GIGALIGHT 10km Bi-Directional SFP+ Optical Transceiver
GBP-XXXX6G-LRx
1270/1330nm TX / 1330/1270 nm RX

Features

- Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- Compliant with SFF-8431,SFF-8432 and IEE802.3ae
- Up to 10km on 9/125um SMF
- Two types：

  A:1270nm DFB Laser transmitter,1330nm receiver

  B:1330nm DFB Laser transmitter,1270nm receiver
- Operating case temperature:

  Standard : 0 to +70℃

  Industrial : -40 to +85℃
- Digital Diagnostic SFF-8472 Compliant
- RoHS6 compliant(lead free)

Applications

- Radio Base Station
- CPRI or OBSAI rates:

  614.4Mb/s,1228.8Mb/s,1536Mb/s,2457.6Mb/s,3072Mb/s,4915.2Mb/s,6144Mb/s
- LTE optical repeater application

Product description

The GBP-2733192-LRC & GBP-3327192-LRC 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-2733192-LRC module is designed for single mode fiber and operates at a nominal wavelength of 1270nm; GBP-3327192-LRC module is designed for single mode fiber and operates at a nominal wavelength of 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 uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

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.

Parameters	Symbol	Min.	Max.	Unit
Supply Voltage	V_{CC}	-0.5	+3.6	V
Storage Temperature	Tc	-40	+85	°C
Operating Case Temperature	T_C	0	25	70
	T_C	-40	25	85
Relative Humidity	RH	0	85	%

Recommended operating Conditions

Parameters	Symbol	Min.	Typical	Max	Unit
Supply Voltage	V_{CC}	3.0	3.3	+3.6	V
Storage Current	Icc		300	360	MA
Operating Case Temperature	Tc	-10	25	+70	°C
	Tc	-40	25	+85	°C
Relative Humidity	Pm	-	0.7	1.1	W

Notes:
1,Supply current is shared between VCCTX and VCCRX.
2,In-rush is defined as current level above steady state current requirements

Electrical characteristics

Parameter	Symbol	Min	Typical	Max		Unit
Supply Voltage	Vcc	3.00		3.60		V
Supply Current	Icc		200	300		MA
Transmitter						
Input differential impedance	R_{in}		100		Ω	Input differential
Single ended data input swing	$V_{in,pp}$	150		1200	mVpp	Single ended
Transmit Disable Voltage	V_D	2		V_{CC}	V	Transmit Disable
Transmit Enable Voltage	V_{EN}	Vee		Vee+0.8	V	Transmit Enable
Receiver						
Output differential impedance	R_{out}		100		Ω	2
Single ended data output swing	Vout,pp	300		700	mV	4
LOS Fault	$V_{LOS\ fault}$	2		VCC_{HOST}	V	5
LOS Normal	$V_{LOS\ norm}$	Vee		Vee+0.8	V	5

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

Optical characteristics (GBP-2733192-LRC, 1270 DFB & PIN/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)	Δλ			1	nm	
Average Output Power	P_{op}	-8.2		0.5	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			-14.1	dBm	1,2
Receiver Overload	P_{MAX}			+0.5	dBm	
Centre Wavelength	λC	1320	1330	1340	nm	
LOS De-Assert	LOS_D			-15	dBm	
LOS Assert	LOS_A	-30			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≦10-12

Optical characteristics(GBP-3327192-LRC, 1330 DFB & PIN/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)	Δλ			1	nm	
Average Output Power	P_{op}	-8.2		0.5	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			-14.1	dBm	1,2

Receiver Overload	P_{MAX}			+0.5	dBm	
Centre Wavelength	λC	1260	1270	1280	nm	
LOS De-Assert	LOS_D			-15	dBm	
LOS Assert	LOS_A	-30			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 PRBS231-1 test pattern @10.3125Gbps, BER≦10-12

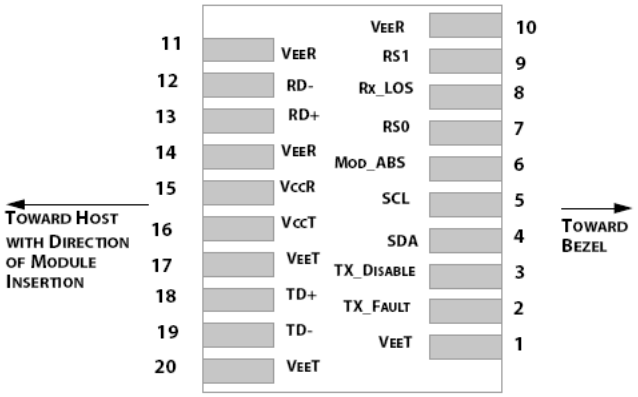


Figure1:Interface to Host PCB

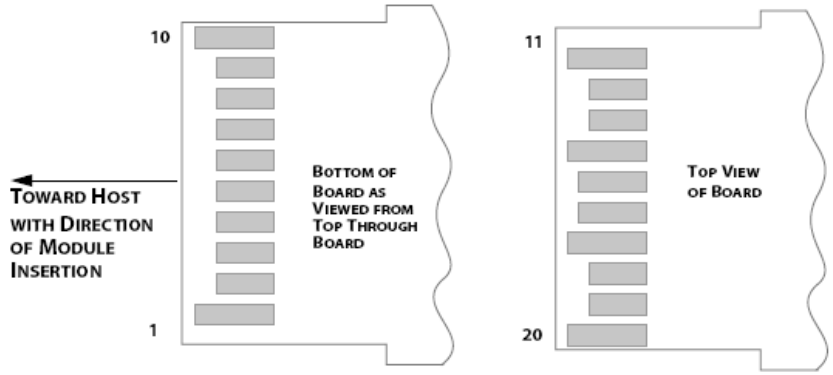


Figure 2: Module Contact Assignment

Pin definltion

Parameter	*Symbol*	*Min.*	*Max.*	*Unit*	*Conditions*
TX_Disable assert time	t_off		100	µs	rising edge of TX_Disable to fall of output signal below 10% of nominal
TX_Disable negate time	t_on		2	ms	Falling edge of Tx_Disable to rise of output signal above 90% of nominal. This only applies in normal operation, not during start up or fault recovery.
Time to initialize 2-wire interface	t_2w_start_up		300	ms	From power on or hot plug after the supply meeting Table 8.
Time to initialize	t_start_up		300	ms	From power supplies meeting Table 8 or hot plug or Tx disable negated during power up, or Tx_Fault recovery, until non-cooled power level I part (or non-cooled power level II part already enabled at power level II for Tx_Fault recovery) is fully operational.
Time to initialize cooled module	t_start_up_cooled		90	s	From power supplies meeting Table 8 or hot plug, or Tx disable negated during power up or Tx_Fault recovery, until cooled power level I part (or cooled power level II part during fault recovery) is fully operational.
Time to Power Up to Level II	t_power_level2		300	ms	From falling edge of stop bit enabling power level II until non-cooled module is fully operational
Time to Power Down from Level II	t_power_down		300	ms	From falling edge of stop bit disabling power level II until module is within power level I requirements
TX_Fault assert	TX_Fault_on		1	ms	From occurrence of fault to assertion of TX_Fault
TX_Fault assert for cooled module	TX_Fault_on_cooled		50	ms	From occurrence of fault to assertion of TX_Fault
TX_Fault Reset	t_reset	10		µs	Time TX_Disable must be held high to reset TX_Fault
RS0, RS1 rate select timing for FC	t_RS0_FC, RS1_FC		500	µs	From assertion till stable output
RS0, RS1 rate select timing non FC	t_RS0, t_RS1		10	ms	From assertion till stable output
Rx_LOS assert delay	t_los_on		100	µs	From occurrence of loss of signal to assertion of Rx_LOS
Rx_LOS negate delay	t_los_off		100	µs	From occurrence of presence of signal to negation of Rx_LOS

Notes:

1. Module circuit ground is is isolated from module chassis ground within the module.
2. should be pulled up with 4.7-10k ohms on host board to a voltage between 3.15 and 3.6V.
3. Tx_Disable is an input contact with a 4.7KΩ 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 4.7kΩ。Mod_ABS is asserted High when the SFP+ module is physically absent from a host slot.
5. Rso and RS1 are module inputs and are pulled low to VeeT with>30k resistors in the module

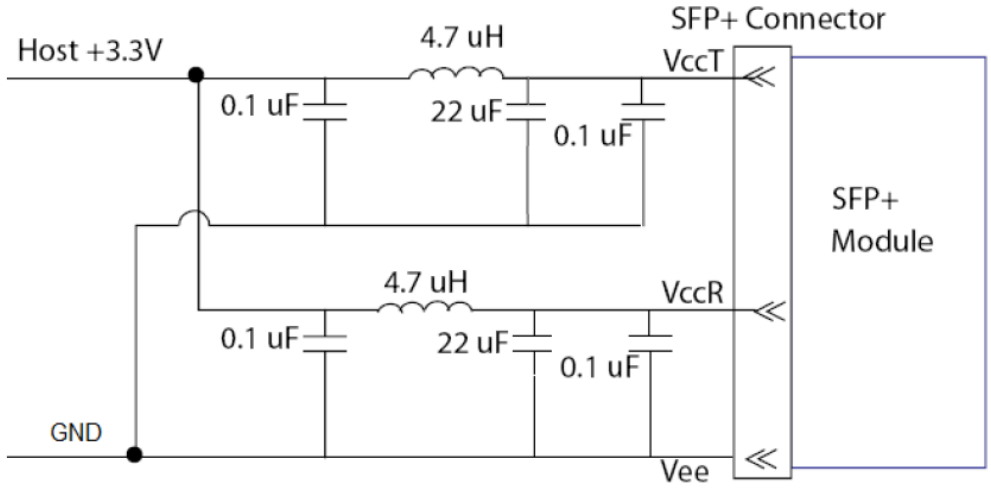


Figure3. Host Board Power Supply Filters Circuit

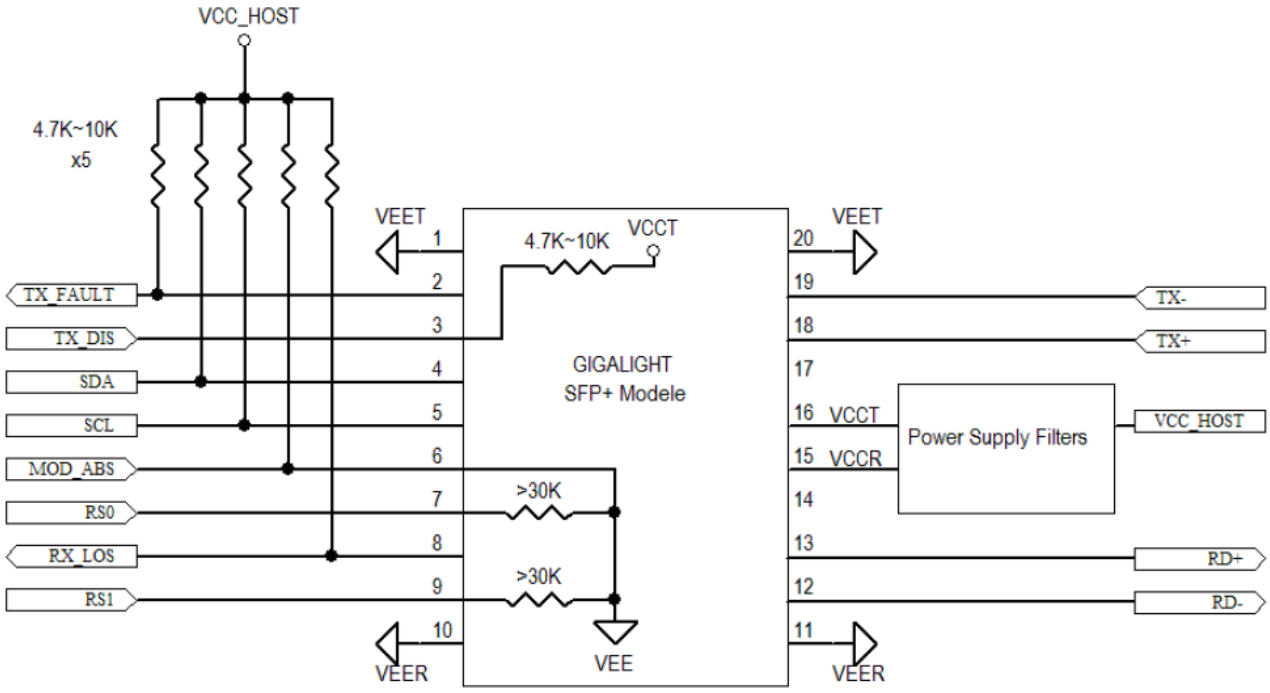
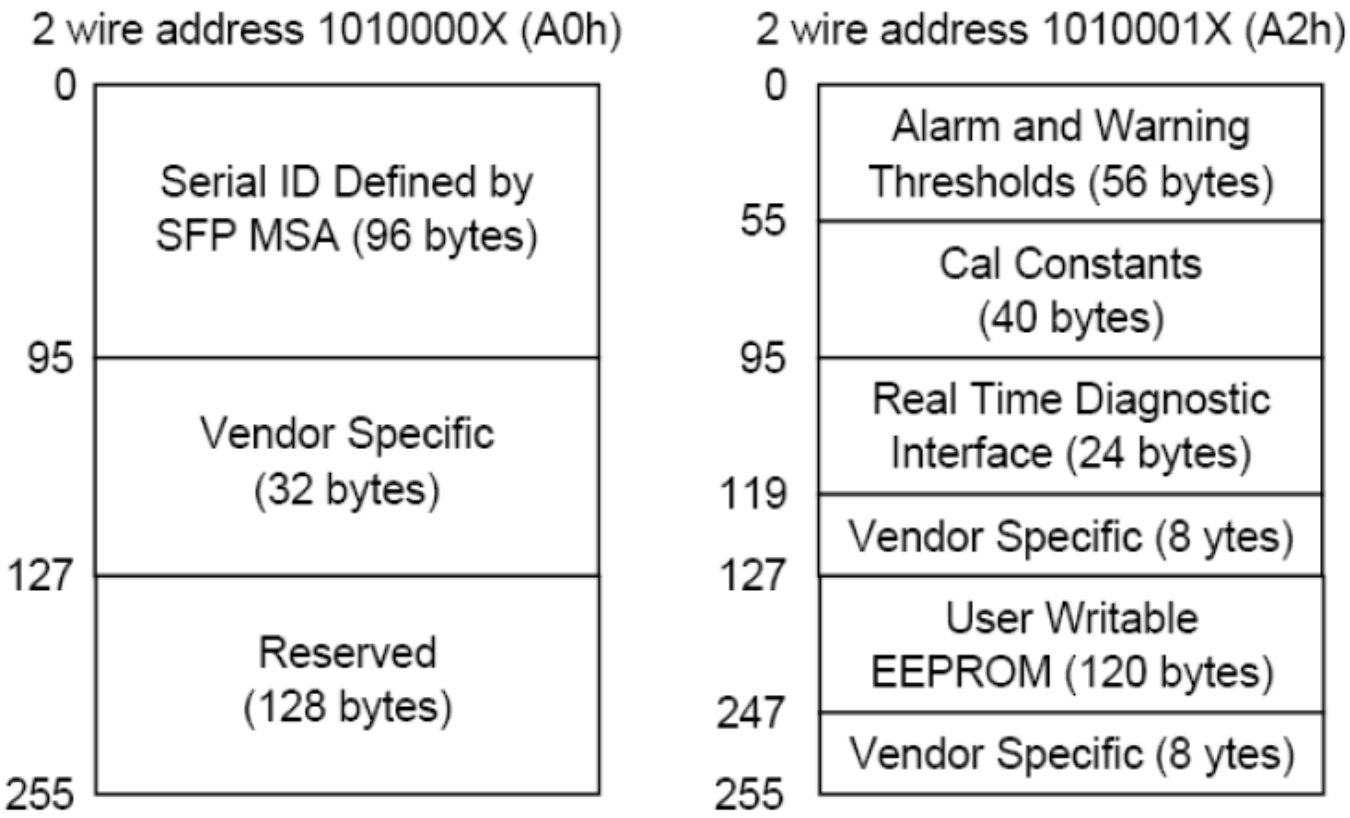


Figure4. Host-Module Interface

EEPROM

The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components.When the serial protocol is activated,the host generates the serial clock signal(SCL).The serial data signal (SDA) is bi-directional for serial data transfer.The
Host uses SDA in conjunction with SCL to mark the start and end of serial protocol actvation .The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating condition.The transceiver generates this diagnostic data by digitization of internal analog signals.Calibration and alarm/warning threshold data is written during device manufacture .Received power monitoring ,transmitted power monitoring,bias current monitoring,supply voltage monitoring and diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM location 56-95 at wire serial bus address A2H .The digital diagnostic memory map specific data field define as following .For detail EEPROM information ,please refer to the related document of SFF 8472 Rev 10.3



Mechanical

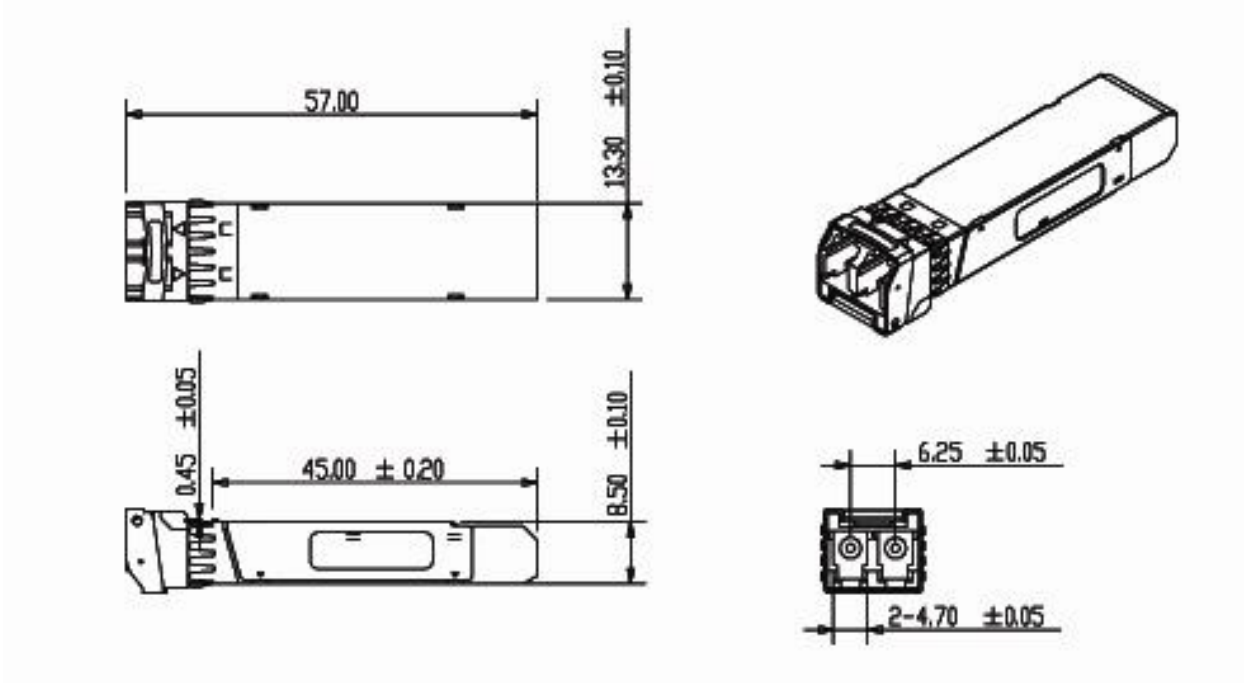


Table 9: Key Mechanical Dimensions

Regulatory Compllance

GIGALIGHT SFP+ transceiver designed to be Class I laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certficate/Comments
Laser Safety	FDA	CDRH 21CFR 1040 and laser Notice No.50	1120292-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	ROHS Directive 2002/95/EC	GZ1001008918/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003	WT10093759-D-E-E

Ordering information

Part Number	Product Description
GBP-27336G-LRC	1270nm/1330nm, 6.25Gbps, 10km, -10ºC ~ +70ºC
GBP-33276G-LRC	1330nm/1270nm, 6.25Gbps, 10km, -10ºC ~ +70ºC
GBP-27336G-LRT	1270nm/1330nm, 6.25Gbps, 10km, -40ºC ~ +85ºC
GBP-33276G-LRT	1330nm/1270nm, 6.25Gbps, 10km, -40ºC ~ +85ºC

References

1.Specification for Enhanced Small Form Factor Pluggable Module SFP+,SFF-8431,Rev4.1 July 6 2009.
2.Improved Pluggable Formfactor SFF-8432,Rev 4.2,Apr 18,2007
3.IEEE802.3ae-2002
4.Diagnostic Monitoring Interface for Optical Transceiver SFF-8472,Rev 10.3,Dec 1,2007

Important Notice

Performance figure ,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 accordiance with the GIGALIGHT policy of contiuous improvement specification may change without notice.

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