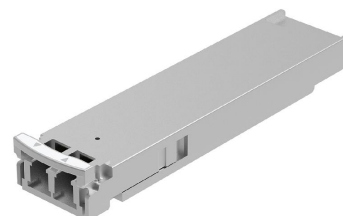


# 10G DWDM XFP 80km Extended Optical Transceivers

## GXD-xx192-08N

### Features

- Hot-pluggable XFP form factor
- Full-duplex transceiver modules
- Cooled EML transmitter and APD receiver
- No Reference Clock required
- Compliant with XFP MSA
- Data rate from 9.95Gbps to 11.3Gbps
- 1528-1563nm DWDM wavelengths (100GHz spacing)
- Reach up to 80km over SMF
- Power consumption < 2.5W
- Dual LC receptacles
- Built-in digital diagnostic functions
- Operating case temperature range from -20°C to +85°C
- 3.3V power supply voltage
- RoHS compliant (lead free)

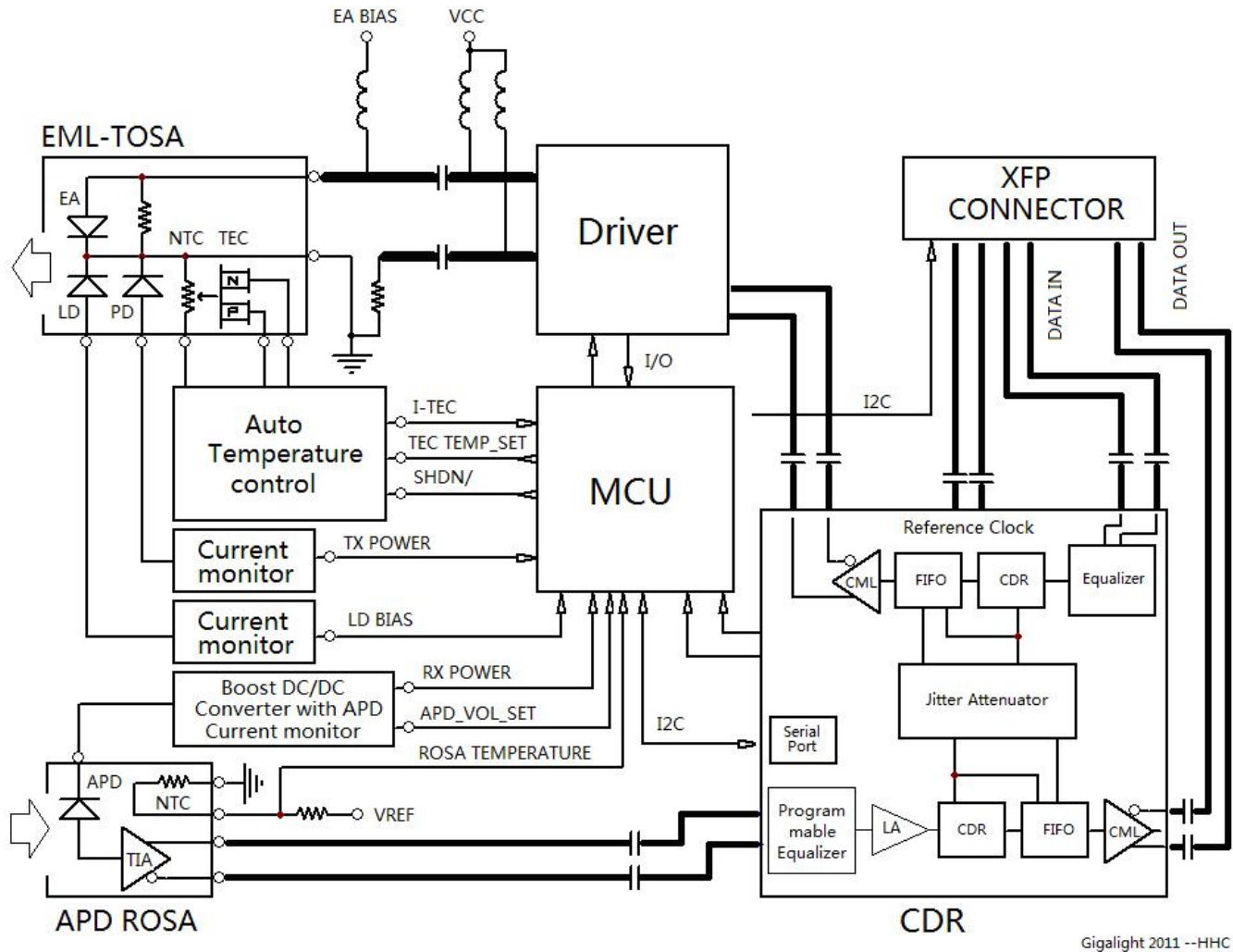


### Applications

- SONET OC-192 / SDH STM-64
- 10GBASE-ZR/ZW Ethernet
- 10G Fibre Channel
- OTN OTU2e

### Description

The Gigalight 10G DWDM XFP 80km extended optical transceivers (GXD-xx192-08N) are designed for 10G SDH/SONET, 10GBASE-ZR Ethernet, OTN OTU2e and 10G Fibre Channel applications. Each transceiver consists of two sections: the transmitter section incorporates a cooled EML laser; the receiver section consists of a APD photo-diode integrated with a TIA. All modules satisfy class I laser safety requirements. The Gigalight 10G DWDM XFP 80km transceivers provide an enhanced monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.



Gigalight 2011 --HHC

Figure 1. Module Block Diagram

### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc3	-0.5	4.0	V
Storage Temperature	Tst	-25	85	°C
Case Operating Temperature	Top	-20	85	°C

### Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc3	3.13	3.3	3.47	V
Supply current	Icc3	-	500	720	mA
Operating Case temperature	Tca	-20	-	85	°C
Module Power Dissipation	Pm	-	1.8	2.5	W

## Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength-Start of Life	$\lambda_c$	$\lambda_c - 25$	$\lambda_c$	$\lambda_c + 25$	pm
Center Wavelength-End of life [1]	$\lambda_c$	$\lambda_c - 100$	$\lambda_c$	$\lambda_c + 100$	pm
Optical Transmit Power	Po	0	-	+4	dBm
Optical Transmit Power	PTX_DIS	-	-	-30	dBm
Extinction Ratio	ER	8.2	-	-	dB
Jitter Generation(P-P)	JG P-P	-	-	0.1	UI
Jitter Generation(RMS)	JG RMS	-	-	0.01	UI
Spectral Width (-20dB)	$\Delta \lambda_{20}$	-	-	0.3	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Dispersion penalty (1600ps/nm)	DP	-	-	2	dB
Relative Intensity Noise	RIN	-	-	-130	dB/Hz
Eye Mask	Compliant with ITU-T G.691 STM-64 eye mask				

### Notes:

1. Wavelength stability is achieved within 60 seconds (max) after power up.  $\lambda_c$  refer to wavelength selection,
2. BER= $10^{-12}$ ; PRBS  $2^{31}-1$ @10.3125Gbps

## Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Input differential impedance	Rim	-	100	-	$\Omega$
Differential data Input	VtxDIFF	120	-	850	mV
Transmit Disable Voltage	VD	2.0	-	Vcc3+0.3	V
Transmit Enable Voltage	Ven	0	-	+0.8	V
Transmit Disable Assert Time	Vn	-	-	10	us

## Receiver Specifications – Optical

Parameter	Bit Rate (Gb/s)	BER	Symbol	Min	Typical	Max	dBm
Sensitivity (0km)	9.95-10.7	$<10^{-12}$	Rsen		-	-26	dBm
	11.1	$<10^{-12}$	Rsen			-25	dBm
		$<10^{-4}$	Rsen			-28	dBm
	11.3	$<10^{-4}$	Rsen			-28	dBm
Sensitivity (80km)	9.95-10.7	$<10^{-12}$	Rsen			-22	dBm
	11.1	$<10^{-12}$	Rsen			-21	dBm
Maximum Input Power			RX-overload	-7	-	-	dBm

Input Operating Wavelength		$\lambda$	1260	-	1600	nm
Reflectance		Rrx	-	-	-27	dBm
Loss of Signal Asserted		LOS_A	-37	-	-30	dBm
LOS De-Asserted		LOS_D	-	-	-28	dBm
LOS Hysteresis		LOS_H	0.5	-	-	dB

**Notes:**

1. Measured with ER=9 dB; PRBS  $2^{31} - 1$ .
2. For 10G Ethernet application, -24dBm is equivalent to an OMA of -22.09dBm for an ER = 9 dB.

**Receiver Specifications – Electrical**

Parameter	Symbol	Min	Typical	Max	Unit
Output differential	Rom	-	100	--	$\Omega$
Differential Output Swing	Vout P-P	350	-	850	mV
Rise/Fall Time[1]	Tr / Tf	24	-	40	ps
Loss of Signal –Asserted	VOH	2	-	Vcc3+0.3-	V
Loss of Signal –Negated	VOL	GND	-	GND+0.5	V

**Notes:**

1. 20%-80%;

**C-band  $\lambda$  c Wavelength Guide\_100GHz**

ITU Channel Product Code	Frequency (THz)	Wavelength (nm)	ITU Channel Product Code	Frequency (THz)	Wavelength (nm)
17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82

30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

## Pin Descriptions

Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Module Ground	1
2		VEE5	Optional -5.2 Power Supply – Not required	
3	LVTTTL-I	Mod-Dese I	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, open collector	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	3
6		VCC5	Not required	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTTL-I	SCL	Serial 2-wire interface clock, open collector	2
11	LVTTTL-	SDA	Serial 2-wire interface data line, open collector	2
12	LVTTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	
13	LVTTTL-O	Mod_NR	Module Not Ready; open collector	2
14	LVTTTL-O	RX_LOS	Receiver Loss of Signal indicator; open collector	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	Not required	

21	LVTTTL-I	P_Down/R ST	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		VCC2	Not required	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board, <b>Not required</b>	4
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board, <b>Not required</b>	4
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	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 3.6V.
3. Laser output disabled on TX\_DIS >2.0V or open, enabled on TDIS <0.8V.
4. Reference Clock input is not required.

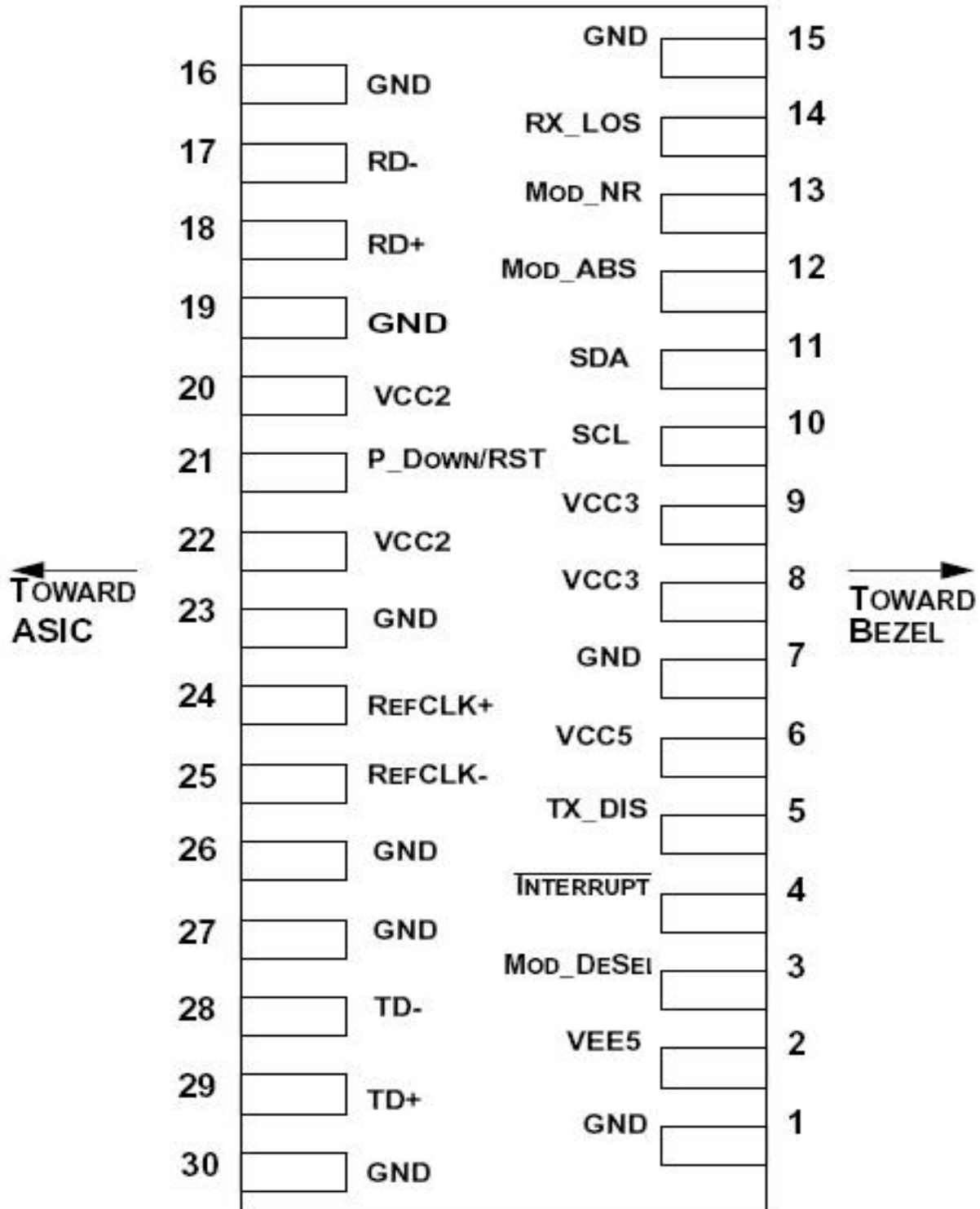


Figure 2. Electrical Pin-out Details

### Mechanical Dimensions

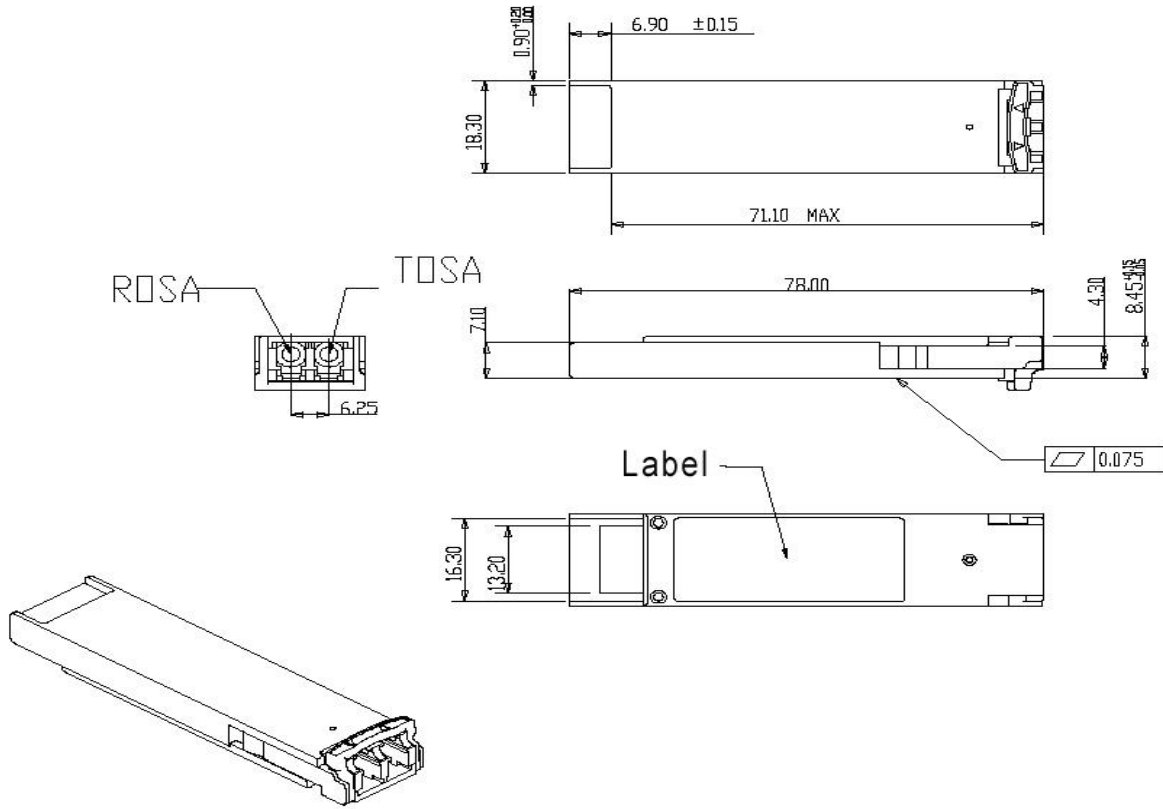
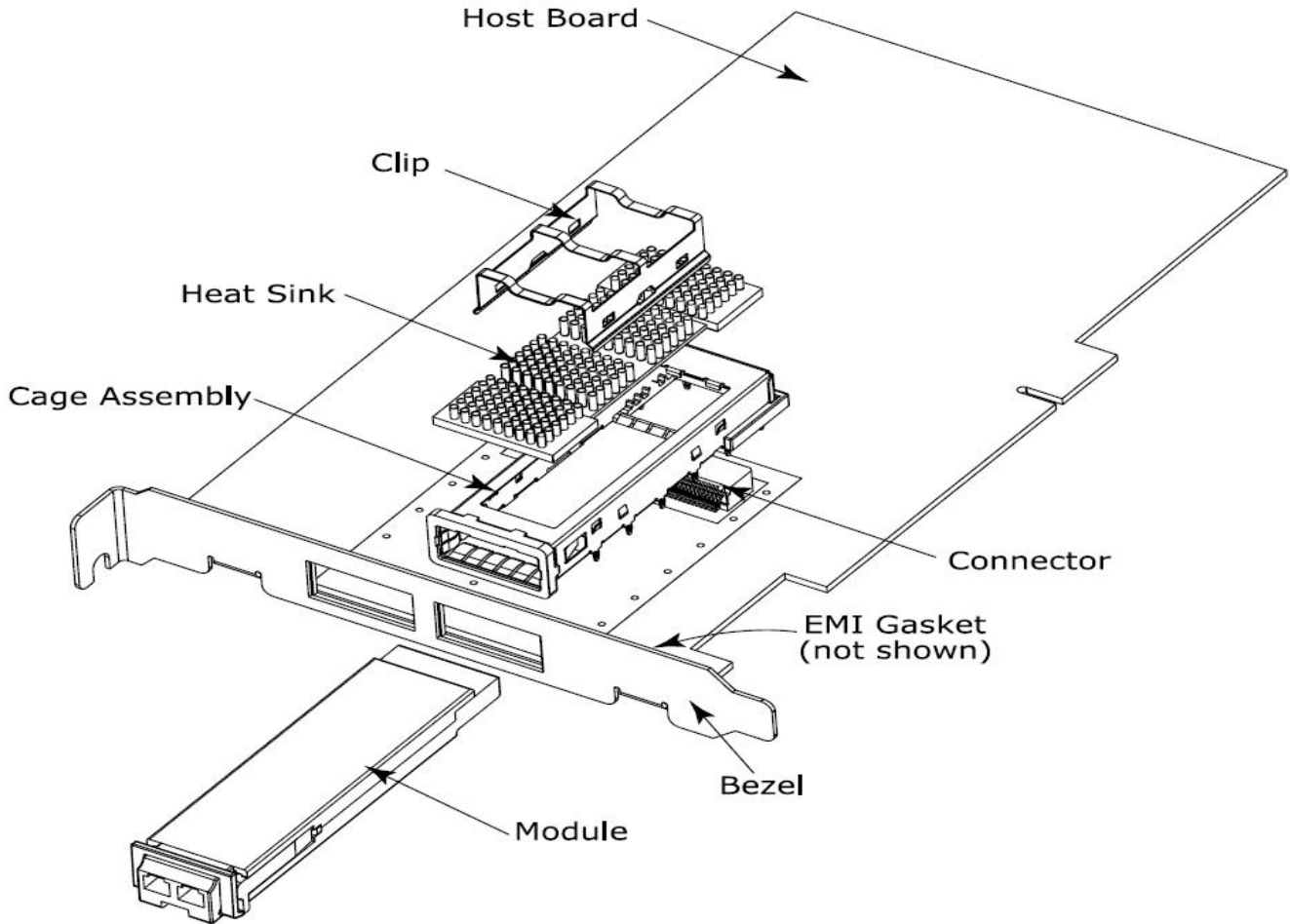


Figure 3. Mechanical Specifications





**Figure 4. XFP Mechanical Components**

The mechanical components defined:

1. The module, clip and connector dimensions are constant for all applications. While the bezel, cage assembly, EMI gasket and heat sink can be designed and/or adjusted for the individual application.
2. The relatively small form factor of the XFP module combined with an adaptable heatsink option allows host system design optimization of module location, heatsink shape/dimension/fins design, and airflow control. The module can be inserted and removed from the cage with the heat sink and clip attached.

## Regulatory Compliance

GIGALIGHT XFP transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Standard
Laser Safety	IEC 60825-1:2014(Third Edition)
Environmental protection	2011/65/EU

CE EMC	EN55032: 2015 EN55035: 2017 EN61000-3-2: 2014 EN61000-3-3: 2013
FCC	FCC Part 15, Subpart B; ANSI C63.4-2014

## References

1. 10 Gigabit Small Form Factor Pluggable Module (XFP) Multi-Source Agreement (MSA), Rev 4.5 – August 2005. Documentation is currently available at <http://www.xfpmsa.org/>
2. IEEE 802.3ae – 2002
3. ITU-T G.709 / ITU-T G.959.1 <http://www.itu.int/>
4. Telcordia GR-253-CORE

## CAUTION:

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Ordering information

Part Number	Product Description
GXD-xx192-08N	xx= ITU Grid 17~61, 100GHz, 10Gbps, DWDM XFP 80km, -20°C to +85°C

## Important Notice

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## Revision History

Revision	Date	Description
V1	Aug-19-2016	