



## ZXS-QD2XLR4Z-00-SKY

Infinera® ZXS-QD2XLR4Z-00 Compatible 2x100GBase-LR4 QSFP28-DD Transceiver (SMF, 1295nm to 1309nm, 10km, 2xCS, DOM)

### Product Description

This Infinera® ZXS-QD2XLR4Z-00 compatible QSFP28-DD transceiver provides 2x100GBase-LR4 throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via a 2xCS 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 Infinera®. 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:

- Supports 206Gbps
- 8x25G electrical interface
- Dual CS Connector
- 8x25Gbps DFB-based LAN-WDM transmitter
- PIN and TIA array on the receiver side
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- RoHS-6 compliant and Lead Free
- I2C interface with integrated Digital Diagnostic Monitoring
- Single +3.3V power supply and power dissipation



### Applications:

- 200GBase Ethernet
- Access and Enterprise

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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 |
|-------------------------------------|--------------------|------|------|------|------|
| Maximum Supply Voltage              | V <sub>cc</sub>    | -0.5 |      | 3.6  | V    |
| Storage Temperature                 | T <sub>S</sub>     | -40  |      | 85   | °C   |
| Operating Case Temperature          | T <sub>c</sub>     | 0    | 25   | 70   | °C   |
| Relative Humidity (non-condensing)  | RH                 | 5    |      | 85   | %    |
| Receiver Damage Threshold, per lane | R <sub>x</sub> dmg | 5.5  |      |      | dBm  |

## Electrical Characteristics

| Parameter                              | Symbol                         | Min                      | Typ | Max   | Unit              | Notes   |
|----------------------------------------|--------------------------------|--------------------------|-----|-------|-------------------|---------|
| Power Supply Voltage                   | V <sub>cc</sub>                | 3.135                    | 3.3 | 3.465 | V                 |         |
| Power Dissipation                      | P <sub>d</sub>                 |                          |     | 8     | W                 |         |
| Instantaneous peak current             | I <sub>cc_ip</sub>             |                          |     | 3200  | mA                |         |
| Sustained peak current                 | I <sub>cc_sp</sub>             |                          |     | 2640  | mA                |         |
| Steady state current                   | I <sub>cc</sub>                |                          |     | 2308  | mA                |         |
| Transmitter                            |                                |                          |     |       |                   |         |
| Differential data input swing per lane |                                |                          |     | 900   | mV <sub>p-p</sub> |         |
| Input Impedance (Differential)         | Z <sub>in</sub>                |                          |     | 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   | mV <sub>p-p</sub> |         |
| Output Impedance (Differential)        | Z <sub>out</sub>               |                          |     | 10    | %                 |         |
| Output Rise/Fall Time                  | t <sub>r</sub> /t <sub>f</sub> | 12                       |     |       | ps                | 20%~80% |
| Eye width                              |                                | 0.57                     |     |       | UI                |         |
| Eye height differential                |                                | 228                      |     |       | mV                |         |
| Vertical eye closure                   |                                |                          |     | 5.5   | dB                |         |

## Optical Characteristics

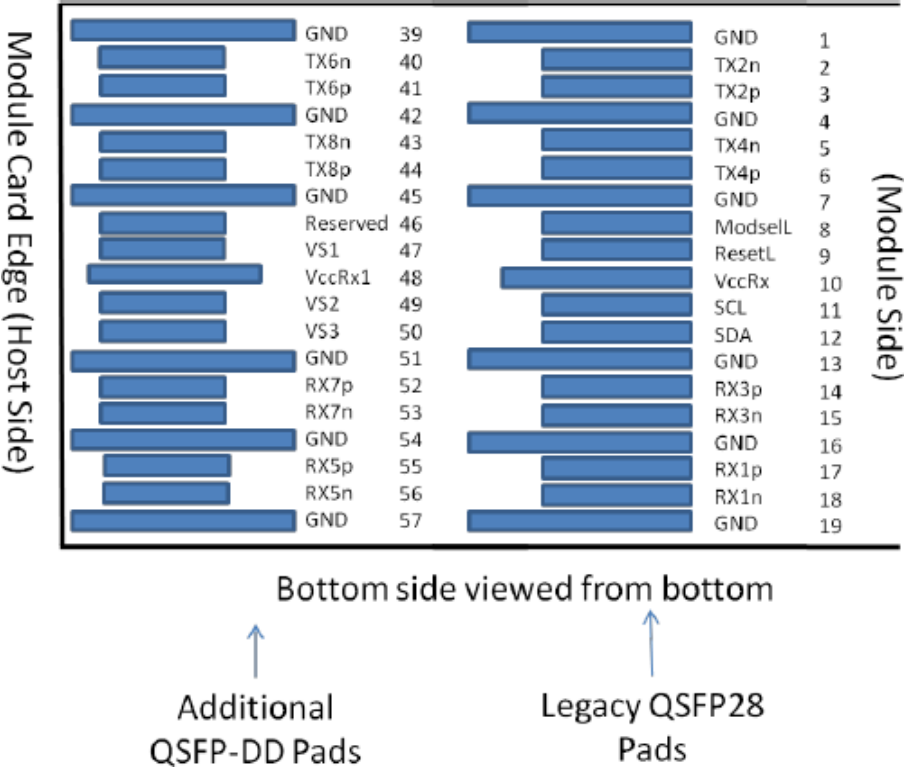
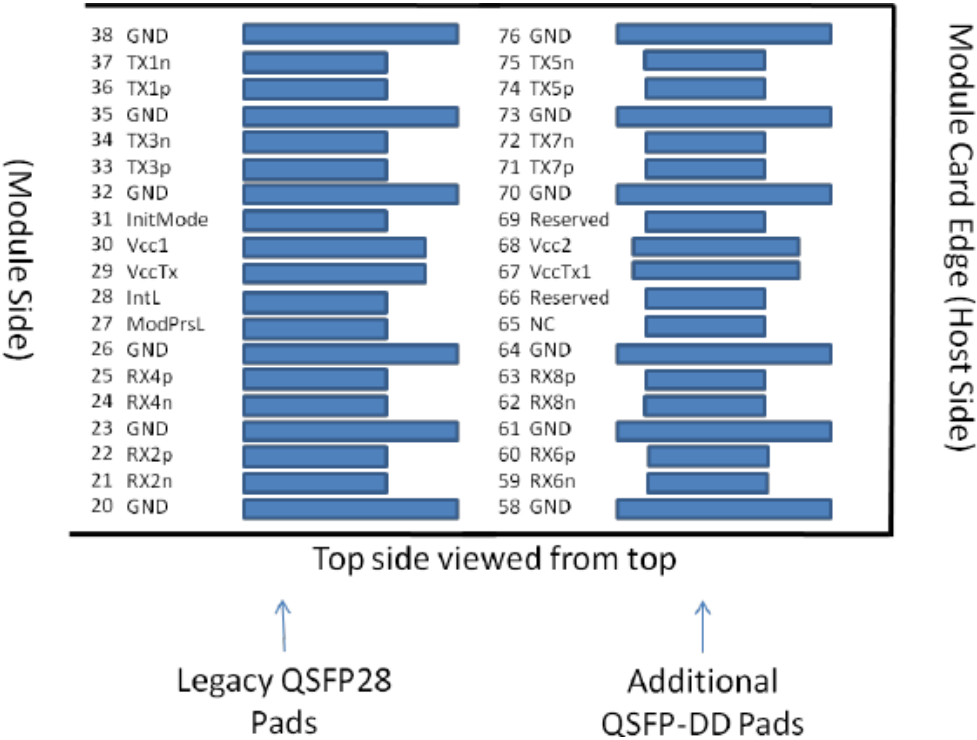
| Parameter                                         | Symbol         | Min                                | Typical | Max     | Unit | Notes |
|---------------------------------------------------|----------------|------------------------------------|---------|---------|------|-------|
| Transmitter                                       |                |                                    |         |         |      |       |
| Signaling Speed per Lane                          | BRAVE          |                                    | 25.78   |         | Gbps |       |
| Data Rate Variation                               |                | -100                               |         | +100    | ppm  |       |
| Lane_1/5 Center Wavelength                        | $\lambda_{C1}$ | 1294.53                            | 1295.56 | 1296.59 | nm   |       |
| Lane_2/6 Center Wavelength                        | $\lambda_{C2}$ | 1299.02                            | 1300.05 | 1301.09 | nm   |       |
| Lane_3/7 Center Wavelength                        | $\lambda_{C3}$ | 1303.54                            | 1304.58 | 1305.63 | nm   |       |
| Lane_4/8 Center Wavelength                        | $\lambda_{C4}$ | 1308.09                            | 1309.14 | 1310.19 | nm   |       |
| Total Average Output Power each optical interface | Po             |                                    |         | 10.5    | dBm  |       |
| Average Launch Power each Lane                    | Peach          | -4.3                               |         | 4.5     | dBm  | 1     |
| Transmit OMA each Lane                            | TxOMA          | -1.3                               |         | 4.5     | dBm  | 2     |
| Launch power in OMA minus TDP, each lane          | OMA-TDP        | -2.3                               |         |         | dBm  |       |
| Transmitter and Dispersion Penalty per Lane       | TDP            |                                    |         | 2.2     | dB   |       |
| Side Mode Suppression Ratio                       | SMSR           | 30                                 |         |         | dB   |       |
| Optical Return Loss Tolerance                     |                |                                    |         | 20      | dB   |       |
| Transmitter Reflectance                           |                |                                    |         | -12     | dB   | 3     |
| Extinction Ratio                                  | ER             | 4                                  |         |         | dB   |       |
| Eye Mask {X1, X2, X3, Y1, Y2, Y3}                 |                | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} |         |         |      | 4     |
| Receiver                                          |                |                                    |         |         |      |       |
| Signaling Speed per Lane                          | BRAVE          |                                    | 25.78   |         | Gbps |       |
| Data Rate Variation                               |                | -100                               |         | +100    | ppm  |       |
| Damage threshold                                  | Rxdmg          | 5.5                                |         |         | dBm  |       |
| Lane_1/5 Center Wavelength                        | $\lambda_{C1}$ | 1294.53                            | 1295.56 | 1296.59 | nm   |       |
| Lane_2/6 Center Wavelength                        | $\lambda_{C2}$ | 1299.02                            | 1300.05 | 1301.09 | nm   |       |
| Lane_3/7 Center Wavelength                        | $\lambda_{C3}$ | 1303.54                            | 1304.58 | 1305.63 | nm   |       |
| Lane_4/8 Center Wavelength                        | $\lambda_{C4}$ | 1308.09                            | 1309.14 | 1310.19 | nm   |       |
| Average receive power                             | Rxpow          | -10.6                              |         | 4.5     | dBm  | 5     |
| Receive Power (OMA) per Lane                      | RxOMA          |                                    |         | 4.5     | dBm  |       |
| Unstressed Receiver Sensitivity (OMA) per Lane    | Rxsens         |                                    |         | -8.6    | dBm  | 6     |
| Stressed Receiver Sensitivity (OMA) per Lane      | RXSRS          |                                    |         | -6.8    | dBm  | 7     |
| Optical Return Loss                               | ORL            |                                    |         | -26     | dB   |       |
| Conditions of Stress Receiver Sensitivity Test    |                |                                    |         |         |      |       |
| Vertical Eye Closure Penalty                      | VECP           | 1.8                                |         |         | dB   | 8     |
| Stressed J2 Jitter                                | J2             | 0.3                                |         |         | UI   | 8     |

|                           |      |      |  |     |     |   |
|---------------------------|------|------|--|-----|-----|---|
| <b>Stressed J9 Jitter</b> | J9   | 0.47 |  |     | UI  | 8 |
| <b>LOS Assert</b>         | LOSA | -25  |  |     | dBm |   |
| <b>LOS De-Assert</b>      | LOSD |      |  | -12 | dBm |   |
| <b>LOS Hysteresis</b>     |      | 0.5  |  |     | dB  |   |

**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. Even if the TDP < 1.0dB, the OMA (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.
4. Hit ratio of  $5 \times 10^{-5}$
5. 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.
6. Receiver sensitivity (OMA), each lane (max) is informative.
7. Measured with conformance test signal at TP3 for BER =  $10^{-12}$ .
8. Vertical eye closure penalty, stressed eye J2 Jitter, stressed eye J9 Jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

QSFP-DD Transceiver Electrical Pad Layout



## Pin Descriptions

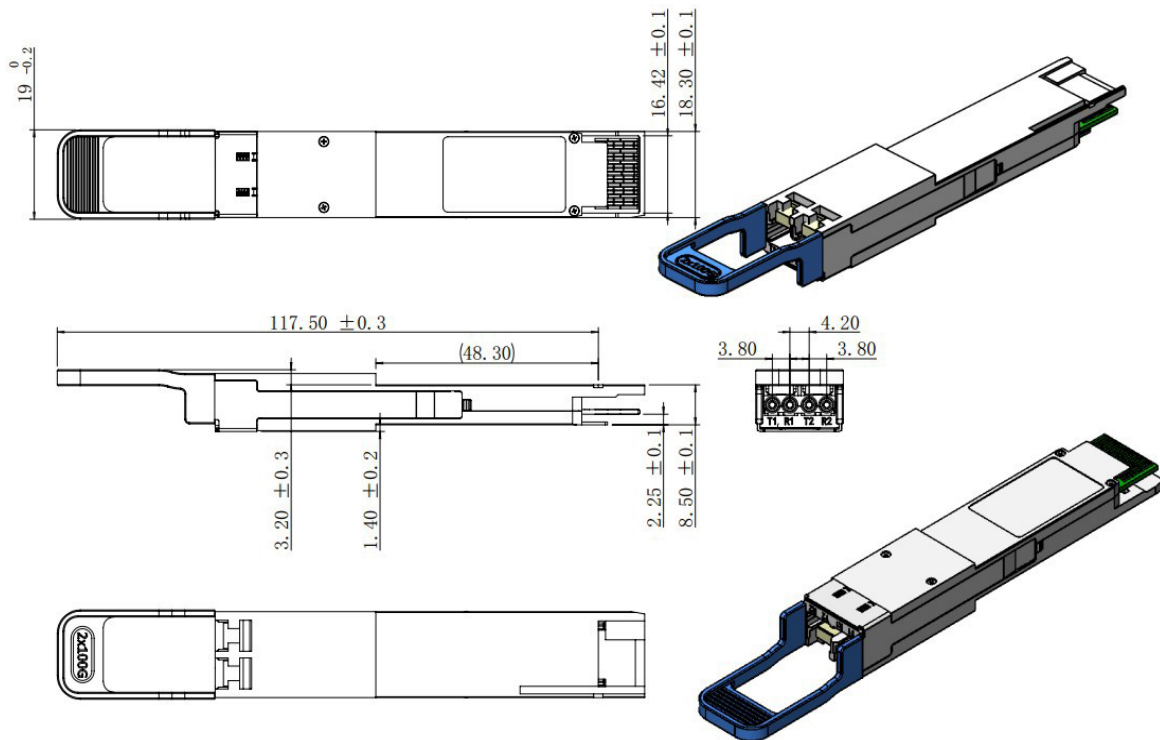
| Pin | Logic        | Symbol  | Name/Descriptions                   | Plug Sequence <sup>4</sup> | Ref. |
|-----|--------------|---------|-------------------------------------|----------------------------|------|
| 1   |              | GND     | Ground                              | 1B                         | 1    |
| 2   | CML-I        | Tx2n    | Transmitter Inverted Data Input     | 3B                         |      |
| 3   | CML-I        | Tx2p    | Transmitter Non-Inverted Data Input | 3B                         |      |
| 4   |              | GND     | Ground                              | 1B                         | 1    |
| 5   | CML-I        | Tx4n    | Transmitter Inverted Data Input     | 3B                         |      |
| 6   | CML-I        | Tx4p    | Transmitter Non-Inverted Data Input | 3B                         |      |
| 7   |              | GND     | Ground                              | 1B                         | 1    |
| 8   | LVTTL-I      | ModSelL | Module Select                       | 3B                         |      |
| 9   | LVTTL-I      | ResetL  | Module Reset                        | 3B                         |      |
| 10  |              | VccRx   | +3.3V Power Supply Receiver         | 2B                         | 2    |
| 11  | LVC MOS- I/O | SCL     | 2-wire serial interface clock       | 3B                         |      |
| 12  | LVC MOS- I/O | SDA     | 2-wire serial interface data        | 3B                         |      |
| 13  |              | GND     | Ground                              | 1B                         | 1    |
| 14  | CML-O        | Rx3p    | Receiver Non-Inverted Data Output   | 3B                         |      |
| 15  | CML-O        | Rx3n    | Receiver Inverted Data Output       | 3B                         |      |
| 16  |              | GND     | Ground                              | 1B                         | 1    |
| 17  | CML-O        | Rx1p    | Receiver Non-Inverted Data Output   | 3B                         |      |
| 18  | CML-O        | Rx1n    | Receiver Inverted Data Output       | 3B                         |      |
| 19  |              | GND     | Ground                              | 1B                         | 1    |
| 20  |              | GND     | Ground                              | 1B                         | 1    |
| 21  | CML-O        | Rx2n    | Receiver Inverted Data Output       | 3B                         |      |
| 22  | CML-O        | Rx2p    | Receiver Non-Inverted Data Output   | 3B                         |      |
| 23  |              | GND     | Ground                              | 1B                         | 1    |
| 24  | CML-O        | Rx4n    | Receiver Inverted Data Output       | 3B                         |      |
| 25  | CML-O        | Rx4p    | Receiver Non-Inverted Data Output   | 3B                         |      |
| 26  |              | GND     | Ground                              | 1B                         | 1    |
| 27  | LVTTL-O      | ModPrsL | Module Present                      | 3B                         |      |
| 28  | LVTTL-O      | IntL    | Interrupt                           | 3B                         |      |
| 29  |              | VccTx   | +3.3V Power supply transmitter      | 2B                         | 2    |
| 30  |              | Vcc1    | +3.3V Power supply                  | 2B                         | 2    |
| 31  | LVTTL-I      | LPMODE  | Low Power Mode                      | 3B                         |      |
| 32  |              | GND     | Ground                              | 1B                         | 1    |
| 33  | CML-I        | Tx3p    | Transmitter Non-Inverted Data Input | 3B                         |      |
| 34  | CML-I        | Tx3n    | Transmitter Inverted Data Input     | 3B                         |      |
| 35  |              | GND     | Ground                              | 1B                         | 1    |
| 36  | CML-I        | Tx1p    | Transmitter Non-Inverted Data Input | 3B                         |      |
| 37  | CML-I        | Tx1n    | Transmitter Inverted Data Input     | 3B                         |      |

|    |       |          |                                     |    |   |
|----|-------|----------|-------------------------------------|----|---|
| 38 |       | GND      | Ground                              | 1B | 1 |
| 39 |       | GND      | Ground                              | 1A | 1 |
| 40 | CML-I | Tx6n     | Transmitter Inverted Data Input     | 3A |   |
| 41 | CML-I | Tx6p     | Transmitter Non-Inverted Data Input | 3A |   |
| 42 |       | GND      | Ground                              | 1A | 1 |
| 43 | CML-I | Tx8n     | Transmitter Inverted Data Input     | 3A |   |
| 44 | CML-I | Tx8p     | Transmitter Non-Inverted Data Input | 3A |   |
| 45 |       | GND      | Ground                              | 1A | 1 |
| 46 |       | Reserved | For future use                      | 3A | 3 |
| 47 |       | VS1      | Module Vendor Specific 1            | 3A | 3 |
| 48 |       | VccRx1   | 3.3V Power Supply                   | 2A | 2 |
| 49 |       | VS2      | Module Vendor Specific 2            | 3A | 3 |
| 50 |       | VS3      | Module Vendor Specific 3            | 3A | 3 |
| 51 |       | GND      | Ground                              | 1A | 1 |
| 52 | CML-O | Rx7p     | Receiver Non-Inverted Data Output   | 3A |   |
| 53 | CML-O | Rx7n     | Receiver Inverted Data Output       | 3A |   |
| 54 |       | GND      | Ground                              | 1A | 1 |
| 55 | CML-O | Rx5p     | Receiver Non-Inverted Data Output   | 3A |   |
| 56 | CML-O | Rx5n     | Receiver Inverted Data Output       | 3A |   |
| 57 |       | GND      | Ground                              | 1A | 1 |
| 58 |       | GND      | Ground                              | 1A | 1 |
| 59 | CML-O | Rx6n     | Receiver Inverted Data Output       | 3A |   |
| 60 | CML-O | Rx6p     | Receiver Non-Inverted Data Output   | 3A |   |
| 61 |       | GND      | Ground                              | 1A | 1 |
| 62 | CML-O | Rx8n     | Receiver Inverted Data Output       | 3A |   |
| 63 | CML-O | Rx8p     | Receiver Non-Inverted Data Output   | 3A |   |
| 64 |       | GND      | Ground                              | 1A | 1 |
| 65 |       | NC       | No Connect                          | 3A | 3 |
| 66 |       | Reserved | For future use                      | 3A | 3 |
| 67 |       | VccTx1   | 3.3V Power Supply                   | 2A | 2 |
| 68 |       | Vcc2     | 3.3V Power Supply                   | 2A | 2 |
| 69 |       | Reserved | For Future Use                      | 3A | 3 |
| 70 |       | GND      | Ground                              | 1A | 1 |
| 71 | CML-I | Tx7p     | Transmitter Non-Inverted Data Input | 3A |   |
| 72 | CML-I | Tx7n     | Transmitter Inverted Data Input     | 3A |   |
| 73 |       | GND      | Ground                              | 1A | 1 |
| 74 | CML-I | Tx5p     | Transmitter Non-Inverted Data Input | 3A |   |
| 75 | CML-I | Tx5n     | Transmitter Inverted Data Input     | 3A |   |
| 76 |       | GND      | Ground                              | 1A | 1 |

#### Notes:

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD 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, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. Requirements defined for the host side of the Host Card Edge Connector are listed in Table 4. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 may be internally connected within the module in any combination. The connector Vcc pins are each rated for a maximum current of 1000 mA.
3. All Vendor Specific, Reserved and No Connect pins may be terminated with 50 ohms to ground on the host. Pad 65 (No Connect) shall be left unconnected within the module. Vendor specific and Reserved pads shall have an impedance to GND that is greater than 10 kOhms and less than 100 pF.
4. Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1A, 2A, 3A, 1B, 2B, 3B. (see Figure 2 for pad locations) Contact sequence A will make, then break contact with additional QSFP-DD pads. Sequence 1A, 1B will then occur simultaneously, followed by 2A, 2B, followed by 3A,3B.

#### Mechanical Specifications





# 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.

