OSFP-RHS 400GBASE-SR4 Optical Transceiver

LOR400-SR4MC

Description

Fly Global Trading Limited's LOR400-SR4MC modules are designed and optimized for 400G Ethernet and Data center applications. They are compliant with IEEE 802.3db & IEEE 802.3ck and OSFP 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 100m of OM4 multi-mode fiber. Digital diagnostics functions are available via a 2-wire serial interface.

Applications

- 400G BASE-SR4 Ethernet
- Data Center
- InfiniBand NDR

Standard

- Compliant to IEEE 802.3db 400GAUI-4
- Compliant to IEEE 802.3ck 400GBASE-SR4
- Compliant to CMIS5.0
- Compliant to RoHS

Features

- Hot-pluggable OSFP-RHS module
- Single MPO12 receptacle
- 4 channels full-duplex transceiver module
- Single 3.3V power supply
- Maximum power consumption < 8W
- Commercial operating temperature range: 0°C ~ 70°C
- Link distance up to 100m over OM4 fiber
- 4 x 100Gb/s 850nm VCSEL-based transmitter
- Built-in digital diagnostic functions
- I²C management interface

Ordering Information

Part Number	Description
LOR400-SR4MC	OSFP-RHS, 400GBASE-SR4, 100m on OM4 MMF, 0°C ~ 70°C

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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}			2424	mA	1
Operating Temperature (Case)	T_{op}	0		70	°C	
Power Consumption				8	W	
Transmission Distance	L1			100	m	OM4
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}			900	mV	
Receiver						
Output Differential Impedance	Z_{out}	90	100	110	Ω	
Differential Data Output Swing	V_{out}-pp			900	mV	

Optical Characteristics
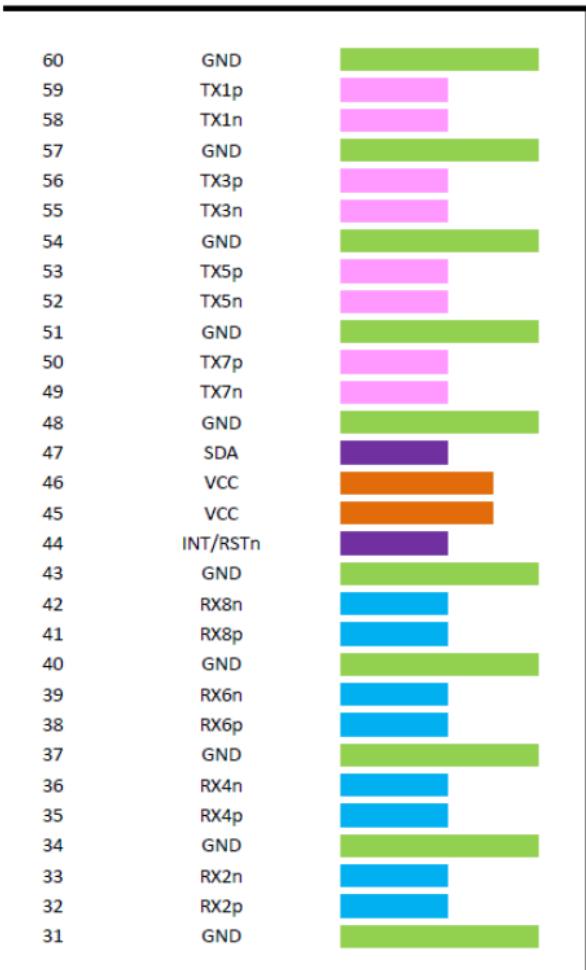
Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter						
Wavelength (range)	λ	844	850	863	nm	
RMS Spectral Width	SW_{RMS}			0.6	nm	
Optical Output Power	P_o	-4.6		4.0	dBm	
Optical Modulation Amplitude (OMA)	P_{oma}	-2.6		3.5	dBm	
Laser Off Power	P_{off}			-30	dBm	
Extinction Ratio	ER	2.5			dB	
Transmitter and Dispersion	TDECQ			4.4	dB	

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Penalty Eye Closure for PAM4, Each Lane						
Optical Return Loss Tolerance	T_{RL}			14	dB	
Receiver						
Wavelength (range)	λ	842	850	948	nm	
Average Receive Power, per channel	P_{IN}	-6.4		4.0	dBm	
Receiver sensitivity (OMAouter), each lane (max) for TECQ≤1.8 dB for 1.8＜TECQ≤4.4 dB	P_{sens}			-4.6 - 6.4+TECQ	dBm	
Stressed Receiver Sensitivity (OMA), per Lane	SRS			-2	dBm	
Damage Threshold	P_{DT}	5.0			dBm	
Receiver Reflectance	R_{RX}			-12	dB	
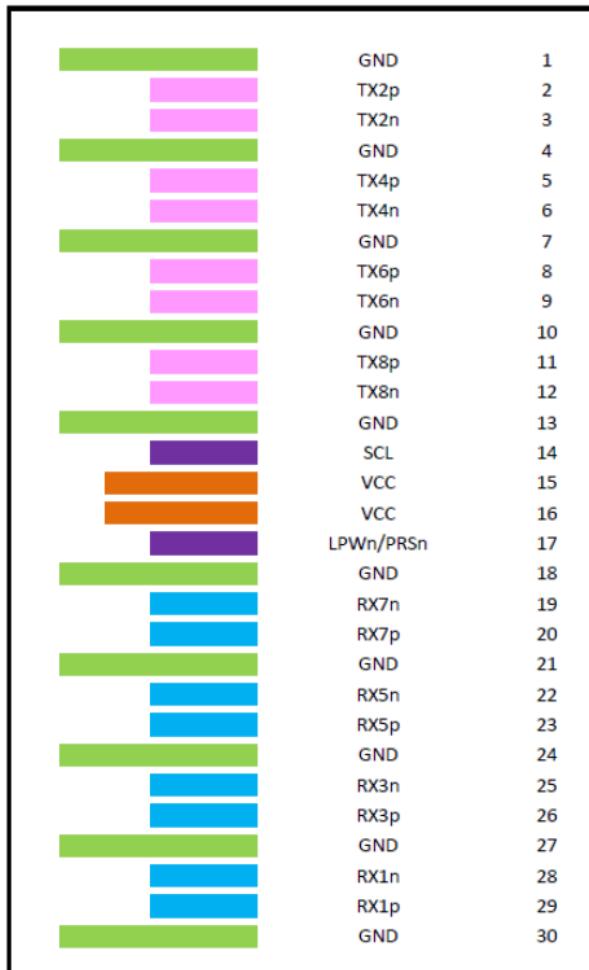
PIN Definition

Top Side (viewed from top)

Pin	Name
60	GND
59	TX1p
58	TX1n
57	GND
56	TX3p
55	TX3n
54	GND
53	TX5p
52	TX5n
51	GND
50	TX7p
49	TX7n
48	GND
47	SDA
46	VCC
45	VCC
44	INT/RSTn
43	GND
42	RX8n
41	RX8p
40	GND
39	RX6n
38	RX6p
37	GND
36	RX4n
35	RX4p
34	GND
33	RX2n
32	RX2p
31	GND

---- Module Card Edge ----

Bottom Side (viewed from bottom)

Name	Pin
GND	1
TX2p	2
TX2n	3
GND	4
TX4p	5
TX4n	6
GND	7
TX6p	8
TX6n	9
GND	10
TX8p	11
TX8n	12
GND	13
SCL	14
VCC	15
VCC	16
LPWn/PRSn	17
GND	18
RX7n	19
RX7p	20
GND	21
RX5n	22
RX5p	23
GND	24
RX3n	25
RX3p	26
GND	27
RX1n	28
RX1p	29
GND	30

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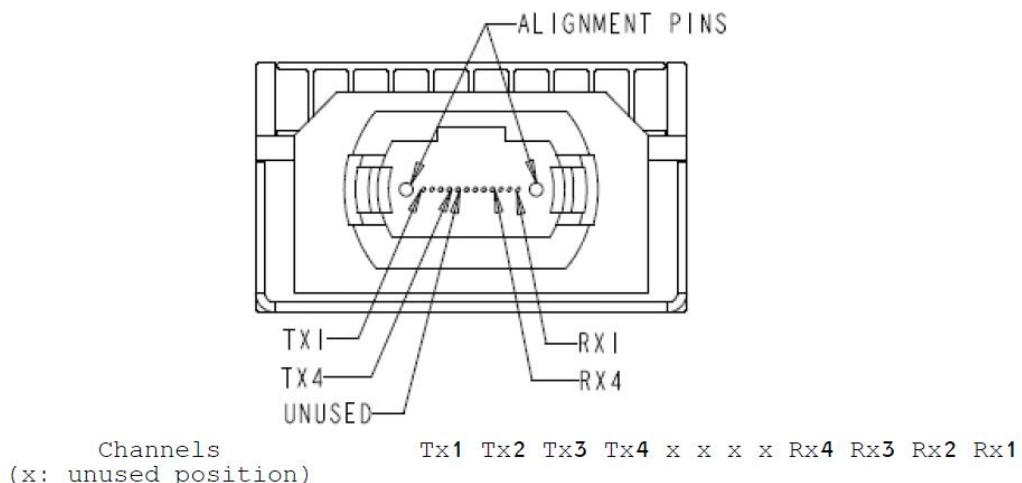
Pin	Symbol	Description	Logic	Direction	Plug Sequence	Notes
1	GND	Ground			1	
2	TX2p	Transmitter Data	CML-I	Input	3	
3	TX2n	Transmitter Data	CML-I	Input	3	
4	GND	Ground			1	
5	TX4p	Transmitter Data	CML-I	Input	3	
6	TX4n	Transmitter Data	CML-I	Input	3	
7	GND	Ground			1	
8	TX6p	Underfined	CML-I	Input	3	
9	TX6n	Underfined	CML-I	Input	3	
10	GND	Ground			1	
11	TX8p	Underfined	CML-I	Input	3	
12	TX8n	Underfined	CML-I	Input	3	
13	GND	Ground			1	
14	SCL	2-wire Serial interface clock	LVCMOS- I/O	Bi-directional	3	Open-Drain with pull up resistor on Host
15	VCC	+3.3V Power		Power	2	
16	VCC	+3.3V Power		Power	2	
17	LPWn/PRSn	Low-Power Mode / Module	Multi-Level	Bi-directional	3	See pin description for required circuit
18	GND	Ground			1	
19	RX7n	Underfined	CML-O	Output	3	
20	RX7p	Underfined	CML-O	Output	3	
21	GND	Ground			1	
22	RX5n	Underfined	CML-O	Output	3	
23	RX5p	Underfined	CML-O	Output	3	
24	GND	Ground			1	
25	RX3n	Receiver Data	CML-O	Output	3	
26	RX3p	Receiver Data	CML-O	Output	3	
27	GND	Ground			1	
28	RX1n	Receiver Data	CML-O	Output	3	
29	RX1p	Receiver Data	CML-O	Output	3	
30	GND	Ground			1	
31	GND	Ground			1	
32	RX2p	Receiver Data	CML-O	Output	3	
33	RX2n	Receiver Data	CML-O	Output	3	
34	GND	Ground			1	
35	RX4p	Receiver Data	CML-O	Output	3	
36	RX4n	Receiver Data	CML-O	Output	3	
37	GND	Ground			1	
38	RX6p	Underfined	CML-O	Output	3	
39	RX6n	Underfined	CML-O	Output	3	
40	GND	Ground			1	
41	RX8p	Underfined	CML-O	Output	3	
42	RX8n	Underfined	CML-O	Output	3	

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43	GND	Ground			1	
44	INT/RSTn	Module Interrupt / Module Reset	Multi-Level	Bi-directional	3	See pin description for required circuit
45	VCC	+3.3V Power		Power	2	
46	VCC	+3.3V Power		Power	2	
47	SDA	2-wire Serial interface data	LVCMOS- I/O	Bi-directional	3	Open-Drain with pull up resistor on Host
48	GND	Ground			1	
49	TX7n	Underfined	CML-I	Input	3	
50	TX7p	Underfined	CML-I	Input	3	
51	GND	Ground			1	
52	TX5n	Underfined	CML-I	Input	3	
53	TX5p	Underfined	CML-I	Input	3	
54	GND	Ground			1	
55	TX3n	Transmitter Data	CML-I	Input	3	
56	TX3p	Transmitter Data	CML-I	Input	3	
57	GND	Ground			1	
58	TX1n	Transmitter Data	CML-I	Input	3	
59	TX1p	Transmitter Data	CML-I	Input	3	
60	GND	Ground			1	

## Optical Interface Lanes and Assignment
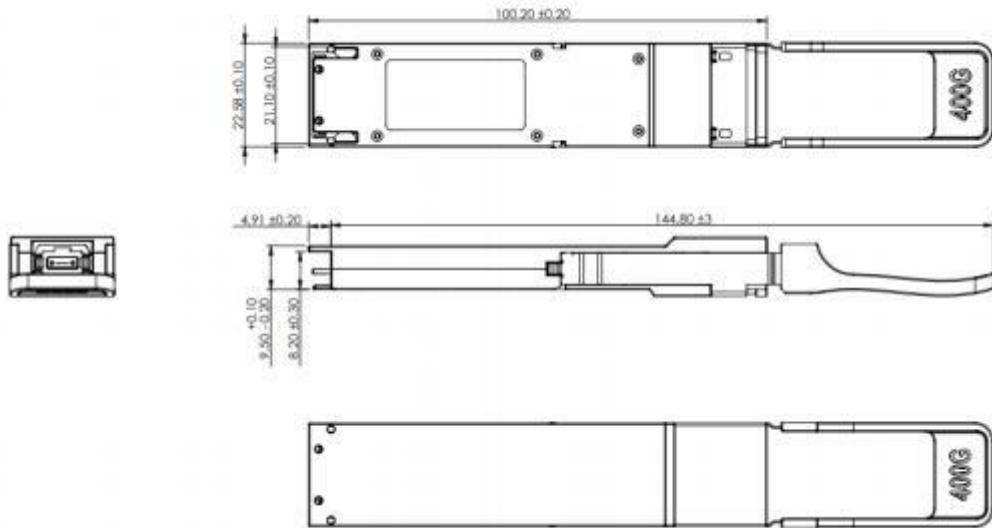
The optical interface port is a male MPO-12 connector. The four fiber positions on the left as shown in below Figure, with the key up, are used for the optical transmit signals (Channel 1 through 4). The fiber positions on the right are used for the optical receive signals (Channel 4 through 1).

Channels Tx1 Tx2 Tx3 Tx4 x x x x Rx4 Rx3 Rx2 Rx1
(x: unused position)

Mechanical Dimensions

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LOR400-SR4MC 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.