maXoptix™

40Gbps QSFP+ LR4 10km

Product Features

- Compliant with IEEE Std 802.3ba
- 40G Ethernet LR4
- Compliant with QSFP+ MSA
- Duplex LC receptacles
- 4x10Gb/s CWDM Transmitter
- 4x10Gb/s PIN Receiver
- Up to 10.3Gb/s per channel data links
- Operating case temperature (0°C~70°C)
- Up to 10km on 9/125µm SMF
- RoHS6 Compliant

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_S	-40	+85	℃
Supply Voltage	V_{CC}	-0.5	4.0	V
Relative Humidity	RH	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Case Temperature	T_C	0	25	70	℃	C-temp
Power Supply Voltage	V_{CC3}	3.135	3.3	3.465	V	
Data Rate PER Channel	-	-	10.3125	-	Gb/s	

Transmitter Optical Characteristic

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Launch Optical Power, each lane	P_{AVG}	-7	-	+2.3	dBm	
Optical Modulation Amplitude(OMA), each lane	P_{OMA}	-4	-	+3.5	dBm	
Difference in Launch Power between any two lanes (OMA)	P_{tx}, diff			4	dB	
Center Wavelength	λ0	1264.5	-	1277.5	nm	C-temp
	λ1	1284.5	-	1297.5	nm	
	λ2	1304.5	-	1317.5	nm	
	λ3	1324.5	-	1337.5	nm	
Extinction Ratio	ER	3.5	-	-	dB	

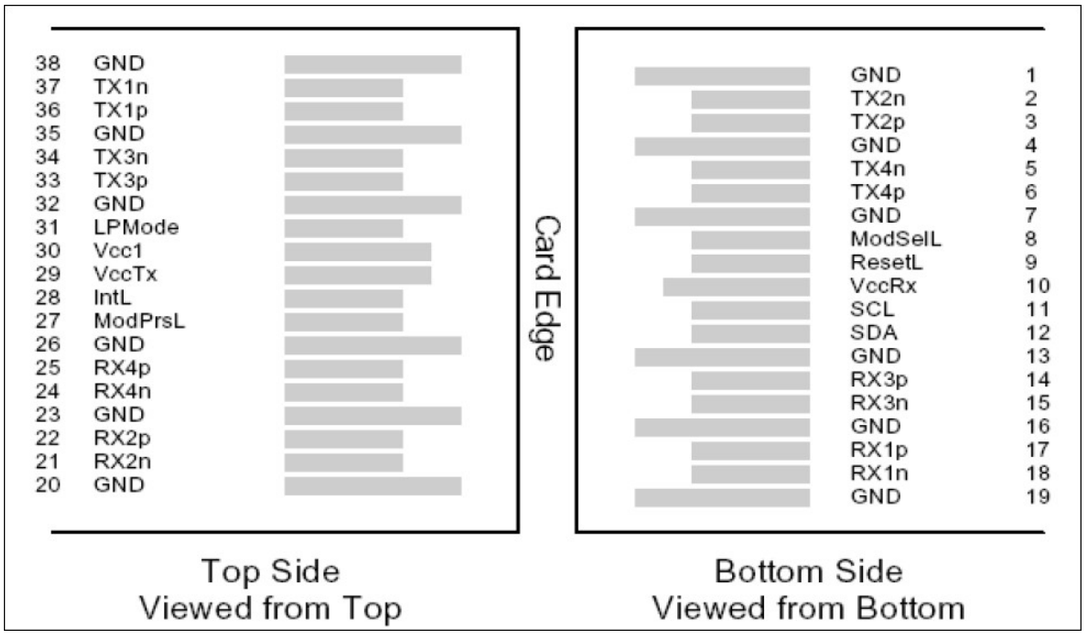
Spectral width(-20dB)	Δλ	-	-	1	nm	
Optical Return Loss Tolerance	TOL	-		12	dB	
Average launch power of OFF transmitter transmitter,each lane	P_{off}	-	-	-30	dBm	
Eye Mask {X1, X2, X3, Y1, Y2, Y3} Hit ratio $5x10^{-5}$ hits per sample	{0.23, 0.34, 0.43, 0.27, 0.35, 0.4}					

Receiver Optical Characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ0	1264.5	-	1277.5	nm	C-temp
	λ1	1284.5	-	1297.5	nm	
	λ2	1304.5	-	1317.5	nm	
	λ3	1324.5	-	1337.5	nm	
Damage threshold	THd	+3.3			dBm	
Overload, each lane	OVL	+2.3			dBm	
Receiver Sensitivity (P_{AVG}), each lane	S_{AVG}			-11.5	dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-13	dBm	
LOS Hysteresis	LOSH	0.5		6	dBm	

Transceiver Electrical Characteristic						
Parameter	**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**	**Note**
Module Supply Current	Icc			800	mA	
Power Dissipation	PD			2500	mW	
Transmitter						
-Single-ended Input Voltage Tolerance	-	-0.3	-	4.0	V	
Input differential impedance	ZIN	-	100		Ω	
Differential data input swing	VIN, P-P	180	-	900	mVP-P	
AC Common Mode Input Voltage Tolerance	-	15	-	-	mV	
Differential Input Voltage Swing Threshold	-	50	-	-	mVpp	
Receiver						
Single-ended Output Voltage Tolerance	-	-0.3	-	4.0	V	
Output Differential Impedance	ZO	90	100	110	Ω	
Differential Data Output Swing	VOUT, P-P	300	-	850	mVP-P	
AC Common Mode Output Voltage	-	-	-	7.5	mV	

Pin-out Definition



Pin Assignment

Pin	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	2
9	ResetL	Module Reset	2
10	Vcc Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	2
12	SDA	2-wire serial interface data	2
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	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	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	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 the QSFP28 module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the

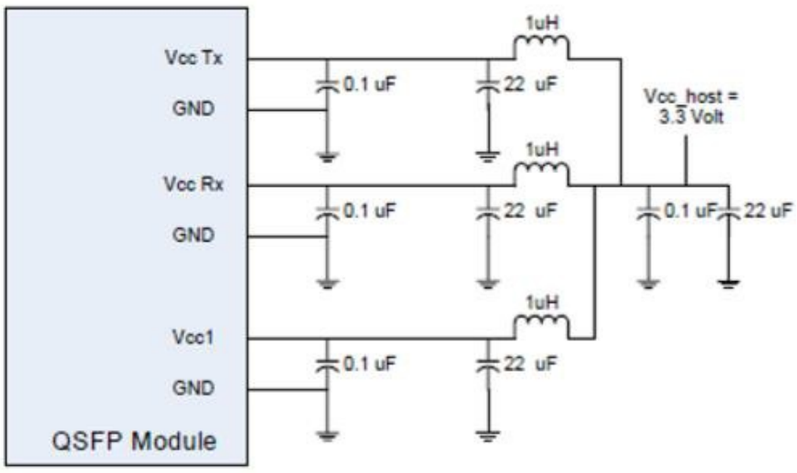
host board signal-common ground plane.

[2] VccRx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 7. VccRx, Vcc1 and VccTx may be internally connected within the QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 500 mA.

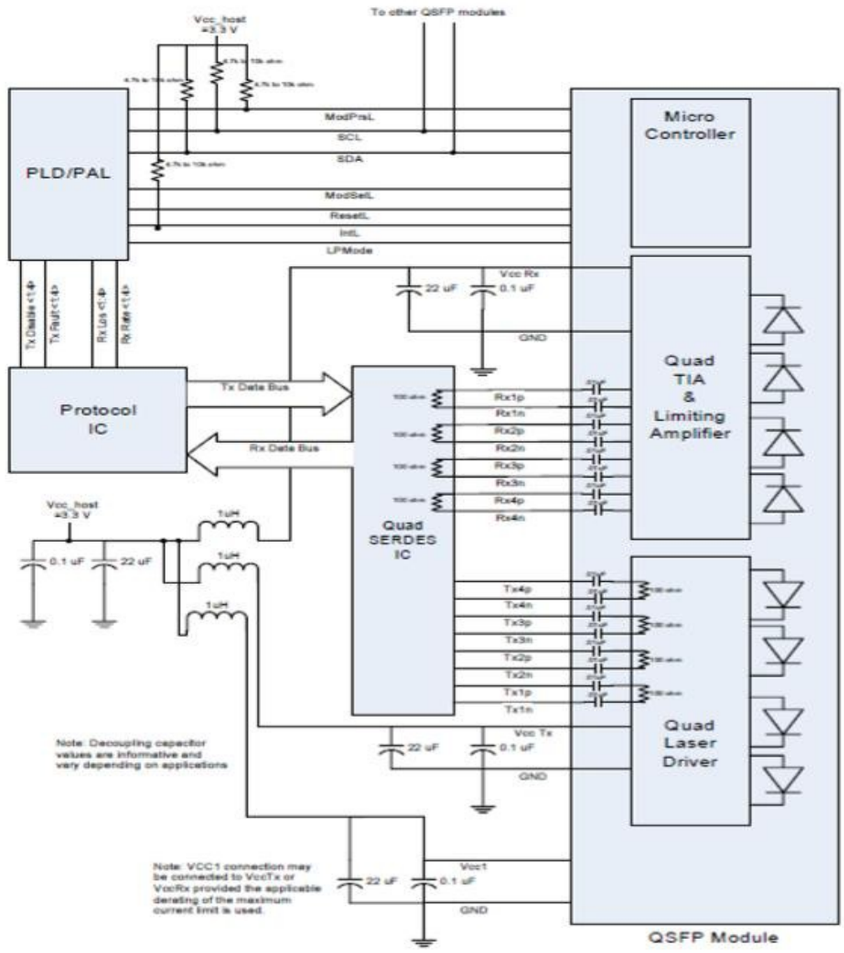
Digital Diagnostic Function

Parameters	Unit	Requirements
Temperature	℃	±3
Voltage	V	±3%
Ibias	mA	±10%
Tx power	dB	±2
Rx power	dB	±2

Recommended Host Board Power Supply Filter Network

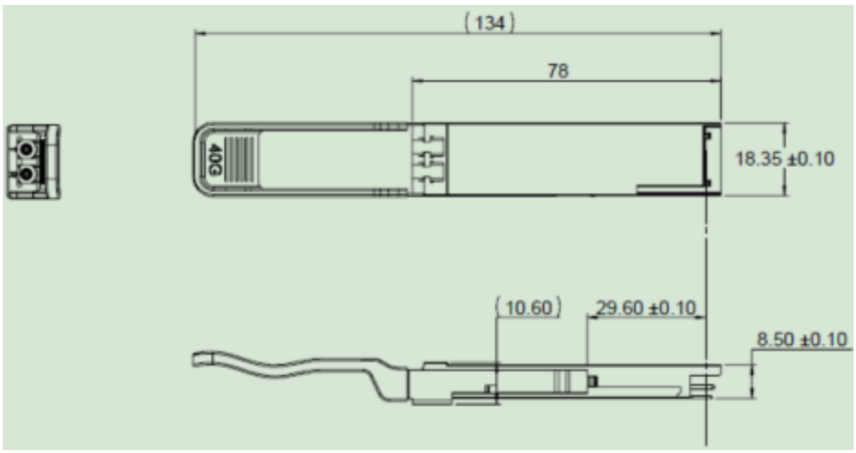


Recommended Application Interface Block Diagram



Mechanical Dimensions

Unit is millimeter. All dimensions are ±0.1mm unless otherwise specified.



Ordering Information

Part Number	Center Wavelength	Output Power	Receiver	Sensitivity	Temp	RoHS	Reach
OPTX-QSFP-40-LR4	1270nm	-7 ~ +2.3dBm	PIN	≤11.5dBm	0 ~ 70℃	Compliant	10km
OPTX-QSFP-40-LR4-M	1290nm	-7 ~ +2.3dBm	PIN	≤11.5dBm	0 ~ 70℃	Compliant	10km
OPTX-QSFP-40-LR4-T	1310nm	-7 ~ +2.3dBm	PIN	≤11.5dBm	0 ~ 70℃	Compliant	10km
	1330nm	-7 ~ +2.3dBm	PIN	≤11.5dBm	0 ~ 70℃	Compliant	10km

VERSION UPDATE:

VERSION NO.	DATE	UPDATED INFORMATION
V20161101	20161101	1. NEW PUBLISHED
V20180729	20180729	2. ADDED MONITOR AND TRANSMIT ONLY

NOTICE:

OptiX² reserves the right to make changes to this product in this specification without notice, in order to improve product performance.