

Alpha Bridge
AB-QSFP28-80P
Datasheet

Product function

- 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 85°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
- Compatible with RoHS6

Product Application

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

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	+85
Relative Humidity	RH	%	5	85
Power Supply Voltage	Vcc	V	-0.5	+3.6
Operating Case Temperature Range	Tc	°C	0	+85
Receiver Damage Threshold Per Lane	Pdag	dBm	+2	

Recommended Operating Conditions

Parameter	Units	Min.	Typ.	Max.	Notes
Operating Case Temperature	°C	0		+85	
Power Supply Voltage	V	3.135	3.3	3.465	
Control Input Voltage High	V	2		Vcc+0.3	
Control Input Voltage Low	V	-0.3		0.8	
Rx Diff Data Output Load	Ω		100		
Power Dissipation	W			7	Tc = 85 °C, Vcc = 3.465V, End of Life

Electrical Characteristics

For electrical characteristics, refer to CAUI-4 chip-to-module draft specifications (IEEE P802.3bm Annex 83E). The CAUI-4 host output shall meet the specifications defined below while measured at TP1 for the transmitter, TP4 for the receiver.

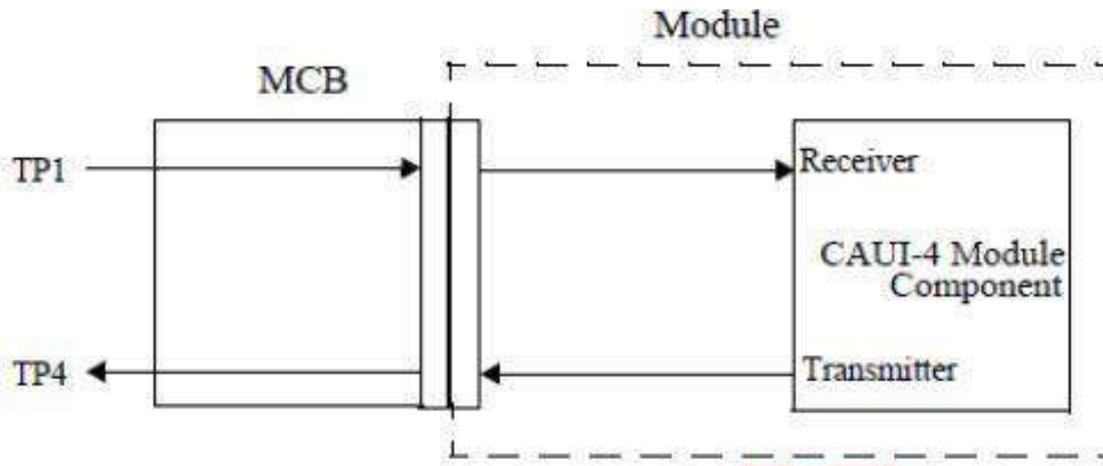


Figure 1: Module CAUI-4 compliance test point

Transmitter Electrical Specification (TP1)

Parameter	Comment	Min	Typ.	Max	Unit
Signaling Rate, each lane		Typ -100 ppm	25.7813	Typ +100 ppm	Gb/s
DC Common Mode Output Voltage		-350	---	2850	mV
Differential Return Loss	See template1	---	---	---	dB
Common to Differential Mode Conversion Return Loss	See template2	---	---	---	dB
Differential Termination Mismatch	At 1 MHz	---	---	10	%

Receiver Electrical Specification (TP4)

Parameter	Comment	Min	Typ.	Max	Unit
Signaling Rate, each lane		Typ - 100 ppm	25.7813	Typ + 100 ppm	Gb/s
Common-Mode AC Output Voltage		---	---	17.5	mV
Differential pk-pk output voltage swing		---	---	900	mVpp
Eye Width	EW15 at 10-15 probability; PRBS 29-1	0.57	---	---	UI
Eye Height Differential	EH15 at 10-15 probability; PRBS 29-1	228	---	---	mV
Vertical Eye Closure		---	---	5.5	dB
Differential Output Return Loss	See template1	---	---	---	dB
Common to Differential Mode Conversion Return Loss	See template2	---	---	---	dB
Differential Termination Mismatch		---	---	10	%
Transition Time (20% to 80%)		12	---	---	ps
DC Common Mode Voltage3		-350	---	2850	mV

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

Transmitter Optical Specification (TP2)

Parameter	Units	Min.	Typ.	Max.	Notes
Optical output power	dBm	-1		+4	
Transmitter Rate	Gbps		55.04318		55.04318*2λ
Lane center wavelength spacing	GHz		100		
Center wavelength	nm	See Wavelength Table			
Extinction ratio	dB	6			
Side-mode suppression Ratio	dB	30			
RIN OMA	dB/Hz			-132	
Optical Return Loss Tolerance	dB			20	
Transmitter reflectance	dB			-12	
Dispersion Tolerance	ps/nm	-150		50	Amplified Link
		-150		100	Unamplified Link

Receiver Optical Specification (TP3)

Parameter	Units	Min.	Typ.	Max.	Notes
Receive Rate	Gbps		55.04318		55.04318*2λ
Center Wavelength	nm	See Wavelength Table			
Receiver reflectance	dB			-26	
Receiver Sensitivity, each lane	dBm			-13	
Required OSNR	dB	26.5			Receiving Power @0~-7dBm
		29.5			Receiving Power @-7~-13dBm
RSSI Accuracy	dB	-3		3	

Wavelength Table:

Product Code	TX1			TX2		
	Ch. No.	Frequency (THz)	Center Wavelength(nm)	Ch. No.	Frequency (THz)	Center Wavelength(nm)
RTXM290-9813	C13	191.30	1567.13	C14	191.40	1566.31
RTXM290-9814	C13+	191.35	1566.72	C14+	191.45	1565.90
RTXM290-9815	C15	191.50	1565.50	C16	191.60	1564.68
RTXM290-9816	C15+	191.55	1565.09	C16+	191.65	1564.27
RTXM290-9817	C17	191.70	1563.86	C18	191.80	1563.05
RTXM290-9818	C17+	191.75	1563.45	C18+	191.85	1562.64
RTXM290-9819	C19	191.90	1562.23	C20	192.00	1561.42
RTXM290-9820	C19+	191.95	1561.83	C20+	192.05	1561.01
RTXM290-9821	C21	192.10	1560.61	C22	192.20	1559.79
RTXM290-9822	C21+	192.15	1560.20	C22+	192.25	1559.39
RTXM290-9823	C23	192.30	1558.98	C24	192.40	1558.17
RTXM290-9824	C23+	192.35	1558.58	C24+	192.45	1557.77
RTXM290-9825	C25	192.50	1557.36	C26	192.60	1556.55

RTXM290-9826	C25+	192.55	1556.96	C26+	192.65	1556.15
RTXM290-9827	C27	192.70	1555.75	C28	192.80	1554.94
RTXM290-9828	C27+	192.75	1555.34	C28+	192.85	1554.54
RTXM290-9829	C29	192.90	1554.13	C30	193.00	1553.33
RTXM290-9830	C29+	192.95	1553.73	C30+	193.05	1552.93
RTXM290-9831	C31	193.10	1552.52	C32	193.20	1551.72
RTXM290-9832	C31+	193.15	1552.12	C32+	193.25	1551.32
RTXM290-9833	C33	193.30	1550.92	C34	193.40	1550.12
RTXM290-9834	C33+	193.35	1550.52	C34+	193.45	1549.72
RTXM290-9835	C35	193.50	1549.32	C36	193.60	1548.51
RTXM290-9836	C35+	193.55	1548.91	C36+	193.65	1548.11
RTXM290-9837	C37	193.70	1547.72	C38	193.80	1546.92
RTXM290-9838	C37+	193.75	1547.32	C38+	193.85	1546.52
RTXM290-9839	C39	193.90	1546.12	C40	194.00	1545.32
RTXM290-9840	C39+	193.95	1545.72	C40+	194.05	1544.92
RTXM290-9841	C41	194.10	1544.53	C42	194.20	1543.73
RTXM290-9842	C41+	194.15	1544.13	C42+	194.25	1543.33
RTXM290-9843	C43	194.30	1542.94	C44	194.40	1542.14
RTXM290-9844	C43+	194.35	1542.54	C44+	194.45	1541.75
RTXM290-9845	C45	194.50	1541.35	C46	194.60	1540.56
RTXM290-9846	C45+	194.55	1540.95	C46+	194.65	1540.16
RTXM290-9847	C47	194.70	1539.77	C48	194.80	1538.98
RTXM290-9848	C47+	194.75	1539.37	C48+	194.85	1538.58
RTXM290-9849	C49	194.90	1538.19	C50	195.00	1537.40
RTXM290-9850	C49+	194.95	1537.79	C50+	195.05	1537.00
RTXM290-9851	C51	195.10	1536.61	C52	195.20	1535.82
RTXM290-9852	C51+	195.15	1536.22	C52+	195.25	1535.43
RTXM290-9853	C53	195.30	1535.04	C54	195.40	1534.25
RTXM290-9854	C53+	195.35	1534.64	C54+	195.45	1533.86
RTXM290-9855	C55	195.50	1533.47	C56	195.60	1532.68
RTXM290-9856	C55+	195.55	1533.07	C56+	195.65	1532.29
RTXM290-9857	C57	195.70	1531.90	C58	195.80	1531.12
RTXM290-9858	C57+	195.75	1531.51	C58+	195.85	1530.72
RTXM290-9859	C59	195.90	1530.33	C60	196.00	1529.55
RTXM290-9860	C59+	195.95	1529.94	C60+	196.05	1529.16

Notes:

The two channels of the transceiver meet above the wavelength table. Other channel wavelength configurations are acceptable for customized design. All the specification is designed by a single wavelength.

No	Pin	Definition	Description	Note
1	1	GND	Ground	1
2	2	Tx2n	Transmitter Inverted Data Input	
3	3	Tx2p	Transmitter Non-Inverted Data Input	
4	4	GND	Ground	1
5	5	Tx4n	Transmitter Inverted Data Input	
6	6	Tx4p	Transmitter Non-Inverted Data Input	
7	7	GND	Ground	1
8	8	ModSelL	Module Select	
9	9	ResetL	Module Reset	
10	10	VccRx	+3.3V Power Supply Receiver	2
11	11	SCL	2-Wire Serial Interface Clock	
12	12	SDA	2-Wire Serial Interface Data	
13	13	GND	Ground	1
14	14	Rx3p	Receiver Non-Inverted Data Output	
15	15	Rx3n	Receiver Inverted Data Output	
16	16	GND	Ground	1
17	17	Rx1p	Receiver Non-Inverted Data Output	
18	18	Rx1n	Receiver Inverted Data Output	
19	19	GND	Ground	1
20	20	GND	Ground	1
21	21	Rx2n	Receiver Inverted Data Output	
22	22	Rx2p	Receiver Non-Inverted Data Output	
23	23	GND	Ground	1
24	24	Rx4n	Receiver Inverted Data Output	
25	25	Rx4p	Receiver Non-Inverted Data Output	
26	26	GND	Ground	1
27	27	ModPrsL	Module Present	
28	28	IntL	Interrupt	
29	29	VccTx	+3.3 V Power Supply transmitter	2
30	30	Vcc1	+3.3 V Power Supply	2
31	31	LPMode	Low Power Mode	
32	32	GND	Ground	1
33	33	Tx3p	Transmitter Non-Inverted Data Input	
34	34	Tx3n	Transmitter Inverted Data Input	
35	35	GND	Ground	1
36	36	Tx1p	Transmitter Non-Inverted Data Input	
37	37	Tx1n	Transmitter Inverted Data Input	
38	38	GND	Ground	1

NOTE:

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.

Memory Map

AB-QSFP28-80P defines a common management interface for 4-lane pluggable transceiver modules, direct attach modules and

2-Wire Serial Address 1010000x	
Lower Page 00h	
0	Identifier
1- 2	Status
3- 21	Interrupt Flags
22- 33	Module Monitors
34- 81	Channel Monitors
82- 85	Reserved
86- 98	Control
99	Reserved
100-106	Free Side Device and Channel Mask
107	Reserved
108-112	Free Side Device Properties
113-118	Reserved
119-122	Password Change Entry Area (Optional)
123-126	Password Entry Area (Optional)
127	Page Select Byte

Upper Page 00h	Optional Page 01h	Optional Page 02h	Optional Page 03h (Cable Assemblies)
128 Identifier	128 CC_APPS	128-255 User EEPROM Data	128-175 Free Side Device Thresholds
129-191 Base ID Fields	129 AST Table Length (TL)		
	130 Application Code Entry 0		
	132-133 Application Code Entry 0		
	134-253 other entries		
192-223 Extended ID		176-223 Channel Threshold	
224-255 Vendor Specific ID		224-225 Reserved	
		226-227 Vendor Specific	
		238-241 Channel Controls	
		242-253 Channel Monitor Masks	
	254-255 Application Code Entry TL	254-255 Reserved	

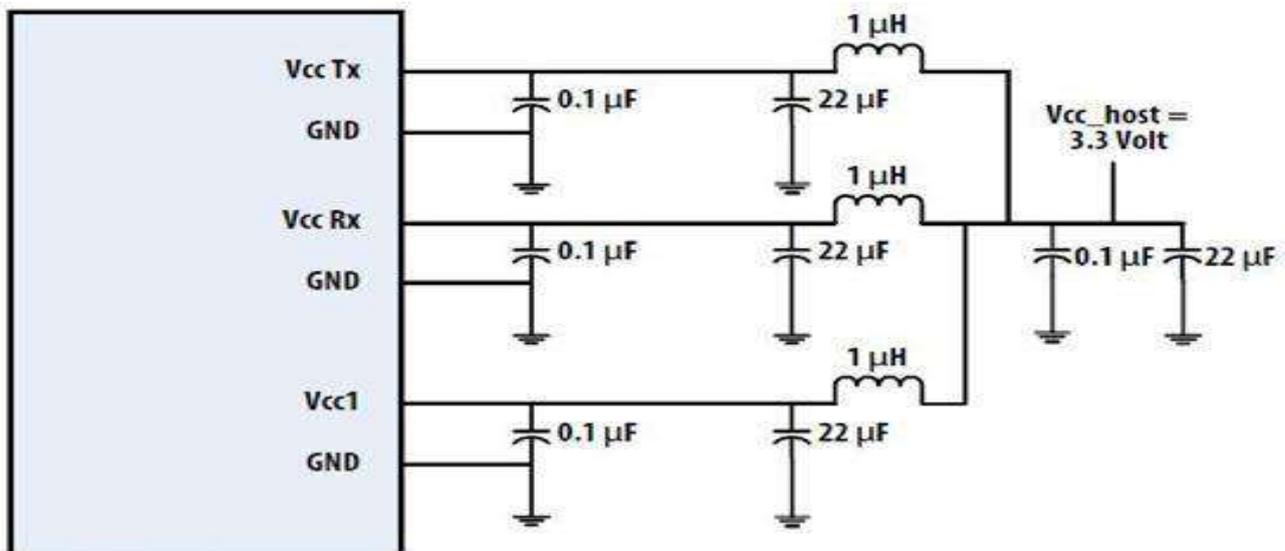
DDM accuracy:

Parameters	Unit	Requirements	Note
temperature	°C	+/-3	
voltage	V	+/-5%	
Ibias	mA	+/-10%	
Rx power	dB	+/-3.0	
Tx power	dB	+/-3.0	

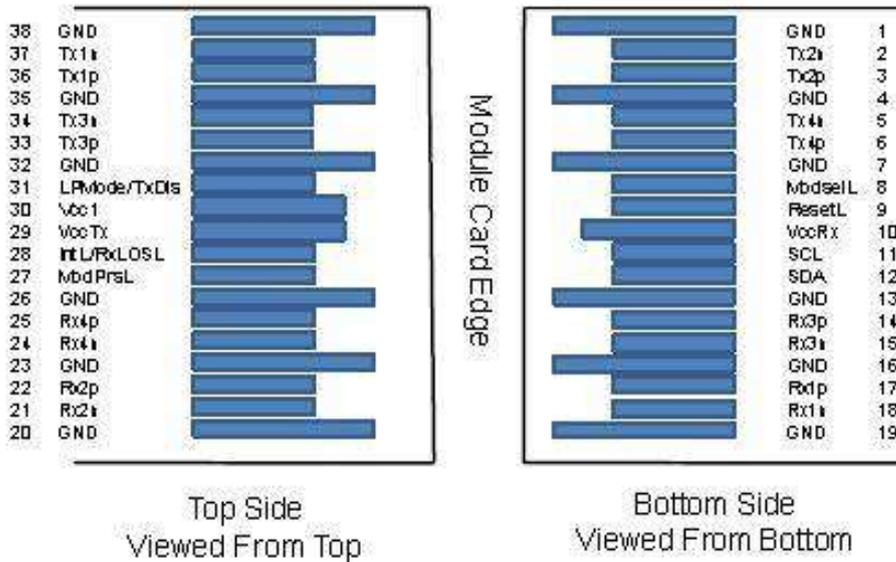
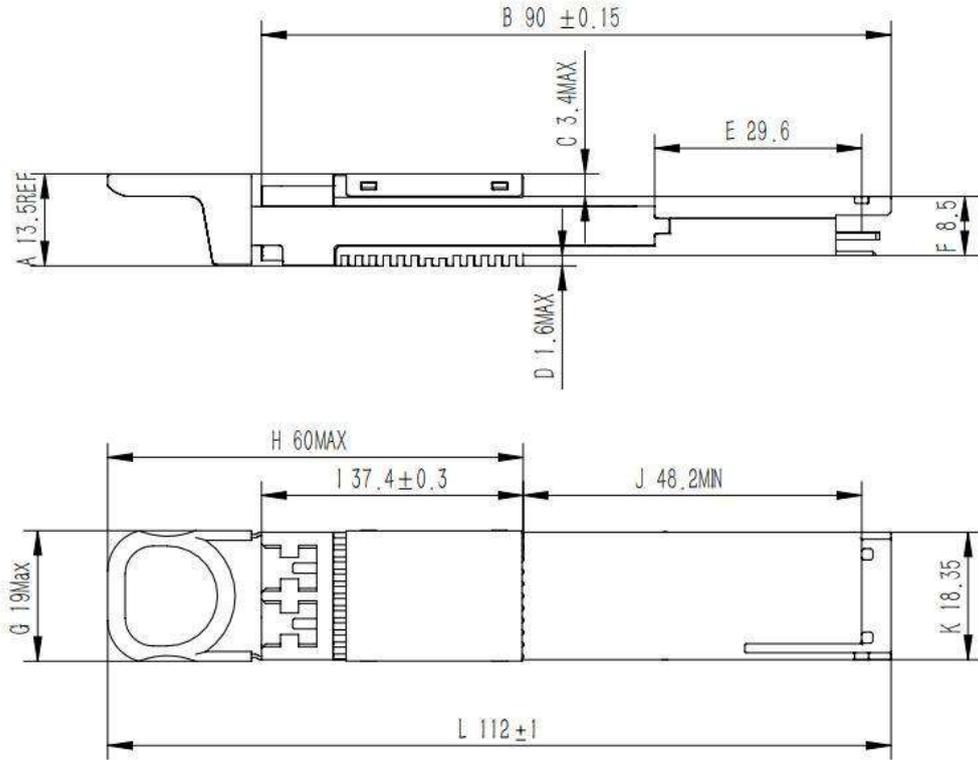
DDM Alarm & warning threshold is listed below:

Parameters	Unit	Requirements	Description
Temp low warning	°C	0	Min. case temperature
Temp high warning	°C	83	Max. case temperature
Voltage low warning	V	3.135	-5% Vcc target
Voltage high warning	V	3.465	+5% Vcc target
Tx power low warning	dBm	-1	Min. optical power in DS.
Tx power high warning	dBm	4	Max. optical power in DS.
Rx power low warning	dBm	-12.5	Sensitivity
Rx power high warning	dBm	4.2	Overload
Temp low alarm	°C	-10	Warning-10°C
Temp high alarm	°C	+88	Warning+10°C
Voltage low alarm	V	2.97	-10% Vcc target
Voltage high alarm	V	3.63	+10% Vcc target
Tx power low alarm	dBm	-4	Warning -3dB
Tx power high alarm	dBm	7	Warning +3dB
Rx power low alarm	dBm	-15.5	Warning -3dB
Rx power high alarm	dBm	7.2	Warning +3dB

Recommended Power Supply Filter



MECHANICAL DRAWINGS



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD-protected Environment.

Ordering Information

Model	Description
AB-QSFP28-80P	100G DWDM QSFP28 PAM4 80km C29 C30 100GHz CS DDM Optical Transceiver

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