

SFP+ 10G BIDI



GOXP-BI2396-20

10Gb/s SFP+ T1270/R1330nm 20km BiDi

GOXP-BI3296-20

10Gb/s SFPT 1330/R1270nm 20km BiDi

> Description GOXP-BI2396-20:

GOXP-BI2396-20
SFP+, 10G, BIDI, 1270/1330NM,
20KM, SMF, DDM

> Overview:

Syrotech GOCP-BI2396-20 is hot pluggable 3.3V Small-Form-Factor transceiver module. It designed expressly for high-speed communication applications that require rates up to 10.7Gbps, it designed to be compliant with SFF-8472 and SFP+ MSA. The module data link up to 10km in 9/125um single mode fiber. The optical output can be disabled by a LVTTTL logic high-level input of Tx Disable. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner.

> Features:

- SFP MSA package with duplex LC connector
- Very low EMI and excellent ESD protection
- Digital Diagnostic Monitor Interface
- Hot pluggable
- 10Gb/s serial optical interface
- Up to 10km distance
- Compliant with SFP+ MSA
- High transmission margin
- +3.3V single power supply
- Below <1.5W power consumption
- SFP mechanical interface

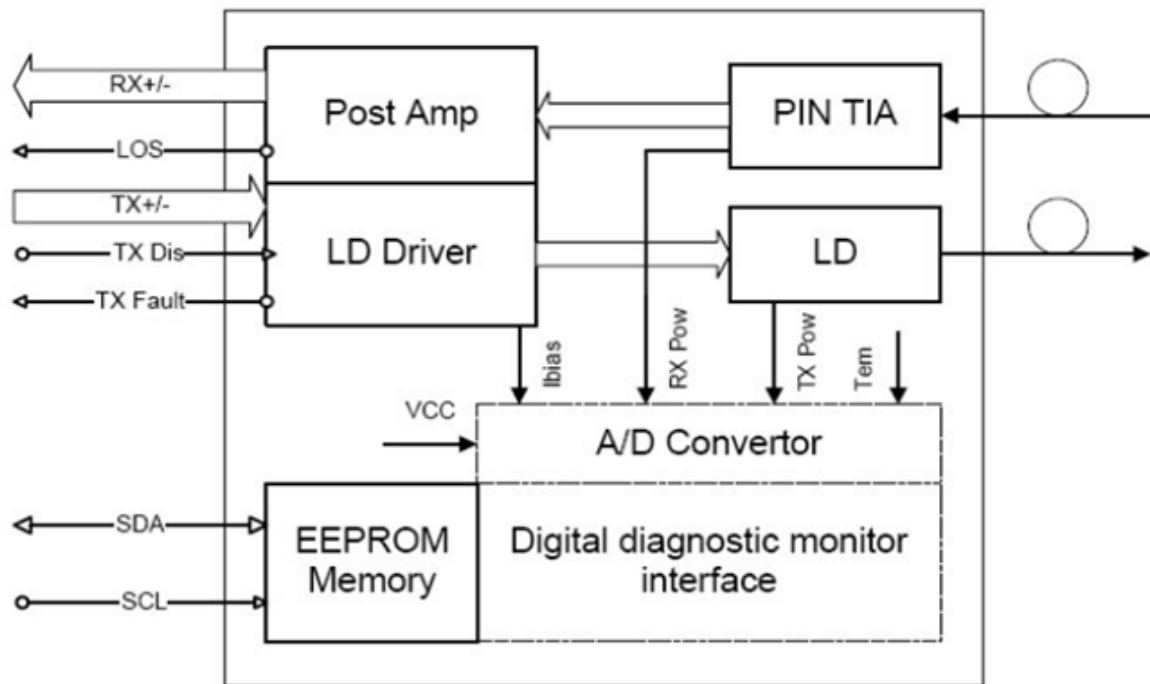
> Applications:

- 10GBASE-BX at 10.3125 Gb/s
- 10GBASE-BX at 9.953 Gb/s

> Standard:

- SFP+ MSA Compliant
- SFF-8472 reversion 9.5 compliant
- IEEE802.3-2005 compliant
- Telcordia GR-468-CORE compliant
- FCC 47 CFR Part 15, Class B compliant
- FDA 21 CFR 1040.10 and 1040.11, class1 compliant
- RoHS compliant

> Functional Diagram:



> Absolute Maximum Ratings:

Parameter	Symbol	Min	Max	Unit	Note
Supply Voltage	Vcc	-0.5	3.8	V	
Storage Temperature		-40	85	°C	
Relative Humidity		0	85	%	

> General Operating Characteristics:

Parameter	Symbol	Min	Type	Max	Unit	Note
Data Rate Ethernet	Vcc	-0.5	3.8	V		
Fiber Channel		-40	85	°C		
Supply Voltage	Vcc	3.13	3.3	3.47	V	Vcc
	Vcc				V	
Supply Current	Icc5				mA	
	Icc3			400	mA	
Operating Case Temp.	Tc	0		70	°C	

> Electrical Input/output Characteristics:

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Diff. input voltage swing		120		820	mVpp	1
Tx Disable input	H	VIH	2.0	Vcc+0.3	V	
	L	VIL	0	0.8		
Tx Fault output	H	VOH	2.0	Vcc+0.3	V	2
	L	VOL	0	0.8		
Input Diff. Impedance	Zin		100		Ω	

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Receiver						
Diff. output voltage swing		340	650	800	mVpp	3
Rx LOS Output	H	VOH	2.0	Vcc+0.3	V	2
	L	VOL	0	0.8		

Note 1. TD+/- are internally AC coupled with 100Ω differential termination inside the module.

Note 2. Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.

Note 3. RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

> Optical Characteristic:

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter (0~70°C@10.3125Gb/s)						
Operating Wavelength			1270		nm	
Ave. output power (Enabled)	Po	-7		0.5	dBm	1
Extinction Ratio	ER	3.5			dB	1
RMS spectral width	Δλ			1	nm	
Rise/Fall time (20%~80%)	Tr/Tf			50	ps	2
Optical modulation amplitude	OMA	-5.2			dBm	
Dispersion penalty				1	dB	
Output Optical Eye	IEEE 802.3-2005 Compliant					

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Receiver (0~70°C@10.3125Gb/s)						
Operating Wavelength			1330		nm	
Sensitivity	Psen			-14.4	dBm	3
Min. overload	Pimax	0.5			dBm	
LOS Assert	Pa	-30			dBm	
LOS De-assert	Pd			-16	dBm	
LOS Hysteresis	Pd-Pa	0.5		4	dB	

Note 1. Measured at 10.3125b/s with PRBS 231 – 1 NRZ test pattern.

Note 2. 20%~80%

Note 3. Under the ER worst case, measured at 10.3125 Gb/s with PRBS 231 - 1 NRZ test pattern for BER <1x10⁻¹²

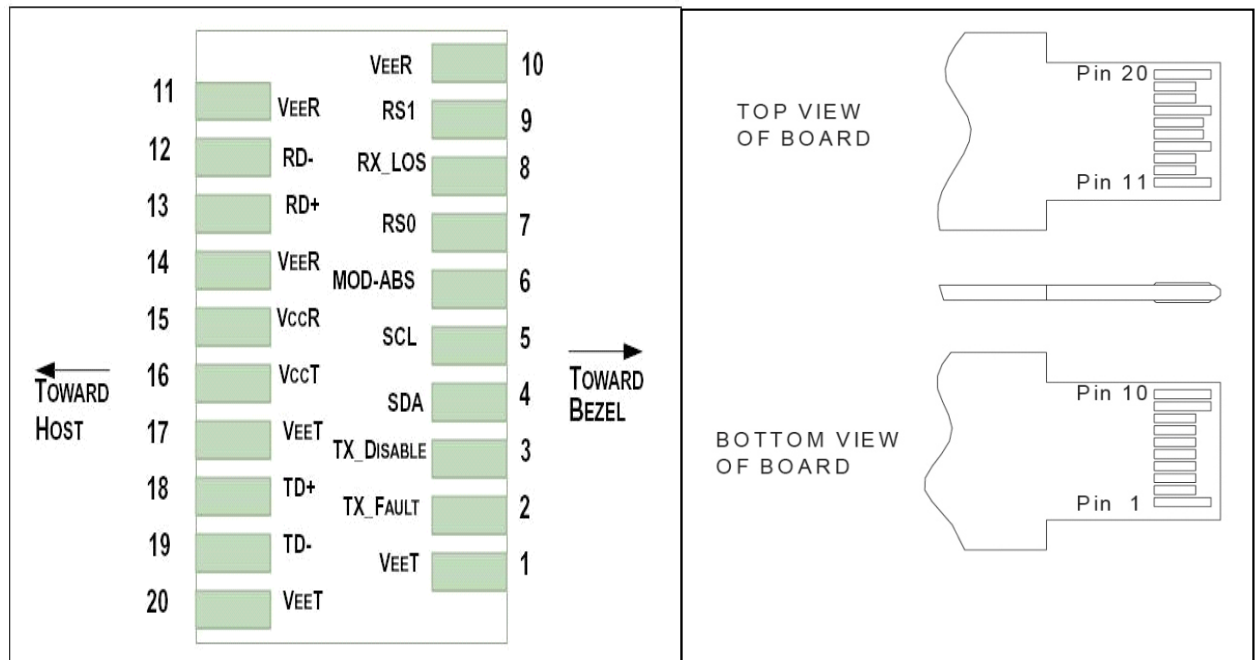
> Serial Interface for Id and DDM:

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP MSA. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h. The memory is mapped in Table 1. Detailed ID information (A0h) is listed in Table 2. And the DDM specification (A2h) is described in Table 3. For more details of the memory map and byte definitions, please refer to the SFF-8472 (Rev 9.3, Aug. 2002), "Digital Diagnostic Monitoring Interface for Optical Transceivers". The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

2 wire address 1010000X (A0h)		2 wire address 1010001X (A2h)	
Address	Information	Address	Information
0~95	Serial ID Defined by SFP MSA (96 bytes)	0~55	Alarm and Warning Thresholds (56 bytes)
96~127	Vendor Specific (32 bytes)	56~95	Calibration Constants (40 bytes)
128~255	Reserved, SFF8079 (128 bytes)	96~119	Real Time Diagnostic Interface (24 bytes)
		120~127	Vendor Specific (8 bytes)
		128~247	User Writable EEPROM (120 bytes)
		248~255	Vendor Specific (8 bytes)

> PIN Definitions and Function:



PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	Note 1
2	Tx Fault	Module transmitter fault	Note 2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	Note 3
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	Note 2
7	RS0	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
8	LOS	Receiver Loss of Signal Indication	Note 4
9	RS1	Rate select1, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
10	VeeR	Module receiver ground	Note 1
11	VeeR	Module receiver ground	Note 1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	Note 1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
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18	TD+	Transmitter inverted data out put	
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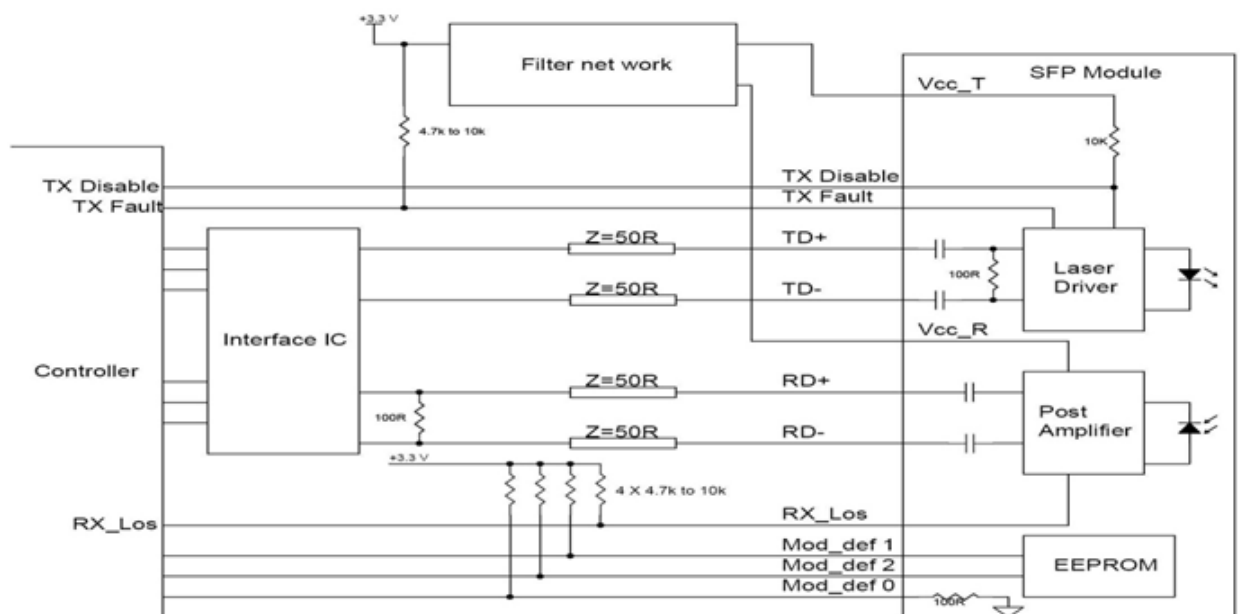
Note 1. The module ground pins shall be isolated from the module case.

Note 2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.

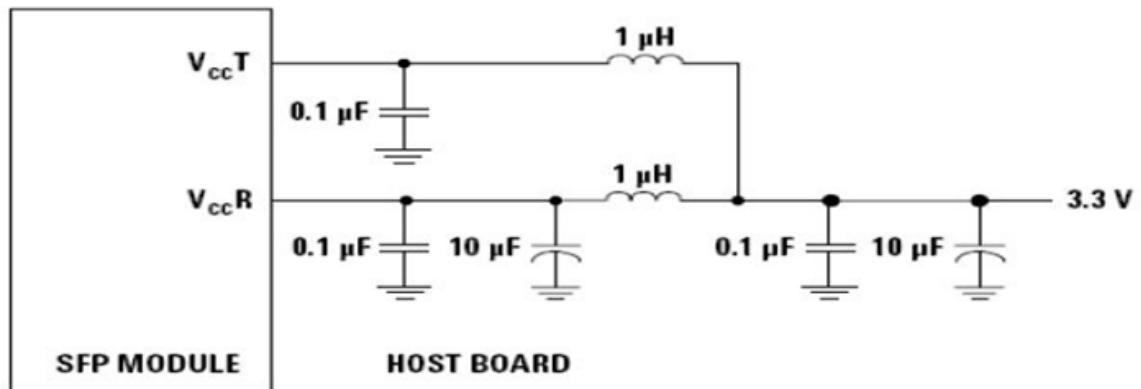
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Typical Interface Circuit:

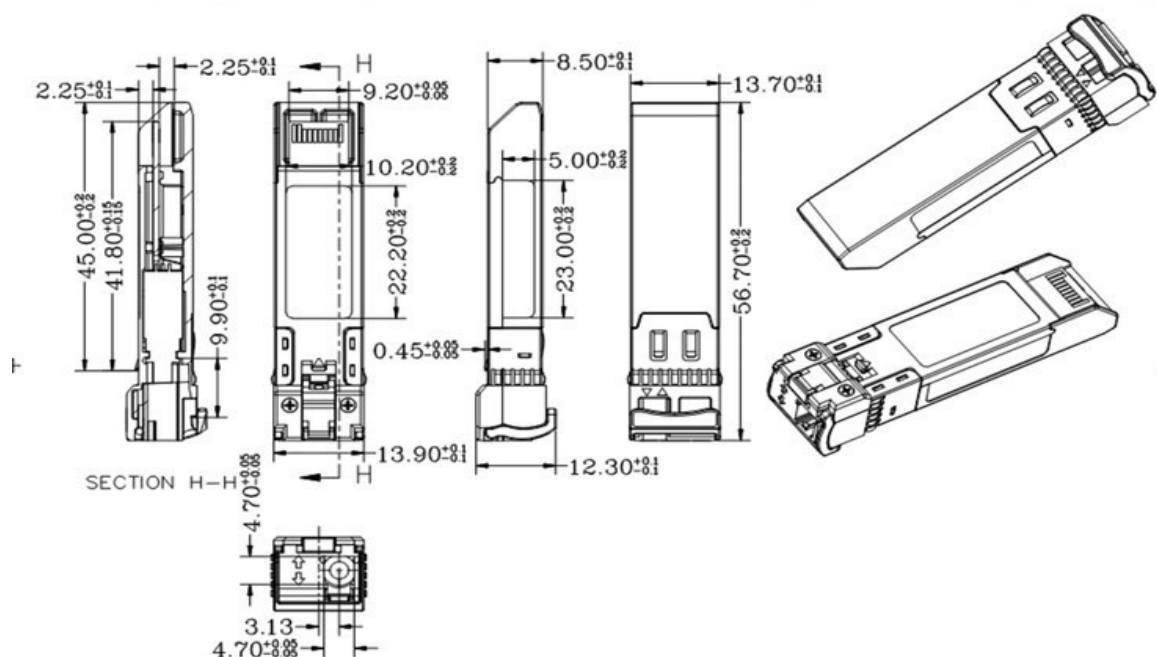


> Recommended power supply filter:



Note: Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state

> Package Dimension:



> Ordering Information:

Part Number	Product Description
GOXP-BI2396-20	SFP+ PlusBiDi, 10.3125Gbps, 1270nm, 20KM, 0~70°C, with DDM

> Overview GOXP-BI3296-20:

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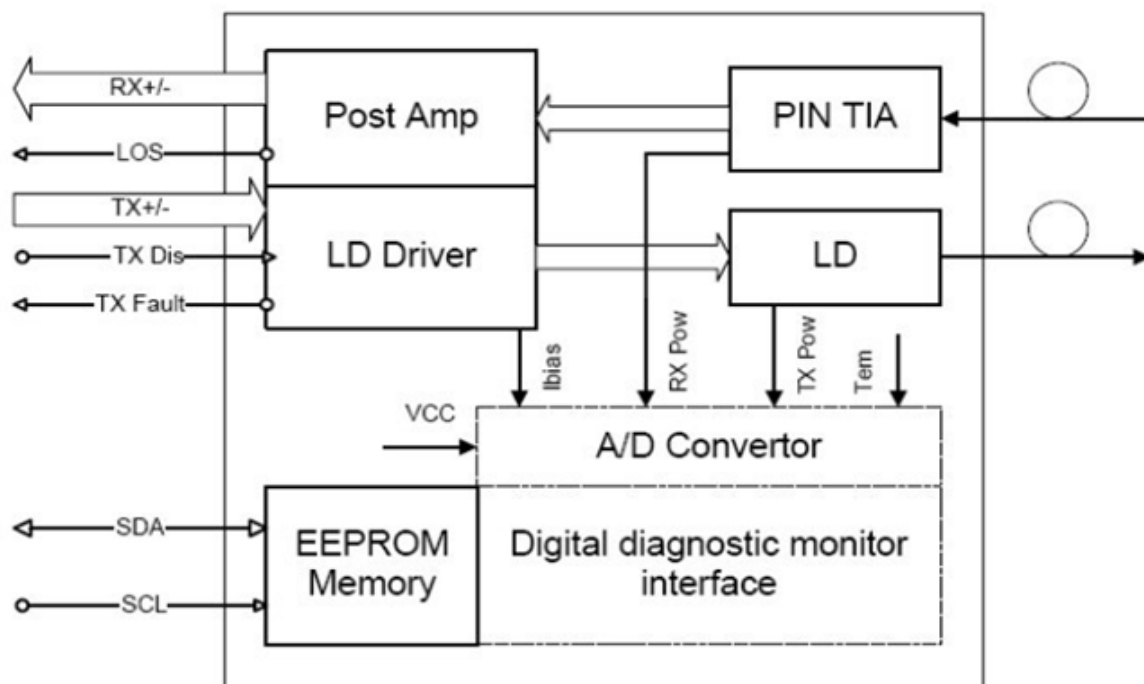
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> General Operating Characteristics:

Parameter	Symbol	Min	Type	Max	Unit	Note
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Fiber Channel				9.953		
Supply Voltage	Vcc	3.13	3.3	3.47	V	
	Vcc				V	
Supply Current	Icc5				mA	
	Icc3			400	mA	
Operating Case Temp.	Tc	0		700	°C	

> Electrical Input/output Characteristics:

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Diff. input voltage swing		120		820	mVpp	1
Tx Disable input	H	VIH	2.0	Vcc+0.3	V	
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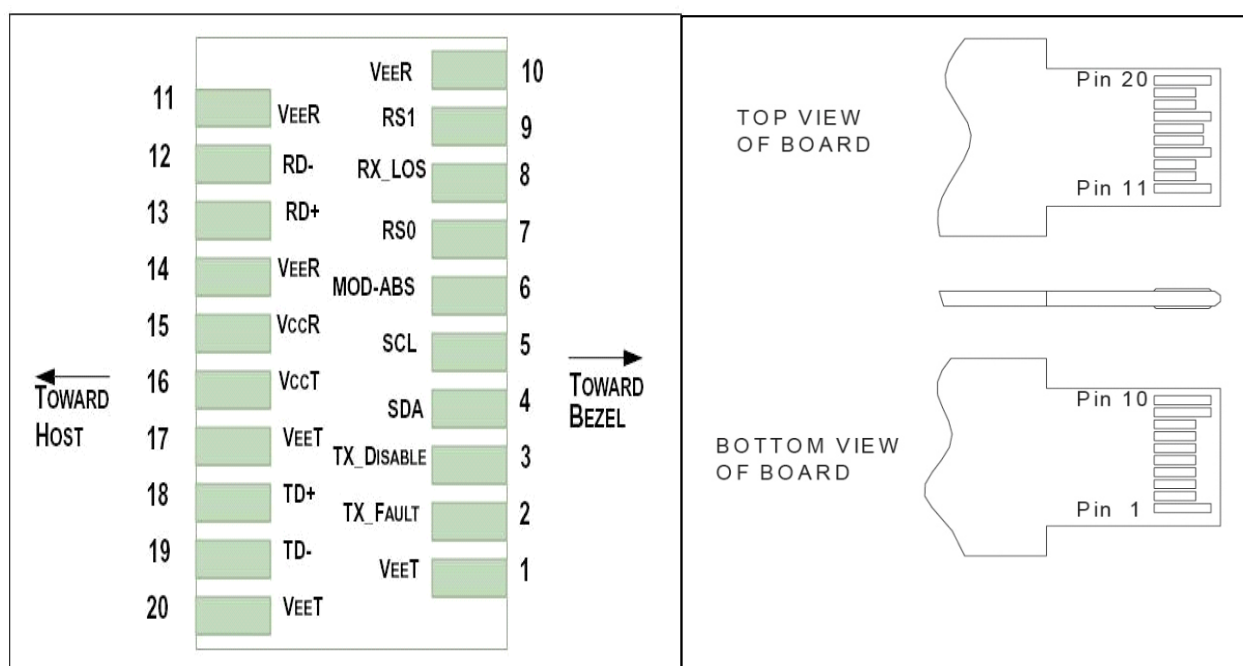
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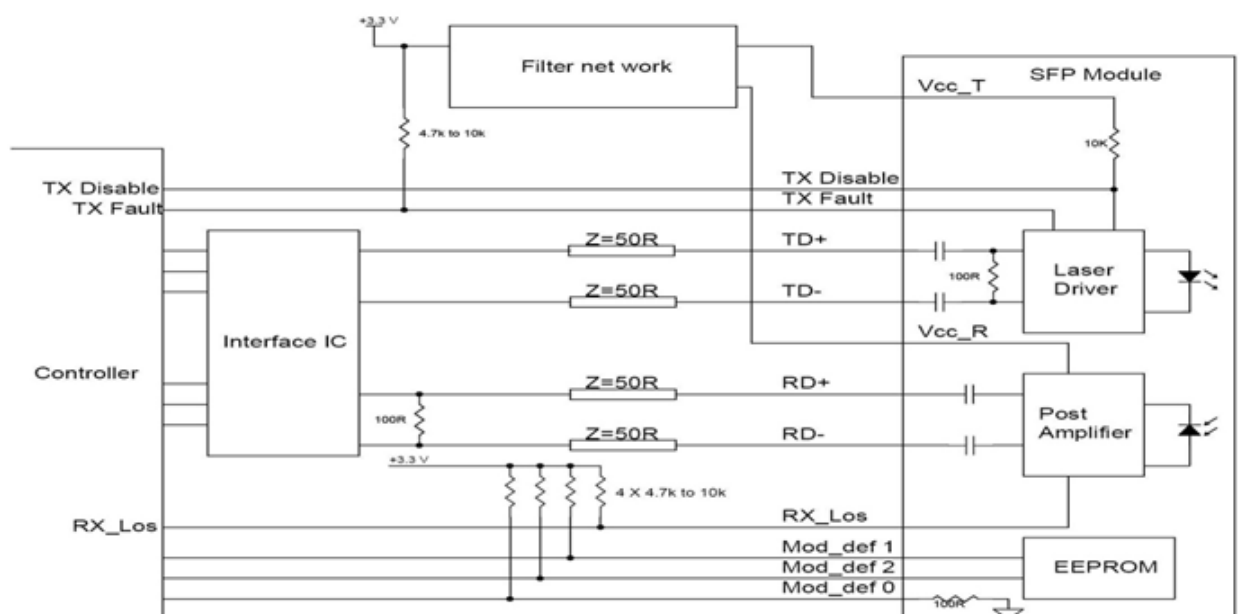
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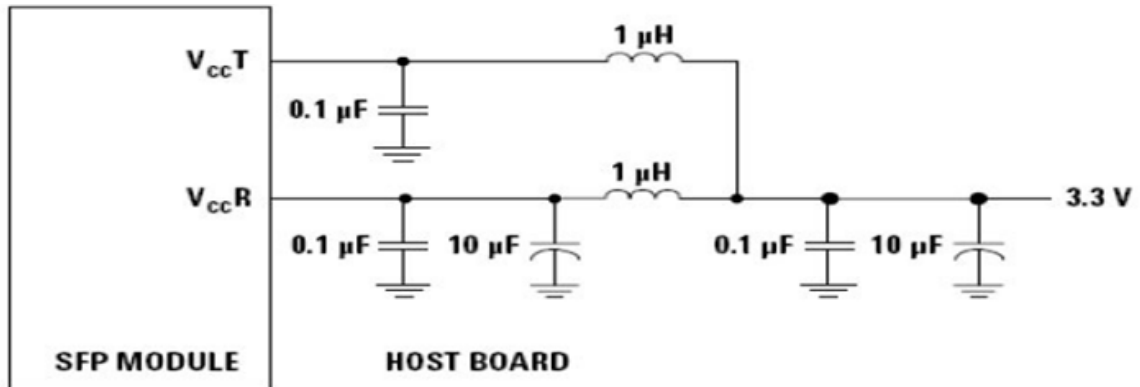
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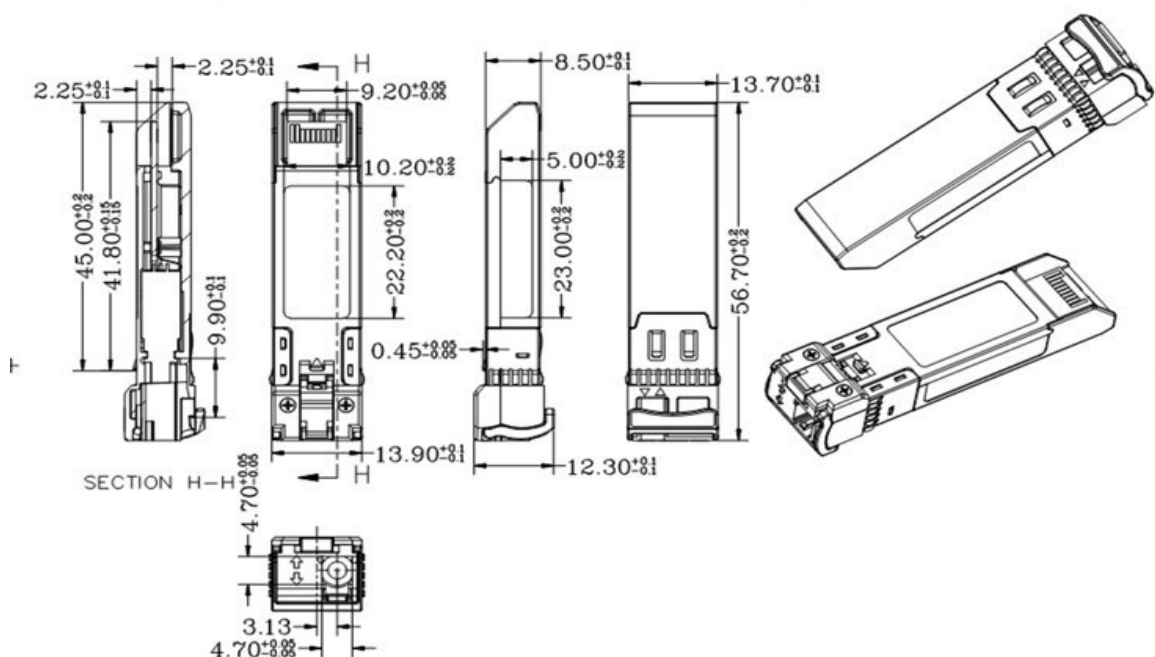


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