

EQ854X-3MCD01

40G QSFP+ SR4 850nm 100m Optical Transceiver

PRODUCT FEATURES

- **High quality and reliability optical device and Sub-assemblies**
- **4 VCSEL Lasers and 4 channels PIN photo detectors**
- **Maximum link length of 100m on OM3 MMF or 150m on OM4 MMF**
- **Compliant with SFF-8436 for electrical interface**
- **Compliant with SFF-8436 for mechanical interface**
- **QSFP+ Mechanical Interface for easy removal**
- **MPO Receptacle**
- **Compliant with SFF-8436 for 2-wire interface for management and DDM**
- **IEEE Std802.3ba**
- **SFF-8436**
- **Low power consumption: <1.5W**
- **Operating case temperature: Standard: 0°C to 70°C**

APPLICATIONS

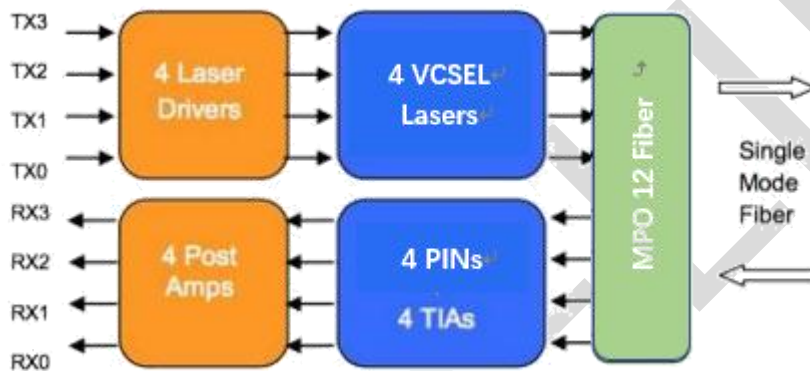
- **40G SR4 Ethernet links**
- **Data center**
- **Other high speed data connections**

DESCRIPTIONS

It is a Four-Channel, Pluggable, Fiber-Optic QSFP+ SR4 for 40Gigabit Ethernet and Infiniband EDR applications. This transceiver is a high performance module for data communication and interconnect applications. It integrates four data lanes in each direction with 40Gbps bandwidth. The length of QSFP+ SR4 is up to 100 meters over OM3 MMF or 150 meters over OM4 MMF. This module is designed to operate over multimode fiber systems using a nominal wavelength of 850nm.

It contains a MPO connector for the optical interface and a 38-pin connector for the electrical interface.

Module Block Diagram



Ordering Information

| Part No. | Data Rate(optical) | Laser | Fiber Type | Distance | Optical Interface | Temp | DDMI | Latch Color |
|---------------|--------------------|-------|------------|----------|-------------------|-------|------|-------------|
| EQ854X-3MCD01 | 41.25Gbps | Vcsel | MMF | 100m | MPO | 0~70℃ | Yes | Black |

Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------------|--------|------|-----|------|
| Storage Temperature | Ts | -40 | 85 | 。C |
| Case Operating Temperature | Top | 0 | 70 | 。C |
| Relative Humidity (non-condensation) | RH | 5 | 95 | % |
| Supply Voltage | Vcc | -0.5 | 3.6 | V |

| | | | | |
|---------------|-----|------|---------|---|
| Input Voltage | Vin | -0.5 | VCC+0.5 | V |
|---------------|-----|------|---------|---|

Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------------|--------|-------|-------|------|
| Operating Case Temperature | Top | 0 | 70 | °C |
| Relative Humidity(non- condensation) | RH | 5 | 85 | % |
| Power Supply Voltage | Vcc | 3.135 | 3.465 | V |
| Total Power Consumption | Pc | - | 1.5 | W |

Optical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | NOTE |
|--|-----------------------------|------|-----|------|------|------|
| Transmitter | | | | | | |
| Center Wavelength | λ_0 | 840 | | 860 | nm | |
| Average Launch Power each lane | | -7.6 | | 2.4 | dBm | |
| Spectral Width (RMS) | σ | | | 0.65 | nm | |
| Optical Extinction Ratio | ER | 3 | | | dB | |
| Average launch Power off each lane | Poff | | | -30 | dBm | |
| Transmitter and Dispersion Penalty each lane | TDP | | | 3.5 | dB | |
| Optical Return Loss Tolerance | ORL | | | 12 | dB | |
| Output Eye Mask | Compliant with IEEE 802.3ba | | | | | |
| Receiver | | | | | | |
| Receiver Wavelength | λ_{in} | 840 | | 860 | nm | |
| Rx Sensitivity per lane | RSENS | | | -9.9 | dBm | 1 |
| Input Saturation Power (Overload) | Psat | 2.4 | | | dBm | |
| Receiver Reflectance | Rr | | | -12 | dB | |
| LOS De-Assert | LOSD | | | -12 | dBm | |
| LOS Assert | LOSA | -30 | | | dBm | |
| LOS Hysteresis | | 0.5 | | | dBm | |

Notes:

Measured with a PRBS $2^{31}-1$ test pattern, @10.325Gb/s, BER<10⁻¹²

Electrical Characteristics

| Parameter | Symbol | Min | Max | Unit |
|---|--------------|------------------------------|----------------------|------|
| Host 2-wire Vcc voltage | Vcc_Host_2 w | 3.14 | 3.46 | V |
| SCL and SDA Voltage[1] | VOL | 0.0 | 0.40 | V |
| | VOH | Vcc_Host 2w - — 0.5 | Vcc_Host_2w + 0.3 | V |
| | VIL | -0.3 | VccT*0.3 | V |
| | VIH | VccT*0.7 | VccT+0.5 | V |
| Input current on the SCL and SDA contacts | II | -10 | 10 | mA |

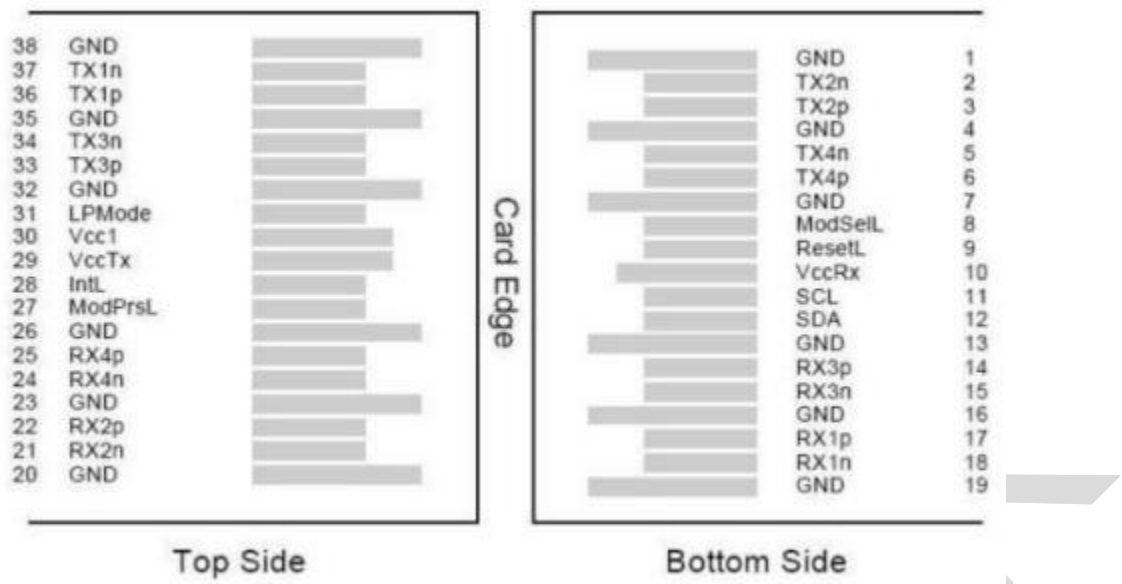
Digital Diagnostics

The following characteristics are defined over recommended operating conditions.

| Parameter | Accuracy | Unit |
|--|----------|------|
| Internally measured transceiver temperature | +/-3 | 。 C |
| Internally measured transceiver supply voltage | +/-3 | % |
| Measured Tx bias current | +/-10 | % |
| Measured Tx output power | +/-3 | dB |
| Measured Rx received average optical power | +/-3 | dB |

Pin Diagram

QSFP+ Transceiver Pad Layout, host PCB QSFP+ Pinout, and PIN Descriptions are as follows:



QSPF+ Transceiver Electrical Pad Pinout

Pin Definitions

| Pin# | Name | Logic | Description | Power Seq. | Note |
|------|---------|--------------|--------------------------------------|------------|------|
| 1 | GND | | Ground | 1st | 1 |
| 2 | Tx2n | CML-I | Transmitter Inverted Data Input | 3rd | |
| 3 | Tx2p | CML-I | Transmitter Non-Inverted Data output | 3rd | |
| 4 | GND | | Ground | 1st | 1 |
| 5 | Tx4n | CML-I | Transmitter Inverted Data Input | 3rd | |
| 6 | Tx4p | CML-I | Transmitter Non-Inverted Data output | 3rd | |
| 7 | GND | | Ground | 1st | 1 |
| 8 | ModSelL | LVTLL-I | Module Select | 3rd | |
| 9 | ResetL | LVTLL-I | Module Reset | 3rd | |
| 10 | VccRx | | +3.3V Power Supply Receiver | 2nd | 2 |
| 11 | SCL | LVC MOS- I/O | 2-Wire Serial Interface Clock | 3rd | |
| 12 | SDA | LVC MOS- I/O | 2-Wire Serial Interface Data | 3rd | |

| | | | | | |
|----|---------|---------|-------------------------------------|-----|---|
| 13 | GND | | Ground | 1st | 1 |
| 14 | Rx3p | CML-O | Receiver Non-Inverted Data Output | 3rd | |
| 15 | Rx3n | CML-O | Receiver Inverted Data Output | 3rd | |
| 16 | GND | | Ground | 1st | 1 |
| 17 | Rx1p | CML-O | Receiver Non-Inverted Data Output | 3rd | |
| 18 | Rx1n | CML-O | Receiver Inverted Data Output | 3rd | |
| 19 | GND | | Ground | 1st | 1 |
| 20 | GND | | Ground | 1st | 1 |
| 21 | Rx2n | CML-O | Receiver Inverted Data Output | 3rd | |
| 22 | Rx2p | CML-O | Receiver Non-Inverted Data Output | 3rd | |
| 23 | GND | | Ground | 1st | 1 |
| 24 | Rx4n | CML-O | Receiver Inverted Data Output | 3rd | |
| 25 | Rx4p | CML-O | Receiver Non-Inverted Data Output | 3rd | |
| 26 | GND | | Ground | 1st | 1 |
| 27 | ModPrsL | LVTTL-O | Module Present | 3rd | |
| 28 | IntL | LVTTL-O | Interrupt | 3rd | |
| 29 | VccTx | | +3.3 V Power Supply transmitter | 2nd | 2 |
| 30 | Vcc1 | | +3.3 V Power Supply | 2nd | 2 |
| 31 | LPMODE | LVTTL-I | Low Power Mode | 3rd | |
| 32 | GND | | Ground | 1st | 1 |
| 33 | Tx3p | CML-I | Transmitter Non-Inverted Data Input | 3rd | |
| 34 | Tx3n | CML-I | Transmitter Inverted Data Output | 3rd | |
| 35 | GND | | Ground | 1st | 1 |
| 36 | Tx1p | CML-I | Transmitter Non-Inverted Data Input | 3rd | |

| | | | | | |
|----|------|-------|----------------------------------|-----|---|
| 37 | Tx1n | CML-I | Transmitter Inverted Data Output | 3rd | |
| 38 | GND | | Ground | 1st | 1 |

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP+ transceiver module in any combination. The connector pins are each rated for a maximum current of 500 mA.

Recommended Interface Circuit

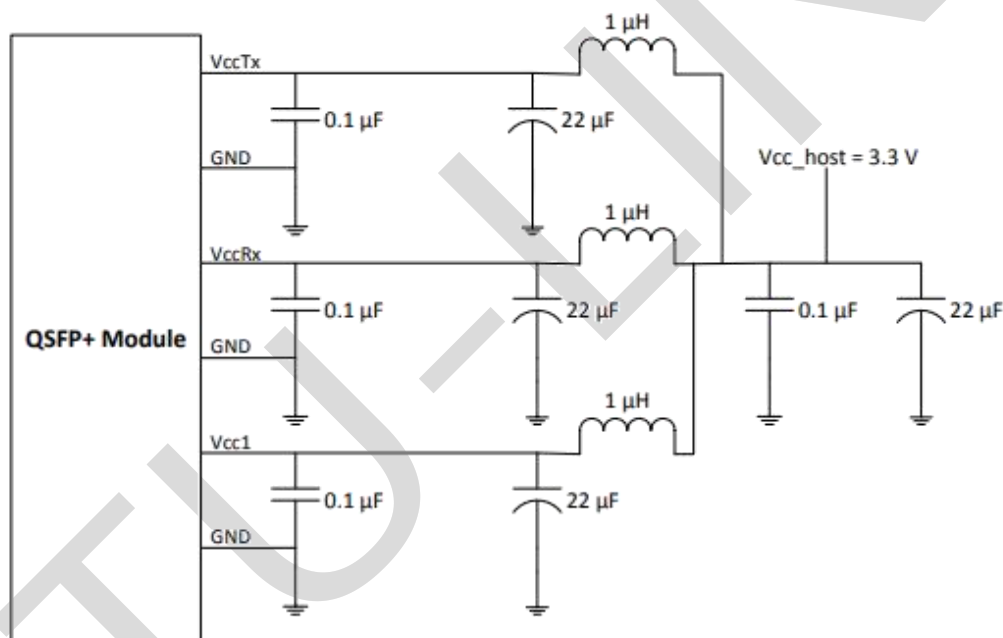
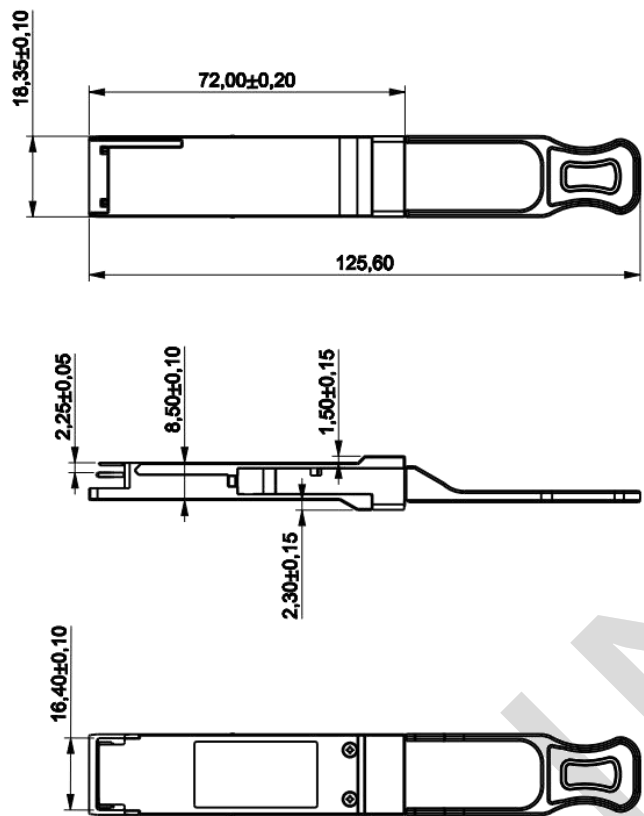


FIGURE 5-4 RECOMMENDED HOST BOARD POWER SUPPLY FILTERING

Mechanical Diagram

Figure shows the package dimensions of the module. The module is designed to be compliant with QSFP+ MSA specification. Package dimensions are specified in SFF-8436.



Revision History

| Version No. | Date | Description |
|-------------|------------------|-----------------------|
| 1.0 | February 8, 2018 | Preliminary datasheet |
| 2.0 | October 11,2023 | Product upgrades |
| 2.1 | July 15,2024 | Format change |

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