

## 400G QSFP-DD SR8 Optical Transceiver

The FIBERWDM 400G QSFP-DD SR8 Transceiver is a 8×50Gbps multi mode fiber, hot pluggable optical transceiver. The module integrates four parallel lanes with baud rate at 26.5625GBd each lane. It can transmit up to 70 m on fiber OM3 fiber or 100 m on OM4 fiber with FEC.

### Features

- ◆ Compliant with IEEE Std 802.3bs, IEEE Std 802.3cm
- ◆ Compliant with 400G-SR8 optical specifications
- ◆ Compliant with QSFP-DD MSA
- ◆ Compliant with CMIS4.0 Management interface specifications
- ◆ 8x53.125Gb/s electrical interface (400GAUI-8)
- ◆ Reach up to 70m on MMF(OM3)
- ◆ Reach up to 100m on MMF(OM4)
- ◆ Single +3.3V power supply
- ◆ Case temperature range: 0 ~ +70°C
- ◆ Maximum power consumption 9W
- ◆ Single MPO16 connector
- ◆ RoHS complaint

### Applications

- ◆ 400GBASE-SR8 Ethernet links
- ◆ Data centers



400G SR8 QSFP-DD

Rev	Date	Modified by	Description
A	Jan 20,2020	Fay Tu	Initial Release

**Table1. Absolute Maximum Ratings**

Parameter	Symbol	Min	Max	Units
Storage Temperature Range	T <sub>STG</sub>	-40	+85	°C
Supply Voltage	V <sub>CC</sub>	0	4	V
Relative Humidity	RH	5% to 85% non-condensing		

**Table2. Operating Conditions**

Parameter	Symbol	Min	Max	Units
Case Temperature- Operating	T <sub>CASE</sub>	0	70	°C
Supply Voltage	V <sub>CC</sub>	3.14	3.46	V
Power Consumption	P <sub>DISS</sub>		9	W
Pre-FEC Bit Error Ratio			2.4x10 <sup>-4</sup>	
Link Distance over OM4 Fiber			100	M
Link Distance over OM3 Fiber			70	M

**Table3. Transmitter Optical Specifications**

Transmitter Parameter	Min	Typical	Max	Units
Signaling Rate, each lane	26.5625 ± 100 ppm			GBd
Center Wavelength Range	840	850	860	nm
Modulation Format	PAM4			
Average launch Power per lane	-6.5		4	dBm
RMS spectral width			0.6	nm
Outer Optical Modulation Amplitude (OMA <sub>outer</sub> ), each lane	-4.5		3	dBm
Average Launch Power per Lane @ TX Off State			-30	dBm
Launch Power in OMA <sub>outer</sub> minus TDECQ, each Lane	-5.9			dBm
Transmitter and Dispersion Eye Closure for PAM4, each Lane			4.5	dB
Extinction Ratio	3			dB
Optical Return Loss Tolerance			12	dB
Encircled flux at 4.5um			30	%
Encircled flux at 19um	86			%

**Table4. Receiver Optical Specifications**

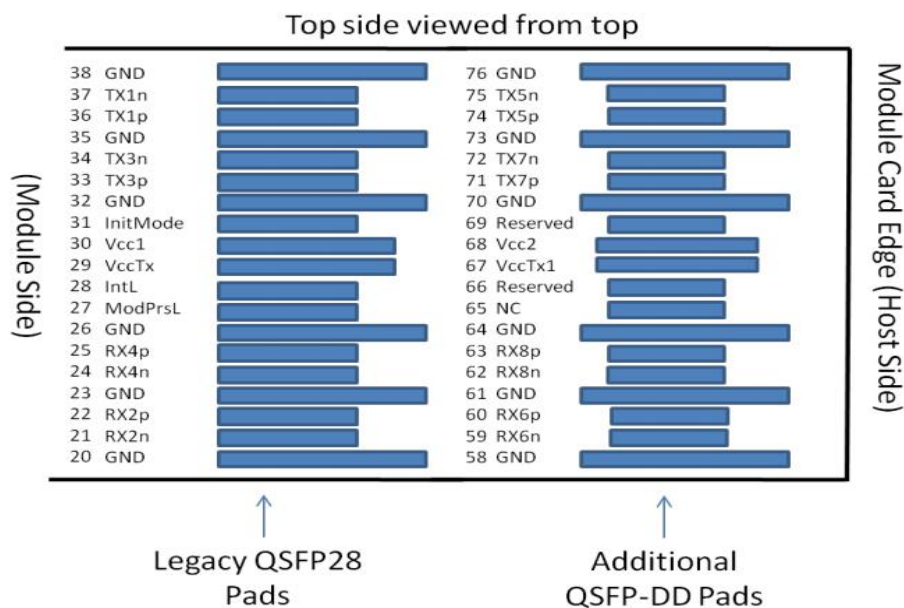
Receiver Parameter	Min	Typical	Max	Units
Signaling Rate, each lane	26.5625 ± 100 ppm			
Lane Wavelength Range	840	850	860	nm
Modulation Format				
Damage Threshold	5			dBm
Average Receive Power, each lane	-8.4		4	dBm
Receiver Power, each lane (OMA)			3	dBm
Receiver Reflectance			-12	dB
Receiver sensitivity( $OMA_{outer}$ ),each lane(SECQ=1.4dB)			-6.5	dBm
Stressed Receiver Sensitivity ( $OMA_{outer}$ ), each lane			-3.4	dBm
Stressed Conditions for Stress Receiver Sensitivity				
Stressed Eye Closure for PAM4 (SECQ),Lane under Test		4.5		dB
SECQ-10log10(Ceq),each lane			4.5	
$OMA_{outer}$ of each Aggressor Lane		3.0		dBm

**Table5. Ordering Information**

Part Number	Product Description
RQ-100G-SR8	400G QSFP-DD 850nm SR8 100M MPO-16

**QSFP-DD Edge Connector and Pinout Description**

The electrical pinout of the QSFP-DD module is shown in Figure 2 below.



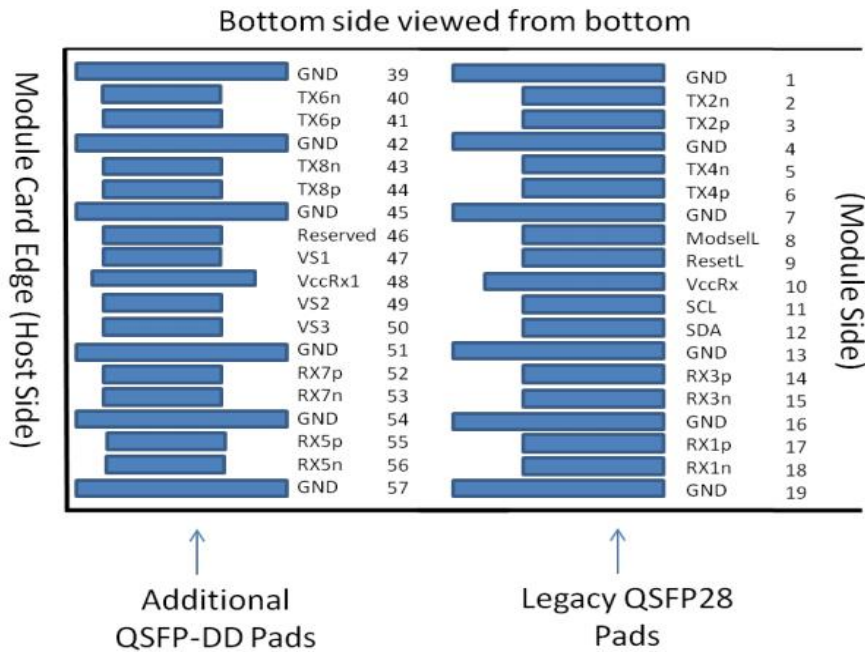


Figure 1. Host PCB QSFP-DD pad assignment top view

Pin No.	Symbol	Description	Note
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	3.3V Power Supply Receiver	2
11	SCL	2-Wire serial Interface Clock	
12	SDA	2-Wire serial Interface Data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	

19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	Init Mode	Initialization mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Output	
38	GND	Ground	1
39	GND	Ground	1
40	Tx6n	Transmitter Inverted Data Input	
41	Tx6p	Transmitter Non-Inverted Data output	
42	GND	Ground	1
43	Tx8n	Transmitter Inverted Data Input	
44	Tx8p	Transmitter Non-Inverted Data output	
45	GND	Ground	1
46	Reserved	For Future Use	3
47	VS1	Module Vendor Specific 1	3
48	VccRx1	3.3V Power Supply	2
49	VS2	Module Vendor Specific 2	3
50	VS3	Module Vendor Specific 3	3
51	GND	Ground	1
52	Rx7p	Receiver Non-Inverted Data Output	
53	Rx7n	Receiver Inverted Data Output	
54	GND	Ground	1
55	Rx5p	Receiver Non-Inverted Data Output	
56	Rx5n	Receiver Inverted Data Output	
57	GND	Ground	1
58	GND	Ground	1
59	Rx6n	Receiver Inverted Data Output	
60	Rx6p	Receiver Non-Inverted Data Output	

61	GND	Ground	1
62	Rx8n	Receiver Inverted Data Output	
63	Rx8p	Receiver Non-Inverted Data Output	
64	GND	Ground	1
65	NC	No Connect	3
66	Reserved	For Future Use	3
67	VccTx1	3.3V power supply	2
68	Vcc2	3.3V power supply	2
69	Reserved	For Future Use	3
70	GND	Ground	1
71	Tx7p	Transmitter Non-Inverted Data Input	
72	Tx7n	Transmitter Inverted Data Output	
73	GND	Ground	1
74	Tx5p	Transmitter Non-Inverted Data Input	
75	Tx5n	Transmitter Inverted Data Output	
76	GND	Ground	1

Host Board Schematic

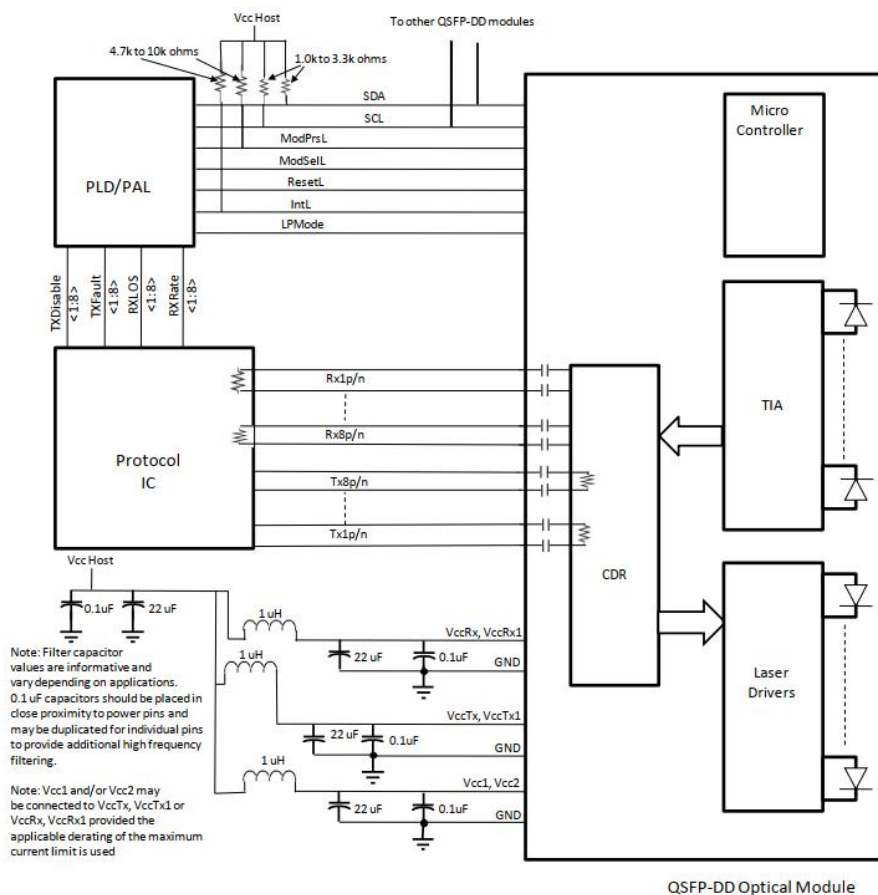
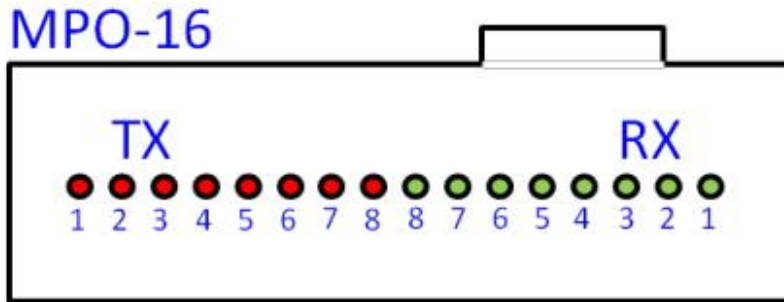


Figure 2. Host Board Schematic

**Optical interface**

QSFP-DD optical interface port is a male MPO-16 receptacle. To minimize MPO connection induced reflections, an MPO receptacle with 8-degree angled end-face is utilized for this product.

Figure 3. Optical lanes Assignment



**Mechanical Specifications REF**

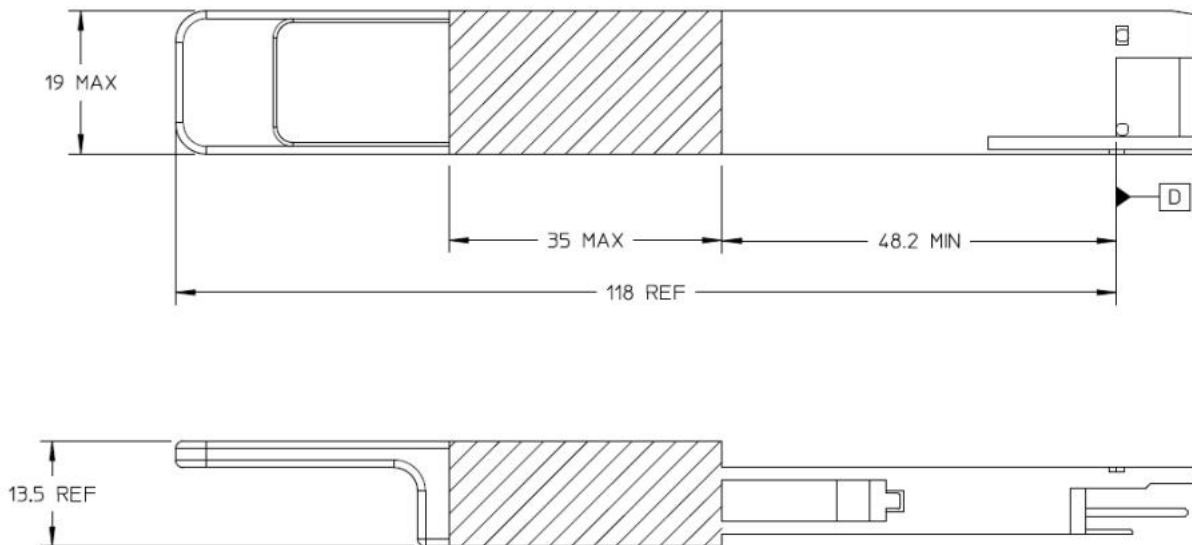


Figure 4. Mechanical Dimensions

**Table6. Receiver Output Power Thresholds for Loss of Signal (LOS)**

Parameter	Min	Typical	Max	Units
RX_LOS_Assert Min/Max	-15.0			dBm
RX_LOS_De-Assert Min/Max			-8.9	dBm
RX_LOS_Hysteresis		1.5		dB

**Table7. Digital Diagnostic Monitoring Specifications**

Parameters	Unit	Specification
Temperature Monitor absolute error	°C	± 3
Supply Voltage Monitor absolute error	%	± 5
I_bias Monitor absolute error	%	± 10
Received Power (Rx) Monitor absolute error	dB	± 3.0
Transmit Power (Tx) Monitor absolute error	dB	± 3.0