

## Features:

- Compliant with QSFP28 Standard: SFF-8661 Revision 1.9, SFF-8636 Revision 2.10a
- Compliant with IEEE 802.3-2018 100GBASE-LR4
- High speed I/O electrical interface (CAUI-4) compliant with IEEE 802.3-2018
- Single 3.3V Supply Voltage
- Maximum power consumption 4.5W
- Case Operating Temperature: -40-85 °C
- LAN WDM EML laser and PIN Receiver Array
- QSFP28 MSA package with duplex LC connector
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant)
- Class 1 Laser



## 1. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	TS	-40	-	+85	°C	
Supply Voltage	VCC	-0.3	-	3.6	V	
Relative Humidity (non-condensing)	RH	5	-	95	%	
Data Input Voltage – Differential	IVDIP-VDINL	-	-	1.0	V	
Control Input Voltage	VI	-0.3	-	Vcc+0.5	V	
Control Output Current	IO	-20	-	20	mA	

## 2. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	TOPR	-40	-	85	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	ICC_IP	-	-	1800	mA	
Sustained peak current at hot plug	ICC_SP	-	-	1485	mA	
Maximum Power Dissipation	PD	-	-	4.5	W	
Maximum Power Dissipation,						

Low Power Mode	P <sub>DLP</sub>	-	-	1.5	W	
Aggregate Bit Rate	ABR	-	103.125	-	Gb/s	
Data Rate per Lane	DRL	-	25.78	-	Gb/s	
Control Input Voltage High	V <sub>IH</sub>	V <sub>CC</sub> *0.7	-	V <sub>CC</sub> +0.3	V	
Control Input Voltage Low	V <sub>IL</sub>	-0.3	-	V <sub>CC</sub> *0.3	V	
Two Wire Serial Interface Clock Rate	-	-	-	400	kHz	
Module power supply noise tolerance 10 Hz - 10 MHz (peak-to-peak)	-	-	-	66	mVpp	
Rx Differential Data Output Load	-	-	100	-	ohms	
Operating Distance	-	2	-	10000	m	

### 3. Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Wavelength L0	λC0	1294.53	1295.56	1296.59	nm	
Wavelength L1	λC1	1299.02	1300.05	1301.09	nm	
Wavelength L2	λC2	1303.54	1304.58	1305.63	nm	
Wavelength L3	λC3	1308.09	1309.14	1310.19	nm	
Side-mode suppression ratio	SMSR	30			dB	
Total Average Optical Launch Power	P <sub>OUT</sub>	-	-	10.5	dBm	
Average Launch Power Tx_Off (Each Lane)	P <sub>OUT_OFF</sub>	-	-	-30	dBm	
Average Optical Launch Power (Each Lane)	P <sub>OUTL</sub>	-4.3	-	4.5	dBm	
Extinction Ratio	ER	4	-	-	dB	
Spectral Width	Δλ	-	-	1	nm	
Optical Modulation Amplitude (Each Lane)	OMA	-1.3	-	4.5	dBm	
Launch Power in OMA minus TDP (Each Lane)	OMA-TDP	-2.3	-	-	dBm	
Difference in launch power between any two lanes (OMA)	DT_OMA	-	-	5	dB	
Transmitter and Dispersion Penalty (Each Lane)	TDP	-	-	2.2	dB	
Optical Return Loss Tolerance	ORLT	-	-	20	dB	
Transmitter Eye Mask Definition	-	{0.25,0.4,0.45,0.25,0.28,0.4}				
RIN20OMA	RIN	-	-	-130	dB/Hz	

## 4. Receiver Optical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Wavelength L0	$\lambda C0$	1294.53	1295.56	1296.59	nm	
Wavelength L1	$\lambda C1$	1299.02	1300.05	1301.09	nm	
Wavelength L2	$\lambda C2$	1303.54	1304.58	1305.63	nm	
Wavelength L3	$\lambda C3$	1308.09	1309.14	1310.19	nm	
Receiver Sensitivity (OMA) per Lane				-8.6	dBm	Note
Stressed Receiver Sensitivity in OMA (Each Lane)	-	-	-	-6.8	dBm	
Stressed Receiver Sensitivity Test Conditions:						
Stressed Eye J2 Jitter (Each Lane)	-	-	0.3	-	UI	
Stressed Eye J9 Jitter (Each Lane)	-	-	0.47	-	UI	
Vertical Eye Closure Penalty	-	-	1.8	-	dB	
Damage Threshold for Receiver	$P_{in, damage}$	5.5	-	-	dBm	
Average Receive Power (Each Lane)	-	-10.6	-	4.5	dBm	
Receive Power in OMA (Each Lane), Overload	OMA	-	-	4.5	dBm	
Difference in receive power between any two lanes (OMA)	DR_OMA	-	-	5.5	dB	
Receiver 3dB electrical upper cut-off frequency (each lane)	F_C	-	-	31	GHz	
Receiver Reflectance	RXR	-	-	-26	dB	

**Note:** Measured with a PRBS231-1 test pattern @25.78125Gbps, BER $\leq$ 10<sup>-12</sup>

## 5. Electrical Specifications

High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3bm)

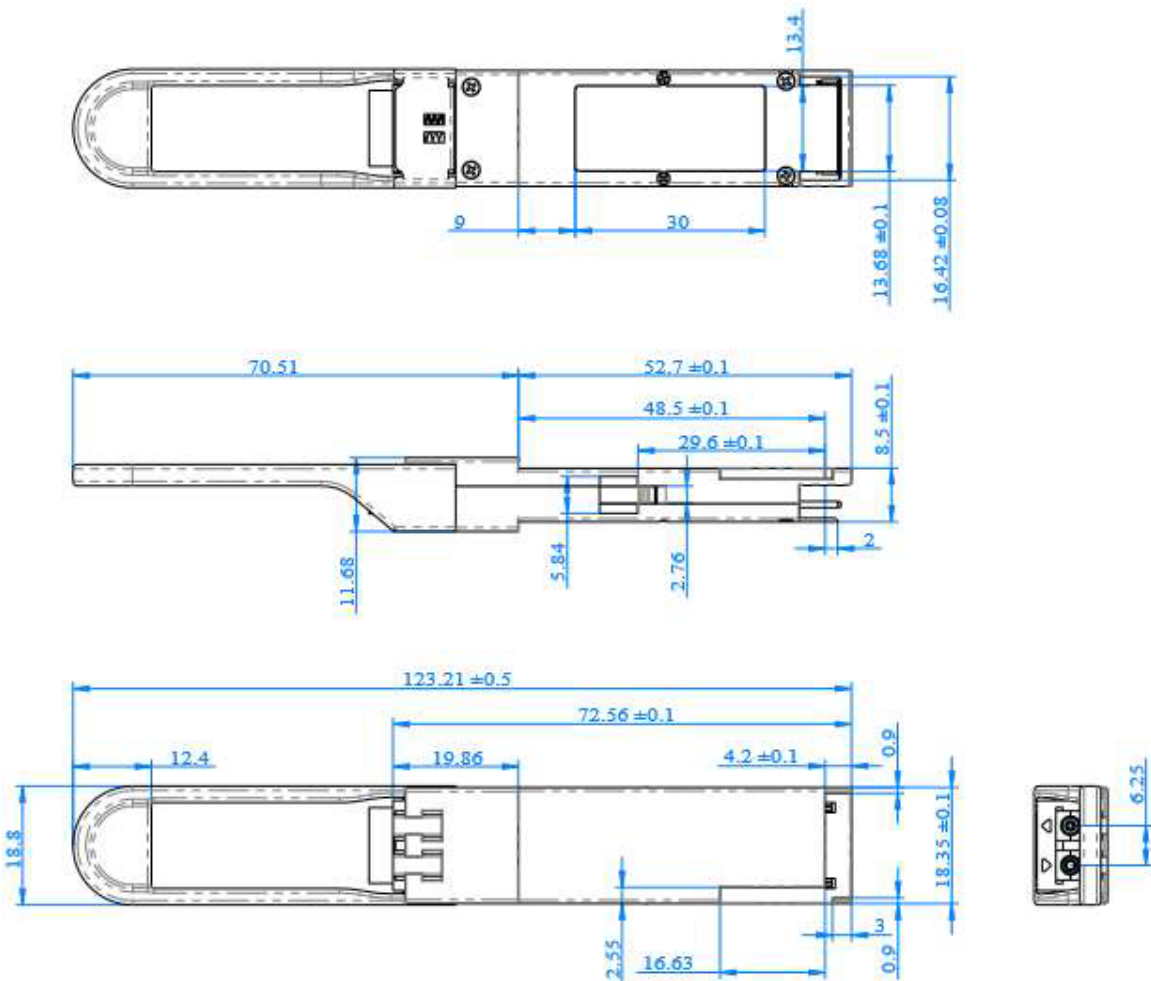
Low-Speed Signal: Compliant to SFF-8679

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter (Module Input)</b>						
Differential Data Input Amplitude	$V_{IN,P-P}$	95	-	900	mVpp	Note
Differential Termination Mismatch		-	-	10	%	
LPMode, Reset and ModSelL	$V_{IL}$	-0.3	-	0.8	V	
	$V_{IH}$	2	-	$V_{CC}+0.3$	V	

Receiver (Module Output)						
Differential Data Output Amplitude	$V_{OUT,P-P}$	-	-	900	mVpp	Note
Differential Termination Mismatch		-	-	10	%	
Output Rise/Fall Time, 20%~80%	$T_R$	12	-	-	ps	
ModPrsL and IntL	$V_{OL}$	0	-	0.4	V	$I_{OL}=4mA$
	$V_{OH}$	$V_{CC}-0.5$	-	$V_{CC}+0.3$	V	$I_{OL}=-4mA$

**Note:** Amplitude customization beyond these specs is dependent on validation in customer system

## 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-100G-LR4-I-A	Juniper	JNP-QSFP-100G-LR4-I-A
Cisco	QSFP-100G-LR4-S-I-A	MSA Generic	AN-QSFP28-LR4-I
Cisco	100GEQ-LR4-CSC	MSA Champion ONE	100GQSFP28E-LR4-H

## 8. Contact Information

Tel: 800.590.9535

Web: <http://www.approvednetworks.com>