

## 40Gb/s QSFP+ SR4 Optical Transceiver



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Lanview's transceiver modules are designed for use in 40 Gigabit per second links over parallel multimode fiber, including breakout to four 10 Gigabit per second links. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-SR4 and compatible with IEEE 802.3ae 10GBASE-SR. They are RoHS compliant and lead-free.

## Product Features

- ✓ 4 independent full-duplex channels Up to 10.5Gbps data rate per channel
- ✓ MTP/MPO optical connector
- ✓ Capable of over 100m transmission on OM3 multi-mode ribbon fiber and 150m on OM4 MMF
- ✓ Single +3.3V power supply
- ✓ QSFP+ MSA compliant
- ✓ Operating case temperature: 0~70°C
- ✓ RoHS compliant
- ✓ Compliant with IEEE802.3ba
- ✓ Compliant with QSFP+ MSA: SFF-8436

## Applications

- ✓ 40G Ethernet
- ✓ Infiniband 4X SDR DDR QDR
- ✓ 40G Telecom connections



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- Immunity compatible with EN 61000-4-3
- EMI compatible with FCC Part 15 Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2
- RoHS compliant with RoHS 2.0(2015/863/EU)-amending

## Pin Descriptions

| Pin | Symbol  | Name                                 | Ref. |
|-----|---------|--------------------------------------|------|
| 1   | GND     | Ground                               | 1    |
| 2   | Tx2n    | Transmitter Inverted Data Input      |      |
| 3   | Tx2p    | Transmitter Non-Inverted Data output |      |
| 4   | GND     | Ground                               | 1    |
| 5   | Tx4n    | Transmitter Inverted Data Input      |      |
| 6   | Tx4p    | Transmitter Non-Inverted Data output |      |
| 7   | GND     | Ground                               | 1    |
| 8   | ModSelL | Module Select                        |      |
| 9   | ResetL  | Module Reset                         |      |
| 10  | VccRx   | +3.3V Power Supply Receiver          | 2    |
| 11  | SCL     | 2-Wire Serial Interface Clock        |      |
| 12  | SDA     | 2-Wire Serial Interface Data         |      |
| 13  | GND     | Ground                               |      |
| 14  | Rx3p    | Receiver Non-Inverted Data Output    |      |
| 15  | Rx3n    | Receiver Inverted Data Output        |      |
| 16  | GND     | Ground                               | 1    |
| 17  | Rx1p    | Receiver Non-Inverted Data Output    |      |
| 18  | Rx1n    | Receiver Inverted Data Output        |      |
| 19  | GND     | Ground                               | 1    |
| 20  | GND     | Ground                               | 1    |
| 21  | Rx2n    | Receiver Inverted Data Output        |      |
| 22  | Rx2p    | Receiver Non-Inverted Data Output    |      |
| 23  | GND     | Ground                               | 1    |
| 24  | Rx4n    | Receiver Inverted Data Output        | 1    |
| 25  | Rx4p    | Receiver Non-Inverted Data Output    |      |
| 26  | GND     | Ground                               | 1    |
| 27  | ModPrsL | Module Present                       |      |

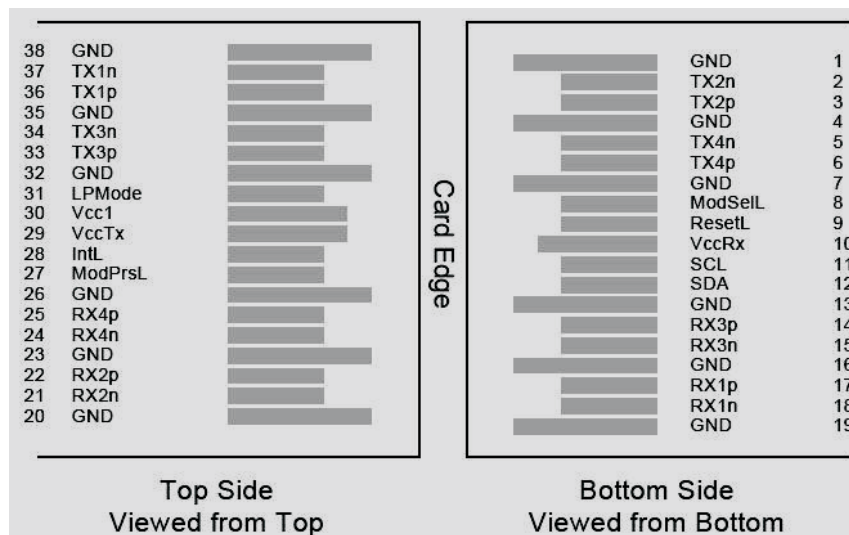
|    |        |                                     |   |
|----|--------|-------------------------------------|---|
| 28 | IntL   | Interrupt                           |   |
| 29 | VccTx  | +3.3 V Power Supply transmitter     | 2 |
| 30 | Vcc1   | +3.3 V Power Supply                 | 2 |
| 31 | LPMode | Low Power Mode                      |   |
| 32 | GND    | Ground                              | 1 |
| 33 | Tx3p   | Transmitter Non-Inverted Data Input |   |
| 34 | Tx3n   | Transmitter Inverted Data Output    |   |
| 35 | GND    | Ground                              | 1 |
| 36 | Tx1p   | Transmitter Non-Inverted Data Input |   |
| 37 | Tx1n   | Transmitter Inverted Data Output    |   |
| 38 | GND    | Ground                              | 1 |

## Notes:

1.GND is the symbol for signal and supply (power), Connect these directly to the host board signal common ground plane

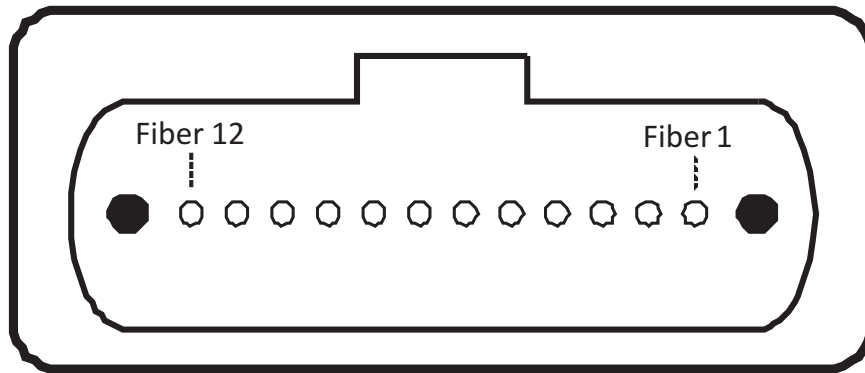
2.VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently.

Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP+, The connector pins are each rated for a maximum current of 500mA.



QSFP+ Transceiver Electrical Pad Layout

## Optical Interface Lanes and Assignment

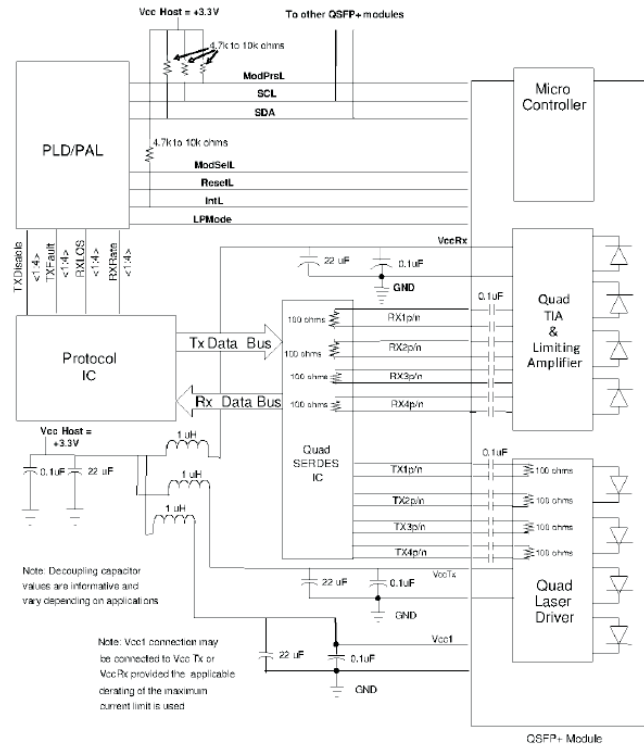


Outside view of the QSFP+ module MPO

## Lane Assignment

| Fiber # | Lane Assignment |
|---------|-----------------|
| 1       | RX0             |
| 2       | RX1             |
| 3       | RX2             |
| 4       | RX3             |
| 5       | Not used        |
| 6       | Not used        |
| 7       | Not used        |
| 8       | Not used        |
| 9       | TX3             |
| 10      | TX2             |
| 11      | TX1             |
| 12      | Tx0             |

## Recommend Circuit Schematic



## Absolute Maximum Ratings

| Parameter              | Symbol | Min  | Typ  | Max  | Unit | Ref. |
|------------------------|--------|------|------|------|------|------|
| Maximum Supply Voltage | Vcc    | -0.5 | +3.3 | +3.6 | V    |      |
| Storage Temperature    | TS     | -40  |      | +85  | °C   |      |
| Operating Humidity     | RH     | 0    |      | 85   | %    |      |

## Recommended Operating Conditions

| Parameter                  | Symbol | Min  | Typ     | Max  | Unit | Ref. |
|----------------------------|--------|------|---------|------|------|------|
| Power Supply Voltage       | Vcc    | 3.15 | 3.30    | 3.45 | V    |      |
| Case Operating Temperature | Tc     | 0    |         | +70  | °C   |      |
| Bit Rate per Lane          | BR     |      | 10.3125 |      | Gbps |      |

### Notes:

1. AC coupled.
2. Into 100 ohm differential termination.

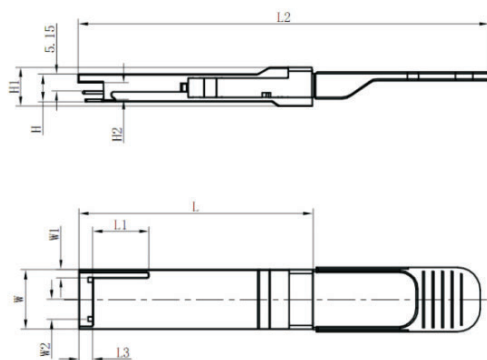
## Transmitter Characteristics

| Parameter                                | Symbol            | Min  | Typ | Max  | Unit | Ref. |
|------------------------------------------|-------------------|------|-----|------|------|------|
| Center Wavelength                        | $\lambda_t$       | 840  | 850 | 860  | nm   |      |
| RMS Spectral Width                       | Pm                |      |     | 0.6  | nm   |      |
| Average Optical Power, each Lane         | Pavg              | -8.2 | -1  | +2.4 | dBm  |      |
| Extinction Ratio                         | ER                | 3    | 4   |      | dB   |      |
| Total Jitter                             | $T_{JTX}$         |      |     | 120  | ps   |      |
| Transition Time(20% to 80%)              | TR,TF             |      |     | 100  | ps   |      |
| Differential data input voltage per lane | VIN <sub>pp</sub> | 120  |     | 1600 | mV   |      |

## Receiver Characteristics

| Parameter                                 | Symbol      | Min | Typ | Max        | Unit     | Ref. |
|-------------------------------------------|-------------|-----|-----|------------|----------|------|
| Center Wavelength                         | $\lambda_c$ | 840 | 850 | 860        | nm       |      |
| Sensitivity                               | Psen        |     |     | -10        | nm       |      |
| Bit Error Ratio                           | BER         |     |     | $10^{-12}$ |          |      |
| Optical Return Loss Tolerance             | RL          |     |     | 12         | dB       |      |
| Differential data output voltage per lane | VQUT        | 320 | 450 |            | mV       |      |
| Differential Termination Resisistance     | Zout        | 80  | 100 | 120        | $\Omega$ |      |
| Transition Time(20% to 80%)               | TR,TF       |     |     | 100        | ps       |      |
| Differential Termination Resisistance     | Zout        | 80  | 100 | 120        | $\Omega$ |      |
| Los De-Assert                             | LosD        |     |     | -15        | dBm      |      |
| Los Assert                                | LosA        | -30 |     |            | dBm      |      |
| Los Hysteresis                            | LosH        | 0.5 |     | 2          | dB       |      |

## Mechanical Specifications

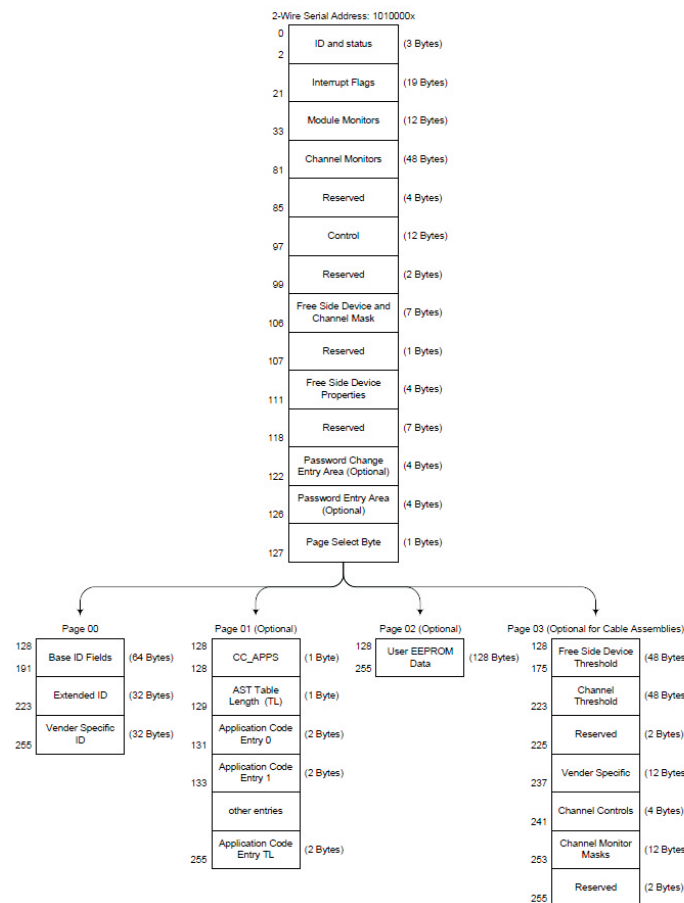


|      | L    | L1   | L2  | L3   | W    | W1  | W2  | H   | H1   | H2   |
|------|------|------|-----|------|------|-----|-----|-----|------|------|
| Max  | 72.2 | —    | 122 | 4.35 | 18.5 | —   | 6.2 | 8.6 | 12.1 | 5.35 |
| Type | —    | —    | —   | —    | —    | —   | —   | —   | —    | —    |
| Min  | 68.8 | 16.5 | 118 | 4.05 | 18.1 | 2.2 | 5.8 | 8.4 | 11.7 | 5.05 |

Unit: mm

## EEPROM Information

- EEPROM memory map specific data field description is as below:



## Digital Diagnostic Monitoring Interface

Four transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

| Parameter    | Range         | Accuracy | Calibration |
|--------------|---------------|----------|-------------|
| Temperature  | 0 to +70°C    | ±3°C     | Internal    |
| Voltage      | 2.97 to 3.63V | ±3%      | Internal    |
| Bias Current | 0 to 100mA    | ±10%     | Internal    |
| RX Power     | -10 to 2.5dBm | ±2dB     | Internal    |