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:-5ºC to +70ºC

● 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 ºC	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.
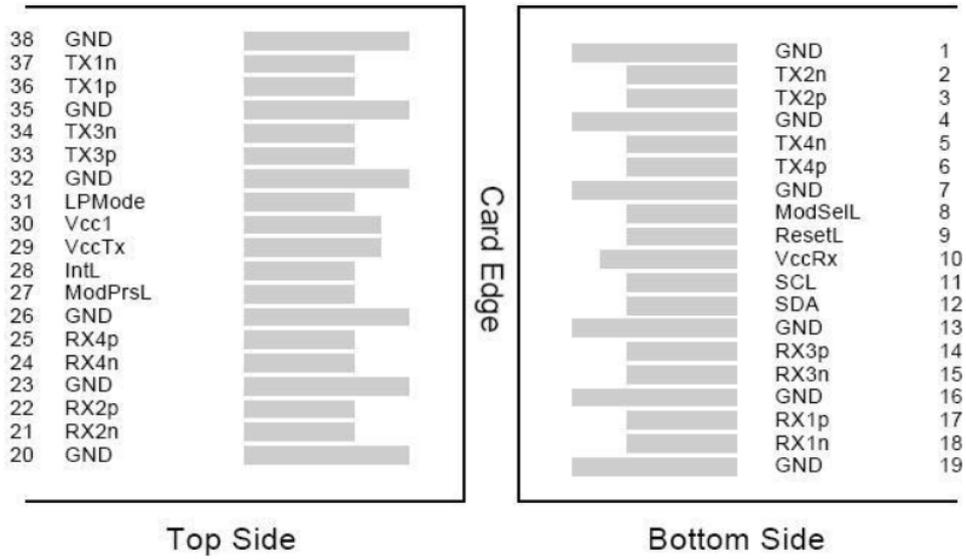
38	GND
37	TX1n
36	TX1p
35	GND
34	TX3n
33	TX3p
32	GND
31	LPMode
30	Vcc1
29	VccTx
28	IntL
27	ModPrsL
26	GND
25	RX4p
24	RX4n
23	GND
22	RX2p
21	RX2n
20	GND

Card Edge

GND	1
TX2n	2
TX2p	3
GND	4
TX4n	5
TX4p	6
GND	7
ModSelL	8
ResetL	9
VccRx	10
SCL	11
SDA	12
GND	13
RX3p	14
RX3n	15
GND	16
RX1p	17
RX1n	18
GND	19

Top Side   Bottom Side

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_S	-40	85	°C
Relative Humidity	RH	5	95	%
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	-5	25	70	°C
Supply Voltage	V_{CC}	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	Icc	-	-	1100	mA	-
Power Dissipation	P_D	-	-	3500	mW	-
Transmitter						
Input Differential Impedance	Z_{IN}	90	100	110	Ω	-
Differential Data Input Swing	$V_{IN, P-P}$	190	-	700	mV_{P-P}	-
AC Common Mode Input Voltage Tolerance	-	15	-	-	mV	-
Receiver						
Output Differential Impedance	Z_O	90	100	110	Ω	-
Differential Data Output Swing	$V_{OUT, P-P}$	300	-	850	mV_{P-P}	1
AC Common Mode Output Voltage	-	-	-	7.5	mV	-
Single-ended Output Voltage	-	-0.3	-	4	V	-

Notes:
1. 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	Po	-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_{off}	-	-	-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^{31}-1 test pattern @25.78125Gbps.

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λc	1295	-	1325	nm	-
Receiver Sensitivity	S	-	-	-12.0	dBm	1
Damage Threshold	P_{OL}	8.0	-	-	dBm	-
LOS De-Assert	LOS_D	-	-	-12.5	dBm	-
LOS Assert	LOS_A	-24	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:
1. Measured with PRBS 2^{31}-1 test pattern, 25.78125Gb/s, BER of 5×10^{-5}(informative)

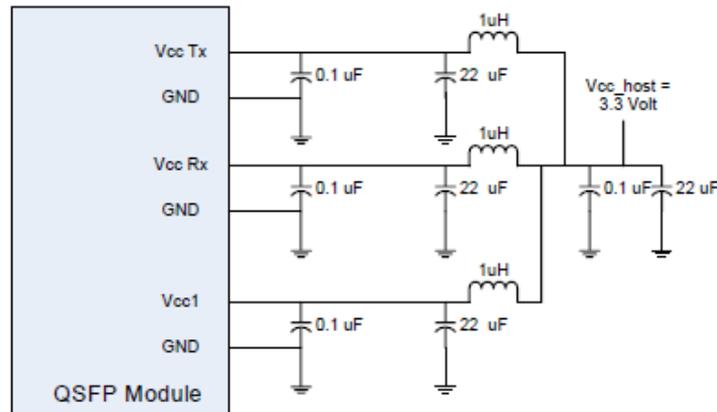# Recommended Host Board Power Supply Filter Network

Figure 2. Recommended Host Board Power Supply Filter Network

Recommended Application Interface Block Diagram

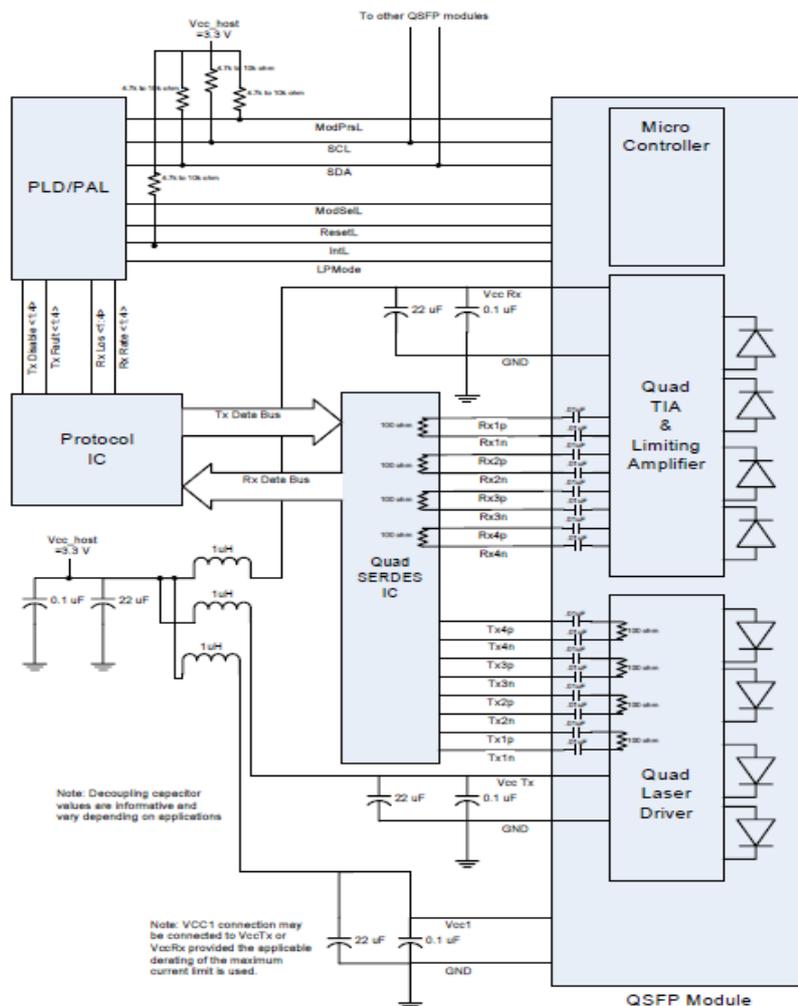
Figure 3. Recommended Application Interface Block Diagram

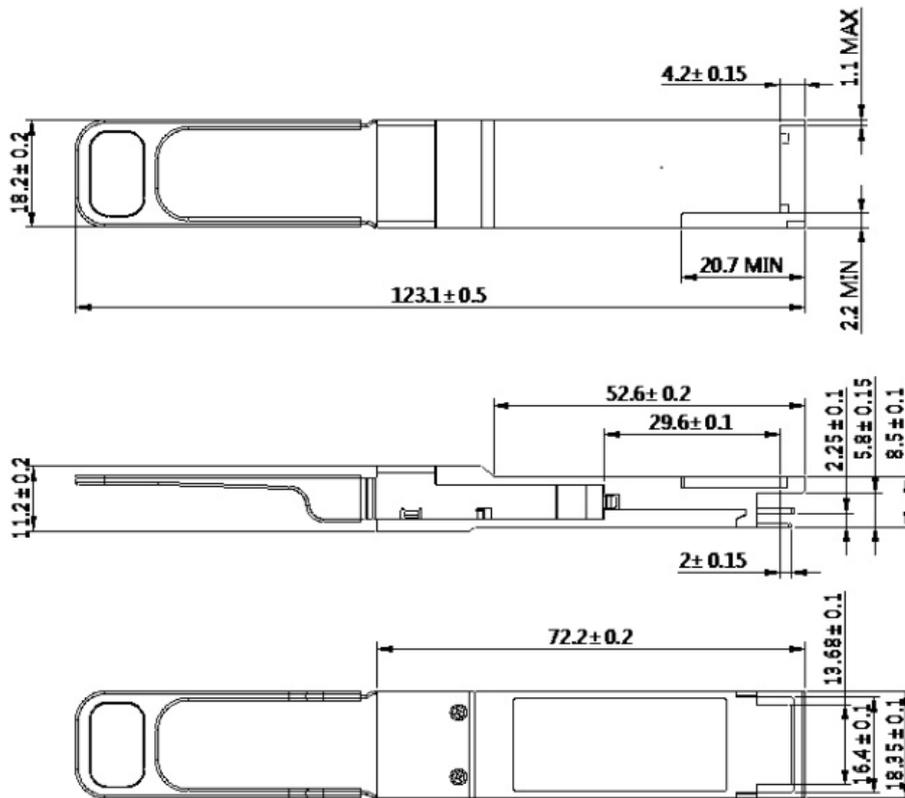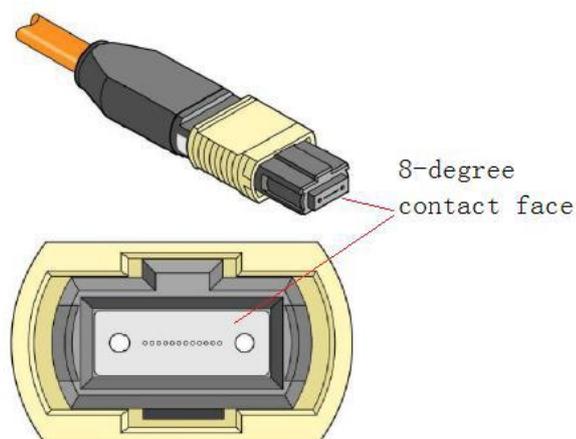# Mechanical specifications

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.

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