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
- I^2C 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 (Vcc-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

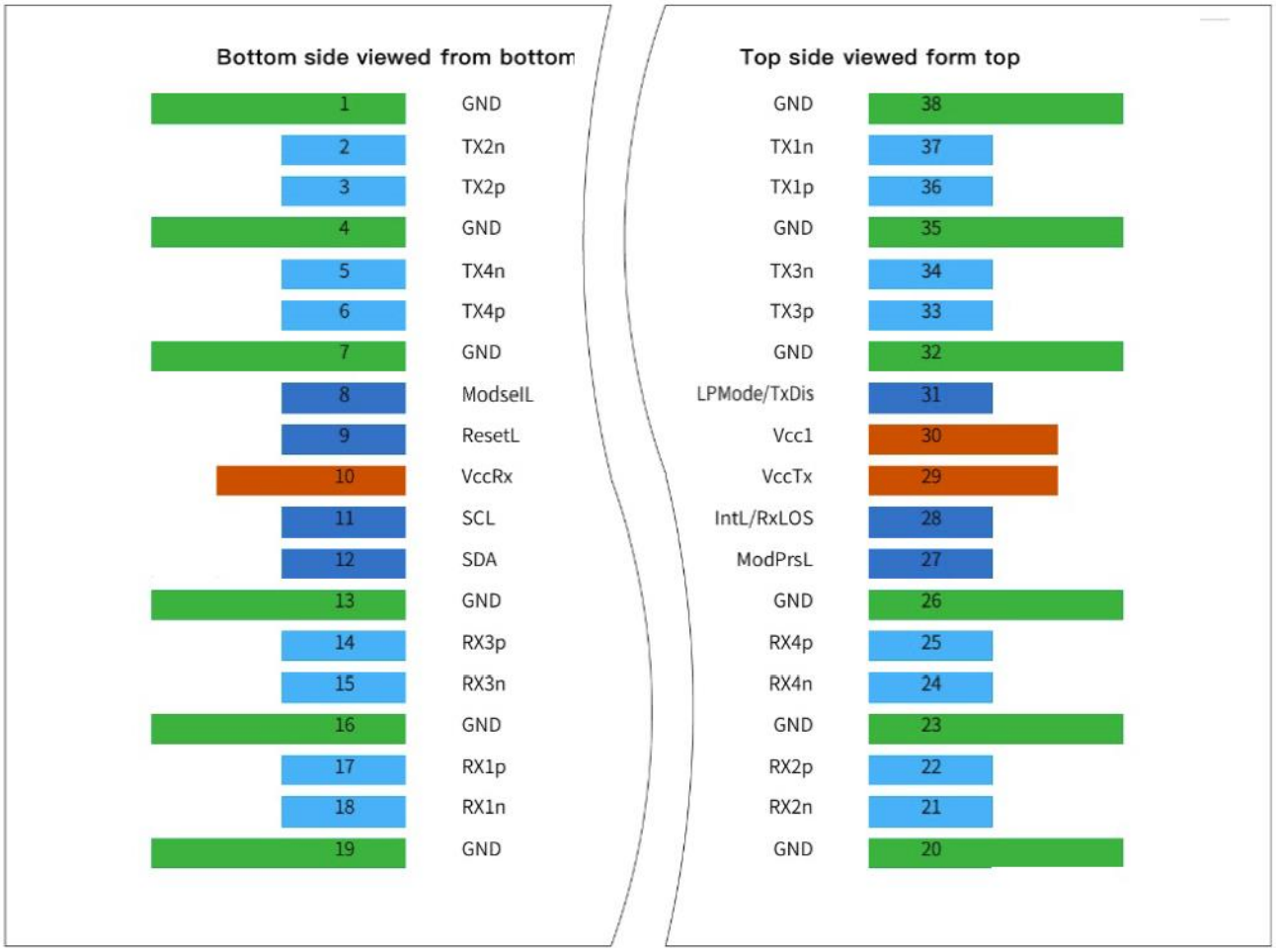
Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter						
Input Differential Impedance	Z_{in}	90	100	110	Ω	
Input Amplitude	$V_{in\text{-}pp}$			880	mV	
Receiver						
Output Differential Impedance	Z_{out}	90	100	110	Ω	
Differential Data Output Swing	V_{out}-pp			900	mV	

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	

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



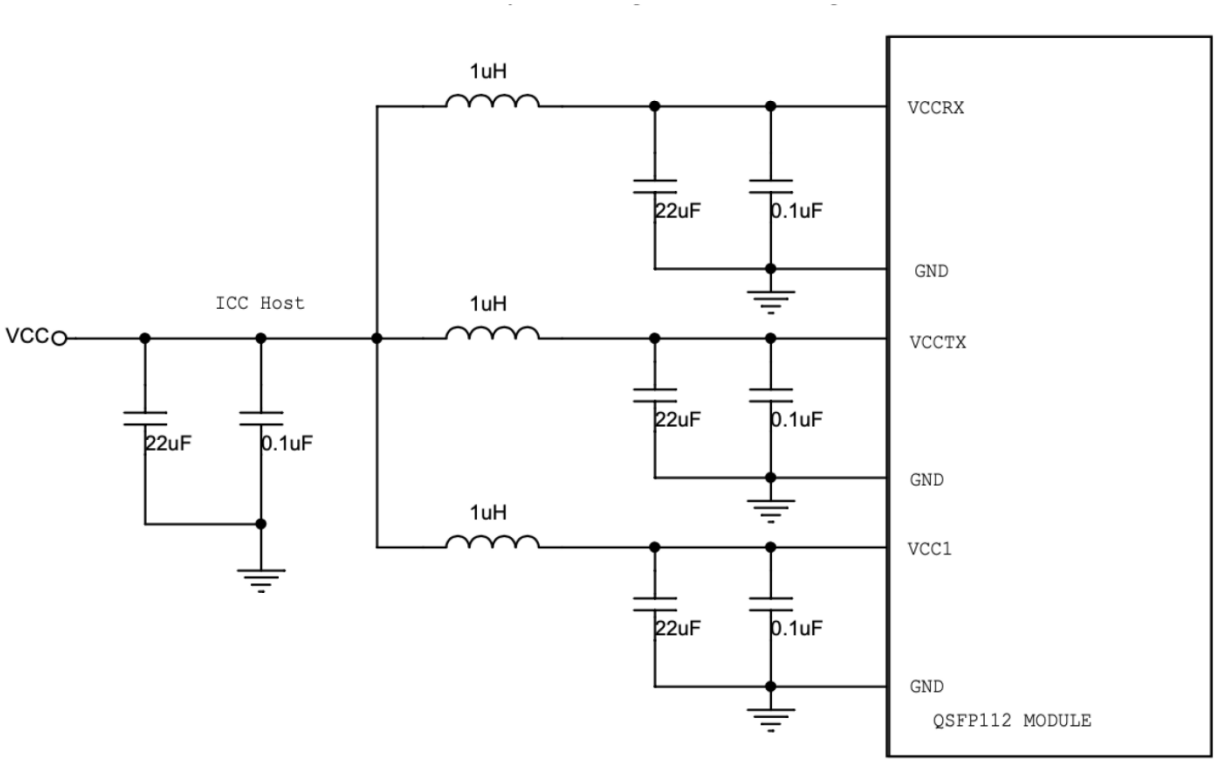
LQ400-VR4MC

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	LVCMOS-I/O	SCL	2-wire serial interface clock	3	
12	LVCMOS-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

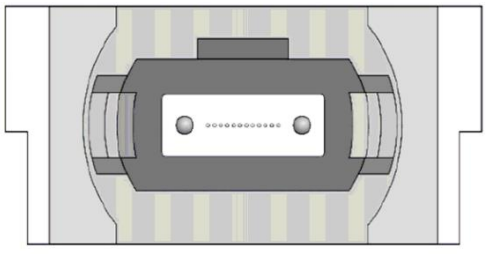
1. GND is the symbol for signal and supply (power) common for the QSFP112 module. All are common within the QSFP112 module and all voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements. Vcc Rx, Vcc1and 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

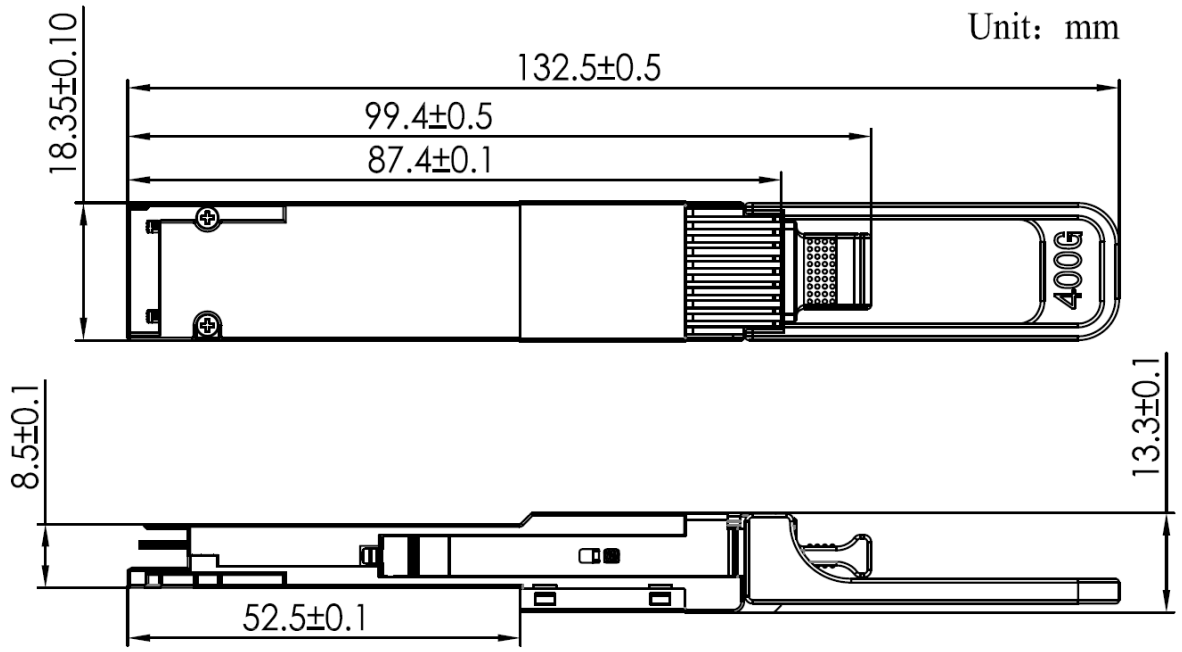
The optical interface port is a male MPO connector. The four fiber positions on the left as shown in below Figure, with the key up, are used for the optical transmit signals (Channel 1 through 4). The fiber positions on the right are used for the optical receive signals (Channel 4 through 1).



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

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.