AE-Q28-BX20

QSFP28 100Gb/s BIDI LH 20km Transceiver

FEATURES

- Supports 100GBASE-LR1-20 BIDI
- Lane signaling rate 106.25Gb/s with PAM4
- Up to 20km transmission on SMF
- EML Laser and PIN receiver
- 4x25.78Gb/s with NRZ electrical interface (CAUI-4)
- High speed I/O electrical interface
- I2C interface with integrated Digital Diagnostic monitoring
- QSFP28 MSA package with simplex LC connector
- Single +3.3V power supply
- Support HW TX_DIS and RX_LOS for telecom application
- Maximum power consumption 4.5 W
- Operating case temperature: 0 to +70°C
- Compliant to 802.3cu, SFF-8636&SFF-8679 standard
- Complies with EU Directive 2015/863/EU

APPLICATIONS

- 100GBASE-LR1-20 BIDI

Ordering Information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
AE-Q28-BX20-U	106.25Gbps	Tx1291/Rx1311	SMF	20km	LC	0~70C	Y	Purple
AE-Q28-BX20-D	106.25Gbps	Tx1311/Rx1291	SMF	20km	LC	0~70C	Y	Red

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T_S	-40	-	+85	°C	
Supply Voltage	V_{CC}	-0.5	-	+4.0	V	
Operating Relative Humidity	RH	-	-	+85	%	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	0	-	+70	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}	-	-	1.3	A	
Maximum Power Dissipation	P_D	-	-	4.5	W	
Data Rate(optical)	DRo	-	106.25	-	Gb/s	
Transmission Distance	TD	-	-	20	km	Over SMF

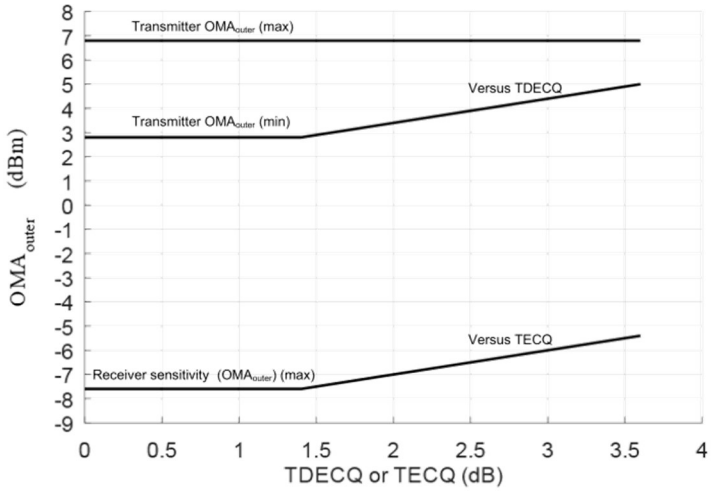
III. Optical and Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Center Wavelength	CW	1284.5	1291	1297.5	nm	
		1304.5	1311	1317.5	nm	
Average Launch Power	P_{TX}	-0.2	-	6.6	dBm	1
Outer Optical Modulation Amplitude	OMA	2.8	-	6.8	dBm	TEDCQ<1.4
		1.4+TDECQ	-		dBm	1.4≤TDECQ
Transmitter and dispersion eye closure for PAM4 (TDECQ) (max)	TDECQ	-	-	3.6	dBm	
Transmitter eye closure for PAM4 (TECQ) (max)	TECQ	-	-	3.4	dBm	
|TDECQ-TECQ| (max)	-	-	-	2.7	dB	
Average Output Power (Laser Turn off)	$P_{OUT-OFF}$	-	-	-15	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	

Extinction Ratio	ER	3.5	-	-	dB	
Receiver						
Center Wavelength	CW	1304.5	1311	1317.5	nm	
		1284.5	1291	1297.5	nm	
Damage threshold	Pdamage	7.6	-	-	dBm	2
Average Rx Power	P_{RX}	-10	-	6.6	dBm	3
Receive power_OMAouter	P_{OMA}	-	-	6.8	dBm	
Receiver sensitivity _OMAouter	SEN _OMA	-	-	-7.6	dBm	TECQ≤1.4
		-	-	-9+TECQ	dBm	1.4≤TECQ≤3.6
Los Assert	LosA	-26	-	-	dBm	
Los De-Assert	LosDA	-	-	-11	dBm	
Los Hysteresis	LosH	0.5	-	-	dB	

Notes:

1. The optical power is launched into SMF. The transmitter wavelength range supports a broad range of transmitter types which may have different chirp characteristics. Compliance to the TDECQ and TECQ specifications may require a tighter wavelength range depending on the chirp characteristics of the transmitter
2. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level. The receiver does not have to operate correctly at this input power.
3. Average receive power, each lane (min) is informative and not the principal indicator of signal strength.



IV. Electrical Characteristics

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

Low-Speed Signal: Compliant to SFF-8679.

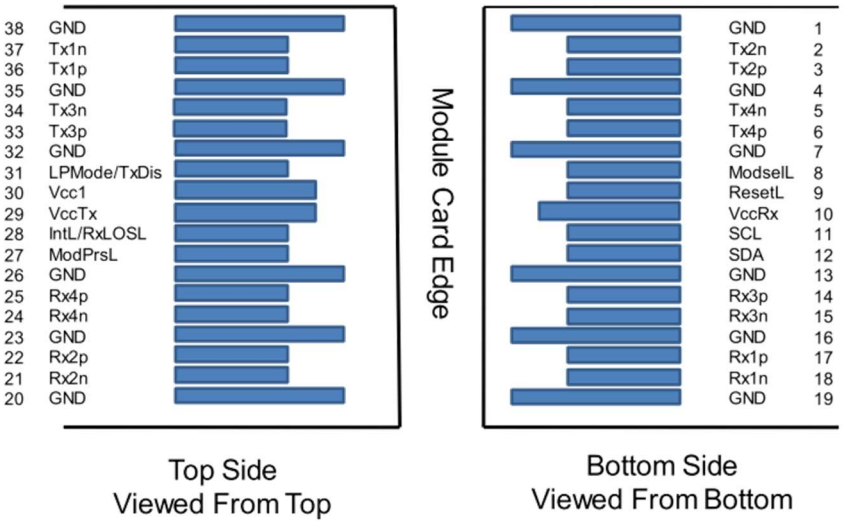
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter (Module Input)						
Input Differential Impedance	Rin	-	100	-	Ohm	
Differential Data Input Amplitude	$V_{IN,P-P}$	80	-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10	%	
DC common-mode input voltage		-0.3	-	2.8	V	

Transition time(20%~80%)	Tr Tf	10	-	-	ps	
LPMode, Reset and ModSelL / Tx dis	V_{IL}	-0.3	-	0.8	V	
LPMode, Reset and ModSelL / Tx dis	V_{IH}	2.0	-	V_{CC}+0.3	V	
Receiver (Module Output)						
Output Differential Impedance	Rout	-	100	-	Ohm	
Differential Data Output Amplitude	$V_{OUT,P-P}$	-	-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10	%	
Transition time, 20% to 80%	Tr Tf	12	-		ps	
ModPrsL and IntL/ Rx los	V_{OL}	0	-	0.4	V	
ModPrsL and IntL/ Rx los	V_{OH}	V_{CC}-0.5	-	V_{CC}+0.3	V	

V. Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	ºC	Internal
Voltage	0 to V_{CC}	10%	V	Internal
Tx Bias Current	0 to 100	10%	mA	Internal
Tx Output Power	0 to 5.6	±3	dBm	Internal
Rx Input Power	-14.7 to -3.4	±3	dBm	Internal

VI. Pin Diagram



VII. Pin Definitions

PIN	Logic	Symbol	Description	Plug Seq.	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	

3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5		NC		3	
6		NC		3	
7		GND	Ground	1	1
8	LVTLL-I	ModSelL	Module Select	3	
9	LVTLL-I	ResetL	Module Reset	3	
10		VccRx	+ 3.3V Power Supply Receiver	2	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	
14		NC		3	
15		NC		3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24		NC		3	
25		NC		3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3 V Power Supply transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2
31	LVTTL-I	LPMode	Low Power Mode	3	
32		GND	Ground	1	1
33		NC		3	
34		NC		3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Output	3	
38		GND	Ground	1	1

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 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. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in MSA. The connector pins are each rated for a maximum current of 1000 mA.