

# 1.25 Gb/s, SFP LC, Dual BiDi TX 1310/RX1490, TX 1490/RX1310 nm Single Mode, 20 km Distance

## Description

This compact SFP has dual-channel Bi-Directional (BiDi) optics for single mode applications. This compact module increases by 4x instantly the total bandwidth capacity of an existing fiber cable infrastructure. Built upon OptixCom's advanced BiDi technology, this compact design has set a new standard for increasing port density requirement in the networking industry.

This optical transceiver integrates two BiDi channels transmitting at 1310 nm and receiving at 1490 nm wavelength, and vice versa for the matching one (1310 nm to receive and 1490 nm to transmit) at the other end to make a complete link.

It operates at 1.25 Gb/s with 20 km of transmission distance and > 14 dB power budget. The product is compliant with CSFP MSA Option 2 and SFF-8472. It's RoHS compliant.

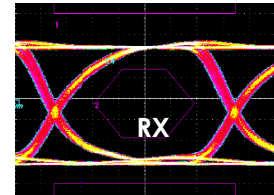
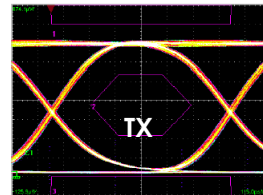


Lead-Free

**CBD-1250T3R4-AT20K**  
**CBD-1250T4R3-AT20K**



1.25 Gb/s, 2<sup>7</sup>-1 NRZ Data Eye pattern



## Key Features

- 2x Bi-Directional channels in one SFP package
- Single Mode, 1.25 Gb/s
- TX1310/RX1490 and TX1490/RX1310 nm wavelength
- > 14 dB power budget, 20 km reach
- Single 3.3 V power supply
- Z-axis hot pluggable
- Compliant with CSFP MSA Option 2
- Dual LC connector optical interface
- AC coupling LVPECL differential I/O logics
- -40-85 °C extended temperatures available
- RoHS compliant

## Applications

- ✓ Fiber Channel, Gigabit Ethernet
- ✓ High speed I/O for file server
- ✓ Data Communication for SAN and LAN
- ✓ Industrial Control Link
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect

## Ordering Information

**Part Number:** CBD-1250T3R4-AT20K

### Description:

1.25 Gb/s, Single Mode, SFP Dual BiDi Optical Transceiver, TX 1310 nm /RX 1490 nm, 20 km, 0 -70°C.

**Part Number:** CBD-1250T4R3-AT20K

### Description:

1.25 Gb/s, Single Mode, SFP Dual BiDi Optical Transceiver, TX 1490 nm /RX 1310 nm, 20 km, 0 -70°C.

\* Add "-T" in the Part Number for extended temperature range -40-85 °C, i.e., CBD-1250T3R4-AT20K-T.

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
- T Transceivers	-40	25	85	°C
Data Rate	---	1.25	1.3	Gb/s
Supply Voltage	3.13	3.3	3.47	V
Supply Current	---	350	400	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	$V_{CC} + 0.3$	V
Output Current	$I_o$	---	50	mA
Relative Humidity	$R.H.$	0	85	%

### Transmitter Electro-Optical Characteristics

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
Optical Output Power <sup>3</sup>	$P_o$	-9	---	-3	dBm
Optical Wavelength (CBD-1250T3R4-AT20K)	$\lambda_o$	1260	1310	1360	nm
Optical Wavelength (CBD-1250T4R3-AT20K)	$\lambda_o$	1470	1490	1510	nm
Rise/Fall Time (20%~80%)	$T_r/T_f$	---	---	0.26	ns
Extinction Ratio	$ET$	9	---	---	dB
TX Disable Power	$P_{TD}$	---	---	-30	dBm
Spectral Width (rms)	$\Delta\lambda$	---	---	4	nm
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. Applied to AC LVPECL I/O 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 Input Impedance	$Z$	---	100	---	Ohm
Differential Output Voltage <sup>1</sup>	$\Delta V_o$	0.4	---	1.8	V
Optical Wavelength (CBD-1250T3R4-AT20K)	$\lambda_o$	1470	1490	1510	nm
Optical Wavelength (CBD-1250T4R3-AT20K)	$\lambda_o$	1260	1310	1360	nm
Receiver Overload	$P_{max}$	-3	---	---	dBm
Receiver Sensitivity <sup>2</sup>	$P_I$	---	---	-23	dBm
Optical Return Loss	$OL$	12	---	---	dB
RX Signal Loss – Deasserted	$P_{RL-}$	-35	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-23	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1	---	4	dB
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s
RX Signal Loss Output - High	$V_{RL+}$	2.0	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.8	V

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Test at 1.25 Gb/s, 2<sup>7</sup> – 1 PRBS data pattern, and > 1x10<sup>-12</sup> of Bit-Error-Rate (BER)

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



### PIN Assignment and Description

The SFP transceiver contains a printed circuit board that mates with the SFP electrical connector. The pads are designed for a sequenced mating:

- First mate ground contacts
- Second mate power contacts
- Third mate signal contacts

