

PRODUCT SPECIFICATION

Part No.:	AC-QP-Q2G100-80	
Description:	100G QSFP28 Transceiver, DWDM 80km	
Release Date	Rev.	Revision Change Description
2015/06/07	A0	New Release
2021/12/21	A1	Template Update

Features

- ✧ Hot pluggable QSFP28 MSA form factor
- ✧ Up to 80km reach for G.652 SMF with transport white box
- ✧ Single +3.3V power supply
- ✧ Temperature Range 0 to 70°C
- ✧ Transmitter: Cooled EML 2*27.5Gbaud/s DWDM TOSA
- ✧ Receiver: 2*27.5Gbaud/s Pin-PD ROSA
- ✧ 4*25G CAUI4 electrical interface
- ✧ Integrated SFEC with high coding gain
- ✧ PAM4 modulation format on 100GHz ITU DWDM wavelength grid compatible
- ✧ Dual CS adaptor
- ✧ Compliant with RoHS6

Application

- ✧ High bandwidth connectivity for Data Center Interconnection
- ✧ 100G Ethernet Metro-Access over DWDM
- ✧ P to P Access Network

Standard

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

Wavelength Table

TX1			TX2		
Channel	Frequency(THZ)	Wavelength (nm)	Channel	Frequency(THZ)	Wavelength (nm)
C13	191.3	1567.13	C14	191.4	1566.31
C13+	191.35	1566.72	C14+	191.45	1565.9
C15	191.5	1565.5	C16	191.6	1564.68
C15+	191.55	1565.09	C16+	191.65	1564.27
C17	191.7	1563.86	C18	191.8	1563.05
C17+	191.75	1563.45	C18+	191.85	1562.64
C19	191.9	1562.23	C20	192	1561.42
C19+	191.95	1561.83	C20+	192.05	1561.01
C21	192.1	1560.61	C22	192.2	1559.79
C21+	192.15	1560.2	C22+	192.25	1559.39
C23	192.3	1558.98	C24	192.4	1558.17
C23+	192.35	1558.58	C24+	192.45	1557.77
C25	192.5	1557.36	C26	192.6	1556.55
C25+	192.55	1556.96	C26+	192.65	1556.15
C27	192.7	1555.75	C28	192.8	1554.94
C27+	192.75	1555.34	C28+	192.85	1554.54
C29	192.9	1554.13	C30	193	1553.33
C29+	192.95	1553.73	C30+	193.05	1552.93
C31	193.1	1552.52	C32	193.2	1551.72
C31+	193.15	1552.12	C32+	193.25	1551.32
C33	193.3	1550.92	C34	193.4	1550.12
C33+	193.35	1550.52	C34+	193.45	1549.72
C35	193.5	1549.32	C36	193.6	1548.51
C35+	193.55	1548.91	C36+	193.65	1548.11
C37	193.7	1547.72	C38	193.8	1546.92
C37+	193.75	1547.32	C38+	193.85	1546.52
C39	193.9	1546.12	C40	194	1545.32
C39+	193.95	1545.72	C40+	194.05	1544.92
C41	194.1	1544.53	C42	194.2	1543.73
C41+	194.15	1544.13	C42+	194.25	1543.33
C43	194.3	1542.94	C44	194.4	1542.14
C43+	194.35	1542.54	C44+	194.45	1541.75
C45	194.5	1541.35	C46	194.6	1540.56
C45+	194.55	1540.95	C46+	194.65	1540.16
C47	194.7	1539.77	C48	194.8	1538.98

C47+	194.75	1539.37	C48+	194.85	1538.58
C49	194.9	1538.19	C50	195	1537.4
C49+	194.95	1537.79	C50+	195.05	1537
C51	195.1	1536.61	C52	195.2	1535.82
C51+	195.15	1536.22	C52+	195.25	1535.43
C53	195.3	1535.04	C54	195.4	1534.25
C53+	195.35	1534.64	C54+	195.45	1533.86
C55	195.5	1533.47	C56	195.6	1532.68
C55+	195.55	1533.07	C56+	195.65	1532.29
C57	195.7	1531.9	C58	195.8	1531.12
C57+	195.75	1531.51	C58+	195.85	1530.72
C59	195.9	1530.33	C60	196	1529.55
C59+	195.95	1529.94	C60+	196.05	1529.16
Non-ITU	Peak wavelength between 1529.16nm-1567.13				

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage Temperature Range	Ts	-40	+85	°C
Relative Humidity	RH	5	85	%
Power Supply Voltage	Vcc	-0.5	+3.6	V
Operating Case Temperature Range	Tc	0	+70	°C
Receiver Damage Threshold Per Lane	P _{dag}	+5.2		dBm

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	TC	0		+70	°C
Power Supply Voltage	VCC	3.135	3.3	3.465	V
Control Input Voltage High		2		Vcc+0.3	V
Control Input Voltage Low		-0.3		0.8	V
Rx Diff Data Output Load			100		Ω
Power Dissipation			5		W

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes

Transmitter Electrical Specification (TP1)						
Signaling Rate, each lane		Typ -100 ppm	25.7813	Typ +100 ppm	Gb/s	
DC Common Mode Output Voltage		-350		2850	mV	
Differential Termination Mismatch				10	%	
Transmitter Electrical Specification (TP2)						
Optical output power	OOP	-1		+4	dBm	
Transmitter Rate	TR		55.04318		Gbps	55.04318*2λ
Lane center wavelength spacing			100		GHz	
Center wavelength	CW	See Wavelength Table			nm	
Extinction ratio	ER		6		dB	
Side-mode suppression Ratio	SMSR	30			dB	
RIN OMA				-132	dB/Hz	
Optical Return Loss Tolerance				20	dB	
Transmitter reflectance	Tr			-12	dB	
Dispersion Tolerance		-150		50	ps/nm	Residual dispersion (RD) after DCM, and at worst ONSR

Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Electrical Specification (TP4)						
Signaling Rate, each lane		Typ - 100ppm	25.7813	Typ+100ppm	Gb/s	
Common-Mode AC Output Voltage				17.5	mV	
Differential pk-pk output voltage swing				900	mVpp	
Eye Width		0.57			UI	
Eye Height Differential		228			mV	
Vertical Eye Closure				5.5	dB	
Differential Termination Mismatch				10	%	
Transition Time (20% to 80%)		12			ps	
DC Common Mode Voltage3		-350		2850	mV	
Receiver Electrical Specification (TP3)						
Receive Rate	RR		55.04318		Gbps	55.04318*2λ
Center Wavelength	CW	See Wavelength Table			nm	
Receiver reflectance				-26	dB	
Receiver Power, each lane		-12.5		6	dBm	

Required OSNR		28			dB	Receiving Power @0~-7dBm
		31				Receiving Power @-7~-12.5dBm
RSSI Accuracy		-3		3	dB	

Notes:

1. Reference IEEE P802.3bm Annex 83E, Figure 83E-7 for template.
2. Reference IEEE P802.3bm Annex 83E, Figure 83E-8 for template.

Pin Definition

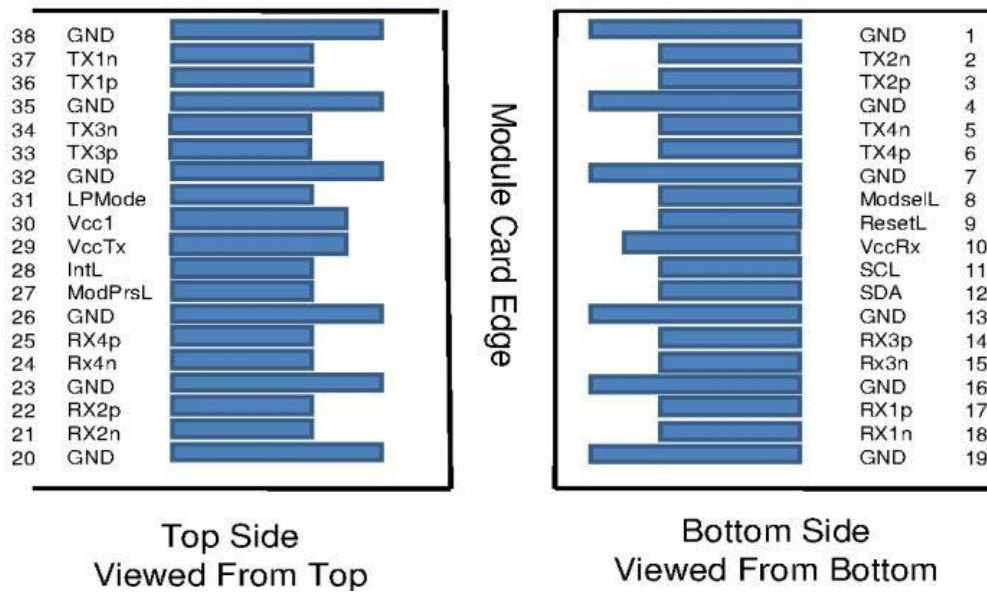


Figure1 QSFP MSA-compliant 38-pin connector

Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3V Power Supply Receiver	2
11	SCL	2-Wire Serial Interface Clock	

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12	SDA	2-Wire Serial Interface Data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3 V Power Supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMODE	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

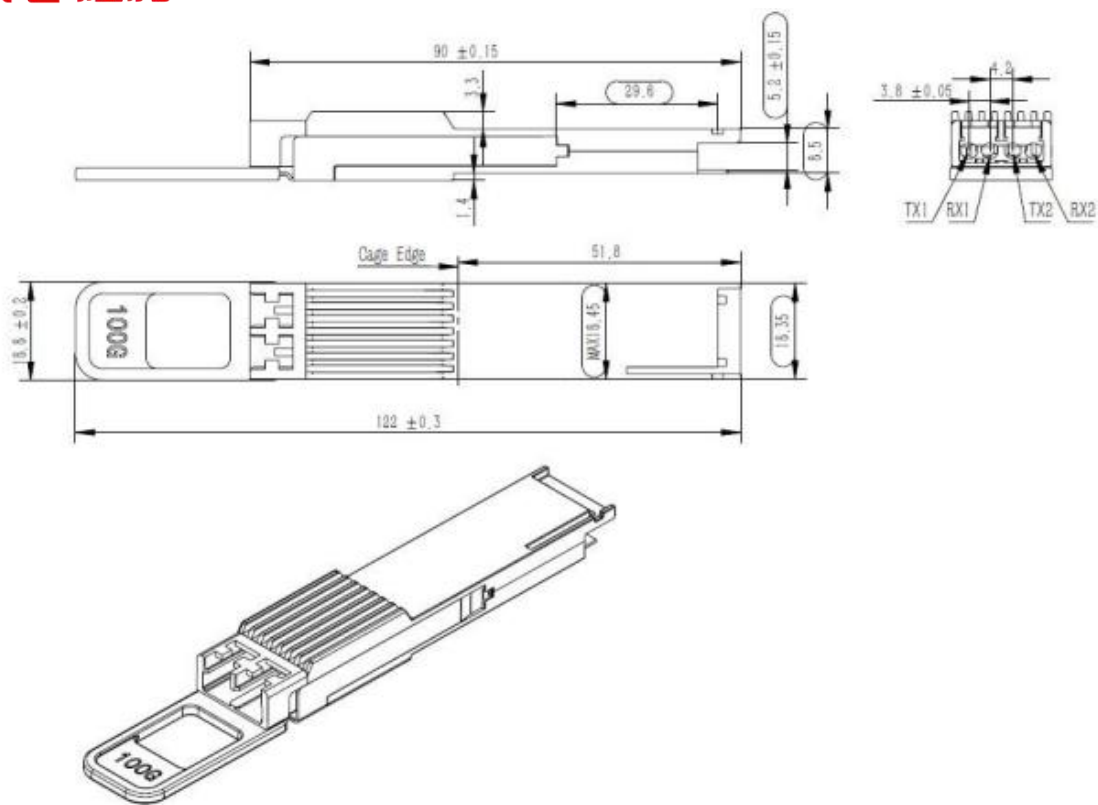
Table 1: QSFP Module PIN Definition

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 3 below. Vcc Rx, Vcc1 and VccTx may be internally connected within the module in any combination. The connector pins are each rated for a maximum current of 2000mA.

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-QP-Q2G100-80	QSFP28	103.125Gb/s	Cooled EML	-1~+4	PIN	-12.5dBm	0~70°C	80	Y