



### 407-BBXZ-OPC

Dell® 407-BBXZ Compatible TAA 25GBase-LR SFP28 Transceiver (SMF, 1310nm, 10km, LC, DOM)

#### Features

- SFF-8402 and SFF-8472 Compliance
- Duplex LC Connector
- Single-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 Dell® 407-BBXZ compatible SFP28 transceiver provides 25GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Dell® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. 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.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products."



## Absolute Maximum Ratings

| Parameter                                       | Symbol          | Min. | Typ.  | Max.               | Unit | Notes |
|-------------------------------------------------|-----------------|------|-------|--------------------|------|-------|
| Supply Voltage                                  | V <sub>CC</sub> | -0.5 |       | 4.0                | V    |       |
| Storage Temperature                             | T <sub>S</sub>  | -40  |       | 85                 | °C   |       |
| Operating Case Temperature                      | T <sub>c</sub>  | 0    | 25    | 70                 | °C   |       |
| Relative Humidity                               | RH              | 5    |       | 95                 | %    |       |
| Data Rate                                       | BR              |      | 25.78 |                    | Gb/s |       |
| Bit Error Rate                                  | BER             |      |       | 5x10 <sup>-5</sup> |      | 1     |
| Supported Link Length on 9/125um SMF, 25.78GB/s | L               |      | 10    |                    | km   | 2     |

### Notes:

1. Tested with a PRBS 231-1 test pattern for 25.78Gb/s operation.
2. Distances are based on FC-P1-6 Rev 3.1 and IEEE 802.3 standards.

## Electrical Characteristics

| Parameter                         |                      | Symbol                          | Min   | Typ   | Max                 | Unit  | Notes |
|-----------------------------------|----------------------|---------------------------------|-------|-------|---------------------|-------|-------|
| Supply Voltage                    |                      | V <sub>CC</sub>                 | 3.135 | 3.3   | 3.465               | V     |       |
| Data Rate                         |                      |                                 |       | 25.78 |                     | GB/s  |       |
| 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    | V <sub>OH</sub>                 | 2.0   |       | V <sub>CCHOST</sub> | V     |       |
|                                   | Normal Operation     | V <sub>OL</sub>                 | 0     |       | 0.8                 | V     |       |
| TX_DISABLE                        | Transmitter Disable  | V <sub>IH</sub>                 | 2.0   |       | V <sub>CCHOST</sub> | V     |       |
|                                   | Transmitter Enable   | V <sub>IL</sub>                 | 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 Rinse Time, Fall Time |                      | t <sub>r</sub> , t <sub>f</sub> | 15    |       |                     | Ps    | 2     |
| Rx_LOS                            | Loss of Signal (LOS) | V <sub>OH</sub>                 | 2.0   |       | V <sub>CCHOST</sub> | V     | 3     |
|                                   | Normal Operation     | V <sub>OL</sub>                 | 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 4.7Ω on the host board.

**Optical Characteristics**

| Parameter                          | Symbol          | Min  | Typ  | Max   | Unit | Notes |
|------------------------------------|-----------------|------|------|-------|------|-------|
| <b>Transmitter</b>                 |                 |      |      |       |      |       |
| Launch Optical Power               | Po              | -5   |      | 2     | dBm  | 1     |
| Extinction Ratio                   | ER              | 4    |      |       | dB   |       |
| Center Wavelength Range            | $\lambda_c$     | 1295 | 1310 | 1325  | nm   |       |
| Optical Modulation Amplitude       | OMA             | 631  |      |       | uW   |       |
| Transmitter Dispersion Penalty     | TDP             |      |      | 2.7   | dB   |       |
| Spectral Width                     | $\Delta\lambda$ |      |      | 1     | nm   | 2     |
| Optical Rise/Fall Time @25.78 Gb/s | tr/tf           |      |      | 15    | ps   | 3     |
| Optical Return Loss Tolerance      | ORLT            |      |      | 12    | dB   |       |
| Pout @TX-Disable Asserted          | POFF            |      |      | -30   | dBm  | 1     |
| <b>Receiver</b>                    |                 |      |      |       |      |       |
| Center Wavelength                  | $\lambda_c$     | 1260 | 1310 | 1370  | nm   |       |
| Receiver OMA Sensitivity           | RxSENS          |      |      | -11.4 | dBm  | 4     |
| Receiver Overload (P avg)          | POL             | 2    |      |       | dBm  |       |
| Optical Return Loss                | ORL             | 26   |      |       | dB   |       |
| LOS De-Assert                      | LOSD            |      |      | -13   | dBm  |       |
| LOS Assert                         | LOSA            | -30  |      |       | 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 (LVTTTL-O) - High indicates a fault condition        | 2     |
| 3   | TX_Disable | Transmitter Disable (LVTTTL-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        |                                                                        | 6     |
| 8   | RX_LOS     | Receiver Loss of Signal (LVTTTL-O)                                     | 2     |
| 9   | RS1        |                                                                        | 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       | 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 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccHost.
3. This input is internally biased high with a 4.7K $\Omega$  to 10K $\Omega$  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 4.7K $\Omega$  to 10K $\Omega$  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.

Electrical Pin-Out Details



Recommended Host Board Power Supply Filter Network



Recommended Application Interface 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**

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

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