

**155 Mb/s, SFP LC Package, BIDI  
TX1490/RX1550, TX1550/RX1490 nm  
Single mode, 100 – 120 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 1490 nm LD to transmit and 1550 nm PD to receive, and vice versa for the matching one (1550 nm to receive and 1490 nm to transmit) at the other end to make a complete link.

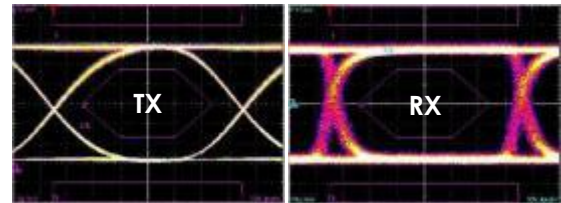
OptixCom's SFP transceivers are compliant with SFP Multi-Source Agreement (MSA). The BIDI transceivers utilize advanced filter optics to separate the two wavelength with more than 40 dB of isolation. These transceivers operate at 155 Mb/s for 100 - 120 km transmission distance with single mode fibers. The products are RoHS compliant.



**BD7-155T4R5-ATXXXK**  
**BD7-155T5R4-ATXXXK**  
**(XXX = 100, 120)**



155 Mb/s, 2<sup>23</sup>-1 NRZ Data Eye Pattern



**Key Features**

- Single mode, 155 M/s data rate
- TX1490/RX1550 and TX1550/RX1490 nm wavelength
- 100 - 120 km reach and single 3.3 V power supply
- 30 – 32 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, ATM/SONET OC-3, SDH STM-1
- ✓ High speed I/O for file server
- ✓ Media converter, bus extension
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect
- ✓ Computer cluster cross-connect

**Ordering Information**

**Part Number:** BD7-155T4R5-ATXXXK  
**Description:**  
155 Mb/s, Single mode, SFP BIDI Transceiver, TX 1490 nm and RX 1550 nm, XXX km reach, 0 – 70 °C.

**Part Number:** BD7-155T5R4-ATXXXK  
**Description:**  
155 Mb/s, Single mode, SFP BIDI Transceiver, TX 1550 nm and RX 1490 nm, XXX km reach, 0 – 70 °C.

**Operating Conditions**

| Parameter           | Min. | Typical | Max. | Units |
|---------------------|------|---------|------|-------|
| Operate Temperature | 0    | 25      | 70   | °C    |
| Data Rate           | ---  | 155     | 200  | Mb/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%)                | $T_r/T_f$    | ---  | ---     | 1.3      | ns    |
| 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%)                | $T_r/T_f$          | ---  | ---     | 1.3      | ns      |
| Signal Detect Hysteresis                  | $P_{SD+} - P_{SD}$ | 1    | ---     | 4        | 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.
2. Single ended will be 50 ohm for each signal line.

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### Transmitter Electro-Optical Characteristics (DFB Laser)

| Parameter                                  | Symbol          | Min. | Typical | Max. | Units |
|--|-----------------|------|---------|------|-------|
| Optical Output Power <sup>1</sup>          | $P_o$           | 0    | ---     | +5   | dBm   |
| Optical Wavelength<br>(BD7-155T4R5-AT100K) | $\lambda_o$     | 1470 | 1490    | 1510 | nm    |
| Optical Wavelength<br>(BD7-155T5R4-AT100K) | $\lambda_o$     | 1530 | 1550    | 1570 | nm    |
| Extinction Ratio                           | $ET$            | 9    | ---     | ---  | dB    |
| Spectral Width (-20 dB)                    | $\Delta\lambda$ | ---  | ---     | 1    | nm    |
| Side Mode Suppression Ratio                | $SMSR$          | 30   | ---     | ---  | dB    |

### Receiver Electro-Optical Characteristics

| Parameter                                    | Symbol      | Min. | Typical | Max. | Units |
|--|-------------|------|---------|------|-------|
| Operating Wavelength<br>(BD7-155T4R5-AT100K) | $\lambda_c$ | 1530 | ---     | 1570 | nm    |
| Operating Wavelength<br>(BD7-155T5R4-AT100K) | $\lambda_c$ | 1470 | ---     | 1510 | nm    |
| Receiver Overload                            | $P_{max}$   | -3   | ---     | ---  | dBm   |
| Receiver Sensitivity <sup>2</sup>            | $P_I$       | ---  | ---     | -30  | dBm   |
| RX Signal Loss – Asserted                    | $P_{RL+}$   | ---  | ---     | -30  | dBm   |
| RX Signal Loss – Deasserted                  | $P_{RL-}$   | -45  | ---     | ---  | dBm   |

Notes:

1. Output of coupling optical power into 9/125  $\mu\text{m}$  SMF.
2. Test at 155 Mb/s, 2<sup>23</sup> – 1 PRBS data pattern, and  $> 1 \times 10^{-10}$  of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with Telcordia GR-253-CORE and ITU-T G-957 standard.
4. Maximum supply current for the transceiver from Vcc is 300 mA.

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