



SEMTECH POWER MANAGEMENT

Power Management Selector Guide

Greener, Smarter, Smaller Power Management



Semtech Overview

Semtech Corporation, based in Camarillo, CA, USA, is a leading global supplier of analog and mixed-signal semiconductors with breakthrough technologies across a broad product portfolio, including:

- Power Management ICs
- Circuit Protection ICs
- Timing and Synchronization ICs
- Touch Interface Controllers
- Telecom and Datacom SerDes
- Microwave and Millimeter Wave
- Wireless RF Transmitters, Receivers, Transceivers
- Digital Sensors/Signal Conditioners

Semtech's goal is to provide semiconductor solutions that help customers push system performance to new levels and meet emerging, ultra-low power green technology initiatives.

GREENER, SMARTER, 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 totally new class of greener, smarter and smaller end products.

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 new family of EcoSpeed® converters that set a new standard for efficiency, speed, size and simplicity in emerging green energy applications.

Boost Converters

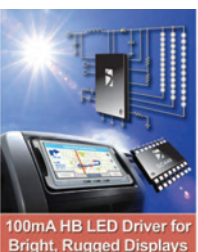
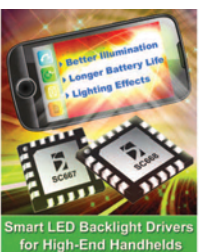
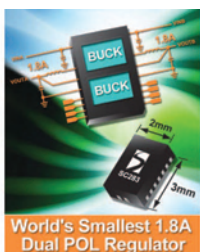
Semtech's expanded line of boost converters now includes the world's smallest low-voltage regulators, as well as a growing line of single- and multi-string boost LED drivers for demanding, rugged backlighting applications.

Charge Pumps

Semtech's high-performance, charge pump-based converters and LED backlight drivers build on a strong history of charge pump experience providing very high efficiency in the smallest footprint, with accurate current regulation, low noise and a wide dimming range.

LDOs

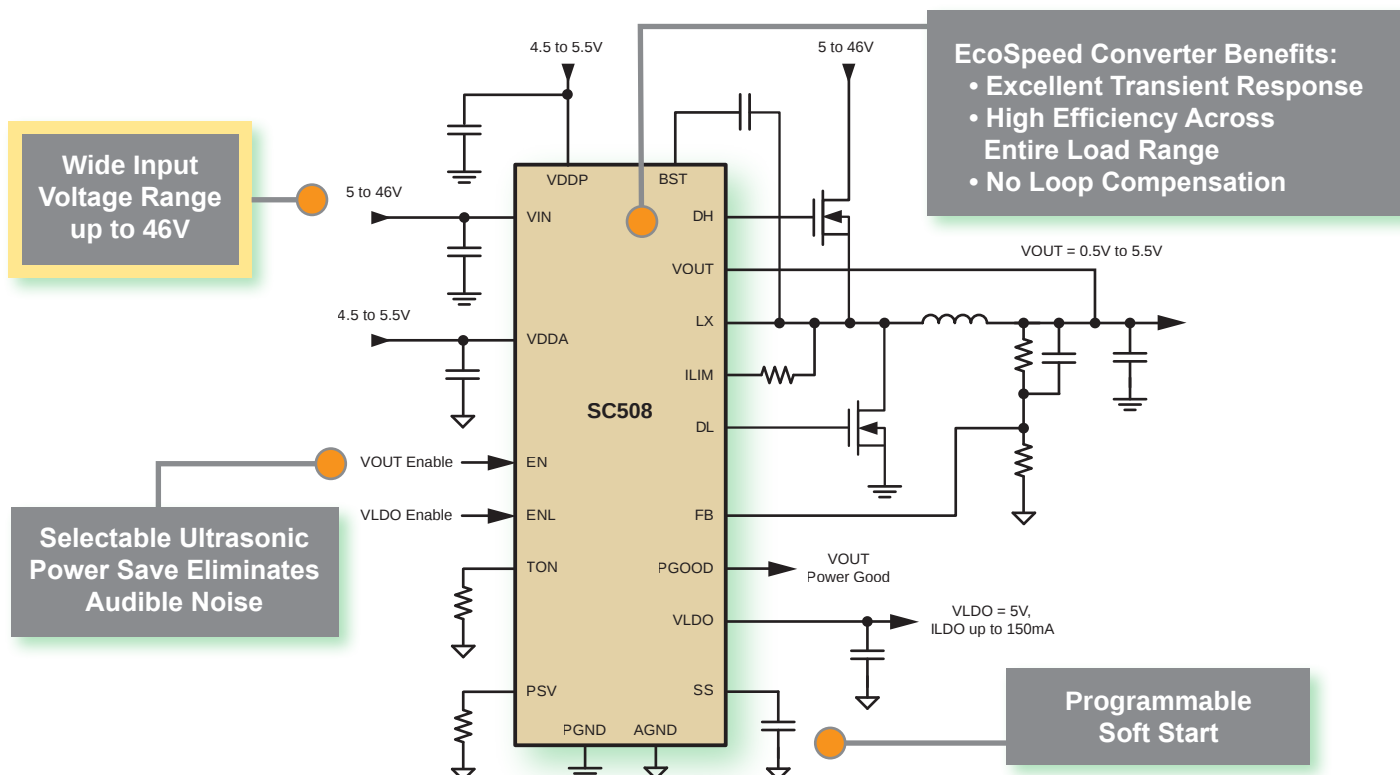
A wide range of ultra-low dropout regulators offers ideal solutions for systems where VOUT is very close to VIN.



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High Voltage EcoSpeed® Controller



EcoSpeed® Converters - Product Portfolio

Controllers and Regulators with Integrated FETs

Power Save for Maximum Efficiency at Light Load

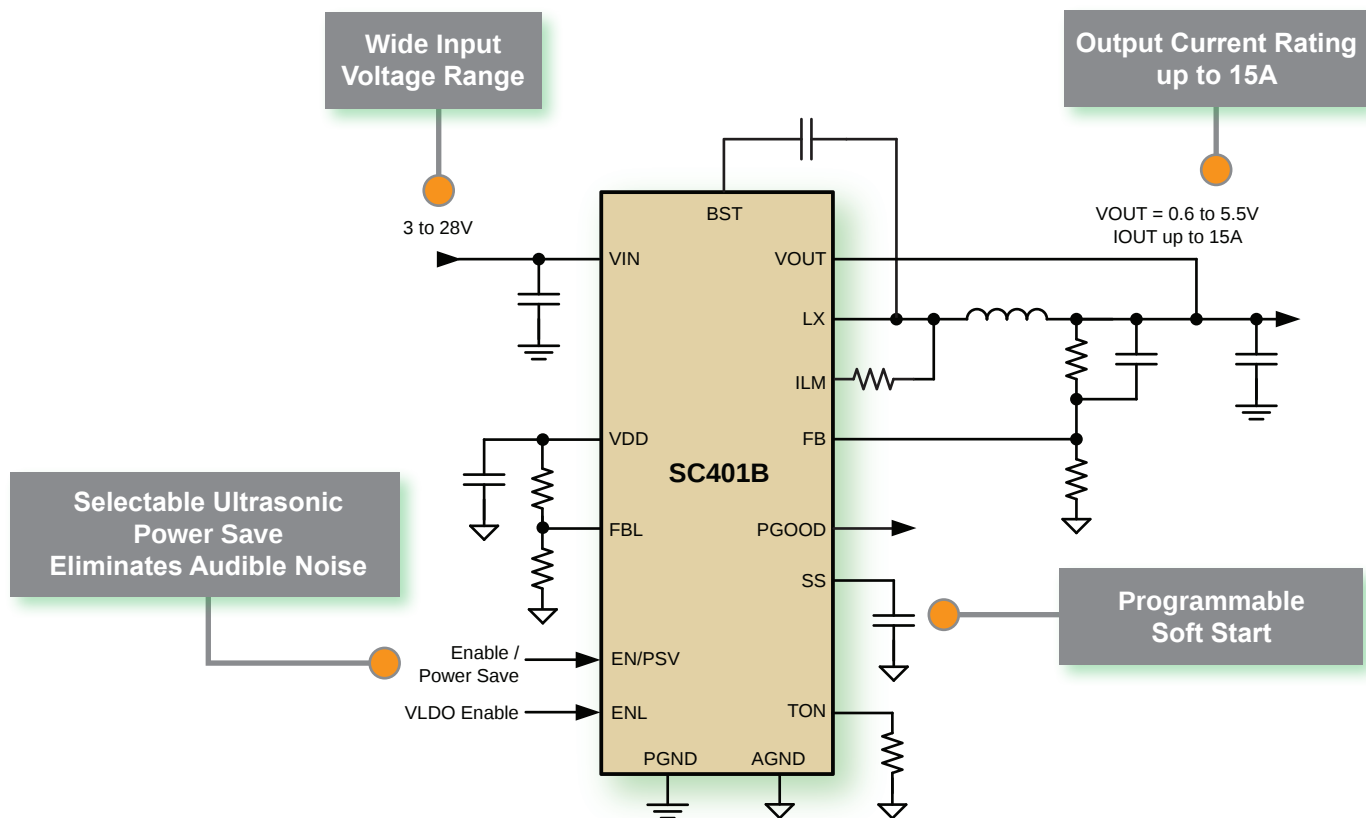
Very Small Packaging

Product	Type	V _{IN} Range	I _{OUT} (max)	PGOOD	Enable	Soft Start	PSAVE ⁺	OCP	Package
SC171	Regulator	3 - 5.5V	1A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1mm)
SC172	Regulator	3 - 5.5V	2A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1mm)
SC173	Regulator	3 - 5.5V	3A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1mm)
SC173A	Regulator	3 - 5.5V	3A	Yes	Yes	Yes	Regular	Latching	MLPD-10 (3x3x1mm)
SC410	Regulator	5.5 - 24V	3A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1mm)
SC174	Regulator	3 - 5.5V	4A	Yes	Yes	Yes	Ultrasonic	Latching	MLPD-10 (3x3x1mm)
SC403B	Regulator	3 - 28V	6A	Yes	Yes	Programmable	Ultrasonic	Latching	MLPQ-32 (5x5x1mm)
SC414	Regulator	3 - 28V	6A	Yes	Yes	Yes	Ultrasonic	Latching	MLPQ-28 (4x4x1mm)
SC424	Regulator	3 - 28V	6A	Yes	Yes	Yes	Regular	Latching	MLPQ-28 (4x4x1mm)
SC402B	Regulator	3 - 28V	10A	Yes	Yes	Programmable	Ultrasonic	Latching	MLPQ-32 (5x5x1mm)
SC417	Regulator	3 - 28V	10A	Yes	Yes	Yes	Ultrasonic	Latching	MLPQ-32 (5x5x1mm)
SC427	Regulator	3 - 28V	10A	Yes	Yes	Yes	Regular	Latching	MLPQ-32 (5x5x1mm)
SC401B	Regulator	3 - 17V	15A	Yes	Yes	Programmable	Ultrasonic	Latching	MLPQ-32 (5x5x1mm)
SC418	PWM Controller	3 - 28V	30A*	Yes	Yes	Yes	Prog. Ultrasonic or Regular	Latching	MLPQ-UT-20 (3x3x0.6mm)
SC419	PWM Controller	3 - 28V	30A*	Yes	Yes	Yes	Prog. Ultrasonic or Regular	Latching	MLPQ-UT-20 (3x3x0.6mm)
SC508	PWM Controller	5 - 46V	30A*	Yes	Yes	Programmable	Prog. Ultrasonic or Regular	Hiccup	MLPQ-UT-20 (3x3x0.6mm)
SC493	I ² C Controller	3 - 28V	30A*	Yes	Yes	Programmable	Prog. Ultrasonic or Regular	Latching	MLPQ-UT-20 (3x3x0.6mm)

* External FET Drive

⁺ For details on Power Save, see Page 17

Efficiency and Speed of EcoSpeed Regulators with Programmable Soft Start



EcoSpeed® Converters

High Efficiency, Fast Wake-Up, Low EMI

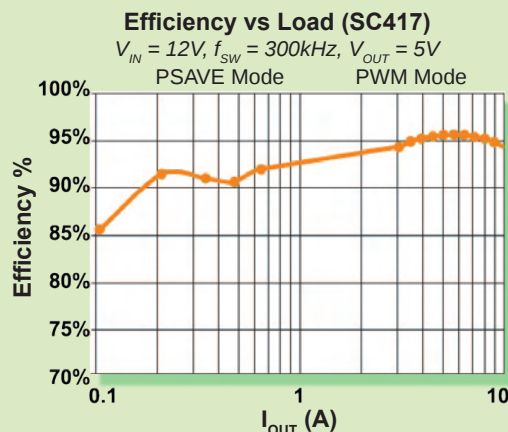
EcoSpeed converters provide high efficiency across the entire load range with a power save (PSAVE*) feature that lowers the switching frequency to cater to low-power standby requirements. This reduces power FET gate charge switching losses and results in greater than 90% peak standby efficiency during 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.

An ultrasonic power save option maintains switching frequencies above 25kHz to eliminate audible noise during standby.

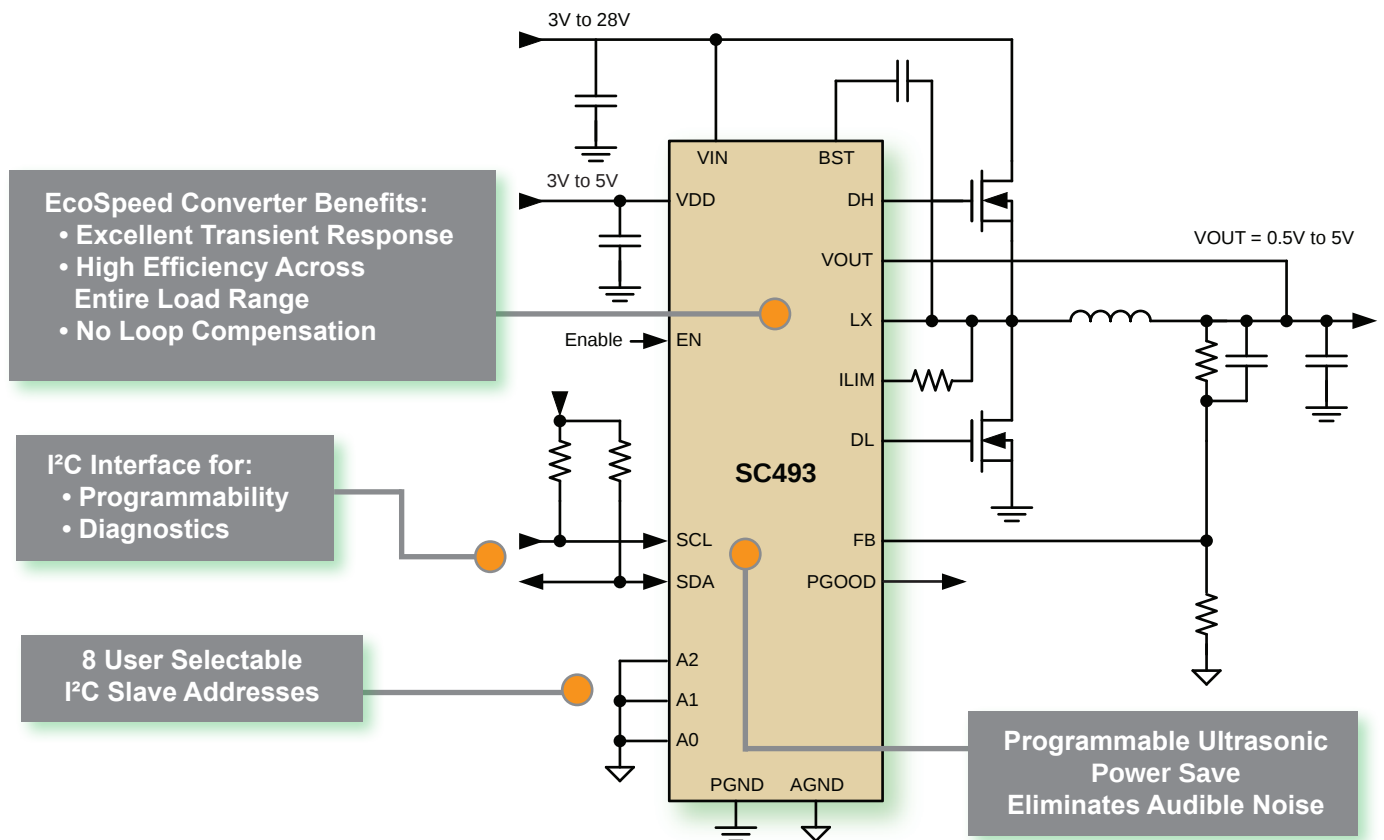
All EcoSpeed converters offer SmartDrive™, a two-step, high-side FET turn-on scheme that reduces EMI.

* For details on Power Save, see Page 17



High Efficiency Across the Entire Load Range

Digital Power with EcoSpeed Converter Core

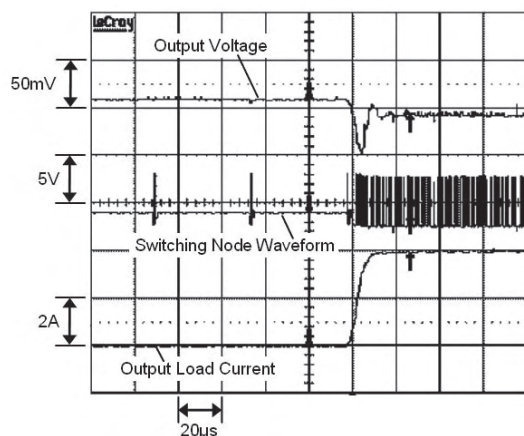


EcoSpeed® Converters

Excellent Transient Response

Load Transient Response – Load Rising (SC174)

($V_{IN} = 5V$, $V_{OUT} = 1.2V$)

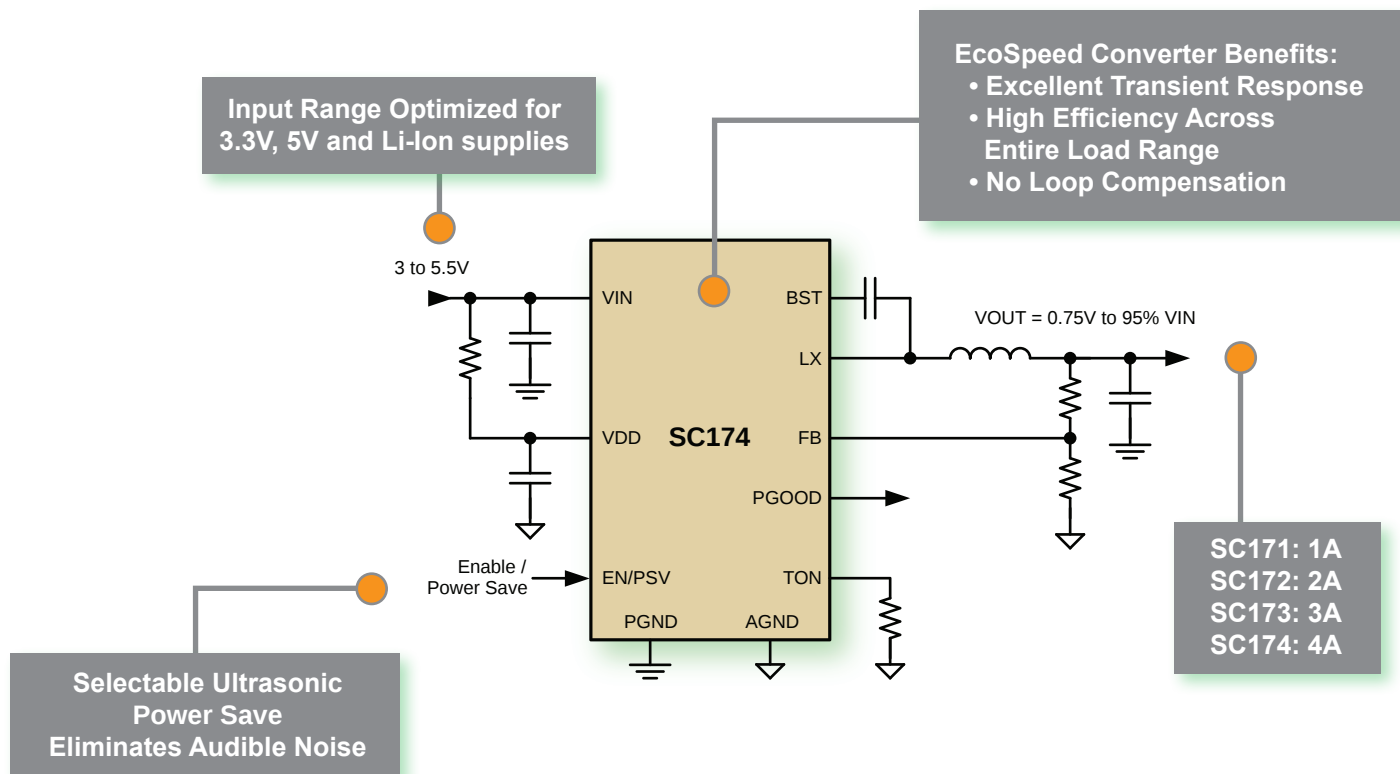


**Fast Comparator Provides
Excellent Transient Response**

The adaptive on-time pseudo-fixed frequency core used in EcoSpeed converters enables very fast transient response, due to the response time being controlled by a fast comparator instead of a relatively slow error amplifier found in conventional voltage mode and current mode control topologies. This also reduces the size of the power components used in the system.

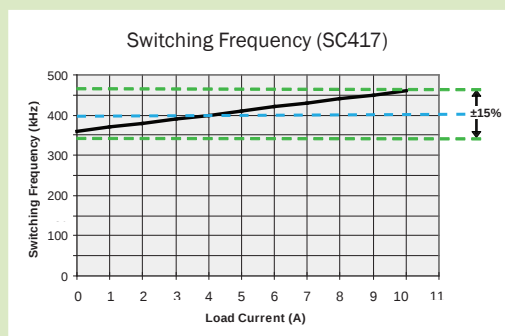
The fast transient response also enables the output capacitance to be reduced.

EcoSpeed Regulators: High Efficiency with High Performance



EcoSpeed® Converters

Best-in-Class DC-DC Converter Performance



EcoSpeed converters are a new class of DC-DC buck regulators and controllers that use Semtech's patented AOT* architecture to enable:

- Very high efficiency across the entire load range
- Ultra-fast transient response
- Easy-to-use, small and highly integrated solutions

The AOT topology dynamically adjusts the on-time, based upon input and output voltages. This results in pseudo-fixed frequency operation with $\pm 15\%$ accuracy – similar to voltage mode and current mode, and better than constant on-time and hysteretic topologies.

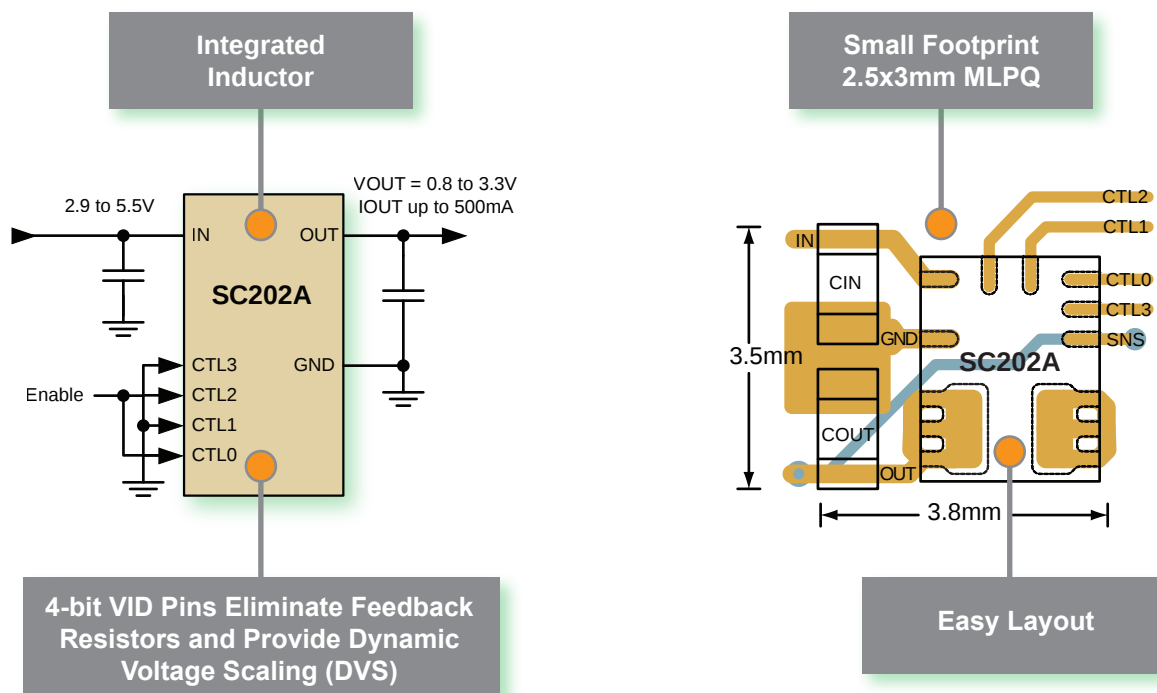
AOT core simplifies design, reduces components:

- Eliminates need for loop compensation components
- Enables use of ceramic input/output capacitors

*AOT = Adaptive On-Time architecture; U.S. Patent No. 7,714,547

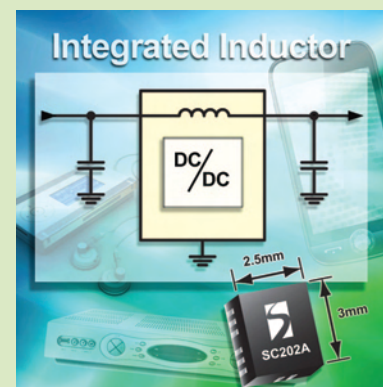
Switching Regulator as Easy to Use as LDOs

The SC202A combines the ease-of-use of an LDO with the high efficiency (up to 94%) of a synchronous buck converter by integrating two FETs, drivers and an inductor in a tiny, 2.5x3x1mm package. A programmable output voltage eliminates the need for external programming resistors, further reducing total PCB space. The combination of high integration and ultra-small packaging occupies a footprint of less than 14mm², to offer a more efficient switching regulator as an alternative to LDOs.



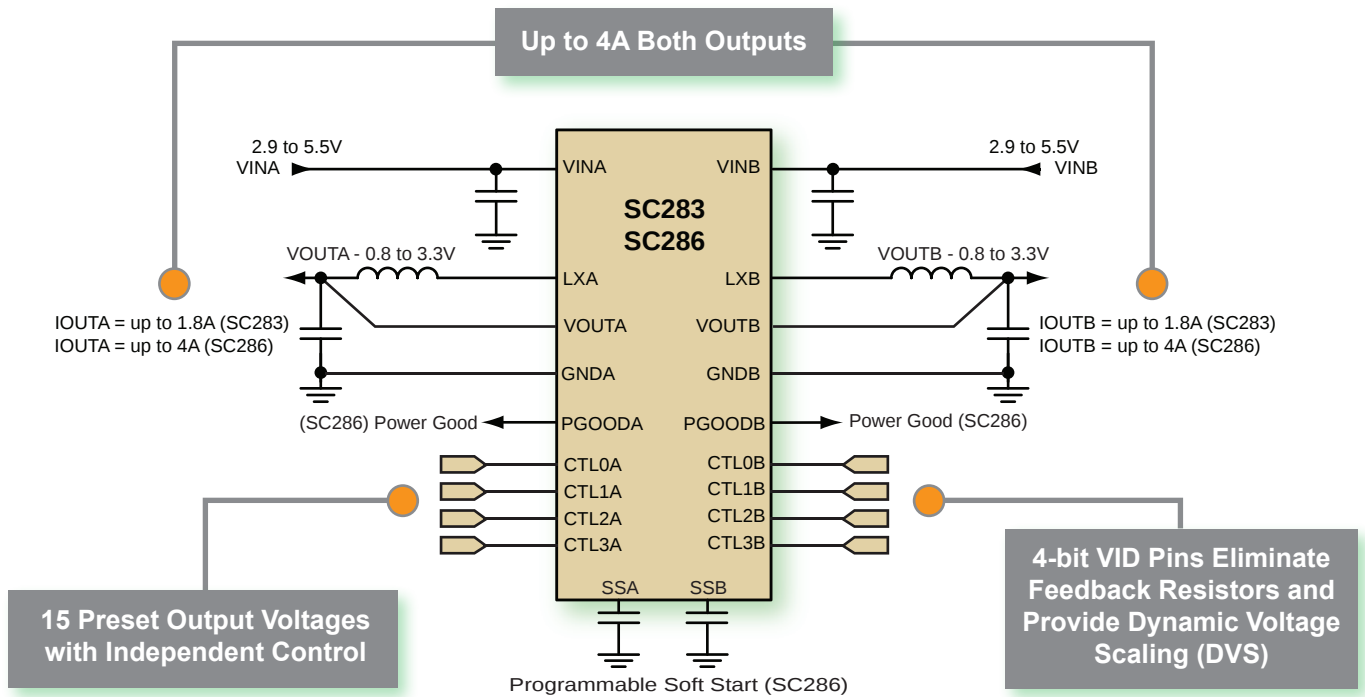
Buck Converters Available with or without Integrated Inductor

- Up to 94% efficiency
- Automatic PSAVE mode maintains high efficiency at light loads
- Soft Start
- 3.5MHz switching frequency
- SC202A: includes integrated inductor
- SC195: without integrated inductor
- SC197: dual version of SC195 in 2x3mm package

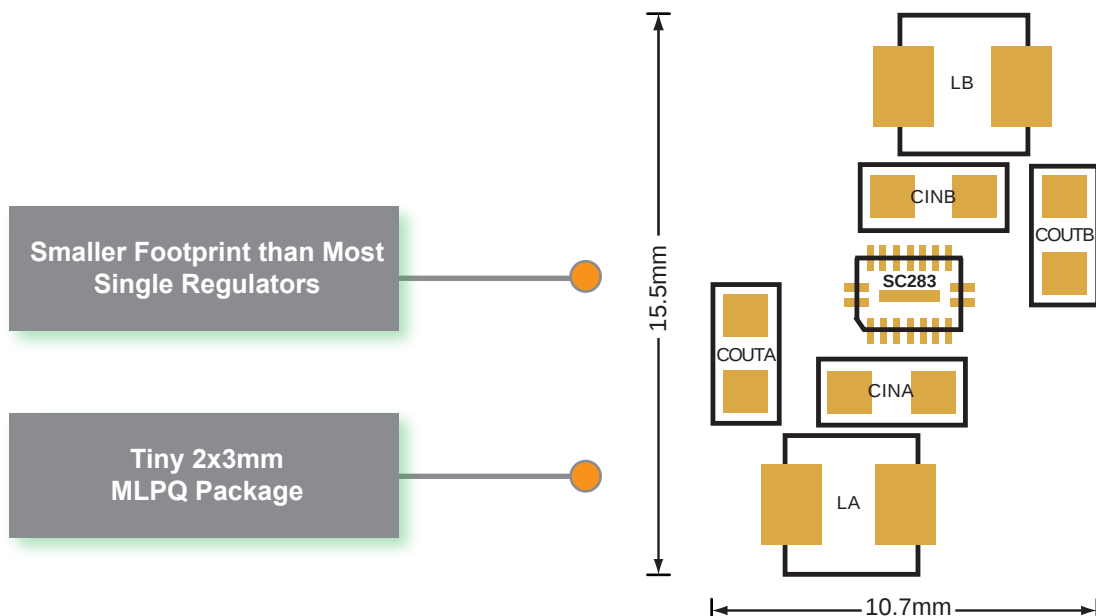


World's Smallest Dual POL Regulators

Most point-of-load applications derive more than one load voltage from a 5V or 3.3V bus. The SC283 (1.8A) and SC286 (4A) address this need, combining two high performance, high efficiency synchronous buck regulators in a single package. Full independent control of both outputs provides the flexibility of two discrete regulators combined with an amazingly small footprint.



Part Number	I _{OUT} (max)	Power Good	Prog. Soft Start	Power Save	Package
SC283	1.8A	No	No	No	MLPQ-W18 (2x3x0.8mm)
SC286	4A	Yes	Yes	Yes	MLPQ-UT28 (4x4x0.6mm)



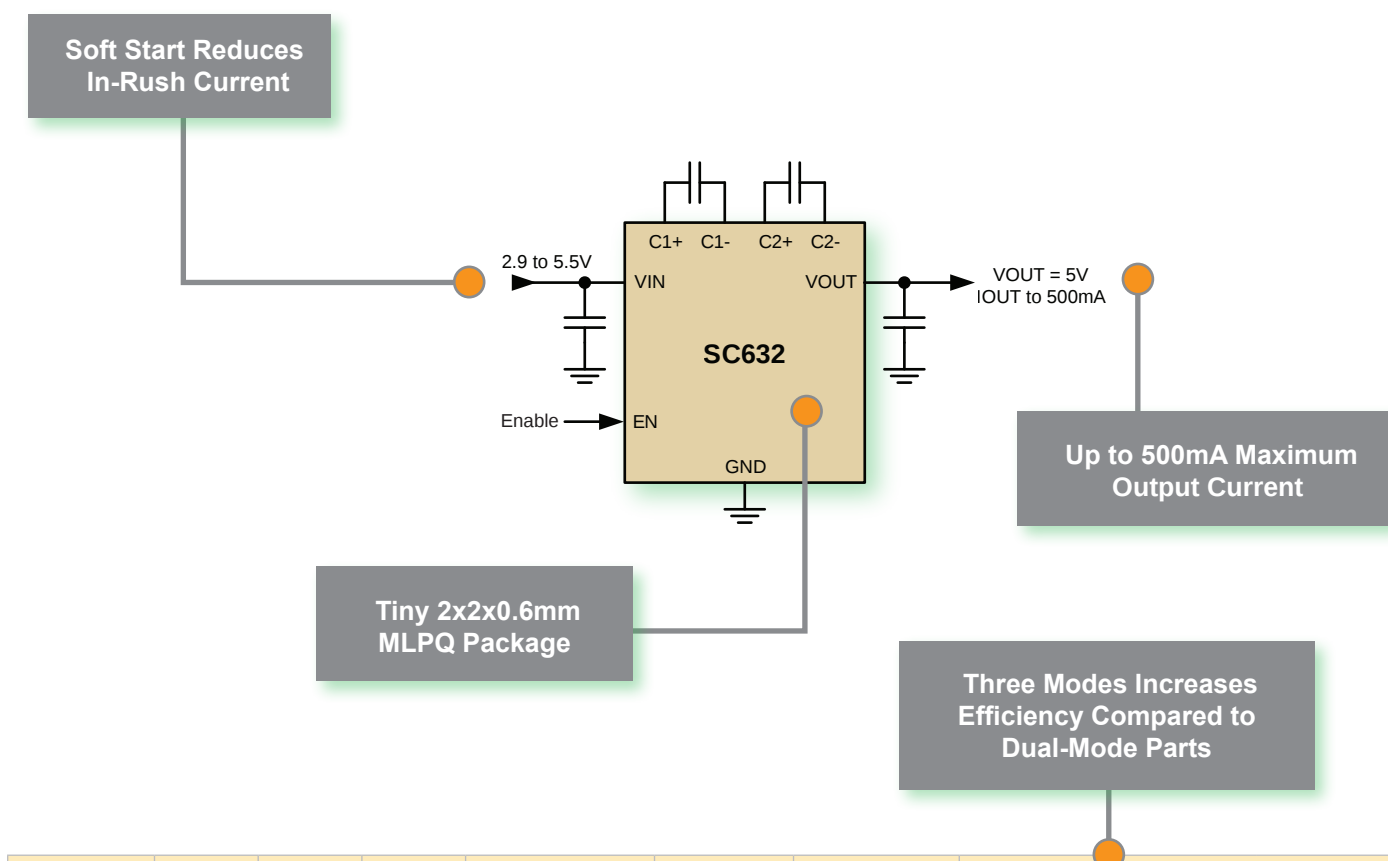
Simple Buck-Boost Converter With No Inductor



The SC63x converter family builds on Semtech's strong charge pump technology to provide simple, efficient and low-noise converters that:

- Boost voltage when the input is below the required output voltage, and
- Function as LDO linear regulators when the input voltage is greater than the output.

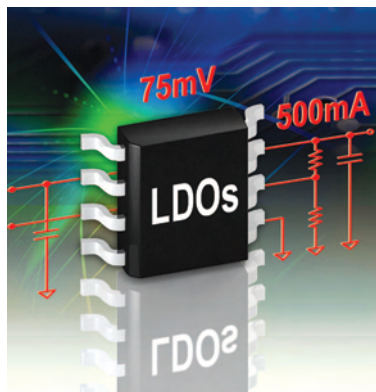
Unlike most charge pumps, these devices can source large amounts of current – up to 500mA.



Part Number	V_{IN} (min)	V_{IN} (max)	V_{OUT}	I_{OUT} Continuous*	I_{OUT} (max)	I_q (typ)	Charge Pump Modes		
	(V)	(V)	(V)	(mA)	(mA)	(mA)	1x	1.5x	2x
SC630	2.9	5.5	3.3	400	500	1.5	✓	✓	✓
SC630A	2.95	5.5	3.3	300	500	2.5	✓	✓	✓
SC631	2.9	5.5	4.4	250	500	1.5	✓	✓	✓
SC632	2.9	5.5	5.0	275	500	1.5	✓	✓	✓
SC632A	2.95	5.5	5.0	275	400	2.5	✓	✓	✓

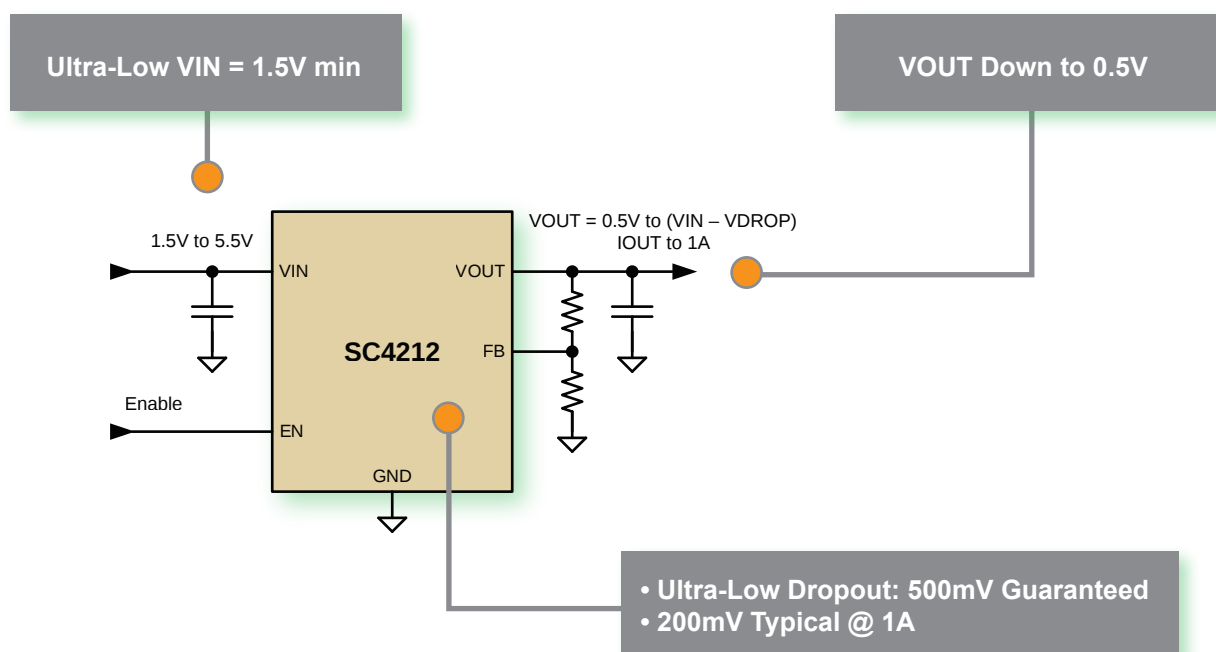
* Limited by thermal dissipation of the package

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 of green power applications.



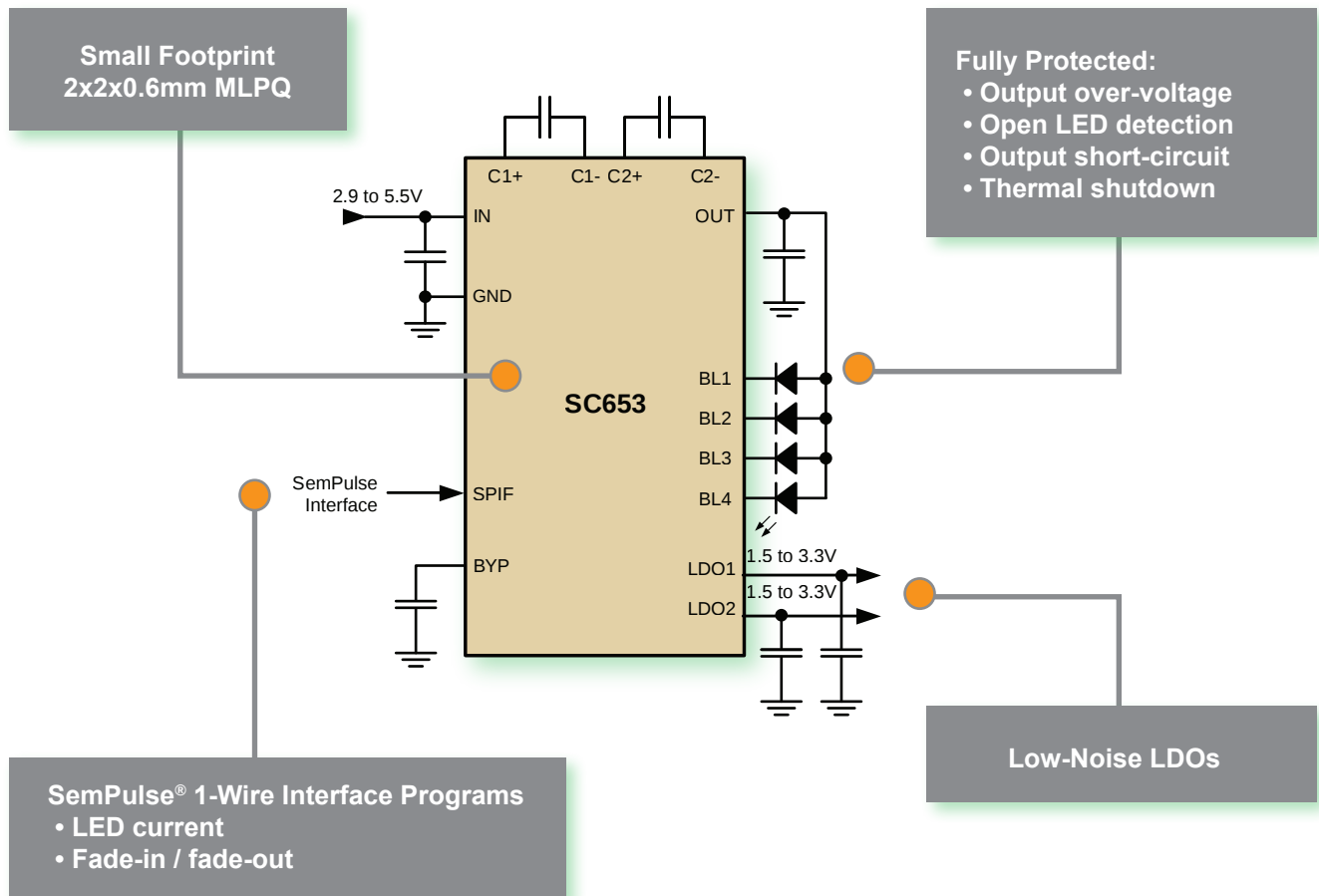
Part Number	V_{IN} (V) (min)	I_{OUT} (A) (max)	V_{DROP} at Full Load (V) (typ)	Enable Pin (Y/N)	Package
SC4213H	1.4	0.5	0.075	Y	SOIC-8
SC4211	1.4	1	0.1	Y	SOIC-8 EDP*
SC4212	1.5	1	0.2	Y	MLPD-8 (3x3x1mm)
SC4215A SC4215H	1.4	2	0.3	Y	SOIC-8 EDP*
SC4216 SC4216H	1.45	3	0.45	Y	SOIC-8 EDP*
SC4217	1.8	3	0.3	Y	TO-263-5

*Thermally enhanced exposed die pad

Best and Broadest Range of Charge Pump LED Drivers



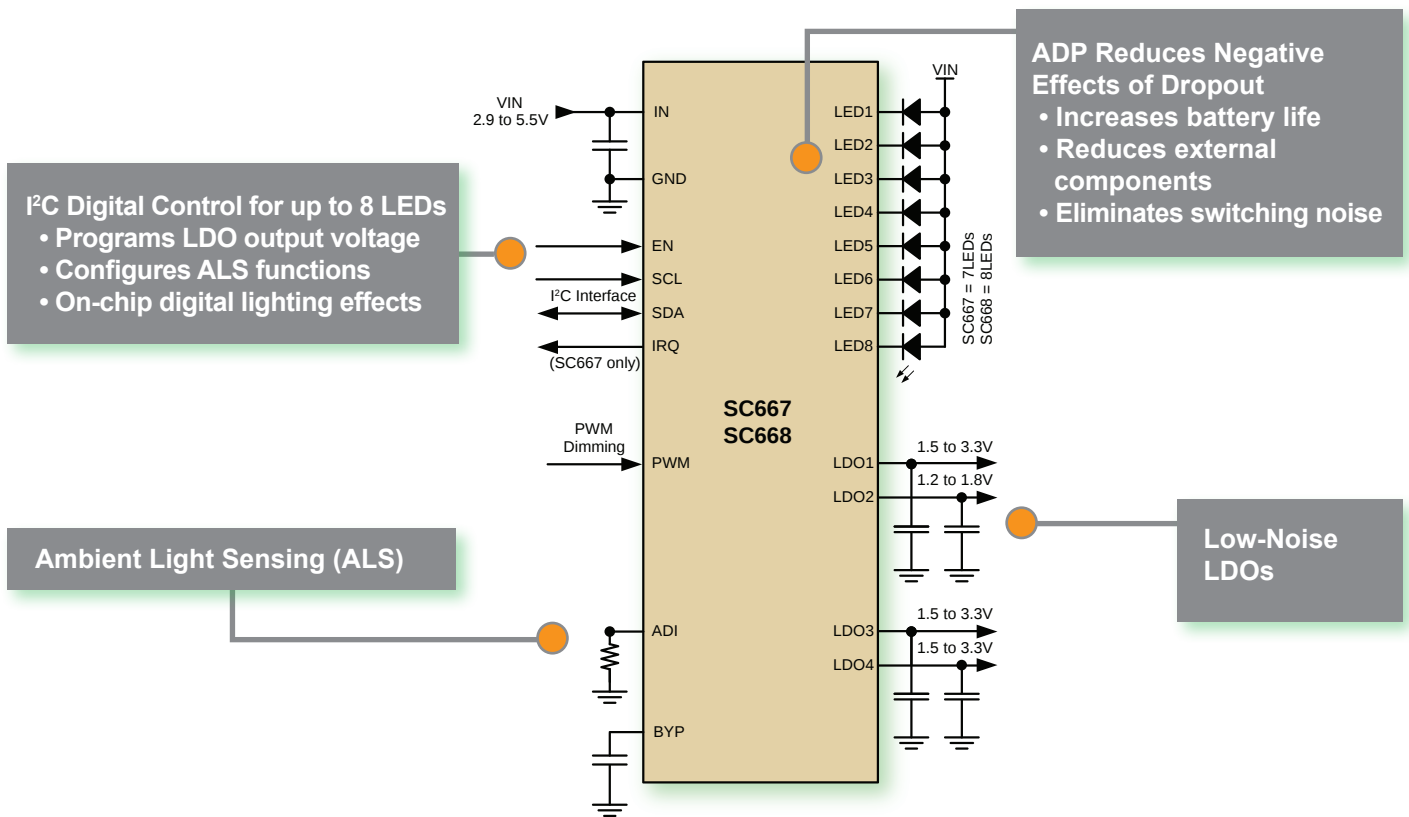
The SC65x charge pump family further expands Semtech's extensive offering of LED backlight drivers for portable applications. The SC65x devices combine leading-edge 3-mode charge pump capability with an extensive feature set – including 0.5% matching and $\pm 1.5\%$ accuracy – all in a tiny 2x2x0.6mm MLPQ package.



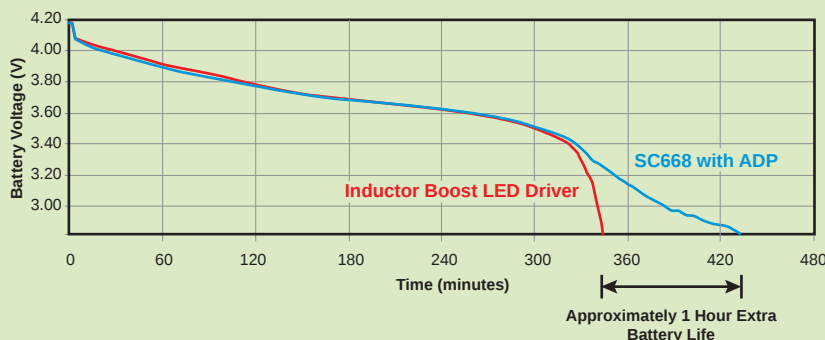
ADP* Improves Backlight Performance and Extends Battery Life

Lower LED forward voltages now enable some portable applications to use current sinks instead of boost converters. The SC667 and SC668 LED light management ICs provide the benefits of traditional current sinks, while reducing the negative effects of dropout, making them ideal for backlighting even in high-end handheld products.

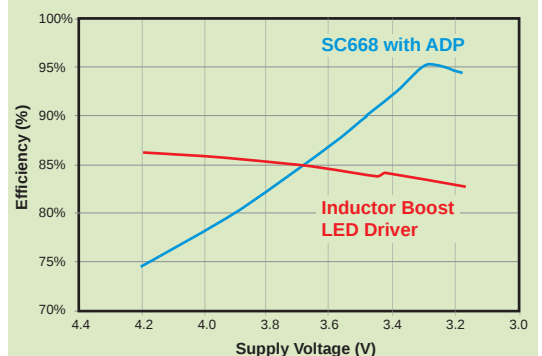
Designed with Semtech's Automatic Drop-out Prevention (ADP) feature, the SC667 and SC668 eliminate LED flicker (by ensuring that current regulation is always maintained) and remove the need for guardbanding to provide brighter backlight for a longer time, as the battery voltage nears end-of-life.



APD Extends Battery Life
8 LEDs at 20mA/LED, Room Temperature



APD Efficiency vs Inductive Boost
8 LEDs at 20mA/LED, Room Temperature



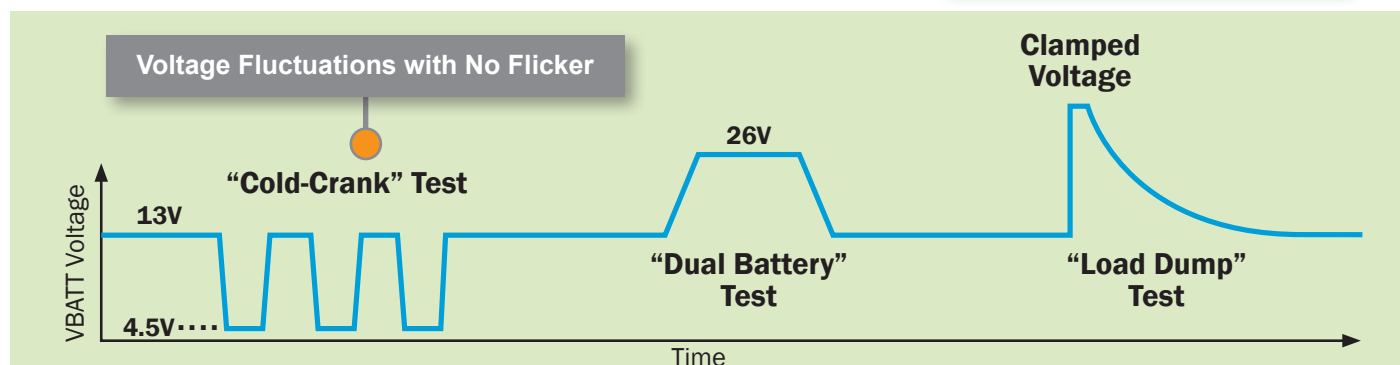
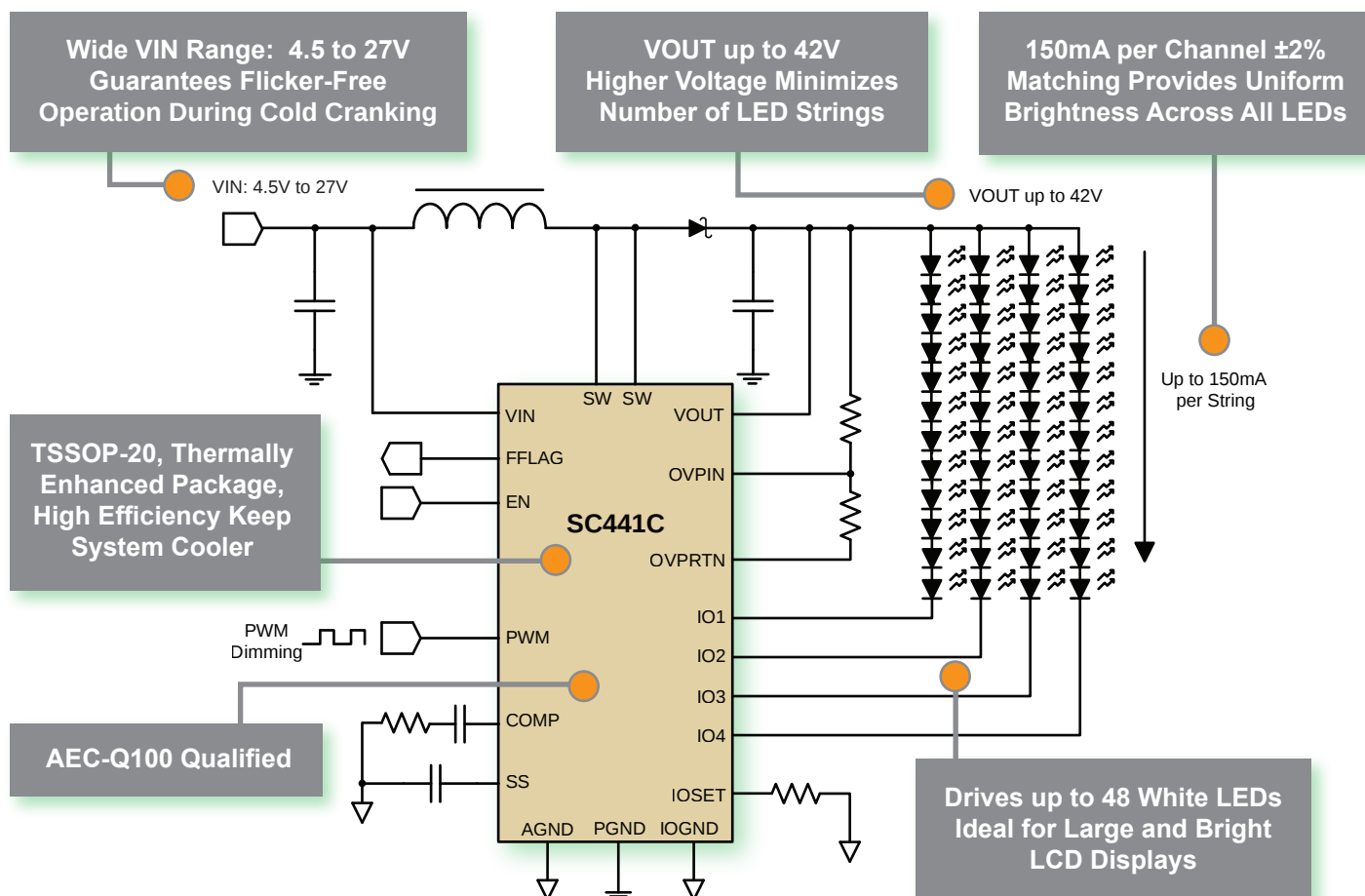
*ADP: Automatic Dropout Prevention

Rugged, High-Brightness LED Drivers for Automotive and Consumer Displays



The SC441C drives up to 48 LEDs at up to 150mA per channel, with up to 90% efficiency in a thermally enhanced package to provide high-brightness illumination with low operating temperature and long life in high ambient conditions.

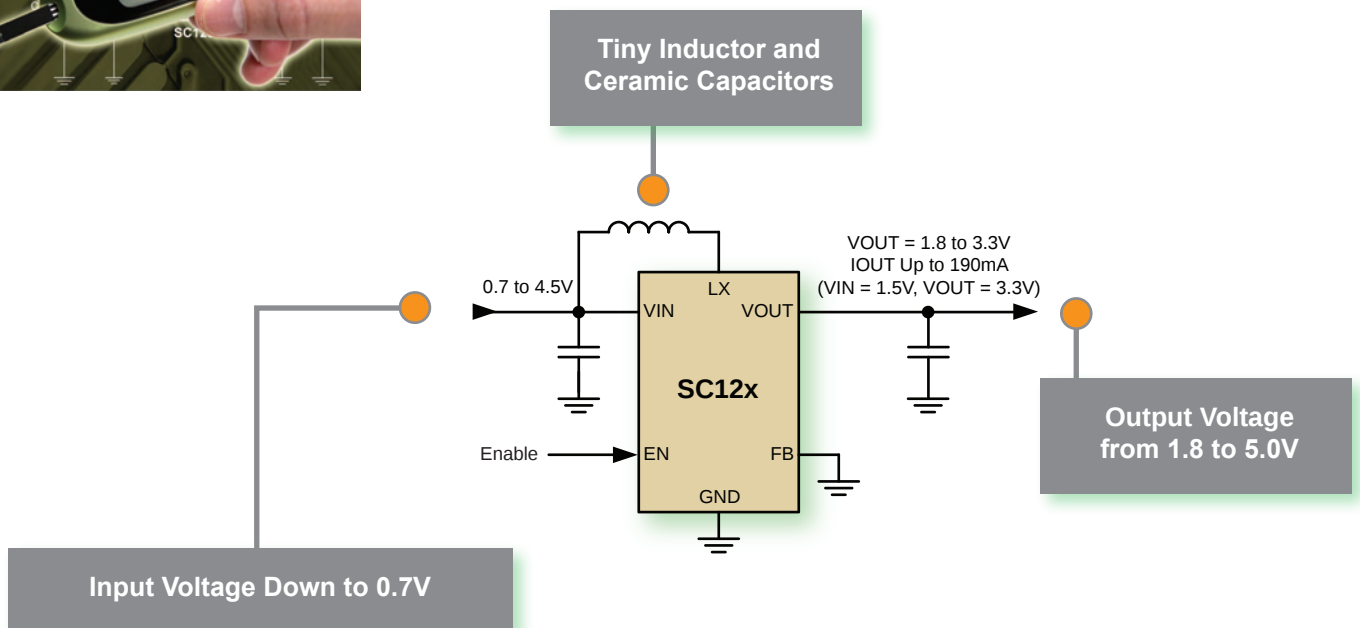
A wide operating voltage range from 4.5 to 27V enables the SC441C to operate under cold crank conditions making it a great choice for automotive lighting applications, from turn signal and brake lights, to instrument cluster lighting and LCD backlighting for navigation and infotainment systems. Additionally, 1mm pin spacing provides protection from PCB contamination in harsh environments by minimizing the risk of pin-to-pin faults.



World's Smallest Low VIN Boost Converters



Optimized for extremely small, space-constrained portable applications where battery life matters more than ever, the SC12x family of synchronous boost converters combines the ultimate in efficiency (up to 94%) with the smallest solution size (1.5x2x0.6mm MLPD).



Tiny Packages

Part Number	Input Voltage	Output Voltage	Output Current (1.5 V _{IN} to 3.3V _{OUT})	Operating Mode	I _Q (Measured at V _{OUT})	Shutdown Mode	Package
SC120	0.7 to 4.5V	1.8 to 5V, 3.3V fixed	190mA	PWM/PSAVE	50μA	Active Discharge	MLPD 1.5x2x0.6mm SOT23
SC121	0.7 to 4.5V	1.8 to 5V, 3.3V fixed	190mA	Forced-PWM	3.5mA	Active Discharge	MLPD 1.5x2x0.6mm
SC122	0.7 to 1.6V	3.3V fixed	95mA	PSAVE only	40μA	High-Z	MLPD 1.5x2x0.6mm

Step-down Switching Regulators / Controllers

Single Output Synchronous Regulators

	Part Number	VIN (V)		VOUT (V)		I _{OUT} Max (A)	Shutdown Current (μA)	Quiescent Current (mA)	f _{sw} (kHz)	PSAVE	Power Good Flag	Enable Pin	Package	Features
		Min	Max	Min	Max									
New	SC171	3.0	5.5	0.75	95%* V _{IN}	1	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10, 3X3x1mm	EcoSpeed® regulator, fast transient response
New	SC172	3.0	5.5	0.75	95%* V _{IN}	2	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10, 3X3x1mm	EcoSpeed® regulator, fast transient response
New	SC173	3.0	5.5	0.75	95%* V _{IN}	3	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10, 3x3x1mm	EcoSpeed® regulator, fast transient response
New	SC173A	3.0	5.5	0.75	95%* V _{IN}	3	5	0.5	200-1000	Regular	Yes	Yes	MLPD-10, 3X3x1mm	EcoSpeed® regulator, fast transient response
New	SC174	3.0	5.5	0.75	95%* V _{IN}	4	5	0.75	200-1000	Ultrasonic	Yes	Yes	MLPD-10, 3x3x1mm	EcoSpeed® regulator, fast transient response
	SC183C	2.9	5.5	0.8	3.3	2	11	0.01	2500	No	No	Yes	MLPQ-UT16, 3x3x0.6mm	4-bit VID
New	SC185	2.9	5.5	1.0	3.3	4	1	0.1	1500	Regular	Yes	Yes	MLPQ-UT16, 3x3x0.6mm	Prog Soft Start, Power Good
New	SC186	2.9	5.5	0.8	3.3	4	1	0.1	1500	Regular	Yes	Yes	MLPQ-UT16, 3x3x0.6mm	Prog Soft Start, Power Good, 4-bit VID
	SC189	2.9	5.5	1.0	3.3	1.5	1	7.5	2500	No	No	Yes	SOT23-5, MLPD-6, 2x2x0.6mm	
	SC190	2.7	5.5	1.0	2.8	0.3	0.1	0.01	1000	No	No	Yes	MLPD-10, 3x3x1mm	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, 2.3x2.3x0.8mm	Very low noise, very low input ripple
	SC192	2.7	7	0.8	V _{IN}	0.7	0.1	0.04	750	Regular	Yes	Yes	MLPD-10, 3x3x1mm	Adj current limit, ext synch
	SC194A/B	2.7	5.5	1.0	3.6	1	0.1	0.02	750-1250	Regular	No	Yes	MLPD-10, 3x3x1mm	Ext synch, 2-bit VID
New	SC195	2.9	5.5	0.8	3.3	0.5	0.1	0.04	3500	Regular	No	Yes	MLPQ-UT8, 1.5x1.5x0.6mm	4-bit VID
	SC196A	2.7	5.5	1.0	1.8	1.5	0.1	0.02	750-1250	Regular	No	Yes	MLPD-10, 3x3x1mm	Ext synch, 2-bit VID
	SC196	2.5	5.5	0.8	V _{IN}	1.5	0.1	0.02	750-1250	Regular	No	Yes	MLPD-UT10, 3x3x0.6mm	Ext synch, 2-bit VID
New	SC202A	2.9	5.5	0.8	3.3	0.5	0.1	0.04	3500	Regular	No	Yes	MLPQ-13, 2.5x3x1mm	Integrated inductor, 4-bit VID
New	SC401B	3.0	17	0.6	5.5	15	<27	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPQ-32, 5x5x1mm	EcoSpeed® regulator with prog Soft Start, integrated LDO w/crossover circuit, fast transient response
New	SC402B	3.0	28	0.6	5.5	10	<27	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPQ-32, 5x5x1mm	EcoSpeed® regulator with prog Soft Start, integrated LDO w/crossover circuit, fast transient response
New	SC403B	3.0	28	0.6	5.5	6	<27	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPQ-32, 5x5x1mm	EcoSpeed® regulator with prog Soft Start, integrated LDO w/crossover circuit, fast transient response
New	SC410	5.5	24	0.75	7.5	3	9	2.5	200-1000	Ultrasonic	Yes	Yes	MLPD-10, 3x3x1mm	EcoSpeed® regulator, fast transient response
	SC414	3.0	28	0.75	5.5	6	12	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPQ-28, 4x4x1mm	EcoSpeed® regulator, integrated LDO w/crossover circuit, fast transient response
	SC417	3.0	28	0.5	5.5	10	12	See datasheet	200-1000	Ultrasonic	Yes	Yes	MLPQ-32, 5x5x1mm	EcoSpeed® regulator, integrated LDO w/crossover circuit, fast transient response
	SC424	3.0	28	0.75	5.5	6	12	See datasheet	200-1000	Regular	Yes	Yes	MLPQ-28, 4x4x1mm	EcoSpeed® regulator, integrated LDO w/crossover circuit, fast transient response
	SC427	3.0	28	0.5	5.5	10	12	See datasheet	200-1000	Regular	Yes	Yes	MLPQ-32, 5x5x1mm	EcoSpeed® regulator, integrated LDO w/crossover circuit, fast transient response
	SC4620	2.3	5.5	0.5	V _{IN}	2.5	0.2	7.0	200-2000	No	Yes	Yes	MLPQ-20, 4x4x1mm	Prog Soft Start and current limit, Power Good flag, ext synch
	SC4624	2.3	5.5	0.5	V _{IN}	4	0.2	7.0	200-2000	No	Yes	Yes	SO-16 EDP, MLPQ-20, 4x4x1.75mm	Prog Soft Start and current limit, Power Good flag, ext synch
	SC4626	2.9	5.5	1.0	3.3	1	1	7.5	2500	No	No	Yes	SOT23-5	

Step-down Switching Regulators / Controllers (...continued)

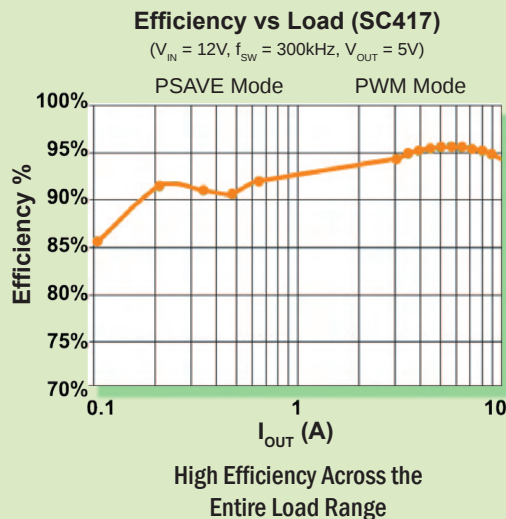
Multiple Output Synchronous Regulators

Part Number	VIN (V)		# of Outputs	VOUT (V)		IOUT Max (A)	ISW Min (A)	Shutdown Current (μ A)	Quiescent Current (μ A)	fsw (kHz)	PSAVE	Package	Features
	Min	Max		Min	Max								
SC197	2.9	5.5	2	0.8/0.8	3.3/3.3	0.5/0.5	0.8/0.8	0.1/0.1	38/38	3500	Regular	MLPQ-UT18, 2x3x0.6mm	4-bit VID
SC283	2.9	5.5	2	0.8/0.8	3.3/3.3	1.8/1.8	2.25/2.25	<10	10	2500	No	MLPQ-W18, 2x3x0.8mm	4-bit VID, very small footprint, 100% duty cycle
SC286	2.9	5.5	2	0.8/0.8	3.3/3.3	4/4	5/5	<1	0.1	1600	Regular	MLPQ-UT28, 4x4x0.6mm	4-bit VID, very small footprint, 100% duty cycle

EcoSpeed® Converters: Ultra-Fast Transient Response and High Efficiency

EcoSpeed converters are a new class of DC-DC buck regulators and controllers that use Semtech's patented adaptive on-time (AOT) architecture to provide:

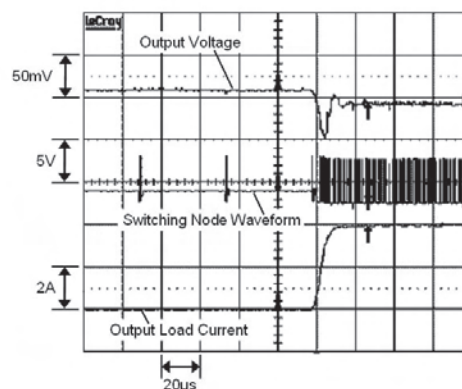
- Very high efficiency across the entire load range
- Ultra-fast transient response
- Ease-of-use and small size



The AOT architecture eliminates the need for control loop compensation and enables the use of ceramic input/output capacitors to simplify design and reduce component count.

Load Transient Response – Load Rising (SC174)

($V_{IN} = 5V$, $V_{OUT} = 1.2V$)



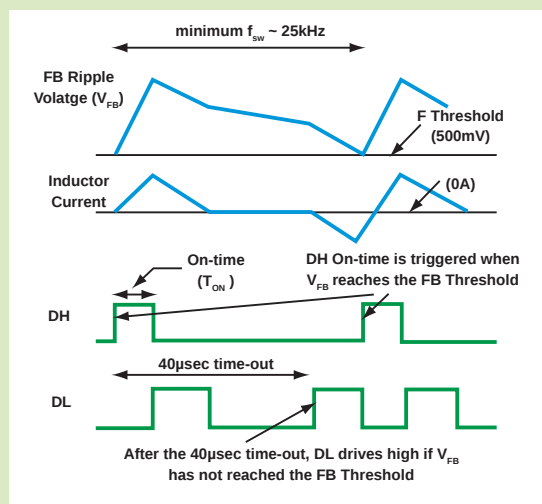
Fast Comparator Provides Excellent Transient Response

PSAVE: Low Standby Power with Fast Wake-Up Response

Many Semtech DC-DC converters offer a power-save (PSAVE) mode to lower the switching frequency and meet the low standby power requirements of today's green energy initiatives. PSAVE reduces power FET gate charge switching losses, resulting in up to 95% peak standby efficiency during light loads.

For fast recovery from PSAVE to active mode, the AOT architecture inside EcoSpeed converters responds on a cycle-by-cycle basis. So, when the load changes from light to full conditions, the converter can quickly exit PSAVE mode providing fast wake-up response time.

Several EcoSpeed DC-DC converters also offer an ultrasonic PSAVE (UPSAVE) feature that maintains frequencies above 25kHz to eliminate audible noise during standby.



Ultrasonic PSAVE Operation Eliminates Audible Noise During Standby

Step-down Switching Regulators / Controllers (...continued)

Single Output Non-Synchronous Regulators

Part Number	VIN (V)		VOUT (V)		IOUT Max (A)	ISW Min (A)	Shutdown Current (µA)	fsw (kHz)	Package	Features
	Min	Max	Min	Max						
SC4518H	4.4	24	0.8	0.85* VIN	1.4	2.0	100	600	SO-8 EDP	External synch
SC4519	3	16	1.2	0.85* VIN	2.7	3.0 typ.	5	600	SO-8 EDP	External synch
SC4519(H)	4.4	24	0.8		3.0	3.5	10			
SC4520	4.4	24	0.8	0.85* VIN	2.7	3.0	250	100-600	SO-8 EDP	
SC4521	4.4	24	0.8	0.85* VIN	3.0	3.5	250	600	SO-8 EDP	Prog Soft Start
SC4524C	3	28	1	0.96* VIN	2.0	2.6	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback
SC4524D	3	18	1	0.96* VIN	2.0	2.6	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback
SC4525C	3	28	1	0.96* VIN	3.0	3.9	40	200-2000	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback
SC4525D	3	18	1	0.93* VIN	3.0	3.9	40	350	SO-8 EDP	Prog Soft Start, hiccup overload protection with freq foldback

Multiple Output Non-Synchronous Regulators

Part Number	VIN (V)		# of outputs	VOUT (V)		IOUT Max (A)	ISW Min (A)	Shutdown Current (µA)	fsw (kHz)	Package	Features
	Min	Max		Min	Max						
SC2440	2.78	20	2	1	0.8* VIN	1.7/1.7	2.0/2.0	<60	250-2500	TSSOP-16 EDP	Soft Start, Power Good flag, ext synch, 2-phase

Single Output Controllers

Part Number	VIN (V)		VOUT (V)		IOUT* Max (A)	Gate Drive Current (A)	Synch or Non-Synch	fsw (kHz)	PSAVE	Power Good Flag	Enable Pin	Package	Features
	Min	Max	Min	Max									
SC2602L	4.2	12.6	0.8	0.9* VIN	20	1	Synch	200	No	Yes	Yes	SO-14	Soft Start
SC2608A	4.5	14	0.8	0.85* VIN	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	5.5	30	4	Synch	Up to 1000	Yes+	Yes	Yes	MLPQ-20, 3x3x0.6mm	EcoSpeed® controller
SC419	3	28	0.5	5.5	30	4	Synch	Up to 1000	Yes+	Yes	Yes	MLPQ-20, 3x3x0.6mm	EcoSpeed® controller, on-board prog LDO
SC4508A	2.7	15	0.5	0.97* VIN	15	1.5	Non-Synch	Up to 1500	No	No	Yes	MLPQ-12, 4x4x1mm	Buck or buck/boost (inverting), prog Soft Start, hiccup overload protection
SC4510	2.5	16	0.5	0.90* VIN	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	VIN	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* VIN	15	1.65	Synch	Up to 1000	No	No	Yes	MLP-16	Hiccup overload protection
SC4614	4	25	0.5	0.97* VIN	20	1.5	Synch	500	No	No	No	MSOP-10	Hiccup overload protection
SC493	3	28	0.5	5.0	30	8.3	Synch	250 to 1000	Yes+	Yes	Yes	MLPQ-UT20, 3x3x0.6mm	Digital power EcoSpeed® controller, I²C configuration and status register
SC508	5	46	0.6	5.5	30	4	Synch	Up to 1000	Yes+	Yes	Yes	MLPQ-UT20, 3x3x0.6mm	EcoSpeed® controller, on-board prog LDO, prog Soft Start, hiccup overload protection, AEC-Q100

Multiple Output Controllers

*Values dependent upon type of MOSFET used
+ Programmable Ultrasonic or Regular Power Save - see Page 17 for Power Save details

Part Number	VIN (V)		# of Out-puts	VOUT (V)		IOUT* Max (A)	Gate Drive Current (A)	On-time Min (ns)	fsw (kHz)	External Sync	Control Method	Hiccup Overload	Power Good Flag	Enable Pin	Package	Features
	Min	Max		Min	Max											
SC2441A	1.8	20	3	0.5	0.88* VIN	20/20/0.6	2	180	Up to 1000	Yes	Current	Yes	No	Yes	TSSOP-28 EDP	Two buck controllers + 1 boost regulator
SC2442(H)	4.75	30/36 (H)	2	0.75	0.85* VIN	10/10	0.5	-	Up to 1100	Yes	Voltage	Yes	No	Yes	TSSOP-24	
SC2443	4.7	16	2	0.5	0.88*VIN	20/20	1.5	150	Up to 1000	Yes	Current	Yes	No	Yes	MLPQ-24, 4x4mm	Sink/source capable
SC2446	4.7	16	2	0.5	0.88* VIN	20/20	1.5	150	Up to 1000	Yes	Current	Yes	No	Yes	TSSOP-28 EDP	Sink/source capable
SC2447	4.65	15	2	0.5	0.88* VIN	30/30	N/A	-	Up to 1000	Yes	Current	Yes	No	Yes	TSSOP-28	Optimized for DrMOS, sink/source current
SC2545	4.5	28	2	0.75	0.9* VIN	10/10	0.5	-	100-300	No	Voltage	No	Yes	Yes	TSSOP-24 MLPQ-24, 4x4mm	Sequential and coincidental start-up tracking
SC2672	3	15	2	0.9	0.9* VIN	20/20	1.7	-	300	No	Voltage	No	Yes	Yes	SO-16	Simple dual channel controller
SC2677B	3	15	2	0.5	0.86* VIN	20/20	1.7	300	300-1000	No	Voltage	No	Yes	Yes	TSSOP-24 TSSOP-24 EDP	Current sharing from two inputs or dual output, adj phase shift

*Values dependent upon type of MOSFET used

Step-down Switching Regulators / Controllers (...continued)

DDR Regulators/Controllers (Switching and LDO)

Part Number	V _{CC} (V)		V _{DDQ} (V)	I _{VDDQ} (A) Max	V _{TT} Type	V _{TT} (V)	I _{VTT} (A) Max	f _{sw} (kHz)	Peak gate Drive Current (A)	DDR Type	Synch or Non-Synch	Integrated Driver	Package	Features
	Min	Max												
SC1116	3	15	N/A	N/A	LDO	0.25-1.25	±4	N/A	-	1,2,3	N/A	Yes	SOT-23 6L	Simple DDR VTT LDO controller
SC2446	4.7	16	0.5-2.5	20	Switcher	0.5-1.25	20	Up to 1000	1.5	1,2,3	Synch	Yes	TSSOP-28	2-phase, buffered VDDQ/2 output
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
SC2595	2.3	5.5	N/A	N/A	LDO	1.25	±1.5	N/A	-	1	N/A	N/A	SO-8 EDP	Integrated DDR VTT LDO with on-board buffered reference, remote sense
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 VTT 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

Step-up Switching Regulators / Controllers

Single Output Step-up Controllers

Part Number	V _{IN} (V)		V _{OUT} (V)		I _{OUT} (A) Max	Gate Drive Current (A)	Shutdown Current (μA)	Quiescent Current (mA)	f _{sw} (kHz)	Package	Features
	Min	Max	Min	Max							
SC2603	4.5	16	4.5	* (1)	* (2)	0.8	6000	9	200	SOT23-6	
SC2604	4.5	16	4.5	* (1)	* (2)	0.8	200	9	400	MSOP-8	Input disconnect FET drive

* (1) = External FET Voltage * (2) I_{OUT} is function of V_{IN}, V_{OUT}, f_{sw} and inductor value

Single Output Step-up Regulators

Part Number	V _{IN} (V)		V _{OUT} (V)		I _{OUT} (A) Max	I _{sw} (A) Min	Shutdown Current (μA)	Quiescent Current (mA)	f _{sw} (kHz)	Package	Features
	Min	Max	Min	Max							
SC4501	1.4	16	1.4	30	*	2	<18	<1.6	Up to 2000	MSOP-8 EDP MLPD-10, 3x3x1mm	Prog Soft Start, SEPIC conf possible
SC4502 SC4502H	1.4	16	1.4	32/40	*	1.4	<18	<1.6	Up to 2000	MLPD-10, 3x3x1mm	Prog Soft Start, SEPIC conf possible
SC4503	2.5	20	3	27	*	1.4	<1	<1.1	1300	TSOT-23 MLPD-8, 2x2x0.8mm	Prog Soft Start, SEPIC conf possible
SC120	0.7	4.5	1.8	5	0.19	1.2	0.1	0.05	1200	MLPD, 1.5x2x0.6mm 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, 1.5x2x0.6mm	No Power Save
SC122	0.7	1.6	3.3	3.3	0.095/0.05	0.35	8.5	0.04	1200	MLPD-UT-6, 1.5x2x0.6mm	Operates in Power Save+ mode at all loads

* I_{OUT} is function of V_{IN}, V_{OUT}, f_{sw} and inductor values

+ For Power Save details, see Page 17

Inverting Buck / Boost Controller

Part Number	V _{IN} (V)		V _{OUT} (V)		I _{OUT} (A) Max	Gate Drive RDS _{on} (Ω)	Shutdown Current (μA)	Quiescent Current (mA)	f _{sw} (kHz)	Package	Features
	Min	Max	Min	Max							
SC4508A	2.7	15	-0.5	* (1)	*(2)	8	<500	3	100-1500	MLPQ-12, 4x4x1mm	Buck or buck/boost (inverting), Prog Soft Start, hiccup mode over-current protection

* (1) = External FET Voltage * (2) I_{OUT} is function of V_{IN}, V_{OUT}, f_{sw} and inductor value

Combo Regulators / Controllers

Part Number	Topologies	VIN (V)		Buck VOUT (V)		IOUT Max (A)	fsw (kHz)	Power Good Flag	Package	Features
		Min	Max	Min	Max					
SC1109	1 synch buck controller + 2 LDO controllers	4.4	5.25	1.2	0.9* VIN	10/4/4	200/500	Yes	SO-16	Prog Soft Start
SC2441A	2 synch buck controllers + 1 boost regulator	1.8	20	0.5	0.88* VIN	20/20/0.6	Up to 1000	No	TSSOP-28 EDP	Ext synch, capable of 2-phase with current sharing
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) Max	Topologies	# of Outputs	Mode of Operation	fsw (kHz)	Max Duty Cycle	Turn On Threshold (Vmax)	Package	Features
SC4806	150	Pushpull, Full Bridge, Half Bridge	2	Voltage Mode or Current Mode	Up to 1000	50% each channel	8.6	MLPQ-12, 4x4x1mm	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		
SC4810B	250	Forward / Flyback	2	Voltage Mode or Current Mode	Up to 1000	85%	8.8	TSSOP-16, MLPQ-16, 4x4x1mm	Dual-phase mode of operation for low ripple
SC4905A	100	Forward / Flyback, Boost	1	Voltage Mode	Up to 1000	95%	4.6	MSOP-10	Ext synch
SC4905B							12		
SC4911	80	Flyback	1	Voltage Mode	Up to 500	72%	7	MSOP-8	Ultra-low startup current: 45μA (typical), UVLO

Voltage References

Part Number	VIN (V)		Reference Voltage (V)	Accuracy (%)	Package	Features
	Min	Max				
SC431	2.5	30	2.5	±0.5	SOT-23-3, SO-8	Adjustable shunt regulator
SC431L	1.24	20	1.24	±0.25	SOT-23-3, SOT-23-5	Low-voltage adjustable shunt regulator
SC4431	1.5	15	1.224	±0.5	SOT-23-5	Adjustable shunt regulator with open collector output for driving an opto-isolator
SC4437	0.9	28	3.3	±1	SOT-23-3	Low-power precision series voltage reference, wide input range

MOSFET Drivers

Part Number	VIN (V)		Gate Drive Current (A)	Rise/Fall Time (ns)	Prop Delay (ns)	Package	Features
	Min	Max					
SC1301A	4.5	16.5	2	20	60	SOT23-5	Single low-side MOSFET driver, TTL compatible input, inverting and non-inverting options
SC1302A	4.5	16.5	2	20	40	SO-8, MSOP-8	Dual low-side MOSFET driver, TTL compatible input, inverting, non-inverting options

LDOs

Single Output LDOs

Part Number	VIN (V)		VOUT (V)		IOUT (A)	VDROPOUT (V) Max 0.1	Enable Pin	Power Good Flag	Package	Features
	Min	Max	Min	Max						
EZ1580 EZ1581 EZ1582 EZ1583	2.05*	7	1.25	6.2	7 5 3 1.5	0.8 0.6 0.6 0.6	No	No	TO-263-5 TO-220-5	
SC1202	2.65	7	1.25	5.7	0.6	1.3	No	No	SOT-223	
SC1565	2.2	5.5	1.2	4.8	1.5	0.6	Yes	No	TO-263-5, SO-8, SOT-223, TO-263-3	
SC1566	2.2	5.5	1.2	4.8	3	0.45	Yes	No	TO-220-5, TO-263-3, TO-220-3, TO-263-5	
SC1592	1.25*	16	0.8	V _{IN} -V _{DROPOUT}	3	0.52	Yes	No	TO-263-7 SO-8 EDP	Separate control and power inputs for lower dropout, prog current limit
SC4205	2.2	5.5	1.2	4.8	1	0.5	Yes	No	SO-8 EDP	
SC4211	1.4	6	0.5	V _{IN} -V _{DROPOUT}	1	0.5	Yes	No	SO-8 EDP	Very low input (1.4V), very low dropout
SC4212	1.5	5.5	0.5	V _{IN} -V _{DROPOUT}	1	0.5	Yes	No	MLPD-8, 3x3x1mm	Very low input, very low dropout
SC4213H	1.4	6	0.5	V _{IN} -V _{DROPOUT}	0.5	0.15	Yes	No	SO-8	Very low input, very low dropout
SC4215A	1.4	6	0.5	3.8	2	0.6	Yes	No	SO-8 EDP	Very low input, very low dropout
SC4215H	1.4	6	0.5	V _{IN} -V _{DROPOUT}	2	0.6	Yes	No	SO-8 EDP	Very low input, very low dropout
SC4216	1.45	5.5	0.5	3.8	3	0.7	Yes	No	SO-8 EDP	Very low input, very low dropout
SC4216H	1.45	5.5	0.5	V _{IN} -V _{DROPOUT}	3	0.7	Yes	No	SO-8 EDP	Very low input, very low dropout
SC4217	1.8	5.5	1.24	V _{IN} -V _{DROPOUT}	3	0.6	Yes	No	TO-263-5	Very low dropout

* Control voltage also required. See datasheet.

Multiple Output LDOs

Part Number	VIN (V)		VOUT (V)		IOUT* (mA)	VDROPOUT (mV)	Power Good Flag	Iq** (μA)	Enable Pin	# of LDOs	Noise (μVRMS)	PSRR (dB)	Serial Interface	Package	Features
	Min	Max	Min	Max											
SC560	2.5	5.5	1.2	3.3	300*	100	Yes	100	Yes	2	50	65	No	MLPQ-UT8, 1.5x1.5x0.6mm	Power Good flag, dual enable, low noise
SC561	2.5	5.5	2.85	3.1	300*	100	Yes	40	Yes	2	50	65	No	MLPQ-UT8, 1.5x1.5x0.6mm	Power Good flag, standby mode, low noise
SC1458	2.5	5.5	1.8	2.85	300*	100	Yes	100	Yes	2	50	65	No	MLPD-W6, 3x3x0.8mm	Power Good flag, low noise

* Per output ** All regulators active

LDO Controllers

Part Number	VIN (V)		VOUT (V)		# Channels	VDROPOUT (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

Charge Pump Regulators

Part Number	VIN (V)		VOUT (V)	IOUT (cont) (mA)	fsw (kHz)	Mode	Package	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, 3x3x1mm	
SC603	2.5	6.5	4.5, 5	160, 200	262, 650	2x	MLPD-10, 3x3x1mm	
SC613	2.5	6.5	4.5, 5	100,140	262, 650	2x	MLPD-10, 3x3x1mm	
SC630	2.9	5.5	3.3	400	200	1x,1.5x,2x	MLPD-UT-8, 2x2x0.6mm	Buck-Boost <20mV Vripple, Soft Start
New SC630A	2.95	5.5	3.3	300	1000	1x,1.5x,2x	MLPD-UT-8, 2x2x0.6mm	Buck-Boost 33mV Vripple, Soft Start, uses ultra-small input/output capacitors
SC631	2.9	5.5	4.4	250	200	1x,1.5x,2x	MLPD-UT-8, 2x2x0.6mm	Buck-Boost <30mV Vripple, Soft Start
SC632	2.9	5.5	5	275	200	1x,1.5x,2x	MLPD-UT-8, 2x2x0.6mm	Buck-Boost <30mV Vripple, Soft Start
New SC632A	2.95	5.5	5	275	1000	1x,1.5x,2x	MLPD-UT-8, 2x2x0.6mm	Buck-Boost 50mV Vripple, Soft Start, uses ultra-small input/output capacitors

LED Drivers

Charge Pump Based

Part Number	VIN (V)		fsw (kHz)	IOUT (mA)	Mode	Backlight Sink Current (mA)	Flash Sink Current (mA)	Flash Safety Timer	LDOs	Control Interface	Package	Features
	Min	Max				Max	Max					
SC606	2.85	5.5	250, 1330	120	Fractional	32	-	-	0	I ² C	MLPQ-16, 4x4x1mm	6 backlight sinks, low noise, tight accuracy and matching, high efficiency.
SC621(A)	3	5.5	250	500	1x,1.5x,2x	25	400	Yes	2	SemWire™ I ² C (A-version)	MLPQ-UT-20, 3x3x0.6mm	Prog spotlight to flash ratio
SC622(A)	3	5.5	250	400	1x,1.5x,2x	N/A	400	Yes	2	SemWire™ I ² C (A-version)	MLPQ-UT-20, 3x3x0.6mm	Prog spotlight to flash ratio
SC623(A)	3	5.5	250	500	1x,1.5x,2x	4 x 25	400	Yes	0	SemWire™ I ² C (A-version)	MLPQ-UT-20, 3x3x0.6mm	Prog spotlight to flash ratio
SC624(A)	3	5.5	250	100	1x,1.5x,2x	4 x 25	N/A	N/A	2	SemWire™ I ² C (A-version)	MLPQ-UT-20, 3x3x0.6mm	
SC627(A)	3	5.5	250	800	1x,1.5x,2x	4 x 25	700	Yes	2	SemWire™ I ² C (A-version)	MLPQ-UT-20, 3x3x0.6mm	Prog spotlight to flash ratio
SC628A	3	5.5	250	1000	1x,1.5x,2x	N/A	1000	Yes	0	I ² C	MLPQ-UT-20, 3x3x0.6mm	Flash LED = 1A max in flash mode, 275mA max continuous for spotlight
SC643	2.9	5.5	250	125	1x,1.5x,2x	5 x 25	N/A	N/A	4	SemPulse®	MLPQ-UT-20, 3x3x0.6mm	±0.5% matching, ±1.5% accuracy, fade-in/fade-out
SC644	2.9	5.5	250	150	1x,1.5x,2x	6 x 25	N/A	N/A	4	SemPulse®	MLPQ-UT-20, 3x3x0.6mm	±0.5% matching, ±1.5% accuracy, fade-in/fade-out
SC652	2.9	5.5	250	125	1x,1.5x,2x	5 x 25	N/A	N/A	0	PWM	MLPQ-UT-14, 2x2x0.6mm	±0.5% matching, ±1.5% accuracy
SC653	2.9	5.5	250	100	1x,1.5x,2x	4 x 25	N/A	N/A	2	SemPulse®	MLPQ-UT-18, 2.3x2.3x0.6mm	±0.5% matching, ±1.5% accuracy
SC656	2.9	5.5	250	175	1x,1.5x,2x	7 x 25	N/A	N/A	0	PWM	MLPQ-UT-20, 3x3x0.6mm	Two independently controlled LED banks, ±0.5% matching, ±1.5% accuracy
SC657	2.9	5.5	250	125	1x,1.5x,2x	5 x 25	N/A	N/A	0	SemPulse®	MLPQ-UT-14, 2x2x0.6mm	±0.5% matching, ±1.5% accuracy, fade-in/fade-out, LED float detection
SC658	2.9	5.5	250	100	1x,1.5x,2x	4 x 25	N/A	N/A	0	SemPulse®	MLPQ-UT-14, 2x2x0.6mm	±0.5% matching, ±1.5% accuracy, fade-in/fade-out, LED float detection
New SC662	2.9	5.5	250, 1000	150	1x,1.5x,2x	6 x 25	N/A	N/A	0	SemPulse®	MLPQ-UT-14, 2x2x0.6mm	±0.5% matching, ±1.5% accuracy, fade-in/fade-out

LED Current Sinks

Part Number	VIN (V)		Sink Dropout Voltage (mV)	Sink Current Range (mA)	Sink Quantity	Control Interface	Dimming	Package	Features
	Min	Max							
SC620	2.7	5.5	150 max	31.25μA - 25mA	8	I ² C Interface	Register	MLPQ-UT-16, 3x3x0.6mm	Output expansion capability, individually controllable current sinks
New SC667	2.9	5.5	59 typ	0 - 25mA	7	I ² C Interface	PWM	MLPQ-UT-20, 3x3x0.6mm	LED current sink, 7 back lights + 4 LDOs + I ² C + PWM + SemPulse + ALS, Automatic Dropout Prevention (ADP)
New SC668	2.9	5.5	59 typ	0 - 25mA	8	I ² C Interface	PWM	MLPQ-UT-20, 3x3x0.6mm	LED current sink, 8 back lights + 4 LDOs + I ² C + PWM + SemPulse + ALS, Automatic Dropout Prevention (ADP)

ADP* Improves Backlight Performance, Extends Battery Life in High-End Handhelds

Limitations of Conventional Current Sinks

As the battery voltage approaches the V_F of the LEDs, two issues occur with conventional current sinks:

- (1) There is not enough headroom to regulate and match the currents across the individual LEDs, plus, the V_F variation from LED to LED makes it worse. When the battery voltage drops further, the LEDs will go into dropout and the current through them will change drastically.
- (2) Poor power supply rejection - this occurs when the current sinks do not have enough headroom to reject line transients on the battery voltage, which could be as high as 500mV. This will cause the display to flicker and will be very noticeable to the human eye.

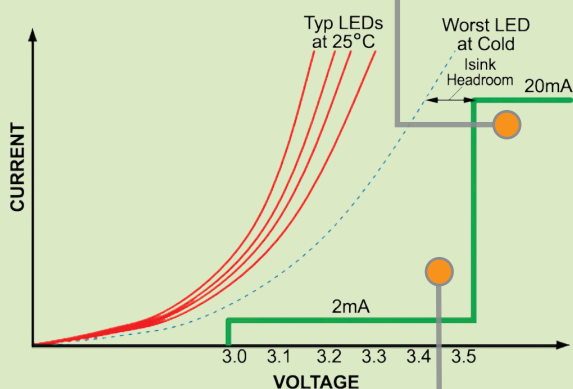
Benefits of current sinks with ADP

Semtech's Automatic Dropout Prevention (ADP) technology prevents the LEDs from going into dropout by continuously monitoring each current sink. This maintains current matching across the LEDs and allows flicker-free operation during large transients on the battery.

As the battery discharges and its voltage approaches the V_F of the LEDs, the current sinks with ADP gradually dim the LEDs, reducing the loading on the weak battery. This can extend battery life up to an hour.

Without ADP

Threshold Set Above Worst-case V_F

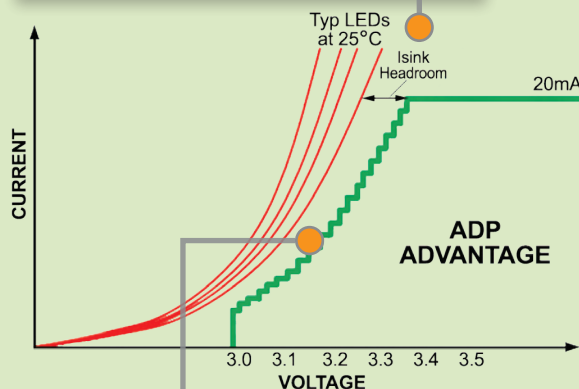


Typically Toggled to 1/10th Nominal Current

*ADP: Automatic Dropout Prevention

With ADP

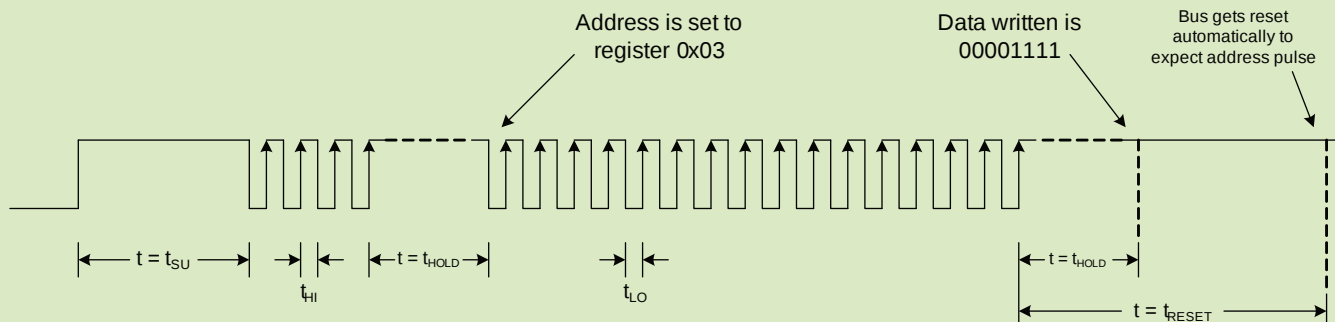
No Guardbanding Means Display Stays at Target Brightness Longer



Current not Toggled: Maintains maximum current needed to stay out of dropout

SemPulse®, SemWire™ Interfaces: Control 32 Registers with Only One Wire

SemPulse and SemWire are one-wire digital interfaces available in many of Semtech's LED driver products. These interfaces allow control of 32 registers providing access to functions generally associated with 2- and 3-wire busses, with the benefit of only using one pin.



SemPulse interface is an enhanced derivative of SemWire interface that can accommodate irregular bit patterns

LED Drivers (...continued)

Inductor Based

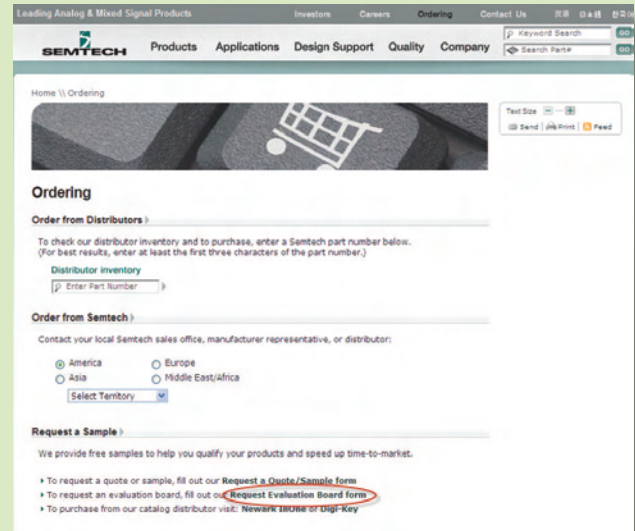
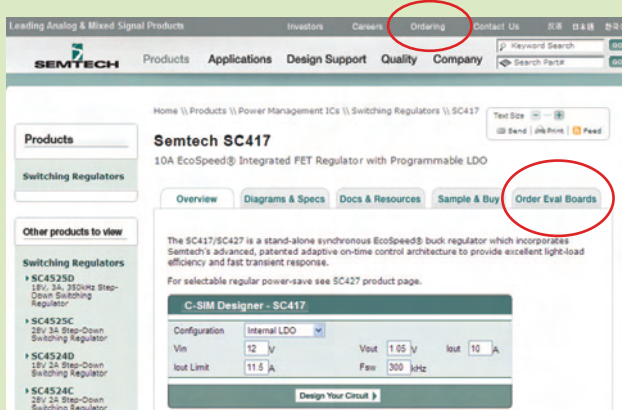
	Part Number	VIN (V)		VOUT (V)	fsw (MHz)	Max # LED's	# LED Strings	# LED's Per String	Current Per LED String	Total current	Dimming	Package	Features
		Min	Max	Max				Max (VF=3.5V)	Max (mA)	Max (mA)	Max (Freq)		
	SC104	1.55	10	38	Varies	10	1	10	-	-	Analog/PWM	MLP-8, 3x3x1mm	
	SC440A	4.5	27	42	0.8	72	6	12	30	180	PWM Up to 50kHz	MLPQ-24, 4x4x1mm	Open/Short LED string disable, OCP, OTP, OVP and FFLAG
New	SC446	4.5	27	42	0.8	36	3	12	100	300	PWM Up to 50kHz	TSSOP-16 EDP	Open/Short LED string disable, OCP, OTP and OVP
	SC441A	4.5	21	36	0.7	40	4	10	150	600	PWM Up to 50kHz	TSSOP-20 EDP	Open/Short LED string disable, OCP, OTP, OVP and FFLAG, AEC-Q100 qualified
New	SC441C	4.5	27	42	0.7	48	4	12	150	600	PWM Up to 50kHz	TSSOP-20 EDP	Open/Short LED string disable, OCP, OTP, OVP and FFLAG, AEC-Q100 qualified
New	SC442	4.5	21	42	0.2-1.0	120	10	12	30	300	PWM Up to 50kHz	MLPQ-UT-28, 4x4x1.0mm	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	PWM Up to 50kHz	MLPQ-UT-16, 3x3x0.6mm	Adj freq Open LED string disable, OCP, OTP and OVP
	SC4505	2.6	12	28	1	12	2	6	Backlight=75, Flash=125	200	PWM Up to 50kHz	MLPQ-16, 3x3x1mm	Dual channel: backlight and Torch/Flash, OCP, OTP and OVP
	SC4509	2.7	10	20	1.2	5	1	5	30	>30	PWM Up to 10kHz	SOT23-6 MLPD-W8, 2x2x0.8mm	Tiny solution size with integrated Schottky, ballast resistor sets LED current, OCP, OTP and OVP
	SC4538	2.8	5.5	38	0.8	10	1	10	30	30	PWM Up to 50kHz	MLPD-UT-8, 2x2x0.6mm	Excellent dimming range, high dimming linearity, OCP, OTP and OVP
	SC4539	2.8	5.5	22	0.8	6	1	6	30	30	PWM Up to 50kHz	MLPD-UT-8, 2x2x0.6mm	Excellent dimming range, high dimming linearity, OCP, OTP and OVP
	SC4540	4.5	12	38	0.8	10	1	10	30	30	PWM Up to 50kHz	MLPD-UT-8, 2x2x0.6mm	Excellent dimming range, high dimming linearity, OCP, OTP and OVP
New	SC4541	2.9	20	25	1.25	7	1	7	20	20	PWM Up to 1kHz	SOT23-6 MLPD-UT-6, 2x2x0.6mm	High-side sensing integrated Schottky rectifier, no external compensation
New	SC5010	4.5	27	50	2.2	96	8	12	25	320	PWM Up to 30kHz	MLPQ-UT-28 4x4x0.6mm	Synchronous phase-shift, 10-bit dimming resolution, no external compensation

Linear Battery Chargers

Part Number	Max. Charge Current (A)/ Accuracy		Operating Input Voltage (V)		Input Voltage Withstand (V)	Output Voltage (V)	Output Voltage Accuracy (%)	LDO Mode	NTC Interface	Safety Timer	Charger Present Indicator	Charge Status Indicator	Fault Indicator	Package	Features
	Min	Max	Min	Max			Max								
SC802	1	+/- 50mA	4.3	6.5	14	4.1, 4.2, ADJ	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPQ-16, 4x4x1mm	Fully featured, high input voltage protection, prog pre-, fast- and termination current
SC802A		+/- 60mA													
SC805A	1	+/- 5%	3.5	5.9	7	4.2	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPD-10, 3x3x1mm	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, 3x3x1mm	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, 2x2x0.6mm	Termination options: float charge, automatic re-charge, forced re-charge
SC811	1	+/- 9%	4.0	4.6	30	4.2	+/-1	Yes	No	No	No	Yes	No	MLPD-UT-8, 2x2x0.6mm	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 9.6V
SC813	1	+/- 9%	4.0	4.6	30	4.2	+/-1	Yes	No	No	No	Yes	No	MLPD-UT-8, 2x2x0.6mm	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 6.0V
SC820	1	+/- 9%	4.0	8.2	30	4.2	+/-1	Yes	No	No	No	Yes	No	MLPD-UT-8, 2x2x0.6mm	Dual input adapter and USB, individual charging current
SC824	1	+/- 9%	4.0	8.2	30	4.2	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPD-UT-10, 2x2x0.6mm	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 9.6V

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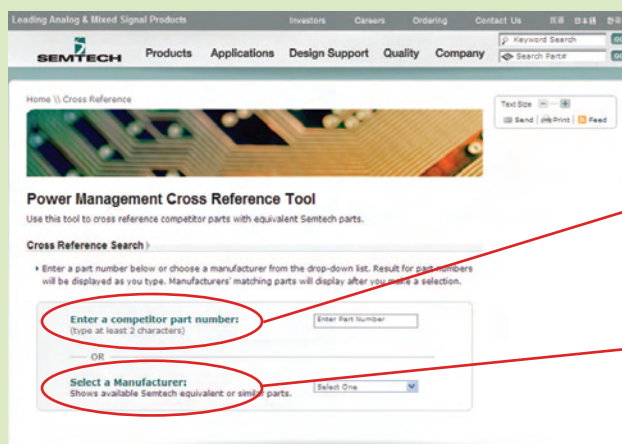
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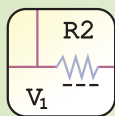
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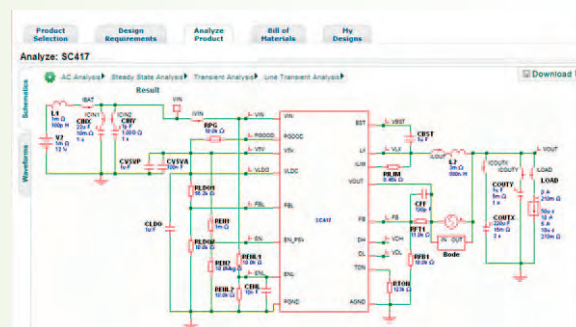
C-SIM -- Online Design Simulation Tool



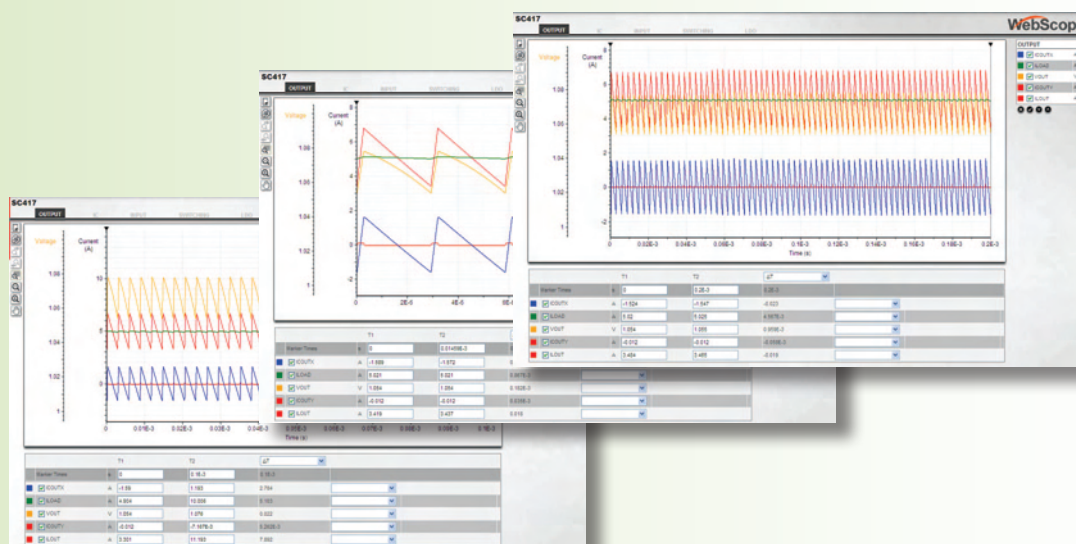
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Easily Create Bill of Materials

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Product Selection Design Requirements Analyze Product Bill of Materials My Designs

Semtech - Bill of Materials: SC417

Ref	# of Parts	Value	Description
U1	1	SC417	IC
CBST	1	1uF	Capacitor
CEBL	1	10uF	Capacitor
CF1	1	100pF	Capacitor
CRK	1	20uF	Capacitor
CRY	1	1uF	Capacitor
CLD0	1	1uF	Capacitor
CONTX	2	220uF	Capacitor
CONTY	1	1uF	Capacitor
CVSWA	1	100nF	Capacitor
CVSWP	1	1uF	Capacitor
L1	1	100uH	Inductor
L2	1	880nH	Inductor
RES1	1	1mΩ	Resistor
RES2	1	10.00kΩ	Resistor
RESL1	1	10.0kΩ	Resistor
RESL2	1	10.0kΩ	Resistor
RES1	1	10.0kΩ	Resistor
RFT1	1	11.0kΩ	Resistor
RLIM1	1	8.45kΩ	Resistor
RLD01	1	50.2kΩ	Resistor
RLD02	1	10.0kΩ	Resistor
RPG	1	10.0kΩ	Resistor
RTOW	1	123kΩ	Resistor

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