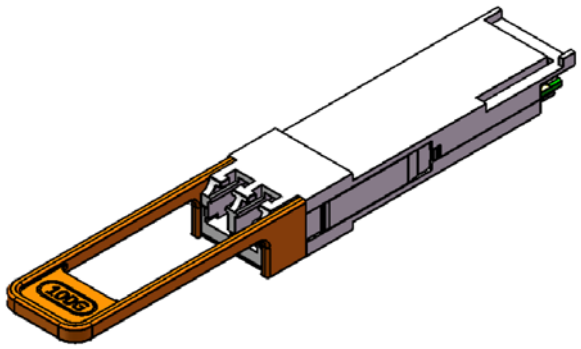
EOLQ-161HG-40-L7 Series

Single-Mode 100GBASE 40km QSFP28 Transceiver
RoHS Compliant



Features

- Supports 103Gbps
- Single 3.3V Power Supply
- Power dissipation < 5W
- Up to 40km over SMF
- Commercial case temperature range of 0°C to 70°C
- Four 25Gbps EML LAN-WDM lasers on transmitter side
- APD and TIA array on the receiver side
- 4x25G electrical interface
- Duplex LC receptacles
- I^2C interface with integrated Digital Diagnostic Monitoring
- Safety Certification: TUV/UL/FDA*Note1
- RoHS Compliant

Applications

- 100G 40km applications with FEC on host side
- 100G Datacom&Telecom connections

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Ordering Information

Part No.	Data Rate	Fiber	Distance *(note3)	Interface	Temp.	DDMI
EOLQ-161HG-40-L7*(note2)	103Gbps	SMF	40km	LC	0℃~+70℃	Yes

Note1: For the latest certification information, please check with Eoptolink.
Note2: Standard version
Note3: Over SMF
*The product image only for reference purpose.

Product Description

Eoptolink's EOLQ-161HG-40-L7 QSFP28 transceiver module is designed for 100 Gigabit Ethernet links over 40Km single mode fiber. Digital diagnostics functions are available via an I^2C interface, as specified by the QSFP+ MSA. And compliant with 100G 4WDM-40 MSA.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-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	Vcc	3.135	3.3	3.465	V
Power Dissipation	P_D			5	W

Performance Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Differential data input swing per lane				900	mv_{p-p}
Input Impedance (Differential)	Zin			10	%
Stressed input parameters					
Eye width		0.46			UI
Applied pk-pk sinusoidal jitter		IEEE 802.3bm Table 88-13			
Eye height		95			mv
DC common mode voltage		-350		2850	mv
Receiver					
Differential output amplitude		200		900	mv_{p-p}
Output Impedance (Differential)	Zout			10	%
Eye width		0.57			UI
Eye height differential		228			mv
Vertical eye closure				5.5	dB

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Signaling Speed per Lane	BR_{AVE}		25.78125		Gbps
Data Rate Variation		-100		+100	ppm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm

Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Total Average Output Power	Po			12.5	dBm
Average Launch Power per Lane*(Note4)	Peach	-2.5		6.5	dBm
Optical Modulation Amplitude (OMA), each lane*(Note5)	Peach (OMA)	0.5		6.5	dBm
Average launch power of OFF transmitter per lane	Poff			-30	dBm
Side-mode suppression ratio	SMSR	30			dB
Transmitter dispersion penalty , each lane*(Note6)	TDP			2.0	dB
Difference in launch power between any two lanes (OMA)				4	dB
Optical Return Loss Tolerance				20	dB
Transmitter reflectance*(Note7)				-26	
Extinction Ratio	ER	4.5			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}*(Note8)		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			

Receiver					
Signaling Speed per Lane	BR_{AVE}		25.78125		Gbps
Data Rate Variation		-100		+100	ppm
Receiver overload per Lane	Psat	-3			dBm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane*(Note9)	Rx_pow	-20.5		-3.5	dBm
Damage threshold per lane(min) *(Note10)	Pdamage			-2.5	dBm
Receive Sensitivity in OMA per Lane*(Note11)	Rx_sens			-18.5	dBm
Stressed Receiver Sensitivity (OMA) per Lane*(Note12)	RX_{SRS}			-16	dBm
Receiver Reflectance	ORL			-26	dB
LOS Assert	LOSA	-35			dBm
LOS De-Assert	LOSD			-25	dBm
LOS Hysteresis		0.5			dB

Note4: Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.

Note5: Even if the TDP < 1.0dB, the OMA (min) must exceed 0.5 dBm.

Note6: Measured at 100Gbps & BER = $5*10^{-5}$.

Note7: Transmitter reflectance is defined looking into the transmitter.

Note8: Vertical eye closure penalty, stressed eye J2 Jitter, stressed eye J4 Jitter, and SRS eye mask definition are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

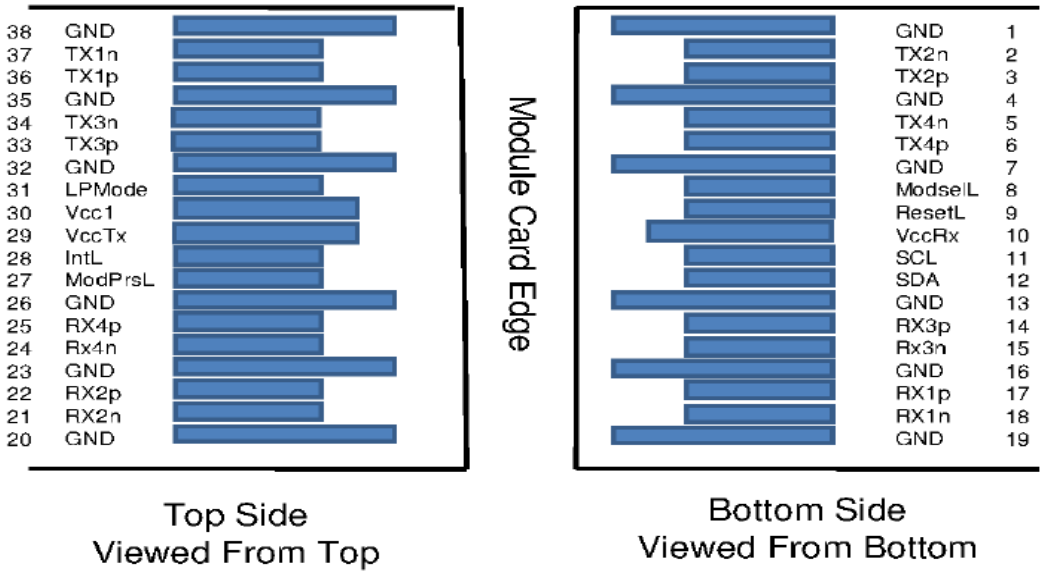
Note9: Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.

Note10: The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level.

Note11: Receiver sensitivity (OMA), each lane (max) at 5E-5 BER is a normative specification.

Note12: Measured with conformance test signal at TP3 for BER = $5*10^{-5}$.

QSFP28 Transceiver Electrical Pad Layout



Pin Arrangement and Definition

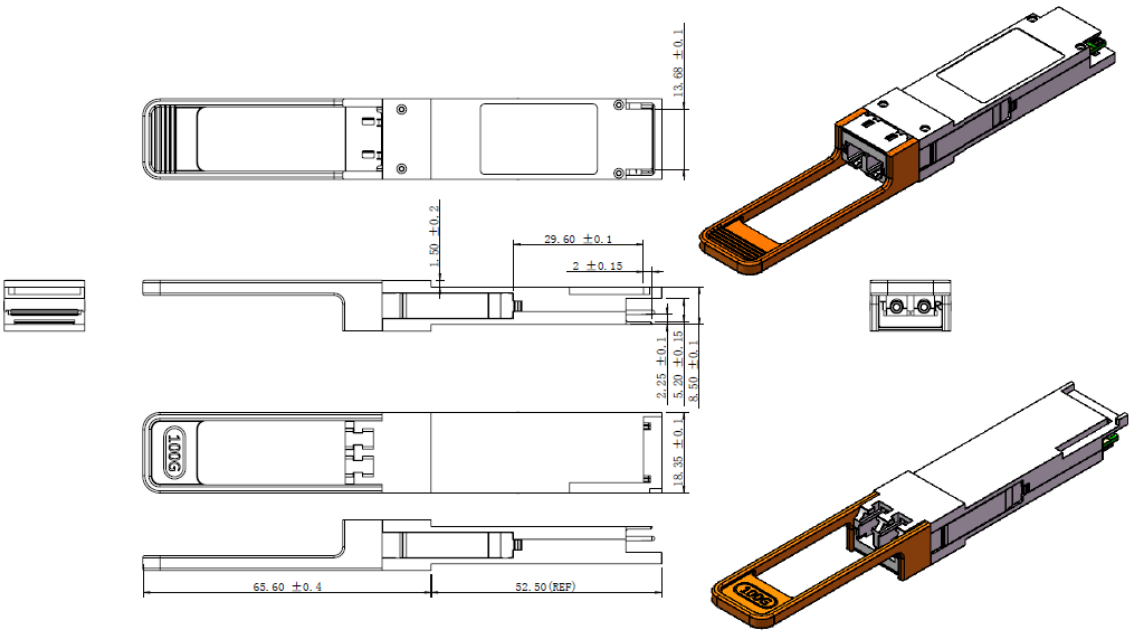
Pin	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	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	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-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 QSFP28 module. All are common within the QSFP28 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. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 1000mA.

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	Eliss			Preliminary	Jul 13, 2017
V1.b	Torres	Kelly/Neal		Update optical index and the regulatory compliance.	Jul 10, 2018
V1.c	Yvan	Erik/Elaine /Eliss		Update transmitter optical characteristics and the maximum current of connector pins.	Nov 8, 2018
V1.d	Neal	Torres/Kelly Erik/Tracy/ Eliss/Angela/ Derrick/ Elaine		Update optical characteristics & 2D drawing	Dec 14, 2018

Notice:

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