100Gbps 1294 -1310nm 40Km QSFP28 Optical Transceiver Module

S-QP1ALWL40-CD

Features

- Compliant with 100GBASE-ER4
- Support line rates from 103.125 Gbps to 111.81 Gbps
- Integrated LAN WDM TOSA / APD ROSA for up to 40 km reach over SMF with FEC / 30km without FEC
- Digital Diagnostics Monitoring Interface
- Duplex LC optical receptacle
- No external reference clock
- Electrically hot-pluggable
- Compliant with QSFP28 MSA with LC connector
- Power dissipation < 4.0 W
- Operating Temperature:0 to +70°C
- RoHS compliant (lead free)

Applications

- 100G Ethernet &100GBASE-ER4
- ITU-T OTU4

Standards

- Compliant to IEEE 802.3ba ,IEEE 802.3bm
- Compliant to SFF-8636

Description

100G QSFP28 ER4 Lite optical Transceiver integrates receiver and transmitter path on one module. In the transmit side, four lanes of serial data streams are recovered, retimed, and passed to four laser drivers. The laser drivers control 4- EML with center wavelength of 1296 nm, 1300nm, 1305nm and 1309 nm. The optical signals are multiplexed to a single –mode fiber through an industry standard LC connector. In the receive side, the four lanes of optical data streams are optically de-multiplexed by the integrated optical de-multiplexer. Each data stream is recovered by a APD and trans-impedance amplifier, retimed. This module features a hot-pluggable electrical interface, low power consumption and 2-wire serial interface.

product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP28 Multi-Source Agreement (MSA) and compliant to IEEE 802.3ba.

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Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	-0.3		3.6	V
Storage Temperature Range	Ts	-40		85	°C
Relative Humidity - Storage	RH_S	0		95	%
Relative Humidity - Operating	RH_O	0		85	%

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	3.47	V
Total Power Consumption	P	-	-	3.5	W
Data Rate	BR	-	25.78125	-	Gbps

Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential Input Voltage Swing	V_{IN}	180	-	1000	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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ptical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Characteristics						
Signaling rate per lane			25.78125		GBd	1
Lane center wavelengths(range)	λ	1294.53	1295.56	1296.59	nm	
		1299.02	1300.05	1301.09		
		1303.54	1304.58	1305.63		
		1308.09	1309.14	1310.19		
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Total Average launch Power	P_{TOTAL}	-	-	10.5	dBm	
Average Launch Power, each lane	P_{OUT}	-2.9	-	4.5	dBm	
Spectral Width (-20dB)	σ		-	1	nm	
Average Launch Power of OFF transmitter, each lane	P_{OFF}	-	-	-30	dBm	
Extinction Ratio	ER	4	-	-	dB	
Transmit Reflectance	RFL	-	-	-12	dB	
Output Eye Mask definition {X1，X2，X3，Y1，Y2，Y3}	{0.25，0.4，0.45，0.25，0.28，0.4}					
Receiver Characteristics						
Signaling rate per lane			25.78125		GBd	
Lane center wavelengths(range)	λ	1294.53	1295.56	1296.59	nm	
		1299.02	1300.05	1301.09		
		1303.54	1304.58	1305.63		
		1308.09	1309.14	1310.19		
Damage Threshold	THd	-3			dBm	1
Total Average Receive Power				2.0	dBm	
Receiver Sensitivity (OMA), each lane	SenOMA1	-	-16.5	-	dBm	1
Receiver Sensitivity (OMA), each lane	SenOMA2	-	-20.5	-19	dBm	2
LOS Assert	LOSA	-	-26	-	dBm	
LOS De-Assert	LOSD	-	-24	-	dBm	
LOS hysteresis	LOSH	0.5	-	-	dB	

Notes

1. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
2. 25.78125Gb/s,NRZ,PRBS 231-1,BER=$1x10^{-12}$.
3. 27.95249Gb/s,NRZ,PRBS 231-1,BER=$5x10^{-5.}$

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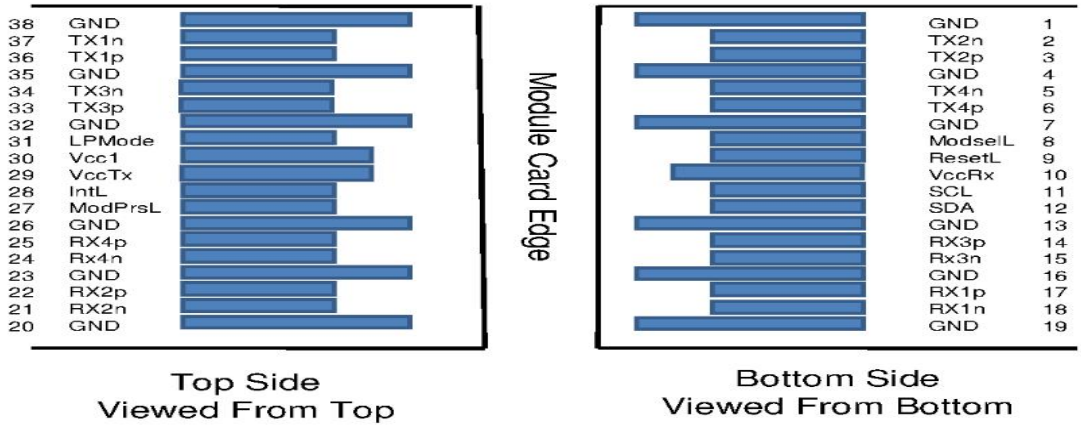
Pin Definitions



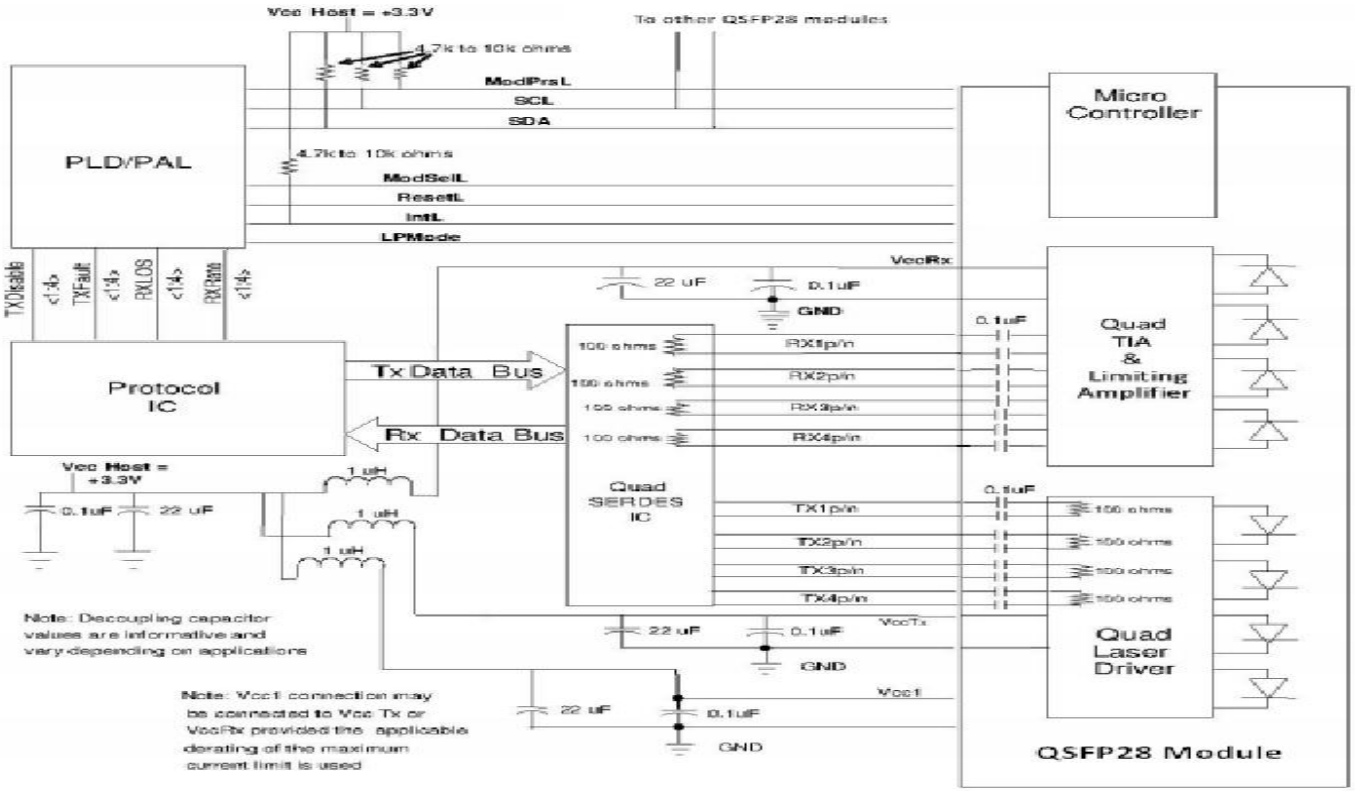
Pin	Symbol	Name/Description	Notes
1	GND	Ground.	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground.	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground.	1
8	ModSelL	Module Select.	
9	ResetL	Module Reset.	
10	VccRx	3.3V Power Supply Receiver.	2
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.	1
17	Rx1p	Receiver Non-Inverted Data Output.	
18	Rx1n	Receiver Inverted Data Output.	
19	GND	Ground.	1
20	GND	Ground.	1
21	Rx2n	Receiver Inverted Data Output.	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground.	1
24	Rx4n	Receiver Inverted Data Output	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground.	1
27	ModPrsl	Module Present	

28	IntL	Interrupt	
29	VccTx	3.3V power supply.	2
30	Vcc1	3.3V power supply.	2
31	LPMode	Low Power Mode	
32	GND	Ground.	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground.	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground.	1

Notes:

1. GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 mod-ule and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board sig-nal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recom-mended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

Recommended Interface Circuit



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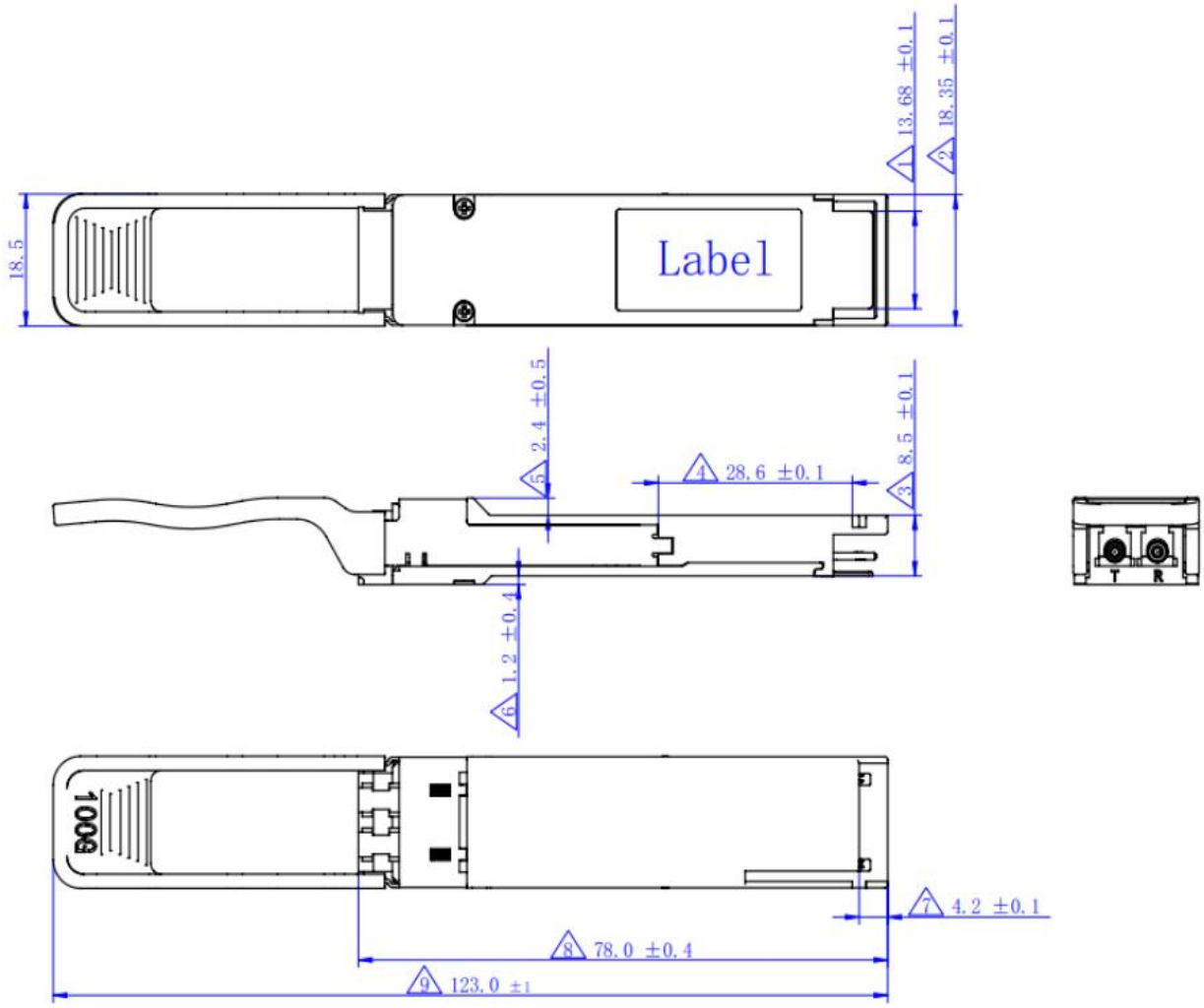
Mechanical Dimensions



Ordering information

Part Number	Product Description
S-QP1ALWL40-CD	QSFP28, 100Gbps,ER,1294-1310nm, SM, LC,40km, FEC,0ºC~+70ºC, With DDM