

PRODUCT SPECIFICATION

Part No.:	AC-QPBL1011-G100-40	
Description:	100G QSFP28 Transceiver, BIDI TX1304nm/RX1309nm 40km 100G QSFP28 Transceiver, BIDI TX1309nm/RX1304nm 40km	
Release Date	Rev.	Revision Change Description
2015/06/07	A0	New Release
2020/12/28	A1	Template Update

Features

- ✧ Hot-pluggable QSFP28 form factor
- ✧ Support Ethernet CAUI-4
- ✧ High Sensitivity APD Receiver
- ✧ Operation case temperature C-Temp:0-70
- ✧ Single 3.3V power supply
- ✧ Aligned with IEEE 802.3bs and 100G Lambda MSA
- ✧ Simplex LC receptacles
- ✧ RoHS-6 compliant

Application

- ✧ Transmission over 40km
- ✧ Ethernet
- ✧ 100G Lambda MSA

Standard

- ✧ CEI-28G-VSR
- ✧ QSFP28 MSA
- ✧ SFF-8636

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Maximum Supply Voltage	Vcc	0	+3.6	V
Storage Temperature	Ts	-40	+85	°C
Relative Humidity (non-condensation)	RH	0	+85	%
Damage Threshold	THd	2.4		dBm

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.135	3.3	3.465	V
Supply Curren	ICC		1.2	1.36	A
Power Consumption			4	4.5	W
Case Temperature	C-Temp	0		70	°C
Link Distance	LD			40	km

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Data Rate (each Lane)		53.125±100 ppm(CAUI-4)			GBd	
Modulation Format		PAM4				
Wavelength	UP-LINK	1304.58+/- 1.0			nm	
	DOWN-LINK	1309.14+/- 1.0				
Side-mode Suppression ratio	SMSR	30			dB	
Average launch power ¹	PAVG	1.7		7.1	dBm	
Outer Optical Modulation Amplitude (OMA _{outer}) TDECQ<1.4dB TDECQ>1.4dB	POMA	4.7 3.3+TDECQ		7.9	dBm	
Transmitter and Dispersion penalty ²	TDECQ			3.9	dB	
TECQ	TECQ			3.9	dB	
TDECQ-TECQ (max)				2.7	dB	
Extinction Ratio		5.0			dB	
Optical Return Loss Tolerance				15	dB	

Transmitter Reflectance ³	RL			-26	dB	
Average Launch Power OFF Transmitter	Poff			- 15	dBm	
RIN15.6 OMA	RIN			- 136	dB/Hz	
Transmitter (each Lane)						
Signaling rate	Rate	25.78 (CAUI-4)			Gbps	
Differential Input Impedance	Zd		100		Ω	
Differential Input Voltage per lane				900	mV	
Input impedance mismatch				10	%	
Input High Voltage	VIH	2		Vcc+0.3	V	
Input LOW Voltage	VIL	-0.3		0.8	V	

Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate (each Lane)		53.125 ± 100 ppm(CAUI-4)			GBd	
Modulation Format		PAM4				
Lane Wavelength	UP-LINK	1309.14+/-1.0			nm	
	DOWN-LINK	1304.58+/-1.0				
Damage Threshold ³		-2.4			dBm	
Average receive power ⁴		-16		-3.4	dBm	
Receive Power(OMAouter)				-2.6	dBm	
Receiver Reflectance				-26	dB	
Receiver sensitivity(OMAouter) ⁵				Max(-13.8, TECQ- 15.2)	dBm	
Stressed receiver sensitivity (OMAouter), each laned (max) ⁶	SRS			-10	dBm	
Transmitter Reflectance				-26	dB	
LOS Assert	LOSA	-30		- 19.5	dBm	
LOS De-assert	LOSD			- 16.5	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Receiver (each Lane)						
Signaling rate	Rate	25.78 (CAUI-4)			Gbps	
Common mode voltage	Vcm	-350		2850	mV	

Common Mode Noise, rms				17.5	mV	
Differential Termination Resistance Mismatch (at 1 MHz)				10	%	
Differential Return Loss (SDD22)				Per CEI-28G-VSR	dB	
Common Mode to Differential conversion and Differential to Common Mode Conversion (SDC22,SCD22)				Per CEI-28G-VSR	dB	
Common Mode Return Loss(SCC22)-from 250 MHz to 30 GHz				-2		
Transition Time: 20/80%		9.5			ps	
Vertical Eye Closure	VEC			6.5	dB	
Eye width at 10- 15robability	EW15	0.57			UI	
Eye height at 10-15probability	EH15	228			mV	

Notes:

1. Average launch power (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. Transmitter Reflectance is defined looking into the transmitter.
- 3.The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane.
4. Average receive power (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. CAUI4 mode,the Pre-FEC BER level is 2E-4.
6. Measured with conformance test signal at TP3 for the BER specified in IEEE Std 802.3cd.

Pin Definition

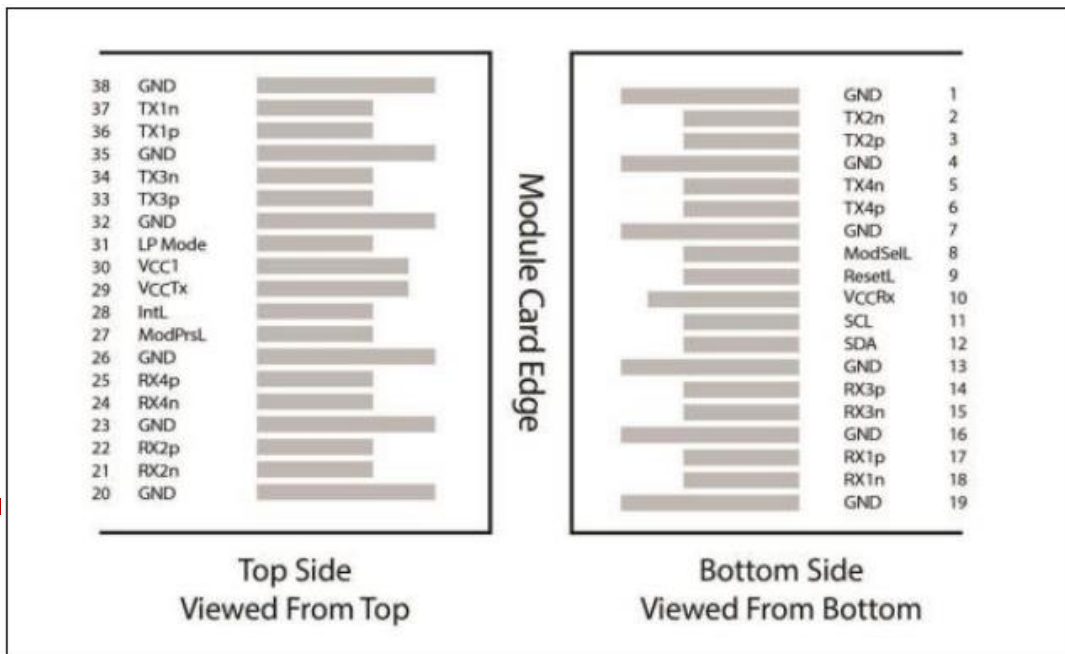


Figure 2. QSFP28 Connector Pad layout

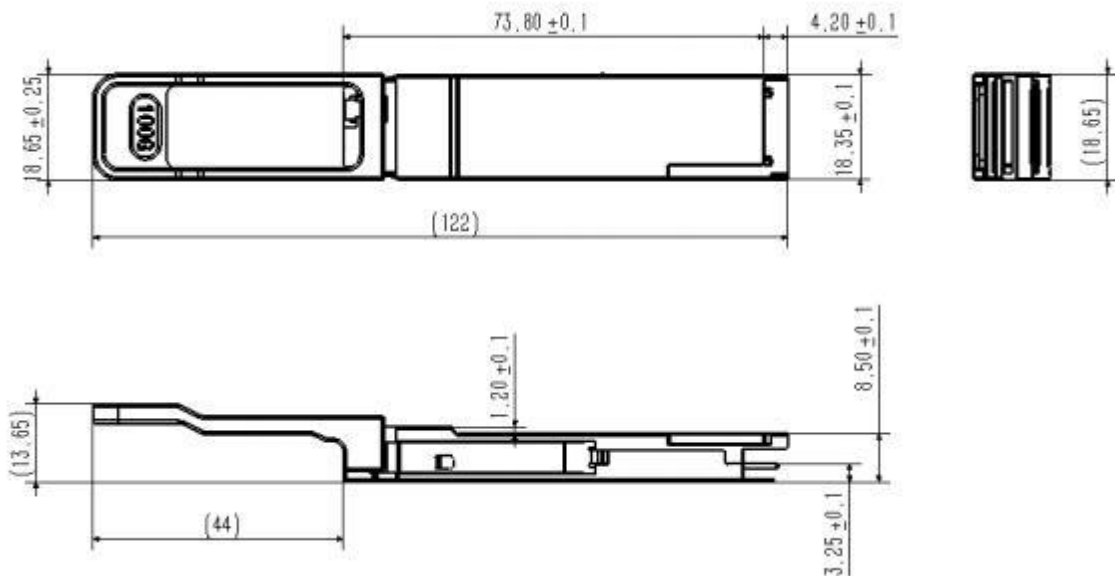
Pin	Symbol	Name/Description	Notes
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3V Power Supply Receiver	
11	SCL	2-Wire Serial Interface Clock	
12	SDA	2-Wire Serial Interface Data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3 V Power Supply transmitter	
30	Vcc1	+3.3 V Power Supply	
31	LPMoDe	Low Power Mode	

32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

Table 1: QSFP Module PIN Definition

Package Outline

Dimensions are in millimeters. All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified. (Unit: mm)



Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000V for other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I Laser Product

Ordering information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (°C)	Reach (KM)	DDM
AC-QPBL10-G100-40	QSFP28	100G	Tx1304 EML	1.7-7.1	APD	-13.8	0~70	40	Y
AC-QPBL11-G100-40	QSFP28	100G	Tx1309 EML	1.7-7.1	APD	-13.8	0~70	40	Y