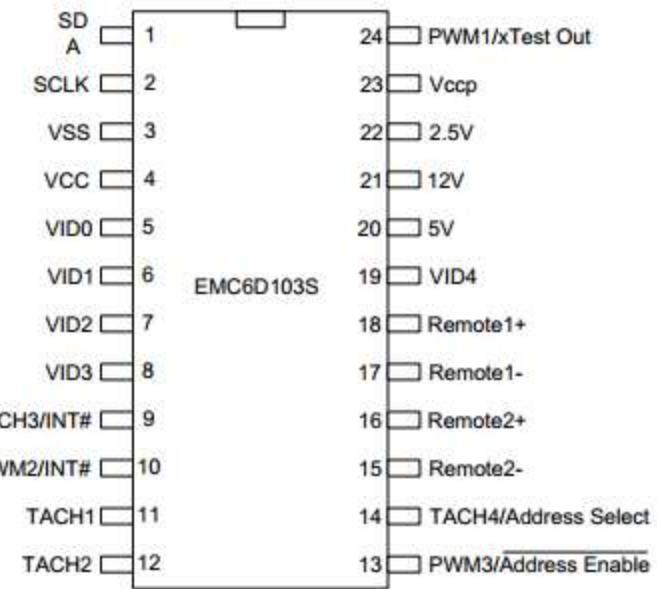
- 3.3V Operation
- Fan Control
 - Three PWM Outputs
 - Four Fan Tachometer Inputs
 - Fan ramp rate control for noise reduction
- Temperature Monitor
 - Monitoring two remote thermal diodes
 - Internal ambient temperature measurement
- Voltage Monitor
 - Monitor power supplies (2.5V, 5V, 12V, Vcc)
- Power saving modes
- 5 VID (Voltage Identification Inputs)
- XNOR Tree Test Mode
- SMBus 2.0 Interface
- 24-pin SSOP



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Features:

- 3.3V Operation
- Fan Control
 - Three PWM Outputs
 - Four Fan Tachometer Inputs
 - 4-wire fan compatible
 - Fan ramp rate control for noise reduction
- Temperature Monitor
 - Monitoring two remote thermal diodes
 - Internal ambient temperature measurement
- Voltage Monitor
 - Monitor power supplies (2.5V, 5V, 12V, Vcc)
- Power saving modes
- 5 VID (Voltage Identification Inputs)
- XOR Tree Test Mode
- SMBus 2.0 Interface
- 24-pin SSOP





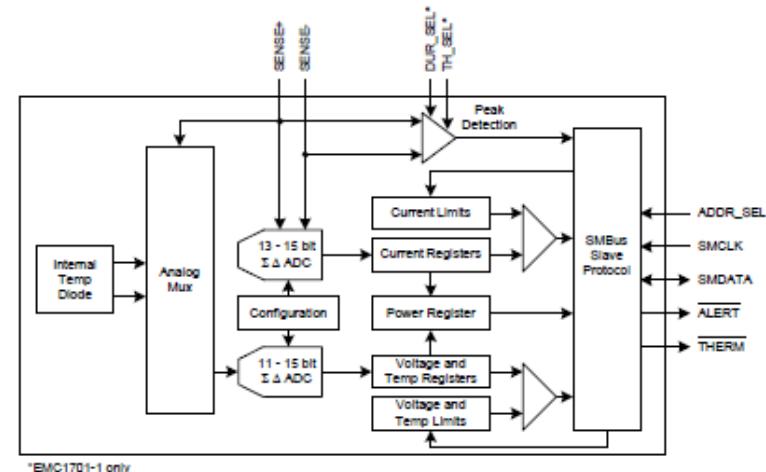
MICROCHIP

EMC1701

Online
Datasheet

Features:

- High-side current sensor
 - Bi-directional current measurement
 - Measures bus voltage
 - 1% current measurement accuracy
 - Integrated over 82ms to 2.6sec, 11-bit resolution
 - 3V to 24V voltage bus voltage range
- Calculates proportional power
- Independent hardware set instantaneous current peak detector (EMC1701-1 only)
 - Software controls to program time duration and magnitude threshold
- Power supply options
 - Bus or separately powered for low voltage operation
- Internal temperature monitor
 - $\pm 1^\circ\text{C}$ accuracy ($-5^\circ\text{C} < T_A < 85^\circ\text{C}$)
- ALERT# and THERM# outputs for temperature, voltage, and out-of-current limit reporting
- I₂C/SMBus 2.0 Interface
- Industrial temperature range: -40°C to +85°C
- 10-pin MSOP, 12-pin 4x4 QFN



*EMC1701-1 only

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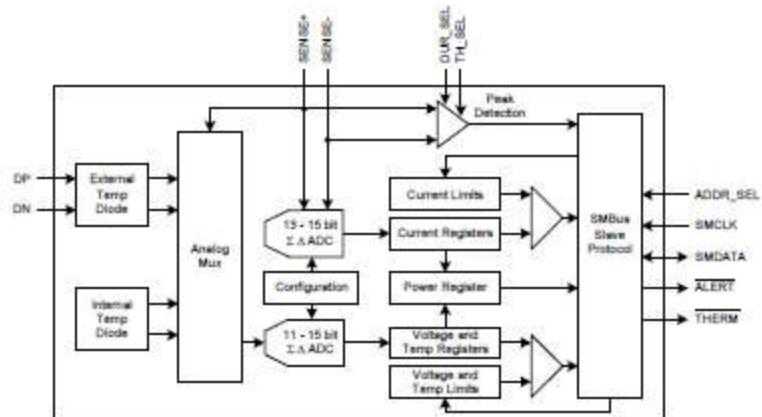
MICROCHIP

EMC1702

Online
Datasheet

Features:

- High-side current sensor
 - Bi-directional current measurement
 - Measures bus voltage
 - 1% current measurement accuracy
 - Integrated over 82ms to 2.6sec, 11-bit resolution
 - 3V to 24V voltage bus voltage range
- Calculates proportional power
- Independent hardware set instantaneous current peak detector
- Power supply options
 - Bus or separately powered for low voltage operation
- Internal temperature monitor
 - $\pm 1^\circ\text{C}$ accuracy ($-5^\circ\text{C} < T_A < 85^\circ\text{C}$)
- One external temperature monitor
 - 1°C accuracy ($20^\circ\text{C} < T_{\text{DIODE}} < 110^\circ\text{C}$) with 0.125°C resolution
- ALERT# and THERM# outputs for temperature, voltage, and out-of-current limit reporting
- I²C/SMBus 2.0 interface
- Industrial temperature range: -40°C to $+85^\circ\text{C}$
- 12-pin 4x4 QFN



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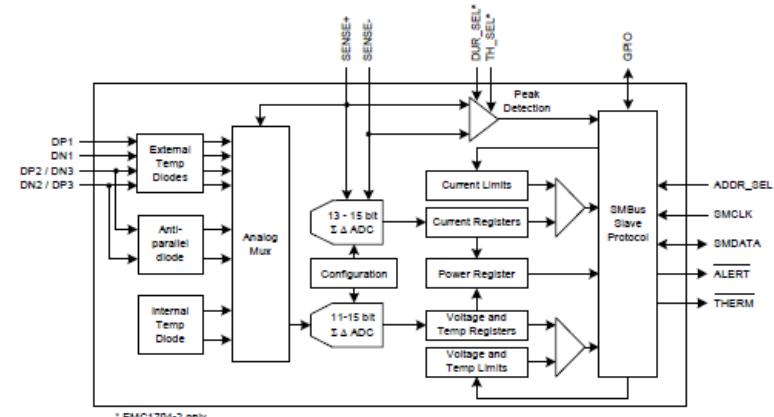
MICROCHIP

EMC1704

Online
Datasheet

Features:

- High-side current sensor
 - Bi-directional current measurement
 - Measures bus voltage
 - 1% current measurement accuracy
 - Integrated over 82ms to 2.6sec, 11-bit resolution
 - 3V to 24V voltage bus voltage range
- Calculates proportional power
- Independent hardware set instantaneous current peak detector
- Bus or separately powered for low voltage operation
- Internal temperature monitor
 - $\pm 1^\circ\text{C}$ accuracy ($-5^\circ\text{C} < T_A < 85^\circ\text{C}$)
- Up to 3 external temperature monitor
 - 1°C accuracy ($20^\circ\text{C} < T_{\text{DIODE}} < 110^\circ\text{C}$) with 0.125°C resolution
- ALERT# and THERM# outputs for temperature, voltage, and out-of-current limit reporting
- General purpose I/O
- I₂C/SMBus 2.0 interface
- Industrial temperature range: -40°C to $+85^\circ\text{C}$
- 14-pin SOIC, 16-pin 4x4 QFN



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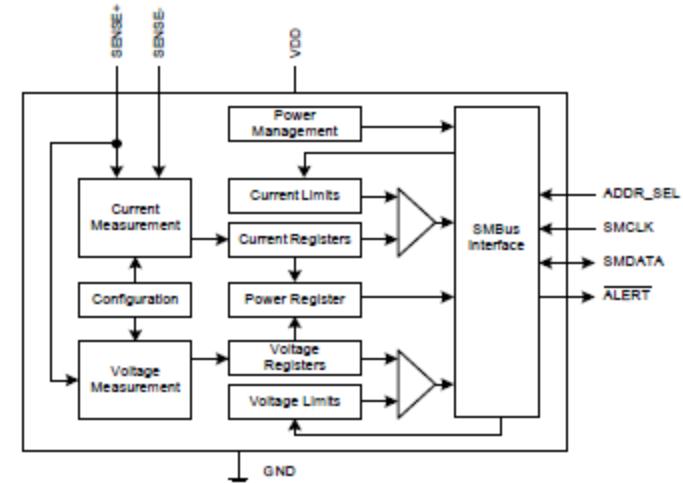
MICROCHIP

PAC1710

Online
Datasheet

Features:

- High-side current sensor
 - Current measurement is integrated over 2.5ms to 2.6sec with up to 11-bit resolution
 - 1% current measurement accuracy in positive range
 - Measures V_{SOURCE} voltage
- Calculates proportional power
- V_{SOURCE} voltage range 0V to 40V
 - Bi-directional current sensing
- Auto-zero input offset voltage
- Digital averaging
- 5 μ A typical Standby current
- Programmable sense voltage range
 - $\pm 10mV$, $\pm 20mV$, $\pm 40mV$, and $\pm 80mV$
- Industrial temperature range: -40°C to +85°C
- ALERT# output for voltage and current out of limit transients
- SMBus 2.0 communications interface
- Sample time configurable from 2.5ms-320ms
 - With averaging effective sampling times up to 2.6sec
- Power supply range 3.0V to 5.5V
- 10-pin 3x3 DFN



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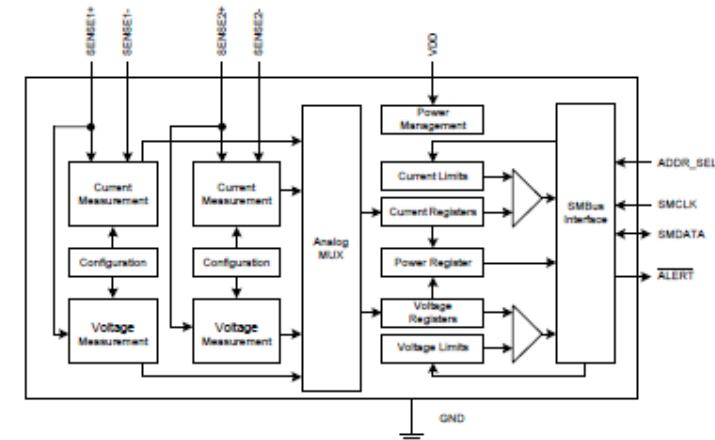
MICROCHIP

PAC1720

Online
Datasheet

Features:

- Dual High-side current sensor
 - Current measurement is integrated over 2.5ms to 2.6sec with up to 11-bit resolution
 - 1% current measurement accuracy in positive range
 - Measures V_{SOURCE} voltage
- Calculates proportional power
- V_{SOURCE} voltage range 0V to 40V
 - Bi-directional current sensing
- Auto-zero input offset voltage
- Digital averaging
- 5 μ A typical Standby current
- Programmable sense voltage range
 - $\pm 10mV$, $\pm 20mV$, $\pm 40mV$, and $\pm 80mV$
- Industrial temperature range: -40°C to +85°C
- ALERT# output for voltage and current out of limit transients
- SMBus 2.0 communications interface
- Sample time configurable from 2.5ms-320ms
 - With averaging effective sampling times up to 2.6sec
- Power supply range 3.0V to 5.5V
- 10-pin 3x3 DFN



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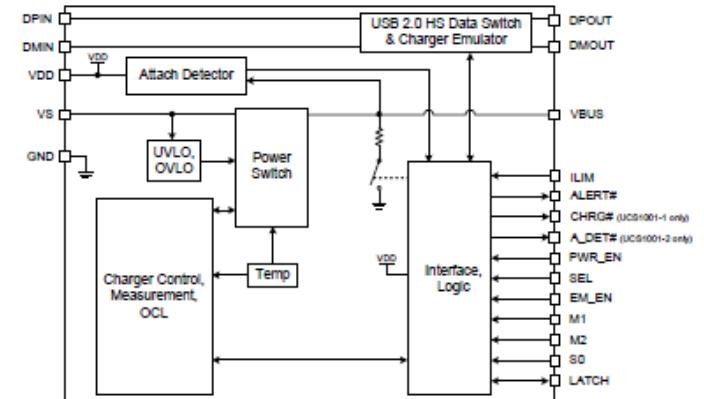
MICROCHIP

UCS1001

Online
Datasheet

Features:

- Port power switch with two current limit behaviors
 - 2.9 V to 5.5 V source voltage range
 - Up to 2.5 A current with 55 mΩ On Resistance
 - Over-current trip or constant current limiting
 - Soft turn-on circuitry
 - Selectable current limit
 - Dynamic thermal management
 - Under- and over-voltage lockout
 - Back-drive, back-voltage protection
 - Latch or auto-recovery (low test current) fault handling
 - Selectable active high or low power switch enable
 - BC1.2 VBUS discharge port renegotiation function
- Selectable/automatic cycling of USB data line charger emulation profiles
 - USB-IF BC1.2 charging downstream port (CDP) and dedicated charging port (DCP) modes, YD/T-1591, and most Apple® and RIM® protocols standard
 - USB 2.0 compliant high-speed data switch (in Passthrough and CDP modes)
 - Nine preloaded charger emulation profiles for maximum compatibility coverage of peripheral devices
- Charging Active (UCS1001-1) or Attach Detection (UCS1001-2) open-drain output
- Fault Alert open-drain output
- Ultra low power Sleep state
- Optional split supply support for VBUS and VDD for low power in system standby states
- Wake on Attach USB (UCS1001-2)
- Industrial temperature range: -40°C to +85°C
- IEC61000-4-2 8 / 15 kV ESD immunity
- UL recognized and EN/IEC 60950-1 (CB) certified



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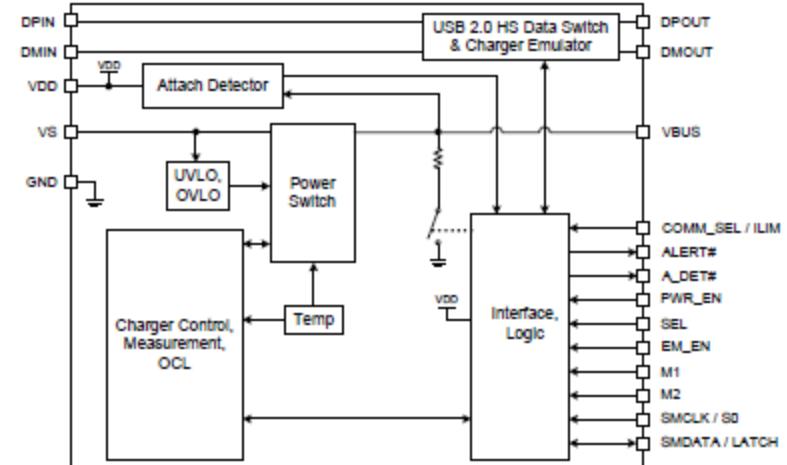
MICROCHIP

UCS1002

Online
Datasheet

Features:

- Port power switch with two current limit behaviors
 - 2.9 V to 5.5 V source voltage range
 - Up to 2.5 A current with 55 mΩ On Resistance
 - Over-current trip or constant current limiting
 - Soft turn-on circuitry
 - Programmable current limit
 - Dynamic thermal management
 - Under- and over-voltage lockout
 - Back-drive, back-voltage protection
 - Latch or auto-recovery (low test current) fault handling
 - BC1.2 VBUS discharge port renegotiation function
- Selectable/automatic cycling of USB data line charger emulation profiles
 - USB-IF BC1.2 charging downstream port (CDP) and dedicated charging port (DCP) modes, YD/T-1591, and most Apple® and RIM® protocols standard; others as defined via the SMBus 2.0/I²C®
 - USB 2.0 compliant high-speed data switch (in Passthrough and CDP modes)
 - Nine preloaded charger emulation profiles for maximum compatibility
 - One custom programmable charger profile for portable device support
- Self-contained current monitoring and charge rationing for power allocation applications
- Automatic shutdown when Battery Full option and low power Sleep state
- Low power Attach Detection and open-drain A_DET# pin
- Optional split supply support for VBUS and VDD for low power in system standby states
- Wake on Attach USB
- SMBus 2.0/I²C communications
- Wide operating temperature range: -40°C to +85°C
- IEC61000-4-2 8 / 15 kV ESD immunity
- UL recognized and EN/IEC 60950-1 (CB) certified



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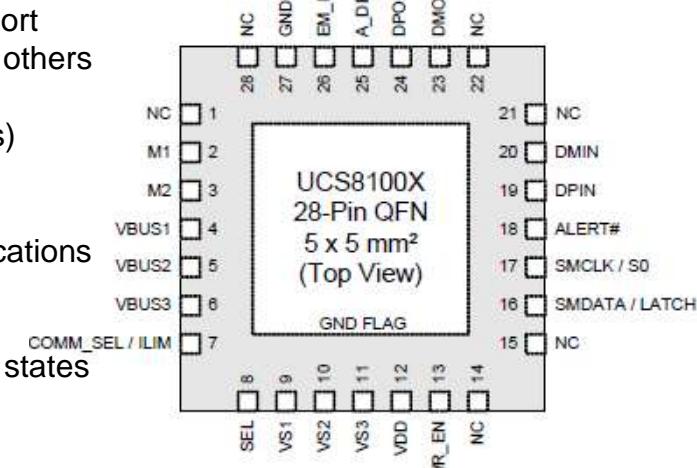
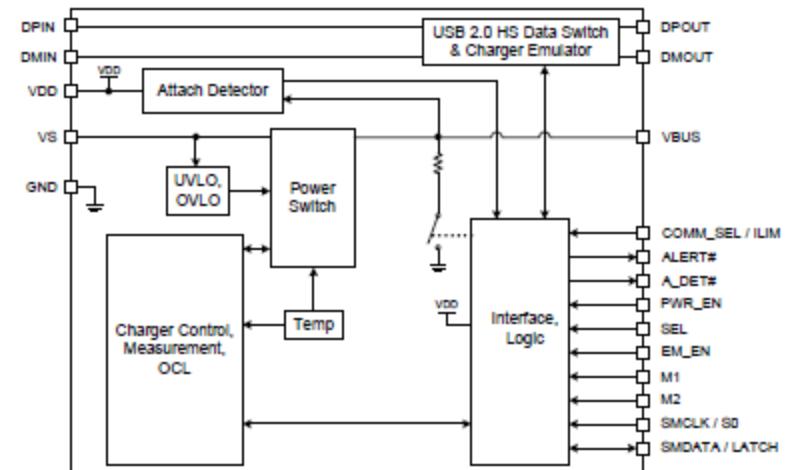
MICROCHIP

UCS81001/2

Online
Datasheet

Features:

- Port power switch with two current limit behaviors
 - 2.9 V to 5.5 V source voltage range
 - Up to 2.5 A current with 55 mΩ On Resistance
 - Over-current trip or constant current limiting
 - Soft turn-on circuitry
 - Programmable current limit
 - Dynamic thermal management
 - Under- and over-voltage lockout
 - Back-drive, back-voltage protection
 - Latch or auto-recovery (low test current) fault handling
 - BC1.2 VBUS discharge port renegotiation function
- Selectable/automatic cycling of USB data line charger emulation profiles
 - USB-IF BC1.2 charging downstream port (CDP) and dedicated charging port (DCP) modes, YD/T-1591, and most Apple® and RIM® protocols standard; others as defined via the SMBus 2.0/I²C®
 - USB 2.0 compliant high-speed data switch (in Passthru, SDP, CDP modes)
 - Nine preloaded charger emulation profiles for maximum compatibility
 - One custom programmable charger profile for portable device support
- Self-contained current monitoring and charge rationing for power allocation applications
- Automatic shutdown when Battery Full option and low power Sleep state
- Low power Attach Detection and open-drain A_DET# pin
- Optional split supply support for VBUS and VDD for low power in system standby states
- Wake on Attach USB
- UCS81002 issues an Alert on Reset
- SMBus 2.0/I²C communications
- Wide operating temperature range: -40°C to +85°C
- IEC61000-4-2 8 / 15 kV ESD immunity



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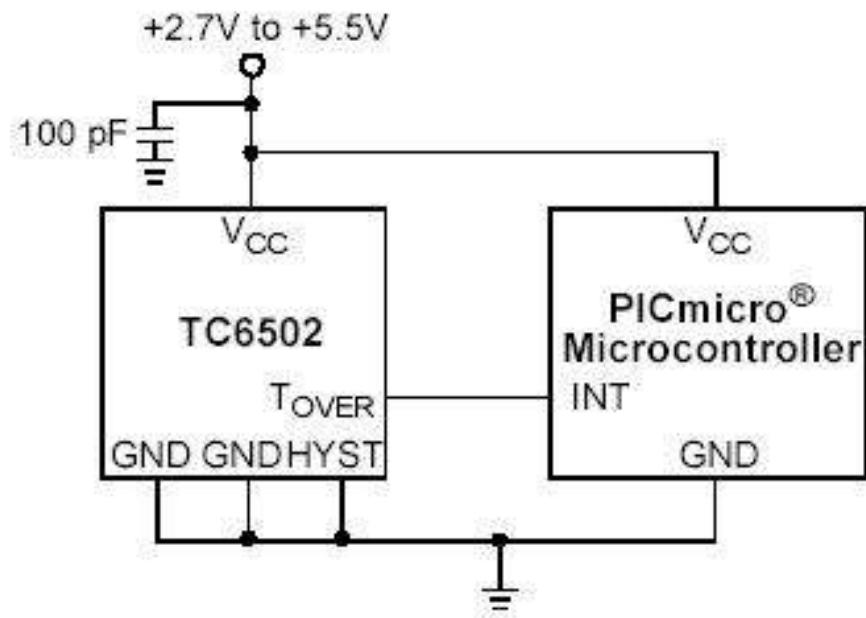
MICROCHIP

TC6501/2/3/4

Online
Datasheet

Features:

- 5-Pin SOT-23A
- Factory-programmed Thresholds from 45°C to +125°C in 10°C Increments
- Pin Selectable +2°C or +10°C Hysteresis
- $\pm 0.5^\circ\text{C}$ (typ.) Threshold Accuracy Over Full Temperature Range
- No External Components Required
- 17 μA Supply Current (typ.)



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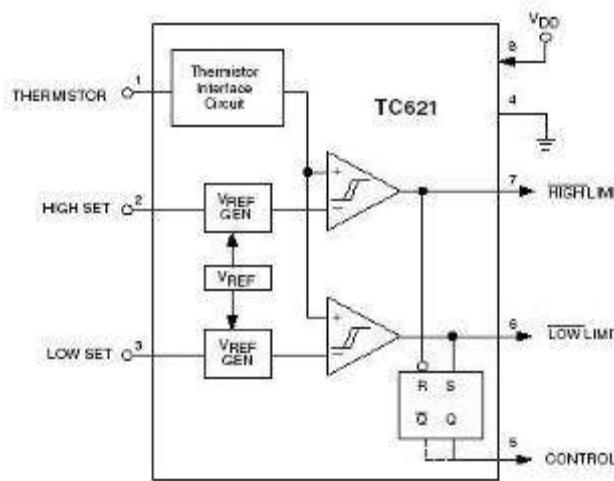
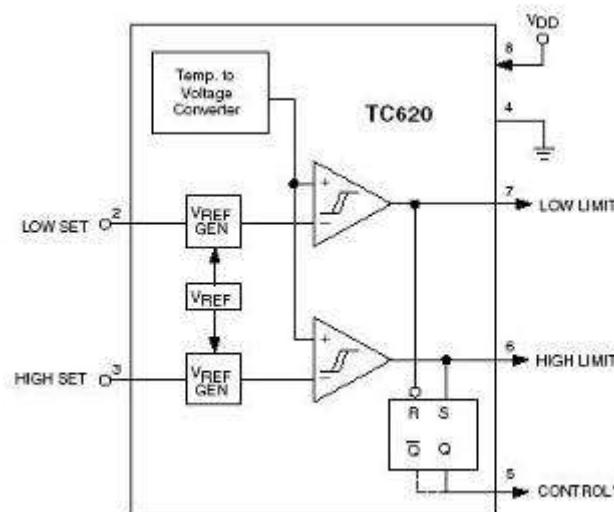
MICROCHIP

TC620/1

Online
Datasheet

Features:

- User Programmable Hysteresis and Temperature Set Point
- Easily Programs with 2 External Resistors
- Wide Temperature Detection Range:
 - 0°C to 70°C: (TC620/TC621CCX)
 - 40°C to +125°C: (TC620/TC621CVX)
 - 40°C to +85°C: (TC620/TC621CEX)
 - 55°C to +125°C: (TC620/TC621CMX)
- Onboard Temperature Sensing Applications (TC620X)
- External NTC Thermistor for Remote Sensing Applications (TC621X)
- Available in 8-Pin PDIP and SOIC Packages



[TC622/4 >>](#)

[TC623 >>](#)

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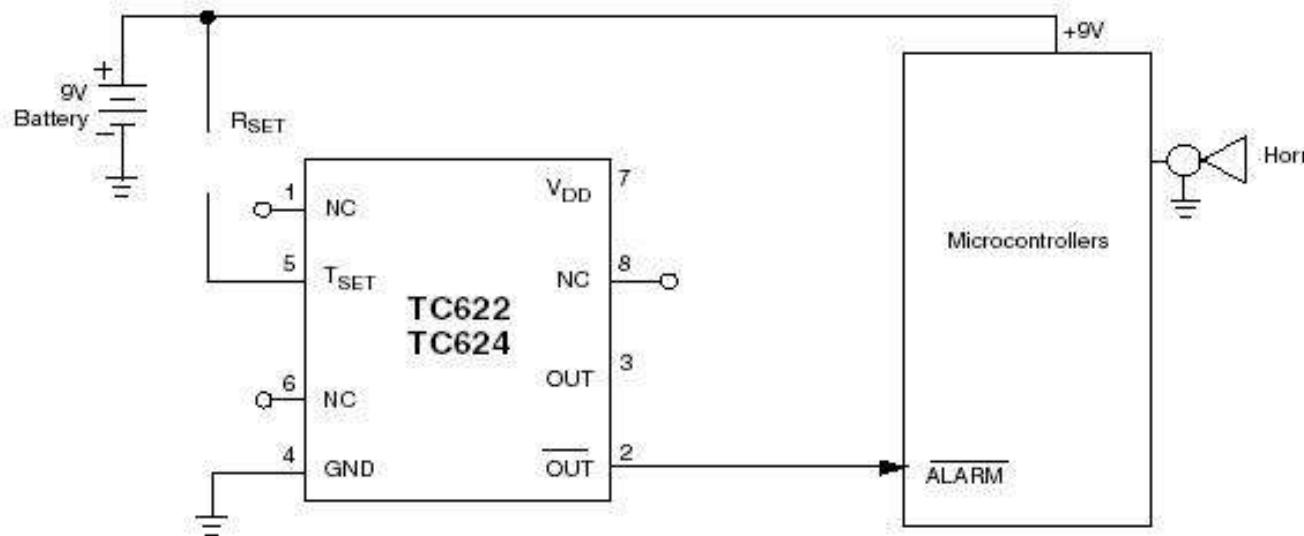
MICROCHIP

TC622/4

Online
Datasheet

Features:

- Temperature Set Point Easily Programs with a Single External Resistor
- Operates with 2.7V Power Supply (TC624)
- TO-220 Package for Direct Mounting to Heatsink (TC622XAT) or Standard 8-Pin PDIP and SOIC



[TC620/1 >>](#)

[TC623 >>](#)

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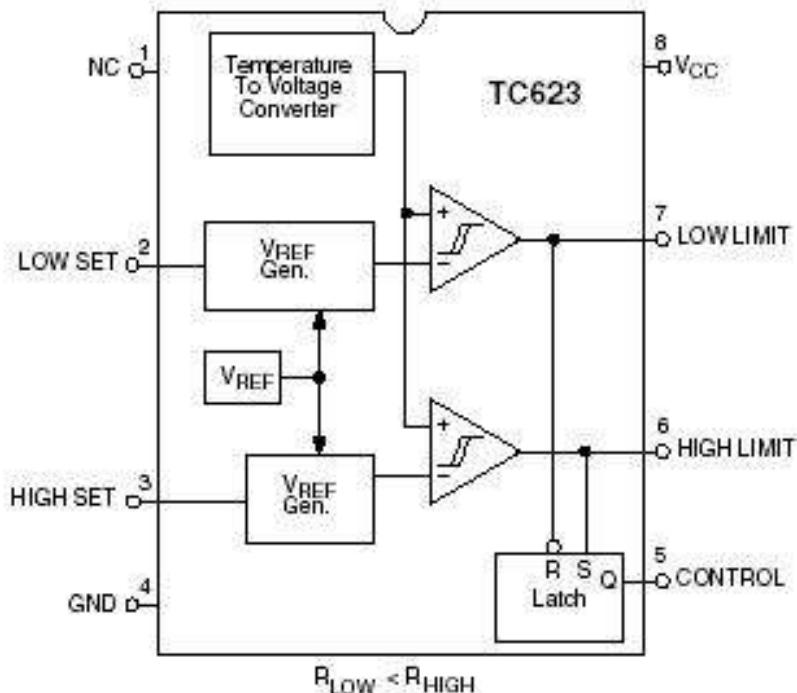
MICROCHIP

TC623

Online
Datasheet

Features:

- Integrated Temp Sensor and Detector
Operate from a Supply Voltage as Low as 2.7V
- Replaces Mechanical Thermostats and Switches
- On-Chip Temperature Sense
- 8-Pin DIP or SOIC for Direct PCB Mounting
- 2 User Programmable Temperature Set Points
- 2 Independent Temperature Limit Outputs
- Heat/Cool Regulate Output



[TC620/1 >>](#)

[TC622/4 >>](#)

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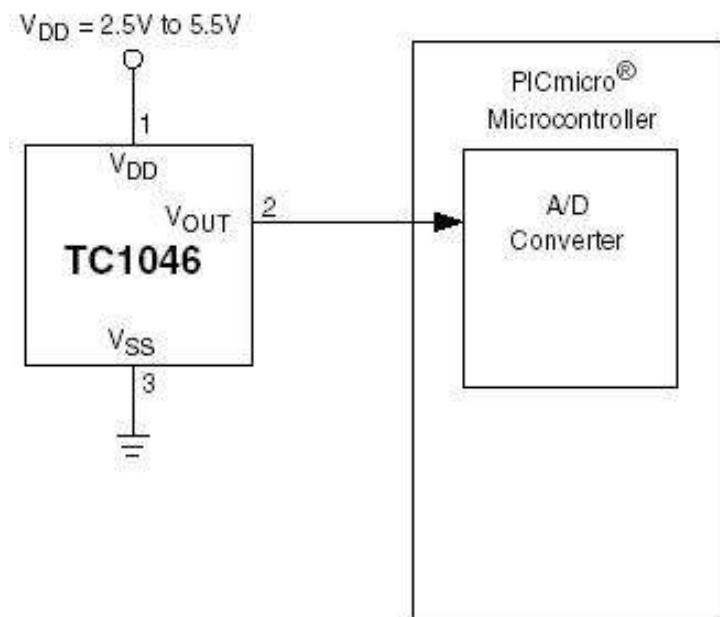
MICROCHIP

TC1046

Online
Datasheet

Features:

- Supply Voltage Range: 2.7V to 4.4V
- Wide Temperature Measurement Range: -40°C to +125°C
- High Temperature Converter Accuracy: ±2°C (max.) at 25°C
- Linear Temperature Slope: 6.25mV/°C
- Very Low Supply Current: 35µA Typical
- Small 3-Pin SOT-23B Package



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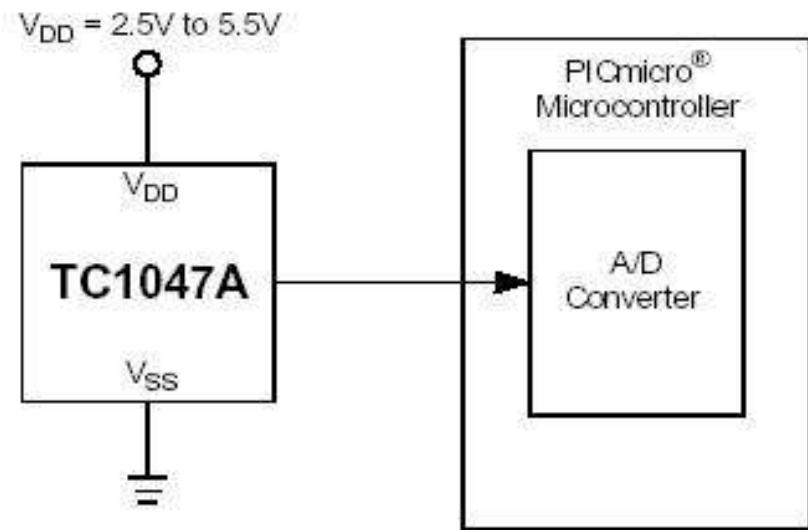
MICROCHIP

Online
Datasheet

TC1047/47A Recommend MCP9700/1/A

Features:

- Supply Voltage Range:
TC1047: 2.7V to 4.4V
TC1047A: 2.5V to 5.5V
- Wide Temperature Measurement Range:
-40°C to +125°C
- High Temperature Converter Accuracy:
±2°C (max.) at 25°C
- Linear Temperature Slope: 10 mV/°C (typ.)
- Available in 3-Pin SOT-23B Package
- Very Low Supply Current: 35µA (typ.)
- **Pin Compatible to the MCP9700/1/A**



[MCP9700/1/A >>](#)

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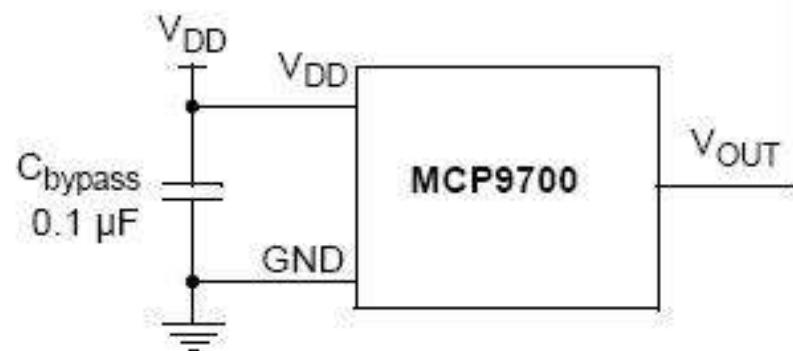
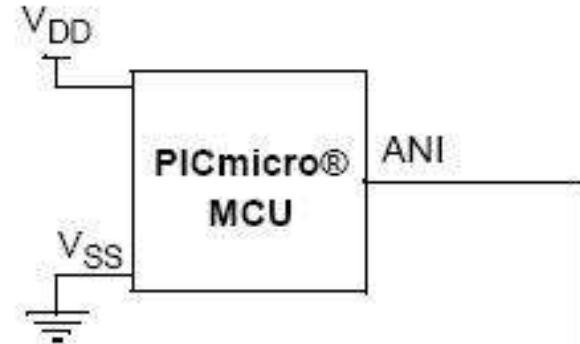
MICROCHIP

MCP9700/1/A

Online
Datasheet

Features:

- Tiny Analog Temperature Sensor
- Available Packages: SC-70-5, SOT-23-5, TO-92-3
- Wide Temperature Measurement Range:
-40°C to +125°C
- Accuracy:
 $\pm 2^\circ\text{C}$ (max.), 0°C to +70°C (**MCP9700A/9701A**)
 $\pm 4^\circ\text{C}$ (max.), 0°C to +70°C (**MCP9700/9701**)
- Optimized for Analog-to-Digital Converters (ADCs):
10.0 mV/°C (typ.) **MCP9700/9700A**
19.5 mV/°C (typ.) **MCP9701/9701A**
- Wide Operating Voltage Range:
VDD = 2.3V to 5.5V **MCP9700/9700A**
VDD = 3.1V to 5.5V **MCP9701/9701A**
- Low Operating Current: 6 μA (typ.)
- Optimized to Drive Large Capacitive Loads



[TC1047/47A >>](#)

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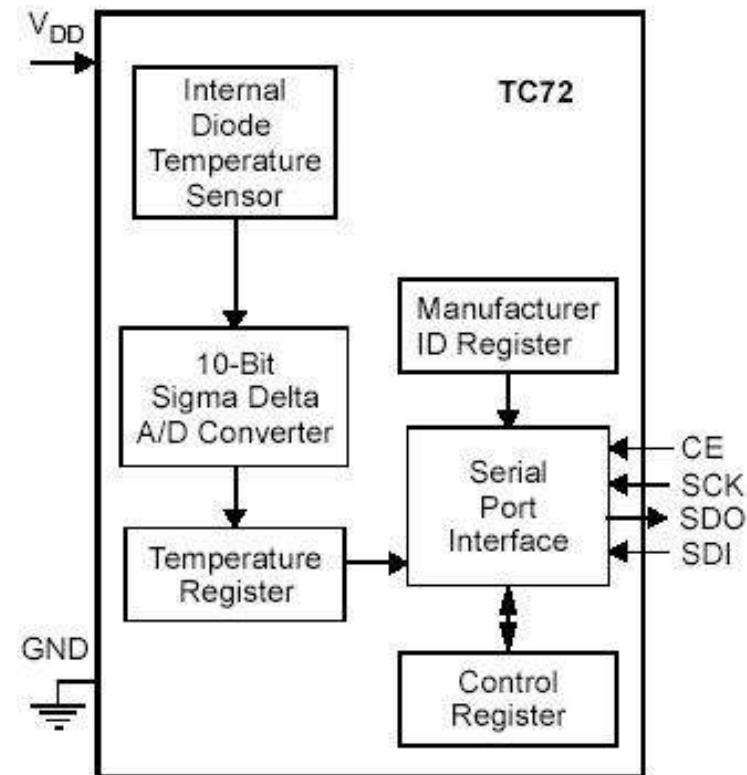
MICROCHIP

TC72

Online
Datasheet

Features:

- Temperature-to-Digital Converter
- SPI™ Compatible Interface
- 10-Bit Resolution (0.25°C/Bit)
- $\pm 2^\circ\text{C}$ (max.) Accuracy from -40°C to $+85^\circ\text{C}$
- $\pm 3^\circ\text{C}$ (max.) Accuracy from -55°C to $+125^\circ\text{C}$
- 2.65V to 5.5V Operating Range
- Low Power Consumption:
 - 250 μA (typ.) Continuous Temperature Conversion Mode
 - 1 μA (max.) Shutdown Mode
- Power Saving One-Shot Temperature Measurement
- Industry Standard 8-Pin MSOP Package
- Space Saving 8-Pin DFN (3x3 mm) Package



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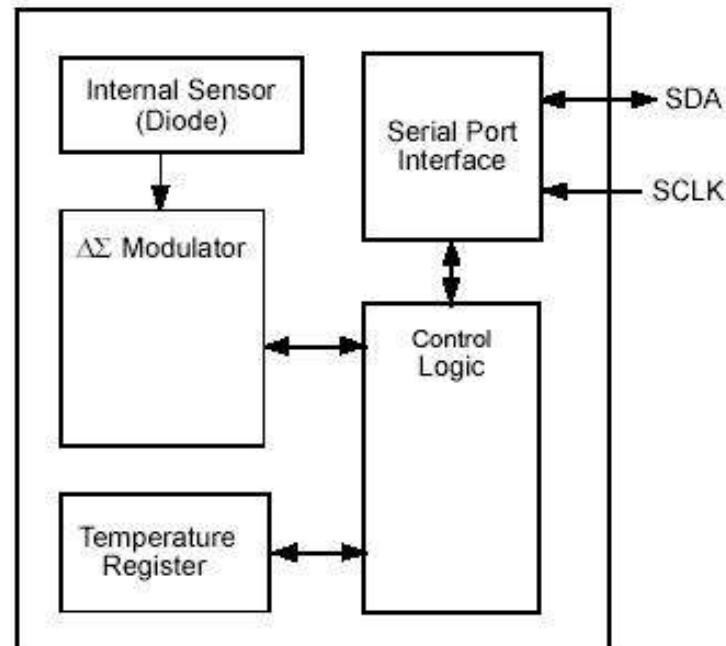
MICROCHIP

TC74

Online
Datasheet

Features:

- Digital Temperature Sensing in SOT-23-5 or TO-220 Packages
- Outputs Temperature as an 8-Bit Digital Word
- Simple SMBus/I²C™ Serial Port Interface
- Solid-State Temperature Sensing:
 - ±2°C (max.) Accuracy from +25°C to +85°C
 - ±3°C (max.) Accuracy from 0°C to +125°C
- 2.65V to 5.5V Operating Range
- Supply voltage of 2.7V to 5.5V
- Low Power Consumption:
 - 250µA (typ.) Operating Current
 - 1µA (max.) Standby Mode Current



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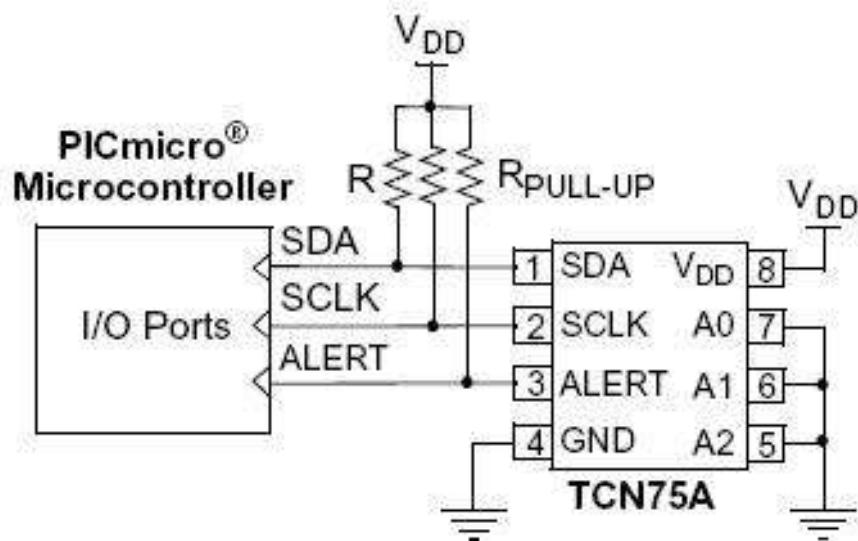
MICROCHIP

TCN75A

Online
Datasheet

Features:

- Temperature-to-Digital Converter
- Accuracy:
 - ±1°C (typ.) from -40°C to +125°C
 - ±2°C (max.) from -40°C to +125°C
- User-selectable Resolution:
 - 0.5°C to 0.0625°C
- Operating Voltage Range: 2.7V to 5.5V
- 2-wire Interface: I²C™ Compatible
- Operating Current: 200µA (typ.)
- Shutdown Current: 2µA (max.)
- Power-saving One-shot Temperature Measurement
- Available Packages: MSOP-8, SOIC-8



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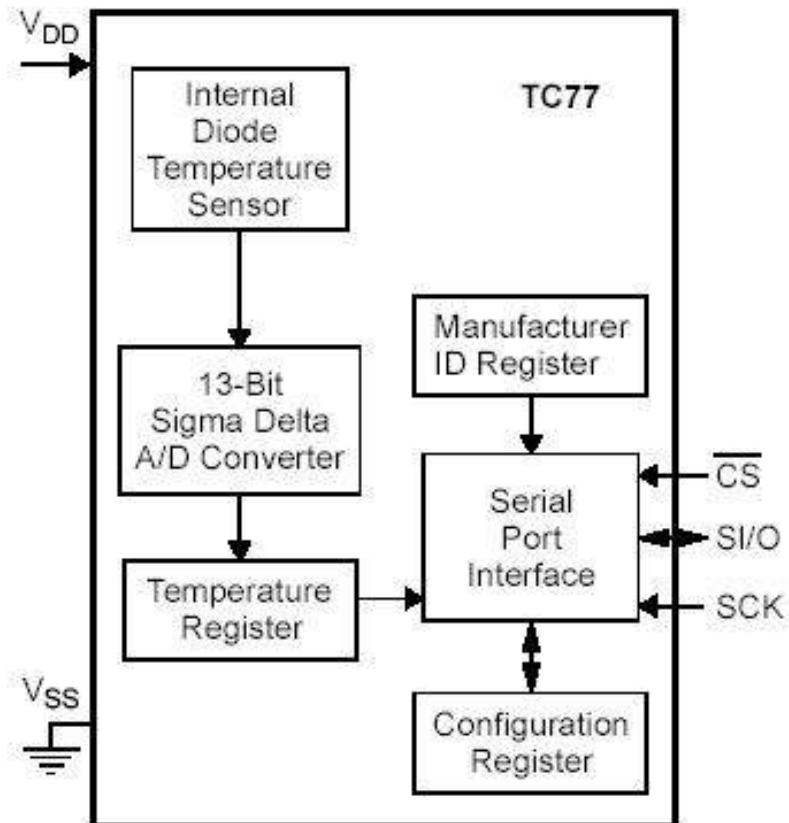
MICROCHIP

TC77

Online
Datasheet

Features:

- Digital Temperature Sensing in 5-Pin SOT-23A and 8-Pin SOIC Packages
- Outputs Temperature as a 13-Bit Digital Word
- SPI and MICROWIRE™ Compatible Interface
- Solid State temperature Sensing
 - ±1°C (max.) accuracy from +25°C to +65°C
 - ±2°C (max.) accuracy from -40°C to +85°C
 - ±3°C (max.) accuracy from -55°C to +125°C
- 2.7V to 5.5V Operating Voltage Range
- Lower Power
 - 250µA (typ.) Continuous Conversion Mode
 - 0.1µA (typ.) Shutdown Mode



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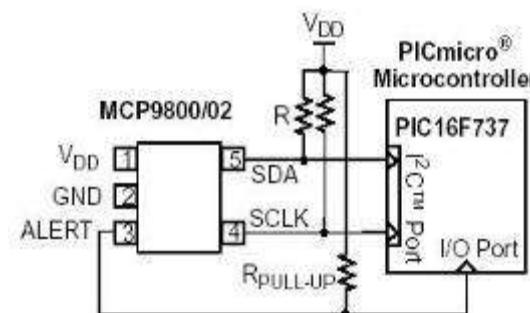
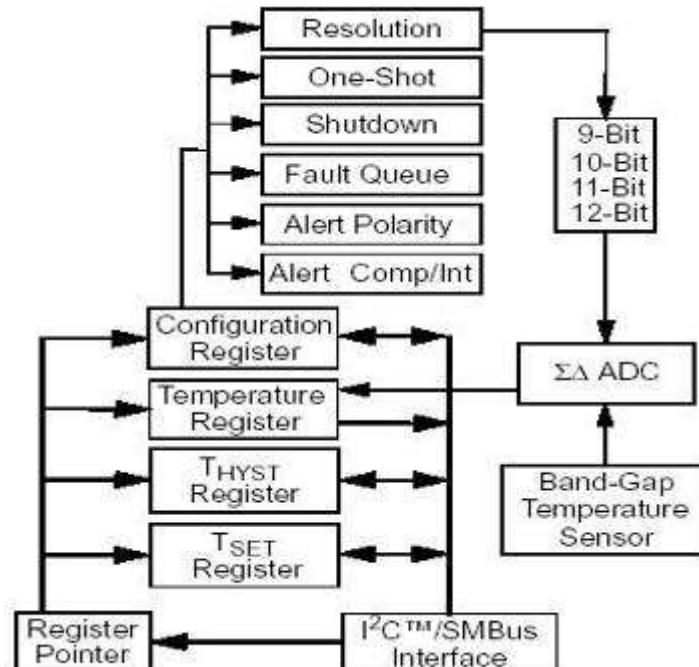
MICROCHIP

MCP9800/1/2/3

Online
Datasheet

Features:

- Temperature-to-Digital Converter
- Accuracy with 12-bit Resolution
 - ±1°C (max.) accuracy from -10°C to +85°C
 - ±2°C (max.) accuracy from -10°C to +125°C
 - ±3°C (max.) accuracy from -55°C to +125°C
- User-selectable Resolution: 9 - 12 bit
- 2.7V to 5.5V Operating Voltage Range
- 2-wire Interface: I²C™/SMBus Compatible
- Lower Power
 - 200µA (typ.) Operating Current
 - 1µA (max.) Shutdown Mode
- Power-saving One-shot Temperature Measurement
- Available Packages: SOT-23-5, MSOP-8, SOIC-8



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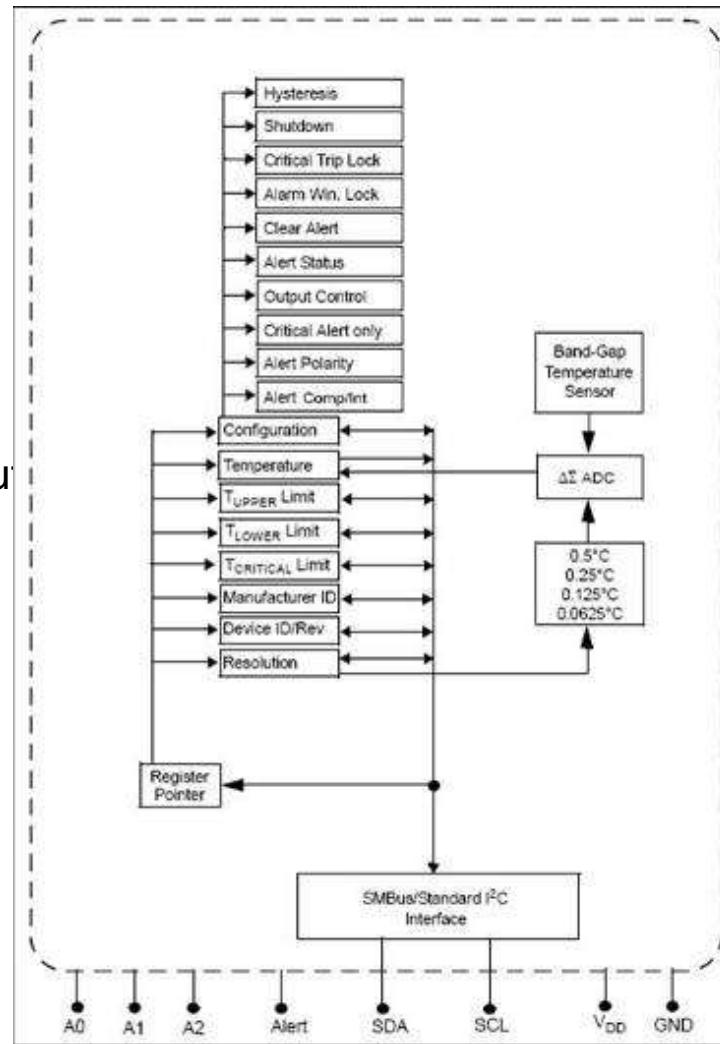
MICROCHIP

MCP9804

Online
Datasheet

Features:

- Accuracy:
 - $\pm 0.25^\circ\text{C}$ (typical) from -40°C to $+125^\circ\text{C}$
 - $\pm 1^\circ\text{C}$ (maximum) from -40°C to $+125^\circ\text{C}$
- User Selectable Measurement Resolution:
 0.5°C , 0.25°C , 0.125°C , 0.0625°C
- User Programmable Temperature Limits:
 - Temperature Window Limit
 - Critical Temperature Limit
- User Programmable Temperature Alert Output
- Operating Voltage Range: 2.7V to 5.5V
- Operating Current: 200 μA (typical)
- Shutdown Current: 0.1 μA (typical)
- 2-wire Interface: I²C/SMBus Compatible
- Available Packages: 2x3 DFN-8, MSOP-8



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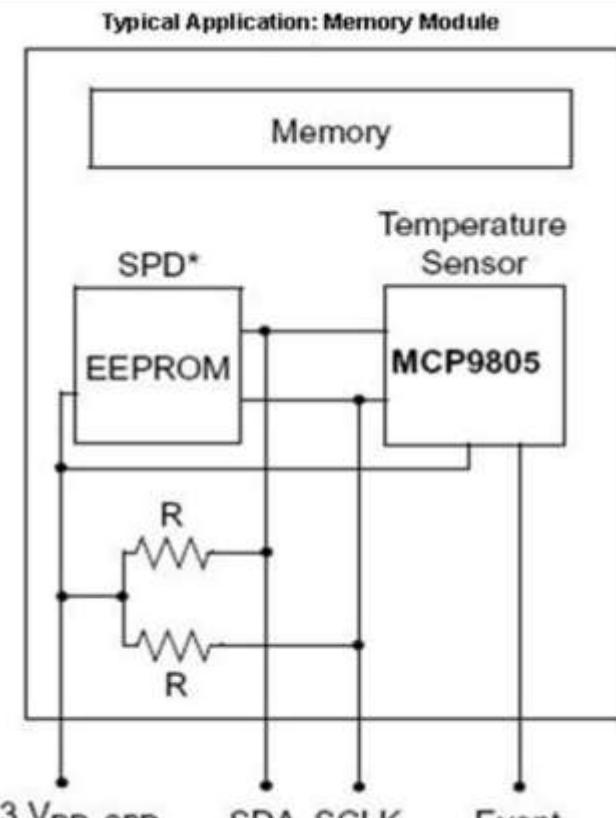
MICROCHIP

MCP9805

Online
Datasheet

Features:

- Meets JEDEC Standard JC42.4
- Temperature-to-Digital Converter
- Accuracy with 0.25°C/LSB Resolution:
 - ±1°C (max.) accuracy from +75°C to +95°C
 - ±2°C (max.) accuracy from +40°C to +125°C
 - ±3°C (max.) accuracy from -20°C to +125°C
- Programmable Temperature Monitor Boundary
- Critical Temperature Output
- Operating Voltage Range: 3.0V to 3.6V
- 2-wire Interface: I²C™/SMBus Compatible
- Lower Power
 - 200µA (typ.) Operating Current
 - 0.1µA (typ.) Shutdown Current
- Available Packages: 2x3 DFN-8, TSSOP-8



* Serial Presence Detect

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MICROCHIP

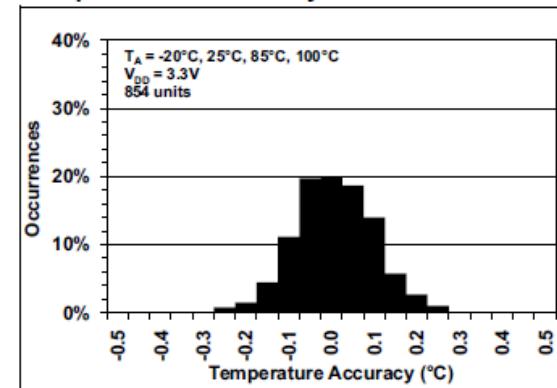
MCP9808

Online
Datasheet

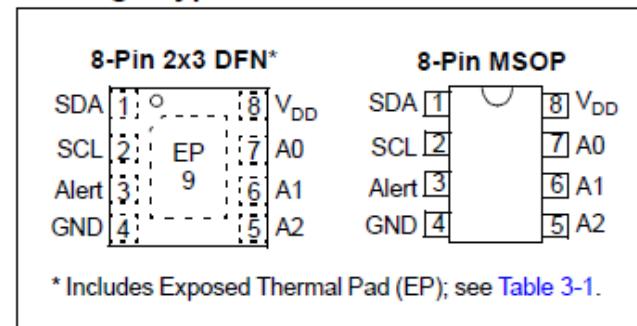
Features:

- Accuracy:
 - ± 0.25 (typical) from -40°C to $+125^{\circ}\text{C}$
 - $\pm 0.5^{\circ}\text{C}$ (maximum) from -20°C to 100°C
 - $\pm 1^{\circ}\text{C}$ (maximum) from -40°C to $+125^{\circ}\text{C}$
- User-Selectable Measurement Resolution:
 - $+0.5^{\circ}\text{C}$, $+0.25^{\circ}\text{C}$, $+0.125^{\circ}\text{C}$, $+0.0625^{\circ}\text{C}$
- User-Programmable Temperature Limits:
 - Temperature Window Limit
 - Critical Temperature Limit
- User-Programmable Temperature Alert Output
- Operating Voltage Range: 2.7V to 5.5V
- Operating Current: 200 μA (typical)
- Shutdown Current: 0.1 μA (typical)
- 2-wire Interface: I²C™/SMBus Compatible
- Available Packages: 2x3 DFN-8, MSOP-8

Temperature Accuracy



Package Types



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MICROCHIP

MCP9843/98243

Online
Datasheet

Features:

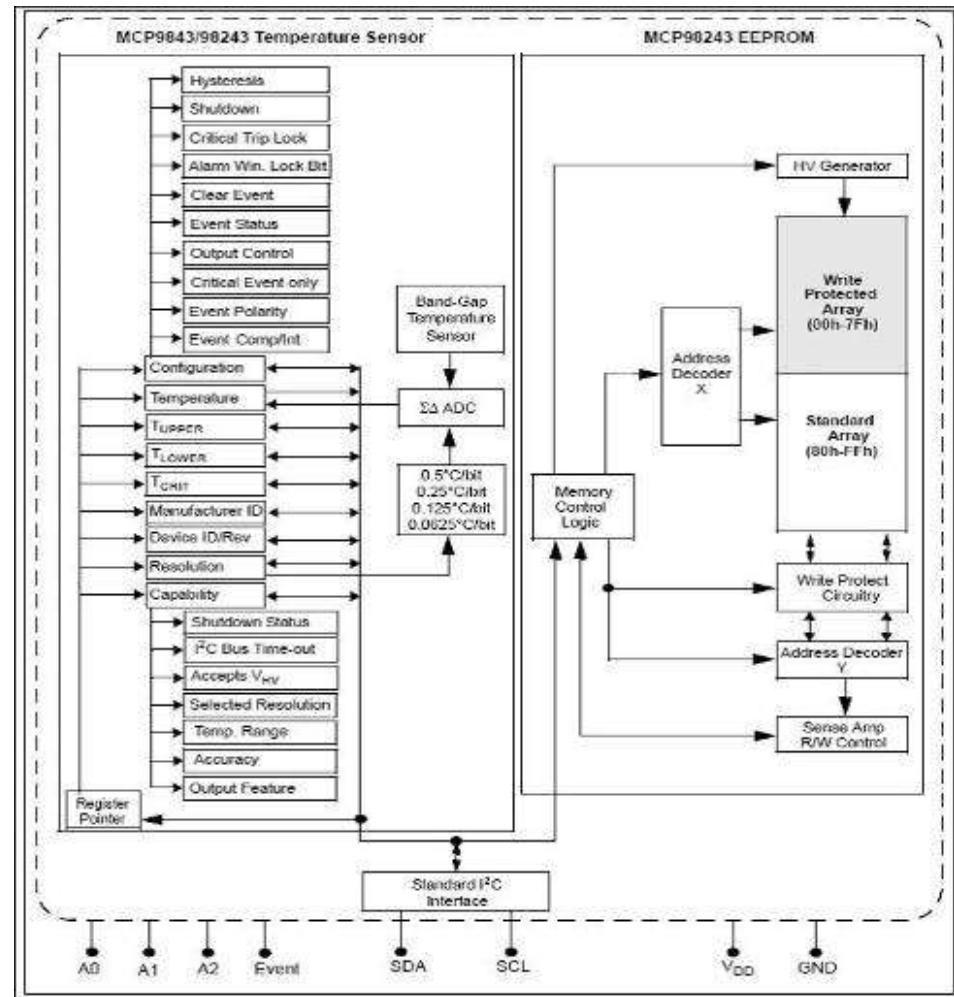
- Meets JEDEC Specification
 - MCP9843 - JC42.4-TSE3000B3
- Temperature Sensor
 - MCP98243 --> JC42.4-TSE2002B3
 - Temperature Sensor with 2 Kbit Serial EEPROM for Serial Presence Detect (SPD)
- I²C/SMBus Interface
- Packages: DFN-8, TDFN-8, UDFN-8, TSSOP-8

Temperature Sensor Features

- Sensor Accuracy (Grade B):
 - $\pm 0.2^\circ\text{C}/\pm 1^\circ\text{C}$ (typ./max.) $\rightarrow +75^\circ\text{C}$ to $+95^\circ\text{C}$
 - $\pm 0.5^\circ\text{C}/\pm 2^\circ\text{C}$ (typ./max.) $\rightarrow +40^\circ\text{C}$ to $+125^\circ\text{C}$
 - $\pm 1^\circ\text{C}/\pm 3^\circ\text{C}$ (typ./max.) $\rightarrow -20^\circ\text{C}$ to $+125^\circ\text{C}$
- Operating Current: 200 μA (typical)
- V_{DD} : 2.7V to 5.5V

Serial EEPROM Features (MCP98243)

- V_{DD} : 1.8V to 5.5V
- Operating Current:
 - Write : 1.1 mA (typical) for 3.5 ms (typical)
 - Read : 100 μA (typical)
- Permanent and Reversible Software Write Protect



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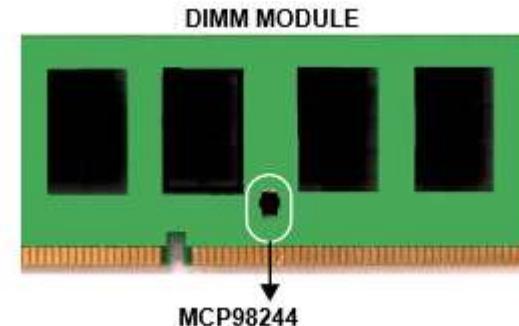
MICROCHIP

MCP98244

Online
Datasheet

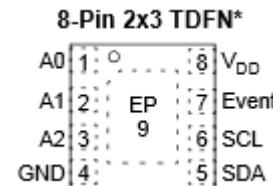
Features:

- Meets JEDEC Specification:
 - JC42.4-TSE2004B1 Temperature Sensor with 4 Kbit Serial EEPROM for Serial Presence Detect (SPD)
- 1MHz, 2-wire I₂C Interface
- V_{DD}: 1.7V to 3.6V
- Operating Current: 100 μ A (typ., EEPROM Idle)
- Package: TDFN-8



Temperature Sensor Features

- Sensor Accuracy (Grade B):
 - $\pm 0.2^{\circ}\text{C}/\pm 1^{\circ}\text{C}$ (typ./max.) between $+75^{\circ}\text{C}$ to $+95^{\circ}\text{C}$
 - $\pm 0.5^{\circ}\text{C}/\pm 2^{\circ}\text{C}$ (typ./max.) between $+40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
 - $\pm 1^{\circ}\text{C}/\pm 3^{\circ}\text{C}$ (typ./max.) between -40°C to $+125^{\circ}\text{C}$



Serial EEPROM Features

- Operating Current:
 - Write: 250 μ A (typical) for 3 ms (typical)
 - Read :100 μ A (typical)
- Reversible Software Write Protect
- Software Write Protection for each 1 Kbit Block
- Organized as two banks of 256 x 8-bit (2 Kbit x 2)

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MICROCHIP

MCP9844

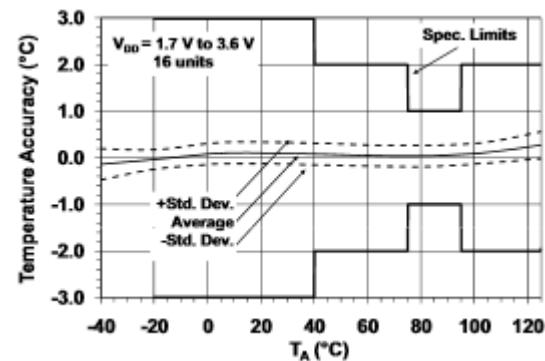
Online
Datasheet

Features:

- User Selectable Measurement Resolution:
 - $+0.5^{\circ}\text{C}$, $+0.25^{\circ}\text{C}$, $+0.125^{\circ}\text{C}$, $+0.0625^{\circ}\text{C}$
- User Programmable Temperature Limits:
 - Temperature Window Limit
 - Critical Temperature Limit
- User Programmable Temperature Alert Output
- I_C Interface
- V_{DD}: 1.7V to 3.6V
- Operating Current: 100 μA (typ.)
- Package: 8-lead TDFN

Temperature Sensor Features

- Sensor Accuracy (Grade B):
 - $\pm 0.2^{\circ}\text{C}/\pm 1^{\circ}\text{C}$ (typ./max.) between $+75^{\circ}\text{C}$ to $+95^{\circ}\text{C}$
 - $\pm 0.5^{\circ}\text{C}/\pm 2^{\circ}\text{C}$ (typ./max.) between $+40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
 - $\pm 1^{\circ}\text{C}/\pm 3^{\circ}\text{C}$ (typ./max.) between -40°C to $+125^{\circ}\text{C}$



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MICROCHIP

MCP9501/2/3/4

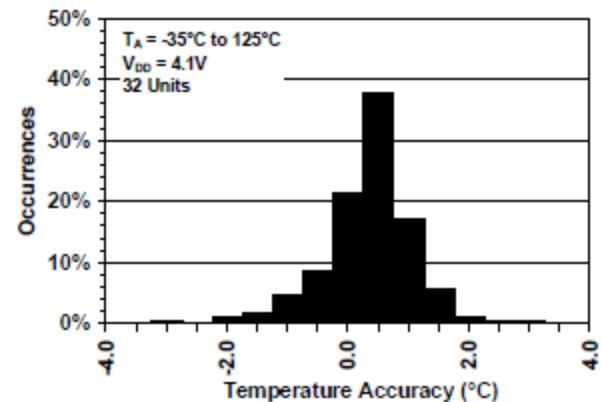
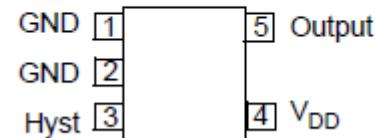
Online
Datasheet

Features:

- Factory Set Temperature Switch
- Wide Operating Voltage Range: 2.7V to 5.5V
- Low Supply Current: 25 μ A (typ.)
- Temperature Switch Accuracy:
 - $\pm 1^\circ\text{C}$ (typical)
 - $\pm 4^\circ\text{C}$ (maximum) -15°C to $+75^\circ\text{C}$
 - $\pm 6^\circ\text{C}$ (maximum) -40°C to $+125^\circ\text{C}$
- Switch Threshold Options (Hot/Cold):
 - Rising Temp.: MCP9501/2 (Hot Option)
 - Falling Temp.: MCP9503/4 (Cold Option)
- Output Configuration Options:
 - Active Low, Open-Drain Output: MCP9501/3
 - Uses External Pull-up Resistor
 - Active-High, Push-Pull Output: MCP9502/4
- User Selectable Hysteresis: 2°C or 10°C (typical)
- 5-lead SOT-23 package

MCP9501/2/3/4

SOT-23-5



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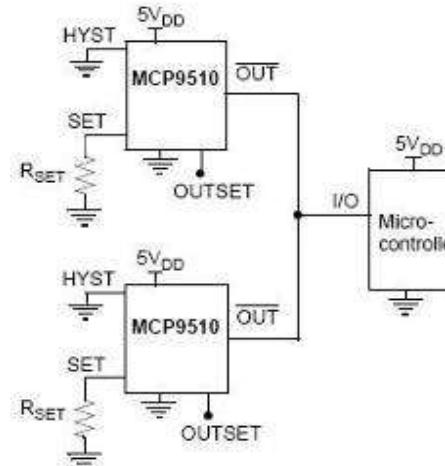
MICROCHIP

MCP9509/10

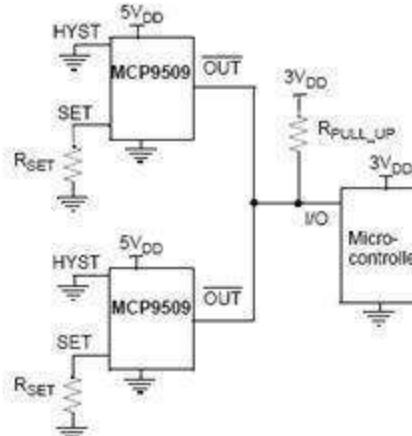
Online
Datasheet

Features:

- Resistor-Programmable Temperature Switch
- Wide Operating Voltage Range: 2.7V to 5.5V
- Low Supply Current: 30 μ A (typ.)
- Temperature Switch Accuracy:
 - $\pm 0.5^\circ\text{C}$ (typ.) at $+25^\circ\text{C}$, $+45^\circ\text{C}$
 - $\pm 1^\circ\text{C}$ (typ.) 0°C to $+70^\circ\text{C}$
 - $\pm 3.5^\circ\text{C}$ (max.) 0°C to $+125^\circ\text{C}$
 - $\pm 4.5^\circ\text{C}$ (max.) -20°C to $+125^\circ\text{C}$
 - $\pm 2^\circ\text{C}$ (typ.) -40°C to $+125^\circ\text{C}$
- Sensor Options available:
 - Switch for rising temperature: Cold to Hot (H)
 - Switch for falling temperature: Hot to Cold (C)
- Output Configurations:
 - Open-Drain:
 - External Pull-up Resistor: MCP9509
 - Internal Pull-up Resistor: MCP9510
 - Active-Low, Push-Pull: MCP9510
 - Active-High, Push-Pull: MCP9510
- User Selectable Hysteresis: 2°C or 10°C (typ.)
- Space-Saving SOT-23-5, SOT-23-6 Packages



MCP9510 Wired-Or Output Configuration
with Internal Pull-up Resistor.



MCP9509 Wired-Or Output Configuration with Level-shift.

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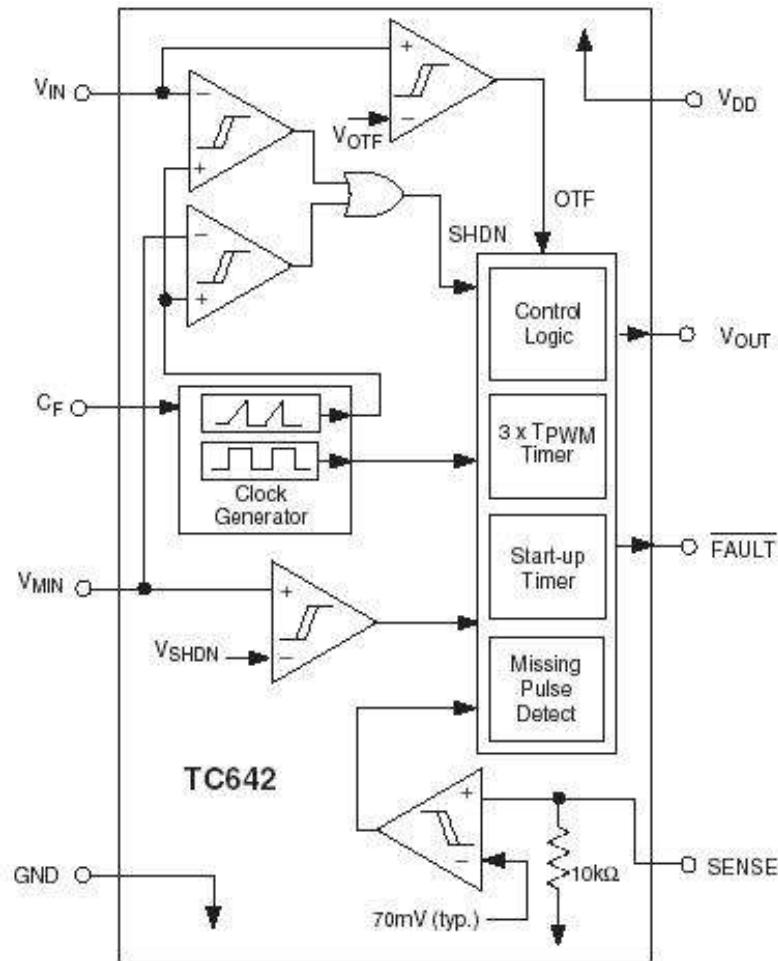
MICROCHIP

TC642

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC647 Supply Voltage
 - Supports any Fan Voltage
- FanSense™ Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Over-temperature Indication
- Space Saving 8-Pin MSOP Package



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[TC648 >>](#)

[TC647 >>](#)

[TC649 >>](#)

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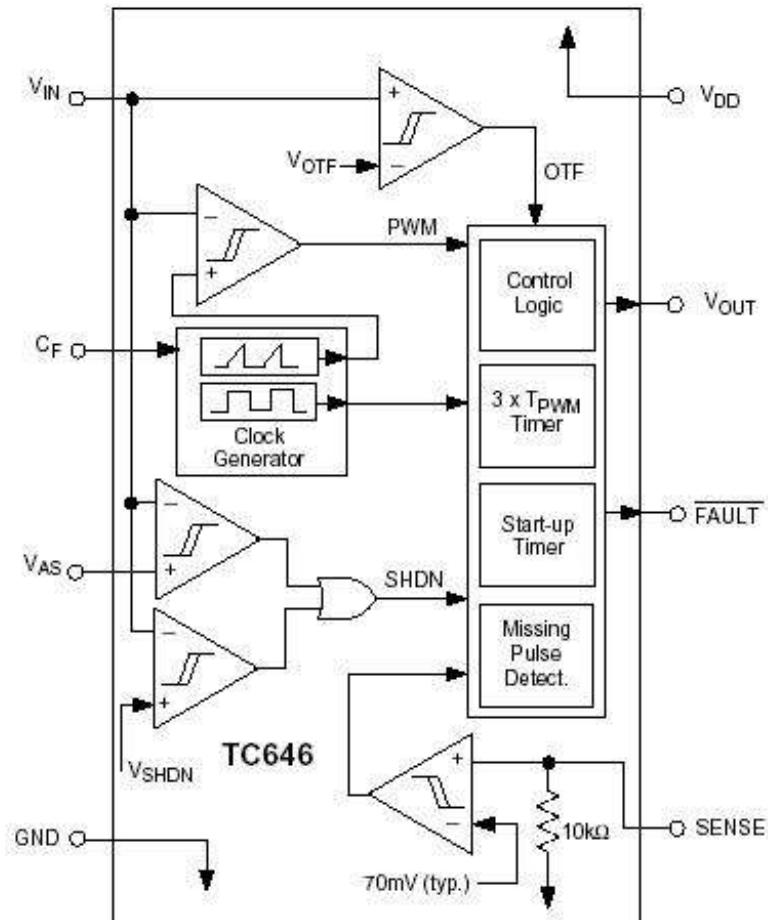
MICROCHIP

TC646

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC646 Supply Voltage
 - Supports any Fan Voltage
- FanSense™ Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Over-temperature Indication



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[TC648 >>](#)

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[TC649 >>](#)

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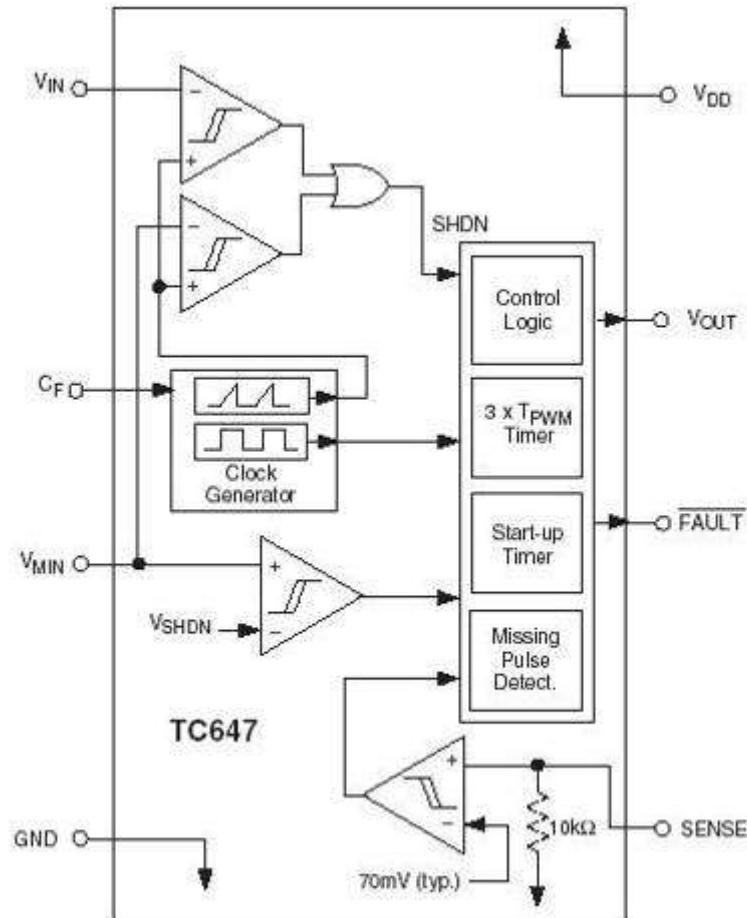
MICROCHIP

TC647

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC647 Supply Voltage
 - Supports any Fan Voltage
- FanSense™ Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Over-temperature Indication
- Space Saving 8-Pin MSOP Package



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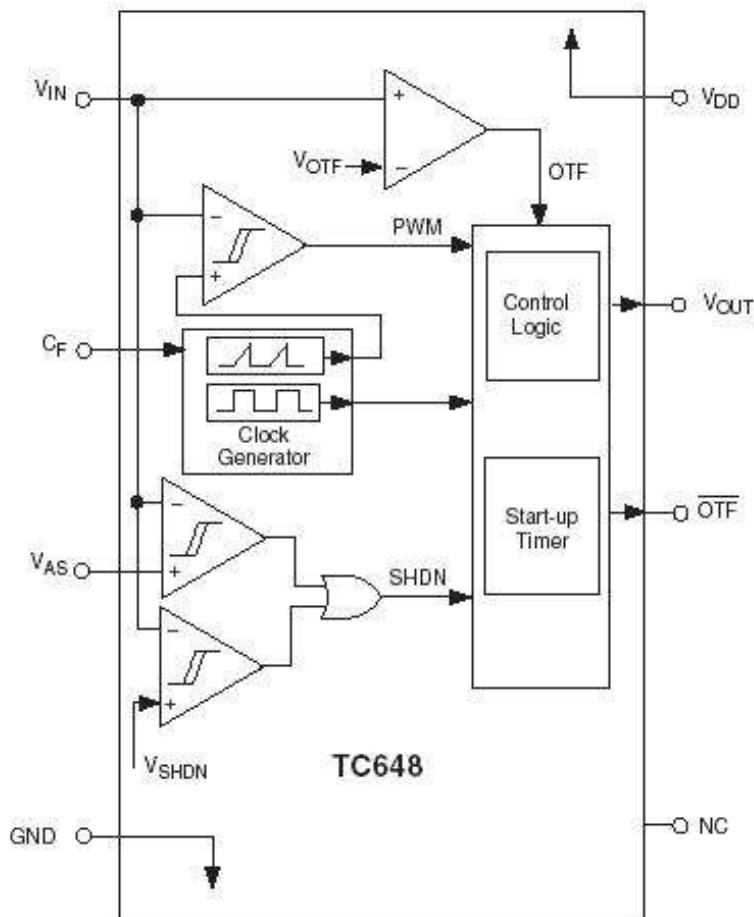
MICROCHIP

TC648

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC647 Supply Voltage
 - Supports any Fan Voltage
- Over-temperature Fan Detection
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Space Saving 8-Pin MSOP Package



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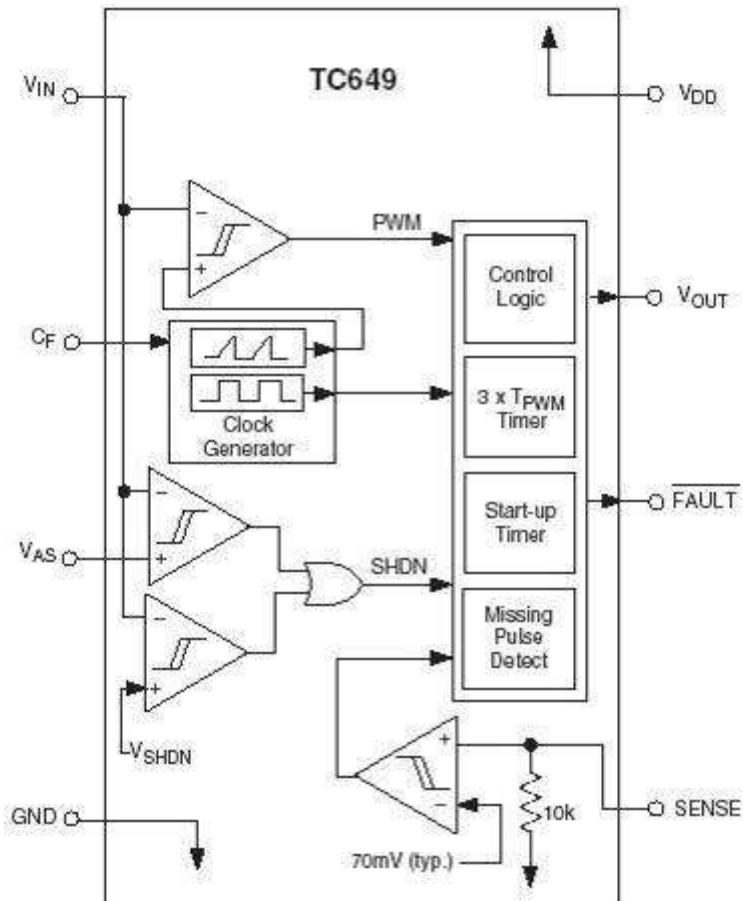
MICROCHIP

TC649

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC649 Supply Voltage
 - Supports any Fan Voltage
- FanSense™ Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Over-temperature Indication
- Space Saving 8-Pin MSOP Package



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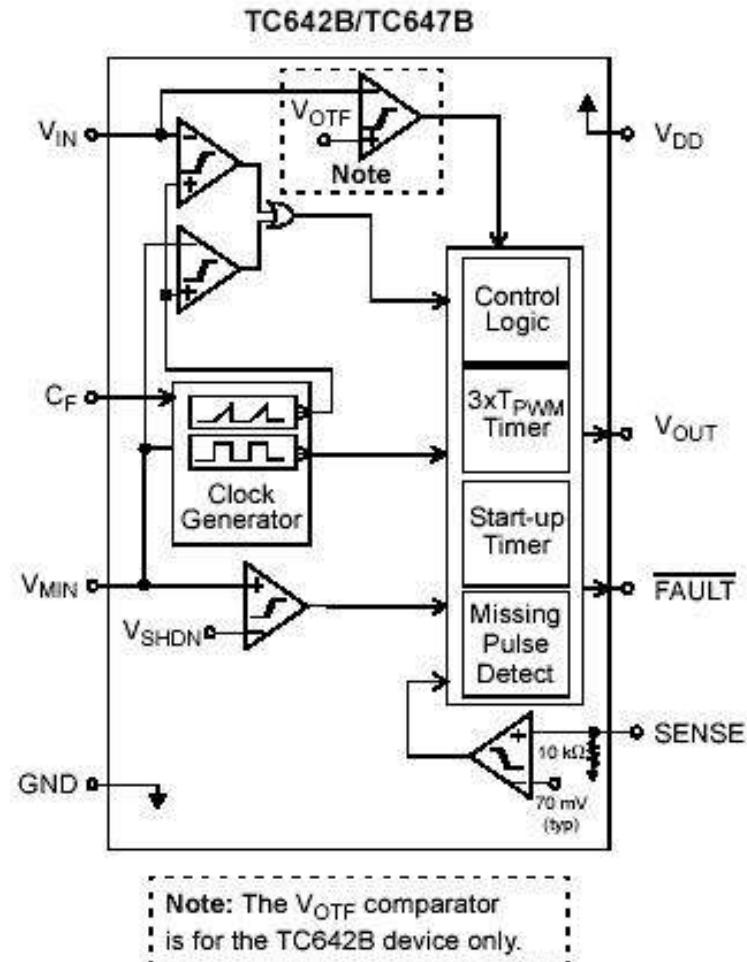
MICROCHIP

TC642B/647B

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC642B/TC647B Supply Voltage
 - Supports any Fan Voltage
- FanSense™ Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Over-temperature Indication
- Fan Auto-Restart
- Space Saving 8-Pin MSOP Package



[TC646/8/9B >>](#)

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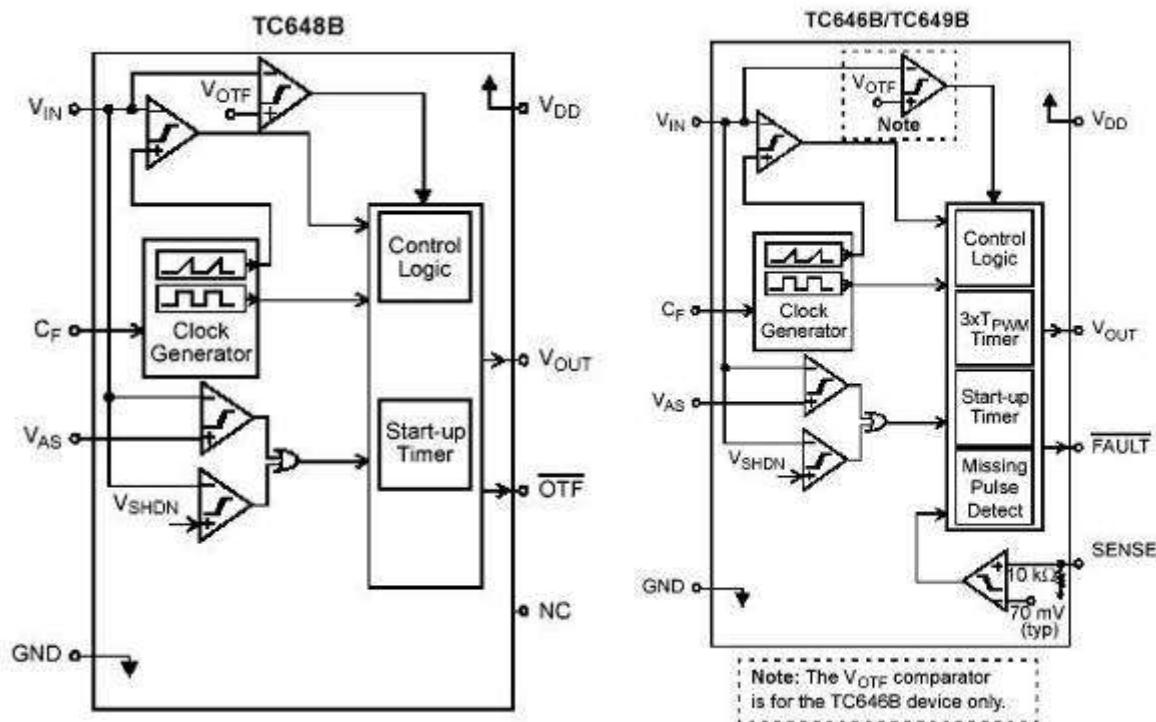
MICROCHIP

TC646B/648B/649B

Online
Datasheet

Features:

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range:
 - Fan Voltage Independent of TC646B/TC648B/TC649B Supply Voltage
 - Supports any Fan Voltage
- FanSense™ Fault Detection Circuits Protect Against Fan Failure and Aid System Testing (TC646B/TC649B)
- Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Over-temperature Indication (TC646B/TC648B)
- Fan Auto-Restart
- Space Saving 8-Pin MSOP Package



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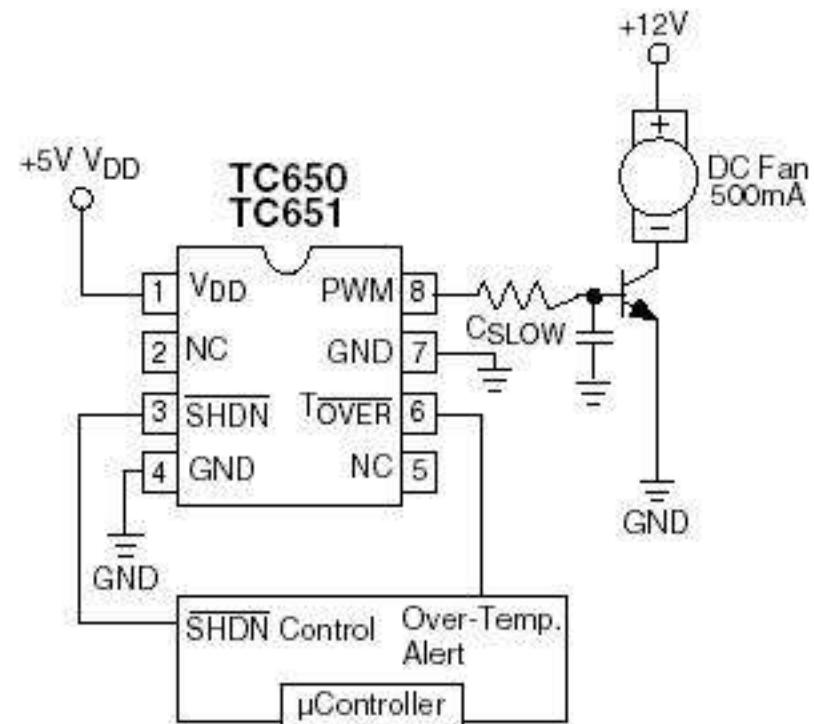
MICROCHIP

TC650/1

Online
Datasheet

Features:

- Integrated Temperature Sensing and Multi-Speed Fan Control
- Built-in Over Temperature Alert
- Temperature Proportional Fan Speed Control for Acoustic Noise Reduction and Longer Fan Life
- Pulse Width Modulation Output Drive for Cost and Power Savings
- Solid-State Temperature Sensing
- $\pm 1^\circ\text{C}$ (typ.) accuracy $+25^\circ\text{C}$ to $+70^\circ\text{C}$
- 2.8V to 5.5V Operating Range
- TC651 includes Auto Fan Shutdown
- Low Operating Current 50 μA (typ.)



[TC652/3 >>](#)

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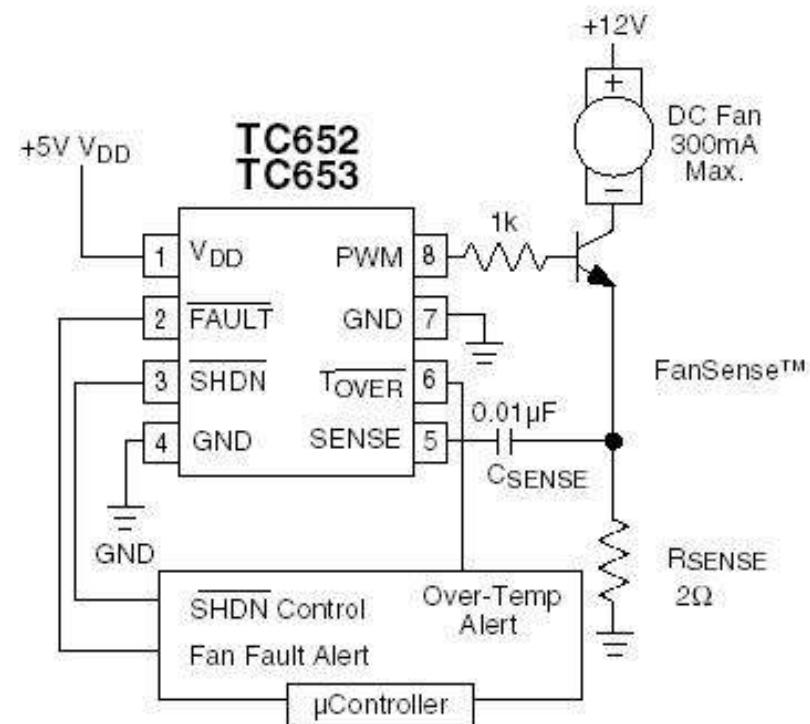
MICROCHIP

TC652/3

Online
Datasheet

Features:

- Integrated Temperature Sensing and Multi-Speed Fan Control
- FanSense™ Fan Fault Detect Circuitry
- Built-in Over Temperature Alert
- Temperature Proportional Fan Speed Control for Acoustic Noise Reduction and Longer Fan Life
- Pulse Width Modulation Output Drive for Cost and Power Savings
- Solid-State Temperature Sensing
- $\pm 1^\circ\text{C}$ (typ.) Accuracy $+25^\circ\text{C}$ to $+70^\circ\text{C}$
- 2.8V to 5.5V Operating Range
- TC651 includes Auto Fan Shutdown
- Low Operating Current 50 μA (typ.)



[TC650/1 >>](#)

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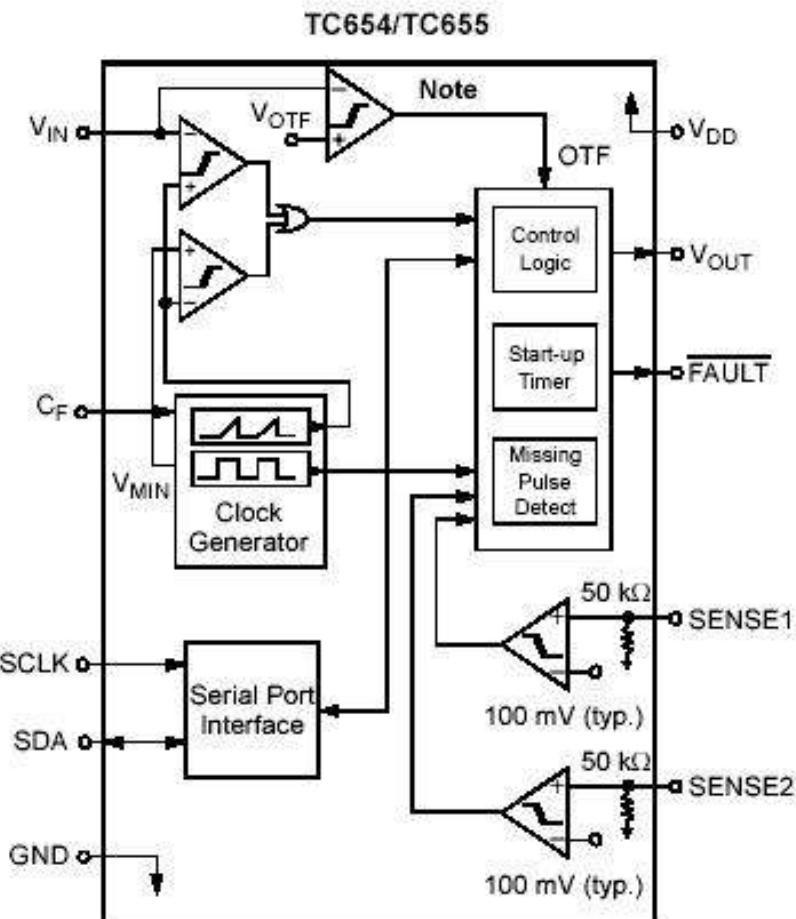
MICROCHIP

TC654/5

Online
Datasheet

Features:

- FanSense™ Protects against Fan Failure and Eliminates the Need for 3-wire Fans
- Temperature Proportional Fan Speed Control for Acoustic Noise Reduction and Longer Fan Life
- Over Temperature Detection (TC655)
- Provides RPM Data
- 2-Wire SMBus™ Compatible Interface
- Software Controlled Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Space Saving 10-pin MSOP Package
- Temperature Range: -40°C to +85°C



Note: OTF condition applies for the TC655 device only.

[TC664/5 >>](#)

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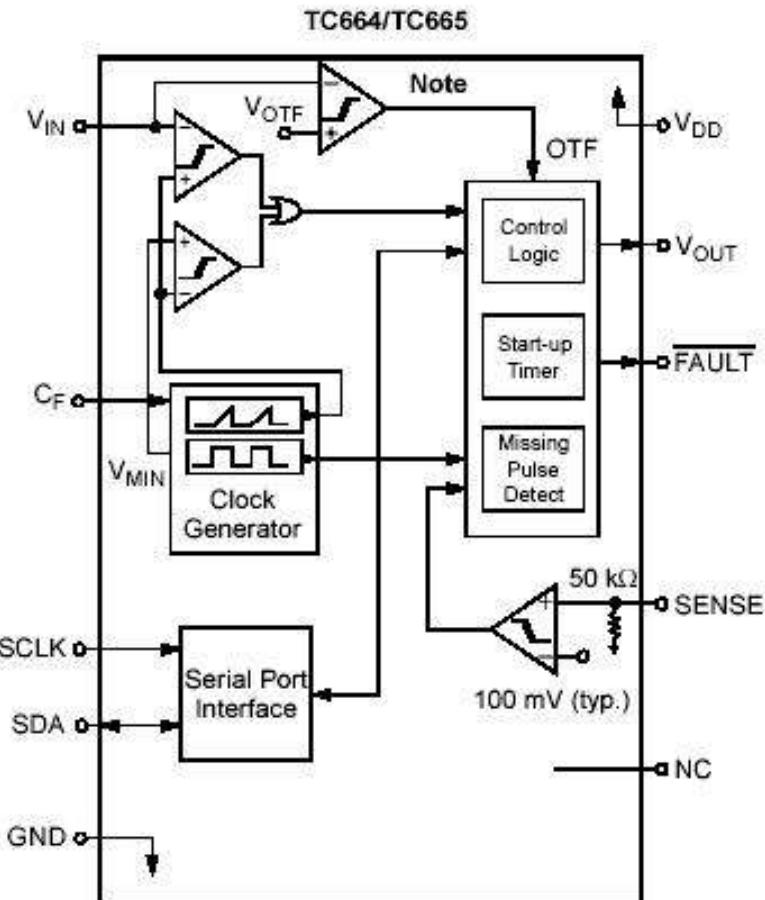
MICROCHIP

TC664/5

Online
Datasheet

Features:

- FanSense™ Protects against Fan Failure and Eliminates the Need for 3-wire Fans
- Temperature Proportional Fan Speed Control for Acoustic Noise Reduction and Longer Fan Life
- Over Temperature Detection (TC665)
- Provides RPM Data
- 2-Wire SMBus™ Compatible Interface
- Supports any Fan Voltage
- Software Controlled Shutdown Mode for “Green” Systems
- Supports Low Cost NTC/PTC Thermistors
- Space Saving 10-pin MSOP Package
- Temperature Range: -40°C to +85°C



Note: OTF condition applies for the TC665 device only.

[TC654/5 >>](#)

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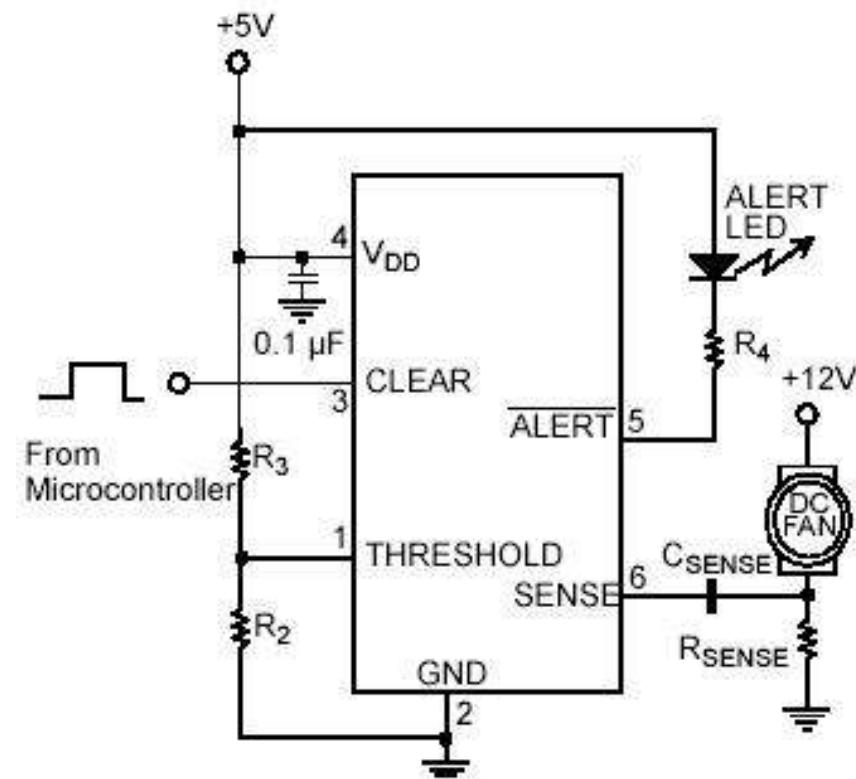
MICROCHIP

TC670

Online
Datasheet

Features:

- Fan Wear-Out Detection for 2-Wire Linear-Controlled Fans
- Replacement System for 3-Wire Fans
- Fan Alert Signal when Fan Speed is below Programmed Threshold
- CLEAR Capability for Eliminating False Alarm
- Low Operating Current, 90 μ A (typ.)
- V_{DD} Range 3.0V to 5.5V
- Available in a 6-Pin SOT-23 Package



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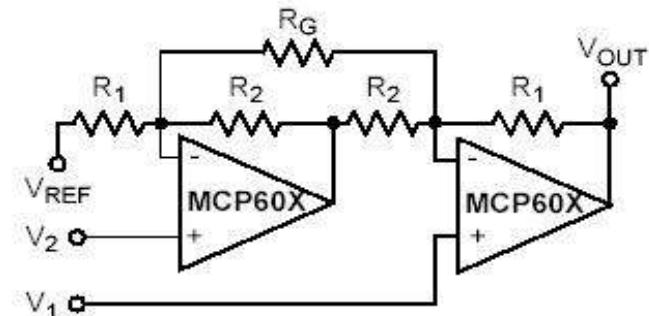
MICROCHIP

MCP601/2/3/4

Online
Datasheet

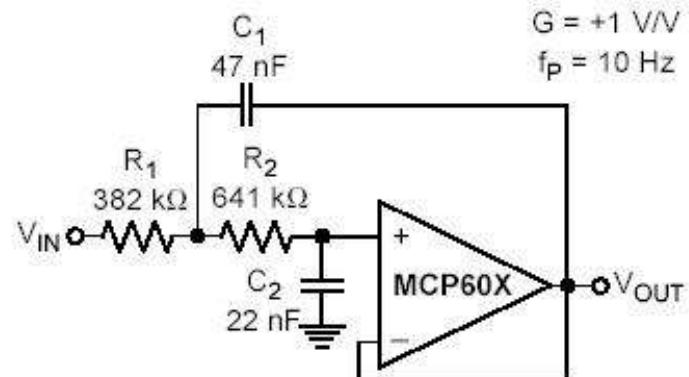
Features:

- Gain Bandwidth Product: 2.8MHz (typ.)
- Low Quiescent Current: 230 μ A/amplifier (typ.)
- Input Offset Voltage (max): ± 2 mV
- Single-Supply: 2.7V to 6V
- Rail-to-Rail Output
- Input Range Includes Ground
- Unity-Gain Stable
- Chip Select (CS): **MCP603 only**
- Temperature Ranges:
 - Industrial: -40°C to +85°C
 - Extended: -40°C to +125°C
- Available in Single, Dual and Quad



$$V_{OUT} = (V_I - V_2) \left(1 + \frac{R_2}{R_1} + \frac{2R_I}{R_G} \right) + V_{REF}$$

Two-Op Amp Instrumentation Amplifier



Second-Order, Low-Pass Sallen-Key Filter

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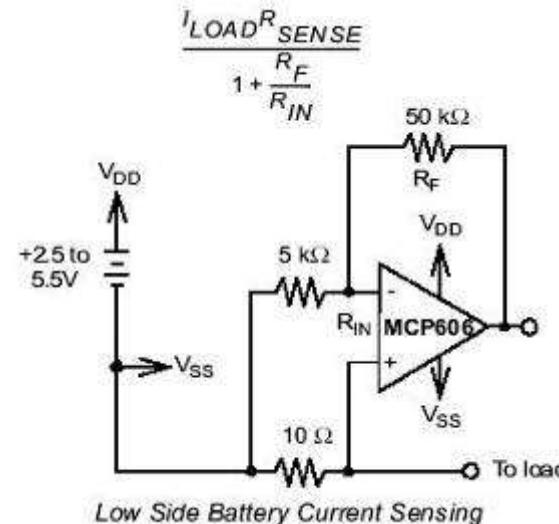
MICROCHIP

MCP606/7/8/9

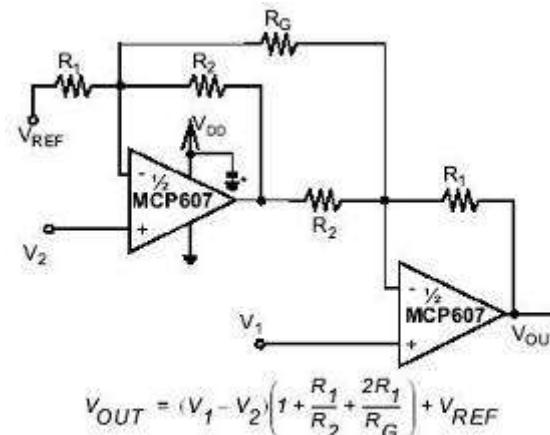
Online
Datasheet

Features:

- Gain Bandwidth Product: 155 kHz
- Low Quiescent Current: 25 μ A (max.)
- Low Input Offset Voltage: $\pm 250\mu$ V (max.)
- Power Supply Voltage: 2.5V to 6V
- Low Input Bias Current: 80pA (max.) at 85°C
- Unity Gain Stable
- Rail to Rail Output
- Chip Select Capability: **MCP608**
- Industrial Temperature Range:
-40°C to +85°C
- Available in Single, Dual and Quad Packages
- Available in PDIP, SOIC, MSOP, TSSOP



Low Side Battery Current Sensing



*Bypass Capacitor, 0.1mF

Two Op Amp Instrumentation Amplifier

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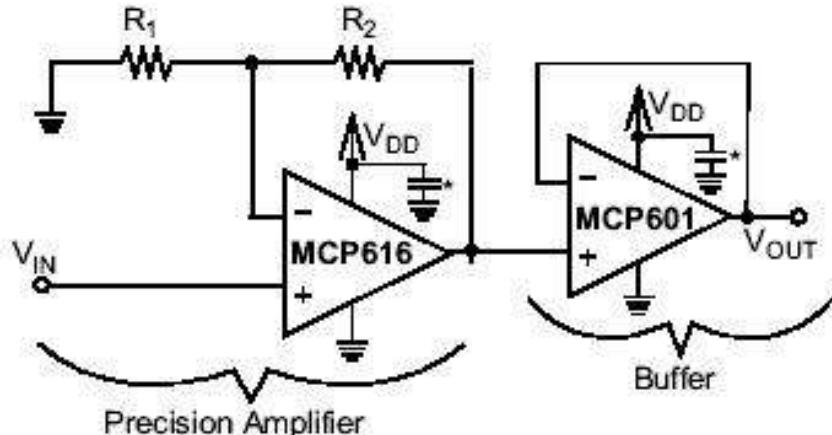
MICROCHIP

MCP616/7/8/9

Online
Datasheet

Features:

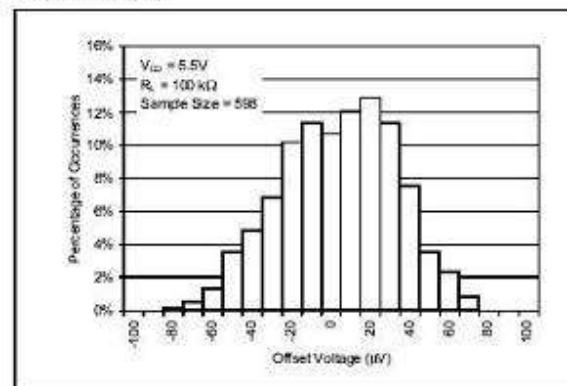
- Gain Bandwidth Product: 190 kHz
- Low Quiescent Current: 25 μ A (max.)
- Low Input Offset Voltage: $\pm 150\mu$ V (max.)
- Power Supply Voltage: 2.3V to 5.5V
- Low Noise: 2.2 μ V_{P-P} (typ.), 0.1Hz to 10Hz
- Low Input Offset Current: 0.3nA (typ.)
- Rail to Rail Output
- Unity Gain Stable
- Chip Select Capability: **MCP618**
- Industrial Temperature Range:
-40°C to +85°C
- Available in Single, Dual and Quad
- Available in PDIP, SOIC, MSOP, TSSOP



*Bypass Capacitor, 1 μ F

Precision Gain with Good Load Isolation

HISTOGRAM OF INPUT OFFSET VOLTAGE



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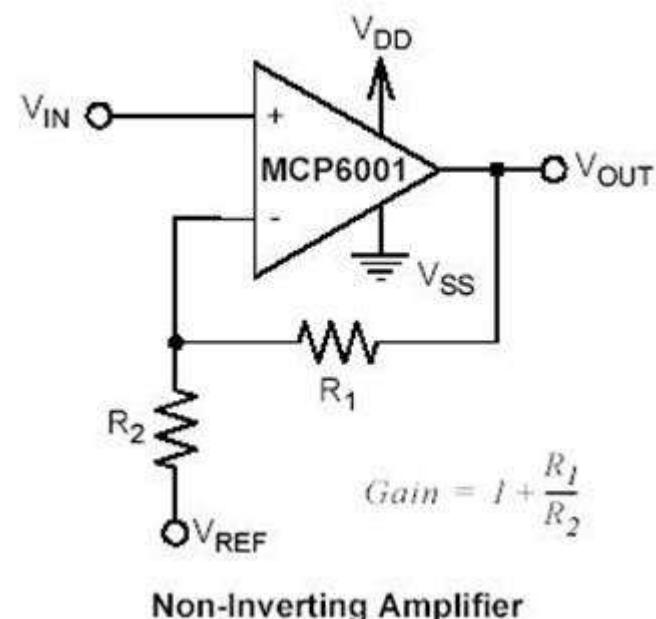
MICROCHIP

MCP6001/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 1MHz (typ.)
- Supply Current: 100 μ A (typ.)
- Input Offset Voltage (max): ± 4.5 mV
- Supply Voltage: 1.8V to 6V
- Rail to Rail Input/Output
- Phase Margin: 90° (typ.)
- Temperature Ranges:
Industrial: -40°C to +85°C
Extended: -40°C to +125°C
- Available in Single, Dual and Quad
- Packages
Single: SOT23, SC70
Dual: MSOP, 2x3 DFN
Quad: SOIC, TSSOP



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MICROCHIP

MCP6401/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 1MHz (typ.)
- Supply Current: 45 μ A (typ.)
- Input Offset Voltage (max): ± 4.5 mV
- Supply Voltage: 1.8V to 6V
- Phase Margin: 65° (typ.)
- Rail to Rail Input/Output
- Temperature Ranges:
 - Extended: -40°C to +125°C
- Available in Single, Dual and Quad
- Packages:
 - Singles: SC70, SOT23
 - Dual: SOIC, 2x3 TDFN
 - Quad: TSSOP, SOIC

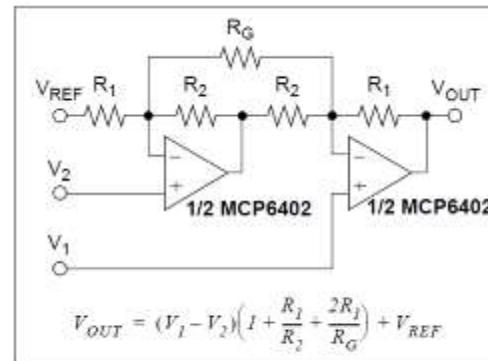
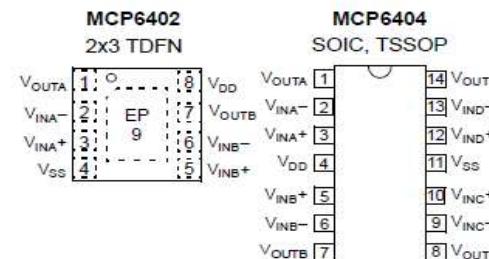
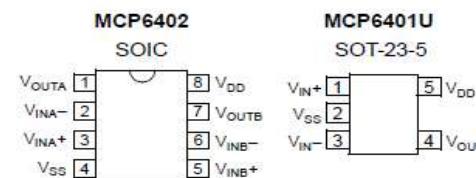
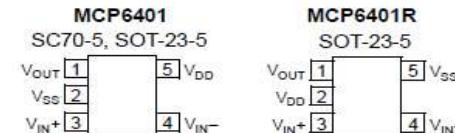


FIGURE 4-10: Two Op Amp
Instrumentation Amplifier.



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MICROCHIP

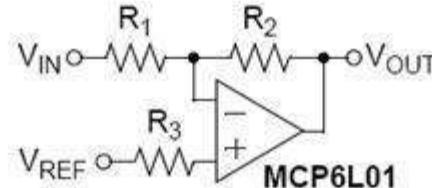
MCP6L01/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 1MHz (typ.)
- Supply Current: 85 μ A (typ.)
- Input Offset Voltage (max): ± 5 mV
- Supply Voltage: 1.8V to 6V
- Phase Margin: 90° (typ.)
- Rail to Rail Input/Output
- Temperature Ranges:
Extended: -40°C to +125°C
- Available in Single, Dual and Quad

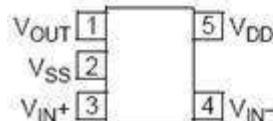
Typical Application



Inverting Amplifier

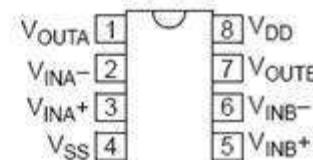
MCP6L01

SC-70-5, SOT-23-5



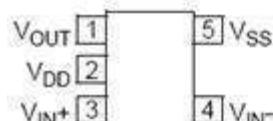
MCP6L02

SOIC, MSOP



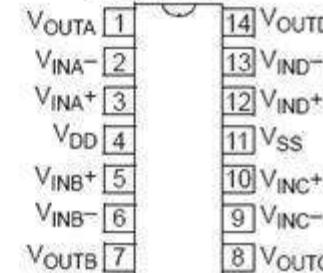
MCP6L01R

SOT-23-5



MCP6L04

SOIC, TSSOP



MCP6L01U

SOT-23-5



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MICROCHIP

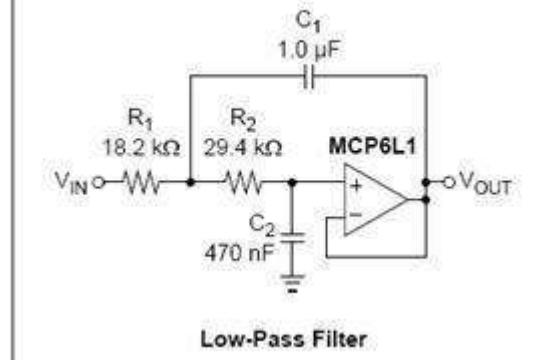
MCP6L1/2/4

Online
Datasheet

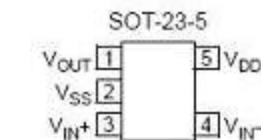
Features:

- Gain Bandwidth Product: 2.8MHz (typ.)
- Supply Current: 200 μ A (typ.)
- Input Offset Voltage (max): ± 3 mV
- Supply Voltage: 2.7V to 6.0V
- Rail to Rail Output
- Phase Margin: 50° (typ.)
- Temperature Ranges:
Extended: -40°C to +125°C
- Available in Single, Dual and Quad

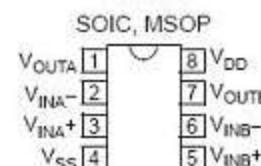
Typical Application



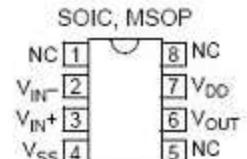
MCP6L1



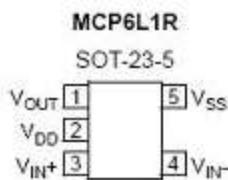
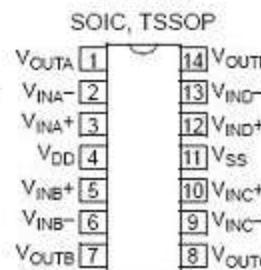
MCP6L2



MCP6L1



MCP6L4



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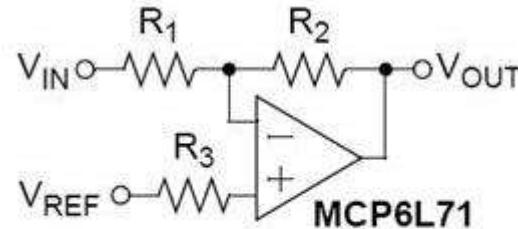
MICROCHIP

MCP6L71/2/4

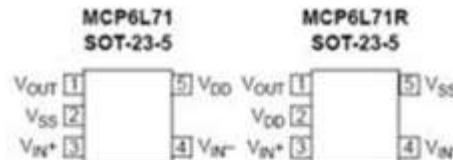
Online
Datasheet

Features:

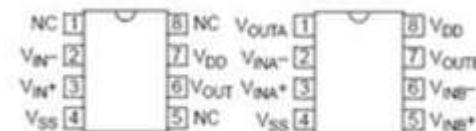
- Gain Bandwidth Product: 2MHz (typ.)
- Supply Current: $I_Q = 150\mu A$ (typ.)
- Input Offset Voltage (max): $\pm 4 \text{ mV}$
- Supply Voltage: 2.0V to 6V
- Rail to Rail Input/Output
- Phase Margin: 65° (typ.)
- Temperature Ranges:
Extended: -40°C to +125°C
- Available in Single, Dual and Quad



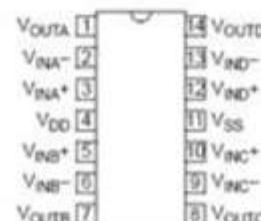
Inverting Amplifier



MCP6L71
SOIC, MSOP



MCP6L74
SOIC, TSSOP



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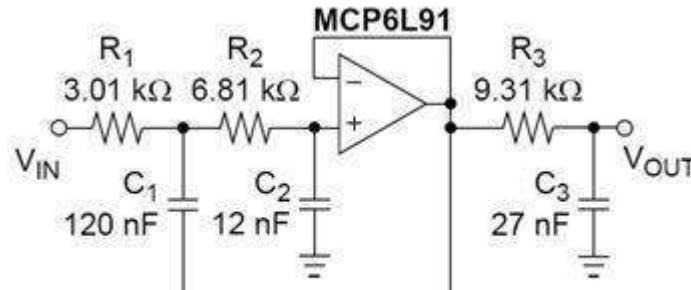
MICROCHIP

MCP6L91/2/4

Online
Datasheet

Features:

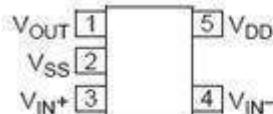
- Gain Bandwidth Product: 10MHz (typ.)
- Supply Current: 850 μ A (typ.)
- Input Offset Voltage (max): $\pm 4\text{mV}$
- Supply Voltage: 2.4V to 6V
- Rail to Rail Input/Output
- Phase Margin: 65° (typ.)
- Temperature Ranges:
Extended: -40°C to +125°C
- Available in Single, Dual and Quad



Low-pass Filter

MCP6L91

SOT-23-5



MCP6L92

SOIC, MSOP



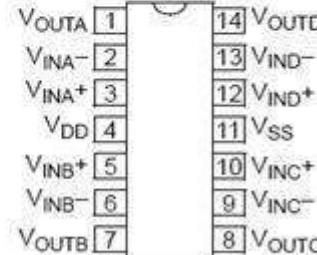
MCP6L91

SOIC, MSOP



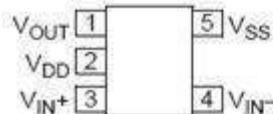
MCP6L94

SOIC, TSSOP



MCP6L91R

SOT-23-5



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MICROCHIP

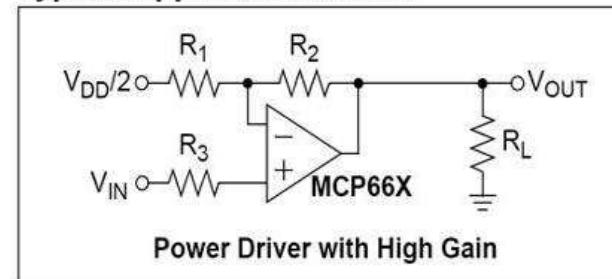
MCP660/1/2/3/4/5/9

Online
Datasheet

Features:

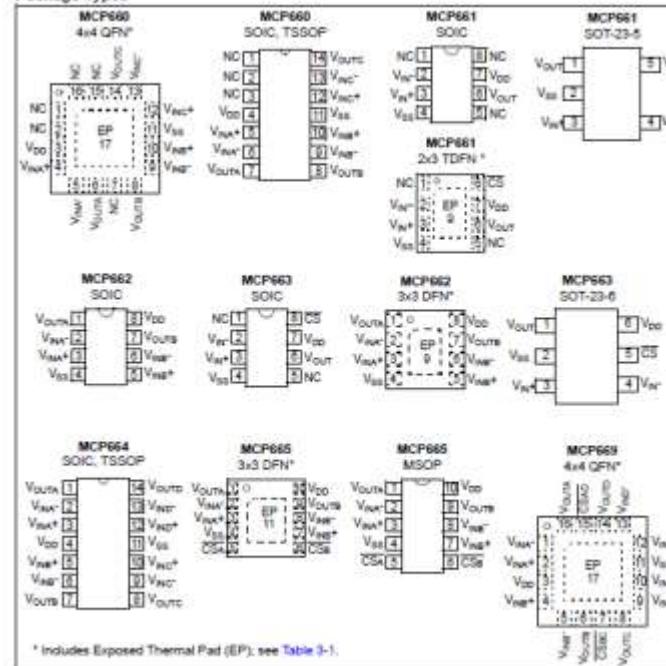
- Gain Bandwidth Product: 60 MHz (typical)
- Single/Dual/Triple/Quad
- Supply Current: 6.0 mA (typical)
- Input Offset Voltage (max): ± 8 mV
- Supply Voltage: 2.5V to 5.5V
- Short Circuit Current: 90 mA (typical)
- Noise: 6.8 nV/ $\sqrt{\text{Hz}}$ (typical, at 1 MHz)
- Rail-to-Rail Output
- Slew Rate: 32 V/ μs (typical)
- Available in Single, Dual and Quad
- Chip Select: MCP663, MCP665, MCP669
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$

Typical Application Circuit



Power Driver with High Gain

Package Types



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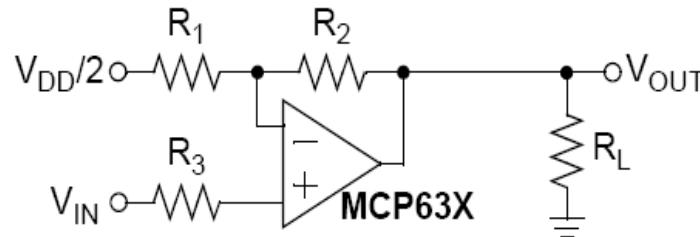
MICROCHIP

MCP631/2/3/4/5/9

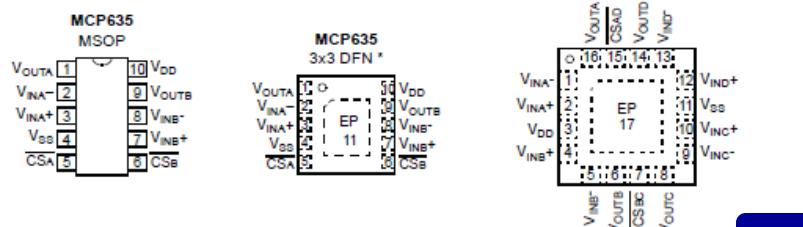
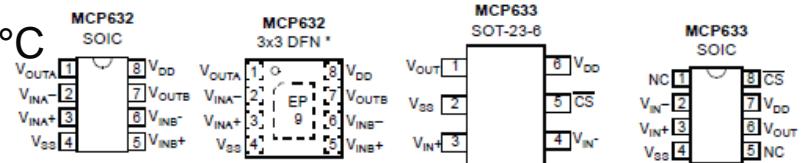
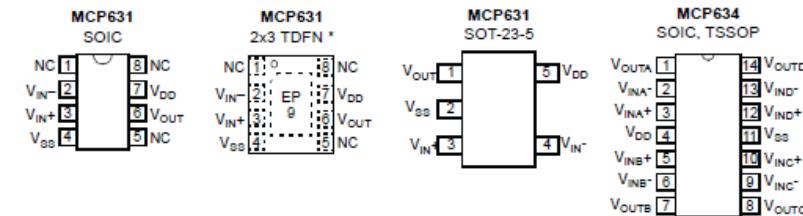
Online
Datasheet

Features:

- Gain Bandwidth Product: 24 MHz (typical)
- Supply Current: 2.5 mA (typical)
- Input offset voltage (max): ± 8 mV
- Power Supply: 2.5V to 5.5V
- Short Circuit Current: 70 mA (typical)
- Noise: 10 nV/ $\sqrt{\text{Hz}}$ (typical, at 1 MHz)
- Rail-to-Rail Output
- Slew Rate: 10 V/ μs (typical)
- Available in Single, Dual and Quad
- Chip Select: MCP633, MCP635, MCP639
- Extended Temperature Range: -40°C to +125°C



Power Driver with High Gain



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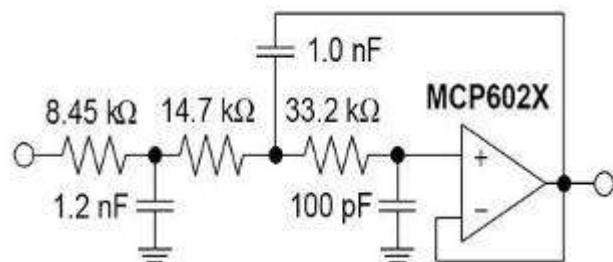
MICROCHIP

Online
Datasheet

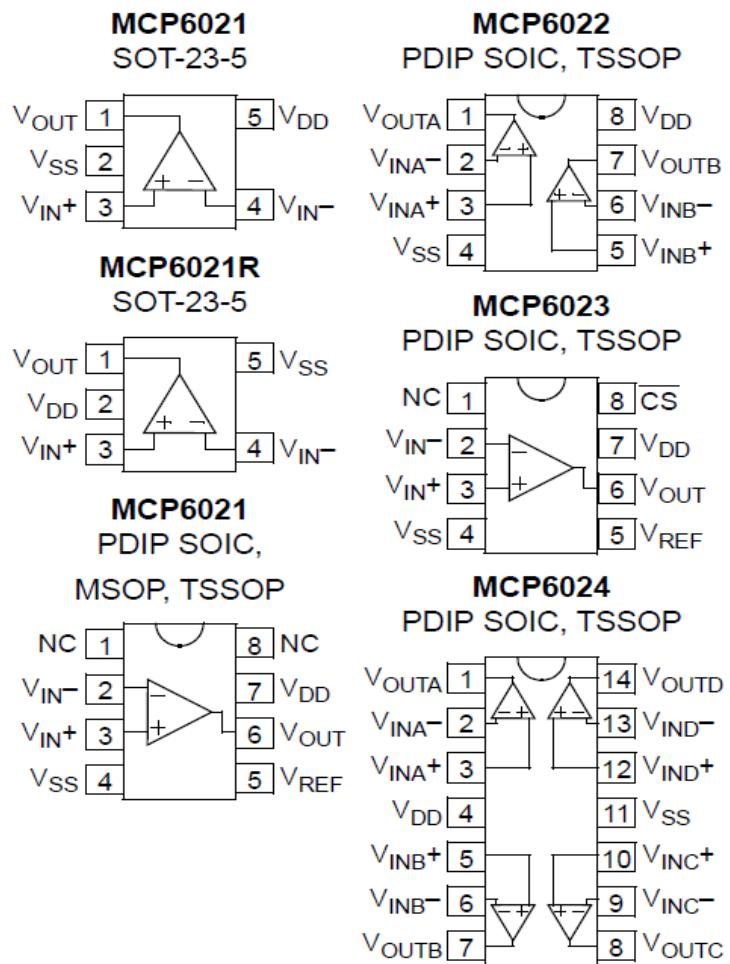
MCP6021/2/3/4

Features:

- Gain Bandwidth Product : 10MHz (typ.)
- Low Supply Current: 1mA (typ.)
- Low Offset Voltage:
 - Industrial Temperature: $\pm 500\mu V$ (max.)
 - Extended Temperature: $\pm 250\mu V$ (max.)
- Power Supply Range: 2.5V to 5.5V
- Low Noise: $8.7nV/\sqrt{Hz}$, at 10kHz (typ.)
- Rail-to-Rail Input/Output
- Mid-Supply V_{REF} : MCP6021 and MCP6023
- Unity Gain Stable
- Temperature Range:-40°C to +125°C



A/D converter driver and anti-aliasing filter with a
20 kHz cutoff frequency



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MICROCHIP

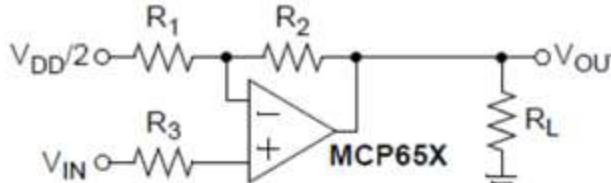
MCP651/1S/2/3/5/9

Online
Datasheet

Features:

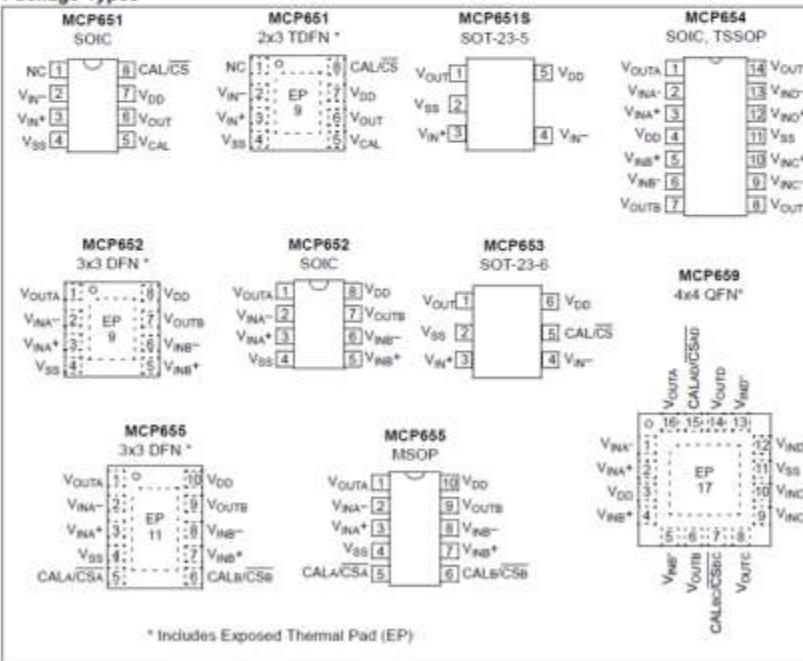
- Gain Bandwidth: 50MHz (typ.)
- Low Supply Current: 6mA (typ.)
- Calibrated Offset Voltage: $\pm 200\mu V$ (max.)
- Power Supply Range: 2.5V to 5.5V
- Short Circuit Current: 100mA (typ.)
- Low Noise: $7.5nV/\sqrt{Hz}$, at 1MHz (typ.)
- Slew Rate: $30V/\mu s$ (typ.)
- Rail-to-Rail Output
- Calibrate/Chip Select Pin Options
- Temperature Range:
Extended: -40°C to +125°C

Typical Application Circuit



Power Driver with High Gain

Package Types



* Includes Exposed Thermal Pad (EP)

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MICROCHIP

MCP621/1S/2/3/4/5/9

Online
Datasheet

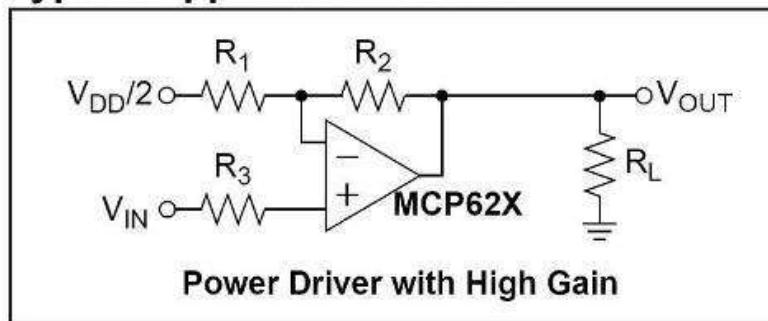
Features:

- Gain Bandwidth Product: 20MHz (typ.)
- Single/Dual/Quad
- Supply Current: 2.5mA (typ.)
- Calibrated Input Offset: $\pm 200\mu V$ (max.)
- Power Supply: 2.5V to 5.5V
- Short Circuit Current: 70mA (typ.)
- Noise: $13nV/\sqrt{Hz}$ (typ., at 1MHz)
- Rail-to-Rail Output
- Slew Rate: $10V/\mu s$ (typ.)

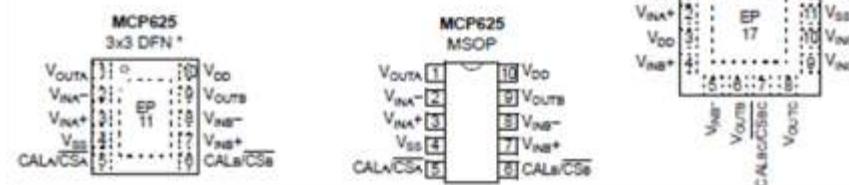
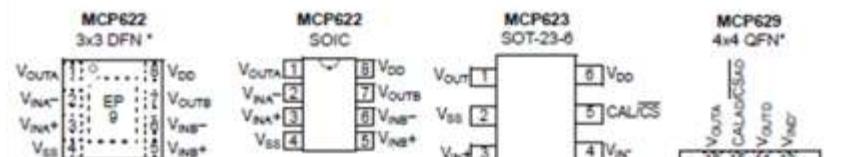
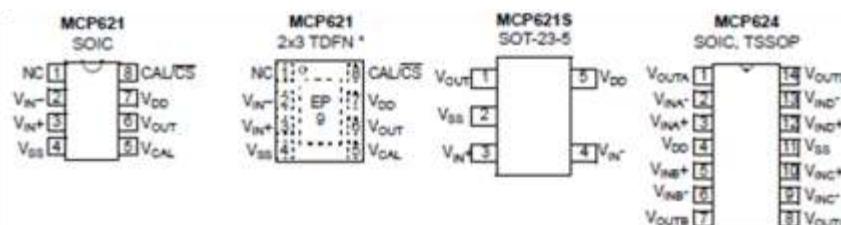
Calibrate/Chip Select Pin Options

- Extended Temperature Range:
 $-40^{\circ}C$ to $+125^{\circ}C$

Typical Application Circuit



Power Driver with High Gain



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MICROCHIP

MCP6441/2/4

Online
Datasheet

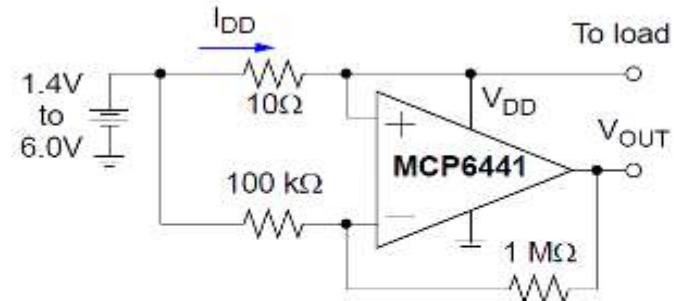
Features:

- Gain Bandwidth Product: 9kHz (typ.)
- Low Supply Current: 450nA/Amplifier (typ.)
- Input Offset Voltage (max): $\pm 4.5 \text{ mV}$
- Supply Voltage Range: 1.4V to 6V (max.)
- Rail-to-Rail Input/ Output
- Unity Gain Stable
- Available in Single, Dual and Quad
- Packages:

Singles: SC70, SOT23

Dual: SOIC, MSOP

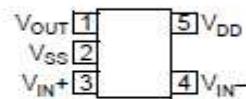
Quad: TSSOP, SOIC



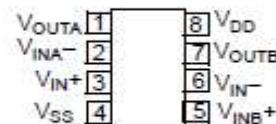
$$I_{DD} = \frac{V_{DD} - V_{OUT}}{(10 \text{ V/V}) \cdot (10\Omega)}$$

Battery Current Sensing

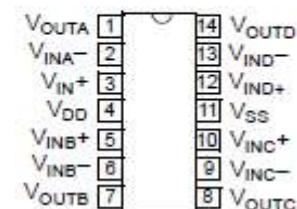
MCP6441
SC70-5, SOT-23-5



MCP6442
SOIC, MSOP



MCP6444
SOIC, TSSOP



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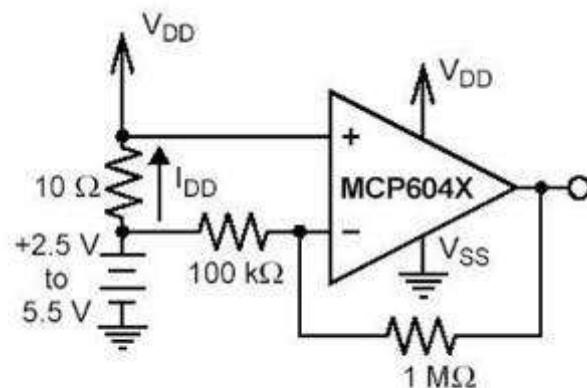
MICROCHIP

Online
Datasheet

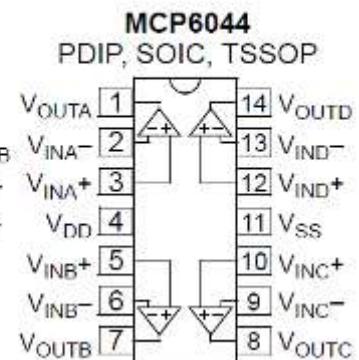
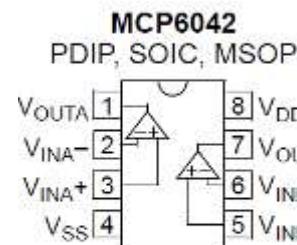
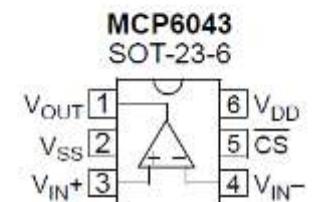
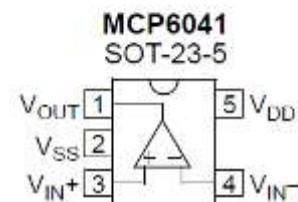
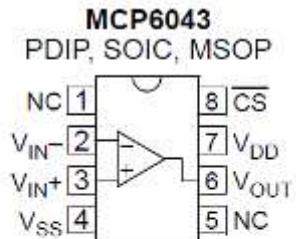
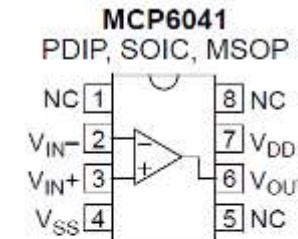
MCP6041/2/3/4

Features:

- Gain Bandwidth Product: 14kHz (typ.)
- Low Supply Current: 600nA/Amplifier (typ.)
- Input Offset Voltage (max): $\pm 3\text{ mV}$
- Supply Voltage Range: 1.4V to 6V (max.)
- Rail-to-Rail Input/ Output
- Unity Gain Stable
- Available in Single, Dual and Quad
- Chip Select (CS) with MCP6043



High Side Battery Current Sensor



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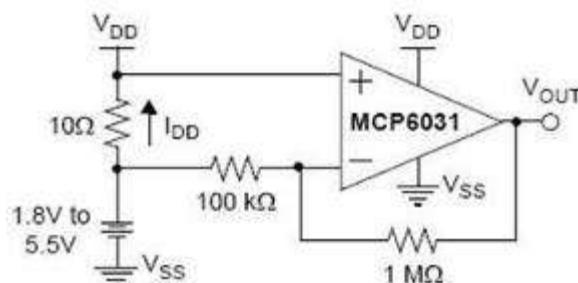
MICROCHIP

Online
Datasheet

MCP6031/2/3/4

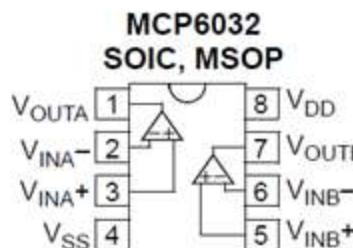
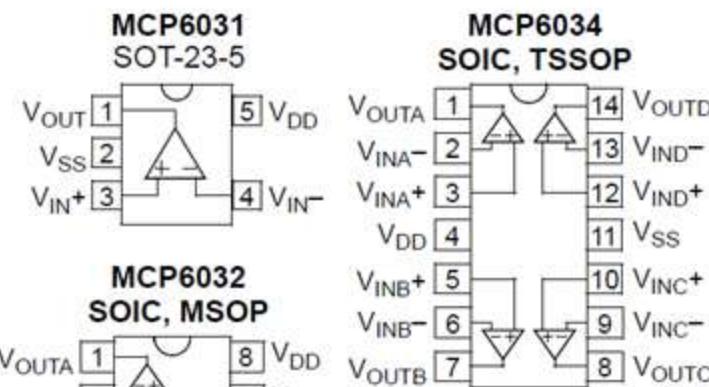
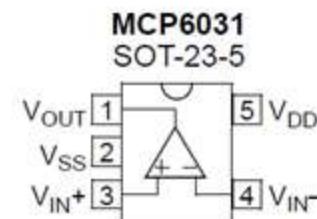
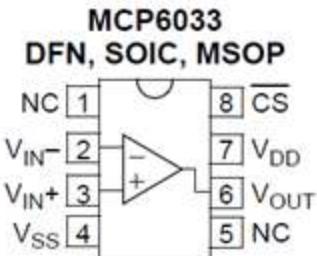
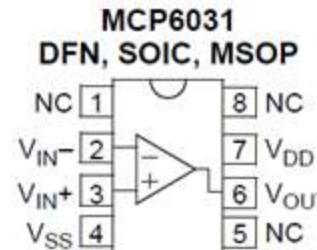
Features:

- Gain Bandwidth Product: 10 kHz (typ.)
- Ultra Low Quiescent Current: 0.9µA (typ.)
- Low Offset Voltage: ±150µV (max.)
- Wide Power Supply Voltage: 1.8V to 5.5V
- Rail-to-Rail Input and Output
- Unity Gain Stable
- Chip Select (CS) capability: MCP6033
- Extended Temperature Range:
-40°C to +125°C



$$I_{DD} = \frac{V_{DD} - V_{OUT}}{(10 \text{ V/V}) \bullet (10\Omega)}$$

High Side Battery Current Sensor



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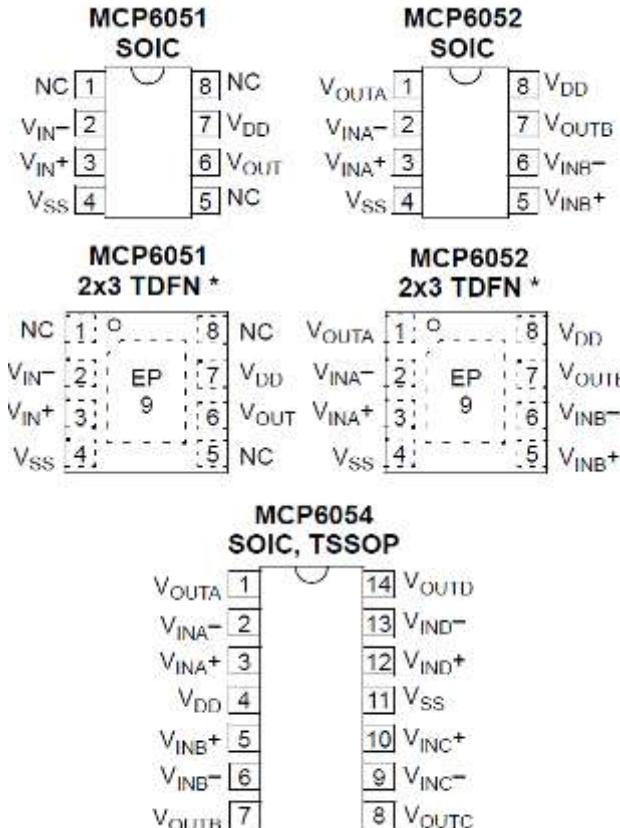
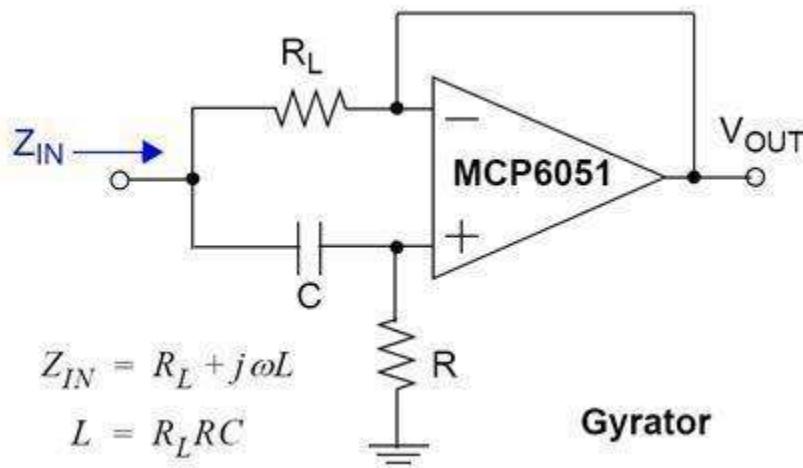
MICROCHIP

MCP6051/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 385kHz (typ.)
- Ultra Low Quiescent Current: 30µA (typ.)
- Low Offset Voltage: $\pm 150\mu V$ (max.)
- Wide Power Supply Voltage: 1.8V to 6.0V
- Rail-to-Rail Input and Output
- Unity Gain Stable
- Extended Temperature Range:
-40°C to +125°C



* Includes Exposed Thermal Pad (EP); see Table 3-1.

<< BACK



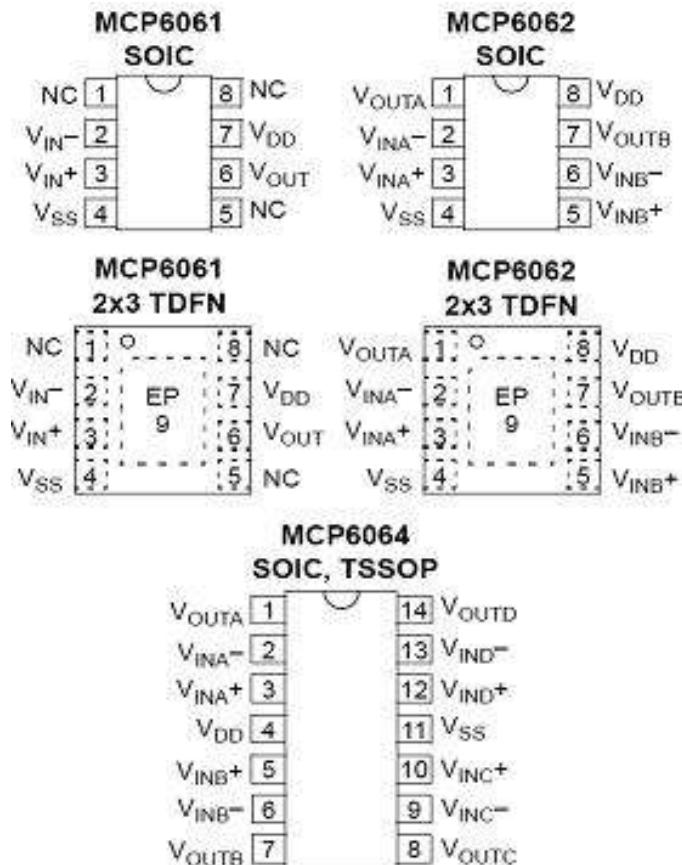
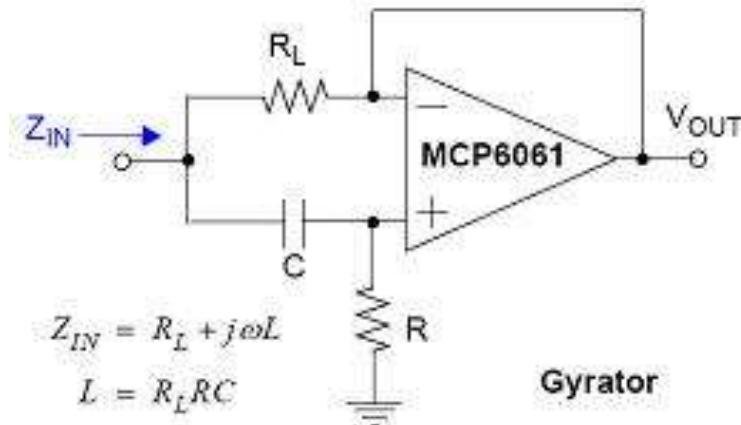
MICROCHIP

MCP6061/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 730kHz (typ.)
- Ultra Low Quiescent Current: 60 μ A (typ.)
- Low Offset Voltage: $\pm 150\mu$ V (max.)
- Wide Power Supply Voltage: 1.8V to 6.0V
- Rail-to-Rail Input and Output
- Unity Gain Stable
- Extended Temperature Range: -40°C to +125°C



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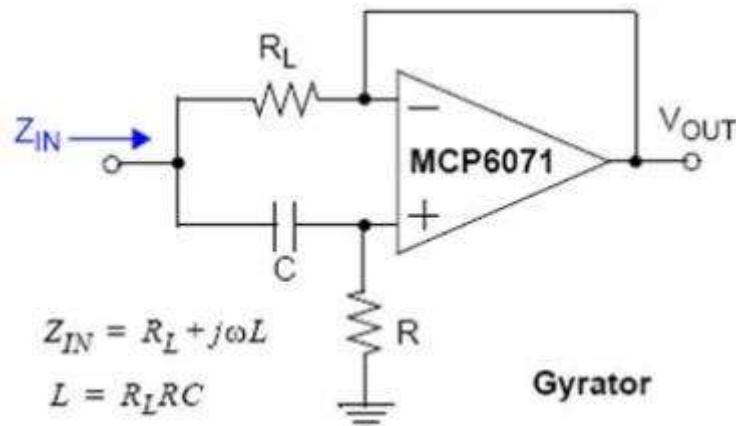
MICROCHIP

MCP6071/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 1.2MHz (typ.)
- Ultra Low Quiescent Current: 110 μ A (typ.)
- Low Offset Voltage: $\pm 150\mu$ V (max.)
- Wide Power Supply Voltage: 1.8V to 6.0V
- Rail-to-Rail Input and Output
- Unity Gain Stable
- Extended Temperature Range: -40°C to +125°C



MCP6071 SOIC	MCP6072 SOIC	MCP6071 2x3 TDFN	MCP6072 2x3 TDFN	MCP6074 SOIC, TSSOP
NC [1]	V _{OUTA} [1]	1 [1] O.	1 [1] O.	V _{OUTA} [1]
V _{IN-} [2]	V _{DD} [8]	EP [2]	V _{DD} [8]	V _{IND-} [13]
V _{IN+} [3]	V _{OUT} [6]	9 [3]	V _{OUTB} [7]	V _{IND+} [12]
V _{SS} [4]	NC [5]	6 [6]	V _{INB-} [2]	V _{SS} [11]
		5 [5]	V _{INB+} [3]	V _{INC+} [10]
		NC [4]	NC [4]	V _{INC-} [9]
				V _{OUTC} [8]

* Includes Exposed Thermal Pad (EP); see Table 3-1.

<< BACK



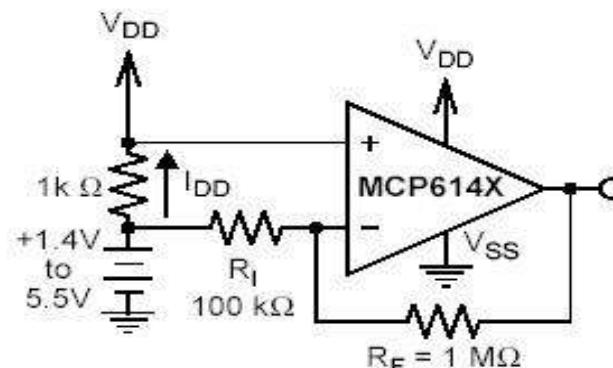
MICROCHIP

Online
Datasheet

MCP6141/2/3/4

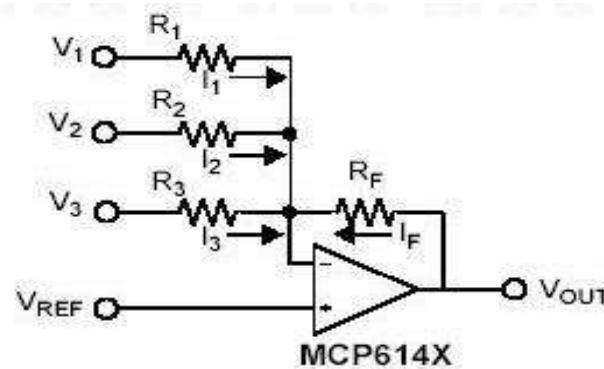
Features:

- Gain Bandwidth Product: 100kHz (typ.)
- Low Quiescent Current: 600nA/amplifier (typ.)
- Input Offset Voltage: $\pm 3 \text{ mV}$ (max)
- Wide Supply Voltage Range: 1.4V to 6V
- Stable for gains of 10 V/V or higher
- Rail-to-Rail Input/Output
- Available in Single, Dual, and Quad
- Chip Select (CS) with MCP6143
- Available in 5-lead and 6-lead SOT-23
- Temperature Ranges:
Industrial: -40°C to +85°C
Extended: -40°C to +125°C



High Side Battery Current Sensor

$$G_n = \left(1 + \frac{R_F}{R_I} \right) \geq 10 \text{ V/V}$$



Summing Amplifier

$$G_n = 1 + R_F \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right) \geq 10 \text{ V/V}$$

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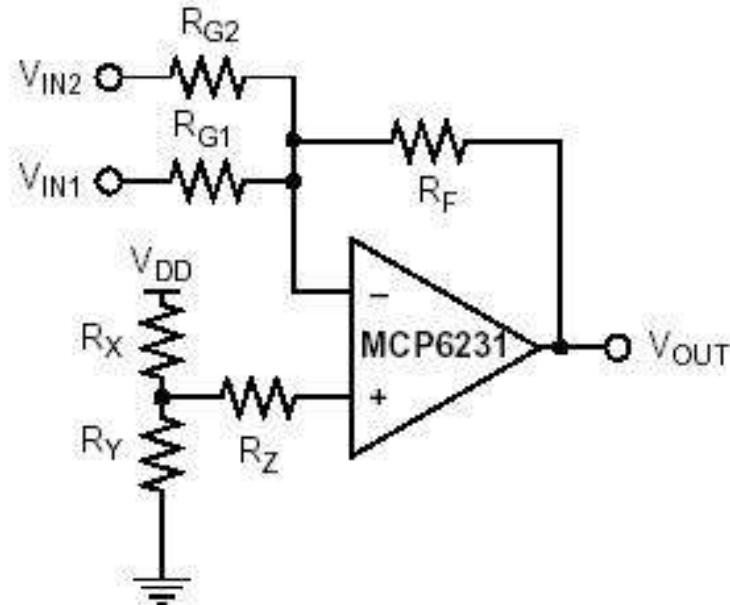
MICROCHIP

MCP6231/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 300kHz (typ.)
- Supply Current: $I_Q = 20\mu A$ (typ.)
- Input Offset voltage: $\pm 5 \text{ mV}$ (max)
- Supply Voltage: 1.8V to 6V
- Rail-to-Rail Input/Output
- Extended Temperature Range:
 -40°C to $+ 125^\circ\text{C}$
- Available in 5-pin SC-70 and SOT-23



Summing Amplifier Circuit



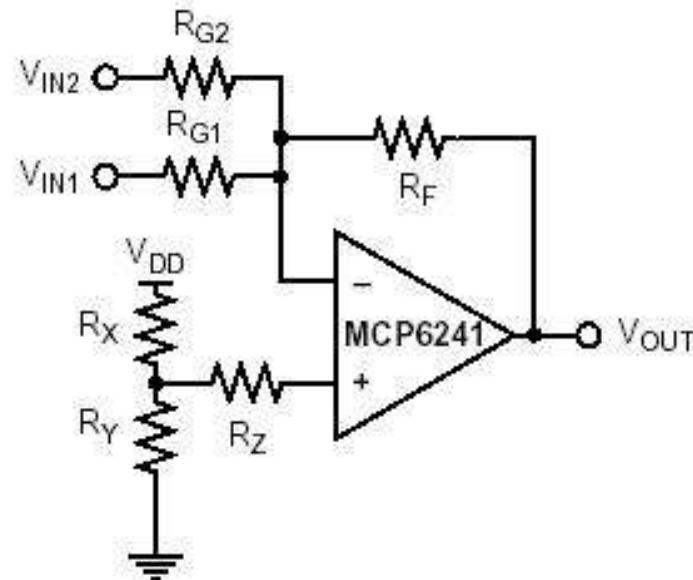
MICROCHIP

MCP6241/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 550kHz (typ.)
- Supply Current: $I_Q = 50\mu A$ (typ.)
- Input Offset Voltage: $\pm 5 \text{ mV}$ (max)
- Supply Voltage: 1.8V to 5.5V
- Rail-to-Rail Input/Output
- Extended Temperature Range:
 -40°C to $+ 125^\circ\text{C}$
- Available in 5-pin SC-70 and SOT-23



Summing Amplifier Circuit

[MCP6231/2/4 >>](#)

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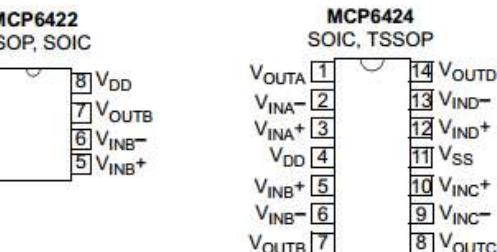
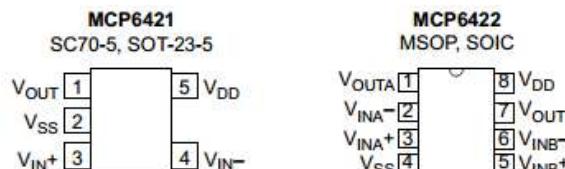
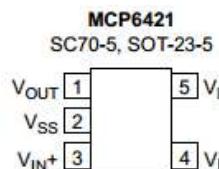
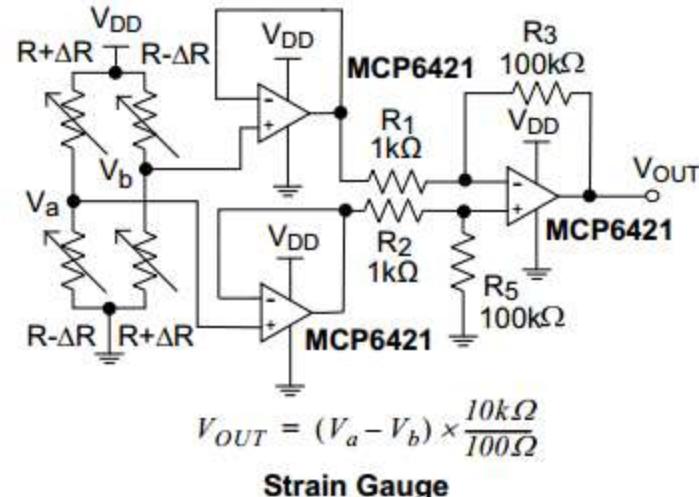
MICROCHIP

MCP6421/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 90kHz (typ.)
- Supply Current: $I_Q = 4.4 \mu\text{A}$ (typ.)
- Input Offset Voltage: $\pm 1 \text{ mV}$ (max)
- Supply Voltage: 1.8V to 5.5V
- Rail-to-Rail Input/Output
- Enhanced EMI Protection:
Electromagnetic Interference Rejection Ratio
(EMIRR) 97 dB at 1.8 GHz
- Extended Temperature Range:
-40°C to + 125°C
- Available in Single, Dual and Quad
Packages



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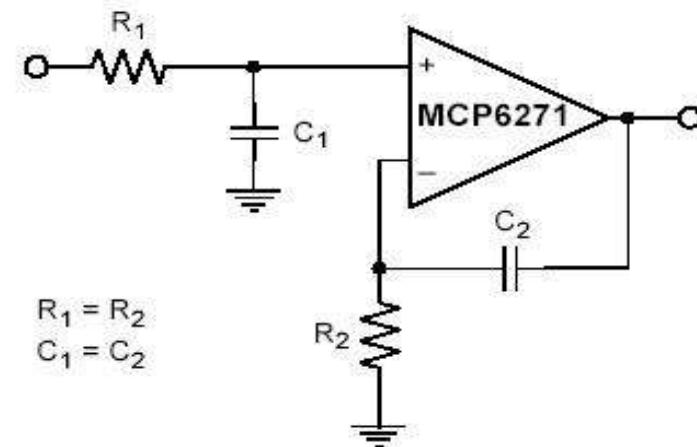
MICROCHIP

Online
Datasheet

MCP6271/2/3/4

Features:

- Gain Bandwidth Product: 2MHz (typ.)
- Supply Current: $I_Q = 170\mu A$ (typ.)
- Input Offset Voltage: $\pm 3 \text{ mV}$ (max)
- Supply Voltage: 2.0V to 6V
- Rail-to-Rail Input/Output
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$
- Available in Single, Dual and Quad Packages



Non-Inverting Integrator

[MCP6275 >>](#)

[MCP6285 >>](#)

[MCP6295 >>](#)

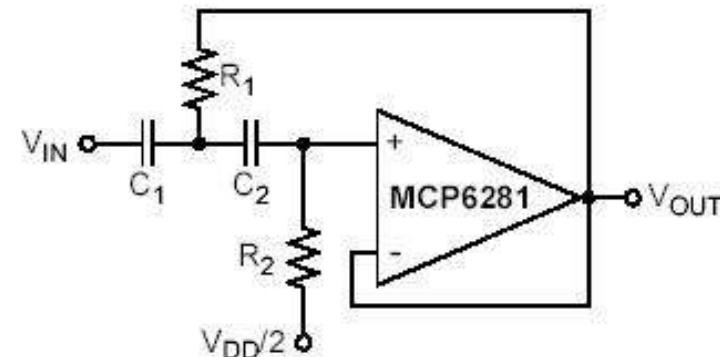
[MCP6281/2/3/4 >>](#)

[MCP6291/2/3/4 >>](#)

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Features:

- Gain Bandwidth Product: 5MHz (typ.)
- Supply Current: $I_Q = 450\mu A$ (typ.)
- Input Offset Voltage: $\pm 3 \text{ mV}$ (max)
- Supply Voltage: 2.2V to 6V
- Rail-to-Rail Input/Output
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$
- Available in Single, Dual and Quad Packages



Sallen-Key Highpass Filter

[MCP6275 >>](#)

[MCP6271/2/3/4 >>](#)

[MCP6285 >>](#)

[MCP6295 >>](#)

[MCP6291/2/3/4 >>](#)

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MICROCHIP

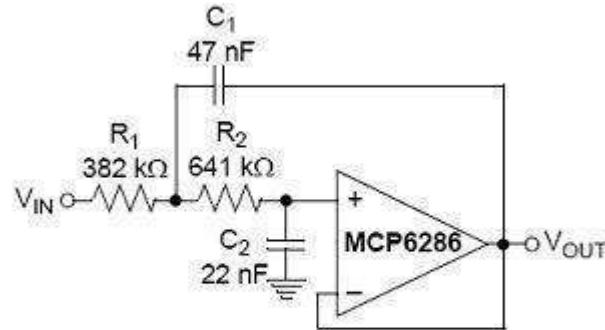
MCP6286

Online
Datasheet

Features:

- Low Noise: $5.4\text{nV}/\sqrt{\text{Hz}}$ (typ.)
- Gain Bandwidth Product: 3.5MHz (typ.)
- Low Quiescent Current: $520\mu\text{A}$ (typ.)
- Input Offset voltage: $\pm 1.5 \text{ mV}$ (max)
- Wide Supply Voltage Range: 2.2V to 5.5V
- PSRR: 100 dB (typ.), CMRR: 95 dB (typ.)
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$
- Unity Gain Stable
- Small Package: SOT- 23

Typical Application



$$f_P = 10 \text{ Hz} \quad G = +1 \text{ V/V}$$

Second-Order, Low-Pass Butterworth Filter

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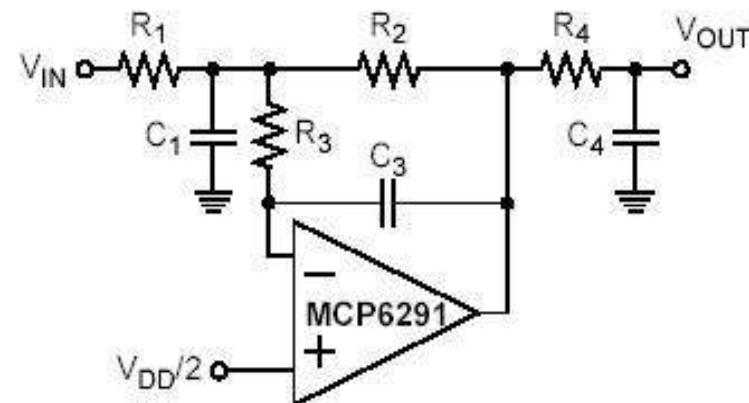
MICROCHIP

MCP6291/2/3/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 10MHz (typ.)
- Supply Current: $I_Q = 1.0$ mA (typ.)
- Supply Voltage: 2.4V to 6V
- Input Offset Voltage: ± 3 mV (max)
- Rail-to-Rail Input/Output
- Extended Temperature Range:
 -40°C to $+125^{\circ}\text{C}$
- Available in Single, Dual and Quad Packages



Multiple Feedback Lowpass Filter

[MCP6275 >>](#)

[MCP6271/2/3/4 >>](#)

[MCP6285 >>](#)

[MCP6281/2/3/4 >>](#)

[MCP6295 >>](#)

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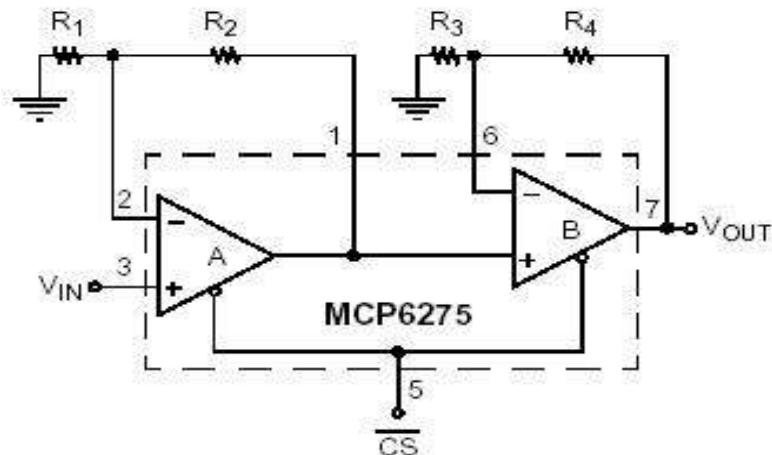
MICROCHIP

MCP6275

Online
Datasheet

Features:

- Gain Bandwidth Product: 2 MHz (typ.)
- Supply Current: $I_Q = 170 \mu\text{A}$ (typ.)
- Input Offset Voltage: $\pm 3 \text{ mV}$ (max)
- Supply Voltage: 2.0V to 6V
- Rail-to-Rail Input/Output
- Dual with Chip Select
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$



Cascaded Gain with Chip Select

[MCP6271/2/3/4 >>](#)

[MCP6285 >>](#)

[MCP6281/2/3/4 >>](#)

[MCP6295 >>](#)

[MCP6291/2/3/4 >>](#)

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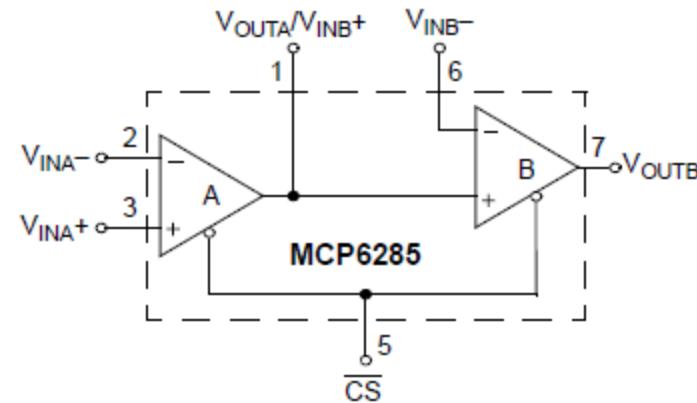
MICROCHIP

MCP6285

Online
Datasheet

Features:

- Gain Bandwidth Product: 2 MHz (typ.)
- Supply Current: $I_Q = 170 \mu\text{A}$ (typ.)
- Input Offset Voltage: $\pm 3 \text{ mV}$ (max)
- Supply Voltage: 2.0V to 6V
- Rail-to-Rail Input/Output
- Dual with Chip Select
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$



Cascaded Gain Amplifier

[MCP6275 >>](#)

[MCP6271/2/3/4 >>](#)

[MCP6281/2/3/4 >>](#)

[MCP6295 >>](#)

[MCP6291/2/3/4 >>](#)

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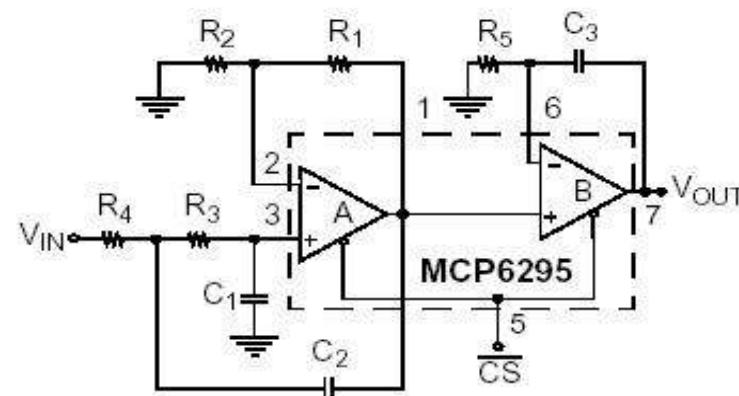
MICROCHIP

MCP6295

Online
Datasheet

Features:

- Gain Bandwidth Product: 10 MHz (typ.)
- Supply Current: $I_Q = 1.0 \text{ mA}$ (typ.)
- Input Offset Voltage: $\pm 3 \text{ mV}$ (max)
- Supply Voltage: 2.4V to 6V
- Rail-to-Rail Input/Output
- Dual with Chip Select
- Extended Temperature Range:
 -40°C to $+125^\circ\text{C}$



Second-Order Sallen-Key Low-Pass Filter with
an Extra Pole-Zero Pair and a Chip Select.

[MCP6275 >>](#)

[MCP6271/2/3/4 >>](#)

[MCP6285 >>](#)

[MCP6281/2/3/4 >>](#)

[MCP6291/2/3/4 >>](#)

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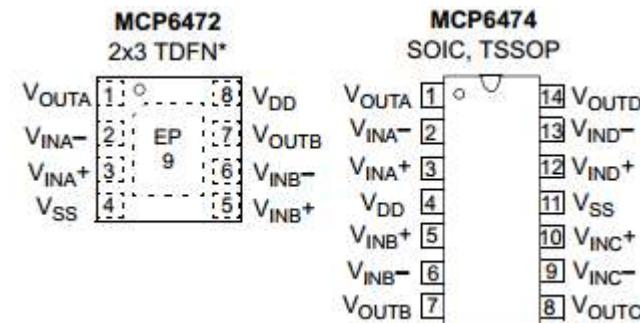
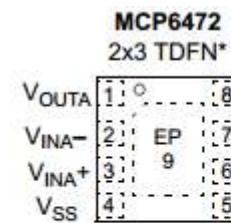
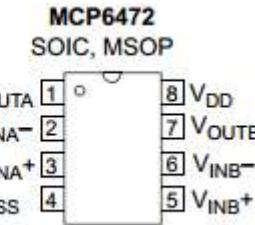
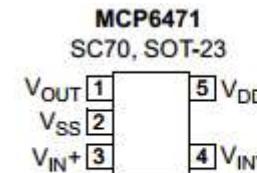
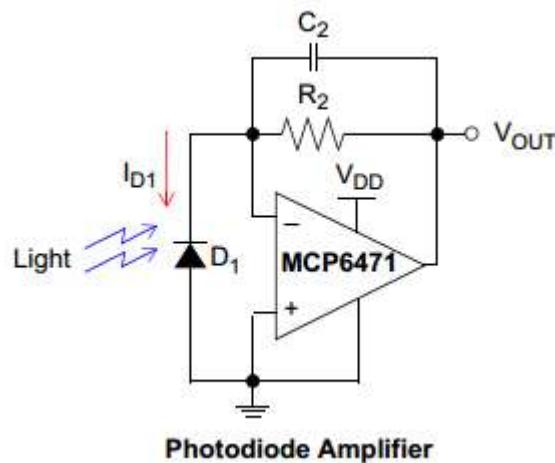
MICROCHIP

MCP6471/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 2 MHz (typ.)
- Supply Current: $I_Q = 100 \mu\text{A}$ (typ.)
- Input Offset Voltage: $\pm 1.5 \text{ mV}$ (max)
- Supply Voltage: 2.0V to 5.5V
- Rail-to-Rail Input/Output
- Extended Temperature Range: -40°C to +125°C
- Available in Single, Dual and Quad Packages



[MCP6481/2/4 >>](#)

[MCP6491/2/4 >>](#)

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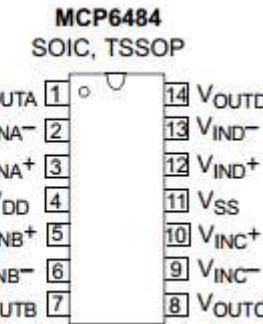
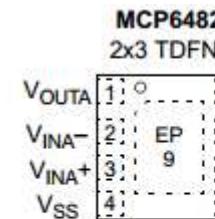
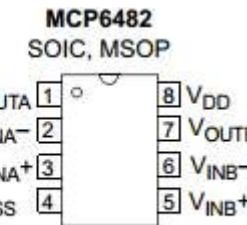
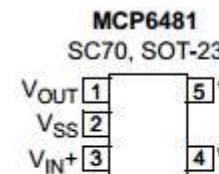
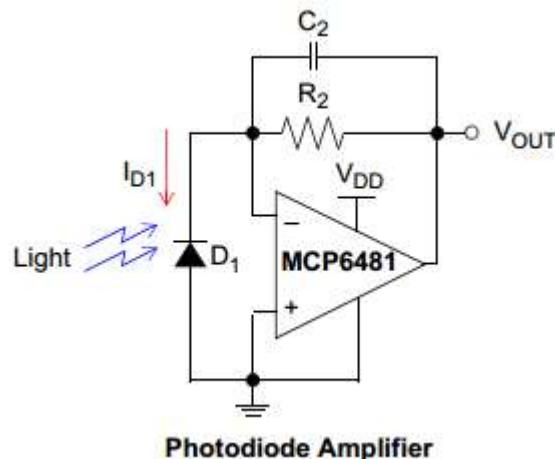
MICROCHIP

MCP6481/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 4 MHz (typ.)
- Supply Current: $I_Q = 240 \mu\text{A}$ (typ.)
- Input Offset Voltage: $\pm 1.5 \text{ mV}$ (max)
- Supply Voltage: 2.0V to 5.5V
- Rail-to-Rail Input/Output
- Extended Temperature Range: -40°C to +125°C
- Available in Single, Dual and Quad Packages



[MCP6471/2/4 >>](#)

[MCP6491/2/4 >>](#)

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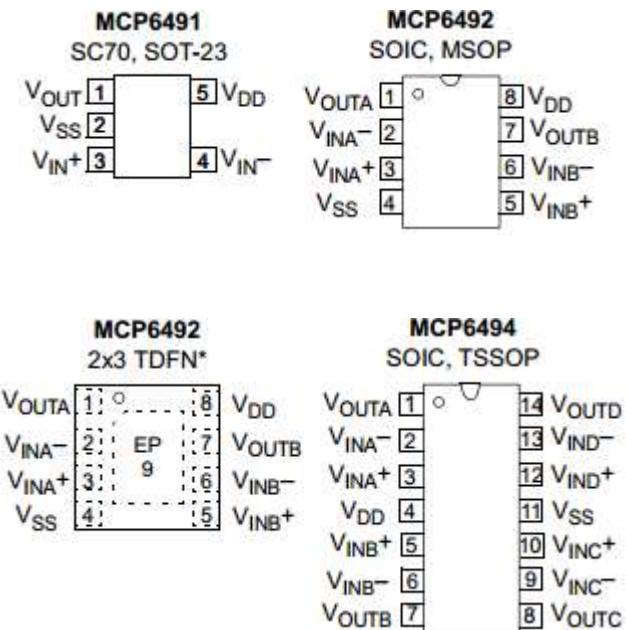
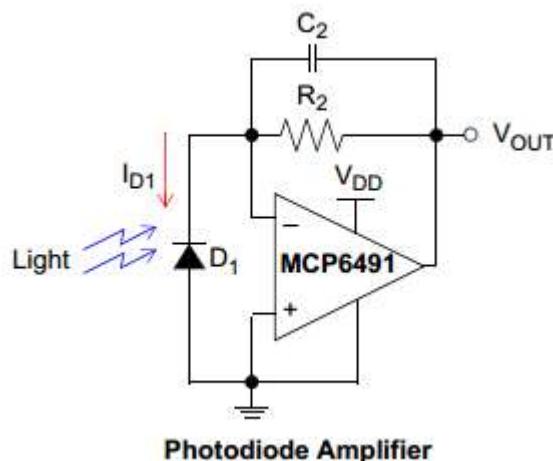
MICROCHIP

MCP6491/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 7.5 MHz (typ.)
- Supply Current: $I_Q = 530 \mu\text{A}$ (typ.)
- Input Offset Voltage: $\pm 1.5 \text{ mV}$ (max)
- Supply Voltage: 2.0V to 5.5V
- Rail-to-Rail Input/Output
- Extended Temperature Range: -40°C to +125°C
- Available in Single, Dual and Quad Packages



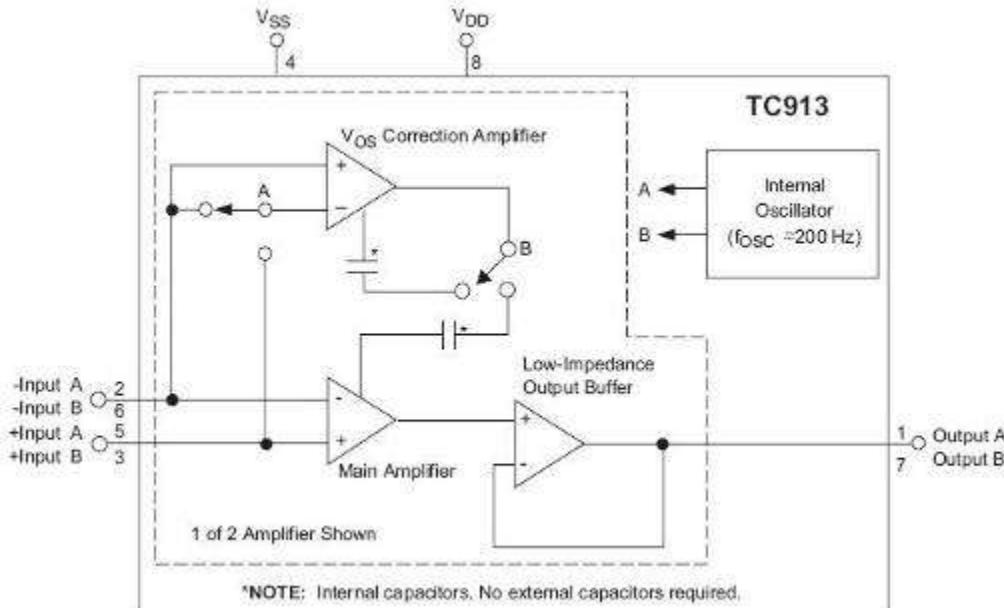
[MCP6471/2/4 >>](#)

[MCP6481/2/4 >>](#)

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Features:

- First Monolithic Dual Auto-Zeroed Operational Amplifier
- Excellent AC Operating Characteristics:
 - Slew Rate; $2.5V/\mu s$
 - Unity-Gain Bandwidth; $1.5MHz$
- Low Supply Current; $650\mu A$
- Chopper Amplifier Performance Without External Capacitors:
 - V_{OS} : $\pm 15\mu V$ (max.)
 - V_{OS} : Drift; $0.15\mu V/\text{ }^{\circ}\text{C}$ (max.)
 - Saves Cost of External Capacitors
- High DC Gain; $120dB$
- Low Input Voltage Noise:
 - $0.65\mu V_{P-P}$ ($0.1Hz$ to $10Hz$)
- Wide Common Mode Voltage Range:
 - V_{SS} to $V_{DD} - 2V$
- High Common Mode Rejection; $116dB$
- Dual or Single Supply Operation:
 - $\pm 3.5V$ to $\pm 8.3V$
 - $+7V$ to $+16V$
- SOIC Packages Available
- Pin Compatible with LM358, OP-14, MC1458, ICL7621, TL082, TLC322





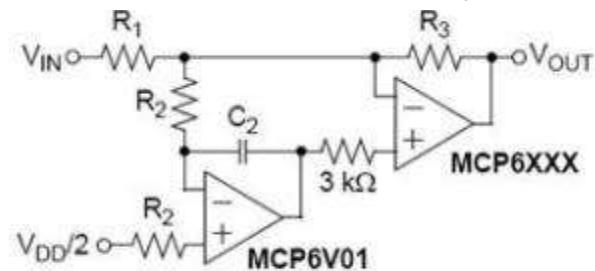
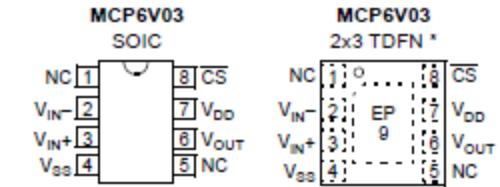
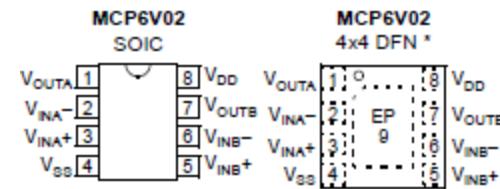
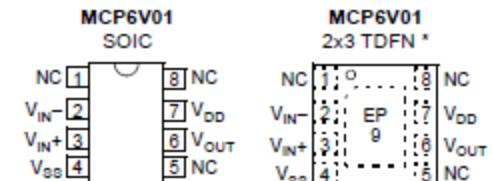
MICROCHIP

MCP6V01/2/3

Online
Datasheet

Features:

- Gain Bandwidth Product: 1.3 MHz (typ.)
- Low Power and Supply Voltages:
 - I_Q : 300 μ A/amplifier (typ.)
 - Wide Supply Voltage Range: 1.8V to 5.5V
- High DC Precision:
 - V_{OS} Drift: $\pm 50\text{nV}/^\circ\text{C}$ (max.)
 - Input Offset Voltage: $V_{OS} = \pm 2 \mu\text{V}$ (max.)
 - AOL: 130 dB (min.)
 - PSRR: 130 dB (min.)
 - CMRR: 130 dB (min.)
 - Eni: 2.5 $\mu\text{V}_{\text{P-P}}$ (typ.), $f = 0.1\text{Hz}$ to 10Hz
 - Eni: 0.79 $\mu\text{V}_{\text{P-P}}$ (typ.), $f = 0.01\text{Hz}$ to 1Hz
- Rail-to-Rail Input/Output
- Unity Gain Stable
- Available in Single and Dual
 - Single with Chip Select (CS): MCP6V03
- Extended Temperature Range:
-40°C to +125°C



Offset Voltage Correction for Power Driver

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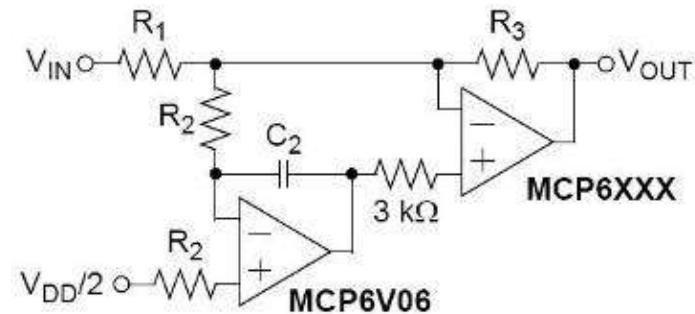
MICROCHIP

MCP6V06/7/8

Online
Datasheet

Features:

- Gain Bandwidth Product: 1.3 MHz (typ.)
- Low Power and Supply Voltages:
 - I_Q : 300 μ A/amplifier (typ.)
 - Wide Supply Voltage Range: 1.8V to 5.5V
- High DC Precision:
 - Input Offset Voltage: $\pm 3 \mu V$ (max.)
 - V_{OS} Drift: $\pm 50 nV/\text{ }^\circ C$ (max.)
 - AOL: 125 dB (min.)
 - PSRR: 125 dB (min.)
 - CMRR: 120 dB (min.)
 - Eni: 1.7 μV_{P-P} (typ.), $f = 0.1\text{Hz to } 10\text{Hz}$
 - Eni: 0.54 μV_{P-P} (typ.), $f = 0.01\text{Hz to } 1\text{Hz}$
- Rail-to-Rail Input/Output
- Unity Gain Stable
- Available in Single and Dual
 - Single with Chip Select (CS): MCP6V08
- Extended Temperature Range: -40°C to 125°C

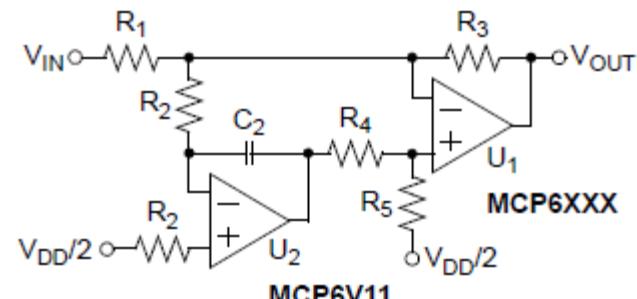
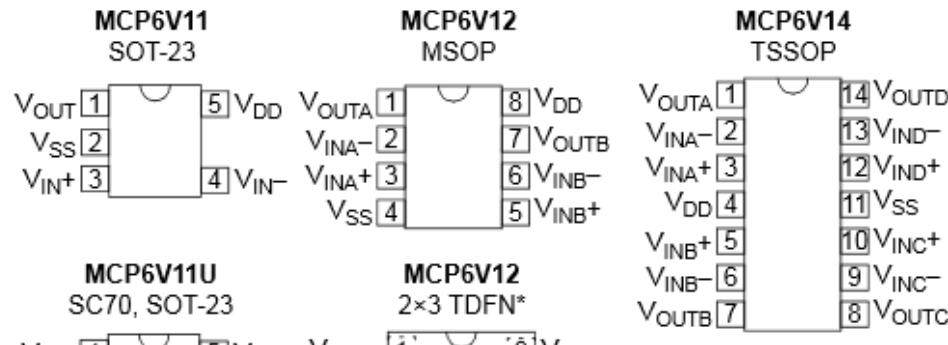


Offset Voltage Correction for Power Driver

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Features:

- Gain Bandwidth Product: 80 kHz (typ.)
- Low Power and Supply Voltages:
 - I_Q : 7.5 μ A/amplifier (typ.)
 - Wide Supply Voltage Range: 1.6V to 5.5V
- High DC Precision:
 - Input Offset Voltage: $\pm 8 \mu$ V (max.)
 - V_{OS} Drift: $\pm 50 \text{nV}/^\circ\text{C}$ (max.)
 - AOL: 112 dB (min.)
 - PSRR: 118 dB (min.)
 - CMRR: 119 dB (min.)
 - Eni: 2.1 μ V_{P-P} (typ.), f = 0.1Hz to 10Hz
 - Eni: 0.67 μ V_{P-P} (typ.), f = 0.01Hz to 1Hz
- Rail-to-Rail Input/Output
- Unity Gain Stable
- Small Packages:
 - Singles in SC70, SOT-23
 - Duals in MSOP-8, 2x3 TDFN
 - Quad in TSSOP-14
- Extended Temperature Range: -40°C to 125°C



Offset Voltage Correction for Power Driver



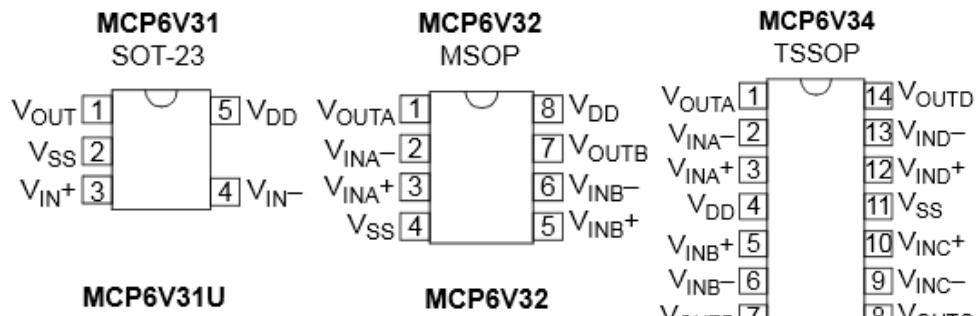
MICROCHIP

MCP6V31/2/4

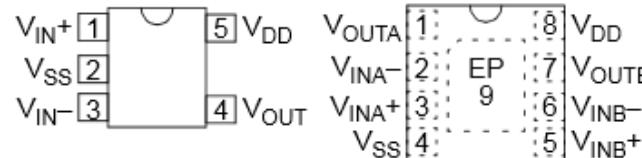
Online
Datasheet

Features:

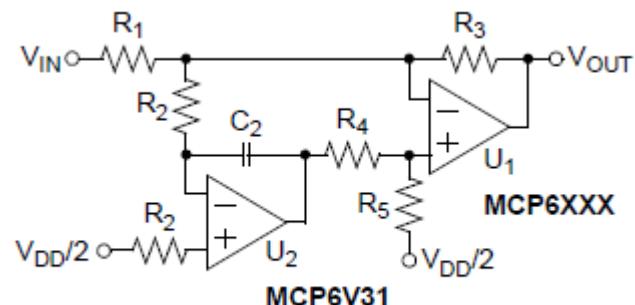
- Gain Bandwidth Product: 300 kHz (typ.)
- Low Power and Supply Voltages:
 - I_Q : 23 μ A/amplifier (typ.)
 - Wide Supply Voltage Range: 1.8V to 5.5V
- High DC Precision:
 - Input Offset Voltage: $\pm 8 \mu$ V (max.)
 - V_{OS} Drift: $\pm 50\text{nV}/^\circ\text{C}$ (max.)
 - AOL: 120 dB (min.)
 - PSRR: 120 dB (min.)
 - CMRR: 120 dB (min.)
 - Eni: 1.0 μ V_{P-P} (typ.), f = 0.1Hz to 10Hz
 - Eni: 0.33 μ V_{P-P} (typ.), f = 0.01Hz to 1Hz
- Rail-to-Rail Input/Output
- Unity Gain Stable
- Small Packages:
 - Singles in SC70, SOT-23
 - Duals in MSOP-8, 2x3 TDFN
 - Quad in TSSOP-14
- Extended Temperature Range: -40°C to 125°C



MCP6V31U
SC70, SOT-23



MCP6V32
2x3 TDFN *



Offset Voltage Correction for Power Driver

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MICROCHIP

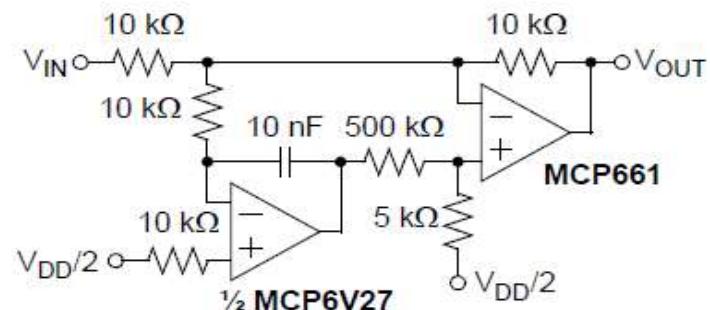
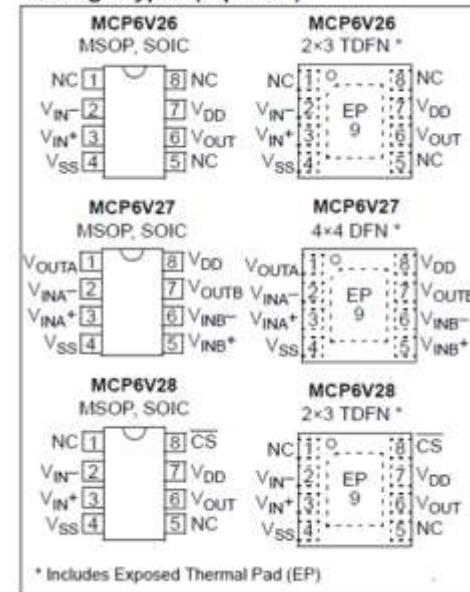
MCP6V26/7/8

Online
Datasheet

Features:

- Gain Bandwidth Product: 2 MHz (typ.)
- Supply Current: 620 μ A/amplifier (typ.)
- Input Offset Voltage (max): $\pm 2 \mu$ V (max.)
- Supply Voltage Range: 2.3V to 5.5V
- Dual Channel
- High DC Precision:
 - VOS Drift: $\pm 50 \text{ nV}/^\circ\text{C}$ (max.)
 - AOL: 133 dB (min.)
 - PSRR: 125 dB (mini.)
 - CMRR: 125 dB (min.)
 - Eni: 1 μ Vp-P (typ.), $f = 0.1 \text{ Hz}$ to 10 Hz
 - Eni: 0.32 μ Vp-p (typ.), $f = 0.01 \text{ Hz}$ to 1 Hz
- Rail-to-Rail Input/Output
- Unity Gain Stable
- 8-Pin SOIC and 4x4 DFN Packages
- Extended Temperature Range: -40°C to +125°C

Package Types (top view)



Offset Voltage Correction for Power Driver

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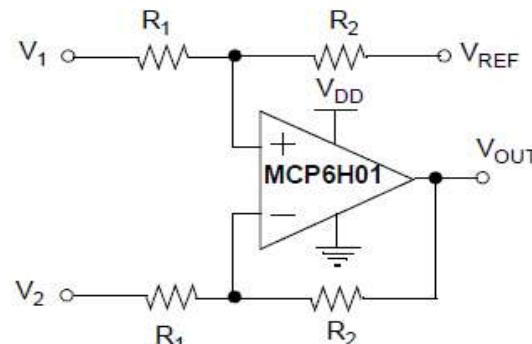
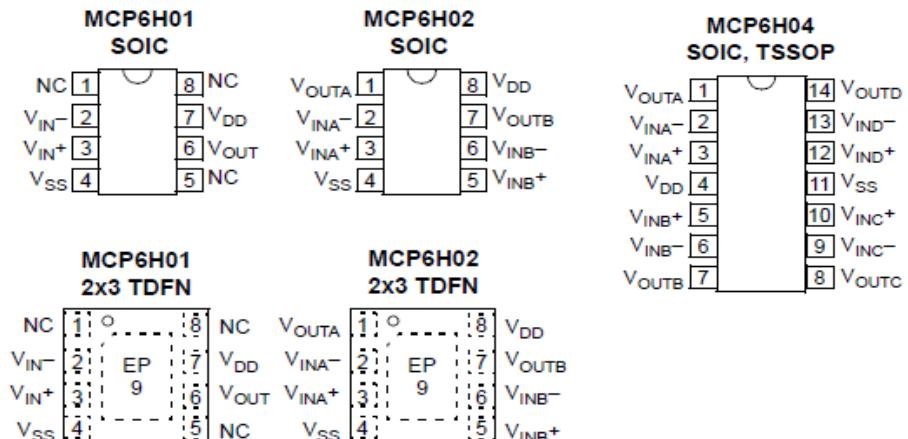
MICROCHIP

MCP6H01/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 1.2 MHz (typ.)
- Supply Current: 135 μ A/amplifier (typ.)
- Input Offset Voltage (max): ± 3.5 mV
- Supply Voltage: 3.5V to 16V
- High DC Precision:
 - V_{OS} Drift: ± 2.5 μ V V/ $^{\circ}$ C (max.)
 - PSRR: 87 dB (min.)
 - CMRR: 78 dB (min.)
- Rail-to-Rail Output
- Unity Gain Stable
- Available in
 - Single: MCP6H01
 - Dual: MCP6H02
 - Quad: MCP6H04
- Extended Temperature Range: -40 $^{\circ}$ C to 125 $^{\circ}$ C



Difference Amplifier

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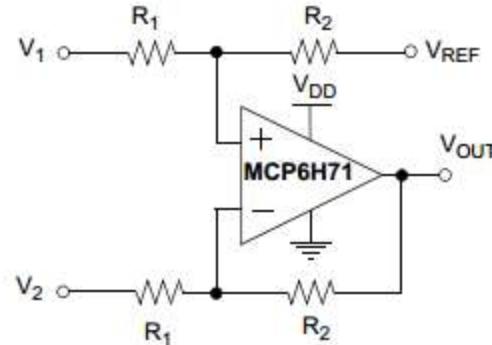
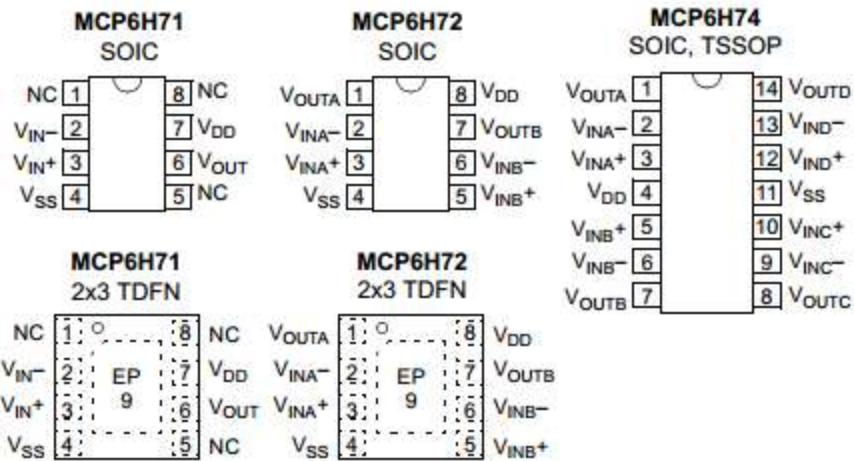
MICROCHIP

MCP6H71/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 2.7 MHz (typical)
- Supply Voltage Range:
 - Single-Supply Operation: 3.5V to 12V
 - Dual-Supply Operation: $\pm 1.75V$ to $\pm 6V$
- Input Offset Voltage: ± 1 mV (typical)
- Quiescent Current: 480 μA (typical)
- Common Mode Rejection Ratio: 103 dB (typical)
- Power Supply Rejection Ratio: 105 dB (typical)
- Rail-to-Rail Output
- Slew Rate: 2 V/ μs (typical)
- Unity Gain Stable
- Extended Temperature Range: -40°C to +125°C



Difference Amplifier

[MCP6H8x >>](#)

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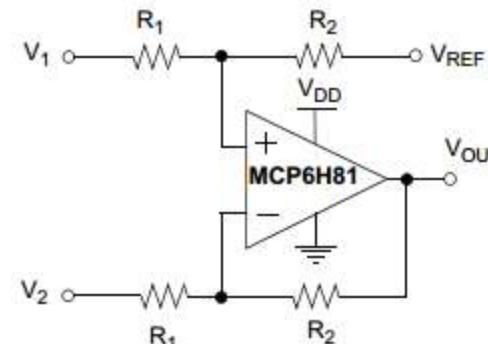
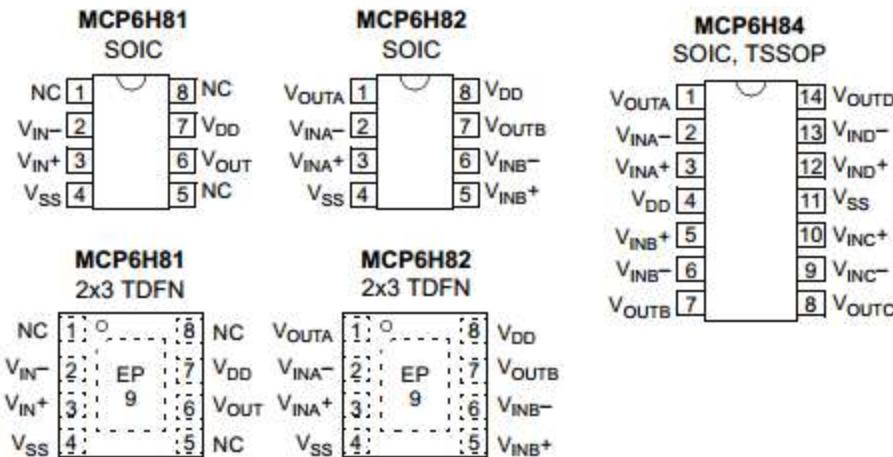
MICROCHIP

MCP6H81/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 5.5 MHz (typ.)
- Supply Voltage Range:
 - Single-Supply Operation: 3.5V to 12V
 - Dual-Supply Operation: $\pm 1.75V$ to $\pm 6V$
- Quiescent Current: 0.7 mA/amplifier (typ.)
- Input Offset Voltage: ± 1 mV (typ.)
- Common Mode Rejection Ratio: 100 dB (typ.)
- Power Supply Rejection Ratio: 102 dB (typ.)
- Rail-to-Rail Output
- Gain Bandwidth Product: 5.5 MHz (typical)
- Slew Rate: 5 V/ μ s (typical)
- Unity Gain Stable
- Extended Temperature Range: -40°C to +125°C



Difference Amplifier

[MCP6H7x >>](#)

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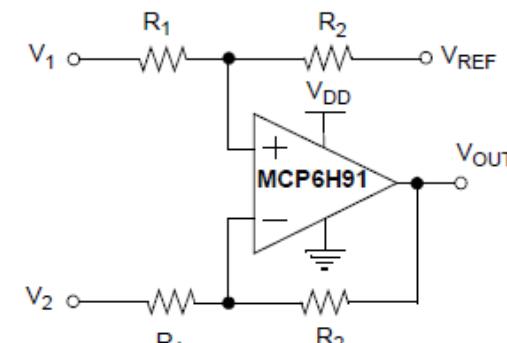
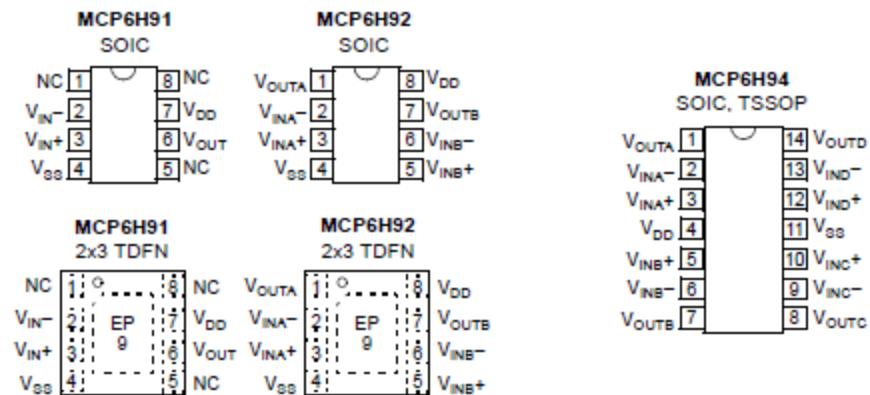
MICROCHIP

MCP6H91/2/4

Online
Datasheet

Features:

- Gain Bandwidth Product: 10 MHz (typ.)
- Supply Current: 2 mA/amplifier (typ.)
- Input Offset Voltage (max): ± 4 mV
- Supply Voltage: 3.5V to 12V
- High DC Precision:
 - V_{OS} Drift: $\pm 4 \mu V/{\circ}C$ (max.)
 - PSRR: 75 dB (min.)
 - CMRR: 75 dB (min.)
- Rail-to-Rail Output
- Unity Gain Stable
- Available in
 - Single: MCP6H91
 - Dual: MCP6H92
 - Quad: MCP6H94
- Extended Temperature Range: -40°C to 125°C



Difference Amplifier

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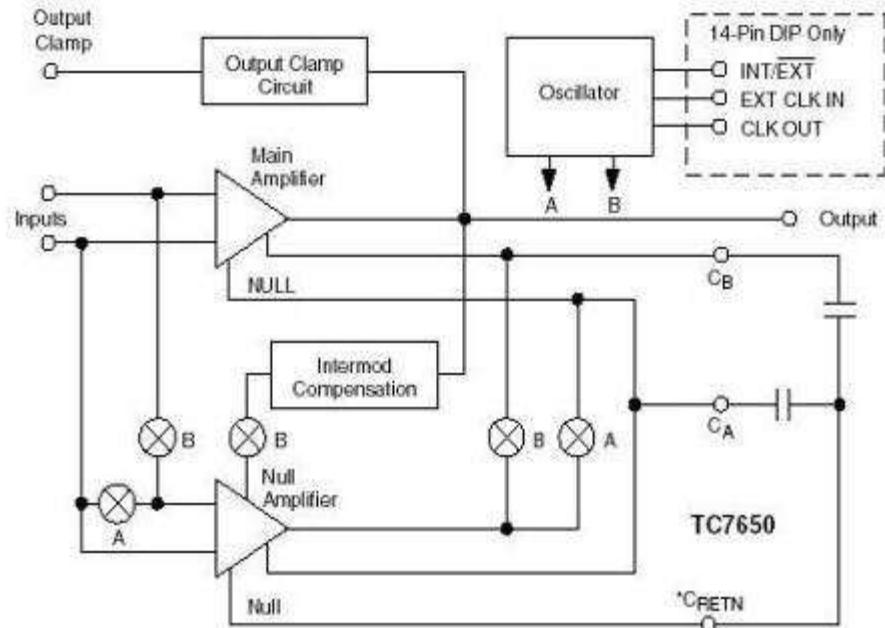
MICROCHIP

TC7650

Online
Datasheet

Features:

- Gain Bandwidth: 2 MHz
- Supply current: 3.5 mA (max)
- Low Input Offset Voltage: $\pm 5 \mu\text{V}$ (typ.)
- Supply Voltage Range: 4.5V to 16V
- Low Input Offset Voltage Drift: $0.05 \mu\text{V}/^\circ\text{C}$ (max.)
- Low Input Bias Current: 10pA (max.)
- High Impedance Differential CMOS Inputs: $10^{12}\Omega$
- High Open Loop Voltage Gain: 120dB (min.)
- Low Input Noise Voltage: $2.0 \mu\text{V}_{\text{P-P}}$
- High Slew Rate: $2.5\text{V}/\mu\text{s}$
- Low Power Operation: 20mW
- Output Clamp Speeds Recovery Time
- Compensated Internally for Stable Unity Gain
- Direct Replacement for ICL7650
- Available in 8-Pin PDIP and 14-Pin PDIP



* For 8-Pin DIP, connect to V_{SS}

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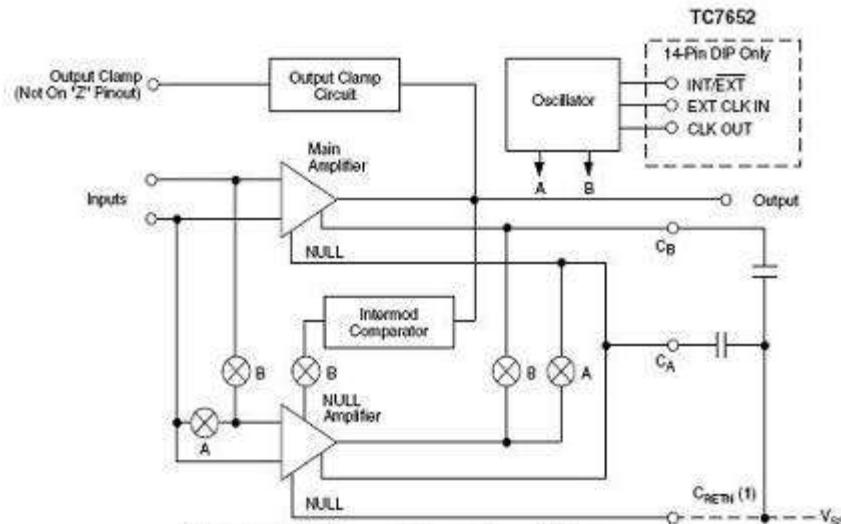
MICROCHIP

TC7652

Online
Datasheet

Features:

- Gain Bandwidth Product: 0.4 MHz
- Supply Current: 3 mA (max)
- Low Offset Over Temperature Voltage: 10 μ V
- Supply Voltage Range: 5V to 16V
- Ultra Low Long Term Drift: 150nV/month
- Low Temperature Drift: 100nV/ $^{\circ}$ C
- Low DC Input Bias Current: 15pA
- High Gain, CMRR and PSRR: 110dB (min.)
- Low Input Noise Voltage: 0.2 μ V_{P-P} (DC to 1Hz)
- Compensated Internally for Stable Unity Gain
- Clamp circuit for Fast Overload Recovery



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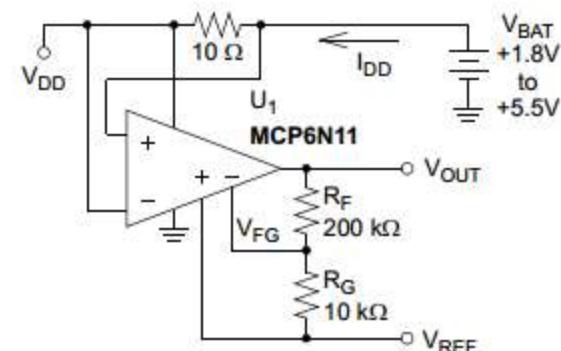
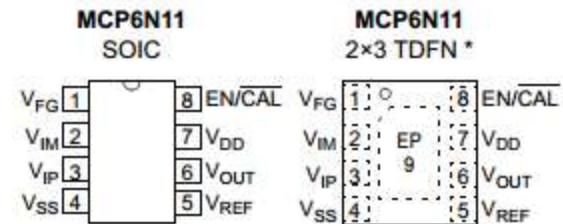


MCP6N11

Online Datasheet

Features:

- Bandwidth: 500 kHz (typical, Gain = GMIN)
 - Rail-to-Rail Input and Output
 - Gain Set by 2 External Resistors
 - Minimum Gain (GMIN) Options: n1, 2, 5, 10 or 100 V/V
 - Common Mode Rejection Ratio (CMRR): 115 dB
(typical, GMIN = 100)
 - Power Supply Rejection Ratio (PSRR): 112 dB
(typical, GMIN = 100)
 - Supply Current: 800 μ A/channel (typical)
 - Single Channel
 - Enable/VOS Calibration pin: (EN/CAL)
 - Power Supply: 1.8V to 5.5V
 - Extended Temperature Range: -40°C to +125°C



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MICROCHIP

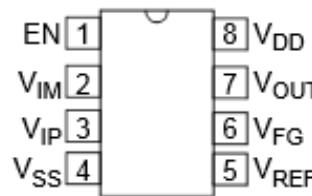
MCP6N16

Online
Datasheet

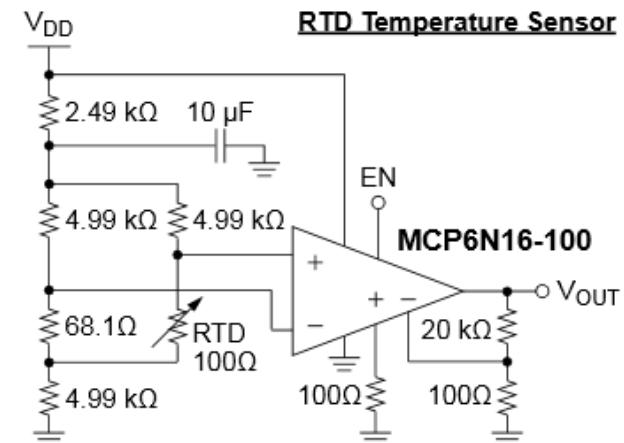
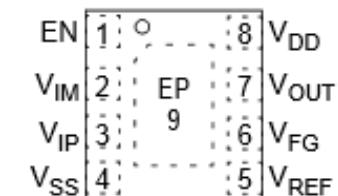
Features:

- Zero-Drift Architecture
 - Low V_{os} , 17 μV ($G_{min} = 100$)
 - Low offset drift: $\pm 60 \text{ nV}/^\circ\text{C}$
 - No 1/f noise
 - CMRR: 112 dB minimum
 - PSRR: 110 dB minimum
- Flexibility
 - Rail to rail input/output
 - Gain set by two external resistors
- Enhanced EMI Protection
- Bandwidth of 500 kHz
- Operating voltage: 1.8 to 5.5V

MCP6N16
MSOP



MCP6N16
3x3 DFN *



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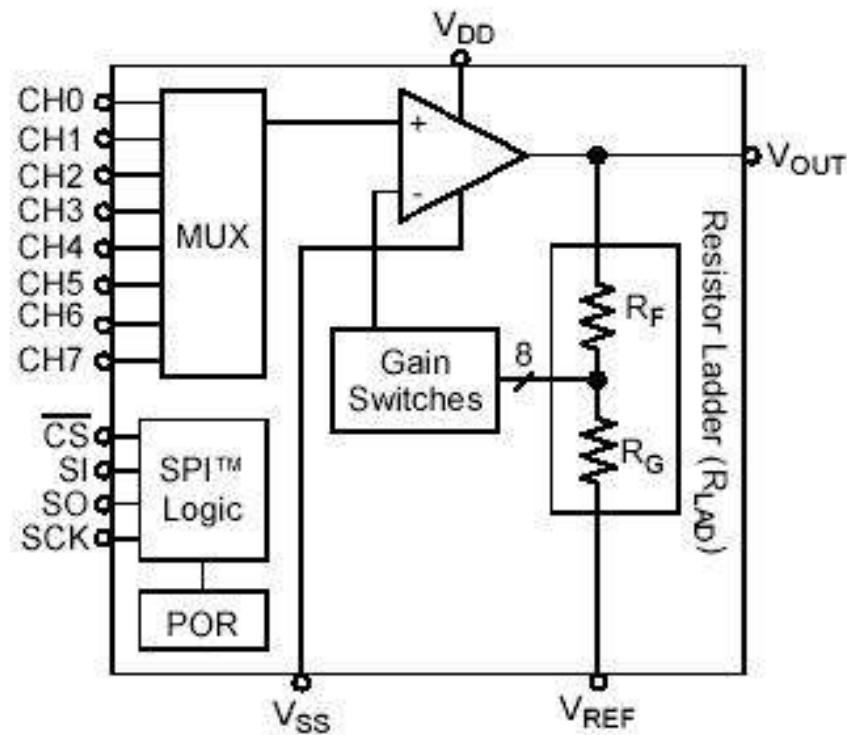
MICROCHIP

MCP6S21/2/6/8

Online
Datasheet

Features:

- Multiplexed Inputs: 1, 2, 6 or 8 Channels
- 8 Gain Selections:
+1, +2, +4, +5, +8, +10, +16, or +32 V/V
- Serial Peripheral Interface (SPI)
- Rail-to-Rail Input and Output
- Low Gain Error: $\pm 1\%$ (max.)
- Low Offset: $\pm 275\mu\text{V}$ (max.)
- High Bandwidth: 2 to 12MHz (typ.)
- Low Noise: $10\text{nV}/\sqrt{\text{Hz}}$ @ 10kHz (typ.)
- Low Supply Current 1.0mA (typ.)
- Single Supply: 2.5V to 5.5V



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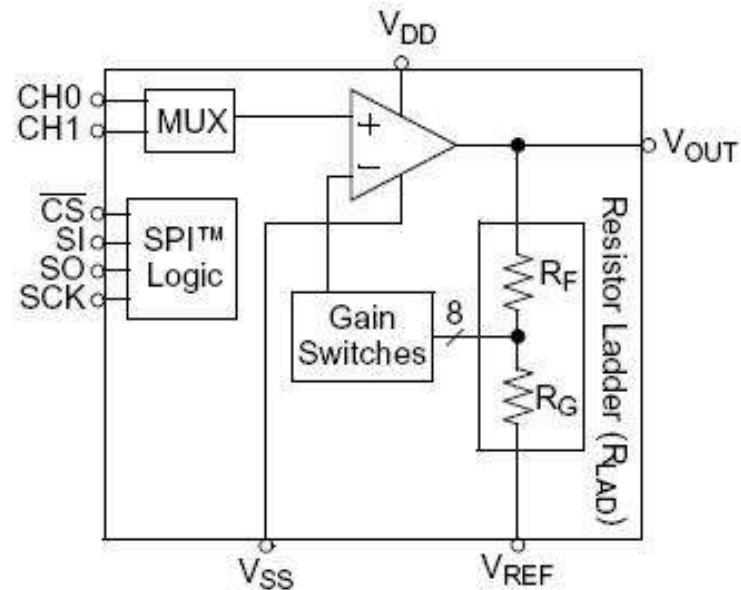
MICROCHIP

MCP6S91/2/3

Online
Datasheet

Features:

- Multiplexed Inputs: 1 or 2 Channels
- 8 Gain Selections:
+1, +2, +4, +5, +8, +10, +16, or +32 V/V
- Serial Peripheral Interface (SPI)
- Rail-to-Rail Input and Output
- Low Gain Error: $\pm 1\%$ (max.)
- Offset Mismatch Between Channels: $0\mu\text{V}$
- High Bandwidth: 1 to 18MHz (typ.)
- Low Noise: $10 \text{ nV}/\sqrt{\text{Hz}}$ @ 10kHz (typ.)
- Low Supply Current 1.0mA (typ.)
- Single Supply: 2.5V to 5.5V
- Extended Temperature Range: -40°C to +125°C



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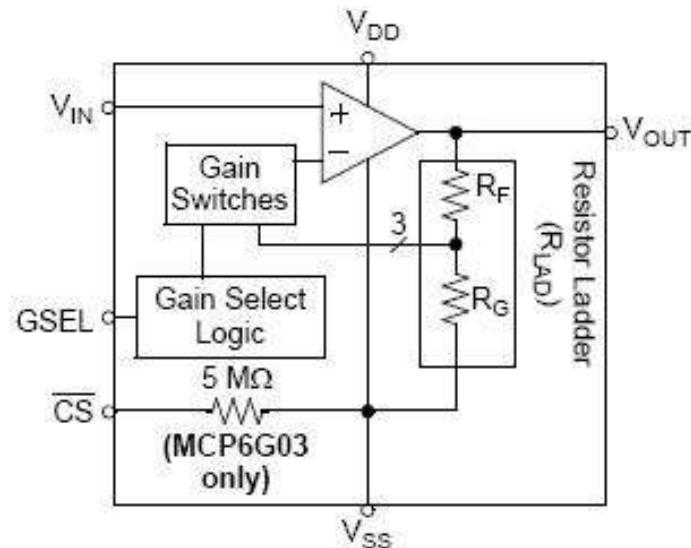
MICROCHIP

MCP6G01/2/3/4

Online
Datasheet

Features:

- 3 Gain Selections:
+1, +10, +50 V/V
- One Gain Select Input per Amplifier
- Rail-to-Rail Input and Output
- Low Gain Error: $\pm 1\%$ (max.)
- High Bandwidth: 250 to 900kHz (typ.)
- Low Supply Current: 110 μ A (typ.)
- Single Supply: 1.8V to 5.5V
- Extended Temperature Range: -40°C to +125°C



Gain (V/V)	GSEL Voltage (Typ.) (V)
1	$V_{DD}/2$ (or open)
10	0
50	V_{DD}

Note: V_{ss} is assumed to be 0V

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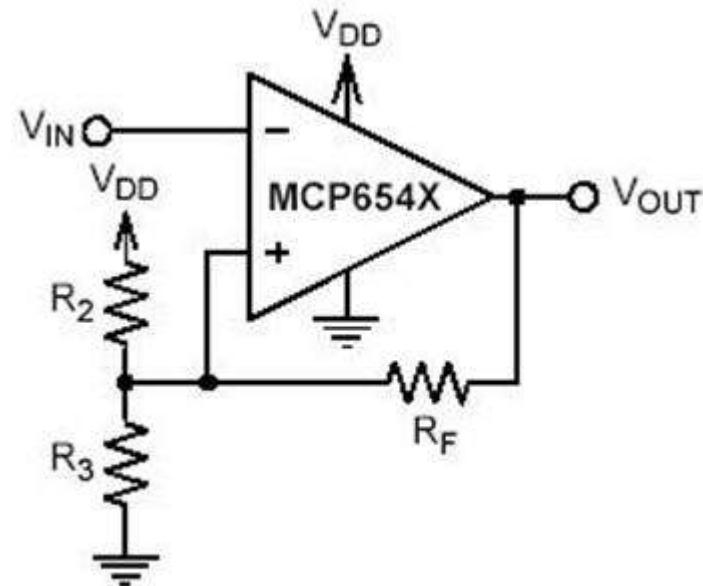
MICROCHIP

Online
Datasheet

MCP6541/2/3/4

Features:

- Low Quiescent Current: 600nA/comparator (typ.)
- Rail-to-Rail Input: V_{SS} -0.3V to V_{DD} +0.3V
- CMOS/TTL-Compatible Output
- Propagation Delay: 4 μ s (typ.), 100mV Overdrive
- Wide Supply Voltage Range: 1.6V to 5.5V
- Available in Single, Dual and Quad
- Single available in SOT-23-5, SC-70-5
- Chip Select (CS) with MCP6543
- Low Switching Current
- Internal Hysteresis: 3.3mV (typ.)
- Temperature Ranges:
 - Industrial: -40°C to +85°C
 - Extended: -40°C to +125°C



Inverting Circuit With Hysteresis

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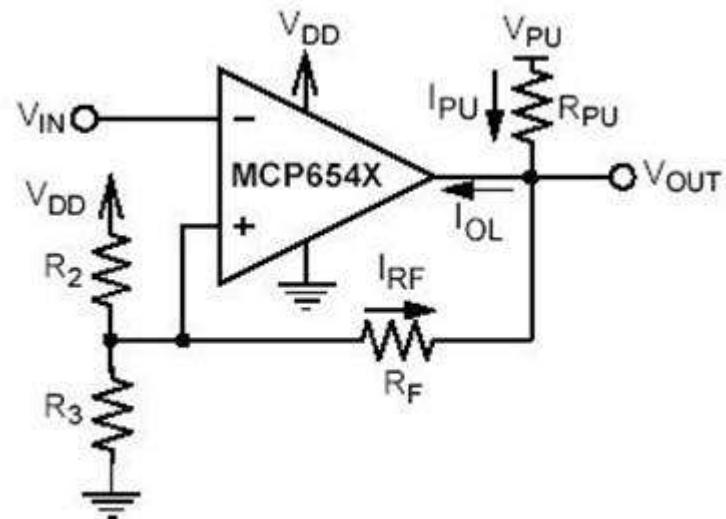
MICROCHIP

MCP6546/7/8/9

Online
Datasheet

Features:

- Low Quiescent Current:
600nA/comparator (typ.)
- Rail-to-Rail Input: $V_{SS} -0.3V$ to $V_{DD} +0.3V$
- Open-Drain Output: $V_{OUT} \leq 10V$
- Propagation Delay: 4 μs (typ.),
100 mV Overdrive
- Wide Supply Voltage Range: 1.6V to 5.5V
- Single available in SOT-23-5, SC-70-5
- Available in Single, Dual and Quad
- Chip Select (CS) with MCP6548
- Low Switching Current
- Internal Hysteresis: 3.3mV (typ.)
- Temperature Range:
 - Industrial: -40°C to +85°C
 - Extended: -40°C to +125°C

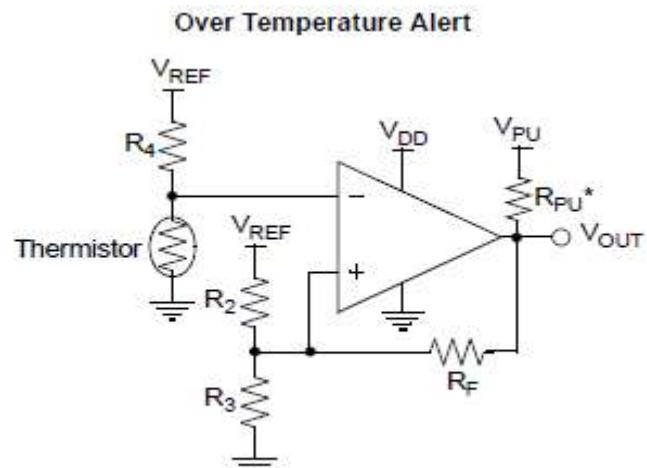
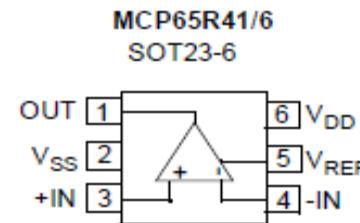


Inverting circuit with hysteresis

<< BACK

Features:

- Integrated Reference Voltage
 - Factory Set Reference Voltage: 1.21V or 2.4V
 - Tolerance: $\pm 1\%$ (typ.)
- Low Quiescent Current: 2.5 μ A (typ.)
- Propagation Delay: 4 μ s (typ.), 100mV Overdrive
- Input Offset Voltage: $\pm 3\text{mV}$ (typ.)
- Rail-to-Rail Input: V_{SS} -0.3V to V_{DD} +0.3V
- CMOS/TTL-Compatible Output
- Wide Supply Voltage Range: 1.8V to 5.5V
- Output Options:
 - MCP65R41 Push-Pull
 - MCP65R46 Open-Drain
- SOT-23-6
- Extended Temperature Ranges: -40°C to +125°C



* Pull-up resistor required for the MCP65R46 only.



MICROCHIP

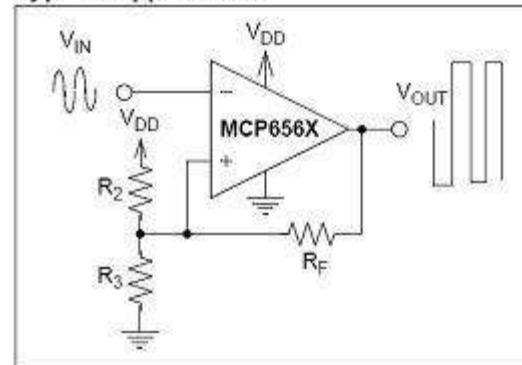
MCP6561/1R/2/4

Online
Datasheet

Features:

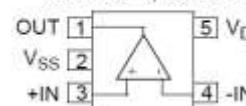
- Propagation Delay at 1.8V_{DD}:
 - 56ns (typ.) High to Low
 - 49ns (typ.) Low to High
- Low Quiescent Current: 100µA (typ.)
- Input Offset Voltage: ±3mV (typ.)
- Rail-to-Rail Input: V_{SS} -0.3V to V_{DD} +0.3V
- CMOS/TTL Compatible Output
- Wide Supply Voltage Range: 1.8V to 5.5V
- Available in Single, Dual, and Quad
- Packages: SC70-5, SOT-23-5, SOIC, MSOP, TSSOP

Typical Application



MCP6561

SOT-23-5, SC70-5



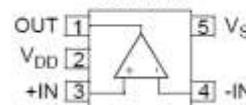
MCP6562

SOIC, MSOP



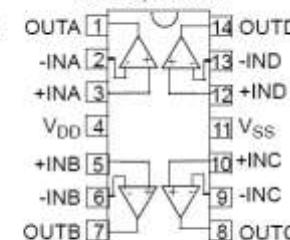
MCP6561R

SOT-23-5



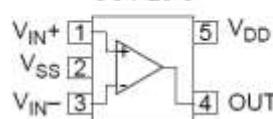
MCP6564

SOIC, TSSOP



MCP6561U

SOT-23-5



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MICROCHIP

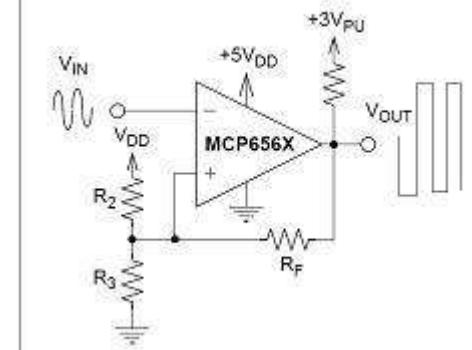
MCP6566/6R/7/9

Online
Datasheet

Features:

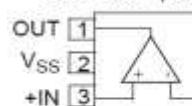
- Propagation Delay at 1.8V_{DD}:
 - 56ns (typ.) High to Low
- Low Quiescent Current: 100µA (typ.)
- Input Offset Voltage: ±3mV (typ.)
- Rail-to-Rail Input: V_{SS} -0.3V to V_{DD} +0.3V
- Open-Drain Output
- Wide Supply Voltage Range: 1.8V to 5.5V
- Available in Single, Dual, and Quad
- Packages: SC70, SOT-23-5, SOIC, MSOP, TSSOP

Typical Application



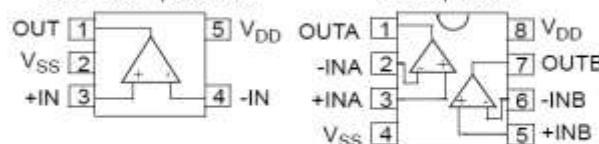
MCP6566

SOT-23-5, SC70-5



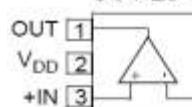
MCP6568

SOIC, MSOP



MCP6566R

SOT-23-5



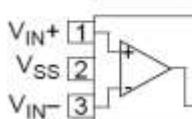
MCP6569

SOIC, TSSOP



MCP6566U

SOT-23-5



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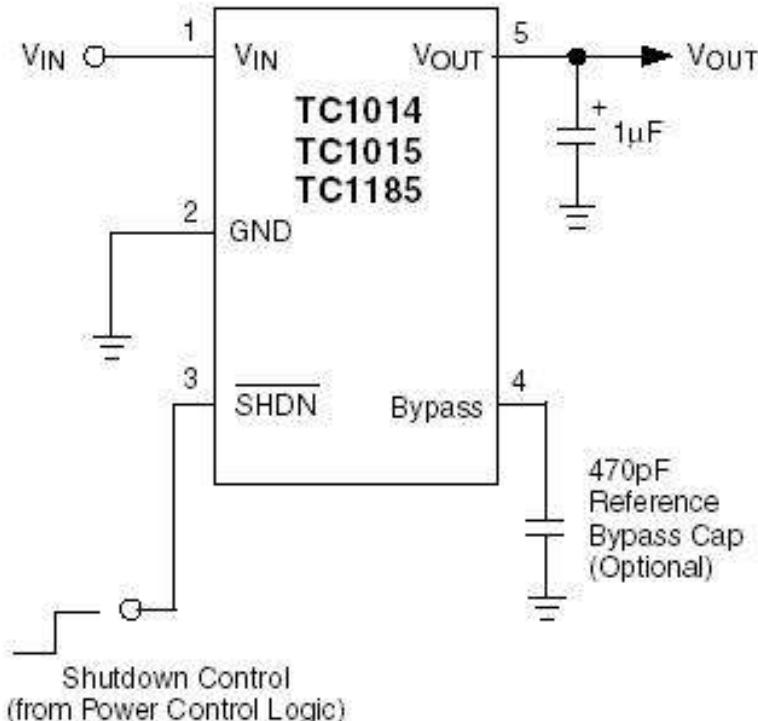
MICROCHIP

TC1014

Online
Datasheet

Features:

- Low Supply Current: 50 μ A (typ.)
- Low Dropout Voltage
- Choice of 50mA (TC1014), 100mA (TC1015) and 150mA (TC1185) Output
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Reference Bypass Input for Ultra Low-Noise Operation
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin-Compatible Upgrades for Bipolar Regulators



[TC1054 >>](#)

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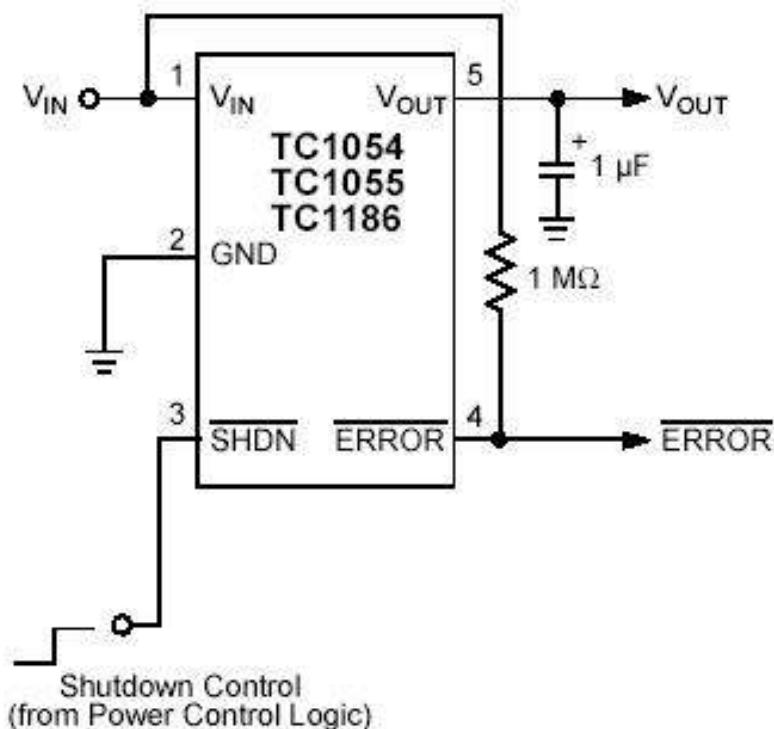
MICROCHIP

TC1054

Online
Datasheet

Features:

- Low Ground Current for Longer Battery Life
- Low Dropout Voltage
- Choice of 50mA (TC1054), 100mA (TC1055) and 150mA (TC1186) Output
- High Output Voltage Accuracy
- Power-Saving Shutdown Mode
- ERROR Output Can Be Used as a Low Battery Detector or Microcontroller Reset Generator
- Overcurrent and Overtemperature Protection
- 5-Pin SOT-23 Package
- Pin Compatible Upgrades for Bipolar Regulators



[TC1014 >>](#)

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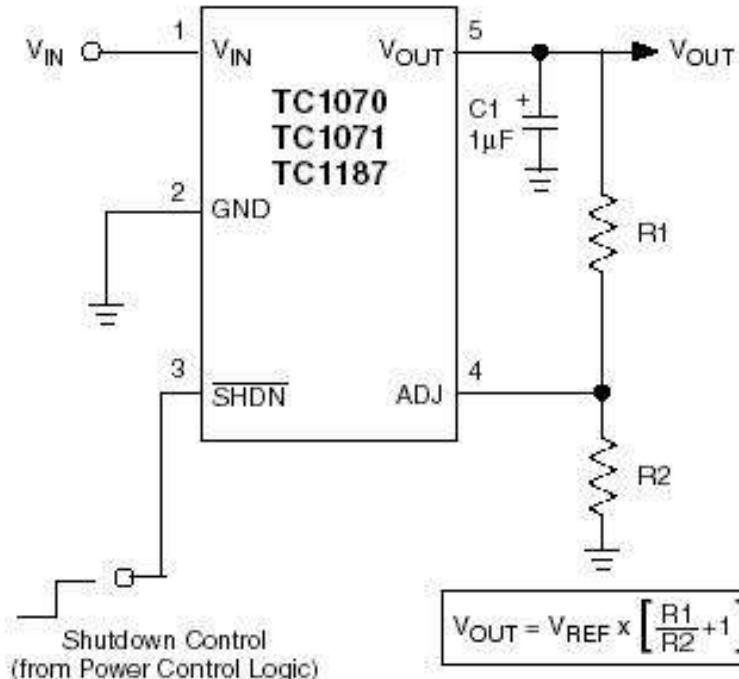
MICROCHIP

TC1070

Online
Datasheet

Features:

- 50 μ A Ground Current for Longer Battery Life
- Adjustable Output Voltage
- Very Low Dropout Voltage
- Choice of 50mA (TC1070), 100mA (TC1071) and 150mA (TC1187) Output
- Power-Saving Shutdown Mode
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin Compatible with Bipolar Regulators



[TC1072 >>](#)

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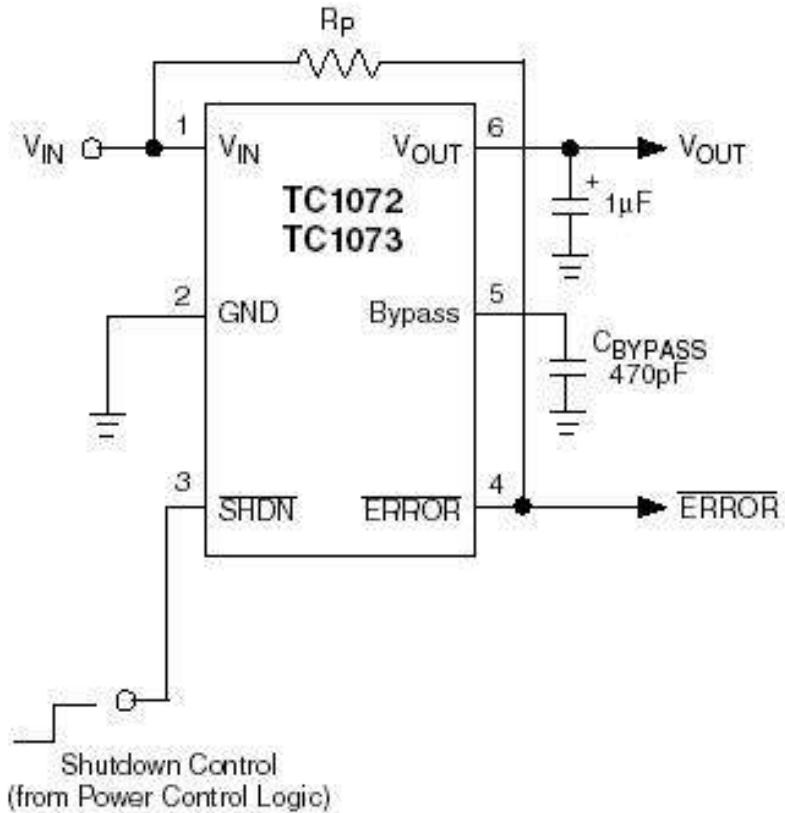
MICROCHIP

TC1072

Online
Datasheet

Features:

- 50 μ A Ground Current for Longer Battery Life
- Very Low Dropout Voltage
- Choice of 50mA (TC1072) and 100mA (TC1073) Output
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- ERROR Output Can Be Used as a Low Battery Detector or Processor Reset Generator
- Bypass Input for Low Noise Operation
- Overcurrent and Overtemperature Protection
- Space-Saving 6-Pin SOT-23 Package
- Pin Compatible Upgrades for Bipolar Regulators
- Standard Output Voltage Options:
1.8V, 2.5V, 2.6V, 2.7V, 2.8V, 2.85V, 3.0V,
3.3V, 3.6V, 4.0V, 5.0V
- Other output voltages are available. Please contact Microchip Technology Inc. for details.



Shutdown Control
(from Power Control Logic)

[TC1070 >>](#)

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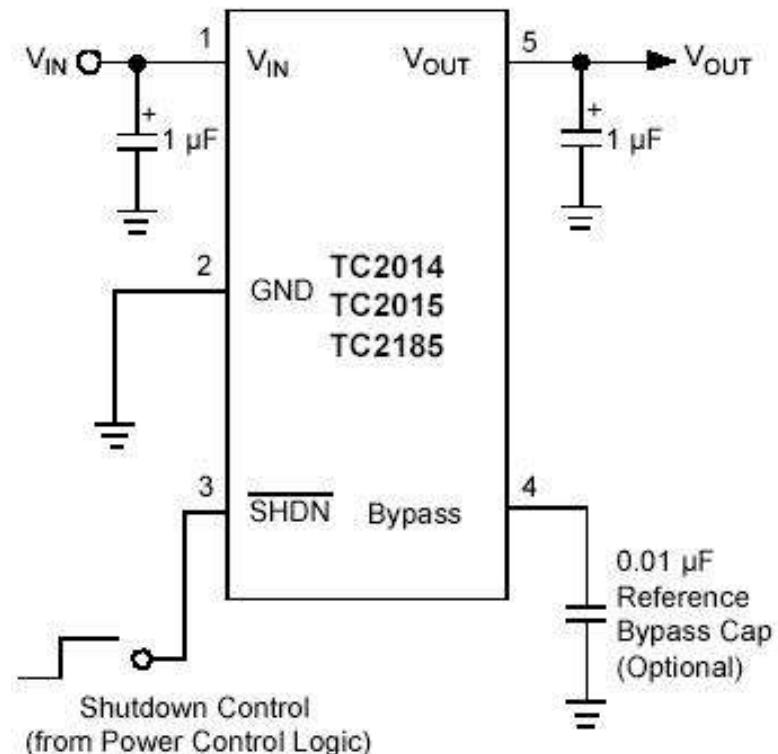
MICROCHIP

TC2014

Online
Datasheet

Features:

- Low Supply Current: 55 μ A (typical)
- Low Dropout Voltage: 45 mV (typ.) @ 50 mA
- High-Output Voltage Accuracy: $\pm 0.4\%$ (typ.)
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- Reference Bypass Input for Ultra Low-Noise Operation
- Fast Shutdown Response Time: 60 μ s (typ.)
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin-Compatible Upgrades for Bipolar Regulators
- Stable with Ceramic Output Capacitors
- Wide Operating Temperature Range:
-40°C to +125°C
- Standard Output Voltage Options:
1.8V, 2.5V, 2.6V, 2.7V, 2.8V, 2.85V, 3.0V,
3.3V, 5.0V



[TC2054 >>](#)

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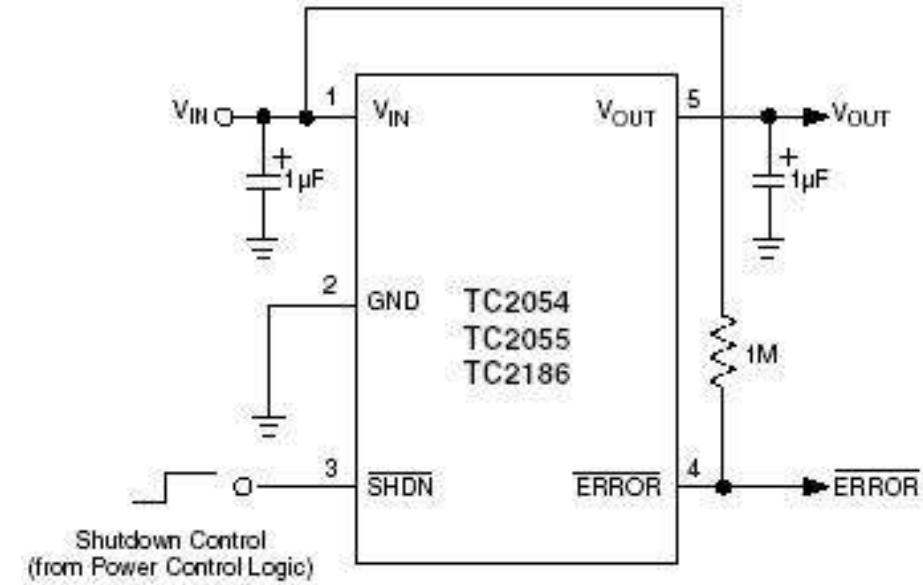
MICROCHIP

TC2054

Online
Datasheet

Features:

- Low Supply Current: 55 μ A (typ.)
- Low Dropout Voltage:
45 mV (typ.) @ 50 mA
- High Output Voltage Accuracy: $\pm 0.4\%$ (typ.)
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- ERROR Output Can Be Used as a Low Battery Detector or Processor Reset Generator
- Fast Shutdown Response Time: 60 μ s (typ.)
- Overcurrent and
Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin Compatible Upgrades for
Bipolar Regulators
- Stable with Ceramic Output Capacitors



[TC2014 >>](#)

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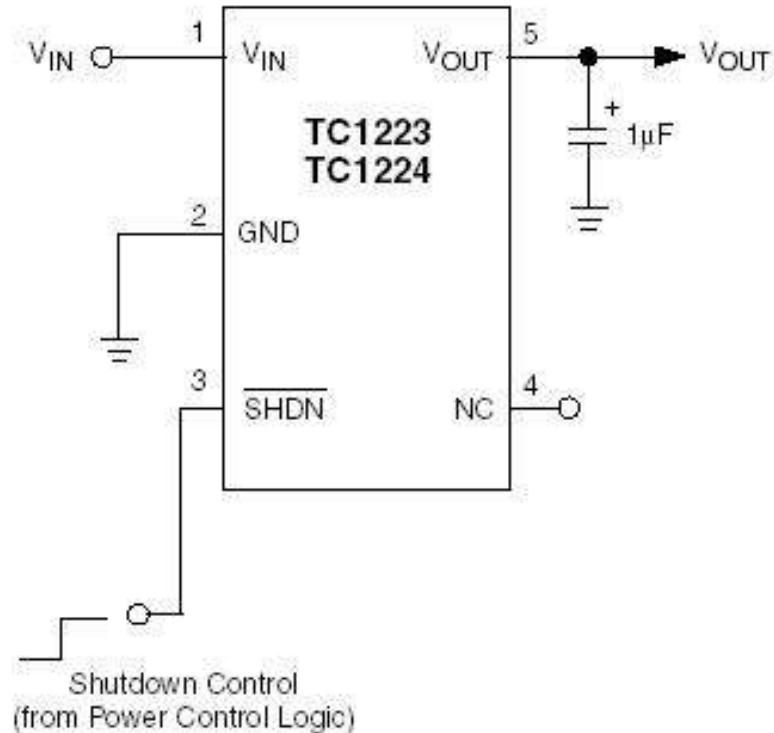
MICROCHIP

TC1223

Online
Datasheet

Features:

- Extremely Low Ground Current for Longer Battery Life
- Very Low Dropout Voltage
- Choice of 50mA and 100mA Output (TC1223 and TC1224, respectively)
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin Compatible Upgrades for Bipolar Regulators



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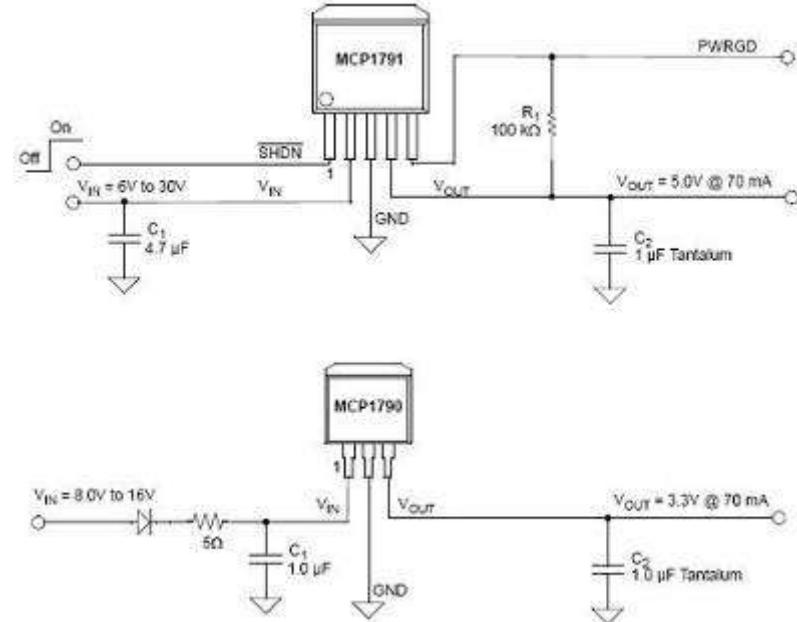
MICROCHIP

MCP1790/1

Online
Datasheet

Features:

- 48V ($43.5V \pm 10\%$) load dump protected for 180ms with a 30 second repetition rate (FORD Test Pulse G Loaded)
- Wide steady state supply voltage, 6.0V to 30.0V
- Extended Junction Temperature Range:
-40°C to +125°C
- Fixed output voltages: 3.0V, 3.3V, 5.0V
- Low quiescent current: 70 μ A (typ.)
- Low shutdown quiescent current: 10 μ A (typ.)
- Output Voltage Tolerances of $\pm 2.5\%$ over the temperature range
- Maximum output current of 70mA @ +125°C Junction Temperature
- Maximum continuous input voltage of 30V
- Internal thermal overload protection, +157°C (typ.) Junction Temperature
- Internal short circuit current limit, 120mA (typ.) for +5V option
- Short Circuit Current Foldback
- Shutdown Input option (MCP1791)
- Power Good Output option (MCP1791)
- High PSRR, -90 dB @100Hz (typ.)
- Stable with 1 μ F to 1000 μ F tantalum and electrolytic Capacitors
- Stable with 4.7 μ F to 1000 μ F ceramic capacitors



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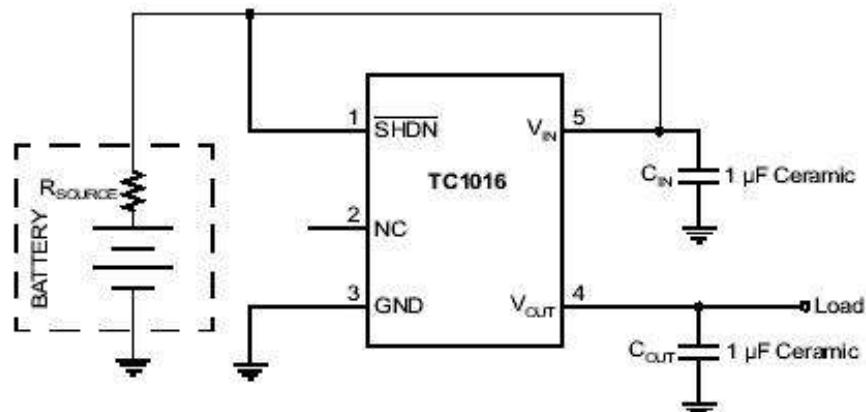
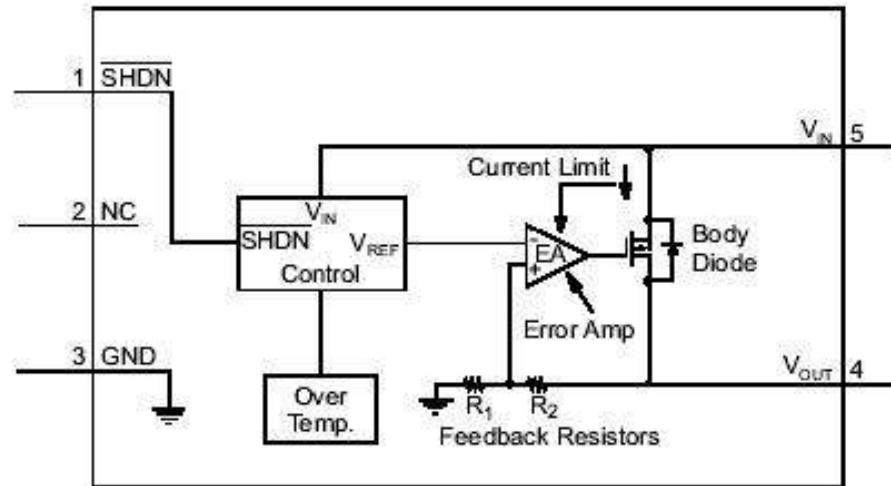
MICROCHIP

TC1016

Online
Datasheet

Features:

- Space-Saving 5-Pin SC-70 Package
- Low Operating Current: $53\mu\text{A}$ (typ.)
Shutdown Mode: $0.05\mu\text{A}$ (typ.)
- Very Low Dropout Voltage
- Rated 80mA Output Current
- Requires only $1\mu\text{F}$ Ceramic Output Capacitance
- High Output Voltage Accuracy:
 $\pm 0.5\%$ (typ.)
- $10\mu\text{s}$ (typ.) Wake-Up Time from SHDN
- Overcurrent and Overtemperature Protection
- Pin Compatible Upgrades for Bipolar Regulators



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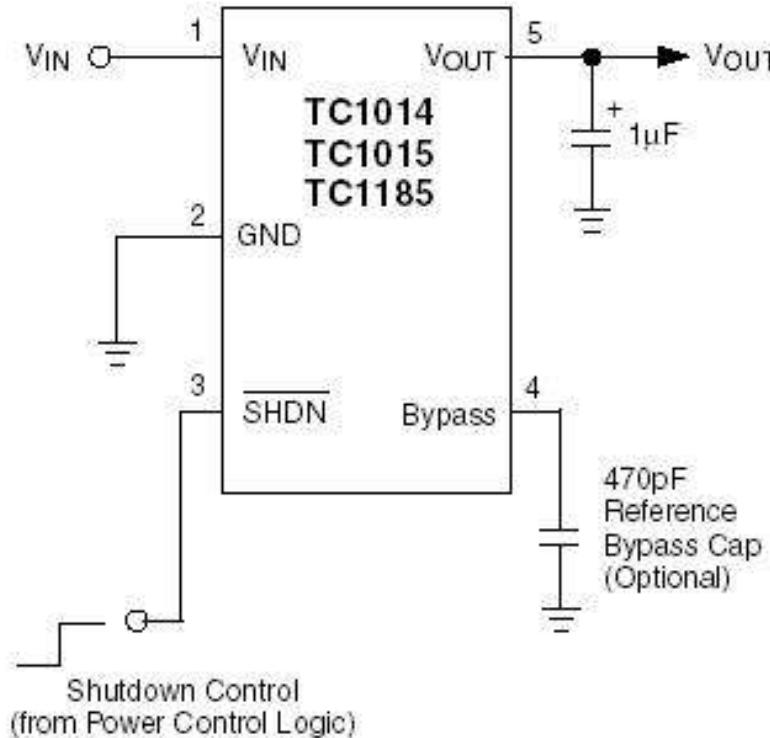
MICROCHIP

TC1015

Online
Datasheet

Features:

- Low Supply Current: 50 μ A (typ.)
- Low Dropout Voltage
- Choice of 50mA (TC1014), 100mA (TC1015) and 150mA (TC1185) Output
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Reference Bypass Input for Ultra Low-Noise Operation
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin Compatible Upgrades for Bipolar Regulators



[TC1055 >>](#)

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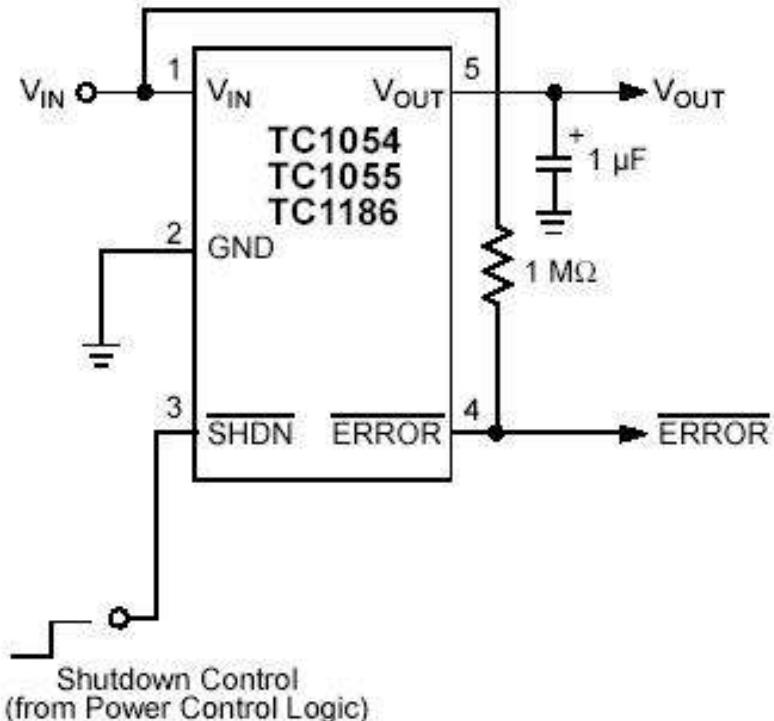
MICROCHIP

TC1055

Online
Datasheet

Features:

- Low Ground Current
- Low Dropout Voltage
- Choice of 50mA (TC1054), 100mA (TC1055) and 150mA (TC1186) Output
- High Output Voltage Accuracy
- Power-Saving Shutdown Mode
- ERROR Output Can Be Used as a Low Battery Detector or Microcontroller Reset Generator
- Overcurrent and Overtemperature Protection
- 5-Pin SOT-23 Package
- Pin Compatible Upgrades for Bipolar Regulators



[TC1015 >>](#)

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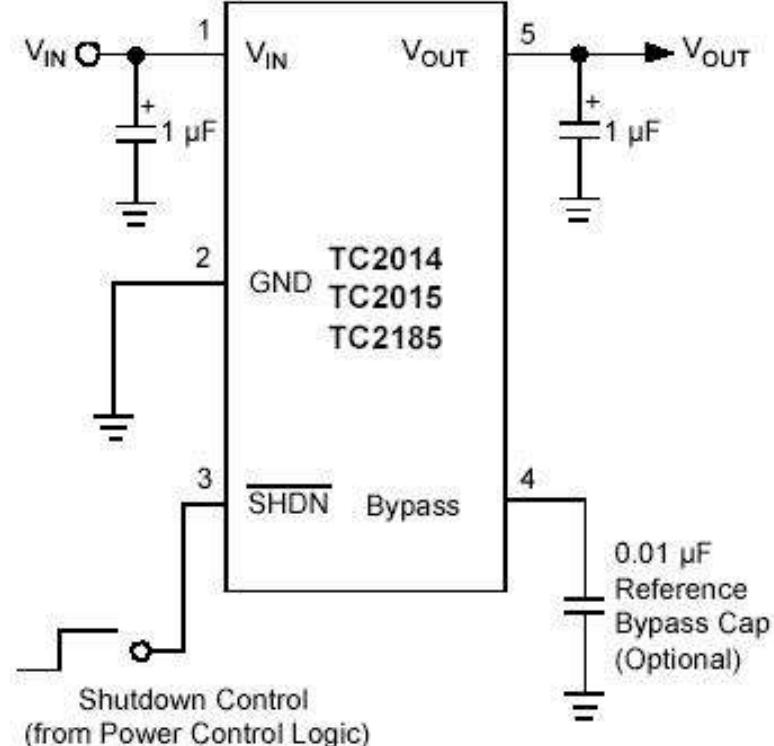
MICROCHIP

TC2015

Online
Datasheet

Features:

- Low Supply Current: 55 μ A (typical)
- Low Dropout Voltage: 90 mV (typ.) @ 100 mA
- High-Output Voltage Accuracy: $\pm 0.4\%$ (typ.)
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- Reference Bypass Input for Ultra Low-Noise Operation
- Fast Shutdown Response Time: 60 μ s (typ.)
- Over-current and Over-temperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin-Compatible Upgrades for Bipolar Regulators
- Stable with Ceramic Output Capacitors
- Wide Operating Temperature Range:
-40°C to +125°C



[TC2055 >>](#)

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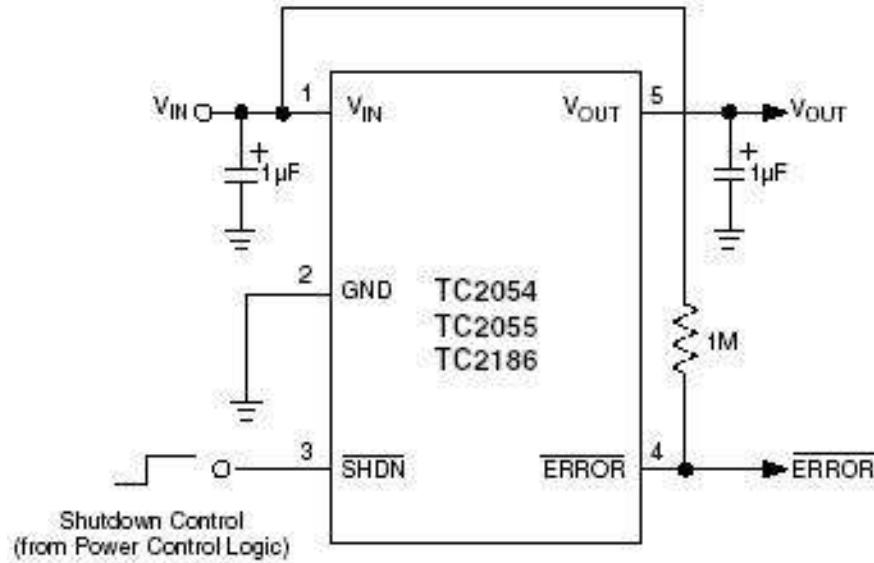
MICROCHIP

TC2055

Online
Datasheet

Features:

- Low Supply Current, 55 μ A (typ.)
- Low Dropout Voltage: 90 mV (typ.) @ 100 mA
- High Output Voltage Accuracy: $\pm 0.4\%$ (typ.)
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- ERROR Output Can Be Used as a Low Battery Detector or Processor Reset Generator
- Fast Shutdown Response Time: 60 μ s (typ.)
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin Compatible Upgrades for Bipolar Regulators
- Stable with Ceramic Output Capacitors



[TC2015 >>](#)

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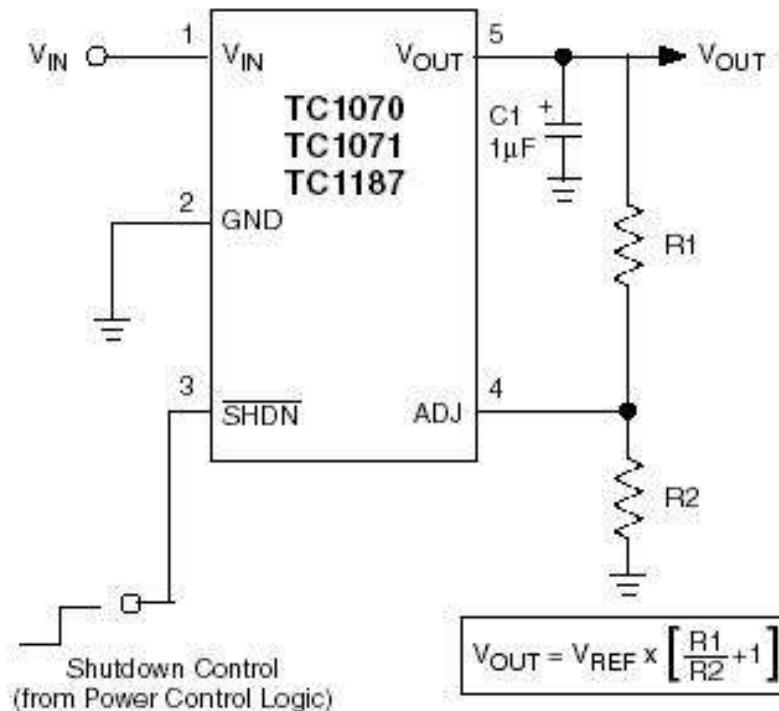
MICROCHIP

TC1071

Online
Datasheet

Features:

- 50 μ A Ground Current for Longer Battery Life
- Adjustable Output Voltage
- Very Low Dropout Voltage
- Choice of 50mA (TC1070), 100mA (TC1071) and 150mA (TC1187) Output
- Power-Saving Shutdown Mode
- Over Current and Over Temperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin Compatible with Bipolar Regulators



[TC1073 >>](#)

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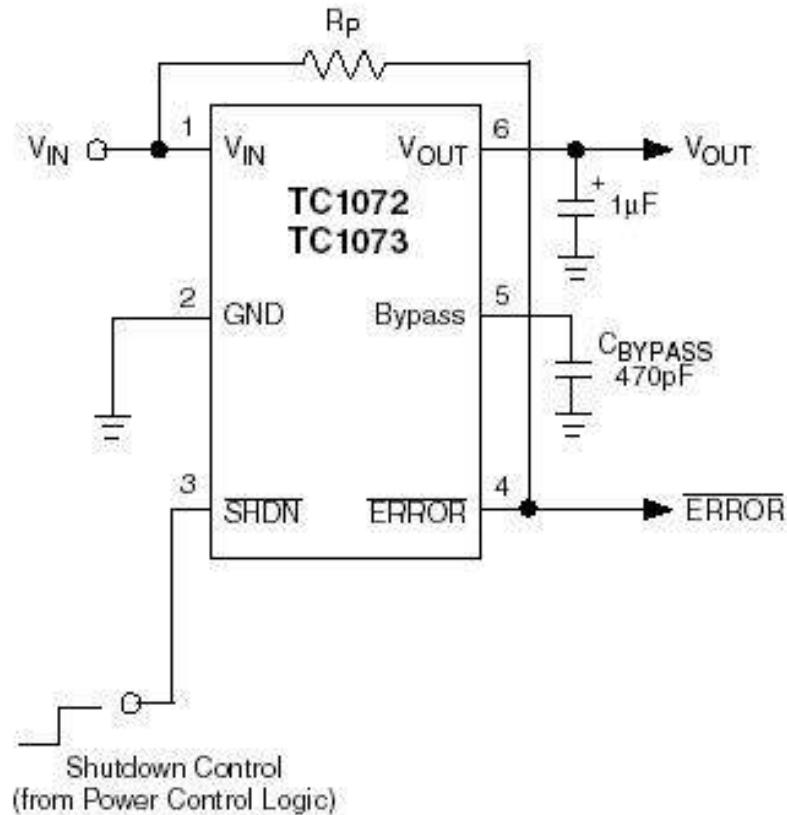
MICROCHIP

TC1073

Online
Datasheet

Features:

- 50 μ A Ground Current for Longer Battery Life
- Adjustable Output Voltage
- Very Low Dropout Voltage
- Choice of 50mA (TC1070), 100mA (TC1071) and 150mA (TC1187) Output
- Power-Saving Shutdown Mode
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin Compatible with Bipolar Regulators



[TC1071 >>](#)

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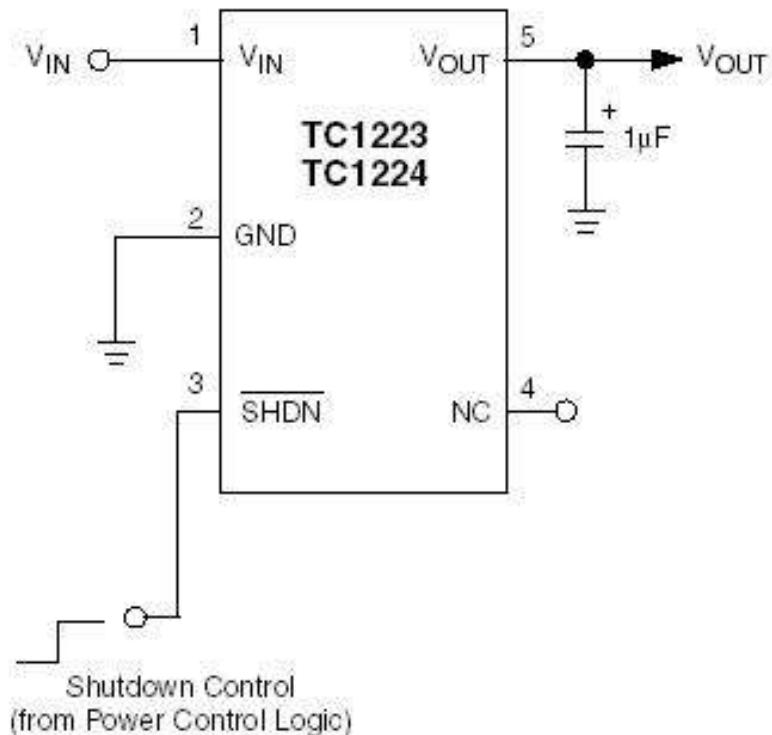
MICROCHIP

TC1224

Online
Datasheet

Features:

- Low Ground Current for Longer Battery Life
- Low Dropout Voltage
- Choice of 50mA (TC1223), 100mA (TC1224) Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin Compatible Upgrades for Bipolar Regulators



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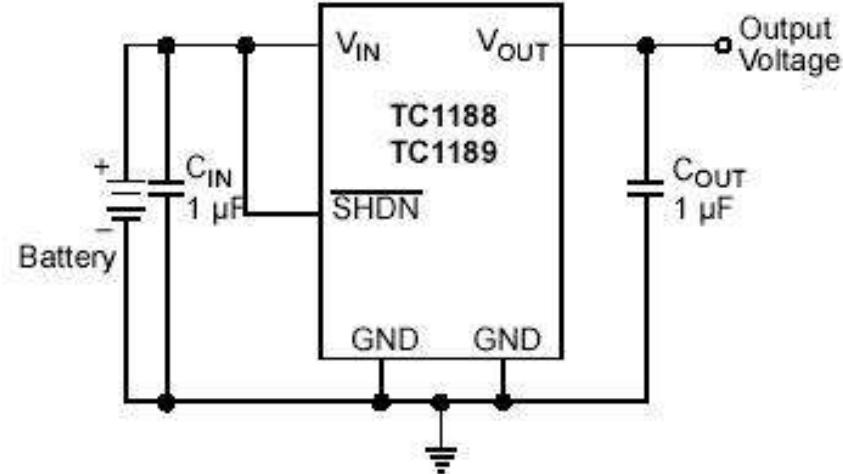
MICROCHIP

TC1188/9

Online
Datasheet

Features:

- Input Voltage Range: 2.7V to 6.0V
- 120mA Output Current
- Low Supply Current: 50 μ A, (typ.)
- Low Dropout Voltage: 110mV (typ.)
@ 100mA
- Fast Turn-On from Shutdown:
140 μ s (typ.)
- Low Output Noise
- Overcurrent and
Overtemperature Protection
- Low Power Shutdown Mode
- Auto Discharge of Output Capacitor
(TC1189)



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MICROCHIP

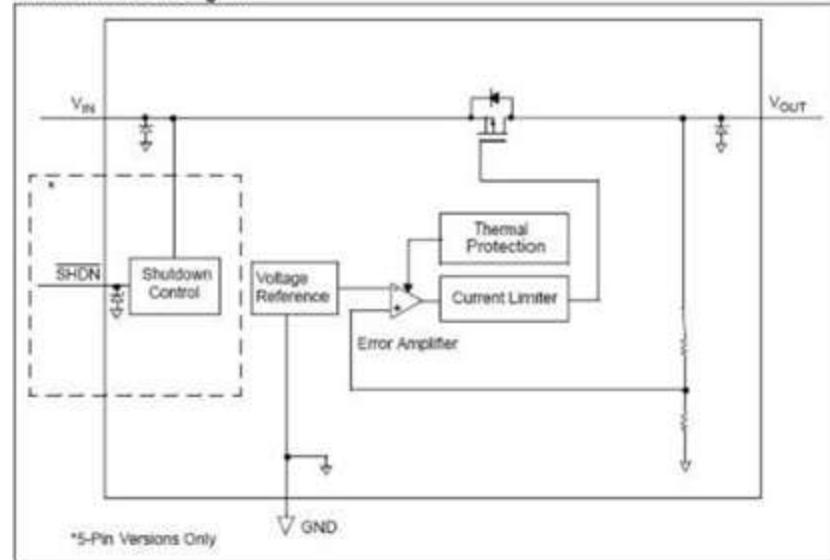
MCP1804

Online
Datasheet

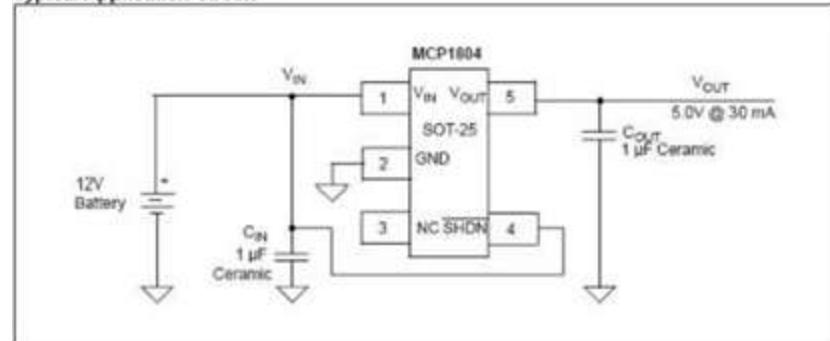
Features:

- 150 mA Output Current
- Low Dropout Voltage, 260mV typ. @ 20mA, VR=3.3V
- 50 μ A Typical Quiescent Current
- 0.01 μ A Typical Shutdown Current
- Input Operating Voltage Range: 2.0V to 28.0V
- Standard Output Voltage Options (1.8V, 2.5V, 3.0V, 3.3V, 5.0V, 10.0V, 12.0V)
- Output Voltage Accuracy: $\pm 2\%$
- Output voltages from 1.8V to 18.0V in 0.1V increments are available upon request
- Stable with Ceramic output capacitors
- Current Limit Protection With Current Foldback
- Shutdown pin
- High PSRR: 50 dB typical @ 1 kHz

Functional Block Diagram



Typical Application Circuit



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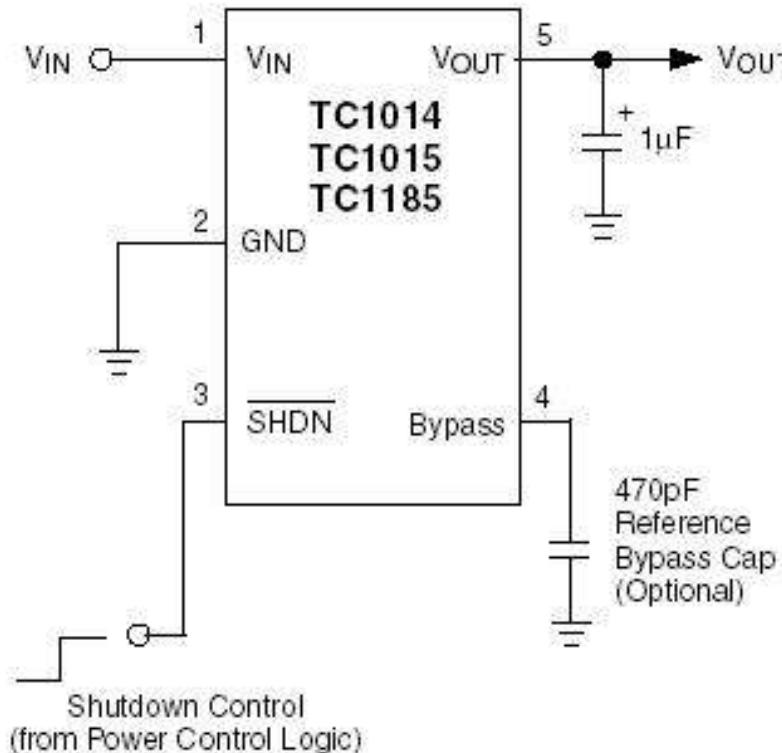
MICROCHIP

TC1185

Online
Datasheet

Features:

- Low Supply Current: 50 μ A (typ.)
- Low Dropout Voltage
- Choice of 50mA (TC1014), 100mA (TC1015) and 150mA (TC1185) Output
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- Reference Bypass Input for Ultra Low-Noise Operation
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin-Compatible Upgrades for Bipolar Regulators



[TC1187 >>](#)

[TC1186 >>](#)

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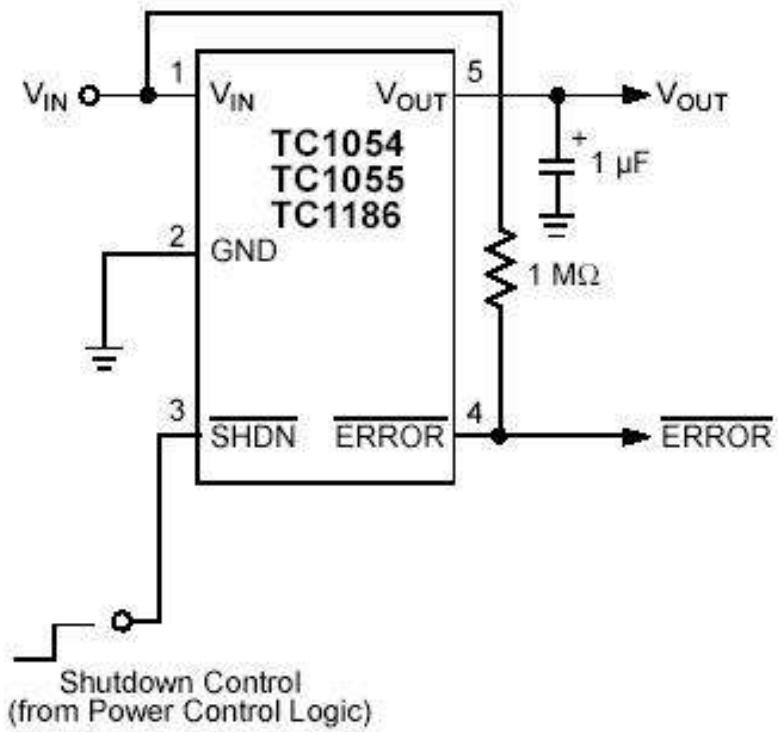
MICROCHIP

TC1186

Online
Datasheet

Features:

- Low Ground Current for Longer Battery Life
- Low Dropout Voltage
- Choice of 50mA (TC1014), 100mA (TC1015) and 150mA (TC1185) Output
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Error Output Can Be Used as a Low Battery Detector or Microcontroller Reset Generator
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin-Compatible Upgrades for Bipolar Regulators



[TC1187 >>](#)

[TC1185 >>](#)

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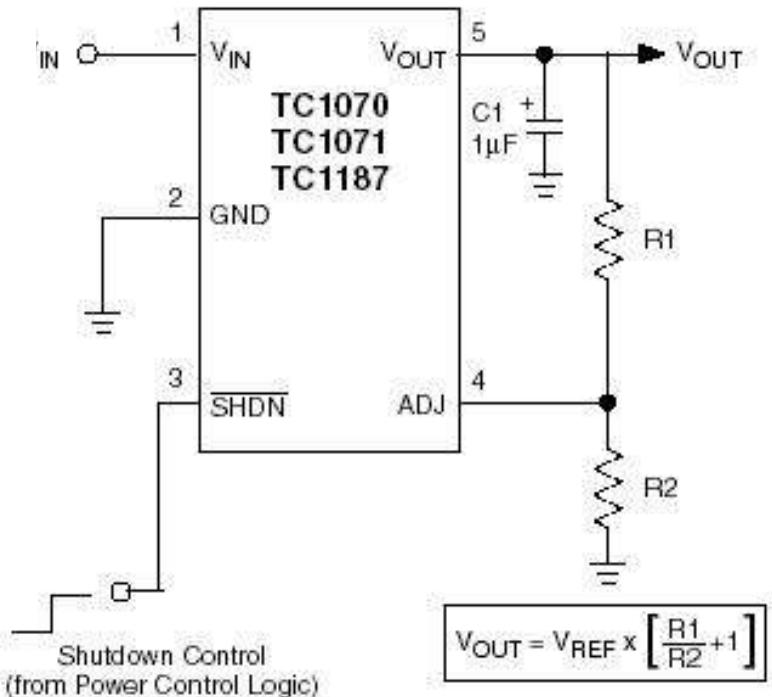
MICROCHIP

TC1187

Online
Datasheet

Features:

- 50 μ A Ground Current for Longer Battery Life
- Adjustable Output Voltage
- Very Low Dropout Voltage
- Choice of 50mA (TC1070), 100mA (TC1071) and 150mA (TC1187) Output
- Power-Saving Shutdown Mode
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23 Package
- Pin Compatible with Bipolar Regulators



[TC1185 >>](#)

[TC1186 >>](#)

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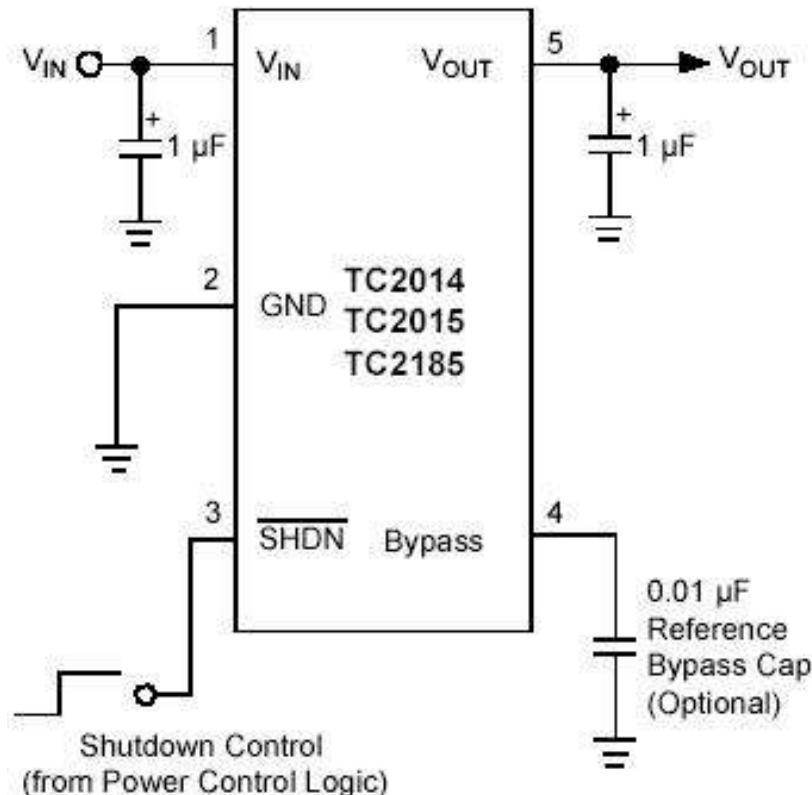
MICROCHIP

TC2185

Online
Datasheet

Features:

- Low Supply Current: 80 μ A (max.)
- Low Dropout Voltage: 140mV (typ.) @ 150mA
- High-Output Voltage Accuracy: $\pm 0.4\%$ (typ.)
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- Reference Bypass Input for Ultra Low-Noise Operation
- Fast Shutdown Response Time: 60 μ s (typ.)
- Over-current and Over-temperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin-Compatible Upgrades for Bipolar Regulators
- Stable with Ceramic Output Capacitors
- Wide Operating Temperature Range:
-40°C to +125°C



[TC2186 >>](#)

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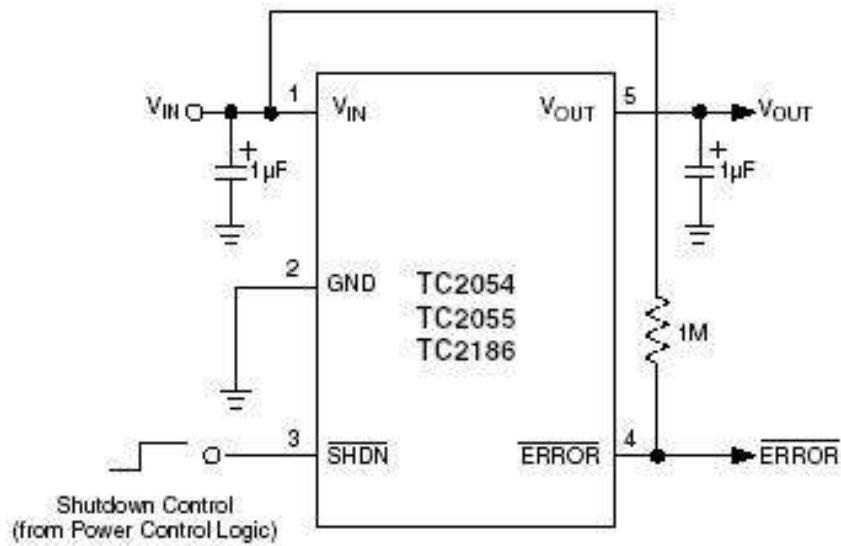
MICROCHIP

TC2186

Online
Datasheet

Features:

- Low Supply Current: 55 μ A (typ.)
- Low Dropout Voltage:
140mV (typ.) @ 150mA
- High Output Voltage Accuracy: $\pm 0.4\%$ (typ.)
- Standard or Custom Output Voltages
- Power-Saving Shutdown Mode
- ERROR Output Can Be Used as a Low Battery Detector or Processor Reset Generator
- Fast Shutdown Response Time: 60 μ s (typ.)
- Overcurrent and Overtemperature Protection
- Space-Saving 5-Pin SOT-23A Package
- Pin Compatible Upgrades for Bipolar Regulators
- Stable with Ceramic Output Capacitors



[TC2185 >>](#)

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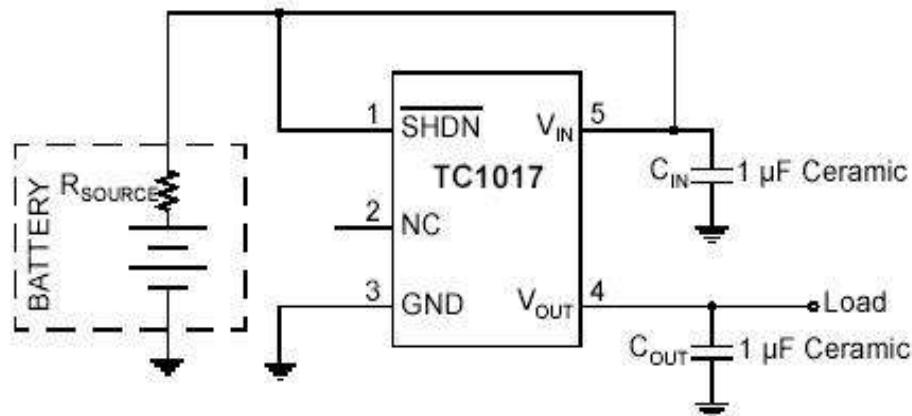
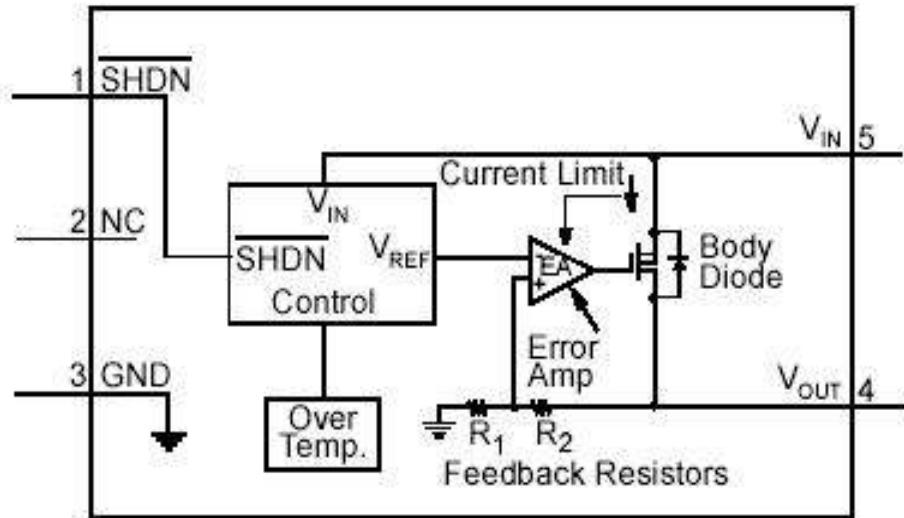
MICROCHIP

TC1017

Online
Datasheet

Features:

- Space Saving 5-Pin SC-70 and SOT-23 Packages
- Low Operating Current: $53\mu\text{A}$ (typ.)
Shutdown Mode: $0.05\mu\text{A}$ (typ.)
- High Output Voltage Accuracy: $\pm 0.5\%$ (typ.)
- Very Low Dropout Voltage
- Rated 150mA Output Current
- Wake-Up Time from SHDN: $10\mu\text{s}$ (typ.)
- Overcurrent and Overtemperature Protection
- Pin Compatible Upgrades for Bipolar Regulators
- Requires Only $1\mu\text{F}$ Ceramic Output Capacitance



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MICROCHIP

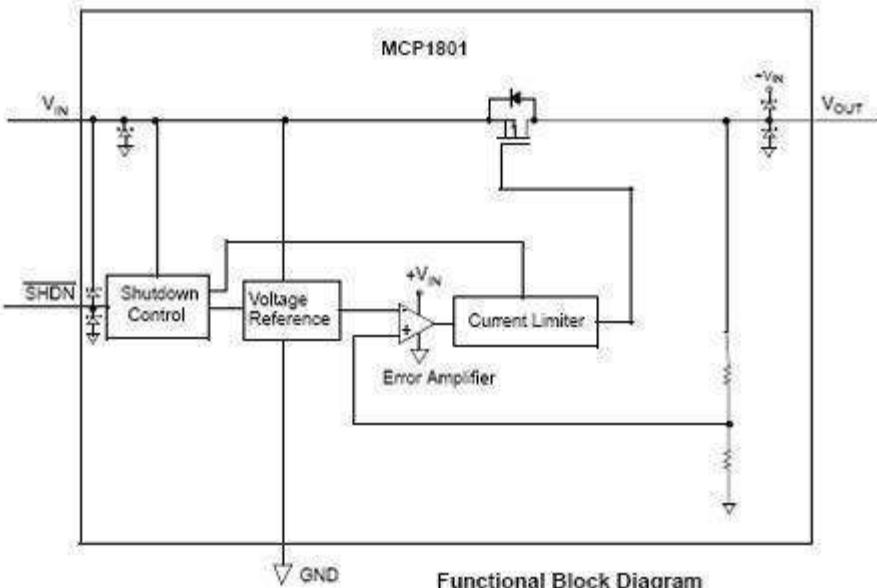
Online
Datasheet

MCP1801

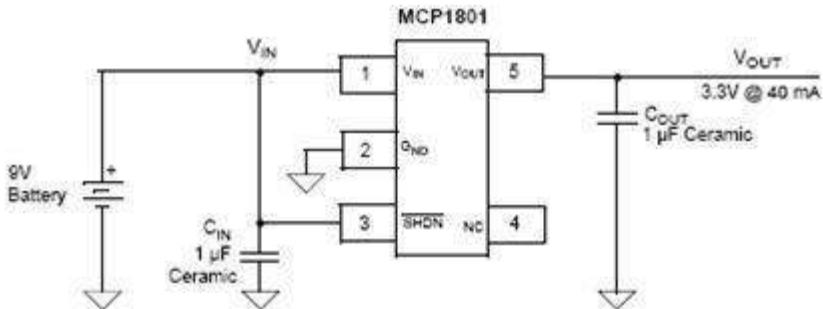
Recommend MCP1754

Features:

- 150mA (max.) Output Current
- Low Dropout Voltage,
200mV (typ.) @ 100mA
- 25 μ A (typ.) Quiescent Current
- 0.01 μ A (typ.) Shutdown Current
- Input Operating Voltage Range:
2.0V to 10.0V
- Standard Output Voltage Options:
0.9V, 1.2V, 1.8V, 2.5V,
3.0V, 3.3V, 5.0V, 6.0V
- Output voltage accuracy:
 $\pm 2\%$ ($V_R > 1.5V$),
 $\pm 30mV$ ($V_R \leq 1.5V$)
- Stable with Ceramic output capacitors
- Current Limit Protection
- Shutdown pin
- High PSRR: 70dB (typ.) @ 10kHz



Functional Block Diagram



[MCP1754>>](#)

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MICROCHIP

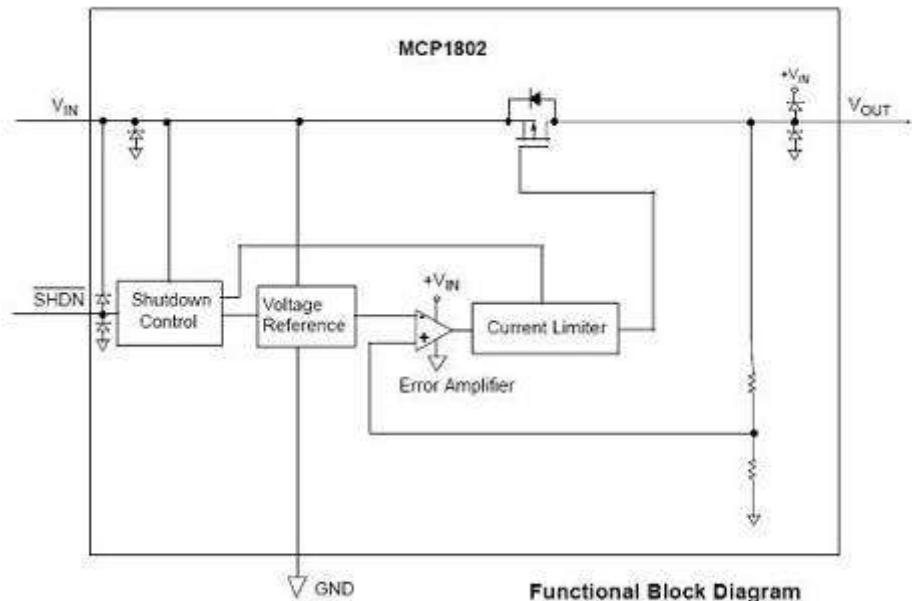
Online
Datasheet

MCP1802

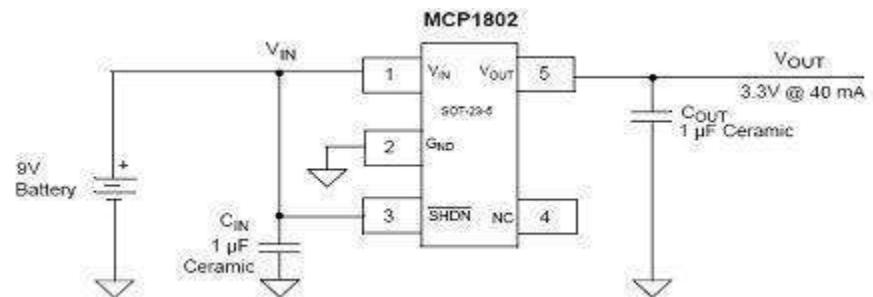
Recommend MCP1755

Features:

- 300mA (max.) Output Current
- Low Dropout Voltage,
200mV (typ.) @ 100 mA
- 25 μ A (typ.) Quiescent Current
- 0.01 μ A (typ.) Shutdown Current
- Input Operating Voltage Range:
2.0V to 10.0V
- Standard Output Voltage Options:
0.9V, 1.2V, 1.8V, 2.5V,
3.0V, 3.3V, 5.0V, 6.0V
- Output voltage accuracy:
 $\pm 2\%$ ($V_R > 1.5V$),
 $\pm 30mV$ ($V_R \leq 1.5V$)
- Stable with Ceramic output capacitors
- Current Limit Protection
- Shutdown pin
- High PSRR: 70dB (typ.) @ 10kHz



Functional Block Diagram



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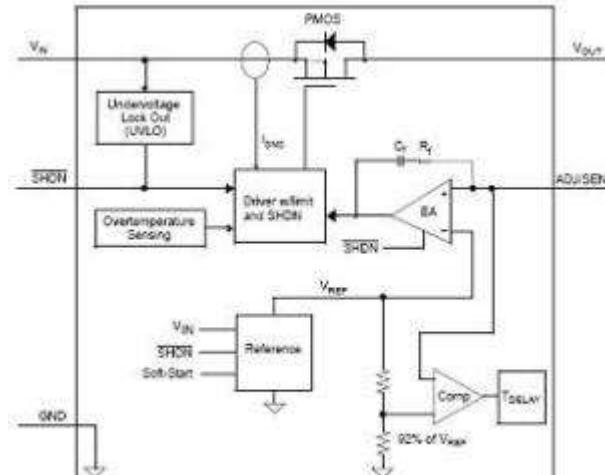
MICROCHIP

MCP1824/S

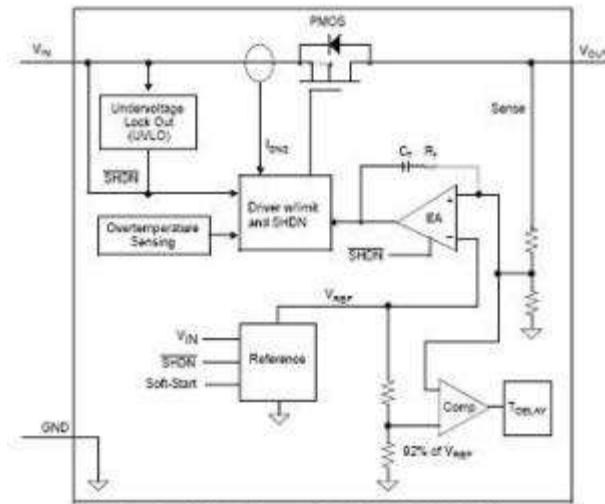
Online
Datasheet

Features:

- 300mA Output Current Capability
- Input Operating Voltage Range: 2.1V to 6.0V
- Adjustable Output Voltage Range: 0.8V to 5.0V (MCP1824 only)
- Standard Fixed Output Voltages:
0.8V, 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V
- Other Fixed Output Voltage Options Available Upon Request
- Low Dropout Voltage: 200mV (typ.) @ 300mA
- Typical Output Voltage Tolerance: 0.4%
- Stable with 1.0 μ F Ceramic Output Capacitor
- Fast Response to Load Transients
- Low Supply Current: 120 μ A (typ.)
- Low Shutdown Supply Current: 0.1 μ A (typ.) (MCP1824 only)
- Fixed Delay on Power Good Output (MCP1824 only)
- Short Circuit Current Limiting and Overtemperature Protection
- 5-Lead Plastic SOT-223, SOT-23 Package Options (MCP1824)
- 3-Lead Plastic SOT-223 Package Option (MCP1824S)



Functional Block Diagram - Adjustable Output (MCP1824)



Functional Block Diagram - Fixed Output (MCP1824S)

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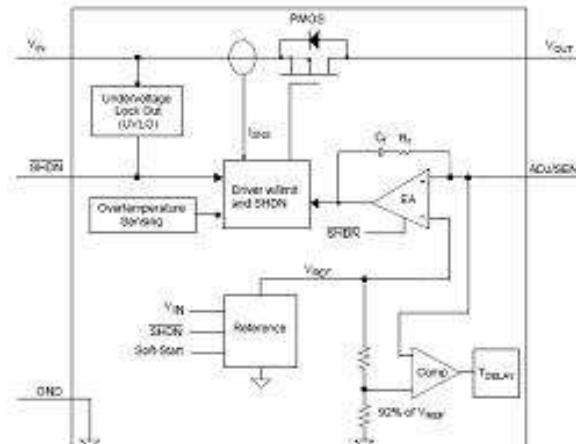
MICROCHIP

MCP1825/S

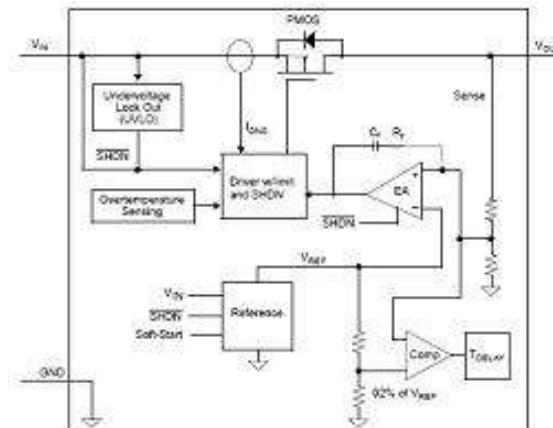
Online
Datasheet

Features:

- 500mA Output Current Capability
- Input Operating Voltage Range: 2.1V to 6.0V
- Adjustable Output Voltage Range: 0.8V to 5.0V (**MCP1825 only**)
- Standard Fixed Output Voltages: 0.8V, 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V
- Other Fixed Output Voltage Options Available Upon Request
- Low Dropout Voltage: 210mV (typ.) at 500mA
- Typical Output Voltage Tolerance: 0.5%
- Stable with 1.0 μ F Ceramic Output Capacitor
- Fast response to Load Transients
- Low Supply Current: 120 μ A (typ.)
- Low Shutdown Supply Current: 0.1 μ A (typ.) (**MCP1825 only**)
- Fixed Delay on Power Good Output (**MCP1825 only**)
- Short Circuit Current Limiting and Overtemperature Protection
- TO-263-5 (DDPAK-5), TO-220-5, SOT-223-5 Package Options (**MCP1825**)
- TO-263-3 (DDPAK-3), TO-220-3, SOT-223-3 Package Options (**MCP1825S**)



Functional Block Diagram - Adjustable Output



Functional Block Diagram - Fixed Output (3-Pin)

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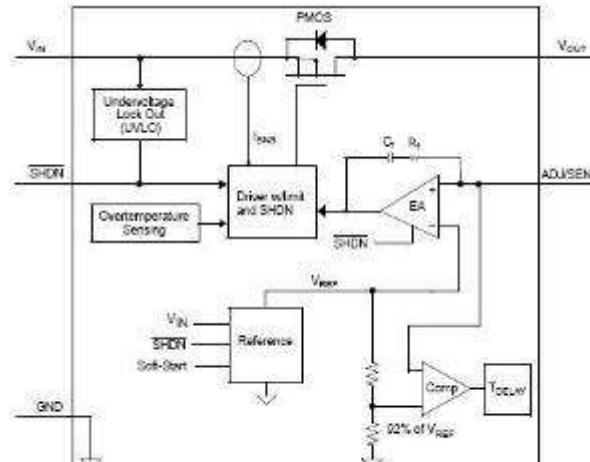
MICROCHIP

MCP1826/S

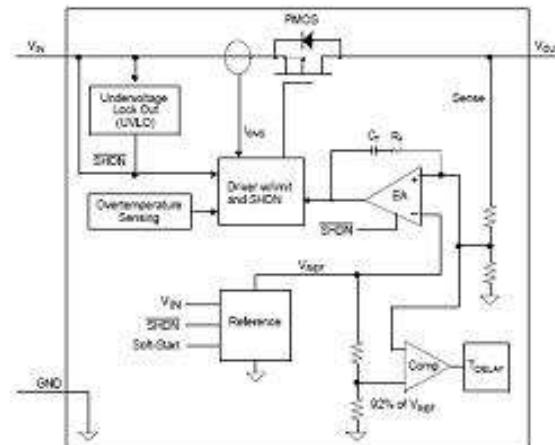
Online
Datasheet

Features:

- 1000mA Output Current Capability
- Input Operating Voltage Range:
2.3V to 6.0V
- Adjustable Output Voltage Range:
0.8V to 5.0V (**MCP1826 only**)
- Standard Fixed Output Voltages:
0.8V, 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V
- Other Fixed Output Voltage Options
Available Upon Request
- Low Dropout Voltage: 250mV (typ.) @ 1000mA
- Typical Output Voltage Tolerance: 0.5%
- Stable with 1.0 μ F Ceramic Output Capacitor
- Fast response to Load Transients
- Low Supply Current: 120 μ A (typ.)
- Low Shutdown Supply Current:
0.1 μ A (typ.) (**MCP1826 only**)
- Fixed Delay on Power Good Output (**MCP1826 only**)
- Short Circuit Current Limiting and
Overtemperature Protection
- TO-263-5 (DDPAK-5), TO-220-5, SOT-223-5
Package Options (**MCP1826**).
- TO-263-3 (DDPAK-3), TO-220-3, SOT-223-3
Package Options (**MCP1826S**).



Functional Block Diagram - Adjustable Output



Functional Block Diagram - Fixed Output (3-Pin)

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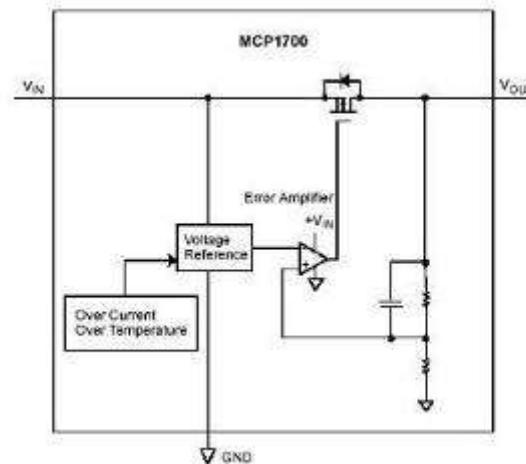
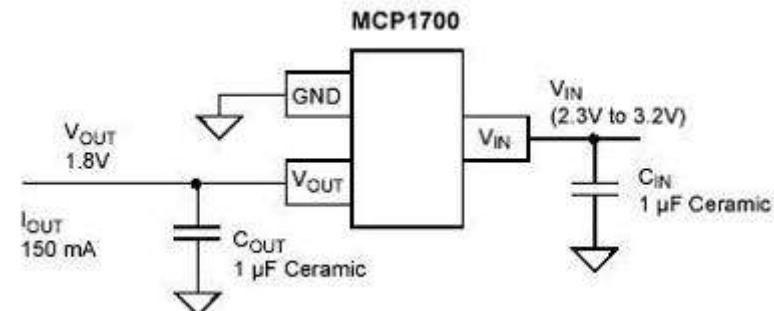
MICROCHIP

MCP1700

Online
Datasheet

Features:

- 1.6 μ A (typ.) Quiescent Current
- Input Operating Voltage Range: 2.3V to 6.0V
- Output Voltage Range: 1.2V to 5.0V
- 250mA Output Current for Output Voltages \geq 2.5V
- 200mA Output Current for Output Voltages $<$ 2.5V
- Low Dropout voltage: 178mV (typ.) @ 250mA for $V_{OUT} = 2.8V$
- 0.4% (typ.) Output Voltage Tolerance
- Stable with 1.0 μ F Ceramic Output Capacitor
- Short Circuit Protection
- Overtemperature Protection



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MICROCHIP

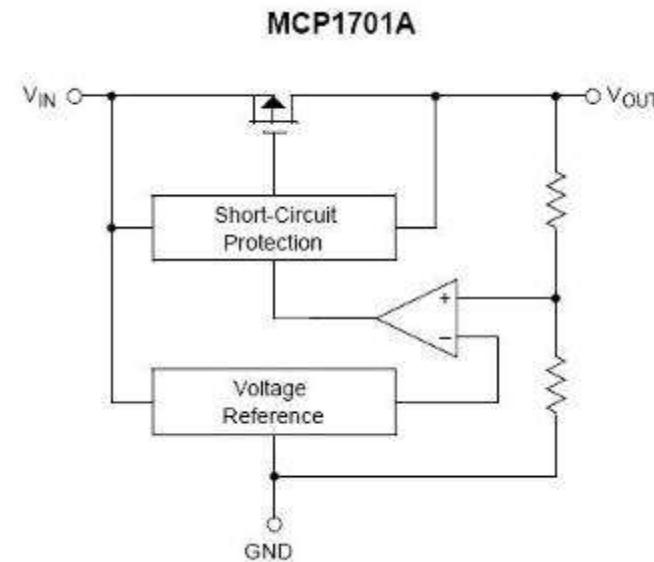
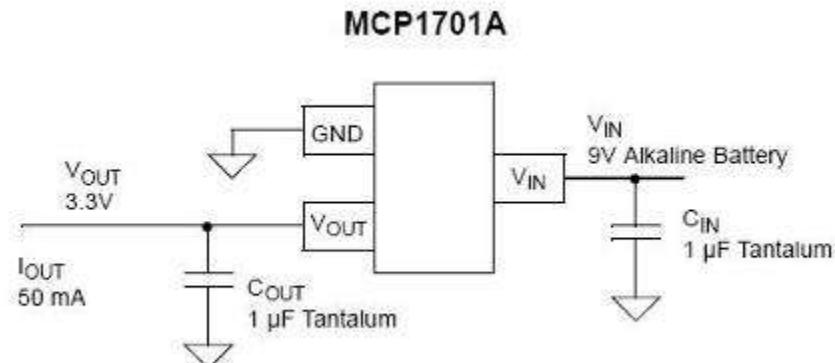
MCP1701A

Online
Datasheet

Recommend MCP1703A for new designs

Features:

- 2.0 μ A (typ.) Quiescent Current
- Input Operating Voltage up to 10.0V
- Low Dropout Voltage
 - 120mV (typ.) @ 100mA
 - 380mV (typ.) @ 200mA
- High Output Current:
250mA ($V_{OUT} = 5.0V$)
- High-Accuracy Output Voltage: 2% (max.)
- Low Temperature Drifting: 100ppm/ $^{\circ}$ C
- Excellent Line Regulation: 0.2%/V
- Short Circuit Protection
- Package Options:
SOT-23A-3, SOT-89-3, TO-92-3
- Standard Output Voltage Options:
1.8V, 2.5V, 3.0V, 3.3V, 5.0V



[MCP1703A >>](#)

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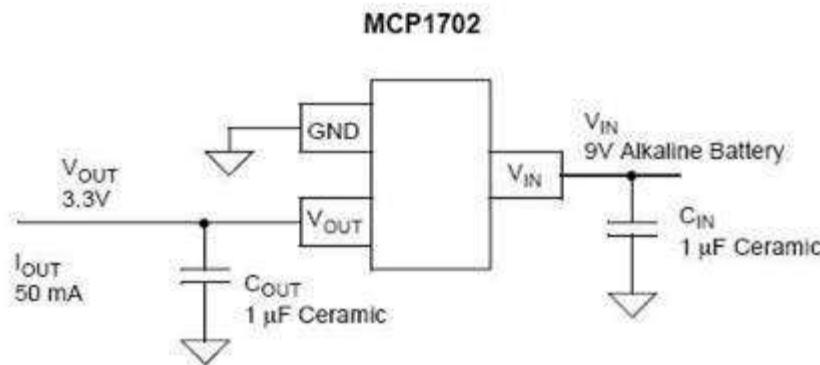
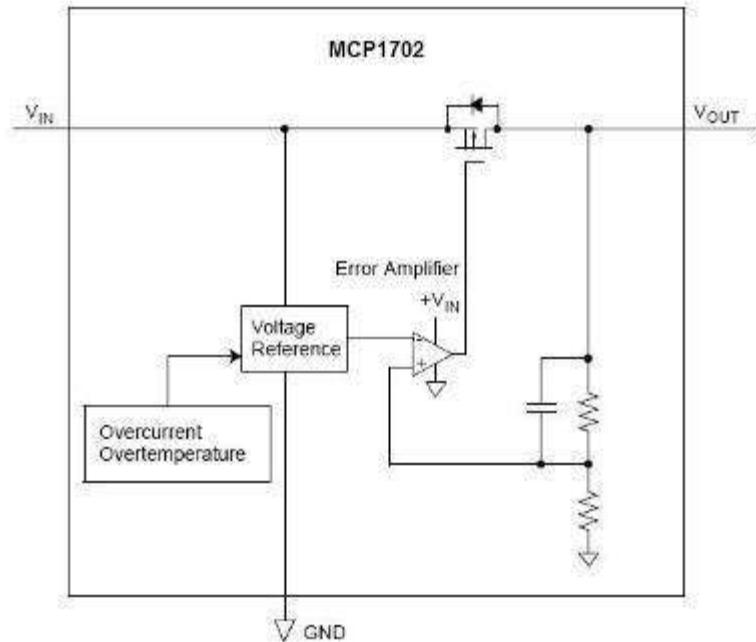
MICROCHIP

MCP1702

Online
Datasheet

Features:

- 2.0 μ A Quiescent Current (typ.)
- Input Operating Voltage Range: 2.7V to 13.2V
- 250mA Output Current for Output Voltages \geq 2.5V
- 200mA Output Current for Output Voltages $<$ 2.5V
- Output voltage range 1.2V to 5.5V in 0.1V increments (50mV increments available upon request)
- Stable with 1.0 μ F to 22 μ F Output Capacitor
- Short-Circuit Protection
- Overtemperature Protection
- Package Options: 3-Pin SOT-23A, 3-Pin SOT-89, TO-92-3



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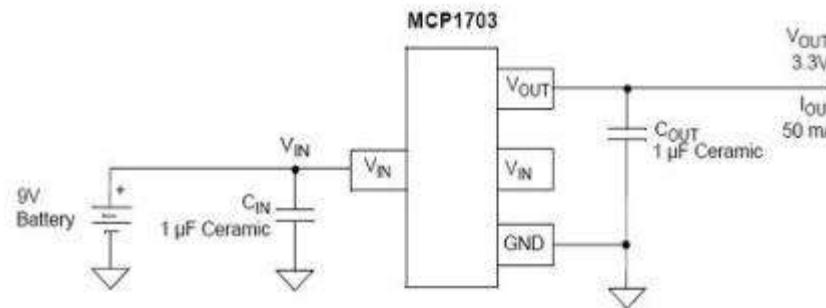
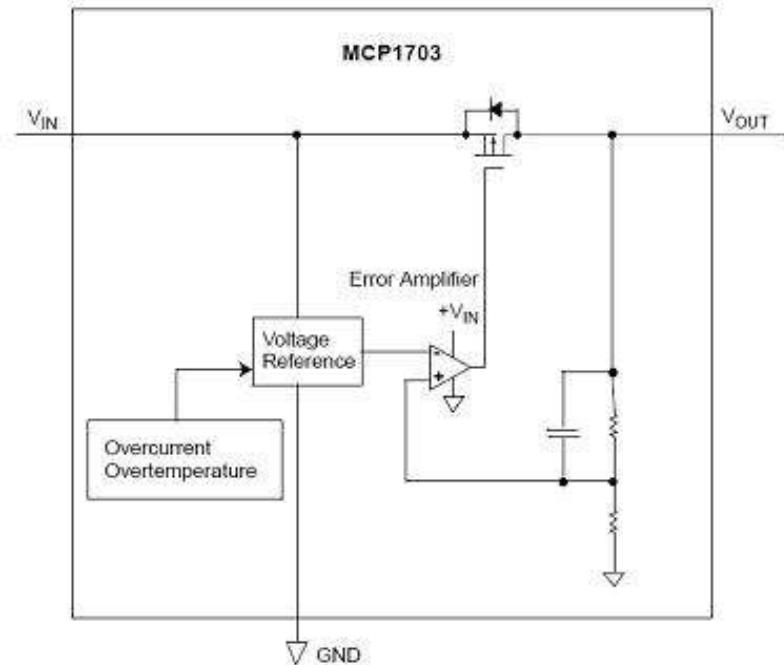
MICROCHIP

MCP1703

Online
Datasheet

Features:

- 2.0 μ A Quiescent Current (typ.)
- Input Operating Voltage Range: 2.7V to 16V
- 250mA Output Current for Output Voltages \geq 2.5V
- 200mA Output Current for Output Voltages $<$ 2.5V
- 0.4% (typ.) Output Voltage Tolerance
- Output voltage range 1.2V to 5.5V in 0.1V increments (50mV increments available upon request)
- Stable with 1.0 μ F to 22 μ F Output Capacitor
- Short-Circuit Protection
- Overtemperature Protection
- Package Options: 3-Pin SOT-23A, 3-Pin SOT-89, TO-92-3, 2x3 DFN



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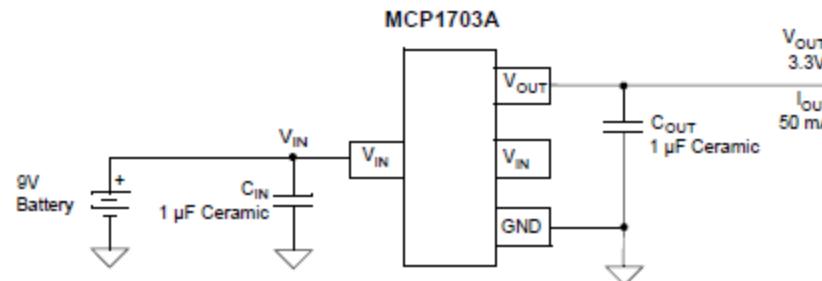
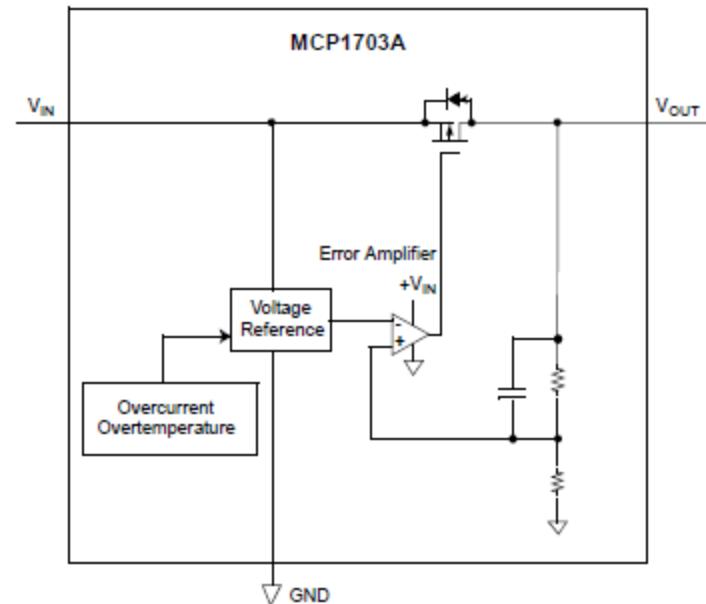
MICROCHIP

MCP1703A

Online
Datasheet

Features:

- 2.0 μ A Quiescent Current (typ.)
- Input Operating Voltage Range: 2.7V to 16V
- 250mA Output Current for Output Voltages \geq 2.5V
- 200mA Output Current for Output Voltages $<$ 2.5V
- 0.4% (typ.) Output Voltage Tolerance
- Output voltage range 1.2V to 5.5V in 0.1V increments (50mV increments available upon request)
- Stable with 1.0 μ F to 22 μ F Output Capacitor
- Short-Circuit Protection
- Overtemperature Protection
- Package Options: 3-Pin SOT-23A, 3-Pin SOT-89, TO-92-3, 2x3 DFN



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MICROCHIP

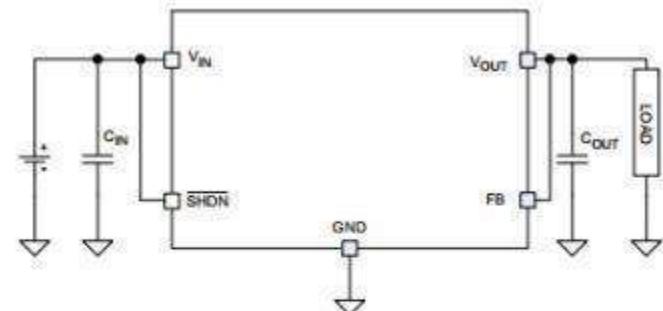
MCP1710

Online
Datasheet

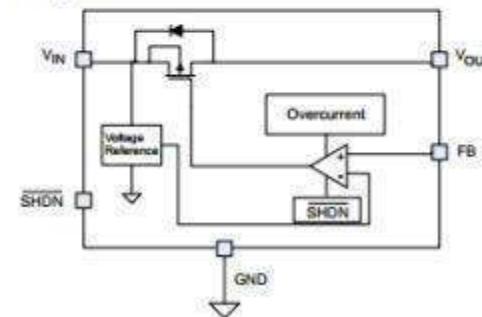
Features:

- Ultra-Low Quiescent Current: 20 nA (typ)
- Ultra-Low Shutdown Supply Current: 0.1 nA (typ)
- Input Operating Voltage Range: 2.5V to 5.5V
- 200 mA Output Current Capability for $V_{OUT} < 3.5V$
- 100 mA Output Current Capability for $V_{OUT} > 3.5V$
- Standard Output Voltages
 - 1.2V, 1.8V, 2.5V, 3.3V, 4.2V
- Low Dropout Voltage:
450 mV Maximum at 200 mA
- Stable with 1.0 μ F Ceramic Output Capacitor
- Overcurrent Protection
- Space Saving 8-Lead 2x2 DFN-8

Typical Application



Functional Block Diagram



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MICROCHIP

MCP1754/S

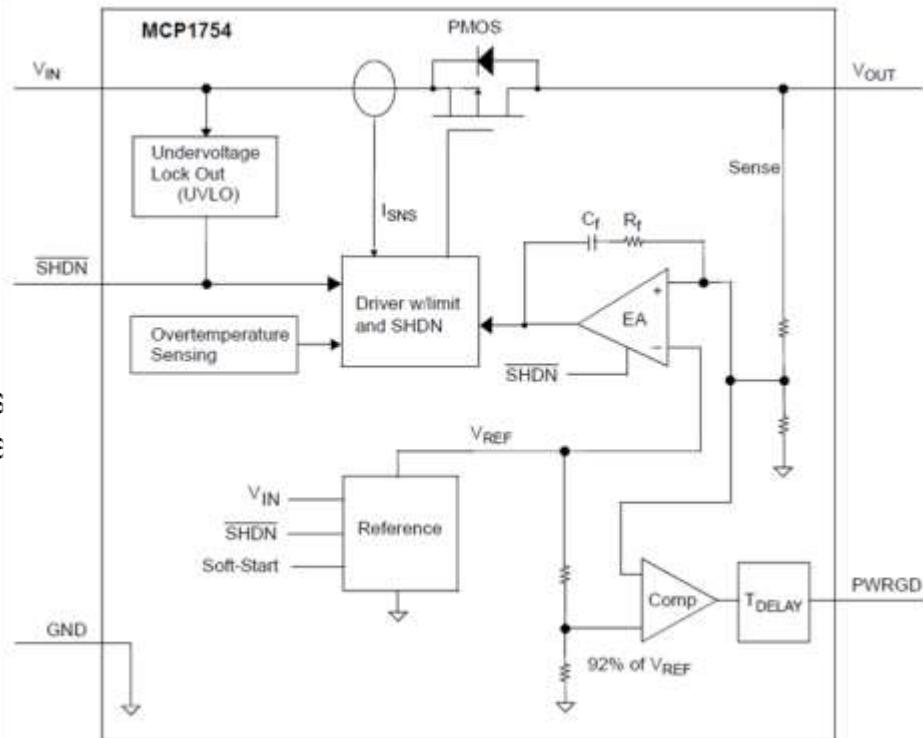
Online
Datasheet

Features:

- High PSRR: >70 dB @ 1 kHz typical
- 56.0 μ A Typical Quiescent Current
- Input Operating Voltage Range: 3.6V to 16.0V
- 150 mA Output Current
- Low Dropout Voltage, 300 mV Typical @ 150 mA
- 0.4% Typical Output Voltage Tolerance
- Standard Output Voltage Options (1.8V, 2.5V, 2.8V, 3.0V, 3.3V, 4.0V, 5.0V)
- Output Voltage Range 1.8V to 5.5V in 0.1V increments
- Output Voltage Tolerances of $\pm 2.0\%$ Over Temperature
- Stable with Minimum 1.0 μ F Output Capacitance
- Power Good Output
- Shutdown Input
- True Current Foldback Protection
- Short-Circuit Protection
- Overtemperature Protection

Package Options:

- 3-pin SOT-23A, SOT-89, SOT-223, 2x3 DFN-8 (MCP1754S)
- 5-pin SOT-23, SOT-223, and 2x3 DFN-8



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MICROCHIP

MCP1755/S

Online
Datasheet

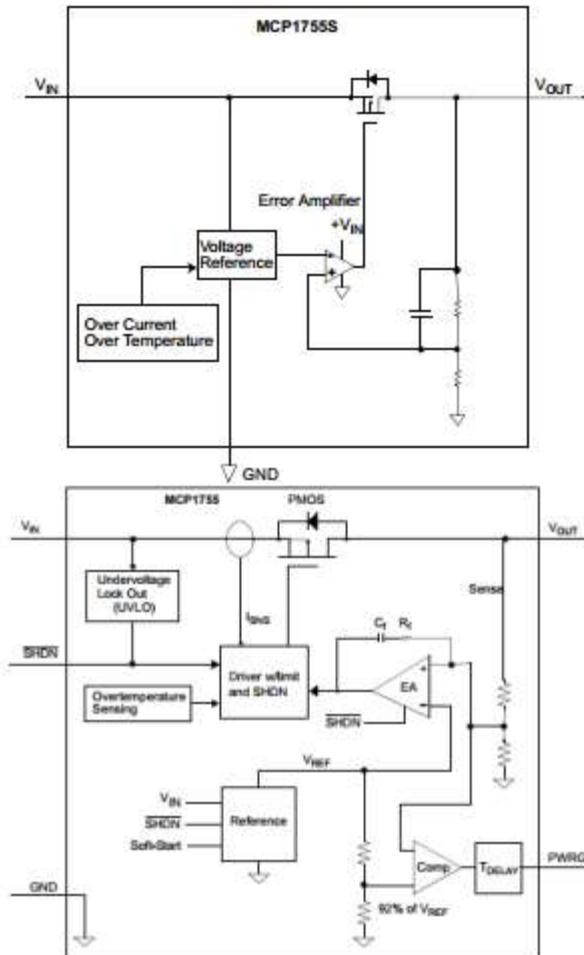
Features:

- High PSRR: >70 dB @ 1 kHz typical
- 68.0 μ A Typical Quiescent Current
- Input Operating Voltage Range: 3.6V to 16.0V
- 300 mA Output Current
- Low Dropout Voltage, 300 mV Typical @ 300 mA
- 0.85% Typical Output Voltage Tolerance
- Standard Output Voltage Options (1.8V, 2.5V, 2.8V, 3.0V, 3.3V, 4.0V, 5.0V)
- Output Voltage Range 1.8V to 5.5V in 0.1V increments
- Output Voltage Tolerances of $\pm 2.0\%$ Over Temperature
- Stable with Minimum 1.0 μ F Output Capacitance
- Power Good Output
- Shutdown Input
- True Current Foldback Protection
- Short-Circuit Protection
- Overtemperature Protection

Package Options:

3-pin SOT-223, 8-lead 2x3 (MCP1755S)

5-pin SOT-23, SOT-223, and 8-lead 2x3 DFN (MCP1755)



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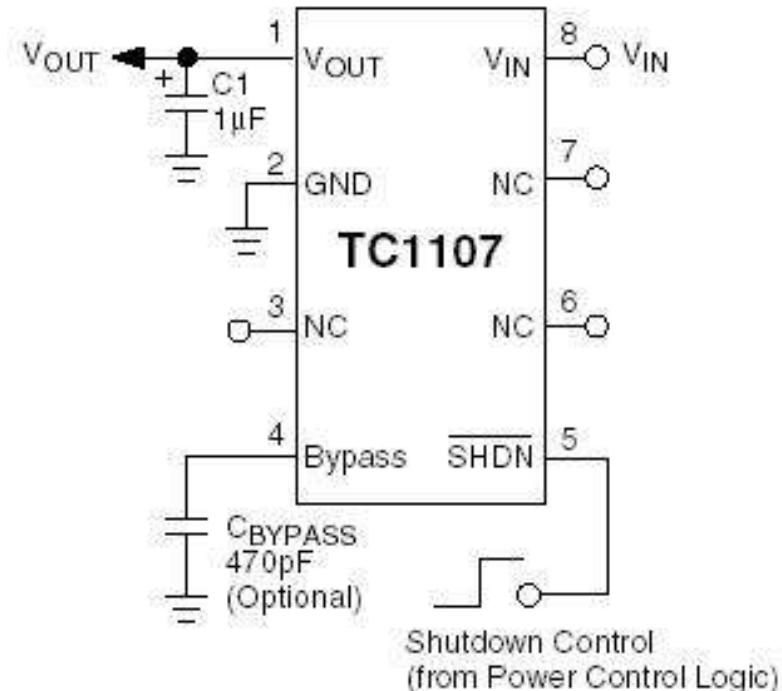
MICROCHIP

TC1107

Online
Datasheet

Features:

- Extremely Low Supply Current: 50 μ A (typ.)
- Very Low Dropout Voltage
- 300mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- Over-Current and Over-Temperature Protection
- Space Saving MSOP Package Option

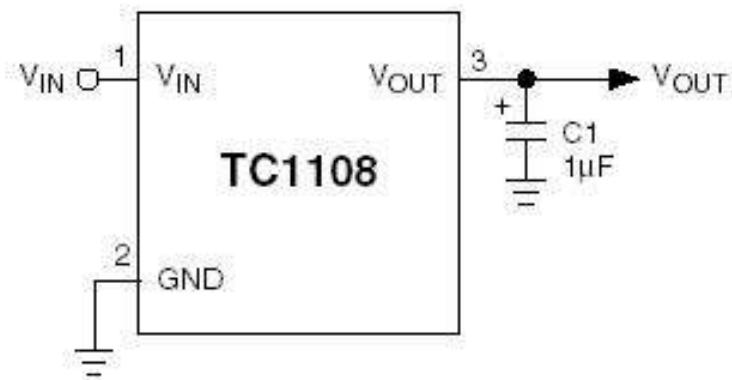


[TC1108 >>](#)

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Features:

- Extremely Low Supply Current: 50 μ A (typ.)
- Very Low Dropout Voltage
- 300mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and Overtemperature Protection





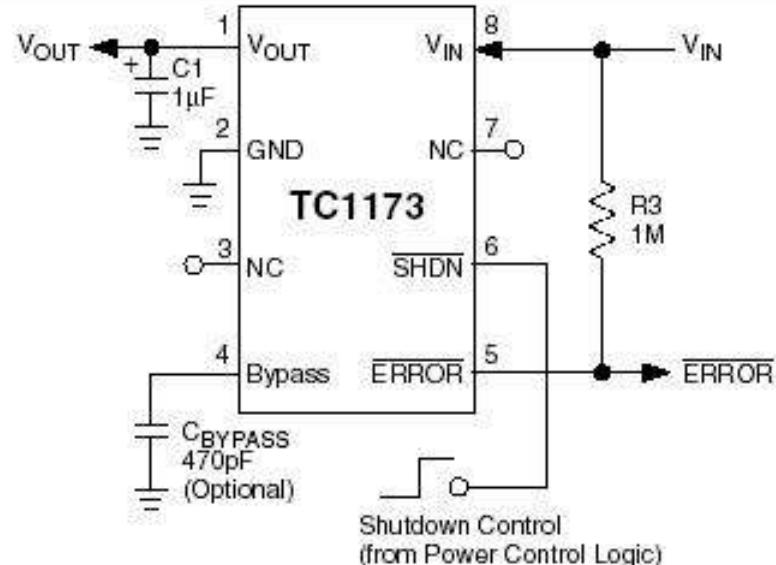
MICROCHIP

TC1173

Online
Datasheet

Features:

- Extremely Low Supply Current
- Very Low Dropout Voltage
- 300mA Output Current
- ERROR Output can be used as a Low Battery Detector or Processor Reset Generator
- Power Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and Overtemperature Protection
- Space Saving MSOP Package Option



[TC1174 >>](#)

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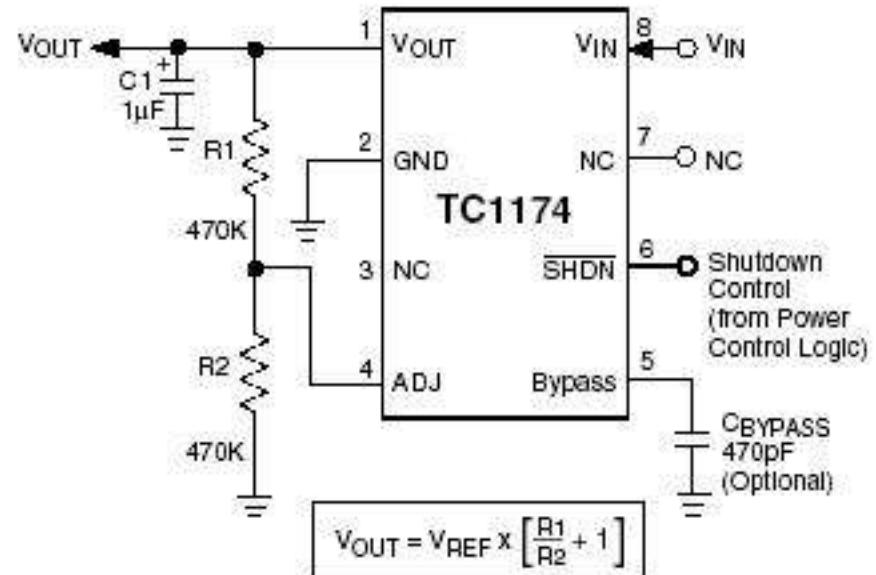
MICROCHIP

TC1174

Online
Datasheet

Features:

- Extremely Low Supply Current: 50 μ A (typ.)
- Very Low Dropout Voltage
- 300mA Output Current
- Adjustable Output Voltage
- Power Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- Overcurrent and Overtemperature Protection
- Space Saving MSOP Package Option



[TC1173 >>](#)

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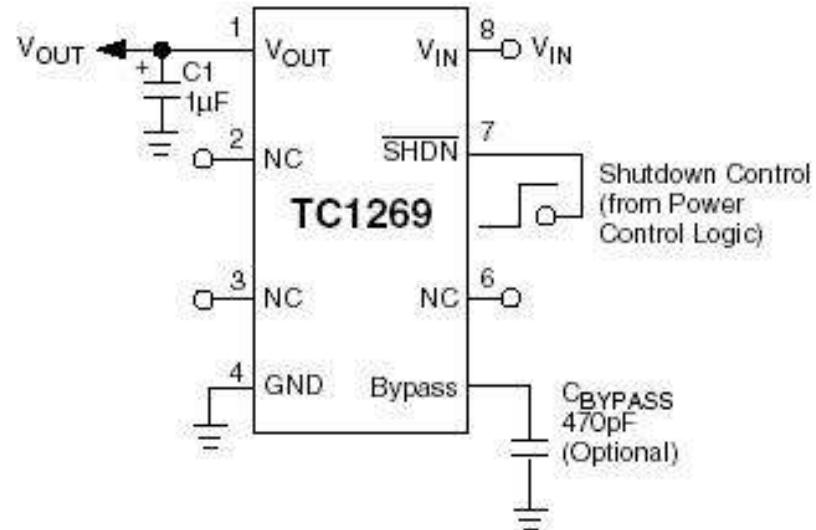
MICROCHIP

TC1269

Online
Datasheet

Features:

- Very Low Ground Current for Longer Battery Life
- Very Low Dropout Voltage
- 300mA Output Circuit
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Power Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- Over Current and Over Temperature Protection
- Space-Saving MSOP Package



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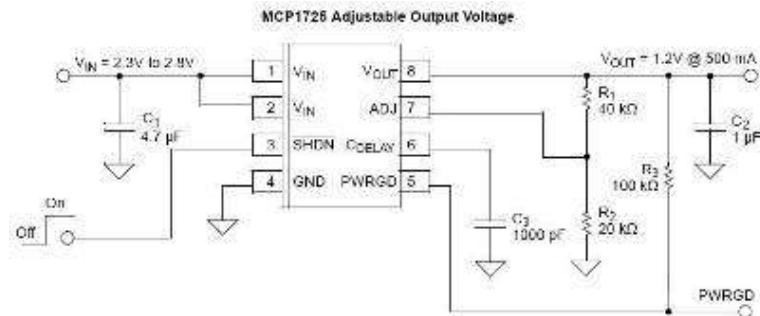
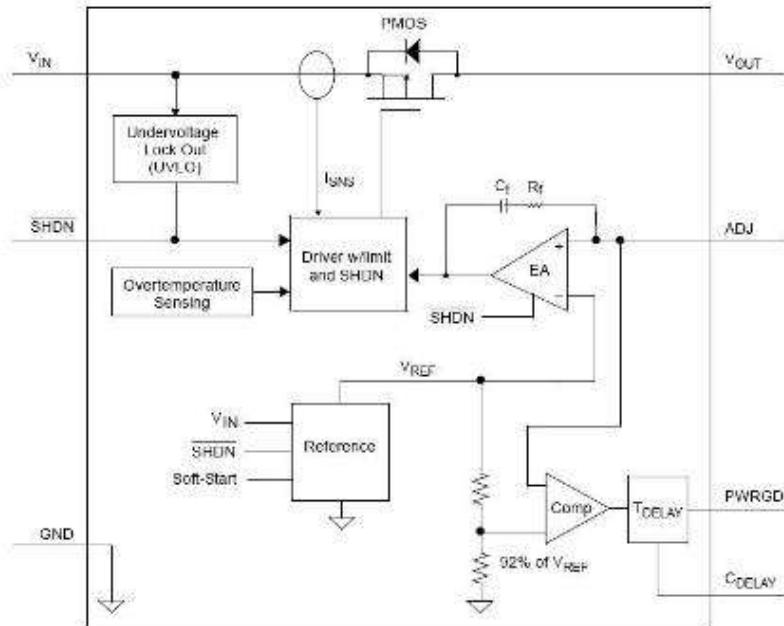
MICROCHIP

MCP1725

Online
Datasheet

Features:

- 500mA Output Current Capability
- Input Operating Voltage Range: 2.3V to 6.0V
- Adjustable Output Voltage Range: 0.8V to 5.0V
- Standard Fixed Output Voltages:
0.8V, 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V
- Other Fixed Output Voltage Options Available Upon Request
- Low Dropout Voltage: 210mV (typ.) @ 500mA
- Output Voltage Tolerance: 0.5% (typ.)
- Stable with 1.0 μ F Ceramic Output Capacitor
- Low Supply Current: 120 μ A (typ.)
- Adjustable Delay on Power Good Output
- Short Circuit Current Limiting and Overtemperature Protection
- Small Packaging: 2x3 DFN-8 and SOIC-8 Packages



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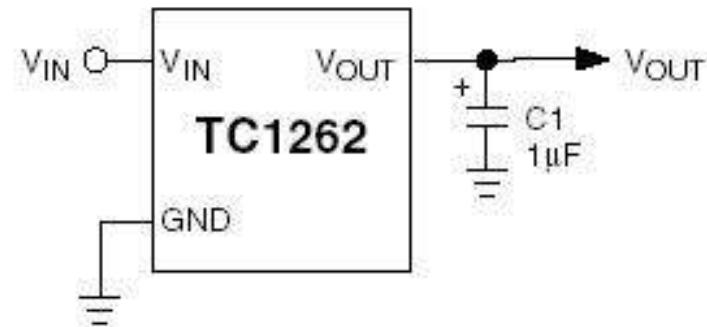
MICROCHIP

TC1262

Online
Datasheet

Features:

- Very Low Dropout Voltage
- 500mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and Overtemperature Protection



[TC1263 >>](#)

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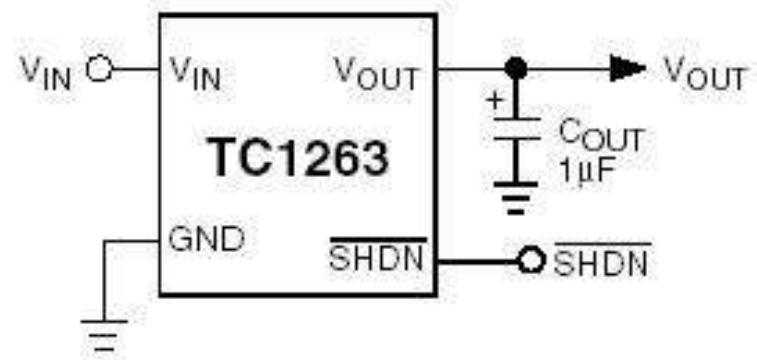
MICROCHIP

TC1263

Online
Datasheet

Features:

- Very Low Dropout Voltage
- 500mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and Overtemperature Protection
- SHDN Input for Active Power Management
- ERROR Output can be used as a Low Battery Detector (SOIC only)



[TC1262 >>](#)

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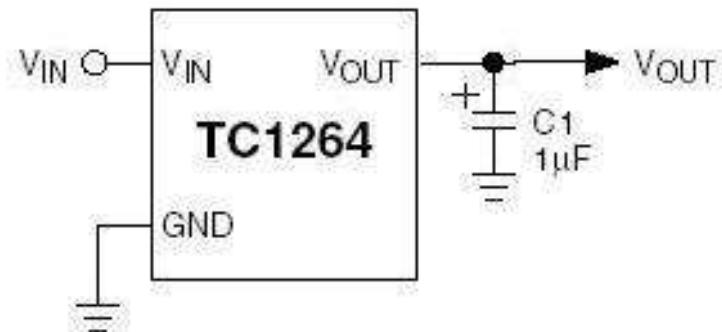
MICROCHIP

TC1264

Online
Datasheet

Features:

- Very Low Dropout Voltage
- 800mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and
Overtemperature Protection



[TC1265 >>](#)

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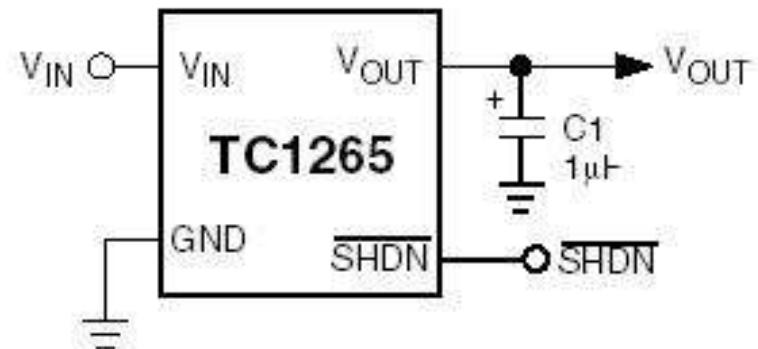
MICROCHIP

TC1265

Online
Datasheet

Features:

- Very Low Dropout Voltage
- 800mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and
Overtemperature Protection
- SHDN Input for Active Power
Management
- ERROR Output to Detect Low Battery
(SOIC only)



[TC1264 >>](#)

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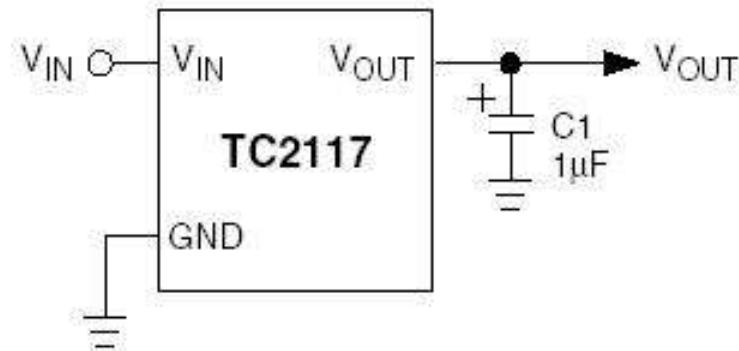
MICROCHIP

TC2117

Online
Datasheet

Features:

- Very Low Dropout Voltage
- 800mA Output Current
- High Output Voltage Accuracy
- Standard or Custom Output Voltages
- Overcurrent and
Overtemperature Protection
- Space Saving SOT-223 Package
- Fixed Output Voltages:
1.8V, 2.5V, 3.0V, 3.3V



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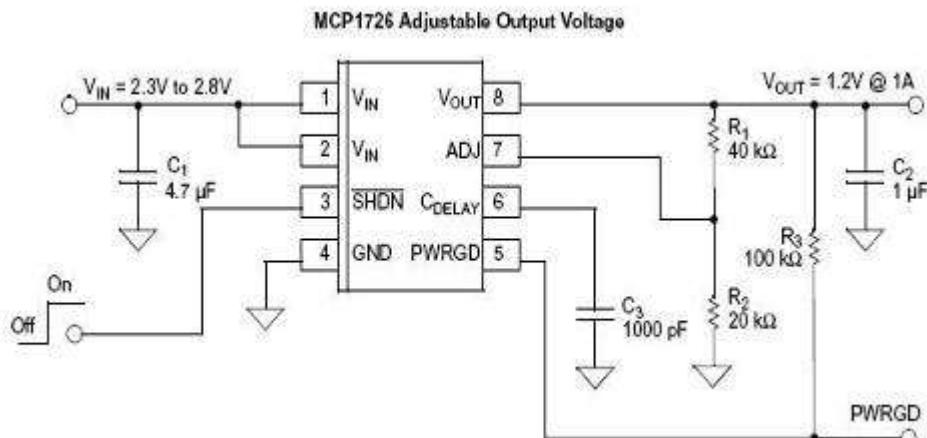
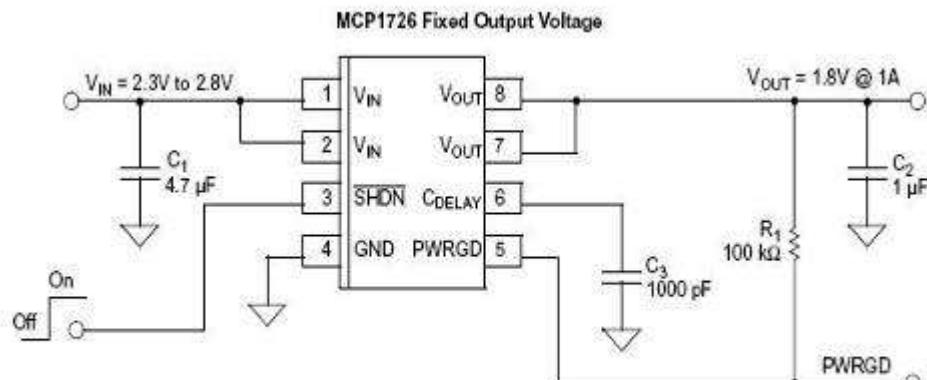
MICROCHIP

MCP1726

Online
Datasheet

Features:

- 1A Output Current Capability
- Input Operating Voltage Range: 2.3V to 6.0V
- Adjustable Output Voltage Range: 0.8V to 5.0V
- Standard Fixed Output Voltages: 0.8V, 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V
- Low Dropout Voltage: 220mV (typ.) @ 1A
- Output Voltage Tolerance: 0.4% (typ.)
- Stable with 1.0 μ F Ceramic Output Capacitor
- Fast response to Load Transients
- Low Supply Current: 140 μ A (typ.)
- Low Shutdown Supply Current: 0.1 μ A (typ.)
- Adjustable Delay on Power Good Output
- Short Circuit Current Limiting and Overtemperature Protection
- 3x3 DFN-8 and SOIC-8 Package Options



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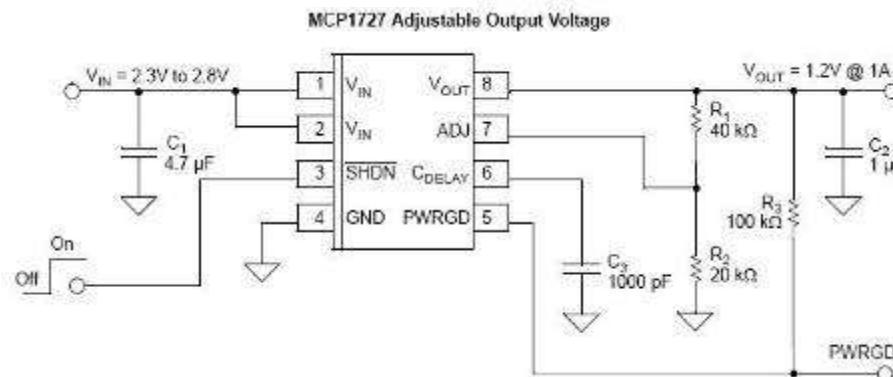
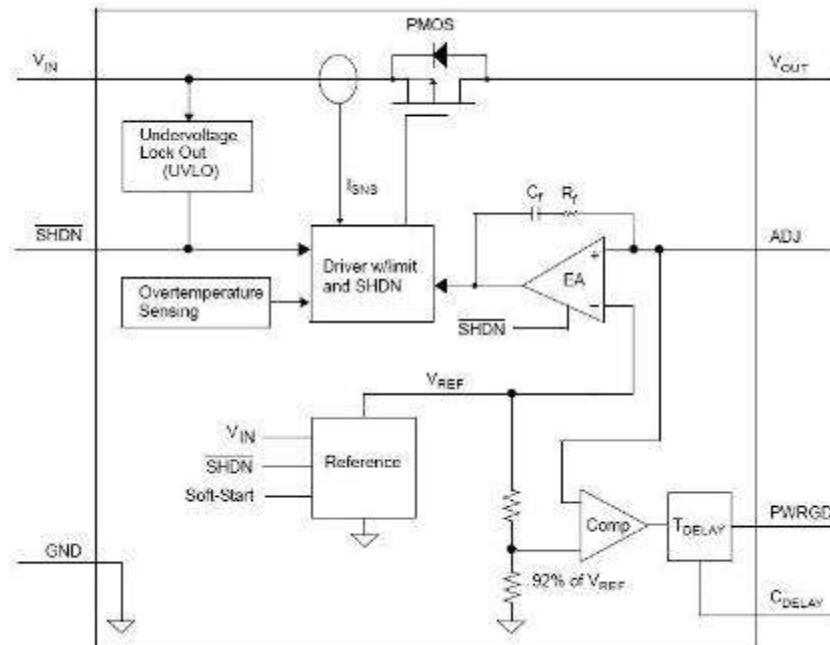
MICROCHIP

MCP1727

Online
Datasheet

Features:

- Up to 1.5A output load current
- Low Dropout Voltage: 330mV (typ.) @ 1.5A
- Output voltage from 0.8V to 5.0V, both fixed and adjustable
- Stable with 1.0 μ F ceramic output capacitor
- Output Voltage Tolerance: 0.5% (typ.)
- Power good output with adjustable delay
- Low supply current: 140 μ A (typ.)
- Low shutdown current: 0.1 μ A (typ.)
- Short Circuit Current Limiting and Overtemperature Protection
- DFN-8 3x3 and SOIC-8 Pb-free packages



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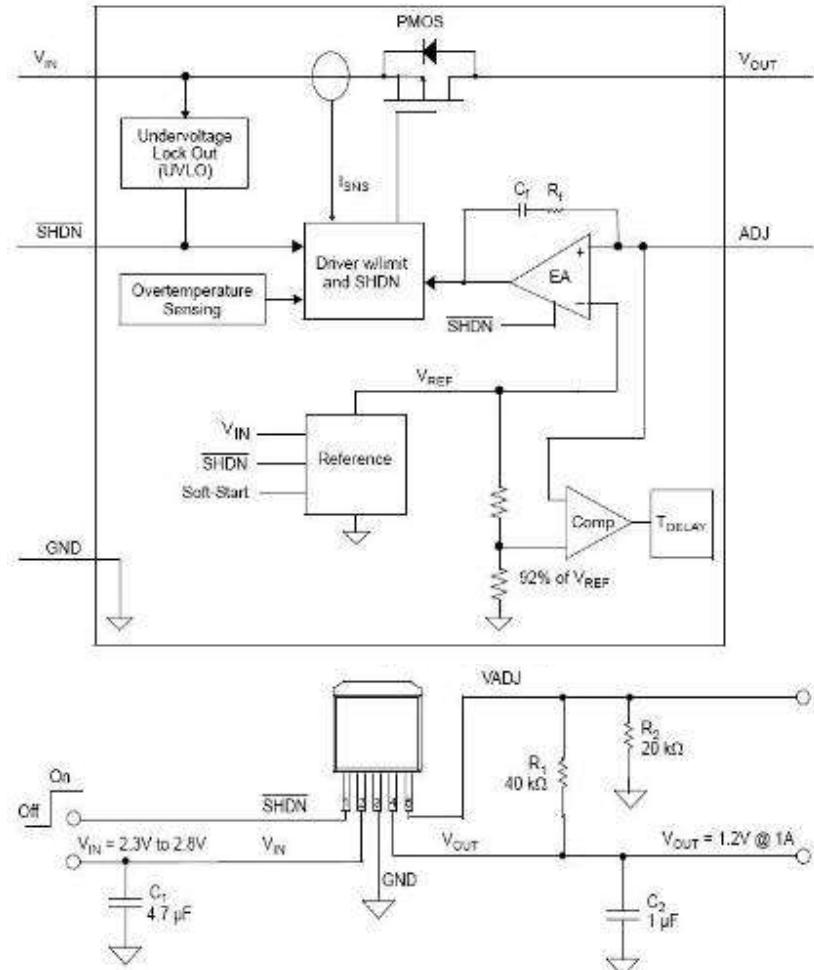
MICROCHIP

MCP1827/S

Online
Datasheet

Features:

- 1.5A Output Current Capability
- Input Operating Voltage Range: 2.3V to 6.0V
- Adjustable Output Voltage Range: 0.8V to 5.0V (MCP1827 only)
- Standard Fixed Output Voltages:
0.8V, 1.2V, 1.8V, 2.5V, 3.0V, 3.3V, 5.0V
- Other Fixed Output Voltage Options Available Upon Request
- Low Dropout Voltage: 330mV (typ.) @ 1.5A
- Output Voltage Tolerance: 0.5% (typ.)
- Stable with 1.0 μ F Ceramic Output Capacitor
- Fast response to Load Transients
- Low Supply Current: 120 μ A (typ.)
- Low Shutdown Supply Current: 0.1 μ A (typ.) (MCP1827 only)
- Fixed Delay on Power Good Output (MCP1827 only)
- Short Circuit Current Limiting and Overtemperature Protection
- 5-Lead Plastic DDPAK, 5-Lead TO-220 Package Options (MCP1827)
- 3-Lead Plastic DDPAK, 3-Lead TO-220 Package Options (MCP1827S)



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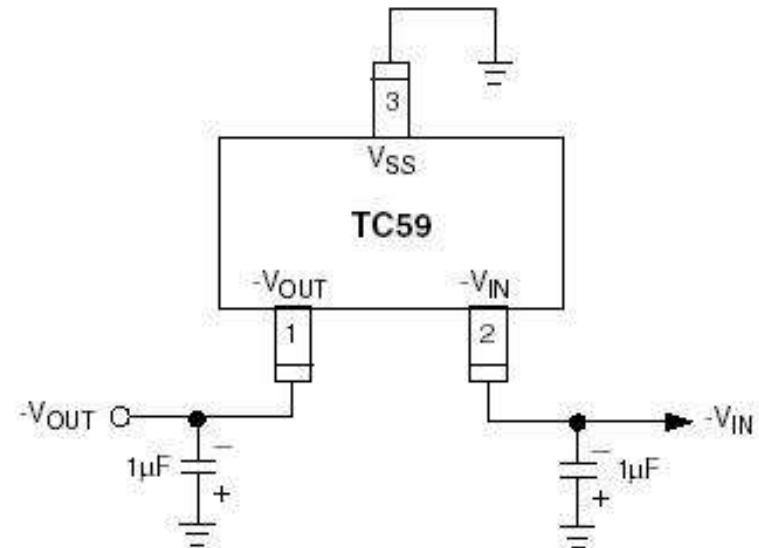
MICROCHIP

TC59

Online
Datasheet

Features:

- Low Dropout Voltage
120mV (typ.) @ 50mA
380mV (typ.) @ 100mA for -5.0V Out
- High Output Voltage Accuracy: 2% (max.)
- Low Supply Current: 3.5 μ A (typ.)
- Small Package: 3-Pin SOT-23A



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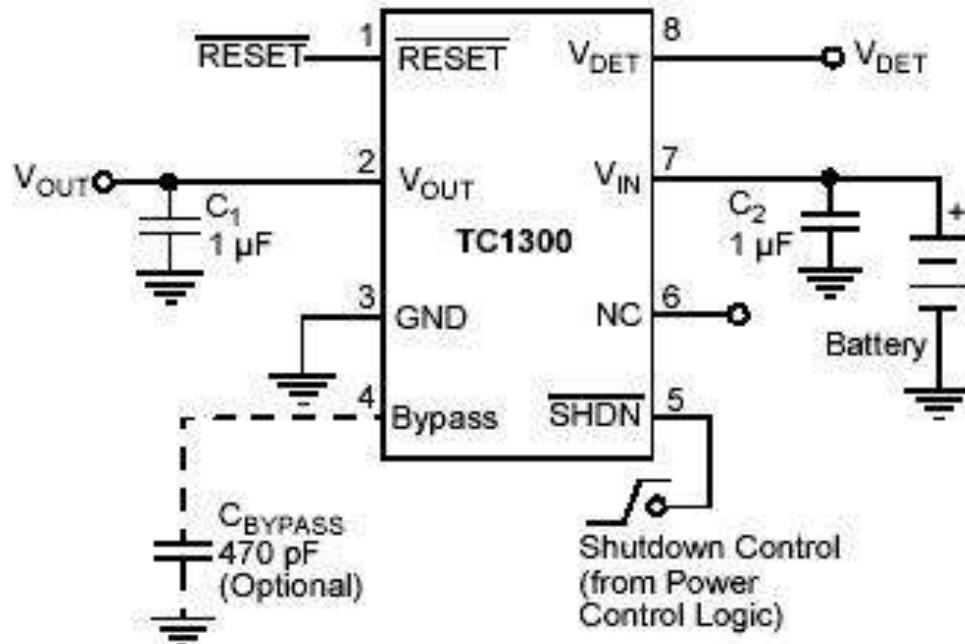
MICROCHIP

TC1300

Online
Datasheet

Features:

- LDO with Integrated Microprocessor Reset Monitor Functionality
- Low Supply Current: 80 μ A (typ.)
- Stable with Any Type of Capacitor
- Very Low Dropout Voltage
- 10 μ s (typ.) Wake Up Time from SHDN
- Standard or Custom Output and Detected Voltages
- Power-Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- Separate Input and Detected Voltage
- 140ms Guaranteed Minimum RESET Output Duration



[TC1307 >>](#)

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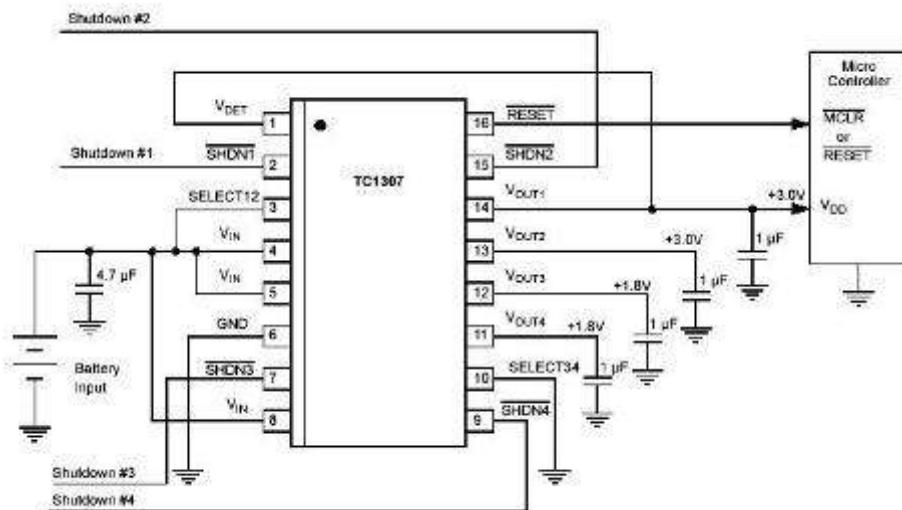
MICROCHIP

TC1307

Online
Datasheet

Features:

- Four Independent 150mA LDOs
- Low Supply Current 220 μ A (typ.)
- SelectMode™: Selectable Output Voltages for High Design Flexibility
- Low Dropout Voltage: 100mV (typ.) with 150mA load
- 10 μ s (typ.) Wake Up Time from SHDN
- High Output Voltage Accuracy: 0.5% (typ.)
- Power-Saving Shutdown Mode
- RESET Output used as a Low Battery Detector or Processor Reset Generator
- Overcurrent and Overtemperature Protection
- Small 16-Pin QSOP Package



[TC1300 >>](#)

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MICROCHIP

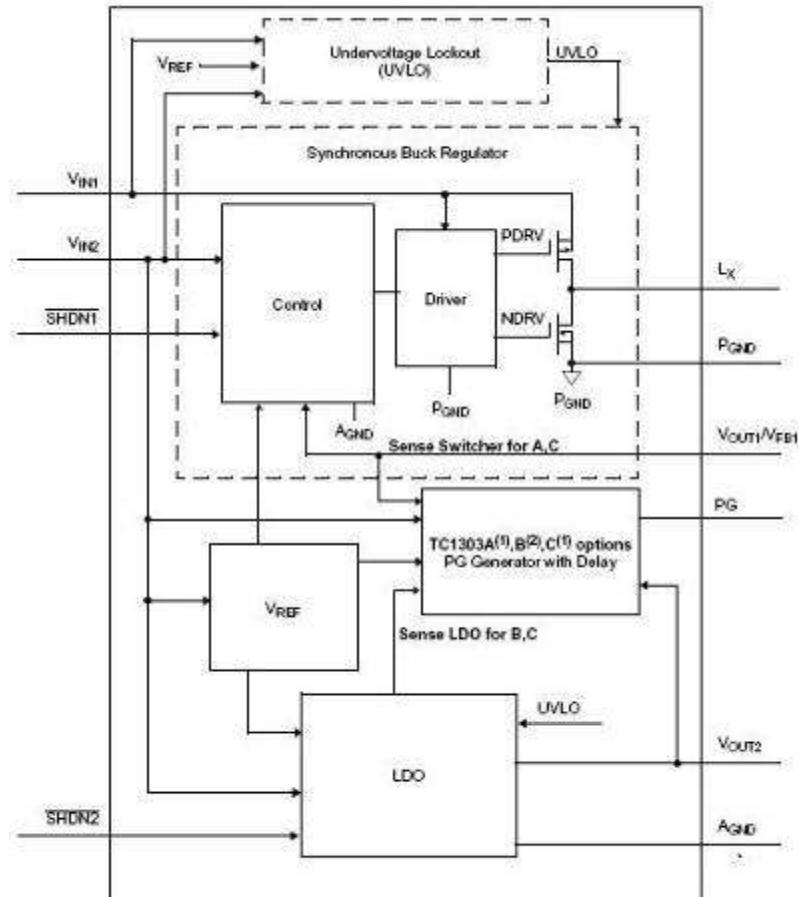
TC1303/4

Online
Datasheet

Features:

- Dual-Output Regulator (500mA Buck Regulator and 300mA LDO)
- Power-Good Output with 300ms Delay
- Quiescent Current: 65 μ A (typ.)
- Independent Shutdown for Buck and LDO Outputs (TC1303)
- Synchronous Buck Regulator:
 - Over 90% (typ.) Efficiency
 - 2.0MHz Fixed-Frequency PWM
 - Automatic PWM to PFM Mode Transition
 - Adjustable and Standard Output Voltages
- Low-Dropout Regulator:
 - Dropout Voltage: 137mV @ 200mA (typ.)
 - Standard Fixed Output Voltages
- Power-Good Function:
 - Monitors Buck Output Function (TC1303A)
 - Monitors LDO Output Function (TC1303B)
 - Monitors Both Buck and LDO Output Function (TC1303C and TC1304)
- Sequenced Startup and Shutdown (TC1304)
- Small 10-Pin 3x3 DFN or MSOP Package

[More Diagrams](#)



Note 1: PG open-drain for A,C options

2: PG push-pull output for B option

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Switchers](#)

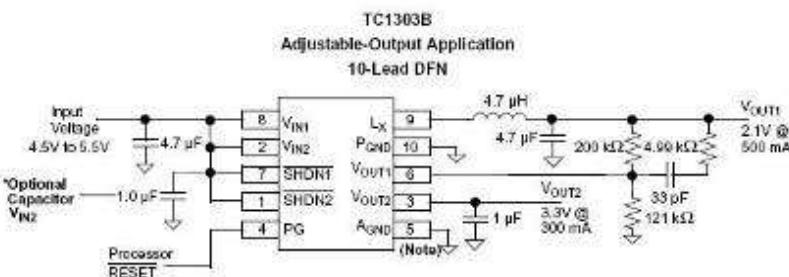
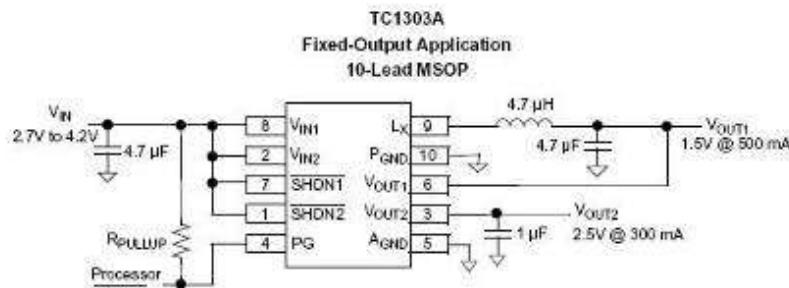
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LDOs](#)



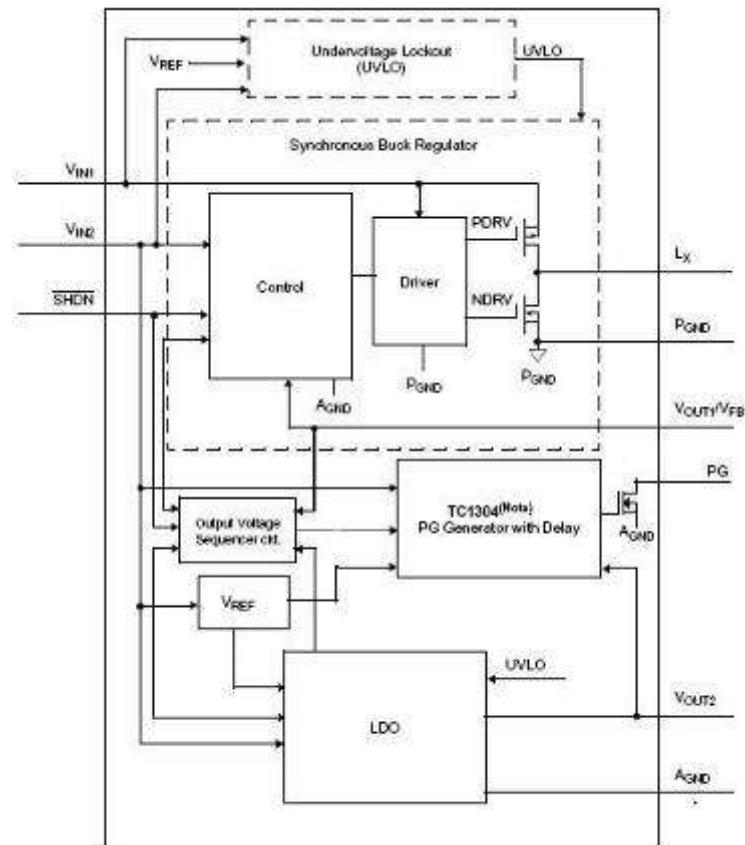
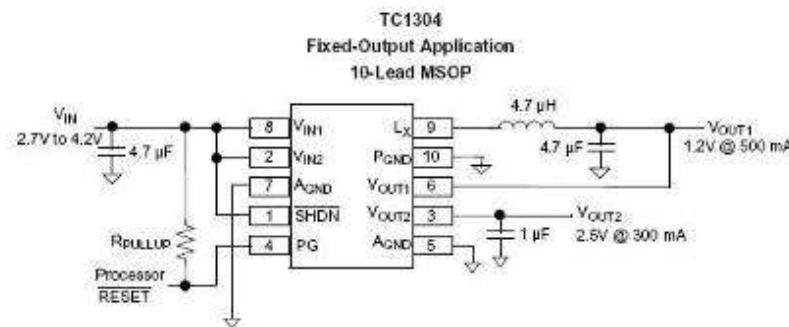
MICROCHIP

Online
Datasheet

TC1303/4 (cont.)



Note: Connect DFN package exposed pad to A_GND.



Note: PG open-drain for TC1304

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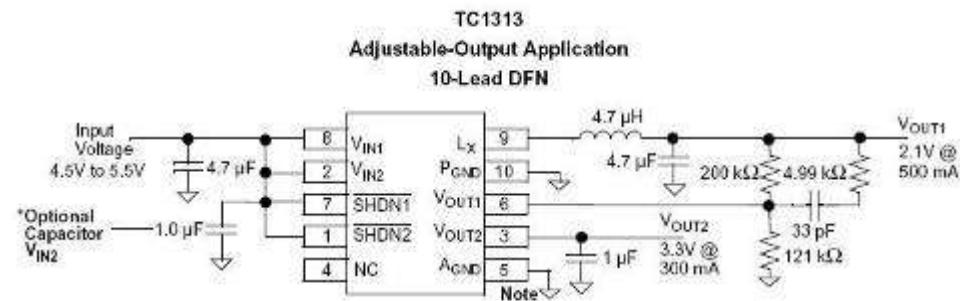
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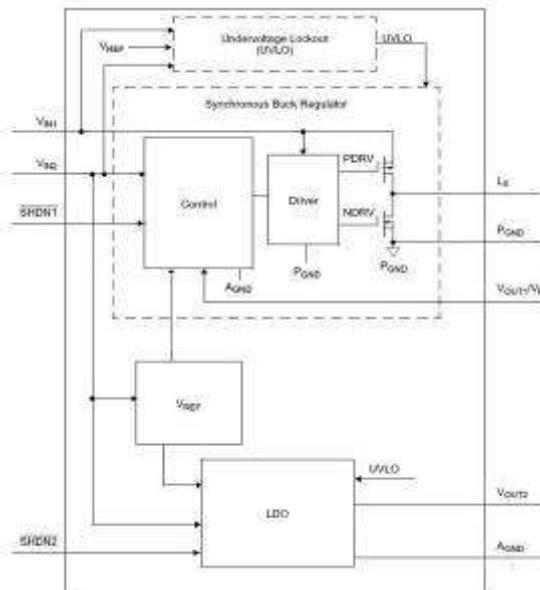
TC1313

Features:

- Dual-Output Regulator (500mA Buck Regulator and 300mA LDO)
- Quiescent Current: 57 μ A (typ.)
- Independent Shutdown for Buck and LDO Outputs
- Synchronous Buck Regulator:
 - Over 90% (typ.) Efficiency
 - 2.0MHz Fixed-Frequency PWM
 - Automatic PWM to PFM Mode Transition
 - Adjustable and Standard Output Voltages
- Low-Dropout Regulator:
 - Dropout Voltage: 137mV @ 200mA (typ.)
 - Standard Fixed Output Voltages
- Undervoltage Lockout (UVLO)
- Output Short Circuit Protection
- Overtemperature Protection
- Small 10-Pin 3x3 DFN or MSOP Package



Note: Connect DFN package exposed pad to AGND.



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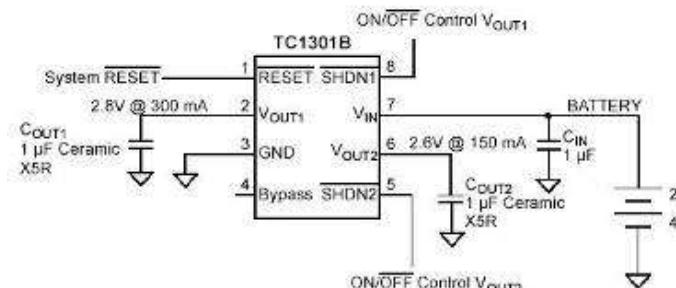
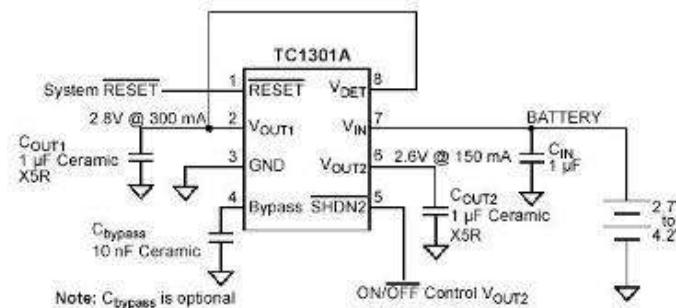
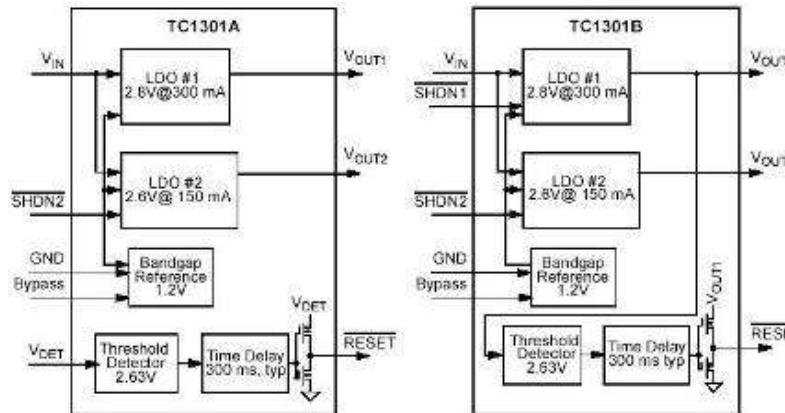
MICROCHIP

TC1301

Online
Datasheet

Features:

- Dual Output LDO with Microcontroller Reset Monitor Functionality:
 - $V_{OUT1} = 1.5$ to $3.3V$ @ $300mA$
 - $V_{OUT2} = 1.5V$ to $3.3V$ @ $150mA$
 - $V_{RESET} = 2.20V$ to $3.20V$
- Output Voltage and RESET Threshold Voltage Options Available (See Table 8-1)
- Low Dropout Voltage:
 - V_{OUT1} : $104mV$ @ $300mA$ (typ.)
 - V_{OUT2} : $150mV$ @ $150mA$ (typ.)
- Low Supply Current: $116\mu A$ (typ.)
- Reference Bypass Input for Low Noise Operation
- Both Output Voltages Stable with a Minimum $1\mu F$ Ceramic Output Capacitor
- Separate Input for RESET Detect Voltage (TC1301A)
- Separate V_{OUT1} and V_{OUT2} SHDN Pins (TC1301B)
- Power Saving Shutdown Mode
- Small 8-Pin DFN and MSOP Packages



[TC1302 >>](#)

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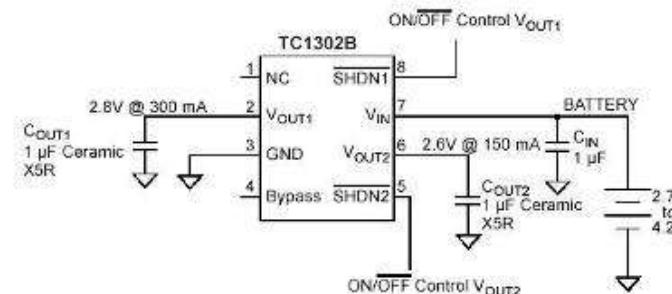
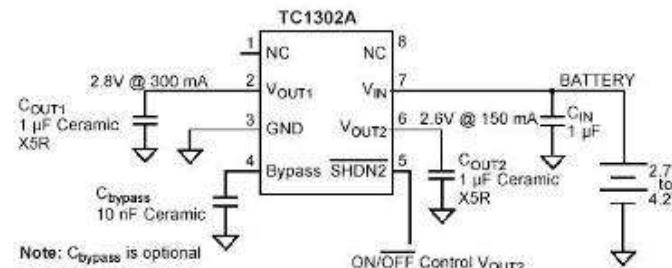
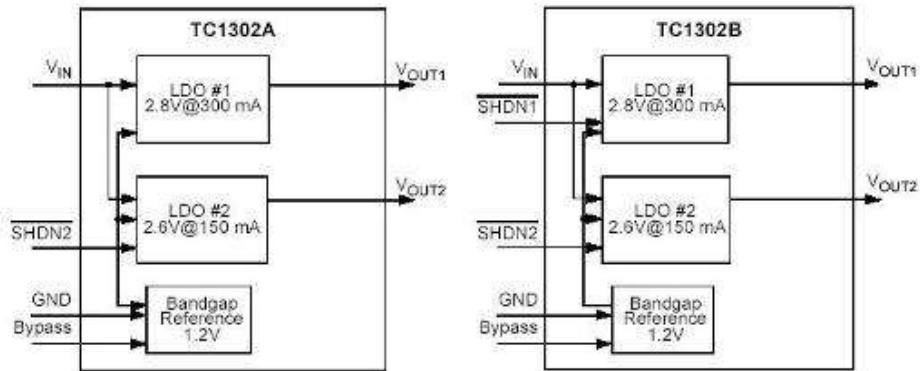
MICROCHIP

TC1302

Online
Datasheet

Features:

- Dual Output LDO:
 - $V_{OUT1} = 1.5$ to $3.3V$ @ $300mA$
 - $V_{OUT2} = 1.5V$ to $3.3V$ @ $150mA$
 - $V_{RESET} = 2.20V$ to $3.20V$
- Output Voltage Options (See Table 8-1)
- Low Dropout Voltage:
 - V_{OUT1} : $104mV$ @ $300mA$ (typ.)
 - V_{OUT2} : $150mV$ @ $150mA$ (typ.)
- Low Supply Current: $116\mu A$ (typ.)
- Reference Bypass Input for Low Noise Operation
- Both Output Voltages Stable with a Minimum $1\mu F$ Ceramic Output Capacitor
- Separate V_{OUT1} and V_{OUT2} SHDN Pins (TC1302B)
- Power Saving Shutdown Mode
- Overtemperature and Overcurrent Protection
- Small 8-Pin DFN and MSOP Packages



[TC1301 >>](#)

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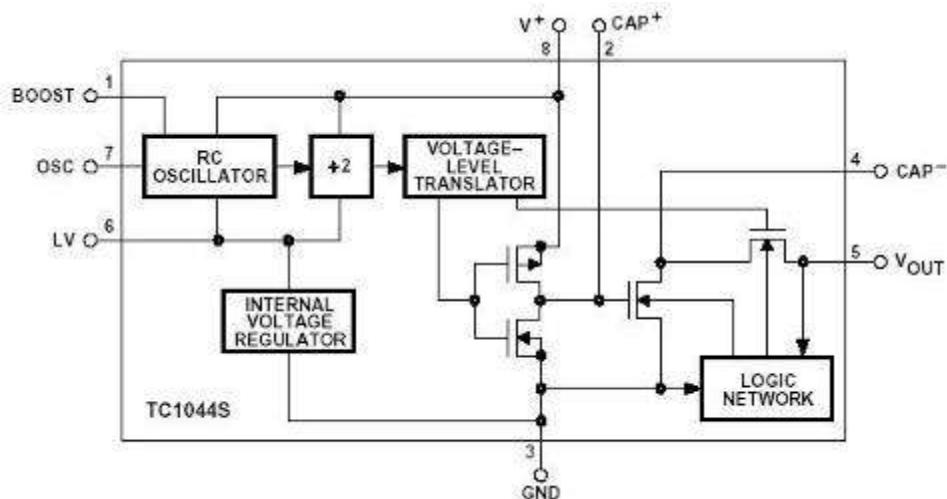
MICROCHIP

TC1044S

Online
Datasheet

Features:

- Converts +5V Logic Supply to $\pm 5V$ System
- Wide Input Voltage Range: 1.5V to 12V
- Efficient Voltage Conversion: 99.9%
- Excellent Power Efficiency: 98%
- Low Power Consumption: $80\mu A$ @ $V_{IN} = 5V$
- Low Cost and Easy to Use
- Only Two External Capacitors Required
- RS-232 Negative Power Supply
- Available in 8-Pin SOIC and 8-Pin Plastic DIP Packages
- Improved ESD Protection: Up to 10kV
- No External Diode Required for High Voltage Operation
- Frequency Boost Raises F_{OSC} to 45kHz



[TC7660S >>](#)

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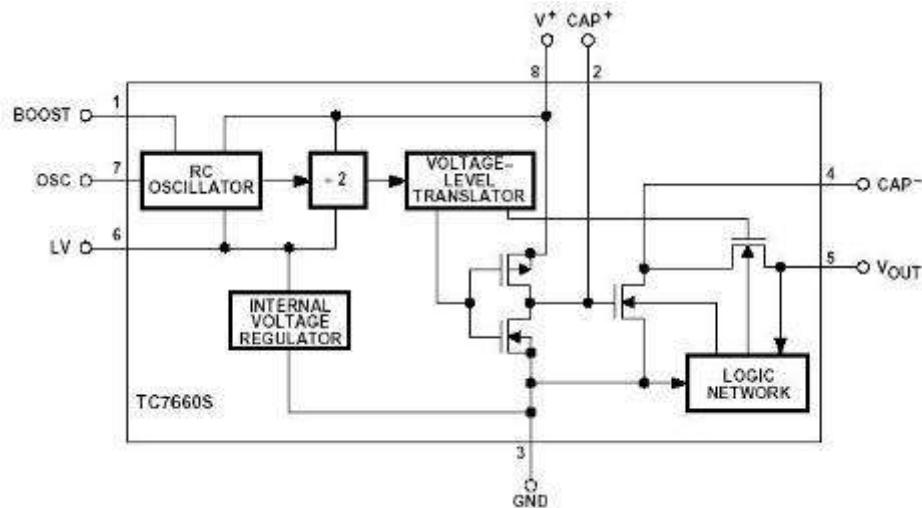
MICROCHIP

TC7660S

Online
Datasheet

Features:

- Oscillator Boost from 10kHz to 45kHz
- Converts +5V Logic Supply to $\pm 5V$ System
- Wide Input Voltage Range: 1.5V to 12V
- Efficient Voltage Conversion: 99.9%
- Excellent Power Efficiency: 98%
- Low Power Consumption: $80\mu A$ @ $V_{IN} = 5V$
- Low Cost and Easy to Use
- Only Two External Capacitors Required
- Available in 8-Pin SOIC Package
- Improved ESD Protection: Up to 10kV
- No External Diode Required for High Voltage Operation



[TC1044S >>](#)

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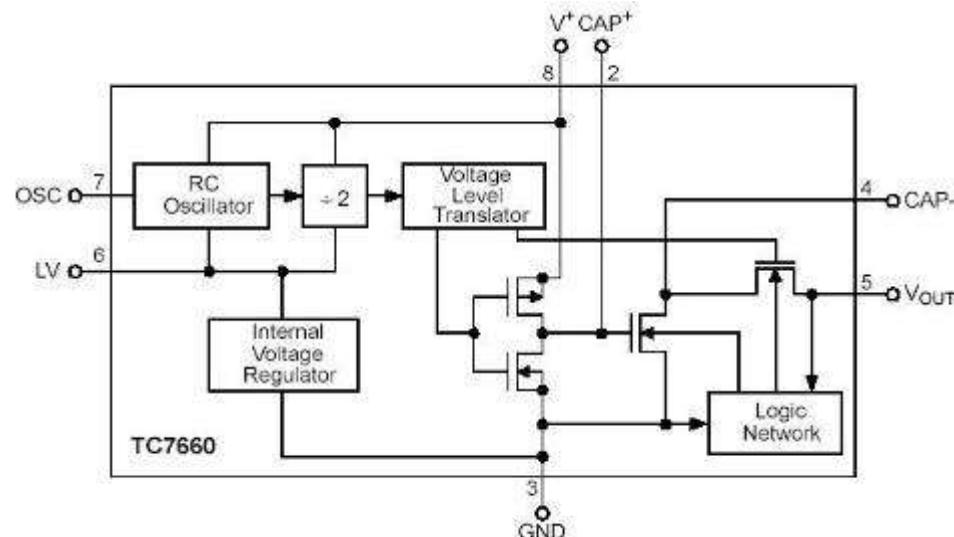
MICROCHIP

TC7660

Online
Datasheet

Features:

- Wide Input Voltage Range: 1.5V to 12V
- Efficient Voltage Conversion: 99.9%
- Excellent Power Efficiency: 98%
- Low Power Consumption: 80 μ A @ $V_{IN} = 5V$
- Low Cost and Easy to Use
- Only Two External Capacitors Required
- Available in 8-Pin SOIC Package, PDIP, and CERDIP Packages
- Improved ESD Protection: 3kV HBM
- No External Diode Required for High Voltage Operation



[TC7660H >>](#)

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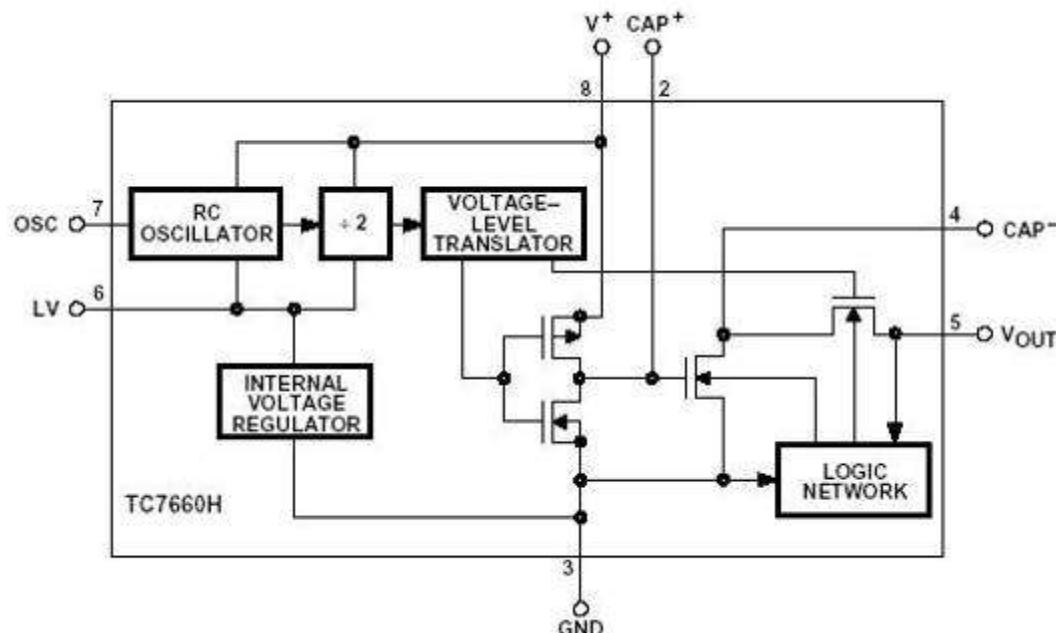
MICROCHIP

TC7660H

Online
Datasheet

Features:

- Wide Input Voltage Range:
1.5V to 10V
- Efficient Voltage Conversion: 99.7%
- Power Efficiency: 85%
- Pin Compatible with TC7660,
High Frequency Performance
DC-to-DC Converter
- Low Cost, Only Two External
Capacitors Required (1 μ F)
- Available in 8-Pin SOIC Package and
PDIP Packages



[TC7660 >>](#)

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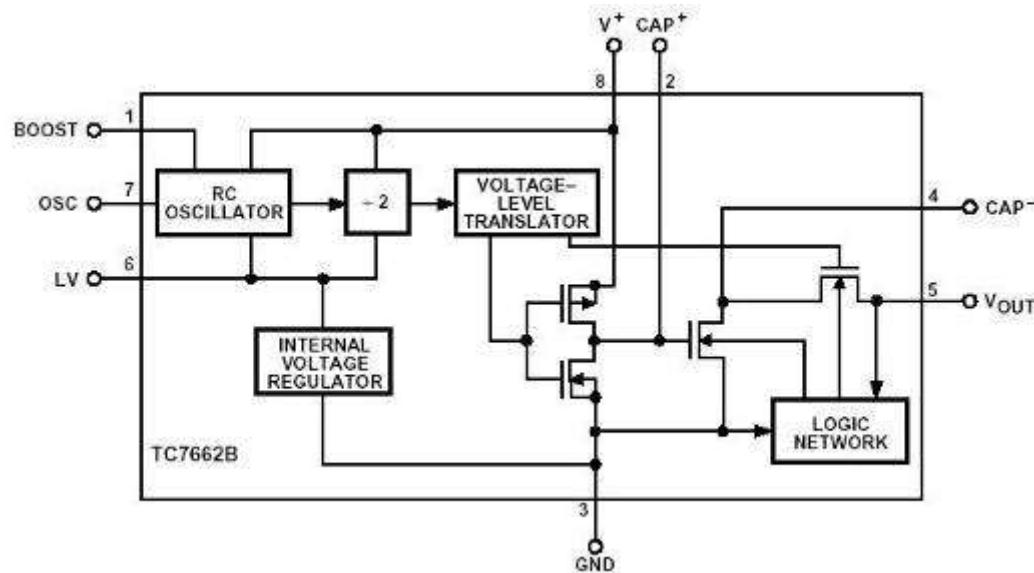
MICROCHIP

TC7662B

Online
Datasheet

Features:

- Wide Operating Voltage Range:
1.5V to 15V
- Boost Pin (Pin 1) for Higher
Switching Frequency
- High Power Efficiency: 96%
- Easy to Use:
Requires Only 2 External Non-
Critical Passive Components
- Improved Direct Replacement for
- Industry Standard ICL7660 and
Other Second Source Devices



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MICROCHIP

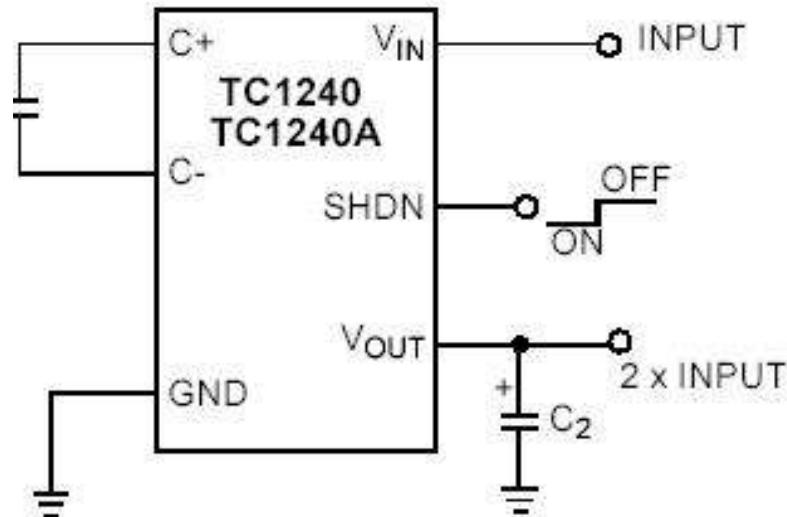
TC1240/A

Online
Datasheet

Features:

- 6-Pin SOT-23A Package
- >99% Typical Voltage Conversion Efficiency
- Voltage Doubling
- Input Voltage Range:
 - TC1240: +2.5 to +4.0V
 - TC1240A: +2.5V to +5.5V
- Low Output Resistance:
 - TC1240: 17Ω (typ.)
 - TC1240A: 17Ω (typ.)
- Only Two External Capacitors Required
- Low Supply Current
 - TC1240: 180µA (typ.)
 - TC1240A: 550µA (typ.)
- Power-Saving Shutdown Mode: 1µA (max.)
- Fully Compliant with 1.8V Logic Systems

Positive Voltage Doubler



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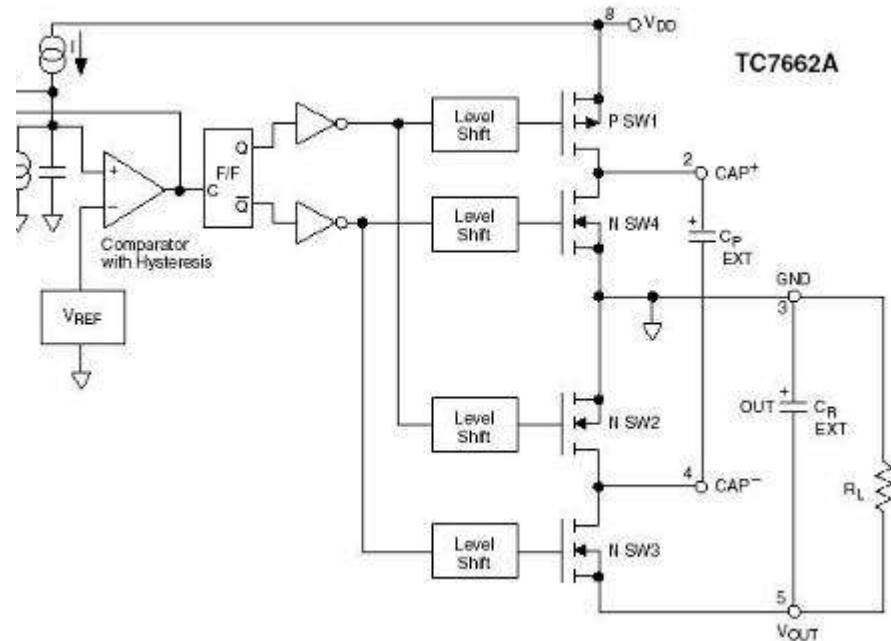
MICROCHIP

TC7662A

Online
Datasheet

Features:

- Wide Operating Range: 3V to 18V
- 40mA Output Current
- Pin Compatible with ICL7662/SI7661/TC7660/ LTC1044
- No External Diodes Required
- Low Output Impedance @ $I_L = 20\text{mA}$, 40Ω (typ.)
- No Low-Voltage Terminal Required
- CMOS Construction
- Available in 8-Pin PDIP Package



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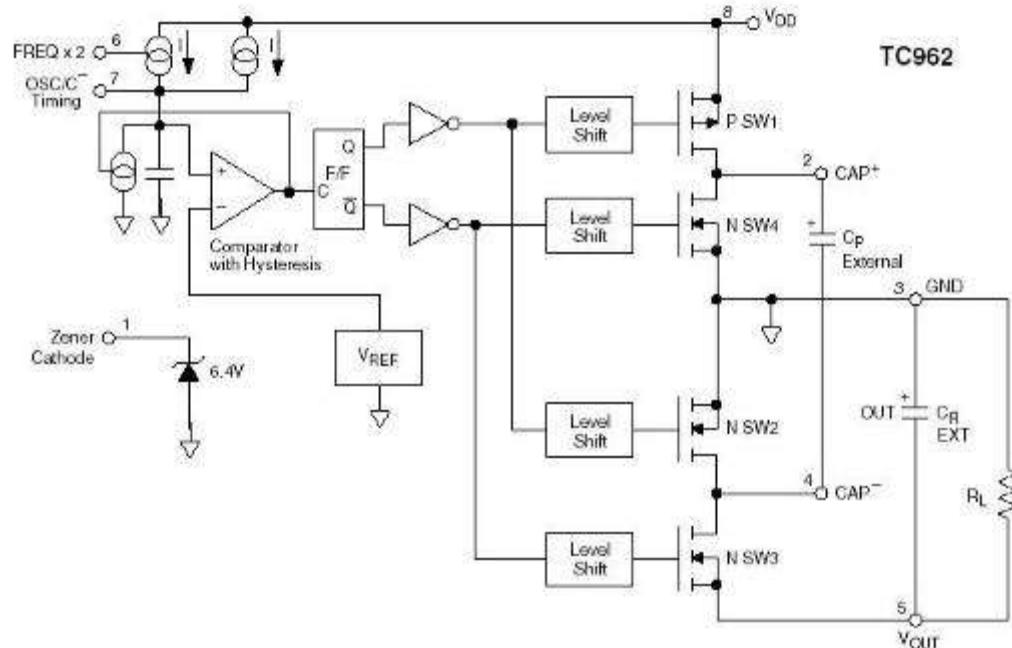
MICROCHIP

TC962

Online
Datasheet

Features:

- Pin Compatible With TC7662/ICL7662/SI7661
- High Output Current: 80mA
- No External Diodes Required.
- Wide Operating Range: 3V to 18V
- Low Output Impedance: 28Ω (typ.)
- No Low Voltage Terminal Required
- Application Zener On Chip
- OSC Frequency Doubling Pin
- Option for Smaller Output Capacitors



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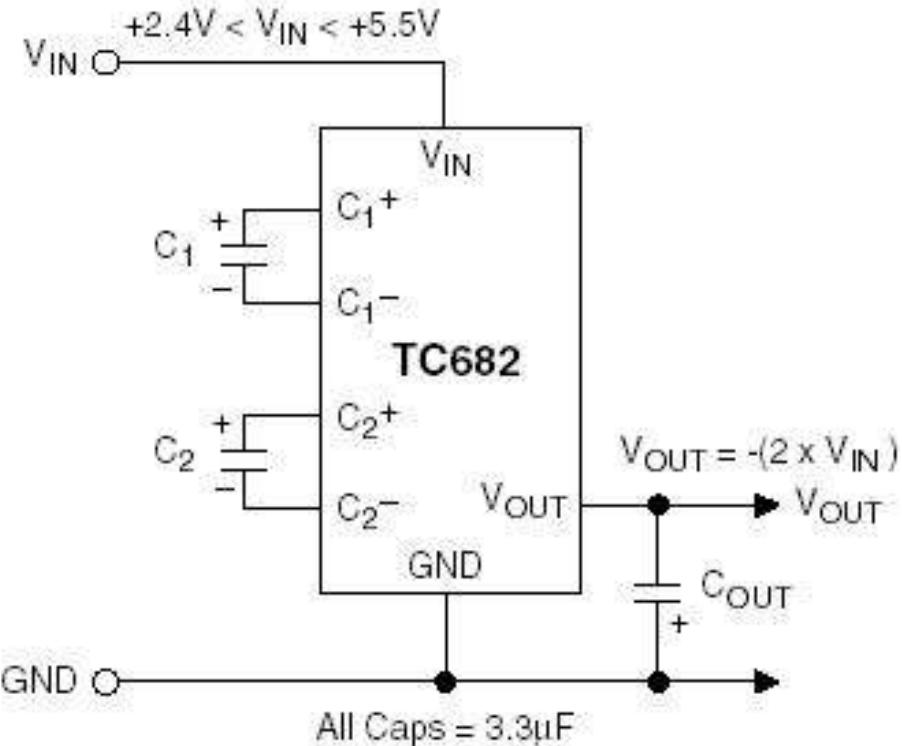
MICROCHIP

TC682

Online
Datasheet

Features:

- Doubling/Inverting Functionality
- 99.9% Voltage Conversion Efficiency
- 92% Power Conversion Efficiency
- Wide Input Voltage Range: +2.4V to +5.5V
- Only 3 External Capacitors Required
- 185 μ A Supply Current
- Space Saving 8-Pin SOIC and PDIP Packages



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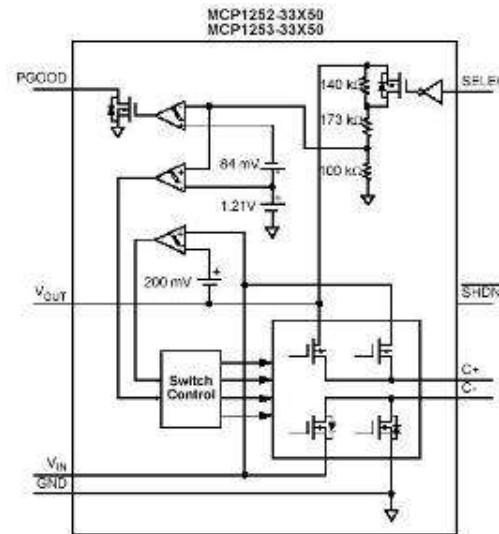
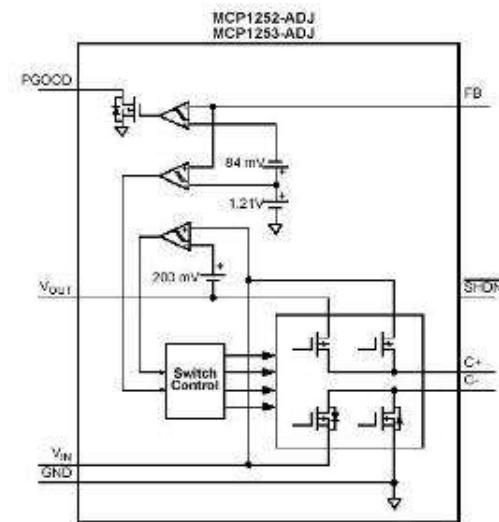
MICROCHIP

MCP1252/3

Online
Datasheet

Features:

- Inductorless, Buck/Boost, DC/DC Converter
- Low Power: $80\mu\text{A}$ (typ.)
- High Output Voltage Accuracy:
 $\pm 2.5\%$ (V_{OUT} Fixed)
- 120mA Output Current
- Wide Operating Temperature Range:
 -40°C to $+85^{\circ}\text{C}$
- Thermal Shutdown and Short-Circuit Protection
- Uses Small Ceramic Capacitors
- Switching Frequency:
MCP1252: 650kHz
MCP1253: 1MHz
- Low Power Shutdown Mode: $0.1\mu\text{A}$ (typ.)
- Shutdown Input Compatible 1.8V Logic
- V_{IN} Range: 2.1V to 5.5V
- Selectable Output Voltage (3.3V or 5.0V)
or Adjustable Output Voltage
- Space-saving, 8-Lead MSOP
- Soft-Start Circuitry to Minimize In-Rush Current



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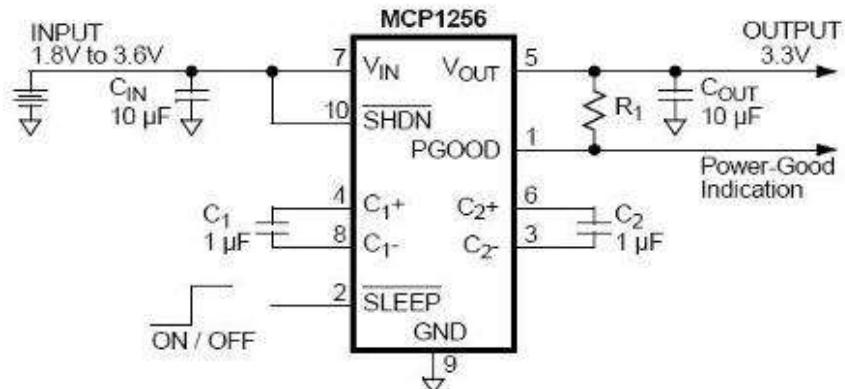
MICROCHIP

MCP1256/7/8/9

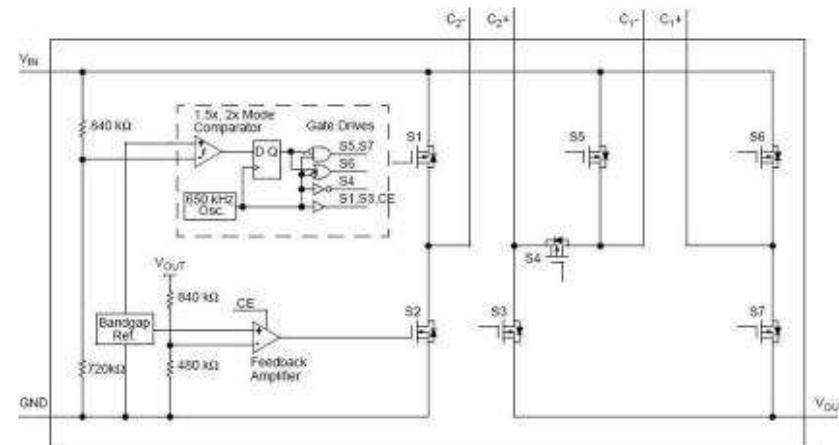
Online
Datasheet

Features:

- Inductorless 1.5x, 2x Boost DC/DC Converter
- Output Voltage: 3.3V
- Voltage Accuracy: $\pm 3.0\%$ (V_{OUT} Fixed)
- Output Current Up To 100mA
- 20mV_{P-P} Output Voltage Ripple
- Temperature Range: -40°C to +125°C
- Thermal Shutdown and Short Circuit Protection
- Uses small Ceramic Capacitors
- Switching Frequency: 650kHz
- Power Good Output
- Low Power SLEEP Mode: MCP1256/7
- Low Power Shutdown Mode: 0.1µA (typ.)
- Shutdown Input Compatible with 1.8V Logic
- V_{IN} Range: 1.8V to 3.6V
- Soft-Start Circuitry to Minimize In-Rush Current
- Packages: 10-Pin MSOP, 10-Lead 3x3 DFN



Typical Application with Power-Good Indication



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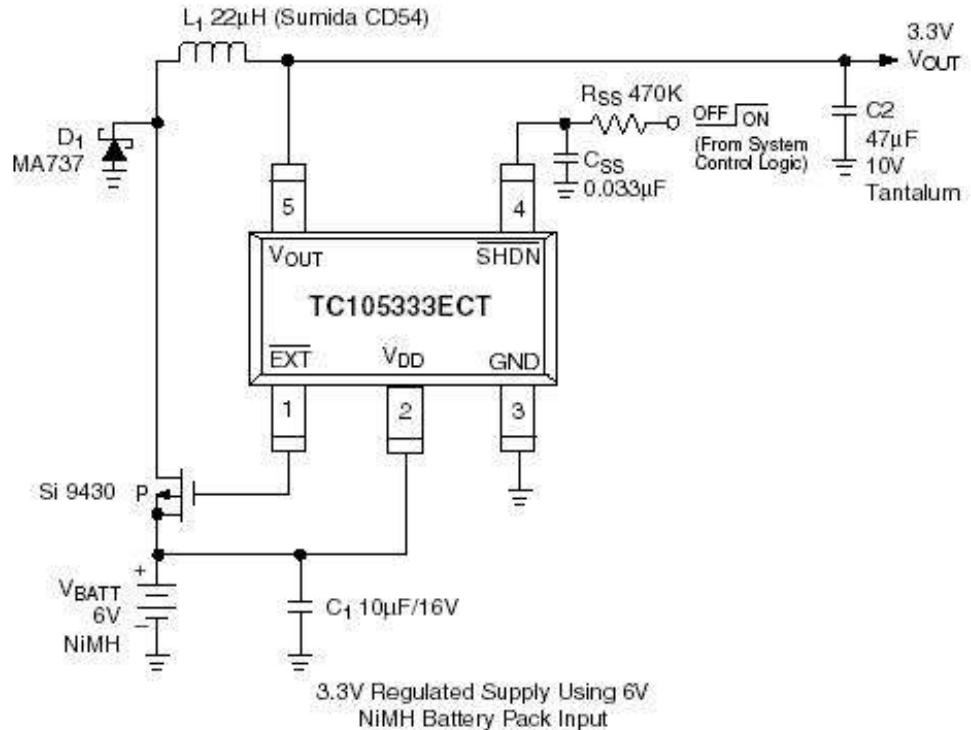
MICROCHIP

TC105

Online
Datasheet

Features:

- 57 μ A (typ.) Supply Current
- 1A Output Current
- 0.5 μ A Shutdown Mode
- 300 kHz Switching Frequency for Small Inductor Size
- Programmable Soft-Start
- 92% Efficiency (typ.)
- Small Package: 5-Pin SOT-23A



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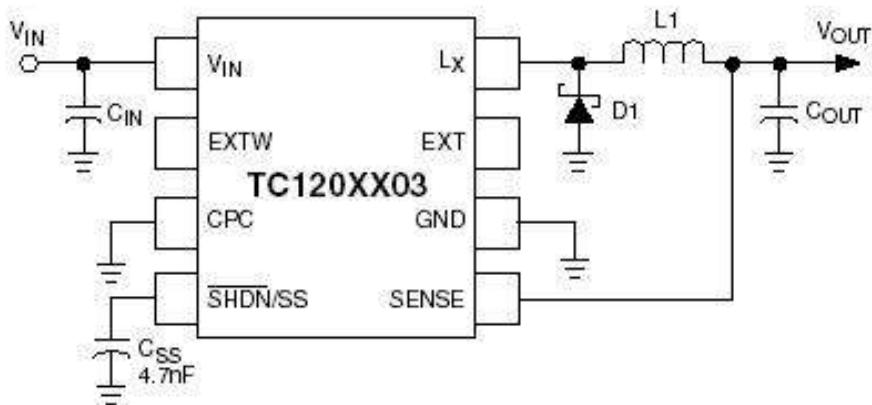
MICROCHIP

TC120

Online
Datasheet

Features:

- Internal Switching Transistor
- 600mA Output Current
- External Switching Transistor Control for Output Currents of 2A+
- 300kHz Oscillator Frequency Supports Small Inductor Size
- Short Circuit Protection
- Built-In Undervoltage Lockout
- 95% Efficiency (typ.)
- Automatic Switchover to Current-Saving PFM Mode at Low Output Loads
- Automatic Output Capacitor Discharge While in Shutdown
- Programmable Soft-Start Time
- Power-Saving Shutdown Mode
- Small 8-Pin SOP Package



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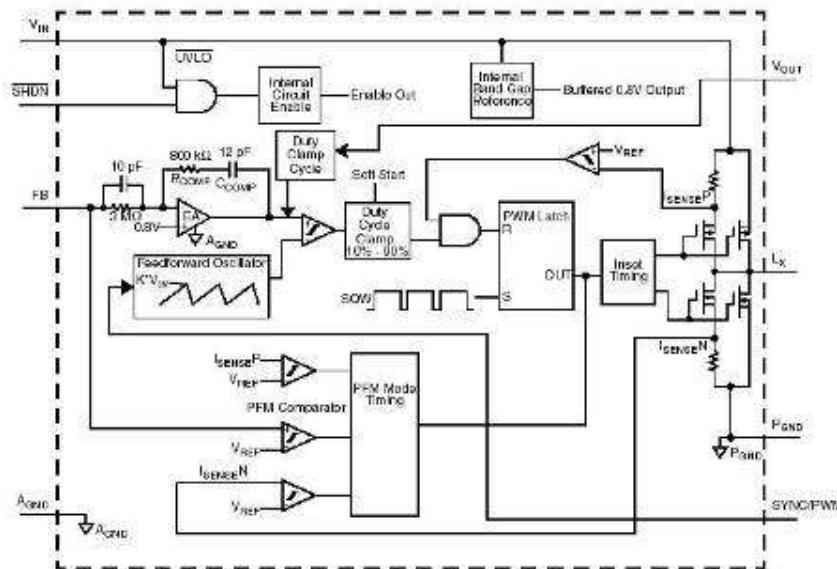
MICROCHIP

MCP1601

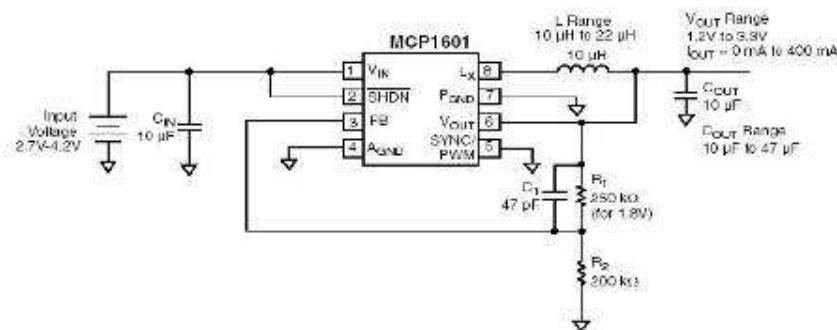
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Datasheet

Features:

- Input Range: 2.7V to 5.5V
- Low Output Voltage Capability: 0.9V
- 500mA Continuous Output Current
- 3 operating modes: PWM, PFM and LDO
- Auto-Switching from PWM/PFM Operation
- Integrated Buck and Synchronous Switches
- Ceramic or Electrolytic Filtering Capacitors
- Shutdown mode
- 750kHz Fixed Switching Frequency
- Oscillator Synchronization to 1.0MHz PWM
- Integrated UVLO, Soft-start, and Overtemperature protection
- Short circuit protection
- Temperature Range: -40°C to +85°C
- Small 8-Pin MSOP Package



Typical Application (2.7V to 4.2V)



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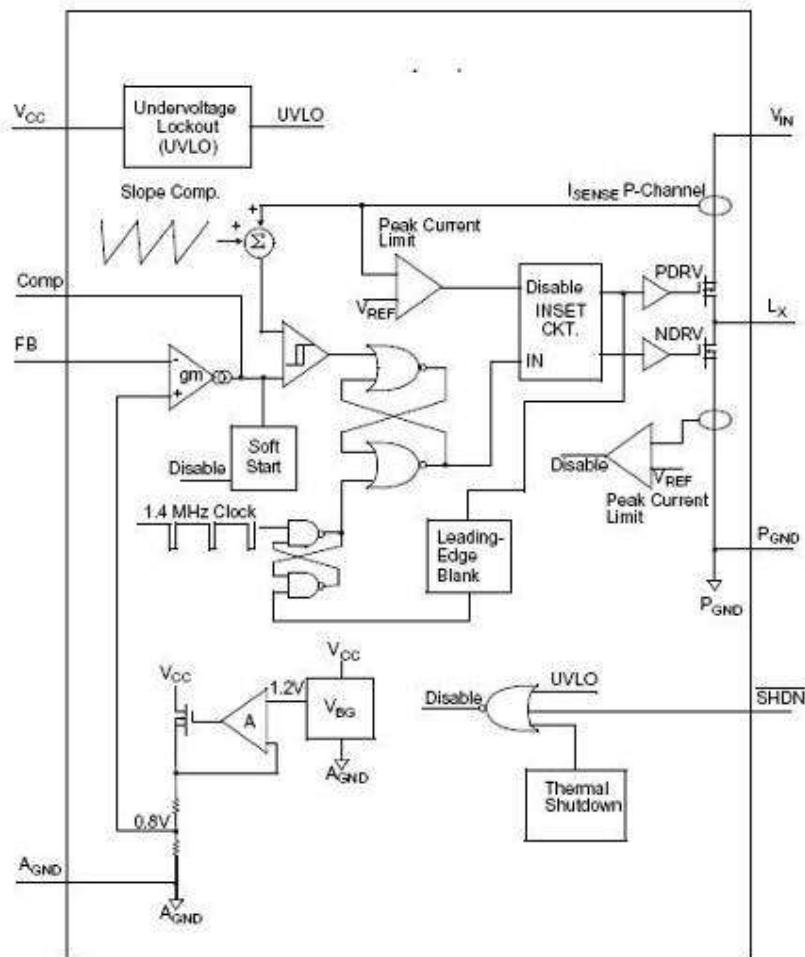
MICROCHIP

MCP1612

Online
Datasheet

Features:

- Input Voltage Range: 2.7V to 5.5V
- Fixed switching frequency: 1.4MHz
- Integrated Buck and Synchronous Switches
- Continuous Output Current: 1A
- Adjustable Output Voltage Range: 0.8V to 5.0V
- 100% duty cycle capability for Low Input Voltages
- Shutdown Control with $I_Q < 0.01\mu A$ (typ.)
- Overvoltage, Overcurrent, and Thermal Protection
- Under Voltage Lockout (UVLO)
- Integrated soft start
- Space Saving 8-Pin MSOP, DFN Packages
- Extended Operating Temperature Range: -40°C to +85°C



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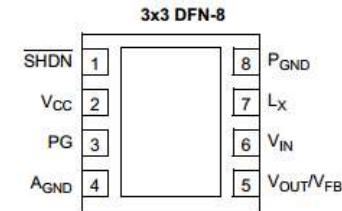
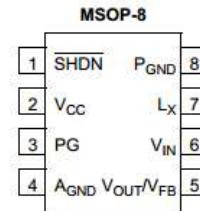
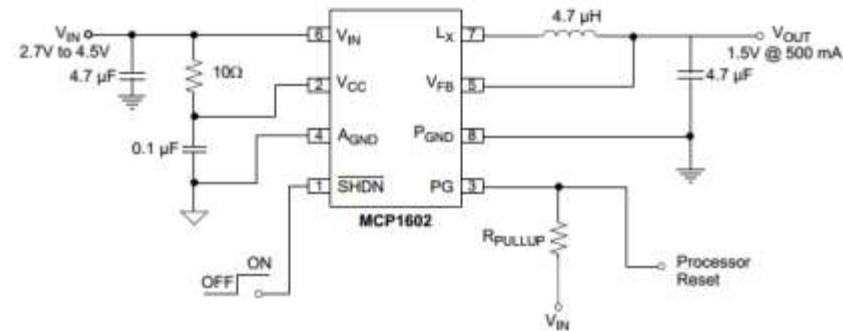
MICROCHIP

MCP1602

Online
Datasheet

Features:

- Power-Good Output with 262ms Delay
- Over 90% Efficiency (typ.)
- Output Current: up to 500mA
- Low Quiescent Current: 45 μ A (typ.)
- Low Shutdown Current: 0.05 μ A (typ.)
- Automatic PWM to PFM Mode Transition
- Adjustable Output Voltage:
0.8V to 4.5V
- Fixed Output Voltage:
1.2V, 1.5V, 1.8V, 2.5V, 3.3V
- 2.0MHz Fixed-Frequency PWM (Heavy Load)
- Internally Compensated
- Undervoltage Lockout (UVLO)
- Overtemperature Protection
- Overcurrent Protection
- 8-Lead MSOP, 8-Lead 3x3 DFN



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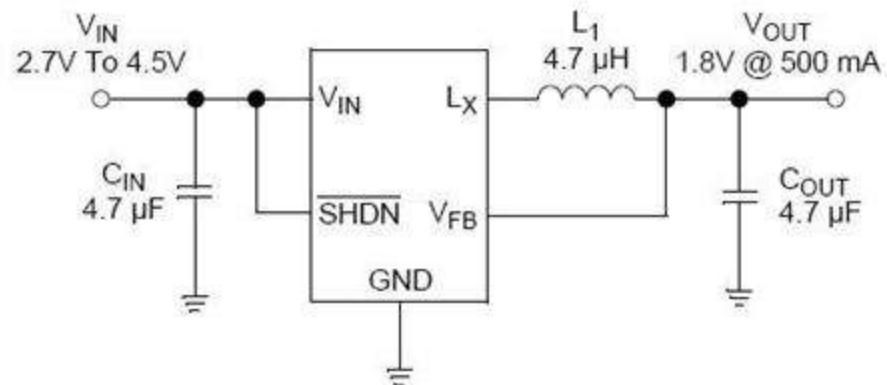
MICROCHIP

MCP1603

Online
Datasheet

Features:

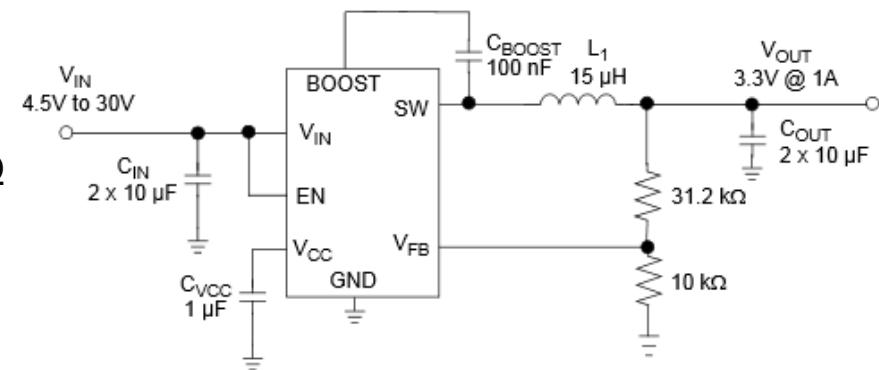
- Over 90% Efficiency (typ.)
- Output Current: up to 500mA
- Low Quiescent Current: 45 μ A (typ.)
- Low Shutdown Current: 0.01 μ A (typ.)
- Automatic PWM to PFM Mode Transition
- Adjustable Output Voltage:
0.8V to 4.5V
- Fixed Output Voltage:
1.2V, 1.5V, 1.8V, 2.5V, 3.3V
- 2.0MHz Fixed-Frequency PWM (Heavy Load)
- Internally Compensated
- Undervoltage Lockout (UVLO)
- Overtemperature Protection
- 100% Duty Cycle Operation
- Space Saving Packages:
5-Lead TSOT, 8-Lead 2x3 DFN



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Features:

- Up to 95% Typical Efficiency
- Input Voltage Range: 4.4V to 30V
- 1A Output Current Capability
- Output Voltage Range: 2.0V to 24V
- Integrated N-Channel High-Side Switch: 300 mΩ
- Integrated N-Channel Low-Side Switch: 170 mΩ
- Stable Reference Voltage: 0.8V
- Automative PFM/PWM Operation
 - 500 kHz PWM Operation
 - MCP16312 proved PWM-Only Operation
- Low Quiescent Current
 - 44 µA (PFM Mode, typical)
 - 3 µA Shutdown (typical)
- Peak Current Mode Control
- Undervoltage Lockout (UVLO)
- Overtemperature Protection
- 8-lead MSOP and 2x3 TDFN





MICROCHIP

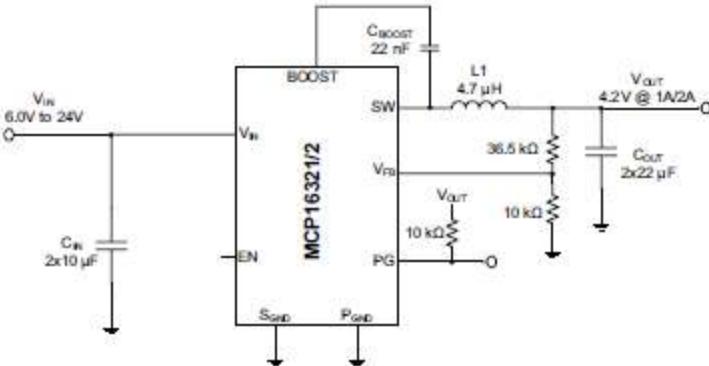
MCP16321

Online
Datasheet

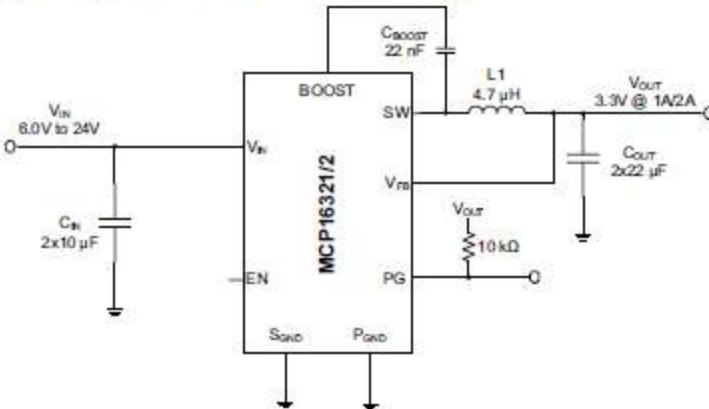
Features:

- Up to 95% Typical Efficiency
- Input Voltage Range: 6.0V to 24V
- 1A Output Current
- Fixed Output Voltages: 0.9V, 1.5V, 1.8V, 2.5V, 3.3V, 5V with 2% Output Voltage Accuracy
- Adjustable Version Output Range: 0.9V to 5V
- Integrated N-Channel High-Side Switch: 180 mΩ
- Integrated N-Channel Low-Side Switch: 120 mΩ
- 1 MHz Fixed Frequency
- Peak Current Mode Control
- Stable with Ceramic Capacitors
- Undervoltage Lockout (UVLO): 5.75V
- Overtemperature Protection
- VOUT Overvoltage Protection
- Power Good Indicator
- 16-lead 3x3 QFN

Typical Application with Adjustable Output Voltage



Typical Application with Fixed Output Voltage



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MICROCHIP

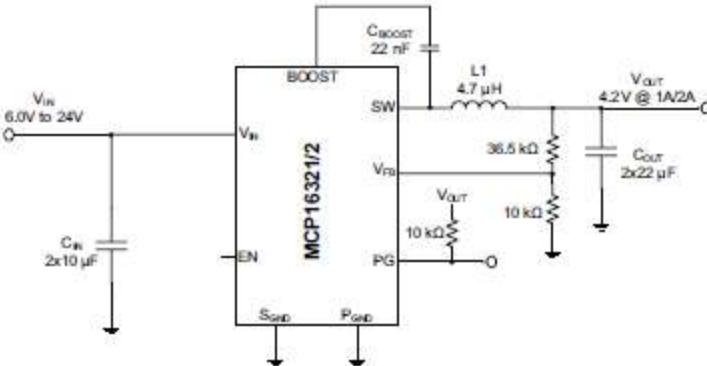
MCP16322

Online
Datasheet

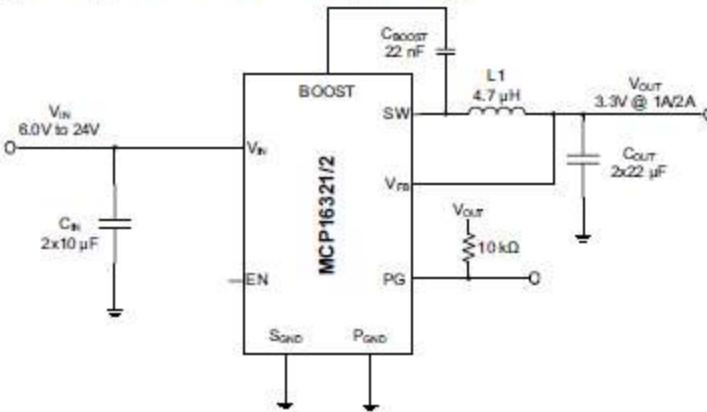
Features:

- Up to 95% Typical Efficiency
- Input Voltage Range: 6.0V to 24V
- 2A Output Current
- Fixed Output Voltages: 0.9V, 1.5V, 1.8V, 2.5V, 3.3V, 5V with 2% Output Voltage Accuracy
- Adjustable Version Output Range: 0.9V to 5V
- Integrated N-Channel High-Side Switch: 180 mΩ
- Integrated N-Channel Low-Side Switch: 120 mΩ
- 1 MHz Fixed Frequency
- Peak Current Mode Control
- Stable with Ceramic Capacitors
- Undervoltage Lockout (UVLO): 5.75V
- Overtemperature Protection
- VOUT Overvoltage Protection
- Power Good Indicator
- 16-lead 3x3 QFN

Typical Application with Adjustable Output Voltage



Typical Application with Fixed Output Voltage



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MICROCHIP

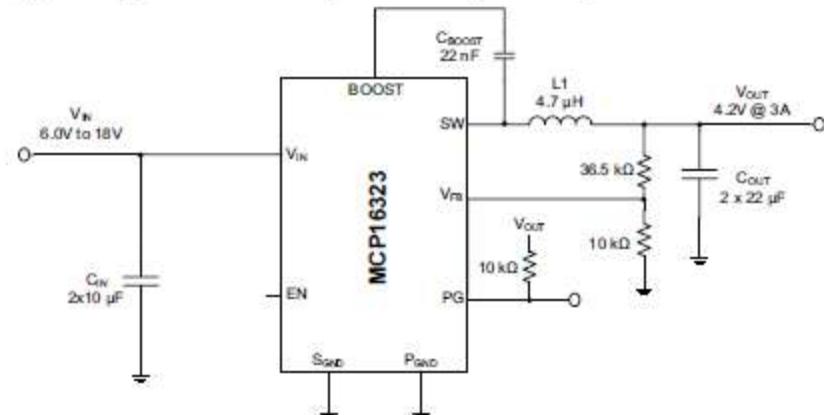
MCP16323

Online
Datasheet

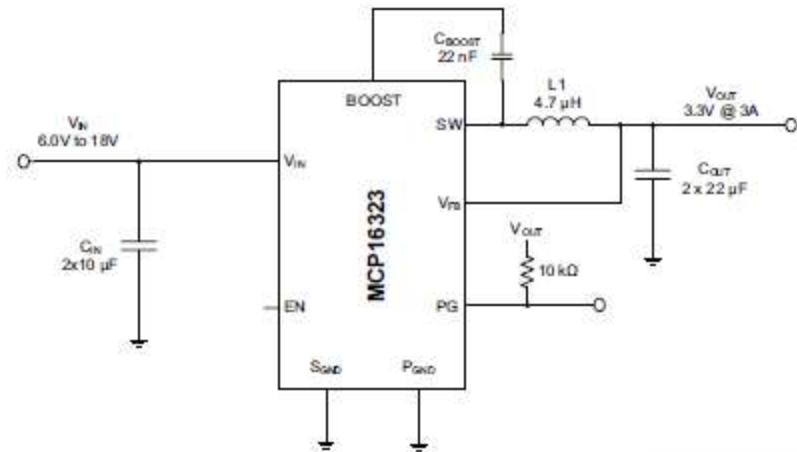
Features:

- Up to 95% Typical Efficiency
- Input Voltage Range: 6.0V to 18V
- 3A Output Current
- Fixed Output Voltages: 0.9V, 1.5V, 1.8V, 2.5V, 3.3V, 5V with 2% Output Voltage Accuracy
- Adjustable Version Output Range: 0.9V to 5V
- Integrated N-Channel High-Side Switch: 180 mΩ
- Integrated N-Channel Low-Side Switch: 120 mΩ
- 1 MHz Fixed Frequency
- Peak Current Mode Control
- Stable with Ceramic Capacitors
- Undervoltage Lockout (UVLO): 5.75V
- Overtemperature Protection
- V_{OUT} Overvoltage Protection
- Power Good Indicator
- 16-lead 3x3 QFN

Typical Application with Adjustable Output Voltage



Typical Application with Fixed Output Voltage



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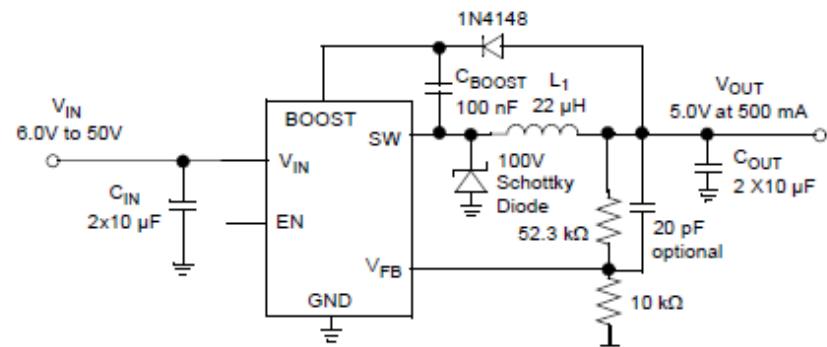
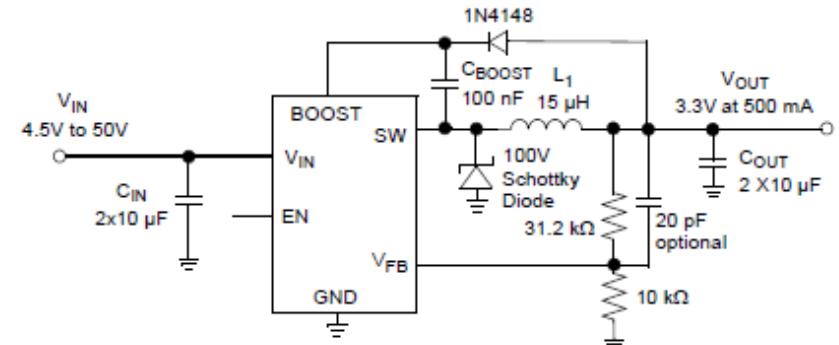
MICROCHIP

MCP16331

Online
Datasheet

Features:

- Up to 96% Efficiency
- Input Voltage Range: 4.4V to 50V
- Output Voltage Range: 2.0V to 24V
- 2% Output Voltage Accuracy
- Minimum 500 mA Output Current
 - See Figure 2-9 for Maximum Output Current vs VIN
- 500 kHz Fixed Frequency
- Adjustable Output Voltage
- Low Device Shutdown Current
- Peak Current Mode Control
- Internal Compensation
- Stable with Ceramic Capacitors
- Internal Soft-Start
- Internal pull up on EN
- Cycle-by-Cycle Peak Current Limit
- Undervoltage Lockout (UVLO): 4.1V to Start; 3.6V to Stop
- Overtemperature Protection
- Packages: 6-Lead SOT-23, 8-Lead 2x3 TDFN



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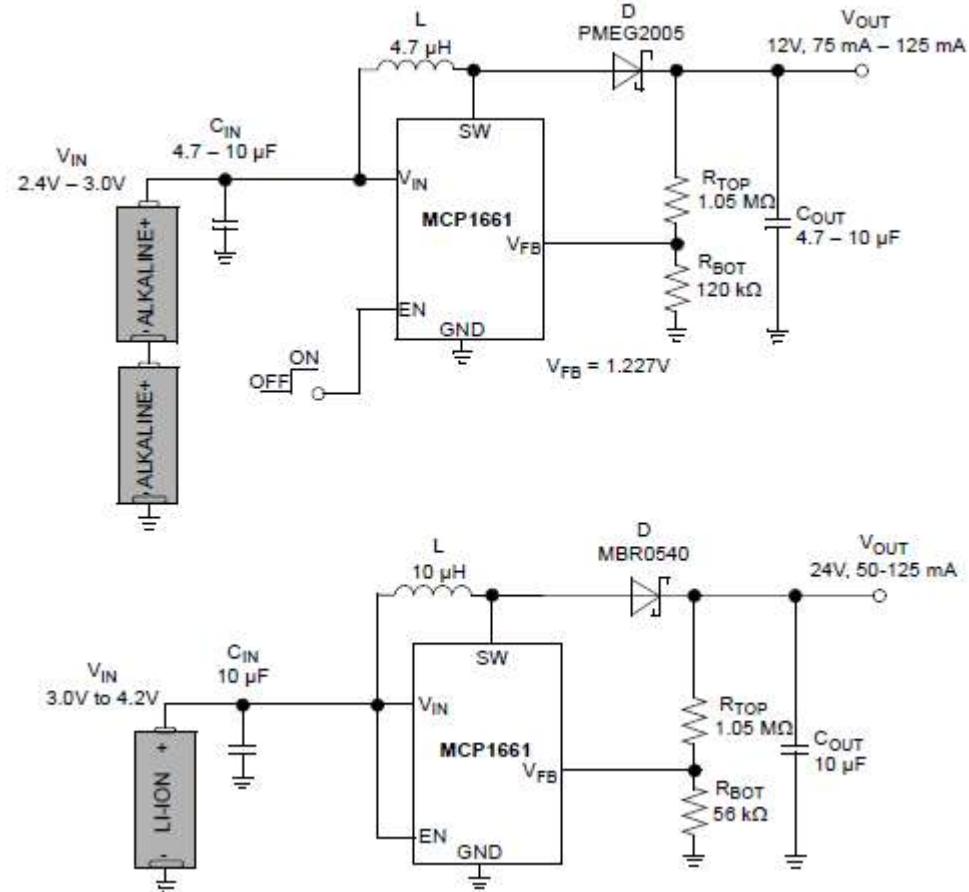
MICROCHIP

MCP1661

Online
Datasheet

Features:

- Up to 92% Efficiency
- High Output Voltage Range: up to 32V
- 1.3A Peak Input Current Limit:
 - I_{OUT} > 200 mA @ 5.0V VIN, 12V V_{OUT}
 - I_{OUT} > 125 mA @ 3.3V VIN, 12V V_{OUT}
 - I_{OUT} > 100 mA @ 4.2V VIN, 24V V_{OUT}
- Input Voltage Range: 2.4V to 5.5V
- Undervoltage Lockout (UVLO):
 - UVLO@VIN Rising: 2.3V, typical
 - UVLO@VIN Falling: 1.85V, typical
- No Load Input Current: 250 μ A, typical
- Sleep mode: 200 nA
- PWM Operation with Skip mode: 500 kHz
- Feedback Voltage Reference: V_{FB} = 1.227V
- Cycle-by-Cycle Current Limiting
- Internal Compensation
- Inrush Current Limiting and Internal Soft-Start
- Output Overvoltage Protection (OVP)
- Overtemperature Protection
- Easily Configurable for SEPIC or Flyback Topologies
- Packages: 5-Lead SOT-23, 2x3 8-Lead TDFN



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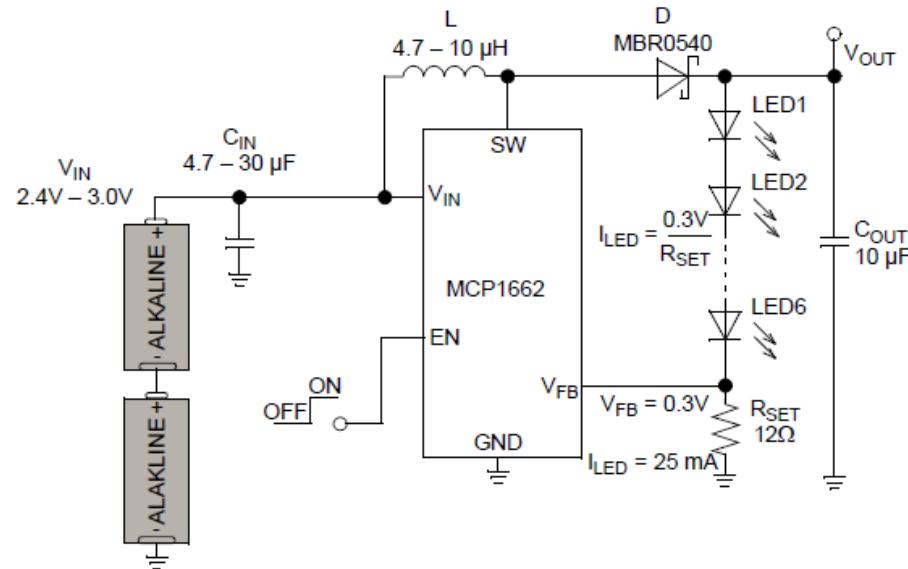
MICROCHIP

MCP1662

Online
Datasheet

Features:

- Up to 92% Efficiency
- Drive LED Strings in Constant Current
- 1.3A Peak Input Current Limit:
 - ILED up to 200 mA @ 5.0V VIN, 4 White LEDs
 - ILED up to 125 mA @ 3.3V VIN, 4 White LEDs
 - ILED up to 100 mA @ 4.2V VIN, 8 White LEDs
- Input Voltage Range: 2.4V to 5.5V
- Feedback Voltage Reference: $V_{FB} = 300 \text{ mV}$
- Undervoltage Lockout (UVLO):
 - UVLO@VIN Rising: 2.3V, typical
 - UVLO@VIN Falling: 1.85V, typical
- Sleep Mode: 200 nA
- PWM Operation: 500 kHz Switching Frequency
- Cycle-by-Cycle Current Limiting
- Internal Compensation
- Inrush Current Limiting and Internal Soft Start
- Open Load Protection (OLP)
- Overtemperature Protection
- Packages: 5-Lead SOT-23, 8-Lead 2x3 TDFN



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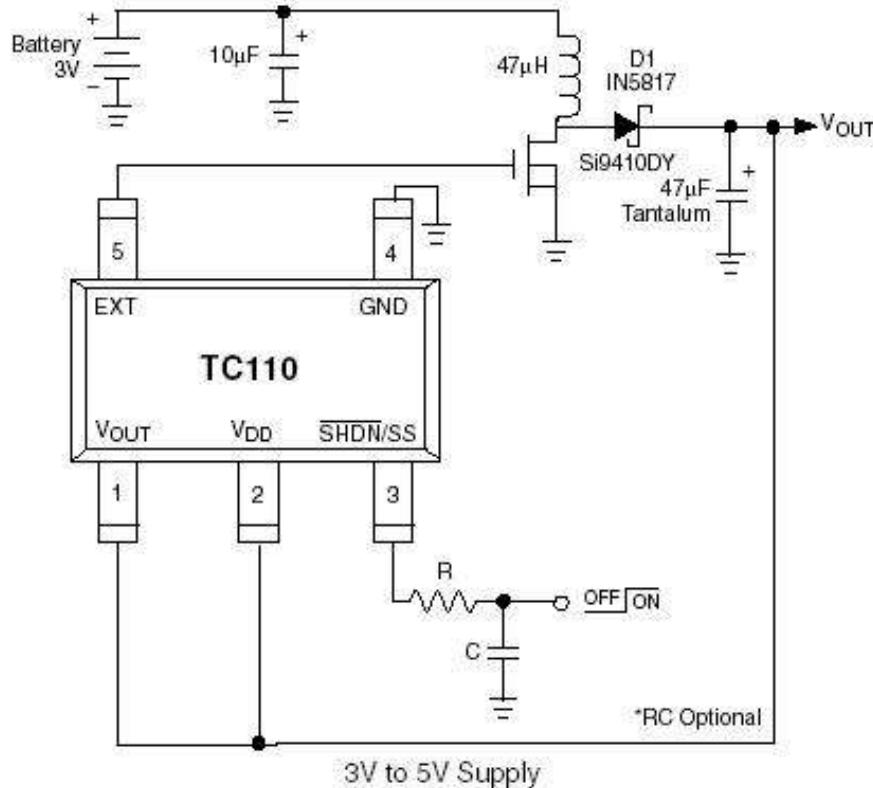
MICROCHIP

TC110

Online
Datasheet

Features:

- Guaranteed Start-Up at 0.9V
- Supply Current: 50 μ A @ 100kHz (typ.)
- Shutdown Mode: 0.5 μ A
- 300mA Output Current @ $V_{IN} \geq 2.7V$
- 100KHz and 300KHz Switching Frequency Options
- Programmable Soft-Start
- 84% Efficiency
- Small Package: 5-Pin SOT-23A



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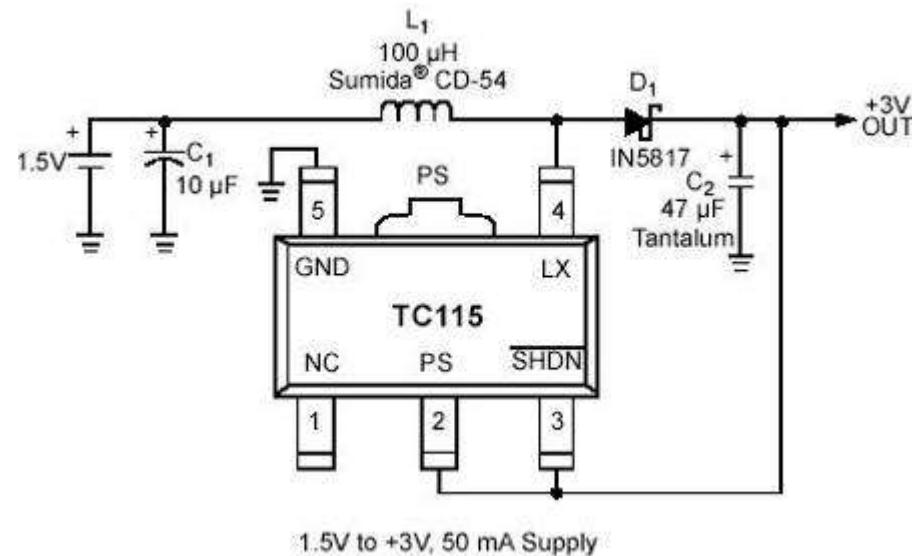
MICROCHIP

TC115

Online
Datasheet

Features:

- High Efficiency at Low Output Load Currents via PFM Mode
- Guaranteed Start-Up at 0.9V
- 80 μ A (typ.) Supply Current
- 85% (typ.) Efficiency at 100mA
- Output Current: 140mA (typ.) @ $V_{IN} = 2.0V$
- Low Power Shutdown Mode
- No External Switching Transistor Needed
- Space Saving SOT-89 Package



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MICROCHIP

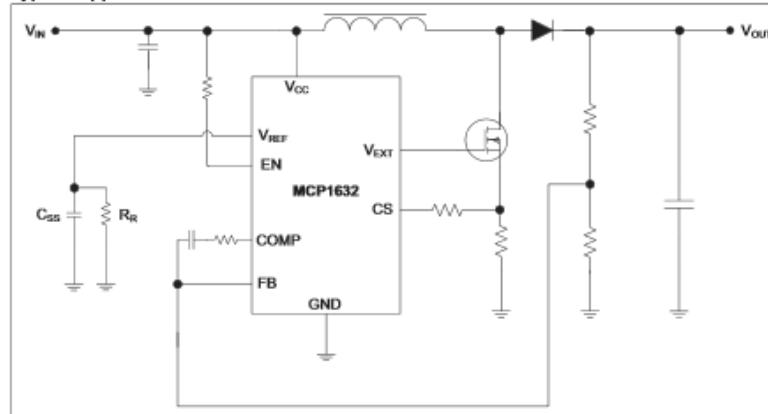
MCP1632

Online
Datasheet

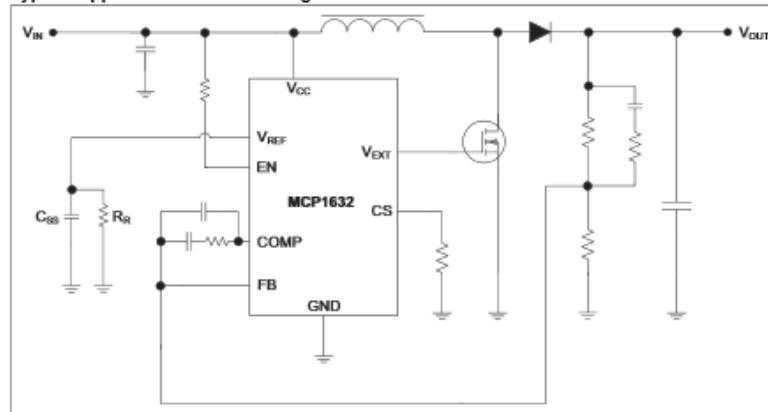
Features:

- High-Speed PWM Controller
- Fixed Switching Frequency Options (fSW):
300 or 600 kHz
- Integrated Low-Side MOSFET Driver support
many Low-Side Power Conversion Topologies
- Configurable as either a Peak Current Mode
Controller or a Voltage Mode Controller
- Internal UVLO, OVLO, and over temperature
protection
- Low Operating Current < 5 mA (typical)
- Extended Temperature Range:
-40°C to +125°C

Typical Application Circuit – Peak Current Mode Control



Typical Application Circuit – Voltage Mode Control



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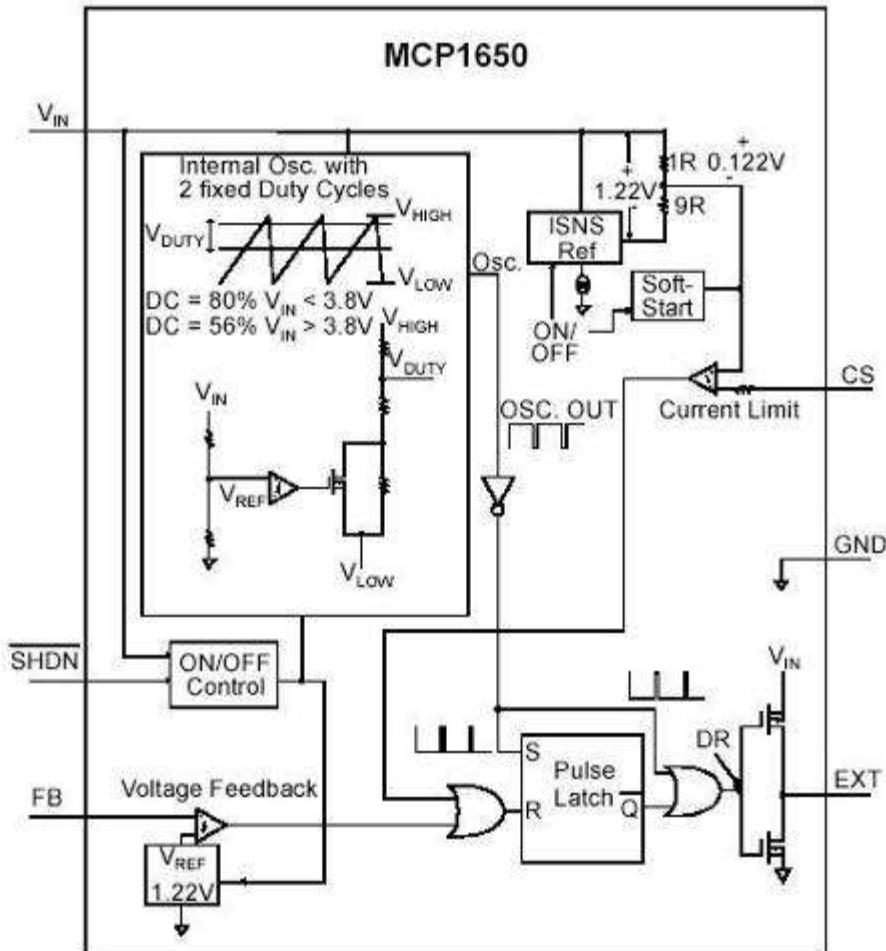
MICROCHIP

MCP1650/1/2/3

Online
Datasheet

Features:

- Output Power Capability Over 5 Watts
- Output Voltage Capability: 3.3V to Over 100V
- 750kHz Gated Oscillator Switching Frequency
- Adaptable Duty Cycle for Battery or Wide-Input, Voltage-Range Applications
- Input Voltage Range: 2.0V to 5.5V
- Capable of SEPIC® and Flyback Topologies
- Shutdown Control with $I_Q < 0.1\mu A$ (typ.)
- Low Operating Quiescent Current: $I_Q = 120\mu A$
- Voltage Feedback Tolerance: 0.6% (typ.)
- Popular MSOP-8 Package
- Peak Current Limit Feature
- Two Undervoltage Lockout (UVLO) Options: 2.0V or 2.55V
- Extended Temperature Range: -40°C to +125°C



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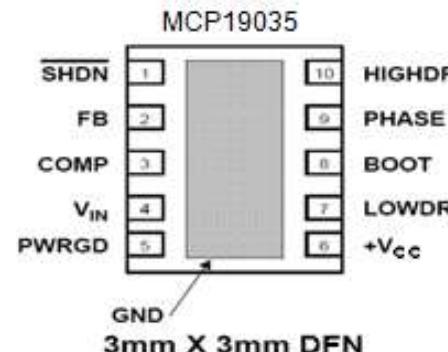
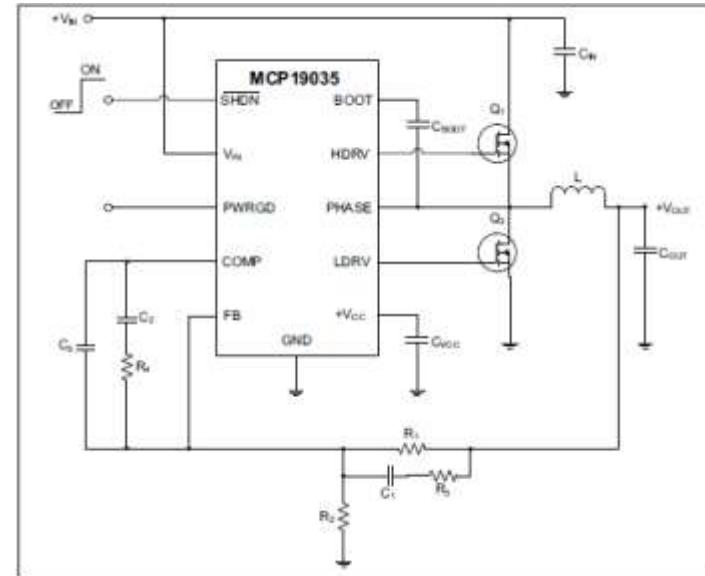
MICROCHIP

MCP19035

Online
Datasheet

Features:

- Vin Range: 5.0V to 30.0V
- Voltage Mode Controller
- Switching Freq:
 - 300 kHz
 - 600 kHz
- Dead Time Options: 12ns/20ns
- Integrated Current limit
- Integrated MOSFET Driver
 - Logic-Level (5V) Drive
 - 1/2A – Source/Sink Drive Strength
- Over temperature Protection
- Package: 10-lead 3x3 DFN
- Extended Temperature Range:
-40°C to +125°C



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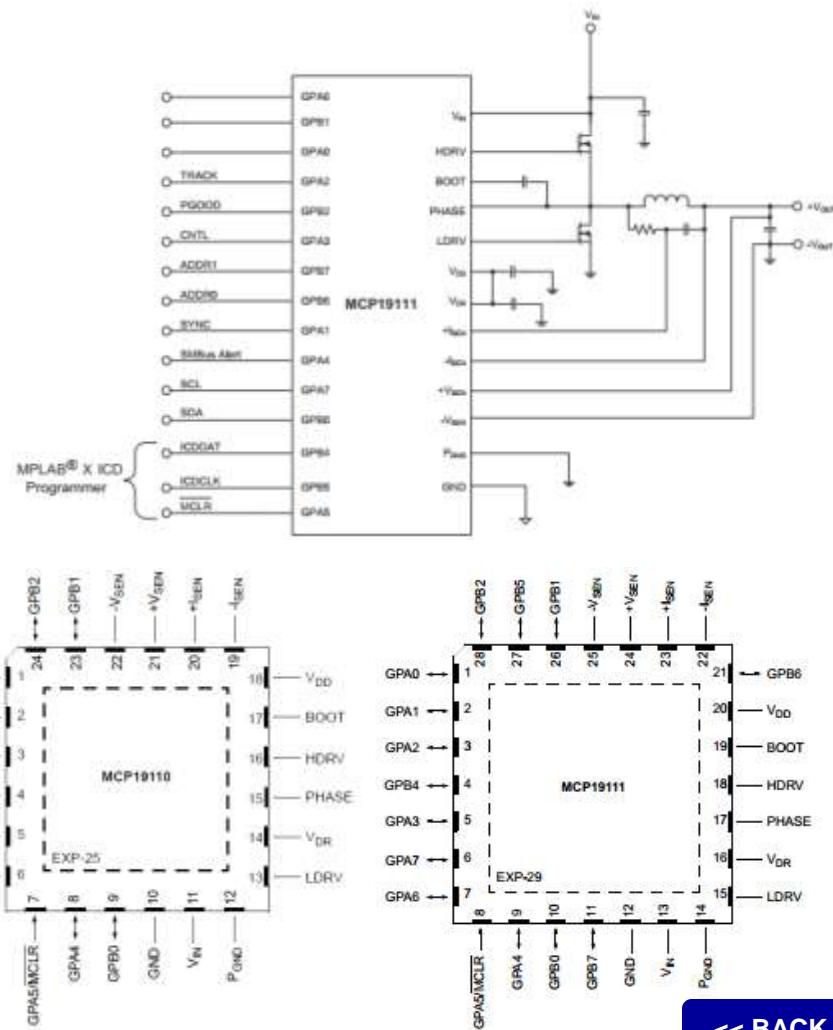
MICROCHIP

MCP19110/1

Online
Datasheet

Features:

- Wide Operating Voltage Range: 4.5-32V
- Analog Peak-Current Mode PWM Control
- Integrated 8-Bit PIC® Microcontroller
- Significant Configurability: Adjustable Analog Compensation, Switching Frequency, MOSFET Deadtime, Etc...
- PMBUS® Compliant I2C Interface
- Integrated Synchronous High- and Low-Side MOSFET Drivers
- Integrated Current Sense
- Minimal External Components Needed
- Custom Algorithm Support
- Package:
 - MCP19110 – 28 lead 4x4 mm QFN
 - MCP19111 – 28 lead 5x5 mm QFN
- Extended Temperature Range:
-40°C to +125°C



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MICROCHIP

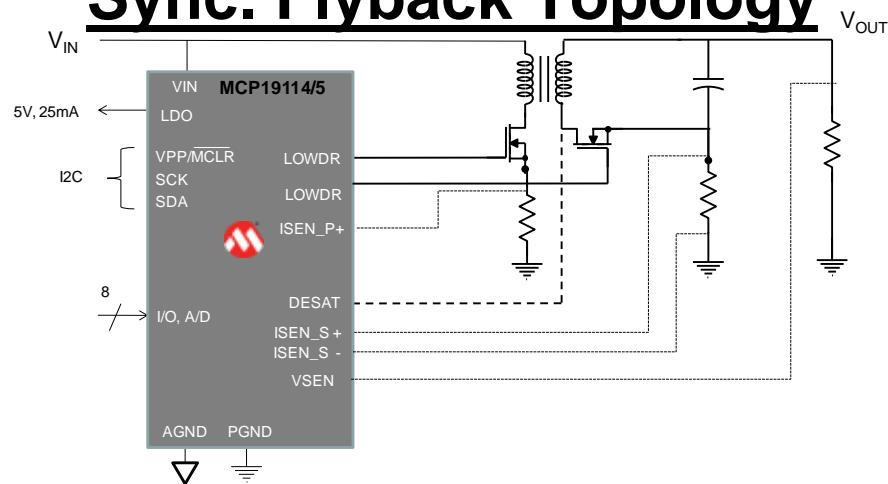
MCP19114/5

Online
Datasheet

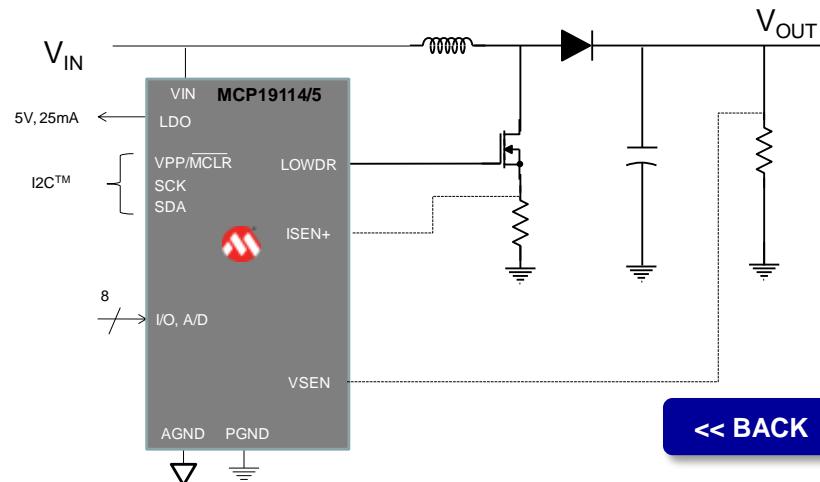
Features:

- Dual low-side gate drive outputs
- V_{IN} Range: 4.5V to 42.0V
- Switching Freq: 100kHz to 1MHz
 - Supports Quasi-Resonant Mode
- 5V LDO w/ 15mA auxiliary output
- Integrated, Low-Side MOSFET Driver
 - 1A Source, 1.5A Sink
 - Supports Flyback, SEPIC, Boost, and Ćuk Topologies.
- **Fully Programmable – Integrated PIC16 Core**
 - MPLABX Support, GUI-Configurable
 - 4k word Flash, 256b RAM
 - Adjustable Current limit/ULVO/OVLO/...
 - Up to 12 General Purpose I/O
 - I²C™ Communication Interface
- Operating Temperature: -40°C to +125°C
- Package(s): 24L QFN 4x4mm , 28L QFN 5x5mm

Sync. Flyback Topology



Boost Topology



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MICROCHIP

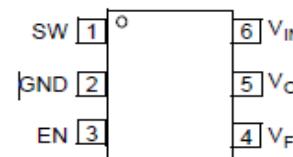
MCP1623/24

Online
Datasheet

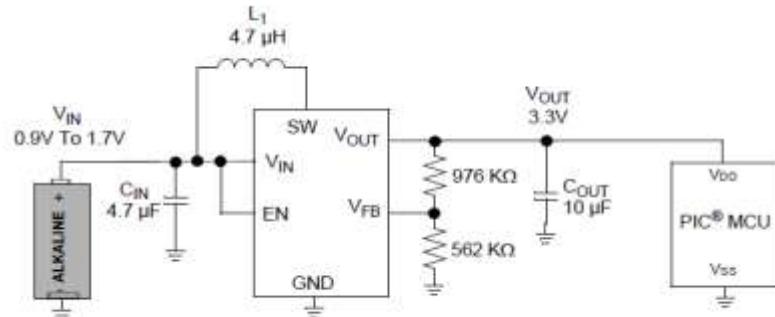
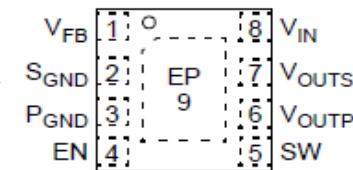
Features:

- Up to 96% Typical Efficiency
- 425 mA Typical Peak Input Current Limit:
 - $I_{OUT} > 50$ mA @ 1.2V V_{IN} , 3.3V V_{OUT}
 - $I_{OUT} > 175$ mA @ 2.4V V_{IN} , 3.3V V_{OUT}
 - $I_{OUT} > 175$ mA @ 3.3V V_{IN} , 5.0V V_{OUT}
- Low Start-up Voltage: 0.65V, typical 3.3V V_{OUT} @ 1 mA
- Low Operating Input Voltage: 0.35V, typ. 3.3V V_{OUT} @ 1 mA
- Adjustable Output Voltage Range: 2.0V to 5.5V
- Maximum Input Voltage: $V_{OUT} < 5.5$ V
- Automatic PFM/PWM Operation (MCP1624):
 - PFM Only Operation (MCP1623)
 - 500 kHz PWM Operation
- Low Device Quiescent Current: 19 μ A, typ. PFM Mode
- Internal Synchronous Rectifier
- Internal Compensation
- Inrush Current Limiting and Internal Soft-Start
- Shutdown Current: < 1 μ A
- Low Noise, Anti-Ringing Control
- Over temperature Protection
- Available Packages: SOT23-6, 2x3 8-Lead DFN

MCP1623/24
6-Lead SOT-23



MCP1623/24
2x3 DFN*



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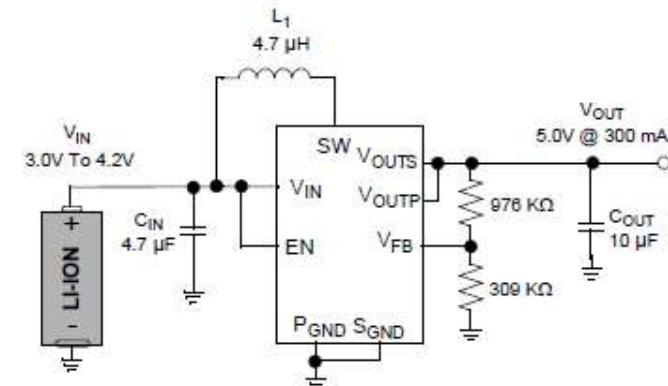
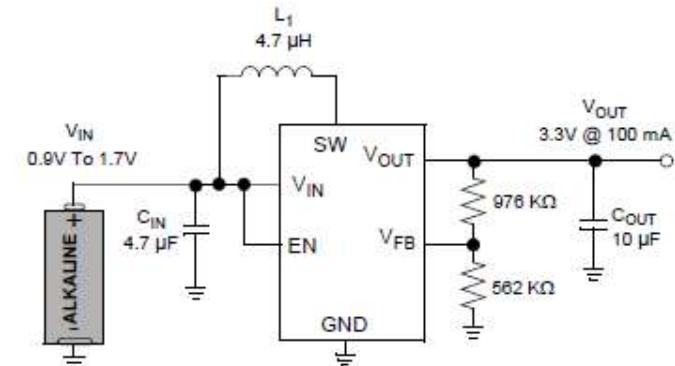
MICROCHIP

MCP1640/40B/40C/40D

Online
Datasheet

Features:

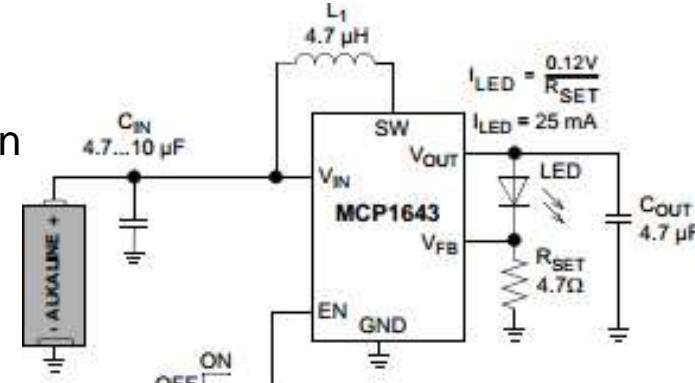
- Up to 96% Typical Efficiency
- 800 mA Typical Peak Input Current Limit:
 - $I_{OUT} > 100 \text{ mA}$ @ 1.2V V_{IN} , 3.3V V_{OUT}
 - $I_{OUT} > 350 \text{ mA}$ @ 2.4V V_{IN} , 3.3V V_{OUT}
 - $I_{OUT} > 350 \text{ mA}$ @ 3.3V V_{IN} , 5.0V V_{OUT}
- Low Start-up Voltage: 0.65V, typical 3.3V V_{OUT} @ 1 mA
- Low Operating Input Voltage: 0.35V, typ. 3.3V V_{OUT} @ 1 mA
- Adjustable Output Voltage Range: 2.0V to 5.5V
- Maximum Input Voltage: $V_{OUT} < 5.5\text{V}$
- Automatic PFM/PWM Operation (MCP1640/C):
 - PFM Operation Disabled (MCP1640B/D)
 - PWM Operation: 500 kHz
- Low Device Quiescent Current: 19 μA , typ. PFM Mode
- Internal Synchronous Rectifier
- Internal Compensation
- Inrush Current Limiting and Internal Soft-Start
- Selectable, Logic Controlled, Shutdown States:
 - True Load Disconnect Option (MCP1640/B)
 - Input to Output Bypass Option (MCP1640C/D)
- Shutdown Current (All States): < 1 μA
- Low Noise, Anti-Ringing Control
- Over temperature Protection
- Available Packages: SOT23-6, - 2x3 8-Lead DFN



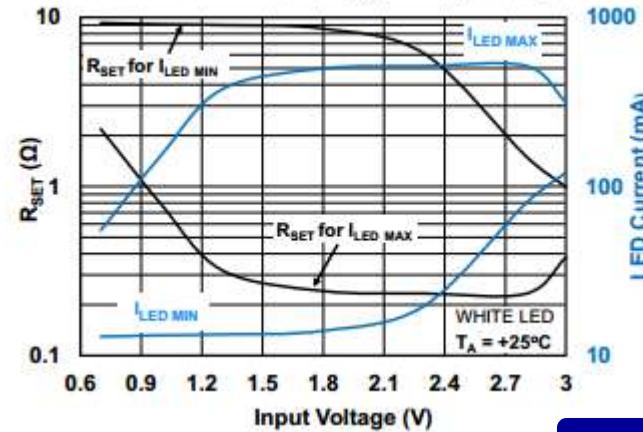
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Features:

- 1.6A Typical Peak Input Current Limit
- Up to 550 mA LED Load Current
- Low Start-up Voltage: 0.65V (typical, 25 mA LED Current)
- Low Operating Input Voltage: down to 0.5V
- Maximum Input Voltage < VLED < 5.0V
- Maximum Output Voltage: 5.0V
- Overvoltage Protection
- Low Reference Voltage: VFB = 120 mV
- Pulse-Width Modulation Mode Operation (1 MHz)
- Internal Synchronous Rectifier
- Internal Compensation
- Inrush Current Limiting
- Internal Soft-Start (240 μ s typical)
- Shutdown (EN = GND): True Load Disconnect
- Dimming Control by Variable Duty Cycle
- Shutdown Current: 1.2 μ A (typical)
- Overtemperature protection
- Packages: MSOP-8, 2x3 DFN-8



R_{SET} Minimum and Maximum Limits for I_{LED} in Regulation, with $\pm 6\%$ Tolerance


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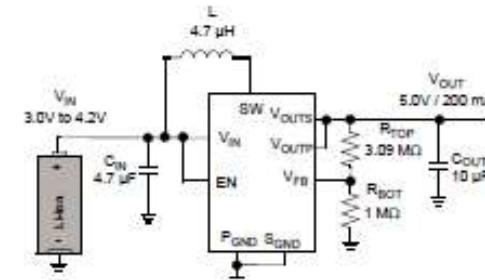
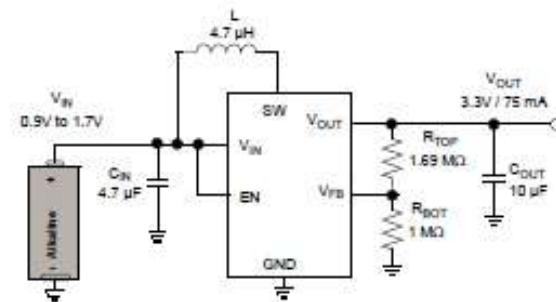
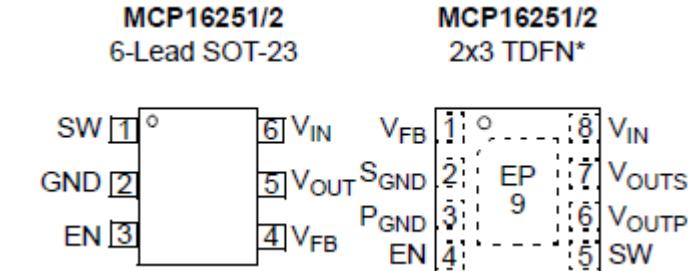
MICROCHIP

MCP16251/2

Online
Datasheet

Features:

- Up to 96% Typical Efficiency
- 650mA Typical Peak Input Current Limit:
 - I_{OUT} > 100 mA @ 3.3V V_{OUT}, 1.2V V_{IN}
 - I_{OUT} > 250 mA @ 3.3V V_{OUT}, 2.4V V_{IN}
 - I_{OUT} > 225 mA @ 5.0V V_{OUT}, 3.3V V_{IN}
- Low Device Quiescent Current:
 - Output Quiescent Current: < 4 μ A typical
- Shutdown Current: 0.6 μ A typical
- Low Start-up Voltage: 0.82V, 1 mA load
- Low Operating Input Voltage: down to 0.35V
- Adjustable Output Voltage Range: 1.8V to 5.5V
- Maximum Input Voltage \leq V_{OUT} < 5.5V
- Automatic PFM/PWM Operation:
 - PWM Operation: 500 kHz
 - PFM Output Ripple: 150 mV typical
- Internal Synchronous Rectifier
- Internal Compensation
- Inrush Current Limiting and Internal Soft Start (1.5 ms typical)
- Selectable, Logic Controlled, Shutdown States:
 - True Load Disconnect Option (MCP16251)
 - Input to Output Bypass Option (MCP16252)
- Anti-Ringing Control, Overtemperature Protection
- Available Packages:SOT-23-6, 2x 3 8-Lead TDFN



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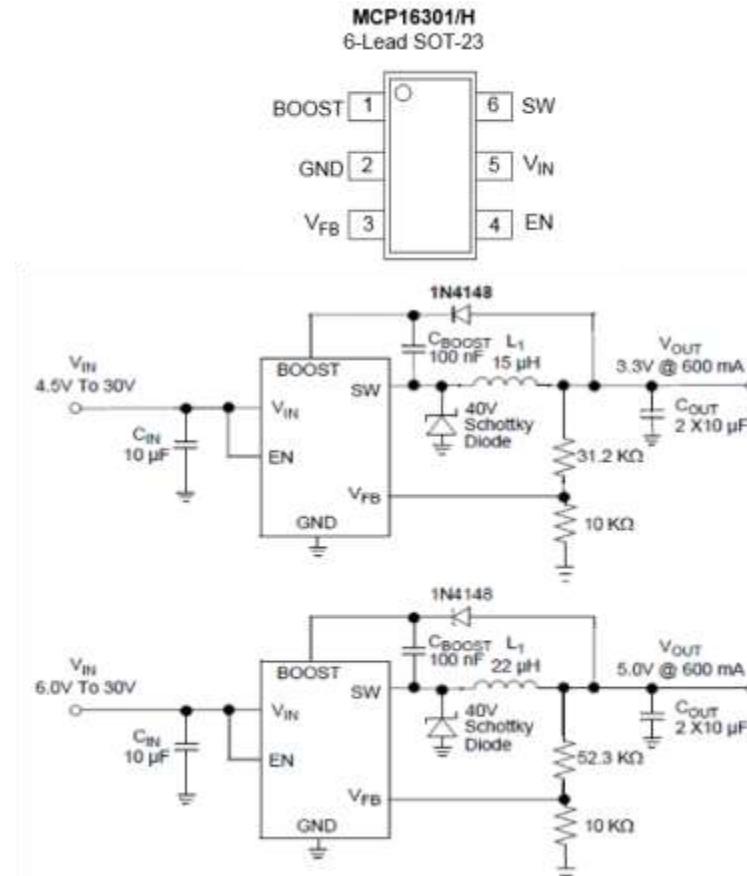
MICROCHIP

MCP16301/H

Online
Datasheet

Features:

- Up to 96% Typical Efficiency
- Input Voltage Range:
 - 4.0V to 30V (MCP16301)
 - 4.7V to 36V (MCP16301H)
- Output Voltage Range: 2.0V to 15V
- 2% Output Voltage Accuracy
- Integrated N-Channel Buck Switch
- 600 mA Output Current
- 500 kHz Fixed Frequency
- Adjustable Output Voltage
- Low Device Shutdown Current
- Peak Current Mode Control
- Internal Compensation
- Stable with Ceramic Capacitors
- Internal Soft-Start
- Cycle by Cycle Peak Current Limit
- Under Voltage Lockout (UVLO): 3.5V
- Overtemperature Protection
- SOT-23-6 Package
- Temperature Range: -40°C to +85°C



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MICROCHIP

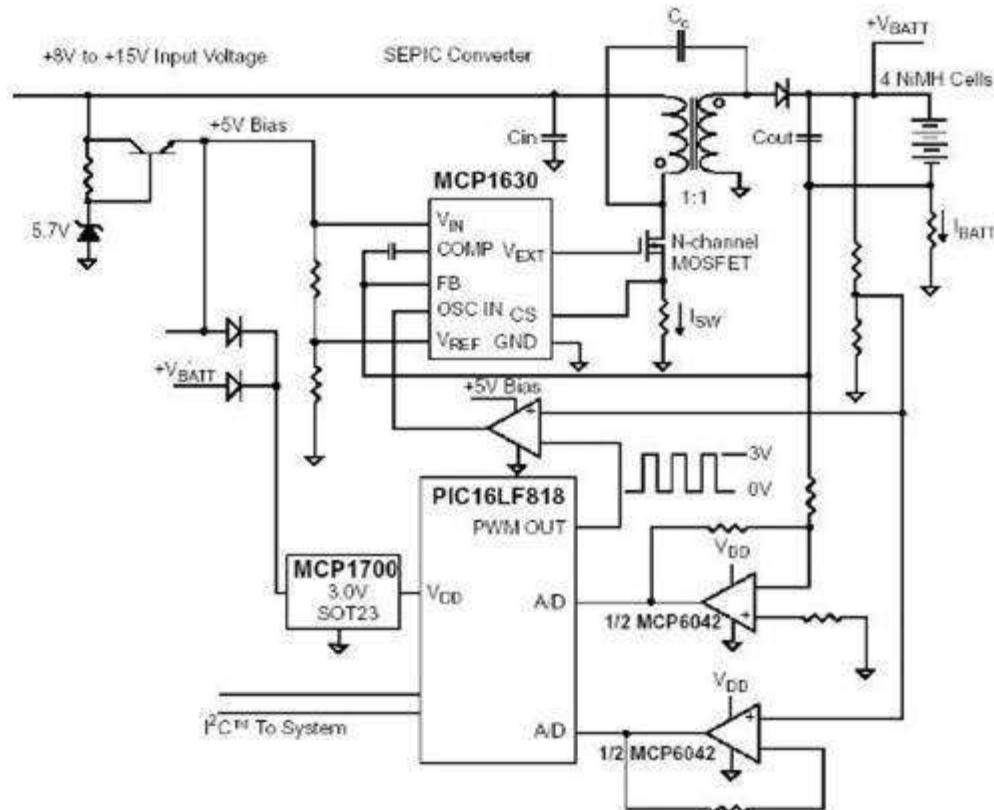
MCP1630/V

Online
Datasheet

Features:

- High-Speed PWM Operation (12ns Current Sense to Output Delay)
- Operating Temperature Range: -40°C to +125°C
- Precise Peak Current Limit ($\pm 5\%$ MCP1630)
- Voltage Mode and Average Current Mode Control (MCP1630V)
- CMOS Output Driver
- External Oscillator Input
- External voltage Reference Input
- Peak Current Mode Operation > 1MHz
- Low Operating Current: 2.8mA (typ.)
- Fast Output Rise and Fall Times: 5.9ns and 6.2ns
- Undervoltage Lockout (UVLO) Protection
- Output Short Circuit and Overtemperature Protection
- Space Saving 8-Pin MSOP

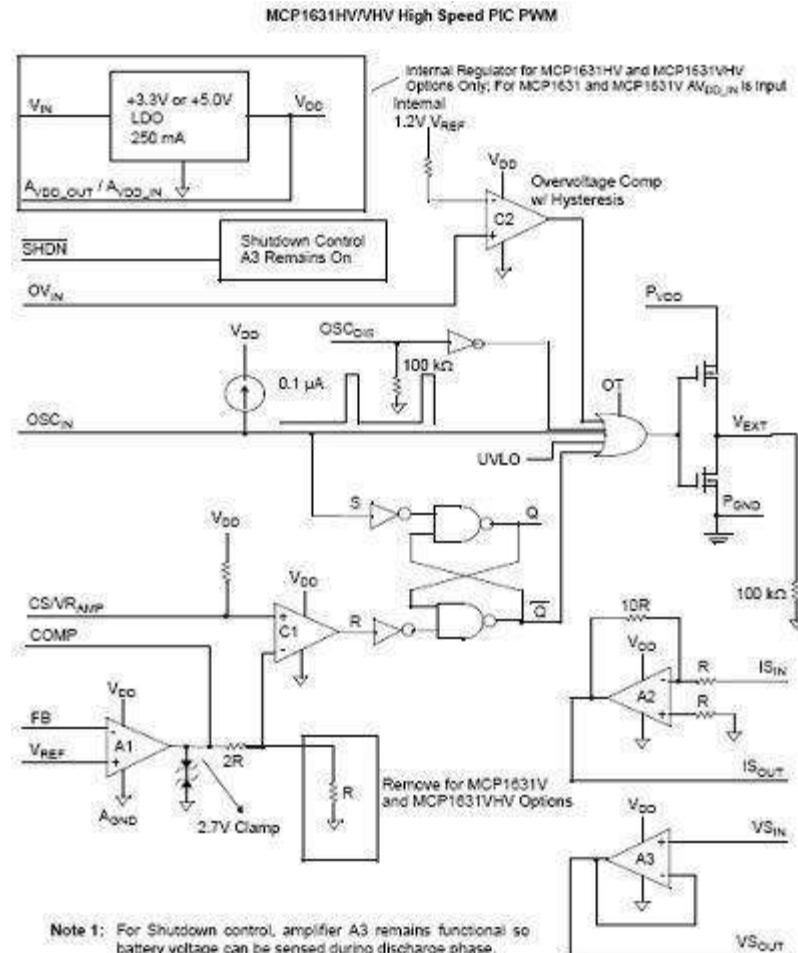
MCP1630 NiMH Battery Charger and Fuel Gauge Application Diagram



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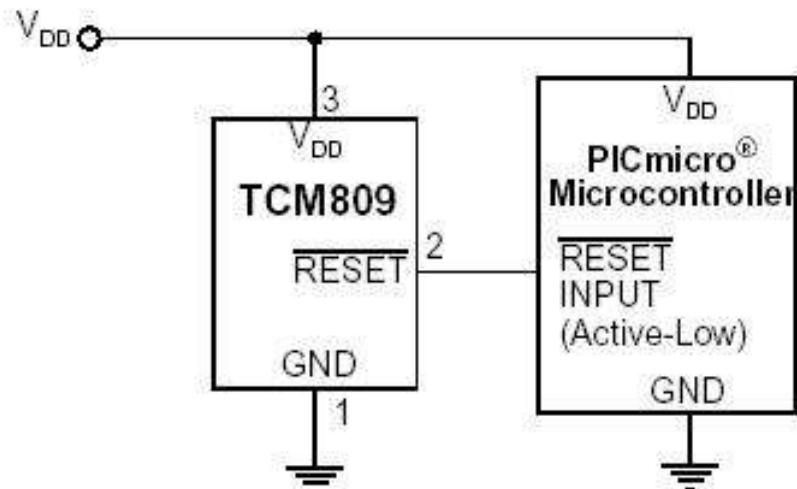
Features:

- Programmable Switching Battery Charger Designs
- High-Speed Analog PWM Controller: 2MHz
- Peak Current Mode Control (MCP1631)
- Voltage Mode Control (MCP1631V)
- High Voltage Options Operate to +16V Input:
MCP1631HV Current Mode
MCP1631VHV Voltage Mode
- Output Voltage Options: +5.0V or +3.3V, 250mA
- External Oscillator and Ext. Reference Inputs
- Error Amplifier, Battery Current I_{SNS} Amplifier,
Battery Voltage V_{SNS} Amplifier Integrated
- Integrated Overvoltage Comparator
- Integrated Low Side MOSFET Driver: 1A Peak
- Shutdown mode reduces I_Q to 2.4 μ A (typ.)
- Internal Overtemperature Protection
- Undervoltage Lockout (UVLO)
- Package Options:
4x4 20-Lead QFN (MCP1631/MCP1631V)
20-Lead TSSOP, 20-Lead SSOP (all devices)



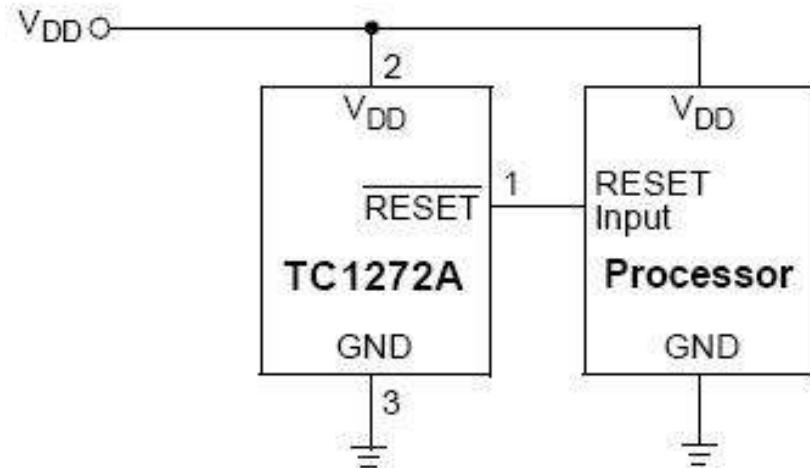
Features:

- Precision VCC Monitor for 2.5V, 3.0V, 3.3V, 5.0V Nominal Voltage Supplies
- 140ms Minimum RESET Time Out Period
- RESET Output Guaranteed to $V_{CC} = 1.0V$ (TCM809)
- Low 12 μ A Supply Current
- Push-Pull RESET Output
- No External Components
- Temperature Range:
Industrial SC-70 (E): -40°C to +85°C
Extended SOT-23 (V): -40°C to +125°C



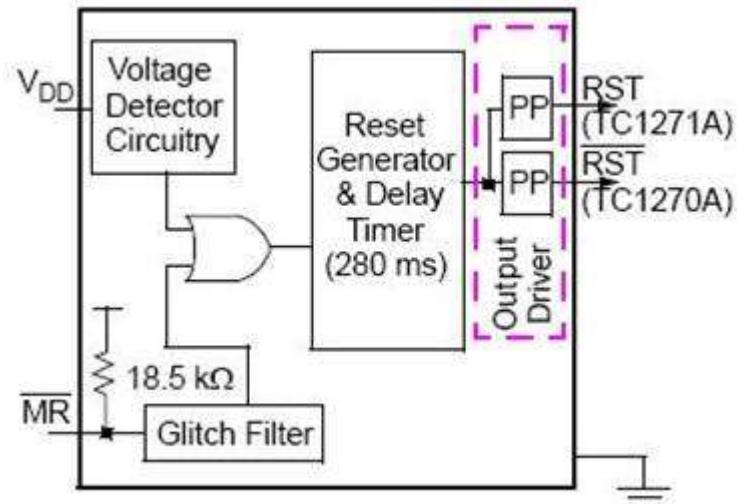
Features:

- Precision V_{DD} Monitor
- 140ms Minimum RESET Output Duration
- Output Valid to $V_{DD} = 1.2V$
- V_{DD} Transient Immunity
- Small 3-Pin SOT-23B Package
- No External Components



Features:

- Precision Voltage Monitor: 2.63V, 2.93V, 3.08V, 4.38V and 4.63V trip points (typ.)
- Manual Reset input
- Reset Time-out Delay:
Standard: 280ms (typ.)
Optional: 2.19ms, and 35ms (typ.)
- Power Consumption $\leq 15\mu\text{A}$ (max.)
- Active Low Output Options:
Push-Pull Output and Open-Drain Output
- Active High Output Option: Push-Pull Output
- Replacement for (Specification compatible):
TC1270, TC1271, TyyCM811, TCM812
- Low Voltage Operation: (1.0V)
- ESD protection:
 $\geq 4\text{kV}$ Human Body Model (HBM)
 $\geq 400\text{V}$ Machine Model (MM)
- Extended (E) Temperature Range:
-40°C to +125°C
- Package Options:
4-lead SOT-143, 5-lead SOT-23





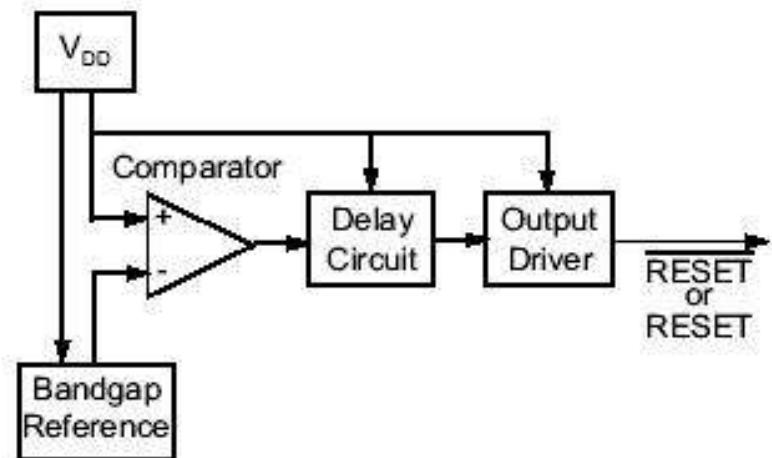
MICROCHIP

MCP100/101

Online
Datasheet

Features:

- Holds Microcontroller in Reset until Supply Voltage Reaches Stable Operating Level
- Resets Microcontroller during Power Loss
- Precision Monitoring of 3.0V, 3.3V, and 5V Systems
- 7 Voltage Trip Points Available
- Active Low RESET Pin (MCP100) or Active high RESET (MCP101)
- Push-Pull Output
- Holds RESET'/RESET for 350ms (typ.)
- RESET'/RESET to $V_{DD} = 1.0V$
- Accuracy of $\pm 125mV$ for 5V Systems and $\pm 75mV$ for 3V Systems Over Temperature
- 45 μA Typical Operating Current
- Temperature Range:
-40°C to +85°C



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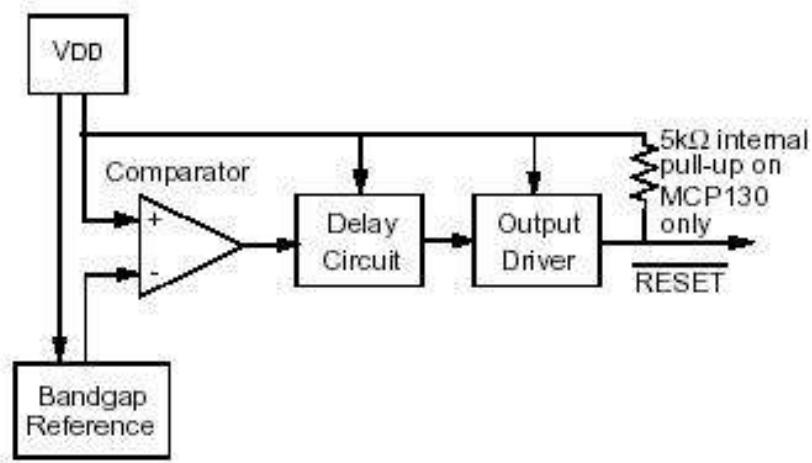
MICROCHIP

MCP120/130

Online
Datasheet

Features:

- Holds Microcontroller in Reset until Supply Voltage Reaches Stable Operating Level
- Resets Microcontroller during Power Loss
- Precision Monitoring of 3.0V, 3.3V, and 5V Systems
- 7 Voltage Trip Points Available
- Active Low RESET Pin
- Open Drain Output
- Internal Pull-Up Resistor: $5\text{k}\Omega$ (MCP130)
- Holds RESET for 350ms (typ.)
- RESET to $V_{DD} = 1.0\text{V}$
- Accuracy of $\pm 125\text{mV}$ for 5V Systems and $\pm 75\text{mV}$ for 3V Systems Over Temperature
- $45\mu\text{A}$ (typ.) Operating Current
- Temperature Range:
 -40°C to $+85^\circ\text{C}$



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MICROCHIP

MCP102/103/121/131

Online
Datasheet

Features:

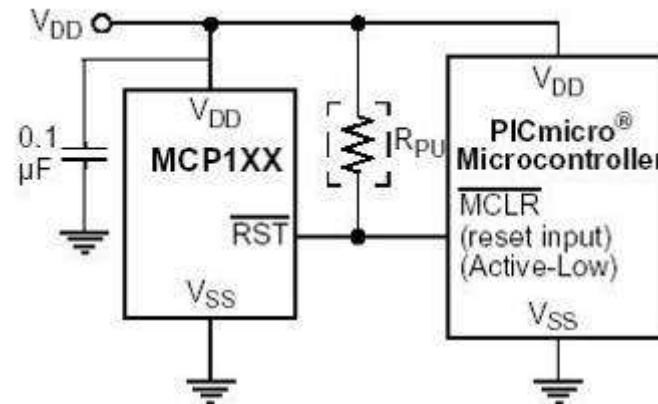
- Ultra Low Supply Current: 1.75 μ A (max.)
- Precision Monitoring of: 1.90V, 2.32V, 2.63V, 2.93V, 3.08V, 4.38V and 4.63V
- Resets Microcontroller during Power Loss
- Active Low RESET Pin

MCP121: Active-Low, Open-Drain

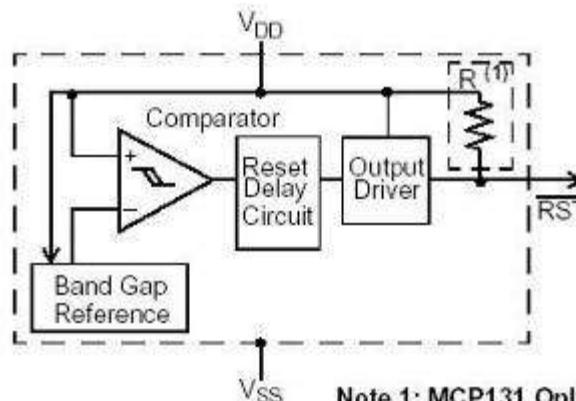
MCP131: Active-Low, Open-Drain with
Internal Pull-Up Resistor

MCP102 and MCP103: Active-Low, Push-Pull

- Reset Delay Timer: 120ms Delay (typ.)
- Space Saving SOT-23-3, TO-92 and SC70
Packages
- Temperature Range:
 - 40°C to +125°C (except MCP1xx-195)
 - 40°C to +85°C



Note 1: Resistor R_{PU} may be required with the MCP121 due to the open-drain output. Resistor R_{PU} may not be required with the MCP131 due to the internal pull-up resistor. The MCP102 and MCP103 do not require the external pull-up resistor.



Note 1: MCP131 Only

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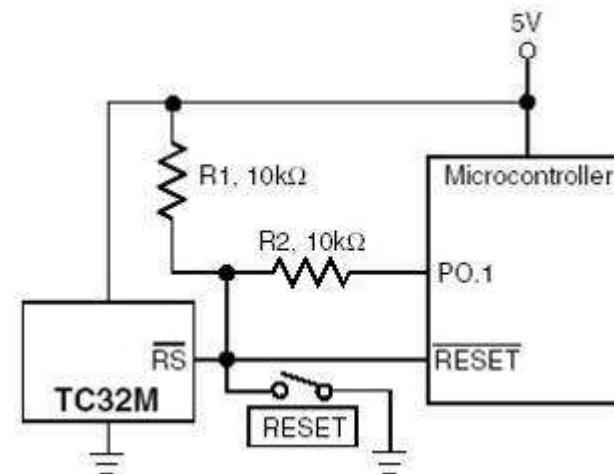
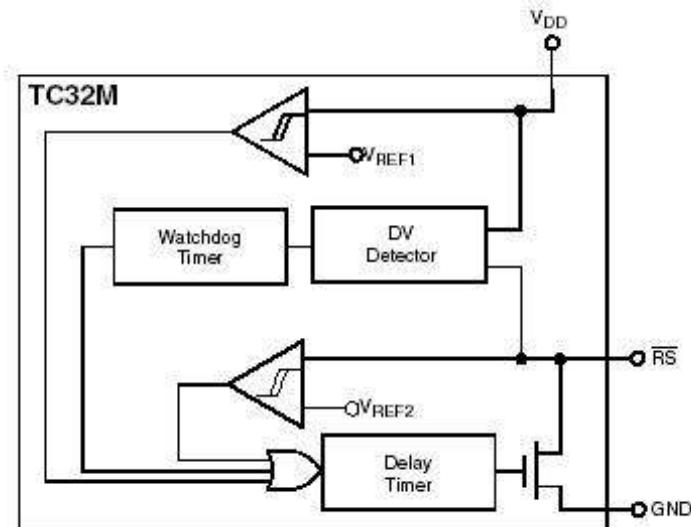
MICROCHIP

TC32M

Online
Datasheet

Features:

- Incorporates the Functionality of the Industry Standard TC1232 (Processor Monitor, Watchdog and Manual Override Reset Controller) into a Small, Lower Cost Package
- Guards Against Unstable Processor Operation Resulting from Power “Brown-Out”
- Automatically Halts and Restarts an Out-of-Control Microprocessor
- Output can be Wire-ORed, or Hooked to Manual RESET Push-button Switch
- Space-Saving 3-Pin TO-92 or SOT-223 Package



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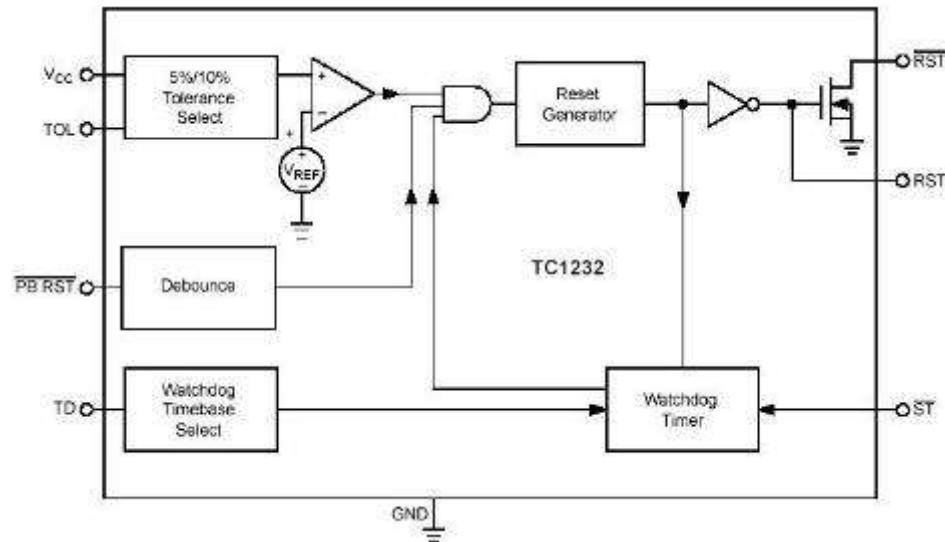
MICROCHIP

TC1232

Online
Datasheet

Features:

- Precision Voltage Monitor:
Adjustable +4.5V or +4.75V
- Reset Pulse Width: 250ms (min.)
- No External Components
- Adjustable Watchdog Timer:
150ms, 600ms or 1.2s
- Debounced Manual Reset Input for External Override



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MICROCHIP

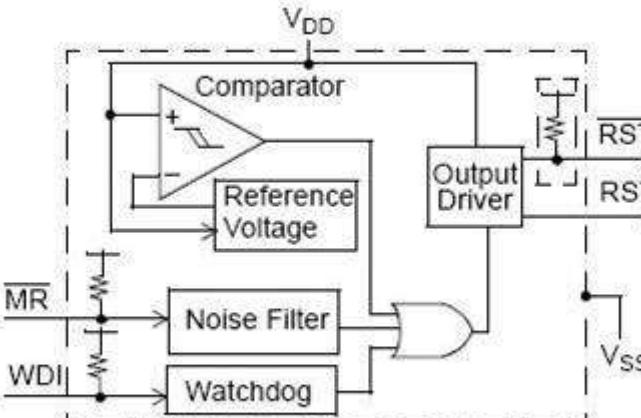
MCP1316/17/18/19/ 20/21/22

Online
Datasheet

Features:

- Low supply current: 1 μ A (typ.)
- Precision monitoring trip point options:
2.9V and 4.6V (Standard Offerings)
2.0V to 4.7V in 100 mV increments
- Resets Microcontroller in a Power-loss Event
- Reset Delay Time Out Option:
1.4ms, 30ms, 200ms, or 1.6s (typ.)
- Watchdog Timer Input Time Out Options:
6.3ms, 102ms, 1.6s, or 25.6s (typ.)
- Manual Reset (MR) Input (Active-low)
- Single and Complementary Reset Output(s)
- Reset Output Options:
Push-Pull (Active-high or Active-low)
Open-Drain (Internal or External Pull-up)
- Temperature Range:
-40°C to +85°C for trip points 2.0 to 2.4V
-40°C to + 125°C for trip points > 2.5V
- Voltage Range: 1.0V to 5.5V
- Space Saving SOT-23-5 Packaging

Device	Reset Output A			Reset Output B			WDI Input	MR Input
	Type	Pull-up Resistor	Active Level	Type	Pull-up Resistor	Active Level		
MCP1316	Push-Pull	—	Low	—	—	—	Yes	Yes
MCP1316M	Open-Drain	Internal	Low	—	—	—	Yes	Yes
MCP1317	Push-Pull	—	High	—	—	—	Yes	Yes
MCP1318	Push-Pull	—	Low	Push-Pull	—	High	Yes	No
MCP1318M	Open-Drain	Internal	Low	Push-Pull	—	High	Yes	No
MCP1319	Push-Pull	—	Low	Push-Pull	—	High	No	Yes
MCP1319M	Open-Drain	Internal	Low	Push-Pull	—	High	No	Yes
MCP1320	Open-Drain	External	Low	—	—	—	Yes	Yes
MCP1321	Open-Drain	External	Low	Push-Pull	—	High	Yes	No
MCP1322	Open-Drain	External	Low	Push-Pull	—	High	No	Yes



Note: Features available depend on the device

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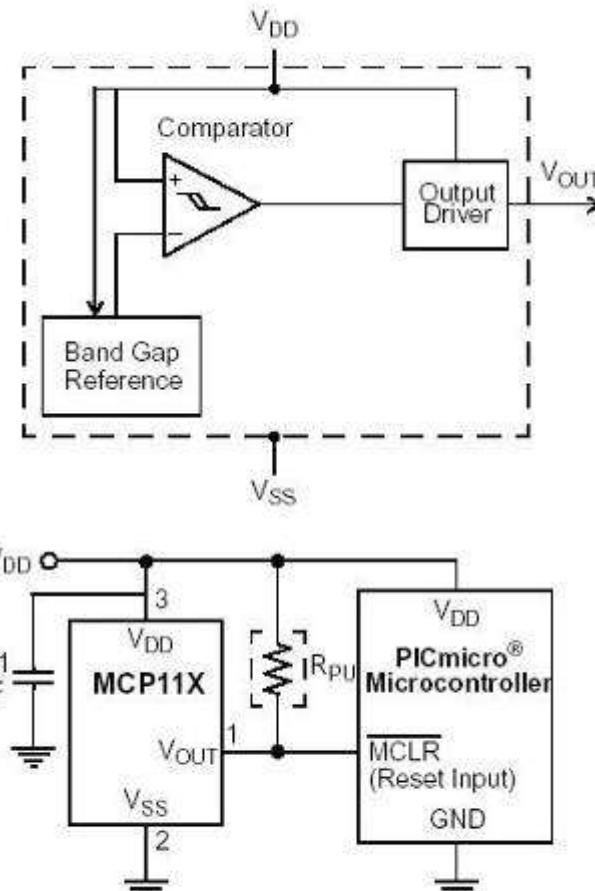
MICROCHIP

MCP11/112

Online
Datasheet

Features:

- Low Supply Current: $1.75\mu A$ (max.)
- Precision Monitoring Options:
1.90V, 2.32V, 2.63V, 2.90V, 2.93V, 3.08V,
4.38V and 4.63V
- Resets Microcontroller in a Power-loss Event
- Active-low V_{OUT} Pin:
MCP111: Active-low, Open-drain
MCP112: Active-low, Push-pull
- Temperature Range:
-40°C to +125°C (except MCP1xx-195)
-40°C to +85°C
- Space Saving SC-70, SOT23-3
and TO-92 Packages



Note 1: R_{PU} may be required with the MCP111 due to the open-drain output. Resistor R_{PU} is not required with the MCP112.

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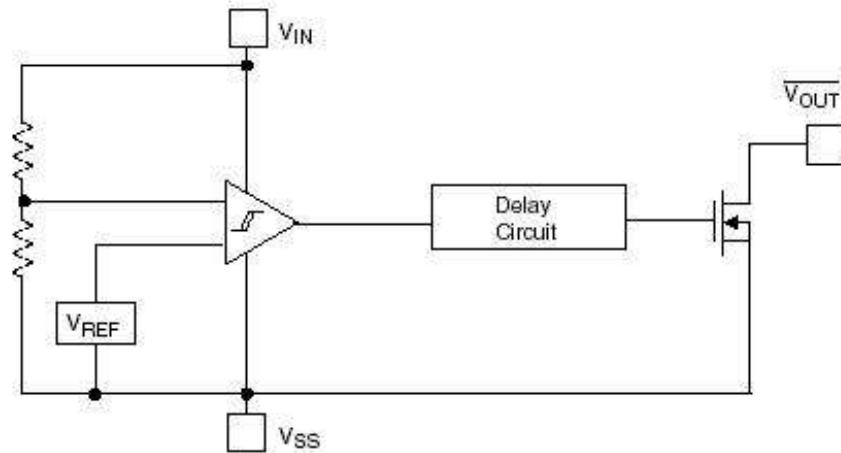
MICROCHIP

TC51

Online
Datasheet

Features:

- Precise Detection Thresholds: $\pm 2.0\%$
- Small Package: 3-Pin SOT-23A
- Low Supply Current: $1\mu A$ (typ.)
- Wide Detection Range: 1.6V to 6.0V
- Wide Operating Voltage Range: 0.7V to 10V
- Built-in Delay Circuit: 50ms to 200ms
- Open-drain Output



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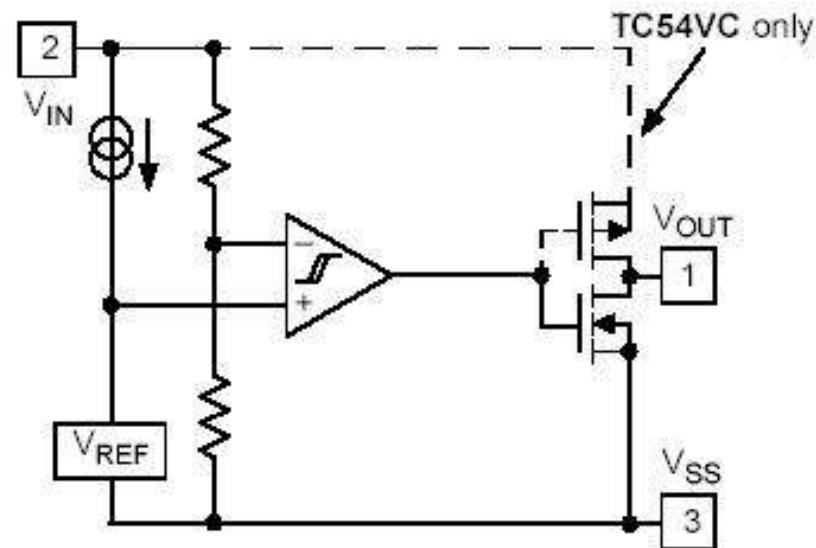
MICROCHIP

TC54

Online
Datasheet

Features:

- Precise Detection Thresholds:
Standard $\pm 2.0\%$, Custom $\pm 1.0\%$
- Small Packages:
3-Pin SOT-23A,
3-Pin SOT-89, TO-92
- Low Current Drain: $1\mu\text{A}$ (typ.)
- Wide Detection Range:
 1.1V to 6.0V
- Wide Operating Voltage Range:
 0.7V to 10V



TC54VN has open-drain output.
TC54VC has complementary output.

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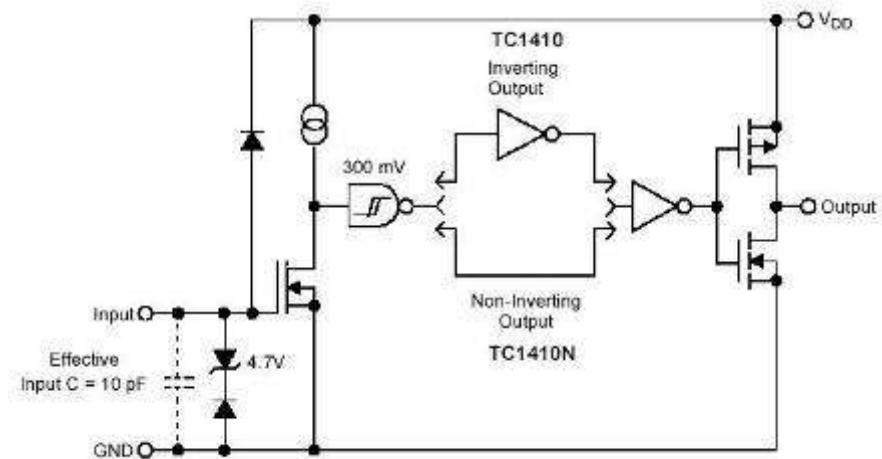
MICROCHIP

TC1410/N

Online
Datasheet

Features:

- Latch-Up Protected: Will Withstand 500mA Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- ESD Protected: 4kV
- High Peak Output Current: 0.5A
- Wide Input Supply Voltage Operating Range: 4.5V to 16V
- High Capacitive Load Drive Capability: 500pF in 25ns (typ.)
- Short Delay Time: 30ns (typ.)
- Consistent Delay Times With Changes in Supply Voltage
- Matched Delay Times
- Low Supply Current
 - With Logic '1' Input: 500 μ A
 - With Logic '0' Input: 100 μ A
- Low Output Impedance: 16 Ω
- Space Saving 8-pin MSOP Package
- Pinout Same as TC1411/TC1412/TC1413



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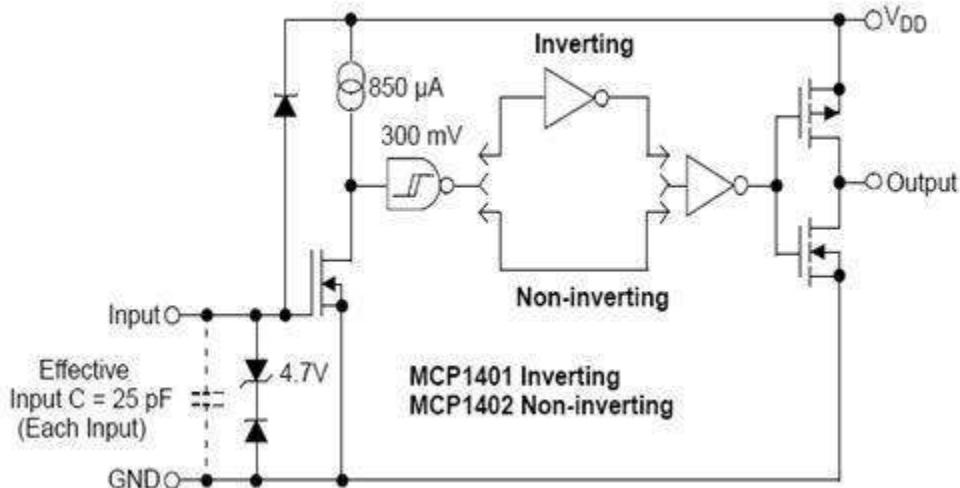
MICROCHIP

MCP1401/02

Online
Datasheet

Features:

- High Peak Output Current: 500mA (typ.)
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- Low Shoot-Through/Cross-Conduction Current in Output Stage
- High Capacitive Load Drive Capability:
 - 470pF in 19ns (typ.)
 - 1000pF in 34ns (typ.)
- Short Delay Times: 35ns (typ.)
- Matched Rise/Fall Times
- Low Supply Current:
 - With Logic '1' Input – 0.85mA (typ.)
 - With Logic '0' Input – 0.10mA (typ.)
- Latch-Up Protected: Will Withstand 500mA Reverse Current
- Logic Input Will Withstand Negative Swing Up To 5V
- Space Saving 5-Pin SOT-23 Package



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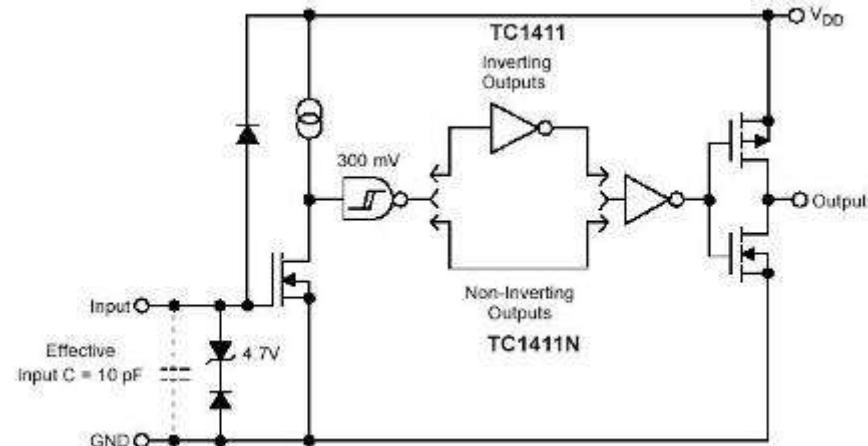
MICROCHIP

TC1411/N

Online
Datasheet

Features:

- Latch-Up Protected: Will Withstand 500mA Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- ESD Protected: 4kV
- High Peak Output Current: 1A
- Wide Input Supply Voltage Operating Range: 4.5V to 16V
- High Capacitive Load Drive Capability: 1000pF in 25ns (typ.)
- Short Delay Time: 30ns (typ.)
- Matched Delay Times
- Low Supply Current
With Logic '1' Input: 500 μ A
With Logic '0' Input: 100 μ A
- Low Output Impedance: 8 Ω
- Available in Space-Saving 8-pin MSOP Package
- Pinout Same as TC1410/TC1412/TC1413



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MICROCHIP

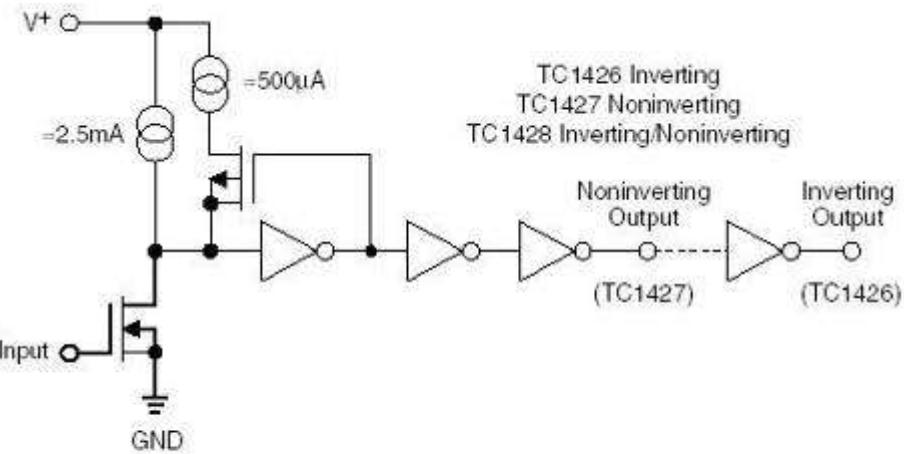
TC1426/7/8

Online
Datasheet

Recommend TC4426A/27A/28A for new designs

Features:

- Low Cost
- Latch-Up Protected: Will Withstand 500mA Reverse Output Current
- ESD Protected $\pm 2\text{kV}$
- High Peak Output Current: 1.2A
- Wide Operating Range: 4.5V to 16V
- High Capacitive Load Drive Capability: 1000pF in 38ns
- Low Delay Time: 75ns (max.)
- Logic Input Threshold Independent of Supply Voltage
- Output Voltage Swing to Within 25mV of Ground or V_{DD}
- Low Output Impedance: 8 Ω



NOTE: TC1428 has one inverting and one noninverting driver.
Ground any unused driver input.

[TC4426A/27A/28A >>](#)

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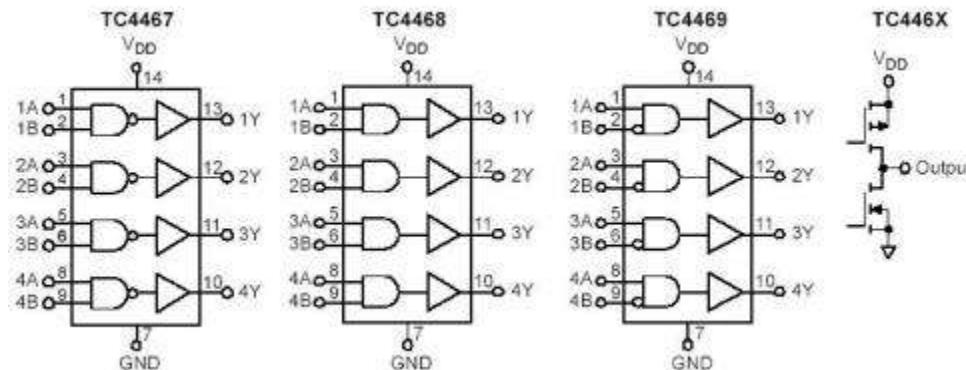
MICROCHIP

TC4467/8/9

Online
Datasheet

Features:

- High Peak Output Current: 1.2A
- Wide Operating Range: 4.5V to 18V
- Symmetrical Rise/Fall Times: 25ns
- Short, Equal Delay Times: 75ns
- Latch-proof. Will Withstand 500mA Inductive Kickback
- 3 Input Logic Choices: AND / NAND / AND + Inv
- ESD Protection on all pins: 2kV



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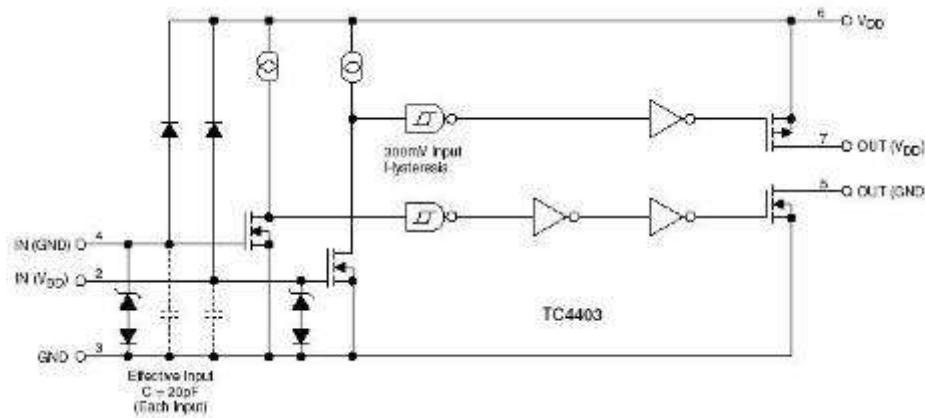
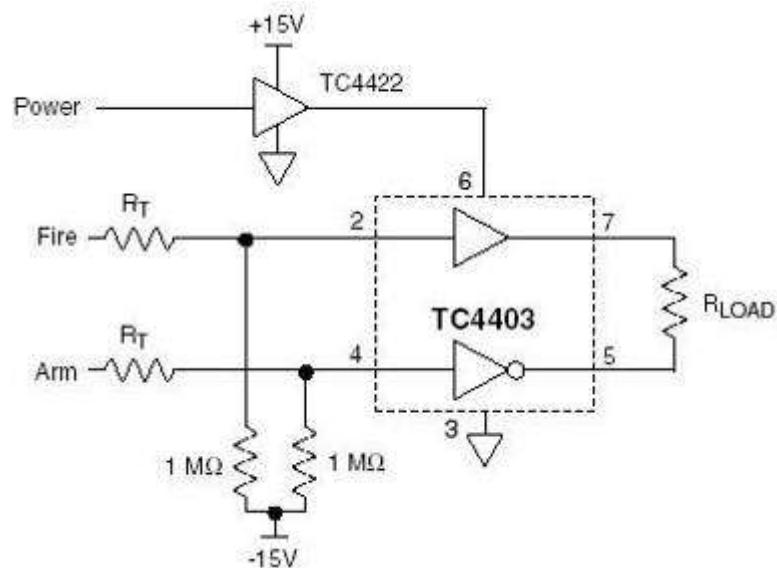
MICROCHIP

TC4403

Online
Datasheet

Features:

- Low Quiescent Current: 300 μ A (max.)
- Capacitive Inputs With 300mV Hysteresis
- Both Inputs Must Be Driven to Drive Load
- Low Output Leakage
- High Peak Current Capability
- Fast Output Rise Time
- Outputs Individually Testable



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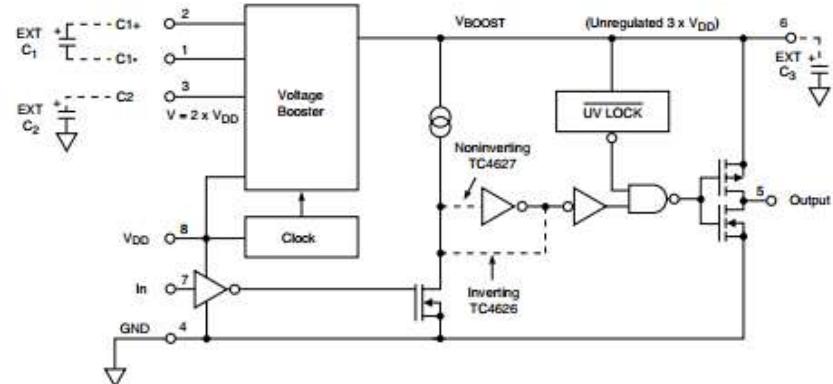
MICROCHIP

TC4626/7

Online
Datasheet

Features:

- Power Driver With On Board Voltage Booster
- Low I_{DD} : <4mA
- Small Package: 8-Pin PDIP
- Under-Voltage Circuitry
- Fast Rise-Fall Time: <40ns @1000pF
- Below-Rail Input Protection



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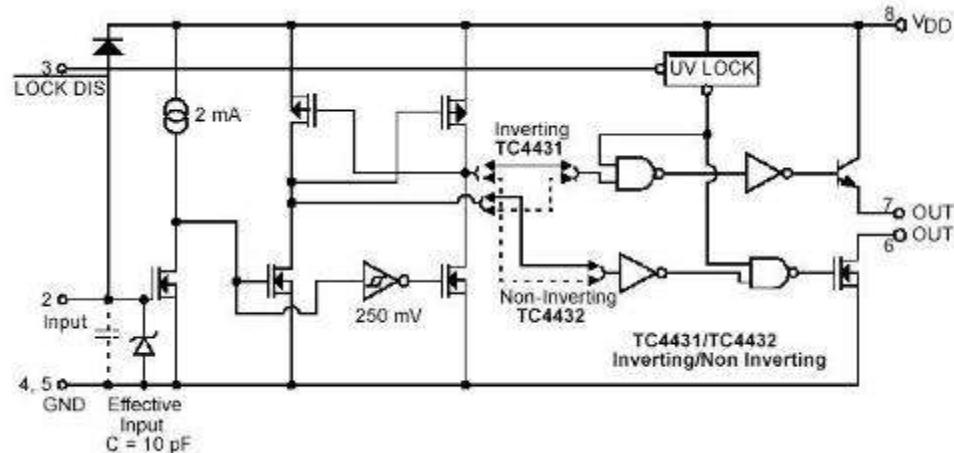
MICROCHIP

TC4431/2

Online
Datasheet

Features:

- High Peak Output Current: 1.5A
- Wide Operating Range: 4.5V to 30V
- High Capacitive Load Drive Capability: 1000pF in 25ns
- Short Delay Times: < 78ns (typ.)
- Low Supply Current:
 - With Logic '1' Input: 2.5mA
 - With Logic '0' Input: 300 μ A
- Low Output Impedance: 7 Ω (typ.)
- Latch-Up Protected: Will Withstand > 300mA Reverse Current
- ESD Protected: 4kV



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MICROCHIP

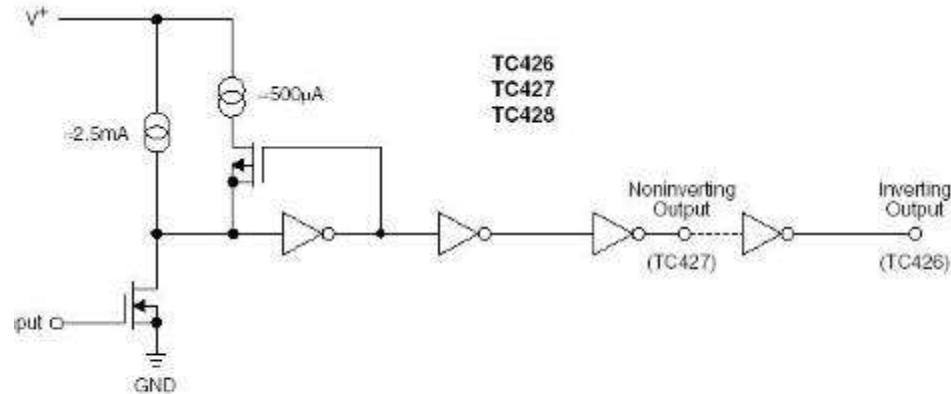
TC426/7/8

Online
Datasheet

Recommend TC4426A/27A/28A for new designs

Features:

- High-Speed Switching ($C_L=1000\text{pF}$): 30ns
- High Peak Output Current: 1.5A
- High Output Voltage Swing:
 $V_{DD} - 25\text{mV}$
 $\text{GND} +25\text{mV}$
- Low Input Current (Logic '0' or '1'): 1 μA
TTL/CMOS Input Compatible
- Wide Operating Supply Voltage: 4.5V to 18V
- Current Consumption:
Inputs Low: 0.4mA
Inputs High: 8mA
- Low Output Impedance: 6 Ω
- Pinout Equivalent of DS0026 and MMH0026
- Latch-Up Resistant: Withstands > 500mA Reverse Current
- ESD Protected: 2kV



OTE: TC428 has one inverting and one noninverting driver.
Ground any unused driver input.

[TC4426A/27A/28A >>](#)

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MICROCHIP

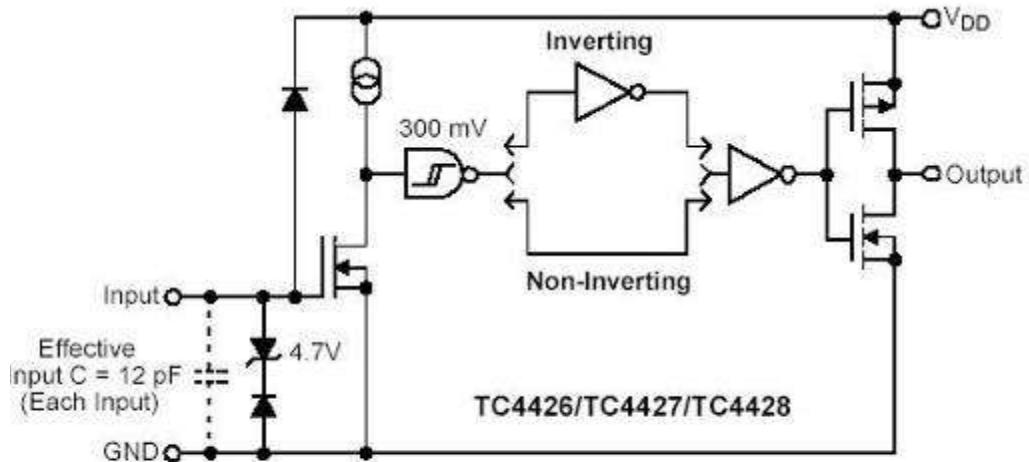
TC4426/7/8

Online
Datasheet

Recommend TC4426A/27A/28A for new designs

Features:

- High-Speed Switching ($C_L=1000\text{pF}$):
30ns
- High Peak Output Current: 1.5A
- Short Delay Times: 40ns (typ.)
- Wide Operating Supply Voltage:
4.5V to 18V
- Matched Rise and Fall Times
- Current Consumption:
Logic '1' Input: 4mA (typ.)
Logic '0' Input: 400 μA (typ.)
- Low Output Impedance: 7 Ω (typ.)
- Pinout Equivalent TC426/TC427/TC428
- Latch-Up Resistant: Withstands 0.5A
Reverse Current
- ESD Protected: 4kV



Note 1: TC4426 has two inverting drivers; TC4427 has two non-inverting drivers;
TC4428 has one inverting and one non-inverting driver.

2: Ground any unused driver input.

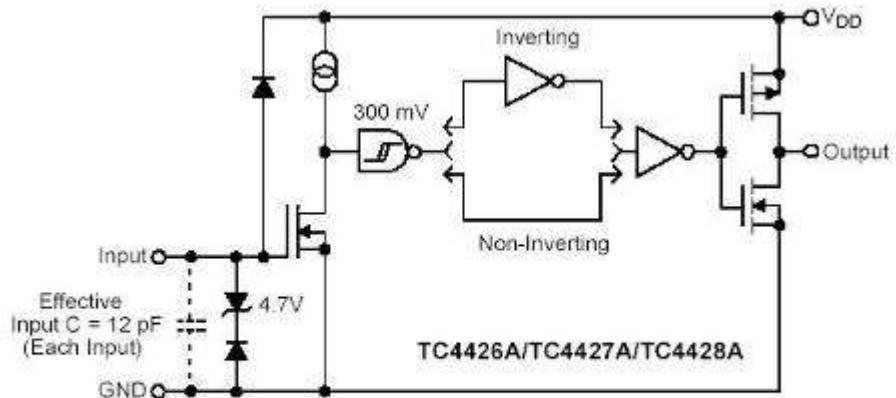
[TC426/7/8 >>](#)

[TC4426A/27A/28A >>](#)

[<< BACK](#)

Features:

- High Peak Output Current: 1.5A
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Capacitive Load Drive Capability: 1000pF in 25ns (typ.)
- Short Delay Times: 30ns (typ.)
- Matched Rise, Fall and Delay Times
- Low Supply Current:
 - With Logic '1' Input: 1mA (typ.)
 - With Logic '0' Input: 100 μ A (typ.)
- Low Output Impedance: 7 Ω (typ.)
- Latch-Up Protected: Will Withstand 0.5A Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- ESD Protected: 4kV
- Pin-compatible with TC426/27/28 and TC4426/27/28
- 8-Pin MSOP and 8-Pin 6x5 DFN Packages



Note 1: TC4426A has two inverting drivers; TC4427A has two non-inverting drivers.
TC4428A has one inverting and one non-inverting driver.

2: Ground any unused driver input.



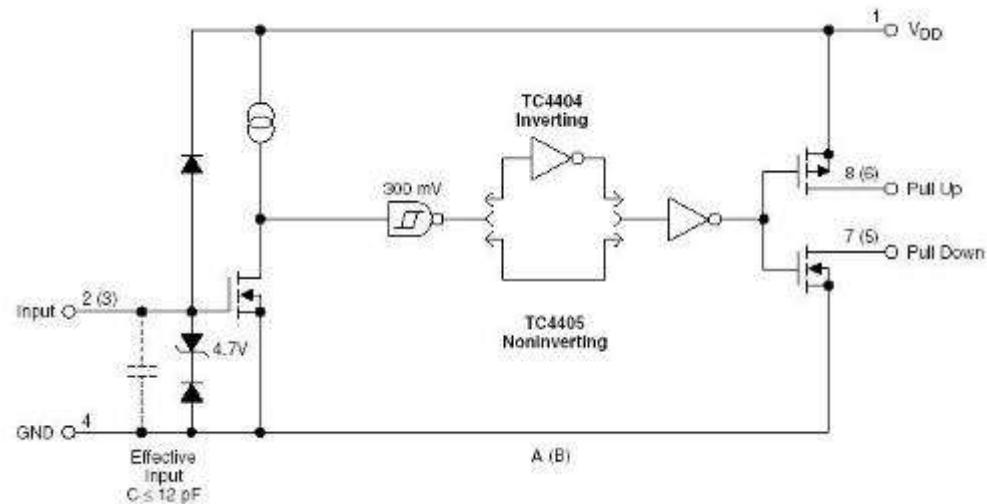
MICROCHIP

TC4404/5

Online
Datasheet

Features:

- Independently-Programmable Rise and Fall Times
- Low Output Impedance: 7Ω (typ.)
- High Speed t_R , t_F :
 $< 30\text{ns}$ with 1000pF Load
- Short Delay Times: $< 30\text{ns}$
- Wide Operating Range: 4.5V to 18V
- Latch-Up Protected:
Will Withstand $> 500\text{mA}$
Reverse Current (Either Polarity)
- Input Withstands Negative Swings
Up to -5V



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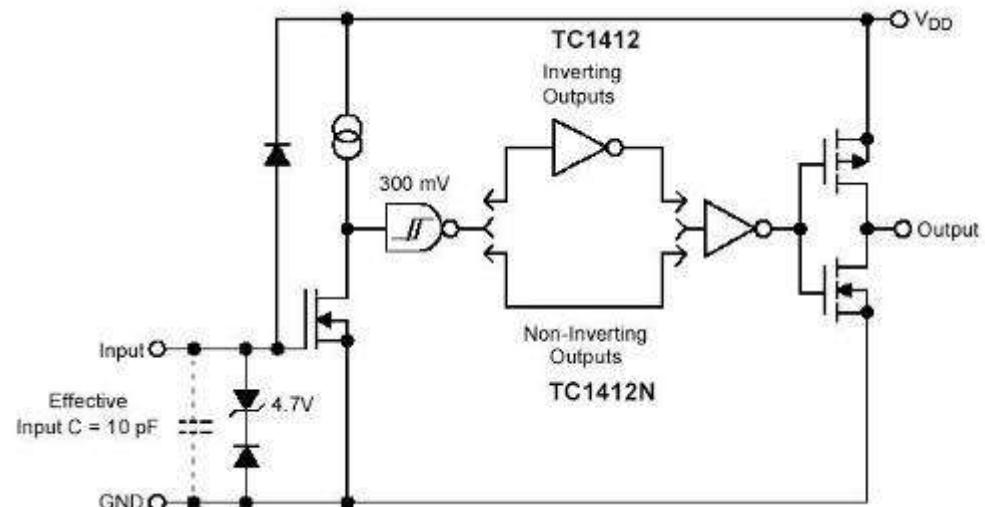
MICROCHIP

TC1412/N

Online
Datasheet

Features:

- High Peak Output Current: 2A
- Latch-Up Protected: Will Withstand 500mA Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- ESD Protected: 4kV
- Wide Operating Range: 4.5V to 16V
- High Capacitive Load Drive Capability: 1000pF in 18ns
- Short Delay Time: 35ns (typ.)
- Matched Delay Times
- Low Supply Current
 - With Logic '1' Input: 500 μ A (typ.)
 - With Logic '0' Input: 100 μ A (typ.)
- Low Output Impedance: 4 Ω (typ.)
- Pinout Same as TC1410/11/13
- Space Saving 8-Pin MSOP Package



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MICROCHIP

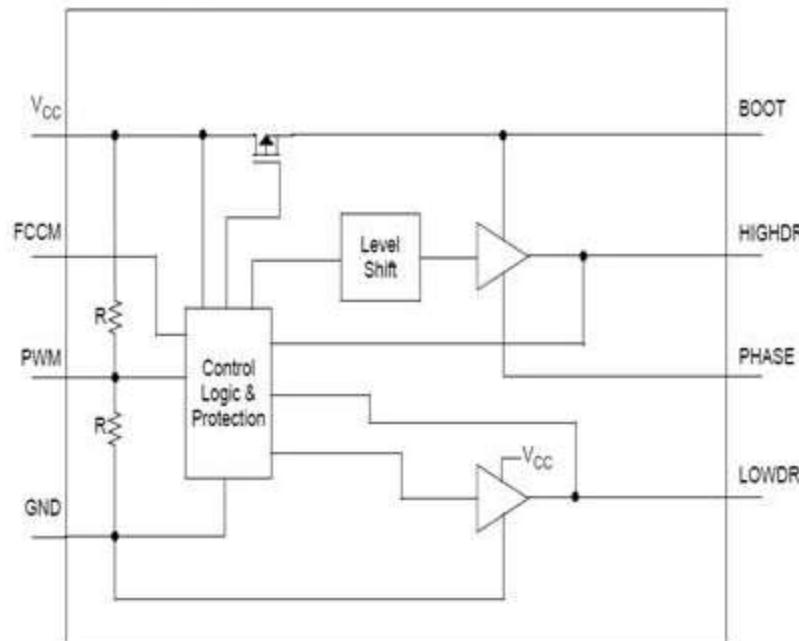
MCP14628

Online
Datasheet

Features:

- Dual Output MOSFET Driver for Synchronous Applications
- High Peak Output Current: 2A (typ.)
- Adaptive Cross Conduction Protection
- Internal Bootstrap Blocking Device
- +36V BOOT Pin Maximum Rating
- Enhanced Light Load Efficiency Mode
- Low Supply Current: 80 μ A (typ.)
- High Capacitive Load Drive Capability: 3300pF in 10ns (typ.)
- Tri-State PWM Pin for Power Stage Shutdown
- Input Voltage Undervoltage Lockout Protection
- Space Saving Packages:
8-Lead SOIC, 8-Lead 3x3 DFN

Functional Block Diagram



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MICROCHIP

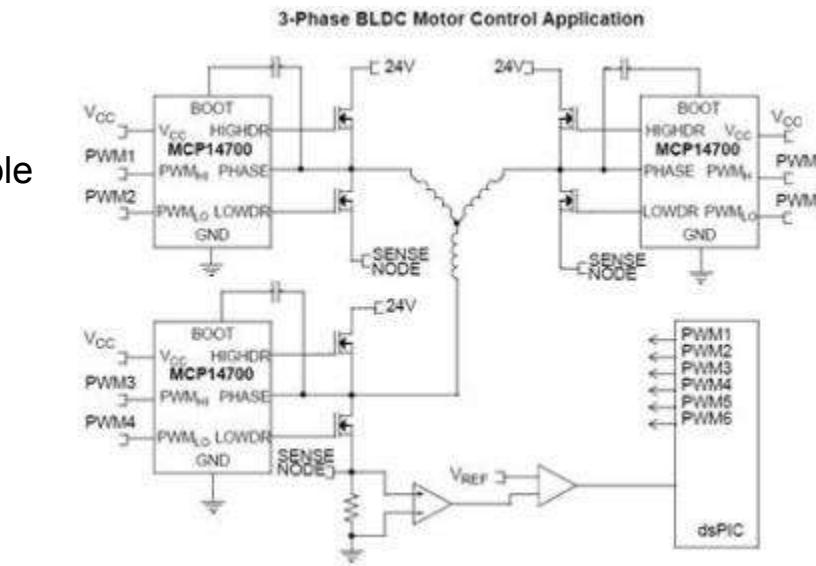
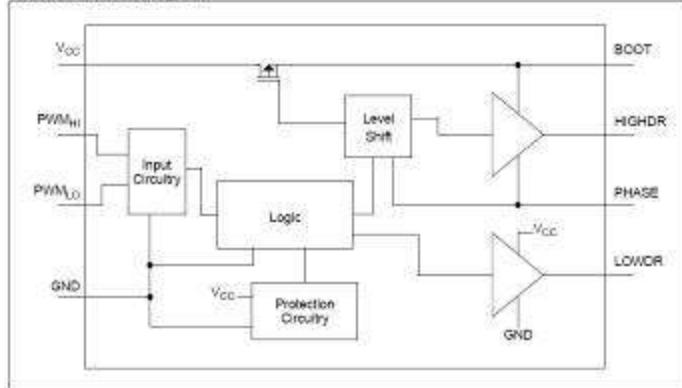
MCP14700

Online
Datasheet

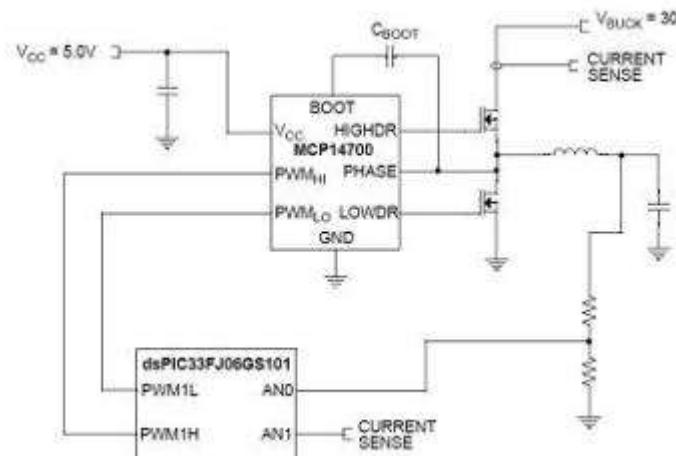
Features:

- Independent PWM Input Control for High-Side and Low-Side Gate Drive
- Input Logic Level Threshold 3.0V TTL Compatible
- Dual Output MOSFET Drive for Synchronous Applications
- High Peak Output Current: 2A (typ.)
- Internal Bootstrap Blocking Device
- +36V BOOT Pin Maximum Rating
- Low Supply Current: 45 μ A (typ.)
- High Capacitive Load Drive Capability:
- 3300pF in 10.0ns (typ.)
- Input Voltage Undervoltage Lockout Protection
- Overtemperature Protection
- Packages: 8-Lead SOIC, 8-Lead 3x3 DFN

Functional Block Diagram



Synchronous Buck Application



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MICROCHIP

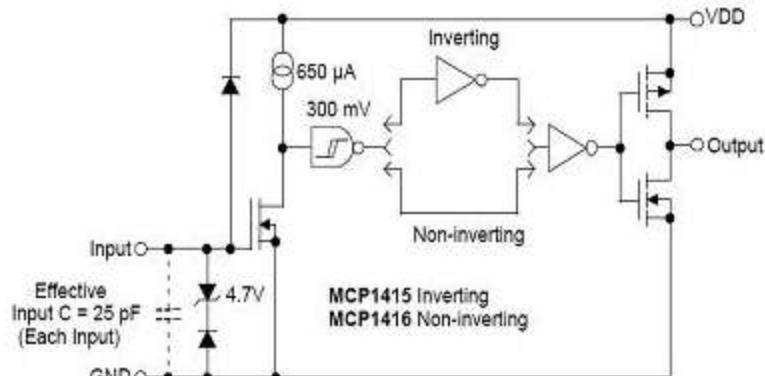
MCP1415/6

Online
Datasheet

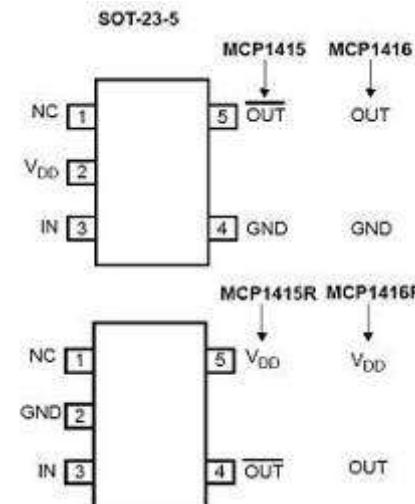
Features:

- High Peak Output Current: 1.5A (typ.)
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- Low Shoot-Through/Cross-Conduction - Current in Output Stage
- High Capacitive Load Drive Capability: 470pF in 13ns (typ.)
1000pF in 20ns (typ.)
- Short Delay Times: 41ns (t_{D1}), 48ns (t_{D2}), (typ.)
- Low Supply Current:
 - With Logic '1' Input: 0.65mA (typ.)
 - With Logic '0' Input: 0.1mA (typ.)
- Latch-Up Protected: Will Withstand 500mA Reverse Current
- Logic Input Withstands Negative Swing up to 5V
- Space-saving 5-SOT-23 Package

Functional Block Diagram



Note: Unused inputs should be grounded.



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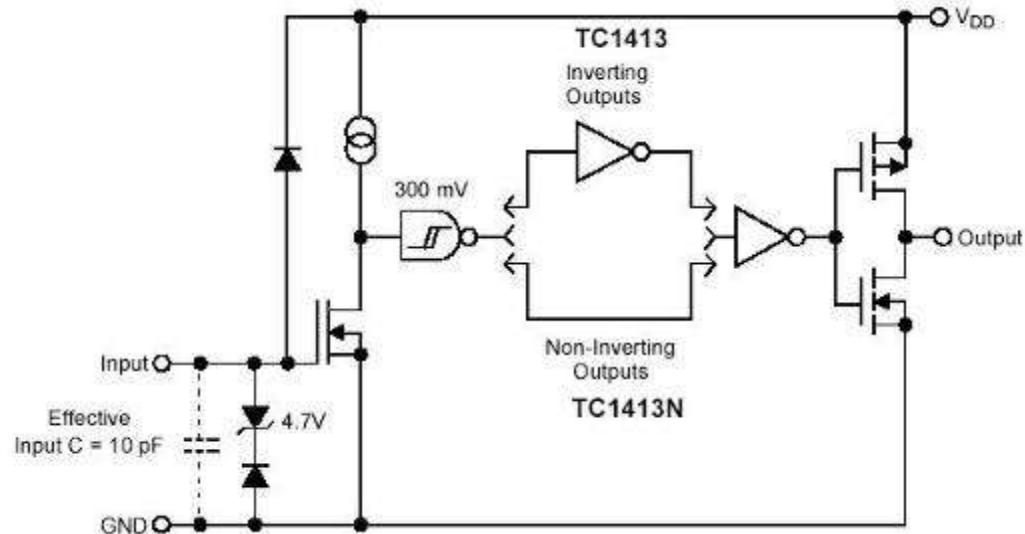
MICROCHIP

TC1413/N

Online
Datasheet

Features:

- High Peak Output Current: 3A
- Latch-Up Protected: Will Withstand 500mA Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- ESD Protected: 4kV
- Wide Operating Range: 4.5V to 16V
- High Capacitive Load Drive Capability: 1800pF in 20ns
- Short Delay Time: 35ns (typ.)
- Matched Delay Times
- Low Supply Current
 - With Logic '1' Input: 500 μ A
 - With Logic '0' Input: 100 μ A
- Low Output Impedance: 2.7 Ω
- Pinout Same as TC1410/11/12
- Space Saving 8-Pin MSOP Package



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MICROCHIP

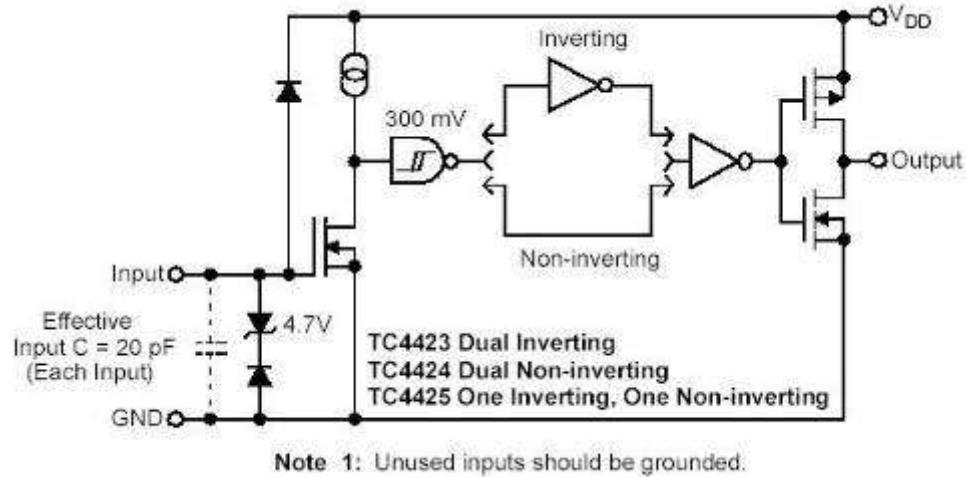
TC4423/4/5

Online
Datasheet

Recommend TC4423A/24A/25A for new designs

Features:

- High Peak Output Current: 3A
- Wide Input Supply Voltage Operating Range 4.5V to 18V
- High Capacitive Load Drive Capability: 1800pF in 25ns
- Short Delay Times: < 40ns (typ.)
- Matched Rise/Fall Times
- Low Supply Current:
 - With Logic '1' Input: 3.5mA (max.)
 - With Logic '0' Input: 350 μ A (max.)
- Low Output Impedance: 3.5 Ω (typ.)
- Latch-Up Protected: Will Withstand 1.5A Reverse Current
- Logic Input Will Withstand Negative Swing up to 5V
- ESD Protected: 4kV
- Pin compatible with the TC4423A/24A/25A and TC4426A/27A/28A devices

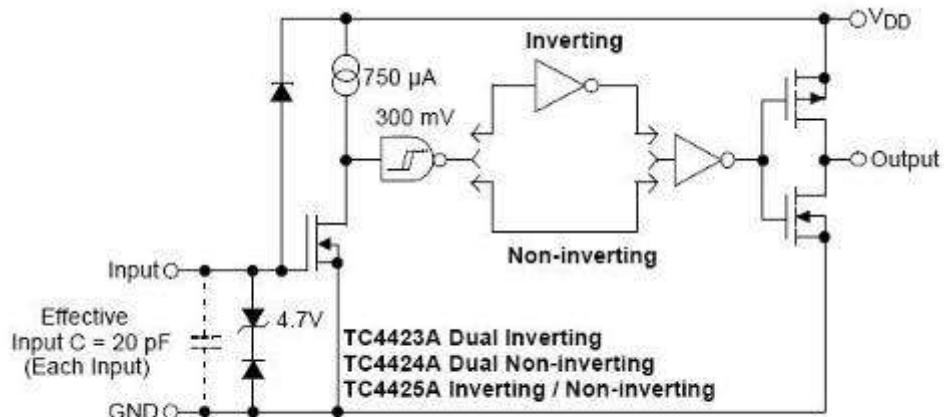


[TC4423A/24A/25A >>](#)

[<< BACK](#)

Features:

- High Peak Output Current: 4.5A
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Capacitive Load Drive Capability: 1800pF in 12ns
- Short Delay Times: 40ns (typ.)
- Matched Rise/Fall Times
- Low Supply Current:
With Logic '1' Input: 1.0mA (max.)
With Logic '0' Input: 150µA (max.)
- Low Output Impedance: 2.5Ω (typ.)
- Latch-up protected: will withstand 1.5A reverse current
- Logic input will withstand negative swing up to 5V
- Pin compatible with the TC4423/24/25 and TC4426A/27A/28A
- Space-saving 8-Pin 150 mil body SOIC and 8-Pin 6x5 DFN packages



Note 1: Unused inputs should be grounded.



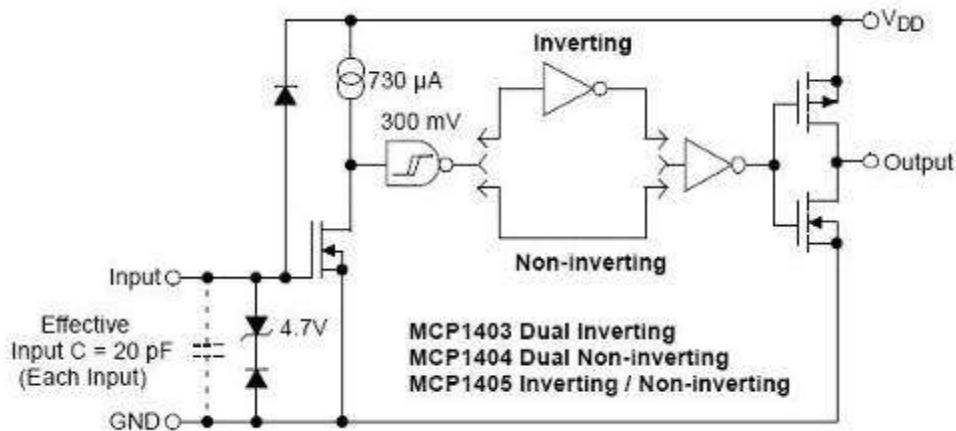
MICROCHIP

MCP1403/4/5

Online
Datasheet

Features:

- High Peak Output Current: 4.5A
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Capacitive Load Drive Capability: 2200pF in 15ns
- Short Delay Times: 40ns (typ.)
- Low Supply Current:
With Logic '1' Input: 1.0mA (max.)
With Logic '0' Input: 150µA (max.)
- Latch-Up Protected: Will Withstand 1.5A Reverse Current
- Logic Input Will Withstand Negative Swing up to 5V
- Packages: 8-Pin SOIC, PDIP, 6x5 DFN, and 16-Pin SOIC



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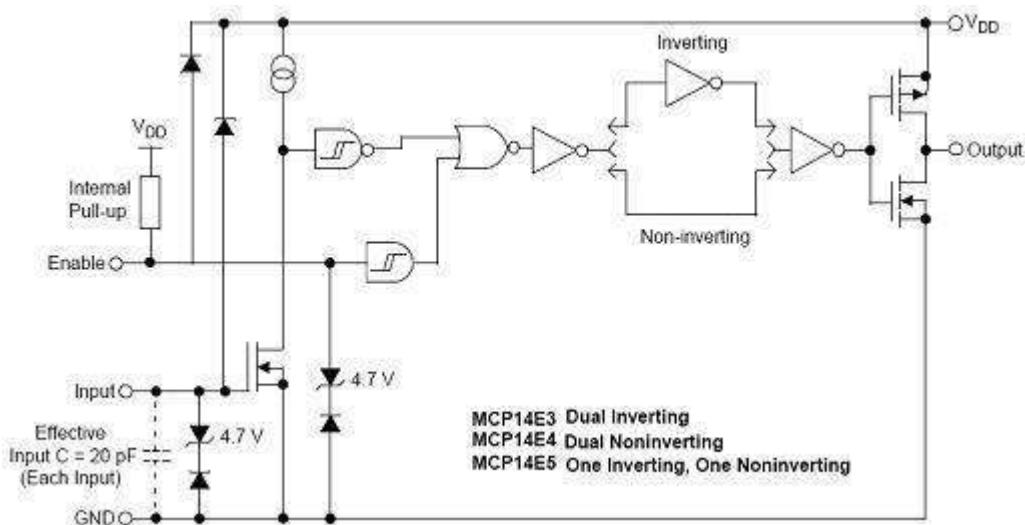
MICROCHIP

MCP14E3/4/5

Online
Datasheet

Features:

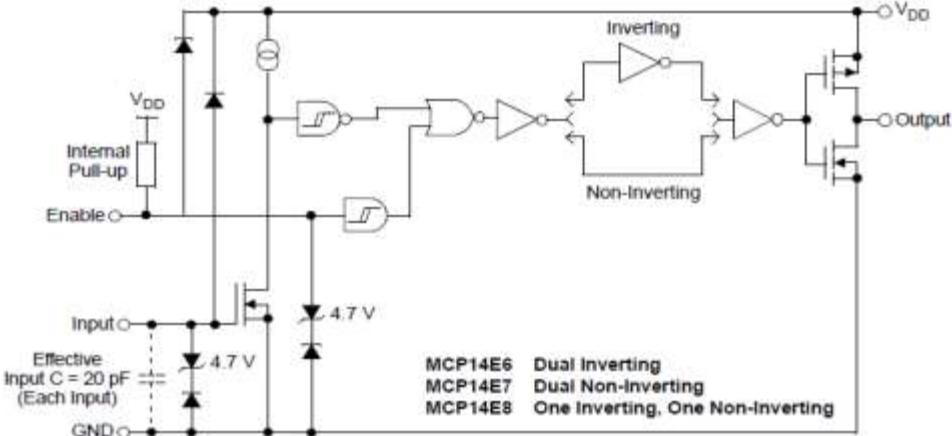
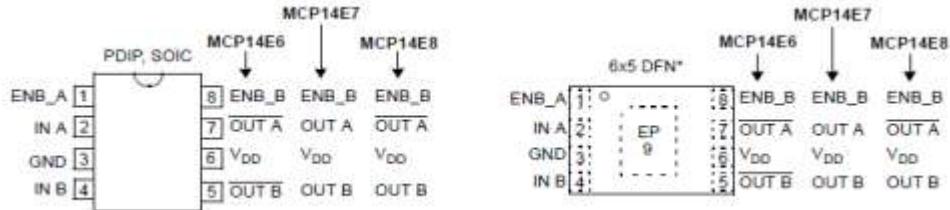
- High Peak Output Current: 4.0A
- Independent Enable Function for Each Driver Output
- Low Shoot-Through/Cross-Conduction Current in Output Stage
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Capacitive Load Drive Capability: 2200pF in 15ns (typ.)
5600pF in 26ns (typ.)
- Short Delay Times: 50ns (typ.)
- Latch-Up Protected: Will Withstand 1.5A Reverse Current
- Logic Input Will Withstand Negative Swing Up To 5V
- Space-Saving Packages: 8-Pin 6x5 DFN, PDIP, SOIC



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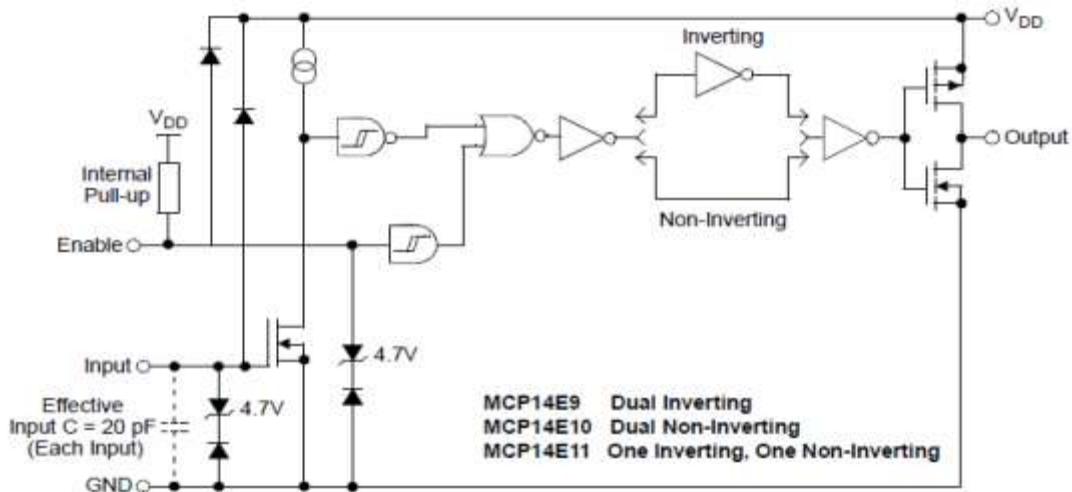
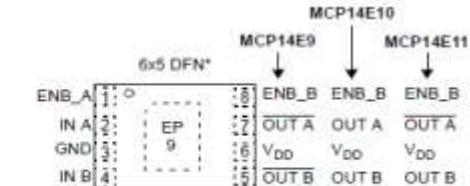
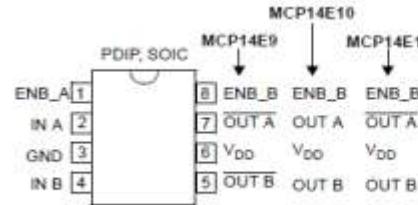
Features:

- High peak output Current: 2A (typ.)
- Dual Outputs
 - Dual inverting: MCP14E6
 - Dual non-inverting: MCP14E7
 - Complementary outputs: MCP14E8
- Enable Function for each Driver
- Low Shoot-Through/Cross-Conduction Current in output Stage
- Wide Input Operating Range: 4.5v to 18V
- High Capacitive Load drive Capability:
 - 1000 pF in 15 nsec (typ.)
- Short Delay Times: 45 nsec (typ.)
- Latch-up Protected
 - Passed JEDEC JESD78A
- Input are TTL/CMOS compatible and will withstand negative swings up to 5V
- ESD Protected: 4kV
- Packages:
 - 8-Pin 6x5 DFN, PDIP, SOIC



Features:

- High peak output Current: 3A (typ.)
 - Dual Outputs (E9/10/11):
 - Dual inverting: MCP14E9
 - Dual non-inverting: MCP14E10
 - Complementary outputs: MCP14E11
 - Enable Function for each Driver
 - Low Shoot-Through/Cross-Conduction
- Current Wide Input Operating Range:
4.5v to 18V
- High Capacitive Load drive Capability:
 - 1800 pF in 17 nsec (typ.)
 - Short Delay Times: 45 nsec (typ.)
 - Latch-up Protected
 - Passed JEDEC JESD78A
 - Input are TTL/CMOS compatible and will withstand negative swings Up To 5V
 - ESD Protected: 4kV
 - Packages:
 - 8-Pin 6x5 DFN, PDIP, SOIC



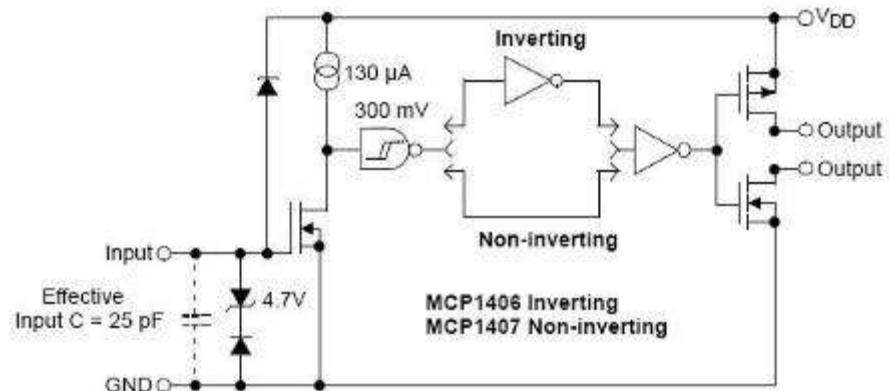


MCP1406/7

Online Datasheet

Features:

- High Peak Output Current: 6.0A (typ.)
 - Wide Input Supply Voltage Operating Range: 4.5V to 18V
 - High Capacitive Load Drive Capability: 2500pF in 20ns
6800pF in 40ns
 - Short Delay Times: 40ns (typ.)
 - Matched Rise/Fall Times
 - Low Supply Current:
 - With Logic '1' Input: 130 μ A (typ.)
 - With Logic '0' Input: 35 μ A (typ.)
 - Latch-Up Protected: Will Withstand 1.5A Reverse Current
 - Logic Input Will Withstand Negative Swing up to 5V
 - Pin compatible with the TC4420/TC4429
 - Space-saving 8-Pin SOIC, PDIP and 8-Pin 6x5 DFN Packages



TC4420/9 >>

TC429 >>

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MICROCHIP

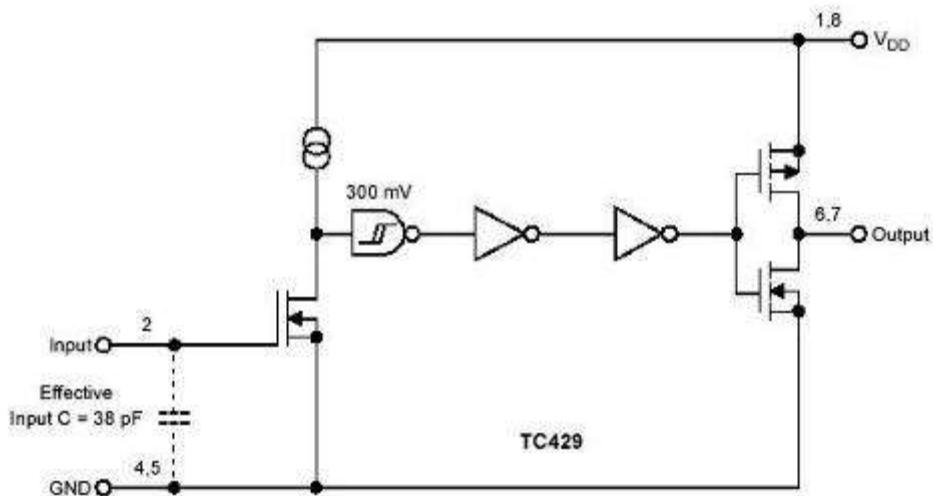
TC429

Online
Datasheet

Recommend MCP1406 for new designs

Features:

- High Peak Output Current: 6A
- Wide Input Supply Voltage Operating Range: 7V to 18V
- High Capacitive Load Drive Capability: $C_L=2500\text{pF}$ in 35ns (max.)
- Short Delay Times: 75ns (max.)
- Low Supply Current:
 - With Logic '1' Input: 5mA (max.)
 - With Logic '0' Input: 0.5mA (max.)
- Logic Input Threshold Independent of Supply Voltage
- Output Voltage Swing Within 25mV of Ground or V_{DD}
- Space Saving 8-Pin SOIC Package



[TC4420/9 >>](#)

[MCP1406/7 >>](#)

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MICROCHIP

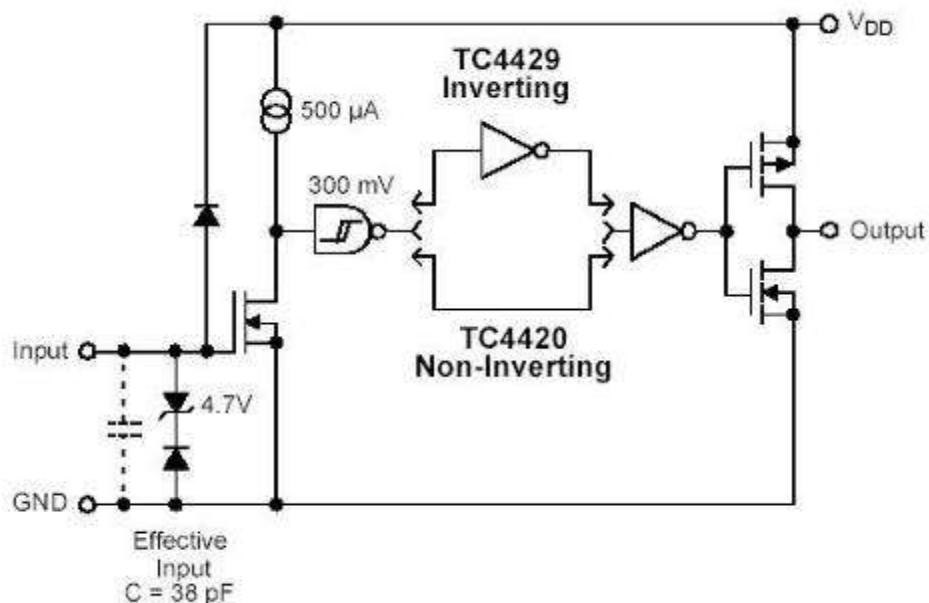
TC4420/9

Online
Datasheet

Recommend MCP1406 for new designs

Features:

- Latch-Up Protected: Will Withstand >1.5A Reverse Output Current
- Logic Input Will Withstand Negative Swing up to 5V
- ESD Protected: 4kV
- Matched Rise and Fall Times: 25ns
- High Peak Output Current: 6A Peak
- Wide Operating Range: 4.5V to 18V
- High Capacitive Load Drive: 10,000pF
- Short Delay Time: 55ns (typ.)
- Logic High Input, Any Voltage: 2.4V to V_{DD}
- Low Supply Current with Logic '1' Input 450 μ A (typ.)
- Low Output Impedance: 2.5 Ω
- Output Voltage Swing to Within 25mV of Ground or V_{DD}



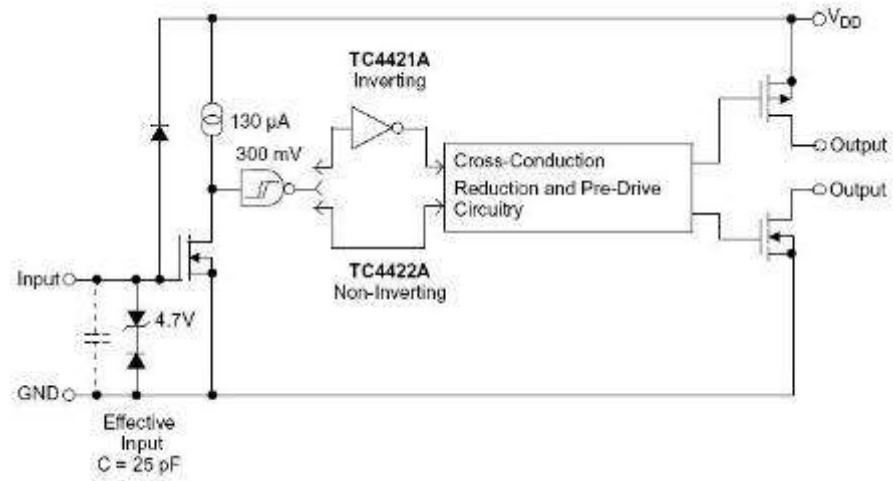
[TC429 >>](#)

[MCP1406/7 >>](#)

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Features:

- High Peak Output Current: 9A
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Continuous Output Current: 2A (max.)
- Fast Rise and Fall Times:
30ns with 4,700pF Load
180ns with 47,000pF Load
- Short Propagation Delays: 30ns (typ.)
- Low Supply Current:
With Logic '1' Input: 200 μ A (typ.)
With Logic '0' Input: 55 μ A (typ.)
- Low Output Impedance: 1.4 Ω (typ.)
- Latch-Up Protected: Will Withstand 1.5A Output Reverse Current
- Input Will Withstand Negative Inputs up to 5V
- Pin-Compatible with the TC4420/TC4429
- Space-saving 8-Pin 6x5 DFN Package





MICROCHIP

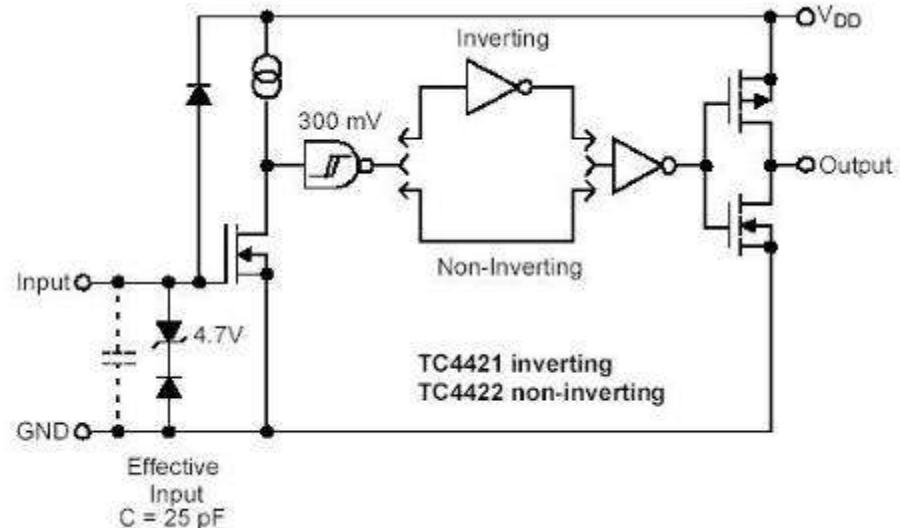
TC4421/4422

Online
Datasheet

Recommend TC4421A/22A for new designs

Features:

- High Peak Output Current: 9A
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Continuous Output Current: 2A (max.)
- Fast Rise and Fall Times:
30ns with 4,700pF Load
180ns with 47,000pF Load
- Short Propagation Delays: 30ns (typ.)
- Low Supply Current:
With Logic '1' Input: 200 μ A (typ.)
With Logic '0' Input: 55 μ A (typ.)
- Low Output Impedance: 1.4 Ω (typ.)
- Latch-Up Protected: Will Withstand 1.5A Output Reverse Current
- Input Will Withstand Negative Inputs Up to 5V
- Pin-Compatible with the TC4420/TC4429
- Space-saving 8-Pin 6x5 DFN Package



[TC4421A/2A >>](#)

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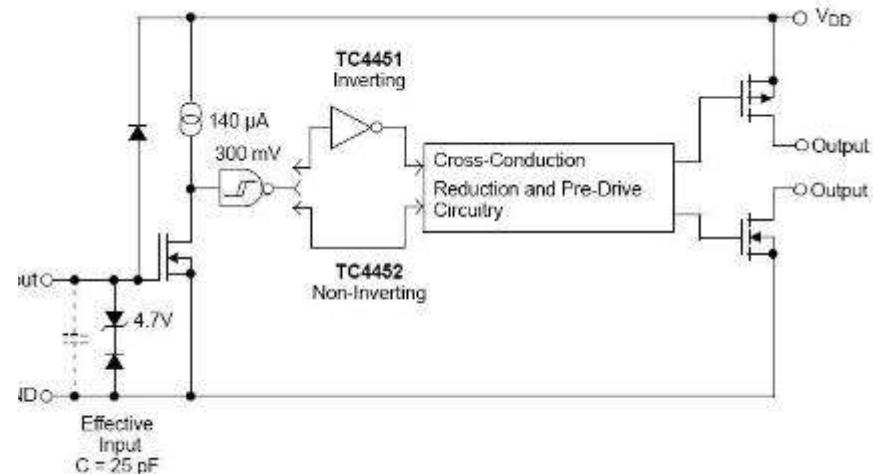
MICROCHIP

TC4451/4452

Online
Datasheet

Features:

- High Peak Output Current: 13A (typ.)
- Wide Input Supply Voltage Operating Range: 4.5V to 18V
- High Continuous Output Current: 2.6A (max.)
- Matched Fast Rise and Fall Times:
21ns with 10,000 pF Load
42ns with 22,000 pF Load
- Matched Propagation Delays: 44ns (typ.)
- Low Supply Current:
With Logic '1' Input: 140 μ A (typ.)
With Logic '0' Input: 40 μ A (typ.)
- Low Output Impedance: 0.9 Ω (typ.)
- Latch-Up Protected: Will Withstand 1.5A Output Reverse Current
- Input Will Withstand Negative Inputs up to 5V
- Pin-Compatible with the TC4420/TC4429,
TC4421/TC4422 and TC4421A/TC4422A
- Space-Saving, Thermally-Enhanced,
8-Pin DFN Package



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Features

- Low Drain-to-Source On Resistance (RDS(ON))
 - Low Total Gate Charge (QG) and Gate-to-Drain Charge (QGD)
 - Low Series Gate Resistance (RG)
 - Fast Switching = Capable of Short Dead-Time Operation for Maximum Power Conversion Efficiency
 - ROHS Compliant
-
- **Use with Microchip's Switching Controllers and/or MOSFET Drivers**



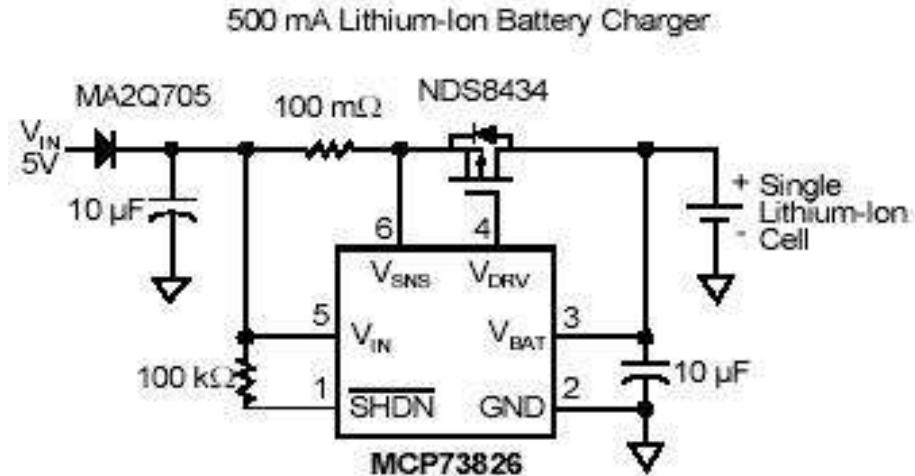
MICROCHIP

MCP73826

Online
Datasheet

Features:

- Linear Charge Management Controller for Single Lithium-Ion Cells
- High Accuracy Preset Voltage Regulation: $\pm 1\%$ (max.)
- Two Preset Voltage Regulation Options:
4.1V, MCP73826-4.1
4.2V, MCP73826-4.2
- Programmable Charge Current
- Automatic Cell Preconditioning of Deeply Depleted Cells, Minimizing Heat Dissipation During Initial Charge Cycle
- Automatic Power-Down when Input Power Removed
- Temperature Range: -20°C to +85°C
- Packaging: 6-Pin SOT-23A



[MCP73827 >>](#)

[MCP73828 >>](#)

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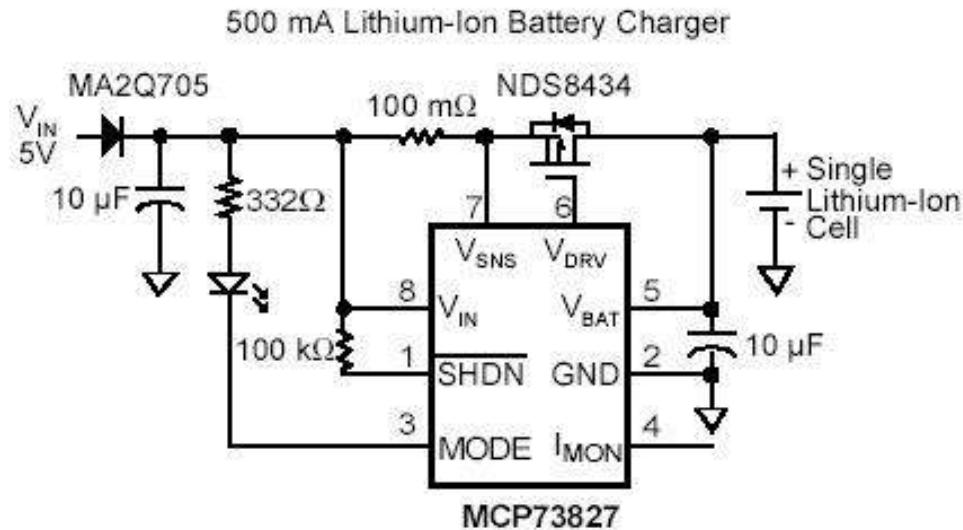
MICROCHIP

MCP73827

Online
Datasheet

Features:

- Linear Charge Management Controller for Single Lithium-Ion Cells
- High Accuracy Preset Voltage Regulation: $\pm 1\%$ (max.)
- Two Preset Voltage Regulation Options:
4.1V, MCP73827-4.1
4.2V, MCP73827-4.2
- Programmable Charge Current
- Automatic Cell Preconditioning of Deeply Depleted Cells, Minimizing Heat Dissipation During Initial Charge Cycle
- Charge Status Output for LED Drive or Microcontroller Interface
- Charge Current Monitor Output
- Automatic Power-Down when Input Power Removed
- Temperature Range: -20°C to +85°C
- Packaging: 8-Pin MSOP



[MCP73826 >>](#)

[MCP73828 >>](#)

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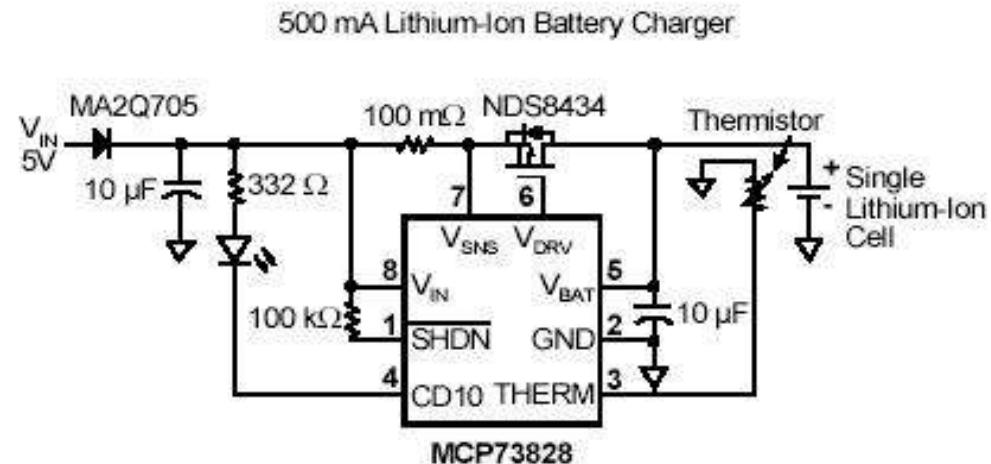
MICROCHIP

MCP73828

Online
Datasheet

Features:

- Linear Charge Management Controller for Single Lithium-Ion Cells
- High Accuracy Preset Voltage Regulation: $\pm 1\%$ (max.)
- Two Preset Voltage Regulation 4.1V, MCP73828-4.1
4.2V, MCP73828-4.2
- Programmable Charge Current
- Automatic Cell Preconditioning of Deeply Depleted Cells, Minimizing Heat Dissipation During Initial Charge Cycle
- Charge Complete Output CD10 for LED Drive or Microcontroller Interface
- Continuous Temperature Monitoring
- Automatic Power-Down when Input Power Removed
- Temperature Range: -20°C to +85°C
- Packaging: 8-Pin MSOP



[MCP73826 >>](#)

[MCP73827 >>](#)

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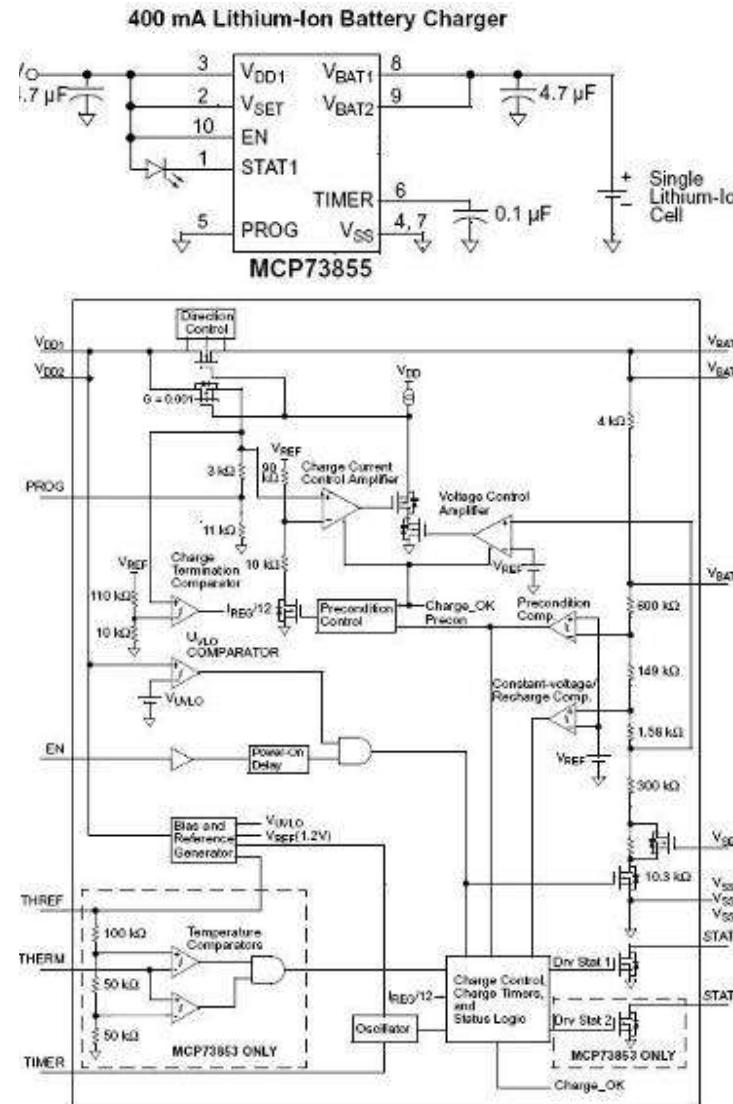
MICROCHIP

MCP73853/5

Online
Datasheet

Features:

- Linear Charge Management Controllers
 - Integrated Pass Transistor
 - Integrated Current Sense
 - Reverse Blocking Protection
- High-Accuracy Preset Voltage Regulation:
 $\pm 0.5\%$ (max.)
- Two Selectable Voltage Regulation Options:
4.1V, 4.2V
- Programmable Charge Current
- USB Compatible Charge Current Settings
- Programmable Safety Charge Timers
- Preconditioning of Deeply Depleted Cells
- Automatic End-of-Charge Control
- Optional Continuous Cell Temperature Monitoring - **MCP73853**
- Charge Status Output for Direct LED Drive
- Fault Output for Direct LED Drive - **MCP73853**
- Automatic Power-Down
- Thermal Regulation
- Temperature Range: -40°C to +85°C
- Packaging:
 - 16-Lead, 4x4 mm QFN (**MCP73853**)
 - 10-Lead, 3x3 mm DFN (**MCP73855**)



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MICROCHIP

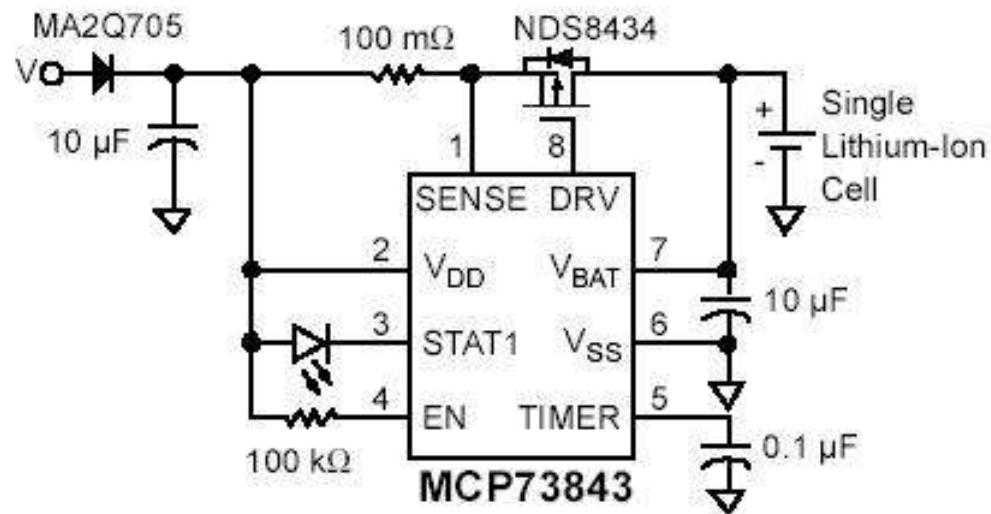
MCP73841/2/3/4

Online
Datasheet

Features:

- Linear Charge Management Controllers
- High-Accuracy Preset Voltage Regulation:
 $\pm 0.5\%$ (max.)
- Four Preset Voltage Regulation Options:
4.1V, MCP73841-4.1, MCP73843-4.1
4.2V, MCP73841-4.2, MCP73843-4.2
8.2V, MCP73842-8.2, MCP73844-8.2
8.4V, MCP73842-8.4, MCP73844-8.4
- Programmable Charge Current
- Programmable Safety Charge Timers
- Preconditioning of Deeply Depleted Cells
- Automatic End-of-Charge Control
- Optional Continuous Cell Temperature Monitoring (**MCP73841** and **MCP73842**)
- Charge Status Output for Direct LED Drive
- Automatic Power-Down when Input Power Removed
- Temperature Range: -40°C to 85°C
- Packaging:
MSOP-10: MCP73841, MCP73842
MSOP-8: MCP73843, MCP73844

1A Lithium-Ion Battery Charger



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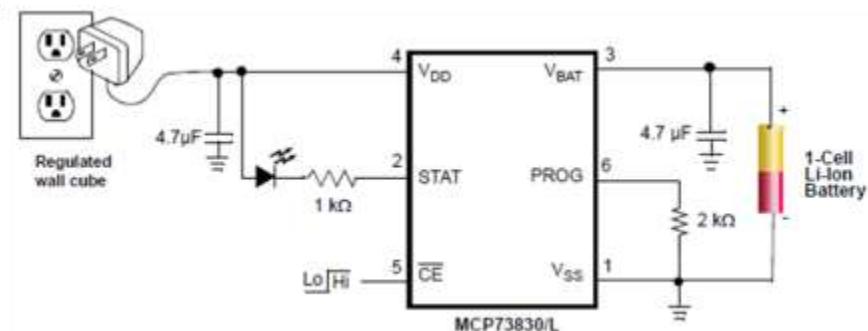
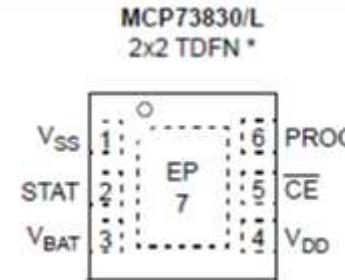
MICROCHIP

MCP73830/L

Online
Datasheet

Features:

- Complete Linear Charge Management Controller
 - Integrated Pass Transistor
 - Integrated Current Sense
 - Integrated Reverse Discharge Protection
- Constant Current/Constant Voltage Operation
- High Accuracy Preset Voltage Regulation: 4.20V \pm 0.75% over temperature
- Programmable Charge Current:
 - MCP73830L: 20 mA – 200 mA
 - MCP73830: 100 mA – 1000 mA
- Soft-start to avoid inrush current
- Preconditioning: 10% and No Preconditioning
- Fixed Elapse Timer: 0 Hour or 4 Hours
- Fixed Preconditioning Timer: 1 Hour
- Automatic Recharge: Optional
- Automatic End-of-Charge Control Termination: 7.5%/10%
- Automatic Power-Down when Input Power Removed
- Under Voltage Lockout (UVLO)
- Chip/Charge Enable Pin (CE)
- Packaging: TDFN-6 (2x2 mm)
- Pin-to-pin functional compatible to LTC4065LX
- Temperature Range: -40°C to +85°C



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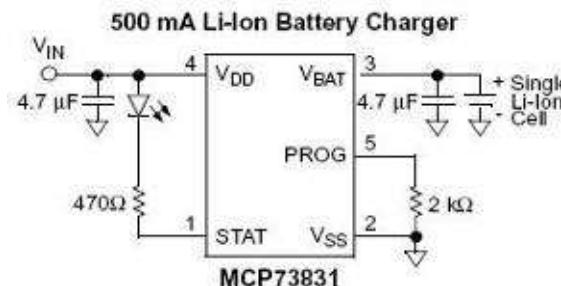
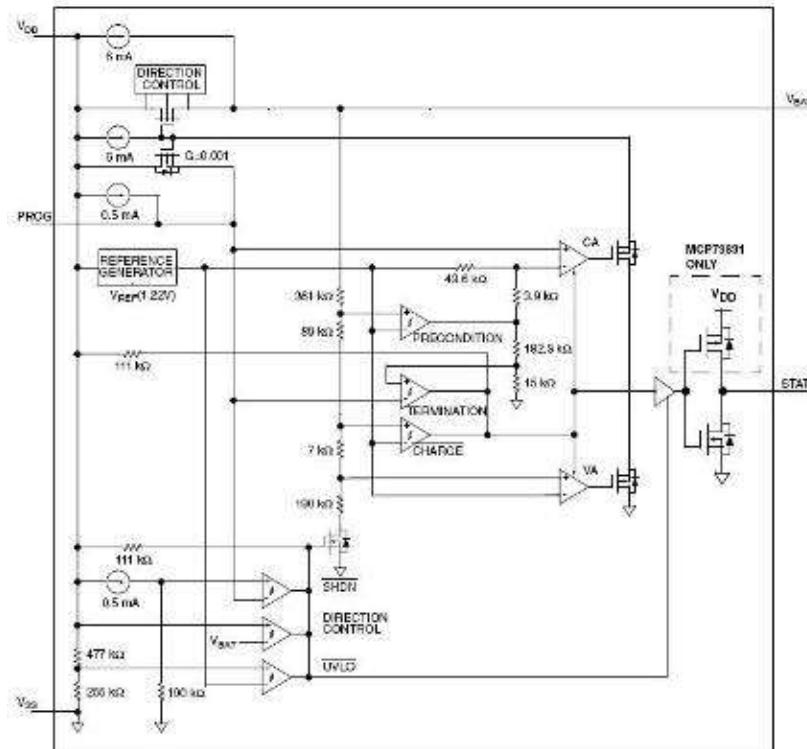
MICROCHIP

MCP73831/2

Online
Datasheet

Features:

- Linear Charge Management Controller:
 - Integrated Pass Transistor
 - Integrated Current Sense
 - Reverse Discharge Protection
- High Accuracy Preset Voltage Regulation: $\pm 0.75\%$
- Four Voltage Regulation Options:
4.20V, 4.35V, 4.40V, 4.50V
- Programmable Charge Current: 15mA to 500mA
- Selectable Preconditioning: 10%, 20%, 40%, or Disable
- Selectable End-of-Charge Control:
5%, 7.5%, 10%, or 20%
- Charge Status Output
 - Tri-State Output - **MCP73831**
 - Open-Drain Output - **MCP73832**
- Automatic Power-Down
- Thermal Regulation
- Temperature Range: -40°C to $+85^{\circ}\text{C}$
- Packaging: 8-Pin, 2x3 mm DFN, 5-Lead, SOT-23



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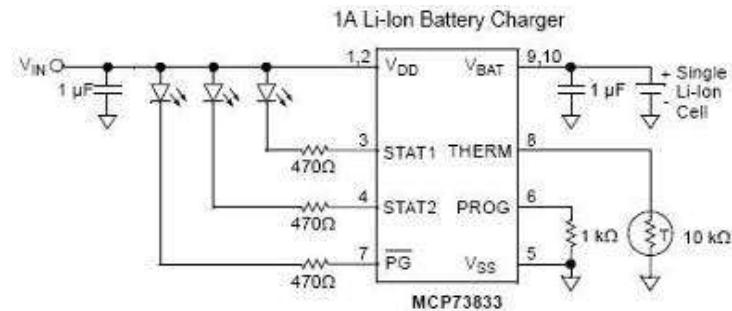
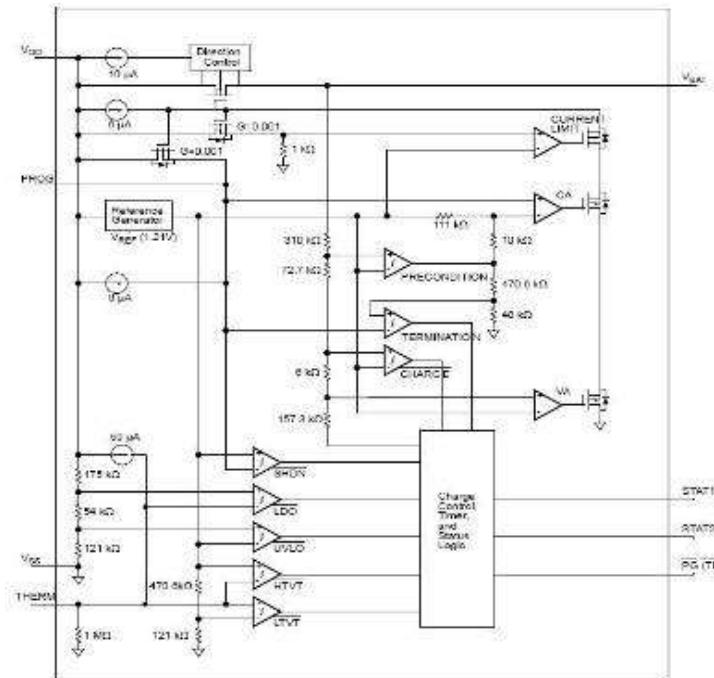
MICROCHIP

MCP73833/4

Online
Datasheet

Features:

- Complete Linear Charge Management Controller:
Integrated Pass Transistor, Current Sense and
Reverse Discharge Protection
- Constant Current / Constant Voltage Operation
with Thermal Regulation
- High Accuracy Preset Voltage Regulation:
4.2V, 4.35V, 4.4V, or 4.5V, $\pm 0.75\%$
- Programmable Charge Current: 1A (max.)
- Preconditioning of Deeply Depleted Cells
 - Selectable Current Ratio
 - Selectable Voltage Threshold
- Automatic End-of-Charge Control
 - Selectable Current Threshold
 - Selectable Safety Time Period
- Automatic Recharge
 - Selectable Voltage Threshold
- Two Charge Status Outputs
- Cell Temperature Monitor
- Low-Dropout Linear Regulator Mode
- Automatic Power-Down when Input Power Removed
- Under Voltage Lockout
- Available Packages: 3mm x 3mm DFN-10, MSOP-10



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MICROCHIP

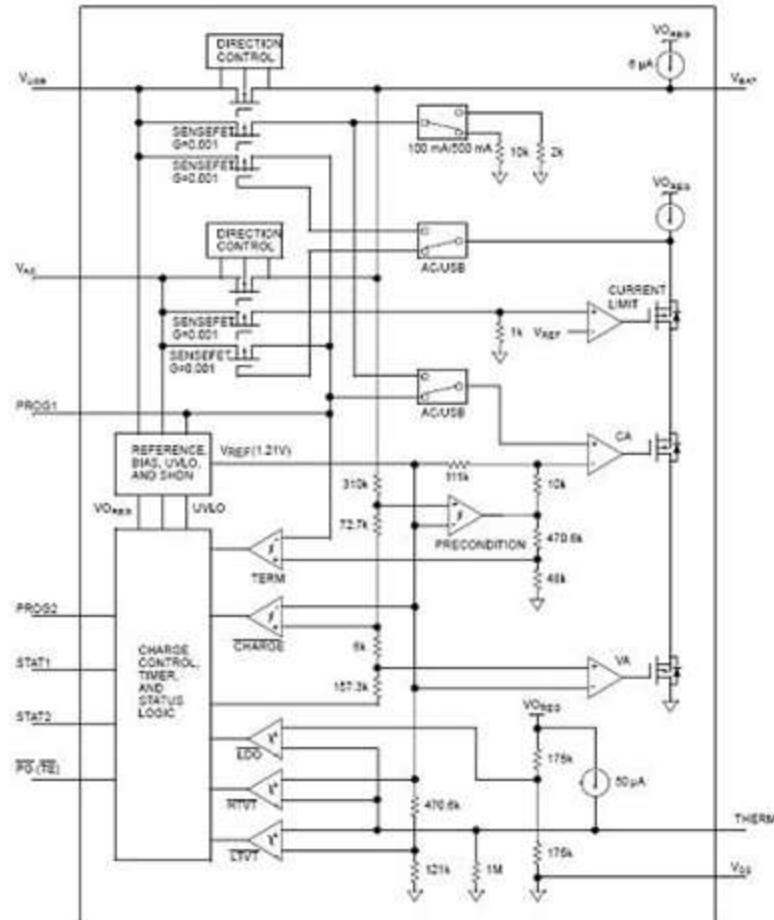
MCP73837/8

Online
Datasheet

Features:

- High Accuracy Preset Voltage Regulation: + 0.5%
- Available Voltage Regulation Options: 4.20V, 4.35V, 4.4V, or 4.5V
- Complete Linear Charge Management Controller:
 - Autonomous Power Source Selection
 - Integrated Pass Transistors
 - Integrated Current Sense
 - Integrated Reverse Discharge Protection
- Constant Current (CC) / Constant Voltage (CV) Operation with Thermal Regulation
- Selectable USB-Port Charge Current:
 - Low: 1 Unit Load / High: 5 Unit Loads
- Programmable AC-Adapter Charge Current: 15mA to 1000mA
- Two Charge Status Outputs
- Power-Good Monitor: MCP73837
- Timer Enable: MCP73838
- Automatic Recharge:
 - Selectable Voltage Threshold
- Automatic End-of-Charge Control:
 - Selectable Charge Termination Current Ratio
 - Selectable Safety Timer Period
- Preconditioning of Deeply Depleted Cells - can be disabled
- Battery Cell Temperature Monitor
- UVLO (Undervoltage Lockout)
- Automatic Power-Down when Input Power is Removed
- Low-Dropout (LDO) Linear Regulator Mode
- Temperature Range: -40°C to 85°C
- Packaging:
 - 10-Lead 3 mm x 3 mm DFN, 10-Lead MSOP

Functional Block Diagram (MCP73837/8)



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MICROCHIP

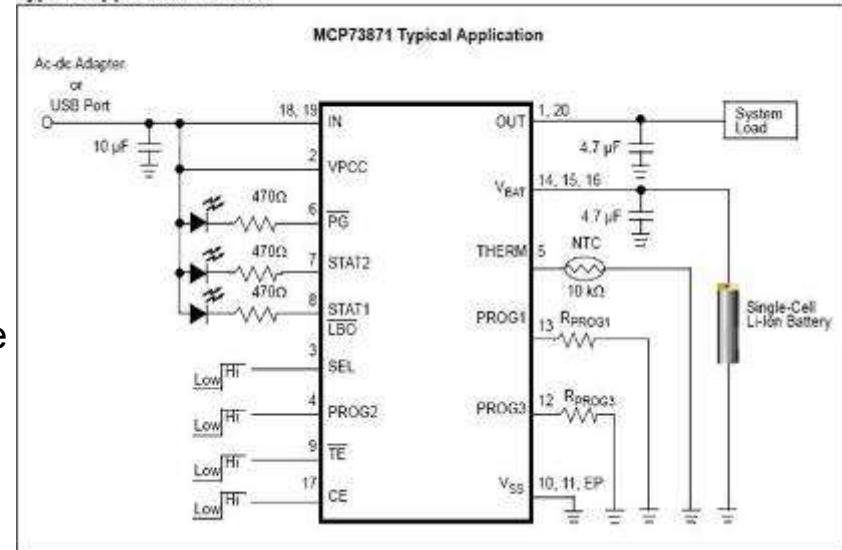
MCP73871

Online
Datasheet

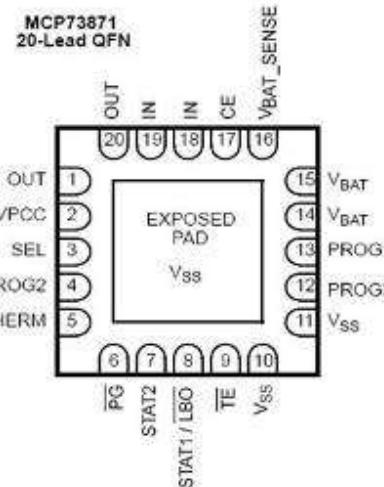
Features:

- Integrated System Load Sharing and Battery Charge Management
 - Simultaneously Power the System and Charge the Li-Ion Battery
 - Resistor Programmable Fast Charge Current: 50mA to 1A
- Integrated Pass Transistors, Current Sense and Reverse Discharge Protection
- Selectable Input Power Sources: USB Port or AC-DC Wall Adapter
- Preset High Accuracy Charge Voltage Options: 4.10V, 4.20V, 4.35V or 4.40V
- Regulation Tolerance: $\pm 0.5\%$ (typ.)
- 0.1°C Preconditioning for Deeply Depleted Cells
- Resistor Programmable Termination Set Point
- Automatic Recharge and End-of-Charge Control
- Safety Timer With Timer Enable/Disable Control
- Battery Cell Temperature Monitor
- Undervoltage Lockout (UVLO)
- Low Battery Status Indicator (LBO)
- Power-Good Status Indicator (PG)
- Temperature Range: -40°C to 85°C
- Packaging: 20-Lead QFN (4 mm x 4 mm)

Typical Application Circuit



MCP73871
20-Lead QFN



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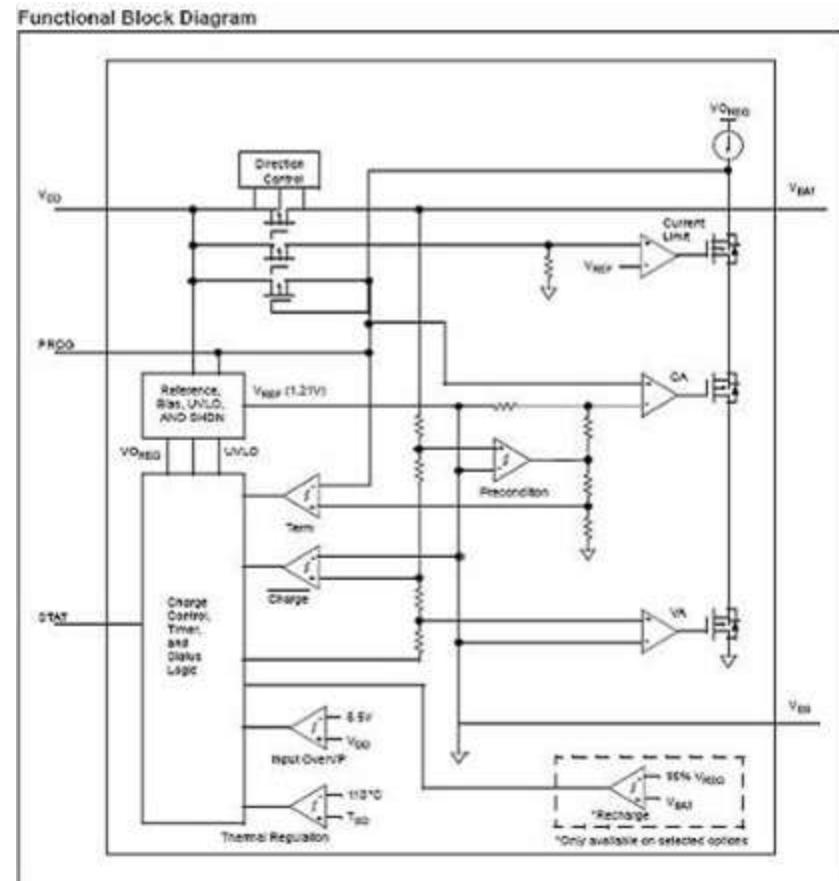
MICROCHIP

MCP73113/4

Online
Datasheet

Features:

- Complete Linear Charge Management Controller:
 - **Integrated Input Overvoltage Protection**
 - Integrated Pass Transistor
 - Integrated Current Sense
 - Integrated Reverse Discharge Protection
- Constant Current / Constant Voltage Operation with Thermal Regulation
- 4.15V Undervoltage Lockout (UVLO)
- **18V Absolute Maximum Input with OVP: 6.5V(MCP738113) and 5.8V (MCP738114)**
- High Accuracy Preset Voltage Regulation Through Full Temperature Range (-5°C to 55°C): $\pm 0.5\%$
- Battery Charge Voltage Options: 4.10V, 4.20V, 4.35V or 4.4V
- Resistor Programmable Fast Charge Current: 130mA to 1100mA
- Preconditioning of Deeply Depleted Cells
- Integrated Precondition Timer
- Automatic End-of-Charge Control:
- Automatic Recharge: Available Options: 95% or Disable
- Charge Status Output - Two Style Options
- Soft start
- Temperature Range: -40°C to +85°C
- Packaging: DFN-10 (3 mm x 3 mm)

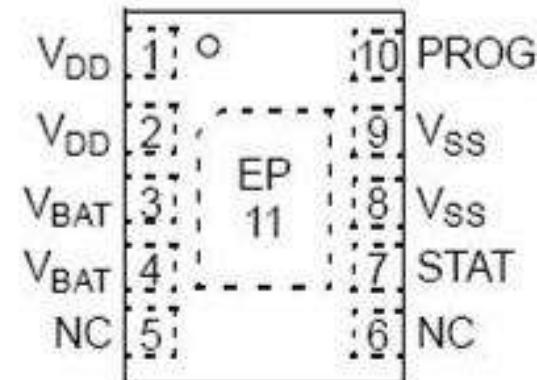


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Features:

- Complete Linear Charge Management Controller:
 - Integrated Input Overvoltage Protection, Pass Transistor, Current Sense, Reverse Discharge Protection
- Constant Current / Constant Voltage Operation w/ Thermal Regulation
- 4.15V Undervoltage Lockout (UVLO)
- 18V Absolute Maximum Input with OVP:
 - 6.5V (MCP73123) and 13V (MCP73223)
- High Accuracy Preset Voltage Regulation Through Full Temperature Range (-5°C to +55°C):
 - ±0.5% (MCP73123) and ±0.6% (MCP73223)
- Battery Charge Voltage Options:
 - 3.6V (MCP73123) and 7.2V (MCP73223)
- Resistor Programmable Fast Charge Current: 30mA to 1100mA
- Preconditioning of Deeply Depleted Cells: Avail Options: 10% or Disable
- Integrated Precondition Timer: 32 Minutes or Disable
- Automatic End-of-Charge Control:
 - Selectable Minimum Current Ratio: 5%, 7.5%, 10% or 20%
 - Elapse Safety Timer: 4 HR, 6 HR, 8 HR or Disable
- Automatic Recharge: Available Options: 95% or Disable
- Factory Preset Charge Status Output: On/Off or Flashing
- Soft Start
- Temperature Range: -40°C to +85°C
- Packaging: DFN-10 (3 mm x 3 mm)

MCP73123/223
3x3 DFN *





MICROCHIP

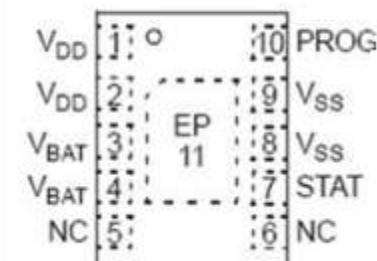
MCP73213

Online
Datasheet

Features:

- Complete Linear Charge Management Controller:
 - Integrated Input Overvoltage Protection, Pass Transistor, Current Sense, Reverse Discharge Protection
- Constant Current / Constant Voltage Operation w/Thermal Regulation
- 4.15V Undervoltage Lockout (UVLO)
- 13V Input Overvoltage Protection
- High Accuracy Preset Voltage Regulation
 - Through Full Temperature Range (-5°C to +55°C): $\pm 0.6\%$
- Battery Charge Voltage Options: 8.20V, 8.40V, 8.7V or 8.8V
- Resistor Programmable Fast Charge Current: 130mA to 1100mA
- Preconditioning of Deeply Depleted Cells: 10% or Disable
- Integrated Precondition Timer: 32 Minutes or Disable
- Automatic End-of-Charge Control:
 - Selectable Minimum Current Ratio: 5%, 7.5%, 10% or 20%
 - Elapse Safety Timer: 4 HR, 6 HR, 8 HR or Disable
- Automatic Recharge: Available Options: 95% or Disable
- Factory Preset Charge Status Output: On/Off or Flashing
- Soft Start
- Temperature Range: -40°C to +85°C
- Packaging: DFN-10 (3 mm x 3 mm)

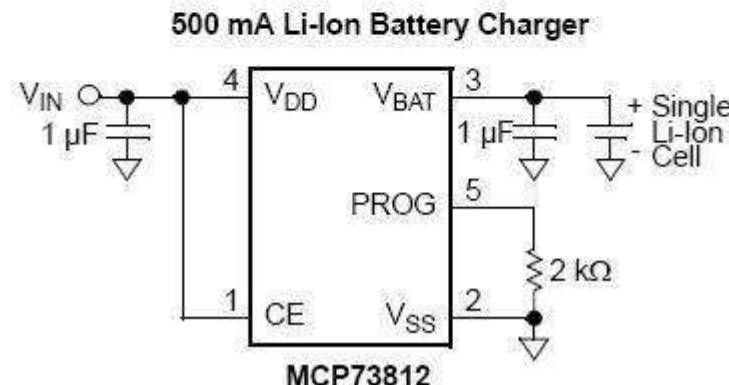
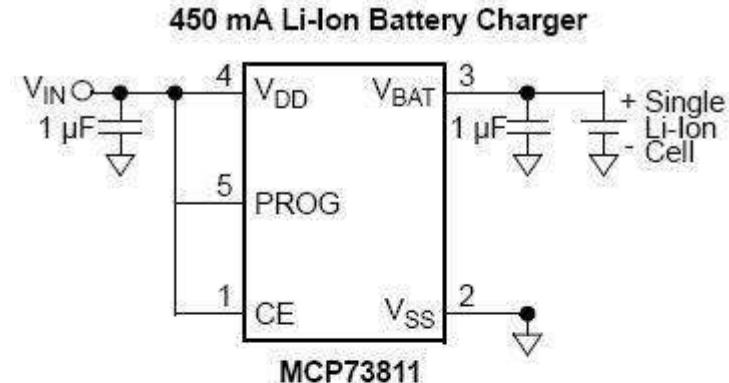
MCP73213
3x3 DFN *



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Features:

- Complete Linear Charge Management Controller
 - Integrated Pass Transistor
 - Integrated Current Sense
 - Integrated Reverse Discharge Protection
- Constant Current / Constant Voltage Operation with Thermal Regulation
- High Accuracy Preset Voltage Regulation: $\pm 1\%$
- Voltage Regulation: 4.20V
- Selectable Charge Current:
 - **MCP73811**: 85mA / 450mA
- Programmable Charge Current:
 - **MCP73812**: 50mA to 500mA
- Minimum External Components Required:
 - **MCP73811**: 2 Ceramic Capacitors
 - **MCP73812**: 2 Ceramic Capacitors and 1 Resistor
- No Preconditioning
- External End-of-Charge Control
- Automatic Power-Down when Input Power Removed
- Active High Charge Enable
- Temperature Range: -40°C to +85°C
- Packaging: 5-Lead SOT-23





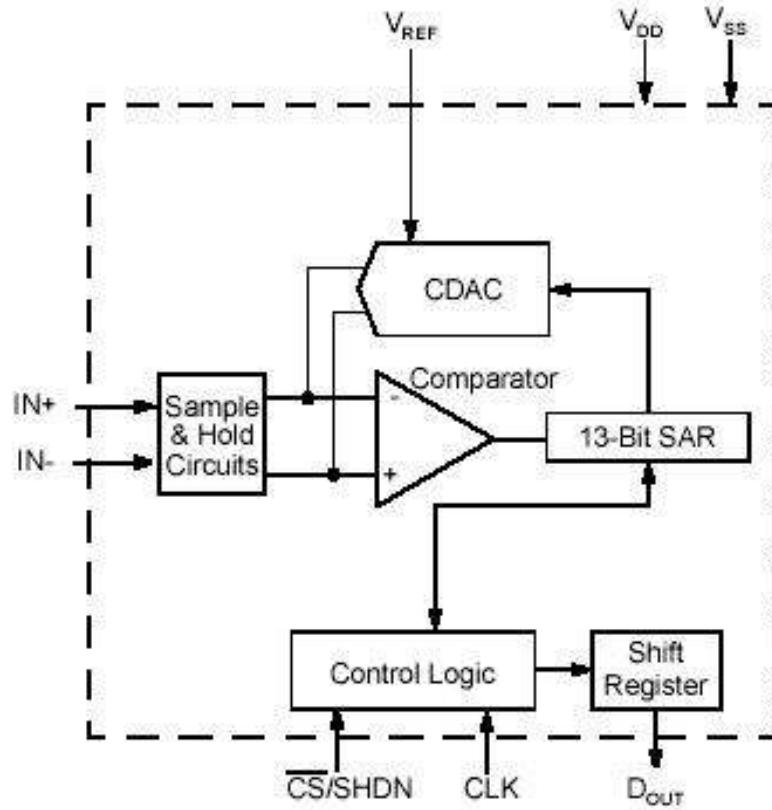
MICROCHIP

MCP3301

Online
Datasheet

Features:

- Full Differential Inputs
- 13-bit Resolution
- ± 1 LSB (max.) DNL
- ± 1 LSB (max.) INL (MCP3301-B)
- ± 2 LSB (max.) INL (MCP3301-C)
- Single Supply Operation: 2.7V to 5.5V
- 100 ksps Sampling Rate with 5V Supply Voltage
- 50 ksps Sampling Rate with 2.7V Supply Voltage
- 50nA (typ.) Standby Current
- 450 μ A (max.) Active Current at 5V
- Industrial Temperature Range: -40°C to +85°C
- 8-Pin MSOP, PDIP and SOIC Packages
- MXDEV™ Evaluation Kit Available



[MCP3302/4 >>](#)

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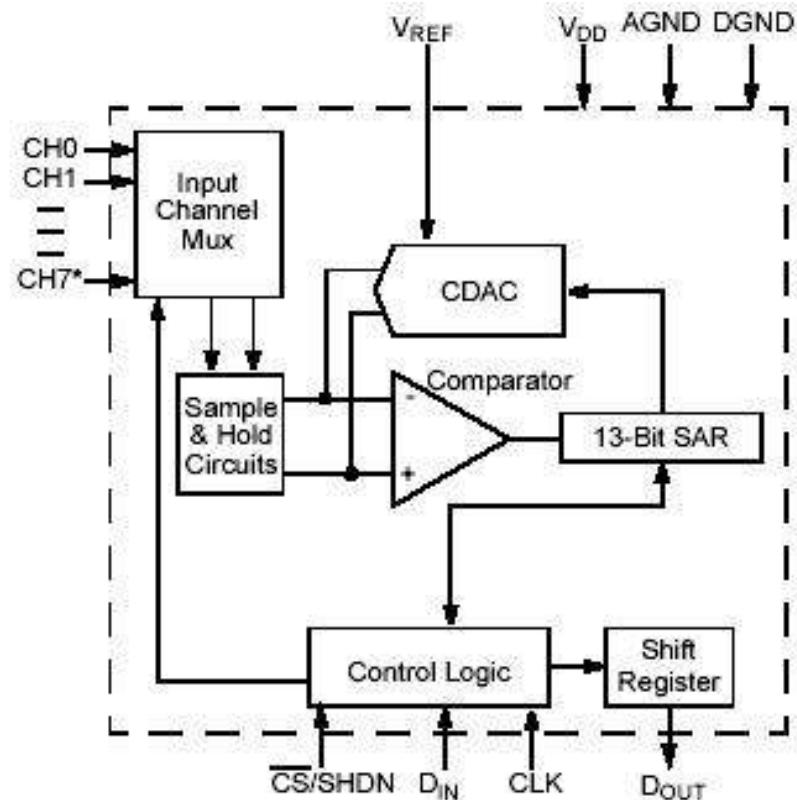
MICROCHIP

MCP3302/4

Online
Datasheet

Features:

- Full Differential Inputs
- 13-bit Resolution
- MCP3302: 2 Differential or 4 Single Ended Inputs
- MCP3304: 4 Differential or 8 Single Ended Inputs
- ± 1 LSB (max.) DNL
- ± 1 LSB (max.) INL (MCP3302/04-B)
- ± 2 LSB (max.) INL (MCP3302/04-C)
- Single Supply Operation: 2.7V to 5.5V
- 100 ksps Sampling Rate with 5V Supply Voltage
- 50 ksps Sampling Rate with 2.7V Supply Voltage
- 50nA (typ.) Standby Current
- 450 μ A (max.) Active Current at 5V
- Industrial Temperature Range: -40°C to +85°C
- 14 and 16-Pin PDIP, SOIC and TSSOP Packages
- MXDEV™ Evaluation Kit Available



* Channels 5-7 available on MCP3304 Only

[MCP3301 >>](#)

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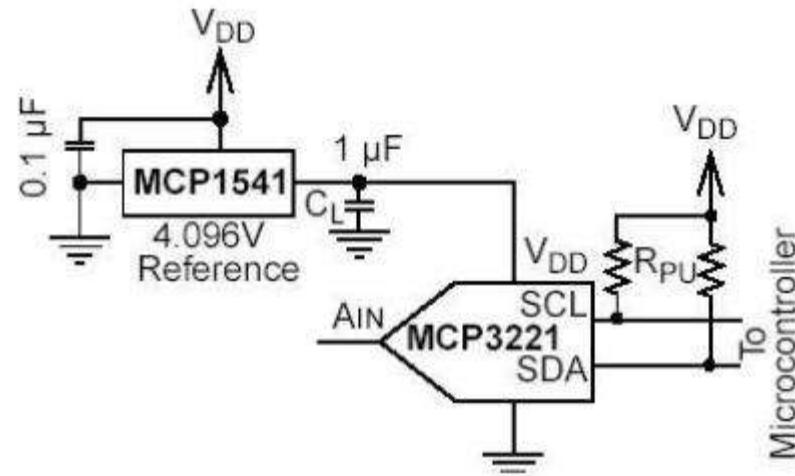
MICROCHIP

MCP3221

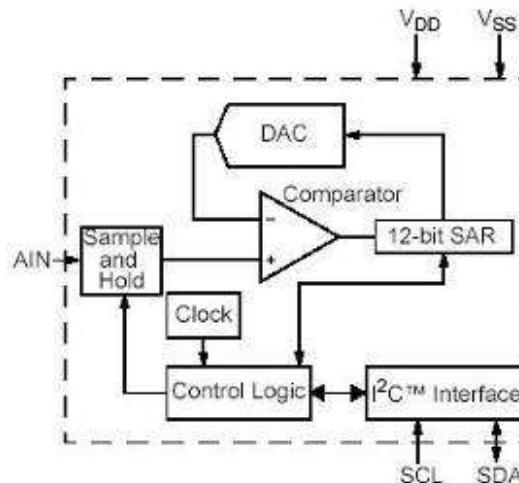
Online
Datasheet

Features:

- 12-bit Resolution
- ± 1 LSB DNL, ± 2 LSB INL (max.)
- 250 μ A (max.) Conversion Current
- 5nA (typ.) Standby Current
- I²C™ Compatible Serial Interface:
 - 100 kHz Standard Mode
 - 400 kHz Fast Mode
- Up to 8 Devices on a Single 2-Wire Bus
- Single-Ended Analog Input Channel
- On-Chip Sample and Hold
- On-Chip Conversion Clock
- Single-Supply: 2.7V to 5.5V
- Temperature Range:
 - Industrial: -40°C to +85°C
 - Extended: -40°C to +125°C
- Small SOT-23 Package



Stable Power and Reference Configuration



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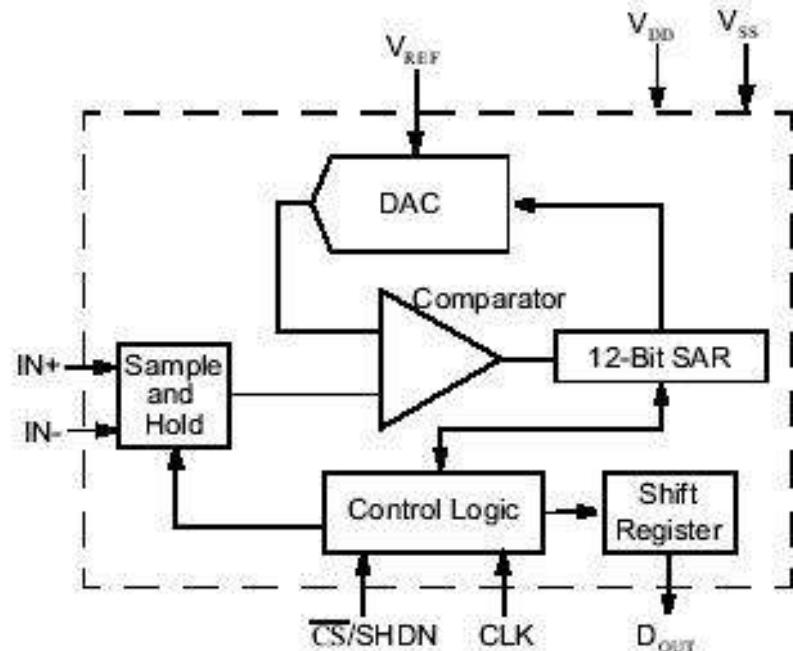
MICROCHIP

MCP3201

Online
Datasheet

Features:

- 12-bit Resolution
- ± 1 LSB (max.) DNL
- ± 1 LSB (max.) INL (MCP3301-B)
- ± 2 LSB (max.) INL (MCP3301-C)
- SPI Serial Interface: Modes 0,0 and 1,1
- Single Supply Operation: 2.7V to 5.5V
100 ksps (max.) Sampling Rate at 5V
50 ksps (max.) Sampling Rate at 2.7V
- 500nA (typ.) Standby Current
- 400 μ A (max.) Active Current at 5V
- On-Chip Sample and Hold
- Industrial Temperature Range: -40°C to +85°C
- 8-Pin MSOP, PDIP, SOIC and TSSOP
Packages



[MCP3204/8 >>](#)

[MCP3202 >>](#)

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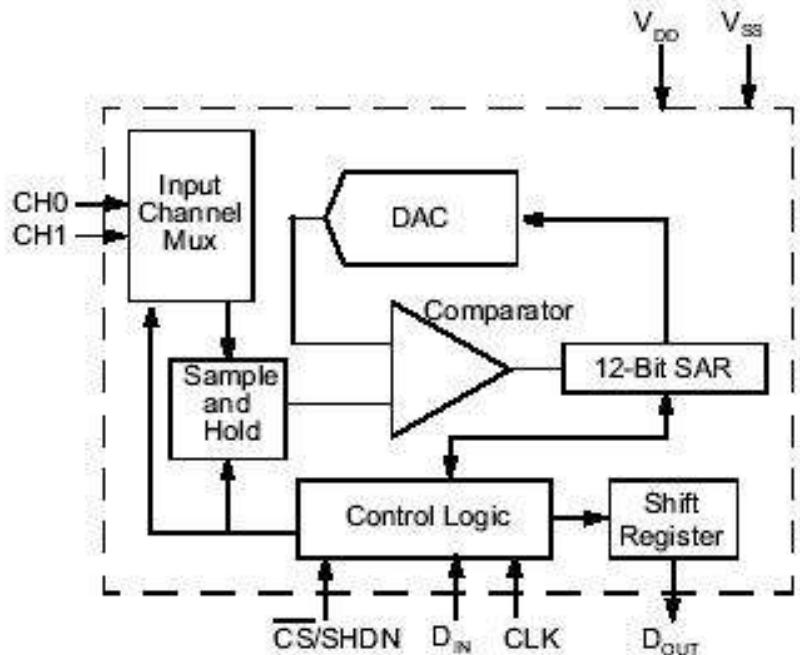
MICROCHIP

MCP3202

Online
Datasheet

Features:

- 12-bit Resolution
- ± 1 LSB (max.) DNL
- ± 1 LSB (max.) INL (MCP3302-B)
- ± 2 LSB (max.) INL (MCP3302-C)
- 2 Input Channels
- Analog Inputs Programmable as Single-Ended or Pseudo-Differential Pairs
- SPI Serial Interface: Modes 0,0 and 1,1
- Single Supply Operation: 2.7V to 5.5V
 - 100 ksps (max.) Sampling Rate at 5V
 - 50 ksps (max.) Sampling Rate at 2.7V
- 500nA (typ.) Standby Current
- 550 μ A (max.) Active Current at 5V
- On-Chip Sample and Hold
- Industrial Temperature Range: -40°C to +85°C
- 8-Pin MSOP, PDIP, SOIC and TSSOP Packages



[MCP3204/8 >>](#)

[MCP3201 >>](#)

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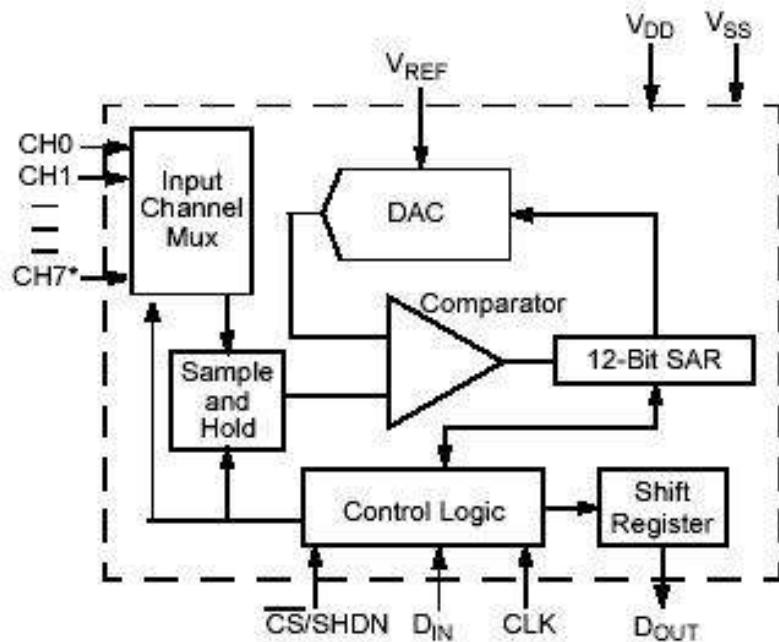
MICROCHIP

MCP3204/8

Online
Datasheet

Features:

- 12-bit Resolution
- ± 1 LSB (max.) DNL
- ± 1 LSB (max.) INL (MCP3304/08-B)
- ± 2 LSB (max.) INL (MCP3304/08-C)
- 4 (MCP3204) or 8 (MCP3208) Input Channels
- Analog Inputs Programmable as Single-Ended or Pseudo-Differential Pairs
- SPI Serial Interface: Modes 0,0 and 1,1
- Single Supply Operation: 2.7v to 5.5V
- 100 ksps (max.) Sampling Rate at 5V
- 50 ksps (max.) Sampling Rate at 2.7V
- 500nA (typ.) Standby Current
- 400 μ A (max.) Active Current at 5V
- On-Chip Sample and Hold
- Industrial Temperature Range: -40°C to +85°C
- PDIP, SOIC and TSSOP Packages



* Note: Channels 5-7 available on MCP3208 Only

[MCP3202 >>](#)

[MCP3201 >>](#)

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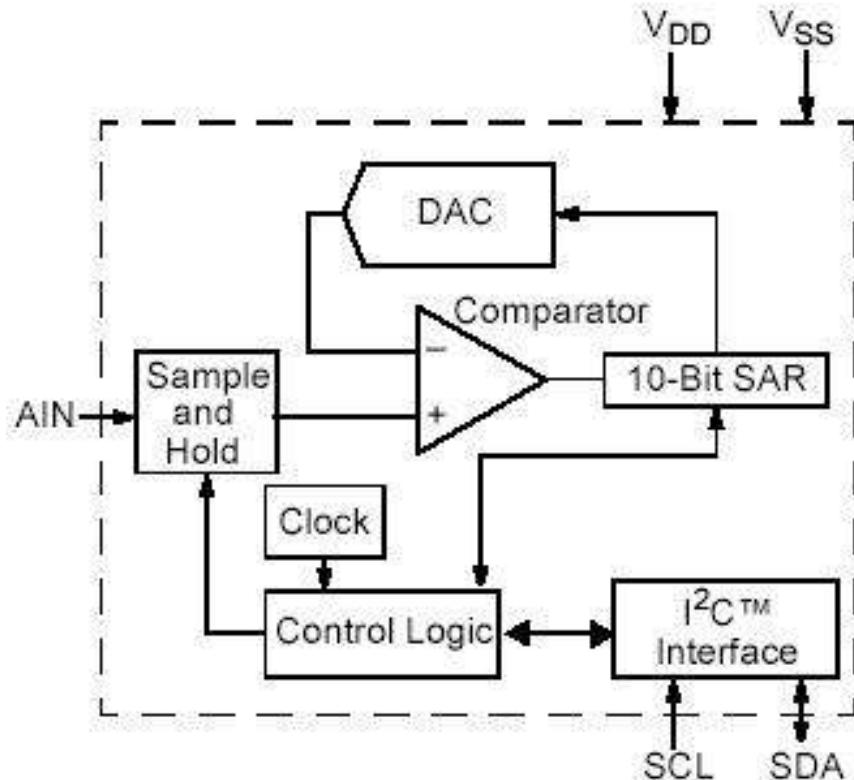
MICROCHIP

MCP3021

Online
Datasheet

Features:

- 10-bit Resolution
- Singly Supply: 2.7V to 5.5V
- ± 1 LSB DNL, ± 1 LSB INL (max.)
- 250 μ A (max.) Conversion Current
- 5nA (typ.) Standby Current, 1 μ A (max.)
- I²CTM Compatible Serial Interface
 - 100 kHz Standard Mode
 - 400 kHz Fast Mode
- 22.3 ksps in Fast Mode
- Up to 8 Devices on Single 2-Wire Bus
- Single-Ended Analog Input Channel
- On-Chip Sample and Hold
- On-Chip Conversion Clock
- Extended Temperature Range:
-40°C to +125°C
- Small SOT-23 Package



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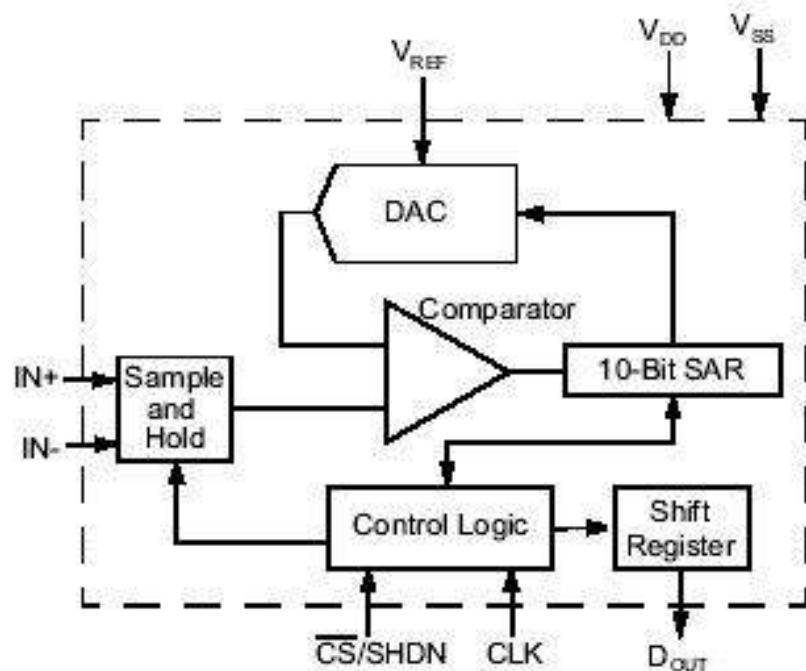
MICROCHIP

MCP3001

Online
Datasheet

Features:

- 10-bit Resolution
- Singly Supply: 2.7V to 5.5V
 - 200 ksps Sampling Rate at 5V
 - 75 ksps Sampling Rate at 2.7V
- ± 1 LSB DNL, ± 1 LSB INL (max.)
- SPI Serial Interface: modes 0,0 and 1,1
- On-Chip Sample and Hold
- Low Power CMOS Technology:
 - 5nA (typ.) Standby Current, 2 μ A (max.)
 - 500 μ A (max.) Active Current at 5V
- Industrial Temperature Range:
 - 40°C to +85°C
- Space Saving 8-Pin SOIC, MSOP, TSSOP and PDIP Packages



[MCP3004/8 >>](#)

[MCP3002 >>](#)

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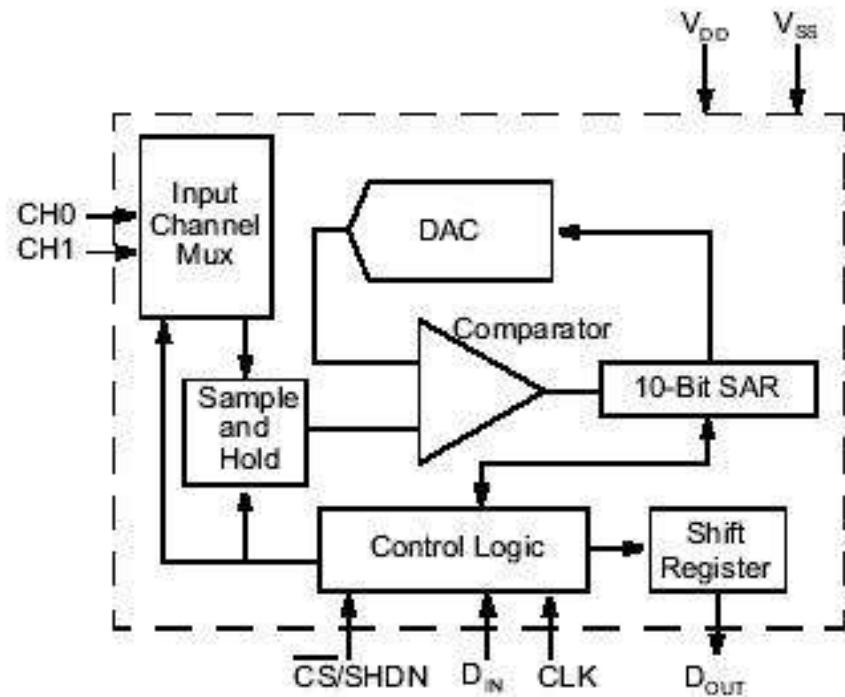
MICROCHIP

MCP3002

Online
Datasheet

Features:

- 10-bit Resolution
- Singly Supply: 2.7V to 5.5V
200 ksps Sampling Rate at 5V
75 ksps Sampling Rate at 2.7V
- ± 1 LSB DNL, ± 1 LSB INL (max.)
- Analog Inputs:
Single-Ended or Pseudo-Differential Pairs
- SPI Serial Interface: modes 0,0 and 1,1
- On-Chip Sample and Hold
- Low Power CMOS Technology:
5nA (typ.) Standby Current, 2 μ A (max.)
550 μ A (max.) Active Current at 5V
- Industrial Temperature Range:
-40°C to +85°C
- Space Saving 8-Pin SOIC, MSOP, TSSOP
and PDIP Packages



[MCP3004/8 >>](#)

[MCP3001 >>](#)

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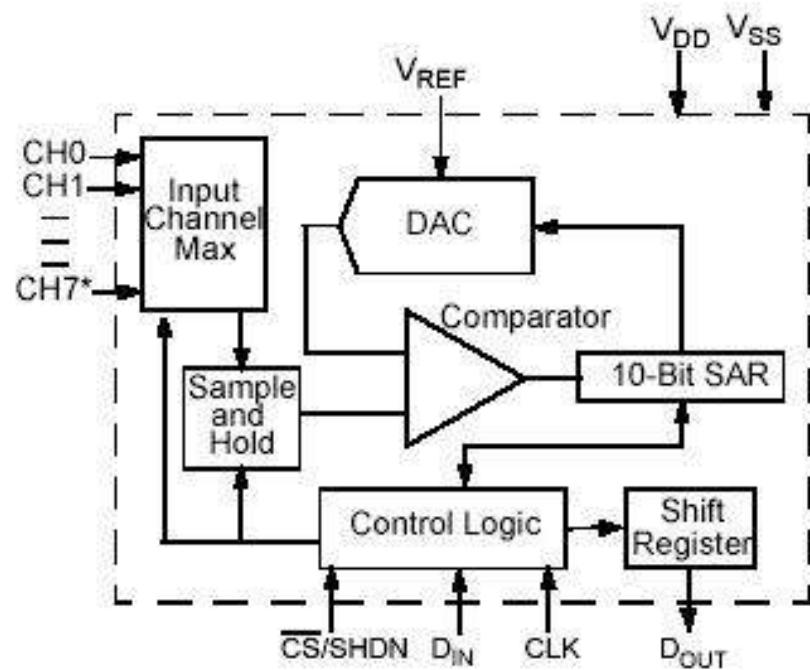
MICROCHIP

MCP3004/8

Online
Datasheet

Features:

- 10-bit Resolution
- Singly Supply: 2.7V to 5.5V
- 200 ksps Sampling Rate at 5V
- 75 ksps Sampling Rate at 2.7V
- 4 (MCP3004) or 8 (MCP3008) Input Channels
- ± 1 LSB DNL, ± 1 LSB INL (max.)
- Analog Inputs:
Single-Ended or Pseudo-Differential Pairs
- SPI Serial Interface: modes 0,0 and 1,1
- On-Chip Sample and Hold
- Low Power CMOS Technology:
5nA (typ.) Standby Current, 2 μ A (max.)
500 μ A (max.) Active Current at 5V
- Industrial Temperature Range:
-40°C to +85°C
- SOIC, TSSOP and PDIP Packages



* Note: Channels 4-7 available on MCP3008 Only

[MCP3002 >>](#)

[MCP3001 >>](#)

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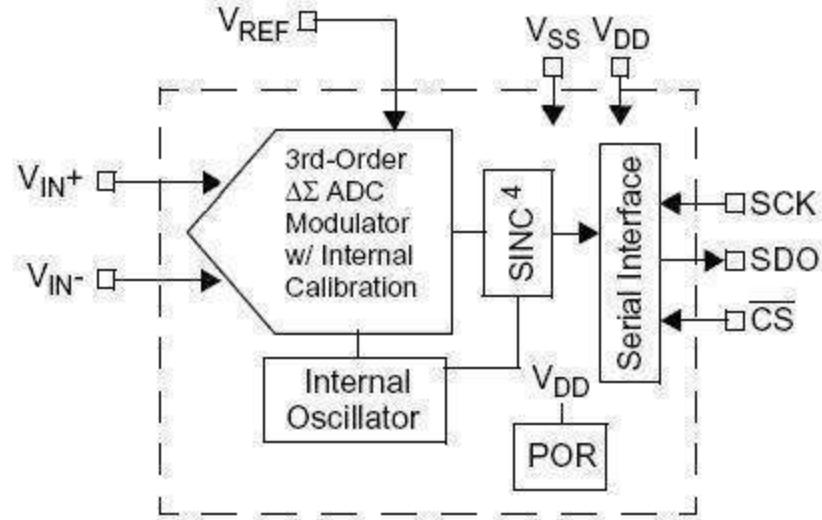
MICROCHIP

MCP3550/1/3

Online
Datasheet

Features:

- 22-bit ADC in Small 8-pin MSOP Package
- Ultra-Low Conversion Current (MCP3550/1):
 - 100 μ A (typ.) ($V_{DD} = 2.7V$)
 - 120 μ A (typ.) ($V_{DD} = 5.0V$)
- Low-Output Noise of 2.5 μ V_{RMS} with Effective Resolution of 21.9 bits (MCP3550/1)
- Offset Error: 3 μ V (typ.)
- Full Scale Error: 2ppm (typ.)
- INL Error: 6ppm (max.)
- Total Unadjusted Error Less Than 10ppm
- Data rate
 - MCP3550/1: 15sps
 - MCP3553: 60sps
- No Digital Filter Settling Time, Single-Command Conversions through 3-wire SPI Interface
- 50/60Hz Rejection (MCP3550/1)
- Differential Input with V_{SS} to V_{DD} Common Mode Range
- 2.7V to 5.5V Single-Supply Operation
- Extended Temperature Range: -40°C to +125°C



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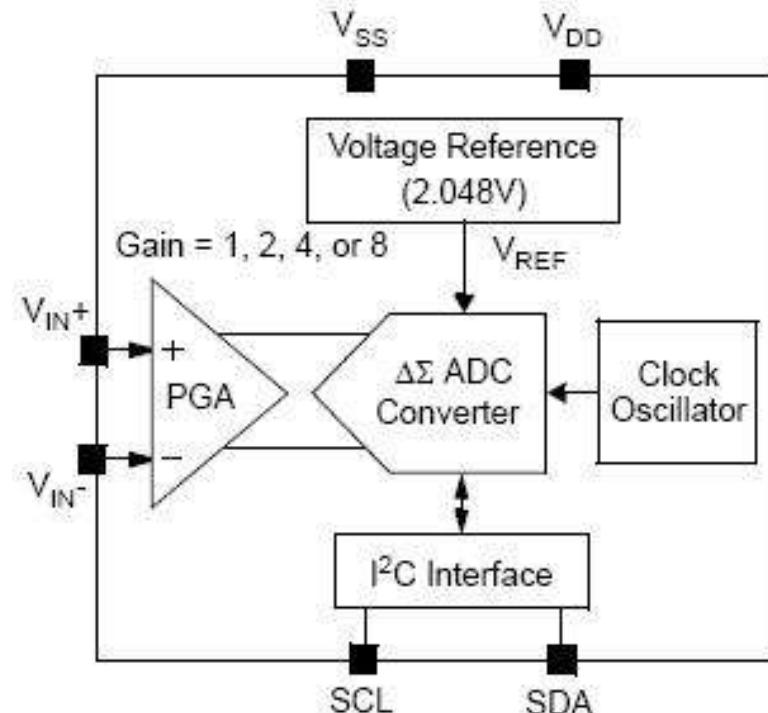
MICROCHIP

MCP3421

Online
Datasheet

Features:

- 18-bit $\Delta\Sigma$ ADC in a SOT-23-6 package
- On-board Voltage Reference
- On-board Programmable Gain Amplifier:
Gains of 1, 2, 4 or 8
- One-Shot or Continuous Conversion
- Low current consumption:
 $145\mu\text{A}$ (typ.), $V_{DD} = 3\text{V}$, Continuous
 $39\mu\text{A}$ (typ.), $V_{DD} = 3\text{V}$, One-Shot
- Programmable Data Rate Options:
3.75 sps (18 bits), 15 sps (16 bits),
60 sps (14 bits), 240 sps (12 bits)
- INL: 10ppm of FSR (FSR = $4.096\text{V}/\text{PGA}$)
- Self Calibration of Internal Offset and Gain
per each Conversion
- Differential Input Operation
- Supports I²C™ Serial Interface:
Standard, Fast and High Speed Modes
- Single Supply Operation: 2.7V to 5.5V
- On-board Oscillator
- Extended Temperature Range: -40°C to 125°C



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MICROCHIP

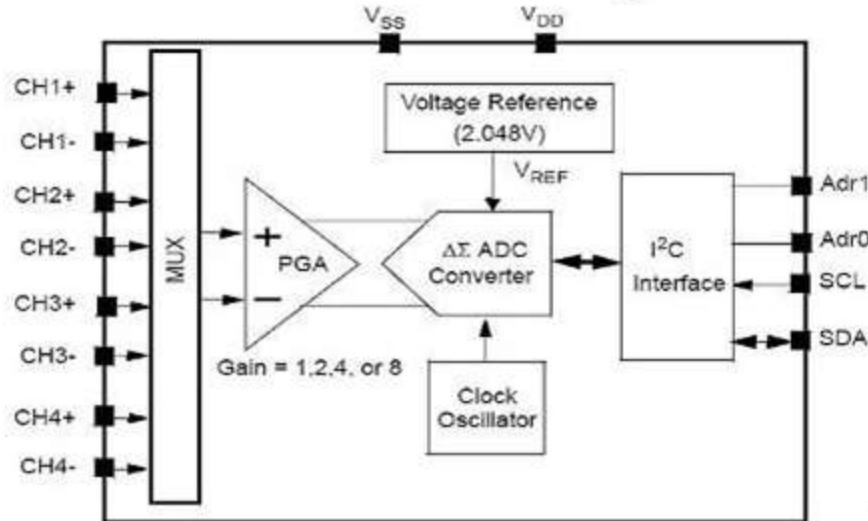
MCP3422/3/4

Online
Datasheet

Features:

- 18-bit $\Delta\Sigma$ ADC
- Multi-Channel inputs
 - 2-channel (MCP3422/3)
 - 4-channel (MCP3424)
- On-board Voltage Reference
- On-board Programmable Gain Amplifier:
Gains of 1, 2, 4 or 8
- One-Shot or Continuous Conversion
- Low current consumption:
 $145\mu\text{A}$ (typ.), $V_{DD} = 3\text{V}$, Continuous
 $39\mu\text{A}$ (typ.), $V_{DD} = 3\text{V}$, One-Shot
- Programmable Data Rate Options:
3.75 sps (18 bits), 15 sps (16 bits),
60 sps (14 bits), 240 sps (12 bits)
- INL: 10ppm of FSR (FSR = $4.096\text{V}/\text{PGA}$)
- Self Calibration of Internal Offset and Gain
per each Conversion
- Differential Input Operation
- Supports I²C™ Serial Interface
 - User-selectable addressing (MCP3423/4)
- Single Supply Operation: 2.7V to 5.5V
- Extended Temperature Range: -40°C to 125°C

Functional Block Diagram



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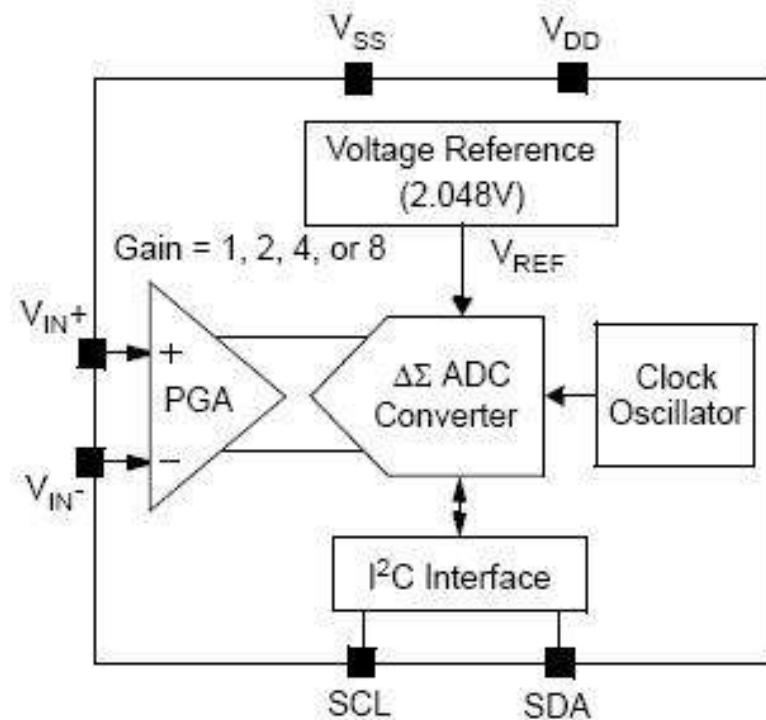
MICROCHIP

MCP3425

Online
Datasheet

Features:

- 16-bit $\Delta\Sigma$ ADC in a SOT-23-6 package
- Differential Input Operation
- Self Calibration of Internal Offset and Gain per each Conversion
- On-board Voltage Reference Accuracy: $2.048V \pm 0.05\%$
- On-board Programmable Gain Amplifier: Gains of 1, 2, 4 or 8
- On-board Oscillator
- INL: 10ppm of FSR (FSR = $4.096V/\text{PGA}$)
- Programmable Data Rate Options
 - 15 sps (16 bits), 60 sps (14 bits), 240 sps (12 bits)
- One-Shot or Continuous Conversion options
- One-Shot Conversion
 - $9.7\mu\text{A}$ (typ.) with 16-bit mode
 - $2.4\mu\text{A}$ (typ.) with 14-bit mode
 - $0.6\mu\text{A}$ (typ.) with 12-bit mode
- Low current consumption:
 - $145\mu\text{A}$ typical ($V_{DD} = 3V$, Continuous)
- Supports I²C™ Serial Interface:
 - Standard, Fast and High Speed Modes
- Single Supply Operation: 2.7V to 5.5V
- Extended Temperature Range: -40°C to 125°C



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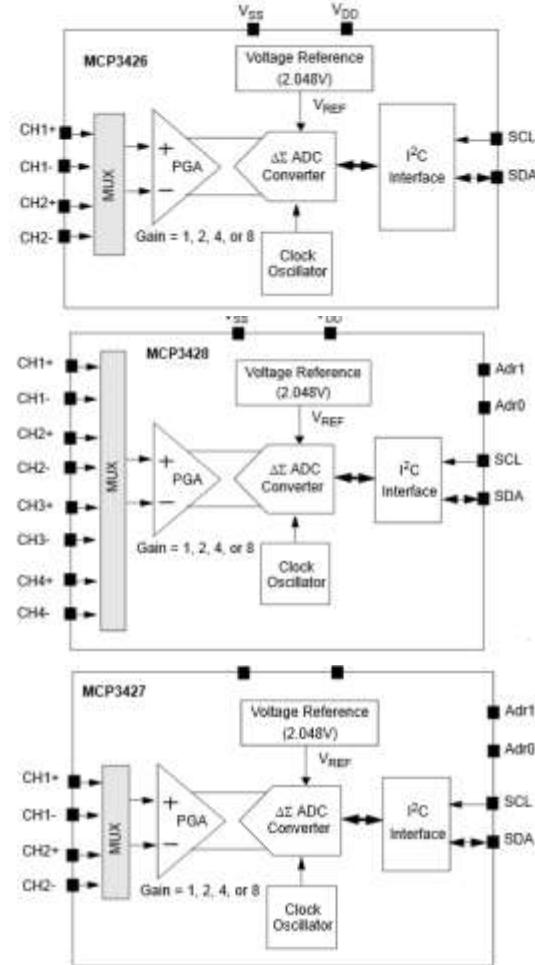
MICROCHIP

MCP3426/7/8

Online
Datasheet

Features:

- 16-bit $\Delta\Sigma$ ADC
 - 2 channels: MCP3426 and MCP3427
 - 4 channels: MCP3428
- Differential Input Full Scale Range Operation
- Self Calibration of Internal Offset and Gain per each Conversion
- On-board Voltage Reference: Accuracy: $2.048V \pm 0.05\%$
- On-board Programmable Gain Amplifier: Gains of 1, 2, 4 or 8
- On-board Oscillator
- INL: 10ppm of FSR
- Programmable Data Rate Options
 - 5 sps (16 bits), 60 sps (14 bits), 240 sps (12 bits)
- One-Shot or Continuous Conversion options
- One-Shot Conversion
 - 9 μA (typ.) with 16-bit mode
 - 2.25 μA (typ.) with 14-bit mode
 - 0.56 μA (typ.) with 12-bit mode
- Low current consumption:
 - 135 μA typical ($V_{DD} = 3V$, Continuous)
- Supports I²C™ Serial Interface:
 - User configurable address pins (MCP3427/MCP3428)
- Single Supply Operation: 2.7V to 5.5V
- Extended Temperature Range: -40°C to 125°C



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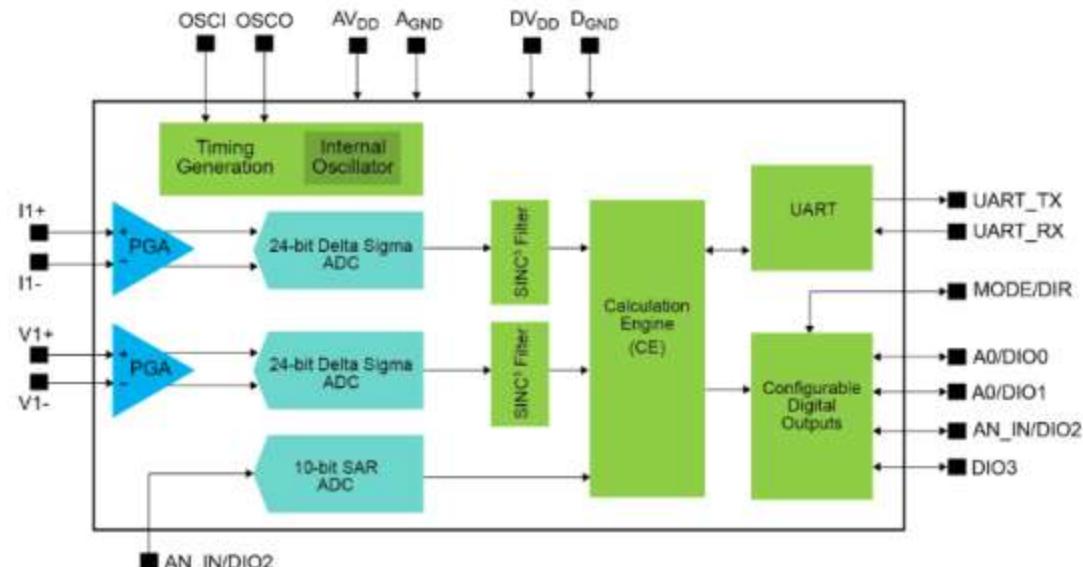
MICROCHIP

MCP39F501

Online
Datasheet

Features:

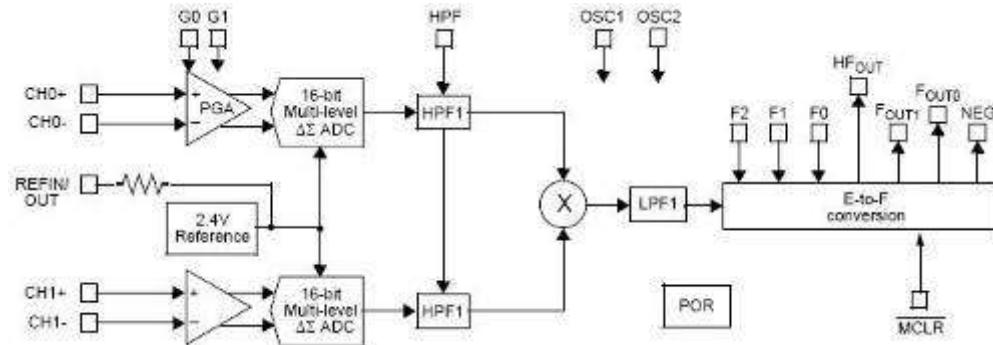
- Power Monitoring Accuracy capable of 0.1% error across 4000:1 dynamic range
- Built-in calculations:
 - Active, Reactive and Apparent Power
 - RMS Current, RMS Voltage
 - Line Frequency, Power Factor
- Fast Calibration Routine
- Programmable Event Notifications such as overcurrent and voltage sag, surge protection
- 512 bytes User-accessible EEPROM
- Non-volatile On-chip Memory, no external memory required
- 2-wire UART interface supporting multiple devices on a single bus
- Low-Drift Internal Voltage Reference:
10 ppm/ $^{\circ}\text{C}$ typical
- 28-lead 5x5 QFN package
- Extended Temperature Range :
-40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$



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Features:

- Supplies active (real) power measurement for single-phase, residential energy metering
- Supports IEC 62053 International Energy Metering Specification and legacy IEC 1036/61036/687 Specifications
- Two multi-bit, DAC, second-order, 16-bit, Delta-Sigma Analog-to-Digital Converters (ADCs)
- Reduced pulse width of calibration output frequency and mechanical counter drive for low power meter designs (MCP3905L)
- Increased output frequency constant options for meter design (MCP3905L)
- 0.1% typical measurement error over 500:1 dynamic range (MCP3905A / MCP3905L)
- 0.1% typical measurement error over 1000:1 dynamic range (MCP3906A)
- Programmable Gain Amplifier (PGA) for small signal inputs supports low value shunt current sensor:
16:1 PGA - MCP3905A / MCP3905L
32:1 PGA - MCP3906A
- Ultra-low drift on-chip reference: 15ppm/ $^{\circ}\text{C}$ (typ.)
- Direct drive for electromagnetic mechanical counter and two-phase stepper motors
- Low I_{DD} of 4mA (typ.)
- Tamper output pin for negative power indication
- Industrial Temperature Range: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$
- Supplies instantaneous real power on HF_{OUT} for meter calibration





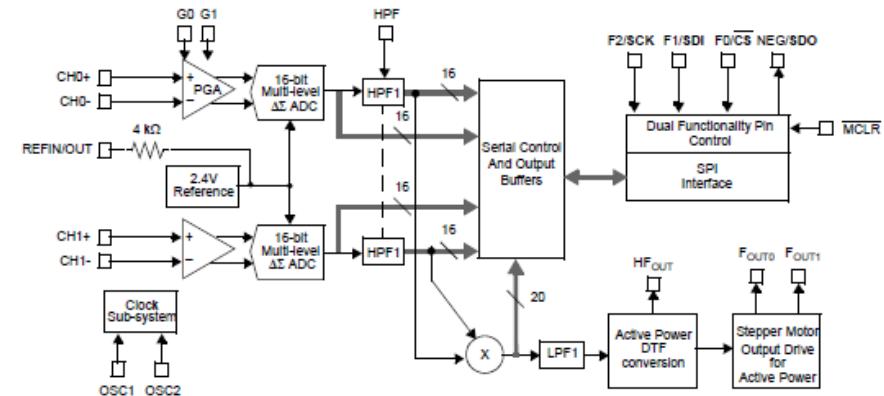
MICROCHIP

MCP3909

Online
Datasheet

Features:

- Supports IEC 62053 International Energy Metering Specification and legacy IEC 1036/61036/687 Specifications
- Digital waveform data access through SPI interface
 - 16-bit Dual ADC output data words
 - 20-bit Multiplier output data word
- Dual functionality pins support serial interface and simultaneous Active Power Pulse Output
- Two 16-bit second order delta-sigma Analog-to-Digital Converters (ADCs) with multi-bit DAC
 - 81 dB SINAD (typ.) both channels
- 0.1% typical active energy measurement error over 1000:1 dynamic range
- PGA for small signal inputs supports low value shunt current sensor
- Ultra-low drift on-chip reference: 15ppm/ $^{\circ}\text{C}$ (typ.)
- Direct drive for electromagnetic mechanical counter and two-phase stepper motors
- Low I_{DD} of 4mA (max.)
- Tamper output pin for negative power indication
- Industrial Temperature Range: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$



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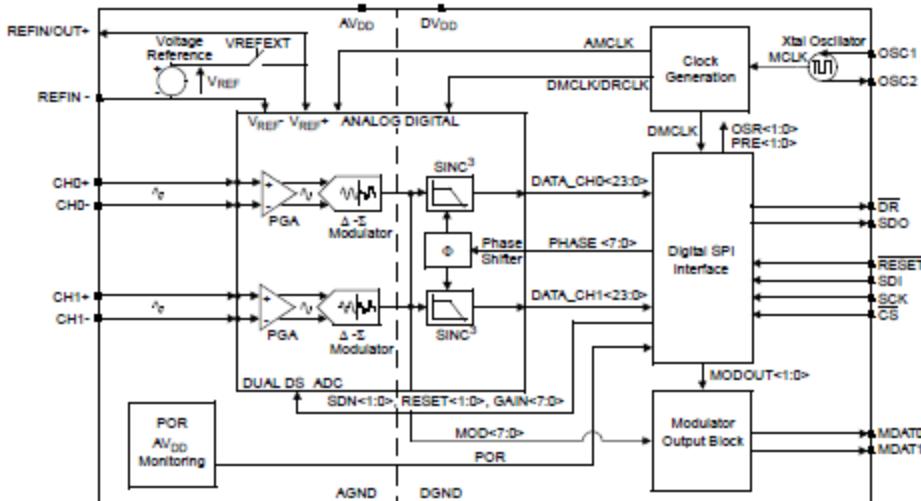
MICROCHIP

MCP3901

Online
Datasheet

Features:

- Two synchronous sampling 16/24-bit resolution Delta-Sigma A/D Converters
- 91 dB SINAD, -104 dBc THD (up to 35th harmonic), 109 dB SFDR for each channel
- Programmable data rate up to 64 ksps
- Ultra low power shutdown mode with <2 μ A
- -133 dB Crosstalk between the two channels
- Low Drift Internal Voltage Reference: 12 ppm/ $^{\circ}$ C
- Differential Voltage Reference Input Pins
- High Gain PGA on each channel (up to 32 V/V)
- Phase Delay Compensation: 1 μ s time resolution
- Separate Modulator outputs for each channel
- High-Speed Addressable 20 MHz SPI Interface with Mode 0,0 and 1,1 Compatibility
- Independent analog and digital power supplies 4.5V - 5.5V AV_{DD}, 2.7V - 5.5V DV_{DD}
- Low Power consumption: 14 mW typical at 5V
- Available in small 20-lead SSOP package
- Extended Temperature Range: -40 $^{\circ}$ C to +125 $^{\circ}$ C



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MICROCHIP

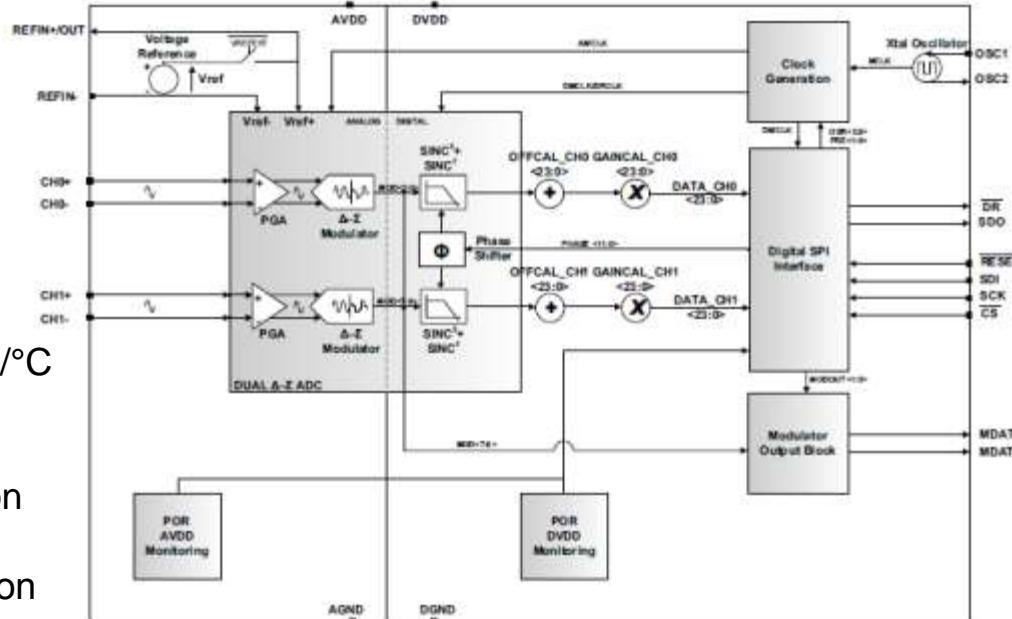
MCP3911

Online
Datasheet

Features

- 2.7V - 3.6V AVDD, DVDD
- Two Synchronous Sampling 16/24-bit $\Delta\Sigma$ ADCs
- 94.5 dB SINAD, -106.5 dB THD (up to 35th harmonic), 111 dB SFDR
- Programmable Data Rate up to 125 ksps
- Oversampling Ratio up to 4096
- -122 dB Crosstalk between the Two Channels
- Low Drift 1.2V Internal Voltage Reference: 7 ppm/ $^{\circ}\text{C}$
- Differential Voltage Reference Input Pins
- PGA on Each Channel (up to 32V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Modulator Outputs for Each Channel
- Separate Data Ready Pin for Easy Synchronization
- Individual 24-bit Digital Offset and Gain Error Correction for Each Channel

- High-Speed 20 MHz SPI Interface
- Continuous Read/Write Modes
- Low Power Consumption down to 5.6 mW at 3.3V
- Extended Temperature Range: -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
- 20-lead QFN and SSOP Packages
- Pin-to-pin Compatible with MCP3901



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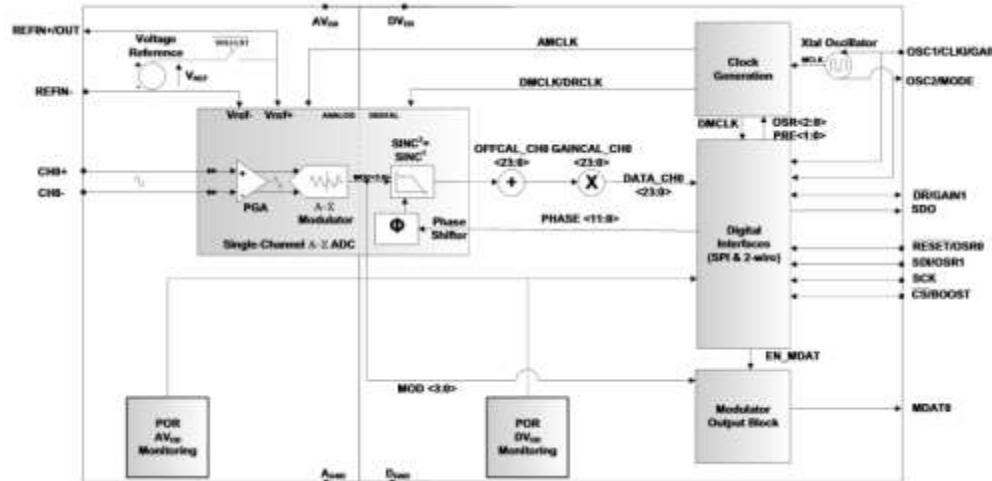
MICROCHIP

MCP3918

Online
Datasheet

Features

- Single 24-bit ΔΣ ADC
- 93.5 dB SINAD, -107 dBc Total Harmonic Distortion (THD) (up to 35th Harmonic), 112 dBFS SFDR
- Flexible Serial Interface that Includes Both SPI and a Simple 2-Wire Interface Ideal for Polyphase Shunt Energy Meters
- Advanced Security Features:
 - 16-bit CRC checksum
 - Register map lock with 8-bit secure key
- Programmable Data Rate, up to 125 kspS
- Oversampling Ratio up to 4096
- Internal Voltage Reference: 9 ppm/°C drift
- PGA (up to 32 V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Data Ready Pin for Easy Synchronization
- 24-bit Digital Offset and Gain Error Correction
- High-Speed 20 MHz SPI interface
- Continuous Read/Write Modes for Minimum Communication Time
- Extended Temperature Range: -40°C to +125°C
 - All specifications are valid down to - 45°C
- 20-lead SSOP and QFN Packages



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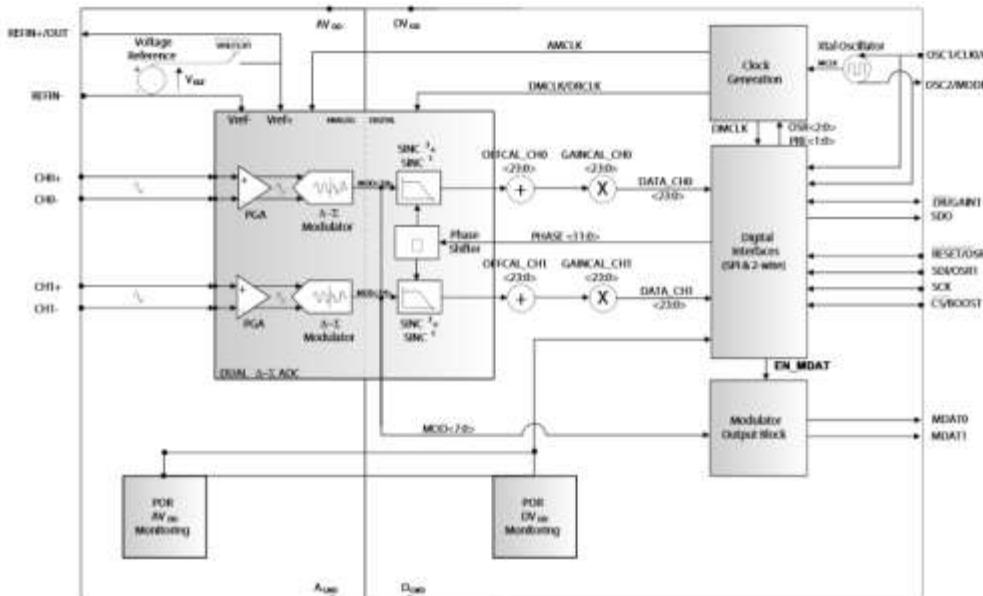
MICROCHIP

MCP3910

Online
Datasheet

Features

- Two 24-bit ΔΣ ADC
- 93.5 dB SINAD, -107 dBc Total Harmonic Distortion (THD) (up to 35th Harmonic), 112 dBFS SFDR
- Enables 0.1% Typical Active Power Measurement Error over a 10,000:1 Dynamic Range
- Flexible Serial Interface that Includes Both SPI and a Simple 2-Wire Interface Ideal for Polyphase Shunt Energy Meters
- Advanced Security Features:
 - 16-bit CRC checksum
 - Register map lock with 8-bit secure key
- Programmable Data Rate, up to 125 ksps
- Oversampling Ratio up to 4096
- -122 dB Crosstalk between Channels
- Low Drift Internal Voltage Reference: 9 ppm/°C
- PGA on Each Channel (up to 32 V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Data Ready Pin for Easy Synchronization
- 24-bit Digital Offset and Gain Error Correction
- High-Speed 20 MHz SPI interface
- Extended Temperature Range: -40°C to +125°C
 - All specifications are valid down to - 45°C
- 20-lead SSOP and QFN Packages



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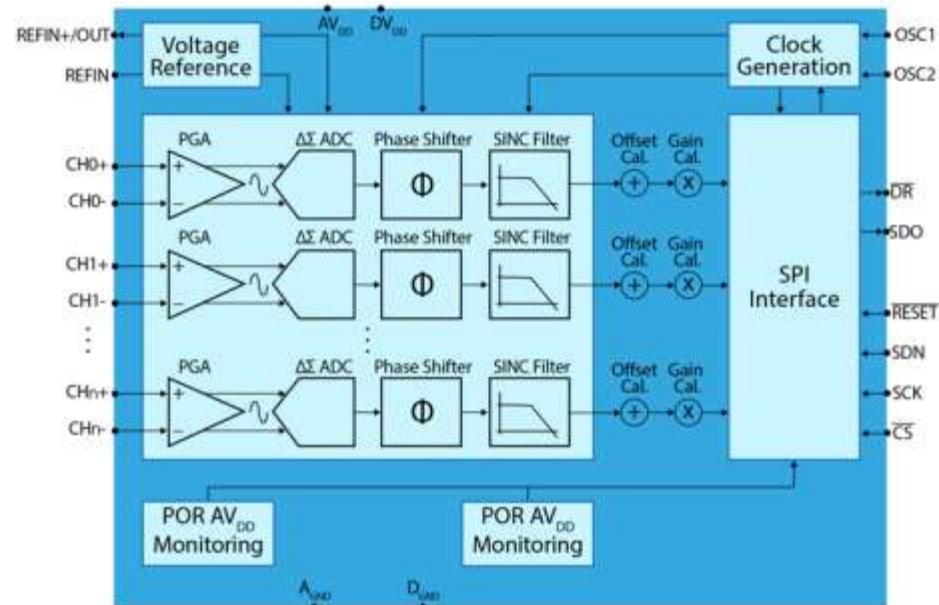
MICROCHIP

MCP3919

Online
Datasheet

Features

- Three Synchronous Sampling 24-bit $\Delta\Sigma$ ADCs
- 93.5 dB SINAD, -107 dBc Total Harmonic Distortion (THD) (up to 35th Harmonic), 112 dBFS SFDR
- Enables 0.1% Typical Active Power Measurement Error over a 10,000:1 Dynamic Range
- Advanced Security Features:
 - 16-bit CRC checksum
 - Register map lock with 8-bit secure key
- Programmable Data Rate up to 125 ksps
- Oversampling Ratio up to 4096
- -122 dB Crosstalk between Channels
- Low Drift Internal Voltage Reference: 9 ppm/ $^{\circ}\text{C}$
- PGA on Each Channel (up to 32 V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Data Ready Pin for Easy Synchronization
- Individual 24-bit Digital Offset and Gain Error Correction for Each Channel
- High-Speed 20 MHz SPI interface with 2-Wire Interface Mode
- Continuous Read/Write Modes for Minimum Communication Time
- Extended Temperature Range: -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
- 28-lead QFN and SSOP Packages



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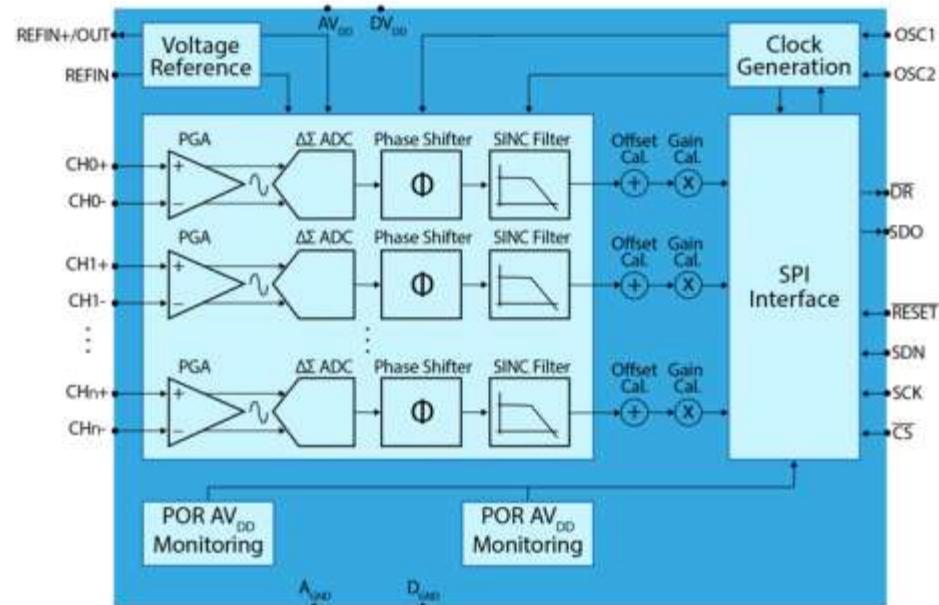
MICROCHIP

MCP3912

Online
Datasheet

Features

- Four Synchronous Sampling 24-bit $\Delta\Sigma$ ADCs
- 93.5 dB SINAD, -107 dBc Total Harmonic Distortion (THD) (up to 35th Harmonic), 112 dBFS SFDR
- Enables 0.1% Typical Active Power Measurement Error over a 10,000:1 Dynamic Range
- Advanced Security Features:
 - 16-bit CRC checksum
 - Register map lock with 8-bit secure key
- Programmable Data Rate up to 125 ksps
- Oversampling Ratio up to 4096
- -122 dB Crosstalk between Channels
- Low Drift Internal Voltage Reference: 9 ppm/ $^{\circ}\text{C}$
- PGA on Each Channel (up to 32 V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Data Ready Pin for Easy Synchronization
- Individual 24-bit Digital Offset and Gain Error Correction for Each Channel
- High-Speed 20 MHz SPI interface
- Continuous Read/Write Modes for Minimum Communication Time
- Extended Temperature Range: -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
- 28-lead QFN and SSOP Packages



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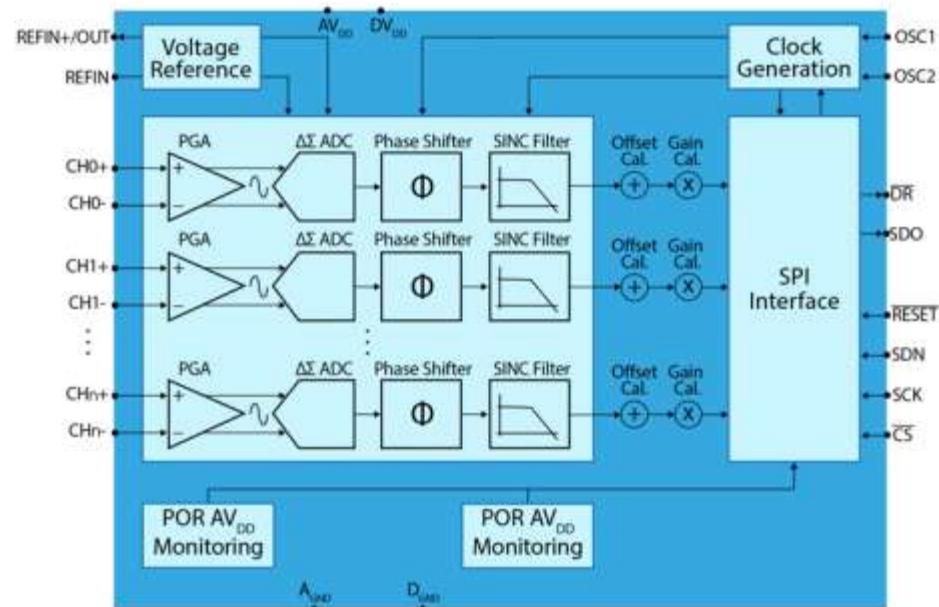
MICROCHIP

MCP3913

Online
Datasheet

Features

- Six Synchronous Sampling 24-bit $\Delta\Sigma$ ADCs
- 94.5 dB SINAD, -107 dBc Total Harmonic Distortion (THD) (up to 35th Harmonic), 112 dBFS SFDR
- Enables 0.1% Typical Active Power Measurement Error over a 10,000:1 Dynamic Range
- Advanced Security Features:
 - 16-bit CRC checksum
 - Register map lock with 8-bit secure key
- Programmable Data Rate up to 125 kspS
- Oversampling Ratio up to 4096
- -122 dB Crosstalk between Channels
- Low Drift Internal Voltage Reference: 9 ppm/ $^{\circ}\text{C}$
- PGA on Each Channel (up to 32 V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Data Ready Pin for Easy Synchronization
- Individual 24-bit Digital Offset and Gain Error Correction for Each Channel
- High-Speed 20 MHz SPI interface
- Continuous Read/Write Modes for Minimum Communication Time
- Extended Temperature Range: -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
- 28-lead SSOP and 40-lead μQFN Package



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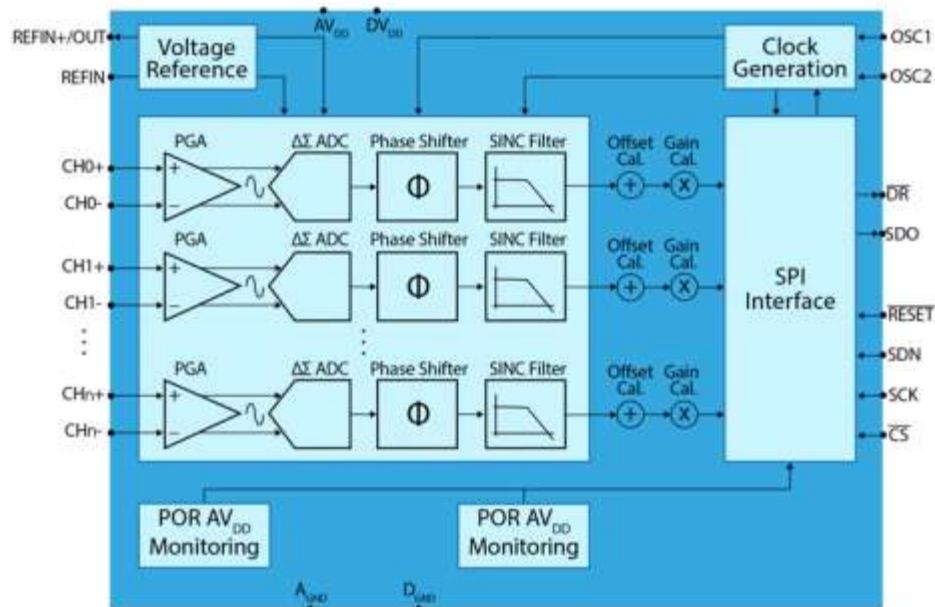
MICROCHIP

MCP3914

Online
Datasheet

Features

- Eight Synchronous Sampling 24-bit $\Delta\Sigma$ ADCs
- 94.5 dB SINAD, -107 dBc Total Harmonic Distortion (THD) (up to 35th Harmonic), 112 dBFS SFDR
- Enables 0.1% Typical Active Power Measurement Error over a 10,000:1 Dynamic Range
- Advanced Security Features:
 - 16-bit CRC checksum
 - Register map lock with 8-bit secure key
- Programmable Data Rate up to 125 ksps
- Oversampling Ratio up to 4096
- -122 dB Crosstalk between Channels
- Low Drift Internal Voltage Reference: 9 ppm/ $^{\circ}\text{C}$
- PGA on Each Channel (up to 32 V/V)
- Phase Delay Compensation: 1 μs Time Resolution
- Separate Data Ready Pin for Easy Synchronization
- Individual 24-bit Digital Offset and Gain Error Correction for Each Channel
- High-Speed 20 MHz SPI interface
- Continuous Read/Write Modes for Minimum Communication Time
- Extended Temperature Range: -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$
- 28-lead SSOP and 40-lead μQFN Package



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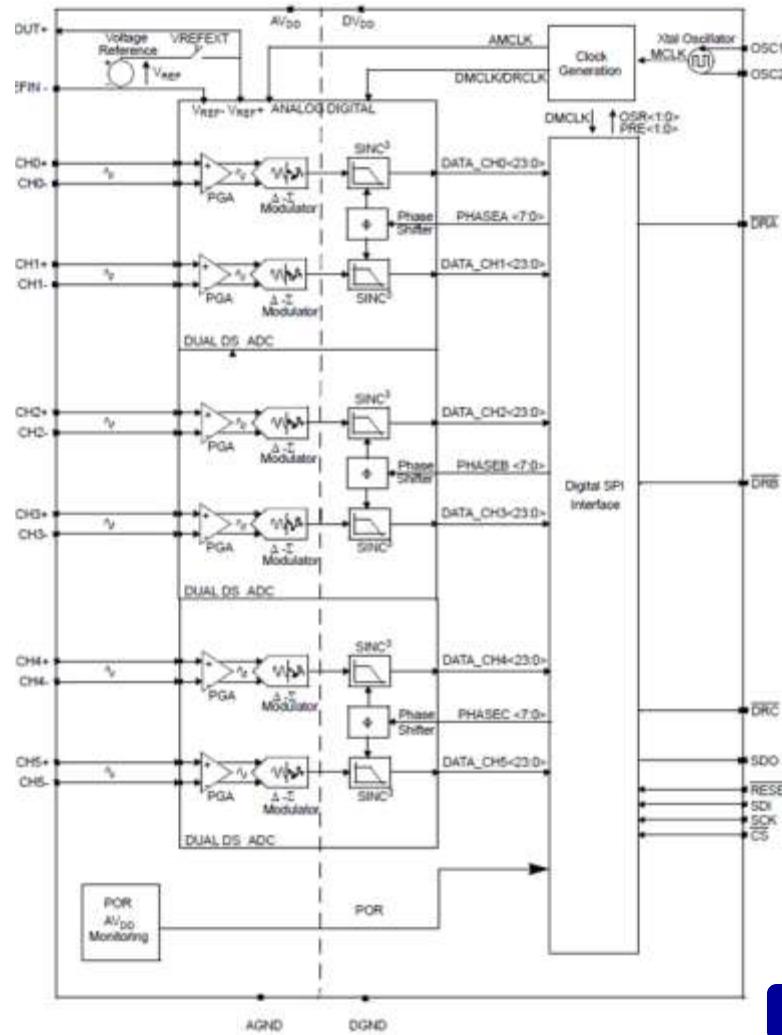
MICROCHIP

MCP3903

Online
Datasheet

Features:

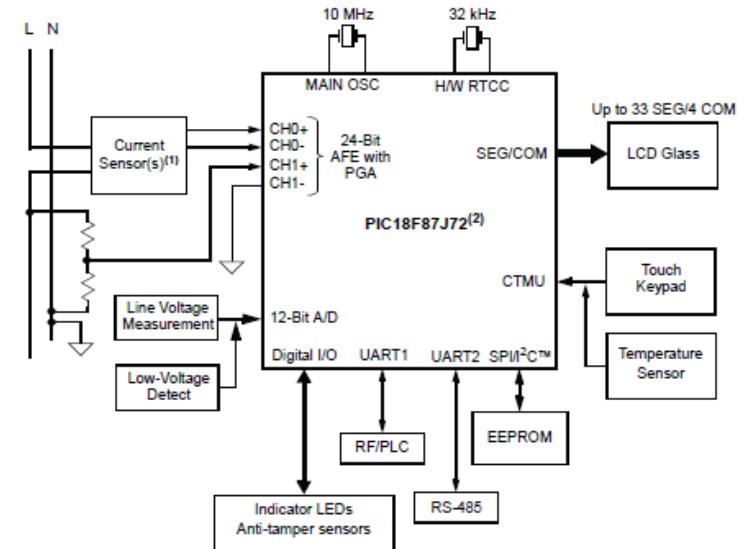
- Six Synchronous Sampling 16/24-bit Resolution Delta-Sigma A/D Converters with Proprietary Multi-Bit Architecture
- 91 dB SINAD, -100 dBc Total Harmonic Distortion (THD) (up to 35th harmonic), 102 dB Spurious-free Dynamic Range (SFDR) for Each Channel
- Programmable Data Rate up to 64 ksps
- Ultra Low-Power Shutdown Mode with <2 μ A
- -115 dB Crosstalk Between any Two Channels
- Low Drift Internal Voltage Reference: 5 ppm/ $^{\circ}$ C
- Differential Voltage Reference Input Pins
- High Gain PGA on Each Channel (up to 32 V/V)
- Phase Delay Compensation Between Each Pair of Channels with 1 μ s Time Resolution
- High-Speed Addressable 10 MHz SPI Interface with Mode 0,0 and 1,1 Compatibility
- Independent Analog and Digital Power Supplies 4.5V - 5.5V AVDD, 2.7V - 3.6V DVDD
- Available in Small 28-lead SSOP Package
- Extended Temperature Range: -40 $^{\circ}$ C to +125 $^{\circ}$ C



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Features:

- Dual-channel 16-/24-bit Analog Front End (AFE) with Delta-Sigma A/D Converters and high-gain PGAs for 90 dB SINAD and -101 dBc THD (to 35th harmonic) performance
- 12-bit, 12-channel, 100ksps SAR A/D Converter
- LCD driver for up to 132 pixels with voltage boost regulator
- Hardware Real-Time Clock & Calendar
- Charge Time Measurement Unit (CTMU) for temperature sensing and capacitive touch
- Program Memory: 128k (PIC18F87J72), 64k (PIC18F86J72)
- Two Analog Comparators
- Two UARTs
- One Master Synchronous Serial Port (MSSP)
- Four Timers
- Two Capture/Compare/PWM (CCP)
- Up to 12 MIPS performance
- Internal oscillator support 31kHz to 8MHz and 4xPLL
- 8x8 Single Cycle Hardware Multiply
- nanoWatt low power with Run, Idle and Sleep modes
- Brown-Out-Reset (BOR)
- Low Voltage Detect (LVD)
- Operating Voltage Range: 2.0 to 3.6V for Digital and 12-bit ADC; 4.5 to 5.5V for 16-/24-bit AFE





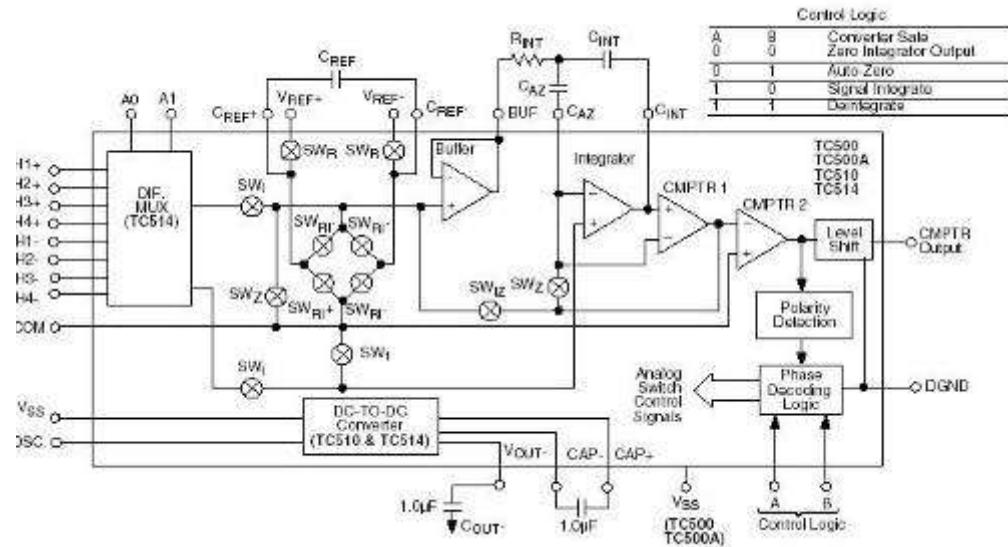
MICROCHIP

TC500/10/14

Online
Datasheet

Features:

- Precision (up to 17 bits) A/D Converter “Front End”
- 3-Pin Control Interface to Microprocessor
- Flexible: User Can Trade-off Conversion Speed for Resolution
- Single-Supply Operation (TC510/TC514)
- 4 Input, Differential Analog MUX (TC514)
- Automatic Input Voltage Polarity Detection
- Low Power Dissipation:
(TC500/TC500A): 10mW
(TC510/TC514): 18mW
- Wide Analog Input Range:
 $\pm 4.2V$ (TC500A/TC510)
- Directly Accepts Bipolar and Differential Input Signals



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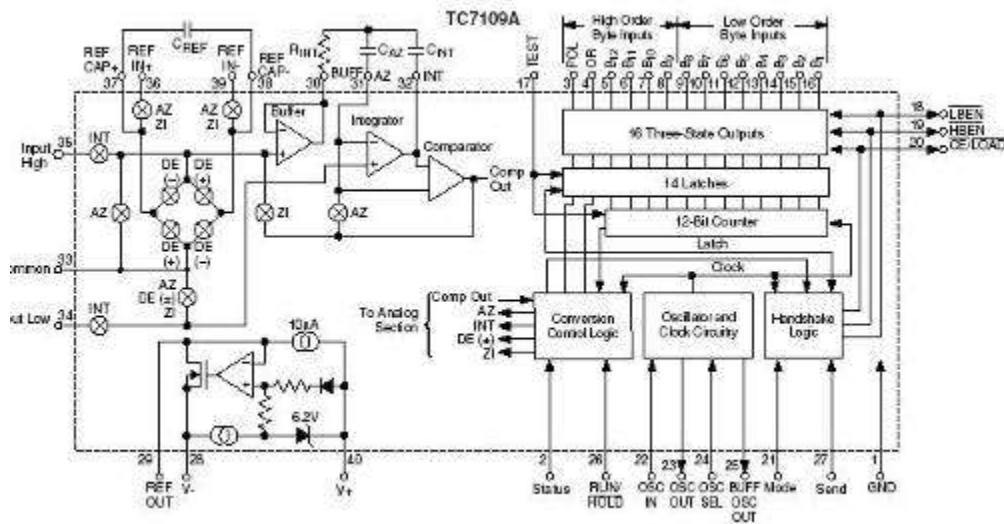
MICROCHIP

TC7109/A

Online
Datasheet

Features:

- Zero Integrator Cycle for Fast Recovery from Input Overloads
- Eliminates Cross-Talk in Multiplexed Systems
- 12-Bit Plus Sign Integrating A/D Converter with Over Range Indication
- Sign Magnitude Coding Format
- True Differential Signal Input and Differential Reference Input
- Low Noise: $15\mu\text{V}_{\text{P-P}}$ (typ.)
- Input Current: 1pA (typ.)
- No Zero Adjustment needed
- TTL Compatible, Byte Organized Tri-State Outputs
- UART Handshake Mode for simple Serial Data Transmissions



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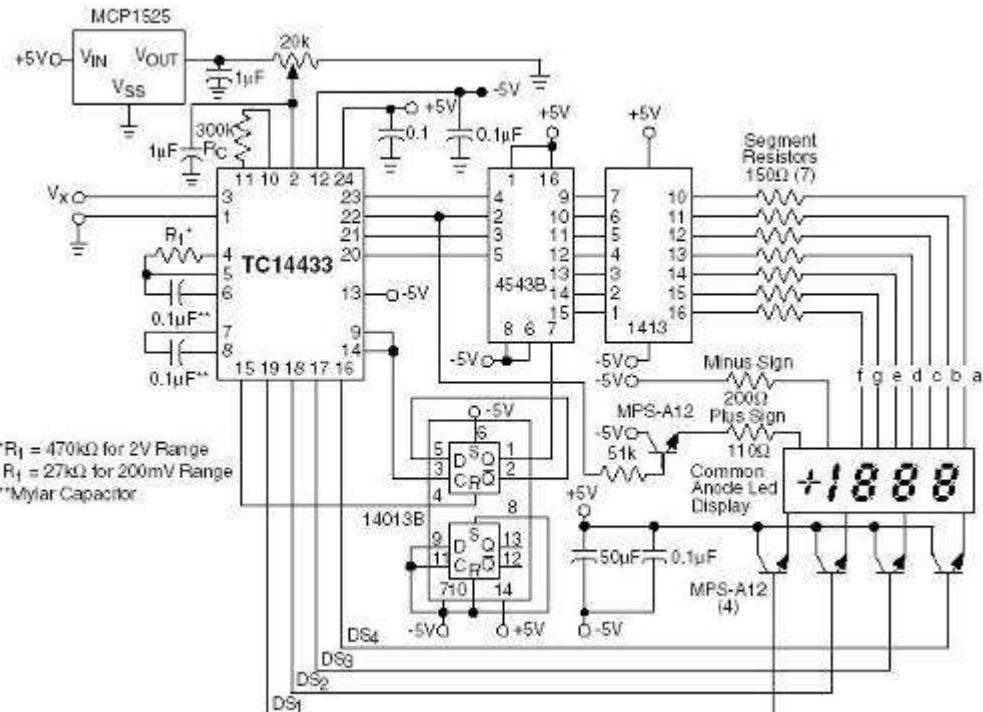
MICROCHIP

TC14433/A

Online
Datasheet

Features:

- Accuracy: $\pm 0.05\%$ of Reading ± 1 Count
- Two Voltage Ranges: 1.999V and 199.9mV
- Up to 25 Conversions Per Second
- $Z_{IN} > 1000M\Omega$
- Single Positive Voltage Reference
- Auto-Polarity and Auto-Zero
- Overrange and Underrange Signals Available
- Operates in Auto-Ranging Circuits
- Uses On-Chip System Clock or External Clock
- Wide Supply Range: $\pm 4.5V$ to $\pm 8V$



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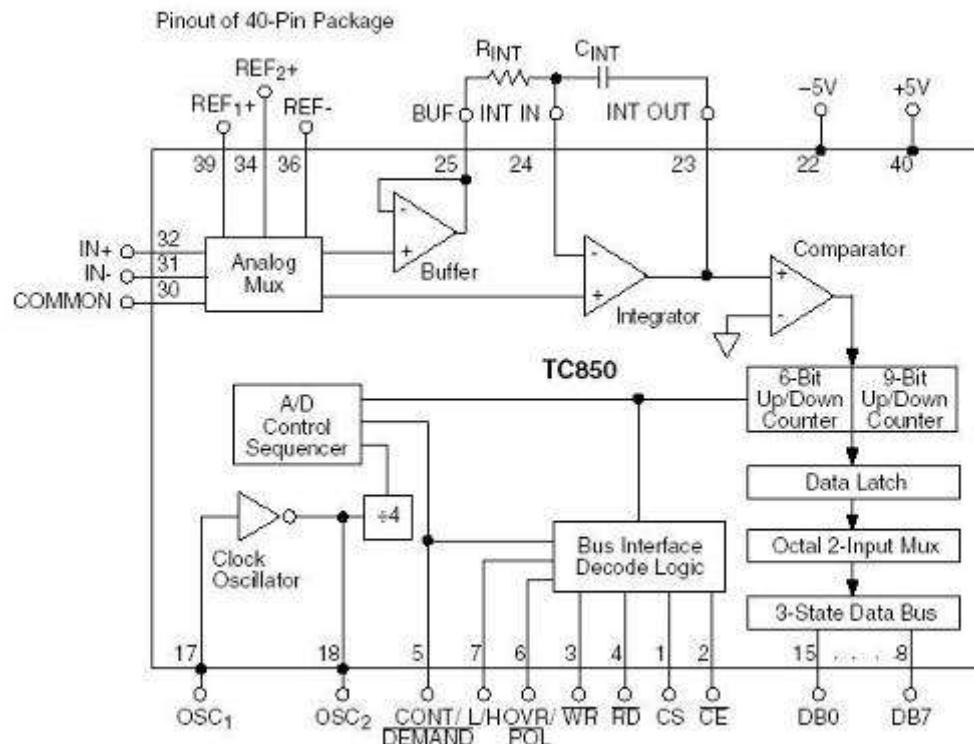
MICROCHIP

TC850

Online
Datasheet

Features:

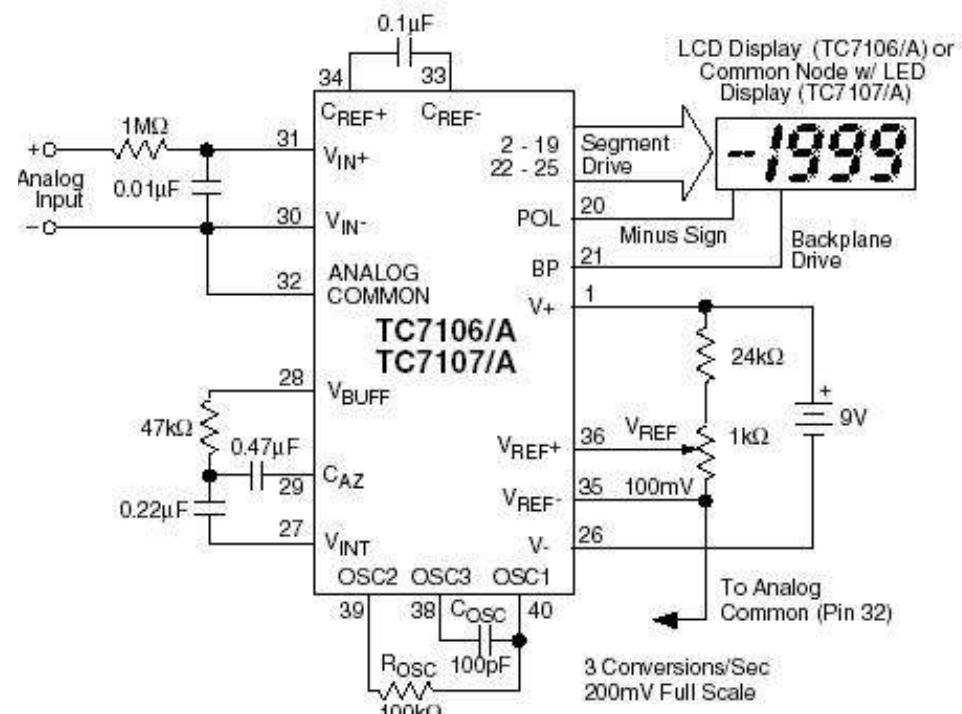
- 15-bit Resolution Plus Sign Bit
- Up to 40 Conversions per Second
- Integrating ADC Technique:
 - Monotonic
 - High Noise Immunity
 - Auto-Zeroed Amplifiers Eliminate Offset Trimming
- Wide Dynamic Range: 96dB
- Low Input Bias Current: 30pA
- Low Input Noise: 30 μ V_{P-P}
- Sensitivity: 100 μ V
- Flexible Operational Control
- Continuous or On Demand Conversions
- Data Valid Output
- Bus Compatible, 3-State Data Outputs:
 - 8-Bit Data Bus
 - Simple μ P Interface
 - Two Chip Enables
 - Read ADC Result Like Memory
- $\pm 5V$ Power Supply Operation: 20m Ω
- 40-Pin Dual-in-Line or 44-Pin PLCC Packages



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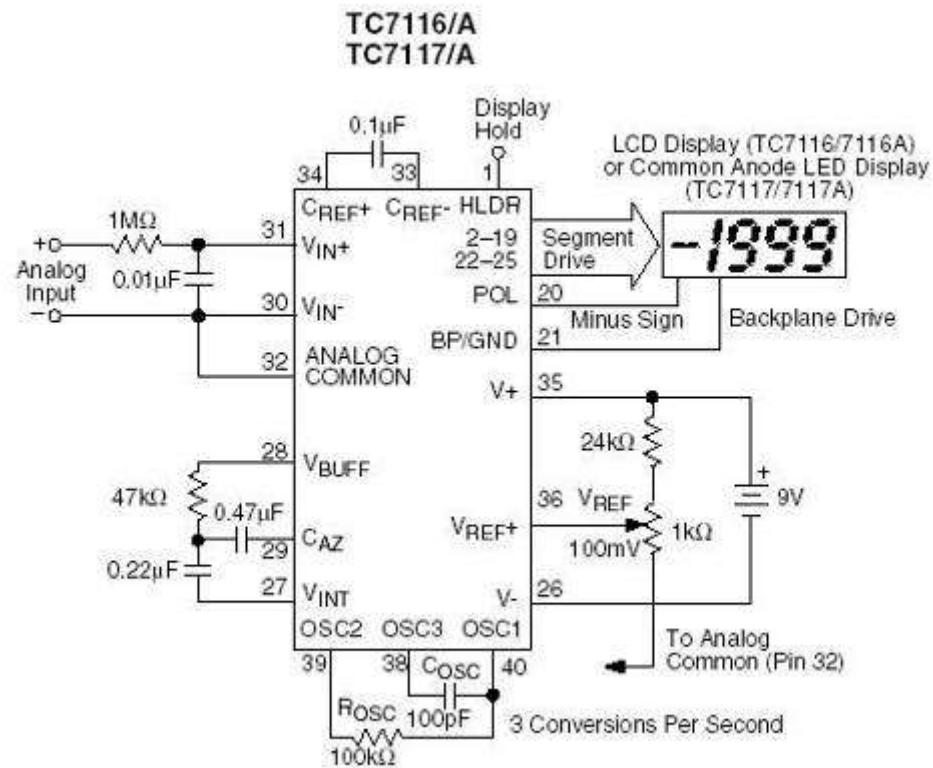
Features:

- Internal Reference with Low Temperature Drift:
TC7106/7: 80ppm/ $^{\circ}\text{C}$ (typ.)
TC7106A/7A: 20ppm/ $^{\circ}\text{C}$ (typ.)
- Drives LCD (TC7106) or LED (TC7107) Display Directly
- Zero Reading with Zero Input
- Low Noise for Stable Display
- Auto-Zero Cycle Eliminates Need for Zero Adjustment
- True Polarity Indication for Precision Null Applications
- Convenient 9V Battery Operation (TC7106A)
- High-Impedance CMOS Differential Inputs: $10^{12}\Omega$
- Differential Reference Inputs Simplify Ratiometric Measurements
- Low-Power Operation: 10mW



Features:

- Low Temperature Drift Internal Reference
TC7116/TC7117: 80ppm/ $^{\circ}\text{C}$ (typ.)
TC7116A/TC7117A: 20ppm/ $^{\circ}\text{C}$ (typ.)
- Display Hold Function
- Directly Drives LCD or LED Display
- Zero Reading With Zero Input
- Low Noise for Stable Display: 2V or 200mV
- Full-Scale Range (FSR)
- Auto-Zero Cycle Eliminates Need for Zero
- Adjustment Potentiometer
- True Polarity Indication for Precision Null Applications
- Convenient 9V Battery Operation:
TC7116/TC7116A
- High Impedance CMOS Differential Inputs:
 $10^{12} \Omega$
- Low Power Operation: 10mW





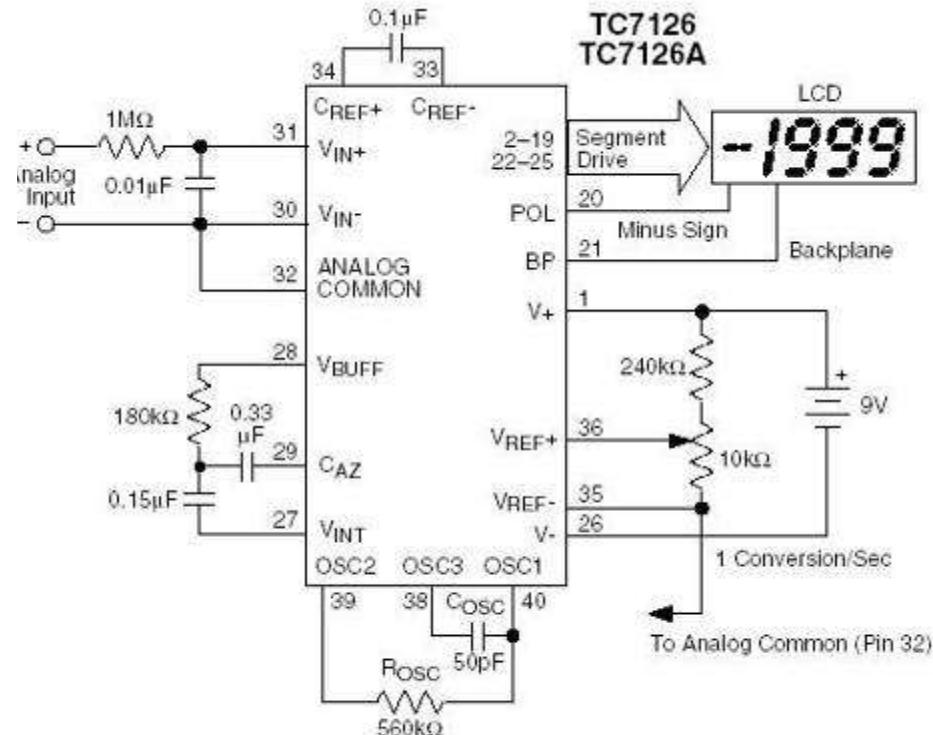
MICROCHIP

TC7126/A

Online
Datasheet

Features:

- Internal Reference with Low Temperature Drift:
TC7126: 80ppm/ $^{\circ}$ C (typ.)
TC7126A: 35ppm/ $^{\circ}$ C (typ.)
- Zero Reading with Zero Input
- Low Noise: 15 μ V_{P-P}
- High Resolution: 0.05%
- Low Input Leakage Current:
1pA (typ.), 10pA (max.)
- Precision Null Detectors with True Polarity at Zero
- High-Impedance Differential Input
- Convenient 9V Battery Operation with Low-Power Dissipation:
500 μ W (typ.), 900 μ W (max.)



Note: Pin numbers refer to 40-pin DIP.

[TC7116/7/A >>](#)

[TC7106/7/A >>](#)

[<< BACK](#)



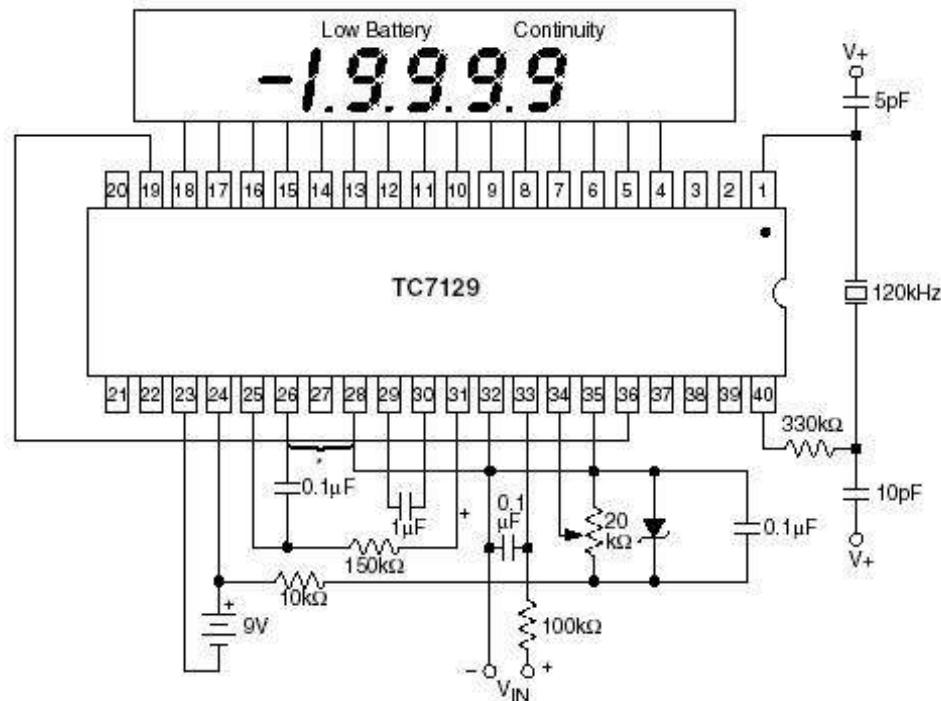
MICROCHIP

TC7129

Online
Datasheet

Features:

- Count Resolution: $\pm 19,999$
- Resolution on 200mV Scale: $10\mu V$
- True Differential Input and Reference
- Low Power Consumption:
 $500\mu A$ at 9V
- Direct LCD Driver for 4½ Digits,
Decimal Points, Low Battery Indicator,
and Continuity Indicator
- Overrange and Underrange Outputs
- Range Select Input: 10:1
- High Common Mode Rejection Ratio:
110dB
- External Phase Compensation Not
Required



Note: RC network between Pins 26 and 28 is not required.

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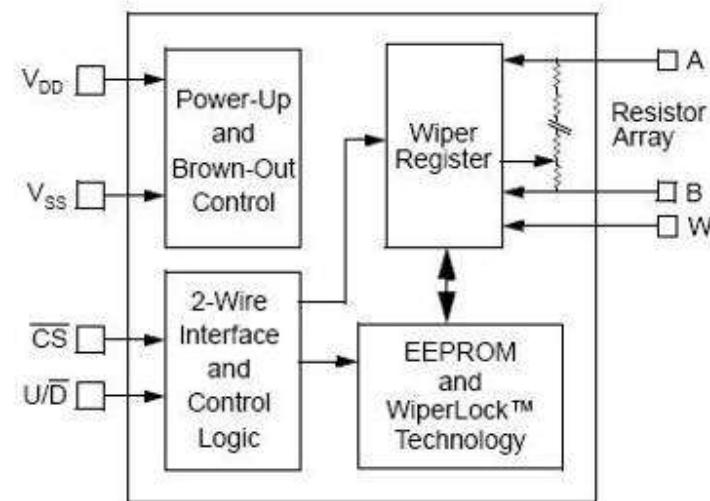
MICROCHIP

MCP4021/2/3/4

Online
Datasheet

Features:

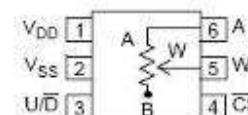
- Nonvolatile Digital Potentiometer in SOT-23, MSOP and SOIC Packages
- 64 Taps: 63 Resistors with Taps to V_{SS} and V_{DD}
- Simple Up/Down (U/D) Protocol
- Automatic Recall of Potentiometer Wiper Settings
- Resistance Values: 2 k Ω , 5 k Ω , 10 k Ω , 50 k Ω
- Low Tempco:
Absolute (Rheostat): <100ppm (typ.)
Ratiometric (Potentiometer): <10ppm (typ.)
- Low Wiper Resistance: 75 Ω (typ.)
- WiperLock™ Technology to Secure the EEPROM
- Low-Power Operation: 1 μ A (max.) Static Current
- Wide Operating Voltage: 2.7V to 5.5V
- Extended Temperature Range: -40°C to +125°C



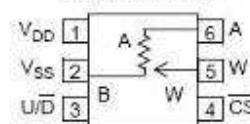
MCP4021
MSOP, SOIC
Potentiometer



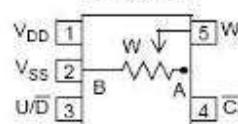
MCP4022
SOT-23-6
Rheostat



MCP4023
SOT-23-6
Potentiometer



MCP4024
SOT-23-5
Rheostat



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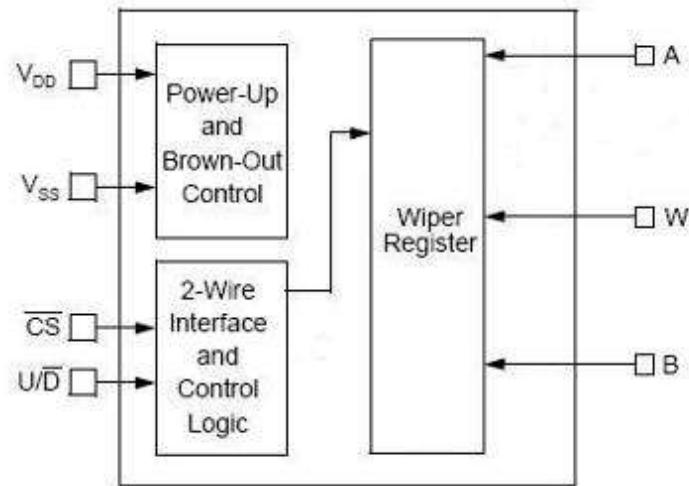
MICROCHIP

MCP4011/2/3/4

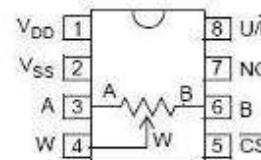
Online
Datasheet

Features:

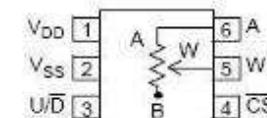
- Volatile Digital Potentiometer in SOT-23, MSOP and SOIC Packages
- 64 Taps: 63 Resistors with Taps to V_{SS} and V_{DD}
- Simple Up/Down (U/D) Protocol
- Automatic Recall of Potentiometer Wiper Settings
- Resistance Values: 2.1 k Ω , 5 k Ω , 10 k Ω , 50 k Ω
- Low Tempco:
Absolute (Rheostat): 50ppm (typ.)
Ratiometric (Potentiometer): 10ppm (typ.)
- Low Wiper Resistance: 75 Ω (typ.)
- High-Voltage Tolerant Digital Inputs: up to 12V
- Low-Power Operation: 1 μ A (max.) Static Current
- Wide Operating Voltage: 2.7V to 5.5V
- Extended Temperature Range: -40°C to +125°C



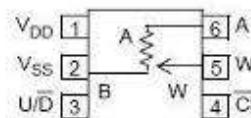
MCP4011
MSOP, SOIC
Potentiometer



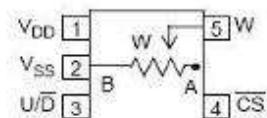
MCP4012
SOT-23-6
Rheostat



MCP4013
SOT-23-6
Potentiometer



MCP4014
SOT-23-5
Rheostat



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MICROCHIP

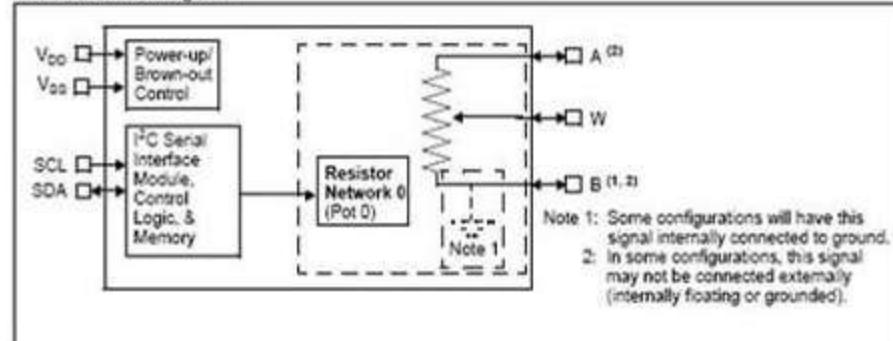
MCP4017/8/9

Online
Datasheet

Features:

- Potentiometer or Rheostat configuration options
- 7-bit: Resistor Network Resolution
 - 127 Resistors (128 Steps)
- Zero Scale to Full Scale Wiper operation
- RAB Resistances: 5k Ω , 10k Ω , 50k Ω , or 100k Ω
- Low Wiper Resistance: 100 Ω (typ.)
- Low Tempco:
 - Absolute (Rheostat): 50ppm (typ.) (0°C to 70°C)
 - Ratiometric (Potentiometer): 10ppm (typ.)
- Simple I²C™ Protocol with read & write commands
- Brown-out reset protection: 1.5V (typ.)
- Power-on Default Wiper Setting (mid-scale)
- Low-Power Operation:
 - 2.5 μ A Static Current (typ.)
- Wide Operating Voltage Range:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3dB) Operation:
 - 2MHz (typ.) for 5.0k Ω device
- Extended temperature range (-40°C to +125°C)
- Very small package (SC70)

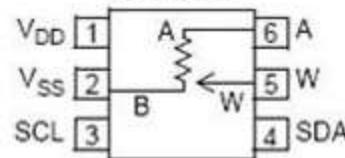
Device Block Diagram



Potentiometer

MCP4018

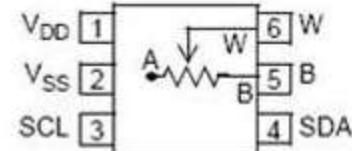
SC70-6



Rheostat

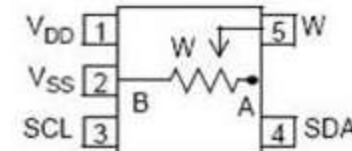
MCP4017

SC70-6



MCP4019

SC70-5



[MCP40D17/8/9 >>](#)

[<< BACK](#)



MICROCHIP

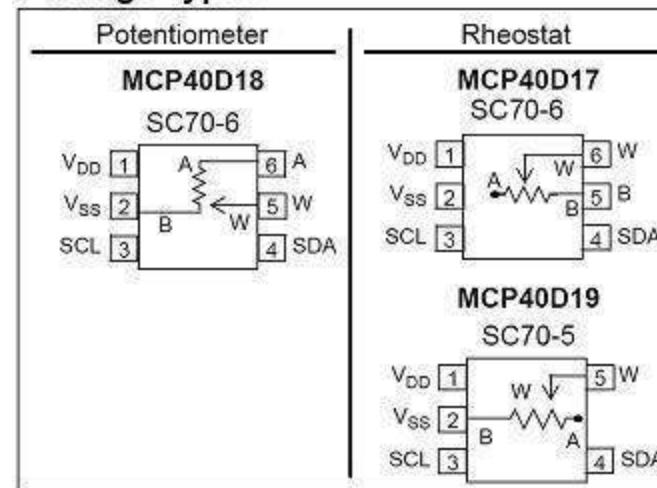
MCP40D17/8/9

Online
Datasheet

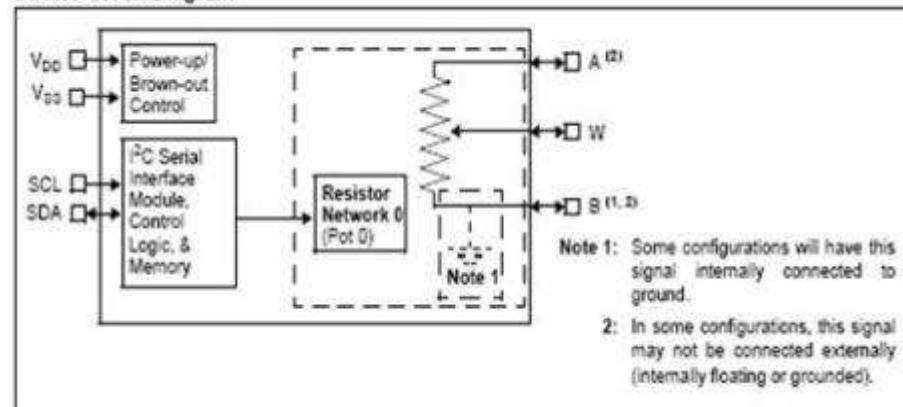
Features:

- Potentiometer or Rheostat configuration options
- 7-bit: Resistor Network Resolution: 127 Resistors (128 Steps)
- Zero Scale to Full Scale Wiper operation
- RAB Resistances: 5kΩ, 10kΩ, 50kΩ, or 100kΩ
- Low Wiper Resistance: 100Ω (typ.)
- Low Tempco:
 - Absolute (Rheostat): 50ppm (typ.) 0°C to 70°C
 - Ratiometric (Potentiometer): 15ppm (typ.)
- I²C™ Protocol
 - Supports SMBus 2.0 Write Byte/Word Protocol Formats
 - Supports SMBus 2.0 Read Byte/Word Protocol Formats
- Standard I²C Device Addresses:
 - All devices offered with address “0101110”
 - MCP40D18 also offered with address “0111110”
- Brown-out reset protection: 1.5V (typ.)
- Power-on Default Wiper Setting (mid-scale)
- Low-Power Operation:
 - 2.5µA Static Current (typ.)
- Wide Operating Voltage Range:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3dB) Operation:
 - 2 MHz (typ.) for 5.0kΩ device
- Extended temperature range (-40°C to +125°C)
- Very small package (SC70)
- Lead free (Pb-free) package

Package Types



Device Block Diagram



<< MCP4017/8/9

<< BACK



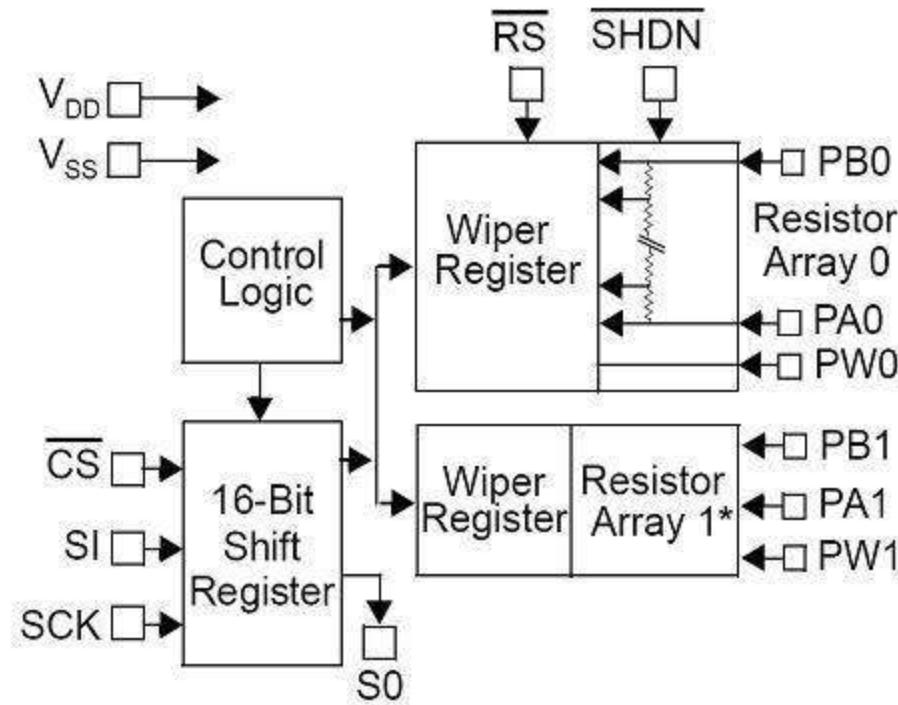
MICROCHIP

MCP41xxx/42xxx

Online
Datasheet

Features:

- 256 taps for each potentiometer
- Potentiometer values for 10kΩ, 50kΩ and 100kΩ
- Single and dual versions
- SPI™ serial interface (mode 0,0 and 1,1)
- ±1 LSB max INL & DNL
- Low power CMOS technology
- 1µA (max.) supply current in static operation
- Multiple devices can be daisy-chained together (MCP42XXX only)
- Shutdown feature open circuits of all resistors for maximum power savings
- Hardware shutdown pin available on MCP42XXX only
- Single supply operation (2.7V to 5.5V)
- Industrial temperature range: -40°C to +85°C
- Extended temperature range: -40°C to +125°C



*Potentiometer P1 is only available on the dual MCP42XXX version.

Upgrades Available. Click on the links below

Volatile Options

[MCP413x, MCP415x, MCP423x, MCP425x >>](#)

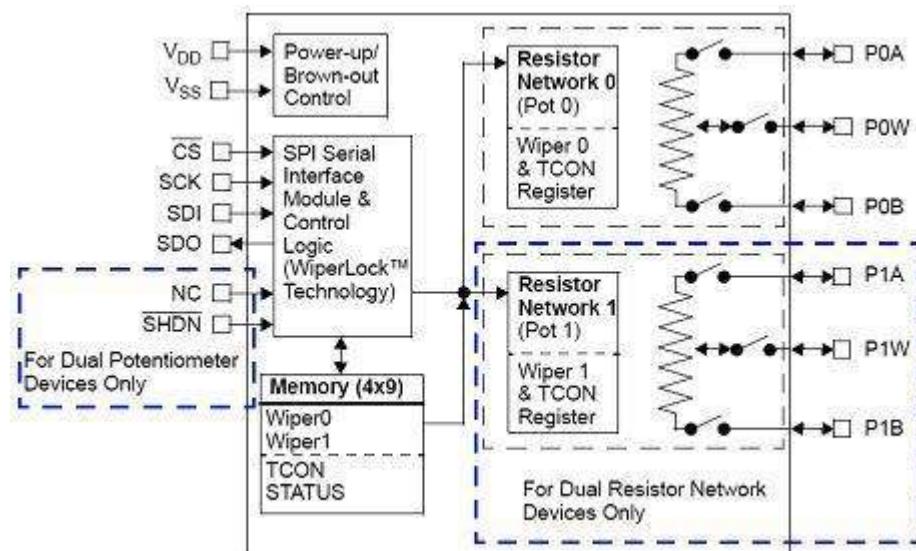
Non- Volatile Options

[MCP414x, MCP416x, MCP424x, MCP426x >>](#)

[**<< BACK**](#)

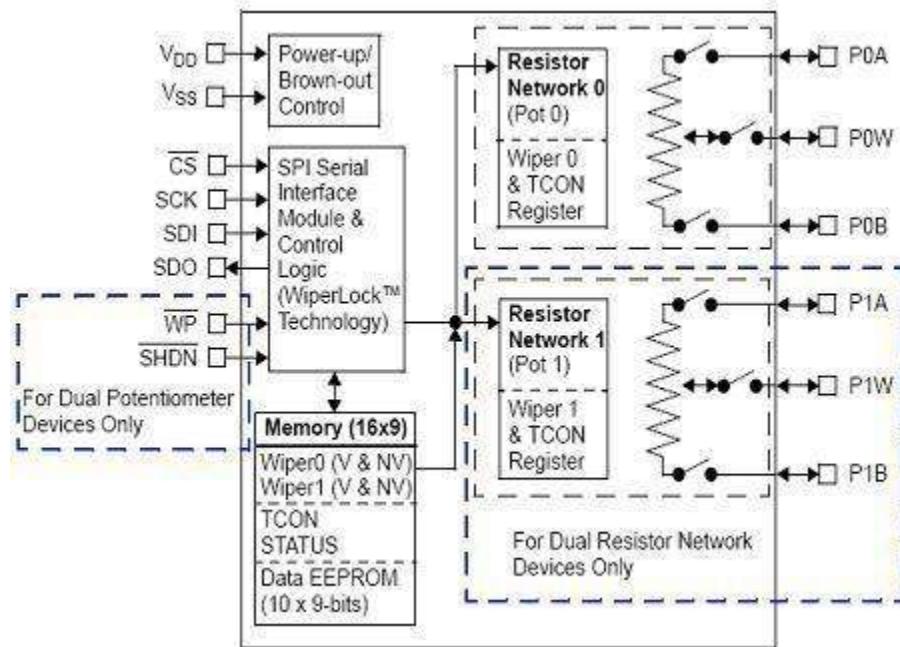
Features:

- Single or Dual Resistor Network options
- Potentiometer or Rheostat Configuration Options
- Resistor Network Resolution
 - 7-bit: 128 Resistors (129 Steps)
 - 8-bit: 256 Resistors (257 Steps)
- R_{AB} Resistances options of:
5k Ω , 10k Ω , 50k Ω , 100k Ω
- Low Tempco:
 - Absolute (Rheostat): 50ppm (typ.) 0°C to 70°C
 - Ratiometric (Potentiometer): 15ppm (typ.)
- SPI Serial Interface (10MHz, modes 0,0 & 1,1)
 - High-Speed Read/Writes to wiper registers
 - SDI/SDO multiplexing (MCP41X1 only)
- High-Voltage Tolerant Digital Inputs: up to 12.5V
- Supports Split Rail Applications
- Wide Operating Voltage:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3dB) Operation:
2MHz (typ.) for 5.0k Ω device
- Extended temperature range: -40°C to +125°C



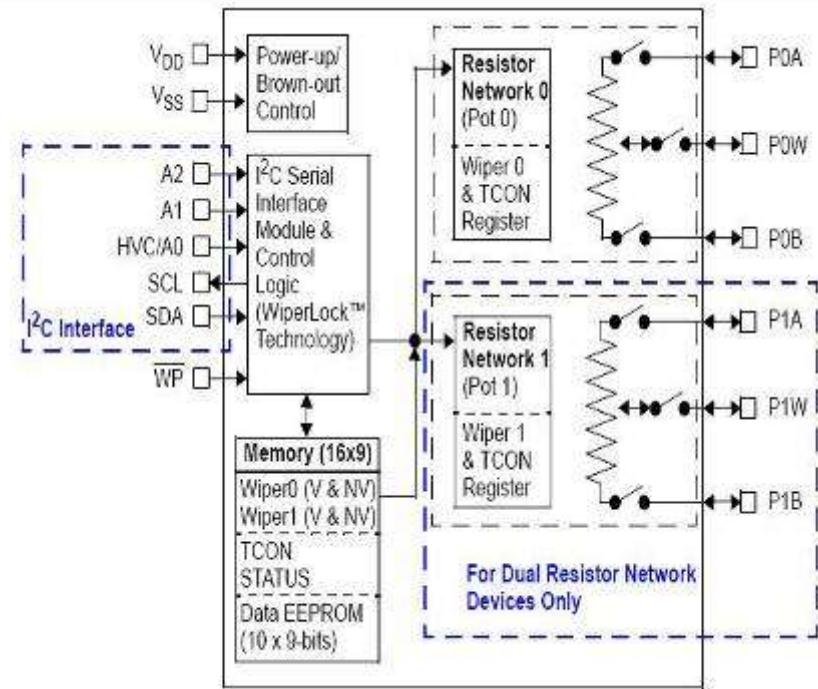
Features:

- Single or Dual Resistor Network options
- Potentiometer or Rheostat configuration options
- Resistor Network Resolution
 - 7-bit: 128 Resistors (129 Steps)
 - 8-bit: 256 Resistors (257 Steps)
- R_{AB} Resistances options: 5k Ω , 10k Ω , 50k Ω , 100k Ω
- Low Tempco:
 - Absolute (Rheostat): 50ppm (typ.) 0°C to 70°C
 - Ratiometric (Potentiometer): 15ppm (typ.)
- SPI serial interface (10MHz, modes 0,0 & 1,1)
 - High-Speed Read/Writes to wiper registers
 - Read/Write to Data EEPROM registers
 - Seriously enabled EEPROM write protect
 - SDI/SDO multiplexing (MCP41X1 only)
- Write Protect Feature:
 - Hardware Write Protect (WP) Control pin
 - Software Write Protect (WP) Configuration bit
- Supports Split Rail Applications
- Wide Operating Voltage:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3dB) Operation: 2MHz (typ.) 5.0k Ω
- Extended temperature range (-40°C to +125°C)



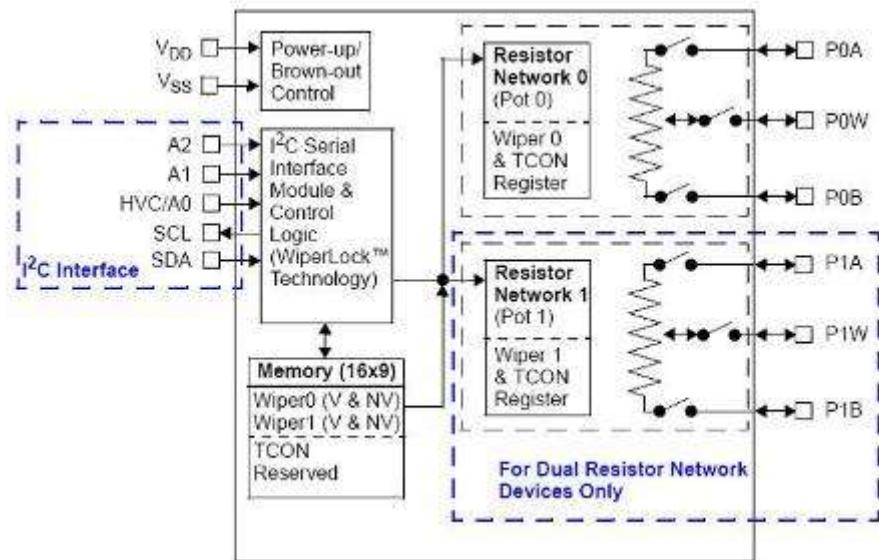
Features:

- Single or Dual Resistor Network options
- Potentiometer or Rheostat configuration options
- Resistor Network Resolution
 - 7-bit: 128 Resistors (129 Steps)
 - 8-bit: 256 Resistors (257 Steps)
- R_{AB} Resistances options of: 5k Ω , 10k Ω , 50k Ω , 100k Ω
- Zero-Scale to Full-Scale Wiper operation
- Low Wiper Resistance: 75 Ω (typ.)
- Low Tempco:
 - Absolute (Rheostat): 50ppm (typ.) 0°C to 70°C
 - Ratiometric (Potentiometer): 15ppm (typ.)
- Non-volatile Memory
 - Automatic Recall of Saved Wiper Setting
 - WiperLock™ Technology
 - 10 General Purpose Memory Locations
- I²C™ Serial interface: 100kHz, 400kHz and 3.4MHz support
- Serial protocol allows:
 - High-Speed Read/Write to wiper, Read/Write to EEPROM, Write Protect to be enabled/disabled, WiperLock to be enabled/disabled
- Resistor Network Terminal Disconnect Feature via the Terminal Control (TCON) Register
- Write Protect Feature:
- Brown-out reset protection: 1.5V (typ.)
- Serial Interface Inactive current: 2.5 μ A (typ.)
- High-Voltage Tolerant Digital Inputs: up to 12.5V
- Wide Operating Voltage:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3dB) Operation: 2MHz (typ.) for 5.0k Ω device
- Extended temperature range: -40°C to +125°C



Features:

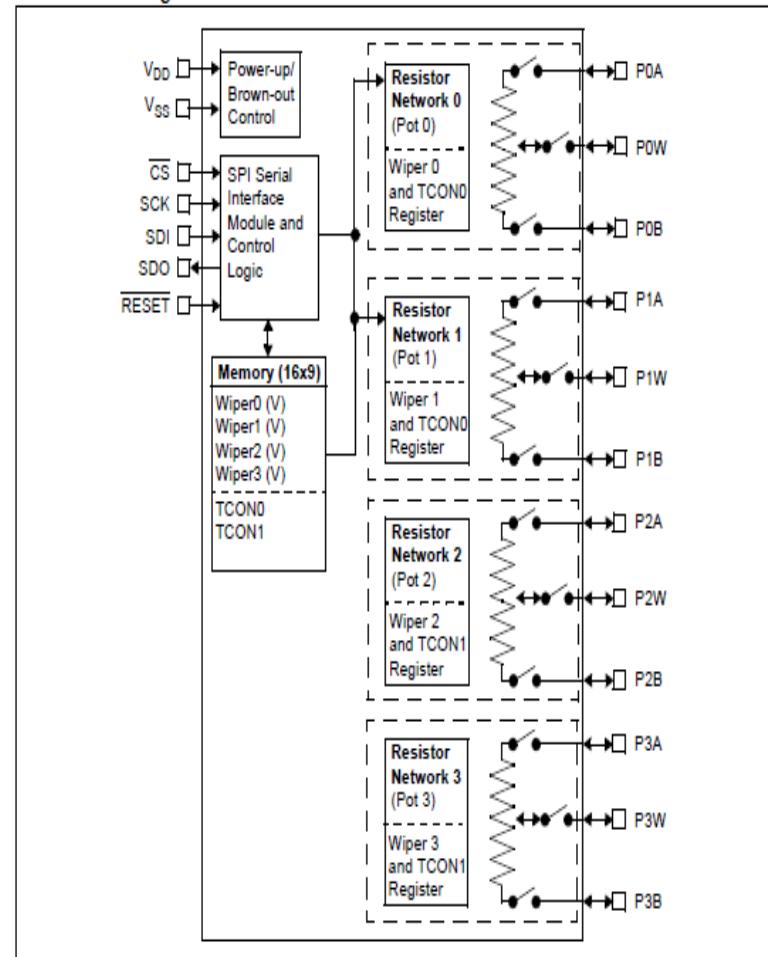
- Single or Dual Resistor Network options
- Potentiometer or Rheostat configuration options
- Resistor Network Resolution
 - 7-bit: 128 Resistors (129 Steps)
 - 8-bit: 256 Resistors (257 Steps)
- RAB Resistances options of: 5kΩ, 10kΩ, 50kΩ, 100kΩ
- Zero-Scale to Full-Scale Wiper operation
- Low Wiper Resistance: 75Ω (typ.)
- Low Tempco:
 - Absolute (Rheostat): 50ppm (typ.) 0°C to 70°C
 - Ratiometric (Potentiometer): 15ppm (typ.)
- I²C™ Serial interface
 - 100kHz, 400kHz and 3.4MHz support
- Serial protocol allows:
 - High-Speed Read/Write to wiper
 - Increment/Decrement of wiper
- Resistor Network Terminal Disconnect Feature via the Terminal Control (TCON) Register
- Brown-out reset protection: 1.5V (typ.)
- Serial Interface Inactive current: 2.5µA (typ.)
- High-Voltage Tolerant Digital Inputs: up to 12.5V
- Wide Operating Voltage:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3dB) Operation:
 - 2MHz (typ.) for 5.0kΩ device
- Extended temperature range: -40°C to +125°C



Features:

- Quad Resistor Network
- Volatile and nonvolatile memory options available
- Potentiometer or Rheostat Configuration Options
- Resistor Network Resolution:
 - 7-bit: 128 Resistors (129 Taps)
 - 8-bit: 256 Resistors (257 Taps)
- RAB Resistances Options of: 5kΩ, 10kΩ, 50kΩ, 100kΩ
- Zero Scale to Full Scale Wiper Operation
- Low Wiper Resistance: 75 Ω (typical)
- Low Tempco:
 - Absolute (Rheostat): 50 ppm typical (0°C to 70°C)
 - Ratiometric (Potentiometer): 15 ppm typical
- SPI Serial Interface (10 MHz, Modes 0,0 and 1,1):
 - High-Speed Read/Writes to wiper registers
- Resistor Network Terminal Disconnect Feature via Terminal Control (TCON) Register
- Reset Input Pin
- Brown-out Reset Protection (1.5V typical)
- Serial Interface Inactive Current (2.5 μA typical)
- High-Voltage Tolerant Digital Inputs: Up to 12.5V
- Supports Split Rail Applications
- Internal Weak Pull-up on all Digital Inputs
- Wide Operating Voltage: - 2.7V to 5.5V
 - Device Characteristics Specified - 1.8V to 5.5V
- Wide Bandwidth (-3 dB) Operation: 2 MHz (typ.) for 5.0 kΩ device
- Extended Temperature Range (-40°C to +125°C)

Device Block Diagram

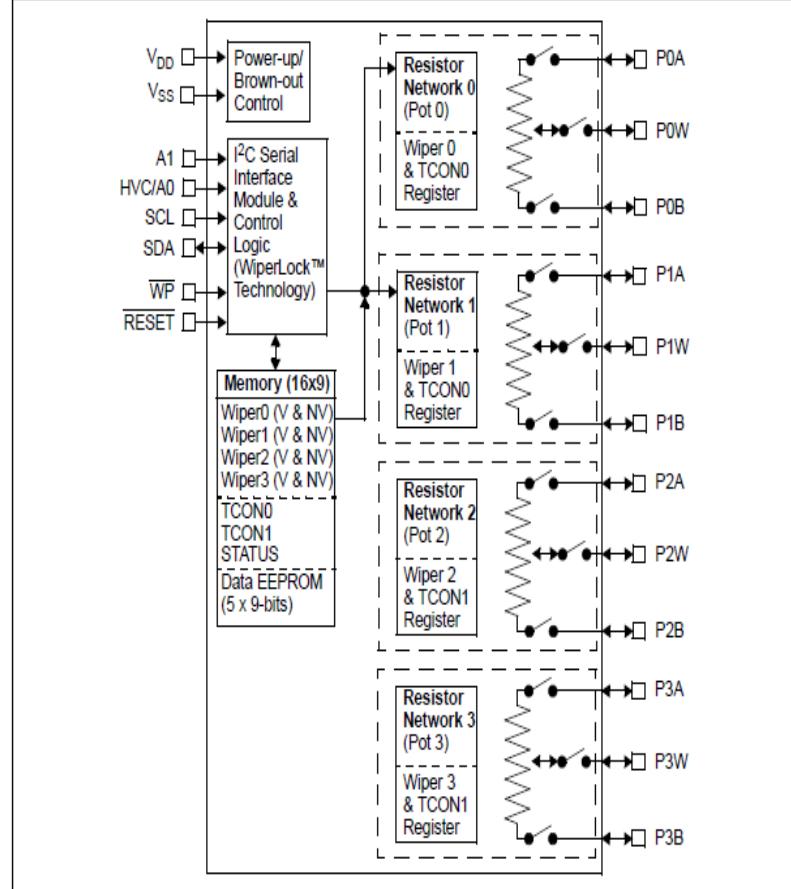


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Features:

- Quad Resistor Network
- Potentiometer or Rheostat Configuration Options
- Resistor Network Resolution:
 - 7-bit – 128 Resistors (129 Taps)
 - 8-bit – 256 Resistors (257 Taps)
- Four RAB Resistances options: 5kohm, 10kohm, 50kohm, 100kohm
- Zero-scale to Full-scale Wiper Operation
- Low Wiper Resistance – 75 Ω typical
- I²C Serial Interface Support: 100kHz, 400kHz, 3.4MHz
- Brown-out Reset Protection – 1.5V typical
- Serial Interface Inactive Current – 2.5 μ A typical
- High-Voltage Tolerant Digital Inputs Up to 12.5V
- Internal Weak Pull-up on All Digital Inputs, except SCL and SDA
- Wide Operating Voltage:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 5.5V - Device Operation
- Wide Bandwidth (-3 dB) Operation: 2 MHz typical (5.0 kohm Device)
- Extended Temperature Range (-40°C to +125°C)
- Three Package Options: 4x4 QFN-20 TSSOP-20 TSSOP-14

Device Block Diagram





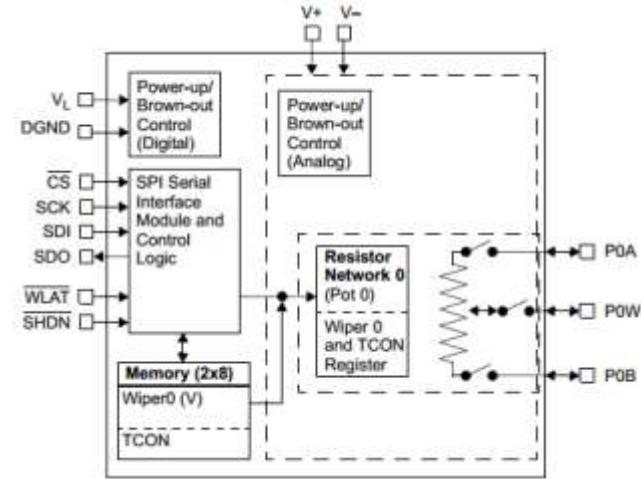
MICROCHIP

MCP41HV31/51

Online
Datasheet

Features:

- High-Voltage Analog Support:
 - +36V Terminal Voltage Range (DGND = V-)
 - $\pm 18V$ Terminal Voltage Range (DGND = V- + 18V)
- Wide Operating Voltage:
 - Analog: 10V to 36V (specified performance)
 - Digital: 2.7V to 5.5V
 - 1.8V to 5.5V (DGND \square V- + 0.9V)
- Single Resistor Network
- Potentiometer Configuration Options
- Resistor Network Resolution
 - 7-bit: 127 Resistors (128 Taps) MCP41HV31
 - 8-bit: 255 Resistors (256 Taps) MCP41HV51
- RAB Resistance Options:
 - 5 k Ω , 10 k Ω , 50 k Ω , 100 k Ω
- High Terminal/Wiper Current (IW) Support:
- Zero-Scale to Full-Scale Wiper Operation
- Low Wiper Resistance: 75 Ω (Typical)
- Low Tempco:
 - Absolute (Rheostat): 50 ppm Typical (0°C to +70°C)
 - Ratiometric (Potentiometer): 15 ppm Typical
- SPI Serial Interface
- Resistor Network Terminal Disconnect Via:
 - Shutdown Pin (SHDN) or Terminal Control (TCON) Register
- Write Latch (WLAT) Pin
- Power-On Reset / Brown-Out Reset
- Extended Temperature Range (-40°C to +125°C)
- Package Types: TSSOP-14 and QFN-20 (5x5)



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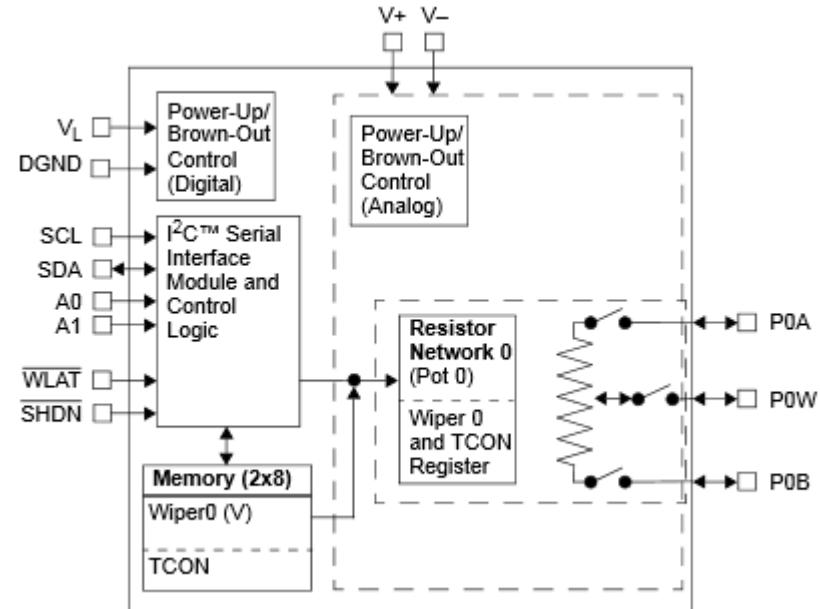
MICROCHIP

MCP45HV31/51

Online
Datasheet

Features:

- High-Voltage Analog Support:
 - +36V Terminal Voltage Range (DGND = V-)
 - $\pm 18V$ Terminal Voltage Range (DGND = V- + 18V)
- Wide Operating Voltage:
 - Analog: 10V to 36V (specified performance)
 - Digital: 2.7V to 5.5V
 - 1.8V to 5.5V (DGND \square V- + 0.9V)
- Single Resistor Network
- Resistor Network Resolution
 - 7-bit: 127 Resistors (128 Taps) MCP45HV31
 - 8-bit: 255 Resistors (256 Taps) MCP45HV51
- RAB Resistance Options:
 - 5 k Ω , 10 k Ω , 50 k Ω , 100 k Ω
- High Terminal/Wiper Current (IW) Support
- Zero-Scale to Full-Scale Wiper Operation
- Low Wiper Resistance: 75 Ω (Typical)
- Low Tempco:
 - Absolute (Rheostat): 50 ppm Typical (0°C to +70°C)
 - Ratiometric (Potentiometer): 15 ppm Typical
- I²C Serial Interface
- Resistor Network Terminal Disconnect Via:
 - Shutdown Pin (SHDN) or Terminal Control (TCON) Register
- Write Latch (WLAT) Pin
- Power-On Reset / Brown-Out Reset
- Extended Temperature Range (-40°C to +125°C)
- Package Types: TSSOP-14 and QFN-20 (5x5)



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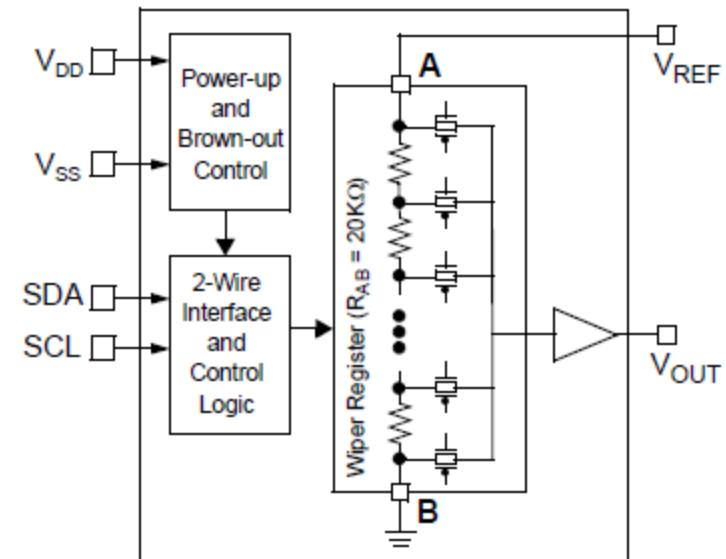
MICROCHIP

MCP47A1

Online
Datasheet

Features:

- 6-bit DAC
 - 65 Taps: 64 Resistors with Taps to Full-Scale and Zero-Scale
- VREF Pull-down Resistance: 20 kOhms (typical)
- VOUT Voltage Range: VSS to VREF
- SMBus/ I²C Compatible Interface
- Brown-out Reset Protection (1.5V typical)
- Power-on Default Wiper Setting (Mid-scale)
- Low-Power Operation: 90 μ A Static Current (typ.)
- Wide Operating Voltage Range: - 1.8V to 5.5V
- Low Tempco: 15 ppm (typ.)
- 100 kHz (typical) Bandwidth (-3 dB) Operation
- Extended Temperature Range: -40°C to +125°C
- 6-lead SC70



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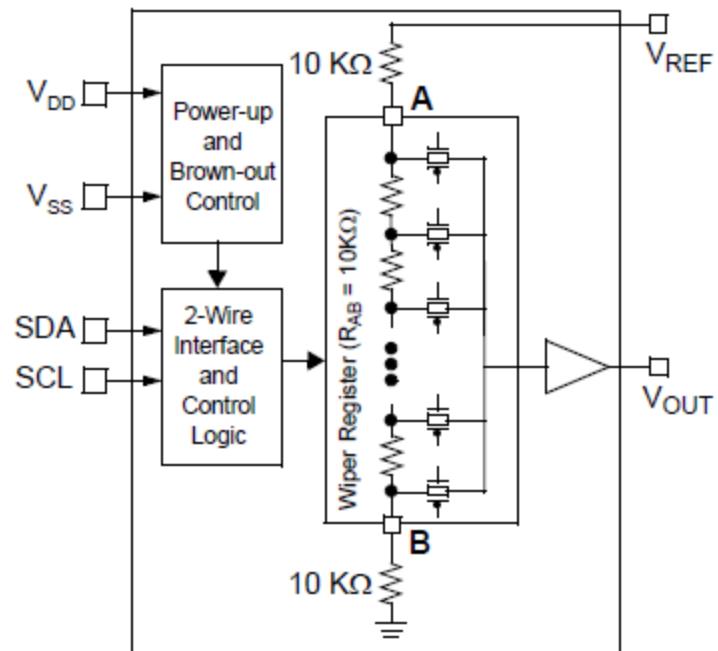
MICROCHIP

MCP47DA1

Online
Datasheet

Features:

- 6-bit DAC
 - 65 Taps: 64 Resistors with Taps to Full-Scale and Zero-Scale (Wiper Code 00h to 40h)
 - 7-bit Serial Data (00h to 7Fh, 00h - 20h = Zero-Scale and 60h - 7Fh = Full-Scale)
- VREF Pull-down Resistance: 30 k Ω (typ.)
- VOUT Voltage Range
 - 1/3 * VREF to 2/3 * VREF
- SMBus/ I²C Compatible Interface
- Brown-out Reset Protection (1.5V typ.)
- Power-on Default Wiper Setting (Mid-scale)
- Low-Power Operation: 90 μ A Static Current (typ.)
- Wide Operating Voltage Range:
 - 2.7V to 5.5V - Device Characteristics Specified
 - 1.8V to 2.7V - Device Operation
- Low Tempco: 15 ppm (typ.)
- 100 kHz (typical) Bandwidth (-3 dB) Operation
- Extended Temperature Range (-40°C to +125°C)
- 6-lead SOT-23, SC70



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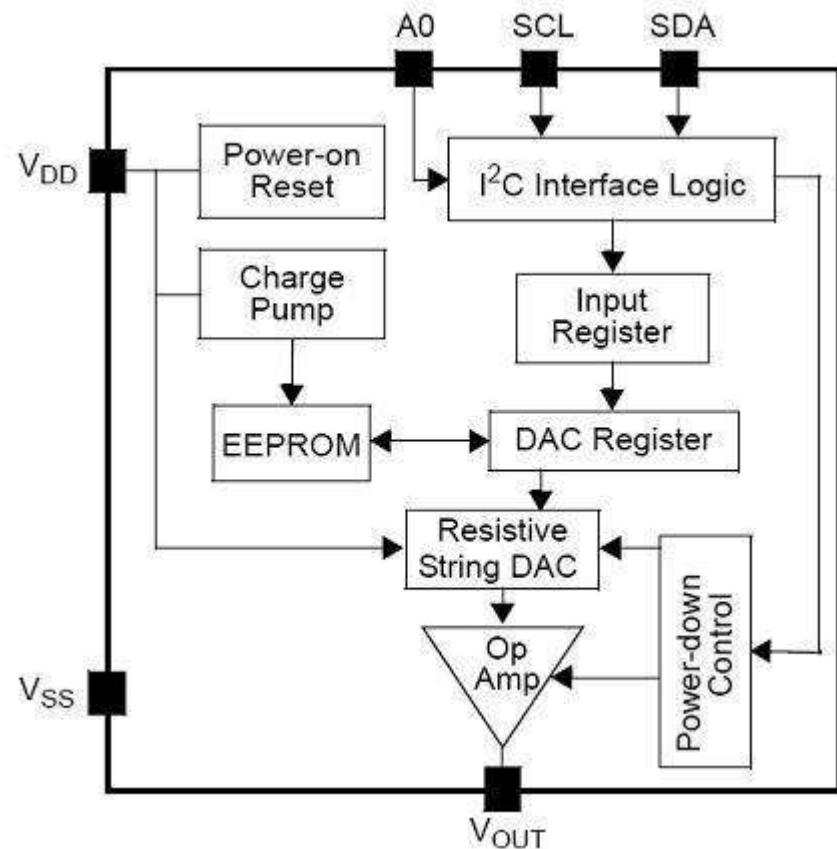
MICROCHIP

MCP4725

Online
Datasheet

Features:

- 12-bit Resolution
- On-Board Non-Volatile Memory (EEPROM)
- ± 0.2 LSB DNL (typ.)
- External A0 Address Pin
- Normal or Power-Down Mode
- Fast Settling Time of $6\mu\text{s}$ (typ.)
- External Voltage Reference (V_{DD})
- Rail-to-Rail Output
- Low Power Consumption
- Single-Supply Operation: 2.7V to 5.5V
- I²C™ Interface:
 - Eight Available Addresses
 - Standard (100 kbps), Fast (400 kbps), and High-Speed (3.4 Mbps) Modes
- Extended Temperature Range: -40°C to +125°C
- 6-lead SOT-23 Package



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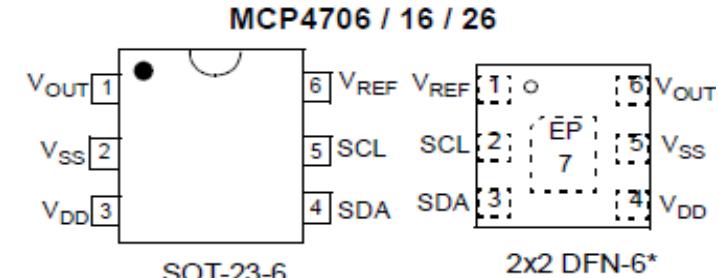
MICROCHIP

MCP4706/16/26

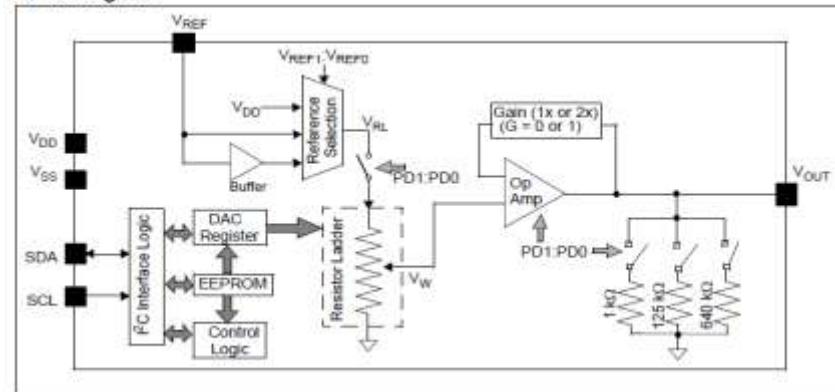
Online
Datasheet

Features:

- Output Voltage Resolutions
 - 12-bit: MCP4726
 - 10-bit: MCP4716
 - 8-bit: MCP4706
- Fast Settling Time of 6 μ s (typ.)
- Rail-to-Rail Output
- DAC Voltage Reference Options
 - V_{DD} or V_{REF} Pin
- Output Gain Options: Unity (1x) or 2x
- Nonvolatile Memory (EEPROM)
 - Auto Recall of DAC register setting
 - Auto Recall of Device Configuration
- Low Power Consumption
 - Normal Operation: 210 μ A (typ.)
 - Power Down: 60 nA (typ.)
- Power Down Modes
- Single-Supply Operation: 2.7V to 5.5V
- I²C™ Interface
- Small 6-lead SOT-23 and 2x2 DFN Packages
- Extended Temperature Range: -40°C to +125°C



Block Diagram



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MICROCHIP

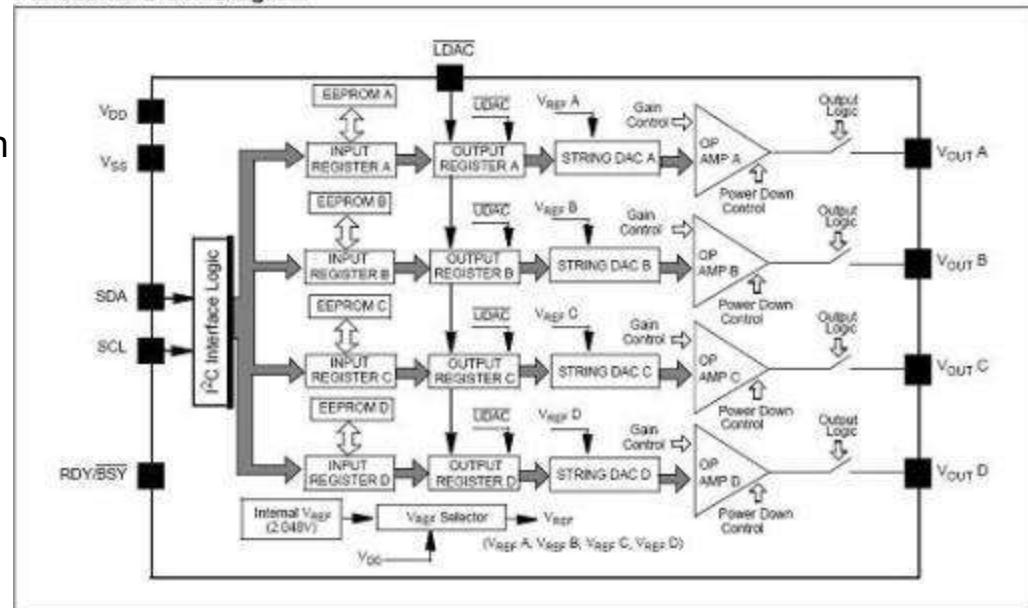
MCP4728

Online
Datasheet

Features:

- 12-Bit Voltage Output DAC with 4 Buffered Outputs
- On-Board Non-Volatile Memory (EEPROM) for DAC Codes and I²C™ Address Bits
- Internal or External Voltage Reference Selection
- Output Voltage Range:
 - Using Internal V_{REF} (2.048V): 0.000V to 2.048V with Gain Setting = 1
0.000V to 4.096V with Gain Setting = 2
 - Using External V_{REF} (V_{DD}): 0.000V to V_{DD}
- ± 0.2 LSB DNL (typ.)
- Fast Settling Time: 6 μ s (typ.)
- Normal or Power-Down Mode
- Low Power Consumption
- Single-Supply Operation: 2.7V to 5.5V
- I²C Interface:
 - Address bits: User Programmable to EEPROM
 - Standard (100 kbps), Fast (400 kbps) and High Speed (3.4 Mbps) Modes
- 10-Lead MSOP Package
- Extended Temperature Range: -40°C to +125°C

Functional Block Diagram



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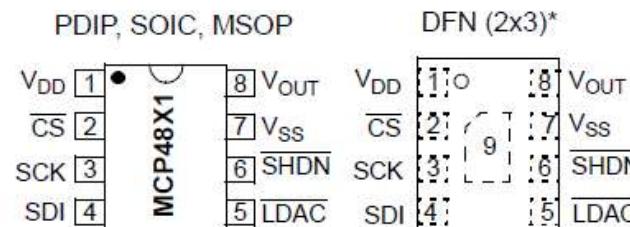
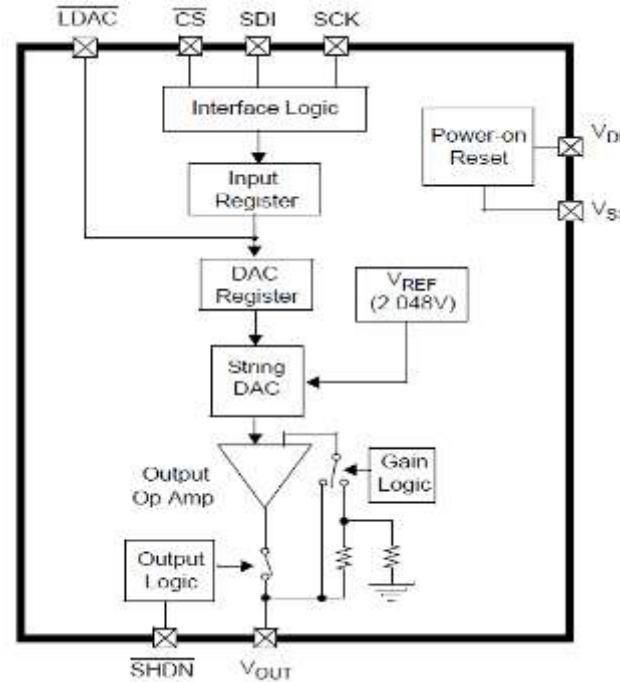
MICROCHIP

MCP4801/4811/4821

Online
Datasheet

Features:

- MCP4801: 8-Bit Voltage Output DAC
- MCP4811: 10-Bit Voltage Output DAC
- MCP4821: 12-Bit Voltage Output DAC
- Rail-to-Rail Output
- SPI Interface with 20 MHz Clock Support
- Simultaneous Latching of the DAC Output with LDAC Pin
- Fast Settling Time of 4.5 μ s
- Selectable Unity or 2x Gain Output
- 2.048V Internal Voltage Reference
- 50ppm/ $^{\circ}$ C V_{REF} Temperature Coefficient
- 2.7V to 5.5V Single-Supply Operation
- Extended Temperature Range:
-40 $^{\circ}$ C to +125 $^{\circ}$ C



MCP4801: 8-bit single DAC

MCP4811: 10-bit single DAC

MCP4821: 12-bit single DAC

* Includes Exposed Thermal Pad (EP)

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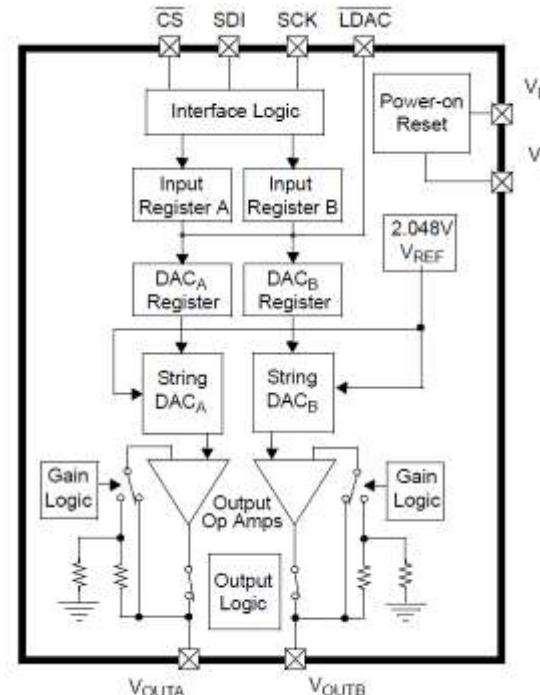
MICROCHIP

MCP4802/4812/4822

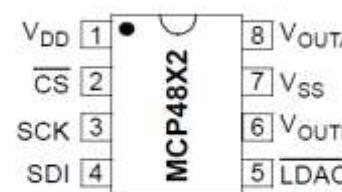
Online
Datasheet

Features:

- MCP4802: Dual 8-Bit Voltage Output DAC
- MCP4812: Dual 10-Bit Voltage Output DAC
- MCP4822: Dual 12-Bit Voltage Output DAC
- Rail-to-Rail Output
- SPI Interface with 20 MHz Clock Support
- Simultaneous Latching of the Dual DACs with LDAC pin
- Fast Settling Time of 4.5 μ s
- Selectable Unity or 2x Gain Output
- 2.048V Internal Voltage Reference
- 50ppm/ $^{\circ}$ C V_{REF} Temperature Coefficient
- 2.7V to 5.5V Single-Supply Operation
- Extended Temperature Range:
-40 $^{\circ}$ C to +125 $^{\circ}$ C



8-Pin PDIP, SOIC, MSOP



MCP4802: 8-bit dual DAC
MCP4812: 10-bit dual DAC
MCP4822: 12-bit dual DAC

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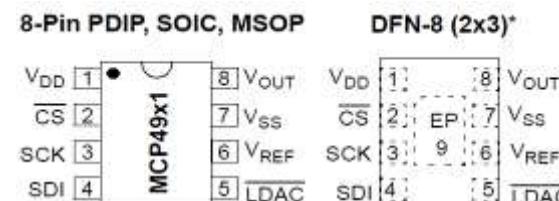
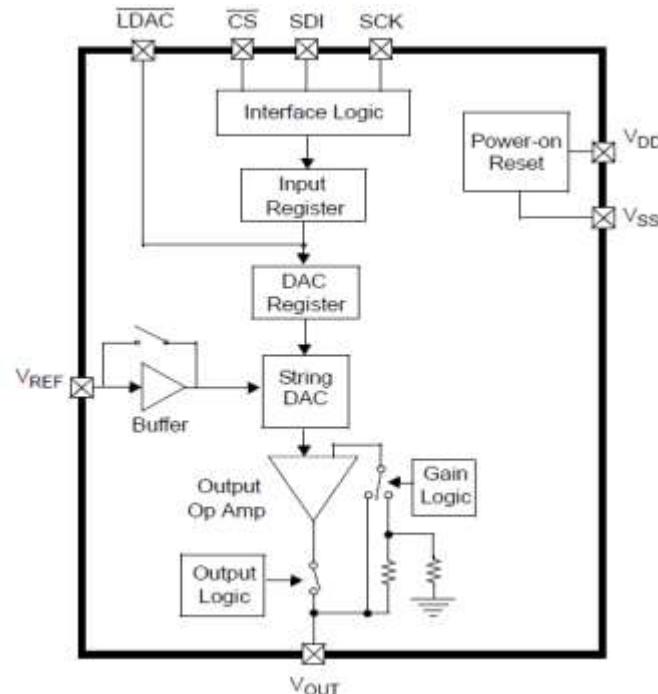
MICROCHIP

MCP4901/4911/4921

Online
Datasheet

Features:

- MCP4901: 8-Bit Voltage Output DAC
- MCP4911: 10-Bit Voltage Output DAC
- MCP4921: 12-Bit Voltage Output DAC
- Rail-to-Rail Output
- SPI Interface with 20 MHz Clock Support
- Simultaneous Latching of the DAC Output with LDAC Pin
- Fast Settling Time of 4.5 μ s
- Selectable Unity or 2x Gain Output
- External Voltage Reference Input
- External Multiplier Mode
- 2.7V to 5.5V Single-Supply Operation
- Extended Temperature Range:
-40°C to +125°C



MCP4901: 8-bit single DAC

MCP4911: 10-bit single DAC

MCP4921: 12-bit single DAC

* Includes Exposed Thermal Pad (EP)

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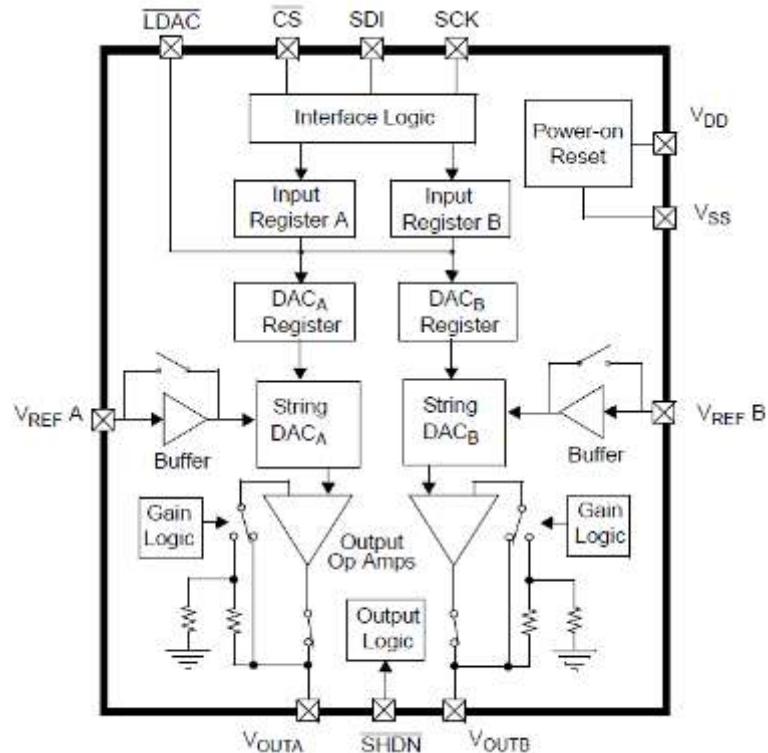
MICROCHIP

MCP4902/4912/4922

Online
Datasheet

Features:

- MCP4902: Dual 8-Bit Voltage Output DAC
- MCP4912: Dual 10-Bit Voltage Output DAC
- MCP4922: Dual 12-Bit Voltage Output DAC
- Rail-to-Rail Output
- SPI Interface with 20 MHz Clock Support
- Simultaneous Latching of the Dual DACs with LDAC pin
- Fast Settling Time of 4.5 μ s
- Selectable Unity or 2x Gain Output
- External Voltage Reference Inputs
- External Multiplier Mode
- 2.7V to 5.5V Single-Supply Operation
- Extended Temperature Range:
-40°C to +125°C



14-Pin PDIP, SOIC, TSSOP

V _{DD}	1	V _{OUTA}	14
NC	2	V _{REFA}	13
CS	3	V _{SS}	12
SCK	4	V _{REFB}	11
SDI	5	V _{OUTB}	10
NC	6	SHDN	9
NC	7	LDAC	8

MCP4902: 8-bit dual DAC

MCP4912: 10-bit dual DAC

MCP4922: 12-bit dual DAC

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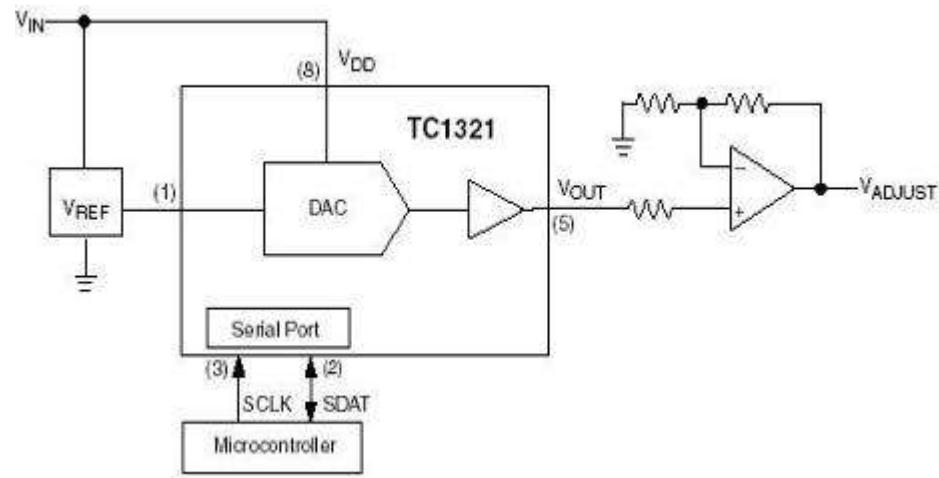
MICROCHIP

TC1321

Online
Datasheet

Features:

- 10-bit Voltage Output DAC
- 2.5V to 5.5V Singly Supply Operation
- Simple SMBus/I²C™ Serial Interface
- Low Power:
350µA Operation, 0.5µA Shutdown
- 8-Pin SOIC and 8-Pin MSOP Packages



<< BACK



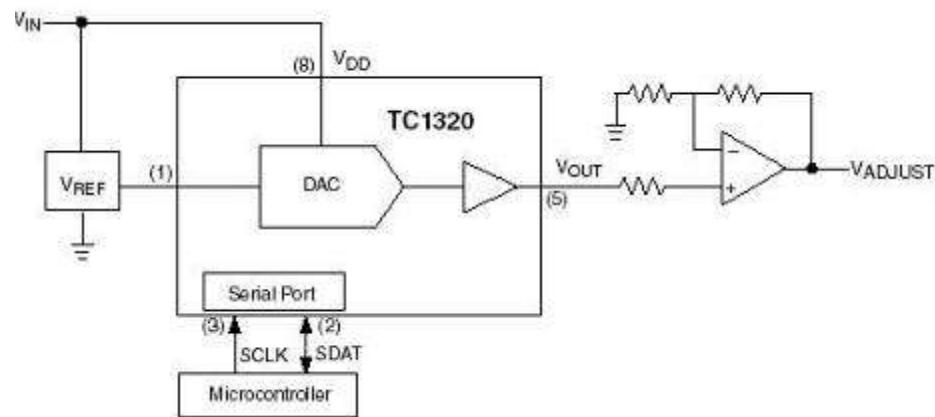
MICROCHIP

TC1320

Online
Datasheet

Features:

- 8-bit Voltage Output DAC
- 2.5V to 5.5V Singly Supply Operation
- Simple SMBus/I²C™ Serial Interface
- Low Power:
350µA Operation, 0.5µA Shutdown
- 8-Pin SOIC and 8-Pin MSOP Packages



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MICROCHIP

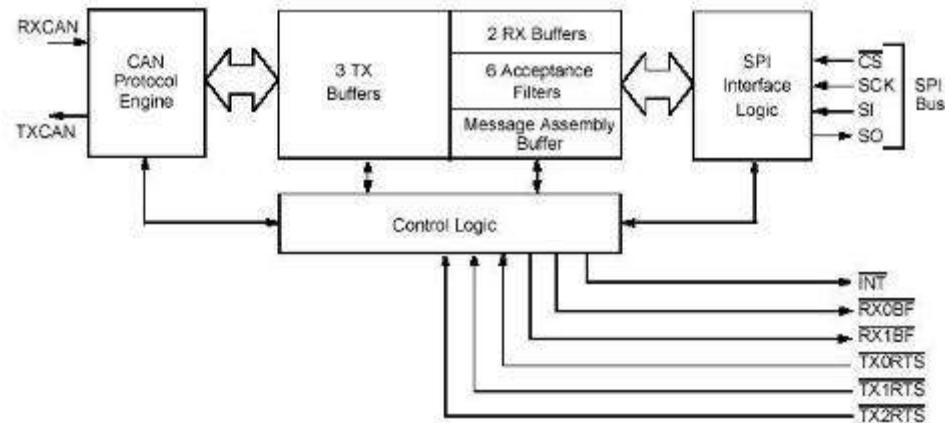
MCP2510

Online
Datasheet

Recommend MCP2515 for new designs

Features:

- Implements Full CAN V2.0A and V2.0B at 1 Mb/s:
 - 0 - 8 byte message length
 - Standard and extended data frames, Support for remote frames
 - Programmable bit rate up to 1 Mb/s
 - Two receive buffers with prioritized message storage
 - Six full acceptance filters, Two full acceptance filter masks
 - Three transmit buffers with prioritization and abort feature
 - Loop-back mode for self test operation
- Hardware Features:
 - High Speed SPI Interface (5MHz at 4.5V I-temp)
 - Supports SPI modes 0, 0 and 1, 1
 - Clock out pin with programmable prescaler
 - Interrupt output pin with selectable enables
 - 'Buffer full' output pins configurable as interrupt pins for each receive buffer or as general purpose digital outputs
 - 'Request to Send' input pins configurable as control pins to request immediate message transmission for each transmit buffer general purpose digital inputs
 - Low Power Sleep mode
- Low power CMOS technology:
 - Operates from 3.0V to 5.5V
 - 5mA active current typical
 - 10 μ A standby current typical at 5.5V
- Temperature ranges supported: Extended: -40°C to +125°C



[MCP2515 >>](#)

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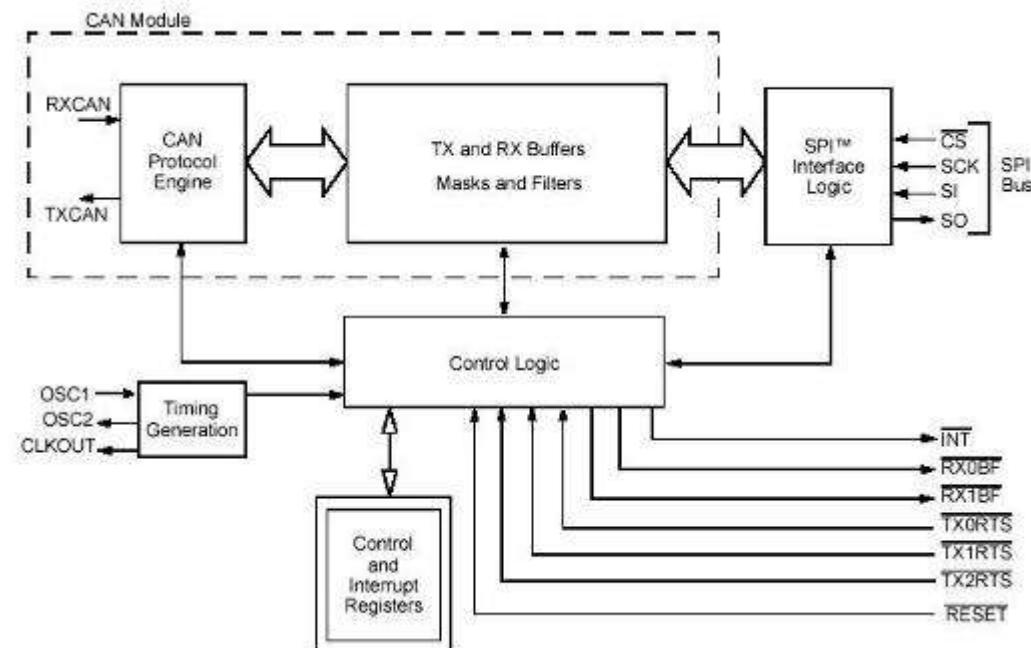
MICROCHIP

MCP2515

Online
Datasheet

Features:

- Implements CAN V2.0B at 1 Mb/s
- 0 - 8 byte length in the data field
- Standard and extended data and remote frames
- Receive buffers, masks and filters
- Data byte filtering on the first two data bytes (applies to standard data frames)
- Three transmit buffers with prioritization and abort features
- High-speed SPITM Interface (10MHz):
 - One-Shot mode ensures message transmission is attempted only one time
- Clock out pin with programmable prescaler
- Start-of-Frame (SOF) signal is available for monitoring the SOF signal
- Interrupt output pin with selectable enables
- Buffer Full output pins configurable as
 - Interrupt output for receive buffer
 - General purpose Output
- Request-to-Send (RTS) input pins individually configurable as
 - Control pins to request transmission for each transmit buffer
 - General Purpose inputs
- Low-Power CMOS technology
 - Operates from 2.7V to 5.5V
 - 5mA active current (typ.)
 - 1µA standby current (typ.) (Sleep mode)
- Temperature ranges: -40°C to +125°C



[MCP2510 >>](#)

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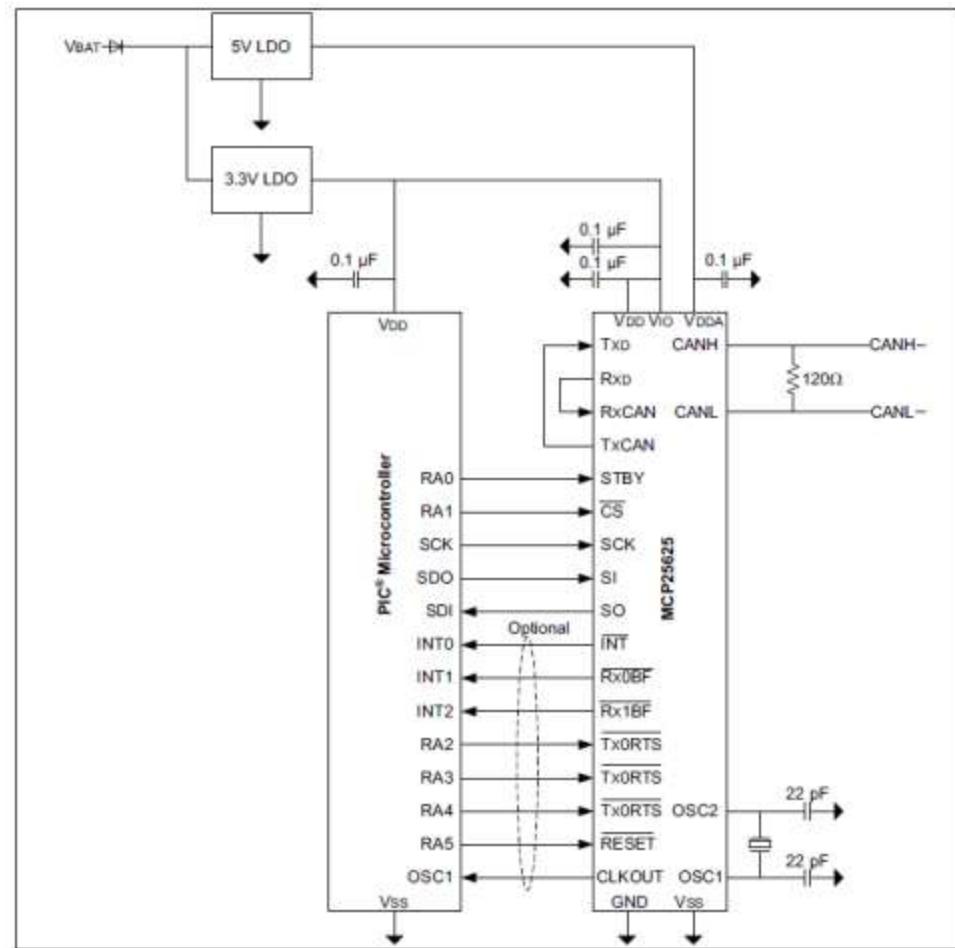
MICROCHIP

MCP25625

Online
Datasheet

Features:

- Stand-Alone CAN2.0B Controller with Integrated CAN Transceiver and Serial Peripheral Interface (SPI)
- Up to 1 Mb/s Operation
- Very Low Standby Current (10 μ A, typical).
- Up to 10 MHz SPI Clock Speed
- Interfaces Directly with Microcontrollers with 2.7V to 5.5V I/O
- Packages: SSOP-28L and 6x6 QFN-28L
- Extended Temperature Range:
-40°C to +125°C



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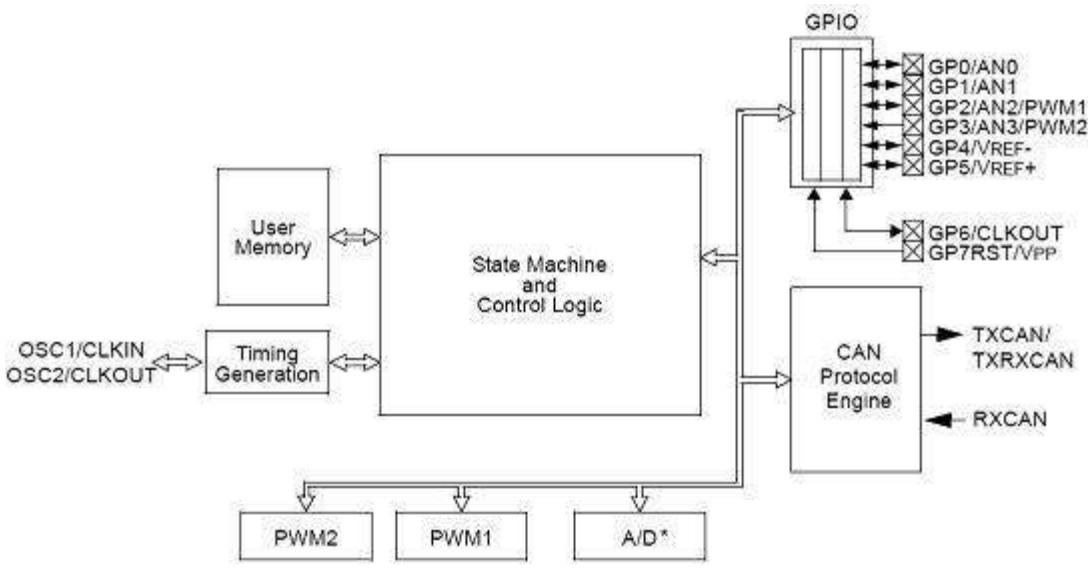
MICROCHIP

MCP25020/25

Online
Datasheet

Features:

- Implements CAN V2.0B
 - Programmable bit rate up to 1 Mb/s
 - One programmable mask, two programmable filters
 - Three auto-transmit buffers, two message reception buffers
 - Does not require synchronization or configuration messages
 - Enables simple CAN nodes to be created without an MCU
- Hardware Features
 - Non-volatile memory for user configuration
 - User configuration automatically loaded on power-up
 - 8 GPIO lines individually selectable as inputs or outputs
 - Individually selectable transmit-on-pin change for each input
 - Programmable conversion clock and V_{REF} sources (MCP2505X devices only)
 - Message scheduling capability
 - Two 10-bit PWM outputs with independently programmable frequencies
 - Device configuration can be modified via CAN bus messages
 - In-Circuit Serial Programming™ (ICSP™) of default configuration memory
 - Optional 1-wire CAN bus operation
- Low-power CMOS technology
 - Operates from 2.7V to 5.5V
 - 10mA active current (typ.)
 - 30 μ A standby current (CAN Sleep mode)
- 14-pin PDIP (300 mil) and SOIC (150 mil) packages
- Available temperature ranges:
 - Industrial (I): -40°C to +85°C
 - Extended (E): -40°C to +125°C



* Only the MCP2505X devices have the A/D module.

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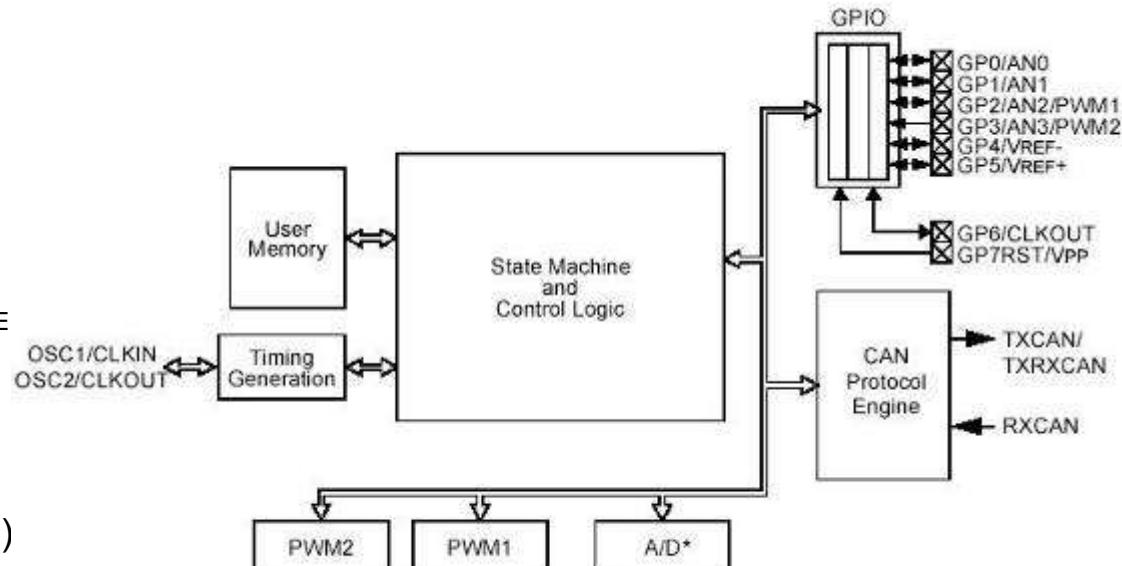
MICROCHIP

MCP25050/5

Online
Datasheet

Features:

- Implements CAN V2.0B
 - Programmable bit rate up to 1 Mb/s
- Hardware Features
 - Non-volatile memory for configuration
 - Eight general-purpose I/O lines
 - Individually selectable transmit-on-pin change for each input
 - Programmable conversion clock and V_{RE} (MCP2505X devices only)
 - Message scheduling capability
 - Two 10-bit PWM outputs with independently programmable frequencies
 - In-Circuit Serial Programming™ (ICSP™) of default configuration memory
 - Optional 1-wire CAN bus operation
- Low-power CMOS technology
 - Operates from 2.7V to 5.5V
 - 30 μ A standby current (CAN Sleep mode)
- 14-pin PDIP and SOIC packages
- Available temperature ranges:
 - Industrial (I): -40°C to +85°C
 - Extended (E): -40°C to +125°C



* Only the MCP2505X devices have the A/D module.

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MICROCHIP

MCP2551

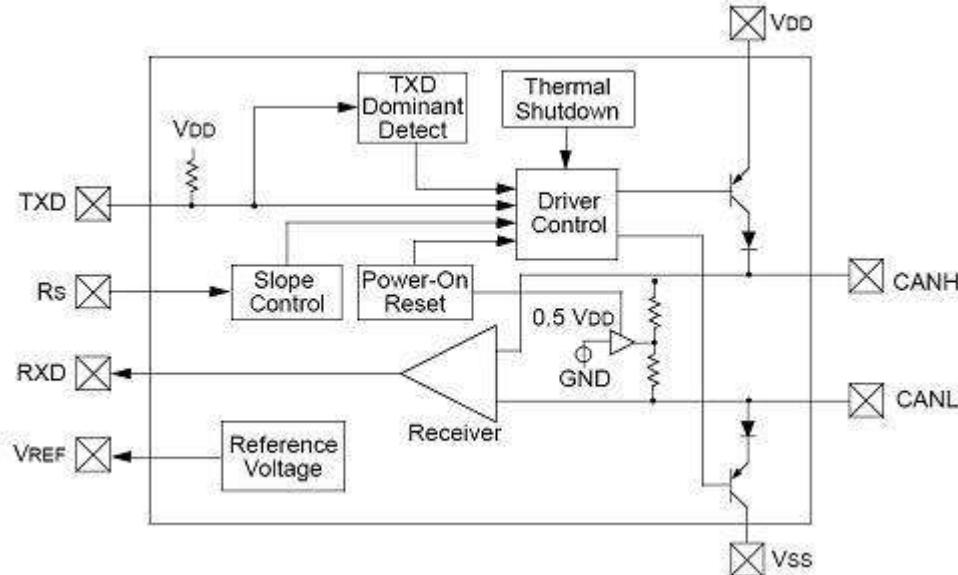
Online
Datasheet

Recommend MCP2561 for new designs

Features:

- Supports 1 Mb/s operation
- Implements ISO-11898 standard physical layer requirements
- Suitable for 12V and 24V systems
- Externally-controlled slope for reduced RFI emissions
- Detection of ground fault (permanent dominant) on TXD input
- Power-on reset and voltage brown-out protection
- An unpowered node or brown-out event will not disturb the CAN bus
- Low current standby operation
- Protection against damage due to short-circuit conditions (positive or negative battery voltage)
- Protection against high-voltage transients
- Automatic thermal shutdown protection
- Up to 112 nodes can be connected
- High noise immunity due to differential bus implementation
- Temperature ranges: -40°C to +125°C

[MCP2561>>](#)



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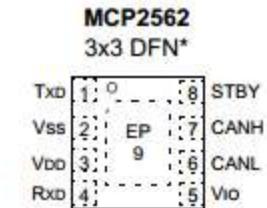
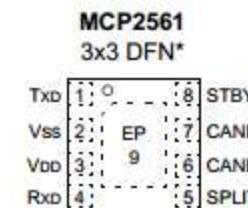
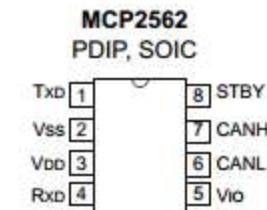
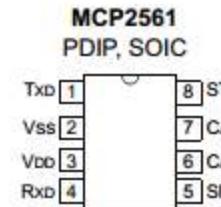
MICROCHIP

MCP2561/2

Online
Datasheet

Features:

- Supports 1 Mb/s operation
- Implements ISO-11898-5 standard physical layer requirements
- Very low standby current (Typ: 5µA)
- VIO supply pin (MCP2562) to interface directly to CAN controllers and microcontrollers with 1.8V to 5V I/O
- SPLIT output pin (MCP2561) to stabilize common mode in biased split termination schemes
- Permanent dominant detection on TxD and bus
- Power-on Reset and voltage brown-out protection on VDD and VIO pin
- Short-circuit protection
- Protection against high-voltage transients
- Thermal Shutdown protection
- Suitable for 12V and 24V systems
- Up to 112 nodes can be connected
- High-noise immunity
- High ESD protection on CANH and CANL, IEC61000-4-2 > 8kV
- Available in PDIP-8L, SOIC-8L and 3x3 DFN-8L.
- Temperature ranges: Extended -40°C to +125°C, High -40°C to +150°C



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MICROCHIP

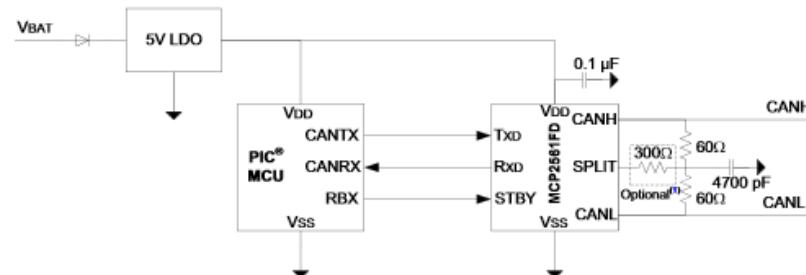
MCP2561/2FD

Online
Datasheet

Features:

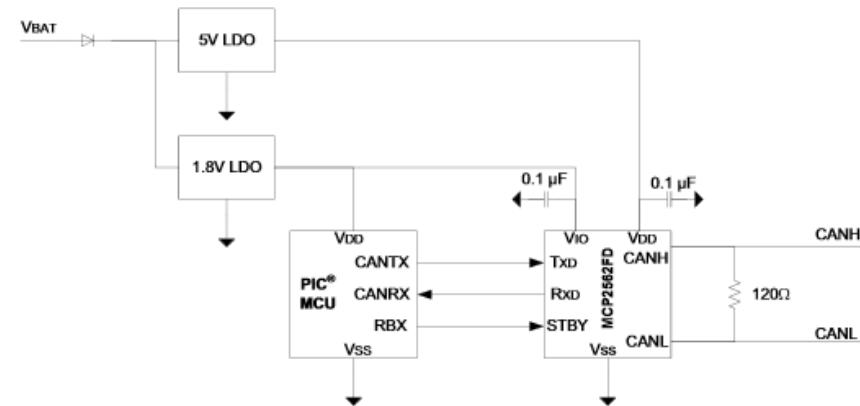
- Optimized for CAN FD (Flexible Data rate) at 2, 5 & 8 Mbps
 - Maximum Propagation Delay: 120 ns
 - Loop Delay Symmetry: -10%/+10% (2 Mbps)
- Implements ISO-11898-2 & ISO-11898-5 Standard Physical Layer
- Very Low Standby Current of 5 μ A (typical)
- VIO Supply Pin to Interface Directly to CAN Controllers and Microcontrollers with 1.8V to 5.5V I/O
- SPLIT Output Pin
- Detection of Ground Fault
- Power-on Reset and Voltage Brown-Out Protection on VDD Pin
- Short-Circuit Protection
- Protection Against High-Voltage Transients
- Automatic Thermal Shutdown Protection
- Suitable for 12V and 24V Systems
- Meets/exceeds automotive requirements including “Hardware Requirements for LIN, CAN and FlexRay Interfaces in Automotive Applications”, Version 1.3, May 2012
- ESD Protection on CANH & CANL, IEC61000-4-2 up to ± 14 kV
- Available in PDIP-8L, SOIC-8L and 3x3 DFN-8L
- Temperature ranges:
 - Extended (E): -40°C to +125°C
 - High (H): -40°C to +150°C

FIGURE 1-1: MCP2561FD WITH SPLIT PIN



Note 1: Optional resistor to allow communication during bus failure (CANL shorted to ground).

FIGURE 1-2: MCP2562FD WITH VIO PIN



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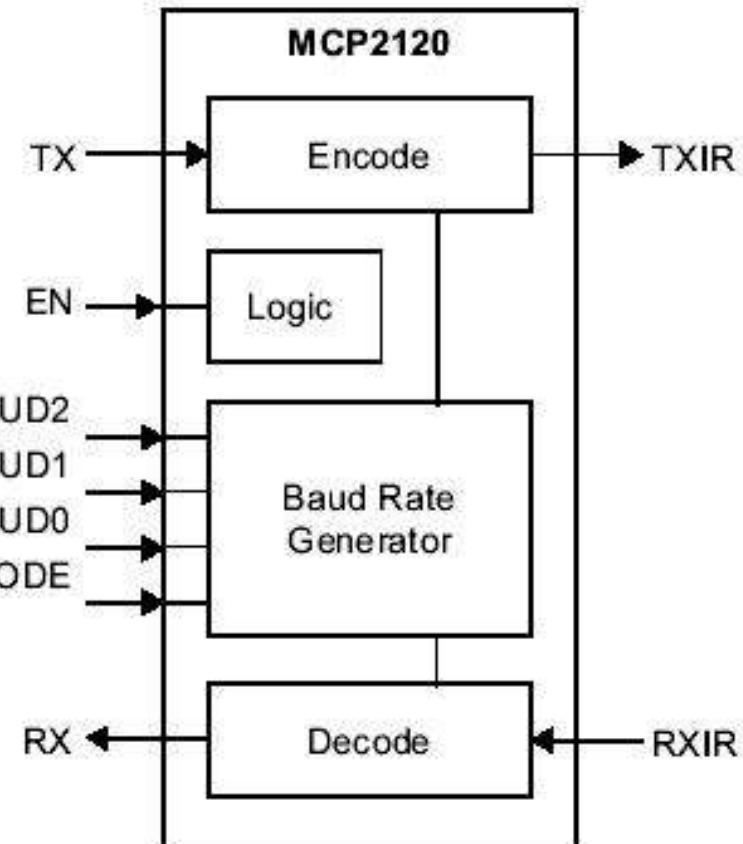
MICROCHIP

MCP2120

Online
Datasheet

Features:

- Supports IrDA® Physical Layer Specification (version 1.3)
- UART to IR Encoder/Decoder
 - Interfaces with IrDA Compliant Transceivers
 - Used with any UART, including standard 16550 UART and microcontroller UART
- Transmit/Receive formats supported:
 - 1.63µs
- Hardware or Software Baud rate selection
 - Up to IrDA standard 115.2 kbaud operation
 - Up to 312.5 kbaud operation (at 20MHz)
 - Low power mode
- Pb-free packaging



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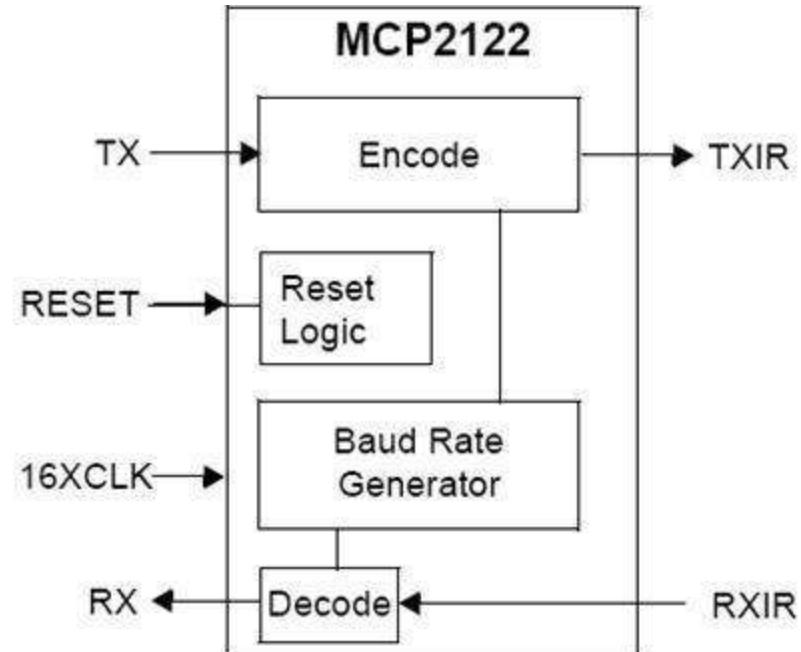
MICROCHIP

MCP2122

Online
Datasheet

Features:

- Pinout compatible with HSDL-7000
- Compliant with IrDA® Standard Physical Layer Specification (version 1.3)
- UART to IrDA Standard Encoder/Decoder
 - Interfaces with IrDA Standard Compliant Transceiver
- Baud Rates:
 - Up to IrDA Standard 115.2 kbaud Operation
- Transmit/Receive Formats (Bit Width) Supported:
 - 1.63µs
- Low-power Mode (2µA at 1.8V, +125°C)
- Pb-free packaging



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MICROCHIP

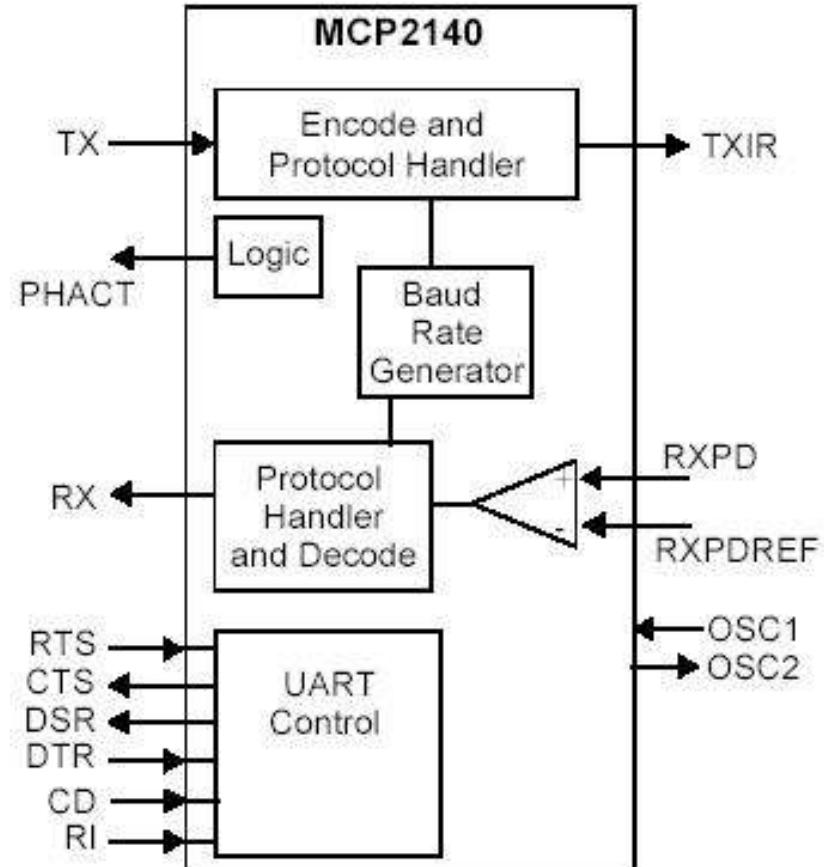
MCP2140

Online
Datasheet

Recommend MCP2140A for new designs

Features:

- Implements the IrDA® standard
- Provides IrDA standard physical signal layer support including:
 - Bidirectional communication
 - CRC implementation
 - Fixed Data communication rate of 9600 baud
- Includes UART-to-IrDA standard encoder/decoder functionality:
 - Easily interfaces with industry standard UARTs and infrared transceivers
- UART interface for connecting to Data Communications Equipment (DCE) or Data Terminal Equipment (DTE) systems
- Transmit/Receive formats (bit width) supported:
 - 1.63µs
- Hardware UART Support:
 - 9.6 kbaud baud rate
 - 29 Byte Data Buffer Size
- Infrared Supported:
 - 9.6 kbaud baud rate
 - 64 Byte Data Packet Size
- Operates as Secondary Device
- Automatic Low Power mode
 - < 60µA when no IR activity present (PHACT = L)



[MCP2140A >>](#)

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MICROCHIP

MCP2140A

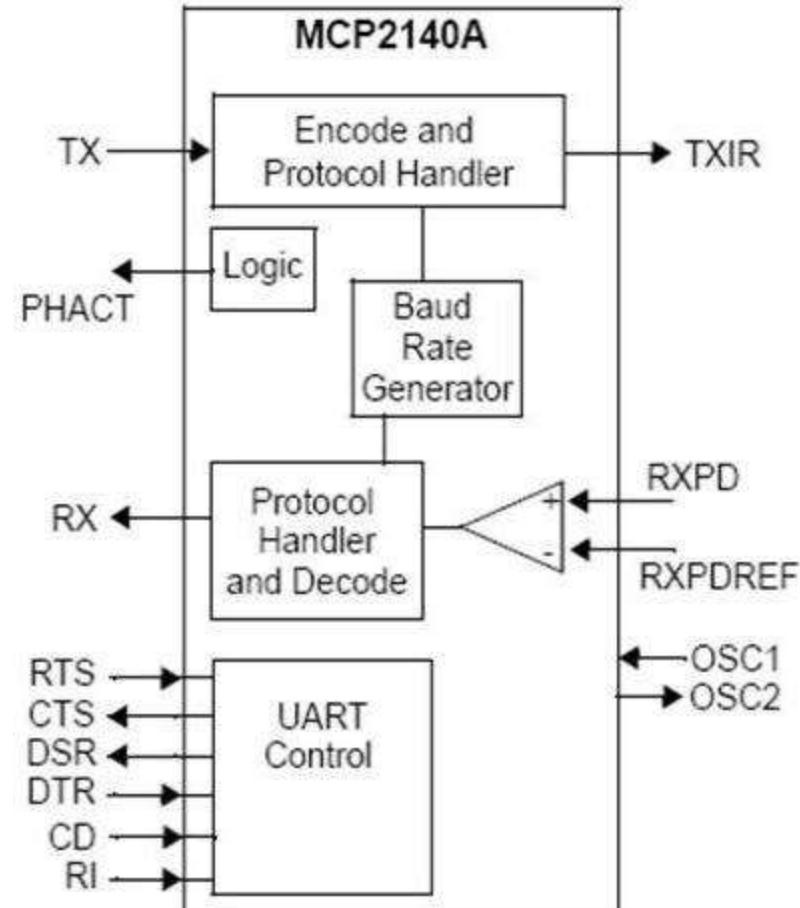
Online
Datasheet

Features:

- Implements the IrDA® standard
- Provides IrDA standard physical signal layer
- Includes UART-to-IrDA standard encoder/ decoder functionality
- Easily communicates with 16-bit PIC Microcontroller IrDA Standard Stack Library
- UART interface for connecting to Data Communications Equipment (DCE) or Data Terminal Equipment (DTE) systems
- Transmit/Receive formats (bit width) supported:
1.63µs (Transmit & Receive), 3/16 bit time (Receive Only)
- Hardware UART Support:
9.6 kbaud baud rate, 60 Byte Data Buffer Size (64 Byte Packet)
- Infrared Supported:
 - 9.6 kbaud baud rate, 64 Byte Packet Size (60 Data Bytes)
- Operates as Secondary Device
- Wide Operating Voltage: 2.0V to 5.5V
- Automatic Low Power mode:
< 23µA (max.) @ 2.0V, when no IR activity present (PHACT = L)
- Footprint Compatibility with MCP2140

CMOS Technology

- Low power, high-speed CMOS technology
- Low voltage operation
- Industrial temperature range
- Low power consumption:
 - < 407µA (max.) @ 2.0V, 3.6864 MHz



[MCP2140 >>](#)

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MICROCHIP

MCP2150

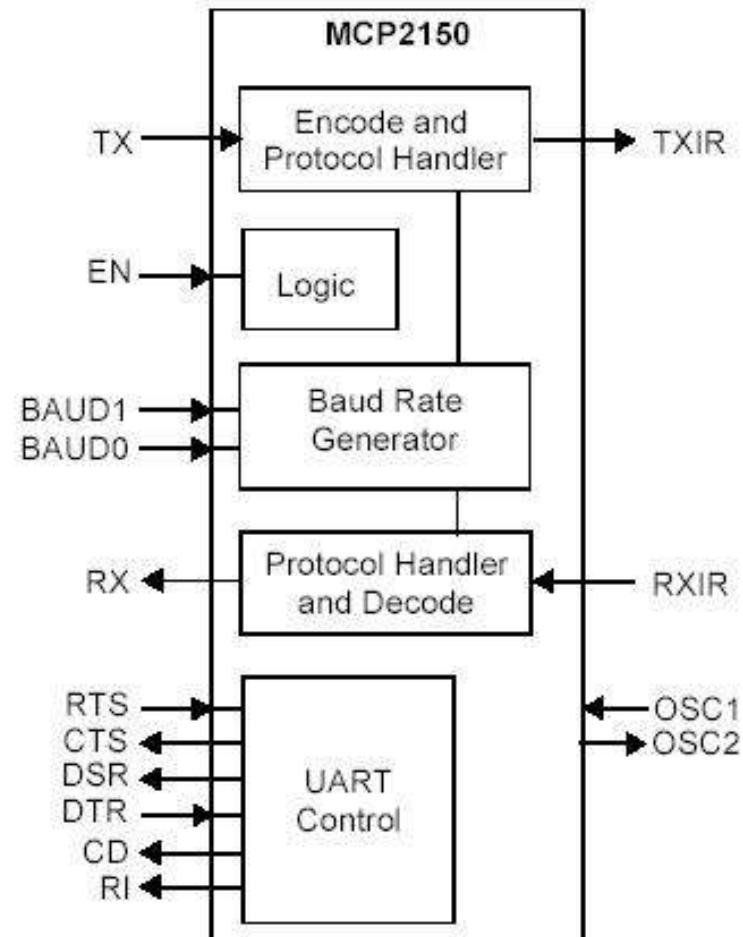
Online
Datasheet

Features:

- Implements the IrDA® standard including:
 - IrLAP, IrLMP, IAS, TinyTP, IrCOMM (9-wire “cooked” service class)
- Provides IrDA standard physical signal layer support including:
 - Bidirectional communication, CRC implementation
 - Data communication rates up to 115.2 kbaud
- Includes UART to IrDA standard encoder/decoder functionality: Easily interfaces with industry standard UARTs and infrared transceivers
- UART interface for connecting to Data Terminal Equipment (DTE) systems
- Transmit/Receive formats (bit width) supported: 1.63µs
- Hardware baud rate selection for UART:
9.6 kbaud, 19.2 kbaud, 57.6 kbaud, 115.2 kbaud
- Infrared baud rates supported:
9.6 kbaud, 19.2 kbaud, 38.4 kbaud, 57.6 kbaud, 115.2 kbaud
- 64 Byte Data Packet Size
- Programmable Device ID String
- Operates as Secondary Device

CMOS Technology

- Low power, high-speed CMOS technology
- Fully static design
- Low voltage operation
- Industrial temperature range
- Low power consumption
< 1mA @ 3.3 V, 11.0592MHz (typ.), 3µA (typ.) @ 5.0V when disabled



[MCP2155 >>](#)

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MICROCHIP

MCP2155

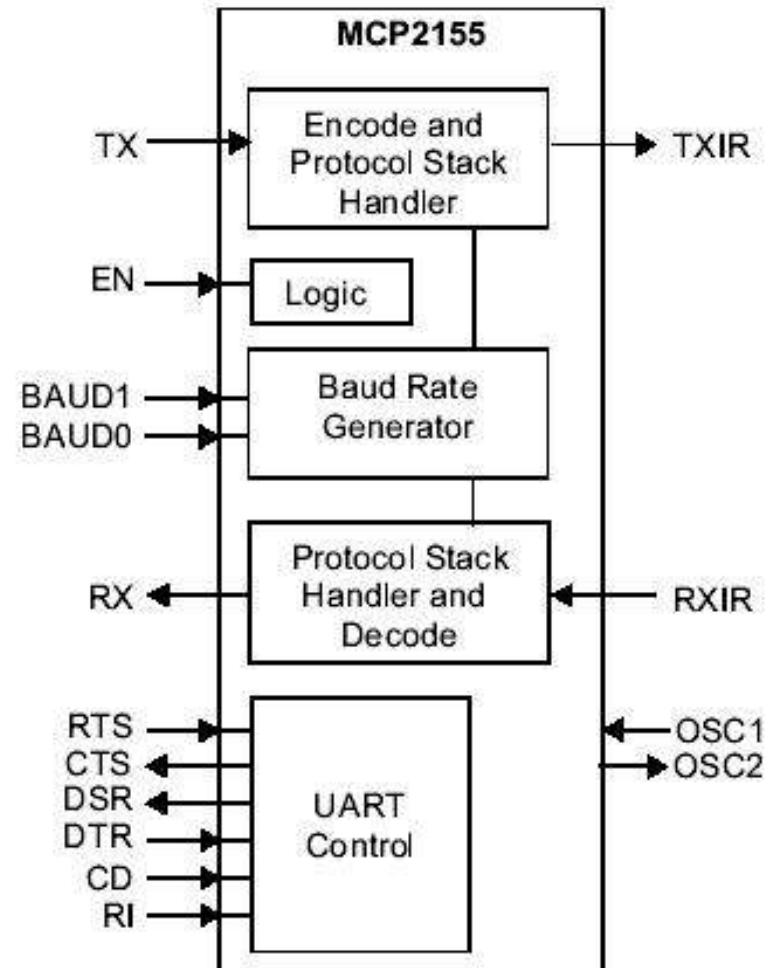
Online
Datasheet

Features:

- Implements the IrDA® standard including:
 - IrLAP, IrLMP, IAS, TinyTP, IrCOMM (9-wire “cooked” service class)
- Provides IrDA standard physical signal layer support including:
 - Bidirectional communication, CRC implementation
 - Data communication rates up to 115.2 kbaud
- Includes UART to IrDA standard encoder/decoder functionality:
Easily interfaces with industry standard UARTs and infrared transceivers
- UART interface for Data Terminal Equipment (DTE) systems
- Transmit/Receive formats (bit width) supported: 1.63 μ s
- Hardware baud rate selection for UART:
 - 9.6 kbaud, 19.2 kbaud, 57.6 kbaud, 115.2 kbaud,
- Infrared baud rates supported:
 - 9.6 kbaud, 19.2 kbaud, 38.4 kbaud, 57.6 kbaud, 115.2 kbaud
- 64 Byte Data Packet Size
- Programmable Device ID String
- Operates as Secondary Device

CMOS Technology

- Low power, high-speed CMOS technology
- Fully static design
- Low voltage operation
- Industrial temperature range
- Low power consumption
 - < 1mA @ 3.3V, 11.0592MHz (typ.), 3 μ A (typ.) @ 5.0V when disabled



[MCP2150 >>](#)

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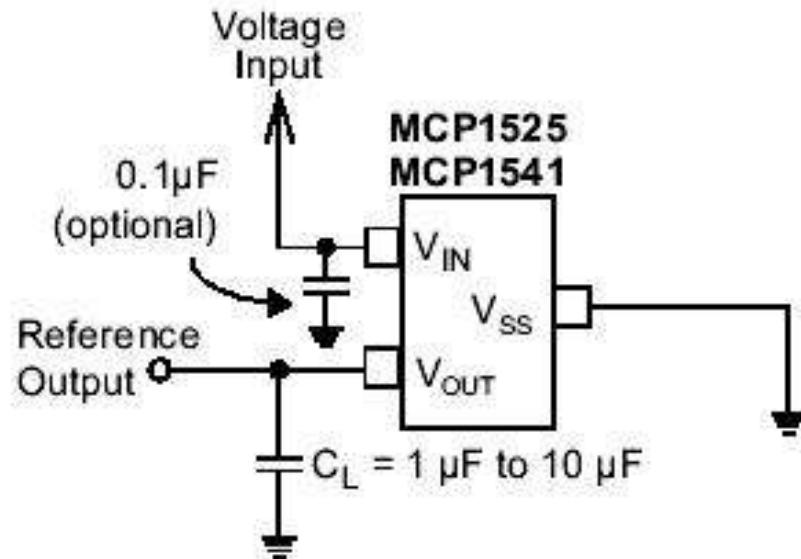
MICROCHIP

MCP1525/41

Online
Datasheet

Features:

- Precision Voltage Reference
- Output Voltages of 2.5V and 4.096V
- Initial Accuracy of $\pm 1\%$ (max.)
- Temperature Drift: $\pm 50\text{ppm}/^\circ\text{C}$ (max.)
- Output Current Drive: $\pm 2\text{mA}$
- Operating Current: $100\mu\text{A} @ 25^\circ\text{C}$ (max.)
- Small SOT23-3 and TO-92 Packages
- Industrial Temperature Range:
 -40°C to $+85^\circ\text{C}$



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MICROCHIP

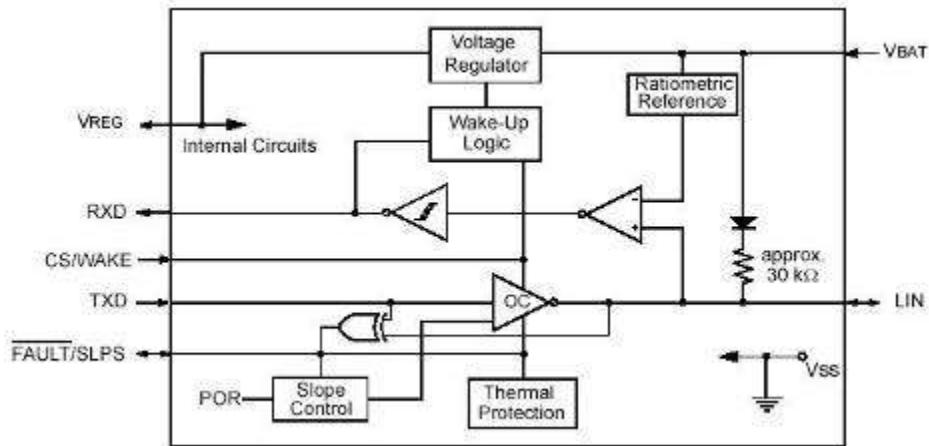
MCP201

Online
Datasheet

Recommend MCP2021/2 for new designs

Features:

- Supports baud rates up to 20 kbaud
- 40V load dump protected
- Wide supply voltage, 6.0 to 18.0V, continuous
 - Maximum input voltage of 30V
- Extended Temperature Range: -40°C to +125°C
- Interface to standard USARTs
- Compatible with LIN Spec 1.3
- Local Interconnect Network (LIN) Line pin:
 - Internal pull-up resistor and diode
 - Protected against ground shorts (LIN pin to ground)
 - Protected against LIN pin loss of ground
 - High current drive, $40\text{mA} \leq I_{OL} \leq 200\text{mA}$
- Automatic thermal shutdown
- On-board Voltage Regulator:
 - Output voltage of 5V with $\pm 5\%$ tolerances over temperature range
 - Maximum output current of 50mA
 - Able to drive an external series-pass transistor for increased current supply capability
 - Thermal overload protection & short-circuit current limit
 - External components limited to filter capacitor only and load capacitor





MICROCHIP

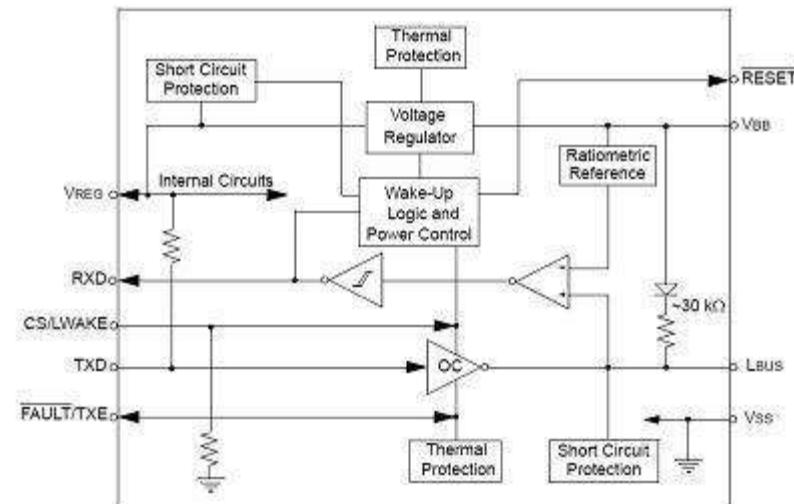
MCP2021/2

Online
Datasheet

Features:

- V_{reg}: 3.3V or 5.0V, 50mA, ±3% Accuracy across temperature
- Temp Range: -40°C to 125°C
- V_{BB} regulation: 6V to 18V
- V_{BB} continuous: -0.3V to 30V
- V_{BB} load dump: 43V
- Low power consumption to meet car makers requirements
 - Transmitter off mode: 90µA (typ.), Power down current: 16µA (typ.)
- Compliant to LIN Specifications 1.x, 2.0, 2.1 and SAE J2602
- Baud rates supported up to 20 kbaud
- EMC Performance meets stringent car maker requirements
 - Reports available upon request
- Very high ESD on LIN, V_{bat} of +/- 8kV HBM
- Wake up through LIN bus activity and or CS/LWake going high
- Fail safe features
 - LIN pin with internal pull up resistor
 - LIN pin protected against ground shorts, loss of ground
 - Automatic thermal shutdown protection
 - V_{reg} thermal overload protection and short circuit current limit
 - TXD has internal pull up. Forced to '1' if V_{reg} < 1.8V
 - CS has internal pull down. No disruptive data during MCU POR
 - Fault/TXE signals a mismatch between TXD and LIN Bus
- RESET Output on **MCP2022** in case MCU BOR is not available

Built-in Voltage Regulator + Optional µC Reset
Functional Block Diagram





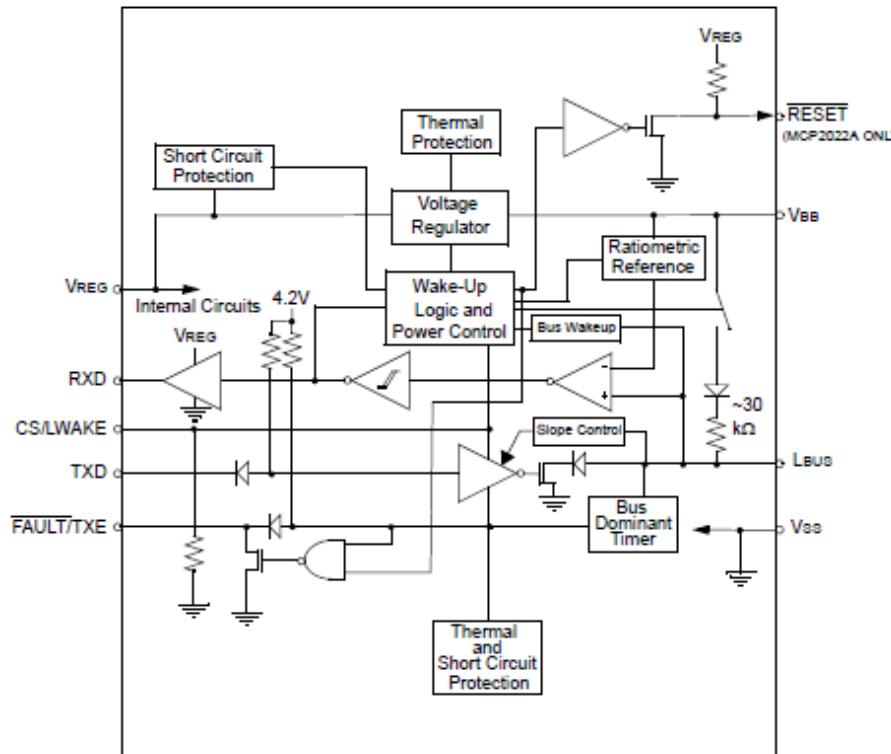
MICROCHIP

MCP2021A/2A

Online
Datasheet

Features:

- The MCP2021A/2A is compliant with:
 - LIN Bus Specifications Version 1.3, and 2.x.
 - SAE J2602-2
- Support Baud Rates up to 20 kBaud
- 43V Load Dump Protected
- Maximum Continuous Input Voltage of 30V
- Wide LIN Compliant Supply Voltage, 6.0 - 18.0V
- Interface to PIC® EUSART and Standard USARTs
- Wake-up on LIN Bus Activity or Local Wake Input
- LIN Bus Pin
- TXD and LIN Bus Dominant Time-out Function
- Two Low-Power Modes
 - TRANSMITTER OFF Mode: 90 μ A (typical)
 - POWER DOWN Mode: 4.5 μ A (typical)
- Output Indicating Internal RESET State (POR or SLEEP Wake)
- MCP2021A/2A On-chip Voltage Regulator
 - Output Voltage of 5.0V or 3.3V ,70 mA
- Automatic Thermal Shutdown
- High EMI, Low EME (Electromagnetic Emission)
- Robust ESD Performance: ± 15 kV for LBUS and VBB pin (IEC61000-4-2)
- Transient Protection for LBUS and VBB Pins in Automotive Environment (ISO7637)
- Meets Stringent Automotive Design Requirements Including “OEM Hardware Requirements for LIN, CAN and FlexRay Interfaces in Automotive Applications”, Version 1.2, March 2011
- Extended Temperature Range: -40 to +125°C
- 8-lead 4x4 mm DFN, PDIP, SOIC, TSSOP



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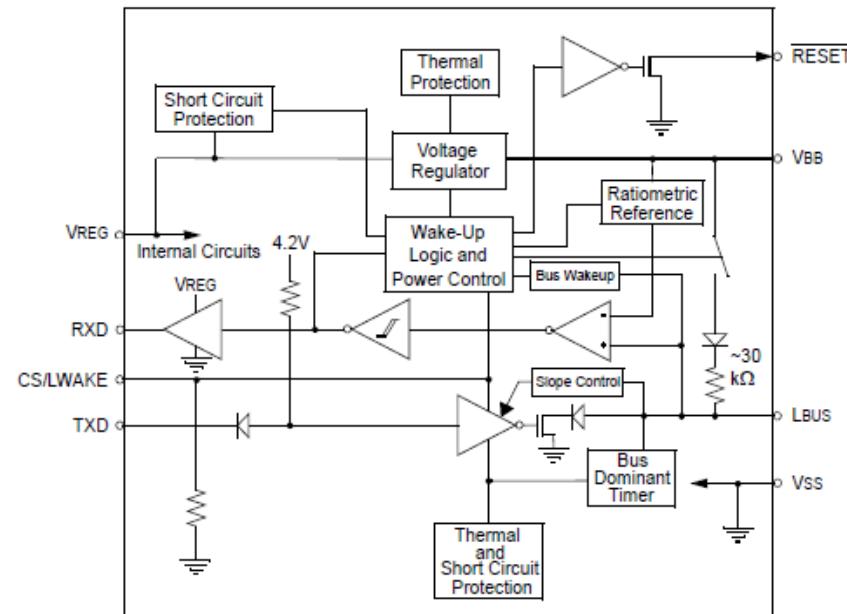
MICROCHIP

MCP2025

Online
Datasheet

Features:

- The MCP2025 is compliant with:
 - LIN Bus Specifications Version 1.3, and 2.x
 - SAE J2602-2
- Supports Baud Rates up to 20 kBaud
- 43V Load Dump Protected
- Maximum Continuous Input Voltage of 30V
- Wide LIN Compliant Supply Voltage: 6.0-18.0V
- Interface to PIC® EUSART and Standard USARTs
- Wake-up on LIN Bus Activity or Local Wake Input
- LIN Bus Pin
- TXD and LIN Bus Dominant Time-out Function
- Two Low-power Modes
 - TRANSMITTER-OFF: 90 μ A (typical)
 - POWER-DOWN mode: 4.5 μ A (typical)
- MCP2025 On-chip Voltage Regulator
 - Output Voltage of 5.0V or 3.3V, 70 mA
- Automatic Thermal Shutdown
- High EMI, Low EME (Electromagnetic Emission)
- Robust ESD Performance: ± 15 kV for LBUS and VBB Pin (IEC61000-4-2)
- Transient Protection for LBUS and VBB pins in Automotive Environment (ISO7637)
- Meets stringent automotive design requirements including “OEM Hardware Requirements for LIN, CAN and FlexRay Interfaces in Automotive Applications”, Version 1.2, March 2011
- Extended Temperature Range: -40 to +125°C
- 8-lead 4x4 mm DFN, PDIP, and SOIC



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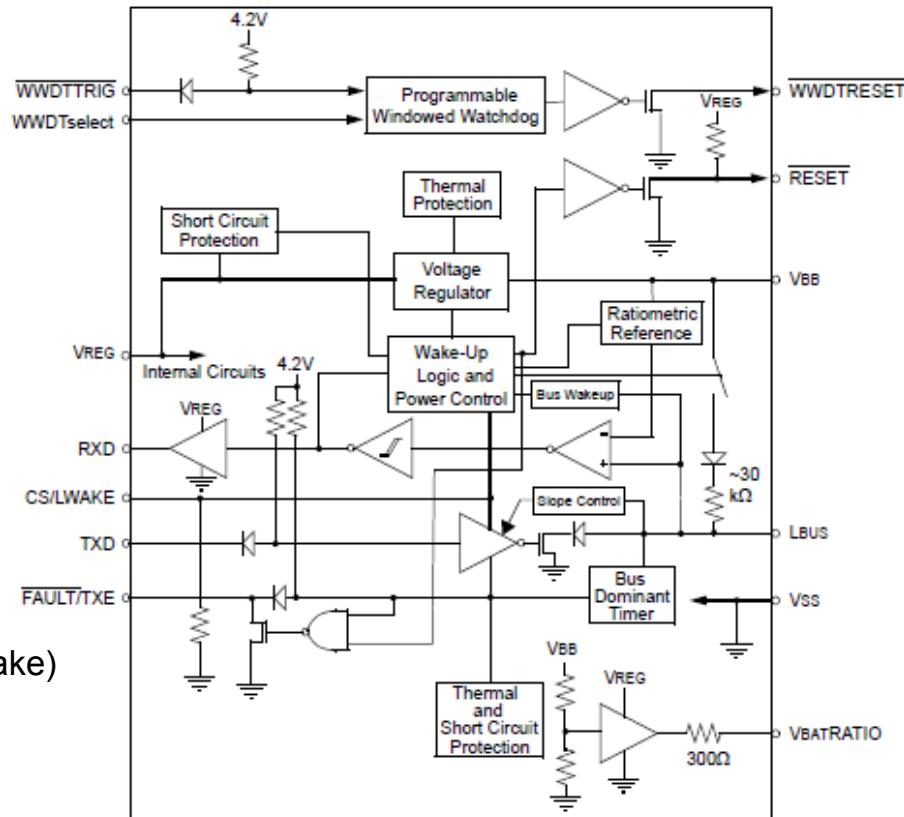
MICROCHIP

MCP2050

Online
Datasheet

Features:

- The MCP2050 is compliant with:
 - LIN Bus Specifications Version 1.3, and 2.x
 - SAE J2602-2
- Support Baud Rates Up to 20 kBaud
- 43V Load Dump Protected
- Maximum Continuous Input Voltage of 30V
- Wide LIN Compliant Supply Voltage, 6.0-18.0V
- Interface to PIC® EUSART and Standard USARTs
- Wake-up on LIN Bus Activity or Local Wake Input
- LIN Bus Pin
- TXD and LIN Bus Dominant Time-out Function
- Two Low-power Modes
 - TRANSMITTER OFF Mode: 90 μ A (typical)
 - POWER DOWN Mode: 4.5 μ A (typical)
- Output Indicating Internal RESET State (POR or SLEEP Wake)
- MCP2050 On-chip Voltage Regulator
- Output Voltage of 5.0V or 3.3V, 70 mA
- Programmable Windowed Watchdog Timer (WWDT)
- Ratiometric Output of VBAT Voltage Scaled to VREG
- Automatic Thermal Shutdown
- Robust ESD Performance: ± 15 kV for LBUS and VBB pin (IEC61000-4-2)
- Transient Protection for LBUS and VBB Pins in Automotive Environment (ISO7637)
- Meets Stringent Automotive Design Requirements
- Extended Temperature Range: -40 to +125°C



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MICROCHIP

MCP2200

Online
Datasheet

Features:

Universal Serial Bus (USB):

- Supports full-speed USB (12 Mb/s)
- Implements USB protocol composite device CDC device for communications, configuration and I/O control
- 128 byte buffer to handle data throughput at any UART baud rate:
- Fully configurable VID and PID assignments, and string descriptors
- Bus powered or self-powered
- USB 2.0 Compliant

USB Driver and Software Support:

- Uses standard Microsoft® Windows® drivers for Virtual Com Port (VCP)
- Configuration utility for initial configuration

Universal Asynchronous Receiver/Transmitter (UART):

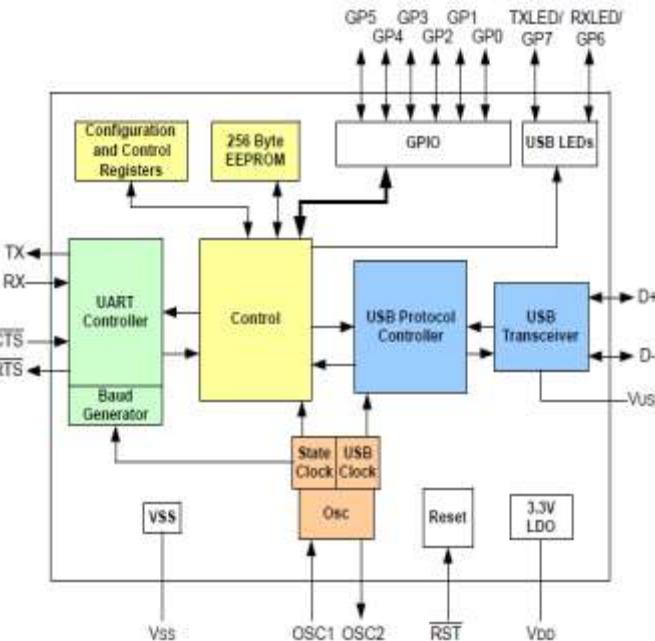
- Responds to SET LINE CODING commands to dynamically change baud rates
- Supports baud rates: 300-1000k
- Hardware flow control
- UART signal polarity option

General Purpose Input/Output (GPIO) Pins: Eight GPIO pins

EEPROM: 256 bytes of user EEPROM

Other:

- USB activity LED outputs (TxLED and RxLED)
- SSPND output pin
- USBCFG output pin (indicates if requested current is allowed)
- Operating voltage: 3.0-5.5V
- Oscillator input: 12 MHz
- ESD protection > 4 kV HBM
- Industrial (I) Operating Temperature: -40°C to +85°C
- Available in 20-lead 5x5 QFN, SOIC, and SSOP Packages



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MICROCHIP

MCP2210

Online
Datasheet

Features:

Universal Serial Bus (USB)

- Supports Full-Speed USB (12 Mb/s)
- Human Interface Device (HID) device
- 128-Byte Buffer to Handle Data Throughput:
- Fully Configurable VID, PID Assignments and String Descriptor (factory programming also available)
- Bus Powered or Self-Powered
- USB 2.0 Compliant

USB Driver and Software Support

- Uses Standard HID Drivers
- Configuration Utility for Device's Power-up Configuration
- Utility for USB-SPI Communication, GPIO Manipulation , Features Usage

SPI Master Peripheral

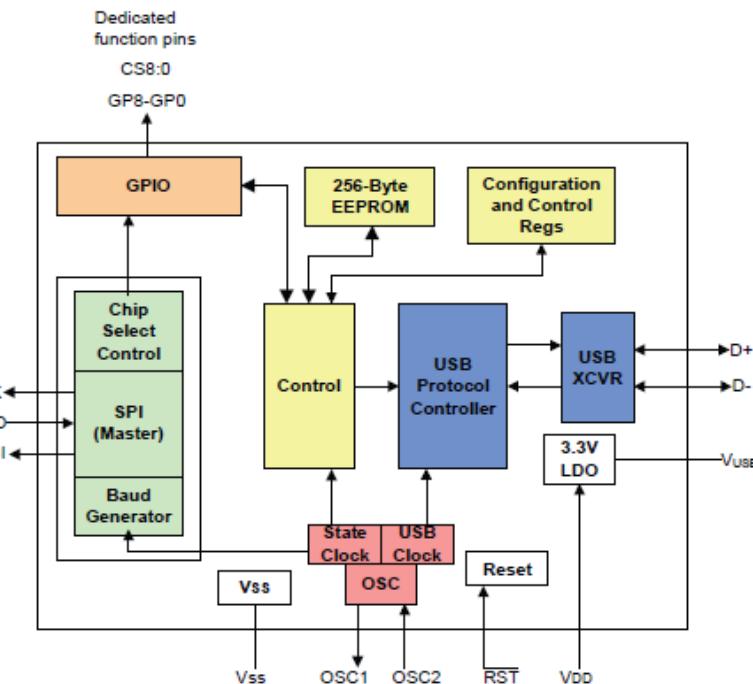
- Supports all Four SPI modes (Mode 0, 1, 2, 3)
- Bit Rates from 1500 bps up to 12 Mbps
- Configurable Delays for SPI Transactions:
- SPI Transactions Lengths of up to 65535 Bytes Long
- Up to 9 Chip Select lines – to be used in any combination

General Purpose Input/Output (GPIO) Pins: 8 GPIO pins

EEPROM: 256 Bytes of User EEPROM

Other

- USB Activity LED Output
- SSPND Output Pin (to signal USB Suspend state)
- USBCFG Output Pin
- Operating Voltage: 3.3-5.5V
- Oscillator Input: 12 MHz
- Available in 20-lead 5x5 QFN, SOIC, and SSOP Packages



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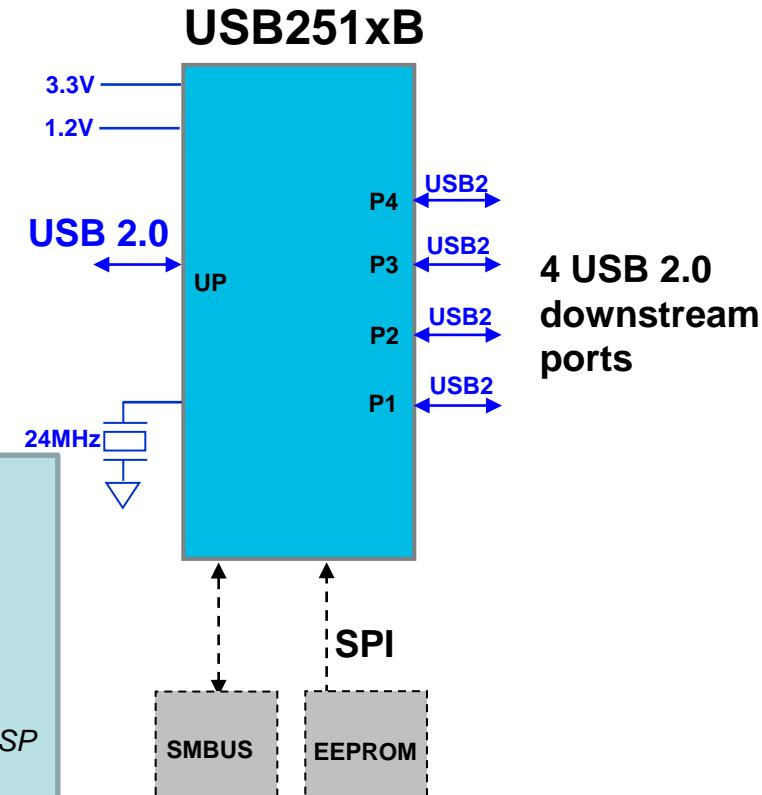
MICROCHIP

USB251xB 5th Gen USB2.0 Certified Hub

Online
Datasheet

Features:

- Full Featured 5th generation USB 2.0 4-Port
- Fully configurable via EPPROM, SMBus
- Supports Battery Charging USB BC 1.1
- PHYBoost, PortMap, PortSwap, MultiTRAK™ Technology
- Self & Bus Powered
- Overcurrent Protection Ganged and Individual Modes
- LED Drivers
- QFN36 - Package
- World class interoperability & customer support



Next Gen Hubs

USB2514B	→	USB2534
USB2513B	→	USB2533
USB2512B	→	USB2532
USB3503 (HSIC)	→	USB3613 (HSIC)
USB3803	→	USB3813
USB2412	→	USB2422
		USB4604 (I/O Bridging)
		USB4624 (+HSIC)

36pin low power

Mobile apps WLCSP

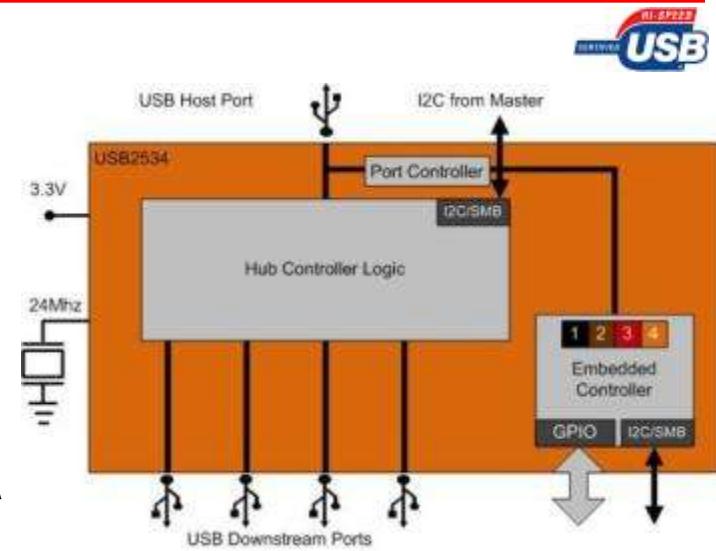
24pin lower cost

USB46X4/3X13

USB251XB

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- Integrated Controller with “Quad Page” Configuration Management for utmost flexibility
- Flex Connect (Port Reversal) 0,1
- I/O Bridging with Programmable Interfaces
 - USB to SPI, UART, I2C
- BC1.1, BC1.2, Apple Charging and China Charger compatibility
- 2/3/4 port options in 36-pin QFN package
- HSIC versions available to interface with many major processors
- USB3x13 in miniature WLCSP ideal for mobile applications
- USB46x4 in 48-pin QFN package
- Pin Compatible versions w/USB2514B

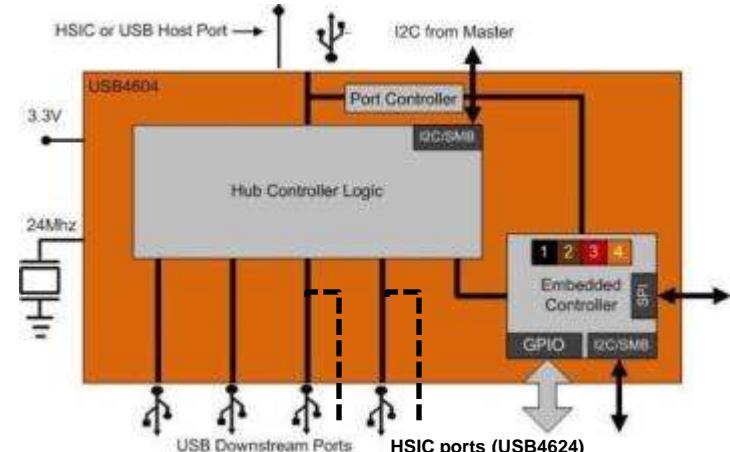


USB2.0 Hub USB46x4 and USB3x13

Same features as the **USB253x Family**

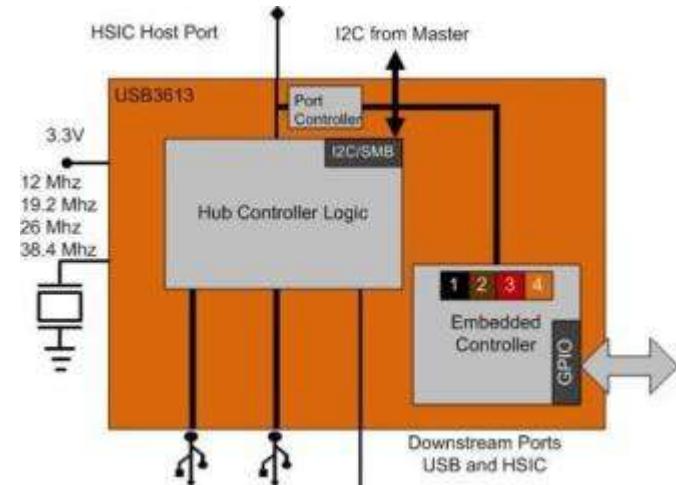
USB4604 and USB4624

SPECS	USB4604	USB4624
Upstream Port	USB2.0 or HSIC	
Downstream Ports	4 x USB2.0	2 x USB2.0 / 2 x HSIC
Package	48-pin QFN	



USB3613 and USB3813

SPECS	USB3613	USB3813
Upstream Port	HSIC	USB2.0
Downstream Ports	2 x USB2.0 / 1 x HSIC	
Ref Clock	12/19.2/26/38.4Mhz*	
Package	30-ball WLCSP	



[USB253X](#)

[USB251XB](#)

* Can share system reference clock



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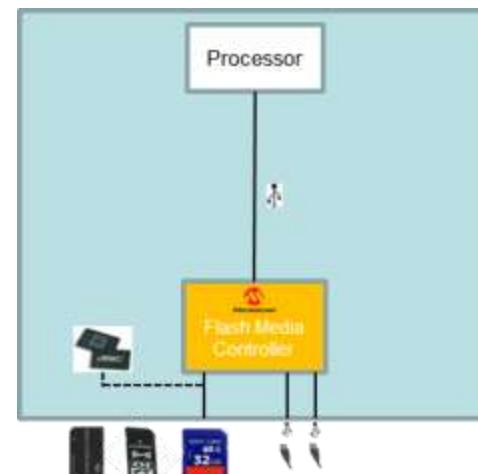
USB Flash Media Controller Overview

[Online Datasheet](#)

USB Card Reader Products	USB2244	USB2250	USB2640	USB2660	USB4640
Up Stream Interface	USB 2.0	USB 2.0	USB 2.0	USB 2.0	HSIC (USB 2.0)
Down Stream Output	SD, MMC	SD, MMC, CF, MS, xD	SD, MMC, MS, xD	2xSD, 2xMMC, MS, xD	SD, MMC, MS, xD
Down Stream USB Ports	None	None	2	2	2
Logical Units	1	1	1	1	1
Package Body size (mm)	36 QFN (6 x 6 x 0.9)	128 VTQDP (14 x 14 x 1.1)	48 QFN (7 x 7 x 0.9)	64 QFN (9 x 9 x 0.9)	48 QFN (7 x 7 x 0.9)

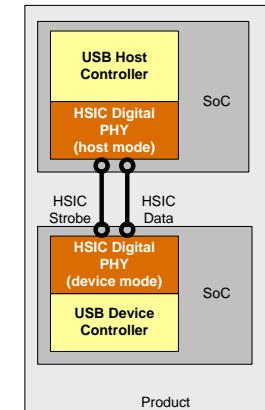
SD – SecureDigital, MMC – MultiMediaCard, CF – Compact Flash, MS – Memory Stick, xD – xD Picture Card

- Ultra-fast flash media reader/writer for external memory card storage or embedded flash memory
 - SD, MMC/eMMC, MS / MS-Pro / MS-Pro-HG, xD
- USB interface for design ease and flexibility on placement
- USB port expansion options


[<< BACK](#)

- **High-Speed Inter-Chip [HSIC]; USB2 chip-to-chip interconnect**
 - HSIC removes the analog transceivers designed for 5M cables in USB2 Eco Systems
 - **Absolutely 100% software compatible** as “USB Host” sees no different behavior

Product	Upstream	Downstream	Package	Applications
USB4640-HZH	HSIC	USB x2	48 QFN	Hub Combo (w/card reader)
USB4624-1080HN	HSIC/USB	USB x2 / HSIC x2	48 QFN	<u>Hub</u> Controller
USB4604-1080HN	HSIC/USB	USB x4	48 QFN	<u>Hub</u> Controller
USB3503A-1-GL	HSIC	USB x3	25 WLCSP	Mobile <u>Hub</u> with HSIC
USB3813-1080XY	USB	USB x2 / HSIC x1	30 WLCSP	Mobile <u>Hub</u> Controller
USB3613-1080XY	HSIC	USB x2 / HSIC x1	30 WLCSP	Mobile Low-Power <u>Hub</u> Controller



HSIC **lowers power** with 1.2V signaling
 **note USB2 Signaling is 3.3V

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USB3.0 Solutions Overview

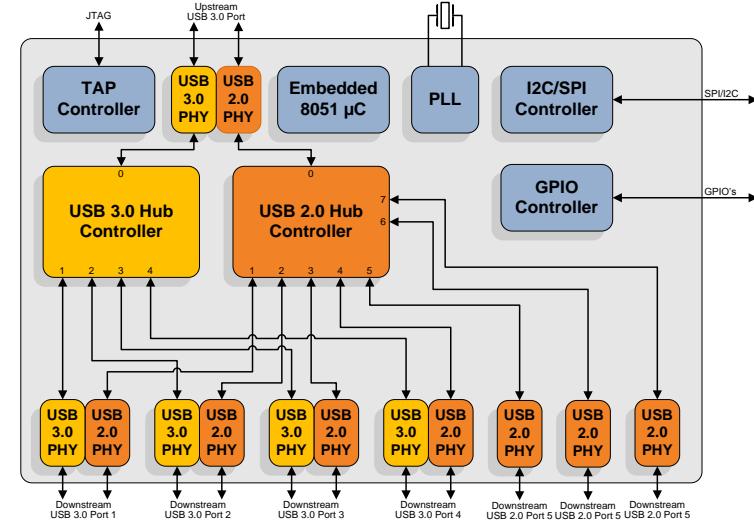
[Online Datasheet](#)

- Leveraging leadership position and expertise in USB
- Third generation of USB3.0 hub solutions
 - USB-IF compliant hub
 - Hybrid solutions (USB2.0/3.0 ports)
 - High levels of integration featuring integrated controller providing ease-of-use and flexibility
 - Battery charger detection support
 - USB-IF Battery Charger v1.2
 - Apple charger, China charger, RIM
 - *Industry's Most Complete Hub Product Line*

Lowest Pin Count!

Most complete BC Modes!

Most Programmable Features!



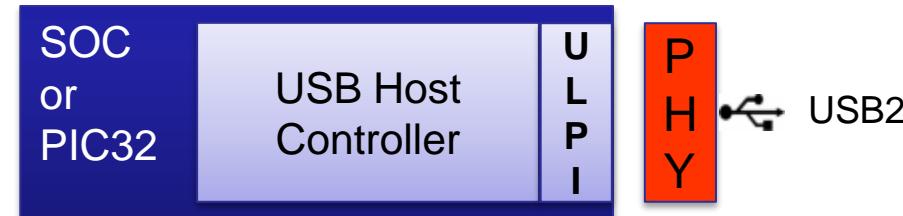
Part Number	Downstream	USB3 Logo
USB5537B-5000AKZE	7 Port Hybrid	TID 330000039
USB5534B-5000JZX	4 Port	TID 330000041
USB5533B-5000JZX	3 Port	TID 330000041
USB5532B-5000JZX	2 Port	TID 330000041

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USB Transceiver Product Overview

[Online Datasheet](#)

USB PHY Products	USB3450	USB3500	USB3280 USB3290	USB3300	USB334x	USB333x
PHY Interface	UTMI+ (Device or Host)	UTMI+ (Device, Host, or OTG)	UTMI (Device)	ULPI (Device, Host, or OTG)	ULPI (Device, Host, or OTG)	ULPI (Device, Host, or OTG)
HS & FS USB	Yes	Yes	Yes	Yes	Yes	Yes
LS USB	Yes	Yes	No	Yes	Yes	Yes
Data Interface	8 bit Bidir	8 bit Bidir	8 bit Bidir	8 bit Bidir	8 bit Bidir	8 bit Bidir
Internal Reg	Yes	Yes	Yes	Yes	Yes	Yes
Package Body size (mm)	40 QFN (6x 6 x 0.9)	56 QFN (8 x 8 x 0.9)	36 QFN (6 x 6 x 0.9) 40 VFBGA (4 x 4 x 0.9)	32 QFN (5 x 5 x 0.9)	24 QFN (4 x 4 x 0.9) 25 BGA (3 x 3 x 0.8)	25 WLCSP (1.9 x 1.9 x 0.5)


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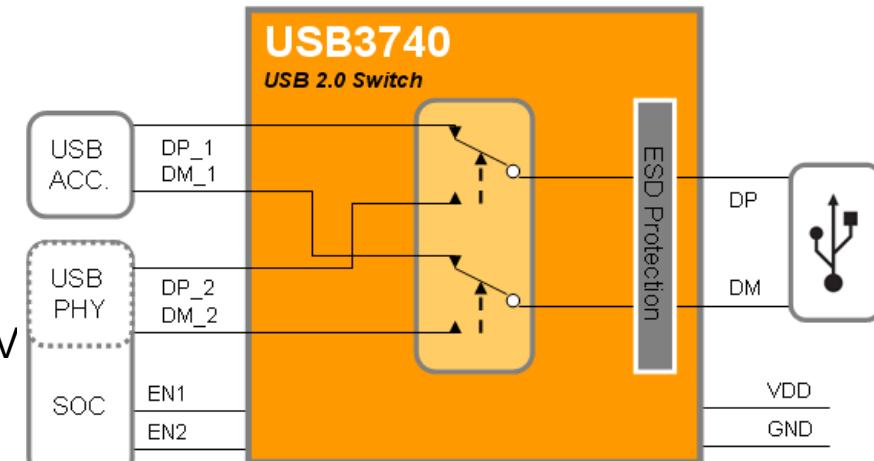
MICROCHIP

USB3740

Online
Datasheet

Features:

- High-bandwidth USB 2.0 Switch with Dual Enables
 - For high-speed USB 2.0 data
- Multiplex differential outputs from a USB host device to one of two corresponding outputs
 - Enable DP/DM multiplexing
 - Flexible solution for embedded applications
- Ultra-low Current Consumption
 - Active (switch ON) = 5 uA (Vcc = 3V)
 - Standby (switch OFF) = 0.01 uA (Vcc = 3V)
- Competitive USB 2.0 Switch Specifications
 - Designed to pass USB signals from 0 to 3.3V
 - USB Mux on resistance < 6 ohms
 - USB Mux off leakage < 0.5 uA
 - Off isolation < -40 dB
 - On capacitance < 6 pF
 - High bandwidth: 1 GHz
- Extreme ESD Protection \pm 15 kV (IEC)
- Package:
 - 10-lead 1.3 mm x 1.8 mm QFN with 0.4 mm pitch
 - 10-lead 1.6 mm x 2.1 mm QFN with 0.5 mm pitch



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MICROCHIP

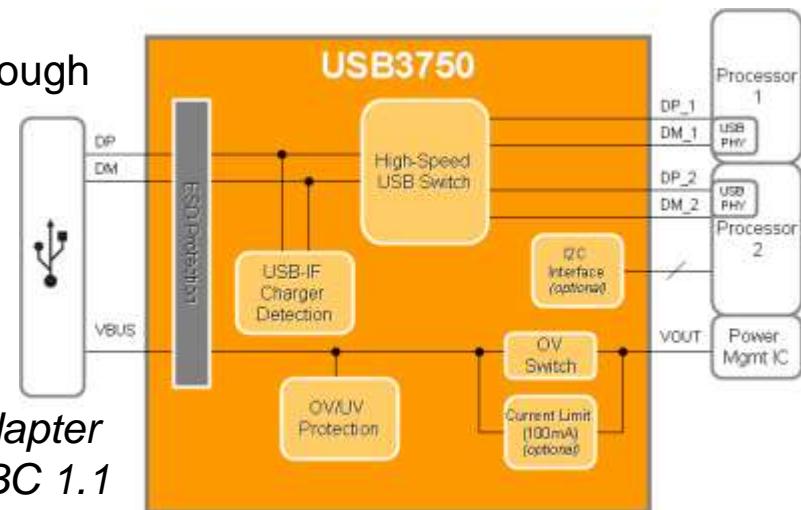
USB375X

Online
Datasheet

Features:

- Integrated and Flexible USB Port Protection and Detection with Hi-Speed USB Switch
- ESD Protection: Up to ± 15 kV
- VBUS Overvoltage Protection
 - Low resistance switch for high current pass-through
 - Up to 28V of protection
- High-speed USB Switch for Port Sharing
 - Enable DP/DM multiplexing
 - Flexible solution for embedded applications
- Complete Battery Charger Detection Capability
 - USB-IF 1.1 battery charging (up to 1.5A)
 - Dedicated charging port (DCP) *i.e. Wall A/C adapter*
 - Charging downstream port (CDP) *i.e. USB-IF BC 1.1 port*
 - Standard downstream port (SDP) *i.e. PC or hub*
 - Supports detection of majority of USB (SE1) chargers
- Optional I²C Interface
- Package:
 - 16-lead 3x3 QFN

Portable
POWER



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MICROCHIP

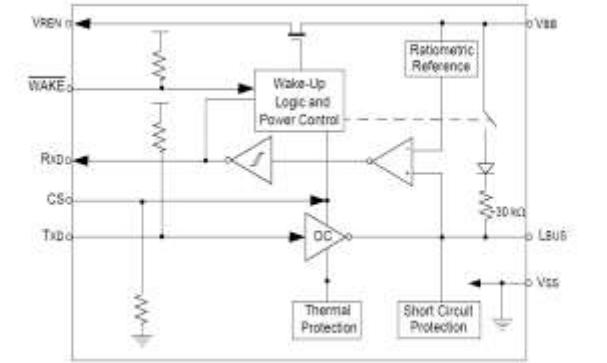
MCP2003/4 MCP2003A/4A

Online
Datasheet

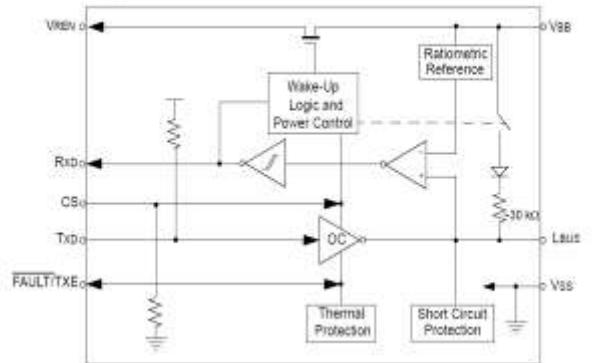
Features:

- Compliant with LIN Bus Specifications 1.3, 2.0, and 2.1 and are compliant to SAE J2602
- MCP2003/3A is industry standard pin-out
- MCP2004/4A supports Fault/TXE pin (Fault Output/Transmitter Enable)
- Support Baud Rates up to 20 Kbaud
- 43V load dump protected
- Very low EMI meets stringent OEM requirements
- Very high ESD immunity
 - >20kV on VBB (IEC 61000-4-2)
 - >14kV on LBUS (IEC 61000-4-2)
- Very high immunity to RF disturbances: Meets stringent OEM requirements
- Wide supply voltage, 6.0V - 18.0V continuous
- Extended Temperature Range: -40 to +125°C
- Interface to PIC® EUSART and standard USARTs
- Local Interconnect Network (LIN) bus pi
- Automatic thermal shutdown
- Low-power mode: $\cong 5 \mu\text{A}$
- Software Library support for most

MCP2003 Block Diagram



MCP2004 Block Diagram



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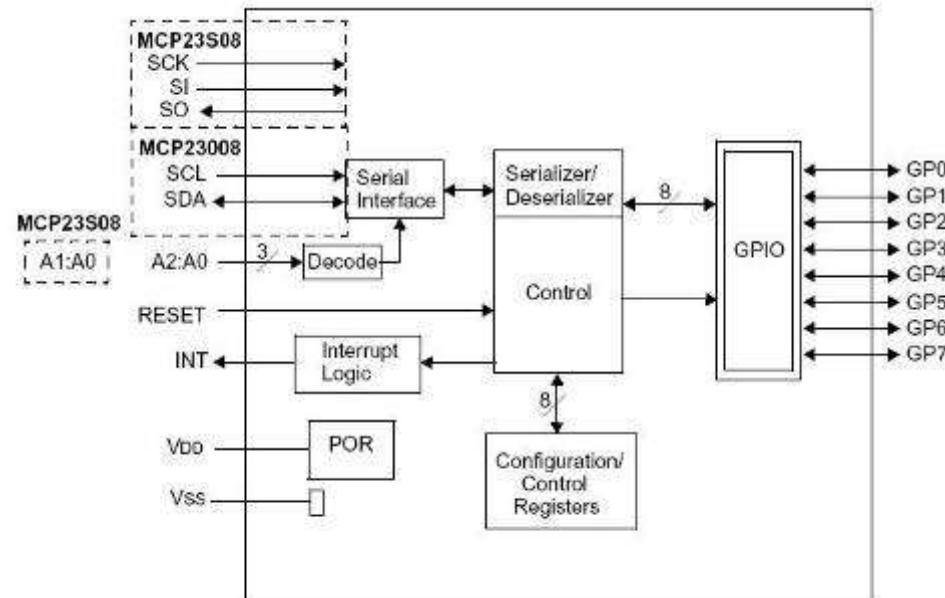
MICROCHIP

MCP23008 / 23S08

Online
Datasheet

Features:

- 8-bit Remote Bidirectional I/O Port
- High-speed I²C™ Interface (MCP23008): 100kHz, 400kHz and 1.7MHz Modes
- High-speed SPI Interface (MCP23S08): 10MHz
- Hardware Address pins:
 - Three for the MCP23008 to allow up to Eight Devices on the bus
 - Two for the MCP23S08 to allow up to Four Devices using the same chip-select
- Configurable Interrupt Output Pin: Active-high, Active-low or Open-drain
- Configurable interrupt source
- Polarity Inversion Register to Configure the Polarity of the Input Port Data
- External Reset Input
- Low standby current: 1µA (max.)
- Operating voltage: 1.8V to 5.5V



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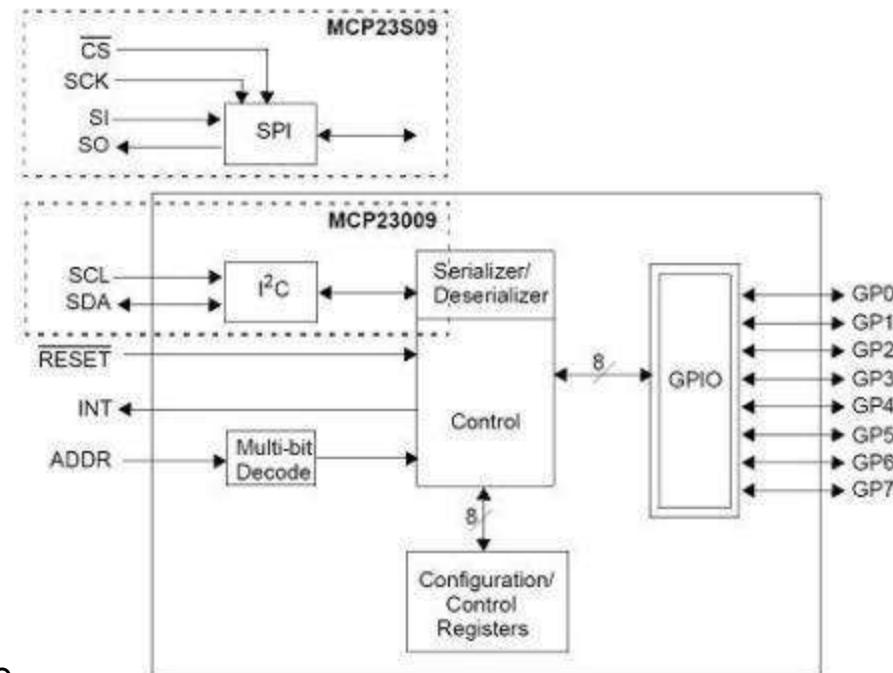
MICROCHIP

MCP23009 / 23S09

Online
Datasheet

Features:

- 8-bit remote bidirectional I/O port:
 - I/O pins default to input
 - Open-drain outputs:
 - 5.5V tolerant, 25mA sink capable (per pin), 200 mA total
 - High-speed I²C™ interface: (**MCP23009**)
 - 100 kHz, 400 kHz, 3.4MHz
 - High-speed SPI interface: (**MCP23S09**)
 - 10MHz
 - Single hardware address pin: (**MCP23009**)
 - Voltage input to allow up to eight devices on the bus
 - Configurable interrupt output pins:
 - Configurable as active-high, active-low or open-drain
 - Configurable interrupt source:
 - Interrupt-on-change from configured defaults or pin change
 - Polarity inversion register to configure the polarity, of the input port data
 - External reset input
 - Low standby current as low as 1µA
 - Operating voltage: 1.8V to 5.5V
- Packages: 16-pin 3x3 QFN, 18-pin PDIP, 18-pin SOIC, 20-pin SSOP



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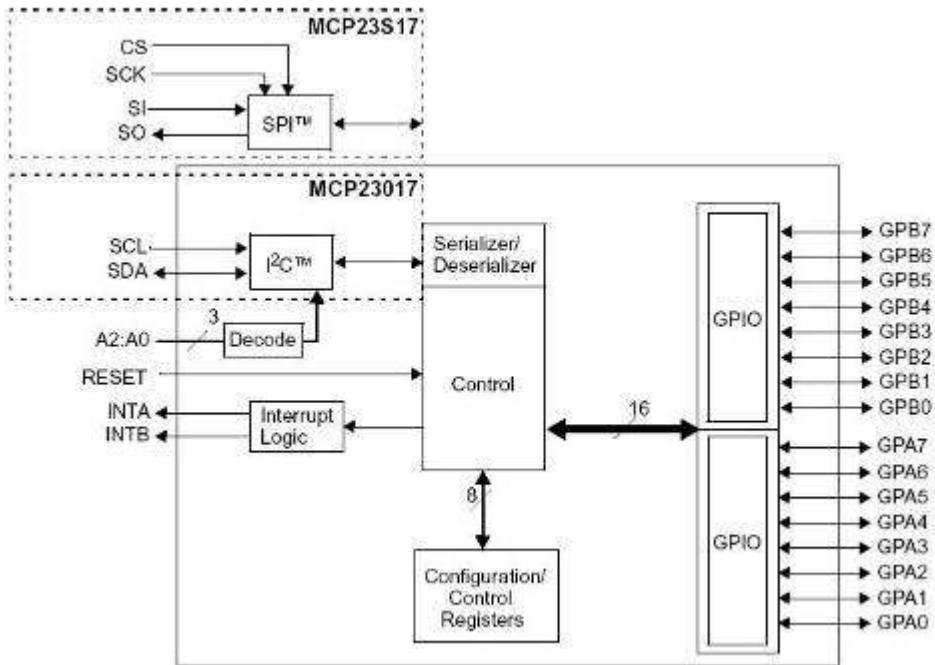
MICROCHIP

MCP23017 / 23S17

Online
Datasheet

Features:

- 16-bit remote bidirectional I/O Port:
- High-speed I²C™ interface (MCP23017):
100kHz, 400kHz and 1.7MHz modes
- High-speed SPI interface (MCP23S17):
10MHz (max.)
- Three Hardware Address Pins to allow up to Eight Devices on the Bus
- Configurable Interrupt Output Pins:
Configurable as Active-high, Active-low or Open-drain
- INTA and INTB can be Configured to Operate Independently or Together
- Configurable Interrupt Source:
 - Interrupt-on-change from configured register defaults or pin changes
- Polarity Inversion Register to Configure the Polarity of the Input Port Data
- External Reset Input
- Low standby current: 1µA (max.)
- Operating voltage: 1.8V to 5.5V
- Packages: 28-pin PDIP, SOIC, SSOP and QFN



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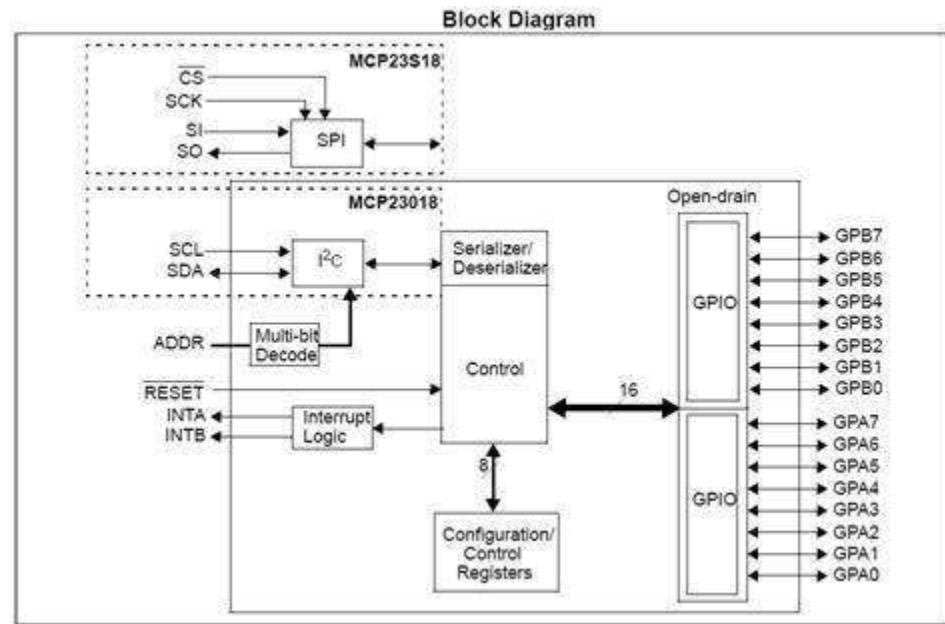
MICROCHIP

MCP23018 / 23S18

Online
Datasheet

Features:

- 16-bit remote bidirectional I/O port:
 - I/O pins default to input
- Open-drain outputs:
 - 5.5V tolerant, 25mA sink capable (per pin), 400mA total
- High-speed I²C™ interface: (MCP23018)
 - 100kHz, 400kHz, 3.4MHz
- High-speed SPI interface: (MCP23S18)
 - 10MHz: $2.7V \leq V_{DD} \leq 5.5V$
- Single hardware address pin: (MCP23018)
 - Voltage input to allow up to eight devices on the bus
- Configurable interrupt output pins:
 - Configurable as active-high, active-low or open-drain
- Configurable interrupt source:
 - Interrupt-on-change from configured defaults or pin change
- Polarity inversion register to configure the polarity of the input port data
- External reset input
- Low standby current: $1\mu A$ ($-40^{\circ}C \leq T_A \leq +85^{\circ}C$)
 $6\mu A$ ($+85^{\circ}C \leq T_A \leq +125^{\circ}C$)
- Operating voltage: 1.8V to 5.5V
- Packages: 28-pin PDIP, 28-pin SOIC (300 mil), 24-pin QFN, 24-pin SSOP (MCP23018 only)



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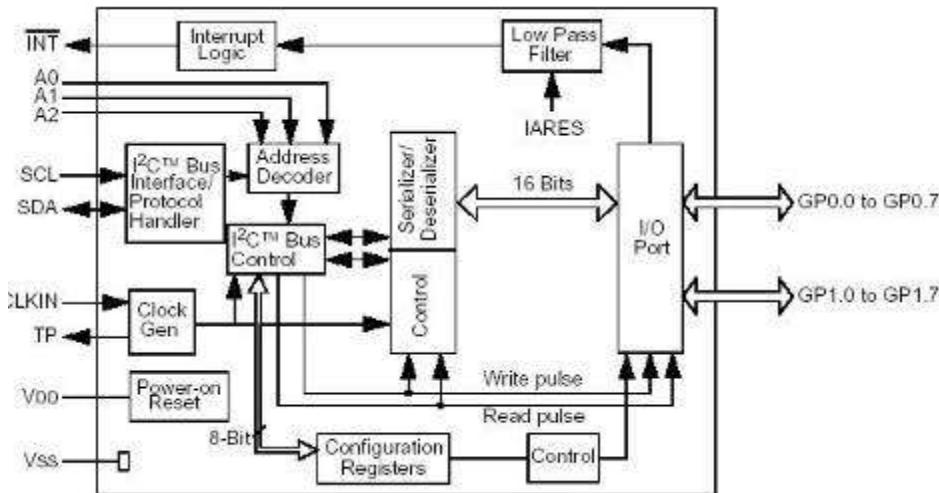
MICROCHIP

MCP23016

Online
Datasheet

Features:

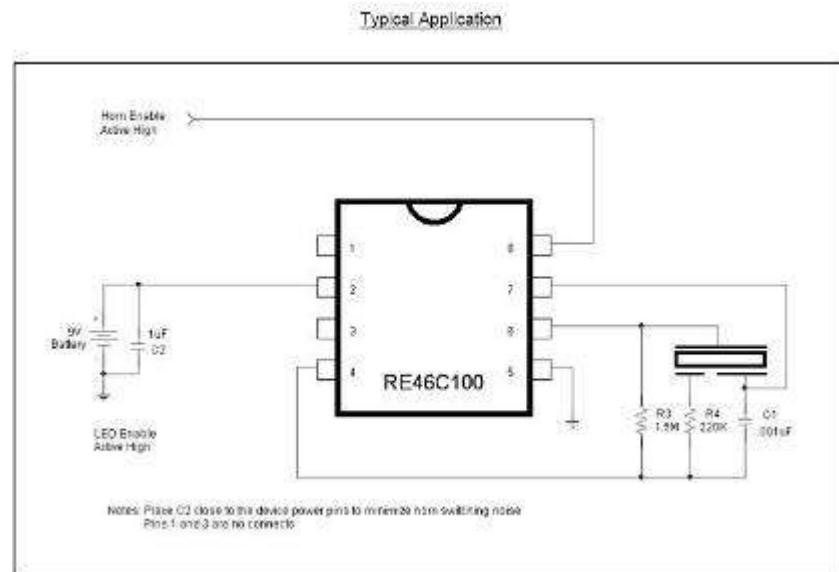
- 16-Bit Remote Bidirectional I/O Port
- Fast I²C™ bus Clock Frequency (0 to 400 kbits/s)
- Three Hardware Address Pins allow use of up to Eight Devices
- High-current Drive Capability per I/O: $\pm 25\text{mA}$
- Open-drain interrupt output on input change
- Interrupt Port Capture Register
- Internal Power-On Reset (POR)
- Polarity Inversion Register to Configure the Polarity of the Input Port Data
- Compatible with most Microcontrollers
- Industrial temperature range: -40°C to +85°C



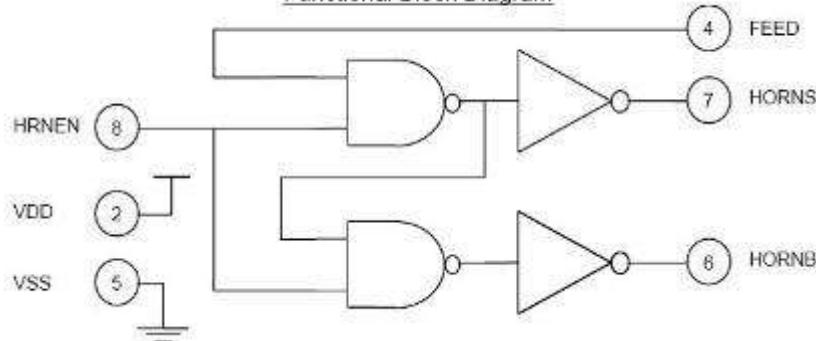
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Features:

- Low Quiescent Current (<100nA)
- Low Driver R_{ON} : 20Ω (typ.) at 9V
- Wide Operating Voltage Range
- 8-pin PDIP and SOIC Packages
- Available inRoHS Compliant Pb-free Packaging



Functional Block Diagram





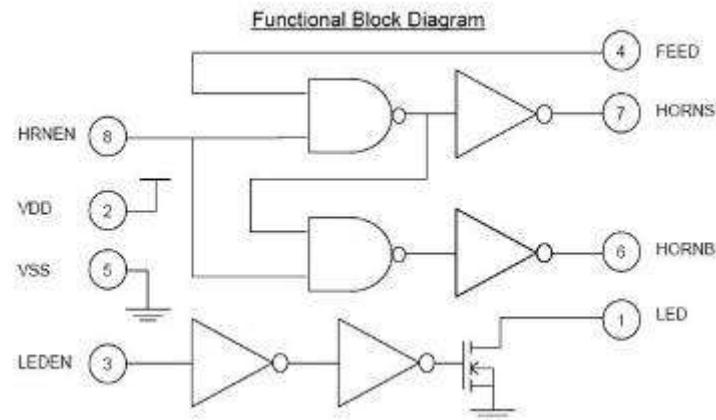
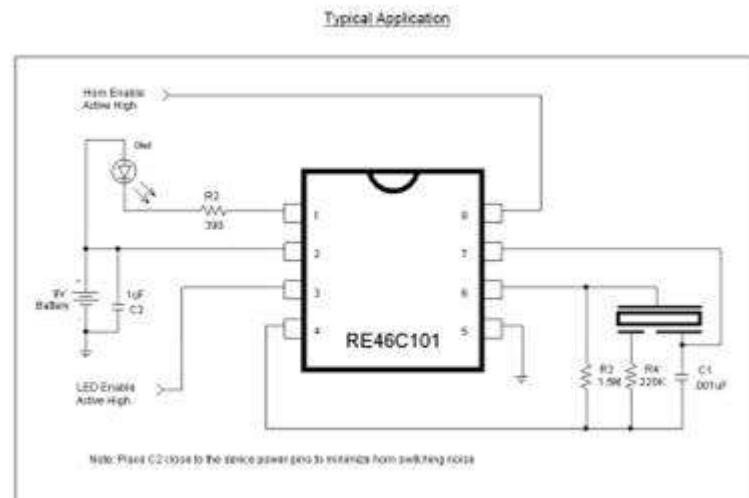
MICROCHIP

RE46C101

Online
Datasheet

Features:

- Low Quiescent Current (<100nA)
- Low Driver R_{ON} : 20Ω (typ.) at 9V
- Wide Operating Voltage Range
- 8-pin PDIP and SOIC Packages
- Available in RoHS Compliant Pb-free Packaging



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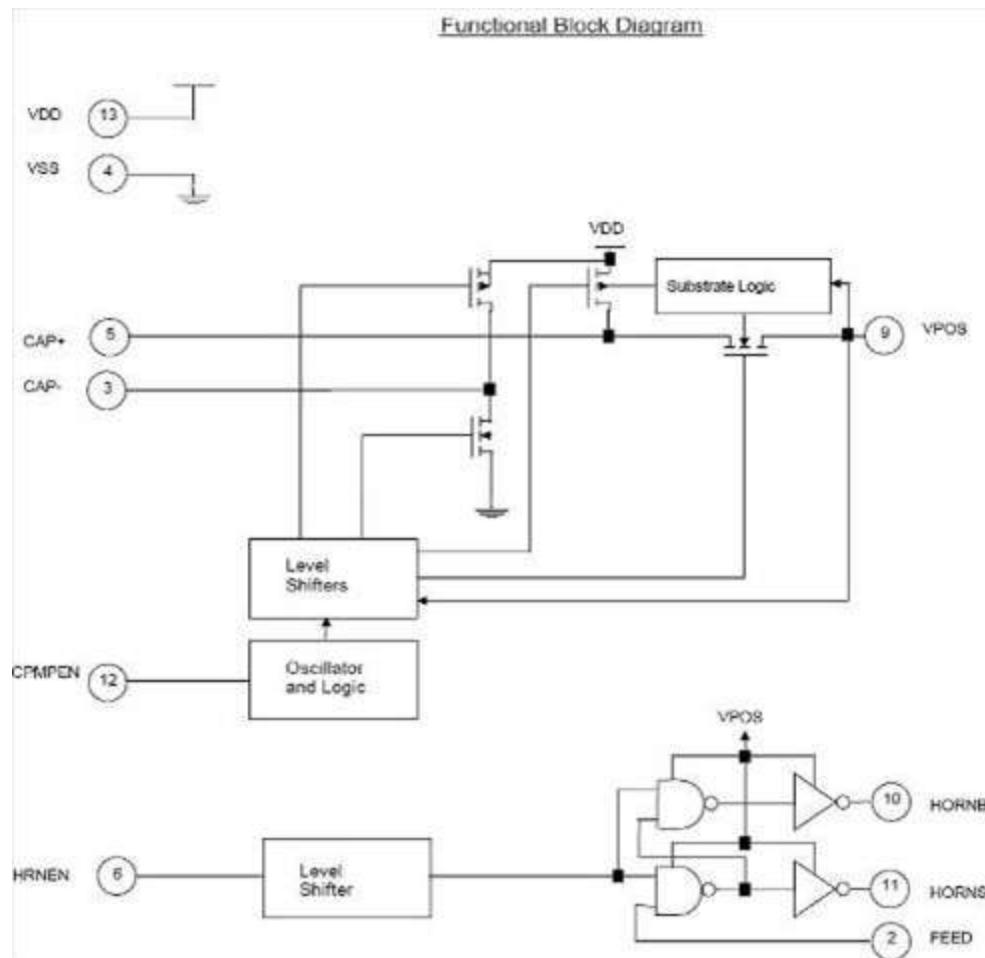
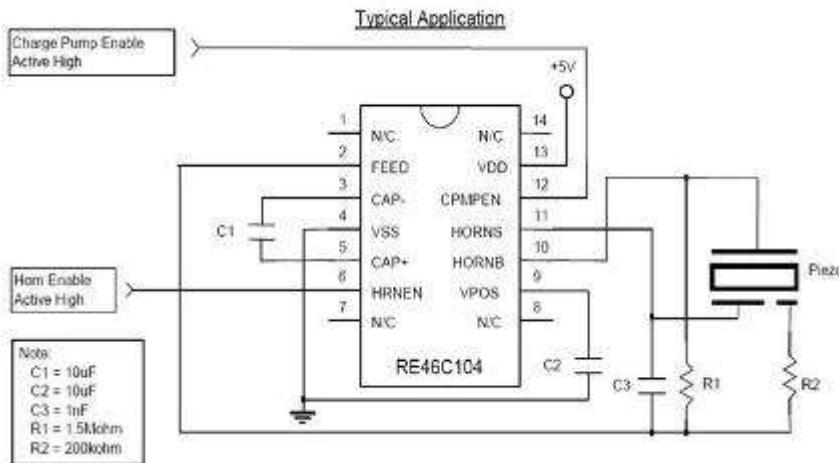
MICROCHIP

RE46C104

Online
Datasheet

Features:

- Low Quiescent Current
- Low Driver R_{ON}
- Wide Operating Voltage Range
- Available in RoHS Compliant Pb Free Packaging



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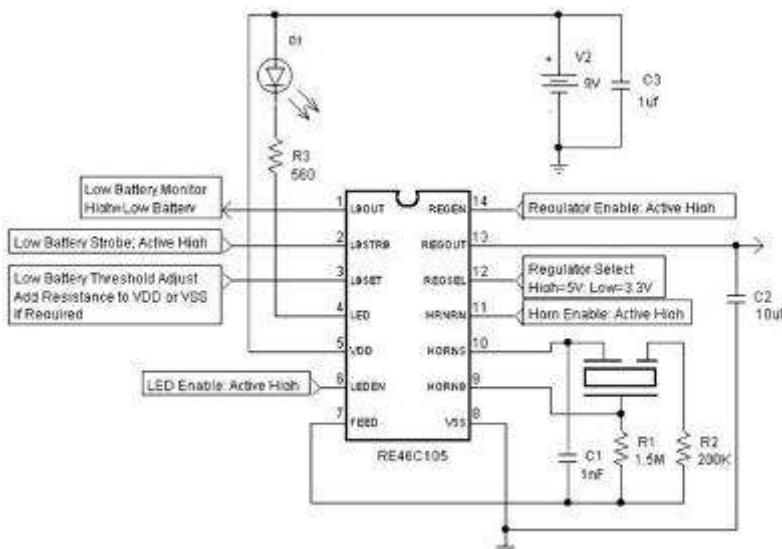
MICROCHIP

RE46C105

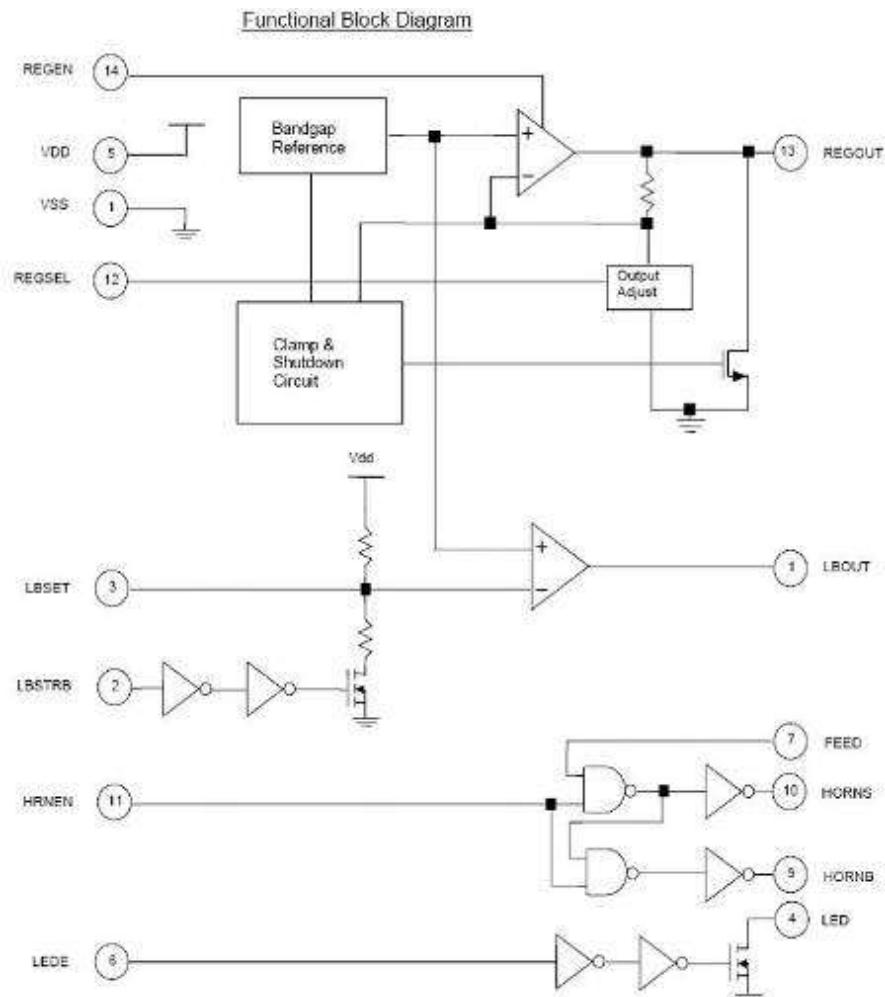
Online
Datasheet

Features:

- Low Quiescent Current
- Low Horn Driver R_{ON}
- Voltage Regulation to 3.3V or 5V
- Low Battery Detection
- Available in PDIP and SOIC packaging



Typical Application Using Self Resonating Piezoelectric Horn



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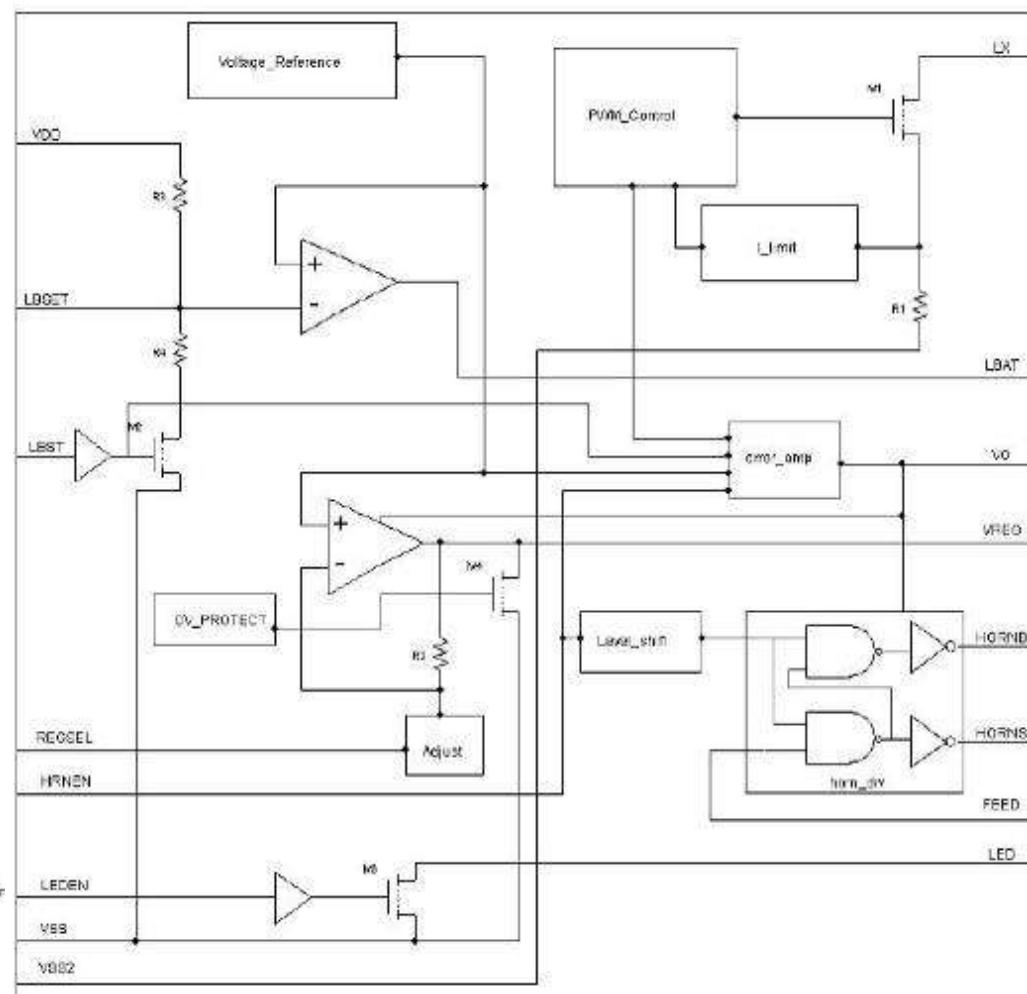
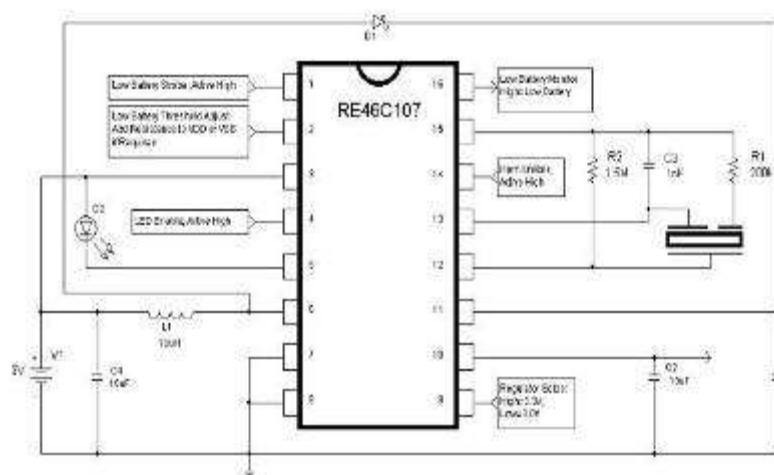


RE46C107

Online
Datasheet

Features:

- Low Quiescent Current
 - 10V Up Converter
 - Low Horn Driver R_{ON}
 - Voltage Regulation to 3.0V or 3.3V
 - Low Battery Detection



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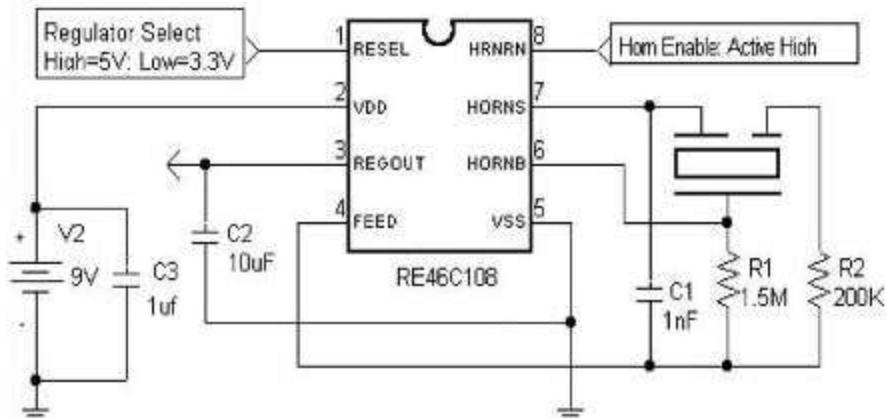
MICROCHIP

RE46C108

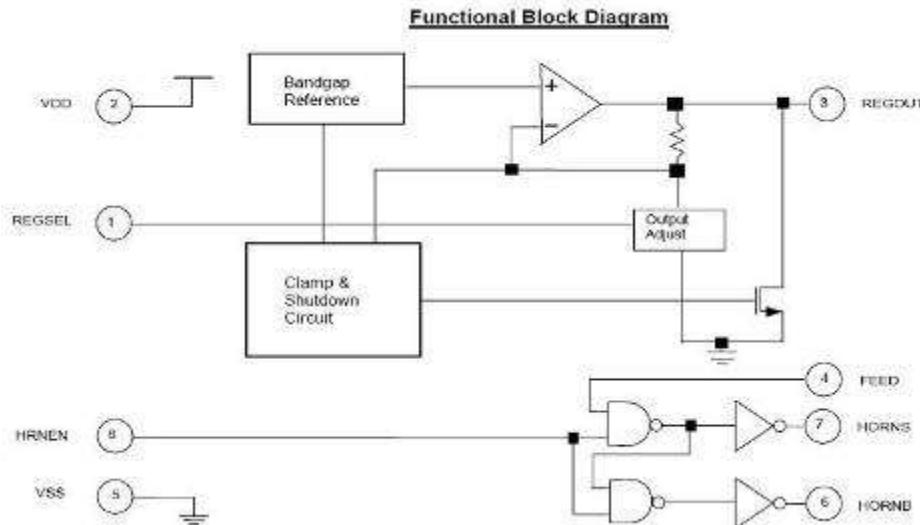
Online
Datasheet

Features:

- Low Quiescent Current
- Low Horn Driver R_{ON}
- Voltage Regulation to 3.3V or 5V
- Available in PDIP and SOIC packages



Typical Application Using Self Resonating Piezoelectric Horn



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MICROCHIP

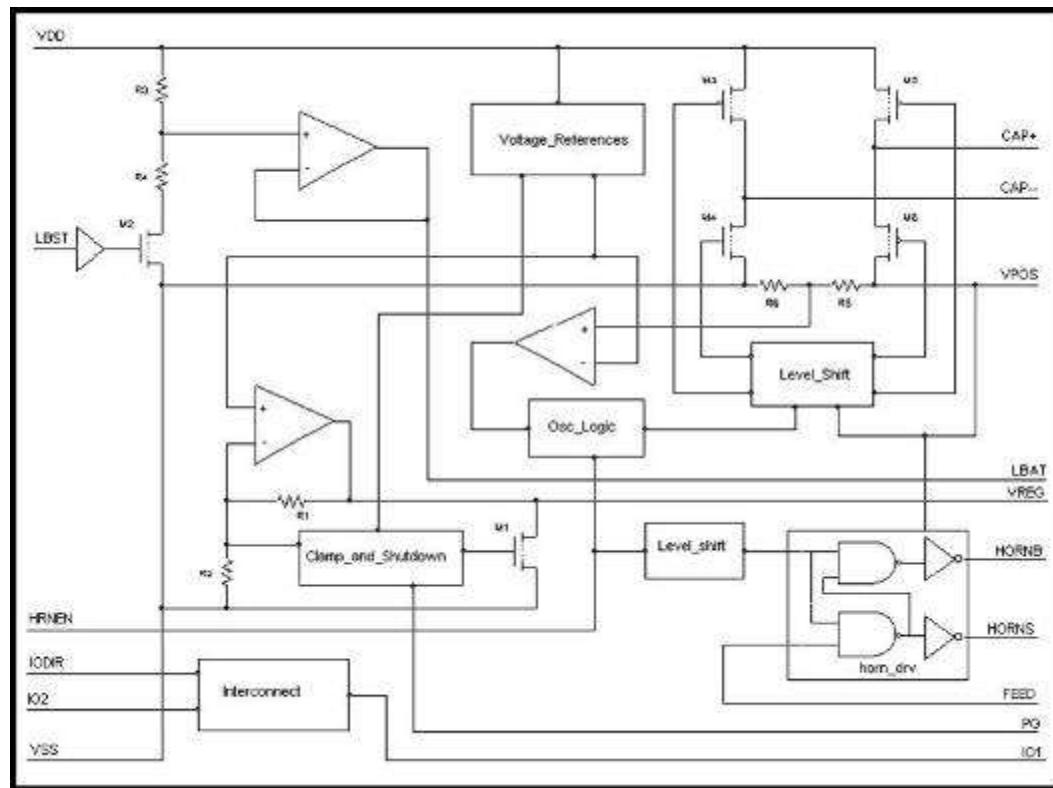
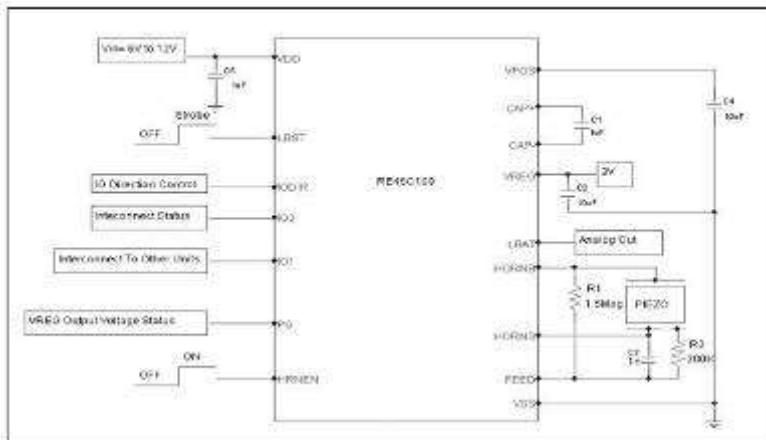
RE46C109

Online
Datasheet

Features:

- Low Quiescent Current
- 12V Boost Regulator
- Low Horn Driver R_{ON}
- 3V Regulator, other Options Available
- Low Battery Detection Interface
- Power Good and Brownout Circuits
- Device interconnection
- Available in PDIP and SOIC packages

Typical Application Circuit



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MICROCHIP

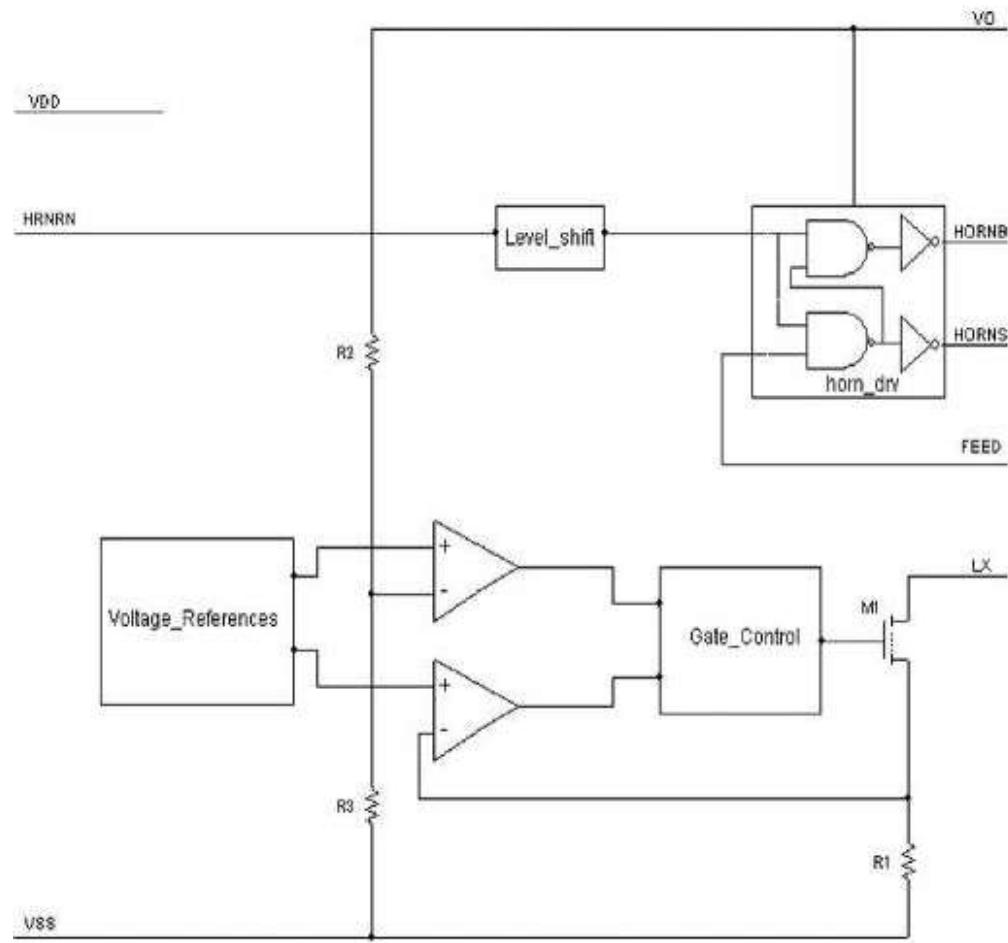
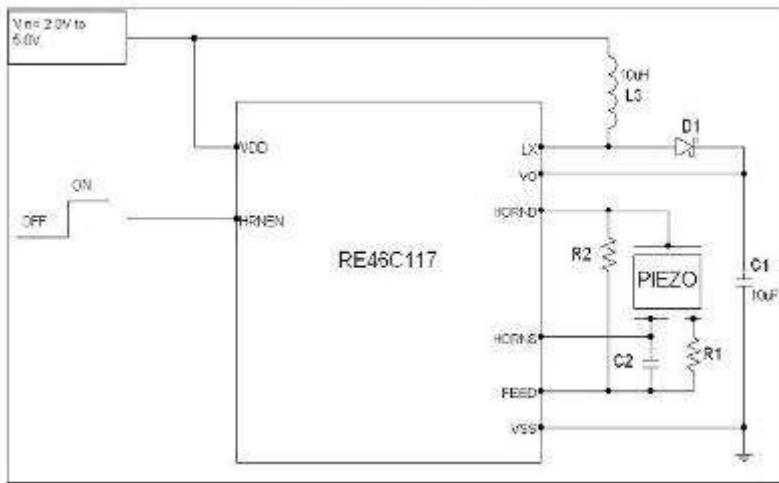
RE46C117

Online
Datasheet

Features:

- Low Quiescent Current
- 10V Up Converter
- Low Horn Driver R_{ON}
- Available in PDIP and SOIC Packages

Typical Application Circuit



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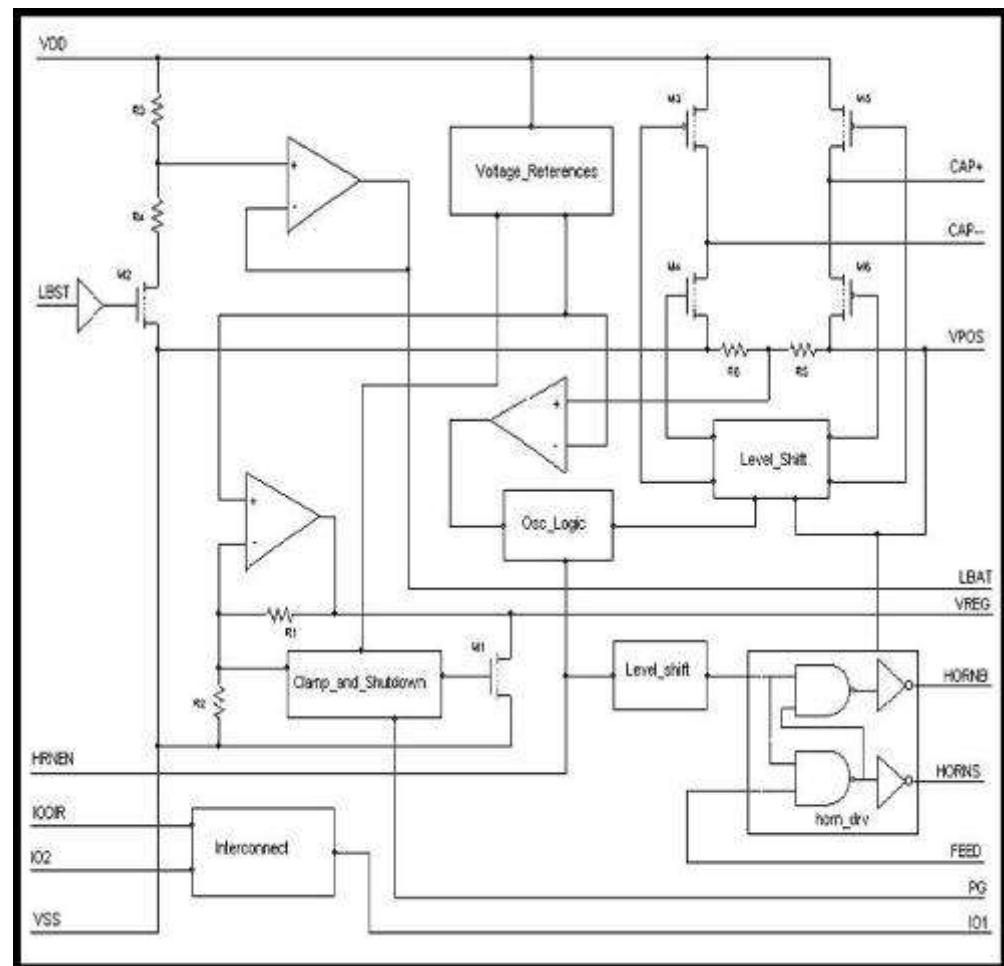
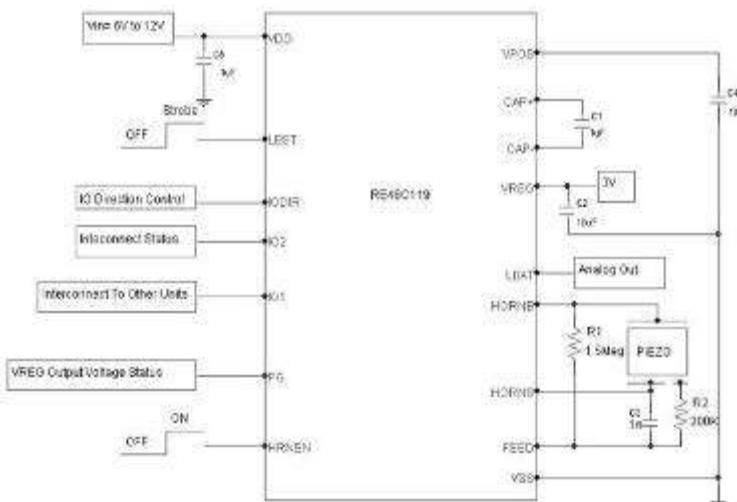
MICROCHIP

RE46C119

Online
Datasheet

Features:

- Low Quiescent Current
- 12V Boost Regulator
- Low Horn Driver R_{ON}
- 3V Regulator, other Options Available
- Low Battery Detection Interface
- Power Good Circuit
- Device interconnection
- Available in PDIP and SOIC packages



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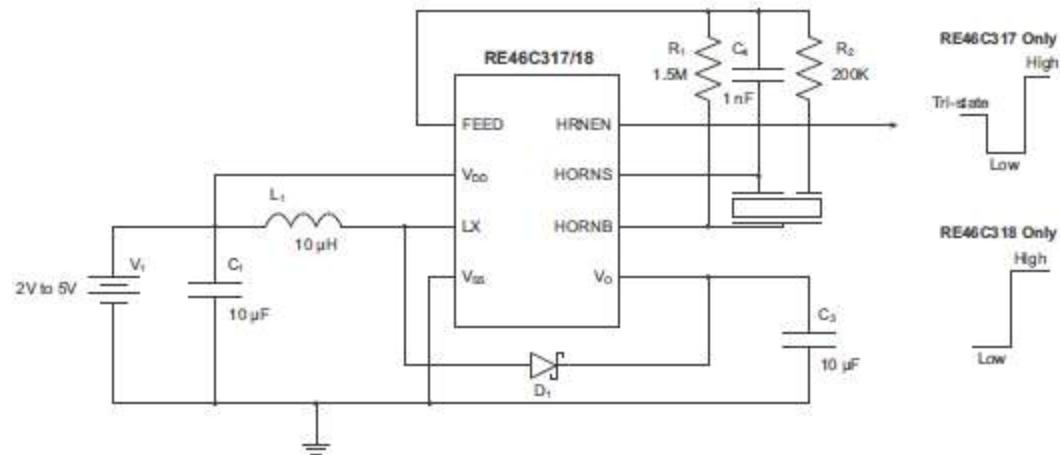
MICROCHIP

RE46C317/8

Online
Datasheet

Features:

- 3V Operation
- Low Quiescent Current
- 10V Up Converter
- Low Horn Driver R_{ON}
- Horn Enable
 - RE46C317: Three states
 - RE46C318: Two states
- Compatible with RE46C117
- Available in 8-lead PDIP and SOIC



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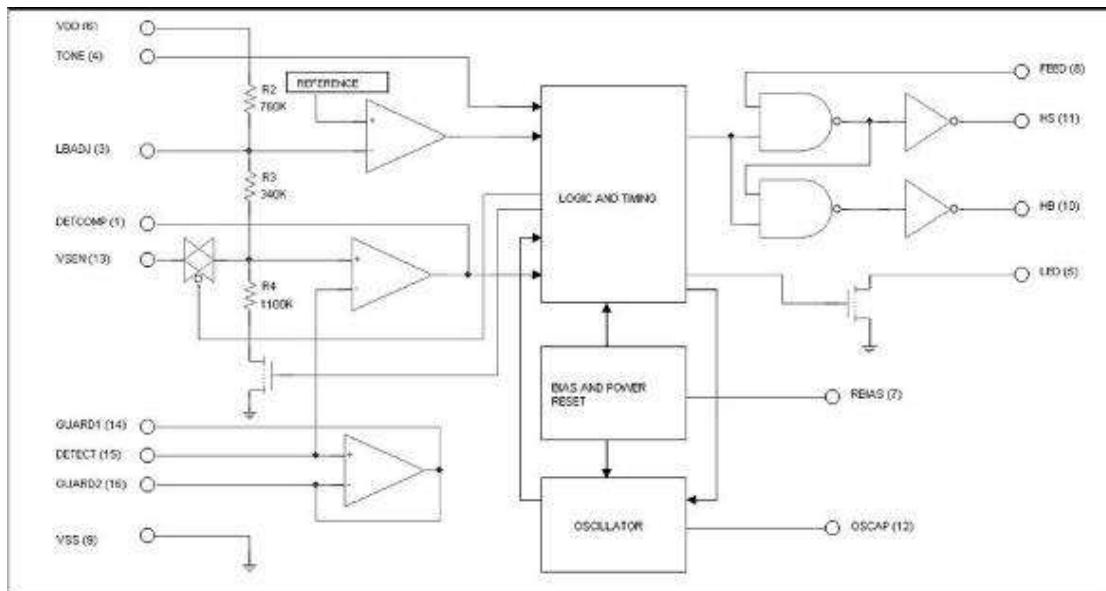
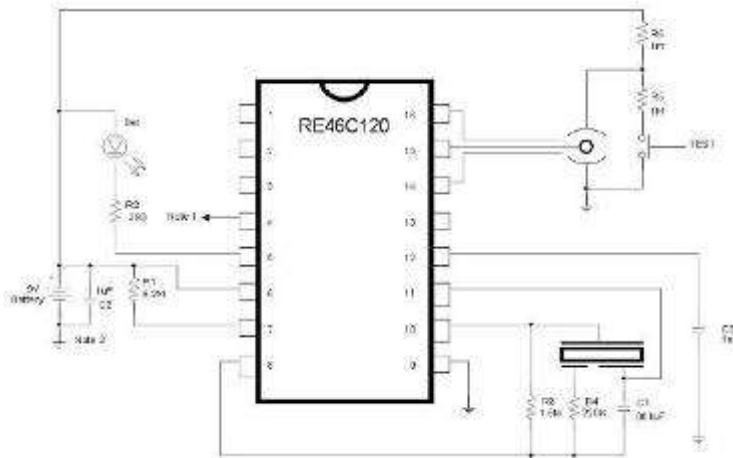
MICROCHIP

RE46C120

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Internal Low Battery Detection
- Pin Selectable Horn Pattern
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- 16-lead PDIP
- ESD Protection on all Pins



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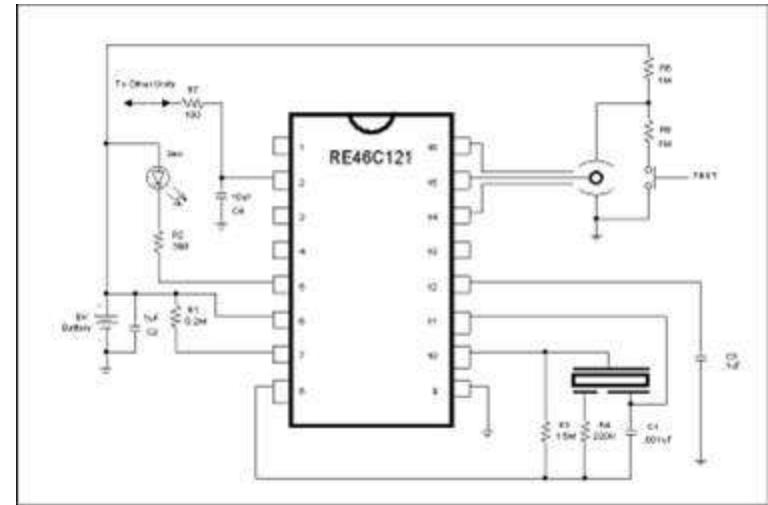
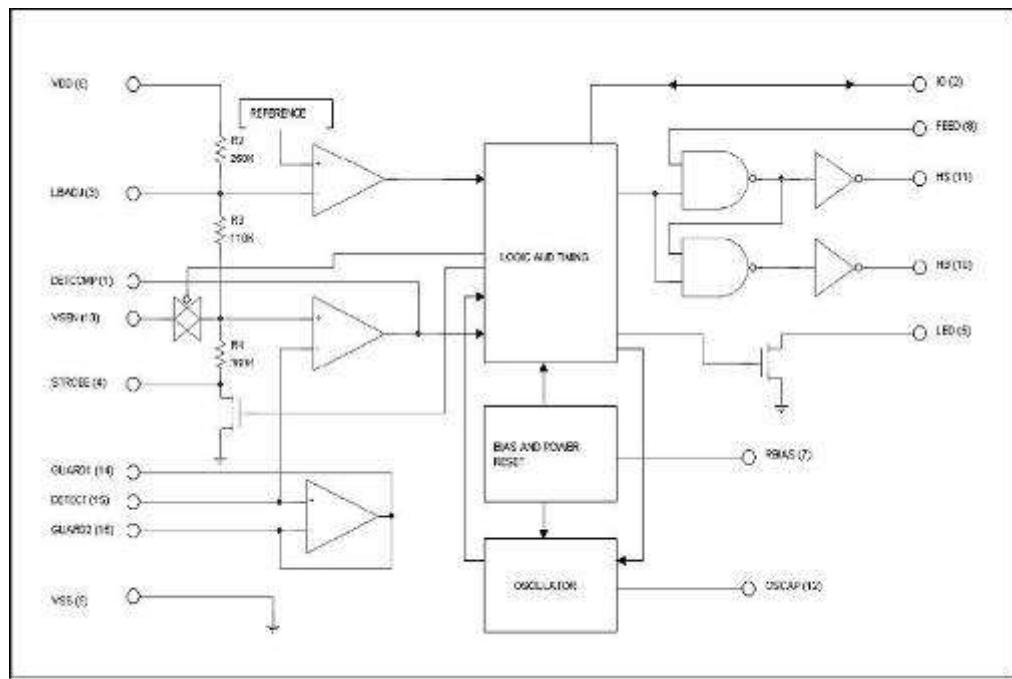
MICROCHIP

RE46C121

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Internal Low Battery Detection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP or 16-lead SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors





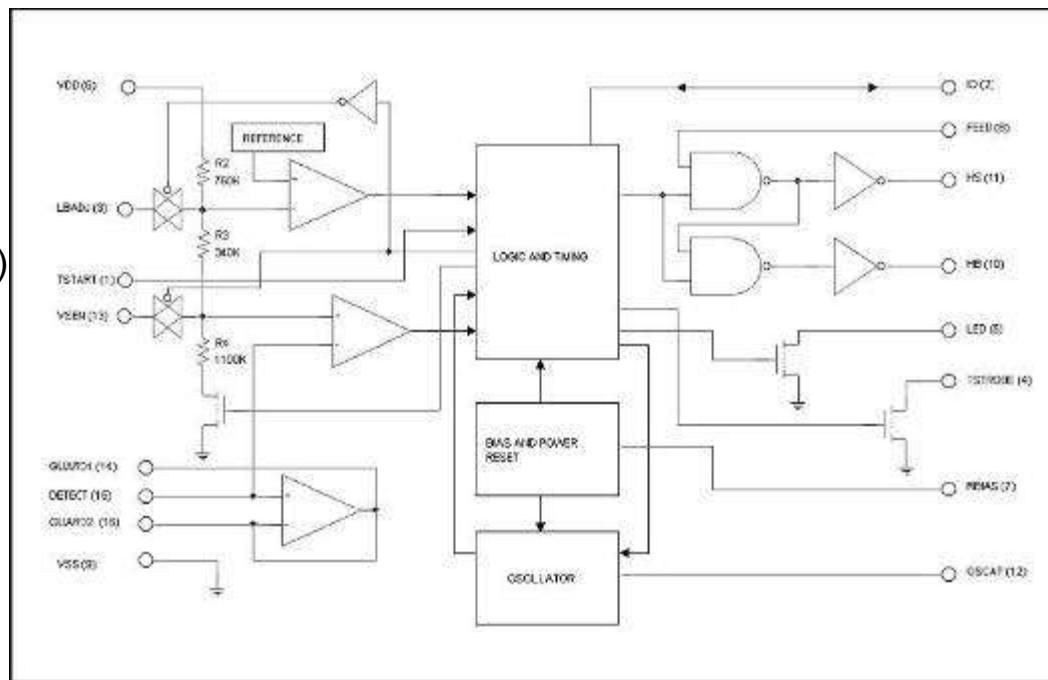
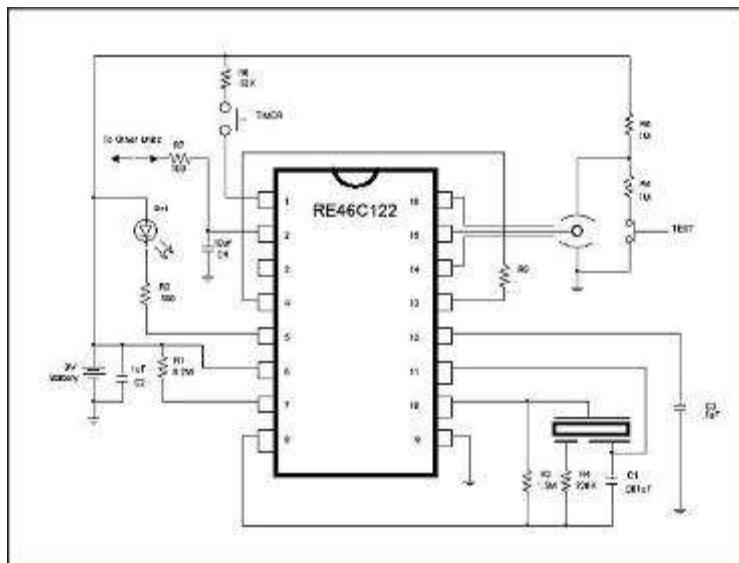
MICROCHIP

RE46C122

Online
Datasheet

Features:

- >1500V ESD Protection (HBM) on all Pins
- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP or 16-lead SOIC
- Internal Low Battery Detection
- Power Up Low Battery Test
- Interconnect up to 40 Detectors
- 10 Minute Timer for Sensitivity Control



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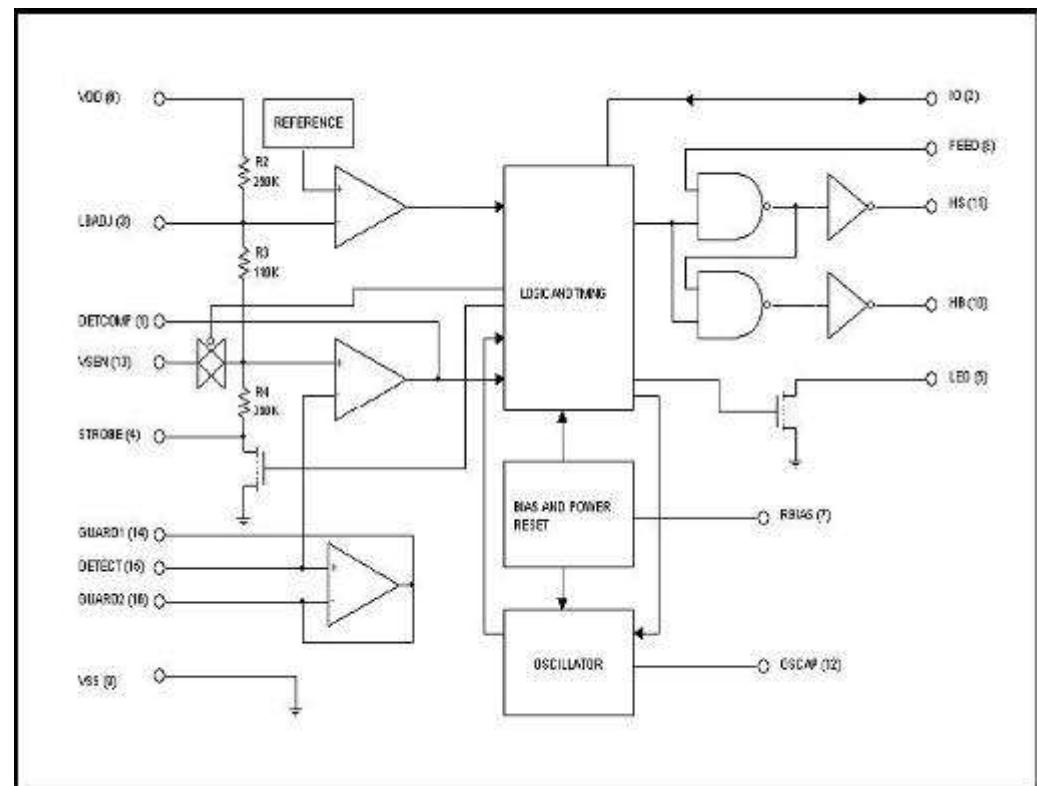
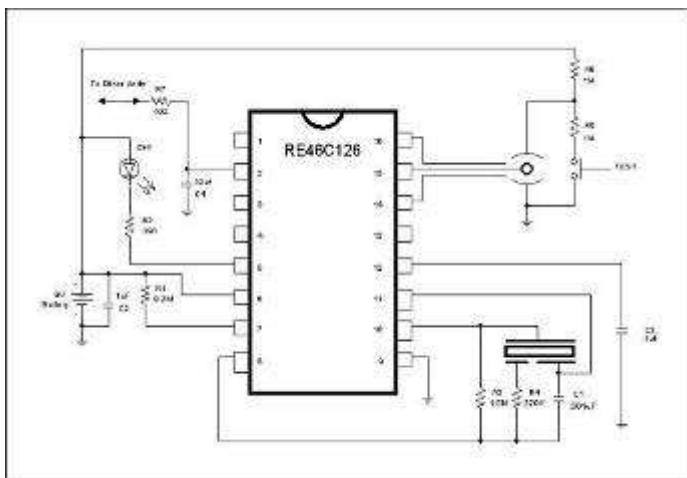
MICROCHIP

RE46C126

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Internal Low Battery Detection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP or 16-lead SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors



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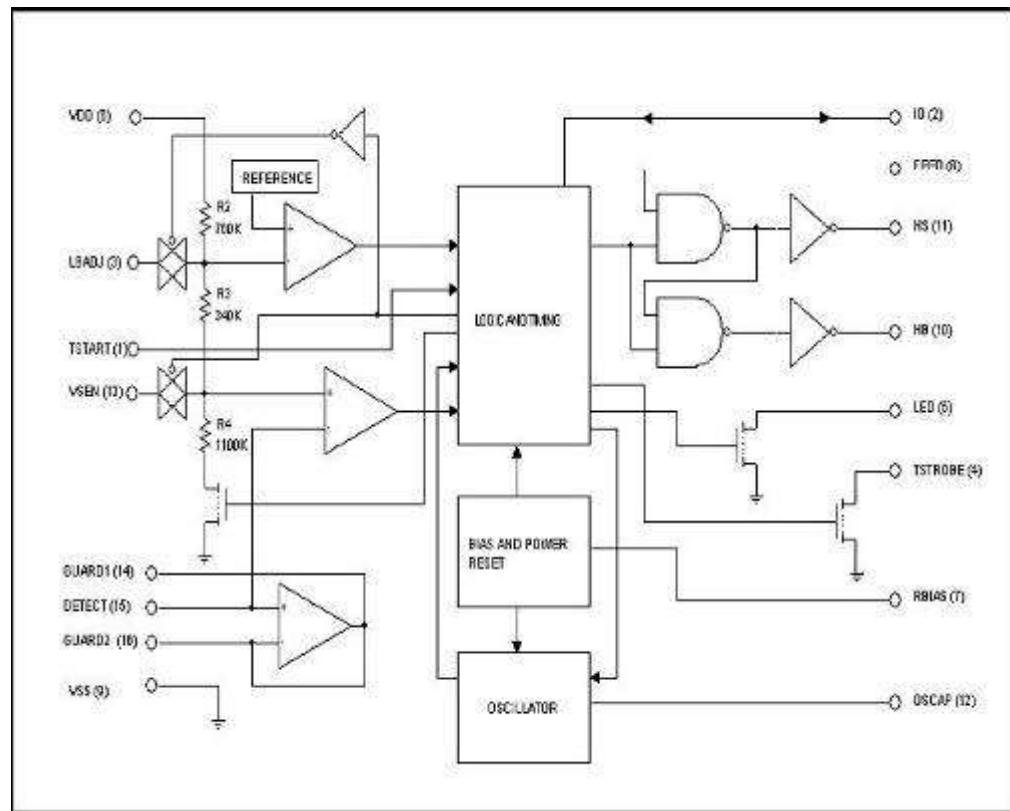
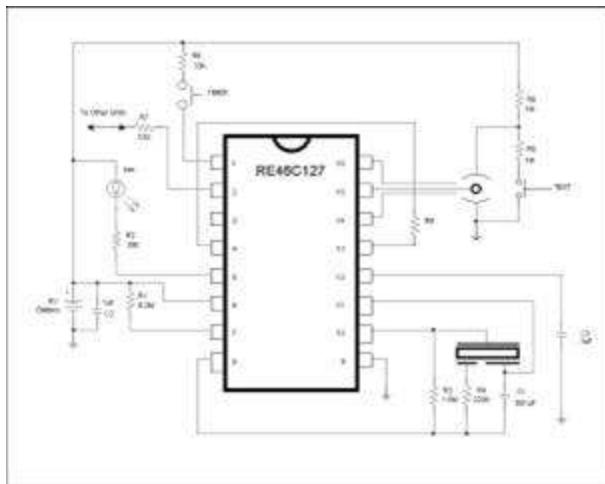
MICROCHIP

RE46C127

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP or 16-lead SOIC
- ESD Protection on all Pins
- Internal Low Battery Detection
- Interconnect up to 40 Detectors
- 8 Minute Timer for Sensitivity Control



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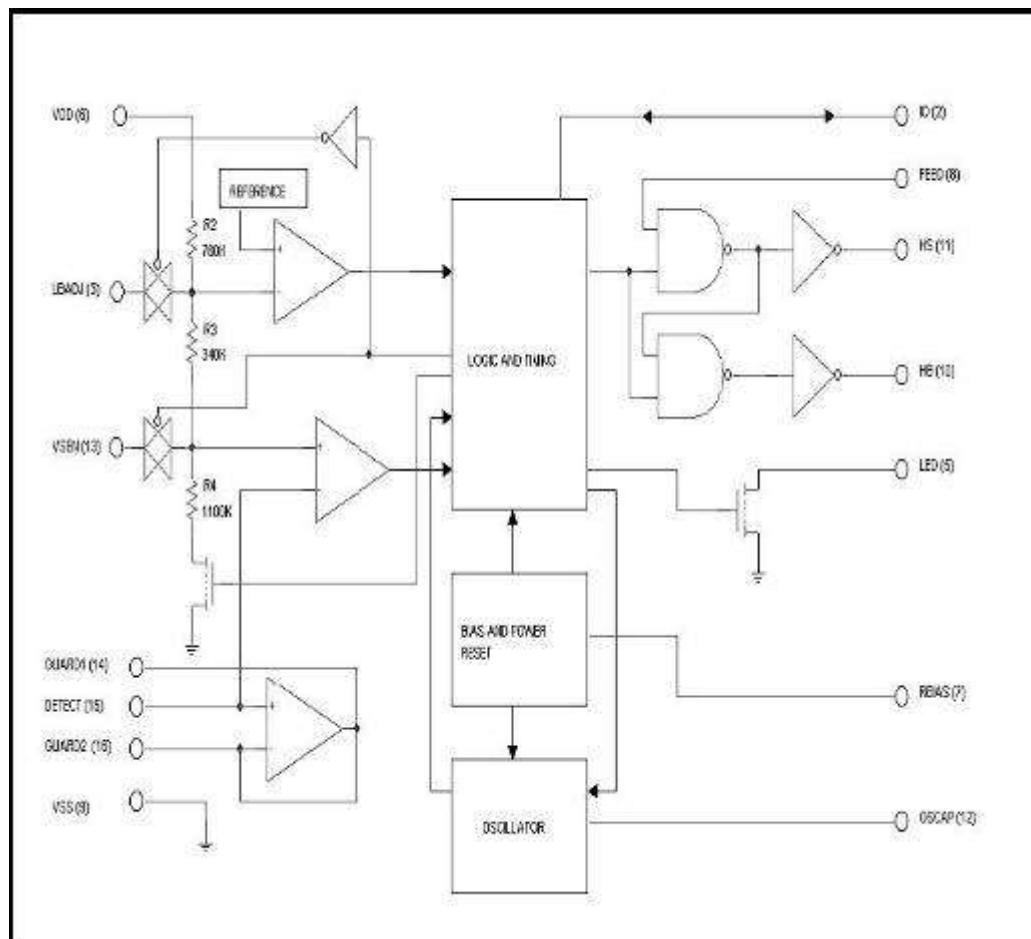
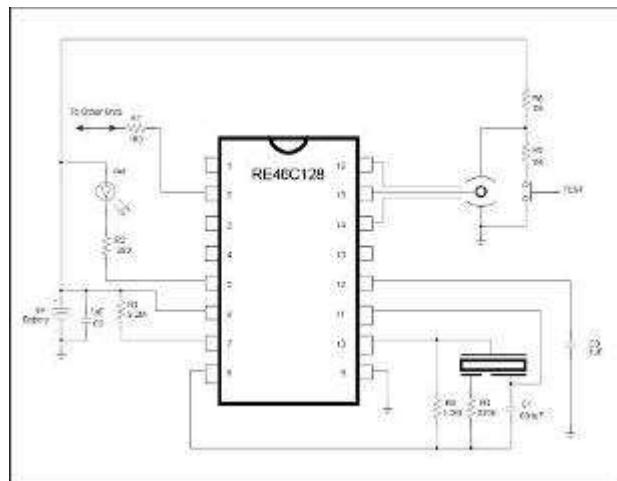
MICROCHIP

RE46C128

Online
Datasheet

Features:

- >1500V ESD Protection (HBM) on all Pins
- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP or 16-lead SOIC
- Internal Low Battery Detection
- Power Up Low Battery Test
- Interconnect up to 40 Detectors



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MICROCHIP

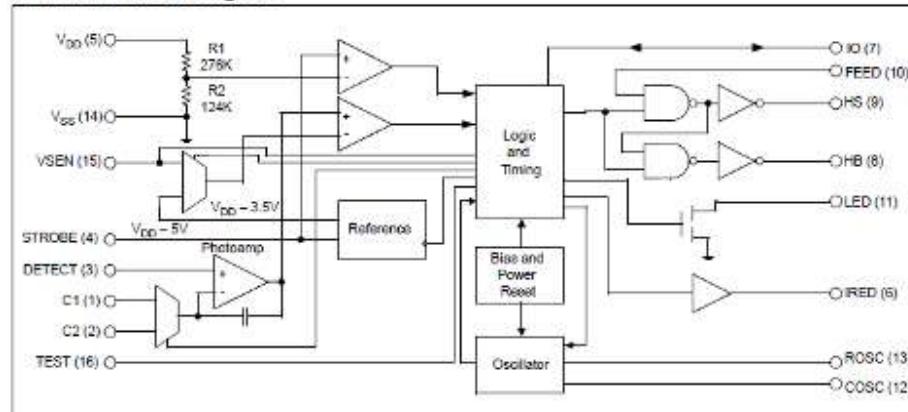
RE46C165/6/7/8

Online
Datasheet

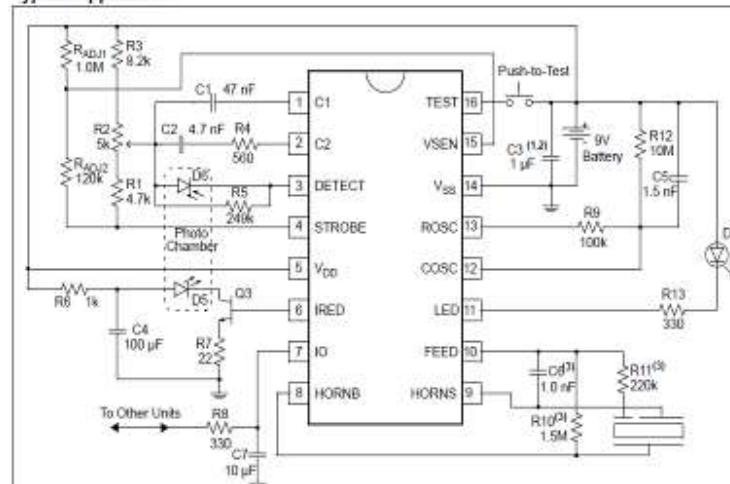
Features:

- Temporal Horn Pattern or Continuous Tone
- Alarm Memory
- Sensitivity Control Times:
 - 9 minutes (RE46C165/6)
 - 1.2 minutes (RE46C167/8)
- I/O Filter and Charge Dump
- Interconnect up to 40 Detectors
- Internal Power-on Reset
- >2000V ESD Protection (HBM) on All Pins
- Low Quiescent Current Consumption (<8 μ A)
- Internal Low Battery Detection and Chamber Test
- RoHS Compliant Lead-Free Packaging:
PDIP, SOIC

Functional Block Diagram



Typical Application



Note 1: C3 should be located as close as possible to the device power pins.

2: C3 is typical for an alkaline battery. This capacitance should be increased to 4.7 μ F or greater for a carbon battery.

3: R10, R11 and C6 are typical values and may be adjusted to maximize sound pressure.

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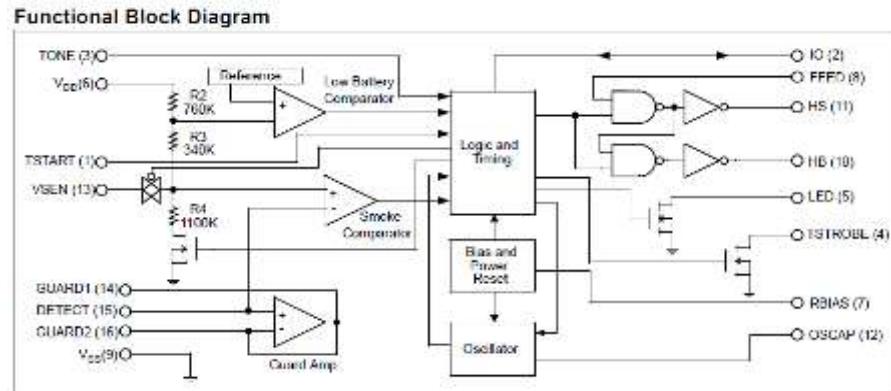
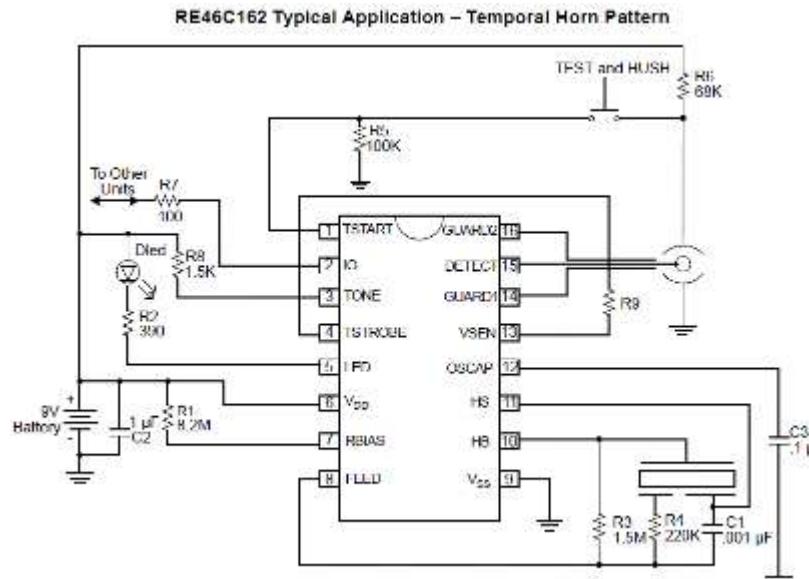
MICROCHIP

RE46C162/3

Online
Datasheet

Features:

- Pin Selectable Horn Patterns:
Temporal or Continuous Horn Patterns
- Alarm Memory
- Sensitivity Control Timer:
 - 8 minute Timer for RE46C162
 - 1 minute Timer for RE46C163
- >1500V ESD Protection (HBM) on All Pins
- Guard Outputs for Ion Detector Input
- ± 0.75 pA Detect Input Current
- Internal Reverse Battery Protection
- Low Quiescent Current Consumption (<6.5 μ A)
- I/O Filter and Charge Dump
- Internal Low Battery Detection
- Power-up Low Battery Test
- Interconnect up to 66 Detectors
- RoHS Compliant, Lead Free Packaging: PDIP



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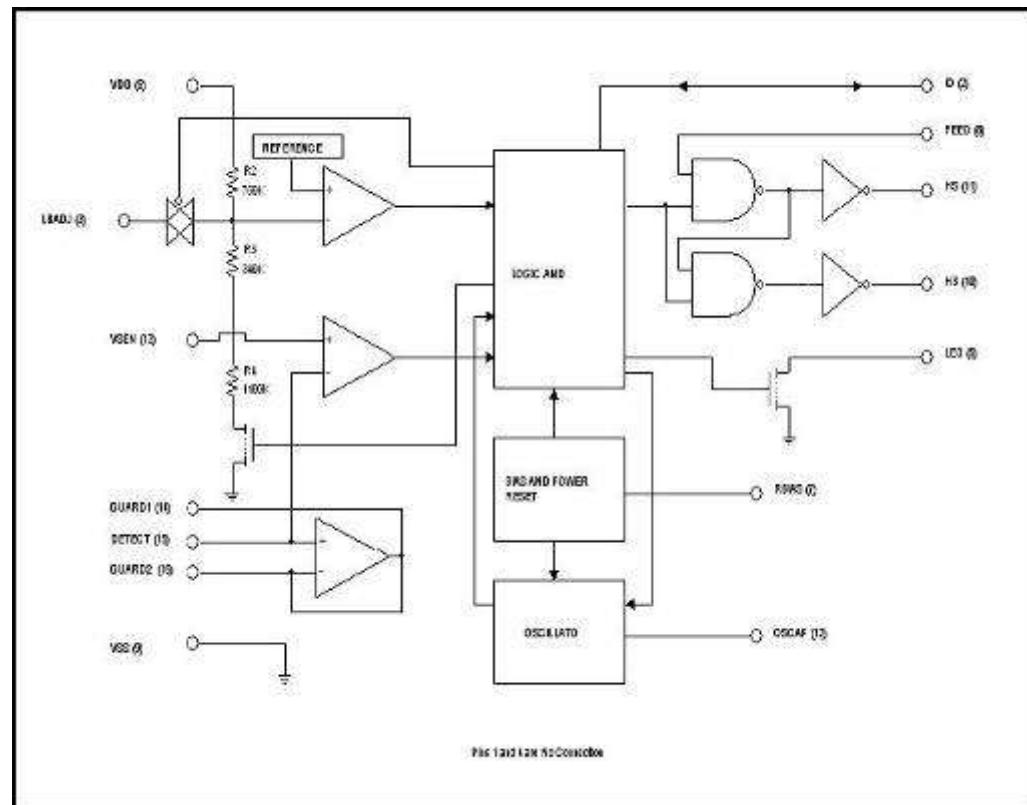
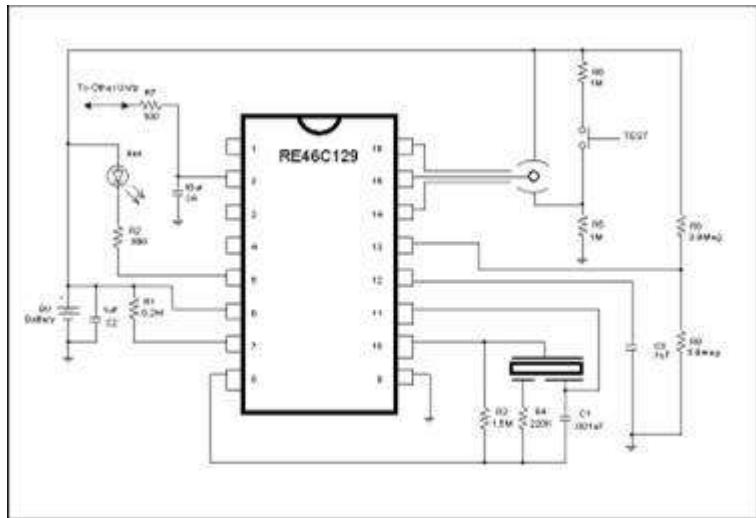
MICROCHIP

RE46C129

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP or 16-lead SOIC
- ESD Protection on all Pins
- Internal Low Battery Detection
- Interconnect up to 40 Detectors



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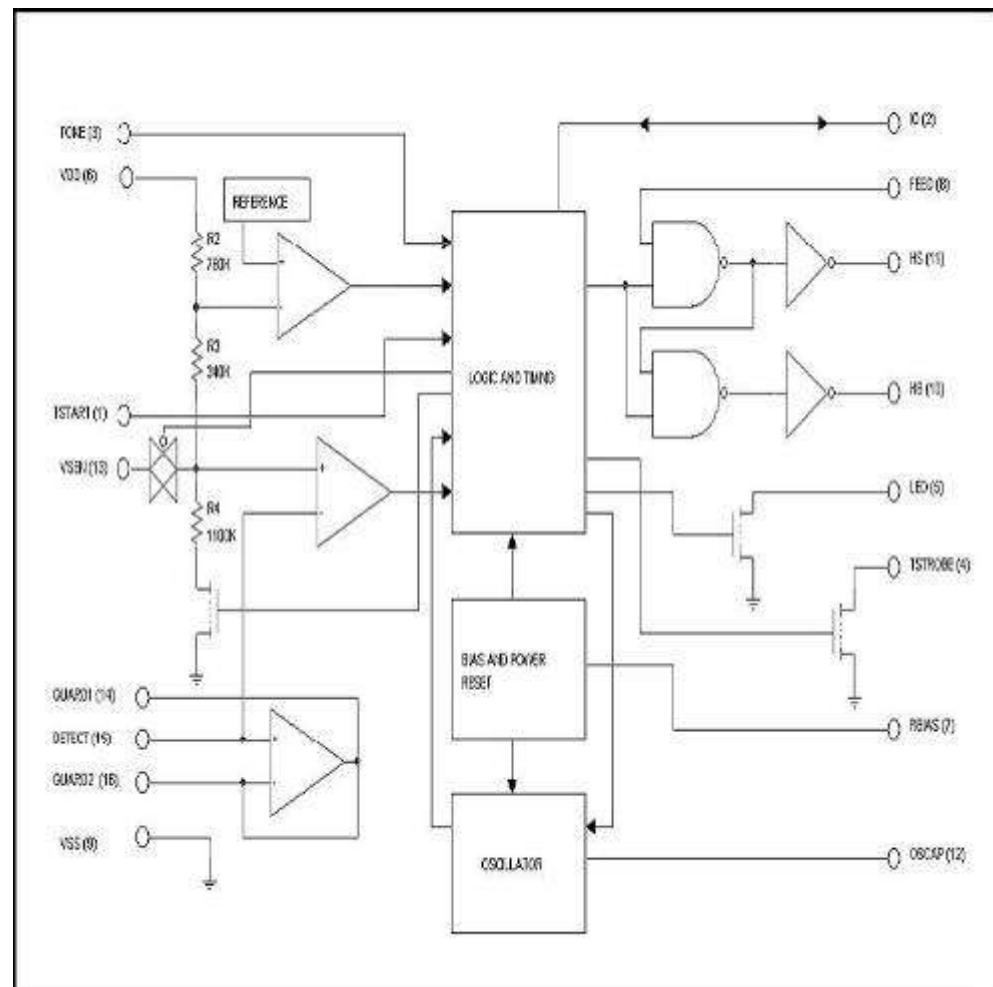
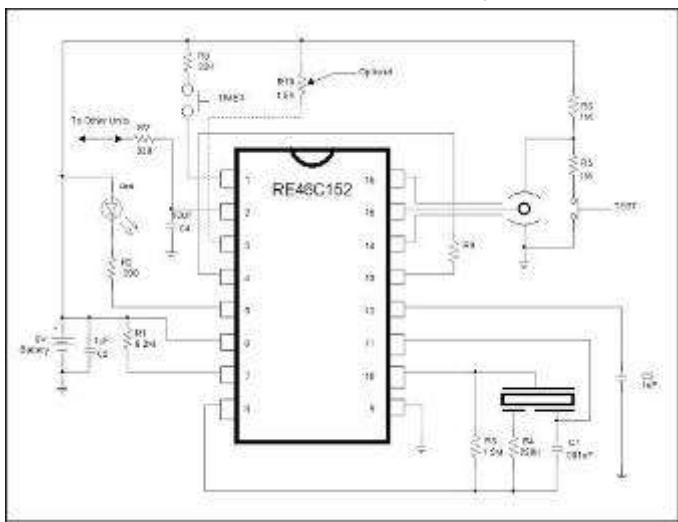
MICROCHIP

RE46C152

Online
Datasheet

Features:

- >1500V ESD Protection (HBM) on all Pins
- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Internal Reverse Battery Protection
- Low Quiescent Current Consumption ($<6.5\mu\text{A}$)
- Available in 16-lead PDIP package
- Internal Low Battery Detection
- Power Up Low Battery Test
- Interconnect up to 40 Detectors
- Pin selectable horn patterns
- 8 Minute Timer for Sensitivity Control



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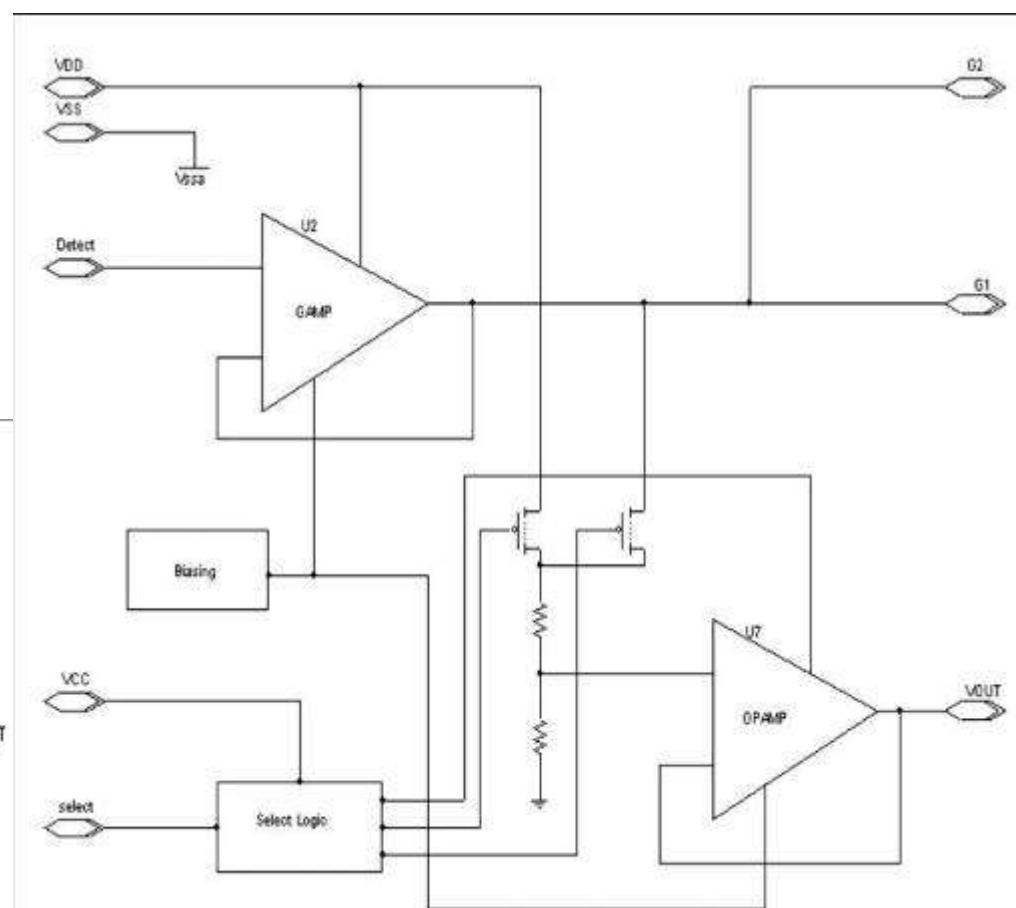
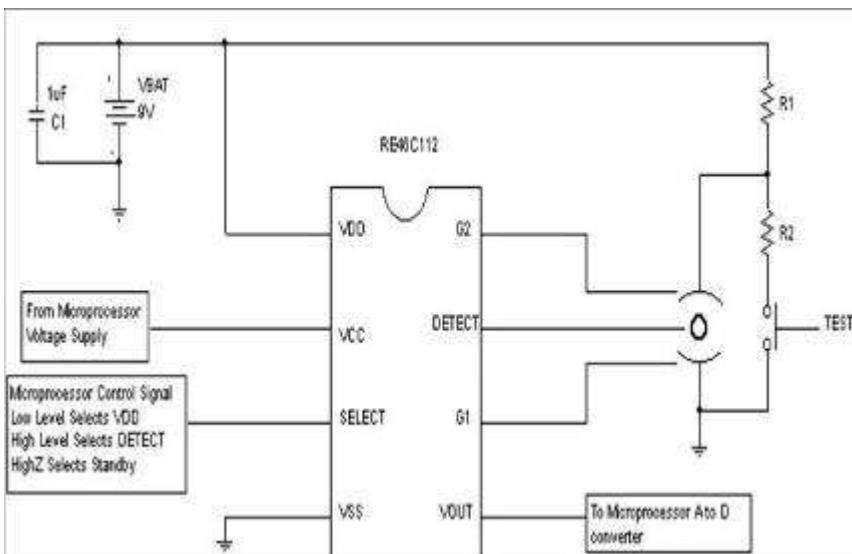


RE46C112

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
 - $\pm 0.75\text{pA}$ Detect Input Current
 - Microprocessor A/D Compatible Analog Output
 - Low Quiescent Current Consumption ($<10\mu\text{A}$)
 - Available in 8-lead PDIP or 8-lead SOIC
 - 2000V ESD Protection (HBM)



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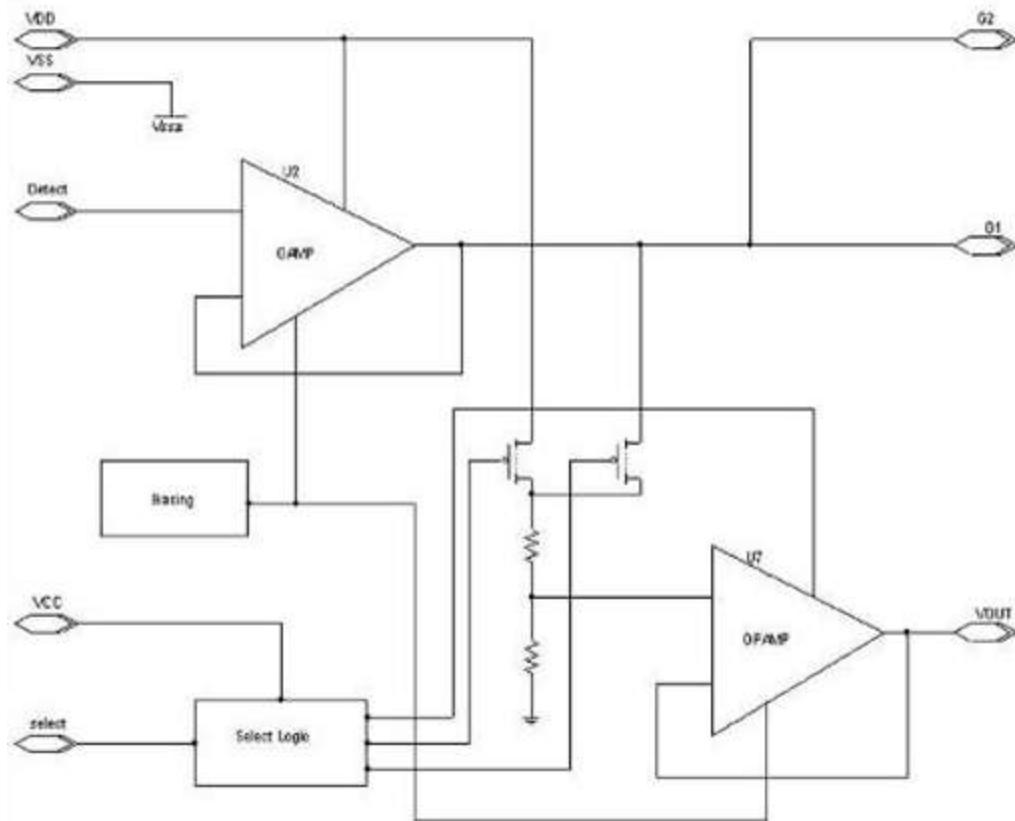
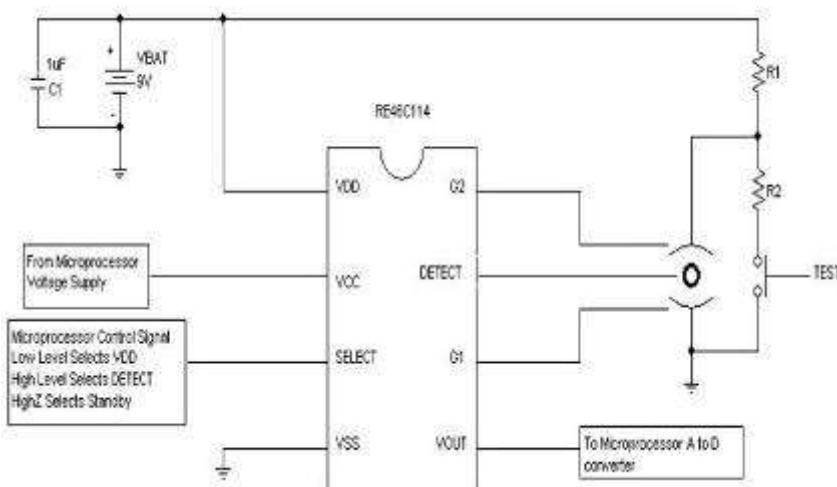
MICROCHIP

RE46C114

Online
Datasheet

Features:

- Guard Outputs for Ion Detector Input
- $\pm 0.75\text{pA}$ Detect Input Current
- Microprocessor A/D Compatible Analog Output
- Low Quiescent Current Consumption ($<10\mu\text{A}$)
- Available in 8-lead PDIP or 8-lead SOIC
- 2000V ESD Protection (HBM)



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MICROCHIP

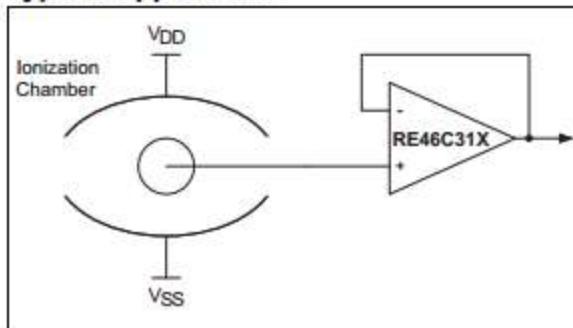
RE46C311/12

Online
Datasheet

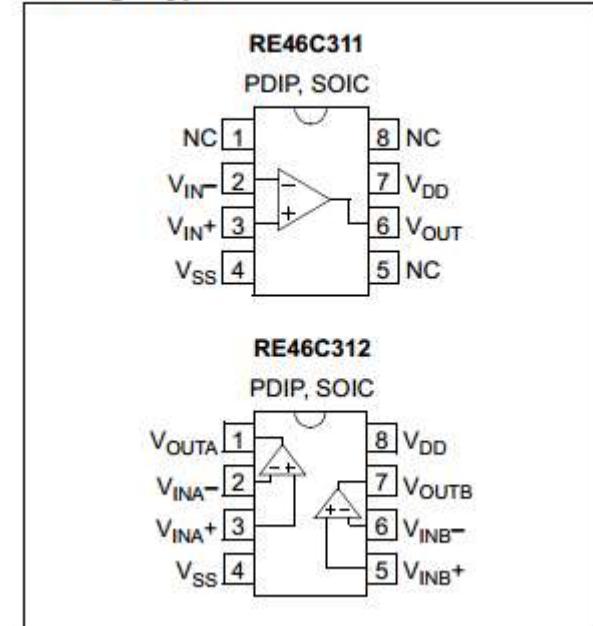
Features:

- Low Quiescent Current: 600 nA/Amplifier (typical)
- Rail-to-Rail Input/Output
- Gain Bandwidth Product: 10 kHz (typical)
- Wide Supply Voltage Range: 1.8V to 5.5V
- Unity Gain Stable
- Temperature Ranges: -10°C to +60°C
- Single: RE46C311
- Dual: RE46C312

Typical Application



Package Types



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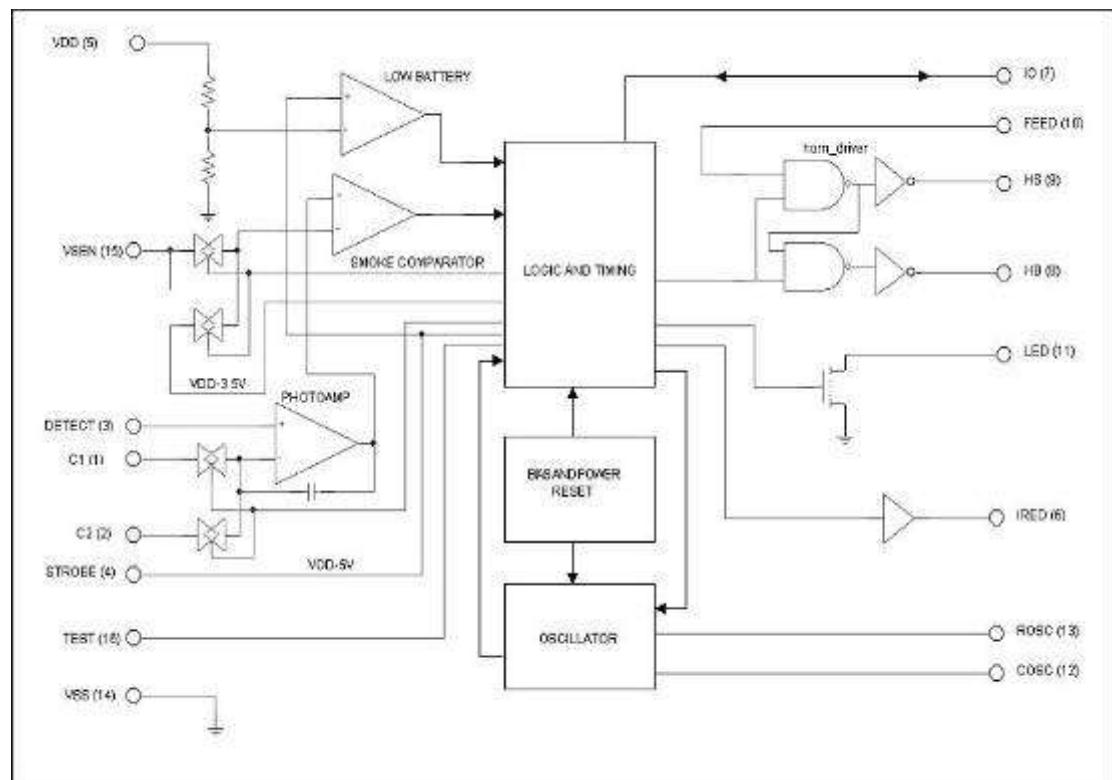
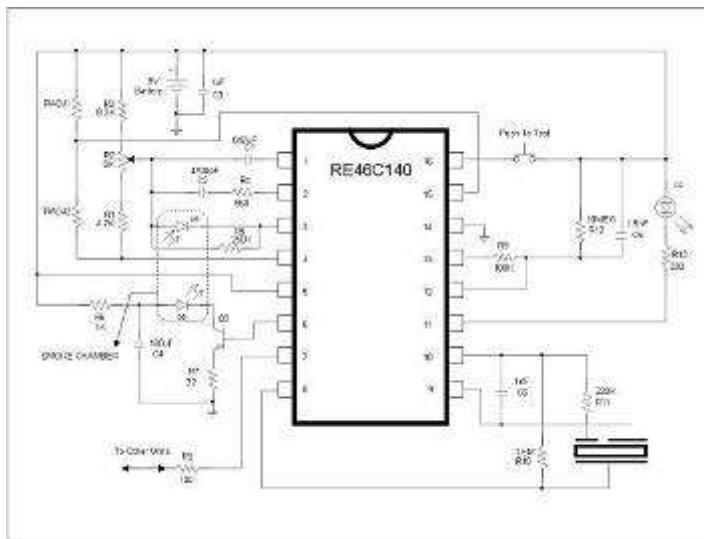
MICROCHIP

RE46C140

Online
Datasheet

Features:

- Internal Power On Reset
- Low Quiescent Current Consumption
- Available in 16-lead PDIP or SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors
- 10 Minute Timer for Sensitivity Control
- Temporal Horn Pattern
- Internal Low Battery and Chamber Test



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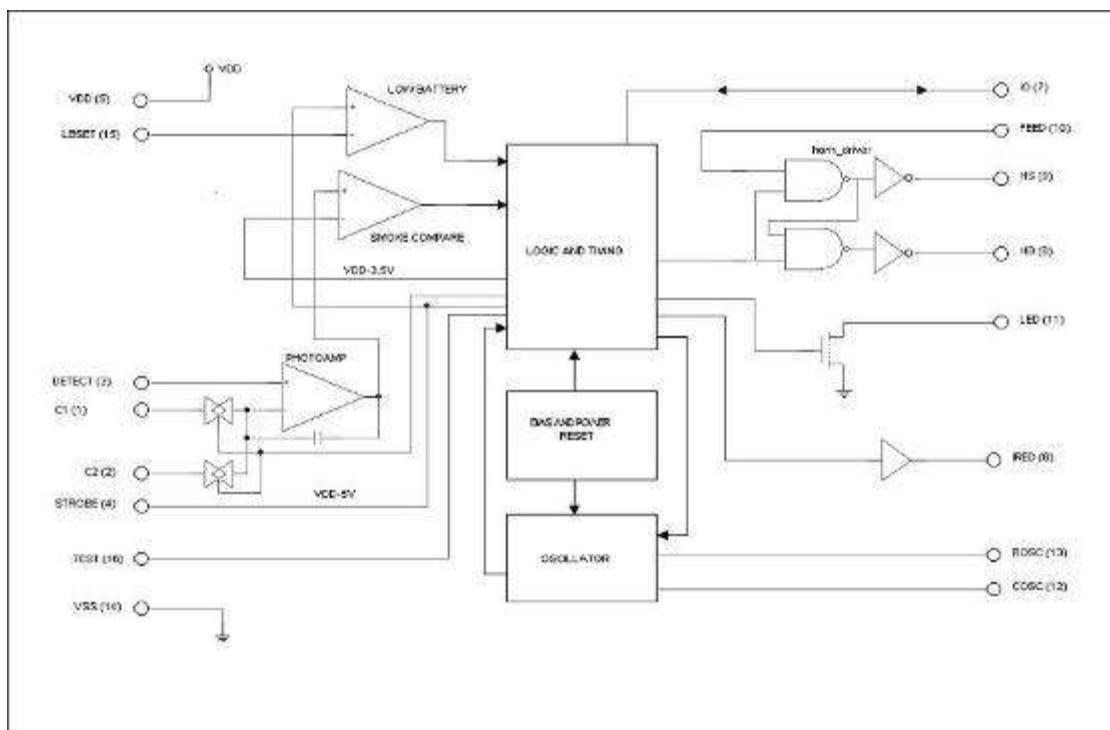
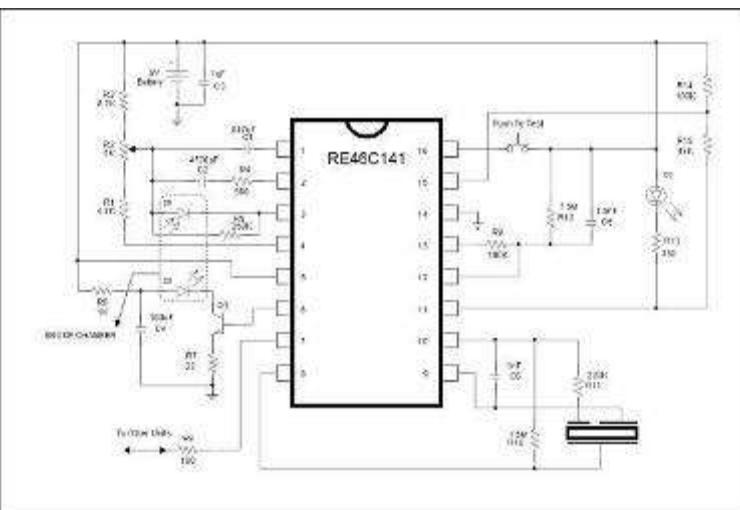
MICROCHIP

RE46C141

Online
Datasheet

Features:

- Internal Power On Reset
- Low Quiescent Current Consumption
- Available in 16-lead PDIP or SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors
- Temporal Horn Pattern
- Low Battery and Chamber Test



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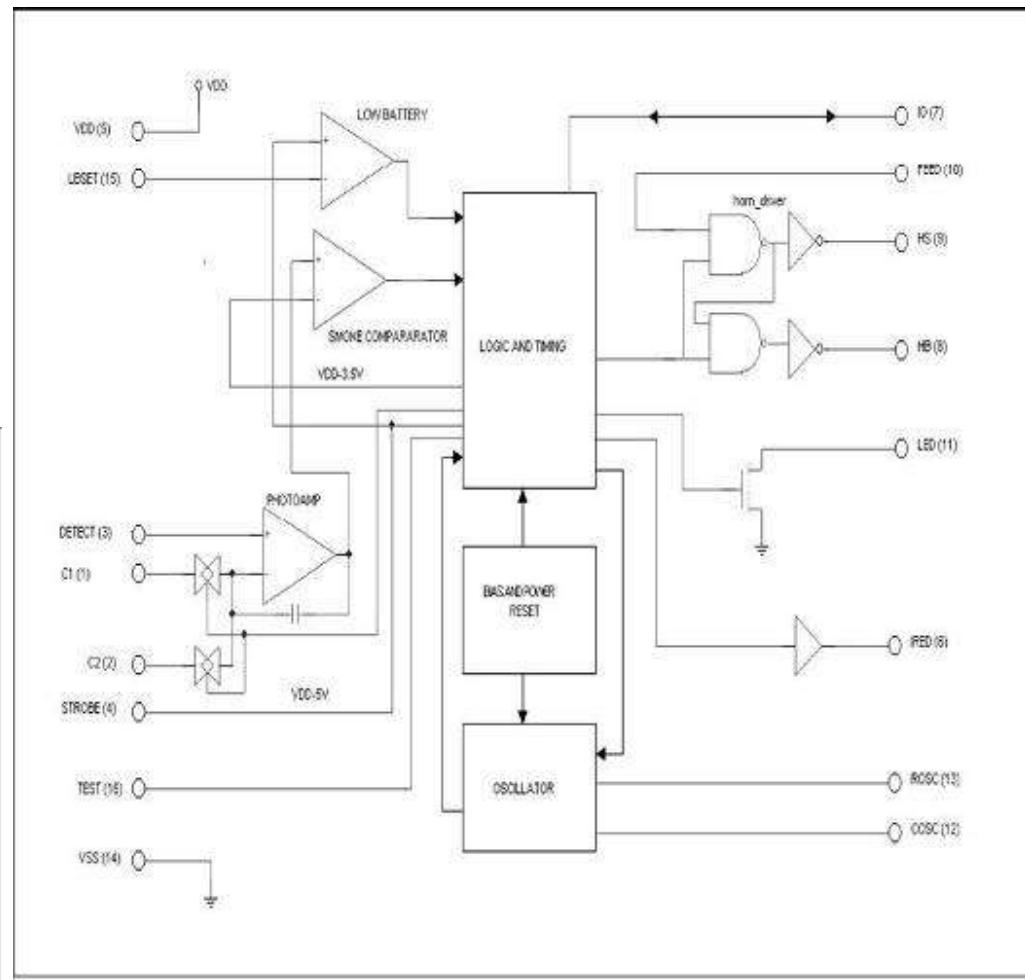
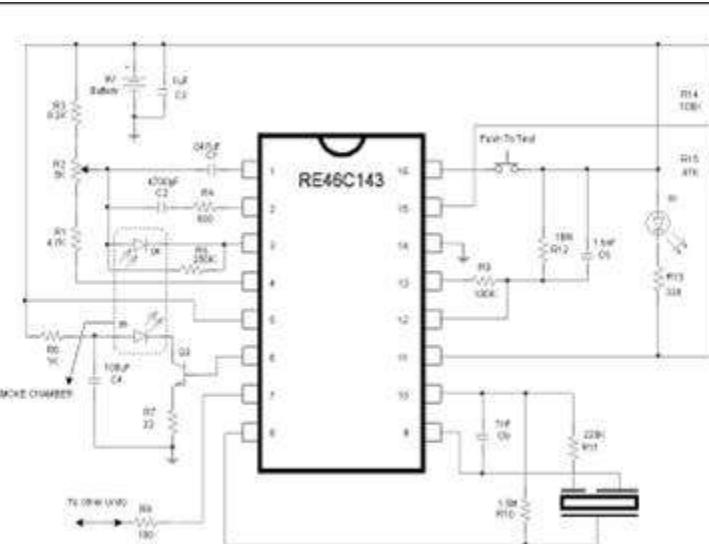
MICROCHIP

RE46C143

Online
Datasheet

Features:

- Internal Power On Reset
- Low Quiescent Current Consumption
- Available in 16-lead PDIP or SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors
- Continuous Horn Pattern
- Low Battery and Chamber Test



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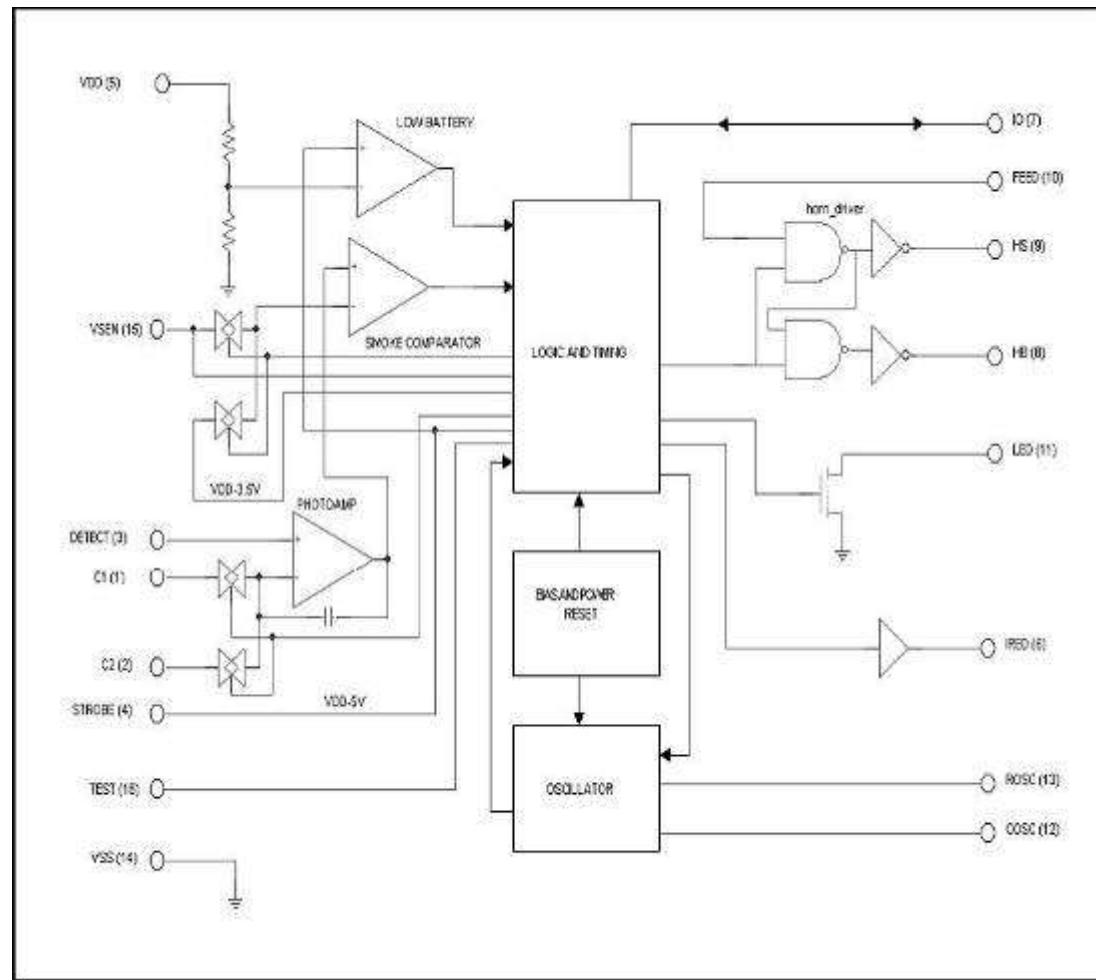
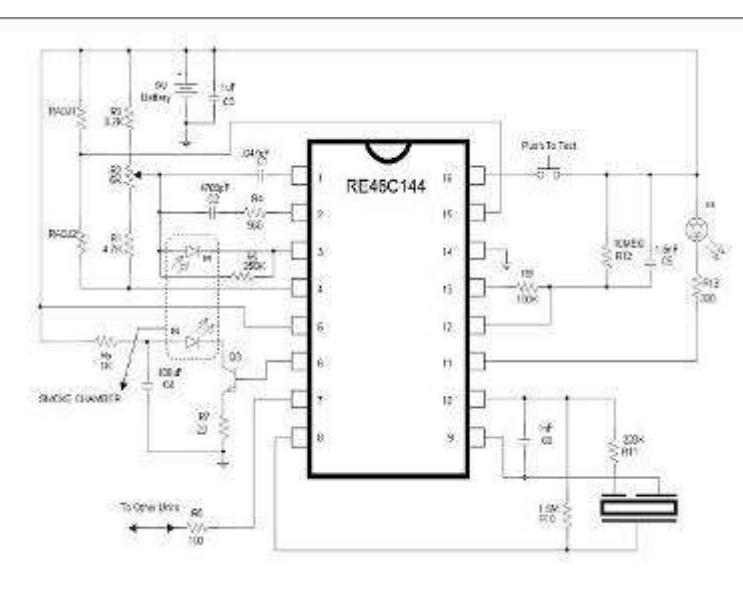
MICROCHIP

RE46C144

Online
Datasheet

Features:

- Internal Power On Reset
- Low Quiescent Current Consumption
- Available in 16-lead PDIP or SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors
- 10 Minute Timer for Sensitivity Control
- Continuous Horn Pattern
- Internal Low Battery and Chamber Test



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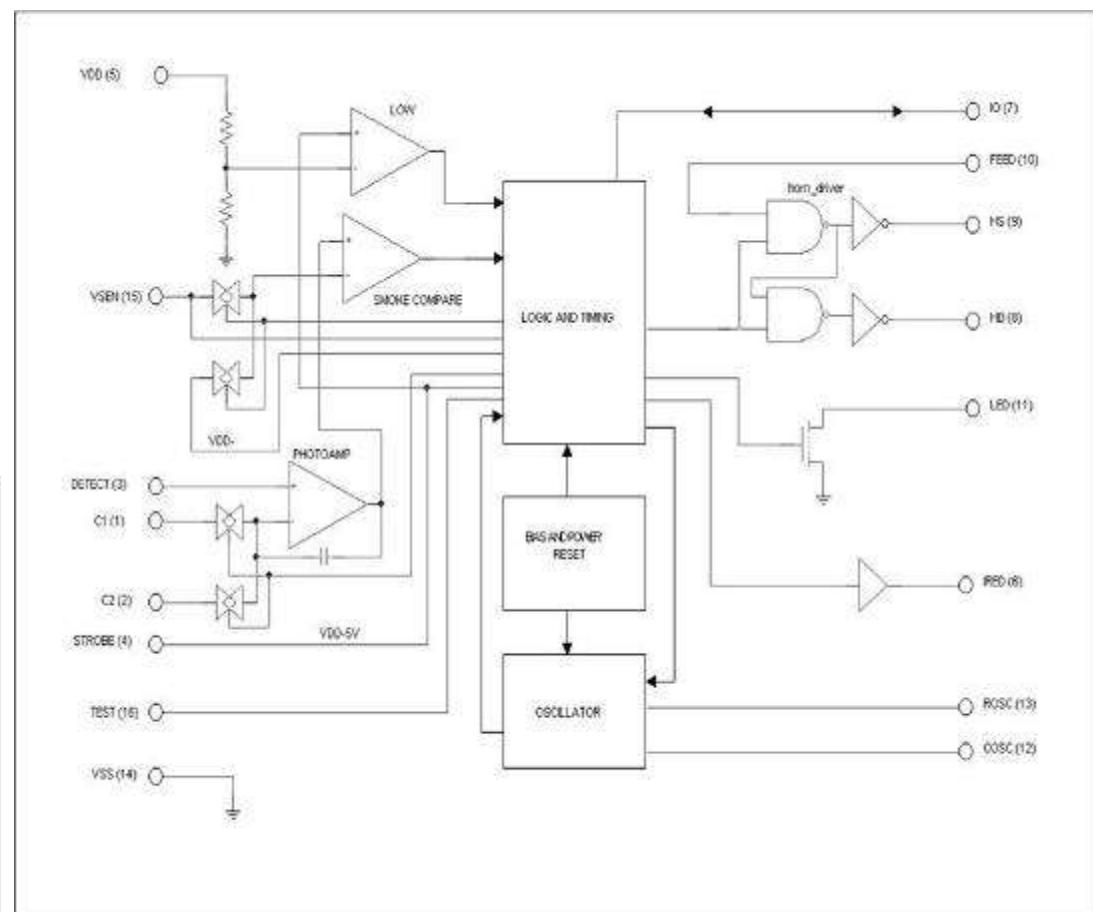
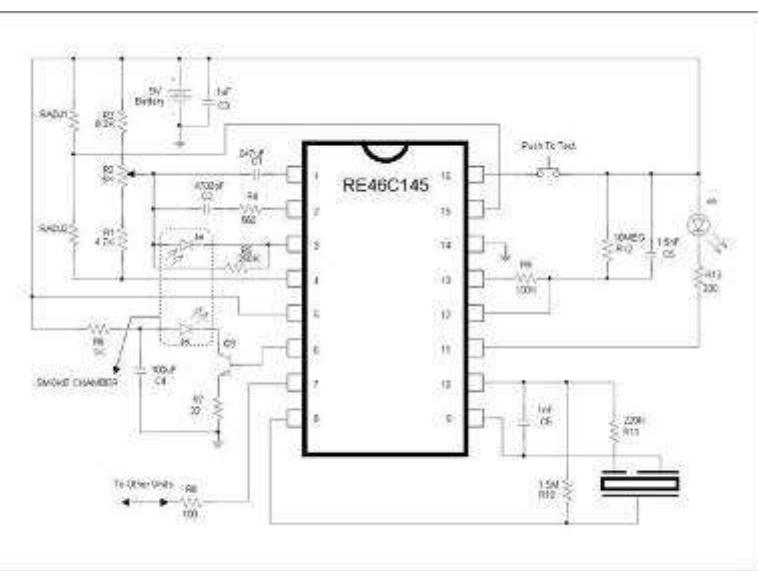
MICROCHIP

RE46C145

Online
Datasheet

Features:

- Internal Power On Reset
- Low Quiescent Current Consumption
- Available in 16-lead PDIP or SOIC
- ESD Protection on all Pins
- Interconnect up to 40 Detectors
- 10 Minute Timer for Sensitivity Control
- Temporal Horn Pattern
- Internal Low Battery and Chamber Test
- Alternate Diagnostic Mode



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MICROCHIP

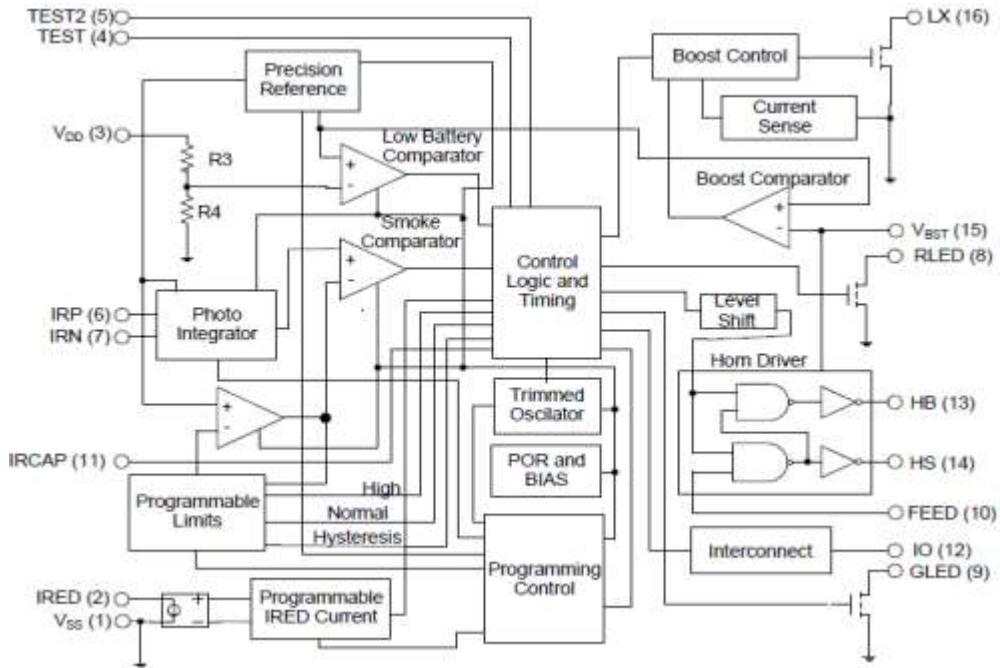
RE46C190

Recommend RE46C191

Online
Datasheet

Features:

- Two AA battery Operation
- Internal Power On Reset
- Low Quiescent Current Consumption
- Internal IRED driver with Programmable IRED Current
- Programmable Photo Amplifier
- Programmable Smoke Sensitivity Levels
- 9 Minute Timer for Sensitivity Control
- Chamber Test with Programmable Sensitivity Level
- Internal Low Battery Test with Programmable Threshold
- Interconnect up to 40 Detectors
- Local Alarm Memory
- Temporal or Continuous Horn Pattern
- All internal Oscillator
- Available 16L N SOIC



RE46C191

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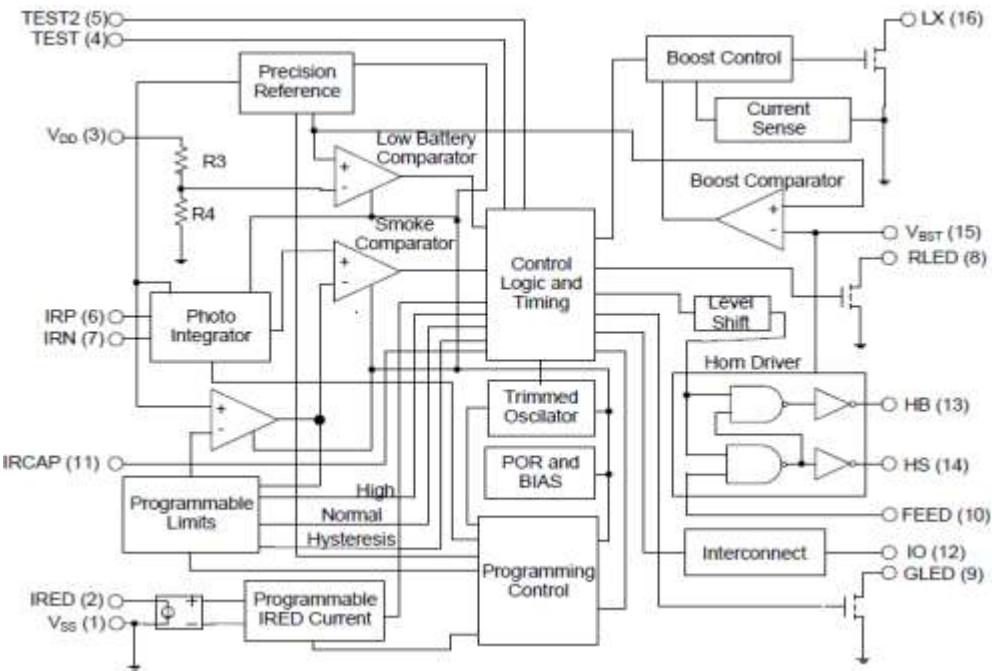


MICROCHIP

RE46C191

Features:

- Two AA battery Operation
- Low Quiescent Current Consumption
- Programmable IRED Current
- Programmable Photo Amplifier
- 6-Bit ADC
- Programmable Smoke Alarm Levels
- Long Term Drift Adjustment
- 9 Minute Timer for Sensitivity Control
- Chamber Test with Programmable Alarm Level
- Low Battery Test with Programmable Threshold
- Interconnect up to 40 Detectors
- Local Alarm Memory
- Temporal or Continuous Horn Pattern
- 10 Year End of Life Indicator
- Pin-for-Pin Compatible with the RE46C190
- Contact AIPD Marketing for additional information



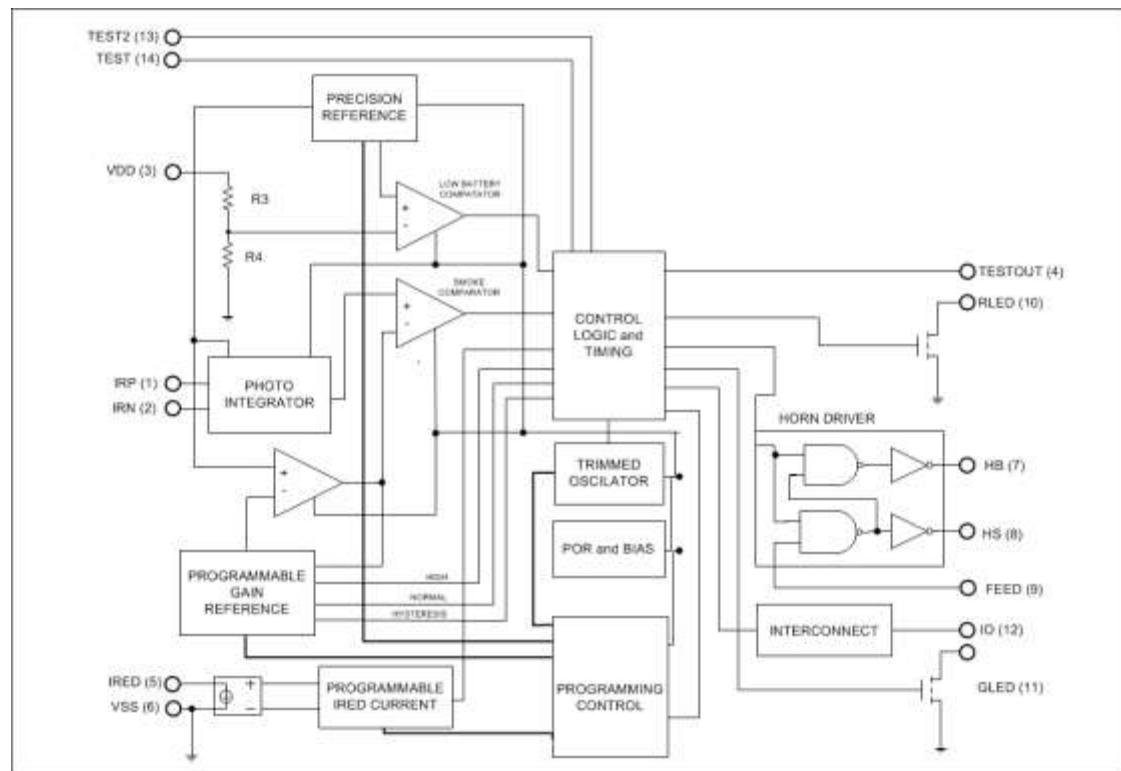


MICROCHIP

RE46C200

Features:

- 6.5 - 12V Operation
- Low Quiescent Current
- Programmable IRED Current
- Programmable Photo Amplifier
- Programmable Alarm Levels
- 6-Bit ADC
- Long Term Drift Adjustment
- Programmable Low Battery Test
- Programmable Low Battery Hush
- Programmable Horn Pattern
- Horn Synchronization
- Automatic Alarm Locate
- 10-year End-of-Life Indication
- Local Alarm Memory
- Smart IO for CO alarm option
- 9 Minute or 80 Second Hush Timer
- Smart HUSH option
- Contact AIPD Marketing for additional information



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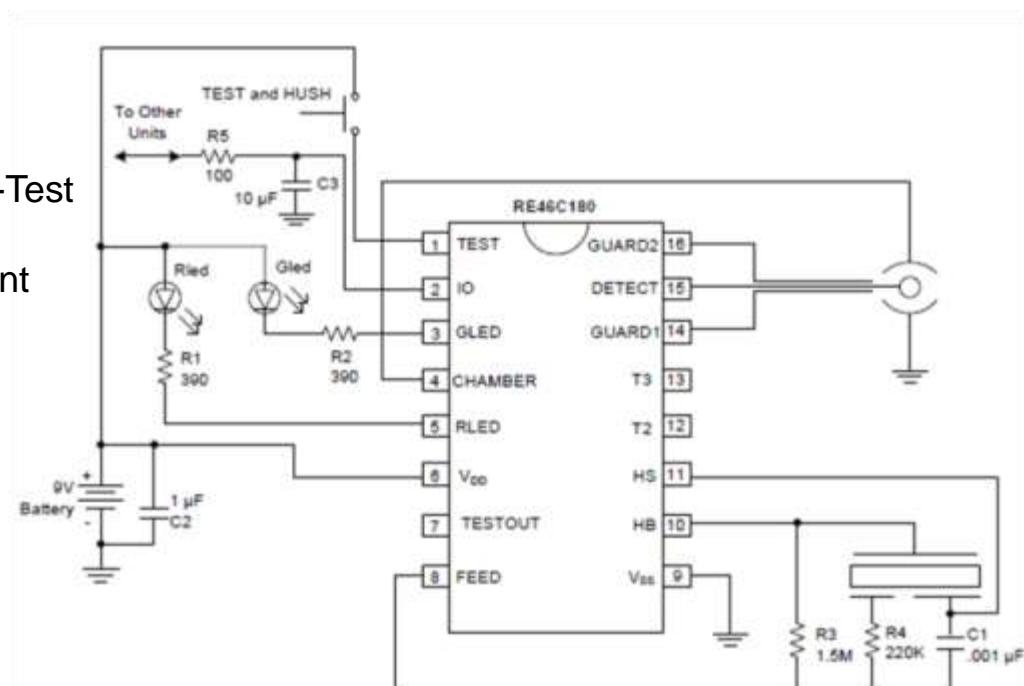
MICROCHIP

RE46C180

Online
Datasheet

Features:

- 6 – 12V Operation
- Low Quiescent Current Consumption
- Programmable Standby Sensitivity
- Programmable HUSH Sensitivity
- Programmable Hysteresis
- Programmable Chamber Voltage for Push-to-Test (PTT) and Chamber Test
- Programmable ± 150 mV Low Battery Set Point
- Internal Ionization Chamber Test
- Internal Low Battery Test
- Internal Power-On Reset and Power-up Low
- Alarm Memory
- Auto Alarm Locate
- Horn Synchronization
- IO Filter and Charge Dump
- Smart Interconnect, up to 40 Detectors
- $\pm 5\%$ All Internal Oscillator
- 9 Minute or 80 Second Timer for Sensitivity Control
- Temporal or Continuous Horn Pattern
- Guard Outputs for Ion Detector Input
- ± 0.75 pA Detect Input Current
- 10-year End-of-Life Indication



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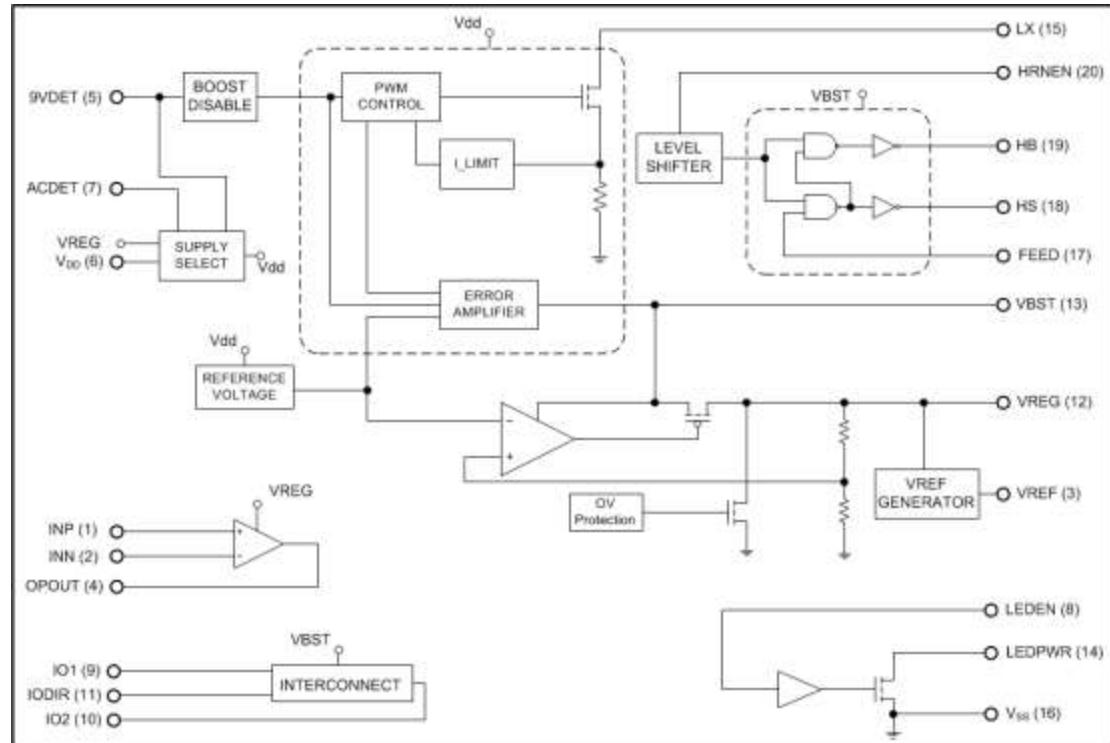
MICROCHIP

RE46C800

Online
Datasheet

Features:

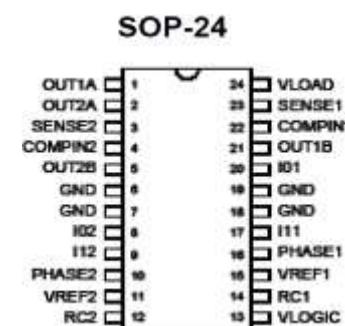
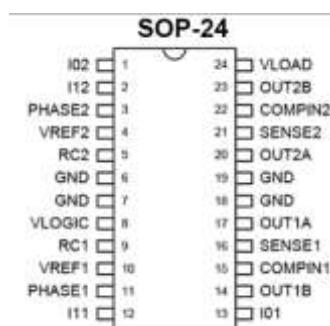
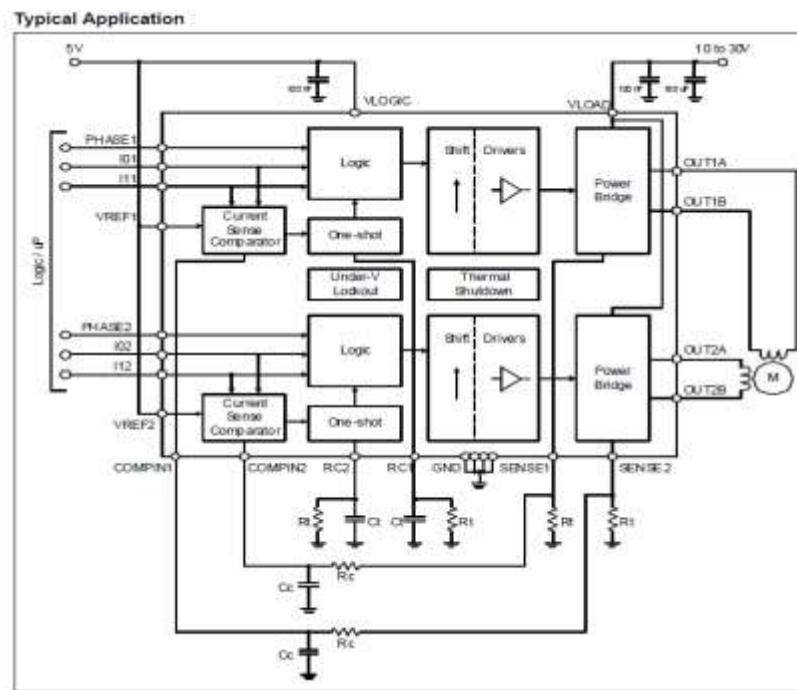
- Low Quiescent Current
- Operation from 2V to 12V
- 9.8V Boost Regulator
- Horn Driver
- LED Driver
- Bidirectional Interconnect
- 3.3V Regulator
- Internal Operation Amplifiers
 - $\pm 1\text{mV}$ Input Offset
 - Rail to Rail Input and Output
 - 10kHz Gain Bandwidth Product
 - Unity Gain Stable
- Package: 20-lead SSOP



<< BACK

Features:

- Able to drive both windings of a bipolar stepper motor
- Load voltage supply range: 10V to 40V
- Output current upto 750mA (each bridge)
- Internal fixed Toff time PWM current control
- Built-in protection diodes
- Internal thermal shutdown
- Under-voltage lockout
- LS-TTL compatible logic inputs with pull up resistors
- Low Ron output resistance
- Low quiescent current


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MICROCHIP

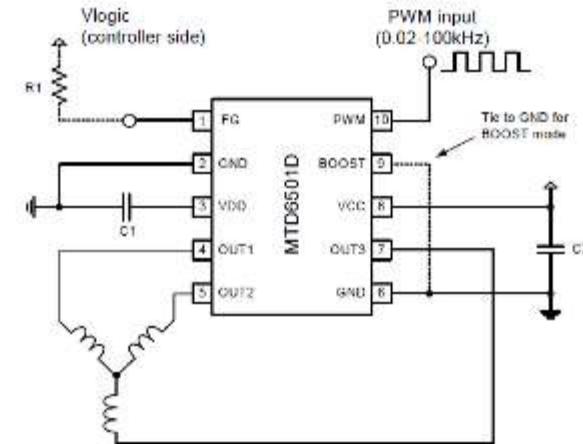
MTD6501C/D/G

Online
Datasheet

Features:

- Position sensorless BLDC drivers (no Hall sensor required)
- 180° sinusoidal drive, for high efficiency and low acoustic noise
- Support 2V to 14V power supplies
- Speed control through PAM and/or PWM
- Built-in frequency generator
- Built-in lockup protection and automatic recovery circuit (external capacitor not necessary)
- Built-in over current limitation and short circuit protection
- Built-in thermal shutdown protection
- No external tuning required
- Boost Mode (Optional BEMF Pre-Amplification in MTD6501D)
- 20 kHz (MTD6501C/D), 23 kHz (MTD6501G)

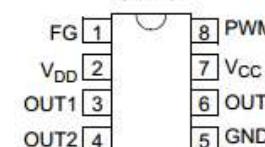
Typical Application – Fan Motor Driver Using the MTD6501D



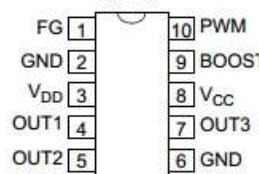
Recommended External Components for Typical Application

Element	Type/Value	Comment
C1	$\geq 1 \mu\text{F}$	Connect as close as possible to IC input pins.
C2	$\geq 1 \mu\text{F}$	Connect as close as possible to IC input pins.
R1	$\geq 10 \text{ k}\Omega$	Connect to Vlogic on controller side.

MTD6501C, MTD6501G
SOP-8



MTD6501D
MSOP



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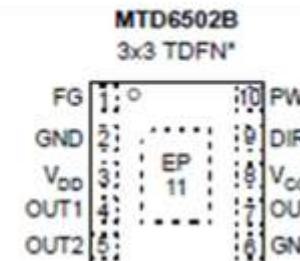
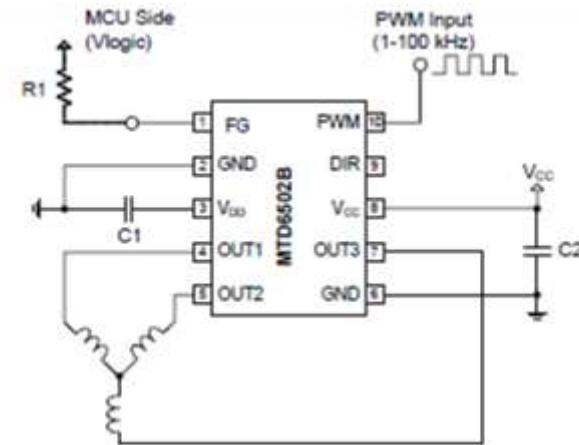
MICROCHIP

MTD6502B

Online
Datasheet

Features:

- Position Sensorless BLDC Drivers (No Hall Sensor Required)
- 180° Sinusoidal Drive for High Efficiency and Low Acoustic Noise
- Support 2V to 5.5V Power Supplies
- Direction Control:
 - Forward direction: connect DIR pin to GND or leave floating
 - Reverse direction: connect DIR pin to VDD
- Speed Control through Power Supply Modulation (PSM) and/or Pulse-Width Modulation (PWM)
- Built-in Frequency Generator (FG Output Signal)
- Built-in Lock-up Protection and Automatic Recovery Circuit (External Capacitor not Necessary)
- Built-in Over Current Limitation
- Built-in Thermal Shutdown Protection
- No External Tuning Required
- 10-lead 3x3 TDFN
- Extended Temperature Range: -40°C to +125°C



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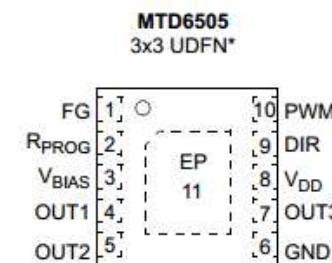
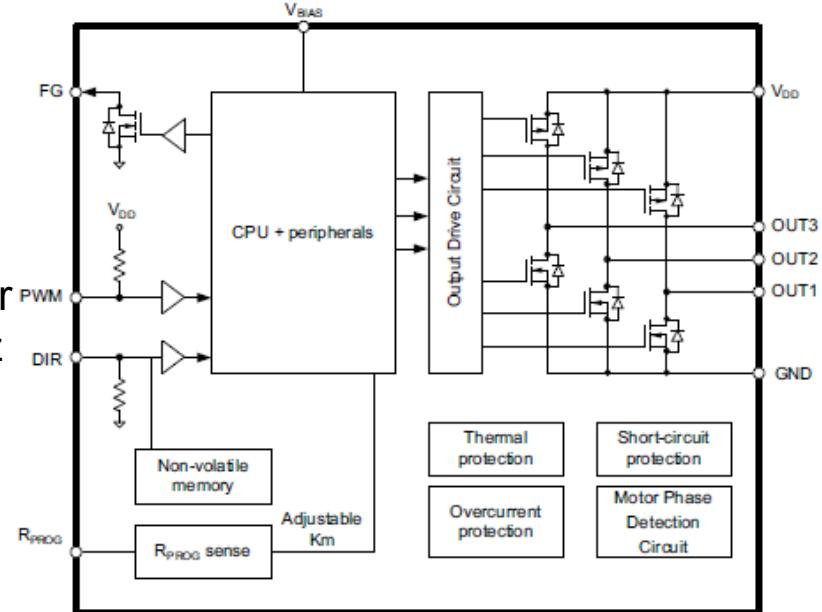
MICROCHIP

MTD6505

Online
Datasheet

Features:

- 180° Sinusoidal Drive
 - high efficiency and low acoustic noise
- Position Sensorless BLDC Drivers
- Integrated Power Transistors
- Supports 2V to 5.5V Power Supplies
- Programming Resistor (R_{PROG}) setting to fit motor constant (K_m) range from 3.25 mV/Hz to 52 mV/Hz
- Direction Control:
- Speed Control through Power Supply Modulation (PSM) and/or Pulse-Width Modulation (PWM)
- Built-in Frequency Generator (FG Output Signal)
- Built-in Lockup Protection and Automatic Recovery Circuit
- Built-in Overcurrent Limitation
- Built-in Thermal Shutdown Protection
- Built-in Over Voltage Protection
- No External Tuning Required
- Extended Temperature Range: -40°C to +125°C
- 10-Lead 3mm x 3mm UDFN



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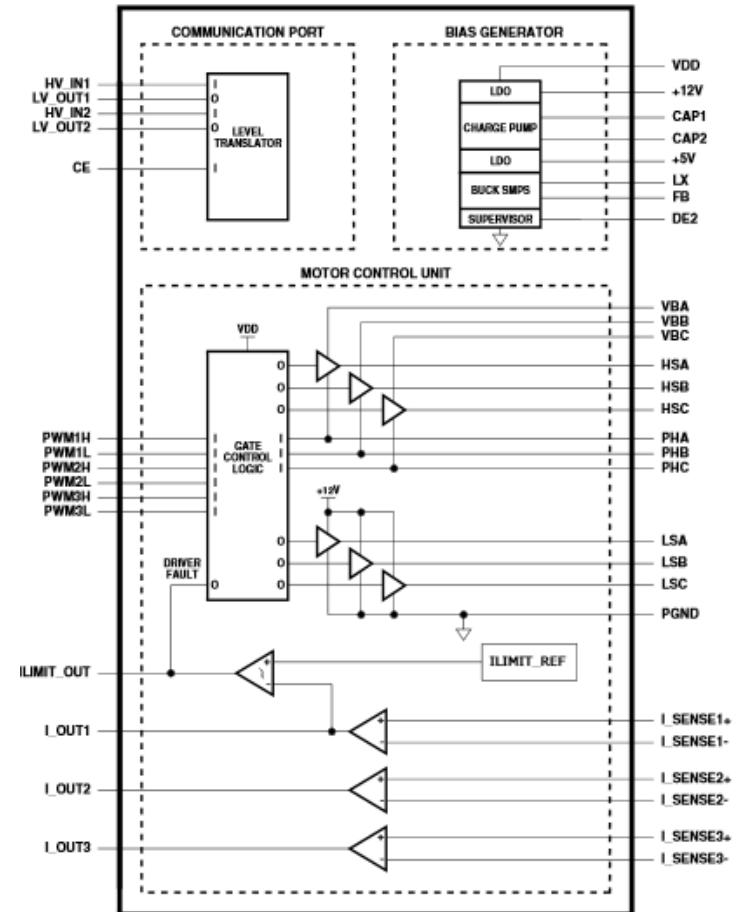
MICROCHIP

MCP8024

Online
Datasheet

Features:

- Three Half-bridge Drivers Configured to Drive External High-Side NMOS and Low-Side NMOS MOSFETs:
 - Independent input control for high-side NMOS and low-side NMOS MOSFETs
 - Peak output current: 0.5A @ 12V
 - Shoot-through protection
 - Overcurrent and short circuit protection
- Adjustable Output Buck Regulator (750 mW)
- Two LDOs: 5V @ 20 mA / 12V @ 20 mA
- Internal Bandgap Reference
- Three Operational Amplifiers for Motor Phase Current Monitoring and Position Detection
- Overcurrent Comparator and Thermal Shutdown
- Two Level Translators
- Input Voltage Range: 6 - 40V
- Operational Voltage Range: 6 - 28V
- Undervoltage Lockout (UVLO): 6V
- Overvoltage Lockout (OVLO): 28V
- Transient (100 ms) Voltage Tolerance: 48V
- Temperature Range: -40 to +150°C (H-Temp)



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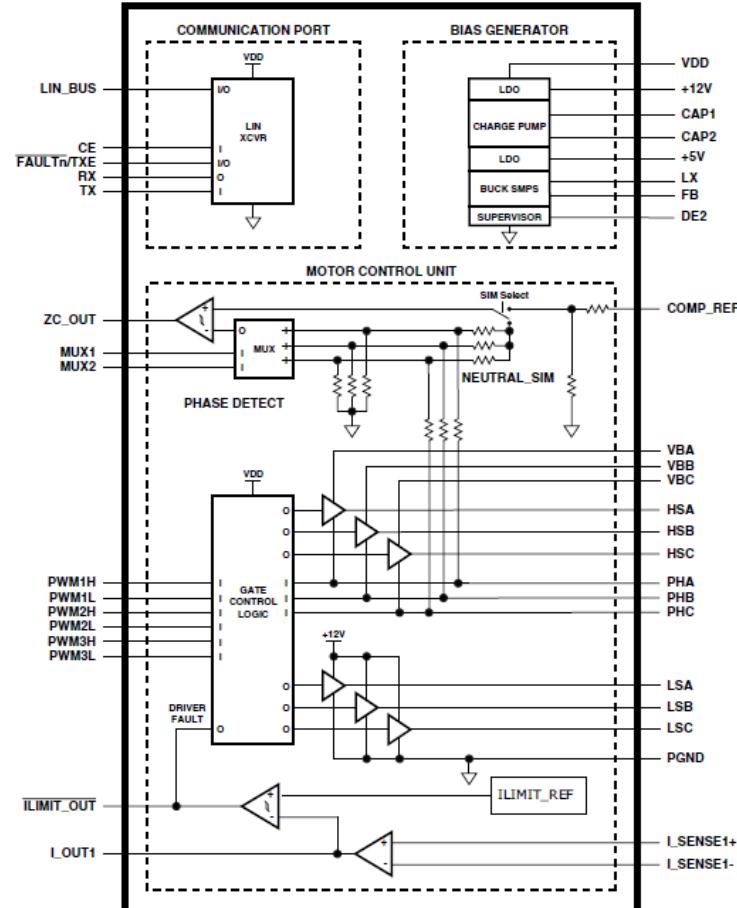
MICROCHIP

MCP8025

Online
Datasheet

Features:

- LIN Transceiver Interface: Compliant with LIN Bus Specifications 1.3, 2.2, and SAE J2602
- Three Half-bridge Drivers Configured to Drive External High-Side NMOS and Low-Side NMOS MOSFETs:
 - Independent input control for high-side NMOS and low-side NMOS MOSFETs
 - Peak output current: 0.5A @ 12V
 - Shoot-through protection
 - Overcurrent and short circuit protection
- Adjustable Output Buck Regulator (750 mW)
- Two LDOs: 5V @ 30 mA / 12V @ 30 mA
- Buck Regulator Undervoltage Lockout: 4.0V
- One Operational Amplifiers for Motor Phase Current Monitoring and Position Detection
- Overcurrent Comparator and Thermal Shutdown
- Operational Voltage Range: 6 - 19V
- Undervoltage Lockout (UVLO): 5.5V
- Overvoltage Lockout (OVLO): 20V
- Transient (100 ms) Voltage Tolerance: 48V
- Temperature Range: -40 to +150°C



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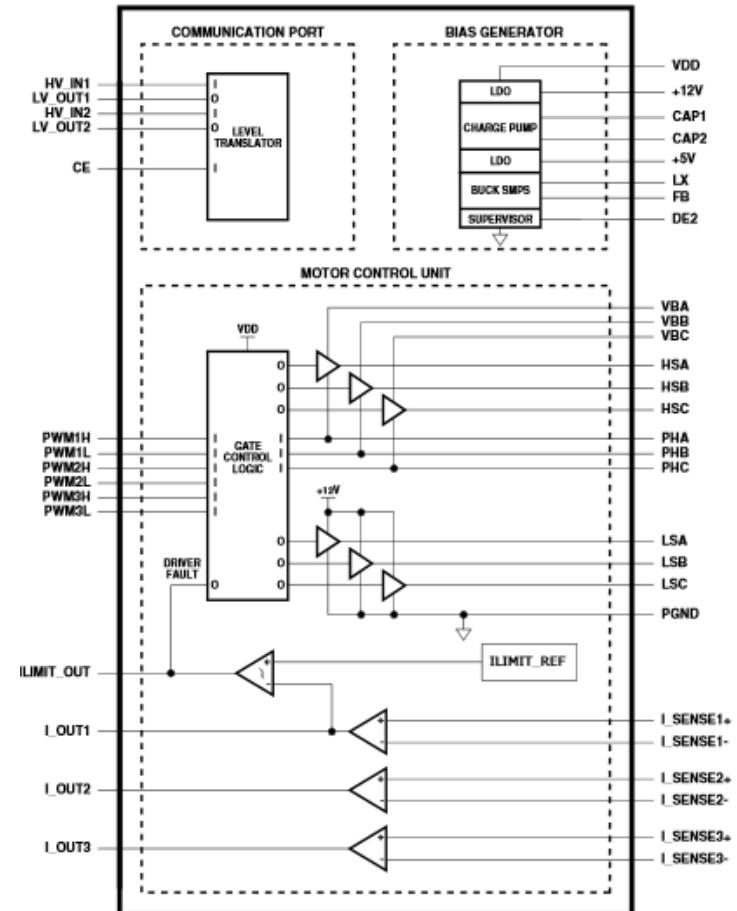
MICROCHIP

MCP8026

Online
Datasheet

Features:

- Three Half-bridge Drivers Configured to Drive External High-Side NMOS and Low-Side NMOS MOSFETs:
 - Independent input control for high-side NMOS and low-side NMOS MOSFETs
 - Peak output current: 0.5A @ 12V
 - Shoot-through protection
 - Overcurrent and short circuit protection
- Adjustable Output Buck Regulator (750 mW)
- Two LDOs: 5V @ 30 mA / 12V @ 30 mA
- Internal Bandgap Reference
- Buck Regulator Undervoltage Lockout: 4.0V
- Three Operational Amplifiers for Motor Phase Current Monitoring and Position Detection
- Overcurrent Comparator and Thermal Shutdown
- Two Level Translators
- Operational Voltage Range: 6 - 28V
- Undervoltage Lockout (UVLO): 5.5V
- Overvoltage Lockout (OVLO): 32V
- Transient (100 ms) Voltage Tolerance: 48V
- Temperature Range: -40 to +150°C



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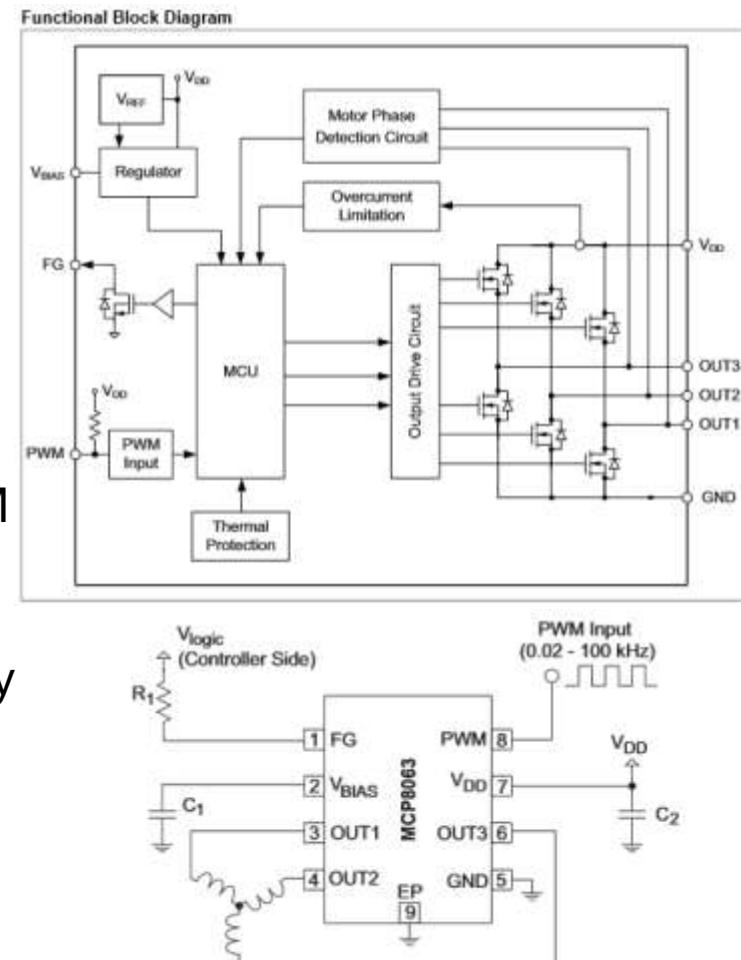
MICROCHIP

MCP8063

Online
Datasheet

Features:

- Automotive AEC-Q100 Qualified
- Position Sensorless BLDC Drivers
 - No Hall Sensor Required
- 23 kHz PWM Output Frequency
- 180° Sinusoidal Drive
 - High Efficiency And Low Acoustic Noise
- Support 2V to 14V Power Supplies
- Speed Control Through Power Supply and/or PWM
- Built-in 1.5A Over Current Limitation
- Built-in Frequency Generator (FG Output Signal)
- Built-in Lock-up Protection and Automatic Recovery Circuit
- Built-in Thermal Shutdown Protection
- No External Tuning Required
- 8-lead 4x4 DFN
- Extended Temperature Range: -40 to +125°C



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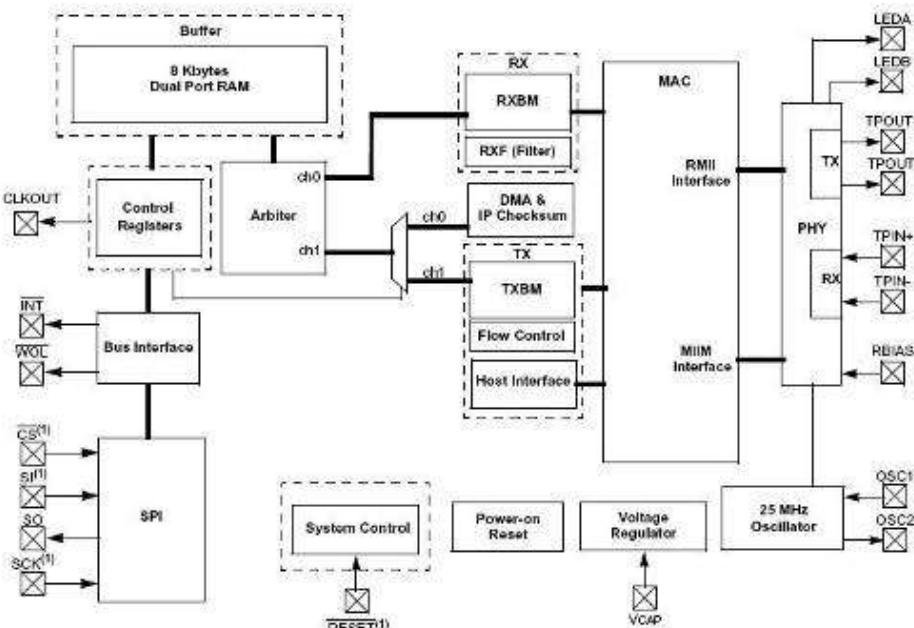
MICROCHIP

ENC28J60

Online
Datasheet

Features:

- IEEE 802.3 compatible Ethernet Controller
- Integrated MAC and 10BASE-T PHY
- Supports one 10BASE-T port with Automatic Polarity Detection and Correction
- Supports Full and Half-Duplex modes
- Programmable Automatic Retransmit on Collision
- Programmable Padding and CRC Generation
- Programmable Automatic Rejection of Erroneous Packets
- SPI Interface: Clock Speeds up to 20MHz



Note 1: Those pins are 5V tolerant.

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Features:

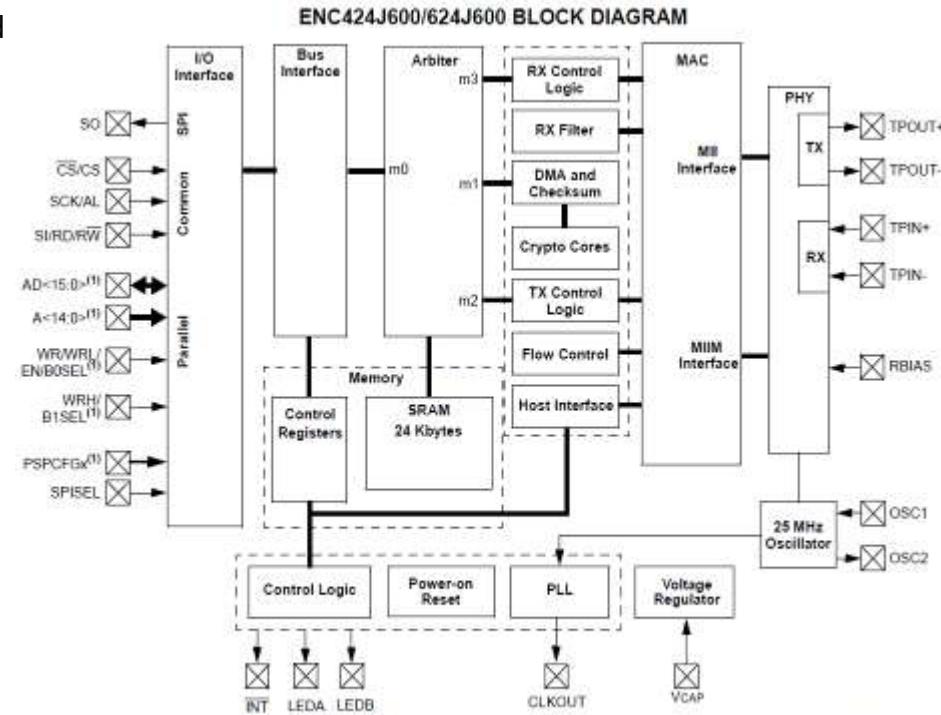
- IEEE 802.3™ Compliant Fast Ethernet Controller - Integrated
- MAC and 10/100Base-T PHY - Hardware Security
- Acceleration Engines
- Factory Preprogrammed Unique MAC Address - Supports
- one 10/100Base-T Port with Automatic Polarity Detection and
- Correction
- Supports Auto-Negotiation
- Support for Pause Control Frames, including Automatic
- Transmit and Receive Flow Control
- Supports Half and Full-Duplex Operation
- Programmable Automatic Retransmit on Collision

Available MCU Interfaces:

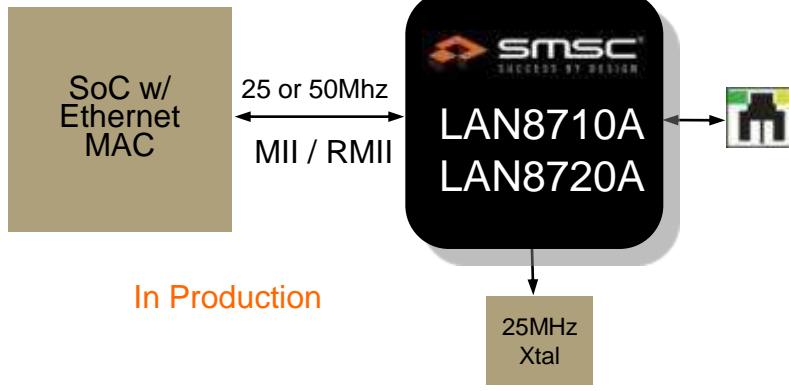
- 14 Mbit/s SPI interface with enhanced set of opcodes
- 8-bit multiplexed parallel interface

Security Engines:

- High-performance, modular exponentiation engine with up to 1024-bit operands
- Supports RSA® and Diffie-Hellman key exchange algorithms
- Fast MD5 hash computations
- Fast SHA-1 hash computations
- **Package:** 44-Pin (TQFP and QFN)

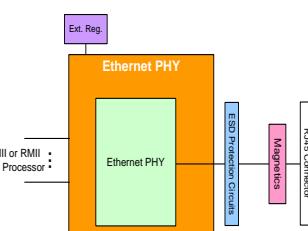
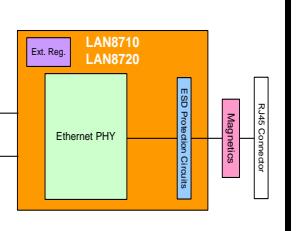


LAN8710A/20A 10/100 Ethernet Physical Layer

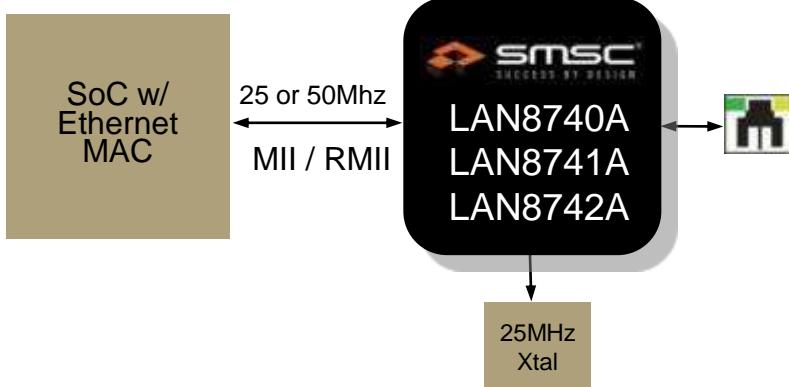
[Online Datasheet](#)


Features

- Excellent ESD Protection levels without any external protection devices
 - Meets / exceeds IEC requirements
- Integrated DSP with adaptive equalizer
- Integrated 1.2V Linear Regulator
- Incorporates SMSC flexPWR®
 - Flexible I/O voltage down to 1.8V
 - Extremely low energy detect standby mode

	Other Solutions	SMSC Solutions
	 <p>MII or RMII : To Processor</p>	 <p>MII and RMII : To Processor</p>
Ethernet PHY	Discrete	Single Solution!
Regulator	Discrete	
ESD protection	External	
Passive	30+	20

- Uses a low cost 25MHz xtal for RMII
- Lead free ROHS compliant packages:
 - **LAN8710: 32QFN 5x5mm (MII/RMII)**
 - **LAN8720: 24QFN 4x4mm (RMII only)**
- Commercial (0 to +70C) and Industrial (-40 to +85C) temperature supported



Features

- Energy Efficient Ethernet 802.3az
- Wake On LAN support (WoL)
- Cable Diagnostics
- HP Auto-MDIX
- Compliant with IEEE 802.3/802.3u
- Integrated DSP with adaptive equalizer
- Integrated 1.2V Linear Regulator
- Uses a low cost 25MHz xtal for RMII
- Lead free ROHS compliant packages:
 - LAN8740A/41A: 32QFN (MII/RMII)
 - LAN8742A: 24QFN (RMII only)

Target Applications

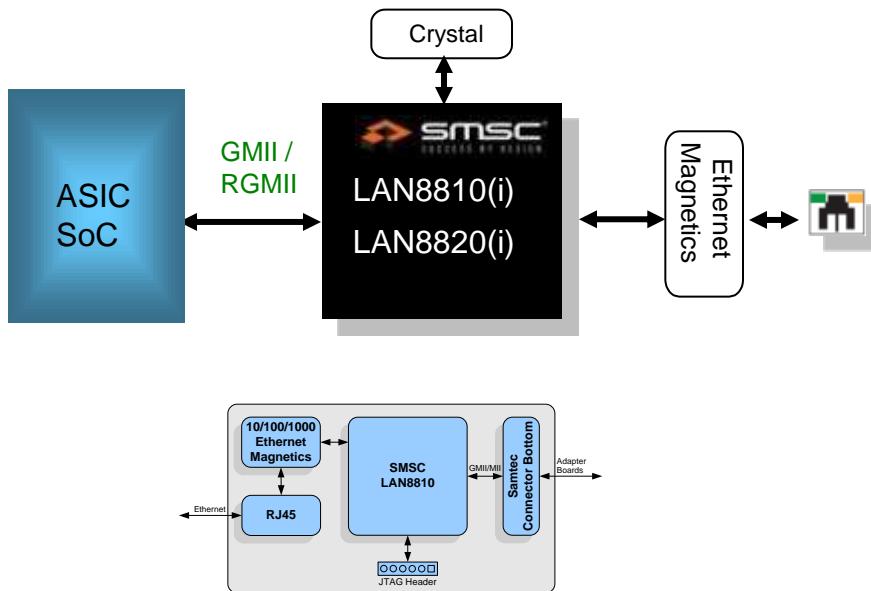
- | | |
|----------------------|------------------|
| • PC Docking | • Netbook/Tablet |
| • Port Replicators | • PVR, STB |
| • USB to eNet Dongle | • Digital TV |
| • Digital Signage | • SoC Reference |
| • Networked Printers | Platforms |

Commercial (0 to +70C) and Industrial (-40 to +85C)
temperature supported

LAN8740A/41A/42A Pin compatible with LAN8710A/20A!

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LAN8810/20 Gigabit Ethernet



Target Applications

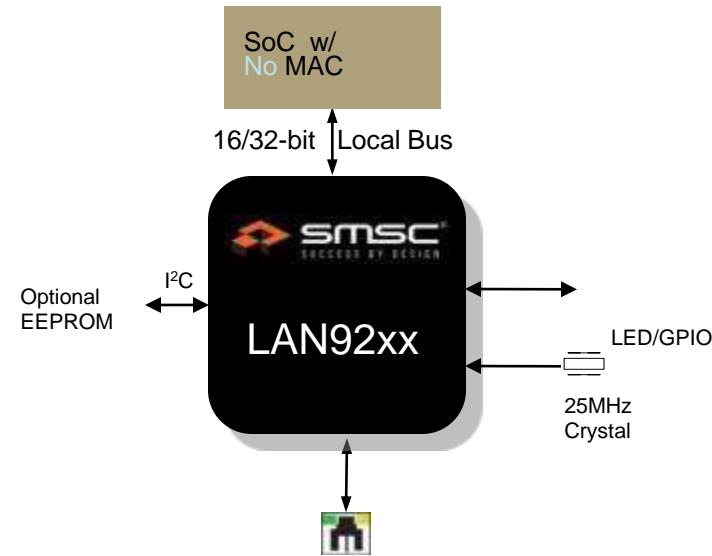
- Industrial PC
- Industrial Networks
- VoIP gateway
- Security/Inspection
- SOHO/SMB
- Cameras
- router

Features

- Small Footprint, Low Power
- HP Auto-MDIX support with IEEE 802.3ab specs at 10/100/1000 Mbps operation
- Excellent ESD Protection levels without any external protection device
- Flexible configurations for LED status indicators
- Implements Energy Detection and Power Down modes
- Link status change and wake-up detection
- Lead free ROHS compliant packages:
 - LAN8810: 72QFN 10x10mm (GMII)
 - LAN8820: 56QFN 8x8mm (RGMII)
- Temperature Range:
 - Commercial 0°C to +70°C
 - Industrial -40°C to +85°C

Features:

- High performance 16/32-bit local bus Ethernet controllers
- Support HP Auto MDIX™
- Minimizes dropped packets
 - Internal buffer memory can store over 200 packets
 - Automatic PAUSE and back-pressure flow control
- Reduced host CPU MIPS consumption
- Reduced-power modes
 - Numerous power management modes
 - Wake on LAN
 - Magic packet wakeup
 - Wakeup indicator event signal
 - Link status change
- Flexible address filtering modes
- Full Driver Support for popular OS



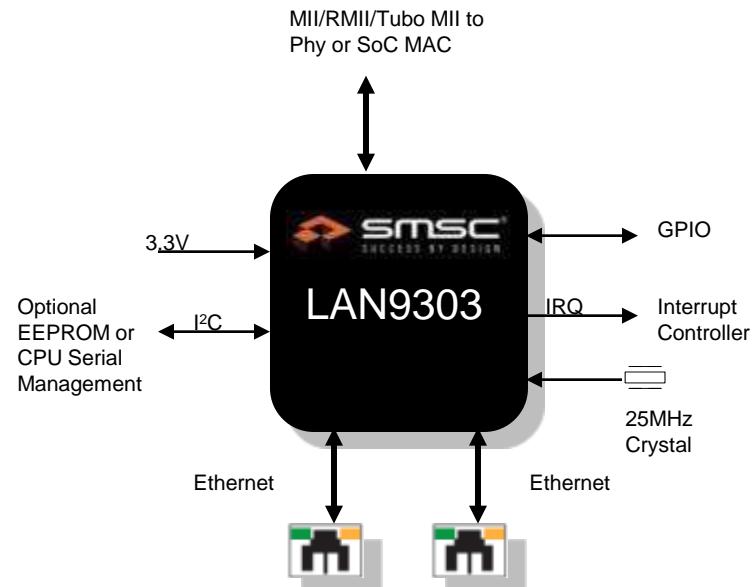
	LAN9221	LAN9220	LAN9217	LAN9218
Bus Interface	16-bit	16-bit	16-bit	32-bit
I/O voltage supported	1.8v to 3.3v	1.8v to 3.3v	3.3v	3.3v
Performance	High	Standard	High	High
External MII			◆	
Mixed Endian	◆	◆		
Industrial Temp available	◆			◆
Checksum Offload Engine	◆	◆		
Package	56 QFN	56 QFN	100 TQFP	100 TQFP

LAN9303 Enhanced 10/100 3 Port Switch

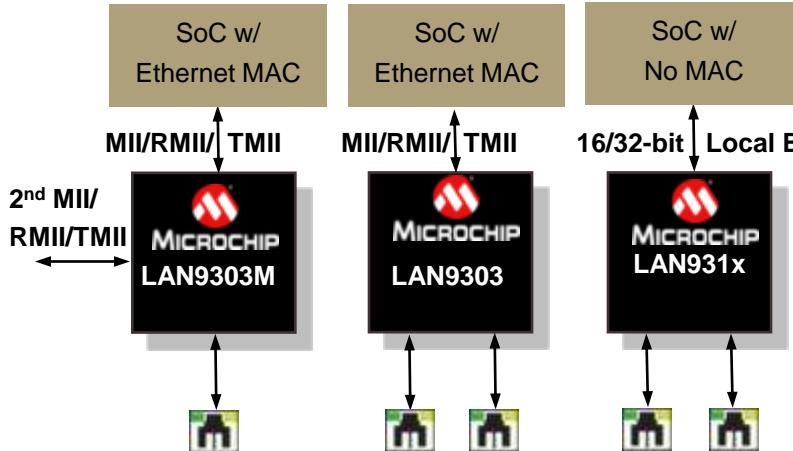
[Online
Datasheet](#)

Features:

- *High-performance, full-featured 3 port switch*
 - IEEE 802.1Q VLAN support
 - IGMP snooping for multicast packet filtering
 - Up to 200Mbps network speed via Turbo MII interface
 - Optional EEPROM or external CPU serial management support via I2C interface
 - *Unique virtual PHY feature simplifies software development by mimicking multiple switch ports as a single-port PHY*
- Integrated reg enables single 3.3V supply
- +/- 8kV/15kV per port ESD protection
- Lead free ROHS compliant packages
 - *LAN9303: 56-pin QFN 8x8mm*
 - *LAN9303M: 72-pin QFN 10x10mm*
- Commercial (0 to +70C) and Industrial (-40 to +85C) temperature supported


[<< BACK](#)

LAN93xx 3-Port 10/100 Ethernet Switch Family

[Online Datasheet](#)


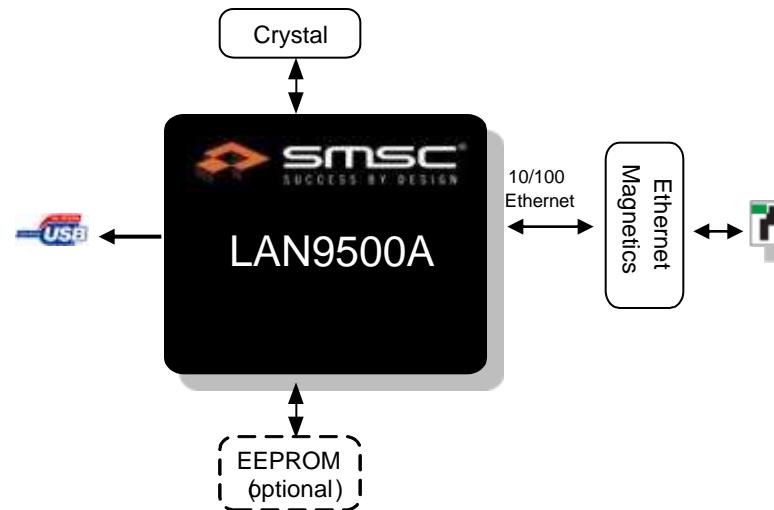
- High Performance, full feature 3-port switches
 - VLAN, QoS packet prioritization, Rate Limiting, IGMP Snooping and Management Function
- Unique Virtual PHY feature
 - Simplifies software development by mimicking the multiple switch ports as a single port PHY
 - Port mirroring / monitoring / sniffing: ingress and / or egress traffic on any port or port pair
 - Industrial Temp support (-40 to 85 °C)

	LAN9303/LAN89303	LAN9303M	LAN9313	LAN9311	LAN9312
Interface	Single MII/RMII/ Turbo MII	Dual MII/RMII/ Turbo MII	Single MII	16-bit Local Bus	32-bit Local Bus
Serial I/F	I ² C, SMI	I ² C, SMI	I ² C, SPI, SMI	I ² C, SMI	I ² C, SMI
IEEE1588-2002			◆	◆	◆
MAC Address Table size	512	512	1024	1024	1024
Virtual PHY	Yes	Yes	Yes		
Package	56 QFN (8x8mm)	72 QFN (10x10mm)	128 VTQFP (16x16mm)	128 VTQFP (16x16mm)	128 VTQFP (16x16mm)

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Features:

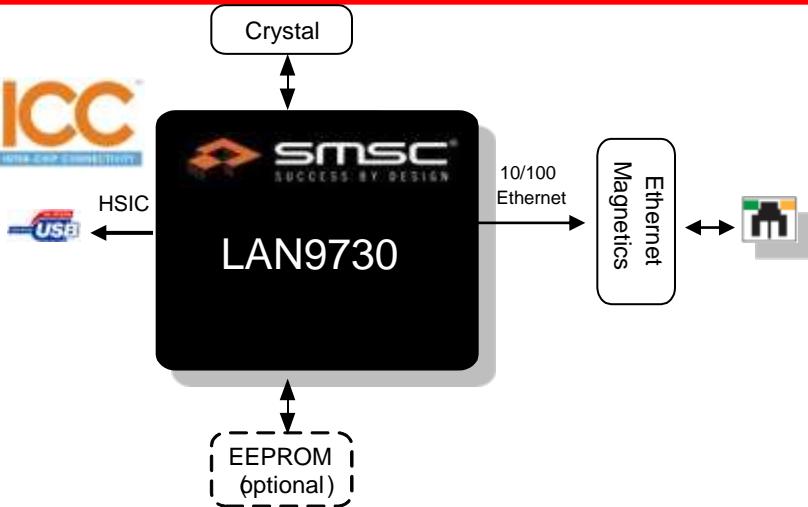
- Fully supports IEEE 802.3/802.3u standards
- Implements NetDetach™ and WoL support for reduced system power consumption
- Supports PCI-like PME Wake
- Supports EEPROM-less operation for reduced BOM costs
- Excellent ESD Protection levels without any external protection device
 - $\pm 8\text{kV} / \pm 15\text{kV}$ for contact/air discharge mode per IEC61000-4-2
- UniClock Technology requires single 25 MHz crystal for both USB and Ethernet
- Package: 56-pin QFN 8x8mm
- Commercial (0 to +70C) and Industrial (-40 to +85C) temperature supported



Target Applications

- | | |
|----------------------|------------------|
| • PC Docking | • Netbook/Tablet |
| • Port Replicators | • PVR, STB |
| • USB to eNet Dongle | • Digital TV |
| • Digital Signage | • SoC Reference |
| • Networked Printers | Platforms |

LAN9730 HSIC to 10/100 Ethernet



Features

- Software compatibility - Transparent to USB software stack and device drivers
- Fully supports IEEE 802.3/802.3u standards
- Power savings - Eliminate two USB PHY's in on-board USB chip-to-chip connection
 - 2-pin interface: Clock, Data
- Implements WoL support for reduced system power consumption
- Supports EEPROM-less operation for reduced BOM costs
- UniClock Technology requires single 25 MHz crystal for USB & Ethernet
- Lead free ROHS compliant packages

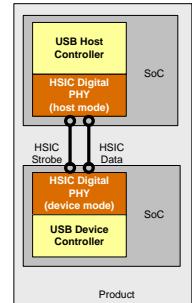
LAN9730: 56-pin QFN 8x8mm

Target Applications

- | | |
|----------------------|--------------------------|
| • IP TV Players | • Netbook/Tablet |
| • Set Top Box | • SoC Reference |
| • Digital TV | Platforms |
| • Docking (wireless) | • TI OMAP5, |
| • Digital Signage | Nvidia Tegra,
Marvell |

Commercial (0 to +70C) and Industrial (-40 to +85C)
temperature supported

What is HSIC - USB chip-to-chip interconnect. HSIC removes the analog transceivers found in normal USB. HSIC is meant to be a point to point connection between a host and device on the same PCB.



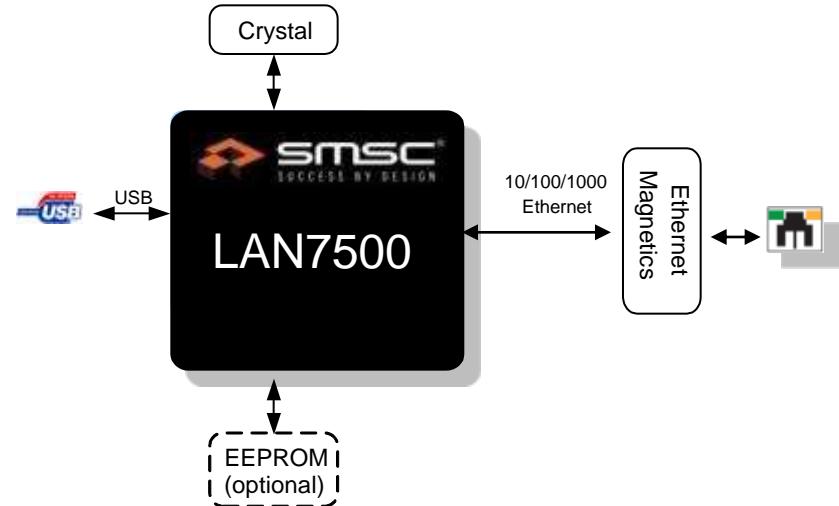
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LAN7500 USB to Gigabit Ethernet

[Online Datasheet](#)

Features:

- Fully supports IEEE 802.3/802.3u/802.3ab standards
- Implements NetDetach™ for reduced system power consumption
- Excellent ESD Protection levels without any external protection device
 - $\pm 8\text{kV} / \pm 15\text{kV}$ for contact/air discharge mode per IEC61000-4-2
- Supports EEPROM-less operation for reduced BOM costs
- UniClock Technology requires single 25 MHz crystal for both USB and Ethernet
- Package:
 - 56-pin QFN 8x8mm
- Commercial (0 to +70C) and Industrial (-40 to +85C) temperature supported



Target Applications

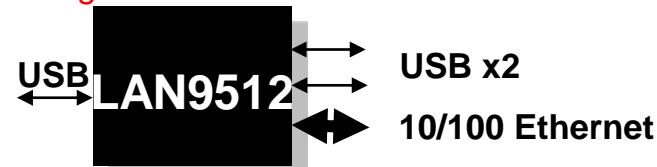
- | | |
|----------------------|------------------|
| • PC Docking | • Netbook/Tablet |
| • Port Replicators | • PVR, STB |
| • USB to eNet Dongle | • Digital TV |
| • Digital Signage | • SoC Reference |
| • Networked Printers | Platforms |

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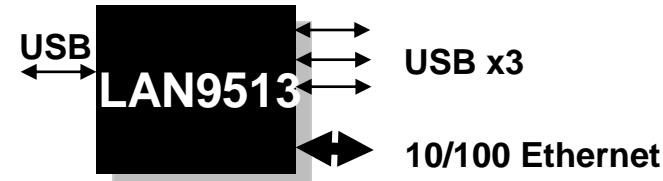
Features:

- USB to Ethernet controller with USB2.0 hub integrated
 - 1st in the industry !
 - 2, 3 or 4 additional USB downstream ports and 10/100 Ethernet
 - LAN9512 → 2 downstream ports
 - LAN9513 → 3 downstream ports
 - LAN9514 → 4 downstream ports
- Unique BOM cost saving features
 - Only a single 25MHz crystal needed for both USB and Ethernet
 - Built in 8kv/15kv contact/air discharge ESD protection
 - 24MHz clock out provided to connect additional SMSC USB hub if needed
- Extensive power management features
 - WOL, Magic Packet, GPIO assertion, Link Status Change
- Package: 64QFN 9x9mm Package

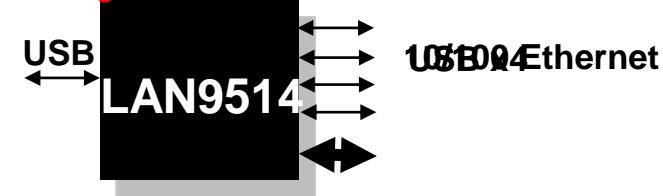
Integrated 3 Port USB Hub



Integrated 4 Port USB Hub



Integrated 5 Port USB Hub



Target Applications

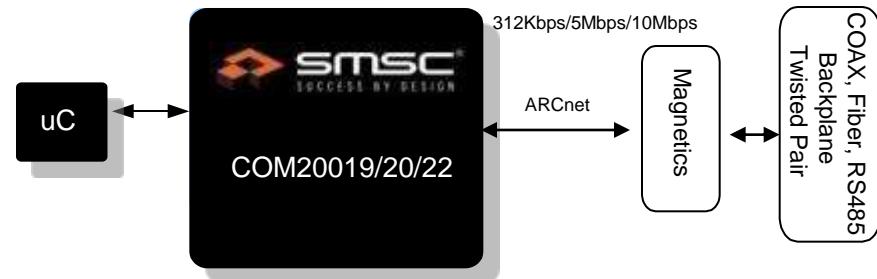
- | | |
|----------------------|------------------|
| • PC Docking | • Netbook/Tablet |
| • Port Replicators | • PVR, STB |
| • USB to eNet Dongle | • Digital TV |
| • Digital Signage | • SoC Reference |
| • Networked Printers | Platforms |

ARCnet Controllers COM20019i/20i/22i

Online
Datasheet

Features:

- ANSI Standard 878.1
- **Deterministic** protocol based on Token Passing.
 - Perfect for Automation and Process applications
- 3.3v Power Supply
- Low software overhead
- Simple address & data interface
 - Compatible with any SoC
 - 8/16 bit bus
- COM20019 312Kbps data rate
- COM20020 5Mbps data rate
- COM20022 10Mbps data rate
- Devices come in either 28PLCC or 48TQFP
 - COM20022 48TQFP only
- Commercial (0 to +70C) and Industrial (-40 to +85C) temperature supported



Additional information available at the ARCnet Trade Association WEB site www.arcnet.com

Target Applications

- | | |
|---|--|
| <ul style="list-style-type: none"> • Transportation • Gaming • Photo Development Equipment • Medical Equipment • Process Equipment | <ul style="list-style-type: none"> • Building Automation • ATM's • Robotics • Power generation |
|---|--|

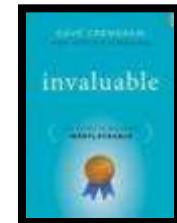
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LANCheck Design Review Service

LANCheck Online Review is a personalized, value-added service available at no charge to customers who have selected our Ethernet offerings for their application design-in. LANCheck will support your design process by providing guidance through the complete design cycle – from initial schematic design to PCB design.

Benefits:

- Accelerated design cycle, reduced design risk & improves time-to-market
- Savings in PCB costs by reducing spins
- Address EMI and ESD compliance requirements early on in the design cycle
- “Heads-up” provided in the LANCheck feedback on subtle specifications for companion parts (magnetics, crystals, oscillators)
- On-line documentation allows the customer to “help themselves” and eliminates any back-and-forth between the factory, saving time



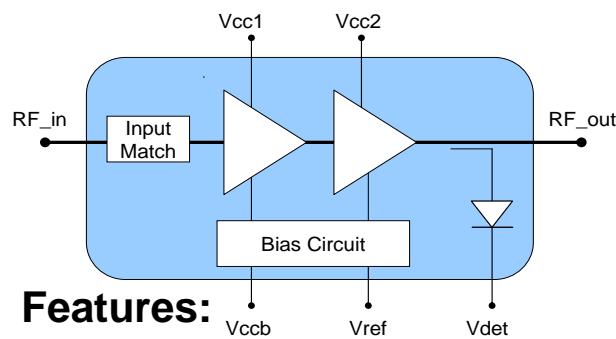


MICROCHIP

Online
Datasheet

2.4 GHz High Efficiency Power Amplifier

SST12LP14E-QX8E
8-lead 2x2x0.45 mm



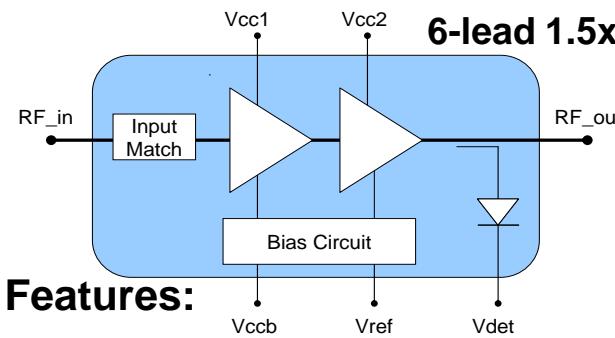
Features:

- Gain: 23.5 dB
- EVM: ~2.5%@18dBm
- Current: 95mA@18dBm
- 11b ACPR: 22 dBm
- Matched input
- Ultra low shutdown current: < 3 uA
- Low control current: Iref= 2mA
- Low Harmonics:
f₂, f₃, f₄, f₅ Harmonics <30dBc
at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- High ESD: > 1000 V HBM
- Used on Marvell, Atheros, and
MediaTek reference Designs

SST12LP18E

SST12LP14E-QX6E
6-lead 1.5x1.5x0.45 mm

SST12LP19E-QX8E
8-lead 2x2x0.45 mm



Features:

- Gain: 26 dB
- EVM: ~2.5%@18dBm , 3% @ 19.5 dBm
- Current: 95mA@18dBm
- 11b ACPR: 23 dBm
- Matched input
- Ultra low shutdown current: < 3 uA
- Low control current: Iref= 2mA
- Low Harmonics:
f₂, f₃, f₄, f₅ Harmonics <30dBc
at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Cost down equivalent for 12LP14E
- High ESD level: > 1000 V HBM

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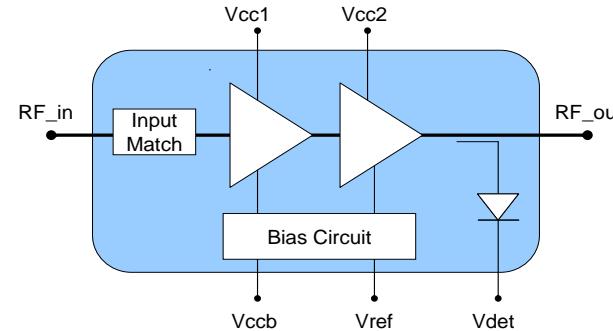
2.4 GHz High Efficiency Power Amplifier

Online
Datasheet

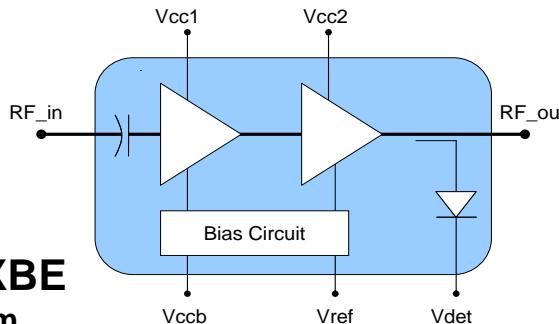
SST12LP18E-QX8E 8-lead 2x2x0.45 mm

Features:

- Gain: 25 dB
- EVM: 18 dBm at 3% added EVM with 54Mbps 802.11g signal
17 dBm at 1.8% added EVM with 802.11ac 256 QAM, 2.4 GHz
- Current: 140mA@18dBm
- 11b ACPR: 22.5 dBm
- Matched input
- Ultra low shutdown current: < 3 uA
- Low control current: Iref < 2mA
- Low Harmonics:
f₂, f₃, f₄, f₅ Harmonics <30dBc at 23dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Low Vreg: as low as 2.7V
- High ESD level: > 1000 V HBM
- Cost down equivalent for 12LP14E



2.4 GHz High Gain Power Amplifier

[Online Datasheet](#)


SST12LP08-QXBE
12-lead 2x2x0.45 mm

SST12LP08-QX6E
6-lead 1.5x1.5x0.45 mm

Features:

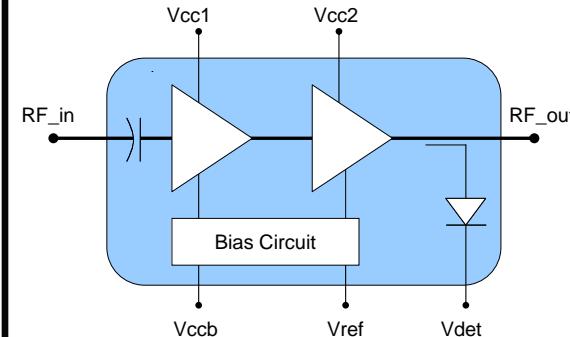
- Gain: 32 dB
- EVM: ~2.5%@20dBm
- Current: 148mA@20dBm
- 11b ACPR: 23.5 dBm
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA
- Low Harmonics:
f₂, f₃, f₄, f₅ Harmonics <40dBc
at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Used on Ralink, RealTek reference designs

SST12LP08A-QX8E
8-lead 2x2x0.45 mm

Features:

- Gain: 29 dB
- EVM: ~2.5%@20dBm
- Current: 150mA@20dBm
- 11b ACPR: 23.5 dBm
- Ultra Low shutdown current: < 2 uA
- Low control current: 2 mA
- Low Harmonics:
f₂, f₃, f₄, f₅ Harmonics <40dBc
at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Pin-compatible with 12LP14E-QX8E
- Used on Atheros reference designs

SST12LP14A-QVCE
16-lead 3x3x0.9 mm QFN



Features:

- Gain: 30 dB
- EVM: ~4%@21dBm
- Current: 185mA@21dBm
- 11b ACPR: 23 dBm
- Ultra Low shutdown current: < 0.1 uA
- Low control current: < 2 mA
- Low Harmonics:
f₂, f₃, f₄, f₅ Harmonics <40dBc
at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Used on Ralink reference design

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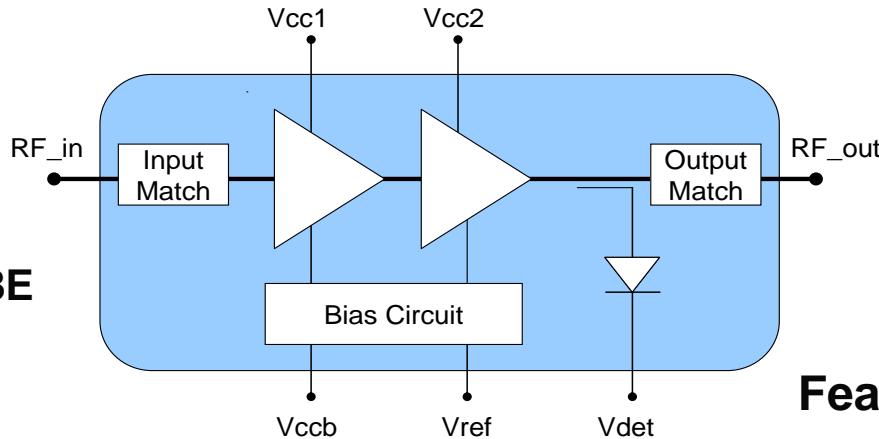
2.4 GHz Fully Integrated Power Amplifier

Online
Datasheet

SST12LP17E-XX8E
8-lead 2x2x0.4mm

Features:

- Gain: 28 dB
- EVM: ~3%@18dBm
- Current: 105mA@18dBm
- ACPR: 22 dBm
- Matched input and output
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA
- Low Harmonics: f₂, f₃, f₄, f₅ Harmonics <40dBc at 23dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Only one external component



SST12LP20-QUAE
8-lead 2x2x0.55mm

Features:

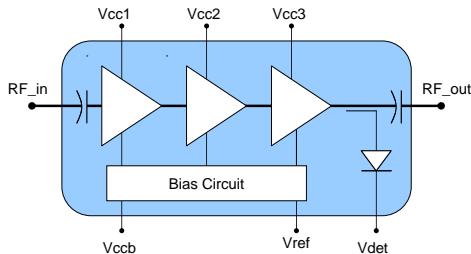
- Gain: 30 dB
- EVM: ~3%@18dBm
- Current: 110mA@18dBm
- ACPR: 21 dBm
- Matched input and output
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA
- Low Harmonics: f₂, f₃, f₄, f₅ Harmonics <25dBc at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Only one external component
- Pin compatible to SE2568U

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2.4 GHz High-Power Power Amplifier

SST12LP15A-QVCE

16-lead 3x3x0.9 mm

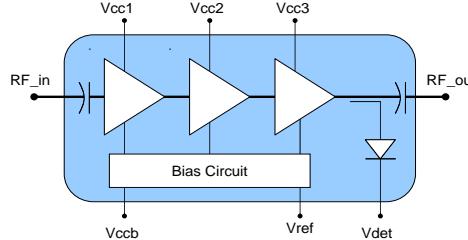


Features:

- Gain: 32 dB
- EVM: ~3%@22dBm
- Current: 230mA@22dBm
- ACPR: 25 dBm
- Ultra Low shutdown current: < 2 uA
- Low control current: 2 mA
- Low Harmonics: f2, f3, f4, f5 Harmonics <40dBc at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Used on Atheros, Ralink, RealTek reference designs

SST12LP15B-QVCE

16-lead 3x3x0.9 mm

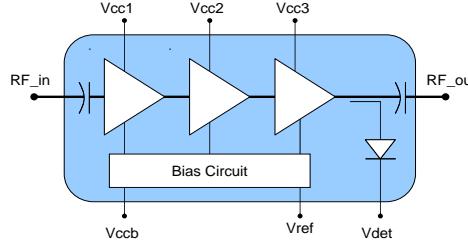


Features:

- Gain: 36 dB
- EVM: ~3%@23dBm
- Current: 280mA@23dBm
- ACPR: 25.5 dBm
- Ultra Low shutdown current: < 2 uA
- Low control current: 2 mA
- Low Harmonics: f2, f3, f4, f5 Harmonics <40dBc at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Cost down equivalent for 12LP15A

SST12LP15B-QXBE

12-lead 2x2x0.45 mm



Features:

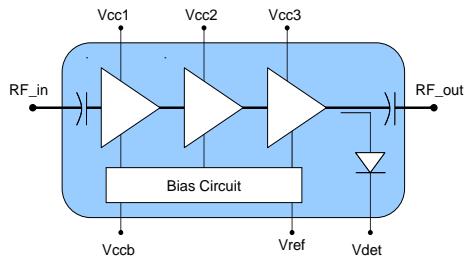
- Gain: 32 dB
- EVM: ~3%@23dBm
- Current: 310mA@23dBm
- ACPR: 25.5 dBm
- Ultra Low shutdown current: < 2 uA
- Low control current: 2 mA
- Low Harmonics: f2, f3, f4, f5 Harmonics <40dBc at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Providing high output power in a small package

2.4 GHz High-Power Power Amplifier Cont'd

[Online Datasheet](#)

SST12CP11-QVCE

16-lead 3x3x0.9 mm

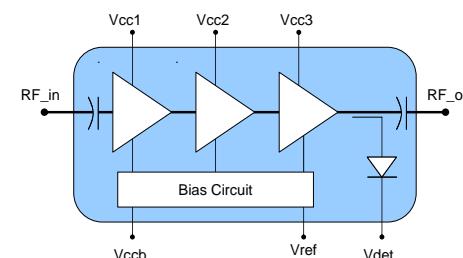


Features:

- Gain: 34dB
- EVM: ~3%@25dBm (5V)
- ~2.5%@23.5dBm, 802.11n HT40
- ~1.75% @ 21.5dBm, MCS9 HT40 256QAM
- Current: 440mA@25dBm (5V)
- ACPR: 28.5 dBm
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Low Harmonics: f2, f3, f4, f5 Harmonics <38dBc at 25dBm output

SST12CP11C-QUCE (256QAM PA)

16-lead 3x3x0.55 mm



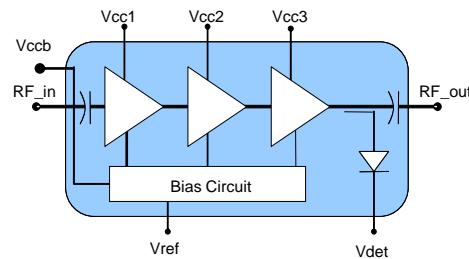
Features

- 5V operation
- Gain: 37 dB
- Linear power for WLAN applications
 - 23.5dBm at 1.75% EVM, MCS9-HT40
 - 25dBm at 3% EVM 802.11g OFDM 54Mbps
 - 28 dBm 802.11b/g spectrum mask compliant
- Integrated power detector
 - Temperature compensated
 - VSWR insensitive
 - >20 dB dynamic range (dB wise linear)
- Matched input RF port
- DC blocked input and output ports
- Lead Free, Halogen Free, RoHS compliant
- 12CP11 Pin-to-Pin

2.4 GHz High Power Power Amplifier Cont'd

[Online Datasheet](#)

SST12CP12-QUCE (256QAM PA) 16-lead 3x3x0.55 mm

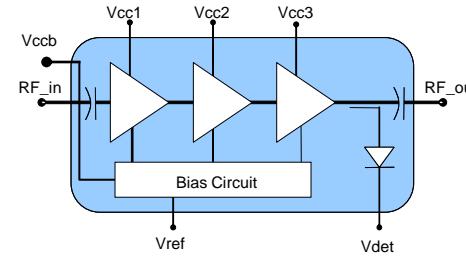


Features

- Gain: 33dB
- High Power:
Meet 802.11g OFDM spectrum mask up to 28.5dBm
- High Linearity
1.75% dynamic EVM @ 23dBm, 256QAM, 40MHz channel
- 2.5% EVM @ 24dBm, 802.11n, MCS7, HT40
- 3.0% EVM @ 25.5dBm, 802.11g 54Mbps OFDM
- 28 dBm 802.11b spectrum mask compliant
- VSWR and temperature insensitive power detector with 20dB dynamic range
- 5V power supply
- RFMD RF5602 Pin-compatible

[SST12LP15A/15B](#)

SST12CP21-QUCE (256QAM PA) 16-lead 3x3x0.55 mm



Features

- 5V operation
- Gain: 39 dB
- Linear power for WLAN applications
 - 23dBm at 1.75% EVM, MCS9-HT40 with 320mA
 - 25dBm at 3% EVM 802.11g OFDM 54Mbps with 350mA
 - 28 dBm 802.11b/g spectrum mask compliant
- Integrated power detector
 - Temperature compensated
 - VSWR insensitive
 - >20 dB dynamic range (dB wise linear)
- Matched input RF port
- DC blocked input port
- Lead Free, Halogen Free, RoHS compliant
- SE2623L1 Pin-to-Pin

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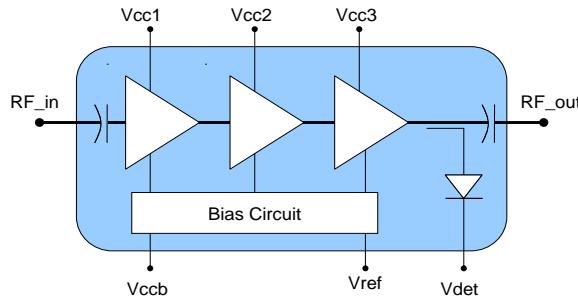


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5 GHz High Efficiency Power Amplifier

Online
Datasheet

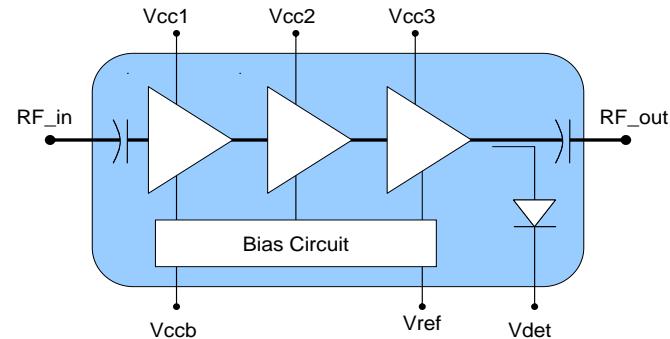
Normal Power PA **SST11CP15E-QUBE** 12-lead 2x2x0.55 mm



Features:

- Gain: 27 dB
- EVM: ~3%@18dBm at 3.3V
~3%@20dBm at 5V
1.8%@16dBm for 315 Mbps 802.11ac at 3.3V
- Current: 200mA@18dBm
- ACPR: 22 dBm at 3.3V
24dBm at 5V
- Ultra Low shutdown current: < 1 uA
- Low control current: 3 mA
- Low Harmonics: f2, f3, f4, f5 Harmonics <40dBC at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors

High Power PA **SST11LP12-QCF** 16-lead 3x3x0.7 mm



Features:

- Gain: 28 dB
- EVM: ~3%@21dBm
- Current: 280mA@21dBm
- ACPR: 24 dBm
- Ultra Low shutdown current: < 3 uA
- Low control current: 3 mA
- Low Harmonics: f2, f3, f4, f5 Harmonics <40dBC at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- Used on Atheros reference designs

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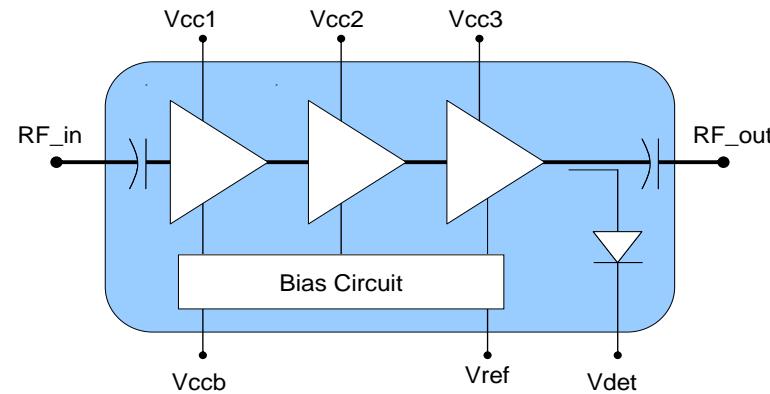
5 GHz 11ac Power Amplifier

Online
Datasheet

High Power 11ac PA **SST11CP16-QXCE** 16-lead 3x3x0.5 mm

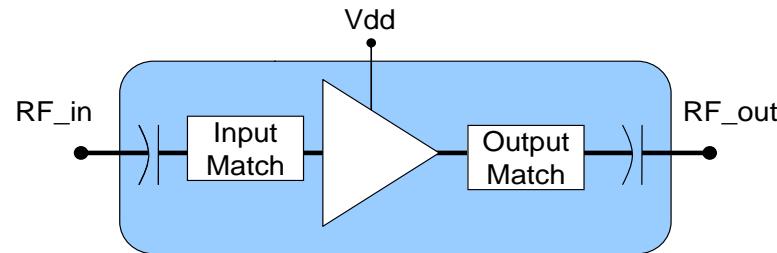
Features:

- Gain: 30 dB across band 5.1-5.9 GHz
- High linear output power (at 5V):
 - 21.5 dBm at 3% EVM with 54 Mbps 802.11a
 - 20 dBm at 2.5% EVM with 65 Mbps 802.11n
 - 19 dBm at 1.8% EVM with 351 Mbps 802.11ac
- Current: 340mA@22dBm
- ACPR: 25.5 dBm with 802.11a mask compliance
- Ultra Low shutdown current: < 1uA
- Low control current: 2 mA
- Low Harmonics: f₂, f₃, f₄, f₅ Harmonics <40dBc at 22dBm output
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- 50Ω on-chip input match and simple output match



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SST12LN01-QU6E 6-lead 3x1.6x0.55 mm QFN



Features:

- Gain: 14 dB
- Noise Figure: 1.55 dB
- Current: 11mA
- Input P1dB: -7 dBm
- Match: Fully Matched
- Used on Ralink reference designs

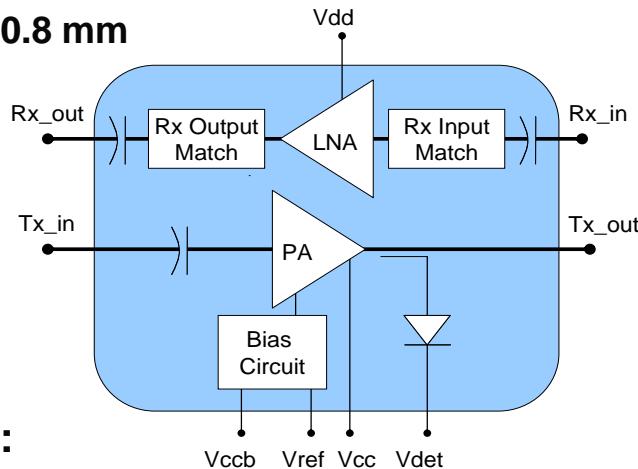
2.4 GHz Front End Modules

[Online Datasheet](#)

WiFi Transmitter / Receiver Module

SST12LF01-QDE

24-lead 4x4x0.8 mm



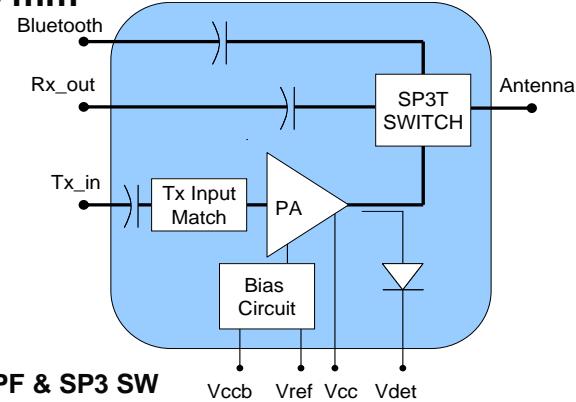
Features:

- Configuration: PA, LNA
- Tx Gain: 29 dB
- Tx EVM: 3%@19.5dBm
- Tx Current: 130mA@19.5dBm
- Tx ACPR: 22 dBm
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA
- Rx Gain: 12 dB
- Rx Noise Figure: 1.45dB
- Rx Current: 10mA

WiFi-Bluetooth dual mode modules

SST12LF02-QXCE

16-lead 3x3x0.45 mm



Features:

- Configuration: PA, LPF & SP3 SW
- Low external component counts:
Only 2 external components for optimized performance
- Pin compatible with RFMD RF5325
- Low loss Receiver paths: <1dB from Antenna to WLAN RX or BT
- Tx Gain: 30 dB
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- EVM: ~2.5%@19dBm
- Current: 140mA@19dBm
- ACPR: 22 dBm
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA

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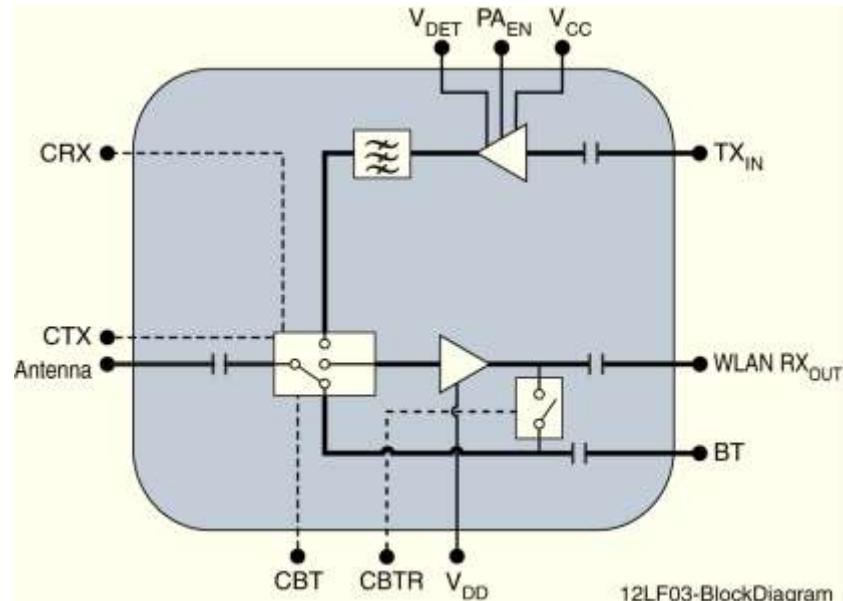
WiFi-Bluetooth dual mode modules

SST12LF03-QXCE

20-lead 3x3x0.55 mm

Features:

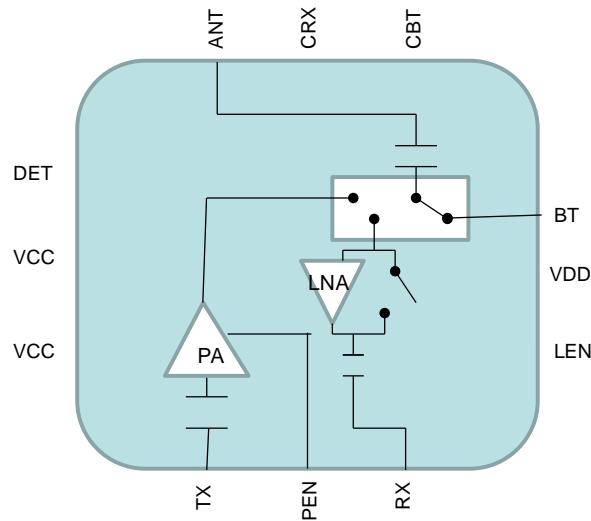
- Configuration: PA, LPF, LNA & SP3 SW
- All RF ports 50Ω-matched and DC-decoupled
- Low external component counts:
Only 2 external components for optimized performance
- Tx Gain: 28 dB
- Temperature stable, wide dynamic range, dB-Linear Power Detectors
- EVM: >3%@19dBm for 54 Mbps 802.11g signal
- Current: 130mA@19dBm
- ACPR: 22 dBm
- Ultra Low shutdown current: < 3 uA
- Low control current: 2 mA
- Low Harmonics: f₂, f₃, f₄, f₅ Harmonics <35dBC at 22dBm output
- Rx gain: 12 dB
- High P1-dB LNA: > 5 dBm
- Noise Figure: 3.1 dB
- Bluetooth path: typical 2.5 dB loss



12LF03-BlockDiagram

2.4GHz 802.11b/g/n/256 QAM Front End Module

SST12LF09-Q3CE
16-lead 2.5x2.5x0.4 mm



Features

- └ **50Ω input/output matched, DC decoupled**
- └ **PA, LNA with bypass, SP3T antenna SW**
- └ **3.3V to 5.0V power supply**
- └ **Transmitter Chain**
 - └ **24dB gain**
 - └ **1.8% dynamic EVM@15dBm(3.6V); 16.5dBm(5.0V)**
 - └ **256-QAM, 40MHz BW**
 - └ **3.0% dynamic EVM@17dBm(3.6V); 18.5(5.0V) , 802.11g 54Mbps OFDM**
 - └ **VSWR and temperature insensitive power detector with 20dB dynamic range**
- └ **Receiver Chain**
 - └ **12dB LNA gain**
 - └ **2.5dB Noise Figure**
 - └ **Input P1dB -6dBm**
 - └ **9dB LNA bypass loss**
- └ **AWL9281 and SKY85303 P2P**

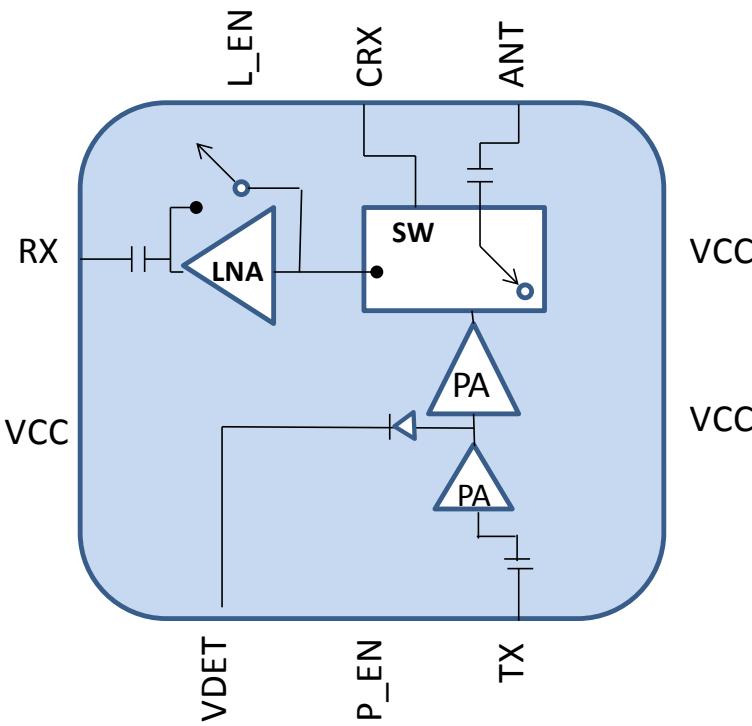
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MICROCHIP

Online
Datasheet

5GHz 802.11a/n/ac Front End Module



SST11LF04-Q3CE

16-lead 2.5x2.5x0.4 mm

Features

- 5GHz 802.11a/n/ac FEM
- 50Ω input/output matched, DC decoupled
- PA, LNA with bypass, SPDT antenna SW
- 3.0~5.0V operating voltage
- Transmitter Chain
 - └ 30dB gain
 - └ 802.11ac MCS9, 80MHz
 - └ 1.8% dynamic EVM@16dBm (3.3V); 17dBm (5.0V)
 - └ 3.0% dynamic EVM@18dBm (3.3V); 19dBm (5.0V)
 - └ VSWR and temperature insensitive power detector with 20dB dynamic range
- Receiver Chain
 - └ 12dB LNA gain
 - └ Input P1dB -7dBm
 - └ LNA bypassed 8dB loss, P1dB > 20dBm
 - └ Noise Figure 2.95dB
- 16-Lead 2.5mm x 2.5mmx0.4mm QFN
- SKY85706 P2P

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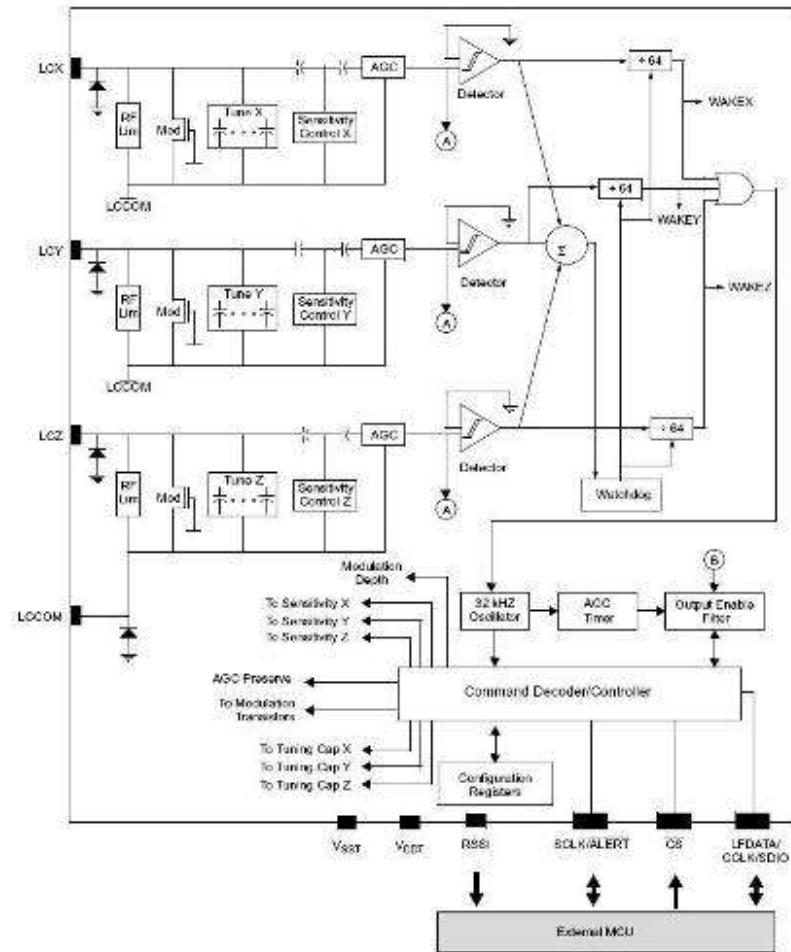
MICROCHIP

MCP2030

Online
Datasheet

Features:

- Three input pins for analog input signals
- High input detection sensitivity: $3\text{mV}_{\text{P-P}}$ (typ.)
- High modulation depth sensitivity (as low as 8%)
- Three output selections:
Demodulated data, Carrier clock, RSSI
- Input carrier frequency: 125kHz (typ.)
- Input data rate: 10 kbps, maximum
- 8 internal Configuration registers
- Bidirectional transponder communication (LF talk back)
- Programmable antenna tuning capacitance (up to 63pF, 1pF/step)
- Programmable output enable filter
- Low standby current: $4\mu\text{A}$ (typ.) with 3 channels enabled
- Low operating current:
 $13\mu\text{A}$ (typ.) with 3 channels enabled
- Serial Peripheral Interface (SPI™) with external devices
- Supports Battery Back-Up mode and battery-less operation with external circuits
- Industrial Temperature Range:
 -40°C to $+85^{\circ}\text{C}$ (industrial)



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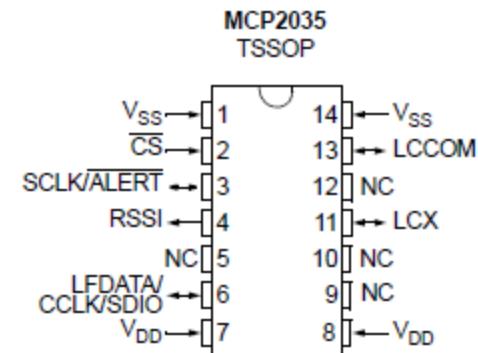
MICROCHIP

MCP2035

Online
Datasheet

Features:

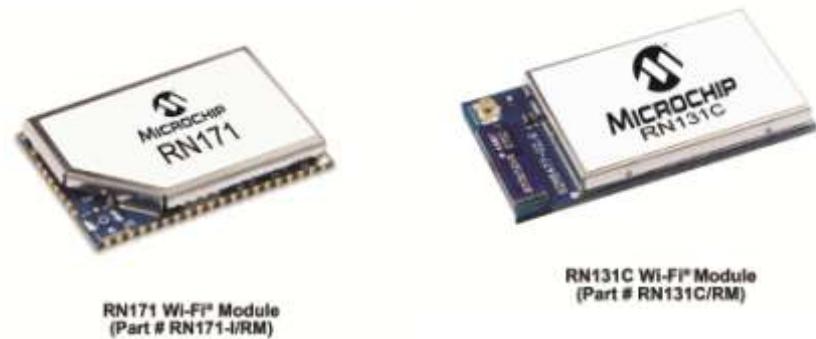
- Single Analog Input Pin for Signal Detection
- High Input Detection Sensitivity (3 mVPP, typical)
- High Modulation Depth Sensitivity (as low as 8%)
- Three Output Type Selections:
 - Demodulated Data
 - Carrier Clock
 - Received Signal Strength Indicator (RSSI)
- Input Carrier Frequency: 125 kHz, typical
- Input Data Rate: 10 Kbps, maximum
- 8 Internal Configuration Registers
- Bidirectional Transponder Communication via the same input pin (LF talk-back)
- Programmable Antenna Tuning Capacitance (up to 63 pF, 1 pF/step)
- Programmable Output Enable Filter
- Low Standby Current: 2 μ A, typical
- Low Operating Current: 10 μ A, typical
- Serial Peripheral Interface (SPI) with external devices
- Industrial Temperature Range: -40°C to +85°C
- 14-lead TSSOP



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Features:

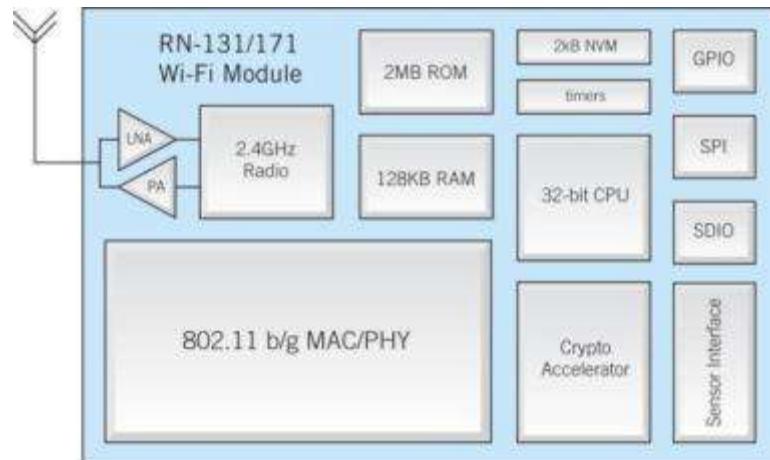
- FCC/CE/IC certified 2.4-GHz IEEE 802.11b/g transceiver
- Small form factor: 27 x 18 x 3.1 mm (RN171), 37mm x 20 mm x 3.5 mm (RN131)
- Configurable transmit power: 0 to 10 dBm (RN171)
- RF pad connector for antennas (RN171)
- Certified antennas: Chip antenna, 4" dipole, PCB trace, and wire antenna (RN171), Chip antenna and U.FL Connector (RN131)
- Ultra-low power: 4-uA sleep, 38-mA Rx, 120-mA Tx at 0dBm (RN171)



Description:

The RN171 / RN131 module is a complete, standalone TCP/IP wireless networking module. With its small form factor and extremely low power consumption, the RN171 / RN131 is perfect for mobile wireless applications such as asset monitoring, sensors, and portable battery operated devices. It incorporates a 2.4-GHz radio, 32-bit SPARC processor, TCP/IP stack, real-time clock, crypto accelerator, power management, and analog sensor interfaces.

The module is preloaded with firmware to simplify integration and minimize application development. In the simplest configuration, the hardware only requires four connections (PWR, TX, RX, and GND) to create a wireless data connection.





MICROCHIP

Online
Datasheet

MRF24WG0MA/MB

Features:

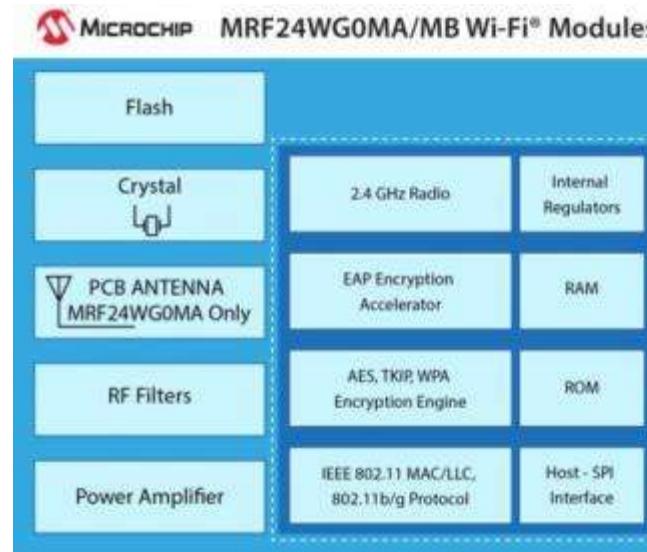
- EEE 802.11-compliant RF transceiver
- Serialized unique MAC address
- Data rate: 1 to 11 Mbps for 802.11b / 6 to 54 Mbps for 802.11g
- Compatible with IEEE 802.11b/g/n networks
- Small size: 21 mm x 31 mm 36-pin Surface Mount module
- Integrated PCB antenna (MRF24WG0MA)
- External antenna option (MRF24WG0MB) with ultra-miniature coaxial (U.FL) connector
- Easy integration into final product – accelerates product development, provides quicker time to market
- Radio regulation certification for United States (FCC), Canada (IC), and Europe (ETSI)
- Designed for use with Microchip microcontroller families (PIC18, PIC24, dsPIC33, and PIC32) with downloadable Microchip TCP/IP Stack

RF/Analog Features:

- ISM Band 2.400 to 2.484 GHz operation
- Channels 1-11
- DSSS/OFDM modulation
- Application throughput: 4500 kbps
- -95 dBm Typical sensitivity at 1 Mbps
- +18 dBm Typical 802.11b TX power with control
- +16 dBm Typical 802.11g TX power with control
- Integrated low phase noise VCO, RF frequency synthesizer, PLL loop filter and PA
- Integrated RSSI ADC and I/Q DACs, RSSI readings available to host



IEEE 802.11 b/g Embedded Wi-Fi® Module



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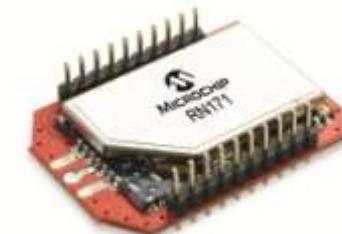
MICROCHIP

RN171XV

Online
Datasheet

Features:

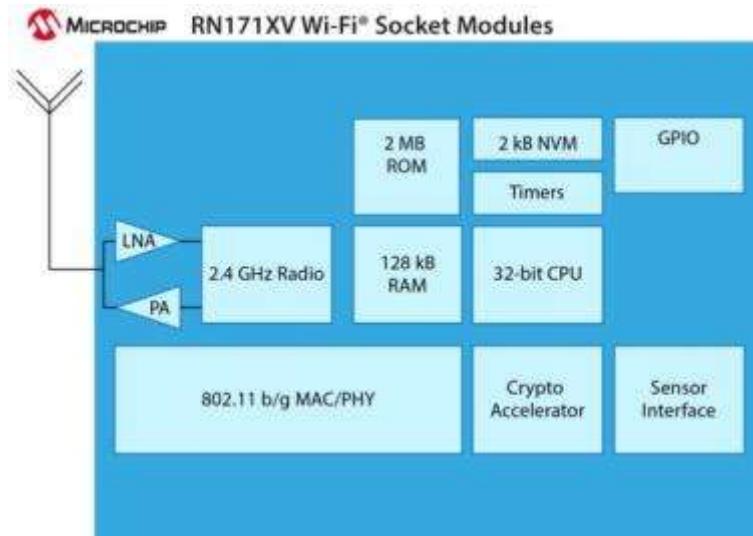
- Direct internet connectivity provides internet access to every node
- Point to point connectivity to every node without the need for custom profiles
- Based on common 802.15.4 footprint
- 3 Antenna options available – wire (RN171XVW-I/RM), reverse polarity SMA connector (RN171XVS-I/RM), and U.FL connector (RN171XVU-I/RM)
- Ultra low power: 4uA sleep mode, 38mA active
- Onboard TCP/IP stack includes DHCP, UDP, DNS, ARP, ICMP, HTTP client, FTP client and TCP



RN171XVU Wi-Fi® Socket Module
(Part # RN171XVU-I/RM)

Description:

The RN171XV module is a certified Wi-Fi solution especially designed for customers who want to migrate their existing 802.15.4 architecture to a standard TCP/IP based platform without having to redesign their existing hardware. The RN171XV is available in 3 antenna options: Wire (RN171XVW-I/RM), reverse polarity SMA connector (RN171XVS-I/RM) and U.FL connector (RN171XVU-I/RM). The RN171XV module is based upon the robust RN171 Wi-Fi module and incorporates an 802.11 b/g radio, 32 bit processor, TCP/IP stack, real-time clock, crypto accelerator, power management unit and analog sensor interface. The RN171XV module supports infrastructure networking for worldwide internet access directly by every node and adhoc connectivity for fully connected point to point networks, unlike many 802.15.4 implementations that need extensive, custom application profiles and additional bridging products.



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MRF24WB0MA/MB

Online
Datasheet

Features:

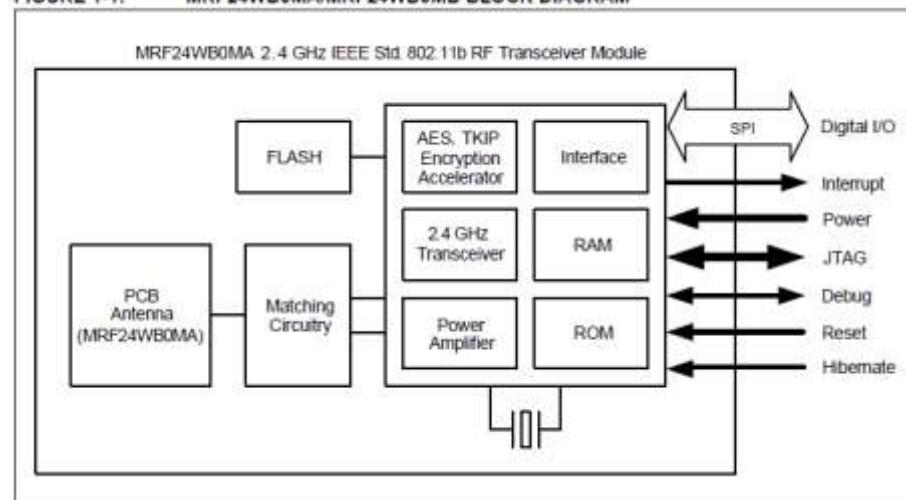
- IEEE Std. 802.11-compliant RF Transceiver
- Serialized unique MAC address
- Data Rate: 1 and 2 Mbps
- Small size: 21mm x 31mm 36-pin Surface Mount Module
- Integrated PCB antenna (MRF24WB0MA)
- External antenna option (MRF24WB0MB) with ultra miniature coaxial (U.FL) connector
- Range: up to 400m (1300 ft.)
- Easy integration into final product – accelerates product development, provides quicker time to market
- Radio regulation certification for United States (FCC), Canada (IC), Europe (ETSI) and Japan (ARIB)
- Wi-Fi® certified (WFA ID: WFA7150)
- Designed for use with Microchip microcontroller families (PIC18, PIC24, dsPIC33, and PIC32) with downloadable Microchip TCP/IP Stack

RF/Analog Features:

- ISM Band 2.400-2.483.5 GHz operation
- 14 Channels selectable individually or domain-restricted
- DSSS Modulation
- -91 dBm Typical sensitivity at 1 Mbps
- +10 dBm Typical output power with control
- Integrated low phase noise VCO, RF frequency synthesizer, PLL loop filter and PA
- Digital VCO and filter calibration
- Integrated RSSI ADC and I/Q DACs, RSSI readings available to host
- Balanced receiver and transmitter characteristics for low power consumption



FIGURE 1-1: MRF24WB0MA/MRF24WB0MB BLOCK DIAGRAM



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MICROCHIP

RN4020

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Datasheet

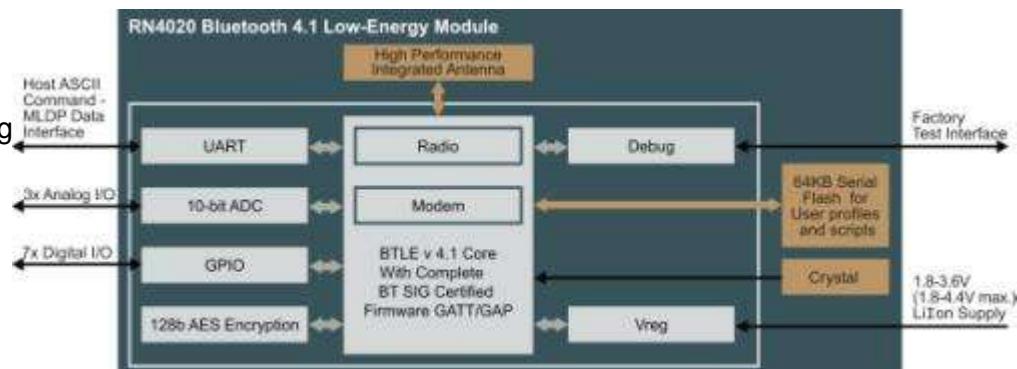
Features:

- Fully-certified Bluetooth® version 4.1 module
- On-board embedded Bluetooth low energy stack
- Simple ASCII command interface over UART
- Multiple IOs for control and status
- Secure AES128 encryption
- GAP,GATT,SM, L2CAP and integrated public profiles
- Create custom services using command API
- Data streaming with Microchip's Low Energy Data Profile (MLDP)
- Scripting for standalone module operation with analog and digital data collection
- 7 dBm transit power for 100m+ range
- Field-upgradeable via the UART interface or over-the-air
- Software configurable role as peripheral or central, client or server
- Compact form factor 11.5 x 19.5 x 2.5mm
- Low power modes
- UART interface, GPIO, ADC
- 64KB internal serial flash
- Castellated SMT pads for easy and reliable PCB mounting
- Environmentally friendly, RoHS compliant
- Certifications: FCC, IC, CE, QDID



Description:

The RN4020 is a fully-certified, Bluetooth Version 4.1 low energy module for designers who want to easily add low power wireless capability to their products. The small form factor, surface mount module has the complete Bluetooth stack on-board and is controlled via simple ASCII commands over the UART interface. The RN4020 also includes all Bluetooth SIG profiles, as well as MLDP (Microchip Low-energy Data Profile) for custom data. Developers can utilize the scripting feature to enable standalone operation without a host MCU or Processor. The RN4020 can be remote controlled by another module over a secure connection and can be updated via the UART interface or over-the-air. The module has a built-in high performance PCB antenna optimally tuned for long range, typically over 100 meters. The compact size, 11.5 x 19.5 x 2.5mm, enables ease of integration in size-constrained applications. The RN4020 can be used with any low cost microcontroller for intelligent Bluetooth Low Energy applications.



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RN41 / RN42

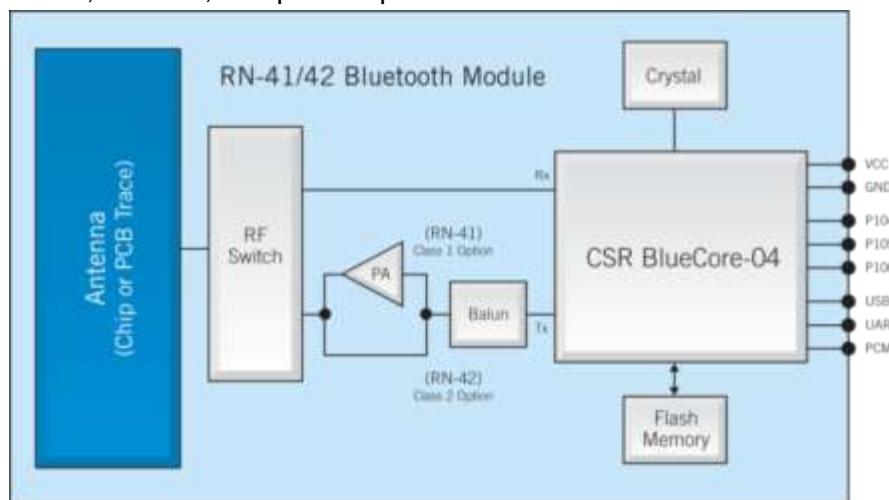
Features:

- Fully certified Class 1 (RN41), Class 2 (RN42) Bluetooth 2.1 + EDR module
- Onboard embedded Bluetooth stack (no host processor required)
- UART (SPP or HCI) and USB (HCI only) data connection hardware interfaces
- Supports Bluetooth data link to iPhone/iPad/iPod Touch
- Supports HID profile for making accessories such as keyboards, mouse, pointing devices
- Programmable low power modes
- Secure communications, 128 bit encryption
- Error correction for guaranteed packet delivery
- UART local and over-the-air RF configuration
- Auto-discovery/pairing requires no software configuration (instant cable replacement)
- Castellated SMT pads for easy and reliable PCB mounting
- The standard part number (RN41-I/RM / RN42-I/RM) supports SPP and DUN profiles
- Available in multiple configurations: Apple-compatible firmware (RN4xAPL-I/RM), HCI mode (RN4xHCI-I/RM), HID mode (RN4xHID-I/RM), USB mode (RN4xU-I/RM), and socket module (RN4xSM-I/RM)
- Available without antenna (RN41N-I/RM)
- Bluetooth SIG qualified



Description:

The RN41 / RN42 is a small form factor, low power, simple to integrate Bluetooth radio for OEMs adding wireless capability to their products. The RN41 / RN42 is perfect for battery powered applications and by default is ready to use in the SPP (Serial Port Profile) configuration. It uses only 250 μ A in sleep mode while still being discoverable and connectable. Multiple low power modes available allow you to dial in the lowest power profile for your application. The RN41 / RN42 supports multiple Bluetooth profiles, is fully certified, and is simple to design in, making it a complete embedded Bluetooth solution. The RN41 / RN42 is also available without antenna (RN41N / RN42N). This is useful when the application requires an external antenna. The RN41N / RN42N is form, function, and pin compatible with the RN41 / RN42.



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RN52

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Features:

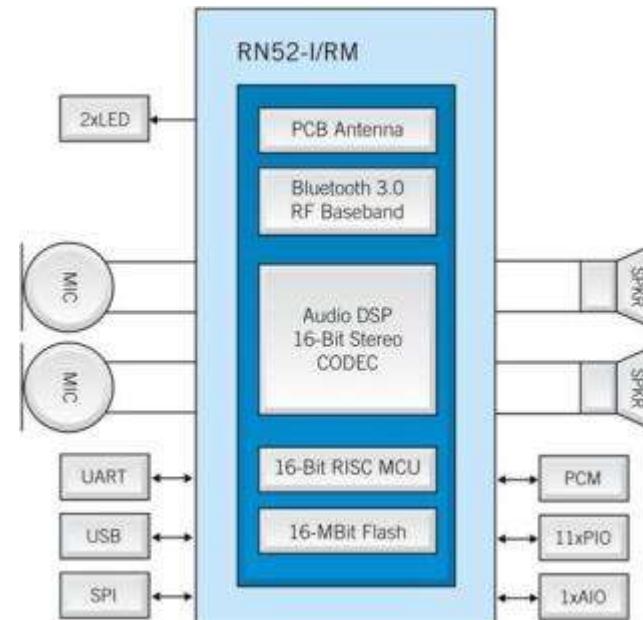
- Fully certified Bluetooth version 3.0 audio module, fully compatible with Bluetooth version 2.1+EDR, 1.2, and 1.1
- Software configurable through commands over UART console interface
- Embedded Bluetooth stack profiles: SPP, A2DP, HFP/HSP, and AVRCP
- Supports iAP profile discovery for iPhone® and iPod® Bluetooth accessories
- Available as an A2DP audio source or sink
- Postage-stamp-sized form factor, 13.5 x 26 x 2.7mm
- Dual-channel, differential audio input and output for highest quality audio
- External audio codecs supported via I2S and S/PDIF interface
- Castellated SMT pads for easy and reliable PCB mounting
- Additional support for codecs such as aptX®, AAC, MP3, and others
- Environmentally friendly, RoHS compliant

Description:

The RN52 Bluetooth audio module provides a fully integrated solution for delivering high-quality stereo audio in a small form factor. It combines a Class 2 Bluetooth radio with an embedded DSP processor, controlled and configured by simple ASCII commands and GPIO. It integrates RF, a baseband controller, and DSP, making it a complete Bluetooth audio wireless link. The RN52 supports HSP/HFP, A2DP, AVRCP, SPP, and iAP profiles and includes support for codecs such as SBC, aptX®, and AAC. It provides a UART interface, GPIO, stereo speaker outputs, stereo microphone inputs, and a USB port.



Bluetooth® Audio Module
(Part # RN52-I/RM)



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Features:

- Fully certified Bluetooth® version 2.1 module, supports version 2.1 + Enhanced Data Rate (EDR)
- Backwards-compatible with Bluetooth version 2.0, 1.2, and 1.1
- Pin compatible with widely used 2 x 10 (2mm) socket typically used for 802.15.4 applications
- Low power: 30 mA connected, < 10 mA sniff mode
- UART (SPP or HCI) and USB (HCI only) data connection interfaces
- Sustained SPP data rates: 240 Kbps (slave), 300 Kbps (master)
- HCI data rates: 1.5 Mbps sustained, 3.0 Mbps burst in HCI mode

Embedded Bluetooth stack profiles included (requires no host stack): GAP, SDP, RFCOMM, and L2CAP protocols, with SPP, HID and DUN profile support

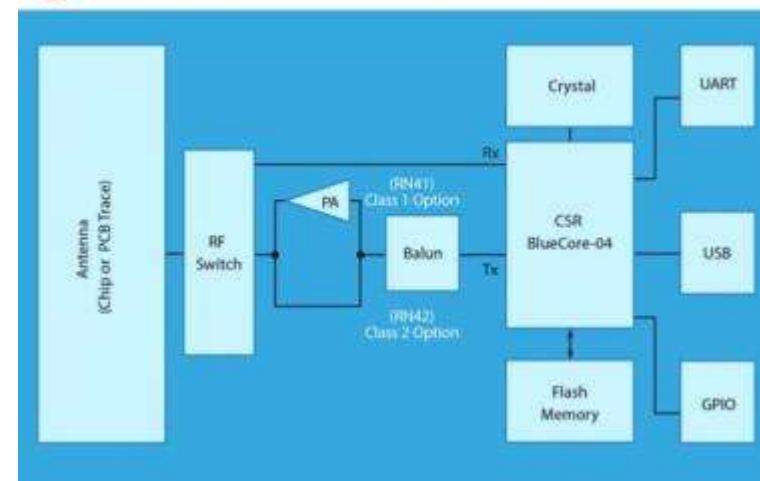
- Bluetooth SIG certified
- Certifications: FCC, IC, CE
- Environmentally friendly, RoHS compliant
- 2 antenna options available: Chip antenna (RN41XVC-I/RM) and U.FL connector for external antenna (RN41XVU-I/RM)

Description:

The RN41XV module provides drop-in, certified Bluetooth connectivity for existing systems using 802.15.4 modules. Based on the popular 2 x 10 (2mm) socket footprint often found in embedded applications, the RN41XV offers a complete wireless solution for customers looking to migrate to a standard protocol without modifying existing hardware. The RN41XV is built upon Roving's RN41 low power Bluetooth module. The module has an embedded Bluetooth stack and supports multiple interface protocols and profiles including the commonly used SPP and HID profiles.



 **RN41/42XV Bluetooth® Socket Modules**



Features:

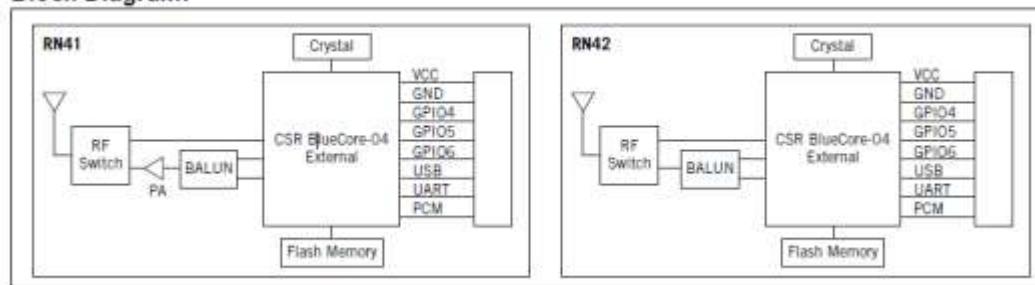
- Socket module with UART interface
- 3.3/5V logic CMOS I/O (RS-232 as well)
- Fully qualified Bluetooth 2.1/2.0/1.2/1.1 module
- Bluetooth v2.1+EDR support
- Low power (*8-30 mA connected, 2 mA idle*)
- UART supports baud rates from 1,200 to 3Mbit
- Sustained SPP data rates - 240Kbps (slave), 300Kbps (master)
- HCI data rates - 1.5Mbps sustained, 3.0Mbps burst in HCI mode
- HCI mode, or SPP/DUN software stacks available.
- Embedded Bluetooth stack profiles included
(*requires no host stack*): GAP, SDP, RFCOMM and L2CAP, with SPP, DUN and HID profiles.
- RS232 on board with power enable on IO pin.
- Bluetooth SIG Qualified, End Product Listing
- Class 1 high power amplifier (RN41SM only) with on board ceramic RF chip antenna.
- Certifications: FCC, ICS, CE
- Environmentally friendly, RoHS compliant

Description:

The RN41SM / RN42SM is a though hole, low power, highly flexible Bluetooth socket module. This module supports SPP/DUN and HCI Bluetooth interface protocols, is simple to design in and fully certified. With its high performance on chip antenna and support for Bluetooth® Enhanced Data Rate (EDR), the RN41 / RN42 delivers up to 3 Mbps data rate for distances to 100M / 20M. The RN41/RN42 socket module is the perfect method for adding Bluetooth wireless capability to existing products without redesign, saving you significant time and money.



Block Diagram:

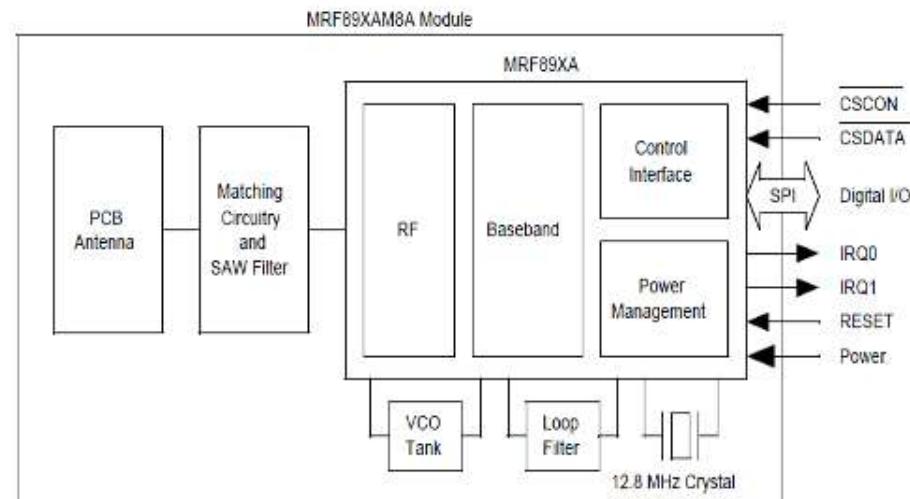
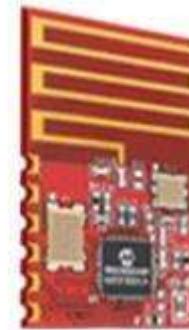


Features:

- Fully integrated ultra low-power, sub-GHz transceiver
- Wide-band half-duplex transceiver
- Supports proprietary sub-GHz wireless protocols
- Simple 4-wire SPI-compatible interface
- CMOS/TTL-compatible I/Os
- On-chip oscillator circuit
- Dedicated clock output
- Operating voltage: 2.1V-3.6V
- Low-current consumption
- Supports Industrial temperature
- Complies with ETSI EN 300 220 and FCC part 15
- Small, 32-pin TQFN package

Module Features

- Module designed from the MRF89XA integrated ultra low-power, sub-GHz transceiver IC.
- The MRF89XAM8A is an 868 MHz radio transceiver module
- The MRF89XAM9A is a 915 MHz radio transceiver module
- Supports proprietary sub-GHz wireless protocols
- Simple, SPI Interface with Interrupts
- Small size: 0.7" x 1.1" (17.8 mm x 27.9 mm), surface mountable
- Integrated crystal, internal voltage regulator, matching circuitry and Printed Circuit Board (PCB) antenna
- Easy integration into final product
- Compatible with Microchip's Microcontroller families (PIC16, PIC18, PIC24, dsPIC33 and PIC32)
- Conforms to the following ETSI standards:
 - EN 300 220-2 V2.3.1 (2001–02)
 - EN 301 489-3 V1.4.1 (2002–08)





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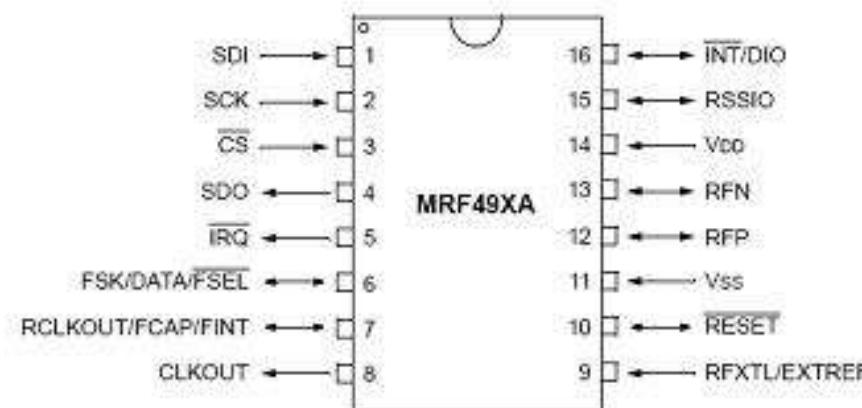
MRF49XA

Features:

- Fully Integrated Sub-GHz Transceiver
- Supports Proprietary Sub-GHz Wireless Protocols
- 4-Wire Serial Peripheral Interface (SPI)
- CMOS/TTL Compatible I/Os
- Clock and Reset Signals for Microcontroller
- Integrated 10 MHz Oscillator Circuitry
- Integrated Low Battery Voltage Detector
- Supports Power-Saving Modes
- Operating Voltage: 2.2V-3.8V
- Low-Current Consumption, Typically:
 - 11mA in RX mode
 - 15mA in TX mode
 - 0.3*μ*A in Sleep mode
- Industrial Temperature Range
- 16-Pin TSSOP Package

RF/Analog Features

- Supports ISM Band Sub-GHz Frequency Ranges (433, 868 and 915 MHz)
- Modulation Technique: FSK with FHSS Capability
- Supports High Data Rates:
 - Digital mode 115.2 kbps, max.
 - Analog mode 256 kbps, max.
- Differential RF Input/Output:
 - -110 dBm Typical Sensitivity with 0 dBm Maximum Input Level
 - +7 dBm Typical Transmit Output Power
- High-Resolution Programmable PLL Synthesizer
- Integrated Power Amplifier
- Integrated Low Phase Noise VCO Frequency
- Synthesizer and PLL Loop Filter
- Automatic Frequency Control



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MICROCHIP

MRF24XA

Online
Datasheet

MRF24XA is an IEEE 802.15.4™ Standard compliant 2.4 GHz RF transceiver with feature extensions. MRF24XA integrates the PHY and MAC functionality in a single chip solution. MRF24XA implements a low-cost, low-power, high data rate (125 kbps to 2 Mbps) Wireless Personal Area Network (WPAN) device.

Features:

IEEE 802.15.4™-2003 and IEEE 802.15.4-2006 Standard

Compliant RF transceiver

- Multiple air data rates:

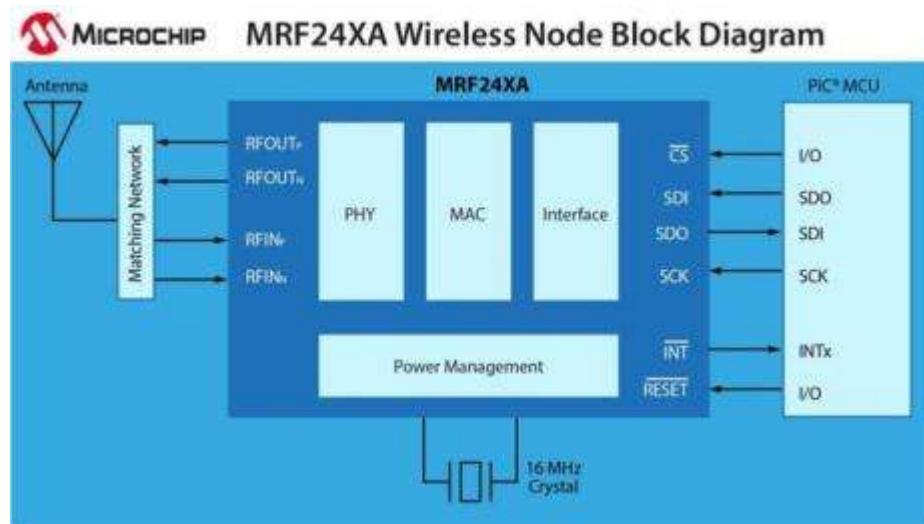
- 250 kbps (IEEE 802.15.4)
- 125, 500, 1000, 2000 kbps, co-existence with standard networks

- Configurable TX output power: -17.5 to 0 dBm

- Frame header duration scales with the selected data rate

- On-the-fly, per-frame air-data-rate detection (link-by-link independent air data rates)

- Inferred destination addressing (to further save on framing overheads; optional)



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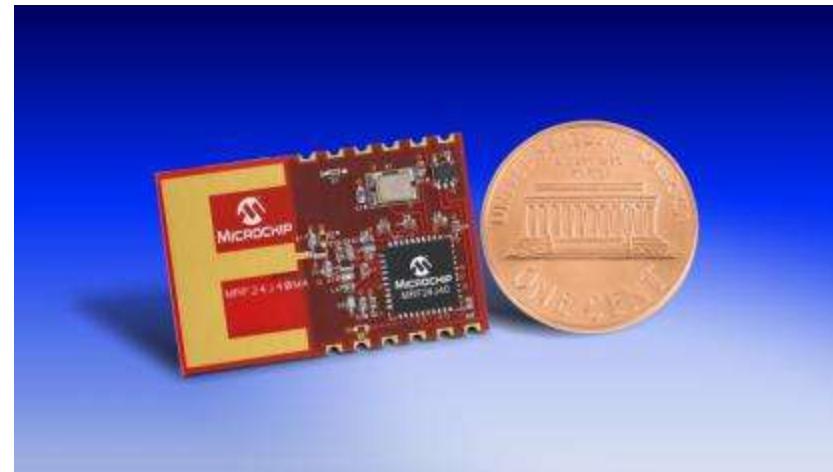
MRF24J40 is a complete IEEE 802.15.4 radio and operates in the 2.4GHz freq band. The MRF24J40 supports ZigBee™, MiWi™ protocols and proprietary protocols to provide an ideal solution for wireless sensor networks, home automation, building automation and consumer applications.

Module Features:

- IEEE Std. 802.15.4™ Compliant RF Transceiver
- Supports ZigBee®, MiWi™, MiWi™ P2P and Proprietary Wireless Networking Protocols
- Small Size: 0.7" x 1.1" (17.8 mm x 27.9 mm), Surface Mountable
- Integrated Crystal, Internal Voltage Regulator, Matching Circuitry and PCB Antenna
- Easy Integration into Final Product
- Radio Regulation Certification for United States (FCC), Canada (IC) and Europe (ETSI)
- Compatible with Microchip Microcontroller Families
- Up to 400m Range (outdoor, line-of-sight)

Operational:

- 20/10/5/2.5 MHz Clock Output:
- Operating Voltage: 2.4-3.6V (3.3V typ.)
- Temperature Range: -40°C to +85°C Industrial
- Simple, Four-Wire SPI Interface
- Low-Current Consumption:
 - RX mode: 19 mA (typ.), TX mode: 23 mA (typ.), Sleep: 2 µA (typ.)
- Supports Power Save mode



Features:

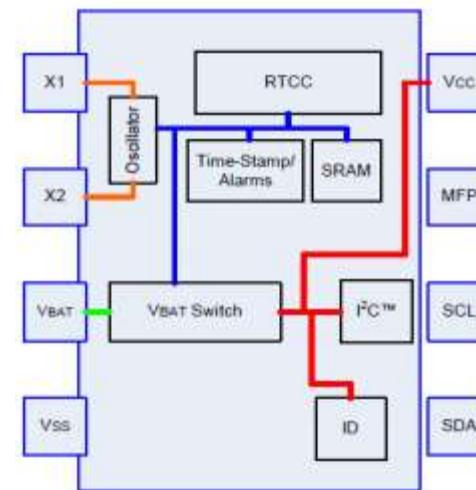
- Battery Backed Real-Time Clock/Calendar (RTCC):
 - Hours, Minutes, Seconds, Day of Week, Day, Month & Year
 - Dual Alarms
- On-Chip Digital Trimming/Calibration
- Open-Drain Output:
 - Selectable Frequency Clock Output
 - Alarm Output
- Power-Fail Time-Stamp
- Low-Power CMOS Technology:
 - Battery Backup Current: <700nA @ 1.8V
- 400 kHz I²C™
- Packages: 8-Lead SOIC, TSSOP, 2x3 TDFN, MSOP
- Industrial Temperature Range:
 - 40°C to +85°C (Industrial)

Memory:

- 64 Bytes Battery Backed SRAM
- Protected 64-Bit Unique ID memory space:
 - EUI-48™ or EUI-64™ MAC address
 - Custom ID Programming

Device Selection Table:

Part Number	Unique ID
MCP79400	Blank
MCP79401	EUI-48™
MCP79402	EUI-64™





MICROCHIP

MCP7940M

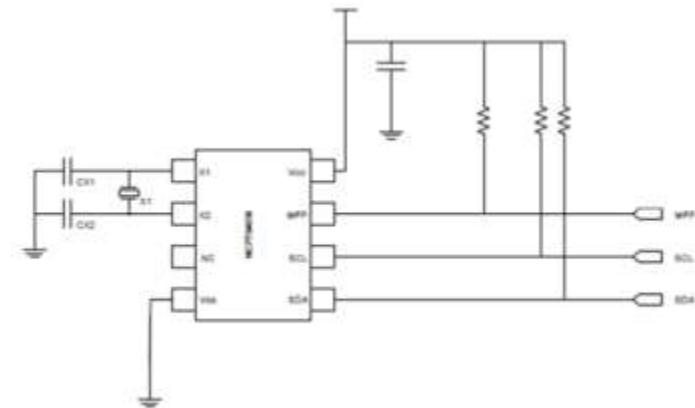
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Features:

- Real-Time Clock/Calendar (RTCC):
 - Hours, Minutes, Seconds, Day of Week, Day, Month & Year
 - Dual Alarms
- On-Chip Digital Trimming/Calibration
- Open-Drain Output:
 - Selectable Frequency Clock Output
 - Alarm Output
- 400 kHz I²C™
- Packages: 8-Lead SOIC, TSSOP, 2x3 TDFN, MSOP, PDIP
- Industrial Temperature Range:
 - -40°C to +85°C (Industrial)

Memory:

- 64 Bytes SRAM



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MCP7940N

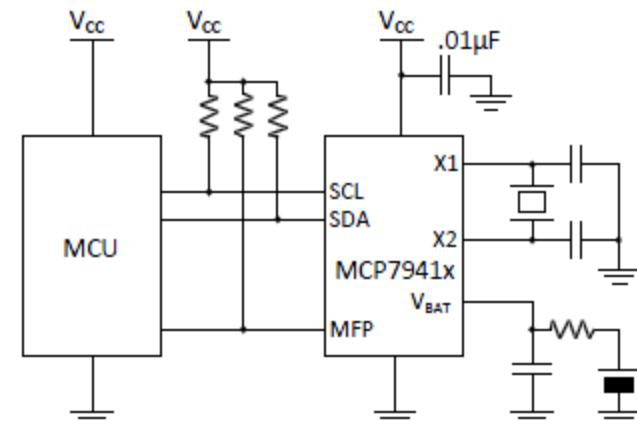
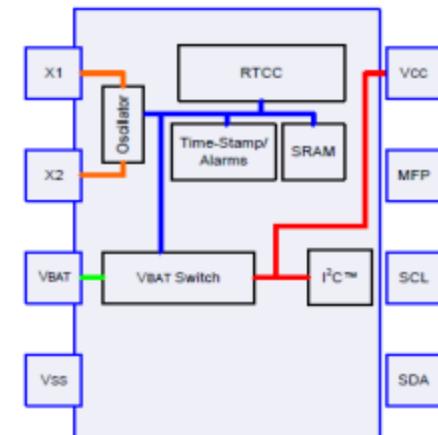
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Features:

- Battery Backed Real-Time Clock/Calendar (RTCC):
 - Hours, Minutes, Seconds, Day of Week, Day, Month & Year
 - Dual alarms
- On-Chip Digital Trimming/Calibration
- Open-Drain Output:
 - Selectable Frequency Clock Output
 - Alarm Output
- Power-Fail Time-Stamp
- Low-Power CMOS Technology:
 - Battery Backup Current: <700nA @ 1.8V
- 400 kHz I²C™
- Packages: 8-Lead SOIC, TSSOP, 2x3 TDFN, MSOP, PDIP
- Temperature Ranges:
 - -40°C to +85°C (Industrial)
 - -40°C to +125°C (Extended)

Memory:

- 64 Bytes Battery Backed SRAM



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Features:

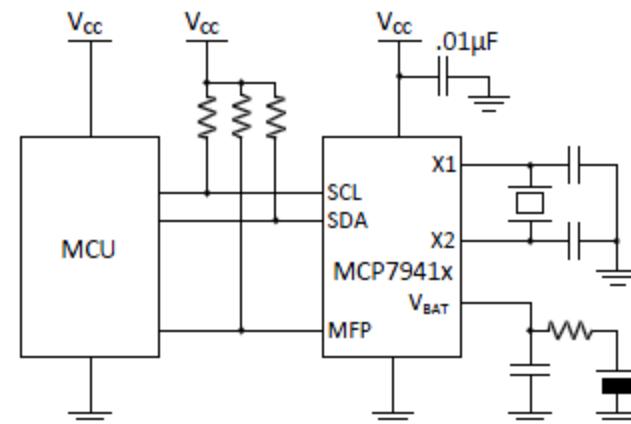
- Battery Backed Real-Time Clock/Calendar (RTCC):
 - Hours, Minutes, Seconds, Day of Week, Day, Month & Year
 - Dual alarms
- On-Chip Digital Trimming/Calibration:
- Open-Drain Output:
 - Selectable Frequency Clock Output
 - Alarm Output
- Power-Fail Time-Stamp
- Low-Power CMOS Technology:
 - Battery Backup Current: <700nA @ 1.8V
- 400 kHz I²C™
- Packages: 8-Lead SOIC, TSSOP, 2x3 TDFN, MSOP
- Industrial Temperature Range:
 - -40°C to +85°C (Industrial)

Memory:

- 64 Bytes Battery Backed SRAM
- 1 Kbits EEPROM (128x8)
- Protected 64-Bit Unique ID memory space:
 - EUI-48™ or EUI-64™ MAC address
 - Custom ID programming

Device Selection Table:

Part Number	Unique ID
MCP79410	Blank
MCP79411	EUI-48™
MCP79412	EUI-64™



Features:

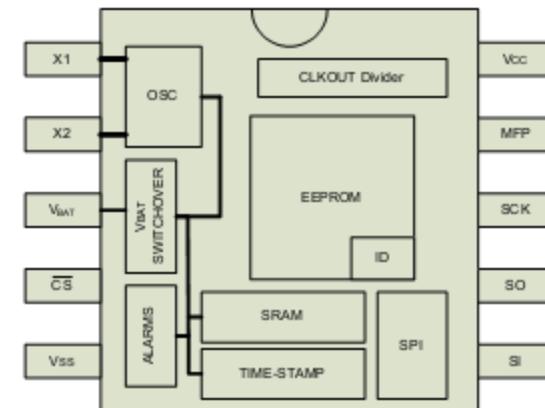
- Battery Backed Real-Time Clock/Calendar:
 - Hours, Minutes, Seconds, Hundredth of Seconds, Day of Week, Month, Year & Leap Year
 - Dual Alarms
- Open-Drain Output:
 - Selectable Frequency Clock Output
 - Alarm Output
- On-Chip Digital Trimming/Calibration
- Power-Fail Time-Stamp
- 1.8V to 3.6V Operating Voltage
- Low Operating Current:
 - VBAT Timekeeping Current: <700nA @ 1.8V
- 5 MHz SPI
- 10-lead MSOP & TDFN
- Industrial Temperature Range:
 - -40°C to +85°C

Memory:

- 64-Byte Battery-Backed SRAM
- 2 Kbit and 1 Kbit EEPROM Memory
- Protected 128-Bit Unique ID memory space:
 - EUI-48™ or EUI-64™ MAC address
 - Custom ID programming

Device Selection Table:

Part Number	EEPROM (Kbits)	Unique ID
MCP79510	1	Blank
MCP79520	2	Blank
MCP79511	1	EUI-48™
MCP79521	2	EUI-48™
MCP79512	1	EUI-64™
MCP79522	2	EUI-64™


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MCP795W10/11/12 and MCP795W20/21/22

Online
Datasheet

Features:

- Battery Backed Real-Time Clock/Calendar:
 - Hours, Minutes, Seconds, Hundredth of Seconds, Day of Week, Month, Year & Leap Year
 - Dual Alarms
- Open-Drain Output:
 - Selectable Frequency Clock Output
 - Alarm Output
- On-Chip Digital Trimming/Calibration
- Power-Fail Time-Stamp
- 1.8V to 3.6V Operating Voltage
- Low Operating Current:
 - VBAT Timekeeping Current: <700nA @ 1.8V
- 10 MHz SPI
- 14-Lead SOIC & TSSOP
- Industrial Temperature Range:
 - -40°C to +85°C

Enhanced Features:

- Programmable Watchdog Timer with dedicated output pin
- High-Speed Digital Event Detect (EVHS) with transition count
- Debounced Low-Speed Event Detect (EVLS)

Device Selection Table:

Part Number	EEPROM (Kbits)	Unique ID
MCP795W10	1	Blank
MCP795W20	2	Blank
MCP795W11	1	EUI-48™
MCP795W21	2	EUI-48™
MCP795W12	1	EUI-64™
MCP795W22	2	EUI-64™

Memory:

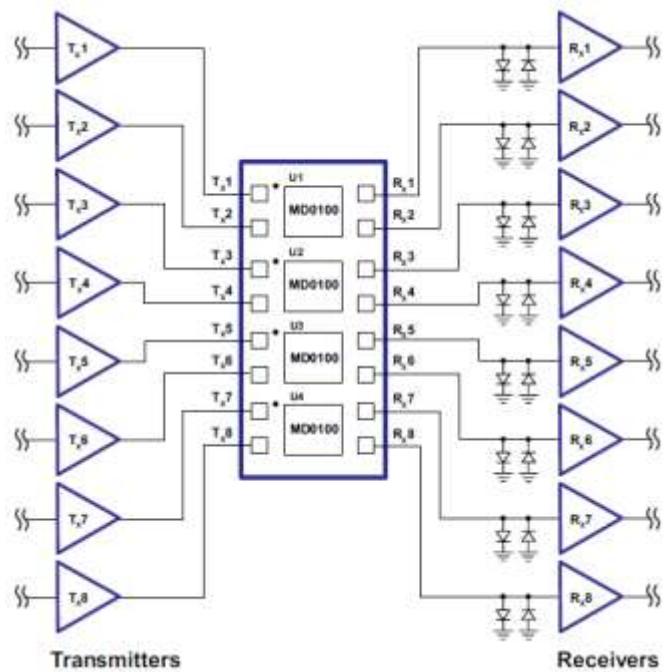
- 64-Byte Battery-Backed SRAM
- 2 Kbit and 1 Kbit EEPROM Memory
- Protected 128-Bit Unique ID memory space:
 - EUI-48™ or EUI-64™ MAC address
 - Custom ID programming

MCP7951X/2X

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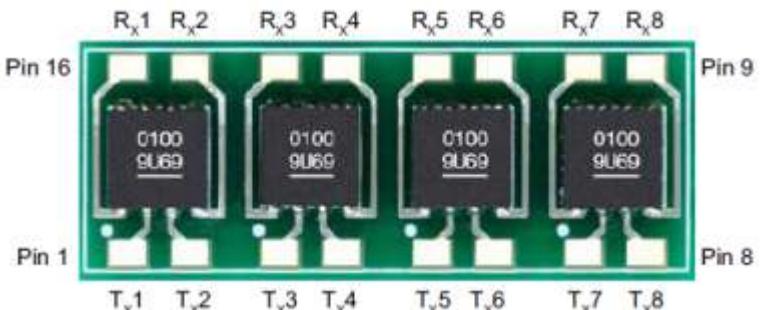
MD0100DB1 Demo Board

The MD0100DB1 demo board contains four MD0100DK6-G dual packages providing 8 T/R switches in the system. There are no other external components on the board. This demo board replaces 8 discrete diode bridge protection circuits. The input of the MD0100DB1 is called TX which is connected to the output of the transmitter, and the output is called RX which is connected to the input of the receiver. The TX and RX are interchangeable. The MD0100DB is especially laid out so that all the inputs are on one side and all the outputs are on other side of the board. It provides for easy replacement on the system for testing.



Products supported

- MD0100


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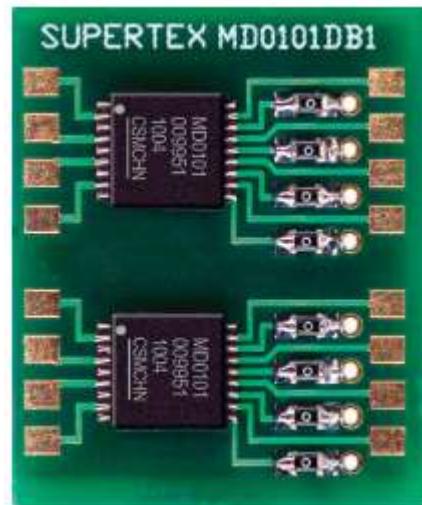


MD0101DB1 Demo Board

The MD0101DB1 demoboard contains two MD0101 packages providing eight T/R switches in the system. This demoboard replaces eight discrete diode bridge protection circuits. The input of the MD0101DB1 is called TX, which is connected to the output of the transmitter, and the output is called RX, which is connected to the input of the receiver. The clamping diodes are integrated between the RX and RGND. There is a 0Ω resistor connected between the RGND and the ground plane of the board. If external diodes are desired, the 0Ω resistor has to be removed and the external diodes can then be connected between the RX and RGND. The MD0101DB1 is especially layed out so that all inputs are on one side and all outputs are on the other side of the board. This provides easy access and replacement on the system for testing.

Products supported

- MD0101

[**<< BACK**](#)

MCP37XXX-200 Evaluation Board

The MCP37xxx-200 VTLA Evaluation Board (ADM00505) provides the opportunity to evaluate the performance of the MCP37xxx-200 Device Families. With the MCP37D31, 200Msps pipelined A/D converter on-board, the user can evaluate the functionality of the 200Msps A/D converters and the digital signal processing features. With the help of a compatible data capture card, the evaluation board can provide the user with performance analysis features through the PC GUI.

For proper operation, this evaluation board must be used with a compatible data capture card.

Products supported

- MCP37D31-200
- MCP3421
- MCP1727

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MCP37XXX Data Capture Card

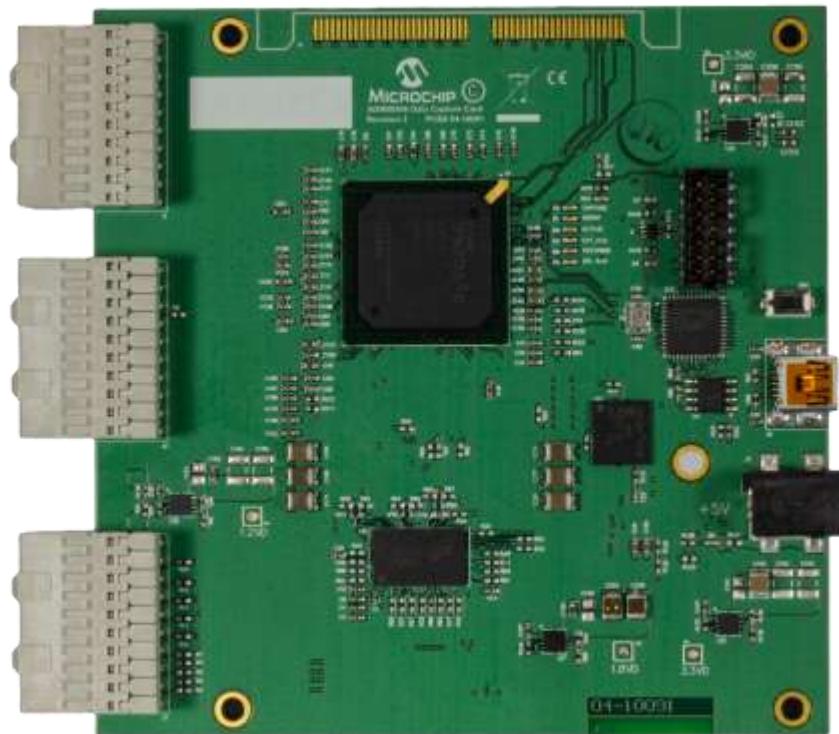
The MCP37xxx Data Capture Card (ADM00506) is an FPGA-based memory buffer for the digital data received from the Analog to Digital Converter (ADC) on board the MCP37xxx Evaluation Boards. The data capture card connects to a PC via a USB cable, providing the user with two functionalities:

- The ability to send user commands directly to the MCP37xxx device using the PC GUI.
- The ability to collect data from the Evaluation Board and send it to the PC GUI.

For proper operation, this data capture card must be used with a compatible evaluation board.

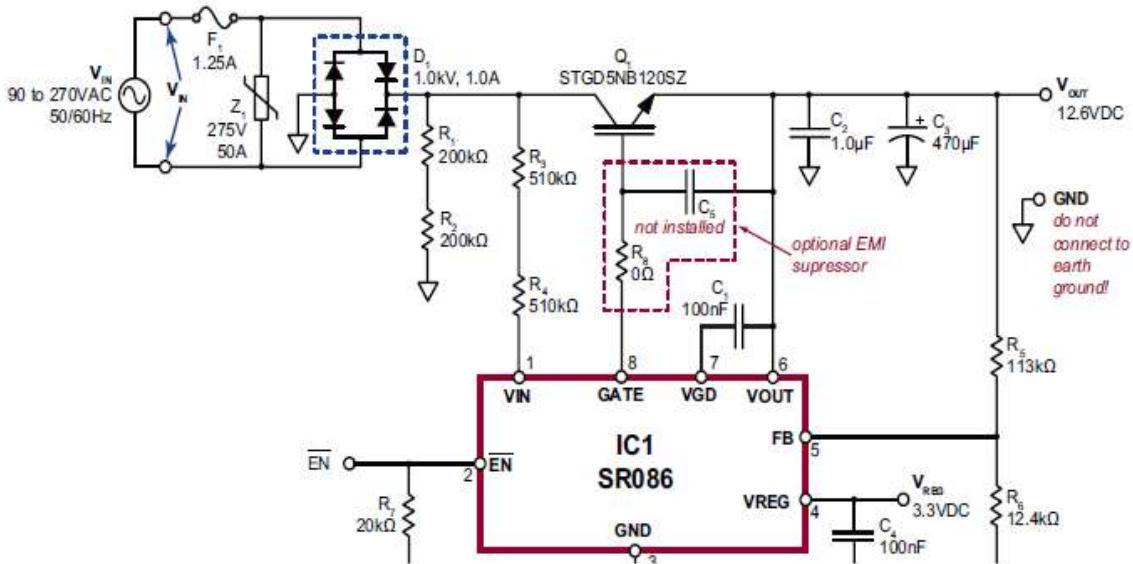
Products supported

- MCP37XXX

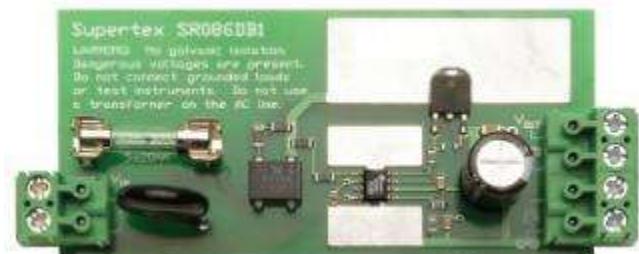
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SR086DB1 Demo Board

The SR086DB1 demoboard is an inductorless switching power supply intended for operation directly from a 120/230VAC line. Two outputs, 12.6V and 3.3V are provided. The operating principle is to turn on a pass transistor when the rectified AC input is below the output voltage, and to turn it off when the output storage capacitor is charged up to the regulation point. Since the output capacitor charges up on the rising edge of a sine wave, reasonable efficiencies can be obtained without the use of magnetics.



Products supported
SR086



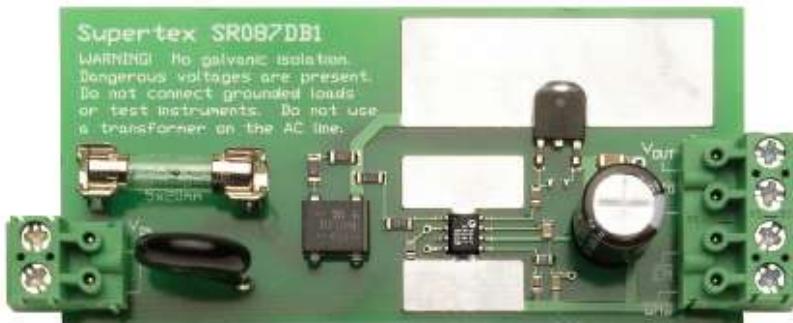
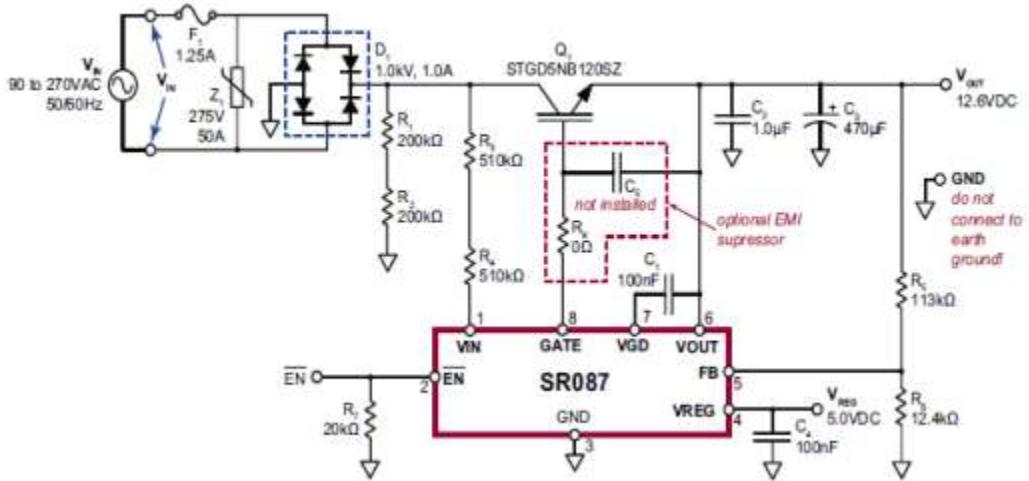
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SR087DB1 Demo Board

Online Info

The SR087DB1 demoboard is an inductorless switching power supply intended for operation directly from a 120/230VAC line. Two outputs, 12.6V and 5.0V are provided. The operating principle is to turn on a pass transistor when the rectified AC input is below the output voltage, and to turn it off when the output storage capacitor is charged up to the regulation point. Since the output capacitor charges up on the rising edge of a sine wave, reasonable efficiencies can be obtained without the use of magnetics.



Products supported

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P/N: SR087DB1

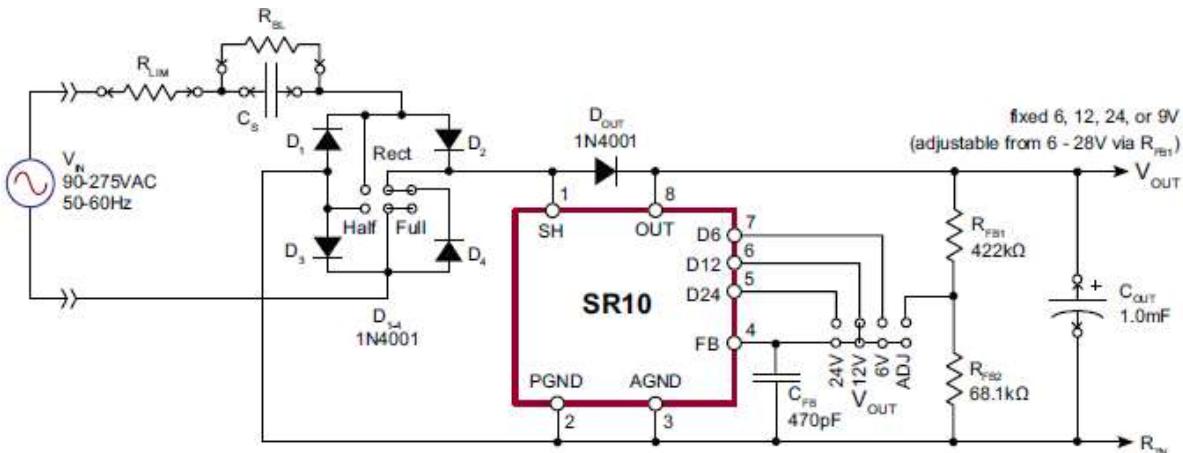


SR10DB1 Demo Board

The SR10 is an inductorless switching power supply controller intended for operation directly from a rectified 120/240VAC line. Due to the capacitor-coupled, switched shunt topology (CCSS), it exhibits low standby power and good efficiency while employing no magnetics nor high voltage electrolytic capacitors. To meet a wide variety of applications, the SR10DB1 is highly configurable. Many components are socketed. Half or full-wave rectification is jumper-selectable. Output voltage is jumper-selectable to 3 fixed voltages or may be set anywhere in the range of 6 - 28V using an on-board feedback divider.

Products supported

- SR10



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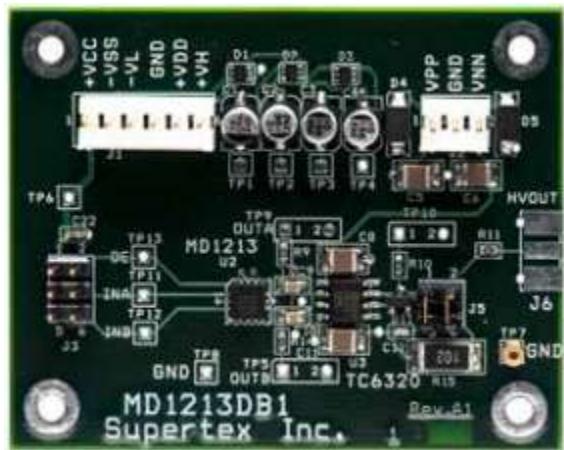
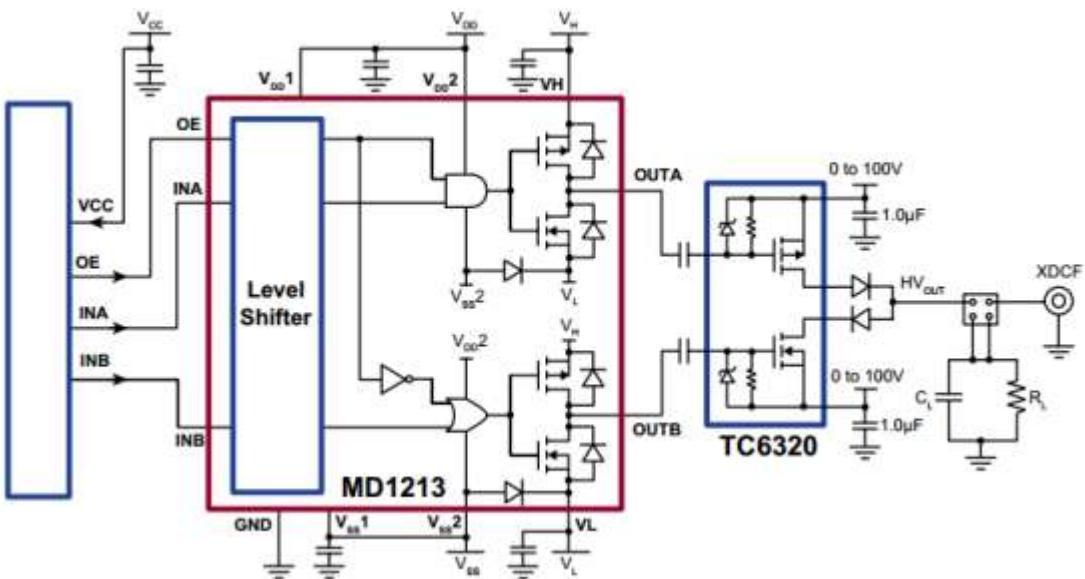
P/N: SR10DB1



MD1213DB1 Demo Board

Online Info

The MD1213DB1 can drive a transducer as a single channel transmitter for ultrasound and other applications. The demoboard consists of one MD1213 combined with TC6320. Logic control inputs INA, INB and OE of the MD1213 are controlled via the six-pin head connector on the board. Due to the fast signal rise and fall time requirement, every ground wire of the ribbon cable must be used to connect from the logic signal source. When OE is enabled, it should receive the same voltage as the logic source circuit's power supply.



Products supported

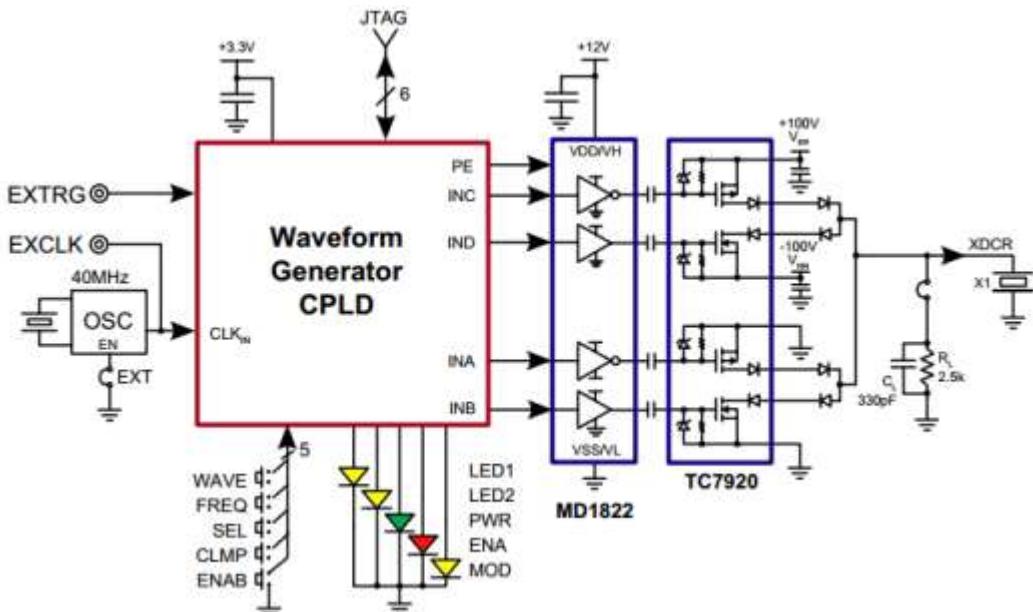
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P/N: MD1213DB1



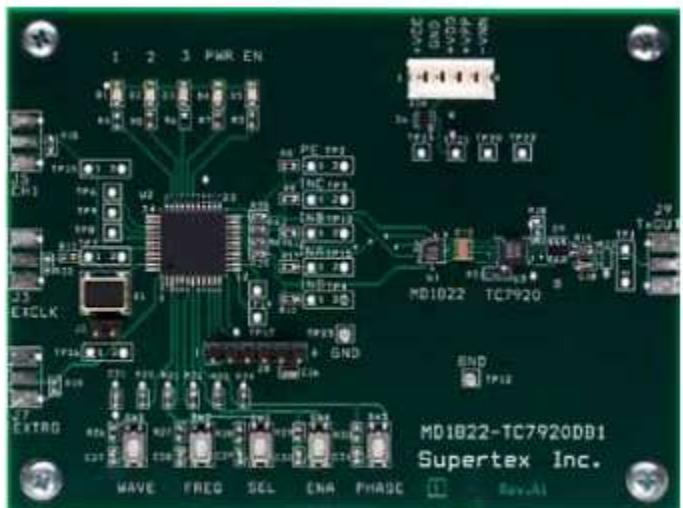
MD1822DB1 Demo Board

The MD1822DB1 is a demoboard for the three level $\pm 100V$ 2.5A pulser chip-set of the MD1822 MOSFET driver and the TC7920 MOSFET. The demoboard consists of one MD1822 in the 3x3 QFN-16 package driving the TC7920 which has two pairs of high speed and high voltage complimentary P- and N-Channel MOSFETs in one 4x4 DFN-8 package. This circuit is an ideal, cost-optimized, high voltage and high current RTZ ultrasound transmit pulser.



Products supported

- MD1822
- TC7920


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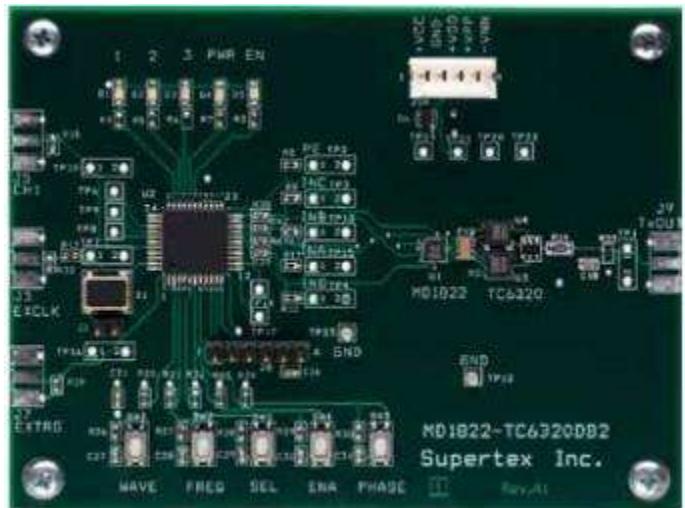
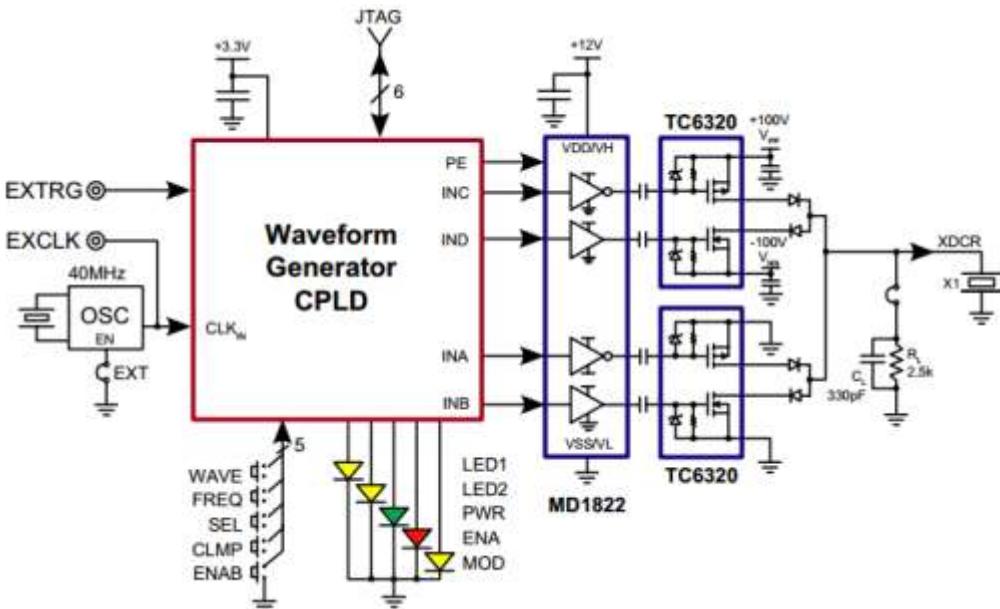


MD1822DB2 Demo Board

The MD1822DB2 is a demoboard for the three level $\pm 100V$ 2.5A pulser chip-set of the MD1822 MOSFET driver and the TC6320 MOSFET. The demoboard consists of one MD1822 in a 3x3mm, 16-lead QFN package driving the TC6320, which has one pair of high speed and high voltage complimentary P- and N-Channel MOSFETs in one 4x4mm, 8-lead DFN package. This circuit is an ideal, cost-optimized, high voltage and high current RTZ ultrasound transmit pulser.

Products supported

- MD1822
- TC6320


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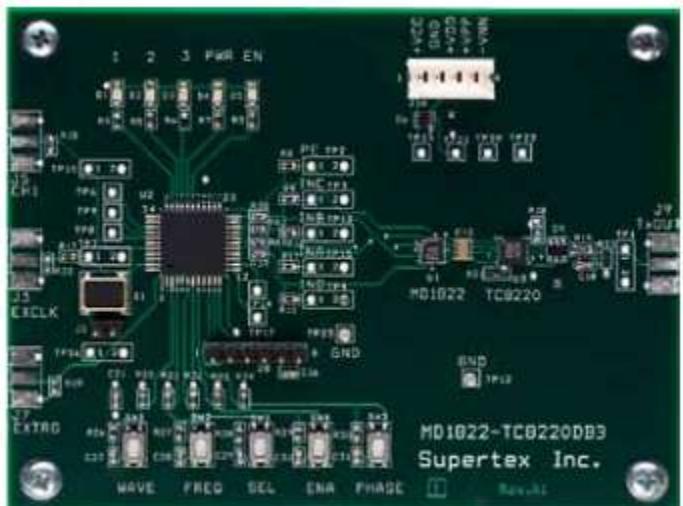
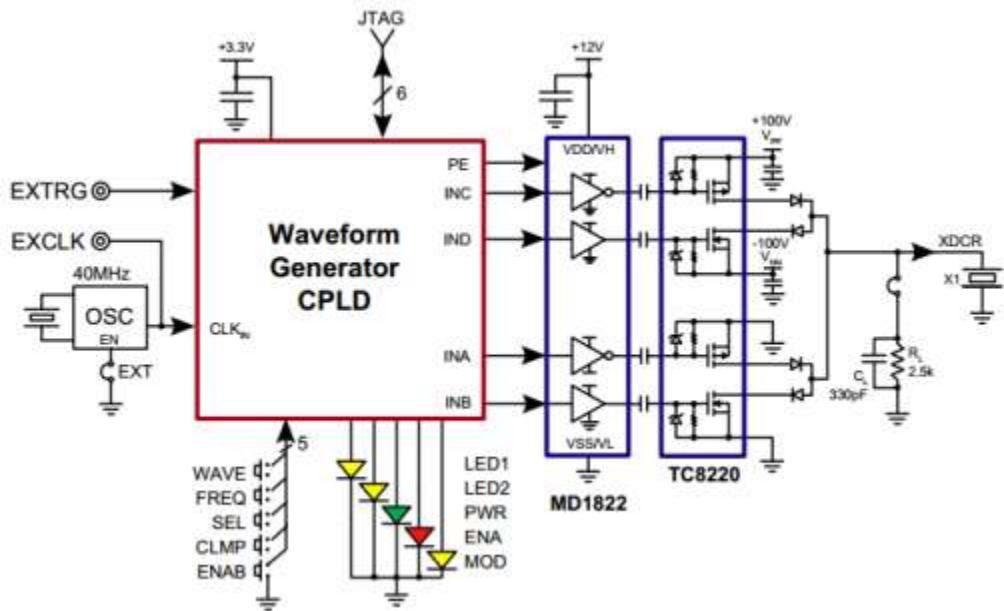


MD1822DB3 Demo Board

The MD1822DB3 is a demoboard for the three level $\pm 100V$ 2.5A pulser chip-set of the MD1822 MOSFET driver and the TC8220 MOSFET. The demoboard consists of one MD1822 in the 3x3mm 16-lead QFN package driving the TC8220 which has two pairs of high speed and high voltage complimentary P- and N-MOSFETs in one 4x4mm, 8-lead DFN package. This circuit is an ideal, cost-optimized, high voltage and high current RTZ ultrasound transmit pulser.

Products supported

- MD1822
- TC8220



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P/N: MD1822DB3



MD1711DB2 Demo Board

The MD1711DB2 demoboard is a five-level, dual-channel, +/-100V, 2.0A, return-to-zero pulser. It can directly drive two 50 or 75Ω impedance transducers for 1.0MHz to 20MHz medical ultrasound imaging or NDT applications.

The MD1711DB2 consists of one MD1711 in a 48-Lead LQFP package driving six TC6320 complementary high voltage MOSFET pairs in 8-Lead SOIC packages. The external logic signal connector, J13, connects all the input control signals of the MD1711 to the user's logic control source via a short ribbon cable. In typical two-, three- or five-level bipolar pulsing, PW or CW waveforms can be generated by the proper input control signal listed below. Jumpers are provided for the output, such that it can drive either the on-board RC load 220pF capacitor in parallel with a 1.0KΩ resistor or with an external load of cable to the user's ultrasound testing transducer.

Products supported

- MD1711
- TC6320

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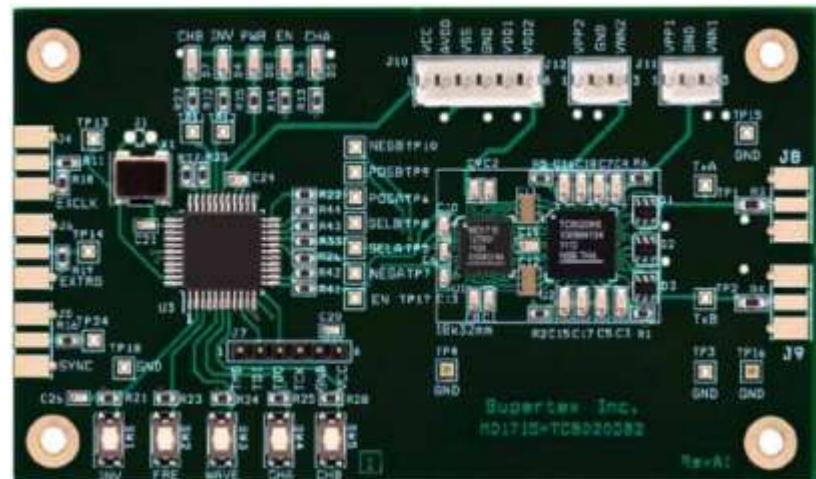
MD1715DB2 Demo Board

The MD1715DB2 demoboard can drive two transducers as a five-level, two channel transmitter for ultrasound and other applications.

The demoboard consists of one MD1715 in a 6x6mm 40-lead QFN package driving 12 high voltage FETs in six TC8020s in one 8x8mm 56-lead QFN package. The CPLD programmable logic circuit 40MHz crystal oscillator generates accurate timing high-speed waveforms on a separate CPL board. There are multiple frequency and waveform combinations that can be selected as bipolar pulse waveforms. External clock input can be used if the on board oscillator is disabled. The external trigger input can be used to synchronize the output waveforms. There are five push buttons for selecting the demo waveform, frequency, phase, mode selection functions. Color LEDs indicate the demo selection states. Jumpers on board for select the SMA connector to the external loads or the 220pF//1k on board dummy load.

Products supported

- MD1715
- TC8020

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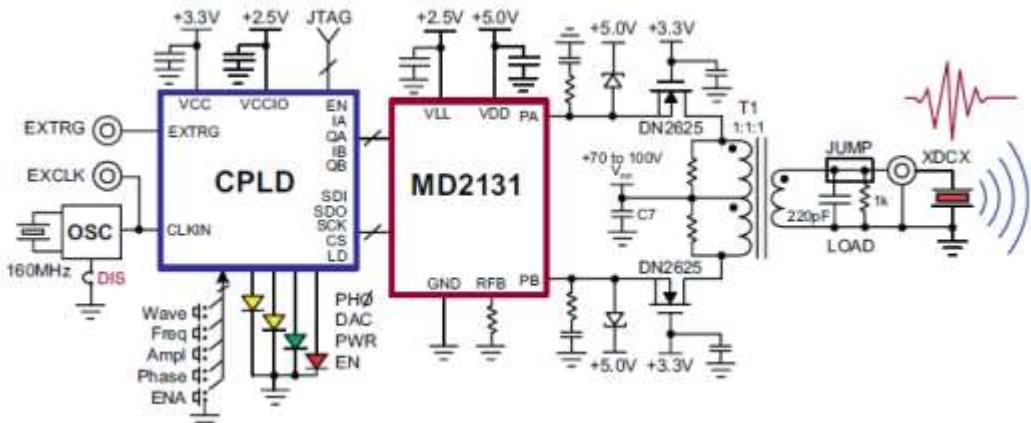


MD2131DB1 Demo Board

The MD2131DB1 demoboard is used to generate the ultrasound transmit beamforming waveform with the Gaussian profile, and the adjustable frequency, amplitude and phase angle. The MD2131DB1 circuit uses two depletion-mode MOSFETs in the push-pull mode to drive the center tapped, wide band, ultrasound output transformer. The sources of the MOSFETs are directly driven by the MD2131's two outputs, whose maximum peak sinking current is up to 3.0A. These current source outputs are controlled by the MD2131's internal angular vector switch matrix and the in-phase and quadrature PWM input signals.

Products supported

- MD2131



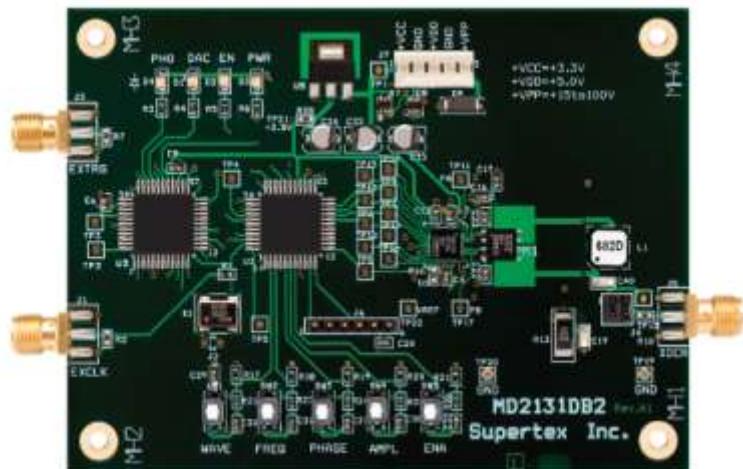
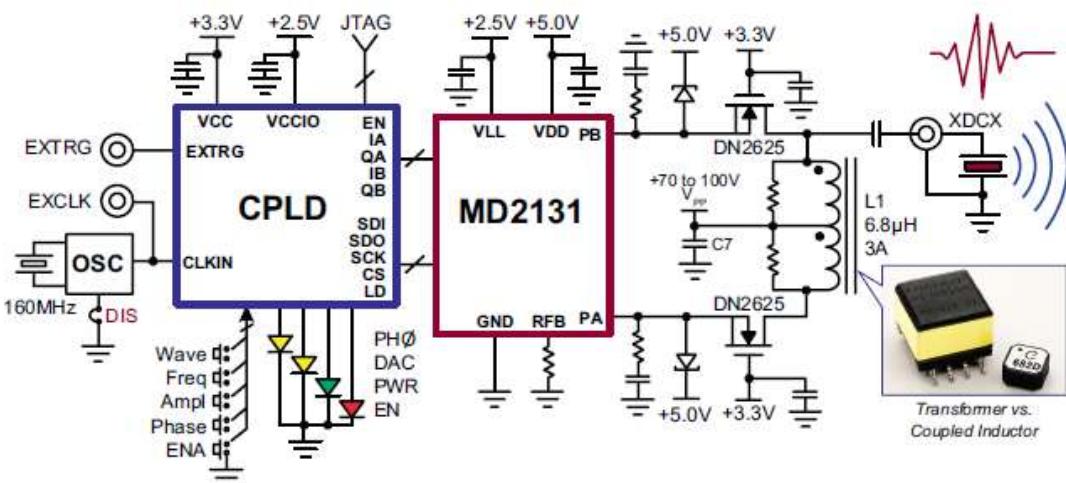
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P/N: MD2131DB1



MD2131DB2 Demo Board

The MD2131DB2 demoboard is used to generate the ultrasound transmit beamforming waveform with the Gaussian profile, and the adjustable frequency, amplitude and phase angle. It also provides information about how to design a user application circuit and PCB using the Supertex MD2131 and DN2625 devices. The MD2131DB2 circuit uses two depletion-mode MOSFETs in the push-pull mode to drive the center tapped, coupled, RF power inductor. The sources of the MOSFETs are directly driven by the MD2131's two outputs, whose maximum peak sinking current is up to 3.0A. These current source outputs are controlled by the MD2131's internal angular vector switch matrix and the in-phase and quadrature PWM input signals.



Products supported

- MD2131

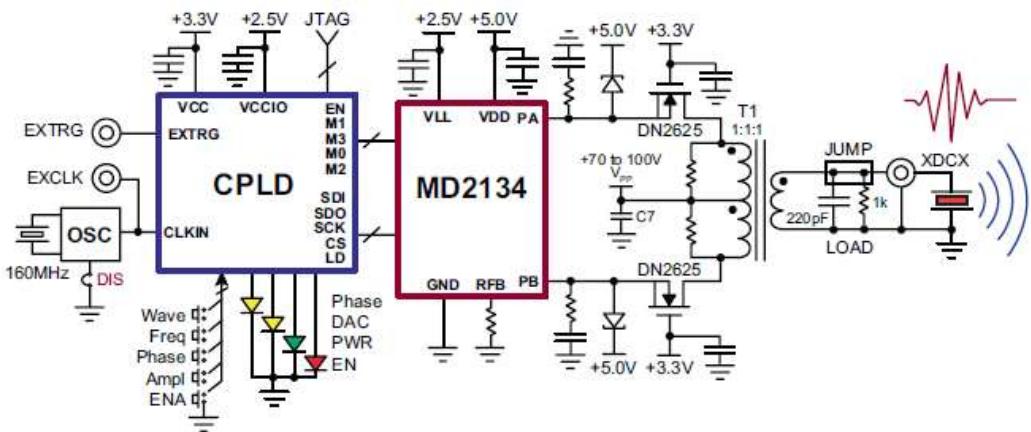
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P/N: MD2131DB2

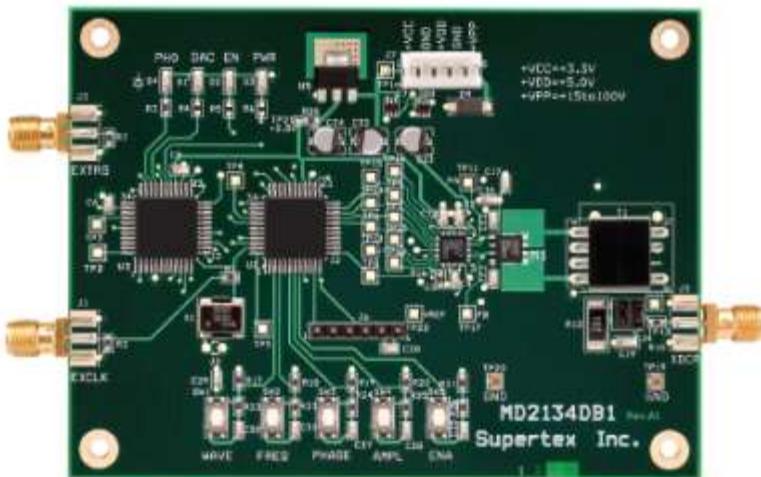


MD2134DB1 Demo Board

The MD2134DB1 demoboard is used to generate the ultrasound transmit beam forming waveform with the Gaussian profile, and the adjustable frequency, amplitude and phase angle. The MD2134DB1 circuit uses a pair of depletion mode, high voltage, DN2625 MOSFETs in the push-pull mode to drive the center-tap wide band ultrasound output transformer. The MOSFETs are in one 8-Lead DFN surface mount package. The sources of the MOSFETs are directly driven by the MD2134's two outputs, whose maximum peak sinking current is up to 3.3A. These current-source outputs are controlled by the MD1234's internal current source switch array and the input signals M[3:0].



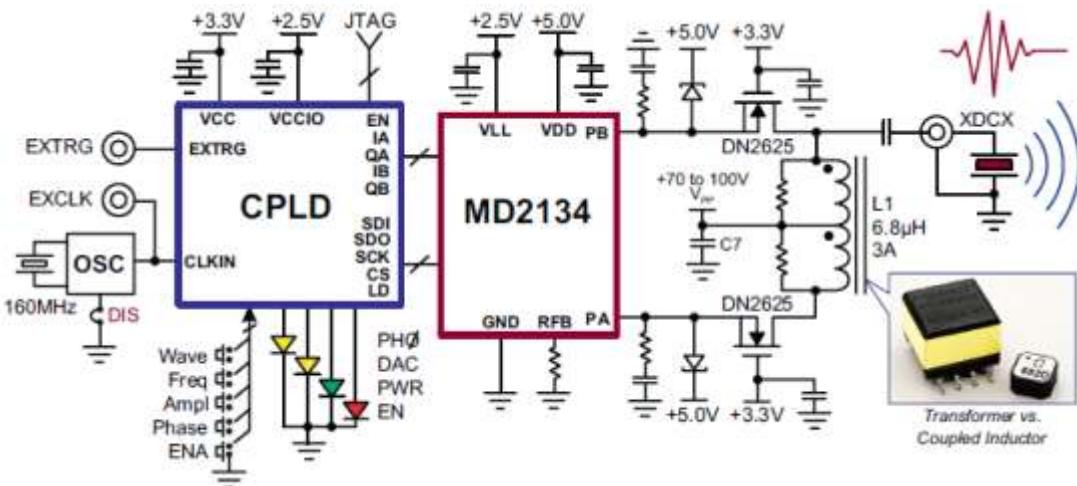
Products supported





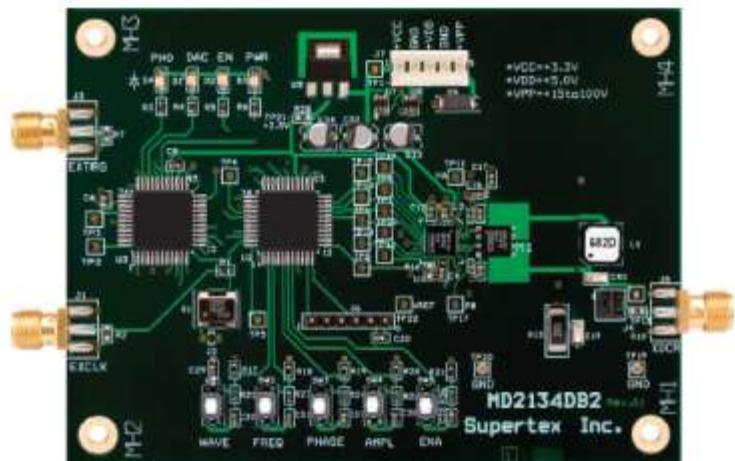
MD2134DB2 Demo Board

The MD2134DB2 demoboard is used to generate the ultrasound transmit beamforming waveform with the Gaussian profile, and the adjustable frequency, amplitude and phase angle. It also provides information on how to design a user application circuit and PCB using the Supertex MD2134 and DN2625 devices. The MD2134DB2 circuit uses two depletion-mode MOSFETs in the push-pull mode to drive the coupled inductor. The sources of the MOSFETs are directly driven by the MD2134's two outputs, whose maximum peak sinking current is up to 3.0A. These current source outputs are controlled by the MD2134's internal array-switch of the fast PAM current sources.



Products supported

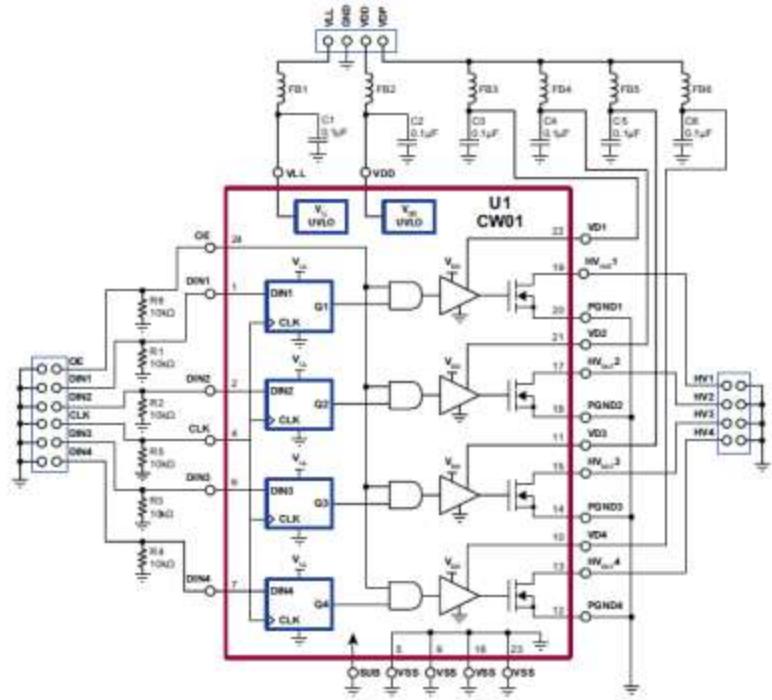
- MD2134



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CW01DB1 Demo Board

The CW01 has 6 logic inputs; OE, CLK, DIN1, DIN2, DIN3, and DIN4. Every logic input has a $10\text{k}\Omega$ pull down resistor. There are 3 power input voltages: VLL, VDD and VDX. VLL is the input logic level, typically 2.5V. VDD is the level translator, typically 5.0V. VDX is the gate drive voltage, and is at the same voltage level as VDD. High peak currents will be drawn from VDX during switching. Each supply has a series ferrite bead and a $0.1\mu\text{F}$ ceramic chip capacitor to keep the supply clean from high frequency noise. There are 4 outputs: HV1, HV2, HV3 and HV4. These are the connections to the drains of 100V, 7.0Ω , N-channel MOSFETs.



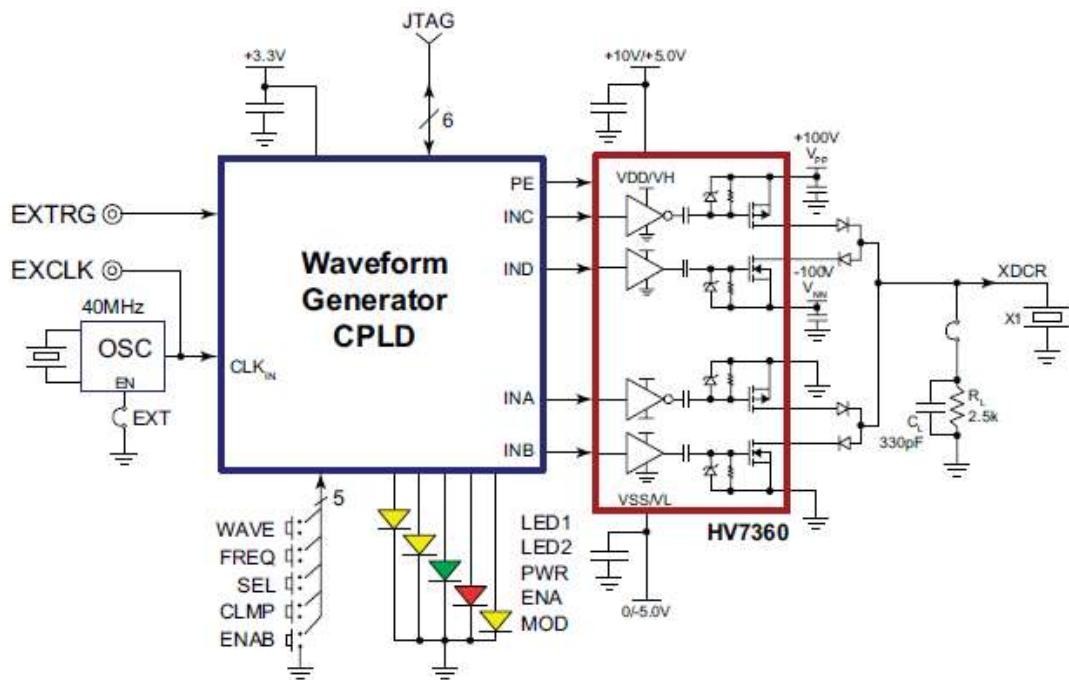
Products supported

- CW01


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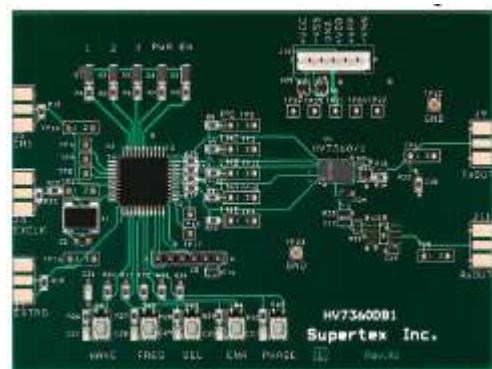
HV7360DB1 Demo Board

The HV7360DB1 is a demoboard for the HV7360, a three level +/-100V 2.5A pulser, with integral MOSFET driver and P&N channel output MOSFETs. The demoboard consists of four channels of high speed matched driver, four gatecoupling capacitors driving two pairs of high speed and high voltage complimentary P- and N-MOSFETs in one 5x7mm, 22-lead LFGA package. This circuit is an ideal, size-optimized, high voltage and high current RTZ ultrasound transmit pulser.



Products supported

- HV7360



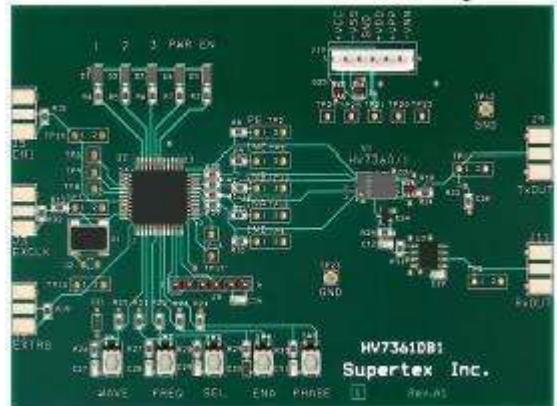
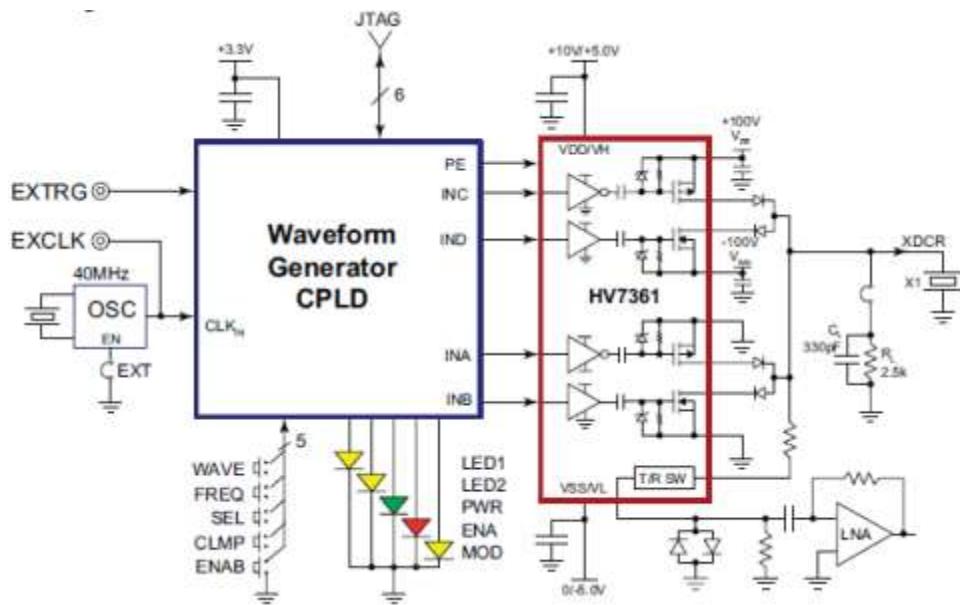
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HV7361DB1 Demo Board

The HV7361DB1 is a demoboard for the HV7361, a three level +/-100V 2.5A pulser, with integral MOSFET driver, P&N channel output MOSFETs and a T/R switch. The demoboard consists of four channels of high speed matched driver, four gate-coupling capacitors driving two pairs of high speed and high voltage complimentary P- and N-MOSFETs in one 5x7mm, 22-lead LFGA package. This circuit is an ideal, sizeoptimized, high voltage and high current RTZ ultrasound transmit pulser.

Products supported

- HV7361



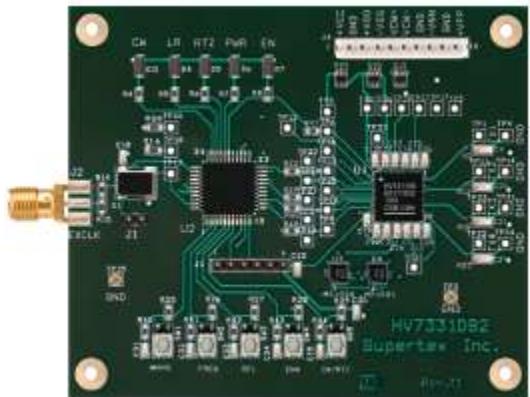
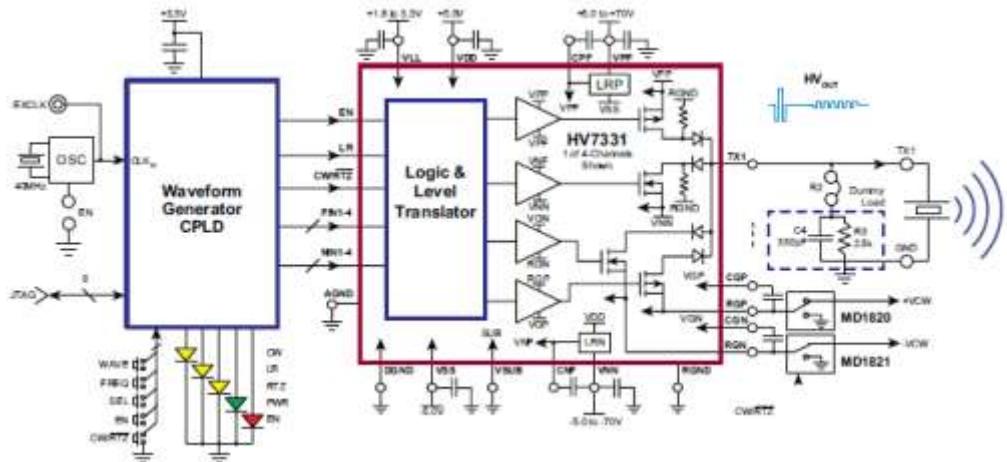
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HV7331DB2 Demo Board

The HV7331DB2 demoboard is used to generate the basic high voltage pulse waveform as an ultrasound transmitting pulser. The HV7331DB2 output waveforms can be displayed directly by using an oscilloscope connected with the scope probe to the test points TX1~4 and GND. The soldering jumper can select whether or not to connect the onboard dummy-load, a 330pF capacitor paralleling with a $2.5\text{k}\Omega$ resistor. The test points can be used to connect the user's transducer to easily evaluate the pulser.

Products supported



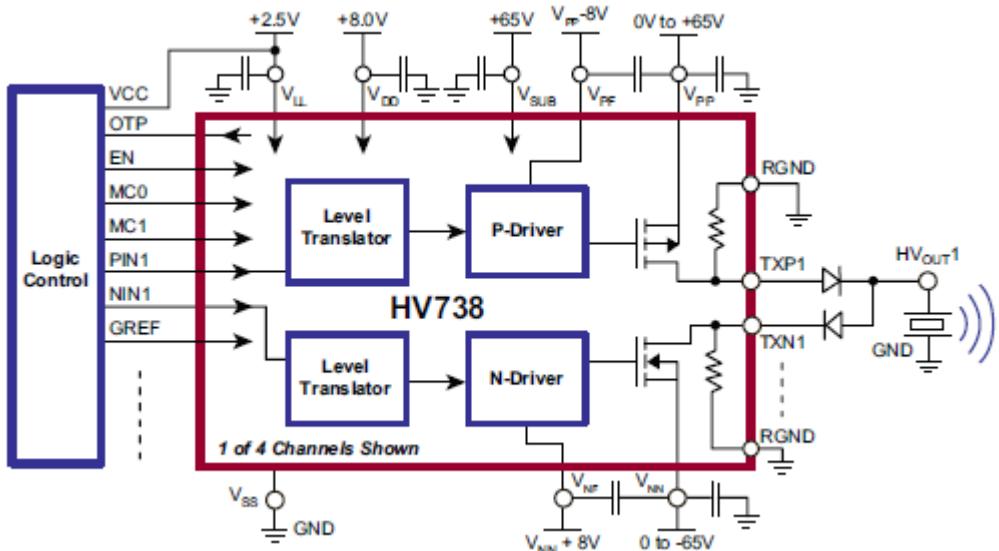
P/N: HV7331DB2

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HV738DB1 Demo Board

The HV738DB1 demoboard is used to generate the basic high voltage pulse waveform as an ultrasound transmitting pulser. The HV738 circuit uses the DC coupling method in all level translators. There are no external coupling capacitors needed. The VPP and VNN rail voltages can be changed rather quickly, compared to a high voltage capacitor gate coupled driving pulser. This direct coupling topology of the gate drivers not only saves two high voltage capacitors per channel, but also makes the PCB layout easier.



Products supported

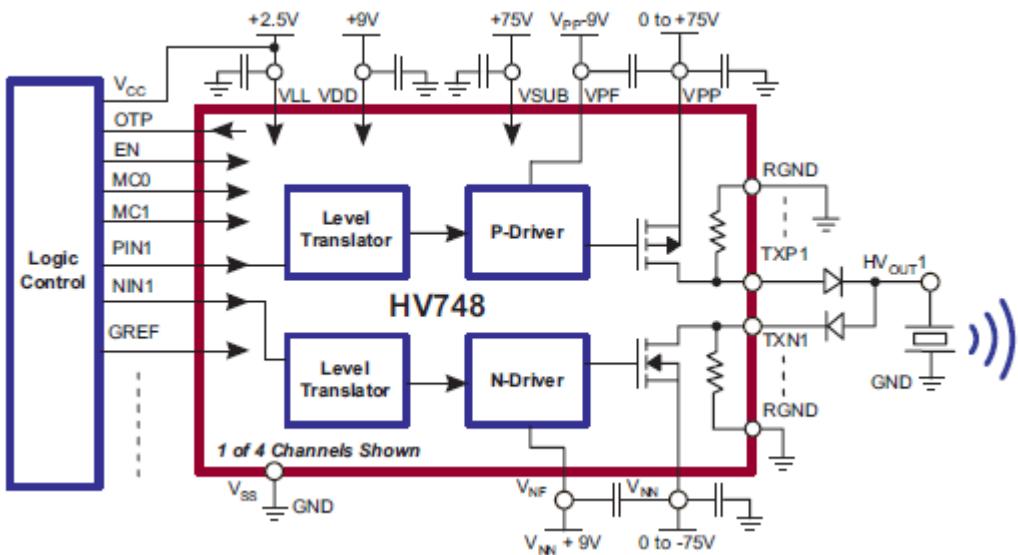
- HV738



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HV748DB1 Demo Board

The HV748DB1 demoboard is used to generate the basic high voltage pulse waveform as an ultrasound transmitting pulser. The HV748 circuit uses the DC coupling method in all level translators. There are no external coupling capacitors needed. The VPP and VNN rail voltages can be changed rather quickly, compared to a high voltage capacitor gate coupled driving pulser. This direct coupling topology of the gate drivers not only saves two high voltage capacitors per channel, but also makes the PCB layout easier.



Products supported
HV748

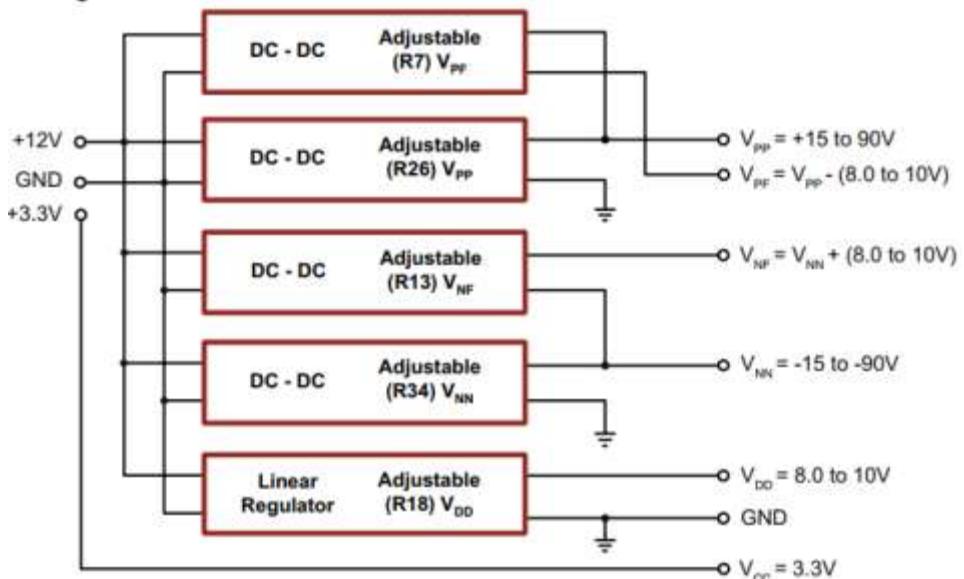


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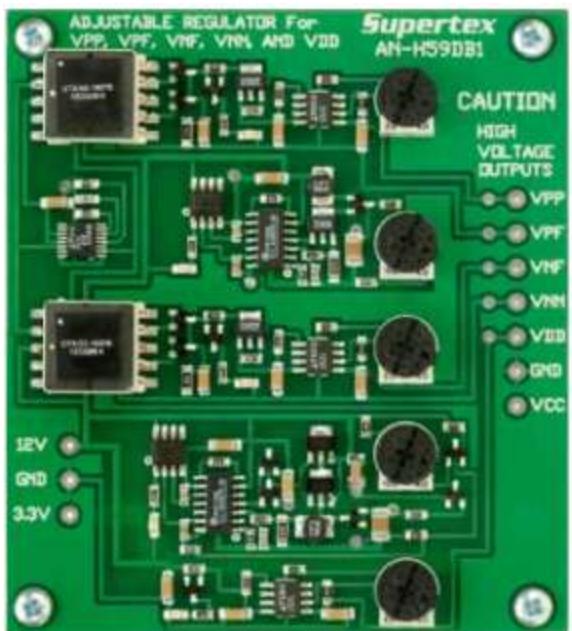
AN-H59DB1 Demo Board

The AN-H59DB1 is a high voltage DC/DC converter power supply demoboard designed to provide the required voltages needed for the HV738DB1 or HV748DB1 ultrasound transmitter demo boards. It generates five output voltages from the 12V input.



Products supported

- HV738
- HV748

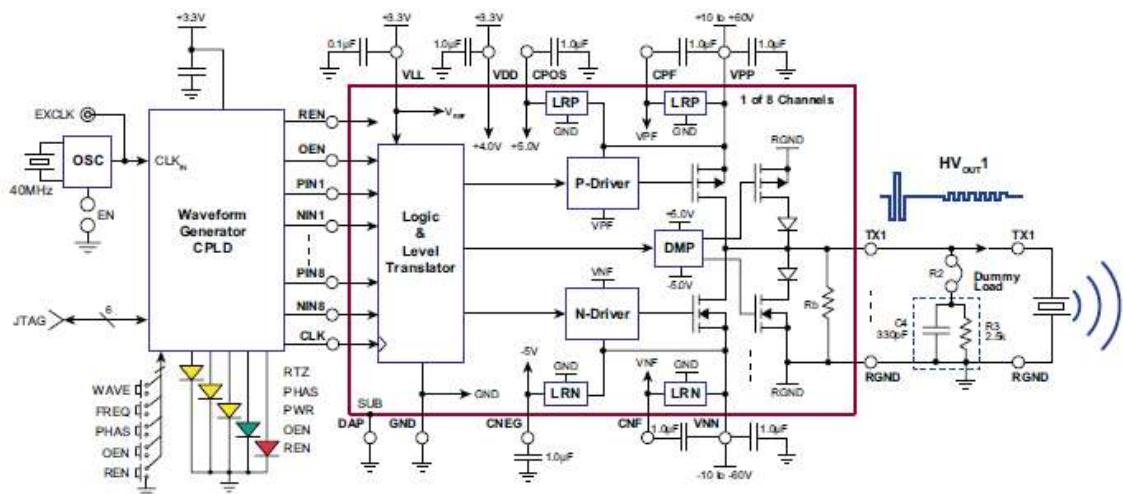


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HV7350DB1 Demo Board

The HV7350DB1 demoboard is used to generate the basic high voltage pulse waveform as an ultrasound transmitting pulser. The HV7350 circuit uses DC coupling from a 3.3V logic input to output Tx1~8 internally, therefore the chip needs three sets of voltage supply rails: VLL +3.3V, VDD +5.0V and VPP/VNN ±10 to ±60V. The VPP and VNN rail voltages can be changed rather quickly, compared to the capacitor gatecoupled driving pulsers. This direct coupling topology of the gate drivers not only saves two high voltage capacitors per channel, but also makes the PCB layout easier.



Products supported

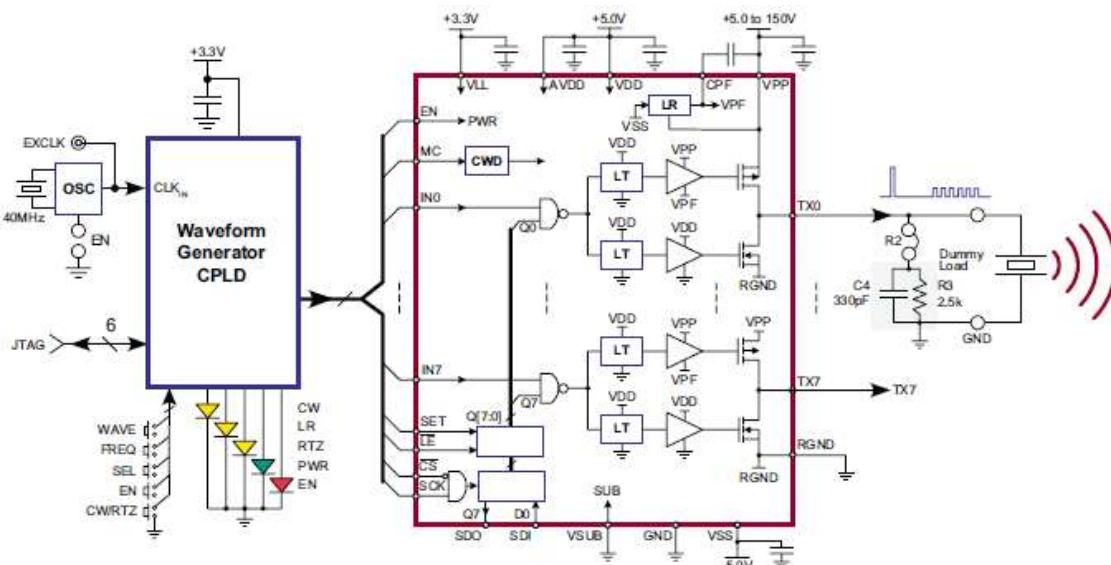
HV7350



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HV7355DB1 Demo Board

The HV7355DB1 demoboard is used to generate the basic high voltage pulse waveform as an ultrasound transmitting pulser. The HV7355 circuit uses DC-coupling from a 3.3V logic input to output TX0~7 internally, therefore the chip needs three sets of voltage supply rails: VLL (+3.3V), VDD/VSS (+/-5.0V) and VPP (up to +150V). The VPP high voltage supply can be changed rather quickly, compared to the capacitor gatecoupled driving pulsers. This direct coupling topology of the gate drivers not only saves two high voltage capacitors per channel, but also makes the PCB layout easier.



Products supported

- HV7355


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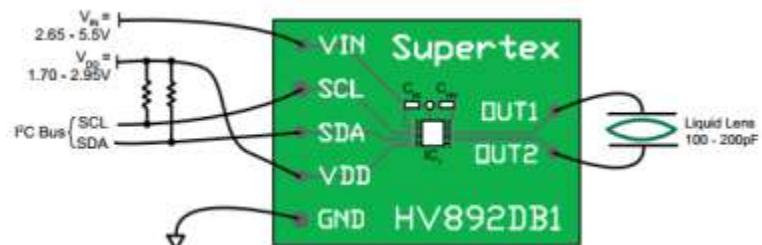
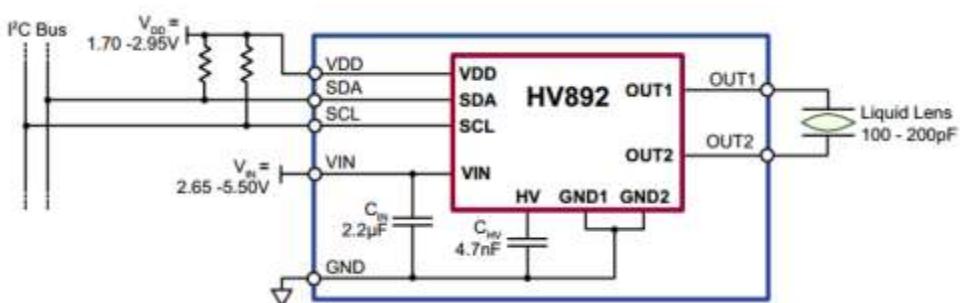


HV892DB1 Demo Board

The HV892DB1 liquid lens driver demoboard is controlled via an I²C interface, is capable of driving capacitive loads of up to 200pF, and is compatible with 40VRMS to 60VRMS lenses. A charge pump boost converter integrated on-chip provides the high voltage necessary for driving the lens. No external inductors or diodes are needed. The board requires only two ceramic chip capacitors to complete a lens driver circuit. An H-bridge output stage provides AC drive to the lens, allowing the use of a single high voltage boost converter while providing alternating polarity to the lens. Controlled rising and falling edges on the drive waveform reduces EMI.

Products supported

- HV892

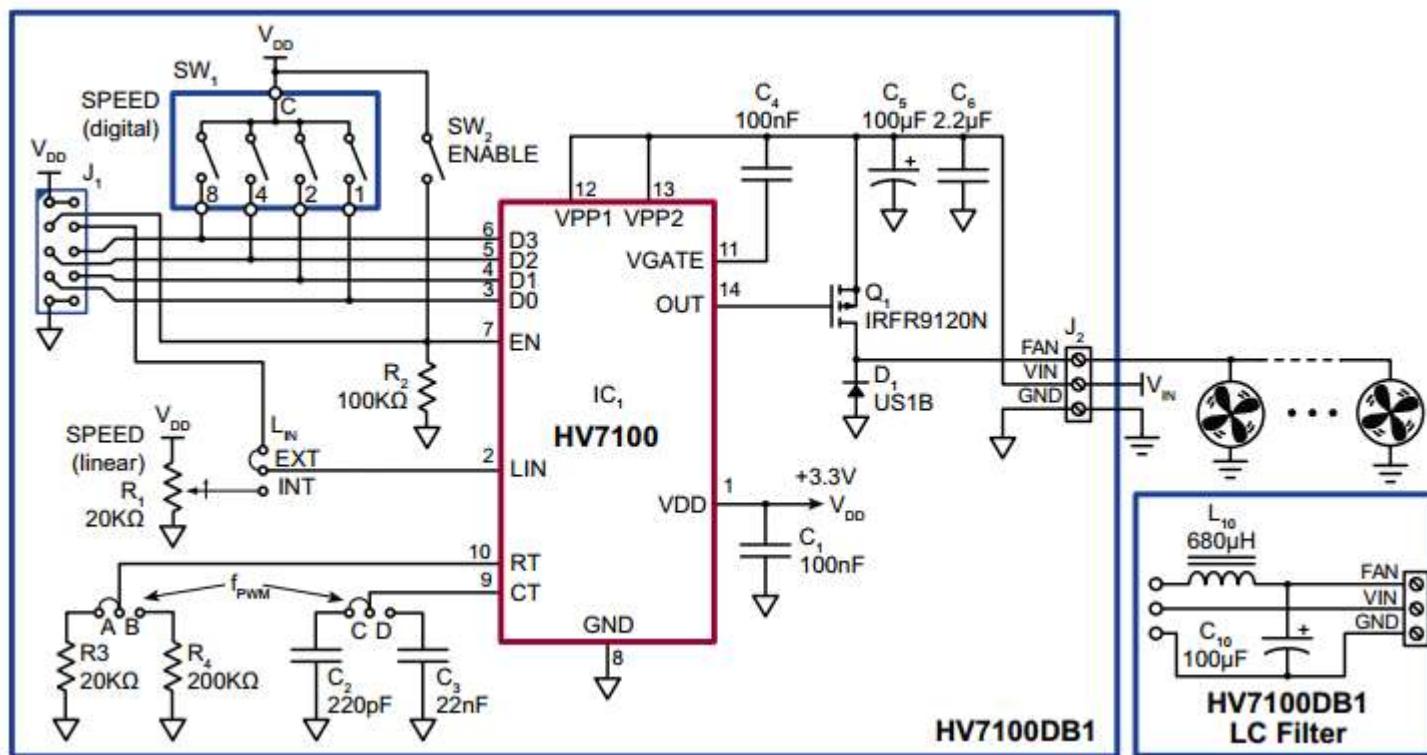

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HV7100DB1 Demo Board

The HV7100DB1 is a fan controller/driver designed to operate from +24 or +48V supplies. Fan speed is controlled by pulse width modulating the supply voltage provided to the fans. For fans that do not work properly with a PWM supply, an included daughter board contains an LC filter for converting the pulse width modulated output of the main board to a DC output voltage.

Products supported

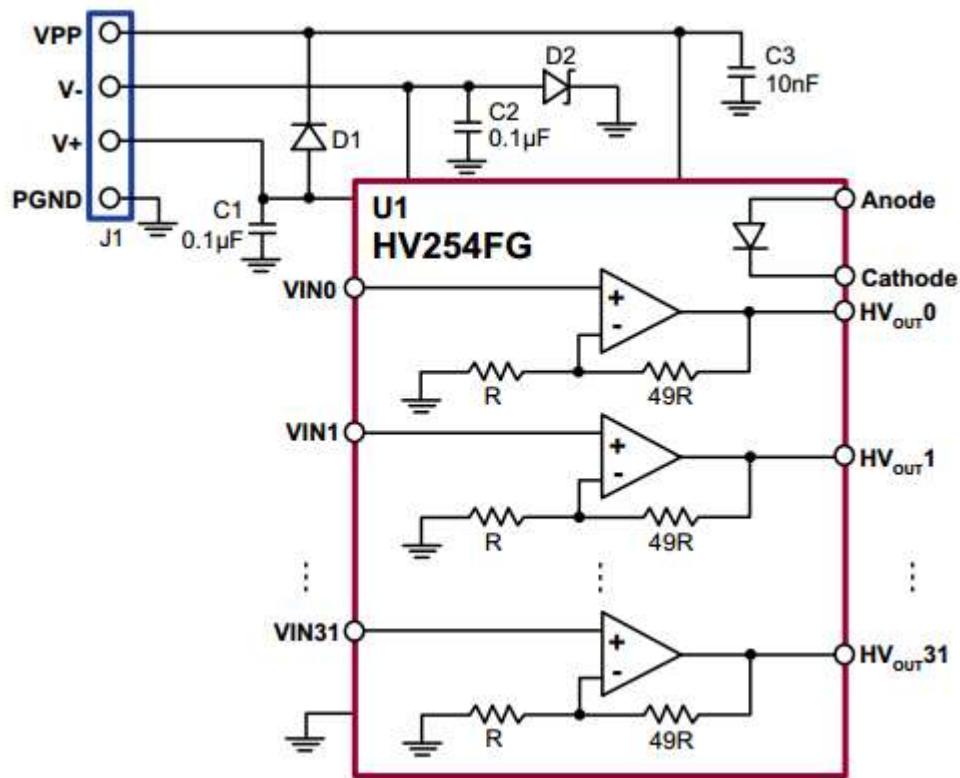
- HV7100



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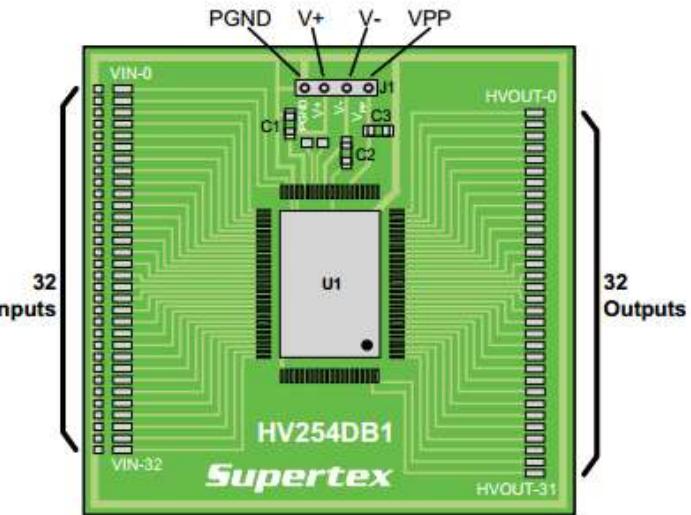
HV254DB1 Demo Board

The HV254DB1 is a 32-channel 250V amplifier array with a nominal gain of 50V/V. The HV254DB1 provides a means to easily evaluate the HV254FG device. A high voltage supply, VPP, and two low voltage supplies, V+ and V-, are required. These connections can be made via the J1 header provided on the board. There are 32 pads on the left side of the board for the input signals and 32 pads on the right for the outputs.



Products supported

□ HV254

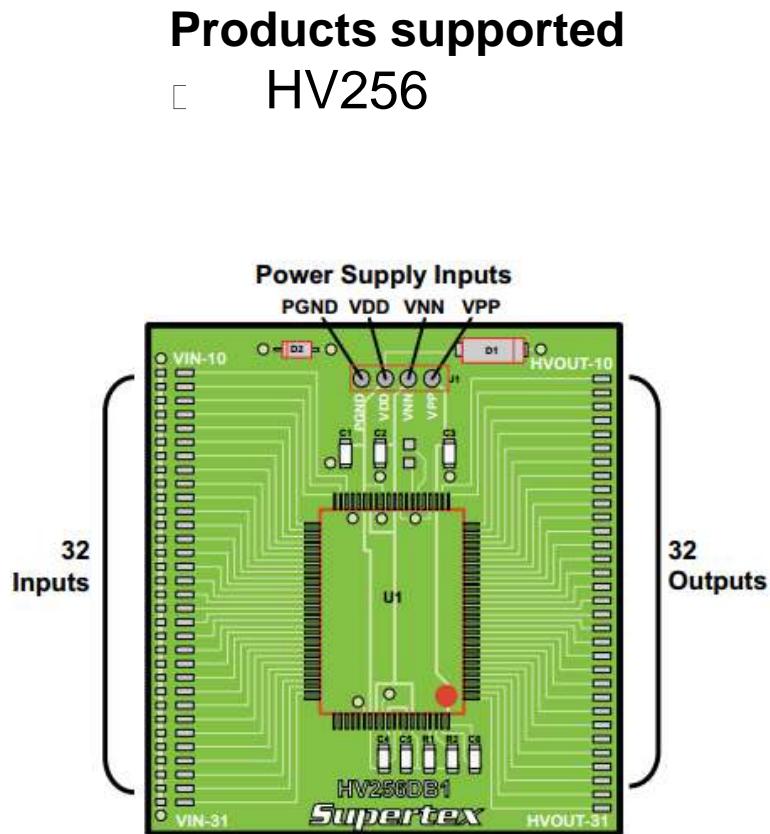
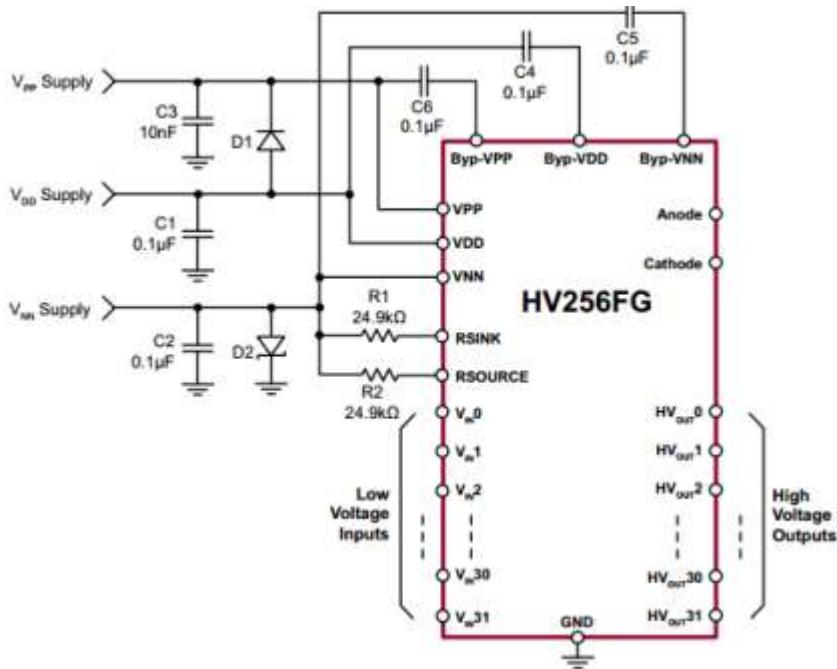


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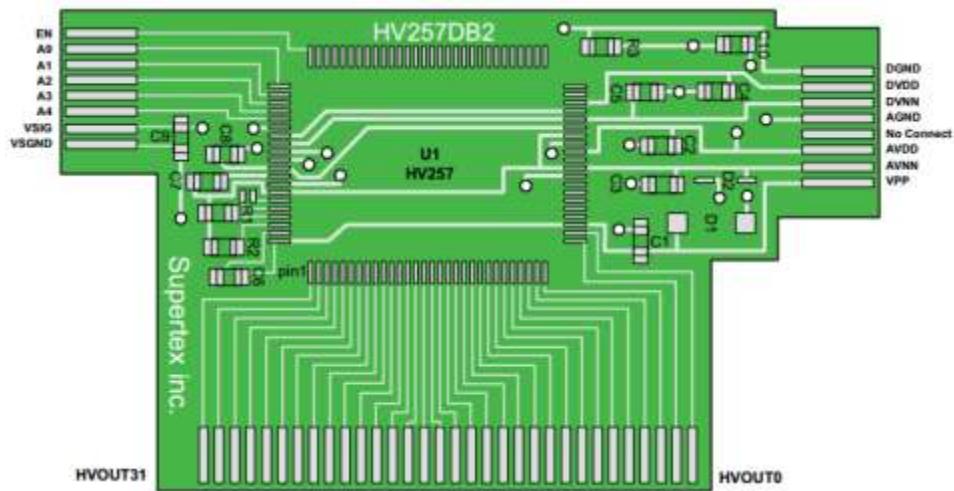
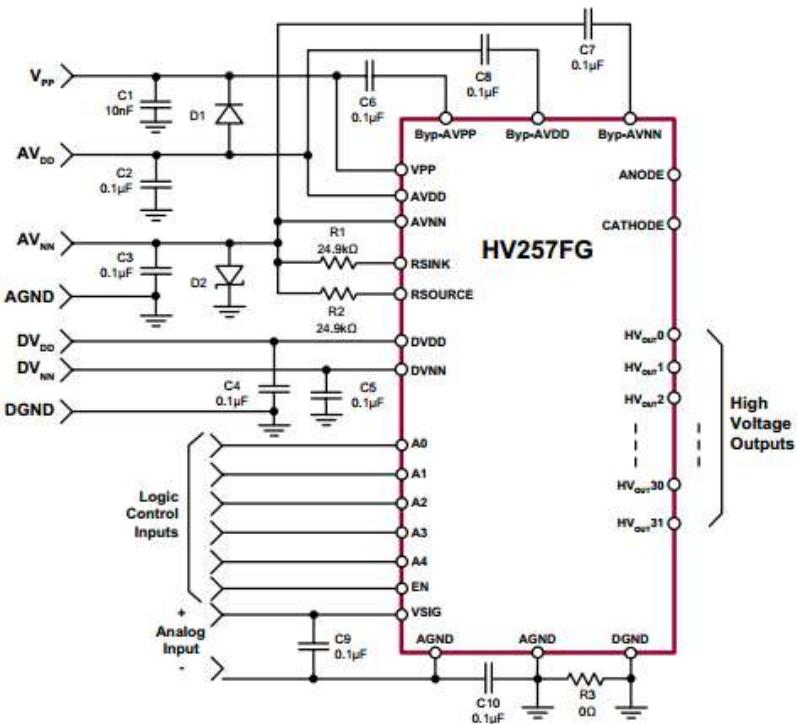
HV256DB1 Demo Board

The HV256DB1 is a 32-Channel 295V amplifier array with a nominal gain of 72V/V. The purpose of the HV256DB1 is to provide a means to easily evaluate the HV256FG device. A high voltage supply, VPP, and two low voltage supplies, VDD and VNN, are required. These connections can be made via the J1 header provided on the board. There are 32 pads on the left side of the board for the input signals and 32 pads on the right for the outputs.


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HV257DB2 Demo Board

The HV257DB2 is a 32-Channel, 295V, sample and hold amplifier array with a nominal gain of 72V/V. The purpose of the HV257DB2 is to provide a means to easily evaluate the HV257FG device. A high voltage supply, VPP, and four low voltage supplies, AVDD and DVDD, AVNN and DVNN, are required. Referring to the demo board drawing shown below, the logic and VSIG connections are on the left, the high voltage outputs are on the bottom, and the supplies are on the right.

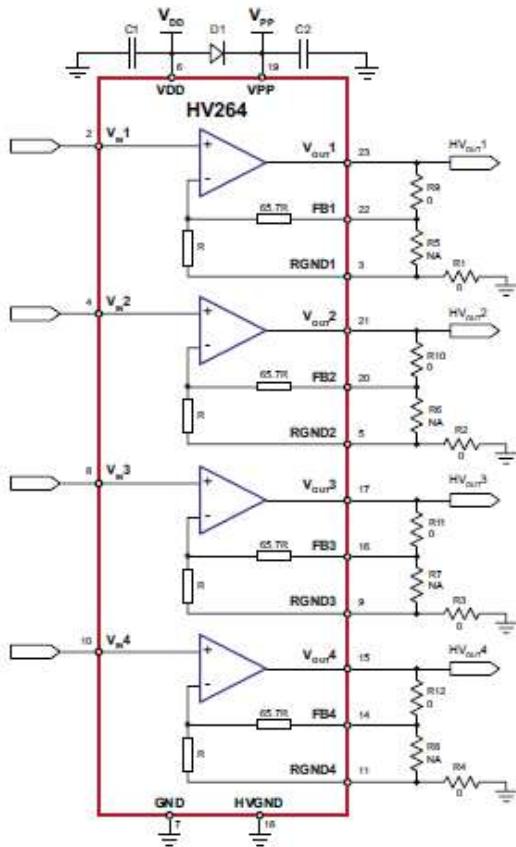


Products supported
 HV257

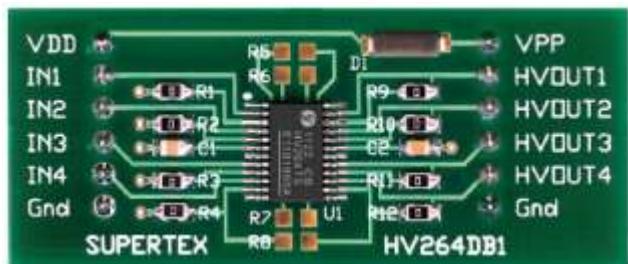
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HV264DB1 Demo Board

The HV264TS-G is a quad high voltage amplifier array device in a 24-pin TSSOP package. The HV264DB1 demo board provides a platform to evaluate this device. This demoboard requires only a minimum setup including a VDD low voltage supply, a VPP high voltage supply, and a signal source. The demoboard provides the input/output connections through two 6-pin headers.



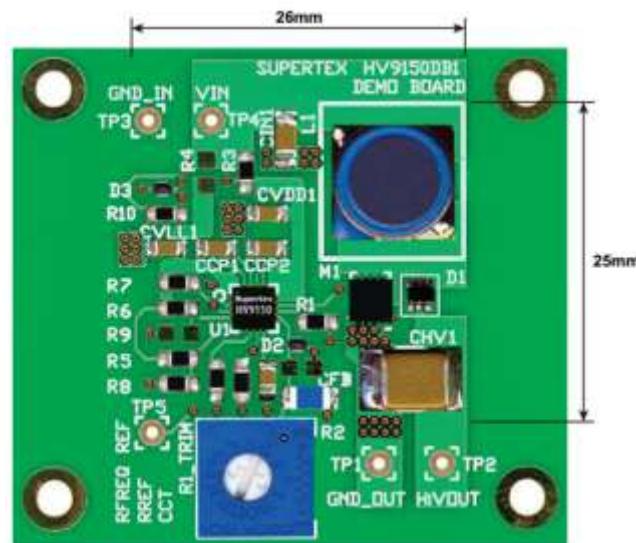
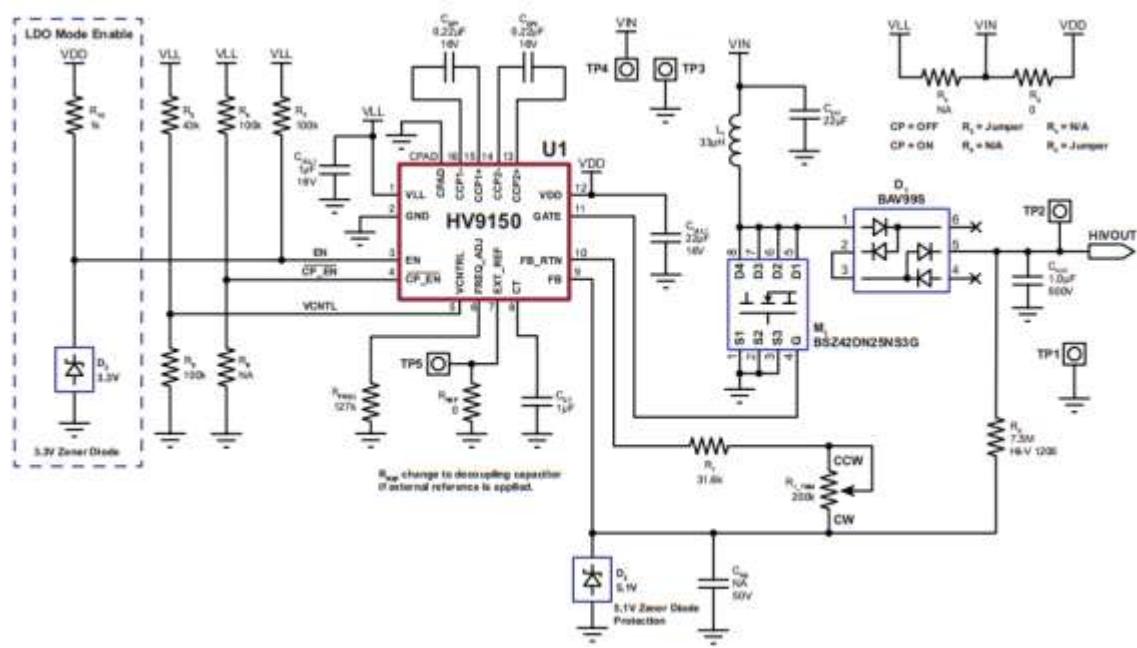
Products supported
HV264TS-G


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HV9150DB1 Demo Board

The HV9150DB1 demoboard is for the evaluation of the HV9150 hysteretic DC/DC controller. This demoboard consists of all necessary components to create a 5V to 200V step up converter capable of providing 600mW of output power. This DC/DC converter has a single voltage input and a single voltage output. The demoboard is configured to use the internal voltage reference. In addition, the user also has access to an external voltage reference pin if it is preferred. The output voltage can be adjusted from 50V to 200V by adjusting the potentiometer next to the output terminals. The potentiometer is used in the resistor feedback network for demonstration purposes.



Products supported

- █ HV9150K6-G

P/N: HV9150DB1

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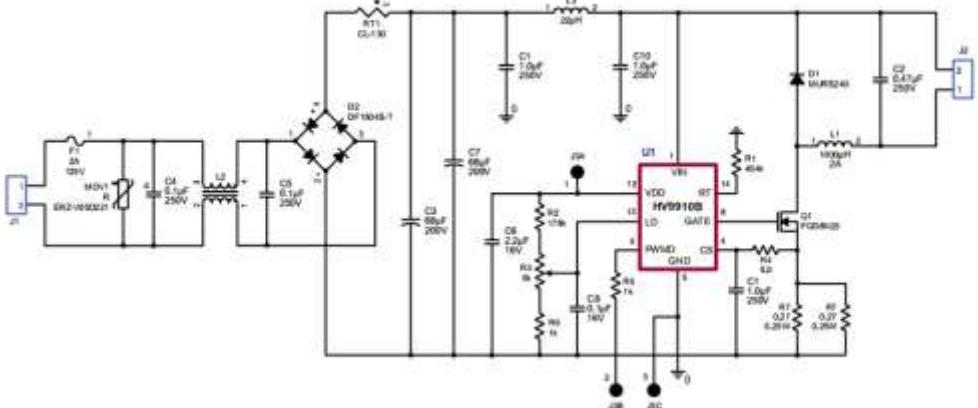


HV9910BDB1 Demo Board

The HV9910BDB1 demoboard is an offline, high current LED driver designed to drive a 40V LED string at 1.4A from a 110V input. The demoboard uses HV9910B LED driver IC to drive a buck converter.

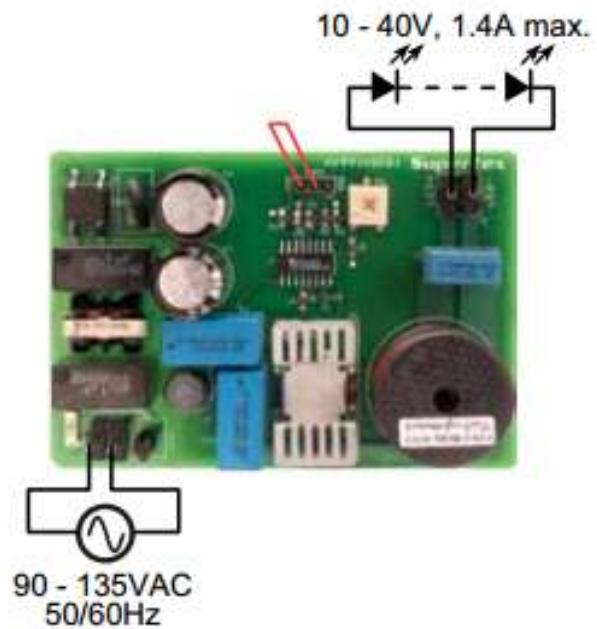
The HV9910BDB1 has a typical full load efficiency of 88%, with the buck converter efficiency (excluding the diode bridge rectifier and EMI filter) at 93%. The demoboard also meets CISPR-15 conducted EMI standards.

The output current can be adjusted in two ways – either with linear dimming using the onboard potentiometer or with PWM dimming by applying a TTL-compatible square wave signal at the PWMD terminal. Using linear dimming, the output current of the HV9910DB1 can be lowered to about 0.1A (note: zero output current can be obtained only by PWM dimming).



Products supported

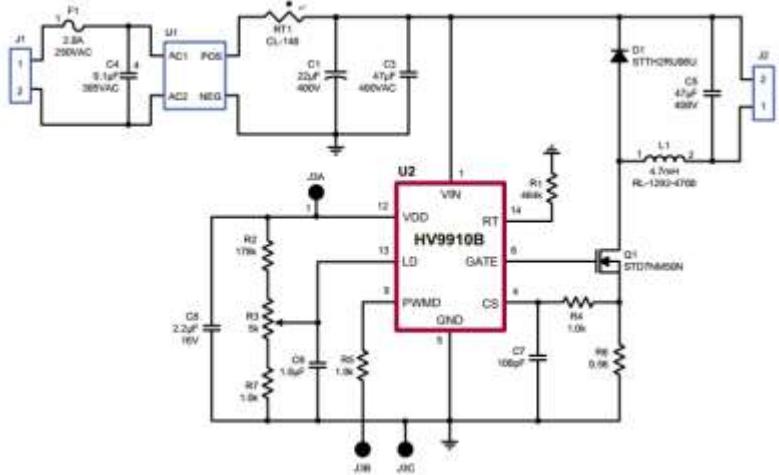
HV9910BNG-G





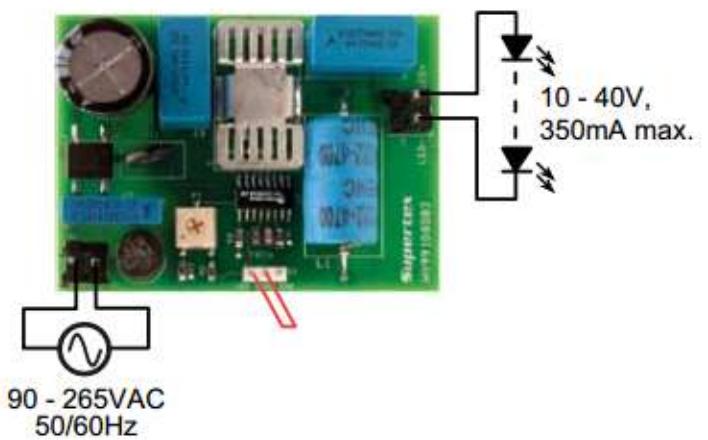
HV9910BDB2 Demo Board

The HV9910BDB2 demoboard is a high brightness LED power driver to supply a string of LEDs using the HV9910B IC from a universal AC input. The HV9910BDB2 can supply a maximum output current of 350mA to drive 10 - 40V LED strings from a wide input voltage - 90 to 265VAC, 50/60Hz. The power conversion stage of the HV9910BDB2 consists of a diode bridge rectifier, followed by a current-controlled buck converter operating at a switching frequency of 50kHz. The nominal output current of the demoboard can be adjusted to any value between 30 and 350mA using the on-board trimming potentiometer. PWM dimming can be achieved by applying a pulse-width-modulated square wave signal between the PWMD and GND pins. Zero output current can be obtained only by PWM dimming. The HV9910BDB2 is not CISPR-15 compliant. Additional filtering is required to make the board meet CISPR-15 limits.



Products supported

- HV9910BNG-G



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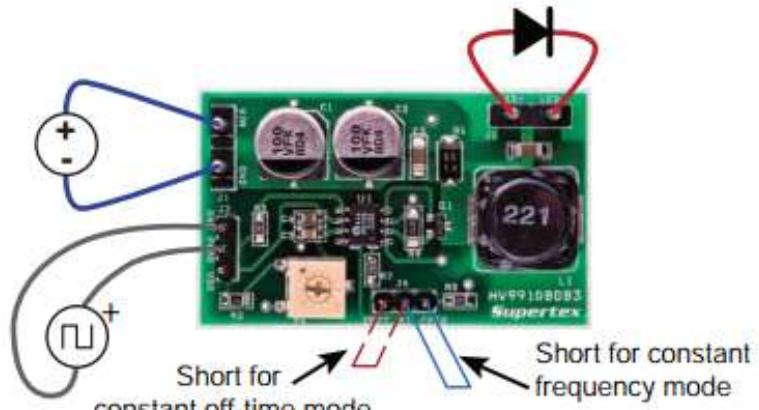
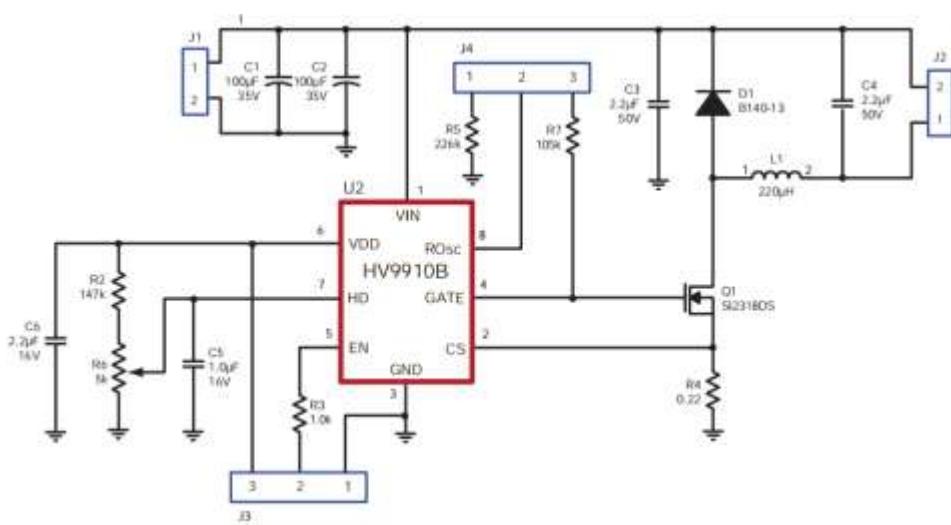


HV9910BDB3 Demo Board

Online Info

The HV9910BDB3 demoboard is a high current LED driver designed to drive one LED or two LEDs in series at currents up to 1.0A from a 10 – 30VDC input. The demoboard uses HV9910B Universal LED driver IC to drive a buck converter. The HV9910BDB3 can be configured to operate in either a constant frequency mode (for driving a single LED) or in a constant off-time mode (for driving two LEDs). The output current can be adjusted in two ways – either with linear dimming using the onboard potentiometer or with PWM dimming by applying a TTL – compatible square wave signal at the PWMD terminal. Using linear dimming, the output current of the HV9910DB1 can be lowered to about 0.01A (note: zero output current can be obtained only by PWM dimming).

Products supported



Short for
constant off-time mode

Short for constant frequency mode

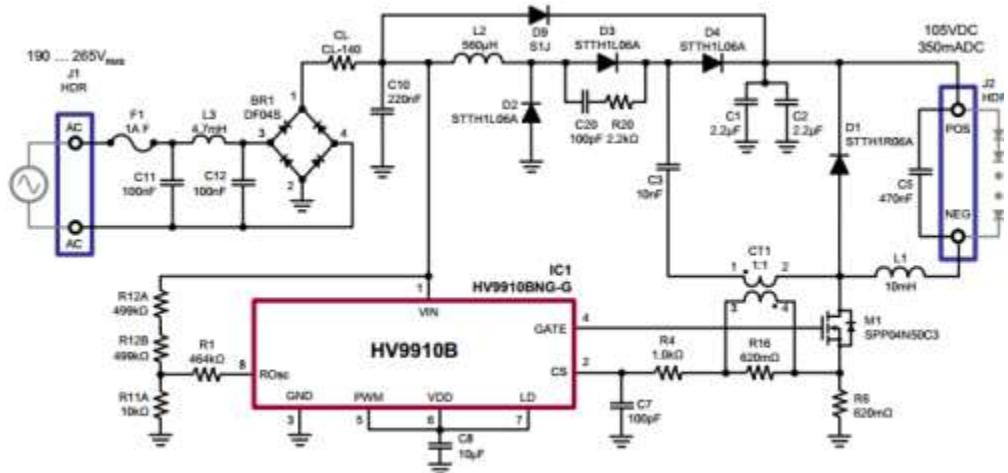
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P/N: HV9910BDB3



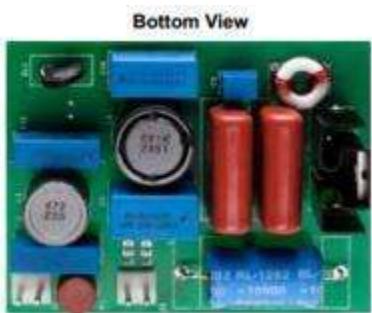
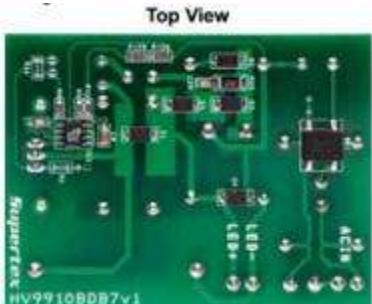
HV9910BDB7 Demo Board

The HV9910BDB7 demonstrates the use of an HV9910B control IC in an off-line, High Brightness LED driver application. The board incorporates power factor correction (PFC) and satisfies the limits for harmonic currents according to the EN61000-3-2 Class C standard having total harmonic distortion (THD) less than 20%. The board features a low component count and long life operation due to the absence of electrolytic capacitors. The board is designed to supply a string of LEDs with a current of 350mA and a voltage in the 65 to 105V range from a 220/230VAC line.



Products supported

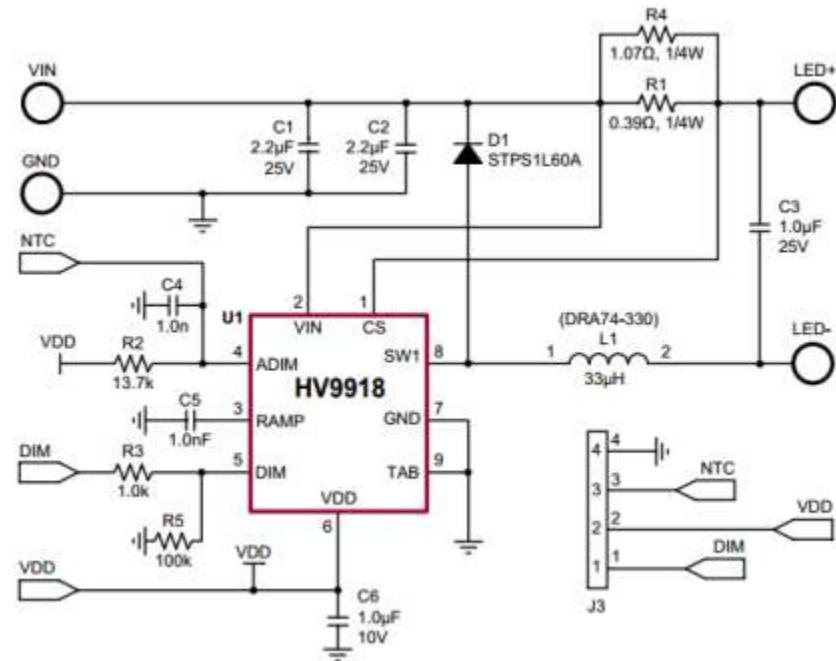
- HV9910BLG-G


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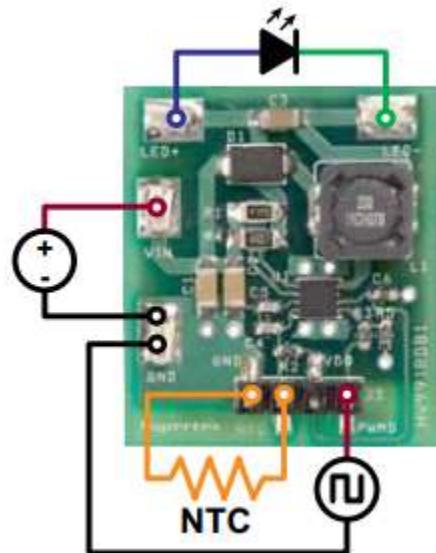


HV9918DB1 Demo Board

The HV9918DB1 demoboard is a high current LED driver designed to drive one or two LEDs at 700mA from a 9.0 - 16VDC input. The demoboard uses HV9918 hysteretic buck LED driver IC.



Products supported
HV9918K7-G



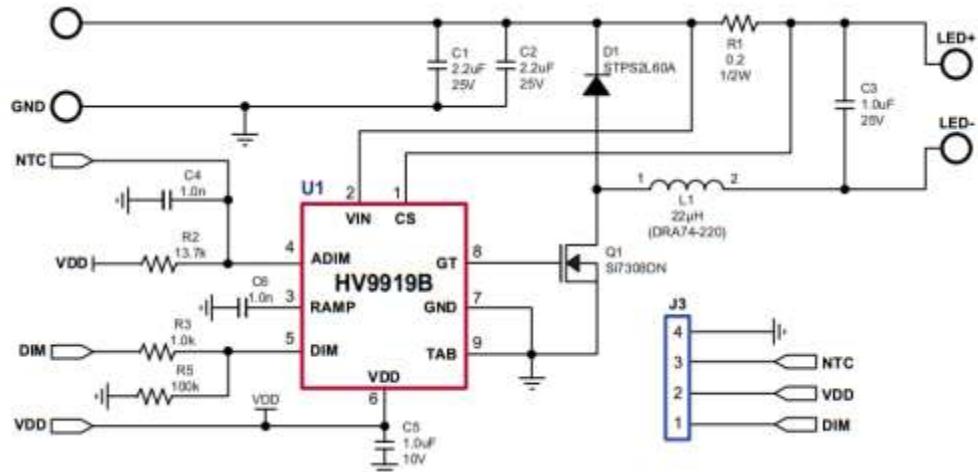
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P/N: HV9918DB1



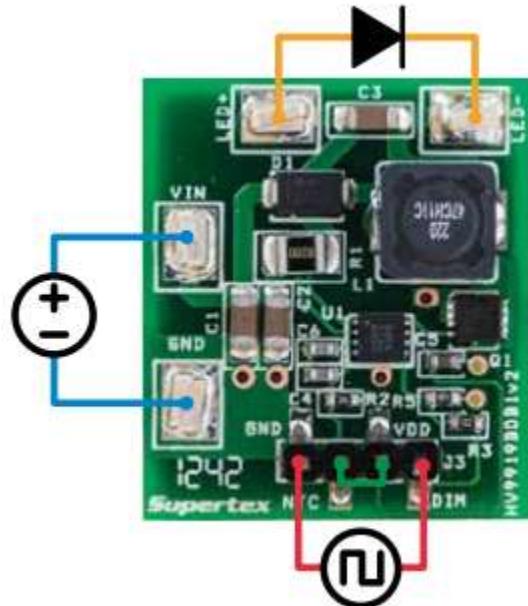
HV9919BDB1 Demo Board

The HV9919BDB1 demoboard is a high current LED driver designed to drive one LED at 1.0A from a 9.0 - 16V DC input. The demoboard uses HV9919 hysteretic buck LED driver IC. The HV9919BDB1 includes two PWM dimming modes. The analog control of the PWM dimming mode allows the user to dim the LED using a 0 - 2.0V analog signal applied between the ADIM and GND pins (0V gives 0% and 2.0V gives 100%). In this mode, the PWM dimming frequency is set to 1kHz on the board. The digital control of PWM dimming mode allows the user to dim the LEDs using an external, TTL-compatible square wave source applied between DIM and GND. In this case, the PWM dimming frequency and duty ratio are set by the external square wave source.



Products supported

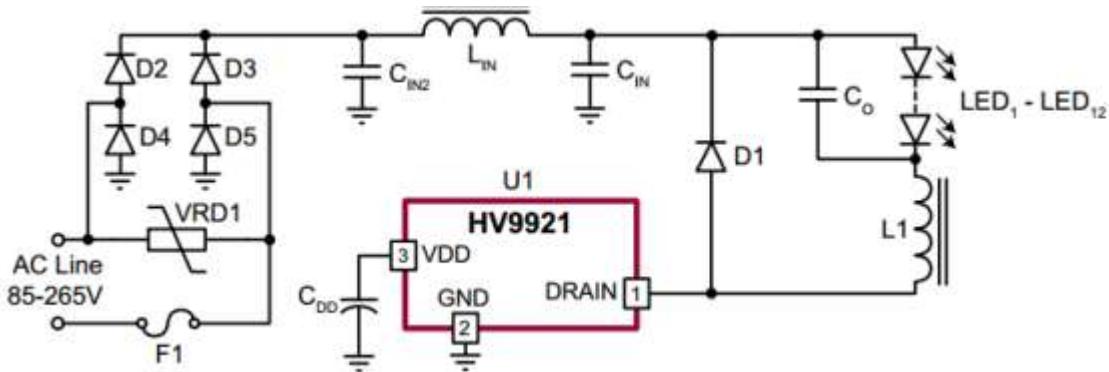
- HV9919BK7-G


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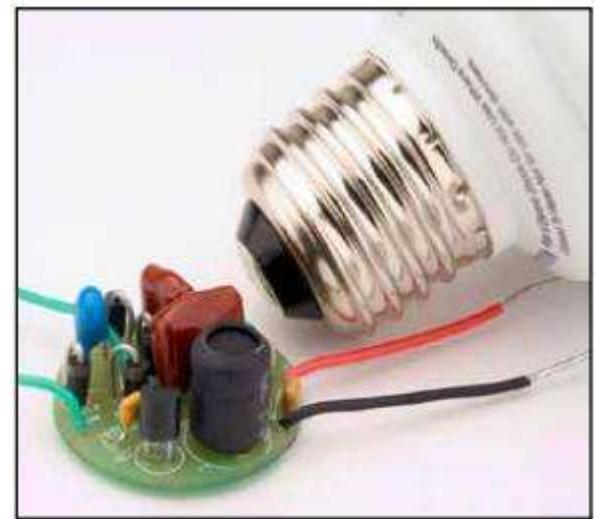


HV9921DB1 Demo Board

The HV9921DB1 demoboard is a complete LED power driver to supply a string of LEDs using the HV9921, an integrated 3-pin high input voltage constant-current buck regulator IC. The HV9921 integrates a 500V switching MOSFET and can operate directly from the rectified universal AC line voltage range of 80 to 265VAC. The current in the LED string is internally programmed to $20\text{mA} \pm 15\%$. The HV9921DB1 is ideally suited for driving strings of LEDs having forward voltage from 20 to 50V at high efficiency (typically 80% at 120VAC). The HV9921DB1 is a peak current-controlled buck converter operating with fixed off-time of 10.5us. Its fixed off-time control scheme provides good stability and tight regulation of the LED current throughout the input AC line voltage range. As its switching frequency varies over the AC line cycle, the HV9921 inherently introduces frequency dither and simplifies the compliance with EMI regulations.



Products supported
HV9921N3-G

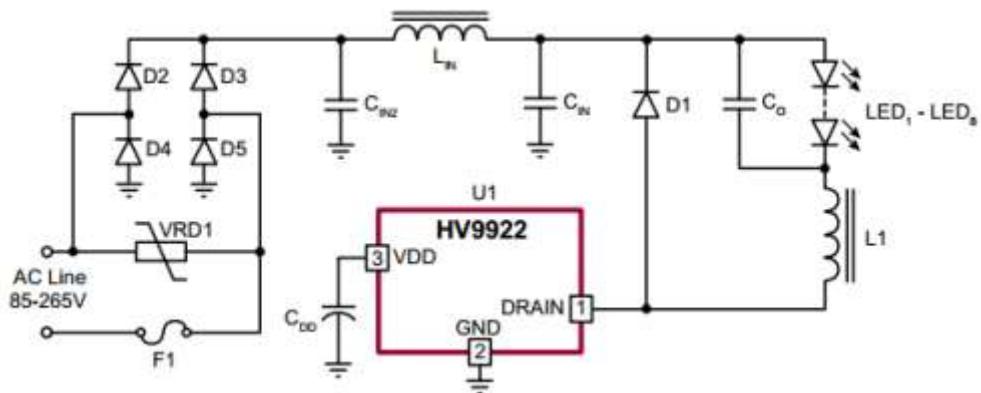


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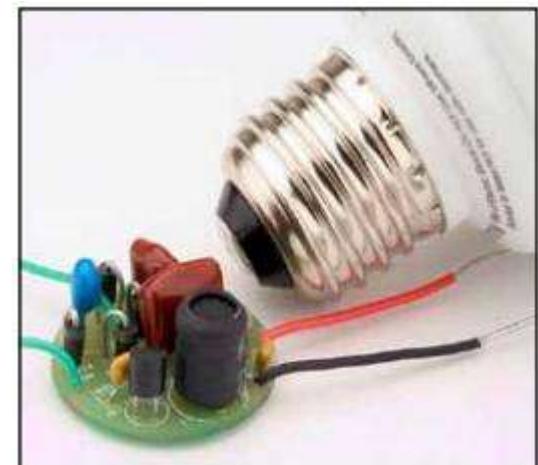


HV9922DB1 Demo Board

The HV9922DB1 demoboard is a complete LED power driver to supply a string of LEDs using the HV9922, an integrated 3-pin high input voltage constant-current buck regulator IC. The HV9922 integrates a 500V switching MOSFET and can operate directly from the rectified universal AC line voltage range of 80 to 265VAC. The current in the LED string is internally programmed to $20\text{mA} \pm 15\%$. The HV9922DB1 is ideally suited for driving strings of LEDs having forward voltage from 20 to 30V at high efficiency (typically 80% at 120VAC). The HV9922DB1 is a peak current-controlled buck converter operating with fixed off-time of $10.5\mu\text{s}$. Its fixed off-time control scheme provides good stability and tight regulation of the LED current throughout the input AC line voltage range. As its switching frequency varies over the AC line cycle, the HV9922 inherently introduces frequency dither and simplifies the compliance with EMI regulations.



Products supported
HV9922N3-G



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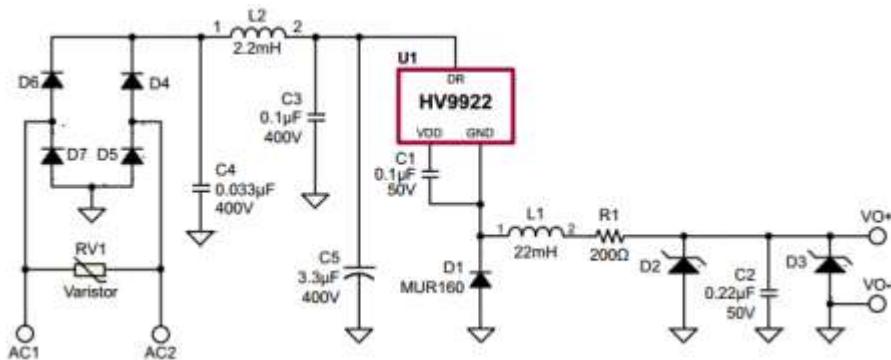


HV9922DB2 Demo Board

The HV9922DB2 is a universal input, offline, non-isolated auxiliary power supply using HV9922 constant current switching regulator IC. The output voltage is regulated to 23V +/-5% and is referenced to the negative side of the diode bridge rectifier (i.e. ground of the rectified DC voltage). The demoboard is protected against output open circuit and short circuit conditions and meets FCC Class B (residential) EMI limits. The HV9922 acts as a constant 50mA current source which is sourced into an output zener diode. On the demoboard, a 22V zener diode is used at D2 to regulate the output voltage to 23V within +/-5%. Lower output voltages can be obtained by using an appropriate 2W zener diode in parallel to D2 in the space provided on the demoboard (D3).

Products supported

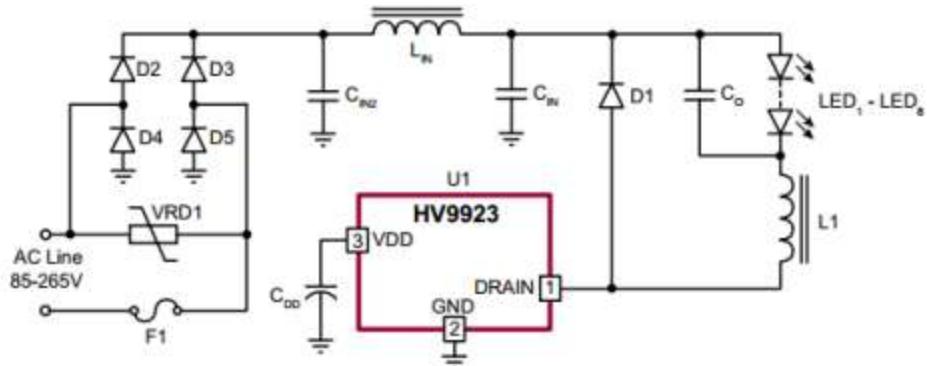
- HV9922N3-G



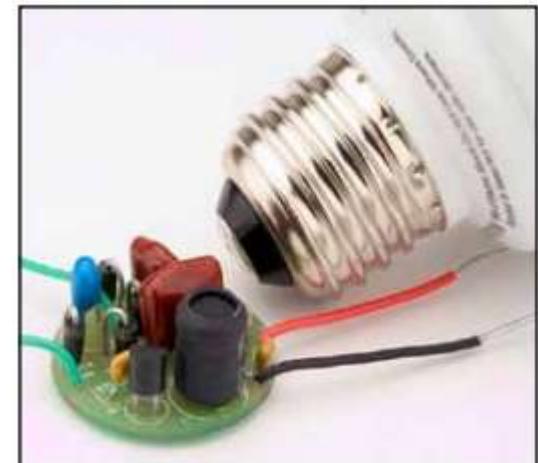
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HV9923DB1 Demo Board

The HV9923DB1 demoboard is a complete LED power driver to supply a string of LEDs using the HV9923, an integrated 3-pin high input voltage constant-current buck regulator IC. The HV9923 integrates a 500V switching MOSFET and can operate directly from the rectified universal AC line voltage range of 80 to 265VAC. The current in the LED string is internally programmed to $30\text{mA} \pm 15\%$. The HV9923DB1 is ideally suited for driving strings of LEDs having forward voltage from 20 to 30V at high efficiency (typically 80% at 120VAC). The HV9923DB1 is a peak current-controlled buck converter operating with fixed off-time of 10.5us. Its fixed off-time control scheme provides good stability and tight regulation of the LED current throughout the input AC line voltage range. As its switching frequency varies over the AC line cycle, the HV9923 inherently introduces frequency dither and simplifies the compliance with EMI regulations.



Products supported
 HV9923N3-G



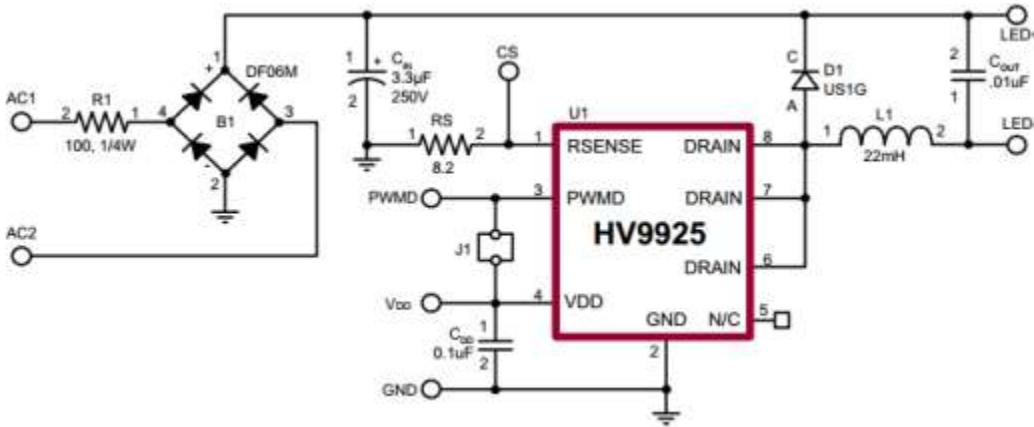
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HV9925DB1 Demo Board

The HV9925DB1 demo board is a complete LED power driver to supply a string of LEDs using the HV9925, an integrated, high-voltage, buck regulator IC featuring programmable output current and PWM dimming.

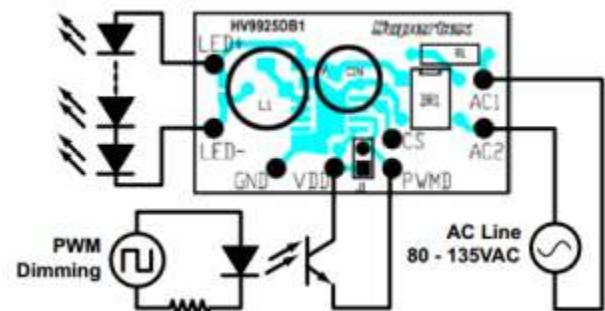
The HV9925 includes a 500V switching MOSFET and can operate directly from rectified AC line voltages of 80 to 135VAC. The current in the LED string is externally programmed to $50\text{mA} \pm 10\%$ by a single resistor RS. The HV9925DB1 is ideally suited for driving strings of LEDs having forward voltage from 20V to 60V at high efficiency. The HV9925DB1 is a peak current-controlled buck converter operating with a fixed off-time of $10.5\mu\text{s}$. Its fixed off-time control scheme provides good stability and tight regulation of the LED current throughout the input AC line voltage range. As its switching frequency varies over the AC line cycle, the HV9925 inherently introduces frequency dither and simplifies the compliance with EMI regulations.



P/N: HV9925DB1

Products supported

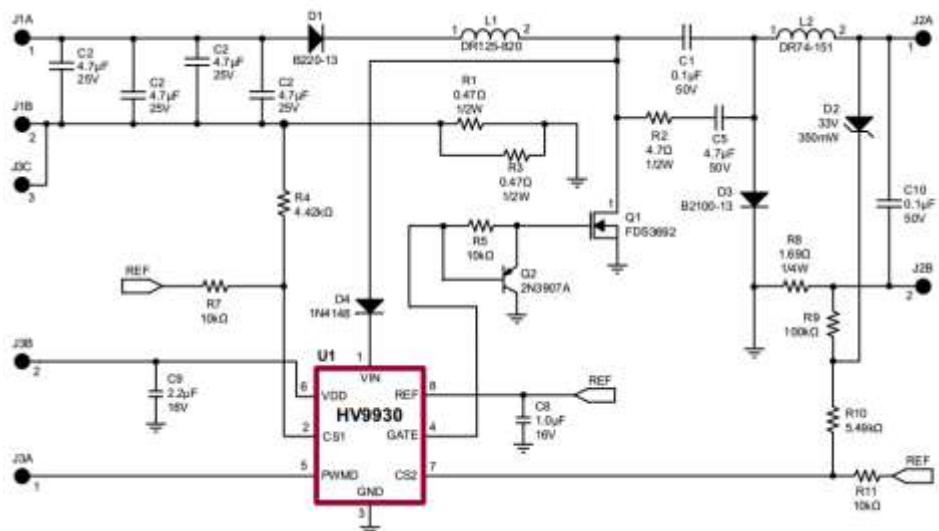
- HV9925N3-G



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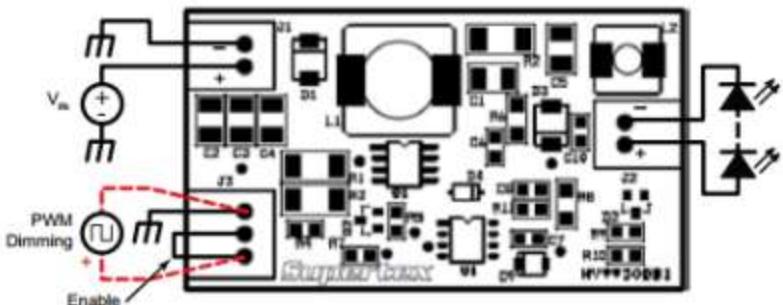
HV9930DB1 Demo Board

The HV9930DB1 is an LED driver demoboard capable of driving up to 7 1-watt LEDs in series from an automotive input of 9 - 16VDC. The demoboard uses HV9930 in a boost-buck topology. The converter operates at frequencies in excess of 300kHz and has excellent output current regulation over the input voltage range. It can also withstand transients up to 42V and operate down to 6V input. The converter is also protected against open LED and output short circuit conditions. Protection against reverse polarity up to 20V is also included.



Products supported

- HV9930LG-G

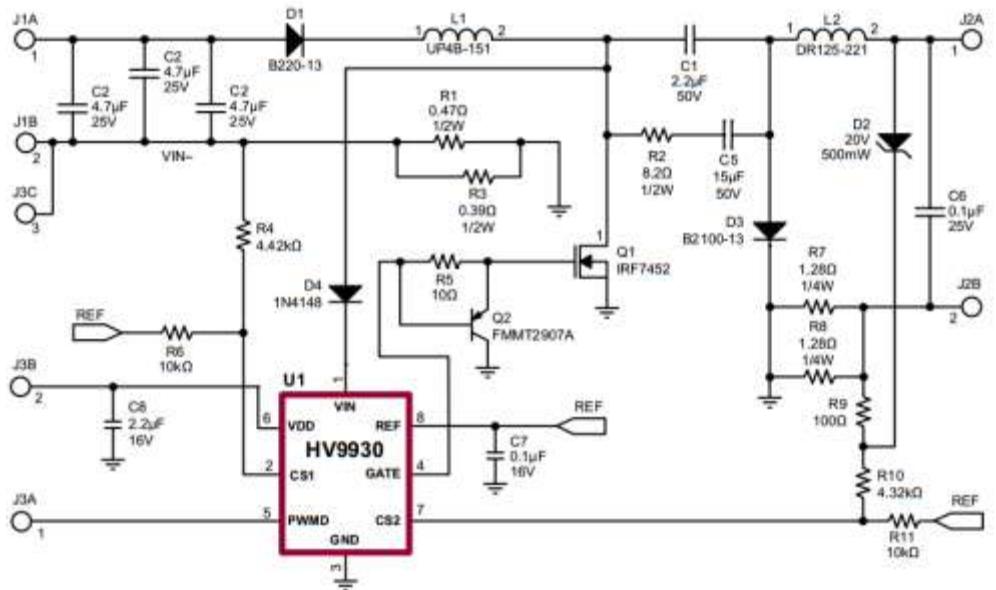


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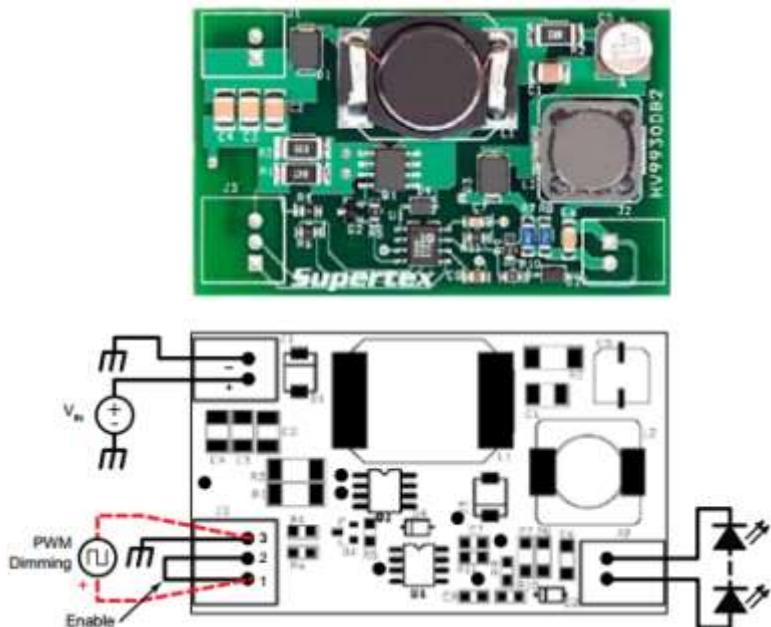
HV9930DB2 Demo Board

The HV9930DB2 is a LED driver demoboard capable of driving 4 3-watt LEDs in series from an input of 9 - 25V DC. The demoboard uses HV9930 in a boost-buck topology. The converter has excellent line and load regulation over the entire input and output voltage range. The full load efficiency of the converter is typically greater than 80%. The converter is also protected against open LED and output short circuit conditions.



Products supported

- HV9930LG-G

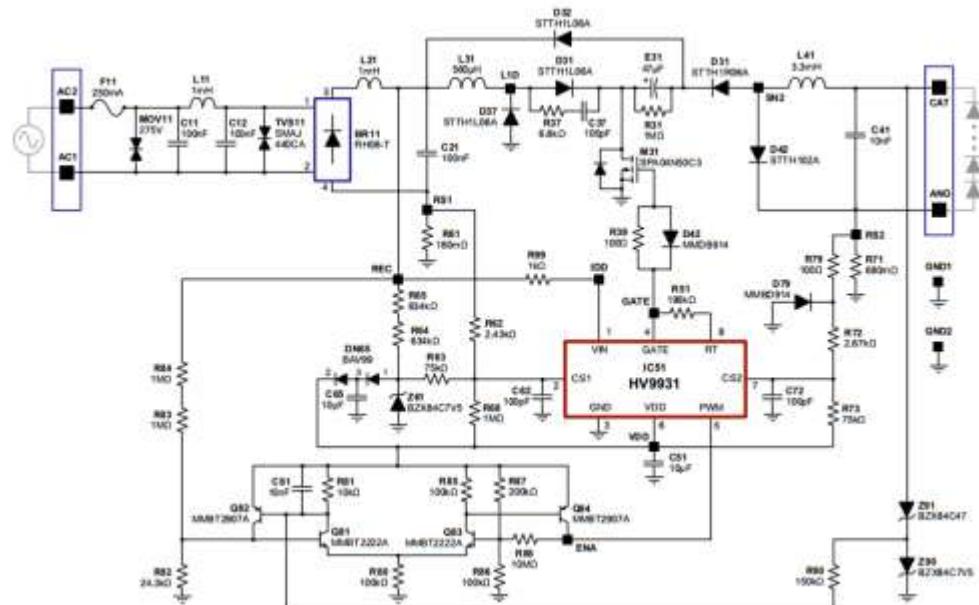


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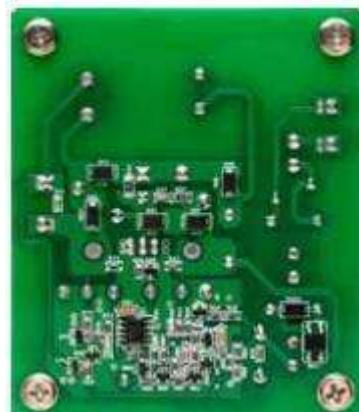
HV9931DB1 Demo Board

The HV9931 LED driver is primarily targeted at low to medium power LED lighting applications where galvanic isolation of the LED string is not an essential requirement. The driver provides near unity power factor and constant current regulation using a two stage topology driven by a single MOSFET and control IC. Triac dimming of this design is possible with the addition of some components for preloading and inrush current shaping. The HV9931DB1 is designed for a fixed string current of 350mA and a string voltage of 40V for a load power of about 14W. The board will regulate current for an output voltage down to 0V. Nominal input is 120VAC. Design for universal input (85 to 265VAC) is by all means possible but does increase cost and size while lowering efficiency.



P/N: HV9931DB1

Products supported
HV9931LG-G

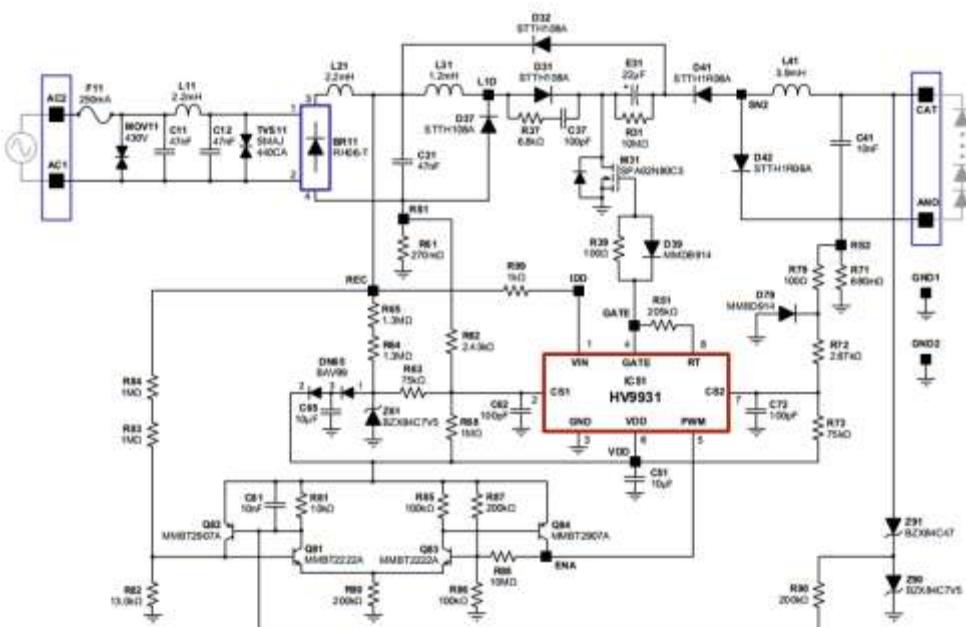


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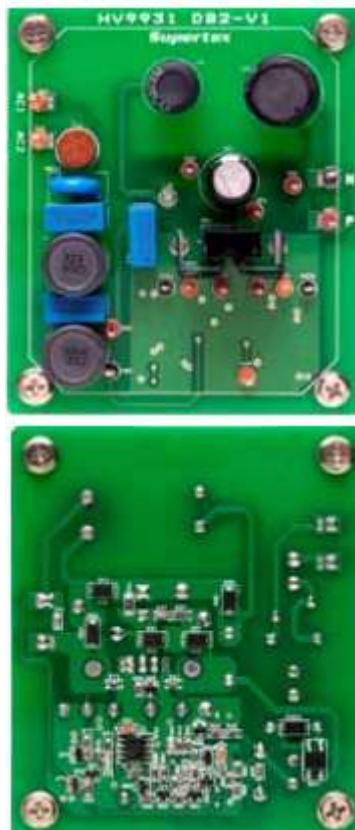


HV9931DB2 Demo Board

The HV9931 LED driver is primarily targeted at low to medium power LED lighting applications where galvanic isolation of the LED string is not an essential requirement. The driver provides near unity power factor and constant current regulation using a two stage topology driven by a single MOSFET and control IC. Triac dimming of this design is possible with the addition of some components for preloading and inrush current shaping. The HV9931DB2 IS designed for a fixed string current of 350mA and a string voltage of 40V for a load power of about 14W. The boards will regulate current for an output voltage down to 0V. Nominal input voltage is 230VAC. Design for universal input (85 to 265VAC) is by all means possible but does increase cost and size while lowering efficiency.



Products supported
HV9931LG-G



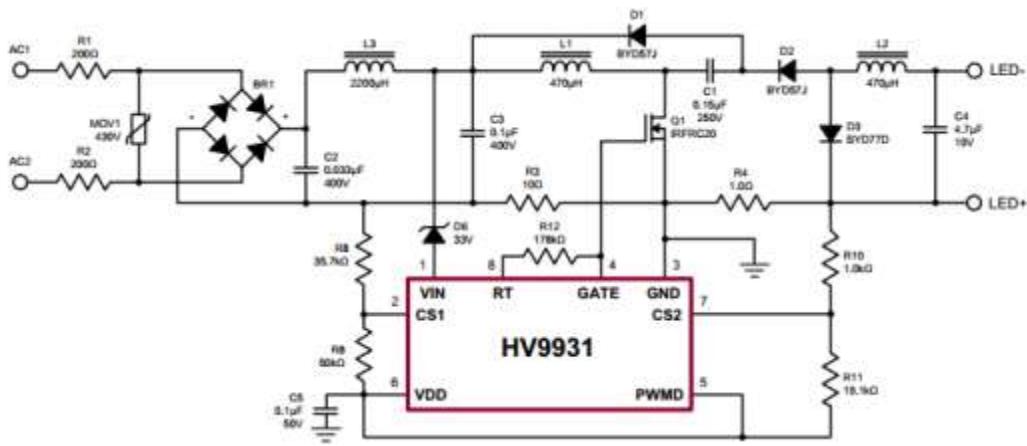
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HV9931DB5 Demo Board

Online
Info

The HV9931DB5 demoboard is a high brightness (HB) LED power driver to supply one HB LED, using the HV9931 IC from either a 110 or 220VAC supply. The HV9931DB5 is ideal for incandescent retrofit applications, as it features a very small size and a low component count. The HV9931DB5 avoids the use of electrolytic capacitors, which reduce the lifetime of the circuit in high ambient temperatures (which would be found in the base of a bulb). The demo board can be used to test the performance of the HV9931 as a constant current driver to power LEDs. The HV9931DB5 uses a unique cascaded converter circuit, with a single active switch, to achieve the high step down conversion ratio required for operating low voltage LEDs from a high input voltage. This circuit allows the converter to operate at a high switching frequency, about 120kHz, while still regulating the output current at all times. The HV9931DB5 supplies 350mA to a 4.0V(max) LED with input voltages ranging from 90 – 265VAC 50/60Hz.



Products supported

- HV9931LG-G

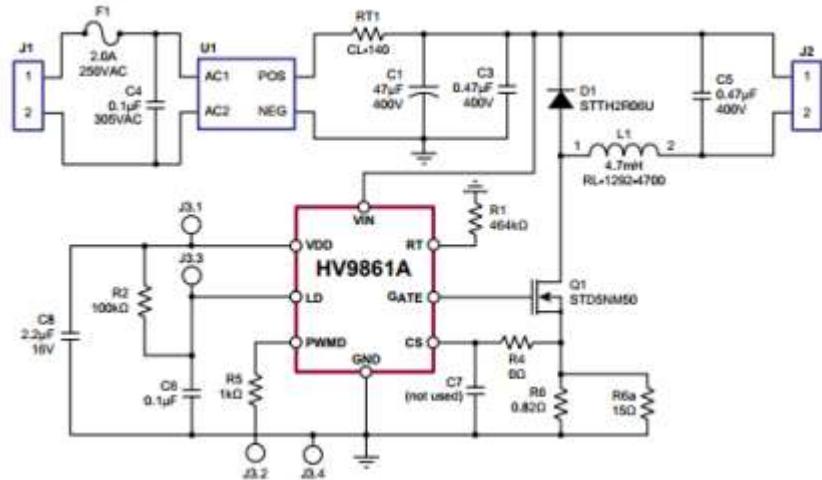
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P/N: HV9931DB5



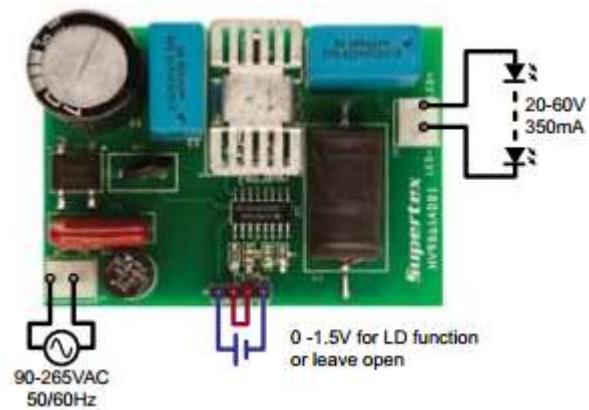
HV9861ADB1 Demo Board

The HV9861ADB1 demoboard is a high-brightness LED driver employing the patented average-mode, constant current control scheme. The power conversion stage of the HV9861ADB1 consists of a diode bridge rectifier followed by a buck converter operating with fixed off-time of 20µs. The HV9861ADB1 LED driver features tight regulation of the LED current within a few millamps over the entire range of the input AC line and the output LED string voltage. The LED current accuracy is almost insensitive to the passive component tolerances, such as the output filter inductance or the timing resistor. The accuracy of the LED current is mainly determined by the internal 270mV ± 3% reference voltage of the HV9861A control IC and by the external current sense resistor tolerance.



Products supported

- HV9861ANG-G

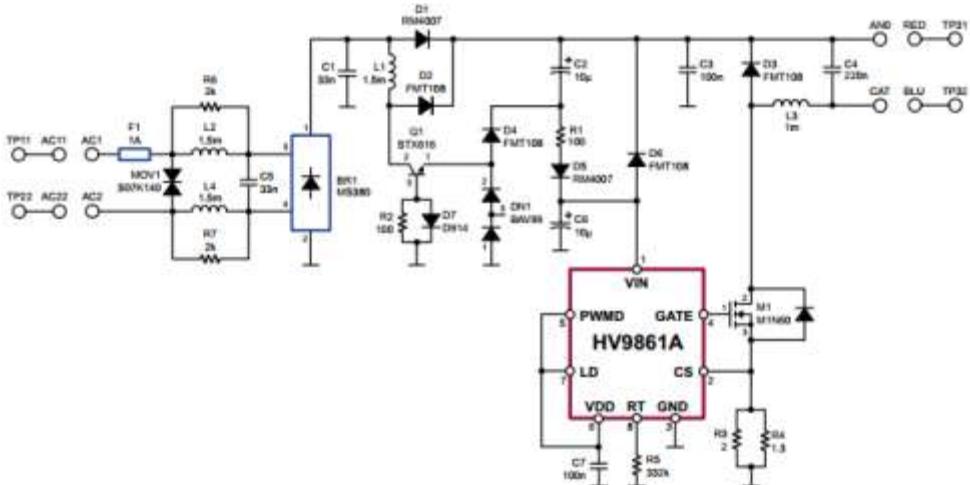


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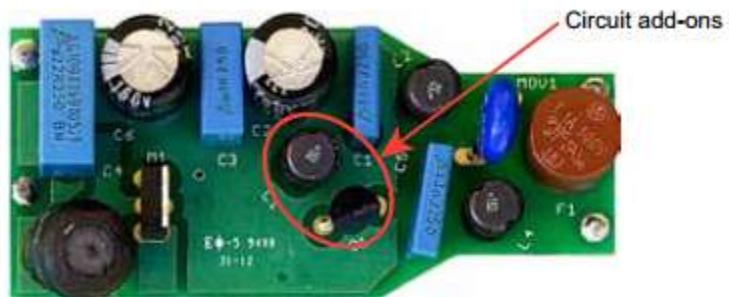


HV9861ADB2 Demo Board

Certain target markets for LED lighting require a power factor of at least 90%. A power factor over 90% can be attained using valley fill power factor correction with the addition of a small boost converter. The boost converter lowers line current distortion by adding line current draw in the valley and lowering the peak amplitude of the valley fill capacitor recharging current.



Products supported
HV9861LG-G

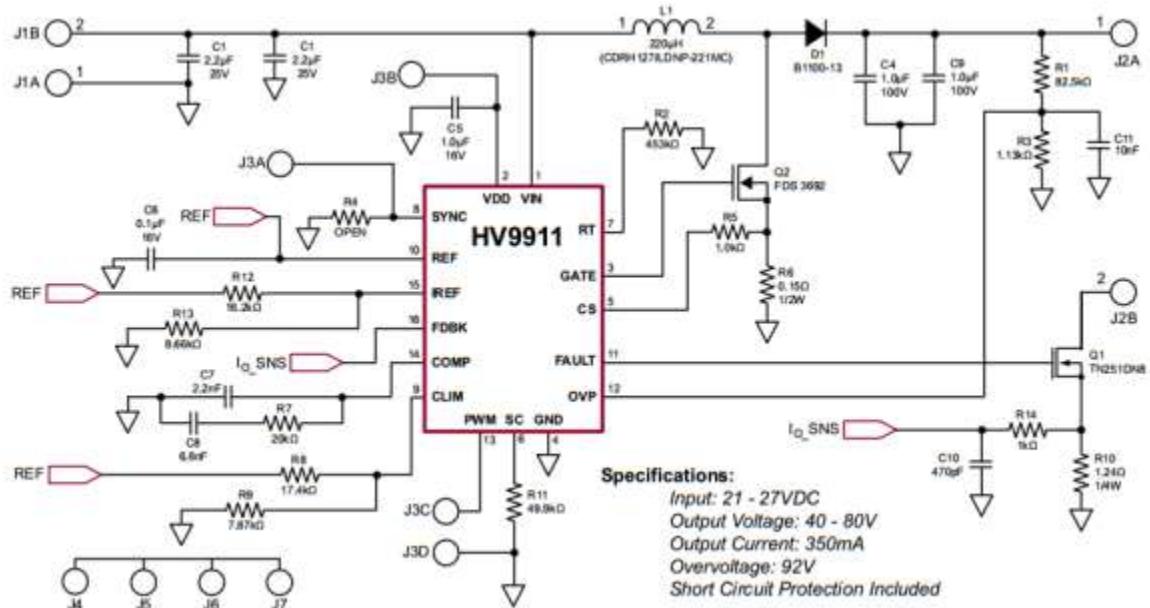


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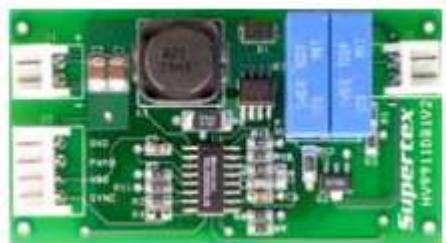


HV9911DB1 Demo Board

The HV9911DB1 is an LED driver capable of driving up to 20 one-watt LEDs in series from an input of 21 - 27VDC. The demoboard uses HV9911 in a boost topology. The converter has a very good initial regulation (+/- 5%) and excellent line and load regulation over the entire input and output voltage range (<+/- 1%). The full load efficiency of the converter is typically greater than 90%.



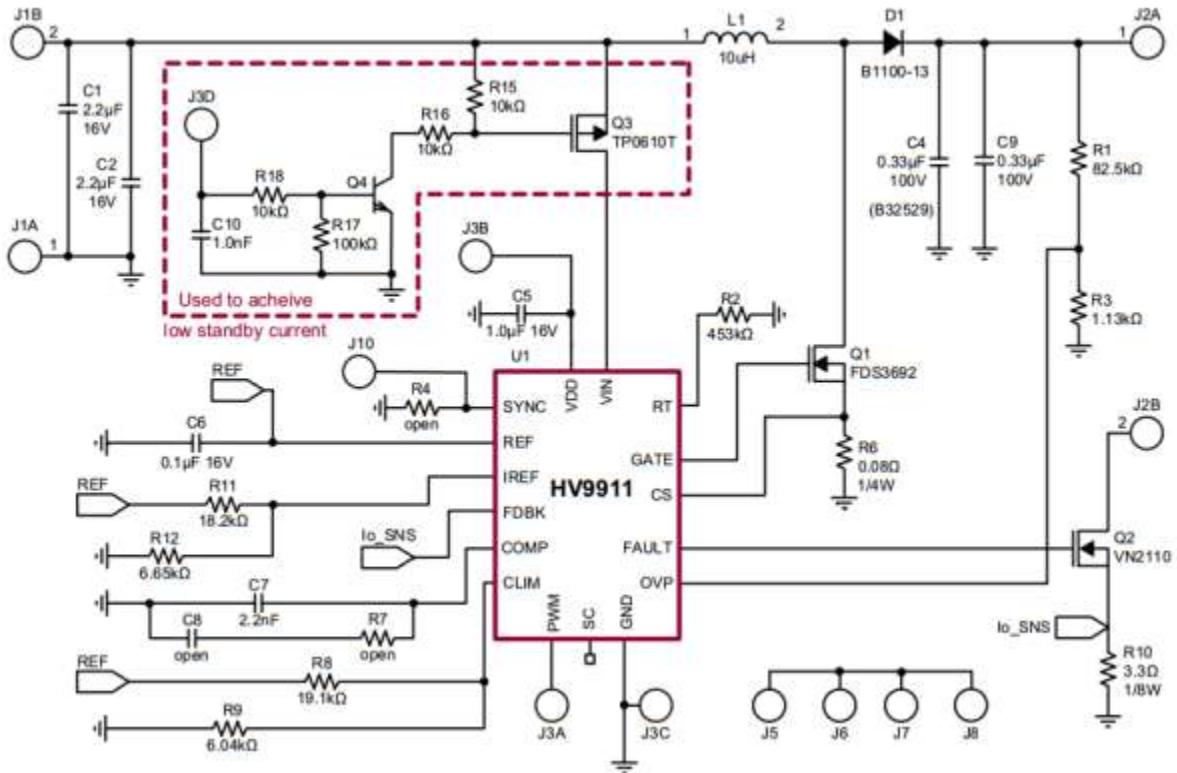
Products supported
HV9911NG-G



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HV9911DB2 Demo Board

The HV9911DB2 is an LED driver capable of driving up to twenty 100mA LEDs in series from an input of 9 - 16V DC. The demoboard uses HV9911 IC in a boost topology. The converter has a very good initial regulation, (+/- 5%), and excellent line and load regulation over the entire input and output voltage range (<+/- 1%). The full load efficiency of the converter is typically greater than 85%.



Products supported
HV9911NG-G

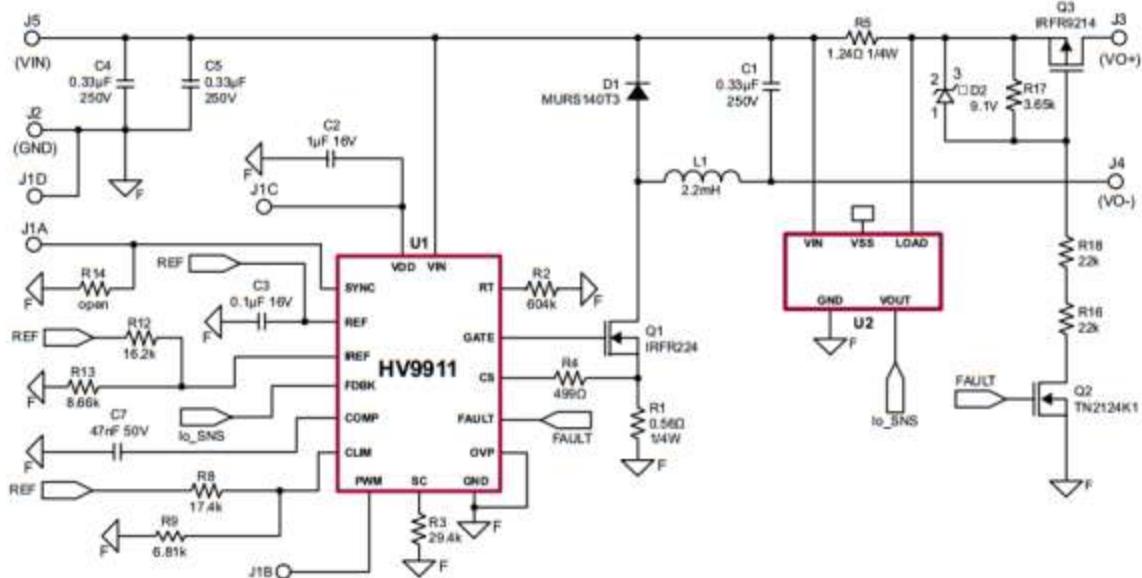


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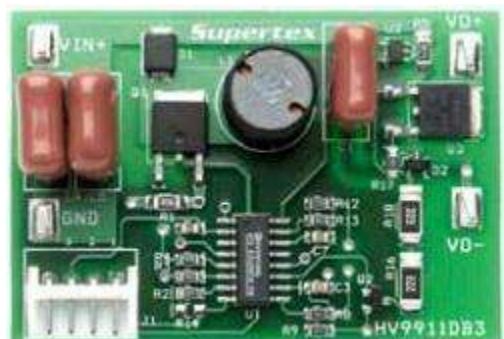


HV9911DB3 Demo Board

The HV9911DB3 is an LED driver capable of driving up to 25 one-watt LEDs in series from an input of 130 - 200VDC. The demoboard uses Supertex's HV9911 in a buck topology with the HV7800 used for high side current sensing. The converter has a very good initial regulation (+/-5%) and excellent line and load regulation over the entire input and output voltage range (<+/-2%). The full load efficiency of the converter is typically greater than 85%.



Products supported
HV9911NG-G

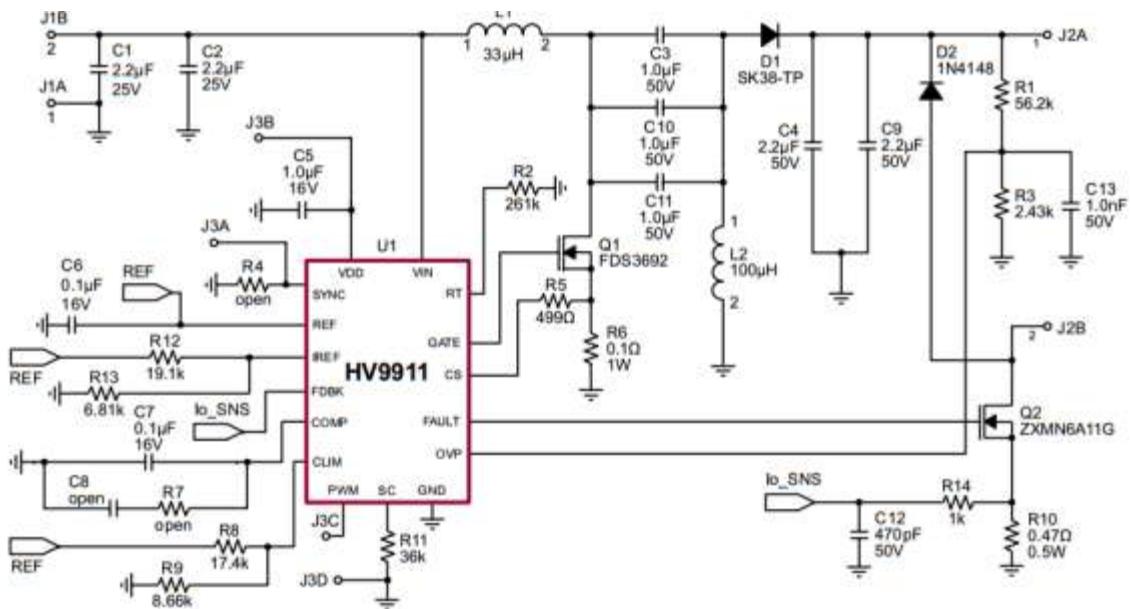


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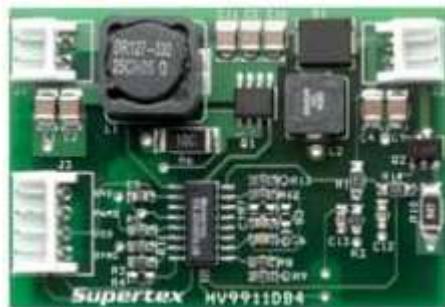


HV9911DB4 Demo Board

The HV9911DB4 is an LED driver demoboard capable of driving one to six three-watt LEDs in series from an input of 9.0 - 16VDC. The demoboard uses HV9911 in a SEPIC topology to drive LED string voltages higher or lower than the input voltage. The converter has a very good initial regulation (+/-5%), and excellent line and load regulation over the entire input and output voltage range (<+/-1%). The full load efficiency of the converter is typically greater than 85%.



Products supported
HV9911NG-G



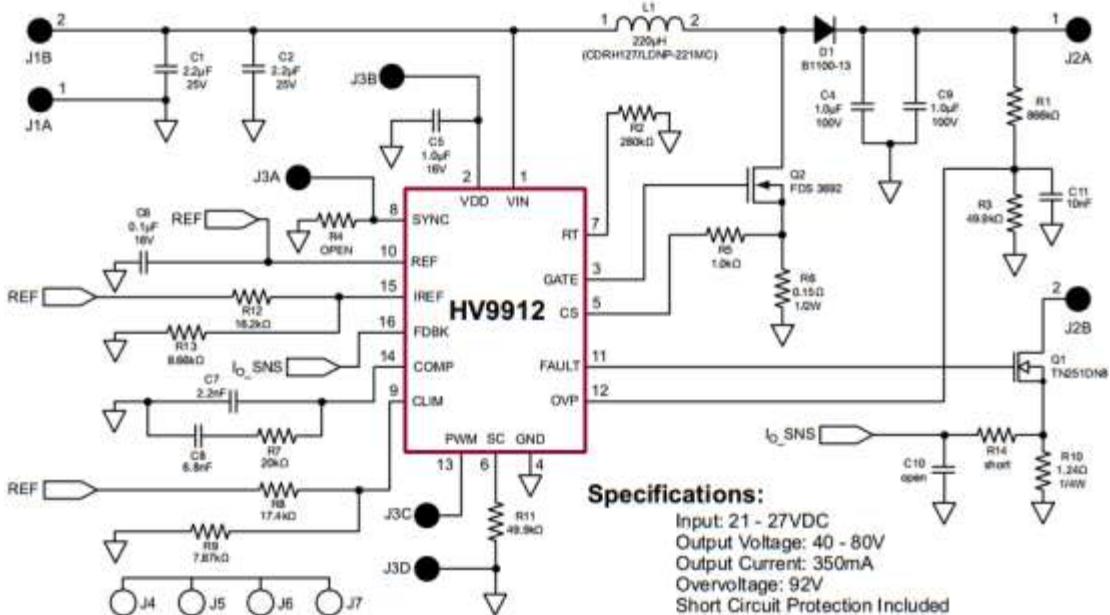
<< BACK

P/N: HV9911DB4

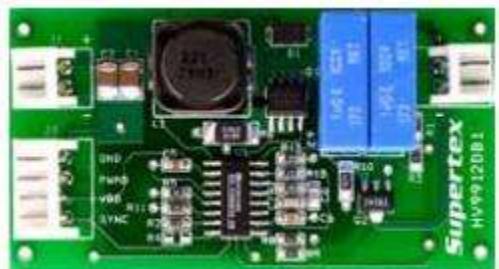


HV9912DB1 Demo Board

The HV9912DB1 is an LED driver demoboard capable of driving up to 20 one-watt LEDs in series from an input of 21 - 27VDC. It uses the HV9912 in a boost topology. The converter has very good initial regulation (+/-5%) and excellent line and load regulation over the entire input and output voltage range (<+/- 1%). The full load efficiency of the converter is typically greater than 90%.



Products supported
HV9912NG-G

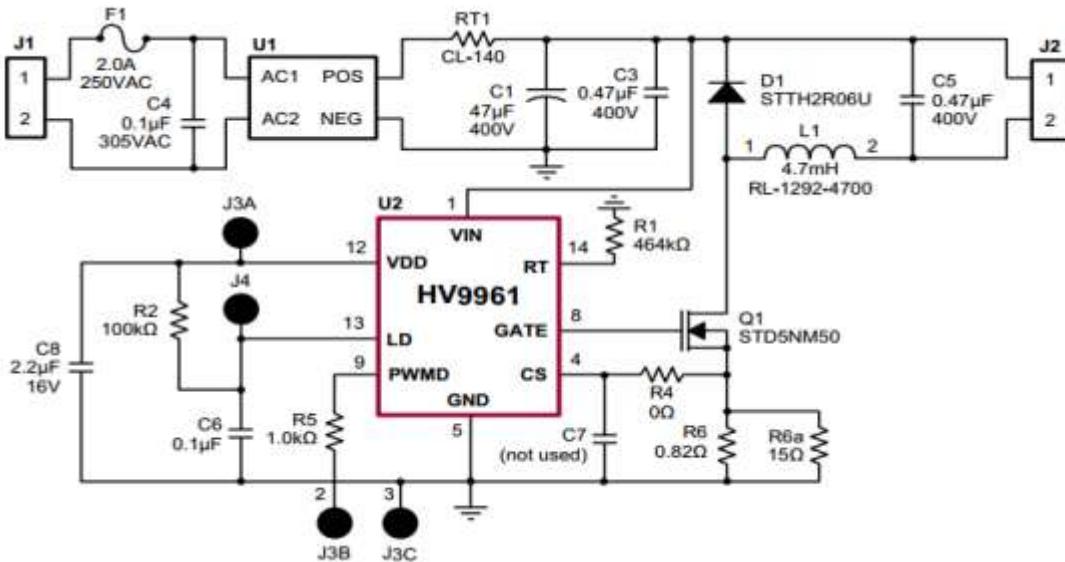


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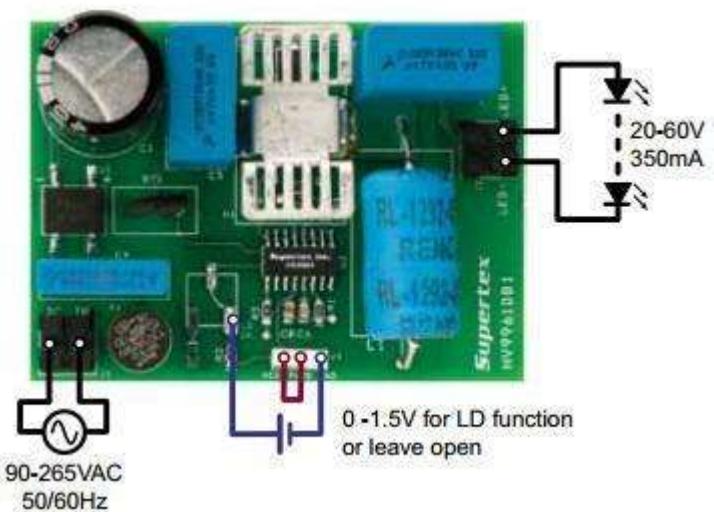
HV9961DB1 Demo Board

The HV9961 demoboard is a high-brightness LED driver employing the patent-pending average-mode constant current control scheme. The power conversion stage of the HV9961DB1 consists of a diode bridge rectifier followed by a buck converter operating with fixed off-time of 20µs. The HV9961DB1 LED driver features tight regulation of the LED current within a few millamps over the entire range of the input AC line and the output LED string voltage.



Products supported

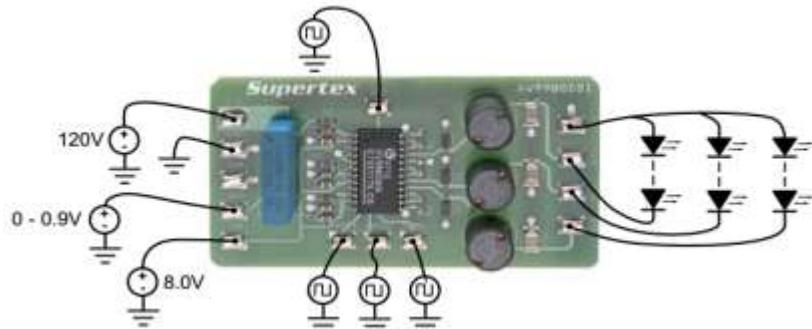
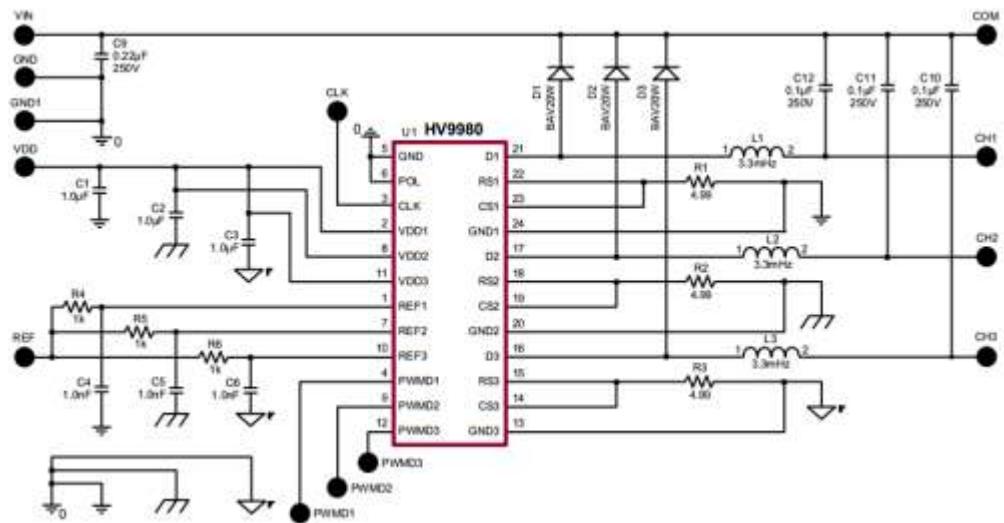
- HV9961NG-G



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HV9980DB1 Demo Board

The HV9980B1 demoboard is an RGB or multi-channel white LED backlight driver designed to drive LEDs for a large-screen TV. The HV9980DB1 can drive three common-anode LED strings from a 100 - 140V input at currents up to 70mA in steady state. It can also drive the LEDs at currents as large as 160mA for short durations to facilitate backlight scanning mode.



Products supported
HV9980WG-G



HV9982DB1 Demo Board

The HV9982DB1 is a three channel boost LED driver demoboard using HV9982 LED Driver IC. The LED driver can be used to drive RGB or multi channel white LEDs from a 24V input. The LED string current can be adjusted up to a maximum of 100mA. The demoboard has good current matching between strings and an excellent PWM dimming response, making it ideal for LED backlight applications.

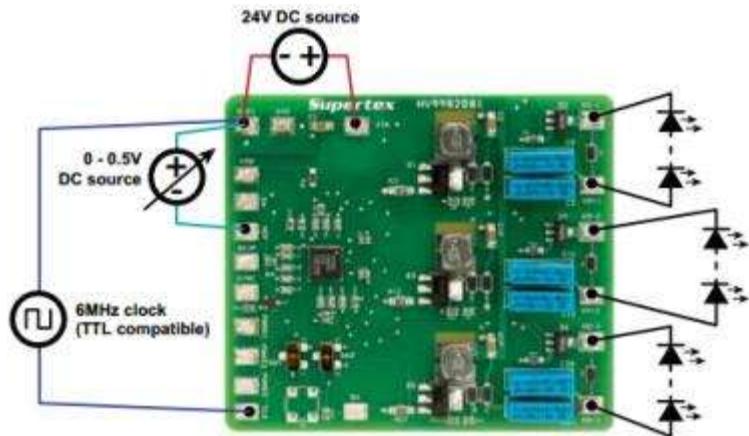
The HV9982DB1 uses the HV9982 LED driver IC to drive three discontinuous conduction mode boost converters at a 500kHz switching frequency. The clocks of the three channels are phase shifted to provide ripple cancellation at the input and thus reducing the input capacitor requirements. The output current level can be adjusted using an external voltage source at the REF terminal.

The HV9982DB1 includes hiccup mode protection for both short circuit and open circuit conditions to ensure that it recovers from a momentary fault condition. It also enables the board to survive prolonged fault conditions without any damage to both the driver as well as the LEDs.

The HV9982DB1 also includes an on-board PWM generator for analog control for PWM dimming (for backward compatibility with CCFL controllers). This feature enables the user to PWM dim the driver with a 0 - 2.0V analog signal input and helps to achieve zero LED current with an analog dimming input.

Products supported

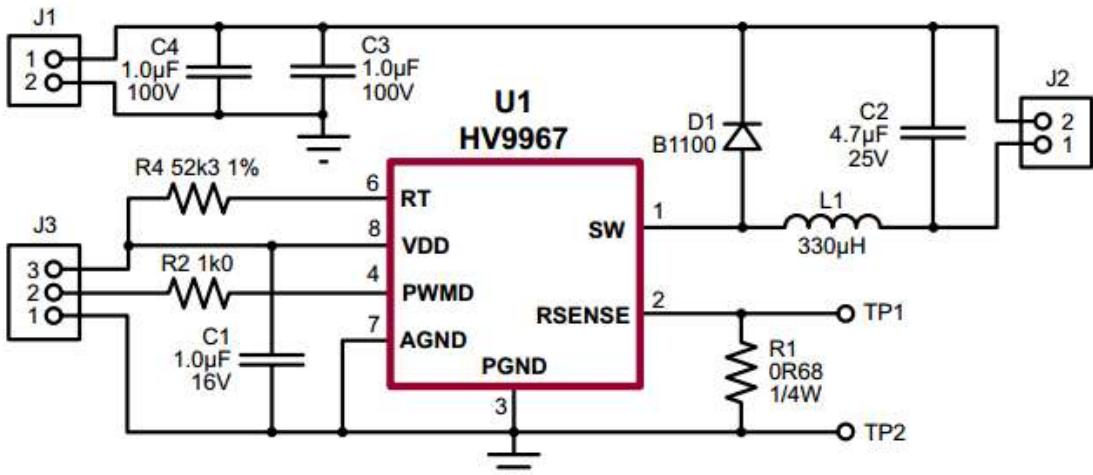
- HV9982K6-G

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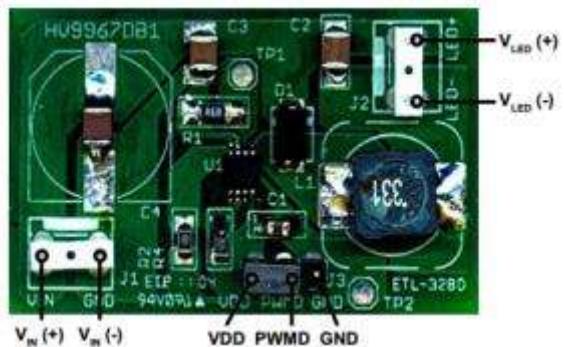


HV9967BDB1 Demo Board

The HV9967BDB1 demoboard is a high-brightness LED driver designed to drive 4 LEDs in series at currents up to 350mA from a 20 - 60V DC input. The demoboard uses the HV9967B in a buck configuration in a constant off-time mode. The HV9967BDB1 LED driver features tight regulation of the LED current within a few millamps over the entire range of the input voltage (i.e. 20 - 60VDC). The LED current accuracy is almost insensitive to the passive component tolerances, such as the inductance or the timing resistor.



Products supported
HV9967BMG-G

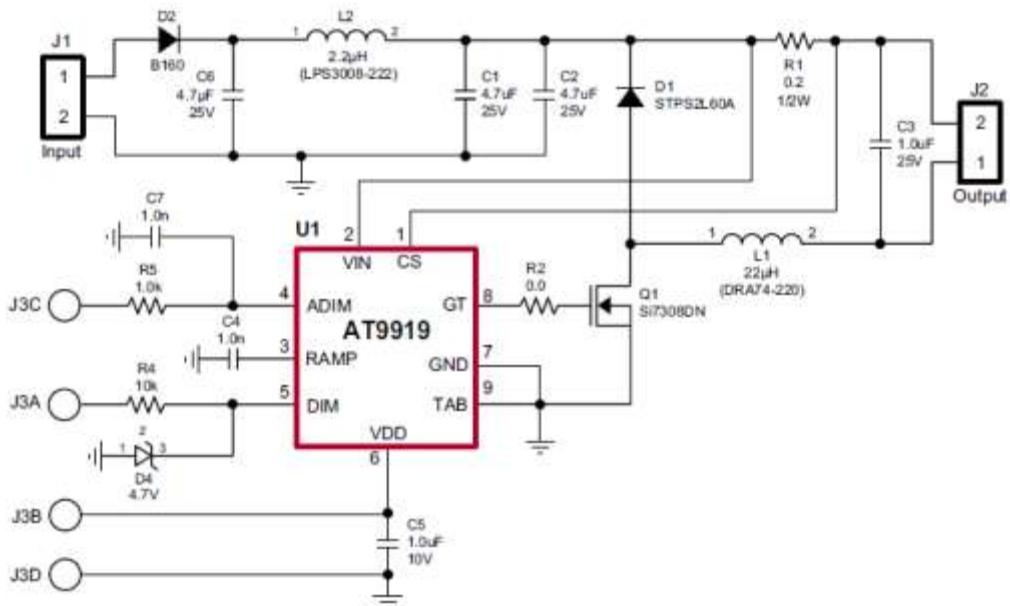


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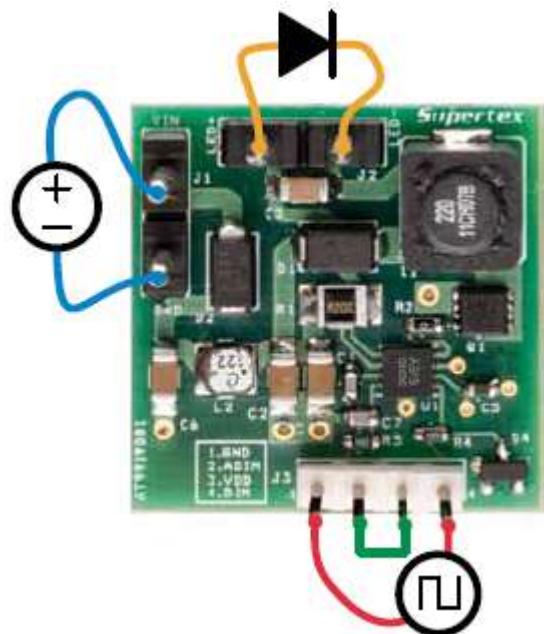


AT9919DB1 Demo Board

The AT9919BDB1 demoboard is a high current LED driver designed to drive one LED at 1.0A from a 9.0 - 16VDC input. AT9919DB1 includes two PWM dimming modes. The analog control of the PWM dimming mode allows the user to dim the LED using a 0 - 2.0V analog signal applied between the ADIM and GND pins (0V gives 0% and 2.0V gives 100%). In this mode, the PWM dimming frequency is set to 1kHz on the board. The digital control of PWM dimming mode allows the user to dim the LEDs using an external, TTL-compatible square wave source applied between DIM and GND. In this case, the PWM dimming frequency and duty ratio are set by the external square wave source.



Products supported
AT9919K7-G

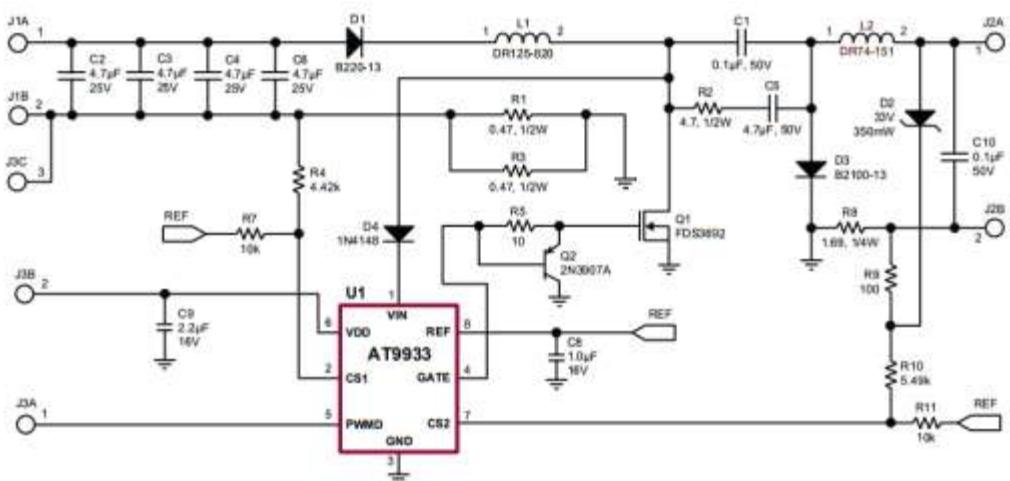


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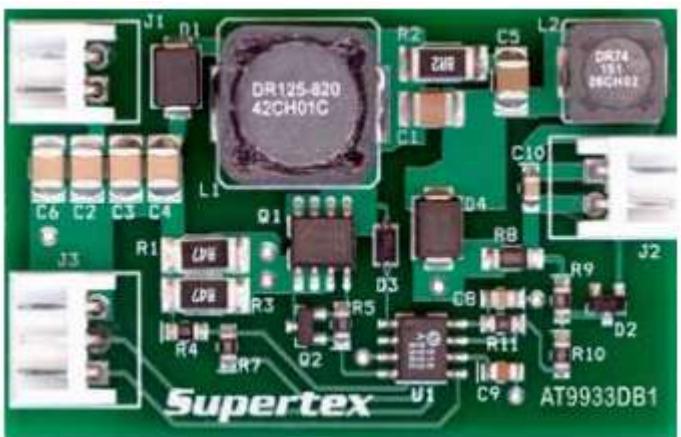


AT9933DB1 Demo Board

The AT9933DB1 is an LED driver capable of driving up to 7 1-watt LEDs in series from an automotive input of 9 - 16V DC. The demoboard uses AT9933LG-G in a boost-buck topology. The converter operates at frequencies in excess of 300kHz and has excellent output current regulation over the input voltage range. It can also withstand transients up to 42V and operate down to 6V input. The converter is also protected against open LED and output short circuit conditions. Protection against reverse polarity up to 20V is also included.



Products supported
AT9933LG-G

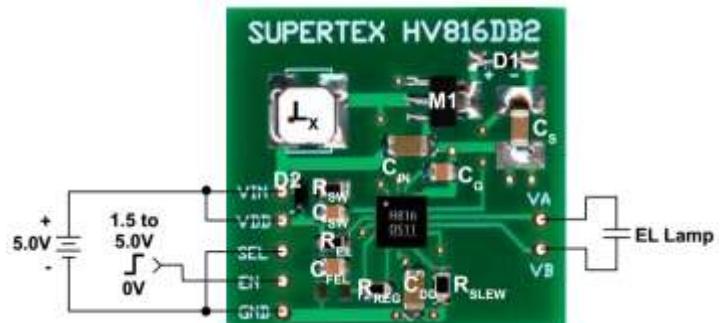
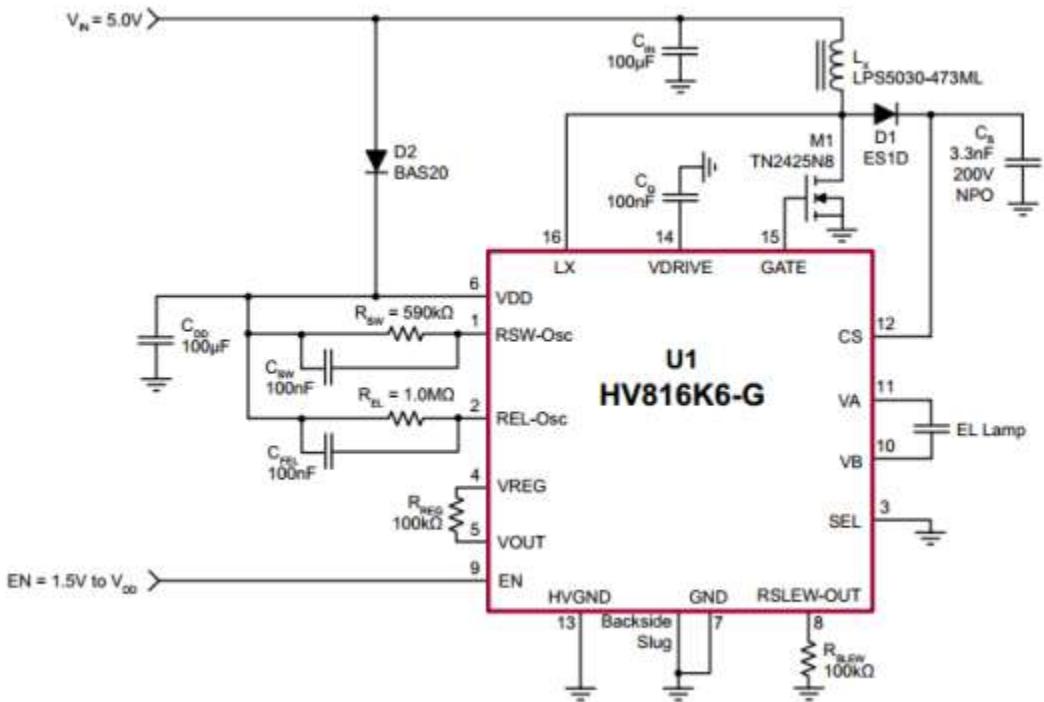


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HV816DB2 Demo Board

The HV816DB2 is a high brightness demoboard with the circuitry to drive a 10in2 EL lamp using the HV816 in a 4x4 QFN-16 package.

Products supported
HV816K6-G



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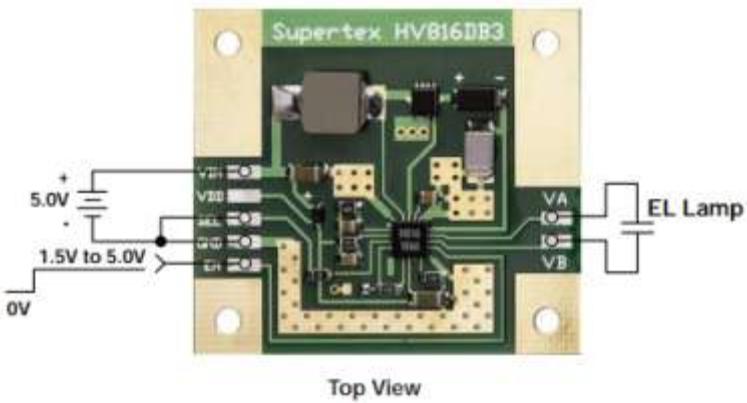
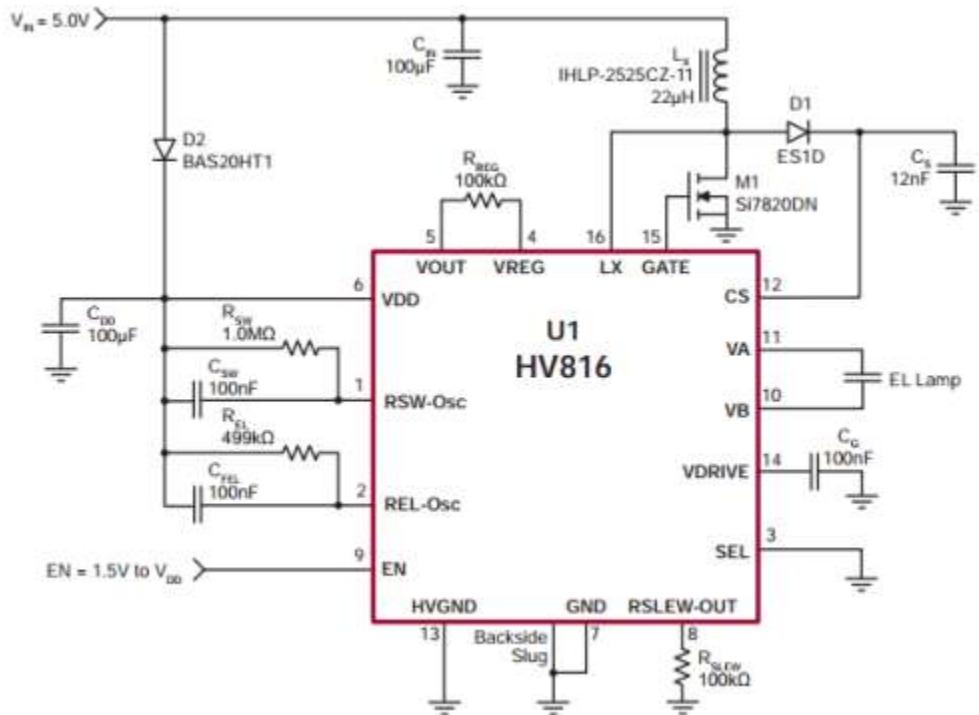


HV816DB3 Demo Board

The HV816DB3 is a demoboard designed for high power applications using the HV816 4x4 QFN-16 package. The HV816DB3 board has the circuitry to drive a 16.5in² EL lamp. For applications requiring smaller lamps and/or lower power, please refer to the HV816DB2 demoboard datasheet.

Products supported

- HV816K6-G



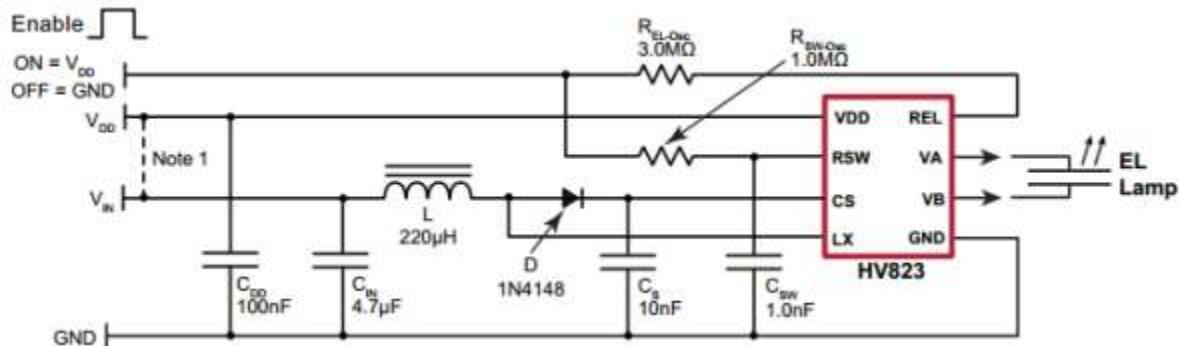


HV823DB1 Demo Board

The HV823DB1 EL Driver demoboard contains all the circuitry necessary to drive an EL (Electroluminescent) lamp. The supplied circuit has been optimized to drive an 8.0in2 lamp from a 3.0 to 3.3V supply. The circuit may be customized with different component values to suit a particular application.

Products supported

- HV823LG-G

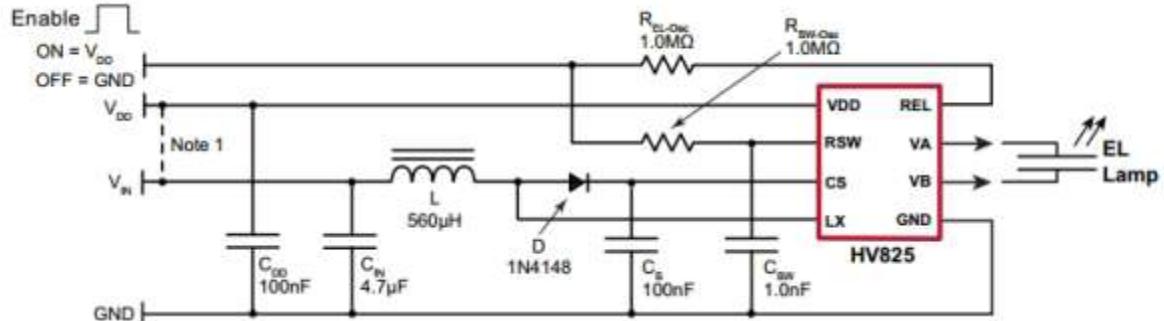


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HV825DB1 Demo Board

The HV825DB1 EL Driver demoboard contains all the circuitry necessary to drive an EL (Electroluminescent) lamp. The supplied circuit has been optimized to drive a 1.5in²lamp from a 1.5V supply. The circuit may be customized with different component values to suit a particular application.

Products supported
 HV825



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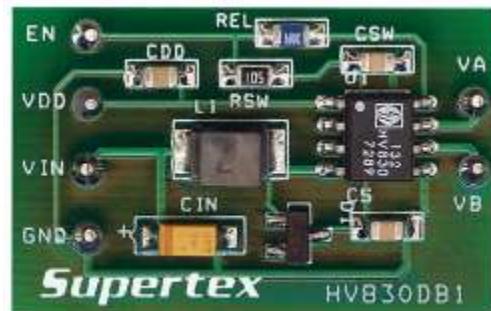
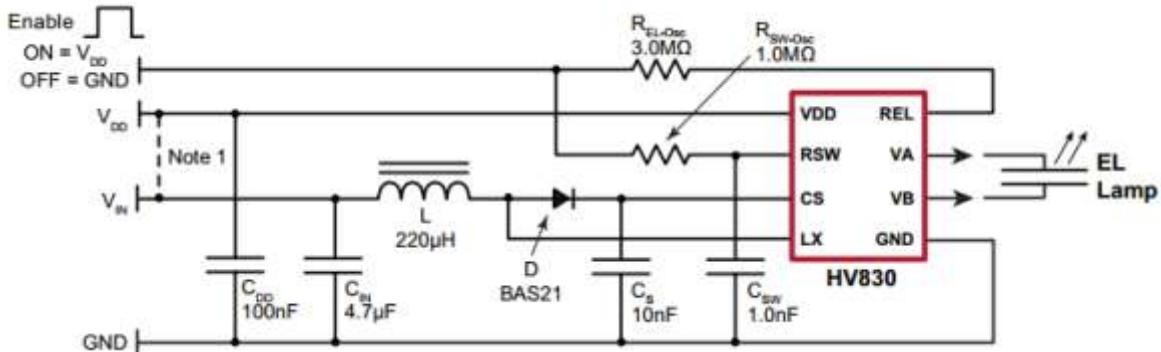


HV830DB1 Demo Board

The HV830DB1 EL Driver demoboard contains all the circuitry necessary to drive an EL (Electroluminescent) lamp. The supplied circuit has been optimized to drive an 8.0in2 lamp from a 3.0 to 3.3V supply. The circuit may be customized with different component values to suit a particular application.

Products supported

- HV830

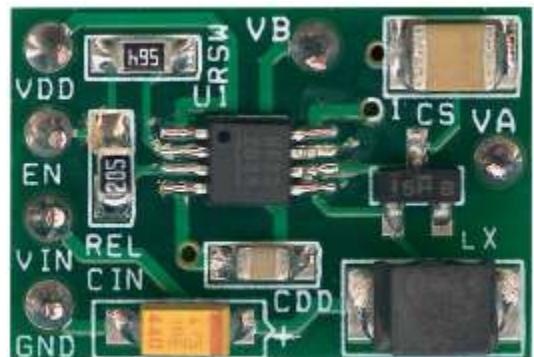
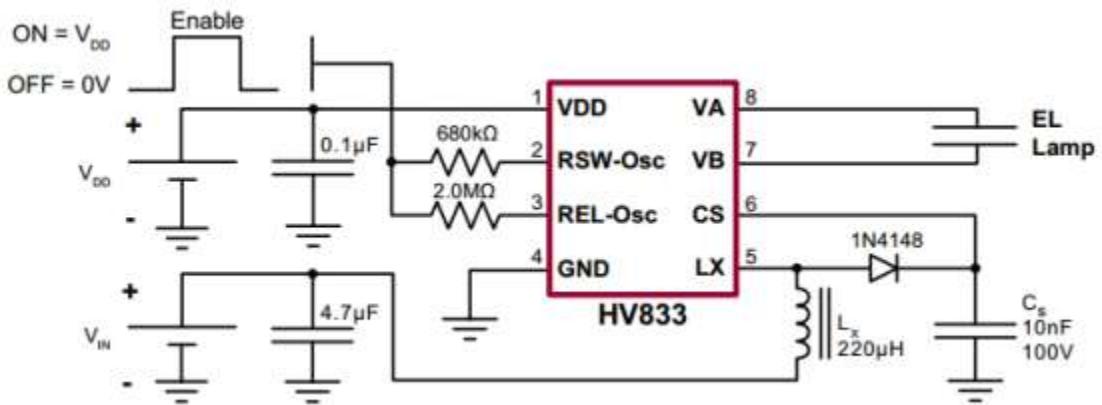


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HV833DB1 Demo Board

The HV833DB1 demoboard contains all necessary circuitry to demonstrate the features of the HV833 EL lamp driver.

Products supported
HV833



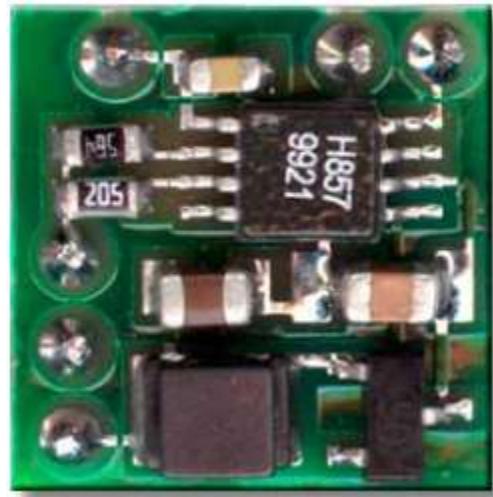
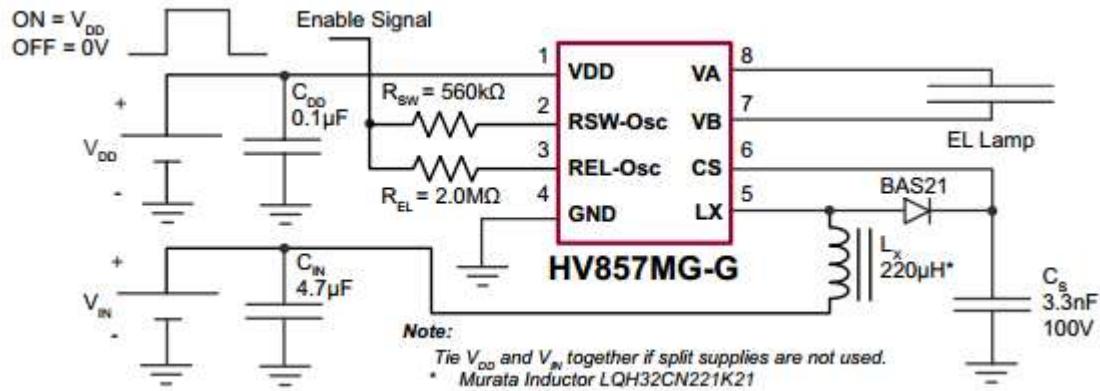
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HV857DB1 Demo Board

The HV857DB1 demoboard contains all necessary circuitry to demonstrate the features of the HV857 EL lamp driver.

Products supported
HV857MG-G



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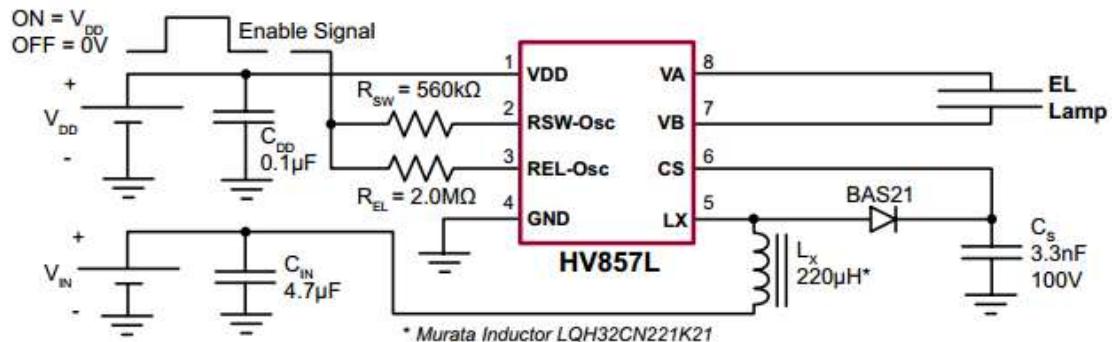
P/N: HV857DB1



HV857LDB1 Demo Board

The HV857LDB1 demoboard contains all necessary circuitry to demonstrate the features of the HV857L EL lamp driver.

Products supported
HV857LMG-G



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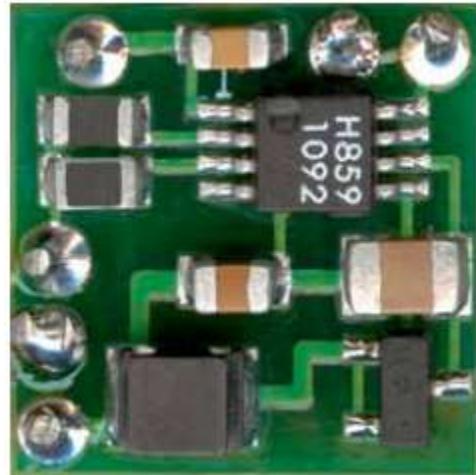
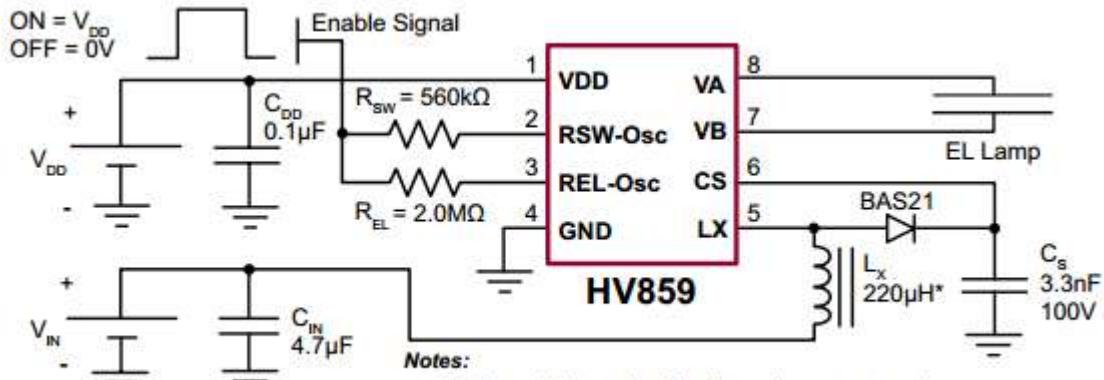
P/N: HV857LDB1



HV859DB1 Demo Board

The HV859DB1 demoboard contains all the necessary circuitry needed to demonstrate the features of the HV859 EL lamp driver.

Products supported
 HV859MG-G

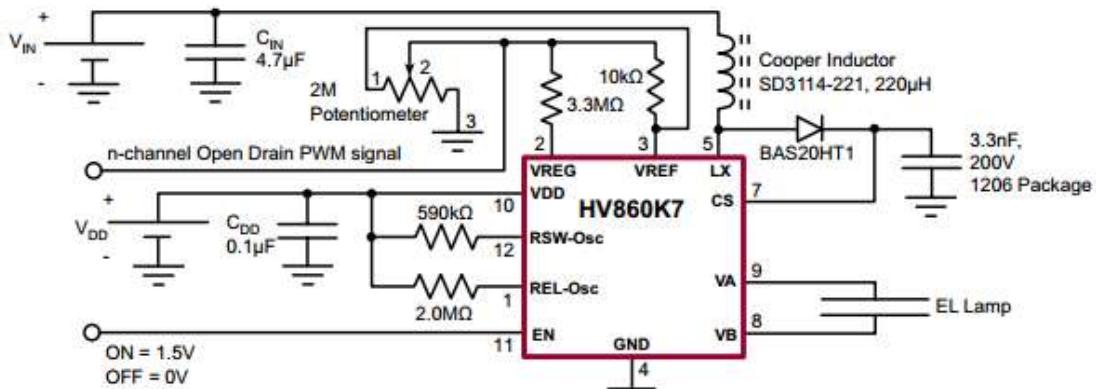


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HV860DB1 Demo Board

The HV860DB1 demoboard contains all necessary circuitry to demonstrate the features of the HV860 EL lamp driver.

Products supported
 HV860K7-G

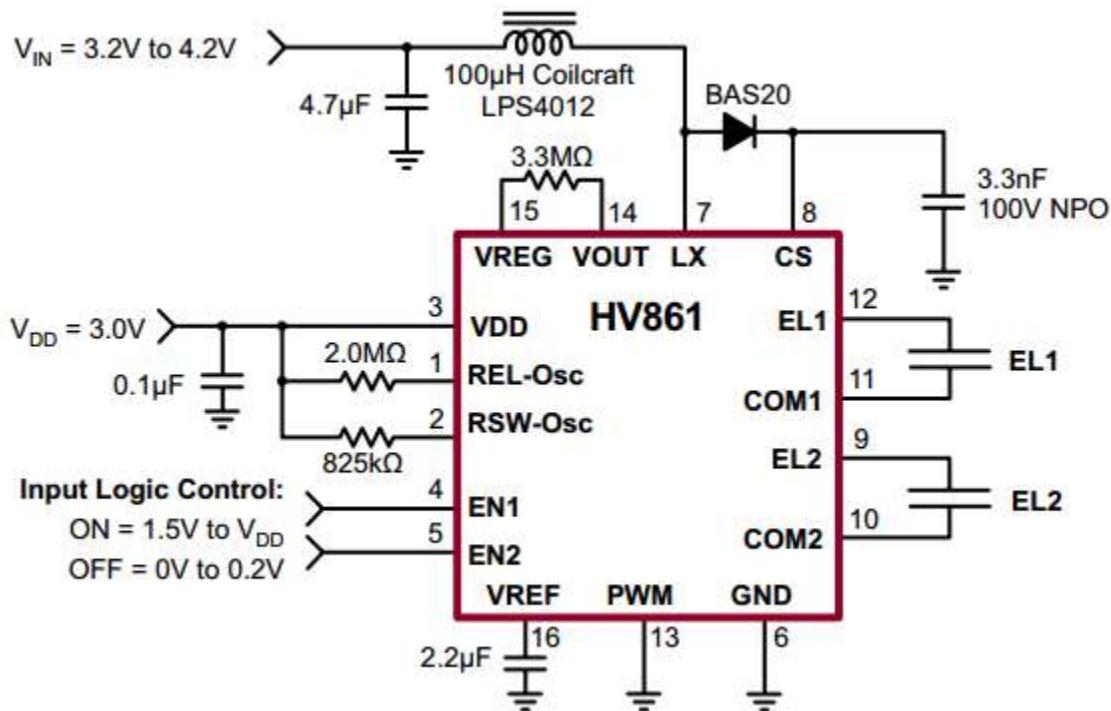


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HV861DB1 Demo Board

The HV861DB1 demoboard contains all the necessary circuitry to demonstrate the features of the HV861 dual EL Lamp driver

Products supported
HV861K7-G

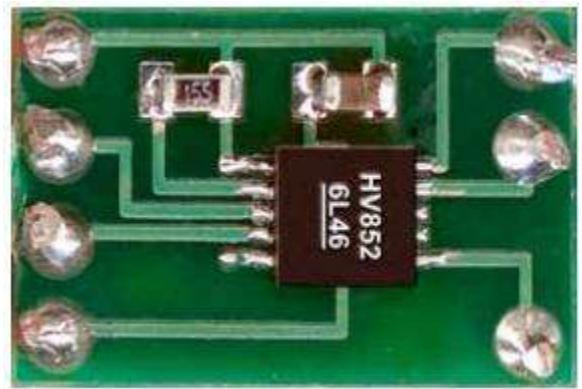
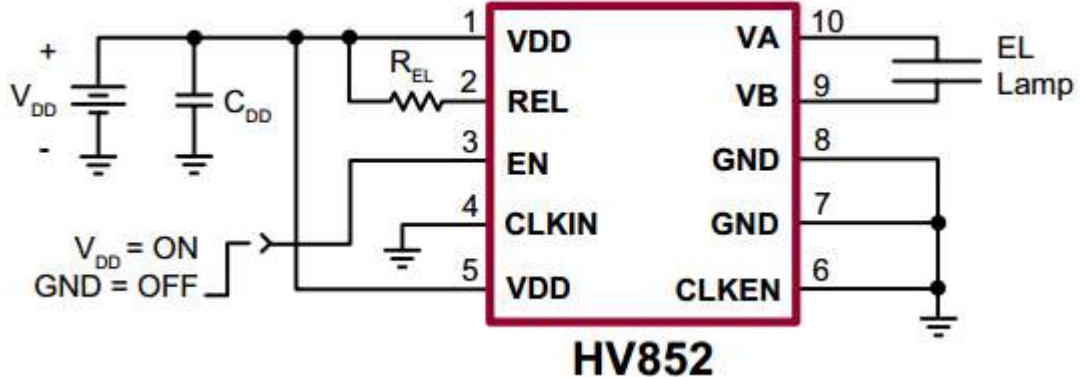


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HV852DB1 Demo Board

The HV852DB1 demoboard contains all necessary circuitry to demonstrate the features of the HV852 EL lamp driver.

Products supported
HV852K7-G



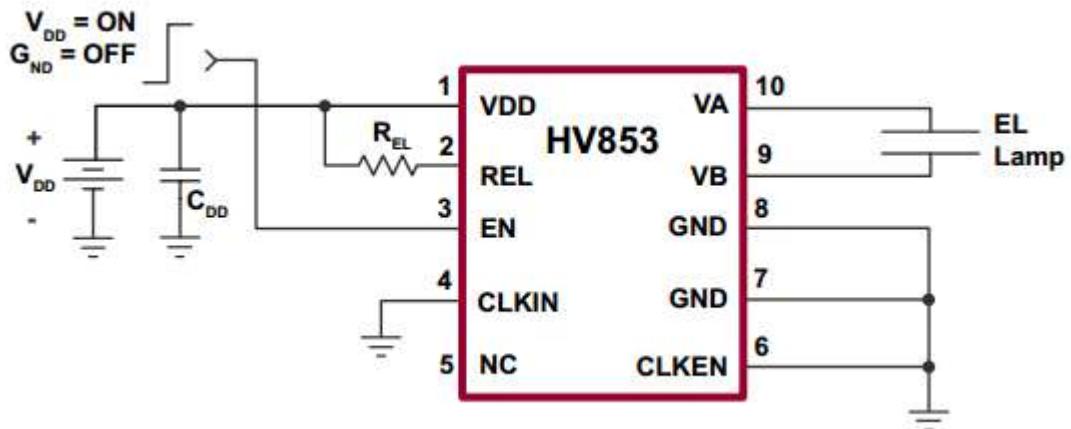
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HV853DB1 Demo Board

The HV853DB1 demoboard contains all the necessary circuitry to demonstrate the features of the HV853 EL lamp driver. The HV853 is the low noise version of the EL driver HV852 with improved EMI performance.

Products supported
 HV853K7-G

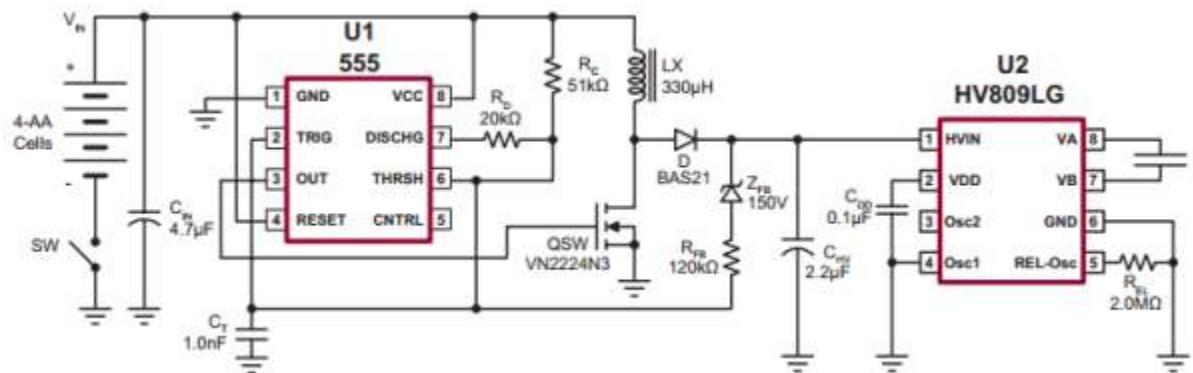


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HV809DB2 Demo Board

The HV809DB2 EL Driver demoboard contains all the circuitry necessary to drive an EL (Electroluminescent) lamp.

Products supported
HV809



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Ethernet EVBs (PHY/Switch/Controller)

Online
Datasheet

LAN874x 10/100 Ethernet PHY
Customer Evaluation Board



EVB8740

LAN922x
Ethernet Controller w/Variable I/O
Customer Evaluation Board



EVB-LAN9221-MINI

LAN921x
Ethernet Controller Customer
Evaluation Board



EVB-LAN9218I-MINI

LAN9303
3-Port Managed Ethernet Switch
Customer Evaluation Board



EVB9303M

LAN931x
3-Port Ethernet Switch with Flexible
Interfaces Customer Evaluation Board



EVB-LAN9313M

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* NOTE: Contact Marketing for GbE PHY tools

Ethernet Evaluation Boards

Online
Datasheet

LAN9500A
High-Speed USB 2.0 to 10/100
Ethernet Customer
Evaluation Board



EVB-LAN9500A-LC

LAN7500
High-Speed USB 2.0 to 10/100/1000
Ethernet Customer
Evaluation Board



EVB-LAN7500-LC

LAN951x High-Speed USB 2.0 to 10/100
Ethernet Hub Customer
Evaluation Board



EVB9514



EVB-LAN9500A-MII



EVB-LAN7500

LAN9730 High-Speed USB 2.0 HSIC to
10/100 Ethernet Customer Evaluation Board



EVB-LAN9730-MII



EVB9512

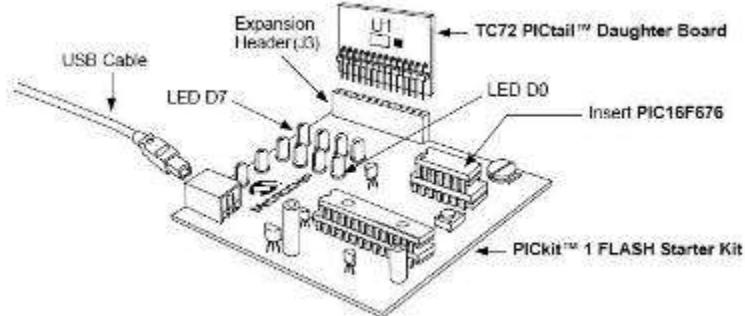
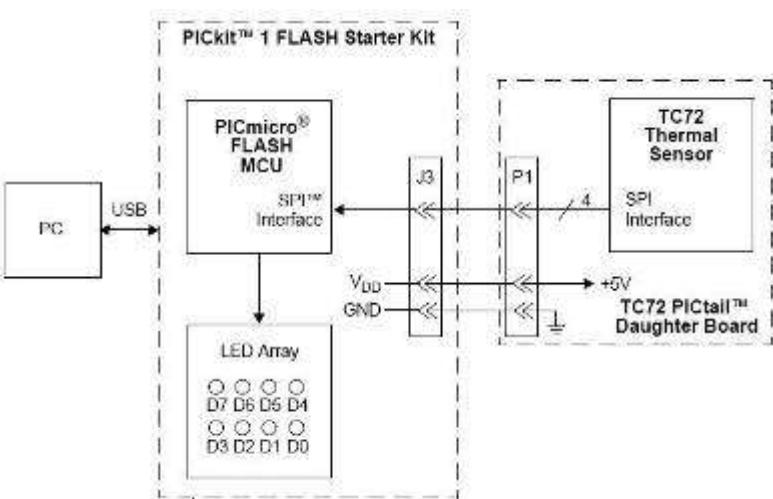
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TC72 PICtail™ Demo Board

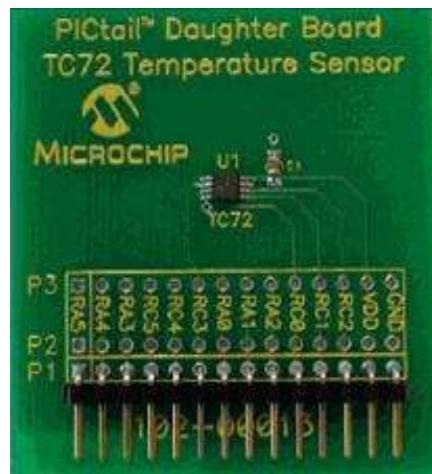
The TC72 Digital Temperature Sensor PICtail™ Demo Board demonstrates how to interface the TC72 Temperature Sensor device to a microcontroller. A PIC16F676 14-pin Flash-based 8-bit CMOS microcontroller is included with the demo board, which can be used with the PICkit™ 1 Flash Starter Kit, along with firmware that provides the SPI interface and temperature conversion routines, to communicate with the TC72.

The Demo Board can also be used as a stand-alone module to quickly add thermal-sensing capability to any existing application. This basic sensor functionality is implemented on a small PCB.



Products supported

- TC72
- PIC16F676

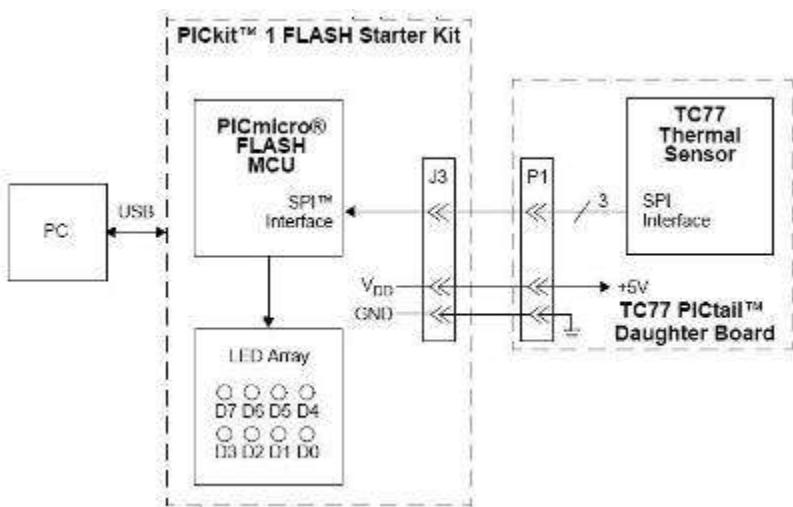

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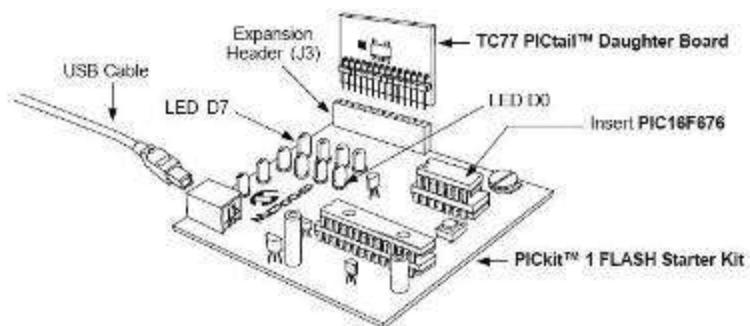
TC77 PICtail™ Demo Board

The TC77 Thermal Sensor PICtail™ Demo Board demonstrates how to interface the TC77 device to a microcontroller. A PIC16F676 14-pin Flash-based 8-bit CMOS microcontroller is included with the demo board, which can be used with the PICkit™ 1 Flash Starter Kit, along with firmware that provides the SPI interface and temperature conversion routines, to communicate with the TC77.

The Demo Board can also be used as a stand-alone module to quickly add thermal-sensing capability to any existing application. This basic sensor functionality is implemented on a small PCB.



- TC77
PIC16F676



P/N: TC77DM-PICTL

Online
Info

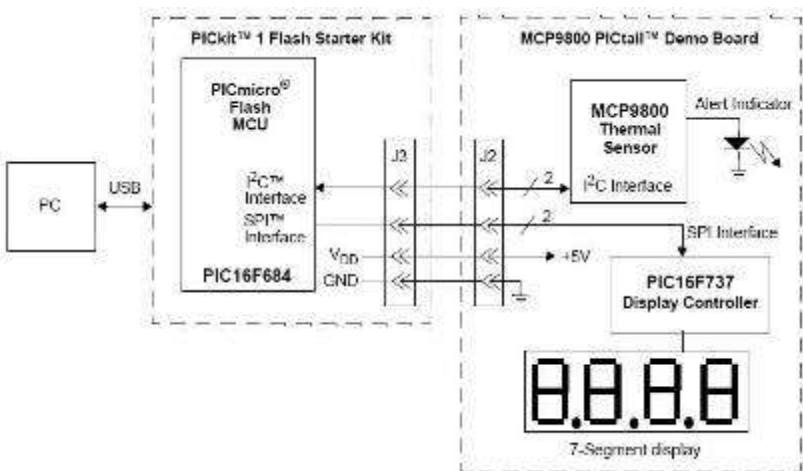
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MCP9800 PICtail™ Demo Board

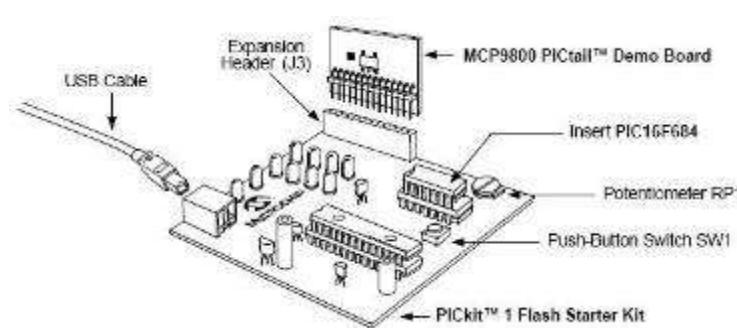
The MCP9800 Thermal Sensor PICtail™ Demo Board demonstrates how to interface the MCP9800 to a PIC® microcontroller using the PICkit™ 1 Flash Starter Kit as a platform. A PIC16F676 14-pin Flash-based 8-bit CMOS microcontroller is included with the demo board, which can be used with the PICkit™ 1 Flash Starter Kit. Also included is firmware that provides the I²C™ interface and temperature conversion routines, to communicate with the MCP9800 and to convert the serial data.

The MCP9800 Thermal Sensor PICtail Demo Board can also be used as a stand-alone module to quickly add thermal sensing capability to any existing application. This basic sensor functionality is implemented on a small Printed Circuit Board (PCB) and an interface via a standard 100 mil header



Products supported

- MCP9800
- PIC16F676

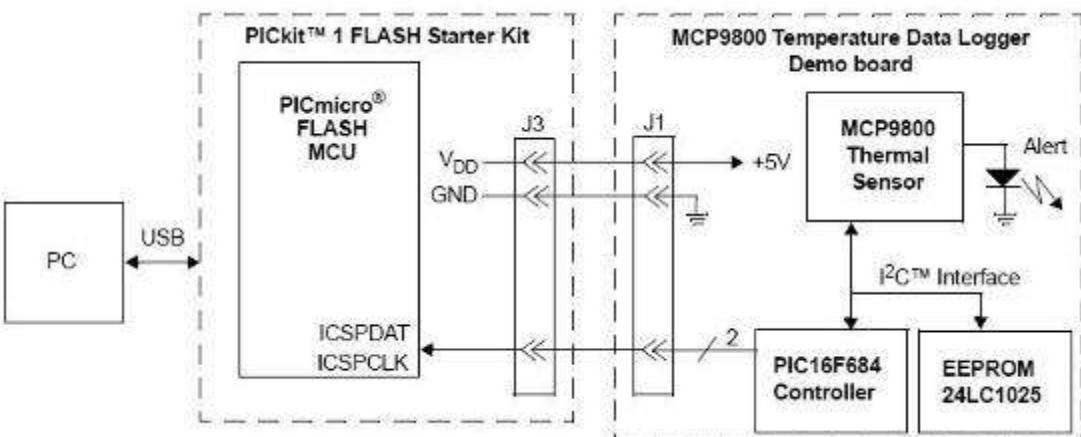


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MCP9800 Data Logger Demo Board

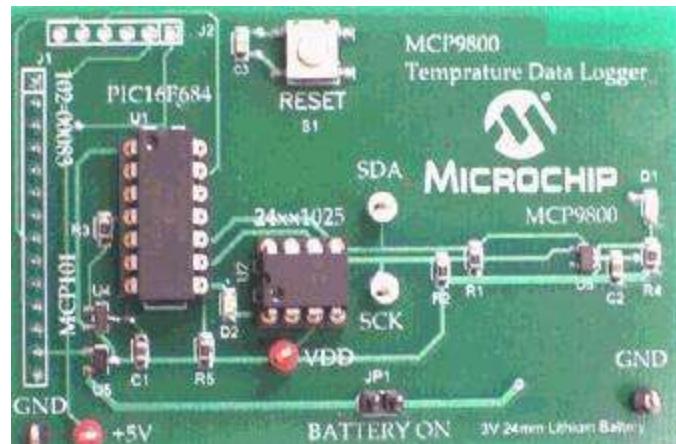
The MCP9800 Temperature Data Logger Demo Board demonstrates how to use the MCP9800 and an on-board EEPROM to log temperature data. A PIC16F676 14-pin Flash-based 8-bit CMOS microcontroller is used with the MCP9800 and stores the temperature data in EEPROM. The PIC microcontroller also communicates with a PC using the PICkit1™ Flash Starter Kit. The temperature data stored in the EEPROM can be transferred to a PC using the PICkit™ 1 software and can be saved in .csv format. The data file can be opened using Microsoft® Excel® software.

The MCP9800 Temperature Data Logger Demo Board can also be used as a stand-alone module, powered with a lithium battery, to measure ambient temperature and store up to 4096 temperature samples over an extended period of time.



Products supported

- MCP9800
- PIC16F684
- 24LC1025

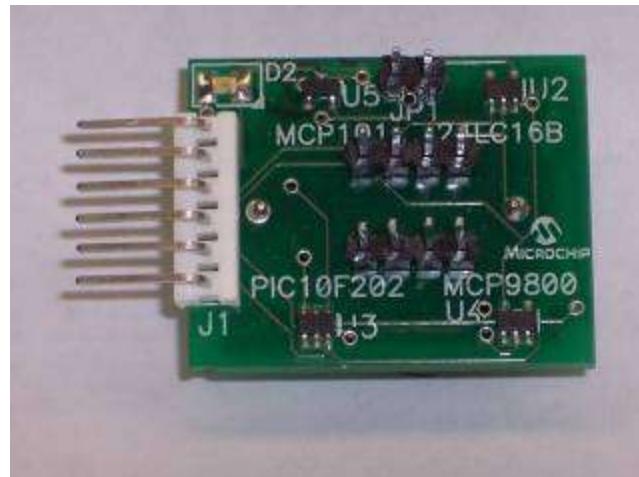
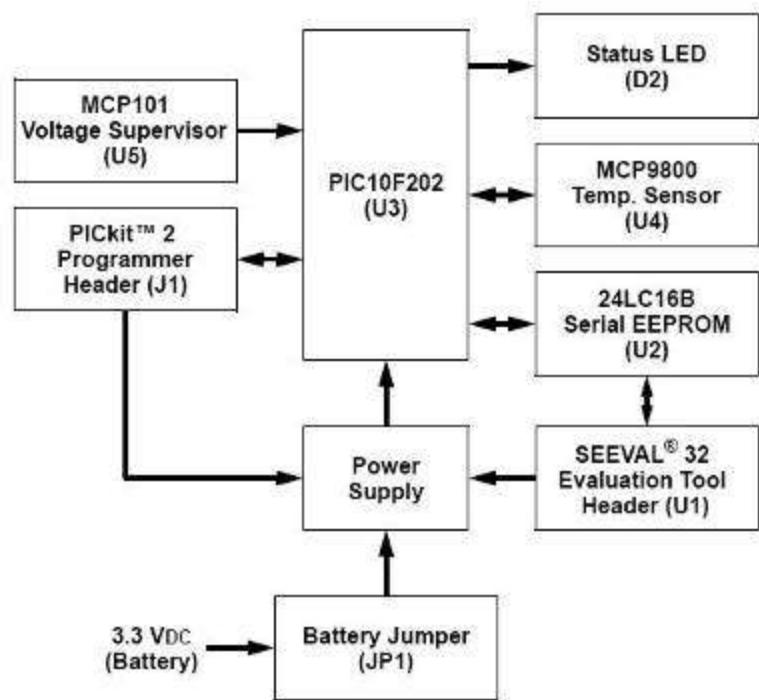


MCP9800 Data Logger Demo Board 2

The MCP9800 Temperature Data Logger Demo Board 2, once programmed, will log temperature measurements for a predetermined amount of time until the 24LC16B is fully programmed with temperature data (i.e., 2,048 temperature readings). Each sample uses one byte of memory. The intervals can be changed in the firmware provided by changing the TIMEOUTVAL variable. The firmware will take measurements for approximately 45 minutes (approx. 1 sample/sec).

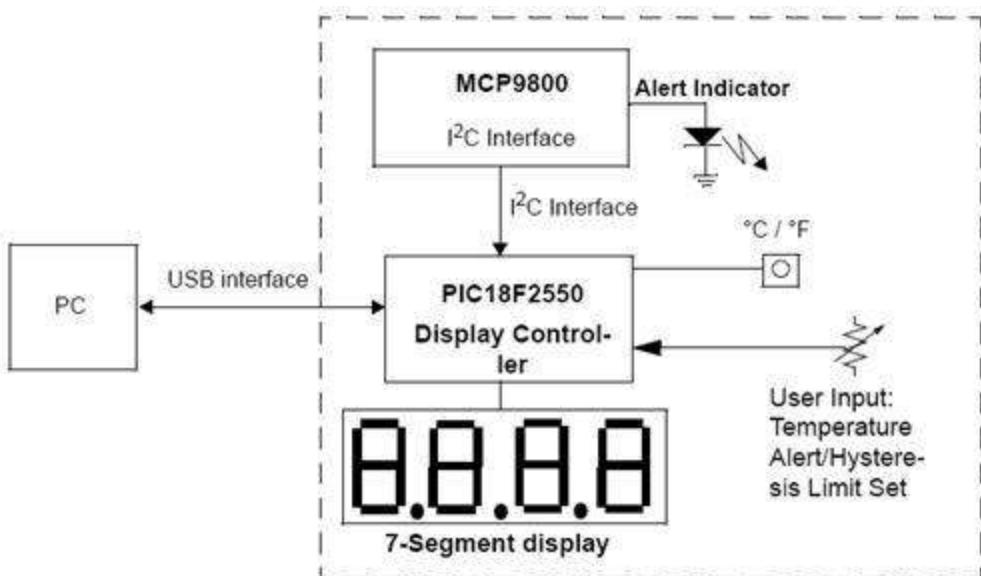
Products supported

- MCP9800
- MCP101
- PIC10F202
- 24LC16B


[**<< BACK**](#)

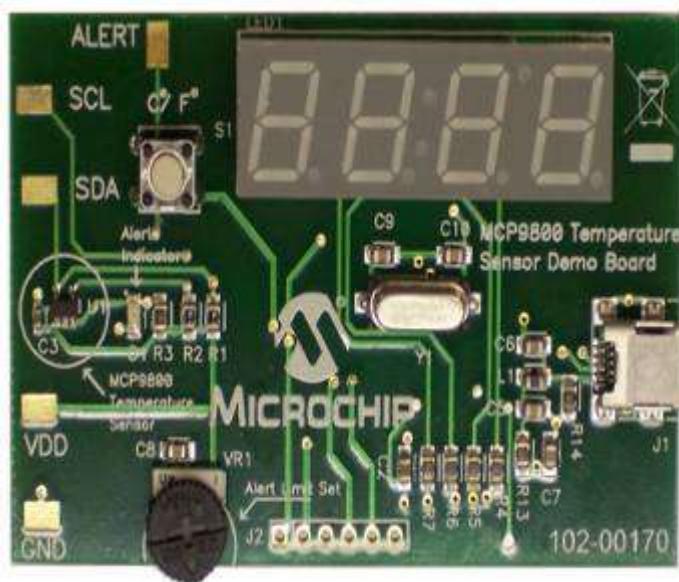
MCP9800 Temperature Sensor Demo Board

The MCP9800 Temperature Sensor Demo Board demonstrates the sensor's features. Users can connect the demo board to a PC with USB interface and evaluate the sensor performance. The 7-Segment LED displays temperature in degrees Celsius or degrees Fahrenheit; the temperature alert feature can be set by the users using an on board potentiometer. An alert LED is used to indicate an over temperature condition. In addition, temperature can be datalogged using the Microchip Thermal Management Software Graphical User Interface (GUI). The sensor registers can also be programmed using the GUI.



Products supported

- MCP9800
- PIC18F2550

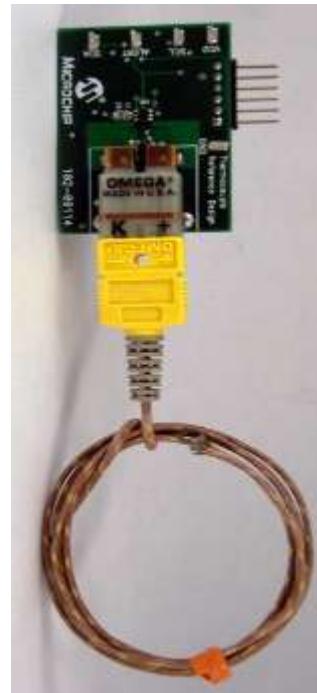
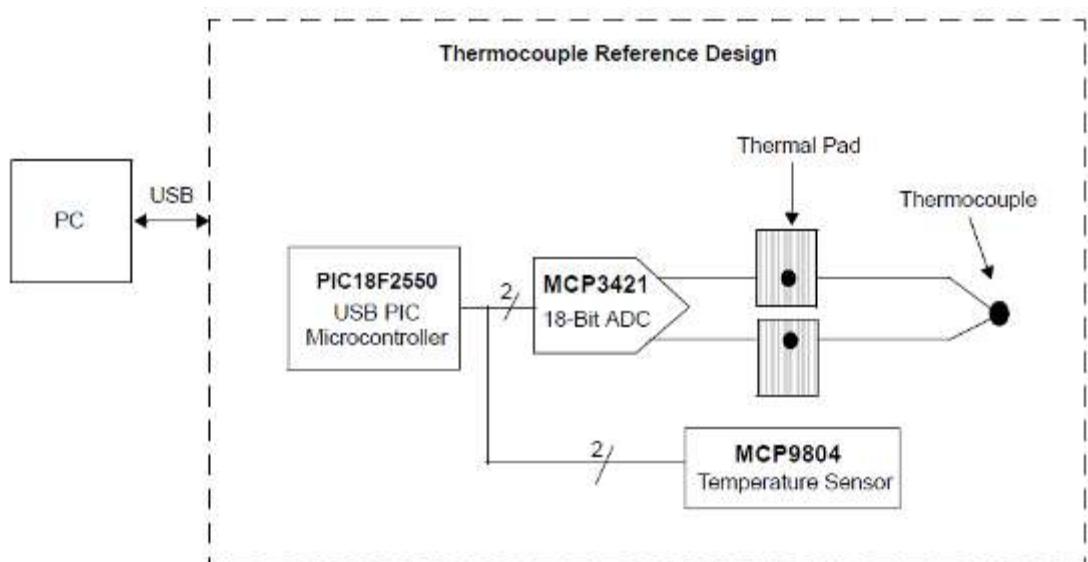

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Thermocouple Reference Design

The Thermocouple Reference Design demonstrates Microchip's solution to accurately measure temperature using a Thermocouple and an 18-bit ADC, MCP3421. This solution eliminates the need for the traditional analog instrumentation system calibration or gain and offset trimming techniques. In addition, the Thermocouple linearization techniques can be implemented in firmware or software.

Products supported

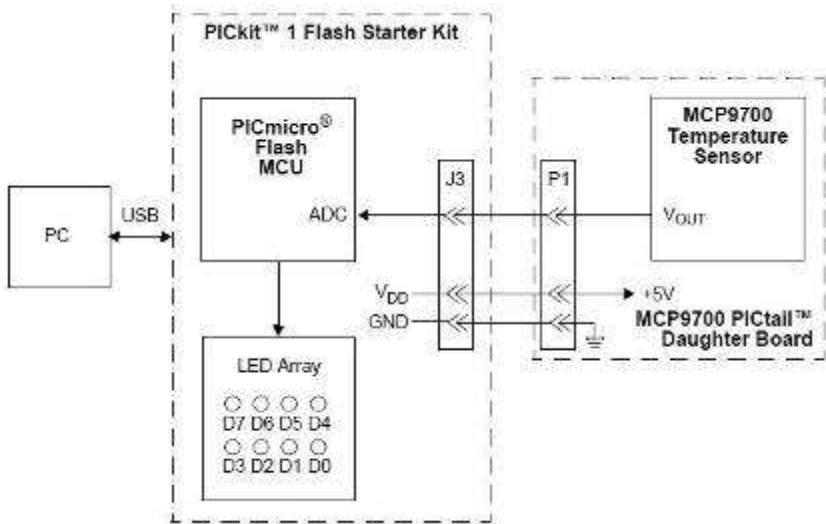
- MCP9804
- MCP3421
- PIC18F2550


[<< BACK to ADC](#)
[<< BACK to Temp. Sensors](#)

MCP9700 PICtail™ Demo Board

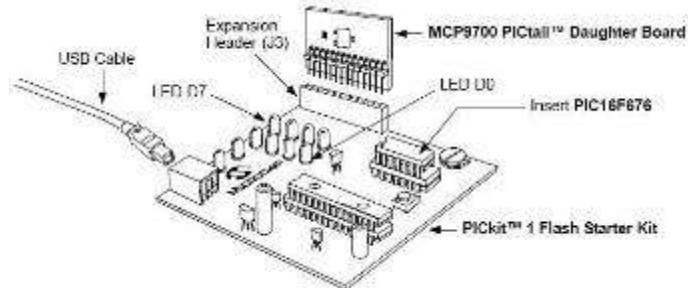
The MCP9700 Temperature-to-Voltage Converter PICtail™ Demo Board demonstrates how to interface the MCP9700 to a PIC® microcontroller using the PICkit™ 1 Flash Starter Kit as a platform. A PIC16F676 14-pin, Flash-based, 8-bit CMOS microcontroller device is included with the demo board that can be used with the PICkit™ 1 Flash Starter Kit, along with firmware that provides the interface to the MCP9700 Temperature-to-Voltage Converter PICtail™ Demo Board and the voltage-to-temperature conversion routines.

The demo board can also be used as a stand-alone module to quickly add thermal sensing capability to any existing application. This basic sensor functionality is implemented on a small PCB and an interface via a standard 100 mil header.



Products supported

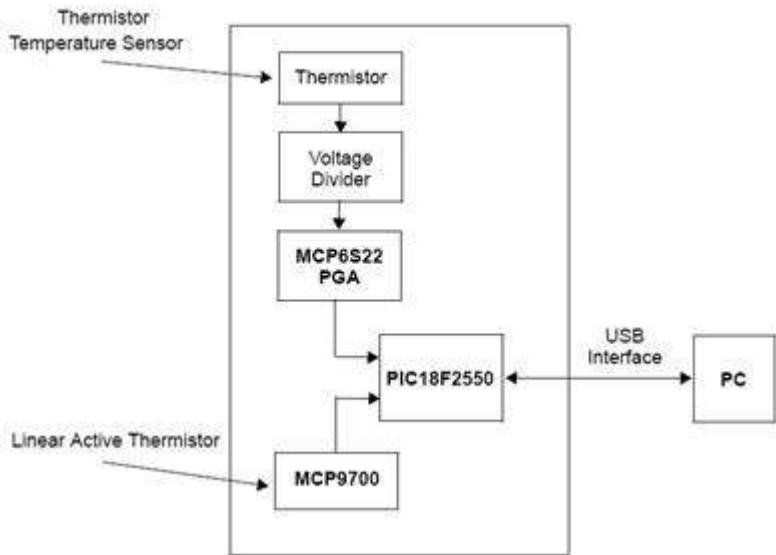
- MCP9700
- PIC16F676


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MCP9700 Thermistor Demo Board

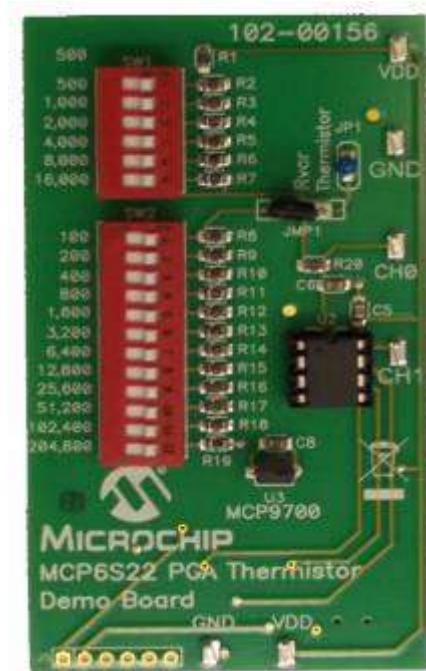
The MCP9700 Thermistor Demo Board contains the analog circuitry to measure temperature. It uses BC Components' 232264055103 NTC thermistor to convert temperature to resistance. The thermistor is placed in a voltage divider which converts resistance to voltage. This voltage is filtered and placed at the MCP6S22 Programmable Gain Amplifier's (PGA) CH0 input. The PGA gains and buffers the thermistor. In addition, the board includes the MCP9700 Linear Active Thermistor. The MCP9700 outputs voltage proportional to temperature. A PIC18F2550 is used to both measure the voltage output of the MCP9700 and the MCP6S22 using an integrated 10-bit Analog to Digital Converter and communicate to a PC via USB interface. Temperature can be data logged using Microchip Thermal Management Software Graphical User Interface (GUI).



P/N: MCP9700DM-TH1

Products supported

- MCP9700
- MCP6S92
- PIC18F2550

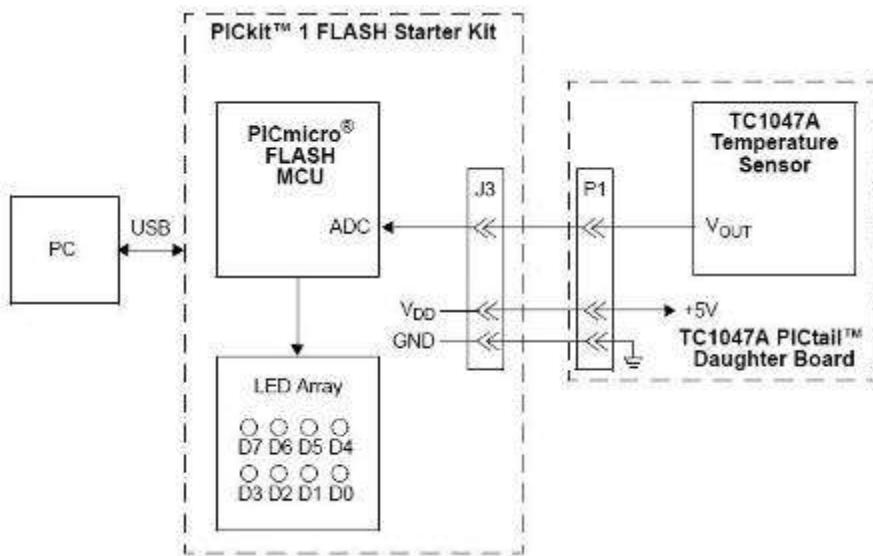


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TC1047A PICtail™ Demo Board

The TC1047A Temperature-to-Voltage Converter PICtail™ Demo Board demonstrates how to interface the TC1047A to a PIC® microcontroller using the PICkit™ 1 Flash Starter Kit as a platform. A PIC16F676 14-pin, Flash-based, 8-bit CMOS microcontroller device is included with the demo board that can be used with the PICkit™ 1 Flash Starter Kit, along with firmware that provides the interface to the TC1047A Temperature-to-Voltage Converter PICtail™ Demo Board and the voltage-to-temperature conversion routines.

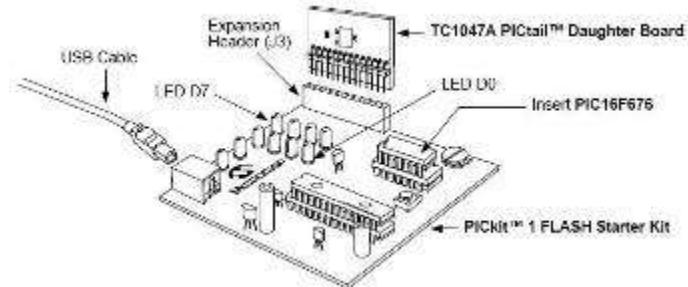
The demo board can also be used as a stand-alone module to quickly add thermal sensing capability to any existing application. This basic sensor functionality is implemented on a small PCB and an interface via a standard 100 mil header.



P/N: TC1047ADM-PICTL

Products supported

- TC1047A
- PIC16F676



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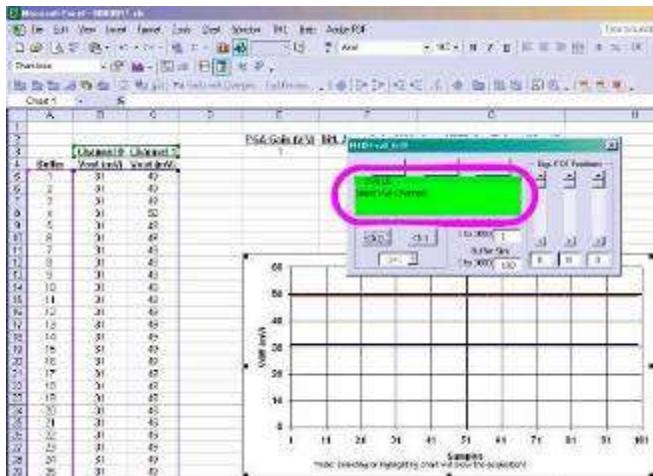
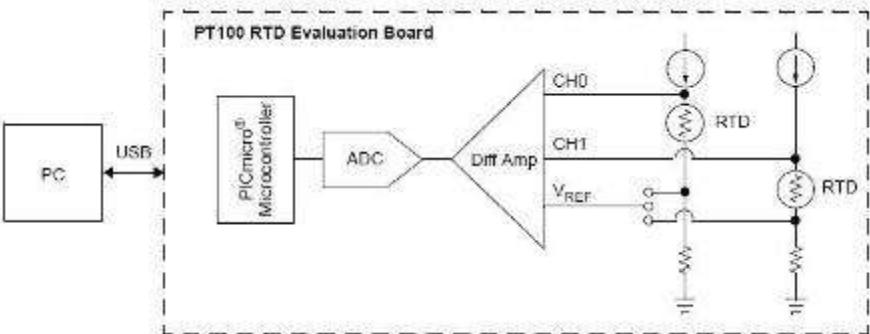
PT100 RTD Evaluation Board

The PT100 RTD Evaluation Board allows the user to evaluate Microchip's solution to accurately measure temperature using RTD. When biasing RTDs to measure temperature, self-heat due to power dissipation has to be considered. RTD resistance availability typically ranges from 100Ω to $5,000\Omega$. In order to measure the output voltage across the RTD over a wide temperature range, the biasing current has to be relatively high. This higher current causes more power dissipation through heat and skews the temperature reading. Microchip's solution to this challenge is to use a MCP6S26 Programmable Gain Amplifier (PGA) to increase the sensor dynamic output range and increase measurement resolution while significantly reducing the biasing current magnitude.



Products supported

- MCP6S26
- MCP3301
- MCP6024
- MCP41010
- MCP6002
- TC1071
- PIC18F2550



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MICROCHIP

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EMC1043/53 Evaluation Board

The EMC1043/53 Evaluation Board provides the means to demonstrate the EMC1043/53 features and to view and modify registers through USB. LED indicators and test points are included to show status information. 2N3904 diode-connected transistors are installed on the PCB.

Products supported

- EMC1043
- EMC1053



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P/N: ADM00490

EMC1043 Evaluation Board

The EMC1043 Triple Temperature Sensor Evaluation Board is a USB-based platform for evaluating the EMC1043 device. It provides the means to demonstrate the EMC1043 features and to view and modify registers through USB. LED indicators and test points are included to show status information. The 2N3904 diode-connected transistors are installed on the PCB.

Products supported

- EMC1043

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EMC1412 Evaluation Board

The EMC1412 Evaluation Board provides the means to demonstrate the EMC1412 features and to view and modify registers through USB. LED indicators and test points are included to show status information and a fan driver circuit linearly drives a 5V fan to 3 different speeds based on programmable temperature limits.

Products supported

EMC1412



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P/N: ADM00491



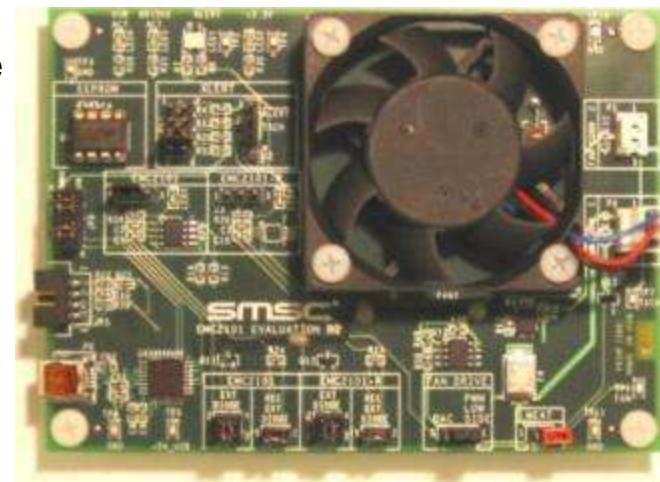
EMC2101 Eval Board

The EMC2101 EVB is a USB-based platform that provides the means to demonstrate EMC2101 features and to view and modify registers. A +12V fan and power supply are provided to demonstrate the fan control functionality. LEDs indicate status information and test points are included to monitor system voltages with a user provided voltmeter or oscilloscope. Also included are:

- Headers for connecting a remote diode or CPU/GPU thermal diode
- Chip Manager (SMSC application) allows:
 - Viewing and changing register values
 - Graphing of any register
 - Resistance Error Correction verification
- Autonomous register loading via included EEPROM (EMC2101-R only)
- USB communication to evaluation board
- An external SMBus master may also be used via jumper settings

Products supported

- EMC2101

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EMC1701 Eval Board

The EMC1701 EVB is a USB-based platform that provides the means to evaluate features and to view and modify registers. LEDs indicate status information and test points are included to monitor system voltages with a user-provided voltmeter or oscilloscope. The features include:

- The SMSC Chip Manager application allows:
 - Viewing and changing register values
 - Graphing registers
 - Saving settings for all registers to allow quick configuration at later time
- The Evaluation Board provides:
 - Test pins and LEDs for monitoring onboard function
 - Screw terminal connections for monitoring external system current up to 20A
 - Multiple onboard adjustable current sources (steady state, square wave, test pulse)
 - USB to SMBus bridge for power and communications
 - Capability to connect directly to external SMBus master

Products supported

- EMC1701

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PAC1710/20 Eval Board

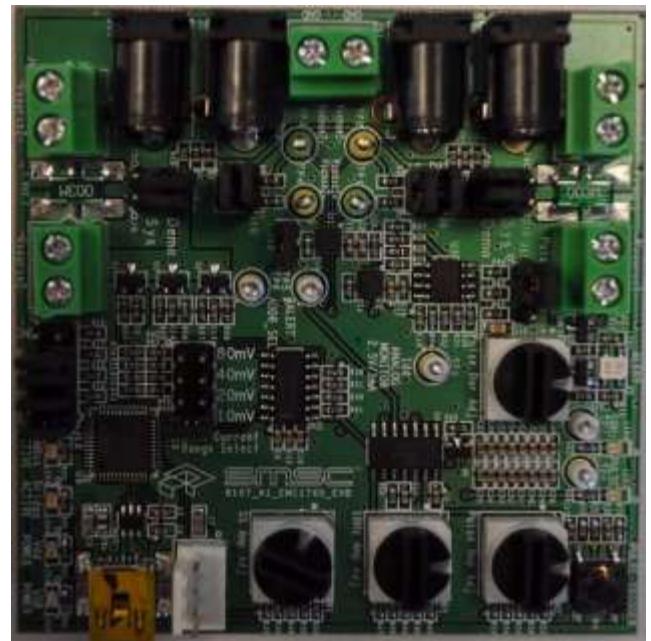
The PAC1710/20 Single-Dual High Side DC Current Sense Eval Board provides the means to evaluate features and to view and modify registers of both PAC1710 and PAC1720. There are two modes of EVB current monitoring operation: Demo Mode, which monitors an onboard current source, and Sys Mode, which monitors an external current source. LEDs indicate status information, and test points are included to monitor system voltages with a user-provided voltmeter or oscilloscope

Features:

- Chip Manager software allows viewing and changing register values
- USB to SMBus bridge for power and communications
- Test points and LEDs for monitoring onboard function
- Screw terminal connections for monitoring external system current up to 20A
- Multiple onboard adjustable current sources (steady state, square wave, test pulse)
- Capability to connect directly to external SMBus master

Products supported

- PAC1710
- PAC1720

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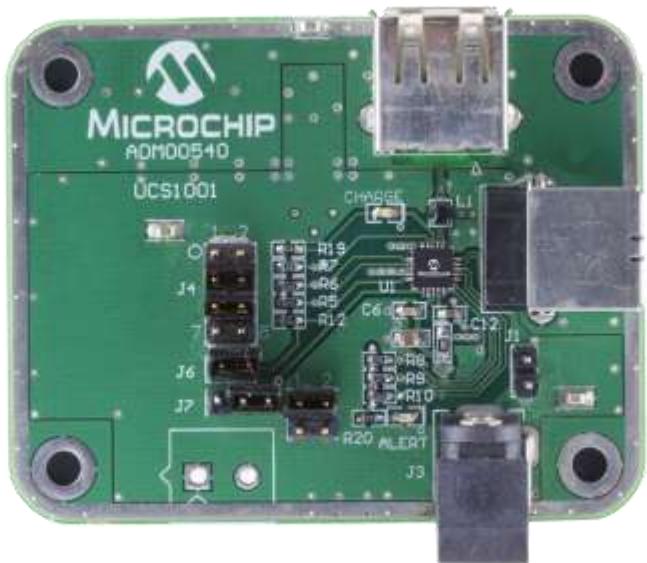


UCS1001 Eval Board

The UCS1001 Evaluation Board is intended for evaluation of stand-alone USB charging. The UCS1001 supports popular emulation profiles for Apple, Samsung, and BC1.2 compliant devices. Jumper configurations allow selection of operation for Dedicated Charging Emulation, Charging Downstream Port, Standard Downstream Port, and USB Pass Through

Products supported

- UCS1001-1
- UCS1001-2

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UCS1002 Eval Board

The UCS1002 Evaluation Board allows the user to use a graphical user interface to demonstrate the Highest Current Algorithm, apply charger emulation profiles, and set up for full BC1.2 CDP, DCP, and SDP modes. Options in the GUI include custom profile register configuration, dead battery routines, charge ration operation, and configuration of fault handling.

Products supported

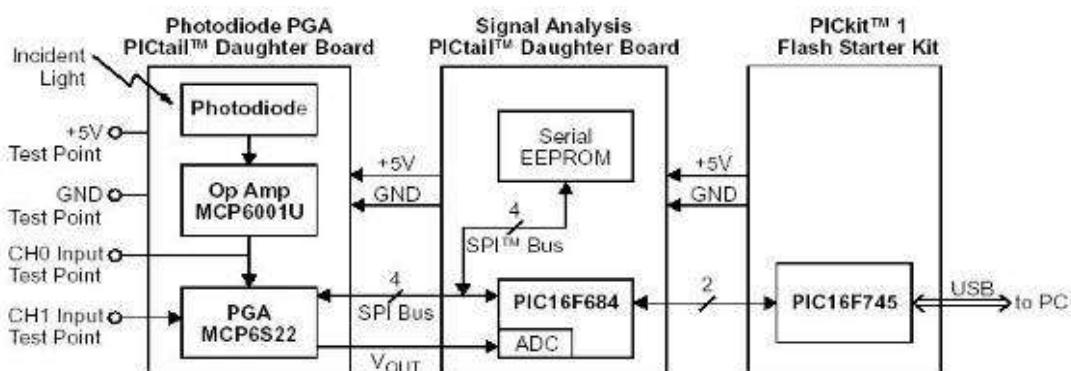
- UCS1002

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P/N: EVB-UCS1002

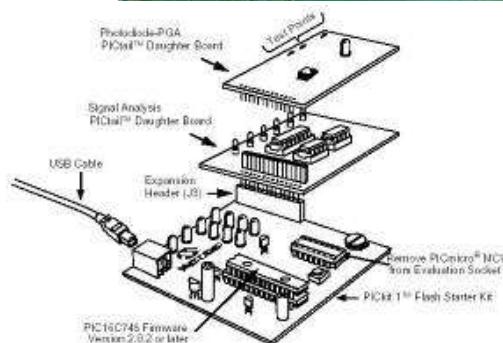
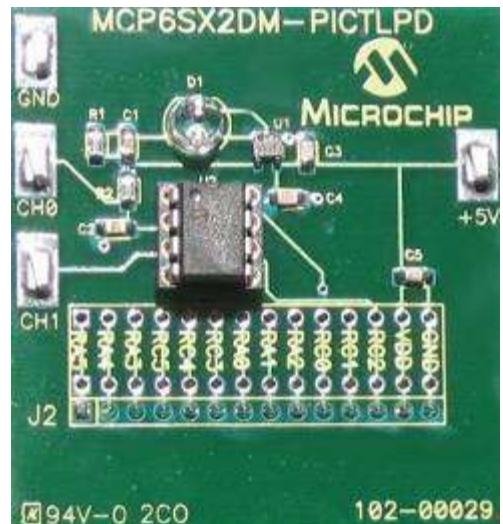
MCP6SX2 Photodiode PICtail™ Demo Board

The Photodiode PGA PICtail™ Daughter Board contains the analog circuitry to convert light incident to the photodiode to current. The op amp converts current to voltage (transimpedance amplifier). This voltage is sent to the CH0 input of the PGA. The PGA gains and buffers this output, which is sent off-board (V_{OUT}). Board power is applied to the +5V and GND inputs. The SPI bus makes it possible to control the PGA; its gain and input channel can be set as desired from the software.



Products supported

- MCP6S22
- MCP6001

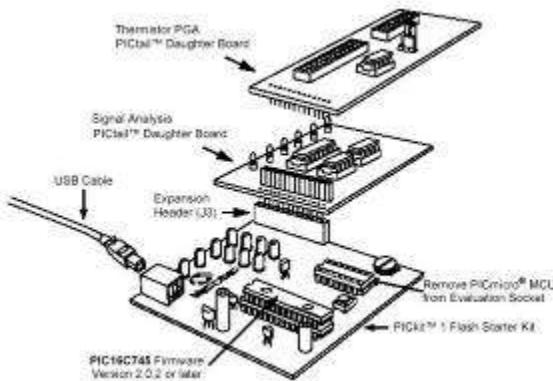
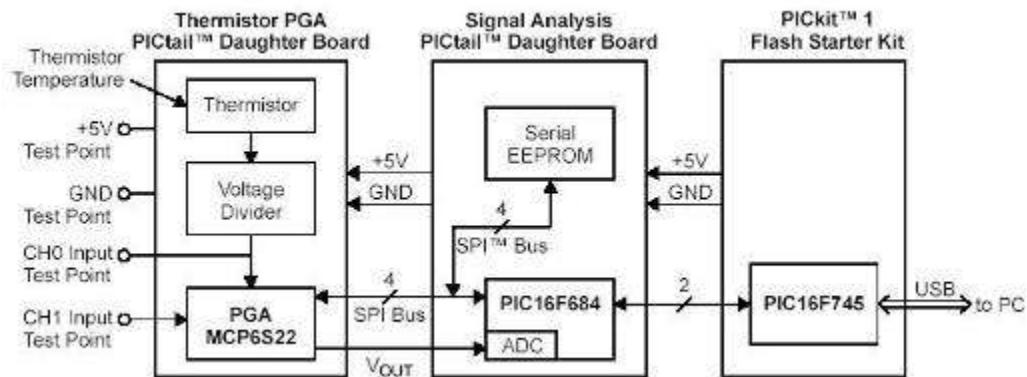

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MCP6SX2 Thermistor PICtail™ Demo Board

The Thermistor PGA PICtail™ Daughter Board uses BC Components' NTC thermistor to convert temperature to resistance. The thermistor is placed in a voltage divider which converts resistance to voltage. The voltage is filtered and placed at the MCP6S22 Programmable Gain Amplifier's (PGA) CH0 input. The PGA gains and buffers this output, which is sent off-board (V_{OUT}). Board power is applied to the +5V and GND inputs. The SPI bus makes it possible to control the PGA; its gain and input channel can be set as desired from the software.

Products supported

- MCP6S22


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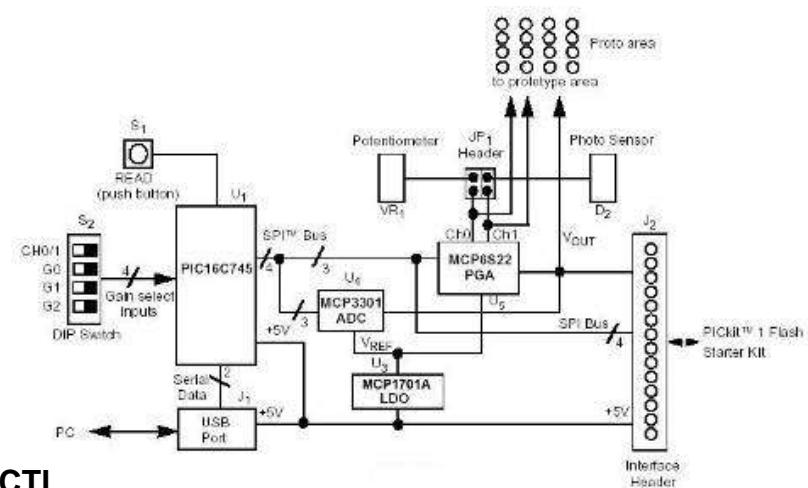
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MCP6S22 PICtail™ Demo Board

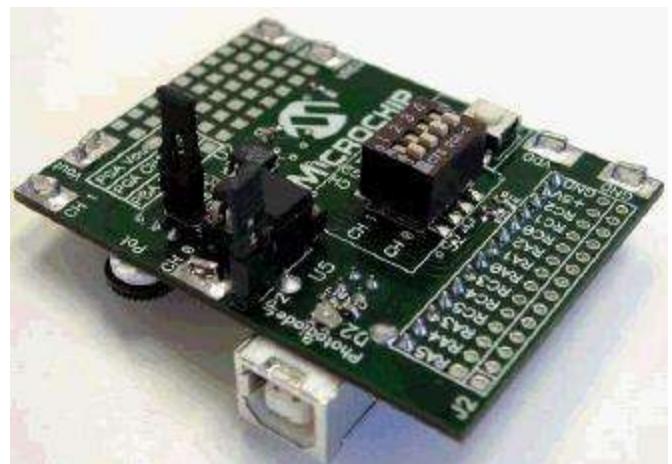
The MCP6S22 PGA PICtail™ Demo Board is used to evaluate and demonstrate Microchip Technology's Programmable Gain Amplifier (PGA) family, MCP6S21/2/6/8. This board has a user interface program the MCP6S22 two-channel PGA. It can also be interfaced with Microchip's PICkit™ 1 Flash Starter Kit Development Board. This platform allows the user to develop firmware that selects the PGA gains and channels using SPI interface.

The demo board can also be used stand-alone, with a user interface that allows the PGA gains and channels to be selected without a firmware development. The board uses a USB interface to communicate with a PC, while the PICkit™ software can be used as a Graphical User Interface (GUI) to display the PGA output voltage.



Products supported

- MCP6S22
- MCP3301
- MCP1701A
- PIC16C745



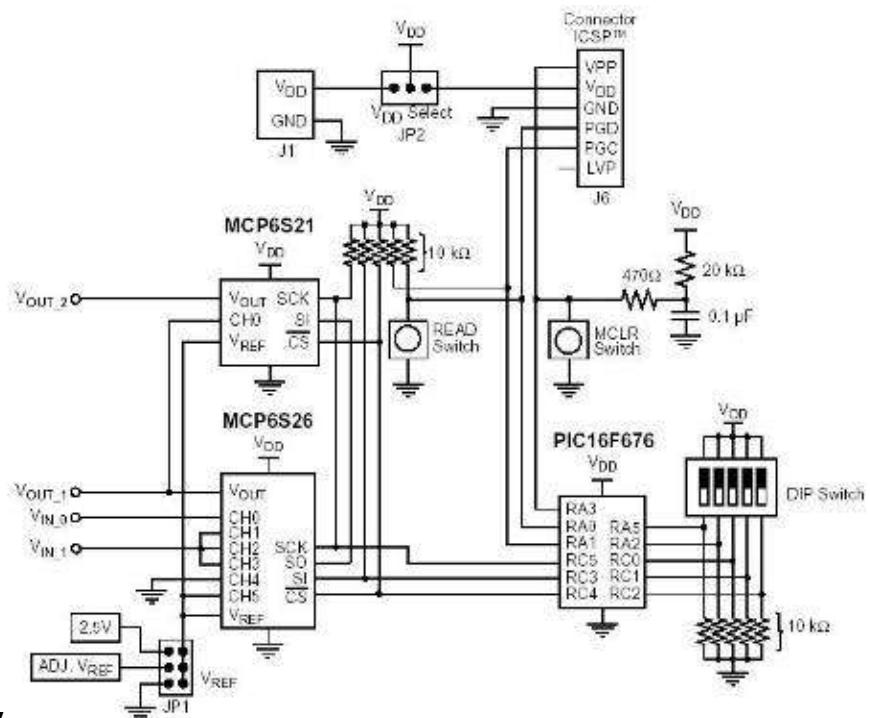
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P/N: MCP6S22DM-PICTL



MCP6S2X Eval Board

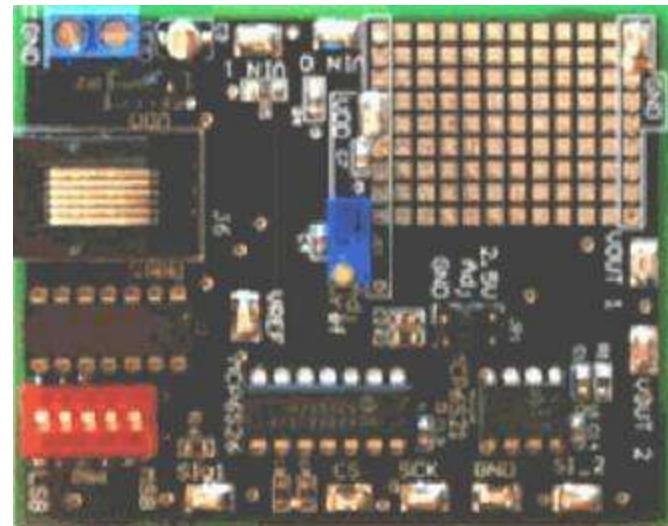
The single-channel MCP6S21 and six-channel MCP6S26 have been selected for this evaluation board. The PIC16F676 microcontroller is used on-board DIP switch settings that are configured according to the table printed on the evaluation board. This allows the user to program the channel, gain and shutdown of each PGA. Either PGA or both PGAs can be shut down. The six channels of the MCP6S26 and the PGA gains of 1, 2, 4, 5, 8, 10, 16 and 32 V/V can be configured.



P/N: MCP6S2XEV

Products supported

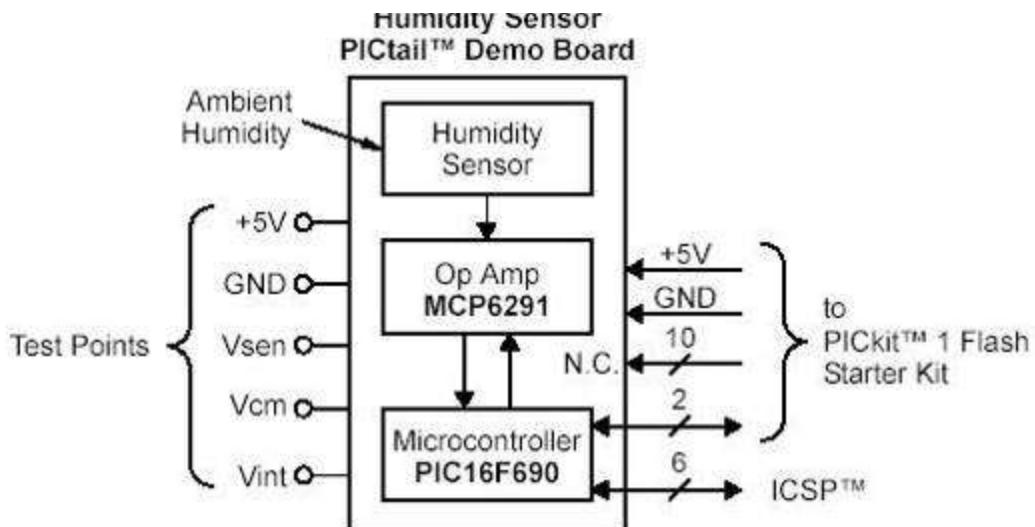
- MCP6S21
- MCP6S26
- PIC16F676



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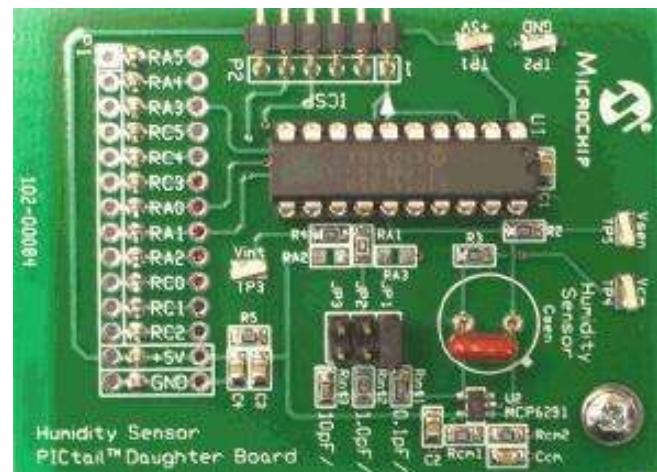
Humidity Sensor PICtail™ Demo Board

The Humidity Sensor PICtail™ Demo Board senses the ambient relative humidity by changes in the capacitance of the humidity sensor (HS1101LF from Humirel). This sensor is connected to a MCP6291 op amp and a resistor to form an inverting (Miller) integrator. The PIC16F690 microcontroller sends a square wave to the input of the integrator, which the integrator converts to a triangle wave at its output. The firmware controls the magnitude of the triangle wave and measure the integration time. The microcontroller measure the time it takes for the triangle wave to rise and fall. These times are converted to a capacitance value.



Products supported

- MCP6291
- PIC16F690


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FilterLab®

FilterLab® is an innovative software tool that simplifies active filter design. Available at no cost, the FilterLab® active filter software design tool provides full schematic diagrams of the filter circuit with component values and displays the frequency response.

Features

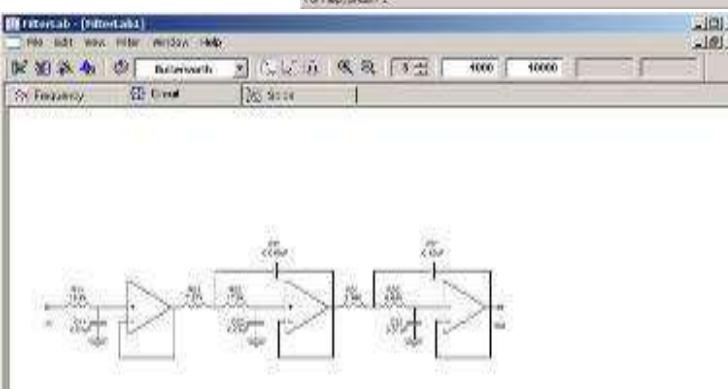
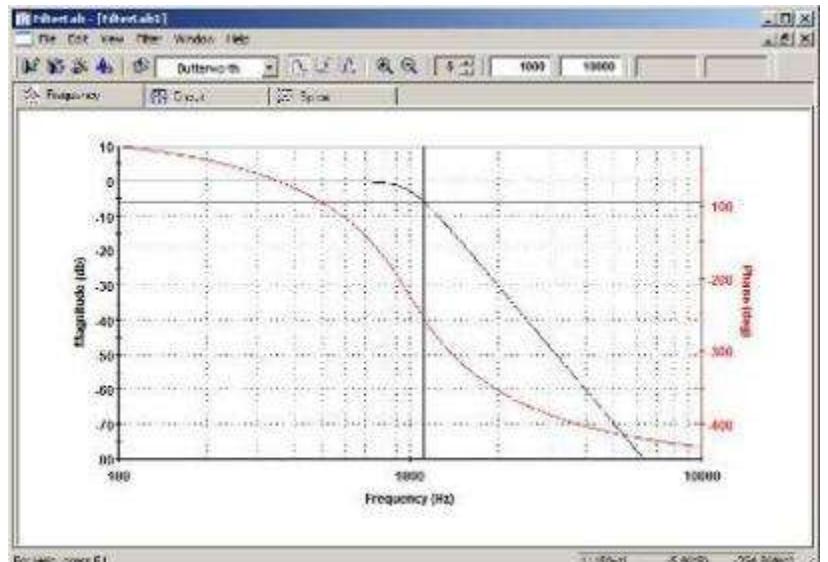
Allows the design of low-pass filters up to an 8th order filter with Chebyshev, Bessel or Butterworth responses from frequencies of 0.1 Hz to 10 MHz

Selection of flat passband or sharp transition from passband to stopband

Options, such as minimum ripple factor, sharp transition and linear phase delay, are available

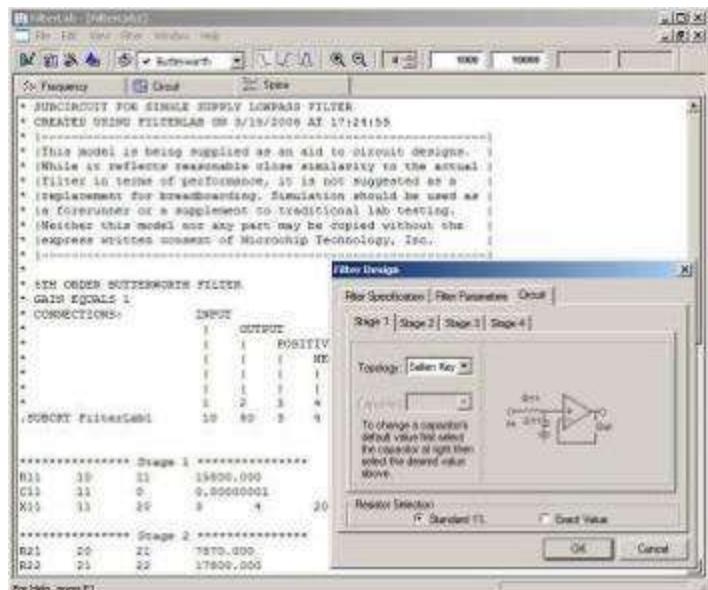
Changes in capacitor values can be implemented

Generates a SPICE model of the designed filter allowing time domain analysis in SPICE simulations



Products supported

MCP6xxx

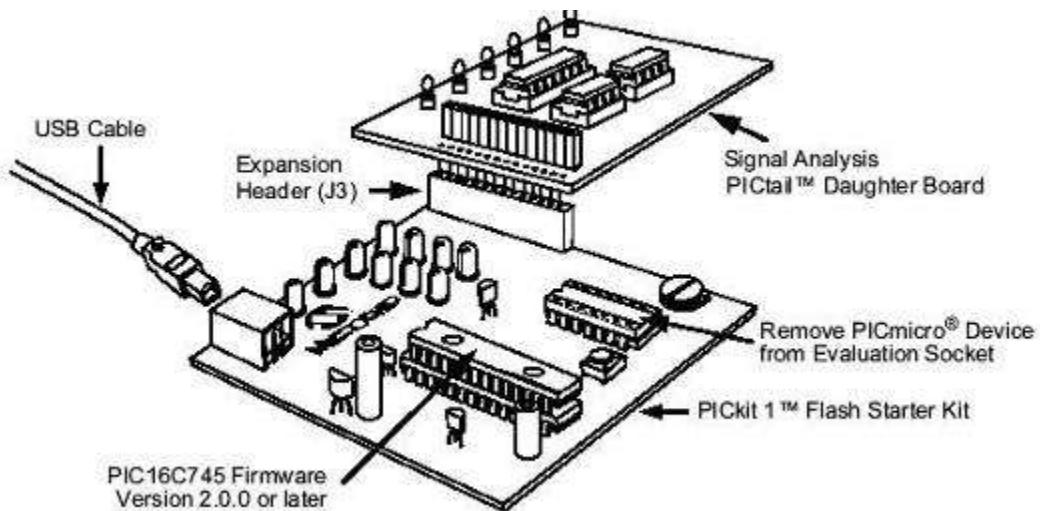


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Signal Analysis PICtail™ Daughter Board

The Signal Analysis PICtail™ Daughter Board works as an extension to the PICkit™ 1 Flash Starter Kit. When combined with the PICkit™ V2.0.0 (or later) firmware and the PICkit™ 1 Signal Analysis PC Application, the Signal Analysis PICtail™ Daughter Board can perform signal analysis capabilities such as:

- Real-time Strip Chart
- Oscilloscope
- Fast Fourier Transformation (FFT)
- Histogram
- Programming



Products supported

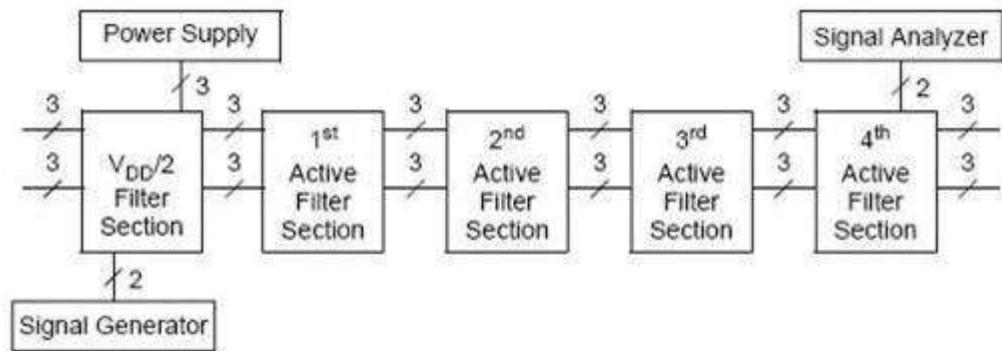
- PIC16F684
- 25LC640

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Active Filter Demo Board Kit

This kit is intended to support active filters designed by FilterLab® V2.0. These filters are all pole and are built by cascading first and second order sections. Higher frequency filters (e.g., a low-pass filter with cutoff at 1 MHz) can have their design initially verified on these boards.



Products supported

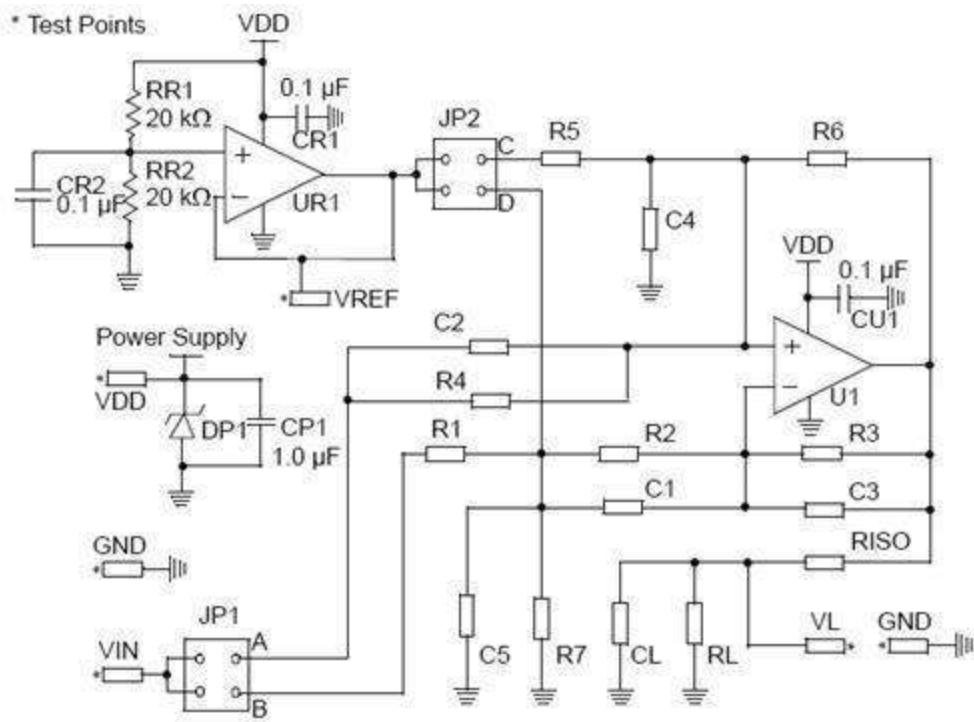
- MCP6271



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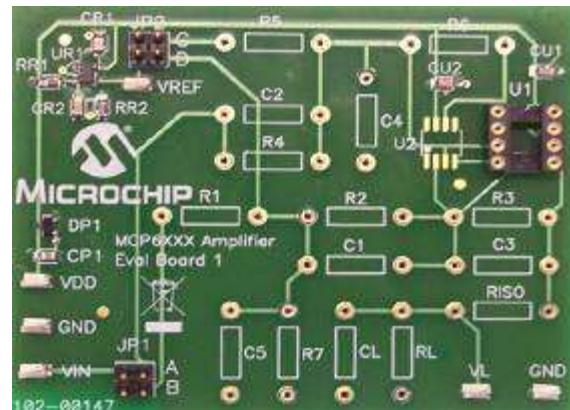
MCP6XXX Amplifier Evaluation Board 1

The MCP6XXX Amplifier Evaluation Board 1 is designed to support inverting/non-inverting amplifiers, voltage followers, inverting/non-inverting comparators and inverting/non-inverting differentiators.



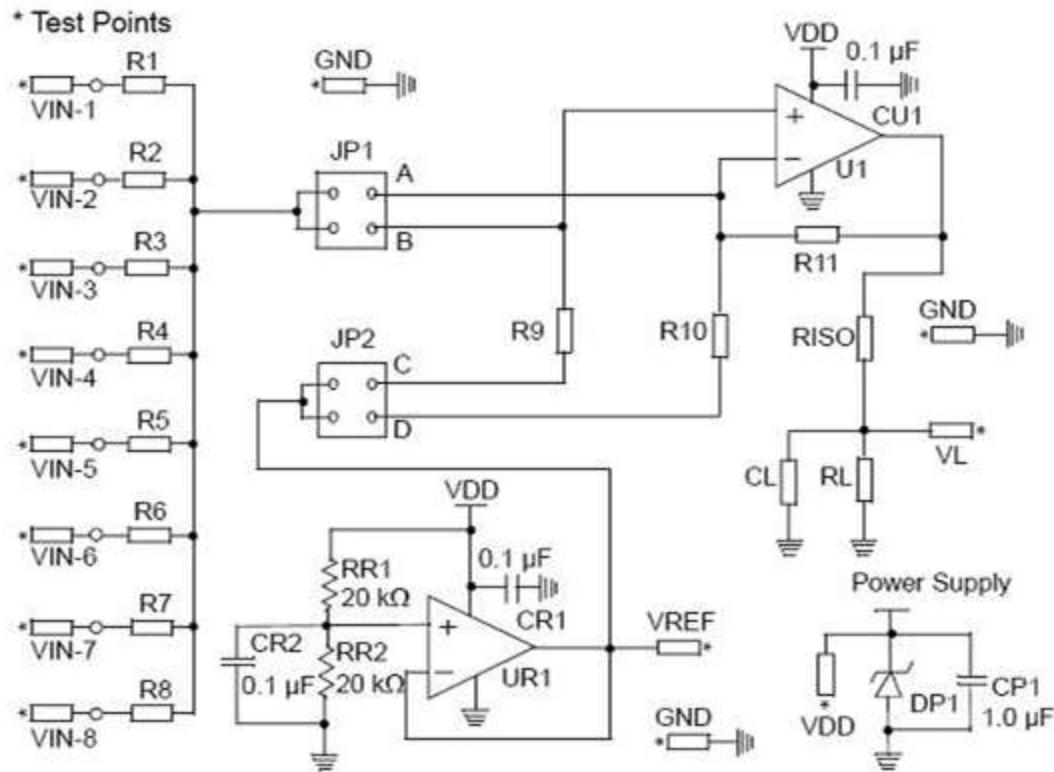
Products supported

- MCP6XXX

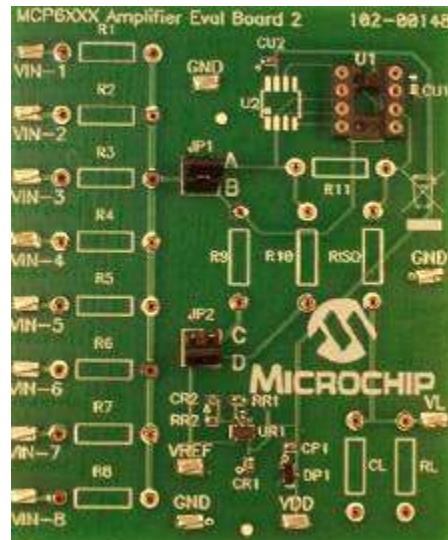

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MCP6XXX Amplifier Evaluation Board 2

The MCP6XXX Amplifier Evaluation Board 2 is designed to support inverting/non-inverting summing amplifiers.



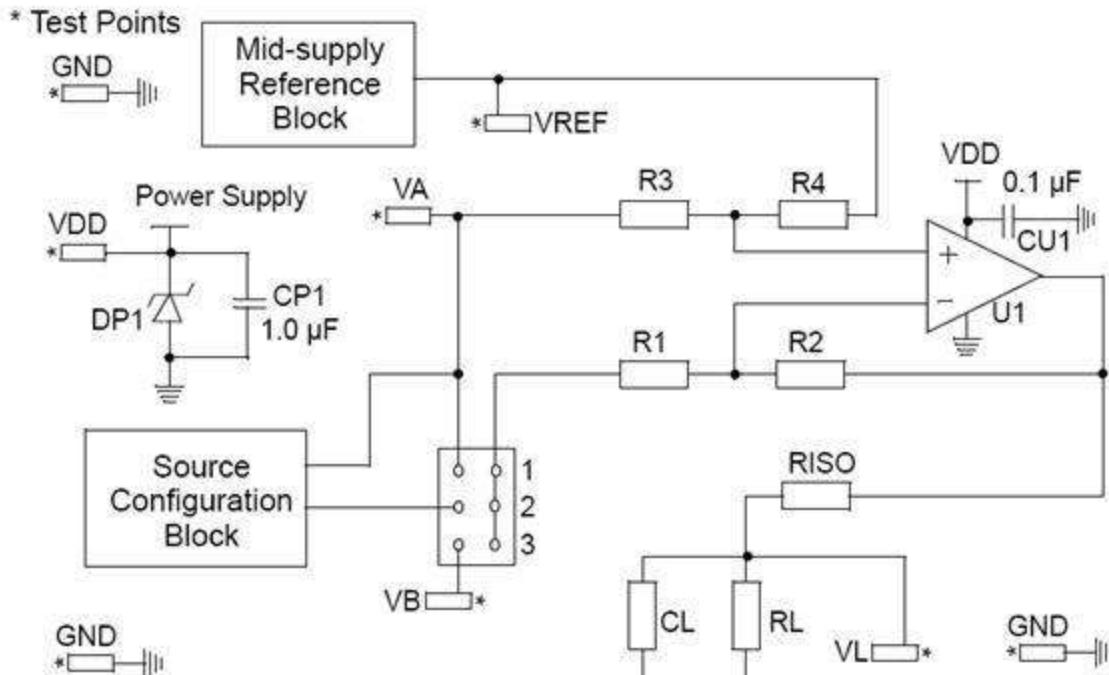
Products supported
MCP6XXX



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MCP6XXX Amplifier Evaluation Board 3

The MCP6XXX Amplifier Evaluation Board 3 is intended to support the difference amplifier circuits.



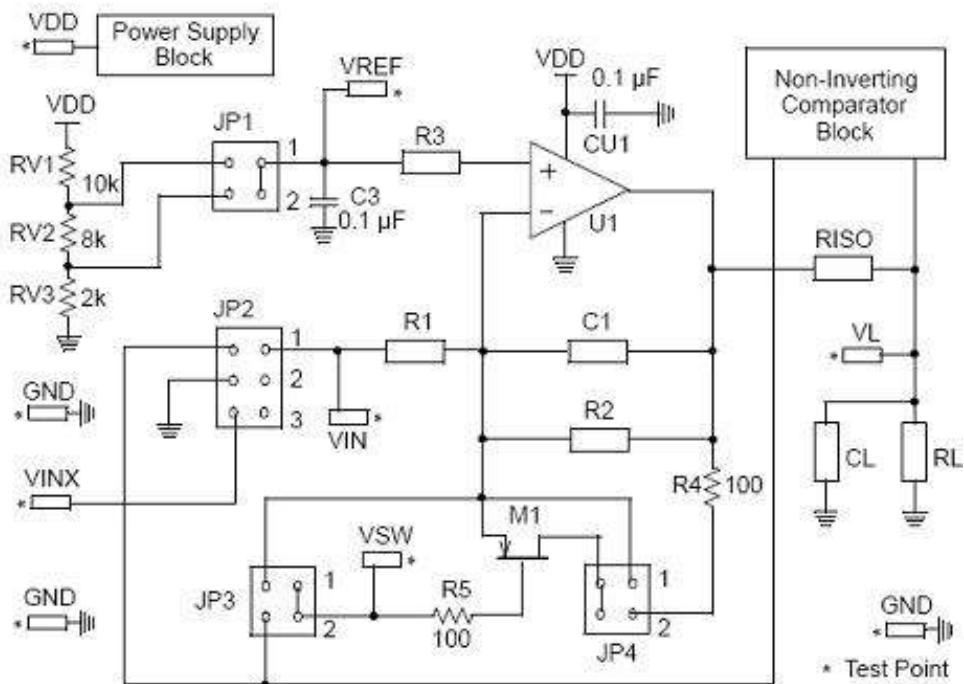
Products supported

- MCP6XXX

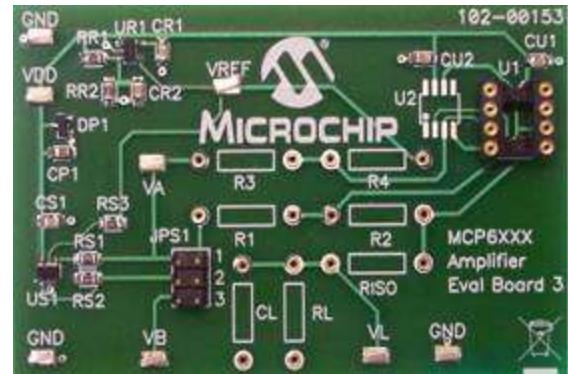

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MCP6XXX Amplifier Evaluation Board 4

The MCP6XXX Amplifier Evaluation Board 4 is designed to demonstrate an inverting integrator using one op amp and supporting circuitry. This section details the conversion of the topology to the MCP6XXX Amplifier Evaluation Board 4. Figure shows the circuit diagram for the board.



Products supported MCP6XXX


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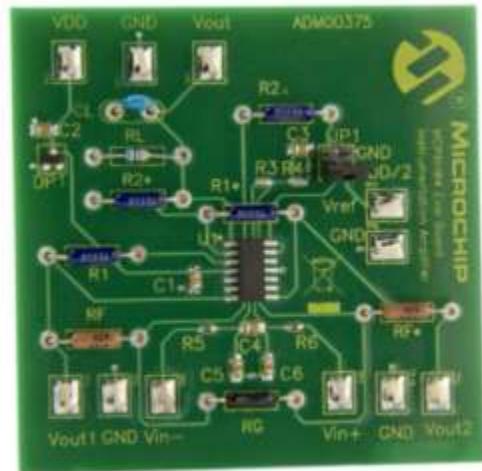


MCP6H04 Evaluation Board

The MCP6H04 Evaluation Board is intended to support an instrumentation amplifier and show the capability of the MCP6H04 operational amplifier. It uses a quad op amp in a difference amplifier configuration with input buffers and voltage reference. The test points for the power supply, ground, input signals, output signals, and voltage reference allow lab equipment to be connected to the board..

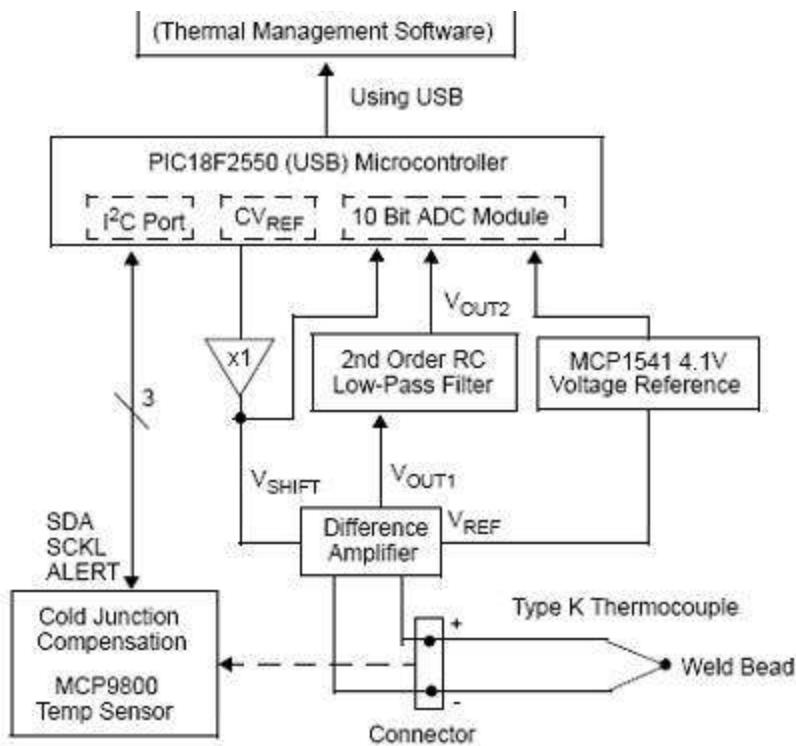
Products supported

- MCP6H04

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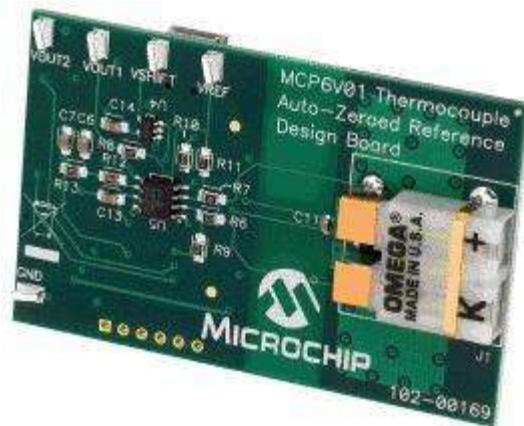
MCP6V01 Thermocouple Auto-Zeroed Ref. Design

The MCP6V01 Thermocouple Auto-Zeroed Reference Design demonstrates how to use a difference amplifier system to measure electromotive force (EMF) voltage at the cold junction of thermocouple in order to accurately measure temperature at the hot junction. This can be done by using the MCP6V01 auto-zeroed op amp because of its ultra low offset voltage (V_{OS}) and high common mode rejection ratio (CMRR).



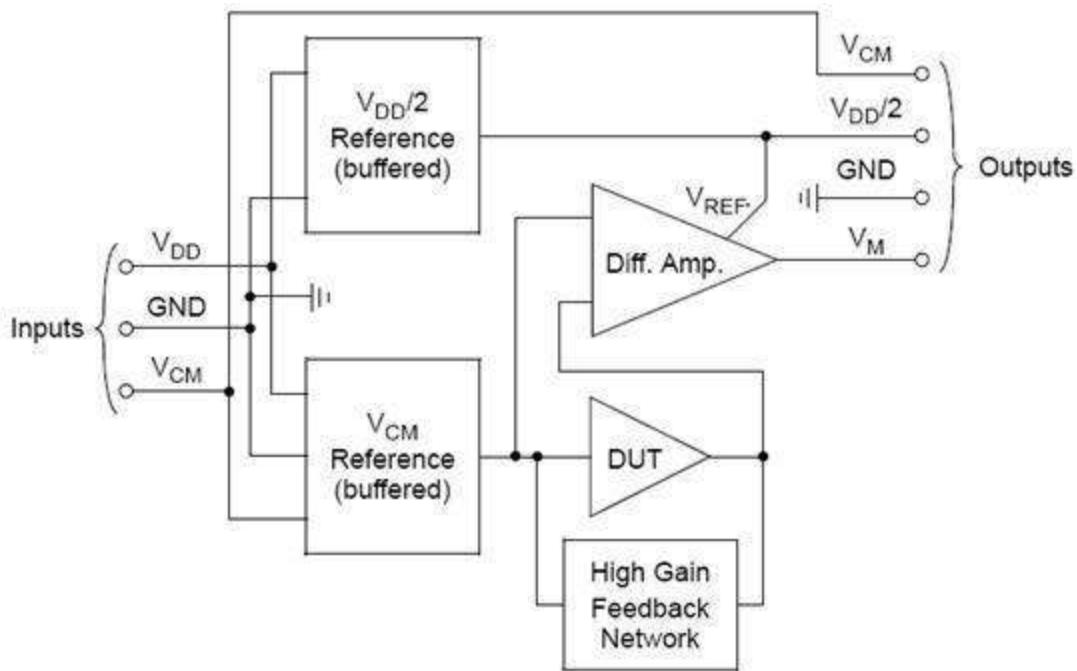
Products supported

- MCP6V01
- MCP9800
- MCP1541
- PIC18F2550


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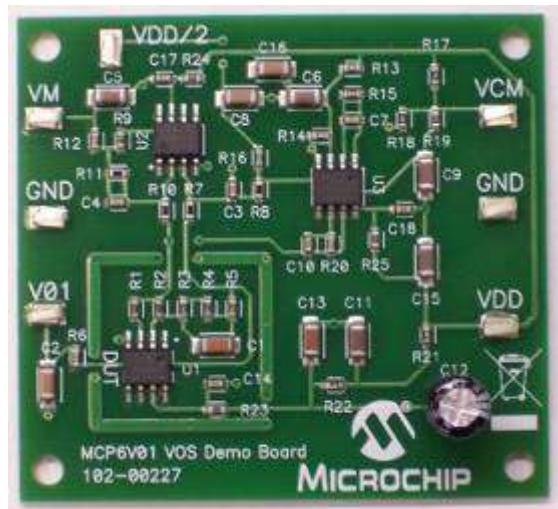
MCP6V01 Input Offset Demo Board

The MCP6V01 Input Offset Demo Board is intended to provide a simple means to measure the MCP6V01/2/3 op amps input offset voltage (V_{OS}) under a variety of bias conditions. This V_{OS} includes the specified input offset voltage value found in the data sheet plus changes due to power supply voltage (PSRR), common mode voltage (CMRR), output voltage (A_{OL}) and temperature (I_{VOS}/I_{TA}).



Products supported

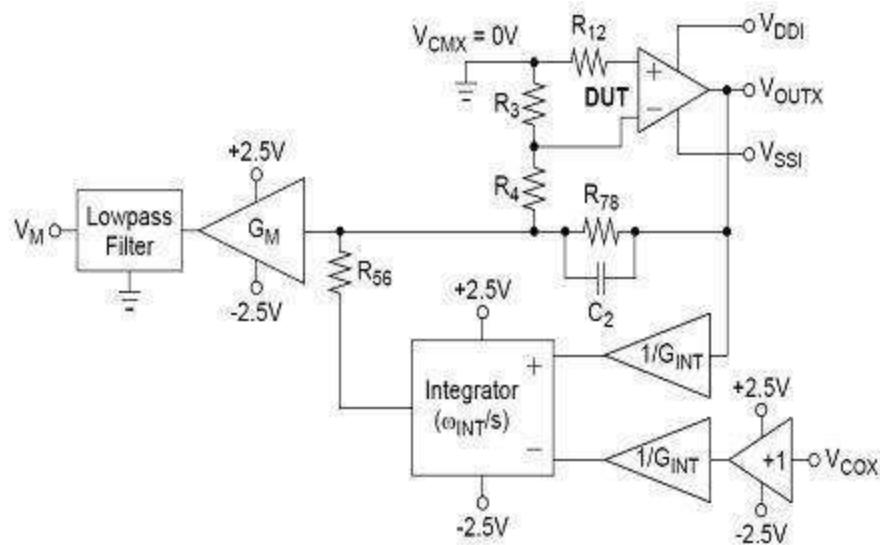
- MCP6V01
- MCP6V03
- MCP6V06
- MCP6V08


[**<< BACK**](#)

MCP651 Input Offset Evaluation Board

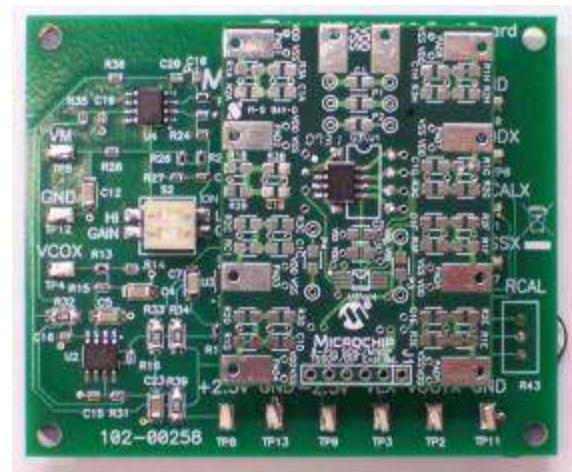
The MCP651 Input Offset Evaluation Board is intended to provide a simple means to measure the MCP651 op amp's input offset voltage under a variety of operating conditions. The measured input offset voltage includes the input offset voltage specified in the data sheet plus changes due to: power supply voltage (PSRR), common mode voltage (CMRR), output voltage, input offset voltage drift over temperature and 1/f noise.

The MCP651 Input Offset Evaluation Board works most effectively at room temperature (near +25°C). Measurements at other temperatures should be done in an oven where the air velocity is minimal.



Products supported

- MCP651
- MCP6V01



MCP6031 Photodiode PICtail™ Demo board

The MCP6031 Photodiode PICtail™ Plus Demo Board demonstrates how to use a transimpedance amplifier, which consists of MCP6031 high precision op amp and external resistors, to convert photo-current to voltage.

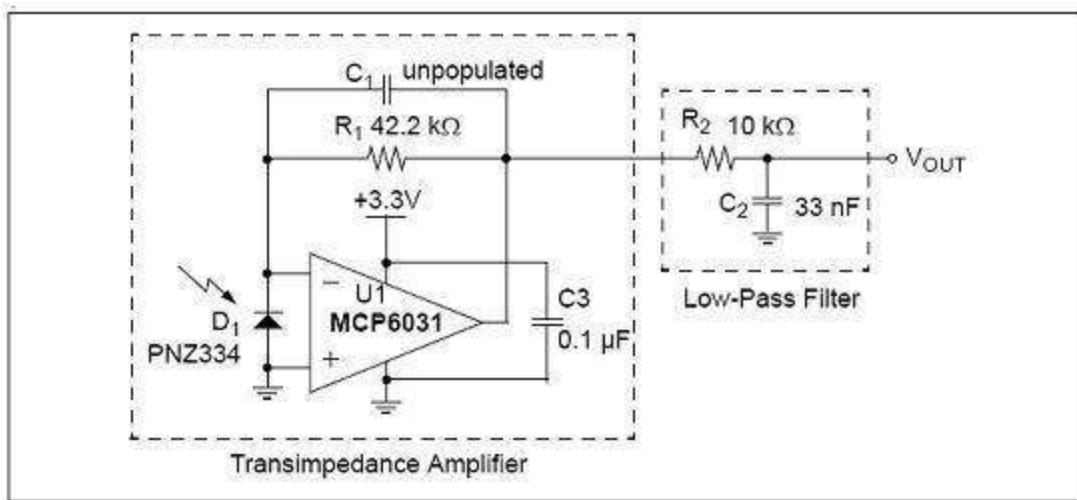


FIGURE 1-4: MCP6031 Photodiode PICtail™ Plus Demo Board Circuit Diagram.

Products supported

- MCP6031



MCP661 Line Driver Demo board

This demo board uses the MCP661 in a very basic application for high-speed op amps; a 50Ω line (coax) driver.

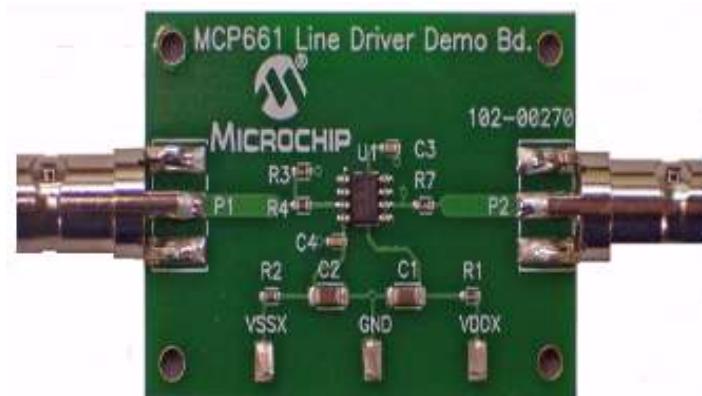
It gives:

- A 30 MHz solution
- High speed PCB layout techniques
- A means to test AC response, step response and distortion

Both the input and the output are connected to lab equipment with 50Ω BNC cables. There are 50Ω terminating resistors and transmission lines on the board. The op amp is set to a gain of 2V/V to overcome the loss at its output caused by the 50Ω resistor at that point. Connecting lab supplies to the board is simple; there are three surface mount test points provided for this purpose.

Products supported

- MCP661
- MCP662
- MCP665

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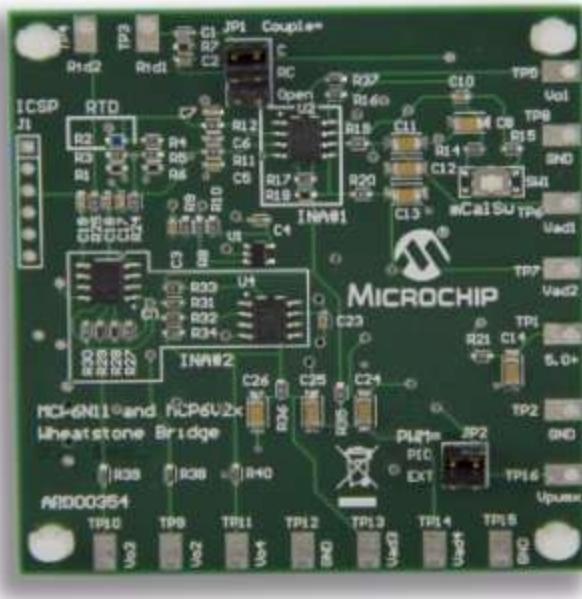
This board demonstrates the performance of Microchip's MCP6N11 instrumentation amplifier (INA) and a traditional three op amp INA using Microchip's MCP6V26 and MCP6V27 auto-zeroed op amps. The input signal comes from an RTD temperature sensor in a Wheatstone bridge. Real world interference is added to the bridge's output, to provide realistic performance comparisons. Data is gathered and displayed on a PC, for ease of use. The USB PICmicro® microcontroller and included Graphical User Interface (GUI) provides the means to configure the board and collect sample data.

This Kit Contains:

- 1x MCP6N11 Wheatstone Bridge Reference Design
- 1x Mini USB Cable

Products supported

- MCP6N11
- MCP6001
- MCP6V26/7
- PIC18F2553

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MICROCHIP

MCP6421 EMIRR Evaluation Board

Online
Info

The MCP6421 EMIRR Evaluation Board is intended to support the electromagnetic interference rejection ratio (EMIRR) measurement and to show the electromagnetic interference (EMI) rejection capability of the MCP6421 operational amplifier.

Products supported

MCP6421



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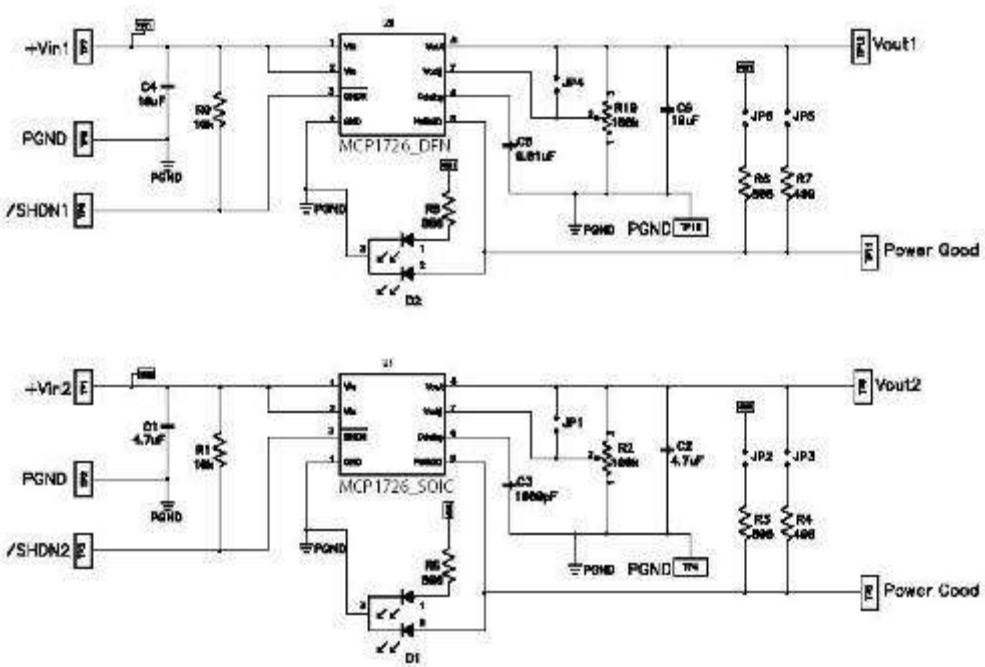
P/N: ADM00443



MCP1726 Eval Board

The MCP1726 1A LDO Evaluation Board allows the user to evaluate both the fixed and adjustable versions of the part in the 8-pin SOIC and 8-lead 3x3 DFN packages. An on-board potentiometer allows the user to easily set the output voltage of the adjustable voltage version of the device. Status LEDs indicate when input voltage is applied and when the Power Good (PWRGD) output is in a high condition (output voltage is in regulation).

Connection terminals are provided for the input voltage, output voltage, ground, power good and shutdown.



Products supported

- MCP1726



SOT223-5 Voltage Regulator Eval Board

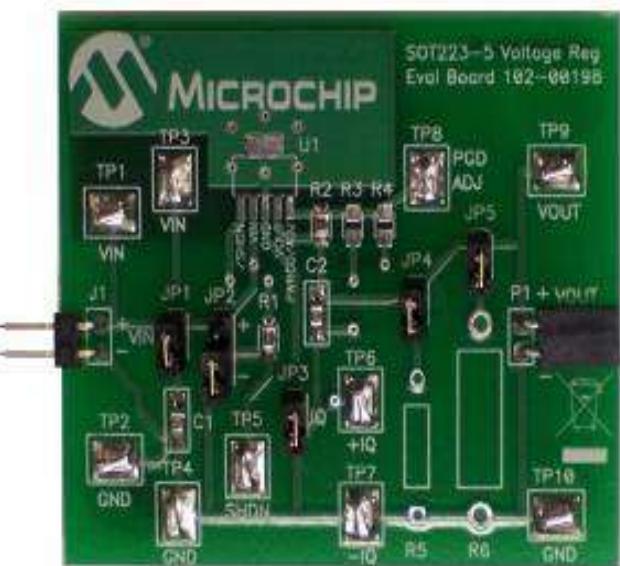
The SOT223-5 Voltage Regulator Evaluation Board is designed to be used to facilitate the evaluation of Microchip's voltage regulators or to be used as a standalone voltage regulator board. Jumpers have been placed on the board to facilitate testing of specific voltage regulator parameters. The jumpers may also be used to select pull-up and pull-down voltage levels.

Features:

- Input and Output headers for future connection to Line Step and Load Step modules
- Ample test points to attach multi-meters, power supplies, and loads
- Jumper to select ground current measurement
- Jumper to select input capacitor
- Jumper to select two different load resistors
- Jumper to select shutdown pin input: V_{DD} , GND, or use test point
- Jumper to connect input capacitor to circuit
- SMT0805 PCB footprints for user Power-Good pull-up resistor
- SMT0805 PCB footprints for user Adjustable Voltage resistor divider
- SMT0805 PCB footprints for user Bypass Capacitor

Products supported

- MCP1790
- MCP1824
- MCP1825
- MCP1826


[**<< BACK**](#)

SOT23-3 Voltage Regulator Eval Board

The SOT23-3 Voltage Regulator Evaluation Board is designed to evaluate and test voltage regulators. By soldering the desired device to the evaluation board, the user can easily validate several parameters of the device.

The SOT23-3 Voltage Regulator Evaluation Board does not come with a voltage regulator soldered onto the board. This allows the user to attach the voltage regulator of their choosing to the board and perform quiescent current, ground current, Power Supply Ripple Rejection (PSRR), and other desired tests.

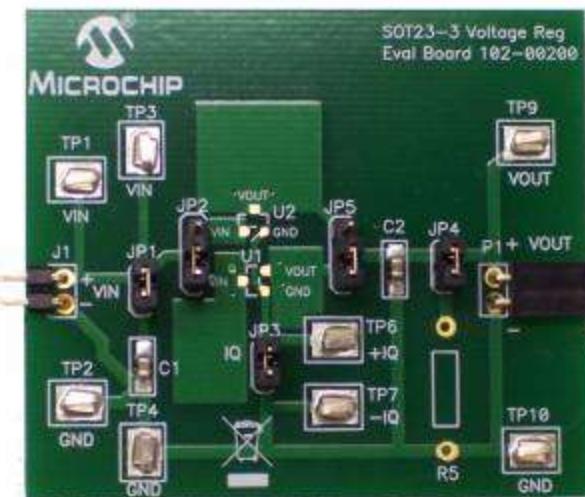
The SOT23-3 Voltage Regulator Evaluation Board is based upon a modular concept which will allow the user to plug in additional boards to increase the test capability of the voltage regulator.

Features:

- Input and Output headers for future connection to Line Step and Load Step Modules
- Ample test points to attach multimeters, power supplies, and loads
- Jumper to select ground current measurement
- Jumper to connect output load resistor
- Jumper to connect input capacitor to circuit
- Jumper to select one of two device pinouts

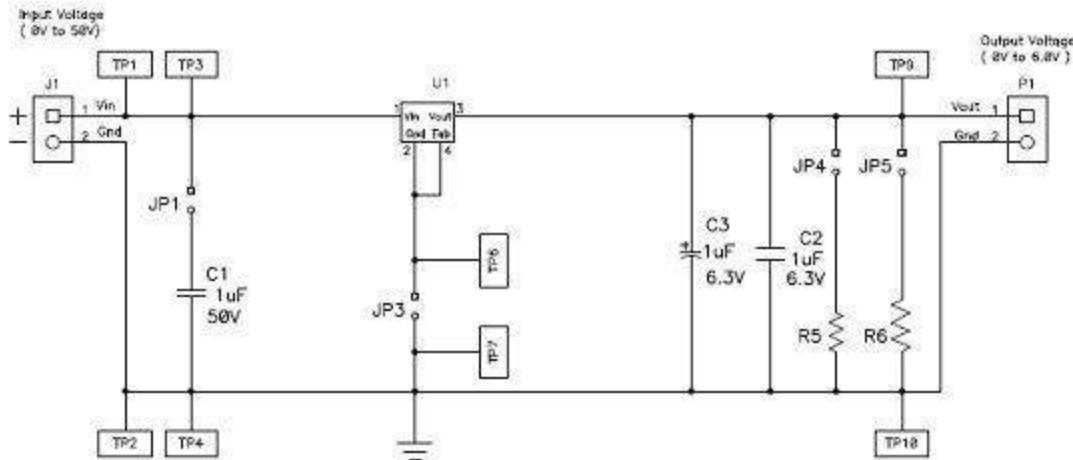
Products supported

- MCP1701A
- MCP1702
- MCP1703


[**<< BACK**](#)

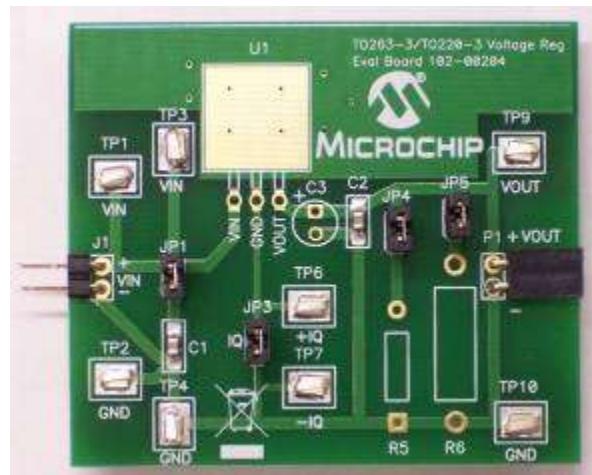
TO220-3/TO263-3 Voltage Regulator Eval Board

The TO220-3 / TO263-3 Voltage Regulator Evaluation Board is designed to provide functional evaluation of Microchip Voltage Regulators that utilize the TO220-3 and TO263-3 package. The TO220-3 / TO263-3 Voltage Regulator Evaluation Board does not come with a voltage regulator soldered onto the board. This allows the user to attach the voltage regulator of their choosing to the board and perform quiescent current, ground current, PSRR, and other desired tests.



Products supported

- MCP1790
- MCP1825S
- MCP1826S
- MCP1827S


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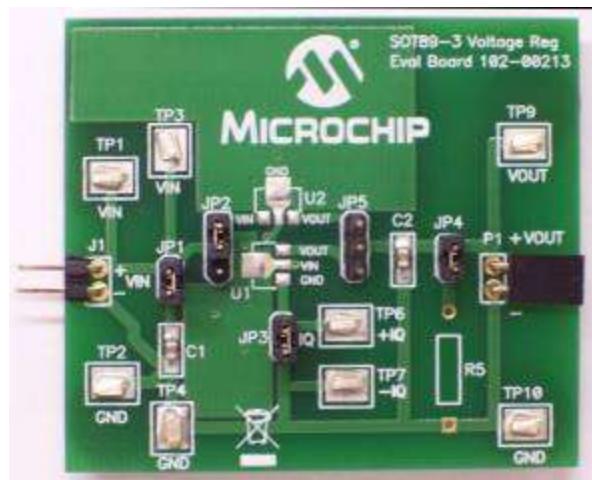
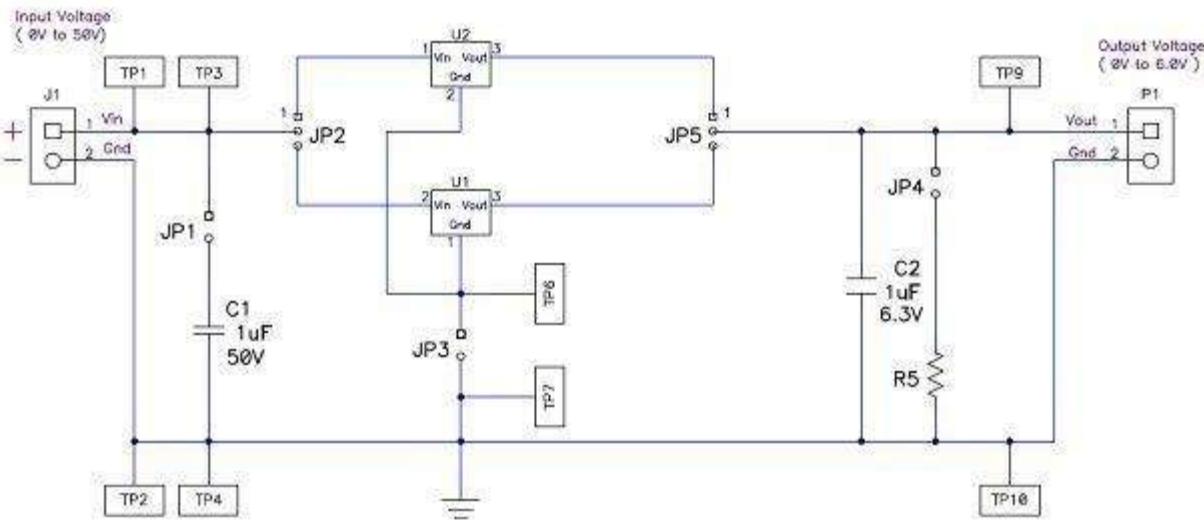
SOT89-3 Voltage Regulator Eval Board

The SOT89-3 Voltage Regulator Evaluation Board is designed to provide functional evaluation of Microchip Voltage Regulators that utilize the SOT89-3 package.

The SOT89-3 Voltage Regulator Evaluation Board does not come with a voltage regulator soldered onto the board. This allows the user to attach the voltage regulator of their choosing to the board and perform quiescent current, ground current, PSRR, and other desired tests.

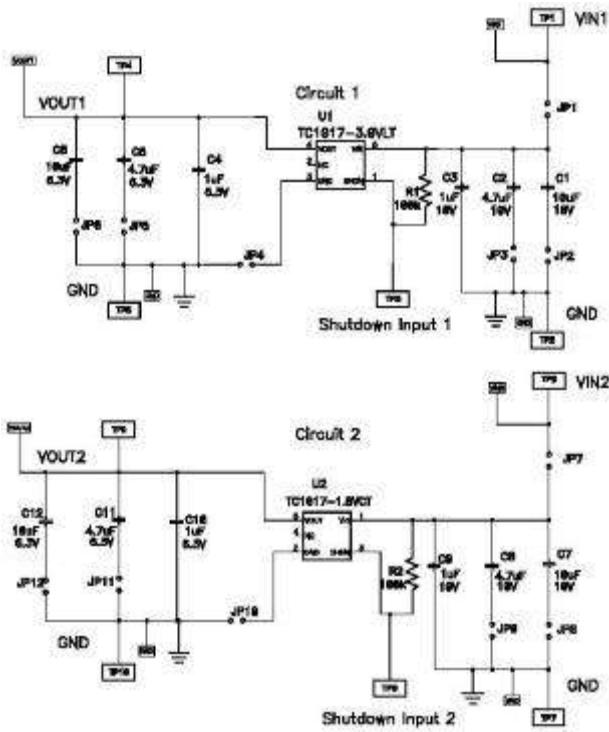
Products supported

- MCP1700
- MCP1701A
- MCP1702
- MCP1703


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TC1016/17 Eval Board

The TC1016/TC1017 LDO Evaluation Board is used to evaluate Microchip's TC1016 and TC1017, 80mA and 150mA, Low-Dropout (LDO) regulators. This evaluation board contains one circuit for the 5-pin SC-70 package (3.0V output voltage device) and one for the 5-pin SOT-23 package (1.8V output voltage device). Any output voltage version of either device can be used in both circuits. Both LDOs on the TC1016/TC1017 LDO Evaluation Board are the TC1017 devices.



Products supported

- TC1016
- TC1017


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MCP1710 Demo Board

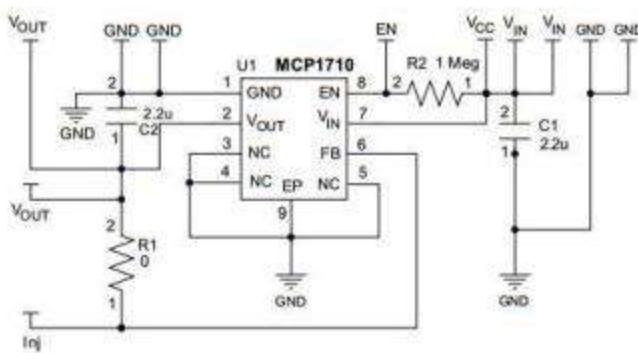
The MCP1710 Demo Board demonstrates how the MCP1710 device operates over a wide input voltage and load range. Test points are provided for input and output, allowing the demo board to be connected directly to a system. A copper via connected to the EN input can be used to turn the MCP1710 on and off. Turning the device on, ($\text{EN} > 70\%$ of VIN) will enable the device. When the EN pin is less than 30% of VIN , the device output is turned off.

Features:

- Output Voltage set to 3.0V
- 200 mA Output Current
- EN Input Test Point
- Input Voltage Range 2.5V to 5.5V
- Ultra Low Quiescent Current of 20 nA
- Low-Dropout Voltage: 450 mV Maximum at 200 mA

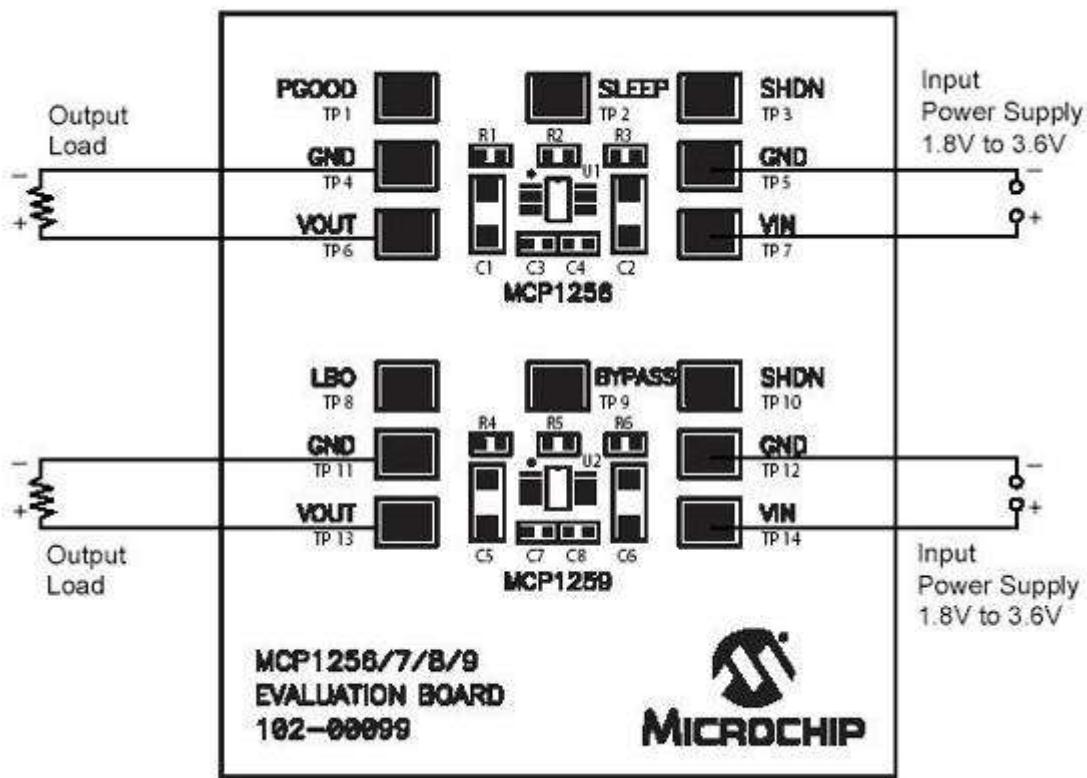
Products supported

- MCP1710

[<< BACK](#)

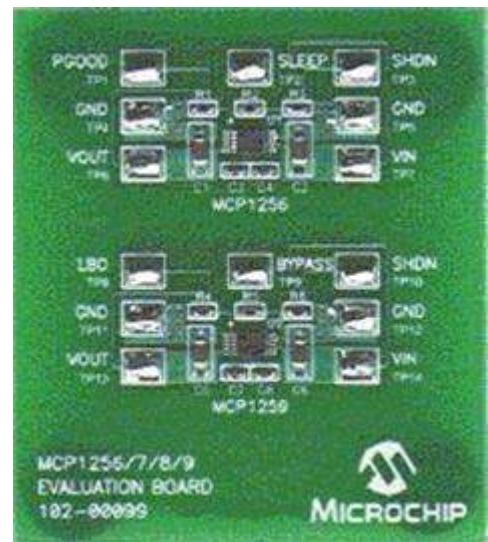
MCP1256/7/8/9 Eval Board

The MCP1256/7/8/9 Charge Pump Evaluation Board is an evaluation and demonstration tool for Microchip Technology's MCP1256/7/8/9 Regulated 3.3V Low-Ripple Charge Pumps with low-operating current SLEEP mode or BYPASS mode. The design provides for dynamic versatility.



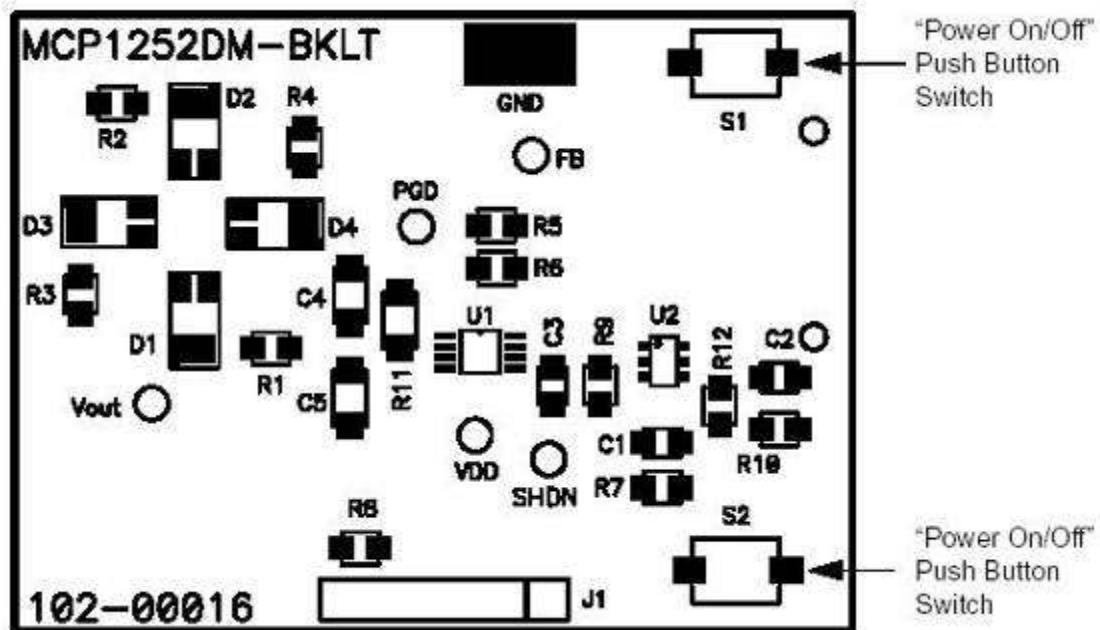
Products supported

- MCP1256
- MCP1257
- MCP1258
- MCP1259


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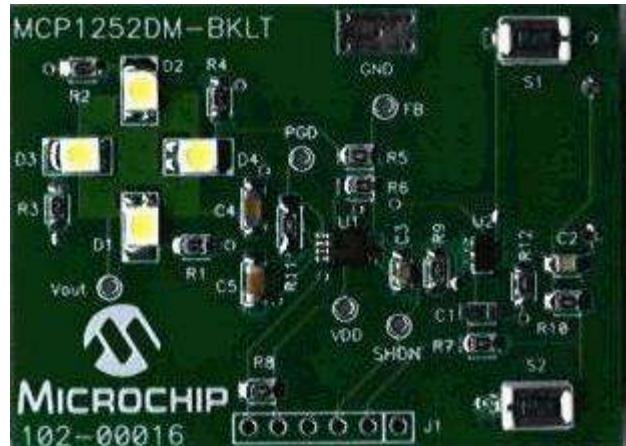
MCP1252 Backlight Demo Board

The MCP1252 Charge Pump Backlight LED Demo Board demonstrates the use of a charge pump device in a LED application. The board also serves as a platform to evaluate the MCP1252 device generally.



Products supported

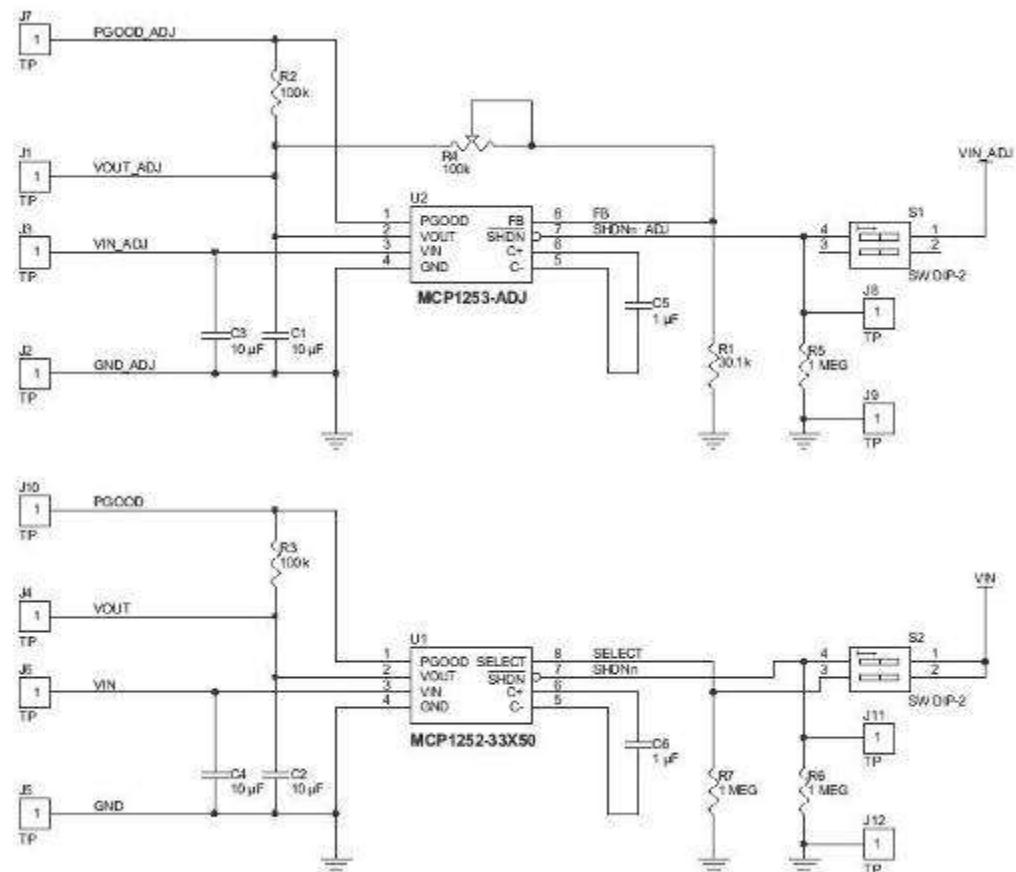
- MCP1252





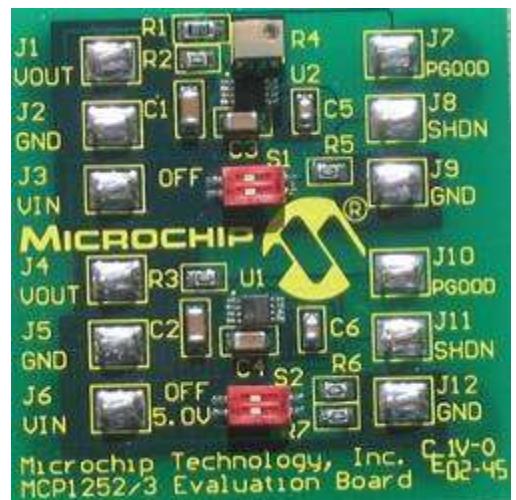
MCP1252/3 Eval Board

The MCP1252/3 Evaluation Board is an evaluation kit designed to support Microchip's MCP1252*33X50, MCP1252-ADJ, MCP1253-33X50 and MCP1253-ADJ low noise, positive-regulated charge pump devices.



Products supported

- MCP1252
- MCP1253



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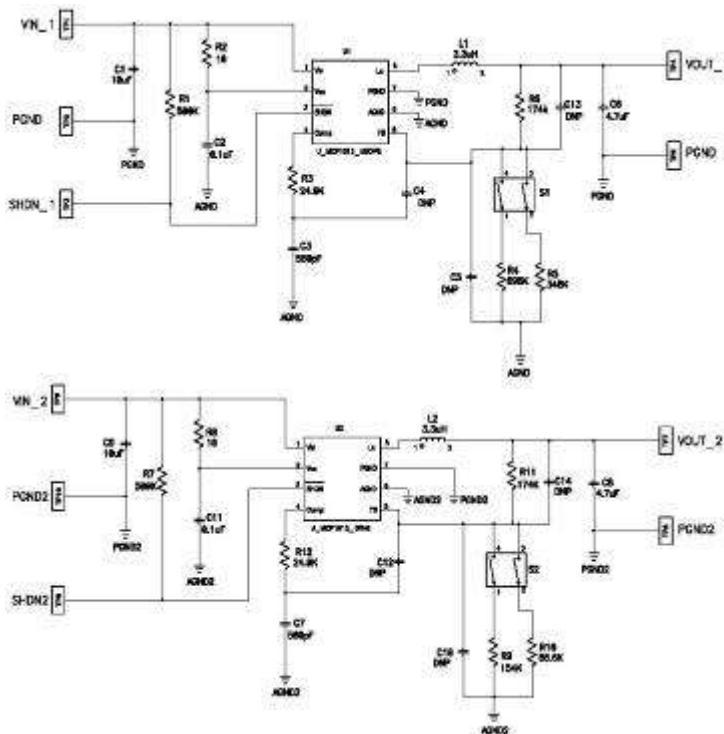
P/N: MCP1252/3EV



MCP1612 Eval Board

The MCP1612 is a 1A, 1.4 MHz, fully integrated buck regulator. The output voltage is selectable from 0.8V to V_{IN} by use of an external resistor divider.

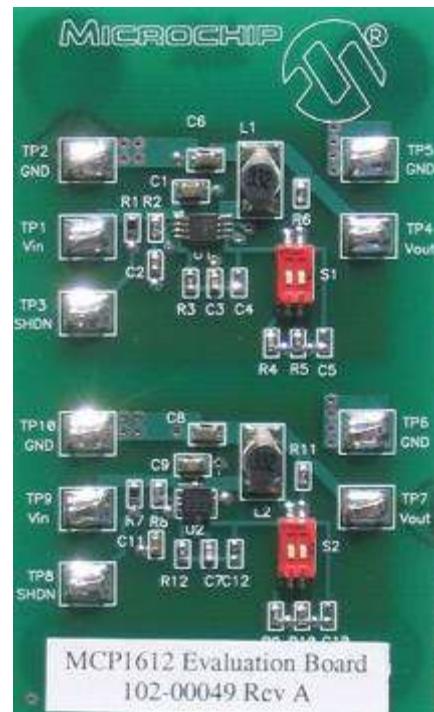
The MCP1612 Evaluation Board contains two independent buck regulators featuring the 8-pin MSOP and 8-pin DFN packages. The output voltage is set to one of eight different preset values (four per regulator circuit) by use of a two-position DIP switch. Each regulator circuit can supply an output current of 0 to 1A.



P/N: MCP1612EV

Products supported

- MCP1612

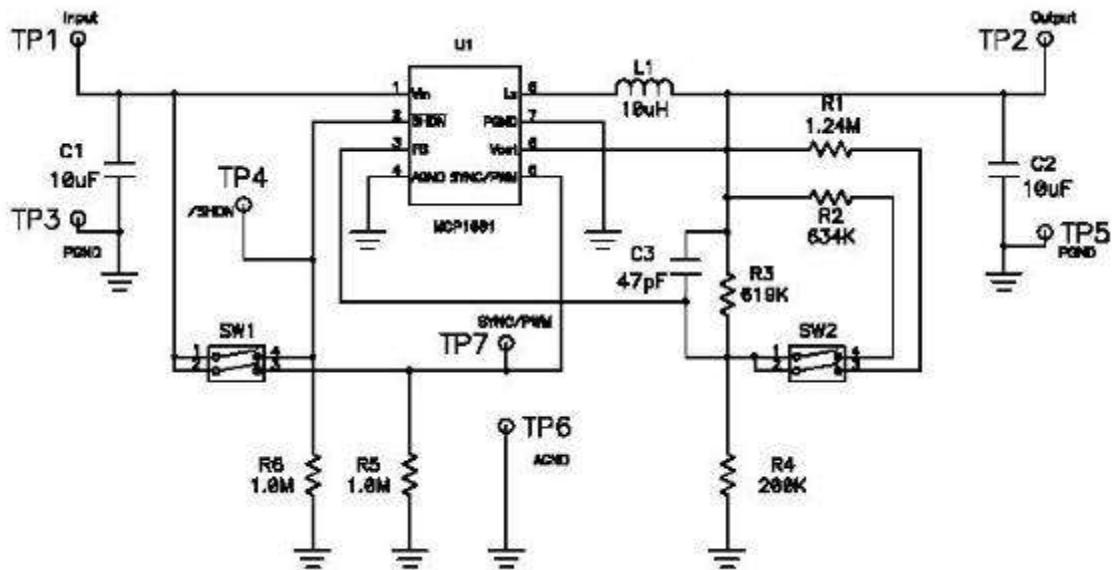


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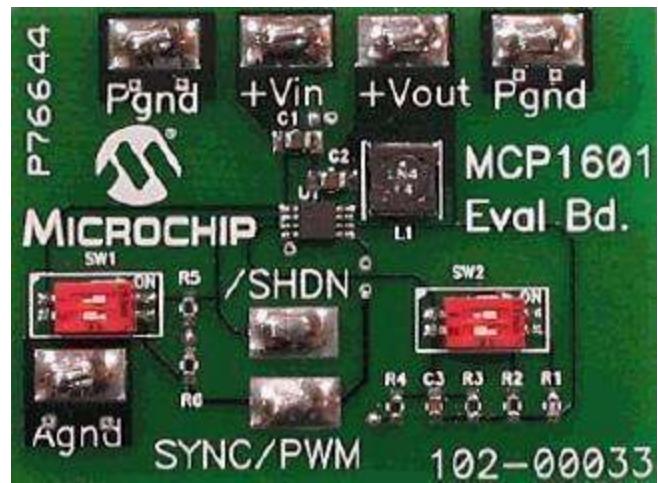
MCP1601 Eval Board

The MCP1601 is a 500mA synchronous buck regulator. Both the high-side buck P-channel and the low-side N-channel switches are integrated within the device. The integrated synchronous switch makes the MCP1601 very efficient, even when converting unregulated input voltages to low-voltage, fixed outputs. This evaluation board is designed for a wide range of output voltages and currents. For specific applications, smaller inductors, shielded inductors, tantalum capacitors and different output voltage settings can improve the total DC/DC converter performance and cost.



Products supported

- MCP1601

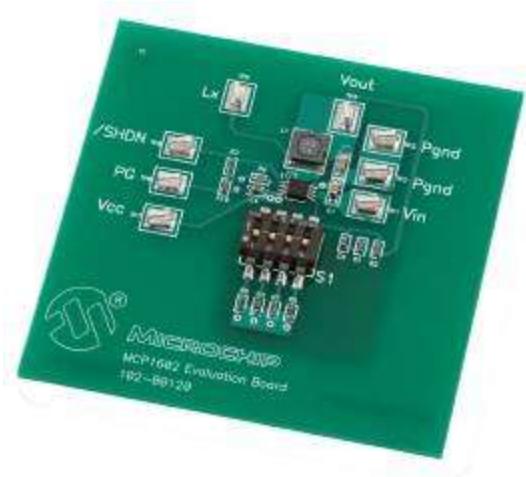
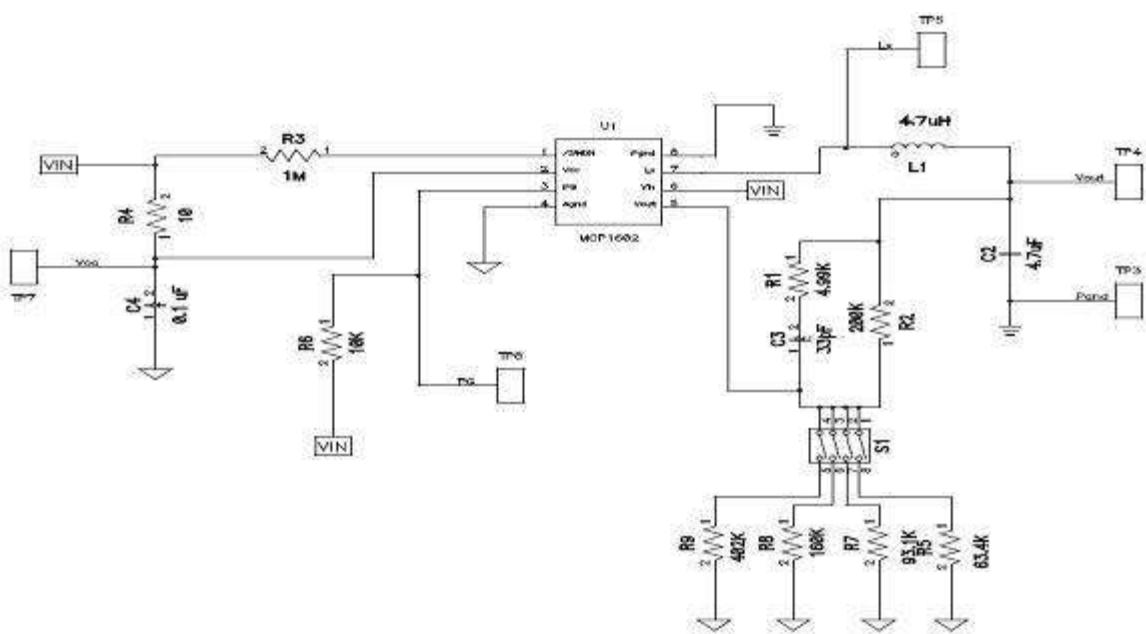




MCP1602 Buck Converter Eval Board

Online Info

The MCP1602 Evaluation Board demonstrates the features and capabilities of Microchip's MCP1602 Evaluation Board 500mA PFM/PWM Synchronous Buck Regulator. The MCP1602 is a step-down (Buck) switching regulator with a Power-Goodmonitor to provide a highly integrated solution for systems that require supply voltage between 0.8V to 4.5V. The MCP1602 requires input voltage range from 2.7V to 5.5V. The MCP1602 Evaluation Board includes a MCP1602 circuit that has a Shutdown feature and a 4-position Dip Switch to select between different output voltages. MCP1602 Evaluation Board is available in 0.8V, 1.2V, 1.8V, 2.5V and 3.3V. Additional test points are available on the MCP1602 Evaluation Board for reviewing the performances and features of MCP1602 Evaluation Board.



Products supported

- MCP1602

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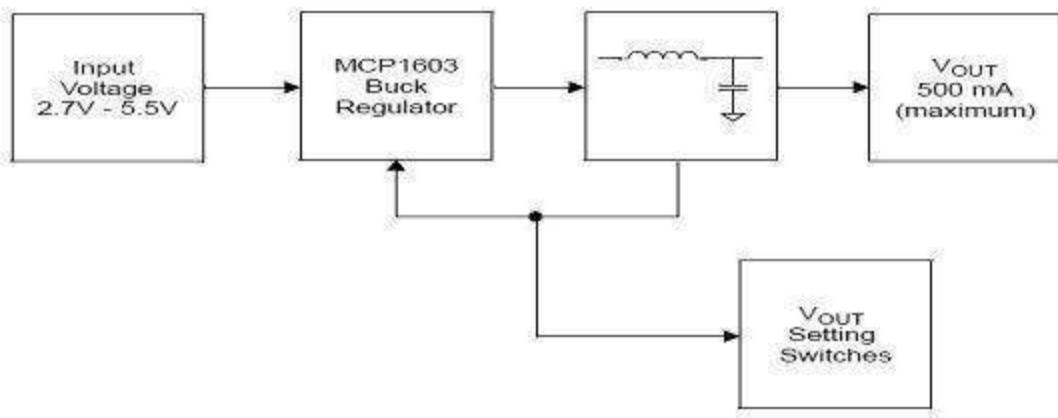
P/N: MCP1602EV

MCP1603 Buck Converter Eval Board

The MCP1603 Buck Converter Evaluation Board is designed to demonstrate Microchip's MCP1603 in an adjustable output voltage configuration. The MCP1603 is a 500mA synchronous buck regulator that features both Pulse Frequency Modulation (PFM) and Pulse Width Modulation (PWM). The PFM mode is used at light loads to improve system efficiency, while the 2.0 MHz PWM mode is entered at heavy loads. The transition between PFM and PWM modes automatically occurs without any external intervention. The MCP1603 is available in both adjustable parts that require an external divider to set the output voltage and fixed output voltage parts.

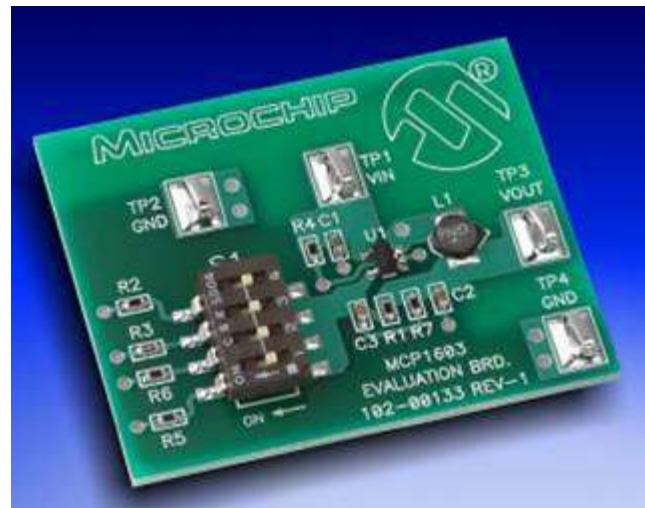
Features:

- Compact size and low profile 500mA Converter design
- Wide Input voltage range from 2.7V to 5.5V
- Five different output voltage settings: 0.8V, 1.8V, 2.5V, and 3.3V
- Test points for connecting input voltage source and external load



Products supported

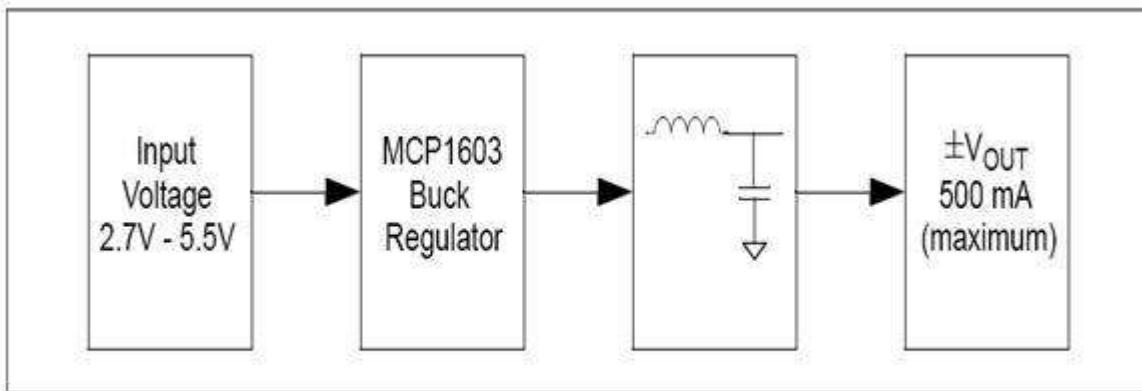
MCP1603



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MCP1603 Tiny Reference Design Board

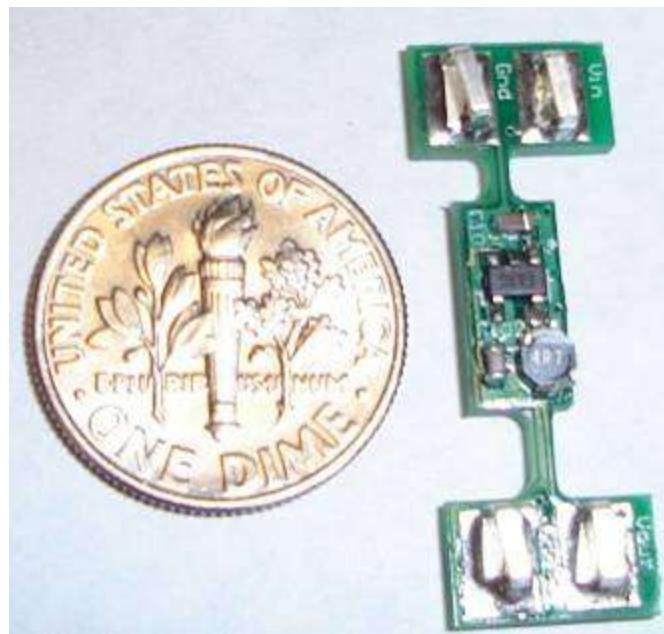
The MCP1603 Tiny Reference Design Board demonstrates the use of Microchip's MCP1603 device in a step-down application. The evaluation board is a fully functional platform to evaluate the MCP1603 buck regulator over the input voltage, output voltage and current range of the device. The evaluation board is designed to show off one of the main advantages of MCP1603 – its small size. Test points are provided to allow easy connection of the input voltage source and the output load.



MCP1603 Tiny Reference Design Block Diagram.

Products supported

- MCP1603

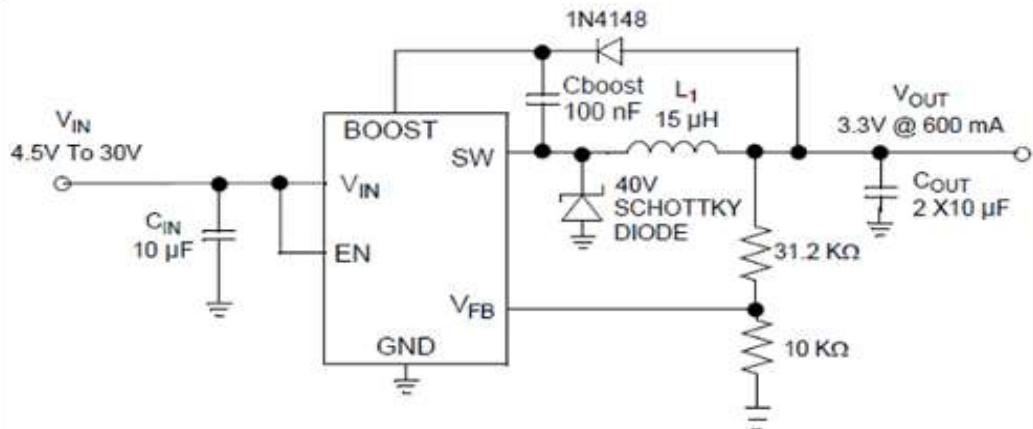


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MCP16301 High Voltage Buck Converter Demo Board

MCP16301 High Voltage Buck Converter 600 mA Demo Board supports the development of MCP16301 device. The MCP16301 is a highly integrated, high-efficiency, fixed frequency, step-down DC-DC converter in a popular 6-pin SOT23 package that operates from input voltage sources up to 30V. Integrated features include a high-side switch, fixed-frequency peak-current mode control, internal compensation, peak current limit and over-temperature protection. Minimal external components are necessary to develop a complete step-down DC-DC converter power supply.

Products supported
MCP16301



[**<< BACK**](#)

MCP16301 HV Buck Converter Demo Board

Demo board supporting the development of MCP16301 high input voltage, 300mA, D2PAK buck converter.

Products supported
 MCP16301

This Kit Contains:

- MCP16301 300mA D2PAK Demo Board



**MCP16301 300mA D2PAK footprint Demo Board
(Part # ARD00360)**

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MCP16301 HV Cuk LED Driver Demo Board

The MCP16301 High-Voltage Single-Inductor Cuk LED Driver Demo Board is designed to operate from a 6V to 18V input and regulate the output current to 300 mA. Test points for input power are provided to demonstrate the capability of the demo board over the entire range. The demo board was designed using small surface-mount components to show application size for a high-voltage single-inductor Cuk LED driver design. Compared with the traditional asynchronous buck converter, the MCP16301 High-Voltage Single-Inductor Cuk LED Driver Demo Board has an additional resistor and capacitor for compensation.

Features:

- 6V to 18V Input Voltage
- Input voltage can be lower or higher than the output voltage
- 300 mA output current
- Four 3W LEDs
- Dimming can be achieved by pulsing the enable pin on the MCP16301

Products supported

MCP16301



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MCP16301 5V/600mA Low Noise Evaluation Board

The MCP16301 5V/600mA Low Noise Evaluation Board is used to demonstrate a high voltage input DC-DC converter design, which can deliver high efficiency, while minimizing high-frequency switching noise. The board steps down high input voltages, up to 30V, to a low output voltage, having more than 90% efficiency and a minimum of 30 mV output ripple. High-frequency input/output noise generated by the switching converters can reach high-noise levels that interfere with other devices powered from the same source. The high amplitude of high-frequency noise can disturb some RF systems. High efficiency is achieved with the MCP16301 buck converter by switching the integrated N-Channel MOSFET at a high speed. The evaluation board is optimized for 12V Input and 100 mA load.

Features:

- Input voltage: 6 to 30V
- Output voltage: 5V
- Output capability: 600 mA load current
- Output ripple plus noise: 30 mV_{p-p} @ 12V input and 100 mA load
- Low radiated noise
- Efficiency: up to 91% @ 12V input

Products supported

- MCP16301

[<< BACK](#)

MCP16301 High Voltage Buck-Boost Demo Board

The MCP16301 High Voltage Buck-Boost Demo Board is designed to operate from a 5V to 30V input and regulate the output to 12V. Test points for input power and load are provided to demonstrate the capability of the demo board over the entire range. The MCP16301 High Voltage Buck-Boost Demo Board was designed using small surface-mount components to show application size for a high voltage buck-boost design.

Features:

- Input Voltage Range: 4.0V to 30V
- Output Voltage Range: 2.0V to 15V
- Up to 96% Typical Efficiency
- 2% Output Voltage Accuracy
- Integrated N-Channel Switch: 460 mΩ
- 500 kHz Fixed Frequency

Products supported

- MCP16301

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MCP16311/2 Synchronous Buck Converter Eval Board

The MCP16311/2 Synchronous Buck Converter Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP16311/2 product. This board demonstrates the MCP16311 (PFM/PWM – low quiescent current) and the MCP16312 (PWM only – low output voltage ripple) in two buck converter applications with two output voltages. It can be used to evaluate both package options: 8LD MSOP and 8LD 2 x 3 TDFN. The MCP16311/2 Synchronous Buck Converter Evaluation Board was developed to help engineers reduce the product design cycle time. Two common output voltages can be selected: 3.3V and 5.0V. The first converter with the 8LD MSOP package is a PWM/PFM device with a fixed output of 3.3V, while the second converter with the 2 x 3 8LD TDFN package is a PWM-only device, with a fixed output of 5V.

Features:

- Input Voltage Range (VIN): 4V to 30V
- Fixed Output Voltage: 3.3V and 5.0V
- Output Current: Typically 1A @ 3.3V Output, 12V Input
- Automatic PFM/PWM Operation for MCP16311, or PWM-only for MCP16312
- PWM Switching Frequency: 500 kHz
- Internal Compensation
- Internal Soft Start
- Overtemperature Protection

Products supported

- MCP16311
- MCP16312

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MCP16321 Evaluation Board

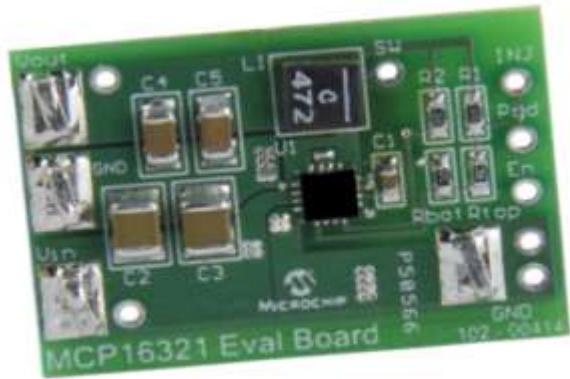
The MCP16321 Evaluation Board is designed to operate from a 6V to 24V input and regulate the output to 3.0V. Test points for input power and load are provided to demonstrate the capability of the MCP16321 Evaluation Board over the entire range. The MCP16321 Evaluation Board was designed using small surface-mount components to show application size for a high-voltage buck design.

Features:

- 6V to 24V Input
- 3.0V Output
- 1A Maximum Output Current

Products supported

- MCP16321

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MCP16322 Evaluation Board

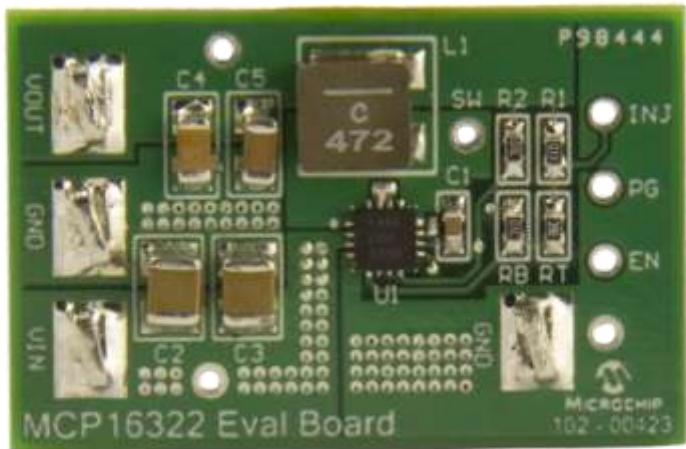
The MCP16322 Evaluation Board is designed to operate from a 6V to 24V input and regulate the output to 3.0V. Test points for input power and load are provided to demonstrate the capability of the MCP16322 Evaluation Board over the entire range. The MCP16322 Evaluation Board utilizes small surface-mount components to show application size for a high-voltage buck design.

Features:

- 6V to 24V Input
- 3.0V Output
- 2A Maximum Output Current

Products supported

- MCP16321
- MCP16322

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MCP16323 Evaluation Board

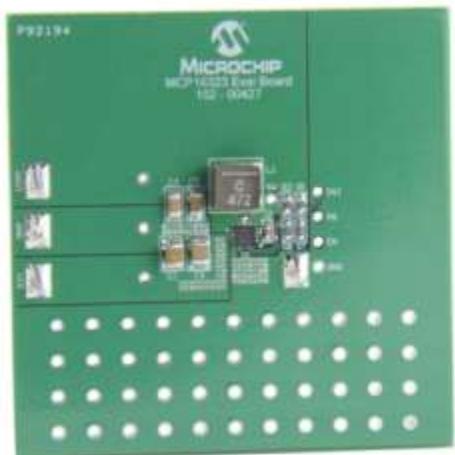
The MCP16323 Evaluation Board is designed to operate from a 6V to 18V input and regulate the output to 3.0V. Test points for input power and load are provided to demonstrate the capability of the MCP16323 Evaluation Board over the entire range. The MCP16323 Evaluation Board was designed using small surface-mount components to show application size for a high-voltage buck design.

Features:

- 6V to 18V Input
- 3.0V Output
- 3A Maximum Output Current

Products supported

- MCP16323

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The MCP16331 Buck Converter Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP16331 product in the SOT-23 package. This board demonstrates the MCP16331 in a buck-converter application with two selectable output voltages. Test points are provided for the input and output, allowing the board to be connected directly to a system. Additional test points are provided to access the EN pin, in order to modify the state of the converter and also access the SW pin, in order to see the switching waveform. The MCP16331 High-Voltage Buck Converter Evaluation Board was developed to help engineers reduce product design cycle time.

Features:

- Input voltage range, VIN: 6V to 50V
- Converter can be turned on/off by using a jumper
- Fixed output voltage: 3.3V or 5.0V (selectable)
- Typical output current: 500 mA
- PWM Switching Frequency = 500 kHz
- Internal compensation
- Internal soft-start
- Over-temperature protection

Products supported

- MCP16331

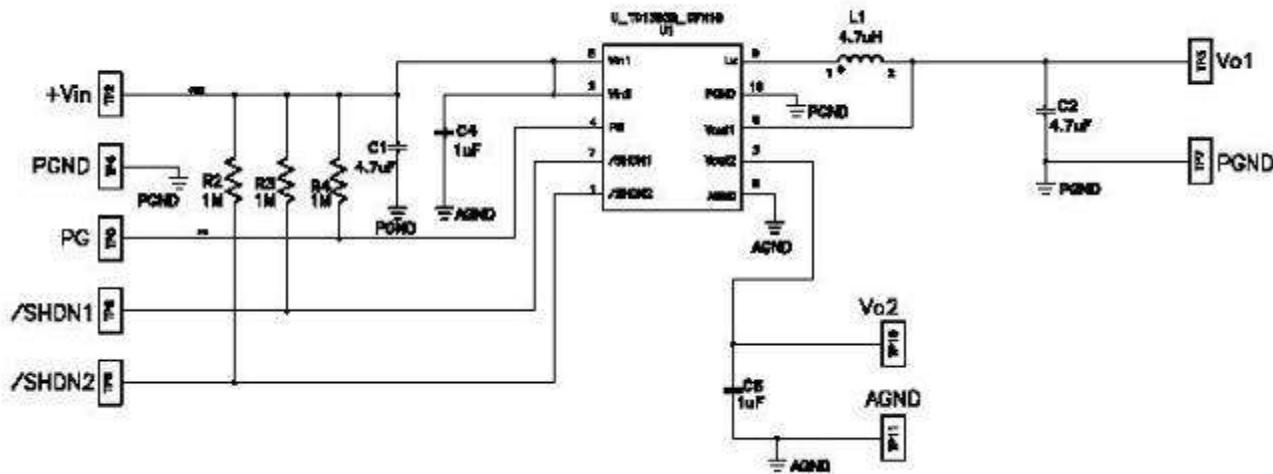
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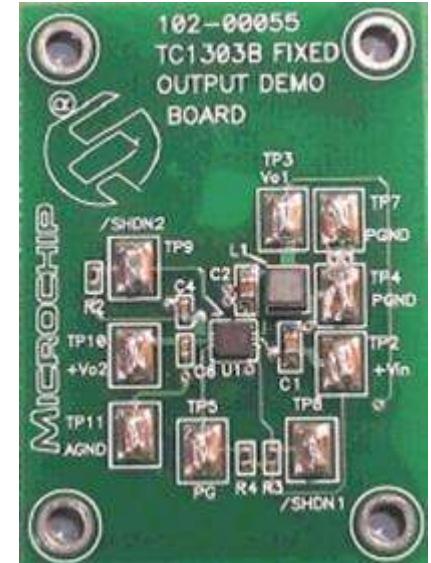
TC1303B Demo Board

The TC1303B Dual-Output Regulator with Power-Good Output Demo Board can be used to evaluate the TC1303B device over the input voltage range and output current range for both the synchronous buck regulator output and the low-dropout linear regulator output.

Test points are provided for input power, output loads, shutdown control and power-good monitoring.



Products supported
TC1303B



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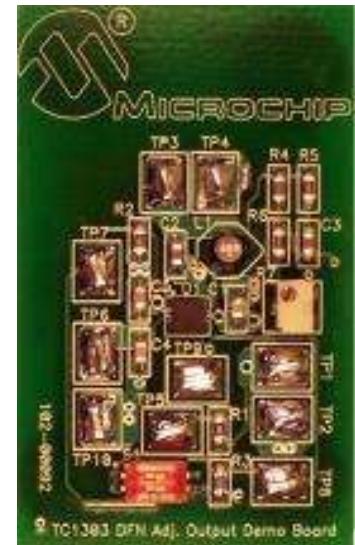
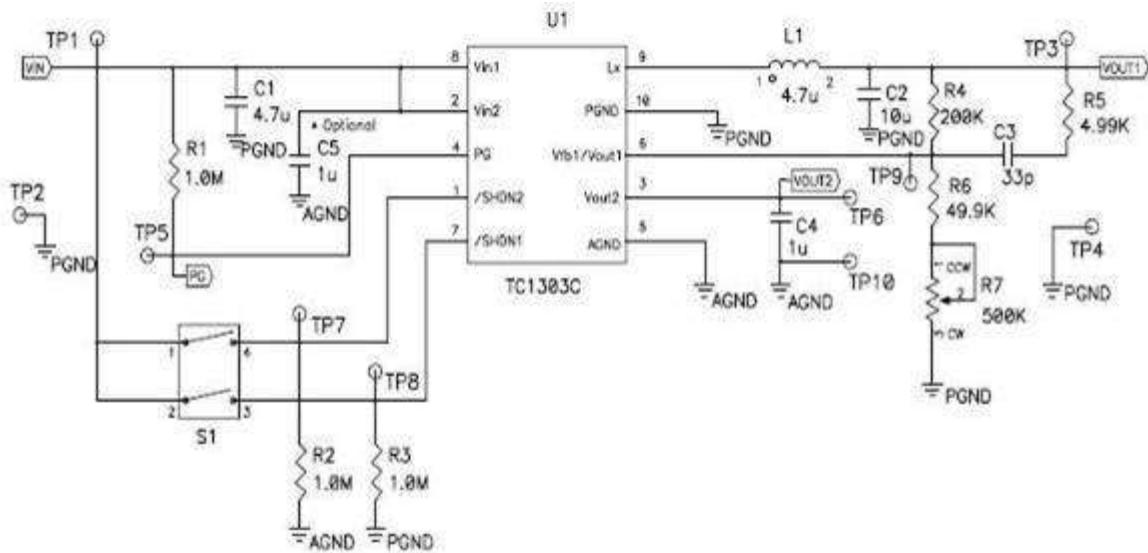


TC1303C Demo Board

The TC1303C DFN Adjustable Output demo board demonstrates the use of Microchip's TC1303C device in applications that require dual supply voltage. The demo board is used to evaluate the TC1303C device over the input voltage range, output voltage and current range for both the synchronous buck regulator output and the low dropout linear regulator output.

Products supported

- TC1303C



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MCP1632 300 kHz Boost Converter Demo Board

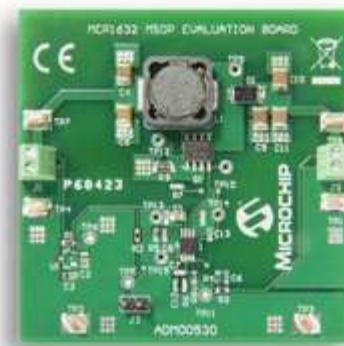
The MCP1632 300 kHz Boost Converter Demo Board is a compact, highly efficient, step-up voltage converter that will convert the input voltage rail (typically 5V) to a regulated 12V output voltage. The maximum output current for this demo board is 0.9A. The board demonstrates the capabilities of the MCP1632 PWM controller. Test points for various signals are provided for measuring different parameters of the converter. The Demo Board can be modified to support output voltages from 9V to 15V by changing a single resistor.

Features:

- Input Voltage Range: 3.6V to 5.5V
- Output Voltage: 12V (9V to 15V adjustable)
- Maximum Output Current: 0.9A
- 90% typical efficiency at 12V/0.8A output and 5V input
- 300 kHz fixed switching frequency
- Overcurrent Protection for MOSFETs
- Shutdown input for low-power Standby mode
- UVLO with 2.7V and 2.8V typical thresholds

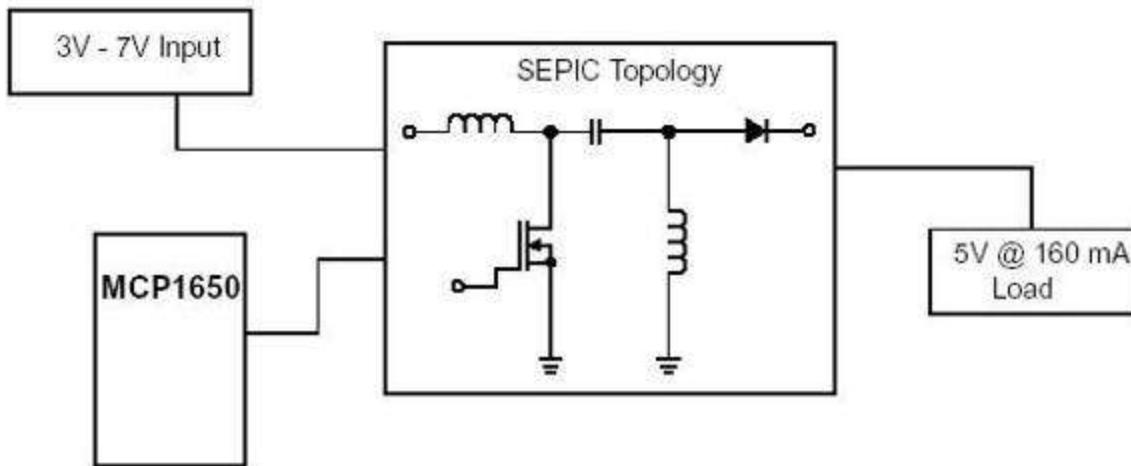
Products supported

- MCP1632



MCP1650 SEPIC Power Supply Demo Board

The MCP1650 SEPIC Demo Board is a complete, step-up or step-down, Switch mode, DC-DC power converter. The MCP1650 SEPIC Demo Board generates a regulated 5.0V output at load currents up to 160mA. The SEPIC topology has the ability to step-up or step-down the input voltage. The input voltage range for the MCP1650 SEPIC Demo Board is from 3.0V to 7.0V. Test points are provided for input power, output load and shutdown control.



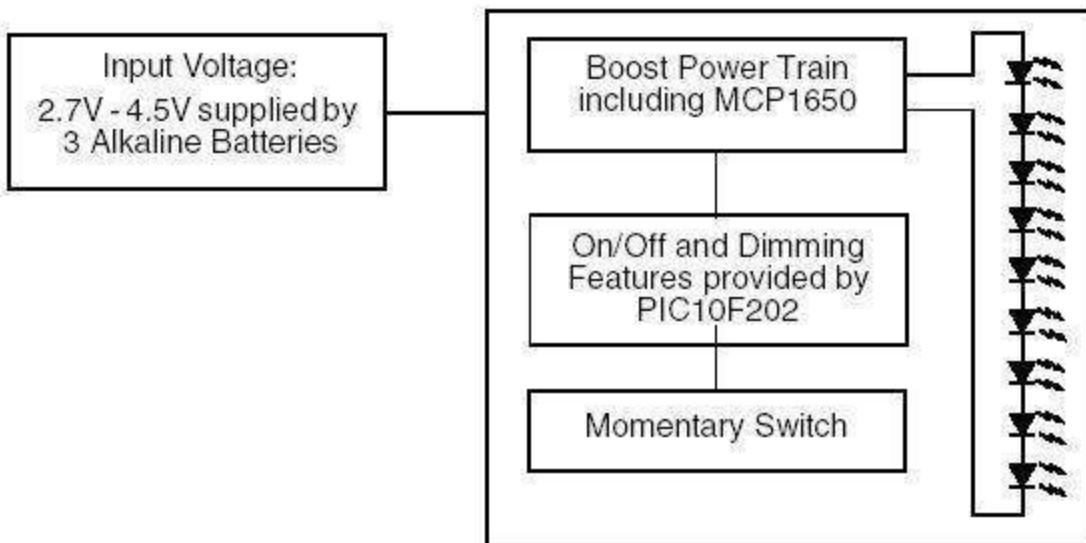
Products supported

- MCP1650


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MCP1650 Multiple White LED Demo Board

The MCP1650 Multiple White LED Demo Board demonstrates the use of a conventional boost topology in a LED application. The board also serves as a platform to evaluate the MCP1650 boost controller.



Products supported

- MCP1650
- PIC10F202

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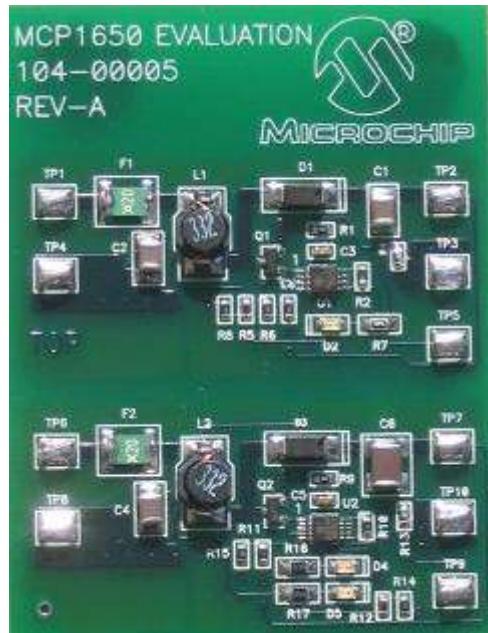


MCP1650 Eval Board

The MCP1650 Boost Controller Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP1650/51/52/53 Boost Controller product family. This board used the MCP1650/51/52/53 in two high-power, boost-converter applications. The first application features the MCP1651 98-pin MSOP0 with the low battery detect feature. The input voltage for the MCP1651 application is 2.8V to 4.8V, with the output boosted to 5V. The second application uses the MCP1653 (10-pin MSOP), which features both the low battery detect and power good features. The input voltage for this application is 3.3V with the output boosted to 12V.

Products supported

- MCP1650
- MCP1651
- MCP1652
- MCP1653

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MCP19035 300 kHz Buck Controller Eval Board

The MCP19035 300 kHz Synchronous Buck Controller Evaluation Board is a compact, highly efficient, step-down voltage regulator that will convert the input voltage rail (typically 12V) to 1.8V regulated output voltage. The maximum output current for this step-down converter is 15A. The board demonstrates the capabilities of the MCP19035 300 kHz synchronous buck converter, as well as Microchip's high-performance power MOSFET transistors. Test points for various signals are provided for measuring different parameters of the converter. The evaluation board can be modified to support output voltages from 0.9V to 3.3V by changing a single resistor.

Microchip's companion Power MOSFETs are used in the design.

Products supported

- MCP19035
- MCP87050
- MCP87022

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MCP19035 600 kHz Buck Controller Eval Board

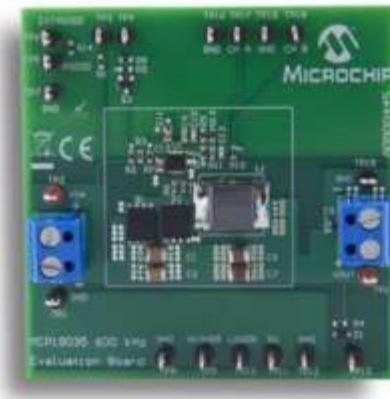
The MCP19035 600 kHz Synchronous Buck Controller Evaluation Board is a compact, highly efficient, step-down voltage regulator that will convert the input voltage rail (typically 12V) to 1.8V regulated output voltage. The maximum output current for this step-down converter is 10A. The board demonstrates the capabilities of the MCP19035 600 KHz Synchronous Buck Converter, as well as Microchip's high-performance power MOSFET transistors. Test points for various signals are provided for measuring different parameters of the converter. The evaluation board can be modified to support output voltages ranging from 0.9V to 3.3V by changing a single resistor.

Features:

- Input Voltage Range: 8V to 14V
- Output Voltage: 1.8V (can be adjusted by changing one resistor between 0.9V and 3.3V)
- Maximum Output Current: 10A
- 88% typical efficiency at 1.8V/10A output and 12V input
- 600 kHz fixed switching frequency
- On-board High Performance Power MOSFET Transistors
- Overcurrent Protection for High and Low-Side MOSFETs
- Power Good (PGOOD) output for monitoring the output voltage quality
- Shutdown input for placing the converter in low-power standby mode
- Under Voltage Lockout (UVLO) with 4.2V and 3.6V typical thresholds

Products supported

- MCP19035
- MCP87050
- MCP87022

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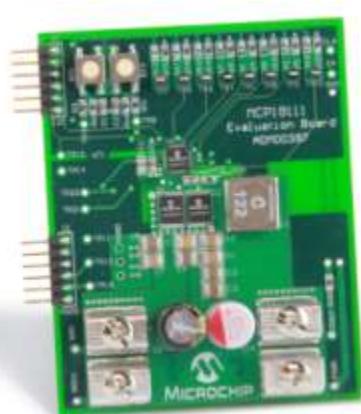


MCP19111 Eval Board

The MCP19111 Evaluation Board demonstrates how the MCP19111 device operates in a synchronous buck topology over a wide input voltage and load range. Nearly all operational and control system parameters are programmable by utilizing the integrated PIC microcontroller core. MPLAB X IDE can be used in conjunction with a Graphical User Interface (GUI) plug-in to easily configure the MCP19111. Alternatively, the user can program the MCP19111 using their own firmware, tailoring it to their application. The evaluation board contains headers for ICSP™ (In-Circuit Serial Programming™) as well as I²C communication, pull-up and pull-down resistor pads and test point pads on each GPIO pin, and two push buttons for system development.

Products supported

- MCP19111
- MCP87050
- MCP87018

[<< BACK](#)

MCP19114 Flyback Standalone Evaluation Board

The MCP19114 Flyback Standalone Evaluation Board and Graphical User Interface (GUI) demonstrate the MCP19114 performance in a synchronous Flyback topology. It is configured to regulate load current, and is well suited to drive LED loads. Nearly all operational and control system parameters are programmable through the integrated PIC MCU core. The MCP19114 evaluation board comes preprogrammed with firmware designed to operate with the GUI interface. Microchip's MPLABX IDE (Integrated Development Environment) can be used to develop and program user-defined firmware, thus customizing it to the specific application. The evaluation board contains headers for ICSPTM (In-Circuit Serial Programming) as well as I2C™ communication. Several test points have been designed into the PWB for easy access and development purposes. The MCP19114-Flyback Standalone Evaluation Board also demonstrates an optimized PCB (Printed Circuit Board) layout that minimizes parasitic inductance, while increasing efficiency and power density. Proper PCB layout is critical to achieve optimum MCP19114 operation as well as power train efficiency and noise minimization.

Features

- Ceramic and bulk capacitors on the input reduce RMS ripple current and tame input voltage deviation caused by load transients
- Ceramic capacitors on the output reduce voltage ripple and provide energy to the output while the primary side is being re-energized
- PC software provides simple interface to evaluating the evaluation board
- Vin range: 8V to 14V
- Adjustable Vout range: 0V to 50V
- Maximum output current: 500mA with proper air flow
- Programming and I2C communication headers

Products supported

MCP19114

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MCP1640 Eval Board

The MCP1640 Synchronous Boost Converter Evaluation Board uses the MCP1640 in a high-efficiency (up to 96%), fixed frequency (500MHz), step-up DC-DC converter.

It demonstrates:

- Easy-to-use and minimum number of external components power supply solution for applications powered by one-cell, two-cell, or three-cell alkaline, NiCd/NiMH; one-cell Li-Ion or Li-Polymer batteries
- Selection of the best operating mode for efficiency (PWM/PFM)
- A wide input voltage range (0.35 to 5.5V) and low start-up voltage (0.65V)
- PCB layouts recommendation for SOT23-6 and 2x3mm-8 DFN packages
- Three common output voltages to evaluate: 2.0V, 3.3V and 5.0V enable selection (when disabled, the MCP1640 disconnects the path from input to output for “true-disconnect”).

Products supported

- MCP1640

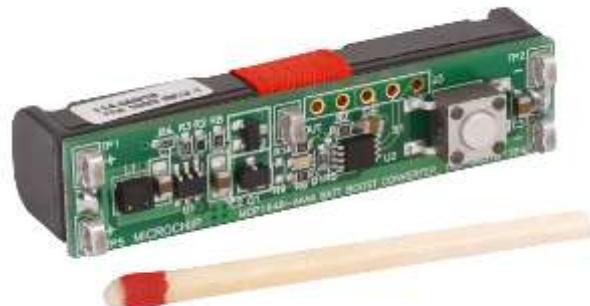
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MCP1640 Single AAAA Battery Boost Ref. Design

The MCP1640 Single Quadruple-A Battery Boost Converter Reference Design demonstrates how the MCP1640 device, with the True Output Disconnect Shutdown option, works attached to a microcontroller application. This board demonstrates how to optimize battery life using the MCP1640, and an 8-bit low cost PIC microcontroller, to reduce the No Load Input Current for applications that operate in Standby mode for a long period of time. During Standby, the enable signal for the MCP1640 has a low frequency, with less than 1% positive duty cycle. This maintains the output of the MCP1640 device up to 2.3V, which is sufficient to keep the PIC microcontroller live. This solution reduces up to 80% of the No Load Input Current the MCP1640 consumes in PFM Mode.

Products supported

- MCP1640
- PIC12F617

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MCP1640 12V/50mA Two Cells Input Ref. Design

The MCP1640 12V/50 mA Two Cells Input Boost Converter Reference Design is designed to demonstrate the MCP1640 device's high-voltage boost capability above its typical output range of 5.5V. This board boosts the low-voltage input to 12V and up to 70 mA load. By changing specific resistors, a lower/higher output than 12V can be obtained. The MCP1640 Input Boost Converter was developed to help engineers reduce product design cycle time. At 2.0V input and 12V output, the board is capable of a maximum of 50 mA load current.

This Kit Contains:

- 1x MCP1640 12V/50 mA Two Cells Input Boost Converter Board

Products supported

- MCP1640B

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MCP1643 1.6A LED Driver Evaluation Board

The MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP1643 device. This board demonstrates the MCP1643 in a boost converter application supplied by one AA battery, or from an external voltage source, which drives an LED with three selectable currents. This evaluation board was developed to help engineers reduce the product design cycle time.

Four output currents can be selected: 25, 50, 75 and 100mA. The output current can be changed with a dual switch that changes the external LED current sense equivalent resistance. An enable switch is used to enable and disable the converter. When enabled, the MCP1643 will regulate the output current; when disabled, the MCP1643 disconnects the path from input to output for "true-disconnect". In this state, the current consumed from the battery is 1 μ A, typically.

Features:

- Can be powered by one-cell Alkaline, NiCd, or NiMH batteries, or by external power supply
- Input voltage range, V_{IN} : 0.35V to 2.5V, with $V_{IN} < V_{OUT}$
- Start-up voltage: 0.65V
- Fixed output current: 25 mA 50 mA, 75 mA or 100 mA, selected
- PWM Switching Frequency: 1 MHz
- Mechanical battery reverse polarity protection

P/N: ADM00435

Products supported

MCP1643



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MCP16251 & MCP1640B Synchronous Boost

The MCP16251 and MCP1640B Synchronous Boost Converters Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP16251 and MCP1640B products. This board demonstrates the MCP16251/MCP1640B in two boost-converter applications with multiple output voltages. It can be used to evaluate both package options (SOT-23-6 and 2x3 mm 8-(T)DFN). The MCP16251 and MCP1640B Synchronous Boost Converters Evaluation Board was developed to help engineers reduce the product design cycle time. Three common output voltages can be selected: 2.0V, 3.3V and 5.0V. The output voltage can be changed with a mini-dip switch that changes the external resistor divider. A switch connected to the EN pin is used to enable and disable the converters. When enabled, the MCP16251/MCP1640B will regulate the output voltage; when disabled, the MCP16251/MCP1640B disconnects the path from input to output for "true-disconnect".

Features:

- Can be powered by one-cell, two-cell, or three-cell alkaline, NiCd, NiMH, one-cell Li-Ion or Li-Polymer batteries
- Input voltage range (VIN): 0.35V to 5.5V, with $V_{IN} \leq V_{OUT}$
- Fixed output voltage: 2.0V or 3.3V and 3.3V or 5.0V, selected using a mini-dip switch on board
- Output current: typical 125 mA @ 3.3V Output, 1.5V Input or 200 mA @ 5.0V Output, 3V Input

Products supported

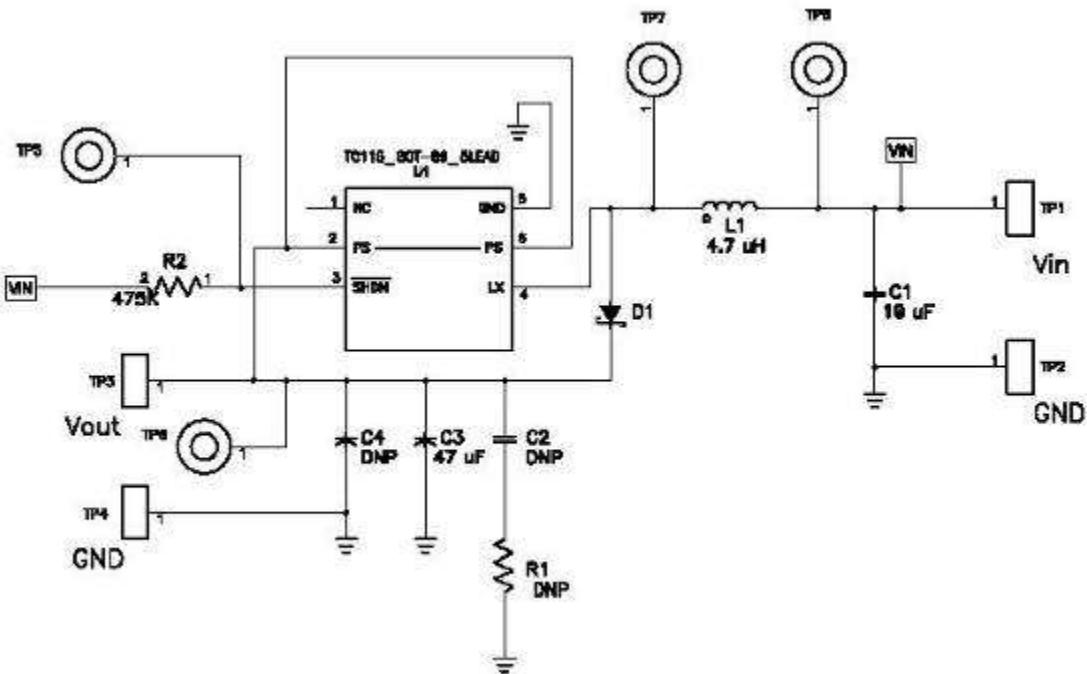
- MCP16251
- MCP1640B

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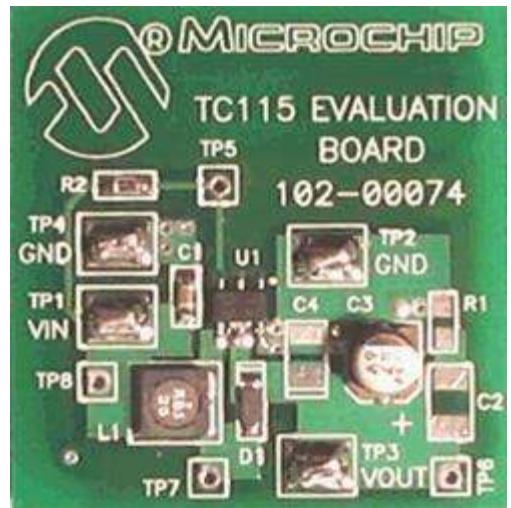
TC115 Eval Board

The TC115 Evaluation Board is a complete, step-up, switch-mode, dc-dc power converter. The TC115 Evaluation Board generates a regulated 3.0V output at load currents up to 110mA. Different output voltages are obtainable by replacing the fixed 3.0V output with a fixed 3.3V or 5.0V device. Since the TC115 operate from a minimum input voltage of 0.9V, the input voltage can be provided by a single-cell battery.



Products supported

- TC115


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Online
Info

MCP1662 LED Driver Eval Board

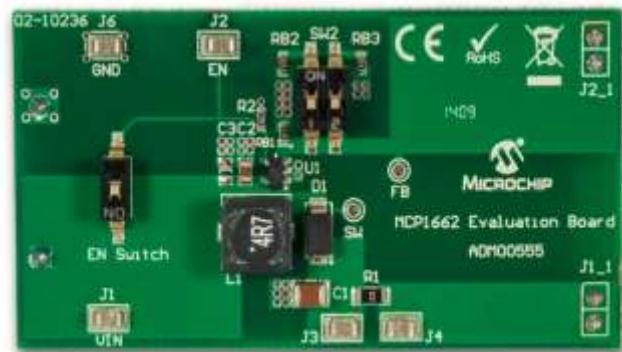
This board demonstrates the MCP1662 in a boost-converter application supplied by two AA batteries, or from an external voltage source, which drives a string of LEDs with three selectable currents: 30 mA, 60 mA and 90 mA. The output current can be changed with a dual switch that changes the external LED current sense equivalent resistance (RSET). An enable switch is used to enable and disable the converter. When enabled, the MCP1662 will regulate the output current; when disabled, the current consumed from the battery by the device is typically less than 20 nA.

Features:

- Can be powered by two-cell Alkaline, NiCd, NiMH or Lithium AA cell batteries
- Input Voltage range (V IN): 2.4V to 5.5V,
- Undervoltage Lockout: 2.3V to Start; 1.85V to Stop
- Adjustable Output Current: 30 mA, 60 mA or 90 mA, selected using a dual switch on-board
- PWM Switching Frequency: 500 kHz
- Enable converter using switch on board
- 1.3A Peak Input Current Limit
- Overtemperature Protection
- Open Load Protection in case of: LED fail or FB disconnected/fault

Products supported

MCP1662



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P/N: ADM00555

MCP1661 HV Boost and SEPIC Converters Eval Board

The MCP1661 High-Voltage Boost and SEPIC Converters Evaluation Board is used to evaluate Microchip Technology's MCP1661 product. This board demonstrates the MCP1661 capabilities in two different topologies:

- 12V output Boost Converter application supplied from an external voltage source ($V_{IN} < 5.5V$ e.g. two cell boost to 12V)
- 3.3V output SEPIC Converter application supplied from a Li-Ion Cell. It can be used to evaluate the SOT-23-5 package. The MCP1661 High-Voltage Boost and SEPIC Converters Evaluation Board was developed to help engineers reduce product design cycle time.

In both the MCP1661 Boost Application and MCP1661 SEPIC Application, the output voltage is set to the proper value using an external resistor divider, resulting in a simple and compact solution.

In the MCP1661 SEPIC Application, a switch is used to enable and disable the converter. When enabled, the MCP1661 will regulate the output voltage; when disabled, the MCP1661 SEPIC Application will disconnect the path from input to output

Features:

- MCP1661 device can be evaluated in two separate applications: Boost and SEPIC
- Start-up Voltage: 2.3V (UVLO Start)
- Input Voltage range (V_{IN}) after start-up: 2.4V to 5.5V,
- Output Voltage:
 - 12V (for MCP1661 Boost Application)
 - 3.3V (for MCP1661 SEPIC Application)
- Output Current: typical 125 mA @ 12V Output, 3.3V Input (Boost)

Products supported



MCP1661



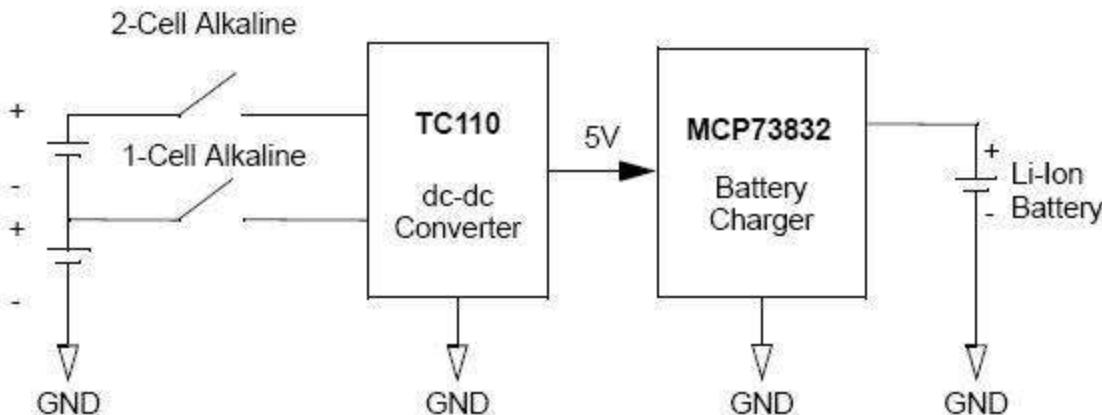
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TC110 Boost Converter Demo Board

The TC110 Boost Converter Demo Board can charge Li-Ion Batteries with single-cell Alkaline battery or 2-cell Alkaline battery at maximum 500mA constant current. The TC110 Boost Converter Demo Board is used to evaluate Microchip's TC110 PFM/PWM Step-Up DC/DC Controller. The TC110 is a step-up (Boost) switching controller that can regulate output voltage with a typical start-up voltage of 0.9V. The TC110 Boost Converter Demo Board also includes a MCP73832 Miniature Single-Cell, Fully Integrated Li-Ion, Li-Polymer Charge Management Controllers. Microchip's MCP73832 is a highly advanced linear charge management controller used in space-limited, cost-sensitive applications.

Products supported

- TC110
- MCP73832

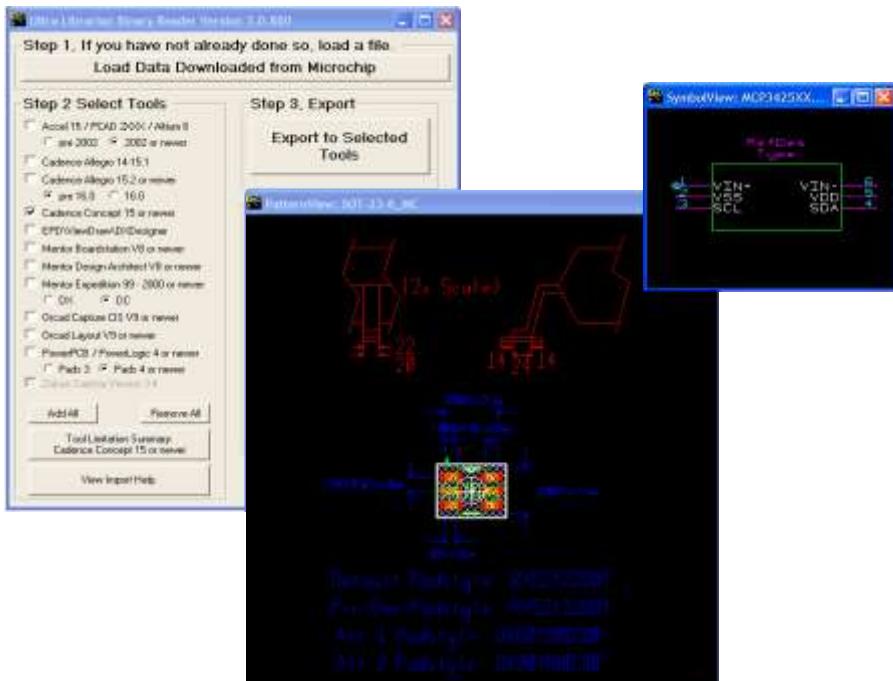

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CAD/CAE Schematic Symbols and Footprints

Microchip and Accelerated Designs Inc. have collaborated together to provide Microchip customers with schematic symbols and PCB footprints for Microchip products.

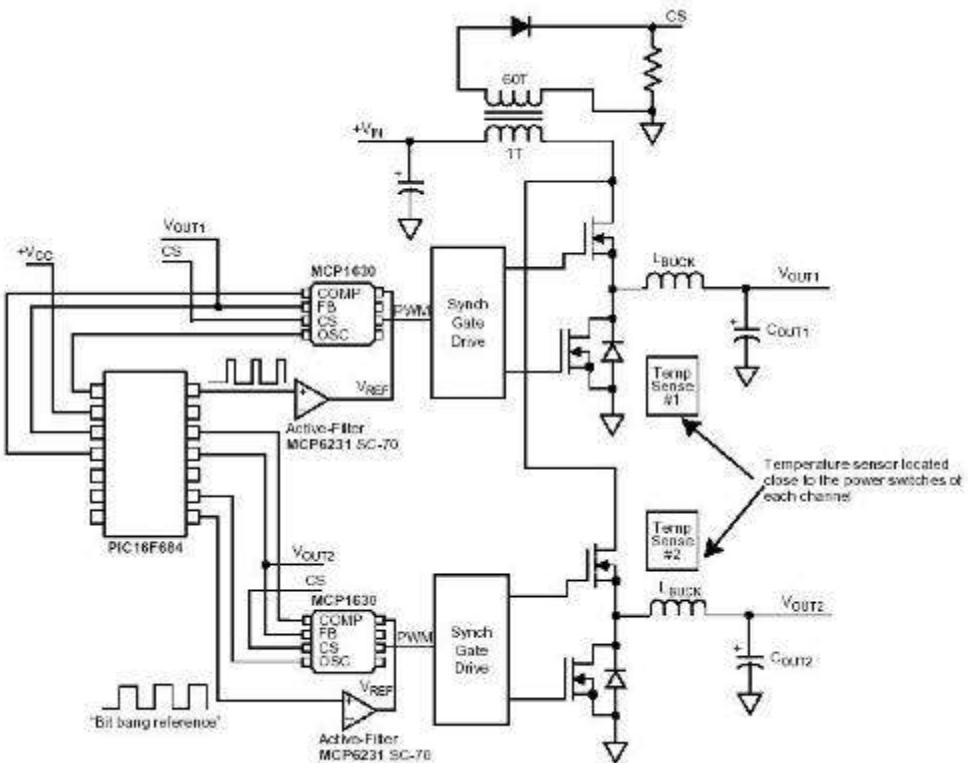
Both PCB footprints and schematic symbols are available for download in a vendor neutral format which can then be exported to the leading EDA CAD/CAE design tools using the Ultra Librarian Reader. The reader is available for free download

Providing components based on parametric data through the Ultra Librarian Reader will allow Microchip customers to reliably create consistent quality CAD entities to an established standard with minimal effort. It is anticipated that this free download service will save Microchip's customers significant time


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MCP1630 Dual Output Buck Converter Ref. Design

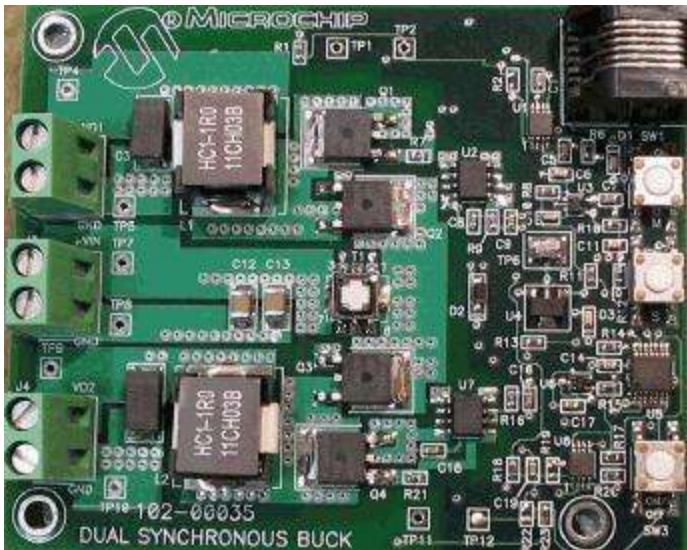
The MCP1630 Dual Buck Demo Board is a complete, stand-alone, dual-output power supply capable of 20A per output, powered from a +12V input source. This board utilizes Microchip's MCP1630 (high-speed PIC® MCU PWM MSOP8), PIC16F684 (MCU Flash TSSOP13), MCP6231U (Op Amp SC-70) and TC6501 (Temperature Switch SOT23A-5). The input voltage range for the demo board is +9.0V to +13.5V. Both adjustable regulated outputs are capable of 20A.



P/N: MCP1630RD-DDBK1

Products supported

- MCP1630
- MCP6231
- TC6501
- PIC16F684



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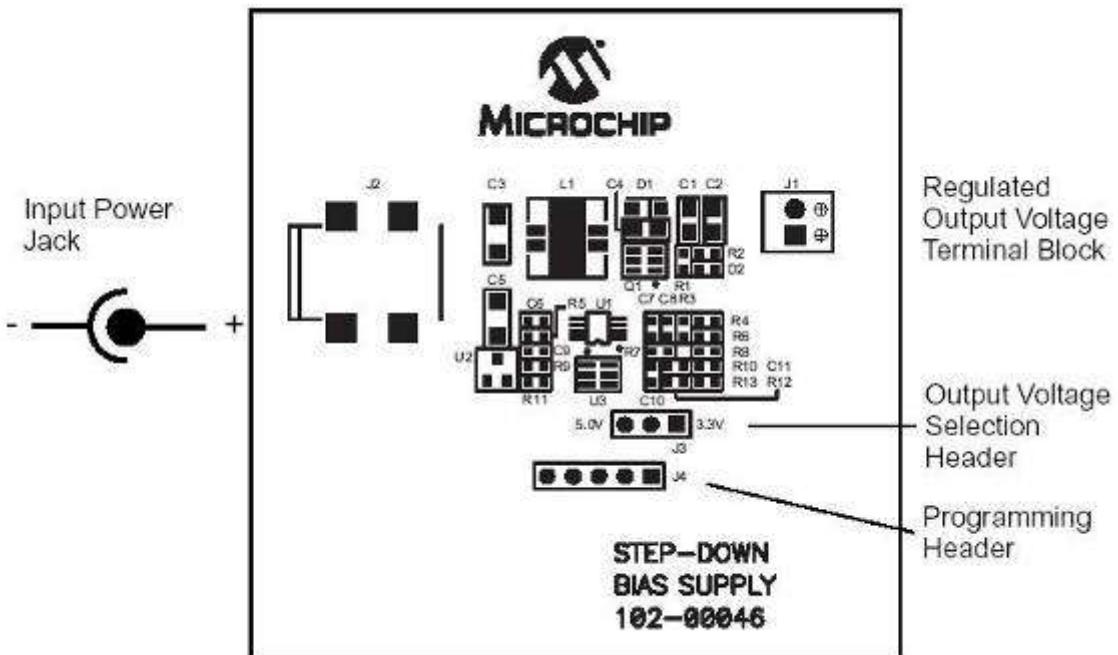
MCP1630 1A Bias Supply Demo Board

Online
Info

The MCP1630 1A Bias Supply Demo Board is a complete, step-down, switch-mode, DC-DC power converter. The demo board generates a regulated output voltage for systems requiring a bias of 3.3V or 5V at load currents up to 1A. Different output voltages can be obtained with minor modifications to the firmware and/or hardware.

Products supported

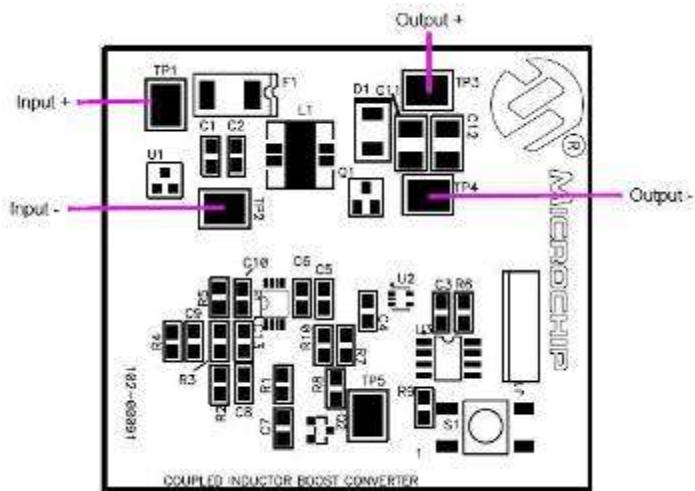
- MCP1630
- MCP1701A
- PIC10F200





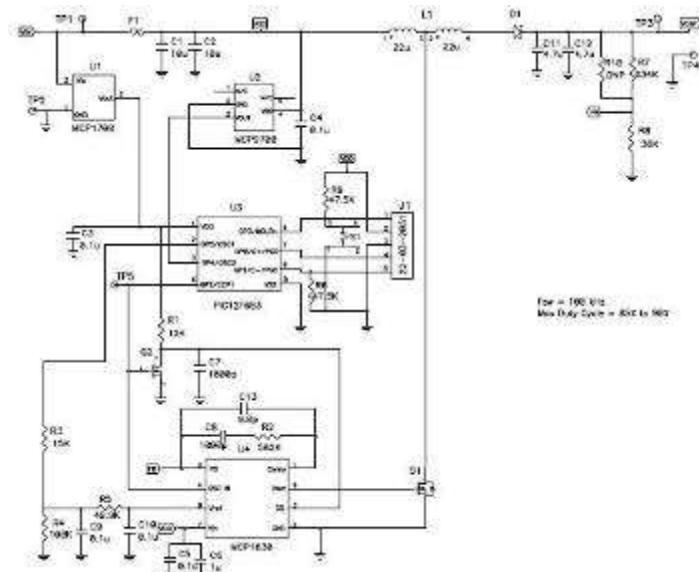
MCP1630 Coupled Inductor Boost Demo Board

The MCP1630 Coupled Inductor Boost Converter Demo Board demonstrates Microchip's High-Speed Pulse Width Modulator (PWM) used in a coupled inductor design. When used in conjunction with a microcontroller, the MCP1630 device will control the power system duty cycle to provide different regulated output voltages using push button S1. The PIC12F683 microcontroller is used to generate oscillator pulses, can also be programmed to monitor the board ambient temperature using the MCP9700 Linear Active Thermistor™ device and provide different regulated output voltages for different thermal readings. The MCP1630 device generates duty cycle based on various external inputs. External signals include the input oscillator pulses, reference voltage from PIC12F683 device, and the feedback voltage. The output signal is a square-wave pulse given to drive the MOSFET.



Products supported

- MCP1630
 PIC12F683
 MCP9700



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Controller Boards](#)

MCP1630 Boost Mode LED Driver Demo Board

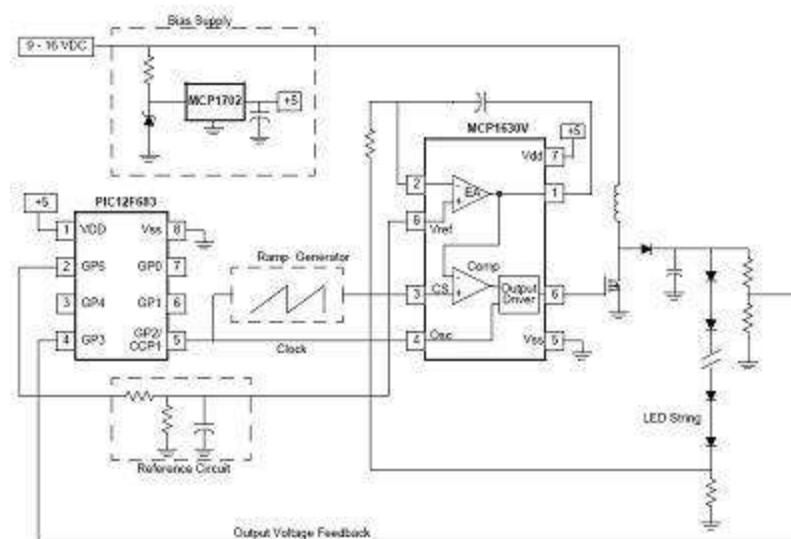
The MCP1630 Boost Mode LED Driver Demo Board is a step-up, switch-mode, DC-DC converter used for power LED applications. The demo board provides a 350mA or 700mA constant current source. Other output currents can be obtained with minor modifications to the board. The demo board utilized Microchip's MCP1630V high-speed pulse width modulator (PWM). The 8-pin MCP1630 device contains the analog components necessary for an analog switch-mode control loop including an error amplifier, PWM comparator, and a high current driver pin. The switching frequency and maximum duty cycle for the MCP1630V are determined by an external clock source. An 8-pin PIC12F683 microcontroller is used to provide a 500 kHz switching clock for the MCP1630V. In addition, the PIC12F683 firmware supervises the circuit output voltage and can optionally dim the LEDs when a potentiometer is attached.

Features:

- Compact size with high output power
- High efficiency over entire operating input voltage range
- Selectable output current: 350mA or 700mA
- Maximum output power: 30W
- Optional software dimming control
- Factory programmed source code provided
- Switching frequency, maximum duty cycle, and MCP1630 reference voltage can be modified in firmware

Products supported

- MCP1630V
- PIC12F683
- MCP1702



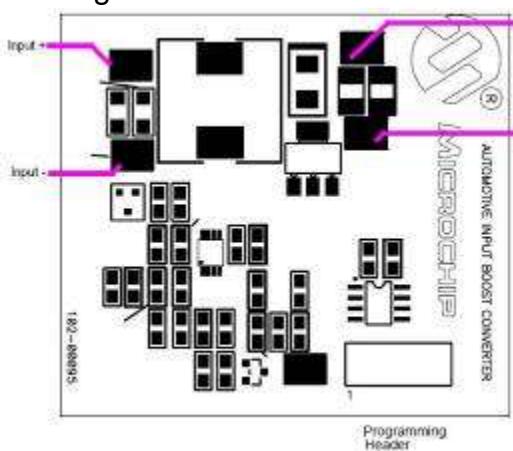


MCP1630 Automotive Boost Converter Demo Board

The MCP1630 Automotive Input Boost Converter Demo Board demonstrates the use of a conventional boost topology with automotive input. The board also serves as a platform to evaluate the MCP1630/V devices.

The MCP1630/V inputs were developed to be easily attached to the I/O of a microcontroller. The microcontroller unite (MCU) supplies the oscillator pulses and reference voltage (V_{REF}) to the MCP1630/V devices to provide the most flexible and adaptable power system. The power system switching frequency and maximum duty cycle are set using the I/O of the MCU. The reference input to the high-speed PWM can be external, a D/A Converter (DAC) output or as simple as an I/O output from the MCU. This enables the power system to adapt to many external signals.

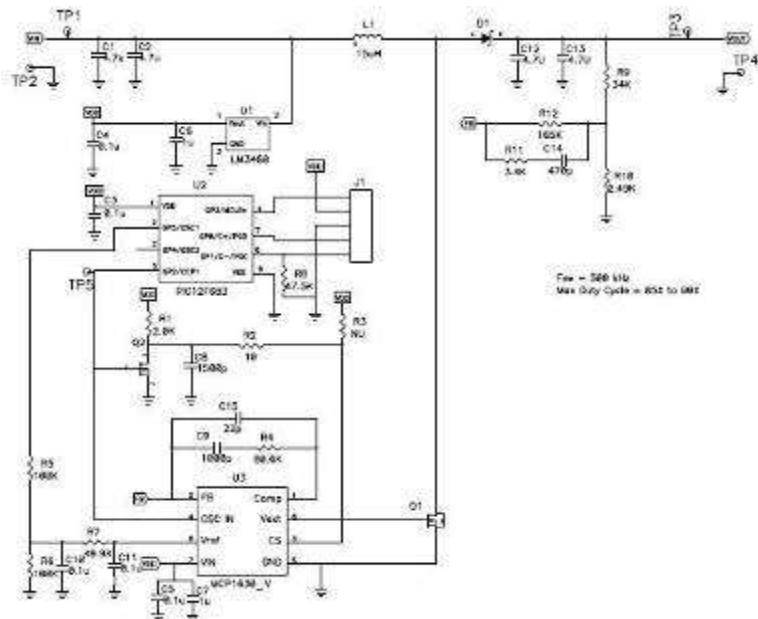
The board utilizes Microchip's MCP1630/V integrated with the PIC12F683 Flash-based MCU. The converter is capable of delivering an output voltage of 36.5V at 400mA load current with maximum power of 14.6W.



P/N: MCP1630DM-DDBS1

Products supported

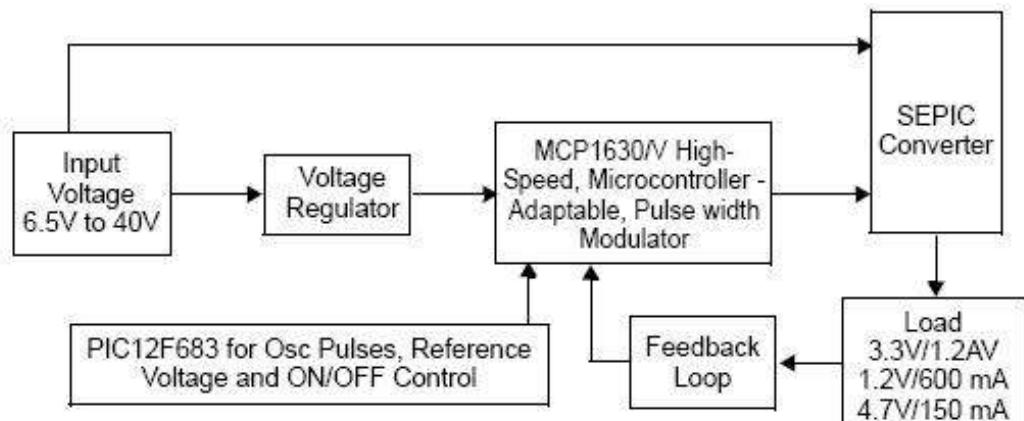
- MCP1630
- PIC12F683



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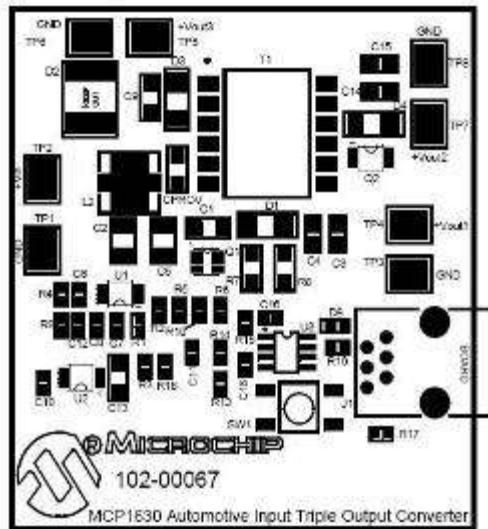
MCP1630 Automotive Triple Converter Demo Board

The MCP1630 Automotive Input Triple Output Converter Demo Board demonstrates the use of a SEPIC topology for Automotive applications. The board also serves as a platform to evaluate the MCP1630 device.



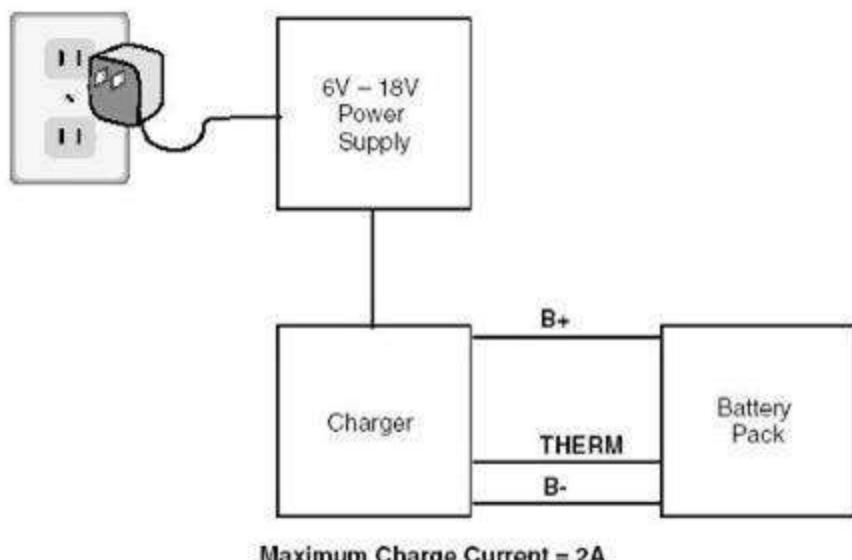
Products supported

- MCP1630
- PIC12F683



MCP1630 Li-Ion Battery Charger Reference Design

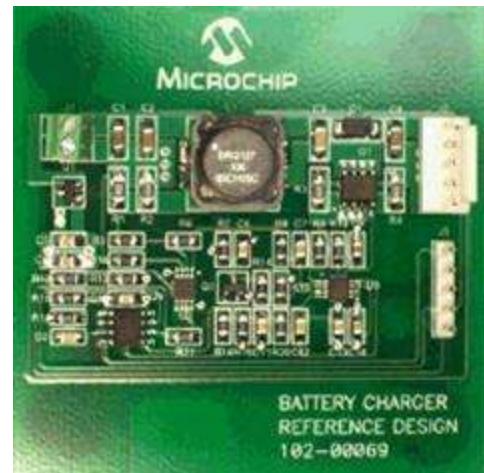
The MCP1630 Low-Cost Li-Ion Battery Charger is used to evaluate Microchip's MCP1630 in a SEPIC power converter application. As provided, the MCP1630 Low-Cost Li-Ion Battery Charger is capable of charging a single-cell, Li-Ion battery pack from an input voltage of 6V to 18V. The MCP1630 Low-Cost Li-Ion Battery Charger provides a constant current, constant voltage charge with preconditioning, cell temperature monitoring and battery pack fault monitoring. Also, the charger provides a status or fault indication. The MCP1630 Low-Cost Li-Ion Battery Charger automatically detects the insertion or removal of a battery pack.



P/N: MCP1630RD-LIC2

Products supported

- MCP1630
- MCP6292
- PIC12F683

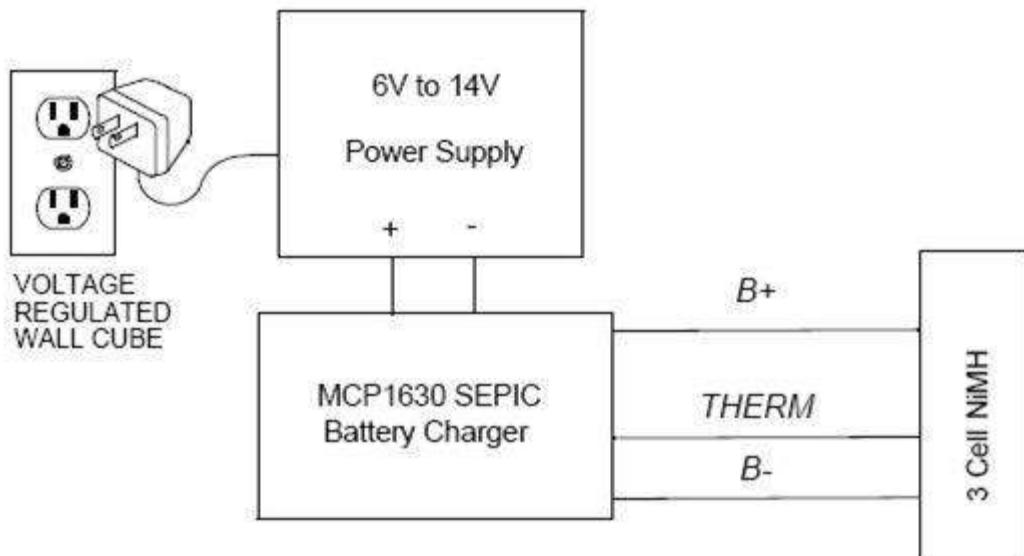


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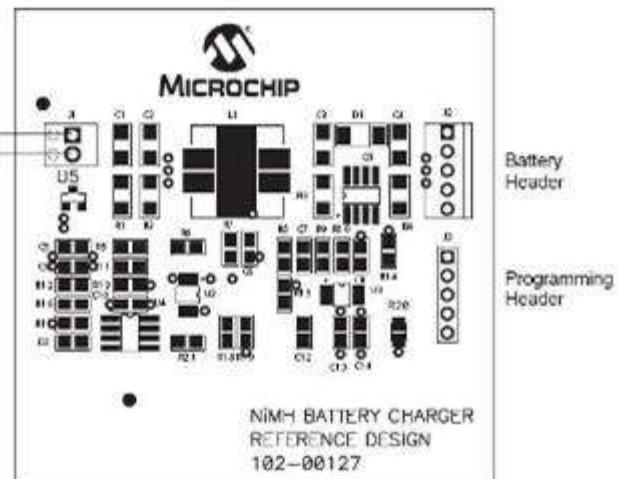
MCP1630 NiMH Battery Charger Reference Design

The MCP1630 Low-Cost NiMH Battery Charger Reference Design is used to charge three series cell NiMH or NiCd batteries. The board uses the MCP1630 high-speed analog PWM and PIC12F683 to generate the charge algorithm for NiMH or NiCd batteries.



Products supported

- MCP1630
- MCP6292
- PIC12F683
- MCP1702

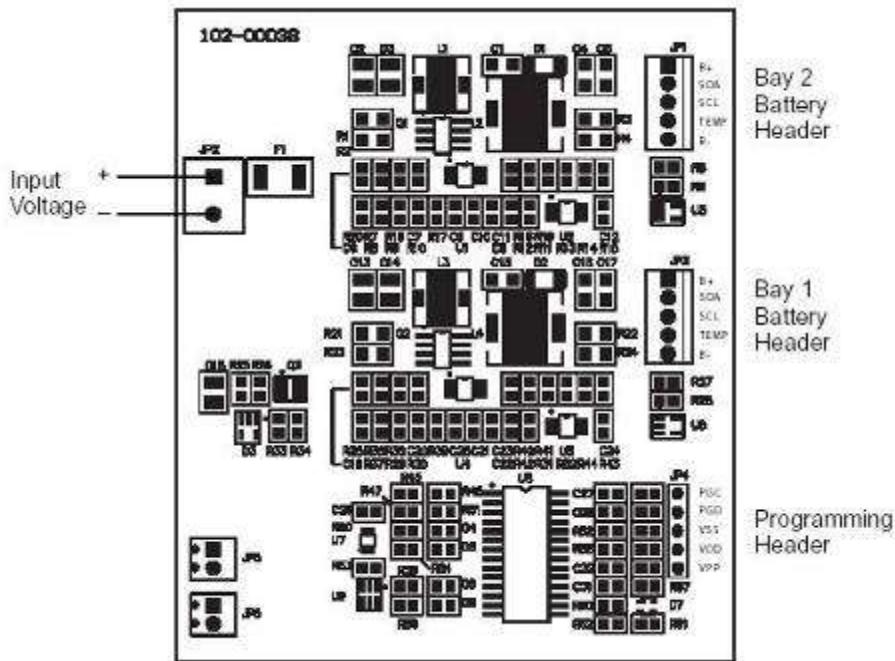

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MCP1630 Li-Ion Multi-Bay Battery Reference Design

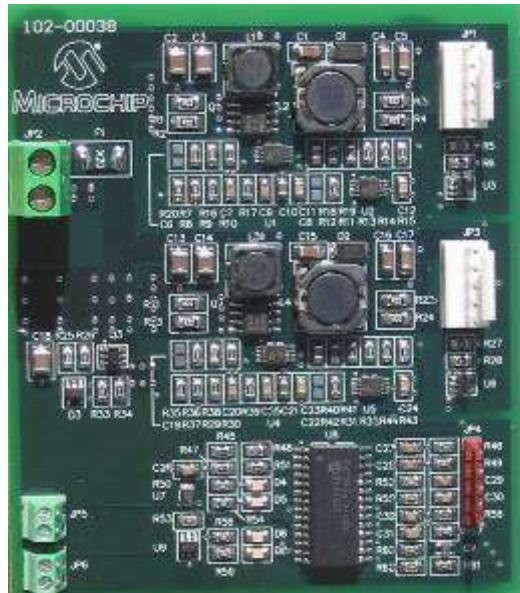
Online Info

The MCP1630 Li-Ion Multi-Bay Battery Charger is a complete, stand-alone, constant-current, constant-voltage battery charger for single-cell Li-Ion battery packs. Different battery chemistries (i.e. three NiMH or NiCd batteries connected in series) can be charged with minor modifications to the firmware. This board utilizes Microchip's MCP1630 high-speed PWM, MCP6292 dual op-amp and PIC18F2410 Flash MCU. The input voltage range is 10V to 28V. The output is capable of charging at a fast-charge rate of 2A constant current.



Products supported

- MCP1630
 - MCP6292
 - PIC18F2410



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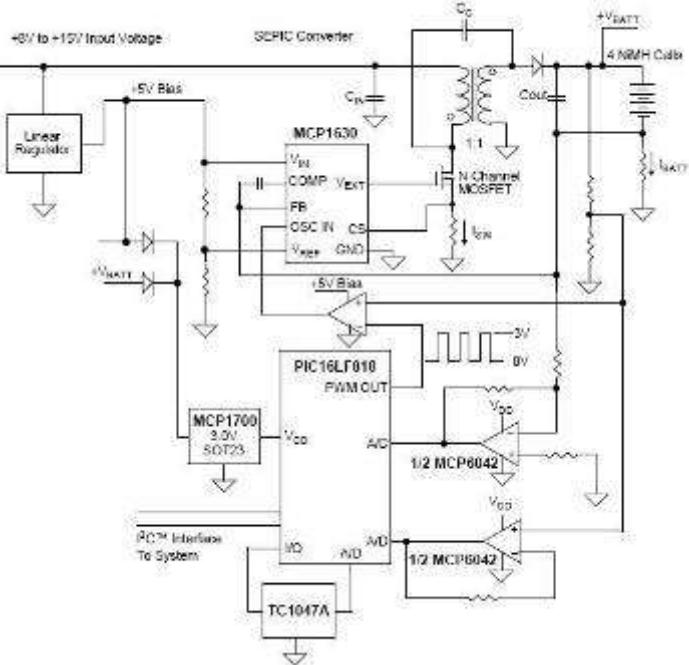
P/N: MCP1630RD-LIC1



MCP1630 NiMH Demo Board

The MCP1630 NiMH Demo Board is a complete stand-alone constant current battery charger and simple fuel gauge for four NiMH series batteries. This board utilizes Microchip's MCP1630 high-speed PWM, MCP1700 LDO Regulator, MCP6042T Op-Amp, PIC16LF818 Flash MCU, TC54 Voltage detector and TC1047A Temperature-Voltage Converter. The input voltage range for the demo board is 8V to 15V. The output is capable of charging four NiMH batteries with up to 1.6V per cell at a fast charge rate of 500mA constant current.

MCP1630 NiMH Battery Charger and Fuel Gauge Application Diagram



P/N: MCP1630DM-NMC1

Online
Info

Products supported

- MCP1630
 - MCP6042
 - TC1047A
 - MCP1700
 - TC54
 - PIC16LF818

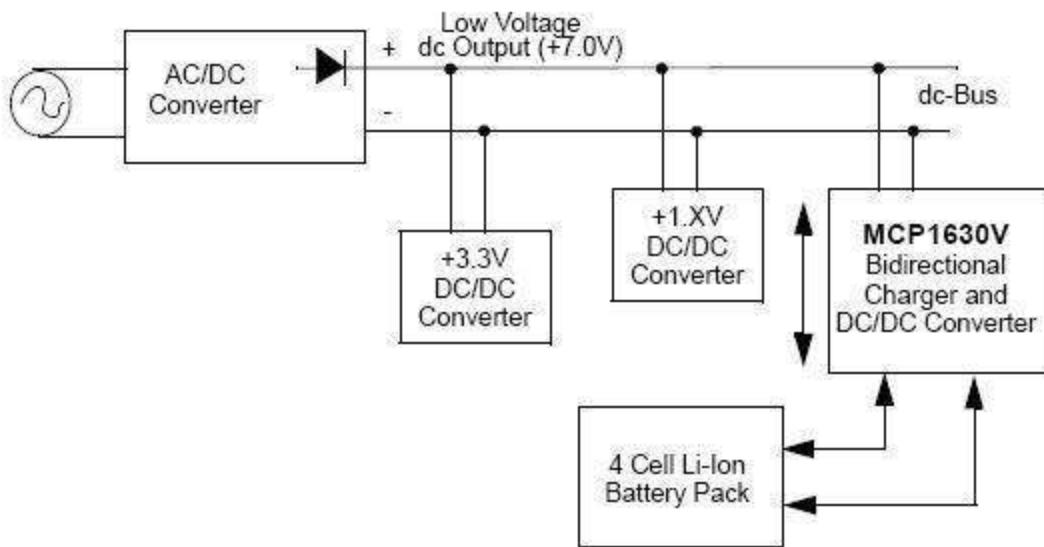
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MCP1630V Bidirectional 4-cell Li-Ion Charger Ref Design

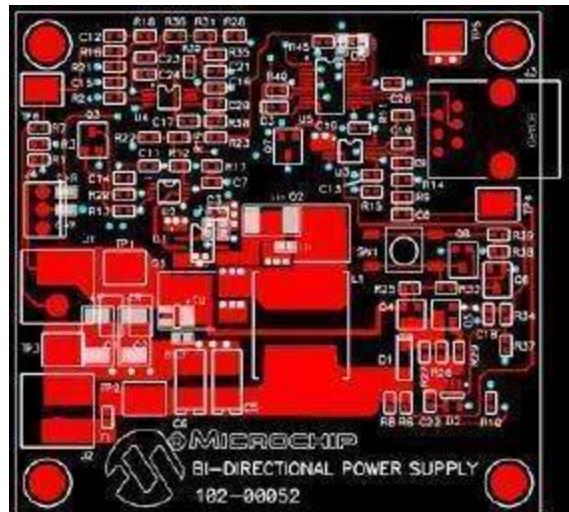
The MCP1630V Bidirectional 4 Cell Li-Ion Charger Reference Design demonstrates the use of a bidirectional buck-boost converter used to charge multiple series cell Li-Ion batteries with the presence of an input source (boost) and provide a regulated output voltage when the input source is removed (buck). The board also serves as a platform to evaluate the MCP1630V device.

Wide Range
ac Input
(85 Vrms to 240 Vrms)



Products supported

- MCP1630V
- MCP6022
- PIC16F88



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MCP1631HV Multi-Chemistry Battery Charger Ref Design

The MCP1631 Multi-Chemistry Battery Charger Reference Design is a complete stand-alone constant current battery charger for NiMH, NiCd or constant current / constant voltage for Li-Ion battery packs. When charging NiMH or NiCd batteries, the reference design is capable of charging one, two, three or four batteries connected in series. If Li-Ion chemistry is selected, the board is capable of charging one or two series batteries. This board utilizes Microchip's MCP1631HV (high-speed PIC® MCU PWM TSSOP-20) and PIC16F883 (28 pin SSOP). The input voltage range for the demo board is 5.5V to 16V.

Products supported

- MCP1631HV
- PIC16F883

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MCP1631HV Programmable Current Source Design

The MCP1631HV Digitally Controlled Programmable Current Source Reference Design is used to drive and dim one or more power LEDs in a series or parallel topology (depending on the LED's capability).

The reference design may also be used to charge one to four cell NiMH/NiCd or one to two cell Li-Ion battery packs. The board uses the MCP1631HV high-speed analog PWM controller and PIC16F616 microcontroller to generate the proper dimming ratio for LEDs or charge algorithm for NiMH, NiCd and Li-Ion batteries. The board is used to evaluate Microchip's MCP1631HV in a SEPIC power converter application.

Products supported

- MCP1631HV
- PIC16F616

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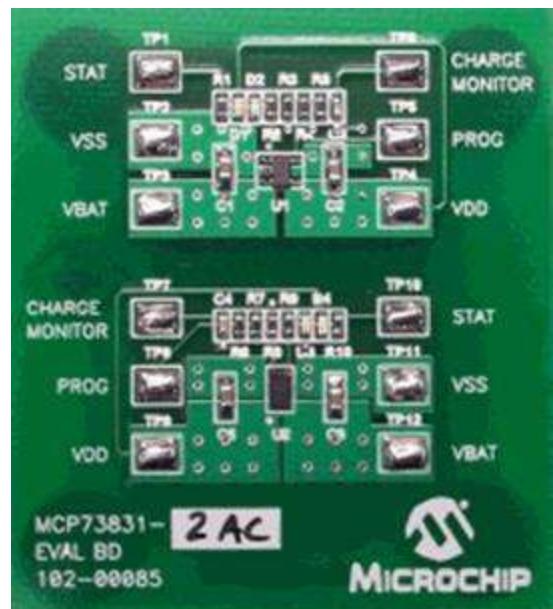
MCP73831 Eval Kit

The MCP73831 Evaluation Board is an evaluation and demonstration tool for Microchip's MCP73831 miniature single-cell, fully-integrated Li-Ion, Li-Polymer charge-management controllers.

Two evaluation boards are provided in the MCP73831 Evaluation kit. The boards are set up to evaluate simple, stand-alone, linear charging of single-cell Li-Ion/Li-Polymer battery packs (the battery packs are not included). Each board design provides constant current charging followed by constant voltage charging with automatic charge termination. In addition, the MCP73831-2AC board provides preconditioning of deeply depleted cells.

Products supported

- MCP73831

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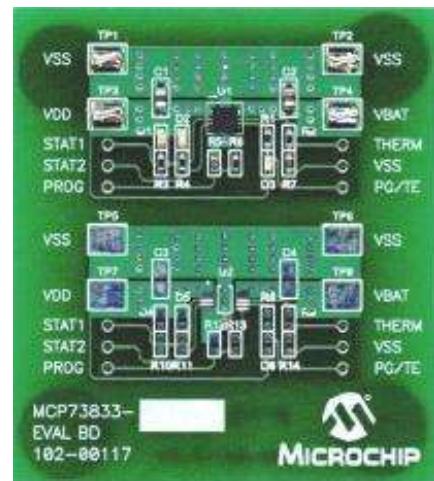
MCP73833/4 Eval Board

The MCP73833 Li-Ion Battery Charger Evaluation Board is an evaluation and demonstration tool for Microchip's MCP73833/4 Stand-Alone Linear Li-Ion/Li-Polymer Charge Management Controllers.

The evaluation board has two circuits provided with one circuit fully assembled and tested. Each circuit is set up to evaluate simple, stand-alone, linear charging of single cell Li-Ion/Li-Polymer battery packs (the battery packs are not included). The circuits can be evaluated independently. Each circuit design provides constant current charging followed by constant voltage charging with automatic charge termination and battery temperature monitoring. In addition, the assembled MCP73833/4-FC circuit provides preconditioning of deeply depleted cells.

Products supported

- MCP73833
- MCP73834

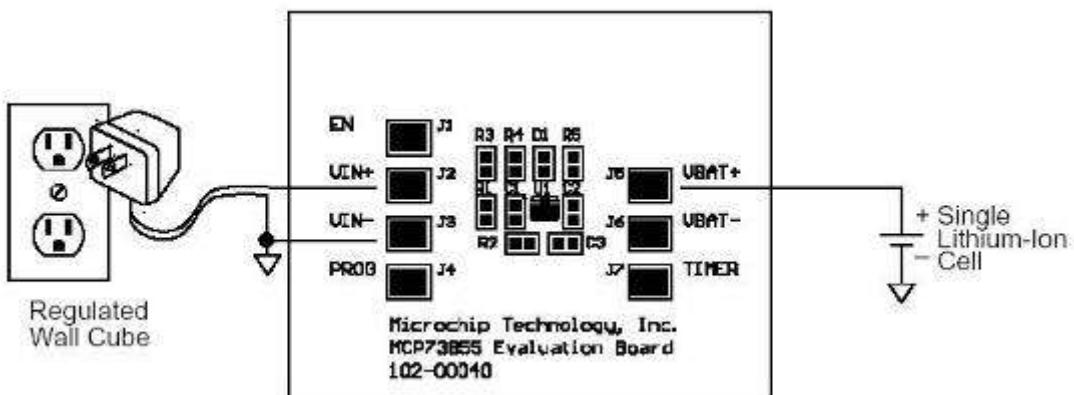
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MCP73855 Eval Board

The MCP73855 Evaluation Board is an evaluation and demonstration tool for Microchip Technology's MCP73855 USB Compatible Li-Ion/Li-Polymer Charge Management Controller. The design provides for dynamic versatility while being able to handle accurate measurements.

The MCP73855 Evaluation Board allows for the evaluation of the MCP73855 device in a variety of applications.



Products supported

- MCP73855

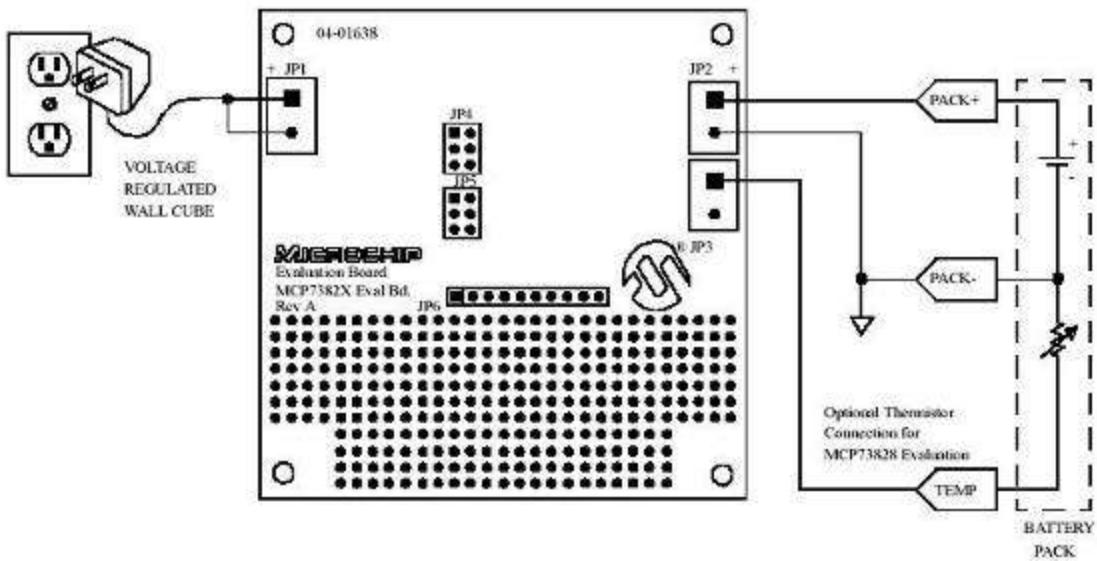
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MCP7382x Eval Board

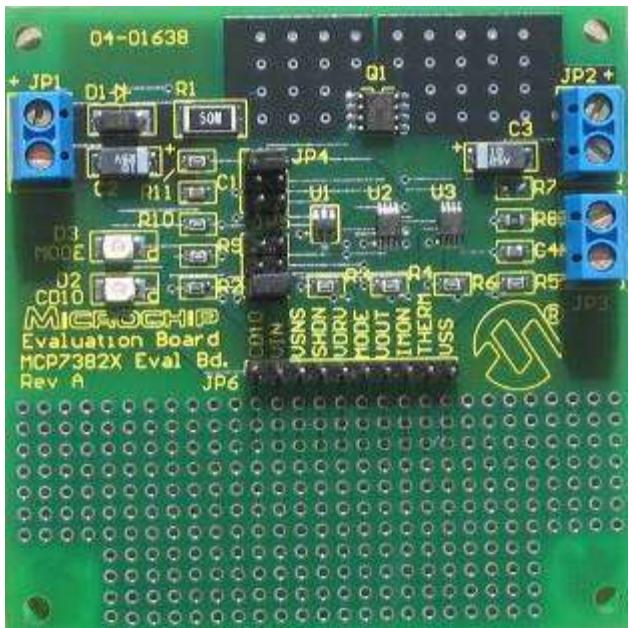
The MCP7382X Evaluation Board is an evaluation and demonstration tool for Microchip Technology's MCP7382X Single Cell Li-Ion Charge Management Controllers. The design provides for dynamic versatility while being able to handle accurate measurements.

The MCP7382X Evaluation Board allows for the evaluation of the MCP7382X device in a variety of applications.



Products supported

- MCP7382x

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MCP7381x Eval Board

The MCP7381X Li-Ion Battery Charger Evaluation Board demonstrates the features and abilities for Microchip's MCP7381X Li-Ion Battery Charger Evaluation Board Simple, Miniature Single-Cell, Fully Integrated Li-Ion / Li-Polymer Charge Management Controllers. The MCP73811/2 are stand-alone highly integrated linear Li-Ion battery chargers that employ a constant current/constant voltage (CCCV) charge algorithm for cost sensitive and space limited applications.

Products supported

- MCP73811
- MCP73812

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MCP73113 OVP Single Cell Li-Ion Battery Charger Eval Bd

The MCP73113 OVP Single-Cell Li-Ion Battery Charger Evaluation Board demonstrates the features of Microchip's MCP73113 "Single-Cell Li-Ion / Li-Polymer Battery Charge Management Controller with Input Overvoltage Protection".

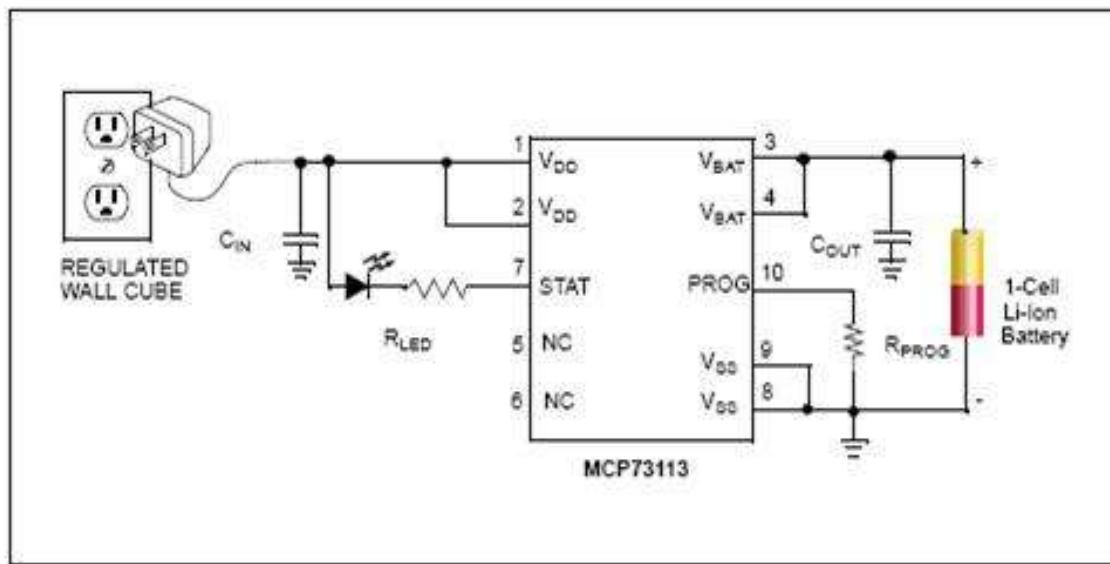


FIGURE 1-1: MCP73113 Typical Application.

Products supported

- MCP73113
- MCP73114



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MCP73213 OVP Dual Cell Li-Ion Battery Charger Eval Bd

The MCP73213 OVP Dual-Cell Li-Ion Battery Charger Evaluation Board demonstrates the features of Microchip's MCP73213 "Dual-Cell Li-Ion / Li-Polymer Battery Charge Management Controller with Input Overvoltage Protection".

Products supported
 MCP73213

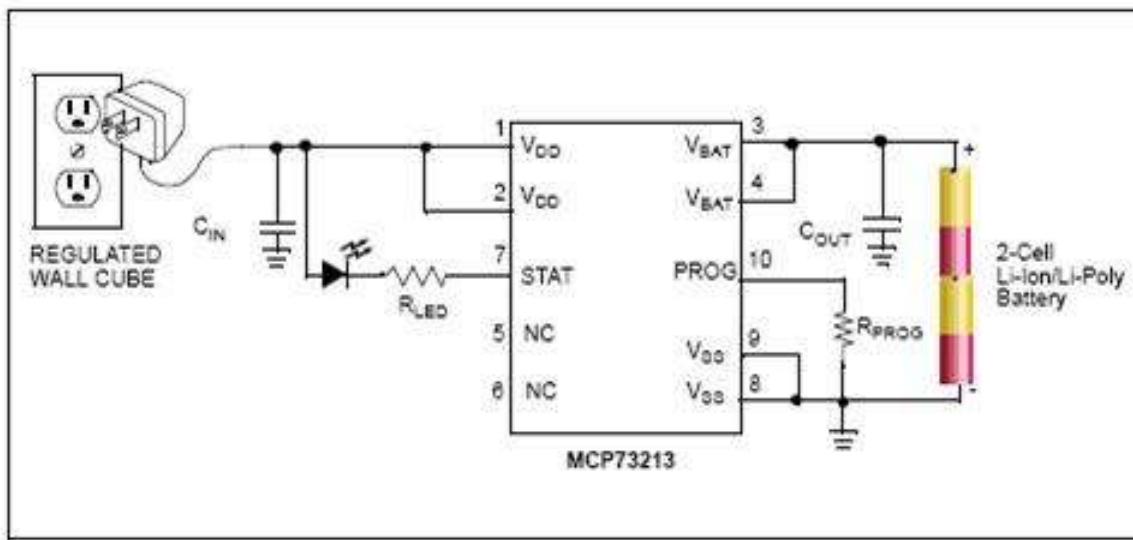


FIGURE 1-1: MCP73213 Typical Application.

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MCP73X23 LiFePO₄ Battery Charger Eval Board

The MCP73123/223 is a highly integrated Li-Ion battery charge management controller for use in space-limited and cost-sensitive applications.

The MCP73123/223 provides specific charge algorithms for Lithium Iron Phosphate batteries to achieve optimal capacity and safety in the shortest charging time possible. Along with its small physical size, the low number of external components makes the MCP73123/223 ideally suitable for low-cost and small-capacity (less than 2000 mAh) LiFePO₄ battery applications. It will take longer time to complete a charge cycle for larger capacity LiFePO₄ battery packs.

Products supported

- MCP73123
- MCP73223

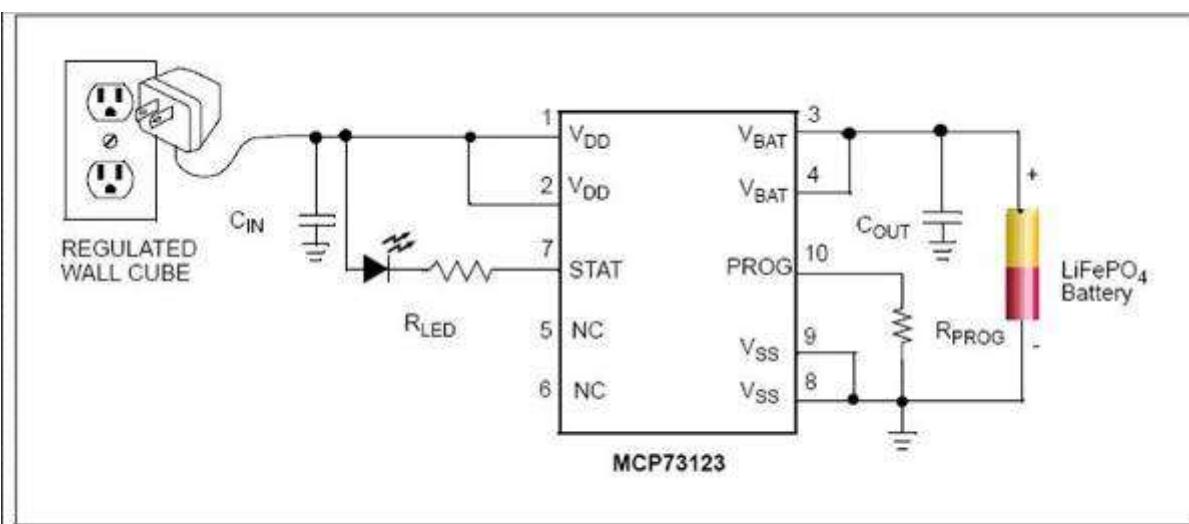


FIGURE 1-1: MCP73123 Typical Application.

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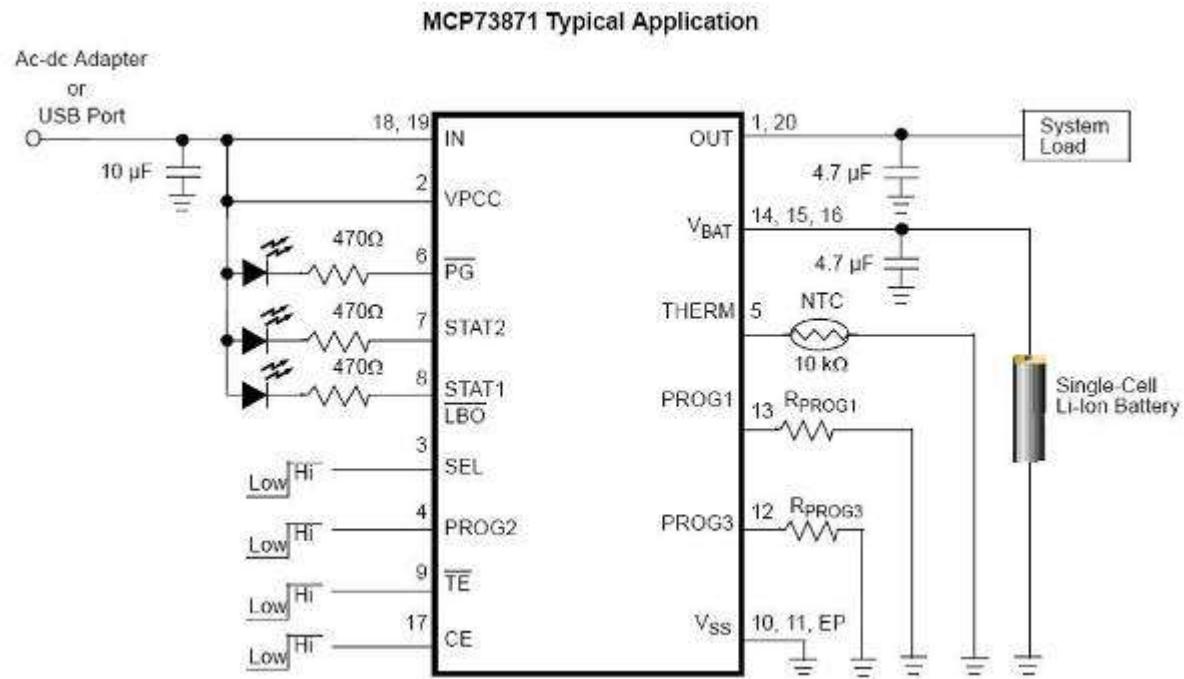


MCP73871x Eval Board

The MCP73871 Evaluation Board is designed to demonstrate Microchip's stand-alone linear Li-Ion battery charger with system power path and load sharing management control solution. The system load is also supported by the Li-Ion battery when input power is disconnected. A number of device options allow the MCP73871 device to be utilized in a variety of applications.

Products supported

- MCP73871



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MCP7383X Li-Ion Power Path Management Design

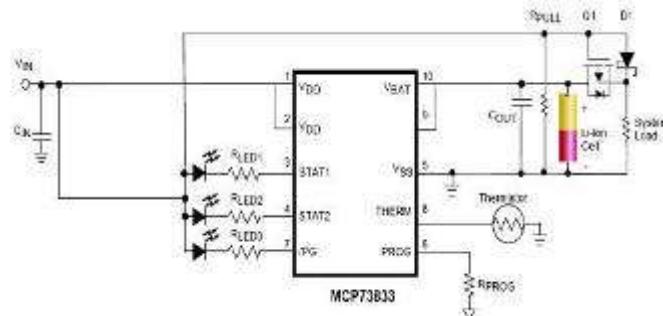
This reference design is developed to assist product designers in reducing product design cycle and time by utilizing Microchip's favorite stand-alone Li-Ion battery charge management controllers with system power path management.

Features:

- Load sharing system power path management that support charging single cell Li-Ion battery and system load at the same time without affecting charging algorithm of Microchip's stand-alone charge management controllers.
- The system load is supported by Li-Ion battery when input power source is removed
- Blue LED indicates charge status
- Additional Red LED to indicate Power-Good (PG) and Green LED to indicate charge complete (Available from MCP73833)
- Dip Switch to select programmable fast charge current between 1000mA (H) and 50mA (L) for MCP73833 and 400mA (H) and 25mA (L) for MCP73832
- Available THERM pin on the MCP73833 for temperature monitoring with a thermistor. It is disabled by default and can be enabled to use with NTC thermistor

Products supported

- MCP73831
- MCP73832
- MCP73833
- MCP73834


[**<< BACK**](#)

MCP73871 Demo with Voltage Prop. Current Control

The MCP73871 Demo Board with Voltage Proportional Current Control is designed to demonstrate Microchip's stand-alone linear Li-Ion battery charger with system power path and load sharing management control solution. The

MCP73871 integrates the required elements to meet design challenges when developing new Li-Ion / Li-Polymer batteries powered products.

The MCP73871 Demo Board with Voltage Proportional Current Control is designed to deliver minimum 1.5A total current to system load and to a single cell Li-Ion battery at 4.2V preset voltage regulation (4.1V, 4.35V and 4.4V options are also available for MCP73871). The board has a dip switch helping to decides the input power source between AC-DC wall adapter and USB port (AC/USB) and control input current limits, enable charge timer and enable charging.

The MCP73871 Demo Board with Voltage Proportional Current Control comes with a factory preset low-battery indicator (LBO) when input is absent. The preset value is 3.2V and STAT1 LED (green) with turn ON if the battery voltage is below the threshold voltage.

Products supported

- MCP73871

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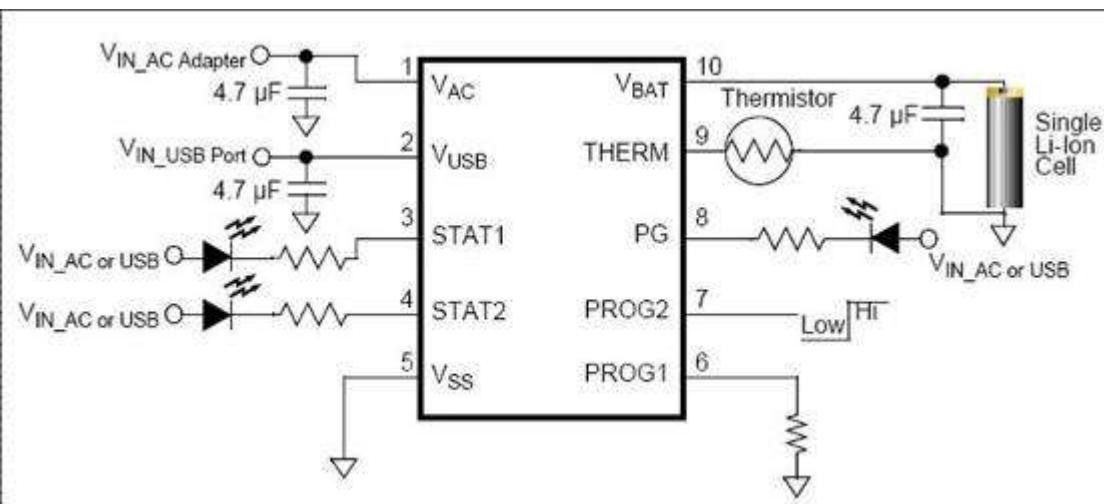
MCP73837/8 AC/USB Dual Input Battery Charger Board

The MCP73837/8 AC/USB Dual Input Battery Charger Evaluation Board demonstrates Microchip's stand-alone Linear Li-Ion Battery Chargers - MCP73837 and MCP73838.

The MCP73837/8 require only minimum components to implement a complete battery charge management circuit. The MCP73837/8 are designed to select AC-Adapter or USB-Port Power Source automatically where AC-Adapter provides the charge current when both sources are present.

Products supported

- MCP73837
- MCP73838

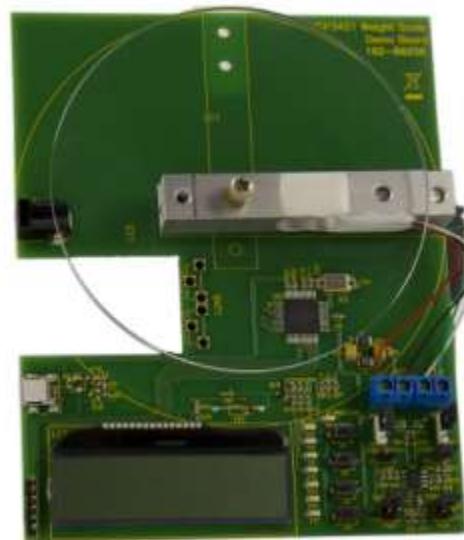

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MCP3421 Weight Scale Demo Board

The MCP3421 Weight Scale Demo Board is designed to evaluate the performance of the low-power consumption, 18-bit ADC in an electronic weight scale design. Next to the MCP3421 there is a low-noise, auto-zero MCP6V07 op amp. This can be used to investigate the impact of extra gain added before the ADC for performance improvement. The PIC18F4550 is controlling the LCD and the USB communication with the PC. The GUI is used to indicate the performance parameters of the design and for calibration of the weight scale.

Products supported

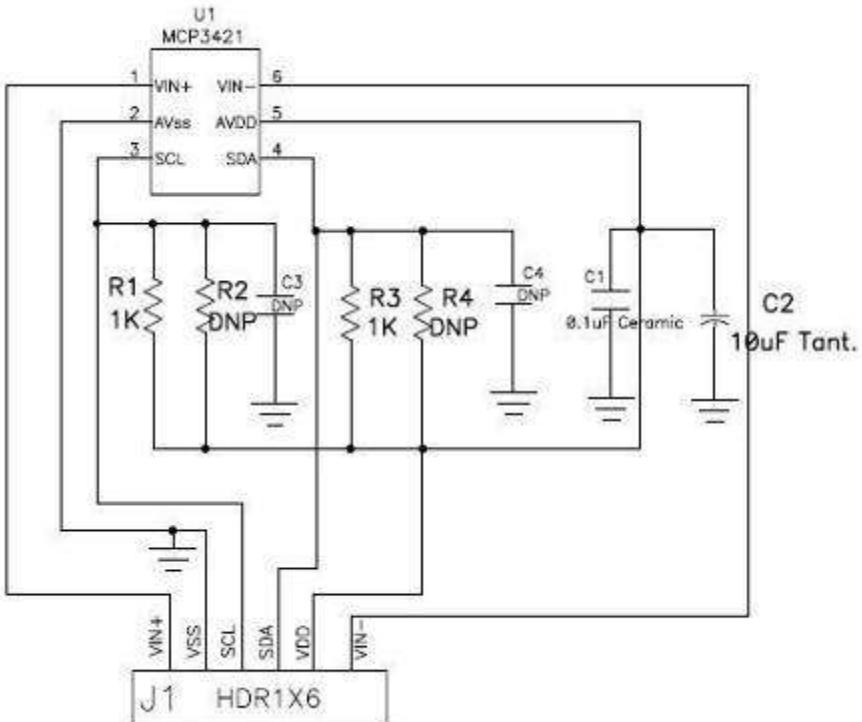
- MCP3421
- MCP6V07

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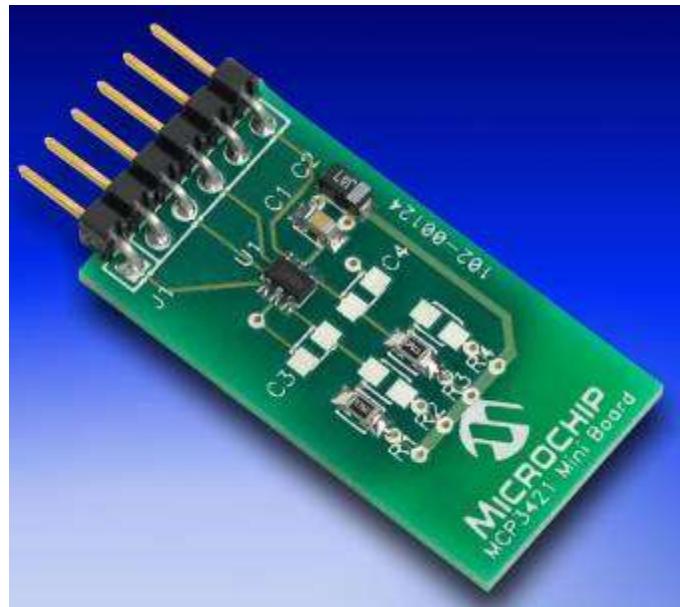


MCP3421 Evaluation Board

The MCP3421 Evaluation Board assists in the evaluation of the MCP3421 device in a simple way.. The evaluation board contains minimum components: MCP3421, two bypass capacitors, and two loading resistors for the I²C™ bus.



Products supported
MCP3421



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P/N: MCP3421EV

MCP3421 Battery Fuel Gauge Demo Board

The MCP3421 Battery Fuel Gauge Demo Board demonstrates how to measure the battery voltage and discharging current using the MCP3421.

The MCU algorithm calculates the battery fuel being used. This demo board is shipped with 1.5V AAA non-rechargeable battery.

The demo board displays the following parameters:

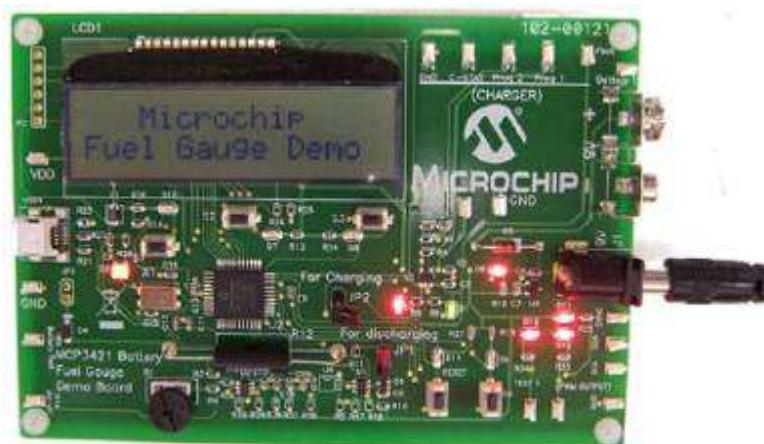
- (a) Measured battery voltage.
- (b) Measured battery discharging current.
- (c) Battery Fuel Used (calculated).

The MCP3421 Battery Fuel Gauge Demo Board also can charge a single-cell 4.2V Li-Ion battery. This feature, however, is disabled by firmware since the demo kit is shipped to customer with non-rechargeable 1.5V AAA battery.

Please contact Microchip Technology Inc if you want to use the battery rechargeable feature.

Products supported

- MCP3421
- MCP73831
- MCP1702
- PIC18F4550

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MCP342x Evaluation Boards

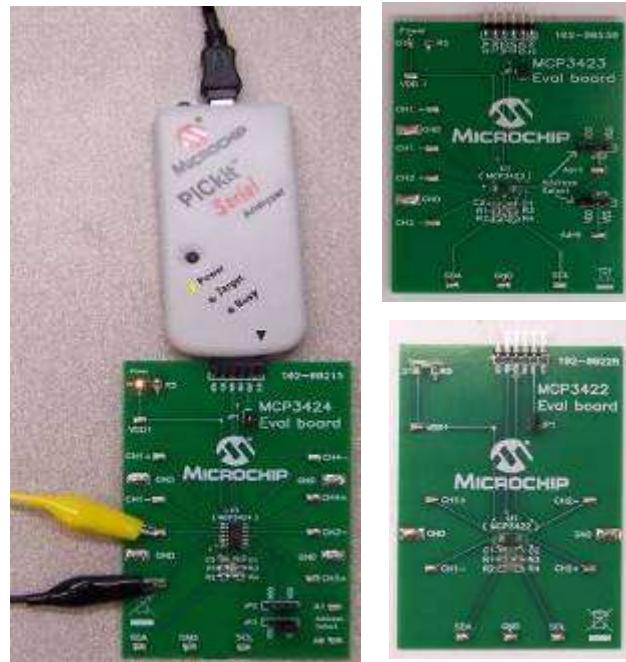
The MCP342x Evaluation Boards enable the easy evaluation of the MCP3422/3/4/5 Delta-Sigma Analog-to-Digital Converters (ADCs). Each board has analog input connection pads and various test pads. The user can connect inputs and test the conversion results using the PICkit™ Serial Analyzer and its PC graphic user interface (GUI).

Features:

- Evaluate the MCP342x using the PICKit Serial Analyzer
- The user can write the MCP342x configuration register and read output codes by using the PICKit Serial Analyzer
- The sensor signal can be connected to the input pads of the board I²C™ communication signal (SCL and SDA) can be monitored at the SCL and SDA pins on the board
- Evaluate the MCP342x performance using by simply connecting the SCL and SDA pins to the user's PC board

Products supported

- MCP3422
- MCP3423
- MCP3424
- MCP3425

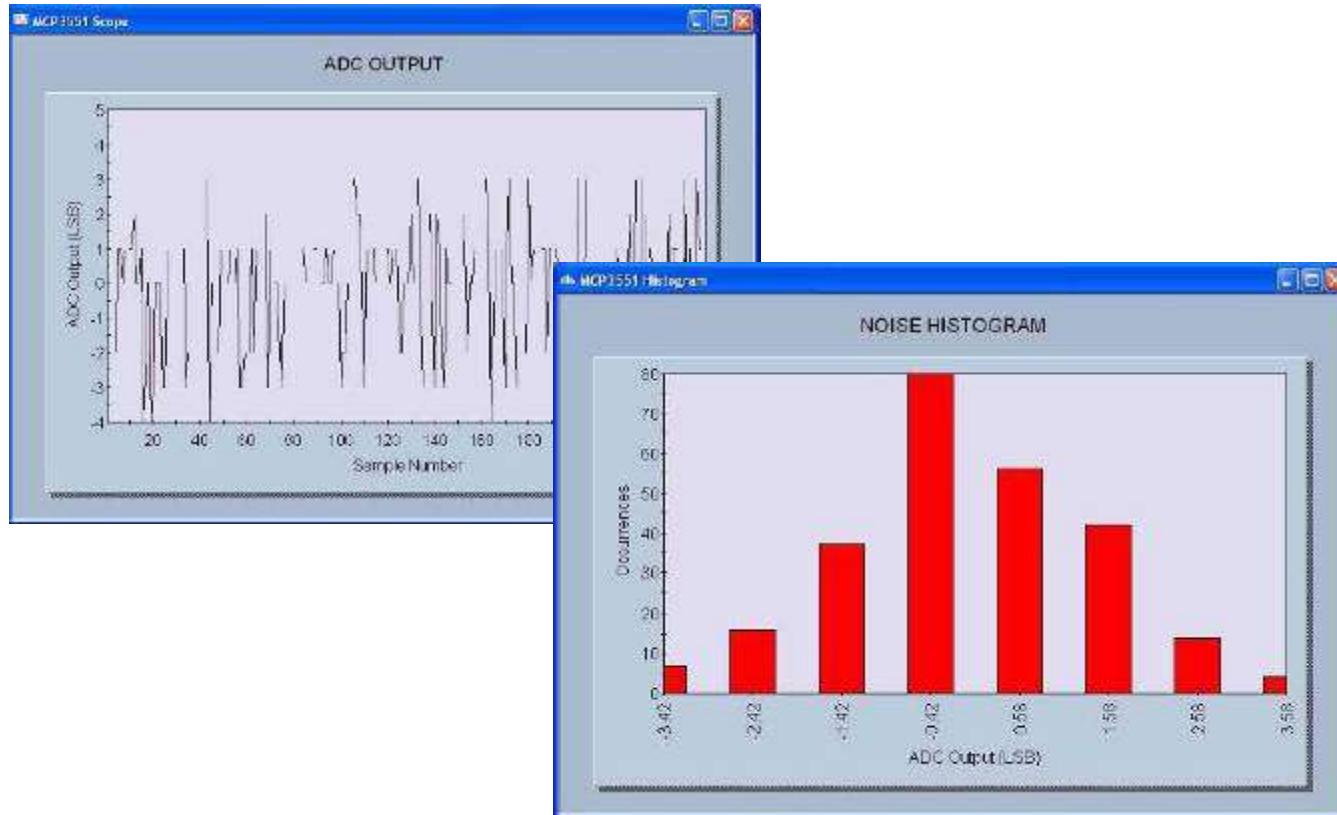

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MCP3551 PICtail™ Demo Board

The MCP3551 PICtail™ Demo Board allows the system designer to evaluate the operation of the MCP3551 22-Bit Delta-Sigma ADC. The baud demonstrates the MCP3551 performance in a low-noise environment.

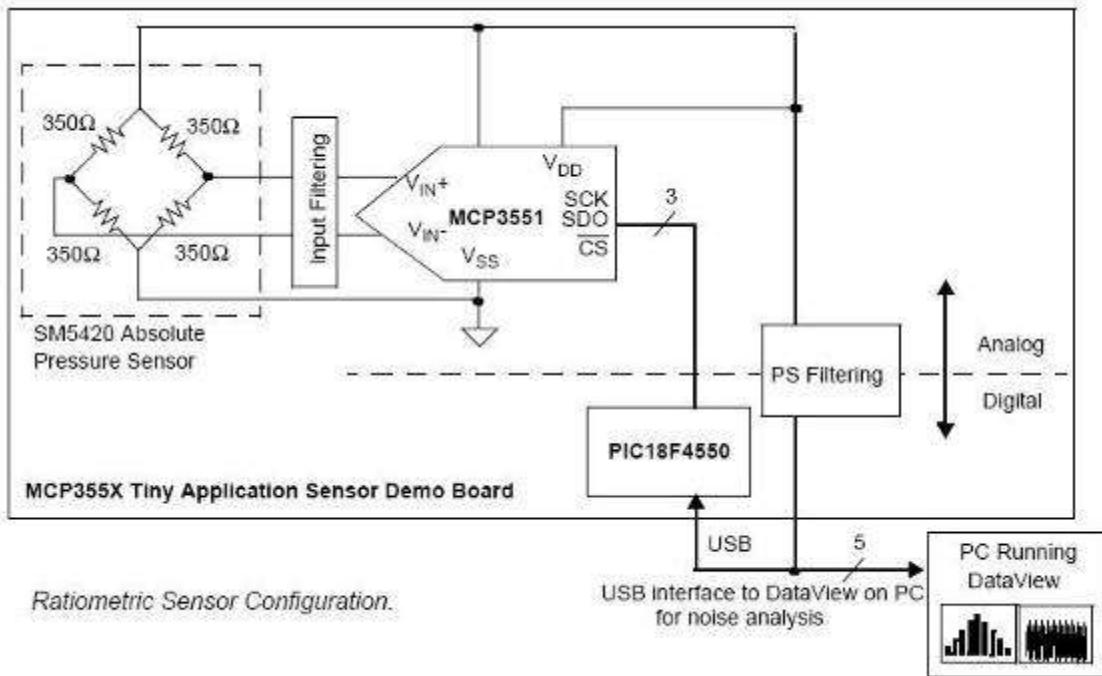
Products supported

- MCP3551
- PIC18F4550

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MCP355X Tiny Application Sensor Demo Board

The MCP3550/1/3 devices are 2.7V to 5.5V low-power, 22-bit Delta-Sigma ADCs. The MCP355x Tiny Application Sensor Demo Board is used to demonstrate the most basic application of the devices using a ratiometric connection with V_{DD} as V_{REF} . The board includes all the necessary PCB circuits and layout tips required to obtain the performance demonstrated on the PC.



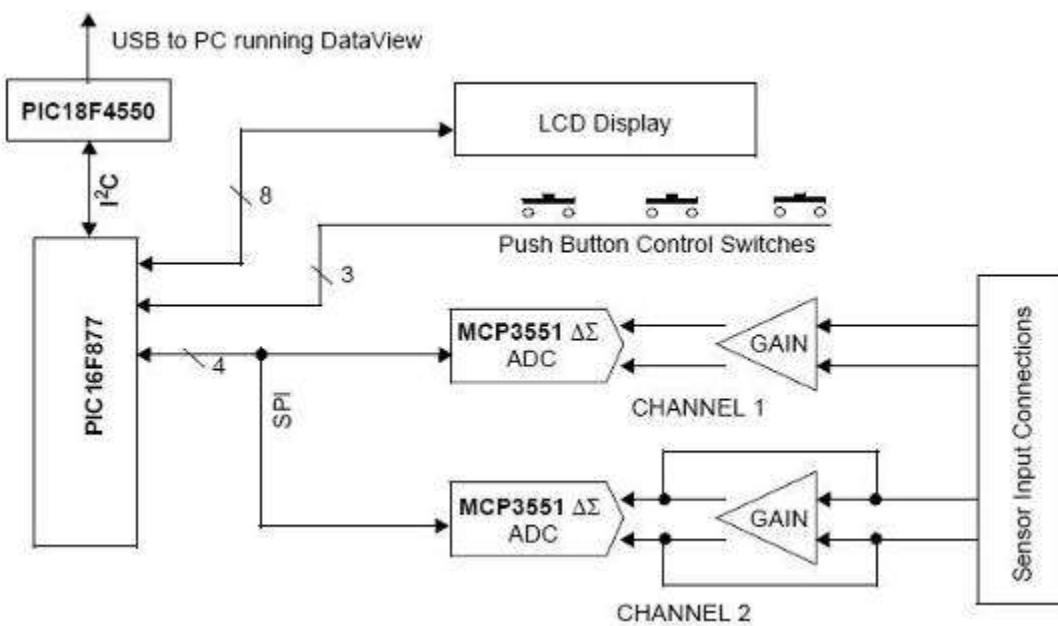
Products supported

- MCP3550
- MCP3551
- MCP3553
- PIC18F4550


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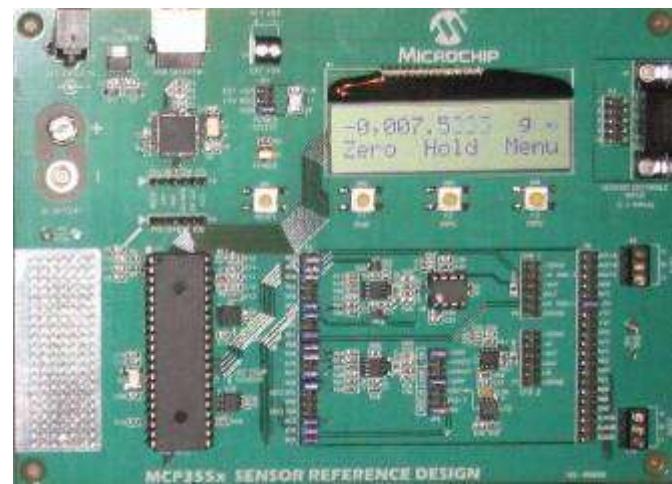
MCP355X Sensor Application Dev Board

The MCP355X Sensor Application Developer's Board allows for the easy system design of high resolution systems such as weigh scale, temperature sensing, or other small signal systems requiring precise signal conditioning circuits. The reference design includes firmware that performs all the necessary functions including ADC sampling, USB communication for PC data analysis, LCD display output, zero cancellation, full scale calibration, and units display in gram (g), kilogram (kg), or ADC output units.



Products supported

- MCP3550
- MCP3551
- MCP3553
- MCP617
- PIC18F4550
- PIC16F877


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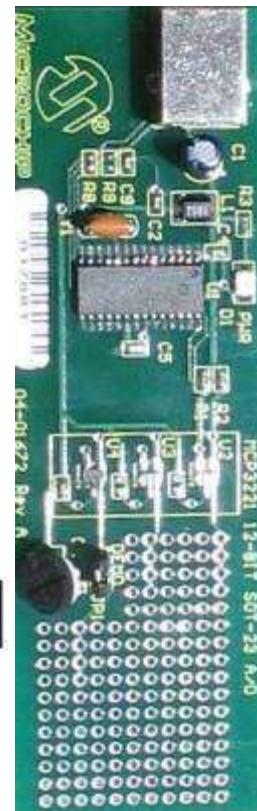
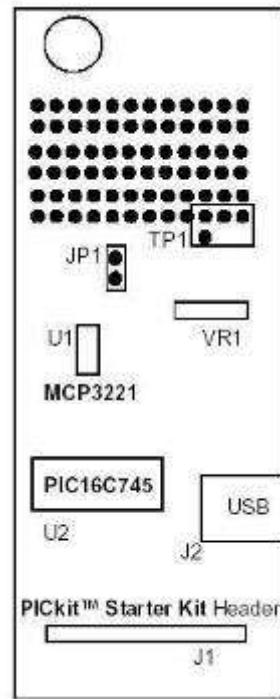
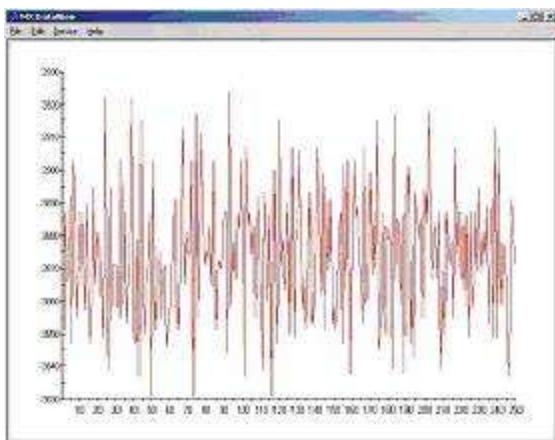


MCP3221 PICtail™ Demo Board

The MCP3221 device is a low-power, 12-bit A/D Converter (ADC) in a SOT-23 package. It communicates via an I²C™ interface. A stand-alone demonstration is possible using a USB port and the DataView™ software. The MCP3221 Pictail™ Demo Board is also used to evaluate and demonstrate the MCP3221 device using the PICkit™ 1 Flash Starter Kit.

Products supported

- MCP3221
- PIC16C745



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MCP3201/02 MXDEV Daughter Board

The daughter boards for this evaluation and demonstration tool is for the MCP3001/2 stand-alone A/D Converters, and is designed to be used in conjunction with the MXDEV™ Driver Board (available separately).



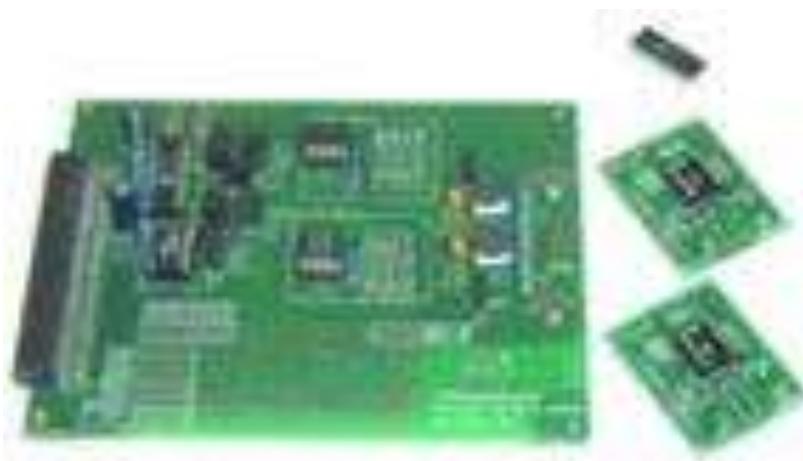
Products supported

- MCP3001
- MCP3002
- MCP3201
- MCP3202
- MCP3301
- MCP3302

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MCP3204/08 MXDEV Daughter Board

The daughter boards for this evaluation and demonstration tool is for the MCP3004/8 and MCP3204/8 stand-alone A/D Converters, and is designed to be used in conjunction with the MXDEV™ Driver Board (available separately).



Products supported

- MCP3304
- MCP3004
- MCP3008
- MCP3204
- MCP3208

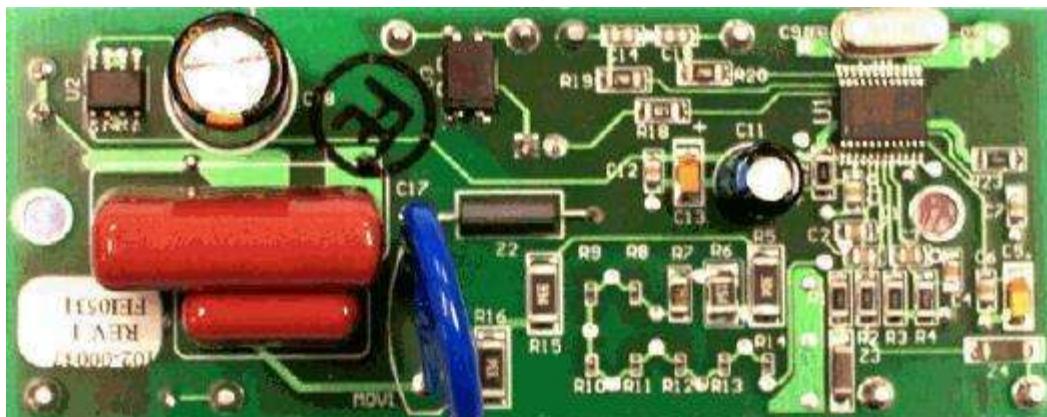
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MCP3905A Reference Design

The MCP3905A/06A device is an energy metering IC that supplies average active power information via a pulse output with direct drive for mechanical counters. It also includes a higher-frequency output that supplies instantaneous power information for calibration. The device contains function blocks specific for IEC energy meter compliance, such as a no-load threshold and startup current.

The MCP3905A/06A Energy Meter Reference Design Printed Circuit Board (PCB) is used as a reference design for single-phase, residential meters.



Products supported

- MCP3905A
- MCP3906A

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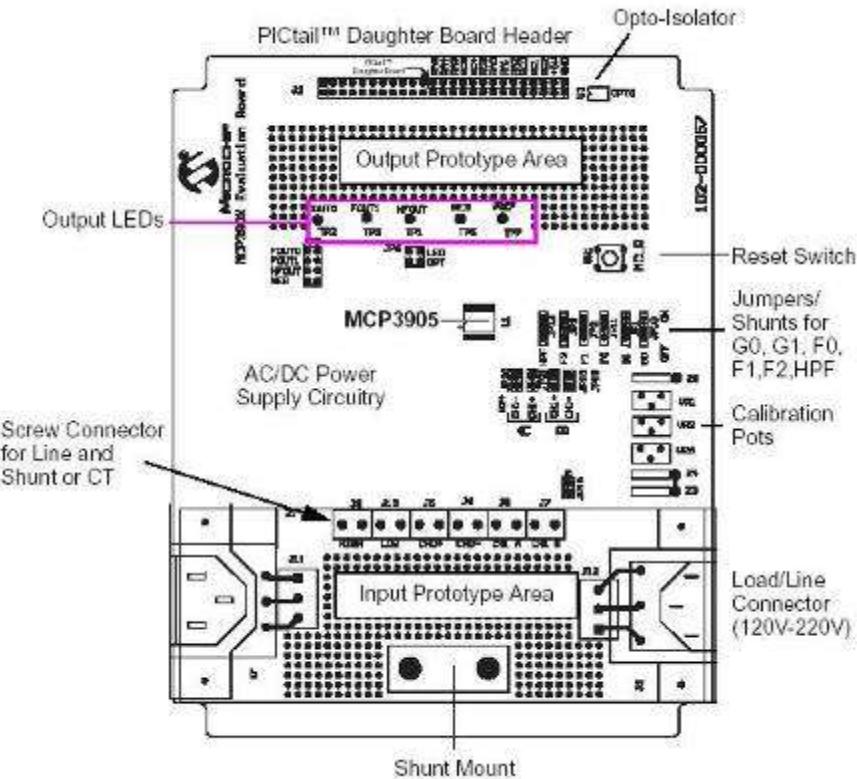


MCP3905A Eval Board

The MCP3905A/06A Evaluation Board is designed to test a variety of meter designs using the MCP3905A/06A energy metering Integrated Circuit (IC). Stand-alone MCP3905A/06A energy meter designs, as well as those using a PIC® Microcontroller Unit (MCU), are easily designed using this evaluation board as the prototype Analog Front-End (AFE).

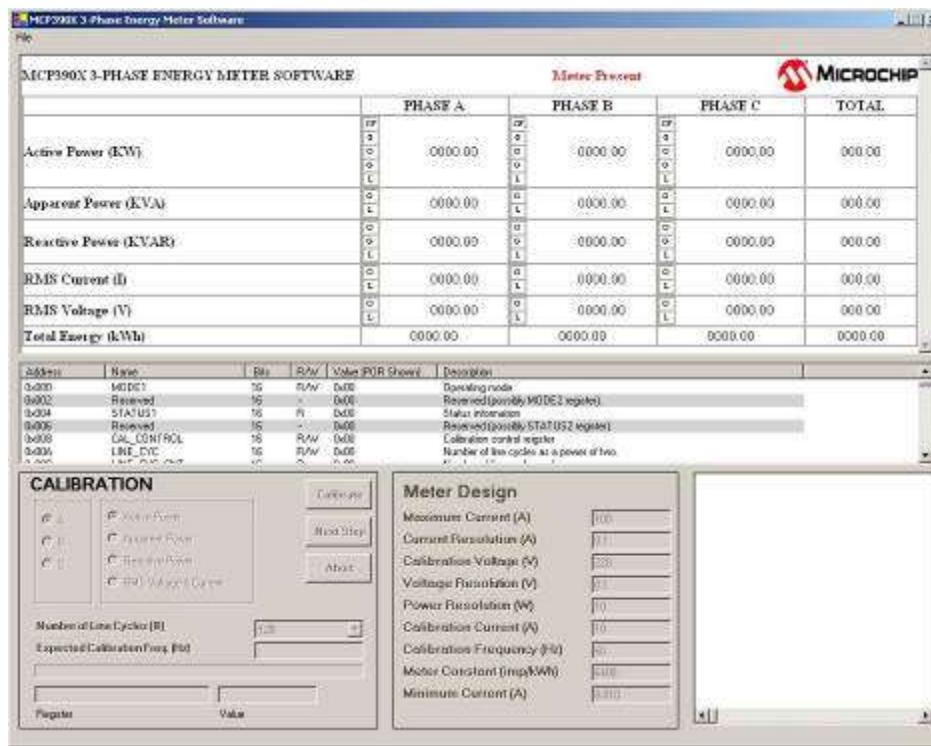
Products supported

- MCP3905A
- MCP3906A



MCP3909 3-Phase Energy Meter Reference Design

The MCP3909 3-Phase Energy Meter Reference Design is a fully functional 3-phase meter. There are two boards that comprise the complete meter: the main board and the USB communications module. The communications module shipped with this kit is the PIC18F4550 USB Interface module. The USB interface module also includes an LCD display. The main board contains the analog circuitry and the PIC18F2520 device that functions as the main RMS engine.



Products supported

- MCP3909
- PIC18F2520
- PIC18F4550

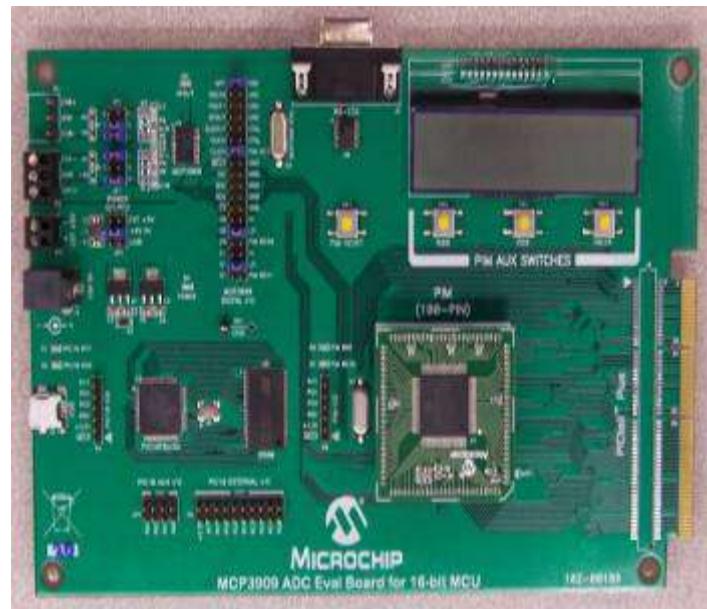

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MCP3909 ADC Eval Board for 16-Bit MCUs

The MCP3909 ADC Evaluation Board for 16-Bit MCUs system provides the ability to evaluate the performance of the MCP3909 dual channel ADC. It also provides a development platform for 16-bit PIC based applications, using existing 100-pin PIM systems compatible with the Explorer-16 and other high pin-count PIC demo boards. The system comes with programmed PIC24FJ128GA010 and dsPIC33FJ256GP710 PIM modules that communicate both to on-board LCD and a LabVIEW GUI for both in-circuit and PC signal processing.

Products supported

- MCP3909
- PIC18F86J65

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MCP3909 and dsPIC33F 3-Phase Energy Meter

The MCP3909/dsPIC33F 3-Phase Energy Meter Reference Design is a fully functional energy meter with many advanced features such as harmonic analysis, per phase distortion information, sag detection, four quadrant energy measurement, and active and reactive power calculation. It uses Microchip's powerful 16-bit dsPIC33F Microcontroller Unit (MCU).

This reference design is unique in the fact that all calculations take advantage of the dsPIC33F DSP engine, and all output quantities are calculated in the frequency domain through the use of Discrete Fourier Transforms (DFT). This approach yields a large volume of outputs for a variety of meter designs, from simple active power only energy meters, to advanced energy meters requiring harmonic analysis. Another significant advantage of this design, is that the dsPIC firmware implements a quasi-synchronous sampling algorithm, eliminating the need for external zero-crossing detection and PLL circuit for the synchronization of ADC samples to line frequency. The line frequency is measured in software and corrected for measurement errors caused by frequency fluctuations in the power grid. This additional processing on the dsPIC reduces the overall meter cost by eliminating the requirement for a PLL circuit.

Products supported

- MCP3909
- dsPIC33FJ128

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MCP3909 and PIC18F85J90 Single Phase Energy Meter

The MCP3909/PIC18F85J90 Single Phase Shunt Energy Meter is a fully functional single phase meter. The design uses a half wave rectified power supply circuit and a shunt current sensing element. A single MCP3909 acts as the analog front end measurement circuitry. The PIC18F85J90 directly drives the LCD glass and displays active energy consumption.

The meter design contains serially accessible registers and is intended to be flexible and upgraded to a variety of PIC® micro-based energy meter designs using the firmware presented herein. The “Single Phase Energy Meter Software” offers a functional and simple means to monitor and control the PIC18F85J90 and can be used to create custom calibration setups.

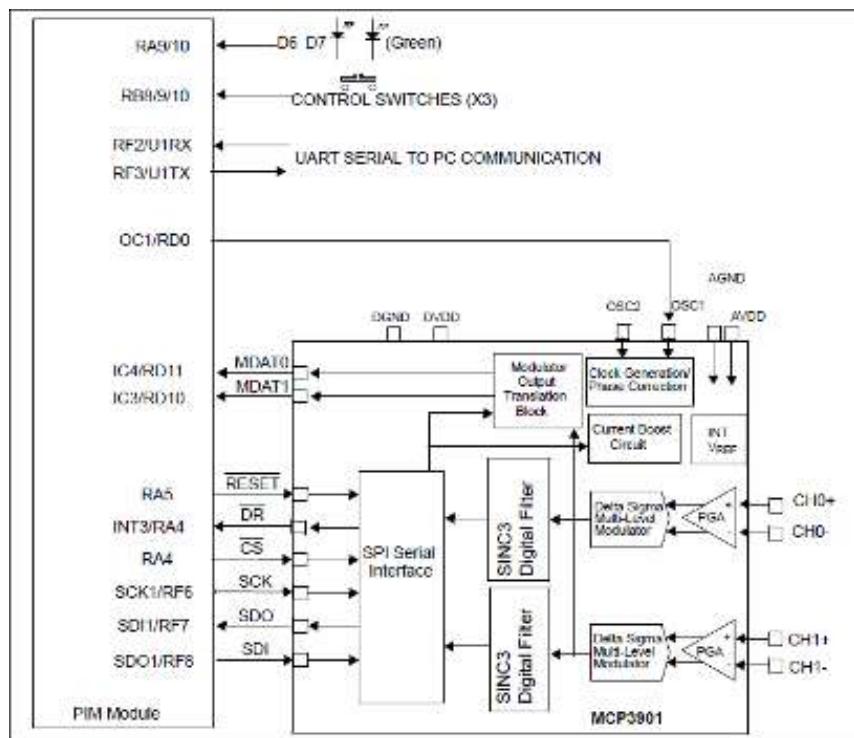
Products supported

- MCP3909
- PIC18F85J90

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MCP3901 Eval Board for 16-bit MCUs

The MCP3901 ADC Evaluation Board for 16-Bit MCUs system provides the ability to evaluate the performance of the MCP3901 dual channel ADC. It also provides a development platform for 16-bit PIC based applications, using existing 100-pin PIM systems



Products supported

- MCP3901
- PIC24F
- PIC24H
- dsPIC33
- PIC18F86J55


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MCP3910 Eval Board for 16-bit MCUs

The MCP3910 ADC Evaluation Board for 16-Bit MCUs provides the opportunity to evaluate the performance of the MCP3910 dual-channel ADCs in a multiple device, isolated system. It comes with four MCP3910s, three of which are isolated and operate in 2-wire Serial Interface Mode. It also provides a development platform for 16-bit PIC® microcontroller-based applications, using existing 100-pin PIM systems, compatible with the Explorer 16 and other high pin count PIC device demo boards. The system comes with programmed PIC24FJ256GA110 PIM modules that communicate with the PC software for viewing data samples sent from the board.

Features:

- Four MCP3910 devices for complete 3-phase isolated and neutral system evaluation
- Selectable Phase A, B, C, or N (neutral) MCP3910 dual channel output display on the PC Software Interface
- Simultaneous 55 ksps at 95 dB SINAD performance on any MCP3910 channel
- Single-phase MCP3910 performance analysis through graphical PC tools showing Noise Histogram, Frequency Domain (FFT), Time domain scope plot, and statistical numerical analysis
- PICtail® Plus connectors for Explorer 16 daughter board compatibility

Products supported

- MCP3911
- PIC24F
- dsPIC33

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MCP3911 Eval Board for 16-bit MCUs

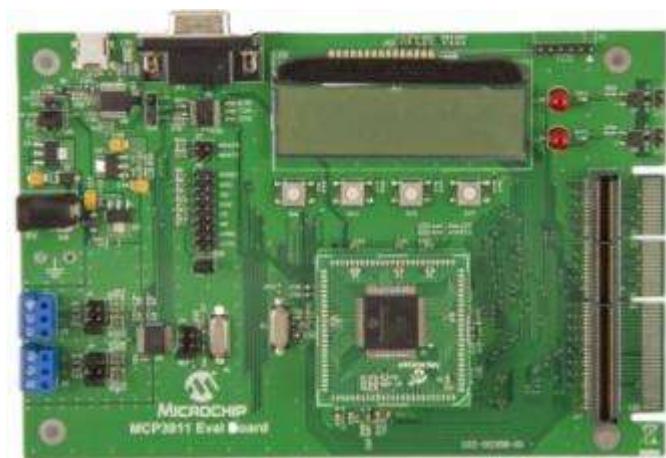
The MCP3911 ADC Evaluation Board for 16-Bit MCUs system provides the ability to evaluate the performance of the MCP3911 dual-channel ADC. It also provides a development platform for 16-bit PIC-based applications, using existing 100-pin PIM systems compatible with the Explorer-16 and other high pin count PIC demo boards. The system comes with a programmed PIC24FJ256GA110 PIM module that communicates with the included PC software for data exchange and ADC configuration.

Features:

- Dual ADC MCP3911 output display using serial communication to PC software (Energy Management Utility)
- Simultaneous 55 ksps at 95 dB SINAD performance
- System and ADC performance analysis through graphical PC tools showing Noise Histogram, Frequency Domain (FFT), Time domain scope plot, and statistical numerical analysis
- PICtail Plus connectors for Explorer-16 daughter board compatibility

Products supported

- MCP3911
- PIC24F
- dsPIC33

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MCP3919 Eval Board for 16-bit MCUs

The MCP3919 ADC Evaluation Board for 16-Bit MCUs system provides the opportunity to evaluate the performance of the MCP3919 three-channel AFE. It also provides a development platform for 16-bit PIC® based applications, using existing 100-pin PIC microcontroller Plug-in Module (PIM) systems that are compatible with the Explorer 16 and other high pin count PIC® based demo boards. The system comes with a programmed PIC24FJ256GA110 PIM module that communicates with the Energy Management Utility software.

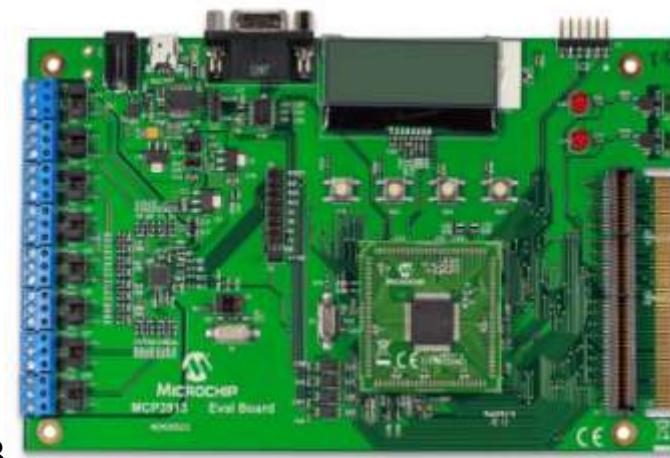
Features:

- Three-Channel ADC MCP3919 output display using serial communication to PC software
- Simultaneous 57 ksps at OSR32 address loop ALL or 95 dB SINAD at OSR512 performance on MCP3919
- System and ADC performance analysis showing Noise Histogram, Frequency Domain (FFT), Time domain scope plot, and statistical numerical analysis
- PICtail Plus connectors for Explorer-16 daughter board compatibility

P/N: ADM00573

Products supported

- MCP3919
- PIC24F
- dsPIC33



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MCP3912 Eval Board for 16-bit MCUs

The MCP3912 ADC Evaluation Board for 16-Bit MCUs system provides the opportunity to evaluate the performance of the MCP3912 four-channel AFE. It also provides a development platform for 16-bit PIC® based applications, using existing 100-pin PIC microcontroller Plug-in Module (PIM) systems that are compatible with the Explorer 16 and other high pin count PIC® based demo boards. The system comes with a programmed PIC24FJ256GA110 PIM module that communicates with the Energy Management Utility software.

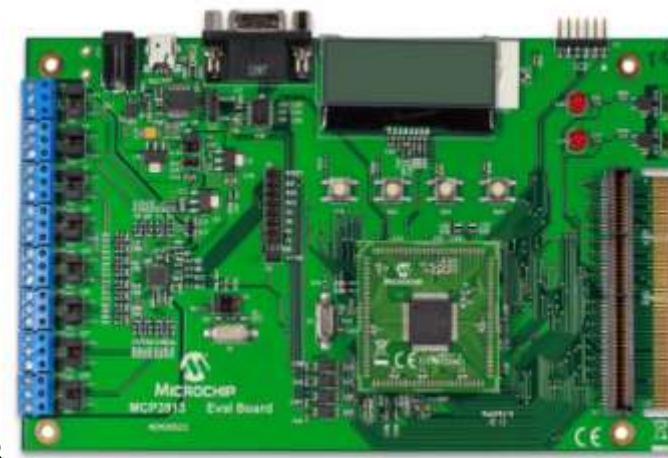
Features:

- Four-Channel ADC MCP3912 output display using serial communication to PC software
- Simultaneous 57 ksps at OSR32 address loop ALL or 95 dB SINAD at OSR512 performance on MCP3912
- System and ADC performance analysis showing Noise Histogram, Frequency Domain (FFT), Time domain scope plot, and statistical numerical analysis
- PICtail Plus connectors for Explorer-16 daughter board compatibility

P/N: ADM00499

Products supported

- MCP3912
- PIC24F
- dsPIC33



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MCP3913 Eval Board for 16-bit MCUs

The MCP3913 ADC Evaluation Board for 16-Bit MCUs system provides the opportunity to evaluate the performance of the MCP3913 six-channel AFE. It also provides a development platform for 16-bit PIC® based applications, using existing 100-pin PIC microcontroller Plug-in Module (PIM) systems that are compatible with the Explorer 16 and other high pin count PIC® based demo boards. The system comes with a programmed PIC24FJ256GA110 PIM module that communicates with the Energy Management Utility software.

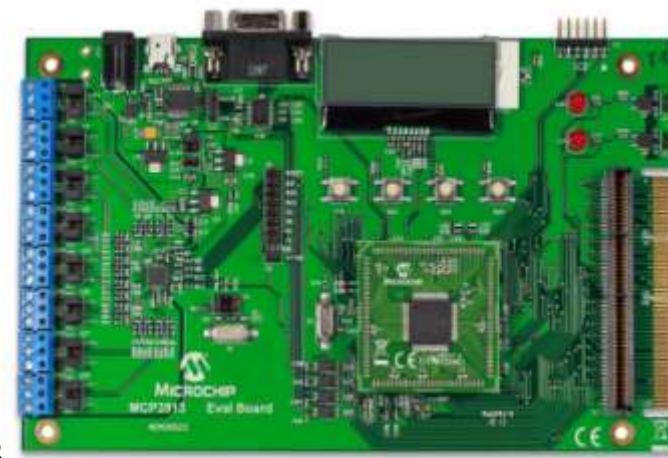
Features:

- Six-Channel ADC MCP3913 output display using serial communication to PC software
- Simultaneous 57 ksps at OSR32 address loop ALL or 95 dB SINAD at OSR512 performance on MCP3913
- System and ADC performance analysis showing Noise Histogram, Frequency Domain (FFT), Time domain scope plot, and statistical numerical analysis
- PICtail Plus connectors for Explorer-16 daughter board compatibility

P/N: ADM00522

Products supported

- MCP3913
- PIC24F
- dsPIC33



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MCP3914 Eval Board for 16-bit MCUs

The MCP3914 ADC Evaluation Board for 16-Bit MCUs system provides the opportunity to evaluate the performance of the MCP3914 eight-channel AFE. It also provides a development platform for 16-bit PIC® based applications, using existing 100-pin PIC microcontroller Plug-in Module (PIM) systems that are compatible with the Explorer 16 and other high pin count PIC® based demo boards. The system comes with a programmed PIC24FJ256GA110 PIM module that communicates with the Energy Management Utility software.

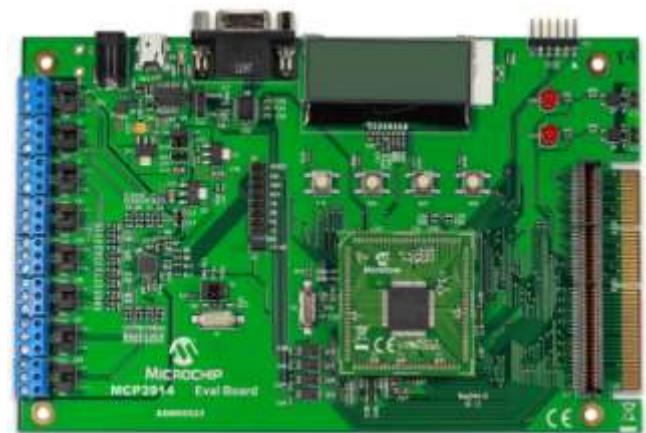
Features:

- Eight-Channel ADC MCP3914 output display using serial communication to PC software
- Simultaneous 57 ksps at OSR32 address loop ALL or 95 dB SINAD at OSR512 performance on MCP3914
- System and ADC performance analysis showing Noise Histogram, Frequency Domain (FFT), Time domain scope plot, and statistical numerical analysis
- PICtail Plus connectors for Explorer-16 daughter board compatibility

P/N: ADM00523

Products supported

- MCP3914
- PIC24F
- dsPIC33



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MCP3903 Eval Board for 16-bit MCUs

The MCP3903 ADC Evaluation Board for 16-bit MCU system provides the ability to evaluate the performance of the MCP3903 six channel sigma-delta ADC. It also provides a development platform for 16-bit PIC-based applications, using existing 100-pin PIM systems.

Features:

- MCP390x DataVIEW PC software interface for communicating and controlling the MCP3903 Evaluation board through the virtual COM port created by the on-board MCP2200
- System and ADC performance analysis through graphical PC tools showing noise histogram, frequency domain (FFT), time domain scope plot, and statistical numerical analysis
- Robust hardware design with analog grounding and analog/digital separation, allowing low noise evaluation of the MCP3903 device.
- Separate power supplies and power planes - 4 layer board
- PICtail Plus connectors for Explorer-16 daughter board compatibility

Products supported

- MCP3903
- PIC24F
- PIC24H
- dsPIC33

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PIC18F87J72 Eval Board

The PIC18F87J72 Evaluation Board provides a platform for developing and evaluating applications which are based on the PIC18F87J72 device. These applications can range from accurate measurement of low signals like an output signal of a load cell to processing of information for metering and other metrology applications like Energy meter, Flowmeter, Heatmeter and so on. The device is capable of interfacing to a large variety of voltage and current sensors, including shunts, Current Transformers (CT), Rogowski coils and Hall Effect sensors.

Features:

- Seven-Segment LCD Display
- Real Time Clock and Calendar function
- Capacitive Touch keys
- PICtail™ connectors for PIC18 daughter boards
- Easy configuration of the Dual-Channel Delta-Sigma ADC
- Graphical PC tools for system and ADC performance analysis

Products supported

□ PIC18F87J72



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MCP39F501 Demo Board

The MCP39F501 Power Monitor Demonstration Board is a fully functional single-phase power monitor. This low-cost design does not use any transformers and requires few external components. The device calculates typical power quantities as defined in the MCP39F501 data sheet. The MCP39F501 Power Monitor Utility software is used to calibrate and monitor the system, and can be used to create custom calibration setups. For some accuracy requirements, only a single point calibration may be needed.

Features:

- Displays Active, Reactive and Apparent Power, RMS Current, RMS Voltage, Line Frequency, Power Factor and Temperature using PC software
- Event notifications, such as Over Current, Over Power, Over/Under Frequency, Over/Under Temperature, and Voltage Sag/Surge
- Device configuration through PC software, including Event Notifications, Gain Calibration, EEPROM, Calculation Multipliers, and I/O settings
- 120V and 220V operation

P/N: ARD00455

Products supported

- MCP39F501



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MCP39F501 Power Monitor PICTail™ Board

The MCP39F501 Power Monitor PICtail™ Evaluation Board duals as a fully functional single-phase power monitor and development platform. This low-cost design does not use any transformers and requires few external components. The device calculates active power, reactive power, RMS current, RMS voltage, power factor, line frequency and other typical power quantities as defined in the MCP39F501 data sheet. The MCP39F501 Power Monitor Utility software is used to calibrate and monitor the system and can be used to create custom calibration setups. For some accuracy requirements only a single point calibration may be needed.

Features:

- PICtail board allows development with Microchip's 16-bit and 32-bit microcontrollers using the Explorer 16 Development Board (DM240001)
- PC software displays power quantities, event notifications and allows device configuration

Products supported

- MCP39F501
- PIC® MCUs

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PIC18F87J72 Energy Monitoring PICtail

The PIC18F87J72 Energy Monitoring PICtail™ Plus Daughter Board is a single phase energy monitor daughter board featuring the PIC18F87J72 high performance 8-bit MCU with 16/24-bit delta-sigma A/D converters. This low cost design uses a shunt for the current sensor in place of expensive current transformers.

The PIC18F87J72 calculates active/reactive energy, forward/reverse energy, active/reactive/apparent power and RMS current/voltage.

The Energy Monitoring PICtail Plus Daughter Board interfaces to the Explorer 16 Development Board (DM240001) where additional evaluation can be performed. Through the Explorer 16 Development Board, wired and wireless network connections can be made through other PICtail Daughter boards such as the Ethernet PICtail (AC164123) and the WiFi PICtail (AC164136-4).

Products supported

- PIC18F87J72



Energy Monitoring PICtail™ Plus Daughter Board
(Part # ARD00330)

PIC18F87J72 Single Phase Energy Meter

The PIC18F87J72 Single Phase Energy Meter Reference Design is a fully functional single phase meter featuring the PIC18F87J72 MCU with Analog Front End. This low cost design uses a shunt for the current sensor in place of expensive current transformers. The PIC18F87J72 directly drives the LCD and includes both an isolated USB connection and non-isolated RS232 interface for meter calibration and access to the device power calculations. The system calculates active/reactive energy, forward/reverse energy, active/reactive/apparent power and RMS current/voltage. The Microchip Energy Meter 1-Phase Software is used to calibrate and monitor the system. It can also be used to create custom calibration setups. For some accuracy requirements only a single point calibration may be required. The energy meter software offers an automated step by step calibration process that can be used to quickly calibrate energy meters.

Products supported

- PIC18F87J72

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MCP3901 PIC18F65J90 Shunt Meter

Online
Info

The MCP3901 and PIC18F65J90 Energy Meter Reference Design is a fully functional IEC Class 0.5 compliant single-phase meter. This low-cost design does not use any transformers and requires few external components. The PIC18F65J90 directly drives the LCD and includes both an isolated USB connection for meter calibration and access to the device power calculations. The system calculates active energy, active power, RMS current, RMS voltage, reactive energy, reactive power, apparent power, and other typical power quantities.

The Microchip Energy Meter 1-Phase Software is used to calibrate and monitor the system and can be used to create custom calibration setups. The energy meter software offers an automated step-by-step calibration process that can be used to quickly calibrate energy meters

Products supported

- MCP3901
□ PIC18F65J90



P/N: ARD00342

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MCP3911 PIC18F85K90 Anti-Tamper Meter

The MCP3911 and PIC18F85K90 Single-Phase Anti-Tamper Energy Meter is a fully functional single-phase meter with enhanced capabilities, such as battery backup, RTC and anti-tamper features. The two current channels are measured with the MCP3911 device and the voltage channel is measured with the 12-bit SAR ADC integrated in the microcontroller. This design has two sensors for the current measurements: a current transformer and a shunt. The PIC18F85K90 microcontroller directly drives the LCD and communicates via UART with the MCP2200, offering an isolated USB connection for meter calibration and access to the device power calculations. The system calculates active and reactive energy, active, reactive and apparent power, power factor, RMS current, RMS voltage and the line frequency. The Microchip Energy Meter Software is used to calibrate and monitor the system.

Features:

- Rated 5(60)A 220V 3200 imp/kWh IEC62053-22 Class 0.5 Meter
- Calculates active and reactive energy, active, reactive and apparent power, power factor, RMS current, RMS voltage and the line frequency
- Anti-tamper monitoring including neutral monitoring, current circuit reversal, magnetic field disturbance and cover opening detection
- Microchip Energy Meter Software to calibrate and monitor the system
- Calibration can be done in closed loop or open loop

Products supported

- MCP3911
- PIC18F85K90

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MCP6L2 PIC18F66J73

The MCP6L2 and PIC18F66J93 Energy Meter is a fully functional single-phase meter that uses the 12-bit successive approximation analog-to-digital converter (SAR ADC) integrated in the microcontroller. This low-cost design has a shunt as the current sensor. The signal from the shunt is amplified by two external operational amplifiers and applied to the input of the ADC. The PIC18F66J93 directly drives the LCD and communicates via UART with the MCP2200, offering an isolated USB connection for meter calibration and access to the device power calculations. The system calculates active and reactive energy; active, reactive and apparent power; power factor; RMS current; RMS voltage, and line frequency.

The Microchip energy meter software is used to calibrate and monitor the system. The calibration can be done in closed loop or open loop. When connected to a stable source of voltage and current, the meter can do an auto-calibration by including the open loop calibration routine and formulas in the firmware.

Features:

- Energy meter software allows calibration and system monitoring
- Isolated USB connection
- Calculates active and reactive energy, active and apparent power, power factor, RMS current, RMS voltage, and line frequency

Products supported

- MCP6L2
- PIC18F66J93

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MCP4725 Eval Board

The MCP4725 SOT-23-6 Evaluation Board is a quick and easy evaluation tool for the MCP4725 12-bit DAC device. It works with Microchip's popular PICkit™ Serial Analyzer or independently with the customer's applications board.

Connect the MCP4725 SOT-23-6 Evaluation Board to the PICkit™ Serial Analyzer and type in the DAC input data in the PICkit™ Serial Analyzer's PC Graphical User Interface program.

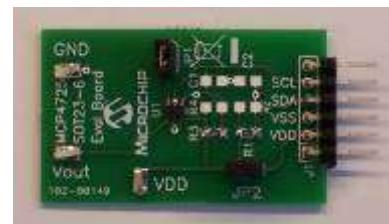
The PICkit™ Serial Analyzer will then send the user's data to the DAC device automatically. The DAC's analog output will be available immediately at the output pin. The user will appreciate the simplicity of evaluating the DAC device using this kit.

The customer also can connect the MCP4725 SOT-23-6 Evaluation Board directly to their applications board and test out their systems functions immediately.

The MCP4725 SOT-23-6 Evaluation Board kit includes two of the Evaluation Boards. The PICkit™ Serial Analyzer is sold separately

Products supported

- MCP4725



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MCP4725 PICtail™ Plus Daughter Board

The MCP4725 PICtail™ Plus Daughter Board (P/N MCP4725DM-PTPLS) contains an MCP4725 12-bit Digital-to-Analog Converter (DAC). This daughter board has the following two interfaces:

- Explorer 16 Starter Kit (P/N: DV164033) for 16-bit MCU environment
- PICkit™ Serial Analyzer (P/N: DV164122) for reading and writing the DAC register and observing the DAC output

The user can connect this daughter board to one of the above tools and perform their own experiments.

Products supported

- MCP4725

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MCP4726 PICtail™ Plus Daughter Board

The MCP47X6 PICtail™ Plus Daughter Board allows customers to evaluate the capabilities of the MCP4726, MCP4716, and MCP4706 devices. This board can be controlled by the MCU of the Explorer 16 Development Board (P/N: DV164033) or by a PICkit™ Serial Analyzer. The board also provides easy access via test points to desired signals to monitor device operation. A buzzer is supplied that is connected to the output of the MCP4726, which allows generation of an audible sound. The buzzer has a volume control.

Products supported

- MCP4706
- MCP4716
- MCP4726

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MCP4728 Eval Board

The MCP4728 Evaluation Board is a tool for quick and easy evaluation of the MCP4728 4-channel 12-bit DAC device. It contains the MCP4728 device and connection pins for the Microchip's popular PICkit™ Serial Analyzer. Simply connect the MCP4728 Evaluation Board to the PICkit™ Serial Analyzer and type in the DAC input data in the PICkit™ Serial Analyzer's PC Graphical User Interface program. The PICkit™ Serial Analyzer will then send the user's data to the DAC device automatically. The new DAC's analog outputs will be available immediately at the DAC output pins.

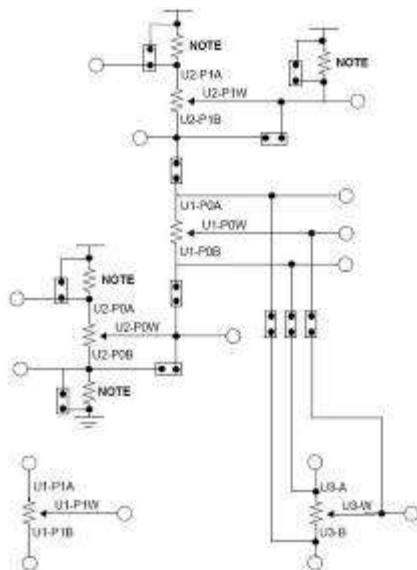
Products supported

- MCP4728

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MCP4XXX Daughter Board

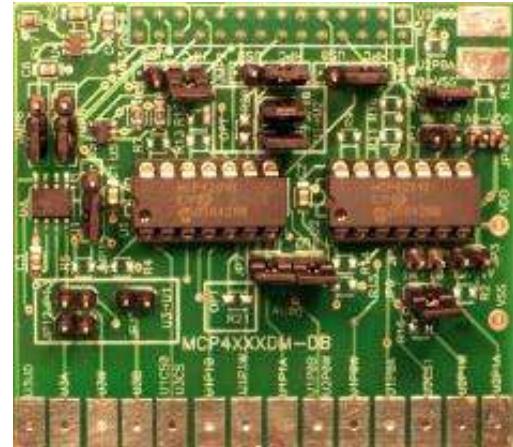
The MCP4XXX Digital Potentiometer Daughter Board allows the system designer to quickly evaluate the operation of Microchip Technology's MCP42XXX and MCP4021 Digital Potentiometers. The MCP42XXX are dual digital potentiometer devices that have the same characteristics as their single digital potentiometer devices (MCP41XXX). The MCP4021 devices are non-volatile devices that have similar characteristics as their volatile memory version (MCP4011). The board supports two MCP42XXX devices to allow the resistor networks to be "tacked" and form a programmable windowed digital potentiometer and an MCP4021 device, which can be replaced with an MCP4011 device. The board has one MCP42010 device ($10\text{k}\Omega$), which can be the rheostats at the ends, and one MCP42010 device ($10\text{k}\Omega$) which is the potentiometer in the middle and a separate standalone potentiometer.



P/N: MCP4XXXDM-DB

Products supported

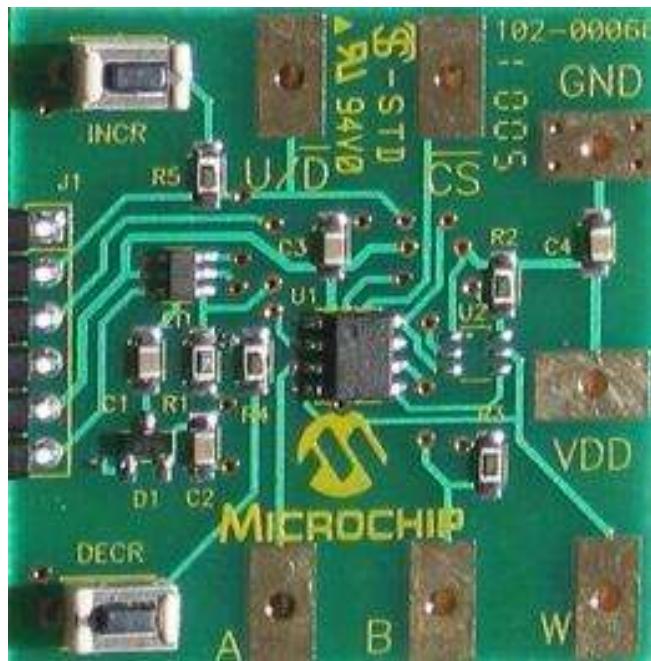
- MCP4011
- MCP4021
- MCP42XXX



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MCP401x/402x Eval Board

The MCP402X Digital Potentiometer Evaluation Board (MCP402XEV) allows the system designer to quickly evaluate the operation of Microchip Technology's MCP401X/2X Digital Potentiometer products.



Products supported

- MCP4011
- MCP4012
- MCP4013
- MCP4014
- MCP4021
- MCP4022
- MCP4023
- MCP4024

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MCP401X Eval Board

The MCP401XEV Evaluation Board allows the system designer to quickly evaluate the operation of the MCP40D18 Digital Potentiometer device. The board uses the SC70EV Generic PCB and has been populated for the MCP40D18. The 6-pin header (PICkit Serial) has been jumpered to the MCP40D18's appropriate pins. This allows the PICkit Serial to communicate with the device.

Products supported

- MCP40D17
- MCP40D19
- MCP4017
- MCP4018
- MCP4019

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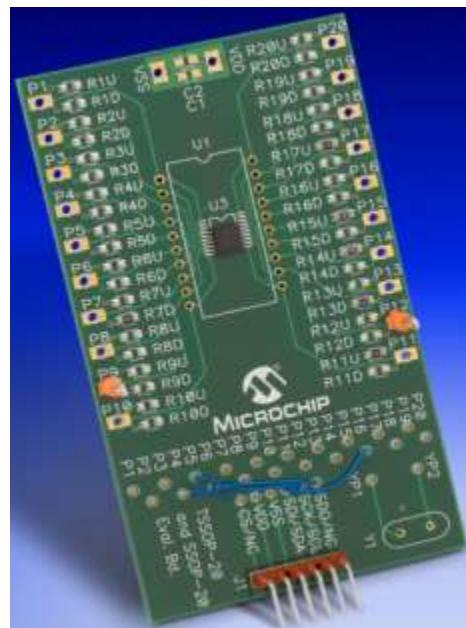


MCP42XX Eval Board

The MCP42XX Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's MCP4261 Digital Potentiometer device. The board uses the TSSOP20EV Generic PCB and has been populated for the MCP4261. The 6-pin header (PICkit Serial) has been jumpered to the MCP4261's appropriate pins. This allows the PICkit Serial to communicate with the device.

Products supported

- MCP4231
- MCP4241
- MCP4251
- MCP4261

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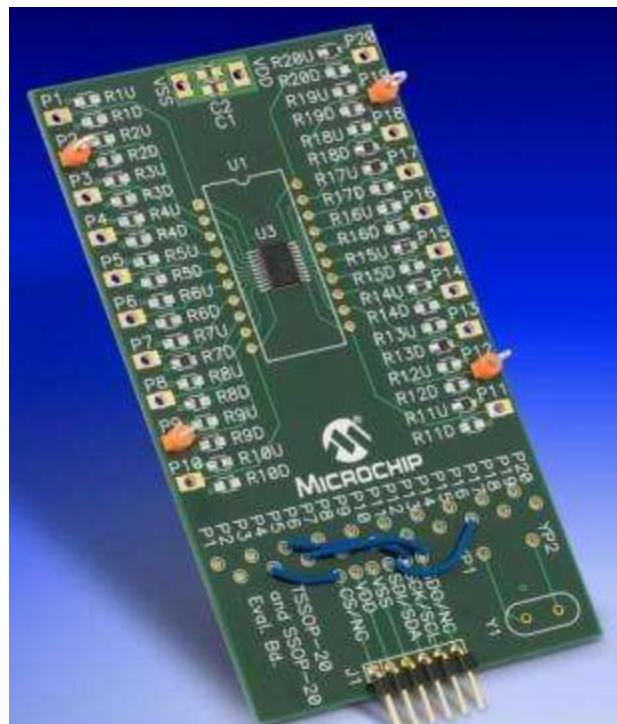


MCP43XX Eval Board

The MCP43XX Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's MCP4361 Digital Potentiometer device. The board uses the TSSOP20EV Generic PCB and has been populated for the MCP4361. The 6-pin header (PICkit Serial) has been jumpered to the MCP4361's appropriate pins. This allows the PICkit Serial to communicate with the device.

Products supported

- MCP4331
- MCP4341
- MCP4351
- MCP4361



P/N: MCP43XXEV

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MCP46XX Eval Board

The MCP46XX Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's MCP4661 Digital Potentiometer device. The board uses the TSSOP20EV Generic PCB and has been populated for the MCP4661. The 6-pin header (PICkit Serial) has been jumpered to the MCP4661's appropriate pins. This allows the PICkit Serial to communicate with the device.

Products supported

- MCP4631
- MCP4641
- MCP4651
- MCP4661

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MCP42xxx MXDEV Daughter Board

The MCP42XXX Evaluation Board kit contains an evaluation board, prototype board, RS-232 cable, 9V DC power supply, MXLAB software, user guide, warranty/registration card, digital potentiometers and PIC® MCU.

Products supported

- MCP42010
- MCP42050
- MCP42100



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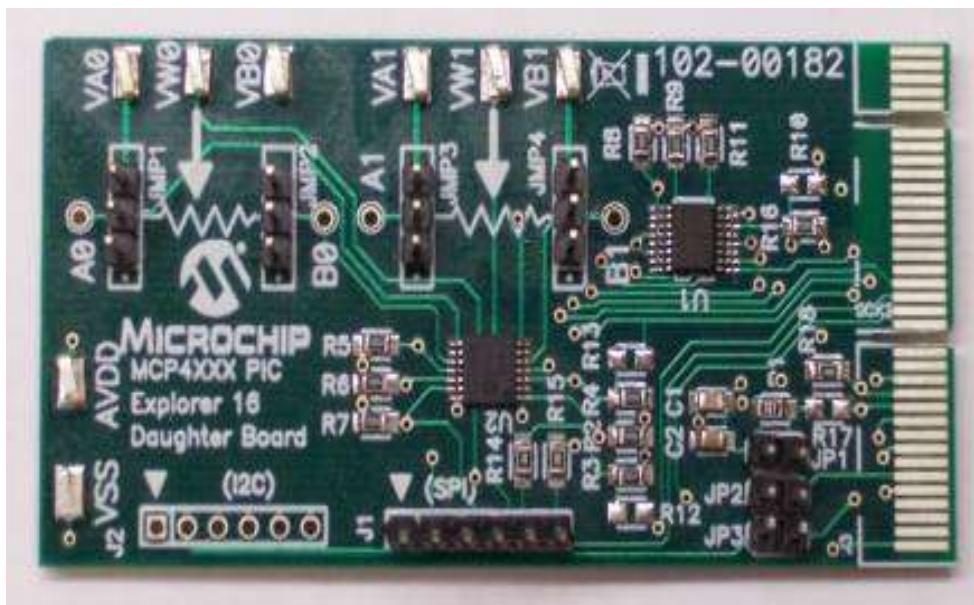
MCP42XX PICtail™ Plus Daughter Board

The MCP42XX PICtail™ Plus Daughter Board is used to demonstrate the operation of the MCP42XX Digital Potentiometers. The operation of the MCP41XX devices is similar to the MCP42XX devices. Therefore, this demo board can be used as a development platform for either device family.

This board is designed to be used in conjunction with either the PIC24 Explorer 16 Demo Board or the PICkit™ Serial Analyzer.

Products supported

- MCP4231/2
- MCP4241/2
- MCP4251/2
- MCP4261/2

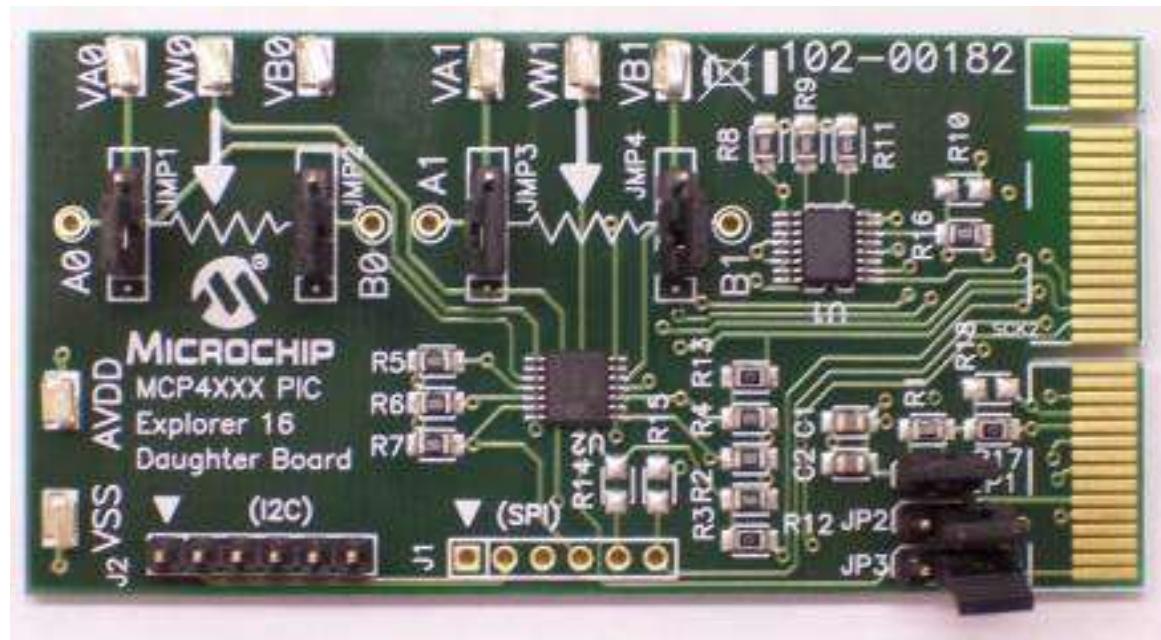
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MCP46XX PICtail™ Plus Daughter Board

The MCP46XX PICtail™ Plus Daughter Board demonstrates the features and abilities of Microchip's MCP45XX and MCP46XX Digital Potentiometers. This board is designed to exclusively use the MCP46X1 devices. The MCP4661 uses an I²C™ interface and can be controlled via the PICkit Serial Analyzer interface or via the PICtail™ Plus interface.

Products supported

- MCP4631/2
- MCP4641/2
- MCP4651/2
- MCP4661/2

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MXDEV Eval System

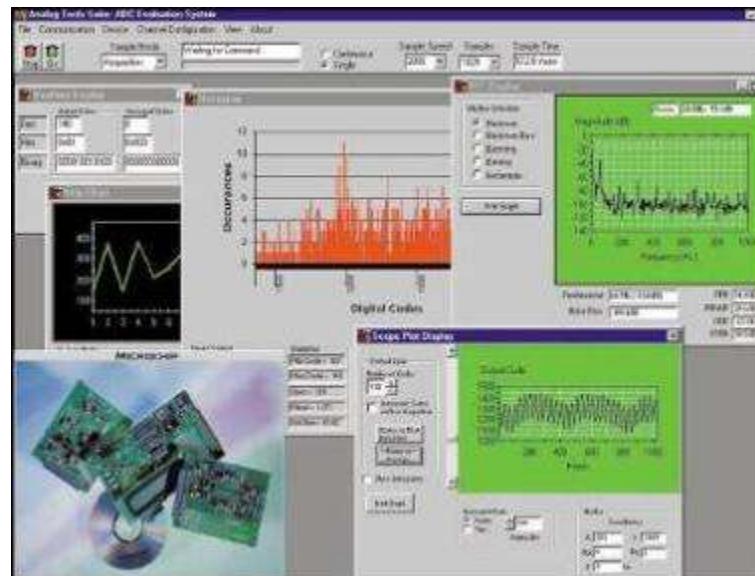
The Analog Evaluation System gives system designers the ability to control Microchip stand-alone analog devices, acquire data and then analyze the data using strip charts, histograms and Fast Fourier Transforms (FFTs). User-friendly data analysis software is included with the device-specific Daughter Boards.

The evaluation system consists of two parts: a Driver Board, which performs the data analysis and connects to a PC for subsequent analysis and display; and a Daughter Board, which plugs into the Driver Board and contains the device to be evaluated. Device-specific software is included.

In addition to the ability of the Driver Board to work with device-specific Daughter Boards, users can create their own daughter boards based on their own design requirements. Also, there is a prototype area on the Driver Board for user-designed circuits that could be used in place of the Daughter boards.

Products supported

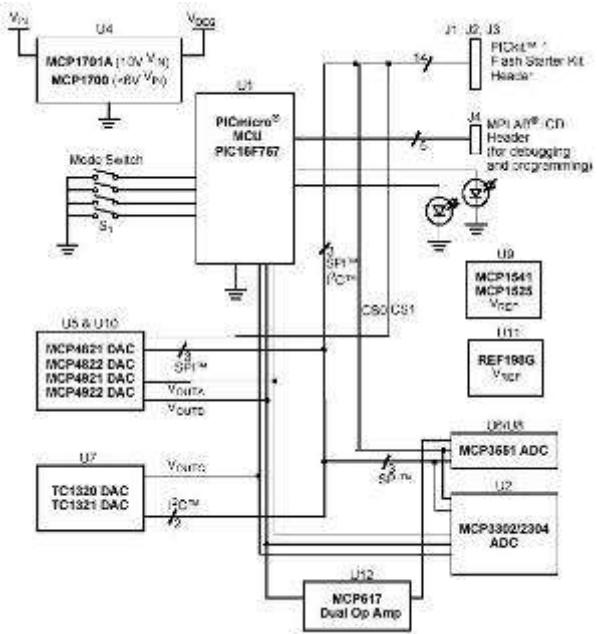
- MCP330x
- MCP320x
- MCP300x
- MCP42xxx

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P/N: DVMCPA

Mixed Signal PICtail™ Demo Board

The Mixed Signal PICtail™ Demo Board allows the system designer to quickly evaluate the suitability of several Microchip analog products for their product's design. Microchip's Digital-to-Analog Converters (DACs), Analog-to-Digital Converters (ADCs), V_{REF}, Low Dropout Output (LDO) regulators and the PIC16F7X devices are supported. Evaluation precision analog products for specific applications can be challenging for practical reasons. First, many products are only available in surface-mount packages. Secondly, analog circuits tend to be affected adversely by system noise. Common bread boarding techniques are not practical for these reasons. The Mixed Signal PICtail™ Demo Board utilizes a 4-layer PCB with attention paid to reducing system noise.



Products supported

- MCP3551
- MCP3302/04
- MCP482x
- MCP492x
- TC132x
- MCP617
- MCP15xx
- MCP1701A
- MCP1700
- PIC16F767

MCP2515/2510 CAN Developer's Kit

The MCP2515 Development Kit is a two-node Controller Area Network (CAN) tool that can be used in the evaluation/implementation of the MCP2515 stand-alone CAN controller. The software allows manipulation of the MCP2515 at the bit and byte levels with one template, while providing high-level control with a second template.

- One node is controlled by the PC that acts as a microcontroller using the provided software. This node can be used for basic MCP2515 evaluation/development ("node 0")
- The second node is controlled by a microcontroller that is programmed by the user as part of device validation and/or system development

The two nodes are connected via CAN bus that is also routed off-board through a connector, allowing the target board to be connected to an external CAN bus ("node 1")

Products supported

- MCP2515
- MCP2510

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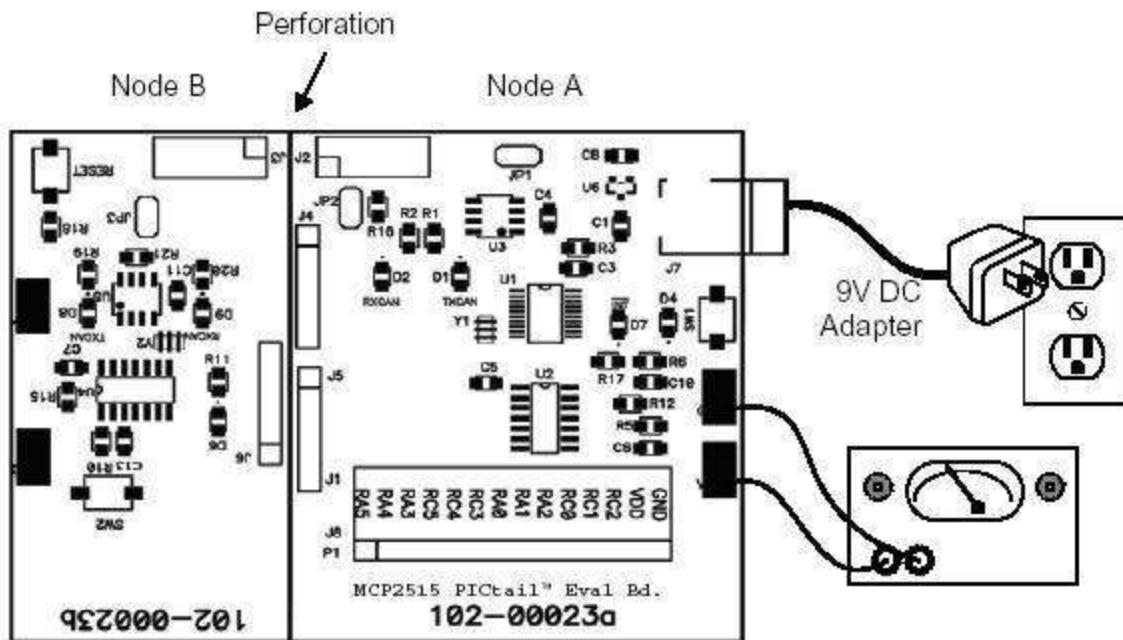
MCP2515 PICtail™ Demo Board

The MCP2515 PICtail™ Demo Board allows the system designer to quickly evaluate the operation of the MCP2515 Stand-Alone CAN Controller. The board demonstrates the MCP2515 in a CAN bus environment.

In addition, the kit includes a MCP25020 CAN I/O Expander node which demonstrates the device on a CAN bus.

Products supported

- MCP2515
- MCP2551
- MCP25020
- PIC16F676



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MCP2515 PICtail™ Plus Daughter Demo Board

The MCP2515 PICtail™ Plus Daughter Board is a simple Controller Area Network (CAN) board designed to be used with boards containing the PICtail Plus connector.

The board also has the PICkit™ Serial connector for interfacing to the PICkit Serial Analyzer tool. The CAN node consists of the MCP2515 Stand-Alone CAN controller and MCP2551 CAN transceiver.

The PICkit Plus and PICkit Serial connectors allow the board to be interfaced to a variety of PIC® micros so that the user can develop a CAN node. The board also contains headers or test points for most of the MCP2515 pins to allow the external functions to be monitored/evaluated.

Products supported

- MCP2515
- MCP2551

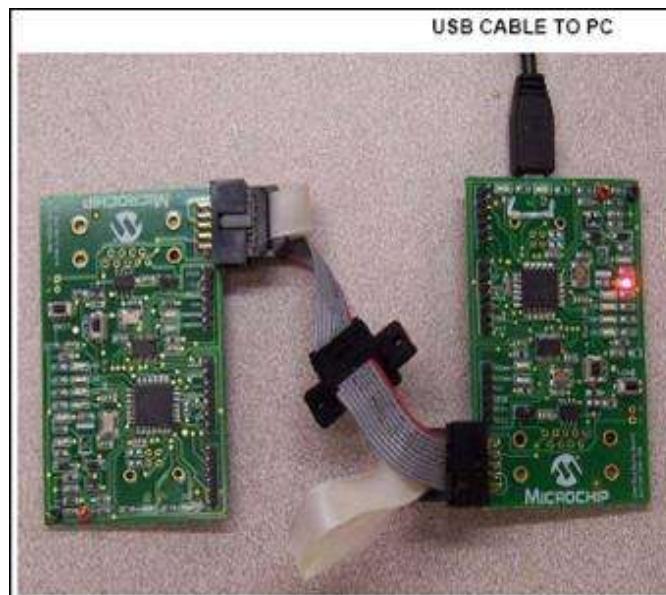
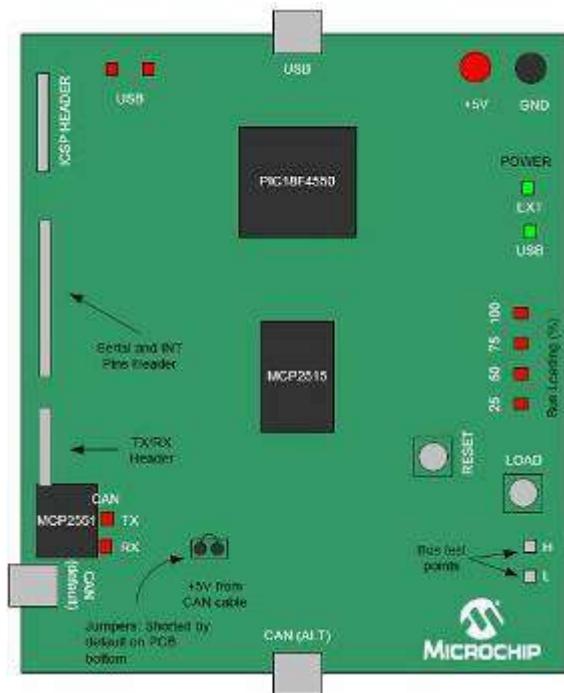
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MCP2515 CAN Bus Monitor Demo Board

The MCP2515 CAN Bus Monitor Demo Board kit contains two identical boards which can be connected together to create a simple two node Controller Area Network (CAN) bus, which can be controlled and/or monitored via the included PC interface. The board(s) can also be connected to an existing CAN bus.

Products supported

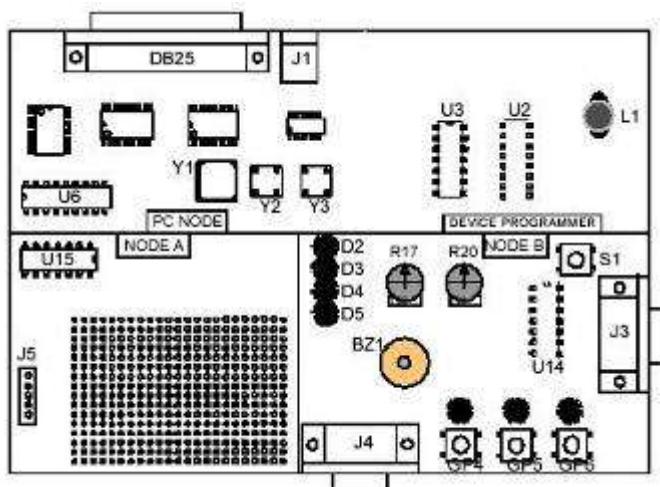
- MCP2515
- MCP2551


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MCP250xx Developer's Kit

The MCP250XX Development Kit is an evaluation, demonstration and development tool for Microchip Technology's 14-pin CAN IO/O Expanders. The MCP3250XX can be evaluated easily by installing the provided software and running the demonstration program. Furthermore, development can be accomplished by utilizing the bare CAN node with the prototyping area, as well as with the on-board device programmer.

The development board has the ability to program the user-defined defaults by using the device programmer module and the supplied software. Alternatively, the In-Circuit Serial Programming™ (ICSP™) protocol can be used to program the MCP250XX using the 5-pin header, which is connected to a 14-pin socket on the board.



Products supported

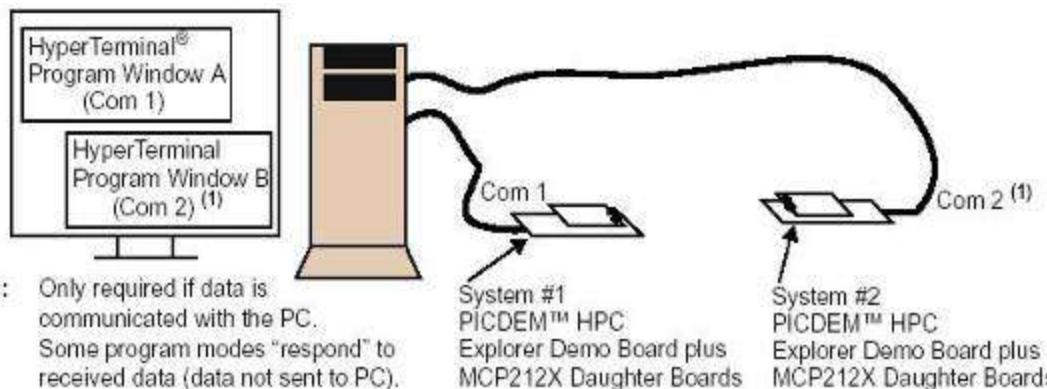
- MCP2515
- MCP25020
- MCP25050


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MCP212x Developer's Daughter Board

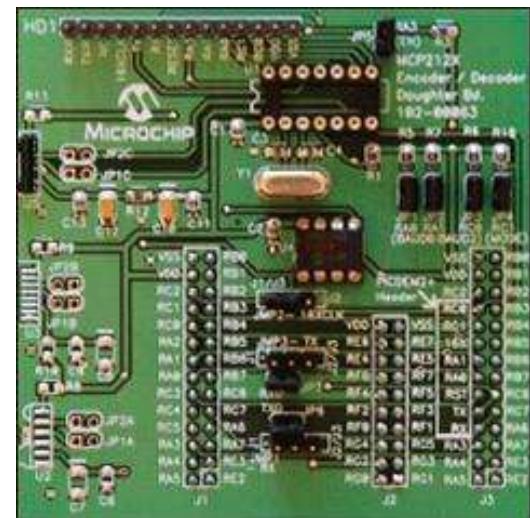
The MCP212X Developer's Daughter Board is used to evaluate and demonstrate the MCP2122 or MCP2120 IrDA® Standard Encoder/Decoder device. This allows the system designer to implement a low-cost, wireless IR port in any application providing support for IrDA standard bit encoding/decoding.

The MCP212X Developer's Daughter Board is designed to interface to several of the "new" low-cost PIC® microcontroller-based demonstration boards, or to be interfaced into your application. Multiple header interfaces are available that allow support for the many different PCIDEM™ Demo Boards, as well as being easily jumpered into systems for development purposes.



Products supported

- MCP2122
- MCP2120



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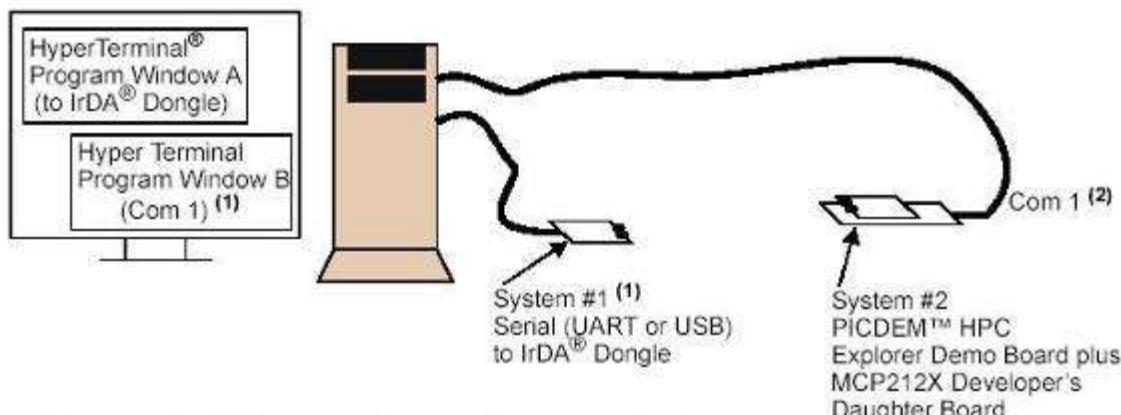


MCP215x/40 Developer's Daughter Board

Online
Info

The MCP215X/40 Developer's Daughter Board is used to evaluate and demonstrate the MCP2150, MCP2155 or MCP2140 IrDA® Standard Protocol Handler with Encoder/Decoder devices. This allows the system designer to implement a low-cost, wireless IR port in any application providing support for IrDA standard bit encoding/decoding.

The MCP215X/40 Developer's Daughter Board is designed to interface to several of the "new" low-cost PIC® microcontroller-based demonstration boards, or to be interfaced into your application. Multiple header interfaces are available that allow support for the many different PCIDEM™ Demo Boards, as well as being easily jumpered into systems for development purposes.



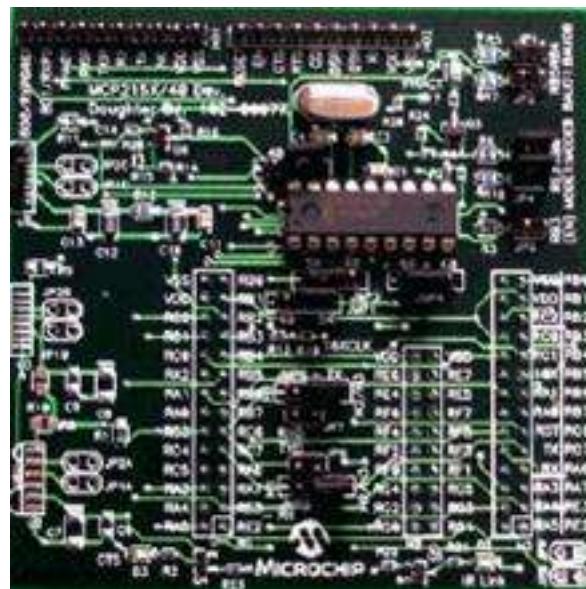
Note 1: The PC may be a notebook with an integrated IR port.

2: Only required if data is communicated with the PC.

Some PICDEM™ HPC Explorer Demo Board program modes "respond" to received data (data not sent to PC).

Products supported

- MCP2150
 - MCP2155
 - MCP2140

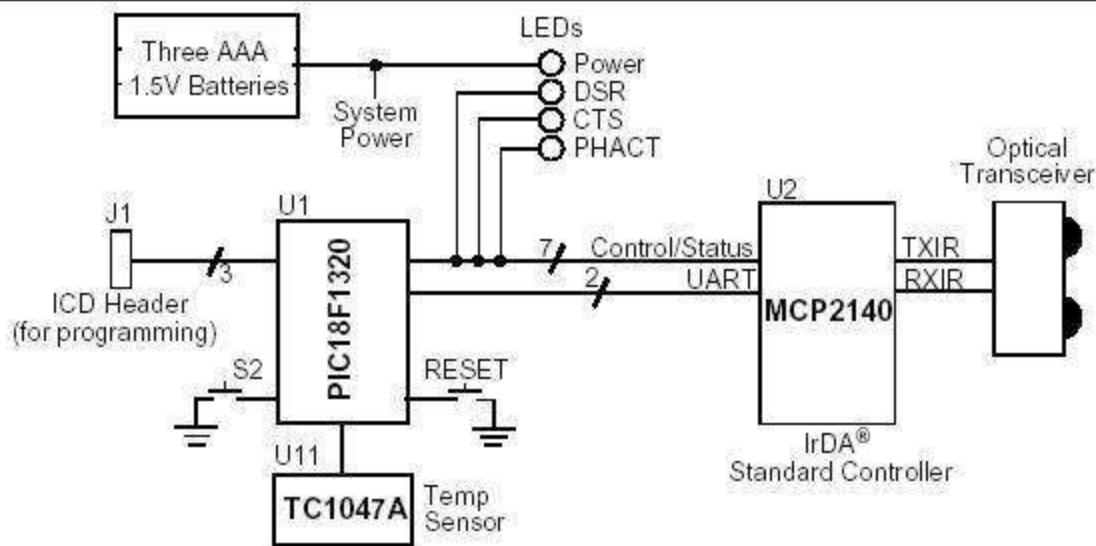


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MCP2140 IrDA® Wireless Temperature Demo Board

The MCP2140 IrDA® Standard Protocol Stack Controller device allows the system designer to implement a low-cost wireless IR port in any application, providing support for the IrDA standard protocol stack and IrDA standard bit encoding/decoding.

The MCP2140 IrDA Standard Wireless Temperature Sensor Demo Board is used to evaluate and demonstrate the MCP2140 device in data-logging application by transmitting ambient temperature to a PDA (e.g., Palm™ PDA) or laptop computer. It is intended to serve as an example to assist system designers in developing an IrDA standard node using the MCP2140 device.



Products supported

- MCP2140
- TC1047A
- PIC18F1320

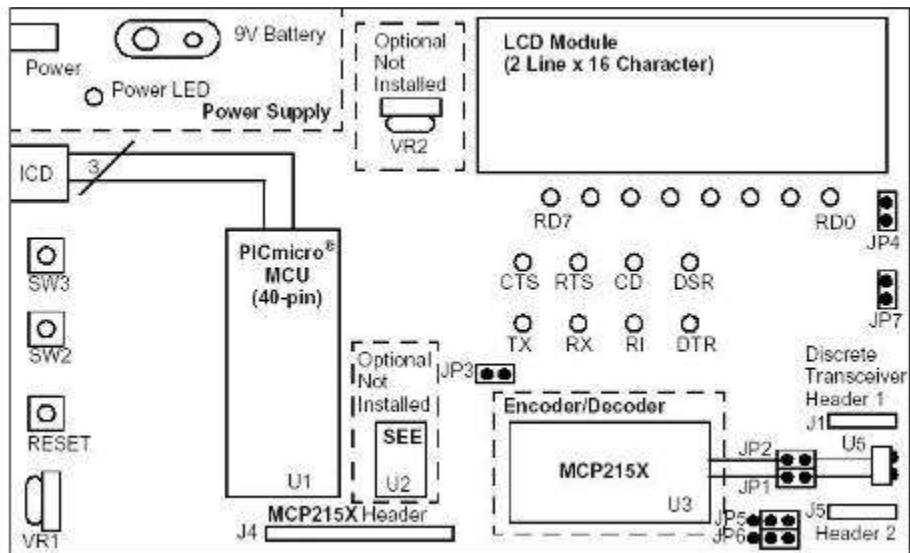

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MCP215x Data Logger Demo Board

The MCP215X IrDA Standard Protocol Stack Controller device allows the system designer to implement a low-cost wireless IR port in any application, providing support for the IrDA standard protocol stack and IrDA standard bit encoding/decoding.

The MCP215X Data Logger Demo Board is used to evaluate and demonstrate the MCP2150 or MCP2155 device in data-logging application. The board will communicate to a Primary device, such as a PDA (e.g., Palm™) or laptop computer. It is intended to serve as an example to assist system designers in developing an IrDA standard node using the MCP215X device.

Though the MCP215X Data Logger Demo Board ships with a MCP2150 installed, this device may be interchanged with a MCP2155, allowing the MCP2155 to be evaluated.



Products supported

- MCP2150
- MCP2155

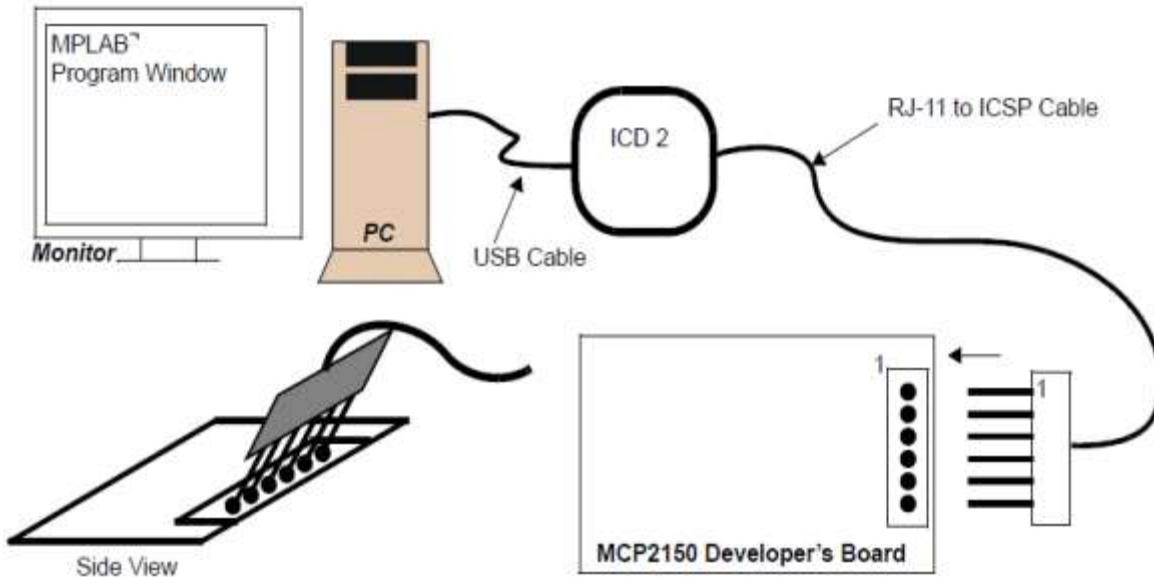

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MCP2150 Demo Board

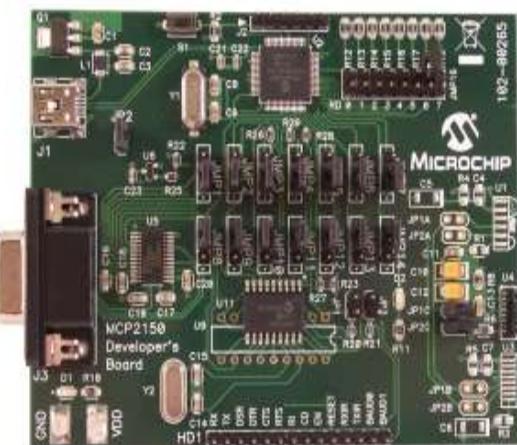
The MCP2150 Developer's Board allows for the easy demonstration and development of IrDA applications. The board can be powered via USB or the power test points (VDD and GND).

The Host interface can be connected to the UART driver device for communication over the DB-9 connector (for IrDA to UART operation), connected to the PIC18F65J50 for stand alone operation, or connected to the PIC18F65J50 with the PIC18F65J50 connected to the UART driver device (for pass-through operation).



Products supported

- MCP2150
- MCP111
- TC1108
- PIC18F86J50

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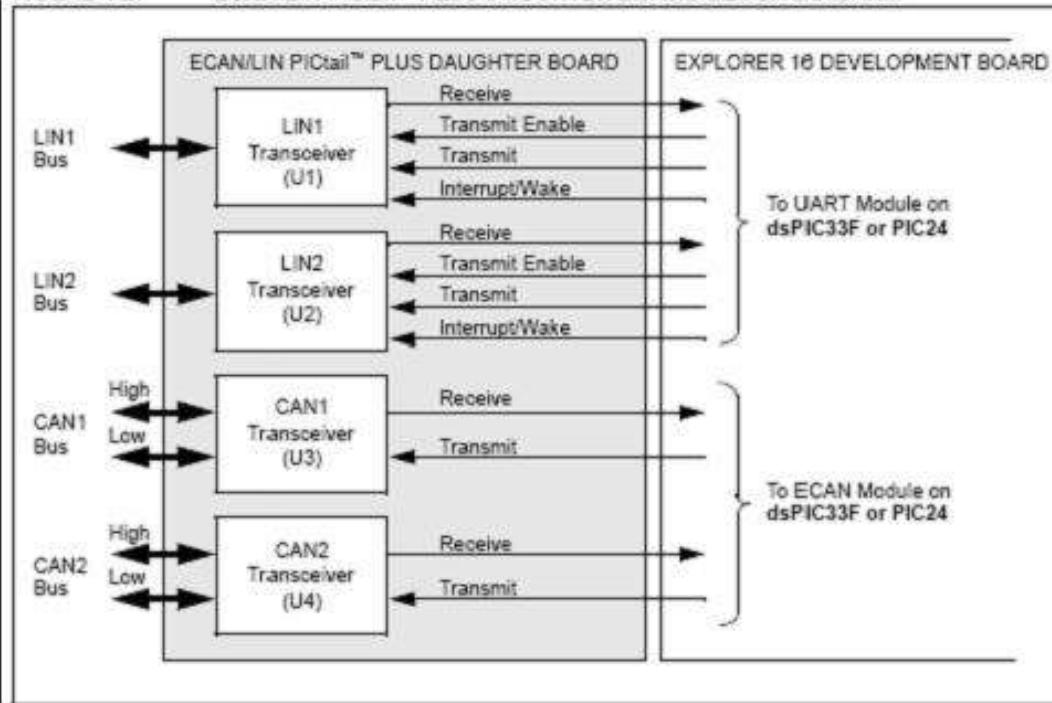
ECAN/LIN PICtail Plus Daughter Board

The ECAN/LIN PICtail™ Plus Daughter Board is used with the Explorer 16 Development Board to facilitate rapid implementation and evaluation of applications that use Controller Area Network (CAN) and Local Interconnect Network (LIN) interfaces and are implemented on dsPIC33F Digital Signal Controllers and PIC24H 16-bit microcontrollers

Products supported

- MCP2551
- MCP2021

FIGURE 1-2: ECAN/LIN PICtail™ PLUS DAUGHTER BOARD BLOCK DIAGRAM



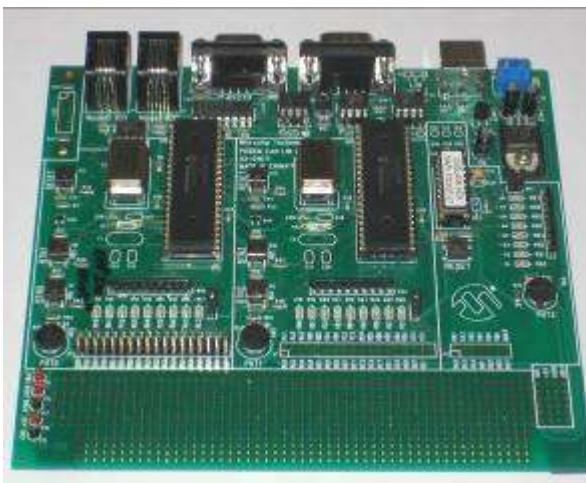
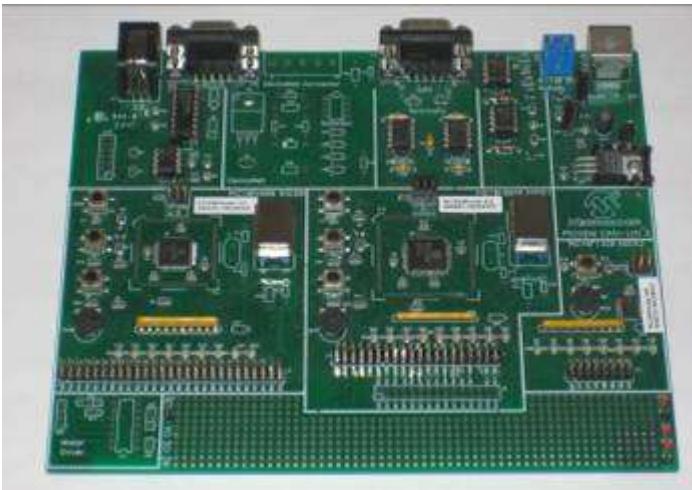
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PICDEM CAN-LIN 2 and 3 Demo Boards

Microchip offers two similar PICDEM CAN-LIN demonstration boards to support different PICmicro® devices. All demonstrate the main features of the devices, especially those features of the integrated CAN module. In addition to the CAN network, the board also employs a LIN sub-network using Microchip's PIC16C43X and PIC18F320 device families. Each PICDEM CAN-LIN demonstration board includes both firmware and PC software for simulating a CAN network. The firmware comes pre-programmed on the sample device. The PC software and documentation are furnished on a CD-ROM.

Products supported

- PICDEM CAN-LIN supports:
 - └ PIC18F258, 2580, 2680, 2685, PIC18F458, 4580, 4680, 4685
 - └ PIC16C432 with integrated LIN Bus transceiver
- PICDEM CAN-LIN 3 supports:
 - └ PIC18F6680, PIC18F8680
 - └ PIC18F1320
 - └ MCP201 LIN Bus transceiver

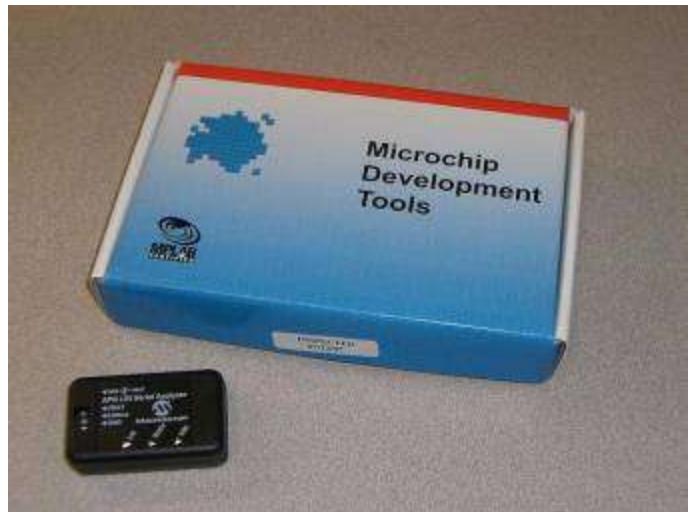
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P/N: DM163011, DM163015

LIN Serial Analyzer

The LIN Serial Analyzer development system enables a Personal Computer (PC) to communicate with a LIN (Local Interface Network) bus. The PC program uses a graphical user interface to enter and display message frames occurring on the target bus.

The LIN Serial Analyzer consists of several components, that together, make a network debug and analysis tool.

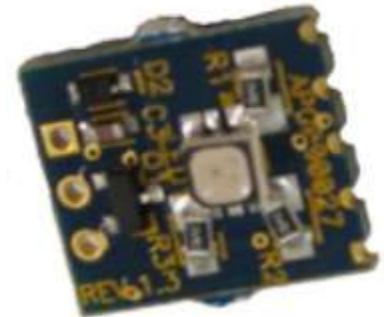
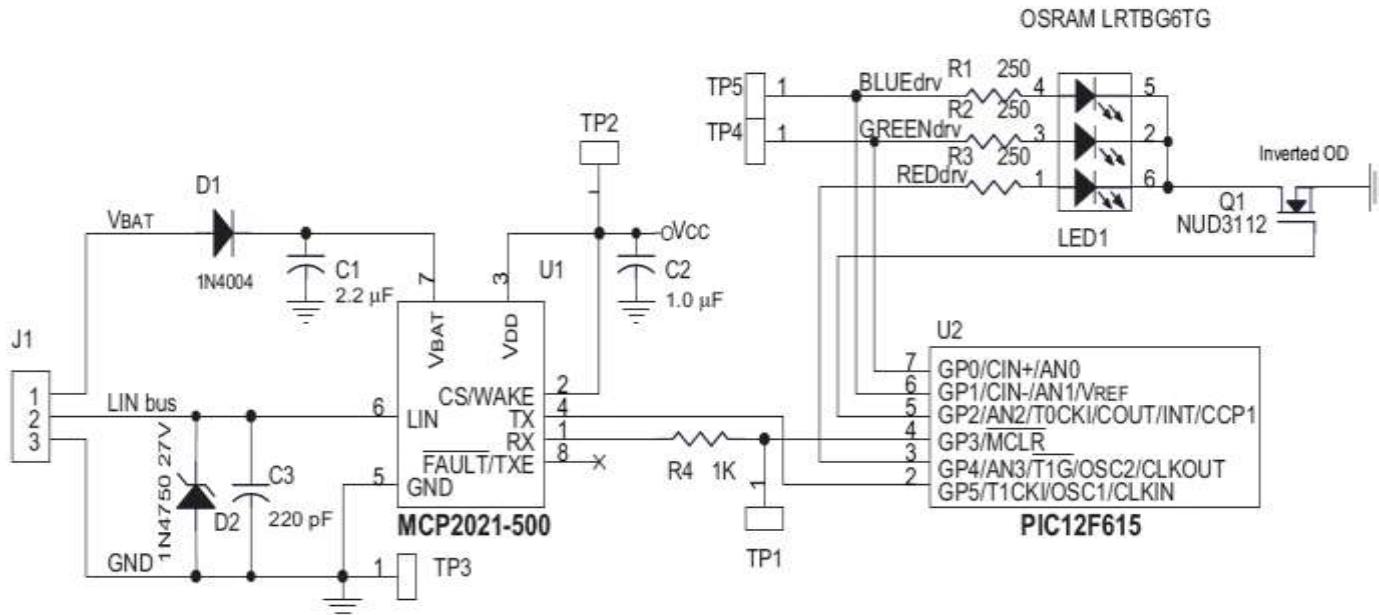
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Automotive Ambient Lighting Module

The Automotive Ambient Interior Lighting Module Reference Design demonstrates microcontroller-based control of RGB LED devices. This module can be controlled remotely by a master body controller via a LIN bus. These modules are offered in a very compact form-factor board and comprise of a PIC12F615 MCU, an MCP2021 LIN transceiver/voltage regulator, and RGB LED. LIN commands are interpreted by the module to control color mixing (16,383 colors) and intensity (1023 levels).

Products supported

- MCP2120
- PIC12F615



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MCP23x17 Eval Board

The MCP23X17 Evaluation Board allows the system designer to evaluate the operation of the MCP23X17 General Purpose I/O (GPIO) expander. The board demonstrates the MCP23X17 performance in a simple circuit (4 inputs and 12 outputs).



Products supported

- MCP23017
- MCP23S17

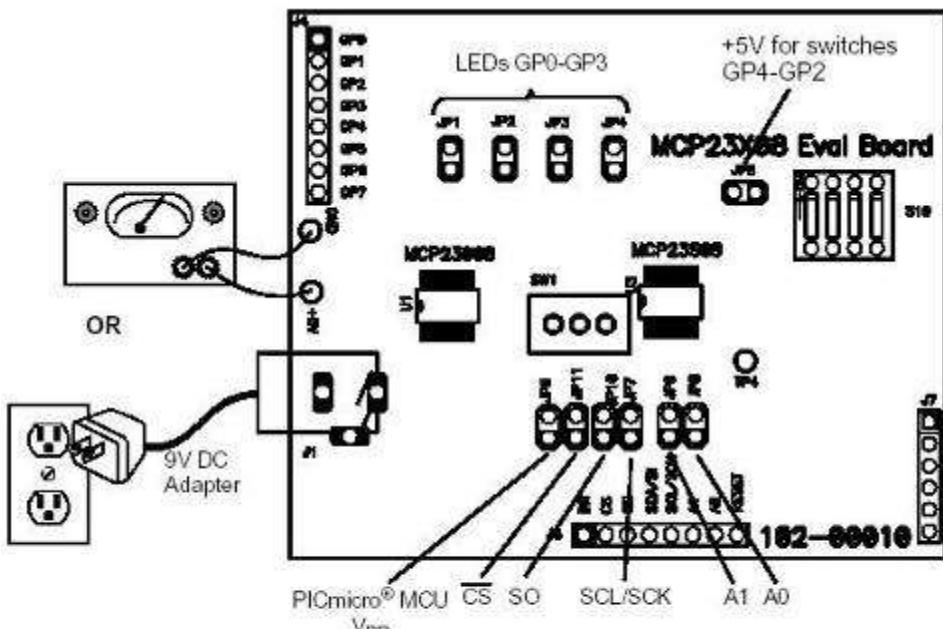
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P/N: MCP23X17EV



MCP23x08 Eval Board

The MCP23008/MCP23S08 Evaluation Board allows the system designer to quickly evaluate the operation of the MCP2X08 8-bit GPIO expanders. The board demonstrates the I/O expansion capabilities/operation of both the MCP213008 (I²C™ Interface) and MCP23S08 (SPI interface).



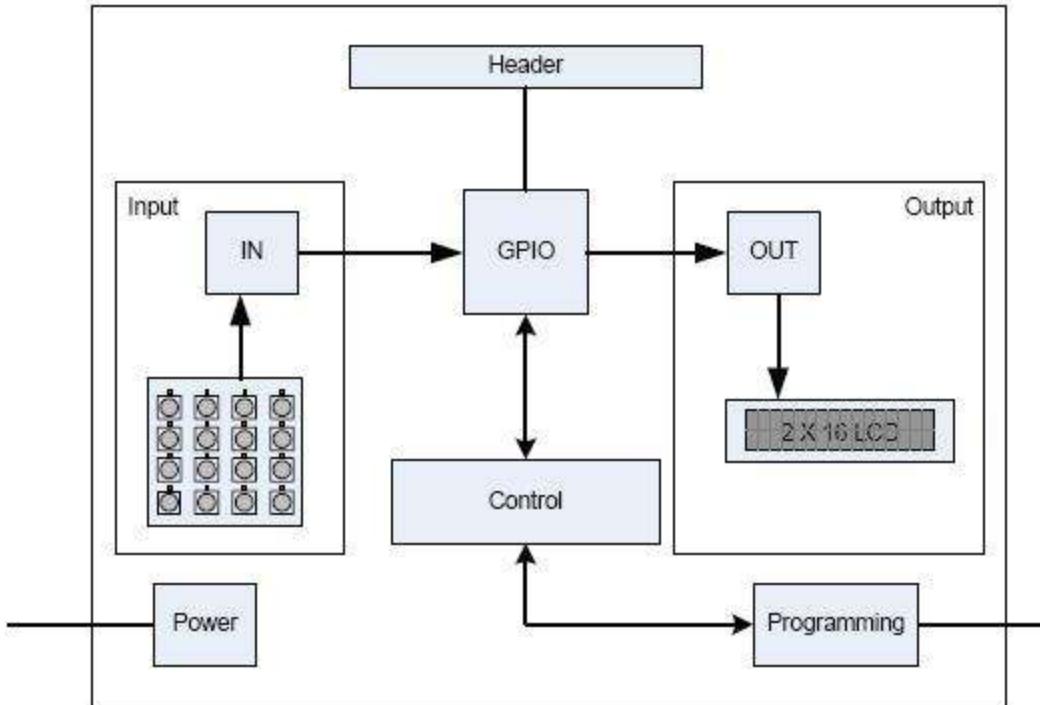
Products supported

- MCP23008
- MCP23S08



GPIO Expander Keypad Demo Board

The GPIO Expander Keypad and LCD Demo Board allows the system designer to evaluate the operation of the MCP23X17 and MCP23X08 General Purpose I/O (GPIO) Expanders. The board demonstrates the GPIO Expanders' performance in keypad and LCD example.



Products supported

- MCP23008
- MCP23S08
- MCP23017
- MCP23S17
- MCP1702
- PIC18F4550


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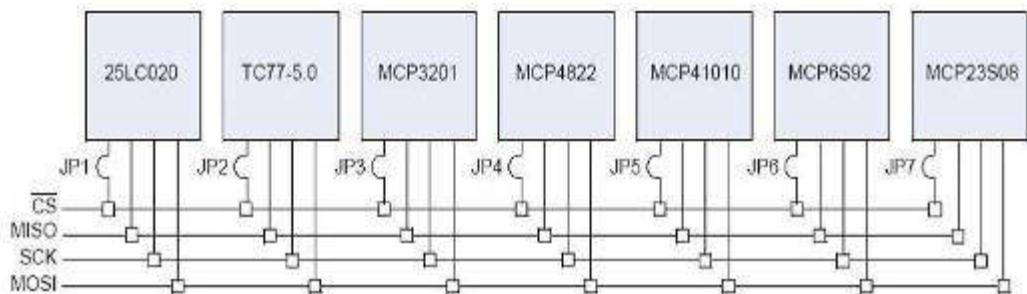


PICKit™ Serial SPI Demo Board

The PICkit™ Serial SPI Demo Board demonstrates SPI serial communications and operation of the following devices:

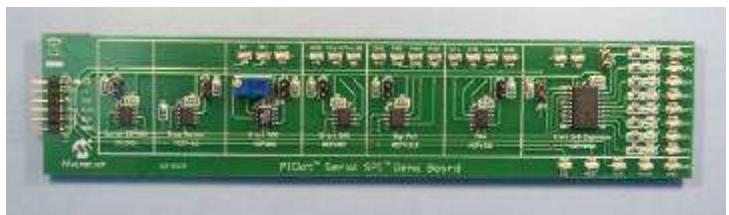
- 25LC020A – 2K SPI Bus Serial EEPROM
- TC77-5.0 – Thermal Sensor with SPI Interface
- MCP3201 – 2.7V 12-bit A/D Converter with SPI Serial Interface
- MCP4822 – 12-bit DAC with Internal V_{REF} and SPI Interface
- MCP41010 – Single/Dual Digital Potentiometer with SPI Interface
- MCP6S92 – Single-Ended, Rail-to-Rail I/O, Low-Gain PGA
- MCP23S08 – 8-bit I/O Expander with Serial Interface

The PICkit™ Serial SPI Demo Board was designed to easily connect to the PICkit Serial Analyzer (DV164122). The PICkit Serial Analyzer provides the SPI master mode serial communications and power. The PICkit™ Serial SPI Demo Board devices all operate in the SPI slave mode and can easily be connected to virtually any demo or development board by connecting the communications lines to connector P1.



Products supported

- TC77
- MCP3201
- MCP4822
- MCP41010
- MCP6S92
- MCP23S08
- 25LC020A



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General Purpose](#)

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DACs/Digital Pot](#)

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Linear](#)

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Thermal](#)

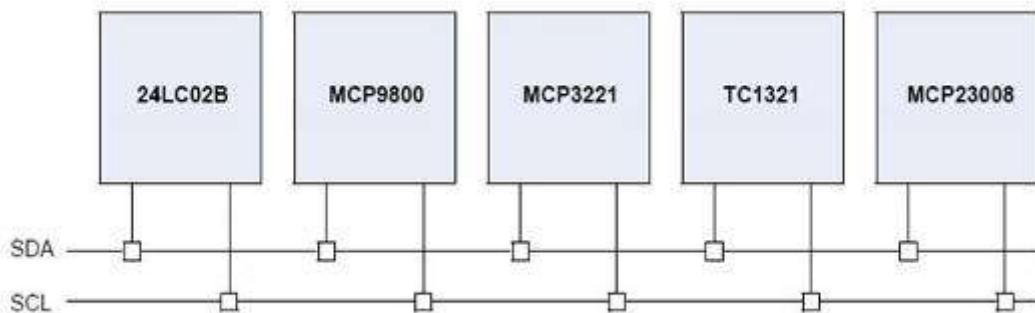
[<< BACK to
Interface](#)

PICKit™ Serial I²C™ Demo Board

The PICkit™ Serial I²C™ Demo Board demonstrates I²C™ serial communications and operation of the following devices:

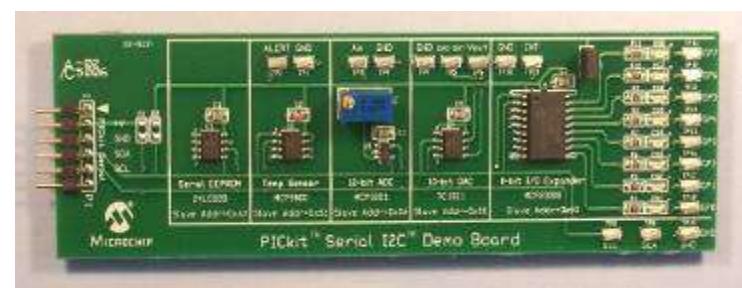
- 24LC02B – 2K Serial EEPROM
- MCP9801 – High-Accuracy Temperature Sensor
- MCP3221 – Low-Power 12-bit A/D Converter
- TC1321 – 10-bit DAC
- MCP23008 – 8-bit I/O Expander

The PICkit™ Serial I²C™ Demo Board was designed to easily connect to the PICkit Serial Analyzer (DV164122). The PICkit Serial Analyzer provides the I²C™ master mode serial communications and power. The board devices all operate in the I²C™ slave mode and can easily be connected to virtually any demo or development board by connecting the communications lines to connector P1.



Products supported

- MCP9801
- MCP3221
- TC1321
- MCP23008
- 24LC02B



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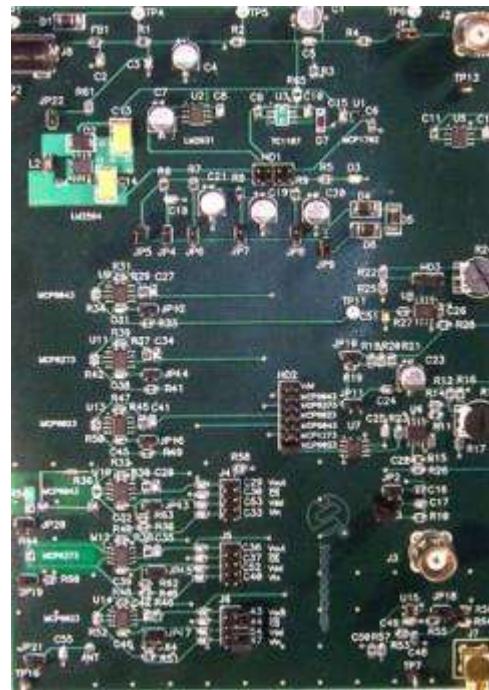
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PSRR and Digital Noise Evaluation Board

The PSRR and Digital Noise Evaluation Board (104-00139) is designed to explore and quantify the effects of power and digital noise on system performance. These experiments will help system designers understand the impact that power and digital noise can have in their design.

The PSRR and Digital Noise Evaluation Board supports measurement of Power Supply Rejection Ratio (PSRR) performance of Operational Amplifiers, as well as illustrates effects of Digital Interface spikes on Chip Select pins (and V_{DD} , V_{OUT} , V_{IN} pins). The various measurements demonstrate importance of I_{DDQ} on PSRR and Digital Noise performance.



Electrical Field Evaluation Board

The E-Field Evaluation Board (EFIELDEV) is designed to demonstrate E-field coupling under various conditions on a Printed Circuit Board (PCB). These experiments will help system designers understand the impact PCB layout techniques have on controlling E-field noise in their design.

The E-Field Evaluation Board PCB supports measurement of capacitive trace-trace coupling, in 1-layer, 2-layer, and 3-layer experiments; in each experiment, Transmitter-to-Receiver PCB trace spacings are varied, to demonstrate how coupling changes with distance.

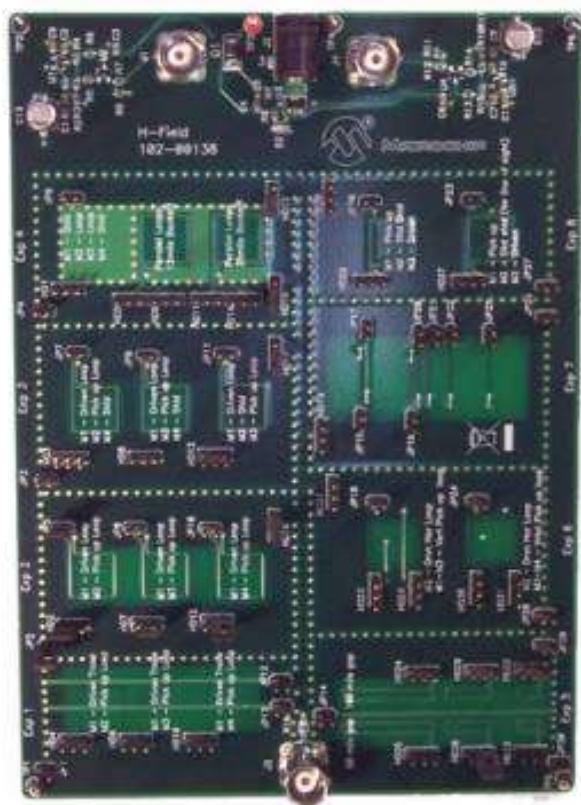


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Magnetic Field Evaluation Board

The Magnetic Field Evaluation Board (104-00138) is designed to demonstrate H-field coupling under various conditions. These experiments will help system designers understand the impact PCB layout techniques have on controlling magnetic coupling in their design.

The Magnetic Field Evaluation Board supports measurement of inductive (magnetic) trace-to-loop and loop-to-loop coupling, with and without shielding by planes.

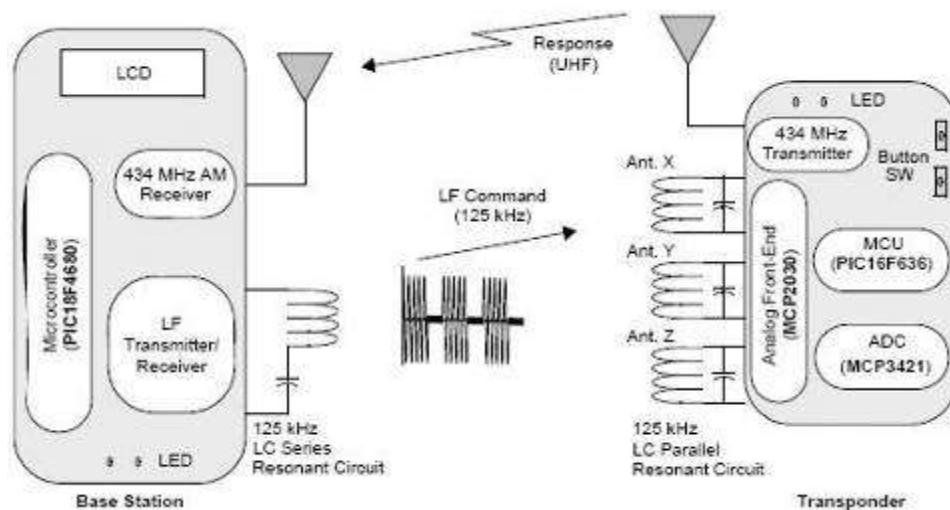


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MCP2030 Bidirectional Communication Demo Kit

The MCP2030 Bidirectional communication Demo Kit consists of two Transponders and a Base Station unit. The Transponder consists of an MCP2030 (stand-alone, three-axis analog front-end device), a PIC16F636, and a MCP3421 (18-bit delta-sigma analog-to-digital converter). Unlike the existing PKE Reference Design System (P/N: APGRD001) from Microchip Technology, this Transponder uses stand-alone devices for the bidirectional passive keyless entry (PKE) operation. This system also demonstrates the received signal strength indicator (RSSI) function using the MCP3421 delta-sigma ADC.

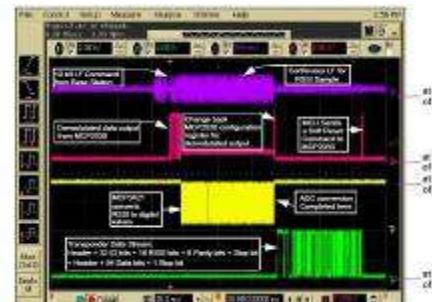
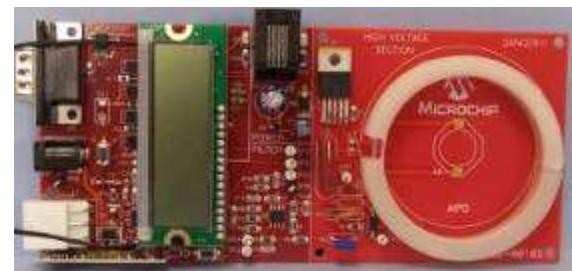
The MCP203 Bidirectional Communication Demo Kit has been designed for easy modification by customers. The firmware of both the Transponder and Base Station units can be easily modified using the MPLAB® in-circuit serial programmers.



P/N: MCP2030DM-TPR & MCP2030DM-BS

Products supported

- MCP2030
- MCP3421
- TC4421
- PIC18F4680
- PIC16F636



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RN-171-EK / RN-131-EK

The RN-171-EK / RN-131-EK is an 802.11 b/g Wi-Fi evaluation kit for the [RN171](#) / [RN131](#) module that can be used to quickly add Wi-Fi connectivity to embedded applications. It has the flexibility to connect directly to a PC via a standard USB interface or to embedded processors through the TTL/UART interface. The board includes 2 convenient pushbuttons for controlling both SoftAP and [WPS](#) (Wi-Fi Protected Setup) mode without software configuration. The status LEDs and jumpers enable rapid prototyping and integration into existing systems.

The RN-171-EK can be powered by both a USB cable (included in the kit) or batteries. The board contains a battery boost circuit which makes it possible to power the board using two AAA batteries (the input voltage can go down to 2.0 V DC when using the battery boost circuit). The battery boost circuit makes the RN-171-EK perfect for battery powered applications such as sensors, data acquisition systems, controllers, etc.



P/N = RN-171-EK



P/N = RN-131-EK



RN-171-PICTail / RN-131-PICTail

The RN Wi-Fi PICTail™/ PICTail Plus Daughter Boards allow customers to easily develop Wi-Fi applications using Microchip's 8, 16 and 32-bit PIC® microcontrollers. Includes a fully integrated TCP/IP stack allowing for a simple serial to Wi-Fi connection to the microcontroller.

Key Features:

- FCC/CE/IC certified 2.4 GHz IEEE 802.11b/g transceiver
- Plugs into Microchip's Explorer 16 and PIC18 Explorer development boards
- Adds wireless capability to designs targeting the Microchip development ecosystem.
- Compatible with 4, 8, 16, and 32-bit MCUs
- Ultra-low power: 4 µA sleep, 38 mA Rx, 120 mA Tx at 0 dBm (RN-171-PICTAIL) and 4 µA sleep, 40 mA Rx, 210 mA Tx (RN-131-PICTAIL)
- Configurable transmit power
- PCB trace antenna (RN-171-PICTail) and on-board ceramic chip antenna (RN-131-PICTail)

Kit Contents:

- RN-171-PICTail or RN-131PICTail Daughter Board
- 2 jumpers (for use with the PIC18 Explorer board only)



P/N = RN-171-PICTail



P/N = RN-131-PICTail



RN-XV-EK1

The RN-XV-EK1 is an evaluation kit for the RN171XV series of modules. The board connects to a PC via a standard USB cable (included in the kit), and provides 2 pushbutton switches to control WPS mode and to reset the module.

Key Features:

- Evaluation kit for the RN171XV module based on Roving Networks' robust RN171 Wi-Fi module
- Supports several antenna options, depending on the RN171XV module selected
- WPS pushbutton for easy configuration
- Reset pushbutton wakes the module
- Standard USB connector
- Hardware interface: USB via FTDI chipset



P/N = RN-XV-EK1

Kit Contents

- RN-XV-RD2 reference design board
- USB cable

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RN-XV-RD2

The RN-XV-RD2 is a dual relay I/O reference design that demonstrates the RN171XV series of Wi-Fi modules. This convenient reference design includes a USB cable that connects directly from the board to a PC for programming the module over the UART. The board has 2 relays capable of switching up to 240 volts and multiple pushbuttons for reset, ad hoc/WPS mode, and AP mode. Also includes status LEDs and jumpers for quickly and easily evaluating the RN171XV series of modules.

Key Features:

- Reference design for evaluating the RN171XV 802.11 b/g Wi-Fi module
- Kit includes a standard USB cable that connects directly from the board to a PC for programming the module over the UART
- Contains 2 10-amp relays capable of switching up to 240V
- Built in temperature sensor
- External temperature probe connector
- 3 status LEDs that mimic the LEDs on the RN171XV module
- 4 pushbutton switches and jumpers to simplify development
- 10 GPIO pins accessible via the 3.3V headers
- Voltage regulator
- Supports several RN171XV antenna options: Wire, SMA connector, U.FL connector

Kit Contents

- RN-XV-RD2 reference design board
- USB cable



P/N = RN-XV-RD2

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Wi-Fi G Demo Board

The Wi-Fi® G Demo Board is a compact demonstration platform for customers to easily evaluate and configure Microchip's new [MRF24WG0MA](#) Wi-Fi module. The demo board is a fully-functional standalone web server powered by 2 AAA batteries. It comes with a PIC32 pre-programmed with the Microchip TCP/IP stack, connected to an onboard, fully-certified MRF24WG0MA Wi-Fi module.

Key Features:

- Complete IEEE 802.11 b/g Wi-Fi Solution
- Supports Infrastructure/Ad hoc networks and SoftAP networking
- Web server allows for configuration of network settings
- Headers bring out signals for quick prototyping

The Wi-Fi G Demo Board Offers:

- Schematics
- Complete applications compliant with Microchip TCP/IP reference source code library
- Reference application source code



P/N = DV102412

Kit Contents:

- Wi-Fi G Demo Board
- Wi-Fi G Demo Board Information Sheet

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MRF24WG0MA Wi-Fi G PICtail/PICtail Plus Board

The Wi-Fi PICtail/PICtail Plus Daughter Board is a demonstration board for evaluating Wi-Fi connectivity using PIC microcontrollers and the MRF24WG0MA module. This product is compatible with the Explorer 16 Development Board ([DM240001](#)), PICDEM.net2 Development Board ([DM163024](#)) and PIC32 Starter Kit ([DM320001](#)) with I/O Expansion Board ([DM320002](#)).

The TCPIP stack and demo applications can be downloaded from
www.microchip.com/MLA

Module Key Features:

- Supports low-power, 802.11b/g to 5mbps data-rate
- Wi-Fi FCC (USA), IC (Canada), ETSI (Europe) Certified
- Integrated PCB Antenna with Simple four-wire SPI interface to PIC® microcontroller
- WEP, WPA-PSK, WPA2-PSK Security
- SoftAP, WPS, and Wi-Fi Direct Client functionality



MRF24WG0MA Wireless-G PICtail™/PICtail Plus Daughter Board
(Part # AC164149)

P/N = AC164149

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RN-4020-PICTail

The RN4020 PICTail / PICTail Plus Board is a Bluetooth® Low Energy demonstration board that showcases the Microchip [RN4020](#) module, a fully-certified Bluetooth Version 4.1 low energy module for designers who want to easily add low power wireless capability to their products. This flexible development board includes the [RN4020](#) paired with an eXtreme Low Power PIC18F25K50 microcontroller.

This convenient development board includes a USB to UART interface for plug-and-play capability. The high-speed UART interface and the General Purpose Input Output (GPIO) ports are available on the RN4020 module to configure, control and transfer data. The RN-4020-PICTail also includes PICTail and PICTail Plus interfaces for connecting to Microchip development boards. The on-board PIC18 microcontroller can be custom programmed via the available PICkit serial programmer / debugger interface. The board also includes on-board connection and data status LEDs enabling rapid prototyping and fast time to market.

Key Features:

- Enables flexible development with the [RN4020](#) BTLE Module
- USB to UART Interface, to quickly get started
- Connection and data status LEDs
- PICTail™ and PICTail Plus interfaces for connection to Microchip development boards
- eXtreme Low Power PIC18F25K50 MCU on-board
- PICkit™ serial programmer / debugger interface
- Multiple options for programming and experimentation



P/N = RN-4020-PICTail

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RN-41-EK / RN-42-EK

The RN-41-EK / RN-42-EK is a fully certified Class 1 Bluetooth evaluation kit for the RN41-I/RM / RN42-I/RM module. It has the flexibility to connect directly to a PC via a standard USB interface or to embedded processors through the TTL UART interface. The status LEDs, switches, and signal headers enable rapid prototyping and integration into existing systems.

Key Features:

- Evaluation board with USB interface
- Fully certified Bluetooth 2.1 + EDR/2.1/2.0/1.1 module
- Low power (8-30 mA connected, 2 mA idle)
- Embedded Bluetooth stack profiles included (requires no host stack): GAP, SDP, RFCOMM and L2CAP, with SPP, HID, and DUN profiles
- Supports various modes including HCI and SPP/DUN
- FCC, IC, CE certified, RoHS compliant



P/N = RN-41-EK



P/N = RN-42-EK

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RN-41-APL-EVAL

RN-42-APL-EVAL

Microchip's Bluetooth® APL modules natively support iAP (iPod Accessory Protocol) data connections and directly manage authentication, reducing engineering effort and cost, and simplifying accessory product design.

Apple iOS devices such as the iPhone freely connect with Bluetooth hands-free and headset accessories. However, establishing Bluetooth data connections with Apple devices requires a unique discovery/pairing sequence and negotiation with the Apple authentication co-processor.

APL modules are based on the standard RN41 and RN42, making them footprint compatible. Power, ground and UART connections are identical, and connection of the Apple authentication chip is direct to the module via a 3-wire interface.

Key Features:

- Discoverable/Connectable with iPhone, iPod or iPad
- Allows dual profile Bluetooth® connections to other smartphone or computing platforms
- Automatically stores Bluetooth® address of the last paired iPhone, iPod, or iPad device, for quick reconnection
- Secure Simple Pairing (SSP) enables 'no PIN code required' operation
- Supports the complete Roving Networks Bluetooth® feature set
- Direct hardware connection to the authentication coprocessor
- No iAP firmware development required for authentication on host microprocessor
- Class 1 (~100m) and Class 2 (~30m) versions available

All products designed to connect to iPhones, iPods and iPads, including those that incorporate the Roving Bluetooth® APL module must be registered and approved with Apple's Made for iPod (MFi) program. Developers of such products should visit Apple's developer portal at: <http://developer.apple.com/ipod/>. With MFi membership, engineers can purchase the evaluation kit which includes detailed documentation and support.



The RN-4x-APL-EVAL evaluation kits include:

RN-4x-APLX development board which contains:

- RN4xAPL-I/RM module
- Apple authentication co-processor
- Status LEDs
- Power regulation
- RS232 and TTL signals
- Four RN4xAPL-I/RM modules
- Complete design documents including schematics
- Source code for the Roving Networks Diagnostic Application

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RN-42-HID-RD1

The RN Bluetooth modules support many different profiles including SPP, DUN, iAP and HID. HID, or Human Interface Device, refers to the device providing the service of human data input and output to and from the host.

The Bluetooth HID profile enables customers to develop products such as a game controller, keyboard, mouse, or pointing device. Additionally, Microchip has extended the basic HID capability to allow programmability and control of devices like the iPad for example.

Reference design

To demonstrate the capabilities of the HID firmware, Microchip has a reference design called the [RN-42-HID-RD1](#) based on the RN42 Bluetooth module running the HID profile. This HID reference design offers three modes of operation:

- Presenter mode: Enables the control of presentation software such as Microsoft® Powerpoint
- Music mode: Enables the control of music functions such as pause, play, volume controls and switching tracks on devices such as iPhones® and iPods®
- Custom mode: Enables programming of each button to send a sequence of keys

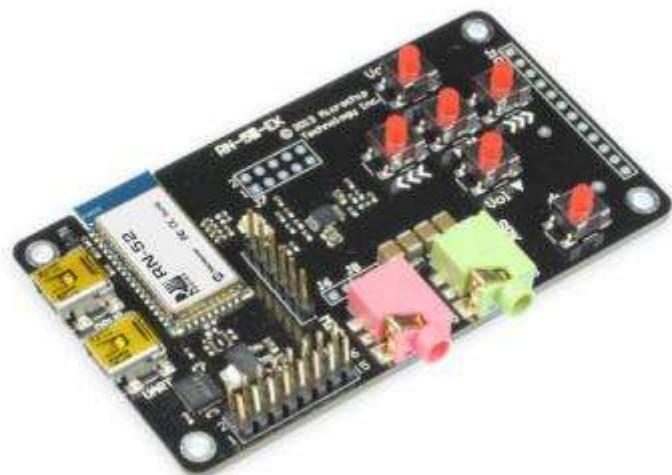


RN52 Bluetooth Audio Evaluation Kit

The RN-52-EK is an evaluation kit for the RN52, a fully certified Bluetooth version 3.0 audio module, and fully compatible with Bluetooth version 2.1 + EDR. It demonstrates the key features of the RN52 allowing designers to quickly and easily evaluate and develop prototypes.

Features:

- Based on RN52 Bluetooth audio module
- Demonstrates key features of RN52 module for embedded systems
- Allows designers to develop prototypes and proof of concept
- Dual channel audio output and input available in analog and digital formats
- Provides interface to external devices
- USB port to supply power and access to command interface
- Built-in amplifier for stereo audio output and 6 function buttons
- Additional support for codecs such as aptX®, AAC, MP3, and others



P/N = RN-52-EK

Supported Bluetooth Profiles:

- A2DP stereo audio (sink mode, SBC codec)
- AVRCP media player remote control
- HFP/HSP can accept a phone call from mobile phone
- SPP allows serial data over UART
- iAP Profile discovery

Kit Contents:

- RN52 Evaluation board
- USB cable
- Two stereo mini-speakers
- Microphone

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PIC32 Bluetooth Audio Development Kit

The PIC32 Bluetooth® Audio Development Kit provides a comprehensive solution to develop Bluetooth A2DP audio streaming solutions and applications. The board is coupled with two daughter cards: the Bluetooth HCI Radio Daughter Card that demonstrates a low cost Bluetooth implementation and the Audio DAC Daughter Card that demonstrates a high quality 16/24-bit, 32-192 KHz audio conversion/amplification for line or headphones. The kit ships with demo code that enables wireless streaming digital audio from any Bluetooth enabled Smartphone or portable music player or over USB.

Key Features:

- PIC32MX450/470 MCU
- HCI Bluetooth module Daughter Card (QDID Certified Module)
- 16/24-bit, 32-192KHz DAC/Amp Daughter Card
- USB Host/Device audio support
- USB Charging
- 2 inch color LCD Display
- Headphone/Line Out
- Audio Control function

Bluetooth /USB Audio Software Support for:

- Apple*
- Samsung Audio
- Google/Android AOA Audio
- Bluetooth Audio w/ SBC & AAC Decode
- Bluetooth Stack QDID Certified

*For Apple USB Authenticated applications contact

applesupport@microchip.com



PIC32 Bluetooth® Audio Development Kit
(Part # DV320032)

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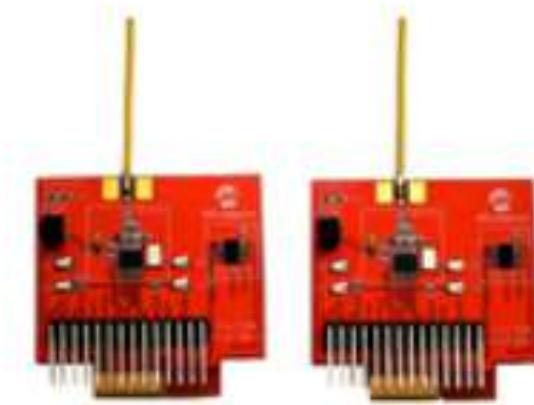
MRF49XA PICtail Plus Daughter Board 433.92 MHz

The MRF49XA PICtail/PICtail Plus Daughter Board is a demonstration and development daughter board for the MRF49XA ISM Band Sub-GHz RF Transceiver.

The daughter board can plug into multiple Microchip Technology demonstration and development boards. For example, for 8-bit microcontroller development using the PIC18 Explorer Board (DM183032) or 16-bit microcontroller development using the Explorer 16 Development Board (DM240001).

Supported MiWi software stack and radio utility driver can be downloaded from the Microchip website at:

www.microchip.com/wireless.



Part #AC164137-1



MRF49XA PICtail Plus Daughter Board 868/915 MHz

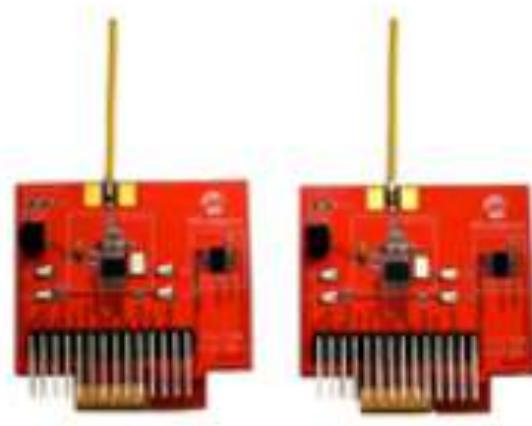
Online
Info

The MRF49XA PICtail/PICtail Plus Daughter Board is a demonstration and development daughter board for the MRF49XA ISM Band Sub-GHz RF Transceiver.

The daughter board can plug into multiple Microchip Technology demonstration and development boards. For example, for 8-bit microcontroller development using the PIC18 Explorer Board (DM183032) or 16-bit microcontroller development using the Explorer 16 Development Board (DM240001).

Supported MiWi software stack and radio utility driver can be downloaded from the Microchip website at:

www.microchip.com/wireless.



Part #AC164137-2

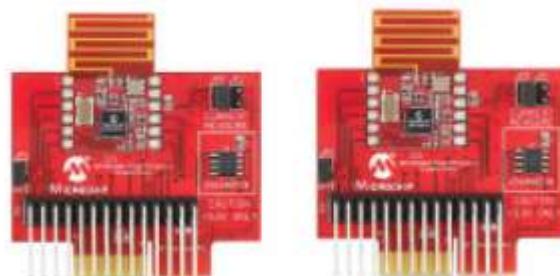
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MRF89XAM8A Pictail / Pictail Plus Daughter Card

The MRF89XAM8A PICtail/PICtail™ Plus Daughter Board is a demonstration and development daughter board for the 868 MHz radio transceiver module which conforms to the European ETSI standard.

The module is surface mounted to a PICtail/PICtail Plus daughter board that plugs into multiple Microchip demonstration and development boards like the PICDEM PIC18 Explorer Board (DM183032) for 8-bit microcontroller development, or the Explorer 16 Development Board (DM240001) for 16-bit microcontroller development.

Targeted for the MiWi™ Development Environment and other proprietary wireless protocol applications, the MRF89XAM8A is a perfect solution for low-cost, low-power, complete embedded wireless applications. Supporting software stacks and application notes may be downloaded from www.microchip.com/wireless.



Part #AC164138-1

ZENA Wireless Adapter 915 MHz

The **ZENA™ Wireless Adapter** is a multi-function Universal Serial Bus (USB) wireless adapter connecting USB-equipped desktop or notebook computers with Microchip wireless products for development or application uses.

As a development tool, the ZENA Wireless Adapter can be used as a protocol analyzer or as a diagnostic tool. It can also be used to connect the computer as a wireless node to the network for application use.

The ZENA Wireless Adapter is capable of performing a variety of functions and each function can be programmed into the adapter using the USB boot loader.

The ZENA Wireless Adapter is preprogrammed with a [**MiWi™ Wireless Protocol**](#) Sniffer application. This allows the user to display MiWi Wireless Protocol packets in a graphical format in the Wireless Development Studio.

Upload firmware applications from the [**Wireless Development Studio**](#)



Part #AC182015-3

ZENA Wireless Adapter 868 MHz

The **ZENA™ Wireless Adapter** is a multi-function Universal Serial Bus (USB) wireless adapter connecting USB-equipped desktop or notebook computers with Microchip wireless products for development or application uses.

As a development tool, the ZENA Wireless Adapter can be used as a protocol analyzer or as a diagnostic tool. It can also be used to connect the computer as a wireless node to the network for application use.

The ZENA Wireless Adapter is capable of performing a variety of functions and each function can be programmed into the adapter using the USB boot loader.

The ZENA Wireless Adapter is preprogrammed with a [**MiWi™ Wireless Protocol**](#) Sniffer application. This allows the user to display MiWi Wireless Protocol packets in a graphical format in the Wireless Development Studio.

Upload firmware applications from the [**Wireless Development Studio**](#)



Part #AC182015-2



8-bit Wireless Dev Kit 868 MHz MRF89XA

8-bit Wireless Development Kit – 868 MHz MRF89XA is an easy-to-use evaluation and development platform for Sub GHz application designers. This kit includes Microchip's MRF89XAM8A transceiver module and also features Microchip's PIC18 XLP microcontroller family. The kit includes complete hardware needed to rapidly prototype wireless applications. The demonstration kit is pre-programmed with MiWi™ protocol stack and you can find the demo instructions in the user's guide. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi.

The PIC18 demonstration board is equipped with a 28-pin PICtail™ connector to interface with Microchip's wireless transceiver PICtail daughter boards such as MRF24J40MA, MRF89XAM8A and MRF49XA.

Developers can reprogram or modify the PIC18 MCU Flash memory and develop and debug application code all on the same platform.



Part #DM182015-2

MiWi Demo Kit 868 MHz MRF89XA

MiWi Demo Kit – 868 MHz MRF89XA is an easy-to-use evaluation and development platform for 868 MHz applications. This kit includes Microchip's MRF89XAM8A transceiver module and also features Microchip's PIC18 XLP microcontroller family. The kit includes complete hardware needed to rapidly prototype wireless applications. The demonstration kit is pre-programmed with MiWi™ protocol stack and you can find the demo instructions in the user's guide. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi. Developers can reprogram or modify the PIC18 MCU Flash memory and develop and debug application code all on the same platform.

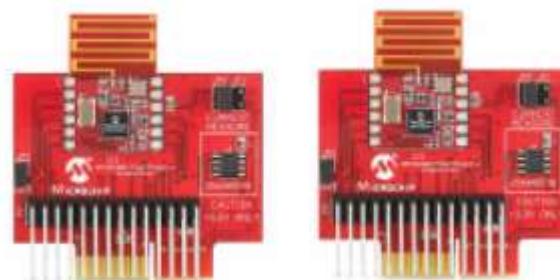


MRF89XAM9A PICtail / PICtail Plus Daughter Board

The MRF89XAM9A PICtail/PICtail™ Plus Daughter Board is a demonstration and development daughter board for the 915 MHz radio transceiver module which is FCC certified.

The module is surface mounted to a PICtail/PICtail Plus daughter board that plugs into multiple Microchip demonstration and development boards like the PICDEM PIC18 Explorer Board (DM183032) for 8-bit microcontroller development, or the Explorer 16 Development Board (DM240001) for 16-bit or 32-bit microcontroller development.

Targeted for the MiWi™ Development Environment and other proprietary wireless protocol applications, the MRF89XAM9A is a perfect solution for low-cost, low-power, complete embedded wireless applications. Supporting software stacks and application notes may be downloaded from www.microchip.com/wireless.



Part #AC164138-2

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8-bit Wireless Dev Kit 915 MHz MRF89XA

Online
Info

8-bit Wireless Development Kit – 915 MHz MRF89XA is an easy-to-use evaluation and development platform for Sub GHz application designers. This kit includes Microchip's MRF89XAM8A transceiver module and also features Microchip's PIC18 XLP microcontroller family. The kit includes complete hardware needed to rapidly prototype wireless applications. The demonstration kit is pre-programmed with MiWi™ protocol stack and you can find the demo instructions in the user's guide. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi.

The PIC18 demonstration board is equipped with a 28-pin PICtail™ connector to interface with Microchip's wireless transceiver PICtail daughter boards such as MRF24J40MA, MRF89XAM8A and MRF49XA.

Developers can reprogram or modify the PIC18 MCU Flash memory and develop and debug application code all on the same platform.



Part #DM182015-3

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MiWi Demo Kit 915 MHz MRF89XA

MiWi Demo Kit – 915 MHz MRF89XA is an easy-to-use evaluation and development platform for 868 MHz applications. This kit includes Microchip's MRF89XAM8A transceiver module and also features Microchip's PIC18 XLP microcontroller family. The kit includes complete hardware needed to rapidly prototype wireless applications. The demonstration kit is pre-programmed with MiWi™ protocol stack and you can find the demo instructions in the user's guide. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi. Developers can reprogram or modify the PIC18 MCU Flash memory and develop and debug application code all on the same platform.



Remote Control Demo Board with ZENA Wireless Adapter

RF based Remote Controls are becoming more prevalent as they enable non line-of-sight and provide bi-directional communication. A high-end remote control typically has a graphics display, a number of keys and a radio to communicate with the target devices.

Microchip's Remote Control Demo Board (Part # DM240315-2) integrates Graphics, mTouch, USB and RF4CE into a single demo. The board demonstrates a remote populated with PIC24FJ256DA210 MCU, 3.5" Graphical TFT LCD with resistive touch screen, capacitive touch keys with plastic overlay, MRF24J40 2.4 GHz transceiver and ZENA™ wireless Adapter.



Remote Control Demo Board with ZENA Wireless Adapter
(Part # DM240315-2)

Part #DM240315-2

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ZENA Wireless Adapter 2.4 GHz MRF24J40

The **ZENA™ Wireless Adapter** is a multi-function Universal Serial Bus (USB) wireless adapter connecting USB-equipped desktop or notebook computers with Microchip wireless products for development or application uses.

As a development tool, the ZENA Wireless Adapter can be used as a protocol analyzer or as a diagnostic tool. It can also be used to connect the computer as a wireless node to the network for application use.

The ZENA Wireless Adapter is capable of performing a variety of functions and each function can be programmed into the adapter using the USB boot loader.

The ZENA Wireless Adapter is preprogrammed with a [**MiWi™ Wireless Protocol**](#) Sniffer application. This allows the user to display MiWi Wireless Protocol packets in a graphical format in the Wireless Development Studio.

Upload firmware applications from the [Wireless Development Studio](#)

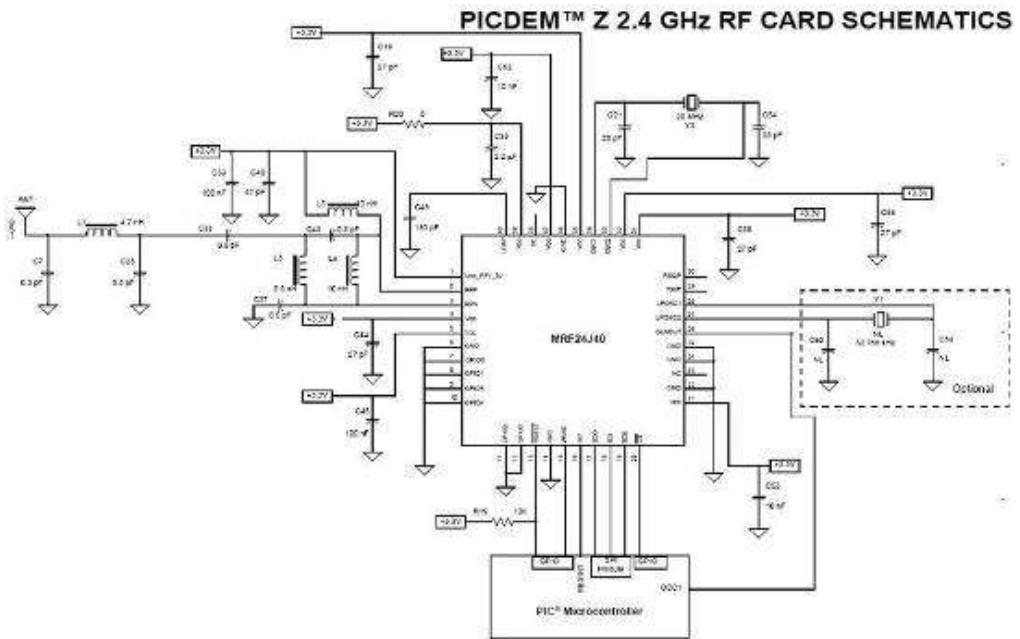


Part #AC182015-1



PICDEM Z Demo Kit

The PICDEM Z Demonstration Kit is designed to allow developers to evaluate and experiment with Microchip RF solutions. It is designed to work with either the ZigBee™ or MiWi™ protocol. The PICDEM Z Demonstration Kit provides two nodes to create a simple two-node network. If required, additional nodes may be purchased to expand the network. The preprogrammed demo application firmware shows a simple two-node ZigBee™ protocol network. Using either the MiWi Wireless Networking Protocol Stack or the Microchip Stack for ZigBee™ Protocol source code, available free of charge from the Microchip website, developers can develop their own applications.



P/N: DM163027 and AC163027

Products supported

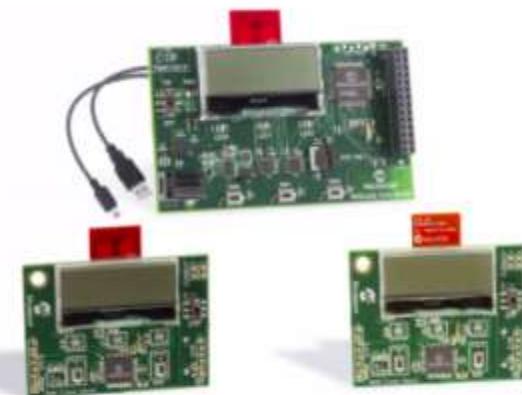
- MRF24J40
- TC77-3.3MCTTR
- PIC18LF4620



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MiWi Protocol to Wi-Fi Wireless Demo Kit

MiWi™ Protocol to Wi-Fi® Wireless Demo kit allows developers to evaluate and experiment with MiWi protocol to Wi-Fi gateway solutions. The kit includes a Wireless Evaluation Board with both the MiWi protocol and Wi-Fi transceivers. The kit also includes two MiWi Demo Boards to create a three node MiWi protocol network. The Wireless Evaluation Board can be connected to a client device, such as a laptop or a mobile phone using the Wi-Fi network. Based on the application running on the MiWi protocol nodes, the information exchanged can be displayed on the client device. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi & To learn more about WiFi solutions, please visit www.microchip.com/WiFi.



MiWi™ Protocol to Wi-Fi® Wireless Demo Kit
(Part # DM182018)

Demo Software

The demo software can be downloaded from the “Microchip Libraries of Applications” at www.microchip.com/MLA. After installing the MLA, you can find the demo source code at ..\Microchip Solutions \ Combo folder.

MiWi Demo Kit 2.4 GHz MRF24J40

MiWi Demo Kit – 2.4 GHz MRF24J40 is an easy-to-use evaluation and development platform for IEEE 802.15.4 application designers. This kit includes Microchip's MRF24J40MA transceiver module and also features Microchip's PIC18 XLP microcontroller family. The kit includes complete hardware needed to rapidly prototype wireless applications. The demonstration kit is pre-programmed with MiWi™ protocol stack and you can find the demo instructions in the user's guide. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi.

Developers can reprogram or modify the PIC18 MCU Flash memory and develop and debug application code all on the same platform.



8-bit Wireless Dev Kit 2.4 GHz MRF24J40MA

8-bit Wireless Development Kit – 2.4 GHz MRF24J40 is an easy-to-use evaluation and development platform for IEEE 802.15.4 application designers. This kit includes Microchip's MRF24J40 transceiver module and also features Microchip's PIC18 XLP microcontroller family. The kit includes complete hardware needed to rapidly prototype wireless applications. The demonstration kit is pre-programmed with MiWi™ protocol stack and you can find the demo instructions in the user's guide. To learn more about MiWi wireless protocol, please visit www.microchip.com/MiWi.

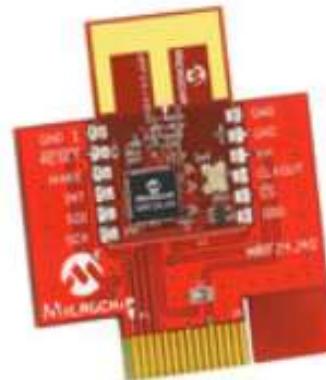
The PIC18 demonstration board is equipped with a 28-pin PICtail™ connector to interface with Microchip's wireless transceiver PICtail daughter boards such as MRF24J40MA, MRF89XAM8A and MRF49XA.

Developers can reprogram or modify the PIC18 MCU Flash memory and develop and debug application code all on the same platform.



MRF24J40MA Pictail Plus 2.4 GHz RF Card

The MRF24J40MA PICtail Plus 2.4GHz Radio Frequency Card is built with the NEW agency-certified MRF24J40MA IEEE 802.15.4 RF transceiver module. The module is attached to a PICtail Plus carrier board allowing the RF Board to be used with an Explorer 16 development kit. Targeted for ZigBee, MiWi, and MiWi P2P wireless protocol applications, the MRF24J40MA is a perfect solution for low-cost, low-power complete embedded wireless PAN applications.



Part #AC164134

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MRF24J40MA Pictail / PICtail Plus

The MRF24J40MA PICtail/PICtail Plus Daughter Board is a demonstration and development daughter board for the agency-certified MRF24J40MA 2.4GHz IEEE Std. 802.15.4™ +0 dBm RF Transceiver Module.

The module is surface-mounted to a PICtail/PICtail Plus daughter board that allows it to plug into multiple Microchip Technology Demonstration and development boards like the PIC18 Explorer Board (DM183022) for 8-bit microcontroller development or the Explorer 16 Development Board (DM240001) 16-bit microcontroller development.

Targeted for ZigBee® and MiWi™ Development Environment wireless protocol applications, the MRF24J40MA is a perfect solution for low-cost, low-power complete embedded wireless PAN applications. Supporting software stacks and application notes may be downloaded from the Microchip website at <http://www.microchip.com/wireless>



Part #AC164134-1

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MRF24J40MC Pictail / PICtail Plus Daughter Board

Online
Info

The MRF24J40MC PICtail/PICtail Plus Daughter Board is a demonstration and development daughter board for the MRF24J40MC 2.4GHz IEEE Std. 802.15.4™ 20 dBm RF Tranceiver Module with external antenna.

The daughter board can plug into multiple Microchip Technology Demonstration and development boards. For example, for 8-bit microcontroller development using the PIC18 Explorer Board (DM183032) or 16-bit microcontroller development using the Explorer 16 Development Board (DM240001).

Supporting software stacks and application notes may be downloaded from the Microchip website at <http://www.microchip.com/wireless>.



Part #AC164143

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MRF24XA PICtail / PICtail Plus Daughter Board

The MRF24XA PICtail™/PICtail Plus Daughter Board is a demonstration and development daughter board for the [MRF24XA](#) Low-Power, 2.4 GHz ISM-Band IEEE 802.15.4™ RF transceiver.

The daughter board can be plugged into multiple Microchip Technology demonstration and development boards. For example, the daughter board is appropriate for 8-bit microcontroller development using the PIC18 Explorer Board (DM183032) or for 16-bit and 32-bit microcontroller development using the Explorer 16 Development Board (DM240001).

Targeted for ZigBee® and MiWi™ Development Environment wireless protocol applications, the MRF24XA is a perfect solution for low-cost, low-power and battery powered embedded wireless PAN applications. Supporting software stacks and application notes may be downloaded from the Microchip website at Personal Area Networks Design Center:
<http://www.microchip.com/pan>



**MRF24XA PICtail™/PICtail Plus Daughter Board
(Part # AC164152-1)**

Wireless Network Software

Microchip offers three FREE wireless protocol stacks to our customers to aid them in their IEEE 802.15.4 short-range wireless networking development and now we offer the Certified ZigBee PRO protocol stack for those customers needing the advanced features of this new protocol.

ZigBee® PRO

- Certified ZigBee PRO protocol stack
- Part of Microchip's Certified ZigBee PRO Compliant Platform

ZigBee® Residential

- Certified ZigBee 2006 protocol stack
- Part of Microchip's Certified ZigBee Compliant Platform

MiWi™

- Microchip Wireless Proprietary protocol stack
- Based on IEEE 802.15.4 standard
- Small footprint, highly optimized Mesh and Star Network protocol

MiWi™ P2P

- Microchip Wireless Proprietary peer-to-peer protocol stack
- Based on IEEE 802.15.4 standard
- Ultra-Small footprint (3KB), Peer-to-Peer Network protocol

Wireless Network Software

Microchip offers three FREE wireless protocol stacks to our customers to aid them in their IEEE 802.15.4 short-range wireless networking development and now we offer the Certified ZigBee PRO protocol stack for those customers needing the advanced features of this new protocol.

ZigBee® PRO

- Certified ZigBee PRO protocol stack
- Part of Microchip's Certified ZigBee PRO Compliant Platform

ZigBee® Residential

- Certified ZigBee 2006 protocol stack
- Part of Microchip's Certified ZigBee Compliant Platform

MiWi™

- Microchip Wireless Proprietary protocol stack
- Based on IEEE 802.15.4 standard
- Small footprint, highly optimized Mesh and Star Network protocol

MiWi™ P2P

- Microchip Wireless Proprietary peer-to-peer protocol stack
- Based on IEEE 802.15.4 standard
- Ultra-Small footprint (3KB), Peer-to-Peer Network protocol

Ethernet PICtail™ Daughter Board

The Ethernet PICtail™ Daughter Board is an Ethernet demonstration board for evaluating Microchip Technology's ENC28J60 stand-alone 10 Base-T Ethernet controller. It is an expansion board compatible with a number of PICDEM™ demonstration boards. A complete list of compatible PICDEM™ demonstration boards is available on Microchip's web site.

Products supported

- ENC28J60
- 25LC256

[<< BACK](#)

USB EVBs

USB253x USB2.0 Hub Controller
Customer Evaluation Board



EVB-USB2534

USB553x USB3.0 Hub Controller
Customer Evaluation Board



EVB-USB5537

Other Hub Controller
Customer Evaluation Board
(No picture here)

EVB-USB2422
EVB-USB4604BCH
EVB-USB4624BCH

USB224x
USB2.0 Flash Media Controller
Customer Evaluation Board



EVB-USB2240-IND

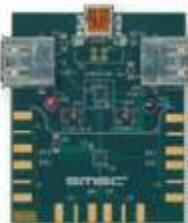
USB264x
USB2.0 Flash Media Controller w/Hub
Customer Evaluation Board



EVB-USB2640

USB EVBs Continued

USB3740
USB2.0 2-Port Switch
Customer Evaluation Board



EVB-USB3740

USB375x
USB2.0 Port Protection w/Switch
Customer Evaluation Board



EVB-USB3750

USB333x
USB PHY (Mobile)
Customer Evaluation Board



EVB-USB3330

USB334x
USB PHY (General)
Customer Evaluation Board



EVB-USB3340

USB266x
USB2.0 Flash Media Controller w/Hub
Customer Evaluation Board



EVB-USB2660



MCP2200 USB to RS232 Demo Board

Online
Info

The MCP2200EV-VCP is a USB to RS232 development and evaluation board for the MCP2200 USB to UART device. The board allows for easy demonstration and evaluation of the MCP2200. The accompanying software allows the special device features to be configured and controlled.

The board is powered from USB. Each I/O has an associated test point. In addition, two I/O are connected to LEDs which are used to indicate USB to UART traffic when the associated pins are configured as TxLED and RxLED pins respectively.

Products supported



[<< BACK](#)

P/N:MCP2200EV-VCP



MICROCHIP

Online
Info

MCP2200 Breakout Module

The MCP2200 Breakout Module is a development and evaluation platform for the USB-to-UART (Universal Serial Bus-to-Universal Asynchronous Receiver/Transmitter) serial converter MCP2200 device. The module is comprised of a single Dual In-Line Package (DIP) form-factor board.

Products supported
 MCP2200



[<< BACK](#)

P/N:ADM00393



MCP2210 Breakout Module

The MCP2210 Breakout Module can be used with either the MCP2210 Motherboard or as a standalone USB to SPI (Master) bridge module. The breakout board provides all the needed signals in order to assist the user in building their own boards using the MCP2210. The MCP2210 Utility software allows custom device configuration. In addition, a DLL package is also available in order to allow development of custom software utilizing the MCP2210.

Products supported

- MCP2210

[<< BACK](#)

MCP2210 Evaluation Kit

The MCP2210 Evaluation Kit is a development and evaluation platform for the MCP2210 device. The MCP2210 Motherboard is designed to work together with the MCP2210 Breakout Board (included). The motherboard provides the test points needed for measurements and it also contains the following SPI slave chips:

- MCP23S08 – 8 bit I/O expander
- MCP3204 – 4 channel, 12-bit ADC
- 25LC02 – 2kbit EEPROM
- TC77 – temperature sensor

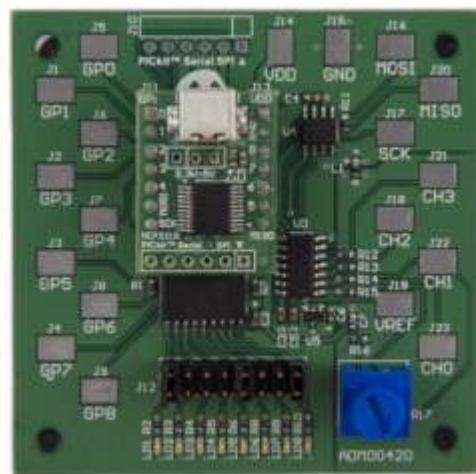
All the mentioned chips are SPI slaves controlled by the MCP2210.

The MCP2210 Eval Board Demo software can be used to demonstrate the MCP2210 as a USB-to-SPI (Master) device and allow I/O control. In addition, the MCP2210 Utility software allows custom device configuration. A DLL package is also available in order to allow development of custom software using the MCP2210.



Products supported

- MCP2210
- MCP3204
- TC77
- 25LC02

[<< BACK](#)



MCP2221 Breakout Module

The MCP2221 Breakout Module is a development and evaluation platform comprised of a single DIP form factor board. The provided supporting software demonstrates the capabilities of the MCP2221 device as a USB-to-UART/I2C/SMBus protocol converter.

Additionally, these tools provide simple access for I/O control and the ability to establish custom device configuration. Custom tools can also be created through the use of the provided DLL package.

Features:

- UART Tx and Rx signals
- I2C/SMBus clock and data lines (SCL and SDA)
- Four GP lines, configurable for GPIO, dedicated or alternate function operation
- User-selectable (jumper) power supply of 3.3V or 5V (up to 500 mA)
- DIP form factor
- PICkit™ Serial Analyzer header — used for UART and I2C/SMBus communication only

Products supported

- MCP2221

[<< BACK](#)



RE46C190 Demo Board

The demo board is a complete stand-alone smoke detector application with a smoke chamber emulator. The demo board allows evaluation of all the functions of the RE46C190. Key test points of the device are available at the bottom edge of the demo board.

The demo board is designed for battery operation using a CR123A battery or can be operated using a power supply.

The RE46C190 application circuit is on the right side of the board by the battery holder and piezo horn and the smoke chamber emulator is on the left. The smoke chamber emulator can be disconnected from the application circuit and a photo smoke chamber or its components can be connected to the demo board.

Products supported

- RE46C190

[<< BACK](#)



MTS2916A Demo Board

The MTS2916A Dual Full-Bridge Stepper Motor Driver Evaluation Board demonstrates the capabilities of the MTS2916A to control both windings of a bipolar stepper motor. The board also demonstrates the capabilities of the MTS62C19A, which has the same functionality, but different pin assignments. A PIC16F883 is utilized for motor control processing.

This evaluation board incorporates features through the implementation of push button switches and a variable speed input potentiometer to exercise a stepper motor in Full-Step, Half-Step, Modified Half-Step and Microstepping modes. LEDs indicate a binary representation of which mode has been selected. The evaluation board and the stepper motor can be powered from a single power input J1 (7 VDC to 12 VDC) with jumper JP2 installed. For higher motor voltages, make sure JP2 is not installed, and connect VLOAD at J4. Numerous test points have been designed into the board to allow easy access.

Products supported

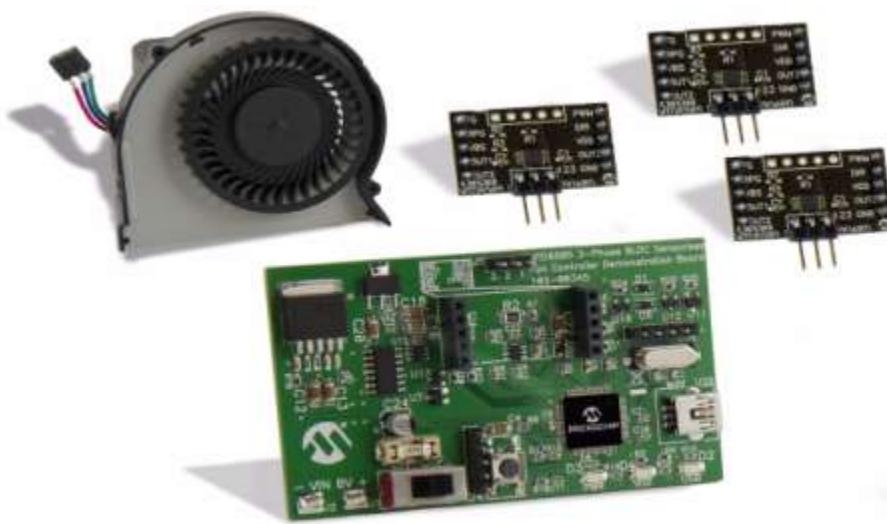
- MTS2916A

[<< BACK](#)

MTD6505 3-Phase BLDC Sensorless Demo Board

The MTD6505 3-Phase BLDC Sensorless Fan Controller Demonstration Board allows the control and monitoring of the MTD6505 device using PC software connected to the board via a USB connection. The included board software provides several features including V_{DD} control and monitoring, pulse-width modulation (PWM) control, speed and current consumption monitoring. It also allows selecting the R_{PROG} resistor value for fan fitting.

Products supported
 MTD6505



MTD6505 3 Phase BLDC Sensorless Fan Controller Demonstration Board
(Part # ADM00345)

[<< BACK](#)

MCP8024 BLDC Motor Driver Evaluation Board

The MCP8024 TQFP BLDC Motor Driver Evaluation Board demonstrates Microchip's MCP8024 3-Phase Brushless DC (BLDC) Motor Gate Driver in a BLDC motor drive application. The MCP8024 contains the high-side and low-side drivers for external N-channel MOSFETs. A dsPIC33FJ32MC204 motor control processor is used to supply the PWM inputs to the MCP8024 as well as handle the high-speed Analog-To-Digital Conversion (ADC) required for 40 KHz PWM operation. The MCP8024 onboard UART is used to configure the MCP8024 and to send fault information to the dsPIC controller. The evaluation board firmware uses a 6-step trapezoidal drive control algorithm to demonstrate the MCP8024 capabilities.

Features:

- Input Operating Voltage Range: +7.0V to +28V
- 500 mA (max) of gate drive current for external N-Channel MOSFETs
- Drives up to a 15 Amp BLDC motor
- 750 mW Buck Regulator with resistor programmable output voltage
- RESET momentary contact switch
- Two Spare user programmable momentary contact switches
- 100 pin dsPIC PIM header for use with MA330017 compatible PIMs
- PICkit 3, Real Ice, and ICD3 debugger interfaces
- Speed control potentiometer
- Terminal block for 5V or 12V Hall effect sensors
- SPI and I2C headers for user communications use

P/N: ADM00557

Products supported

- MCP8024
- dsPIC33FJ32MC204



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MCP8063 12V 3-Phase BLDC Sensorless Fan Controller Kit

Online Info

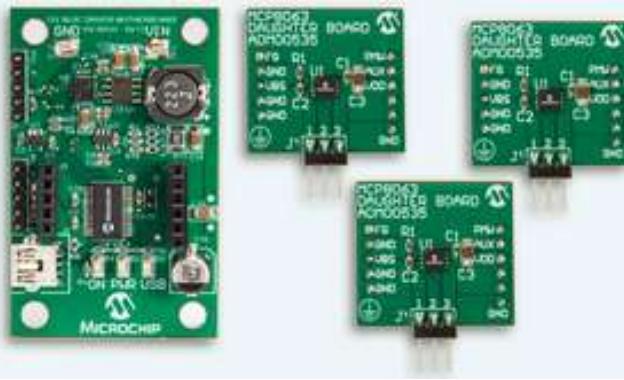
The MCP8063 12V 3-Phase BLDC Sensorless Fan Controller Demonstration Kit allows the control and monitoring of Microchip 12V fan driver devices, such as the MCP8063 or MTD6501, using a PC software connected to the demo board via a USB connection. The MCP8063 12V 3-Phase BLDC Sensorless Fan Controller Demonstration Board software provides several features, such as fan driver power supply control and monitoring, pulse-width modulation (PWM) control, and speed and current consumption monitoring. It also allows automatic application testing.

Features:

- PC software allows controlling and monitoring the MCP8063 3-Phase Fan Controller via USB connection
- VDD voltage control and IDD current measurement
- PWM control for speed setting
- FG measurement for speed monitoring
- Automated test measurement

Products supported

MCP8026



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MCP8025 BLDC Motor Driver Evaluation Board

The MCP8025 TQFP BLDC Motor Driver Evaluation Board demonstrates Microchip's 3-Phase Brushless DC (BLDC) Motor Gate Driver with Power Module, MCP8025, used in a BLDC motor drive application. When used in conjunction with a microcontroller, the MCP8025 will provide the necessary drive signals to drive for a 3-Phase BLDC motor.

The MCP8025 contains the high-side and low-side drivers for external N-channel MOSFETs. A dsPIC33EP256MC504 processor is used to supply the PWM inputs to the MCP8025 as well as handle the high-speed Analog-To-Digital Conversion (ADC) required for 50 kHz PWM operation.

Features:

- Input Operating Voltage Range: +6.0V to +19V
- Drives up to a 15A BLDC motor
- ON/OFF momentary contact switch
- Reset momentary contact switch
- Spare user-programmable momentary contact switch
- PWM signal LED indicators
- PICkit 3 and MPLAB ICD 3 debugger interfaces
- Speed control potentiometer
- Terminal block for 5V and 12V Hall-effect sensors
- LIN terminal block for user communications use
- Complete "C" source code (provided on the board web page)

P/N: ADM00600

Products supported

- MCP8025
- dsPIC33EP256MC504



MCP8025 TQFP BLDC Motor Driver Evaluation Board
(Part # ADM00600)

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MCP7941x PICtail™ Plus Daughter Board

The MCP7941x RTCC PICtail™ Plus Daughter Board demonstrates the features and abilities of the MCP7941x and MCP7940x Real-Time Clock/Calendar family in standard development platforms. By designing this daughter board with the PICtail Plus, PICtail and PICkit™ Serial connectors, it will operate with the Explorer 16 Development Board, the PICDEM PIC18 Explorer Board, the XLP16-bit Development Board and the PICkit Serial Analyzer tool. Also included is a 3V coin cell battery that can be installed in the coin cell holder for backup power.



Products supported

- MCP79410
- MCP79411
- MCP79412
- MCP79400
- MCP79401
- MCP79402
- MCP7940N

MCP795xx PICtail™ Plus Daughter Board

The MCP795XX RTCC PICtail™ Plus Daughter Board demonstrates the features and abilities of the MCP795xx SPI Real-Time Clock/Calendar (RTCC) family in standard development platforms. This daughter board will support the full featured 14-pin MCP795W2x and MCP795W1x devices along with the mid-range 10-pin MCP7952x and MCP7951x devices. By designing this daughter board with both PICtail and PICtail Plus connectors, it will operate with the Explorer 16 Development Board and the PICDEM PIC18 Explorer Board. Also included is a 3V coin cell battery for backup power to the RTCC.

Products supported

- MCP7951x
- MCP7952x
- MCP795W1x
- MCP795W2x

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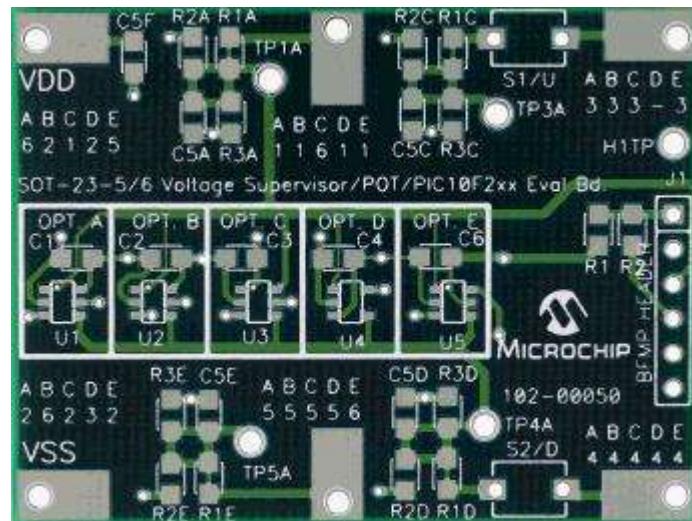
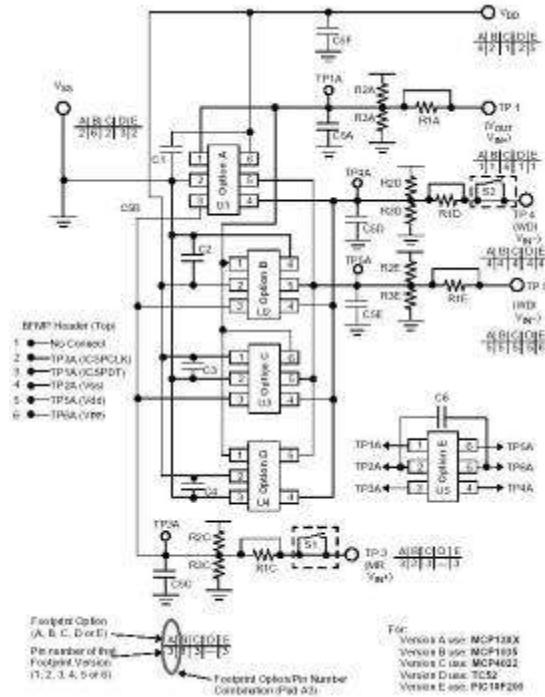
Online
Info

5 and 6-pin SOT-23 Eval Board

The Voltage Supervisor SOT-23-5/6 Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's Voltage Supervisors and Voltage Detectors in the SOT-23-5 (5-pin SOT-23) or SOT-23-6 (6-pin SOT023) packages.

The Voltage Supervisor SOT-23-5/6 Evaluation Board PCB supports the four different SOT-23-6 pinouts (which also supports compatible SOT-23-5 footprints) and one SOT-23-5 footprint.

This board has been made generic so that other devices in the SOT-23-5 and SOT-23-6 packages may be supported with this board.



Products supported

- 5-pin SOT-23 packages
- 6-pin SOT-23 packages

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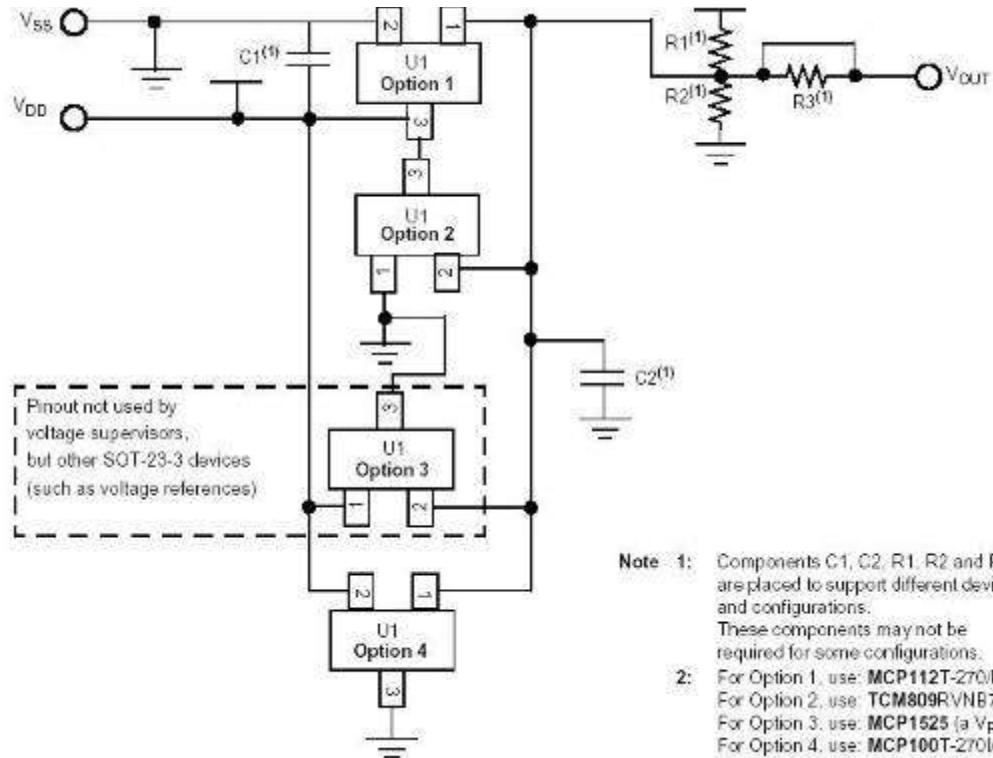
P/N: VSUEV2



3-pin SOT-23 Eval Board

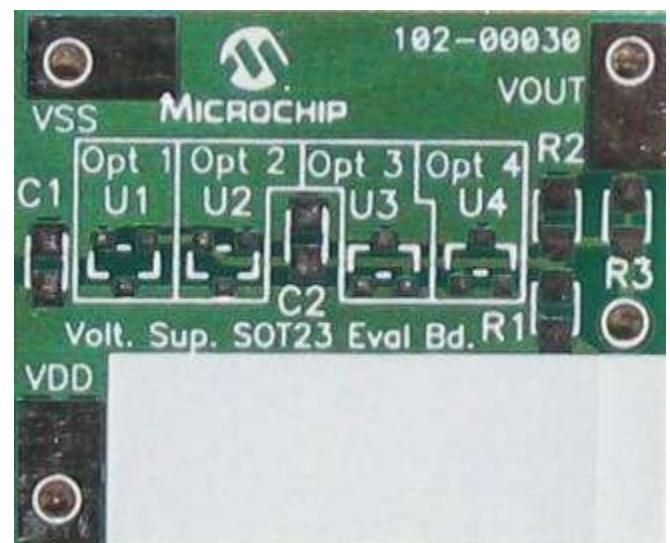
The Voltage Supervisor SOT-23 Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's Voltage Supervisors and Voltage Detectors in the SOT-23-3 (3-pin SOT-23) package.

The Voltage Supervisor SOT-23 Evaluation Board PCB supports the four different SOT-23-3 pinouts for the product family. This board has been made generic so that other devices in the SOT-23-3 package may be supported with this board.



Products supported

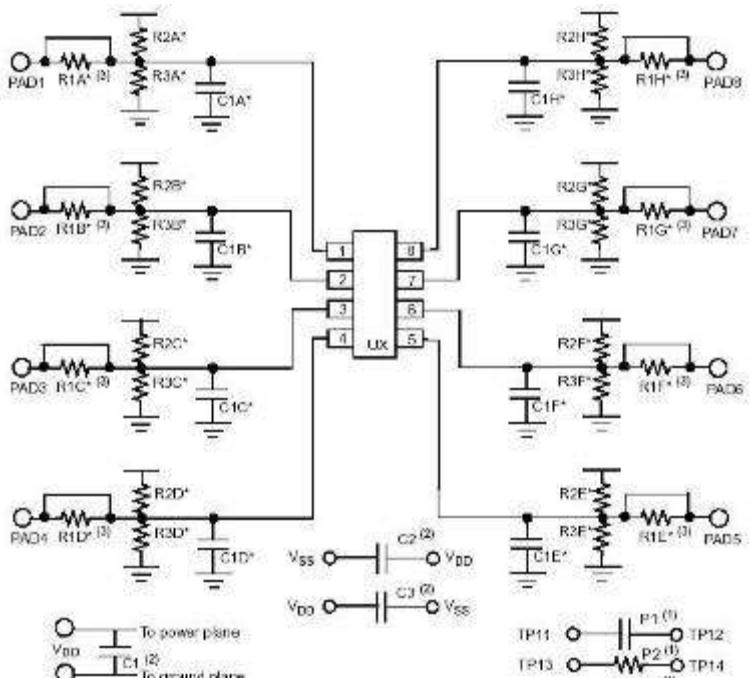
- 3-pin SOT-23 packages



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8-pin SOIC/MSOP/TSSOP/PDIP Eval Board

The 8-Pin SOIC/MSOP/TSSOP/DIP Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's devices in any of the following 8-pin packages: SOIC, MSOP, DIP, TSSOP



* Optional components, circuit-dependent.

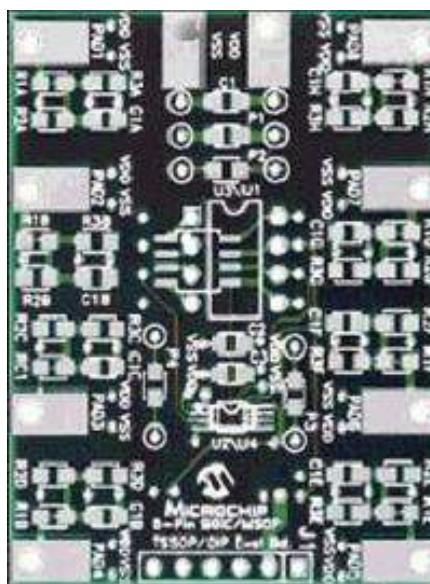
Note 1: Can be any passive component (R, C, ...) that fits onto a 605 surface-mount footprint.

2: Optional power/device filtering capacitors.

3: When installing this component, ensure to cut the trace between the two pads of the device.

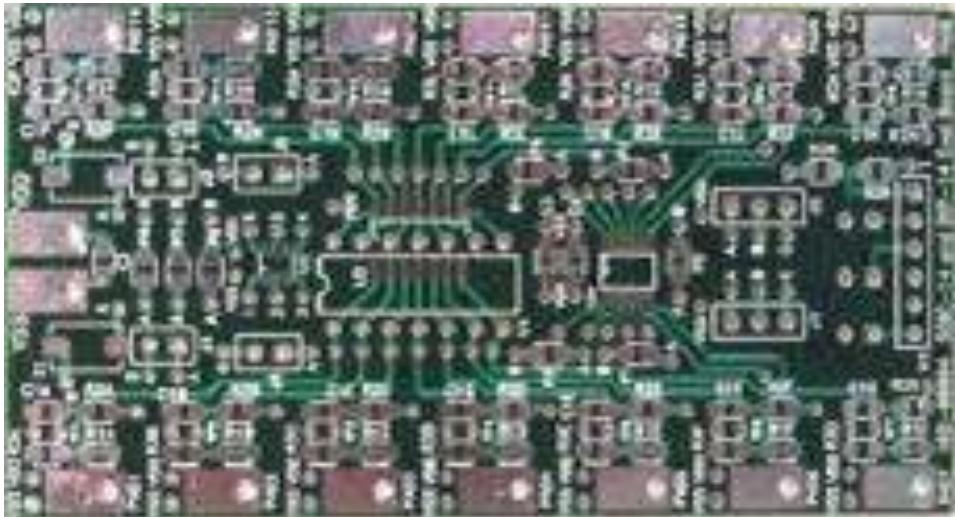
Products supported

- 8-pin SOIC packages
- 8-pin MSOP packages
- 8-pin TSSOP packages
- 8-pin PDIP packages


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14-pin SOIC/TSSOP/PDIP Eval Board

The 14-Pin SOIC/TSSOP/DIP Evaluation Board allows the system designer to quickly evaluate the operation of Microchip Technology's devices in any of the following 14-pin packages: SOIC, DIP, TSSOP



Products supported

- 14-pin SOIC packages
- 14-pin TSSOP packages
- 14-pin PDIP packages

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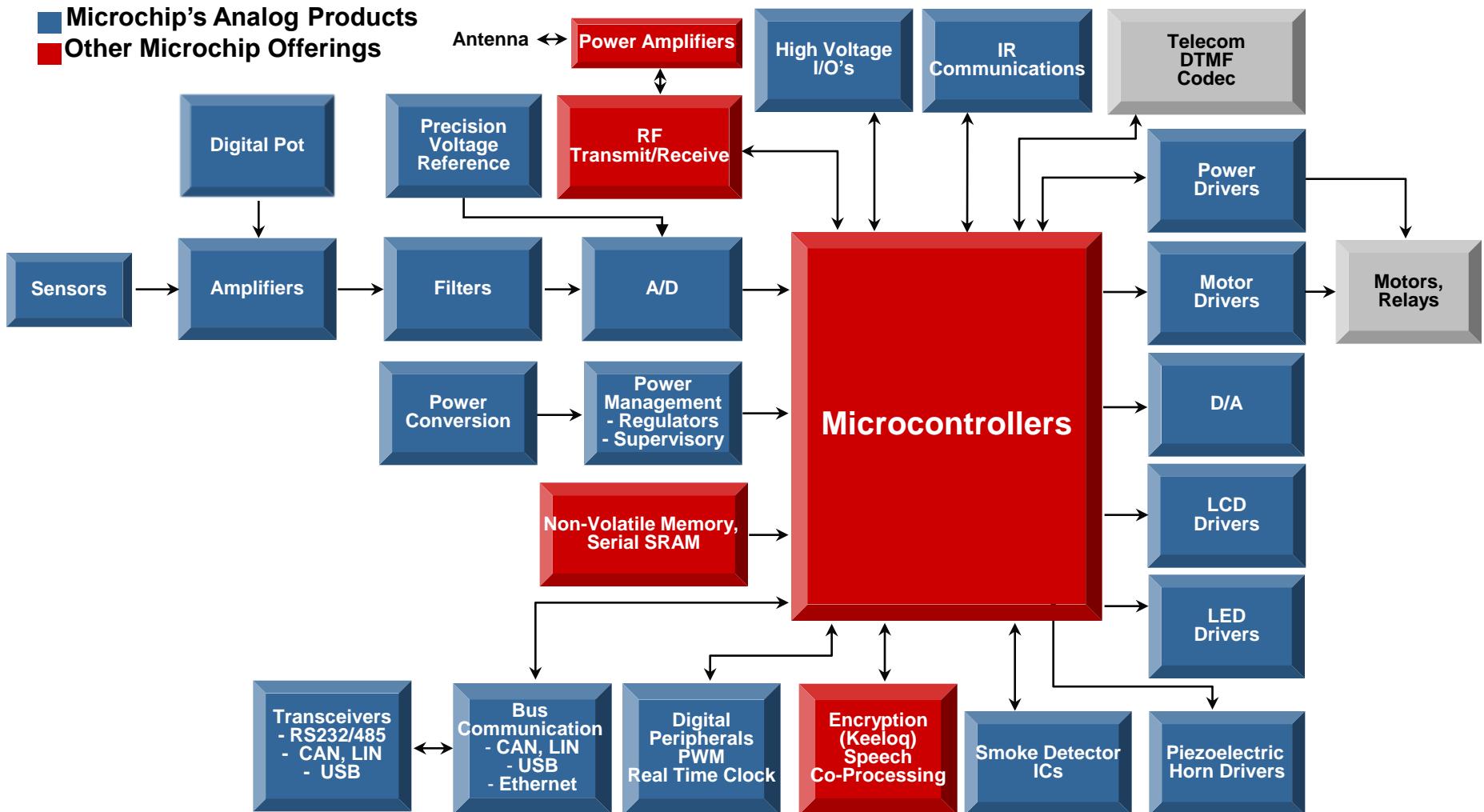
MICROCHIP

Analog and Interface Overview

<< BACK
to Products

NEXT >>

Universe of Embedded Control Systems



Focus on Applications

- Signal conditioning
- Power management
- Analog-to-digital conversion
- Data computation
- Temperature monitoring

Power and Flow Metering



- ASICs
- Power management
- Signal conditioning

Smoke & CO Detectors



- Signal conditioning
- Power management
- Temperature sensing
- Fan control

PCs Laptops, Servers and Gaming



- Temperature sensors
- Signal conditioning
- Power management
- Analog-to-digital conversion,
- Data computation

Temperature Measurement



- Power management
- Temperature monitoring

Power Supplies



- LED drivers w/ offline capability
- Power management
- Temperature monitoring

Lighting



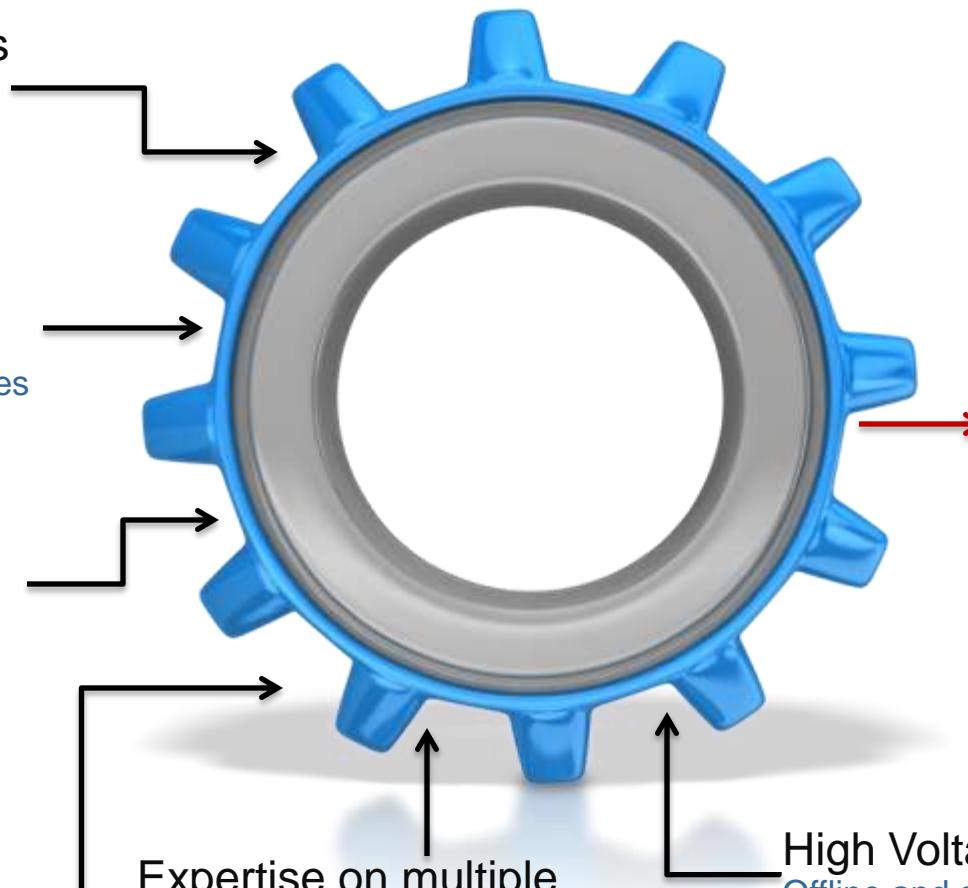


MICROCHIP

Proprietary Enabling Technology

Low Power CMOS Process

Lower power than competing processes



Understanding of Customer Needs

Only necessary features are included, unnecessary power consuming features are excluded

Simplified Designs

Proprietary designs reduce circuit complexity for more performance and less power

Non-volatile Trim

Accuracy achieved through after-package trimming, not complex, power consuming circuitry

**A
Complete
Analog
Solution**

Expertise on multiple process nodes

Advanced Lithographies

High Voltage Technology
Offline and automotive capabilities

What Makes Microchip Analog Different?

- **Flexibility to customers:**
 - Using both internal and external fabs allows flexibility and safety for our customers
 - Our knowledge of NVM makes analog easier to manufacture and offers flexibility
- **Analog for digital systems:**
 - Easy to use development tools
 - Standard digital serial interfaces
- **Design-in support**



Microchip Analog/Interface Attributes

- **Low power/low voltage**
 - Op amps with lowest power for a given gain bandwidth: 450nA/1.4V/9kHz Op Amps
 - 0.65V start-up voltage switching regulator
- **Robustness**
 - MOSFET drivers lead the industry in latch-up immunity/stability

Microchip Analog/Interface Attributes (cont.)

□ Integration

- Switcher + LDO, LDO + reset
- PGA integrates MUX, resistive ladder, gain switches, high-performance amplifier, SPI interface

□ Innovation

- Zero-Drift and mCal auto-calibration technology
- Sinusoidal motor drivers
- Proprietary algorithms for low power high accuracy ADC and high-speed ADC families

Microchip Analog/Interface Attributes (cont.)

□ Space savings

- ADC, Op amps, comparators, Supervisors and LDOs in SC70, ADCs, temperature sensors in SOT-23
- CAN and IrDA® standard protocol stack embedded in an 18-pin packages

□ Accuracy

- Offset trimmed after packaging using non-volatile memory



MICROCHIP

Worldwide Manufacturing Locations





MICROCHIP

Worldwide Technical Support Centers



The only non-commissioned sales team in the semiconductor industry

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NEXT >>

Application Centers of Excellence

- AIPD has developed design centers of excellence for specific applications



ACE Center for Energy Measurement (Romania)



ACE Center for Interface Solutions (Chandler, AZ)



ACE Center for Motor Solutions (Endwell, NY)



ACE Center for Power Supplies (Endwell, NY)



ACE Center for Smoke Detectors (Norristown, PA)



MICROCHIP

Microchip Analog Product Portfolio Growth

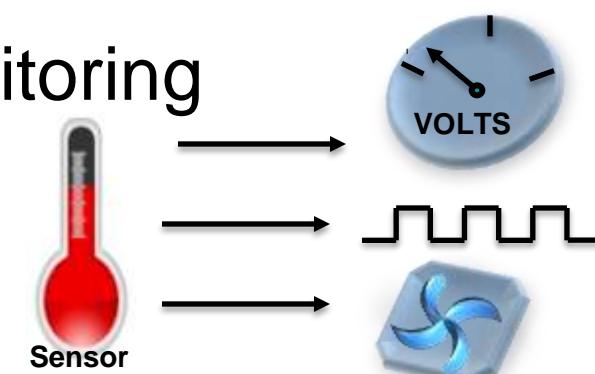


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Thermal Management Solutions

- Offer a wide range of high-accuracy, space-saving, low-power products well suited for portable applications
 - Offer great cost-to-performance ratio
 - Low voltage operation and low current consumption
 - DC fan speed control/DC fan fault detection
 - Over-, under-temperature monitoring
 - Temperature measurement
 - Thermal calibration



Power Management Solution

□ Microchip's Winning Attributes

- High-voltage product offering
- Built-in intelligence
- Optimized, high-efficiency power conversion
- Low power, low startup voltage regulators
- Small footprint
- Stability & robustness

Battery
Charger

Switching
Regulator

Controller

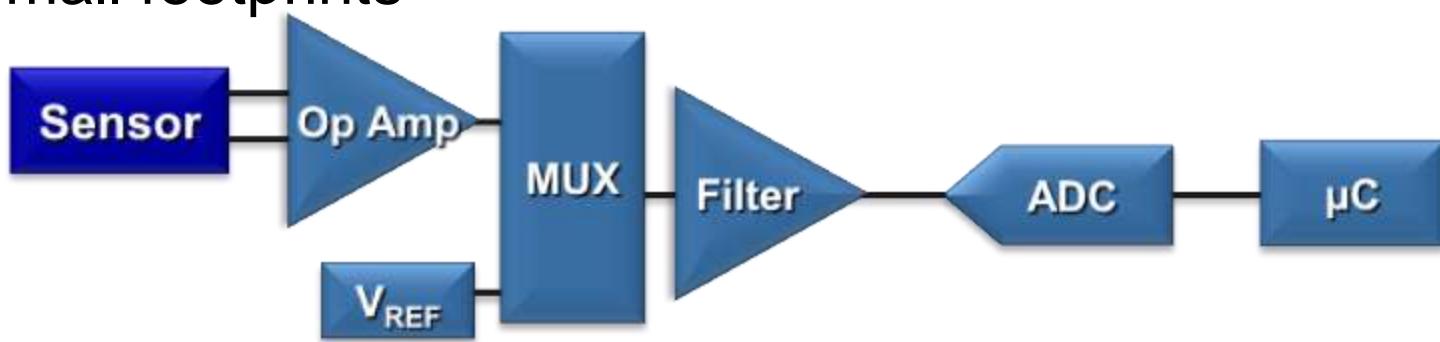
Voltage
Regulator

Charge
Pump

System
Supervisor

Signal Chain Solutions

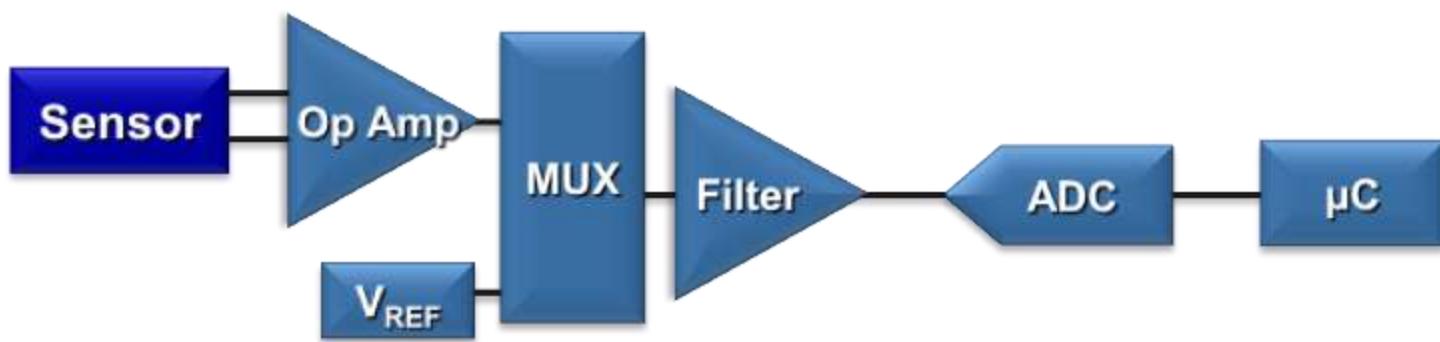
- Provide complete system solutions for sensor signal conditioning & data acquisition applications, while focusing on:
 - Integration: reduced component count
 - Low power: low operating current and voltage
 - Precision: high resolution, low offset voltage
 - Low system cost: affordable pricing
 - Small footprints



Signal Chain Solutions (contd.)

Microchip's Winning Attributes

- Lower cost to performance ratio
- Lowest supply current Op Amps for a given Gain-Bandwidth Product
- High accuracy delta-sigma ADCs and high-speed pipelined ADCs
- Broad digital potentiometer portfolio



Interface Solutions

- Develop MCU/DSP-synergistic products for the automotive and industrial market segments
 - CAN, LIN, infrared, ethernet, RF, USB to UART
 - Transceivers, expanders
- Enable the implementation of wireless and wire-line communication via inexpensive & easy-to-use products



Safety & Security Solution

□ Microchip's Winning Attributes

- Horn drivers meet loudness requirements
- Electronic calibration
- 3V operation, Single cell battery operation
- Piezo Horn Drivers
 - Piezo alarm system, industrial and consumer
 - CO Detectors, MCU Smoke Detectors
 - E-bike horns
- Photoelectric Smoke Detectors
- Ion Smoke Detectors



Motor Drive and Control Solution

- **Portfolio Offering includes**
 - Dual H-bridge motor drivers
 - Integrated sensorless sinusoidal 3-phas BLDC fan drivers
- **Lowest supply current Vs. major competitors**
- **Total solution provider with PIC MCU and dsPIC DSC**
- **Applications in Industrial & Security, Automotive & Medical, Appliances**



Summary

- **Complete Embedded Control solution provider**
 - Strong low power portfolio
 - High voltage product focus
 - High integration in space-saving packages
- **Best lead-time in the industry**
- **Excellent worldwide technical support**
- **Excellent design and training resources**



End Equipments

Appliance

- Beverage Machine
- Robot Vacuum Cleaner

Automotive

- HVAC
- In-Vehicle Network Communication
- LED Control Module (Exterior Lighting)
- LED Control Module (Interior Ambient)
- Smart Actuators in Turbo Charger
- USB Breakout Box

Consumer

- Power Tools (Professional, Household)
- Set-Top/PVR Boxes
- Weigh Scales
- Wireless Handsets

Computing

- Computing (Main board)
- Ethernet Switch
- Servers

Home Alarm

- Security Systems (Security Panel, Keypad, Sensors)

Home - Smoke & CO Detection

- 10 Yr Low Voltage
- Addressable Smoke Detectors
- CO Detector
- CO Companion
- Low Cost Smoke Detectors

Lighting

- LED lighting

Medical Equipment

- Blood Glucose Meter
- Digital Thermometer
- ECG/EKG System

Motor Control/Drive

- High Power
- High Integration

Power Supply

- Power Supplies (End Market)
- Distributed Point-of-Load Power Architecture
- Power Monitoring
- Digital Power

Utility Metering

- Energy Meter
- Signal Chain Generic Blk. Dia.



MICROCHIP

Microchip Analog Products for Motor Control Applications

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Microchip's Winning Attributes

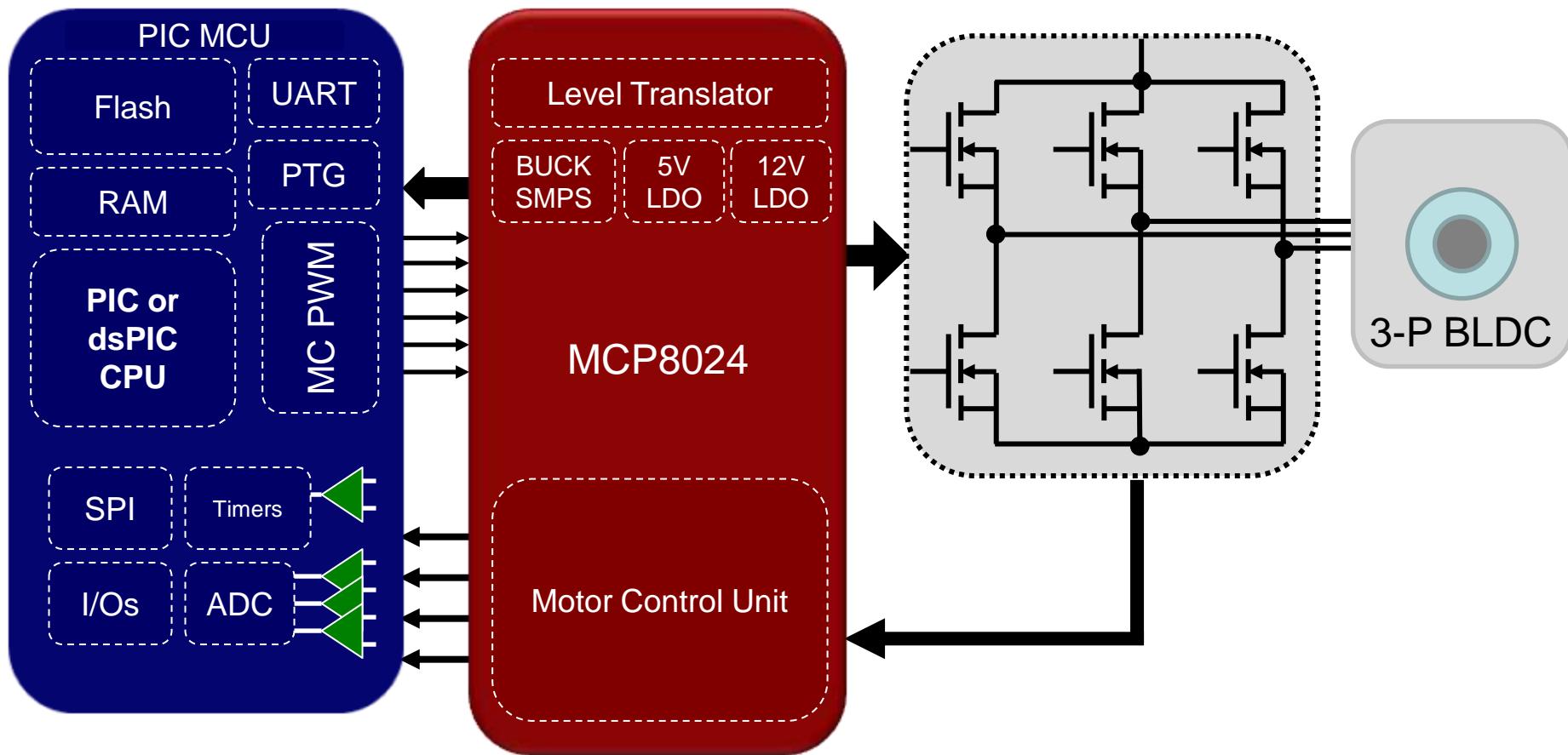
- Industry standard footprint – Dual H-bridge motor drivers
- Lowest supply current Vs. major competitors!
- Integrated sensorless sinusoidal algorithm – 3-phase BLDC fan drivers (3mm x 3mm DFN, TDFN, UDFN packages)
- Total solution provider with PIC MCU and dsPIC DSC

NEXT

Microchip's Winning Attributes

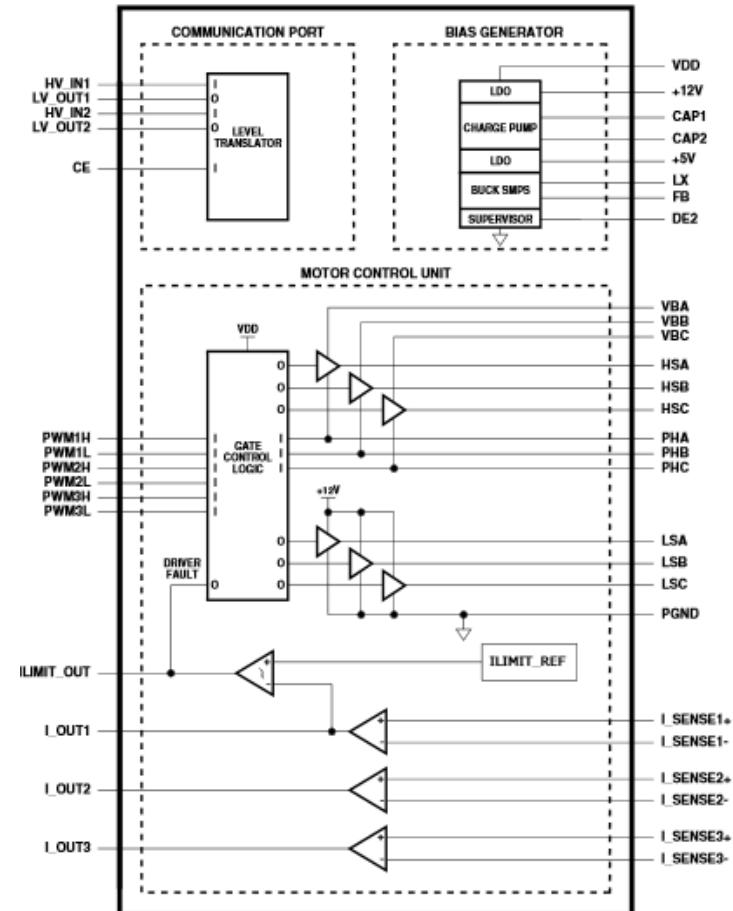
- One of the first & leading suppliers in MOSFET driver and temperature sensor products
- Large offering of DC-DC converters and Resets covering needed voltages
- RR-I/O op amps reduce design concerns
- Attach sell with PICmicro, frequently used
- Great lead times and customer support
- Growing portfolio of Motor Driver ICs

High Integration Motor Control/ Drive



Features:

- Three Half-bridge Drivers Configured to Drive External High-Side NMOS and Low-Side NMOS MOSFETs:
 - Independent input control for high-side NMOS and low-side NMOS MOSFETs
 - Peak output current: 0.5A @ 12V
 - Shoot-through protection
 - Overcurrent and short circuit protection
- Adjustable Output Buck Regulator (750 mW)
- Two LDOs: 5V @ 20 mA / 12V @ 20 mA
- Internal Bandgap Reference
- Three Operational Amplifiers for Motor Phase Current Monitoring and Position Detection
- Overcurrent Comparator and Thermal Shutdown
- Two Level Translators
- Input Voltage Range: 6 - 40V
- Operational Voltage Range: 6 - 28V
- Undervoltage Lockout (UVLO): 6V
- Overvoltage Lockout (OVLO): 28V
- Transient (100 ms) Voltage Tolerance: 48V
- Temperature Range: -40 to +150°C



High Power Motor Control/Drive

High Integration Motor Control/Drive

PIC Microcontrollers

- **Function:** coordinating all the control and monitor functions - the brain of the system
- **Popular products:** PIC16F182X, 178X, 75X, 15XX, 193X
- **Attributes:**
 - Upwards of 32MHz internal OSC
 - 4 channel Programmable Switch Mode Controller (PSMC)
 - Integrated high performance comparators, op-amp, 10/12 bit ADC, 5/8/9 bit DAC, CCP, COG, NCO, CLC
 - Slope compensation
 - 256 bytes of EEPROM
 - Available in various packages

NEXT

PIC16F178x

Key Features

- Enhanced Mid-Range core (EMR)
- Flash Program Memory with self read/write capability
- Data EEPROM
- Low Power Internal 32kHz/32MHz osc.
- Integrated Temperature Indicator
- Up to 14-Channel 10bit / 12bit ADC w/Vref
- Up to (4) PSMC (Programmable Switch Mode Controller)
- Extended Watchdog Timer (EWDT)

PIC16F178x Key Features (contd.)

- Up to (4) High Performance Comparators with selectable Voltage Reference
- Up to (3) Operation Amplifiers with rail-to-rail input/output
- Up to (3) CCP (Capture, Compare, PWM)
- (1) 8-bit DAC (Digital to Analog Converter)
- (3) 5-bit DAC (Digital to Analog Converter)
(PIC16F1788/9 ONLY)
- (1) MI²C, (1) SPI, (1) EUSART w/auto baud
- (2) 8-bit Timer (TMR0/TMR2) & (1) 16-bit Timer (TMR1)

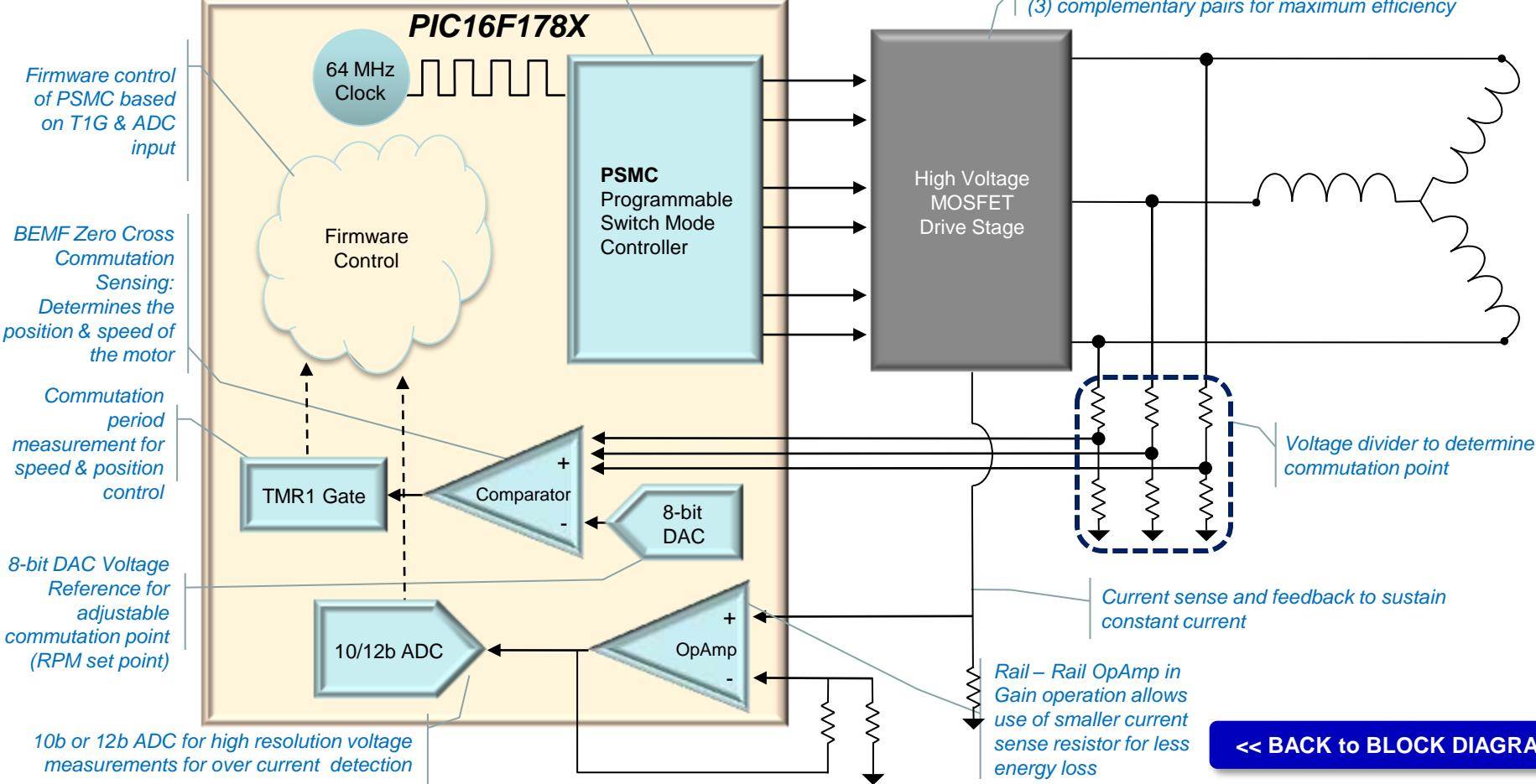
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Application Example: Sensorless 3-Φ BLDC Motor

- 16-bit PWM with dedicated 64MHz clock
- 6 steerable outputs or 3 steerable output pairs
- Blanking Control for transient filtering
- Independent rising/falling output control
- Dead band with independent rise & fall control
- Polarity Control / Auto Shutdown & Restart

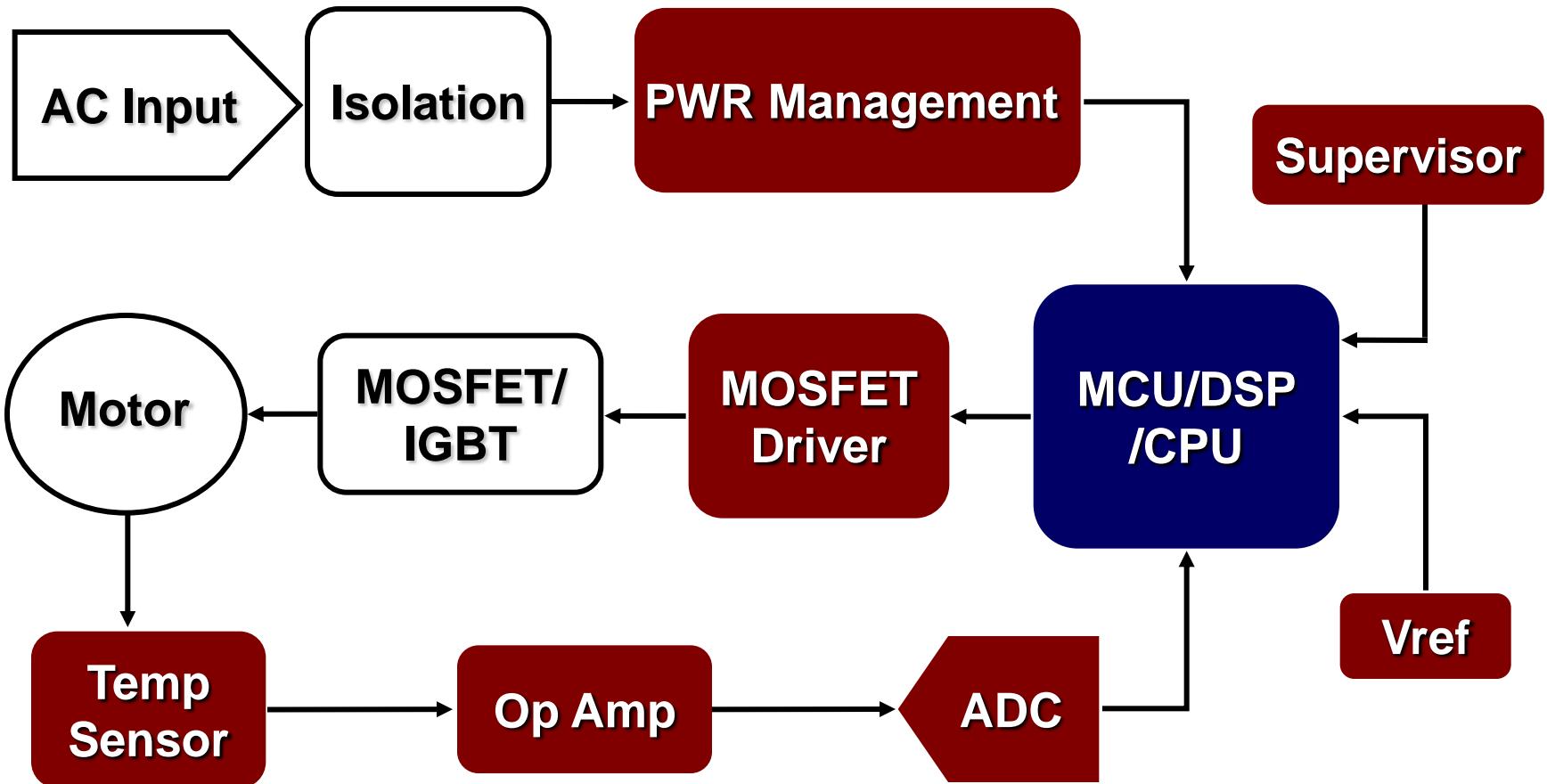
- High Efficiency closed-loop control enabling higher RPMs
- Cost effective integration with BOM reductions
 - OpAmp, Voltage Reference, reduced size of inductors, capacitors, & resistors

3-phase drive controlled by PIC16F178X microcontroller with (3) complementary pairs for maximum efficiency



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High Power Motor Control/ Drive



Temperature Sensors

Function: Measuring and providing Temperature information

Popular Products	Description	Product Web Page
MCP9808 Digital temperature sensor	The MCP9808 converts temperatures between -20°C and +100°C to a digital word with $\pm 0.5^{\circ}\text{C}$ (max.) accuracy	Click Here
MCP9700 Linear Active Thermistor™ ICs	The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.	Click Here

Temperature Sensors Winning Attributes

Attributes:

- Small SC70, SOT-23 and DFN leadless packages
- Very low operating current: 35 to 250 μ A (typ)
- Very low shutdown current: 1 μ A (max)
- High temp accuracy: $\pm 0.25^{\circ}\text{C}$
- Simple operation: no need for external components
- Analog and digital (SPITM, I2CTM, SMBusTM) devices
- High temperature resolution

Low-Power LDOs

- Function: providing regulated, low-noise supply voltages for the system

Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
MCP1703A	With 250 mA maximum output, MCP1703 works with input voltage of up to 16V and in combination with its low current consumption of 2 μ A	Click Here

Low-Power LDOs Winning Attributes

Attributes:

- Extremely low operating current: as low as 1 μ A
- High output voltage accuracy
- Stability with ceramic capacitors
- Wide range of output voltage options
- Space-saving SC70 and SOT-23 packages
- Wide range of features: shutdown mode

RESET Monitors

- Function: System supervisor circuits designed to monitor VCC in digital systems and provide a reset signal to the host processor when needed

Popular Products	Description	Product Web Page
TCM809	<p>The reset output is driven active within 20 µsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.</p>	Click Here
MCP1xx	<p>The MCP1xx are a family of voltage supervisory devices which also operates as protection from brown-out conditions when the supply voltage drops below a safe operating level</p>	Click Here

RESET Monitors Winning Attributes

- **Attributes:**
 - Tiny SOT-23 and SC-70 packages
 - Very low operating current: as low as 1 μ A (max)
 - High threshold voltage accuracy: $\pm 2.8\%$ (max)
 - V_{DD} transient immunity
 - Many available options: push-pull output, open-drain output and internal pull-up resistor

Synchronous Buck MOSFET Drivers

Function: driving the high power devices (MOSFETs in synch. Buck configuration)

Popular Products	Description	Product Web Page
MCP14628 Dual Output MOSFET Driver for Synchronous Applications	<p>The MCP14628 is a synchronous MOSFET driver used for driving MOSFETs in a rectified bridge arrangement. There are two separate drivers contained in the MCP14628. The low-side driver output drives a non-floating or ground reference N-Channel MOSFET. The high-side driver is designed to drive a floating N-Channel MOSFET. An external bootstrap capacitor is used to provide the additional voltage.</p>	Click Here
MCP14700 Synchronous MOSFET Driver w/separate High/Low side control	<p>The MCP14700 is a high-speed synchronous MOSFET driver designed to optimally drive a high-side and low-side N-Channel MOSFET. The MCP14700 has two PWM inputs to allow independent control of the external N-Channel MOSFETs.</p>	Click Here

[Winning Attributes](#)
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Synchronous Buck MOSFET Drivers

Attributes:

- Operating voltage range: 5V to 30V
- Peak current capability: 2A source, 4A sink
- Internal Bootstrap Blocking Device
- Low Supply Current: 80 µA (typical)
- Space Saving Packages: SOIC, DFN

Operational Amplifiers

Function: buffering and filtering sensor feedback

Popular Products	Description	Product Web Page
MCP6004	The MCP6004 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typical quiescent current of 100 microamperes.	Click Here
MCP6H04	MCP6H04 has a wide supply voltage range of 3.5V to 16V and rail-to-rail output operation. This device has a gain bandwidth product of 1.2 MHz (typical), while only drawing 135 µA/amplifier (typical) of quiescent current.	Click Here
MCP6294	MCP6294 provide wide bandwidth of 10 MHz Gain Bandwidth Product. This family also operates from a single supply voltage as low as 2.4V to 6V, while drawing 1 mA (typical) quiescent current.	Click Here

[Winning Attributes](#)
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Operational Amplifiers

Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Analog-to-Digital Converters

- Function: converting analog feedback signals from motor to digital signals for MCU

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3201	<p>The MCP3201 12-bit Analog-to-Digital Converter (ADC) combines high performance and low power consumption in a small package, making it ideal for embedded control applications. The MCP3201 features SAR architecture and a SPI serial interface, allowing 12-bit ADC capability to be added to any PIC® microcontroller. The MCP3201 features 100k samples/second, 1 input channel, low power consumption (5nA typical standby, 400µA max. active).</p>	Click Here

Analog-to-Digital Converters

□ SAR ADC Attributes:

- Resolution: 8 to 13 bits
- Max sampling rate: up to 200 ksps
- Linearity: ± 1 LSB DNL, ± 1 LSB INL
- Current consumption: 175 to 500 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP

Voltage References

- Function: providing the system with an accurate analog voltage for comparison (needed for ADC)

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

Voltage References

Attributes:

- 1.2V (TC1070), 2.5V or 4.096V output
- Initial accuracy: $\pm 1\%$ (max)
- Temperature coefficient: 50ppm/ $^{\circ}\text{C}$ (max)
- Output current: $\pm 2\text{mA}$
- Operating current: 100 μA (max)
- Industrial temperature range: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$
- SOT-23 and TO-92 packages

PIC Microcontrollers

- **Function:** coordinating all the control and monitor functions - the brain of the system
- **Popular products:** PIC16F182X, 178X, 75X, 15XX, 193X
- **Attributes:**
 - Upwards of 32MHz internal OSC
 - 4 channel Programmable Switch Mode Controller (PSMC)
 - Integrated high performance comparators, op-amp, 10/12 bit ADC, 5/8/9 bit DAC, CCP, COG, NCO, CLC
 - Slope compensation
 - 256 bytes of EEPROM
 - Available in various packages

NEXT

PIC16F178x

Key Features

- Enhanced Mid-Range core (EMR)
- Flash Program Memory with self read/write capability
- Data EEPROM
- Low Power Internal 32kHz/32MHz osc.
- Integrated Temperature Indicator
- Up to 14-Channel 10bit / 12bit ADC w/Vref
- Up to (4) PSMC (Programmable Switch Mode Controller)
- Extended Watchdog Timer (EWDT)

PIC16F178x Key Features (contd.)

- Up to (4) High Performance Comparators with selectable Voltage Reference
- Up to (3) Operation Amplifiers with rail-to-rail input/output
- Up to (3) CCP (Capture, Compare, PWM)
- (1) 8-bit DAC (Digital to Analog Converter)
- (3) 5-bit DAC (Digital to Analog Converter)
(PIC16F1788/9 ONLY)
- (1) MI²C, (1) SPI, (1) EUSART w/auto baud
- (2) 8-bit Timer (TMR0/TMR2) & (1) 16-bit Timer (TMR1)

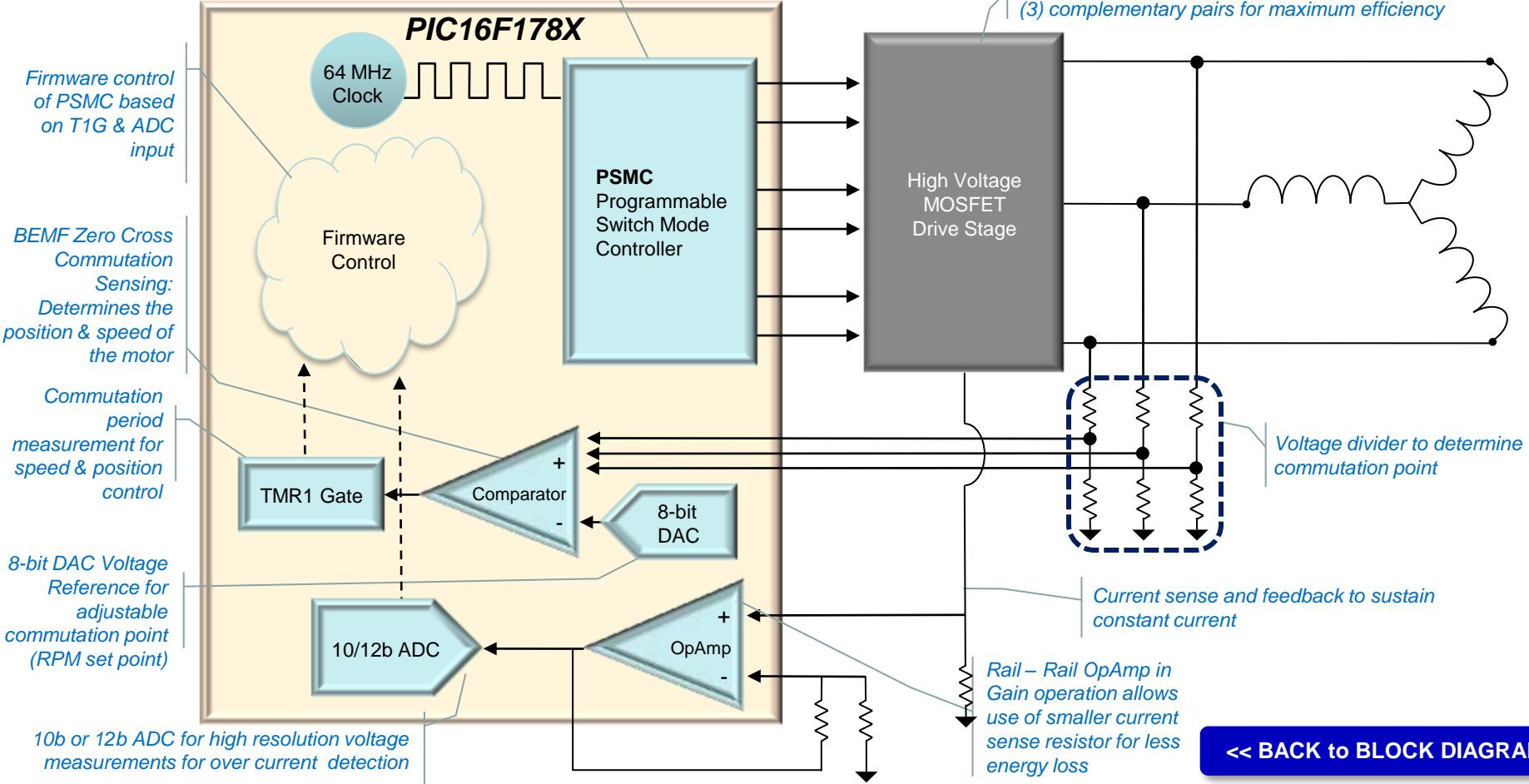
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Application Example: Sensorless 3-Phase BLDC Motor

- 16-bit PWM with dedicated 64MHz clock
- 6 steerable outputs or 3 steerable output pairs
- Blanking Control for transient filtering
- Independent rising/falling output control
- Dead band with independent rise & fall control
- Polarity Control / Auto Shutdown & Restart

- High Efficiency closed-loop control enabling higher RPMs
- Cost effective integration with BOM reductions
 - OpAmp, Voltage Reference, reduced size of inductors, capacitors, & resistors

3-phase drive controlled by PIC16F178X microcontroller with (3) complementary pairs for maximum efficiency





MICROCHIP

Microchip Analog Products for Signal Chains

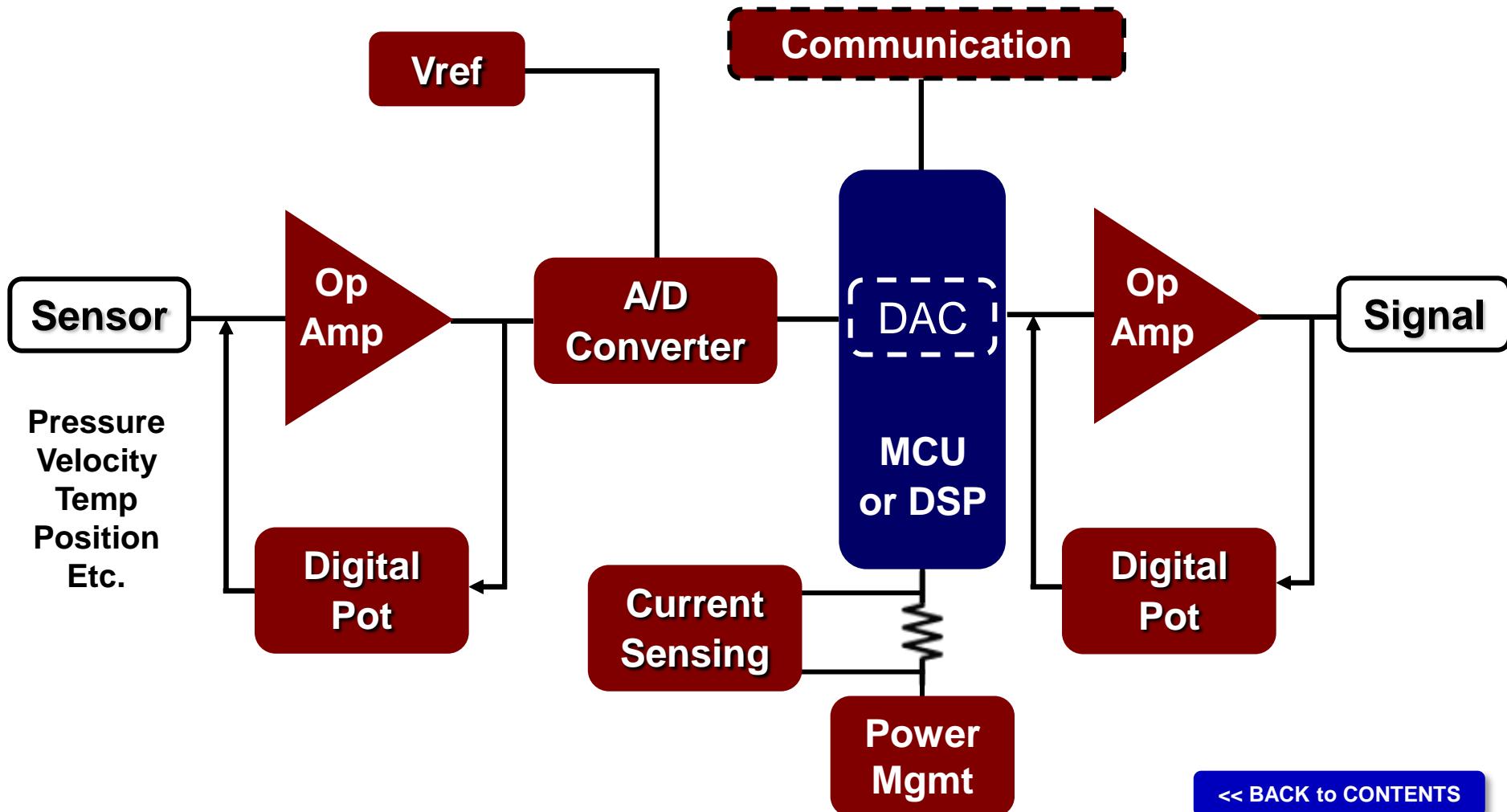
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Microchip's Winning Attributes

- **Low operating current to extend battery life**
- **A wide variety of analog and digital products for complete system solution**
- **Integration & small packages to occupy smaller footprints on the board and reduce cost**
- **High accuracy by trimming offset after packaging using non-volatile memory**
- **Competitive pricing for making the end equipment attractive on the market**
- **Great lead times and customer support**

Typical Signal Chain Diagram



Current Sensing

- Function: To measurement current and voltage and communicate over SMBus

Popular Products	Description	Product Web Page
PAC1710	<p>The PAC1710 is a high-side bi-directional current sensing monitor with precision voltage measurement capabilities. The power monitor measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.</p>	Click Here
PAC1720	<p>The PAC1720 is a dual high-side bi-directional current sensing monitor with precision voltage measurement capabilities. Each sensor measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.</p>	Click Here

Operational Amplifiers

- Function: buffering and filtering sensor signals for preserving signal characteristics and rejecting unwanted frequencies

Popular Products	Description	Product Web Page
MCP6404	The MCP6404 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typ. quiescent current of 40microamperes.	Click Here
MCP6N11	The MCP6N11 single instrumentation amplifier is optimized for single-supply operation with rail-to-rail input and output performance. Two external resistors set the gain, minimizing gain error and drift over temperature. The supply voltage range of 1.8V to 5.5V is low enough to support many portable applications	Click Here
Additional Suggested Products: MCP60x, MCP644x, MCP600x, MCP603x, MCP6Vxx		

Operational Amplifiers

Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Analog-to-Digital Converters

- Function: Converting analog voltage or current signal (pressure, position, temperature, etc.) into digital data that a microcontroller can use

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3421	<p>The MCP3421 is a single channel low-noise, high accuracy Delta-Sigma A/D converter with differential inputs and up to 18 bits of resolution in a small SOT-23-6 package. The device uses a two-wire I2C™ compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.</p>	Click Here

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Analog-to-Digital Converters

□ SAR Attributes:

- Resolution: 8 to 13 bits
- Max sampling rate: up to 200 ksps
- Linearity: ± 1 LSB DNL, ± 1 LSB INL
- Current consumption: 175 to 500 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP

□ Delta-Sigma Attributes:

- Resolution: 16 to 22 bits
- Max sampling rate: up to 240 sps
- Current consumption: 120 to 155 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP

Digital Potentiometers

- Function: buffering and filtering sensor signals for preserving signal characteristics and rejecting unwanted frequencies

Popular Products	Description	Product Web Page
MCP4021	The MCP402X devices are non-volatile, 6-bit (64 wiper steps) digital potentiometers that are programmed/reprogrammed through a simple up/down serial interface.	Click Here
MCP45xx	The MCP45XX devices offer a wide range of product offerings using an I2C™ Compatible interface. This family of devices support a 7-bit resistor network, Non-Volatile memory configurations, and Potentiometer and Rheostat pinouts. WiperLock Technology allows application-specific calibration settings to be secured in the EEPROM.	Click Here
Additional Suggested Products: MCP46xx, 43xx, MCP44xx		

Digital Potentiometers

□ Attributes:

- 6 to 8-bit resolution
- 2k, 5k, 10k, 50k and 100k Ohm options
- Low operating and shutdown current
- ± 1 LSB max INL & DNL
- Single or dual per package
- Small SOT-23 & 3x2 DFN packages

Voltage References

- Function: providing the system with an accurate analog voltage for comparison (needed for ADC)

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

Voltage References

Attributes:

- 1.2V (TC1070), 2.5V or 4.096V output
- Initial accuracy: $\pm 1\%$ (max)
- Temperature coefficient: 50ppm/ $^{\circ}\text{C}$ (max)
- Output current: $\pm 2\text{mA}$
- Operating current: 100 μA (max)
- Industrial temperature range: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$
- SOT-23 and TO-92 packages

(Low-I_q) Power Management ICs

- Function: monitoring critical voltage levels and providing regulated, low-noise supply voltages ($V_{in} > V_{out}$) for the system

Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
TCM809	The reset output is driven active within 20 μ sec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.	Click Here
MCP1xx	The MCP1xx are a family of voltage supervisory devices which also operates as protection from brown-out conditions when the supply voltage drops below a safe operating level	Click Here

(Low-I_q) Power Management ICs

Attributes:

- Extremely low operating current: as low as 1µA (typ)
- Initial accuracy: ±2%
- Wide range of voltage options
- Industrial temperature range: -40°C to +85°C
- SC-70, SOT-23 and TO-92 packages

Infrared

- Function: providing low-cost, wireless two-way data connection

Popular Products	Description	Product Web Page
MCP2122	Converts serial data from UART bit streams to IrDA standard bit streams (encodes) and from IrDA standard bit streams to UART bit streams (decodes). Requires input clock that is 16x needed baud rate.	Click Here
MCP2140	MCP2140 embeds IrDA protocol handling and bit encoding/decoding, and provides the lowest cost, lowest power consumption solution for adding IrDA connectivity to embedded systems	Click Here
MCP2155	MCP2155 provided IrDA protocol handling PLUS bit encoding/decoding functionality for Data Communication Equipment (DCE) applications in one low pincount device. Supports the IrCOMM (9-wire cooked service class), TinyTP, IrLMP, and IrLAP layers of the IrDA Standard protocol stack PLUS the bit encoding/decoding portion of the IrPHY	Click Here

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Infrared

Attributes:

- Enable infrared communication to be easily added to existing system
- IrDA® standard protocol embedded on chip (up to 115.2 kbaud)
- DTE and DCE applications supported
- Simple and flexible infrared encoder/decoder
- Easy to use developer's kit

PIC Microcontrollers

- **Function:** providing all the control and some peripheral functions
- **Popular products:** PIC16F627/8, PIC12F675, PIC16C781/2
- **Attributes:**
 - 20MHz operating speed
 - PWM output (PIC16F627/8)
 - Integrated comparators, op-amp, ADC, DAC
 - 128 bytes of EEPROM
 - Available in PDIP, SOIC, and TSSOP packages
 - 8-pin solutions (PIC12F675)

NEXT

PIC12F752 - PICmicro

- **Only 35 Instructions to Learn:**
 - All single-cycle instructions except branches
- **Operating Speed:**
 - DC – 20 MHz clock input
 - DC – 200 ns instruction cycle
- **1024 x 14 On-chip Flash Program Memory**
- **Self Read/Write Program Memory**
- **64 x 8 SRAM**
- **Interrupt Capability**
- **8-Level Deep Hardware Stack**
- **Direct, Indirect and Relative Addressing modes**



MICROCHIP

Microchip Analog Products for Wireless Handsets and Modules

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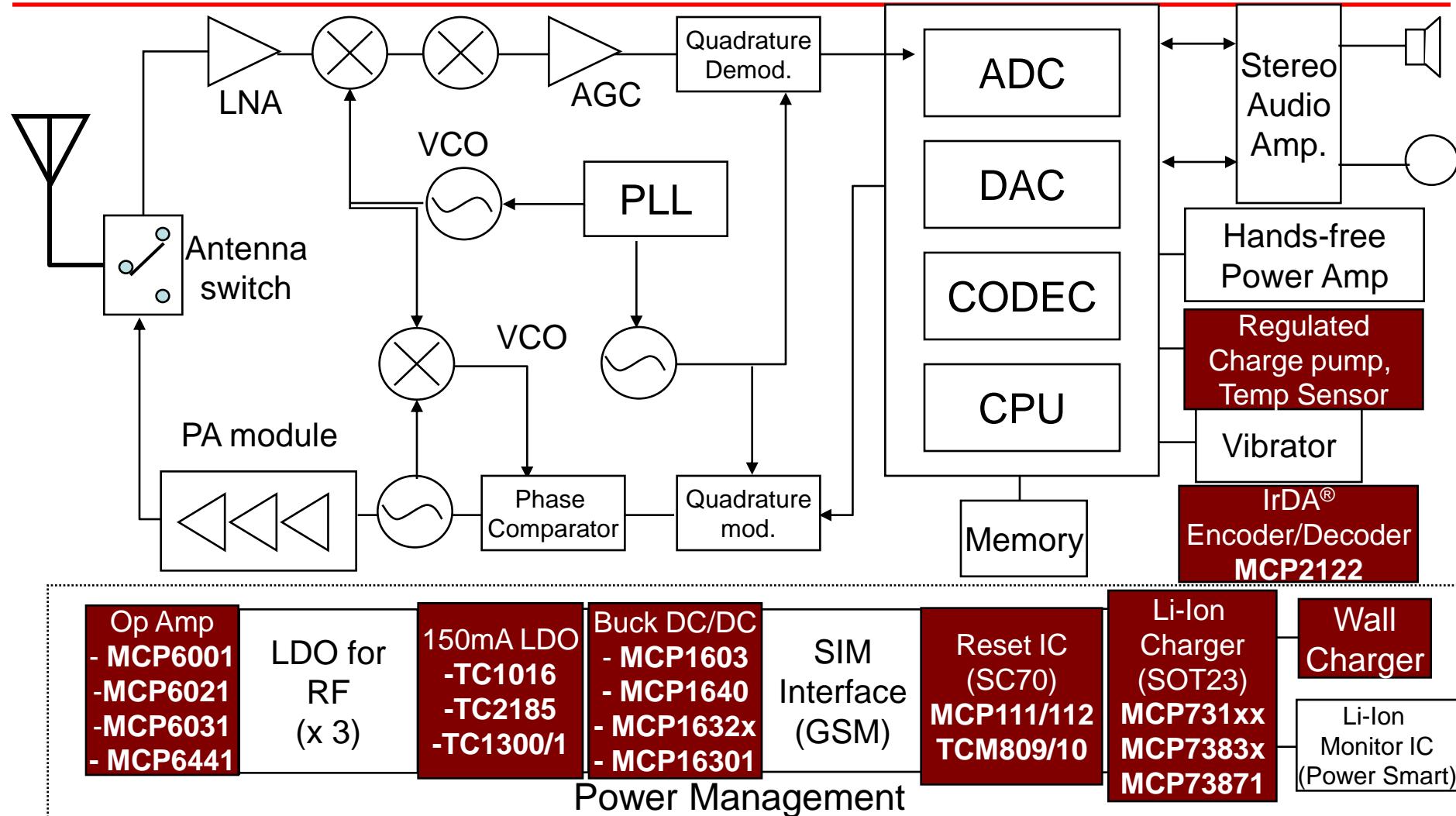


Microchip's Winning Attributes

- **Low operating current to extend battery life**
- **Integration & small packages to occupy smaller footprints on the board and reduce cost**
- **Competitive pricing for making the end equipment attractive on the market**
- **Low noise operation for allowing “clean” RF communication**
- **Wide product offering for minimizing customer’s transaction and inventory costs**
- **Great lead times and customer support**

NEXT

Microchip Products for Wireless Handsets





Power Over USB Controllers

Popular Products	Description	Product Web Page
UCS1001	USB Port Power Controller with Charger Emulation	Click Here
UCS1002	Programmable USB Port Power Controller with Charger Emulation	Click Here

Low Dropout Regulators

Function	Popular Products	Description	Product Web Page
Supply power to the analog (baseband) section - RF, IF, audio	MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
	TC1016	80mA , LDO With Shutdown in SC70	Click Here
Supply power to the digital section - modem, DSP, codec	TC1301	300 mA, Dual LDO With Microcontroller RESET Function	Click Here
	TC1173	Low Supply Current for Longer Battery Life Very Low Dropout Voltage 300 mA Output Current Standard or Custom Output Voltages ERROR Output Can be Used as a Low Battery Detector or Processor Reset Generator Power-Saving Shutdown Mode Bypass Input for Ultra-Quiet Operation Over-Current and Over-Temperature Protection	Click Here

[Winning Attributes](#)
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Low Dropout Regulators

Attributes:

- Tiny SOT-23 and SC-70 packages
- Small MSOP packages and high integration
- Very low operating current: 80 μ A (max)
- High output voltage accuracy: $\pm 2\%$ (max)
- Excellent dynamic performance (line & load regulation)
- Very low dropout voltage:
 - As low as 90mV @ 100mA
 - 210mV @ 300mA
- Stability with ceramic output capacitors
- Very low output noise

BACK

RESET Monitors

- Function: Resets the CPU, DSP, and modem when supply voltage falls below threshold

Popular Products	Description	Product Web Page
TCM809	<p>The reset output is driven active within 20 μsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.</p>	Click Here
MCP100/1/2/3/21/20/31	<p>The MCP1xx are a family of voltage supervisory devices which also operates as protection from brown-out conditions when the supply voltage drops below a safe operating level</p>	Click Here

RESET Monitors

Attributes:

- Tiny SOT-23 and SC-70 packages
- Very low operating current: as low as 1 μ A (max)
- High threshold voltage accuracy: $\pm 2.8\%$ (max)
- V_{DD} transient immunity
- Manual RESET
- Many available options: push-pull output, open-drain output and internal pull-up resistor

Voltage Detectors

- Function: Monitor battery voltage level and indicate low-battery condition, monitor regulated supply voltages to RF, IF, and analog baseband sections

Popular Products	Description	Product Web Page
MCP11/2	<p>The MCP11/112 Series are CMOS voltage detectors are well suited for portable, consumer electrics applications due to the extremely low 1uA operating current and small surface-mount packaging. These devices are designed to hold the microcontroller in reset until the supply voltage reaches a predetermined operating level. These devices also protect against brownout conditions that occur as a result of the supply voltage dropping below a tolerable level.</p>	Click Here

Voltage Detectors

Attributes:

- Tiny SOT-23 and SC-70 packages
- Very low operating current: 1 μ A (typ)
- Precise thresholds: $\pm 2\%$ (typ)
- Open-drain and push-pull outputs

Battery Chargers

Function: Charge & monitor the Lithium Ion battery

Popular Products	Description	Product Web Page
MCP731xx	<p>The MCP73811/2 devices are linear charge management controllers that are designed to provide specific charge algorithms for single cell Li-Ion or Li-Polymer battery to achieve optimal capacity in the shortest charging time possible.</p>	Click Here
MCP732xx	<p>The MCP73123/223 is a highly integrated Lithium Iron Phosphate (LiFePO4) battery charge management controller that provide specific charge algorithms for LiFePO4 batteries to achieve optimal capacity and safety in the shortest charging time possible. Along with its small physical size, the low number of external components makes the MCP73123/223 ideally suitable for various applications.</p>	Click Here

Battery Chargers

Attributes:

- Small thermally efficient DFN and QFN packages
- High-accuracy voltage regulation: $\pm 0.5\%$ (max)
- Low operating current: $260\mu\text{A}$ (typ)
- Shutdown and pre-conditioning modes
- Temperature monitor & charge complete indicator
- USB/AC inputs
- Loadsharing
- Overvoltage Protection (OVP)

Operational Amplifiers

- Function: filtering/amplifying for analog baseband and audio signal processing

Popular Products	Description	Product Web Page
MCP6404	The MCP6404 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typ. quiescent current of 40 μ A.	Click Here
MCP603x	The MCP6031/2/3/4 op amps have a gain bandwidth of 10 kHz with a low typical operating current of 900 nA and an offset voltage that is less than 150 μ V.	Click Here
MCP60x	MCP601/2/3/4 operational amplifier (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μ A and an offset voltage that is less than 2 mV.	Click Here

Operational Amplifiers

Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Charge Pumps

Function: powering white LEDs, providing negative DC bias for LCD or GaAs transmit power amplifier, converting Li-Ion voltage to DC voltage level required by the system

Popular Products	Description	Product Web Page
MCP1252/3	<p>The MCP1252/3 are inductorless, positive-regulated charge pump DC/DC converters. The devices generate a regulated fixed (3.3V or 5.0V) or adjustable output voltage. They are specifically designed for applications requiring low noise and high efficiency and are able to deliver up to 120 mA output current. The devices allow the input voltage to be lower or higher than the output voltage, by automatically switching between buck/ boost operation.</p>	Click Here

Charge Pumps

Attributes:

- Small SOT-23 and MSOP packages
- Very low operating current
- High voltage conversion efficiency: up to 95%
- Switching frequency: 10kHz to 1MHz
- Inductorless operation: reduced cost and EMI noise
- Low-power shutdown mode

Temperature Sensors

Function: adjusting LCD contrast, measuring RF Power Amplifier temperature, thermally compensate RF oscillator

Popular Products	Description	Product Web Page
MCP9808 Digital temperature sensor	The MCP9808 converts temperatures between -20°C and +100°C to a digital word with $\pm 0.5^{\circ}\text{C}$ (max.) accuracy	Click Here
MCP9700 Linear Active Thermistor™ ICs	The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.	Click Here

Temperature Sensors Winning Attributes

Attributes:

- Small SC70, SOT-23 and DFN leadless packages
- Very low operating current: 35 to 250 μ A (typ)
- Very low shutdown current: 1 μ A (max)
- High temp accuracy: $\pm 0.25^{\circ}\text{C}$
- Simple operation: no need for external components
- Analog and digital (SPITM, I2CTM, SMBusTM) devices
- High temperature resolution

Switching Regulators

Function: efficiently convert Li-Ion voltage to DC voltage level required by the DSP or CPU

Popular Products	Description	Product Web Page
MCP163xx	<p>MCP163xx are highly integrated, high-efficiency, fixed frequency, step-down DC-DC converter that operates from input voltage sources up to 30V. Integrated features include a high side switch, fixed frequency Peak Current Mode Control, internal compensation, peak current limit and over temperature protection. Minimal external components are necessary to develop a complete step-down DC-DC converter power supply.</p>	Click Here
MCP1640	<p>The MCP1640 is a compact, high-efficiency, fixed frequency, synchronous step-up DC-DC converter. It provides an easy-to-use power supply solution for applications powered by either one-cell, two-cell, or three-cell alkaline, NiCd, NiMH, one-cell Li-Ion or Li-Polymer batteries.</p>	Click Here

[Winning Attributes](#)

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Switching Regulators

Attributes:

- Small SOT and DFN package
- Auto-switching PWM/PFM operation
- Efficiency as high as 96%
- Very low shutdown current <1 μ A (typ)
- Input voltage as high as 30V
- UVLO, Soft-start & over-temperature protection
- Boost Start-up as low as 0.65V

Infrared

- Function: providing low-cost, wireless two-way data connection - infrared port

Popular Products	Description	Product Web Page
MCP2122	Converts serial data from UART bit streams to IrDA standard bit streams (encodes) and from IrDA standard bit streams to UART bit streams (decodes). Requires input clock that is 16x needed baud rate.	Click Here
MCP2140	MCP2140 embeds IrDA protocol handling and bit encoding/decoding, and provides the lowest cost, lowest power consumption solution for adding IrDA connectivity to embedded systems	Click Here
MCP2155	MCP2155 provided IrDA protocol handling PLUS bit encoding/decoding functionality for Data Communication Equipment (DCE) applications in one low pincount device. Supports the IrCOMM (9-wire cooked service class), TinyTP, IrLMP, and IrLAP layers of the IrDA Standard protocol stack PLUS the bit encoding/decoding portion of the IrPHY	Click Here

Infrared

Attributes:

- Enable infrared communication to be easily added to existing system
- IrDA® standard protocol embedded on chip (up to 115.2 kbaud)
- DTE and DCE applications supported
- Simple and flexible infrared encoder/decoder
- Easy to use developer's kit



MICROCHIP

Microchip Analog Products for Power Supplies

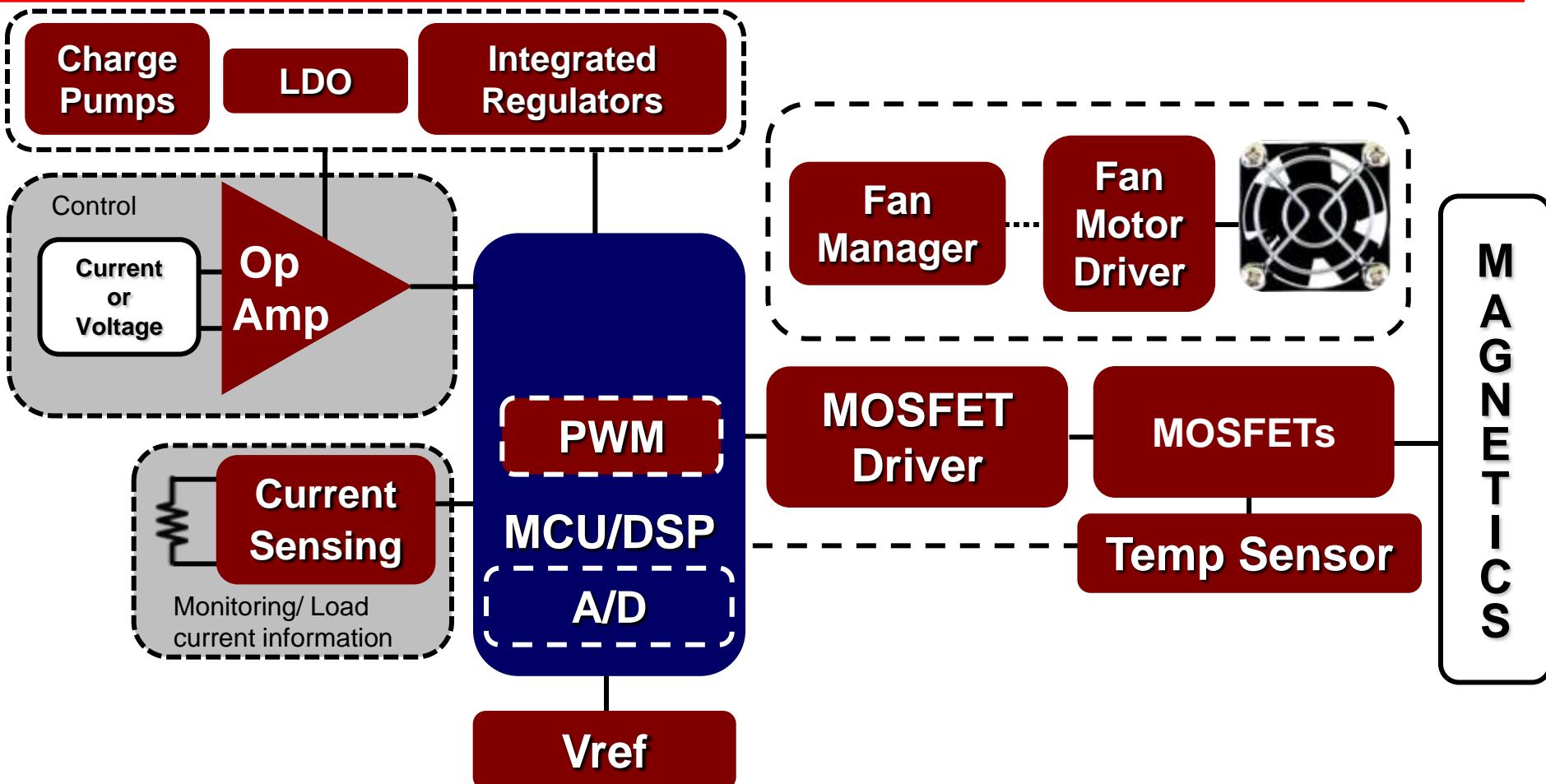
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Microchip's Winning Attributes

- **A wide variety of analog and digital products for complete system solution**
- **One of the first & leading suppliers in MOSFET driver and temperature sensor products**
- **Great lead times and customer support**
- **Competitive pricing for making the end equipment attractive on the market**
- **Small packages to occupy smaller footprints on the board and reduce cost**

Typical DC/DC Brick Diagram*



Current Sensing

- Function: To measurement current and voltage and communicate over SMBus

Popular Products	Description	Product Web Page
PAC1710	<p>The PAC1710 is a high-side bi-directional current sensing monitor with precision voltage measurement capabilities. The power monitor measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.</p>	Click Here
PAC1720	<p>The PAC1720 is a dual high-side bi-directional current sensing monitor with precision voltage measurement capabilities. Each sensor measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.</p>	Click Here

Fan Managers

- Function: controlling fan speed according to ambient temperature for reducing acoustic noise and extending fan life

Popular Products	Description	Product Web Page
EMC2101	The EMC2101 is an SMBus 2.0 compliant, integrated fan control solution complete with two temperature monitors, one external and one internal.	Click Here

Fan Motor Driver

Products	Description	Product Web Page	
Three-Phase BLDC Fan Motor Drivers	MTD6501C/D/G (23kHz)	Standalone 3-Φ Sinusoidal Sensorless BLDC Motor Controller. 12V; $I_{MAX} = 800$ mA	Click Here
	MTD6502B	Standalone 3-Phase Sinusoidal Sensorless BLDC Motor Controller. 5V Application; $I_{MAX} = 750$ mA ; TDFN - 10	Click Here
	MTD6505	Standalone 3-Phase Sinusoidal Sensorless BLDC Motor Controller - 5V Application; $I_{MAX} = 750$ mA ; UDFN – 10; -Programmable BEMF Coefficient	Click Here

Temperature Sensors

- Function: Shutting down the system when temperature rises above operating limit

Popular Products	Description	Product Web Page
TC1047A	Supply Voltage Range: 2.5V to 5.5V, Wide Temperature Measurement Range: -40°C to +125°C, High Temperature Converter Accuracy: $\pm 2^\circ\text{C}$, Max, at 25°C, Linear Temperature Slope: 10mV/°C, Very Low Supply Current: 35µA Typical	Click Here
EMC1701	The EMC1701 is a combination high-side current sensing device with precision temperature measurement. It measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.	Click Here
EMC1412	The EMC1412 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Advanced features such as Resistance Error Correction , Beta Compensation and automatic diode type detection combine to provide a robust solution for complex environmental monitoring applications	Click Here

Temperature Sensors

□ Attributes:

- High temperature accuracy: $\pm 1^\circ\text{C}$ (typ)
- Small SOT-23 packages
- Very low power consumption
- Wide temperature range: -55°C to $+125^\circ\text{C}$
- Voltage, logic and serial output options available

MOSFET Drivers

Function: driving the high power devices (MOSFETs, bipolar transistors, IGBTs)

Popular Products	Description	Product Web Page
TC4427A	Supply Voltage Range: 2.5V to 5.5V Wide Temperature Measurement Range: -40°C to +125°C High Temperature Converter Accuracy: $\pm 2^\circ\text{C}$, Max, at 25°C Linear Temperature Slope: 10mV/°C Very Low Supply Current: 35µA Typical	Click Here
MCP1415/16	The MCP1415/16 devices are small footprint Low-Side MOSFET drivers capable of supplying 1.5A peak output current in a SOT23 5L package.	Click Here
MCP14E3/E4/E5	The MCP14E3/E4/E5 devices are a family of 4.5A,dual output buffers/MOSFET drivers with separate enable functions for each output. As MOSFET drivers, the MCP14E3/E4/E5 can easily charge 2200 pF gate capacitance in under 28 nsec (max)	Click Here

[Winning Attributes](#)
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MOSFET Drivers

Attributes:

- Operating voltage range: 4.5V to 18V (TC4431/2, 30V)
- Peak current capability: 0.5A to 12.0A
- Operating junction temperature up to 150°C
- Drive capability: 470pF in 15ns, 47,000pF in 180ns
- Input / output delay: 30 to 75ns
- Single, dual, quad configurations
- Superior ESD & latch-up protection

Voltage References

- Function: providing the system with an accurate analog voltage for comparison

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

Voltage References

Attributes:

- 2.5V or 4.096V output
- Initial accuracy: $\pm 1\%$ (max)
- Temperature coefficient: 50ppm/ $^{\circ}\text{C}$ (max)
- Output current: $\pm 2\text{mA}$
- Operating current: 100 μA (max)
- Industrial temperature range: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$
- SOT-23 and TO-92 packages

PWM Controllers

- Function: provide drive signal for MOSFET drivers

Popular Products	Description	Product Web Page
MCP1630	<p>The MCP1630 is a high-speed Pulse Width Modulator (PWM) used to develop intelligent power systems. When used with a microcontroller, the MCP1630 will control the power system duty cycle to provide output voltage or current regulation. The MCP1630 inputs are designed to be easily attached to the I/O of a microcontroller, which supplies the reference and oscillator to the MCP1630, to generate a flexible and adaptable power system.</p>	Click Here

PWM Controllers

- **Attributes:**
 - High speed PWM operation
 - Peak current mode operation to 1.0MHz
 - Wide operating temperature range, -40°C to +125°C
 - (1630) accepts variable controlling inputs from µC
 - UVLO, short circuit, over current protection circuits
 - Precision peak current limiting

PICTM Microcontrollers

- **Function:** providing all the control functions and the PWM output for the system
- **Popular products:** PIC16F182X, 178X, 75X, 15XX, 193X
- **Attributes:**
 - Upwards of 32MHz internal OSC
 - Slope compensation
 - 4 channel programmable switch mode controller (PSMC)
 - Integrated high performance comparators, op-amp, 10/12 bit ADC, 5/8/9 bit DAC
 - 256 bytes of EEPROM
 - Available in various packages

Operational Amplifiers

Function	Popular Products	Description	Product Web Page
Sense and gain up output current - low offset voltage required for minimizing measurement error	MCP602x	The MCP6021/2/3/4 op amps have a gain bandwidth of 10 MHz with a low typical operating current of 1mA and an offset voltage that is less than 150 μ V.	Click Here
	MCP6V01 Zero Drift Op Amps	VOS: $\pm 2 \mu$ V (maximum), PSRR: 130 dB (minimum), CMRR: 130 dB (minimum), IQ: 300 μ A/amplifier (typical) Wide Supply Voltage Range: 1.8V to 5.5V	Click Here
Provide feedback compensation by sensing output voltage and comparing it with reference voltage	MCP6404	The MCP6404 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typ. quiescent current of 40 microamperes.	Click Here
	MCP60x	MCP601/2/3/4 (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μ A and an offset voltage that is less than 2 mV.	Click Here

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Operational Amplifiers

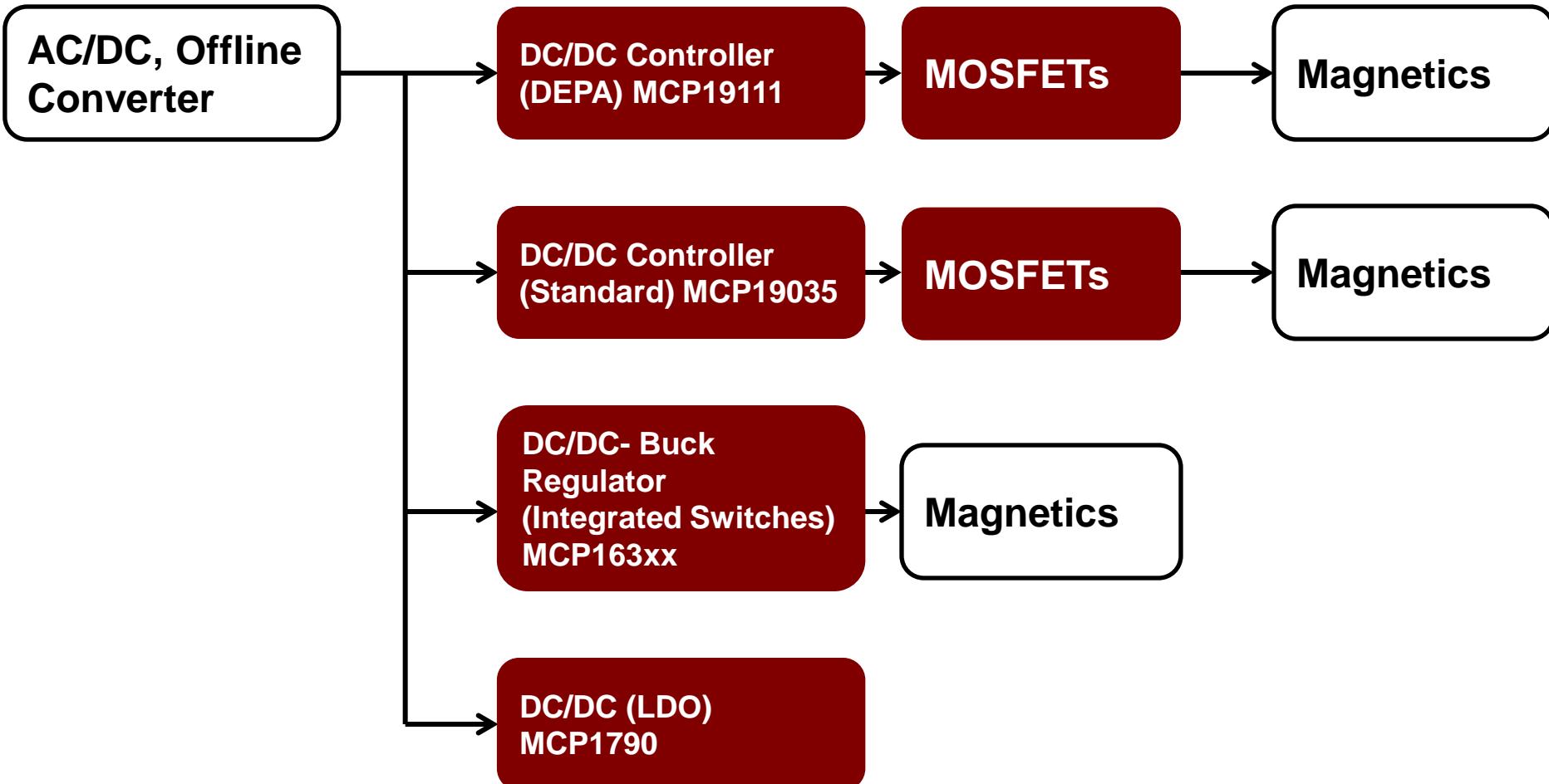
Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Power Management

Popular Products	Description	Product Web Page
MCP1790	The MCP1790 is a 70 mA, ceramic output cap stable, high voltage, Low Dropout Regulator (LDO). The MCP1790 is capable of handling continuous input voltage of up to 30V and is load dump protect for up to 48V	Click Here
TC7660/2	The TC7660 is a charge pump voltage converter that +1.5V to +10V input to a corresponding -1.5V to -10V output using two low-cost capacitors	Click Here
MCP16311/2	The MCP16311/2 is a compact, high-efficiency, fixed frequency PWM/PFM, synchronous step-down DC-DC converter that operates from input voltage sources up to 30V. Integrated features include a high-side and a low-side switch, fixed frequency Peak Current Mode Control, internal compensation, peak-current limit and over temperature protection.	Click Here
MCP1632x	The MCP16321/2 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a that operates from input voltages up to 24V.	Click Here

Distributed Point-of-Load Power Architecture



Digitally-Enhanced Power Analog

- Function: Customizable, Analog-based Power Conversion Controller driving external, logic-level MOSFETs in high-power, power conversion applications

Popular Products	Description	Product Web Page
MCP19111	<p>The MCP19111 is a mid-voltage (4.5-32V) analog-based PWM controller family with an integrated 8-bit PIC® Microcontroller. This unique product combines the performance of a high-speed analog solution, including high-efficiency and fast transient response, with the configurability and communication interface of a digital solution. The MCP1911x family, when combined with Microchip's MCP87xxx MOSFETs, or any low-FOM MOSFET, produce high-efficiency (>96%) DC/DC power-conversion solutions.</p>	Click Here

Digitally-Enhanced Power Analog

□ Attributes:

- Analog power conversion performance, offering fast response and high efficiency
- Digital interface to support higher-level functions, including communication and implementation of customer IP.

DC/DC Power Controller

- Function: Standalone, Analog-Based PWM Power Conversion Controller driving external, logic-level MOSFETs in high-power, power conversion applications

Popular Products	Description	Product Web Page
MCP19035	<p>The MCP19035 is a small, analog-based PWM controller family with integrated synchronous MOSFET drivers offering outstanding transient performance. The MCP19035 operates over a wide 4.5 - 30Vdc range, has a 300 kHz switching-frequency, and offers a factory-adjustable dead-time setting, allowing designers to optimize the performance across a wide selection of MOSFET devices. The MCP19035 family, when combined with Microchip's MCP87xxx MOSFETs, or any low-FOM MOSFET, produces high-efficiency (>96%) DC/DC power-conversion solutions.</p>	Click Here

High-Speed MOSFETs

Function: High-Efficiency, Switched Mode Power Conversion Power Devices

Popular Products	Description	Product Web Page
MCP87xxx	<p>The MCP87xxx family of high-speed MOSFETs have been designed to optimize the trade-off between ultra-low On-state resistance (R_{ds-on}) and Gate Charge (Q_g) to maximize power conversion efficiency in switched mode power supplies.</p>	Click Here

High-Speed MOSFETs

Attributes:

- Very Low Rds_on and Gate Charge (Qg)
- Optimized for high-efficiency Power Conversion

Product ID	Type	Config	Vds (V)	Vgs (V)	Rds_on @ 4.5V (mΩ-typ)	Qg (nC)	Package
MCP87022*	N	Single	25	+10/-8	2.2	25	5x6 DFN
MCP87030	N	Single	25	+10/-8	3	13.3	5x6 DFN
MCP87050*	N	Single	25	+10/-8	5	9	5x6 DFN
MCP87055*	N	Single	25	+10/-8	5.5	6	3.3x3.3 DFN
MCP87090	N	Single	25	+10/-8	9	4	5x6 DFN 3.3x3.3 DFN
MCP87130	N	Single	25	+10/-8	13	2.9	5x6 DFN 3.3x3.3 DFN

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DC/DC- Buck Regulator

Popular Products	Description	Product Web Page
MCP16301	The MCP16301 is a high-input voltage step-down regulator, capable of supplying 600 mA to a regulated output voltage from 2.0V to 15V.	Click Here
MCP1632x	The MCP16321/2 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a 16-pin QFN package that operates from input voltages up to 24V. Integrated features include a high-side and low-side N-Channel switch, fixed frequency Peak Current Mode Control, internal compensation, peak current limit, VOUT overvoltage protection and over temperature protection. Minimal external components are necessary.	Click Here
MCP16311/2	The MCP16311/2 is a compact, high-efficiency, fixed frequency PWM/PFM, synchronous step-down DC-DC converter in a 8-pin MSOP, or 2 x 3 TDFN package that operates from input voltage sources up to 30V. Integrated features include a high-side and a low-side switch, fixed frequency Peak Current Mode Control, internal compensation, peak-current limit and over temperature protection.	Click Here

DC/DC Controller (LDO)

- Function: Providing regulated, low-noise supply voltages ($V_{in} > V_{out}$) for the system

Popular Products	Description	Product Web Page
MCP1790	The MCP1790 is a 70 mA, ceramic output cap stable, high voltage, Low Dropout Regulator (LDO). The MCP1790 is capable of handling continuous input voltage of up to 30V and is load dump protect for up to 48V	Click Here



MICROCHIP

Personal Video Recorders (Set-Top Box)

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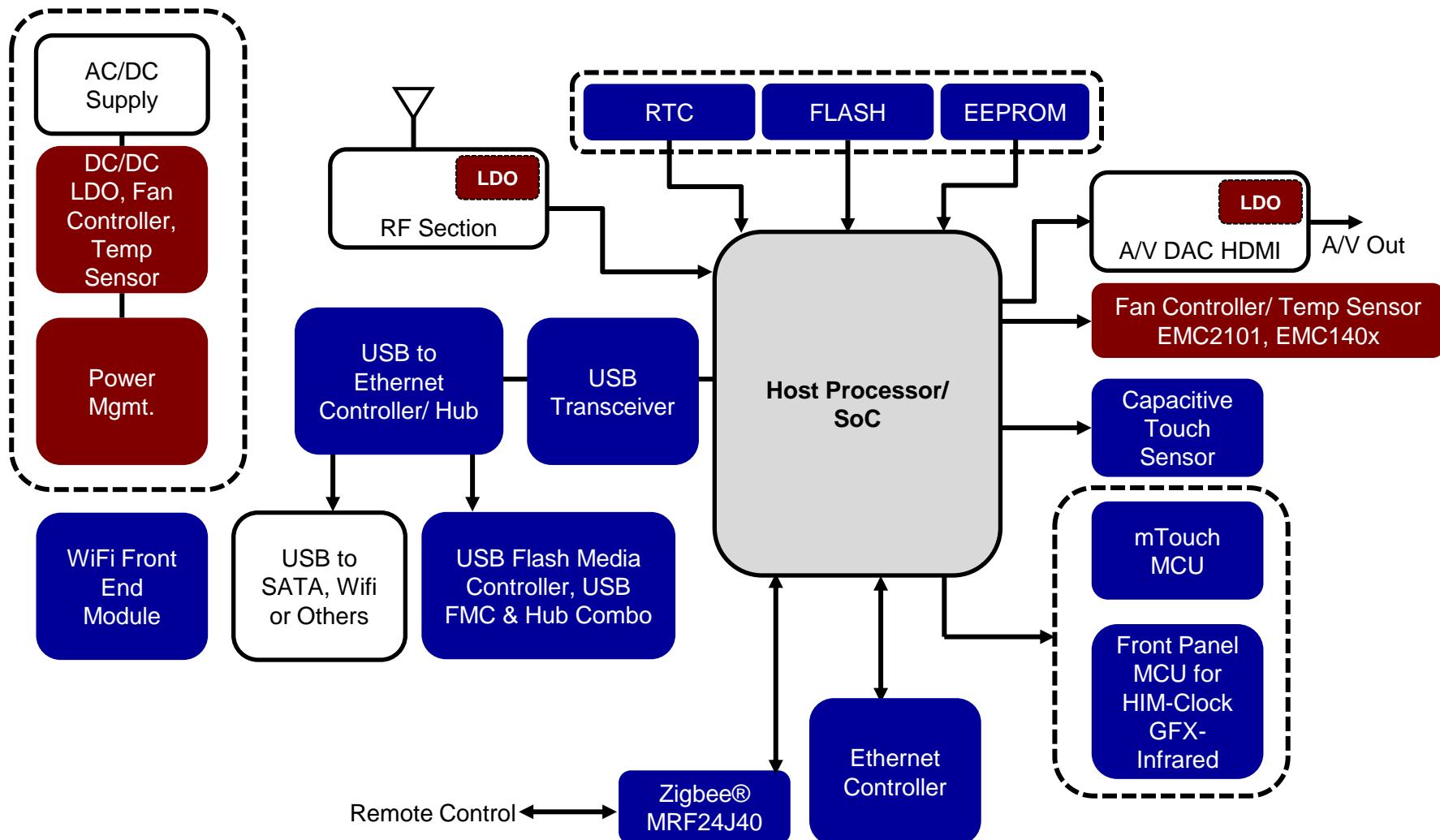


Microchip's Winning Attributes

- Large offering of LDO and Resets covering needed voltages
- Heat reducing DC to DC converters at needed voltages
- RR-I/O Op Amps reduce design concerns
- Attach sell with PICmicro often used in Set-Top Box for system control and power management
- Wide product offering for minimizing customer's transaction and inventory costs
- Great lead times and customer support

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Set-Top Box



Low Noise High PSRR LDO

Popular Products	Description	Product Web Page
MCP1754	The MCP1754/5 is a 16 volt, high PSRR voltage regulator with short circuit current foldback. The MCP1754 regulator provides up to 150 mA of current. The MCP1755 regulator provides up to 300 mA of current. The input operating voltage range is specified from 3.6V to 16V continuous, 18V absolute maximum, 12 VDC systems. Simplified, low pin count versions of the of these devices are also available	Click Here
MCP1755		Click Here

RTC/ Memory

Function	Popular Products	Description	Product Web Page
Real Time Clock	MCP79410	The MCP79410 general purpose I2C™ Compatible real-time clock/calendar (RTCC) is highly integrated with nonvolatile memory and advanced features normally found in higher priced devices. These features include a battery switchover circuit for backup power, a timestamp to log power failures and digital trimming for accuracy.	Click Here
EEPROM	24LC256	24AA256/24LC256/24FC256 (24XX256*) is a 32K x 8 (256 Kbit) Serial Electrically Erasable PROM, capable of operation across a broad voltage range (1.7V to 5.5V).	Click Here
FLASH	SST2xVF032x SST2xVF064x	The 25 Series SPI family is among the industry's lowest power 3.0V and 1.8V products. Lower pin count means less space, smaller PCBs, reduced system costs and lower power consumption. The industry's fastest erase times mean cost savings during manufacturing.	Click Here



Fan Controller/ Temp Sensor

Function	Popular Products	Description	Product Web Page
Fan Controller	EMC2101	SMBus Fan Control with 1°C Accurate Temperature Monitoring	Click Here
Temperature Sensor	EMC140x	1°C Temperature Sensor with Beta Compensation	Click Here

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Capacitive Touch Solutions

Function	Popular Products	Description	Product Web Page
Capacitive Touch Solutions	CAP11/12xx	SMSC's capacitive touch sensor products, featuring RightTouch® technology, set a new standard in simplifying development, improving noise immunity, and lowering BOM costs in PC, LCD monitors, white goods and consumer electronic designs. These devices have been carefully designed to filter for common noise sources such as backlight inverters, DC-DC switching regulators and wireless frequencies. They support a wide variety of interfaces such as I2C, SMBus, SMSC BC-Link™ and SPI and also provide world-class ESD protection of $\pm 8\text{kV}$ HBM with no external ESD protection circuits required.	Click Here

mTouch and Input Sensing Solutions

Popular Products	Description	Product Web Page
AR10xx	<p>The Microchip mTouch™ AR1000 Series Resistive Touch Screen Controller is a complete, easy to integrate, cost-effective and universal touch screen controller chip solution.</p> <p>The AR1000 Series has sophisticated proprietary touch screen decoding algorithms to fully process all touch data and save the host from this overhead. More than the usual “preprocessing” features of other low cost devices, the AR1000 delivers reliable, validated and calibrated touch</p>	Click Here
MTCH6301	<p>The MTCH6301 is a turnkey projected capacitive touch controller that allows easy integration of multi-touch and gestures to create a rich user interface in your design.</p>	Click Here

USB Transceiver

Popular Products	Description	Product Web Page
USB334x	Highly Integrated, Hi-Speed USB 2.0 ULPI Transceiver Family for Consumer Electronics Applications	Click Here
USB333x	Ultra Small and Highly Integrated, Hi-Speed USB 2.0 ULPI Transceiver Family for Mobile Consumer Electronics Applications	Click Here

USB Ethernet Controller or Hub

Popular Products	Description	Product Web Page
USB251x	<p>USB251x is a family of versatile, cost-effective and power-efficient USB 2.0 hub controllers. Leveraging SMSC's innovative MultiTRAK™ technology that delivers industry-leading data throughput in mixed-speed USB environments, the USB251x family is designed for applications that demand low power and a small footprint without compromising on performance</p>	Click Here
USB2602	<p>4th Generation USB 2.0 Flash Media Controller with Integrated Card Power FETs and HS Hub</p>	Click Here

USB Flash Media Controller

Popular Products	Description	Product Web Page
USB224x	USB 2.0 Flash Media Card Controller with Integrated Card Power FETs	Click Here
USB264x	USB 2.0 Flash Media Controller with Integrated Card Power FETs and HS Hub	Click Here

Ethernet Controller and Switches

Popular Products	Description	Product Web Page
LAN921x	High-Performance Small Form Factor Single-Chip Ethernet Controller with HP Auto-MDIX Support	Click Here
LAN922x	High-Performance Small Form Factor Single-Chip Ethernet Controller with 16-bit Non-PCI interface with Variable Voltage I/O	Click Here
LAN9303	3-port 10/100 Ethernet switch with flexible configuration options supporting a wide variety of different applications and architectures.	Click Here
LAN931x	3-port 10/100 Ethernet switch with flexible configuration options supporting a wide variety of different applications and architectures. Additional MII port provided to further expand customer use cases.	Click Here

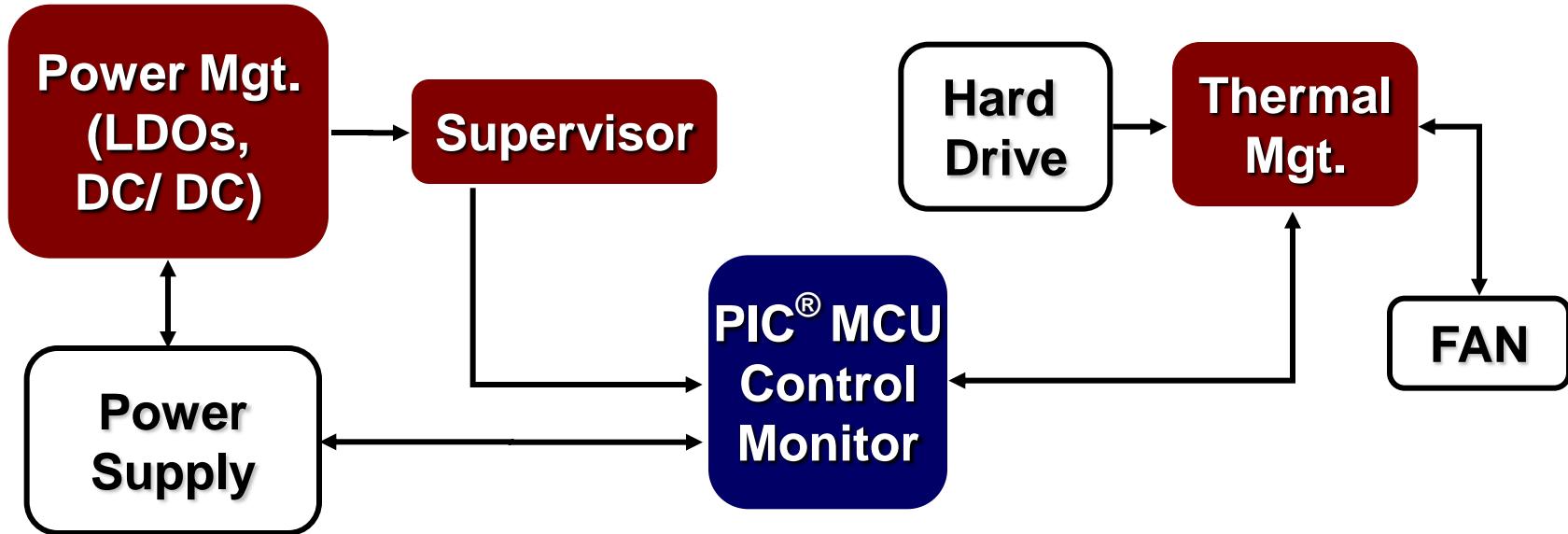
WiFi Front End Module

Popular Products	Description	Product Web Page
MRF24WG0MA/B	<p>MRF24WB0MA is an agency certified IEEE 802.11 Wi-Fi radio transceiver module. The MRF24WB0MA has an integrated PCB antenna, matching circuitry, and supports Wi-Fi with the free TCP/IP protocol stack. The MRF24WB0MA Module connects to hundreds of PIC® microcontrollers via a 4-wire SPI interface and is an ideal solution for low-power, low data-rate Wi-Fi sensor networks, home automation, building automation and consumer applications.</p>	Click Here

Zigbee

Popular Products	Description	Product Web Page
MRF24WG0MA/B	<p>MRF24J40 is a complete IEEE 802.15.4 radio and operates in the 2.4GHz freq band. The MRF24J40 supports ZigBee™, MiWi™ protocols and proprietary protocols to provide an ideal solution for wireless sensor networks, home automation, building automation and consumer applications</p>	Click Here
PIC18F46J50	<p>This low power and high performance 8-bit MCU with integrated full-speed USB 2.0 and peripheral flexibility comes in a small package for cost sensitive applications in the PIC18 J-series. New features include Deep sleep mode for low power applications, Peripheral Pin Select for design flexibility for mapping peripherals to I/O pins and a CTMU module for easy capacitive touch user interfaces. The PIC18F46J50 family is ideal for applications requiring cost-effective, low-power USB solutions with a robust peripheral set in a small package.</p>	Click Here

Power Management for Set-Top box



PI^C Microcontrollers

- **Function:** coordinating all the control, some peripheral functions and monitor functions - the brain of the system
- **Popular products:** PIC16F15XX, 182X, 193X
- **Attributes:**
 - Up to 32 MHz operating speed
 - On board CCP, CLC, CWG, NCO
 - Integrated comparators, op-amp, 12-bit ADC, 5/8/9 bit DAC
 - Up to 256 bytes of EEPROM
 - Available in UQFN, QFN, PDIP, SOIC, and TSSOP packages

1A- 1.5A Low Dropout Regulators

- Function: converting 5V to low-noise 3.3V, 2.5V, or 1.8V voltage levels for the various system components

Popular Products	Description	Product Web Page
MCP1727	The MCP1727 is a 1.5A, ceramic output cap stable, low output voltage Low Dropout Regulator (LDO) with shutdown and user-programmable delay for power good function.	Click Here
MCP1726	The MCP1726 is a 1A, ceramic output cap stable, low output voltage Low Dropout Regulator (LDO) with shutdown and user-programmable delay power good functions.	Click Here

[NEXT: Switching Regulators >>](#)

[Winning Attributes](#)

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1A- 1.5A Low Dropout Regulators

Attributes:

- Very low operating current: 80 μ A (typ)
- High output voltage accuracy: $\pm 2.5\%$ (max)
- Excellent dynamic performance (line & load regulation)
- Very low dropout voltage: as low as 450mV @ 800mA (typ)
- Package offering: SOT-223, SOIC, TO-220, DDPAK

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Switching Regulators

Popular Products	Description	Product Web Page
MCP16321/2	The MCP16321/2 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a 16-pin QFN package that operates from input voltages up to 24V.	Click Here
MCP16323	The MCP16323 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a 16-pin QFN package that operates from input voltages up to 18V.	Click Here
MCP16311/2	The MCP16311/2 is a compact, high-efficiency, fixed frequency PWM/PFM, synchronous step-down DC-DC converter in a 8-pin MSOP, or 2 x 3 TDFN package that operates from input voltage sources up to 30V. Integrated features include a high-side and a low-side switch, fixed frequency Peak Current Mode Control, internal compensation, peak-current limit and over temperature protection. The MCP16311/2 provides all the active functions for local DC-DC conversion, with fast transient response and accurate regulation.	Click Here

Switching Regulators

Attributes:

- Regulator and controller (external FET) solutions
- Small SOT-23, MSOP and SOP packages
- Auto-switching PWM/PFM operation
- 300kHz and 750kHz switching frequency
- UVLO, Soft-start & over-temperature protection
- Efficiency as high as 95%
- Very low operating current

RESET Monitors

- Function: Reset the CPU and/or MCU when supply voltage falls below threshold

Popular Products	Description	Product Web Page
MCP13xx	The MCP13xx voltage supervisors provide precision monitoring trip points, Watch Dog Timer inputs, Manual Reset with a low Supply current of 10 µA over extended temperature range from 1.0V to 5.5V supply.	Click Here
TCM809	The reset output is driven active within 20 µsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.	Click Here

RESET Monitors

Attributes:

- Tiny SOT-23 and SC-70 packages
- Very low operating current: as low as 10 μ A (max)
- High threshold voltage accuracy: $\pm 2.8\%$ (max)
- V_{DD} transient immunity
- Watchdog Timer / manual reset (MCP13xx, TC1232)
- Many available options: push-pull output, open-drain output and internal pull-up resistor

Temperature Sensors

- Function: To Monitor temperature and initiate actions during over-temperature conditions

Popular Products	Description	Product Web Page
TCN75	TCN75 is a serially programmable temperature sensor that notifies the host controller when ambient temperature exceeds a user-programmed setpoint. Hysteresis is also programmable.	Click Here
MCP9808 Digital temperature sensor	The MCP9808 converts temperatures between -20°C and +100°C to a digital word with $\pm 0.5^{\circ}\text{C}$ (max.) accuracy	Click Here

[NEXT: Fan Managers >>](#)

[Winning Attributes](#)

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Temperature Sensors

Attributes:

- Small SOT-23 and MSOP-8 packages
- Very low operating current: 250 μ A (typ)
- Very low shutdown current: 1 μ A (typ)
- High temp accuracy: $\pm 1^{\circ}\text{C}$ (typ)
- Simple operation: no need for external components
- Analog and digital (SPITM, I²CTM, SMBusTM) devices

Fan Managers

- Function: controlling fan speed according to ambient temperature for reducing acoustic noise and extending fan life

Popular Products	Description	Product Web Page
TC652	<p>The TC652/653 are integrated temperature sensors and brushless DC fan speed controllers with FanSense™ technology. The TC652/653 measure their junction temperature and control the speed of the fan based on that temperature, making them especially suited for applications in modern electronic equipment. The FanSense™ fan fault detect circuitry eliminates the need for a more expensive 3 wire fan.</p>	Click Here

Fan Managers

Attributes:

- Small MSOP packages
- High temp accuracy: $\pm 1^\circ\text{C}$ (typ)
- Fan failure detection
- Very low power consumption
- Wide range of features: SMBusTM Interface, Auto-shutdown, Minimum fan speed, Over-temp indication, etc.

Operational Amplifiers

Function: buffering and filtering signals

Popular Products	Description	Product Web Page
MCP6004	The MCP6004 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typical quiescent current of 100 microamperes.	Click Here
MCP6H04	MCP6H04 has a wide supply voltage range of 3.5V to 16V and rail-to-rail output operation. This device has a gain bandwidth product of 1.2 MHz (typical), while only drawing 135 µA/amplifier (typical) of quiescent current.	Click Here
MCP6294	MCP6294 provide wide bandwidth of 10 MHz Gain Bandwidth Product. This family also operates from a single supply voltage as low as 2.4V to 6V, while drawing 1 mA (typical) quiescent current.	Click Here

[Winning Attributes](#)
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Operational Amplifiers

Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Analog-to-Digital Converters

Function: implementing Automatic Gain Control (AGC) for the tuner - frequency adjustment

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3201	<p>The MCP3201 12-bit Analog-to-Digital Converter (ADC) combines high performance and low power consumption in a small package, making it ideal for embedded control applications. The MCP3201 features SAR architecture and a SPI serial interface, allowing 12-bit ADC capability to be added to any PIC® microcontroller. The MCP3201 features 100k samples/second, 1 input channel, low power consumption (5nA typical standby, 400µA max. active).</p>	Click Here

[Winning Attributes](#)
[<< BACK to BLOCK DIAGRAM](#)

Analog-to-Digital Converters

SAR Attributes:

- Resolution: 8 to 13 bits
- Max sampling rate: up to 200 ksps
- Linearity: ± 1 LSB DNL, ± 1 LSB INL
- Current consumption: 175 to 500 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP

Delta-Sigma Attributes:

- Resolution: 16 to 22 bits
- Max sampling rate: up to 240 sps
- Current consumption: 120 to 155 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP



MICROCHIP

Microchip Analog Products for Medical Applications

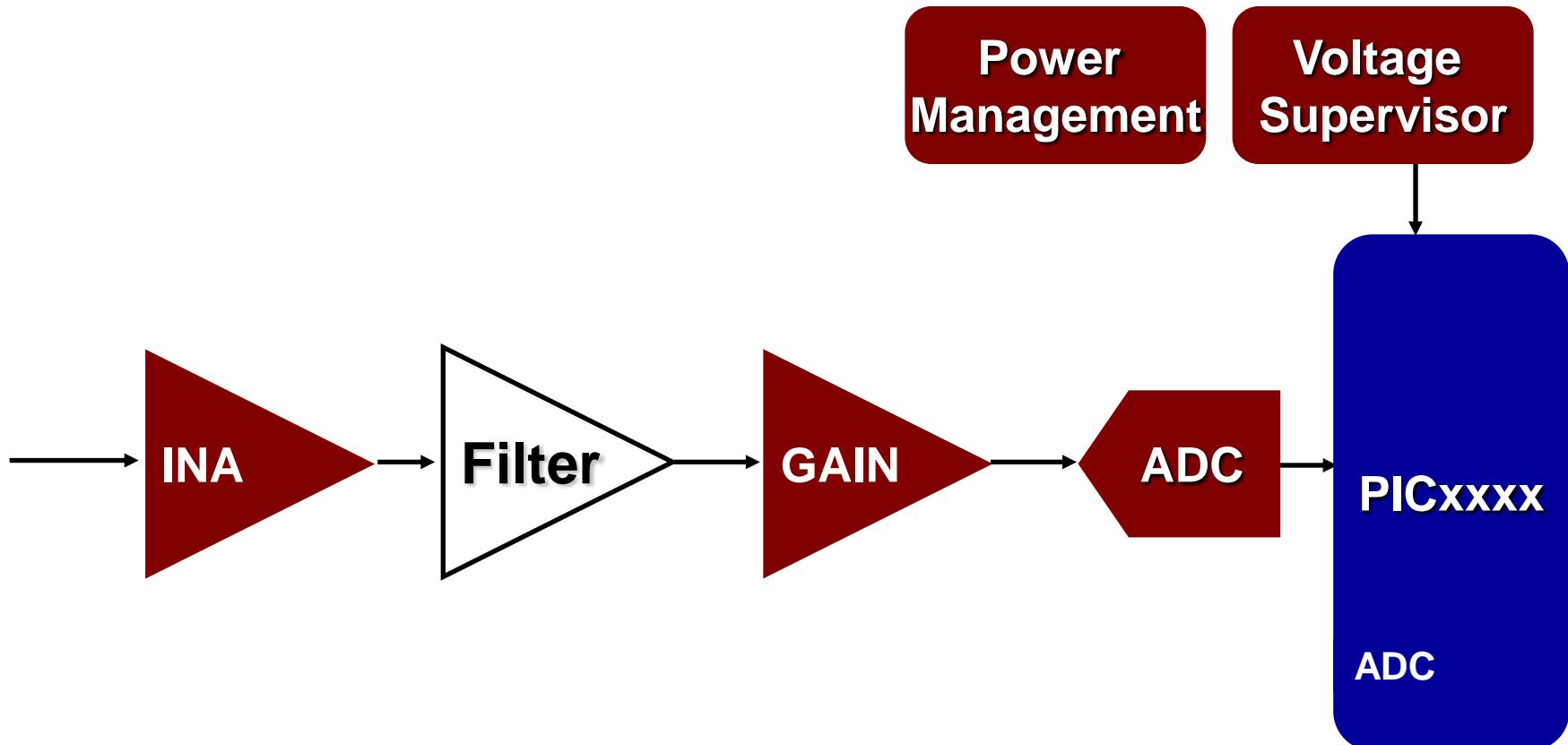
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Microchip's Winning Attributes

- Large offering of LDO and Resets covering needed voltages
- RR-I/O op amps reduce design concerns
- High Precision Operational Amplifiers
- Low Power consumption
- Attach sell with PICmicro, frequently used
- Great lead times and customer support

ECG/EKG Block Diagram



PIC Microcontrollers

- **Function: coordinating all the control, some peripheral functions and monitor functions - the brain of the system**
- **Popular products: PIC16F178X, 75X, 15XX**
- **Attributes:**
 - Up to 32 MHz operating speed
 - PWM output (PIC1XF75X)
 - Integrated hi-speed, comparators, op-amp, 12-bit ADC, 5/8/9 bit DAC, CCP, COG
 - Up to 256 bytes of EEPROM
 - Available in UQFN, QFN, PDIP, SOIC, and TSSOP packages

Instrumentation Amplifiers

- Function: buffering and filtering sensor signals for preserving signal characteristics and rejecting unwanted frequencies

Popular Products	Description	Product Web Page
MCP6N11	The MCP6N11 single instrumentation amplifier is optimized for single-supply operation with rail-to-rail input and output performance. Two external resistors set the gain, minimizing gain error and drift over temperature. The supply voltage range of 1.8V to 5.5V is low enough to support many portable applications	Click Here

Operational Amplifiers

Function: Provide gain to small signals

Popular Products	Description	Product Web Page
MCP603x	The MCP6031/2/3/4 op amps have a gain bandwidth of 10 kHz with a low typical operating current of 0.9 μ A and an offset voltage that is less than 150 μ V.	Click Here
MCP6V11 Zero Drift Op Amps	Gain-Bandwidth Product: 80 kHz, Offset Voltage: $\pm 8 \mu$ V (max.), IQ: 11 μ A (typ.), Wide Supply Voltage Range: 1.6V to 5.5V	Click Here
MCP6444	The MCP6444 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 9 kHz with typ. quiescent current of 450 nA .	Click Here
MCP60x	MCP601/2/3/4 (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μ A and an offset voltage that is less than 2 mV.	Click Here

Analog-to-Digital Converters

- Function: converting analog feedback signals to digital signals for MCU

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3201	<p>The MCP3201 12-bit Analog-to-Digital Converter (ADC) combines high performance and low power consumption in a small package, making it ideal for embedded control applications. The MCP3201 features SAR architecture and a SPI serial interface, allowing 12-bit ADC capability to be added to any PIC® microcontroller. The MCP3201 features 100k samples/second, 1 input channel, low power consumption (5nA typical standby, 400µA max. active).</p>	Click Here

Low-Power LDOs

- Function: providing regulated, low-noise supply voltages for the system

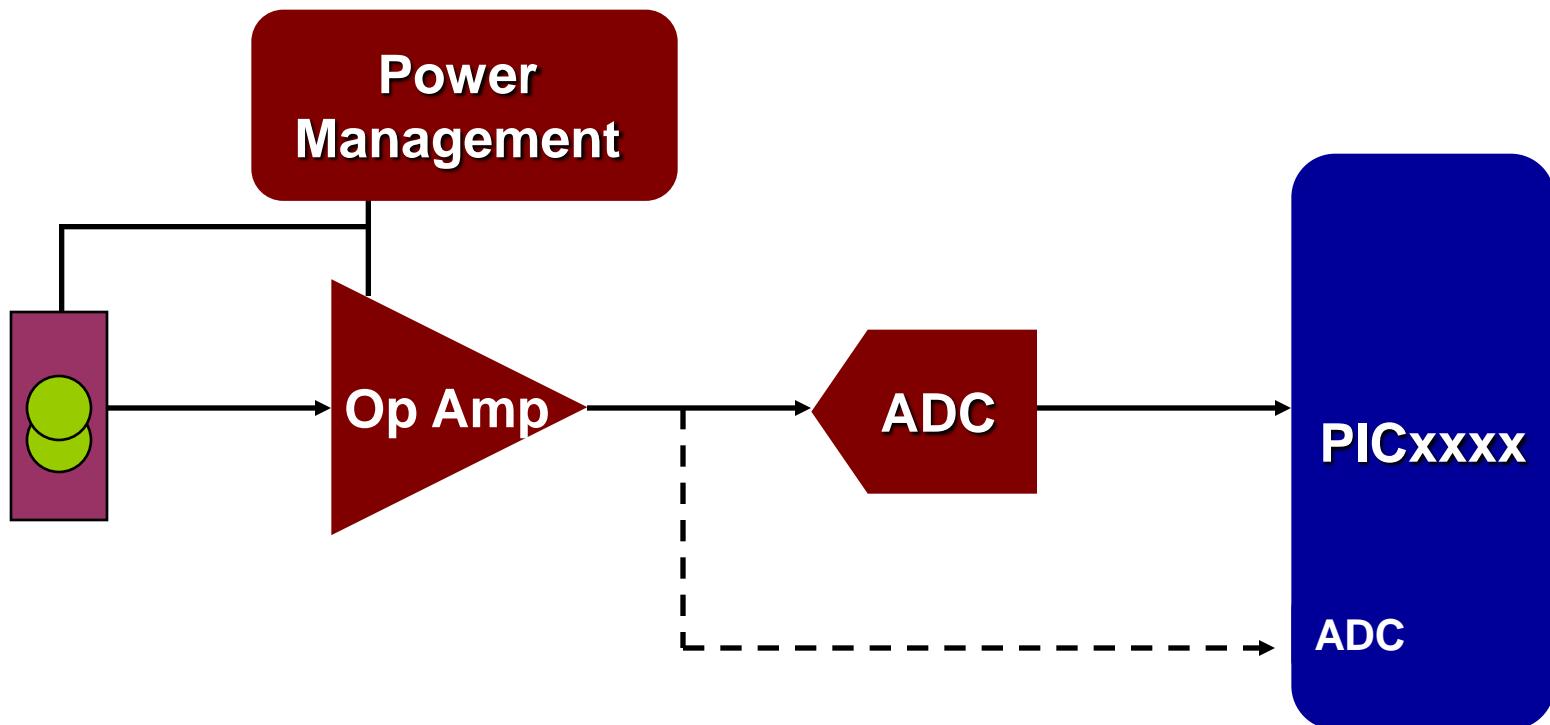
Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
TC1016	80mA , LDO With Shutdown in SC70	Click Here

RESET Monitors

- Function: Reset the CPU and/or MCU when supply voltage falls below threshold

Popular Products	Description	Product Web Page
MCP13xx	The MCP13xx voltage supervisors provide precision monitoring trip points, Watch Dog Timer inputs, Manual Reset with a low Supply current of 10 µA over extended temperature range from 1.0V to 5.5V supply.	Click Here
TCM809	The reset output is driven active within 20 µsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.	Click Here

Blood Glucose Block Diagram



PIC Microcontrollers

- **Function: coordinating all the control, some peripheral functions and monitor functions - the brain of the system**
- **Popular products: PIC16F178X, 75X, 15XX**
- **Attributes:**
 - Up to 32 MHz operating speed
 - PWM output (PIC1XF75X)
 - Integrated hi-speed, comparators, op-amp, 12-bit ADC, 5/8/9 bit DAC, CCP, COG
 - Up to 256 bytes of EEPROM
 - Available in UQFN, QFN, PDIP, SOIC, and TSSOP packages
 - 8-pin solutions (PIC12F752)

Power Management

- Function: providing regulated, low-noise supply voltages for the system

Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
TC1016	80mA , LDO With Shutdown in SC70	Click Here
MCP16251/2	The MCP16251/2 is a compact, high-efficiency, fixed frequency, synchronous step-up DC-DC converter. This family of devices provides an easy-to-use power supply solution for applications powered by either one-cell, two-cell or three-cell alkaline, NiCd, NiMH and one-cell Li-Ion or Li-Polymer batteries.	Click Here

Voltage References

- Function: providing the system with an accurate analog voltage for comparison

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

Operational Amplifiers

Function: buffering and filtering signals

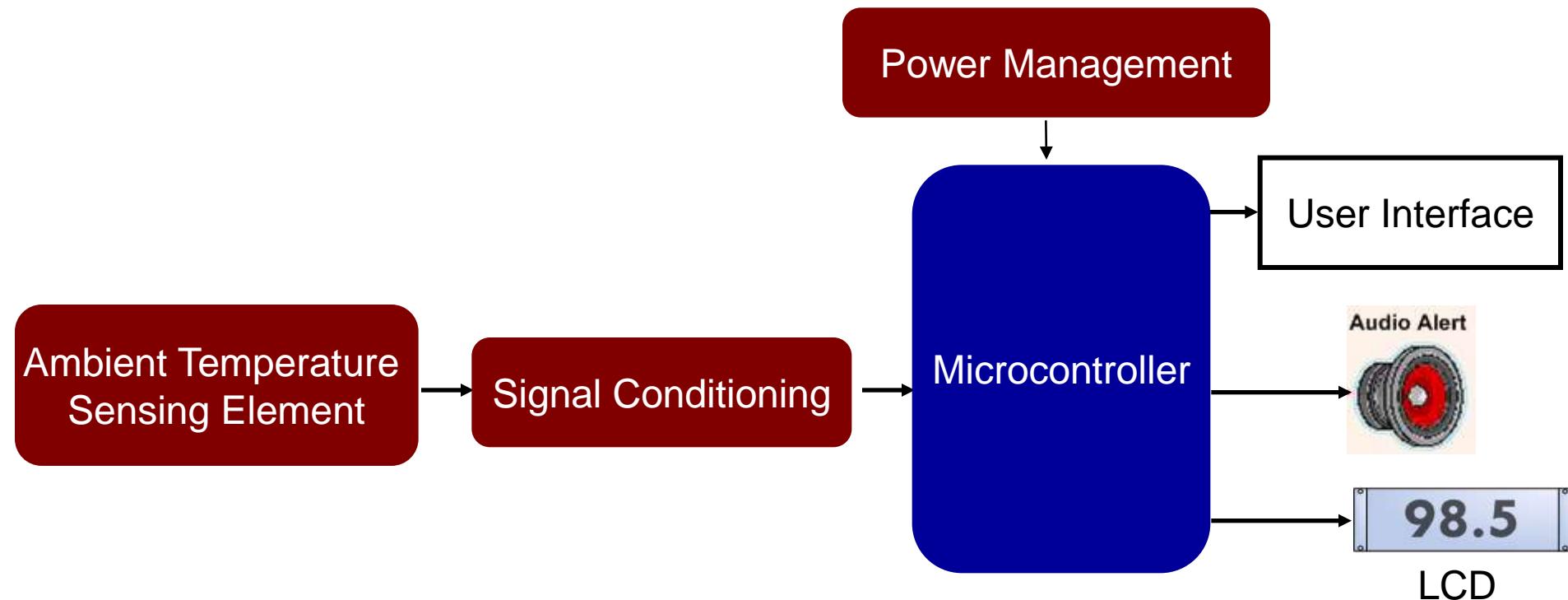
Popular Products	Description	Product Web Page
MCP603x	The MCP6031/2/3/4 op amps have a gain bandwidth of 10 kHz with a low typical operating current of 0.9 μ A and an offset voltage that is less than 150 μ V.	Click Here
MCP6V11 Zero Drift Op Amps	Gain-Bandwidth Product: 80 kHz, Offset Voltage: $\pm 8 \mu$ V (max.), IQ: 11 μ A (typ.), Wide Supply Voltage Range: 1.6V to 5.5V	Click Here
MCP6444	The MCP6444 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 9 kHz with typ. quiescent current of 450 nA .	Click Here
MCP60x	MCP601/2/3/4 (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μ A and an offset voltage that is less than 2 mV.	Click Here

Analog-to-Digital Converters

- Function: converting analog feedback signals to digital signals for MCU

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3421	<p>The MCP3421 is a single channel low-noise, high accuracy Delta-Sigma A/D converter with differential inputs and up to 18 bits of resolution in a small SOT-23-6 package. The device uses a two-wire I2C™ compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.</p>	Click Here

Digital Thermometer



Signal Conditioning

- Microchip offers high resolution SAR and Delta-Sigma ADC and a wide range of high bandwidth, low current and cost effective operational amplifiers

Popular Products	Description	Product Web Page
MCP6231/2/4	MCP6231/1R/1U/2/4 - Family of operational amplifiers Gain Bandwidth Product: 300 kHz (typical), Low Supply Current: = 20 µA (typical), Wide Supply Voltage: 1.8V to 6.0V	Click Here
MCP3421	The MCP3421 is a single channel low-noise, high accuracy Delta-Sigma A/D converter with differential inputs and up to 18 bits of resolution in a small SOT-23-6 package. The device uses a two-wire I ² C™ compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.	Click Here

Power Management

Wide range of Voltage Regulators and DC- DC Converters

Popular Products	Description	Product Web Page
MCP16251/2	The MCP16251/2 is a compact, high-efficiency, fixed frequency, synchronous step-up DC-DC converter. This family of devices provides an easy-to-use power supply solution for applications powered by either one-cell, two-cell or three-cell alkaline, NiCd, NiMH and one-cell Li-Ion or Li-Polymer batteries.	Click Here
MCP1700/2/3A	Input Voltage Options between 6V and 16V, Very low active current < 2 µA, Multiple small package options (SOT23-3), Custom output voltages available upon request	Click Here
TC101(4/5/85) Linear Regulators	Low Supply Current (50 µA, typical), Power-Saving Shutdown Mode Pin Options for outputs of 50mA, 100mA, 150mA	Click Here

Thermal Compensation

- In many cases ambient temperature compensation requires a second

Popular Products	Description	Product Web Page
MCP9808 Digital temperature sensor	The MCP9808 converts temperatures between -20°C and +100°C to a digital word with $\pm 0.5^{\circ}\text{C}$ (max.) accuracy	Click Here
MCP9700 Linear Active Thermistor™ ICs	The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.	Click Here

PIC Microcontrollers

- **Function:** coordinating all the control, some peripheral functions and monitor functions - the brain of the system
- **Popular products:** PIC16F193X, PIC18F65J90/94
- **Attributes:**
 - Up to 32 MHz operating speed
 - PWM output (PIC16F193X)
 - Integrated LCD controller, up to 256 segments
 - Integrated comparators, op-amp, 12-bit ADC, 5/8/9 bit DAC
 - Up to 256 bytes of EEPROM



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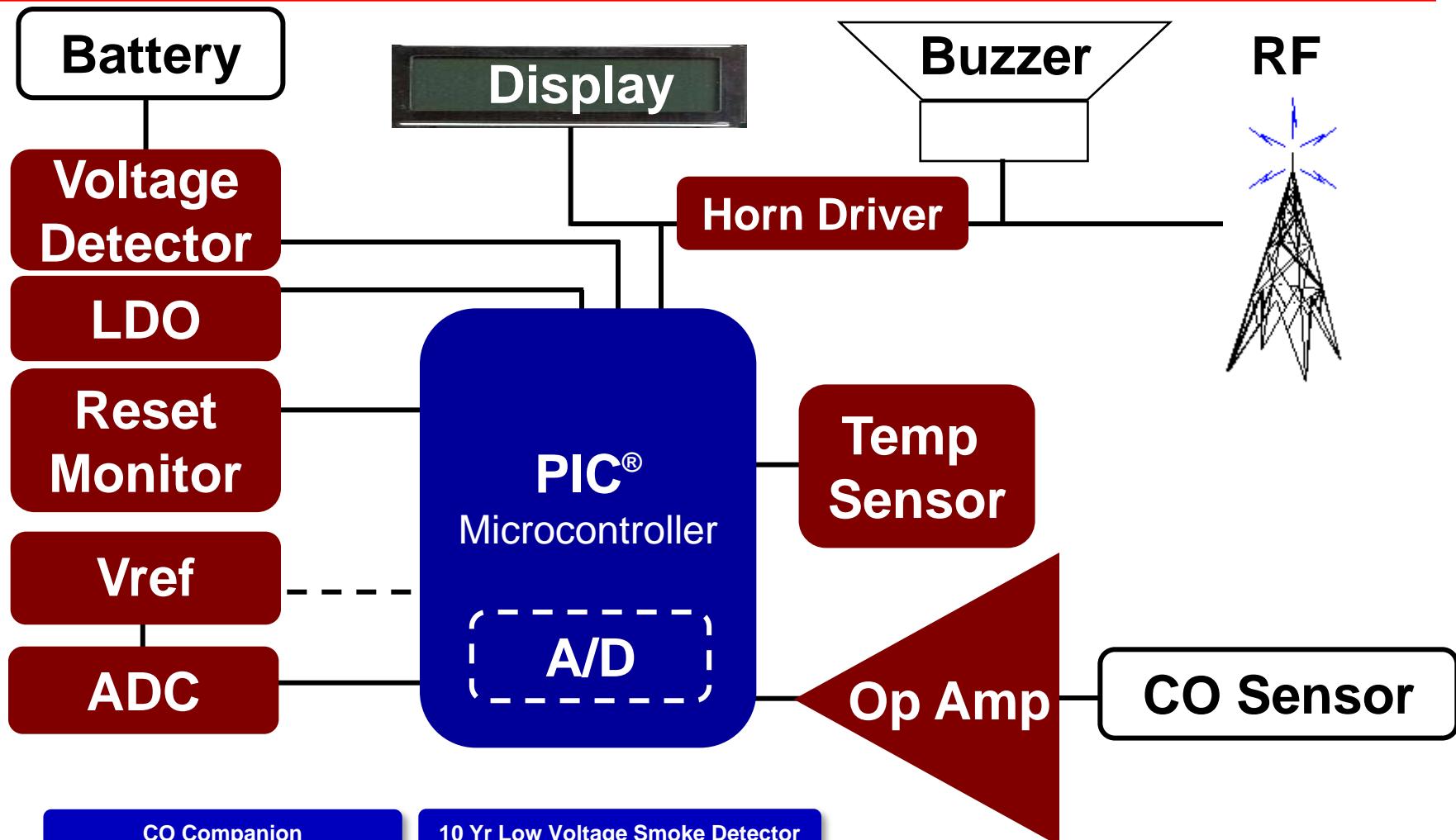
Microchip Analog Products for Smoke and CO Detectors

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CO Detector



CO Companion

10 Yr Low Voltage Smoke Detector

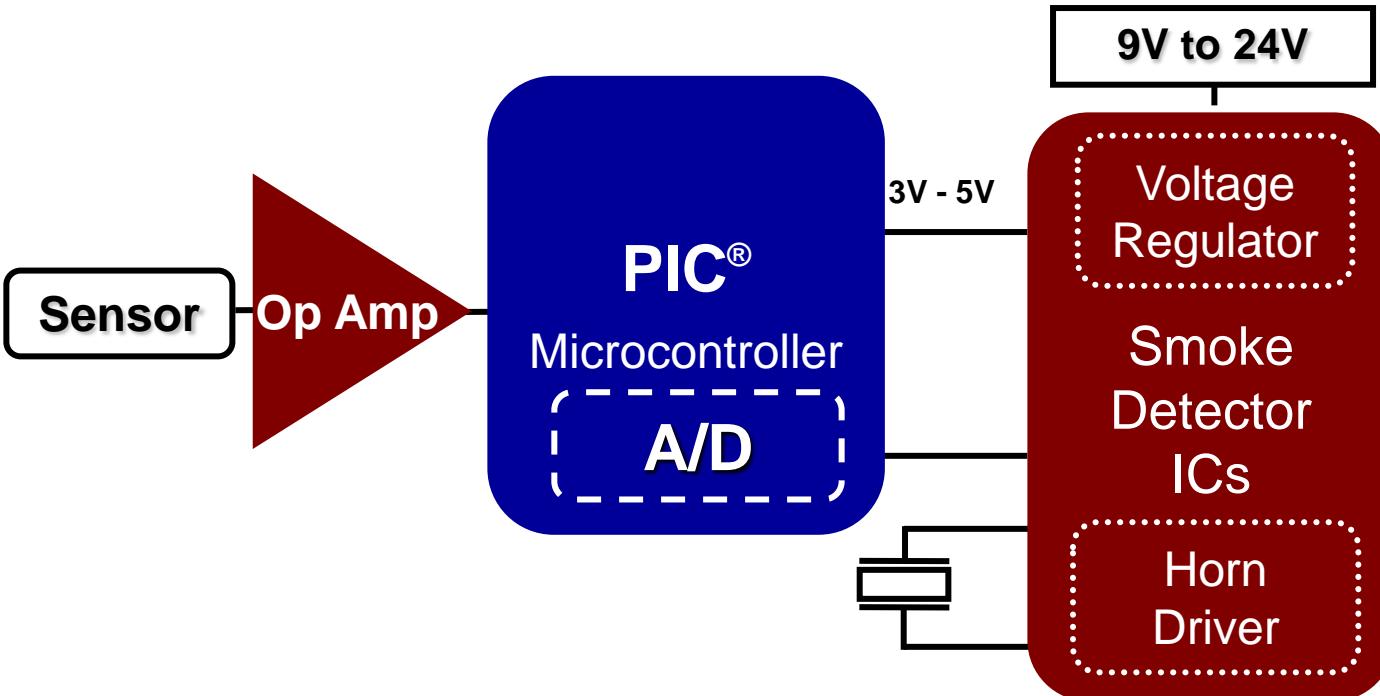
Home Alarm Systems

Low Cost Smoke Detectors

Addressable Smoke Detectors

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Addressable Smoke Detector



CO Companion

10 Yr Low Voltage Smoke
Detector

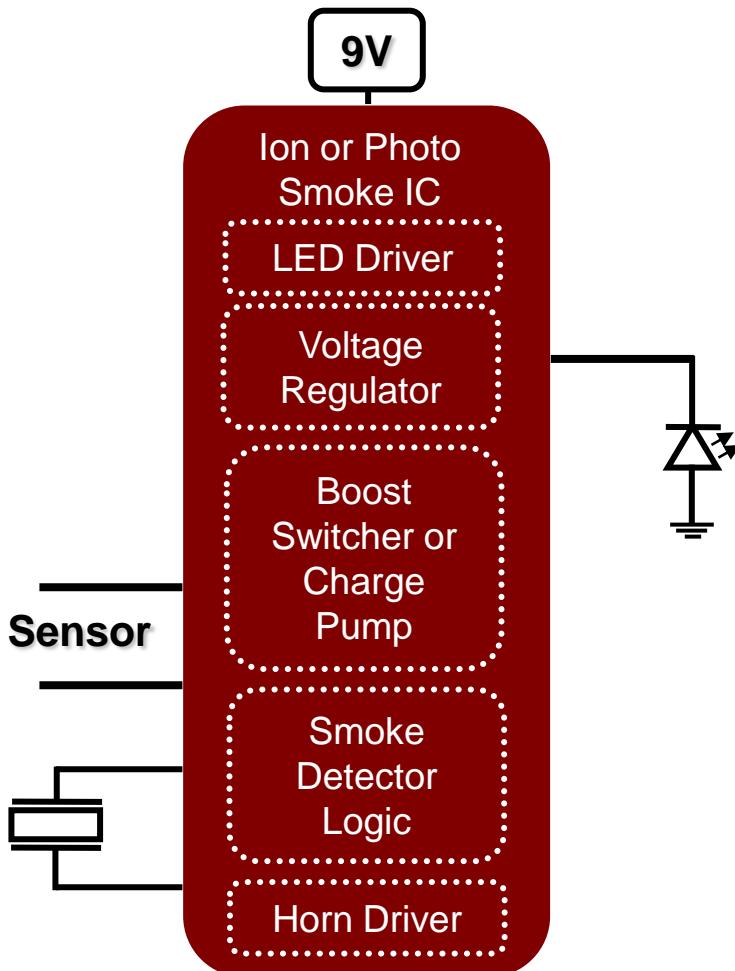
CO Detectors

Low cost Smoke Detectors

Home Alarm Systems

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Low Cost Smoke Detector



[CO Detectors](#)

[Addressable Smoke Detectors](#)

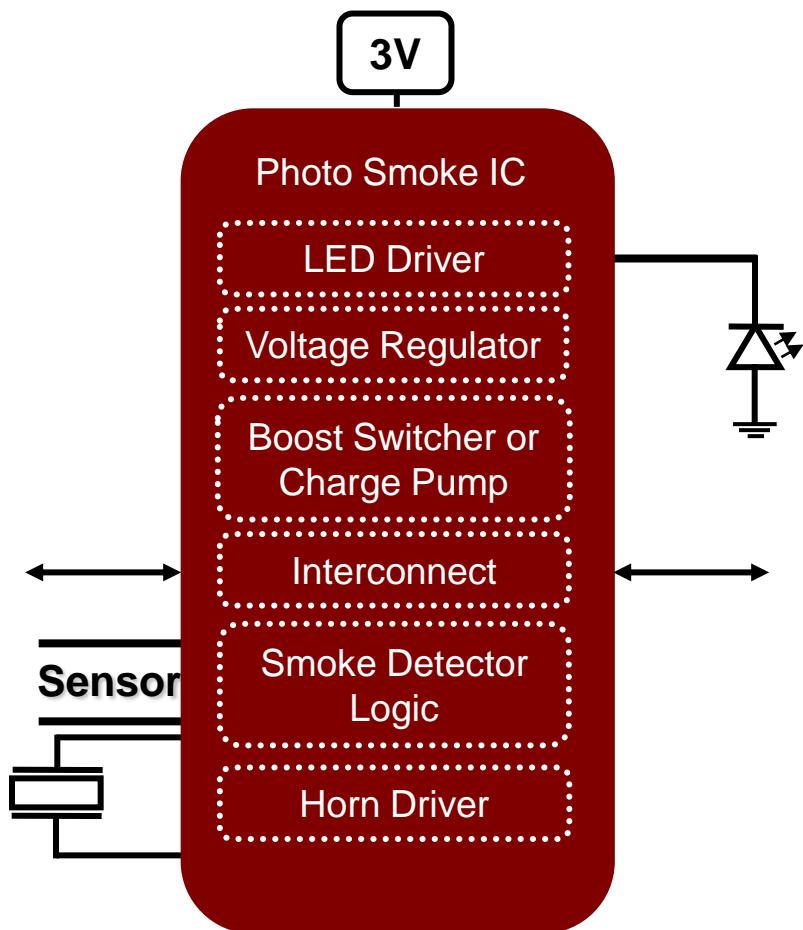
[CO Companion](#)

[10 Yr Low Voltage Smoke Detector](#)

[Home Alarm Systems](#)

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10 Year Low Voltage Photoelectric Smoke Detector



CO Companion

CO Detectors

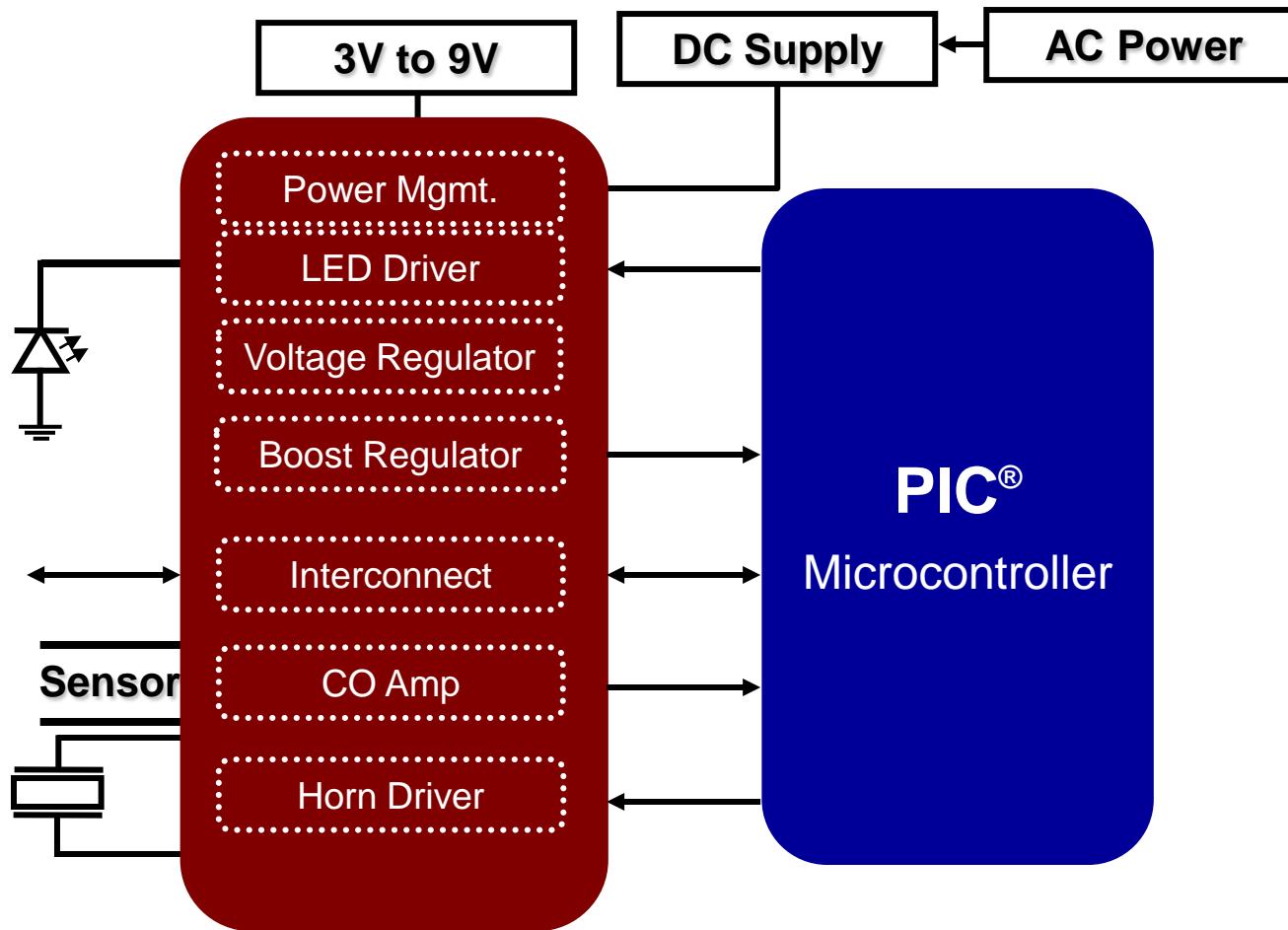
Low cost Smoke Detectors

Addressable Smoke Detectors

Home Alarm Systems

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CO Detector Companion IC



CO Detectors

10 Yr Low Voltage Smoke Detector

Low cost Smoke Detectors

Addressable Smoke Detectors

Home Alarm Systems

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Operational Amplifiers

Function: Provide gain to small signals

Popular Products	Description	Product Web Page
MCP603x	The MCP6031/2/3/4 op amps have a gain bandwidth of 10 kHz with a low typical operating current of 0.9 μ A and an offset voltage that is less than 150 μ V.	Click Here
MCP6444	The MCP6444 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 9 kHz with typ. quiescent current of 450 nA .	Click Here

Comparators

- Function: Establish alarm thresholds (primarily in smoke detectors)

Popular Products	Description	Product Web Page
MCP6567	<p>These comparators are optimized for low power, single-supply operation with greater than rail-to-rail input operation. The open drain output of the MCP6566/7/9 family with a pull-up resistor, can be used as a level shifter for any desired voltage from 1.6V to 5.5V.</p>	Click Here

Analog-to-Digital Converters

- Function: converting analog feedback signals to digital signals for MCU

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3201	<p>The MCP3201 12-bit Analog-to-Digital Converter (ADC) combines high performance and low power consumption in a small package, making it ideal for embedded control applications. The MCP3201 features SAR architecture and a SPI serial interface, allowing 12-bit ADC capability to be added to any PIC® microcontroller. The MCP3201 features 100k samples/second, 1 input channel, low power consumption (5nA typical standby, 400µA max. active).</p>	Click Here

RESET Monitors

- Function: Reset the CPU and/or MCU when supply voltage falls below threshold

Popular Products	Description	Product Web Page
MCP13xx	The MCP13xx voltage supervisors provide precision monitoring trip points, Watch Dog Timer inputs, Manual Reset with a low Supply current of 10 µA over extended temperature range from 1.0V to 5.5V supply.	Click Here
TCM809	The reset output is driven active within 20 µsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.	Click Here

Voltage References

- Function: providing the system with an accurate analog voltage for comparison

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

Power Management

Popular Products	Description	Product Web Page
MCP13xx	The MCP13xx are voltage supervisor devices designed to keep a microcontroller in reset until the system voltage has reached and stabilized at a proper level for reliable system operation.	Click Here
MCP111/2	The MCP111/112 voltage detectors have extremely low 1uA operating current and small form factor. They hold the microcontroller in reset until the supply voltage reaches a predetermined operating level. These devices also protect against brownout conditions	Click Here
LDO MCP1700 MCP1703A	The MCP1700/3A are CMOS low dropout positive voltage regulators which can source up to 250mA of current with an extremely low input-output voltage differential. The low dropout voltage combined with the low current consumption makes this part ideal for battery operation.	MCP1700 MCP1703A
MCP16301	The MCP16301 is a highly integrated, high-efficiency, fixed frequency, step-down DC-DC converter in a popular SOT-23 package that operates from input voltage sources up to 30V	Click Here

Temperature Sensor

Function: provides temperature measurement

Popular Products	Description	Product Web Page
TC1047	<p>The TC1047A is a linear output temperature sensor whose output voltage is directly proportional to measured temperature. For the TC1047A, the output voltage range is typically 100mV at -40C, 500mV at 0C, 750mV at +25C, and 1.75V at +125C. A 10mV/°C voltage slope allows for the wide temperature range.</p>	Click Here
MCP9700 Linear Active Thermistor™ ICs	<p>The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.</p>	Click Here

PIC Microcontrollers

- **Function: coordinating all the control and monitor functions - the brain of the system**
- **Popular products: PIC16F161X, 527/570, 32X, 182X, 75X, 15XX**
- **Attributes:**
 - Up to 32MHz operating speed
 - PWM output (PIC16F182X)
 - Programmable switch mode controller (PIC16F75X)
 - Integrated comparators, op-amp, 12-bit ADC, 8-bit DACs
 - Up to 256 bytes of EEPROM
 - Available various packages

PIC12F675 - PICmicro

High Performance RISC CPU:

- Only 35 instructions to learn
- All single cycle instructions (200 ns), except for program branches which are two-cycle
- Operating speed:
 - DC - 20 MHz oscillator/clock input
 - DC - 200 ns instruction cycle
- Memory
 - 1024 x 14 words of FLASH Program Memory
 - 64 x 8 bytes of Data Memory (SRAM)
 - 128 x 8 bytes of EEPROM data memory
- Interrupt capability
- 16 special function hardware registers
- 8-level deep hardware stack
- Direct, Indirect, and Relative Addressing modes

Peripheral Features:

- 6 I/O pins with individual direction control
- High current sink/source for direct LED drive
- Analog comparator module with:
 - One analog comparator
 - Programmable on-chip comparator voltage reference (CVREF) module
 - Programmable input multiplexing from device inputs
 - Comparator output is externally accessible
- Analog-to-Digital Converter module (PIC12F675):
 - 10-bit resolution
 - Programmable 4-channel input
 - Voltage reference input
- Timer0: 8-bit timer/counter with 8-bit programmable prescaler
- Enhanced Timer1:
 - 16-bit timer/counter with prescaler
 - External Gate Input mode
 - Option to use OSC1 and OSC2 in LP mode as Timer1 oscillator, if INTRC Oscillator mode selected
- 64 bytes of general purpose RAM



MICROCHIP

RE46C190

	Description	Product Web Page
RE46C190	<ul style="list-style-type: none">• Two AA battery Operation• Internal Power On Reset• Low Quiescent Current Consumption• Internal IRED driver with Programmable IRED Current• Programmable Photo Amplifier• Programmable Smoke Sensitivity Levels• 9 Minute Timer for Sensitivity Control• Chamber Test with Programmable Sensitivity Level• Internal Low Battery Test with Programmable Threshold• Interconnect up to 40 Detectors• Local Alarm Memory• Temporal or Continuous Horn Pattern• All internal Oscillator• Available 16L N SOIC	Click Here

<< BACK to BLOCK DIAGRAM

RE46C800

	Description	Product Web Page
RE46C800	<ul style="list-style-type: none">• The RE46C800 provides all of the necessary analog, interface, and power management functions necessary to build a microcontroller based CO or toxic gas detector.• The RE46C800 is intended for use with two terminal electrochemical CO and toxic gas sensors.• The uncommitted op amp can also be used for heat detector applications	<u>Click Here</u>

EEPROM Memory

- **Function: storing factory calibration values and the "life" clock of a CO sensor**
- **Popular products: 24LCxxx, 93xx46A/B, 25LCxxx**
- **Attributes:**
 - SPI™, I²C™ and Microwire® Interface
 - Small SOT-23 and MSOP packages
 - Densities from 128 to 512k
 - Supply voltages as low as 1.8V
 - E/W Cycles: 1M

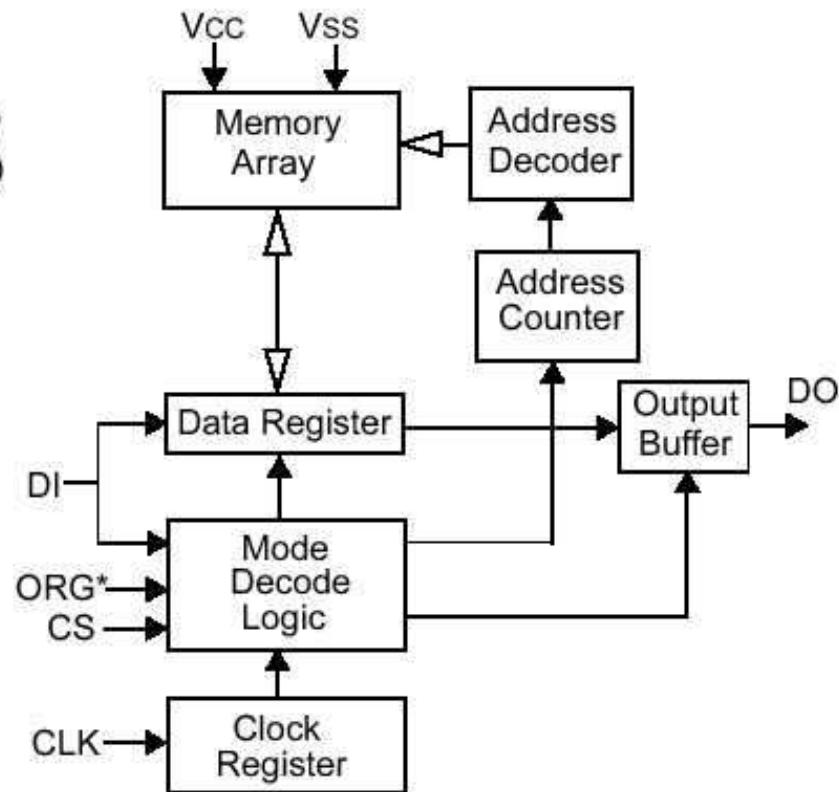


MICROCHIP

93XX46A/B - Microwire EEPROM

Features

- Low power CMOS technology
- ORG pin to select word size for '46C version
- 128 x 8-bit organization 'A' ver. devices (no ORG)
- 64 x 16-bit organization 'B' ver. devices (no ORG)
- Self-timed ERASE/WRITE cycles (including auto-erase)
- Automatic ERAL before WRAL
- Power on/off data protection circuitry
- Industry standard 3-wire serial I/O
- Device status signal (READY/BUSY)
- Sequential READ function
- 1,000,000 E/W cycles
- Data retention > 200 years
- Temperature ranges supported
 - Industrial (I) -40°C to +85°C
 - Automotive (E) -40°C to +125°C



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Horn Drivers

- **Horn Drivers allows battery operation of a piezoelectric horn**
 - Piezoelectric horns are a low cost, high efficiency method to achieve the sound pressure required.
- **Horn Drivers provide these advantages:**
 - Realize cost savings by reducing component count
 - Increase battery life, low current low voltage
 - Switchers and charge pumps for even lower voltage operation
 - Self resonance calibration

Horn Driver Family (1)

□ Piezoelectric Horn Drivers, baseline ASIC Products

- RE46C100 basic model, Vdd 6V - 16V
- RE46C101 with LED Driver, Vdd 6V - 16V
- RE46C104 with Voltage Converter, Vdd 4V-8V
- RE46C117 with Charge Pump, Vdd 2V - 5V

Horn Driver Family (2)

- **Piezoelectric Horn Drivers with controller
Voltage Regulators ASIC products**
 - RE46C108 Vreg pin select 3.3V or 5V, Vdd 6V-12V
 - RE46C105 Vreg pin select 3.3V or 5V, Low Battery, LED Driver, Vdd 6V-12V
 - RE46C107 Vreg pin select 3V or 3.3V, Low Battery, Brownout, Vdd 2V-5V
 - RE46C109 Vreg 3.0V, Low Battery, I/O, Brownout, Vdd 6-12V
 - RE46C119 Vreg 3.0V, Low Battery, I/O, Power Good, 6V-12V

Smoke Detector ICs

- **Smoke Detector ICs allows implementation of low power Ionization or photoelectric smoke detectors**
- **Advantages:**
 - Low battery detection
 - Integrated horn driver
- **Advantages for selected detectors**
 - Interconnect for sounding multiple units
 - Sensitivity/Hush Timer
 - Reverse battery protection
 - 24V Regulator and step-up regulator

Ionization Smoke ICs

Popular Products	Description	Product Web Page
RE46C12x	Hush, Interconnect, Continuous or Temporal Pattern, Reverse Chamber Polarity	Click Here
RE46C152	Hush, Interconnect, Pin-select Temporal and Continuous Pattern	
RE46C162/3	Interconnect, Temporal or Continuous Horn Pattern, Alarm Memory	



Photoelectric Smoke ICs

Popular Products	Description	Product Web Page
RE46C140/1/3/5/	Hush Timer, Interconnect, Temporal and Continuous Horn Pattern	Click Here
RE46C165/6/7/8	Hush Timer, Interconnect, Temporal and Continuous Horn Pattern, Alarm Memory. Ideal for new home construction market	Click Here

[Low cost Smoke Detectors](#)

[Addressable Smoke Detectors](#)

[CO Detectors](#)

[10 Yr Low Voltage Smoke Detector](#)



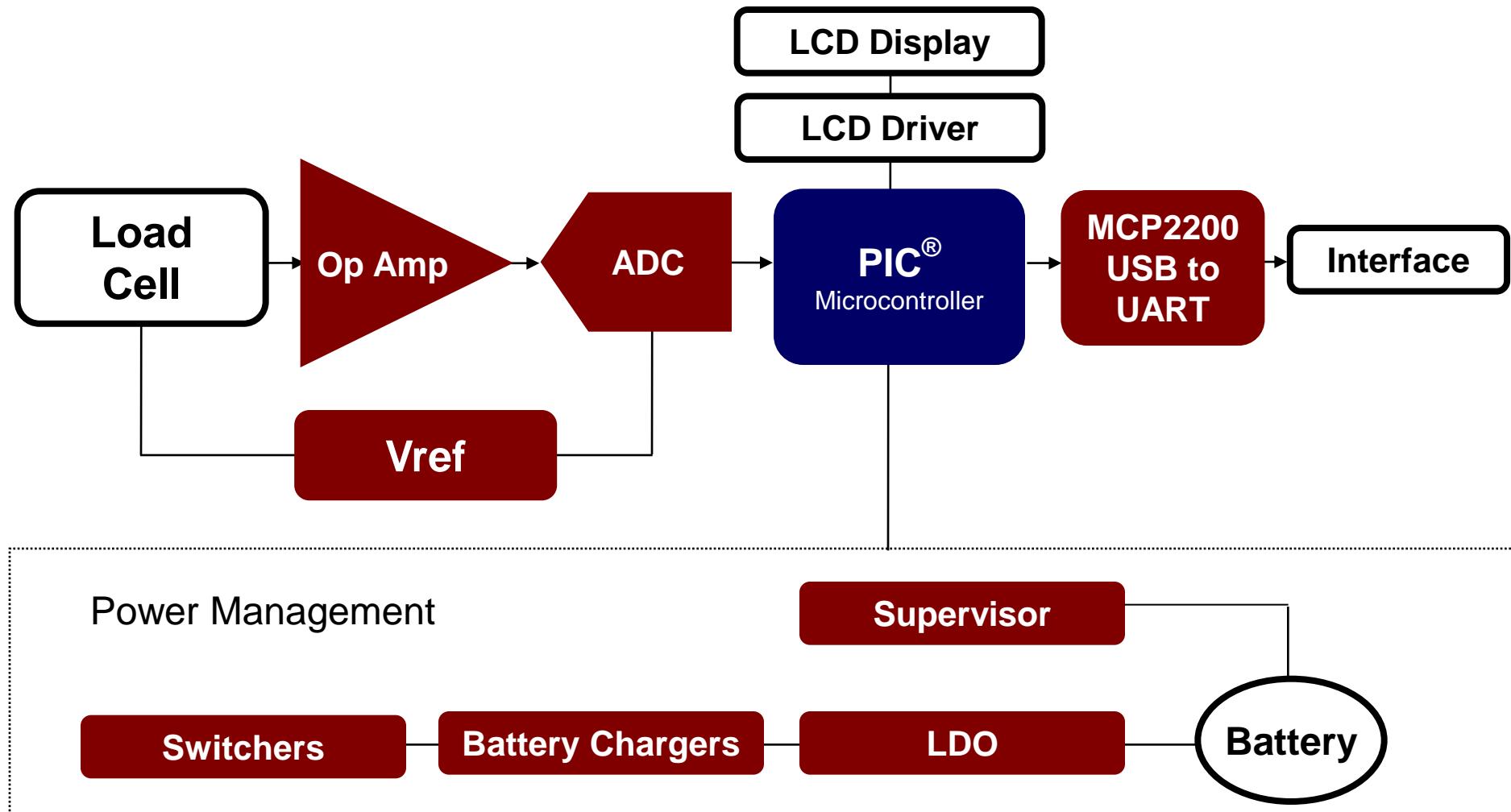
MICROCHIP

Weigh Scale

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Typical Weigh Scale



Operational Amplifiers

Function	Popular Products	Description	Product Web Page
Sense and gain up output current - low offset voltage required for minimizing measurement error	MCP603x	The MCP6031/2/3/4 op amps have a gain bandwidth of 10 kHz with a low typical operating current of 1.35µA and an offset voltage that is less than 150 µV.	Click Here
	MCP6V0x Zero Drift Op Amps	VOS: $\pm 2 \mu\text{V}$ (maximum), PSRR: 130 dB (minimum), CMRR: 130 dB (minimum), IQ: 300 $\mu\text{A}/\text{amplifier}$ (typical) Wide Supply Voltage Range: 1.8V to 5.5V	Click Here
Provide feedback compensation by sensing output voltage and comparing it with reference voltage	MCP627x/8x /9x	The MCP627/8/9x family general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 2-10 MHz with low quiescent current in small packages	Click Here
	MCP60x	MCP601/2/3/4 (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μA and an offset voltage that is less than 2 mV.	Click Here

[Winning Attributes](#)
[<< BACK to BLOCK DIAGRAM](#)

Operational Amplifiers

Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Voltage References

- Function: providing the system with an accurate analog voltage for comparison

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

USB-to-UART/SPI

- Function: Enables USB connectivity in applications that have UART/SPI interface

Popular Products	Description	Product Web Page
MCP2200	<p>The MCP2200 is a USB-to-UART serial converter. The device reduces external components by integrating the USB termination resistors. The MCP2200 also has 256-bytes of integrated user EEPROM. The MCP2200 has eight general purpose input / output pins. Four of the pins have alternate functions to indicate USB and communication status.</p>	Click Here
MCP2210	<p>The MCP2210 is a USB-to-SPI Master converter. The device reduces external components by integrating the USB termination resistors. The MCP2210 also has 256 bytes of integrated user EEPROM. The MCP2210 has nine general purpose input/output pins. Seven pins have alternate functions to indicate USB and communication status.</p>	Click Here

Battery Chargers

Function: Charge & monitor the Lithium battery chemistries

Popular Products	Description	Product Web Page
MCP731xx	<p>The MCP73811/2 devices are linear charge management controllers that are designed to provide specific charge algorithms for single cell Li-Ion or Li-Polymer battery to achieve optimal capacity in the shortest charging time possible.</p>	Click Here
MCP732xx	<p>The MCP73123/223 is a highly integrated Lithium Iron Phosphate (LiFePO4) battery charge management controller that provide specific charge algorithms for LiFePO4 batteries to achieve optimal capacity and safety in the shortest charging time possible. Along with its small physical size, the low number of external components makes the MCP73123/223 ideally suitable for various applications.</p>	Click Here

Battery Chargers

Attributes:

- Small thermally efficient DFN and QFN packages
- High-accuracy voltage regulation: $\pm 0.5\%$ (max)
- Low operating current: $260\mu\text{A}$ (typ)
- Shutdown and pre-conditioning modes
- Temperature monitor & charge complete indicator
- USB/AC inputs
- Loadsharing
- Overvoltage Protection (OVP)

PIC Microcontrollers

- **Function:** coordinating all the control, some peripheral functions and monitor functions - the brain of the system
- **Popular products:** PIC16F193X, PIC18F65J90/94, K87K90
- **Attributes:**
 - Up to 32 MHz operating speed
 - PWM output (PIC16F193X)
 - Integrated LCD controller, up to 256 segments
 - Integrated comparators, op-amp, 12-bit ADC, 5/8/9 bit DAC
 - Up to 256 bytes of EEPROM
 - Available in PDIP, SOIC, and TSSOP packages

Switching Regulators

Popular Products	Description	Product Web Page
MCP1601	<p>The MCP1601 is a synchronous Buck (step-down) switching regulator that can continuously supply 500mA of load current. This device can provide output voltages of 0.9V to Vin with an operating efficiency that can exceed 92%.</p>	Click Here
MCP16251/2	<p>The MCP16251/2 is a compact, high-efficiency, fixed frequency, synchronous step-up DC-DC converter. This family of devices provides an easy-to-use power supply solution for applications powered by either one-cell, two-cell or three-cell alkaline, NiCd, NiMH and one-cell Li-Ion or Li-Polymer batteries.</p>	Click Here
MCP1640	<p>The MCP1640 is a compact, high-efficiency, fixed frequency, synchronous step-up DC-DC converter. It provides an easy-to-use power supply solution for applications powered by either one-cell, two-cell, or three-cell alkaline, NiCd, NiMH, one-cell Li-Ion or Li-Polymer batteries.</p>	Click Here

Switching Regulators

Attributes:

- Regulator and controller (external FET) solutions
- Small SOT-23, MSOP and SOP packages
- Auto-switching PWM/PFM operation
- 300kHz and 750kHz switching frequency
- UVLO, Soft-start & over-temperature protection
- Efficiency as high as 95%
- Very low operating current

RESET Monitors

- Function: Reset the CPU and/or MCU when supply voltage falls below threshold

Popular Products	Description	Product Web Page
MCP13xx	The MCP13xx voltage supervisors provide precision monitoring trip points, Watch Dog Timer inputs, Manual Reset with a low Supply current of 10 µA over extended temperature range from 1.0V to 5.5V supply.	Click Here
TCM809	The reset output is driven active within 20 µsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.	Click Here

RESET Monitors

Attributes:

- Tiny SOT-23 and SC-70 packages
- Very low operating current: as low as 10 μ A (max)
- High threshold voltage accuracy: $\pm 2.8\%$ (max)
- V_{DD} transient immunity
- Watchdog Timer / manual reset (MCP13xx, TC1232)
- Many available options: push-pull output, open-drain output and internal pull-up resistor

Low-Power LDOs

- Function: providing regulated, low-noise supply voltages for the system

Popular Products	Description	Product Web Page
MCP1824/5/6/7	The MCP1825 is a 500 mA, ceramic output cap stable, low output voltage, Low Dropout Regulator (LDO) with shutdown and power good functions (fixed output version only). It is part of the family of LDOs that includes 300 mA MCP1824, 1A MCP1826 and 1.5A MCP1827.	Click Here
MCP1703A	With 250 mA maximum output, MCP1703 works with input voltage of up to 16V and in combination with its low current consumption of 2 μ A	Click Here

ADC Portfolio

Function: Converting analog voltage or current signal (pressure) into digital data

Popular Products	Description	Product Web Page
MCP3421	The MCP3421 is a single channel low-noise, high accuracy Delta-Sigma A/D converter with differential inputs and up to 18 bits of resolution in a small SOT-23-6 package. The device uses a two-wire I2C™ compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.	Click Here
MCP3551	MCP355X devices are 2.7V to 5.5V, 22-bit delta-sigma A/D converters. The family exhibit good linearity, high accuracy and low noise performance for applications where sensor measurements such as pressure are performed.	Click Here

Delta-Sigma Analog-to-Digital Converters

Attributes:

- Resolution: 16 to 22 bits
- Max sampling rate: up to 240 sps
- Current consumption: 120 to 155 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP

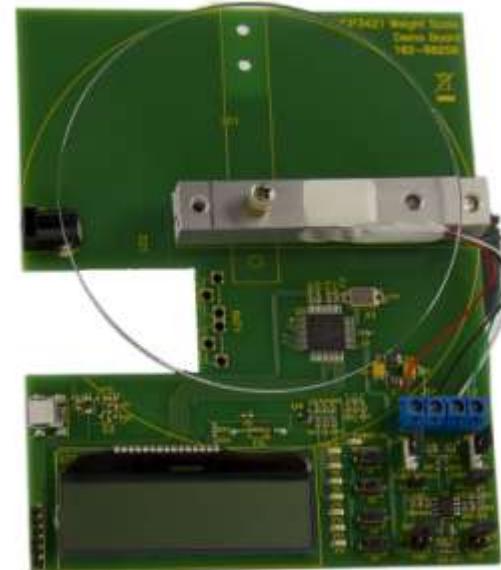
Product Support Tools

Devices Supported:

MCP3421, MCP6V07, PIC18F4550

Summary Description:

The MCP3421 Weight Scale Demo Board is designed to evaluate the performance of the low-power consumption, 18-bit ADC in an electronic weight scale design. Next to the MCP3421 there is a low-noise, auto-zero MCP6V07 op amp. This can be used to investigate the impact of extra gain added before the ADC for performance improvement. The PIC18F4550 is controlling the LCD and the USB communication with the PC. The GUI is used to indicate the performance parameters of the design and for calibration of the weight scale.



This Kit Contains:

- MCP3421 Weight Scale Demo Board
- 9V Power adapter
- Mini USB cable
- CD with software and documentation



MICROCHIP

Energy Measurement

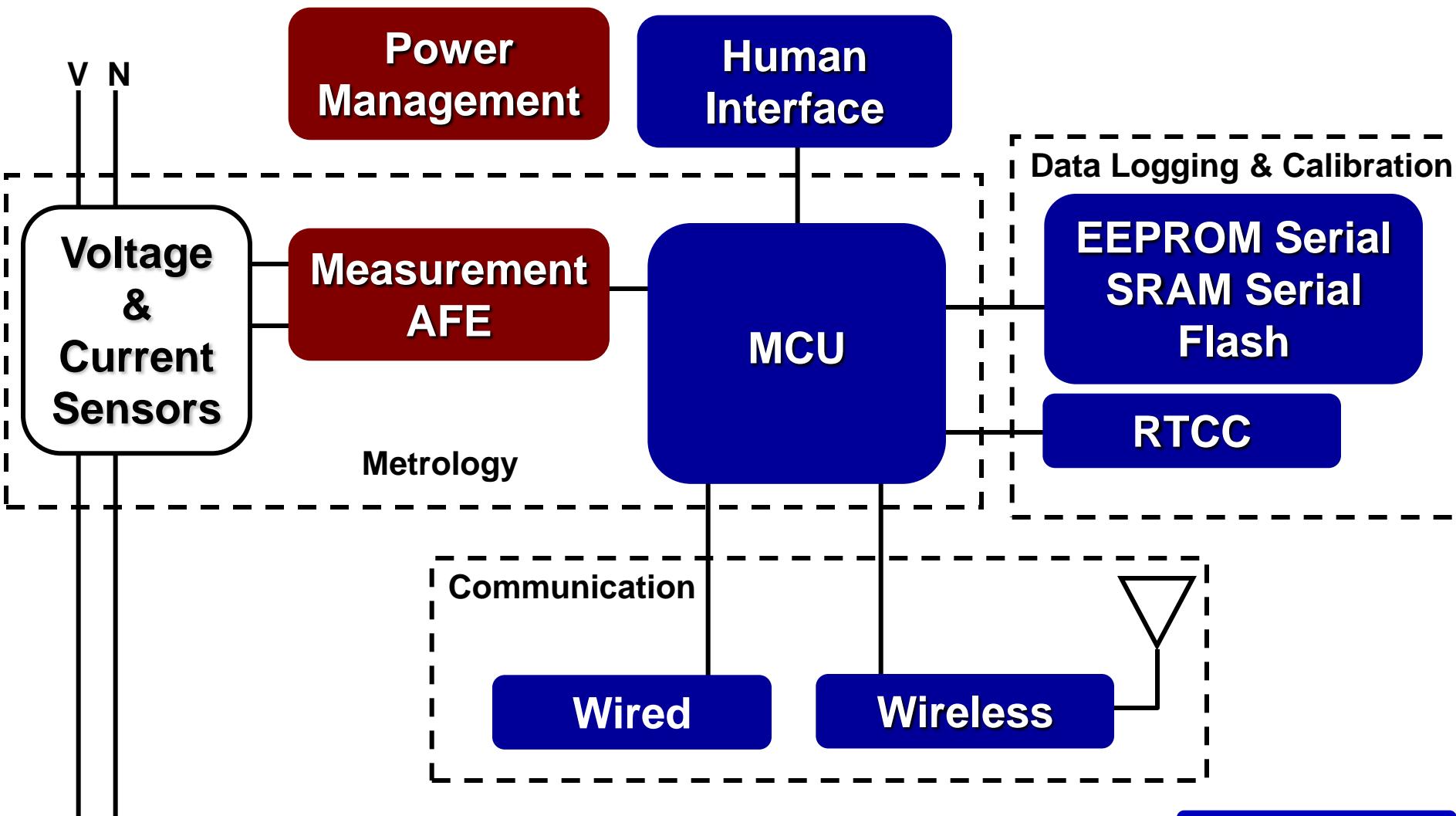
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Microchip's Winning Attributes

- **Industry leading Analog Front End (AFE) accuracy (SINAD, THD, SFDR)**
- **High performance integration**
- **Full solution**
 - Flexible and upgradable solution with AFE+PIC® MCUs and SoC solutions
 - System solution with wireless, memory, analog
- **Great technical support**
 - Numerous reference designs and evaluation boards
 - ACE Metrology Team

Energy Meter Block Diagram



Power Management

Popular Products	Description	Product Web Page
LDO MCP1700 MCP1703A	<p>The MCP1700/3A are CMOS low dropout positive voltage regulators which can source up to 250mA of current with an extremely low input-output voltage differential. The low dropout voltage combined with the low current consumption makes this part ideal for battery operation.</p>	MCP1700 MCP1703A
MCP16311/2	<p>The MCP16311/2 is a compact, high-efficiency, fixed frequency PWM/PFM, synchronous step-down DC-DC converter in a 8-pin MSOP, or 2 x 3 TDFN package that operates from input voltage sources up to 30V. Integrated features include a high-side and a low-side switch, fixed frequency Peak Current Mode Control, internal compensation, peak-current limit and overtemperature protection. The MCP16311/2 provides all the active functions for local DC-DC conversion, with fast transient response and accurate regulation.</p>	Click Here

Sensing Technologies

□ Voltage

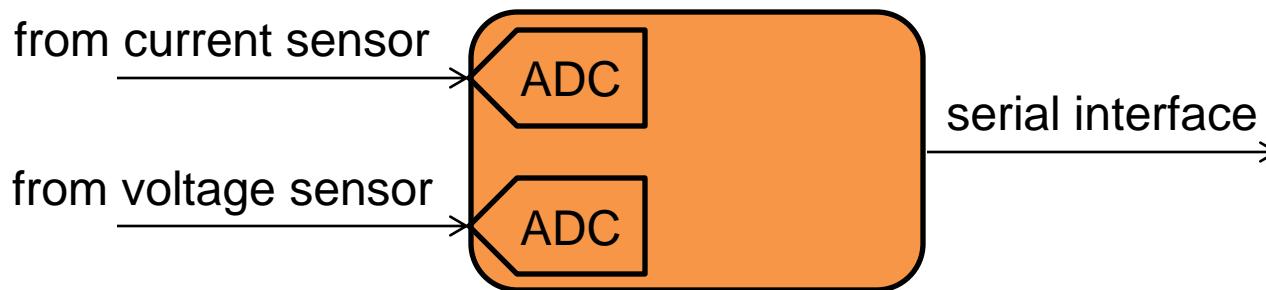
- Resistive Divider from line voltage

□ Current: 4 main sensor types

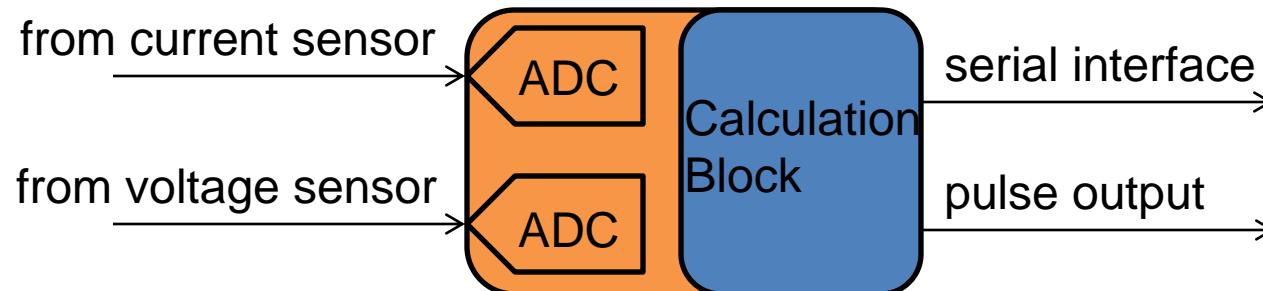
Current Sensor	Cost	Power Consumption	High Current Capability	Description
Current Shunt	Very Low	Medium	Poor	Accurate resistor, 100 $\mu\Omega$ to 500m Ω , non-isolated
Current Transformer	Medium	Low	Good	Winding with magnetic core, isolated
Rogowski Coil	Low-Med	Low	Very Good	Helical coil, output needs to be integrated, isolated
Hall Effect Transformer	High	Medium	Good	Hall plate, isolated

Energy Measurement Analog Front Ends

- Energy Measurement AFEs provide the most flexible and highest accuracy solutions



- Energy Calculation ICs provide energy and power calculations, simplifying design



Energy Measurement Analog Front Ends

Part Number	# of ADCs	Power Measurement
MCP3918	1	1-Phase or 3-Phase (Isolated)
MCP3910	2	1-Phase or 3-Phase (Isolated)
MCP3911	2	1-Phase
MCP3913	6	3-Phase
MCP3914	8	3-Phase w/ Neutral
MCP3901	2	1-Phase
MCP3903	6	3-Phase

2nd Generation:
 Improved performance
 Added features
 2.5V–3.6V Analog V_{DD}
 2.5V–3.6V Digital V_{DD}

1st Generation:
 5V Analog V_{DD}
 2.7V-5.5V Digital V_{DD}

Energy Measurement Analog Front Ends

- Energy measurement AFEs enables the most flexible and highest accuracy solutions

Popular Products	Description	Product Web Page
MCP391X	<p>The MCP391X family are 3V Analog Front Ends (AFE), containing up to eight Delta-Sigma Analog-to-Digital Converters (ADC), PGAs, phase delay compensation block, low-drift voltage reference, digital offset and gain errors calibration registers, and high-speed 20 MHz SPI interface.</p> <p>The family enables 0.1% typical active power measurement error over a 10000:1 dynamic range and are capable of interfacing a variety of voltage and current sensors, including shunts, current transformers, Rogowski coils and Hall-effect sensors.</p>	Click Here

Winning Attributes

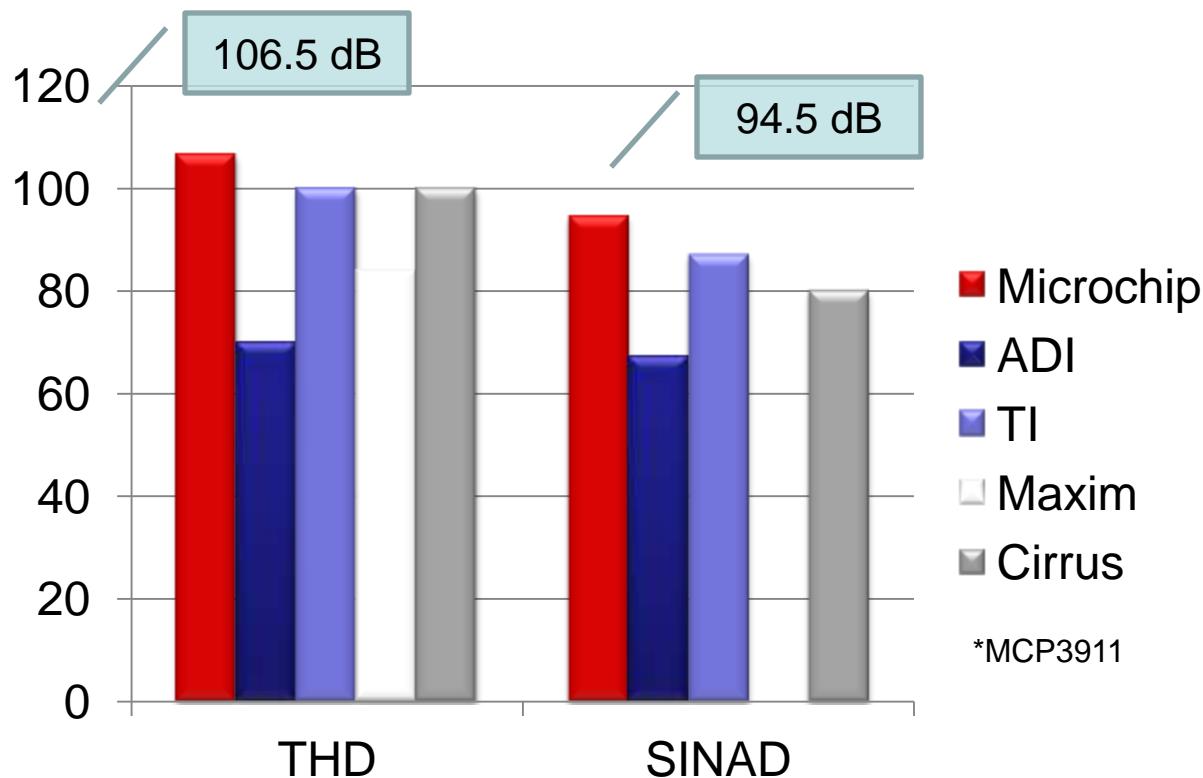
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Energy Measurement AFE Winning Attributes

Attributes:

- Industry leading accuracy enables 0.1% active power measurement error (typ.) over a 10000:1 dynamic range, use of smaller shunt sensors, and reduction in calibration requirements
- Programmable data rate up to 125 ksps allows device to run at low power or at high speed for advanced signal acquisition such as for harmonic analysis
- High performance integration including PGAs, low-drift voltage reference, phase delay block, CRC checksum and register-map lock

Accuracy Comparison



Total Harmonic Distortion and Signal-to-Noise and Distortion Ratio are measures of a device's accuracy

Energy Measurement ICs

- Energy measurement calculation ICs provide energy and power calculations on one device

Popular Products	Description	Product Web Page
MCP3905A MCP3906A MCP3909	<p>The MCP3905A are energy measurement ICs supporting the IEC 62053 international energy metering specification. The output of the device includes a frequency proportional to the average active (real) power at the inputs as well as a higher frequency output proportional to the instantaneous power for meter calibration. These devices incorporate two 16-bit delta-sigma ADCs with a programmable gain up to 16 and on-chip voltage reference.</p> <p>The MCP3909 also includes an SPI interface for ADC and multiplier output data.</p>	Click Here

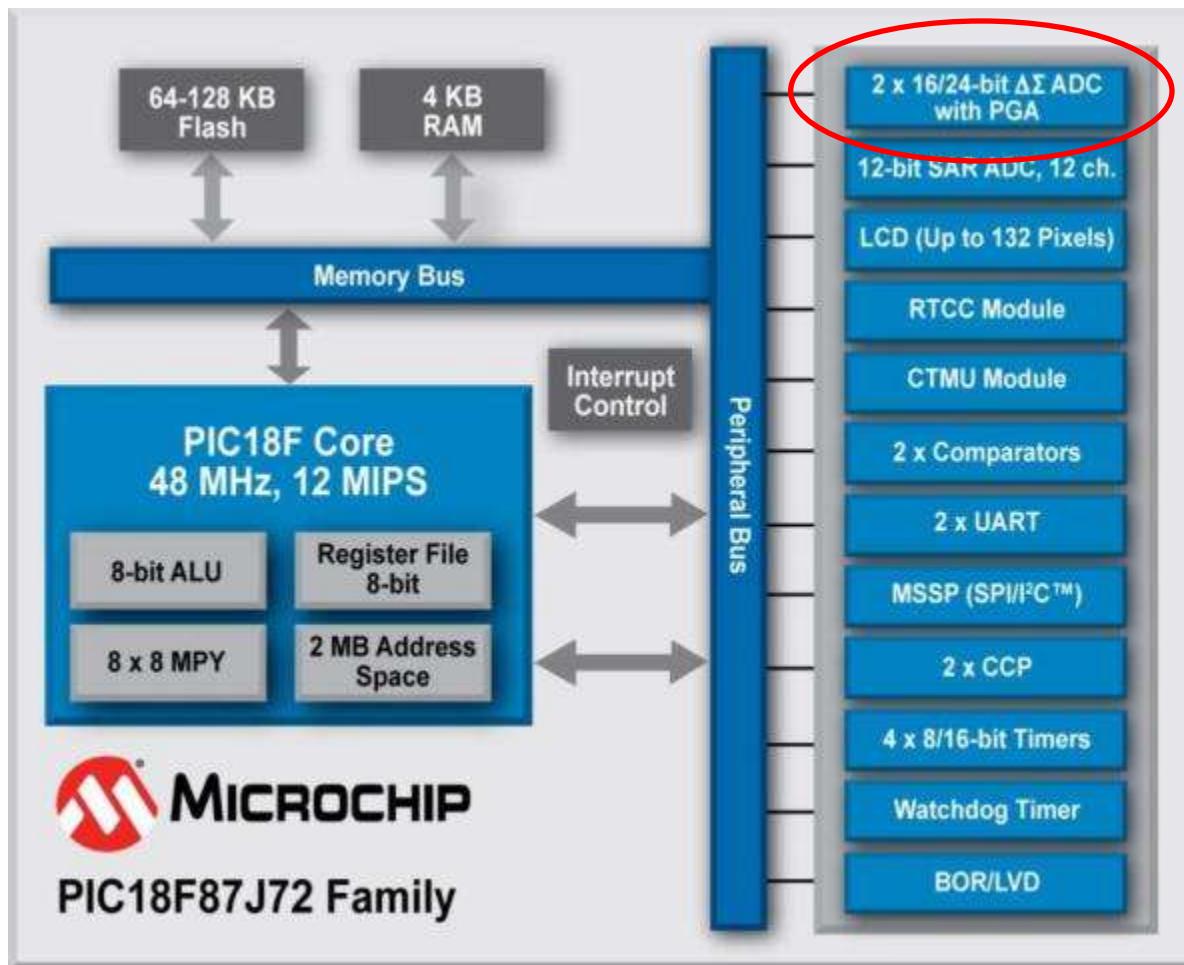
Energy Measurement AFE Winning Attributes

- **Attributes:**
 - Dynamic Range:
 - MCP3905A 500:1
 - MCP3906A 1000:1
 - MCP3909 1000:1
 - Provides active power pulse output
 - MCP3909 includes SPI interface for ADC and multiplier output data
 - MCP3905A/06A pin-to-pin compatible with ADE7755

PIC Microcontrollers

- **Function:**
 - Power calculations
 - More powerful MCUs for (wireless) communications
- **SoC Solutions (AFE+PIC): PIC18F86J72 and PIC18F87J72**
- **Popular products:**
 - PIC16F15XX
 - PIC16F182X
 - PIC18F65J90
 - PIC24FJ128GA306, PIC24FJ128GA310
 - PIC32 (advanced smart meters)

PIC18F87J72 with Energy Measurement AFE



Microchip Calculation Library

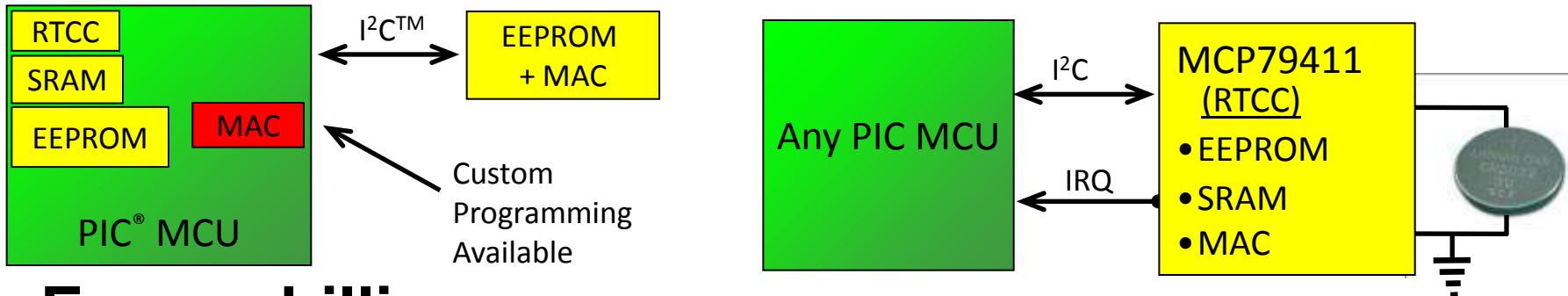
MCU	Phase Sensor	Active Power	V & I rms	Apparent Power	Reactive Power	Harmonic Analysis
PIC18 8-bit, 12 MIPS	1Φ-Shunt 3Φ-CT	✓	✓	✓	✓	n/a
PIC24F/H 16b, 16-70 MIPS	1Φ- Shunt/CT 3Φ-Shunt, CT, RGC	✓	✓	✓	✓	TBD
dsPIC33 16b, 40-70 MIPS	1Φ-Shunt 3Φ-CT	✓	✓	✓	✓	✓
PIC32 32-bit, 80MHz	1Φ-Shunt 3Φ-CT	✓	✓	✓	✓	✓

CT = Current Transformer, RGC = Rogowski Coil

- A.C.E metrology team has developed a library of firmware that is available for customer use and can assist in customization

RTCC

Monitoring Time of Usage

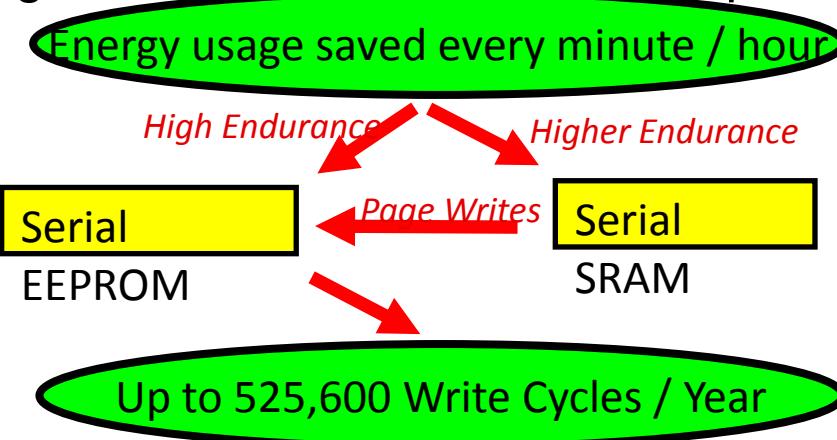


- **Energy billing purposes**
 - Accurate time & energy usage monitored and stored
- **Smart energy communications**
 - Timestamp usually included with messages
 - MAC address loaded in MCU or RTCC with unique ID
- **Periodic system status to validate meter operation**
 - Timestamp logged each time a self diagnostics is performed

Data Storage & Data Logging in Energy Monitoring

□ Data Logging:

- Meter operation is periodically monitored & recorded
- Energy usage by the consumer is measured and stored
 - High endurance memory is a requirement



□ Calibration:

- Calibration parameters stored in non-volatile memory

Human Interface Solutions

Display

- Graphics
- Segmented LCD
- Monochrome
- Full color



Touch sense

- Capacitive touch
- Resistive touch screens
- Tactile buttons
- Rotary switches



www.microchip.com/humaninterface

Audio and speech

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Data Communication

- **Methods vary based on application requirements**

- Physical environments
 - Standard protocol interfaces

- **Wireless**

- ZigBee, WiFi, MiWi, Z-Wave, proprietary



- **Wired**

- PLC, Ethernet, USB, Home Plug, BACnet, proprietary

- **Protocols**

- DLMS, COSEM, Smart Energy Profile



NEXT

Microchip Wi-Fi Solution

- Driver incorporated into Microchip TCP/IP stack
- Compatibility across nearly every major Microchip MCU family
- Demo Source Code and Applications
- PICtails and PICtail-based development kits shipping now



NEXT

Microchip Sub-GHz Wireless Solutions

Multiple frequency options

- 868/915/950 MHz
- FSK/OOK Modulation

Low current operation

- Low Rx Current = 3 mA
- Low Tx Current = 25 mA @ +10 dBm

Integrated power amplifier (+12.5 dBm)

High receiver sensitivity

- -107 dBm FSK/ -113dBm OOK)

Automatic frequency control (AFC)

Module features:

- FCC (U.S.A.), IC (Canada), and ETSI (Europe) compliant
- Surface-mountable PCB



NEXT

Microchip 2.4 GHz Solutions

□ Transceiver Features:

- Supports MiWi™, MiWi P2P & ZigBee®
- 2.4GHz IEEE 802.15.4 compliant
- In-line/stand-alone encryption
- Automatic MAC retransmit
- 18 mA(RX)/22 mA(TX)/2 µA(Sleep)



□ Module Features:

- Integrated PCB antenna
- FCC (U.S.A.), IC (Canada), and ETSI (Europe) certified



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MICROCHIP

Analog Products in Automotive: Heating, Ventilation and Air Conditioning (HVAC) system

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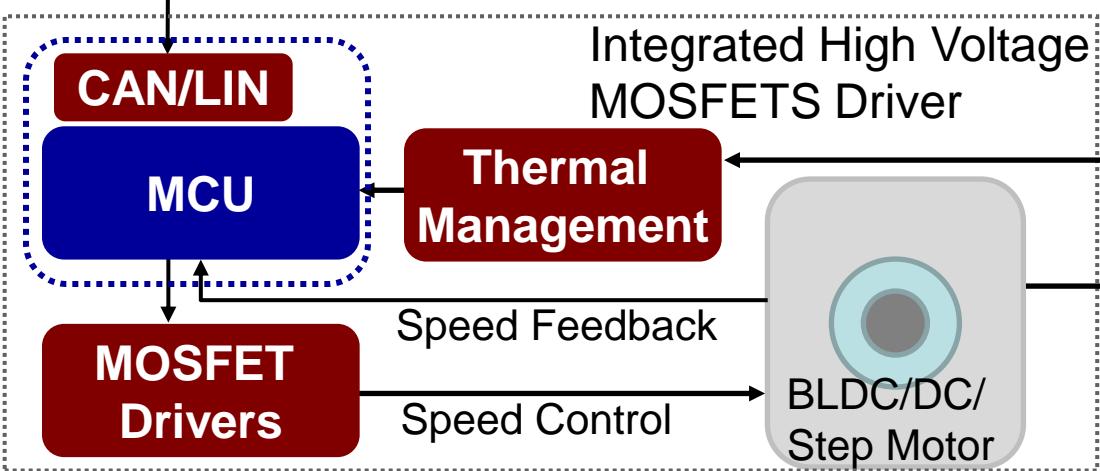
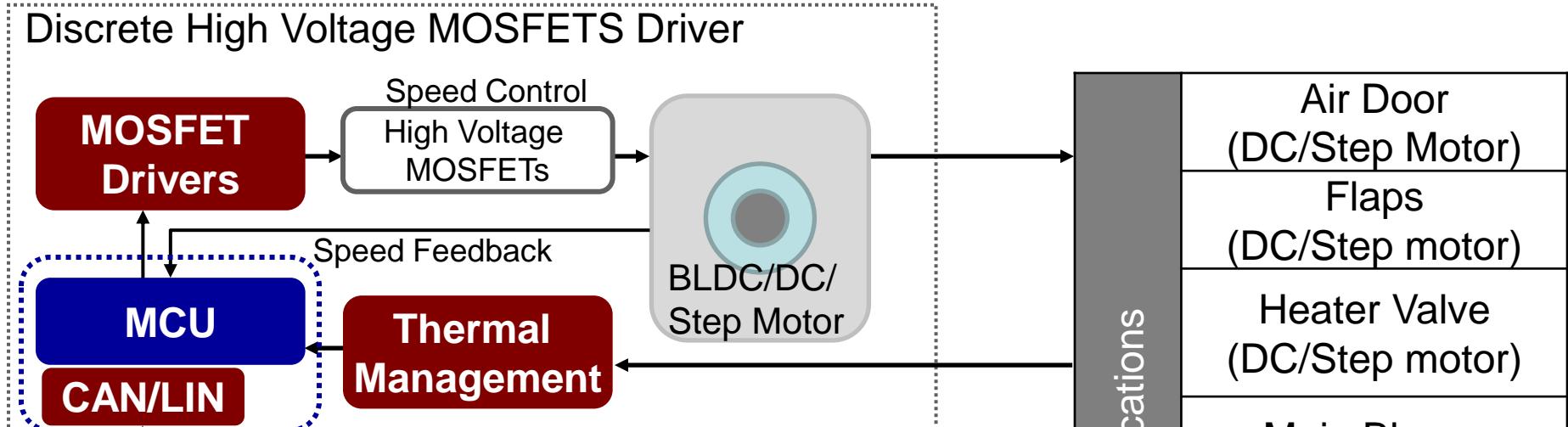
Automotive HVAC

- **Automotive HVAC control**
 - Automotive heating, ventilation and air conditioning (HVAC) system is designed to provide passengers' desired cabin temperature while keeping the engine from overheating
- **Microchip offers comprehensive solutions to control HVAC applications such as fans, blowers, pumps, condensers and compressors to efficiently achieve such tasks**

NEXT

Automotive - HVAC

Discrete High Voltage MOSFETS Driver



MOSFET Drivers

Popular Products	Description	Product Web Page
MCP140X, MCP141X, MCP14628	Low-side and low-side/high-side drivers	MOSFET Driver's Parametric Search table

Thermal Management

Suggested Products	Description	Product Web page
MCP9700/ MCP9800/	Improves control of color temperature and detects disconnected LED channel. MCP9700 outputs analog voltage that is proportional to the temperature (-40C to 150C). MCP9800 outputs temperature data (-55C to 125C) via I ² C™/SMBus two-wire interface.	MCP9700 MCP9800
EMC2101	The EMC2101 is an SMBus 2.0 compliant, integrated fan control solution complete with two temperature monitors, one external and one internal. Each temperature channel has programmable high limits that can assert an interrupt.	EMC2101
EMC1412	The EMC1412 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Advanced features such as Resistance Error Correction (REC), Beta Compensation and automatic diode type detection combine to provide a robust solution for complex environmental monitoring applications.	EMC1412



MICROCHIP

MCU

Suggested Products	Description	Product Web page
PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver.	PIC16F1829LIN
PIC18FXX31	8-bit MCU with LIN slave support	PIC18FXX31
PIC18F4680	8-bit MCU with enhanced CAN module and LIN master/slave support	PIC18F4680
PIC24/dsPIC33	16-bit MCU and DSC with enhanced CAN controller and LIN master/slave support. Supports Sensorless field-oriented motor control algorithm to achieve stunning performance.	PIC24/dsPIC33

NEXT: CAN/LIN Communication

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CAN/LIN Communication

	Suggested Products	Description	Product Web page
LIN	MCP2003/4/3A/4A	<p>Standalone LIN transceivers.</p> <p>EMC/ESD performance is among the best in automotive industry.</p> <p>The MCP2003 is available in an industry standard pin out and the MCP2004 offers a TXE/Fault pin which allows users the ability to disable and enable the transmitter in addition to a fault output</p>	MCP2003
	MCP2021A/2A MCP2025	The MCP202X family of LIN transceivers integrates a LIN physical layer, 3.3V or 5V internal voltage regulator and POR/BOR Reset function.	MCP2021/2A MCP2025
	MCP2050	LIN transceivers with an integrated voltage regulator and an integrated windowed watchdog timer	MCP2050
	PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver.	PIC16F1829 LIN
CAN	MCP2515	Stand-alone CAN controller supports CAN V2.0B specification Can also interface with MCU with Standard SPI.	MCP2515
	MCP2561/2	CAN transceiver.	MCP2561



MICROCHIP

Analog Products in Automotive: Interior LED Ambient Module

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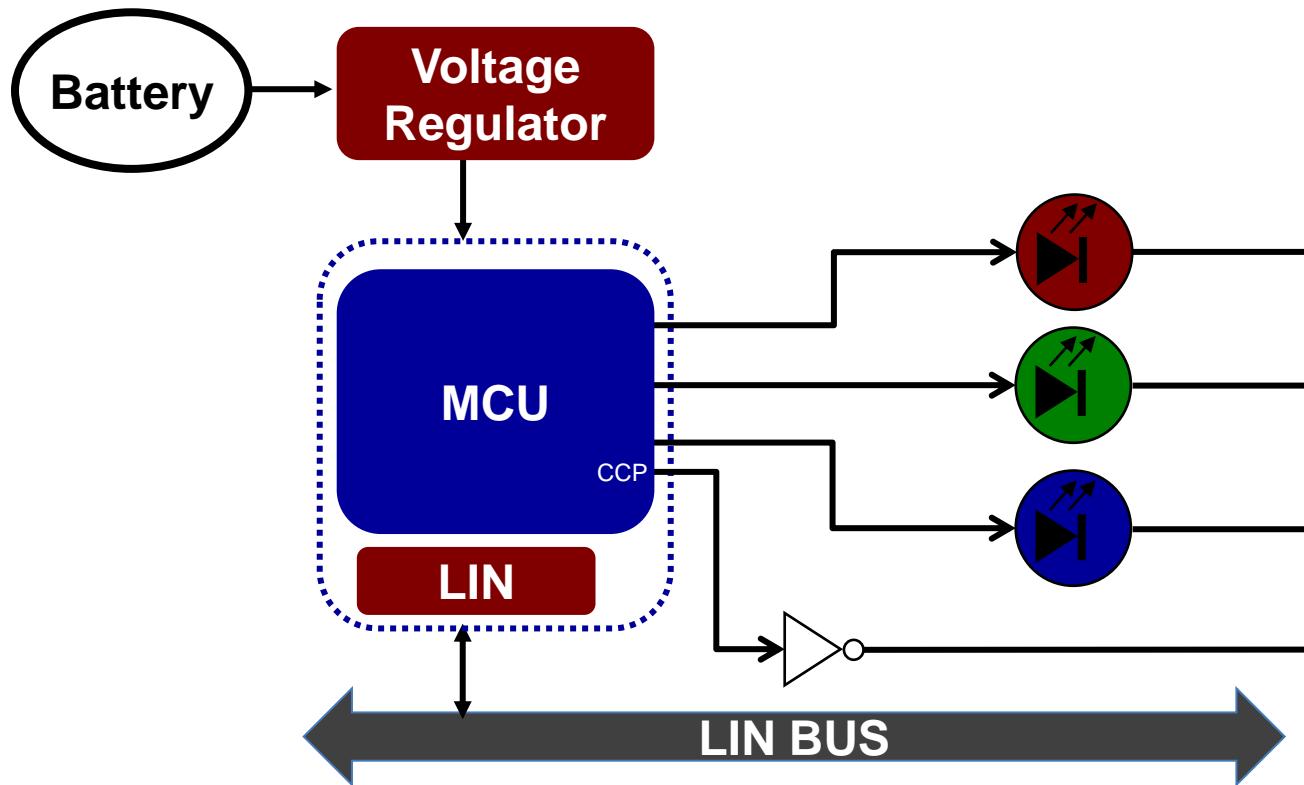
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Automotive LED Lighting

- **Interior Automotive LED ambient Module:**
 - LED ambient module controls an integrated RGB LEDs unit, which enables real-time LEDs color and brightness control. With this design, interior lightings are no longer monotonic. Adjustable multicolor allows passengers for a more personalized ambient lighting experience. The small size of LEDs also makes implementing lighting in small spaces easier.
- **Application examples**
 - Foot well lights, cup holder lights, cluster backlighting, Tell Tale lights, and LCD panel backlighting

NEXT

Automotive: Interior LED Ambient Module



LED ambient module controls an integrated RGB LEDs unit, which enables real-time LEDs color and brightness control

MCU: RGB LED Controller

Suggested Products	Description	Product Web Page
8-bit PIC12/16/18 MCU	<ul style="list-style-type: none"> • Integrated DAC or PWM modules are used to control LEDs color or brightness. • The resolution of the DAC or PWM for the selected MCU is directly proportional to the number of color combination capable of being created with the RGB LEDs. • CCP module is used to detect defect. • NanoWatt XLP microcontrollers from the PIC16/ PIC18 families have the industry leading low quiescent current characteristics. • These MCUs further conserve battery life when LEDs are on while ignition is off. • Small MCU footprints are available to support the desired styling factor for various lighting components. 	Click Here



MICROCHIP

LIN

Suggested Products	Description	Product Web Page
MCP2003A/4A	Standalone LIN transceivers.	MCP2003A
MCP2021A/2A MCP2025	LIN transceivers with an integrated voltage regulator.	MCP2021/2A MCP2025
MCP2050	LIN transceivers with an integrated voltage regulator and an integrated windowed watchdog timer.	MCP2050
PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver and 5V LDO	PIC16F1829 LIN

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Voltage Regulators

Suggested Products	Description	Product Web Page
MCP1790/1	The low power, low dropout regulator is used to reduce battery depletion while the vehicle is in the <i>ignition off</i> condition. This product meets the current low power requirements of automakers.	MCP1790



MICROCHIP

Analog Products in Automotive: Exterior LED Control Module

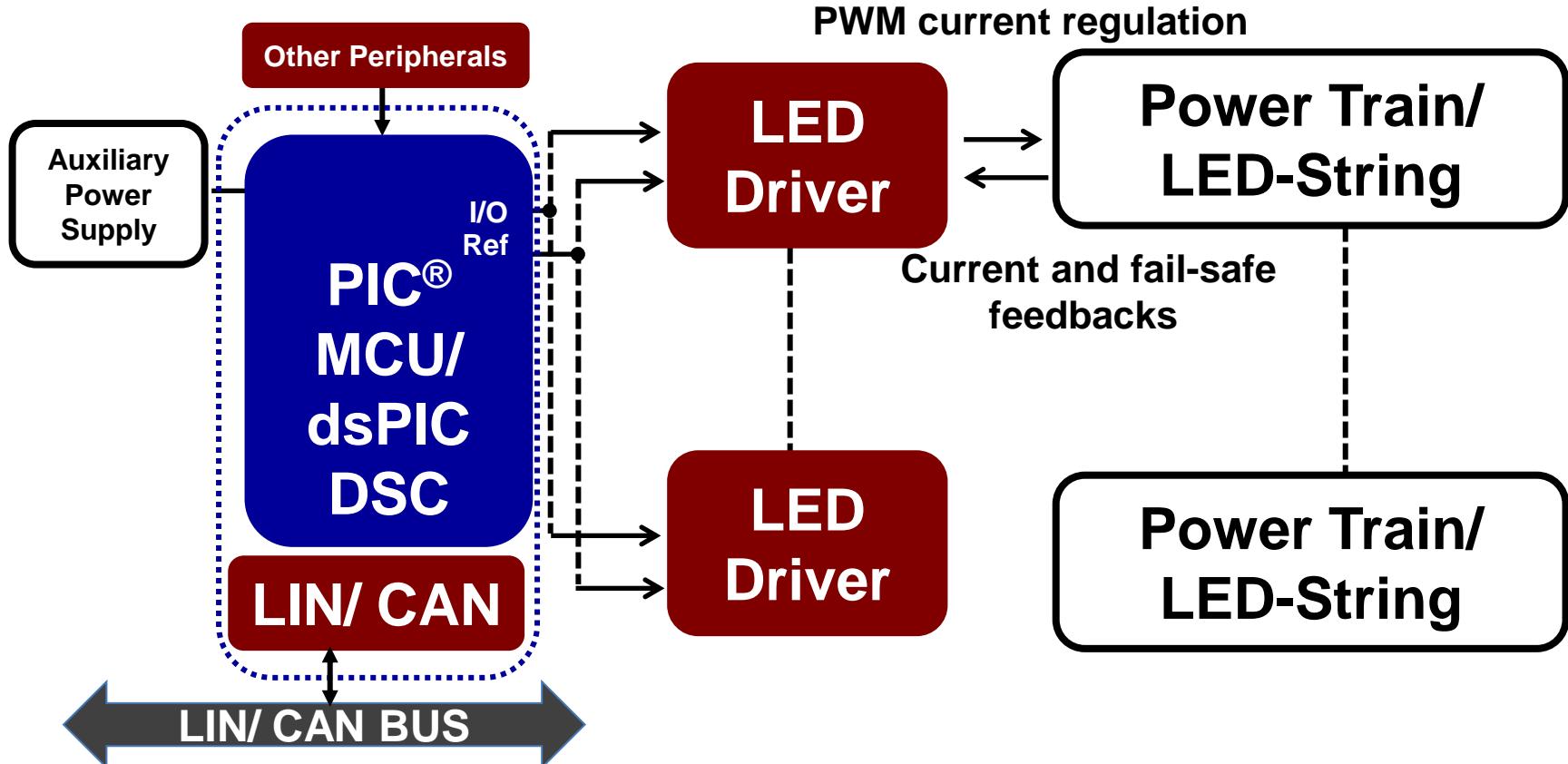
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Automotive LED Lighting

- Microchip offers broad range of high brightness LED control solutions for automotive exterior lightings. These solutions support flexible power train topologies to support constant LED current regulation, fail-safe monitoring and maximization of LEDs lifetime and efficiency.
- Example Applications:
 - Fog lights, Taillights, Daytime running light, position light High/Low Beam, corner light. Headlamp

Automotive: Exterior LED Control Module



Low- End Single LED String Solution

Mid- Range Mult. LED String Solution

High- End Mult. LED String Solution

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MCU

Suggested Products	Description	Product Web Page
PIC12F683/ PIC12HV752	<ul style="list-style-type: none"> • Ideal for low-end LED drivers such as fog light/turn light, which has lower stability requirements than most exterior front light units and doesn't require dimming • Hysteretic Current control • Integrated analog peripherals with minimum digital support for low-cost/high performance SMPS applications 	PIC12F683
dsPIC33F GS family	<ul style="list-style-type: none"> • Ideal for High End Multi. LED String Solution • Multi-channel control (up to 18 LED channels) • Up to 18 high-speed PWM channels (1.04ns resolution) • Each PWM output can be individually adjusted in frequency, duty ratio and phase shift. • Each PWM output can be chopped by a lower frequency to support flexible dimming outputs. 	dsPIC33F/E
PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver	PIC16F1829 LIN

Low-End Single LED String Solution

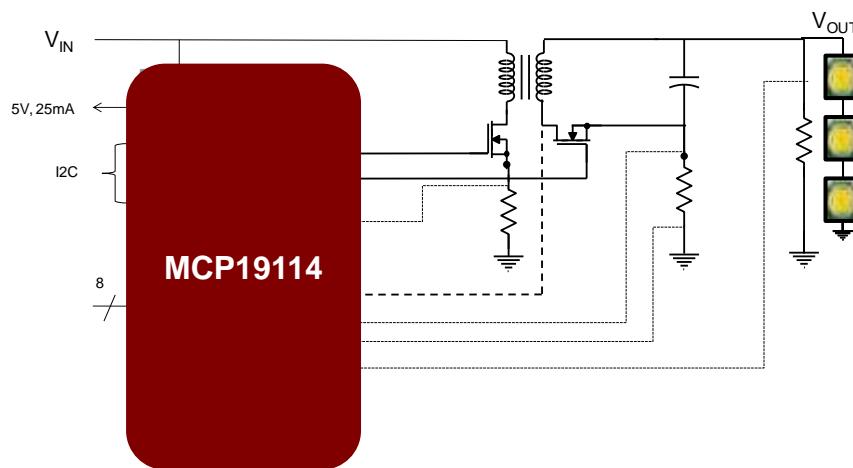
- For low-end single LED string solution, a low cost 8-bit PIC MCU can be used to provide close-loop single LED string current regulation.

Suggested Products	Description
PIC12F683/PIC12HV752	<ul style="list-style-type: none">Ideal for low-end LED drivers such as fog light/turn light, which has lower stability requirements than most exterior front light units and doesn't require dimming<ul style="list-style-type: none">Hysteretic Current controlIntegrated analog peripherals with minimum digital support for low-cost/high performance SMPS applications

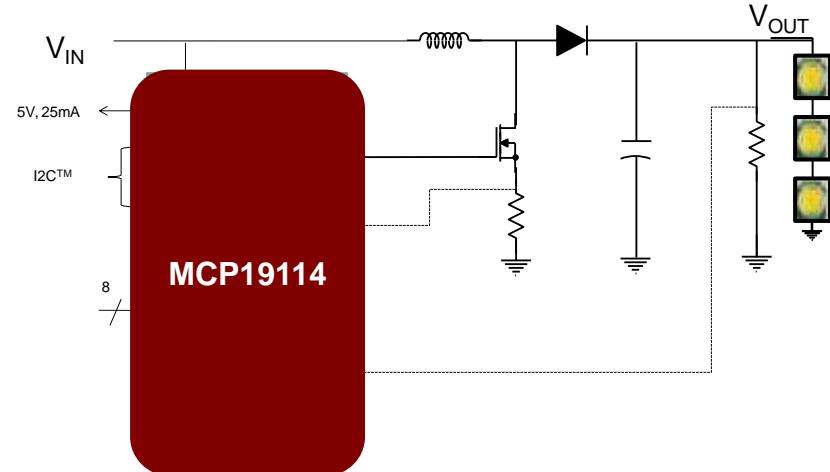
Mid- Range Mult. LED String Solution

- More than one discrete PWM controllers can be added to a low cost PIC MCU to support the additional LED strings.
 - The PWM controller provides additional built-in analog modules and MOSFET driver needed for each LED string control.
 - This approach is also ideal for an existing system that already has a low cost MCU in place. Instead of replacing the MCU, designer can attach the additional PWM controllers to the MCU.

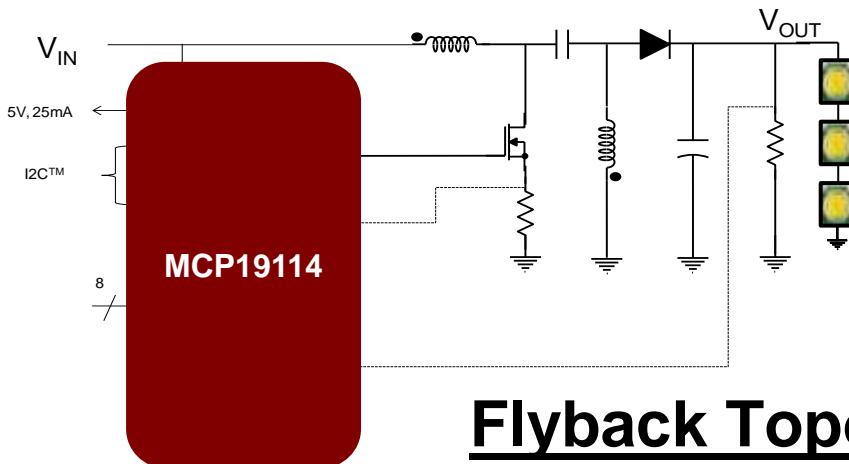
LED Driver



SEPIC Topology



Boost Topology



Flyback Topology
(Synchronous)

*...and more, including Ćuk and Forward Converters
(Broad Topology Support)*

NEXT

MCP19114

Popular Products	Description	Product Web Page
MCP19114/5	<p>The MCP19114 is a mid-voltage (4.5-42V) analog-based PWM controller with an integrated 8-bit PIC™ Microcontroller. This unique product family combines the performance of a high-speed analog solution, including high-efficiency and fast transient response, with the configurability and communication interface of a digital solution. Combining these solution types creates a new family of devices that maximizes the strengths of each technology to create a more cost-effective, configurable, high-performance power conversion solution.</p>	Click Here
<u>MCP19114 Flyback Standalone Evaluation Board:</u> The MCP19114-Flyback Standalone Evaluation Board and Graphical User Interface (GUI) demonstrate the MCP19114 performance in a synchronous Flyback topology. It is configured to regulate load current, and is well suited to drive LED loads.		

MCU + PWM Controller based LED Driver

Suggested Products	Description	Product Web Page
MCP1630/31/32	<ul style="list-style-type: none"> • Small footprint discrete high-speed PWM controllers (2MHz), as stand alone (MCP1632) or in conjunction with a MCU (MCP1630/1) • Single MCU attaches multiple PWM controllers for desired number of LED strings control (One LED string per MCP1630/31). • Peak Current Mode Control. • High Voltage Options Operate to +16V Input. • Integrated Overvoltage Comparator and Low Side MOSFET Driver. • Over-temperature Protection and Under-voltage Lockout (UVLO). 	MCP1630 MCP1631 MCP1632
App Notes/ Ref. Designs	<ul style="list-style-type: none"> • Dimming Power LEDs Using a SEPIC Converter and MCP1631 PIC Attach PWM Controller • MCP1630 SEPIC Automotive LED Driver Reference Design • MCP1632 - 300 kHz Boost Converter Demo Board 	

High- End Mult. LED String Solution

- For high-end multi LED strings solution, a 16-bit DSC (dsPIC33F GS) is recommended because it has the necessary integrated PWM drivers and analog modules to provide up to 18 LED strings or Matrix control. With this approach, discrete PWM controllers are not needed.

dsPIC33F

Suggested Products	Description	Product Web Page
dsPIC33F/E GS family	<ul style="list-style-type: none"> • Ideal for High End Multi. LED String Solution • Multi-channel control (up to 18 LED channels) • Up to 18 high-speed PWM channels (1.04ns resolution) • Each PWM output can be individually adjusted in frequency, duty ratio and phase shift. • Each PWM output can be chopped by a lower frequency to support flexible dimming outputs. 	<u>dsPIC33F/E</u>
App Notes/ Ref. Designs	<ul style="list-style-type: none"> • <u>High Brightness LEDs by dsPIC® “GS” Series (doc# en550157.pdf)</u> • <u>Digital LED Lighting Development Kit (DM330014)</u> 	

CAN/ LIN Communication

	Suggested Products	Description	Product Web page
LIN	MCP2003/4/3A/4A	<p>Standalone LIN transceivers. EMC/ESD performance is among the best in automotive industry.</p> <p>The MCP2003 is available in an industry standard pin out and the MCP2004 offers a TXE/Fault pin which allows users the ability to disable and enable the transmitter in addition to a fault output</p>	MCP2003
	MCP2021A/2A MCP2025	The MCP202X family of LIN transceivers integrates a LIN physical layer, 3.3V or 5V internal voltage regulator and POR/BOR Reset function.	MCP2021/2A MCP2025
	MCP2050	LIN transceivers with an integrated voltage regulator and an integrated windowed watchdog timer	MCP2050
	PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver.	PIC16F1829 LIN
CAN	MCP2515	Stand-alone CAN controller supports CAN V2.0B specification Can also interface with MCU with Standard SPI.	MCP2515
	MCP2561/2	CAN transceiver.	MCP2561

Other Analog Peripherals

	Suggested Products	Description	Product Web Page
Voltage Regulators	MCP170X family	The low power, low dropout regulator is used to reduce battery depletion while the vehicle is in the <i>ignition off</i> condition. This product meets the current low power requirements of automakers.	LDO Parametric Table
Temperature Sensors	MCP9700/ MCP9800/	Improves control of color temperature and detects disconnected LED channel. MCP9700 outputs analog voltage that is proportional to the temperature (-40C to 150C). MCP9800 outputs temperature data (-55C to 125C) via I ² C™/SMBus two-wire interface.	MCP9700 MCP9800
	EMC2101	The EMC2101 is an SMBus 2.0 compliant, integrated fan control solution complete with two temperature monitors, one external and one internal. Each temperature channel has programmable high limits that can assert an interrupt.	EMC2101
	EMC1412	The EMC1412 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Advanced features such as Resistance Error Correction (REC), Beta Compensation and automatic diode type detection combine to provide a robust solution for environmental monitoring applications.	EMC1412



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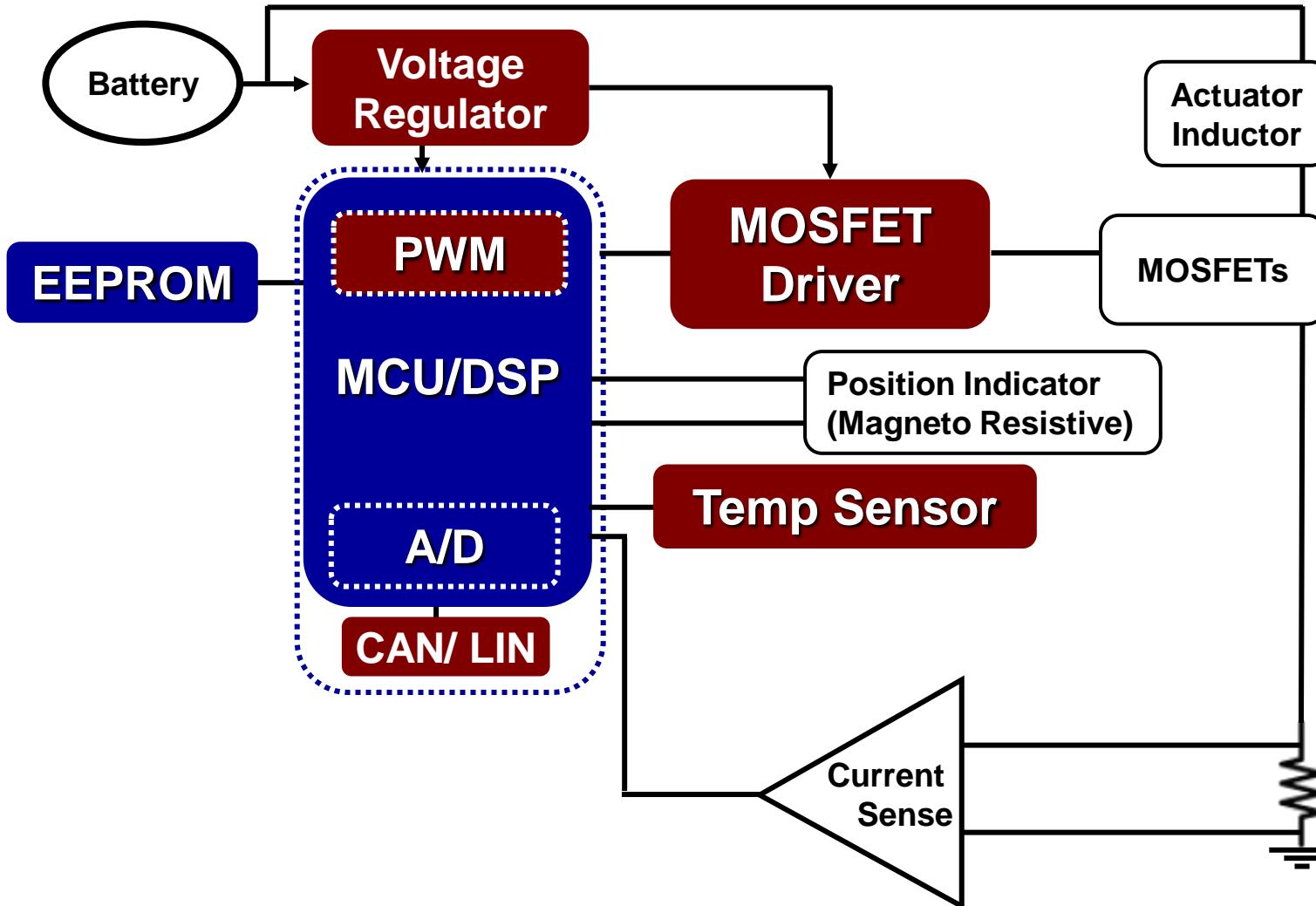
Analog Products in Automotive: Smart Actuators in Turbo Charger

Automotive: Smart Actuators in Turbo Charger

- **Smart Actuators are actuators that use microcontrollers to perform intelligent tasks. They are being utilized more and more in the automotive engine environment to enhance fuel efficiency.**

- **Example Applications:**
 - Turbo Charger Waste Gate; the Electrical Turbo Charger Bypass, and the Air/Exhaust Bypassing Valves.

Turbo Charger Waste Gate w/Smart Actuator Controller



CAN/ LIN Communication

	Suggested Products	Description	Product Web page
LIN	MCP2003/4/3A/4A	<p>Standalone LIN transceivers. EMC/ESD performance is among the best in automotive industry.</p> <p>The MCP2003 is available in an industry standard pin out and the MCP2004 offers a TXE/Fault pin which allows users the ability to disable and enable the transmitter in addition to a fault output</p>	MCP2003
	MCP2021A/2A MCP2025	The MCP202X family of LIN transceivers integrates a LIN physical layer, 3.3V or 5V internal voltage regulator and POR/BOR Reset function.	MCP2021/2A MCP2025
	MCP2050	LIN transceivers with an integrated voltage regulator and an integrated windowed watchdog timer	MCP2050
	PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver.	PIC16F1829 LIN
CAN	MCP2515	Stand-alone CAN controller supports CAN V2.0B specification Can also interface with MCU with Standard SPI.	MCP2515
	MCP2561/2	CAN transceiver.	MCP2561

Thermal Management

Suggested Products	Description	Product Web page
MCP9700/ MCP9800/	Improves control of color temperature and detects disconnected LED channel. MCP9700 outputs analog voltage that is proportional to the temperature (-40C to 150C). MCP9800 outputs temperature data (-55C to 125C) via I ² C™/SMBus two-wire interface.	MCP9700 MCP9800
EMC2101	The EMC2101 is an SMBus 2.0 compliant, integrated fan control solution complete with two temperature monitors, one external and one internal. Each temperature channel has programmable high limits that can assert an interrupt.	EMC2101
EMC1412	The EMC1412 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Advanced features such as Resistance Error Correction (REC), Beta Compensation and automatic diode type detection combine to provide a robust solution for complex environmental monitoring applications.	EMC1412

MOSFET Drivers

Popular Products	Description	Product Web Page
MCP140X, MCP141X, MCP14628, MCP14700	Low-side and low-side/high-side drivers. Used as a low-to-high voltage bridge to allow an MCU with a low voltage output to drive a motor that requires higher voltage	MOSFET Driver's Parametric Search table

Voltage Regulators

Suggested Products	Description	Product Web Page
MCP1790/1	The low power, low dropout regulator is used to reduce battery depletion while the vehicle is in the <i>ignition off</i> condition. This product meets the current low power requirements of automakers.	<u>MCP1790</u>

PWM Controller

Suggested Products	Description	Product Web Page
MCP1630/31	<ul style="list-style-type: none"> • Small footprint discrete high-speed PWM controllers (2MHz) in conjunction with a MCU. • Single MCU attaches multiple PWM controllers for desired number of LED strings control (One LED string per MCP1630/31). • Peak Current Mode Control. • High Voltage Options Operate to +16V Input. • Integrated Overvoltage Comparator and Low Side MOSFET Driver. • Over-temperature Protection and Under-voltage Lockout (UVLO). 	MCP1630 MCP1631

EEPROM

Suggested Products	Description	Product Web Page
25LCxxx Family	A standalone serial data EEPROM is used to provide cost-effective data storage options for position logging or position calibration.	<u>Serial EEPROM offering</u>

MCU

Suggested Products	Description	Product Web Page
8-bit PIC12/PIC16 MCU	<p>Provides simple control for rotary or linear switches, such as for use in relays and valves.</p> <p>Acts as a gateway between a specific position indicator interface such as SENT and a standard serial interface such as SPI/I2C.</p> <p>Controls the BLDC motor.</p>	<u>8-Bit PIC® MCU</u>
16-bit PIC24 MCU / dsPIC33 DSC	<p>Used in applications that require digital filtering and high-end algorithms, such as the calculation of actuator positions from real-time analog Sine and Cosine signals.</p> <p>Controls BLDC motor.</p> <p>Supports AUTOSAR.</p>	<u>16-Bit PIC® MCU</u>
PIC16F1829LIN	8-bit MCU with an integrated LIN transceiver	<u>PIC16F1829 LIN</u>



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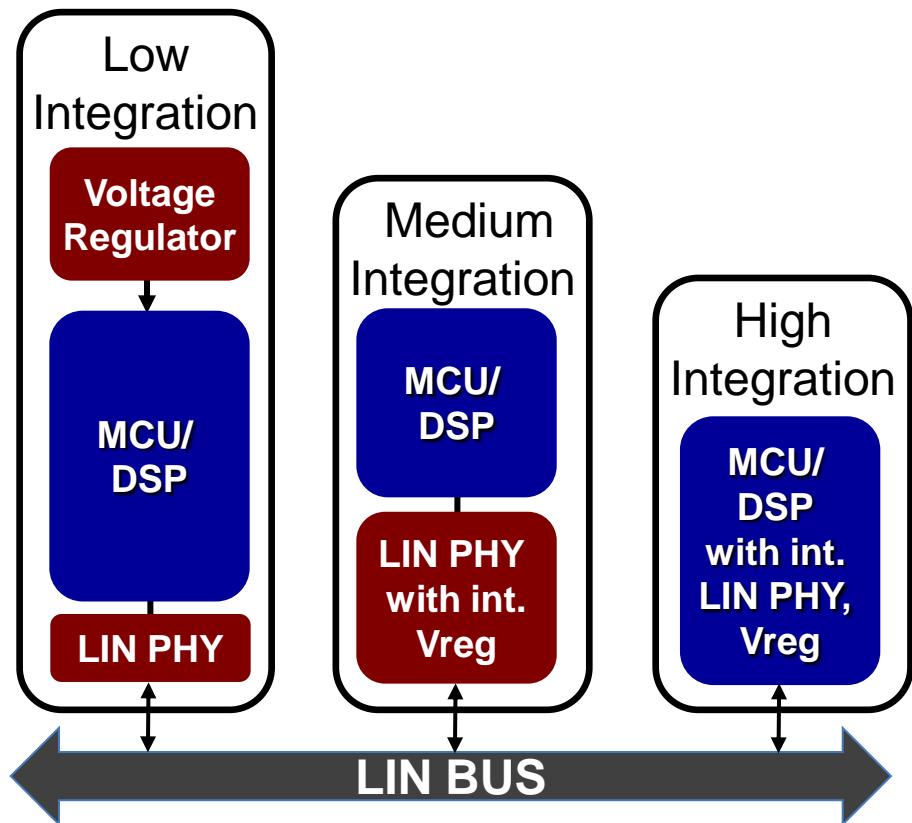
Analog Products in Automotive: In-Vehicle Network Communication

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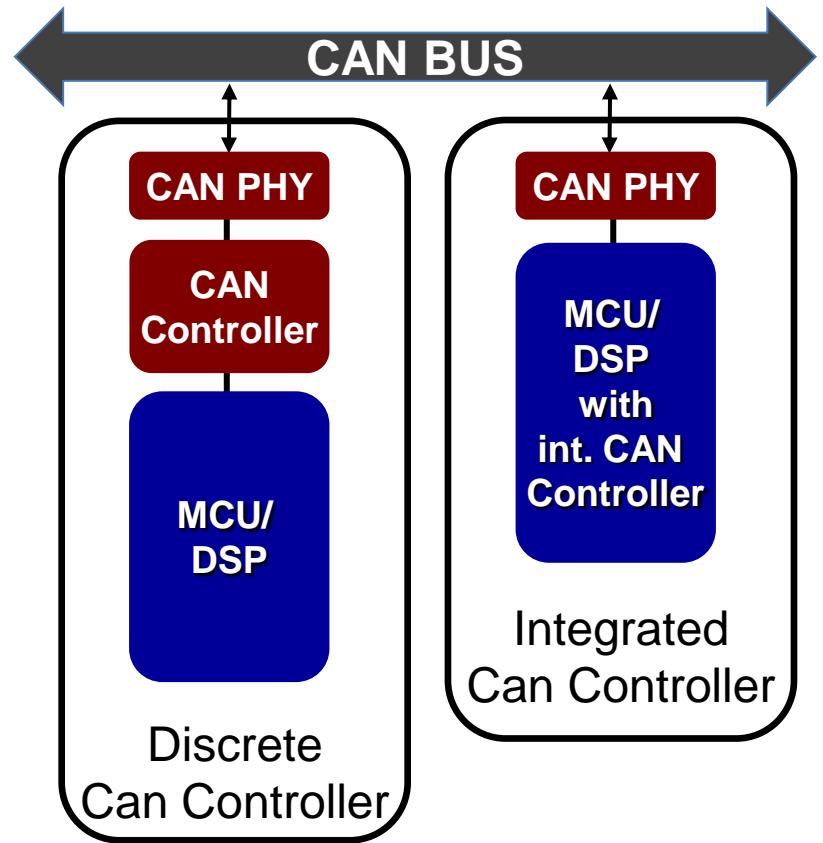
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In-Vehicle Network Communication

LIN Application Diagram



CAN Application Diagram



Low Integration LIN Communication

Microchip Solutions	Suggested Products	Description
LIN	MCP2003/4/3A/4A	<p>Standalone LIN transceivers.</p> <p>Offers a TXE/Fault pin which allows users the ability to disable and enable the transmitter in addition to a fault output</p>
MCU and DSC with Can/LIN Controller integrated	PIC16F690/PIC16F182x	8-bit MCU with LIN slave support
	PIC18F4680	8-bit MCU with enhanced CAN module and LIN master/slave support
	dsPIC30F4012	16-bit DSC with standard CAN module and LIN master/slave support
	PIC24/dsPIC33	16-bit MCU and DSP with enhanced CAN controller and LIN master/slave support
	PIC32MX5XX/PIC32MX7X	32-bit MCU with 32-bit CAN module and LIN master/slave support
Voltage Regulation	MCP1790/1 family	The low power, low dropout regulator is used to reduce battery depletion while the vehicle is in the <i>ignition off</i> condition.

Medium Integration LIN Communication

Microchip Solutions	Suggested Products	Description
LIN	MCP2021A/2A MCP2025	Standalone LIN Transceivers. Offers built-in 3.3V or 5V internal voltage regulator and POR/BOR Reset function.
	MCP2050	Standalone LIN Transceiver. Offers built-in voltage regulator and an integrated windowed watchdog timer.
MCU and DSC with Can/LIN Controller Integrated	PIC16F690/PIC16F182x	8-bit MCU with LIN slave support
	PIC18F4680	8-bit MCU with enhanced CAN module and LIN master/slave support
	dsPIC30F4012	16-bit DSC with standard CAN module and LIN master/slave support
	PIC24/dsPIC33	16-bit MCU and DSP with enhanced CAN controller and LIN master/slave support
	PIC32MX5XX/PIC32MX7X	32-bit MCU with 32-bit CAN module and LIN master/slave support

High Integration LIN Communication

Microchip Solutions	Suggested Products	Description
LIN	PICF16F1829LIN	Small footprint 8-bit MCU with an integrated LIN transceiver.
MCU and DSC with Integrated Can/LIN Controller	PIC16F690/PIC16F182x	8-bit MCU with LIN slave support
	PIC18F4680	8-bit MCU with enhanced CAN module and LIN master/slave support
	dsPIC30F4012	16-bit DSC with standard CAN module and LIN master/slave support
	PIC24/dsPIC33	16-bit MCU and DSP with enhanced CAN controller and LIN master/slave support
	PIC32MX5XX/PIC32MX7X	32-bit MCU with 32-bit CAN module and LIN master/slave support

Discrete CAN Controller

Microchip Solutions	Suggested Products	Description
CAN	MCP2515	Stand-alone CAN controller supports CAN V2.0B specification Interfaces with MCU with Standard SPI.
	MCP2561/2	CAN transceiver.
MCU and DSC with Integrated Can Controller	PIC18F4680	8-bit MCU with enhanced CAN module and LIN master/slave support
	dsPIC30F4012	16-bit DSC with standard CAN module and LIN master/slave support
	PIC24/dsPIC33	16-bit MCU and DSP with enhanced CAN controller and LIN master/slave support
	PIC32MX5XX/PIC32MX7X	32-bit MCU with 32-bit CAN module and LIN master/slave support

Integrated CAN Controller

Microchip Solutions	Suggested Products	Description
MCU and DSC with Integrated Can/LIN Controller	PIC18F4680	8-bit MCU with enhanced CAN module and LIN master/slave support
	dsPIC30F4012	16-bit DSC with standard CAN module and LIN master/slave support
	PIC24/dsPIC33	16-bit MCU and DSP with enhanced CAN controller and LIN master/slave support
	PIC32MX5XX/PIC32MX7X	32-bit MCU with 32-bit CAN module and LIN master/slave support



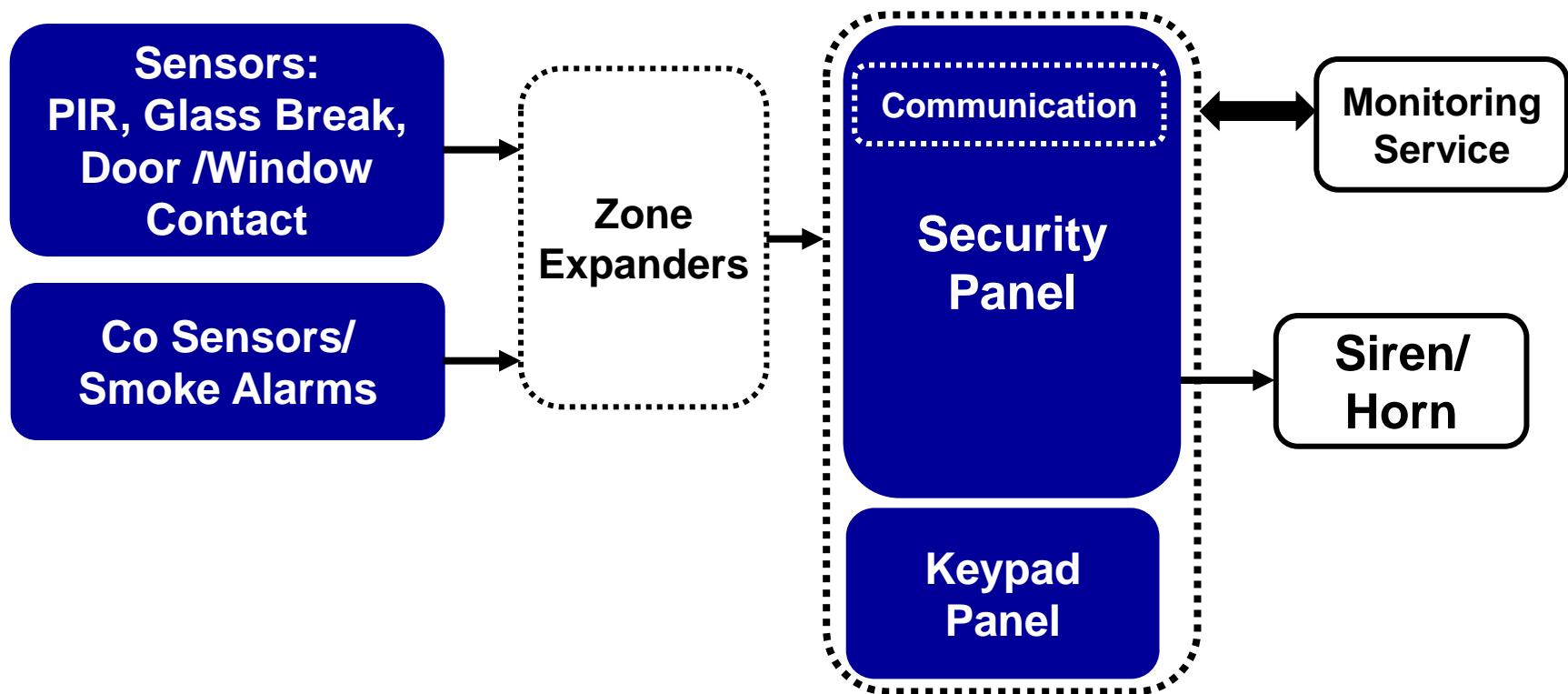
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Analog Products in Home Security Alarm Systems

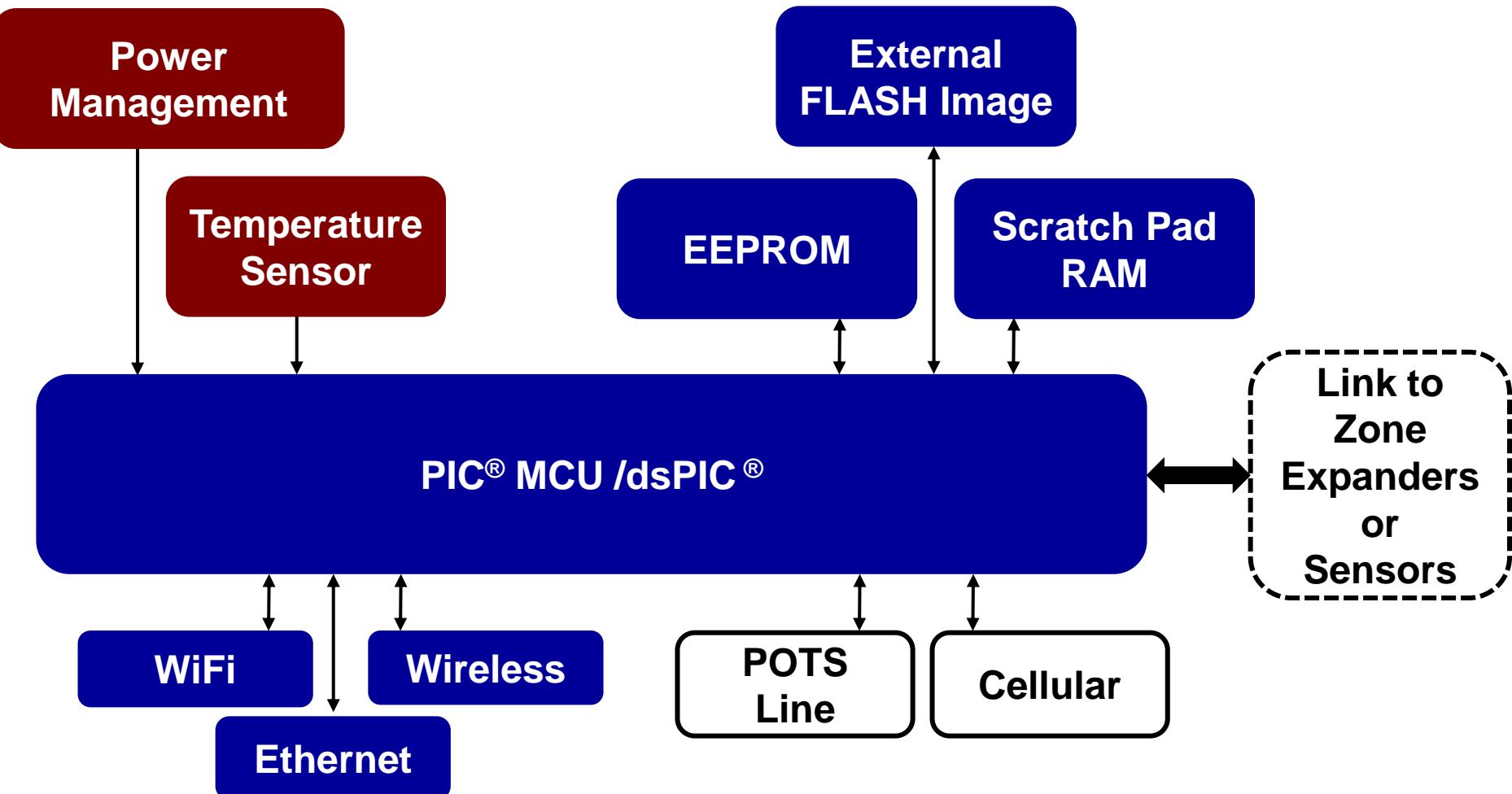
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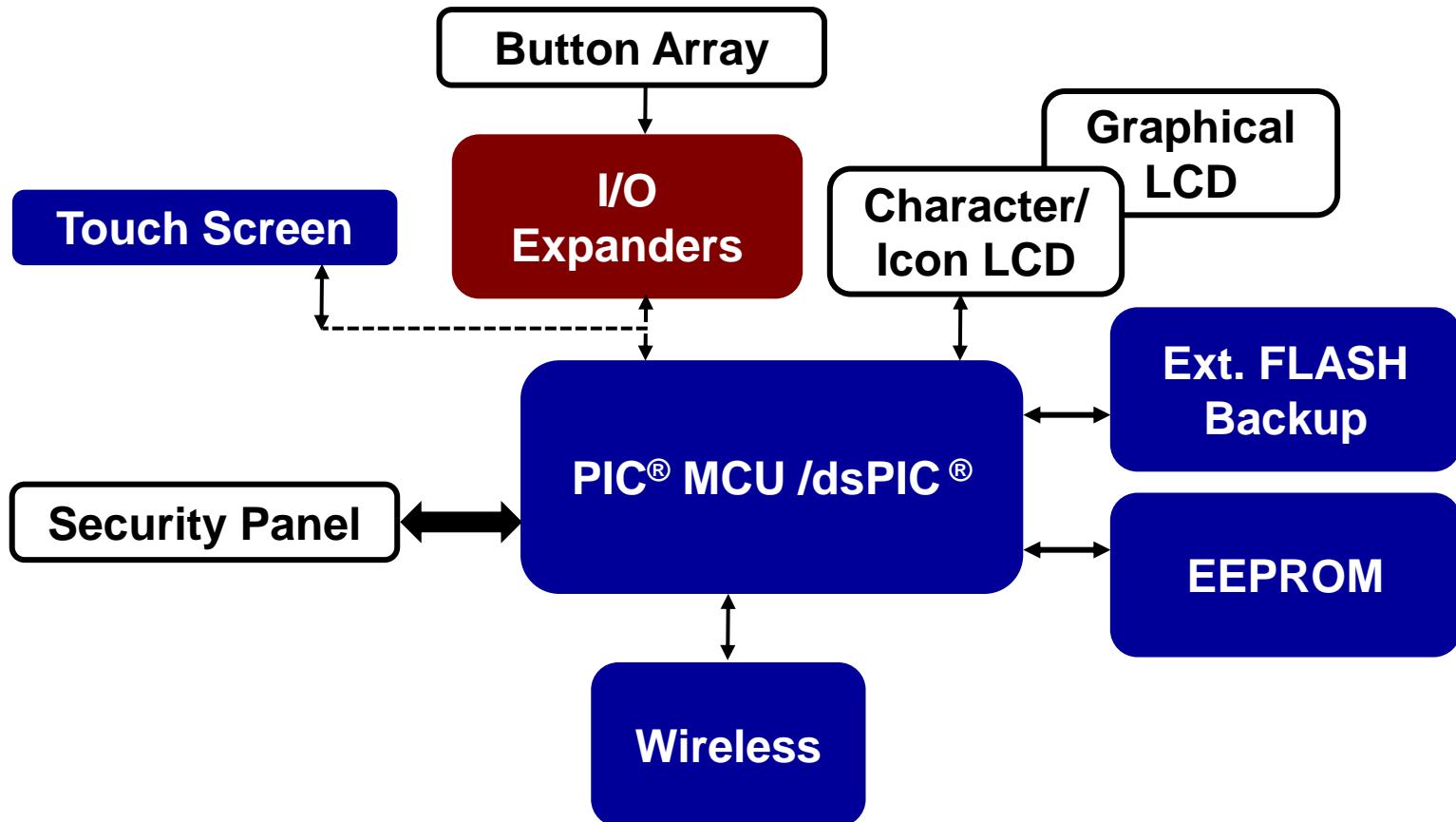
Home Security Alarm System



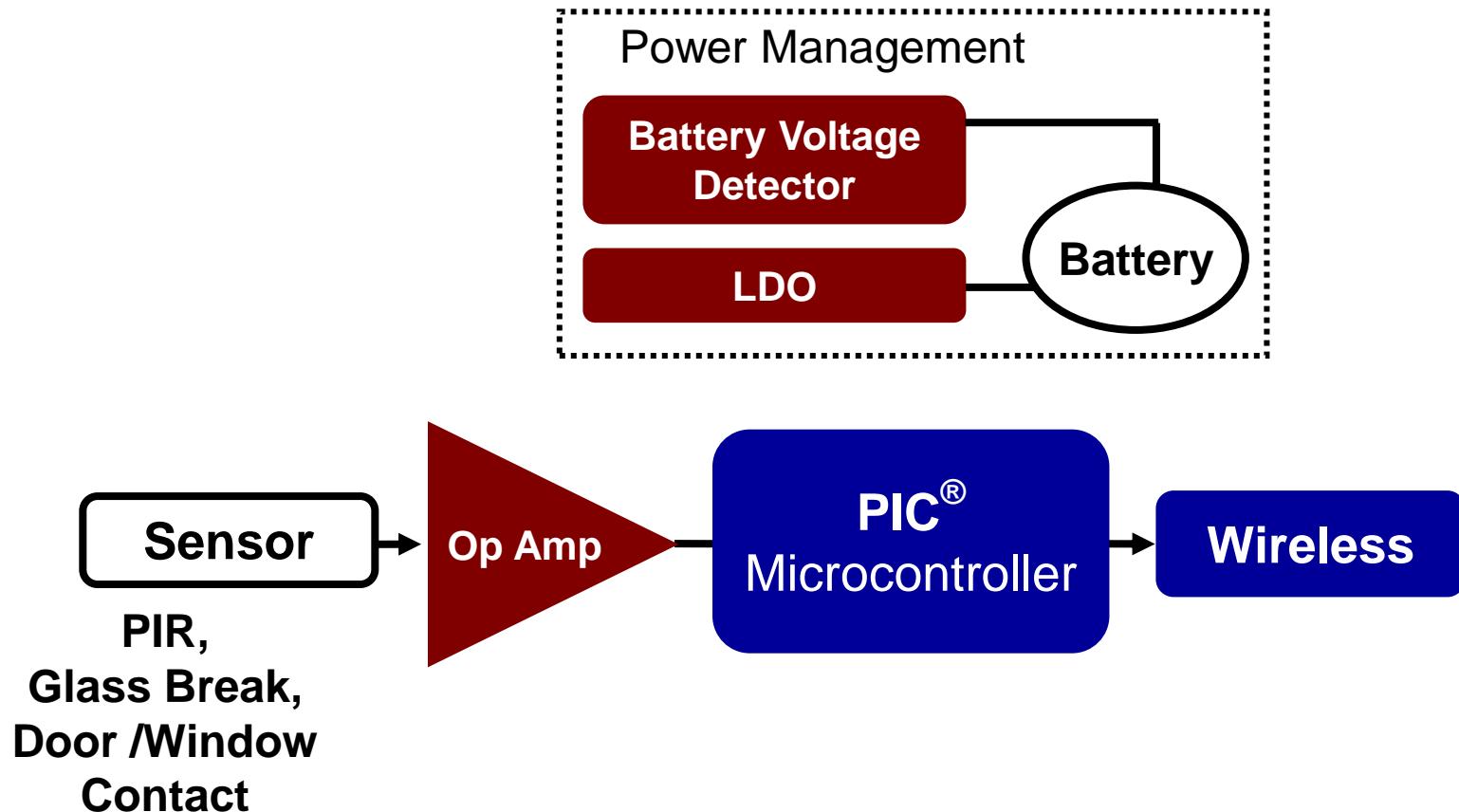
Security Panel Block Diagram



Keypad Panel Block Diagram



Sensor Block Diagram



16/32-Bit Microcontroller

Suggested Products	Description	Product Web Page
PIC32M	<p>MIPS M4K Core</p> <ul style="list-style-type: none"> Up to 80 MHz, 1.65 DMIPS/MHz 5 Stage Pipeline devices Temperature Range: -40C to 105C AEC-Q100 qualified <p>Date and Code</p> <ul style="list-style-type: none"> Up to 512 KB Flash Up to 128 KB SRAM Separate Buses for Instructions and Data <p>Connected Peripherals with DMA</p> <ul style="list-style-type: none"> Full-speed USB Host/Device/OTG 10/100 Ethernet MAC with MII/RMII Interfaces 2x CAN 2.0B Ports Up to 6 UART, 5 I²C™, 4 SPI Ports, CTMU and I²S Up to 8 Additional Channels of General Purpose DMA 	Click Here
PIC24F	The PIC24F microcontroller family features cost effective, 16 MIPS 16-bit MCU performance and many devices with Microchip's eXtreme Low Power Technology	Click Here

[**<< BACK to Keypad Panel Blk Diagram**](#)
[**<< BACK to Security Panel Blk Diagram**](#)

8-Bit Microcontroller

Suggested Products	Description			Product Web Page
	Flexible Intelligence	Innovative Integration	eXtreme Low Power	
PIC12/16/18	<ul style="list-style-type: none"> ■ Continuous re-investment in 8-bit portfolio ■ Industry's most robust offering ■ Pin and code compatible across families ■ 6 pin DFN to 100 pin TQFP ■ 375B to 128KB Flash ■ 16B to 4KB RAM ■ Onboard EEPROM ■ 1.8V to 5.5V+ Operation 	<ul style="list-style-type: none"> ■ Core Independent Peripherals ■ Complementary Output Generator ■ Configurable Logic Cell ■ Numerically Controlled Oscillator ■ Rail to Rail Op-Amps, Fast Comparators ■ Programmable Switch Mode Controller ■ High Resolution PWM, ADC, DAC ■ I2C, SPI, UART, USB, Ethernet 	<ul style="list-style-type: none"> ■ Lowest power sleep modes with flexible wake-up sources ■ Active currents down to 35 uA/MHz ■ Sleep current as low as 20nA ■ Battery lifetime ≥ 20 years ■ Operation down to 1.8V ■ Single cell operation ■ Special low power BOR, WDT, RTC 	Click Here

Temperature Sensors

Function: Measuring and providing Temperature information

Popular Products	Description	Product Web Page
MCP9808 Digital temperature sensor	The MCP9808 converts temperatures between -20°C and +100°C to a digital word with $\pm 0.5^{\circ}\text{C}$ (max.) accuracy	Click Here
MCP9700 Linear Active Thermistor™ ICs	The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.	Click Here

Operational Amplifiers

Function: buffering and filtering signals

Popular Products	Description	Product Web Page
MCP603x	The MCP6031/2/3/4 op amps have a gain bandwidth of 10 kHz with a low typical operating current of 0.9 μ A and an offset voltage that is less than 150 μ V.	Click Here
MCP6V11 Zero Drift Op Amps	Gain-Bandwidth Product: 80 kHz, Offset Voltage: $\pm 8 \mu$ V (max.), IQ: 11 μ A (typ.), Wide Supply Voltage Range: 1.6V to 5.5V	Click Here
MCP6444	The MCP6444 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 9 kHz with typ. quiescent current of 450 nA .	Click Here
MCP60x	MCP601/2/3/4 (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μ A and an offset voltage that is less than 2 mV.	Click Here

I/O Expanders

- Function: Provide general purpose parallel I/O expansion for I²C™ or SPI applications

Popular Products	Description	Product Web Page
MCP23018/S18	MCP23018/S18 is a 16-bit I/O expander for high speed I ² C™ Compatible interface. MCP23018 is available in the following packages: 28-pin PDIP (300 mil,)28-pin SOIC (300 mil), 24-pin SSOP, 24-pin QFN (4x4	Click Here

Power Management

Popular Products	Description	Product Web Page
MCP13xx	The MCP13xx are voltage supervisor devices designed to keep a microcontroller in reset until the system voltage has reached and stabilized at a proper level for reliable system operation.	Click Here
MCP111/2	The MCP111/112 voltage detectors have extremely low 1uA operating current and small form factor. They hold the microcontroller in reset until the supply voltage reaches a predetermined operating level. These devices also protect against brownout conditions	Click Here
MCP1700 MCP1703A	The MCP1700/3A are CMOS low dropout positive voltage regulators which can source up to 250mA of current with an extremely low input-output voltage differential. The low dropout voltage combined with the low current consumption makes this part ideal for battery operation.	MCP1700 MCP1703A
MCP16301/H	The MCP16301 is a highly integrated, high-efficiency, fixed frequency, step-down DC-DC converter in a popular SOT-23 package that operates from input voltage sources up to 36V	Click Here

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Touch and Input Sensing Solutions

Popular Products	Description	Product Web Page
AR10xx	<p>The Microchip mTouch™ AR1000 Series Resistive Touch Screen Controller is a complete, easy to integrate, cost-effective and universal touch screen controller chip solution.</p> <p>The AR1000 Series has sophisticated proprietary touch screen decoding algorithms to fully process all touch data and save the host from this overhead. More than the usual “preprocessing” features of other low cost devices, the AR1000 delivers reliable, validated and calibrated touch</p>	Click Here
MTCH6301	<p>The MTCH6301 is a turnkey projected capacitive touch controller that allows easy integration of multi-touch and gestures to create a rich user interface in your design.</p>	Click Here

Memory

Function Block	Popular Products	Description	Product Web Page
External Flash Image	SST39V	The SST39 Series MPF™ (Multi-Purpose Flash) products, including MPF+ and Advanced MPF+, provide fast read and program times with features such as Erase-Suspend/Erase-Resume, Boot Block, Security ID, Hardware Reset and heightened protection features.	Click Here
	SST25	The SST25xx family of Serial FLASH is among the industry's lowest power 3.0V and 1.8V products.	Click Here
EEPROM	24LC 25LC	Microchip offers the broadest range of Serial EEPROM devices (from 128 bits to 1 Mbit) over the widest operating voltage range (1.7 to 5.5V). Microchip Serial EEPROMs are compatible with the I ² C®, SPI, Microwire, as well as the new single-I/O UNI/O® bus.	Click Here
Scratch Pad RAM	23LC		

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Wireless

Function Block	Popular Products	Description	Product Web Page
Wireless/ WiFi®	MRF24xx	The MRF Module connects to hundreds of PIC® microcontrollers via a 4-wire SPI interface and is an ideal solution for lower-power, low data-rate Wi-Fi® sensor networks	Click Here
	RN-17	The RN171 is a standalone, complete Wi-Fi® networking module. Due to its small form factor and extremely low power consumption, it is perfect for wireless applications such as asset monitoring, sensors, and battery operated devices.	
Ethernet	ENC624x, 11/24/25AA, LANxxxx	<p><u>External Controllers</u> Offer low-cost stand-alone 10/100Base-T Ethernet interface controller with integrated MAC and PHY. Connect to MCUs through either serial or parallel interfaces</p> <p><u>Support Products</u> EUI-48™/EUI-64™ MAC Address Chips <u>SMSC Products</u> Ethernet Switches and Controllers USB to Ethernet Bridges Ethernet Transceivers ARCNet Controllers</p>	Click Here

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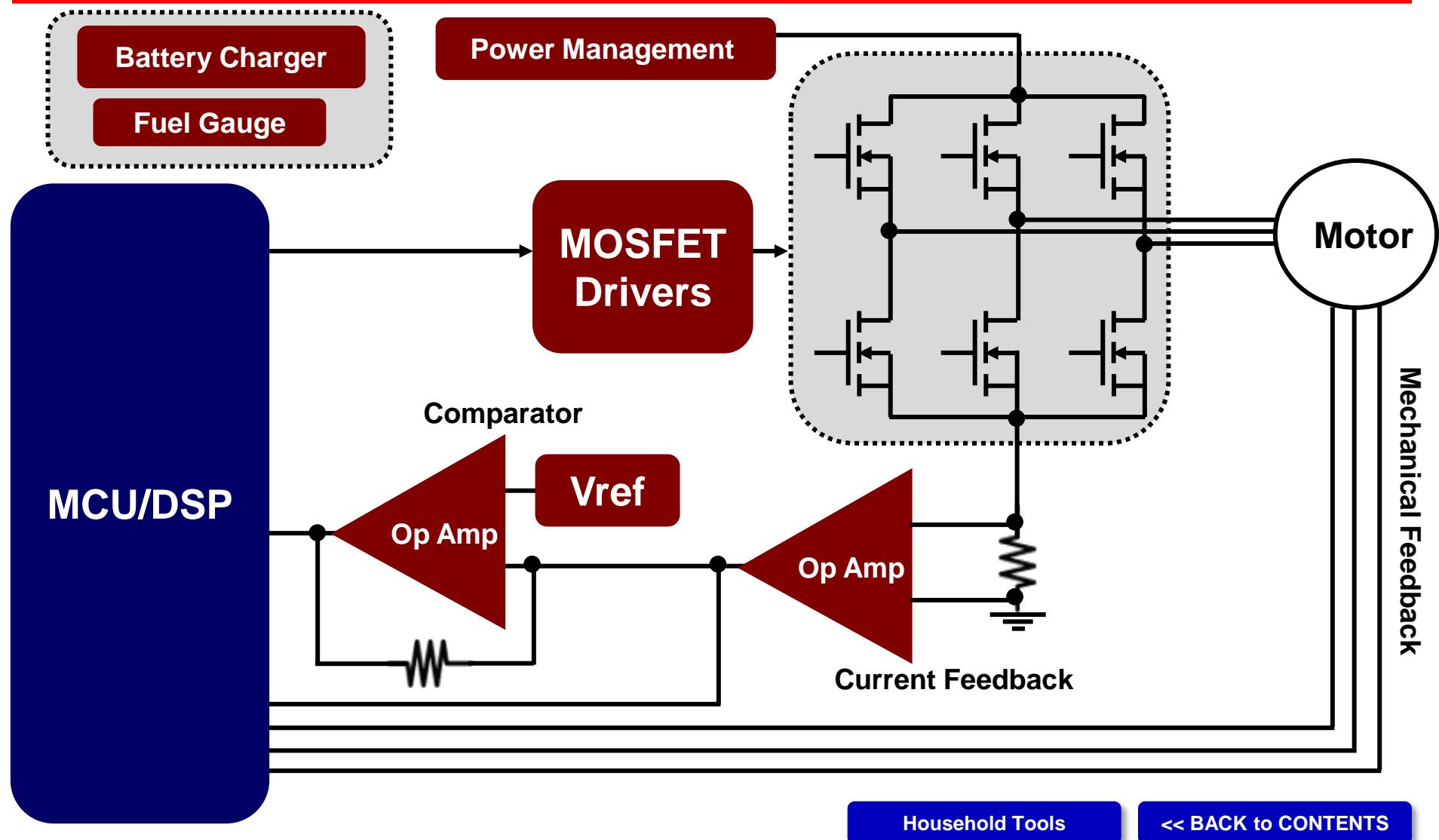
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Power Tools

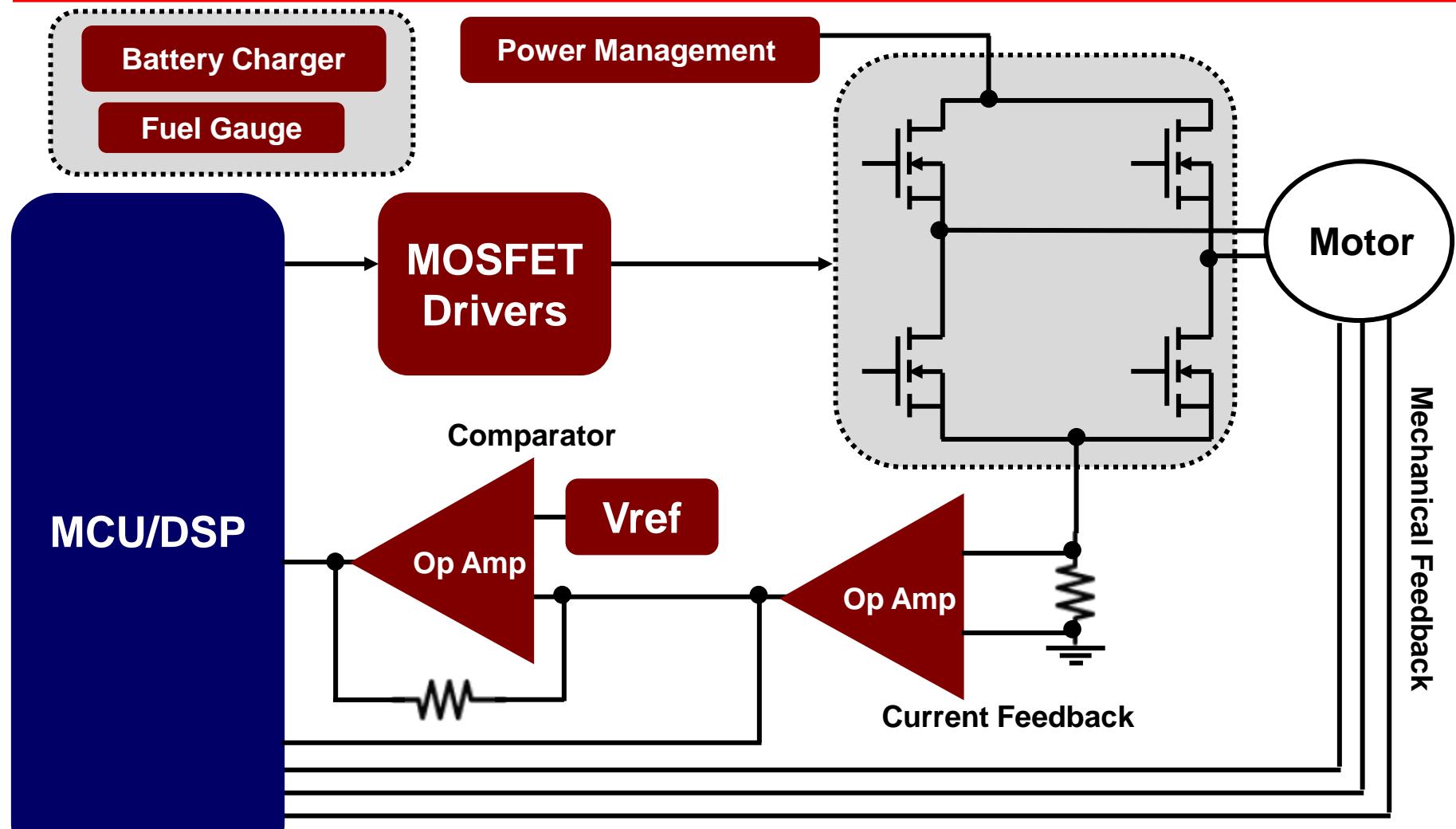
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Professional Power Tools



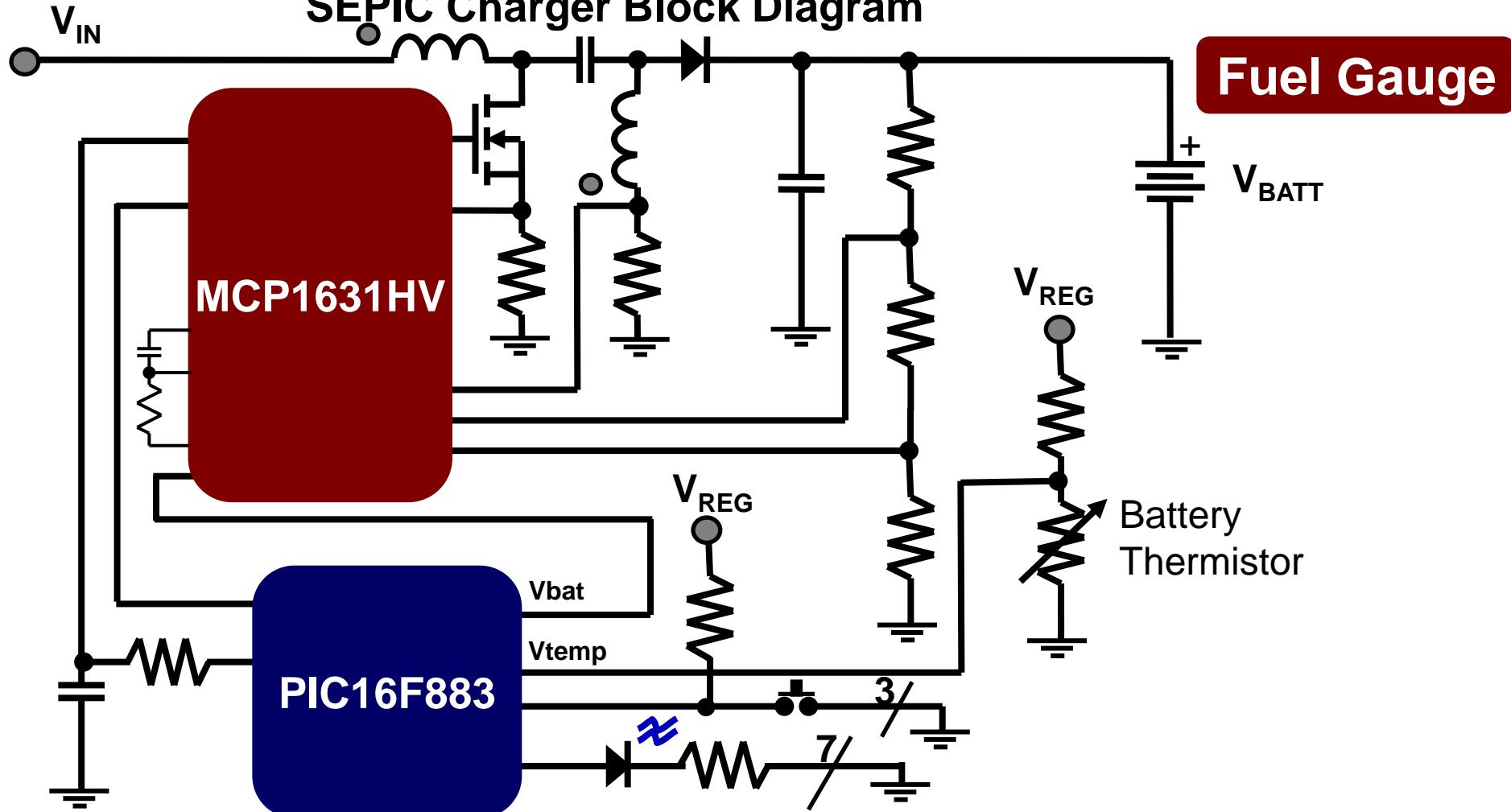
Household Power Tools





Battery Charger

SEPIC Charger Block Diagram



Professional Power Tools

Household Tools

PWM Controller

Suggested Products	Description	Product Web Page
MCP1630/1	<ul style="list-style-type: none"> • Small footprint discrete high-speed PWM controllers (2MHz) in conjunction with a MCU. • Peak Current Mode Control. • High Voltage Options Operate to +16V Input. • Integrated Overvoltage Comparator and Low Side MOSFET Driver. • Over-temperature Protection and Under-voltage Lockout (UVLO). 	MCP1630 MCP1631
MCP1631RD-MCC2: MCP1631HV Multi-Chemistry Battery Charger Reference Design		Click Here
MCP1631RD-DCPC1: MCP1631HV Digitally Controlled Programmable Current Source Reference Design		Click Here

PIC Microcontrollers

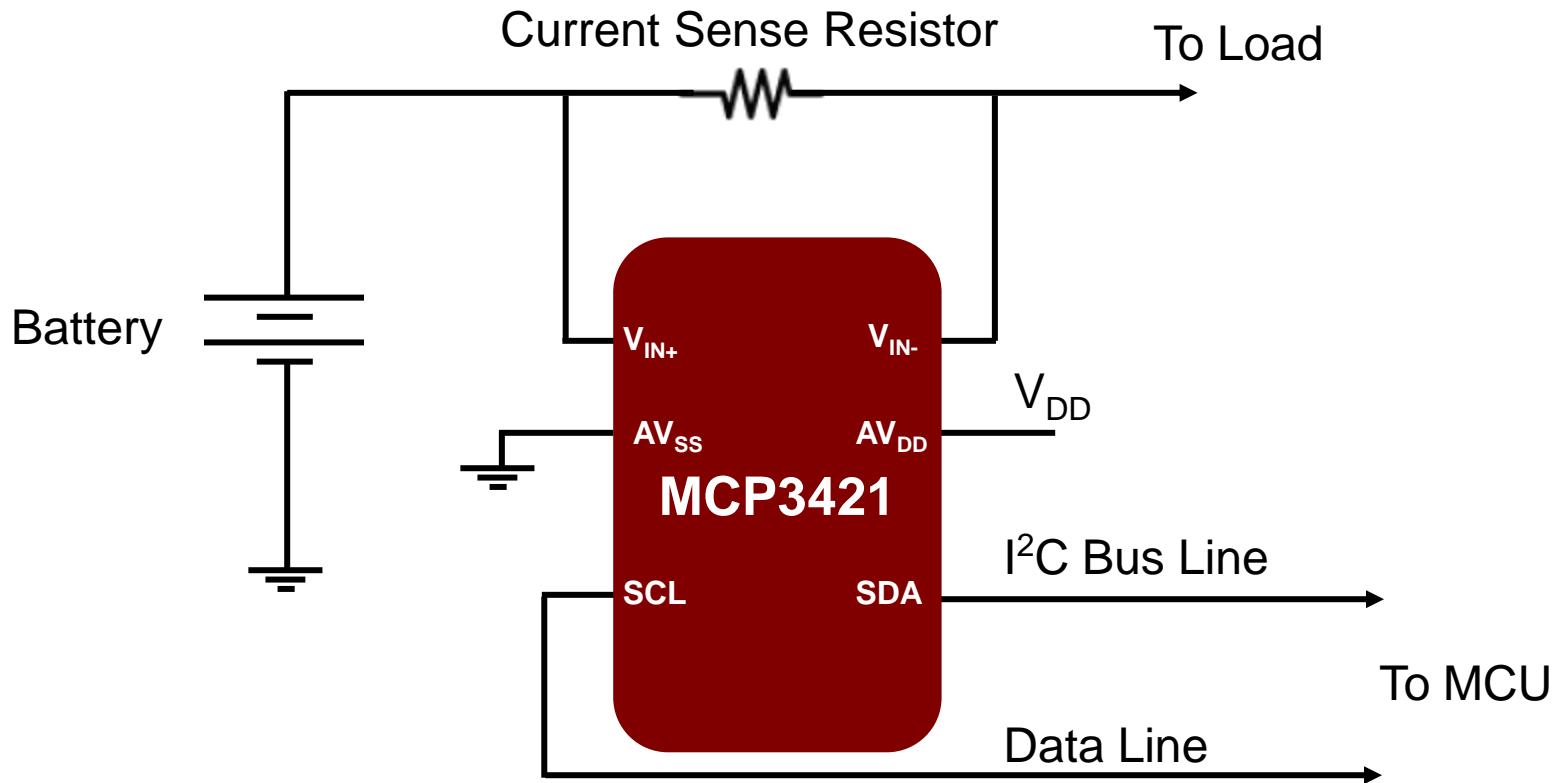
- **Function:** coordinating all the control and monitor functions - the brain of the system
- **Popular products:** PIC16F182X, 178X, 75X, 15XX, 193X
- **Attributes:**
 - Upwards of 32MHz internal OSC
 - 4 channel Programmable Switch Mode Controller (PSMC)
 - Integrated high performance comparators, op-amp, 10/12 bit ADC, 5/8/9 bit DAC, CCP, COG, NCO, CLC
 - Slope compensation
 - 256 bytes of EEPROM
 - Available in various packages

Microcontroller

Suggested Products	Description	Product Web Page
PIC16F883	<ul style="list-style-type: none"> This powerful yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller in a 28 pin package. The PIC16F883 features 256 bytes of EEPROM data memory, 2 Comparators, 11 channels of 10-bit ADC, 1 capture/compare/PWM and 1 Enhanced capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I²C™) bus and an Enhanced Universal Asynchronous Receiver Transmitter (EUSART). 	PIC16F833

Fuel Gauge

- Function: To track remaining battery level or charging status



Analog to Digital Convertor

- Function: Converting analog voltage or current signal (pressure) into digital data

Popular Products	Description	Product Web Page
MCP3421	The MCP3421 is a single channel low-noise, high accuracy Delta-Sigma A/D converter with differential inputs and up to 18 bits of resolution in a small SOT-23-6 package. The device uses a two-wire I ² C™ compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.	Click Here
AN1156: Application Note on Battery Fuel Measurement Using Delta-Sigma ADC Devices		Click Here
MCP3421DM-BFG: Battery Fuel Gauge Demo Board		Click Here

Linear Products

Function	Popular Products	Description	Product Web Page
Sense and gain up output current. Low offset voltage required for minimizing measurement error	MCP62x	The MCP62x mCAL op amps have a gain bandwidth of 20 MHz with a low typical operating current of 2.5 mA and an offset voltage that is less than 200 μ V. They feature on-chip Input offset voltage calibration	Click Here
Provide feedback compensation by sensing O/P voltage and comparing it with ref. voltage	MCP60x	MCP601/2/3/4 (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 230 μ A and an offset voltage that is less than 2 mV.	Click Here
Compares voltage output of the amplifier to a reference to determine over current condition	MCP65xx	These comparators are optimized for low power, single-supply operation with greater than rail-to-rail input operation. Available in push-pull and Open drain outputs, the MCP656x family supports rail-to-rail output swing. The output limits supply current surges, and dynamic power consumption while switching.	Click Here

Synchronous Buck MOSFET Drivers

Function: driving the high power devices

Popular Products	Description	Product Web Page
MCP14700 Synch. MOSFET Driver w/separate High/Low side control	The MCP14700 is a high-speed synchronous MOSFET driver designed to optimally drive a high-side and low-side N-Channel MOSFET. The MCP14700 has two PWM inputs to allow independent control of the external N-Channel MOSFETs.	Click Here
MCP1401/2	The MCP1401/02 MOSFET drivers are inverting and non-inverting respectively. These MOSFET drivers are small size and allow the gate driver to be positioned close to the MOSFET's physical gate connection, which minimizes gate bounce caused by the parasitic PCB layout. This also minimizes gate rise-and-fall times, propagation-delay times and shoot-through current, all of which help to increase system efficiency and reduce power dissipation.	Click Here

Power Management

Popular Products	Description	Product Web Page
MCP16321/2	The MCP16321/2 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a 16-pin QFN that operates from input voltages up to 24V.	Click Here
MCP16323	The MCP16323 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a 16-pin QFN package that operates from input voltages up to 18V.	Click Here
MCP16311/2	The MCP16311/2 is a compact, high-efficiency, fixed frequency PWM/PFM, synchronous step-down DC-DC converter that operates from input voltage sources up to 30V. Integrated features include a high-side and a low-side switch, fixed frequency Peak Current Mode Control, internal compensation, peak-current limit and over temp. protection.	Click Here
MCP1790	The MCP1790 is a 70 mA, ceramic output cap stable, high voltage, Low Dropout Regulator (LDO). The MCP1790 is capable of handling continuous input voltage of up to 30V and is load dump protect for up to 48V	Click Here

Voltage Reference

- Function: providing the system with an accurate analog voltage for comparison

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here



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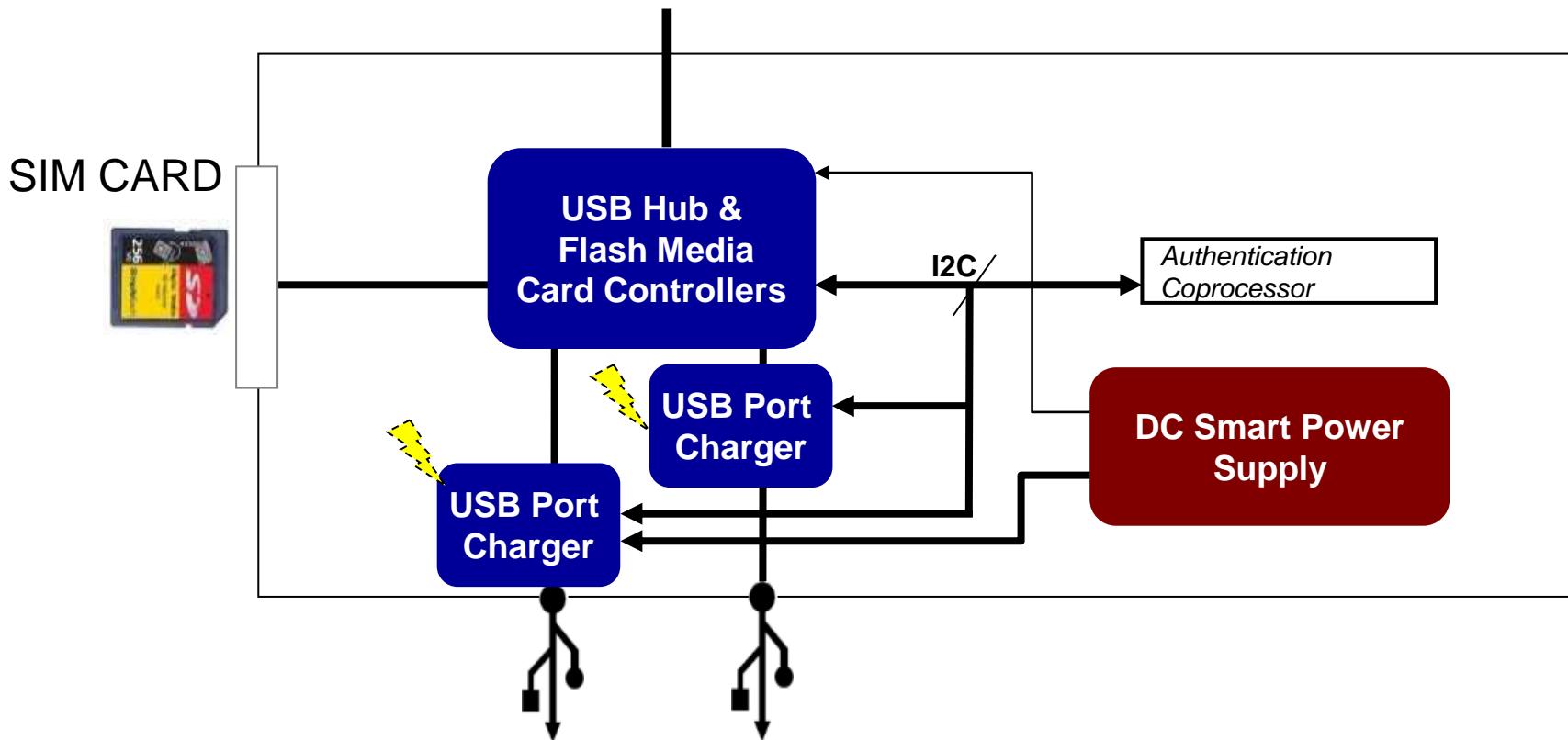
USB Breakout Box

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USB Breakout Box

Display/Control Interface to In-Vehicle Network





USB Hub & Flash Media Card Controllers

Popular Products	Description	Product Web Page
USB224x	USB 2.0 Flash Media Card Controller with Integrated Card Power FETs	Click Here
USB264x	USB 2.0 Flash Media Controller with Integrated Card Power FETs and HS Hub	Click Here

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USB Port Charger

Suggested Products	Description	Product Web Page
UCS81002	<ul style="list-style-type: none"> The UCS81002 is a USB port power controller with charging emulation. It highlights nine pre-loaded charger emulation profiles and is compatible with BC1.2 CDP, DCP, YD/T-1591 as well as most Apple® and RIM® portable devices, e-books and tablets. Capable of up to 2.5A of continuous current and integrates a USB 2.0 compatible switch. I2C/SMBus communication allowing customer charge emulation profiles. The '8' USC<u>8</u>1002 represents automotive part ordering number. Standard part is USC1002. 	<u>UCS81002</u>

DC Smart Power Supply

Suggested Products	Description	Product Web Page
MCP19111	<ul style="list-style-type: none"> The MCP19111 is a mid-voltage (4.5-32V) analog-based PWM controller family with an integrated 8-bit PIC(R) Microcontroller. This unique product combines the performance of a high-speed analog solution, including high-efficiency and fast transient response, with the configurability and communication interface of a digital solution. Combining these solution types creates a new family of devices that maximizes the strengths of each technology to create a more cost-effective, configurable, high-performance power conversion solution. 	<u>MCP19111</u>



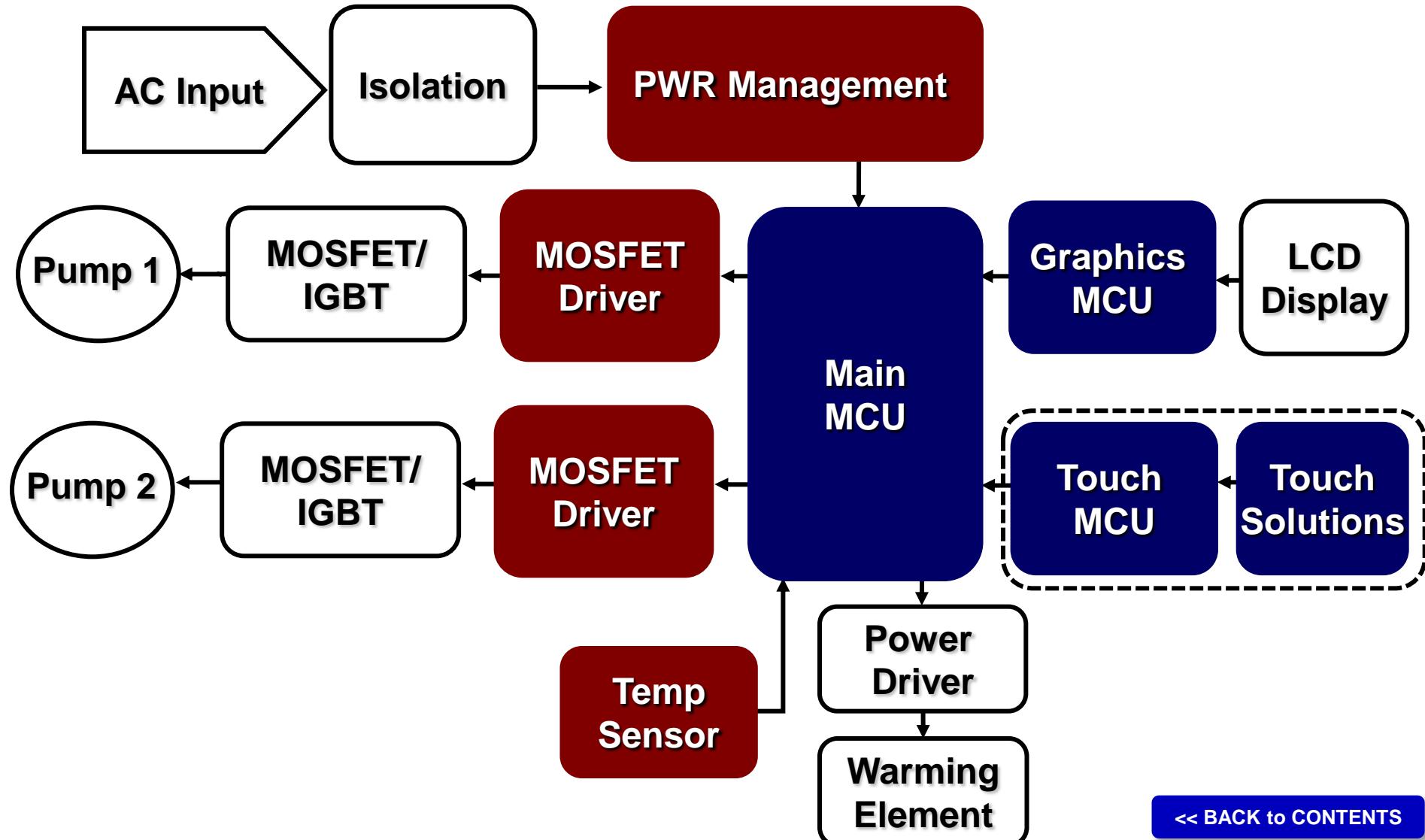
MICROCHIP

High End Beverage Machine

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High End Beverage Machine



Temperature Sensors

Function: Measuring and providing Temperature information

Popular Products	Description	Product Web Page
MCP9800 Digital temperature sensor	<ul style="list-style-type: none"> • 2-wire I²C™/SMBus Compatible Interface • User Selectable 9- to 12-Bit Resolution <ul style="list-style-type: none"> • ±1°C Accuracy from -10°C to +85°C • ±2°C Accuracy from +85°C to +125°C • Low Operating Current: 220 µA (typical) • Shutdown Mode: 1 µA (max) 	Click Here
MCP9700 Linear Active Thermistor™ ICs	<p>The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.</p>	Click Here

[Winning Attributes](#)
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Temperature Sensors Winning Attributes

Attributes:

- Small SC70, SOT-23 and DFN leadless packages
- Very low operating current: 35 to 250 μ A (typ)
- Very low shutdown current: 1 μ A (max)
- High temp accuracy: $\pm 0.25^{\circ}\text{C}$
- Simple operation: no need for external components
- Analog and digital (SPITM, I2CTM, SMBusTM) devices
- High temperature resolution

Low-Power LDOs

- Function: providing regulated, low-noise supply voltages for the system

Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
MCP1703A	With 250 mA maximum output, MCP1703 works with input voltage of up to 16V and in combination with its low current consumption of 2 μ A	Click Here

Low-Power LDOs Winning Attributes

Attributes:

- Extremely low operating current: as low as 1 μ A
- High output voltage accuracy
- Stability with ceramic capacitors
- Wide range of output voltage options
- Space-saving SC70 and SOT-23 packages
- Wide range of features: shutdown mode

RESET Monitors

- Function: System supervisor circuits designed to monitor VCC in digital systems and provide a reset signal to the host processor when needed

Popular Products	Description	Product Web Page
TCM809	<p>The reset output is driven active within 20 µsec of VCC falling through the reset voltage threshold. Reset is maintained active for a minimum of 140msec after VCC rises above the reset threshold.</p>	Click Here
MCP1xx	<p>The MCP1xx are a family of voltage supervisory devices which also operates as protection from brown-out conditions when the supply voltage drops below a safe operating level</p>	Click Here

RESET Monitors Winning Attributes

- **Attributes:**
 - Tiny SOT-23 and SC-70 packages
 - Very low operating current: as low as 1 μ A (max)
 - High threshold voltage accuracy: $\pm 2.8\%$ (max)
 - V_{DD} transient immunity
 - Many available options: push-pull output, open-drain output and internal pull-up resistor

Synchronous Buck MOSFET Drivers

Function: driving the high power devices (MOSFETs in synch. Buck configuration)

Popular Products	Description	Product Web Page
MCP14628 Dual Output MOSFET Driver for Synchronous Applications	<p>The MCP14628 is a synchronous MOSFET driver used for driving MOSFETs in a rectified bridge arrangement. There are two separate drivers contained in the MCP14628. The low-side driver output drives a non-floating or ground reference N-Channel MOSFET. The high-side driver is designed to drive a floating N-Channel MOSFET. An external bootstrap capacitor is used to provide the additional voltage.</p>	Click Here
MCP14700 Synchronous MOSFET Driver w/separate High/Low side control	<p>The MCP14700 is a high-speed synchronous MOSFET driver designed to optimally drive a high-side and low-side N-Channel MOSFET. The MCP14700 has two PWM inputs to allow independent control of the external N-Channel MOSFETs.</p>	Click Here

[Winning Attributes](#)
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Synchronous Buck MOSFET Drivers

Attributes:

- Operating voltage range: 5V to 30V
- Peak current capability: 2A source, 4A sink
- Internal Bootstrap Blocking Device
- Low Supply Current: 80 µA (typical)
- Space Saving Packages: SOIC, DFN

Operational Amplifiers

Function: buffering and filtering sensor feedback

Popular Products	Description	Product Web Page
MCP6004	The MCP6004 is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typical quiescent current of 100 microamperes.	Click Here
MCP6H04	MCP6H04 has a wide supply voltage range of 3.5V to 16V and rail-to-rail output operation. This device has a gain bandwidth product of 1.2 MHz (typical), while only drawing 135 µA/amplifier (typical) of quiescent current.	Click Here
MCP6294	MCP6294 provide wide bandwidth of 10 MHz Gain Bandwidth Product. This family also operates from a single supply voltage as low as 2.4V to 6V, while drawing 1 mA (typical) quiescent current.	Click Here

[Winning Attributes](#)
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Operational Amplifiers

Attributes:

- Small SC-70, TDFN and SOT-23 packages
- GBWP: 9 kHz to 60MHz
- Excellent operating current-to-GBWP ratio
- Mostly rail-to-rail inputs and outputs
- Offset voltage: as low as 2 μ V (MCP6V0x)
- Chip Select capability for power savings

Analog-to-Digital Converters

- Function: converting analog feedback signals from motor to digital signals for MCU

Popular Products	Description	Product Web Page
MCP3221	<p>The MCP3221 is a 12-bit SAR A/D converter. Available in the SOT-23 package, the MCP3221 provides a low max. conversion current and standby current of 250 µA and 1 µA respectively. Communication to the MCP3221 is performed using a 2-wire I2C™ Compatible interface. The MCP3221 runs on a single supply voltage range of 2.7 V to 5.5 V.</p>	Click Here
MCP3201	<p>The MCP3201 12-bit Analog-to-Digital Converter (ADC) combines high performance and low power consumption in a small package, making it ideal for embedded control applications. The MCP3201 features SAR architecture and a SPI serial interface, allowing 12-bit ADC capability to be added to any PIC® microcontroller. The MCP3201 features 100k samples/second, 1 input channel, low power consumption (5nA typical standby, 400µA max. active).</p>	Click Here

Analog-to-Digital Converters

□ SAR ADC Attributes:

- Resolution: 8 to 13 bits
- Max sampling rate: up to 200 ksps
- Linearity: ± 1 LSB DNL, ± 1 LSB INL
- Current consumption: 175 to 500 μ A (max.)
- Single supply voltage: 2.7V to 5.5V
- Small packages: SOT-23 and MSOP

Voltage References

- Function: providing the system with an accurate analog voltage for comparison (needed for ADC)

Popular Products	Description	Product Web Page
MCP1525	MCP1525 is a low power, high precision voltage reference. It provides a precise output voltage of 2.5V which is then compared to other voltages in the system. This voltage reference is normally used in the 3V to 5V systems, where there may be wide variations in supply voltage and a need to minimize power dissipation.	Click Here

Voltage References

Attributes:

- 1.2V (TC1070), 2.5V or 4.096V output
- Initial accuracy: $\pm 1\%$ (max)
- Temperature coefficient: 50ppm/ $^{\circ}\text{C}$ (max)
- Output current: $\pm 2\text{mA}$
- Operating current: 100 μA (max)
- Industrial temperature range: -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$
- SOT-23 and TO-92 packages

PIC Microcontrollers

Function	Popular Products	Description	Product Web Page
Main MCU (Including Touch & Color Graphics)	PIC32MX	Microchip's 32-bit portfolio with the MIPS microAptiv or M4K core offer high performance microcontrollers, and all the tools needed to develop your embedded projects. With MPLAB® Harmony software framework, low cost development tools, and pin/peripheral compatibility from 16-bit product lines, PIC32 MCUs shorten time to market and allow your designs to grow.	Click Here
Main MCU (Including Touch & Simple Graphics)	PIC16F193x	This versatile 40-pin MCU is also a member of Microchip's extreme low power microcontroller family featuring nanoWatt XLP technology. Debug and Programming support is available via PICkit™ 3, and MPLAB® ICD 3	Click Here

Capacitive Touch Solutions

Function	Popular Products	Description	Product Web Page
Capacitive Touch Solutions	CAP11/12xx	SMSC's capacitive touch sensor products, featuring RightTouch® technology, set a new standard in simplifying development, improving noise immunity, and lowering BOM costs in PC, LCD monitors, white goods and consumer electronic designs. These devices have been carefully designed to filter for common noise sources such as backlight inverters, DC-DC switching regulators and wireless frequencies. They support a wide variety of interfaces such as I2C, SMBus, SMSC BC-Link™ and SPI and also provide world-class ESD protection of $\pm 8\text{kV}$ HBM with no external ESD protection circuits required.	Click Here

mTouch and Input Sensing Solutions

Popular Products	Description	Product Web Page
AR10xx	<p>The Microchip mTouch™ AR1000 Series Resistive Touch Screen Controller is a complete, easy to integrate, cost-effective and universal touch screen controller chip solution.</p> <p>The AR1000 Series has sophisticated proprietary touch screen decoding algorithms to fully process all touch data and save the host from this overhead. More than the usual “preprocessing” features of other low cost devices, the AR1000 delivers reliable, validated and calibrated touch</p>	Click Here
MTCH6301	<p>The MTCH6301 is a turnkey projected capacitive touch controller that allows easy integration of multi-touch and gestures to create a rich user interface in your design.</p>	Click Here



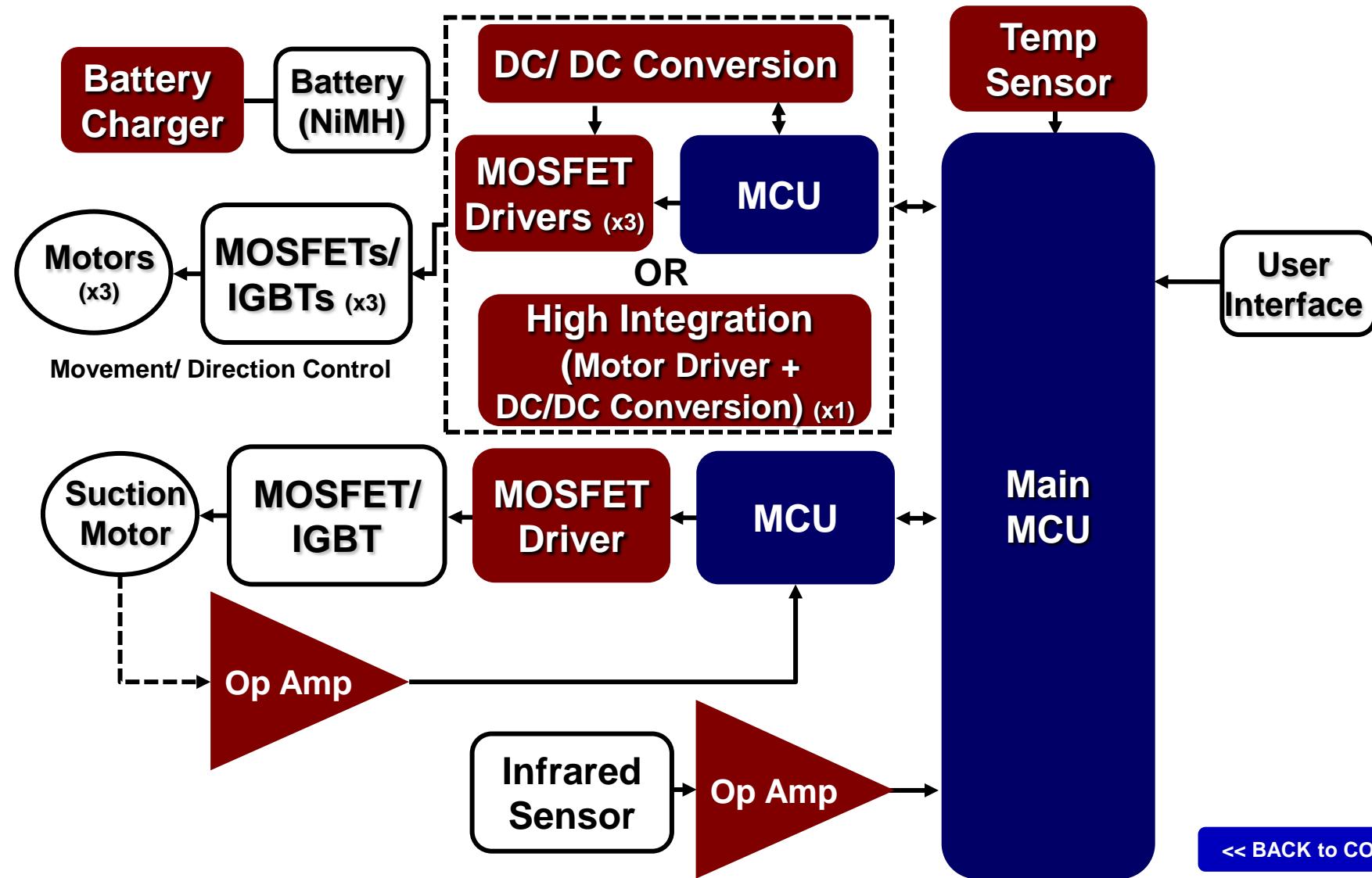
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Robot Vacuum Cleaner

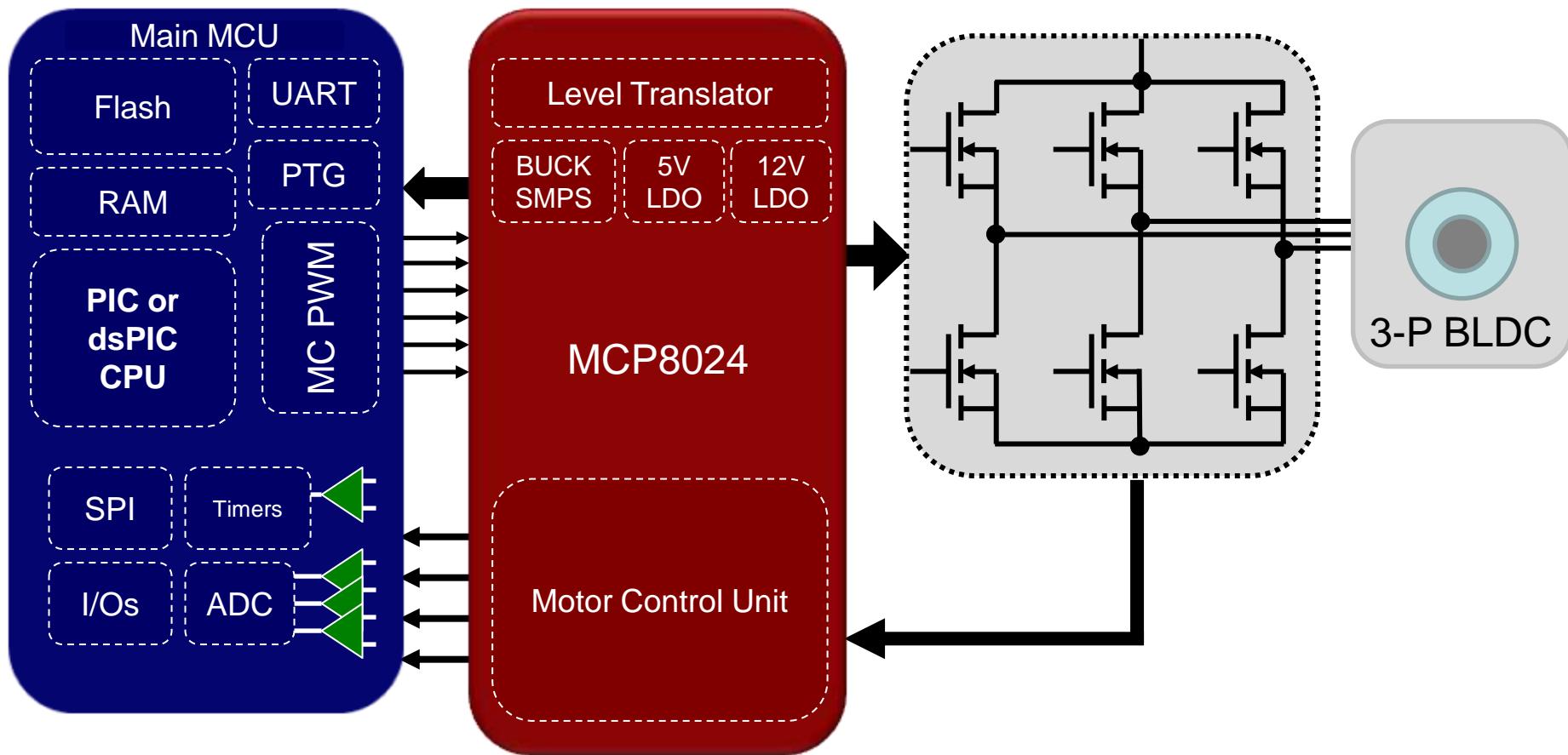
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Robot Vacuum Cleaner



High Integration Motor Control/ Drive





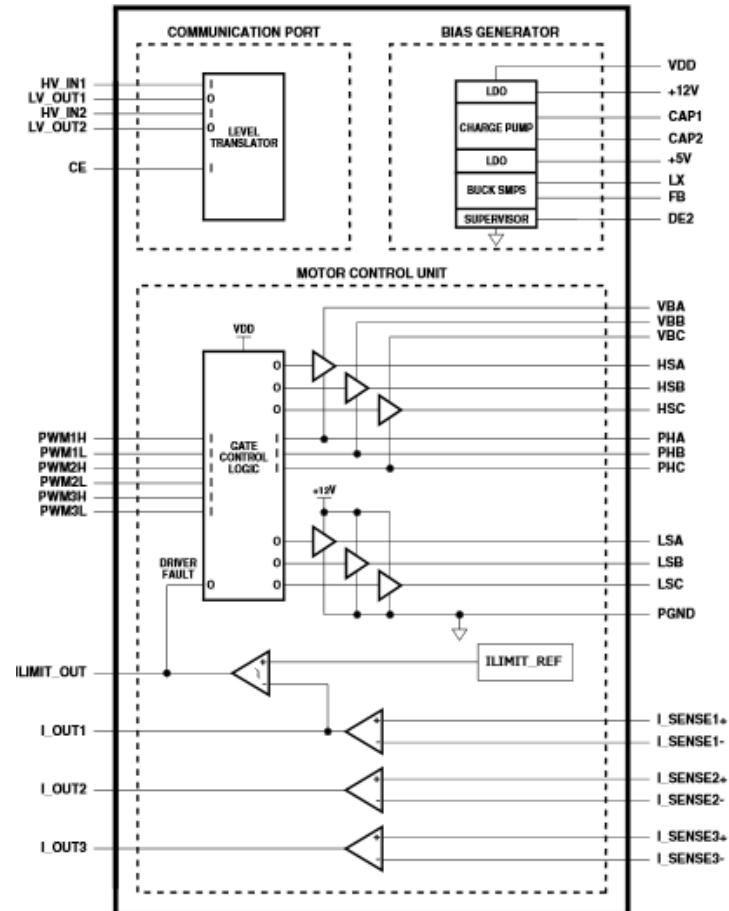
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MCP8024

Online
Datasheet

Features:

- Three Half-bridge Drivers Configured to Drive External High-Side NMOS and Low-Side NMOS MOSFETs:
 - Independent input control for high-side NMOS and low-side NMOS MOSFETs
 - Peak output current: 0.5A @ 12V
 - Shoot-through protection
 - Overcurrent and short circuit protection
- Adjustable Output Buck Regulator (750 mW)
- Two LDOs: 5V @ 20 mA / 12V @ 20 mA
- Internal Bandgap Reference
- Three Operational Amplifiers for Motor Phase Current Monitoring and Position Detection
- Overcurrent Comparator and Thermal Shutdown
- Two Level Translators
- Input Voltage Range: 6 - 40V
- Operational Voltage Range: 6 - 28V
- Undervoltage Lockout (UVLO): 6V
- Overvoltage Lockout (OVLO): 28V
- Transient (100 ms) Voltage Tolerance: 48V
- Temperature Range: -40 to +150°C



BACK

Low-Power LDOs

- Function: providing regulated, low-noise supply voltages for the system

Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
MCP1703A	With 250 mA maximum output, MCP1703 works with input voltage of up to 16V and in combination with its low current consumption of 2 μ A	Click Here



Operational Amplifiers for Sensor Signal Conditioning

Popular Products	Description	Product Web Page
MCP600x	<p>The MCP600x is a quad general purpose op amp offering rail-to-rail input and output over the 1.8 to 6V operating range. This amplifier has a typical GBWP of 1 MHz with typical quiescent current of 100 microamperes/ amp.</p>	Click Here
MCP64xx	<p>MCP64xx family of Low Power Op Amps are designed with Microchip's advanced CMOS process. The MCP64xx Op Amps have low Quiescent Current, Input Offset Voltage and GBWP ranging from 9Khz to 7.5 MHz (typ.). Low power and small form factor make these devices ideal of many portable applications.</p>	Click Here
MCP6294	<p>MCP6294 provide wide bandwidth of 10 MHz Gain Bandwidth Product. This family also operates from a single supply voltage as low as 2.4V to 6V, while drawing 1 mA (typical) quiescent current.</p>	Click Here

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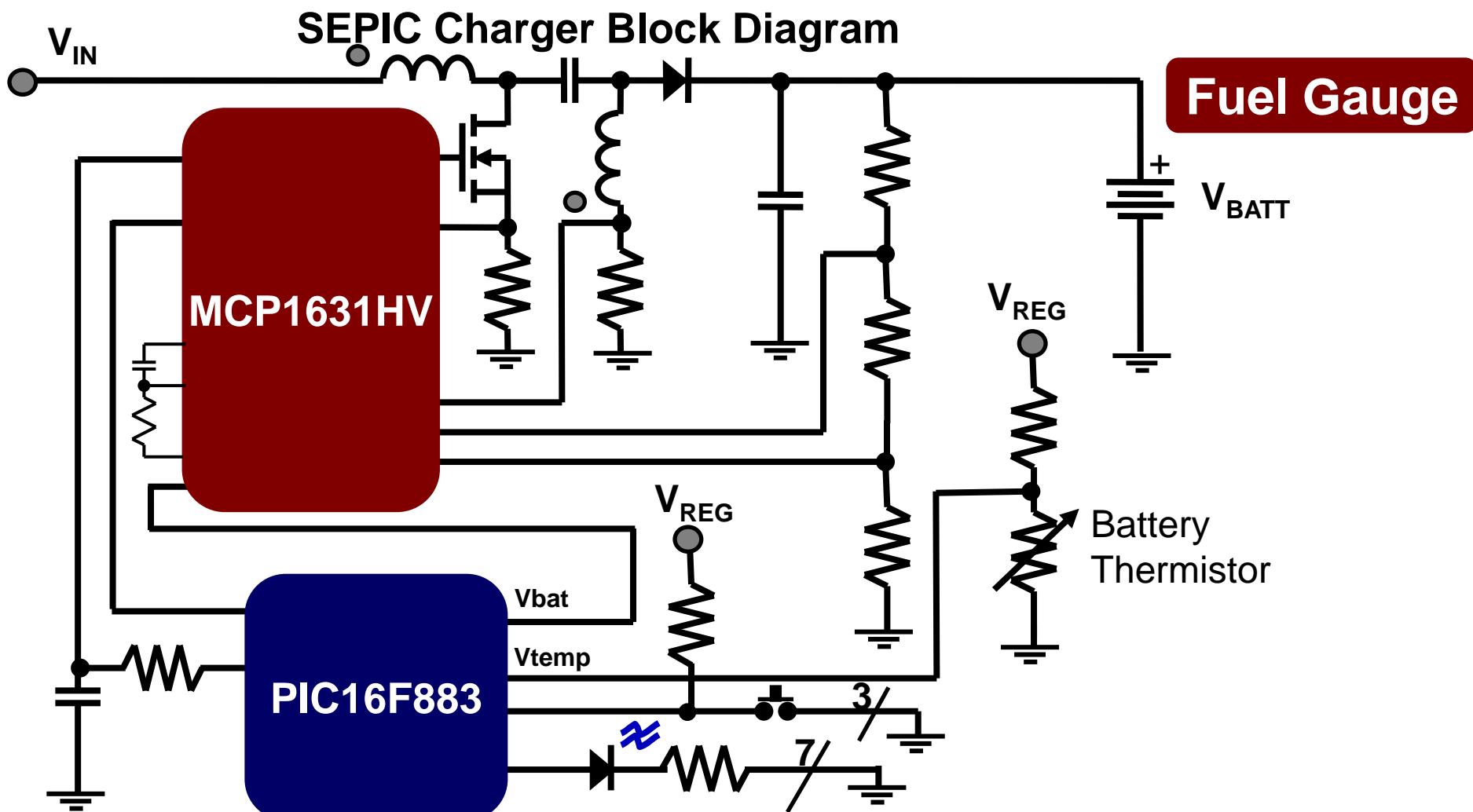
Operational Amplifiers in the Control Loop

Popular Products	Description	Product Web Page
MCP63x	<p>The MCP63x family of operational amplifiers features high gain bandwidth product (24 MHz) and high output short circuit current. Some devices also provide a Chip Select pin that supports a low power mode of operation. These amplifiers are optimized for high speed, low noise and distortion, single-supply operation with rail-to-rail output and an input that includes the negative rail.</p>	Click Here
MCP66x	<p>The MCP66x family of operational amplifiers features high gain bandwidth product, and high output short circuit current. High Gain Bandwidth of 60 MHz, Short Circuit Current of 90 mA, Noise: 6.8nV/rtHz, Rail-to-Rail Output, Slew Rate: 27 V/us</p>	Click Here
MCP629x	<p>MCP629x family provides wide bandwidth of 10 MHz Gain Bandwidth Product. This family also operates from a single supply voltage as low as 2.4V to 6V, while drawing 1 mA (typical) quiescent current.</p>	Click Here

MOSFET Drivers

Popular Products	Description	Product Web Page
MCP14700 Synch. MOSFET Driver w/separate High/Low side control	The MCP14700 is a high-speed synchronous MOSFET driver designed to optimally drive a high-side and low-side N-Channel MOSFET. The MCP14700 has two PWM inputs to allow independent control of the external N-Channel MOSFETs.	Click Here
MCP1401/2	The MCP1401/02 MOSFET drivers are inverting and non-inverting respectively. These MOSFET drivers are small size and allow the gate driver to be positioned close to the MOSFET's physical gate connection, which minimizes gate bounce caused by the parasitic PCB layout. This also minimizes gate rise-and-fall times, propagation-delay times and shoot-through current, all of which help to increase system efficiency and reduce power dissipation.	Click Here
TC4427A	Supply Voltage Range: 2.5V to 5.5V Wide Temperature Measurement Range: -40°C to +125°C High Temperature Converter Accuracy: $\pm 2^\circ\text{C}$, Max, at 25°C Linear Temperature Slope: 10mV/°C Very Low Supply Current: 35μA Typical	Click Here

Battery Charger



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PWM Controller

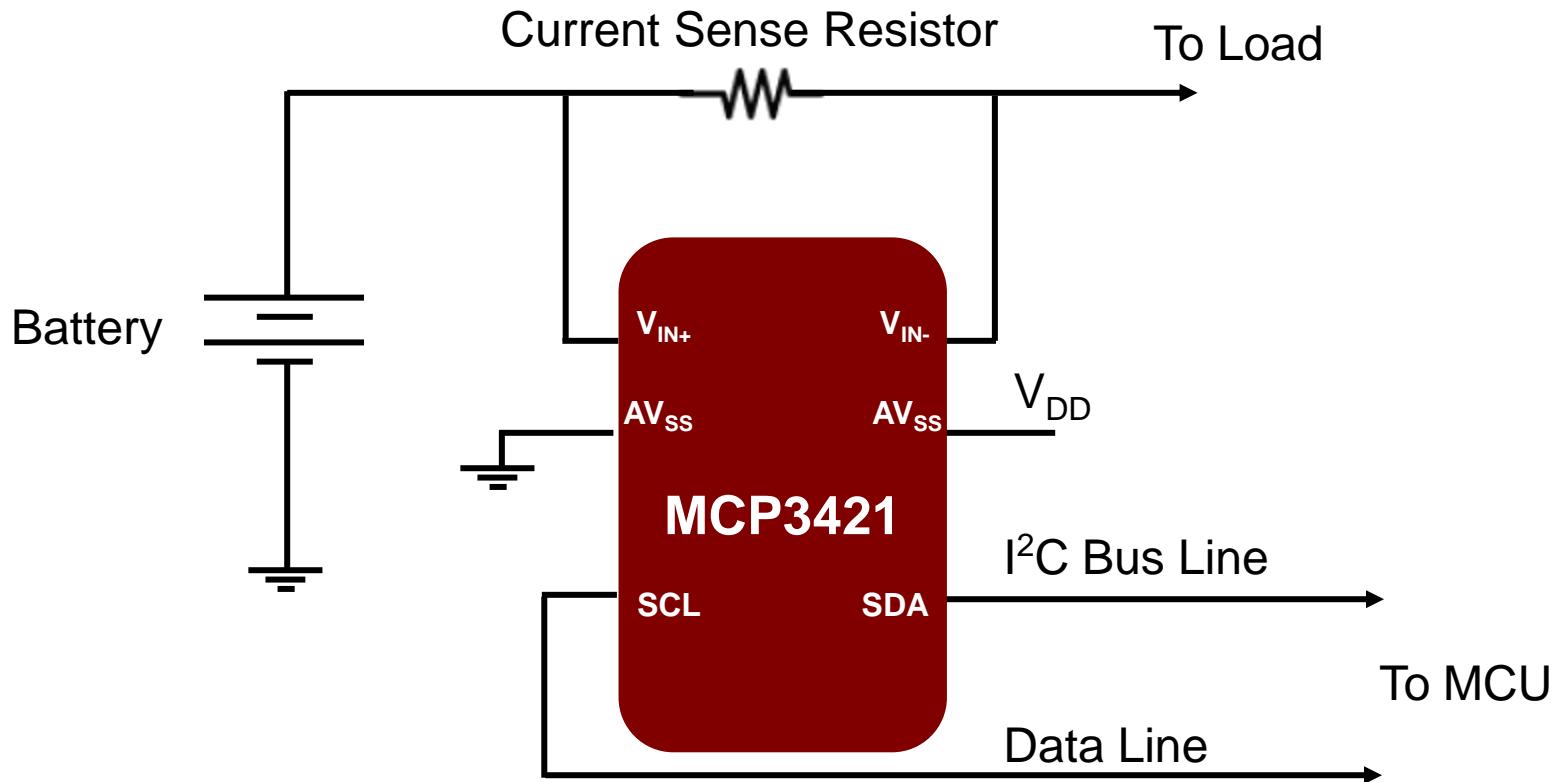
Suggested Products	Description	Product Web Page
MCP1630/1	<ul style="list-style-type: none"> • Small footprint discrete high-speed PWM controllers (2MHz) in conjunction with a MCU. • Peak Current Mode Control. • High Voltage Options Operate to +16V Input. • Integrated Overvoltage Comparator and Low Side MOSFET Driver. • Over-temperature Protection and Under-voltage Lockout (UVLO). 	MCP1630 MCP1631
MCP1631RD-MCC2: MCP1631HV Multi-Chemistry Battery Charger Reference Design		Click Here
MCP1631RD-DCPC1: MCP1631HV Digitally Controlled Programmable Current Source Reference Design		Click Here

Microcontroller

Suggested Products	Description	Product Web Page
PIC16F883	<ul style="list-style-type: none"> This powerful yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller in a 28 pin package. The PIC16F883 features 256 bytes of EEPROM data memory, 2 Comparators, 11 channels of 10-bit ADC, 1 capture/compare/PWM and 1 Enhanced capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I²C™) bus and an Enhanced Universal Asynchronous Receiver Transmitter (EUSART). 	PIC16F833

Fuel Gauge

- Function: To track remaining battery level or charging status



Analog to Digital Convertor

- Function: Converting analog voltage or current signal (pressure) into digital data

Popular Products	Description	Product Web Page
MCP3421	The MCP3421 is a single channel low-noise, high accuracy Delta-Sigma A/D converter with differential inputs and up to 18 bits of resolution in a small SOT-23-6 package. The device uses a two-wire I ² C™ compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.	Click Here
AN1156: Application Note on Battery Fuel Measurement Using Delta-Sigma ADC Devices		Click Here
MCP3421DM-BFG: Battery Fuel Gauge Demo Board		Click Here

Temperature Sensors

Function: Measuring and providing Temperature information

Popular Products	Description	Product Web Page
MCP9800 Digital temperature sensor	<ul style="list-style-type: none"> • 2-wire I²C™/SMBus Compatible Interface • User Selectable 9- to 12-Bit Resolution <ul style="list-style-type: none"> • $\pm 1^\circ\text{C}$ Accuracy from -10°C to +85°C • $\pm 2^\circ\text{C}$ Accuracy from +85°C to +125°C • Low Operating Current: 220 µA (typical) • Shutdown Mode: 1 µA (max) 	Click Here
MCP9700 Linear Active Thermistor™ ICs	<p>The output voltage of this device is directly proportional to measured temperature. The MCP9700 can accurately measure temperature from -40C to +150C with the output calibrated to a slope of 10mV/°C and has a DC offset of 500mV.</p>	Click Here

PIC Microcontrollers

- **Function:** coordinating all the control and monitor functions - the brain of the system
- **Popular products:** PIC16F182X, 178X, 75X, 15XX, 193X
- **Attributes:**
 - Upwards of 32MHz internal OSC
 - 4 channel Programmable Switch Mode Controller (PSMC)
 - Integrated high performance comparators, op-amp, 10/12 bit ADC, 5/8/9 bit DAC, CCP, COG, NCO, CLC
 - Slope compensation
 - 256 bytes of EEPROM
 - Available in various packages



MICROCHIP

Lighting

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LED Lighting

AC/ DC LED Driver



DC/ DC LED Driver



DC/ DC LED Driver



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AC/ DC LED Driver- Current Regulation

Solutions	Description	
MCU + MOSFET Driver	This solution is implemented using a PIC12F752 and MOSFET drivers	Reference Circuit
Universal Offline Linear Sequential LED Driver	<p>Pros for Linear Solutions:</p> <ul style="list-style-type: none"> • Inherently high PF (over 90% at 220V) • No EMI (linear solution) • Very few external components • Small form 	Reference Circuit
Universal Offline Switching LED Driver	<p>Pros for Switching Solutions</p> <ul style="list-style-type: none"> • No flicker • Higher LED utilization • More uniform brightness between channels/strings • Switching solutions generate less heat 	Reference Circuit

Step-Up Current Regulation

Solutions	Description	
MCP19114 based LED Driver	Programmable LED driver capable of high efficiency, high current drive in a minimal component count. Highly customizable, to maximize design flexibility, and can be implemented in flyback, SEPIC, and boost topologies.	Reference Circuit
HV9912 based LED Driver	Boost topology LED drive solution, >90% efficient and capable of boosting up to 90V to drive up to 20W of series connected LEDs from a low (>9V) input	Reference Circuit
MCP1643 Boost Converter LED Drive Solutions	Constant current drive circuit with a low component count, up to 550 mA output current, up to 90% efficient, with a low 1.2 uA shutdown current, and dimmable with a PWM signal	Reference Circuit
MCP16301 Ćuk Converter Circuit	Compact, low component count, 300 mA constant current regulation circuit capable of driving up to 15V of LEDs in series	Reference Circuit
MCP1259 Regulated Charge Pump LED Drive Circuit	Generates a high accuracy 3.3V output from a 1.8 to 3.6V input, which can be used to supply up to 100mA of output current for LED drive from a variety of battery or DC power sources	Reference Circuit

Step-Down Current Regulation

Solutions	Description	
LDO+MCU+ MOSFET Driver	Digitally controlled, high brightness LED drive circuit implemented using a discrete buck circuit controlled with a PIC12F752 MCU	Reference Circuit
HV9967 based Buck LED Drive circuit	Compact buck LED drive solution with tight (3%) current regulation, short circuit protection, and capable of 60V DC input with the integrated low side MOSFET	Reference Circuit
MCP16312 Buck Converter LED Drive Circuit	Constant current source to drive one or more LEDs using a buck implementation. Low component count, with integrated MOSFETs and control logic	Reference Circuit



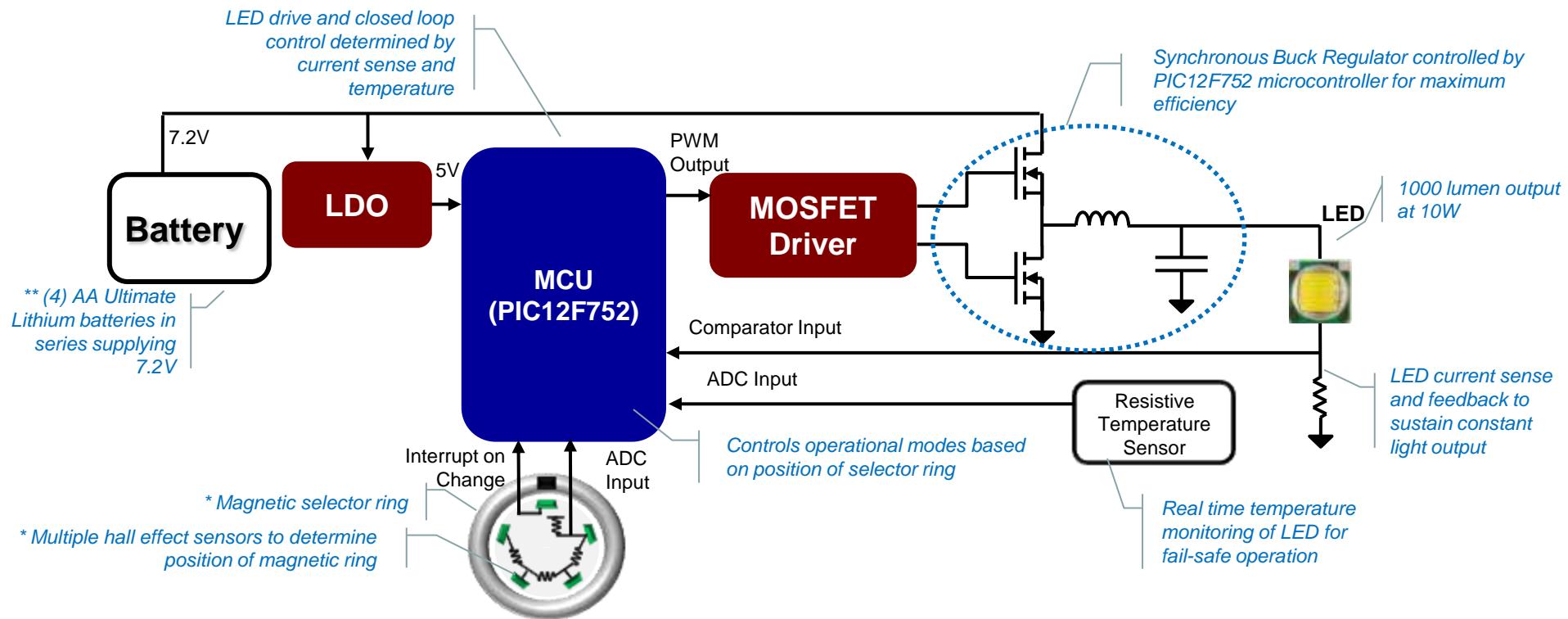
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DC/ DC MCU Based LED Driver

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DC/ DC MCU Based LED Driver

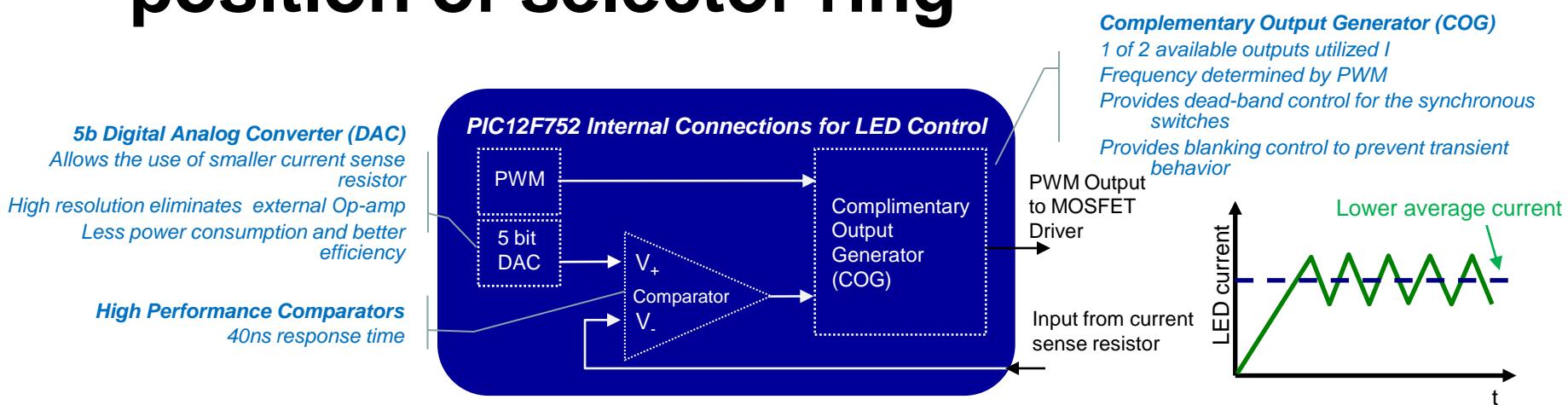


* Magnetic selector ring design can be replaced to accommodate mechanical push-buttons and switches

** Battery capacity can be scaled to accommodate specific mechanical capacity and desired run-times

PIC12F752

- LED drive and closed loop control determined by current sense and temperature
- Controls operational modes based on position of selector ring



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Synchronous Buck MOSFET Drivers

Function: driving the high power devices (MOSFETs in synch. Buck configuration)

Popular Products	Description	Product Web Page
MCP14628 Dual Output MOSFET Driver for Synchronous Applications	<p>The MCP14628 is a synchronous MOSFET driver used for driving MOSFETs in a rectified bridge arrangement. There are two separate drivers contained in the MCP14628. The low-side driver output drives a non-floating or ground reference N-Channel MOSFET. The high-side driver is designed to drive a floating N-Channel MOSFET. An external bootstrap capacitor is used to provide the additional voltage.</p>	Click Here
MCP14700 Synchronous MOSFET Driver w/separate High/Low side control	<p>The MCP14700 is a high-speed synchronous MOSFET driver designed to optimally drive a high-side and low-side N-Channel MOSFET. The MCP14700 has two PWM inputs to allow independent control of the external N-Channel MOSFETs.</p>	Click Here

Low Power LDOs

- Function: providing regulated, low-noise supply voltages for the system

Popular Products	Description	Product Web Page
MCP1700	The MCP1700 can source up to 250mA of current with an extremely low input-output voltage differential of 178mV at 250mA. with the low current consumption of only	Click Here
MCP1703A	With 250 mA maximum output, MCP1703 works with input voltage of up to 16V and in combination with its low current consumption of 2 μ A	Click Here



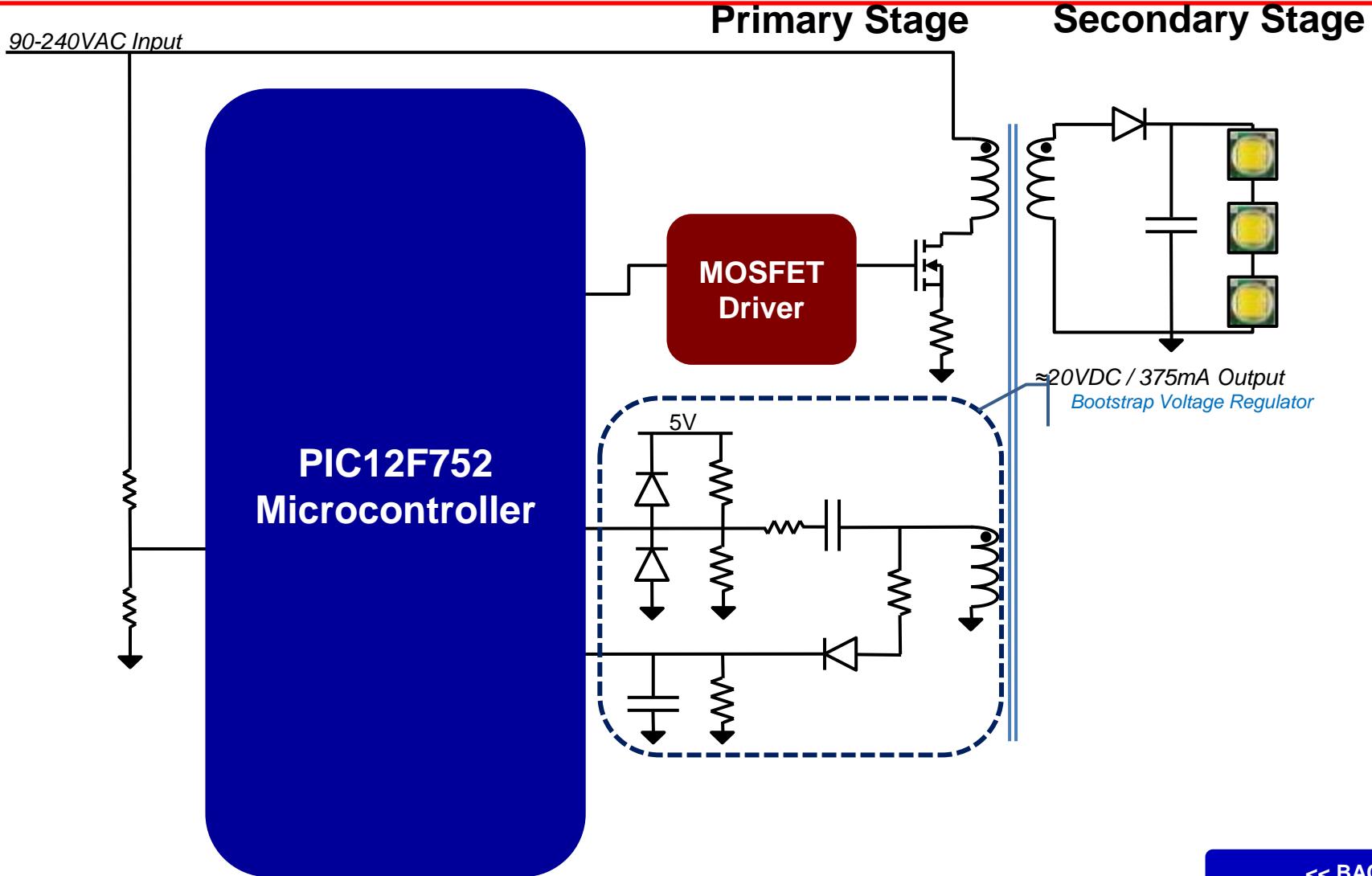
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AC/DC LED Driver System

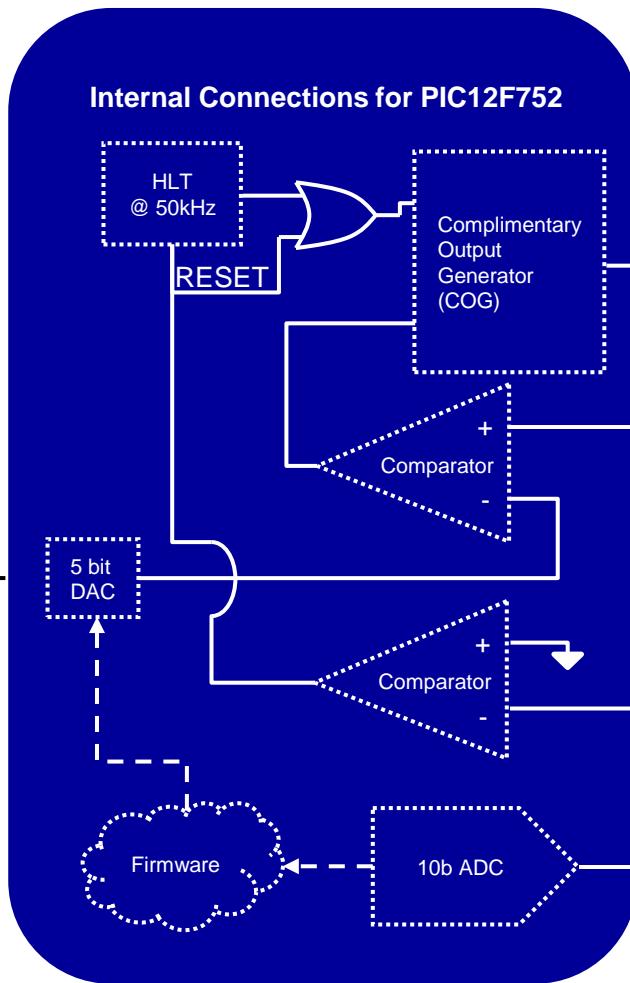
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AC/DC MCU Based LED Driver System



PIC12F752



- 8-Pin Flash-Based, 8-Bit CMOS MCU
- Flash Program Memory with self read/write capability
- Mid-Range Core, Internal 8MHz oscillator
- 2 x High Speed Analog Comparators (50nS)
- 1 x Capture-Compare-PWM (CCP)
- 4 x 10-bit Analog-to-Digital Converter (ADC) with voltage reference,
- 1 x Dual Range 5-bit Digital-to-Analog Converter (DAC)
- Complementary Output Generator (COG): Complementary Waveforms from selectable sources
- Watchdog Timer (WDT)
- Power-On/Off-Reset, Brown-Out Reset (BOR)
- In Circuit Serial Programming (ICSP)
- Wide Operating Voltage of PIC12F752 variant
- High Voltage PIC12HV752 variant (2.0V – user defined) with internal shunt regulator

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MOSFET Drivers

Function: driving the high power devices (MOSFETs, bipolar transistors, IGBTs)

Popular Products	Description	Product Web Page
TC4427A	Supply Voltage Range: 2.5V to 5.5V Wide Temperature Measurement Range: -40°C to +125°C High Temperature Converter Accuracy: $\pm 2^\circ\text{C}$, Max, at 25°C Linear Temperature Slope: 10mV/°C Very Low Supply Current: 35µA Typical	Click Here
MCP1415/16	The MCP1415/16 devices are small footprint Low-Side MOSFET drivers capable of supplying 1.5A peak output current in a SOT23 5L package.	Click Here
MCP14E3/E4/E5	The MCP14E3/E4/E5 devices are a family of 4.5A,dual output buffers/MOSFET drivers with separate enable functions for each output. As MOSFET drivers, the MCP14E3/E4/E5 can easily charge 2200 pF gate capacitance in under 28 nsec (max)	Click Here



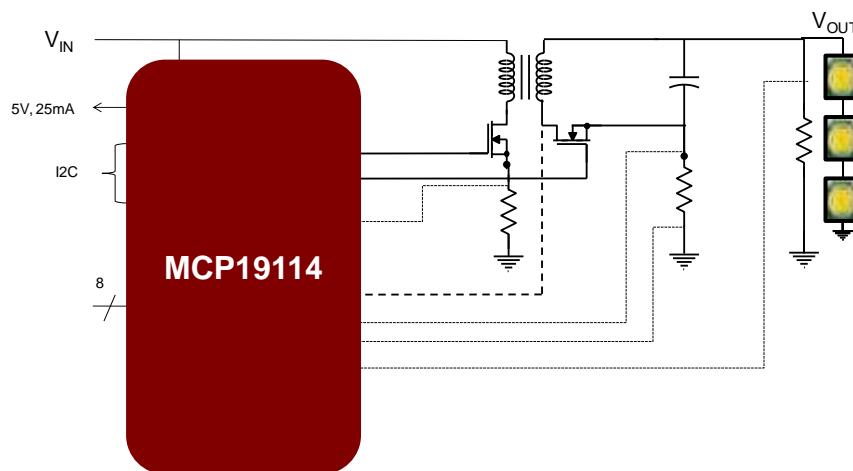
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LED Driver System using MCP19114

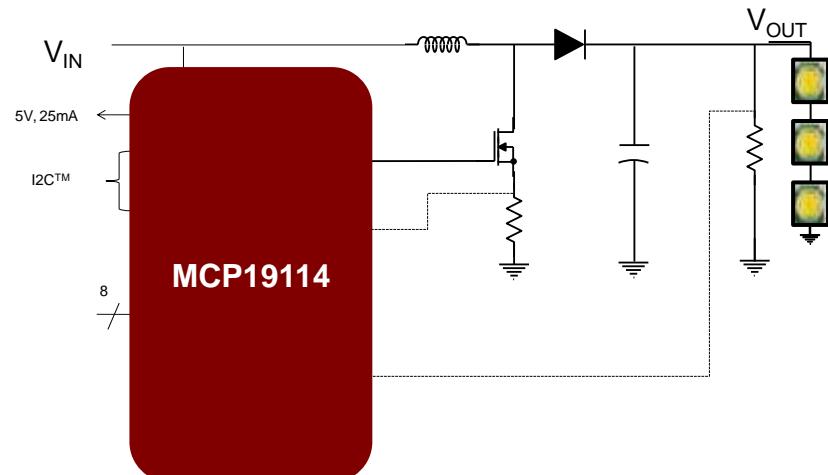
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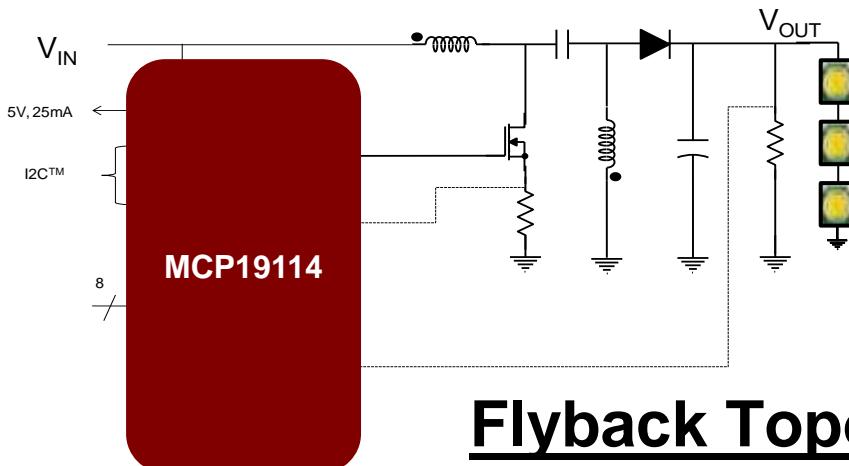
DC/ DC LED Driver System using MCP19114



SEPIC Topology



Boost Topology



Flyback Topology
(Synchronous)

*...and more, including Ćuk and Forward Converters
(Broad Topology Support)*

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MCP19114

Popular Products	Description	Product Web Page
MCP19114/5	<p>The MCP19114 is a mid-voltage (4.5-42V) analog-based PWM controller with an integrated 8-bit PIC™ Microcontroller. This unique product family combines the performance of a high-speed analog solution, including high-efficiency and fast transient response, with the configurability and communication interface of a digital solution. Combining these solution types creates a new family of devices that maximizes the strengths of each technology to create a more cost-effective, configurable, high-performance power conversion solution.</p>	Click Here
<u>MCP19114 Flyback Standalone Evaluation Board:</u> The MCP19114-Flyback Standalone Evaluation Board and Graphical User Interface (GUI) demonstrate the MCP19114 performance in a synchronous Flyback topology. It is configured to regulate load current, and is well suited to drive LED loads.		



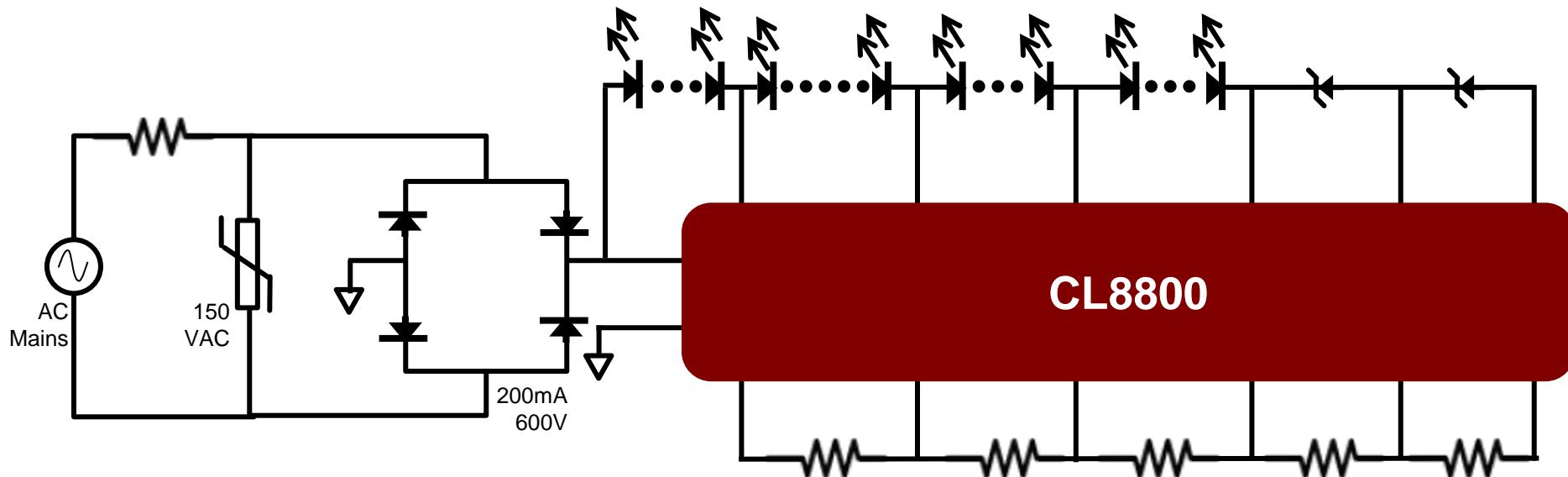
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Supertex LED Drivers

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Sequential Linear LED drivers (120V/ 230VAC)



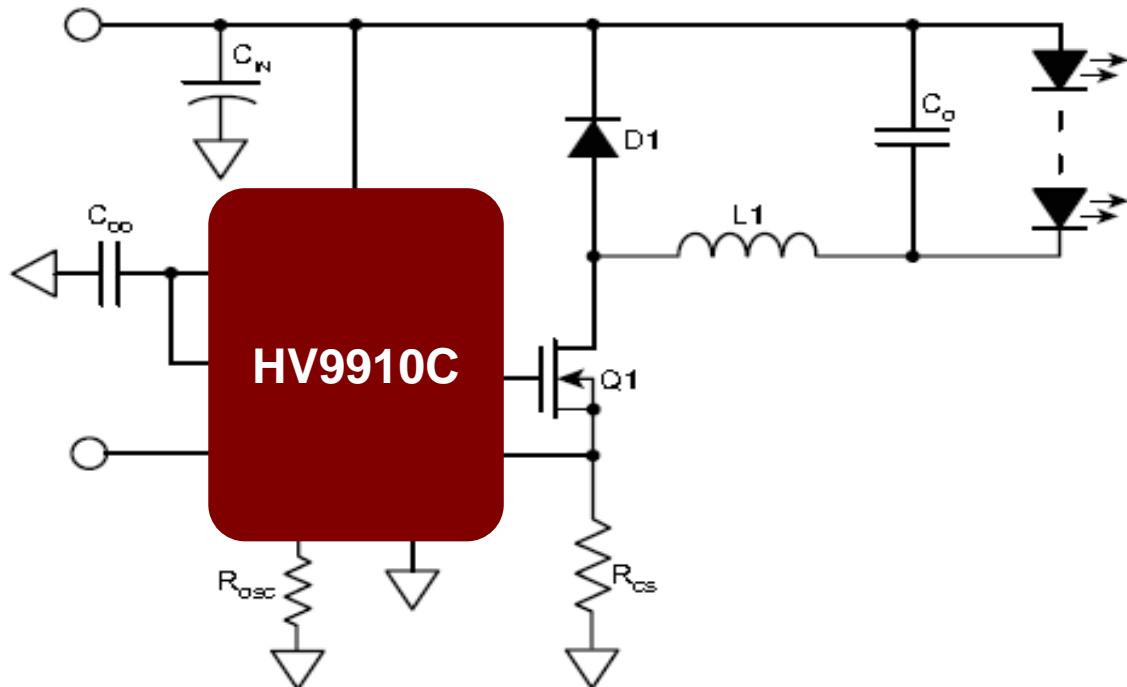
- Up to 1000 Lumens at 100Lm/W
- Direct AC Operation at 120VAC / 230VAC
- Inherently Quiet — No EMI Filters Needed
- Inherent Dimmer Compatibility



CL8800

Popular Products	Description	Product Web Page
CL8800	<p>CL8800 and CL8801, sequential, linear LED drivers designed to drive long strings of low cost, low current LEDs in solid-state replacements for fluorescent tubes, incandescent bulbs and CFL bulbs. Both ICs minimize driver circuit component counts, requiring just four or six resistors and a diode bridge in addition to the IC. Two to four additional components in the circuit provide transient protection, and neither capacitors nor magnetic components are required. Because the ICs are multi-stage linear current regulators, there are no high frequency switching currents and, thus, no need for a front-end EMI filter. CL8800 is intended for 230VAC input, while CL8801 is for 120VAC input. Luminous efficiencies of greater than 115lm/W are achievable with both ICs.</p>	Click Here

Universal Offline Switching LED driver Solution



- Universal Inputs – 110 to 240Vac
- High Power Factor – 0.94 or higher
- High Efficiency – 88%@110Vac & 85%@230Vac
- Example Application: 20W LED tube





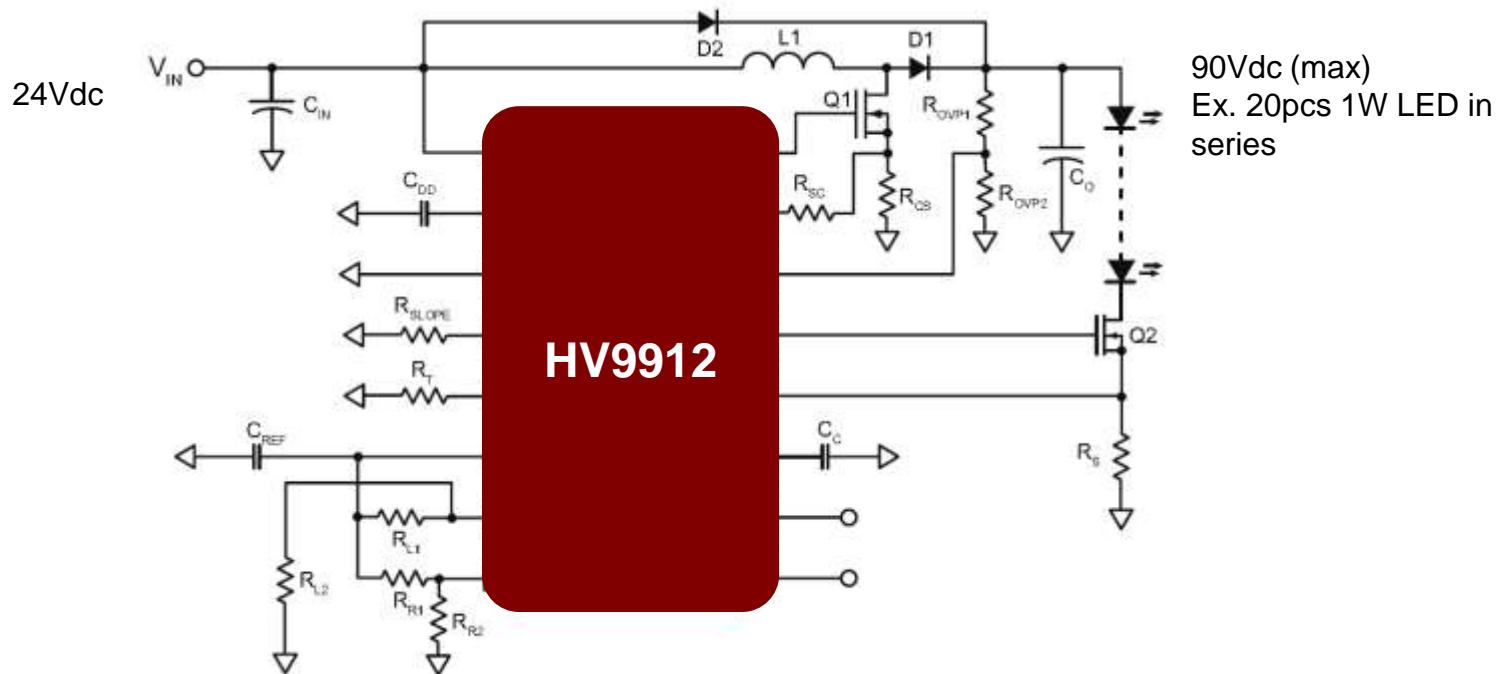
MICROCHIP

HV9910C

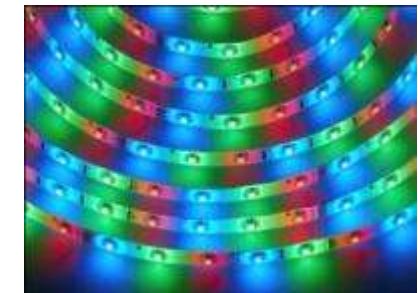
Popular Products	Description	Product Web Page
HV9910C	<p>HV9910C is designed to convert high voltage supplies (85V – 265VAC rectified) or (15V – 450VDC) to a constant current source for powering a string or a combination of strings of high brightness LEDs. It can be programmed to operate in either a constant frequency or constant off-time mode and includes a 15 – 450V linear regulator which allows it to work from a wide range of input voltages without the need for an external low voltage supply. HV9910C requires only three external components (apart from the power stage) to produce a controlled LED current making it an ideal solution for low system cost. Furthermore, the low component count allows for higher reliability and minimum board space.</p>	Click Here

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HV9912 Based LED Driver



- High Efficiency – greater than 90%
- High output current accuracy - Closed loop control
- High Boost – 10x from Vin of 9V to V_{out} of 90V
- Example Application: 20W LED Strip





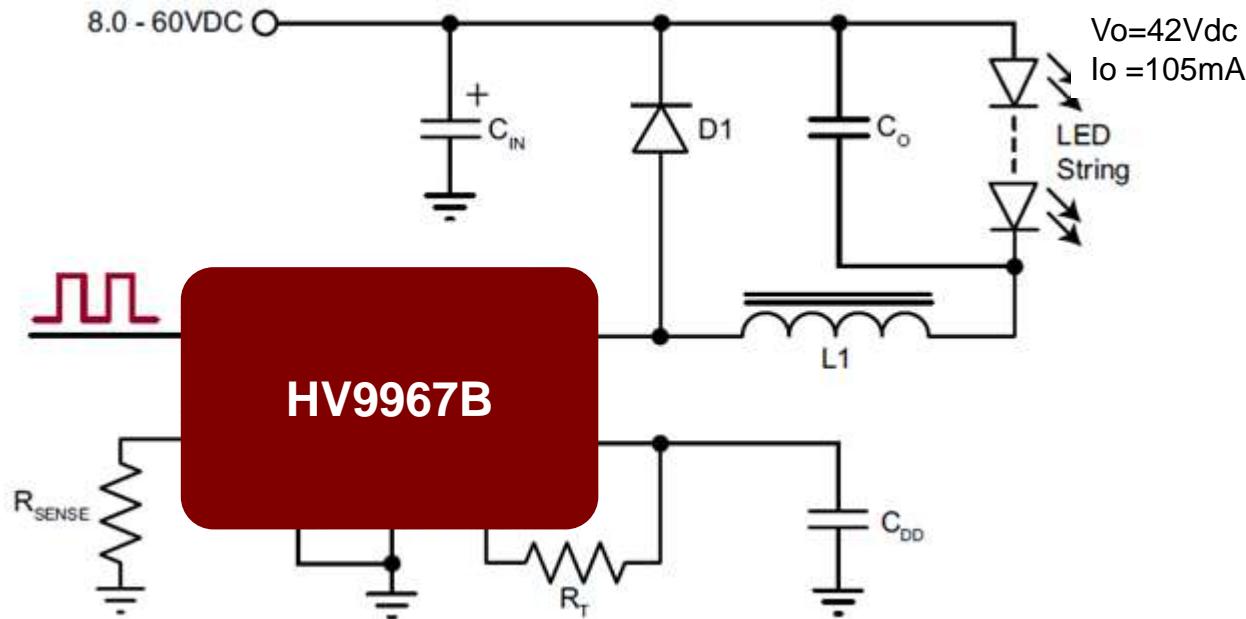
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HV9912

Popular Products	Description	Product Web Page
HV9912	<p>The HV9912 is a current mode control LED driver IC designed to control single switch PWM converters (buck, boost, buck-boost or SEPIC) in a constant frequency mode. The controller uses a peak current-mode control scheme with programmable slope compensation and includes an internal transconductance amplifier to control the output current in closed loop enabling high output current accuracy. In the constant frequency mode, multiple HV9912 ICs can be synchronized to each other or to an external clock using the SYNC pin. Programmable MOSFET current limit enables current limiting during input under voltage and output overload conditions. The IC also includes a 0.2A source and 0.4A sink gate driver that makes the HV9912 suitable for high power applications</p>	Click Here

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HV9967 based Buck LED Driver



- High current accuracy – 3% LED Current control
- Space saving – integrated 60V MOSFET
- Output short circuit & over-temp protection
- Example Application: Cove Lights





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HV9967B

Popular Products	Description	Product Web Page
HV9967B	<p>The HV9967B is an average-mode current control LED driver IC operating in a constant off-time mode. The IC features an integrated 60V, 0.8Ω MOSFET that can be used as a stand-alone buck converter switch, or connected as a source driver for driving an external high-voltage depletion-mode MOSFET. The HV9967B is powered through its switching output when the integrated switch is off. Hence, the same external MOSFET can be used as a high-voltage linear regulator for powering the IC. The LED current is programmed with one external resistor. The average-mode current control method does not produce a peak-to-average error, and therefore greatly improves current accuracy and line and load regulation of the LED current without any need for loop compensation or direct sensing of the LED current at a high-voltage potential. The auto-zero circuit cancels the effects of the input offset voltage and of the propagation delay of the current sense comparator.</p>	Click Here

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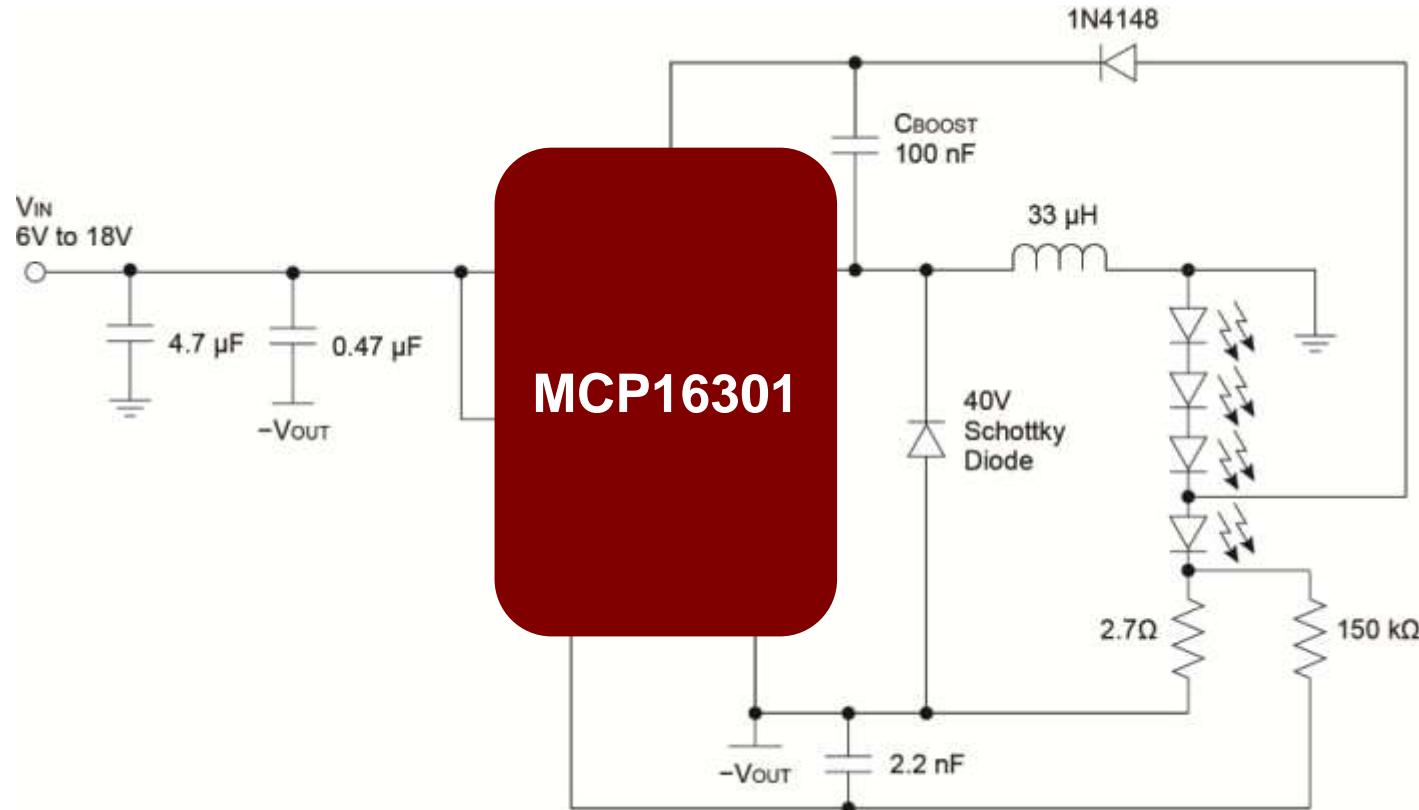
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LED Driver System using Regulators

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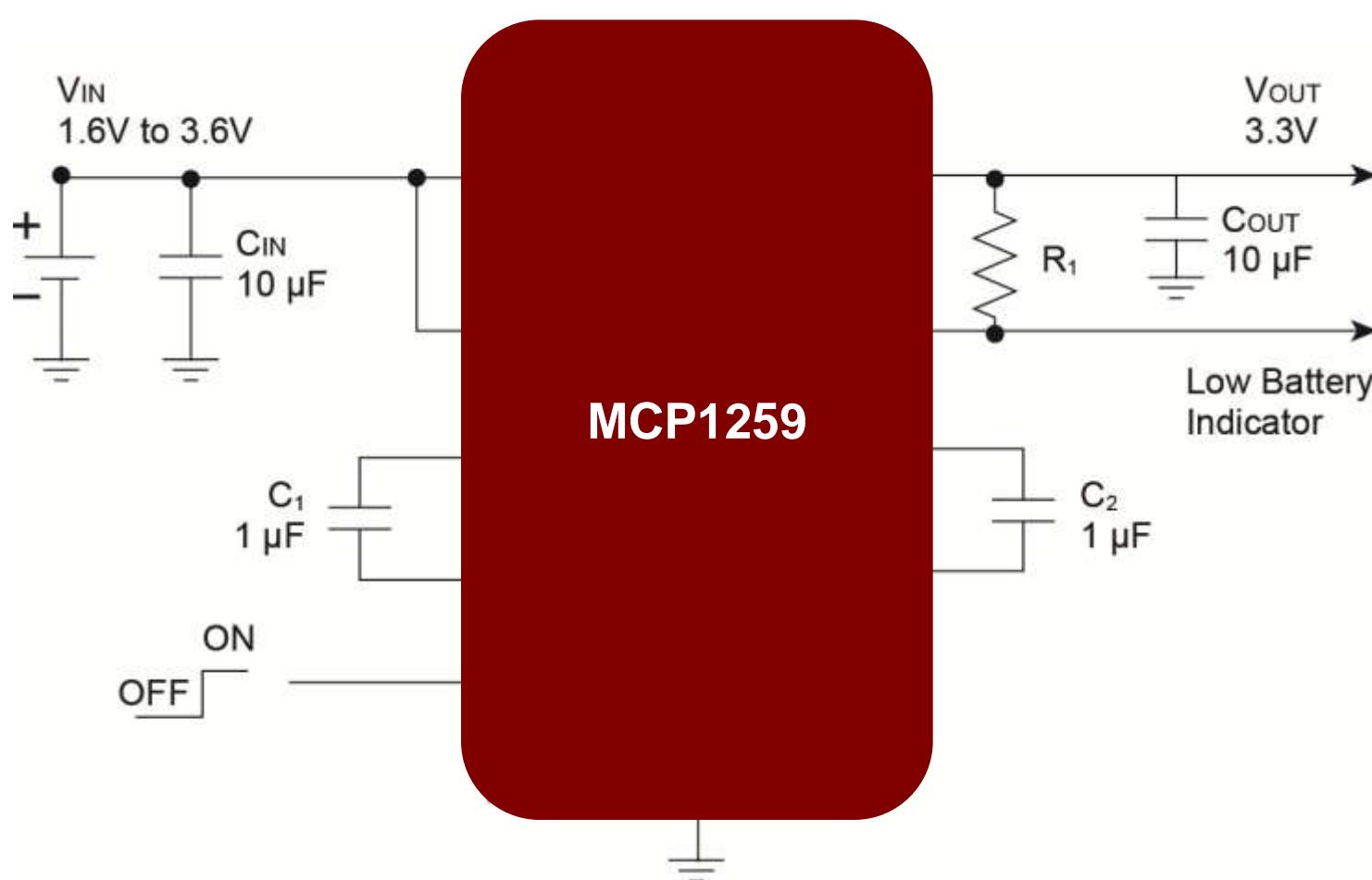
MCP16301 Cuk LED Drive Circuit



MCP16301

Popular Products	Description	Product Web Page
MCP16301	<p>The MCP16301 is a high-input voltage step-down regulator, capable of supplying 600 mA to a regulated output voltage from 2.0V to 15V.</p> <ul style="list-style-type: none">•Operation from 6V to 18V input voltage•Capable of supplying 300 mA of current•Drives up to 15V of LEDs in series•Implemented with only 11 components•Demo board available on Microchip direct	Click Here

MCP1259 Charge Pump LED Lighting Circuit





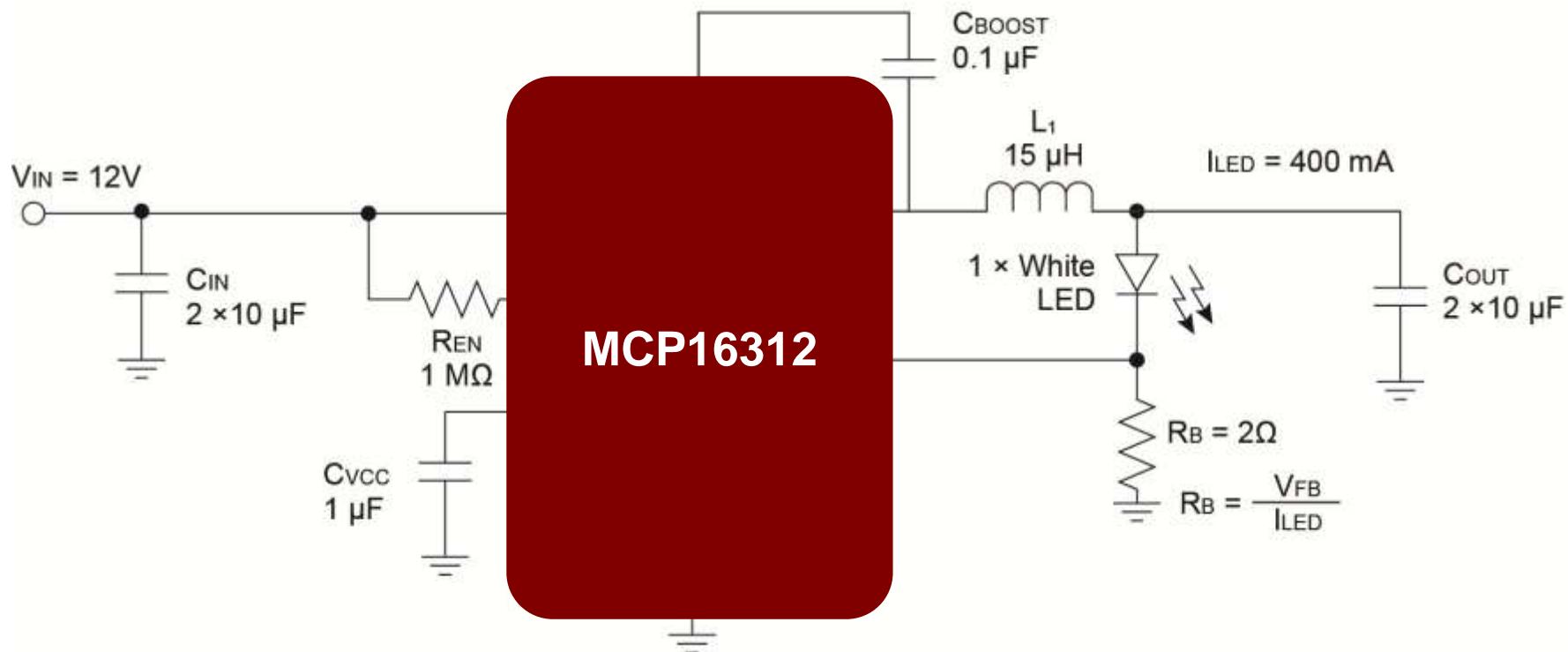
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MCP1259

Popular Products	Description	Product Web Page
MCP1259	<p>The MCP1256-9 family of inductorless, positive regulated charge pump DC/DC converters, generate a regulated 3.3 V output voltage from a 1.8 V to 3.6 V input. They are specifically designed for applications operating from 2 cell alkaline, 2 cell Ni-Cd, 2 cell Ni-MH, or one primary lithium coin cell battery. These devices automatically switch from 1.5x to 2x boost operation modes to maintain high efficiency. In addition, at light output loads, the MCP1256 and MCP1257 can be placed in a sleep mode, lowering the quiescent current while maintaining the regulated output voltage.</p>	Click Here

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MCP16312 Buck Converter LED Drive Application





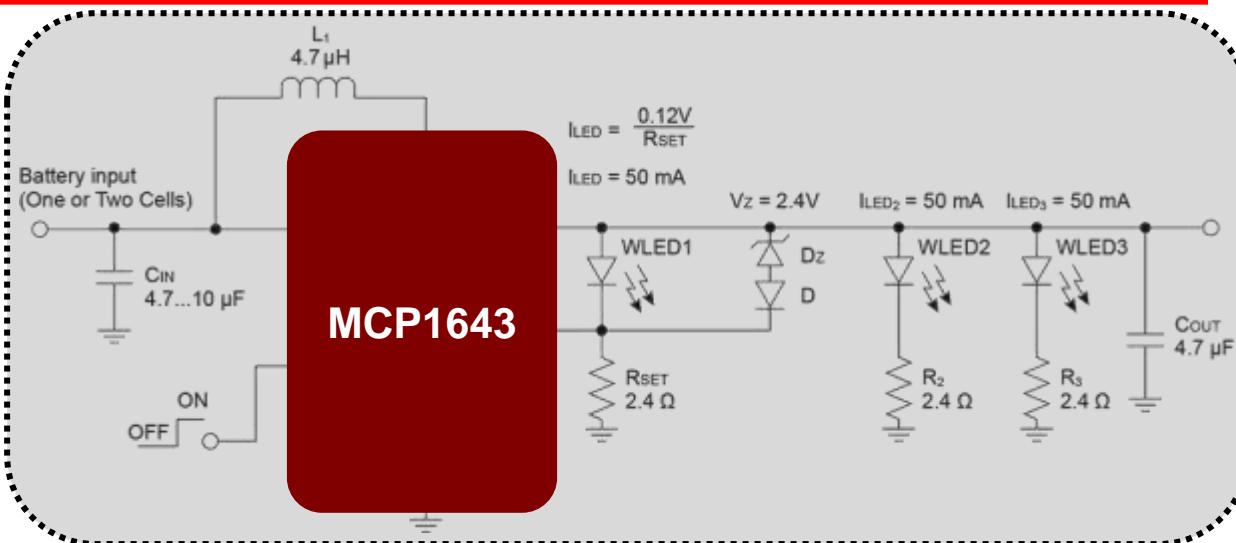
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MCP16312

Popular Products	Description	Product Web Page
MCP16312	<ul style="list-style-type: none">↳ Up to 95% Efficiency↳ Input Voltage Range: 4.4V to 30V↳ 1A Output Current Capability↳ Output Voltage Range: 2.0V to 24V↳ Integrated N-Channel Low and High-Side Switches↳ Low Device Shutdown Current: 3 μA typical↳ Low Device Quiescent Current: 44 μA↳ Internal Compensation↳ Internal Soft-Start: 300 μs (EN low to high)↳ Peak Current Mode Control↳ Cycle-by-Cycle Peak Current Limit↳ Undervoltage Lockout (UVLO)↳ Overtemperature Protection↳ MSOP-8 or 2x3 TDFN-8 package	Click Here

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MCP1643 Boost Converter LED Drive Solutions



MCP1643

Popular Products	Description	Product Web Page
MCP1643	<p>MCP1643 is a compact, high-efficiency, fixed frequency, synchronous step-up LED driver, that operates from one and two-cell alkaline and NiMH/NiCd batteries and can also drive two red/green/yellow series connection LEDs.</p> <ul style="list-style-type: none"> □ Constant current drive capability with a low component count, area-efficient circuit □ 1 MHz PWM synchronous boost operation with up to 550 mA output current □ Low-voltage reference input to maximize LED efficiency conversion ($V_{FB} = 120 \text{ mV}$) □ Capable of start up with only 0.65V input, and continuous operation with an input above 0.5V □ Low 1.2 μA shutdown current □ Over-voltage protection halts device operation (floating output) if the LED fails or is disconnected □ Up to 90% efficiency □ 240 μs soft start time □ Available in tiny footprint 8-lead 2x3 DFN or 8-pin MSOP packages 	Click Here



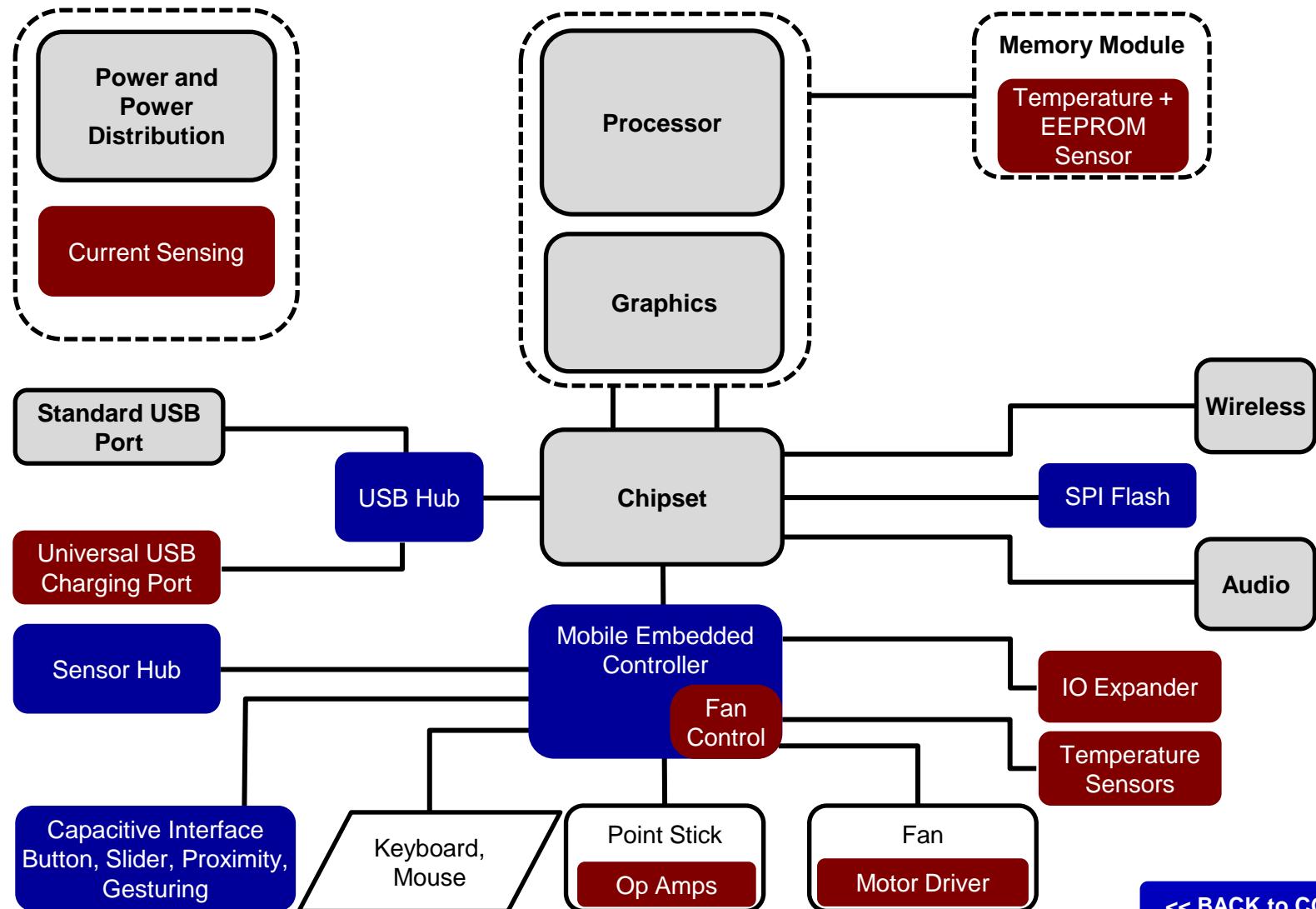
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Notebook Computing Main board

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Notebook Computing Main board



Temperature Sensor

Function	Popular Products	Description	Product Web Page
Temperature Sensor	EMC141x	1°C Multi-Remote Temperature Sensors with Automatic Beta Compensation (3.3V SMBus) These sensors can monitor temperature up to 8 inches (24cm) away from the IC	Click Here
Temperature Sensor	EMC118x	1°C Multi-Remote Temperature Sensors with Automatic Beta Compensation (1.8V SMBus) These sensors can monitor temperature up to 8 inches (24cm) away from the IC	Click Here

Fan Control

While some systems control fans from the embedded controller, other systems use stand-alone fan controller such as these.

Function	Popular Products	Description	Product Web Page
Fan Controller	EMC2103-1	The EMC2103-1 is a complete system thermal management system. It contains a single closed loop PWM fan driver with tachometer input, 2 temperature monitors, a shutdown and alert output, and an 8 entry fan speed look up table.	Click Here
Fan Controller	EMC2113	The EMC2113 is a complete system thermal management system. It contains a single closed loop PWM fan driver with tachometer input, 4 temperature monitors, a shutdown and alert output, and an 8 entry fan speed look up table.	Click Here

Temperature Sensor with EEPROM for SPD

JEDEC DIMM module specifications have defined temperature sensors with EEPROM. The devices below can be used for this purpose or for data logging

Function	Popular Products	Description	Product Web Page
Temperature Sensor with EEPROM	MCP98243	The MCP98243 meets JEDEC's JC42.4-TSE2002B3 with 2K bit serial EEPROM. Along with a wide operating voltage range of 1.8V - 5.5V, this device meets class B accuracy with $\pm 0.2^{\circ}\text{C}/\pm 1^{\circ}\text{C}$ (typ./max.) from +75°C to +95°C	Click Here
Temperature Sensor with EEPROM	MCP98244	The MCP98244 meets JC42.4-TSE2004B1 with 4K bit serial EEPROM. Along with a wide operating voltage range of 1.8V - 5.5V, this device meets class B accuracy with $\pm 0.2^{\circ}\text{C}/\pm 1^{\circ}\text{C}$ (typ./max.) from +75°C to +95°C	Click Here

Universal USB Charging Port

USB charging is becoming more complicated as it becomes more ubiquitous. The device below can be uniquely configure for a discovery phase for new products, measure current, and be implemented in a system to allow for charging profile updates

Function	Popular Products	Description	Product Web Page
USB Port Power Controller	UCS1002-2	This USB port power controller turns USB ports into universal charging ports. The UCS1002 uniquely combines a power switch and high speed switch with programmability and current measurement. Using the 9 built-in charging profiles and 1 programmable profile, a system designer can create an updateable USB charging port for new products yet to come. The current measurement function can be used to search for the highest charging current on unknown devices.	Click Here

Op Amps

Point sticks on notebooks send analog signals through multiple Op Amps for signal conditioning before the signal reaches a controller. The devices below have been used for this function

Function	Popular Products	Description	Product Web Page
Op Amp for point stick or joy stick	MCP6L4T-E/ST	The MCP6L4 quad operational amplifier (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 200 μ A. This device has a low input offset voltage of 3 mV.	Click Here
Op Amp for point stick or joy stick	MCP6L2T-E/MS	The MCP6L2 dual operational amplifier (op amp) has a gain bandwidth product of 2.8 MHz with low typical operating current of 200 μ A. This device has a low input offset voltage of 3 mV.	Click Here

IO Expanders

IO Expanders are often used to insert additional functionality laptops that have an additional function version of a base model

Function	Popular Products	Description	Product Web Page
IO Expander	MCP23017-E/ML	This is a 16-bit I/O port consisting of two 8-bit ports. The system master can enable the I/Os as either inputs or outputs over the I ² C. The data for each input or output is kept in the corresponding input or output register. All data is readable over the I ² C with 2 configurable interrupts to limit the need for polling registers.	Click Here
IO Expander	ECE1088 ECE1099 ECE1105	ECE1088 has 20 GPIOs ECE1099 has 32 GPIOs and 23:8 keyscan ECE1105 has 40 GPIOs, 23:8 keyscan, & 2 PS/2	Click Here

Current Sensing

Current is normally measured using one of two types of devices. First is via an inexpensive op amp with a feedback loop configured for the sense resistor and range possible currents. Second is with a high-side current sensor. Microchip offers this second type of device with an SMBus/I2C interface.

Function	Popular Products	Description	Product Web Page
Op Amps for Current Sensing	MCP6021/3 MCP6291/3	Theses op amps have a gain bandwidth of 10 MHz with a low typical operating current of 1mA and an offset voltage that is less than 150 μ V	MCP602x MCP629x
High Side Current Sensing	PAC1710	The PAC1710 is a high-side bi-directional current sensor. Voltage across an external sense resistor is measured to represent the current of a voltage rail. The PAC1710 also measures the SENSE+ voltage to calculate average power over the integration period. The device will assert an ALERT when high and low limits are exceeded for current sense and bus voltage.	Click Here

Motor Driver

Function	Popular Products	Description	Product Web Page
Motor Driver	MTD6505	<p>The MTD6505 is a 3-phase full-wave sensorless driver for brushless DC (BLDC) motors. It features 180° sinusoidal drive, high torque output and silent drive. With the adaptive features, parameters and wide range of power-supplies (2V to 5.5V), the MTD6505 is intended to cover a broad range of motor characteristics, while requiring minimum external components. Speed control can be achieved through either power supply modulation (PSM) or pulse-width modulation (PWM). The frequency generator (FG) output enables precision speed control in closed-loop applications. The MTD6505 device includes Lockup Protection mode to turn off the output current when the motor is in a lock condition, with an automatic recovery feature.</p>	Click Here

Mobile Embedded Controllers

Function	Popular Products	Description	Product Web Page
Mobile Embedded Controller	MEC1308	8-bit embedded controller with 64k bytes SRAM, 2 SMBus, 4 PWMs, 2 tachs, 1 serial, ADC, 55 GPIOs, RC-6, 1SMSC BC-Link, 4 PS/2, SPI Flash Memory interface	Click Here
Mobile Embedded Controller	MEC1312	8-bit embedded controller with 96k bytes SRAM, 3 SMBus, PECL, 4 PWMs, 2 tachs, 1 serial, ADC, 63 GPIOs, 1SMS CBC-Link, 4 PS/2, SPI Flash Memory interface	Click Here
Mobile Embedded Controller	MEC1620	32-bit embedded controller with 192k bytes of embedded flash, 1k bytes EEPROM, 16k bytes SRAM, 16 ADC, connected standby, 3 SMBus, 2 SPI, 16 PWM, 6 tachs, 1 serial, HDMI-CEC, 153 GPIOs	Click Here

Sensor Hub

Function	Popular Products	Description	Product Web Page
Sensor Hub	SSC7102	<p>The SSC7102 sensor fusion hub is a Windows 8.1 certified, HID over I²C, low-power, flexible, turnkey solution. SSC7102 makes implementing sensor fusion easy for ultrabooks, tablets, and smartphones. Microchip partnered with multiple industry-leading sensor manufacturers and sensor-fusion specialists to create this solution, enabling faster time to market without the need for sensor-fusion expertise. The SSC7102 consumes only ~4mA while running complex sensor-fusion algorithms, resulting in longer battery life for Windows 8.1 tablet, laptop, ultrabook, and smart phone applications.</p>	Click Here

USB 2.0 and 3.0 Hubs

Function	Popular Products	Description	Product Web Page
USB 3.0 Hub	USB553xB	These are 2/3/4/7-porthub controllers are SuperSpeed /Hi-Speed, configurable and compliant with USB 3.0. USB 3.0 traffic can also operate in parallel with a USB 2.0 traffic without being affected by slower data.	Click Here
USB 2.0 Hub	USB251xB	These 2/3/4 port USB 2.0 hub controllers excel at data throughput in mixed-speed USB environments. Programmable features include PortMap, PortSwap, and PHYBoost to simplify PCB layout & optimize BOM cost.	Click Here
USB 2.0 Hub	USB2534	This 4 port hub is compliant with the USB 2.0 and Link Power Management. It provides an additional USB endpoint for use as a USB to I2C interface, allowing external devices to be monitored, controlled, or configured via USB.	Click Here
USB2.0 or HSIC	USB4604	This is an OEM configurable USB 2.0 hub controller with 4 downstream ports. It is compliant with the USB 2.0, USB 2.0 Link Power Management & High-Speed Inter-Chip	Click Here

Capacitive Sensing and Gesturing

Function	Popular Products	Description	Product Web Page
Proximity, Buttons, and Sliders	Various	Microchip offers both turnkey products for a no code development plug-and-play solution, as well as a proven robust firmware solution that leverage our vast PIC microcontroller portfolio. Our broad range of solutions include high sensitivity proximity detection, keys, sliders, Metal-over-Capacitive (MoC) touch sensing and more	Click Here
Gesturing	Various	Microchip's patented GestIC technology unleashes the 3rd dimension for the realization of revolutionary new User Interfaces. Our E-field sensing technology detects the proximity of a human hand and gives accurate X-Y-Z coordinates and recognized 3D gestures.	Click Here

SPI Flash

Function	Popular Products	Description	Product Web Page
SPI Flash	Various	<p>Microchip's Serial Quad Interface (SQI™) and SPI flash memories are manufactured with our proprietary, high performance CMOS SuperFlash® Technology, significantly improving performance (erase any block in less than 25ms) and reliability (100 years data retention) while lowering power consumption.</p> <ul style="list-style-type: none"> • 512Kb-64Mb in 3V and multiple densities in 1.8V • SQI™ flash – Up to 104MHz and includes advanced security features 	Click Here



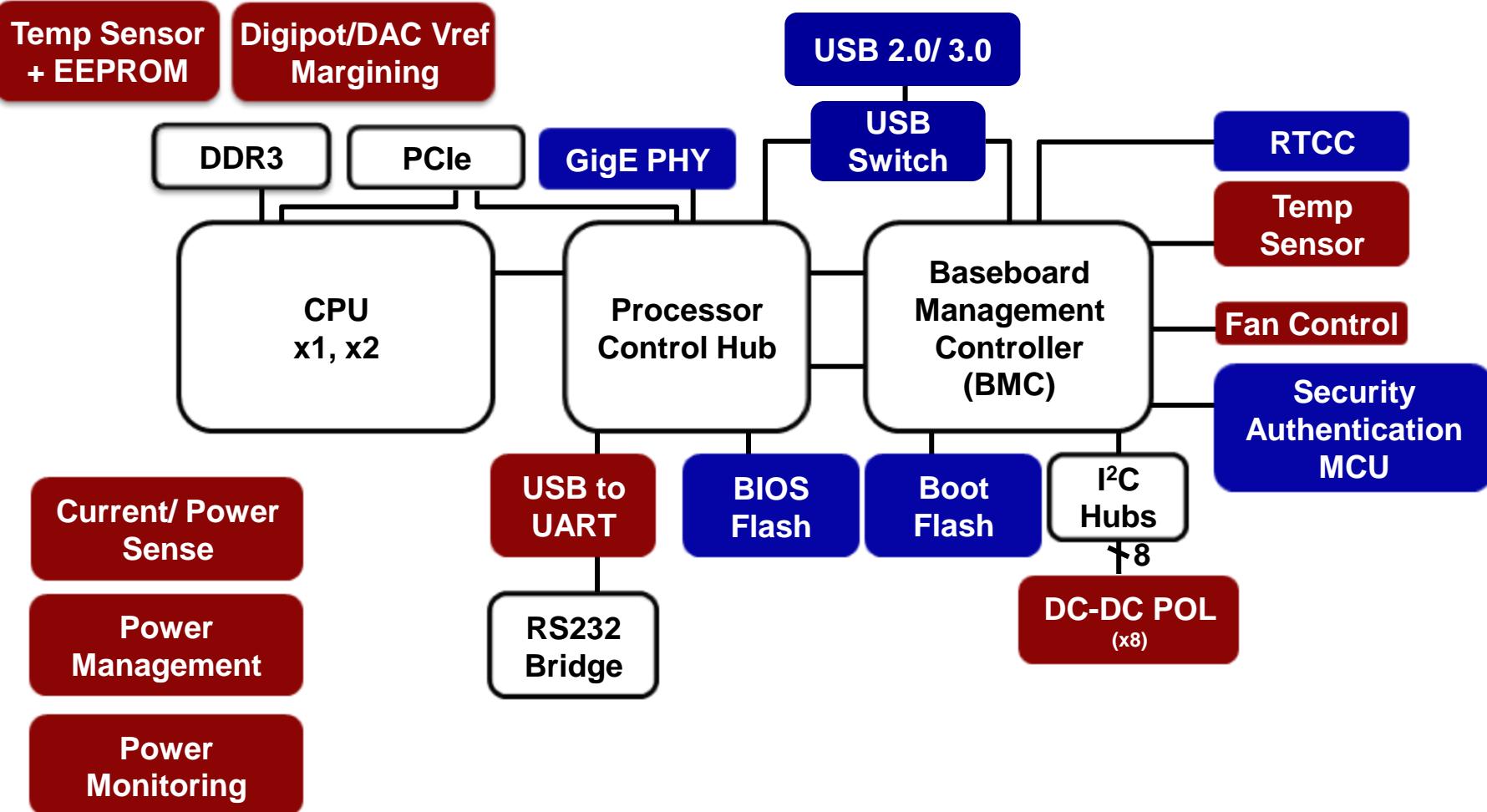
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Servers Main board

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Servers



Temperature Sensor

Popular Products	Description	Product Web Page
EMC141x	<p>1°C Multi-Remote Temperature Sensors with Automatic Beta Compensation (3.3V SMBus)</p> <p>These sensors can monitor temperature up to 8 inches (24cm) away from the IC</p>	Click Here
EMC1428	<p>The EMC1428 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Each device provides $\pm 1^\circ$ accuracy for external diode temperatures and $\pm 2^\circ\text{C}$ accuracy for the internal diode temperature. The EMC1428 monitors up to eight temperature channels (up to seven external and one internal).</p>	Click Here

Fan Control

While some systems control fans from the embedded controller, other systems use stand-alone fan controller such as these.

Popular Products	Description	Product Web Page
EMC230x	<p>The EMC230x is an SMBus compliant fan controller with up to five independently controlled PWM fan drivers. Each fan driver is controlled by a programmable frequency PWM driver and Fan Speed Control algorithm that operates in either a closed loop fashion or as a directly PWM-controlled device. The closed loop Fan Speed Control algorithm (FSC) has the capability to detect aging fans and alert the system. It will likewise detect stalled or locked fans and trigger an interrupt. Additionally, the EMC230x offers a clock output so that multiple devices may be chained and slaved to the same clock source for optimal performance in large distributed systems.</p>	Click Here

Current Sensor

Popular Products	Description	Product Web Page
PAC1710	<p>The PAC1710 is a high-side bi-directional current sensing monitor with precision voltage measurement capabilities. The power monitor measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.</p>	Click Here
PAC1720	<p>The PAC1720 is a dual high-side bi-directional current sensing monitor with precision voltage measurement capabilities. Each sensor measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator.</p>	Click Here

Temperature Sensor with EEPROM

JEDEC DIMM module specifications have defined temperature sensors with EEPROM. The devices below can be used for this purpose or for data logging

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Digital Potentiometers/ DAC

Function	Popular Products	Description	Product Web Page
DAC	MCP47DA1	The MCP47DA1 devices are volatile, 6-Bit digital Digital-to-Analog converter(DAC)with a windowed output for server voltage margining applications. The MCP47DA1 has a windowed output (1/3 to 2/3 of VREF). The DAC setting is controlled through an I2C™Compatible serial interface. The I2C™Compatible slave addresses of “010 1110” and “011 1110” are supported.	Click Here
Digital Potentiometer	MCP40D18	The MCP40D17/8/9 devices offer a wide range of product offerings using an I2C™Compatible interface. This family of devices support a 7-bit resistor network, volatile memory configuration, and potentiometer and rheostat pinouts. This device family is offered in miniature 5 and 6 lead SC-70 packaging.	Click Here

USB to UART

Popular Products	Description	Product Web Page
MCP2200	<p>The MCP2200 is a USB-to-UART serial converter which enables USB connectivity in application that have a UART interface. The device reduces external components by integrating the USB termination resistors. The MCP2200 also has 256-bytes of integrated user EEPROM. The MCP2200 has eight general purpose input / output pins. Four of the pins have alternate functions to indicate USB and communication status.</p>	Click Here

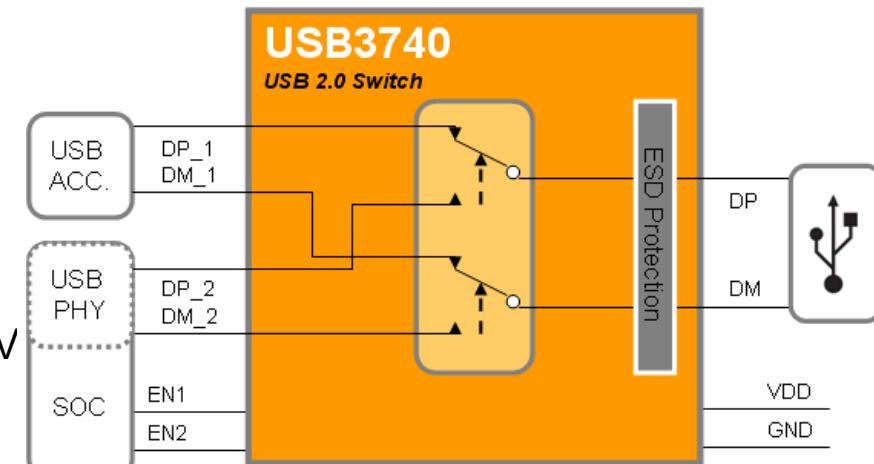
USB Hubs

Function	Popular Products	Description	Product Web Page
USB 3.0 Hub	USB553xB	These are 2/3/4/7-porthub controllers are SuperSpeed /Hi-Speed, configurable and compliant with USB 3.0. USB 3.0 traffic can also operate in parallel with a USB 2.0 traffic without being affected by slower data.	Click Here
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USB2.0 or HSIC	USB4604	This is an OEM configurable USB 2.0 hub controller with 4 downstream ports. It is compliant with the USB 2.0, USB 2.0 Link Power Management & High-Speed Inter-Chip	Click Here

USB3740

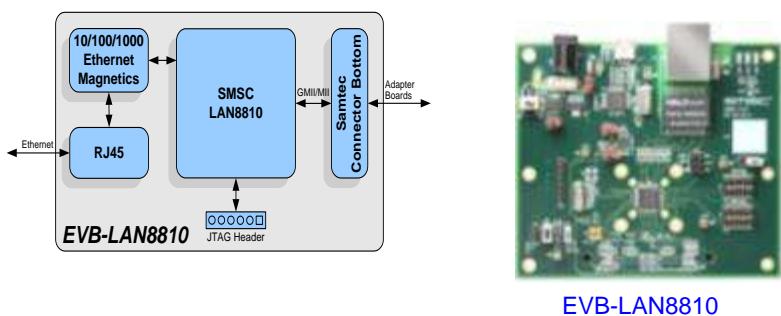
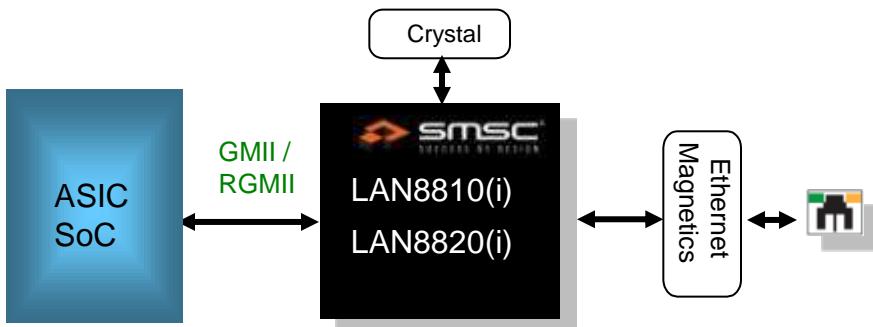
Features:

- High-bandwidth USB 2.0 Switch with Dual Enables
 - For high-speed USB 2.0 data
- Multiplex differential outputs from a USB host device to one of two corresponding outputs
 - Enable DP/DM multiplexing
 - Flexible solution for embedded applications
- Ultra-low Current Consumption
 - Active (switch ON) = 5 uA (Vcc = 3V)
 - Standby (switch OFF) = 0.01 uA (Vcc = 3V)
- Competitive USB 2.0 Switch Specifications
 - Designed to pass USB signals from 0 to 3.3V
 - USB Mux on resistance < 6 ohms
 - USB Mux off leakage < 0.5 uA
 - Off isolation < -40 dB
 - On capacitance < 6 pF
 - High bandwidth: 1 GHz
- Extreme ESD Protection \pm 15 kV (IEC)
- Package:
 - 10-lead 1.3 mm x 1.8 mm QFN with 0.4 mm pitch
 - 10-lead 1.6 mm x 2.1 mm QFN with 0.5 mm pitch



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Gigabit Ethernet



EVB-LAN8810

LAN8810/20 Features

- Small Footprint, Low Power
- HP Auto-MDIX support with IEEE 802.3ab specs at 10/100/1000 Mbps operation
- Excellent ESD Protection levels without any external protection device
- Flexible configurations for LED status indicators
- Implements Energy Detection and Power Down modes
- Link status change and wake-up detection
- Lead free ROHS compliant packages:
 - LAN8810: 72QFN 10x10mm (GMII)
 - LAN8820: 56QFN 8x8mm (RGMII)
- Temperature Range:
 - Commercial 0°C to +70°C
 - Industrial -40°C to +85°C

PIC24F128GB204 Product Family with Security

What's new:

- AES / DES HW encryption
- OTP key storage
- Random Number Generator
- UART with ISO7816

Highlights

- 64 to 128KB Flash
- 8KB RAM
- 28 to 44pins
- XLP low power with Vbat

Peripherals

- USB OTG
- 4 UARTs w/ ISO7816
- 3 SPI w/ I²S, 2 I²C™
- 12-bit ADC, 12ch
- CTMU
- 5 16-bit Timer
- 6 IC, 6 OC



MICROCHIP

RTCC

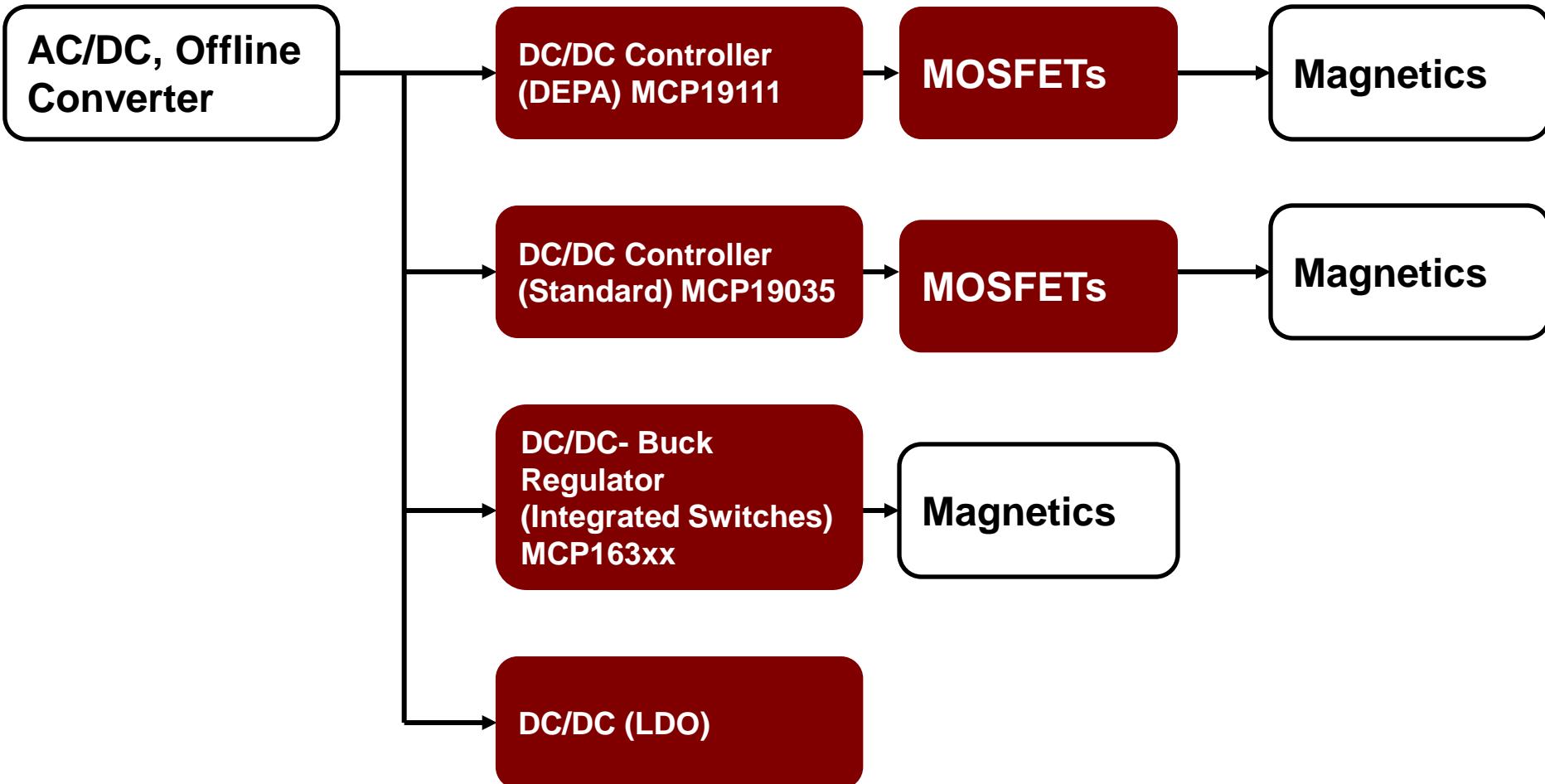
Popular Products	Description	Product Web Page
MCP79410	<p>The MCP79410 general purpose I²C™ Compatible real-time clock/calendar (RTCC) is highly integrated with nonvolatile memory and advanced features normally found in higher priced devices. These features include a battery switchover circuit for backup power, a timestamp to log power failures and digital trimming for accuracy. In addition, non-volatile memory is included along with a Unique ID in a locked section of EEPROM that can be unlocked and programmed by the End User.</p>	Click Here

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BIOS and BOOT Flash

Popular Products	Description	Product Web Page
SST26VF032B	<p>The SST26VF032B/032BA Serial Quad I/O (SQI) flash device utilizes a 4-bit multiplexed I/O serial interface to boost performance while maintaining the compact form factor of standard serial flash devices. SST26VF032B/032BA also support full command-set compatibility to traditional Serial Peripheral Interface (SPI) protocol. Operating at frequencies reaching 104 MHz, the SST26VF032B/032BA enables minimum latency execute-in-place (XIP) capability without the need for code shadowing on an SRAM. The device's high performance and reliability make it the ideal choice for Network Appliance, DSL and Cable Modems, Wireless Lan, Computing, Digital TV, Smart Meter, Server, Set Top Box, Automotive and other Industrial applications.</p>	Click Here

Distributed Point-of-Load Power Architecture



Digitally-Enhanced Power Analog

- Function: Customizable, Analog-based Power Conversion Controller driving external, logic-level MOSFETs in high-power, power conversion applications

Popular Products	Description	Product Web Page
MCP19111	<p>The MCP19111 is a mid-voltage (4.5-32V) analog-based PWM controller family with an integrated 8-bit PIC® Microcontroller. This unique product combines the performance of a high-speed analog solution, including high-efficiency and fast transient response, with the configurability and communication interface of a digital solution. The MCP1911x family, when combined with Microchip's MCP87xxx MOSFETs, or any low-FOM MOSFET, produce high-efficiency (>96%) DC/DC power-conversion solutions.</p>	Click Here

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DC/DC Power Controller

- Function: Standalone, Analog-Based PWM Power Conversion Controller driving external, logic-level MOSFETs in high-power, power conversion applications

Popular Products	Description	Product Web Page
MCP19035	<p>The MCP19035 is a small, analog-based PWM controller family with integrated synchronous MOSFET drivers offering outstanding transient performance. The MCP19035 operates over a wide 4.5 - 30Vdc range, has a 300 kHz switching-frequency, and offers a factory-adjustable dead-time setting, allowing designers to optimize the performance across a wide selection of MOSFET devices. The MCP19035 family, when combined with Microchip's MCP87xxx MOSFETs, or any low-FOM MOSFET, produces high-efficiency (>96%) DC/DC power-conversion solutions.</p>	Click Here

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High-Speed MOSFETs

Function: High-Efficiency, Switched Mode Power Conversion Power Devices

Popular Products	Description	Product Web Page
MCP87xxx	<p>The MCP87xxx family of high-speed MOSFETs have been designed to optimize the trade-off between ultra-low On-state resistance (R_{ds-on}) and Gate Charge (Q_g) to maximize power conversion efficiency in switched mode power supplies.</p>	Click Here

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High-Speed MOSFETs

- Very Low Rds_on and Gate Charge (Qg)
- Optimized for high-efficiency Power Conversion

Product ID	Type	Config	Vds (V)	Vgs (V)	Rds_on @ 4.5V (mΩ-typ)	Qg (nC)	Package
MCP87022*	N	Single	25	+10/-8	2.2	25	5x6 DFN
MCP87030	N	Single	25	+10/-8	3	13.3	5x6 DFN
MCP87050*	N	Single	25	+10/-8	5	9	5x6 DFN
MCP87055*	N	Single	25	+10/-8	5.5	6	3.3x3.3 DFN
MCP87090	N	Single	25	+10/-8	9	4	5x6 DFN 3.3x3.3 DFN
MCP87130	N	Single	25	+10/-8	13	2.9	5x6 DFN 3.3x3.3 DFN

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DC/DC- Buck Regulator

Popular Products	Description	Product Web Page
MCP16301	The MCP16301 is a high-input voltage step-down regulator, capable of supplying 600 mA to a regulated output voltage from 2.0V to 15V.	Click Here
MCP1632x	The MCP16321/2 is a highly integrated, high-efficiency, fixed frequency, synchronous step-down DC-DC converter in a 16-pin QFN package that operates from input voltages up to 24V. Integrated features include a high-side and low-side N-Channel switch, fixed frequency Peak Current Mode Control, internal compensation, peak current limit, VOUT overvoltage protection and over temperature protection.	Click Here
MCP16311/2	The MCP16311/2 is a compact, high-efficiency, fixed frequency PWM/PFM, synchronous step-down DC-DC converter in a 8-pin MSOP, or 2 x 3 TDFN package that operates from input voltage sources up to 30V. Integrated features include a high-side and a low-side switch, fixed frequency Peak Current Mode Control, internal compensation, peak-current limit and over temperature protection.	Click Here

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DC/DC Controller (LDO)

- Function: Providing regulated, low-noise supply voltages ($V_{in} > V_{out}$) for the system

Popular Products	Description	Product Web Page
MCP1790	The MCP1790 is a 70 mA, ceramic output cap stable, high voltage, Low Dropout Regulator (LDO). The MCP1790 is capable of handling continuous input voltage of up to 30V and is load dump protect for up to 48V	Click Here
MCP1754/5	The MCP1754/5 is a 16 volt, high PSRR voltage regulator with short circuit current foldback. The MCP1754 regulator provides up to 150 mA of current. The MCP1755 regulator provides up to 300 mA of current. The input operating voltage range is specified from 3.6V to 16V continuous, 18V absolute maximum, 12 VDC systems. Simplified, low pin count versions of the of these devices are also available	MCP1754 MCP1755

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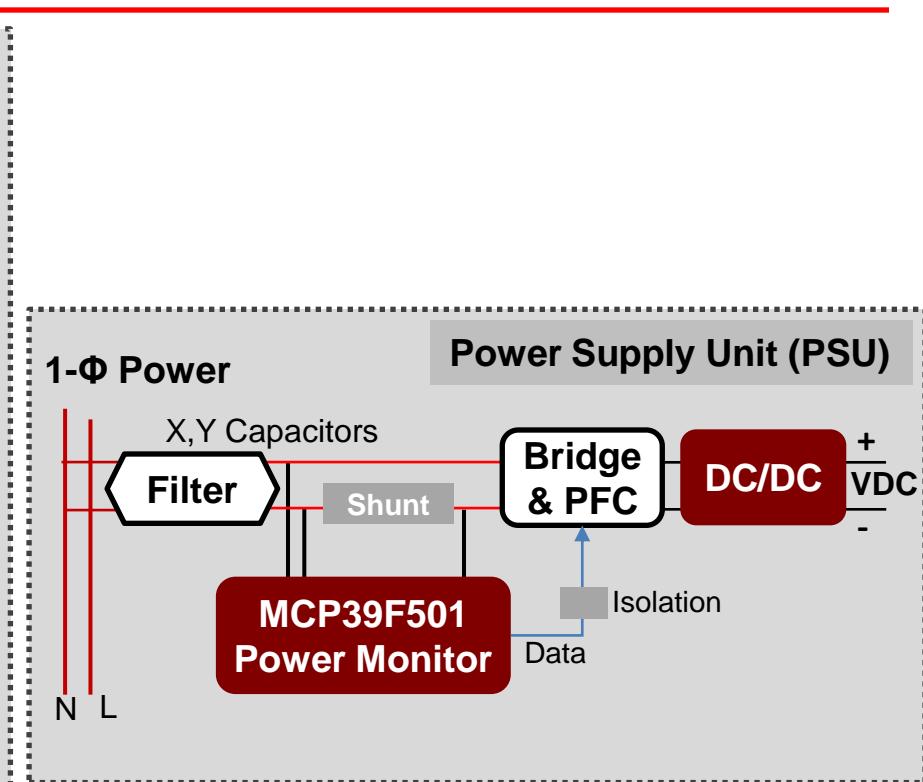
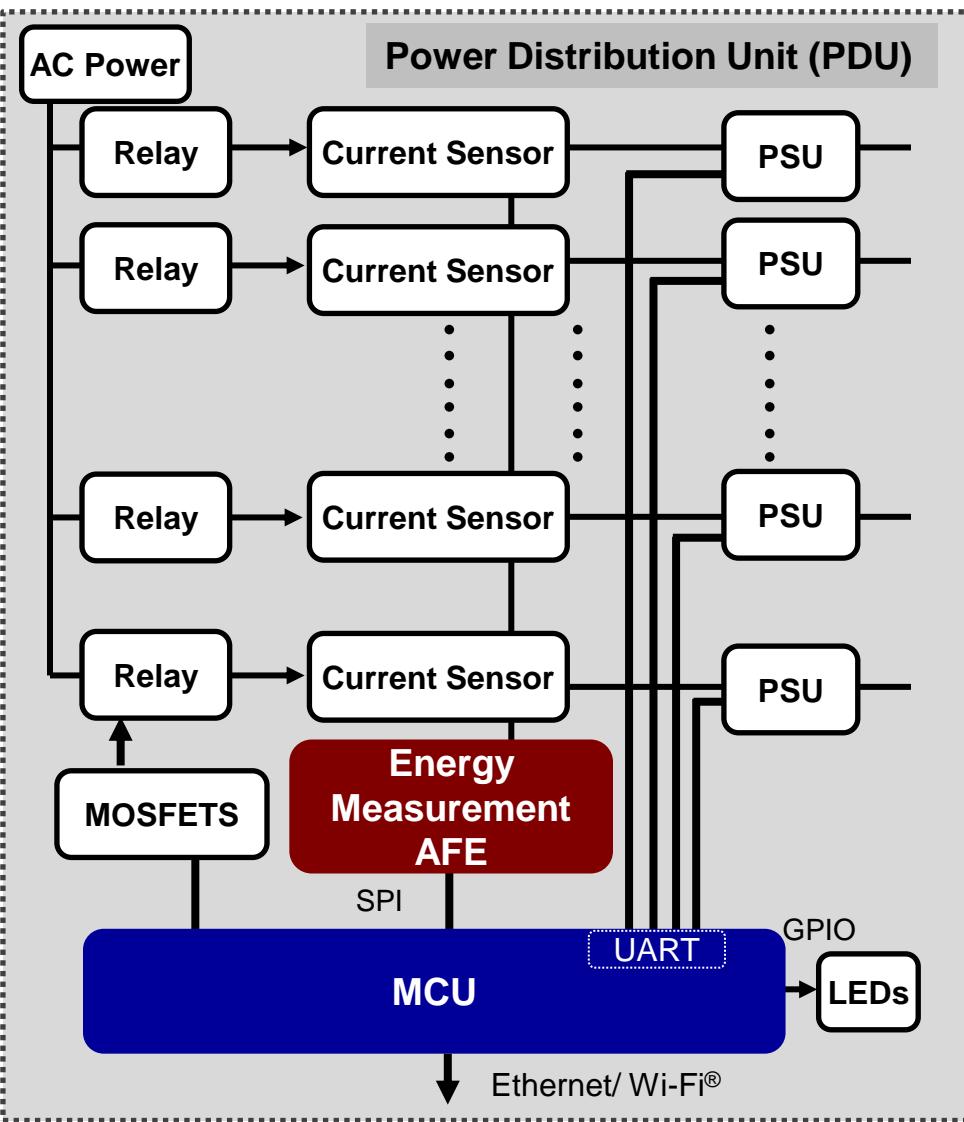
MICROCHIP

Power Monitoring

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Power Monitoring



MCP39F501

Popular Products	Description	Product Web Page
MCP39F501	<p>The MCP39F501 is a highly integrated, single-phase power-monitoring IC designed for real-time measurement of input power for AC/DC power supplies, power distribution units and industrial applications. It includes dual-channel delta sigma ADCs, a 16-bit calculation engine, EEPROM and a flexible 2-wire interface. An integrated low-drift voltage reference addition to 94.5 dB of SINAD performance on each measurement channel allows for better than 0.1% accurate designs across a 4000:1 dynamic range</p>	Click Here



MICROCHIP

MCP3913/4

Popular Products	Description	Product Web Page
MCP3913/14	<p>The MCP3913/4 device is a 3V six/ eight-channel Analog Front End (AFE, containing six synchronous sampling delta-sigma ADCs, six PGAs, phase delay compensation block, low-drift internal voltage reference, digital offset and gain error calibration registers, and high-speed 20 MHz SPI compatible serial interface. The MCP3913 AFE includes advanced security features to secure the communications and the configuration settings, such as a CRC-16 checksum on both serial data outputs and static register map configuration. It also includes a register-map lock through an 8-bit secure key to stop unwanted write commands from processing. The MCP3913 AFE is capable of interfacing with a variety of voltage and current sensors, including shunts, current transformers, Rogowski coils and Hall-effect sensors.</p>	Click Here

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Microcontroller

Popular Products	Description	Product Web Page
PIC32MX	32-bit Microcontrollers (up to 512 KB Flash and 128 KB SRAM) with Graphics Interface, USB, CAN, and Ethernet.	Click Here
PIC24F	The PIC24F microcontroller family features cost effective, 16 MIPS 16-bit MCU performance and many devices with Microchip's eXtreme Low Power Technology. Unique features include USB-OTG, to act as a USB Device or Host, a Charge Time Measurement Unit (CTMU) that allows precision time measurement, capacitive measurement for mTouch™ applications and an integrated graphics or segmented display controller. The PIC24 Lite family (PIC24FxxKxxx) features lowest cost and lowest power in small pin count options, with integrated EEPROM, Op Amps, DACs, flexible PWMs and Configurable Logic Cell (CLC) for real time logic control.	Click Here



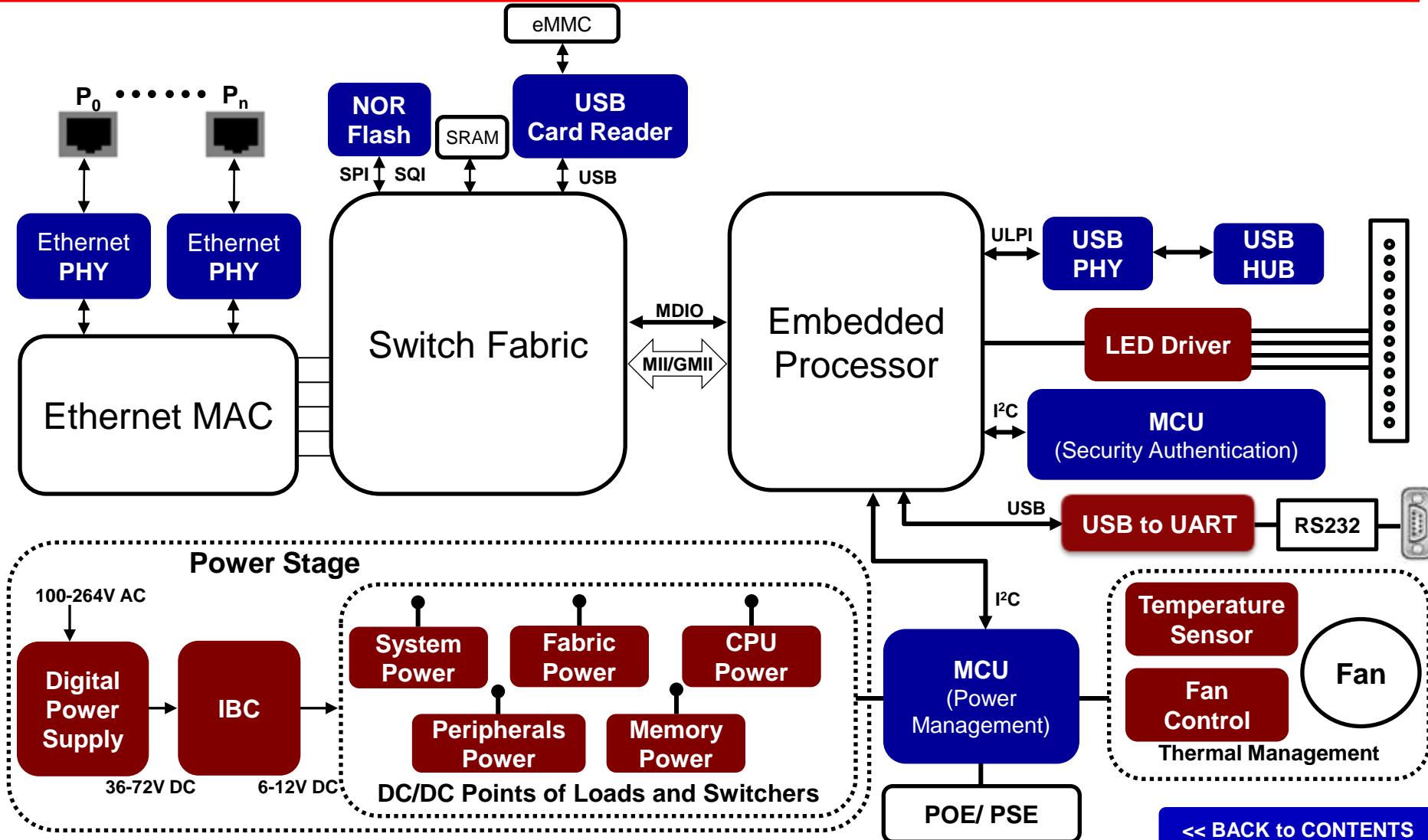
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Ethernet Switch

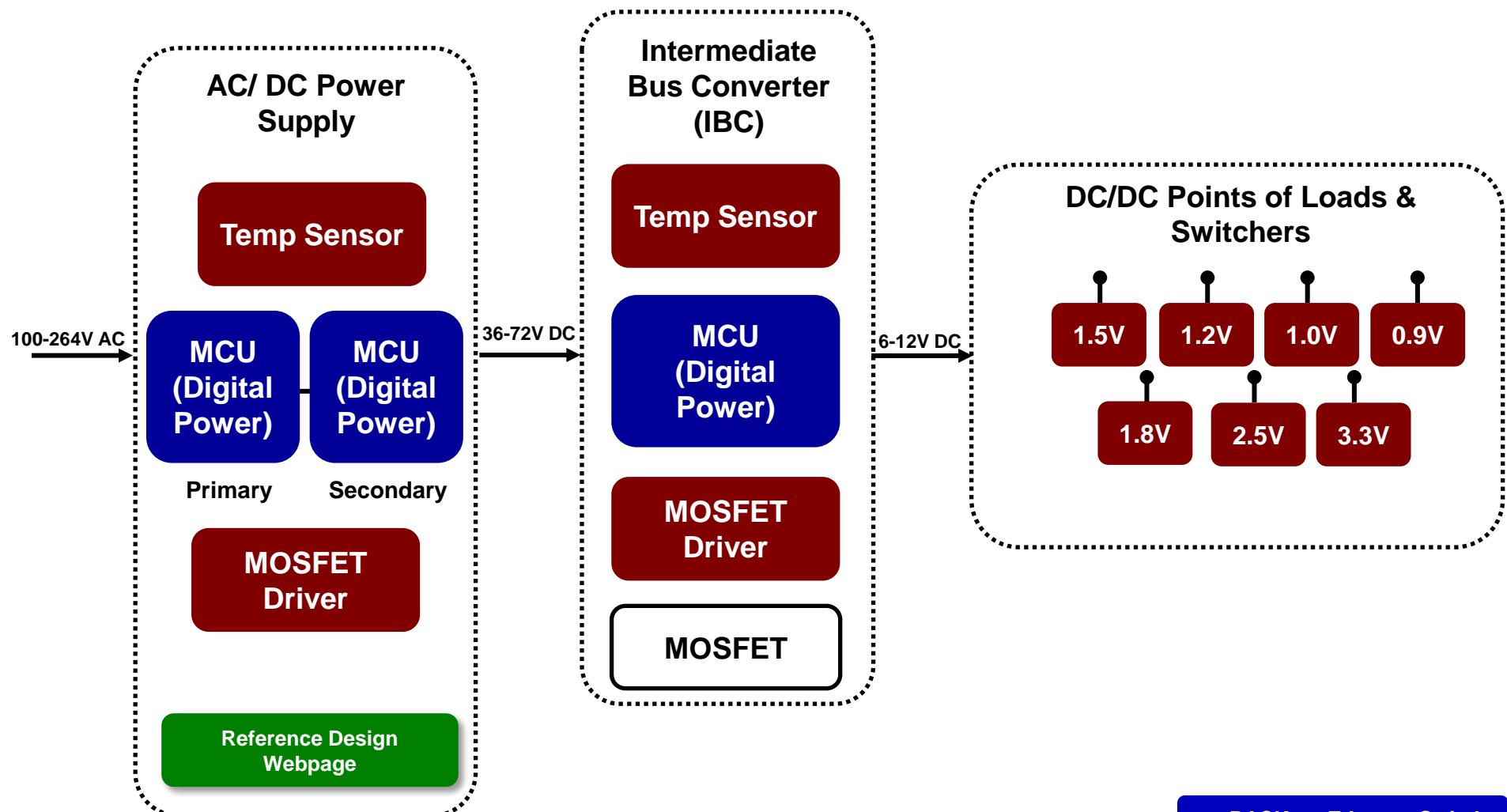
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Ethernet Switch



Power Stage (Ethernet Switch)

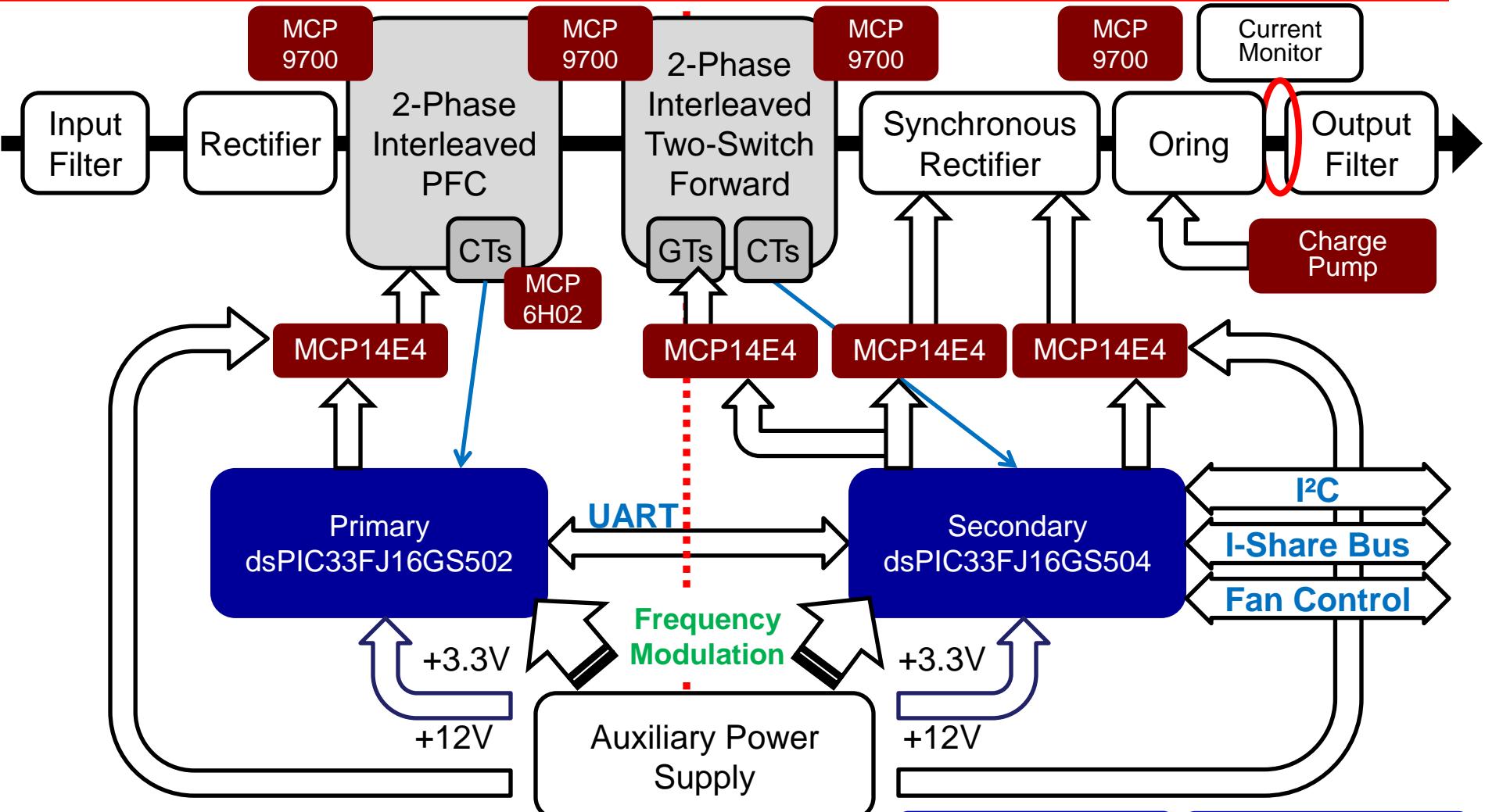




MICROCHIP

720W AC/DC Power Supply Reference Design

High-Level Block Diagram



[Reference Design Webpage](#)

Isolation

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Switch Power Stage

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Equipments Page

USB 2.0 and 3.0 Hubs

Function	Popular Products	Description	Product Web Page
USB 3.0 Hub	USB553xB	These are 2/3/4/7-porthub controllers are SuperSpeed /Hi-Speed, configurable and compliant with USB 3.0. USB 3.0 traffic can also operate in parallel with a USB 2.0 traffic without being affected by slower data.	Click Here
USB 2.0 Hub	USB251xB	These 2/3/4 port USB 2.0 hub controllers excel at data throughput in mixed-speed USB environments. Programmable features include PortMap, PortSwap, and PHYBoost to simplify PCB layout & optimize BOM cost.	Click Here
USB 2.0 Hub	USB2534	This 4 port hub is compliant with the USB 2.0 and Link Power Management. It provides an additional USB endpoint for use as a USB to I2C interface, allowing external devices to be monitored, controlled, or configured via USB.	Click Here
USB2.0 or HSIC	USB4604	This is an OEM configurable USB 2.0 hub controller with 4 downstream ports. It is compliant with the USB 2.0, USB 2.0 Link Power Management & High-Speed Inter-Chip	Click Here

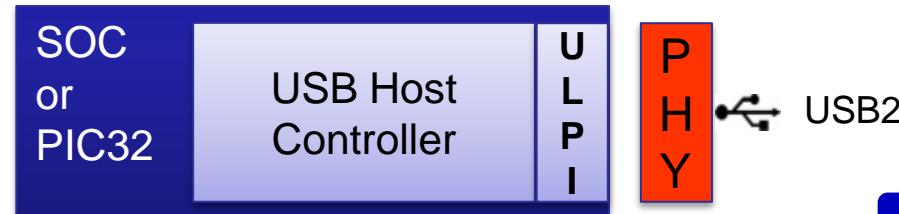
USB-to-UART/SPI

- Function: Enables USB connectivity in applications that have UART/SPI interface

Popular Products	Description	Product Web Page
MCP2200	<p>The MCP2200 is a USB-to-UART serial converter. The device reduces external components by integrating the USB termination resistors. The MCP2200 also has 256-bytes of integrated user EEPROM. The MCP2200 has eight general purpose input / output pins. Four of the pins have alternate functions to indicate USB and communication status.</p>	Click Here
MCP2210	<p>The MCP2210 is a USB-to-SPI Master converter. The device reduces external components by integrating the USB termination resistors. The MCP2210 also has 256 bytes of integrated user EEPROM. The MCP2210 has nine general purpose input/output pins. Seven pins have alternate functions to indicate USB and communication status.</p>	Click Here

USB Transceiver Product Overview

USB PHY Products	USB3450	USB3500	USB3280 USB3290	USB3300	USB334x	USB333x
PHY Interface	UTMI+ (Device or Host)	UTMI+ (Device, Host, or OTG)	UTMI (Device)	ULPI (Device, Host, or OTG)	ULPI (Device, Host, or OTG)	ULPI (Device, Host, or OTG)
HS & FS USB	Yes	Yes	Yes	Yes	Yes	Yes
LS USB	Yes	Yes	No	Yes	Yes	Yes
Data Interface	8 bit Bidir	8 bit Bidir	8 bit Bidir	8 bit Bidir	8 bit Bidir	8 bit Bidir
Internal Reg	Yes	Yes	Yes	Yes	Yes	Yes
Package Body size (mm)	40 QFN (6x 6 x 0.9)	56 QFN (8 x 8 x 0.9)	36 QFN (6 x 6 x 0.9) 40 VFBGA (4 x 4 x 0.9)	32 QFN (5 x 5 x 0.9)	24 QFN (4 x 4 x 0.9) 25 BGA (3 x 3 x 0.8)	25 WLCSP (1.9 x 1.9 x 0.5)

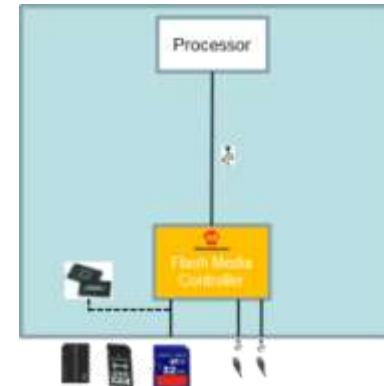

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USB Flash Media Controller Overview

USB Card Reader Products	USB2244	USB2250	USB2640	USB2660	USB4640
Up Stream Interface	USB 2.0	USB 2.0	USB 2.0	USB 2.0	HSIC (USB 2.0)
Down Stream Output	SD, MMC	SD, MMC, CF, MS, xD	SD, MMC, MS, xD	2xSD, 2xMMC, MS, xD	SD, MMC, MS, xD
Down Stream USB Ports	None	None	2	2	2
Logical Units	1	1	1	1	1
Package Body size (mm)	36 QFN (6 x 6 x 0.9)	128 VTQDP (14 x 14 x 1.1)	48 QFN (7 x 7 x 0.9)	64 QFN (9 x 9 x 0.9)	48 QFN (7 x 7 x 0.9)

SD – SecureDigital, MMC – MultiMediaCard, CF – Compact Flash, MS – Memory Stick, xD – xD Picture Card

- **Ultra-fast flash media reader/writer for external memory card storage or embedded flash memory**
 - SD, MMC/eMMC, MS / MS-Pro / MS-Pro-HG, xD
- **USB interface for design ease and flexibility on placement**
- **USB port expansion options**

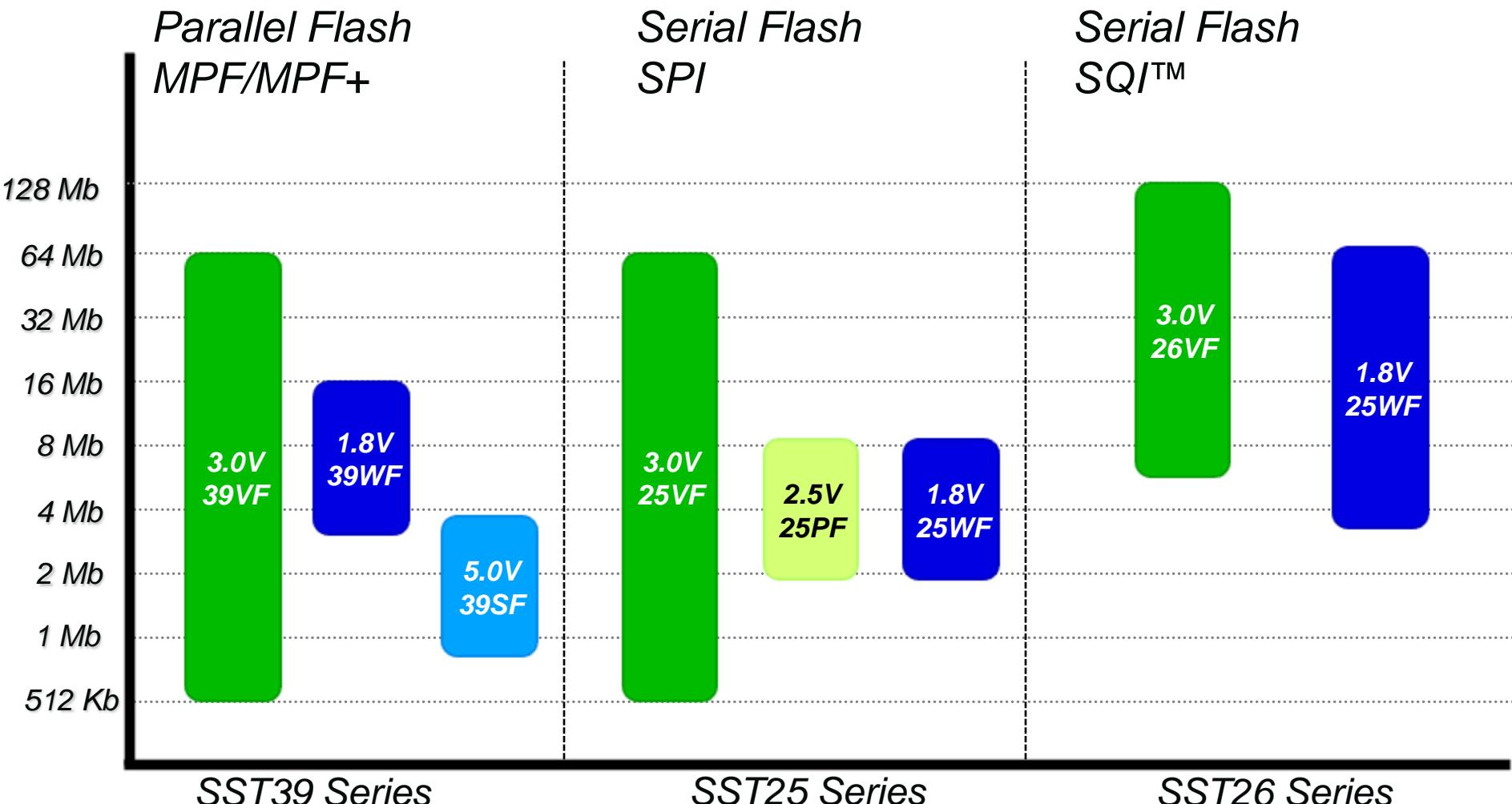


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Ethernet Physical Layer

Popular Products	Description	Product Web Page
LAN8710A/20A	<p>Excellent ESD Protection levels without any external protection devices. Integrated DSP with adaptive equalizer. Integrated 1.2V Linear Regulator. Incorporates SMSC flexPWR. Uses a low cost 25MHz xtal for RMII. Lead free ROHS compliant packages: Commercial (0 to +70C) and Industrial (-40 to +85C) temperature supported</p>	Click Here
LAN8740A/1A/2A	<p>Energy Efficient Ethernet 802.3az, Wake On LAN support (WoL), Cable Diagnostics, HP Auto-MDIX, Compliant with IEEE 802.3/802.3u, Integrated DSP with adaptive equalizer, Integrated 1.2V Linear Regulator, Uses a low cost 25MHz xtal for RMII Lead free ROHS compliant packages</p>	Click Here

NOR Flash Product Offerings



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PIC24F128GB204 Product Family with Security

What's new:

- AES / DES HW encryption
- OTP key storage
- Random Number Generator
- UART with ISO7816

Highlights

- 64 to128KB Flash
- 8KB RAM
- 28 to 44pins
- XLP low power with Vbat

Peripherals

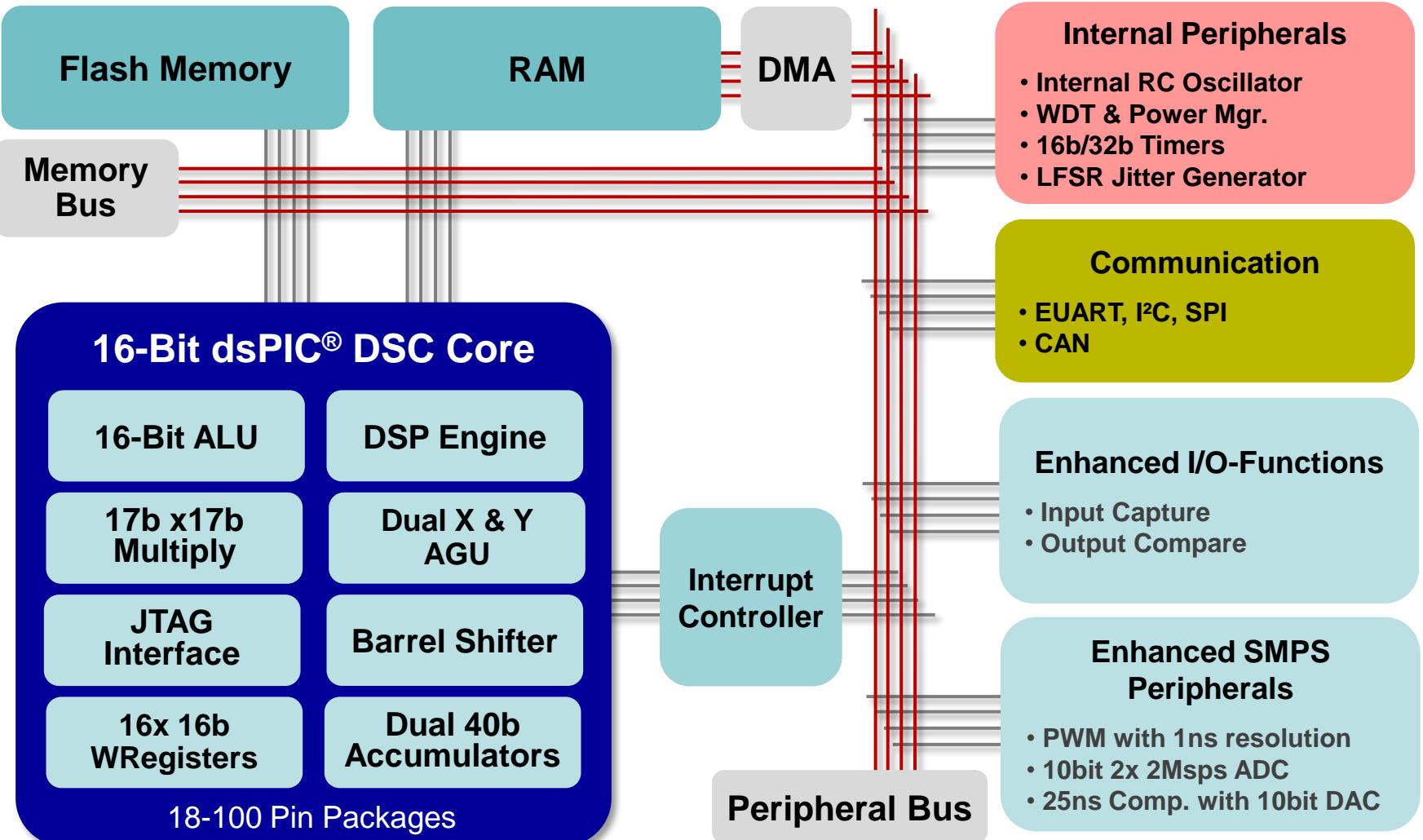
- USB OTG
- 4 UARTs w/ ISO7816
- 3 SPI w/ I²S, 2 I²C™
- 12-bit ADC, 12ch
- CTMU
- 5 16-bit Timer
- 6 IC, 6 OC

Thermal Management

Suggested Products	Description	Product Web page
MCP9700/ MCP9800	Improves control of color temperature and detects disconnected LED channel. MCP9700 outputs analog voltage that is proportional to the temperature (-40C to 150C). MCP9800 outputs temperature data (-55C to 125C) via I ² C™/SMBus two-wire interface.	MCP9700 MCP9800
EMC2301	The EMC2301 is an SMBus compliant fan controller with a PWM fan driver. The fan driver is controlled by a programmable frequency PWM driver and Fan Speed Control algorithm that operates in either a closed loop fashion or as a directly PWM-controlled device and has the capability to detect aging fans and alert the system. It will likewise detect stalled or locked fans and trigger an interrupt.	EMC2301
EMC1412	The EMC1412 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Advanced features such as Resistance Error Correction (REC), Beta Compensation and automatic diode type detection combine to provide a robust solution for complex environmental monitoring applications.	EMC1412

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dsPIC33 GS Architecture



Operational Amplifiers

Suggested Products	Description	Product Web page
MCP6H02	<p>The MCP6H02 operational amplifier (op amp) has a wide supply voltage range of 3.5V to 16V and rail-to-rail output operation. This device is unity gain stable and has a gain bandwidth product of 1.2 MHz (typical), while only drawing 135 µA/amplifier (typical) of quiescent current. The MCP6H02 family is fully specified from -40°C to +125°C and is available in 8L-SOIC and 8L- 2x3 TDFN</p>	MCP6H02
MCP6H92	<p>The MCP6H92 operational amplifier (op amp) has a wide supply voltage range of 3.5V to 12V and rail-to-rail output operation. This device is unity gain stable and has a gain bandwidth product of 10 MHz (typical), while only drawing 2 mA/amplifier (typical) of quiescent current. The MCP6H92 is fully specified from -40°C to +125°C and is available in 8L-SOIC and 8L- 2x3 TDFN</p>	MCP6H92

MOSFET Drivers

Function: driving the high power devices (MOSFETs, bipolar transistors, IGBTs)

Popular Products	Description	Product Web Page
TC4427A	Supply Voltage Range: 2.5V to 5.5V Wide Temperature Measurement Range: -40°C to +125°C High Temperature Converter Accuracy: $\pm 2^\circ\text{C}$, Max, at 25°C Linear Temperature Slope: 10mV/°C Very Low Supply Current: 35µA Typical	Click Here
MCP1415/16	The MCP1415/16 devices are small footprint Low-Side MOSFET drivers capable of supplying 1.5A peak output current in a SOT23 5L package.	Click Here
MCP14E3/E4/E5	The MCP14E3/E4/E5 devices are a family of 4.5A,dual output buffers/MOSFET drivers with separate enable functions for each output. As MOSFET drivers, the MCP14E3/E4/E5 can easily charge 2200 pF gate capacitance in under 28 nsec (max)	Click Here

Charge Pumps

- Function: powering white LEDs, providing negative DC bias for LCD or GaAs transmit power amplifier, converting Li-Ion voltage to DC voltage level required by the system

Popular Products	Description	Product Web Page
MCP1252/3	<p>The MCP1252/3 are inductorless, positive-regulated charge pump DC/DC converters. The devices generate a regulated fixed (3.3V or 5.0V) or adjustable output voltage. They are specifically designed for applications requiring low noise and high efficiency and are able to deliver up to 120 mA output current. The devices allow the input voltage to be lower or higher than the output voltage, by automatically switching between buck/ boost operation.</p>	Click Here