Semtech Products Short Form Catalog

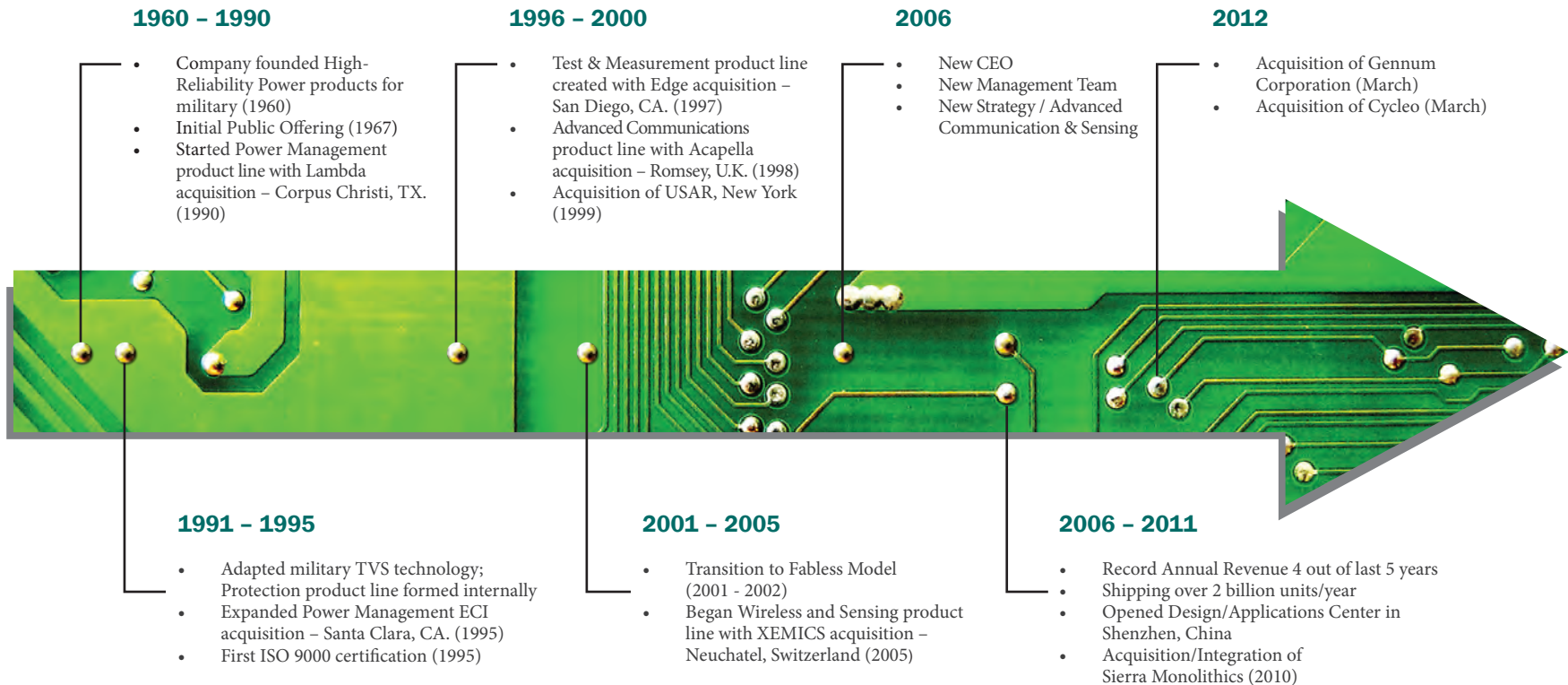## v.28

SEMTECH

www.semtech.com

Semtech Overview & History

Semtech Corporation is a leading supplier of analog and mixed-signal semiconductor platforms for high-end consumer, 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 25 sales and application support offices in 14 countries as well as representatives and distribution support locations in more than 30 countries. Our proprietary platforms, differentiated by innovation, size, efficiency, performance and reach, are used in some of the most innovative systems and products in the market today. Semtech products can be found in a wide range of fast-growing market segments, including Smart Phones, LED TVs, Tablets, Wireless LAN Modems, Automated Meter Reading, Ultra-Low Power Medical, Satellite Communication, Cellular Infrastructure, Optical Transport, Datacenters and state-of-the-art Broadcast Video industries. More than 5,000 customers worldwide rely on our diverse product portfolio and world class technology roadmap to provide them with solutions for 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.

1960 – 1990
- Company founded High-Reliability Power products for military (1960)
- Initial Public Offering (1967)
- Started Power Management product line with Lambda acquisition – Corpus Christi, TX. (1990)

1996 – 2000
- Test & Measurement product line created with Edge acquisition – San Diego, CA. (1997)
- Advanced Communications product line with Acapella acquisition – Romsey, U.K. (1998)
- Acquisition of USAR, New York (1999)

2006
- New CEO
- New Management Team
- New Strategy / Advanced Communication & Sensing

2012
- Acquisition of Gennum Corporation (March)
- Acquisition of Cycleo (March)

1991 – 1995
- Adapted military TVS technology; Protection product line formed internally
- Expanded Power Management ECI acquisition – Santa Clara, CA. (1995)
- First ISO 9000 certification (1995)

2001 – 2005
- Transition to Fabless Model (2001 - 2002)
- Began Wireless and Sensing product line with XEMICS acquisition – Neuchatel, Switzerland (2005)

2006 – 2011
- Record Annual Revenue 4 out of last 5 years
- Shipping over 2 billion units/year
- Opened Design/Applications Center in Shenzhen, China
- Acquisition/Integration of Sierra Monolithics (2010)

contents

Product Applications

Semtech Transient Voltage Suppressors (TVS) safeguard circuits against damage or latch-up caused by ESD, lightning and other destructive voltage transients. Our protection devices feature low clamping voltage, low capacitance, and low leakage current.

PRODUCTS

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

Application (Port)	Part Number	# of Lines	Voltage V	Capacitance (pF)	Protection level (8/20µs)*
Digital Video (HDMI, DVI, etc)	RClamp® 0544T	4	5	0.3	5A
Digital Video (HDMI, Displayport)	RClamp® 7528T	8	5	0.25	5A
Single Line High Speed	RClamp® 0531T	1	5	0.5	4A
10/100 Ethernet	RClamp® 0534N	4	5	1.5	25A
Gigabit Ethernet	RClamp® 3374N	4	3.3	1.7	40A
T1/E1	TClamp® 0602N	2	6	12	95A
USB 2.0 (Data Lines)	RClamp® 0542T	2	5	0.25	5A
USB 2.0 (Data Lines and Vbus)	RClamp® 0582N	2	6.5	0.2	5A
USB 2.0	RClamp® 1624T	4	5/12	0.7	5A
Outer Building Lightning	LC03-3.3	2	3.3	8	100A
General Purpose Low Voltage	µClamp® 3324P	4	3.3	14	5A
CAN Bus	µClamp® 3601P	1	33	25	2A (1.2/50µs)
RS485	SM712	2	12/7	45	17A
Keyboard, I/O	µClamp® 0505A	5	5	60	7A

All devices will protect at a minimum to IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact) and IEC 61000-4-4 (EFT) 40A (5/50ns)
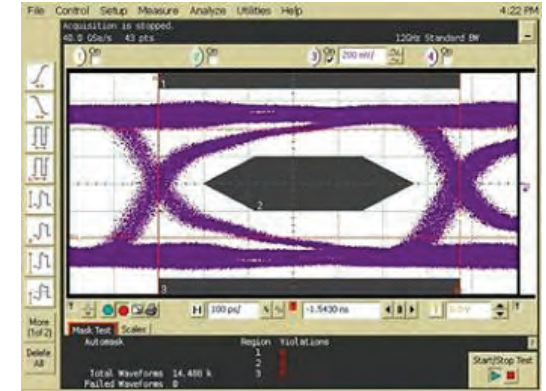
Protection for Automotive

Part Number	Application	Lines	Vrwm (V)	IEC61000-4-2 ESD Immunity (contact/air)	Ipp Max (8x20μs)	Cap (typ) L-L	IR Max @ Vrwm	Package (mm)
SLVU2.8Q	Analog Video	2	2.8	±25kV/±30kV	24A	100pF	1μA	2.9 x 2.37 x 1.0
μClamp® 3311PQ	Single Pair Ethernet Multimedia touchpoint	1	3.3	±20kV/±25kV	5A	12pF	0.5μA	1.0 x 0.6 x 0.5
EClamp® 2410PQ	SD Card	6	5	±12kV/±17kV		12pF	0.5μA*	4.0 x 1.6 x 0.58
RClamp® 2574NQ RClamp® 3374N	Ethernet, LVDS	4	2.5 3.3	±30kV/±30kV	40A	1.7pF	0.1μA	3.0 x 2.0 x 0.6
RClamp® 2431TQ	Antenna, CAN	1	24	±8kV/±13kV	2A	0.35pF	0.1μA	1.0 x 0.6 x 0.4
RClamp® 0582BQ	USB 2.0	2	5	±25kV/±30kV	15A	0.8pF	0.3μA	1.6 x 1.6 x 0.75
RClamp® 0582N	USB 2.0	2	5	±12kV/±20kV	5A	0.2pF	0.1μA	1.2 x 1.0 x 0.58
μClamp® 3601P	CAN	1	36	±15kV/±20kV	4A	0.35pF	1μA	1.0 x 0.6 x 0.4
RClamp® 0531TQ	Multimedia touchpoint	1	5	±25kV/±30kV	4A	0.8pF	0.1μA	1.0 x 0.6 x 0.4
μClamp® 0511PQ	Multimedia touchpoint	1	5	±15kV/±8kV	12A	75pF	1μA	1.0 x 0.6 x 0.5

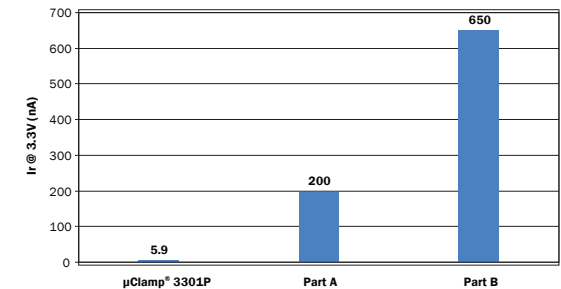*Vrwm = 3V*

Low Capacitance

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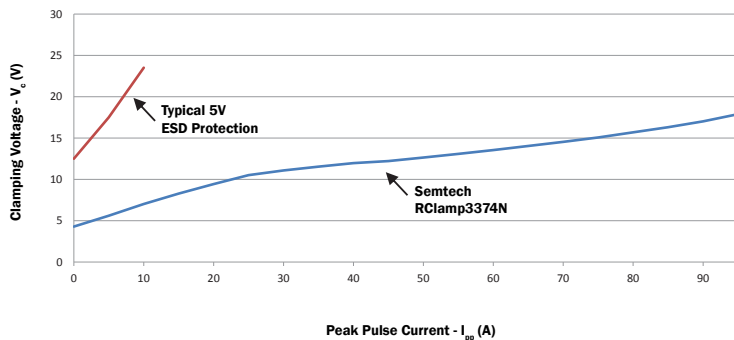

Low Leakage

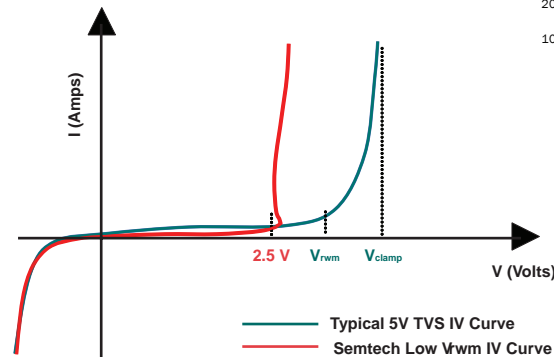Increases battery life in handheld electronic devices

Leakage Current for Low Voltage Parts

Clamping Voltage vs Peak Pulse Current

Typical 5V ESD Protection

Semtech RClamp3374N

Low Clamping Voltage – Better Protection and less stress on transceiver

Typical 5V TVS IV Curve
Semtech Low Vrwm IV Curve

Lower working voltage to reduce stress energy
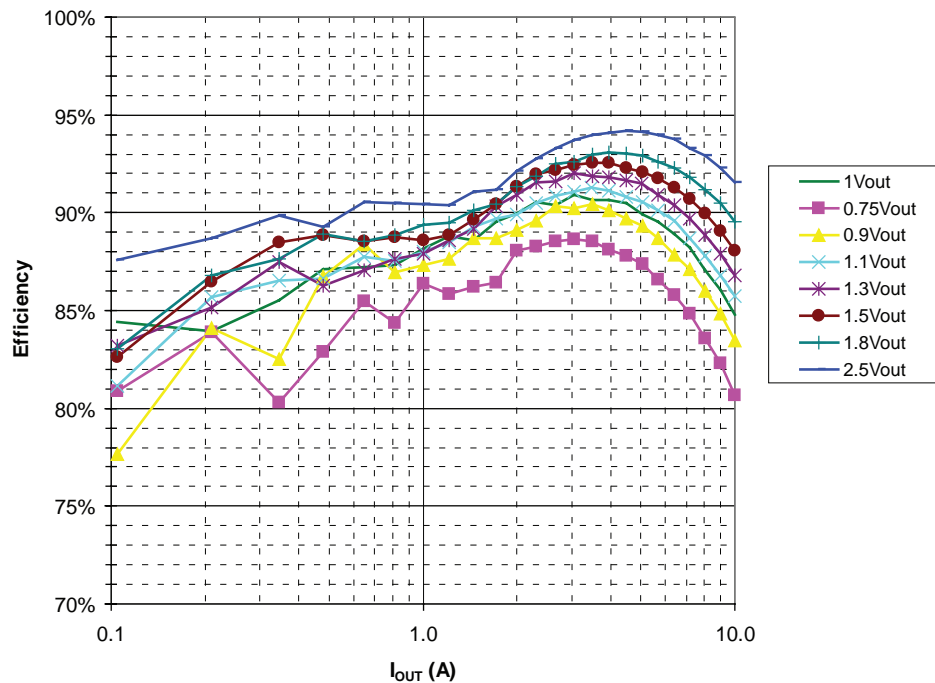
Wide Input Voltage EcoSpeed

Semtech's Power Management products include feature-rich, highly integrated devices for the telecom industry, and low power, small-package, high-efficiency products for cell phones, handsets, notebook PCs and other portable devices.

PRODUCTS

- DC-DC PWM Controllers
- Switching and Linear Regulators
- Charge Pumps
- LED and MOSFET Drivers
- Battery Chargers
- Hot-Swap Controllers

Part Number	Input Voltage	Current	Package (mm)	Key Features
SC3303	5.5V – 28V	3A	MLPD-10, 3x3	Internal LDO
SC401B	3V – 17V	15A	MLPQ-32, 5x5	0.6V to >5V out, prog. SS, internal LDO
SC402B	3V – 28V	10A	MLPQ-32, 5x5	0.6V to >5V out, prog. SS, internal LDO
SC403B	3V – 28V	6A	MLPQ-32, 5x5	0.6V to >5V out, prog. SS, internal LDO
SC414/424	3V – 28V	6A	MLPQ-28, 4x4	0.75V to >5V out, internal LDO
SC417/427	3V – 28V	10A	MLPQ-32, 5x5	0.5V to >5V out, internal LDO
SC418/9	3V – 28V	30A	MLPQ-20, 3x3	0.5V to >5V out, internal LDO, ext. FETs
SC461	3V – 28V	30A	MLPQ-20, 3x3	0.5V to >5V out, internal LDO, ext. FETs, prog SS, hiccup
SC508A	5V – 46V	30A	MLPQ-20, 3x3	0.6V to >5V out, internal LDO, ext. FETs, prog SS, hiccup
SC9301	3V – 28V	10A	MLPQ-32, 5x5	0.6V to >5V out, internal LDO, prog. SS, hiccup

SC417 Efficiency: 12Vin, 300kHz, in UPSAVE mode
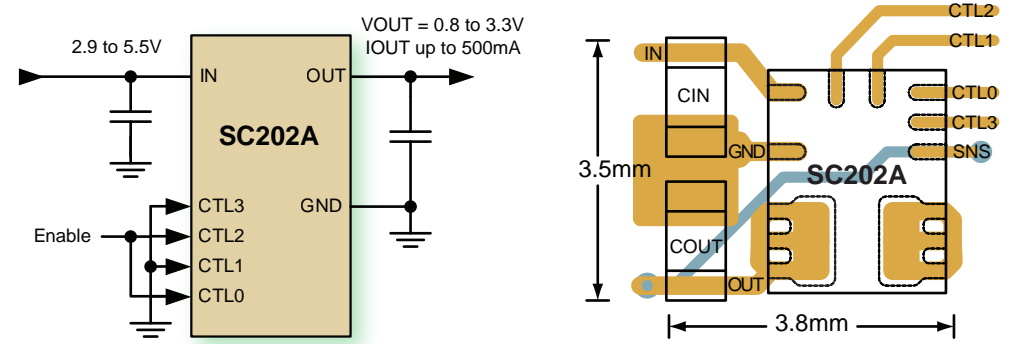

EcoSpeed DC-DC Converters

EcoSpeed® DC-DC Converters - Best-in-class performance for dynamic point-of-load applications. The EcoSpeed® converter platform incorporates Semtech's advanced, patented adaptive on-time (AOT) control architecture to deliver ultra-fast transient response and very high efficiency across light to full power loads. This unique architecture offers the benefits of conventional converter topologies with optimal tradeoffs for best-in-class performance in next-generation low-power, dynamic point-of-load (POL) applications. EcoSpeed DC-DC converters help designers meet today's demanding green power requirements by efficiently managing both standby and full current demands.
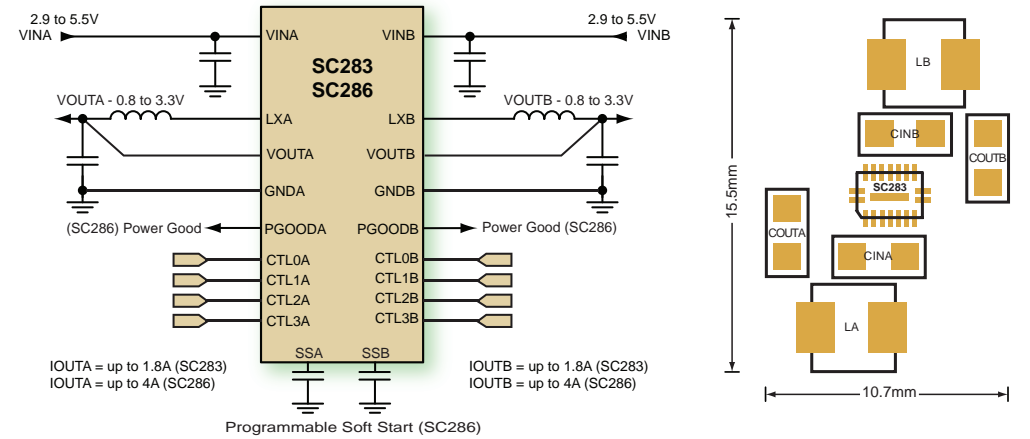
Features

- Ultra-fast transient response
- Very high efficiency across light to full power loads
- Pseudo-fixed switching frequency with ±15% accuracy
- Programmable switching frequency: 200kHz to 1MHz
- No external compensation components required
- Power save (PSAVE and UPSAVE maximize light load efficiency)
- SmartDrive™ technology reduces EMI
- Fully protected with output OVP, UVP and short circuit protection

Solutions for <6V input

Part Number	Current	Package (mm)	Key Features
SC195	0.5A	MLPQ-8, 1.5x1.5	Low BOM 4 bit VID
SC197	2 x 0.5A	MLPQ-18, 2x3	Low BOM 4 bit VID
SC202A	0.5A	MLPQ-13, 2.5x3	Integrated inductor
SC220	0.65A	SOIC 8	PCB trace inductor
SC4626	1A	SOT23-5	Small size
SC189	1.5A	MLPD-6, 2x2	Fixed V_{out} Low BOM
SC183C	2A	MLPQ-16, 3x3	Low BOM 4 bit VID
SC283 SC284	2 x 1.8A	MLPQ-18, 2x3 MLPQ-20, 3x3	Low BOM 4 bit VID
SC185	4A	MLPQ-16, 3x3	Fixed V_{out} Low BOM
SC186	4A	MLPQ-16, 3x3	Low BOM 4 bit VID
SC286	2 x 4A	MLPQ-28, 4x4	Low BOM 4 bit VID

Part Number	V_{IN}(V)		V_{OUT} (V)	I_{OUT} (A)	$V_{DROPOUT}$ (V)	$V_{DROPOUT}$ @ Full Load (V)	Package (mm) *Exposed die pad
	Min	Max	Min	Max	Max O.T.	Typ	
SC4213H	1.4	6	0.5	0.5	0.15	0.075	SOIC-8
SC4211	1.4	6	0.5	1	0.5	0.1	SOIC-8 EDP*
SC4212	1.5	5.5	0.5	1	0.5	0.2	MLPD-8, 3x3
SC4215A SC4215H	1.4	6	0.5	2	0.6	0.3	SOIC-8 EDP*
SC4216 SC4216H	1.45	5.5	0.5	3	0.7	0.45	SOIC-8 EDP*
SC4217	1.8	5.5	1.24	3	0.6	0.3	TO-263-5

Capacitive Touch

The superior sensitivity of the Semtech touch sensor platform enables sensing through a thick overlay material. Semtech's proximity detection has an extended range (>10cm). These devices all come in a tiny footprint with zero components per input.

APPLICATIONS

• Tablet eBook
• Flat panel TV
• LCD monitors
• White goods & appliances
• Printers
• Automotive audio console
• Personal media players
• Set Top Box (STBs)
• Game consoles
• Industrial systems

KEY FEATURES

• Extreme low power
• Support button, slider and wheel design
• Proximity detection (>10cm)
• Built-in LED drivers (up to 15mA)
• 256-step intensity control (Lin/Log)
• Auto lightening
• Field programmable
• Fast scan time (15ms)
• Overlay (>5mm)
• Smart auto-offset compensation
• Ultra-small footprint

Part Number	Button #	LED Driver	Interface	Prox.	Button	Slider	Wheel	Intensity	Fade-in/out	Auto Light.	Package (mm)
SX8633	12	8	I²C	✓	✓			Lin./Log.	✓	✓	QFN 5x5
SX8634	12	8	I²C	✓	✓	✓		Lin./Log.	✓	✓	QFN 5x5
SX8635	12	8	I²C	✓	✓		✓	Lin./Log.	✓	✓	QFN 5x5
SX8636	8	8	I²C	✓	✓			Lin./Log.	✓	✓	QFN 4x4
SX8638	8	8	I²C	✓	✓	✓		Lin./Log.	✓	✓	QFN 4x4
SX8639	8	8	I²C	✓	✓		✓	Lin./Log.	✓	✓	QFN 4x4
SX8643	12	8	I²C		✓			Lin./Log.	✓	✓	QFN 5x5
SX8644	12	8	I²C		✓	✓		Lin./Log.	✓	✓	QFN 5x5
SX8645	12	8	I²C		✓		✓	Lin./Log.	✓	✓	QFN 5x5
SX8646	8	8	I²C		✓			Lin./Log.	✓	✓	QFN 4x4
SX8647	8	8	I²C				✓	Lin./Log.	✓	✓	QFN 4x4
SX8648	8	8	I²C		✓	✓		Lin./Log.	✓	✓	QFN 4x4
SX8649	8	8	I²C		✓		✓	Lin./Log.	✓	✓	QFN 4x4
SX8660	8	8	I²C/Analog		✓			Lin./Log.	✓	✓	QFN 4x4
SX8661	8	8	I²C/Analog	✓	✓			Lin./Log.	✓	✓	QFN 4x4
SX8662	36	36	I²C		✓			Lin./Log.	✓	✓	QFN 5x5
SX8663	36	36	I²C	✓	✓			Lin./Log.	✓	✓	QFN 5x5
SX9300	2		I²C	✓	✓	SAR Engine					QFN 3x3
SX9500	4		I²C	✓	✓						QFN 3x3
SX9501	4		Analog	✓	✓						QFN 3x3
SX9510	8	8	I²C/Analog	✓	✓	IR Detect		Lin./Log.	✓	✓	QFN 4x4, TSSOP 4.4x7.8
SX9511	8	8	I²C/Analog		✓	IR Detect		Lin./Log.	✓	✓	QFN 4x4, TSSOP 4.4x7.8
SX9512	8	8	I²C/Analog	✓	✓			Lin./Log.	✓	✓	QFN 4x4, TSSOP 4.4x7.8
SX9513	8	8	I²C/Analog		✓			Lin./Log.	✓	✓	QFN 4x4, TSSOP 4.4x7.8

Resistive Touch

Part Number	Interface	Multi-touch	Proximity Sensing	Haptics	Package (mm)
SX8650	I²C	No	No	No	WLCSP 1.5x2.0, QFN 3x3
SX8651	I²C	✓	No	No	WLCSP 1.5x2.0, QFN 3x3
SX8652	SPI	No	No	No	WLCSP 1.5x2.0, DFN 4x3
SX8653	SPI	✓	No	No	WLCSP 1.5x2.0, DFN 4x3
SX8654	I²C	No	✓	Generic	WLCSP 2x2, QFN 4x4
SX8655	I²C	No	No	Generic	WLCSP 2x2, QFN 4x4
SX8656	I²C	No	✓	No	WLCSP 2x2, QFN 4x4
SX8657	I²C	No	✓	Immersion	WLCSP 2x2, QFN 4x4
SX8658	I²C	No	No	Immersion	WLCSP 2x2, QFN 4x4
SX8674	I²C	✓	✓	Generic	WLCSP 2x2, QFN 4x4
SX8675	I²C	✓	No	Generic	WLCSP 2x2, QFN 4x4
SX8676	I²C	✓	✓	No	WLCSP 2x2, QFN 4x4
SX8677	I²C	✓	✓	Immersion	WLCSP 2x2, QFN 4x4
SX8678	I²C	✓	No	Immersion	WLCSP 2x2, QFN 4x4

Semtech's ultra-low power, fully integrated touchscreen controller platform enables multi-touch gestures on regular 4-wire resistive touchscreens and supports proximity on any panel. It also features advanced haptics control as well as robust on-chip ESD protection in a small footprint.

APPLICATIONS

- Portable navigation device
- Automotive center console
- Digital photo frame
- DSC, video camera
- Handheld games & mobile
- POS terminals
- Control panel

KEY FEATURES

- Low power (0.4μA)
- Compatible with a wide range of resistive panels
- Enable multi-touch gestures with 4-wire touch panel
- Built-in proximity detection with any panel (>5cm)
- Integrated haptic motor control (LRA & ERM)
- 12-bit resolution
- Robust ESD protection (±25kV air & ±15kV contact)
- 50kSPS Eq. Throughput
- Digital filters

Pressure measurement coupled with emulating tactile feedback via haptics
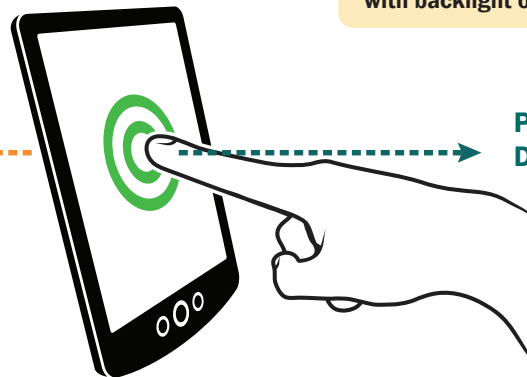
Get the system ready before you "touch" with backlight or menu control

Haptics Feedback

Pressure

Proximity Detection

Two-dimensional measurement gives you touch position in X, Y coordinates

Wireless RF

Semtech provides integrated, short range wireless connectivity solutions. Our wireless RF products consist of RF transceiver, RF transmitter, and RF receiver components covering the Industrial, Scientific and Medical (ISM) band radio frequency spectrum from low kHz up to 1 GHz. Customers worldwide use our wireless RF ICs for applications such as automated wireless remote controls, meter readers, wireless security systems, building automation equipment, and smart lighting systems. In addition, Semtech provides broadband single chip transceiver RFICs in both 2.5 and 3.5 GHz frequency bands.

PRODUCTS

- ISM RF transceivers
- RF transmitters
- RF receivers
- Low-noise amplifier
- WiMAX RF transceivers

	Part Number	TX/RX	Band (MHz)	TX power (dBm)	Modulation	Max Bit Rate	RX Sensitivity (dBm)	Link Budget (dB)	TX Current (mA)	RX Current (mA)
High Link Budget	SX1230	TX	290 – 1020	-18 ~ 17	G/F/MSK & OOK	300kbps (FSK) 32.7 kbps (OOK)	-	-	33mA 10dBm	-
	SX1239	RX	290 – 1020	-	G/F/MSK & OOK		-120dBm	-	-	16mA
	SX1231	TX RX	290 – 1020	-18 ~ 17	G/F/MSK & OOK		-120dBm	137	33mA 10dBm	16mA
	SX1232	TX RX	862 – 1020	-1 ~ 20	G/F/MSK & OOK	300kbps (FSK) 32.7 (OOK)	-123dBm	143	28mA 13dBm	9.3mA
	SX1233	TX RX	290 – 1000	-18 ~ 17	G/F/MSK & OOK	600kbps (FSK) 32.7 kbps (OOK)	-120dBm	137	33mA 10dBm	16mA
Low Power	SX1211	TX RX	863 – 960	-8.5 ~ 12.5	FSK/OOK/ASK	200kbps (FSK) 32.7 kbps (OOK)	-107dBm	119.5	25mA 10dBm	3.0mA
	SX1212	TX RX	310 – 510	-8.5 ~ 12.5	FSK/OOK/ASK		-108dBm	121	25mA 10dBm	2.5mA
	SX1210	RX	862 – 960	-	FSK/OOK/ASK		-107dBm	-	-	3.0mA
	SX1213	RX	310 – 510	-	FSK/OOK/ASK		-108dBm	-	-	2.5mA
Power & Go	SX1240	TX	433 & 868	0 & 10dBm	FSK/OOK/ASK	100kbps	-	-	16mA 10dBm	-
	SX1242	TX	344.94	2 & 12dBm	OOK/ASK	10kb/s	-	-	22mA 12dBm	-

IC Value Proposition	
Key Features	**Customer Benefit**
-138dBm sensitivity	Longest range
+20 up to +33dBm	
Exceptional IIP3 and selectivity	Robust links
Constant RF performance vs VDD	
Lowest RX current – 2.5mA	Extended battery life
Lowest sleep current	
Ultrafast wake-up (sleep to RX/TX)	

System Value Proposition	
Key Features	**Customer Benefit**
Repeater elimination - Range	Reduced deployment cost
Legacy and standard compatible	
Automatic data rate optimization	Extended battery life
Dynamic output power adjustment	
Fast reading for drive-by applications	
Robustness to interferences	Reliability
Security	

ZoomingADC™ & GPIO

Digital Temperature Sensing

Part Number	Supply Voltage	Supply Current	Interface	Inputs	Main Function	Other Features	Package (mm)
SX8733				Internal sensor, up to 2 external sensors	Precision temperature acquisition	Parasitic Series Resistance Cancellation Under / Over Temp Alarms	MLPD-6, 3x3
SX8743	2.7 to 5.5 V	250 µA	SMBus	Internal sensor, up to 3 external sensors	Precision temperature acquisition	Parasitic Series Resistance Cancellation Under / Over Temp Alarms	MSOP-8, 3x3
SX8744				Internal sensor, up to 2 external sensors	Precision temperature acquisition, LM86 pin compatible	Parasitic Series Resistance Cancellation Under / Over Temp Alarms	MSOP-8, 3x3

ZoomingADC with Serial Interfaces

Part Number	Supply Voltage	Supply Current	Interface	Inputs	Main Function	Other Features	Package (mm)
SX8723S				2 diff or 4 single		Embedded voltage reference, SPI, 2 parallel I/Os	MLPQ-16, 4x4
SX8724S			SPI	3 diff or 6 single		Embedded voltage reference, SPI, 2 parallel I/Os	MLPQ-16, 4x4
SX8725S	2.4V to 5.5V	200 µA		1 diff or 2 single	ZoomingADC with 1 to 1000 gain 16 bit over-sampled ADC	Embedded voltage reference, SPI, 2 parallel I/Os	MLPQ-16, 4x4
SX8723C				2 diff or 4 single		Embedded voltage reference, I²C interface, 2 parallel I/Os	MLPD-12, 4x4
SX8724C			I²C	3 diff or 6 single		Embedded voltage reference, I²C interface, 4 parallel I/Os	MLPQ-16, 4x4
SX8725C				1 diff or 2 single		Embedded voltage reference, I²C interface, 2 parallel I/Os	MLPD-12, 4x4

ZoomingADC with High Efficiency MCU and Serial Interfaces

Part Number	Supply Voltage	Supply Current	Interface	Inputs	Main Function	Other Features	Package (mm)
XE8801A XE8801R						UART, 24 parallel I/O programmable clock PWM DACs	LQFP-44
XE8802	2.4V to 5.5V	200 µA	-	4 differential inputs high resolution acquisition path	ZoomingADC with 1 to 1000 gain 16 bit over-sampled ADC MCU and RAM for local data processing	UART, up to 60 parallel I/O, PWM DACs programmable clock, 4 low-power comparators 120 segments LCD driver with voltage reference	LQFP-100
XE8805A						UART, 24 parallel I/O programmable clock 2 DACs with buffers	LQFP-64

Semtech GPIO Family

Part Number	I/O Chan.	I/O Volt. Range (V)	Interface	Max Current (mA)	Dual I/O Supplies	Pull Up/ Pull Down	PLD Function	Lin./Log. Intensity	Blink	Breath	Keypad Scan. Engine	Polarity Inversion	Current (µA)	I²C Add.	Package (mm)
SX1501	4	1.2 - 5.5	I²C	12/24	-	✓	✓	-	-	-	-	-	1	2	3x3
SX1502	8	1.2 - 5.5	I²C	12/24	✓	✓	✓	-	-	-	-	-	1	2	3x3
SX1503	16	1.2 - 5.5	I²C	12/24	✓	✓	✓	-	-	-	-	-	1	1	4x4
SX1504	4	2.3 - 5.5	I²C	12/24	-	✓	✓	-	-	-	-	-	1	2	3x3
SX1505	8	2.3 - 5.5	I²C	12/24	✓	✓	✓	-	-	-	-	-	1	2	3x3
SX1506	16	2.3 - 5.5	I²C	12/24	✓	✓	✓	-	-	-	-	-	1	1	4x4
SX1508	8	1.2 - 3.6	I²C	15	✓	✓	-	✓	✓	✓	✓	✓	1	4	3x3
SX1509	16	1.2 - 3.6	I²C	15	✓	✓	-	✓	✓	✓	✓	✓	1	4	4x4
SX1511	8	1.2 - 3.6	SPI	15	✓	✓	-	✓	✓	✓	✓	✓	1	-	3x3
SX1512	16	1.2 - 3.6	SPI	15	✓	✓	-	✓	✓	✓	✓	✓	1	-	4x4

✓ Enable direct I/O expansion for latest low core voltage chipsets   ✓ Multiple configurations/features optimized for different applications
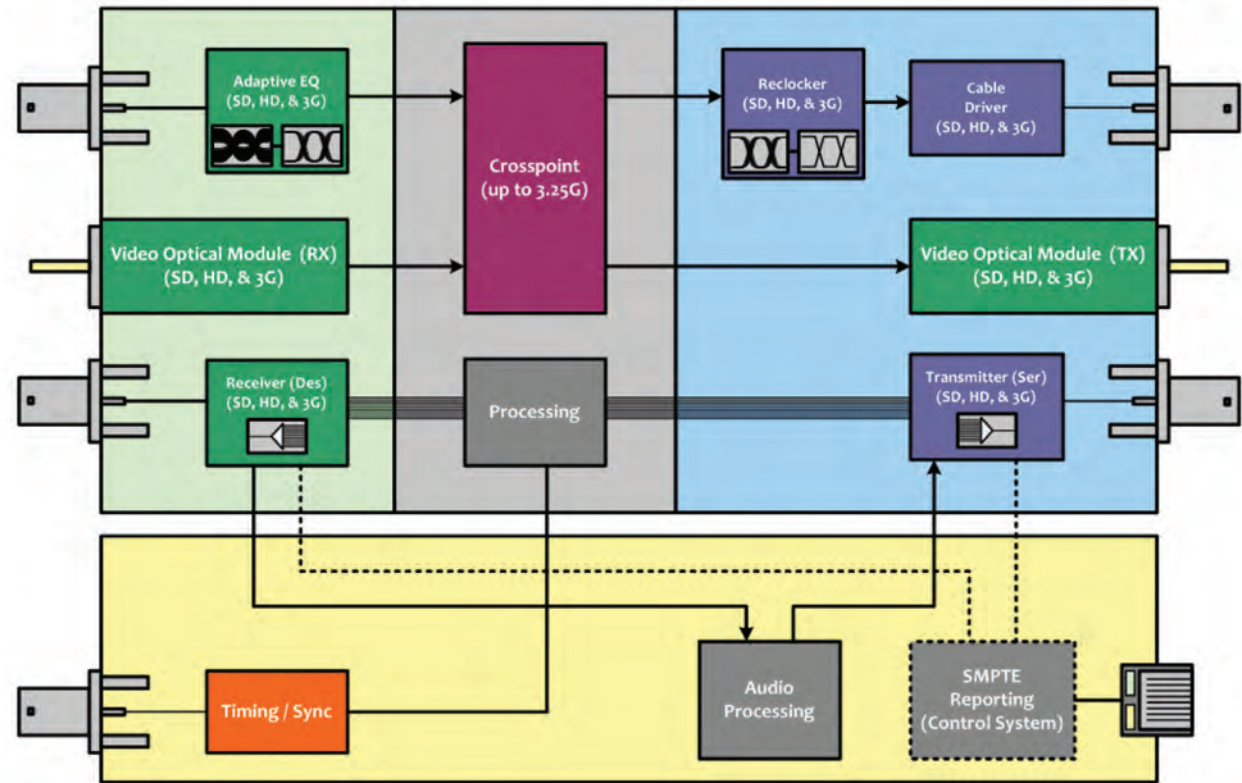
Broadcast Video

Semtech continues to lead the way in proven 3Gb/s, HD and SD technologies. We offer the most comprehensive, end-to-end portfolio of broadcast solutions available, including our family of long-reach, adaptive equalizers, next generation cable drivers, our 3rd generation video optical modules and the industry's most feature-rich crosspoint switches.
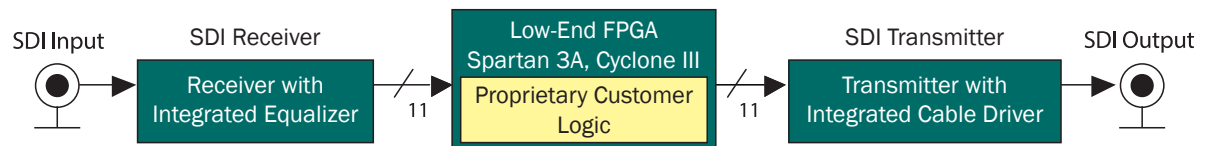
With comprehensive component testing, complimentary design review and dedicated field and applications engineering support, you know we'll be with you for the long run, easing the migration path for you to get to the market quickly with differentiated solutions for next generation video formats, increasing data rates, and evolving I/O and distance requirements.

PRODUCTS

• Equalizers
• Cable drivers
• Reclockers
• Receivers
• Transmitters
• Timing
• Crosspoint switches
• Video optical modules

Gennum: Complete Integrated SDI Receiver and Transmitter Solutions

Broadcast Video

Adaptive Equalizers

Part Number	Application	Data Rate (Mb/s)	Power (mW)	Cable Length (m)	Outputs	Cable Length Indication
GS3440 GS3441	Long Reach	125 - 2970	169 212	3G (200), HD (250), SD (500)	1 2	NO YES
GS2993 GS2994	Long Reach	143 - 2970	165 165	3G (140), HD (200), SD (400)	2 1	YES NO
GS2964	Low Cost	143 - 2970	215	3G (100), HD (130), SD (170)	1	NO
GS1674	HD/SD	143 - 1485	195	3G (NA), HD (220), SD (400)	1	NO

Cable Drivers

Part Number	Application	Data Rate (Mb/s)	Power (mW)	Input Trace EQ	Outputs	Max Output Swing (mV)
GS3480 GS3481	3Gb/s 2 or 4 outputs, Cable Boost	DC to 2970	100 122	YES	2 4	2400
GS2988 GS2989	3Gb/s single or Dual output	143 - 2970	110 180	YES	2 4	1800
GS1678 GS1679	HD/SD Single or Dual output	143 - 1485	110 180	NO	2 4	1200

Reclockers

Part Number	Application	Data Rate (Mb/s)	Input MUX	Input Trace EQ	Output De-emphasis	Package Size (mm)
GS2985	4x1 input Dual output	270, 1485, 2970	4:1	YES	YES	9x9
GS2986	4x1 Input Mux	270, 1485, 2970	4:1	YES	YES	6x6
GS2965	2x1 Input Mux	270, 1485, 2970	2:1	YES	YES	5x5

Serializers

Part Number	Data Rate (Mb/s)	Audio Embedded	Output Jitter (ps)	Video Processing	Parallel Bus Width	Power (mW)
GS2972	270, 1485, 2970	YES	3G (40), HD (50), SD (200)	YES	10 or 20	400
GS2962	270, 1485, 2970	NO	3G (40), HD (50), SD (200)	YES	10 or 20	350
GS1672	270, 1485	YES	HD (50), SD (200)	YES	10 or 20	350
GS1662	270, 1485	NO	HD (50), SD (200)	YES	10 or 20	330

Deserializers

Part Number	Data Rate (Mb/s)	Equalizer	Audio Embedded	Video Processing	Audio Clock Generator	Power (mW)
GS2971A	270, 1465, 2970	YES	YES	YES	YES	525
GS2961A	270, 1465, 2970	YES	NO	YES	NO	500
GS2970A	270, 1485, 2970	NO	YES	YES	YES	350
GS2960A	270, 1465, 2970	NO	NO	YES	NO	320
GS1661A	270, 1465	YES	NO	YES	NO	460
GS1660A	270, 1465	NO	NO	YES	NO	250

Crosspoint

Part Number	Data Rate (Gb/s)	Inputs	Outputs	Power (W)	Input Trace EQ	Output De-emphasis
GX3290	3.5	290	290	34	YES	YES
GX3190	3.5	146	290	25	YES	YES
GX3246	3.5	290	146	18	YES	YES
GX3202	3.5	202	202	24	YES	YES
GX3146	3.5	146	146	18	YES	YES

Video Optical Module

Product Name	Description
GO2917-CM	Single channel PIN optical receiver
GO2918-31CM	Single channel 1310nm FP transmitter
GO2927	Dual channel PIN optical receiver
GO2928-3131CM	Dual channel 1310nm FP transmitter
GO2929-31CM	1310nm / PIN transceiver (Video Pinout)
GO2929-31DM	1310nm / PIN transceiver (MSA Pinout)
GO2951-xxCH	CWDM DFB / PIN transceiver
GO2952-xxCH	CWDM single channel DFB transmitter
GO2953-xxyyCH	CWDM dual channel DFB transmitter

GO2927 Block Diagram
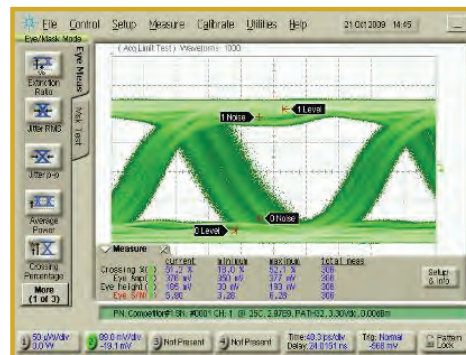

GO2928 Block Diagram

Receiver Overload Performance
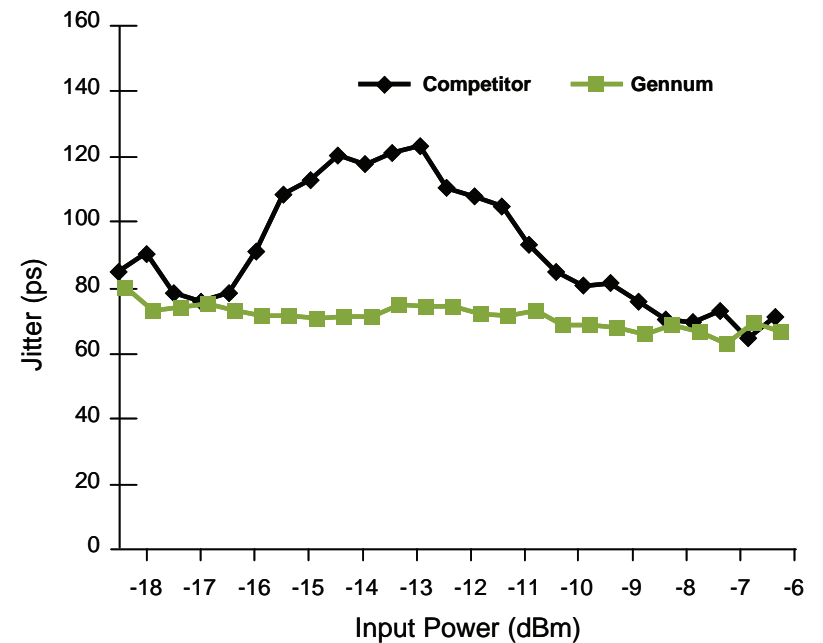
GENNUM

COMPETITOR

Conditions: 3Gb/s, 0dBm input power, Vcc=3.3V, Ta=25C, Pathological test pattern
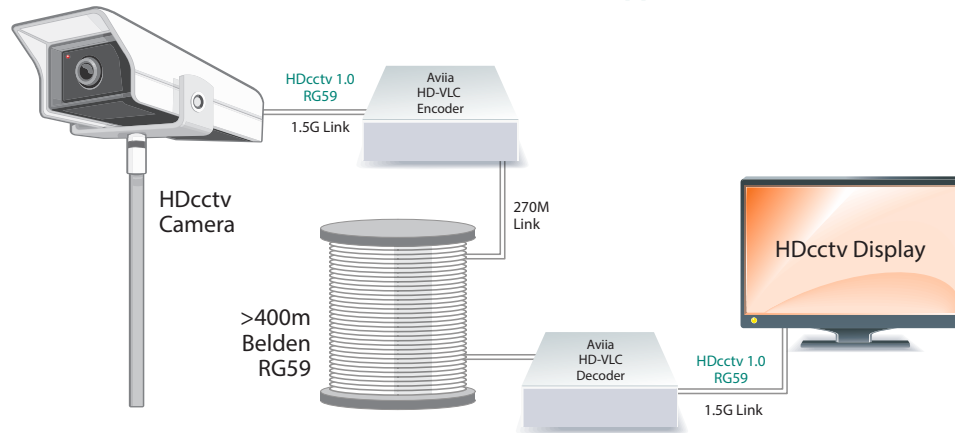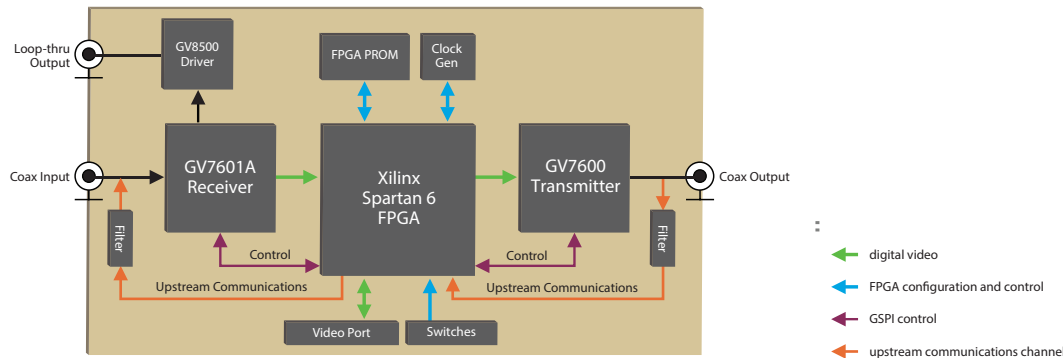
Receive Jitter vs. Input Power

Security & Surveillance

The complete Aviia™ HD-VLC™ reference design can be used to implement converter boxes, enabling extended cable reach transmission for existing 1.485 Gb/s based HD products and solutions.
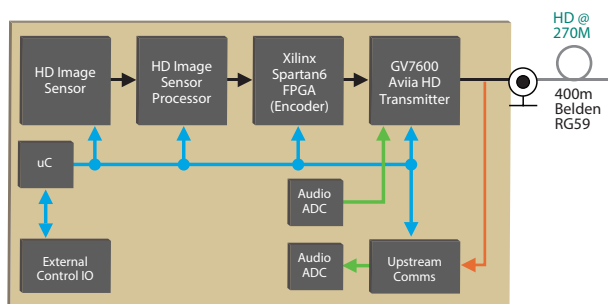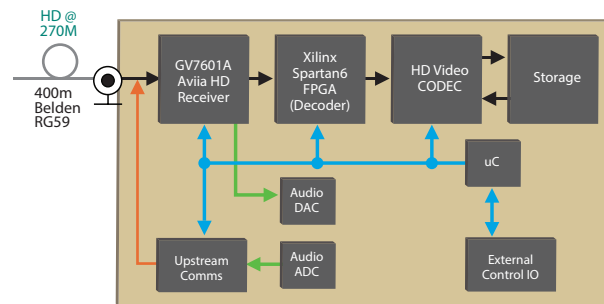
Aviia™ HD-VLC™ Converter Application

HDcctv Camera

HDcctv 1.0 RG59
Aviia HD-VLC Encoder
1.5G Link
270M Link
>400m Belden RG59
HDcctv Display
Aviia HD-VLC Decoder
HDcctv 1.0 RG59
1.5G Link

Semtech's Aviia™ products for HDcctv enable upgrade of analog CCTV installations to full digital HD, leveraging the installed base of cabling. Our fully integrated transmit and receive products enable the highest performance, longest reach, HDcctv standards-compliant designs.

PRODUCTS

- HDcctv Transmitters
- HDcctv Receivers
- HDcctv Cable Drivers
- HDcctv Cable Equalizers

GV7600

Serial digital video transmitter for standard and high definition component video

GV7601A

Extended Reach Serial digital video receiver for standard and high definition component video

GV8500

Serial digital HD video cable driver

GV8601

Serial digital HD video cable equalizer

HDVLC-REF

Aviia™ Visually Lossless CODEC (HD-VLC™) and reference design

Aviia™ HD-VLC™ Reference Design

Loop-thru Output — GV8500 Driver
FPGA PROM | Clock Gen
Coax Input — GV7601A Receiver — Xilinx Spartan 6 FPGA — GV7600 Transmitter — Coax Output
Filter
Control | Control
Upstream Communications | Upstream Communications
Video Port | Switches

← digital video
← FPGA configuration and control
← GSPI control
← upstream communications channel

Aviia™ HD-VLC™ Camera Application

HD Image Sensor — HD Image Sensor Processor — Xilinx Spartan6 FPGA (Encoder) — GV7600 Aviia HD Transmitter — HD @ 270M — 400m Belden RG59
uC
Audio ADC
External Control IO | Audio ADC | Upstream Comms

Aviia™ HD-VLC™ DVR Application

HD @ 270M — 400m Belden RG59 — GV7601A Aviia HD Receiver — Xilinx Spartan6 FPGA (Decoder) — HD Video CODEC — Storage
uC
Audio DAC
Upstream Comms | Audio ADC | External Control IO

HDcctv™

Optical Networking

Semtech designs the industry's most innovative optical, analog and mixed-signal semiconductor solutions to serve the rising global demand for high-speed data transmission products— robust solutions that improve performance and reliability, simplify design, lower system costs and speed time to market. We also offer one of the industry's most comprehensive portfolios of optical transceiver IC products ranging from 100Mb/s-100Gb/s supporting key industry standards such as Fibre Channel, InfiniBand®, Ethernet, PON, SONET and PCI Express®.

For optical component suppliers, this highly differentiated set of products gives a unique roadmap that improves performance and reliability, simplifies design, lowers costs and speeds time to market. For systems designers and manufacturers working on the next generation of high-speed networks, Semtech's multi-lane and multi-rate 10Gb/s-100Gb/s backplane solutions provide cost-effective low power, high performance ways to enable next-generation networks.
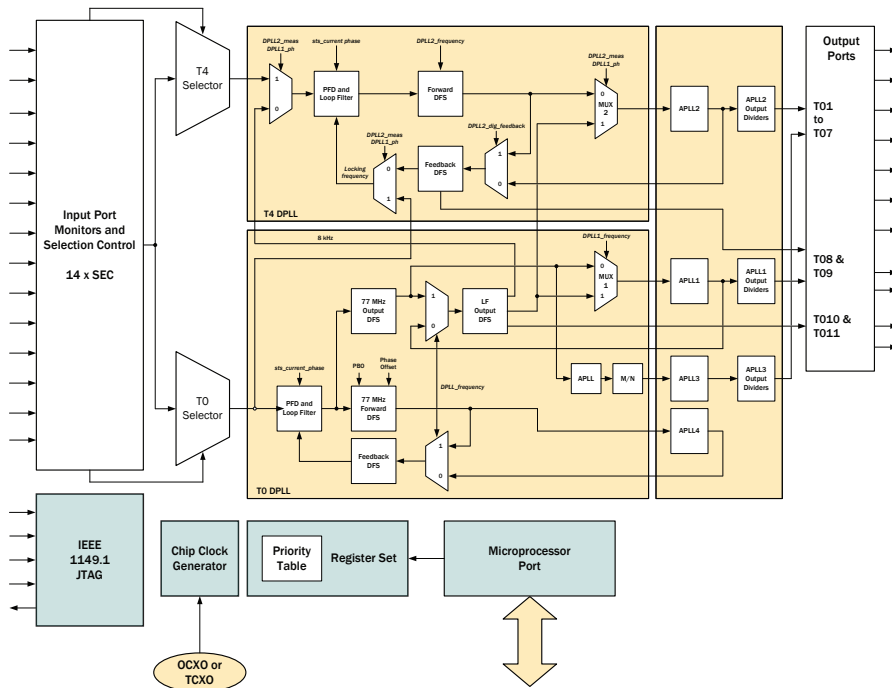
PRODUCTS
- Clock & Data Recovery
- Laser Modulator Drivers
- Limiting Amplifiers
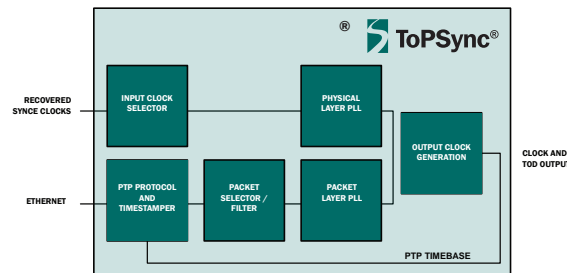- ROSAs
- Transimpedance Amplifiers

Full Portfolio of CDRs for Backplanes

Application	Gennum Solution	Ch.	CTLE / Limiting Amp	CDR?	DFE?	Transmit De-emphasis?	Benefits
XAUI RXAUI	GN1406	4	CTLE	Y		Y	Integrated CDR resets jitter budget
PCIe Gen 1/2/3	GN1407	4	CTLE				Enables 60" transmission over FR4
10Gb/s	GN2405A	4	CTLE	Y		Y	Enables 1m+ backplanes – 28dB loss compensation
10G-Base-KR	GX4002	2	CTLE	Y		Y	Integrated Crosspoint for redundancy switching
	GN2412	12	CTLE	Y	Y	Y	KR AN + Link training support
40Gb/s	GN2405A	4	CTLE	Y		Y	Enables 1m+ backplanes – 28dB loss compensation
40G-Base-KR	GN2412	12	CTLE	Y	Y	Y	40G-KR AN + Link Training
Infiniband QDR	GN2405A	4	CTLE	Y		Y	Reference-free CDR
	GX4002	2	CTLE	Y		Y	Reference-free CDR + xpoint
	GN2412	12	CTLE	Y		Y	High integration – 12 channels
16G Fiber Channel (FC)	GX4002	2	CTLE	Y		Y	Integrated Crosspoint
100Gb/s IEEE 802.3bj Infiniband EDR	GN2505	4	CTLE	Y		Y	Reference-free CDR
32G FC	GN2516	16	CTLE	Y	Y	Y	KR AN + Link training support

Full Portfolio of CDRs for Linecards

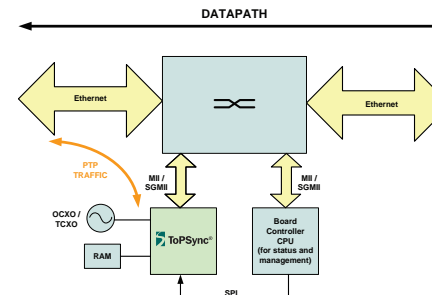| Data Rate	Form Factor	Optical / DAC	Gennum Solution	Ch.	CTLE / Limiting Amp	CDR?	DFE?	Transmit De-emphasis?	Benefits
10Gb/s	SFP+	Optical DAC (Copper)	GN2405A GN2406 GX4002 GN2412	4	CTLE	Y		Y	Reference-free CDR
				4	LA	Y		Y	Low input sensitivity – 10mVppd
				2	CTLE	Y		Y	Integrated Crosspoint
				12	CTLE	Y	Y	Y	High integration – 12 channels
40Gb/s	QSFP+	Optical	GN2405A	4	CTLE	Y		Y	Reference-free CDR
			GN2406	4	LA	Y		Y	Low input sensitivity – 10mVppd
			GN2412	12	CTLE	Y	Y	Y	High integration – 12 channels
		DAC 40G-Base-CR4	GN2412	12	CTLE	Y	Y	Y	40G-CR4 AN + Link training
100Gb/s	CXP, CFP	Optical DAC	GN2412	12	CTLE	Y	Y	Y	High integration – 12 channels
	CFP2,CFP4	Optical DAC	GN2425	2	CTLE	Y		Y	Low power 250mW / channel
16G Fiber Channels	SFP+	OpticalDAC	GX4002	2	CTLE	Y		Y	CDR resets jitter budget

Timing & Synchronization

ACS8530B Block Diagram

ToPSync® Architecture

ToPSync® Application Example

Semtech is an industry leader in network synchronization products. Semtech SETS products allow Stratum 3/3E, G.812 and G.8262 compliant timing systems to be implemented for Sonet/SDH and Synchronous Ethernet applications. Semtech's ToPSync® family products integrate SETS capability with IEEE 1588-2008 (PTP) master, slave and boundary clock functionality for next-generation packet-network timing solutions. ToPSync® includes all real-time processing on-chip and offers advanced features such as SyncE/PTP hybrid mode operation.

PRODUCTS

- Synchronous Equipment Timing Source PLLs (SETS)
- ToPSync® integrated IEEE 1588-2008 (PTP) synch. system-on-a-chip
- Low noise local clock generators

Part Number	Package	Description	Typical Application
ACS8522B	64-pin TQFP	Stratum 3 SETS-Lite physical layer PLL	SEC/EEC Timing
ACS8530B	100-pin TQFP	Stratum 3E/3 SETS physical layer PLL	SEC/EEC Timing, BITS/SSU
ACS9520	256-pin 0.8 mm BGA	ToPSync 2 synchronization system-on-a-chip	Node-B basestations, Edge routers, xPON OLTs, Core & Metro switches
ACS9522	324-ball, 1.0 mm, LBGA	ToPSync 2 synchronization system-on-a-chip with memory	Node-B basestations, Edge routers, xPON OLTs, Core & Metro switches
ACS1790	24-pin QFN	Ultra-low jitter clock generator for ToPSync 2	Synchronous Ethernet

This is only a selection of the Semtech timing product line-up. Contact Semtech for more details.

Telecom & Datacom

Semtech ultra-low jitter performance Telecom & Datacom SerDes devices allow manufacturers to develop low cost, low power, and high performance optical transport equipment that can handle more bandwidth in a smaller space. This enables global carriers to meet exponentially growing video, voice and data traffic demands.

PRODUCTS

- 40/100 Gbps Mux
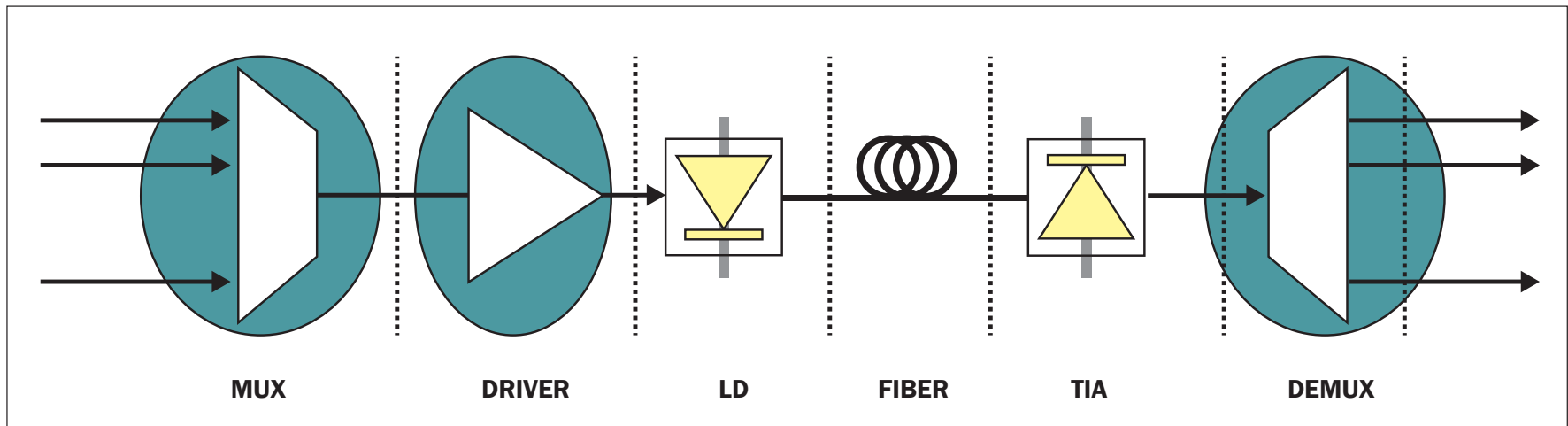- 40/100 Gbps Demux

Complete Solutions for 40 & 100 Gbps

- Direct Detect SerDes (Mux/Demux)
- Mach-Zehnder Modulator Drivers
- 100 Gbps coherent solutions

Solutions for Optical Transport Networks

- Ultra high-speed SerDes for transport communication
- High performance Modulator Drivers for DWDM applications
- High performance transceivers for Datacenter applications

40 Gbps

100 Gbps

400 Gbps

Gamma Delta Epsilon

Theta Sigma

Semtech converts electrical data signals to optical formats and back again

| MUX | DRIVER | LD | FIBER | TIA | DEMUX |

High Reliability Discrete Semiconductors

Semtech designs and manufactures power products in axial, surface-mount discrete and various custom assembly configurations. These high performance/ rugged products, in high-current, high-voltage configurations, are employed in a wide range of devices used primarily in military, aerospace, industrial and medical applications.
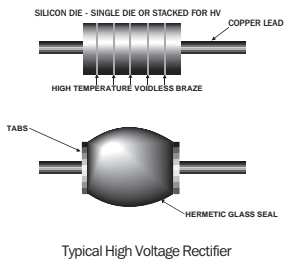
JANS - Qualified Diodes for Space / Critical programs

- MIL-PRF-19500 / 356, 5W Zener voltage regulators (Available in axial lead and surface mount packages)
- MIL-PRF-19500 / 406, 1.5W Zener voltage regulators (Available in axial and surface mount)
- MIL-PRF-19500 / 411, Rectifiers (Available in axial lead packages)
- MIL-PRF-19500 / 420, Rectifiers (Available in axial lead packages)
- MIL-PRF-19500 / 427, Rectifiers (Available in axial lead packages)
- MIL-PRF-19500 / 429, Rectifiers (Available in axial lead packages)
- MIL-PRF-19500 / 477, Rectifiers (Available in axial lead and surface mount packages)
- MIL-PRF-19500 / 516, TVS Devices (Available in axial lead and surface mount packages)

PRODUCTS

- Half wave discrete rectifiers (QPL)
- TVS rectifiers (QPL)
- Zener voltage regulators (QPL)
- Half wave, high current and voltage assemblies
- Single and three phase full wave bridge assemblies
- Center tap and doubler assemblies
- High voltage / High current ISOPAC devices
- High voltage capacitors

Packaging Capabilities

SILICON DIE - SINGLE DIE OR STACKED FOR HV
COPPER LEAD
HIGH TEMPERATURE VOIDLESS BRAZE
TABS
HERMETIC GLASS SEAL

Typical High Voltage Rectifier

Finpac-High Current

DO-4 Stud ISOPAC®

Center Tap

Doubler

1-Phase Bridge

1-Phase Bridge ISOPAC®

3-Phase Bridge ISOPAC®

3-Phase Bridges

Slim Pac - High Voltage

Semtech Worldwide Locations

Calgary, Canada

Toronto, Canada

Kanata, Canada

Bristol, Great Britain

Bishop's Stortford, England

Southampton, England

Hallbergmoos, Germany

Munich, Germany

Beijing, China

Seoul, Korea

San Jose, CA

Irvine, CA

Courtaboeuf, France

Wil, Switzerland

Shanghai, China

Tokyo, Japan

Camarillo, CA

Burlington, Canada

Redondo Beach, CA

Neuchatel, Switzerland

Shenzhen, China

Osaka, Japan

San Diego, CA

Raleigh, North Carolina

Taiwan

Reynosa, Mexico

Bhubaneswar, India

Manila, Philippines

Aguascalientes, Mexico

Penang, Malaysia

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● Design & Application Center and Sales Office

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