

QSFP112 400GBASE-VR4 Optical Transceiver

LQ400-VR4MC

Description

Fly Global Trading Limited's LQ400-VR4MC modules are designed and optimized for 400G Ethernet and Data center applications. They are compliant with IEEE 802.3bs and QSFP112 MSA. The modules offer 4 independent transmit and receive channels, each is capable of 100Gb/s operation for an aggregate data rate of 400Gb/s over 50m of OM4/OM5 multi-mode fiber. Digital diagnostics functions are available via a 2-wire serial interface.

Applications

- 400G BASE-VR4 Ethernet
- Data Center

Standard

- Compliant to IEEE 802.3bs 400GAUI-4
- Compliant to IEEE 802.3df 400GBASE-VR4
- Compliant to CMIS4.0
- Compliant to RoHS

Features

- Hot-pluggable QSFP112 module
- Single MPO12/APC receptacle
- 4 channels full-duplex transceiver module
- Single 3.3V power supply
- Maximum power consumption < 2.4W
- Commercial operating temperature range: 0°C ~ 70°C
- Link distance up to 50m over OM4/OM5 fiber
- 4 x 100Gb/s 850nm VCSEL-based transmitter
- Built-in digital diagnostic functions
- I²C management interface

Ordering Information

| Part Number | Description |
|-------------|---|
| LQ400-VR4MC | QSFP112, 400GBASE-VR4, 50m on OM4 / OM5 MMF, 0°C ~ 70°C |

Absolute Maximum Ratings

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|------------------------|----------|------|-----|-----|------|------|
| Maximum Voltage Supply | V_{cc} | -0.3 | | 3.6 | V | |
| Storage Temperature | T_{st} | -20 | | 85 | °C | |
| Relative Humidity | RH | 5 | | 85 | % | |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|---------------------------------------|----------|-------|--------|-------|------|------|
| Power Supply Voltage (V_{cc} -GND) | V_{cc} | 3.135 | 3.3 | 3.465 | V | |
| Power Supply Current | I_{cc} | | | 700 | mA | 1 |
| Operating Temperature (Case) | T_{op} | 0 | | 70 | °C | |
| Power Consumption | | | | 2.4 | W | |
| Transmission Distance | L1 | | | 50 | m | OM4 |
| Transmission Distance | L2 | | | 50 | m | OM5 |
| Data Rate | DR | | 53.125 | | GBd | |
| Notes: | | | | | | |
| 1. Max. current at V_{cc} =3.3V. | | | | | | |

Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|--------------------------------|--------------|-----|-----|-----|----------|------|
| Transmitter | | | | | | |
| Input Differential Impedance | Z_{in} | 90 | 100 | 110 | Ω | |
| Input Amplitude | V_{in-pp} | | | 880 | mV | |
| Receiver | | | | | | |
| Output Differential Impedance | Z_{out} | 90 | 100 | 110 | Ω | |
| Differential Data Output Swing | V_{out-pp} | | | 900 | mV | |

Optical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|------------------------------------|------------|------|-----|-----|------|------|
| Transmitter | | | | | | |
| Wavelength (range) | λ | 844 | 850 | 863 | nm | |
| RMS Spectral Width | SW_{RMS} | | | 0.6 | nm | |
| Optical Output Power | P_o | -4.6 | | 4.0 | dBm | |
| Optical Modulation Amplitude (OMA) | P_{oma} | -2.6 | | 3.5 | dBm | |
| Laser Off Power | P_{off} | | | -30 | dBm | |
| Extinction Ratio | ER | 2.5 | | | dB | |

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| | | | | | | |
|--|-------------------|------|-----|------|-----|--|
| Transmitter and Dispersion Penalty Eye Closure for PAM4, Each Lane | TDECQ | | | 4.4 | dB | |
| Optical Return Loss Tolerance | T _{RL} | | | 12 | dB | |
| Receiver | | | | | | |
| Wavelength (range) | λ | 842 | 850 | 948 | nm | |
| Average Receive Power, per channel | P _{IN} | -6.4 | | 4.0 | dBm | |
| Receiver Sensitivity (OMA) | P _{sens} | | | -4.6 | dBm | |
| Stressed Receiver Sensitivity (OMA), per Lane | SRS | | | -2 | dBm | |
| Damage Threshold | P _{DT} | 5.0 | | | dBm | |
| Receiver Reflectance | R _{RX} | | | -12 | dB | |

PIN Definition



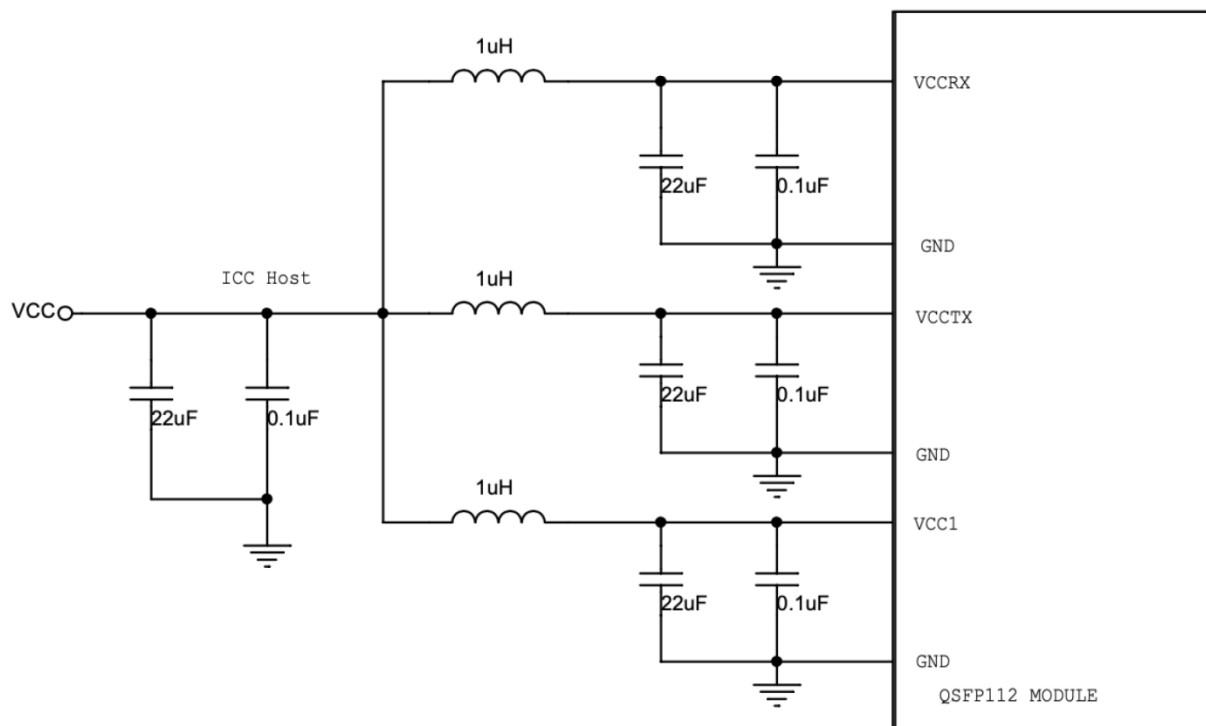
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| Pin | Logic | Symbol | Description | Plug Sequence | Notes |
|-----|-------------|--------------|-------------------------------------|---------------|-------|
| 1 | | GND | Ground | 1 | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | 3 | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input | 3 | |
| 4 | | GND | Ground | 1 | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | 3 | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input | 3 | |
| 7 | | GND | Ground | 1 | 1 |
| 8 | LVTTL-I | ModselL | Module Select | 3 | |
| 9 | LVTTL-I | ResetL | Module Reset | 3 | |
| 10 | | Vcc Rx | +3.3V Power Supply Receiver | 2 | 2 |
| 11 | LVC MOS-I/O | SCL | 2-wire serial interface clock | 3 | |
| 12 | LVC MOS-I/O | SDA | 2-wire serial interface data | 3 | |
| 13 | | GND | Ground | 1 | 1 |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | 3 | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | 3 | |
| 16 | | GND | Ground | 1 | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | 3 | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | 3 | |
| 19 | | GND | Ground | 1 | 1 |
| 20 | | GND | Ground | 1 | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | 3 | |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | 3 | |
| 23 | | GND | Ground | 1 | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | 3 | |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | 3 | |
| 26 | | GND | Ground | 1 | 1 |
| 27 | LVTTL-O | ModPrsL | Module Present | 3 | |
| 28 | LVTTL-O | IntL/RxLOS | Interrupt/optional RxLOS | 3 | |
| 29 | | Vcc Tx | +3.3V Power supply transmitter | 2 | 2 |
| 30 | | Vcc1 | +3.3V Power supply | 2 | 2 |
| 31 | LVTTL-I | LPMODE/TxDis | Low Power Mode/optional TX Disable | 3 | |
| 32 | | GND | Ground | 1 | 1 |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input | 3 | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input | 3 | |
| 35 | | GND | Ground | 1 | 1 |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | 3 | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input | 3 | |
| 38 | | GND | Ground | 1 | 1 |

Notes

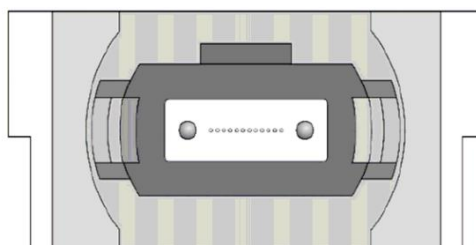
1. GND is the symbol for signal and supply (power) common for the QSFP112 module. All are common within the QSFP112 module and all voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP112 module in any combination. The connector pins are each rated for a maximum current of 1.5A.

Recommended Host Power Supply Filtering



Optical Interface Lanes and Assignment

The optical interface port is a male MPO connector. The four fiber positions on the left as shown in below Figure, with the key up, are used for the optical transmit signals (Channel 1 through 4). The fiber positions on the right are used for the optical receive signals (Channel 4 through 1).

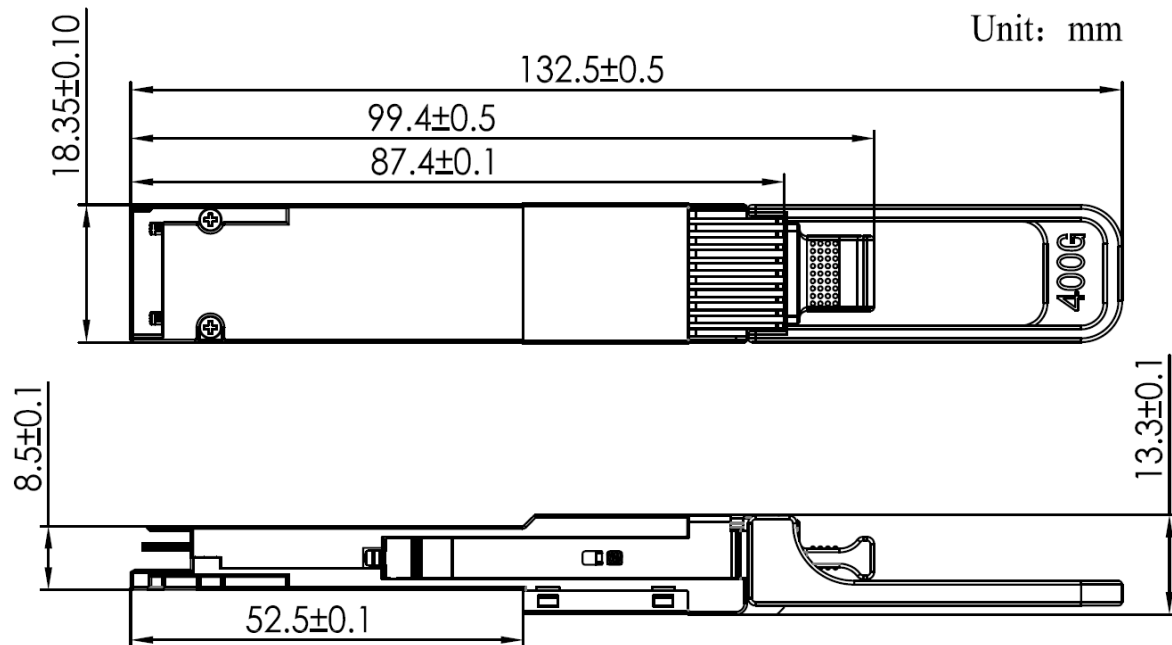


Transmit Channels: 1 2 3 4
 Unused positions: x x x x
 Receive Channels: 4 3 2 1

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Mechanical Dimensions

LQ400-VR4MC transceiver modules mechanical dimensions. (Unit: mm)



⚠ CAUTION:

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.