100GBASE-BX80 QSFP28 BIDI 80km DDM SMF Transceiver

P/N: AE-Q28-BX80-U/D

Features

- Hot pluggable QSFP28 MSA form factor
- Supports 103.1Gb/s aggregate bit rate
- Up to 80km reach for G.652 SMF [with RS (528,514) FEC]
- Single +3.3V power supply
- Temperature Range 0 to 70°C
- Cooled 4x25Gb/s LAN WDM TOSA, LAN WDM ROSA
- Maximum power consumption 5.0W
- Single LC receptacle
- Compatible with RoHS-10
- DDM function

Applications

- Ethernet Links
- 100GBASE-BIDI ZR4

Optic/Electric Specification

Recommended Operating Conditions

NO.	Parameter	Symbol	Unit	Min	Typ	Max
1	Operating Case Temperature Range	Tc	℃	0		70
2	Relative Humidity	RH	%	0		90
3	Power Supply Voltage	Vcc	V	3.135	3.3	3.465
4	Total Power Consumption	Pw	W			5.0
5	Data rate(each line)		Gb/s		25.78125	-

Voltage Supply Electrical Characteristics

NO.	Parameter	Symbol	Unit	Min	Typ	Max	Notes
1	Steady State Supply Current	Icc	mA	-	-	1443	
2	Sustained peak current	I_{SP}	mA			1650	
3	Instantaneous peak current	I_{IP}				2000	
4	Power Dissipation	Pw	W			5.0	
5	Low Power Dissipation	Plow	W			1.5	

Different Signal Electrical Characteristics

NO.	Parameter	Symbol	Unit	Min	Typ	Max	Notes
	Pattern				PRBS9		
Transmitter Electrical Input from Host at TP1a (detailed specification in CEI-28G-VSR)							
1	Differential voltage pk-pk		mV		-	900	
2	Common mode noise (rms)		mV			17.5	
3	Eye height		mV	95			
4	Eye width		Ui	0.46			
5	Differential termination mismatch		%			10	
6	Transition time		ps	10			20/80%
7	Common mode voltage		V	-0.3		2.8	
Receiver Electrical Output to Host at TP4 (detailed specification in CEI-28G-VSR)							

8	Differential voltage pk-pk		mV		-	900	
9	Common mode noise (rms)		mV			17.5	
10	Eye height		mV	228			
11	Eye width		Ui	0.57			
12	Differential termination mismatch		%			10	
13	Transition time		ps	9.5			20/80%
14	Vertical eye closure	VEC	dB			5.5	

3.3V LVTTL Electrical Characteristics

NO.	Parameter	Symbol	Unit	Min	Typ	Max	Notes
1	Input High Voltage	VIH	V	2.0	-	Vcc+0.3	
2	Input Low Voltage	VIL	V	-0.3	-	0.8	
3	Input Leakage Current	IIN	uA	-10	-	+10	
4	Output High Voltage (I_{OH}=100uA)	VOH	V	Vcc-0.5	-	Vcc+0.3	
5	Output Low Voltage (I_{OL}=100uA)	VOL	V	0		0.4	

3.3V LVCMOS Electrical Characteristics

NO.	Parameter	Symbol	Unit	Min	Typ	Max	Notes
1	Input High Voltage	VIH	V	Vcc*0.7	-	Vcc+0.5	
2	Input Low Voltage	VIL	V	-0.3	-	Vcc*0.3	
3	Output High Voltage (I_{OH}=100uA)	VOH	V	Vcc-0.5	-	Vcc+0.3	
4	Output Low Voltage (I_{OL}=100uA)	VOL	V	0		0.4	
5	I/O Pin Capacitance	Ci	pF			14	

Optical Specification

NO.	Parameter	Symbol	Unit	Min	Typ	Max	Note
Optical Transmitter Characteristics							
1	Signaling Rate for Each Lane		Gbps	-	25.78125		
2	Signaling Speed Accuracy		ppm	-100		+100	
3	Four Lane Wavelength Range AE-Q28-BX80-U	λ1	nm	1272.55	1273.55	1274.54	
		λ2		1276.89	1277.89	1278.89	
		λ3		1281.25	1282.26	1283.27	
		λ4		1285.65	1286.66	1287.68	
4	Four Lane Wavelength Range AE-Q28-BX80-D	λ5	nm	1294.53	1295.56	1296.59	
		λ6		1299.02	1300.05	1301.09	
		λ7		1303.54	1304.58	1305.63	
		λ8		1308.09	1309.14	1310.09	
5	Side Mode Suppression Ratio (min)	SMSR		30			
6	Total Launch Power	Pr	dBm	8.0		10.5	
7	Average Launch Power for Each Lane	Pavg	dBm	2		4.5	
8	Optical Modulation Amplitude for Each Lane	OMA	dBm	3[2]		8.8	
9	Difference in launch power between any two lanes(OMA) (max)		dB			3.6	
10	Average Launch Power of Off Transmitter for Each Lanes	Poff	dBm	-		-30	
11	Extinction Ratio	EX	dB	6			
12	Optical Return Loss Tolerance		dB			20	
13	Transmitter Reflectance		dB			-12[3]	
14	Eye Diagram	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}[4]					
15	Eye mask margin	≥10%					
Optical Receiver Characteristics							
16	Receive Rate for Each Lane		Gbps	-	25.78125		
17	Signaling Speed Accuracy		ppm	-100		+100	

NO.	Parameter	Symbol	Unit	Min	Typ	Max	Note
18	Four Lane Wavelength Range AE-Q28-BX80-U	λ5	nm	1294.53	1295.56	1296.59	
		λ6		1299.02	1300.05	1301.09	
		λ7		1303.54	1304.58	1305.63	
		λ8		1308.09	1309.14	1310.09	
19	Four Lane Wavelength Range AE-Q28-BX80-D	λ1	nm	1272.55	1273.55	1274.54	
		λ2		1276.89	1277.89	1278.89	
		λ3		1281.25	1282.26	1283.27	
		λ4		1285.65	1286.66	1287.68	
20	Damage threshold 5	Pmax	dBm	5.5			
21	Average Receive Power for Each Lane	Pin		-30[6]		-7	
22	Receive Power In OMA for Each Lane	PinOMA	dBm	-		-7	
23	Receiver reflectance		dB			-26	
24	Receiver Sensitivity for Each Lane(100GbE) at BER= 5x10–5 BER7 CD=[-356/66] ps/nm	S	dBm			-24	
25	Los Hysteresis		dB	0.5		5	

Note1. 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.

Note2. Even if the TDP<1dB, the OMA (min) must exceed this value.

Note3. Transmitter reflectance is defined as looking into the transmitter.

Note4. The eye mask hit ratio is 5E-5.

Note5. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.

Note6. Average receive power, each lane (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.

Note7. Receiver sensitivity (OMA), each lane (max) at 5 x 10^{-5} BER is a normative specification.

Optic/Electric Ports Definition

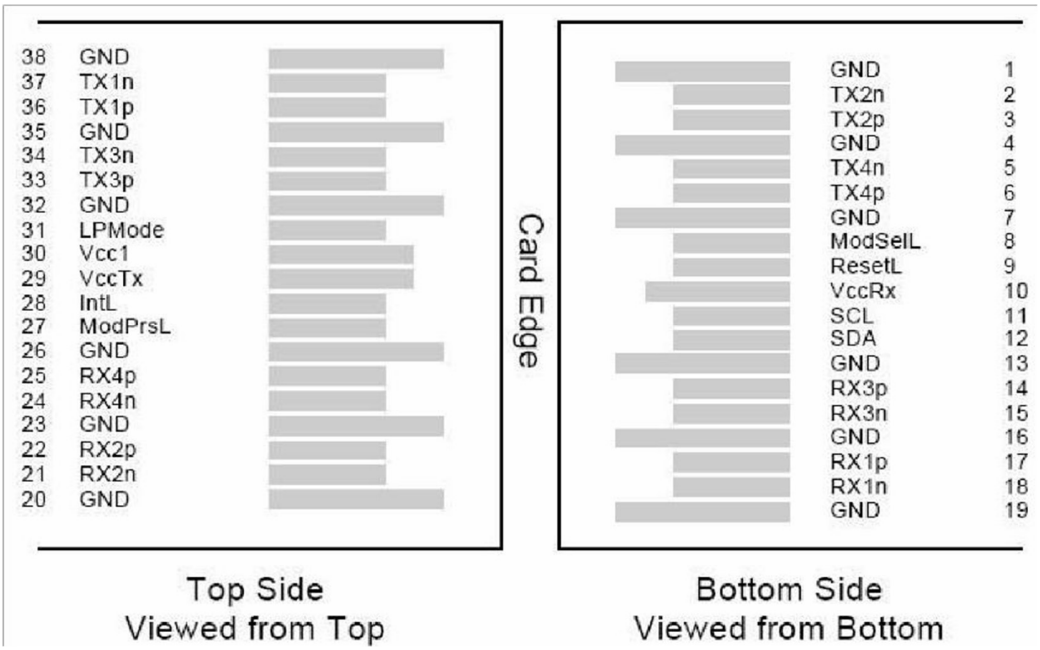


Figure 1. QSFP28-compliant 38-pin connector (per SFF-8679)

Electric Ports Definition

PIN	Definition	Description	Note
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	
12	SDA	2-Wire Serial Interface Data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	

PIN	Definition	Description	Note
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/RxLosL	Interrupt. Optionally configurable as RxLOSL via the management interface(SFF-8636).	
29	VccTx	+3.3 V Power Supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMode	Low Power Mode. Optionally configurable as TxDis via the management interface(SFF-8636).	
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

Note1. 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.

Note2. 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 Vcc Tx may be internally connected within the module in any combination. The connector pins are each rated for a maximum current of 1000mA.

Ordering Information

Part Number	Product Description
AE-Q28-BX80-U	QSFP28 BIDI, 103.125Gbps, Tx 4x25Gb/s LWDM EML, Rx SOA+PIN, 0~70℃, 80km with KR4 FEC, DDM, Tx-1273nm/Rx-1310nm
AE-Q28-BX80-D	QSFP28 BIDI, 103.125Gbps, Tx 4x25Gb/s LWDM EML, Rx SOA+PIN, 0~70℃, 80km with KR4 FEC, DDM, Tx-1310nm/Rx-1273nm