Features

- LC duplex connector
- 4 CWDM lanes MUX/DEMUX design
- Up to 11.2Gb/s data rate per wavelength
- QSFP+ MSA compliant
- IEEE 802.3ba Electrical Interface
- Digital diagnostic capabilities
- Compliant with QDR/DDR Infiniband data rates
- Up to 100m transmission on OM3 multimode fiber (MM) or 2km transmission on single mode (SM) fiber
- Power Dissipation < 3.5W
- Operating Case Temperature
  Standard: 0º to +70º

Applications

- 40GBASE-LX4 Ethernet Links
- Infiniband QDR and DDR interconnects

1. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-0.5	3.6	V
Input Voltage	VIN	-0.5	Vcc	V
Damage Threshold, each Lane	THd	3.3	-	dBm

2. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	Tc	0		70	°C
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Baud rate			10.3125	11.2	Gbps
Link Distance (OM3 MM fiber)				100	m
Link Distance (SM fiber)				2	km

3. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Power Consumption		0		3.5	W	
Supply Current	Icc			1.1	A	
Transceiver Power-on Initialization Time (Note 1)				2000	msec	
Transmitter (Each Lane)						
Single-ended Input Voltage Tolerance (Note 2)		-0.3	4.0		V	Referred to TP1 signal common
AC Common Mode Input Voltage Tolerance (RMS)		15			mV	
Differential Input Voltage Swing Threshold		50			mV	
Differential Input Voltage Swing	Vin,pp	190	700		mVpp	
Differential Input Impedance	Zin	90	100	112	Ohm	
Differential Input Return Loss		See IEEE 802.3ba 86A.4.1.1			dB	10MHz - 11.1GHz
J2 Jitter Tolerance	Jt2	0.17			UI	
J9 Jitter Tolerance	Jt9	0.29			UI	
Data Dependent Pulse Width Shrinkage (DDPWS) Tolerance		0.07			UI	
Eye Mask Coordinates {X1, X2, Y1, Y2}		0.11, 0.31 95, 350			UI mV	
Receiver (Each Lane)						
Single-ended Output Voltage Threshold		-0.3		4.0	V	Referred to signal common
AC Common Mode Output Voltage Tolerance (RMS)				7.5	mV	
Differential Output Voltage Swing Threshold	Vout,pp	300		850	mVpp	
Differential Output Impedance	Aout	90	100	110	Ohm	
Termination Mismatch at 1MHz				5	%	
Differential Output Return Loss		See IEEE 802.3ba 86A.4.2.1			dB	10MHz - 11.1GHz
Common mode Output Return Loss		See IEEE 802.3ba 86A.4.2.2			dB	10MHz - 11.1GHz

Output Transition Time		28			psec	20% to 80%
J2 Jitter Tolerance	Jo2			0.42	UI	
J9 Jitter Tolerance	Jo9			0.65	UI	
Eye Mask Coordinates {X1, X2, Y1, Y2}		0.29, 05 150, 425			UI mV	Hit Ratio = 5x10-5

Notes:

1. Power-on initialization time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fully functional.

2. The single ended input voltage tolerance is the allowable range of the instantaneous input signals.

4. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Wavelength Assignment	λ0	1264.5	1271	1277.5	nm	
	λ1	1284.5	1291	1297.5	nm	
	λ2	1304.5	1311	1317.5	nm	
	λ3	1324.5	1331	1337.5	nm	
Transmitter						
Total Average Launch Power	PT	-1		5.5	dBm	
Average Launch Power (each Lane)	PAVG	-7.0		-0.5	dBm	
Optical Modulation Amplitude (OMA) (each Lane)	POMA	-5.5		1.5	dBm	
Difference in POMA between any 2 Lanes (OMA)	Ptx,diff			6.5	dB	
Extinction Ratio	ER	3.5			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	12dB reflection
Transmitter Reflectance	RT			-12	dB	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.23, 0.34, 0.43, 0.27, 0.35, 0.4}				
Average Launch Power OFF (each Lane)	Poff			-30	dBm	
Receiver						
Total Average Receive Power				5.5	dBm	
Average Receive Power (each Lane)		-11.5		-0.5	dBm	
Receiver Reflectance	RR			-26	dB	

Receive Power (OMA) (each Lane)				1.5	dBm	
Receiver Sensitivity in OMA (each Lane)	SEN			-10.6	dBm	
Difference in Receive Power between any 2 Lanes (OMA)	PRX,diff			7.5	dB	
LOS Assert	LOSA	-28			dBm	
LOS Deassert	LOSD			-15	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Receiver Electrical 3dB upper cut-off Frequency (each Lane)	Fc			12.3	GHz	

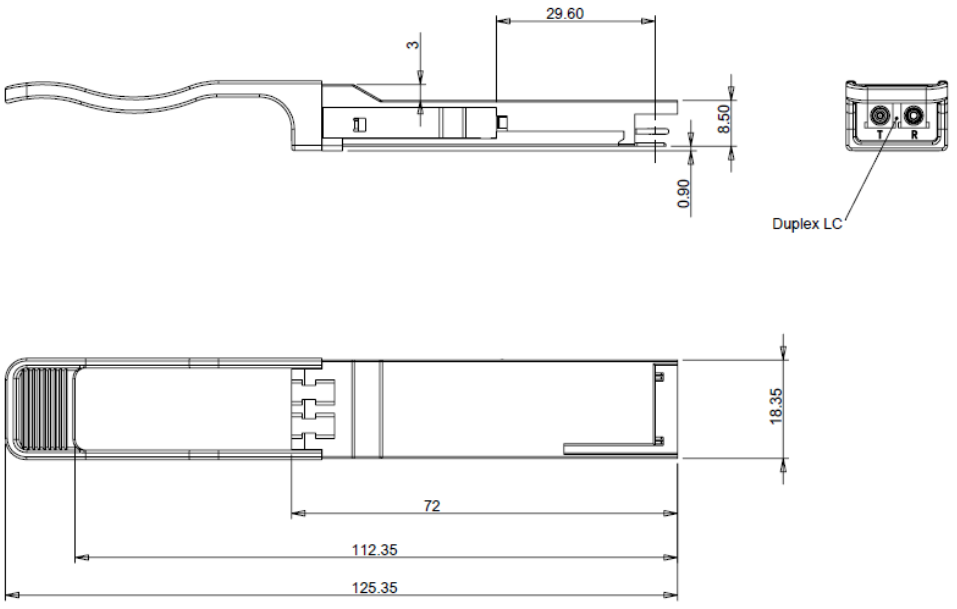
Note: Transmitter optical characteristics are measured with a single mode fiber. Receiver optical characteristics are measured with a multimode fiber.

5. Optical And Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
50 / 125 um MMF			300		m
Data Rate			10.3125		Gbps
Transmitter					
Centre Wavelength	ºC	840	850	860	nm
Spectral Width (RMS)				0.45	nm
Average Output Power	Pout	-6		-1	dBm
Extinction Ratio	Er	3.0	5.0		dB
Output Optical Eye	IEEE 802.3-2005 Compliant				
Transmitter Dispersion Penalty	TDP			3.9	dB
Input Differential Impedance	ZIN	90	100	110	Ω
TX_Disable Assert Time	t_off			10	us
TX_DISABLE Negate Time	t_on	-	-	1	ms
TX_BISABLE time to start reset	t_reset	10	-	-	us
Time to initialize, include reset of TX_FAULT	t_init	-	-	300	ms
TX_FAULT from fault to assertion	t_fault	-	-	100	us
Total Jitter	TJ	-	-	0.28	UI(p-p)
Data Dependant Jitter	DDJ	-	-	0.1	UI(p-p)
Uncorrelated Jitter	UJ	-	-	0.023	RMS

Receiver						
Centre Wavelength		ºC	840	850	860	nm
Receiver Sensitivity		Pmin			-11.1	dBm
Output Differential Impedance		RIN	90	100	110	Ω
Receiver Overload2		Pmax	-1			dBm
Optical Return Loss		ORL			-12	dB
LOS De-Assert		LOSD			-12.5	dBm
LOS Assert		LOSA	25			dBm
LOS Hysteresis			0.5			dB
LOS	High		2.0		VCC+0.3	V
	Low		0		0.8	

6. Mechanical Diagram



Note: External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.

7. Ordering Information

OEM	Part Number	OEM	Part Number
Arista	QSFP-40G-UNIV-A	Juniper	JNP-QSFP-40G-LX4-A
Cisco	QSFP-40G-UNIVL-A	Juniper	QSFPP-40G-LX4-A
Dell	407-BBRC-A	MSA	AN-QSFP-UNIV
Extreme	10334-A	MSA OnePort	OP-QSFP-UNIV
Finisar	FTL4C3QE2C-A		

8. Contact Information

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