400Gb/s OSFP-RHS SR8 850nm 100m MTP/MPO-16 MMF Optical Transceiver

Features

- Hot-pluggable 400G OSFP-RHS SR8 form factor

- Case temperature range of 0°C to +70°C

- Maximum link length of 100m on OM4 fiber with KP4 FEC

- +3.3V single power supply

- Power dissipation < 8W（with CDR）

- Operating case temp Commercial: 0°C to +70 °C

- MPO-16 Connector

- RoHS compliant

Applications

- Data Center Interconnect

- 400G Ethernet

- Enterprise Networking

Description

The 400GBASE-SR8 OSFP-RHS transceiver supports up to 100m link lengths over multi-mode fiber (MMF) with MTP/MPO-16 connector. This transceiver is compliant with OSFP MSA, IEEE 802.3bs protocol and 400GAUI-8 standards. The 400 Gigabit Ethernet signal is carried over eight wavelengths. Multiplexing and de-multiplexing of the eight wavelengths are managed within the device. It is suitable for 400G Ethernet, Data Center and Enterprise Networks.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc3	-0.5	-	+3.6	V	
Storage Temperature	Ts	-40	-	+85	°C	
Operating Humidity	RH	+5	-	+85	%	1
Receiver Damage Threshold perLane	PRDMG	+5	-	-	dBm	

Recommended Operating Conditions

Table2-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	0	-	+70	°C	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	Pd	-	-	8	W	

Electrical Characteristic

Table3-Electrical Characteristic

Parameter	Symbol	Unit	Min	Typical	Max	Notes
Transmitter						
Signaling rate (each lane)	SR	GBd	26.5625	± 100 ppm		
Differential data input voltage per lane	Vin,pp,diff	mV	-	-	900	
Differential termination	-	%	-	-	10	

mismatchal						
Single-ended voltage tolerance range	-	V	-0.4	-	3.3	
DC common mode voltage	-	mV	-350	-	2850	
Receiver						
Signaling rate (each lane)	SR	GBd	26.5625 ± 100 ppm			
Differential output voltage	-	mV	-	-	900	
Near-end ESMW (Eye symmetry mask width)	-	UI	0.265	-	-	
Near-end Eye height, differential (min)	-	mV	70	-	-	
Far-end ESMW (Eye symmetry mask width)	-	UI	0.2	-	-	
Far-end Eye height, differential (min)	-	mV	30	-	-	
Differential termination mismatch	-	%		-	10	
Transition time (min, 20% to 80%)	-	ps	9.5	-	-	
DC common mode voltage	-	mV	-350	-	2850	

Optical Characteristic

Table4-Optical Characteristic						
Parameter	**Symbol**	**Unit**	**Min**	**Typical**	**Max**	**Notes**
Transmitter						
Signaling rate (each lane)	SR	GBd	26.5625 ± 100 ppm			
Modulation format	-	-	PAM4			
Lane wavelength	λ	nm	840	850	860	
RMS spectral width	Δλ	nm	-	-	0.6	
Average launch power, each lane	-	dBm	-6.5	-	4	
Outer Optical Modulation Amplitude (OMAouter), each lane	-	dBm	-4.5	-	3	1
Launch power in OMAouter minus TDECQ,	-	dBm	-5.9			-

each lane						
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane	-	dB	-			-
Launch power in OMAouter minus TDECQ, each lane	-	dBm	-5.9			-
Average launch power of OFF transmitter, each lane	-	dBm	-	-	-30	
Extinction ratio	-	dB	3	-	-	
Transmitter transition time, each lane	-	ps	-	-	34	
Optical return loss tolerance	-	dB	-	-	12	
Average launch power of OFF transmitter, each lane	-	dBm	-	-	-30	
Receiver						
Signaling rate (each lane)	SR	GBd	26.5625 ± 100 ppm			
Modulation format	-	-	PAM4			
Lane wavelength	λ	nm	840	850	860	
Damage threshold, each lane	PIN	dBm	5	-	-	
Average receive power, each lane	-	dBm	-8.4	-	4	
Receive power (OMA outer), each lane	-	dBm	-	-	3	
Receiver sensitivity (OMA outer), each lane	-	dBm	-	-	Max(-6. 5,SECQ- 7.9)	2
LOS Assert	-	dBm	-30	-		
LOS De-Assert	-	dBm	-	-	-12	
LOS Hysteresis	-	dB	0.5	-	-	

Notes:

[1] Even if the TDECQ < 1 dB, the OMA outer (min) must exceed the minimum value specified here.

[2] The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.

[3] Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.

[4] Receiver Sensitivity OMA outer, each lane (max) is informative and is defined for a BER of 2.4x10-4. 6. Measured with conformance test signal at receiver input for the BER of 2.4x10-4.

Digital Diagnostic Functions

Table5-Digital Diagnostic Functions

Parameter	Symbol	Min	Typical	Max	Units	Notes
Temperature monitor absolute error	DMI_Temp	-3		3	℃	Note1
Supply voltage monitor absolute error	DMI_Vcc	-3%		3%	V	Note2
Bias current monitor absolute error	DMI_Ibias	-10%		10%	mA	
Laser power monitor absolute error	DMI_Tx	-3		3	dB	
RX power monitor absolute error	DMI_Rx	-3		3	dB	

Notes:

[1] Temperature here is depending on module case around Max power dissipation. Temperature monitor is done over operating temperature.

[2] Supply voltage monitor is done over operating voltage.
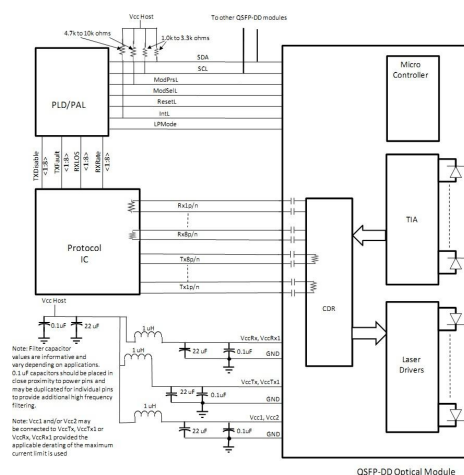
Recommended Interface

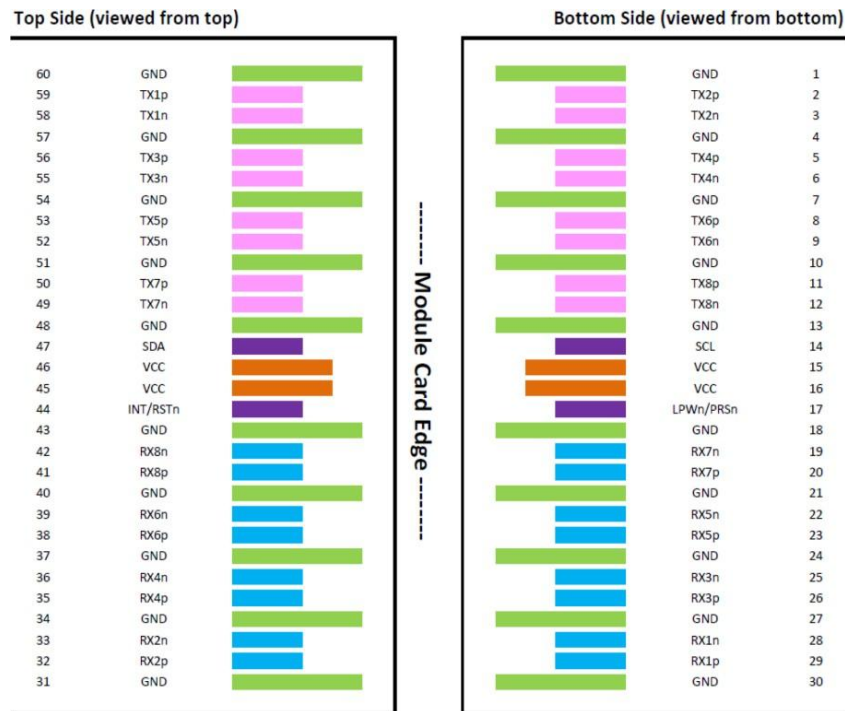Figure 1 Recommended Interface Circuit

Pin Description

Figure 2 OSFP module pinout

Pin Function Definitions

Table6-Pin Function Definitions

Pin	Symbol	Description	Logic	Notes
1	GND	Ground		1
2	Tx2p	Transmitter Data Non-Inverted	CML-I	3
3	Tx2n	Transmitter Data Inverted	CML-I	3
4	GND	Ground		1
5	Tx4p	Transmitter Data Non-Inverted	CML-I	3
6	Tx4n	Transmitter Data Inverted	CML-I	3
7	GND	Ground		1
8	TX6p	Transmitter Data Non-Inverted	CML-I	3
9	Tx6n	Transmitter Data Inverted	CML-I	3
10	GND	Ground		1
11	Tx8p	Transmitter Data Non-Inverted	CML-I	3
12	Tx8n	Transmitter Data Inverted	CML-I	3
13	GND	Ground		1

14	SCL	2-wire serial interface clock	LVCMOS-I/O	3
15	VCC	+3.3V Power		2
16	VCC	+3.3V Power		2
17	LPWn/PRSn	Low-Power Mode / Module Present	Multi-Level	3
18	GND	Ground		1
19	Rx7n	Receiver Data Inverted	CML-O	3
20	Rx7p	Receiver Data Non-Inverted	CML-O	3
21	GND	Ground		1
22	Rx5n	Receiver Data Inverted	CML-O	3
23	Rx5p	Receiver Data Non-Inverted	CML-O	3
24	GND	Ground		1
25	Rx3n	Receiver Data Inverted	CML-O	3
26	Rx3p	Receiver Data Non-Inverted	CML-O	3
27	GND	Ground		1
28	Rx1n	Receiver Data Inverted	CML-O	3
29	Rx1p	Receiver Data Non-Inverted	CML-O	3
30	GND	Ground		1
31	GND	Ground		1
32	Rx2p	Receiver Data Non-Inverted	CML-O	3
33	Rx2n	Receiver Data Inverted	CML-O	3
34	GND	Ground		1
35	Rx4p	Receiver Data Non-Inverted	CML-O	3
36	Rx4n	Receiver Data Inverted	CML-O	3
37	GND	Ground		1
38	Rx6p	Receiver Data Non-Inverted	CML-O	3
39	Rx6n	Receiver Data Inverted	CML-O	3
40	GND	Ground		1
41	Rx8p	Receiver Data Non-Inverted	CML-O	3
42	Rx8n	Receiver Data Inverted	CML-O	3
43	GND	Ground		1
44	INT/RSTn	Module Interrupt / Module Reset	Multi-Level	3
45	VCC	+3.3V Power		2
46	VCC	+3.3V Power		2
47	SDA	2-wire Serial interface data	LVCMOS-I/O	3
48	GND	Ground		1
49	Tx7n	Transmitter Data Inverted	CML-I	3
50	Tx7p	Transmitter Data Non-Inverted	CML-I	3
51	GND	Ground		1
52	Tx5n	Transmitter Data Inverted	CML-I	3

53	Tx5p	Transmitter Data Non-Inverted	CML-I	3
54	GND	Ground		1
55	Tx3n	Transmitter Data Inverted	CML-I	3
56	Tx3p	Transmitter Data Non-Inverted	CML-I	3
57	GND	Ground		1
58	Tx1n	Transmitter Data Inverted	CML-I	3
59	Tx1p	Transmitter Data Non-Inverted	CML-I	3
60	GND	Ground		1

Optical interface arrangement

The optical port is a male MPO connector receptacle, with fiber lane assignments as shown in Figure 3.
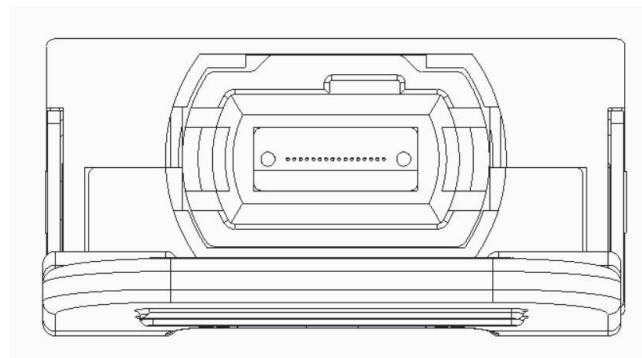

Figure 3 Optical interface arrangement. Lens upwards

Mechanical

400G OSFP-RHS SR8 transceivers are compatible with the OSFP Type 2 Specification for pluggable form factor modules.
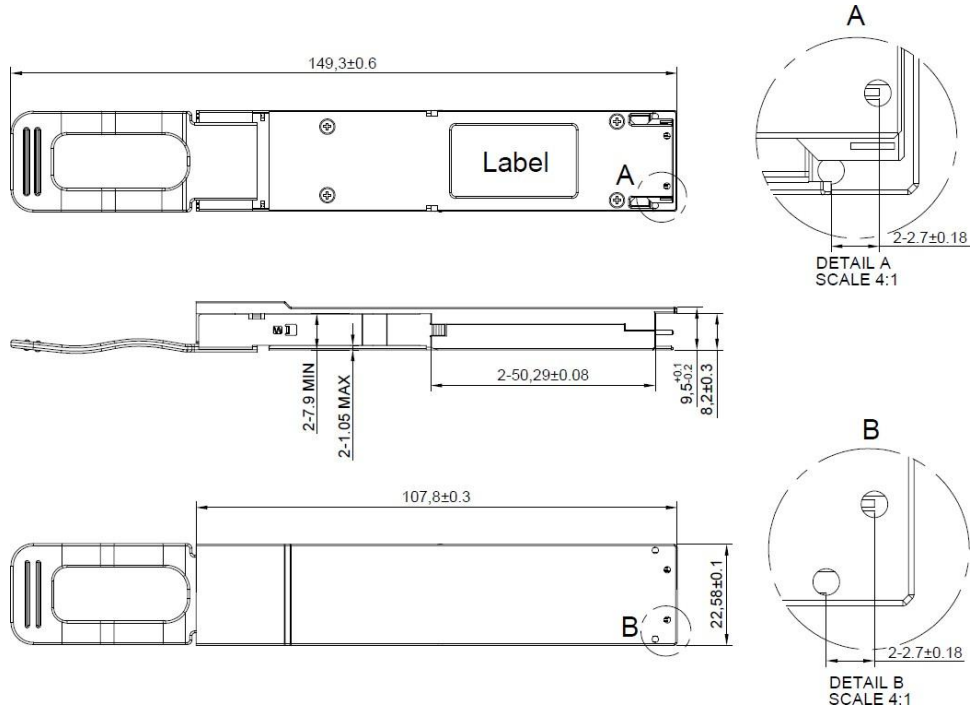
Figure 4 Mechanical Diagram

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