



## QSFP28-100GB-LR4-20-DE-SKY

Dell® Compatible 100GBase-LR4 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 20km, LC, DOM)

### Product Description

This Dell® compatible QSFP28 transceiver provides 100GBase-LR4 throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via an LC 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 Dell®. 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:

- SFF-8665 Compliance
- Single-mode Fiber
- Duplex LC Connector
- Hot Pluggable
- Metal with Lower EMI
- Commercial Temperature 0 to 70 Celsius
- RoHS Compliant and Lead Free
- Excellent ESD Protection



### Applications:

- 100GBase 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 |          | 4.0  | V    |
| Storage Temperature        | T <sub>S</sub>  | -40  |          | 85   | °C   |
| Operating Case Temperature | T <sub>C</sub>  | 0    | 25       | 70   | °C   |
| Operating Humidity         | RH              | 5    |          | 95   | %    |
| Data Rate PER Channel      |                 |      | 25.78125 |      | Gb/s |

## 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                          | PD                    |       |      | 3.5   | W                 |       |
| Module Supply Current                      | I <sub>CC</sub>       |       |      | 1500  | mA                |       |
| Transmitter                                |                       |       |      |       |                   |       |
| Single-ended Input Voltage Tolerance       |                       | -0.3  |      | 4.0   | V                 |       |
| Input Differential Impedance               | Z <sub>IN</sub>       |       | 100  |       | Ω                 |       |
| Differential Data Input Swing              | V <sub>IN, P-P</sub>  | 190   |      | 700   | mV <sub>p-p</sub> |       |
| AC Common Mode Input Voltage Tolerance     |                       | 15    |      |       | mV                |       |
| Differential Input Voltage Swing Threshold |                       | 50    |      |       | mV <sub>pp</sub>  |       |
| Receiver                                   |                       |       |      |       |                   |       |
| Single-ended Output Voltage                |                       | -0.3  |      | 4.0   | V                 |       |
| Output Differential Impedance              | Z <sub>O</sub>        | 90    | 100  | 110   | Ω                 |       |
| Differential Data Output Swing             | V <sub>OUT, P-P</sub> | 300   |      | 850   | mV <sub>p-p</sub> |       |
| AC Common Mode Output Voltage              |                       |       |      | 7.5   | mV                |       |

## Optical Characteristics

| Parameter                                    | Symbol                           | Min.    | Typ.    | Max.    | Unit | Notes |
|----------------------------------------------|----------------------------------|---------|---------|---------|------|-------|
| Transmitter                                  |                                  |         |         |         |      |       |
| Launch Optical Power per lane                | P <sub>o</sub>                   | 0       |         | +5      | dBm  | 1     |
| Total Launch Optical Power                   | P <sub>o</sub>                   |         |         | +10.5   | dBm  | 1     |
| Center Wavelength                            | L1                               | 1294.53 | 1295.56 | 1296.59 | nm   |       |
|                                              | L2                               | 1299.02 | 1300.05 | 1301.09 | nm   |       |
|                                              | L3                               | 1303.54 | 1304.58 | 1305.63 | nm   |       |
|                                              | L4                               | 1308.09 | 1309.14 | 1310.19 | nm   |       |
| Extinction Ratio                             | EX                               | 4.0     |         |         | dB   | 2     |
| Spectral width (-20dB)                       | Δλ                               |         |         | 1       | nm   |       |
| Side Mode Suppression Ratio                  | SMSR                             | 30      |         |         | dB   |       |
| Optical Return Loss Tolerance                | ORLT                             |         |         | 20      | dB   |       |
| P <sub>out</sub> @TX-Disable Asserted        | P <sub>off</sub>                 |         |         | -30     | dBm  | 1     |
| Eye mask definitions: X1, X2, X3, Y1, Y2, Y3 | 0.25, 0.4, 0.45, 0.25, 0.28, 0.4 |         |         |         |      |       |
| Receiver                                     |                                  |         |         |         |      |       |
| Center Wavelength                            | L1                               | 1294.53 | 1295.56 | 1296.59 | nm   |       |
|                                              | L2                               | 1299.02 | 1300.05 | 1301.09 | nm   |       |
|                                              | L3                               | 1303.54 | 1304.58 | 1305.63 | nm   |       |
|                                              | L4                               | 1308.09 | 1309.14 | 1310.19 | nm   |       |
| Sensitivity per Channel (OMA)                | S                                |         |         | -9.0    | dBm  | 3     |
| Overload (each channel)                      | POL                              | 5.0     |         |         | dBm  | 3     |
| Damage Threshold (each channel)              | POL                              | 5.5     |         |         | dBm  |       |
| Optical Return Loss                          | ORL                              | 26      |         |         | dB   |       |
| LOS De-Assert                                | LOSD                             |         |         | -11.6   | dBm  |       |
| LOS Assert                                   | LOSA                             | -24     |         |         | dBm  |       |
| LOS Hysteresis                               |                                  | 0.5     |         |         | dB   |       |

### Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS 231-1 test pattern @25.78125Gbps.
3. Measured with PRBS 231-1 test pattern, 25.78125Gb/s.

## Pin Descriptions

| Pin | Symbol  | Name/Descriptions                                | Ref. |
|-----|---------|--------------------------------------------------|------|
| 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                                    | 2    |
| 9   | ResetL  | Module Reset                                     | 2    |
| 10  | VccRx   | 3.3V Power Supply Receiver                       |      |
| 11  | SCL     | 2-Wire serial Interface Clock                    | 2    |
| 12  | SDA     | 2-Wire serial Interface Data                     | 2    |
| 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                    | 1    |
| 25  | Rx4+    | Receiver Non-Inverted Data Output                |      |
| 26  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 27  | ModPrsl | Module Present                                   |      |
| 28  | IntL    | Interrupt                                        | 2    |
| 29  | VccTx   | 3.3V power supply transmitter                    |      |
| 30  | Vcc1    | 3.3V power supply                                |      |
| 31  | LPMODE  | Low Power Mode                                   | 2    |
| 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. 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.

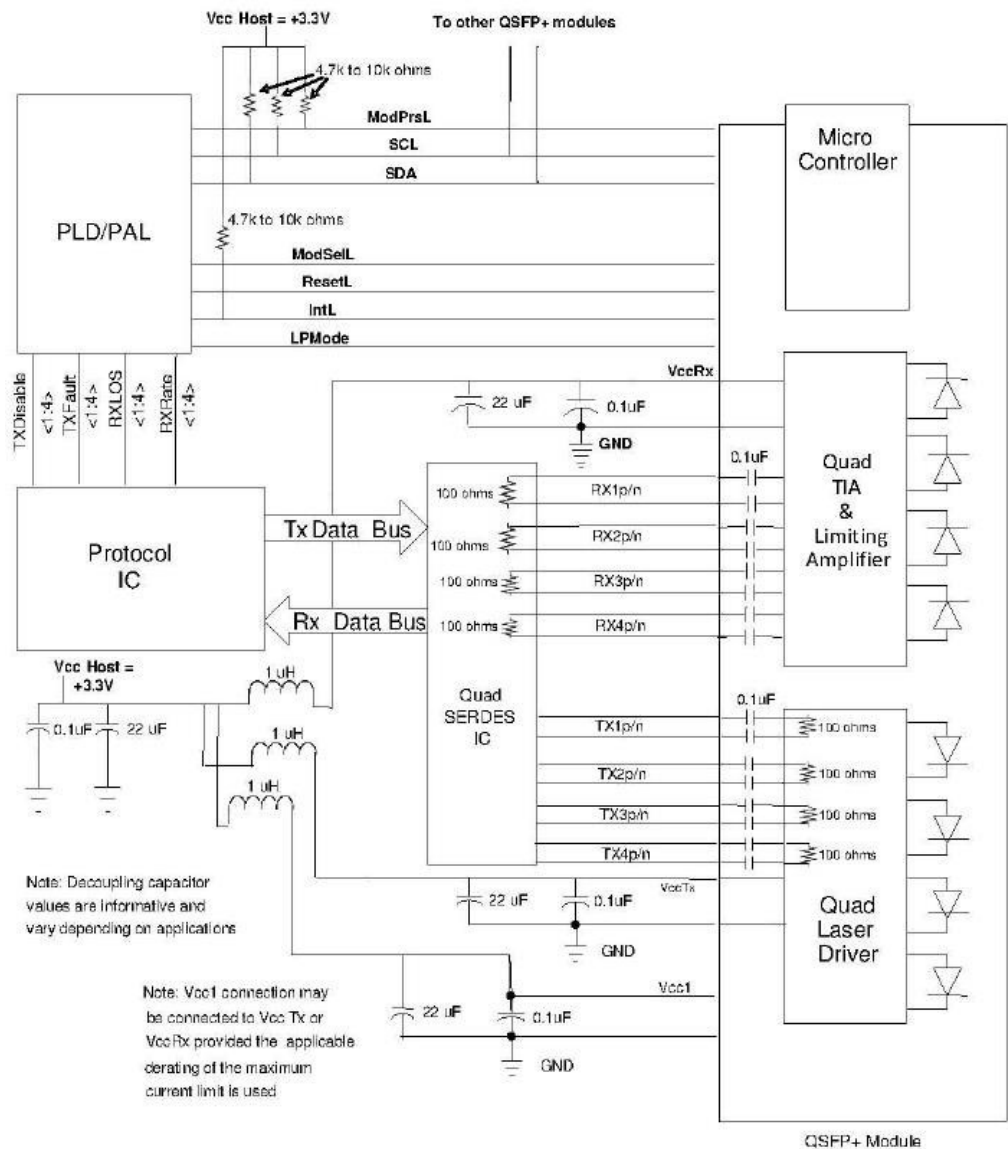
**Electrical Pin-out Details**



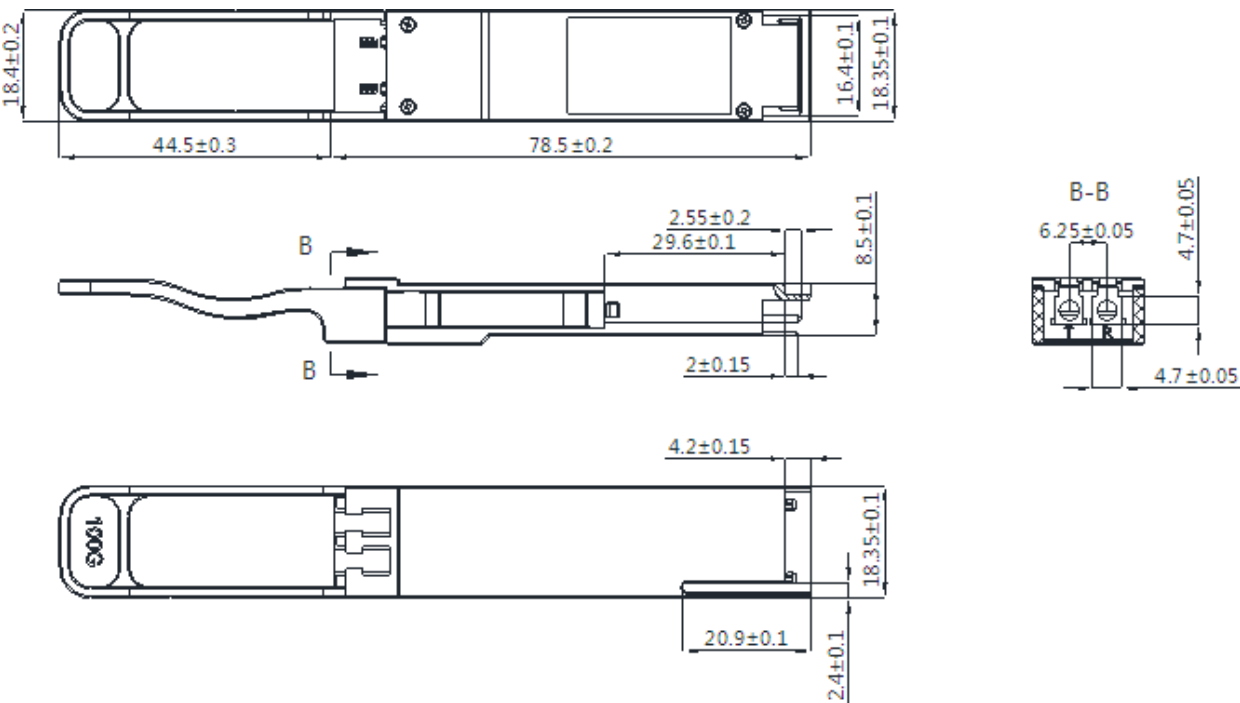
Recommended Host Board Power Supply Filter Network



Recommended Application Interface Block Diagram



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.

