

**155 Mb/s, 1x9 SC Package, BIDI  
TX1310/RX1550, TX1550/RX1310 nm  
Single mode, 15 – 80 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 BIDI transceivers utilize advanced filter optics to separate the two wavelength with more than 45 dB of isolation. The products use industry standard 1x9 pluggable package. These transceivers operate at 155 Mb/s for 15 - 80 km transmission distance with single mode fibers. The products are RoHS compliant.

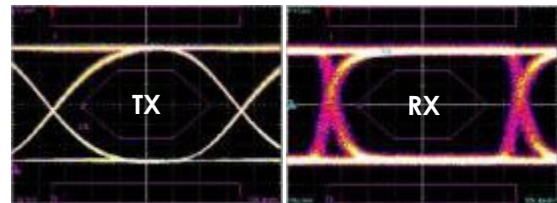


Lead-Free

**BD9-155T3R5-DPXXK  
BD9-155T5R3-DPXXK  
(XX = 15, 25, 40, 60, 80)**



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



**Key Features**

- Single mode, 155 M/s data rate
- TX 1310/RX 1550 and TX 1550/RX1310 matching pair
- 15 - 80 km reach and single 3.3 V power supply
- 17 – 34 dB power budget
- Industry standard 1x9 pluggable package
- Single SC connector optical interface
- DC coupling LVPECL differential I/O logics
- LVPECL Signal detect to monitor optical signals
- -40–85 °C extended temperatures available
- RoHS compliant

**Applications**

- ✓ FTTH, Ethernet, ATM/SONET , SDH STM-1
- ✓ 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:** BD9-155T3R5-DPXXK  
**Description:**  
 155 Mb/s, Single mode, 1x9 BIDI Transceiver, TX 1310 nm and RX 1550 nm, XX km reach, 0 – 70 °C.

**Part Number:** BD9-155T5R3-DPXXK  
**Description:**  
 155 Mb/s, Single mode, 1x9 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., BD9-155T3R5-DP15K-T.

**Operating Conditions**

| Parameter           | Min. | Typical | Max. | Units |
|---------------------|------|---------|------|-------|
| Operate Temperature | 0    | 25      | 70   | °C    |
| - T Transceivers    | -40  | 25      | 85   | °C    |
| Data Rate           | ---  | 155     | 200  | Mb/s  |
| Supply Voltage      | 3.1  | 3.3     | 3.5  | V     |

### 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

| Parameter                                 | Symbol       | Min.           | Typical | Max.           | Units   |
|---|--------------|----------------|---------|----------------|---------|
| Differential Input Voltage <sup>1</sup>   | $\Delta V_i$ | 0.3            | ---     | 1.6            | V       |
| Differential Input Impedance <sup>2</sup> | $Z$          | ---            | 100     | ---            | ohm     |
| Relative Intensity Noise                  | $RIN$        | ---            | ---     | -120           | dB/Hz   |
| Rise/Fall Time (10% - 90%)                | $T_r/T_f$    | ---            | 1       | 2              | ns      |
| Data Input Current - High                 | $I_{IH}$     | ---            | ---     | 350            | $\mu A$ |
| Data Input Current - Low                  | $I_{IL}$     | -350           | ---     | ---            | $\mu A$ |
| Data Input Voltage - High                 | $V_{IH}$     | $V_{cc} - 1.1$ | ---     | $V_{cc} - 0.7$ | V       |
| Data Input Voltage - Low                  | $V_{IL}$     | $V_{cc} - 2.0$ | ---     | $V_{cc} - 1.6$ | V       |

### General Receiver Characteristics

| Parameter                                 | Symbol             | Min.           | Typical | Max.           | Units |
|---|--------------------|----------------|---------|----------------|-------|
| Differential Output Voltage <sup>1</sup>  | $\Delta V_o$       | 0.3            | ---     | 1.6            | V     |
| Differential Input Impedance <sup>2</sup> | $Z$                | ---            | 100     | ---            | Ohm   |
| Optical Return Loss                       | $OL$               | 14             | ---     | ---            | dB    |
| Rise/Fall Time (10% - 90%)                | $T_r/T_f$          | ---            | 1       | 2              | ns    |
| Signal Detect Hysteresis                  | $P_{SD+} - P_{SD}$ | 1              | ---     | ---            | dB    |
| Crosstalk                                 |                    | ---            | ---     | -45            | dB    |
| Signal Detect Output - High               | $V_{SD+}$          | $V_{cc} - 1.1$ | ---     | $V_{cc} - 0.7$ | V     |
| Signal Detect Output - Low                | $V_{SD-}$          | $V_{cc} - 2.0$ | ---     | $V_{cc} - 1.6$ | V     |
| Data Output Voltage - High                | $V_{OH}$           | $V_{cc} - 1.1$ | ---     | $V_{cc} - 0.7$ | V     |
| Data Output Voltage - Low                 | $V_{OL}$           | $V_{cc} - 2.0$ | ---     | $V_{cc} - 1.6$ | V     |

Notes:

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

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

| Parameter                                   | Symbol          | Min. | Typical | Max. | Units |
|---|-----------------|------|---------|------|-------|
| Optical Output Power <sup>1</sup>           | $P_o$           | -9   | ---     | -3   | dBm   |
| Optical Wavelength<br>(BD9-155T3R5-DP25K)   | $\lambda_o$     | 1260 | 1310    | 1360 | nm    |
| Optical Wavelength<br>(BD9-155T5R3-DP25K)   | $\lambda_o$     | 1480 | 1550    | 1580 | nm    |
| Extinction Ratio                            | $ET$            | 9    | ---     | ---  | dB    |
| Spectral Width (rms)<br>(BD9-155T3R5-DP25K) | $\Delta\lambda$ | ---  | ---     | 4    | nm    |
| Spectral Width (rms)<br>(BD9-155T5R3-DP25K) | $\Delta\lambda$ | ---  | ---     | 3    | nm    |

### Receiver Electro-Optical Characteristics

| Parameter                                   | Symbol      | Min. | Typical | Max. | Units |
|---|-------------|------|---------|------|-------|
| Operating Wavelength<br>(BD9-155T3R5-DP25K) | $\lambda_c$ | 1480 | ---     | 1600 | nm    |
| Operating Wavelength<br>(BD9-155T5R3-DP25K) | $\lambda_c$ | 1260 | ---     | 1360 | nm    |
| Receiver Overload                           | $P_{max}$   | 0    | ---     | ---  | dBm   |
| Receiver Sensitivity <sup>2</sup>           | $P_I$       | ---  | ---     | -31  | dBm   |
| Signal Detect– Asserted                     | $P_{SD+}$   | ---  | ---     | -31  | dBm   |
| Signal Detect– Deasserted                   | $P_{SD-}$   | -45  | ---     | ---  | dBm   |

Notes:

1. Output of coupling optical power into 9/125  $\mu$ m SMF.
2. Test at 155 Mb/s, 2<sup>23</sup> – 1 PRBS data pattern, and > 1x10<sup>-10</sup> 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 200 mA.

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11

