

## **E1MG-100FX-OPC**

Brocade® (Formerly) E1MG-100FX Compatible TAA Compliant 100Base-FX SFP Transceiver (MMF, 1310nm, 2km, LC)

### **Features**

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



### **Applications:**

- 100Base Ethernet
- Access and Enterprise

### **Product Description**

This Brocade® (Formerly) E1MG-100FX compatible SFP transceiver provides 100Base-FX throughput up to 2km over multi-mode fiber (MMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Brocade® (Formerly) 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 Brocade® (Formerly), 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.

## 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>stg</sub> | -40  |         | 85   | °C   |
| Operating Case Temperature | T <sub>c</sub>   | 0    |         | 70   | °C   |
| Operating Humidity         | RH               |      |         | 95   | %    |
| Receiver Power             | R <sub>MAX</sub> |      |         | -12  | dBm  |
| Data Rate                  |                  |      | 100/155 |      | Mbps |
| 50µm Core Diameter MMF     | L                |      | 2       |      | km   |

## Electrical Characteristics

| 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    |       |
| Transmitter                   |         |                  |      |      |                      |       |       |
| LVPECL Differential Inputs    |         | V <sub>IN</sub>  | 400  |      | 2000                 | mVp-p | 1     |
| Input Differential Impedance  |         | Z <sub>IN</sub>  | 85   | 100  | 120                  | Ω     | 2     |
| Tx_Disable                    | Disable |                  | 2    |      | V <sub>CC</sub>      | V     |       |
|                               | Enable  |                  | 0    |      | 0.8                  | V     |       |
| Tx_Fault                      | Fault   |                  | 2    |      | V <sub>CC</sub> +0.3 | V     |       |
|                               | Normal  |                  | 0    |      | 0.5                  | V     |       |
| Receiver                      |         |                  |      |      |                      |       |       |
| LVPECL Differential Outputs   |         | V <sub>OUT</sub> | 400  |      | 2000                 | mVp-p | 1     |
| Output Differential Impedance |         | Z <sub>IN</sub>  | 85   | 100  | 120                  | Ω     |       |
| Tx_Disable Assert Time        |         | T <sub>off</sub> |      |      | 10                   | us    |       |
| Rx_LOS                        | LOS     |                  | 2    |      | V <sub>CC</sub> +0.3 | V     |       |
|                               | Normal  |                  | 0    |      | 0.8                  | V     |       |
| MOD_DEF (0.2)                 |         | V <sub>OH</sub>  | 2.5  |      |                      | V     | 3     |
|                               |         | V <sub>OL</sub>  | 0    |      | 0.8                  | V     | 3     |

## Notes:

1. AC Coupled.
2. R<sub>IN</sub> > 100kΩ @ DC.
3. With Serial ID.

## Optical Characteristics

| Parameter                  | Symbol | Min.                  | Typ. | Max. | Unit | Notes |
|----------------------------|--------|-----------------------|------|------|------|-------|
| Transmitter                |        |                       |      |      |      |       |
| Average Output Power       | POUT   | -19                   |      | -14  | dBm  | 1     |
| Optical Extinction Ratio   | ER     | 10                    |      |      | dB   | 2     |
| Optical Wavelength         | Tλ     | 1260                  | 1310 | 1360 | nm   |       |
| Spectral Width (RMS)       | Δλ     |                       |      | 4    | nm   |       |
| Total Jitter               | TJ     |                       |      | 1    | ns   | 2     |
| Tx_Disable Asserted Time   | T_off  |                       |      | 10   | us   |       |
| POUT @ Tx_Disable Asserted | POUT   |                       |      | -45  | dBm  |       |
| Rise/Fall Time (20-80%)    | Tr/Tf  |                       |      | 2    | ns   |       |
| Output Optical Eye         |        | IUT-T G.957 Compliant |      |      |      |       |
| Receiver                   |        |                       |      |      |      |       |
| Receiver Sensitivity       | Pmin   |                       |      | -31  | dBm  | 3     |
| Receiver Overload          | Pmax   | -12                   |      |      | dBm  |       |
| Optical Center Wavelength  | λC     | 1260                  |      | 1600 | nm   |       |
| Return Loss                |        | 14                    |      |      | dB   |       |

### Notes:

1. Output power is measured by coupling into a 50/125mm multi-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  $1E^{-12}$  with  $2^{23}-1$  PRBS and ER=9dB.

## Pin Descriptions

| Pin | Symbol     | Name/Description                                                          | Note |
|-----|------------|---------------------------------------------------------------------------|------|
| 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." LVTTTL-I. | 3    |
| 4   | SDA        | 2-Wire Serial Interface Data (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O. |      |
| 5   | SCL        | 2-Wire Serial Interface Clock (Same as MOD-DEF2 in INF-8074i). LVTTTL-I.  |      |
| 6   | MOD_ABS    | Module Absent. Connect to VeeT or VeeR in the 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 Host\_Vcc with a resistor in the range 4.7kΩ-10kΩ. Pull-ups can be connected to one or several power supplies; however, the host board design shall ensure that no module contact has a voltage exceeding the module VccT/R+0.5V.
3. Tx\_Disable is an input contact with a 4.7kΩ-10kΩ pull-up resistor to the VccT inside the module.
4. MOD\_ABS is connected to the VeeT or VeeR in the SFP+ module. The host may pull the contact up to the Host\_Vcc with a resistor in the range from 4.7kΩ-10kΩ. MOD\_ABS is asserted "high" when the SFP+ module is physically absent from a host slot.
5. Internally pulled down per SFF-8431.



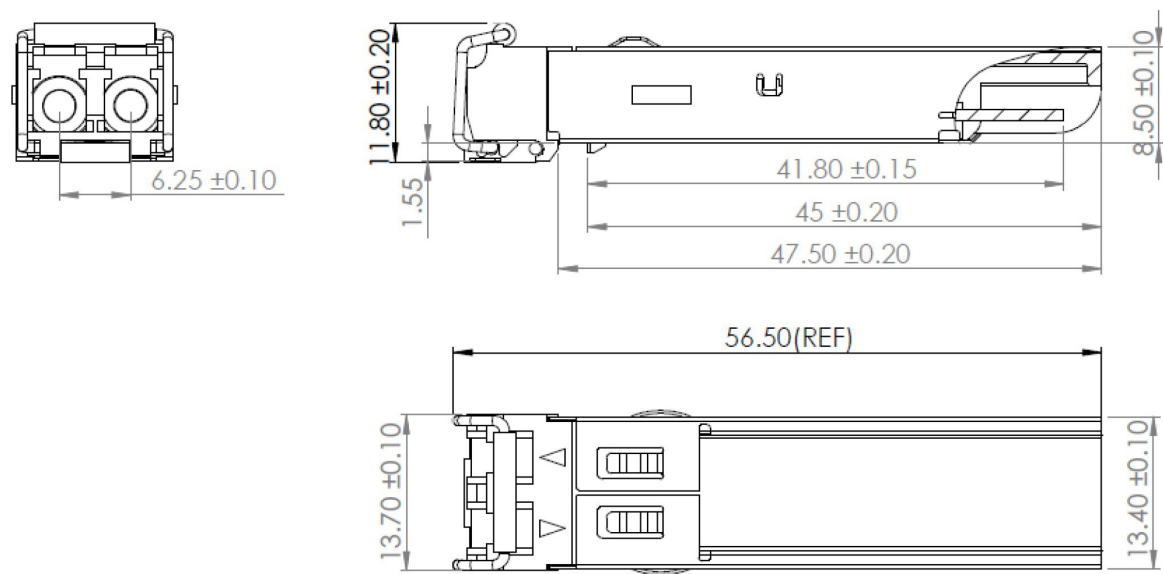
Pin-Out of Connector Block on the Host Board

### 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)                 |