100GBase QSFP28 ER4 40KM Optical Transceiver Module

CC-QKKLL4L-SD

Features

- Hot Pluggable QSFP28 form factor
- Supports aggregate bit rate up to 103.125Gb/s
- LC Duplex optical interface
- 4x25Gb/s LAN-WDM transmitter, EML laser,APD array detector
- Operating case temperature:0 to 70 °C
- Low power consumption <4.5W
- Applicable for 40km SMF connection without FEC
- All-metal housing for superior EMI performance
- IIC management interface
- Single +3.3V power supply
- RoHS compliant (lead free)

Applications

- 100G ethernet
- Other optical links

Standards

- SFF8436,SFF-8636
- SFF-8665, SFF8661
- IEEE 802.3ba

Description

The 40km 100GBase-ER4 QSFP28 transceiver is designed to meet the requirements of 100G ethernet links over SMF up to 40km. It is compliant with QSFP28 MSA, IEEE 802.3ba. It is cost-effective, low power consumption with a single 3.3V power supply. The module has an aggregate bit rate up to 103.125Gbps by multiplexing of 4 independent LAN-WDM optical lanes, each lane capable of transmitting 25.78125Gb/s over 40km SMF with FEC. It is fabricated with all-metal and compact size housing for superior EMI performance.

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Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	-0.5		3.6	V
Storage Temperature Range	Ts	-40		85	°C
Relative Humidity - Storage	RH_S	0		95	%
Relative Humidity - Operating	RH_O	0		85	%
Static electrical discharge (human body model)	-	500	-	-	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	Tc	0	-	70	°C
Power Supply Voltage	V_{cc}	3.14	3.3	3.46	V
Total Power Consumption	P	-	-	4.5	W
Data Rate per lane	BR	-	25.78125	-	Gbps

Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential Input Voltage Swing	V_{IN}	180	-	900	mV
Tx Differential Input Impendence	Z_{IN}	-	100	-	Ω
Differential input return loss		Per 100Gbase-ER4			dB
Common mode input return loss		Per 100Gbase-ER4			dB
Receiver Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential output Voltage Swing	V_{OUT}	300	-	1200	mV
Rx Differential Output Impendence	Z_{OUT}	-	100	-	Ω
Differential output return loss		Per 100Gbase-ER4			dB
Common mode output return loss		Per 100Gbase-ER4			dB

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Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Characteristics						
Laser Type			EML			
Data Rate per lane	f_{DC}	-	25.78125	-	Gb/s	
Aggregate Data Rate	f_D	-	103.125	-	Gb/s	
Signal Speed Variation from Nominal	$\triangle f_D$	-100	-	100	ppm	
Lane Center Wavelength Range	λ	1294.53 - 1296.59			nm	
		1299.02 - 1301.09				
		1303.54 - 1305.63				
		1308.09 - 1310.19				
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Total Average launch Power	P_{TOTAL}	-	-	8.9	dBm	
Average Launch Power, each lane	P_{OUT}	-1	3	5	dBm	1
Optical Modulation Amplitude (OMA), each lane	P_{OMA}	0		5. 5	dBm	1
Average Launch Power of OFF transmitter, each lane	P_{OFF}	-	-	-30	dBm	
Extinction Ratio	ER	8.2		-	dB	
Transmit Reflectance	RFL	-	-	-12	dB	
Eye Diagram	Complies with 100Gbase-ER4 eye masks when filtered					
Receiver Characteristics						
Receiver Type			APD			
Data Rate per lane		-	25.78125	-	Gb/s	
Operating Central Wavelength	λ	1294.53 - 1296.59			nm	
		1299.02 - 1301.09				
		1303.54 - 1305.63				
		1308.09 - 1310.19				
Damage Threshold (OMA)		-5	-	-	dBm	
Receiver Sensitivity, each lane(OMA)	Sen_{OMA}	-	-18	-	dBm	2
Receiver Reflectance	RFL	-	-	-26	dB	
LOS Assert	LOSA	-30	-	-	dBm	
LOS De-Assert	LOSD	-	-	-25	dBm	
LOS Hysteresis	LOSH	0.5	3	5	dB	
Notes						

1. The Min data is bigger than IEEE 802.3ba specified low limit data to reach 40 km transmission.
2. BER=5x10^{-5},with Golden optical eye tested.

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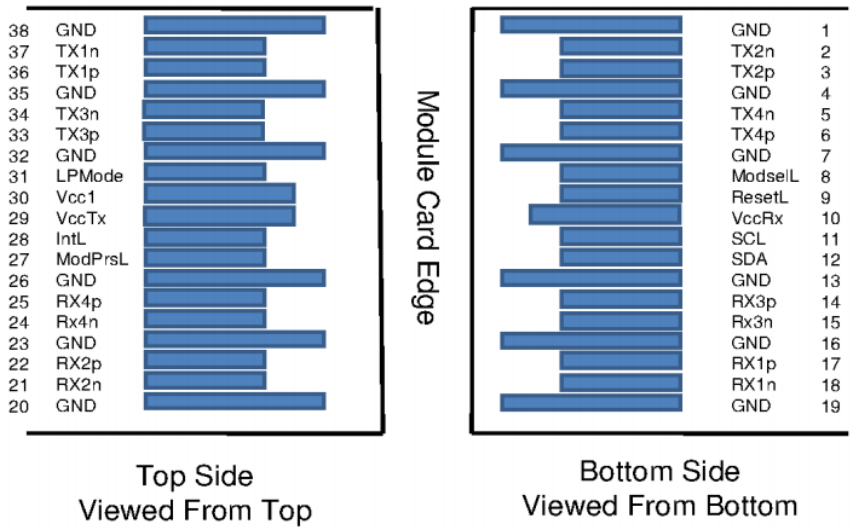
Pin Definitions



Pin	Symbol	Name/Description	Notes
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non -Inverted Data Input	
7	GND	Ground	
8	ModselL	Module Select (Low active, pull-up in module)	
9	RetsetL	Module Reset (Pull-up in module)	
10	V_{cc}Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	

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24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	V_{cc}Tx	+3.3V Power Supply transmitter	
30	V_{cc}1	+3.3V Power Supply	
31	LPMode	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

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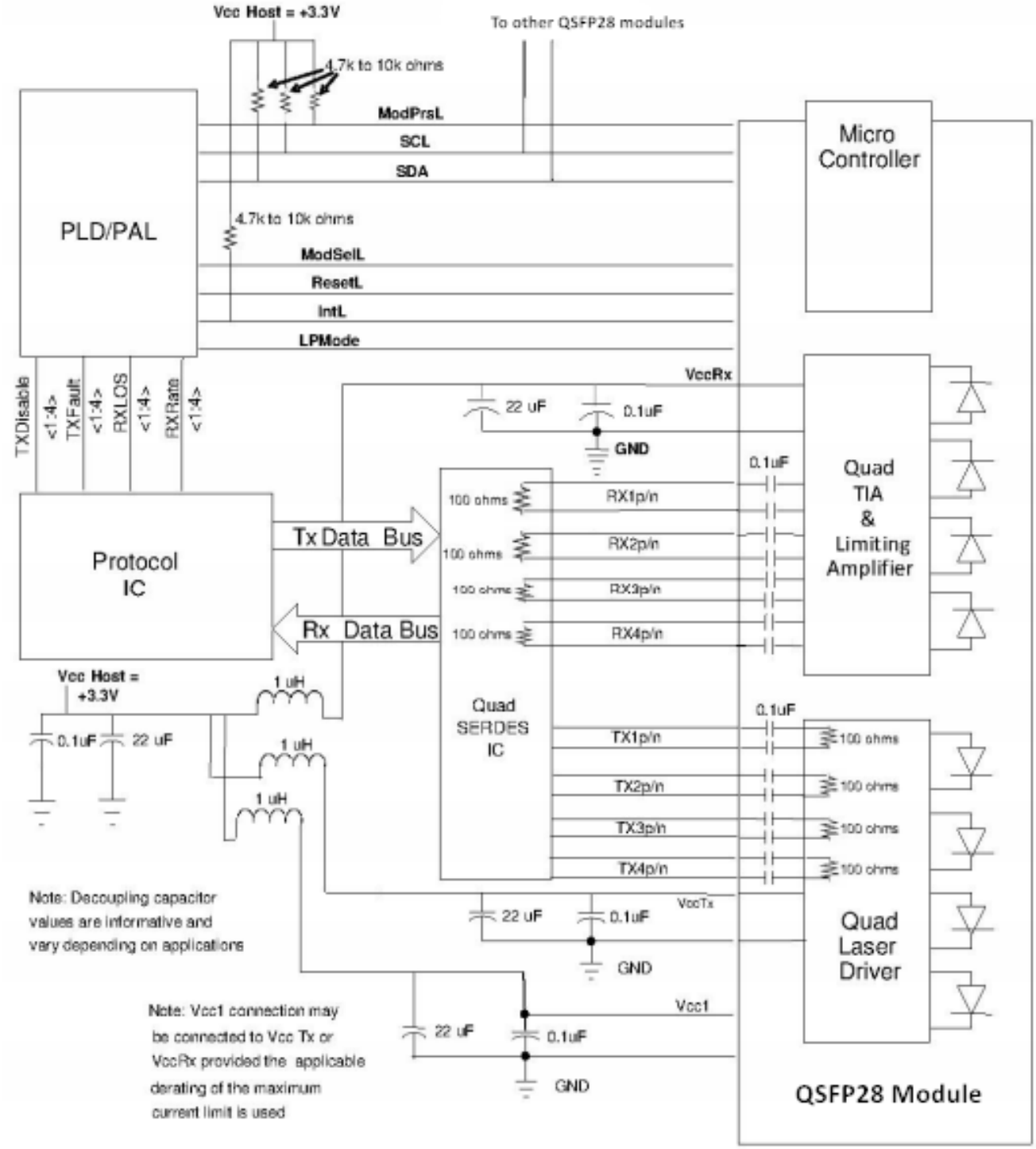
Recommended Interface Circuit



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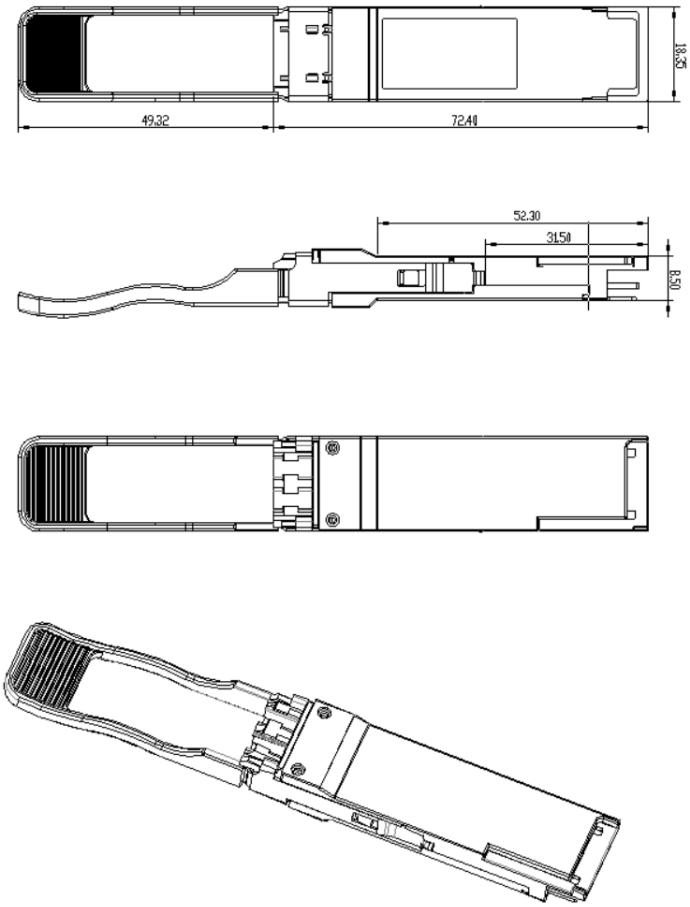
Mechanical Dimensions



Ordering information

Part Number	Product Description
CC-QKKLL4L-SD	QSFP28, 100Gbps, ER4, SM, 40km, 0ºC ~ +70ºC, With DDM

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Regulatory Compliance

Ccloud's transceiver is designed to be Class 1 Laser safety compliant and is certified per the following standards.

Agency	Standard	Certificate /Comments
ISO9001	GB/T 19001-2008/ISO 9001:2008	01 100 1532944
ISO14001	ISO 14001:2015	01 104 1532944
UL	UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07	20170123-E489408
TUV-MARK	EN 60950-1:2006+A11+A1+A12+A2	R 50251968
CE-EMC	EN 55032: 2015	17706703 003
	EN 55024: 2010+A1	
REACH	REACH SVHC 191	68.420.18.0794.01
FCC	FCC Rules and Regulations Part 15 Subpart B Class B	MTi160830E86C
RoHS	2011/65/EU and amendment (EU) 2015/863	68.420.17.1030.01

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ERRATA			
Date	**Rev No**	**Page**	**Description**
1 Apr 19	1.0	All	Initial Release.
4 Sep 19	1. 1	All	Renew the new “Ccloud”logo.
24 Oct 19	1.2	page1	Renew product picture.
12 Feb 20	1.3	page3	Correct “Laser Type” and “Receiver Type”.
12 Apr 20	1.4	page3	Renew the Damage Threshold and the Notes.

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