

TB4-S3-2203N-W2

Description

The series is high performance module for single fiber communications by using 1310 nm transmitter and 1550 nm receiver. 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 Operating temperature is from -40°C to 85°C.



Features

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

Applications

- WDM 1.25 Gb/s Links
- SONET/SDH Equipment Interconnect
- Fast Ethernet / Gigabit Ethernet Links
- 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		V _{cc}	V	
Output Current	I _{out}	0	170	-	mA	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Power Supply Voltage	V _{cc}	3.1	3.3	3.5	V
Operating Temperature	T _{opr}	-40	-	85	°C
Data Rate	-	-	1250	-	Mb/s



RoHS Compliant

www.palconnusa.com

TB4-S3-2203N-W2

Ordering Information

T	B	4	-	S	3	-	2	2	0	3	N	-	W	2																																																																																											
a	b			X			c	d	e	f			g	h																																																																																											
<table border="1"> <tr> <td rowspan="4">Function parameter</td> <td>P:</td> <td>may be Blank, or 000~999 → Pigtail length (unit : cm)</td> </tr> <tr> <td>C:</td> <td>or 0-9 → Case Color (0: Black, 1: Blue)</td> </tr> <tr> <td>S:</td> <td>or B/F → Shield (B: Backward , F: Forward ,X:Non)</td> </tr> <tr> <td>1-4</td> <td>→ Composite Specifications</td> </tr> <tr> <td colspan="2">1:</td> <td>Case Color Blue + Shield Forward</td> </tr> <tr> <td colspan="2">W: 2:</td> <td>Case Color Blue + Shield Backward ,Lead pin X 6 (TB:Half Shield ,Lead pin X 6)</td> </tr> <tr> <td colspan="2">3:</td> <td>Case Color Blue + Full Shield Backward,Lead pin X 4</td> </tr> <tr> <td colspan="2">4:</td> <td>Case Color Black + Full Shield Backward,Lead pin X 6</td> </tr> </table>															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)	1-4	→ Composite Specifications	1:		Case Color Blue + Shield Forward	W: 2:		Case Color Blue + Shield Backward ,Lead pin X 6 (TB:Half Shield ,Lead pin X 6)	3:		Case Color Blue + Full Shield Backward,Lead pin X 4	4:		Case Color Black + Full Shield Backward,Lead pin X 6																																																																						
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)																																																																																																							
	1-4	→ Composite Specifications																																																																																																							
1:		Case Color Blue + Shield Forward																																																																																																							
W: 2:		Case Color Blue + Shield Backward ,Lead pin X 6 (TB:Half Shield ,Lead pin X 6)																																																																																																							
3:		Case Color Blue + Full Shield Backward,Lead pin X 4																																																																																																							
4:		Case Color Black + Full Shield Backward,Lead pin X 6																																																																																																							
<table border="1"> <tr> <td>Function distinction</td> <td colspan="14">may be Blank, or P (P → Pigtail), or C(Case Color), or S (S → Shield) , or R(R → Single receiver) or W (W → Composite Specifications) , or F(F → POF), or I(I → DDMI)</td> </tr> </table>															Function distinction	may be Blank, or P (P → Pigtail), or C(Case Color), or S (S → Shield) , or R(R → Single receiver) or W (W → Composite Specifications) , or F(F → POF), or I(I → DDMI)																																																																																									
Function distinction	may be Blank, or P (P → Pigtail), or C(Case Color), or S (S → Shield) , or R(R → Single receiver) or W (W → Composite Specifications) , or F(F → POF), or I(I → DDMI)																																																																																																								
<table border="1"> <tr> <td rowspan="6">Potential energy & temperature</td> <td>I → AC/AC PECL</td> <td>0°C ~ 70°C</td> <td>RoHS</td> <td>W → DC/AC TTL</td> <td>0°C ~ 70°C</td> <td>RoHS</td> </tr> <tr> <td>J → AC/AC PECL</td> <td>-40°C ~ 85°C</td> <td>RoHS</td> <td>N → DC/DC PECL</td> <td>-40°C ~ 85°C</td> <td>RoHS</td> </tr> <tr> <td>K → AC/AC TTL</td> <td>0°C ~ 70°C</td> <td>RoHS</td> <td>O → DC/DC TTL</td> <td>0°C ~ 70°C</td> <td>RoHS</td> </tr> <tr> <td>L → AC/AC TTL</td> <td>-40°C ~ 85°C</td> <td>RoHS</td> <td>P → DC/DC TTL</td> <td>-40°C ~ 85°C</td> <td>RoHS</td> </tr> <tr> <td>M → DC/DC PECL</td> <td>0°C ~ 70°C</td> <td>RoHS</td> <td>R → DC/DC PECL</td> <td>-10°C ~ 85°C</td> <td>RoHS</td> </tr> <tr> <td>Q → AC/AC TTL</td> <td>-10°C ~ 85°C</td> <td>RoHS</td> <td>X → DC/AC TTL</td> <td>-40°C ~ 85°C</td> <td>RoHS</td> </tr> </table>															Potential energy & temperature	I → AC/AC PECL	0°C ~ 70°C	RoHS	W → DC/AC TTL	0°C ~ 70°C	RoHS	J → AC/AC PECL	-40°C ~ 85°C	RoHS	N → DC/DC PECL	-40°C ~ 85°C	RoHS	K → AC/AC TTL	0°C ~ 70°C	RoHS	O → DC/DC TTL	0°C ~ 70°C	RoHS	L → AC/AC TTL	-40°C ~ 85°C	RoHS	P → DC/DC TTL	-40°C ~ 85°C	RoHS	M → DC/DC PECL	0°C ~ 70°C	RoHS	R → DC/DC PECL	-10°C ~ 85°C	RoHS	Q → AC/AC TTL	-10°C ~ 85°C	RoHS	X → DC/AC TTL	-40°C ~ 85°C	RoHS																																																						
Potential energy & temperature	I → AC/AC PECL	0°C ~ 70°C	RoHS	W → DC/AC TTL	0°C ~ 70°C	RoHS																																																																																																			
	J → AC/AC PECL	-40°C ~ 85°C	RoHS	N → DC/DC PECL	-40°C ~ 85°C	RoHS																																																																																																			
	K → AC/AC TTL	0°C ~ 70°C	RoHS	O → DC/DC TTL	0°C ~ 70°C	RoHS																																																																																																			
	L → AC/AC TTL	-40°C ~ 85°C	RoHS	P → DC/DC TTL	-40°C ~ 85°C	RoHS																																																																																																			
	M → DC/DC PECL	0°C ~ 70°C	RoHS	R → DC/DC PECL	-10°C ~ 85°C	RoHS																																																																																																			
	Q → AC/AC TTL	-10°C ~ 85°C	RoHS	X → DC/AC TTL	-40°C ~ 85°C	RoHS																																																																																																			
<table border="1"> <tr> <td>Operating voltage</td> <td colspan="7">3 → 3.3V</td> <td colspan="7">5 → 5V</td> </tr> </table>															Operating voltage	3 → 3.3V							5 → 5V																																																																																		
Operating voltage	3 → 3.3V							5 → 5V																																																																																																	
<table border="1"> <tr> <td>Distance</td> <td colspan="4">D1 ~ D9 : D1 → 100M, D2 → 200M</td> <td colspan="4">01 ~ 99 : 01 → 1km, 10 → 10km</td> <td colspan="7">00 → 100km</td> </tr> </table>															Distance	D1 ~ D9 : D1 → 100M, D2 → 200M				01 ~ 99 : 01 → 1km, 10 → 10km				00 → 100km																																																																																	
Distance	D1 ~ D9 : D1 → 100M, D2 → 200M				01 ~ 99 : 01 → 1km, 10 → 10km				00 → 100km																																																																																																
<table border="1"> <tr> <td>Optical connector</td> <td colspan="4">1 → FC</td> <td colspan="4">2 → SC</td> <td colspan="4">3 → ST</td> <td colspan="3">4 → LC</td> </tr> </table>															Optical connector	1 → FC				2 → SC				3 → ST				4 → LC																																																																													
Optical connector	1 → FC				2 → SC				3 → ST				4 → LC																																																																																												
<table border="1"> <tr> <td rowspan="4">Wavelength</td> <td colspan="4">M3 → Multi-mode 850 nm</td> <td colspan="4">S1 → Single-mode 1310 nm</td> <td colspan="7">S3 → For Bi-direction : Single-mode Tx1310 / Rx1550 nm</td> </tr> <tr> <td colspan="4">M4 → Multi-mode 1310 nm</td> <td colspan="4">S2 → Single-mode 1550 nm</td> <td colspan="7">S4 → For Bi-direction : Single-mode Tx1550 / Rx1310 nm</td> </tr> <tr> <td colspan="14">00 ~ 99 (CWDM Wavelength)</td> <td colspan="1">S5 → For Bi-direction : Single-mode Tx1310 / Rx1490 nm</td> </tr> <tr> <td colspan="14"></td> <td colspan="1">S6 → For Bi-direction : Single-mode Tx1490 / Rx1310 nm</td> </tr> </table>															Wavelength	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															S6 → For Bi-direction : Single-mode Tx1490 / Rx1310 nm																														
Wavelength	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																																																																																									
															S6 → For Bi-direction : Single-mode Tx1490 / Rx1310 nm																																																																																										
<table border="1"> <tr> <td rowspan="2">Bit rate</td> <td colspan="3">1 → 155Mbps</td> <td colspan="3">3 → 1.0625Gbps</td> <td colspan="3">5 → 2.125Gbps</td> <td colspan="3">7 → 2.7Gbps</td> <td colspan="3">9 → 4.25Gbps</td> </tr> <tr> <td colspan="3">2 → 622Mbps</td> <td colspan="3">4 → 1.25Gbps</td> <td colspan="3">6 → 2.5Gbps</td> <td colspan="3">8 → 3.125Gbps</td> <td colspan="3">0 → 10Gbps</td> </tr> </table>															Bit rate	1 → 155Mbps			3 → 1.0625Gbps			5 → 2.125Gbps			7 → 2.7Gbps			9 → 4.25Gbps			2 → 622Mbps			4 → 1.25Gbps			6 → 2.5Gbps			8 → 3.125Gbps			0 → 10Gbps																																																														
Bit rate	1 → 155Mbps			3 → 1.0625Gbps			5 → 2.125Gbps			7 → 2.7Gbps			9 → 4.25Gbps																																																																																												
	2 → 622Mbps			4 → 1.25Gbps			6 → 2.5Gbps			8 → 3.125Gbps			0 → 10Gbps																																																																																												
<table border="1"> <tr> <td rowspan="6">Electric connector</td> <td colspan="5">TR → Dual Fiber 1×9 Transceiver</td> <td colspan="5">FB → Single Fiber SFF Transceiver</td> <td colspan="5">EUFB → EPON ONU SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td colspan="5">TB → Single Fiber 1×9 Transceiver</td> <td colspan="5">PT → Dual Fiber SFP Transceiver</td> <td colspan="5">ETFB → EPON OLT SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td colspan="5">FT → Dual Fiber SFF Transceiver</td> <td colspan="5">PB → Single Fiber SFP Transceiver</td> <td colspan="5">GUFB → GPON ONU SFF 2×5 BIDI Transceiver</td> </tr> <tr> <td colspan="15">UB → Dual Bi-Direction SFP Transceiver (OM PIN Assignemnt)</td> </tr> <tr> <td colspan="15">UM → Dual Bi-Direction SFP Transceiver(CSFP MSA)</td> </tr> <tr> <td colspan="15">UT → Quad Bi-Direction SFP Transceiver</td> </tr> </table>															Electric connector	TR → Dual Fiber 1×9 Transceiver					FB → Single Fiber SFF Transceiver					EUFB → EPON ONU SFF 2×5 BIDI Transceiver					TB → Single Fiber 1×9 Transceiver					PT → Dual Fiber SFP Transceiver					ETFB → EPON OLT SFF 2×5 BIDI Transceiver					FT → Dual Fiber SFF Transceiver					PB → Single Fiber SFP Transceiver					GUFB → GPON ONU SFF 2×5 BIDI Transceiver					UB → Dual Bi-Direction SFP Transceiver (OM PIN Assignemnt)															UM → Dual Bi-Direction SFP Transceiver(CSFP MSA)															UT → Quad Bi-Direction SFP Transceiver														
Electric connector	TR → Dual Fiber 1×9 Transceiver					FB → Single Fiber SFF Transceiver					EUFB → EPON ONU SFF 2×5 BIDI Transceiver																																																																																														
	TB → Single Fiber 1×9 Transceiver					PT → Dual Fiber SFP Transceiver					ETFB → EPON OLT SFF 2×5 BIDI Transceiver																																																																																														
	FT → Dual Fiber SFF Transceiver					PB → Single Fiber SFP Transceiver					GUFB → GPON ONU SFF 2×5 BIDI Transceiver																																																																																														
	UB → Dual Bi-Direction SFP Transceiver (OM PIN Assignemnt)																																																																																																								
	UM → Dual Bi-Direction SFP Transceiver(CSFP MSA)																																																																																																								
	UT → Quad Bi-Direction SFP Transceiver																																																																																																								

* Please contact with us for the released types.



RoHS Compliant

www.palconnusa.com

TB4-S3-2203N-W2

Transmitter optical Specifications ($-40^{\circ}\text{C} < \text{Topr} < 85^{\circ}\text{C}$, $3.15\text{ V} < \text{Vcc} < 3.45\text{ V}$)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical						
Output Optical Power	P _{out}	-7	-	-2	dBm	1
Extinction Ratio	ER	9	-	-	dB	
Output Eye	Complies with the IEEE 802.3ah specification, and is class 1 laser eye safety					
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	
Electrical						
Data Input Voltage-Low	V _{IL} - V _{CC}	-2.0	-	-1.58	V	3
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. 20% to 80% Values. Maximum t_r, t_f times tested against eye mask.
3. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

Receiver optical Specifications ($-40^{\circ}\text{C} < \text{Topr} < 85^{\circ}\text{C}$, $3.15\text{ V} < \text{Vcc} < 3.45\text{ V}$)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Sensitivity	P _{IN}	-	-	-23	dBm	1
Maximum Input Power	P _{IN}	-3	-	-	dBm	
Center Wavelength	λ_c	1480	1550	1600	nm	
Signal Detect-Asserted	P _A	-	-	-23	dBm	Average
Signal Detect-Deasserted	P _D	-35	-	-	dBm	Average
Signal Detect-Hysteresis	P _A -P _D	1.0	-	-	dB	
Optical Return Loss	ORL	14	-	-	dB	
Electrical						
Data Output Voltage-Low	V _{OL} - V _{CC}	-2.0	-	-1.58	V	2
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:

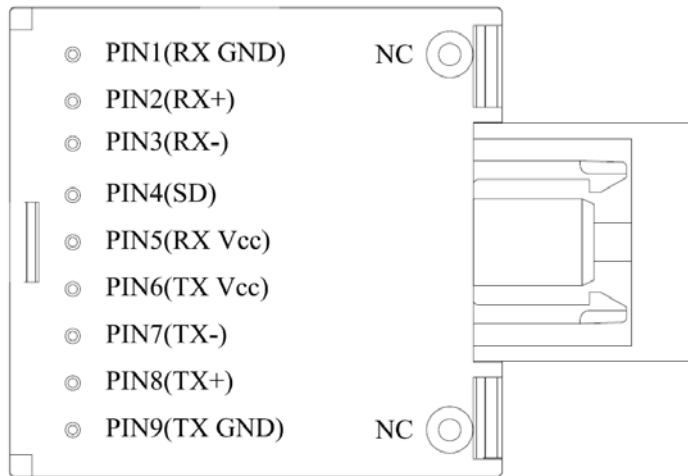
1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2⁷ -1 PRBS with 72 ones and 72 zeros.
2. These outputs are compatible with 10K, 10KH and 100K LVECL and LVPECL outputs.

TB4-S3-2203N-W2

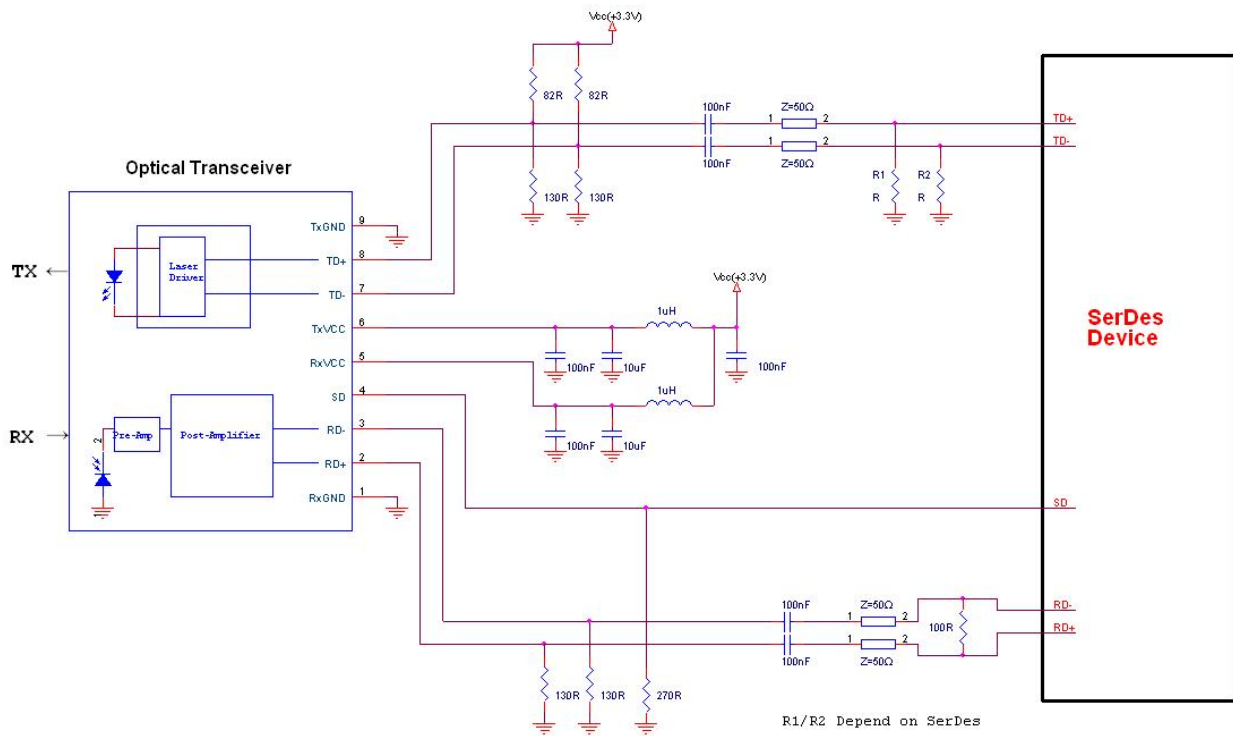
Connection Diagram

TOP VIEW

- 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



TB4-S3-2203N-W2

Dimensions in mm

