SFP-1GB-CW-47-160-C

MSA and TAA 1000Base-CWDM SFP Transceiver (SMF, 1470nm, 160km, LC, DOM)

Features:

- INF-8074 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free

Applications:

- Gigabit Ethernet over CWDM
- 1x Fibre Channel
- Access, Metro and Enterprise

Product Description

This MSA Compliant SFP transceiver provides 1000Base-CWDM throughput up to 160km over single-mode fiber (SMF) using a wavelength of 1470nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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."

TAA COMPLIANT

CWDM Available Wavelengths

Wavelengths	Min.	Typ.	Max.
27	1264.5	1270	1277.5
29	1284.5	1290	1297.5
31	1304.5	1310	1317.5
33	1324.5	1330	1337.5
35	1344.5	1350	1357.5
37	1364.5	1370	1377.5
39	1384.5	1390	1397.5
41	1404.5	1410	1417.5
43	1424.5	1430	1437.5
45	1444.5	1450	1457.5
47	1464.5	1470	1477.5
49	1484.5	1490	1497.5
21	1504.5	1510	1517.5
23	1524.5	1530	1537.5
55	1544.5	1550	1557.5
57	1564.5	1570	1577.5
59	1584.5	1590	1597.5
61	1604.5	1610	1617.5

Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage		Vcc	-0.5		3.6	V	
Storage Temperature		Tstg	-40		85	°C	
Operating Case Temperature		Tc	0		70	°C	
Operating Relative Humidity		RH	5		85	%	
Power Supply Current		Icc			300	mA	
Link Budget				3.6		dB	
Data Rate	**GBE**			1.25		Gbps	
	FC			1.063			

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage		Vcc	3.15	3.3	3.45	V	
Transmitter							
Differential LVPECL Inputs		VIN	400		2000	mVp-p	1
Input Differential Impedance		ZIN	85	100	115	Ω	2
Tx_Disable	**Disable**		2		Vcc+0.3	V	
	Enable		0		0.8	V	
Tx_Fault	**Fault**		2		Vcc+0.3	V	
	Normal		0		0.8		
Receiver							
Differential LVPECL Outputs		VOUT	400		2000	mVp-p	3
Output Differential Impedance		ZOUT	85	100	115	Ω	
Tx_Disable Assert Time		T_off			10	us	
Rx_LOS	**LOS**		2		Vcc+0.3	V	
	Normal		0		0.8		
MOD_DEF(0.2)		VOH	2.5			V	4
		VOL	0		0.5		

Notes:

1. AC coupled inputs. LVPECL logic. Internally AC coupled.
2. RIN>100kΩ @DC.
3. AC coupled outputs. LVPECL logic. Internally AC coupled.
4. With serial ID.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λC	λC-6.5	λC	λC+6.5	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Average Output Power	POUT	2		7	dBm	1
Side-Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	9			dB	
Rise/Fall Time (20-80%)	Tr/Tf			0.26	ns	
POUT @Tx_Disable Asserted	POUT			-45	dBm	
Output Optical Eye	Compliant with IEEE 802.3					2
Receiver						
Center Wavelength	λC	1260		1630	nm	
Receiver Sensitivity	Pmin			-34	dBm	3
Receiver Overload	Pmax	-9			dBm	
LOS De-Assert	LOSD			-37	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Output power is power coupled into a 9/125μm single-mode fiber.
2. Filtered, measured with a PRBS 2^7-1 test pattern @1250Mbps.
3. Minimum average optical power is measured at BER less than $1E^{-12}$, with 1.25Gbps, 2^7-1 PRBS, and ER=9dB.

Pin Descriptions

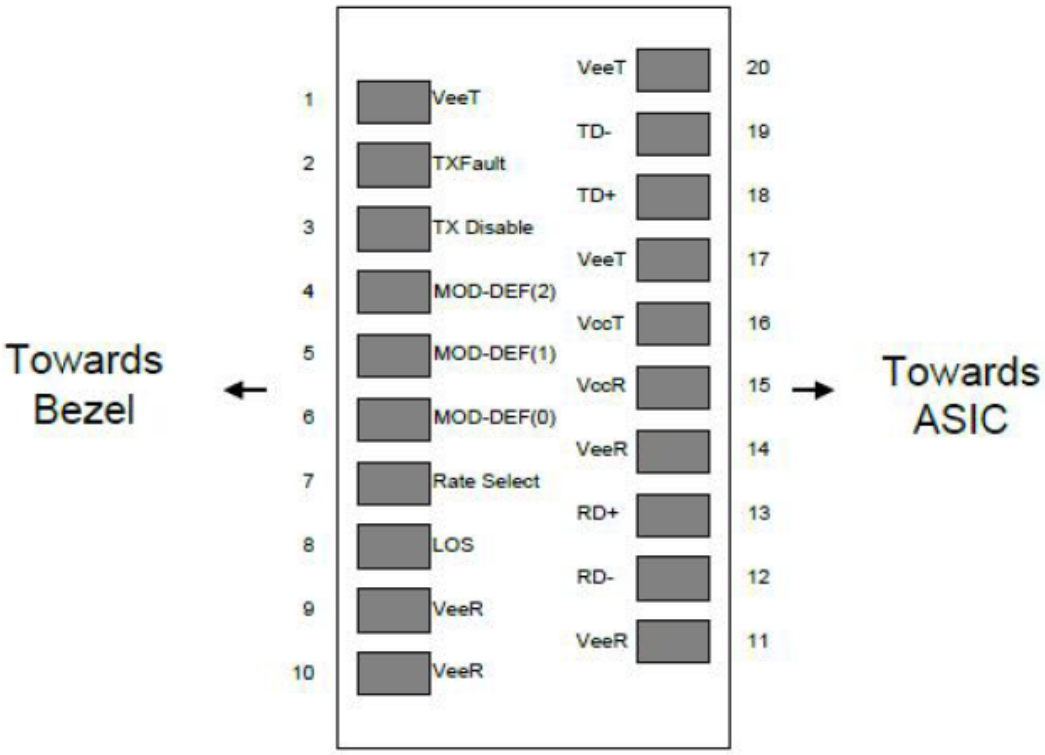
Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground.	1	5
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	MOD-DEF2	Module Definition 2. 2-Wire Serial ID Interface.	3	3
5	MOD-DEF1	Module Definition 1. 2-Wire Serial ID Interface.	3	3
6	MOD-DEF0	Module Definition 0. Grounded within the module.	3	3
7	Rate Select	Not Connected. Function not available.	3	
8	LOS	Loss of Signal.	3	4
9	VeeR	Receiver Ground.	1	5
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Inverse Received Data Out.	3	6
13	RD+	Received Data Out.	3	7
14	VeeR	Receiver Ground.	1	5
15	VccR	3.3 ± 5% Receiver Power.	2	7
16	VccT	3.3 ± 5% Transmitter Power.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmitter Data In.	3	8
19	TD-	Inverse Transmitter Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

Notes:

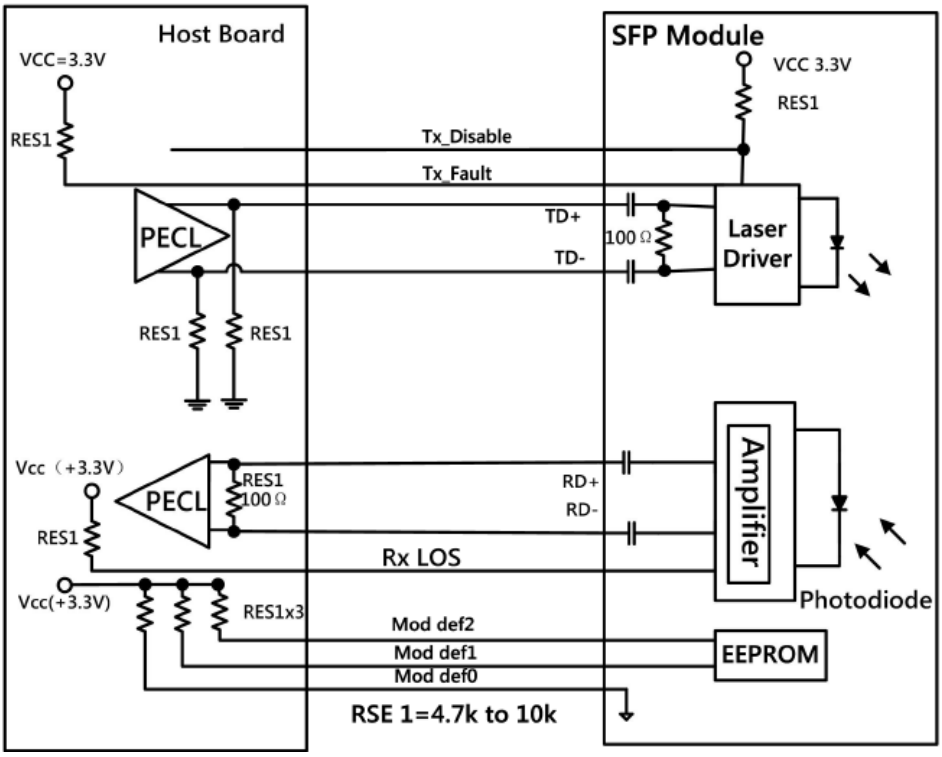
1. Tx_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” output indicates a laser fault of some kind. "Low" indicates normal operation. In the "low" state, the output will be pulled 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 – 0.8V): Transmitter On.
   (>0.8V and <2.0V): Undefined.
   High (2.0V – 3.465V): Transmitter Disabled.
   Open: Transmitter Disabled.
3. MOD-DEF0, 1, and 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. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” this output indicates that the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). "Low" indicates normal operation. In the "low" state, the output will be pulled to <0.8V.
5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+. These are the differential receiver outputs. They are AC-coupled, 100Ω differential lines that should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 400mV and 2000mV differential (200mV and 1000mV single-ended) when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. 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 in-rush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential terminations inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 400mV and 2000mV (200mV and 1000mV single-ended).

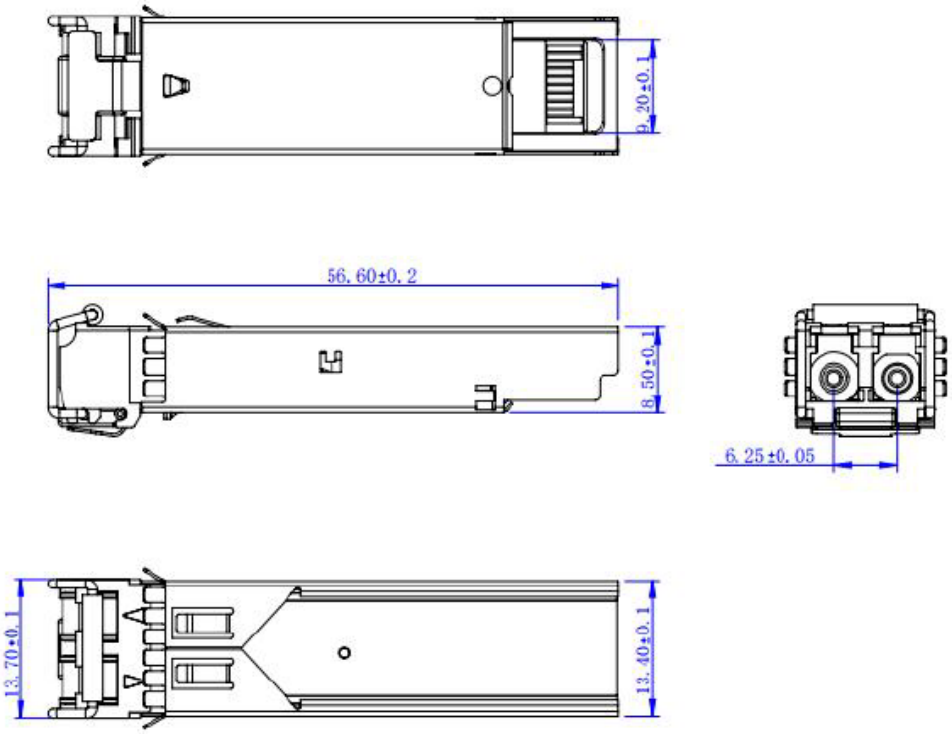
Pin Connectors



Recommended Circuit Schematic



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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