


GBP-XXXX192-E6T**10Gbps SFP+ Bi-Directional Transceiver, 60km Reach**
1270/1330nm TX / 1330/1270 nm RX**Features**

- ✓ Supports 9.95Gb/s to 10.3Gb/s data rates
- ✓ Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- ✓ Single 3.3V Supply
- ✓ Up to 60km on 9/125um SMF
- ✓ A:1270nm DFB Laser transmitter,1330nm APD receiver
- ✓ B:1330nm DFB Laser transmitter,1270nm APD receiver
- ✓ SFP+ MSA SFF-8431 Compliant
- ✓ Digital Diagnostic SFF-8472 Compliant
- ✓ RoHS compliant and Lead Free 
- ✓ Operating case temperature:
- ✓ Industrial CASE temperature: -40 ~ 85 °C

Applications

- ✓ 10GBASE-LR at 10.3125Gbps
- ✓ 10GBASE-LW at 9.953Gbps
- ✓ Other Optical Links
- ✓ OBSAI rates 6.144 Gb/s, 3.072 Gb/s, 1.536 Gb/s, 0.768Gb/s
- ✓ CPRI rates 9.830 Gb/s, 7.373Gb/s, 6.144 Gb/s, 4.915 Gb/s, 2.458 Gb/s, 1.229 Gb/s, 0.614Gb/s

Description

The GBP-XXXX192-E6T series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-LR/LW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

The GBP-XXXX192-E6T module is designed for single mode fiber and operates at a nominal wavelength of 1270nm or 1330nm; The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section consists of a APD photodiode integrated with a TIA.

Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Tst	-40	+85	°C
Case Operating Temperature	Top	-40	+85	°C
Operating Relative Humidity	RH	5	85	%
Supply Voltage	Vcc3.3	-0.3	3.6	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc3	3.135	3.3	3.465	V
Supply current	Icc3	-	300	454	mA
Operating Case temperature	Tca	-40	-	85	°C
Module Power Dissipation	Pm	-	-	1.5	W

Electrical characteristics(T_{OP} = -40 to 85°C, V_{CC} = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Supply Voltage	V _{CC}	3.135	3.3	3.465	V	1
Supply Current	I _{CC}		300	450	mA	1
Transmitter						
Input differential impedance	R _{in}	90	100	110	Ω	2
Single ended data input swing	V _{in,pp}	150		1200	mVpp	
Transmit Disable Voltage	V _D	2		V _{CC}	V	
Transmit Enable Voltage	V _{EN}	V _{ee}		V _{ee} +0.8	V	3
Receiver						
Output differential impedance	R _{out}	90	100	110	Ω	2
Single ended data output swing	V _{out,pp}	300		700	mV	4
LOS Fault	V _{LOS fault}	2		V _{CCHOST}	V	5
LOS Normal	V _{LOS norm}	V _{ee}		V _{ee} +0.8	V	5

Notes:

1. Module power consumption never exceeds 1.5W.
2. AC coupled.
3. Or open circuit.
4. Into 100 ohm differential termination.
5. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical characteristics(T_{OP} = -40 to 85°C, V_{CC} = 3.135 to 3.465 Volts)

(GBP-2733192-E6T, 1270 DFB & 1270 APD/TIA)

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Transmitter						

Optical Wavelength	λ_c	1260	1270	1280	nm	
Side Mode Suppress Ratio	SMSR	30			dB	
Spectral Width(-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	P_{op}	1		7	dBm	1
Extinction Ratio	ER	3.5			dB	
Eye Mask		Compliant with IEEE 802.3				
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Power of OFF Transmitter				-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Receiver						
Average Receiver Power	RSENS			-21	dBm	1,2
Receiver Overload	P_{MAX}	-7			dBm	
Centre Wavelength	λ_C	1320		1340	nm	
LOS De-Assert	LOS_D			-21	dBm	
LOS Assert	LOS_A	-32			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant.
2. Measured with a PRBS2³¹-1 test pattern @10.3125Gbps, BER $\leq 10^{-12}$

(GBP-3327192-E6T, 1330 DFB &1270 APD/TIA)

Parameter	Symbol	Min	Typical	Max	Unit	Ref.
Transmitter						
Optical Wavelength	λ_c	1320	1330	1340	nm	
Side Mode Suppress Ratio	SMSR	30			dB	
Spectral Width(-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	P_{op}	1		7	dBm	1,2
Extinction Ratio	ER	3.5			dB	
Eye Mask		Compliant with IEEE 802.3				
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Power of OFF Transmitter				-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Receiver						

Average Receiver Power	RSENS			-21	dBm	2,3
Receiver Overload	P _{MAX}	-7			dBm	
Centre Wavelength	λ C	1260	1270	1280	nm	
LOS De-Assert	LOS _D			-21	dBm	
LOS Assert	LOS _A	-32			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Output is coupled into a 9/125um SMF.
2. Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant.
3. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps, BER ≤ 10⁻¹²

Pin Descriptions

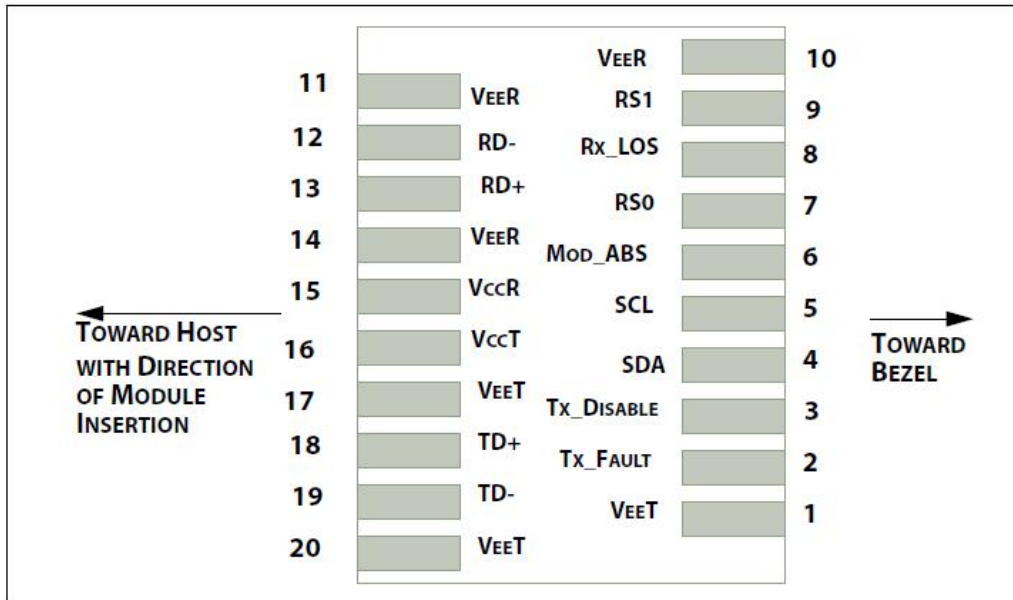


Figure1.Electrical Pin-out Details

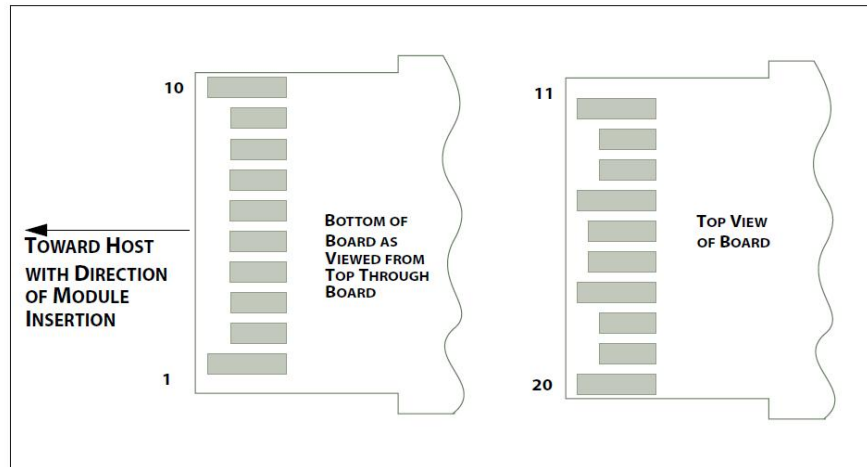


Figure 2.SFP+ module contact assignment

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	RS0 for Rate Select: Open or Low = Module supports ≤4.25Gbps High = Module supports 9.95 Gb/s to 10.3125 Gb/s
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	No connection required
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

[1] Module circuit ground is isolated from module chassis ground within the module.

[2].should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

[3]Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

[4]Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Mechanical Dimensions

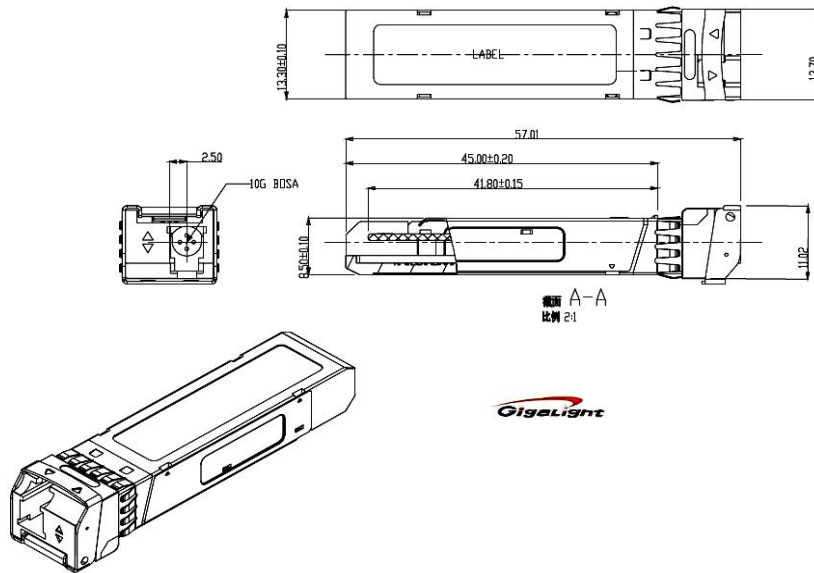


Figure3. Mechanical Specifications

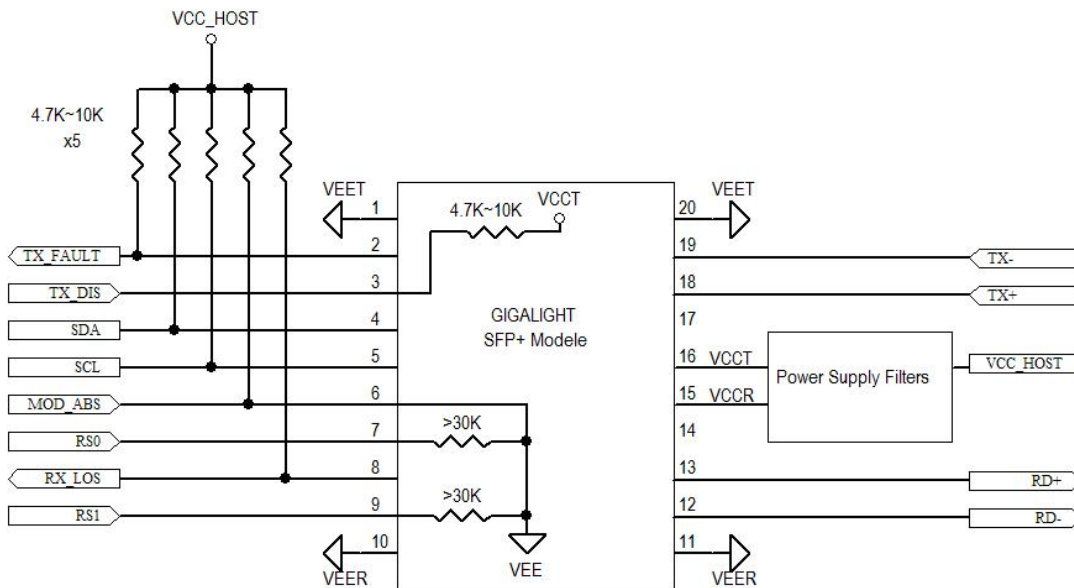


Figure4. Host-Module Interface

Power Supply Filtering

The host board should use the power supply filtering shown in Figure 5.

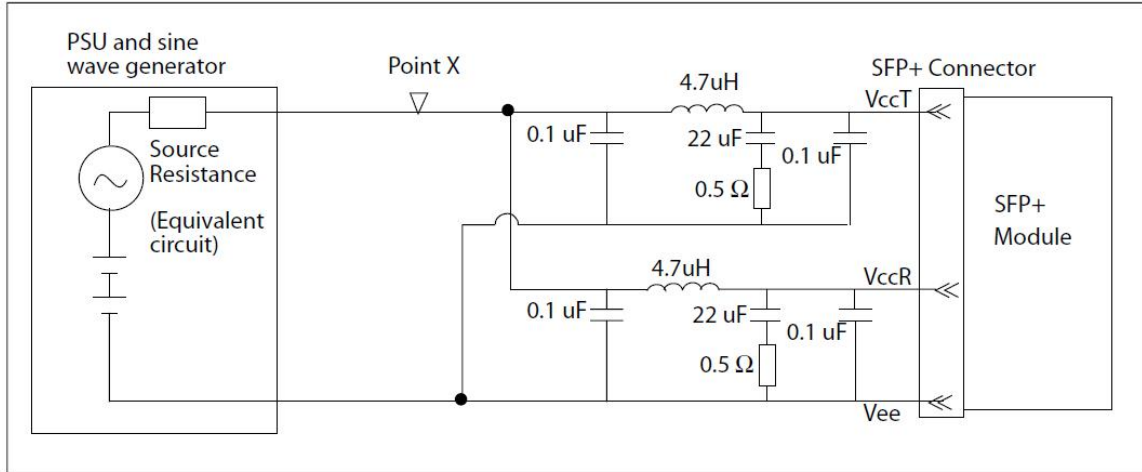


Figure 5. Host Board Power Supply Filters Circuit

DIAGNOSTIC MONITORING INTERFACE

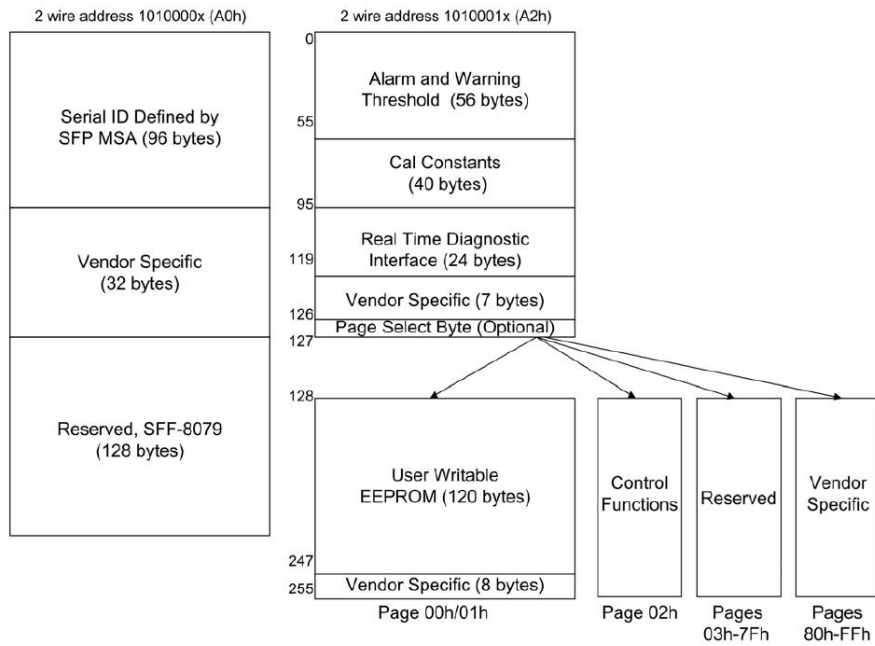


Figure 6. TWO-WIRE INTERFACE FIELDS

A0h	# Bytes	Name	Description
BASE ID FIELDS			
0	1	Identifier	Type of transceiver (see Table 5-1)
1	1	Ext. Identifier	Extended identifier of type of transceiver (see Table 5-2)
2	1	Connector	Code for connector type (see SFF-8024 Transceiver Management)
3-10	8	Transceiver	Code for electronic or optical compatibility (see Table 5-3)
11	1	Encoding	Code for high speed serial encoding algorithm (see SFF-8024 Transceiver Management)
12	1	BR, Nominal	Nominal signalling rate, units of 100MBd. (see details for rates > 25.0Gb/s)
13	1	Rate Identifier	Type of rate select functionality (see Table 5-6)
14	1	Length(SMF,km)	Link length supported for single mode fiber, units of km
15	1	Length (SMF)	Link length supported for single mode fiber, units of 100 m
16	1	Length (50um)	Link length supported for 50 um OM2 fiber, units of 10 m
17	1	Length (62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m
18	1	Length (OM4 or copper cable)	Link length supported for 50um OM4 fiber, units of 10m. Alternatively copper or direct attach cable, units of m
19	1	Length (OM3)	Link length supported for 50 um OM3 fiber, units of 10 m
20-35	16	Vendor name	SFP vendor name (ASCII)
36	1	Transceiver	Code for electronic or optical compatibility (see Table 5-3)
37-39	3	Vendor OUI	SFP vendor IEEE company ID
40-55	16	Vendor PN	Part number provided by SFP vendor (ASCII)
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)
60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)
62	1	Unallocated	
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)

EXTENDED ID FIELDS			
64-65	2	Options	Indicates which optional transceiver signals are implemented (see Table 8-3)
66	1	BR, max	Upper bit rate margin, units of % (see details for rates > 25.0Gb/s)
67	1	BR, min	Lower bit rate margin, units of % (see details for rates > 25.0Gb/s)
68-83	16	Vendor SN	Serial number provided by vendor (ASCII)
84-91	8	Date code	Vendor's manufacturing date code (see Table 8-4)
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver (see Table 8-5)
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver (see Table 8-6)
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with. (see Table 8-8).
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)
VENDOR SPECIFIC ID FIELDS			
96-127	32	Vendor Specific	Vendor Specific EEPROM
128-255	128	Reserved	Reserved for SFF-8079

Figure 7. DATA FIELDS - ADDRESS A0H

A2h	# Bytes	Name	Description
DIAGNOSTIC AND CONTROL/STATUS FIELDS			
0-39	40	A/W Thresholds	Diagnostic Flag Alarm and Warning Thresholds (see Table 9-5)
40-55	16	Optional A/W Thresholds	Thresholds for optional Laser Temperature and TEC Current alarms and warnings (see Table 9-5)
56-91	36	Ext Cal Constants	Diagnostic calibration constants for optional External Calibration (see Table 9-6)
92-94	3	Unallocated	
95	1	CC_DMI	Check code for Base Diagnostic Fields (addresses 0 to 94)
96-105	10	Diagnostics	Diagnostic Monitor Data (internally or externally calibrated) (see Table 9-11)
106-109	4	Optional Diagnostics	Monitor Data for Optional Laser temperature and TEC current (see Table 9-11)
110	1	Status/Control	Optional Status and Control Bits (see Table 9-11)
111	1	Reserved	Reserved for SFF-8079
112-113	2	Alarm Flags	Diagnostic Alarm Flag Status Bits (see Table 9-12)
114	1	Unallocated	
115	1	CDR Unlocked	Optional flags indicating that Tx or Rx CDR is unlocked
116-117	2	Warning Flags	Diagnostic Warning Flag Status Bits (see Table 9-12)
118-119	2	Ext Status/Control	Extended module control and status bytes (see Table 10-1)
GENERAL USE FIELDS			
120-126	7	Vendor Specific	Vendor specific memory addresses (see Table 10-3)
127	1	Table Select	Optional Page Select (see Table 10-3)
Page 00-01h			
128-247	120	User EEPROM	User writable non-volatile memory (see Table 10-4)
248-255	8	Vendor Control	Vendor specific control addresses (see Table 10-5)
Page 02h			
128-129	2	Reserved	Reserved for SFF-8690 (Tunable Transmitter)
130	1	Reserved	Reserved for future receiver controls
131	1	Rx Decision Threshold	RDT value setting
132-172	41	Reserved	Reserved for SFF-8690
173-255	83	Unallocated	

Figure 8. DATA FIELDS - ADDRESS A0H

Regulatory Compliance

Gigalight GBP-XXXX192-E6T SFP+ transceivers are Class 1 Laser Products. They are certified per the following standards:

Agency	Standard
CE EMC	EN55032 EN55035
FCC	47CFR FCC Part 15 Subpart B (Class B) ANSI C63.4:2014
RoHS	2011/65/EU

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
GBP-2733192-E6T	1270nm/1330nm, 10Gbps, 60km, -40°C ~ +85°C
GBP-3327192-E6T	1330nm/1270nm, 10Gbps, 60km, -40°C ~ +85°C

References

1. IEEE802.3ae – 2002
2. 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.

The publication of information in this data sheet does not imply freedom from patent or other protective rights of Gigalight or others. Further details are available from any Gigalight sales representative.

E-mail: sales@gigalight.com

Official Site: www.gigalight.com

Revision History

Revision	Date	Description
V0	January 24, 2019	Advance Release.