TRSL-9340W-CXX0G

3.3V / CWDM / 2.5 Gbps RoHS Compliant SFF LC 2X10 SINGLE-MODE TRANSCEIVER

FEATURES

- 18-wavelength CWDM Transceivers
- Duplex LC Single Mode Transceiver
- SONET OC-48 IR-2 / SDH STM-16 Compliant
- Compliant with Fiber Channel 2X/1X SM-LC-L FC-PI
- Compliant with IEEE 802.3z Gigabit Ethernet
- Multi-sourced 2X10 SFF Package Style
- CWDM DFB LD Transmitter
- 18 dB Link Power Budget At Least
- Analog Monitor Function
  -- Transmitter Laser Bias Current
  -- Transmitter Laser Optical Power Monitor
  -- Receiver Photo Detector Current
- AC/AC Coupled Signal Input / Output
- LVPECL Signal Input / Output
- LVTTL Signal Detection Output
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operation
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- ATM Switches and Routers
- SONET / SDH Switch Infrastructure
- XDSL Applications

DESCRIPTION

The TRSL-9340W-CXX0G series single mode transceivers is small form factor, low power, high performance module for bi-directional serial optical data communications such as SONET OC-48 IR-2 / SDH STM-16 (S-16.2), IEEE 802.3z Gigabit Ethernet and 1X/2X Fiber channel. There are eighteen center wavelengths available from 1270 nm to 1610 nm, each step 20 nm. A guaranteed minimum optical link budget of 18 dB is offered. The transmitter section uses a multiple quantum well 1550 nm 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 LVPECL 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 (Mb/s)	SONET/ SDH	Power Budget (dB)	Wavelength (nm)	Package	Temp. (°C)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
TRSL-9340W-CXX0G	2488		≥ 18	CWDM*	2X10 LC	0 to 70	3 to -2	-20	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 Temperature	Topr	-10	70	°C	With air flow 1m/sec
Soldering Temperature	---		260	°C	10 seconds on leads only
Power Supply Voltage	Vcc	-0.5	3.6	V	
Input Voltage	---	-0.5	Vcc	V	
Output Current	Iout	0	50	mA	

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units / Notes**
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Temperature	Topr	0		70	°C / air flow 1m/sec
Data Rate		622	2500		Mb/s

Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3. 47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Optical Transmit Power	Po	-2	---	3	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	8.2	---	---	dB	
Output Eye	Compliant with Bellcore GR-253-GORE and ITU-T Recommendation G.957					
Optical Rise Time	t_r			150	ps	20% to 80% Values
Optical Fall Time	t_f			150	ps	20% to 80% Values
Relative Intensity Noise	RIN			-120	dB/Hz	
Electrical						
Power Supply Current	Icc			180	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		1600	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
TX Disable Input Voltage – Low	T_{DIS}	0		0.5	V	
TX Disable Input Voltage – High	T_{DIS}	2.0		Vcc	V	
TX Disable Assert Time	T_{ASSERT}			10	μs	
TX Disable Deassert Time	$T_{DEASSERT}$			50	μs	

Notes: 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 20 nm.

3. Maximum current is specified at Vcc = Maximum @ maximum temperature.

4. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

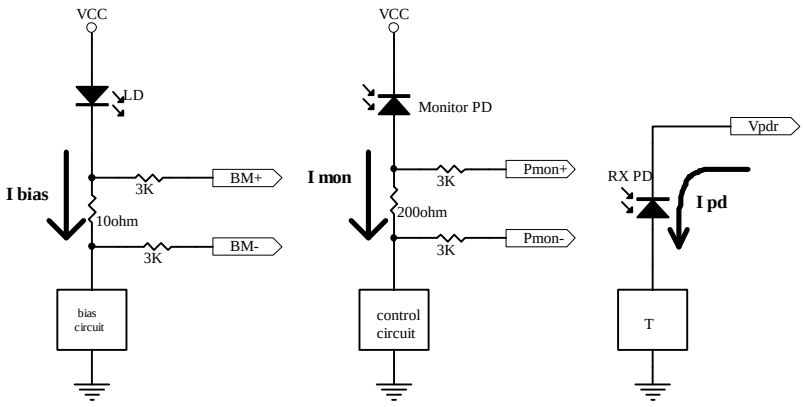
Receiver Specifications (0^oC < Topr < 70^oC, 3.13V < Vcc <3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Sensitivity @ 2.488 Gbps	Sen1	---		-20	dBm	1
Sensitivity @ 1.25 Gbps	Sen2			-22	dBm	2
Maximum Input Power	Pin	0		---	dBm	
Signal Detect -- Asserted	Pa	---	---	-20	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-35	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---	4.0	dB	
Wavelength of Operation		1100	---	1620	nm	
Electrical						
Power Supply Current	Icc		110	140	mA	
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_{SDL}	0		0.8	V	
Signal Detect Output Voltage -- High	V_{SDH}	2.0		Vcc+0.3	V	

Notes: 1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2^{23}-1 PRBS.
2. Minimum sensitivity and saturation levels at BER=1E-12 for a 2^7-1 PRBS.
3. These outputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

ANALOG DIAGNOSTICS FUNCTIONS

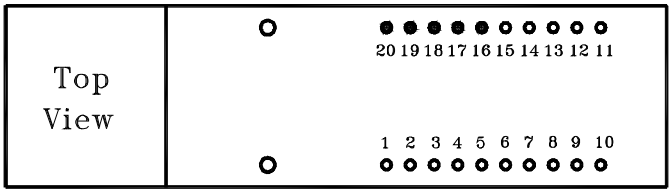
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Transmitter						
Laser Bias Current Monitor	Bmon+, Bmon-	0		Vcc	V	1
Monitor Photodiode Current Monitor	Pmon+,Pmon-	0		Vcc	V	2
Receiver						
Received Photocurrent	Rpd	0		1	mA	3
Photodiode Responsivity	R	0.5	0.9	1.0	A/W	
Applied Voltage at VpdR pin	Vpd	2.4		Vcc	V	3

Notes: 1. PIN 17 and 18 provide an analog voltage output proportional to the laser bias current, based on the following formula: Ibias = V (Bmon+ - Bmon-) / 10 Ω. See below the equivalent circuit.
2. PIN 19 and 20 provide an analog voltage output proportional to the monitor photodiode current, based on the following formula: Imon = V (Pmon+ - Pon-) / 200Ω. See below the equivalent circuit.
3. PIN 1 is used to monitor the received photocurrent. It must be connected to a positive voltage within the specified above. The received power is given by the photocurrent multiplied by the photodiode responsivity.



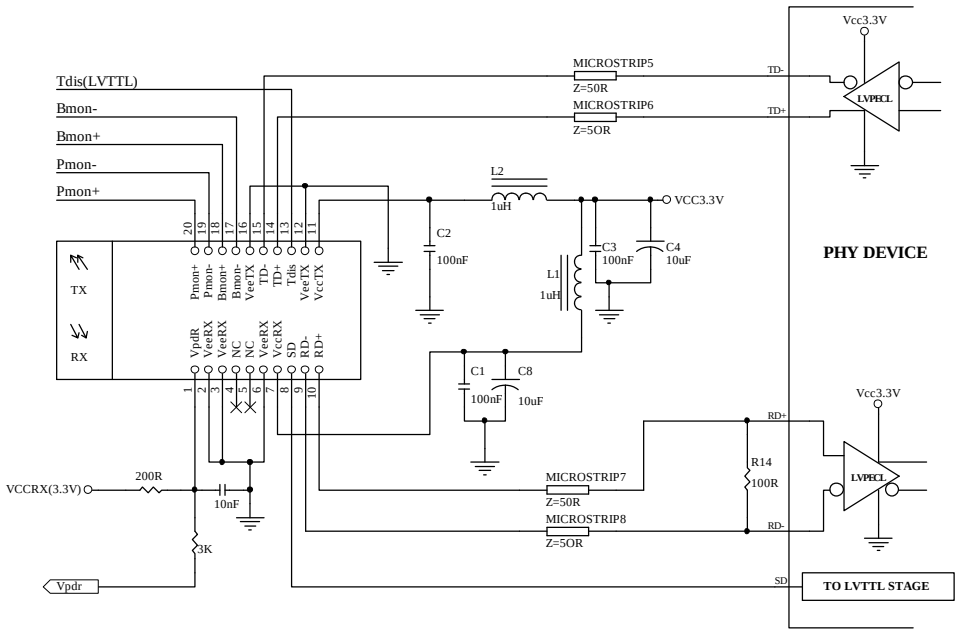
Analog Monitoring Function Connections

CONNECTION DIAGRAM



PIN	Symbol	Notes	PIN	Symbol	Notes
1	VpdR	Receiver power monitor. This pin must be connected to a positive power supply (Vcc), preferably via a small resistor. Supplier photocurrent and maybe used to monitor receiver power.	11	VccT	+3.3V dc transmitter power supply
2	VeeR	Receiver ground.	12	VeeT	Transmitter ground.
3	VeeR	Receiver ground.	13	T Dis	Transmitter Disable. Connect this pin to logic "1" to disable module. To enable module connect to logic low "0"
4	NC	No connected	14	TD +	Transmitter Data In
5	NC	No connected	15	TD –	Transmitter Data In Bar
6	VeeR	Receiver ground.	16	VeeT	Transmitter ground.
7	VccR	+3.3V dc receiver power supply	17	Bmon–	Laser Bias Monitoring – Negative End
8	SD	Signal detect. Logic 1 indicate a normal operation.	18	Bmon+	Laser Bias Monitoring – Positive End (Bmon+ - Bmon-) = 10 Ω X laser bias current
9	RD–	Receiver Dataout Bar	19	Pmon-	Laser Power Monitoring -- Negative end
10	RD+	Receiver Dataout	20	Pmon+	Laser Power Monitoring -- Positive end (Pmon+ - Pmon-) = 200 Ω X monitor photdiode current
MS	MS	Mounting Studs. Connect to Chassis Ground			

RECOMMENDED CIRCUIT SCHEMATIC

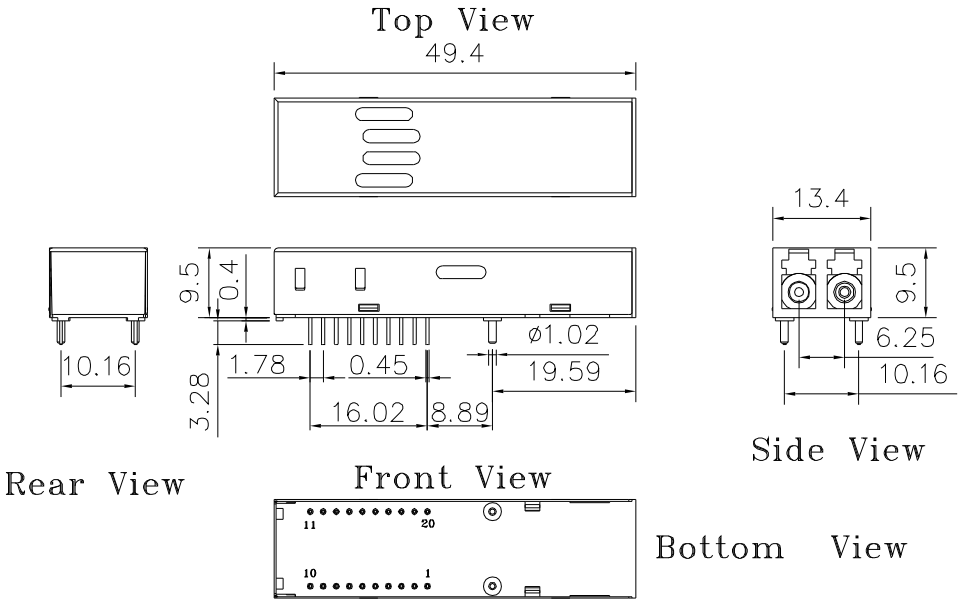


Note: 1. TX input is terminated inside the module.
2. Veer and Veet are not internally connected to each other.
3. 50 Ω line pattern and component placements on TD+/TD- and RD+/RD- lines shall be symmetrical for better impedance matching.

PACKAGE DIAGRAM

Units in mm

1) Standard Case



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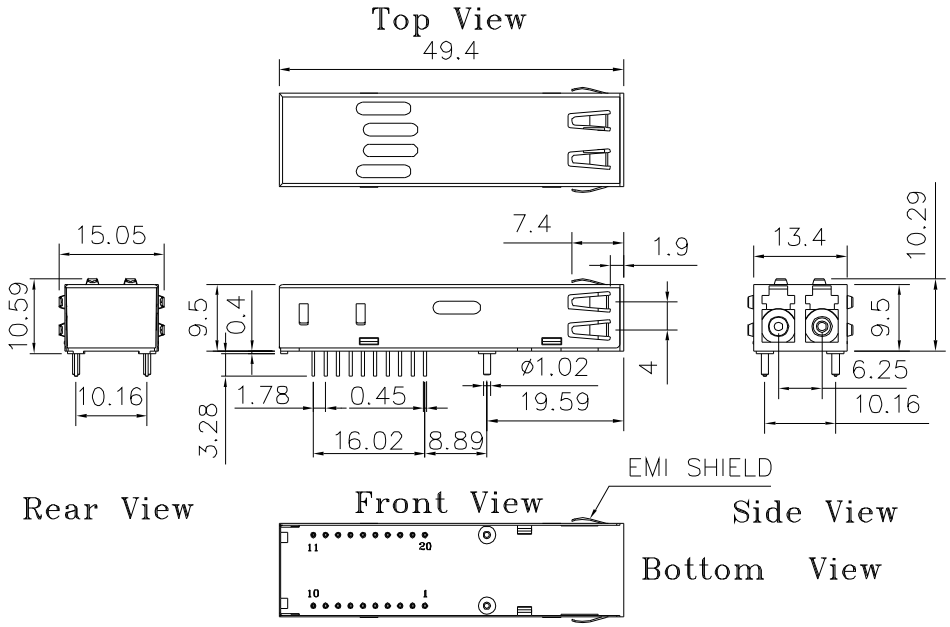
2) Extended Case



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Note: Specifications subject to change without notice.