

## Product Features

- 4 Parallel lanes design
- Compliant with QSFP28 MSA
- Compliant to IEEE 802.3bm 100GBASE PSM IR4
- 4 channels PIN photo detector
- Up to 25.78125Gb/s per channel data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature:-5°C to +70°C
- Up to 500m on SMF
- RoHS 6/6 Compliant



## Applications

- 100GBASE Ethernet links
- Infiniband QDR and DDR
- Data center

## Descriptions

LX8504CDR QSFP28 transceiver modules are designed for use in 100 Gigabit Ethernet links on up to 2 km of single mode fiber. They are compliant with the QSFP28 MSA and portions of IEEE P802.3bm . Digital diagnostics functions are available via the I2C interface, as specified by the QSFP28 MSA. The QSFP28 full-duplex optical module offers 4 independent transmit and receive channels, each capable of 25Gb/s operation for an aggregate data rate of 100Gb/s.

LX8504CDR are compliant with RoHS.

## Ordering Information

**Table 1. Ordering Information**

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LX8504CDR	1310nm DFB	-9 ~ +2dBm	PIN	< -12.0dBm	500m	-5~ 70 °C	Available	Compliant

## Pin Description

**Table 2. Pin Description**

Pin	Name	Function/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	
3	Tx2+	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	2
9	ResetL	Module Reset	2
10	VccRx	3.3V Power Supply Receiver	
11	SCL	2-Wire serial Interface Clock	2
12	SDA	2-Wire serial Interface Data	2
13	GND	Transmitter Ground (Common with Receiver Ground)	1
14	Rx3+	Receiver Non-Inverted Data Output	
15	Rx3-	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1+	Receiver Non-Inverted Data Output	
18	Rx1-	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2-	Receiver Inverted Data Output	
22	Rx2+	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4-	Receiver Inverted Data Output	1
25	Rx4+	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	2
29	VccTx	3.3V power supply transmitter	
30	Vcc1	3.3V power supply	
31	LPMODE	Low Power Mode	2
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3+	Transmitter Non-Inverted Data Input	
34	Tx3-	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

**Notes:**

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.

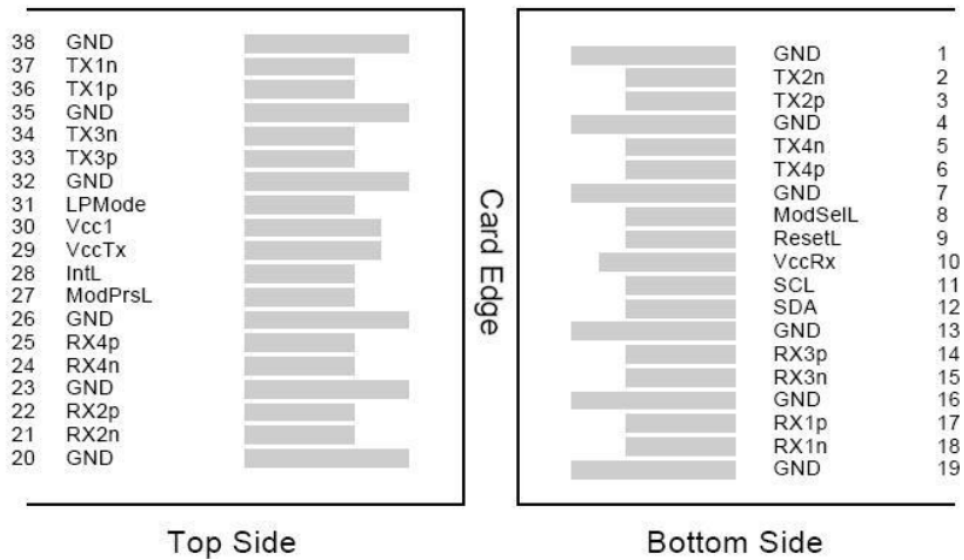


Figure 1. Host PCB QSFP28 pad assignment top view

## 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 <sub>S</sub>	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V <sub>CC</sub>	-0.5	4.0	V

## Recommended Operating Conditions

**Table 4. Recommended Operating Conditions**

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T <sub>C</sub>	-5	25	70	°C
Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V
Data Rate PER Channel	-	-	25.78125	-	Gb/s

## Transceiver Electrical Characteristics

**Table 5. Transceiver Electrical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	I <sub>CC</sub>	-	-	1100	mA	-
Power Dissipation	P <sub>D</sub>	-	-	3500	mW	-
<b>Transmitter</b>						
Input Differential Impedance	Z <sub>IN</sub>	90	100	110	Ω	-
Differential Data Input Swing	V <sub>IN, P-P</sub>	190	-	700	mV <sub>P-P</sub>	-
AC Common Mode Input Voltage Tolerance	-	15	-	-	mV	-
<b>Receiver</b>						
Output Differential Impedance	Z <sub>O</sub>	90	100	110	Ω	-
Differential Data Output Swing	V <sub>OUT, P-P</sub>	300	-	850	mV <sub>P-P</sub>	1
AC Common Mode Output Voltage	-	-	-	7.5	mV	-
Single-ended Output Voltage	-	-0.3	-	4	V	-

**Notes:**

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

## Transmitter Optical Characteristics

**Table 6. Transmitter Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power per lane	P <sub>o</sub>	-9	-	+2	dBm	1
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Center Wavelength Range	λ	1295	1310	1325	nm	-
Extinction Ratio	EX	3.5	-	-	dB	2
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
Pout @TX-Disable Asserted	P <sub>off</sub>	-	-	-30	dBm	1
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}				{0.31,0.4,0.45,0.34,0.38,0.4}		

**Notes:**

1. The optical power is launched into SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125Gbps.

## Receiver Optical Characteristics

**Table 7. Receiver Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ <sub>c</sub>	1295	-	1325	nm	-
Receiver Sensitivity	S	-	-	-12.0	dBm	1
Damage Threshold	P <sub>OL</sub>	3.0	-	-	dBm	-
LOS De-Assert	LOS <sub>D</sub>	-	-	-12.5	dBm	-
LOS Assert	LOS <sub>A</sub>	-24	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

**Notes:**

1. Measured with PRBS 2<sup>31</sup>-1 test pattern, 25.78125Gb/s, BER of 5 × 10<sup>-5</sup>(informative)

## Recommended Host Board Power Supply Filter Network

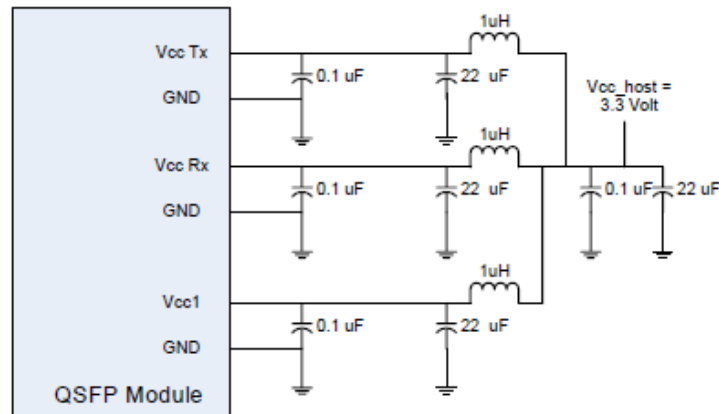


Figure 2. Recommended Host Board Power Supply Filter Network

## Recommended Application Interface Block Diagram

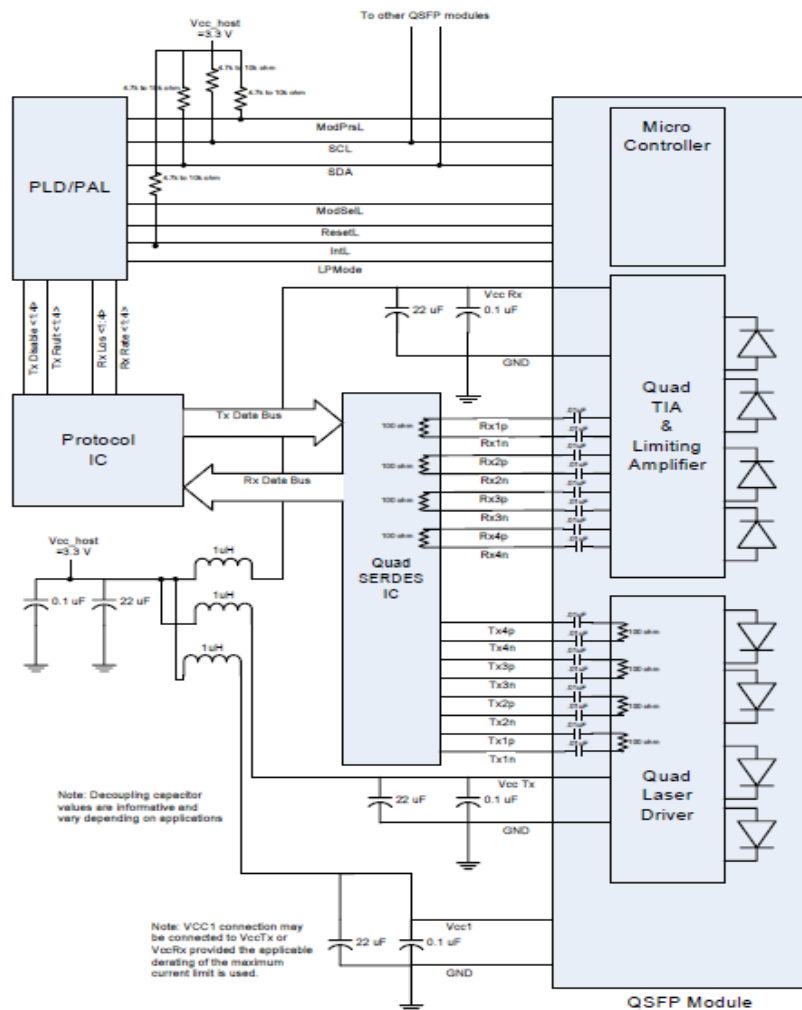


Figure 3. Recommended Application Interface Block Diagram

## Mechanical specifications

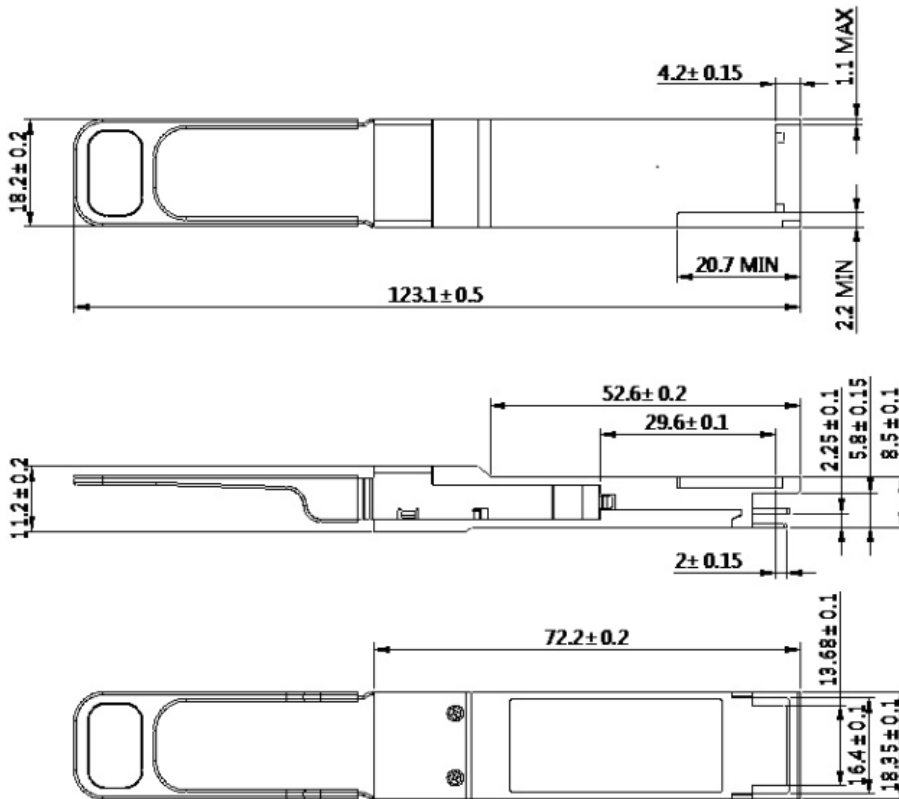
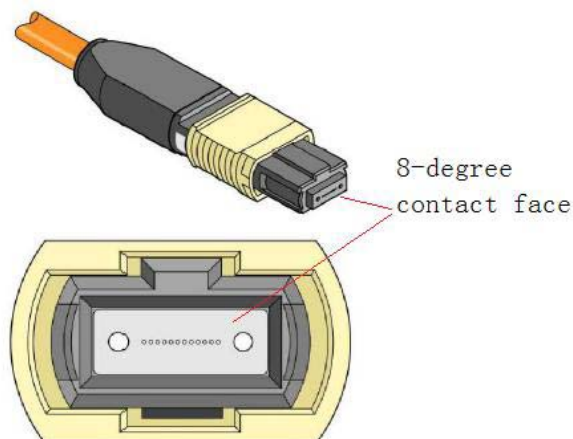


Figure 4. Outline Drawing

Attention: To minimize MPO connection induced reflections, an MPO receptacle with 8-degree angled end-face is utilized for this product. A female MPO connector with 8-degree end-face should be used with this product as illustrated in below Figure.



## **For More Information**

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