SEMTECH POWER MANAGEMENT

Power Management Selector Guide

Semtech offers feature rich, highly integrated power management solutions aimed at reducing system cost and providing design flexibility to meet applications requirements.

Semtech's latest power management portfolio consists of robust, highly efficient, integrated solutions in small form factors designed to conserve PCB area and streamline end-equipment manufacturing.

The wide breadth of product offering features: switching/linear regulators & controllers, LED drivers, and battery chargers designed to provide an overall system solution.

Semtech Power Management provides

- High Power Density
- Highly integrated solutions in small form factor
- High reliability
- Low system cost

by utilizing industry leading BCD process and strong technical support to address the needs of the following markets:

Portable devices

- Smallest and thinnest in industry: 1.5 x 1.5 x 0.6mm
- Simplified design using VID and serial control
- Low quiescent current and Powersave for increased battery life

Displays

- Solutions to support 1 to 6 LED string configurations
- Parts supporting screen sizes: 2" to 20"
- Best current matching accuracy: 1-3%
- Best efficiency at maximum load: >90%

Integrated Access Devices/Telecom

- Simple Robust Solutions
- High Voltage Integration
- High Power Density
- Power Good & Soft-start
- Serial and Digital Control

Applications:

Portable/Personal Electronics
- Cellular Phones
- PDAs / Smart Phones
- GPS / Navigation
- Portable Instruments
- Medical Electronics

Broadband Communications
- VoIP
- WLAN
- xDSL Modems
- IP Telephony
- Cable Modems
- Set Top Boxes

Displays
- Backlight
- LCD Panels
- Car Navigation
- Office Automation

Computing
- Servers
- Desktops
- Notebooks & Netbooks
- UMPCs
- Industrial PCs & COMs

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+ SmartDrive™ system significantly reduces EMI

Multiple Output Non-Synchronous Regulators

Part Number	V_{IN} (V)		# of outputs	V_{OUT} (V)		I_{OUT} Max (A)	I_{SW} Min (A)	Shutdown current (µA)	f_{SW} (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	Independent shutdown, Soft-start and Power Good, external synchronization
SC2620	2.8	30	2	1	0.9* Vin	2/2	2.3/2.3	<60	100-1400	SO-16 EDP	Independent Soft-start and Power Good, low output ripple, external synchronization

Multiple Output Synchronous Regulators

Part Number	V_{IN} (V)		# of outputs	V_{OUT} (V)		I_{OUT} Max (A)	I_{SW} Min (A)	Shutdown current (µA)	Quiescent current (µA)	f_{SW} (kHz)	Package	Features
	Min	Max		Min	Max							
SC198	2.7	5.5	2	1.0/1.0	1.875/1.875	0.6/0.6	0.9/0.9	<1	50	1000	MLPQ-20, 4x4mm	8 programmable output voltage pairs Powersave, MODE/SYNC function
SC198A	2.7	5.5	2	1.0/1.8	1.8/3.3	0.8/0.8	1.2/1.2	<1	50	1000	MLPQ-20, 4x4mm	

Single Output Synchronous Regulators

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} Max (A)	I_{SW} Min (A)	Shutdown current (µA)	Quiescent current (µA)	f_{SW} (kHz)	Package	Features
	Min	Max	Min	Max							
SC183C	2.9	5.5	0.8	3.3	2	2.5	1	10,000	2500	MLPQ-UT16	Ultrafast transient response & Dynamic Voltage Scaling
SC189	2.9	5.5	1.5	Vin	1.5	<2.5	<1	7500	2500	SOT23-5, MLPD-6 2X2mm	Overvoltage protection, Pre-bias output, 5mV output ripple
SC190	2.7	5.5	1	2.8	0.3	0.5	<1	10	1000	MLPD-10, 3x3mm	Very low input ripple: <1mV, 2 VID programmable output voltages
SC191	2.7	5.5	1.2	1.2	0.33	0.55	<1	2500	1000	MLPD-8, 2.3x2.3mm	Very low noise, <1mV input ripple no external compensation required, LDO Mode
SC192	2.7	7	0.75	Vin	0.7	>1A	<1	35	750	MLPD-10, 3x3mm	Powersave, adjustable current limit, external synchronization
SC194A/B	2.7	5.5	1	3.6	1	1.33	<1	17	1000	MLPD-10, 3x3mm	Fixed frequency or 750kHz to 1.25MHz synchronized operation, VID programmable output, Powersave
SC196A	2.7	5.5	1.0	1.8	1.5	1.9	<1	17	1000	MLPD-10, 3x3mm	Fixed frequency or 750kHz to 1.25MHz synchronized operation, Powersave, 4 VID programmable output
SC196	2.5	5.5	0.8	Vin	1.5	1.96	<1	17	1000	MLPD-UT10, 3x3x0.6mm	Fixed frequency or 750kHz to 1.25MHz synchronized operation
SC414	3.0	28	0.75	Vin	6	ADJ	<27	See datasheet	Up to 1000	MLPQ-28, 4x4mm	Integrated LDO with crossover circuitry, SmartDrive™, Ultrasonic power save
SC417	3.0	28	0.5	Vin	10	ADJ	<27	See datasheet	200-1000	MLPQ-32, 5x5mm	Integrated LDO with crossover circuitry, SmartDrive™, Ultrasonic power save
SC424	3.0	28	0.75	Vin	6	ADJ	<27	See SC414 datasheet	Up to 1000	MLPQ-28, 4x4mm	Integrated LDO with crossover circuitry, SmartDrive™, regular power save
SC427	3.0	28	0.5	Vin	10	ADJ	<27	See SC417 datasheet	200-1000	MLPQ-32, 5x5mm	Integrated LDO with crossover circuitry, SmartDrive™, regular power save
SC4624	2.3	5.5	0.5	Vin	4	<1.9	<1	10000	200-2000	SO-16 EDP, MLPQ-20, 4x4mm	Programmable Soft-start and current limit, Power Good, external synchronization
SC4620	2.3	5.5	0.5	Vin	2.5	<1.9	<1	10000	200-2000	SO-16 EDP, MLPQ-20, 4x4mm	Programmable Soft-start and current limit, Power Good, external synchronization
SC4626	2.9	5.5	1.0	Vin	1.0	<1.8	<1	10000	2500	SOT23-5	Overvoltage protection, Pre-bias output, 5mV output ripple

Single Output Non-Synchronous Regulators

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} Max (A)	I_{SW} Min (A)	Shutdown current (µA)	f_{SW} (kHz)	Package	Features
	Min	Max	Min	Max						
SC4519(H)	3	16	1.2	0.85* Vin	2.7	3.0	<45	600	SO-8 EDP	External synchronization: 750kHz to 1.2MHz, independent synch and enable pins
		24			3.0	3.5				
SC4520	4.4	24	0.8	0.85* Vin	2.7	3.0	250	100-600	SO-8 EDP	Adjustable frequency, independent enable pin
SC4521	4.4	24	0.8	0.85* Vin	3.0	3.5	250	600	SO-8 EDP	Programmable Soft-start
SC4524A	3.0	28	1	0.8* Vin	2.0	2.6	40	200 to 2000	SO-8 EDP	Programmable Soft-start, Frequency Foldback
SC4524B	3.0	16	1	0.8* Vin	2.0	2.6	40	200 to 2000	SO-8 EDP	Programmable Soft-start, Frequency Foldback
SC4525A	3.0	28	1	0.8* Vin	3.0	3.9	40	200 to 2000	SO-8 EDP	Programmable Soft-start, Frequency Foldback
SC4525B	3.0	16	1	0.8* Vin	3.0	3.9	40	350	SO-8 EDP	Programmable Soft-start, Frequency Foldback

Step-down Switching Regulators / Controllers

Multiple Output Controllers

▲Values dependent upon type of MOSFET used

Part Number	V_{IN} (V)		# of outputs	V_{OUT} (V)		I_{OUT}▲ Max (A)	Gate drive current (A)	On-time Min (ns)	f_{SW} (kHz)	Control method	Package	Features
	Min	Max		Min	Max							
SC2441A	1.8	20	3	0.5	0.88* Vin	20/20/0.6	2	18	Up to 1000	Current	TSSOP-28 EDP	2 buck controllers + 1 boost regulator, pre-bias startup, external synchronization, 2 phase-1 output
SC2442(H)	4.75	30 36	2	0.75	0.85* Vin	10/10	0.5	-	Up to 500	Voltage	TSSOP-24	External synchronization, 7V AVCC/PVCC controller
SC2443	4.7	16	2	0.5	0.88*Vin	20/20	1.5	150	500	Current	MLPQ-24, 4x4mm	External synchronization, Programmable Soft-start, inductor current sensing, two phase or a single phase shared current
SC2446	4.7	16	2	0.5	0.88* Vin	20/20	1.5	150	Up to 1000	Current	TSSOP-28 EDP	Separate Soft-start and Enable, sink/source available for DDR, external synchronization
SC2447	4.65	15	2	0.5	0.88* Vin	-	NA	-	Up to 1000	Current	TSSOP-28	Optimized for DrMOS, pre-bias startup, external synchronization, tri-state PWM, able to sink/source current
SC2545	4.5	28	2	0.75	0.9* Vin	10/10	0.5	-	100-300	Voltage	TSSOP-24, MLPQ-24, 4x4mm	Sequential & coincidental start-up tracking, Power Good
SC2672	3.0	15	2	0.9	0.9* Vin	20/20	1.7	-	300	Voltage	SO-16	Simple dual channel controller, Power Good, Soft-start, 180° out-of-phase
SC2677B	3.0	15	2	0.5	0.86* Vin	20/20	1.7	300	300-1000	Voltage	TSSOP-24, TSSOP-24 EDP	Single output, dual phase with current sharing from two inputs or dual output, Power Good, Soft-start, adjustable phase shift
SC415	3	25	2	0.75	5.25	25/25	3.1	50	Up to 600/720	Constant on-time	MLPQ-24, 4x4mm	SmartDrive™, Powersave, Soft-start, Power Goods
SC416	3	25	2	0.75	5.25	25/25	3.1	50	Up to 600/720	Constant on-time	MLPQ-24, 4x4mm	Startup/Shutdown tracking, Powersave, SmartDrive™, Soft start, Power Good

Single Output Controllers

▲Values dependent upon type of MOSFET used

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT}▲ Max (A)	Gate drive current (A)	Synch or Non-Synch	f_{SW} (kHz)	Control method	Package	Features
	Min	Max	Min	Max							
SC2602L	4.2	12.6	0.8	0.9* Vin	20	1	Synch	200	Voltage	SO-14	Power Good, Enable, Soft-start
SC2608A	4.5	14	0.8	0.85* Vin	15	0.6	Synch	250	Voltage	SO-8	Integrated boot strap diode, Rds(on) current sensing
SC2618	4.75	14	1.25	12.6	6	0.5	Synch	Up to 500	Hysteretic	SOT-23-6	Internal 100µs Soft-start
SC418	3	28	0.5	5.5	30	4	Synch	Up to 1000	Constant on-time	MLPQ-20, 3x3mm	On-board programmable LDO, Ultrasonic & regular power save, SmartDrive™
SC419	3	28	0.5	5.5	30	4	Synch	Up to 1000	Constant on-time	MLPQ-20, 3x3mm	Ultrasonic & regular power save, SmartDrive™
SC4508A	2.7	15	0.5	0.97* Vin	15	0.875	Non-Synch	Up to 1500	Current	MLPQ-12, 4x4mm	Buck & buck/boost (inverting configuration)
SC4510	4.75	16	0.5	0.75* Vin	25	1	Synch	100-1000	Current	TSSOP-20	Source & Sink Current, reference tracking, external synchronization, Power Good
SC4603	2.25	5.5	0.5	Vin	20	1	Synch	Up to 1000	Voltage	MSOP-10	Drive PMOS and NMOS, 100% duty ratio, external synchronization
SC4612	4.5	28	0.5	0.82* Vin	40	1.7	Synch	1200	Voltage	SO-14, MLPD-12, 4x3mm	Programmable current limit, non-synchronous start-up
SC4612H	4.5	40	0.5	0.82* Vin	40	1.7	Synch	Up to 1200	Voltage	SO-14, MLPD-12, 4x3mm	Programmable current limit, synchronous start-up, programmable soft start, programmable frequency
SC4614	4	25	0.5	0.97* Vin	20	1.5	Synch	500	Voltage	MSOP-10	Internal gate-drive LDO, adaptive shoot-through protection, Hiccup mode current limit
SC471/A	3	25	0.75	5.25	20	3.1	Synch	325	Constant on-time	MLPQ-16, 3x3mm	SmartDrive™, Powersave, voltage margining

Step-down Switching Regulators / Controllers

DDR Regulators/Controllers (Switching & LDO)

Part Number	V_{CC} (V)		V_{DDQ} (V)	IV_{DDQ} (A) Max	V_{TT} type	V_{TT} (V)	IV_{TT} (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	1	20	Switcher	0.5	20	Up to 1000	1.5	1,2,3	Synch	Yes	TSSOP-28	Individual Soft-start and Enable, Sink/source available for DDR
SC2447	4.65	15	N/A	N/A	Switcher	0.5	60	Up to 1000	-	1,2,3	Synch	Yes	TSSOP-28	Dual 30A or 2-phase 60A output, optimized for Phillips 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	0.6-6	15	Switcher	0.3-3.0	15	100-1000	1	1,2,3	Synch	Yes	TSSOP-20	Power Good
SC486	2.5	25	1.5-3.0	20	LDO	0.75-1.5	±3	Up to 600	3.1	1,2,3	Synch	Yes	MLPQ-24 4x4mm	SmartDrive™, Integrated LDO regulator for VTT, buffered reference, remote sense for VTT

CPU & GPU Controllers

Processor Power

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (A)*	f_{SW} (kHz)	Platform	Integrated driver	Package	Features
	Min	Max	Min	Max	Max					
SC450	3	25	0.7	1.708	55	200-500	Intel	Yes	TSSOP-38	SmartDrive™, Dual Phase, IMVP 4/4+
SC451	3	25	0.7	1.708	30	200-500	Intel	Yes	TSSOP-38, TSSOP-28	SmartDrive™, Single Phase, IMVP 4/4+
SC452	4.5	24	0.3	1.5	55	200-500	Intel	Yes	MLPQ-44, 7x7mm	SmartDrive™, Dual Phase, IMVP 6/6+
SC453	3	25	0.7	1.708	30	200-500	VIA C7	Yes	TSSOP-28, MLPQ-32, 5x5mm	SmartDrive™, Single Phase, 6 bit DAC
SC454	3	24	0.3	1.5	30	200-500	Intel	Yes	MLPQ-32, 5x5mm	SmartDrive™, Single Phase, IMVP 6/6+
SC457	3	24	0.3	1.5	30	200-500	Freescale	Yes	MLPQ-32, 5x5mm	SmartDrive™, Single Phase, 7 bit DAC
SC458	4.5	24	0.3	1.5	55	200-500	Freescale	Yes	MLPQ-44, 7x7mm	SmartDrive™, Dual Phase, 7 bit DAC

* Recommended values based on typical inductors and FETs

Graphics Processor Power

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (A)	f_{SW} (kHz)	# of VIDs	Intended chipset	Integrated driver	Package	Features
	Min	Max	Min	Max	Max						
SC471(A)	3	24	0.75	5.25	20	325	2	Intel, Nvidia	Yes	MLPQ-16, 3x3mm	SmartDrive™, Powersave
SC472B	3	24	0.412	1.2875	30	200-500	5	Intel	Yes	MLPQ-24, 4x4mm	SmartDrive™, IMVP 6/6+
SC473	3	24	0.375	1.15	30	200-500	5	ATI	Yes	MLPQ-24, 4x4mm	SmartDrive™, Powersave
SC475A	3	24	0.75	5.25	25	325	1	ATI	Yes	MLPQ-16, 3x3mm	SmartDrive™, Powersave

Step-up Switching Regulators / Controllers

Single Output Step-up Controllers

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (A)	Gate drive current (A)	Shutdown current (µA)	Quiescent current (mA)	f_{SW} (kHz)	Package	Features
	Min	Max	Min	Max	Max						
SC2603	4.5	16	4.5	* (1)	* (2)	0.8	5	8	200	SOT23-6	Internal compensation, over-current protection
SC2604	4.5	13.5	4.5	* (1)	* (2)	0.8	200	9	400	MSOP-8	Input disconnect FET drive, internal compensation, programmable current limit and soft-start

* (1)= External FET Voltage * (2) I_{OUT} is function of Vin, Vo, Fsw, and inductor value

Single Output Step-up Regulators

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (A)	I_{SW} (A)	Shutdown current (µA)	Quiescent current (mA)	f_{SW} (kHz)	Package	Features
	Min	Max	Min	Max	Max	Min					
SC4501	1.4	16	1.4	30	*	2	<18	1.6	Up to 2000	MSOP-8 EDP MLPD-10, 3x3mm	Adjustable frequency and UVLO, programmable Soft-start, SEPIC configuration
SC4502 SC4502H	1.4	16	1.4	32 / 40	*	1.4	10	1.1	Up to 2000	MLPD-10, 3x3mm	Adjustable frequency, programmable Soft-start, SEPIC configuration
SC4503	2.5	20	3	25	*	1.4	<1	1.1	Up to 1300	TSOT-23	Programmable Soft-start, can be used in SEPIC configuration

* I_{OUT} is function of Vin, Vo, Fs and inductor values.

Inverting Buck / Boost Controller

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (A)	Gate drive RDS_{on} (Ω)	Shutdown current (µA)	Quiescent current (mA)	f_{SW} (kHz)	Package	Features
	Min	Max	Min	Max	Max						
SC4508A	2.7	15	-0.5	* (1)	*(2)	8	<500	3	100-1500	MLPQ, 4x4mm	Current mode control, can be used buck or inverting buck/boost configuration

* (1)= External FET Voltage * (2) Iout is function of Vin, Vo, Fsw, and inductor value

Combo Regulators / Controllers

Part Number	Topologies	V_{IN} (V)		Buck V_{OUT} (V)		I_{OUT} Max (A)	Package	Features
		Min	Max	Min	Max			
SC1109	1 buck controller + 2 LDO controllers	4.4	5.25	1.2	0.9* Vin	10/4/4	SO-16	200/500kHz for buck, Power Good, programmable current limit, soft-start
SC2441A	2 buck controllers + 1 boost regulator	1.8	20	0.5	0.88* Vin	20/20/0.6	TSSOP-28	Up to 1MHz Frequency, Pre-bias startup, external synchronization, 2 phase-1 output
SC2463	2 buck controllers + 2 LDO controllers	4.5	30	0.5	0.8* Vin	20/20/2/2	TSSOP-28	Up to 1MHz frequency, auto startup sequence
SC2621A	1 buck controller + 1 LDO controller	4	25	0.5	0.97* Vin	20/2	SO-14	1.5A gate drive for buck controller, hiccup short circuit protection

LDOs

Single Output LDOs

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (A)	$V_{DROPOUT}$ (V)	Enable Pin (Y/N)	Pgood? (Y/N)	Package	Features
	Min	Max	Min	Max	Max	Max				
EZ1580 EZ1581 EZ1582 EZ1583	2.05*	7.0	1.25	6.2	7 5 3 1.5	0.8 0.6 0.6 0.6	N	N	TO-263-5, TO-220-5	Separate control and power inputs for lower dropout, remote output sense
SC1202	2.65	7	1.25	5.7	0.6	1.3	N	N	SOT-223	±2% output voltage regulation over line, load and temperature
SC1563	2.2	6.5	1.2	4.8	0.5	0.7	Y	N	SOT-23-5	Fixed and adjustable versions, works with ceramic capacitors
SC1565	2.2	5.5	1.2	4.8	1.5	0.6	Y	N	TO-263-5, SO-8, SOT-223, TO-263-3	Works with ceramic capacitors, 10µA quiescent current in shutdown, fixed and adjustable versions
SC1566	2.2	5.5	1.2	4.8	3	0.45	Y	N	TO-220-5, TO-263-3, TO-220-3, TO-263-5	Works with ceramic capacitors, 350m$V_{DROPOUT}$ typical @ 3A, 10µA quiescent current in shutdown, fixed and adjustable versions
SC1592	1.25*	16	0.8	V_{IN}-$V_{DROPOUT}$	3	0.52	Y	N	TO-263-7, SO-8 EDP	Separate control and power inputs for lower dropout, programmable current limit & independent enable pin
SC4205	2.2	5.5	1.2	4.8	1	0.4	Y	N	SO-8 EDP	10µA quiescent current in shutdown, over-current and over-temperature protection
SC4211	1.4	5.5	0.5	V_{IN}-$V_{DROPOUT}$	1	0.4	Y	N	SO-8 EDP	Simple LDO, adjustable output, low Vin ≅ 1.4V
SC4215A	1.4	6.0	0.5	V_{IN}-$V_{DROPOUT}$	2	0.4	Y	N	SO-8 EDP	Simple LDO, adjustable output, low Vin ≅ 1.4V
SC4215H	1.4	5.5	0.5	3.3	2	0.5	Y	N	SOIC-8EDP	Very low input / very low dropout 2 Amp regulator with Enable
SC4216	1.45	5.5	0.5	V_{IN}-$V_{DROPOUT}$	3	0.55	Y	N	SO-8 EDP	Simple LDO, adjustable output, low Vin ≅ 1.4V
SC4216H	1.45	5.5	0.5	5	3	0.6	Y	N	SOIC-8EDP	Very low input / very low dropout 3 Amp regulator with Enable
SC553	2.25	6.5	1.25	6	0.15	0.23	Y	N	SOT-23-5	2% output accuracy guaranteed over line, load and temperature, 75µA typical supply current over line and load, industry standard pinout

* Control voltage also required. See datasheet.

Multiple Output LDOs

Part Number	V_{IN} (V)		V_{OUT} (V)		I_{OUT} (mA)	$V_{DROPOUT}$ (mV)	Pgood? (Y/N)	I_Q (µA)	Enable pin (Y/N)	# of LDOs	Noise (μV_{RMS})	PSRR (dB)	Serial interface	Package	Features
	Min	Max	Min	Max											
SC560	2.5	5.5	1.2	3.3	300*	100	Y	100	Y	2	50	65	No	MLPQ-UT8 1.5x1.5x0.6mm	Power Good / dual enable / low noise Features available by option
SC561	2.5	5.5	2.85	3.1	300*	100	Y	40	Y	2	50	65	No	MLPQ-UT8 1.5x1.5x0.6mm	Power Good / Standby Mode / low noise
SC1458	2.5	5.5	1.8	2.85	300*	100	Y	100	Y	2	50	65	No	MLPD-W6, 3x3mm	Power Good / low noise

* Per output ** All regulators active

LDO Controllers

Part Number	V_{IN} (V)		V_{OUT} (V)		# Channels	$V_{DROPOUT}$ (V)	Enable pin (Y/N)	Pgood? (Y/N)	Package	Features
	Min	Max	Min	Max						
SC338(A)	4.5*	13.2	0.5	3.3	2	user selectable	Y	Y	MSOP-10	Reference: +/-2.5% for SC338, +/-1.5% for SC338A, soft-start, separate enable and power good pins for each output
SC339	4.5*	5.5	0.5	3.3	1	user selectable	Y	Y	SOT-23-6	Reference: +/-1%, low quiescent current, soft-start

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

LED Drivers

Inductor Based

Part Number	V_{IN} (V)		V_{OUT} (V)	f_{SW} (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	Various	10	1	10	-	-	Analog/PWM	MLP-8 3x3x1.0mm	Up to 10 white LEDS in series
SC440A	4.5	21	42	0.8	72	6	12	30	180	PWM Up to 50KHz	MLPQ-24 4x4x1.0mm	Integrated high voltage boost with a wide input range. Open/Short LED string disable. OCP, OTP, OVP & FFLAG
SC441	4.5	21	36	0.8	40	4	10	150	600	PWM Up to 50KHz	TSSOP-20 EDP	Integrated high voltage boost with a wide input range for High Brightness LEDs. Open/Short LED string disable. OCP, OTP, OVP & FFLAG.
SC443	4.5	27	42	0.2 - 1.2	36	3	12	30	90	PWM Up to 50KHz	MLPQ-UT-16 3x3x0.6mm	Integrated high voltage boost with a wide input range and adjustable frequency. Open/Short LED string disable. OCP, OTP & OVP.
SC4505	2.6	12	28	1	12	2	6	Backlight=75, Flash=125	200	PWM Up to 50KHz	MLPQ-16 3x3x1.0mm	Dual channel: WLED & Torch/Flash with independent channel current setting. OCP, OTP & 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 & 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 & 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 & 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 & OVP.

Charge Pump Based

Part Number	V_{IN} (V)		V_{OUT} (V)	f_{SW} (kHz)	I_{OUT} (mA)	Mode	Backlight sink current (mA)	Flash Sink current (mA)	Spotlight to flash ratio (%)	Flash safety timer	Control interface	Dimming	Package	Features
	Min	Max	Max		Max		Max	Max						
SC600	2.5	6.5	4, 4.5, 5	8, 32, 262, 650	60, 120	Fractional	-	-	N/A	-	None	PWM	MSOP-10, MLPD-10 3x3mm	Low noise
SC603	2.5	6.5	4.5, 5	262, 650	160, 200	Doubler	-	-	N/A	-	None	PWM	MLPD-10 3x3mm	High current
SC613					100, 400									
SC606	2.85	5.5	-	250, 1330	120	Fractional	32	-	N/A	-	I^2C	Register	MLPQ-16 4x4mm	6 backlight sinks, low noise, tight accuracy and matching, high efficiency
SC605	3	5.25	-	250	700	Doubler	-	-	20, 30, 40	N/A	None	-	MLPD-10 3x3mm	Individual spotlight and flash control pins
SC615(A)					700(A)				20 (40)					
SC635					200				40					
SC618	3	5.25	-	250	700	Single, Doubler	-		40	Yes	None	-	MLPD-10 3x3x0.6mm	1x mode, flash safety timer, individual spotlight and flash control pins
SC619									20					
SC621(A)	3	5.5	-	250	500	Fractional	25	400	Programmable	Yes	SemWire™, I^2C (A)	Register	MLPQ-UT-20 3x3x0.6mm	Two 100mA low noise LDOs, four 25mA backlight sinks, one 400mA flash sink with dedicated enable
SC622(A)	3	5.5	-	250	400	Fractional	N/A	400	Programmable	Yes	SemWire™, I^2C (A)	Register	MLPQ-UT-20 3x3x0.6mm	Two 100mA low noise LDOs, one 400mA flash sink with dedicated enable

(Continued on next page)

LED Drivers

Charge Pump Based *(Continued from pg 8)*

Part Number	V_{IN} (V)		V_{OUT} (V)	fsw (kHz)	I_{OUT} (mA)	Mode	Backlight sink current (mA)	Flash Sink current (mA)	Spotlight to flash ratio (%)	Flash safety timer	Control interface	Dimming	Package	Features
	Min	Max	Max		Max		Max	Max						
SC623(A)	3	5.5	-	250	500	Fractional	4 x 25	400	Programmable	Yes	SemWire™, I²C (A)	Register	MLPQ-UT-20 3x3x0.6mm	Four 25mA backlight sinks, one 400mA flash sink with dedicated enable
SC624(A)	3	5.5	-	250	100	Fractional	4 x 25	N/A	N/A	N/A	SemWire™, I²C (A)	Register	MLPQ-UT-20 3x3x0.6mm	Two 100mA low noise LDOs, four 25mA backlight sinks
SC627(A)	3	5.5	-	250	800	Fractional	4 x 25	700	Programmable	Yes	SemWire™, I²C (A)	Register	MLPQ-UT-20 3x3x0.6mm	Two 100mA low noise LDOs, four 25mA backlight sinks, one 700mA flash sink with dedicated enable
SC643	2.9	5.5	-	250	125	1x,1.5x,2x	5 x 25	N/A	N/A	N/A	SemPulse™	Register	MLPQ-UT-20 3x3x0.6mm	4 programmable LDOs, ±0.5% matching, ±1.5% accuracy, 5 current sinks, fade-in/fade-out, programmable for main and sub displays
SC644	2.9	5.5	-	250	150	1x,1.5x,2x	6 x 25	N/A	N/A	N/A	SemPulse™	Register	MLPQ-UT-20 3x3x0.6mm	4 programmable LDOs, ±0.5% matching, ±1.5% accuracy, 6 current sinks, fade-in/fade-out, programmable for main and sub displays
SC652	2.9	5.5	-	250	125	1x,1.5x,2x	5 x 25	N/A	N/A	N/A	PWM	-	MLPQ-UT-14 2x2x0.6mm	±0.5% matching, ±1.5% accuracy, 5 current sinks, 200Hz to 50KHz PWM Frequency
SC653	2.9	5.5	-	250	100	1x,1.5x,2x	4 x 25	N/A	N/A	N/A	SemPulse™	-	MLPQ-UT-18 2.3x2.3x0.6mm	2 programmable LDOs, ±0.5% matching, ±1.5% accuracy, 4 current sinks
SC654	2.9	5.5	-	250	150	1x,1.5x,2x	6 x 25	N/A	N/A	N/A	SemPulse™	-	MLPQ-UT-14 2x2x0.6mm	6 current sinks, ±0.5% matching, ±1.5% accuracy, 3 LED grouping, fade-in/fade-out
SC657	2.9	5.5	-	250	125	1x,1.5x,2x	5 x 25	N/A	N/A	N/A	SemPulse™	-	MLPQ-UT-14 2x2x0.6mm	5 current sinks, ±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	N/A	SemPulse™	-	MLPQ-UT-14 2x2x0.6mm	4 current sinks, ±0.5% matching, ±1.5% accuracy, fade-in/fade-out, LED float detection

LED Drivers / Sinks

LED Current Sinks

Part Number	V_{IN} (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	I²C Interface	Register	MLPQ-UT-16 3x3x0.6mm	Output expansion capability, individually controllable current sinks

Charge Pump Regulators

Part Number	V_{IN} (V)		V_{OUT} (V)	I_{OUT} (mA)	f_{SW} (kHz)	Mode	Package	Features
	Min	Max		Max				
SC1462	1.65	5.5	2 x Vin	80	160	Doubler	SOT-23-6	94% efficiency @ 3.6V Vin, integrated protection diode
SC600	2.5	6.5	4, 4.5, 5	60, 120	8, 32, 262, 650	Fractional	MSOP-10, MLPD-10, 3x3mm	Very low noise, regulated output
SC603	2.5	6.5	4.5, 5	160, 200	262, 650	Doubler	MLPD-10, 3x3mm	Minimal BOM
SC613				100, 140				
SC630	2.9	5.5	3.3	400	200	1x,1.5x,2x	MLPD-UT-8, 2x2mm	Buck-Boost <20mV Vripple, Soft Start
SC631	2.9	5.5	4.4	250	200	1x,1.5x,2x	MLPD-UT-8, 2x2mm	Buck-Boost <30mV Vripple, Soft Start
SC632	2.9	5.5	5.0	275	200	1x,1.5x,2x	MLPD-UT-8, 2x2mm	Buck-Boost <30mV Vripple, Soft Start

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			Max								
SC801	1.5	+/- 50mA	4.2	6.5	14	4.1, 4.2, ADJ	+/-1	Yes	No	No	Yes	Yes	Yes	MLPQ-16 4x4mm	High input voltage protection, high current, programmable pre-, fast- and termination charge current
SC802	1	+/- 50mA	4.3	6.5	14	4.1, 4.2, ADJ	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPQ-16 4x4mm	Fully featured, high input voltage protection, programmable 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 3x3mm	Fully featured, programmable pre-, fast- and termination current
SC806	1	+/- 5%	3.15	6.3	7	4.2	+/-1	No	Yes	No	Yes	Yes	Yes	MLPD-10 3x3mm	Programmable 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 2x2mm	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 2x2mm	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 2x2mm	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 2x2mm	Dual input adapter and USB, indiviual charging current
SC824	1	+/- 9%	4.0	8.2	30	4.2	+/-1	Yes	Yes	Yes	Yes	Yes	Yes	MLPD-UT-10 2x2mm	Charging mode pin: selects USB high, USB low or adapter inputs, OVP 9.6V

uPMIC

Part Number	V_{IN} (V)		# of LDOs	LDO output voltage range (V)	LDO output current (mA)	# of DC-DCs	DC-DC output voltage range (V)	DC-DC output current range (A)	Charger (Y/N)	Fast charge current (A) (Y/N)	Interface	Package	Features
	Min	Max											
SC908	4.45	7	1	1.5-3.3	300	1	1-3	150	Y	0.5	Logic	MLPQ-24 4x4mm	Bluetooth PMIC, Charger + Buck + LCO+LBI

Isolated PWM Controllers

Part Number	Start Up current (µA) Max	Topologies	# of outputs	Mode of operation	f_{SW} (kHz)	Max duty cycle	Turn on threshold (V_{MAX})	Package	Features
SC4806	150	Pushpull, Full Bridge, Half Bridge	2	Voltage Mode or Current Mode	1000	49% each channel	8.6	MLPQ-12 4x4mm	Independent Soft-start, shutdown, UVLO
SC4808B-2	150	Pushpull, Full Bridge, Half Bridge	2	Voltage Mode or Current Mode	1000	50% each channel	4.4	MSOP-10	UVLO, external synchronization
SC4809A	110	Forward / Flyback, Boost	1	Voltage Mode or Current Mode	1000	90%	4.5	MSOP-10	Programmable duty cycle
SC4809B							12		
SC4809C							6.95		
SC4810B/E	250	Forward / Flyback	2	Voltage Mode or Current Mode	1000	90%	8.8	TSSOP-16, MLPQ-16 4x4mm	Dual-phase mode of operation or low ripple
SC4905A	100	Forward / Flyback, Boost	1	Voltage Mode	1000	90%	4.6	MSOP-10	External synchronization
SC4905B							12		
SC4911	80	Flyback	1	Voltage Mode	500	57%	7	MSOP-8	Ultra low startup current: <45µA (Typical), UVLO

Voltage References

Part Number	V_{IN} (V)		Ref voltage (V)	Accuracy (%)	Package	Features
	Min	Max				
SC431	2.5	36	2.5	0.5	SOT23/SO-8	Adjustable shunt regulator
SC431L	1.24	20	1.24	0.25	SOT23/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

MOSFET Drivers

Part Number	V_{IN} (V)		Gate drive current (A)	Rise/Fall time (ns)	Prop delay (ns)	Package	Features
	Min	Max					
SC1301	4.5	16.5	2	15	60	SOT23-5	TTL compatible input, non-inverting output
SC1302	4.5	16.5	2	20	40	SO-8	TTL compatible input, UVLO

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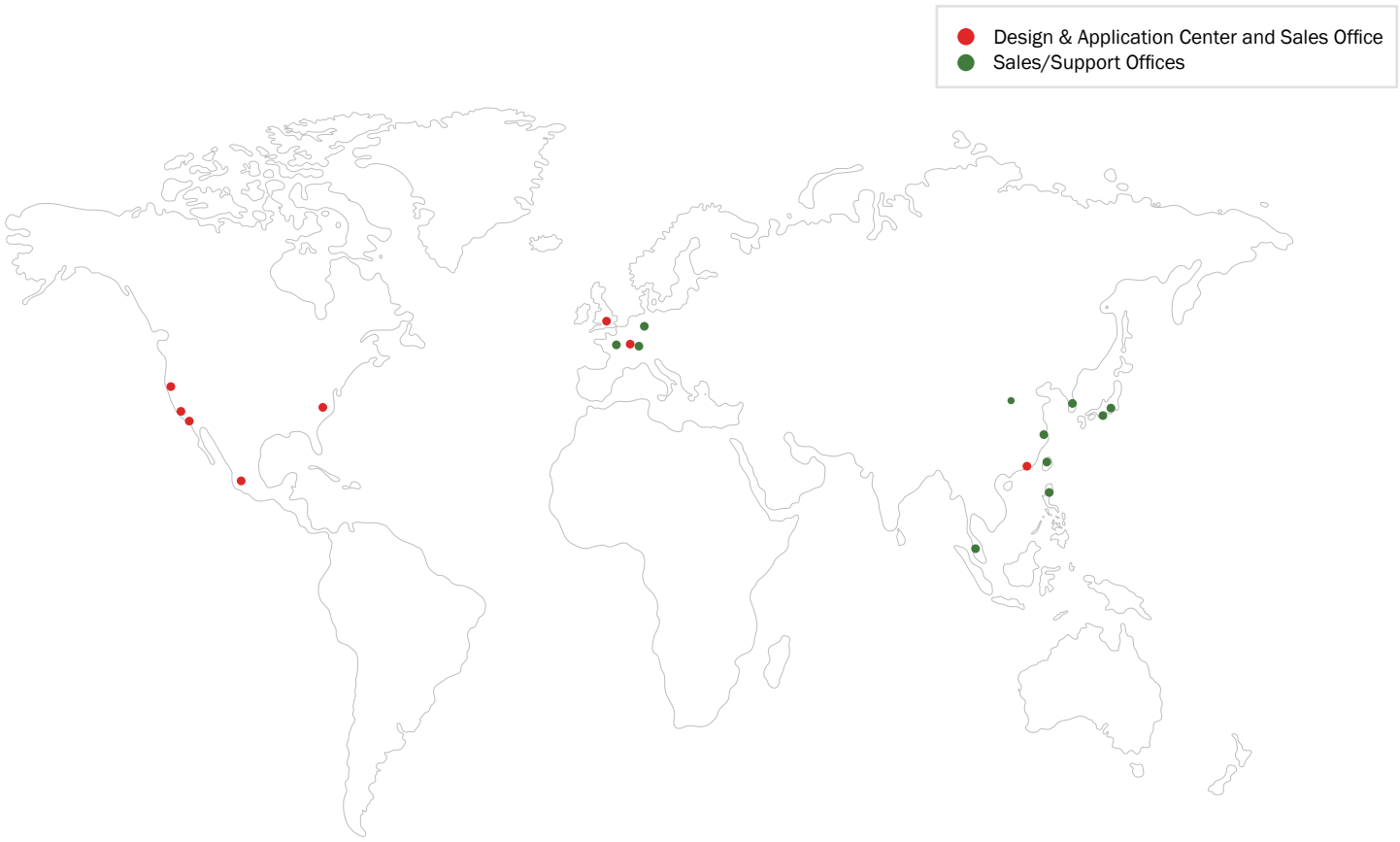

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