

### **SFP-OC-3-LR1-I-C**

MSA and TAA OC-3-LR SFP Transceiver (SMF, 1310nm, 40km, LC, -40 to 85C)

#### **Features:**

- INF-8074 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### **Applications:**

- OC-3 Transmission
- Access and Enterprise

#### **Product Description**

This MSA compliant SFP transceiver provides OC-3 (155mbps) transmission rates for up to 40km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It can operate at temperatures between -40 and 85C. It is guaranteed to be 100% compatible with the equivalent MSA compliant 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. It is built to meet or exceed the specifications of MSA compliant, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. 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.")



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015.
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2.
- Immunity compatible with IEC 61000-4-3.
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B.
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2.
- RoHs compliant with 2002/95/EC 4.1&4.2 2005/747/EC.

## Absolute Maximum Ratings

| Parameter                  | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|--------|------|------|------|------|
| Maximum Supply Voltage     | Vcc    | -0.5 |      | 4.0  | V    |
| Storage Temperature        | Tstg   | -40  |      | 85   | °C   |
| Operating Humidity         | RH     | 5    |      | 85   | %    |
| Operating Case Temperature | Tc     | -40  |      | 85   | °C   |
| Data Rate                  |        |      | 155  |      | Mbps |

## Electrical Characteristics (Tc=25°C, Vcc=3.3V)

| Parameter                     | Symbol | Min. | Typ. | Max. | Unit  | Notes |
|-------------------------------|--------|------|------|------|-------|-------|
| Power Supply Voltage          | Vcc    | 3.14 | 3.3  | 3.46 | V     |       |
| Power Supply Current          | Icc    |      | 165  | 300  | mA    |       |
| Transmitter                   |        |      |      |      |       |       |
| Input Differential Impedance  | ZIN    | 85   | 100  | 120  | Ω     | 1     |
| LVPECL Inputs (Differential)  | VIN    | 500  |      | 2400 | mVp-p | 2     |
| Receiver                      |        |      |      |      |       |       |
| Output Differential Impedance | ZOUT   | 85   | 100  | 120  | Ω     |       |
| LVPECL Outputs (Differential) | VOUT   | 600  | 800  | 1600 | mVp-p | 2     |

## Notes:

1. RIN>100kΩ @ DC.
2. AC coupled.

## Optical Characteristics

| Parameter                 | Symbol          | Min.                  | Typ. | Max. | Unit | Notes |
|---------------------------|-----------------|-----------------------|------|------|------|-------|
| Transmitter               |                 |                       |      |      |      |       |
| Average Output Power      | PO              | -5                    |      | 0    | dBm  | 1     |
| Optical Wavelength        | $\lambda$       | 1275                  | 1310 | 1350 | nm   |       |
| Spectral Width (RMS)      | $\Delta\lambda$ |                       |      | 3    | nm   |       |
| Optical Rise/Fall Time    | Tr/Tf           |                       | 250  | 500  | ps   | 2     |
| Extinction Ratio          | ER              | 9                     |      |      | dB   | 3     |
| Output Optical Eye        |                 | IUT-T G.957 Compliant |      |      |      |       |
| Receiver                  |                 |                       |      |      |      |       |
| Receiver Sensitivity      | Pmin            |                       |      | -32  | dBm  | 4     |
| Receiver Overload         | Pmax            | 0                     |      |      | dBm  |       |
| Optical Center Wavelength | $\lambda_C$     | 1260                  |      | 1600 | nm   |       |
| LOS De-Assert             | LOSD            |                       |      | -32  | dBm  |       |
| LOS Assert                | LOSA            | -45                   |      |      | dBm  |       |
| LOS Hysteresis            |                 | 0.5                   |      |      | dB   |       |

### Notes:

1. Average.
2. 20-80%.
3. Filtered, measured with a PRBS  $2^{23}-1$  test pattern @155Mbps.
4. Minimum average optical power is measured at BER less than  $1E^{-12}$  with  $2^{23}-1$  PRBS and ER=9dB.

## Pin Descriptions

| Pin | Symbol      | Name/Description                                                 | Notes |
|-----|-------------|------------------------------------------------------------------|-------|
| 1   | VeeT        | Transmitter Ground (Common with Receiver Ground).                | 1     |
| 2   | Tx_Fault    | Transmitter Fault.                                               |       |
| 3   | Tx_Disable  | Transmitter Disable. Laser output disabled on "high" or "open."  | 2     |
| 4   | MOD_DEF(2)  | Module Definition 2. Data Line for Serial ID.                    | 3     |
| 5   | MOD_DEF(1)  | Module Definition 1. Clock Line for Serial ID.                   | 3     |
| 6   | MOD_DEF(0)  | Module Definition 0. Grounded within the module.                 | 3     |
| 7   | Rate Select | No Connection Required.                                          |       |
| 8   | LOS         | Loss of Signal Indication. "Logic 0" indicates normal operation. | 4     |
| 9   | VeeR        | Receiver Ground (Common with Transmitter Ground).                | 1     |
| 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.                          |       |
| 13  | RD+         | Receiver Non-Inverted Data Out. AC Coupled.                      |       |
| 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.                    |       |
| 19  | TD-         | Transmitter Inverted Data In. AC Coupled.                        |       |
| 20  | VeeT        | Transmitter Ground (Common with Receiver Ground).                | 1     |

## Notes:

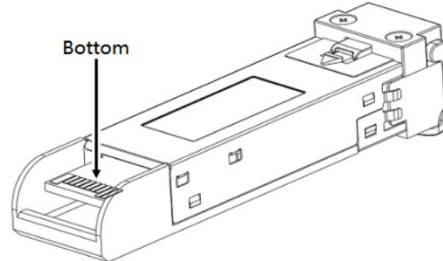
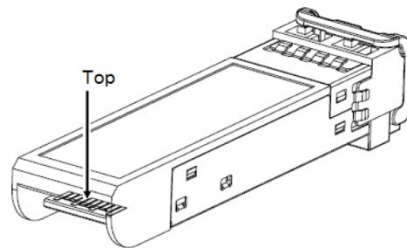
1. The circuit ground is internally isolated from the chassis ground.
2. Laser output is disabled on Tx\_Disable>2.0V or open, enabled on Tx\_Disable<0.8V.
3. Should be pulled up with 4.7kΩ-10kΩ on the host board to a voltage between 2.0V and 3.6V. MOD\_DEF (1) pulls the line low to indicate that the module is plugged in.
4. LOS is an open collector output. Should be pulled up with 4.7kΩ-10kΩ on the host board to a voltage between 2.0V and 3.6V. "Logic 0" indicates normal operation. "Logic 1" indicates a loss of signal.



Top of Board

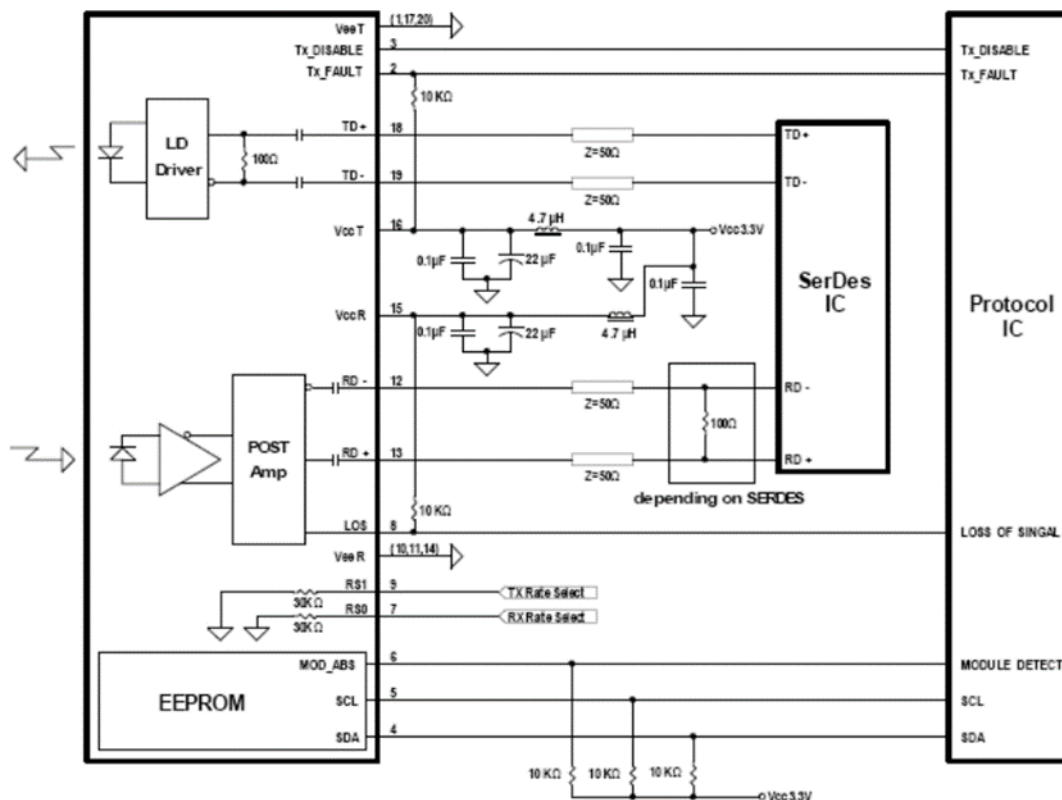


Bottom of Board



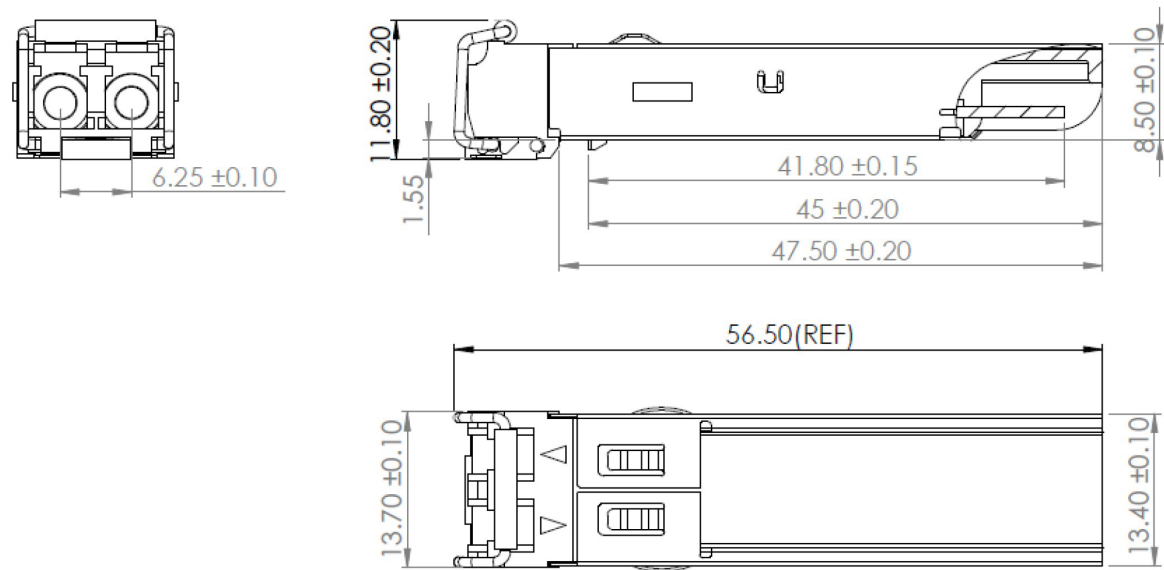
Pin-Out of Connector Block on the Host Board

## 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:

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

## 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.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salesupport@prolabs.com](mailto:salesupport@prolabs.com)

Telephone: +44 1285 719 600