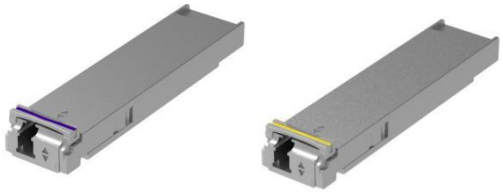
10G XFP BiDi 80km Optical Transceivers
GBX-4955192-E8C/GBX-5549192-E8C

Features

- Support 9.95Gb/s to 10.3Gb/s data rates
- Hot-pluggable XFP footprint
- Maximum link length of 80km with SMF
- EML laser transmitter and APD receiver
- XFP MSA package with LC connector
- No reference clock required
- +3.3V power supply
- Power dissipation < 2W
- Operating CASE Temperature: 0°C to 70°C
- RoHS compliant（Lead Free）



Applications

- 10GBASE-ER/EW Ethernet

Description

The Gigalight 10G XFP BiDi 80km optical transceivers (GBX-4955192-E8C/GBX-5549192-E8C) are compliant with the IEEE 802.3ae 10GBASE-ER/EW standards. Each module comprises a 1490nm (or 1550nm) EML laser transmitter and an integrated 1550nm (or 1490nm) Trans-Impedance Amplifier (TIA) mounted in an optical header and a limiting amplifier IC. Transmitter and receiver are separate within a wide temperature range of 0℃ to +70℃ and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

Absolute Maximum Ratings

Parameter	Symbo	Min	Max	Unit	Ref.
Storage Ambient Temperature		-40	+85	℃	
Powered case Temperature Range		0	+70	℃	
Operating Relative Humidity	RH	5	85	%	
Supply Voltage Range @3.3V	Vcc3	0	3.6	V	

Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions.

Electrical Characteristics

Parameter	Symbo	Min	Typ	Max	Unit	Note
Operating Case Temperature	Tc	0		+70	℃	
Power Supply Voltage @ 3.3V	Vcc3	3.13	3.3	3.47	V	
Module total power	P			2	W	
Transmitter						
Input differential impedance	Rin	90	100	110	Ω	1
Differential data input swing	Vin,pp	120		820	mV	
Transmit Disable Voltage	VD	2.0		VCC	V	
Transmit Enable Voltage	VEN	0		0.8	V	
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output	Vout,pp	340		850	mV	
Data output rise time	t_r			38	ps	2
Data output fall time	t_f			38	ps	2
LOS Fault	$V_{LOS\ fault}$	Vcc – 0.5		Vcc_{HOST}	V	3
LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V	3
Power Supply Rejection	PSR	See Note 3 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.

Optical Characteristics

Parameter	Symbo	Min	Typ	Max	Unit	Ref.
Transmitter						
Optical output Power	P	-4.7		4	dBm	
Optical Wavelength	λ	1480	1490	1500	nm	
		1540	1550	1560		
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3			dB	1
Average Launch power of OFF transmitter	POFF	-30			dBm	
Tx Jitter	Tx_j	Compliant with each standard				
Receiver						
Receiver Sensitivity in OMA	RSENS			-24	dBm	2
Maximum Input Power	PMAX			-1	dBm	

Optical Center Wavelength	λ C	1540		1560	nm	
		1480		1500		
LOS De-Assert	LOS_D			-24	dBm	
LOS Assert	LOS_A	-34			dBm	
LOS Hysteresis		1		5	dB	

Notes:
1, PRBS 2^{31}-1 test pattern @10.3125Gbps.
2, PRBS 2^{31}-1 test pattern @10.3125Gbps, BER≤10^{-12}.

General Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Bit Rate	BR	9.953		10.3125	Gb/s	1
Bit Error Ratio	BER			10^{-12}		2
Max. Supported Link Length	L_{MAX}		80		km	1

Notes:
1. Tested with a 2^{31} – 1 PRBS

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Ref
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – **Not required**	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply– **Not required**	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTL- I/O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready;	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	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	+1.8V Power Supply	
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		VCC2	+1.8V Power Supply	
23		GND	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		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 3.15Vand 3.6V.
3. A Reference Clock input is not required.

Hostboard Connector Pinout

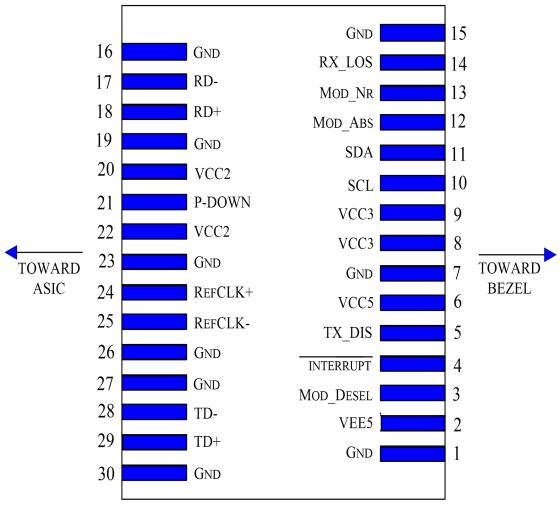


Figure 1: Interface to Host PCB

Management Interface

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented.

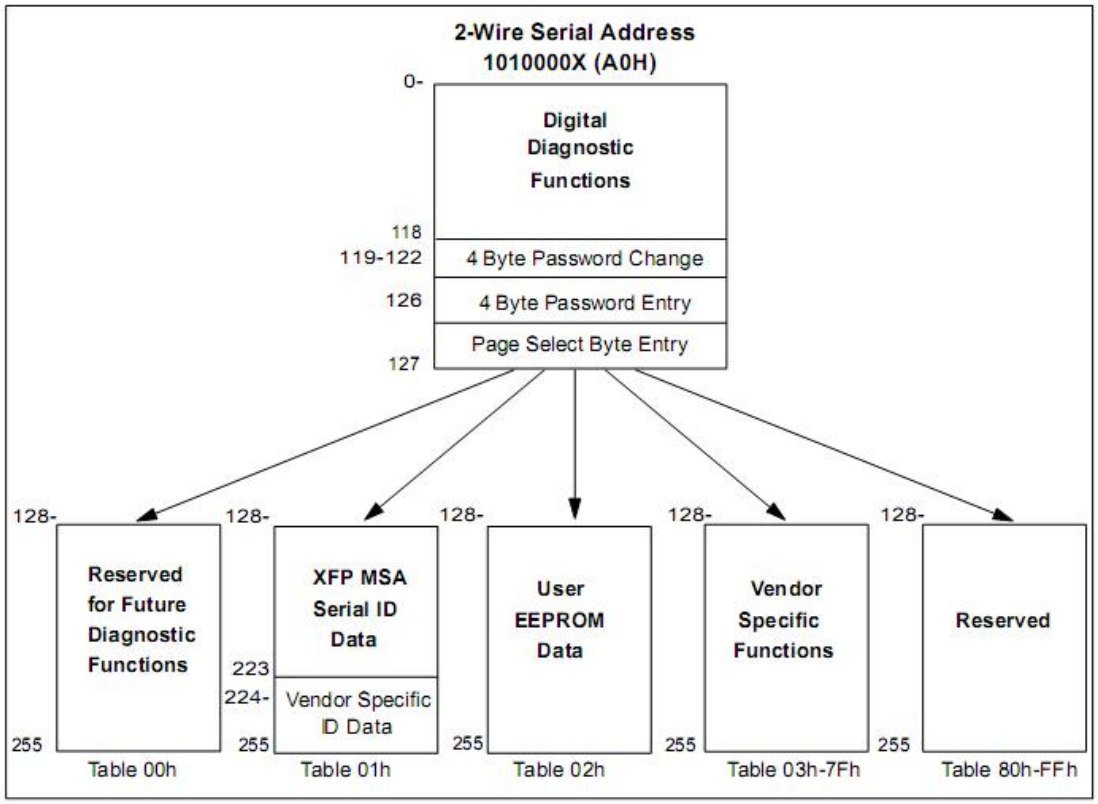


Figure 2. XFP 2-wire Serial Digital Diagnostic Memory Map

Address	Size (Bytes)	Name	Description
		Base ID Fields	
128	1	Identifier	Type of serial transceiver (see Table 32)
129	1	Ext. Identifier	Extended identifier of type of serial transceiver (see Table 47)
130	1	Connector	Code for connector type (see Table 48)
138-131	8	Transceiver	Code for electronic compatibility or optical compatibility (see Table 49)
139	1	Encoding	Code for serial encoding algorithm (see Table 50)
140	1	BR-Min	Minimum bit rate, units of 100 MBits/s.
141	1	BR-Max	Maximum bit rate, units of 100 MBits/s.
142	1	Length(SMF)-km	Link length supported for SMF fiber in km
143	1	Length (E-50µm)	Link length supported for EBW 50/125 µm fiber, units of 2 m
144	1	Length (50 µm)	Link length supported for 50/125 µm fiber, units of 1 m
145	1	Length (62.5 µm)	Link length supported for 62.5/125 µm fiber, units of 1 m
146	1	Length (Copper)	Link length supported for copper, units of 1m
147	1	Device Tech	Device technology (see Table 51, Table 52)
163-148	16	Vendor name	XFP vendor name (ASCII)
164	1	CDR Support	CDR Rate Support (see Table 53)
167-165	3	Vendor OUI	XFP vendor IEEE company ID
183-168	16	Vendor PN	Part number provided by XFP vendor (ASCII)
185-184	2	Vendor rev	Revision level for part number provided by vendor (ASCII)
187-186	2	Wavelength	Nominal laser wavelength (Wavelength = value / 20 in nm)

Address	Size (Bytes)	Name	Description
189-188	2	Wavelength Tolerance	Guaranteed range of laser wavelength (+/- value) from Nominal wavelength. (Wavelength Tol. = value/200 in nm)
190	1	Max Case Temp	Maximum Case Temperature in Degrees C.
191	1	CC_BASE	Check code for Base ID Fields (addresses 120-190)
		Extended ID Fields	
195-192	4	Power Supply	Power supply current requirements and max power dissipation (see Table 54)
211-196	16	Vendor SN	Serial number provided by vendor (ASCII)
219-212	8	Date code	Vendor's manufacturing date code (see Table 55)
220	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver (see Table 56) Bit 1, 0 Reserved
221	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver (see Table 57)
222	1	Aux Monitoring	Defines quantities reported by Aux. A/D channels (see Table 58 Table 59)
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)
		Vendor Specific ID Fields	
255-224	32	Vendor Specific	Vendor Specific EEPROM

Figure 3. Serial ID: Data Fields - Page 01h

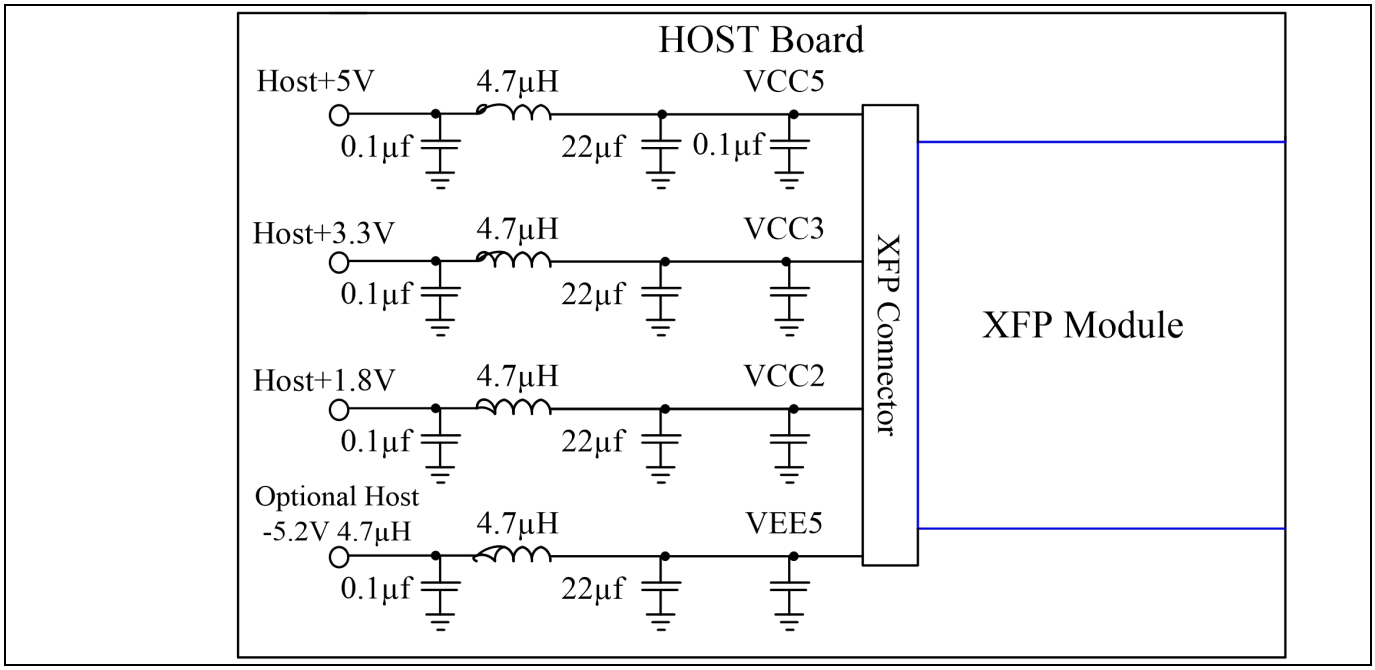


Figure 4:Recommended Host Board Power Supply Circuit

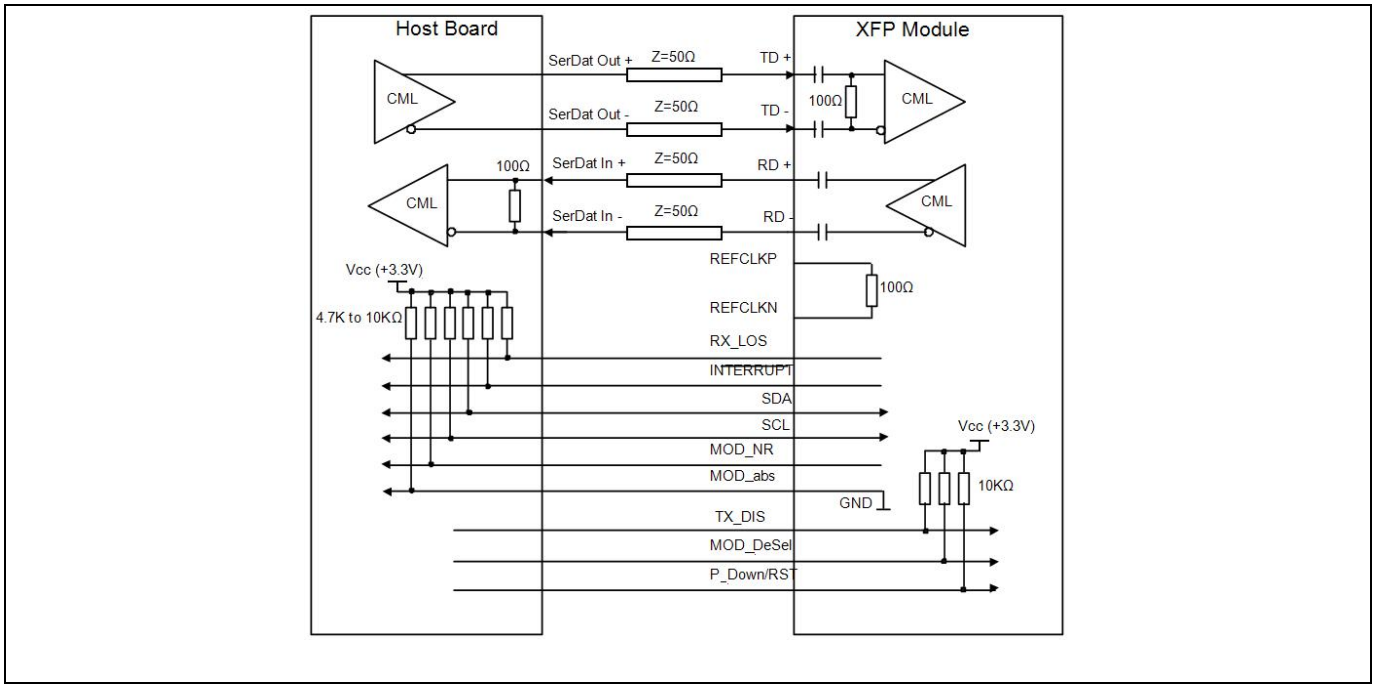


Figure 5:Recommended High-speed Interface Circuit

Mechanical Specifications

XFP transceivers are compliant with the dimensions defined by the XFP MSA

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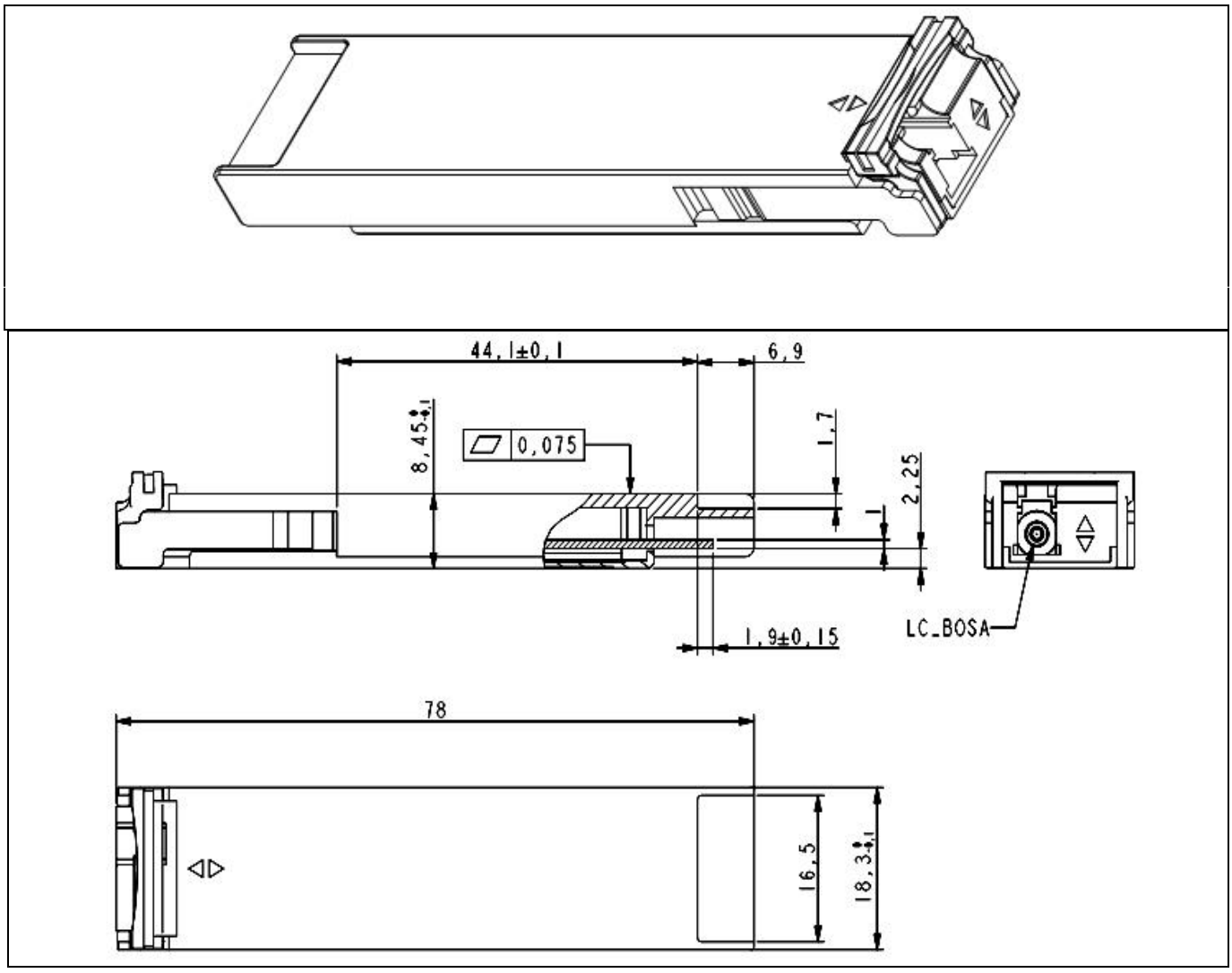

Regulatory Compliance

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

Feature	Standard
Laser Eye Safety	IEC/EN 60825-1:2014
FCC	47CFR FCC Part 15 Subpart B (Class B) ANSI C63.4:2014
RoHS	2011/65/EU and 2015/863/EU
CE EMC	EN55032 EN55035

⚠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
GBX-4955192-E8C	10G XFP BiDi 1490/1550nm 80km Optical Transceiver
GBX-5549192-E8C	10G XFP BiDi 1550/1490nm 80km Optical Transceiver

References

1. 10 Gigabit Small Form Factor Pluggable Module (XFP) Multi-Source Agreement (MSA), Rev 4.5 – August 2005.
2. IEEE802.3ae – 2002
3. ITU-T G.709 / ITU-T G.959.1 http://www.itu.int/
4. Telcordia GR-253-CORE

Important Notice

Performance figures,data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by Gigalight before they become applicable to any particular order or contract. In accordance with the Gigalight policy of continuous improvement specifications may change without notice.

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Revision History

Revision	Date	Description
V0	8-March-2019	Advance Release.