



### **SFP-25GB-BX40-D-I-OPC**

MSA and TAA 25GBase-BX SFP28 Transceiver (SMF, 1310nmTx/1270nmRx, 40km, LC, DOM, -40 to 85C)

#### **Features**

- SFF-8402 and SFF-8472 Compliance
- Simplex LC Connector
- Single-mode Fiber
- Industrial Temperature -40 to 85 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-BX throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1310nmTx/1270nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between -40 and 85C. 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 | Notes |
|---------------------------------------------------|--------|------|----------------|--------------------|------|-------|
| Maximum Supply Voltage                            | Vcc    | -0.3 |                | 4.0                | V    |       |
| Storage Temperature                               | TS     | -40  |                | 85                 | °C   |       |
| Operating Case Temperature                        | Tc     | -40  | 25             | 85                 | °C   |       |
| Relative Humidity                                 | RH     | 5    |                | 95                 | %    |       |
| Data Rate                                         | BR     |      | 24.33<br>25.78 |                    | Gb/s |       |
| Bit Error Rate                                    | BER    |      |                | $5 \times 10^{-5}$ |      | 1     |
| Supported Link Length on<br>9/125umSMF, 25.78Gb/s | L      |      | 40             |                    | km   | 2     |

### Notes:

1. Tested with a PRBS  $2^{31}-1$  test pattern for 25.78Gb/s operation.
2. Distances are based on FC-P1-6 Rev. 3.1 and IEEE 802.3 standards, with FEC.

## Electrical Characteristics

| Parameter                        |                      | Symbol                          | Min.  | Typ. | Max.    | Unit  | Notes |
|----------------------------------|----------------------|---------------------------------|-------|------|---------|-------|-------|
| Power Supply Voltage             |                      | VCC                             | 3.135 | 3.3  | 3.465   | V     |       |
| Module Supply Current            |                      | I <sub>cc</sub>                 |       |      | 450     | mA    |       |
| Power Dissipation                |                      | PD                              |       |      | 1500    | mW    |       |
| Transmitter                      |                      |                                 |       |      |         |       |       |
| Input Differential Impedance     |                      | Z <sub>IN</sub>                 |       | 100  |         | Ω     |       |
| Differential Data Input Swing    |                      | V <sub>IN</sub> , P-P           | 180   |      | 700     | mVP-P |       |
| TX_FAULT                         | Transmitter Fault    | VOH                             | 2.0   |      | VCCHOST | V     |       |
|                                  | Normal Operation     | VOL                             | 0     |      | 0.8     | V     |       |
| TX_DISABLE                       | Transmitter Disable  | VIH                             | 2.0   |      | VCCHOST | V     |       |
|                                  | Transmitter Enable   | VIL                             | 0     |      | 0.8     | V     |       |
| Receiver                         |                      |                                 |       |      |         |       |       |
| Output Differential Impedance    |                      | Z <sub>O</sub>                  |       | 100  |         | Ω     |       |
| Differential Data Output Swing   |                      | V <sub>OUT</sub> , P-P          | 300   |      | 850     | mVP-P | 1     |
| Data Output Rise Time, Fall Time |                      | t <sub>r</sub> , t <sub>f</sub> |       |      | 15      | ps    | 2     |
| RX_LOS                           | Loss of signal (LOS) | VOH                             | 2.0   |      | VCCHOST | 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. Should be pulled up with 4.7kΩ on the host board.

## Optical Characteristics

| Parameter                             | Symbol           | Min. | Typ. | Max. | Unit | Notes |
|---------------------------------------|------------------|------|------|------|------|-------|
| Transmitter                           |                  |      |      |      |      |       |
| Launch Optical Power                  | P <sub>o</sub>   | 0    |      | +5   | dBm  | 1     |
| Center Wavelength Range               | λ <sub>c</sub>   | 1260 | 1270 | 1280 | nm   |       |
| Extinction Ratio                      | EX               | 3.5  |      |      | dB   | 2     |
| Spectral Width (-20dB)                | Δλ               |      |      | 1    | nm   |       |
| Side Mode Suppression Ratio           | SMSR             | 30   |      |      | dB   |       |
| Optical Rise/Fall Time @25.78Gb/s     | tr/tf            | 15   |      |      | ps   | 3     |
| Optical Return Loss Tolerance         | ORLT             |      |      | 12   | dB   |       |
| Pout @TX-Disable Asserted             | P <sub>off</sub> |      |      | -30  | dBm  | 1     |
| Receiver                              |                  |      |      |      |      |       |
| Center Wavelength                     | λ <sub>c</sub>   | 1300 | 1310 | 1320 | nm   |       |
| Receiver OMA Sensitivity              | RxSENS           |      |      | -18  | dBm  | 4     |
| Receiver Overload (P <sub>avg</sub> ) | POL              | -5   |      |      | dBm  |       |
| Optical Return Loss                   | ORL              | 26   |      |      | dB   |       |
| LOS De-Assert                         | LOSD             |      |      | -19  | dBm  |       |
| LOS Assert                            | LOSA             | -35  |      |      | dBm  |       |
| LOS Hysteresis                        |                  | 0.5  |      |      | dB   |       |

### Notes:

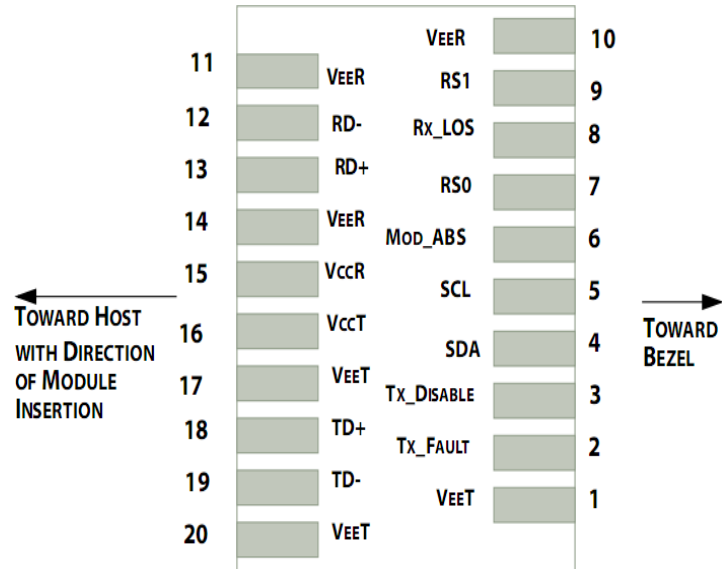
1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Unfiltered, 20-80%
4. Measured with PRBS 2<sup>31</sup>-1 at 5×10<sup>-5</sup> BER.

## Pin Descriptions

| Pin | Symbol     | Name/Descriptions                                                     | Notes |
|-----|------------|-----------------------------------------------------------------------|-------|
| 1   | VeeT       | Transmitter Ground                                                    | 1     |
| 2   | TX_Fault   | Transmitter Fault (LVTTL-O) - High indicates 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        | NA                                                                    | 6     |
| 8   | RX_LOS     | Receiver Loss of Signal (LVTTL-O)                                     | 2     |
| 9   | RS1        | NA                                                                    | 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                                                       | 1     |
| 15  | VccR       | Receiver Power - +3.3V                                                |       |
| 16  | VccT       | Transmitter Power - +3.3 V                                            |       |
| 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     |

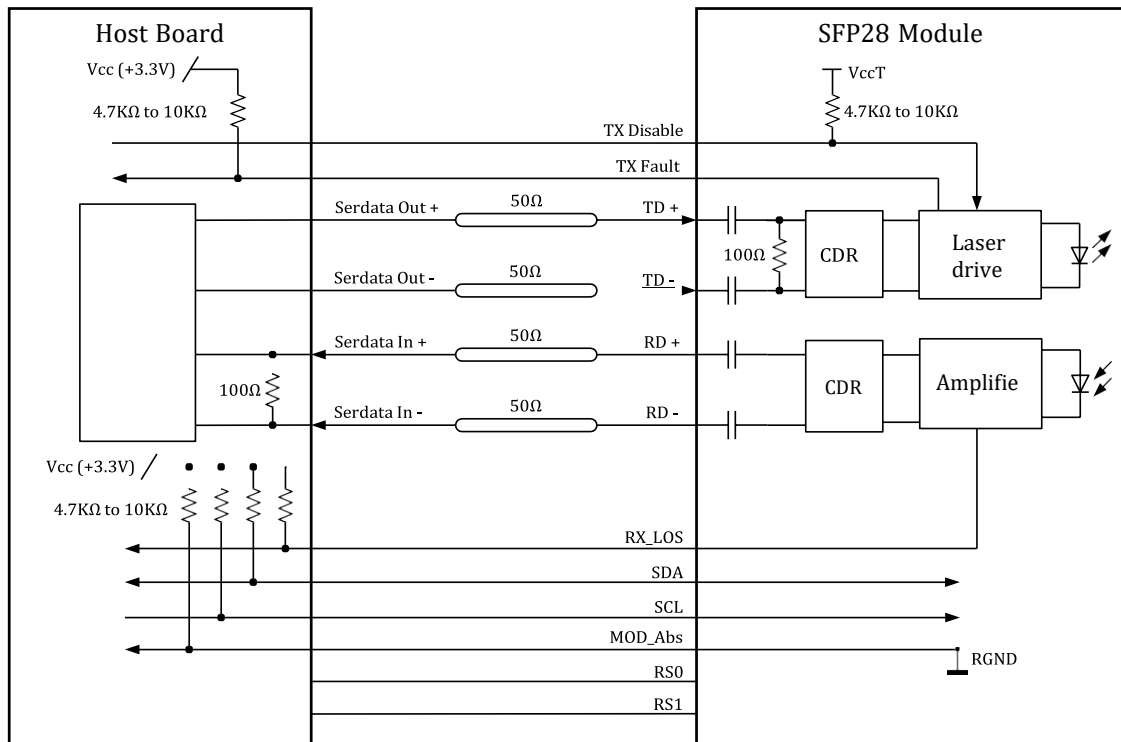
## Notes:

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 4.7KΩ 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. 12.1, 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.



Pin-out of connector Block on Host board

### Recommended Application Interface Block Diagram



Mechanical Specifications



Unit:mm



## **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.

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