

BiXX12-10 1.25G

Bi-Directional Transceiver Module

Features

- Compliant with Industry Standard RFT Electrical Connector and Cage
- 100Ω differential AC coupled CML Outputs
- SFP (Small Form-factor Pluggable) package with SC receptacle optical interface.
- Single + 3.3V Power Supply and TTL Logic Interface
- Compliant with 1.25Gb/s bi-directional data link
- A type: 1310nmTx/1550nmRx
B type: 1550nmTx/1310nmRx operating wavelength
- EEPROM with Serial ID Functionality
- 1310nm FP,1550 DFB Laser for 10Km transmission distance
- Extended Operating Temperature Range(0 ~ 70)
- Low EMI
- Class 1 Laser Product Compliant with the Requirements of IEC 60825-1 and IEC 60825-2

Applications

- ◆ Gigabit Ethernet
- ◆ Fiber channel
- ◆ Switch to Switch interface
- ◆ File server interface

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	Ts	-40		85	°C	
Supply Voltage	VCC	-0.5		4	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Ambient Operating Temperature	T _A	0		70	°C	
Supply Voltage	VCC	3.15	3.3	3.45	V	
Baud Rate			1250		Mbps	
Total Supply Current	I _S			300	mA	
Surge Current	I _{surge}			+30	mA	

PERFORMANCE SPECIFICATIONS - ELECTRICAL

0°C < T_c < +80°C; +3.15V < V_{cc} < +3.6V

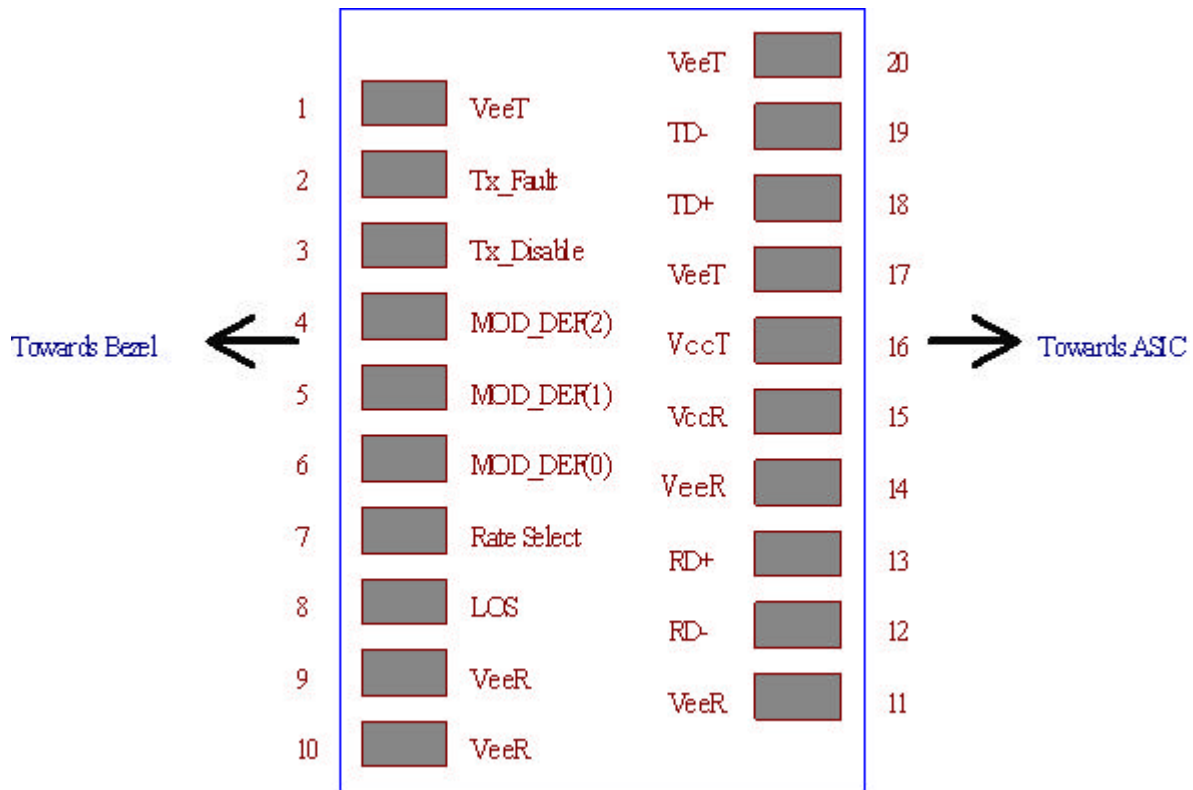
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
TRANSMITTER						
CML/PECL Inputs (Differential)	V _{in}	400		2500	mVpp	AC coupled inputs
Input Impedance (Differential)	Z _{in}	85	100	115	ohms	R _{in} > 100 kohms @ DC
Tx_DISABLE Input Voltage - High		2		3.45	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		V _{cc} -0.5		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Tx_FAULT Output Voltage -- Low		0		0.5	V	I _o = -4.0mA
RECEIVER						
CML Outputs (Differential)	V _{out}	400	800	1200	mVpp	AC coupled outputs
Output Impedance (Differential)	Z _{out}	85	100	115	ohms	
Rx_LOS Output Voltage - High		V _{cc} -0.5		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Rx_LOS Output Voltage - Low		0		0.8	V	I _o = -4.0mA
Total Jitter [Pk - Pk]	TJ			130	ps	Measured with 27 - 1 PRBS
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

OPTICAL SPECIFICATIONS

0°C<Tc<+80°C; +3.15V<Vcc<+3.6V

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes	
9μ m Core Diameter SMF			10		Km	BER<1.0E-12 @ 1.25/1.0625GBaud	
TRANSMITTER							
Optical Center Wavelength	λ	1260	1310	1360	nm	TYPE A	
		1500	1550	1580		TYPE B	
Spectral Width	$\Delta\lambda$			3	nm	RMS	
Optical Transmit Power	Po	-9		-3	dBm	TYPE A	
		-9		-4		TYPE B	
Extinction Ratio	ER	9			dB	P1/P0	
Total Jitter	TJ			170	ps	Measured with 2 ⁷ - 1 PRBS	
Output Rise/Fall Time	1310nm	tR, tF			150	ps	20-80%; measured unfiltered
	1550nm				260		
RECEIVER							
Optical Input Wavelength	λ	1100	1310	1650	nm		
Receiver Sensitivity	P _{in}		-24	-22	dBm	BER<10E-12 @ 1.25/1.0625GBaud	
Optical Return Loss	ORL	12			dB		
RX_LOS - Asserted	Pa	-29			dBm	Measured on transition - Low to High	
RX_LOS - De-asserted	Pd			-17	dBm	Measured on transition - High to Low	

SFP Transceiver Electrical Pad Layout



Pin Function Definitions

Pin Num.	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, 2 wire serial ID interface
5	MOD-DEF1	Module Definition 1	3	Note 3, 2 wire serial ID interface
6	MOD-DEF0	Module Definition 0	3	Note 3, 2 wire serial ID interface
7	Rate Select	Not Connect	3	Function not available
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5

12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KO resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10 K O resistor. Its states are:

Low (0 – 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KO resistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). Mod-Def 0 is grounded by the module to indicate that the module is present Mod-Def 1 is the clock line of two wire serial interface for serial ID Mod-Def 2 is the data line of two wire serial interface for serial ID

4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KO resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5) VeeR and VeeT may be internally connected within the SFP module.

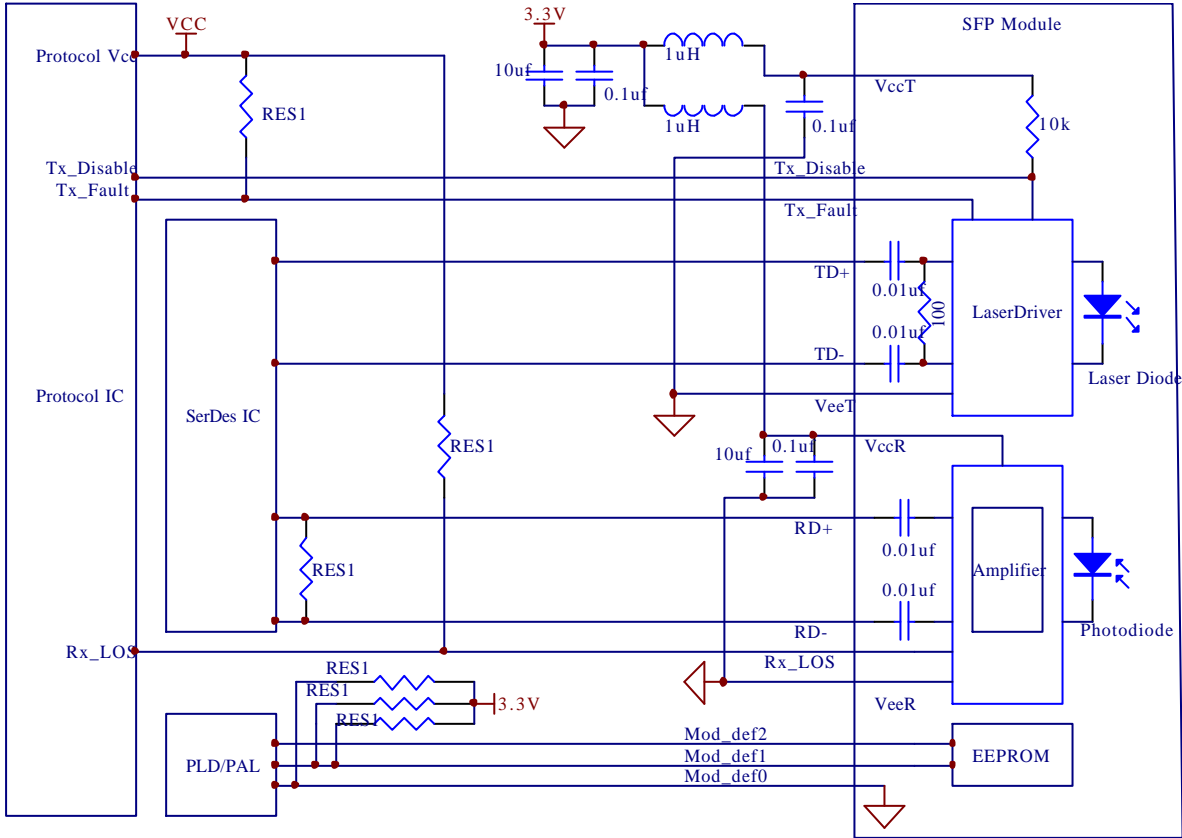
6) RD-/+ : These are the differential receiver outputs. They are AC coupled 1000 differential lines which should be terminated with 100O (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 –1000 mV single ended) when properly terminated.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ± 5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host

board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

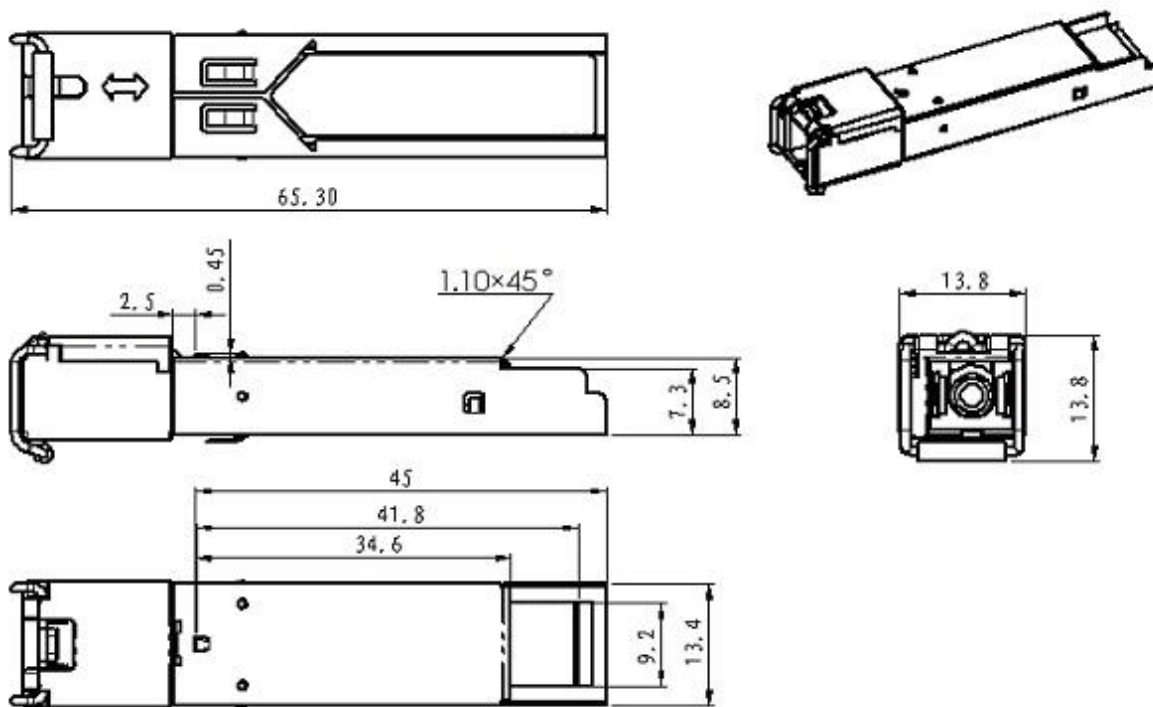
8) TD-/+ : These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600mV single-ended) be used for best EMI performance.

Recommend Circuit Schematic



RES1 = 4.7k to 10k

Mechanical Specifications



Ordering information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical interface
Bi1312-10	1.25G	1310nm FP	SMF	10Km	SC
Bi1512-10	1.25G	1550nm DFB	SMF	10Km	SC