

100G/112Gbps 10Km QSFP28 Optical Transceiver Module

S-QP1ALWL10-CD-OUT

Features

- QSFP28 MSA compliant
- 4x25Gb/s or 4x28Gb/s electrical interface
- Supports 103.125Gb/s and 111.81Gb/s aggregate bit rate
- Up to 10km transmission on single mode fiber
- LC duplex connector
- 4-lane DFB and 4-lane Pin
- Single 3.3V power supply
- Maximum power consumption 4 Watts
- Operating Temperature: 0 to +70°C
- RoHS compliant (lead free)

Applications

- 100G ethernet
- 100GBASE-LR4 Ethernet
- OTN OTU4 411-9D1F
- Telecom networking
- Data Center Interconnect

Standards

- IEEE 802.3bm
- SFF-8636, SFF-8665, SFF-8679

Description

100GBase-LR4 QSFP28-OTU4 is designed for 10km optical communication applications. This module contains 4-lane DFB optical transmitter, 4-lane optical receiver and module management block including 2 wire serial interfaces. The optical signals are multiplexed to a single-mode fiber through an industry standard LC connector.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	-0.5		4	V
Storage Temperature Range	Ts	-40		85	°C
Relative Humidity - Storage	RH _s	0		95	%
Relative Humidity - Operating	RH _o	0		85	%

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Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	T _c	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	-	27.9525	-	Gbps

Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Differential Input Voltage Swing	V _{IN}	180	-	900	mV
Tx Differential Input Impedence	Z _{IN}	-	100	-	Ω
Differential input return loss		Per 100Gbase-LR4			dB
Common mode input return loss		Per 100Gbase-LR4			dB
Receiver Electrical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Differential output Voltage Swing	V _{OUT}	300	-	850	mV
Rx Differential Output Impedence	Z _{OUT}	-	100	-	Ω
Differential output return loss		Per 100Gbase-LR4			dB
Common mode output return loss		Per 100Gbase-LR4			dB

Optical Characteristics

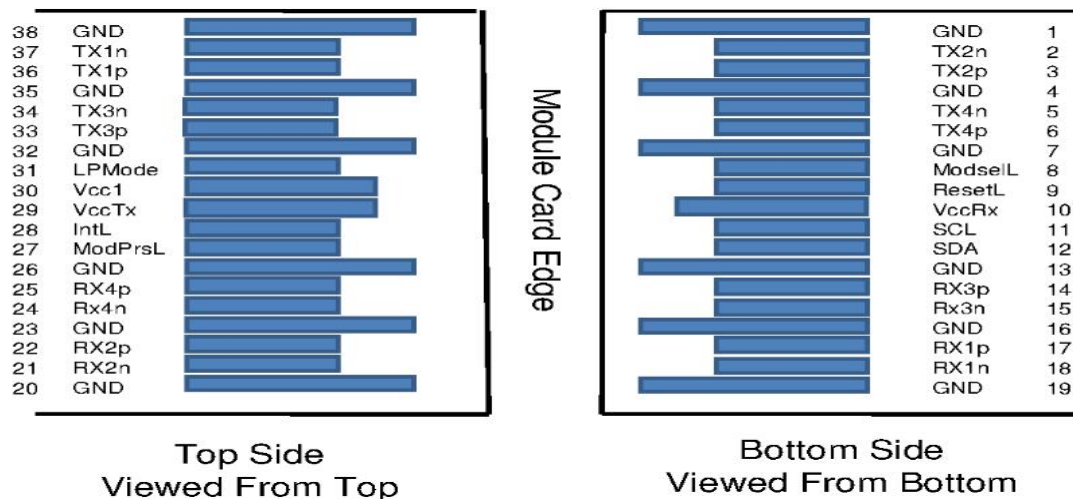
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Characteristics						
Signaling rate per lane		27.9525± 100 ppm			GBd	1
Lane center wavelengths(range)	λ	1294.53	-	1296.59	nm	
		1299.02	-	1301.09		
		1303.54	-	1305.63		
		1308.09	-	1310.19		
Total Average Launch Power	P _{out}	-	-	10.5	dBm	
Transmit OMA per Lane	TxOMA	-1.3	-	4.5	dBm	
Average Launch Power per Lane	TXPx	-0.6	-	4	dBm	
Extinction Ratio	ER	4	-	-	dB	

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Sidemode Suppression ratio		SMSR	30	-	-	dB	
Relative Intensity Noise		RIN	-	-	-130	dB/Hz	
Transmitter Reflectance Reflectance			-	-	-12	dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}			{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				2
Receiver Characteristics							
Signaling rate per lane			27.9525± 100 ppm			GBd	3
Lane center wavelengths(range)		λ	1294.53	-	1296.59	nm	
			1299.02	-	1301.09		
			1303.54	-	1305.63		
			1308.09	-	1310.19		
Average Receive Power per Lane		RXPx	-8.6	-	4.5	dBm	4
Receiver Sensitivity (OMA) per Lane		Rxsens	-	-	-8.4	dBm	
Receiver Reflectance			-	-	-26	dB	
LOS	Optical De-assert	Pd	-	-	-11.6	dBm	
	Optical Assert	Pa	-24	-	-		
LOS hysteresis			0.5	-	6	dB	
Notes							
1. Transmitter operating at 25.78125Gbps each channel. 2. Hit ratio 5x10 ⁻⁵ . 3. Receiver operating at 25.78125Gbps each channel. 4. Power value and power accuracy are with all channels on.							

Pin Definitions



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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.	
11	SCL	2-Wire serial Interface Clock.	
12	SDA	2-Wire serial Interface Data.	
13	GND	Ground.	1
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	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground.	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply.	
30	Vcc1	3.3V power supply.	
31	LPMODE	Low Power Mode	

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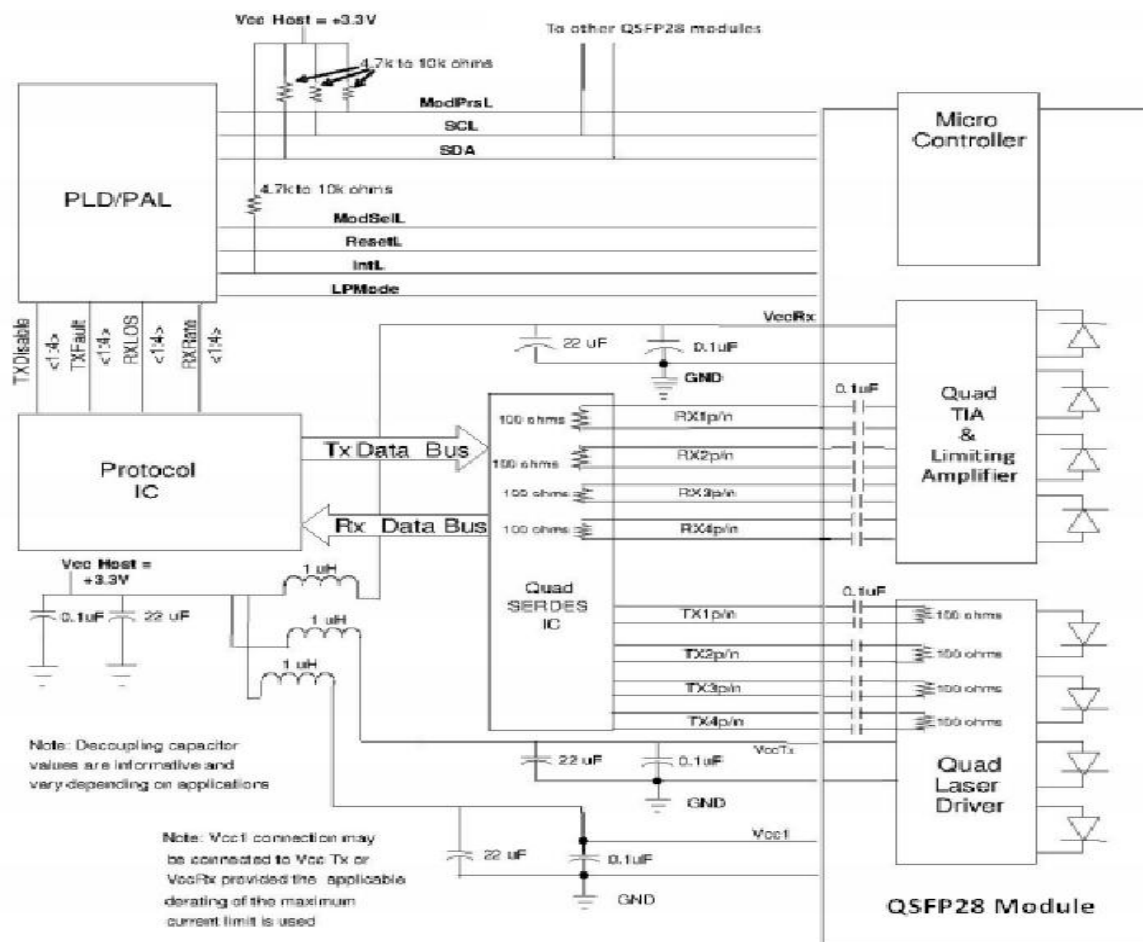
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32	GND	Ground.	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground.	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground.	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

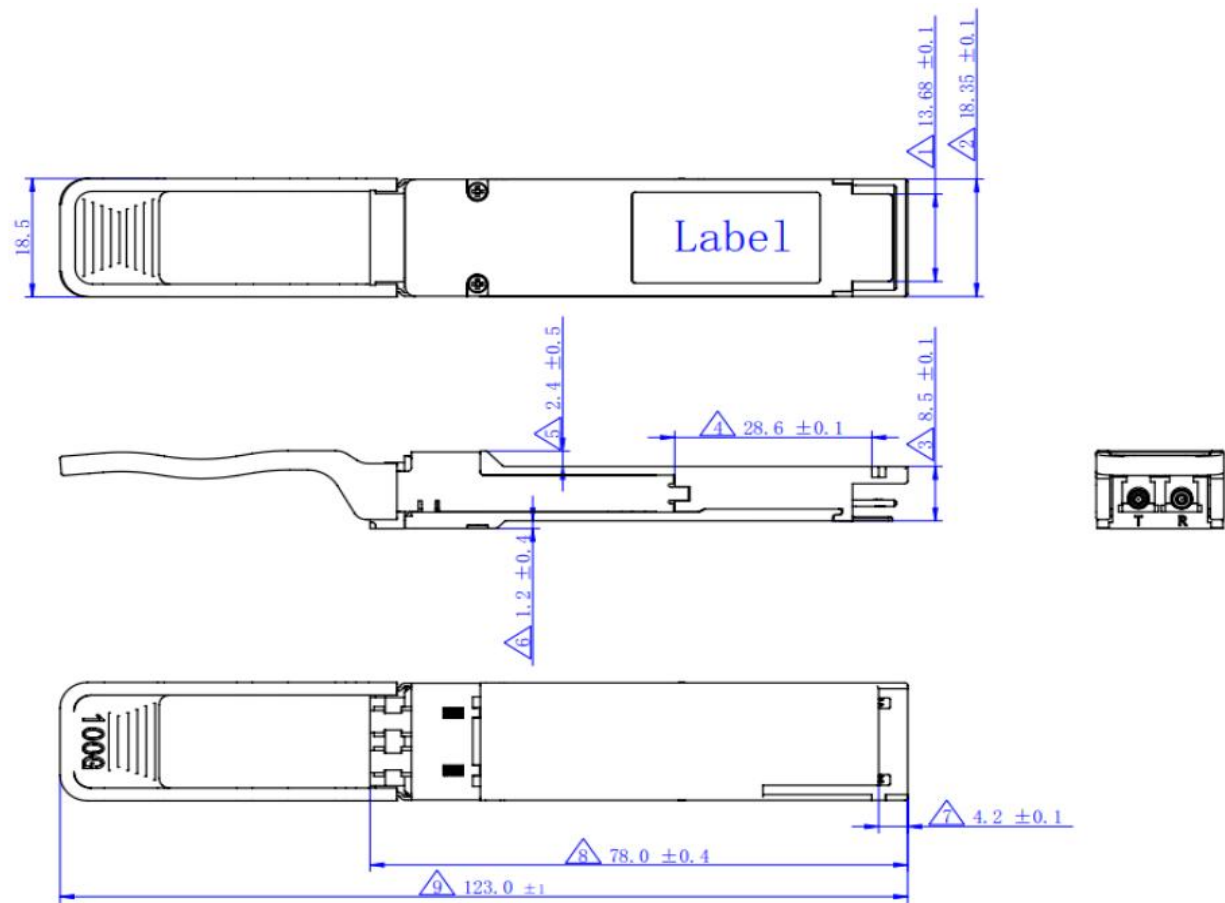
Recommended Interface Circuit



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Mechanical Dimensions



Ordering information

Part Number	Product Description
S-QP1ALWL10-CD-OUT	QSFP28, 100G/112Gbps,1294 -1310 nm, SM, LC,10km, 0°C~+70°C, With DDM,