# Pro**Labs**

# SFP-OC-12-LR2-C

MSA and TAA OC-12-LR2 SFP Transceiver (SMF, 1550nm, 80km, LC)

# 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:**

- OC-12 Transmission
- Access and Enterprise

## **Product Description**

This MSA Compliant SFP transceiver provides OC-12 (155mbs) transmission rates for up to 80km over single-mode fiber (SMF) using a wavelength of 1550nm 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. 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."



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# **Regulatory Compliance**

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

#### **Absolute Maximum Ratings**

Parameter	Symbol	Min.	Тур.	Max.	Unit
Maximum Supply Voltage	Vcc	-0.5		3.6	V
Storage Temperature	TS	-40		+85	°C
Operating Case Temperature	Тс	0		70	°C
Operating Humidity	RH	5		85	%
Receiver Power	R <sub>MAX</sub>			-3	dBm
Data Rate			622		Mbps

## Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes	
Power Supply Voltage	Vcc	3.15	3.30	3.45	V		
Power Supply Current	lcc			300	mA		
Power Consumption	P <sub>DISS</sub>			1	W		
Transmitter							
Single ended data input swing	Vin,pp	400		2000	mVpp	1	
Input differential impedance	Zin	85	100	115	Ω	2	
Receiver							
Single ended data output swing	Vout, pp	400		2000	mVpp	1	
Output differential impedance	Zin	80	100	120	Ω		

#### Notes:

- 1. AC coupled.
- 2. Rin > 100 kohms @ DC

# **Optical Characteristics**

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
9µm Core Diameter SMF	L		80		km	
Data Rate			100/622		Mbps	
Transmitter						
Average Output Power	Pout	-3		2	dBm	1
Optical Extinction Ratio	ER	10			dB	2
Optical Wavelength	Тλ	1520	1550	1580	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Total Jitter	L			0.43	UI	2
Rise/Fall Time (20%~80%)	tr/tf			0.26	ns	
Receiver						
Receiver Sensitivity	Pmin			-28	dBm	3
Receiver Overload	Pmax	-3			dBm	
Optical Center Wavelength	λC	1260		1600	nm	

# Notes:

- 1. Output power is measured by coupling into a 9/125 mm multi-mode fiber.
- 2. Filtered, measured with a PRBS 2<sup>23</sup>-1 test pattern @622Mbps.
- 3. Minimum average optical power is measured at BER less than 1E-12, with  $2^{A^{23}}$  -1 PRBS and ER=9 dB

## **Pin Descriptions**

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	TX Fault	Transmitter Fault. LVTTL-O	2
3	TX Disable	Transmitter Disable. Laser output disabled on high or open. LVTT-I.	3
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTL-I/O.	
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTL-I.	
6	MOD_ABS	Module Absent, Connect to VeeT or VeeR in Module.	4
7	RSO	Rate Select 0. Not used	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. LVTTL-O.	2
9	RS1	Rate Select 1. Not used	5
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O.	
14	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground).	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I.	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-O.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

## Notes:

- 1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
- 2. This contact is an open collector/drain output and should be pulled up to the Vcc\_Host with resister in the range  $4.7K\Omega$  to  $10K\Omega$ . Pull ups can be connected to one or several power supplies, however the host board design shall ensure that no module contract has voltage exceeding module VccT/R +0.5.V.
- 3. Tx\_Disable is an input contact with a 4.7KΩ to 10KΩ pull-up resistor to VccT inside module.
- 4. Mod\_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull the contract up to Vcc\_Host with a resistor in the range from 4.7KΩ to 10KΩ. Mod\_ABS is asserted "High" when the SFP+ module is physically absent from a host slot.
- 5. Internally pulled down per SFF-8431



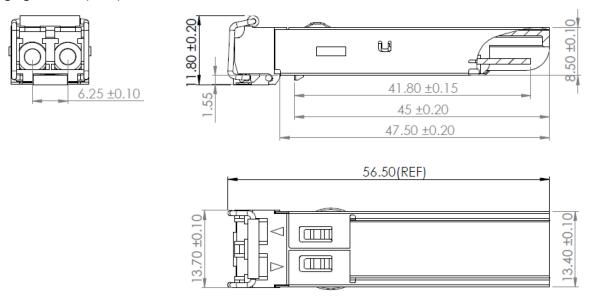
Pin-out of connector Block on Host board

# **Recommended Circuit Schematic**



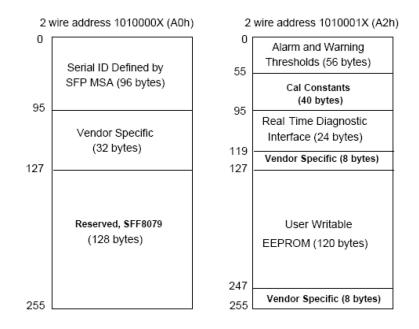
## **Mechanical Specifications**

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



## **EEPROM Information**

EEPROM memory map specific data field description is as below:



## **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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