

**2.5 Gb/s, SFP LC Package, BIDI  
TX1310/RX1550, TX1550/RX1310 nm  
Single mode, 20 – 40 km Distance**

**Description**

The bi-directional (BIDI) transceiver product is unique in that only one single fiber (single mode or multimode) is required to transmit and receive signals simultaneously. That means the total bandwidth capacity of an existing cable infrastructure can be doubled instantly. The typical design of a BIDI transceiver uses a 1310 nm LD to transmit and 1550 nm PD to receive, and vice versa for the matching one (1310 nm to receive and 1550 nm to transmit) at the other end to make a complete link.

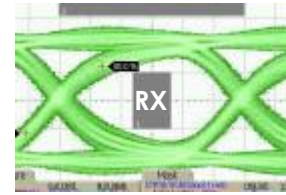
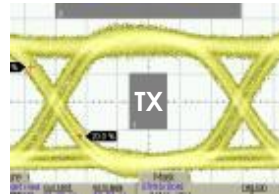
OptixCom's SFP transceivers are compliant with SFP Multi-Source Agreement (MSA). The BIDI transceivers utilize advanced filter optics to separate the two wavelength with more than 40 dB of isolation. These transceivers operate at 2.5 Gb/s for 20 - 40 km transmission distance with single mode fibers. The products are RoHS compliant.



**BD7-2500T3R5-ATXXK  
BD7-2500T5R3-ATXXK  
(XX = 20, 40)**



2.5 Gb/s, 2<sup>7</sup>-1 NRZ Data Eye Pattern



**Key Features**

- Single mode, 2.5 G/s data rate
- TX1310/RX1550 and TX1550/RX1310 nm wavelength
- 20 - 40 km reach and single 3.3 V power supply
- 13 - 16 dB power budget
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- Single LC connector optical interface
- AC coupling LVPECL differential I/O logics
- TTL RX\_LOS signal detect to monitor optical signals
- RoHS compliant

**Applications**

- ✓ FTTH, FTTX, SONET OC48, ATM/STM-16
- ✓ High speed I/O for file server
- ✓ Video over fiber links
- ✓ Media converter, bus extension
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect
- ✓ Computer cluster cross-connect

**Ordering Information**

**Part Number:** BD7-2500T3R5-ATXXK  
2.5 Gb/s single mode, SFP BIDI Transceiver, TX 1310 nm and RX 1550 nm, XX km reach, 0 – 70 °C.

**Part Number:** BD7-2500T5R3-ATXXK  
2.5 Gb/s single mode, SFP BIDI Transceiver, TX 1550 nm and RX 1310 nm, XX km reach, 0 – 70 °C.

Add "-T" in the Part Number for extended temperature range -40–85 °C, i.e., BD7-2500T3R5-AT20K-T.

**Operating Conditions**

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	---	2.488	---	Gb/s
Supply Voltage	3.1	3.3	3.5	V
Supply Current	---	200	300	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{cc}$	-0.5	4.0	V
Input Voltage	$V_{IN}$	-0.5	$V_{cc}$	V
Operating Current	$I_{op}$	---	400	mA
Output Current	$I_o$	---	50	mA
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### General Transmitter Characteristics (DFB Laser)

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.4	---	1.8	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Rise/Fall Time (20% -80%)	$T_r/T_f$	---	---	160	ps
Side Mode Suppression Ratio	SMSR	30	---	---	dB
Relative Intensity Noise	$RIN$	---	---	-120	dB
Total Jitter	$T_j$	---	---	0.1	Ulp-p
TX Disable Power	$P_{OFF}$	---	---	-45	dBm
TX Disable Voltage – High	$V_{DH}$	2.0	---	$V_{cc}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.8	V
TX Fault Output - High	$V_{FH}$	2.0	---	$V_{cc}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.8	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs

Notes:

1. Module is designed for AC LVPECL coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.

**Class 1 Laser Product**  
Complies with  
**21 CFR 1040.10 and 1040.11**



### General Receiver Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	1.8	V
Differential Input Impedance <sup>2</sup>	Z	---	100	---	Ohm
Optical Return Loss	OL	14	---	---	dB
Rise/Fall Time (20% -80%)	$T_r/T_f$	---	---	250	ps
Signal Detect Hysteresis	$P_{SD+} - P_{SD}$	1	---	---	dB
Crosstalk		---	---	-40	dB
RX Signal Loss Output - High	$V_{RL+}$	2.0	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.8	V
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
Serial ID Clock Rate	$f_C$	---	---	100	kHz

Notes:

1. Module is designed for AC LVPECL coupling. See the design guide for proper termination.
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### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-5	---	+0	dBm
Optical Wavelength (BD7-2500T3R5-AT20K)	$\lambda_o$	1285	1310	1335	nm
Optical Wavelength (BD7-2500T5R3-AT20K)	$\lambda_o$	1530	1550	1570	nm
Extinction Ratio	$ET$	9	---	---	dB
Spectral Width (-20dB)	$\Delta\lambda$	---	---	1	nm

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Wavelength (BD7-2500T3R5-AT20K)	$\lambda_c$	1480	1550	1580	nm
Optical Wavelength (BD7-2500T5R3-AT20K)	$\lambda_c$	1290	1310	1330	nm
Receiver Overload	$P_{max}$	-3	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-18	dBm
Signal Detect– Asserted	$P_{SD+}$	---	---	-18	dBm
Signal Detect– Deasserted	$P_{SD-}$	-30	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125  $\mu$ m SMF.
2. Test at 2.5 Gb/s, 2<sup>7</sup> – 1 PRBS data pattern, and > 1x10<sup>-12</sup> of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with IEEE 802.3z standard.
4. Maximum supply current for the transceiver from Vcc is 300 mA.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11

