

### TRSL-8380-CXX0G

**(RoHS Compliant)**

### 3.3V / CWDM / 4.25 Gbps SFF LC SINGLE-MODE TRANSCEIVER

#### FEATURES

- Up to 4.25 Gb/s Bi-directional Data Links
- Duplex LC Single Mode Transceiver
- Fibre Channel FC-PI 400/200/100-SM-LC-L Compliant
- IEEE 802.3z 1000BASE-LX Compliant
- Small Form-Factor, RJ-45 size, 2x5 pin Package
- 18 Wavelength ( $\lambda$ ) 1270 nm to 1610 nm CWDM DFB LD Transmitter
- 28 dB Power Budget at Least
- AC/AC Coupling Signal Input / Output
- LVTTL Transmitter Disable Input
- LVTTL Signal Detect Output
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operation
- Wave Solderable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

#### APPLICATIONS

- Tri-Rate 1.063/2.125/4.25 Gb/s Fibre Channel
- 1.25 Gb/s 1000BASE-LX Gigabit Ethernet

#### DESCRIPTION

The TRSL-8380-CXX0G series single mode transceiver is a small form factor, low power, high performance module for bi-directional serial optical data communications such as 4x/2x/1x Fibre Channel and 1000BASE-LX Gigabit Ethernet. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eighteen center wavelengths available from 1270 nm to 1610 nm, with each step 20 nm. A guaranteed minimum optical link budget of 28 dB is offered. The transmitter section uses a multiple quantum well CWDM DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-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.

#### LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

#### ORDER INFORMATION

P/No.	Bit Rate (Gb/s)	FC-PI	Power Budget (dBm)	Wavelength (nm)	Package	Temp. (°C)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
TRSL-8380-CXX0G	4 / 2 / 1	400/200/100	> 28	CWDM	2x5 LC	0 to 70	5 to 1	-27	Yes

#### CWDM\* Wavelength (0 to 70 °C)

Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)
-C270	1264.5	1270	1277.5	-C450	1444.5	1450	1457.5
-C290	1284.5	1290	1297.5	-C470	1464.5	1470	1477.5
-C310	1304.5	1310	1317.5	-C490	1484.5	1490	1497.5
-C330	1324.5	1330	1337.5	-C510	1504.5	1510	1517.5
-C350	1344.5	1350	1357.5	-C530	1524.5	1530	1537.5
-C370	1364.5	1370	1377.5	-C550	1544.5	1550	1557.5
-C390	1384.5	1390	1397.5	-C570	1564.5	1570	1577.5
-C410	1404.5	1410	1417.5	-C590	1584.5	1590	1597.5
-C430	1424.5	1430	1437.5	-C610	1604.5	1610	1617.5

CWDM\*: 18 Wavelengths from 1270 nm to 1610 nm, each step 20 nm.

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Absolute Maximum Ratings						
Parameter	Symbol	Min	Max	Units	Notes	
Storage Temperature	Tstg	-40	85	°C		
Operating Case Temperature	Topr	0	70	°C		
Soldering Temperature	---		260	°C	10 seconds on leads only	
Power Supply Voltage	Vcc	0	4.5	V		
Input Voltage	---	GND	Vcc	°C		
Output Current	Iout	0	30	mA		

Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units / Notes	
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Operating Case Temperature	Topr	0		70	°C / air flow 1m/sec	
Data Rate		1	4.25		Gb/s	
Power Supply Current	Icc		240	300	mA	

Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
<b>Optical</b>						
Optical Transmit Power	Po	1	---	5	dBm	1
Optical Modulation Amplitude @4.25Gb/s	OMA	1600			μW	
Output Center Wavelength	λ	λc-5.5	λc	λc+7.5	nm	2
Output Spectrum Width	Δλ	---		1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Rise / Fall Time	t <sub>r</sub> / t <sub>f</sub>			90	ps	20% to 80% Values
Relative Intensity Noise	RIN			-118	dB/Hz	
<b>Electrical</b>						
Data Input Current – Low	I <sub>IL</sub>	-350			μA	
Data Input Current – High	I <sub>IH</sub>			350	μA	
Differential Input Voltage	V <sub>IH</sub> - V <sub>IL</sub>	300			mV	
Data Input Voltage – Low	V <sub>IL</sub> - V <sub>CC</sub>	-2.0		-1.58	V	3
Data Input Voltage – High	V <sub>IH</sub> - V <sub>CC</sub>	-1.1		-0.74	V	3
Disable Input Voltage – Low	V <sub>TDIS,L</sub>	0		0.5	V	TX Output Enabled
Disable Input Voltage – High	V <sub>TDIS,H</sub>	V <sub>CC</sub> - 1.3		V <sub>CC</sub>	V	TX Output Disabled
Shut Off Time	t <sub>DIS</sub>			1	ms	

1. Output power is power coupled into a 9/125 μm single mode fiber.
2. ITU-T G.694.2 CWDM wavelength from 1270 nm to 1610 nm, each step 20nm.
3. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

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Receiver Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
<b>Optical</b>						
Sensitivity@4.25Gb/s	Sen1	---	---	2.6	μW	4
				-27	dBm	5
Maximum Input Power	Pin	0			dBm	
Signal Detect – Asserted	Pa	---	---	-27	dBm	Transition: low to high
Signal Detect – Deasserted	Pd	-40	---	---	dBm	Transition: high to low
Signal detect – Hysteresis		1.0	---		dB	
Wavelength of Operation		1260	---	1600	nm	
<b>Electrical</b>						
Data Output Voltage -- Low	$V_{OL} - V_{CC}$	-2.0		-1.58	V	6
Data Output Voltage – High	$V_{OH} - V_{CC}$	-1.1		-0.74		6
Signal Detect Output Voltage -- Low	$V_{OL}$			0.5	V	
Signal Detect Output Voltage -- High	$V_{OH}$	2.0			V	

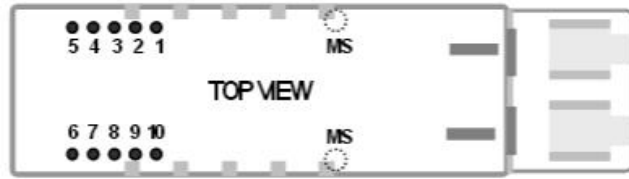
4. Measured at PRBS 2<sup>7</sup>-1 at BER=1E-12.

5. Represents sensitivity based on OMA spec., as corrected to incoming Extinction Ratio of 9 dB. For example, an OMA of 2.6 μW is approximately equal to an average power of -27.7 dBm, average with an Extinction ratio of 9 dB.

6. These outputs are compatible with 10K, 10KH ECL and PECL outputs.

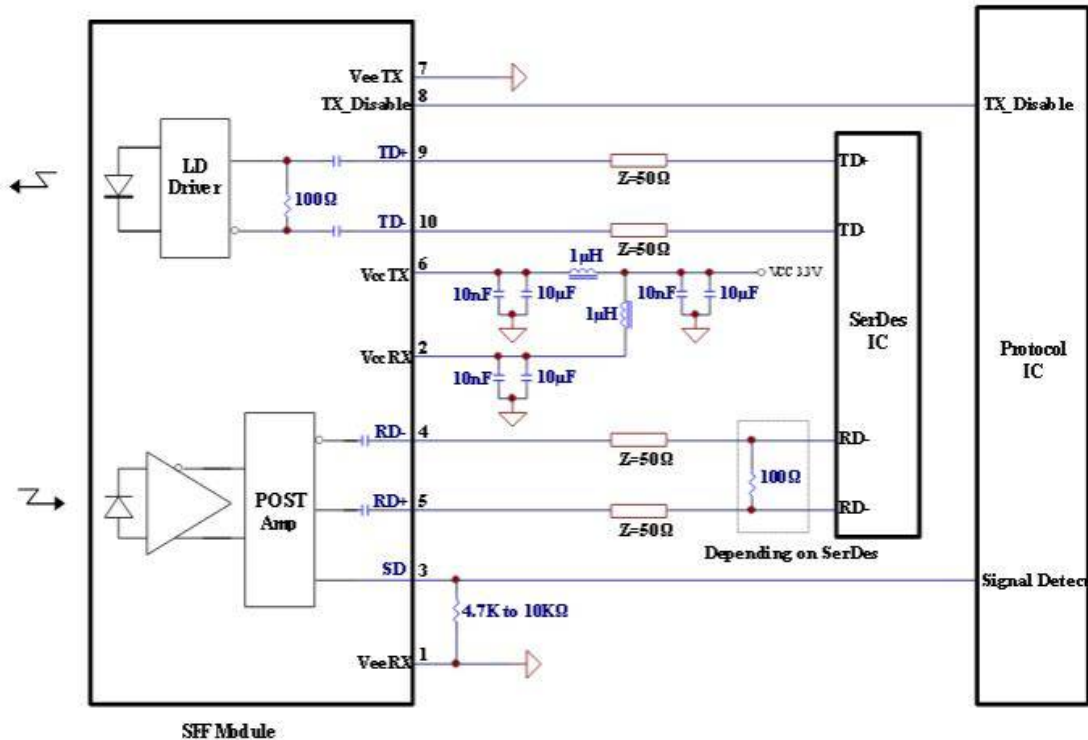
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CONNECTION DIAGRAM



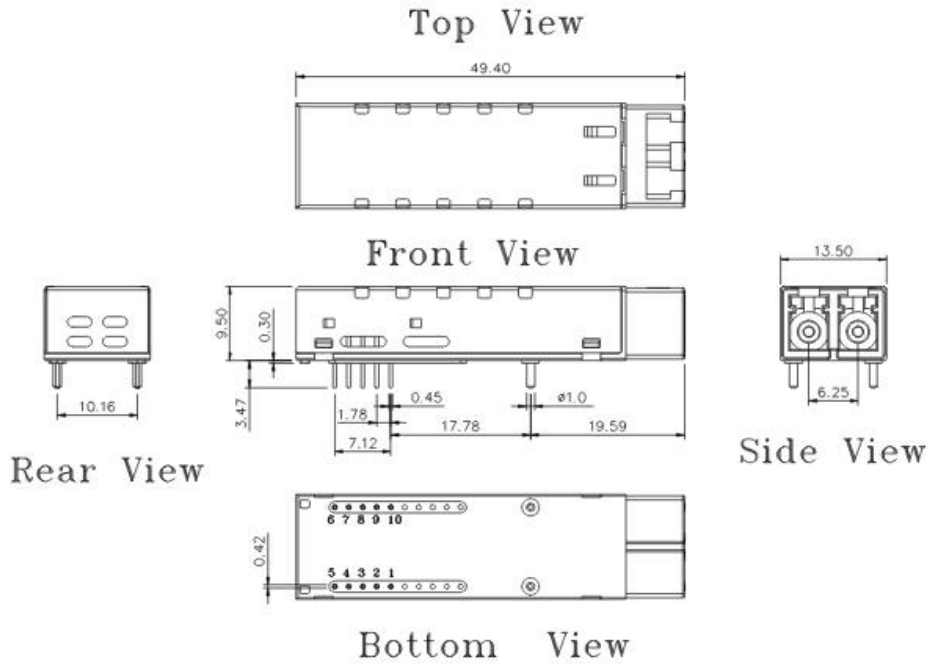
PIN	Symbol	Notes
1	V <sub>EE</sub> RX	Directly connect this pin to the receiver ground plane
2	V <sub>CC</sub> RX	+3.3V dc power for the receiver section
3	SD	Active high on this indicates a received optical signal.
4	RD-	Receiver Data out Bar. See recommended circuit schematic
5	RD+	Receiver Data out. See recommended circuit schematic
6	V <sub>CC</sub> TX	+3.3V dc power for the transmitter section
7	V <sub>EE</sub> TX	Directly connect this pin to the transmitter ground plane
8	TX_Disable	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



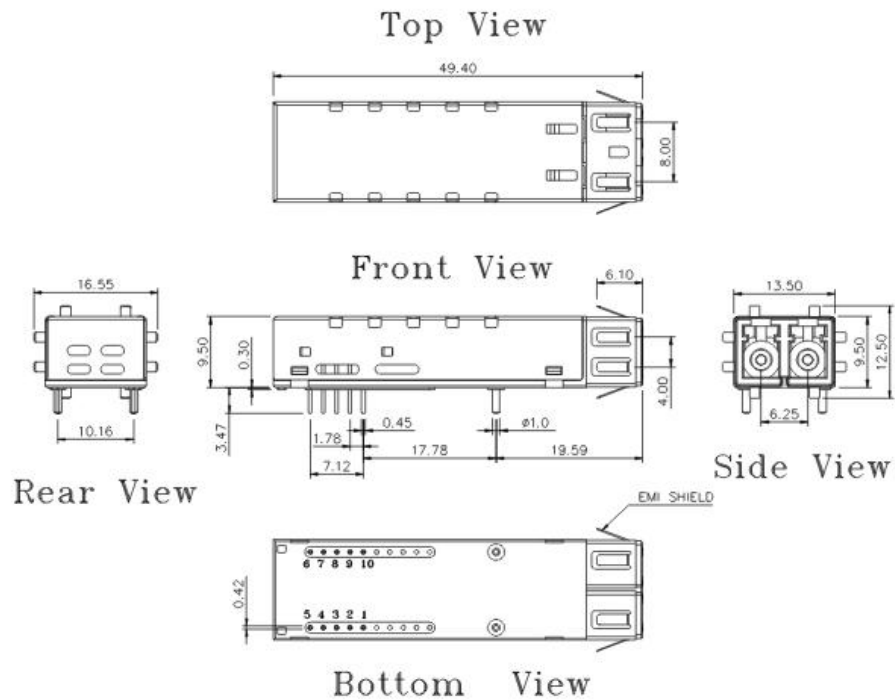
PACKAGE DIAGRAM (Units in mm)

A) Standard Case



TRSL-8380-CXX0G

B) Extended Case



TRSL-8380-CXX0EG

Note: Specifications subject to change without notice.

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**REVISION HISTORY**

Version	Subject	Release Date
1.0	Initial datasheet	2007/02/01