QP1H-SM31LR4C

QSFP28 100Gb/s 1310nm 10km Transceiver

PRODUCT FEATURES

- Hot Pluggable QSFP28 form factor
- Supports aggregate bit rate up to 103.1Gb/s
- LC Duplex optical interface
- 4x25G/s LAN-WDM transmitter, PIN array detector
- Operating case temperature:0 to 70 °C
- Low power consumption <3.5W
- Applicable for 10km SMF connection
- All-metal housing for superior EMI performance
- IIC management interface
- Single +3.3V power supply
- RoHS compliant (lead free)

APPLICATIONS

- 100GBASE-LR4
- InfiniBand EDR

PRODUCT DESCRIPTION

Shenzhen Photonics Valley QP1H-SM31LR4C is designed to meet the requirements of 100G ethernet links over SMF up to 10km. It is compliant with QSFP28 MSA, IEEE 802.3ba and IEEE 802.3bm. It is cost-effective, low power consumption with a single 3.3V power supply. The module has an aggregate bit rate up to 103.1Gbps by multiplexing of 4 independent LAN-WDM optical lanes, each lane capable of transmitting 25.78125Gb/s over 10km SMF. It is fabricated with all-metal and compact size housing for superior EMI performance.

Ordering information

Product part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance	Temperature Range （Tcase）（℃）	
QP1H-SM31LR4C	103.125	SMF	1295.56, 1300.05, 1304.58, 1309.14	10km	0~70	Commercial

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	Vcc	-0.5		3.6	V
Storage Temperature	Ts	-40		85	°C
Humidity- Storage	RH_S	0		95	%
Humidity-Operating	RH_O	0		85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	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

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter						
Laser Type			DFB			
Data Rate per lane	-	-	25.78125	-	Gb/s	
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}	-	-	10.5	dBm	

Average Launch Power, each lane	P_{OUT}	-4.3	-	4.5	dBm	
Optical Modulation Amplitude (OMA), each lane	P_{OMA}	-1.3		4.5	dBm	
Launch Power in OMA minus TDP, each lane		-2.3	-	-	dBm	
Average Launch Power of OFF transmitter, each lane	P_{OFF}	-	-	-30	dBm	
Extinction Ratio	ER	4	-	-	dB	
Transmit Reflectance	RFL	-	-	-12	dB	
Eye Diagram	Complies with 100Gbase-LR4 eye masks when filtered					
Receiver						
Receiver Type		PIN				
Data Rate		-	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		5.5	-	-	dBm	
Receiver Sensitivity (OMA), each lane	Sen_{OMA}	-	-	-8.6	dBm	
Stressed Receiver Sensitivity (OMA), each lane	Sen_S	-	-	-6.8	dBm	1
Average Receive Power, each lane		-10.6	-	4.5	dBm	
Receiver Power, each lane (OMA)		-	-	4.5	dBm	
Receiver Reflectance	RFL	-	-	-26	dB	
LOS Assert	LOSA	-30	-	-	dBm	
LOS De-Assert	LOSD	-	-	-13	dBm	
LOS Hysteresis	LOSH	0.5	3	5	dB	

Notes

1. BER=10^{-12}

Electrical Characteristics

Transmitter					
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-LR4			dB
Common mode input return loss		Per 100Gbase-LR4			dB
Receiver					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential output Voltage Swing	V_{OUT}	300	-	850	mV
Rx Differential Output Impendence	Z_{OUT}	-	100	-	Ω
Differential output return loss		Per 100Gbase-LR4			dB
Common mode output return loss		Per 100Gbase-LR4			dB

Pin Description

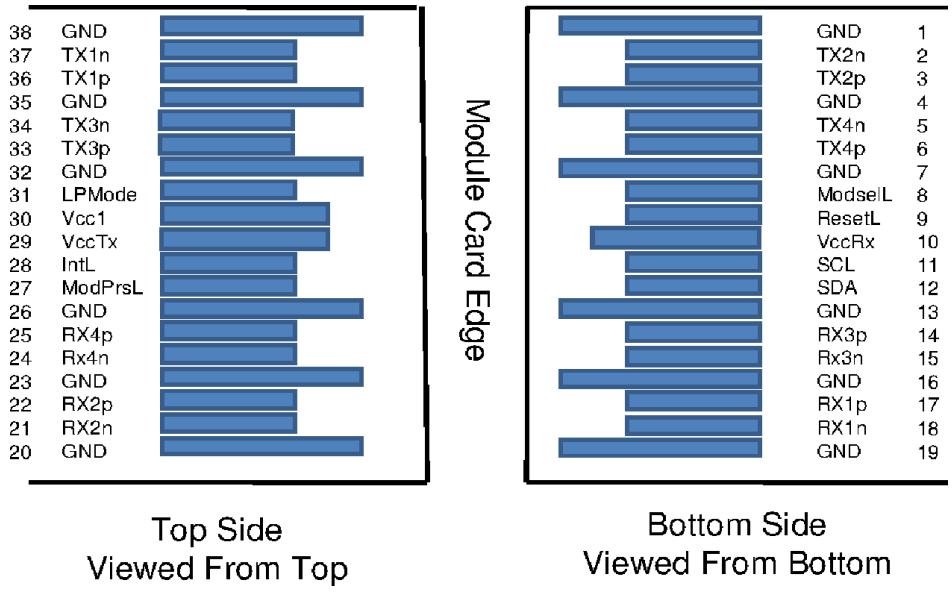
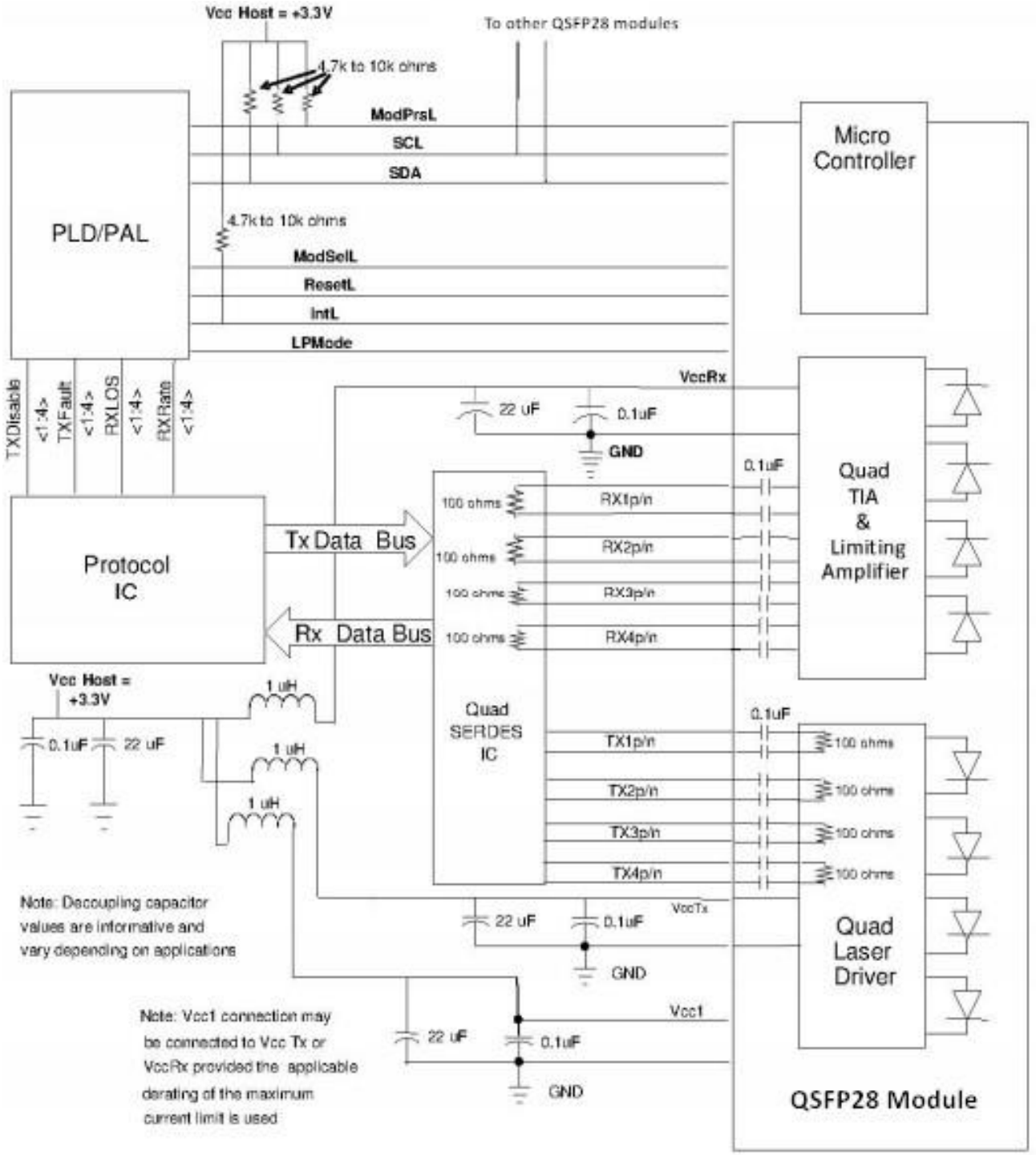


Diagram of Host Board Connector Block Pin Numbers and Name

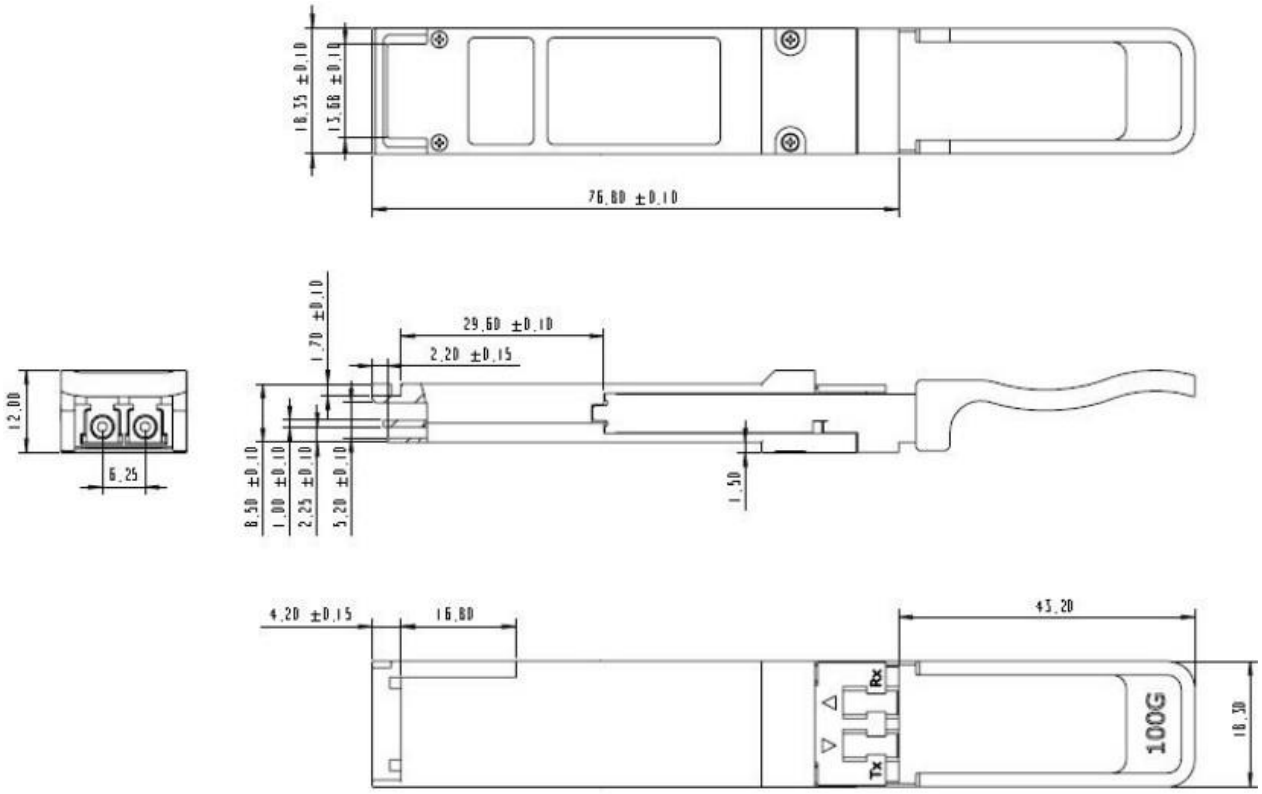
Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+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	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
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

Recommended Interface Circuit



Machnical Dimensions



Regulatory Compliance

Agency	Standard	Certificate /Comments
CE-EMC	EN 55032: 2015	17706703 003
	EN 55024: 2010+A1	
REACH	REACH SVHC 197	68.420.19.0344.01
FCC	FCC Rules and Regulations Part 15 Subpart B Class B	MTi190422E141C
RoHS	2011/65/EU and amendment (EU) 2015/863	68.420.17.1030.01