



### **QSFP28-100GB-LR4-HPB-OPC**

HP® Compatible TAA 100GBase-LR4 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 10km, LC, DOM)

#### **Features**

- SFF-8665 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:**

- 100GBase Ethernet
- Access and Enterprise

#### **Product Description**

This HP® compatible QSFP28 transceiver provides 100GBase-LR4 throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via an LC connector. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with HP®. 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 |
|-------------------------------------|--------|------|------|------|------|
| Maximum Supply Voltage              | Vcc    | -0.5 |      | 3.6  | V    |
| Storage Temperature                 | TS     | -40  |      | 85   | °C   |
| Operating Case Temperature          | Tc     | 0    | 25   | 70   | °C   |
| Operating Humidity                  | RH     | 5    |      | 85   | %    |
| Receiver Damage Threshold, per Lane | Rxdmg  | 5.5  |      |      | dBm  |

## Electrical Characteristics

| Parameter                              | Symbol | Min.                     | Typ. | Max.  | Unit  | Notes   |
|----------------------------------------|--------|--------------------------|------|-------|-------|---------|
| Power Dissipation                      | PD     |                          |      | 3.5   | W     |         |
| Power Supply Voltage                   | Vcc    | 3.135                    | 3.3  | 3.465 | V     |         |
| Transmitter                            |        |                          |      |       |       |         |
| Differential data input swing per lane | Vin    |                          |      | 900   | Mvp-p |         |
| Input Impedance (Differential)         | Zin    |                          |      | 10    | %     |         |
| Stressed Input Parameters              |        |                          |      |       |       |         |
| Eye width                              |        | 0.46                     |      |       | UI    |         |
| Applied pk-pk sinusoidal jitter        |        | IEEE 802.3bm Table 88-13 |      |       |       |         |
| Eye height                             |        | 95                       |      |       | mv    |         |
| DC common mode voltage                 |        | -350                     |      | 2850  | mv    |         |
| Receiver                               |        |                          |      |       |       |         |
| Differential output amplitude          |        | 200                      |      | 900   | Mvp-p |         |
| Output Impedance (Differential)        | Zout   |                          |      | 10    | %     |         |
| Output Rise/Fall Time                  | tr/tf  | 12                       |      |       | ps    | 20%~80% |
| Eye width                              |        | 0.57                     |      |       | UI    |         |
| Eye height differential                |        | 228                      |      |       | mv    |         |
| Vertical eye closure                   |        |                          |      | 5.5   | db    |         |

## Optical Characteristics

| Parameter                                                 | Symbol                           | Min.    | Typ.    | Max.    | Unit  | Notes |
|-----------------------------------------------------------|----------------------------------|---------|---------|---------|-------|-------|
| Transmitter                                               |                                  |         |         |         |       |       |
| Signaling Speed per Lane                                  | Brave                            |         | 25.78   |         | Gbps  |       |
| Data Rate Variation                                       |                                  | -100    |         | +100    |       |       |
| Lane_0 Center Wavelength                                  | $\lambda_{C0}$                   | 1294.53 | 1295.56 | 1296.59 | nm    |       |
| Lane_1 Center Wavelength                                  | $\lambda_{C1}$                   | 1299.02 | 1300.05 | 1301.09 | nm    |       |
| Lane_2 Center Wavelength                                  | $\lambda_{C2}$                   | 1303.54 | 1304.58 | 1305.63 | nm    |       |
| Lane_3 Center Wavelength                                  | $\lambda_{C3}$                   | 1308.09 | 1309.14 | 1310.19 | nm    |       |
| Average Launch Power each Lane                            | P <sub>each</sub>                | -4.3    |         | 4.5     | dBm   | 1     |
| Optical Modulation Amplitude (OMA) each Lane              | TxOMA                            | -1.3    |         | 4.5     | dBm   |       |
| Difference in launch power between any two lanes (OMA)    |                                  |         |         | 5       | dB    |       |
| Launch power in OMA minus TDP, each lane                  |                                  | -2.3    |         |         | dBm   |       |
| Transmitter and dispersion penalty (TDP), each lane       |                                  |         |         | 2.2     | dB    |       |
| Extinction Ratio                                          | ER                               | 4       |         |         | dB    |       |
| Side-mode Suppression ratio                               | SMSR <sub>min</sub>              | 30      |         |         | dB    |       |
| Average launch power of OFF transmitter per lane          |                                  |         |         | -30     | dBm   |       |
| Relative Intensity Noise                                  | RIN                              |         |         | -130    | dB/hz |       |
| Transmitter Reflectance                                   |                                  |         |         | -12     | dB    |       |
| Optical Return Loss Tolerance                             |                                  |         |         | 20      | dB    |       |
| Transmitter eye mask definitions: X1, X2, X3, Y1, Y2, Y3  | 0.25, 0.4, 0.45, 0.25, 0.28, 0.4 |         |         |         |       | 2     |
| Receiver                                                  |                                  |         |         |         |       |       |
| Signaling Speed per Lane                                  | BRAVE                            |         | 25.78   |         | Gbps  |       |
| Data Rate Variation                                       |                                  | -100    |         | +100    | ppm   |       |
| Damage threshold per lane                                 | Rxdmg                            | 5.5     |         |         | dBm   |       |
| Lane_0 Center Wavelength                                  | $\lambda_{C0}$                   | 1294.53 | 1295.56 | 1296.59 | nm    |       |
| Lane_1 Center Wavelength                                  | $\lambda_{C1}$                   | 1299.02 | 1300.05 | 1301.09 | nm    |       |
| Lane_2 Center Wavelength                                  | $\lambda_{C2}$                   | 1303.54 | 1304.58 | 1305.63 | nm    |       |
| Lane_3 Center Wavelength                                  | $\lambda_{C3}$                   | 1308.09 | 1309.14 | 1310.19 | nm    |       |
| Average Receive Power per Lane                            | Rxpow                            | -10.6   |         | 4.5     | dBm   | 3     |
| Receive Power (OMA) per Lane                              | RxOMA                            |         |         | 4.5     | dBm   |       |
| Receive Sensitivity in OMA per Lane                       | Rxsens                           |         |         | -8.6    | dBm   |       |
| Receiver 3 dB electrical upper cutoff frequency, per lane |                                  |         |         | 31      | GHz   |       |
| Stressed Receiver Sensitivity (OMA) per Lane              | RXSRS                            |         |         | -6.8    | dBm   | 4     |

|                                                         |      |     |      |     |     |   |
|---------------------------------------------------------|------|-----|------|-----|-----|---|
| <b>Optical Return Loss</b>                              | ORL  |     |      | -26 | dB  |   |
| <b>LOS Assert</b>                                       | LOSA | -25 |      |     | dBm |   |
| <b>LOS De-Assert</b>                                    | LOSD |     |      | -12 | dBm |   |
| <b>LOS Hysteresis</b>                                   |      | 0.5 |      |     | dB  |   |
| <b>Conditions of stressed receiver sensitivity test</b> |      |     |      |     |     |   |
| <b>Vertical eye closure penalty</b>                     | VECP |     | 1.8  |     | dB  | 5 |
| <b>Stressed eye J2 Jitter</b>                           | J2   |     | 0.3  |     | UI  | 5 |
| <b>Stressed eye J9 Jitter</b>                           | J9   |     | 0.47 |     | UI  | 5 |

**Notes:**

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Hit ratio  $5 \times 10^{-5}$ .
3. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
4. Measured with conformance test signal at TP3 for BER = 10<sup>-12</sup>.
5. Vertical eye closure penalty, stressed eye J2 Jitter, and stressed eye J9 Jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

## Pin Descriptions

| Pin | Logic       | Symbol  | Name/Descriptions                                   | Ref. |
|-----|-------------|---------|-----------------------------------------------------|------|
| 1   |             | GND     | Module Ground                                       | 1    |
| 2   | CML-I       | Tx2-    | Transmitter inverted data input                     |      |
| 3   | CML-I       | Tx2+    | Transmitter non-inverted data input                 |      |
| 4   |             | GND     | Module Ground                                       | 1    |
| 5   | CML-I       | Tx4-    | Transmitter inverted data input                     |      |
| 6   | CML-I       | Tx4+    | Transmitter non-inverted data input                 |      |
| 7   |             | GND     | Module Ground                                       | 1    |
| 8   | LVTTTL-I    | MODSEIL | Module Select                                       | 2    |
| 9   | LVTTTL-I    | ResetL  | Module Reset                                        | 2    |
| 10  |             | VCCRx   | +3.3v Receiver Power Supply                         |      |
| 11  | LVC MOS-I   | SCL     | 2-wire Serial interface clock                       | 2    |
| 12  | LVC MOS-I/O | SDA     | 2-wire Serial interface data                        | 2    |
| 13  |             | GND     | Module Ground                                       | 1    |
| 14  | CML-O       | RX3+    | Receiver non-inverted data output                   |      |
| 15  | CML-O       | RX3-    | Receiver inverted data output                       |      |
| 16  |             | GND     | Module Ground                                       | 1    |
| 17  | CML-O       | RX1+    | Receiver non-inverted data output                   |      |
| 18  | CML-O       | RX1-    | Receiver inverted data output                       |      |
| 19  |             | GND     | Module Ground                                       | 1    |
| 20  |             | GND     | Module Ground                                       | 1    |
| 21  | CML-O       | RX2-    | Receiver inverted data output                       |      |
| 22  | CML-O       | RX2+    | Receiver non-inverted data output                   |      |
| 23  |             | GND     | Module Ground                                       | 1    |
| 24  | CML-O       | RX4-    | Receiver inverted data output                       |      |
| 25  | CML-O       | RX4+    | Receiver non-inverted data output                   |      |
| 26  |             | GND     | Module Ground                                       | 1    |
| 27  | LVTTTL-O    | ModPrsL | Module Present, internal pulled down to GND         |      |
| 28  | LVTTTL-O    | IntL    | Interrupt output, should be pulled up on host board | 2    |
| 29  |             | VCCTx   | +3.3v Transmitter Power Supply                      |      |
| 30  |             | VCC1    | +3.3v Power Supply                                  |      |
| 31  | LVTTTL-I    | LPMode  | Low Power Mode                                      | 2    |
| 32  |             | GND     | Module Ground                                       | 1    |
| 33  | CML-I       | Tx3+    | Transmitter non-inverted data input                 |      |
| 34  | CML-I       | Tx3-    | Transmitter inverted data input                     |      |
| 35  |             | GND     | Module Ground                                       | 1    |
| 36  | CML-I       | Tx1+    | Transmitter non-inverted data input                 |      |
| 37  | CML-I       | Tx1-    | Transmitter inverted data input                     |      |
| 38  |             | GND     | Module Ground                                       | 1    |

**Notes:**

- 1. Module circuit ground is isolated from module chassis ground with in the module.
- 2. Open collector; should be pulled up with 4.7k-10k ohms on host board to a voltage between 3.15V and 3.6V.

**Electrical Pin-out Details**



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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