

Product Features

- Compliant with IEEE Std 802.3cd, 200G BASE SR4 Ethernet
- Compliant with QSFP-DD MSA
- Compliant with QSFP-DD Management interface specifications
- MPO16 APC/MPO24 UPC Male connector receptacle
- 8 channels 850nm VCSEL array
- 8 channels PIN photo detector array
- Up to 425Gb/s data rates
- Single +3.3V power supply
- Commercial operating temperature:0°C to +70°C
- Up to 70m on OM3 MMF and 100m on OM4 and OM5 MMF
- RoHS Compliant



Applications

- 400G BASE-SR8 Ethernet
- Data Center

Descriptions

LX9201CDR QSFP-DD SR8 transceivers are designed for use in 400Gb/s links over multimode fiber. They integrate eight channel VCSEL array and eight channel PIN photodiode array, the module can operate at 425Gb/s up to 70m using OM3 or 100m using OM4 and OM5 MMF. They are compliant with the QSFP-DD MSA and IEEE 802.3cd 400GBASE-SR8.

LX9201CDR are compliant with RoHS.

Ordering Information

Table 1. Ordering Information

Part Number	Transmitter	Average Launch Power	OMA _{outer}	Receiver	OMA Sensitivity	Reach	Temp	DDM	RoHS
LX9201CDR	850nm VCSEL	-6.5 ~ +4dBm	-4.5 ~ +3dBm	PIN	< -6.5dBm	100m	0~ 70 °C	Available	Compliant

Pin Description

Table 2. Pin Description

Pin	Name	Function/Description	Notes
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	LPMode	Low Power 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	ePPS	Precision Time Protocol (PTP) reference clock input	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

Notes:

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 may be internally connected within the module in any combination. The connector Vcc pins are each rated for a maximum current of 1000mA.
3. All Vendor Specific, Reserved, No Connect and ePPS (if not used) pins may be terminated with 50ohms to ground on the host. Pad 65 (No Connect) shall be left unconnected within the module. Vendor specific and Reserved pads shall have an

impedance to GND that is greater than 10kohms and less than 100pF.

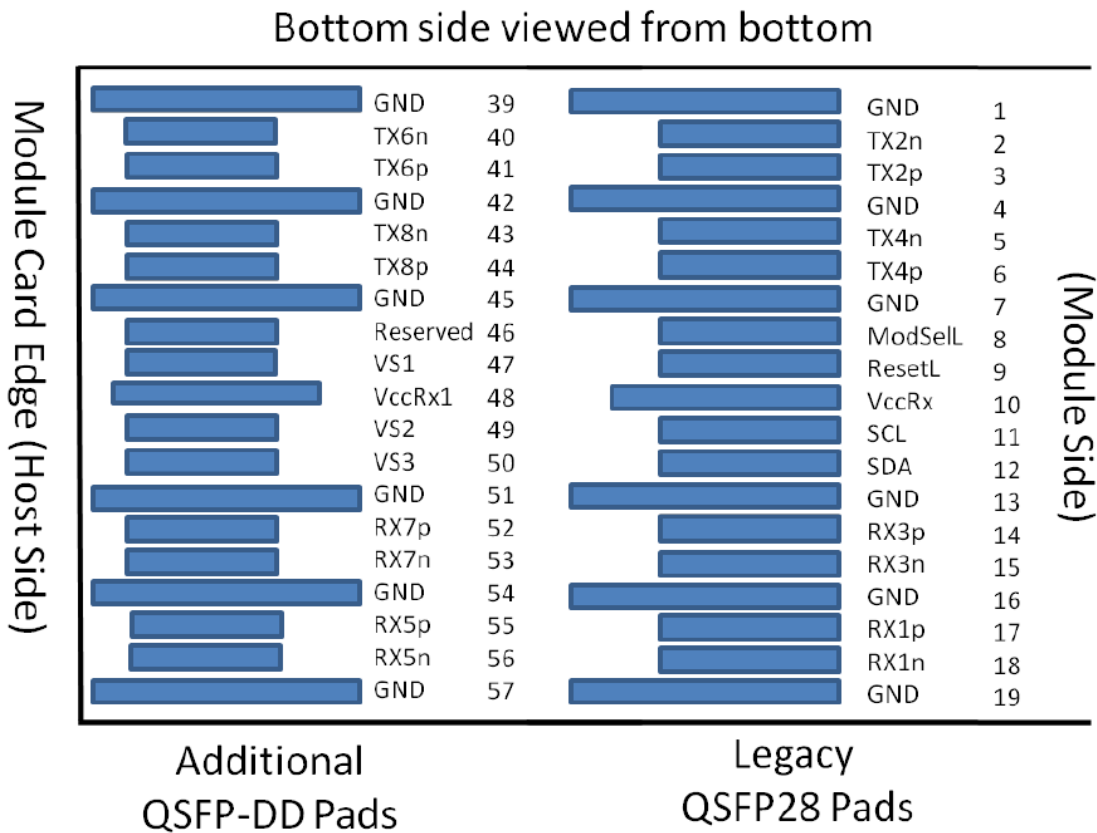
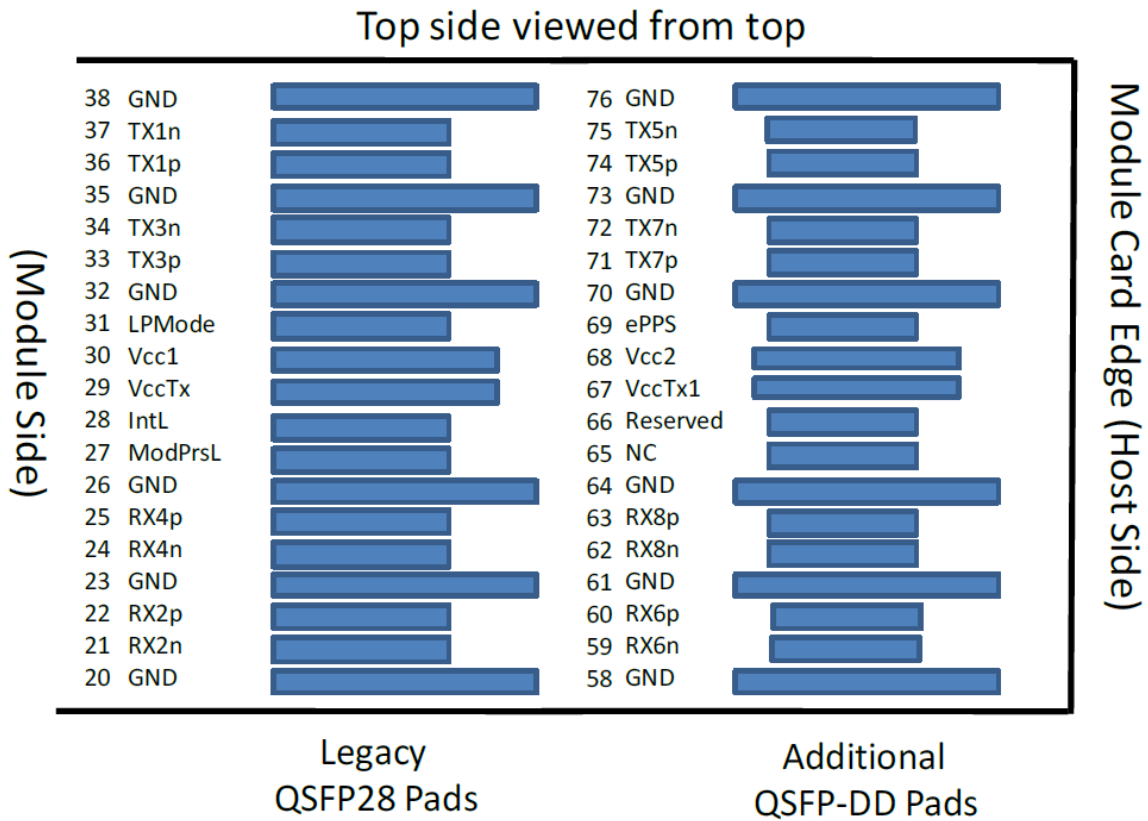


Figure 1. QSFP-DD pad assignment

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Table 3. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T _s	-40	85	°C
Relative Humidity	RH	15	85	%
Supply Voltage	V _{cc}	-0.5	4.0	V

Recommended Operating Conditions

Table 4. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T _c	0	25	70	°C
Supply Voltage	V _{cc}	3.135	3.3	3.465	V
Data Rate PER Channel	-	-	53.125	-	Gb/s
Modulation format			PAM4		

Transceiver Electrical Characteristics

Table 5. Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	I _{cc}	-	-	3.7	A	-
Power Dissipation	P _D	-	-	12	W	-
Transmitter						
Input Differential Impedance	Z _{IN}	-	100	-	Ω	-
Differential Data Input Swing	V _{IN, P-P}	180	-	900	mV _{P-P}	-
Transition Time (20% to 80%)	T _{r, Tf}			34	ps	
Receiver						
Output Differential Impedance	Z _O	-	100	-	Ω	-
Differential Data Output Swing	V _{OUT, P-P}	300	-	850	mV _{P-P}	1

Notes:

- Internally AC coupled, but requires an external 100Ω differential load termination.

Transmitter Optical Characteristics

Table 6. Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P _o	-6.5	-	+4	dBm	1
OMA _{outer}	OMA	-4.5		+3	dBm	
Center Wavelength Range	λ _c	840	850	860	nm	-
Extinction Ratio	EX	3	-	-	dB	2
Spectral width(RMS)	Δλ	-	-	0.6	nm	
Transmitter and Dispersion for PAM4	TDECQ	-	-	4.5	dB	-
Average launch power of OFF transmitter	P _{off}	-	-	-30	dBm	
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
TX Disable Assert Time	T _{off}	-	-	100	ms	
TX Disable De-assert Time	T _{on}	-	-	400	ms	

Notes:

1. The optical power is launched into OM3 MMF.
2. Measured with a SSPRQ test pattern @ 53.125Gb/s PAM4 format.

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ _c	840	850	860	nm	-
Receiver Sensitivity (P _{oma})	S	-	-	-6.5	dBm	1
Receiver Overload (P _{avg})	P _{OL}	4	-	-	dBm	
Damage Threshold	P _{OL}	5	-	-	dBm	
Optical Reflectance	ORL	-	-	-12	dB	-
LOS De-Assert	LOS _D	-	-	-9	dBm	-
LOS Assert	LOS _A	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:

1. Measured with PRBS31Q test pattern, 53.125Gb/s, PAM4, BER<2.4E⁻⁴.

Recommended Host Board Power Supply Filter Network

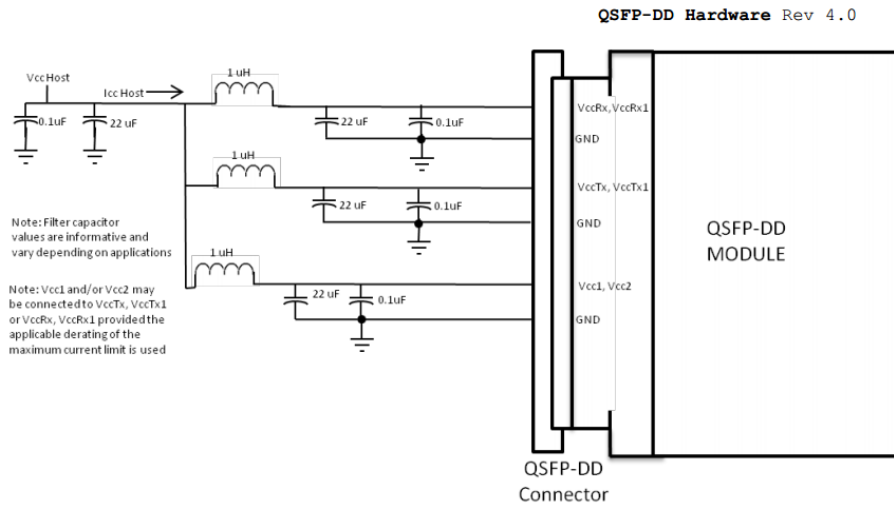


Figure 2. Recommended Host Board Power Supply Filter Network

Mechanical specifications

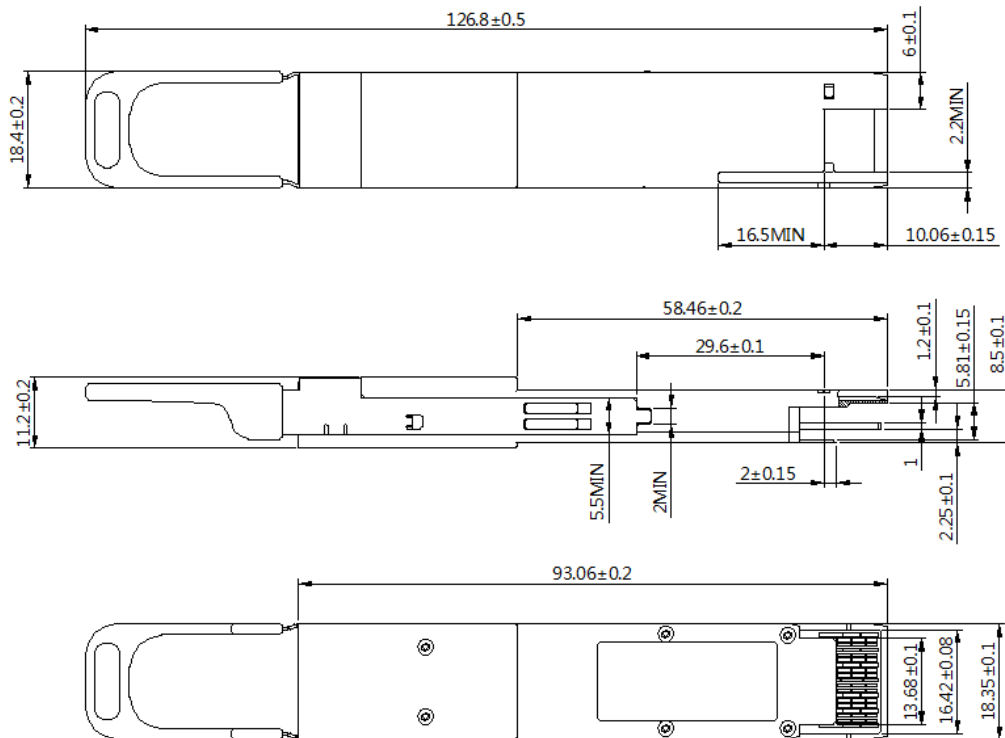


Figure 3. Outline Drawing

RoHS Compliance

RoHS Certificate Number: BST13080782Y-1RC-4, compliance with the council RoHS directive-2011/65/EU.

MPO-16 APC interface specifications

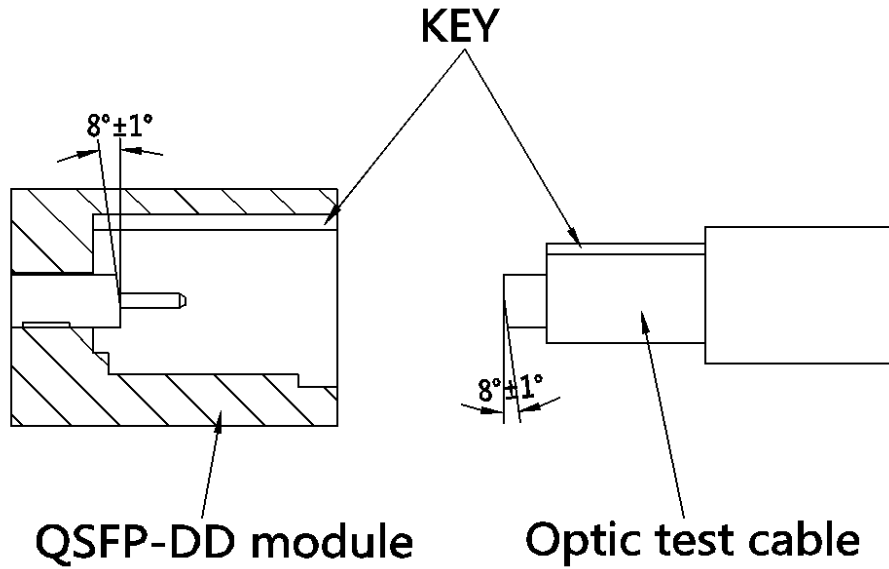
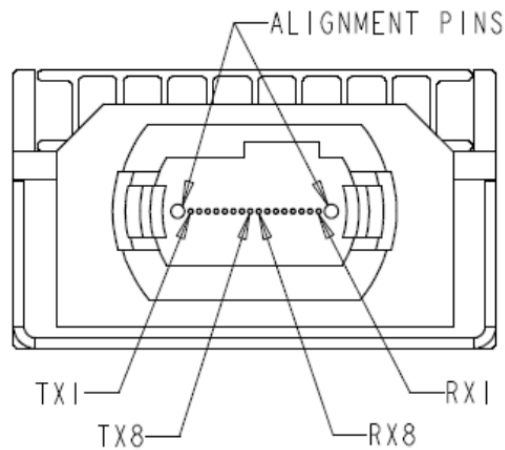


Figure 4. QSFP-DD Module and MPO16 Test cable contact angle specifications

MPO-16 optical interface

LX9201CDR module used a male MPO-16 connector, and channel orientation of the optical interface is shown as Figure 5.



Channels Tx1 Tx2 Tx3 Tx4 Tx5 Tx6 Tx7 Tx8 Rx8 Rx7 Rx6 Rx5 Rx4 Rx3 Rx2 Rx1

Figure 5. Optical receptacle and channel orientation for MPO-16 connector

Revision History

Date	Rev	Description	Modified By
01/22/2019	V1.0	First version	Zexu liu
05/28/2019	V1.1	Change AVG sensitivity to OMA sensitivity	Junyi Wu
05/29/2019	V1.2	Add MPO-24 UPC receptacle support	Junyi Wu
06/17/2019	V1.3	1.Change data rates description from “26.56GBd PAM4”to “53.125Gb/s PAM4” 2.Add Figure 4:“APC contact angle specification” 3.Add Figure 5:“MPO-16 optical interface”	Zexu liu
01/10/2020	V1.4	Add OMAouter characteristic	Teng Shen
04/07/2020	V1.5	Change pin-31 description from Init Mode into LPmode to meet QSFP-DD hardware Specification rev 5.0; Change pin-69 description from Reserved into ePPS to meet QSFP-DD hardware Specification rev 5.0.	Teng Shen
10/30/2020	V1.6	Update “ For More Information”	Teng Shen

For More Information

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