

# 10G BIDI XFP 1330nm-TX/1270nm-RX 40km Transceiver

10G-XFP-BXD-40K-LL



## Application

- 10GBASE-ER/EW Ethernet
- SONET OC-192/SDH STM-64
- 1200-SM-LL-L 10G Fibre Channel

## Standards

- IEEE 802.3ae 10GBASE-ER
- XFP MSA

## Features

- Support 9.95Gb/s to 11.3Gb/s bit rates
- Hot Pluggable XFP footprint
- Single LC for Bi-directional Transmission
- Maximum link length of 40km
- Single 3.3V voltage supply
- Uncooled 1330nm CWDM DFB Laser
- Power dissipation < 3.5W
- No Reference Clock required
- Built-in digital diagnostic functions
- Temperature range 0° C to 70° C
- Very low EMI and excellent ESD protection
- RoHS Compliant

## Description

Longline Bi-directional 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. They comply with 10-Gigabit Ethernet 10GBASE-ER/EW per IEEE 802.3ae, SONET OC-192 /SDH STM-64 and 10G Fibre Channel 1200-SM-LL-L. Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA.

## Products Specifications

### I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature Range	$T_{ST}$	-40	85	°C
Supply Voltage	$V_{CC}$	-0.5	4.0	V

### II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Temperature Range	$T_C$	0		70	°C
Power Supply Voltage	$V_{CC}$	3.13	3.3	3.45	V
Bit Rate	BR	9.95		11.3	Gb/s
Bit Error Rate	BER			$10^{-12}$	
Max. Supported Link Length	L			40	km

### III. Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
<b>Transmitter</b>						
Data Rate	B	9.95		11.3	Gbps	
Average Optical Power	$P_{max}$	0		5	dBm	1
Center Wavelength	$\lambda$	1320	1330	1340	nm	
Spectral Width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	$SMSR_{min}$	30			dB	
Average Launch Power of OFF Transmitter	$P_{OFF}$			-30	dBm	
Extinction Ratio	ER	6			dB	
Rise/Fall Time (20%~80%)	$T_r/T_f$			50	ps	
Tx Jitter	$T_{xj}$	Compliant with each standard requirements				
Optical Eye Mask			IEEE802.3ae			2
<b>Receiver</b>						
Data Rate	BR	9.95		11.3	Gbps	
Center Wavelength	$\lambda_C$	1260	1270	1280	nm	
Receiver Sensitivity	$R_{SEN}$			-15	dBm	2
Maximum Input Power	$P_{MAX}$	0			dBm	2
Receiver Reflectance	$R_{rx}$			-27	dB	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
LOS	Optical Assert	LOS <sub>A</sub>	-30			dBm
	Optical Dessert	LOS <sub>D</sub>		-16		dBm
LOS Hysteresis	LOS <sub>H</sub>	0.5		5	dB	

#### Notes

1. The optical power is launched into SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps BER<10<sup>-12</sup>.

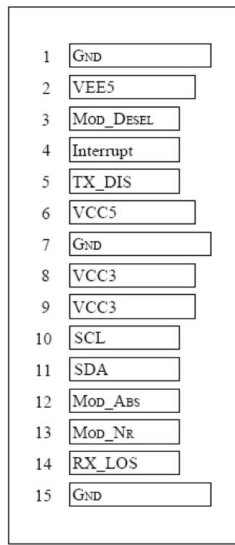
## IV. Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	$V_{CC}$	3.13		3.45	V	
Supply Current	$I_{CC}$			500	mA	
Module Total Power	P			3.5	W	
<b>Transmitter</b>						
Input Differential Impedance	$R_{IN}$		100		$\Omega$	1
Differential Data Input Swing	$V_{IN,pp}$	150		820	mV	
Transmit Disable Voltage	$V_D$	2		$V_{CC}$	V	
Transmit Enable Voltage	$V_{EN}$	$G_{ND}$		$G_{ND}+0.8$	V	
Transmit Disable Assert Time	$T_{off}$			100	ms	
Tx Enable Assert Time	$T_{on}$			100	ms	
<b>Receiver</b>						
Differential Data Output Swing	$V_{out,pp}$	300	500	850	mV	
Output Rise Time	$t_{RISE}$			35	ps	2
Output Fall Time	$t_{FALL}$			35	ps	2
LOS Fault	$V_{LOSFT}$	$V_{CC} - 0.5$		$V_{CCHOST}$	V	3
LOS Normal	$V_{LOSNR}$	$G_{ND}$		$G_{ND}+0.5$	V	3
Power Supply Rejection	PSR		See Note 4 below			4

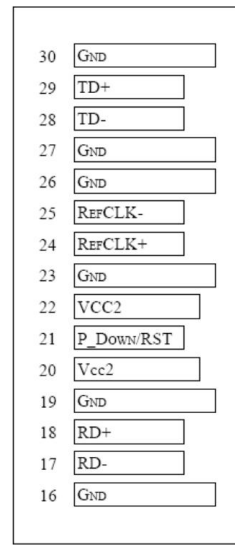
### Notes

1. After internal AC coupling.
2. 20 – 80 %
3. Loss of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
4. Per Section 2.7.1. in the XFP MSA Specification.

### V. Pin Description



Bottom of Board  
(As view through top of board)



Top of Board

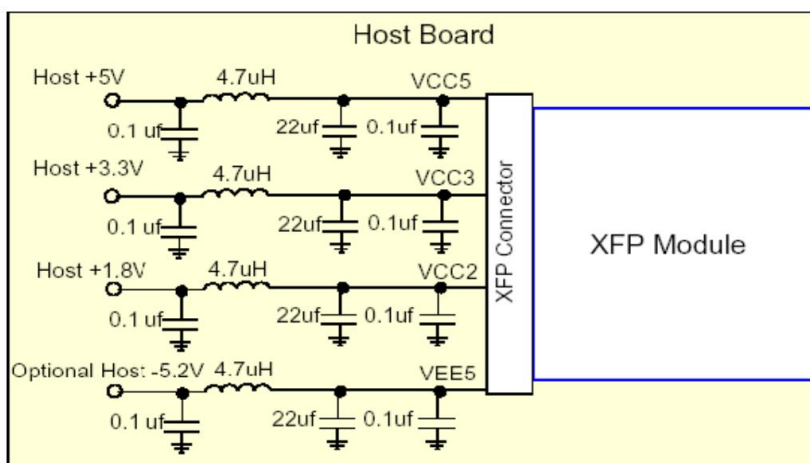
Pin Number	Logic	Symbol	Name/Description	Notes
1		G <sub>ND</sub>	Module Ground	1
2		V <sub>EE5</sub>	Optional -5.2 Power Supply – Not required	
3	LVTTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		V <sub>CC5</sub>	+5 Power Supply	
7		G <sub>ND</sub>	Module Ground	1
8		V <sub>CC3</sub>	+3.3V Power Supply	
9		V <sub>CC3</sub>	+3.3V Power Supply	
10	LVTTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTTL-I/O	SDA	Serial 2-wire interface data line	2
12	LVTTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module	2
13	LVTTTL-O	Mod_NR	Module Not Ready	2
14	LVTTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		G <sub>ND</sub>	Module Ground	1

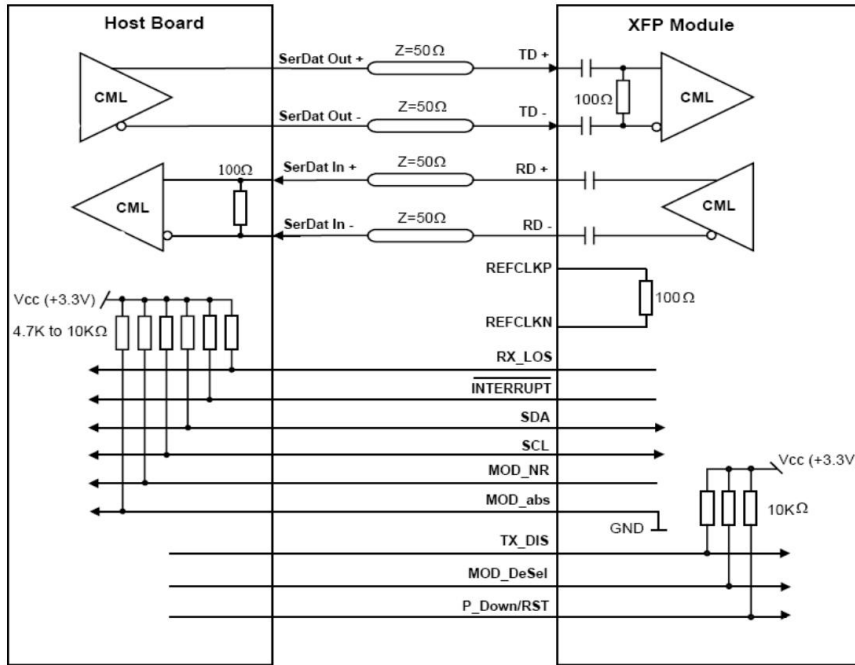
Pin Number	Logic	Symbol	Name/Description	Notes
16		$G_{ND}$	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		$G_{ND}$	Module Ground	1
20		$V_{CC2}$	+1.8V Power Supply – Not required	
21	LVTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle	
22		$V_{CC2}$	+1.8V Power Supply – Not required	
23		$G_{ND}$	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board –Not required	3
26		$G_{ND}$	Module Ground	1
27		$G_{ND}$	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		$G_{ND}$	Module Ground	1

**Notes**

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.45V.
3. A Reference Clock input is not required.

**VI. Typical Application Circuit**





VII. Diagram Mechanical Drawing

