

### SFP-1M-BX-D-I-PRO

MSA and TAA Compliant 100Base-BX SFP Transceiver (SMF, 1550nmTx/1310nmRx, 20km, DOM, -40 to 85C, LC)

#### Features

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



#### Applications:

- 100Base Ethernet
- Access and Enterprise

#### Product Description

This MSA Compliant SFP transceiver provides 100Base-BX throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1550nmTx/1310nmRx 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.

Proline's 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-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. | Typ. | Max. | Unit |
|----------------------------|------------------|------|------|------|------|
| Maximum Supply Voltage     | V <sub>CC</sub>  | -0.5 |      | 3.6  | V    |
| Storage Temperature        | T <sub>S</sub>   | -40  |      | +85  | °C   |
| Operating Case Temperature | T <sub>c</sub>   | -40  |      | +85  | °C   |
| Operating Humidity         | RH               | 5    |      | 85   | %    |
| Receiver Power             | R <sub>MAX</sub> |      |      | -8   | dBm  |
| Data Rate                  |                  |      | 155  |      | Mbps |

### Electrical Characteristics (TOP=25°C, V<sub>CC</sub>=3.3Volts)

| Parameter                     | Symbol           | Min. | Typ. | Max. | Unit | Notes |
|-------------------------------|------------------|------|------|------|------|-------|
| Power Supply Voltage          | V <sub>CC</sub>  | 3.15 | 3.30 | 3.45 | V    |       |
| Power Supply Current          | I <sub>CC</sub>  |      |      | 300  | mA   |       |
| <b>Transmitter</b>            |                  |      |      |      |      |       |
| LVPECL Inputs (Differential)  | V <sub>in</sub>  | 400  |      | 2000 | mVpp | 1     |
| Input differential impedance  | Z <sub>in</sub>  | 85   | 100  | 115  | Ω    | 2     |
| <b>Receiver</b>               |                  |      |      |      |      |       |
| LVPECL Outputs (Differential) | V <sub>out</sub> | 400  |      | 2000 | mVpp | 1     |
| Output differential impedance | Z <sub>out</sub> | 85   | 100  | 115  | Ω    |       |

### Notes:

1. LVPECL logic, internally AC coupled
2. R<sub>in</sub> > 100 kohms @ DC

## Optical Characteristics

| Parameter                      | Symbol                | Min. | Typ. | Max. | Unit | Notes |
|--------------------------------|-----------------------|------|------|------|------|-------|
| <b>Transmitter</b>             |                       |      |      |      |      |       |
| Optical Power (average)        | $P_{AVE}$             | -15  |      | -8   | dBm  | 1     |
| Optical Extinction Ratio       | ER                    | 8.2  |      |      | dB   | 2     |
| Optical Wavelength             | $T\lambda$            | 1530 | 1550 | 1570 | nm   |       |
| Spectral Width (RMS)           | $\Delta\lambda$       |      |      | 4    | nm   |       |
| Rise/Fall Time (20% ~ 80%)     | tr/tf                 |      |      | 2    | ns   |       |
| Total Jitter                   | TJ                    |      |      | 1.5  | ns   |       |
| Pout@TX Disable Asserted       | Pout                  |      |      | -45  | dBm  |       |
| Output Optical Eye             | IUT-T G.957 Compliant |      |      |      |      |       |
| <b>Receiver</b>                |                       |      |      |      |      |       |
| Receiver Sensitivity (average) | $R_{AVE}$             |      |      | -34  | dBm  | 3     |
| Receiver overload              | $P_{max}$             | -8   |      |      | dBm  | 4     |
| Receiver wavelength            | $R\lambda$            | 1260 | 1310 | 1360 | nm   |       |

### Notes:

1. Output power is measured by coupling into a 9/125 mm single-mode fiber.
2. Filtered, measured with a PRBS  $2^{23}-1$  test pattern @155Mbps.
3. Minimum average optical power is measured at BER less than  $1E-12$  and PRBS  $2^{23}-1$  test pattern.
4. Exceeding the Receiver overload can physically damage the module. Please use appropriate attenuation.

## Pin Descriptions

| Pin | Symbol     | Name/Descriptions  | Ref. |
|-----|------------|--|------|
| 1   | VeeT       | Transmitter Ground (Common with Receiver Ground).                              | 1    |
| 2   | TX Fault   | Transmitter Fault. LVTTTL-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). LVTTTL-I/O. |      |
| 5   | SCL        | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I.   |      |
| 6   | MOD_ABS    | Module Absent, Connect to VeeT or VeeR in Module.                              | 4    |
| 7   | RS0        | Rate Select 0. Not used  | 5    |
| 8   | LOS        | Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-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 resistor 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 4.7K $\Omega$  to 10K $\Omega$  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 4.7K $\Omega$  to 10K $\Omega$ . 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 Us:**

Proline Options is one of North America's leading providers of transceivers and high speed cabling. With a reputation for quality, tested products that cover the connectivity spectrum, Proline Options has a solution for you regardless of the specification.

At Proline Options, every product is tested in its intended application - never batch or spec tested only. We run bandwidth, distance and IOS network tests. We have documented an impressive 0.03% failure rate over the last 10 years. To continue this rate of success we invest millions annually in our own on-site testing lab.



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