



## FN-TRAN-QSFP28-SR-SKY

Fortinet® FN-TRAN-QSFP28-SR Compatible 100GBase-SR4 QSFP28 Transceiver (MMF, 850nm, 100m, MPO, DOM)

### Product Description

This Fortinet® FN-TRAN-QSFP28-SR compatible QSFP28 transceiver provides 100GBase-SR4 throughput up to 100m over OM4 multi-mode fiber (MMF) using a wavelength of 850nm via an MPO 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 Fortinet®. 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
- MPO Connector
- Commercial Temperature 0 to 70 Celsius
- Multi-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



### 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 | Notes |
|----------------------------|-----------------|------|----------|------|------|-------|
| Maximum Supply Voltage     | V <sub>CC</sub> | -0.5 |          | 4.0  | V    |       |
| Storage Temperature        | T <sub>S</sub>  | -40  |          | +85  | °C   |       |
| Relative Humidity          | RH              | 5    |          | 95   | %    |       |
| Operating Case Temperature | T <sub>C</sub>  | 0    | 25       | 70   | °C   |       |
| Data Rate PER Channel      | DR              |      | 25.78125 |      | Gb/s |       |

## Electrical Characteristics

| Parameter                      | Symbol                          | Min.  | Typ. | Max.  | Unit  | Notes |
|--------------------------------|---------------------------------|-------|------|-------|-------|-------|
| Supply Voltage                 | V <sub>CC</sub>                 | 3.135 | 3.3  | 3.465 | V     |       |
| Module Supply Current          | I <sub>CC</sub>                 |       |      | 750   | mA    |       |
| Power Dissipation              | P <sub>D</sub>                  |       |      | 2.5   | W     |       |
| Transmitter                    |                                 |       |      |       |       |       |
| Input Differential Impedance   | Z <sub>IN</sub>                 |       | 100  |       | Ω     |       |
| Differential Data Input Swing  | V <sub>IN, P-P</sub>            | 180   |      | 900   | mVp-p |       |
| Receiver                       |                                 |       |      |       |       |       |
| Output Differential Impedance  | Z <sub>O</sub>                  |       | 100  |       | Ω     |       |
| Differential Data Output Swing | V <sub>OUT, P-P</sub>           | 300   |      | 850   | mVp-p | 1     |
| Transition Time (20% to 80%)   | T <sub>r</sub> , T <sub>f</sub> | 12    |      |       | ps    |       |

## Notes:

1. The optical power is launched into OM3 MMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125Gbps.

## Optical Characteristics

| Parameter                                        | Symbol                      | Min. | Typ. | Max.  | Unit. | Notes |
|--------------------------------------------------|-----------------------------|------|------|-------|-------|-------|
| Transmitter                                      |                             |      |      |       |       |       |
| Launch Optical Power                             | P <sub>o</sub>              | -8.4 |      | +2.4  | dBm   | 1     |
| Center Wavelength Range                          | λ <sub>c</sub>              | 840  | 850  | 860   | nm    | -     |
| Extinction Ratio                                 | EX                          | 2    |      |       | dB    | 2     |
| Spectral width (RMS)                             | Δλ                          |      |      | 0.6   | nm    |       |
| Transmitter and Dispersion Penalty               | TDP                         |      |      | 4.3   | dB    |       |
| Optical Return Loss Tolerance                    | ORLT                        |      |      | 12    | dB    |       |
| Eye Diagram                                      | IEEE Std 802.3bm compatible |      |      |       |       |       |
| Receiver                                         |                             |      |      |       |       |       |
| Center Wavelength                                | λ <sub>c</sub>              | 840  | 850  | 860   | nm    |       |
| Average Receiver Sensitivity (P <sub>avg</sub> ) | S                           |      |      | -11   | dBm   | 3     |
| Average Receiver Sensitivity (P <sub>avg</sub> ) | S                           |      |      | -7.5  | dBm   | 4     |
| Receiver Overload (P <sub>avg</sub> )            | P <sub>OL</sub>             | 2.5  |      |       | dBm   |       |
| Damage Threshold                                 | P <sub>OL</sub>             | 3.4  |      |       | dBm   |       |
| Optical Reflectance                              | ORL                         |      |      | -12   | dB    |       |
| LOS Assert                                       | LOS <sub>A</sub>            | -30  |      |       | dB    |       |
| LOS De-Assert                                    | LOS <sub>D</sub>            |      |      | -11.5 | dB    |       |
| LOS Hysteresis                                   |                             | 0.5  |      |       | dB    |       |

### Notes:

1. The optical power is launched into OM3 MMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125Gbps.
3. Measured with a PRBS 2<sup>31</sup>-1 test pattern, 25.78125Gb/s, BER<5E<sup>-5</sup>.
4. Measured with PRBS 2<sup>31</sup>-1 test pattern, 25.78125Gb/s, BER<10<sup>-12</sup>.

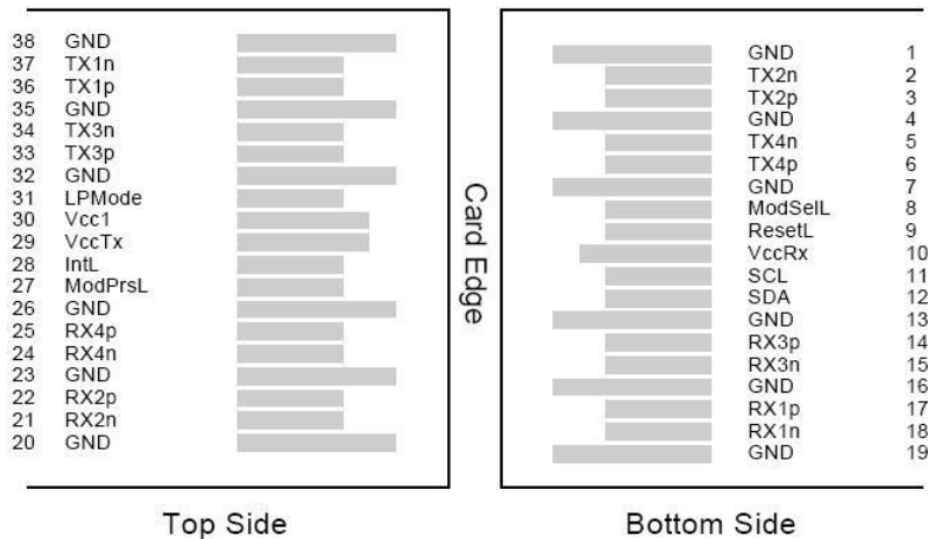
## Pin Descriptions

| Pin | Symbol  | Function/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                                    | 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                 |       |

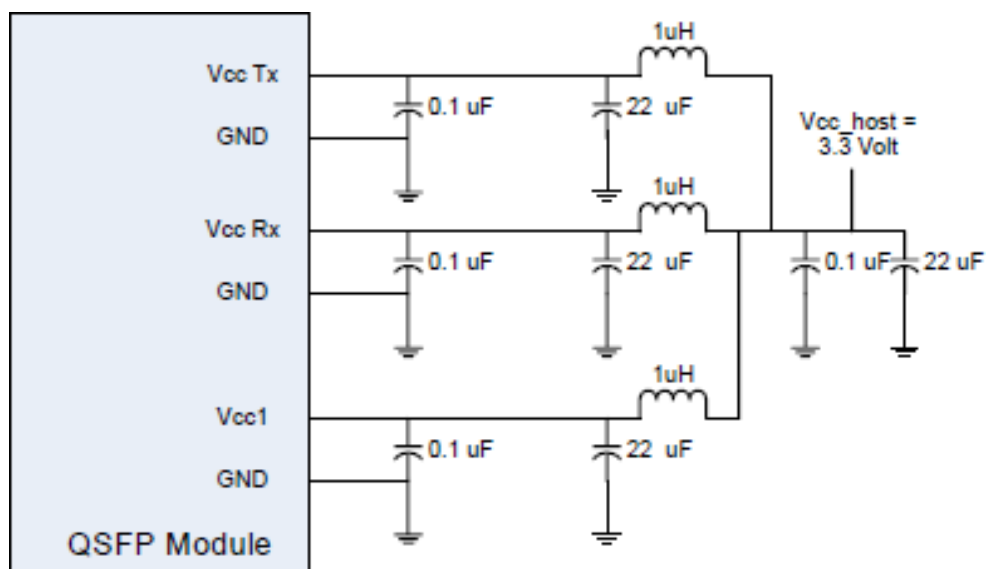
|    |      |                                                  |   |
|----|------|--------------------------------------------------|---|
| 35 | GND  | Transmitter Ground (Common with Receiver Ground) | 1 |
| 36 | Tx1+ | Transmitter Non-Inverted Data Input              |   |
| 37 | Tx1- | Transmitter Inverted Data Output                 |   |
| 38 | GND  | Transmitter Ground (Common with Receiver Ground) | 1 |

**Notes:**

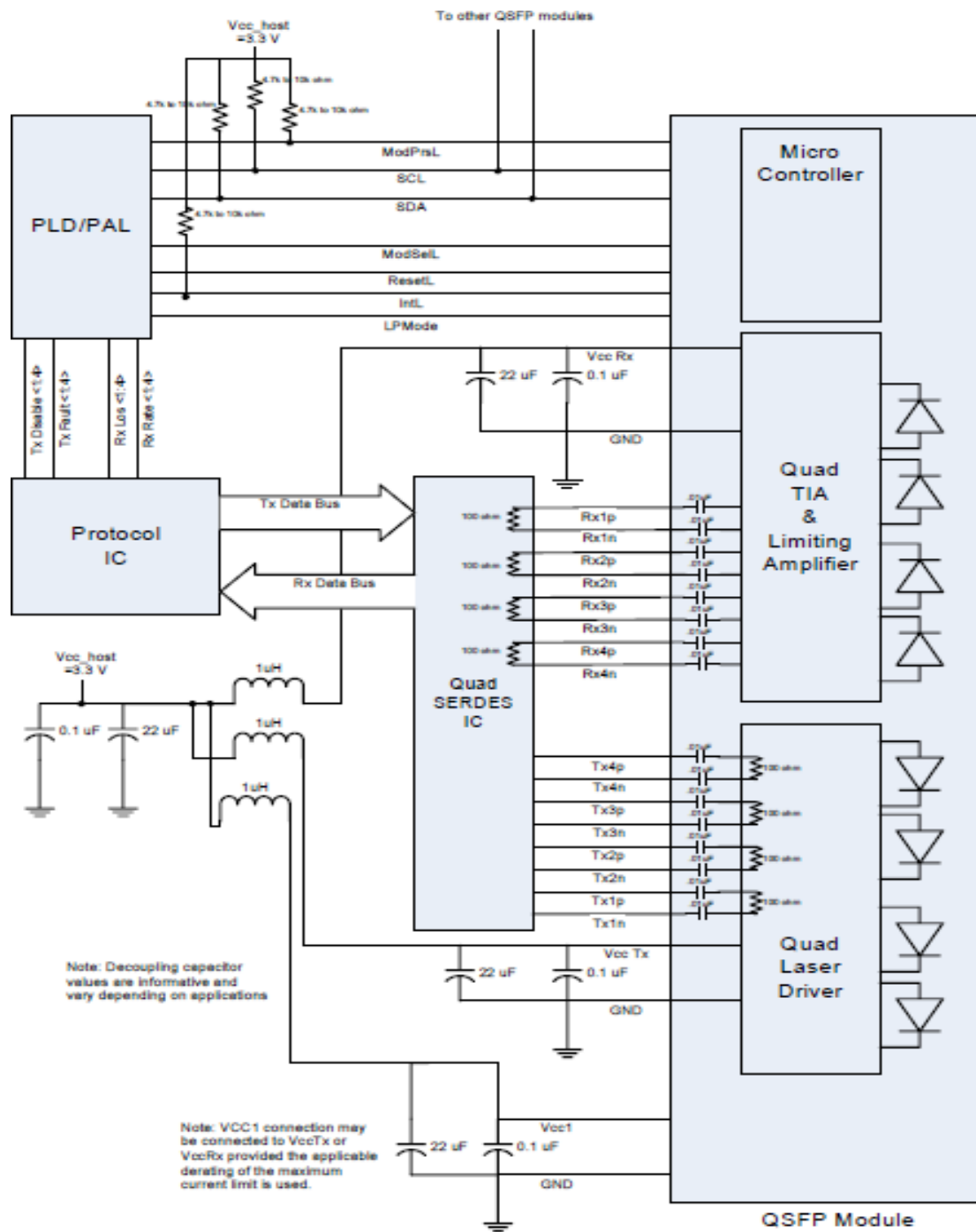
1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.



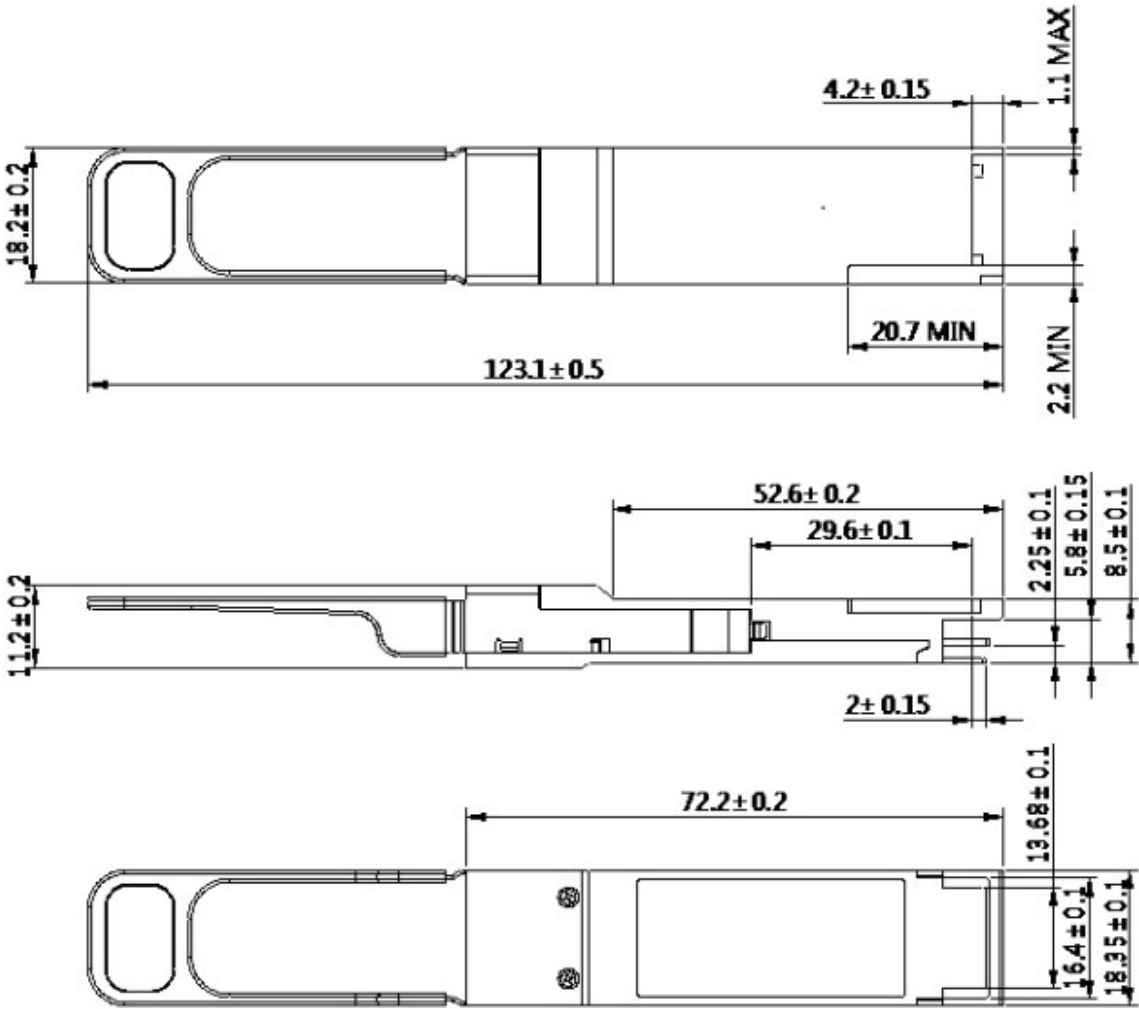
**Recommended Host Board Power Supply Filter Network**



## 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.

