GP-315G-L1TI

4.9Gb/s, 10km Single Mode, Multi-Rate SFP Transceiver

Product Features

- Up to 4.9Gbit rates
- Hot-pluggable SFP footprint
- Single 3.3 V supply
- 10km link length
- Duplex LC connector
- 1310nm DFB transmitter, PIN photo-detector
- Operating case temperature: -40ºC ~ +85ºC
- Built-in digital diagnostic functions
- Gigabit Ethernet compatible
- SFP MSA SFF-8074i compliant
- Digital Diagnostic SFF-8472 compliant
- Digital Diagnostic Monitoring：Internal Calibration or External Calibration
- RoHS-6 compliant (lead-free)

Applications

- Multi-Rate 2.4576Gbps/3.0720Gbps/4.9142Gbps for CPRI
- Other optical links

Description

Gigalight SFP 10KM 1310nm Transceiver is a “Limiting module”, and 3.072G/4.25G/4.9G Fiber Channel applications.

The transceiver consists of two sections: The transmitter section incorporates a DFB laser. And the receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements.

Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, 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.

Absolute maximum Rating

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

Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	VCC	0	+3.6	V
Storage Temperature	Tc	-40	+85	℃
Operating Case Temperature	Tc	-40	+85	℃
Relative Humidity	RH	5	95	%

Recommended operating environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.135	3.300	3.465	V
	ICC		200	250	mA
Operating Case Temperature	TC	-40		+85	℃
Power Dissipation	PD			0.8	W
Data Rate			4.25	4.9	Gbps
Transmission Distance				10	KM

Low Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Power Consumption				1.5	W
TX_Fault,RX_LOS	VOL	0		0.4	V
	VOH	Host_Vcc-0.5		Host_Vcc+0.3	V
TX_DIS	VIL	-0.3		+0.8	V
	VIH	2.0		VCCT+0.3	V
RS0,RS1	VIL	-0.3		+0.8	V
	VIH	2.0		VCCT+0.3	V

Optical characteristics

Parameter	Symbol	Min

Operating Reach	km	10
Transmitter		
Center wavelength (range)	nm	1260 -1355
Side Mode Suppression Ratio (min)	dB	40
Launched power		
maximum	dBm	-1
minimum	dBm	-5 (Notes1)
Transmitter and dispersion penalty	dB	+3.2
Average launch power of OFF transmitter (max)	dBm	-30
Extinction ratio (min)	dB	5
Optical Return Loss Tolerance (min)	dB	12
Receiver		
Center wavelength (range)	nm	1260 -1355
Receive overload (max) in average power[1]	dBm	-1
Receive sensitivity (min)	dBm	-16(Notes2)
Receiver sensitivity (max)	dBm	-14(Notes2)
Receiver Reflectance(max)	dB	-20
Vertical eye closure penalty (min)[3]	dB	2.2
Receiver power (damage, Max)	dBm	0
Notes: 1. The optical power is launched into SMF 2. Measured with a PRBS 2^{7-1} test pattern@4.9Gbps BER≤10^{-12}		

Electrical characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unlessotherwise specified.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate			4.25	4.9	Gbps	

Power Consumption				800	mW	
Transmitter						
Single Ended Output Voltage Tolerance		-0.3		+4.0	V	
C common mode voltage tolerance		15			mV	
Tx Fault	VoL	-0.3		0.4	V	
Receiver						
Single Ended Output Voltage Tolerance		-0.3		4.0	V	
Rx Output Diff Voltage	Vo	600		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	20% to 80%

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environmentunless otherwise specified. It is compliant to SFF-8472 Rev12.2 with internal calibration mode. For externalcalibration mode please contact our sales stuff.

Parameter	Symbol	Min	Max	Unit	Notes
Accuracy					
Transceiver Temperature	DMI_Temp	-3	+3	degC	Over operating temp
TX Output optical power	DMI_TX	-3	+3	dB	
RX Input optical power	DMI_RX	-3	+3	dB	
Transceiver Supply voltage	DMI_VCC	-0.08	+0.08	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	10%	mA	
Dynamic Range Accuracy					
Transceiver Temperature	DMI_Temp	-40	+85	degC	
TX Output optical power	DMI_TX	-7	1	dBm	
RX Input optical power	DMI_RX	-16	-1	dBm	
Transceiver Supply voltage	DMI_VCC	3.0	3.6	V	
Bias current monitor	DMI_Ibias	0	40	mA	

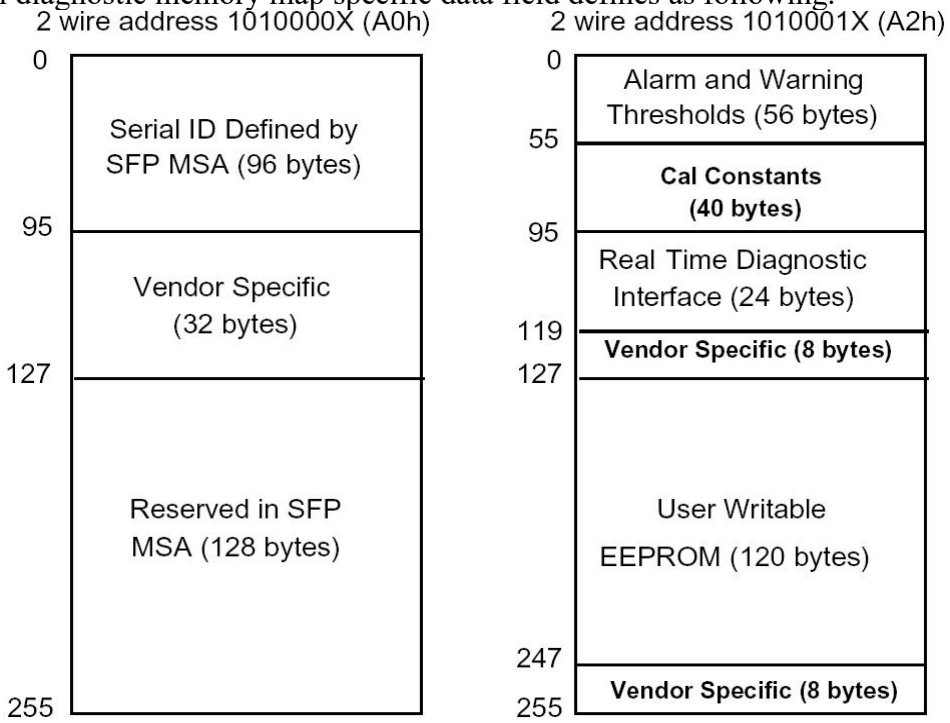
Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present

operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



Data Addr	Field Size (Byte)	Name Of filed	Description of field	Coded value
0	1	Identifier	Type of serial transceiver	03
1	1	Ext.Identifier	Extended identifier of type of serial transceiver	04
2	1	Connector	Code for connector type	07
3	8	Transceiver	Infiniband compliance codes	00
4			Part of SONET compliance codes	00
5			SONET compliance codes	00
6			Gigabit ethernet compliance codes	00
7			Fiber channel link length & part of transmitter technology	00
8			Part of fiber channel transmitter technology	00
9			Fiber channel transmission media	00
10			Fiber channel speed	00

11	1	Encoding	Code for serial encoding algorithm	01
12	1	BR, Nominal	Nominal bit rate,units of 100 Mbits/sec.	31
13	1	Reserved	Reserved	00
14	1	Length (9um)	Link length supported for 9/125 um fiber, units of km	0A
15	1	Length (9um)	Link length supported for 9/125 um fiber, units of 100 m	64
16	1	Length (50um)	Link length supported for 50/125 um fiber, units of 10 m	00
17	1	Length (62.5um)	Link length supported for 62.5/125 um fiber, units of 10 m	00
18	1	Length (Copper)	Link length supported for copper or direct attach cable, units of m	00
19	1	Length (50um)	Link length supported for 50 um OM3 fiber, units of 10 m	00
20	16	Vendor name	Vendor name (ASCII)	47
21				69
22				67
23				61
24				6c
25				69
26				67
27				68
28				74
29				20
30				20
31				20
32				20
33				20
34				20
35				20
36	1	Reserved	Reserved	00
37	3	Vendor OUI	Vendor IEEE company ID	00
38				00
39				00
40	16	Vendor PN	Part number provided by vendor (ASCII)	47
41				50
42				2D
43				33

44				31
45				35
46				47
47				2D
48				4C
49				31
50				54
51				49
52				20
53				20
54				20
55				20
56	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	31
57				2E
58				30
59				20
60	2	Wavelength	Laser wavelength	05
61				1E
62	1	Reserved	Reserved	00
63	1	CC_BASE	The sum of all the bytes from byte 0 to byte 62	88
64	2	Options	Indicates which optional transceiver signals are implemented	00
65				1A
66	1	BR, max	Upper bit rate margin, units of %	00
67	1	BR, min	Lower bit rate margin, units of %	00
68	16	Vendor SN	Serial number provided by vendor (ASCII)	53
69				31
70				38
71				31
72				30
73				31
74				38
75				30
76				30
77				30
78				31
79				20

80				20
81				20
82				20
83				20
84	8	Date code	Vendor's manufacturing date code	31
85				38
86				31
87				30
88				31
89				38
90				20
91				20
92	1	Diagnostic Monitoring Type	Compliant with SFF-8472 V9.5 Externally Calibrated Received power measurement type-Average Power	68
93	1	Enhanced Options	Diagnostics (Optional Alarm/warning flags) Soft TX_FAULT monitoring implemented Soft RX_LOS monitoring implemented	F0
94	1	SFF-8472 Compliance	Diagnostics Compliance(SFF-8472 V9.5)	08
95	1	CC_EXT	The sum of all the bytes from byte 64 to byte 94	D4
96-127	32	Vendor Specific	Vendor Specific EEPROM	00

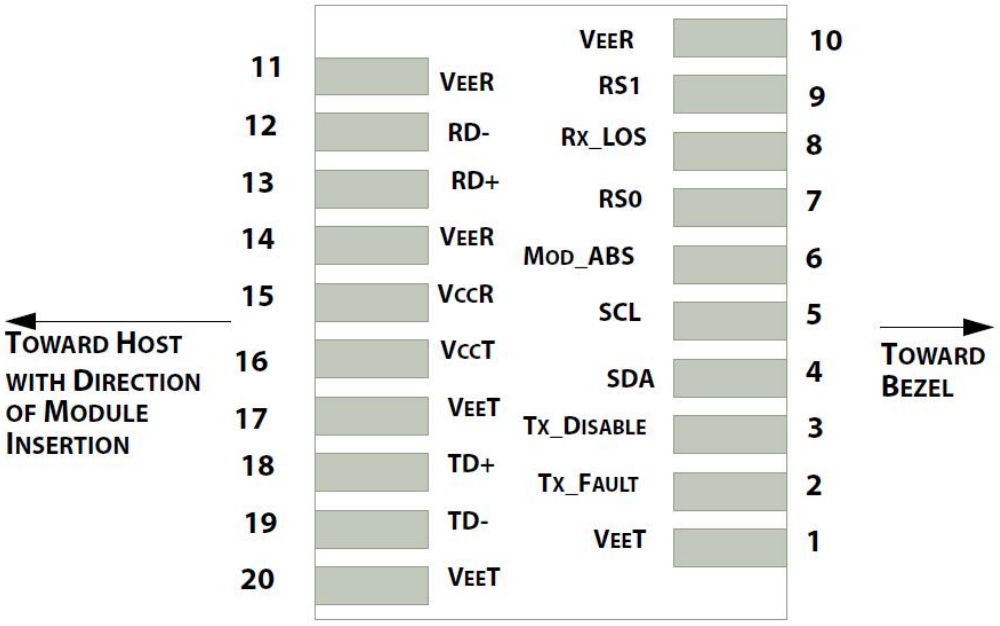


Figure 1.Host PCB SFP pad assignment top view

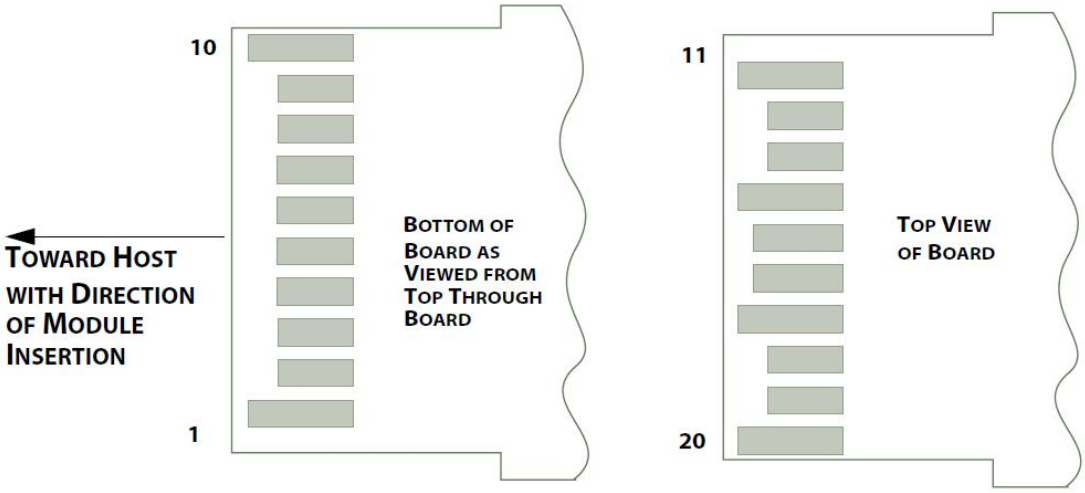


Figure 2.SFP module contact assignment

Pin Descriptions

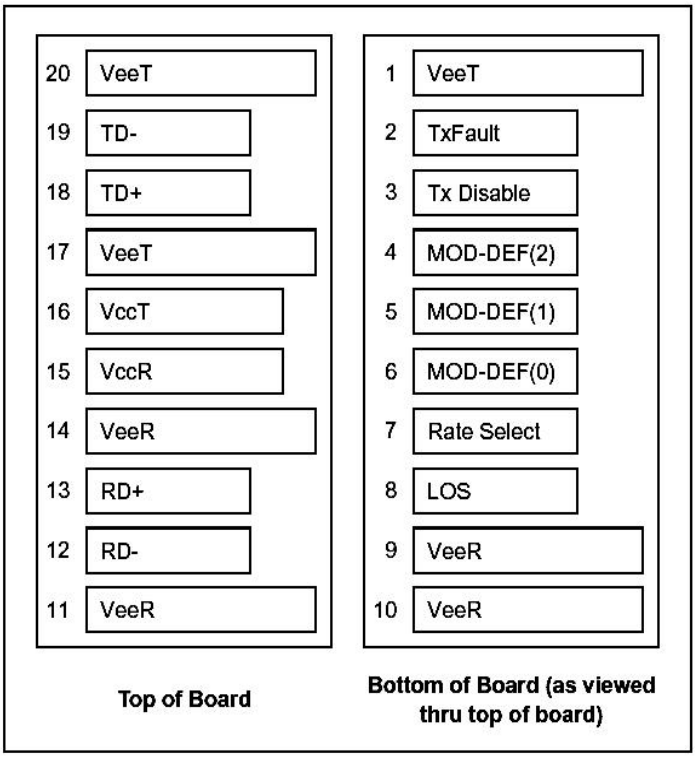


Figure 3. Pin Descriptions

Pin	Symbol	Name/Description
1	VEET[1]	Transmitter Ground
2	Tx_FAULT[2]	Transmitter Fault Indication
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]	Rate Select 0
8	RX_LOS[2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1[5]	Rate Select 1
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 3.15Vand 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 inthe range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFPmodule 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.

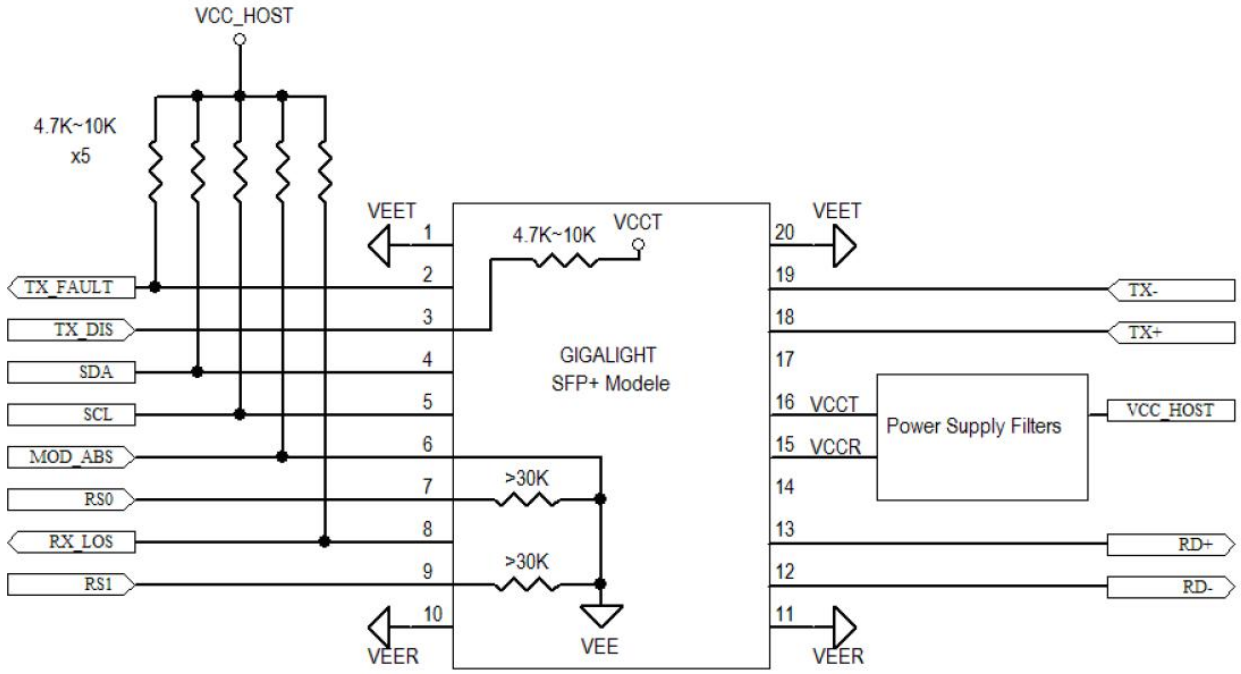


Figure4. Host-Module Interface

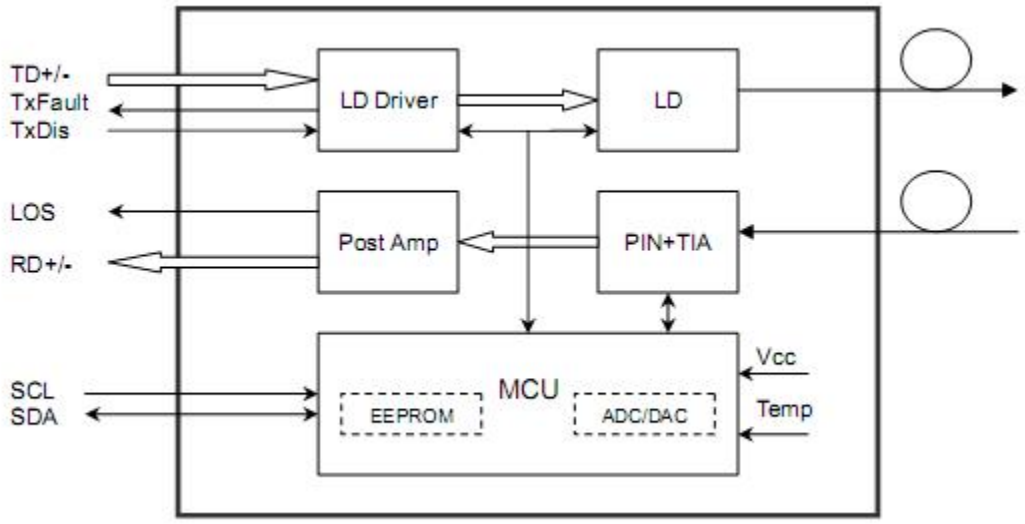


Figure5. Module Block Diagram

Power Supply Filtering

The host board should use the power supply filtering shown in Figure6.

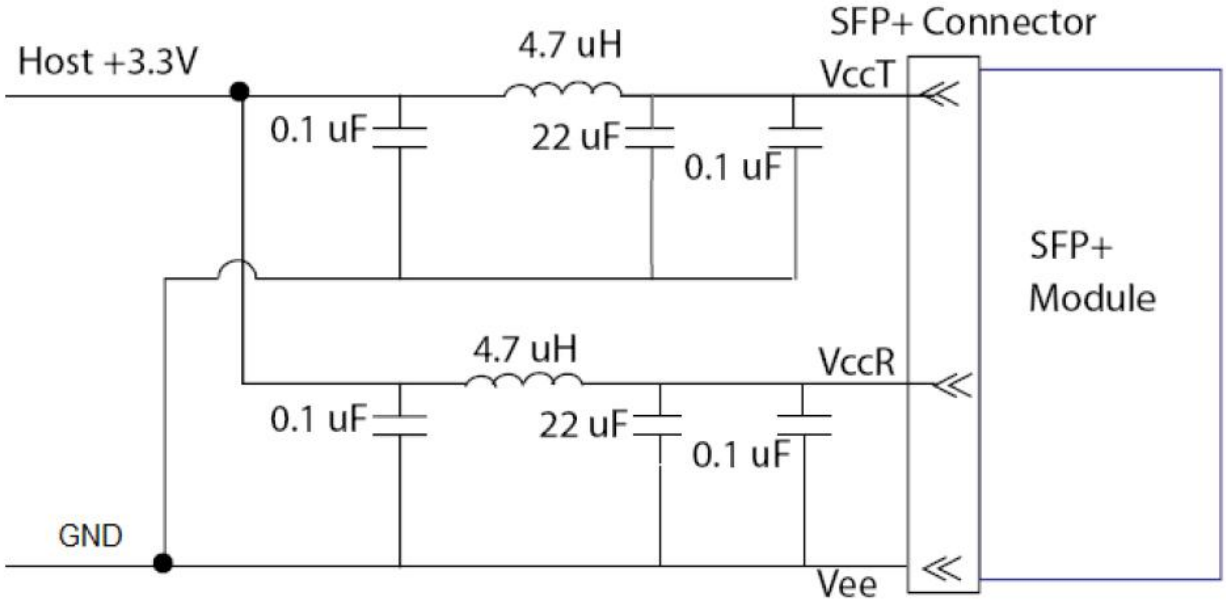


Figure6. Host Board Power Supply Filters Circuit

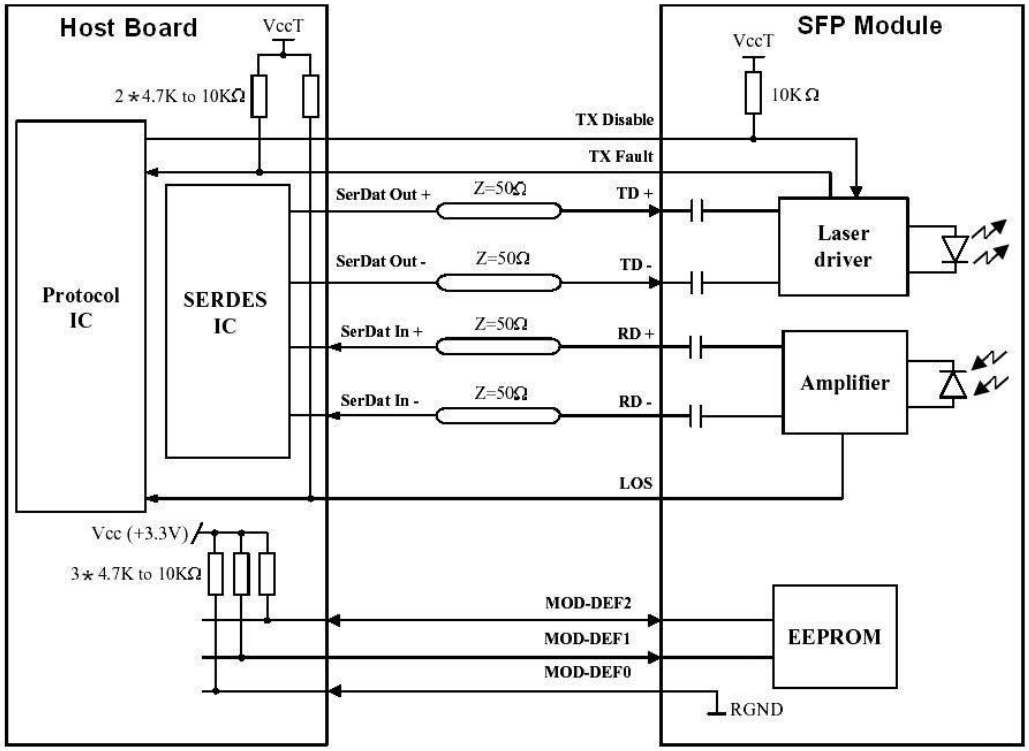


Figure7. Recommended Interface Circuit

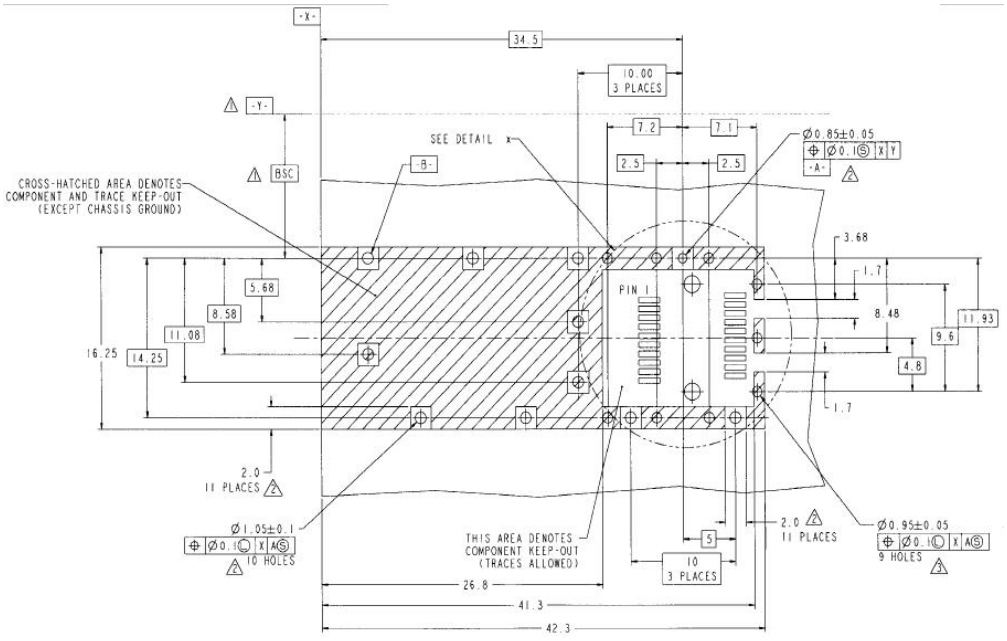


Figure8. SFP Host Board Mechanical Layout

Mechanical Dimensions

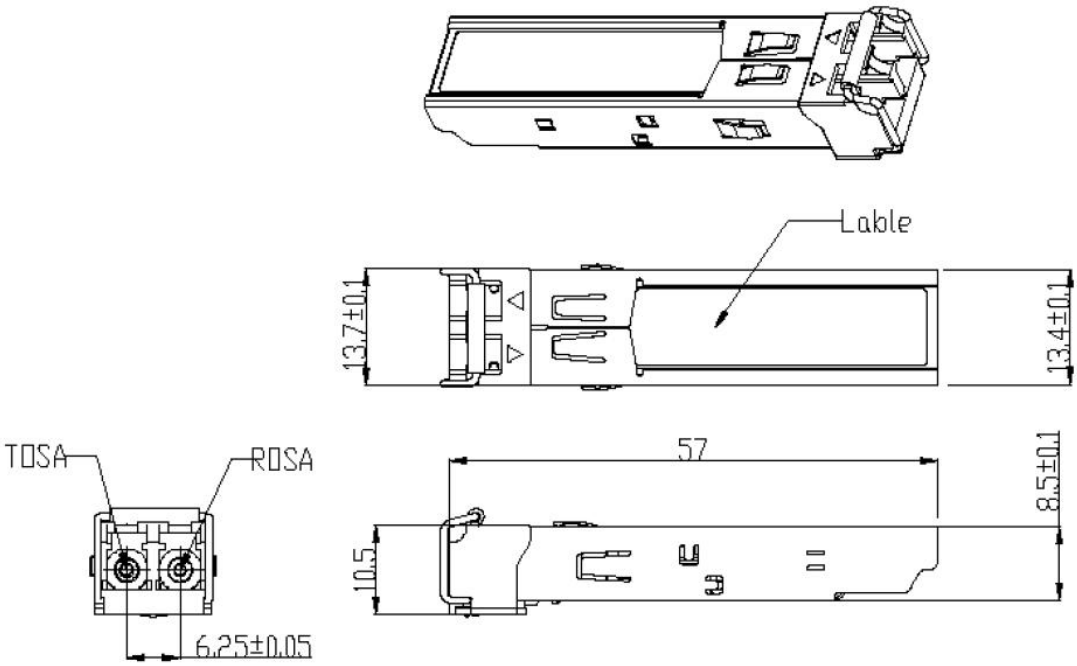


Figure9. Mechanical Specifications

Ordering information

Part Number	Name/Description
GP-315G-L1TI	SFP CPRI 1310nm, 4.9Gbps, SFP 10KM, -40ºC ~ +85ºC

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must bespecifically confirmed in writing by GIGALIGHT before they become applicable to any particular order orcontract. In accordance with the GIGALIGHT policy of continuous improvement specifications may changewithout notice.

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E-mail: sales@gigalight.com.cn
Web : http://www.gigalight.com

Revision History

Version	Date	Description
V0	May-27-2016	New release
V1	Oct-18-2018	Add Memory Map Add SFP Host Board Mechanical Layout Add Module Block Diagram Add Host-Module Interface