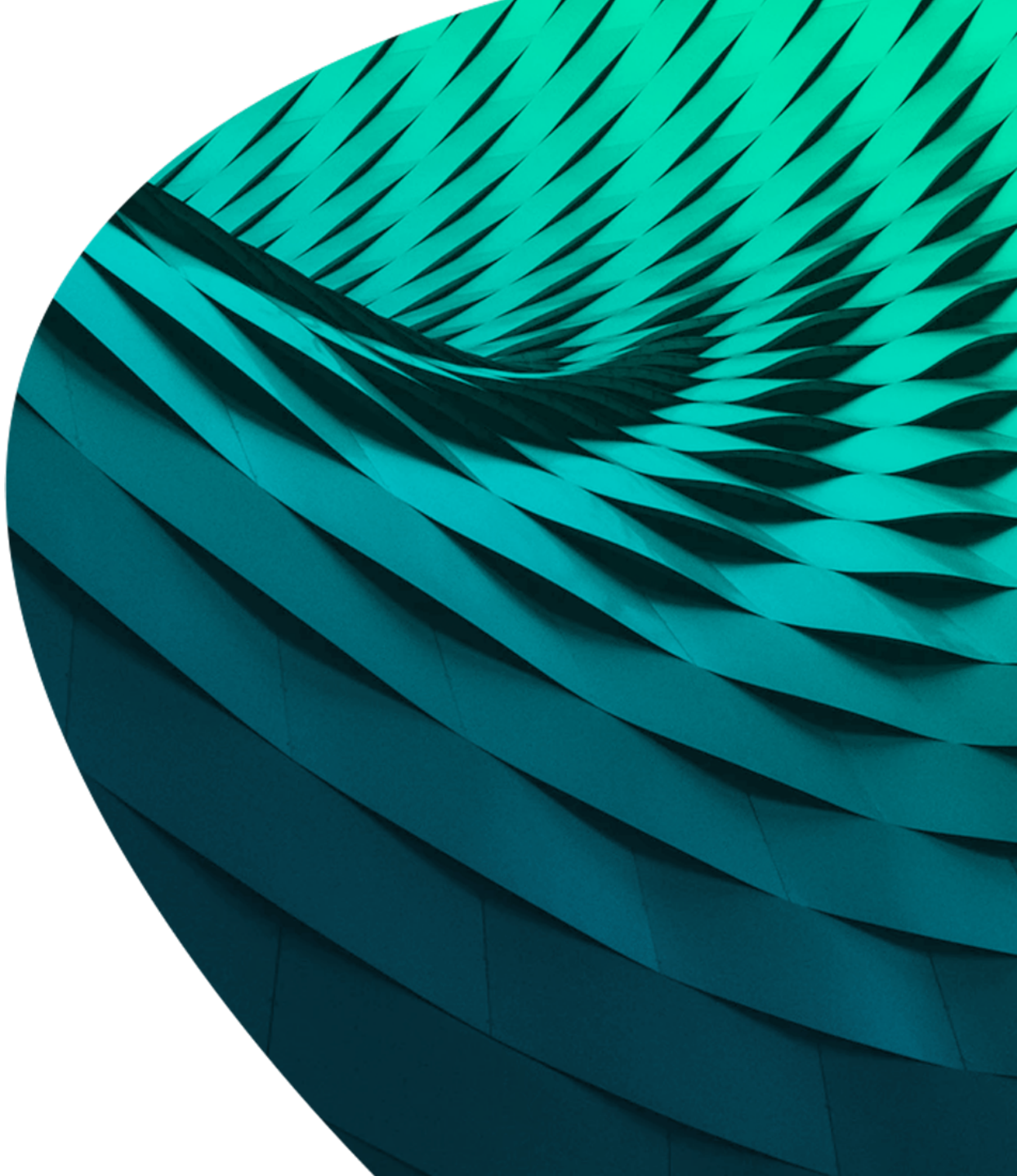
pureoptics

Datasheet

QSFP+-40G-LX4-PO



01

Product features

- 4 CWDM lanes MUX/DEMUX design
- Up to 11.2Gbps data rate per wavelength
- QSFP MSA compliant
- IEEE 802.3ba Electrical Interface
- Up to 150m transmission on OM3 multimode fiber (MMF) or 2km transmission on single mode fiber (SMF)
- Operating case temperature: 0~70C
- Maximum 3.5W operation power
- SMF LC duplex connector
- RoHS compliant

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Applications

- Data Center Interconnect
- 40G Ethernet
- Infiniband QDR
- 40G Campus Link

03

Description

This product is a transceiver module designed for optical transmission applications over both MMF and SMF with transmission distances of up to 150m on MMF (OM3) and 2km on SMF. The module converts 4 inputs channels (ch) of 10Gb/s electrical data to 4 CWDM optical signals, and multiplexes them into a single channel for 40Gb/s optical transmission. Reversely, on the receiver side, the module optically de-multiplexes a 40Gb/s input into 4 CWDM channels signals, and converts them to 4 channel output electrical data.

The central wavelengths of the 4 CWDM channels are 1271, 1291, 1311 and 1331 nm as members of the CWDM wavelength grid defined in ITU-T G.694.2. It contains a duplex LC connector for the optical interface and a 148-pin connector for the electrical interface.

The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP+ Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

For applications over OM3/OM4 MMF, MMF cables are directly connected to the LC connectors of QSFP+ LX4 module and optical signal is directly launched from the transmitter into the MMF cable as shown in Figure 1. For applications over SMF, the module is used as a QSFP+ IR4 module and SMF cables are directly connected to the LC connectors of the module.

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Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	TS	-40	85	degC	
Operating Case Temperature	TOP	0	70	degC	
Power Supply Voltage	VCC	0.5	3.6	V	
Relative Humidity (non-condensation)	RH	0	85	%	

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Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength Assignment	L0	1264.5	1271	1277.5	nm	
	L1	1284.5	1291	1297.5	nm	
	L2	1304.5	1311	1317.5	nm	
	L3	1324.5	1331	1337.5	nm	
Transmitter						
Side-mode Suppression Ratio	SMSR	30	-	-	dB	
Total Average Launch Power	PT	-	-	8.3 (SMF) 9.5 (MMF)	dBm	
Average Launch power, each Lane	PAVG	-7 (SMF) -5 (MMF)	-	2.3 (SMF) 3.5 (MMF)	dBm	
Difference in Launch Power between any two Lanes (OMA)		-	-	5	dB	
Extinction Ratio	ER	3.5	-	-	dB	
Relative Intensity Noise	Rin	-	-	-128	dB/Hz	12dB reflection
-20dB Spectral Width		-	-	1	nm	Modulated

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter Reflectance	RT			-12	dB	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}			{0.23 0.34, 0.43, 0.27, 0.35, 0.4}			
Receiver						
Damage Threshold	THd	4.5			dBm	1
Receiver Sensitivity, each Lane	SR	-11.7 (SMF) -7.0 (MMF)	-	2.3 (SMF) 3.5 (MMF)	dBm	

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.

06

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-0.1	0.1	V	Full operating range
Channel RX power monitor absolute error	DMI_RX	-3	3	dB	Per channel
Channel Bias current monitor	DMI_Ibias	-10%	10%	mA	Per channel
Channel TX power monitor absolute error	DMI_TX	-3	3	dB	Per channel

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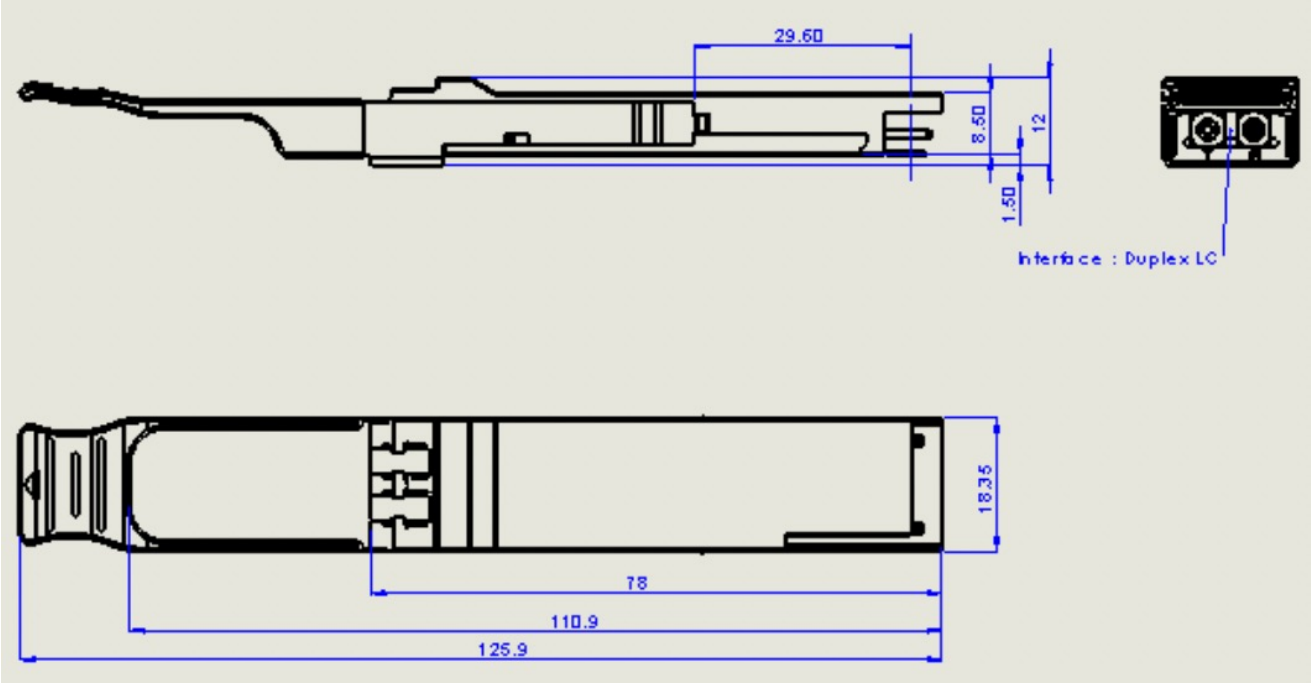
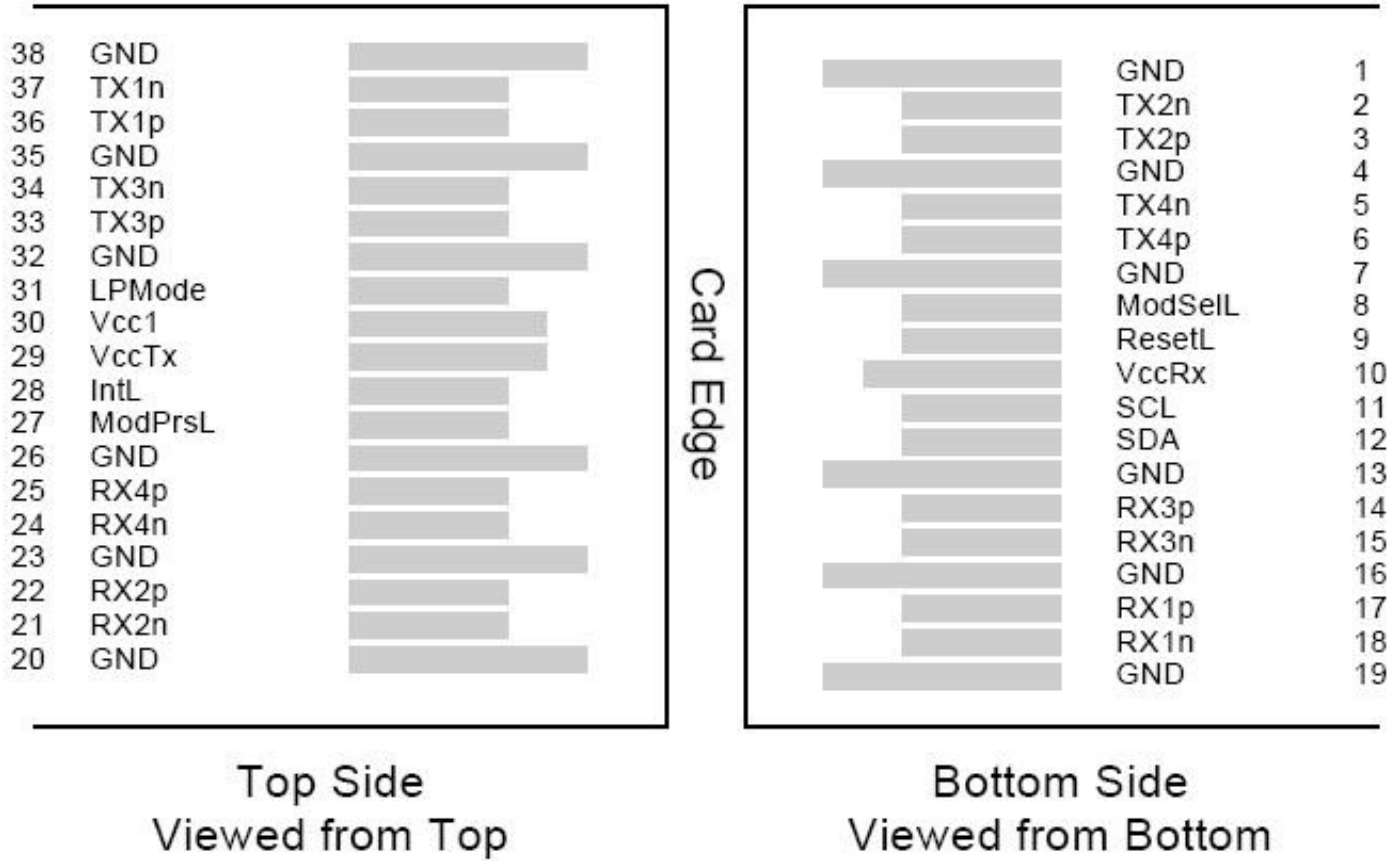
Mechanical Dimension



Pin Assignment and Description



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PIN Assignment

PIN #	Logic	Symbol	Description	Note
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	

PIN #	Logic	Symbol	Description	Note
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1

PIN #	Logic	Symbol	Descrption	Note
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V Power Supply	2
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	1

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