HQL-70794-xx

100GBASE-LR4 QSFP28 10km 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 MSA, IEEE 802.3ba 100GBASE-LR4 and 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
- Up to 10km in Single Mode Fiber
- EML WDM laser
- 4x26G retimed electrical interface
- Duplex LC receptacle
- Digital Diagnostic Monitor (DDM)
- Hot pluggable

Applications

- Switch, Router and HBA's
- 100GBASE-LR4 Ethernet

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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					
Data 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	9.5 – 0.37f, 0.01≤f<8 4.75 – 7.4log10(f/14), 8 ≤f<19			dB
Differential to common mode input return loss (min) at LR4	RLdc	22-20(f/25.78), 0.01≤f<12.89 15-6(f/25.78), 12.89≤f<19			dB
Differentialtermination 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	9.5 – 0.37f, 0.01≤f<8 4.75 – 7.4log10(f/14), 8 ≤f<19			dB
Common to differential mode conversion return loss (min)	RLdc	22-20(f/25.78), 0.01≤f<12.89 15-6(f/25.78), 12.89≤f<19			dB
Differential termination mismatch				10	%
Transition time, 20% to 80%	tr tf	12			ps

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Transmitter					
Signaling Speed per Lane		25.78125 ± 100 ppm			Gb/s
Lane center wavelengths (range)	λ_C	1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19			nm
Total Average Launch Power	POUT			10.5	dBm
Transmit OMA per Lane	TxOMA	-1.3		4.5	dBm
Average Launch Power per Lane	TXPx	-4.3		4.5	dBm
Optical Extinction Ratio	ER	4			dB
Sidemode Suppression ratio	SSRmin	30			dB
Average launch power of OFF transmitter, per lane				-30	dBm
Relative Intensity Noise	RIN			-130	dB/Hz
Optical Return Loss Tolerance				20	dB
Transmitter Reflectance				-12	dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			

Receiver					
Signaling Speed per Lane		25.78125 ± 100 ppm			GBd
Lane center wavelengths (range)	λc	1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19			nm
Receive Power (OMA) per Lane	RxOMA			4.5	dBm
Average Receive Power per Lane	RXPx	-10.6		4.5	dBm
Receiver Sensitivity (OMA) per Lane	Rxsens			-8.6	dBm
Return Loss	RL	-26			dB
Stressed Receiver Sensitivity (OMA) per Lane	SRS			-6.8	dBm
Receive electrical 3 dB upper cutoff frequency, per lane				31	GHz
LOS De-Assert	LOSD			-11.6	dBm
LOS Assert	LOSA	-24		-13.6	dBm
LOS Hysteresis			1.5		dBm

Transceiver Block Diagram

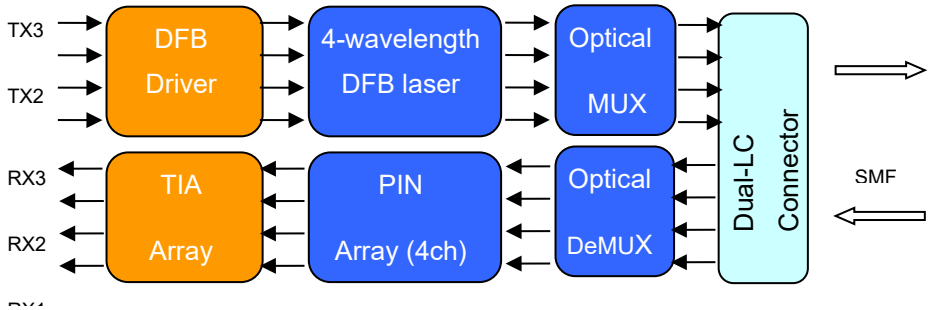

Figure 1: 100Gb/s QSFP LR4 Transceiver Block Diagram

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.

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.

CE 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	AristaNetworks
-56	HP	-64	Adva
-57	Extreme	-65	Microsens
-58	3COM (HP)	-66	DELL
		-67	Intel