TRML-3102G / TRML-3102AG

3.3V / 1310 nm / 155 Mbps RoHS Compliant SFF LC MULTI-MODE TRANSCEIVER

FEATURES

- Duplex LC Multi-Mode Transceiver
- Small Form Factor 2X5 pin Package
- 0 to 2000 m Transmission Distance
- LVPECL Signal Input / Output
- LVTTL Transmitter Disable Input
- LVPECL Signal Detect Output
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operating: TRML-3102G
- -40 to 85°C Operating : TRML-3102AG
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- ATM 155 Mbps Links
- SONET/SDH Equipment Interconnect
- Fast Ethernet 100 Mb/s Links

DESCRIPTION

The TRML-3102G series multi-mode transceivers is small form factor, low power, high performance module for bi-directional serial optical data communications such as FDDI, 100BASE-FX and SONET OC-3 / SDH STM-1. This module is designed for multi-mode fiber and operates at a nominal wavelength of 1310 nm. The transmitter section uses a multiple quantum well 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 multi-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)	100 BASE	Distance (m)	Wavelength (nm)	Package	Temp. (°C)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
TRML-3102G	125/155	FX	0 to 2000	1310	2X5 LC	0 to 70	-12 to -19	-30	Yes
TRML-3102AG	125/155	FX	0 to 2000	1310	2X5 LC	-40 to 85	-12 to -19	-30	Yes

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-40	85	°C	
Operating Temperature	Topr	0 -40	70 85	°C	TRML-3102G TRML-3102AG
Soldering Temperature	---		260	°C	10 seconds on leads only
Power Supply Voltage	Vcc	0	4.5	V	
Input Voltage	---	GND	Vcc	V	
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 Temperature	Topr	0 -40		70 85	°C / TRML-3102G °C / TRML-3102AG
Data Rate			125 / 155		Mb/s

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Transmitter Specifications (0^oC < Topr < 70^oC, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Optical Transmit Power	Po	-19	---	-12	dBm	1
Output Center Wavelength	λ	1260	1310	1360	nm	
Output Spectrum Width	Δλ	---	---	20	nm	RMS (σ)
Extinction Ratio	E_R	10	---	---	dB	
Output Eye	Compliant with Bellcore GR-253-CORE and ITU recommendation G.957					
Optical Rise Time	t_r			2	ns	10% to 90% Values
Optical Fall Time	t_f			2	ns	10% to 90% Values
Relative Intensity Noise	RIN			-116	dB/Hz	
Total Jitter	TJ			1	ns	2
Electrical						
Power Supply Current	Icc			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
Disable Input Voltage -- Low	$V_{TDIS,L}$	0		0.5	V	TX Output Enabled
Disable Input Voltage -- High	$V_{TDIS,H}$	Vcc – 1.3		Vcc	V	TX Ouput Disabled
Shut Off Time for TxDis	t_{DIS}			1	ms	

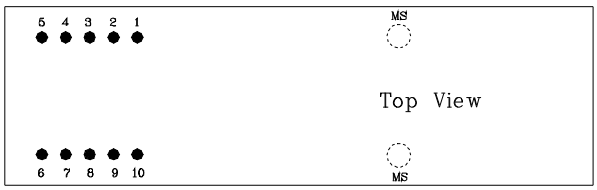
Notes: 1. Output power is power coupled into a 62.5/125 μm MM fiber.
2. Measured with a 2^{23}-1 PRBS with 72 ones and 72 zeros.
3. Maximum current is specified at Vcc = Maximum @ maximum temperature.
4. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

Receiver Specifications (0^oC < Topr < 70^oC, 3.13V < Vcc <3. 47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Sensitivity	---	---	---	-30	dBm	1
Maximum Input Power	Pin	-8		---	dBm	
Signal Detect -- Asserted	Pa	---	---	-30	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-47	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		1100	---	1600	nm	
Electrical						
Power Supply Current	Icc			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	3
Signal Detect Output Voltage -- High	V_{OH} - V_{CC}	-1.1		-0.74	V	3

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

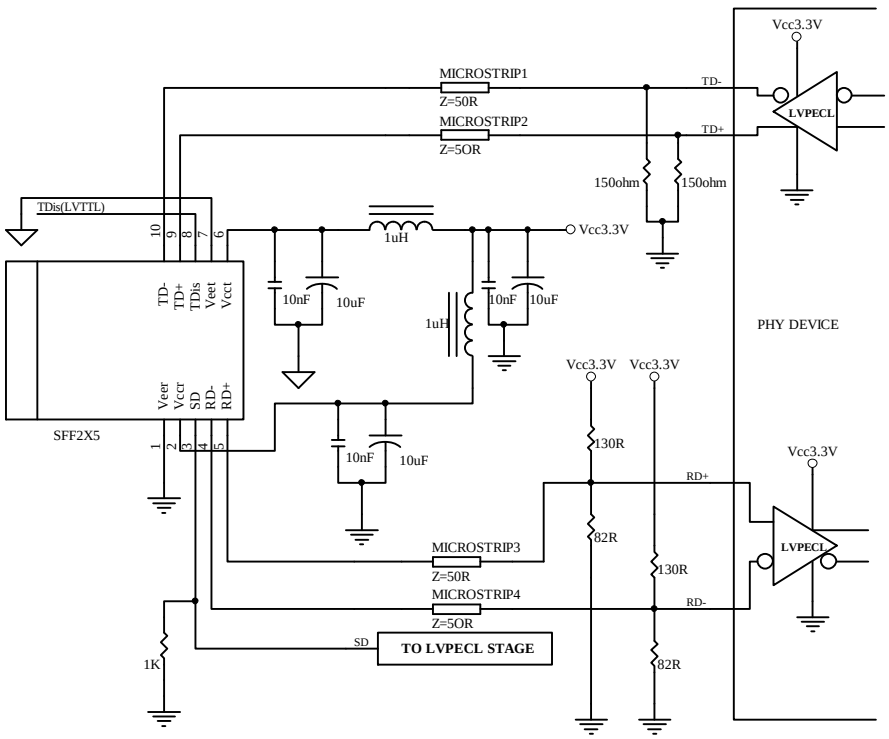
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CONNECTION DIAGRAM



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 Dataout Bar. See recommended circuit schematic
5	RD+	Receiver Dataout. 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

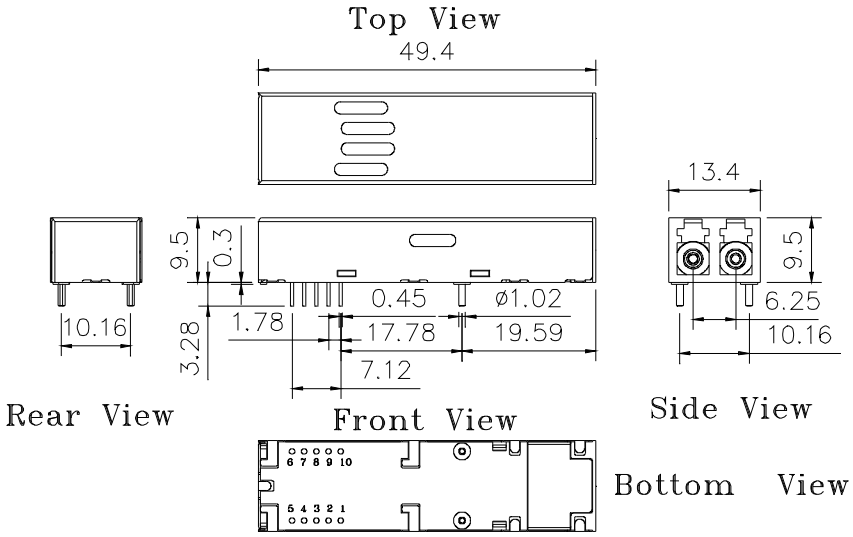
RECOMMENDED CIRCUIT SCHEMATIC



Note: 1. 1000 Ω SD Output pull-down resistor required for TRML-3102G/ TRML-3102AG (LVPECL 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.

PACKAGE DIAGRAM

Units in mm



TRML-3102G / TRML-3102AG

Note: Specifications subject to change without notice.