maXoptix™

OPTX-QSFP-40G-PIR4

40G 1310 SMF 4X10Gb PIR4, MPO

Product Features

- 4 Parallel lanes design
- Compliant with QSFP+MSA
- Management interface specifications per SFF-8436
- 4 lanes FP Tx 1310 Laser and Rx PIN photo detector
- Up to 11.2Gb/s per channel data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature:0°C to +70°C
- Up to 1.4km on SMF
- RoHS Compliant

Applications

- 40GBASE-IR4 Ethernet
- Infiniband QDR, DDR and SDR
- Data center
- Tx only and Rx only options for Network Monitoring

Description

OPTX-QSFP-40G-PIR4-M QSFP+ transceivers are designed for use in 40Gb/s links over single mode fiber. They are integrated over four independent transmit and receive channels. Each channel operates at 10.3125G/s, the module can operate at 40Gb/s up to 1.4km using 9/125um SMF. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-IR4, the optical fiber ribbon cable with the MPO(MTP) connector. This optical transceiver is compliant with RoHS.

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Pin Description

Table 2. Pin Description

Pin	Name	Function/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	
3	Tx2+	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	2
9	ResetL	Module Reset	2
10	VccRx	3.3V Power Supply Receiver	
11	SCL	2-Wire serial Interface Clock	2
12	SDA	2-Wire serial Interface Data	2
13	GND	Transmitter Ground (Common with Receiver Ground)	1
14	Rx3+	Receiver Non-Inverted Data Output	
15	Rx3-	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1+	Receiver Non-Inverted Data Output	
18	Rx1-	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2-	Receiver Inverted Data Output	
22	Rx2+	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4-	Receiver Inverted Data Output	1
25	Rx4+	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver 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	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3+	Transmitter Non-Inverted Data Input	
34	Tx3-	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:
1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.

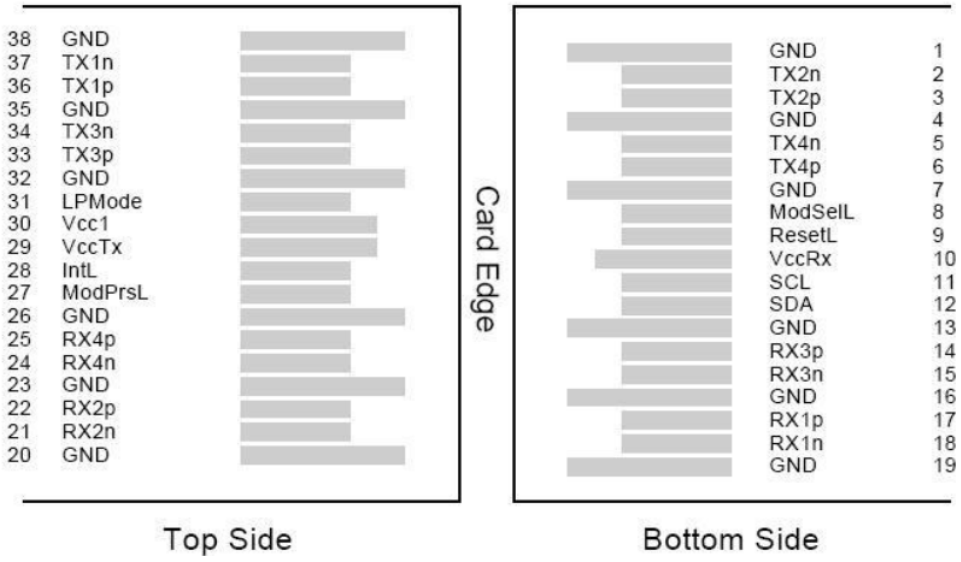

Figure 1: Host PCB QSFP+ Pad Assignment (Top View)

Transceiver Diagram block

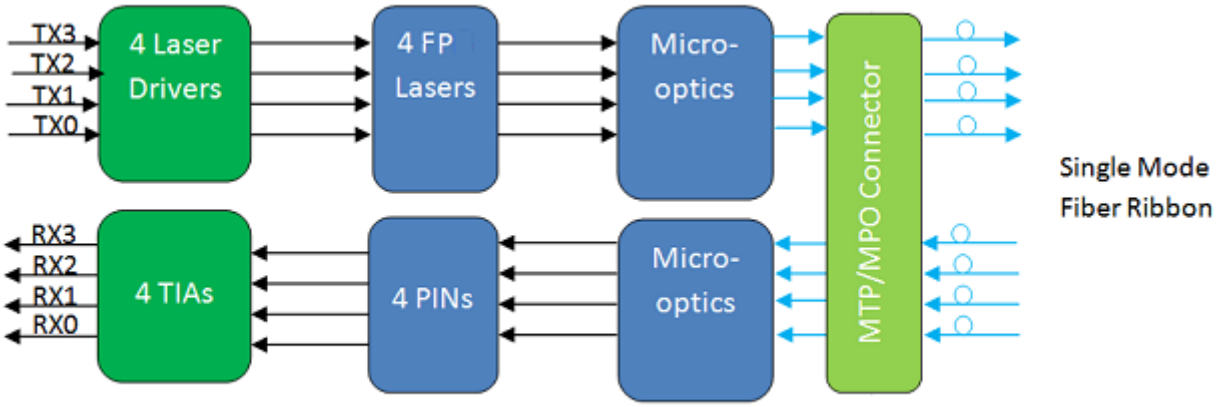

Figure 2: Transceiver Block Diagram

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Table 3. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T_S	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V_{CC}	-0.5	4.0	V

Recommended Operating Conditions

Table 4. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	0	25	70	°C
Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Data Rate PER Channel	-	-	10.3125	11.2	Gb/s

Transceiver Electrical Characteristics

Table 5. Transceiver Electrical Characteristics

Parameter		Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current		Icc	-	-	1100	mA	-
Power Dissipation		P_D	-	-	3500	mW	-
Transmitter							
Input Differential Impedance		Z_{IN}	-	100	-	Ω	-
Differential Data Input Swing		$V_{IN,\ P\text{-}P}$	180	-	900	$mV_{P\text{-}P}$	-
TX_FAULT	Transmitter Fault	V_{OH}	2.0	-	V_{CCHOST}	V	-
	Normal Operation	V_{OL}	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	V_{IH}	2.0	-	V_{CCHOST}	V	-
	Transmitter Enable	V_{IL}	0	-	0.8	V	-
Receiver							
Output Differential Impedance		Z_O	-	100	-	Ω	-
Differential Data Output Swing		$V_{OUT,\ P\text{-}P}$	300	-	850	$mV_{P\text{-}P}$	1

Data Output Rise Time, Fall Time		t_r, t_f	28	-	-	ps	2
RX_LOS	Loss of signal (LOS)	V_{OH}	2.0	-	V_{CCHOST}	V	3
	Normal Operation	V_{OL}	0	-	0.8	V	3

Notes:
1. Internally AC coupled, but requires a external 100Ω differential load termination.
2. 20 – 80 %.
3. LOS is an open collector output. Should be pulled up with 4.7kΩ on the host board.

Transmitter Optical Characteristics

Table 6. Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power per lane	Po	-5.2	-	+0.5	dBm	1
Center Wavelength Range	Λ0	1260	1310	1360	nm	-
Extinction Ratio	EX	3.5	-	-	dB	2
Spectral width(RMS)	Δλ	-	-	3.5	nm	-
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
Pout @TX-Disable Asserted	P_{off}	-	-	-30	dBm	1
Eye Diagram	IEEE Std 802.3ba compatible					

Notes:
1. The optical power is launched into SMF.
2. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps.

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λc	1260	-	1360	nm	-
Receiver Sensitivity (OMA)	S	-	-	-12.6	dBm	1
Damage Threshold	P_{OL}	0.5	-	-	dBm	1
LOS De-Assert	LOS_D	-	-	-15	dBm	-
LOS Assert	LOS_A	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:
1. Measured with PRBS 231-1 test pattern, 10.3125Gb/s, BER<10-12.
2. Recommended Host Board Power Supply Filter Network

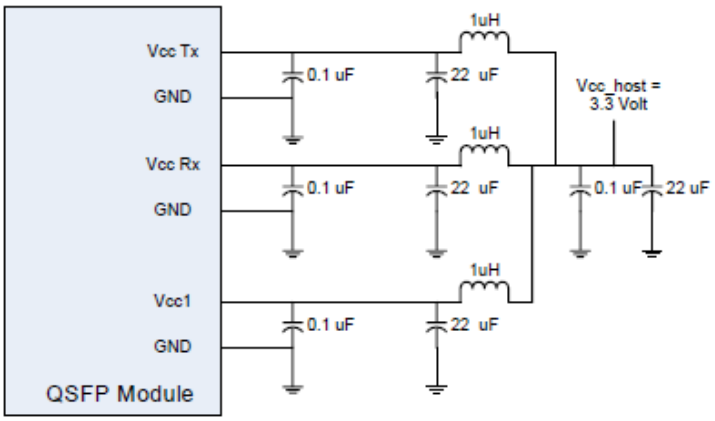

Figure 3: Recommended Host Board Power Supply Filter Network

Recommended Application Interface Block Diagram

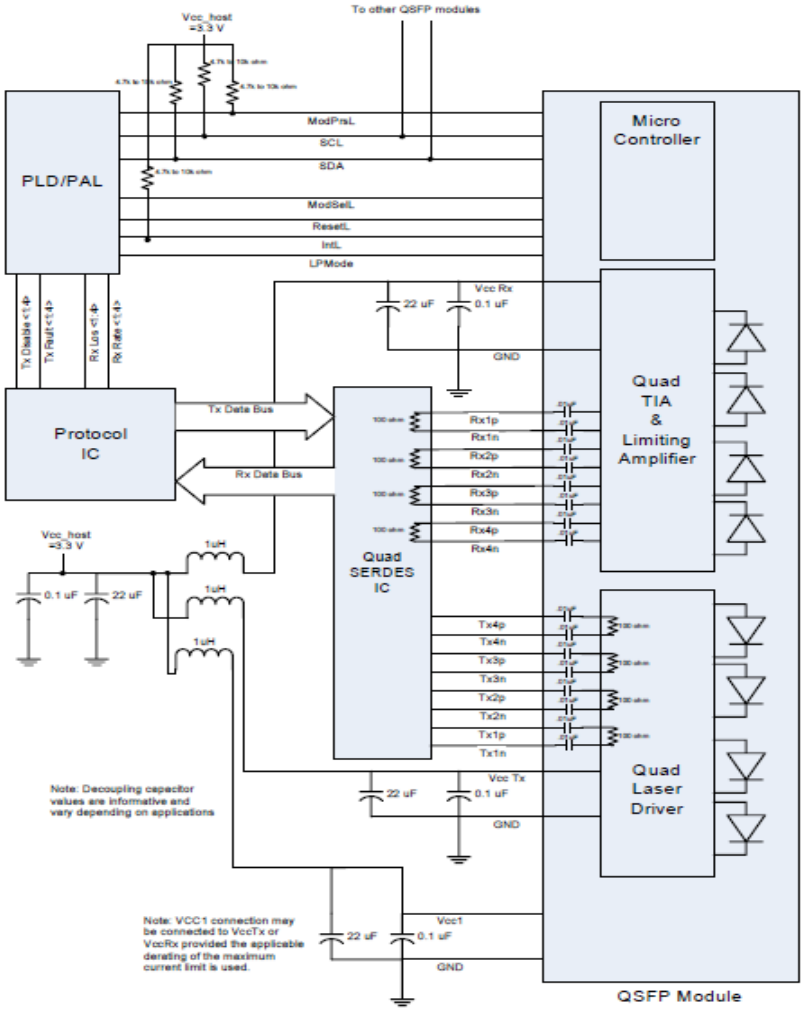

Figure 4: Recommended Application Interface Diagram

Mechanical specifications

Unit:mm

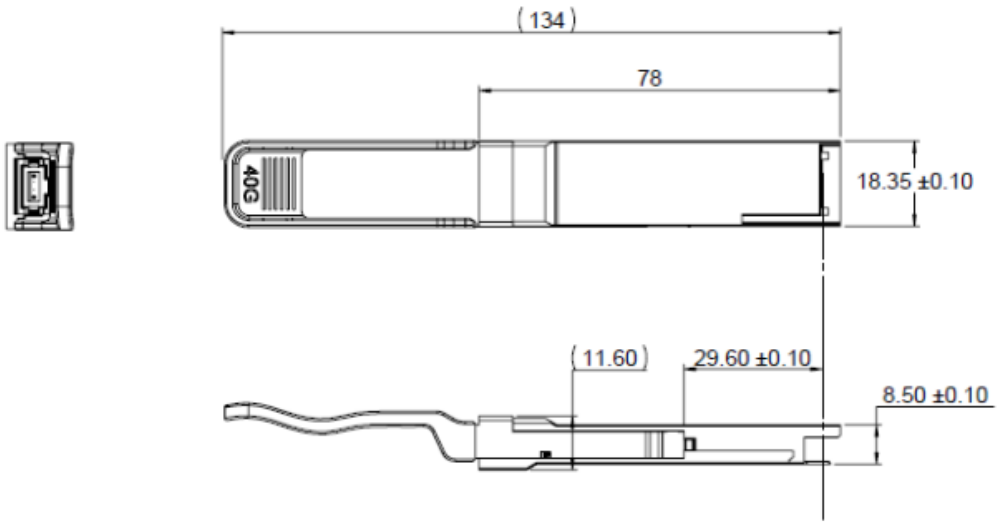

Figure 5: Mechanical Drawing

Attention: To minimize MPO connection induced reflections, an MPO receptacle with 8-degree angled end-face is utilized for this product. A female MPO connector with 8-degree end-face should be used with this product as illustrated in below Figure.

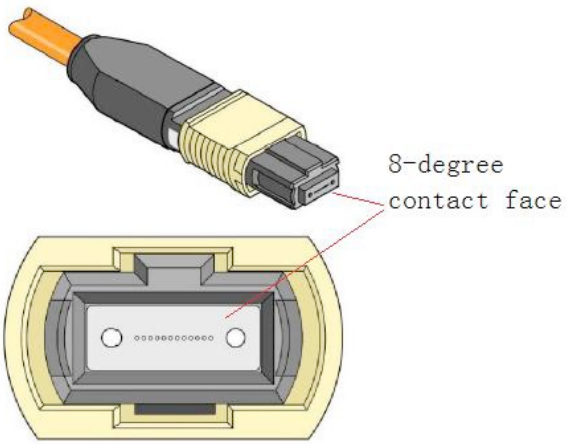

Figure 6: MTP End-Face

Ordering Guide

OptiX^2's 40G PIR4 transceiver can be ordered as a standard transceiver or configured for Tx only or Rx only. Use the following part numbers to order the version you need for your application:

- OPTX-QSFP-40-PIR4
- OPTX-QSFP-40-PIR4-T (Tx only)
- OPTX-QSFP-40-PIR-M (Rx only)