

Professional high-speed optical transceiver

**OPN-S8F13-1SC / OPN-S8F13-1SCI / OPN-S8F13-1SC-EMG /
OPN-S8F13-1SCI-EMG / OPN-S8F13-1ST / OPN-S8F13-1STI**
3.3V / 1310 nm / 622 Mbps RoHS Compliant Optical Multi-Mode Transceiver

PRODUCT FEATURES

- Duplex SC Multimode Transceiver: OPN-S8F13-1SC
- Duplex ST Multimode Transceiver: OPN-S8F13-1ST
 - 1310 nm Transmitter
 - 0 to 1000 m Transmission
- Industry Standard 1 x 9 Footprint
 - Single +3.3 V Power Supply
 - PECL Signal Detection Output
 - RoHS Compliant
- 0 to 70°C Operating: OPN-S8F13-1SC-EMG
- -50 to 85°C Operating: OPN-S8F13-1SCI-EMG
 - Wave Solderable
- Class 1 Laser International Safety Standard IEC 60825Compliant

APPLICATIONS

- ATM 622 Mbps Links
- SONET/SDH Equipment Interconnect
 - Fast Ethernet 100 Mb/s Links

PRODUCT DESCRIPTION

The OPN-S8F13-1SCI-EMG series multi-mode transceivers are low power, high performance module for bi-directional serial optical data communications such as ATM 622 Mb/s, FastEthernet and Fibre Channel. This module is designed for multi-mode fiber and operates at a nominal wavelength of 1310 nm. The transmitter section uses a multiple quantumwell laser 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-amplifierIC. A PECL logic interface simplifies interface to externalcircuitry.

ORDER INFORMATION

P/No.	Bit Rate (Mb/s)	Distance(m)	Wavelength (nm)	Voltage (V)	Connector	Temp.(°C)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
OPN-S8F13-1SC-EMG	622	0 to 1000	1310	3.3	1X9 SC/ST	0 to 70	-12 to -19	-26	Y
OPN-S8F13-1SCI-EMG	622	0 to 1000	1310	3.3	1X9 SC/ST	-50 to 85	-12 to -19	-26	Y

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-50	85	°C	
Operating Temperature	Topr	0 -50	70 85	°C	OPN-S8F13-1SC-EMG OPN-S8F13-1SCI-EMG
Soldering Temperature	---		250	°C	10 seconds on leads only
Power Supply Voltage	Vcc	-0.5	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
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V
Operating Temperature	T _{opr}	0 -50		70 85	°C / OPN-S8F13-1SC-EMG °C / OPN-S8F13-1SCI- EMG
Data Rate		100	622		Mb/s

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	-19	---	-12	dBm	1
Output Center Wavelength	λ	1260	1310	1360	nm	
Output Spectrum Width	Δλ	---	---	10	nm	RMS(σ)
Extinction Ratio	E _R	9	---	---	dB	
Output Eye	Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957					
Optical Rise Time	t _r			1.2	ns	10% to 90% Values
Optical Fall Time	t _f			1.2	ns	10% to 90% Values
Relative Intensity Noise	RIN			-116	dB/Hz	
Total Jitter	TJ			0.55	ns	2
Coupled Power Ratio	CPR	9			dB	
Electrical						
Power Supply Current	I _{CC}			140	mA	3
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	4
Data Input Voltage -- High	V _{IH} - V _{CC}	-1.1		-0.74	V	4

1. Output power is power coupled into a 62.5/125 μm multi-mode fiber.
2. Measured with a 2²³-1 PRBS with 72 ones and 72 zeros.
3. Maximum current is specified at V_{CC}=Maximum @ maximum temperature.
4. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

Receiver Specifications (0°C < T _{opr} < 70°C, 3.13V < V _{CC} < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Sensitivity	---	---	-28	-26	dBm	1
Maximum Input Power	P _{in}	0		---	dBm	
Signal Detect -- Asserted	P _a	---	---	-26	dBm	Transition: low to high
Signal Detect -- Deasserted	P _d	-40	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---	4.0	dB	
Wavelength of Operation		1100	---	1600	nm	
Electrical						
Power Supply Current	I _{CC}			100	mA	2
Data Output Voltage – Low	V _{OL} - V _{CC}	-2.0		-1.58	V	3
Data Output Voltage – High	V _{OH} - V _{CC}	-1.1		-0.74	V	3
Signal Detect Output Voltage -- Low	V _{OL} - V _{CC}	-2.0		-1.58	V	
Signal Detect Output Voltage -- High	V _{OH} - V _{CC}	-1.1		-0.74	V	

- Notes: 1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2²³-1 PRBS.
 2. The current excludes the output load current.
 3. These outputs are compatible with 10K, 10KH and 100K ECL and PECL outputs.

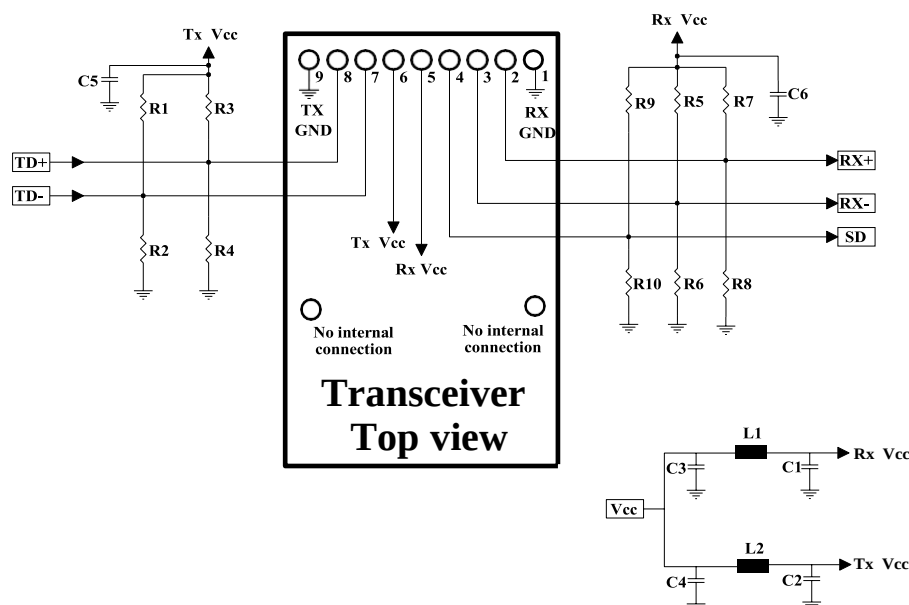
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CONNECTION DIAGRAM

Receiver Signal Ground	1 (Rx GND)	○
Receiver Data Out	2 (RD+)	N/C
Receiver Data Out Bar	3 (RD-)	
Signal Detect	4 (SD)	
Receiver Power Supply	5 (Rx Vcc)	TOP VIEW
Transmitter Power Supply	6 (Tx Vcc)	
Transmitter Data In Bar	7 (TD-)	
Transmitter Data In	8 (TD+)	N/C
Transmitter Signal Ground	9 (Tx GND)	○

PIN	Symbol	Notes
1	Rx GND	Directly connect this pin to the receiver ground plane
2	RD+	See recommended circuit schematic
3	RD-	See recommended circuit schematic
4	SD	Active high on this indicates a received optical signal
5	Rx Vcc	+3.3V dc power for the receiver section
6	Tx Vcc	+3.3V dc power for the transmitter section
7	TD-	See recommended circuit schematic
8	TD+	See recommended circuit schematic
9	Tx GND	Directly connect this pin to the transmitter ground plane

RECOMMENDED CIRCUIT SCHEMATIC



R1=R3=R5=R7=R9=130 ohm
R2=R4=R6=R8=R10=82 ohm
C1=C2=C3=C5=C6=0.1 Uf
C4=10uF L1=L2=1uH

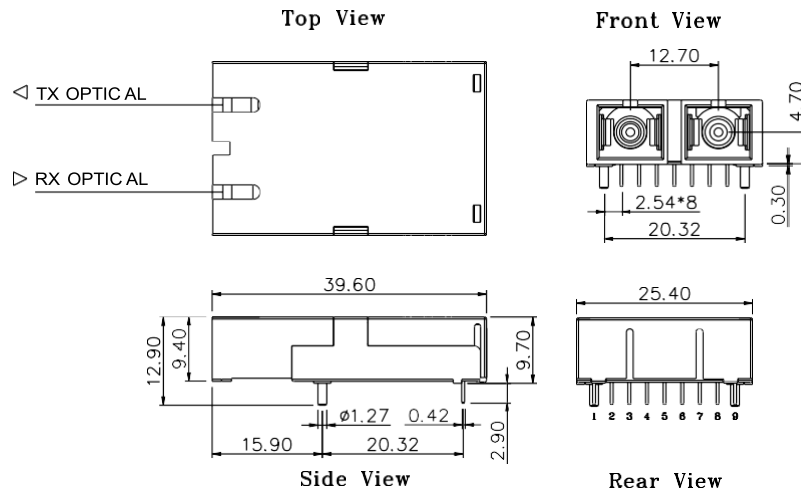
The split-load terminations for ECL signals need to be located at the input of devices receiving those ECL signals. The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module Rx Vcc and Tx Vcc. A GND plane under the module is required for good EMI and sensitivity performance.

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PACKAGE DIAGRAM

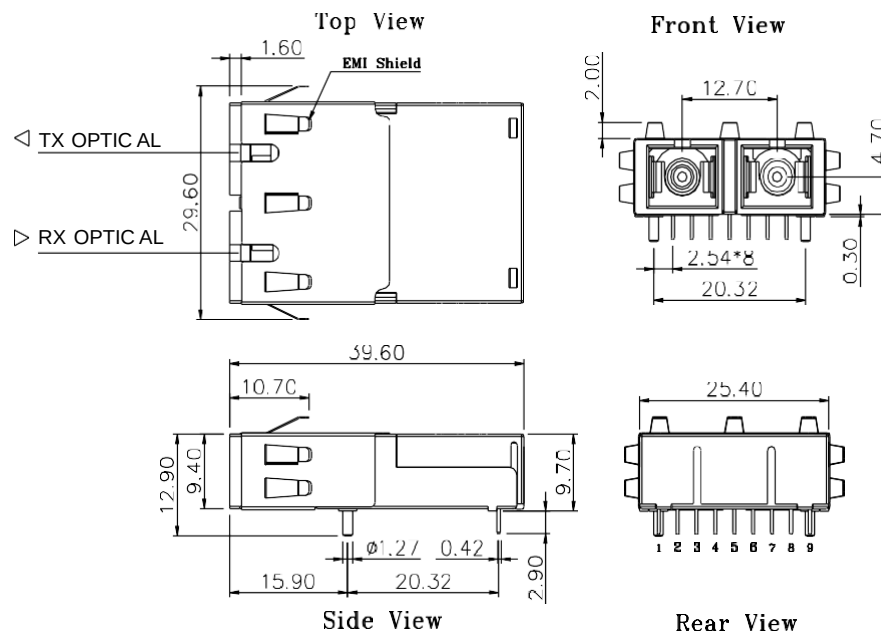
Units in mm

1) SC Duplex



OPN-S8F13-1SC / OPN-S8F13-1SCI

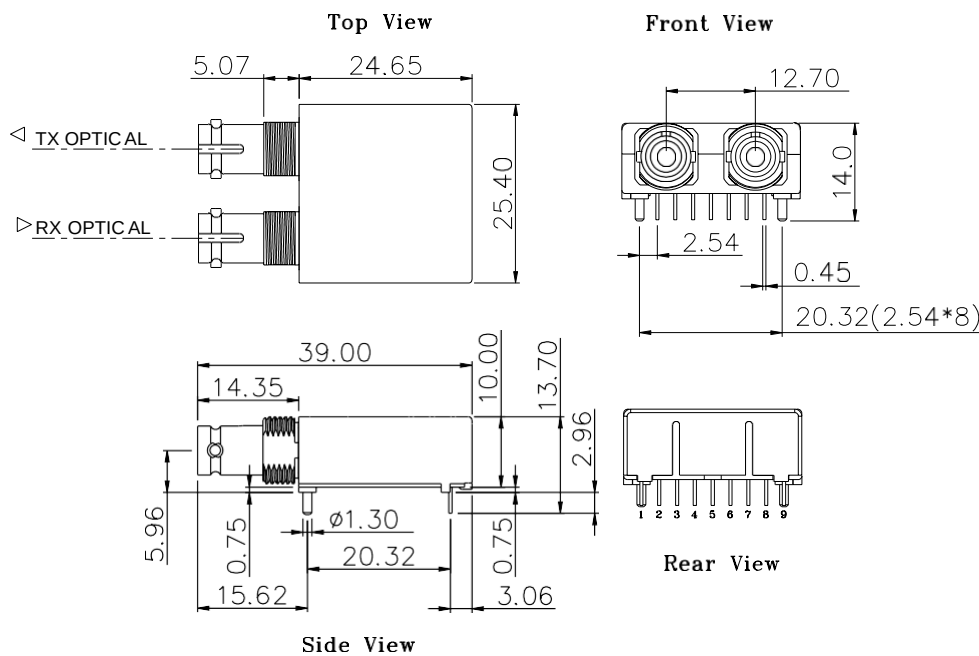
2) SC Duplex with metal shielding



OPN-S8F13-1SC-EMG / OPN-S8F13-1SCI-EMG

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3) Duplex ST



OPN-S8F13-1ST / OPN-S8F13-1STI

Note: Specifications subject to change without notice.