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

MSA and TAA 100/1000Base-FX SFP Dual-Rate 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 at 125Mbps
- Up to 550m Transmission with MMF at 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 MSA compliant SFP transceiver provides 100/1000Base-FX throughput up to 500m over multi-mode fiber (MMF) using a wavelength of 1310nm via an LC connector with SGMII. It is capable of withstanding rugged environments and can operate at temperatures between -40 and 85C. It is guaranteed to be 100% compatible with the equivalent MSA compliant transceiver. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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.")

TAA COMPLIANT

Rev. 012126

Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage		Vcc	-0.5		3.6	V	
Storage Temperature		Tstg	-40		85	°C	
Operating Case Temperature		Tc	-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		Vcc	3.13	3.3	3.47		
Power Supply Current		Icc			350	mA	1
Power Dissipation		P_{DISS}			1.5	W	
Transmitter							
Differential Data Input Swing		VIN	200		2100	mV	2
Input Differential Impedance		ZIN	80	100	120	Ω	
Tx_Disable	**Disable**		2.0		Vcc		
	Enable		Vee		Vee+0.8		
Tx_Fault	**Fault**		2.0		Vcc		
	Normal		Vee		Vee+0.5		
Receiver							
Differential Data Output Swing		VOUT	370		2000	mV	2
LOS	**High**		2.0		Vcc+0.3	V	
	Low		Vee		Vee+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 62.5/125µm 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 ≤1×10^{-12}.
6. Measured with 4B/5B code for 125Mbps, worst-case extinction ratio, and BER ≤1×10^{-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:

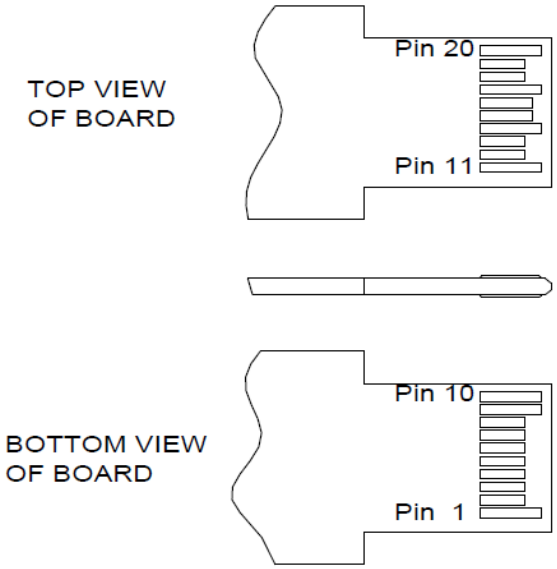
1. Tx_Fault is an open collector output which should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. “Logic 0” indicates normal operation. “Logic 1” indicates a laser fault of some kind. In the “low” state, the output will be pulled to <0.8V.
2. Tx_Disable 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.

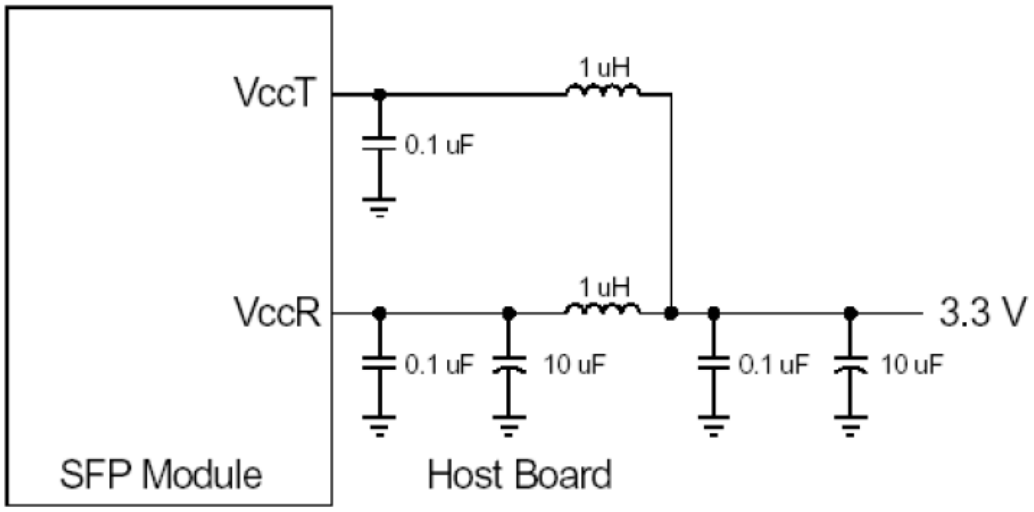
   MOD-DEF0 is grounded by the module to indicate that the module is present.
   MOD-DEF1 is the clock line of 2-wire serial interface for optional serial ID.
   MOD-DEF2 is the data line of 2-wire serial interface for optional serial ID.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7kΩ 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 loss of signal or link down with partner l. 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 100Ω differential lines which should be terminated with 100Ω (differential) at the host with SGMII interface.
6. These are the differential transmitter inputs. They are AC coupled, differential lines with 100Ω differential termination inside the module.

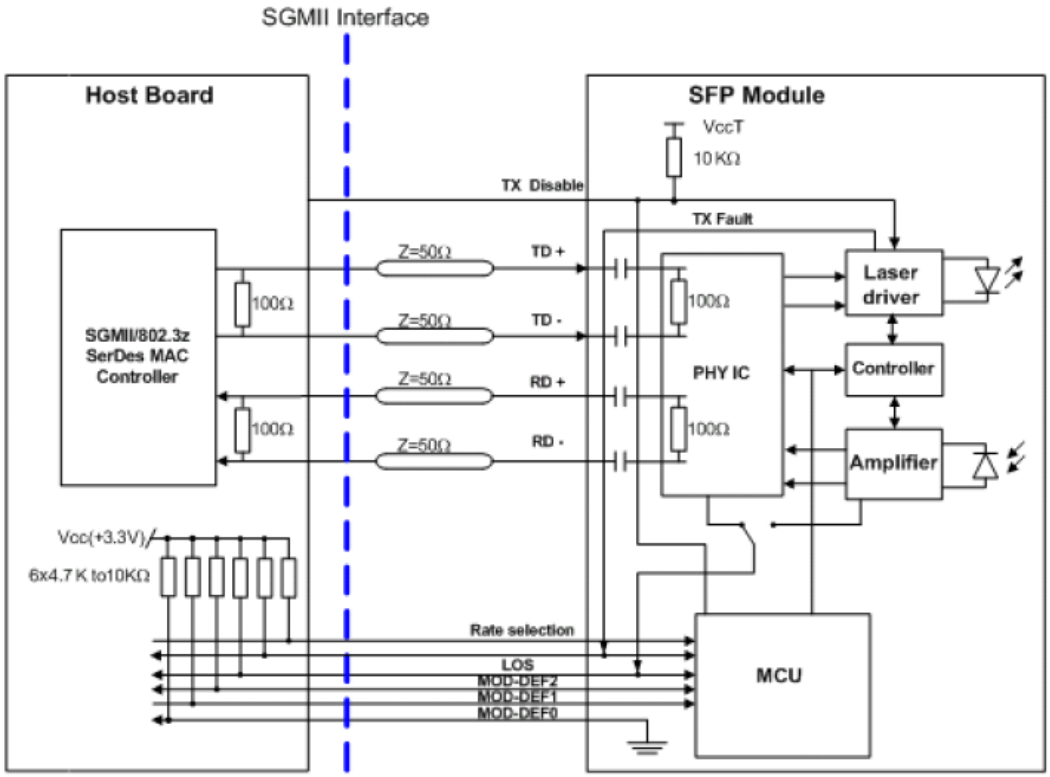
Pin Definitions



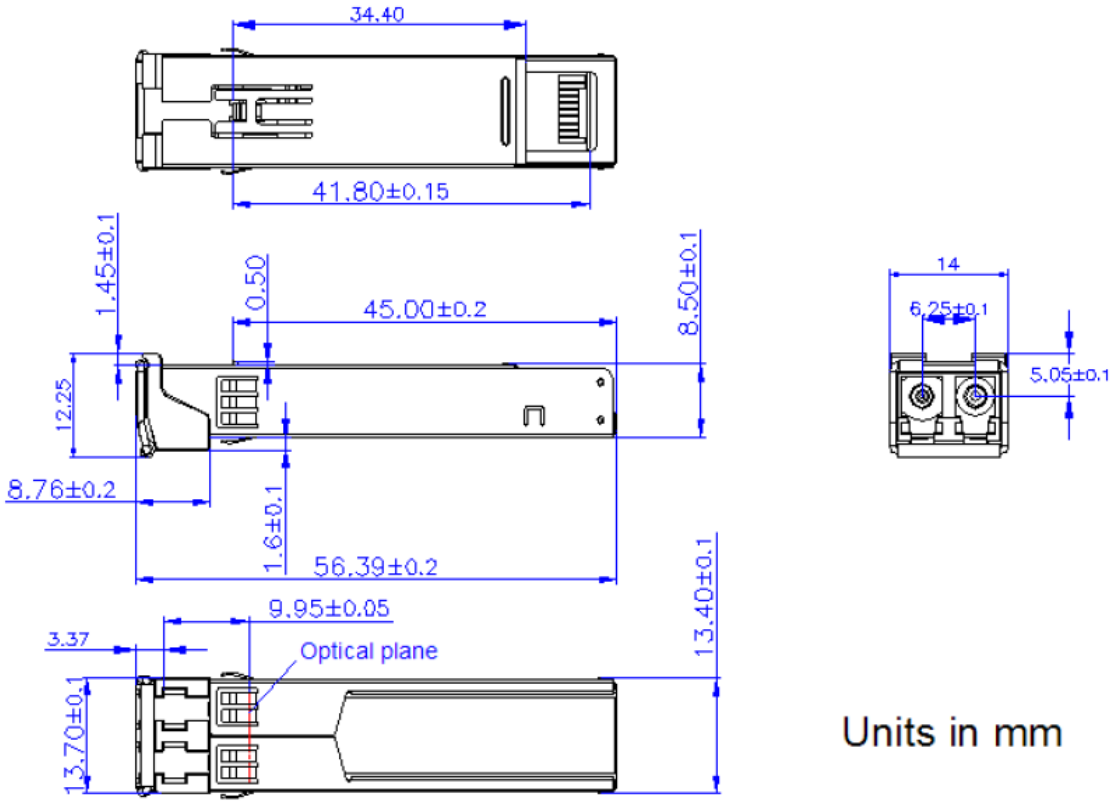
Recommended Host Board Power Supply Circuit



Recommended Interface Circuit



Mechanical Specifications



About ProLabs

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

A 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 1.6T 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.

The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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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