

**155 Mb/s, 1x9 SC Package, BIDI  
TX 1310/RX 1550, TX 1550/RX 1310  
Multimode, 2 – 5 km Distance**

**Description**

The bi-directional (BIDI) transceiver product is unique in that only one single fiber 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 as the transmit wavelength and 1550 nm PD as the receive wavelength for one module, and vice versa for the matching one (1310 nm for receive and 1550 nm for transmit) at the other end to make a complete link.

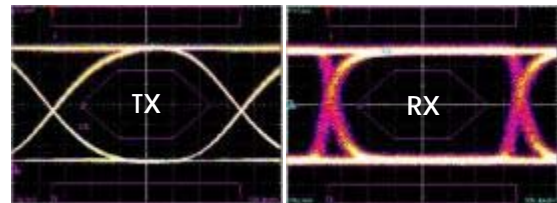
OptoC's BIDI transceivers utilize advanced filter optics to separate the two wavelength with more than 45 dB of isolation. The products use industry standard 1x9 pluggable package. These transceivers operate at 155 Mb/s for 2 - 5 km transmission distance with multimode fibers. The products are RoHS compliant.



**BD9-155T3R5-DPMXK  
BD9-155T5R3-DPMXK  
(X = 2, 5)**



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



**Key Features**

- Multimode, 155 M/s data rate
- TX 1310/RX 1550 and TX 1550/RX1310 matching pair
- 2 - 5 km reach and single 3.3 V power supply
- 18 – 20 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, FTTX, ATM/SONET OC-3, 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-DPMXK

**Description:**

155 Mb/s, Multimode, 1x9 BIDI Transceiver, TX 1310 nm and RX 1550 nm, X km reach, 0 – 70 °C.

**Part Number:** BD9-155T5R3-DPMXK

**Description:**

155 Mb/s, Multimode, 1x9 BIDI Transceiver, TX 1550 nm and RX 1310 nm, X km reach, 0 – 70 °C.

\* Add "-T" in the Part Number for extended temperature range -40–85 °C, i.e., BD9-155T3R5-DPM5K-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
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**

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-10	---	0	dBm
Optical Wavelength (BD9-155T3R5-DPM2K)	$\lambda_o$	1260	1310	1360	nm
Optical Wavelength (BD9-155T5R3-DPM2K)	$\lambda_o$	1480	1550	1580	nm
Extinction Ratio	$ET$	9	---	---	dB
Spectral Width (rms)	$\Delta\lambda$	---	---	7	nm

**Receiver Electro-Optical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength (BD9-155T3R5-DPM2K)	$\lambda_c$	1480	---	1600	nm
Operating Wavelength (BD9-155T5R3-DPM2K)	$\lambda_c$	1260	---	1360	nm
Receiver Overload	$P_{max}$	0	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-28	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-28	dBm
Signal Detect- Deasserted	$P_{SD-}$	-45	---	---	dBm

## Notes:

1. Output of coupling optical power into 50/125 or 62.5/125  $\mu\text{m}$  MMF.
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 180 mA.

Class 1 Laser Product Complies with 21 CFR 1040.10 and 1040.11
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**Transmitter Electro-Optical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power <sup>1</sup>	$P_o$	-8	---	0	dBm
Optical Wavelength (BD9-155T3R5-DPM5K)	$\lambda_o$	1260	1310	1360	nm
Optical Wavelength (BD9-155T5R3-DPM5K)	$\lambda_o$	1480	1550	1580	nm
Extinction Ratio	$ET$	9	---	---	dB
Spectral Width (rms)	$\Delta\lambda$	---	---	7	nm

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Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength (BD9-155T3R5-DPM5K)	$\lambda_c$	1480	---	1600	nm
Operating Wavelength (BD9-155T5R3-DPM5K)	$\lambda_c$	1260	---	1360	nm
Receiver Overload	$P_{max}$	0	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-28	dBm
Signal Detect- Asserted	$P_{SD+}$	---	---	-28	dBm
Signal Detect- Deasserted	$P_{SD-}$	-45	---	---	dBm

Notes:

1. Output of coupling optical power into 50/125 or 62.5/125  $\mu$ m MMF.
2. Test at 155 Mb/s, 2<sup>23</sup> – 1 PRBS data pattern, and > 1x10<sup>-10</sup> of Bit-Error-Rate (BER).
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