**SFP-1/10GB-LR-MX-AO**

Mellanox® Compatible TAA 1/10GBase-LR SFP+ Dual-Rate Transceiver (SMF, 1310nm, 10km, LC, DOM)

**Features**

- Supports Rate Selectable 1.25Gbps or 9.83Gbps to 11.3Gbps Bit Rates
- Compliant with SFF-8431
- Compliant with IEEE 802.3.2-2012 10GBASE-LR/LW and 1000BASE-LX
- 1310 DFB Laser Transmitter
- Built-In Digital Diagnostic Functions
- Hot-Pluggable SFP+ Footprint
- Up to 10km on SMF
- Duplex LC Connector
- Operating Temperature: 0 to 70 Celsius
- 3.3V Power Supply
- RoHS Compliant and Lead-Free

**Applications**

- 10GBase Ethernet

**Product Description**

This Mellanox® compatible SFP+ transceiver provides 1/10GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application 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.

AddOn'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.")

TAA COMPLIANT

**Rev. 031926**

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Maximum Supply Voltage** | Vcc | -0.5 | | 4 | V | 1 |
| **Storage Temperature** | Tstg | -40 | | 85 | °C | |
| **Operating Case Temperature** | Tc | 0 | | 70 | °C | |
| **Data Rate (RS0 = Low)** | DR | | 1.25 | | Gbps | 2 |
| **Data Rate (RS0 = High)** | DR | 9.83 | 10.3125 | 11.3 | Gbps | 2 |
| **Bit Error Rate** | BER | | | $10^{-12}$ | | |

**Notes:**

1. For the electrical power interface.
2. IEEE 802.3-2012.

**Electrical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Module Supply Voltage** | Vcc | 3.14 | 3.3 | 3.46 | V | |
| **Module Supply Current** | Icc | | 290 | 380 | mA | 1 |
| **Power Dissipation** | $P_{DISS}$ | | 1.0 | 1.3 | W | |
| **Transmitter** | | | | | | |
| **Input Differential Impedance** | RIN | | 100 | | Ω | |
| **Differential Data Input Swing** | VIN,pp | 180 | | 700 | mVp-p | |
| **Transmit Disable Voltage** | VD | 2 | | Host_Vcc | V | |
| **Transmit Enable Voltage** | VEN | Vee | | Vee+0.8 | V | |
| **Receiver** | | | | | | |
| **Differential Data Output Swing** | VOUT,pp | 300 | | 850 | mVp-p | |
| **Data Output Rise/Fall Time (20-80%)** | Tr/Tf | 28 | | | ps | |
| **LOS Assert** | VLOSA | 2 | | Host_Vcc | V | |
| **LOS De-Assert** | VLOSD | Vee | | Vee+0.5 | V | |

**Notes:**

1. For the electrical power interface.

**Optical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Output Optical Power @1.25Gbps** | $P_{TX1}$ | -9.5 | | -3 | dBm | 1 |
| **Output Optical Power @10.3Gbps** | $P_{TX2}$ | -8.2 | | 0.5 | dBm | 1 |
| **Optical Center Wavelength** | λC | 1260 | | 1355 | nm | |
| **Optical Modulation Amplitude** | OMA | -5.2 | | | dBm | 2 |
| **Extinction Ratio @1.25Gbps** | ER1 | 9 | | | dB | |
| **Extinction Ratio @10.3Gbps** | ER2 | 3.5 | | | dB | |
| **Spectral Width (-20dB)** | Δλ | | | 1 | nm | |
| **Side-Mode Suppression Ratio** | SMSR | 30 | | | dB | |
| **Relative Intensity Noise** | RIN | | | -128 | dB/Hz | |
| **Transmitter Dispersion Penalty** | TDP | | | 3.2 | dB | |
| **Launch Power of Off Transmitter** | Poff | | | -30 | dBm | 1 |
| **Transmitter Jitter** | | | | | | 2 |
| **Receiver** | | | | | | |
| **Optical Center Wavelength** | λC | 1260 | | 1600 | nm | |
| **Receive Overload** | $P_{OL}$ | 0.5 | | | dBm | |
| **Receiver Sensitivity @1.25Gbps** | $R_{X\_SEN1}$ | | | -19 | dBm | 3 |
| **Receiver Sensitivity @10.3Gbps** | $R_{X\_SEN2}$ | | | -14.4 | dBm | 4 |
| **Receiver Reflectance** | $TR_{RX}$ | | | -12 | dB | |
| **LOS Assert @1.25Gbps** | LOSA | -30 | | | dBm | |
| **LOS Assert @10.3Gbps** | LOSA | -30 | | | dBm | |
| **LOS De-Assert @1.25Gbps** | LOSD | | | -17 | dBm | |
| **LOS De-Assert @10.3Gbps** | LOSD | | | -17 | dBm | |
| **LOS Hysteresis** | LOSH | 0.5 | | | dB | |

**Notes:**

1. Average.
2. According to IEEE 802.3ae requirements.
3. Average. Test the resulting value using the minimum ER value within the defined range: BER<$10^{-12}$ and $2^7$-1 PRBS.
4. Average. Test the resulting value using the minimum ER value within the defined range: BER<$10^{-12}$ and $2^{31}$-1 PRBS.

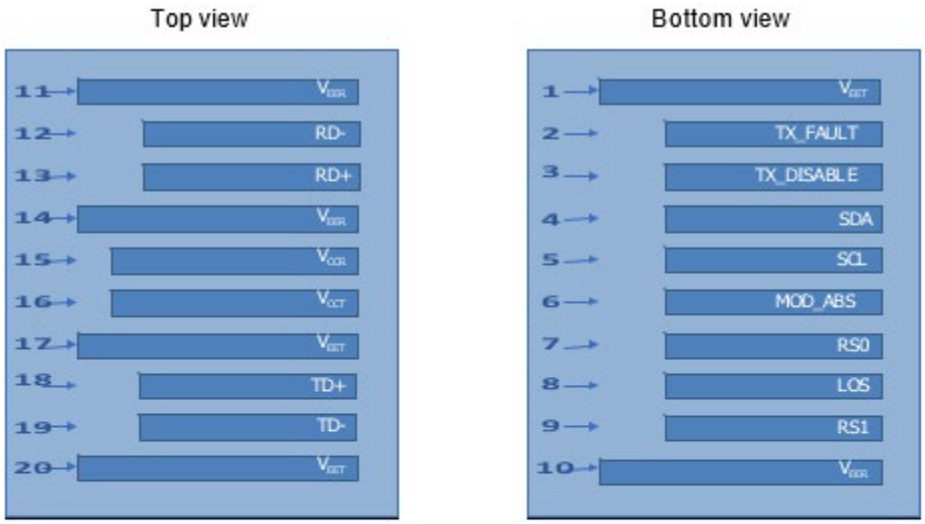
**Pin Descriptions**

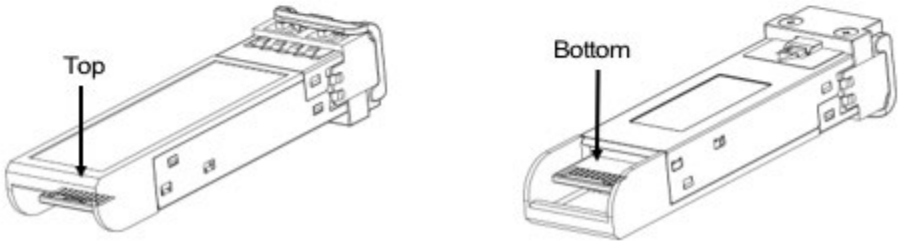
| Pin | Symbol | Name/Description | Notes |
|---|---|---|---|
| **1** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| **2** | Tx_Fault | Transmitter Fault. | 2 |
| **3** | Tx_Disable | Transmitter Disable. Laser output disables on “high” or “open.” | 3 |
| **4** | SDA | 2-Wire Serial Interface Data. | 4 |
| **5** | SCL | 2-Wire Serial Interface Clock. | 4 |
| **6** | MOD_ABS | Module Absent. Grounded within the module. | 4 |
| **7** | RS0 | Module Rate Selection:<br>“Open” or “Low” Level = 1.25Gbps rate (low bandwidth).<br>“High” Level = 9.95-10.31Gbps rate (high bandwidth). | |
| **8** | LOS | Loss of Signal Indication. “Logic 0” indicates normal operation. | 5 |
| **9** | RS1 | No Connection Required. | 1 |
| **10** | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| **11** | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| **12** | RD- | Inverse Receiver Data Out. AC Coupled. | |
| **13** | RD+ | Received 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 Data In. AC Coupled. | |
| **19** | TD- | Inverse Transmitter Data In. AC Coupled. | |
| **20** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |

**Notes:**

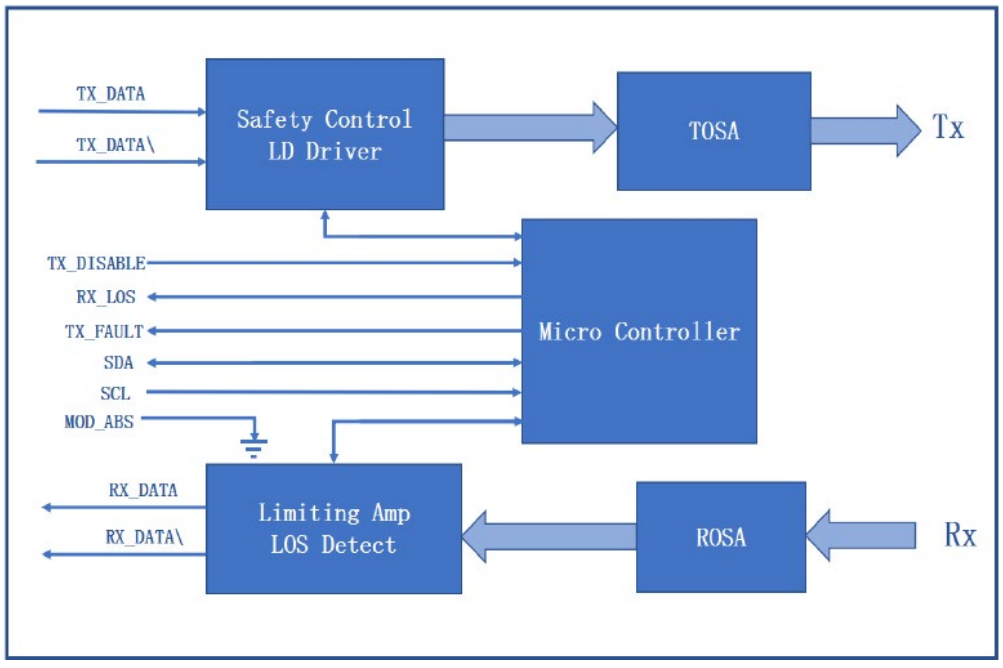
1. The circuit ground is isolated from the chassis ground.
2. Tx_Fault is the open collector output and should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and Vcc+0.3V.
3. Disabled: $T_{DIS}$>2V or open. Enabled: $T_{DIS}$<0.8V.
4. Should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and Vcc+0.3V.
5. LOS is an open collector output and should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and Vcc+0.3V. “Logic 0” indicates normal operation. “Logic 1” indicates that the receiver signal is lost.

**Electrical Pin-Out Details**

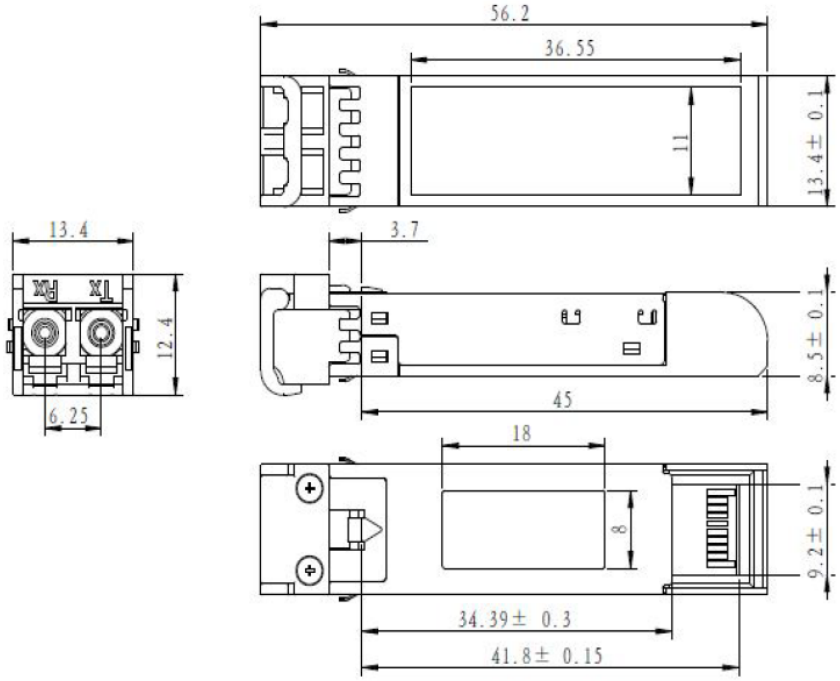


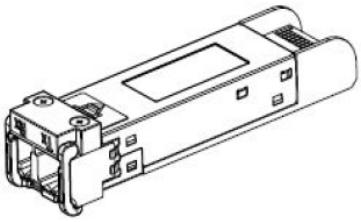




**Block Diagram**



**Mechanical Specifications**



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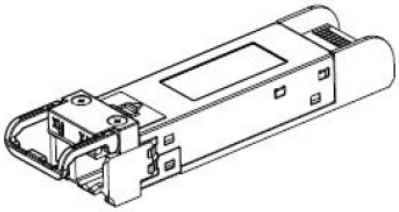

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**About AddOn Networks**

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications ranging from NEBS Level 3 to ISO 9001:2015 with every new development while maintaining the signature reliability of its products.


**U.S. Headquarters**

Email: sales@addonnetworks.com

Telephone: +1 877.292.1701

Fax: 949.266.9273

**Europe Headquarters**

Email: salesemea@addonnetworks.com

Telephone: +44 1285 842070