

SFP-M2 1.25 Gigabit Ethernet-Multimode Transceiver

SFP, Duplex LC Connector, 1310nm FP LD for Multimode Fiber, RoHS Compliant



Applications

- Gigabit Ethernet Links
- Fiber Channel Links at 1.06 Gbps
- High Speed Backplane Interconnects
- Switched Backbones

Features

- 1310nm FP LD
- Multi Data Rate: from 125M to 1.25Gbps, NRZ
- Data Rate: 1.25Gbps, NRZ
- Single +3.3V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Duplex LC Connector
- Compliance with specifications for IEEE-802.3z Gigabit Ethernet at 1.25 Gbps
- Compliance with ANSI specifications for Fibre Channel applications at 1.06 Gbps
- Eye Safety
Designed to meet Laser Class 1, complies with EN60825-1

Description

The SFP-M2 from AAXEON is the high performance and cost-effective module for serial optical data communication applications specified for multimode of 1.25 Gb/s. It operates on +3.3V power. The module is intended for multimode fiber, operates at a nominal wavelength of 1310nm, and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated digital diagnostics functions via an I²C serial interface (optional).

The module is a duplex LC connector transceiver designed for use in Gigabit Ethernet applications and to provide IEEE-802.3z compliant link for 1.25Gb/s short reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

- 1) FCC in the United States
- 2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.

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Product Information

| Model Number | Operating Temperature. & Monitor Function | Distance | LD Type & Wavelength | Output Power | Sensitivity |
|--------------|---|----------|----------------------|---------------|-------------|
| SFP-M2 | 0~70° | 2 km | 1310 nm FP | -9.5 ~ +1 dBm | ≤-23 dBm |

ABSOLUTE MAX RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---------------------|-----------------|-----|-----------------|------|------|
| Storage Temperature | T _S | -40 | 85 | °C | |
| Supply Voltage | V _{CC} | 0 | 6 | V | |
| Data Input Voltage | --- | 0 | V _{CC} | V | |
| Supply Current | I _S | | 300 | mA | |

OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|--------------------------|-----------------|------|------|------|------|------|
| Supply Voltage | V _{CC} | 3.1 | | 3.5 | V | |
| Data Input Voltage Swing | V _{ID} | 300 | | 1860 | mV | |

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|------------------|-----------------------|-----------------------|------|------|
| Transmitter | | | | | |
| Transmitter Supply Current | I _{CCT} | | 200 | mA | |
| Tx_Disable Input Voltage - Low | V _{IL} | 0 | 0.8 | V | |
| Tx_Disable Input Voltage - High | V _{IH} | 2.0 | V _{CC} | V | |
| Tx_Fault Output Voltage - Low | V _{OL} | 0 | 0.8 | V | |
| Tx_Fault Output Voltage - High | V _{OH} | 2.0 | V _{CC} | V | |
| Receiver | | | | | |
| Receiver Supply Current | I _{CCR} | | 100 | mA | |
| Receiver Data Output Differential Voltage | V _{OD} | 0.4 | 1.3 | V | |
| Rx_LOS Output Voltage - Low | V _{OL} | 0 | 0.8 | V | |
| Rx_LOS Output Voltage - High | V _{OH} | 2.0 | V _{CC} | V | |
| MOD_DEF (1) , MOD_DEF (2) - Low | V _{IL} | -0.6 | V _{CC} × 0.3 | V | |
| MOD_DEF (1) , MOD_DEF (2) - High | V _{IH} | V _{CC} × 0.7 | V _{CC} + 0.5 | V | |

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|-----------------------------|----------------|--------------------------------|------|------|-------|------|
| Optical Output Power | P _O | -9.5 | | +1 | dBm | 1 |
| Extinction Ratio | ER | 9 | | | dB | |
| Center Wavelength | λ _c | 1270 | | 1355 | nm | |
| Spectral Width (RMS) | Δλ | | | 4 | nm | |
| RIN | RIN | | | -117 | dB/Hz | |
| Optical Rise time (20%-80%) | t _r | | | 260 | ps | 2 |
| Optical Fall time (20%-80%) | t _f | | | 260 | ps | 2 |
| Output Eye | | Compliant with IEEE802.3z/D5.0 | | | | |

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RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|--|-------------|-----------|------|------|------|------|
| Maximum Input Optical Power | P_{max} | -3 | | | dBm | 3 |
| Minimum Input Optical Power | 1.25Gb/s | | | -23 | | 3 |
| | 1.06Gb/s | | | -23 | | 3 |
| | 622Mb/s | P_{min} | | -23 | dBm | 4 |
| | 155Mb/s | | | -23 | | 4 |
| | 125Mb/s | | | -23 | | 3 |
| Operating Wavelength | λ | 1100 | | 1600 | nm | |
| Optical Return Loss | ORL | 12 | | | dB | |
| Receiver Electrical 3dB Upper Cutoff Frequency | --- | | | 1500 | MHz | |
| LOS of Signal - Asserted | P_A | -35 | | | dBm | |
| LOS of Signal - Deasserted | P_D | | | -22 | dBm | |
| Loss of Signal -Hysterisis | $P_D - P_A$ | 0.5 | | | dB | |

Notes:

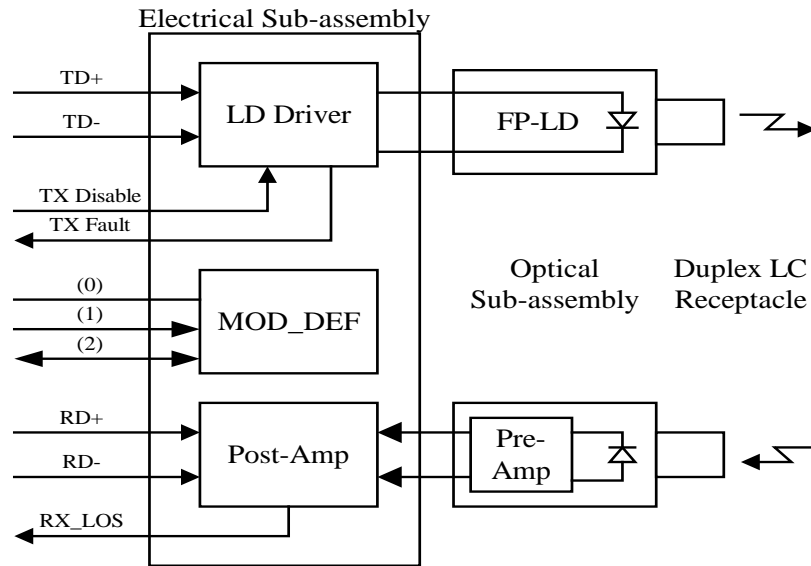
1. Measured average power coupled into 62.5/125 μ m, 0.275 NA graded index multimode fiber.
2. These are 20-80% values.
3. Measured with 2^7-1 PRBS at BER< 10^{-12}
4. Measured with $2^{23}-1$ PRBS at BER< 10^{-10}

TIMING CHARACTERISTICS

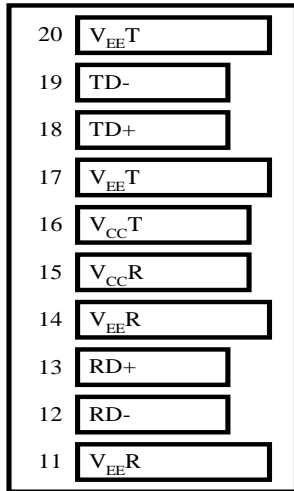
| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|-----------------|-----|------|-----|---------|------|
| TX_DISABLE Assert Time | t_{off} | | | 10 | μ s | |
| TX_DISABLE Negate Time | t_{on} | | | 1 | ms | |
| Time to initialize, include reset of TX_FAULT | t_{init} | | | 300 | ms | |
| TX_FAULT from fault to assertion | t_{fault} | | | 100 | μ s | |
| TX_DISABLE time to start reset | t_{reset} | 10 | | | μ s | |
| Receiver Loss of Signal Assert Time (off to on) | t_{A,RX_LOS} | | | 100 | μ s | |
| Receiver Loss of Signal Assert Time (on to off) | t_{D,RX_LOS} | | | 100 | μ s | |

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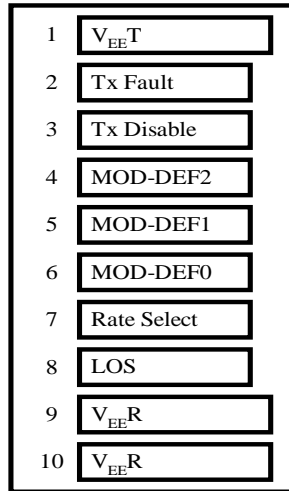
BLOCK DIAGRAM OF TRANSCEIVER



PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board

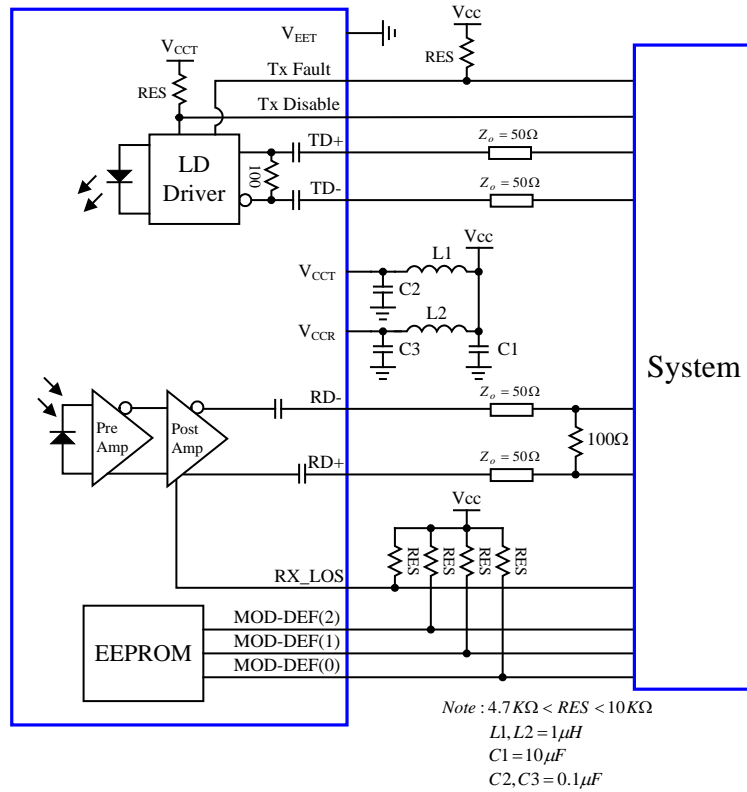


Bottom of Board (As Viewed through Top of Board)

PIN OUT TABLE

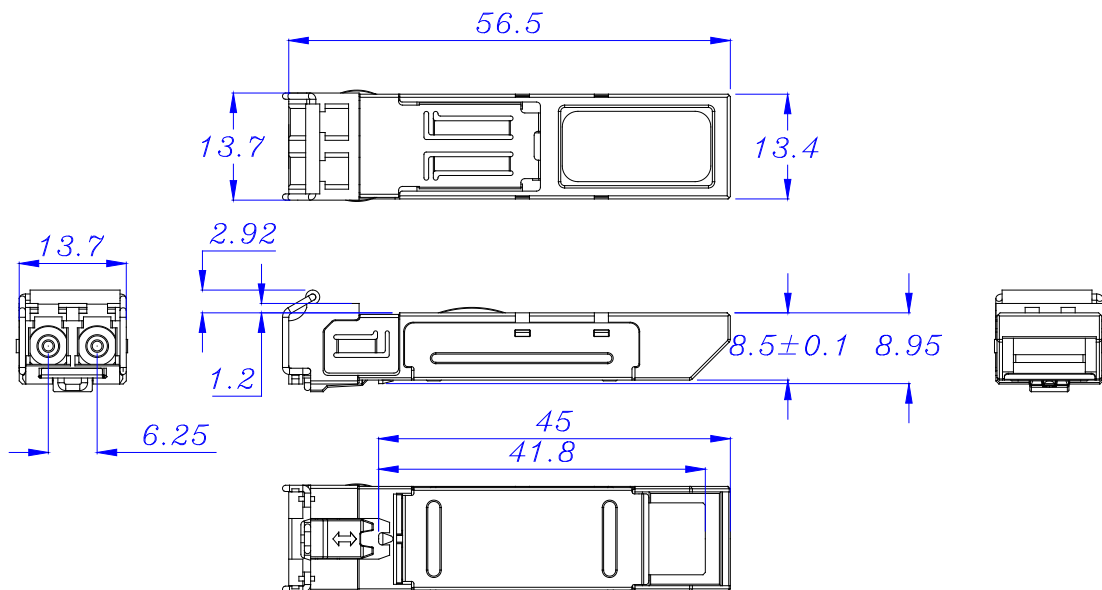
| Pin | Symbol | Functional Description |
|-----|-------------|---|
| 1 | VeeT | Transmitter Ground |
| 2 | TX Fault | Transmitter Fault Indication |
| 3 | TX Disable | Transmitter Disable – Module disables on high or open |
| 4 | MOD-DEF(2) | Module Definition 2 – Two wire serial ID interface |
| 5 | MOD-DEF(1) | Module Definition 1 – Two wire serial ID interface |
| 6 | MOD-DEF(0) | Module Definition 0 – Grounded in module |
| 7 | Rate Select | Not Connected |
| 8 | LOS | Loss of Signal |
| 9 | VeeR | Receiver Ground |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Inverse Received Data Out |
| 13 | RD+ | Received Data Out |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver Power |
| 16 | VccT | Transmitter Power |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitter Data In |
| 19 | TD- | Inverse Transmitter Data In |
| 20 | VeeT | Transmitter Ground |

RECOMMENDED CIRCUIT SCHEMATIC



MECHANICAL DIMENSIONS

Units in mm



All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified.