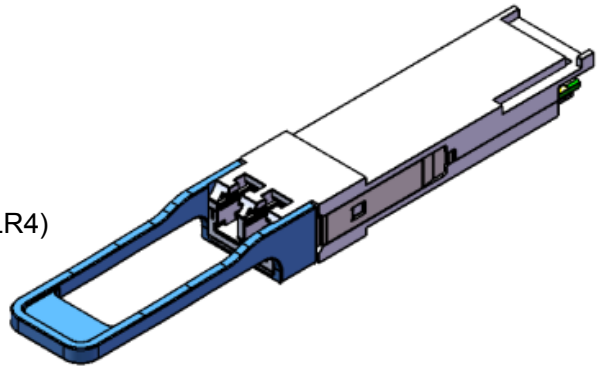


EOLQ-1640G-10 Series

Single-Mode 40GBASE-LR4
 QSFP+ Transceiver
 RoHS6 Compliant

Features

- ◆ Compliant to the IEEE 802.3ba(40GBASE-LR4)
- ◆ Compliant to the QSFP+ MSA SFF-8436 Specification
- ◆ Up to 10km over SMF
- ◆ DFBs and PIN monitor photodiodes array for transmitter section
- ◆ PIN detectors and TIAs array for receiver section
- ◆ Four 10Gbps CWDM channels in the 1300nm band
- ◆ I²C interface with integrated Digital Diagnostic Monitoring
- ◆ Utilizes two standard LC optical connector
- ◆ Operating Case Temperature: 0°C~+70°C



Applications

- ◆ 40GBASE-LR4 Ethernet links
- ◆ Infiniband QDR and DDR interconnects Client-side
- ◆ 40G Telecom connections
- ◆ OTN OTU3

Ordering Information

Part No.	Data Rate	Fiber	Distance *(note2)	Interface	Temp.	DDMI
EOLQ-1640G-10*(note1)	40Gbps	SMF	10km	LC	0°C~+70°C	Yes

Note1: Standard version

Note2: Over SMF

Regulatory Compliance*

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50384190 0001	EN 55032:2012
		EN 55032:2015
		EN 55024:2010
		EN 55024:2010+A1
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

*The above certificate number updated to June 2018, because some certificate will be updated every year, such as FDA and ROHS. For the latest certification information, please check with Eoptolink.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	+85	°C
Supply Voltage	V _{cc}	-0.5	3.6	V
Operating Relative Humidity	RH	5	85	%

*Exceeding any one of these values may destroy the device immediately.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _c	0		70	°C
Power Supply Voltage	V _{cc}	3.15	3.3	3.45	V
Power Supply Current	I _{cc}			1100	mA
Power Dissipation	P _D			3.5	W
Aggregate Bit Rate	BR _{AVE}		41.25(40GE) 43.018(OTU3)		Gbps
Lane Bit Rate	BR _{LANE}		10.3125(40GE) 10.7546(OTU3)		Gbps

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
Single ended input voltage tolerance		-0.3		4	V	Referred to TP1 signal common

Differential Input amplitude			150		1000	mv _{p-p}	
AC common mode input voltage tolerance			15			mV	RMS
Input Impedance (Differential)		Z _{in}	85	100	115	ohms	R _{in} > 100 kohms @ DC
TX Disable	Disable	V _{IH}	2		V _{cc} +0.3	V	
	Enable	V _{IL}	0		0.8		
TX FAULT	Fault	V _{OH}	2.4		V _{cc} +0.3	V	
	Normal	V _{OL}	0		0.8		
Receiver							
Single ended output voltage			-0.3		4	V	Referred to signal common
Differential output amplitude			290		1000	mv _{p-p}	
AC common mode voltage					7.5	mV	RMS
Termination mismatch at 1MHz					5	%	
Output Impedance (Differential)		Z _{out}	85	100	115	ohms	
Output Rise/Fall Time		t _r /t _f	30			ps	10%~90%
RX_LOS	LOS	V _{OH}	2.4		V _{cc} +0.3	V	
	Normal	V _{OL}	0		0.8	V	

Optical and Electrical Characteristics

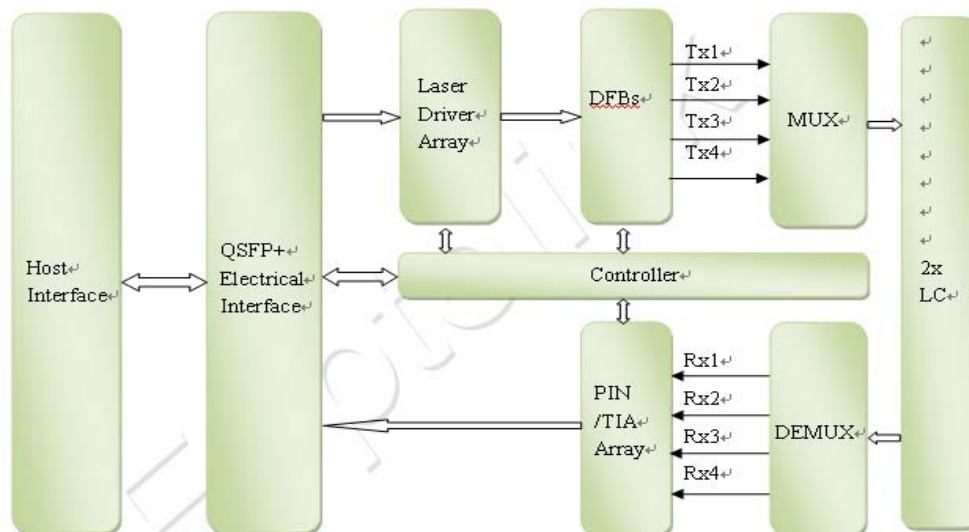
Parameter	Symbol	Min.	Typical	Max.	Unit
SMF	L	-	10	-	km
Aggregate Bit Rate	BR _{AVE}	-	41.25	-	Gbps
Per Lane Bit Rate	BR _{LANE}	-	10.3125	-	Gbps
Transmitter					
Channels wavelength	λ_c	1264.5	1271	1277.5	nm
		1284.5	1291	1297.5	
		1304.5	1311	1317.5	
		1324.5	1331	1337.5	
-20dB spectral width	$\Delta\lambda$	-	-	1	nm
Average Launch Power, Each Lane ^{*(note3)}	P _{out/lane}	-7	-	2.3	dBm
Transmit OMA, per Lane	TX_OMA/lane	-4	-	3.5	dBm
Extinction Ratio	E _r	3.5	-	-	dB
Output Optical Eye ^{*(note4)}	IEEE 802.3ba-2010 Compliant				
Receiver					

Channels wavelength	λ_c	1264.5	1271	1277.5	nm
		1284.5	1291	1297.5	
		1304.5	1311	1317.5	
		1324.5	1331	1337.5	
Damage Threshold		5.5	-	-	dBm
Receiver sensitivity in OMA, each lane	Pmins	-	-	-11.5	dBm
Maximum Receive Power, each lane	Pmax	2.3	-	-	dBm
Receiver reflectance	Rr	-	-	-26	dB
LOS De-Assert	LOS _D			-11.5	dBm
LOS Assert	LOS _A	-24			dBm
LOS Hysteresis		0.5			dB

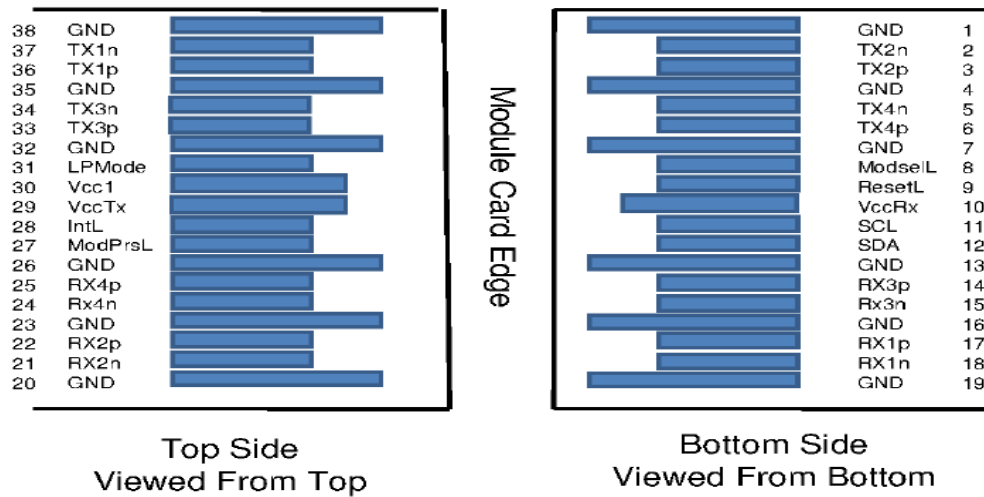
Note3: Output is coupled into a 9/125 μ m Single-Mode fiber.

Note4: Filtered, measured with a PRBS 2³¹-1 test pattern @10.3125Gbps

Functional Description of Transceiver



QSFP+ Transceiver Electrical Pad Layout



Pin Arrangement and Definition

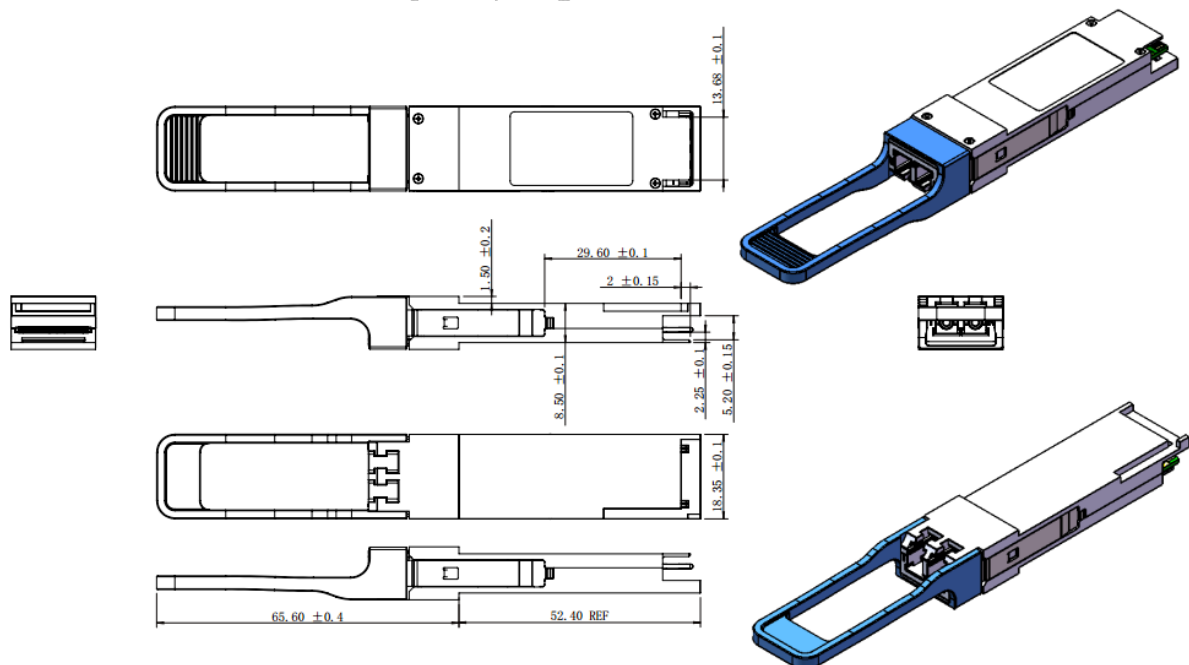
Pin	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCMOS- I/O	SCL	2-wire serial interface clock	3	
12	LVCMOS- I/O	SDA	2-wire serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1

27	LVTTTL-O	ModPrsL	Module Present	3	
28	LVTTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTTL-I	LPMode	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

1: GND is the symbol for signal and supply (power) common for the QSFP+ 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: Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table 6. Recommended host board power supply filtering is shown in Figures 3 and 4. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP+ Module in any combination. The connector pins are each rated for a maximum current of 500mA.

Mechanical Specifications



*This 2D drawing only for reference, please check with Eoptolink before ordering.

Obtaining Document

You can visit our website: <http://www.eoptolink.com>

Or contact Eoptolink Technology Inc., Ltd. Listed at the end of the documentation to get the latest documents.

Revision History

Revision	Initiated	Reviewed	Approved	Revision History	Release Date
V1.a	Kelly			Preliminary.	July 2, 2012
V1.b	Kelly			Correct digital interface.	Aug 7, 2012
V1.c	Bob, Kelly			Update optical characters, photo,	Oct 18, 2012
V1.d	Kelly			Update photo.	Oct 30, 2012
V1.e	Kelly			Update stg. Temp & functional figure.	Nov 1, 2012
V1.f	Jason/Eason Abby	Kelly		Update T _c , I _{cc} &Power Dissipation	Jan 25, 2013
V1.g	Angela	Kelly		Released	Feb 21, 2014
V2.a	Torres			Add input and output amplitude	June 9, 2014
V2.b	Torres			Update storage temperature and regulatory compliance.	Apr 15, 2015
V2.c	Tracy/Abby	Erik/ JP.jiang		Update I _{cc} , LOSA, operating temperature and structure	Sep 30, 2016
V2.d	Eliss	Kelly/Elaine		Update 2D drawing and picture.	Mar 1, 2018
V2.e	Angela	Kelly		Updated the regulatory compliance.	August 27, 2018

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Contact:

Add: No.127 West Wulian Street, Gongxing Town, Shuangliu District, Chengdu, 610213, P.R.
CHINA

Tel: (+86) 028-67087999

Fax: (+86) 028-67087979

Postal: 610213

E-mail: sales@eoptolink.com

<http://www.eoptolink.com>

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