

TB1-S4-2203N-C1

Description

The series is high performance module for single fiber communications by using 1310 nm transmitter and 1550 nm receiver. The transmitter section uses a multiple quantum well laser. Which is a class 1 laser compliant according to International Safety Standard IEC-825. The receiver section uses an integrated 1550 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. A LVPECL logic interface simplifies interface to external circuitry. Operating temperature is from -40°C to 85°C.



Features:

- RoHS Compliant
- Single Fiber Bi-Directional Transceiver
- 1550 nm Transmitter
- 1310 nm Receiver
- Distance Up to 20km
- Industry Standard 1 x 9 Footprint
- Single +3.3 V Power Supply
- Simplex SC Connector
- LVPECL Differential Inputs and Outputs
- LVPECL Signal Detection Output
- Wave Solder able and Aqueous Washable
- Class 1 Laser international Safety Standard IEC 825 Compliant
- Optical Isolation > 30 dB
- Cross Talk < -40 dB
- DC/DC Inputs and Outputs
- Operating Temperature : -40°C ~ 85°C
- Case Color: Blue

Applications

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

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	Max	Units	Notes
Storage Temperature	Tstg	-40	85	°C	
Soldering Temperature	T _s	-	250	°C	10 seconds on leads only
Power Supply Voltage	Vcc	0	4.5	V	
Input Voltage	-	GND	Vcc	V	
Output Current	Iout	0	300	mA	



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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	170	Mb/s

Ordering Information

T B 1 - S 4 - 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)												
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Potential energy & temperature	<table border="1"> <tr> <td>I→AC/AC PECL 0°C~70°C</td> <td>O→DC/DC TTL 0°C~70°C</td> </tr> <tr> <td>J→AC/AC PECL -40°C~85°C</td> <td>P→DC/DC TTL -40°C~85°C</td> </tr> <tr> <td>K→AC/AC TTL 0°C~70°C</td> <td>Q→AC/AC TTL -10°C~85°C</td> </tr> <tr> <td>L→AC/AC TTL -40°C~85°C</td> <td>R→DC/DC PECL -10°C~85°C</td> </tr> <tr> <td>M→DC/DC PECL 0°C~70°C</td> <td>S→AC/AC PECL -10°C~85°C</td> </tr> <tr> <td>N→DC/DC PECL -40°C~85°C</td> <td></td> </tr> </table>	I→AC/AC PECL 0°C~70°C	O→DC/DC TTL 0°C~70°C	J→AC/AC PECL -40°C~85°C	P→DC/DC TTL -40°C~85°C	K→AC/AC TTL 0°C~70°C	Q→AC/AC TTL -10°C~85°C	L→AC/AC TTL -40°C~85°C	R→DC/DC PECL -10°C~85°C	M→DC/DC PECL 0°C~70°C	S→AC/AC PECL -10°C~85°C	N→DC/DC PECL -40°C~85°C	
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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	<table border="1"> <tr> <td>M3→Multi-mode 850 nm</td> <td>S1→Single-mode 1310 nm</td> <td>S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm</td> </tr> <tr> <td>M4→Multi-mode 1310 nm</td> <td>S2→Single-mode 1550 nm</td> <td>S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm</td> </tr> <tr> <td colspan="2">00~99 (CWDM Wavelength) :</td> <td>S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm</td> </tr> <tr> <td colspan="2">47 → 1470 nm , 61 → 1610 nm</td> <td>S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm</td> </tr> </table>	M3→Multi-mode 850 nm	S1→Single-mode 1310 nm	S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm	M4→Multi-mode 1310 nm	S2→Single-mode 1550 nm	S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm	00~99 (CWDM Wavelength) :		S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm	47 → 1470 nm , 61 → 1610 nm		S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm
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* Please contact with 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	
Extinction Ratio	ER			10	%	
Output Eye	Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957					
Center Wavelength	λ_c	1500	1550	1600	nm	
Spectral Width(FWHM)	$\Delta\lambda$	-	-	5	nm	RMS(σ)
Rise/Fall Time	T _r ,T _f	0.6	-	2.0	ns	2
Relative Intensity Noise	RIN	-	-	-117	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	-	-0.47	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 LVECL and LVPECL inputs.



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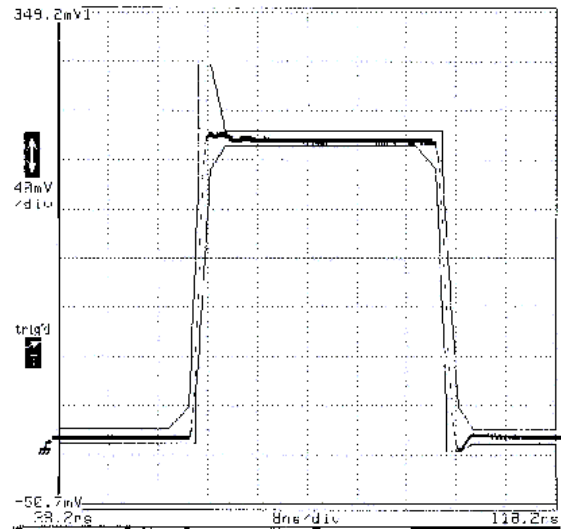
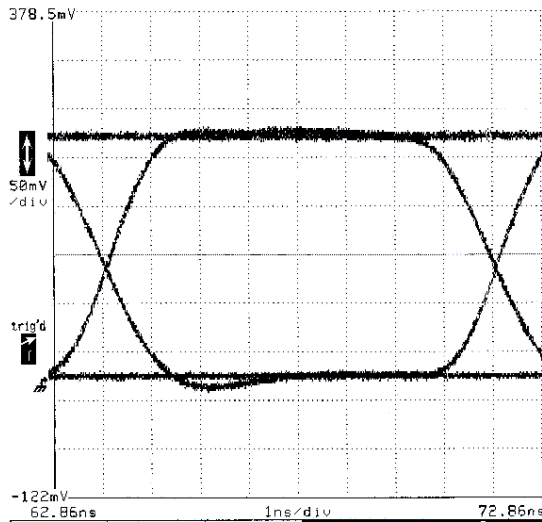
Receiver optical Specifications (-40 °C < Topr < 85 °C, 3.15 V < Vcc < 3.45 V)

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	1260	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	
Optical Isolation	-	30	-	-	dB	2
Electrical						
Power Supply Current	I _{CC}	-	-	100	mA	3
Data Output Voltage-Low	V _{OL} - V _{CC}	-2.0	-	-1.58	V	4
Data Output Voltage-High	V _{OH} - V _{CC}	-1.1	-	-0.47	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:

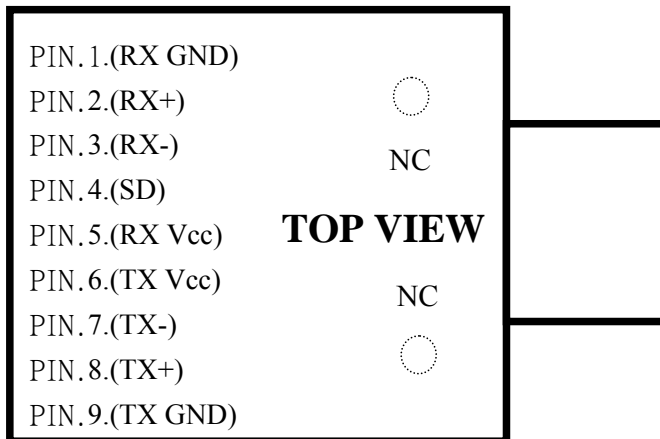
1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2²³ -1 PRBS with 72 ones and 72 zeros.
2. At least 30 dB optical isolation for the wavelength 1260 to 1360 nm.
3. The current excludes the output load current.
4. These outputs are compatible with 10K, 10KH and 100K LVECL and LVPECL outputs.

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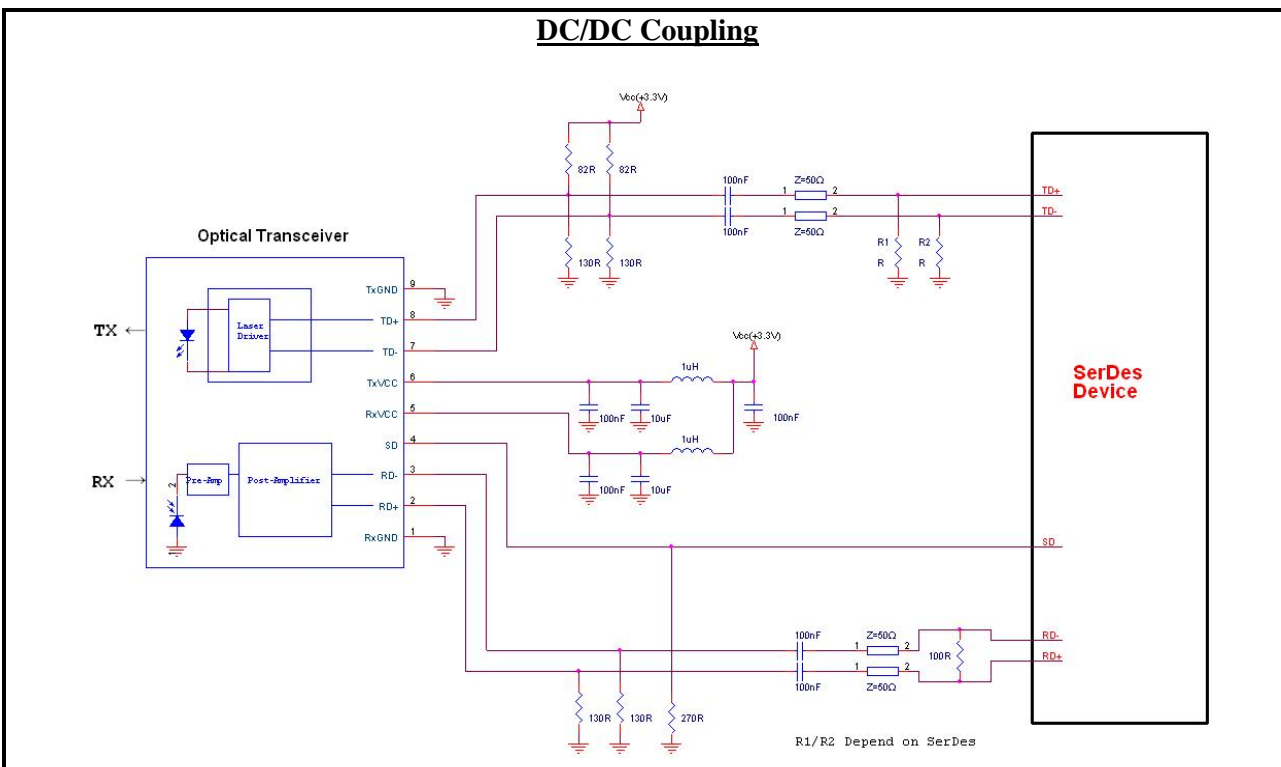
CONNECTION DIAGRAM

- 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



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Recommended Application Circuit



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Dimensions in mm

