



### **SFP28-25GB-CLR-MX-OPC**

Mellanox® Compatible TAA 25GBase-CLR SFP28 Transceiver (SMF, 1310nm, 2km, LC, DOM, No FEC)

#### **Features**

- Up to 25.78125Gbd Bi-Directional Data Links
- Built-In Dual CDR with Bypass Control
- Electrical Interface Specifications Per SFF-8431
- SFP28 MSA Package with Duplex Connector
- 1.5W Maximum Power Consumption with Established Link
- Class 1 Laser Safety Certified
- Uncooled 1310 DFB Laser
- Up to 2km on 9/125um SMF with No FEC
- Power Supply Lines: 3.3V
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



#### **Applications:**

- 25GBase Ethernet

#### **Product Description**

This Mellanox® compatible SFP28 transceiver provides 25GBase-CLR throughput up to 2km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Mellanox®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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.

## Absolute Maximum Ratings

| Parameter                  | Symbol           | Min. | Typ.     | Max. | Unit | Notes |
|----------------------------|------------------|------|----------|------|------|-------|
| Maximum Supply Voltage     | V <sub>CC</sub>  | -0.5 |          | 4    | V    | 1     |
| Storage Temperature        | T <sub>stg</sub> | -40  |          | 85   | °C   |       |
| Operating Case Temperature | T <sub>c</sub>   | 0    | 25       | 70   | °C   |       |
| Relative Humidity          | RH               | 5    |          | 95   | %    |       |
| Signaling Rate             |                  |      | 25.78125 |      | GBd  |       |
| Signaling Rate Variation   |                  | -100 |          | 100  | ppm  |       |

## Electrical Characteristics

| Parameter                     |                      | Symbol               | Min. | Typ. | Max.     | Unit  | Notes |
|-------------------------------|----------------------|----------------------|------|------|----------|-------|-------|
| Module Supply Voltage         |                      | V <sub>CC</sub>      | 3.14 | 3.3  | 3.47     | V     |       |
| Module Supply Current         |                      | I <sub>CC</sub>      |      |      | 478      | mA    |       |
| Power Dissipation             |                      | P <sub>DISS</sub>    |      |      | 1500     | W     |       |
| Transmitter                   |                      |                      |      |      |          |       |       |
| Input Differential Impedance  |                      | Z <sub>IN</sub>      |      | 100  |          | Ω     |       |
| Differential Data Input Swing |                      | V <sub>IN,pp</sub>   | 180  |      | 700      | mVp-p |       |
| Tx_Fault                      | Transmitter Fault    | VOH                  | 2    |      | Host_Vcc | V     |       |
|                               | Normal Operation     | VOL                  | 0    |      | 0.8      | V     |       |
| Tx_Disable                    | Transmitter Disable  | VIH                  | 2    |      | Host_Vcc | V     |       |
|                               | Transmitter Enable   | VIL                  | 0    |      | 0.8      | V     |       |
| Receiver                      |                      |                      |      |      |          |       |       |
| Output Differential Impedance |                      | Z <sub>OUT</sub>     |      | 100  |          | Ω     |       |
| AC Common-Mode Output Voltage |                      | V <sub>OUT,rms</sub> |      |      | 17.5     | mV    |       |
| Differential Output Voltage   |                      | V <sub>OUT,pp</sub>  | 300  |      | 900      | mVp-p | 1     |
| Eye Width                     |                      |                      | 0.57 |      |          | UI    |       |
| Differential Eye Hight        |                      |                      | 228  |      |          | mV    |       |
| Data Output Rise/Fall Time    |                      | Tr/Tf                | 12   |      |          | ps    | 2     |
| Rx_LOS                        | Loss of Signal (LOS) | VOH                  | 2.0  |      | Host_Vcc | V     | 3     |
|                               | Normal Operation     | VOL                  | 0    |      | 0.8      | V     | 3     |

## Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20-80%.
3. LOS is an open collector output and 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              | -5   |      | 2    | dBm  | 1     |
| Extinction Ratio                   | ER              | 3.5  |      |      | dB   |       |
| Optical Modulation Amplitude       | OMA             | -4   |      | 2.2  | dB   |       |
| Center Wavelength Range            | $\lambda_C$     | 1295 | 1310 | 1325 | nm   |       |
| Side-Mode Suppression Ratio        | SMSR            | 30   |      |      | dB   |       |
| Spectral Width                     | $\Delta\lambda$ |      |      | 1    | nm   | 2     |
| Launch Power in OMA Minus TDP      |                 | -5   |      |      | dBm  |       |
| Transmitter and Dispersion Penalty | TDP             |      |      | 2.7  | dB   |       |
| Optical Return Loss Tolerance      | ORLT            |      |      | 20   | dB   |       |
| Transmitter Reflectance            |                 |      |      | -26  | dB   |       |
| POUT @Tx_Disable Asserted          | Poff            |      |      | -20  | dBm  |       |
| Receiver                           |                 |      |      |      |      |       |
| Center Wavelength                  | $\lambda_C$     | 1260 | 1310 | 1370 | nm   |       |
| Receiver Sensitivity               | RxSens          |      |      | -8   | dBm  | 3     |
| Damage Threshold                   |                 | 3    |      |      | dBm  |       |
| Receiver Overload (Pavg)           | POL             | 2    |      |      | dBm  |       |
| Optical Return Loss                | ORL             | 26   |      |      | dB   |       |
| LOS De-Assert                      | LOSD            |      |      | -16  | dBm  |       |
| LOS Assert                         | LOSA            | -30  |      |      | dBm  |       |
| LOS Hysteresis                     |                 | 0.5  |      |      | dB   |       |
| Receiver Reflectance               |                 |      |      | -26  | dBm  |       |

### Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Measured with PRBS31 at  $1E^{-12}$  BER.

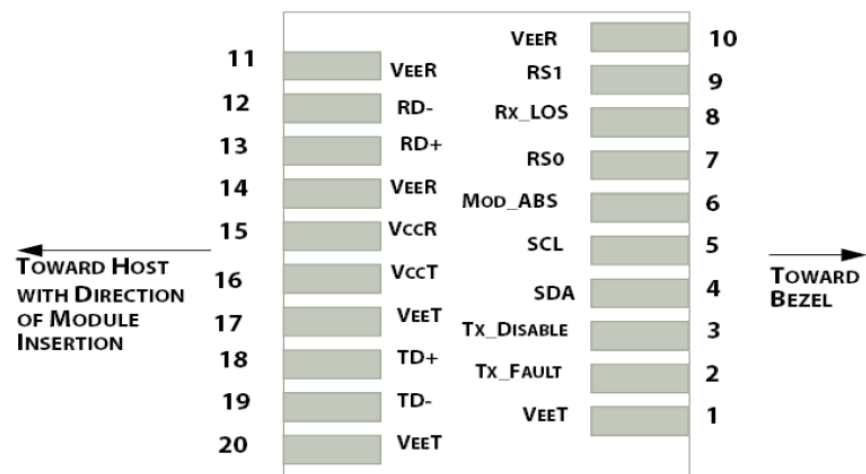
## Pin Descriptions

| Pin | Symbol     | Name/Description                                                          | Notes |
|-----|------------|---------------------------------------------------------------------------|-------|
| 1   | VeeT       | Transmitter Ground.                                                       | 1     |
| 2   | Tx_Fault   | Transmitter Fault. LVTTTL-O. "High" indicates a fault condition.          | 2     |
| 3   | Tx_Disable | Transmitter Disable. LVTTTL-I. "High" or "open" disables the transmitter. | 3     |
| 4   | SDA        | 2-Wire Serial Interface Data. LVCMOS-I/O. MOD-DEF2.                       | 4     |
| 5   | SCL        | 2-Wire Serial Interface Clock. LVCMOS-I/O. MOD-DEF1.                      | 4     |
| 6   | MOD_ABS    | Module Absent (Output). Connected to the VeeT or VeeR in the module.      | 5     |
| 7   | RS0        | Hardware Tx Rate Select Pin.                                              | 6     |
| 8   | Rx_LOS     | Receiver Loss of Signal. LVTTTL-O.                                        | 2     |
| 9   | RS1        | Hardware Rx Rate Select Pin.                                              | 6     |
| 10  | VeeR       | Receiver Ground.                                                          | 1     |
| 11  | VeeR       | Receiver Ground.                                                          | 1     |
| 12  | RD-        | Inverse Received Data Out. CML-O.                                         |       |
| 13  | RD+        | Received Data Out. CML-O.                                                 |       |
| 14  | VeeR       | Receiver Ground.                                                          |       |
| 15  | VccR       | +3.3V Receiver Power.                                                     |       |
| 16  | VccT       | +3.3V Transmitter Power.                                                  |       |
| 17  | VeeT       | Transmitter Ground.                                                       | 1     |
| 18  | TD+        | Transmitter Data In. CML-I.                                               |       |
| 19  | TD-        | Inverse Transmitter Data In. CML-I.                                       |       |
| 20  | VeeT       | Transmitter Ground.                                                       | 1     |

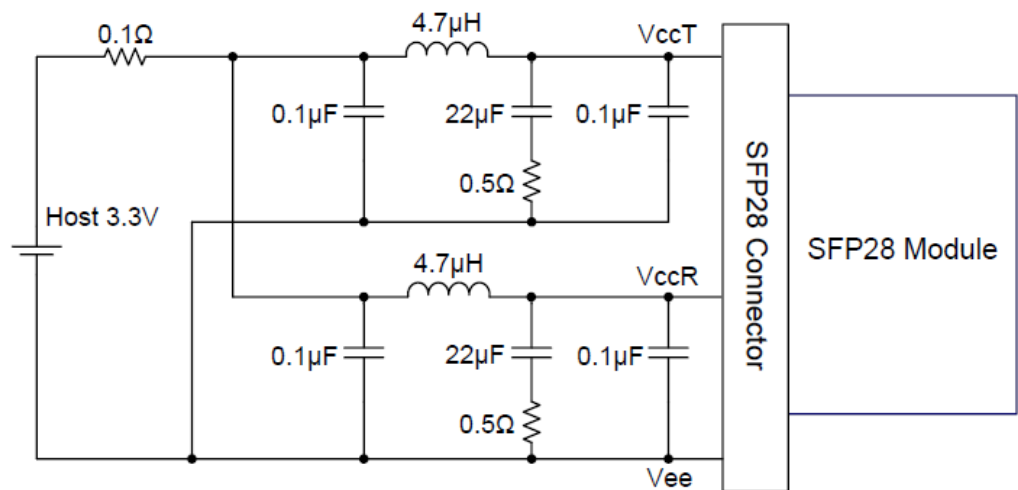
## Notes:

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 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the Host\_Vcc.
3. This input is internally biased "high" with a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the VccT.
4. 2-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 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the Host\_Vcc.
6. Rate Select can also be set through the 2-wire bus in accordance with SFF-8472 v. 12.1. Rx Rate Select is set at Bit 3, Byte 110, and Address A2h, and Tx Rate Select is set at Bit 3, Byte 118, and Address A2h.  
**Note:** Writing a "1" selects maximum bandwidth operation. Rate Select is the logic OR of the input state of the Rate Select Pin and 2-wire bus.

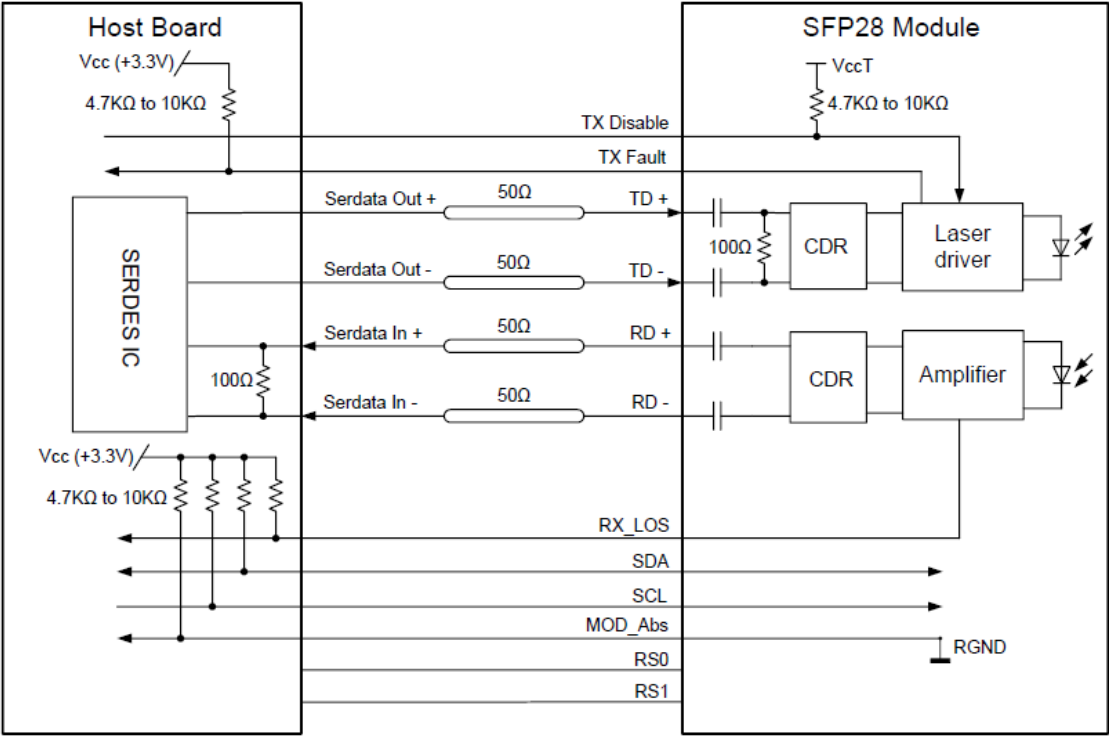
Electrical Pin-Out Details



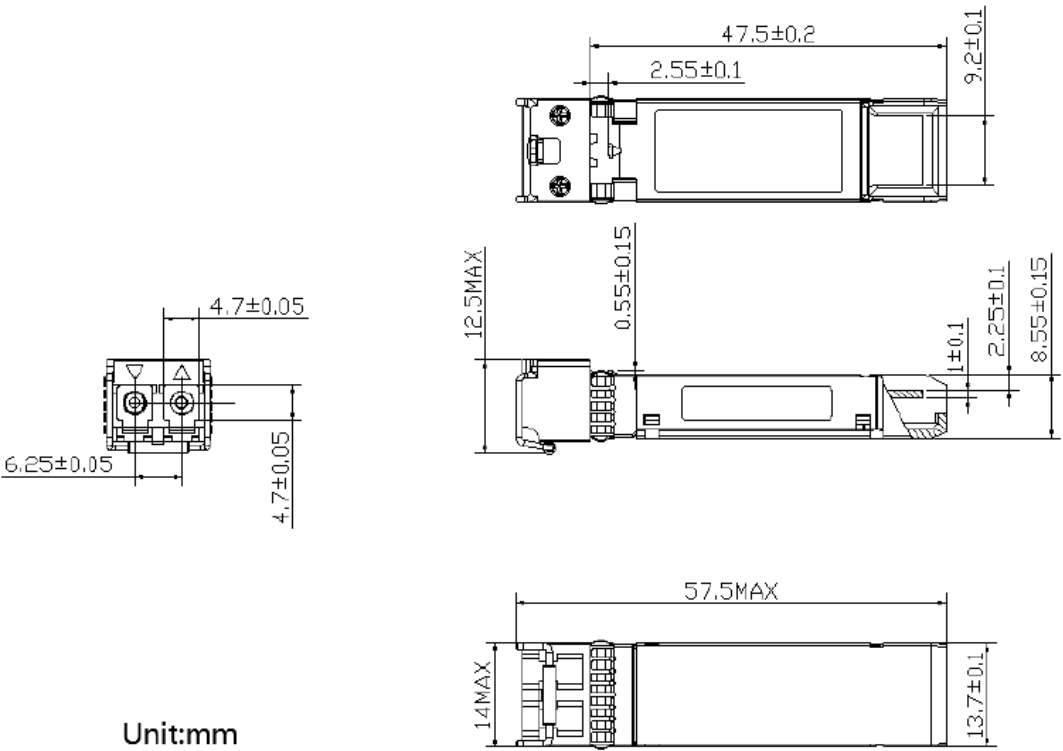
Host Board Power Supply Filter Network



Block Diagram



Mechanical Specifications



## **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**

Discover how OptioConnect's intelligent infrastructure solutions can power your network's next leap forward.

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