

## Product Features

- Compliant with IEEE Std 802.3ba, 40G Ethernet
- Compliant with QSFP+ MSA
- Management interface specifications per SFF-8436
- Single MPO connector receptacle
- 4 channels 850nm VCSEL array
- 4 channels PIN photo detector array
- Up to 10.3Gb/s per channel data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature:0°C to +70°C
- Up to 300m on OM3 MMF and 400m on OM4 MMF
- RoHS6 Compliant



## Applications

- 40GBASE-eSR4 40G Ethernet
- Infiniband QDR and DDR interconnects
- Fiber channel

## Descriptions

LX8001CDL QSFP+ transceivers are designed for use in 40Gb/s links over multimode fiber. They integrate four channel VCSEL array and four channel PIN photodiode array, each channel can operate at 10.3125G/s up to 300m using OM3 or 400m using OM4 MMF. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-eSR4.

LX8001CDL are compliant with RoHS.

## Ordering Information

**Table 1. Ordering Information**

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LX8001CDL	850nm VCSEL	-7.6 ~ +2.4dBm	PIN	< -9.5dBm	300m	0~ 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.

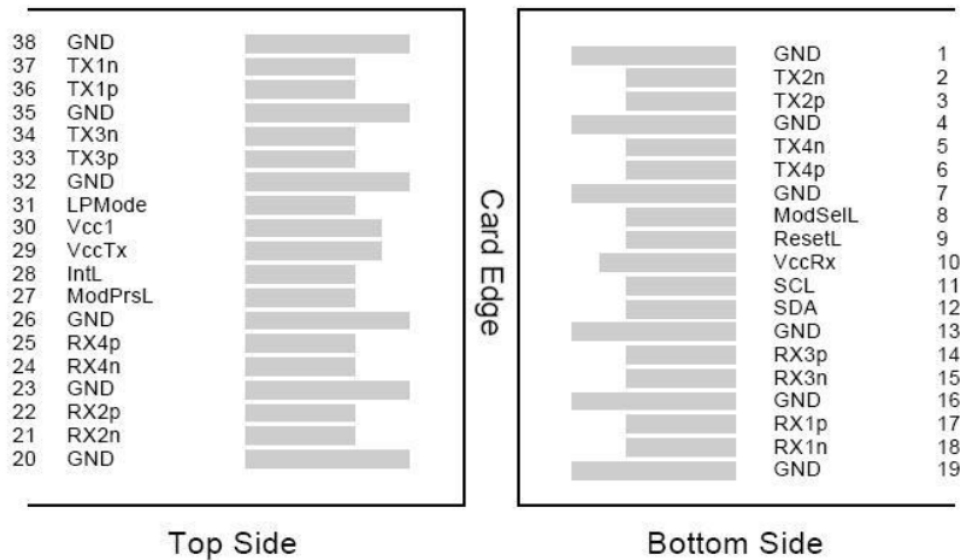


Figure 1. Host PCB QSFP+ pad assignment top view

## 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>	0	25	70	°C
Supply Voltage	V <sub>cc</sub>	3.135	3.3	3.465	V
Data Rate PER Channel	-	-	10.3125	-	Gb/s

## Transceiver Electrical Characteristics

**Table 5. Transceiver Electrical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	I <sub>cc</sub>	-	-	430	mA	-
Power Dissipation	P <sub>D</sub>	-	-	1.5	W	-
<b>Transmitter</b>						
Input Differential Impedance	Z <sub>IN</sub>	-	100	-	Ω	-
Differential Data Input Swing	V <sub>IN, P-P</sub>	180	-	900	mV <sub>P-P</sub>	-
<b>Receiver</b>						
Output Differential Impedance	Z <sub>O</sub>	-	100	-	Ω	-
Differential Data Output Swing	V <sub>OUT, P-P</sub>	300	-	850	mV <sub>P-P</sub>	1
Data Output Rise Time, Fall Time	t <sub>r</sub> , t <sub>f</sub>	28	-	-	ps	2

**Notes:**

- Internally AC coupled, but requires a external 100Ω differential load termination.
- 20 – 80 %.

## Transmitter Optical Characteristics

**Table 6. Transmitter Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P <sub>o</sub>	-7.6	-	+2.4	dBm	1
Center Wavelength Range	λ <sub>c</sub>	830	850	860	nm	-
Extinction Ratio	EX	3	-	-	dB	2
Spectral width(RMS)	Δλ	-	-	0.65	nm	-
Transmitter and Dispersion Penalty	TDP	-	-	3.2	dB	-
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
Eye Diagram	IEEE Std 802.3ba compatible					

**Notes:**

- The optical power is launched into OM3 MMF.
- Measured with a PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps.

## Receiver Optical Characteristics

**Table 7. Receiver Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ <sub>c</sub>	830	850	860	nm	-
Receiver Sensitivity (P <sub>avg</sub> )	S	-	-	-9.5	dBm	1
Damage Threshold	P <sub>OL</sub>	2.5	-	-	dBm	1
Optical Return Loss	ORL	12	-	-	dB	-

LOS De-Assert	LOS <sub>D</sub>	-	-	-11	dBm	-
LOS Assert	LOS <sub>A</sub>	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

**Notes:**

1. Measured with PRBS 2<sup>31</sup>-1 test pattern, 10.3125Gb/s, BER<10<sup>-12</sup>.

## Recommended Host Board Power Supply Filter Network

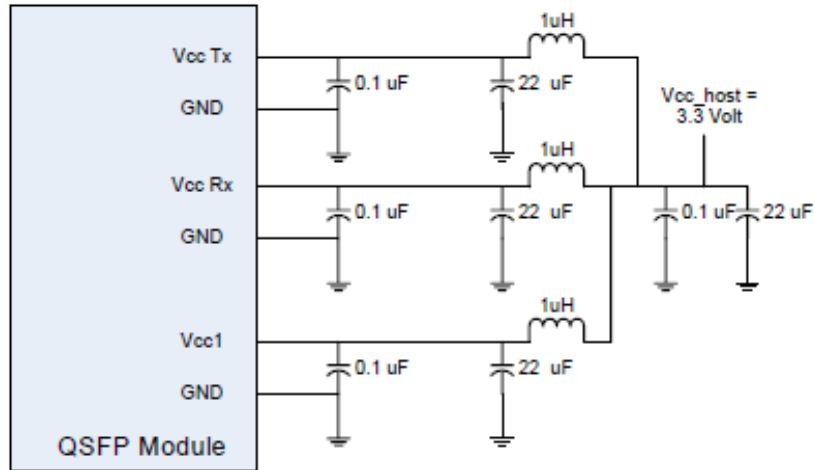


Figure 2. Recommended Host Board Power Supply Filter Network

## Recommended Application Interface Block Diagram

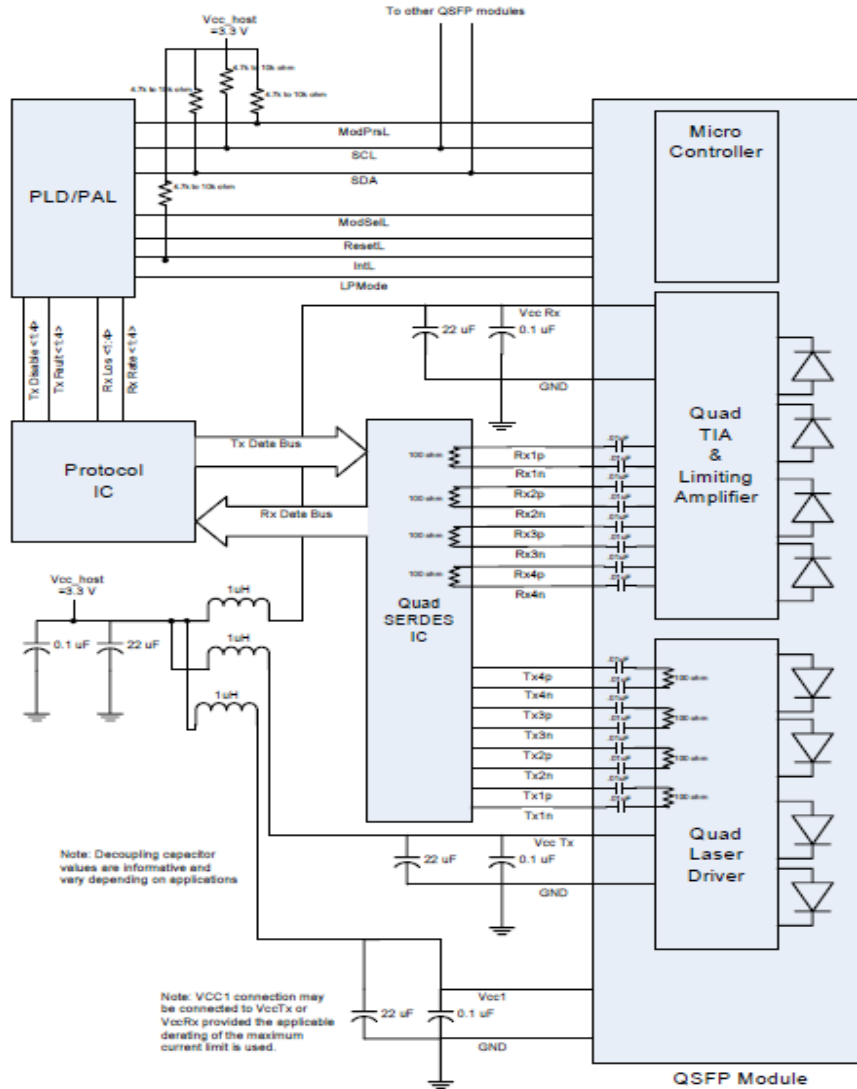


Figure 4. Recommended Application Interface Block Diagram

## Mechanical specifications

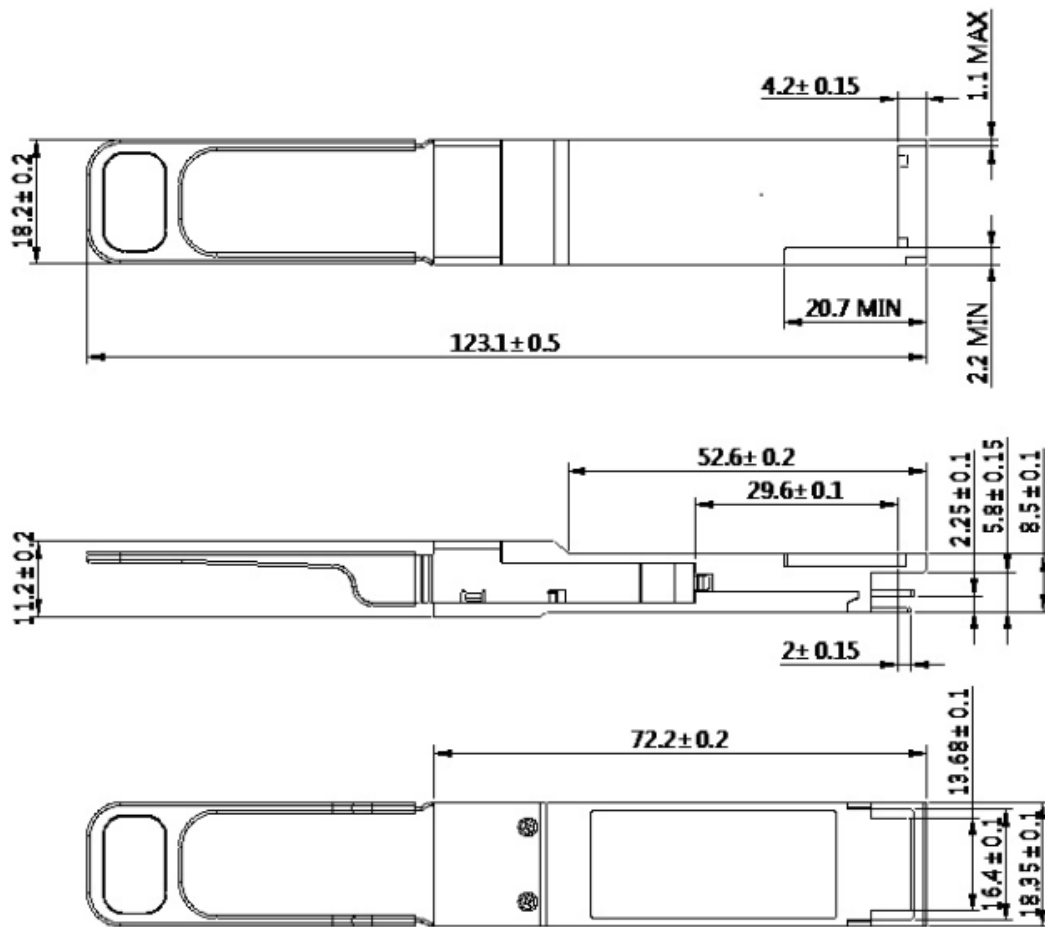


Figure 5. Outline Drawing

## For More Information

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