**SFP-25GBASE-ESR-OPC**

MSA and TAA 25GBase-SR SFP28 Transceiver (MMF, 850nm, 400m, LC, DOM)

**Features**

- SFF-8402 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:**

- 25GBase Ethernet
- Access and Enterprise

**Product Description**

This MSA compliant SFP28 transceiver provides 25GBase-SR throughput up to 400m over multi-mode fiber (MMF) using a wavelength of 850nm 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.

OptioConnect's transceivers are RoHS compliant and lead-free.

**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** | Vcc | -0.5 | | 4.0 | V |
| **Storage Temperature** | TS | -40 | | 85 | °C |
| **Operating Case Temperature** | Tc | 0 | 25 | 70 | °C |
| **Relative Humidity** | RH | 5 | | 85 | % |
| **Data Rate** | | 10.3 | 25.78 | | Gb/s |

**Electrical Characteristics**

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|---|
| **Supply Voltage** | | Vcc | 3.135 | 3.3 | 3.465 | V | |
| **Module Supply Current** | | Icc | | | 290 | mA | |
| **Power Dissipation** | | $P_D$ | | | 1000 | mW | |
| **Transmitter** | | | | | | | |
| **Input Differential Impedance** | | ZIN | | 100 | | Ω | |
| **Differential Data Input Swing** | | Vin,p-p | 180 | | 700 | mVp-p | |
| **TX Fault** | **Transmitter Fault** | VOH | 2.0 | | Vcc | V | TX_FAULT |
| | **Normal Operation** | VOL | 0 | | 0.8 | V | |
| **TX Disable** | **Transmitter Disable** | VIH | 2.0 | | Vcc | V | TX_DISABLE |
| | **Transmitter Enable** | VIL | 0 | | 0.8 | V | |
| **Receiver** | | | | | | | |
| **Output Differential Impedance** | | Zo | | 100 | | Ω | |
| **Differential Data Output Swing** | | Vout,p-p | 300 | | 850 | mVp-p | 1 |
| **Data Output Rise Time, Fall Time** | | tr, tf | | 30 | | ps | 2 |
| **RX_LOS** | **Loss of Signal (LOS)** | VOH | 2.0 | | Vcc | V | RX_LOS |
| | **Normal Operation** | VOL | 0 | | 0.8 | V | |

**Notes:**

1. Internally AC coupled, but requires an external 100Ω differential load termination.

2. 20-80%
3. LOS is an open collector output. Should be pulled up with 4.7KΩ on the host board.

**Optical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Launch Optical Power** | Po | -4.0 | | +2.4 | dBm | 1 |
| **Tx Power (OMA)** | Poma | -4 | | | dBm | 1 |
| **Extinction Ratio** | ER | 2 | | | dB | |
| **Center Wavelength Range** | λc | 840 | 850 | 860 | nm | |
| **Transmitter Dispersion Penalty @25.78Gb/s** | TWDP | | | 4.3 | dB | |
| **Spectral Width (RMS) @25.78Gb/s** | Δλ | | | 0.6 | nm | |
| **Optical Return Loss Tolerance** | ORLT | | | 12 | dB | |
| **Pout @TX-Disable Asserted** | Poff | | | -30 | dBm | 1 |
| **Receiver** | | | | | | |
| **Center Wavelength** | λc | 840 | | 860 | nm | |
| **Receiver Sensitivity (Pavg)** | S | | | -10.3 | dBm | 2 |
| **Receiver Sensitivity (Pavg)** | S | | | -11.0 | dBm | 3 |
| **Receiver Overload (Pavg)** | POL | 2.5 | | | dBm | |
| **Optical Return Loss** | ORL | 12 | | | dB | |
| **LOS De-Assert** | LOSD | | | -11 | dBm | |
| **LOS Assert** | LOSA | -30 | | | dBm | |
| **LOS Hysteresis** | | 0.5 | | | dB | |

**Notes:**

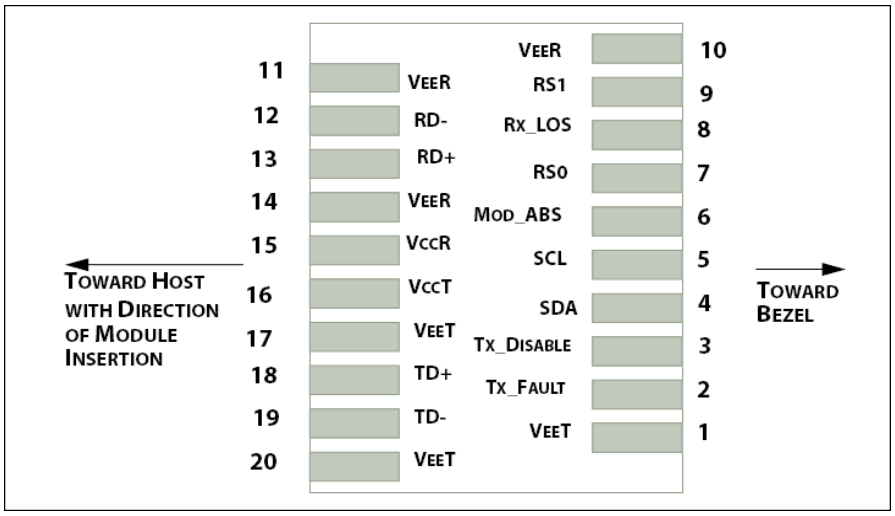
1. 50/125μm fiber with NA = 0.2.
2. Measured with PRBS $2^{31}$-1 at 5e-5 BER @25.78Gb/s.
3. Measured with PRBS $2^{31}$-1 at 5e-5 BER @10.3Gb/s.

**Pin Descriptions**

| Pin | Symbol | Name/Descriptions | Ref. |
|---|---|---|---|
| **1** | VeeT | Transmitter Ground. | 1 |
| **2** | TX_Fault | Transmitter Fault (LVTTL-O) – High indicated a fault condition. | 2 |
| **3** | TX_Disable | Transmitter Disable (LVTTL-I) – High or open disables the transmitter. | 3 |
| **4** | SDA | Two wire serial interface Data Line (LVCMOS-I/O)(MOD-DEF2) | 4 |
| **5** | SCL | Two wire serial interface Clock Line (LVCMOS-I/O)(MOD-DEF1) | 4 |
| **6** | MOD_ABS | Module Absent (Output), connected to VeeT or VeeR in the module. | 5 |
| **7** | RS0 | Rate Select 0 - Not used, Presents high input impedance. | 6 |
| **8** | RX_LOS | Receiver Loss of Signal (LVTTL-O) | 2 |
| **9** | RS1 | Rate Select 1 - Not used, Presents high input impedance. | 6 |
| **10** | VeeR | Receiver Ground. | 1 |
| **11** | VeeR | Receiver Ground. | 1 |
| **12** | RD- | Inverse Received Data out (CML-O). AC Coupled. | |
| **13** | RD+ | Received Data out (CML-O). AC Coupled. | |
| **14** | VeeR | Receiver Ground. | |
| **15** | VccR | Receiver Power +3.3V | |
| **16** | VccT | Transmitter Power +3.3V | |
| **17** | VeeT | Transmitter Ground. | 1 |
| **18** | TD+ | Transmitter Data In (CML-I). AC Coupled | |
| **19** | TD- | Inverse Transmitter Data In (CML-I). AC Coupled. | |
| **20** | VeeT | Transmitter Ground. | 1 |

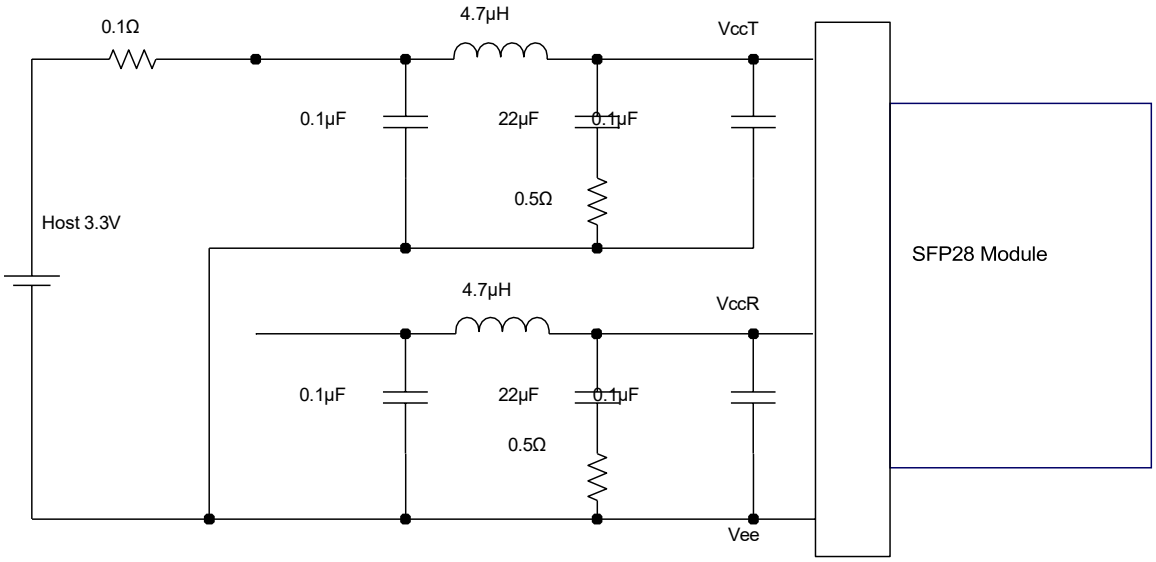
**Notes:**

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.
3. This input is internally biased high with a 4.7KΩ to 10KΩ pull-up resistor to VccT.
4. Two-Wire Serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.
6. Rate select can also be set through the 2-wire bus in accordance with SFF-8472 v. 10.2, Rx Rate Select is set at Bit 3, Byte 110, Address A2h. Tx Rate Select is set at Bit 3, Byte 118, Address A2h.
   Note: writing a “1” selects maximum bandwidth operation. Rate select is the logic OR of the input state of Rate Select Pin and 2-wire bus.



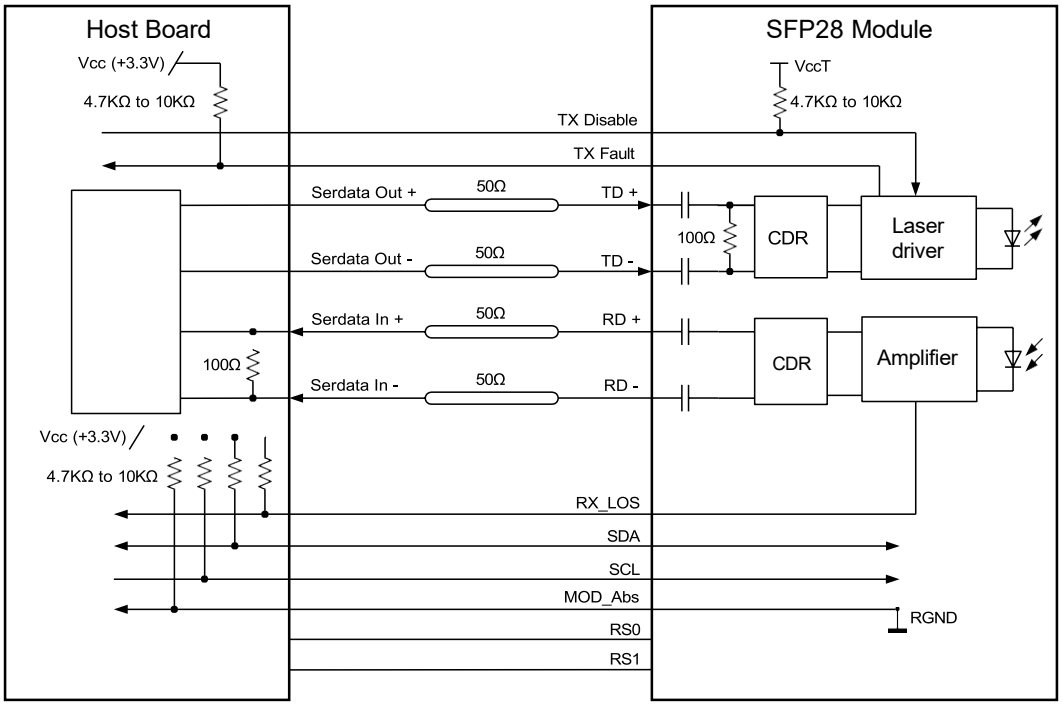

Host PCB SFP+ pad assignment

**Recommended Host Board**

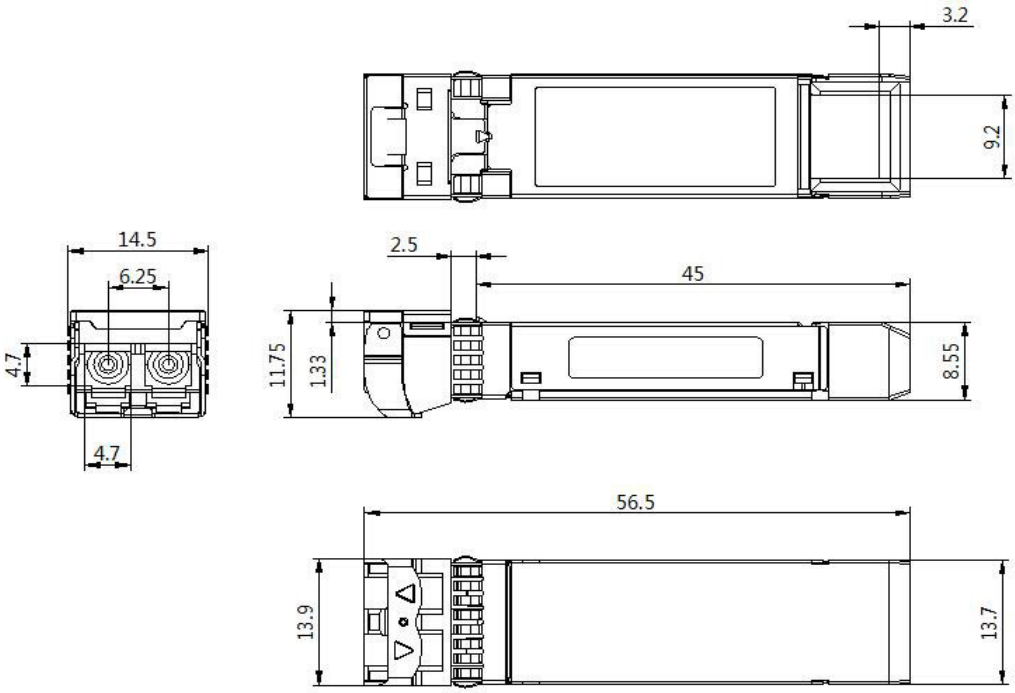



Recommended Host Board Power Supply Filter Network

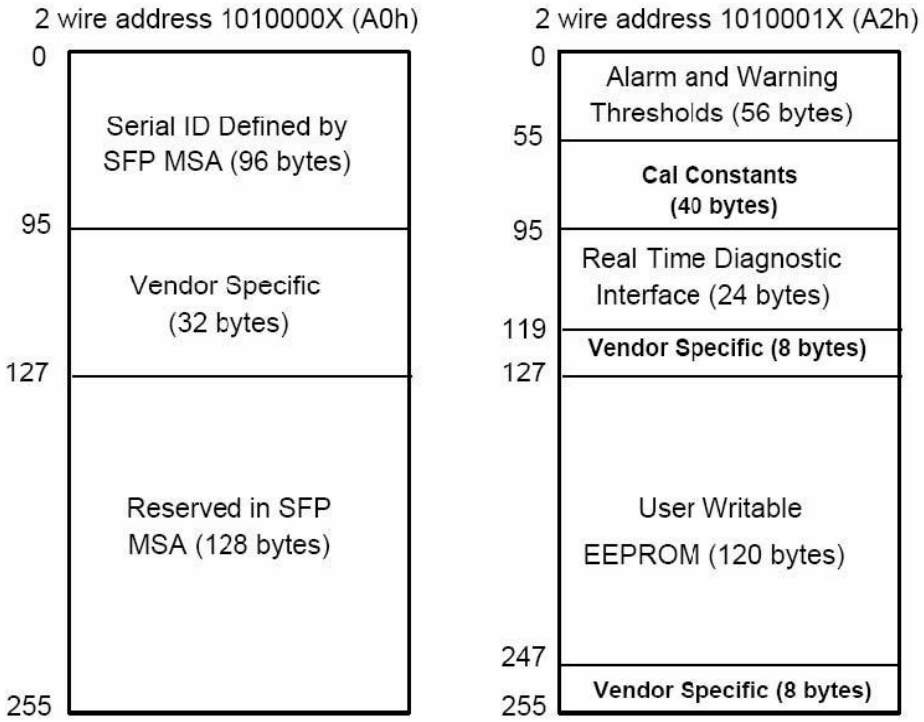
## Recommended Application Interface Block Diagram




## Mechanical Specifications



**EEPROM Information**




Digital Diagnostic Memory Map Specific Data Field Descriptions

**OptioConnect**
**Innovation for the Future of High-Speed Networking**

**Who We Are**
OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

**What We Do**
At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

**Smarter Networks by Design**
Innovation isn't just a goal—it's our process. We embed AI and machine learning across our R&D and product lines, enabling adaptive performance, automated tuning, and faster deployment cycles. The result? Networks that don't just work—they learn, evolve, and outperform.

**Our Team**
Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

**Our Mission**
To deliver AI-enhanced connectivity that reduces cost, increases speed, and maximizes efficiency—empowering our partners to operate at the forefront of a rapidly evolving digital world.

**Let's Connect**
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