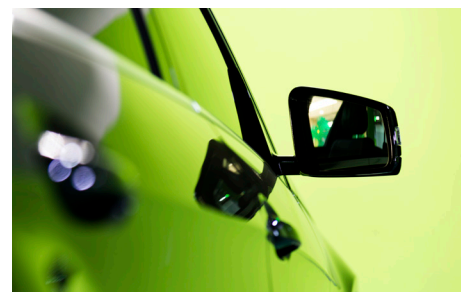




driving



FEATURING AEC-Q100 Qualified Portfolio

Automotive Selector Guide

Semtech Automotive Solutions, helping you drive the future of automotive design with our Touch Controllers, Cable Drivers, Instrument Clusters, Key Fobs, Seatback Infotainment, Switching Regulators in EMI-Sensitive Console Applications, LED Lighting, and Drive Train Power Supplies.

www.semtech.com/applications/automotive-apps



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about Semtech

Semtech Corporation is a leading supplier of analog and mixed-signal semiconductor platforms for high-end consumer, enterprise computing, communications and industrial applications. Our vision is to be the global leader in analog and mixed-signal platforms enabling architectural and performance differentiation. Semtech, publicly traded since 1967, is listed on the NASDAQ Global Select Market under the symbol SMTC and has more than 32 sales and application support offices in 14 countries as well as representatives and distribution support locations in more than 30 countries.

Semtech is dedicated to providing proprietary platforms differentiated by innovation, size, efficiency, performance and reach. Our solutions are used in some of the most innovative systems and products in the fastest growing markets today. These markets include smartphones, LCD TVs, notebooks, tablets, smart grid, automotive, automatic meter reading, medical, wireless infrastructure, PON, Internet of Things, optical transport and datacenters.

More than 5,000 customers worldwide rely on our diverse product portfolio and world class technology roadmap for solutions in low-power wireless communications, optical data transport, video broadcasting, power management, circuit protection, touch sensing, and more making Semtech one of the most balanced semiconductor companies in the industry.



find us, like us, follow us





driving the future

Automotive manufacturers are facing increasing demand for technology that improves the safety, comfort and performance of passenger and commercial automobiles - especially when targeting a tech-savvy market permeated by digital devices.

While virtually unheard of a few years ago, features such as automotive infotainment components, brake assist, lane-departure warning and parking-assist cameras have become commonplace in today's vehicles. Drivers routinely expect their cars to be equipped with digital devices that enable them to control the cabin environment while staying focused on the road. These devices include touchscreen or voice activated controls for navigation, heating and cooling, phone or internet access, and radio and music players.

In order to meet the needs of an increasingly complex automotive market, design engineers rely on Semtech's feature-rich, highly integrated products. Our products offer design flexibility with low power, small package, high efficiency, improved reliability and a lower overall system cost.

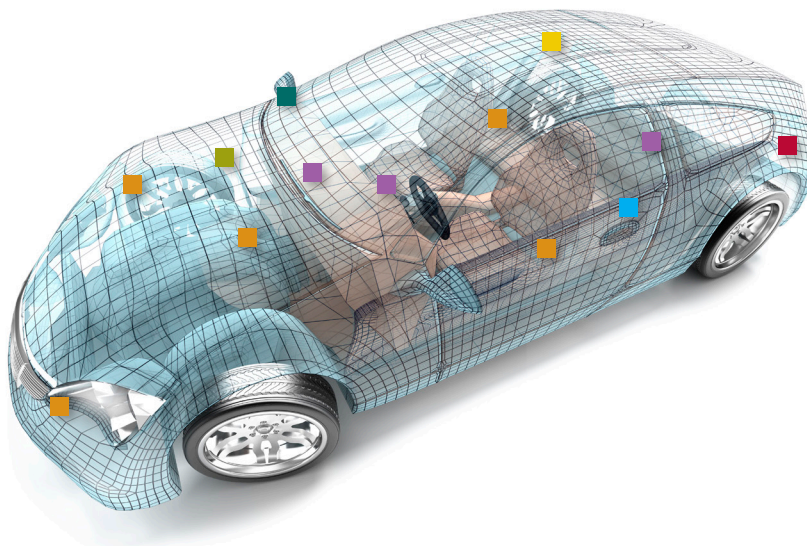
Semtech's automotive product line was created with the needs of automotive design engineers in mind. By partnering with Semtech, you will receive high-quality products, knowledgeable support, and our commitment to meet and exceed your next design challenge. Our knowledge of today's markets and dedication to your success will give you the confidence and freedom to create the solutions your customers.



AEC-Q100 Qualified Parts

OUR EXPANDING COMMITMENT

As the automotive market demand increases so does our commitment to power, protect and connect you with the ideal IC solutions. Semtech has provided ICs for the automotive industry for many years and, our devices are used in applications ranging from protecting sensitive electronics to in-cabin lighting and touch screen human interface. We are continuously working to expand our list of certified products to better serve our automotive customers, and we can prioritize part qualification based on demand in order to meet customer needs.



Power Management	
Part Number	Features
SC183CQ	2.5MHz, 2A Synchronous Step-Down Switching Regulator
SC4501Q	2 Amp, 2 MHz Boost Switching Regulator with Soft-Start
SC220Q	20MHz, 650mA, X-EMI™ Enabled Synchronous Step-Down Regulator
SC441A	High-Efficiency Integrated Boost Driver For 4-Strings Of 150mA LEDs
SC508A	Wide Input Range (4.5V to 46V) EcoSpeed® Buck Controller With Integrated LDO
SC5012Q	High-Brightness LED Driver for 150mA x 4 -strings 5,000:1 PWM Dimming I²C Control
RF/ISM	
SX1239	Low-Power Integrated UHF Receiver
SX1231	Low-Power Integrated UHF Transceiver
SX1233	High Bit Rate Transceiver Low-Power Integrated UHF Transceiver
SX1243	Low Cost Low Current Integrated Transmitter 310 To 928MHz Frequency Agile

Circuit Protection	
Part Number	Features
SLVU2.8Q	Analog Video
RClamp® 0512TQ	USB, LVDS, Ethernet
RClamp® 0524PQ	HDMI, MHL
RClamp® 0582BQ	Single Pair Ethernet, USB 2.0
µClamp® 0571P	Vbus/DC lines
µClamp® 3311PQ	Multimedia Touchpoint
µClamp® 0511PQ	Keypads, ESD Sensitive Touch point
RClamp® 2574NQ	Ethernet, LVDS
RClamp® 1521PQ	Antenna
RClamp® 2431TQ	Antenna, CAN Bus
RClamp® 0531TQ	Antenna, CAN Bus Single Pair Ethernet, USB
EClamp® 2357NQ	SD Card

dash



Dashboard Electronics, USB & Audio Ports

LED Drivers

SC441A - High-Efficiency Integrated Boost Driver For 4-Strings Of 150mA LEDs

SC443 - High Efficiency Integrated Boost Driver for 3-Strings of 30mA LEDs

SC445 - High Efficiency Integrated Boost Driver for 4-Strings of 150mA LEDs

SC446 - High Efficiency Integrated Boost Driver for 3-Strings of 100mA LEDs

SC2597 - Low Voltage DDR Termination Regulator

SC4524/5 - Maximum 28V input, with high efficiency and tight output voltage regulation

SC4541 - Single String LED Driver with High Side Sense

SC5010/H - High-Efficiency Phase Shifted 8-CH LED Driver With I²C Control

SC5012Q - High-Brightness LED Driver for 150mA x 4-strings 5,000:1 PWM Dimming I²C Control

SC5014/A - High-Efficiency 4-CH/2-CH LED Driver With I²C Control

SC9301 - 10A EcoSpeed® Integrated FET Regulator with 5V LDO and Hiccup Restart

Switching Regulators

SC220Q - 20MHz, 650mA, X-EMI™ Enabled Synchronous Step-Down Regulator

ESD Protection

RClamp® 0582BQ - Single Pair Ethernet Protection

RClamp® 0512TQ - USB, LVDS, Ethernet

RClamp® 0524PQ - HDMI, MHL

EClamp® 2357NQ - SD Card Protection

μClamp® 0511PQ - Audio, AUX port

antenna



Antenna Protection

Protection

RClamp® 0531TQ - 5V Bidirectional ESD Protection

RClamp® 2431TQ - 24V Bidirectional ESD Protection

RClamp® 1531TQ - 15V Bidirectional ESD Protection

network



Networking, Computing & Power Supply

SC508A - Wide Input Range (4.5V to 46V) EcoSpeed® Buck Controller With Integrated LDO

SC414 - Wide Input Range (3V to 28V) 6A EcoSpeed® Synchronous Buck Regulator

SC402B - Wide Input Range (3V to 28V) 10A EcoSpeed® Synchronous Buck Regulator

SC187 - Low Input Voltage (2.9V to 5.5V) 4A, 2.2MHz Synchronous Buck Regulator With 15 Selectable Output Voltages

SC174 - Low Input Voltage (3V to 5.5V) 4A EcoSpeed® Synchronous Buck Regulator

SC284 - Low Input Voltage (2.9V to 5.5V) Dual 1.8A Synchronous Buck Regulator with 15 Selectable Output Voltages Per Channel

SC4501 - 2A, 2MHz Boost Regulator With Programmable Soft-Start

SC2597 - Low Voltage DDR Termination Regulator

Networking Protection

RClamp® 2574NQ

RClamp® 3374N - ESD & Surge Protection For Ethernet Interfaces

RClamp® 0512TQ - ESD protection on high-speed ports

RClamp® 0582BQ - Low Capacitance TVS

RClamp® 3552T - 2-Line ESD Protection

μClamp® 3311PQ - Single-Pair Ethernet ESD Sensitive I/O

audio/ video



Audio, Navigation, Infotainment & Power

Cable Drivers

GS1678 - High-Speed Video Cable Driver Solution

SDI SerDes

GS1661A - Multi-rate SDI Integrated Receiver For High-Speed, Low Latency, Video Transmission Solutions

GS1662 - SDI Transmitter For High-Speed, Low Latency, Video Transmission Solutions


Adaptive Cable Equalizer

GS1674 - High-speed BiCMOS Integrated Circuit Design For Video Cable Equalization

Timing

GS4911 - Advanced Video Timing Solution

LED Drivers


 **SC441A** - High-Efficiency Integrated Boost Driver For 4-Strings Of 150mA LEDs

SC5010/H - High-Efficiency Phase Shifted 8-CH LED Driver With I²C Control

SC5014/A - High-Efficiency 4-CH/2-CH LED Driver With I²C Control

 **SC5012Q** - High-Brightness LED Driver for 150mA x 4-strings 5,000:1 PWM Dimming I²C Control

Switching Regulators

 **SC508A** - Wide Input Range (4.5V to 46V) EcoSpeed® Buck Controller With Integrated LDO


SC402B - Wide Input Range (3V to 28V) 10A EcoSpeed® Synchronous Buck Regulator

SC187 - Low Input Voltage (2.9V to 5.5V) 4A, 2.2MHz Synchronous Buck Regulator With 15 Selectable Output Voltages

SC174 - Low Input Voltage (3V to 5.5V) 4A EcoSpeed® Synchronous Buck Regulator

SC284 - Low Input Voltage (2.9V to 5.5V) Dual 1.8A Synchronous Buck Regulator with 15 Selectable Output Voltages Per Channel

SC4501 - 2A, 2MHz Boost Regulator with Programmable Soft-Start

 **SC220Q** - 20MHz, 650mA, X-EMI™ Enabled Synchronous Step-Down Regulator

SC3303 - 3A EcoSpeed® Step-Down Regulator with LDO and Ultrasonic Power Save

Capacitive Touch Controllers

SX8633 - Low-Power, Capacitive Button Touch

SX8634 - Low-Power, Capacitive Button & Slider Touch

SX8635 - Low-Power, Capacitive Button & Wheel Touch

SX8636 - Low-Power, Capacitive Button Touch

SX8638 - Low-Power, Capacitive Button & Slider Touch

SX8639 - Low-Power, Capacitive Button & Wheel Touch

SX8643 - Ultra Low-Power, Capacitive Button Touch

SX8644 - Ultra Low-Power, Capacitive Button & Slider Touch

SX8645 - Ultra Low-Power, Capacitive Button & Wheel Touch

SX8646 - Ultra Low-Power, Capacitive Button Touch

SX8647 - Ultra Low-Power, Capacitive Wheel Touch

SX8648 - Ultra Low-Power, Capacitive Button & Slider Touch

SX8649 - Ultra Low-Power, Capacitive Button & Wheel Touch

Resistive Touch Controllers

SX8654 - Haptics Enabled 4/5-Wire Resistive Touchscreen Controller

SX8656 - Haptics Enabled 4/5-Wire Resistive Touchscreen Controller

SX8658 - Haptics Enabled 4/5-Wire Resistive Touchscreen Controller

SX8675 - Haptics Enabled Multitouch 4/5-Wire Resistive Touchscreen Controller


SX8677 - Haptics Enabled Multitouch 4/5-Wire Resistive Touchscreen Controller

SX8678 - Haptics Enabled Multitouch 4/5-Wire Resistive Touchscreen Controller

Protection

 **μClamp® 0511PQ**,

 **μClamp® 3311PQ**,

 **μClamp® 0531TQ** - Multimedia Touchpoint Protection, Audio Protection

 **RClamp® 0524PQ** HDMI, MHL

 Indicates Semtech AEC-Q100 Qualified Part

camera



Backup Camera & Analog Video

Switching Regulators

- 🚗 **SC508A** - Wide Input Range (4.5V to 46V) EcoSpeed® Buck Controller With Integrated LDO

SC187 - Low Input Voltage (2.9V to 5.5V) 4A, 2.2MHz Synchronous Buck Regulator With 15 Selectable Output Voltages

SC174 - Low Input Voltage (3V to 5.5V) 4A EcoSpeed® Synchronous Buck Regulator

SC284 - Low Input Voltage (2.9V to 5.5V) Dual 1.8A Synchronous Buck Regulator with 15 Selectable Output Voltages Per Channel

Camera Protection

- 🚗 **SLVU2.8Q** - Analog Video/Surveillance Camera Protection

- 🚗 **RClamp® 0512TQ** - USB, LVDS, Ethernet

RClamp® 3552T - LVDS

lights



Interior & Exterior LED Lighting

Interior - Map, Vanity Mirror, Door, Dome, Instrument, Center Stack, Foot Area and LCD Backlights

Exterior - Rear, Turn Signal, Center High Mount, Under Door, Mirror Down and Daytime Running Lights

Boost LED Drivers

- 🚗 **SC441A** - High-Efficiency Integrated Boost Driver For 4-Strings Of 150mA LEDs

SC4541 - Single String LED Driver with High Side Sense

SC446 - High Efficiency Integrated Boost Driver for 3-Strings of 100mA LEDs

SC442 - 10-Channel High Efficiency LED Driver

SC443 - High Efficiency Integrated Boost Driver for 3-Strings of 30mA LEDs

SC4540 - Single String 10 LED Driver

key



Remote Keyless Entry

RF Receivers

- 🚗 **SX1239** - Low-Power Integrated UHF Receiver

RF Transceivers

- 🚗 **SX1231** - Low-Power Integrated UHF Transceiver

RF Transmitters

SX1230 - Integrated RF Transmitter IC Narrow/wideband 315, 434, 868 and 915MHz band RF Transmitter

- 🚗 **SX1243** - Low Cost Low Current Integrated Transmitter 310 To 928MHz Frequency Agile

Protections

- 🚗 **RClamp® 0531TQ** - Antenna, Keypad

- 🚗 **μClamp® 0511PQ** - Single-line bidirectional TVS for keypads, touch-buttons

- 🚗 **μClamp® 3311PQ** - Single-line bidirectional TVS for keypads, touch-buttons

power






Wireless Charging

- 🚗 **SC4501Q** - 2 Amp, 2 MHz Boost Switching Regulator with Soft-Start

🚗 Indicates Semtech AEC-Q100 Qualified Part

TVS Automotive Protection Solutions

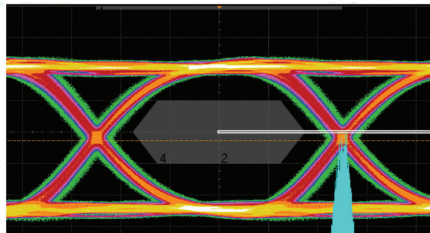
Automotive Transient Voltage (TVS) Protection Family 							
Interface to Protect	Part Number	V _{rwm}	Lines	ESD Rating (air/contact)	Surge (8x20us)	Cap (pF)	Pkg Size (mm)
Standard Ethernet	RClamp® 2574NQ	2.5V	4	±30kV / ±30kV	40A	1.7pF	3.0x2.0x0.6
	RClamp® 3374N	3.3V	4	±30kV/ ±30kV	40A	1.7pF	3.0x2.0x0.65
2-Wire Ethernet Single Twisted Pair	RClamp® 0512TQ	5V	2	±30kV / ±30kV	20A	2pF	1.0x0.6x0.58
	RClamp® 0582BQ	5V	3	±30kV/ ±25kV	15A	1.2pF	1.6x1.6x0.75
	RClamp® 0531TQ	5V	1	±20kV/ ±12kV	4A	0.5pF	1.0x0.6x0.5
LVDS Links	RClamp® 2574NQ	2.5V	4	±30kV / ±30kV	40A	1.7pF	3.0x2.0x0.6
	RClamp® 3324P	3.3V	4	±17kV/ ±20kV	4.5A	0.6pF	2.5x1.0x0.5
	RClamp® 3552T	3.5V	2	±12kV/ ±17kV	4A	0.4pF	1.0x0.6x0.4
USB 3.0	RClamp® 3346P	3.3V	6	±17kV/ ±20kV	4.5A	0.65pF	2.7x0.8x0.5
	RClamp® 3324P	3.3V	4	±17kV/ ±20kV	4.5A	0.6pF	2.5x1.0x0.5
	RClamp® 3552T	3.5V	2	±12kV/ ±17kV	4A	0.4pF	1.0x0.6x0.4
USB 2.0	RClamp® 0582N	5V	3	±20kV/ ±12kV	5A	0.5pF	1.2x1.0x0.58
	RClamp® 0512TQ	5V	2	±30kV/ ±30kV	20A	2pF	1.0x0.6x0.58
	RClamp® 0582BQ	5V	2	±30kV/ ±25kV	15A	1.2pF	1.6x1.6x0.75
	EClamp® 8052P	5V	2	±25kV/ ±30kV	6A	1.2pF	1.9x1.7x0.55
Antenna Interfaces	RClamp® 0531TQ	5V	1	±20kV/ ±12kV	4A	0.5pF	1.0x0.6x0.5
	RClamp® 1521PQ	15V	1	±15kV/ ±8kV	4A	0.3pF	1.0x0.6x0.5
	RClamp® 2431TQ	24V	1	±13kV/ ±8kV	2A	0.35pF	1.0x0.6x0.5
Audio	µClamp® 0511PQ	5V	1	±30kV/ ±30kV	12A	75pF	1.0x0.6x0.5
CAN bus	µClamp® 3601P	36V	1	±20kV/ ±15kV	2A	25pF	1.0x0.6x0.5
	µClamp® 2671P	26V	1	±30kV/ ±30kV	23A	155pF	1.6x1.0x0.57
HDMI, MPPI, MHL	EClamp® 8052P	5V	2	±25kV/ ±30kV	6A	1.2pF	1.9x1.7x0.55
Analog Video	SLVU2.8Q	2.8V	2	±25kV/ ±30kV	24A	100pF	2.9x2.37x0.90
Keypads, Touchbuttons, Control Lines	RClamp® 0524PQ	5V	4	±25kV / ±20kV	5A	0.6pF	2.5 x 1.0 x 0.5mm
	µClamp® 0301PQ	3.0V	1	±25kV/ ±30kV	5A	12pF	1.0x0.6x0.5
	µClamp® 3311PQ	3.3V	1	±25kV/ ±30kV	5A	12pF	1.0x0.6x0.5
	µClamp® 0511PQ	5V	2	±30kV/ ±30kV	12A	75pF	1.0x0.6x0.5
Qualified Single-line DC Bus Protection 							
Typ Application	Part Number	V _{rwm}	Lines	ESD Rating (air/contact)	Surge (8x20us)	Cap (pF)	Pkg Size (mm)
Single-line DC Bus Protection	µClamp® 0571P	5V	1	±30kV/ ±30kV	80A	675pF	1.6x1.0x0.57
	µClamp® 0871P	8V	1	±30kV/ ±30kV	65A	475pF	1.6x1.0x0.57
	µClamp® 1071P	10V	1	±30kV/ ±30kV	60A	350pF	1.6x1.0x0.57
	µClamp® 1271P	12V	1	±30kV/ ±30kV	45A	275pF	1.6x1.0x0.57
	µClamp® 1571P	15V	1	±30kV/ ±30kV	40A	220pF	1.6x1.0x0.57
	µClamp® 1871P	18V	1	±30kV/ ±30kV	35A	220pF	1.6x1.0x0.57
	µClamp® 2271P	22V	1	±30kV/ ±30kV	25A	165pF	1.6x1.0x0.57
	µClamp® 2671P	26V	1	±30kV/ ±30kV	23A	155pF	1.6x1.0x0.57
	µClamp® 3671P	36V	1	±30kV/ ±30kV	18A	150pF	1.6x1.0x0.57
Filter Devices - TVS + EMC Filter 							
Typ Application	Part Number	V _{rwm}	Lines	ESD Rating (air/contact)	Filter Type	Cap (pF)	Pkg Size (mm)
SD Card	EClamp® 2410PQ	5V	6	±17kV/ ±12kV	SD Card Termination	15pF	4.0x1.6x0.5
	EClamp® 2357NQ	5V	6	±20kV/ ±12kV	RC filter SD Card Termination	20pF	3.0x3.0x0.6

TVS Protection - Features & Benefits

Semtech provides TVS (Transient Voltage Suppression) diodes that safeguard low voltage circuits against damage or latch-up caused by electrostatic discharge (ESD), lightning, and other destructive voltage transients. Our circuit protection devices feature low clamping voltage, low capacitance, and low leakage current. Furthermore, we meet the industry's toughest transient immunity standards.

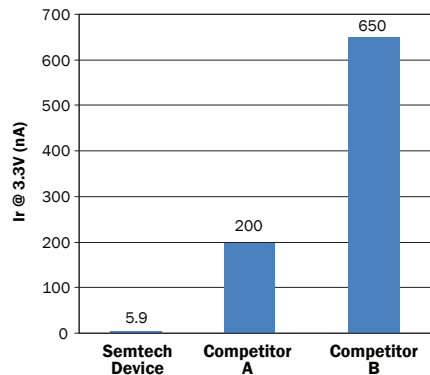
LOW CAPACITANCE

Provides robust protection while preserving signal integrity in high-speed video and data interfaces



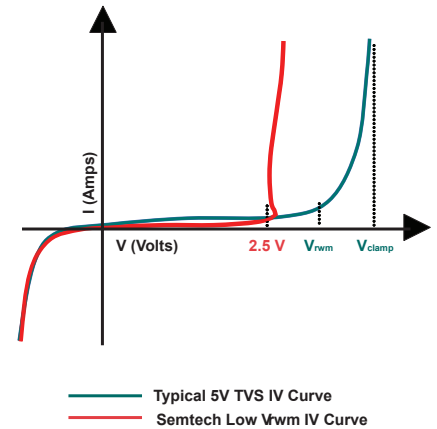
LOW LEAKAGE

Increases battery life in handheld electronic devices



LOWER WORKING VOLTAGE

Reduces stress energy to protected IC



KEY FEATURES

- ESD protection
- ESD-EMI filter protection
- High-current lightning protection
- Low capacitance ESD protection
- Low voltage ESD protection

PRODUCTS

TClamp® = TransClamp
High Surge lightning current handling capability

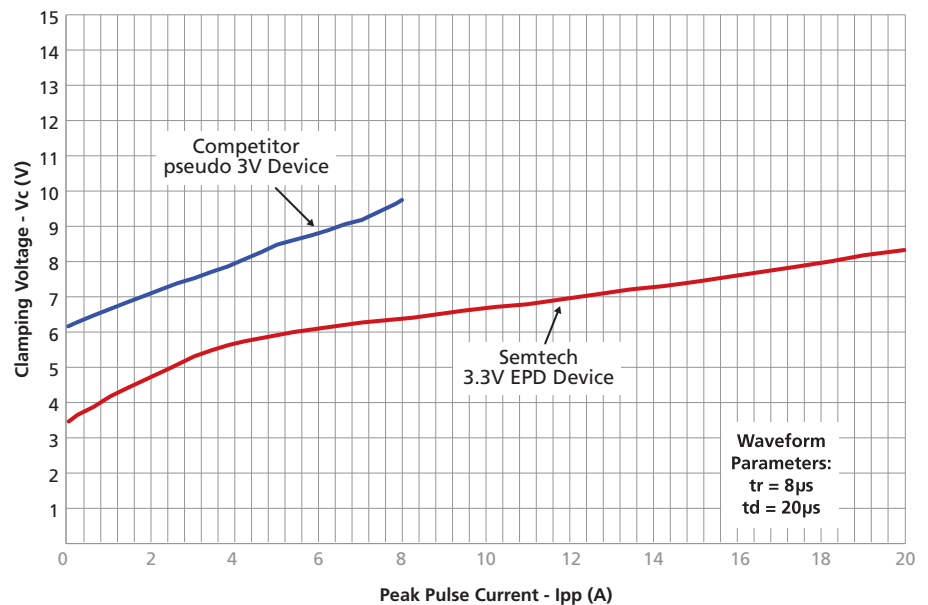
RClamp® = RailClamp
Low capacitance for high speed applications

μClamp® = MicroClamp
Single TVS or TVS arrays for general purpose
Standard TVS Process

EClamp® = EMIClamp
ESD and EMI protection with integrated inductor or resistor

LOW CLAMPING VOLTAGE

Better protection and less stress on transceiver



RF / Wireless & Long Range RFIC Solutions

LOW-POWER INTEGRATED UHF TRANSCEIVERS, TRANSMITTERS AND RECEIVERS

Semtech wireless RF transceivers, transmitters and receivers are designed with a highly integrated architecture allowing for a minimum external component count while maintaining RF design flexibility.

Operating in the license-free ISM (Industry Scientific and Medical) bands, our devices comply with relevant European and North American standards. What makes our ISM band RF devices unique is their extremely low current consumption of only 3mA in full active mode. Our RF devices are used in wireless security systems, sensor networks, industrial monitoring, meter reading, home automation and remote wireless control applications.

The SX1239 is a highly integrated RF receiver capable of operation over a wide frequency range, including the 433,868 and 915MHz license-free ISM frequency bands. Its highly integrated architecture allows for a minimum of external components while maintaining maximum design flexibility.

FEATURES & BENEFITS

- High sensitivity: down to -120dBm at 1.2kbps
- High selectivity: 16-tap FIR channel filter
- Bullet-proof front end: IIP3 = -18dBm, IIP2 = +35dBm, 80dB blocking immunity, no image frequency response
- Low current: Rx = 16mA, 100nA register retention
- Constant RF performance over voltage range of chip
- FSK bit rates up to 300kb/s
- Fully integrated synthesizer with a resolution of 61Hz
- FSK, GFSK, MSK, GMSK and OOK demodulation
- Built-in bit synchronizer performing clock recovery
- Incoming sync word recognition
- 115dB+ dynamic range RSSI
- Automatic RF sense with ultra-fast AFC
- Packet engine with CRC, AES-128 encryption and 66-byte FIFO
- Built-in temperature sensor and low battery indicator

PARTNER SOLUTIONS

Complete solutions with RF, MCU and software protocol stacks.

Freemscale




- TRX SoC – SX1231 + MCU (MC12311)
- Multiple SW protocols including WMBus

Microchip

- TX SoC –SX1243 + PIC (PIC12LF1840T & PIC12F529T)
- SX1211* module w/ mesh networking solution
- Sell rebranded SX1211 (MRF89XAM9A)

APPLICATIONS

- Wireless sensor networks
- Wireless alarm and security systems
- Monitoring and control
- TPMS (tire pressure monitoring)
- RKE (remote keyless entry)

Long Range RFIC									
Part Number	TX / RX	Band (MHz)	TX Power (dBm)	Modulation	Max Bit Rate (kbps)	RX Sensitivity (dBm)	Link Budget (dB)	TX Current (mA)	RX Current (mA)
SX1230	TX	290-1020	-18 ~ 17	G/F/MSK & OOK	300 (FSK) 32.7 (OOK)	–	–	33mA@10dBm	–
 SX1243	TX	310-928	0 & 10	FSK/OOK/ASK	100	–	–	15mA@10dBm	–
 SX1239	RX	290-1020	–	G/F/MSK & OOK	300 (FSK) 32.7 (OOK)	-120	–	–	16
 SX1231	TX / RX	290-1020	-18 ~ 17	G/F/MSK & OOK	300 (FSK) 32.7 (OOK)	-120	137	33mA@10dBm	16
SX1276	TX / RX	137-1020	+20	LoRa®, GFSK, OOK	300kbps (FSK) 32.7kbps (OOK)	-156	-176	29mA@13dBm	10.8

 Indicates Semtech AEC-Q100 Qualified Part

Wireless Charging Solutions for Automotive

WIRELESS POWER TRANSMITTERS AND RECEIVERS

Semtech offers wireless power transmitter and receiver platforms for both direct and indirect charge applications in both standards compliant and non-compliant systems. Semtech is a member of the Wireless Power Consortium (WPC), Power Matters Alliance (PMA) and the Alliance for Wireless Power (A4WP), and is active in helping shape the future standards for wireless power.

FEATURES & BENEFITS

Optimized Dual-mode (PMA + WPC Qi®):

- Transmitter solution on a single hardware platform

Support for Tri-mode

- WPC Qi®, PMA and A4WP-Rezence applications

Firmware-based solution for ultimate flexibility:

- Easy updates to support standard revisions
- Integrate custom firmware for proprietary applications
- Multi-coil support allows freedom of positioning

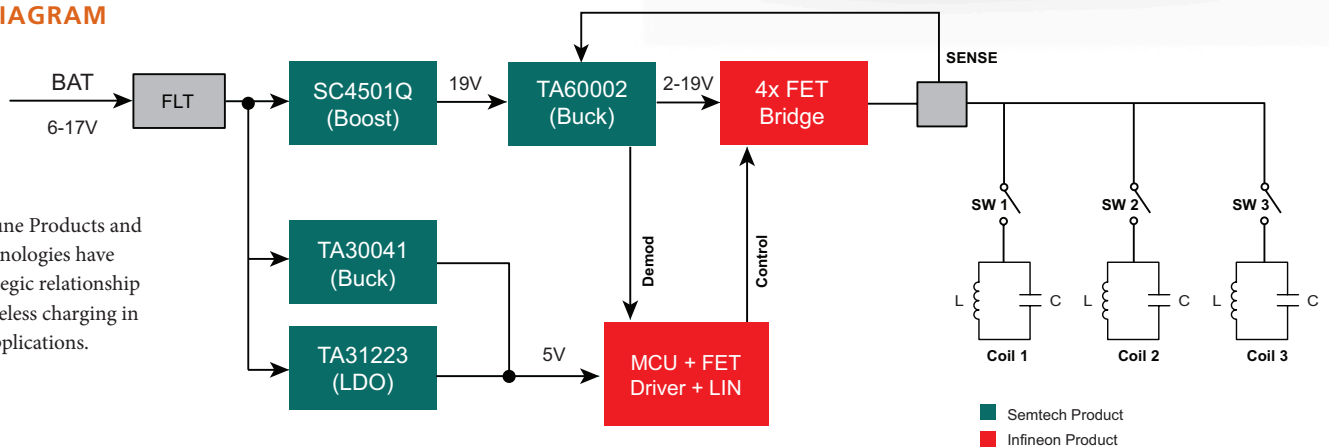
Fully compatible with automotive environment:

- Fixed-frequency operation reduces EMI to minimize interference with other systems
- Operates on 6 - 16V input supply; option to work up to 24V
- Can be protected from load dump, double battery and reverse battery
- Can be integrated into the automotive communications infrastructure
- AEC-Q100 certified 🚗



BLOCK DIAGRAM

Semtech's Triune Products and Infineon Technologies have formed a strategic relationship to expand wireless charging in automotive applications.



AEC-Q100 Qualified

Part Number	Type	V _{in}		I _{out} Max (A)	PowerGood flag	Enable	Soft Start	PSAVE	Package (mm)
		Min	Max						
🚗 SC4501Q	Regulator	1.4	16	2	No	Yes	Programmable	No	10 Pin - MLPD, 3x3

For further inquiries, please contact Semtech Sales Rep directly.

Power Management Solutions - EcoSpeed®

46V ECOSPEED® DC-DC BUCK CONTROLLER WITH INTEGRATED LDO - AEC-Q100 QUALIFIED

The SC508/SC508A is a synchronous EcoSpeed® buck controller, which incorporates Semtech's advanced, patented adaptive on-time control architecture to provide excellent light-load efficiency and fast transient response.

FEATURES & BENEFITS

- Power system
 - Input voltage 4.5V to 46V
 - Integrated bootstrap switch
 - Fixed 5V LDO output 200mA
 - 1% reference tolerance -40 to +85 °C
 - Selectable internal/external bias power supply
 - EcoSpeed® architecture with pseudo-fixed frequency adaptive on-time control
- Logic input and output control
 - Independent EN control for LDO and switcher
 - Programmable Soft-Start time
 - Programmable VIN UVLO threshold
 - Power-Good output
 - Selectable power-save mode
 - Programmable ultrasonic power-save mode
- Protection
 - Automatic restart on fault shutdown
 - Over-voltage and under-voltage
 - TC compensated RDS (ON) sensed current limit
 - Thermal shutdown
 - Smart power-save
 - Pre-bias start-up
- Capacitor types: SP, POSCAP, OSCON and ceramic
- Package: MLPQ-20, 3.0mm x 3.0mm
- Lead-free and halogen-free
- RoHS and WEEE compliant

APPLICATIONS

- Office automation and computing
- Networking and telecommunication equipment
- Point-of-load power supplies and module replacement
- Automotive applications

DDR1 to DDR4 Memory Termination LDO Regulator

Part Number	V _{DD} (V)		V _{DDQ} (V)	V _{TT} (V)	I _{VTT} (A) Max	DDR Type	Package	Features
	Min	Max						
SC2597	2.35	3.6	1-3.6	0.5 - 1.8	±1%	1,2,3,4	SOIC-8 EDP	Integrated DDR VTT LDO with on-board buffered reference, remote sense. Also provides an accuracy of +/-1% over temperature

Power management

	Part Number	Type	V _{in}		I _{out} Max (A)	Power-Good flag	Enable	Soft Start	PSAVE	Package (mm)
			Min	Max						
🚗	SC220Q	Regulator	2.7	5.5	0.65	No	Yes	Yes	Regular	SOIC-8 EDP
	SC195	Regulator	2.9	5.5	0.5	No	No	Yes	Automatic	MLPQ UT8, 1.5x1.5x0.6
🚗	SC183CQ	Regulator	2.9	5.5	2	No	Yes	Yes	No	MLPD-10, 3.0x3.0x1.0
	SC187	Regulator	2.9	5.5	4	Yes	Yes	Programmable	No	MLPQ UT16, 3.0x3.0x0.6
	SC284	Regulator	2.9	5.5	1.8/1.8	No	Yes	Yes	No	MLPQ-UT20, 3.0x3.0x0.6
	SC174	Regulator	3	5.5	4	Yes	Yes	Yes	Ultrasonic	MLPD 10, 3.0x3.0x1.0
🚗	SC4501Q	Regulator	1.4	16	2**	No	Yes	Programmable	No	10 Pin - MLPD, 3.0x3.0
	SC4524/5	Regulator	3	28	2/3	No	Yes	Yes	No	SOIC-8 EDP
	SC3303	Regulator	5.5	28	3	Yes	Yes	Yes	Ultrasonic	MLPD 10, 3.0x3.0x1.0
	SC414	Regulator	3	28	6	Yes	Yes	Yes	Ultrasonic	MLPQ 28, 4.0x4.0x1.0
	SC9301	Regulator	3	28	10	Yes	Yes	Yes	No	MLPQ-32, 5.0x5.0
🚗	SC508A	Controller	4.5	46	30	Yes	Yes	Programmable	Programmable Ultrasonic or Regular	MLPQ -UT20, 4.0x4.0x1.0

🚗 Indicates Semtech AEC-Q100 Qualified Part ** Switch current limit

Power Management Solutions - LED Drivers

HIGH BRIGHTNESS 4-CHANNEL 150mA/CH. LED DRIVER WITH PHASE-SHIFTING - AEC-Q100 QUALIFIED

The SC5210Q is a high brightness 4-Channel LED driver that prevents false registering of short circuit fault. It enables ultra-thin display panels and eliminates audible noise, water fall effect and reduces EMI. The dimming profile is smooth with no visible steps. It also has I2C interface and low quiescent current. It is perfect for Automotive LCD Backlight and industrial displays.

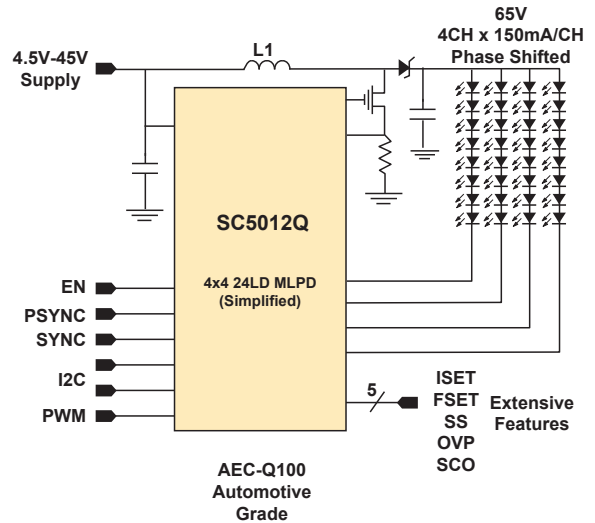
FEATURES & BENEFITS

- V_{IN} Range 4.5V to 45V
- V_{OUT} up to 65V
- 2.2μH Inductor
- Up to 150mA/Channel
- Adj Switch frequency 200kHz-2.2MHz
- Optional True Disconnect FET
- Channel Matching: 1%
- PWM Dimming (100Hz–30KHz)
- 9 or 10 Bit Dimming Resolution
- Phase Shifted Operation
- Optional VSYNC / HSYNC / FSYNC
- I²C Control / Configuration

- 6μA Shutdown Current
- Extensive Protection (Adj OVP, OCP, UVLO, Open/Short LED)
- 4x4mm 24 lead QFN
- “Q” is AEC-Q100, Grade-2, Qualified Version

APPLICATIONS

- Automotive
- Medium-sized LCD panel
- Notebook display
- Sub-notebook and tablet computer displays
- Portable media players



LED Driver												
Part Number	V_{in} (V)		V_{out} (V)	fsw (MHz)	Max # LEDs	# LED Strings	LEDs Per String	Current Per LED String	Total Current	Dimming	Package	Features
	Min	Max	Max				Max ($V_f=3.5V$)	Max (mA)	Max (mA)	(Max Freq)		
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
SC443	4.5	27	42	0.2-1.2	36	3	12	30	90	PWM up to 50kHz	MLP-UT-16	+/- 1% string to string current matching greater than 90% efficiency.
SC445	4.5	27	42	0.7	40	4	10	150	600	PWM up to 50kHz	TSSOP-20	Feed Forward Boost Topology => smaller Input Caps, PWM Dimming.
SC446	4.5	27	42	0.8	36	3	12	100	300	PWM up to 50kHz	TSSOP-16	500:1 PWM Dimming
SC4541	2.9	22	25	2	27	1	7	100/200	100/200	PWM up to 1kHz	SOT23	High side sense for single wire connection
SC5010/H	4.5	27	50	Adj. to 2.2	112	2	8	30/50	240/400	PWM / Analog	QFN-28	Phase shifted, PWM/I ² C dimming, extensive protection
SC5014	4.5	27	50	Adj. to 2.2	56	4	14	120	480	PWM / Analog	MLPQ-20	Phase shifted, PWM/I ² C dimming, extensive protection
SC5014A	4.5	27	50	Adj. to 2.2	28	2	14	240	480	PWM / Analog	MLPQ-20	PWM / I ² C dimming, extensive protection
SC5012/Q	4.5	45	65	Adj. to 2.2	68	4	17	150	600	PWM / Analog	MLPQ-24	5,000:1 PWM Dimming I ² C control extensive protection

Indicates Semtech AEC-Q100 Qualified Part

Touch Screen Solutions

HAPTICS ENABLED 4/5-WIRE RESISTIVE TOUCHSCREEN CONTROLLER WITH PROXIMITY SENSING

The SX8654/74 belong to a family of high performance haptics enabled 4/5-wire Multitouch screen controllers with proximity detection optimized for hand-held applications such as mobile phones, portable music players, game machines, point-of-sales terminal, and other consumer, industrial and automotive applications. They feature a wide input supply range from 2.3V to 3.6V.

FEATURES & BENEFITS

- Low voltage operation
- Low-power consumption
- 4/5-wire touchscreen interface
- Capacitive proximity sensing (SX8654/56/74/76)
- Haptics driver for LRA and ERM (SX8654/55/74/75)
- 400kHz I²C serial interface
- Several host operating modes available
- Hardware, software, and power-on reset
- -40°C to +85°C operating temp. range
- 15kV HBM and IEC ESD protection
- Small footprint packages
- Pb and halogen free, RoHS/WEEE compliant

APPLICATIONS

- DSC, DVR, phones
- POS/POI terminals
- Automotives
- Touch-screen monitors
- Mobile phones
- Game machines
- Portable music players



Haptics Enabled 4/5-Wire									
Part Number	Touch Panel	Resolution	Interface (mm)	Power Consumption (μA)	On-chip-ESD Protection (+/- kV)	Multi-touch	Proximity Sensing	Haptics	Package (mm)
SX8650	4-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	–	–	–	QFN 3.0x3.0
SX8651	4-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	✓	–	–	QFN 3.0x3.0
SX8652	4/5-wire	12-bit	SPI	0.4	25kV Air 15kV Contact	–	–	–	DFN 4.0x3.0
SX8653	4/5-wire	12-bit	SPI	0.4	25kV Air 15kV Contact	✓	–	–	DFN 4.0x3.0
SX8654	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	–	✓	Generic	QFN 4.0x4.0
SX8655	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	–	–	Generic	QFN 4.0x4.0
SX8656	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	–	✓	–	QFN 4.0x4.0
SX8657	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	–	✓	Immersion	QFN 4.0x4.0
SX8658	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	–	–	Immersion	QFN 4.0x4.0
SX8674	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	✓	✓	Generic	QFN 4.0x4.0
SX8675	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	✓	–	Generic	QFN 4.0x4.0
SX8676	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	✓	✓	–	QFN 4.0x4.0
SX8677	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	✓	✓	Immersion	QFN 4.0x4.0
SX8678	4/5-wire	12-bit	I ² C	0.4	25kV Air 15kV Contact	✓	–	Immersion	QFN 4.0x4.0

Touch Button Solutions

LOWEST POWER CAPACITIVE TOUCH SENSORS WITH ENHANCED LED DRIVERS AND PROXIMITY SENSING

Semtech's touch sensor platform enables sensing through a thick overlay material as well as proximity detection with an extended range (>10cm) all in a tiny footprint with zero components per input. The low-power consumption and advanced, built-in LED drivers make it the ideal solution for a wide range of sensing applications in mobile phones, media players, notebooks, white goods and automobiles.

FEATURES & BENEFITS

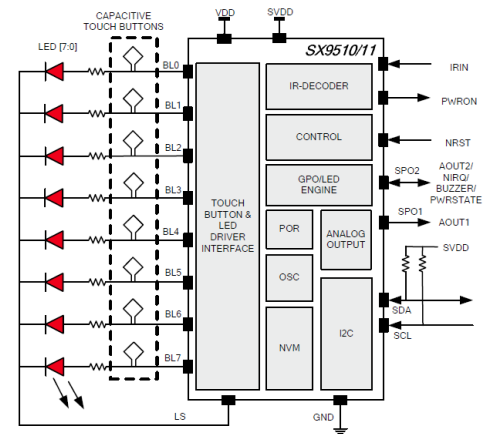
- High resolution capacitive sensing solution
 - Proximity detection up to 10cm
 - Supports button, slider and wheel design
- Extreme sensitivity
 - Works with thick overlay materials (>5mm)
- Smart auto-offset compensation
 - Eliminates false triggers due to environmental factors
- Enhanced LED operation
 - Individual 256-step intensity/fade-in/fade-out control
 - Auto-lighting without host interaction
- No external components per input

APPLICATIONS

- DSC, DVR, phones
- POS/POI terminals
- Automotives
- Touch-screen monitors
- Mobile phones
- Game machines
- Portable music players

PACKAGE

- QFN-28, 4.0mm x 4.0mm
- QFN-32, 5.0mm x 5.0mm
- QFN-32, 4.0mm
- TSSOP-24, 4.4mm x 7.8mm



SX9510/11/12/13, SX8633/34/35/36/38/39/43/44/45/46/47/48/49																
Part Number	Sensor Inputs	LED Driver	Interface	Proximity	Button	Slider	Wheel	IR Detect	Buzzer	Overlay (mm)	Auto Comp	Intensity (256-step)	Fade-in Fade-out	Auto Lighting	Field Prog. Memory	Package (mm)
SX9510	8	8	I ² C/ Analog	✓	✓	-	-	✓	✓	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN 4.4x7.8 TSSOP
SX9511	8	8	I ² C/ Analog	✓	✓	-	-	✓	✓	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN 4.4x7.8 TSSOP
SX9512	8	8	I ² C/ Analog	-	✓	-	-	-	✓	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN 4.4x7.8 TSSOP
SX9513	8	8	I ² C/ Analog	-	✓	-	-	-	✓	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN 4.4x7.8 TSSOP
SX8633	12	8	I ² C	✓	✓	-	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	5x5 QFN
SX8634	12	8	I ² C	✓	✓	✓	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	5x5 QFN
SX8635	12	8	I ² C	✓	✓	-	✓	-	-	>5	✓	Lin./Log.	✓	✓	✓	5x5 QFN
SX8636	8	8	I ² C	✓	✓	-	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN
SX8638	8	8	I ² C	✓	✓	✓	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN
SX8639	8	8	I ² C	✓	✓	-	✓	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN
SX8643	12	8	I ² C	-	✓	-	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	5x5 QFN
SX8644	12	8	I ² C	-	✓	✓	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	5x5 QFN
SX8645	12	8	I ² C	-	✓	-	✓	-	-	>5	✓	Lin./Log.	✓	✓	✓	5x5 QFN
SX8646	8	8	I ² C	-	✓	-	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN
SX8647	8	8	I ² C	-	-	-	✓	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN
SX8648	8	8	I ² C	-	✓	✓	-	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN
SX8649	8	8	I ² C	-	✓	-	✓	-	-	>5	✓	Lin./Log.	✓	✓	✓	4x4 QFN

SEMTECH CORPORATION



Semtech Corporation is a leading supplier of high performance analog, mixed-signal semiconductors and advanced algorithms for high-end consumer, enterprise computing, communications, and industrial equipment. Semtech, publicly traded since 1967, is listed on the Global Select Market under the symbol SMTC and has more than 32 sales and application support offices in 14 countries as well as representatives and distribution support locations in more than 30 countries.

Semtech is dedicated to providing proprietary platforms, differentiated by innovation, size, efficiency, performance, and reach. Our solutions are used in some of the most innovative systems and products in the fastest growing markets today. These markets include

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