



## PAN-QSFP-40GBASE-SR4-SKY

Palo Alto Networks® PAN-QSFP-40GBASE-SR4 Compatible 40GBase-SR4 QSFP+ Transceiver (MMF, 850nm, 150m, MPO, DOM)

### Product Description

This Palo Alto Networks® PAN-QSFP-40GBASE-SR4 compatible QSFP+ transceiver provides 40GBase-SR4 throughput up to 150m over multi-mode fiber (MMF) using a wavelength of 850nm via an MPO connector. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Palo Alto 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:

- SFF-8436 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:

- 40GBase Ethernet
- Access and Enterprise
- 4x10G Breakout Option

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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 |
|----------------------------|------------------|------|---------|------|------|
| Supply Voltage             | V <sub>CC</sub>  | -0.5 |         | 4.0  | V    |
| Storage Temperature        | T <sub>stg</sub> | -40  |         | 85   | °C   |
| Operating Case Temperature | T <sub>c</sub>   | 0    | 25      | 70   | °C   |
| Relative Humidity          | RH               | 5    |         | 95   | %    |
| Data Rate Per Channel      |                  |      | 10.3125 |      | Gbps |

## 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>                |       |      | 430   | mA    |       |
| Power Dissipation               | P <sub>DISS</sub>              |       |      | 1.5   | W     |       |
| Transmitter                     |                                |       |      |       |       |       |
| Input Differential Impedance    | Z <sub>IN</sub>                |       | 100  |       | Ω     |       |
| Differential Data Input Swing   | V <sub>IN,pp</sub>             | 180   |      | 900   | mVp-p |       |
| Receiver                        |                                |       |      |       |       |       |
| Output Differential Impedance   | Z <sub>OUT</sub>               |       | 100  |       | Ω     |       |
| Differential Data Output Swing  | V <sub>OUT,pp</sub>            | 300   |      | 850   | mVp-p | 1     |
| Data Output Rise Time/Fall Time | T <sub>r</sub> /T <sub>f</sub> | 28    |      |       | ps    | 2     |

### Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20 – 80 %.

## Optical Characteristics

| Parameter                          | Symbol                      | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|-----------------------------|------|------|------|------|-------|
| Transmitter                        |                             |      |      |      |      |       |
| Launch Optical Power               | Po                          | -7.6 |      | +2.4 | dBm  | 1     |
| Center Wavelength Range            | λC                          | 830  | 850  | 860  | nm   |       |
| Extinction Ratio                   | ER                          | 3    |      |      | dB   | 2     |
| Spectral Width (RMS)               | Δλ                          |      |      | 0.65 | nm   |       |
| Transmitter and Dispersion Penalty | TDP                         |      |      | 3.2  | dB   |       |
| Optical Return Loss Tolerance      | ORLT                        |      |      | 12   | dB   |       |
| Eye Diagram                        | IEEE Std 802.3ba Compatible |      |      |      |      |       |
| Receiver                           |                             |      |      |      |      |       |
| Center Wavelength                  | λC                          | 830  | 850  | 860  | nm   |       |
| Receiver Sensitivity (Pavg)        | S                           |      |      | -9.5 | dBm  | 3     |
| Damage Threshold                   | POL                         | 2.5  |      |      | dBm  | 3     |
| Optical Return Loss                | ORL                         | 12   |      |      | dB   |       |
| LOS Assert                         | LOSA                        | -30  |      |      | dBm  |       |
| LOS De-Assert                      | LOSD                        |      |      | -11  | dBm  |       |
| LOS Hysteresis                     |                             | 0.5  |      |      | dB   |       |

### Notes:

1. The optical power is launched into OM3 MMF.
2. Measured with a PRBS  $2^{31}-1$  test pattern @10.3125Gbps.
3. Measured with PRBS  $2^{31}-1$  test pattern, 10.3125Gbps, and BER<10<sup>-12</sup>.

## Pin Descriptions

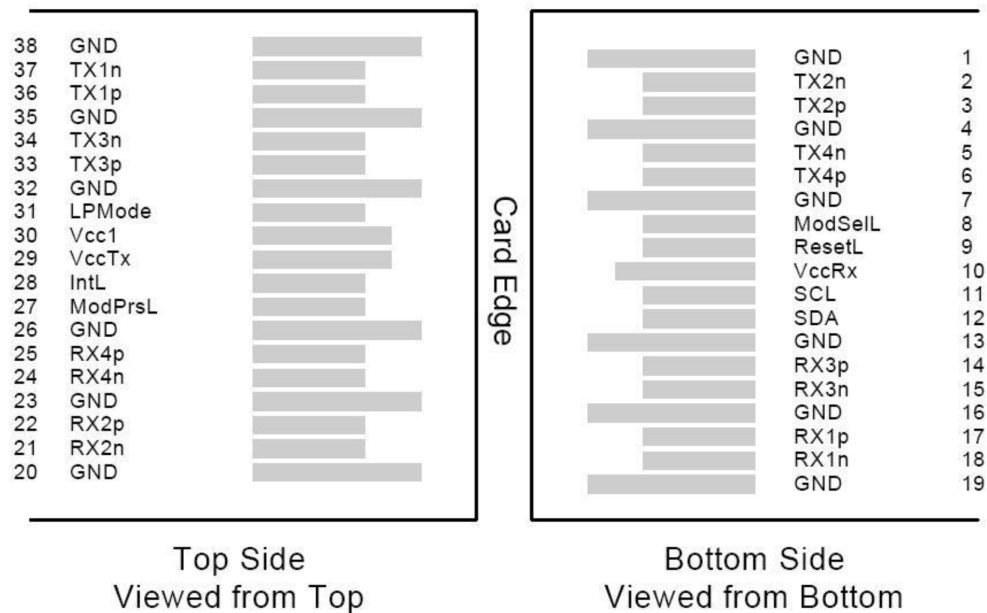
| Pin | Logic       | Symbol  | Name/Descriptions                                        | Notes |
|-----|-------------|---------|----------------------------------------------------------|-------|
| 1   |             | GND     | Module Ground.                                           | 1     |
| 2   | 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   | LVTTL-I     | ModSelL | Module Select.                                           | 2     |
| 9   | LVTTL-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.                           | 1     |
| 25  | CML-O       | Rx4+    | Receiver Non-Inverted Data Output.                       |       |
| 26  |             | GND     | Module Ground.                                           | 1     |
| 27  | LVTTL-O     | ModPrsL | Module Present. Internally pulled down to GND.           |       |
| 28  | LVTTL-O     | IntL    | Interrupt Output. Should be pulled up on the host board. | 2     |
| 29  |             | VccTx   | +3.3V Transmitter Power Supply.                          |       |
| 30  |             | Vcc1    | +3.3V Power Supply.                                      |       |
| 31  | LVTTL-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 |

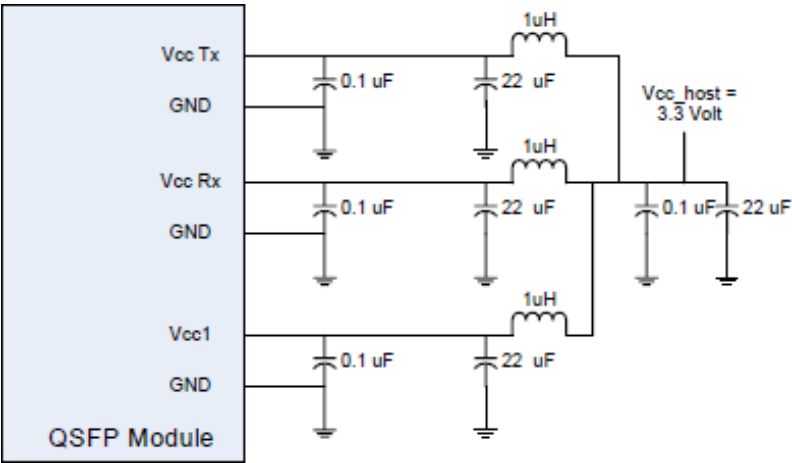
**Notes:**

1. 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 4.7k $\Omega$ -10k $\Omega$  pull-up resistor to the Host\_Vcc.

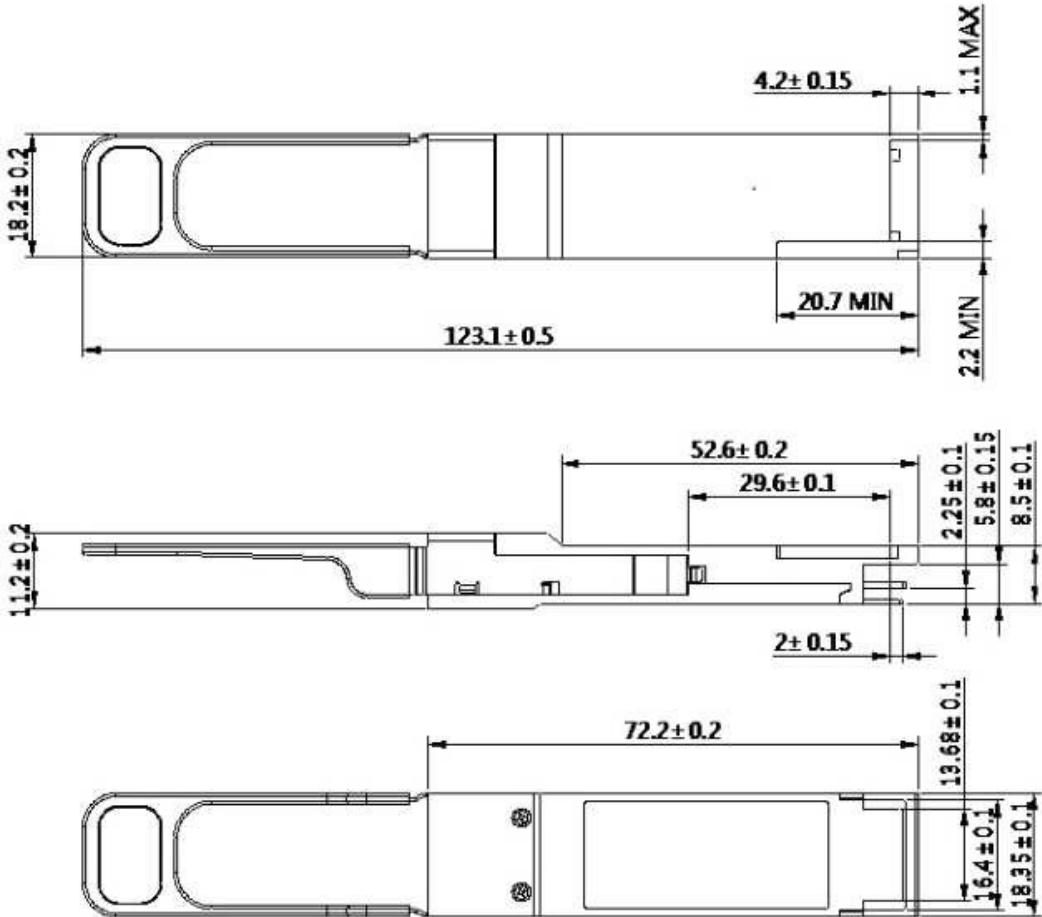
**Electrical Pin-Out Details**



Recommended Host Board Power Supply Filter Network



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.

