

### SFP-1GB-FX-I-SGMII-C-C

Cisco® Compatible 100/1000Base-FX SFP Transceiver (MMF, 1310nm, 500m, LC, DOM, -40 to 85C, SGMII)

#### Features:

- Built-In PHY Supporting SGMII Interface
- Built-In High Performance MCU Supporting Easier Configuration
- Dual-Rate of 100Base-FX/1000Base-LX Operation
- 1310nm FP Laser and PIN Photo-Detector
- Up to 2km Transmission with MMF
- Up to 550m Transmission with MMF @1.25Gbps
- Standard Serial ID Information Compatible with SFP MSA
- Duplex LC Connector
- 3.3V Single Power Supply
- Operating Temperature: -40 to 85 Celsius
- RoHS Compliant and Lead-Free



#### Applications:

- 1000Base-LX Ethernet
- 1x Fibre Channel
- Access and Enterprise

#### Product Description

This Cisco® SFP transceiver provides 100/1000Base-FX throughput up to 500m over multi-mode fiber (MMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



## Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage		V <sub>CC</sub>	-0.5		3.6	V	
Storage Temperature		T <sub>stg</sub>	-40		85	°C	
Operating Case Temperature		T <sub>c</sub>	-40		85	°C	
Relative Humidity		RH	5		95	%	
Data Rate	1000Base			1250		Mbps	
	100Base			125			

## Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V <sub>CC</sub>	3.13	3.3	3.47		
Power Supply Current		I <sub>CC</sub>			350	mA	1
Power Dissipation		P <sub>DISS</sub>			1.5	W	
Transmitter							
Differential Data Input Swing		V <sub>IN</sub>	200		2100	mV	2
Input Differential Impedance		Z <sub>IN</sub>	80	100	120	Ω	
Tx_Disable	Disable		2.0		V <sub>CC</sub>		
	Enable		V <sub>EE</sub>		V <sub>EE</sub> +0.8		
Tx_Fault	Fault		2.0		V <sub>CC</sub>		
	Normal		V <sub>EE</sub>		V <sub>EE</sub> +0.5		
Receiver							
Differential Data Output Swing		V <sub>OUT</sub>	370		2000	mV	2
LOS	High		2.0		V <sub>CC</sub> +0.3	V	
	Low		V <sub>EE</sub>		V <sub>EE</sub> +0.5		

### Notes:

1. The maximum power supply current after the module is work stable.
2. PECL logic. Internally AC coupled.

## Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Center Wavelength		λC	1260	1310	1360	nm	
Average Output Power	1000Base	POUT	-11.5		-3	dBm	1
	100Base	POUT	-20		-14		1
POUT @Tx_Disable Asserted		POUT			-45	dBm	1
Spectral Width (RMS)	1000Base	σ			4	nm	
	100Base				7.7		
Extinction Ratio		EX	9			dB	
Rise/Fall Time (20-80%)	1000Base	Tr/Tf			0.26	ns	2
	100Base				3		
Total Jitter Rate TP2	1000Base	JT			0.481	UI	3
	100Base				0.4		
Deterministic Jitter at TP2	1000Base	JD			0.250	UI	3
	100Base				0.305		
Output Optical Eye		Compatible with IEEE 802.3ah-2004					4
Receiver							
Center Wavelength		λC	1260	1310	1570	nm	
Receiver Sensitivity	1000Base				-22	dBm	5
	100Base				-28		6
Receiver Overload	1000Base		-3			dBm	5
	100Base		-8				6
Return Loss			12			dB	
LOS De-Assert	1000Base	LOSD			-23	dBm	
	100Base				-23		
LOS Assert	1000Base	LOSA	-45			dBm	
	100Base		-45				
LOS Hysteresis			0.5		4.5	dB	
Total Jitter at TP4 (SGMII)		JT			0.749	UI	3
Deterministic at TP4 (SGMII)		JD			0.462	UI	

### Notes:

1. The optical power is launched into 62.5/125 $\mu$ m SMF.
2. Unfiltered, measured with 8B/10B code for 1.25Gbps and 4B/5B code for 125Mbps.
3. Meets the specified maximum output jitter requirements if the specified maximum input jitter is present.
4. Measured with 8B/10B code for 1.25Gbps and 4B/5B code for 125Mbps.
5. Measured with 8B/10B code for 1.25Gbps, worst-case extinction ratio, and  $BER \leq 1 \times 10^{-12}$ .
6. Measured with 4B/5B code for 125Mbps, worst-case extinction ratio, and  $BER \leq 1 \times 10^{-12}$ .

## Pin Descriptions

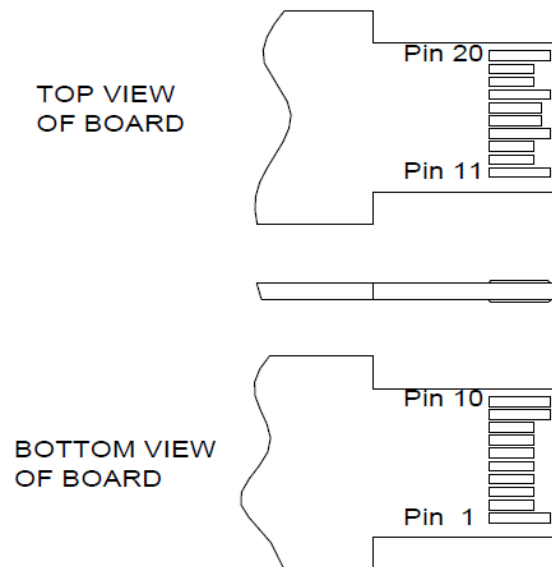
Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground.	1	
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable.	3	2
4	MOD-DEF2	Module Definition 2.	3	3
5	MOD-DEF1	Module Definition 1.	3	3
6	MOD-DEF0	Module Definition 0.	3	3
7	Rate Select	Not Used.	3	
8	LOS	Loss of Signal.	3	4
9	VeeR	Receiver Ground.	1	
10	VeeR	Receiver Ground.	1	
11	VeeR	Receiver Ground.	1	
12	RD-	Inverse Received Data Out.	3	5
13	RD+	Received Data Out.	3	5
14	VeeR	Receiver Ground.	1	
15	VccR	Receiver Power.	2	
16	VccT	Transmitter Power.	2	
17	VeeT	Transmitter Ground.	1	
18	TD+	Transmit Data In.	3	6
19	TD-	Inverse Transmit Data In.	3	6
20	VeeT	Transmitter Ground.	1	

### Notes:

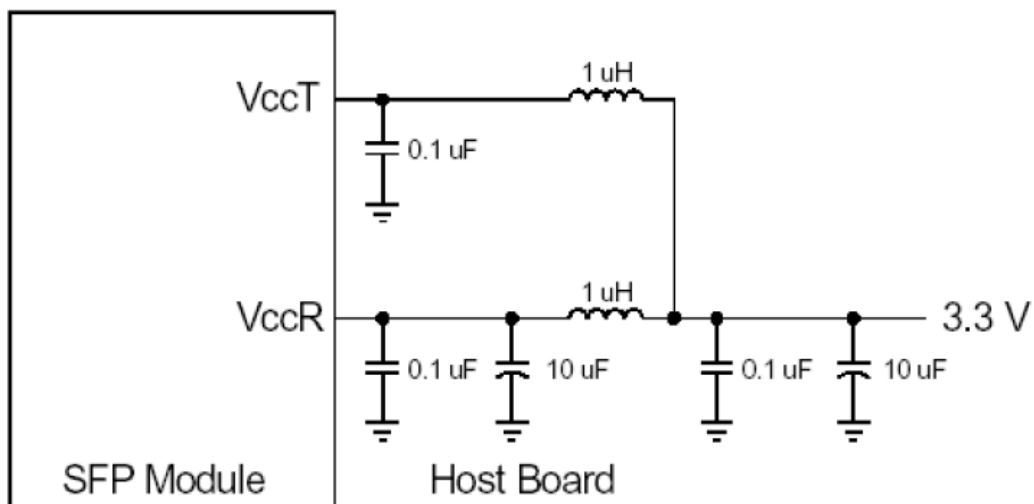
1. Tx\_Fault is an open collector output which should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. "Logic 0" indicates normal operation. "Logic 1" indicates a laser fault of some kind. In the "low" state, the output will be pulled to <0.8V.
2. Tx\_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:
  - Low (0V to 0.8V): Transmitter On
  - (>0.8 and <2V): Undefined
  - High (2.0V to 3.465V): Transmitter Disabled
  - Open: Transmitter Disabled.
3. MOD-DEF0, 1, & 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
  - MOD-DEF0 is grounded by the module to indicate that the module is present.
  - MOD-DEF1 is the clock line of 2-wire serial interface for optional serial ID.
  - MOD-DEF2 is the data line of 2-wire serial interface for optional serial ID.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7k $\Omega$  to 10k $\Omega$  resistor on the host board to a voltage between 2.0V and Vcc+0.3V. "Logic 0" indicates normal operation. "Logic 1" indicates loss of signal or link down with partner I. In the "low" state, the output will be pulled to less than 0.8V.
5. These are the differential receiver outputs. They are internally AC coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  (differential) at the host with SGMII interface.
6. These are the differential transmitter inputs. They are AC coupled, differential lines with 100 $\Omega$  differential termination inside the module.

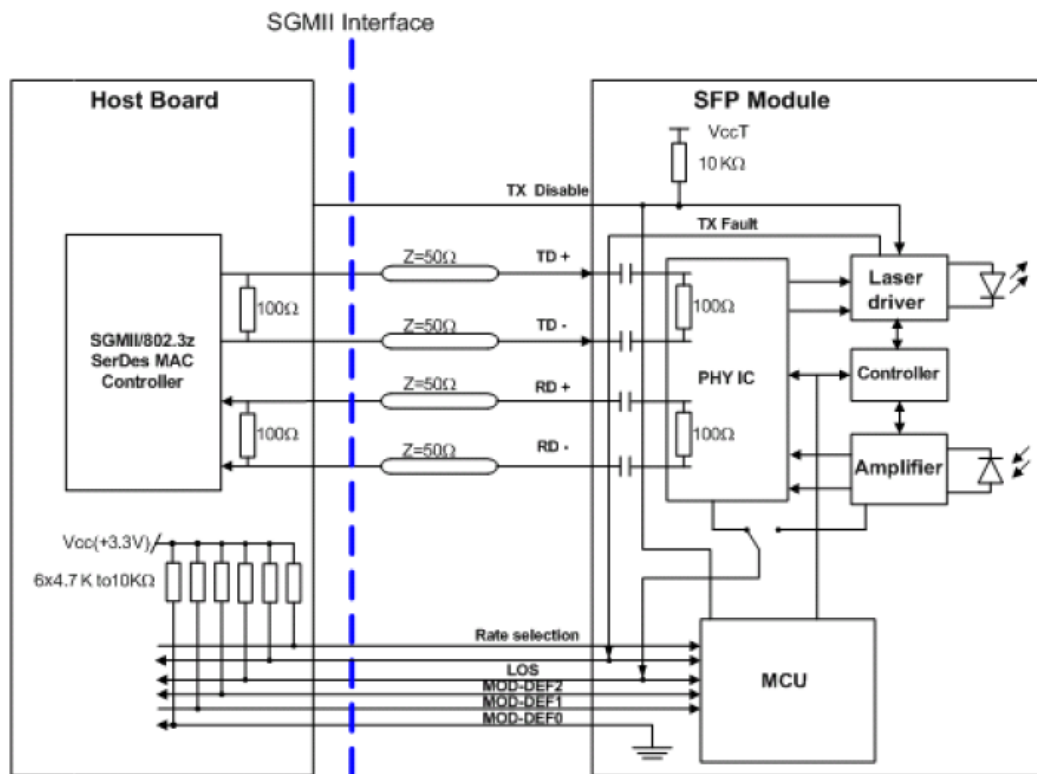
## Pin Definitions



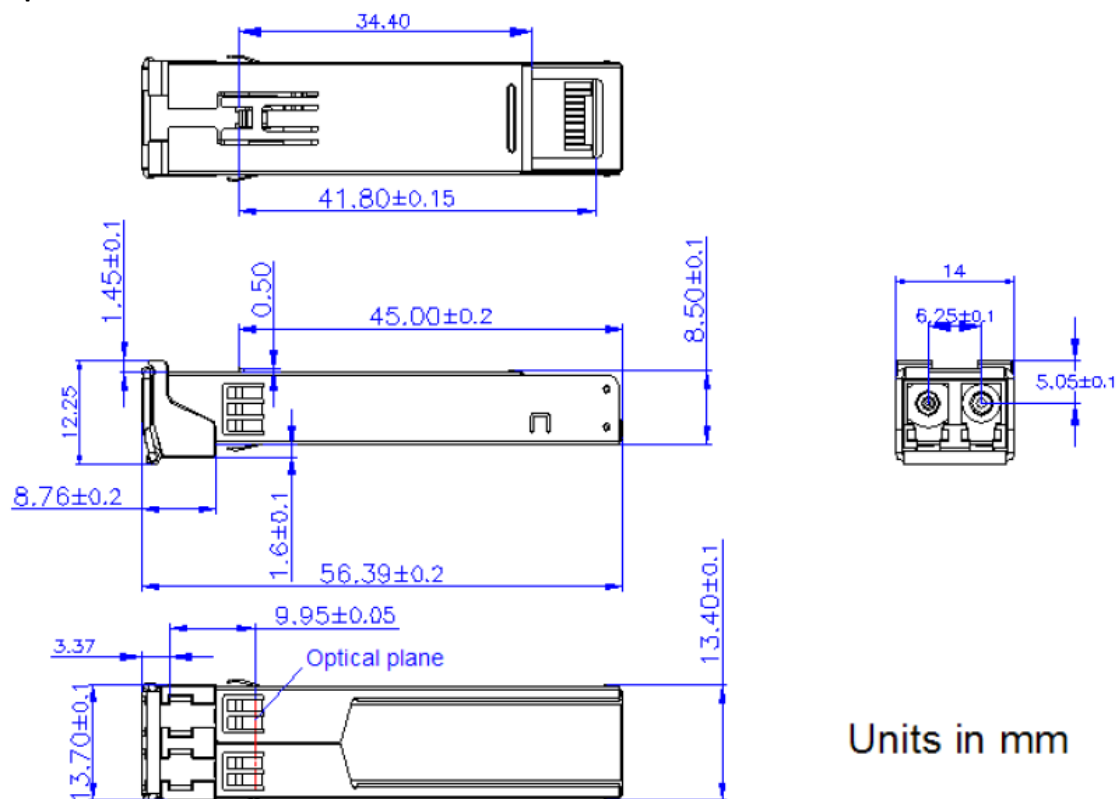
## Recommended Host Board Power Supply Circuit



### Recommended Interface Circuit



## Mechanical Specifications



## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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