

Product Features

- Compliant with IEEE Std 802.3ba, 40G Ethernet LR4
- Compliant with QSFP+MSA
- Management interface specifications per SFF-8436
- 4 CWDM Lane Mux/Demux design
- 4 channels CWDM DFB
- 4 channels PIN photo detector
- Up to 11.1Gb/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 10km on SMF
- RoHS Compliant



Applications

- 40GBASE-LR4 40G Ethernet
- Fiber channel
- Data center

Descriptions

LX8002CDR QSFP+ transceivers are designed for use in 40Gb/s links over single mode fiber. They integrate four channel CWDM DFB laser, and multiplexes them into a single channel for 40Gb/s optical transmission; in receiver side, the module de-multiplexes 40Gb/s optical signal into four CWDM channels. Each channel operates at 10.3125G/s, the module can operate at 40Gb/s up to 10km using 9/125um SMF. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-LR4.

LX8002CDR are compliant with RoHS.

Ordering Information

Table 1. Ordering Information

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LX8002CDR	CWDM DFB	-7 ~ 2dBm	PIN	< -11.5dBm	10km	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 4.7K to 10K pull-up resistor to VccHost.

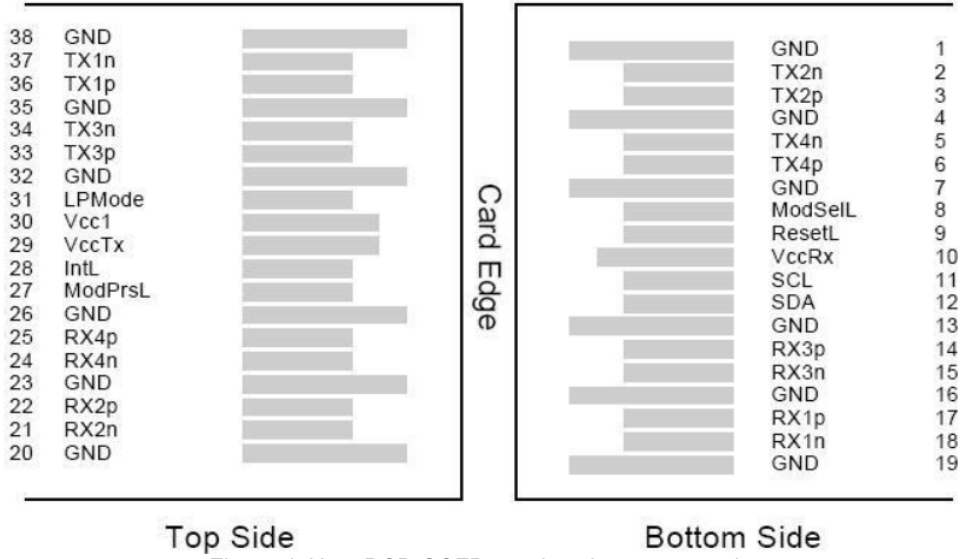


Figure 1. Host PCB QSFP+ pad assignment top view

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 _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	0	25	70	°C
Supply Voltage	V _{CC}	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 _{CC}	-	-	1100	mA	-	
Power Dissipation	PD	-	-	3500	mW	-	
Transmitter							
Input Differential Impedance	Z _{IN}	-	100	-	-	-	
Differential Data Input Swing	V _{IN, P-P}	180	-	900	mVP-P	-	
TX_FAULT	Transmitter Fault	V _{OH}	2.0	-	V _{CCHOST}	V	-
	Normal Operation	V _{OL}	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	V _{IH}	2.0	-	V _{CCHOST}	V	-
	Transmitter Enable	V _{IL}	0	-	0.8	V	-
Receiver							
Output Differential Impedance	Z _O	-	100	-	-	-	
Differential Data Output Swing	V _{OUT, P-P}	300	-	850	mVP-P	1	
Data Output Rise Time, Fall Time	t _r , t _f	28	-	-	ps	2	
RX_LOS	Loss of signal (LOS)	V _{OH}	2.0	-	V _{CCHOST}	V	3

Normal Operation	V_{OL}	0	-	0.8	V	3
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Notes:

1. Internally AC coupled, but requires a external 100 differential load termination.
2. 20 – 80 %.
3. LOS is an open collector output. Should be pulled up with 4.7k on the host board.

Transmitter Optical Characteristics

Table 6. Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power per lane	P_o	-7	-	+2	dBm	1
Total Launch Optical Power	P_o	-	-	+8	dBm	1
Center Wavelength Range	λ_0	1264.5	1271	1277.5	nm	-
	λ_1	1284.5	1291	1297.5	nm	-
	λ_2	1304.5	1311	1317.5	nm	-
	λ_3	1324.5	1331	1337.5	nm	-
Extinction Ratio	EX	3.5	-	-	dB	2
Spectral width(-20dB)	$\Delta\lambda$	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	2.3	dB	-
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
Pout @TX-Disable Asserted	P_{off}	-	-	-30	dBm	1
Eye Diagram	IEEE Std 802.3ba compatible					

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS $2^{31}-1$ test pattern @10.3125Gbps.

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ_c	1260	-	1340	nm	-
Receiver Sensitivity (OMA)	S	-	-	-11.5	dBm	1
Damage Threshold	P_{OL}	3.3	-	-	dBm	1
Optical Return Loss	ORL	26	-	-	dB	-
LOS De-Assert	LOS_D	-	-	-12	dBm	-
LOS Assert	LOS_A	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:

1. Measured with PRBS $2^{31}-1$ test pattern, 10.3125Gb/s, BER< 10^{-12} .

Recommended Host Board Power Supply Filter Network

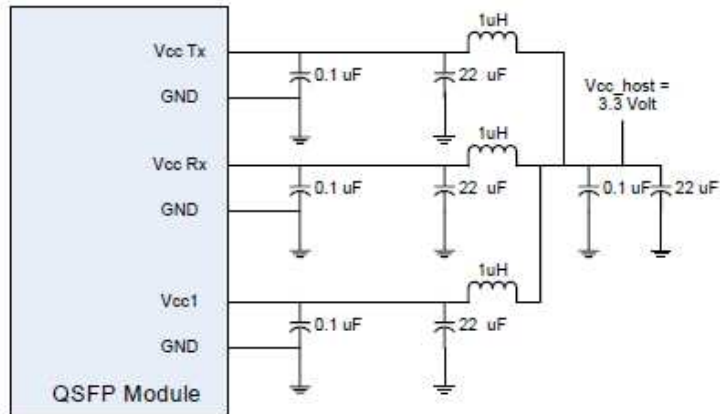


Figure 2. Recommended Host Board Power Supply Filter Network

Recommended Application Interface Block Diagram

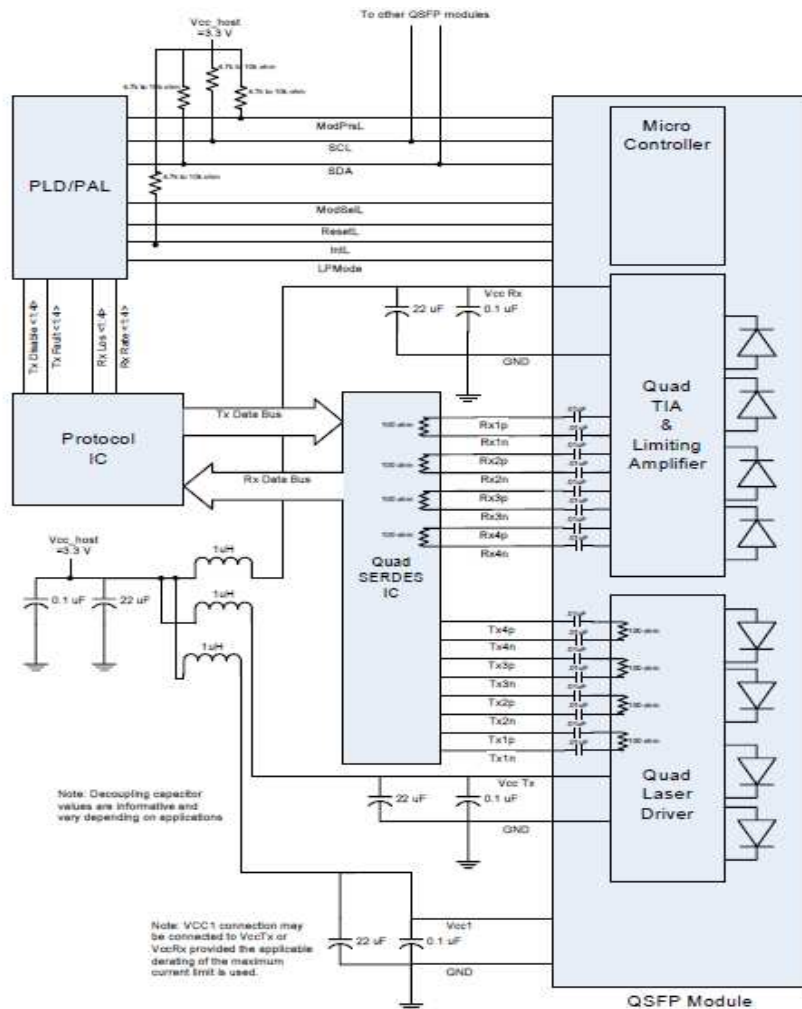


Figure 4. Recommended Application Interface Block Diagram

Mechanical specifications

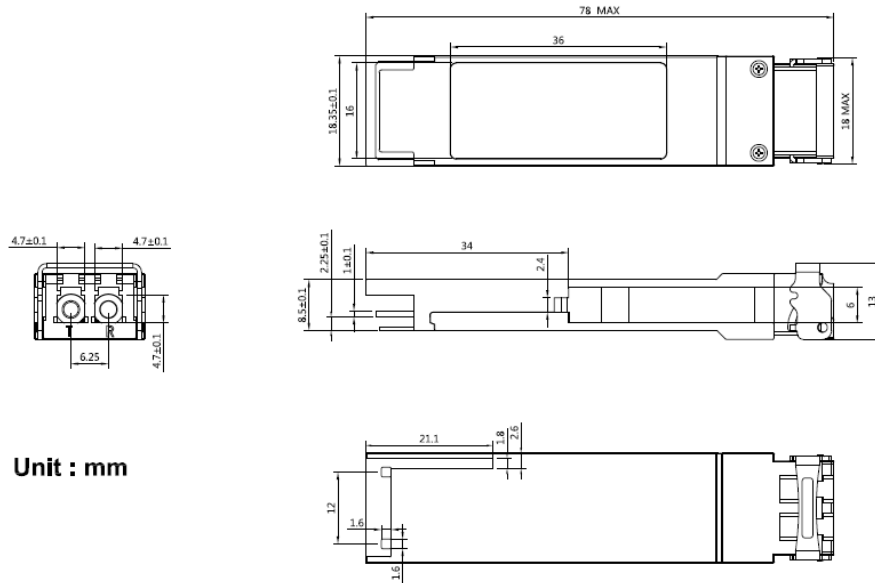


Figure 5. Outline Drawing

For More Information

Linktel Technologies Co., Ltd

sales@linkteltech.com

<http://www.linkteltech.com>

Linktel China

E12, No.52 Liufang Road, East-Lake Hi-tech Development Zone, Wuhan, China

Tel: +86 27 8792 9298

Linktel USA

1601 McCarthy Blvd #9, Milpitas, CA 95035, USA

linktelus@linkteltech.com

Tel: +1 408 807 0482