



power



 **FEATURING** High Performance Portfolio

# Power Management Products

## Wireless Charging

- Single controller, multiple standards
- Medium & High power
- Low power
- Flexible, firmware based

## Neo-Iso Isolated Power

- Small form factor
- Silent operation
- Fast switching times
- Ideal relay replacement

## DC-DC Converters

- Buck & boost
- High efficiency
- Fast response
- Smallest footprint

## LDOs

- Ultra-low Iq
- Low voltage

## LED Drivers

- High efficiency
- Low noise
- Advanced dimming
- Ultra-thin solution

## Load Switches

- Ultra-low RDS ON
- Tiny footprint
- Robust protection

# Greener • Smarter • Brighter • Smaller

An established leader in power management ICs across networking and industrial power, handheld power and LED lighting applications, Semtech is pushing performance to higher levels in our quest to enable a new class of greener, smarter and smaller end products.

## WIRELESS CHARGING SOLUTIONS

Semtech offers wireless power transmitter and receiver platforms for applications 0.1W to 20W. Semtech offers both standard and proprietary protocols. Some solutions target small form factors, while others target aftermarket infrastructure applications with a broad range of supported receivers, including smartphone fast charging.

## NEO-ISO™ ISOLATED LOAD SWITCHES

Semtech Neo-Iso™ technology is a solid state relay family that enhances Internet of Things (IoT) applications by adding higher levels of intelligence and control. Neo-Iso switches make it possible for low power microcontrollers to control higher power loads in the system. Reporting of fault conditions from the switch to the controller enables system responses resulting in safer, more efficient operation. Low current draw allows each switch to operate off of power harvested from the load, eliminating the need for additional supplies.

## ECOSPEED® AND FEMTOBUCK™ BUCK CONVERTERS

With one of the industry's broadest selections of buck converters, Semtech also offers some of the world's smallest, high-performance point-of-load (POL) regulators. These include our family of EcoSpeed® converters that set a new standard for efficiency, speed, size and simplicity in emerging green energy applications.

## BOOST CONVERTERS

Semtech's expanded line of boost converters now includes the world's smallest low-voltage regulators targeted at (IoT) and LoRa applications, as well as a growing line of single and multi-string boost LED drivers for demanding, rugged backlighting applications.

## NANOSMART™ LDOs

A wide range of ultra-low dropout regulators offers ideal solutions for systems where VOUT is very close to VIN.

## ECOBRITE™ LED DRIVERS

Semtech manufactures an extensive line of LED driver ICs for LCD display, automotive, backlight and LED camera flash applications. These include inductor-based boost LED drivers for series-connected LEDs, and charge pump LED drivers including low-dropout current sinks for parallel-connected LEDs. Each LED Driver topology is designed for optimal high efficiency in the smallest footprint with accurate current regulation, low noise, and a wide dimming range.

## FEMTOSWITCH™ LOAD SWITCHES

Semtech's new Load Switch products focus on lowest RDS ON in class for highest system efficiency, and extremely robust protection to withstand the harshest circuit conditions.

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 NEW  
PRODUCT

# Wireless Charging Solutions

Semtech offers wireless power transmitter and receiver platforms for applications 0.1W to 20W. Semtech offers both standard and proprietary protocols. Some solutions target small form factors, while others target aftermarket infrastructure applications with a broad range of supported receivers, including smartphone fast charging.

## FEATURES & BENEFITS

- Firmware-based and programmable
  - Customizable to meet any application requirement
  - Firmware is upgradable to support evolving standards
- Support multiple system configurations
  - Multiple supply voltages and coil configurations with the same architecture
  - Supports custom receiver and transmitter coil sizes and inductance values
- Support for medium and high power Tx and Rx solutions
  - 10W and 15W for tablets, 20W for notebooks, 40W for high power apps
  - Supports indirect (constant voltage) and direct battery charging
- Support for low power (0.1W -2W) Tx and Rx solutions
  - Both standard and proprietary solutions
  - Direct charging of batteries at <50mAh

## LinkCharge™ Standards Compatibility

Power Level	Standard	LinkCharge™ LP	LinkCharge™ 5	LinkCharge™ 20	LinkCharge™ 40
2 W	<b>Semtech Proprietary</b>	✓	—	—	—
5 W	Qi 5 W	—	✓	✓	✓
7.5 W	Apple Fast Charge	—	—	✓	✓
9 W	Samsung Fast Charge	—	—	✓	✓
15 W	Qi 15 W	—	—	✓	✓
20 W	<b>Semtech Proprietary</b>	—	—	✓	✓
40 W	<b>Semtech Proprietary</b>	—	—	—	✓
Product Order Code Transmitter EVM's		TSWITX-G4-EVM	TSDMTX-19V3-EVM	TSDMTX-19V3-EVM	LKCH-TXRX40W-EVB
		TSWITX-5V-2RX-EVM			
Product Order Code Receiver EVM's		TSWIRX-5V2-EVM	TSDMRX-5W-EVM	TSDMRX-19V-20W-EVM	
		TSWIRX-LI2-EVM			

# Wireless Charging Evaluation Boards



Wireless Charging Evaluation Boards				
Category	Part Number	Description	Chipset	Book Cost
LinkCharge™ 15/20	TSDMTX-19V3-EVM	19V Input WC Transmitter Supports 20W with Semtech TSDMRX-19V-20W-EVM Supports 15W WPC/Qi 1.2 Supports 5W WCP/Qi 1.1 Fast Charge Support for iPhone/Samsung/LG	TS80003-QFNR TS30011-M000QNFR TS61002-QNFR TS94033SKTRC	\$120
LinkCharge™ 15/20	TSDMRX-19V-20W-EVM	20W Output WC Receiver 19V/1.1A max output Supports 15W WPC/Qi 1.2 Supports 20W with TSDMTX-19V3-EVM	TS81000-QNFR TS31223-QNFR TS30042-M000QFNR TS94033SKTRC	\$160
LinkCharge™ 5	TSDMRX-5W-EVM	5W Output WC Receiver 5V/1A max output Supports 5W WPC/Qi 1.1	TS81000-QNFR TS51111-M22WCSR	\$120
LinkCharge™ LP	TSWITX-G4-EVM	5V Input Low Power WC Transmitter 1.25W (5V/250mA) Output Power Proprietary communication protocol Compatible with TSWIRX-5V2-EVM & TSWIRX-LI2-EVM	TS80002-QFNR TS51231-QFNR	\$70
	TSWITX-5V-2RX-EVM	Multi-Receiver Low Power WC Transmitter 5V Input, ~1W Output power Can simultaneously support 2 receivers at 100mA/each Proprietary communication protocol Compatible with TSWIRX-5V2-EVM & TSWIRX-LI2-EVM	TS80002-QFNR TS61005-QFNR	\$180
	TSWIRX-LI2-EVM	Direct Battery Charge Low Power WC Receiver 250mA max. charge current Output voltage regulated between 3.3V to Vterm (4.2V typ.) Connects directly to single cell Li-Ion battery Proprietary communication protocol Compatible with TSWITX-G4-EVM & TSWITX-5V-2RX-EVM	TS51224-QFNR	\$70
	TSWIRX-5V2-EVM	Constant Output Voltage WC Receiver 1.25W (5V/250mA) output power with TSWITX-G4-EVM Higher power capability (up to 2W) based on antennae design Proprietary communication protocol Compatible with TSWITX-G4-EVM & TSWITX-5V-2RX-EVM	TS51223-QFNR	\$50





# nanoSmart® Solutions

## NANOSMART SOLUTIONS

Semtech nanoSmart® ultra-low power technology enables energy savings in everyday products. nanoSmart® products support multiple energy harvesting technologies including thermal and RF, as well as indoor and outdoor solar. Off-active™ switching and ultra-low power design provide current draws in the pico-ampere range resulting in more energy delivered to the application or storage element. Implementing advanced system power management and scheduled system wake-up is possible with optional microcontroller and real-time clock based solution making it ideal for remote sensing and control applications.

## FEATURES

- Lowest standby power in the industry
  - Eliminates standby power losses
  - Quiescent current below battery self-discharge current
- Extends battery life on portable products
- Enables portable standalone low power applications
  - Background energy scavenging applications
  - Off-grid indoor solar energy harvesting applications
  - Autonomous systems that run indefinitely (i.e. wireless sensors)
  - Medical and Industrial applications

### nanoSmart® Solutions

Part Number	Description	Features	Application	Samples	Production
TS12001	Battery management under voltage load switch	Trigger voltage options of 1.2V - 4.2V (factory set), 70nA quiescent current	Protects batteries from excessive discharge in portable devices	Now	Now
TS14002	Ultra-low power linear regulator	$V_{IN} = 2.5V$ to $5.5V$ , $V_{OUT} = 1.2V - 4.2V @ 250mA$ (factory set), 20nA quiescent current	Portable battery-operated electronics	Now	Now
<b>NEW</b> SC573	Low dropout linear voltage regulator	Input voltage range — 2.3V to 5.5V Quiescent supply current — 50µA	Low noise low power applications	Now	Now

# Neo-Iso™ Solid State Relay TS13501

Semtech's TS13501 is a bi-directional blocking 36V power DC or AC switch device offering galvanic isolation between control system and load. The device includes an integrated 240mΩ 36V switch allowing high efficiency switching of power loads or other high current applications. The differential input controls the state of the switch by way of a transient-immune serial protocol.

The TS13501 includes an over-current protection feature. Load current is monitored when the switch is in ON state, notifying the system microcontroller of over-current faults by way of the STAT status pin.

## KEY FEATURES

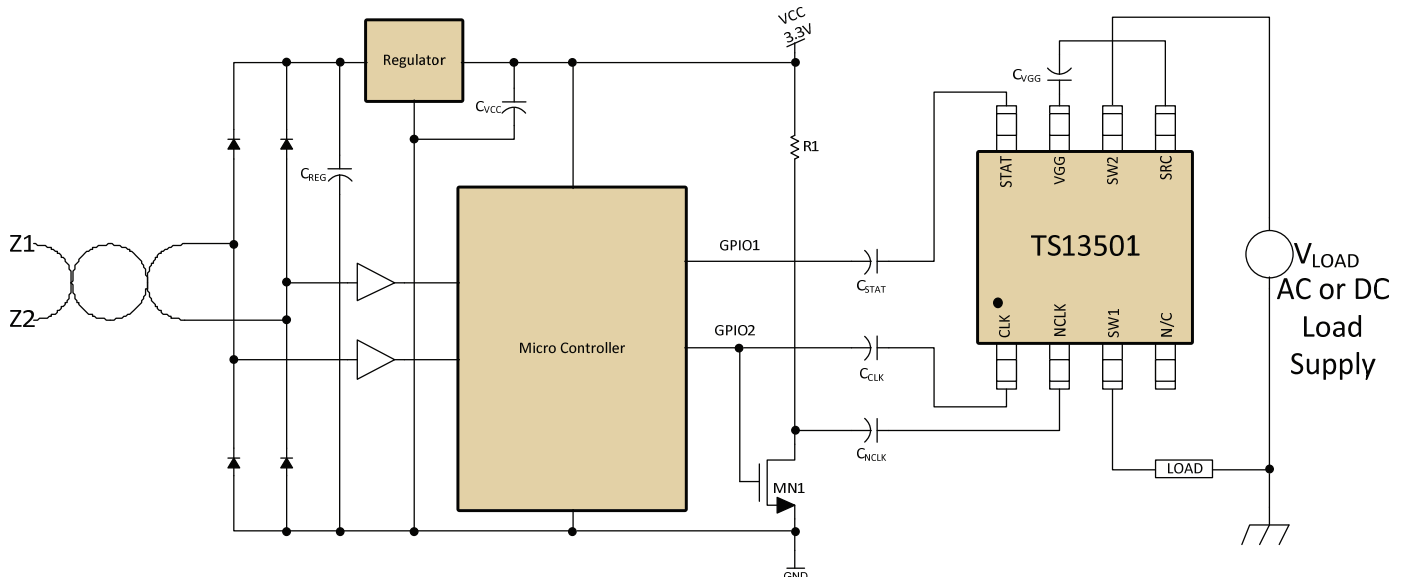
- Supports DC and AC systems
- Switch to Controller scalable galvanic isolation
- Differential signaling interface for transient-immune differential serial protocol
- Device powered via galvanically-isolated interface CLK/NCLK. No power rail needed VGG for decoupling cap only
- Switch characteristics
- Bi-directional blocking in OFF state
- Single 36V switch, 240mΩ RDS(ON)
- Up to 1A operating current
- Steady-state over-current protection, 1.5A nominal
- Inrush current tolerant for 40ms, 3A nominal
- Transient protection for SW1 and SW2
- IEC 61000-4-2 (ESD) ±24kV (air), ±16kV (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns) level 4
- IEC 61000-4-5 (Surge/Lightning) 80V with 2Ω internal impedance (1.2/50μs)

## APPLICATIONS

- Fire safety
- Automatic door controls
- Intrusion alarm sensors
- Industrial control
- Sprinkler control
- Power load/rail switching
- Input supply multiplexing

## SUMMARY SPECIFICATION

- Junction operating temperature -40 °C to 125 °C
- Packaged in a 8-pin SOIC-EP
- Product is lead-free, Halogen Free, RoHS / WEEE



System Block Diagram



# Neo-Iso™ Solid State Relay Overview

## NEO ISO PRODUCT COMPARISON

	TS13501	TS13101	TS13102	TS13401
100ku budgetary price	\$0.40	\$0.95	\$0.75	\$.80 + FET
Current limit	1.5 A	5.5 A	2.5 A	> 10 A (FET dependent)
Max voltage	36 V (Good for 24V DC)	60 V	60 V	240 V (FET dependent)
AC applications or No-polarity DC	✓	✓	✓	✓
FET	Internal FET	Internal FET	Internal FET	External FET
Simple CLK control	✓	✓	—	—
Address pins	—	—	✓	✓
Package size	SOIC-8	QFN 4x4	QFN 3x3	QFN 3x3 + FET
Switch Status feedback	✓	✓	✓	✓
Zero-cross switching (wait 0V/A turn ON/OFF)	—	—	✓	✓
Energy Harvesting	—	—	✓	✓
Load disconnect detection	—	—	✓	✓
Current measure	—	—	—	✓
Voltage measure	—	—	—	✓
Temperature measure	—	—	—	✓



# EcoBrite™ SC5012Q High Brightness 4-Channel 150mA/ch. LED Driver with Phase-Shifting



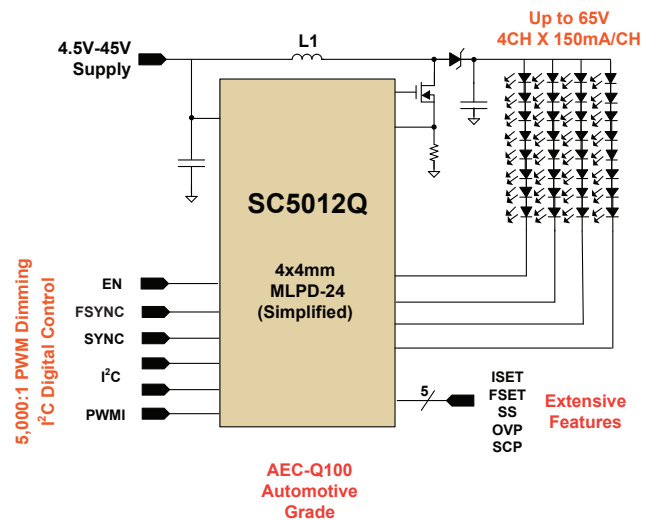
The SC5012/Q is a 4-channel high-precision, high-efficiency step-up (Boost) HB LED driver designed for backlight applications. It features wide input voltage range (4.5V to 45V), flexible output configuration, wide analog and PWM dimming range, phase shifting, optional fading, external boost controller frequency synchronization (FSYNC), I2C interface, and numerous protection features.

## FEATURES

- $V_{IN}$  range 4.5V to 45V
- $V_{OUT}$  up to 65V
- 2.2 $\mu$ H inductor
- Up to 150mA/Channel
- Adj Switch frequency 200kHz-2.2MHz
- Channel matching:  $\pm 1\%$
- PWM dimming (100Hz-30KHz)
- 9 or 10 bit dimming resolution
- Phase shifted operation
- Optional  $V_{SYNC} / H_{SYNC} / F_{SYNC}$
- I<sup>2</sup>C control / configuration
- 6 $\mu$ A shutdown current
- Extensive protection (Adj OVP, OCP, UVLO, Open/Short LED)
- 4x4mm, QFN-24
- “Q” is AEC-Q100, Grade-2, qualified version

## BENEFITS

- Prevents false registering of short circuit fault
- Enables ultra-thin display panels
- Eliminates audible noise and waterfall effect, reduces EMI
- Dimming profile is smooth with no visible steps
- I<sup>2</sup>C interface
- Low quiescent current



## High Brightness Backlighting Product Summary & Ordering Info

Part Number	# CHs	I/Ch (mA)	$V_{IN}$ (V)		Auto Grade	Features	Package (mm)	Std Reel Qty
			Min	Max				
SC5012MLTRT SC5012QMLTRT	4	150	4.5	45	2	I <sup>2</sup> C, FSYNC, 5000:1 Phase shifted PWM dimming	QFN-24 (4x4)	3,000



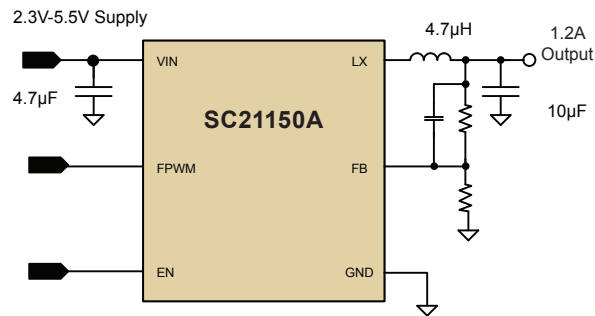
# Femto buck™ – SC21150A

## Tiny 1.2A Single AOT Buck Regulator

The SC21150 is an ultra-high efficiency 1.2A DC/DC buck regulator available in a tiny CSP package. These features make the SC21150 family perfect for small form factor portable applications where long battery life is essential. SC21150 is an Adaptive On-Time 4MHz switching regulator at full load conditions. Under light load conditions it seamlessly transitions into Power Save Mode and reduces switching frequency thus saving energy. High switching frequency operation allows the use of a very small 0.47μH inductor along with small input and output capacitors to minimize overall circuit size. A forced PWM input allows continuous switching under all load conditions.

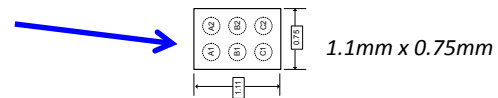
### KEY FEATURES

- Input voltage range — 2.3V to 5.5V
- 1.2A continuous output current
- $V_{OUT}$  0.8V to  $V_{IN}$ 
  - Fixed & adjustable versions
- 4MHz switching frequency
- Adaptive On-Time architecture
  - Up to 100% duty cycle
  - Up to 96% peak efficiency
- Light load mode
  - Up to 90% efficiency at 10mA
- 19μA quiescent current
- Aux PIN optional features:
  - NC = Automatic PSAVE
  - Forced PWM Mode
  - PGOOD
  - ADJ SS (contact marketing)
- 100μs Soft Start (fixed version)
- Package: 1.1mm x 0.75mm, 6-Bump CSP

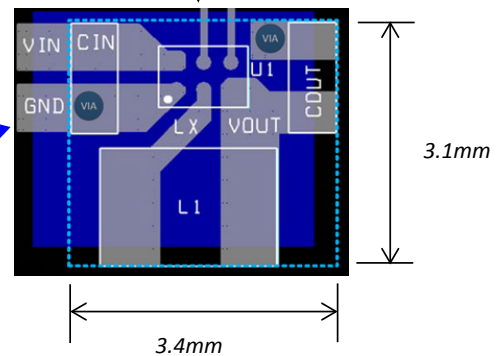


Adjustable Output Voltage

*Tiny CSP Package!*



*Super Small Board Area!*



### SC21150 Ordering Info

Part Number	Options			Package (mm)
	Output	Soft-Start	Output Discharge	
SC21150ACSTRT	Adjustable	100μs	Automatic	6-Bump WLCSP (0.75x1.11)
SC21150EVB	Evaluation Board			3.1x3.4

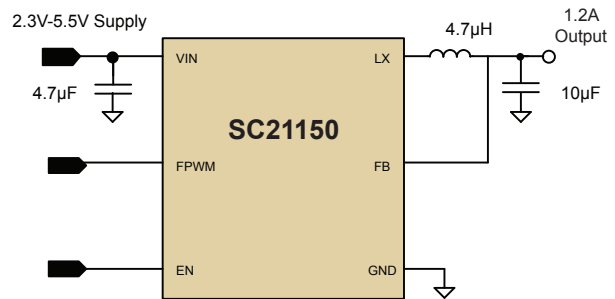
# FemtoBuck™ – SC21152

## Tiny 1.2A Single AOT Buck Regulator

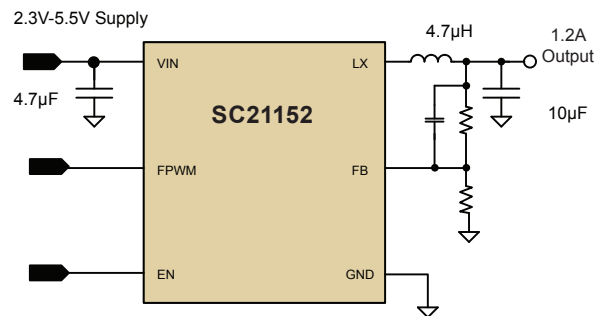
The SC21152 is an ultra-high efficiency 1.2A DC/DC buck regulator available in a small MLPD package. These features make the SC21152 perfect for small form factor consumer applications where high efficiency is essential. SC21152 is an Adaptive On-Time 4MHz switching regulator at full load conditions. Under light load conditions it transitions into PFM Power Save Mode and reduces switching frequency thus saving energy. High switching frequency operation allows the use of a very small 0.47 $\mu$ H inductor along with small input and output capacitors to minimize overall circuit size.

### KEY FEATURES

- Input voltage range — 2.3V to 5.5V
- 1.2A continuous output current
- 4MHz switching frequency
- Adjustable output voltage
- 1% output voltage accuracy
- Adaptive On-Time architecture
  - Up to 100% duty cycle
  - Up to 96% peak efficiency
- Power Save Mode for efficient light load operation
- >90% efficiency 30mA to 75mA
- 0.1 $\mu$ A shutdown current
- 21 $\mu$ A quiescent current
- Power Good indicator
- Pre-bias startup protection
- Internal Soft Start
- Package: 1.5mm x 2mm, 6-Lead MLPD
- WEEE and RoHS compliant and halogen-free



**Fixed Output Voltage**



**Adjustable Output Voltage**

### SC21152 Ordering Info

Part Number	Options			Package (mm)
	Output	Soft-Start	Output Discharge	
SC21152ACSTRT	Adjustable	100 $\mu$ s	Automatic	6-Lead MLPD (1.55x2.0)
SC21152EVB	Evaluation Board			

# World's Smallest Switching Regulator

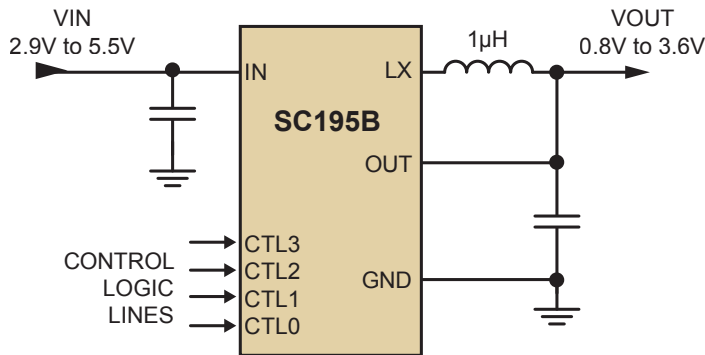
At 0.8mm x 0.8mm package size, SC195B switching regulator is the world's smallest DC-DC converter. With high efficiency of up to 94%, SC195B is a great choice for any portable or mobile application where small size and extended battery life is important.

## KEY FEATURES

- Up to 94% efficiency
- Automatic PSAVE mode maintains high efficiency at light loads
- VID programmable output
- Soft Start
- 3.5MHz switching frequency
- Available in multiple configurations
- SC202A: includes integrated inductor
- SC195: 1.5mm x 1.5mm MLPD package
- SC197: dual version of SC195
- SC195B: 0.8mm x 0.8mm CSP package

## APPLICATIONS

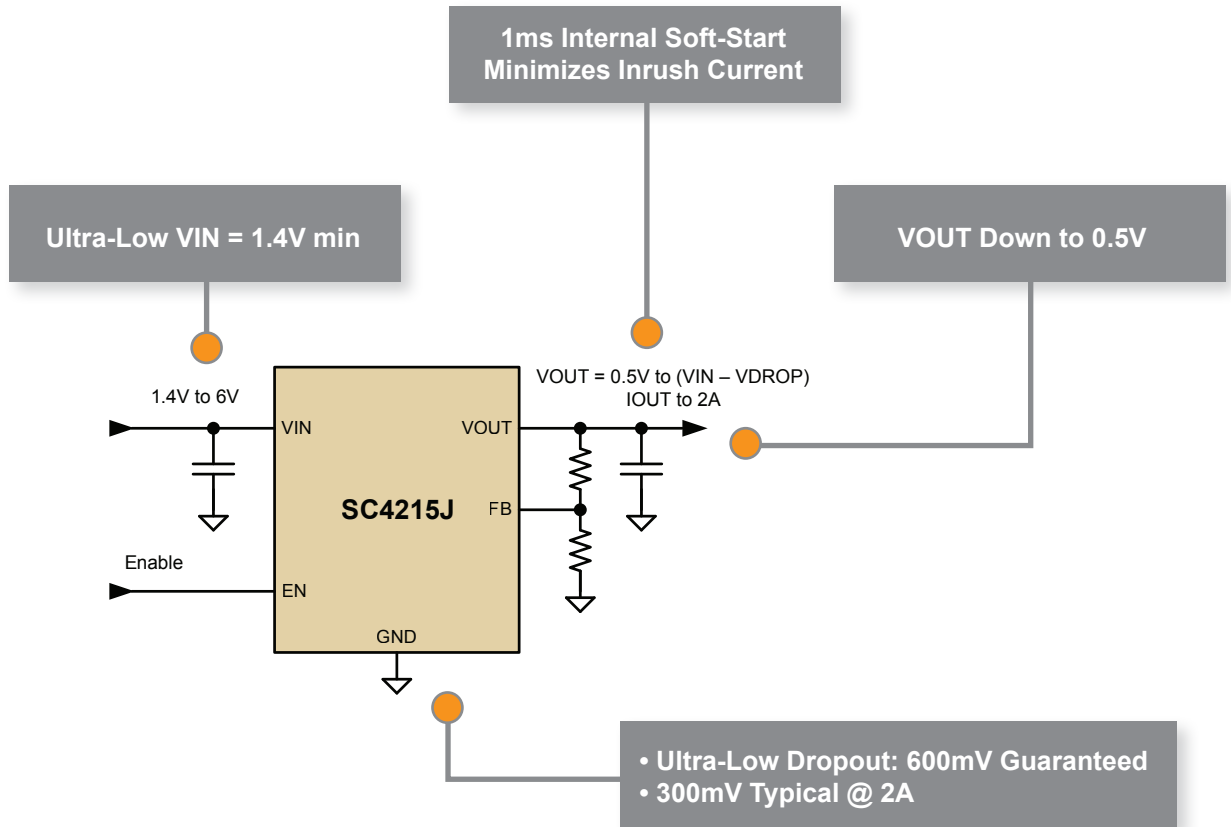
- Smart phones and cellular phones
- MP3 / Personal media players
- Personal navigation devices
- Digital cameras
- Single Li-ion cell or 3 NiMH / NiCd cell devices
- Devices with 3.3V or 5V internal power rails



Single Output Synchronous Regulators													
Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> Max (A)	Shutdown Current (µA)	Quiescent Current (mA)	f <sub>sw</sub> (kHz)	PSAVE	Power Good Flag	Enable Pin	Package (mm)	Features
	Min	Max	Min	Max									
SC195B	2.9	5.5	0.8	3.6	0.5	0.1	0.04	3500	Regular	No	Yes	CSP (0.8x0.8x0.375)	4-bit VID

# Ultra-Low Dropout Regulators Maximize Performance with Minimum Headroom

Semtech's ultra-low dropout regulators maintain output regulation and input supply rejection making them an ideal choice for systems where  $V_{OUT}$  is very close to  $V_{IN}$ . The ultra-low dropout also enables significantly higher efficiency versus conventional LDOs for the next generation green power applications.

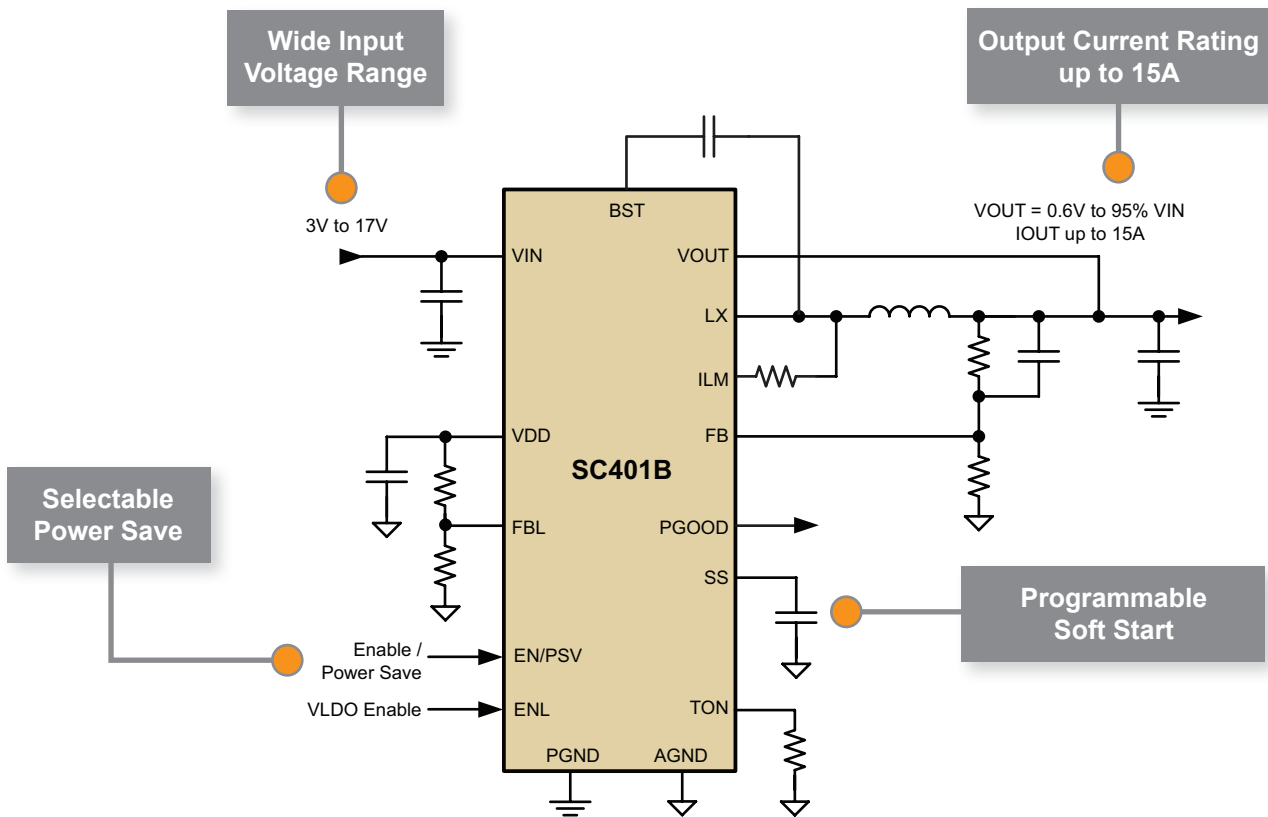


Ultra-low Dropout Regulators					
Part Number	$V_{IN}$ (V) (min)	$I_{OUT}$ (A) (max)	$V_{DROPOUT}$ at Full Load (V) (typ)	Enable Pin	Package (mm)
SC4211	1.4	1	0.1	Yes	SOIC-8 EDP*
SC4212	1.5	1	0.2	Yes	MLPD-8 (3x3x1)
SC4212B	1.6	1	0.085	Yes	MLPD-8 (3x3x1)
SC4212L	1.6	1	0.085	Yes (with prog. SS, PGOOD, BYP)	MLPD-8 (3x3x1)
SC4213H	1.4	0.5	0.075	Yes	SOIC-8
SC4215J	1.4	2	0.3	Yes (with internal SS)	SOIC-8 EDP*
SC4216H	1.45	3	0.45	Yes	SOIC-8 EDP*
SC4217	1.8	3	0.3	Yes	TO-263-5

\*Thermally enhanced exposed die pad

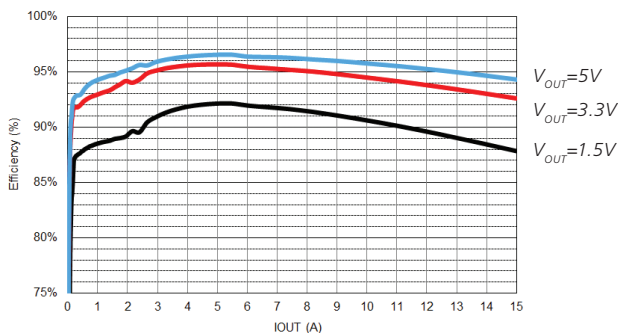
# EcoSpeed® Regulators

EcoSpeed® converters provide high efficiency across the entire load range with a power save (PSAVE) feature lowering the switching frequency to cater to low power standby requirements. This reduces power FET switching losses and results in greater than 90% peak standby efficiency during light loads. When the load changes from standby to steady state, the EcoSpeed converter's cycle-by-cycle response quickly exits PSAVE mode providing very fast wake-up recovery time. All EcoSpeed converters offer SmartDrive™, a two-step, high-side FET turn-on scheme that reduces EMI.



EcoSpeed Converters Color: High Efficiency, Fast Wake-Up, Low EMI

## HIGH EFFICIENCY ACROSS THE ENTIRE LOAD RANGE

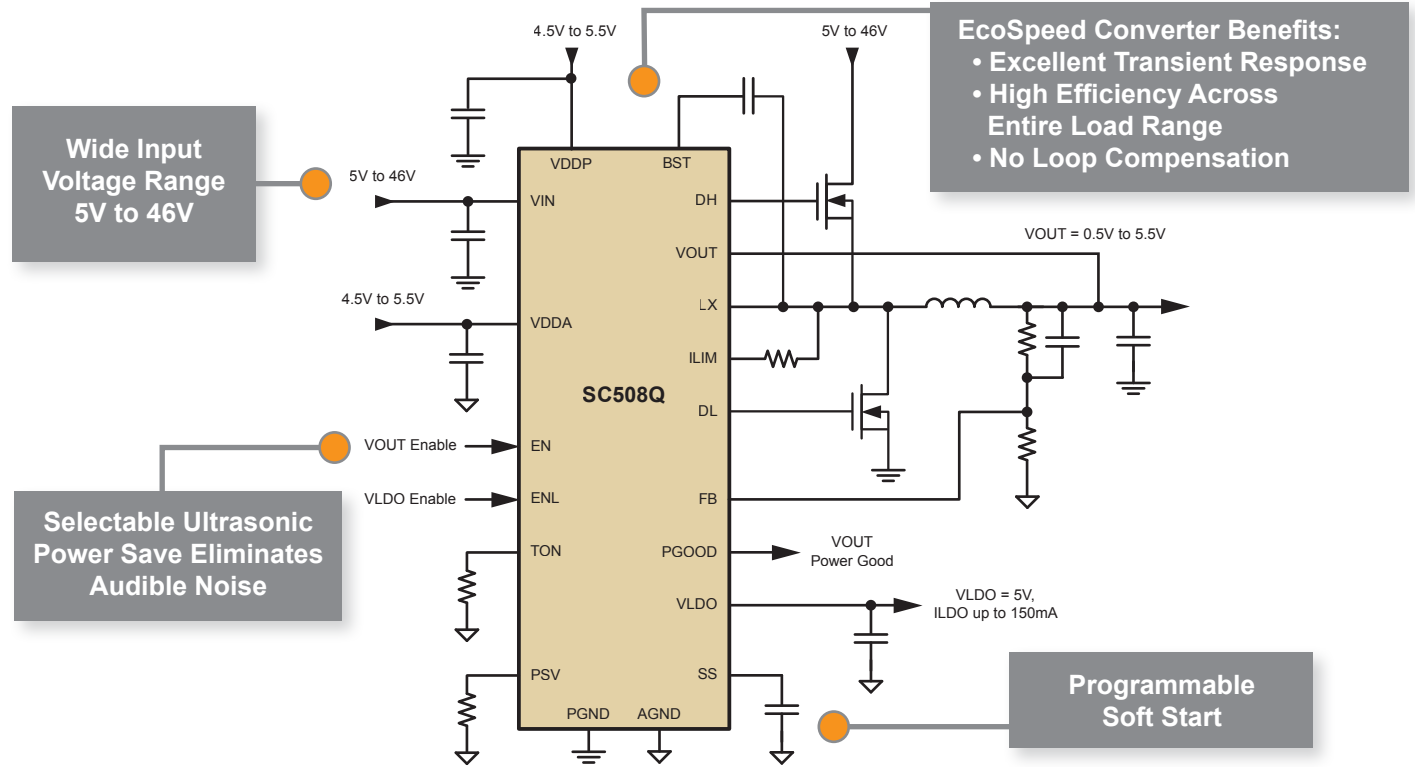


### Efficiency vs. Load (SC401B)

$V_{IN} = 12V$ ,  $f_{SW} = 300kHz$ ,  $V_{BIAS} = 5V$ ,  $V_{OUT} = 5V, 3.3V$  and  $1.5V$



# EcoSpeed® Product Portfolio



Controllers and Regulators with Integrated FETs

Power Save for Maximum Efficiency at Light Load

Very Small Packaging

Part #	Type	V <sub>IN</sub> Range	I <sub>OUT</sub> (max)	PGOOD	Enable	Soft Start	PSAVE	OCP	Package (mm)
SC171	Regulator	3 - 5.5V	1A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1)
SC172	Regulator	3 - 5.5V	2A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1)
SC173	Regulator	3 - 5.5V	3A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1)
SC173A	Regulator	3 - 5.5V	3A	Yes	Yes	Yes	Regular	Not Latching	MLPD-10 (3x3x1)
SC174	Regulator	3 - 5.5V	4A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1)
SC3203	Regulator	9.0 - 16V	3A	Yes	Yes	Yes	Regular	Hiccup	SOIC-8-EP
SC410	Regulator	5.5 - 24V	3A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1)
SC3303	Regulator	5.5 - 28V	3A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1)
SC414	Regulator	3 - 28V	6A	Yes	Yes	Yes	Ultrasonic	Latching	MLPQ-28 (4x4x1)
SC424	Regulator	3 - 28V	6A	Yes	Yes	Yes	Regular	Latching	MLPQ-28 (4x4x1)
SC417	Regulator	3 - 28V	10A	Yes	Yes	Yes	Ultrasonic	Latching	MLPQ-32 (5x5x1)
SC427	Regulator	3 - 28V	10A	Yes	Yes	Yes	Regular	Latching	MLPQ-32 (5x5x1)
SC9301	Regulator	3 - 28V	10A	Yes	Yes	Programmable	None	Hiccup	MLPQ-32 (5x5x1)
SC403B	Regulator	3 - 28V	6A	Yes	Yes	Programmable	Regular	Latching	MLPQ-32 (5x5x1)
SC402B	Regulator	3 - 28V	10A	Yes	Yes	Programmable	Regular	Latching	MLPQ-32 (5x5x1)
SC401B	Regulator	3 - 17V	15A	Yes	Yes	Programmable	Regular	Latching	MLPQ-32 (5x5x1)
SC418	PWM Controller	3 - 28V	30A*	Yes	Yes	Yes	Prog. Ultrasonic or Regular	Latching	MLPQ-UT-20 (3x3x0.6)
SC419	PWM Controller	3 - 28V	30A*	Yes	Yes	Yes	Prog. Ultrasonic or Regular	Latching	MLPQ-UT-20 (3x3x0.6)
SC461	PWM Controller	3 - 28V	30A*	Yes	Yes	Yes	Prog. Ultrasonic or Regular	Hiccup	MLPQ-UT-20 (3x3x0.6)
SC493	PWM Controller	3 - 28V	30A*	Yes	Yes	Programmable	Prog. Ultrasonic or Regular	Latching	MLPQ-UT-20 (3x3x0.6)
SC508Q	PWM Controller	5 - 46V	30A*	Yes	Yes	Programmable	Prog. Ultrasonic or Regular	Hiccup	MLPQ-UT-20 (3x3x0.6)

I<sub>OUT</sub> up to 30A

V<sub>IN</sub> up to 46V

\* Controller Only



# Power Management Portfolio

## Single Output Synchronous Regulators

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> Max (A)	Shut-down Current (μA)	Quiescent Current (mA)	f <sub>sw</sub> (kHz)	PSAVE	Power Good Flag	Enable Pin	Package (mm)	Features
	Min	Max	Min	Max									
TS30011	4.5	24	0.9	5	1	5	2.3	1000	Regular	Yes	Yes	QFN-16 (3x3x0.9)	FemtoBuck™ Family
TS30012	4.5	24	0.9	5	2	5	2.3	1000	Regular	Yes	Yes	QFN-16 (3x3x0.9)	
TS30013	4.5	18	0.9	5	3	5	2.3	1000	Regular	Yes	Yes	QFN-16 (3x3x0.9)	
TS30111	4.5	18	0.9	5	0.7	5	2.3	1000	Regular	Yes	Yes	QFN-16 (3x3x0.9)	
TS32101	1.75	5.5	1.8	6	2	5	0.05	2000	Regular	Yes	Yes	QFN-16 (3x3x0.9)	
TS33010	2	5.5	0.8	3.3	0.6	0.1	0.025	2250	Regular	Yes	Yes	QFN-16 (3x3x0.9)	
TS33001	2.5	5.5	0.8	3.3	1	0.2	18	5000	Regular	Yes	Yes	QFN-16 (4x4x0.9)	
TS33002	2.5	5.5	0.8	3.3	2	0.2	18	5000	Regular	Yes	Yes	QFN-16 (4x4x0.9)	
TS33003	2.5	5.5	0.8	3.3	3	0.2	18	5000	Regular	Yes	Yes	QFN-16 (4x4x0.9)	
TS30041	4.5	40	1.5	5	1	5	3.6	1000	N/A	Yes	Yes	QFN-16 (3x3x0.9)	
TS30042	4.5	40	1.5	5	2	5	3.6	1000	N/A	Yes	Yes	QFN-16 (3x3x0.9)	
SC21150A	2.3	5.5	0.8	V <sub>IN</sub>	1.2	0.1	0.023	4000	Regular	Yes	Yes	CSP-6 (1.1x0.75)	FemtoBuck™ AOT Regulator Family
SC21152	2.3	5.5	0.8	V <sub>IN</sub>	1.2	0.1	0.021	4000	Regular	Yes	Yes	MLPD-6 (1.5x2)	
SC171	3	5.5	0.75	95% * V <sub>IN</sub>	1	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10 (3X3x1)	EcoSpeed® regulator, fast transient response, small footprint, Power Save
SC172	3	5.5	0.75	95% * V <sub>IN</sub>	2	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10 (3X3x1)	
SC173	3	5.5	0.75	95% * V <sub>IN</sub>	3	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10 (3X3x1)	
SC173A	3	5.5	0.75	95% * V <sub>IN</sub>	3	5	0.5	200-1000	Regular	Yes	Yes	MLPD-10 (3X3x1)	
SC174	3	5.5	0.75	95% * V <sub>IN</sub>	4	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10 (3X3x1)	
SC183C	2.9	5.5	0.8	3.3	2	11	0.01	2500	No	No	Yes	MLPQ-UT16 (3x3x0.6)	4-bit VID
SC185	2.9	5.5	1	3.3	4	1	0.1	1500	Regular	Yes	Yes	MLPQ-UT16 (3x3x0.6)	Prog Soft Start, Power Good
SC186	2.9	5.5	0.8	3.3	4	1	0.1	1500	Regular	Yes	Yes	MLPQ-UT16 (3x3x0.6)	Prog Soft Start, Power Good, 4-bit VID
SC189	2.9	5.5	1	3.3	1.5	1	7.5	2500	No	No	Yes	SOT23-5, MLPD-6 (2x2x0.6)	Prog Soft Start, Power Good
SC190	2.7	5.5	1	2.8	0.3	0.1	0.01	1000	No	No	Yes	MLPD-10 (3x3x1)	Very low input ripple, 2-bit VID
SC191	2.7	5.5	1.2	1.2	0.33	0.1	2.5	1000	No	No	Yes	MLPD-8 (2.3x2.3x0.8)	Very low noise, very low input ripple
SC192	2.7	7	0.8	V <sub>IN</sub>	0.7	0.1	0.04	750	Regular	Yes	Yes	MLPD-10 (3x3x1)	Adj current limit, ext synch
SC194A/B	2.7	5.5	1	3.6	1	0.1	0.02	750-1250	Regular	No	Yes	MLPD-10 (3x3x1)	Ext synch, 2-bit VID
SC195	2.9	5.5	0.8	3.3	0.5	0.1	0.04	3500	Regular	No	Yes	MLPQ-UT8, (1.5x1.5x0.6)	4-bit VID
SC195B	2.9	5.5	0.8	3.3	0.5	0.1	0.04	3500	Regular	No	Yes	CSP (0.8x0.8x0.375)	4-bit VID
SC195F	2.9	5.5	0.8	3.3	0.5	0.1	4.8	3500	No	No	Yes	MLPQ-UT8, (1.5x1.5x0.6)	4-bit VID, No PSAVE (low ripple across load)
SC196A	2.7	5.5	1	1.8	1.5	0.1	0.02	750-1250	Regular	No	Yes	MLPD-10 (3x3x1)	Ext synch, 2-bit VID
SC196	2.5	5.5	0.8	V <sub>IN</sub>	1.5	0.1	0.02	750-1250	Regular	No	Yes	MLPD-UT10 (3x3x0.6)	Ext synch, 2-bit VID
SC202A	2.9	5.5	0.8	3.3	0.5	0.1	0.04	3500	Regular	No	Yes	MLPQ-13 (2.5x3x1)	Integrated inductor, 4-bit VID
SC220	2.7	5.5	1	0.9x V <sub>IN</sub>	0.65	0.1	19	20,000	Regular	No	Yes	SOIC-8	X-EMI™ PCB Inductor
SC3102	2.9	5.5	1.1	1.5	2	1	0.06	1500	Forced	Yes	Yes	MLPQ-UT16 (3x3x0.6)	Prog Soft Start, Power Good Forced PSAVE
SC3203	9	16	0.75	7.5	3	10	0.35	500	Regular	Yes	Yes	SOIC-8-EP	EcoSpeed® regulator, fast transient response
SC3303	5.5	28	0.75	7.5	3	9	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPD-10, 3x3x1	EcoSpeed® regulator, fast transient response

**Single Output Synchronous Regulators Continued**

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> (A)	Shut-down Current (μA)	Quiescent Current (mA)	f <sub>sw</sub> (kHz)	PSAVE	Power Good Flag	Enable Pin	Package (mm)	Features
	Min	Max	Min	Max	Max								
SC401B	3	17	0.6	85% * V <sub>IN</sub>	15	<27	See datasheet	200-1000	Regular	Yes	Yes	MLPQ-32 (5x5x1)	EcoSpeed® regulator with prog Soft Start, integrated LDO w/crossover circuit, fast transient response
SC402B	3	28	0.6	85% * V <sub>IN</sub>	10	<27		200-1000	Regular	Yes	Yes	MLPQ-32 (5x5x1)	
SC403B	3	28	0.6	85% * V <sub>IN</sub>	6	<27		200-1000	Regular	Yes	Yes	MLPQ-32 (5x5x1)	
SC410	5.5	24	0.75	7.5	3	9	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPD-10 (3x3x1)	EcoSpeed® regulator, fast transient response
SC414	3	28	0.75	85% * V <sub>IN</sub>	6	12		200-1000	Ultrasonic	Yes	Yes	MLPQ-28 (4x4x1)	EcoSpeed® regulator, integrated LDO w/crossover circuit, fast transient response
SC417	3	28	0.5	85% * V <sub>IN</sub>	10	12		200-1000	Ultrasonic	Yes	Yes	MLPQ-32 (5x5x1)	
SC424	3	28	0.75	85% * V <sub>IN</sub>	6	12	See datasheet	200-1000	Regular	Yes	Yes	MLPQ-28 (4x4x1)	
SC427	3	28	0.5	85% * V <sub>IN</sub>	10	12		200-1000	Regular	Yes	Yes	MLPQ-32 (5x5x1)	
SC4620	2.3	5.5	0.5	V <sub>IN</sub>	2.5	0.2	7	200-2000	No	Yes	Yes	MLPQ-28 (4x4x1)	Prog Soft Start and current limit, Power Good flag, ext synch
SC4624	2.3	5.5	0.5	V <sub>IN</sub>	4	0.2	7	200-2000	No	Yes	Yes	SO-16 EDP, MLPQ-20 (4x4x1.75)	
SC4626	2.9	5.5	1	3.3	1	1	7.5	2500	No	No	Yes	SOT23-5	Easy to use, low cost
SC9301	3	28	0.6	85% * V <sub>IN</sub>	10	<27	see datasheet	200-1000	No	Yes	Yes	MLPQ-32 (5x5x1)	EcoSpeed® regulator with prog Soft Start, integrated LDO, fast transient response, fixed frequency (no PSAVE)

**Multiple Output Synchronous Regulators**

Part Number	V <sub>IN</sub> (V)		# of Outputs	V <sub>OUT</sub> (V)		I <sub>OUT</sub> Max (A)	Shutdown Current (μA)	Quiescent Current (mA)	f <sub>sw</sub> (kHz)	PSAVE	Package (mm)	Features
	Min	Max		Min	Max							
SC197	2.9	5.5	2	0.8/0.8	3.3/3.3	0.5/0.5	0.1/0.1	0.04/0.04	3500	Regular	MLPQ-UT18 (2x3x0.6)	4-bit VID
SC283	2.9	5.5	2	0.8/0.8	3.3/3.3	1.8/1.8	<10	10	2500	No	MLPQ-W18 (2x3x0.8)	4-bit VID, very small footprint, 100% duty cycle
SC284	2.9	5.5	2	0.8/0.8	3.3/3.3	1.8/1.8	<10	10	2500	No	MLPQ-UT20 (3x3x0.6)	4-bit VID, very small footprint, 100% duty cycle
SC284P	2.75	5.5	2	1.0/1.0	3.3/3.3	2	<10	0.06	2500	Regular	MLPQ-UT20 (3x3x0.6)	3-bit VID, very small footprint, 100% duty cycle, automotive PSAVE
SC286	2.9	5.5	2	0.8/0.8	3.3/3.3	4	<1	0.1	1600	Regular	MLPQ-UT28 (4x4x0.6)	4-bit VID, very small footprint, 100% duty cycle

**Single Output Non-Synchronous Regulators**

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> Max (A)	I <sub>sw</sub> Min (A)	Shutdown Current (μA)	f <sub>sw</sub> (kHz)	Package	Features
	Min	Max	Min	Max						
SC4518H	4.4	24	0.8	0.85* V <sub>IN</sub>	1.4	2	100	600	SO-8 EDP	External synch
SC4519	3	16	1.2	0.85* V <sub>IN</sub>	2.7	3.0 typ.	5	600	SO-8 EDP	External synch
SC4519H	4.4	24	0.8	0.85* V <sub>IN</sub>	3	3.5	10	600	SO-8 EDP	External synch
SC4521	4.4	24	0.8	0.85* V <sub>IN</sub>	3	3.5	250	600	SO-8 EDP	Prog Soft Start
SC4524E	3	28	1	0.96* V <sub>IN</sub>	2	2.6	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback
SC4524F	3	18	1	0.96* V <sub>IN</sub>	2	2.6	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback
SC4525E	3	28	1	0.96* V <sub>IN</sub>	3	3.9	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback
SC4525F	3	18	1	0.96* V <sub>IN</sub>	3	3.9	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback

Single Output Controllers													
Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> (A) Max	Gate Drive Current (A)	Synch or Non-Synch	f <sub>sw</sub> (kHz)	PSAVE	Power Good Flag	Enable Pin	Package (mm)	Features
	Min	Max	Min	Max									
SC2602L	4.2	12.6	0.8	0.9* V <sub>IN</sub>	20	1	Synch	200	No	Yes	Yes	SO-14	Soft Start
SC2608A	4.5	14	0.8	0.85* V <sub>IN</sub>	15	0.6	Synch	250	No	No	Yes	SO-8	Prog Soft Start
SC2618	4.75	14	1.25	12.6	6	0.5	Synch	Up to 500	No	No	No	SOT-23-6	Internal Soft Start, hiccup overload protection
SC418	3	28	0.5	0.85* V <sub>IN</sub>	30	4	Synch	Up to 1000	Yes+	Yes	Yes	MLPQ-20, (3x3x0.6)	EcoSpeed® controller
SC419	3	28	0.5	0.85* V <sub>IN</sub>	30	4	Synch	Up to 1000	Yes+	Yes	Yes	MLPQ-20 (3x3x0.6)	EcoSpeed® controller, on-board prog LDO
SC4508A	2.7	15	0.5	0.97* V <sub>IN</sub>	15	1.5	Non-Synch	Up to 1500	No	No	Yes	MLPQ-12 (4x4x1)	Buck or buck/boost (inverting), prog Soft Start, hiccup overload protection
SC4510	2.5	16	0.5	0.90* V <sub>IN</sub>	25	1	Synch	100-1000	No	Yes	Yes	TSSOP-20	Source and sink current, reference tracking, ext synch, prog Soft Start
SC4603	2.25	5.5	0.5	V <sub>IN</sub>	20	1	Synch	Up to 1000	No	No	Yes	MSOP-10	100% duty capable, ext synch, hiccup overload protection
SC4608	2.7	5.5	0.5	0.82* V <sub>IN</sub>	15	1.65	Synch	Up to 1000	No	No	Yes	MLP-16	Hiccup overload protection
SC461	3	28	0.5	0.85* V <sub>IN</sub>	30	40	Synch	Up to 1000	No	Yes	Yes	MLPQ-20 (3x3x0.6)	EcoSpeed® controller, on-board 5V LDO, prog Soft Start, Fixed Frequency (no PSAVE)
SC493	3	28	0.5	5	30	8.3	Synch	250 to 1000	Yes+	Yes	Yes	MLPQ-UT20 (3x3x0.6)	Digital power EcoSpeed® controller, I <sup>2</sup> C configuration and status register
SC508	5	46	0.6	0.85* V <sub>IN</sub>	30	4	Synch	Up to 1000	Yes+	Yes	Yes	MLPQ-UT20 (3x3x0.6)	EcoSpeed® controller, on-board prog LDO, prog Soft Start, hiccup overload protection, AEC-Q100

Multiple Output Controllers																
Part Number	V <sub>IN</sub> (V)		# of Outputs	V <sub>OUT</sub> (V)		I <sub>OUT</sub> Max (A)	Gate Drive Current (A)	On-time Min (ns)	f <sub>sw</sub> (kHz)	Ext. Sync	Control Method	Hiccup Overload	Power Good Flag	Enable Pin	Package (mm)	Features
	Min	Max		Min	Max											
SC2440A	2.8	30	2	1	0.8* V <sub>IN</sub>	2/2	-	-	200-2500	Yes	Current	Yes	Yes	Yes	TSSOP-16 EDP	Out of phase switching, individual SS / EN / PGD
SC2447	4.65	15	2	0.5	0.88* V <sub>IN</sub>	30/30	N/A	-	Up to 1000	Yes	Current	Yes	No	Yes	TSSOP-28	Optimized for DrMOS, sink / source current

DDR Regulators / Controllers (Switching & LDO)														
Part Number	V <sub>CC</sub> (V)		V <sub>DDO</sub> (V)	I <sub>VDDO</sub> (A)	V <sub>TT</sub>	V <sub>TT</sub> (V)	I <sub>VTT</sub> (A) Max	f <sub>SW</sub> (kHz)	Peak gate Drive Current (A)	DDR Type	Synch or Non-Synch	Integrated Driver	Package (mm)	Features
	Min	Max												
SC2447	4.65	15	N/A	N/A	Switcher	0.5-1.25	60	Up to 1000	-	1,2,3	Synch	Yes	TSSOP-28	2-phase, optimized for Philips or Renesas DrMOS
SC2596	2.3	5.5	N/A	N/A	LDO	0.9 -1.25	±2.5	N/A	-	1,2	N/A	N/A	SO-8 EDP	Integrated DDR V <sub>TT</sub> LDO with on-board buffered reference, remote sense
SC2598	2.35	3.6	1-3.6	N/A	LDO	0.5 - 1.8	±3	N/A	-	1,2,3,4	N/A	N/A	SOIC-8 EDP	Integrated DDR V <sub>TT</sub> LDO with on-board buffered reference, remote sense
SC2599	2.35	3.6	1-3.6	N/A	LDO	0.5 - 1.8	±3	N/A	-	1,2,3,4	N/A	N/A	MLPD8 (2x2x0.6)	Integrated DDR V <sub>TT</sub> LDO with on-board buffered reference, remote sense
SC4510	4.75	16	N/A	N/A	Switcher	0.3-3.0	15	100-1000	1	1,2,3	Synch	Yes	TSSOP-20	On-board buffered reference, Power Good flag

Single Output Step-up Controllers											
Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> (A)	Gate Drive Current (A)	Shutdown Current (µA)	Quiescent Current (mA)	f <sub>SW</sub> (kHz)	Package	Features
	Min	Max	Min	Max							
SC2603	4.5	16	4.5	* (1)	* (2)	0.8	-	5	200	SOT23-6	Switch mode efficiency up to 95%

\* (1)= External FET Voltage \* (2) I<sub>OUT</sub> is function of V<sub>IN</sub>, V<sub>OUT</sub>, f<sub>SW</sub> and inductor value

Single Output Step-up Regulators											
Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> (A)	I <sub>SW</sub> (A) Min	Shutdown Current (µA)	Quiescent Current (mA)	f <sub>SW</sub> (kHz)	Package (mm)	Features
	Min	Max	Min	Max							
SC120	0.7	4.5	1.8	5	0.19	1.2	0.1	0.05	1200	MLPD (1.5x2x0.6) SOT23	Power Save + mode maximizes efficiency at light load
SC121	0.7	4.5	1.8	5	0.19	1.2	0.1	3.5	1200	MLPD-UT-6 (1.5x2x0.6)	Constant frequency
SC122	0.7	1.6	3.3	3.3	0.095/0.05	0.35	8.5	0.04	1200	MLPD-UT-6 (1.5x2x0.6)	Operates in Power Save + mode at all loads

Inverting Buck / Boost Controller											
Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> (A)	Gate Drive R <sub>DSon</sub> (Ω)	Shutdown Current (µA)	Quiescent Current (mA)	f <sub>SW</sub> (kHz)	Package (mm)	Features
	Min	Max	Min	Max							
SC4508A	2.7	15	-0.5	* (1)	* (2)	8	<500	3	100-1500	MLPD-12 (4x4x1)	Buck or buck / boost (inverting), Prog Soft Start, hiccup mode over-current protection

\* (1)= External FET Voltage \* (2) I<sub>OUT</sub> is function of V<sub>IN</sub>, V<sub>OUT</sub>, f<sub>SW</sub> and inductor value

Combo Regulators / Controllers										
Part Number	Topologies	V <sub>IN</sub> (V)		Buck V <sub>OUT</sub> (V)		I <sub>out</sub>	f <sub>sw</sub> (kHz)	Power Good Flag	Package (mm)	Features
		Min	Max	Min	Max	Max (A)				
SC2463	2 synch buck controllers + 2 LDO controllers	4.5	30	0.5	0.8* VIN	20/20/2/2	Up to 700	Yes	TSSOP-28	Prog Soft Start, auto startup sequence, prog current limit

Isolated PWM Controllers									
Part Number	Start Up Current (µA)	Topologies	# of Outputs	Mode of Operation	f <sub>sw</sub> (kHz)	Max Duty Cycle	Turn On Threshold (VMAX)	Package (mm)	Features
	Max								
SC4806	150	Pushpull, Full Bridge, Half Bridge	2	Voltage Mode or Current Mode	Up to 1000	50% each channel	8.6	MLPQ-12, (4x4x1)	Independent Soft Start, Shutdown, UVLO, ext synch
SC4808A	150	Pushpull, Full Bridge, Half Bridge	2	Voltage Mode or Current Mode	Up to 1000	50% each channel	12	MSOP-10	UVLO, ext synch
SC4808B							4.4		
SC4808C							8		
SC4809A	110	Forward / Flyback, Boost	1	Voltage Mode or Current Mode	Up to 1000	90%	4.5	MSOP-10	Prog duty cycle, ext synch
SC4809B							12		
SC4809C							6.95		
SC4905A	100	Forward / Flyback, Boost	1	Voltage Mode	Up to 1000	95%	4.6	MSOP-10	Ext synch
SC4905B							12		

Battery Chargers															
Part Number	Max. Charge Current (A) / Accuracy		Operating Input Voltage (V)		Input (V) Withstand	Output (V)	Output Voltage Accuracy (%)	LDO	NTC	Safety Timer	Charger Present Indicator	Charge Status Indicator	Fault Indicator	Package (mm)	Features
			Min	Max			Max								
<b>NEW</b> TS52001	1.4	+/- 10%	3.5	8.1	8.8	CC/CV	+/-1	No	Internal	Yes	Yes	Yes	Yes	QFN-16 (4x4)	User programmable
TS52002	1.4	+/- 10%	3.2	8.1	8.8	CC/CV	+/-1	No	Internal	Yes	Yes	Yes	Yes	QFN-16 (4x4)	User programmable
TS52003	1.4	+/- 10%	3.2	8.1	8.8	CC/CV	+/-1	No	Internal	Yes	Yes	Yes	Yes	QFN-16 (4x4)	User programmable



**Battery Chargers Continued**

Part Number	Max. Charge Current (A)/ Accuracy		Operating Input Voltage (V)		Input (V) Withstand	Output (V)	Output Voltage Accuracy (%)	LDO	NTC	Safety Timer	Charger Present Indicator	Charge Status Indicator	Fault Indicator	Package (mm)	Features
			Min	Max			Max								
<b>NEW</b> TS55101	2	+/- 10%	4.4	16.5	20	CC/CV	+/- .5	No	Internal	Yes	Yes	Yes	Yes	QFN-16 (3x3)	User programmable
SC802A	1	+/- 60mA	4.3	6.5	14	4.1, 4.2, ADJ	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPQ-16 (4x4x1)	Fully featured, high input voltage protection, prog pre-, fast- and termination current
SC805A	1	+/- 5%	3.5	5.9	7	4.2	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPD-10 (3x3x1)	Fully featured, prog pre-, fast- and termination current
SC806	1	+/- 5%	3.15	6.3	7	4.2	+/-1	No	Yes	No	Yes	Yes	Yes	MLPD-10 (3x3x1)	Prog pre-, fast- and termination current
SC810	1	+/- 9%	4.6	8.2	30	4.2	+/-1	Yes	No	No	No	Yes	No	MLPD-UT-6, (2x2x0.6)	Termination options: float charge, automatic recharge, forced recharge
SC811	1	+/- 9%	4	4.6	30	4.2	+/-1	Yes	No	No	No	Yes	No	MLPD-UT-8, (2x2x0.6)	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 9.6V
SC813	1	+/- 9%	4	4.6	30	4.2	+/-1	Yes	No	No	No	Yes	No	MLPD-UT-8, (2x2x0.6)	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 6.0V
SC824	1	+/- 9%	4	8.2	30	4.2	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPD-UT-10, (2x2x0.6)	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 9.6V

**LDO Controllers**

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		# Channels	V <sub>DROPOUT</sub> (V)	Enable Pin	Power Good Flag	Package	Features
	Min	Max	Min	Max						
SC338	4.5*	13.2	0.5	3.3	2	User selectable	Yes	Yes	MSOP-10	Soft Start
SC339	4.5*	5.5	0.5	3.3	1	User selectable	Yes	Yes	SOT-23-6	Soft Start

\*Applies to IC - input to MOSEFET(s) is user selectable

**Single Output LDOs**

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> (A)	V <sub>DROPOUT</sub> (V) Max O.T	Enable Pin	Package (mm)	Features
	Min	Max	Min	Max	Max				
<b>NEW</b> TS14002	2.5	5.5	1.2	4.2	0.2	4.3	Yes	DFN-8 (2x2)	nanoSmart®
SC1565	2.2	5.5	1.2	4.8	1.5	0.6	Yes	TO-263-5, SO-8, SOT-223, TO-263-3	Over current & over temperature protection, low reverse leakage
<b>NEW</b> SC4212B	1.6	6	0.5	V <sub>IN</sub> -V <sub>DROPOUT</sub>	1	0.175	Yes	MLPD-8 (3x3x1)	Very low input, very low dropout
SC4212L	1.6	6	0.5	V <sub>IN</sub> -V <sub>DROPOUT</sub>	1	0.175	Yes	MLPD-8 (3x3x1)	High PSRR / low noise, prog SS, PGD, very low input, very low dropout
SC4213H	1.4	6	0.5	V <sub>IN</sub> -V <sub>DROPOUT</sub>	0.5	0.15	Yes	SO-8	Very low input, very low dropout
SC4215J	1.4	6	0.5	V <sub>IN</sub> -V <sub>DROPOUT</sub>	2	0.6	Yes	SO-8 EDP	Very low input, very low dropout, Soft Start
SC4216H	1.45	5.5	0.5	V <sub>IN</sub> -V <sub>DROPOUT</sub>	3	0.7	Yes	SO-8 EDP	Very low input, very low dropout

**Multiple Output LDOs**

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)		I <sub>OUT</sub> * (mA)	V <sub>DROPOUT</sub> (mV)	Power Good Flag	IQ** (μA)	Enable Pin	# of LDOs	Noise (μVRMS)	PSRR (dB)	Package (mm)	Features
	Min	Max	Min	Max										
SC560	2.5	5.5	1.2	3.3	300*	100	Yes	100	Yes	2	50	65	MLPQ-UT8 (1.5x1.5x0.6)	Power Good flag, dual enable, low noise

\* Per output \*\* All regulators active

**LED Drivers - Inductor Based**

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)	f <sub>SW</sub> (MHz)	Max # LED's	# LED Strings	# LED's Per String Max (Vf=3.5V)	Current Per LED String Max (mA)	Total current Max (mA)	PWM Dimming Max (Freq)	Package (mm)	Features
	Min	Max	Max									
SC440A	4.5	27	42	0.8	72	6	12	30	180	Up to 50kHz	MLPQ-24 (4x4x1)	Open / Short LED string disable, OCP, OTP, OVP and FFLAG
SC441A	4.5	21	36	0.7	40	4	10	150	600	Up to 50kHz	TSSOP-20 EDP	Open / Short LED string disable, OCP, OTP, OVP and FFLAG, AEC-Q100 qualified
SC442	4.5	21	42	0.2-1.0	120	10	12	30	300	Up to 50kHz	MLPQ-UT-28, (4x4x0.6)	Adj freq, adj SCP level, Open / Short LED string disable, OCP, OTP and OVP
SC443	4.5	27	42	0.2-1.2	36	3	12	30	90	Up to 50kHz	MLPQ-UT-16, (3x3x0.6)	Adj freq Open LED string disable, OCP, OTP and OVP
SC445	4.5	27	42	0.7	40	4	10	150	600	Up to 50kHz	TSSOP-20 EDP	Automotive load dump capable, Prog.SCP
SC446	4.5	27	42	0.7	36	3	12	100	300	Up to 50kHz	TSSOP-16 EDP	Open / Short LED string disable, OCP, OTP and OVP
SC4541	2.9	22	25	2	7	1	7	20	20	Up to 500kHz	SOT23-6 MLPD-UT-6, (2x2x0.6)	High-side sensing integrated Schottky rectifier, no external compensation, Buck, Boost Operation
SC5010	4.5	27	50	0.2-2.2	96	8	12	30	240	Up to 30kHz	MLPQ-UT-28 (4x4x0.6)	Synchronous phase-shift, 10-bit dimming resolution, no external compensation
SC5012/Q	4.5	45	65	0.2-2.2	64	4	16	150	600	Up to 30kHz	MLPQ-24 (4x4x1)	I <sup>2</sup> C, FSYNC, 5000:1 Phase Shifted PWM Dimming, AEC-Q100 Qualified
SC5014	4.5	27	50	0.2-2.2	64	4	16	120	480	Up to 30kHz	MLPQ-20 (4x4x1)	Highly integrated, high efficiency, boost driver, reduces display thickness
SC5014A	4.5	27	50	0.2-2.2	32	2	16	240	480	Up to 30kHz	MLPQ-20 (4x4x1)	

**LED Drivers - Charge Pump Based**

Part Number	VIN (V)		f <sub>SW</sub> (kHz)	I <sub>OUT</sub> (mA) Max	Mode	Backlight Sink Current (mA) Max	Flash Sink Current (mA) Max	Flash Safety Timer	LDOs	Control Interface	Package (mm)	Features
	Min	Max										
SC628A	3	5.5	250	1000	1x,1.5x,2x	N/A	1000	Yes	0	I <sup>2</sup> C	MLPQ-UT-20, (3x3x0.6)	Flash LED = 1A max in flash mode, 275mA max continuous for spotlight
SC644	2.9	5.5	250	150	1x,1.5x,2x	6 x 25	N/A	N/A	4	SemPulse®	MLPQ-UT-20, (3x3x0.6)	Sempulse, single wire interface, optimized for single cell Li-ion applications, 4 programmable LDOs
SC654	2.9	5.5	250	150	1x,1.5x,2x	6 x 25	N/A	N/A	0	SemPulse®	MLPQ-UT-14, (2x2x0.6)	Sempulse, single wire interface, optimized for single cell Li-ion applications

## LED Current Sinks

Part Number	V <sub>IN</sub> (V)		Sink Dropout Voltage (mV)	Sink Current Range (mA)	Sink Qty	Control Interface	Dimming	Package (mm)	Features
	Min	Max							
SC620	2.7	5.5	150 max	31.25µA - 25mA	8	I <sup>2</sup> C	Register	MLPQ-UT-16, (3x3x0.6)	Output expansion capability, individually controllable current sinks
SC667/8	2.9	5.5	59 typ	0 - 25mA	8	I <sup>2</sup> C	PWM	MLPQ-UT-20, (3x3x0.6)	LED current sink, 7/8 back lights + 4 LDOs + I <sup>2</sup> C + PWM + SemPulse® + ALS, Automatic Dropout Prevention (ADP)

## Charge Pump Regulators

Part Number	V <sub>IN</sub> (V)		V <sub>OUT</sub> (V)	I <sub>OUT</sub> (cont) (mA)	f <sub>sw</sub> (kHz)	Mode	Package (mm)	Features
	Min	Max		Max				
SC600	2.5	6.5	4, 4.5, 5	60, 120 v	8, 32, 262, 650	1x,1.5x,2x	MSOP-10, MLPD-10, (3x3x1)	For use in battery operated power supply applications
SC603	2.5	6.5	4.5, 5	160, 200	262, 650	2x	MLPD-10 (3x3x1)	
SC630	2.9	5.5	3.3	400	200	1x,1.5x,2x	MLPD-UT-8 (2x2x0.6)	Buck-Boost <20mV V <sub>ripple</sub> , Soft Start
SC630A	2.95	5.5	3.3	300	1000	1x,1.5x,2x	MLPD-UT-8 (2x2x0.6)	Buck-Boost 33mV V <sub>ripple</sub> , Soft Start, uses ultra-small input / output capacitors
SC632	2.9	5.5	5	275	200	1x,1.5x,2x	MLPD-UT-8 (2x2x0.6)	Buck-Boost <30mV V <sub>ripple</sub> , Soft Start
SC632A	2.95	5.5	5	275	1000	1x,1.5x,2x	MLPD-UT-8 (2x2x0.6)	Buck-Boost 50mV V <sub>ripple</sub> , Soft Start, uses ultra-small input / output capacitors
SC633	2.9	5.5	5.3	400	200	1x,1.5x,2x	MLPD-UT-8 (2x2x0.6)	Optimized for single cell Li-ion applications Soft Start functionality

## Load Switches

Part Number	V <sub>IN</sub> (V)		I <sub>OUT</sub> Max (A)	RDS ON (mΩ)	Shutdown Current (µA)	Quiescent Current (µA)	Enable Pin	Auto Discharge	ESD (kV HBM)	Package (mm)
	Min	Max								
TS12001	1.2	5.5	3	175	0.1	0.000	No	No	2	DFN-8 2x2
SC704	1.1	3.6	0.5	90	0.1	2	Yes	No	5	4-Bump CSP (0.76x0.76)
SC705	1.1	3.6	0.5	90	0.1	2	Yes	Yes	5	4-Bump CSP (0.76x0.76)
SC724	1.1	3.6	2.0	36	0.2	2	Yes	No	5	4-Bump CSP (0.76x0.76)
SC725	1.1	3.6	2.0	36	0.2	2	Yes	Yes	5	4-Bump CSP (0.76x0.76)
SC728	1.1	3.6	2.0	36	0.2	2	Yes	No	5	4-Bump CSP (0.76x0.76)
SC729	1.1	3.6	2.0	36	0.2	2	Yes	Yes	5	4-Bump CSP (0.76x0.76)

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