



400G QSFP-DD SR8

8x26.56GBaud 850nm Transceiver

Product Description

400G QSFP -DD Optical transceiver for 8 x 26.56GBaud optical links. It is compliant with the QSFP -DD MSA specifications. It operates at 26.56GBaud up to 100m over OM4 Multi-mode fiber.

Applications

- High performance computing interconnect
- Data center

Features

- 8 independent parallel optical channels
- Each channel data rate up to 26.56GBaud with CDR
- Hot Pluggable
- Up to 100m link on OM4 Multi-mode
- 850nm VCSEL/PD Array Technology
- CML Compatible electrical I/O
- QSFP-DD MSA Compliance
- Optical connectivity via industry standard MPO/MTP terminated fiber ribbon
- MPO-16 APC Optical Receptacle Type
- CMIS 4.0 Compliance
- Monitors for VCSEL bias, transmitted, received power, module temperature, and module supply
- Case Operating Temperature:
 - Commercial: 0 to 70°C
- RoHS II Compliance

Ordering Information
Case Operating Temperature
0 to 70 °C

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Ambient Temperature	T _{stg}	-40	+85	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device. RH is Non-condensing condition.
Relative Humidity - Storage	RH _s	0	95	%	
Relative Humidity - Operating	RH _o	0	85	%	
Module Supply Voltage	V _{CC}	-0.5	3.6	V	



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Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Case Operating Temperature	T_{case}	0	+25	+70	°C	Temperature Range = C
Module Supply Voltage	V_{CC}	3.14	3.3	3.46	V	
Power Consumption	P	-	-	10	W	
Signaling Speed Per Channel	S	-	26.56	-	GB	

Transmitter Electrical Interfaces							
Parameter	Symbol	Min	Typ	Max	Units	Notes	
Tx_Data Differential Input Voltage	V_{IN}	-	-	900	mV		
Tx_Data Differential Input Impedance	Z_{IN}	-	100	-	Ω		

Receiver Electrical Interfaces							
Parameter	Symbol	Min	Typ	Max	Units	Notes	
Rx_Data Differential Output Voltage	V_{OUT}	-	-	900	mV		
Rx_Data Differential Output Impedance	Z_{OUT}	-	100	-	Ω		



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Transmitter Optical Characteristics						
Parameter	Symbol	400G QDD SR8			Units	Notes
		Min	Typ	Max		
Signaling rate, each lane	SR	-	26.56	-	GBd	
Signaling Speed Accuracy	SSA	-100		100	ppm	
Modulation format		PAM4				
Average Launch Power ,each lane	P _{OUT}	-6.5	-	4	dBm	Average Optical Output
Outer Optical Modulation Amplitude each lane	OMA _{outer}	-4.5	-	3	dBm	
Optical Output with Tx OFF	P _{OFF}	-	-	-30	dBm	
Extinction ratio	ER	3			dB	
Center Wavelength	λ	840	850	868	nm	
RMS Spectral Width	$\Delta\lambda$	-	-	0.6	nm	
Transmitter and dispersion eye closure (TDECQ) each lane	TDECQ	-	-	4.5	dB	
Launch power in OMA _{outer} minus TDECQ, each lane (min)		-5.9	-	-	dB	
TDECQ - 10log ₁₀ (Ceq), each lane (max)		-	-	4.5	dB	
RIN ₁₂ OMA	RIN ₁₂ OMA	-	-	-128	dB/Hz	
Optical return loss tolerance (Max)	ORLT			12	dB	

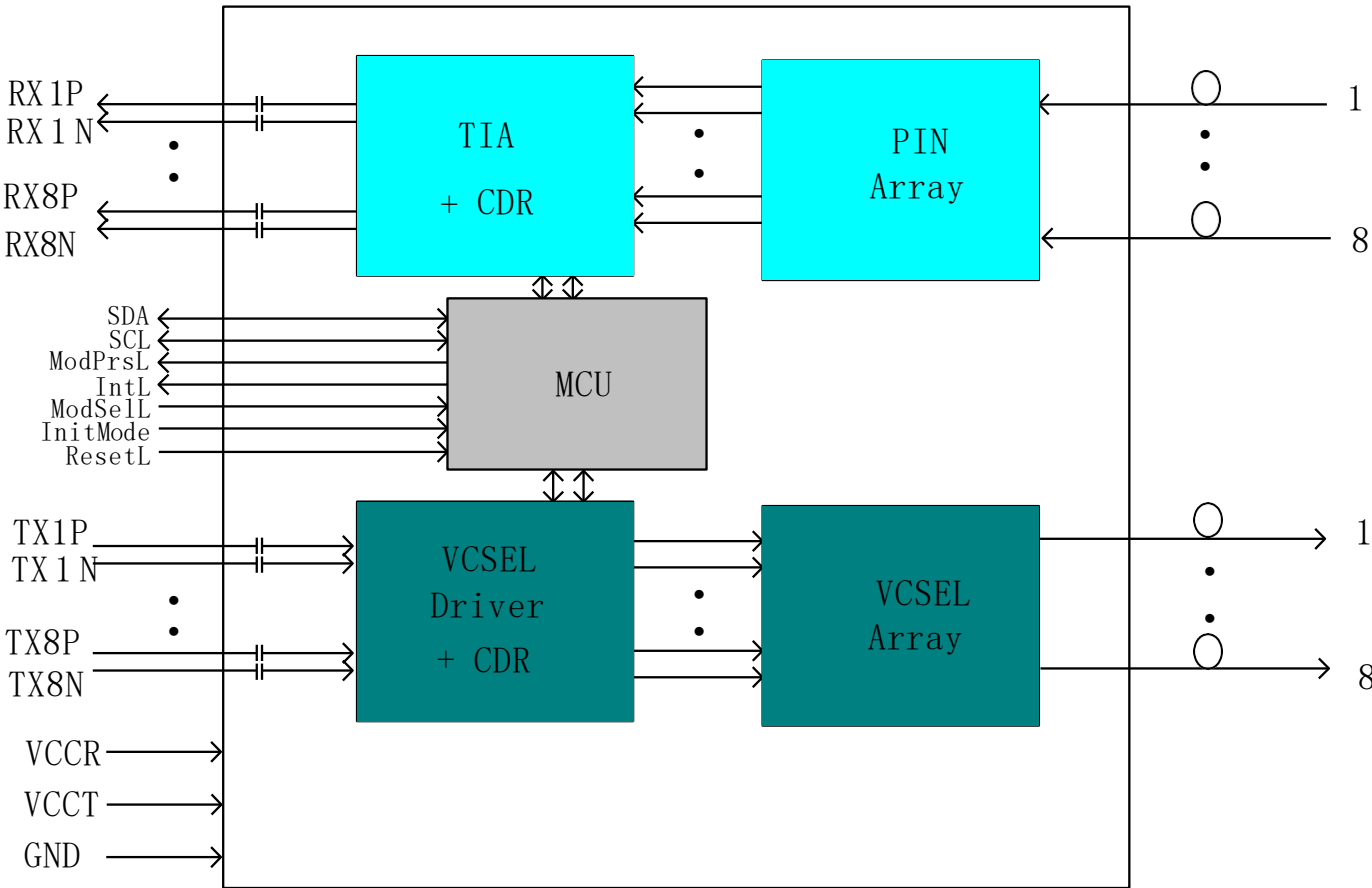
Receiver Optical Characteristics						
Parameter	Symbol	400G QDD SR8			Units	Notes
		Min	Typ	Max		
Signaling rate, each lane	SR	-	26.56	-	GBd	
Signaling Speed Accuracy		-100		100	ppm	
Modulation format		PAM4				
Average power at receive input, each lane	P _{IN}	-8.4	-	4	dBm	Note1
Receive power (OMA _{outer}), each lane (max)		-	-	3	dBm	
Receiver sensitivity (OMA _{outer}) each lane	Sen	-	-	max(-6.6, SECQ - 8)	dBm	Note2
Center Wavelength	λ	840	850	868	nm	
Rx_LOS of Signal - Assert	P _A	-24.6	-	-	dBm	
Rx_LOS of Signal - Deassert	P _D	-	-	-7	dBm	
Rx_LOS of Signal - Hysteresis	P _{Hy}	0.5	-	-	dB	
Note 1: Average received power where the BER = 2.4E-4 measured with a PRBS 31Q test pattern@26.56GBaud						
Note 2: Sensitivity where the BER = 2.4E-4 measured with a PRBS 31Q test pattern@26.56GBaud						



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Block Diagram

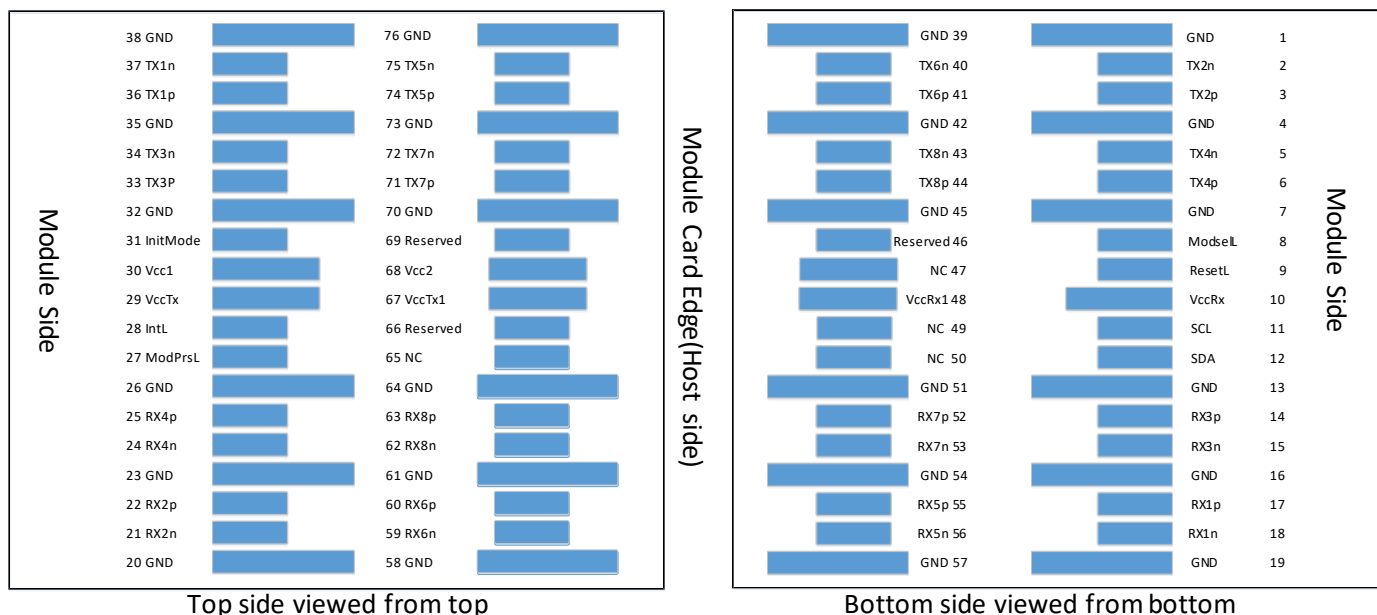




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Pin Assignment



Pin Description			
Pin	Symbol	Description	Notes
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	V _{CC} Rx	Receiver +3.3V DC Power Supply	
11	SCL	I ² C Serial Clock	
12	SDA	I ² C Serial Data	
13	GND	Ground	
14	Rx3p	Receiver Non Inverted Differential Output	
15	Rx3n	Receiver Inverted Differential Output	
16	GND	Ground	
17	Rx1p	Receiver Non Inverted Differential Output	
18	Rx1n	Receiver Inverted Differential Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Differential Output	
22	Rx2p	Receiver Non Inverted Differential Output	
23	GND	Ground	



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24	Rx4n	Receiver Inverted Differential Output	
25	Rx4p	Receiver Non Inverted Differential Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	V _{CC} Tx	Transmitter +3.3V DC Power Supply	
30	V _{CC} 1	+3.3V DC Power Supply	
31	Init Mode	Initialization Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	
39	GND	Ground	
40	Tx6n	Transmitter Inverted Data Input	
41	Tx6p	Transmitter Non Inverted Data Input	
42	GND	Ground	
43	Tx8n	Transmitter Inverted Data Input	
44	Tx8p	Transmitter Non Inverted Data Input	
45	GND	Ground	
46	Reserved	No connect	
47	NC	No connect	
48	V _{CC} Rx1	+3.3V DC Power Supply	
49	NC	No connect	
50	NC	No connect	
51	GND	Ground	
52	Rx7p	Receiver Non Inverted Differential Output	
53	Rx7n	Receiver Inverted Differential Output	
54	GND	Ground	
55	Rx5p	Receiver Non Inverted Differential Output	
56	Rx5n	Receiver Inverted Differential Output	
57	GND	Ground	
58	GND	Ground	
59	Rx6n	Receiver Inverted Differential Output	
60	Rx6p	Receiver Non Inverted Differential Output	
61	GND	Ground	

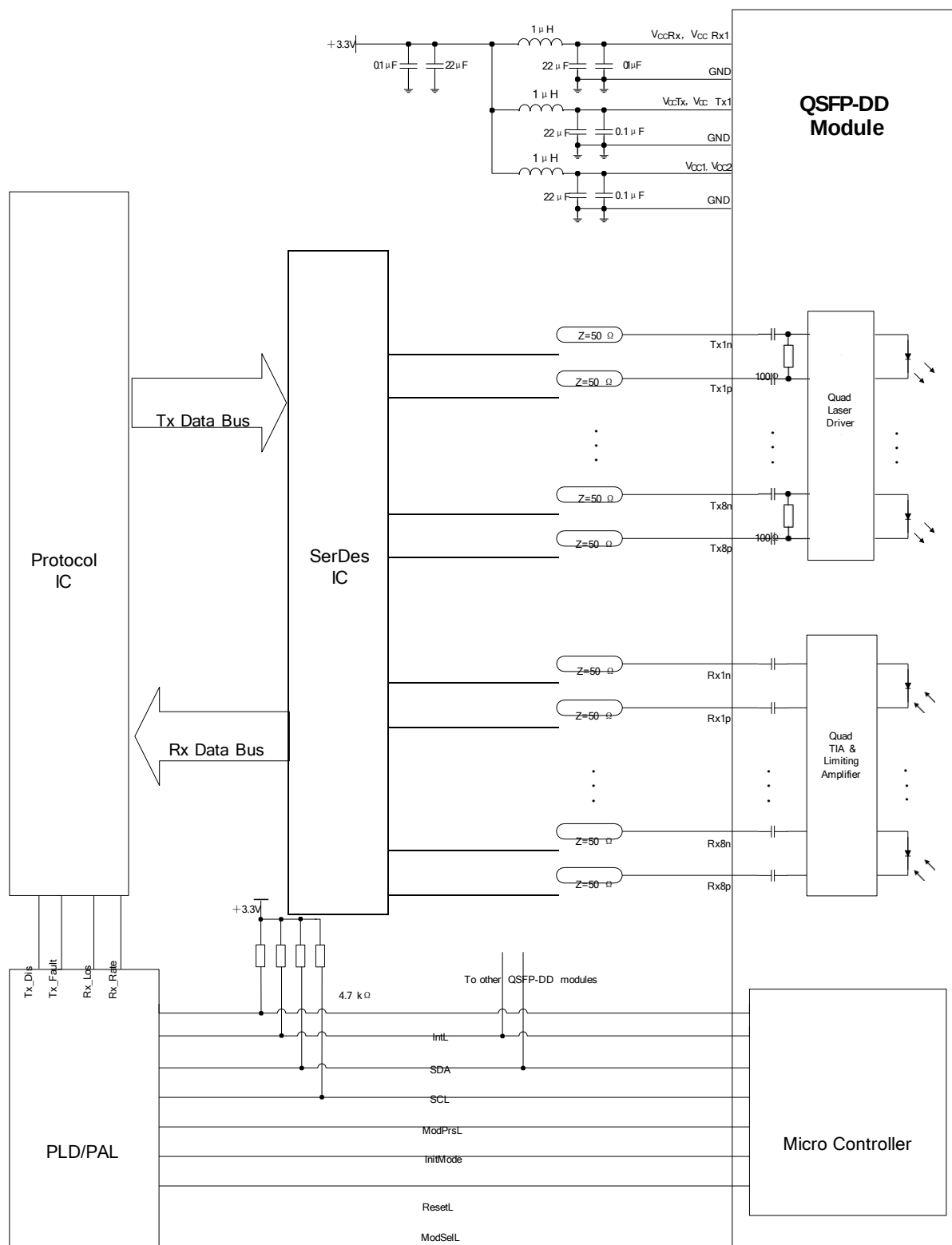


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62	Rx8n	Receiver Inverted Differential Output	
63	Rx8p	Receiver Non Inverted Differential Output	
64	GND	Ground	
65	NC	No Connect	
66	Reserved	No Connect	
67	V _{CC} Tx1	+3.3V DC Power Supply	
68	V _{CC} 2	+3.3V DC Power Supply	
69	Reserved	No Connect	
70	GND	Ground	
71	Tx7p	Transmitter Non Inverted Data Input	
72	Tx7n	Transmitter Inverted Data Input	
73	GND	Ground	
74	Tx5p	Transmitter Non Inverted Data Input	
75	Tx5n	Transmitter Inverted Data Input	
76	GND	Ground	

Electrical Interface

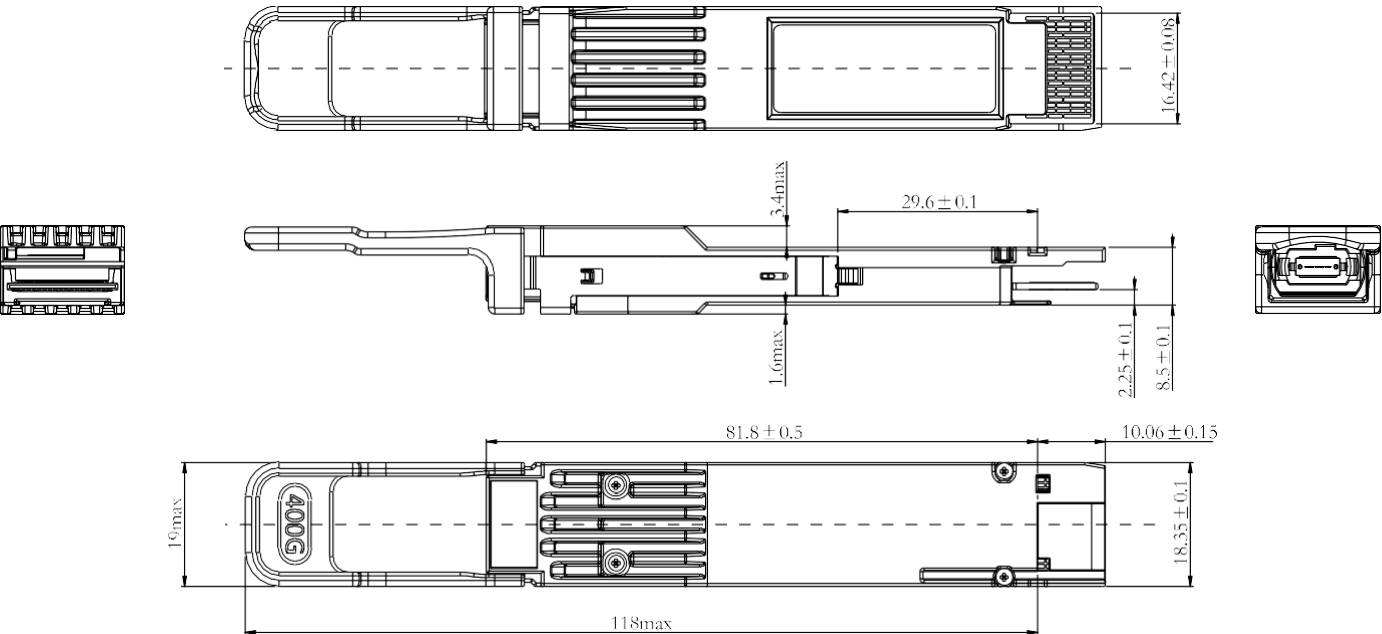




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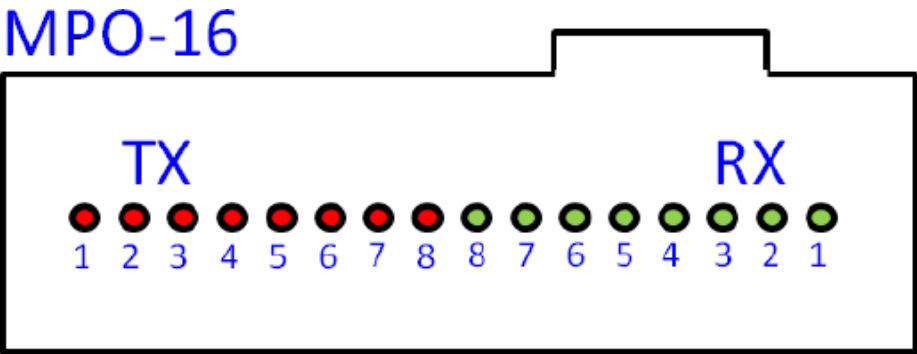
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Mechanical Dimensions



NOTES:
1.TOLERANCE: ± 0.1 MM.
2.OTHERS ACCORDING WITH QSFP-DD MSA OR CUSTOMER SPEC.
3.LIGHT PORT ACCORDING WITH FIBER CONNECTOR SPEC.

Optical Lane Assignment



Connector type: MPO-16



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Warnings

Handling Precautions:

This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety:

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Notice:

The information provided on this page contains the product target specifications which are subject to change without notice.

Check product updates, changes in specifications, sample availability and production release dates.

EYE SAFETY

Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed.3., as described in Laser Notice No. 56, dated May 8, 2019.

Complies with IEC/EN 60825-1 and IEC/EN 60825-2. Class 1 laser safety compliant.

INVISIBLE LASER RADIATION.

CAUTION:

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