



Ultra-Small, Low-Power, 12-Bit Analog-to-Digital Converter with Internal Reference

Check for Samples: [ADS1013](#) [ADS1014](#) [ADS1015](#)

FEATURES

- **ULTRA-SMALL QFN PACKAGE:**
2mm × 1,5mm × 0,4mm
- **WIDE SUPPLY RANGE:** 2.0V to 5.5V
- **LOW CURRENT CONSUMPTION:**
Continuous Mode: Only 150µA
Single-Shot Mode: Auto Shut-Down
- **PROGRAMMABLE DATA RATE:**
128SPS to 3.3kSPS
- **INTERNAL LOW-DRIFT
VOLTAGE REFERENCE**
- **INTERNAL OSCILLATOR**
- **INTERNAL PGA**
- **I²C™ INTERFACE:** Pin-Selectable Addresses
- **FOUR SINGLE-ENDED OR TWO
DIFFERENTIAL INPUTS (ADS1015)**
- **PROGRAMMABLE COMPARATOR**
(ADS1014 and ADS1015)

APPLICATIONS

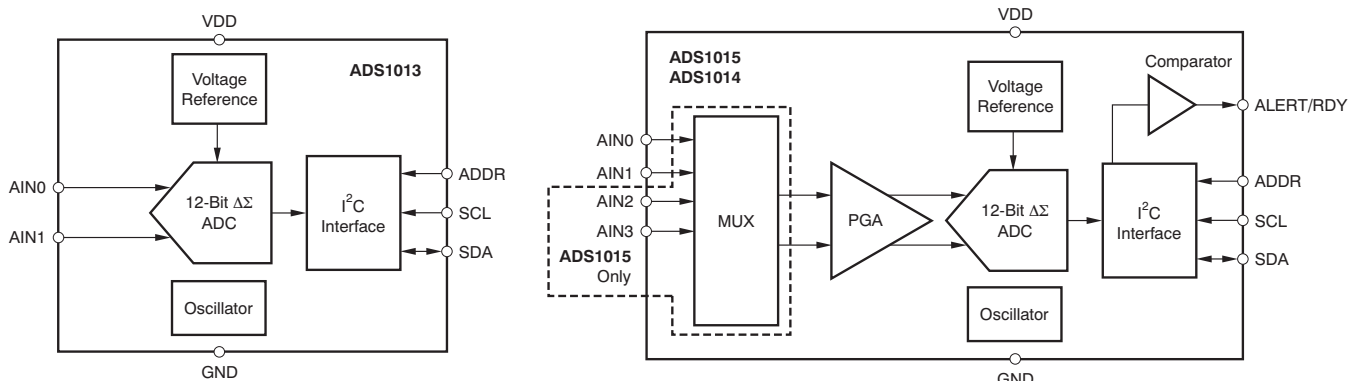
- **PORTABLE INSTRUMENTATION**
- **CONSUMER GOODS**
- **BATTERY MONITORING**
- **TEMPERATURE MEASUREMENT**
- **FACTORY AUTOMATION AND PROCESS
CONTROLS**

DESCRIPTION

The ADS1013, ADS1014, and ADS1015 are precision analog-to-digital converters (ADCs) with 12 bits of resolution offered in an ultra-small, leadless QFN-10 package or an MSOP-10 package. The ADS1013/4/5 are designed with precision, power, and ease of implementation in mind. The ADS1013/4/5 feature an onboard reference and oscillator. Data are transferred via an I²C-compatible serial interface; four I²C slave addresses can be selected. The ADS1013/4/5 operate from a single power supply ranging from 2.0V to 5.5V.

The ADS1013/4/5 can perform conversions at rates up to 3300 samples per second (SPS). An onboard PGA is available on the ADS1014 and ADS1015 that offers input ranges from the supply to as low as ±256mV, allowing both large and small signals to be measured with high resolution. The ADS1015 also features an input multiplexer (MUX) that provides two differential or four single-ended inputs.

The ADS1013/4/5 operate either in continuous conversion mode or a single-shot mode that automatically powers down after a conversion and greatly reduces current consumption during idle periods. The ADS1013/4/5 are specified from –40°C to +125°C.



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Features

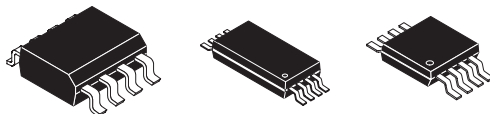
- High Performance, Low Power AVR[®] 8-Bit Microcontroller
- Advanced RISC Architecture
 - 131 Powerful Instructions – Most Single Clock Cycle Execution
 - 32 x 8 General Purpose Working Registers
 - Fully Static Operation
 - Up to 20 MIPS Throughput at 20 MHz
 - On-chip 2-cycle Multiplier
- High Endurance Non-volatile Memory Segments
 - 4/8/16/32K Bytes of In-System Self-Programmable Flash program memory (ATmega48PA/88PA/168PA/328P)
 - 256/512/512/1K Bytes EEPROM (ATmega48PA/88PA/168PA/328P)
 - 512/1K/1K/2K Bytes Internal SRAM (ATmega48PA/88PA/168PA/328P)
 - Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
 - Data retention: 20 years at 85°C/100 years at 25°C⁽¹⁾
 - Optional Boot Code Section with Independent Lock Bits
 - In-System Programming by On-chip Boot Program
 - True Read-While-Write Operation
 - Programming Lock for Software Security
- Peripheral Features
 - Two 8-bit Timer/Counters with Separate Prescaler and Compare Mode
 - One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
 - Real Time Counter with Separate Oscillator
 - Six PWM Channels
 - 8-channel 10-bit ADC in TQFP and QFN/MLF package
 - Temperature Measurement
 - 6-channel 10-bit ADC in PDIP Package
 - Temperature Measurement
 - Programmable Serial USART
 - Master/Slave SPI Serial Interface
 - Byte-oriented 2-wire Serial Interface (Philips I²C compatible)
 - Programmable Watchdog Timer with Separate On-chip Oscillator
 - On-chip Analog Comparator
 - Interrupt and Wake-up on Pin Change
- Special Microcontroller Features
 - Power-on Reset and Programmable Brown-out Detection
 - Internal Calibrated Oscillator
 - External and Internal Interrupt Sources
 - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and Extended Standby
- I/O and Packages
 - 23 Programmable I/O Lines
 - 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF
- Operating Voltage:
 - 1.8 - 5.5V for ATmega48PA/88PA/168PA/328P
- Temperature Range:
 - -40°C to 85°C
- Speed Grade:
 - 0 - 20 MHz @ 1.8 - 5.5V
- Low Power Consumption at 1 MHz, 1.8V, 25°C for ATmega48PA/88PA/168PA/328P:
 - Active Mode: 0.2 mA
 - Power-down Mode: 0.1 A
 - Power-save Mode: 0.75 A (Including 32 kHz RTC)



8-bit AVR[®]
Microcontroller
with 4/8/16/32K
Bytes In-System
Programmable
Flash

ATmega48PA
ATmega88PA
ATmega168PA
ATmega328P





ADVANCED LINEAR CHARGE MANAGEMENT IC FOR SINGLE- AND TWO-CELL LITHIUM-ION AND LITHIUM-POLYMER

FEATURES

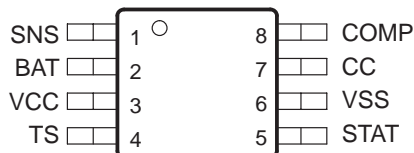
- Ideal for Single (4.1 V or 4.2 V) and Dual-Cell (8.2 V or 8.4 V) Li-Ion or Li-Pol Packs
- Requires Small Number of External Components
- 0.3 V Dropout Voltage for Minimizing Heat Dissipation
- Better Than $\pm 1\%$ Voltage Regulation Accuracy With Preset Voltages
- AutoComp™ Dynamic Compensation of Battery Pack's Internal Impedance to Reduce Charge Time
- Optional Cell-Temperature Monitoring Before and During Charge
- Integrated Voltage and Current Regulation With Programmable Charge-Current and High- or Low-Side Current Sensing
- Integrated Cell Conditioning for Reviving Deeply Discharged Cells and Minimizing Heat Dissipation During Initial Stage Of Charge
- Charge Status Output for Single or Dual Led or Host Processor Interface
- Automatic Battery-Recharge Feature
- Charge Termination by Minimum Current
- Automatic Low-Power Sleep Mode When V_{CC} Is Removed
- EVMs Available for Quick Evaluation
- Packaging: 8-Pin SOIC, 8-Pin TSSOP, 8-Pin MSOP

DESCRIPTION

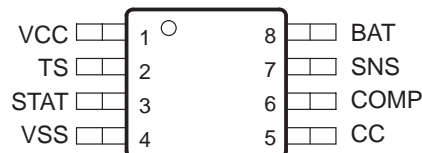
The BENCHMARK bq2057 series advanced Lithium-Ion (Li-Ion) and Lithium-Polymer (Li-Pol) linear charge-management ICs are designed for cost-sensitive and compact portable electronics. They combine high-accuracy current and voltage regulation, battery conditioning, temperature monitoring, charge termination, charge-status indication, and AutoComp charge-rate compensation in a single 8-pin IC. MSOP, TSSOP, and SOIC package options are offered to fit a wide range of end applications.

The bq2057 continuously measures battery temperature using an external thermistor. For safety, the bq2057 inhibits charge until the battery temperature is within user-defined thresholds. The bq2057 then charges the battery in three phases: conditioning, constant current, and constant voltage. If the battery voltage is below the low-voltage threshold, $V_{(min)}$, the bq2057 precharges using a low current to condition the battery. The conditioning charge rate is approximately 10% of the regulation current. The conditioning current also minimizes heat dissipation in the external pass-element during the initial stage of the charge. After conditioning, the bq2057 applies a constant current to the battery. An external sense-resistor sets the current. The sense-resistor can be on either the high or low side of the battery without additional components. The constant-current phase continues until the battery reaches the charge-regulation voltage.

bq2057xSN or bq2057xTS
SOIC (SN) or TSSOP (TS) PACKAGE
(TOP VIEW)



bq2057xDGK
MSOP (DGK) PACKAGE
(TOP VIEW)



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SOT223 PNP SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ISSUE 3 - OCTOBER 1995

FEATURES

- * Low equivalent on-resistance; $R_{CE(sat)}$ **93mΩ at 3A**
- * Gain of 300 at $I_C=2$ Amps and Very low saturation voltage

APPLICATIONS

- * Battery powered circuits

COMPLEMENTARY TYPE – FZT688B

PARTMARKING DETAIL – FZT788B

ABSOLUTE MAXIMUM RATINGS.

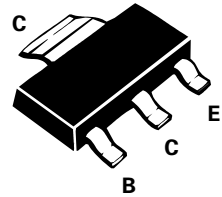
PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-15	V
Collector-Emitter Voltage	V_{CEO}	-15	V
Emitter-Base Voltage	V_{EBO}	-5	V
Peak Pulse Current	I_{CM}	-8	A
Continuous Collector Current	I_C	-3	A
Power Dissipation at $T_{amb}=25^{\circ}C$	P_{tot}	2	W
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	$^{\circ}C$

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$)

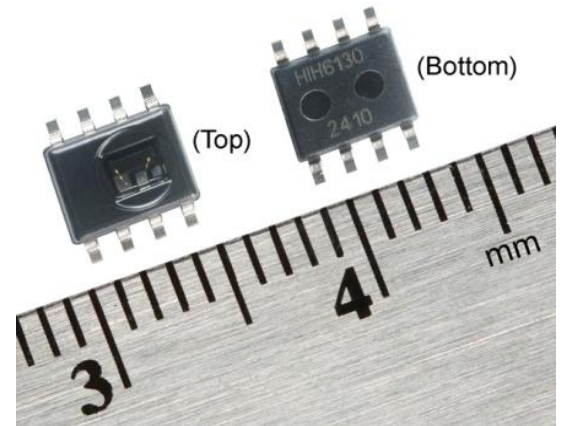
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-15			V	$I_C=-100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-15			V	$I_C=-10mA^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5			V	$I_E=-100\mu A$
Collector Cut-Off Current	I_{CBO}			-0.1	μA	$V_{CB}=-10V$
Emitter Cut-Off Current	I_{EBO}			-0.1	μA	$V_{EB}=-4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.15	V	$I_C=0.5A, I_B=2.5mA^*$
				-0.25	V	$I_C=1A, I_B=5mA^*$
				-0.45	V	$I_C=2A, I_B=10mA^*$
				-0.5	V	$I_C=3A, I_B=50mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			-0.9	V	$I_C=1A, I_B=5mA^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-0.75		V	$I_C=1A, V_{CE}=2V^*$
Static Forward Current Transfer Ratio	h_{FE}	500		1500		$I_C=10mA, V_{CE}=2V^*$
		400				$I_C=1A, V_{CE}=2V^*$
		300				$I_C=2A, V_{CE}=2V^*$
		150				$I_C=6A, V_{CE}=2V^*$
Transition Frequency	f_T	100			MHz	$I_C=50mA, V_{CE}=5V$ $f=50MHz$
Input Capacitance	C_{ibo}		225		pF	$V_{EB}=-0.5V, f=1MHz$
Output Capacitance	C_{obo}		25		pF	$V_{CB}=-10V, f=1MHz$
Switching Times	t_{on}		35		ns	$I_C=500mA, I_{B1}=50mA$
	t_{off}		400		ns	$I_{B2}=50mA, V_{CC}=-10V$

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$
Spice parameter data is available upon request for this device

FZT788B



Honeywell HumidIcon™ Digital Humidity/Temperature Sensors: HIH-6130/6131 Series



DESCRIPTION (★ = *competitive differentiator*)

Honeywell HumidIcon™ Digital Humidity/Temperature Sensors: HIH-6130/6131 Series, is a digital output-type relative humidity (RH) and temperature sensor combined in the same package. These devices offer several competitive advantages, including:

- Industry-leading Total Error Band
- Industry-leading stability
- Industry-leading reliability
- Lowest total cost solution
- True temperature-compensated digital I²C output
- Energy efficiency
- Ultra-small package

★ **Industry-leading Total Error Band (TEB) (±5 %RH):**

Honeywell specifies Total Error Band—the most comprehensive, clear, and meaningful measurement—that provides the sensor's true accuracy of ±5 %RH over a compensated range of 5 °C to 50 °C [41 °F to 122 °F] and 10 %RH to 90 %RH. TEB includes all errors due to:

- Humidity non-linearity
- Humidity hysteresis
- Humidity non-repeatability
- Thermal effect on zero
- Thermal effect on span
- Thermal hysteresis

Total Error Band should not be confused with “Accuracy”, which is actually a component of Total Error Band. Many competitors simply specify the accuracy of their device; however, the specification may exclude hysteresis and temperature effects, and may be calculated over a very narrow range, at only one point in the range, or at their absolute best accuracy level. It is then up to the customer to calibrate the device to make sure it has the accuracy needed for the life of the application.

Honeywell's industry-leading Total Error Band provides the following benefits to the customer:

- Eliminates individually testing and calibrating every sensor, which can increase their manufacturing time and process
- Supports system accuracy and warranty requirements
- Helps to optimize system uptime
- Provides excellent sensor interchangeability—the customer can remove one sensor from the tape, remove the next sensor from the tape, and there is no part-to-part variation in accuracy

For more information about Total Error Band, please see the related Technical Note “Explanation of the Total Error Band Specification for Honeywell's Digital Humidity/Temperature Sensors.”

★ **Industry-leading long term stability (1.2 %RH over five years):**

Competitive humidity sensors need to go through a 12 hour at 75 %RH rehydration process (which requires special equipment chambers) to correct reflow temperature offset. Honeywell's sensor also experiences an offset after reflow; however, it only requires a five hour rehydration under ambient conditions (>50 %RH). Honeywell's industry-leading long term stability provides the following benefits to the customer:

- Minimizes system performance issues
- Helps support system uptime by eliminating the need to service or replace the sensor during its application life
- Eliminates the need to regularly recalibrate the sensor in their application, which can be inconvenient and costly

- ★ **Industry-leading reliability:** Honeywell's new HIH-6130/6131 Series sensors use a laser trimmed, thermoset polymer capacitive sensing element. The element's multilayer construction provides resistance to most application hazards such as condensation, dust, dirt, oils, and common environmental chemicals which help provide industry-leading stability and reliability.



湖南桑顿新能源有限公司
Hunan Sounddon New Energy Co., Ltd

Specification No. APL-2013517

Edition No. 1.0

Cylindrical Li — ion Battery Pack

Product Specification

Model: 18650 3.7v 4400mAh

Hunan Sounddon New Energy Co., Ltd

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LM75B

Digital temperature sensor and thermal watchdog

Rev. 6.1 — 6 February 2015

Product data sheet

1. General description

The LM75B is a temperature-to-digital converter using an on-chip band gap temperature sensor and Sigma-Delta A-to-D conversion technique with an overtemperature detection output. The LM75B contains a number of data registers: Configuration register (Conf) to store the device settings such as device operation mode, OS operation mode, OS polarity and OS fault queue as described in [Section 7 “Functional description”](#); temperature register (Temp) to store the digital temp reading, and set-point registers (Tos and Thyst) to store programmable overtemperature shutdown and hysteresis limits, that can be communicated by a controller via the 2-wire serial I²C-bus interface. The device also includes an open-drain output (OS) which becomes active when the temperature exceeds the programmed limits. There are three selectable logic address pins so that eight devices can be connected on the same bus without address conflict.

The LM75B can be configured for different operation conditions. It can be set in normal mode to periodically monitor the ambient temperature, or in shutdown mode to minimize power consumption. The OS output operates in either of two selectable modes: OS comparator mode or OS interrupt mode. Its active state can be selected as either HIGH or LOW. The fault queue that defines the number of consecutive faults in order to activate the OS output is programmable as well as the set-point limits.

The temperature register always stores an 11-bit two's complement data giving a temperature resolution of 0.125 °C. This high temperature resolution is particularly useful in applications of measuring precisely the thermal drift or runaway. When the LM75B is accessed the conversion in process is not interrupted (that is, the I²C-bus section is totally independent of the Sigma-Delta converter section) and accessing the LM75B continuously without waiting at least one conversion time between communications will not prevent the device from updating the Temp register with a new conversion result. The new conversion result will be available immediately after the Temp register is updated.

The LM75B powers up in the normal operation mode with the OS in comparator mode, temperature threshold of 80 °C and hysteresis of 75 °C, so that it can be used as a stand-alone thermostat with those pre-defined temperature set points.

2. Features and benefits

- Pin-for-pin replacement for industry standard LM75 and LM75A and offers improved temperature resolution of 0.125 °C and specification of a single part over power supply range from 2.8 V to 5.5 V
- I²C-bus interface with up to 8 devices on the same bus
- Power supply range from 2.8 V to 5.5 V
- Temperatures range from –55 °C to +125 °C



LMR61428 SIMPLE SWITCHER® 14Vout, 2.85A Step-Up Voltage Regulator in VSSOP

Check for Samples: [LMR61428](#)

FEATURES

- 1.2V to 14V Input Voltage
- Adjustable Output Voltage up to 14V
- Switch Current up to 2.85A
- Up to 2 MHz Switching Frequency
- Low Shutdown Iq, <1µA
- Cycle-by-Cycle Current Limiting
- VSSOP Packaging (3.0 x 5.0 x 1.09mm)
- WEBENCH® Enabled

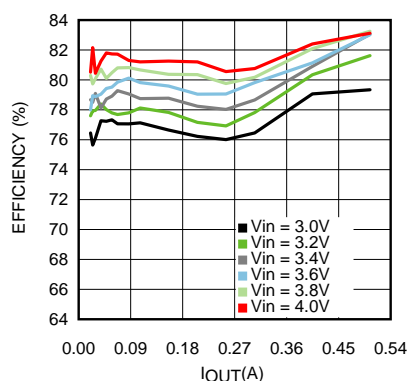
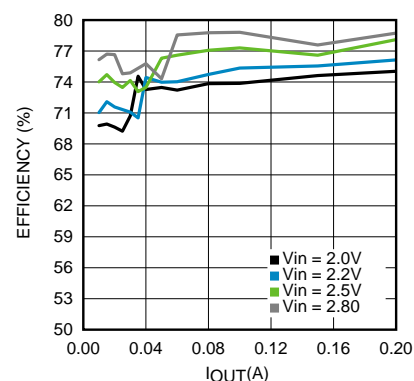
PERFORMANCE BENEFITS

- Extremely Easy to Use
- Tiny Overall Solution Reduces System Cost

APPLICATIONS

- Boost/SEPIC Conversions from 3.3V, 5V, and 12V
- Space Constrained Applications
- LCD Displays
- LED Applications

System Performance

Efficiency vs Load Current, V_{OUT} = 5V

Efficiency vs Load Current, V_{OUT} = 3.3V


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FEATURES

- Very Low Loss Replacement for Power Supply OR'ing Diodes
- Minimal External Components
- Automatic Switching Between DC Sources
- Simplifies Load Sharing with Multiple Batteries
- Low Quiescent Current: 11µA
- 3V to 28V AC/DC Adapter Voltage Range
- 2.5V to 28V Battery Voltage Range
- Reverse Battery Protection
- Drives Almost Any Size MOSFET for Wide Range of Current Requirements
- MOSFET Gate Protection Clamp
- Manual Control Input
- Low Profile (1mm) ThinSOT™ Package

APPLICATIONS

- Cellular Phones
- Notebook and Handheld Computers
- Digital Cameras
- USB-Powered Peripherals
- Uninterruptible Power Supplies
- Logic Controlled Power Switch

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DESCRIPTION

The LTC®4412 controls an external P-channel MOSFET to create a near ideal diode function for power switchover or load sharing. This permits highly efficient OR'ing of multiple power sources for extended battery life and low self-heating. When conducting, the voltage drop across the MOSFET is typically 20mV. For applications with a wall adapter or other auxiliary power source, the load is automatically disconnected from the battery when the auxiliary source is connected. Two or more LTC4412s may be interconnected to allow load sharing between multiple batteries or charging of multiple batteries from a single charger.

The wide supply operating range supports operation from one to six Li-Ion cells in series. The low quiescent current (11µA typical) is independent of the load current. The gate driver includes an internal voltage clamp for MOSFET protection.

The STAT pin can be used to enable an auxiliary P-channel MOSFET power switch when an auxiliary supply is detected. This pin may also be used to indicate to a microcontroller that an auxiliary supply is connected. The control (CTL) input enables the user to force the primary MOSFET off and the STAT pin low.

The LTC4412 is available in a low profile (1mm) ThinSOT package.

TYPICAL APPLICATION

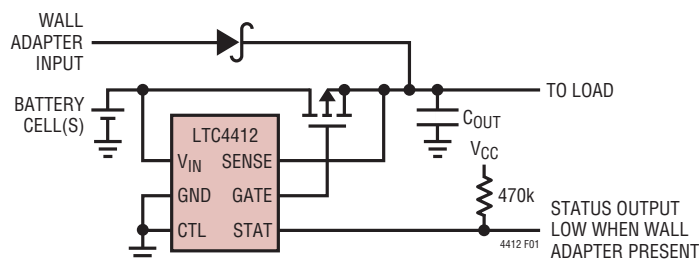
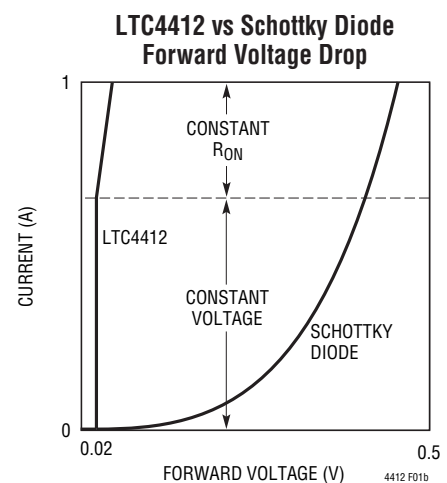


Figure 1. Automatic Switchover of Load Between a Battery and a Wall Adapter



4412fb

Rail-to-Rail, Input and Output, Instrumentation Amplifier

FEATURES

- 116dB CMRR Independent of Gain
- Maximum Offset Voltage: 100 μ V
- Maximum Offset Voltage Drift: 250nV/ $^{\circ}$ C
- -40° C to 125° C Operation
- Rail-to-Rail Input Range
- Rail-to-Rail Output Swing
- Supply Operation: 2.7V to 5.5V
- Available in MS8 and 3mm \times 3mm \times 0.8mm DFN Packages

APPLICATIONS

- Thermocouple Amplifiers
- Electronic Scales
- Medical Instrumentation
- Strain Gauge Amplifiers
- High Resolution Data Acquisition

DESCRIPTION

The LTC[®]6800 is a precision instrumentation amplifier. The CMRR is typically 116dB with a single 5V supply and is independent of gain. The input offset voltage is guaranteed below 100 μ V with a temperature drift of less than 250nV/ $^{\circ}$ C. The LTC6800 is easy to use; the gain is adjustable with two external resistors, like a traditional op amp.

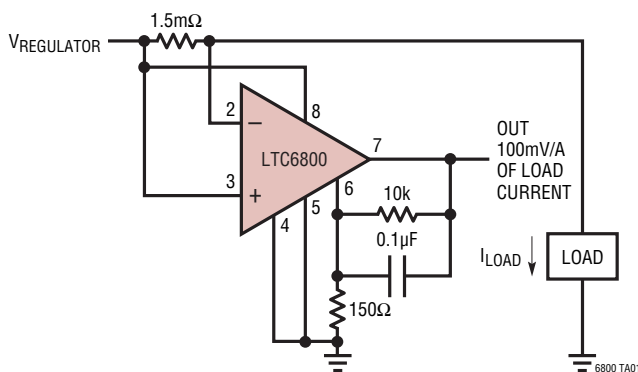
The LTC6800 uses charge balanced sampled data techniques to convert a differential input voltage into a single ended signal that is in turn amplified by a zero-drift operational amplifier.

The differential inputs operate from rail-to-rail and the single ended output swings from rail-to-rail. The LTC6800 is available in an MS8 surface mount package. For space limited applications, the LTC6800 is available in a 3mm \times 3mm \times 0.8mm dual fine pitch leadless package (DFN).

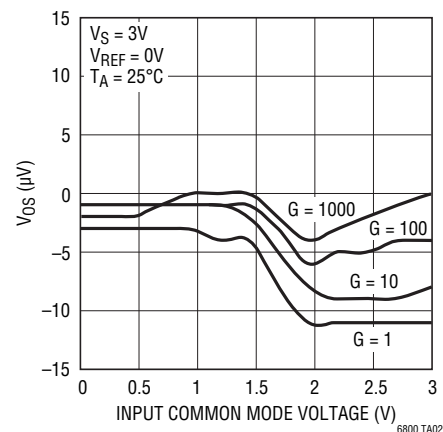
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TYPICAL APPLICATION

High Side Power Supply Current Sense



Typical Input Referred Offset vs Input Common Mode Voltage ($V_S = 3V$)



Micropower Voltage Regulator

Check for Samples: [SM72238](#)

FEATURES

- Renewable Energy Grade
- High-Accuracy Output Voltage
- Ensured 100mA Output Current
- Extremely Low Quiescent Current
- Low Dropout Voltage
- Extremely Tight Load and Line Regulation
- Very Low Temperature Coefficient
- Use as Regulator or Reference
- Needs Minimum Capacitance for Stability
- Current and Thermal Limiting
- Stable With Low-ESR Output Capacitors (10mΩ to 6Ω)

DESCRIPTION

The SM72238 is a micropower voltage regulator with very low quiescent current (75μA typ.) and very low dropout voltage (typ. 40mV at light loads and 380mV at 100mA). It is ideally suited for use in battery-powered systems. Furthermore, the quiescent current of the SM72238 increases only slightly in dropout, prolonging battery life.

The SM72238 is available in the surface-mount D-Pak package.

Careful design of the SM72238 has minimized all contributions to the error budget. This includes a tight initial tolerance (.5% typ.), extremely good load and line regulation (.05% typ.) and a very low output voltage temperature coefficient, making the part useful as a low-power voltage reference.

Block Diagram and Typical Applications

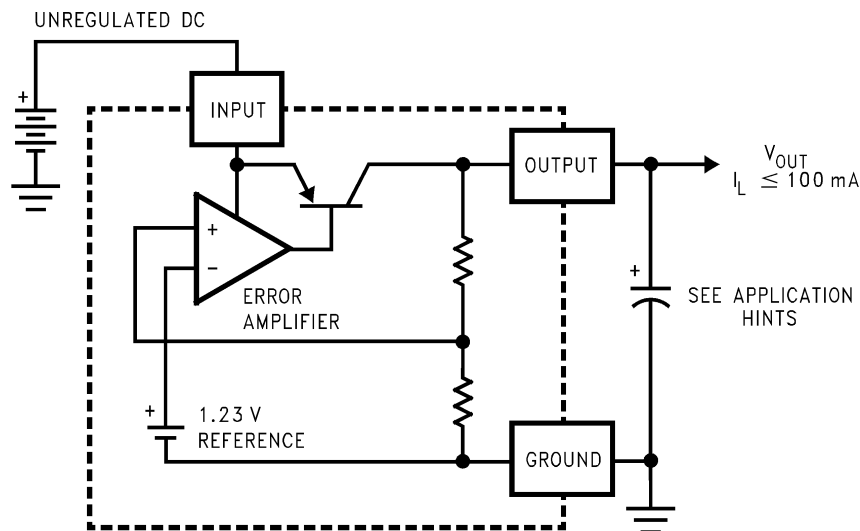


Figure 1. SM72238



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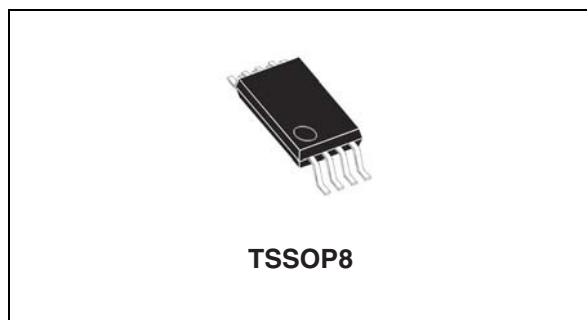
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High efficiency solar battery charger with embedded MPPT

Datasheet - production data



Description

The SPV1040 device is a low power, low voltage, monolithic step-up converter with an input voltage range from 0.3 V to 5.5 V, and is capable of maximizing the energy generated by even a single solar cell (or fuel cell), where low input voltage handling capability is extremely important.

Thanks to the embedded MPPT algorithm, even under varying environmental conditions (such as irradiation, dirt, temperature) the SPV1040 offers maximum efficiency in terms of power harvested from the cells and transferred to the output.

The device employs an input voltage regulation loop, which fixes the charging battery voltage via a resistor divider. The maximum output current is set with a current sense resistor according to charging current requirements.

The SPV1040 protects itself and other application devices by stopping the PWM switching if either the maximum current threshold (up to 1.8 A) is reached or the maximum temperature limit (up to 155 °C) is exceeded.

An additional built-in feature of the SPV1040 is the input source reverse polarity protection, which prevents damage in case of reverse connection of the solar panel at the input.

Features

- 0.3 V to 5.5 V operating input voltage
- 140 mΩ internal synchronous rectifier
- 120 mΩ internal power active switch
- 100 kHz fixed PWM frequency
- Duty cycle controlled by MPPT algorithm
- Output voltage regulation, overcurrent and overtemperature protection
- Input source reverse polarity protection
- Built-in soft-start
- Up to 95% efficiency
- 3 mm x 4.4 mm TSSOP8 package

Applications

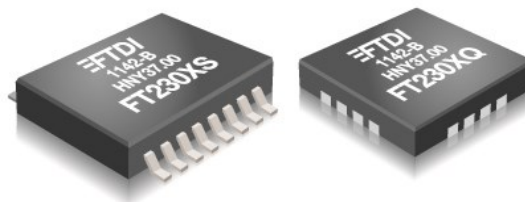
- Smart phones and GPS systems
- Wireless headsets
- Small appliances, sensors
- Portable media players
- Digital still cameras
- Toys and portable healthcare

Table 1. Device summary

Order code	Package	Packaging
SPV1040T	TSSOP8	Tube
SPV1040TTR		Tape and reel

Future Technology Devices International Ltd.

FT230X (USB to BASIC UART IC)



The FT230X is a USB to serial UART interface with optimised pin count for smaller PCB designs and the following advanced features:

- Single chip USB to asynchronous serial data transfer interface.
- Entire USB protocol handled on the chip. No USB specific firmware programming required.
- Fully integrated 2048 byte multi-time-programmable (MTP) memory, storing device descriptors and CBUS I/O configuration.
- Fully integrated clock generation with no external crystal required plus optional clock output selection enabling a glue-less interface to external MCU or FPGA.
- Data transfer rates from 300 baud to 3 Mbaud (RS422, RS485, and RS232) at TTL levels.
- 512 byte receive buffer and 512 byte transmit buffer utilising buffer smoothing technology to allow for high data throughput.
- FTDI's royalty-free Virtual Com Port (VCP) and Direct (D2XX) drivers eliminate the requirement for USB driver development in most cases.
- Configurable CBUS I/O pins.
- Transmit and receive LED drive signals.
- UART interface support for 7 or 8 data bits, 1 or 2 stop bits and odd / even / mark / space / no parity
- Synchronous and asynchronous bit bang interface options with RD# and WR# strobes.
- USB Battery Charger Detection. Allows for USB peripheral devices to detect the presence of a higher power source to enable improved charging.
- Device supplied pre-programmed with unique USB serial number.
- USB Power Configurations; supports bus-powered, self-powered and bus-powered with power switching
- Integrated +3.3V level converter for USB I/O.
- True 3.3V CMOS drive output and TTL input; operates down to 1V8 with external pull ups. Tolerant of 5V input
- Configurable I/O pin output drive strength; 4 mA (min) and 16 mA (max).
- Integrated power-on-reset circuit.
- Fully integrated AVCC supply filtering - no external filtering required.
- UART signal inversion option.
- + 5V Single Supply Operation.
- Internal 3V3/1V8 LDO regulators
- Low operating and USB suspend current; 8mA (active-typ) and 70uA (suspend-typ).
- UHCI/OHCI/EHCI host controller compatible.
- USB 2.0 Full Speed compatible.
- Extended operating temperature range; -40 to 85°C.
- Available in compact Pb-free 16 pin SSOP and 16 pin QFN packages (both RoHS compliant).

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