

10 Gb/s, SFP+ LC Package, BIDI TX 1490/RX1550, TX 1550/RX1490 nm Single Mode, 80 km Distance



SFP+ Bi-Directional (BiDi) Transceivers

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. This long range BIDI transceiver uses EML 1490 nm LD to transmit and 1550 nm APD to receive, and vice versa for the matching one (1490 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 low power consumption of < 2W. These transceivers operate at 10 Gb/s for 80 km transmission distance with single mode fibers. The products are RoHS compliant.



Lead-Free

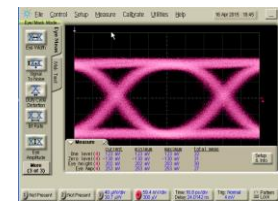
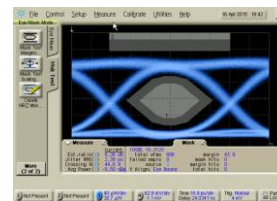
**BD4-10000T4R5-AT80K
BD4-10000T5R4-AT80K**



10 Gb/s, 2³¹-1 NRZ data eye pattern

TX

RX



Key Features

- Single mode, 10 G/s data rate
- TX1490/RX1550 & TX1550/RX1490 nm pair
- > 24 dB power budget for 80 km
- Z-axis hot pluggable
- SFF-8472 MSA Compliant
- Single LC connector optical interface
- AC coupling LVPECL differential I/O logics
- -40–85 °C operating temperatures available
- Single 3.3V power supply
- RoHS compliant

Applications

- ✓ 10G Fiber Channel,
- ✓ 10 Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Computer cluster cross-connect

Ordering Information

Part Number: BD4-10000T4R5-AT80K

10 Gb/s, Single Mode, SFP+ BIDI Transceiver, TX 1490 nm and RX 1550 nm, 80 km reach, 0 – 70 °C.

Part Number: BD4-10000T5R4-AT80K

10 Gb/s, Single Mode, SFP+ BIDI Transceiver, TX 1550 nm and RX 1490 nm, 80 km reach, 0 – 70 °C.

* Add "-T" in the Part Number for -40–85 °C extended temperature range, i.e., BD4-10000T4R5-AT80K-T.

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	9.95	---	11	Gb/s
Supply Voltage (3.3V)	3.13	3.3	3.47	V
Supply Current	---	350	450	mA

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Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	T_{st}	-40	85	°C
Supply Voltage @ 3.3V	V_{CC}	-0.3	3.8	V
Input Voltage	V_{IN}	-0.5	V_{CC}	V
Relative Humidity	$R.H.$	5	95	%

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage ¹	ΔV_i	0.2	---	1.2	V
Differential Input Impedance ²	Z	---	100	---	ohm
Optical Power	P_o	0	---	+4	dBm
Optical Wavelength (BD4-10000T4R5-AT80K)	λ_o	1480	1490	1500	nm
Optical Wavelength (BD4-10000T5R4-AT80K)	λ_o	1540	1550	1560	nm
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	0.3	nm
TX Disable Asserted	P_{OFF}	---	---	-30	dBm
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
Extinction Ratio	ET	7.5	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	40	ps
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}	2.4	---	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.
3. Output of coupling optical power into 9/125 μm SMF.

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage ¹	ΔV_o	0.3	---	0.8	V
Differential Input Impedance ²	Z	---	100	---	Ohm
Optical Wavelength (BD4-1000T4R5-AT80K)	λ_c	1540	1550	1560	nm
Optical Wavelength (BD4-1000T5R4-AT80K)	λ_c	1480	1490	1500	nm
Receiver Overload	P_{max}	-6	---	---	dBm
Receiver Sensitivity ³	P_i	---	---	-24	dBm
RX Signal Loss – Asserted	P_{RL+}	---	---	-25	dBm
RX Signal Loss – Deasserted	P_{RL-}	-35	---	---	dBm
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	40	ps
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	μ s
RX Signal Loss Deassert Time	T_{RL-}	---	---	100	μ 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.
3. Test at 10 Gb/s, $2^{31} - 1$ PRBS data pattern, and $> 1 \times 10^{-12}$ of Bit-Error-Rate (BER).