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# Product Specifications

**Product** : F.O. 1.25G SFP Duplex LC Transceiver, MMF 850nm 500m

### Features

- Up to 1.25Gbps data rate
- 850nm VCSEL Laser and PIN photo detector
- Duplex LC receptacle optical interface compliant
- Single +3.3V power supply
- Hot-pluggable
- AC coupling of LVPECL signals
- International Class1 laser safety certified
- Operating temperature range: Commercial: 0℃~+70℃
- Industrial: -40℃~+85℃
- RoHS Compliant
- DDMI function available with internally calibrated mode

### Application

- Gigabit Ethernet
- Gigabit Fiber Channel

### Standard

- Compliant with MSA SFP specification
- Compatible with G.959.1
- Compliant with SFF-8472
- Compliant with FC-PI v2.0

## Specification

| Absolute Maximum Ratings | | | | |
|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Max** | **Unit** |
| Storage temperature | TS | -40 | 85 | ℃ |
| Power Supply Voltage | Vcc | -0.5 | +4 | V |
| Relative Humidity | RH | 5 | 95 | % |

| Recommended Operating Conditions | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typical** | **Max** | **Unit** |
| Operating Case Temperature (Commercial) | Tc | 0 | | 70 | ℃ |
| Operating Case Temperature (Industrial) | | -40 | | 85 | |
| Power Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V |
| Supply Current | Icc | | | 240 | mA |
| Data Rate | | - | 1.25 | - | Gbps |
| Fiber Length 62.5μm core MMF | | | | 300 | m |
| Fiber Length 50μm core MMF | | - | - | 500 | m |

| Electrical Characteristics | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Max** | **Unit** | **Notes** |
| Transmitter differential input voltage | 400 | | 2400 | mV | |
| Receiver differential output Voltage | 600 | | 1200 | mV | |
| Transmit Fault (TX_Fault) | Voh | 2.4 | Vcc+0.3 | v | LVTTL |
| | Vol | -0.3 | 0.4 | v | LVTTL |
| Loss of Signal (LOS) | Voh | 2.4 | Vcc+0.3 | v | LVTTL |
| | Vol | -0.3 | 0.4 | v | LVTTL |
| TX Disable | Vih | 2 | Vcc+0.3 | v | LVTTL |
| | Vil | -0.3 | 0.8 | v | LVTTL |

| Optical transmitter Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typical** | **Max** | **Unit** | **Notes** |
| Launched Power (avg.) | Pout | -9 | | -3 | dBm | |
| Operating Wavelength Range | λc | 830 | 850 | 860 | nm | |
| Spectral Width (RMS) | Δλ | | | 0.85 | nm | |
| Extinction Ratio | ER | 9 | | | dB | 2 |
| Total Jitter | Tj | | | 0.284 | UI | 2 |
| Transmitter and Dispersion Penalty | TDP | 38 | | -120 | dB/Hz | |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | |
| Optical Rise/Fall Time | Tris/Tfall | | | 260 | PS | 3 |
| Optical Tx Output disable | Pdis | | | -45 | dBm | |
| Output Eye Diagram | Complies with IEEE802.3z eye masks when filtered | | | | | |

| Optical receiver Characteristics | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Min** | **Typical** | **Max** | **Unit** | **Notes** |
| Receiver Sensitivity | | S | -9 | | -17 | dBm | 4 |
| Wavelength Range | | λc | 770 | 850 | 870 | nm | |
| Receiver Reflectance | | | | | -12 | dB | |
| Optical Power Input Overload | | Pin-max | -3 | | | dBm | 4 |
| LOS | Optical De-assert | Pd | | | | dBm | 4 |
| | Optical Assert | Pa | -35 | | 110 | | |
| LOS hysteresis | | | 0.5 | | 5 | dB | 5 |

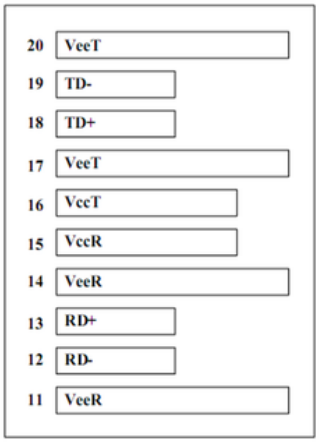
**Notes**

- The supply current is SFP module's working current.
- For the measurements, the device was driven with1.25Gbps data pattern with $2^7$-1 PRBS payload.
- Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between the 20% and 80% amplitudes relative to the logical 1 and 0 levels.
- Measured with a PRBS $2^7$-1 test pattern, @1.25Gbps, ER=10dB, BER<$10^{-12}$
- The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

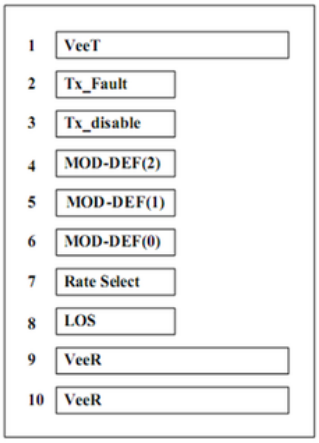
## Digital Diagnostic Monitoring Information

| Parameter | Accuracy | Calibration | Range |
|---|---|---|---|
| Temperature | ±3°C | internal | -40~85 |
| Voltage | ±3% | internal | Vcc=3.3V±5% |
| Bias Current | ±10% | internal | Specified by normal value |
| TX Power | ±2dB | internal | -9~-3dBm |
| RX Power | ±3dB | internal | -17~0dBm |

**Pin Descriptions**




Top of Board




Bottom of Board

| Pin | Name | Function/Description | Engagement | Order |
|---|---|---|---|---|
| 1 | VeeT | Transmitter Ground | 1 | |
| 2 | TX Fault | Transmitter Fault Indication | 3 | 1 |
| 3 | TX Disable | Transmitter Disable-Module disables on high or open | 3 | 2 |
| 4 | MOD-DEF2 | Module Definition 2-Two wire serial ID interface | 3 | 3 |
| 5 | MOD-DEF1 | Module Definition 1-Two wire serial ID interface | 3 | 3 |
| 6 | MOD-DEF0 | Module Definition 0-Two wire serial ID interface | 3 | 3 |
| 7 | Rate Select | Not Connected | 3 | |
| 8 | LOS | Loss of Signal | 3 | 4 |
| 9 | VeeR | Receiver Ground | 1 | |
| 10 | VeeR | Receiver Ground | 1 | |
| 11 | VeeR | Receiver Ground | 1 | |
| 12 | RD- | Inverse Received Data out | 3 | 5 |
| 13 | RD+ | Received Data out | 3 | 5 |
| 14 | VeeR | Receiver Ground | 1 | |
| 15 | VccR | Receiver Power —— +3.3V±5% | 2 | 6 |
| 16 | VccT | Transmitter Power —— +3.3 V±5% | 2 | 6 |
| 17 | VeeT | Transmitter Ground | 1 | |
| 18 | TD+ | Transmitter Data In | 3 | 7 |
| 19 | TD- | Inverse Transmitter Data In | 3 | 7 |
| 20 | VeeT | Transmitter Ground | 1 | |

Notes

- TX Fault is open collector/drain output which should be pulled up externally with a 4.7K – 10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

- TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K – 10K Resistor.
  1. Low (0 – 0.8V): Transmitter on
  2. Between (0.8V and 2V): Undefined High
  3. (2.0 – VccT): Transmitter Disabled
  4. Open: Transmitter Disabled.

- Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7 – 10K Resistor on the host board to supply less than VccT+0.3V or VccR+0.3V.
  1. Mod-Def 0 is grounded by the module to indicate that the module is present.
  2. Mod-Def 1 is clock line of two wire serial interface for optional serial ID.
  3. Mod-Def 2 is data line of two wire serial interface for optional serial ID.

- LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7 – 10K resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

- RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.

- VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.

- TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.

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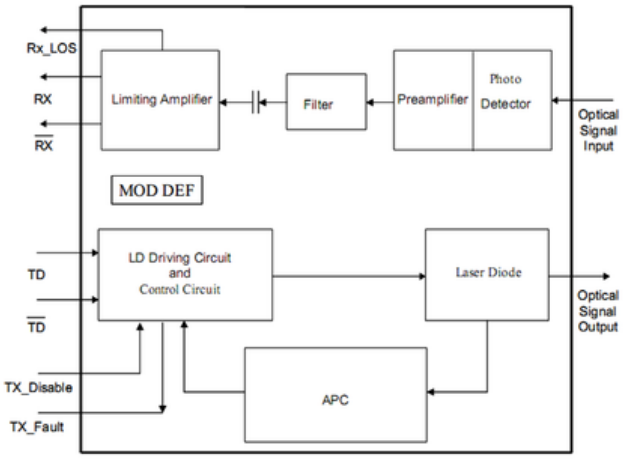
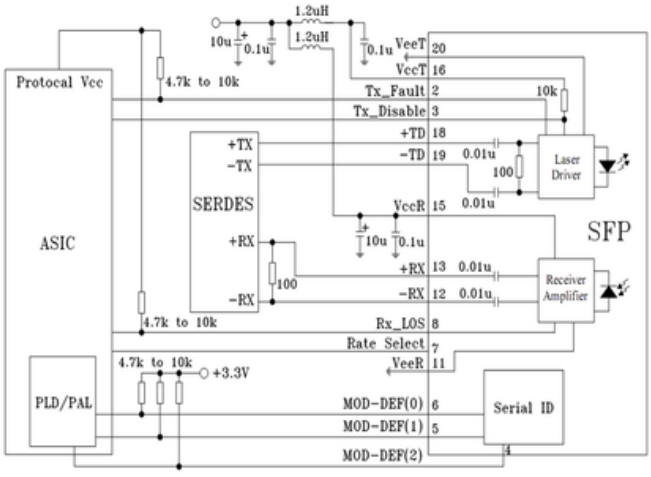
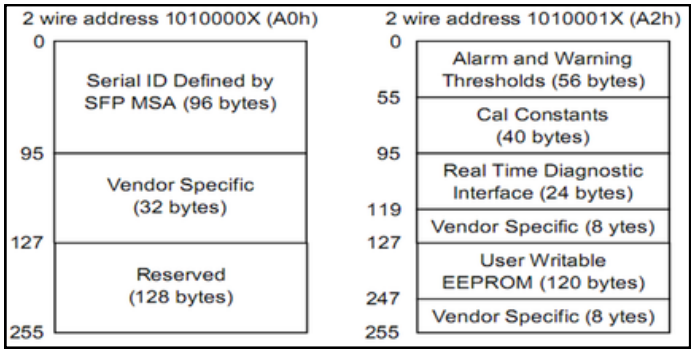
**Block Diagram**



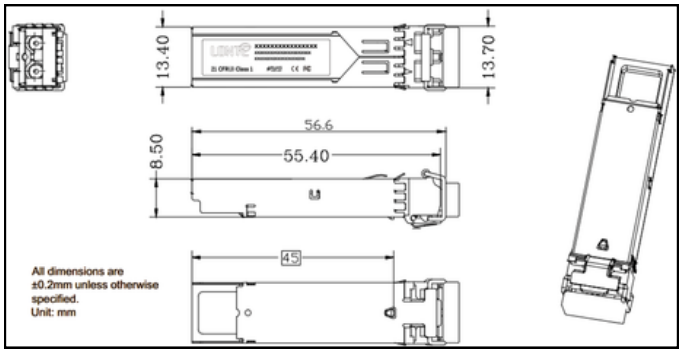

**Typical application Circuit**



### Digital Diagnostic Memory Map




### Package Outline




## Regulatory Compliance

| Feature | Test | Method |
|---|---|---|
| Electrostatic Discharge (ESD) to the Electrical Pins | • MIL-STD-883E<br>• Method 3015.7 | Class 1(>1000V for SFI pins, >2000V for other pins.) |
| Electrostatic Discharge (ESD) Immunity | • IEC61000-4-2 | Class 2(>4.0kV) |
| Electromagnetic Interference (EMI) | • CISPR22 ITE Class B<br>• FCC Class B<br>• CENELEC EN55022<br>• VCCI Class 1 | Comply with standard |
| Immunity | • IEC61000-4-3 | Comply with standard |
| Eye Safety | • FDA 21CFR 1040.10 and<br>• 1040.11<br>• EN (IEC) 60825-1,2 | Compatible with Class I laser Product |

## Revision record

| Date | version | change Description |
|---|---|---|
| May 4, 2026 | V.0 | First release |