

Picking Parts and Reading Datasheets

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APIs to Electrons – 2014.09.04

Welcome!

- APIs to Electrons
- Foundation
- Parts and data sheets 101
- Q&A (feel free to interrupt)

APIs to Electrons

- Meetup for anyone interested in the span
- Organized by Technical Machine
 - Obligatory mention of Tessel, a Node.js-compatible microcontroller with WiFi built in
- Next event: 2014.09.11 - open hack night

Foundation

- Voltage: electric potential difference between two points
- Current: flow of electric charge through a component
- Resistor: component that resists current flow
- Capacitor: component that stores electric charge
- Inductor: component that resists changes in current flow
- Impedance: magnitude of resistance to current flow
- Transistor: electrically controlled switch, current source
- Integrated circuit: many transistors, one piece of silicon

When part-hunting, think about

- What you're trying to build
- The subsystems that go into it
- Functional requirements
- What you don't care about
- What you don't know

At a high level

- Play to your resources' strengths
 - Discovery, learning, and selection
- Go back to the functional requirements. If they don't point to an answer, edit them.
- In the end, pick something that works for what you want to get out of the project

Search far and wide to find *what*

- Google, Wikipedia
 - What are things called and how do they work?
- Adafruit/Sparkfun
 - What are people actually using?
 - Library on GitHub? You may be done!

Narrow down for which

- Manufacturer's web sites
 - What's cutting edge? What exists in the world?
- Distributors, aggregators
 - What can I buy and where? How expensive is it?
 - Digi-Key, Newark, Mouser, Findchips, Octopart

Once you have *some idea*

Digi-Key Product Index

- [CTRL] + [F]
- Click any sub-category that looks like it might be relevant, then play with the filters
- Google/Wiki for unfamiliar terms

The screenshot shows the Digi-Key website's search interface. At the top, there is a search bar with the placeholder "Keywords: ?" and a magnifying glass icon. Below the search bar are three filter checkboxes: "In stock", "Lead free", and "RoHS Compliant". A "Search Again" button is located just below the filters. To the right of the search area, there are social media links for Facebook, Twitter, LinkedIn, YouTube, and Google+. The main content area is titled "Electronic Components" and lists several sub-categories with their respective item counts:

- Audio Products
 - [Accessories](#) (272 items)
 - [Buzzer Elements, Piezo Benders](#) (89 items)
 - [Buzzers](#) (2303 items)
 - [Microphones](#) (1082 items)
 - [Sirens](#) (94 items)
 - [Speakers](#) (1085 items)
- Battery Products
 - [Accessories](#) (40 items)
 - [Batteries Non-Rechargeable \(Primary\)](#) (385 items)
 - [Batteries Rechargeable \(Secondary\)](#) (570 items)
 - [Battery Chargers](#) (113 items)
 - [Battery Holders, Clips, Contacts](#) (1219 items)
 - [Battery Packs](#) (2620 items)
 - [Cigarette Lighter Assemblies](#) (59 items)
- Boxes, Enclosures, Racks
 - [Backplanes](#) (78 items)
 - [Box Accessories](#) (1281 items)
 - [Box Components](#) (2136 items)
 - [Boxes](#) (9236 items)
 - [Card Guide Accessories](#) (292 items)

Narrow to a category

- Capacitors

- [Accessories](#) (199 items)
- [Aluminum - Polymer Capacitors](#) (5846 items)
- [Aluminum Capacitors](#) (77769 items)
- [Capacitor Arrays](#) (2157 items)
- [Ceramic Capacitors](#) (165645 items)
- [Electric Double Layer Capacitors, Supercaps](#) (762 items)
- [Film Capacitors](#) (20911 items)
- [Mica and PTFE Capacitors](#) (3951 items)
- [Niobium Oxide Capacitors](#) (489 items)
- [Silicon Capacitors](#) (321 items)
- [Tantalum - Polymer Capacitors](#) (3376 items)
- [Tantalum Capacitors](#) (54568 items)
- [Thin Film Capacitors](#) (2242 items)
- [Trimmers, Variable Capacitors](#) (593 items)

Protip: you can spend days reading about something as "simple" as capacitors. Hit Wikipedia hard and fast, then get out.

Hint: in this case, the answer is probably either "ceramic" or "aluminum".

Inside a subcategory

Filters/
parameters

[Product Index > Sensors, Transducers > Accelerometers](#)

Results matching criteria: 361

To select multiple values within a box, hold down 'Ctrl' while selecting values within the box.

Manufacturer	Series	Axis	Acceleration Range	Sensitivity	Voltage - Supply	Output Type	Bandwidth	Interface	Mounting Type
Analog Devices Inc									
Bosch Sensortec									
Freescale Semiconductor	605		Six Axis (3D)	$\pm 2g, 4g, 8g$	$0.05mV/g$	1.2V ~ 3.6V			
Kionix Inc	805M1	X	$\pm 12g$	$0.06mV/digit, 0.12mg/digit, 0.18mg/digit, 0.24mg/digit, 0.73mg/digit$	1.62V ~ 3.6V	Analog	$0.5Hz - 2.5kHz$ Selectable	Analog	Adhesive Mount
Measurement Specialties Inc.	832	X or Y	$\pm 1.5g$	$0.081mV/LSB, 0.122mV/LSB, 0.244mV/LSB$	1.62V ~ 3.6V	Digital	$0.5Hz - 250Hz$ Selectable	Analog and Digital	Chassis Mount
Memsic Inc	832M1	X, Y, Z	$\pm 1.5g, 3g, 6g, 12g$	$0.08mV/g$	1.7V ~ 2.75V	IC	$1Hz - 5.3kHz$ Selectable	CAN, I ϕ C, SPI, UART/USART, USB	Connector
Murata Electronics North America	834	Y	$\pm 17g$	$0.2mV/g$	1.7V ~ 3.6V	SPI	$3.125Hz - 1.6kHz$ Selectable	Digital	Surface Mount
Parallax Inc	834M1	Y, Z	$\pm 100g$	$0.25mV/LSB$	1.71V ~ 1.89V	PWM	$6.25Hz - 3.2kHz$ Selectable	IC	Through Hole
STMicroelectronics	ADXL193	Z	$\pm 10g$	$0.4mV/g$	1.8V ~ 3.5V	Voltage	$8Hz - 8Hz \sim 1kHz$	I ϕ C	
			$\pm 112.5g, 56.3g$	$0.62mV/g$	1.8V ~ 3.6V		$10Hz$	I ϕ C, SPI	
								Parallel	

In stock
 Lead free
 RoHS Compliant

Quantity

To see real-time pricing, click either the Digi-Key part number or unit price link.

Enter the quantity that you are interested in and press submit. The unit price for the quantity will display for all products in the table. Any products that cannot be purchased at the entered quantity due to minimum order quantities will be pushed to the bottom of the results.

Quantity

Results per Page | 25 | Page 1/15 (1 2 3 4 5 6 7 8 9 10 ... Last Next)

Results
table

Compare Parts		Image	Digi-Key Part Number	Manufacturer Part Number	Manufacturer	Description	Quantity Available	Unit Price USD	Minimum Quantity	Series	Axis	Acceleration Range	Sensitivity	Voltage - Supply	Output Type	Bandwidth	Interface	Mounting Type	Package / Case	Supplier Device Package
<input type="checkbox"/>			1191-1000-2ND	KXTF9-2050	Kionix Inc	IC ACCELEROMETER TRI-AXIS 10-LGA	1 - Immediate	2.46050	4.000	KXTF9	X, Y, Z	$\pm 2g, 4g, 8g$	$64count/g, 32count/g, 16count/g (8bit), 1024count/g, 512count/g, 256count/g (12bit)$	1.8V ~ 3.6V	I ϕ C	25Hz	I ϕ C	Surface Mount	10-VFLGA (3x3)	
<input type="checkbox"/>			28526PAR-ND	28526	Parallax Inc	MMA7455 3-AXIS ACCEL MODULE	1 - Immediate	29.99000	1	-	X, Y, Z	$\pm 2g, 4g, 8g$	$64count/g, 32count/g, 16count/g$	$2.5V \sim 5.5V$	I ϕ C, SPI	250Hz	I ϕ C, SPI	Through Hole	8-DIP Module	
<input type="checkbox"/>			356-1125-ND	3038-2000	Measurement Specialties Inc.	SENS ACCLRMTR PIEZO SEAL 2000G	2+ Immediate	156.60000	1	-	-	$\pm 2000g$	$0.08mV/g$	5VDC	Analog	4.5kHz	-	Surface Mount	8-LCC	Hermetic LCC
<input type="checkbox"/>			356-1101-ND	834-6000	Measurement Specialties Inc.	SENS ACCLRMTR 3-AXIS 6000G	2- Immediate	130.15000	1	834	X, Y, Z	$\pm 6000g$	$0.2mV/g$	3V ~ 5.5V	-	2kHz	-	Surface Mount	5-SMD, No Lead	SMD

Parametric search

[Product Index](#) > [Sensors, Transducers](#) > Accelerometers

Results matching criteria: 1,063

To select multiple values within a box, hold down 'Ctrl' while selecting values within the box.

Manufacturer	Series	Axis	Acceleration Range	Sensitivity	Voltage - Supply
Analog Devices Inc	*	-	*	-39dB ±4.5dB	-4.75 V ~ -5.25 V
Bosch Sensortec	-	One	± 1g, 1.5g, 2g, 3g, 4g, 8g, 16g	*	1.2 V ~ 3.6 V
Digi International	3801A	Six Axis (± 2g, 4g, 8g	-	1.6 V ~ 3.5 V
Epson Electronics America Inc-Sen	4000	Two	±0.5g	Vdd/24 V/g, Vdd/6 V/g	1.62 V ~ 1.98 V
Freescale Semiconductor	805	X	±1.2g	Vdd/5 V/g	1.62 V ~ 3.6 V
Kionix Inc	805M1	X or Y	±1.5, 6g	Vdd/5, Vdd/15 = V/g	1.7 V ~ 2.75 V
Knowles	832	X, Y	±1.5g	0.05mV/g	1.7 V ~ 3.6 V
Measurement Specialties Inc.	832M1	X, Y, Z	±1.5g	0.06mg/digit, 0.12mg/digit, 0.18mg/digit, 0.24mg/digit, 0.73	1.7 V ~ 3.6 V
Memsic Inc	834	X, Z	±1.5g, 2g, 4g, 6g (Config)	0.061mg/LSB, 0.122mg/LSB, 0.244mg/LSB	1.71 V ~ 1.89 V
Murata Electronics North America	834M1	Y	±1.5g, 3g, 6g, 12g	0.08mV/g	1.71 V ~ 3.6 V

In stock
 Lead free
 RoHS Compliant

Think back to your requirements

- Supply range, IO type, through-hole vs. SMT
- Lead free, RoHS compliance
- Part-specific attributes
 - Speed, precision, interfaces, package, technology, power rating
- Cost

Digi-Key-fu

- Apply constraints in small batches
- Quantity 1 vs. quantity X for pricing
- The *Package* categories are usually a trap
- *Customer Reference* field
- If at first you don't succeed...
...open a new tab and try again

What you should select for

- Microcontrollers
 - Core technology
 - IO/connectivity
 - Manufacturer
- Sensors
 - Supply range
 - Output type
 - Sensitivity/precision
- Analog things
 - Supply range
 - Bandwidth
 - Precision/offset/drift
- Everything else
 - Technology/type
 - Supply range
 - Power rating

Example - accelerometer

System requirements

- 3.3 V
- RoHS, lead free
- SPI, I²C
- SMT

Part requirements

- 3-axis
- Bandwidth > 500Hz
- I²C

285 parts

73 parts

For example

MMA8452Q

Digi-Key CORPORATION

PARTS ▾

PRODUCTS | SUPPLIERS | RESOURCES ▾ | LIVE CHAT

Keywords:

In stock
 Lead free
 RoHS Compliant

CATALOG

Product Index > Sensors, Transducers > Accelerometers > MMA8452QR1

All prices are in US dollars.				
Digi-Key Part Number	MMA8452QR1CT-ND	Price Break	Unit Price	Extended Price
Quantity Available	Digi-Key Stock: 5,297 Can ship immediately	1	1.43000	1.43
	Factory Stock ? - 3,258,000	10	1.27500	12.75
Manufacturer	Freescale Semiconductor	25	1.19840	29.98
Manufacturer Part Number	MMA8452QR1	100	1.14750	114.75
Description	IC ACCELER 2G/4G/8G 3AXIS 16QFN	250	1.09652	274.13
Lead Free Status / RoHS Status	Lead free / RoHS Compliant	500	1.02000	510.00

Quantity Item Number [?](#) Customer Reference

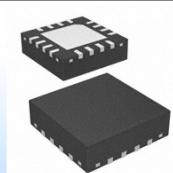


Image shown is a representation only.
Exact specifications should be obtained from the product data sheet.

When requested quantity exceeds displayed pricing table quantities, a lesser unit price may appear on your order.
You may submit a [request for quotation](#) on quantities which are greater than those displayed in the pricing table.

Datasheets	MMA8452Q
Product Photos	16-QVDFN
Product Training Modules	MMA845x Digital Accelerometer Family
PCN Assembly/Origin	Qualification Lead Frame Supplier 06/May/2014
PCN Other	MMA8451.2 3x Solderability Risk 31/Aug/2013
Standard Package ?	1
Category	Sensors, Transducers
Family	Accelerometers
Series	MMA
Axis	X, Y, Z
Acceleration Range	±2g, 4g, 8g
Sensitivity	1024 count/g, 512 count/g, 256 count/g
Voltage - Supply	1.95 V ~ 3.6 V

Alternate Package
This part is also available in the following packaging:

Digi-Key Part Number	Manufacturer Part Number	Packaging	Quantity Available	Unit Price	Minimum Quantity
MMA8452QT-ND	MMA8452QT	Tray ?	6,054 - Immediate 34,300 - Factory Stock ?	1.31000	1
MMA8452QR1TR-ND	MMA8452QR1	Tape & Reel (TR) ?	4,000 - Immediate 3,258,000 - Factory Stock ?	0.94900	1,000
MMA8452QR1DKR-ND	MMA8452QR1	Digi-Reel® ?	5,297 - Immediate 3,258,000 - Factory Stock ?	Calculate	1

Tape & Reel, Cut Tape and Digi-Reels are all derived from the same manufacturer's part number. Inventory from Tape & Reel is used to fulfill Cut Tape and Digi-Reel orders and will impact the total quantity available.

Anatomy of a Digi-Key page

Part information

Digi-Key Part Number		MMA8452QR1CT-ND	Price Break	Unit Price	Extended Price
Quantity Available		Digi-Key Stock: 5,297 Can ship immediately	1	1.43000	1.43
		Factory Stock ? : 3,258,000	10	1.27500	12.75
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Lead Free Status / RoHS Status		Lead free / RoHS Compliant	500	1.02000	510.00

All prices are in US Dollars.

Quantity Item Number Customer Reference

MMA8452QR1CT-ND

When requested quantity exceeds displayed pricing table quantities, a lesser unit price may appear on your order.
You may submit a [request for quotation](#) on quantities which are greater than those displayed in the pricing table.

Datasheets [MMA8452Q](#)
Product Photos [18-VDFN](#)
Product Training Modules [MMA845xQ Digital Accelerometer Family](#)
PCN Assembly/Origin Qualification Lead Frame Supplier 06/May/2014
PCN Other MMA8451.2,3x Solderability Risk 31/Aug/2013
Standard Package [?](#) 1
Category [Sensors, Transducers](#)
Family [Accelerometers](#)
Series MMA
Axis X, Y, Z
Acceleration Range $\pm 2g$, 4g, 8g
Sensitivity 1024 count/g, 512 count/g, 256 count/g
Voltage - Supply 1.95 V ~ 3.6 V

Image shown is a representation only.
Exact specifications should be obtained from the product data sheet.

Digi-Key Part Number	Manufacturer Part Number	Packaging
MMA8452QT-ND	MMA8452QT	Tape ? 3.40
MMA8452QR1TR-ND	MMA8452QR1	Tape & Reel (TR) ? 3.25
MMA8452QR1DKR-ND	MMA8452QR1	Digi-Reel® ? 3.25

Tape & Reel, Cut Tape and Digi-Reels are all derived from the same manufacturer used to fulfill Cut Tape and Digi-Reel orders and will impact the total quantity available.

Datasheet link

Package CAD (approximate)

Specs at a glance

Pricing information

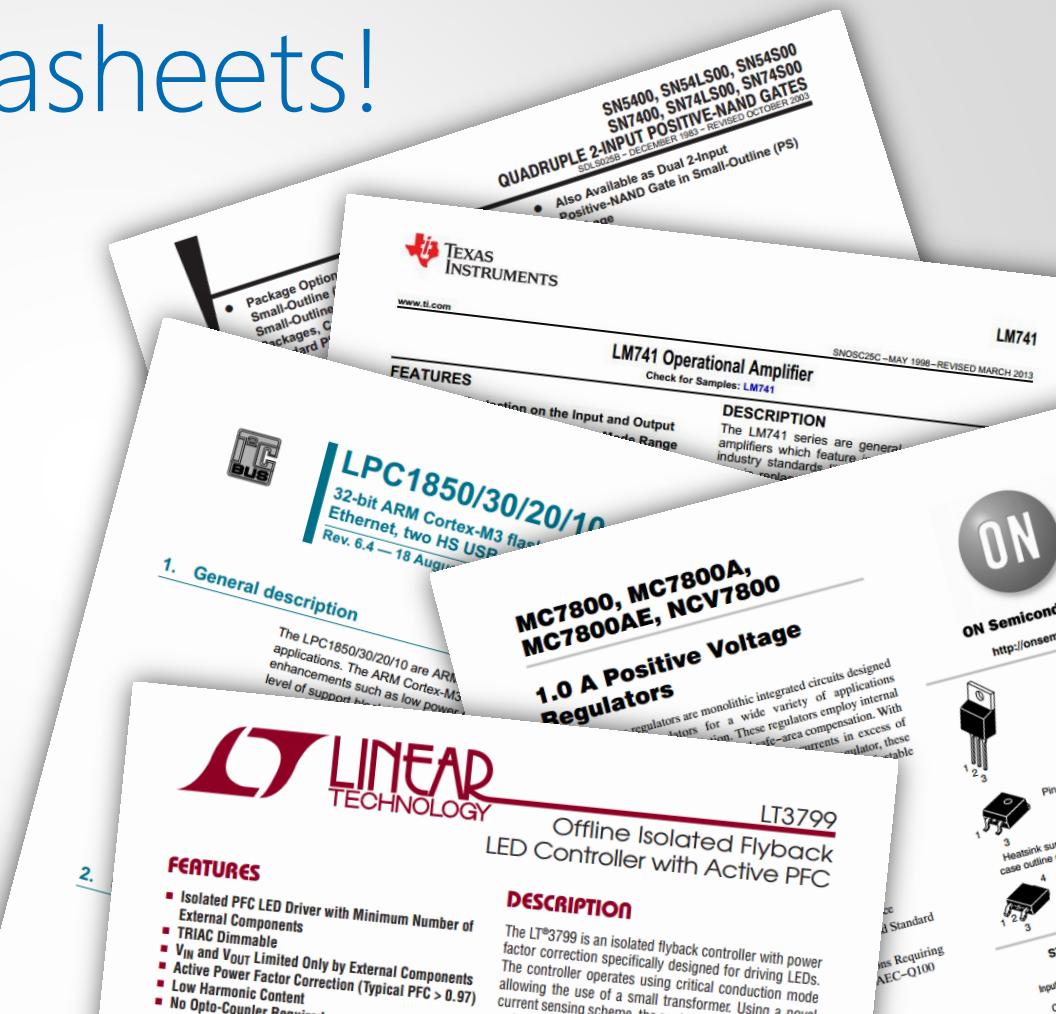
Alternate availability

...but wait! RTFM!

- Skim the product page
- Read the datasheet
- Manufacturers' web sites also have user manuals, application notes, errata, and evaluation boards

Datasheets!

- Reading them is a core part of the spec'ing process
- Information-dense
- Compared to good API docs...they suck



What's in a datasheet?

- Who makes the part
- What it's supposed to do
- All of the “good” specs
- What it expects (power, communication, etc.)
- Part numbering guide

First pass

- Is this even the right kind of part?
- Do all the important facts line up?
 - Power
 - IO/communication
 - Ratings, precision, etc.

 TEXAS INSTRUMENTS



ADS1294, ADS1294R
ADS1296, ADS1296R
ADS1298, ADS1298R

SBAS459J – JANUARY 2010 – REVISED JANUARY 2014

Low-Power, 8-Channel, 24-Bit Analog Front-End for Biopotential Measurements

Check for Samples: [ADS1294](#), [ADS1294R](#), [ADS1296](#), [ADS1296R](#), [ADS1298](#), [ADS1298R](#)

FEATURES

- Eight Low-Noise PGAs and Eight High-Resolution ADCs (ADS1298, ADS1298R)
- Low Power: 0.75mW/channel
- Input-Referred Noise: 4 μ V_{PP} (150Hz BW, G = 6)
- Input Bias Current: 200pA
- Data Rate: 250SPS to 32kSPS
- CMRR: -115dB
- Programmable Gain: 1, 2, 3, 4, 6, 8, or 12
- Supports AAMI EC11, EC13, IEC60601-1, IEC60601-2-27, and IEC60601-2-51 Standards
- Unipolar or Bipolar Supplies:
AVDD = 2.7V to 5.25V, DVDD = 1.65V to 3.6V
- Built-In Right Leg Drive Amplifier, Lead-Off Detection, WCT, PACE Detection, Test Signals
- Integrated Respiration Impedance Measurement (ADS1294R/6R/8R only)
- Digital PACE Detection Capability
- Built-In Oscillator and Reference
- Flexible Power-Down, Standby Modes
- SPI™-Compatible Serial Interface
- Operating Temperature Range: -40°C to +85°C

With its high levels of integration and exceptional performance, the ADS1294/6/8/4R/6R/8R family enables the development of scalable medical instrumentation systems at significantly reduced size, power, and overall cost.

The ADS1294/6/8/4R/6R/8R have a flexible input multiplexer per channel that can be independently connected to the internally-generated signals for test, temperature, and lead-off detection. Additionally, any configuration of input channels can be selected for derivation of the right leg drive (RLD) output signal. The ADS1294/6/8/4R/6R/8R operate at data rates as high as 32kSPS, thereby allowing the implementation of software PACE detection. Lead-off detection can be implemented internal to the device, either with a pull-up/pull-down resistor or an excitation current sink/source. Three integrated amplifiers generate the Wilson Central Terminal (WCT) and the Goldberger Central Terminals (GCT) required for a standard 12-lead ECG. The ADS1294R/6R/8R versions include a fully-integrated, respiration impedance measurement function.

Multiple ADS1294/6/8/4R/6R/8R devices can be cascaded in high channel count systems in a daisy-chain configuration.

Package options include a tiny 8mm × 8mm, 64-ball BGA and a TQFP-64. The ADS1294/6/8 BGA version is specified over the commercial temperature range of 0°C to +70°C. The ADS1294R/6R/8R BGA and ADS1294/6/8 TQFP versions are specified over the industrial temperature range of -40°C to +85°C.



APPLICATIONS

- Medical Instrumentation (ECG, EMG and EEG): Patient monitoring; Holter, event, stress, and vital signs including ECG, AED, telemedicine Bispectral index (BIS), Evoked audio potential (EAP), Sleep study monitor

ABSOLUTE MAXIMUM RATINGS

- (1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

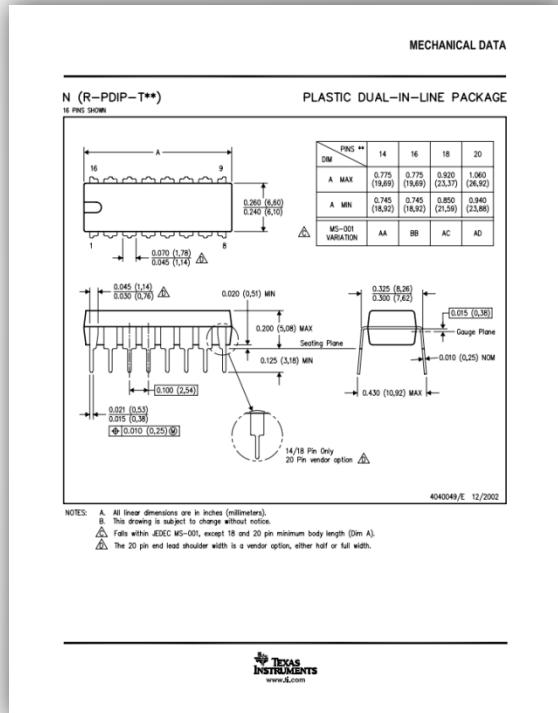
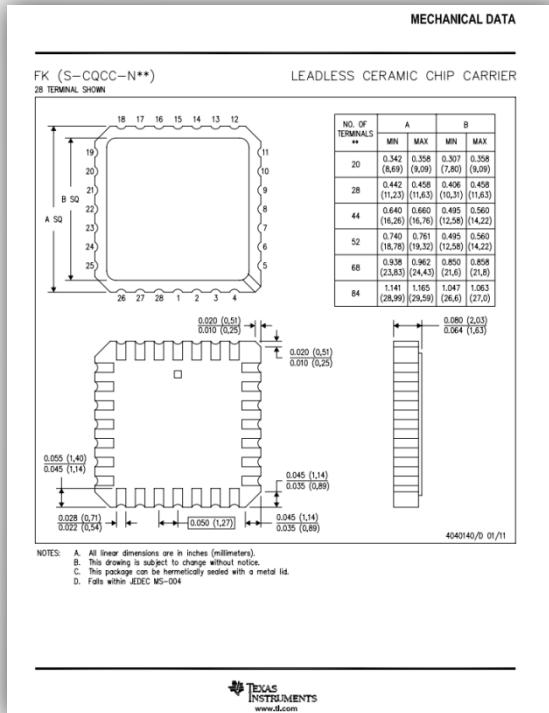
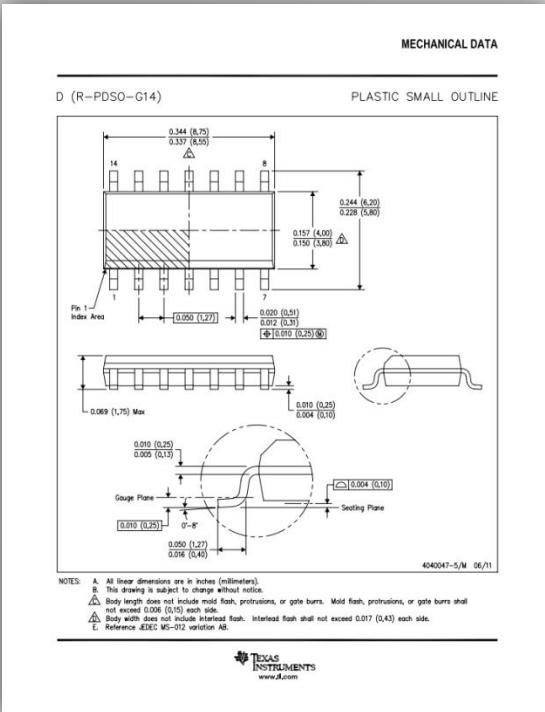
ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Over operating free-air temperature range, unless otherwise noted.

	ADS1294, ADS1296, ADS1298 ADS1294R, ADS1296R, ADS1298R	UNIT
AVDD to AVSS	-0.3 to +5.5	V
DVDD to DGND	-0.3 to +3.9	V
AVSS to DGND	-3 to +0.2	V
V_{REF} input to AVSS	AVSS - 0.3 to AVDD + 0.3	V
Analog input to AVSS	AVSS - 0.3 to AVDD + 0.3	V
Digital input voltage to DGND	-0.3 to DVDD + 0.3	V
Digital output voltage to DGND	-0.3 to DVDD + 0.3	V
Input current (momentary)	100	mA
Input current (continuous)	10	mA
Operating temperature range	Commercial grade: ADS1294, ADS1296, ADS1298 Industrial grade: ADS1294I, ADS1296I, ADS1298I, ADS1294RI, ADS1296RI, ADS1298RI	0 to +70 -40 to +85 °C °C
ESD ratings	Human body model (HBM) JEDEC standard 22, test method A114-C.01, all pins	±2000 V
	Charged device model (CDM) JEDEC standard 22, test method C101, all pins	±500 V
Storage temperature range	-60 to +150	°C
Maximum junction temperature (T_j)	+150	°C

- (1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

Packages



Part number

2. Ordering Information

Product Family
SAMD = General Purpose Microcontroller

Product Series
21 = Cortex M0 + CPU, Basic Feature Set
+ = Cortex + USB

Pin Count
E = 32 Pins
G = 48 Pins
J = 64 Pins

Flash Memory Density
18 = 256KB
17 = 128KB
16 = 64KB
15 = 32KB

Device Variant
A = Default Variant

2.1 SAM D21E

Ordering Code	FLASH (bytes)	SRAM (bytes)	Package	Carrier Type
ATSAMD21E15A-AU	32K	4K	TQFP32	Tray
ATSAMD21E15A-AUT			TQFP32	Tape & Reel
ATSAMD21E15A-MU			QFN32	Tray
ATSAMD21E15A-MUT			QFN32	Tape & Reel
ATSAMD21E16A-AU	64K	8K	TQFP32	Tray
ATSAMD21E16A-AUT			TQFP32	Tape & Reel
ATSAMD21E16A-MU			QFN32	Tray
ATSAMD21E16A-MUT			QFN32	Tape & Reel
ATSAMD21E17A-AU	128K	16K	TQFP32	Tray
ATSAMD21E17A-AUT			TQFP32	Tape & Reel
ATSAMD21E17A-MU			QFN32	Tray
ATSAMD21E17A-MUT			QFN32	Tape & Reel

Atmel | SMART SAM D21 [DATASHEET]
Atmel-42181C-SAM-D21_Datasheet-072014

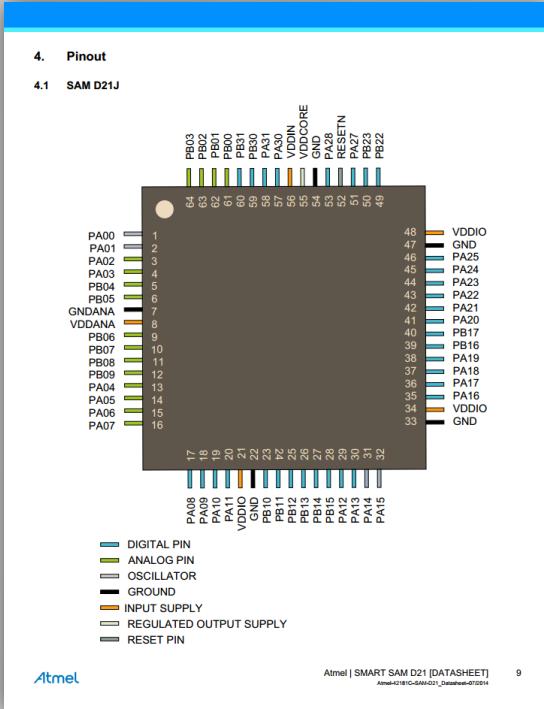
PACKAGE OPTION ADDENDUM

www.ti.com 17-May-2014

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾	Op Temp (°C)	Device Marking ⁽⁴⁾	Samples
SN7414N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN7414N	Samples
SN7414N3	OBsolete	PDIP	N	14	TBD	Call TI	Call TI	0 to 70			Samples
SN7414NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN7414N	Samples
SN7414NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	SN7414	Samples
SN7414NSRE4	ACTIVE	SO	NS	14	TBD	Call TI	Call TI	0 to 70			Samples
SN7414NSRG4	ACTIVE	SO	NS	14	TBD	Call TI	Call TI	0 to 70			Samples
SN74LS14D	ACTIVE	SOIC	D	14	50	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DBR	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DBRE4	ACTIVE	SSOP	DB	14	TBD	Call TI	Call TI	0 to 70			Samples
SN74LS14DBRG4	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	LS14	Samples
SN74LS14N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74LS14N	Samples
SN74LS14N3	OBsolete	PDIP	N	14	TBD	Call TI	Call TI	0 to 70			Samples
SN74LS14NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74LS14N	Samples
SN74LS14NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no PbBr)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	74LS14	Samples

Addendum-Page 2

Pin information



6. I/O Multiplexing and Considerations

6.1 Multiplexed Signals

Each pin is by default controlled by the PORT as a general purpose I/O and alternatively it can be assigned to one of the peripheral functions A, B, C, D, E, F, G or H. To enable a peripheral function on a pin, the Peripheral Multiplexer Enable bit in the Pin Configuration register corresponding to that pin (PINCFG_n.PMUXEN, n = 0-31) in the PORT must be written to one. The selection of peripheral function A to H is done by writing to the Peripheral Multiplexing Odd and Even bits in the Peripheral Multiplexing register (PMUX_n.PMUXE/O) in the PORT.

Table 6-1 on page 11 describes the peripheral signals multiplexed to the PORT I/O pins.

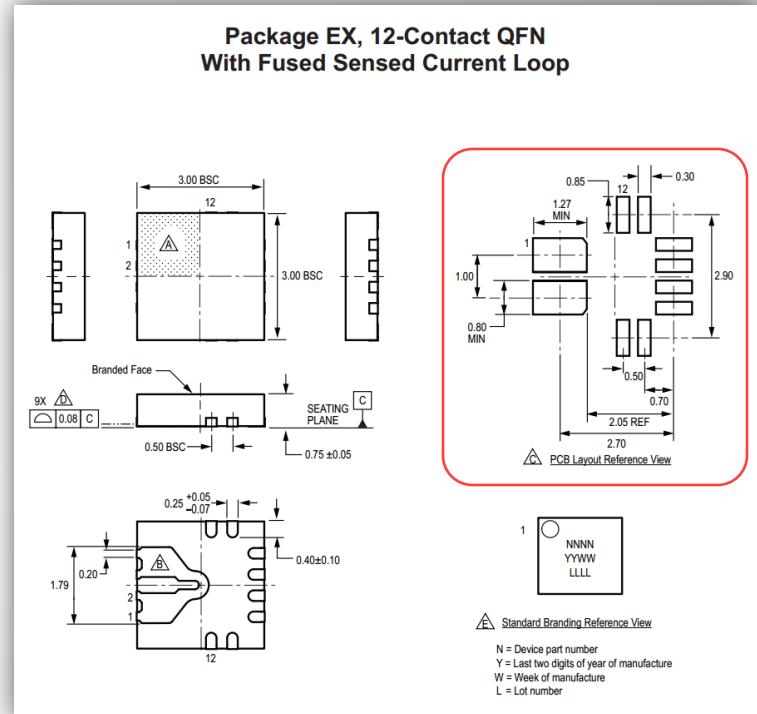
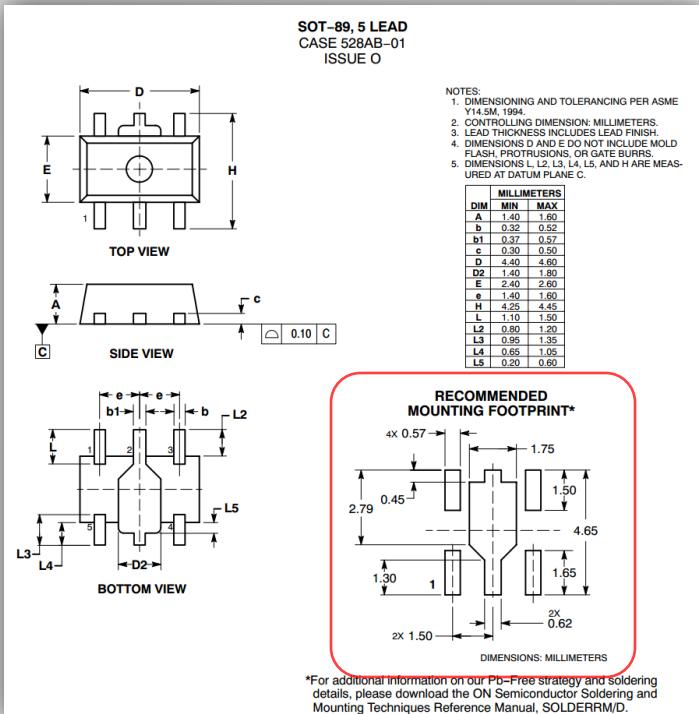
Table 6-1. PORT Function Multiplexing

Pin	I/O Pin	Supply	Type	A				B ⁽¹⁾				C				D		E		F		G		H	
				EIC	REF	ADC	AC	PTC	DAC	SERCOM _n ⁽²⁾	SERCOM _n /ALT	TC _n /TCC	TCC	COM	AC/GCLK										
1	PA00	VDDIO	1	PA00	GND						SERCOM0/PAD[0]	TCC2/WO[0]													
2	PA01	VDDIO	2	PA01	GND						SERCOM1/PAD[1]	TCC2/WO[1]													
3	PA02	VDDIO	3	PA02	GND																				
4	PA03	VDDIO	4	PA03	GND																				
5	PA04	VDDIO	5	PA04	GND																				
6	PA05	VDDIO	6	PA05	GND																				
7	GNDANA	VDDANA	7	GNDANA	VDDANA																				
8	PB06	VDDIO	8	PB06	VDDIO																				
9	PB07	VDDIO	9	PB07	VDDIO																				
10	PB08	VDDIO	10	PB08	VDDIO																				
11	PB09	VDDIO	11	PB09	VDDIO																				
12	PB09	VDDIO	12	PB09	VDDIO																				
13	PB09	VDDIO	13	PB09	VDDIO																				
14	PB09	VDDIO	14	PB09	VDDIO																				
15	PB09	VDDIO	15	PB09	VDDIO																				
16	PB09	VDDIO	16	PB09	VDDIO																				
17	PA06	VDDIO	17	PA06	VDDIO																				
18	PA07	VDDIO	18	PA07	VDDIO																				
19	PA08	VDDIO	19	PA08	VDDIO																				
20	PA09	VDDIO	20	PA09	VDDIO																				
21	PA10	VDDIO	21	PA10	VDDIO																				
22	PA11	VDDIO	22	PA11	VDDIO																				
23	PA12	VDDIO	23	PA12	VDDIO																				
24	PA13	VDDIO	24	PA13	VDDIO																				
25	PA14	VDDIO	25	PA14	VDDIO																				
26	PA15	VDDIO	26	PA15	VDDIO																				
27	PA16	VDDIO	27	PA16	VDDIO																				
28	PA17	VDDIO	28	PA17	VDDIO																				
29	PA18	VDDIO	29	PA18	VDDIO																				
30	PA19	VDDIO	30	PA19	VDDIO																				
31	PA20	VDDIO	31	PA20	VDDIO																				
32	PA21	VDDIO	32	PA21	VDDIO																				
33	PA22	VDDIO	33	PA22	VDDIO																				
34	PA23	VDDIO	34	PA23	VDDIO																				
35	PA24	VDDIO	35	PA24	VDDIO																				
36	PA25	VDDIO	36	PA25	VDDIO																				
37	PA26	VDDIO	37	PA26	VDDIO																				
38	PA27	VDDIO	38	PA27	VDDIO																				
39	PA28	VDDIO	39	PA28	VDDIO																				
40	PA29	VDDIO	40	PA29	VDDIO																				
41	PA30	VDDIO	41	PA30	VDDIO																				
42	PA31	VDDIO	42	PA31	VDDIO																				
43	PA32	VDDIO	43	PA32	VDDIO																				
44	PA33	VDDIO	44	PA33	VDDIO																				
45	PA34	VDDIO	45	PA34	VDDIO																				
46	PA35	VDDIO	46	PA35	VDDIO																				
47	PA36	VDDIO	47	PA36	VDDIO																				
48	PA37	VDDIO	48	PA37	VDDIO																				
49	PA38	VDDIO	49	PA38	VDDIO																				

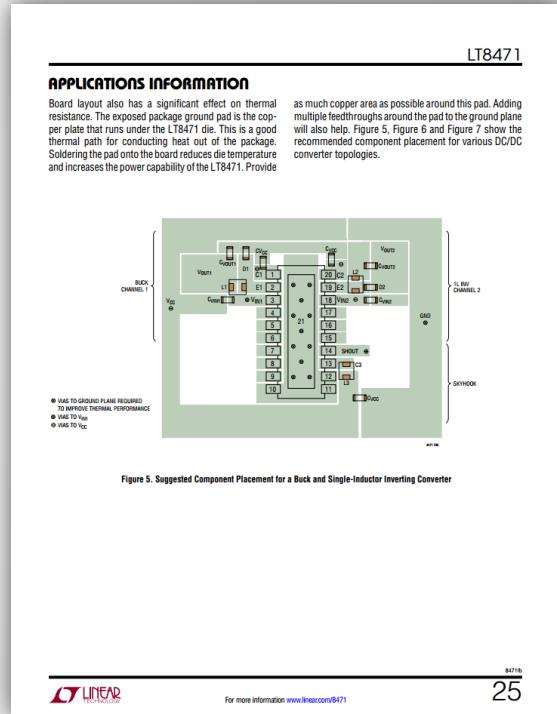
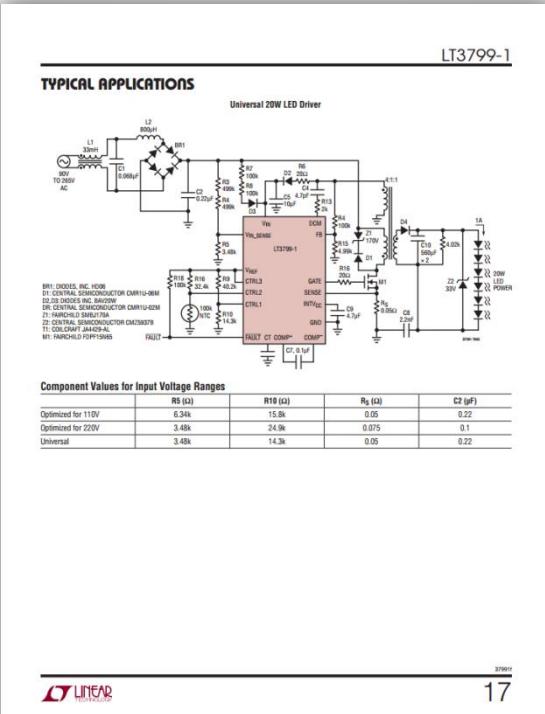
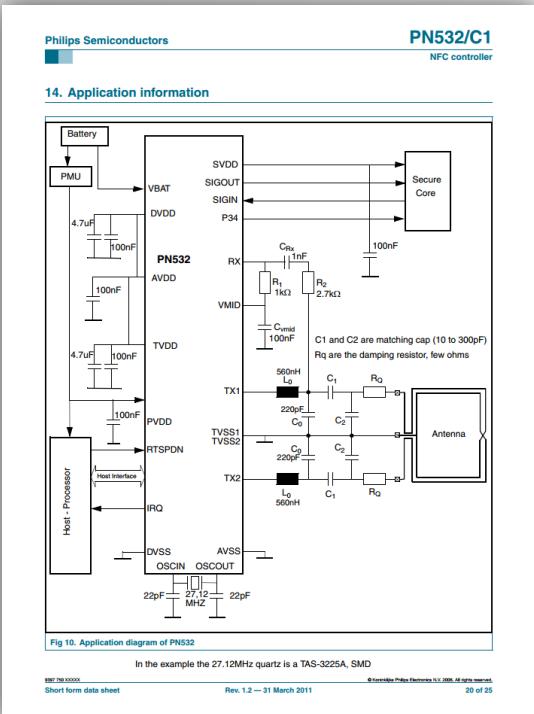
Checklist – nice to have

- Theory of operation
- Pin-compatible alternatives
- Competitors that make the same part

Footprint/land pattern



Reference designs



Errata

ES_LPC1850/30/20/10

Errata sheet LPC1850, LPC1830, LPC1820, LPC1810

Rev. 6.2 — 14 August 2014

Errata sheet

Document information

Info

Content

LPC1850FET286; LPC1850FET180; LPC1850FET1286;
LPC1830FET180; LPC1830FET100; LPC1830FB144;
LPC1820FET100; LPC1820FB144; LPC1810FET100;
LPC1810FB144; Cortex-A3 flashless, Rev. A, C errata

Abstract

This errata sheet describes both the known functional problems and any deviations from the electrical specifications known at the release date of this document. Each deviation is assigned a number and its history is tracked in a table.



PRODUCT BULLETIN
Generic Copy

ISSUE DATE:	20-Feb-2013
NOTIFICATION:	15484
TITLE:	VEYRON M00Z RE-DESIGN FOR STICKTION
EFFECTIVE DATE:	21-Feb-2013

DEVICE(S)

MPN
MMA8451QR1
MMA8451QT
MMA8452QR1
MMA8452QT
MMA8453QR1
MMA8453QT

AFFECTED CHANGE CATEGORIES

- MASK SET REV (SAME FAB SITE)

DESCRIPTION OF CHANGE

Freescale is pleased to announce the qualification of a gcell design improvement for the production of the 3-axis accelerometer products listed on this notice. This change is part of Freescale's ongoing effort to continually improve quality and reliability.

The Si7005 should not be on the same bus as other I²C devices when it is active. It acknowledges data bytes that match its address. This issue has been resolved with other members of the Si70xx family

This change is to insure ongoing supply as well as quality of supply.

ANTICIPATED IMPACT OF PRODUCT CHANGE (FORM, FIT, FUNCTION, OR RELIABILITY)

There is no change to form, fit, function, or reliability.



Errata

SWR2044B—November 2012—Revised May 2013

Errata to TI SimpleLink™ CC3000 Module – Wi-Fi 802.11b/g Network Processor

This document is an errata to the *TI SimpleLink CC3000 Module – Wi-Fi 802.11b/g Network Processor Data Sheet (SWRS126)*.
For conflicts between SWRS126 and this document, this document shall prevail.

1 Hardware Errata

1.1 Recommended Operating Conditions for VBAT_IN

Description

This errata item applies to the recommended operating conditions for VBAT_IN. The current range is 2.7 to 3.6 V until the specified maximum of 4.8 V is qualified.

SWR2044B—November 2012—Revised May 2013
Submit Documentation Feedback

Errata to TI SimpleLink™ CC3000 Module – Wi-Fi 802.11b/g Network Processor
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1

Free samples



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LT3799EMSE-1#PBF	Isolated Flyback LED Controller with Active PFC	MSOP	16	<input type="button" value="1"/> <input type="button" value="+"/>	<input type="button" value="Add to Cart"/>
LT3799IMSE#PBF	Isolated Flyback LED Controller with Active PFC	MSOP	16	<input type="button" value="1"/> <input type="button" value="+"/>	<input type="button" value="Add to Cart"/>
LT3799IMSE-1#PBF	Isolated Flyback LED Controller with Active PFC	MSOP	16	<input type="button" value="1"/> <input type="button" value="+"/>	<input type="button" value="Add to Cart"/>

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Evaluation boards

ADA4700-1 EVALUATION BOARD						Print Table
Model	Description	Price	RoHS	View PCN/PDN	Check Inventory/Purchase/Sample	
EVALPRAHVOPAMP-1RZ Status: Production	Evaluation Board for 8 lead High-Voltage Op Amps	\$27.00	Yes	-	<input type="checkbox"/>	Check Inventory & Purchase

Pricing displayed is based on 1-piece. The USA list pricing shown is for budgetary use only, shown in United States dollars (FOB USA per unit), and is subject to change. International prices may vary due to local duties, taxes, fees and exchange rates.

[» View Sales and Distribution Offices](#)

Needles in haystacks / "meh"

- All those graphs
 - ~3/48 will be useful
- All those register configurations
- All those sleep modes, timing parameters
- Protocol definitions/interpretations/caveats

After you pick your part

- Save all the documentation you can find
- Verify that the part will behave as intended
 - Read the remaining docs as needed
 - Simulate, write test code, build a prototype
- Put it into your schematic
- Seek 2,3 alternatives, but know when to quit

Thanks!

Questions?

e@technical.io

@twiddlee
ekolker

APPENDICES

Featured parts/datasheets

- CC3000
- LPC1830
- LM741
- 7805
- LT3799
- Si7005
- PN532
- 74LS00
- LT8471
- ACS711
- NCP694
- SAMD21
- ADS1298
- MMA8452q
- ADA4700

The big names

Analog Devices

Linear Technology

ON Semiconductor

Texas Instruments

Diodes Inc.

International Rectifier

Atmel

TI

NXP

Microchip

Freescale

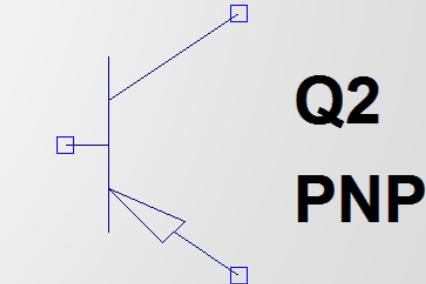
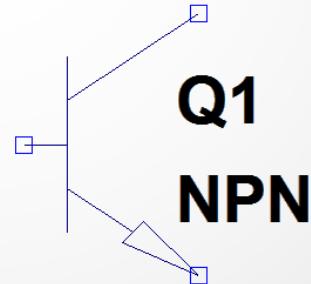
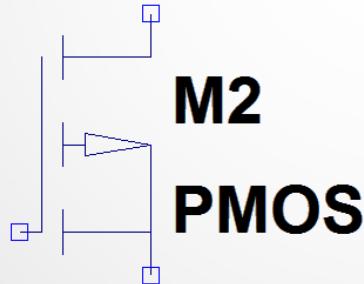
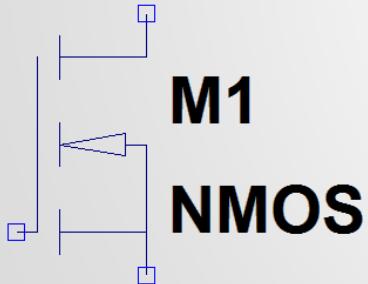
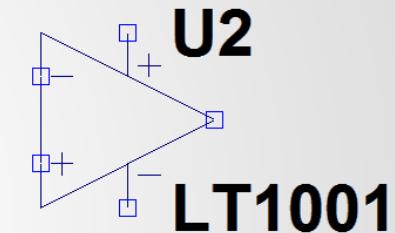
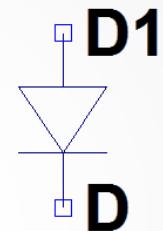
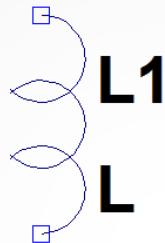
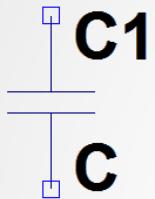
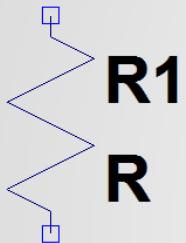
Maxim

Fairchild

Xilinx

Altera

Symbols



Defaults/fallbacks

- LM741 <3
- TL081/2/4
- OPA551
- 2n7000
- 7805
- 555
- ATTiny
- TIP120