

1x9 BiDi Optical Module

1.25 Gb/s, 1x9 Package, SC/FC/ST Connector, 2 – 100km Distance
TX1310/RX1550, TX1550/RX1310nm; TX1490/RX1550, TX1550/RX1490nm

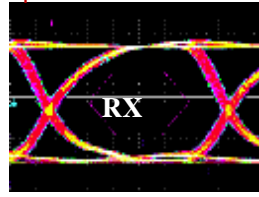
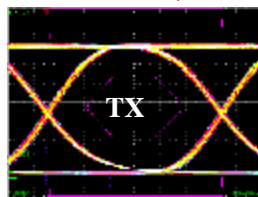
Description

1x9 BiDi optical modules adopt innovative Wavelength Division Multiplex technology to transmit and receive signals simultaneously through only one single fiber. It not only doubles the bandwidth but also helps to save fiber cable installation cost. The typical design of a 1x9 BiDi transceiver uses a 1310nm LD to transmit and 1550nm 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. The products are RoHS compliant and use industry standard 1x9 package.



Only one single fiber is needed for **Bi-Directional** data communication!

1.25 Gb/s, 2⁷-1 NRZ Data Eye pattern



Features

- I One single fiber to transmit and receive simultaneously
- I Single mode, 1.25 G/s data rate
- I TX 1310/RX 1550, TX 1550/RX1310 matching pair; TX 1490/RX 1550, TX 1550/RX1490 matching pair
- I 2-100km reach and single 3.3 V power supply
- I 12–24 dB power budget
- I Industry standard 1x9 pluggable package
- I Single SC/FC/ST connector optical interface
- I AC coupling LVPECL differential I/O logics
- I TTL Signal detect to monitor optical signals
- I 0–70 °C operating temperatures available
- I RoHS compliant

Applications

- I FTTH, FTTX, ATM/SONET, SDH, Ethernet
- I High speed I/O bus extension, systems interconnects
- I Video over fiber links, media converters
- I Data Communication for SAN and LAN
- I Routers and switches, computer cluster cross-connect

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

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage ¹	DV_i	0.3	---	2.0	V
Differential Input Impedance ²	Z	---	100	---	ohm
Relative Intensity Noise	RIN	---	---	-120	dB/Hz
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	260	ps
Data Input Current - High	I_{IH}	---	---	350	mA
Data Input Current - Low	I_{IL}	-350	---	---	mA
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
Optical Output Power ¹	P_o	0	---	+5	dBm
Optical Output Power ¹	P_o	-1	---	+4	dBm
Optical Wavelength	λ_o	1280	1310	1340	nm
Optical Wavelength	λ_o	1530	1550	1570	nm
Extinction Ratio	ET	7	---	---	dB
Spectral Width (-20dB)	DI	---	---	1	nm
Spectral Width (-20dB)	DI	---	---	1	nm

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage ¹	DV_o	1.0	---	1.8	V
Differential Input Impedance ²	Z	---	100	---	Ohm
Optical Return Loss	OL	14	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	350	ps
Signal Detect Hysteresis	$P_{SD+} - P_{SD}$	1	---	---	dB
Crosstalk		---	---	-45	dB
Signal Detect Output - High	V_{SD+}	2.4	---	V_{cc}	V

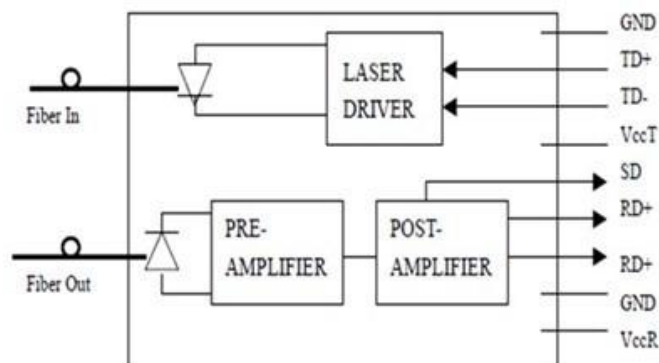
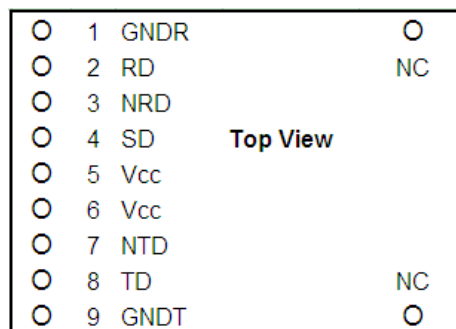
Signal Detect Output - Low	V_{SD-}	0	---	0.5	V
Optical Wavelength	I_c	1500	---	1600	nm
Receiver Overload	P_{max}	-2	---	---	dBm
Receiver Sensitivity ²	P_I	---	---	-25	dBm
Signal Detect- Asserted	P_{SD+}	---	---	-25	dBm
Signal Detect- Deasserted	P_{SD-}	-35	---	---	dBm

Notes:

1. Output of coupling optical power into 9/125 mm SMF.
2. Test at 1.25 Gb/s, 27 – 1 PRBS data pattern, and > 1x10⁻¹² of Bit-Error-Rate (BER).
3. Optical eye diagram is compliant with IEEE 802.3z standard.
4. Maximum supply current for the transceiver from Vcc is 350 mA.

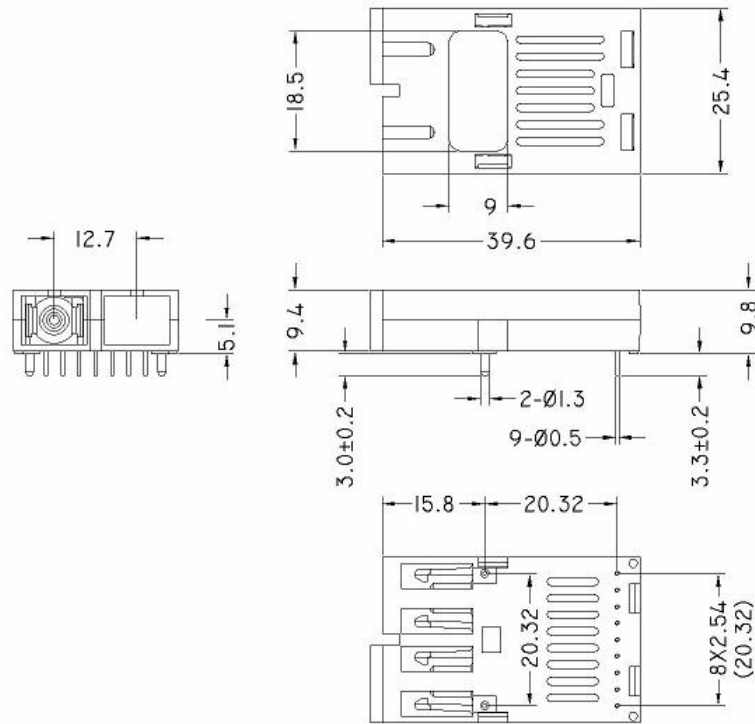
Pins Description

PIN	Symbol	Level	Description
1	GNDR		Receiver section grounded
2	RD(RD+)	PECL/LVPECL	Receiver Inverted DATA output
3	NRD(RD-)	PECL/LVPECL	Receiver Non-inverted DATA output
4	SD	PECL/LVPECL	Receiver LOS Warning, Low Level Activated
5	Vcc(VccR)		Receiver Power Supply, +5V or 3.3V
6	Vcc(VccT)		Transmitter Power Supply, +5V or 3.3V
7	NTD(TD-)	PECL/LVPECL	Transmitter Non-inverted DATA output
8	TD(TD+)	PECL/LVPECL	Transmitter Inverted DATA output
9	GNDT		Transmitter Ground



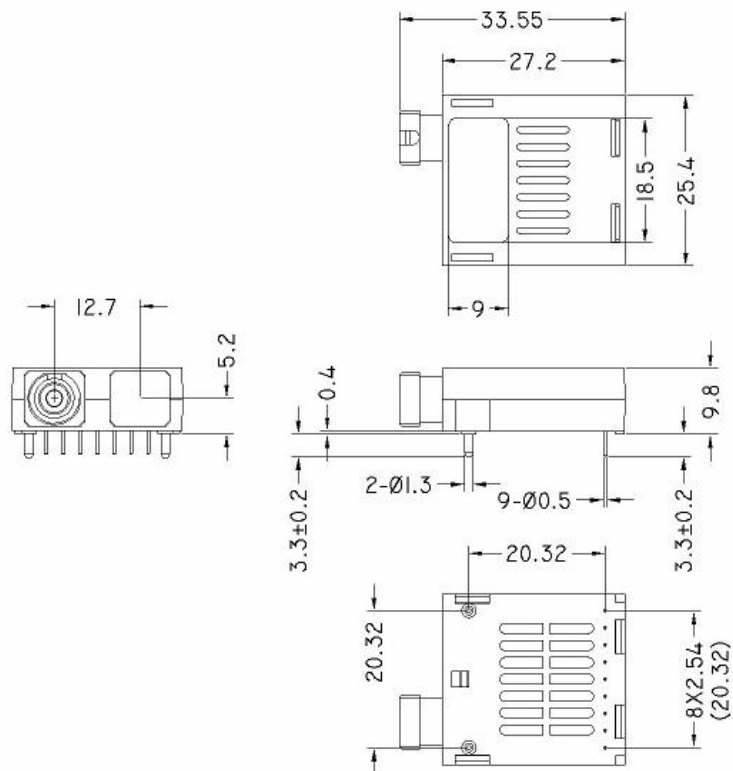
Mechanical Specifications

Mechanical Dimensions (mm)



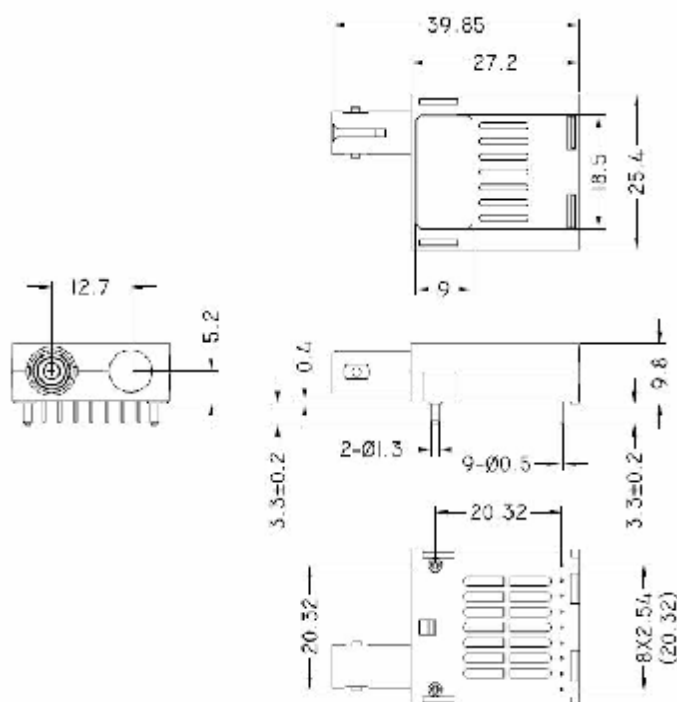
SC Connector

Mechanical Dimensions (mm)



FC Connector

Mechanical Dimensions (mm)



ST Connector

Ordering Information

Part Number	Data Rate	Wavelength & Source	Connector	Voltage	Distance (KM)
GTW5313-311-1PM/5315-221-1PM	1.25G	A\1310TX-1550RX FP; B\1550TX-1310RX FP	SC/ST/FC	3.3V	2
GTW5313-321-1P/5316-221-1P	1.25G	A\1310TX-1550RX FP; B\1550TX-1310RX DFB	SC/ST/FC	3.3V	10
GTW5323-321-1P/5326-221-1P	1.25G	A\1310TX-1550RX FP; B\1550TX-1310RX DFB	SC/ST/FC	3.3V	20
GTW5323-321-2P/5326-221-2P	1.25G	A\1310TX-1550RX FP; B\1550TX-1310RX DFB	SC/ST/FC	3.3V	40
GTW5333-321-1P/5336-221-1P	1.25G	A\1490TX-1550RX DFB; B\1550TX-1490RX DFB	SC/ST/FC	3.3V	60
GTW5344-321-1P/5346-221-1P	1.25G	A\1490TX-1550RX DFB; B\1550TX-1490RX DFB	SC/ST/FC	3.3V	80
GTW5355-321-1P/5356-221-1P	1.25G	A\1490TX-1550RX DFB; B\1550TX-1490RX DFB	SC/ST/FC	3.3V	100
GTW5366-321-1P/5366-221-1P	1.25G	A\1530TX-1610RX CWDM+PIN B\1610TX-1530RX CWDM+PIN	SC/ST/FC	3.3V	80