

## 40G-QSFP-SR4-INT-A

40GBASE, QSFP+ SR4, (MM)  
850 NM, 100 M REACH, MPO

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40GBASE, QSFP+, SR4 Transceiver

### Features

- Support up to 40Gb/s bit rates
- Hot-pluggable QSFP+ footprint, Built-in digital diagnostic
- Maximum link length of 100m OM3 MMF and 150m OM4 MMF
- 850VCSEL laser and PIN photodiode
- QSFP+ MSA package with MPO connector
- +3.3V power supply
- Power dissipation < 1.5W
- Temperature range 0~70°C
- RoHS Compliant



### Applications

- 40GBASE-SR4
- 40G-IB-QDR
- Parallel optical links

### 1. Description

Approved Networks QSFP+ SR4 transceivers include a 1 x 4 850nm VCSEL array and 1 x 4 PIN array comply with QSFP+ Multi-Source Agreement (MSA) SFF-8436, and can support applications on 100m OM3 MMF and 150m OM4 MMF. Digital diagnostics functions are available via 2-wire serial interface, which is compliant with QSFP+ MSA.

## 2. Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual absolute maximum ratings can cause immediate catastrophic damage to the module even if all other parameters are within recommended Operating conditions.

| Parameter                   | Symbol | Min. | Max. | Unit | Notes |
|-----------------------------|--------|------|------|------|-------|
| Storage Temperature         | Ts     | -40  | 85   | °C   | -     |
| Operating Case Temperature  | Top    | 0    | 70   | °C   | -     |
| Power supply Voltage        | Vcc    | 0    | 3.6  | V    | -     |
| Relative Humidity           | RH     | 0    | 85   | %    | -     |
| Maximum Optical Input Power | Pin    | 3.4  |      | dBm  | -     |

## 3. Recommended Operating Conditions

| Parameter                  | Symbol | Min. | Typ.    | Max. | Unit |
|----------------------------|--------|------|---------|------|------|
| Operating Case Temperature | TC     | 0    |         | +70  | °C   |
| Power Supply Voltage       | Vcc    | 3.14 | 3.3     | 3.47 | V    |
| Power Supply Current       | ICC    |      |         | 430  | mA   |
| Power Dissipation          | PD     |      |         | 1.5  | W    |
| Data Rate per Lane         | DR     |      | 10.3125 |      | Gbps |
| Link Distance on OM3 MMF   |        |      |         | 100  | m    |
| Link Distance on OM4 MMF   |        |      |         | 150  | m    |

## 4. Transmitter Specification ( Electrical )

| Parameter                             | Symbol   | Min.    | Typ. | Max. | Unit |
|---------------------------------------|----------|---------|------|------|------|
| Differential Data Input Voltage Swing | Vin, p-p | 500     |      | 1600 | mV   |
| Input Differential Impedance          | Rin      |         | 100  |      | Ω    |
| Input High Voltage (ResetL - LPMode)  | VIH      | +2.0    |      | VCC  | V    |
| Input LOW Voltage (ResetL - LPMode)   | VIL      | 0       |      | +0.8 | V    |
| Output High Voltage (IntL)            | VOH      | VCC-0.5 |      | VCC  | V    |
| Output LOW Voltage (IntL)             | VOL      | 0       |      | +0.4 | V    |

**4. Transmitter Specification ( Optical )**

| Parameter  | Symbol          | Min.                          | Typ.    | Max. | Unit | Condition                   |
|--|-----------------|-------------------------------|---------|------|------|-----------------------------|
| Data Rate, each lane                                   |                 |                               | 10.3125 | 11.2 |      | Gbps                        |
| Center wavelength                                      | $\lambda_C$     | 840                           | 850     | 860  | nm   |                             |
| RMS spectral width                                     | $\Delta\lambda$ |                               |         | 0.65 | nm   | 10.3125Gps, PRBS2^31-1, NRZ |
| Extinction Ratio ER 3 5 dB                             |                 |                               |         |      |      |                             |
| Average launch power                                   | PO,AVG          | -7.6                          |         | 2.4  | dBm  |                             |
| Optical Modulation                                     |                 |                               |         |      |      |                             |
| Amplitude (OMA)  | PO,OMA          | -5.6                          |         | 3.0  | dBm  |                             |
| Difference in launch power between any two lanes (OMA) |                 |                               |         | 4    | dB   |                             |
| Peak power   | PO,PEAK         |                               |         | 4    | dBm  |                             |
| Launch power in OMA minus TDP                          |                 | -6.5                          |         |      | dBm  |                             |
| Transmitter and Dispersion penalty (TDP)               | TDP             |                               |         | 3.5  | dB   |                             |
| Extinction Ratio                                       | ER              | 3                             |         |      | dB   |                             |
| Optical return loss tolerance                          |                 |                               |         | 12   | dB   |                             |
| Average launch power of OFF transmitter                | POFF            |                               |         | -30  | dBm  |                             |
| Encircled Flux   |                 | >86% at 19um<br><30% at 4.5um |         |      |      |                             |

**5. Receiver Specification ( Optical )**

| Parameter                           | Symbol   | Min. | Typ. | Max. | Unit | Condition |
|-------------------------------------|----------|------|------|------|------|-----------|
| Average receiver power              | Pin, AVG | -9.5 |      | 2.4  | dBm  |           |
| Receiver reflectance                |          |      |      | -12  | dBm  |           |
| Receiver power (OMA)                | Pin, OMA |      |      | 3    | dBm  |           |
| Stressed receiver sensitivity (OMA) |          |      |      | -5.4 | dBm  |           |
| Peak power                          | PO, PEAK |      |      | 4    | dBm  |           |
| LOS Assert                          | LOS      | -30  |      |      | dBm  |           |
| LOS De-assert                       | LOSD     |      |      | -22  | dBm  |           |
| LOS Hysteresis                      | LOSH     | 0.5  |      |      | dBm  |           |

**6. Receiver Specification ( Electrical )**

| Parameter                              | Symbol    | Min. | Typ. | Max. | Unit | Condition |
|--|-----------|------|------|------|------|-----------|
| Differential Data Output Voltage Swing | Vout, p-p | 200  | 800  | mV   |      |           |
| Output Differential Impedance          | Rout      |      | 100  |      | Ω    |           |

**7. Pin Definition**

The QSFP+ modules are hot-pluggable. Hot pluggable refers to plugging in or unplugging a module while the host board is powered. The QSFP+ hot connector is a 0.8mm pitch 38 position right angle improved connector specified by SFF-8436, or stacked connector with equivalent electrical performance. Host PCB contact assignment is shown in Figure 1 and contact definitions are given in the table below.

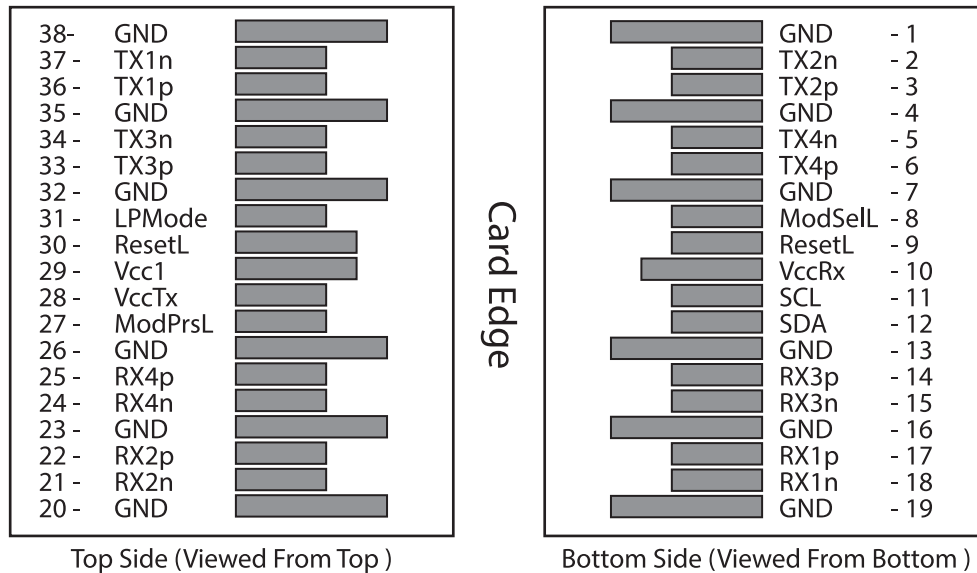


Figure 1. Interface to Host PCB

| Pin | Logic       | Symbol  | Name/Description                        |
|-----|-------------|---------|---|
| 1   |             | GND     | Module Ground                           |
| 2   | CML-I       | Tx2n    | CH2 Transmitter Inverted Data Input     |
| 3   | CML-I       | Tx2p    | CH2 Transmitter Non-inverted Data Input |
| 4   |             | GND     | Module Ground                           |
| 5   | CML-I       | Tx4n    | CH4 Transmitter Inverted Data Input     |
| 6   | CML-I       | Tx4p    | CH4 Transmitter Non-inverted Data Input |
| 7   |             | GND     | Module Ground                           |
| 8   | LVTTL-I     | ModSelL | Module Select                           |
| 9   | LVTTL-I     | ResetL  | Module Reset                            |
| 10  |             | VccRX   | +3.3V Power Supply Receiver             |
| 11  | LVC MOS-I/O | SCL     | 2-wire serial interface clock           |

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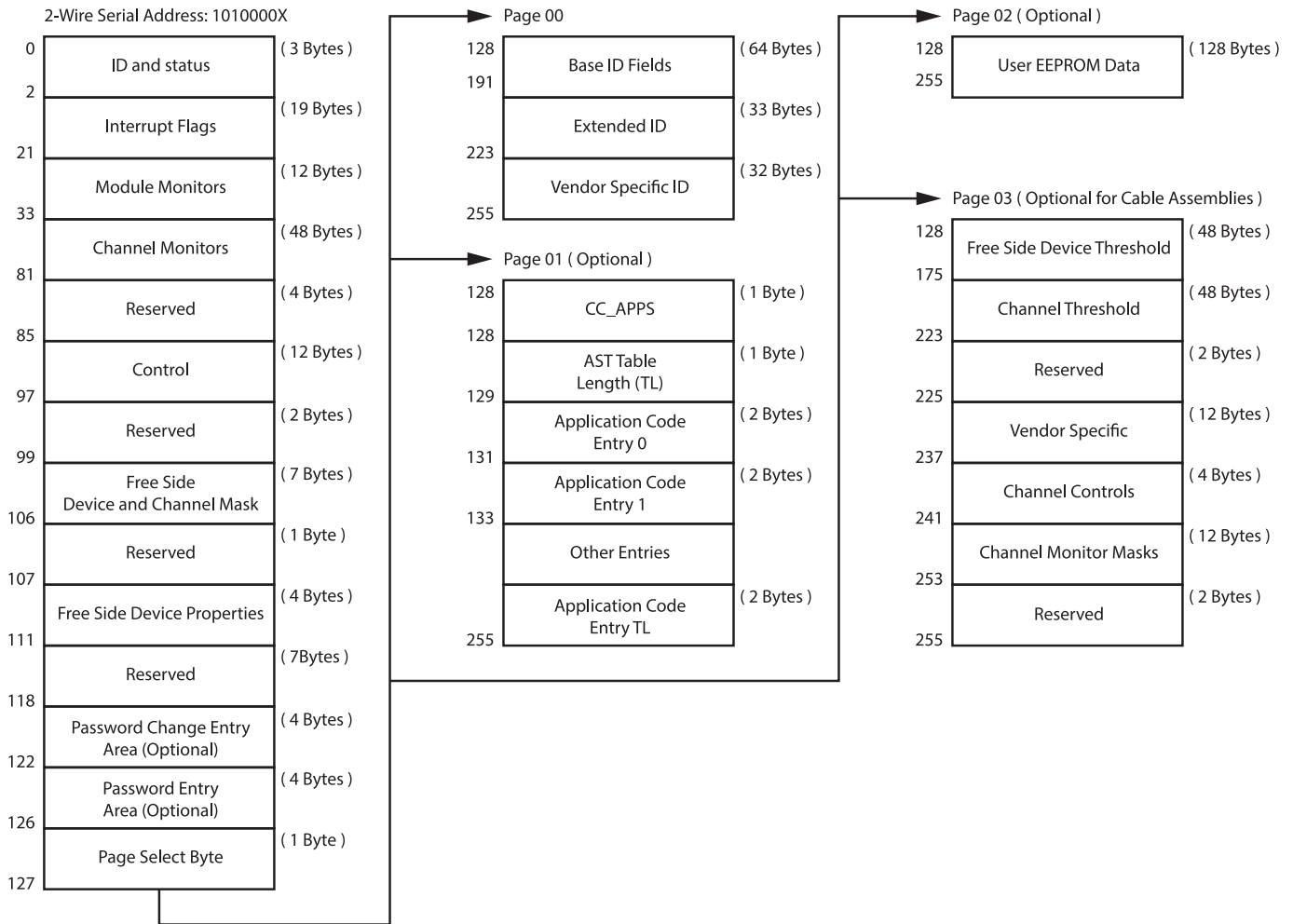
| Pin | Logic       | Symbol  | Name/Description                        |
|-----|-------------|---------|---|
| 12  | LVC MOS-I/O | SDA     | 2-wire serial interface data            |
| 13  |             | GND     | Module Ground                           |
| 14  | CML-O       | Rx3p    | CH3 Receiver Non-inverted Data Input    |
| 15  | CML-O       | Rx3n    | CH3 Receiver Inverted Data Input        |
| 16  |             | GND     | Module Ground                           |
| 17  | CML-O       | Rx1p    | CH1 Receiver Non-inverted Data Input    |
| 18  | CML-O       | Rx1n    | CH1 Receiver Inverted Data Input        |
| 19  |             | GND     | Module Ground                           |
| 20  |             | GND     | Module Ground                           |
| 21  | CML-O       | Rx2n    | CH2 Receiver Inverted Data Input        |
| 22  | CML-O       | Rx2p    | CH2 Receiver Non-inverted Data Input    |
| 23  |             | GND     | Module Ground                           |
| 24  | CML-O       | Rx4n    | CH4 Receiver Inverted Data Input        |
| 25  | CML-O       | Rx4p    | CH4 Receiver Non-inverted Data Input    |
| 26  |             | GND     | Module Ground                           |
| 27  | LVTTL-O     | ModPrsL | Module Present                          |
| 28  | LVTTL-O     | IntL    | Interrupt                               |
| 29  |             | VccTX   | +3.3V Power Supply Transmitter          |
| 30  |             | Vcc1    | +3.3V Power Supply                      |
| 31  | LVTTL-I     | LPMODE  | Low Power Mode                          |
| 32  |             | GND     | Module Ground                           |
| 33  | CML-I       | Tx3p    | CH3 Transmitter Non-inverted Data Input |
| 34  | CML-I       | Tx3n    | CH3 Transmitter Inverted Data Input     |
| 35  |             | GND     | Module Ground                           |
| 36  | CML-I       | Tx1p    | CH1 Transmitter Non-inverted Data Input |
| 37  | CML-I       | Tx1n    | CH1 Transmitter Inverted Data Input     |
| 38  |             | GND     | Module Ground                           |

## Notes:

1. Module circuit ground is isolated from module chassis ground within the module
2. Open collector, should be pulled up with 4.7K-10K ohms on the host board to a voltage between 3.15V and 3.6V.

## 8. 2-wire Management Interface

The transceivers provide management two-wire interface and the management memory map is specified by SFF-8436.



## 9. ESD

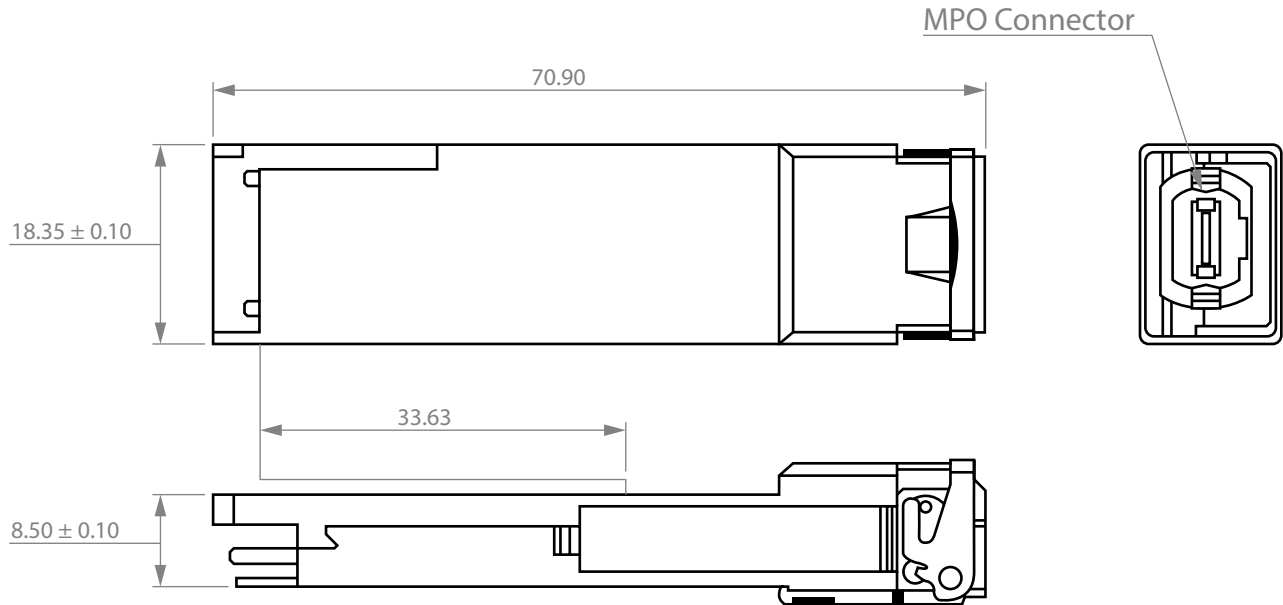
This module high speed pins withstand 1KV electrostatic discharge on Human Body Model per JESD22-A114. The exception of high speed pins withstand 2KV electrostatic discharge based on Human Body Model per JESD 22-A114. The QSFP+ module meet ESD requirement in EN61000-4-2, criterion B test specification. The transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

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## 10. Package Dimentions ( Unit: MM )



## 11. Contact Information

Approved Networks is a leading supplier of Network Transceivers and Connectivity products to Channel Partners, Resellers, and OEMs. With more than 9 years of direct industry experience, our products are resident in the most demanding and mission critical functional networks Worldwide. We serve as a Master Distributor to the largest CMs in the world and deploy the most rigorous testing and firmware management programs to bring the highest level of functional product to the market at a cost that makes sense.

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