Professional high-speed optical transceiver

OPN-S8F161-3D34SC2 / OPN-S8F161T-3D34SC2 / OPN-S8F161-3D34SC2-EMG / OPN-S8F161T-3D34SC2-EMG / OPN-S8F161-3D34ST2 / OPN-S8F161T-3D34ST2 / OPN-S8F161-3D34FC2 / OPN-S8F161T-3D34FC2

CWDM 3.3V / 622 Mbps RoHS Compliant Optical Single-Mode Transceiver

PRODUCT FEATURES

- Duplex SC/ST/FC Single Mode Transceiver
- Long-Reach SONET OC-12 / SDH STM-4 Compliant
- 18-Wavelength CWDM DFB LD Transmitter from1610 nm to 1610 nm, with step 20 nm
- 34 dB Link Budget at Least
- Industry Standard 1 x 9 Footprint
- Single +3.3 V Power Supply
- RoHS Compliant
- PECL Signal Detect Output: OPN-S8F161-3D34SC2
- TTL Signal Detect Output: OPN-S8F161T-3D34SC2
- Wave Solderable
- Class 1 Laser International Safety Standard IEC 60825Compliant

APPLICATIONS

- ATM 622 Mbps Links
- SONET / SDH Equipment Interconnect
- Fibre Channel 532 Mb/s Links
- CWDM

PRODUCT DESCRIPTION

The OPN-S8F161-3D34SC2 series single mode transceivers are a low power, high performance CWDM module for bi-directional serial optical data communications such as SONET OC-12 / SDH STM-4 and Fiber Channel. There are eighteen center wavelengths from 1610 nm to 1610 nm, each step 20 nm. A guaranteed minimum optical link budget of 34 dB is offered. The transmitter section uses a multiple quantum well CWDM DFB laser and is a class 1laser compliant according to International Safety StandardIEC-60825. The receiver section uses an integrated InGaAs 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 (Mb/s)	SONET/ SDH	Power Budget (dB)	Wavelength (nm)	Voltage (V)	Package	Temp. (ºC)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
OPN-S8F161-3D34SC2	622	LR	> 34	CWDM*	3.3	1X9 SC/ST/FC	0 to 70	5 to 0	-34	Y

CWDM Wavelength (0 to 70ºC)

Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)
127	1604.5	1610	1617.5	145	1444.5	1450	1457.5
129	1284.5	1290	1297.5	147	1464.5	1470	1477.5
131	1304.5	1310	1317.5	149	1484.5	1490	1497.5
133	1324.5	1330	1337.5	151	1504.5	1510	1517.5
135	1344.5	1350	1357.5	153	1524.5	1530	1537.5
137	1364.5	1370	1377.5	155	1544.5	1550	1557.5
139	1384.5	1390	1397.5	157	1564.5	1570	1577.5
141	1404.5	1410	1417.5	159	1584.5	1590	1597.5
143	1424.5	1430	1437.5	161	1604.5	1610	1617.5

CWDM*: 18 Wavelengths from 1610 nm to 1610 nm, each step 20 nm.

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Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Temperature	Tstg	-50	85	°C	
Operating Temperature	Topr	0	70	°C	With air flow 1m/sec
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	

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**
Power Supply Voltage	Vcc	3.1	3.3	3.5	V
Operating Temperature	Topr	0		70	°C / air flow 1m/sec
Data Rate		50	622		Mb/s
Power Supply Current	Icc			280	mA

Transmitter Specifications (0°C < Topr < 70°C, 3.1V < Vcc < 3.5V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Optical Transmit Power	Po	0	---	5	dBm	1
Output Center Wavelength	λ	λ-5.5	λ	λ+7.5	nm	2
Output Spectrum Width	Δλ	---	---	1	nm	-20 dB Width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	E_R	10	---	---	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			-120	dB/Hz	
Total Jitter	TJ			0.55	ns	3
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	4
Data Input Voltage -- High	V_{IH} - V_{CC}	-1.1		-0.74	V	4

Notes: 1. Output power is power coupled into a 9/125 μm single mode fiber.
2. ITU-T G.694.2 CWDM wavelength from 1610 nm to 1610 nm, each step 20 nm.
3. Measured with 2^{23}-1 PRBS with 72 ones and 72 zeros.
4. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

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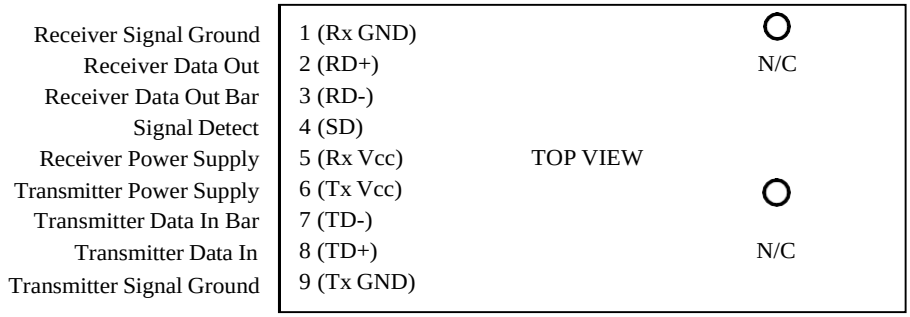
Receiver Specifications (0ºC < Topr < 70ºC, 3.1V < Vcc < 3.5V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Sensitivity	---	---	---	-34	dBm	1
Maximum Input Power	Pin	-9		---	dBm	
Signal Detect – Asserted	Pa	---	---	-34	dBm	Transition: low to high
Signal Detect – Deasserted	Pd	-43	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		1100	---	1620	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} - V_{CC}	-2.0		-1.58	V	OPN-S8F161-3D34SC2
Signal Detect Output Voltage -- High	V_{OH} - V_{CC}	-1.1		-0.74	V	
Signal Detect Output Voltage -- Low	V_{SDL}			0.8	V	OPN-S8F161T-3D34SC2
Signal Detect Output Voltage -- High	V_{SDH}	2.0			V	

Notes: 1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2^{23}-1 PRBS with 72 ones and 72 zeros.
2. These outputs are compatible with 10K, 10KH and 100K ECL and LVPECL outputs.

CONNECTION DIAGRAM



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 V_{CC}	+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

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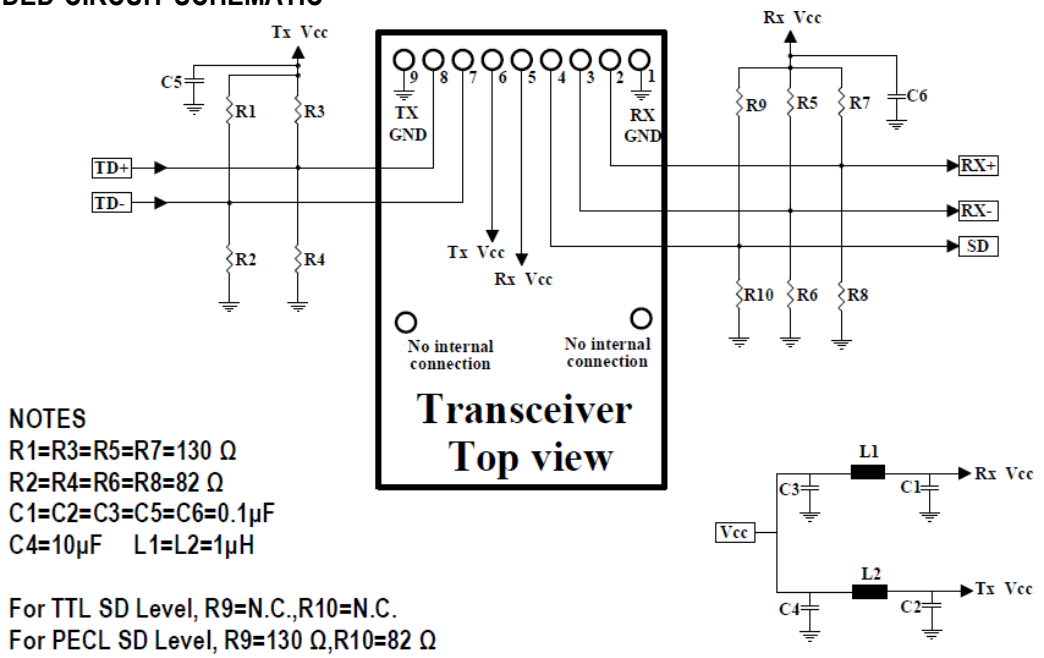
RECOMMENDED CIRCUIT SCHEMATIC



NOTES
R1=R3=R5=R7=130 Ω
R2=R4=R6=R8=82 Ω
C1=C2=C3=C5=C6=0.1μF
C4=10μF L1=L2=1μH

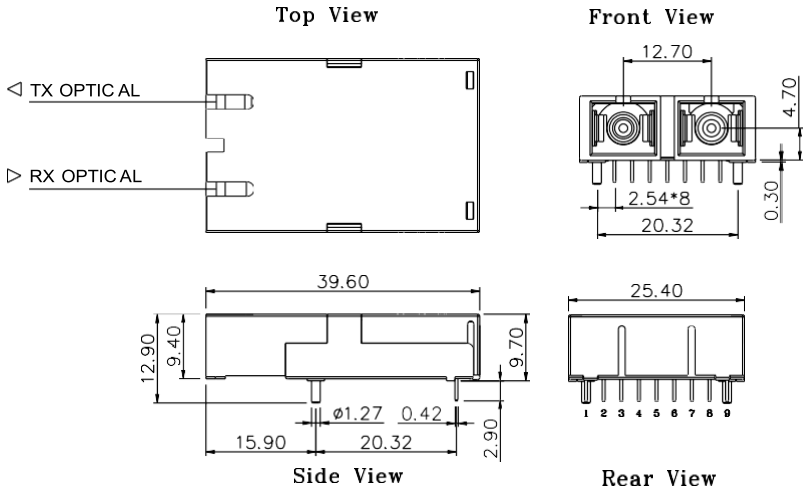
For TTL SD Level, R9=N.C.,R10=N.C.
For PECL SD Level, R9=130 Ω,R10=82 Ω

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.

PACKAGE DIAGRAM

Units in mm

1) SC Type



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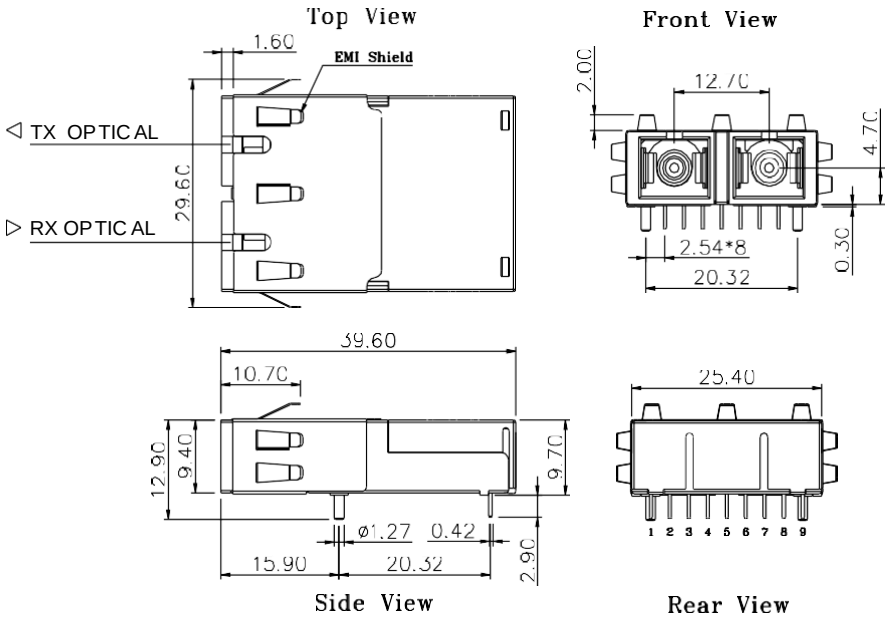
2) SC Type With Extended Shielding



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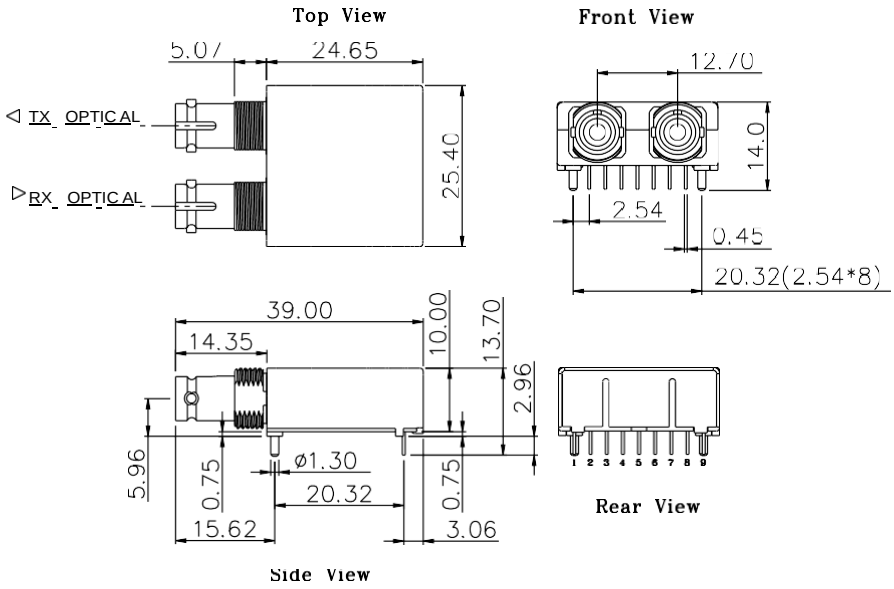
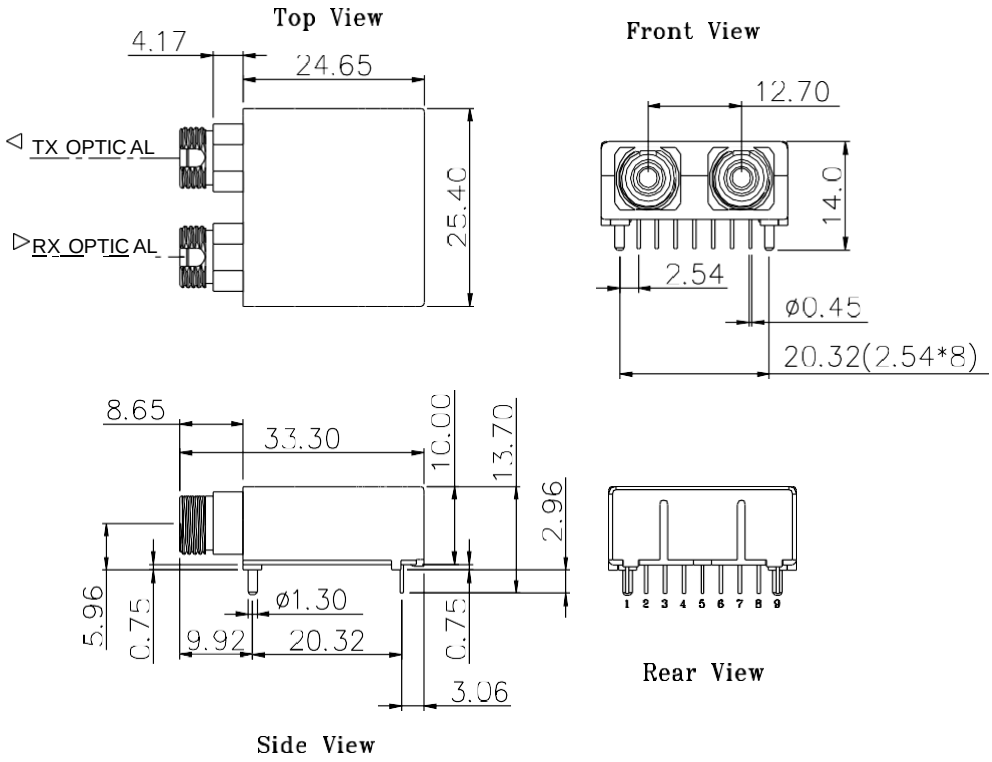
3) ST Type



OPN-S8F161-3D34ST2 / OPN-S8F161T-3D34ST2

4) FC Type



OPN-S8F161-3D34FC2 / OPN-S8F161T-3D34FC2

Note: Specifications subject to change without notice.