

Professional high-speed optical transceiver

**OPN-S3G85-05LC2 / OPN-S3G85-05LC2I /
OPN-S3G85E-05LC2 / OPN-S3G85E-05LC2I**

1.25 Gbps / 850 nm / 3.3V SFF LC MULTI-MODE TRANSCEIVER

PRODUCT FEATURES

- Duplex LC Multi- Mode Transceiver
- Compliant with IEEE 802.3z 1000BASE-SX
- Compliant with Fibre Channel FC-PH-2 for 100-M5-SN-1 and 100-M6-SN-1
 - 300 m links with 62.5/125 μ m MMF Cables
 - 550 m links with 50/125 μ m MMF Cables
- Small Form Factor 2X5 pin Package
- AC/AC Coupled Signal Input / Output
- LVTTTL Transmitter Disable Input
- LVTTTL Signal Detect Output
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operation: OPN-S3G85-05LC2
- -50 to 85°C Operation: OPN-S3G85-05LC2I
 - Wave Solderable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- SONET/SDH Equipment Interconnect
- Gigabit Ethernet 1.25 Gb/s Links

PRODUCT DESCRIPTION

The OPN-S3G85-05LC2 series multi-mode transceivers is small form factor, low power, high performance module for bi-directional serial optical data communications such as Gigabit Ethernet IEEE 802.3z 1000BASE-SX and Fiber Channel FC-PH-2. This module is designed for multi-mode fiber and operates at a nominal wavelength of 850 nm. The transmitter section uses a multiple quantum well 850 nm VCSEL and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. A PECL logic interface simplifies interface to external circuitry.

ORDER INFORMATION

P/No.	Bit Rate (Gb/s)	1000 BASE	Distance (m)	Wavelength (nm)	Package	Temp. (°C)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
OPN-S3G85-05LC2	1.25/1.063	SX	300/550*	850	2X5 LC	0 to 70	-4 to -9	-17	Yes
OPN-S3G85-05LC2I	1.25/1.063	SX	300/550*	850	2X5 LC	-50 to 85	-4 to -9	-17	Yes

*300 m links with 62.5/125 μ m MMF Cables; 550 m links with 50/125 μ m MMF Cables

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-50	85	°C	
Operating Temperature	Topr	0 -50	70 85	°C	OPN-S3G85-05LC2 OPN-S3G85-05LC2I
Soldering Temperature	---		260	°C	10 seconds on leads only
Power Supply Voltage	Vcc	0	3.6	V	
Input Voltage	---	GND	Vcc	V	
Output Current	Iout	0	30	mA	

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Recommended Operating Conditions					
Parameter	Symbol	Min	Typ	Max	Units / Notes
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V
Operating Temperature	T _{opr}	0 -50		70 85	°C / OPN-S3G85-05LC2 °C / OPN-S3G85-05LC2I
Data Rate		1000	1250		Mb/s
Power Supply Current	I _{CC}		180	250	mA

Transmitter Specifications (0°C < T _{opr} < 70°C, 3.13V < V _{CC} < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Optical Transmit Power	P _o	-9	---	-4	dBm	1
Output Center Wavelength	λ	830	850	860	nm	
Output Spectrum Width	Δλ	---	---	0.85	nm	RMS(σ)
Extinction Ratio	E _R	9	---	---	dB	
Output Eye	Compliant with IEEE 802.3z					
Optical Rise Time	t _r			0.26	ns	20% to 80% Values
Optical Fall Time	t _f			0.26	ns	20% to 80% Values
Relative Intensity Noise	RIN			-116	dB/Hz	
Total Jitter	TJ			0.226	ns	2
Electrical						
Data Input Current – Low	I _{IL}	-350			μA	
Data Input Current – High	I _{IH}			350	μA	
Differential Input Voltage	V _{IH} - V _{IL}	300			mV	
Data Input Voltage – Low	V _{IL} - V _{CC}	-2.0		-1.58	V	3
Data Input Voltage -- High	V _{IH} - V _{CC}	-1.1		-0.74	V	3
Disable Input Voltage -- Low	V _{TDIS,L}	0		0.5	V	TX Output Enabled
Disable Input Voltage -- High	V _{TDIS,H}	V _{CC} - 1.3		V _{CC}	V	TX Output Disabled
Shut Off Time for TxDis	t _{DIS}			1	ms	

- Notes: 1. Output power is power coupled into a 62.5/125 μm MM fiber.
 2. Measured with 2⁷-1 PRBS
 3. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

Receiver Specifications (0°C < T _{opr} < 70°C, 3.13V < V _{CC} < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Sensitivity	---	---	---	-17	dBm	1
Maximum Input Power	P _{in}	-3		---	dBm	
Signal Detect -- Asserted	P _a	---	---	-17	dBm	Transition: low to high
Signal Detect -- Deasserted	P _d	-31	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		770	---	860	nm	
Electrical						
Data Output Voltage – Low	V _{OL} - V _{CC}	-2.0		-1.58	V	2
Data Output Voltage – High	V _{OH} - V _{CC}	-1.1		-0.74	V	2
Signal Detect Output Voltage -- Low	V _{OL}			0.5	V	
Signal Detect Output Voltage -- High	V _{OH}	2.0			V	

- Notes: 1. Minimum sensitivity and saturation levels at BER=1E-12 for a 2⁷-1 PRBS.
 2. These outputs are compatible with 10K, 10KH and 100K ECL and PECL outputs.

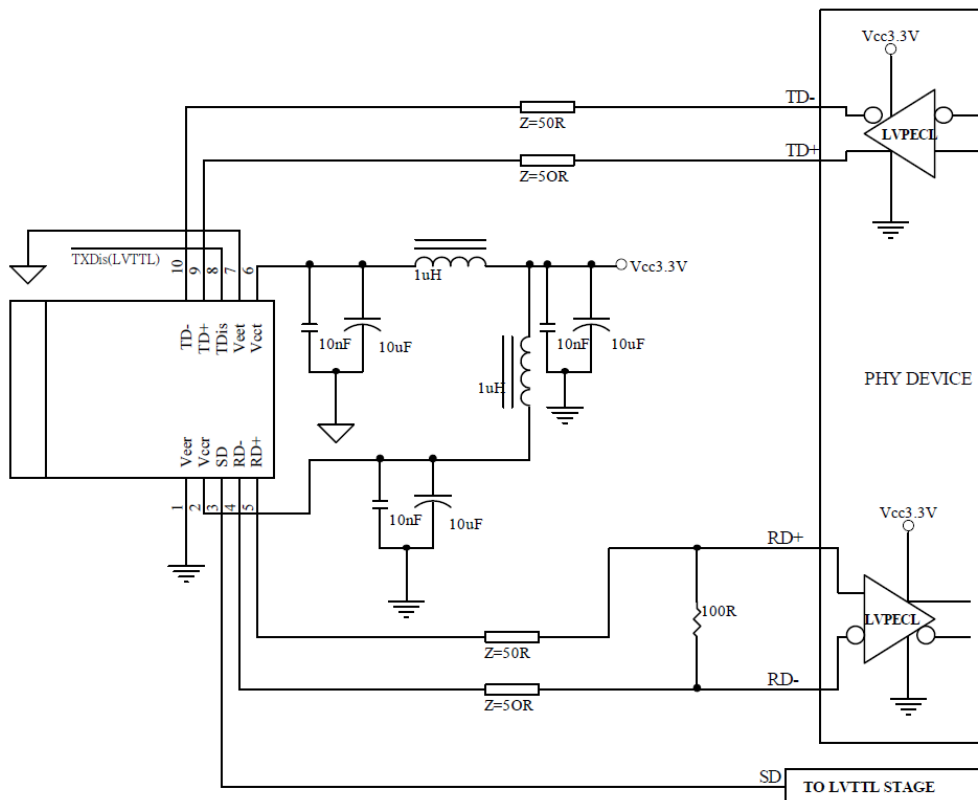
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CONNECTION DIAGRAM



PIN	Symbol	Notes
1	$V_{EE}r$	Directly connect this pin to the receiver ground plane
2	$V_{CC}r$	+3.3V dc power for the receiver section
3	SD	Active high on this indicates a received optical signal.
4	RD-	Receiver Data out Bar. See recommended circuit schematic
5	RD+	Receiver Data out. See recommended circuit schematic
6	$V_{CC}t$	+3.3V dc power for the transmitter section
7	$V_{EE}t$	Directly connect this plan to the transmitter ground plane
8	TDIs	Transmitter Disable. Connect this pin to +3.3V TTL logic "1" to disable module To enable module connect to TTL logic low "0"
9	TD+	Transmitter Data In. See recommended circuit schematic
10	TD-	Transmitter Data In Bar. See recommended circuit schematic
MS	MS	Mounting Studs. Connect to Chassis Ground

RECOMMENDED CIRCUIT SCHEMATIC



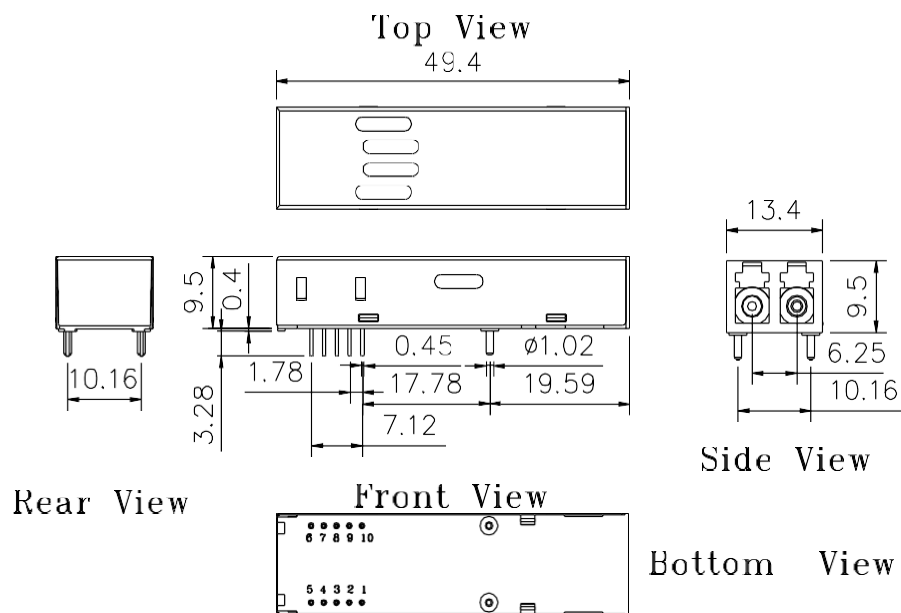
- Note: 1. No SD pull-down resistor required for OPN-S3G85-05LC2 (LVTTTL SD Output)
2. Veer and Veet are not internally connected to each other.
3. 50 Ω line pattern and component placements on TD+/TD- and RD+/RD- lines shall be symmetrical for better impedance matching.

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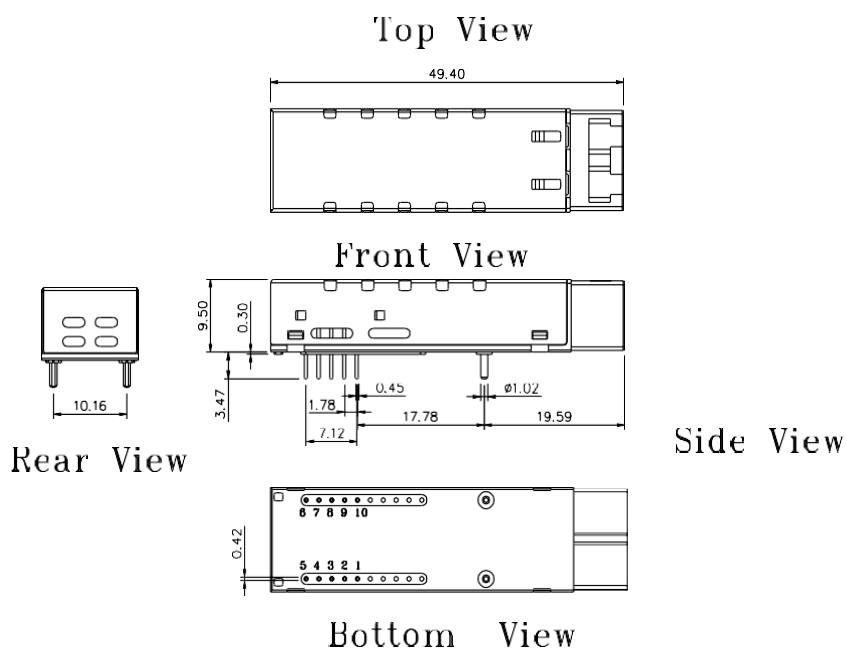
PACKAGE DIAGRAM

Units in mm

1) Standard Case



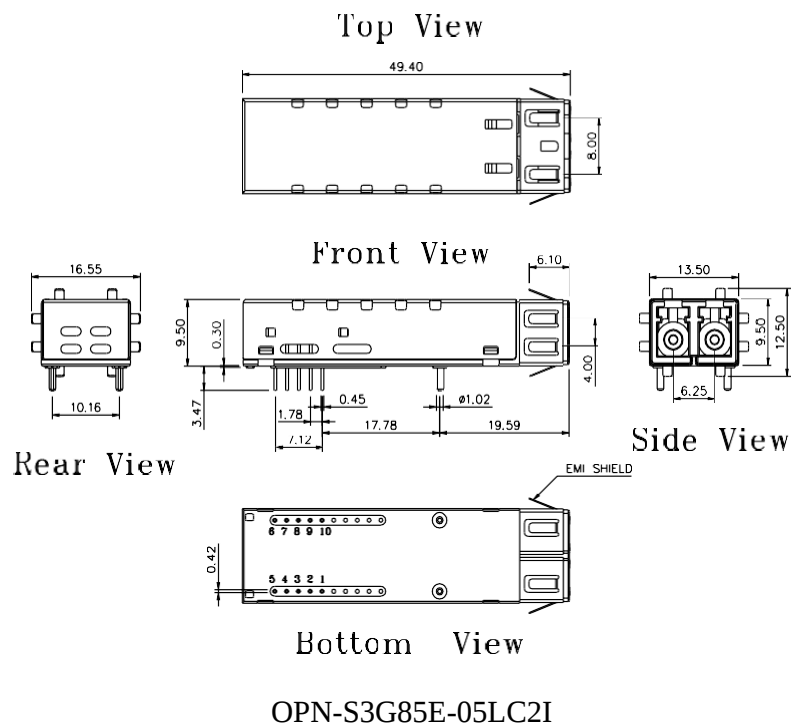
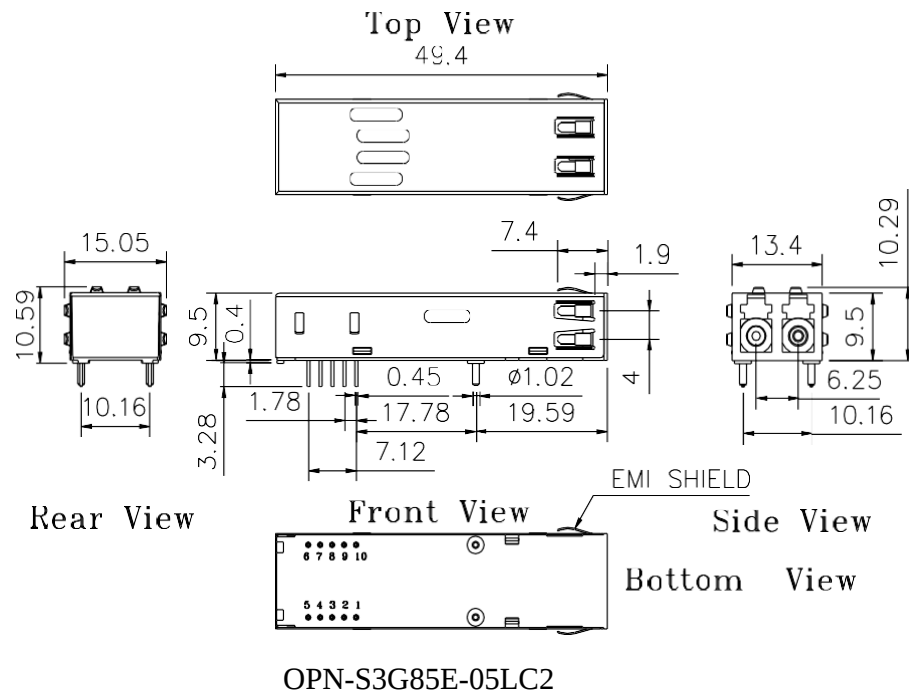
OPN-S3G85-05LC2



OPN-S3G85-05LC2I

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2) Extended Case



Note: Specifications subject to change without notice.