



Datasheet

QSFP+-40G-LR4L-PO

01

Product features

- Uncooled 4x10Gb/s CWDM transmitter
- Up to 11.2Gbps data rate per wavelength
- QSFP+ MSA compliant
- Duplex LC connector
- Built-in digital diagnostic functions
- Up to 2km on SMF
- Maximum 3.5W operation power
- RoHS Compliant
- Operating temperature range: 0°C to 70°C

02

Applications

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

Description

QSFP+-40G-LR4L optical transceivers are based on Ethernet IEEE 802.3ba standard and SFF-8436 standard. The QSFP+ transceiver converts 4 inputs channels 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 G694.2.

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	%	

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Supply Voltage	Vccl, VccTx, VccRx	-0.5	-	3.6	V	
Data Rate, each Lane		-	10.3125	11.2	Gbps	
Transmitter						
Differential Input Impedance		85	100	115	ohm	
Differential Input Swing		120		1200	mV	
Differential Return Loss		Compliant to IEEE 802.3ba			dB	
Receiver						
Differential Output Impedance		85	100	115	ohm	
Differential Output Swing		400	550	800	mV	
Receiver J9 Jitter				0.65	UI	
Receiver electrical mask		Compliant to IEEE 802.3ba				
Output differential return Loss		Compliant to IEEE 802.3ba			dB	

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	dBm	
Optical Modulation Amplitude, each Lane	OMA	-2	-	+3.5	dBm	
Average Launch Power (Each Lane)		-10	-	2.3	dBm	
Extinction Ratio	ER	3.5	-	-	dB	
Relative Intensity Noise	Rin	-	-	-128	dB/Hz	12dB reflection
-20dB Spectral Width		-	-	0.6	nm	

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter Reflectance	RT			-12	dB	
Total Jitter				0.2	UI	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}			{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			
Transmitter Output Power Monitoring Accuracy	OPMA	-2		2	dB	
Receiver						
Damage Threshold	THd	1			dBm	1
Receiver Sensitivity, each Lane	SR		-	-10.5	dBm	
Difference in Receive Power between any two Lanes (OMA)				7.5	dB	
Receive Electrical 3 dB upper Cutoff Frequency, each Lane				12.3	GHz	
RSSI Accuracy		-2		2	dB	

NOTES

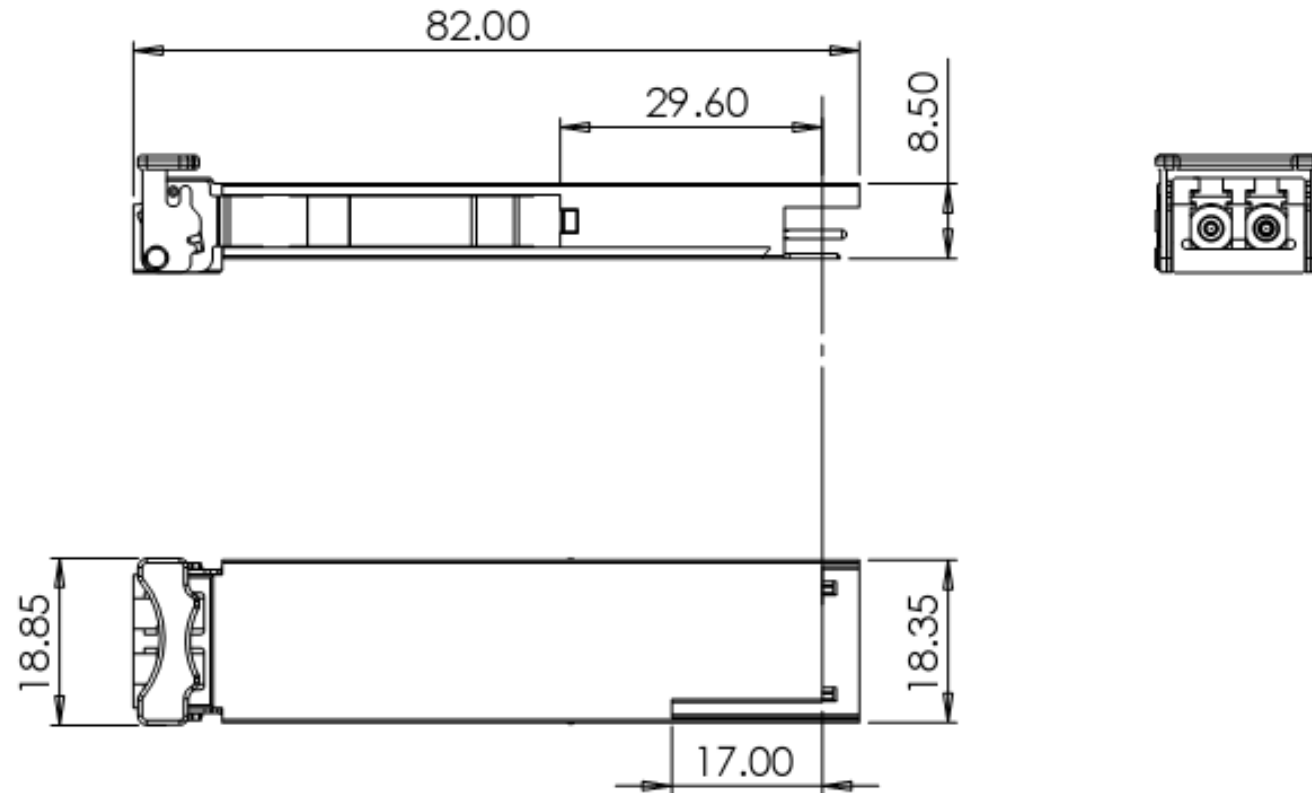
1. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
2. Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Digital Diagnostic Functions

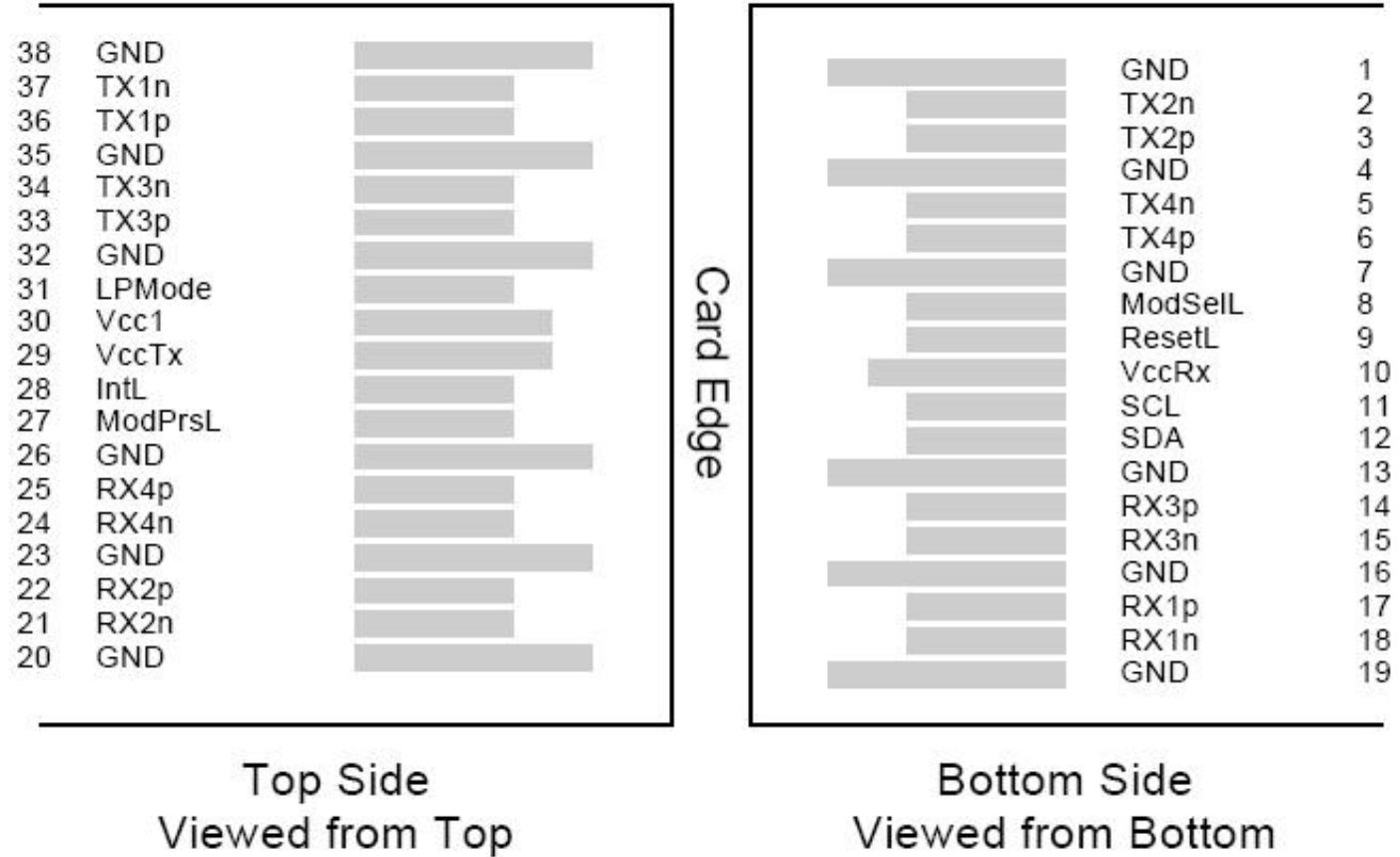
The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

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

Mechanical Dimension



Pin Assignment and Description



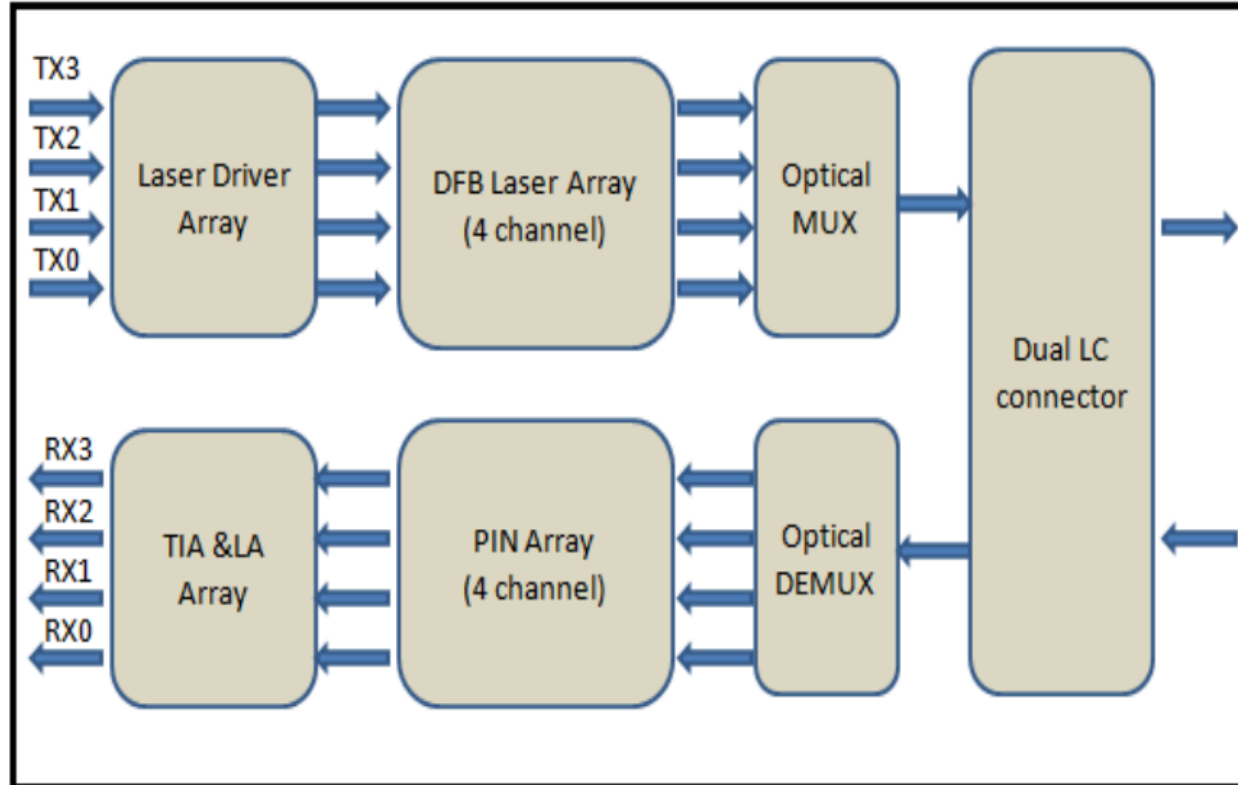
PIN Assignment

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	Description	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

Block-Diagram-of-Transceiver



This product converts the 4-channel 10Gb/s electrical input data into CWDM optical signals (light), by a driven 4-wavelength Distributed Feedback Laser (DFB) array. The light is combined by the MUX parts as a 40Gb/s data, propagating out of the transmitter module from the SMF. The receiver module accepts the 40Gb/s CWDM optical signals input, and de-multiplexes it into 4 individual 10Gb/s channels with different wavelength. Each wavelength light is collected by a discrete photo diode, and then outputted as electric data after amplified by a TIA.



54 rue Saint Lazare
75009 PARIS



+33 9 53 83 97 74
contact@pureoptics.net