

TR1-S1-2203N-C1

Description

The series is high performance module for single fiber communications by using 1310 nm transmitter. The transceiver is provided with the SC receptacle that is compatible with the industry standard SC connector. Also, it is a class 1 eye safety product according to International Safety Standard IEC-825. A LVPECL logic interface simplifies interface to external circuitry. Operating temperature is from -40°C to 85°C.



Features

- Dual Fiber Transceiver
- Distance Up to 20km
- Industry Standard 1 x 9 Footprint
- Single +3.3 V Power Supply
- Duplex SC Connector
- LVPECL Differential Inputs and Outputs
- LVPECL Signal of Detector Output
- DC/ DC Inputs and Outputs
- Operating Temperature : -40°C ~ 85°C

Applications

- SONET/SDH Equipment Interconnect
- Fast Ethernet
- 802.3ah compliance.

Laser Safety

This single mode transceiver is a Class 1 laser product. It complies with IEC 825 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.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Units	Notes
Storage Temperature	Tstg	-40		85	°C	
Soldering Temperature	T _s	-		250	°C	10 seconds on leads only
Input Voltage	-	GND		Vcc	V	
Output Current	Iout	0	170	-	mA	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Power Supply Voltage	Vcc	3.1	3.3	3.5	V
Operating Temperature	Topr	-40	-	85	°C
Data Rate	-	-	155		Mb/s

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Ordering Information

T	R	1	-	S	1	-	2	2	0	3	N	-	C	1	
a	b	X	c	d	e	f	g	h							
Function parameter								P: may be Blank, or 000~999→ Pigtail length (unit : cm) C: or 0~9 → Case Color (0: Black, 1: Blue) S: or B/F→ Shield (B: Backward, F: Forward, X:Non) or 1~4 → Composite Specifications (1: Case Color Blue + Shield Forward, W: 2: Case Color Blue + Shield Backward, 3: Case Color Blue + High Power, 4: Case Color Black + High Power)							
Function distinction								may be Blank, or P (P→ Pigtail), or C (Case Color), or S (S→ Shield), or W (W→ Composite Specifications), or F (F→POF)							
Potential energy & temperature								I→AC/AC PECL 0°C~70°C J→AC/AC PECL -40°C~85°C K→AC/AC TTL 0°C~70°C L→AC/AC TTL -40°C~85°C M→DC/DC PECL 0°C~70°C N→DC/DC PECL -40°C~85°C			O→DC/DC TTL 0°C~70°C P→DC/DC TTL -40°C~85°C Q→AC/AC TTL -10°C~85°C R→DC/DC PECL -10°C~85°C S→AC/AC PECL -10°C~85°C				
Operating voltage								3→3.3V			5→5V				
Distance								D1~D9 : D1→100M, D2→200M		01~99 : 01→1km, 10→10km		00→100km			
Optical connector								1→FC		2→SC		3→ST		4→LC	
Wavelength								M3→Multi-mode 850 nm M4→Multi-mode 1310 nm 00~99 (CWDM Wavelength) : 47 → 1470 nm , 51 → 1610 nm		S1→Single-mode 1310 nm S2→Single-mode 1550 nm		S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm			
Bit rate								1→155Mbps 2→622Mbps		3→1.0625Gbps 4→1.25 Gbps		5→2.125 Gbps 6→2.5 Gbps		7→2.7 Gbps 8→3.125 Gbps	
Electric connector								TR→Dual Fiber 1×9 Transceiver TB→Single Fiber 1×9 Transceiver FT→Dual Fiber SFP Transceiver FB→Single Fiber SFP Transceiver		PT→Dual Fiber SFP Transceiver PB→Single Fiber SFP Transceiver PM→Dual Fiber SFP Transceiver (DDM) UB→Dual Bi-Direction SFP Transceiver		EUFB→ EPON ONU SFF 2×5 BIDI Transceiver ETFB→ EPON OLT SFF 2×5 BIDI Transceiver GUFB→ GPON ONU SFF 2×5 BIDI Transceiver GTFB→ GPON OLT SFF 2×5 BIDI Transceiver			

* Please contact us for the released types.



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Transmitter Optical Specifications ($-40^{\circ}\text{C} < T_{opr} < 85^{\circ}\text{C}$, $3.15\text{V} < V_{cc} < 3.45\text{V}$)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical						
Output Optical Power	P _{out}	-15	-	-5	dBm	1
Extinction Ratio	ER	8.2	-	-	dB	
Output Eye	Complies with ITU recommendation G.957					
Center Wavelength	λ_c	1260	1310	1360	nm	
Spectral Width(FWHM)	$\Delta\lambda$	-	-	3	nm	RMS(σ)
Rise/Fall Time	T _r /T _f	-	-	0.26	ns	2
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	
Total jitter	T _j	---	---	1.2	ns	3
Deterministic Jitter	T _{DDJ}	---	---	0.6	ns	-
Random Jitter	T _{RJ}	---	---	0.69	ns	-
Electrical						
Power Supply Current	I _{cc}	---	---	160	mA	4
Differential Input Voltage	V _{IH} -V _{IL}	300	---	---	mV	5
Data Input Voltage-Low	V _{IL} - V _{cc}	-2.0	-	-1.58	V	
Data Input Voltage-High	V _{IH} - V _{cc}	-1.1	-	-0.74	V	

Notes:

1. Output power is coupled into a 9/125 μm single-mode fiber.
2. 10% to 90% Values. Maximum t_r, t_f times tested against eye mask.
3. Measured with a 2²³ -1 PRBS with 72 ones and 72 zeros.
4. Maximum current is specified at V_{cc} = Maximum @ maximum temperature.
5. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.



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Receiver Optical Specifications (-40 °C < Topr < 85 °C, 3.15 V < Vcc < 3.45 V)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Sensitivity	P _{IN}	-	-34	-32	dBm	1
Maximum Input Power	P _{IN}	-3	-	-	dBm	
Center Wavelength	λ _C	1270	1310	1360	nm	
Signal Detect-Asserted	P _A	-	-	-32	dBm	Average
Signal Detect-Deasserted	P _D	-45	-	-	dBm	Average
Signal Detect-Hysteresis	P _A -P _D	-	3.0	-	dB	
Optical Return Loss	ORL	14	-	-	dB	
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	
Signal Detect Voltage-Low	V _{OL} -V _{CC}	-2.0	-	-1.58	V	
Signal Detect Voltage-High	V _{OH} -V _{CC}	-1.1	-	-0.74	V	

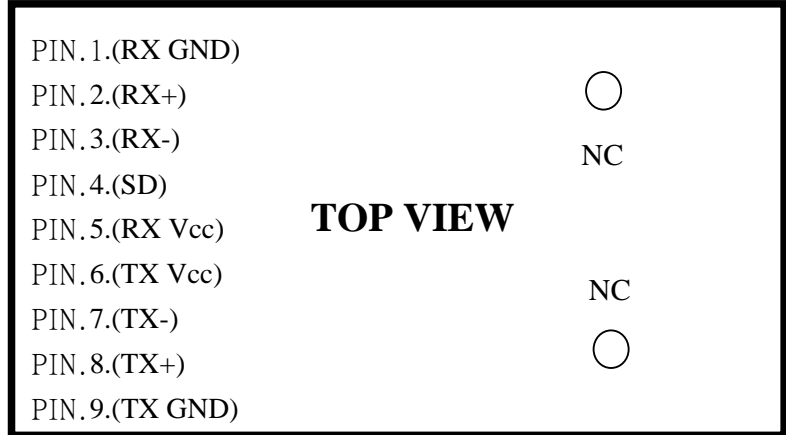
Notes:

1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2⁷ -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 LVECL and LVPECL outputs.

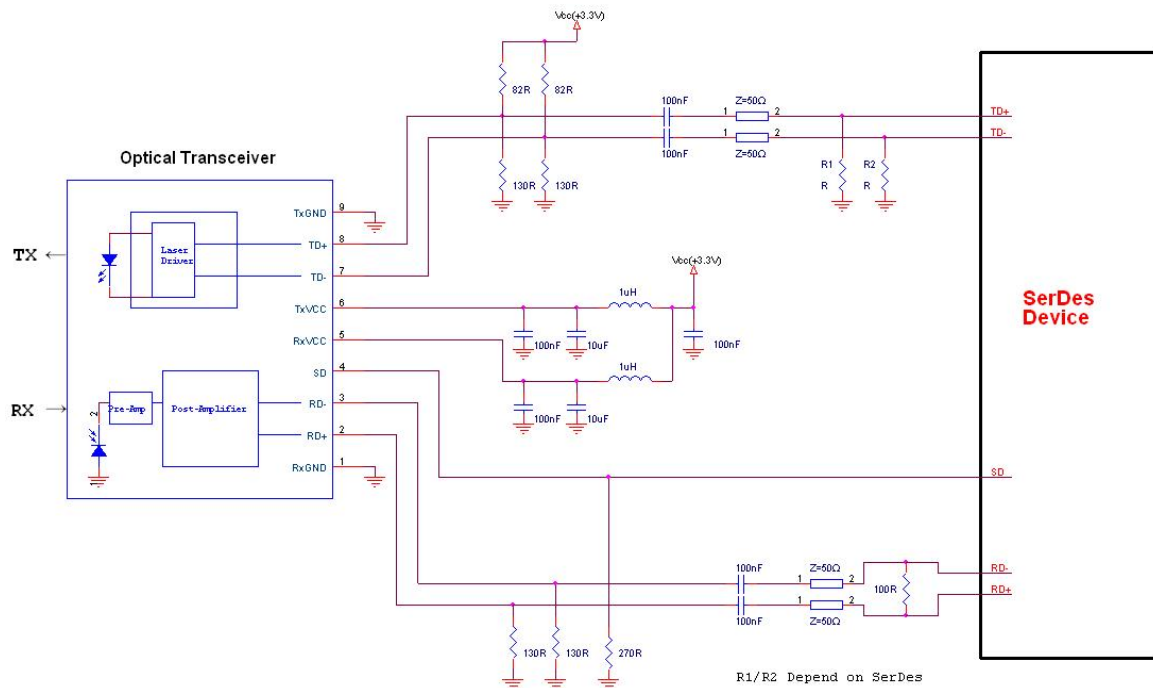
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Connection Diagram

- Receiver Signal Ground
- Receiver Data Out
- Receiver Data Out Bar
- Signal Detect
- Receiver Power Supply
- Transmitter Power Supply
- Transmitter Data In Bar
- Transmitter Data In
- Transmitter Signal Ground

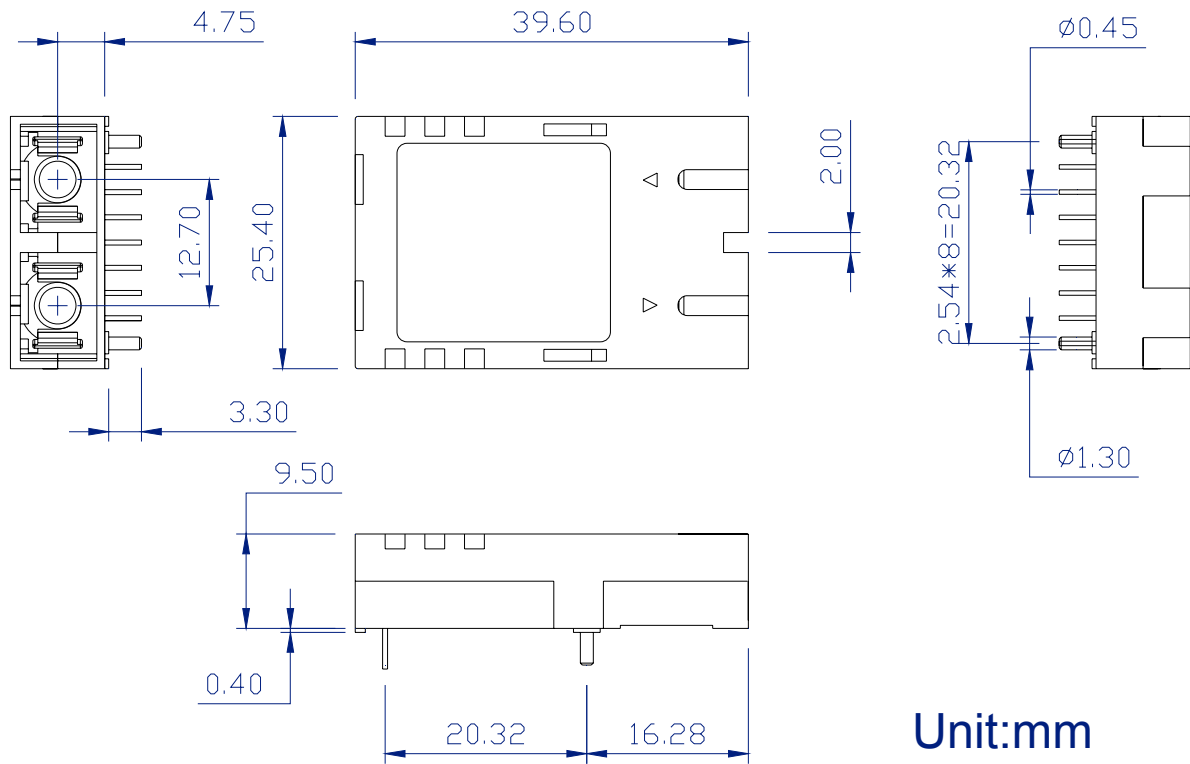


Recommended Application Circuit



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Dimensions (mm)



Unit:mm