

Features

- Hot pluggable QSFP28 MSA form factor
- Up to 80km reach for G.652 SMF with FEC
- Single +3.3V power supply
- Temperature Range -40 to 85°C
- Transmitter: cooled LANWDM EML TOSA
- Receiver: SOA+PIN
- Maximum power consumption 7W
- High speed I/O electrical interface (CAUI-4)
- Duplex LC receptacle
- Compatible with RoHS2.0



Applications

- 100GBASE-ZR4

1. Absolute Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Min.	Max.	Unit
Storage Temperature	-40	85	°C
Operating Case Temperature	-40	85	°C
Power Supply Voltage	-0.3	3.6	V
Relative Humidity (non-condensation)	5	85	%
Damage Threshold, each Lane	5.5	-	dBm

2. Recommended Operating Conditions

Parameter	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	-40		85	°C	1
Relative Humidity	5		85	%	
Power Supply Voltage	3.135	3.3	3.465	V	
Data Rate, each Lane		25.78125		Gbps	
Link Distance with G.652		-	80	km	2

Notes:

1. -40°C cold start / -20°C to 85°C mission mode
2. With FEC

3. Electrical Specification

Power Supply Specification					
Parameter	Min.	Typ.	Max.	Units	Notes
Power Consumption, Low power	-	-	1.5	W	
Power Consumption, High power	-	-	7.0	W	

Low Speed Electrical Specification						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
LPMode, Reset and ModSelL	VIL	-0.3	-	0.8	V	
	VIH	2	-	VCC+0.3	V	
ModPrsL and IntL	VOL	0	-	0.4	V	IOL=4mA
	VOH	VCC-0.5	-	VCC+0.3	V	IOL=-4mA

High Speed Electrical Specification						
Host-to-Module Electrical Specifications (module input)						
Parameter	Points	Min.	Max.	Units	Conditions	
Overload Differential Voltage pk-pk	TP1a	900		mV		
Common Mode Voltage (Vcm)	TP1	-350	2850	mV	1	
Differential Termination Resistance Mismatch	TP1		10	%	At 1MHz	
Module-to-Host Electrical Specifications at TP4 (module output)						
Differential Voltage, pk-pk	TP4		900	mV		
Common Mode Voltage (Vcm)	TP4	-350	2850	mV	1	
Common Mode Noise, RMS	TP4		17.5	mV		
Differential Termination Resistance Mismatch	TP4		10	%	At 1MHz	
Transition Time, 20 to 80%	TP4	12		ps		
Vertical Eye Closure (VEC)	TP4		5.5	dB		
Eye Width at 10-15 probability (EW15)	TP4	0.57		UI		
Eye Height at 10-15 probability (EH15)	TP4	228		mV		

Note:

- Vcm is generated by the host. Specification includes effects of ground offset voltage.
- From 250MHz to 30GHz.

4. Optical Specification

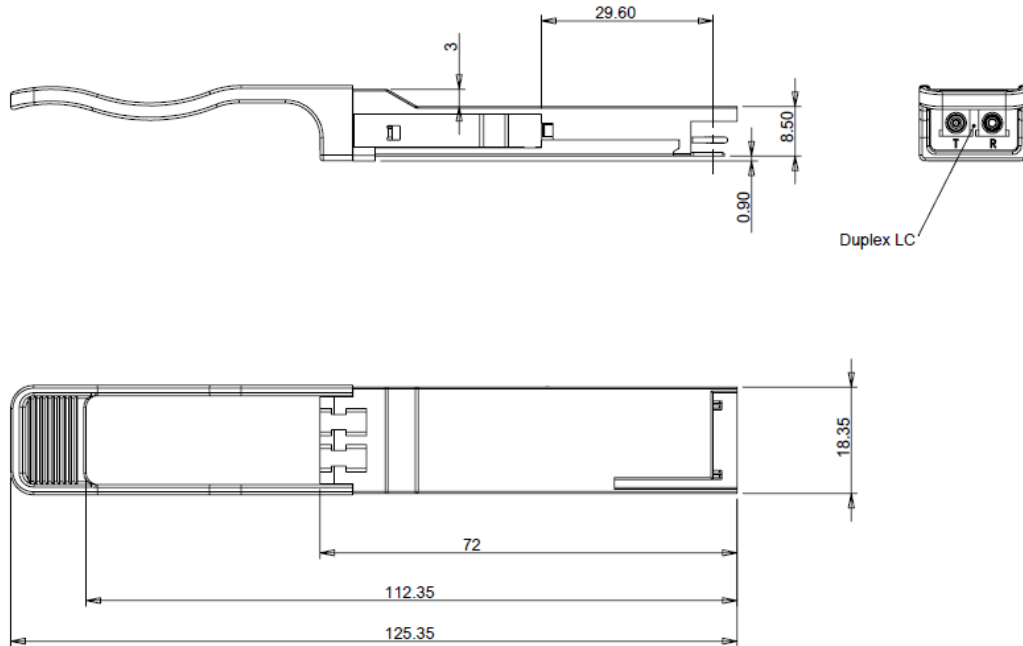
Parameter	Symbol	Unit	Min	Typ	Max	Notes
Transmitter						
Signaling Rate for Each Lane		Gbps		25.78125		
Signaling Speed Accuracy		ppm	-100		100	
Four Lane Wavelength Range	$\lambda 1$	nm	1294.53	1295.56	1296.59	
	$\lambda 2$		1299.02	1300.05	1301.09	
	$\lambda 3$		1303.54	1304.58	1305.63	
	$\lambda 4$		1308.09	1309.14	1310.19	
Side Mode Suppression Ratio	SMSR		30			
Total Average Launch Power	Pt	dBm	-		13	
Average Launch Power for Each Lane	Pa	dBm	2		6.5	1
Optical Modulation Amplitude for Each Lane	OMA	dBm	2.5		8.8	2
Difference in launch power between any two lanes(OMA)		dB			3.6	
Transmitter and Dispersion Penalty for Each Lanes	TDP	dB			2.5	
Average Launch Power of Off Transmitter for Each Lanes	Poff	dBm	-		-30	
Extinction Ratio	EX	dB	6			
RIN20OMA		dB/Hz			-130	
Optical Return Loss Tolerance		dB			20	
Transmitter Reflectance		dB			-26	3
Eye Diagram Hit ratio 5E-5 hits per sample	Compliant with IEEE 802.3ba					
Optical receiver Characteristics						
Receive Rate for Each Lane		Gbps	-	25.78125		
Signaling Speed Accuracy		ppm	-100		100	
Four Lane Wavelength Range	$\lambda 1$	nm	1294.53	1295.56	1296.59	
	$\lambda 2$		1299.02	1300.05	1301.09	
	$\lambda 3$		1303.54	1304.58	1305.63	
	$\lambda 4$		1308.09	1309.14	1310.19	
Damage threshold	Pmax	dBm	5.5			4

Average Receive Power for Each Lane	Pin	dBm	-28.0		-5.0	6
Receive power, each lane (OMA)	PinOMA	dBm	-		-4.5	
Difference in receive power between any two lanes (Average and OMA) (max)		dB			4.5	
Receiver reflectance		dB			-26	
Receiver Sensitivity (Average optical power), Each Lane	S	dBm			-28.0	7
Los Assert		dBm	-40			
Los De-assert		dBm			-28.0	
Los Hysteresis		dBm	0.5			
Conditions of Stress Receiver Sensitivity Test						
Vertical Eye Closure Penalty, each Lane		dB	-	3.5	-	9
Stressed Eye J2 Jitter, each Lane		UI	-	0.3	-	9
Stressed Eye J9 Jitter, each Lane		UI	-	0.47	-	9

Note:

1. 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.
2. Even if the TDP < 1 dB, the OMA (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.
4. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.
5. Average receive power, each lane (min) is informative and not the principal indicator of signal
6. strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
7. Receiver sensitivity (Average optical power), each lane (max) is informative. Pre-FEC BER is 5E-5.
8. 9. Vertical eye closure penalty, stressed eye J2 Jitter, and stressed eye J9 Jitter are test conditions
9. for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

5. 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.

6. Ordering Information

OEM	Part Number	OEM	Part Number
Juniper	QSFP-100G-ZR4-I-A	Cisco	QSFP-100G-ZR4-S-I-A
Arista	QSFP-100G-ZR4-I-A	MSA Generic	AN-QSFP28-ZR4-I
Calix	100-04997-ZR4-I-A	MSA OnePort	OP-QSFP28-ZR4-I
MSA Champion ONE	100GQSFP28E-ZR4-H	Extreme	10403-ZR4-I-A
Ciena	XCVR-Q30V31-80KM-I-A	Nokia	3HE16558AA-I-A

7. Contact Information

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