

HQL-72120-xx

100Gb/s QSFP28 10km CWDM4 LC Transceiver

Product Description

This transceiver module is designed for use in 100 Gigabit Ethernet links on up to 10km over single mode fiber. It's compliant with the QSFP28 MSA1, IEEE 802.3ba 100GBASE-LR4 and IEEE 802.3bm CAUI-46. The module converts 4 x 26Gb/s electrical data input channels to 4 λ optical signals, multiplexed into a single fiber. Reversely, on the receiver side, the module optically de-multiplex the 100G signal into 4 electrical output signals.

Features

- Supports 103.1Gb/s aggregate bit rate
- Power dissipation < 3.5W
- Single 3.3V power supply
- Link length of 10km on Single Mode Fiber (SMF)
- CWDM DFB laser
- 4x26G retimed electrical interface
- Duplex LC receptacle
- Digital Diagnostic Monitor (DDM)
- Hot pluggable



Applications

- Switch, Router and HBA's
- 100GBASE-CWDM4 Ethernet

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Tst	40	+85	°C
Relative Humidity (non-condensation)	RH	5	90	%
Operating Case Temperature	Topc	0	+70	°C
Operating Range			10	km
Supply Voltage	VCC	-0.5	3.6	V

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	Vcc	3.135		3.465	V
Supply Current	Icc			1.12	A
Module total power	P			3.5	W
Transmitter					
Signaling rate per lane		25.78125 ± 100 ppm			Gb/s
Differential data input swing per lane	Vin,pp			900	mV
Differential input return loss (min) at LR4	RLd	Per IEEE P802.3ba, Section 86A.4.1.1			dB
Differential to common mode input return loss (min) at LR4	RLdc	Per IEEE P802.3ba, Section 86A.4.2.2			dB
Differential termination mismatch				10	%
Stressed input parameters					
Eye width			0.46		UI
Applied pk-pk sinusoidal jitter		Per IEEE 802.3bm Table 88-13			
Eye height			95		mV
DC common mode voltage		-350		2850	mV

Receiver					
Signaling rate per lane		25.78125 ± 100 ppm			Gb/s
Differential data output swing	Vout,pp	100		400	mVpp
		300		600	
		400		800	
		600		1200	
Eye width		0.57			UI
Vertical eye closure				5.5	dB
Differential output return loss (min)	RLd	Per IEEE P802.3ba, Section 86A.4.2.1			dB
Common to differential mode conversion return loss (min)	RLdc	Per IEEE P802.3ba, Section 86A.4.2.2			dB
Differential termination mismatch				10	%
Transition time, 20% to 80%	tr tf	12			ps

Optical Characteristics

Transmitter					
Parameter	Symbol	Min.	Typical	Max.	Unit
Center Wavelength Lane 0	λ_0	1267	1270	1273	nm
Center Wavelength Lane 1	λ_1	1287	1290	1293	nm
Center Wavelength Lane 2	λ_2	1307	1310	1313	nm
Center Wavelength Lane 3	λ_3	1327	1330	1333	nm
Total Launch Power, 100GE	PALL	-	-	10.5	dBm
Average Launch Power per Lane, 100GE	PTX_LANE	-4.3	-	4.5	dBm
OMA per Lane, 100GE	OMA	-1.3	-	4.5	dBm
Difference in launch power between lanes	PTX_DELTA_LANE	-	-	3.6	dB
Total Launch Output Power, OTU4	PALL	-	-	TBD	dBm
Average Launch Power per Lane, OTU4	PTX_LANE	-	-	TBD	dBm
Average Output Power (Laser Turn off)	P0UT-OFF	-	-	-30	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Extinction Ratio, 100GE	ER	4	-	-	dB
Transmitter and Dispersion Penalty per lane	TDP	-	-	2.2	dB
Optical Return Loss Tolerance	ORLT	-	-	20	dB
Optical Eye Mask, 100GE	Compliant with IEEE 802.3ba				
Optical Eye Mask, OTU4	Compliant with ITU-T G.695				
Receiver					
Center Wavelength Lane 0	λ_0	1267	1270	1273	nm
Center Wavelength Lane 1	λ_1	1287	1290	1293	nm
Center Wavelength Lane 2	λ_2	1307	1310	1313	nm
Center Wavelength Lane 3	λ_3	1327	1330	1333	nm
Average Rx Power per Lane, 100GE	PRX_LANE	-10.6		4.5	dBm
OMA Sensitivity per Lane,	POMA_LA	-	-	-8.6	dBm
Average Rx Power per Lane, OTU4	PRX_AVE_LANE	TBD		TBD	dBm
Sensitivity per Lane, OTU4	P	-	-	TBD	dBm
Receiver Overload	PIN-OL	4.5	-	-	dBm
Reflectance	Ref	-	-	-26	dB
LOS Assert per lane	LOSA	TBD	-	-	dBm
LOS De-assert	LOSD	-	-	TBD	dBm
LOS Hysteresis	LOSH	0.5	-	4.0	dB

Transceiver Block Diagram

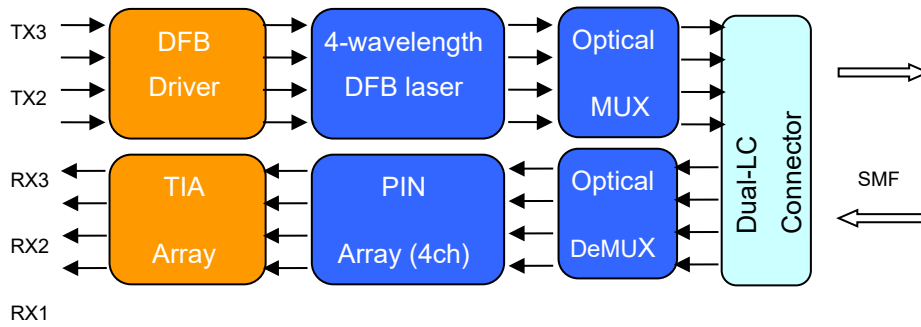


Figure 1: 40Gb/s QSFP LR4 Transceiver Block Diagram

For safety and reliability reasons, please read the following information carefully.

Light Budget is one of the key items for designing fiber optic network. In order to create a product that will meet application requirements. To adequately characterize the budget loss, the following key parameters are generally considered:

- Transmitter: Output power, temperature and aging
- Fiber connections: Active connection and splices
- Fiber Cable: fiber attenuation and temperature effect
- Receiver: Detector sensitivity
- Others: Safety margin and repairs

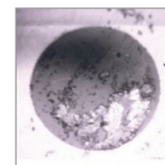
When one of the above-listed variables fails to meet specifications, the performance of the network can be greatly affected or worse, the degradation can lead to network failure. Unfortunately, not all the variables can be controlled with ease during the deployment of the network or the maintenance stage; however, there exists one component—the connector—that is too-often overlooked, sometimes overused (test jumpers) but that can be controlled using the proper procedure.



This is a Class 1 Laser Product according to IEC 60825-1:2014 compatible with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).



This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



Dirt / debris

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination. In a study by NTT-Advanced Technology, 98% of installers and 80% of network owners reported that issues with connector contamination were the greatest cause of network failures.

EU declaration of conformity

The CE marking is mandatory for this category of products. It is the manufacturer's declaration that the product meets the requirements of the applicable EU directives required to allow free movement and sale of the product throughout the European Economic Area.

Equipment Specific part number extension

-51	Cisco	-59	Alcatel (Nokia)
-52	Ericsson	-60	Combo code
-53	Huawei	-61	H3C (HP)
-54	Juniper	-62	Brocade
-55	Generic (MSA)	-63	Arista Networks
-56	HP	-64	Adva
-57	Extreme	-65	Microsens
-58	3COM (HP)		