



## QSFP28-100GB-BX-D-80-I-J-SKY

Juniper Networks® Compatible 100GBase-ZR4 BX QSFP28 Transceiver (SMF, 1310.19nmTx/1272.55nmRx, 80km, LC, DOM, -40 to 85C)

### Product Description

This Juniper Networks® compatible QSFP28 transceiver provides 100GBase-BX ZR4 throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1310.19nmTx/1272.55nmRx 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. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Juniper Networks®. 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. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

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

### Features:

- QSFP28 MSA Compliant
- Built-In 4-Channel CDR
- Hot-Pluggable
- Supports 103.1Gbps to 112.2Gbps OTU4
- LAN WDM EML Laser and PIN Receiver with SOA
- Excellent EMI Performance
- Single 3.3V Power Supply
- Up to 80km Reach for G.652 SMF
- Single LC Receptacle
- Power Consumption: 5.5W
- Operating Temperature: -40 to 85 Celsius
- RoHS Compliant and Lead-Free



### Applications:

- 100GBase Ethernet
- InfiniBand QDR and DDR

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

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## Absolute Maximum Ratings

| Parameter                          | Symbol | Min. | Typ.     | Max.  | Unit | Notes |
|------------------------------------|--------|------|----------|-------|------|-------|
| Storage Temperature                | Tstg   | -40  |          | 85    | °C   |       |
| Operating Case Temperature         | Tc     | -40  |          | 85    | °C   |       |
| Relative Humidity (Non-Condensing) | RH     | 15   |          | 85    | %    |       |
| Supply Voltage                     | Vcc    | -0.3 |          | 4.0   | V    |       |
| Damage Threshold                   | THd    | 6.5  |          |       | dBm  |       |
| Data Rate Per Lane                 |        |      | 25.78125 | 28.05 | Gbps |       |
| Power Consumption                  | P      |      |          | 5.5   | W    |       |
| Link Distance (SMF)                | D      |      |          | 80    | km   | 1     |

### Notes:

1. Depending on actual fiber loss/km (link distance specified is for fiber insertion loss of 0.35dB/km).

## Electrical Characteristics

| Parameter                          | Symbol  | Min.    | Typ. | Max.    | Unit | Notes |
|------------------------------------|---------|---------|------|---------|------|-------|
| Power Supply Voltage               | Vcc     | 3.135   | 3.3  | 3.465   | V    |       |
| Power Supply Current               | Icc     |         |      | 1585    | mA   |       |
| Control Input Voltage - High       |         | 2       |      | Vcc     | V    |       |
| Control Input Voltage - Low        |         | 0       |      | 0.8     | V    |       |
| Transmitter Per Lane               |         |         |      |         |      |       |
| Input Differential Impedance       | RIN     |         | 100  |         | Ω    |       |
| Differential Termination Mismatch  |         |         |      | 10      | %    |       |
| Differential Data Input Amplitude  | VIN,pp  | 180     |      | 1000    | mV   |       |
| LPMODE, Reset, and ModSelL         | VIL     | -0.3    |      | 0.8     | V    |       |
|                                    | VIH     | 2       |      | Vcc+0.3 | V    |       |
| Receiver                           |         |         |      |         |      |       |
| Differential Data Output Amplitude | VOUT,pp | 350     |      | 900     | mV   |       |
| Differential Termination Mismatch  |         |         |      | 10      | %    |       |
| Transition Time (20-80%)           |         | 9.5     |      |         | ps   |       |
| ModPrsL and IntL                   | VOL     | 0       |      | 0.4     | V    |       |
|                                    | VOH     | Vcc-0.5 |      | Vcc+0.3 | V    |       |

## Optical Characteristics

| Parameter                                              | Symbol      | Min.                               | Typ.    | Max.    | Unit  | Notes |
|--------------------------------------------------------|-------------|------------------------------------|---------|---------|-------|-------|
| Transmitter                                            |             |                                    |         |         |       |       |
| Center Wavelength                                      | $\lambda_C$ | 1294.53                            | 1295.56 | 1296.59 | nm    |       |
|                                                        |             | 1299.02                            | 1300.05 | 1301.09 |       |       |
|                                                        |             | 1303.54                            | 1304.58 | 1305.63 |       |       |
|                                                        |             | 1308.09                            | 1309.14 | 1310.19 |       |       |
| Side-Mode Suppression Ratio                            | SMSR        | 30                                 |         |         |       |       |
| Total Average Power                                    | Pt          | 8.0                                |         | 10.5    | dBm   |       |
| Average Launch Power Per Lane                          | Pavg        | 2.0                                |         | 4.5     | dBm   |       |
| Extinction Ratio                                       | ER          | 6                                  |         |         | dB    |       |
| Difference in Launch Power Between Any Two Lanes (OMA) |             |                                    |         | 3.6     | dB    |       |
| Average Launch Power of Off Transmitter Per Lane       | Poff        |                                    |         | -30     | dBm   |       |
| Transmitter Reflectance                                |             |                                    |         | -12     | dB    |       |
| RIN <sub>20OMA</sub>                                   | RIN         |                                    |         | -130    | dB/Hz |       |
| Optical Return Loss Tolerance                          | TOL         |                                    |         | 20      | dB    |       |
| Transmitter Eye Mask: {X1, X2, X3, Y1, Y2, Y3}         |             | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} |         |         |       |       |
| Receiver                                               |             |                                    |         |         |       |       |
| Center Wavelength                                      | $\lambda_C$ | 1272.55                            | 1273.55 | 1274.54 | nm    |       |
|                                                        |             | 1276.89                            | 1277.89 | 1278.89 |       |       |
|                                                        |             | 1281.25                            | 1282.26 | 1283.27 |       |       |
|                                                        |             | 1285.65                            | 1286.66 | 1287.68 |       |       |
| Average Receive Power Per Lane                         | Pin         | -30                                |         | -7      | dBm   |       |
| Receive Power on OMA Per Lane                          | PinOMA      |                                    |         | -7      | dBm   |       |
| Receiver Reflectance                                   | dB          |                                    |         | -26     | dB    |       |
| Average Receiver Sensitivity                           | SEN1        |                                    |         | -22     | dBm   | 1     |
|                                                        | SEN2        |                                    |         | -21     | dBm   | 2     |
|                                                        | SEN3        |                                    |         | -28     | dBm   | 3     |
|                                                        | SEN4        |                                    |         | -27     | dBm   | 4     |
| LOS Assert                                             | LOSA        | -40                                |         |         | dBm   |       |
| LOS De-Assert                                          | LOSD        |                                    |         | -29     | dBm   |       |
| LOS Hysteresis                                         | LOSH        | 0.5                                |         |         | dB    |       |

### Notes:

1. Measured @25.78125Gbps, ER=8.2dB, BER=<1E<sup>-12</sup>, PRBS=2<sup>31</sup>-1 NRZ.
2. Measured @28.05Gbps, ER=8.2dB, BER=<1E<sup>-12</sup>, PRBS=2<sup>31</sup>-1 NRZ.
3. Measured @25.78125Gbps, ER=8.2dB, BER=<5E<sup>-5</sup>, PRBS=2<sup>31</sup>-1 NRZ.
4. Measured @28.05Gbps, ER=8.2dB, BER=<5E<sup>-5</sup>, PRBS=2<sup>31</sup>-1 NRZ.

## Pin Descriptions

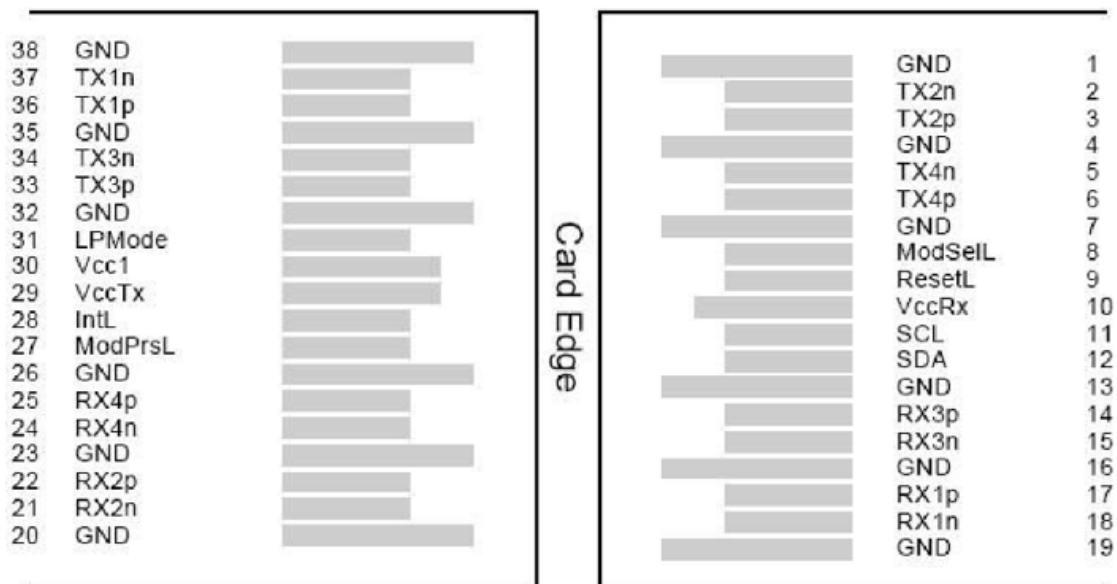
| Pin | Symbol  | Name/Description                                   | Notes |
|-----|---------|----------------------------------------------------|-------|
| 1   | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 2   | Tx2-    | Transmitter Inverted Data Input.                   |       |
| 3   | Tx2+    | Transmitter Non-Inverted Data Output.              |       |
| 4   | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 5   | Tx4-    | Transmitter Inverted Data Input.                   |       |
| 6   | Tx4+    | Transmitter Non-Inverted Data Output.              |       |
| 7   | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 8   | ModSelL | Module Select.                                     |       |
| 9   | ResetL  | Module Reset.                                      |       |
| 10  | VccRx   | +3.3V Receiver Power Supply.                       | 2     |
| 11  | SCL     | 2-Wire Serial Interface Clock.                     |       |
| 12  | SDA     | 2-Wire Serial Interface Data.                      |       |
| 13  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 14  | Rx3+    | Receiver Non-Inverted Data Output.                 |       |
| 15  | Rx3-    | Receiver Inverted Data Output.                     |       |
| 16  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 17  | Rx1+    | Receiver Non-Inverted Data Output.                 |       |
| 18  | Rx1-    | Receiver Inverted Data Output.                     |       |
| 19  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 20  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 21  | Rx2-    | Receiver Inverted Data Output.                     |       |
| 22  | Rx2+    | Receiver Non-Inverted Data Output.                 |       |
| 23  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 24  | Rx4-    | Receiver Inverted Data Output.                     |       |
| 25  | Rx4+    | Receiver Non-Inverted Data Output.                 |       |
| 26  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 27  | ModPrsL | Module Present.                                    |       |
| 28  | IntL    | Interrupt.                                         |       |
| 29  | VccTx   | +3.3V Transmitter Power Supply.                    | 2     |
| 30  | Vcc1    | +3.3V Power Supply.                                | 2     |
| 31  | LPMode  | Low-Power Mode.                                    |       |
| 32  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |
| 33  | Tx3+    | Transmitter Non-Inverted Data Input.               |       |
| 34  | Tx3-    | Transmitter Inverted Data Output.                  |       |
| 35  | GND     | Transmitter Ground. (Common with Receiver Ground). | 1     |

|    |      |                                                    |   |
|----|------|----------------------------------------------------|---|
| 36 | Tx1+ | Transmitter Non-Inverted Data Input.               |   |
| 37 | Tx1- | Transmitter Inverted Data Output.                  |   |
| 38 | GND  | Transmitter Ground. (Common with Receiver Ground). | 1 |

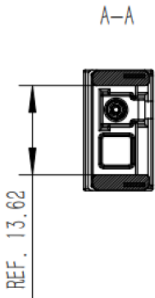
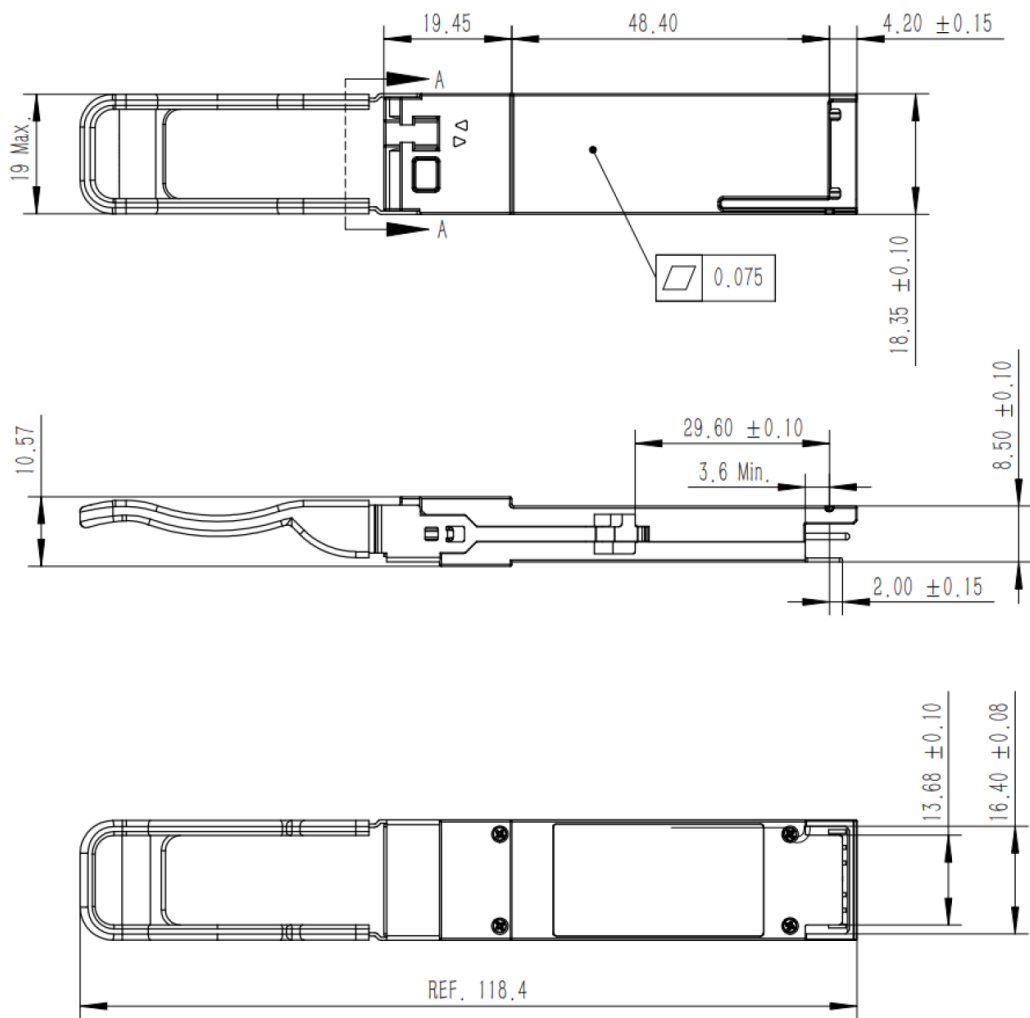
#### Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1, and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. VccRx, Vcc1, and VccTx may be internally connected within the module in any combination. The connector pins are each rated for a maximum current of 1000mA.

#### Electrical Pin-Out Details



Mechanical Specifications



Units in mm

# About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

