Alpha Bridge AQSFP28-100G-eLR4 Datasheet

Alpha Bridge Technologies

AQSFP28-100G-eLR4
Datasheet

Descriptions

This product is a 100Gb/s transceiver module designed for optical communication applications compliant to 100GBASE-LR of theIEEE 802.3ba standard. The module converts 4 input channels of 25Gb/s electrical data to 4 channels of LAN WDM optical signalsand then multiplexes them into a single channel for 100Gb/s optical transmission. Reversely on the receiver side, the module DE multiplexes a 100 GB/s optical input into 4 channels of LAN WDM optical signals and then converts them to 4 output of electrical data. The central wavelengths of the 4 LAN WDM channels are 1295.56, 1300.05, 1304.58, and 1309.14nm as members of the LAN WDM wavelength grid defined in IEEE 802.3ba. The high-performance cooled LAN WDM DFB transmitters and high sensitivity PIN receivers provide superior performance for 100Gigabit Ethernet applications up to 20km links and compliant to optical interface with 100GBASE-LR4 requirements specified in IEEE 802.3ba Clause 88.

The Product is designed with form factor optical/electrical connection and digital diagnostic interface according to the QSFP+ Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

Features

- Hot pluggable QSFP28 MSA form factor
- Compliant to IEEE 802.3ba 100GBASE-LR4
- Digital diagnostic monitoring support
- Hot pluggable 38 pin electrical interface
- Transmitter cooled 4x25Gb/s LAN WDM DFB TOSA (1295.56, 1300.05,1304.58, 1309.14nm)
- Receiver 4x25G PIN ROSA
- Maximum power consumption 4W
- LC duplex connector
- Supports 103.1Gb/s bit rate
- Up to 20kmreach for G.652 SMF
- Commercial case temperature range of 0°C to 70°C
- Single 3.3V power supply
- RoHS-6 compliant

Application

- 100GBASE-LR4 100G Ethernet Links
- Infiniband QDR and DDR interconnects
- Datacenter and Enterprise networking

Absolute Maximum Ratings

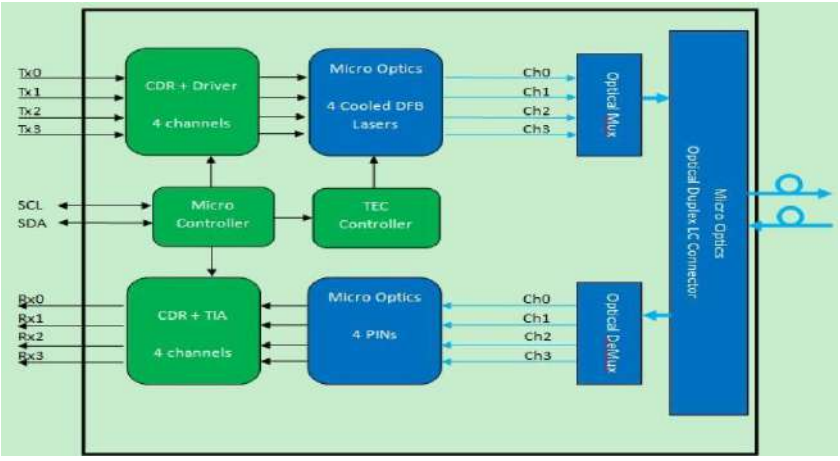
Parameter	*Symbol*	*Min.*	*Max.*	*Units*	*Note*
Storage Temperature	Ts	-40	85	°C	
Max Supply Voltage	Vcc	-0.5	3.6	V	
Relative Humidity	RH	0	85	%	1
Damage Threshold, each Lane	THd	5.5		dBm	
Operating Case Temperature	TOP	0	70	°C	

Note: Non-condensing

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Units	Typ.
Case operating Temperature	Top	0	70	°C	
Supply Voltage	Vcc	3.135	3.465	V	3.3
Link distance with G.652	D	0.002	20	KM	
Data Rate, each lane				Gb/s	25.78125
Data Rate Accuracy		-100	100	ppm	
Control Input Voltage-High		2	Vcc	V	
Control Input Voltage-Low		0	0.8	V	

Block Diagram of Transceiver



Transmitter Electro-optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmit wavelengths	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Signaling Speed per Lane	25.78125± 100 ppm				Gb/s	
Side-mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power	*PT*			10.5	dBm	
Average launch power, each Lane	*PAVG*	0		4.5	dBm	
Optical Modulation Amplitude (OMA), each lane	*POMA*	0.5		4.5	dBm	
Launch Power in OMA minus Transmitter and dispersion penalty (TDP), each lane		-2.3		3.6	dBm	
Transmitter and Dispersion Penalty (TDP), each lane	TDP			2.2	dB	
Extinction Ratio	ER	4			dB	

Difference in Launch Power between any Two Lances (OMA)	*Ptx,diff*			5	dB	
RIN20OMA	*RIN*			-130	dB/Hz	
Optical Return Loss Tolerance	*TOL*			20	dB	
Transmitter Reflectance	*RT*			-12	dB	
Average Launch Power OFF Transmitter, each lane	*Poff*			-30	dBm	
Mask margin		5			%	
Transmitter eye mask definition {X1, X2,X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}					2

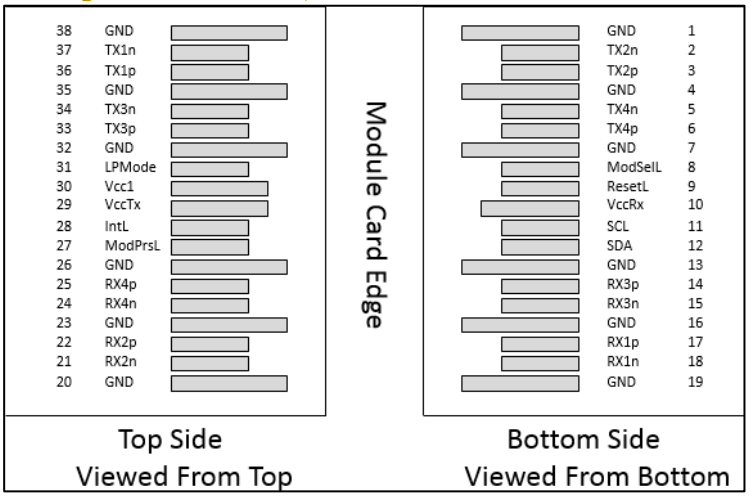
Receiver Electro-optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Average Receiver Power, each Lane		-12.6		4.5	dBm	
Receiver power, each lane (OMA)				-3.5	dBm	
Receiver reflectance	*RR*			-26	dB	
Difference in receive power between any two lanes (Average and OMA)				5.5	dB	
Receiver sensitivity (AOP), each lane	*SEN*			-8.6	dBm	2
Stressed Receiver Sensitivity (OMA),each lane				-6.8	dBm	4
Receiver 3 dB electrical upper cutoff frequency, each lane	*Fc*			31	GHz	
Damage Threshold, each Lane	THd	5.5			dBm	3
LOS Assert	LOSA	-30			dBm	
LOS Deassert	LOSD			-13	dBm	
LOS Hysteresis	LOSH	0.5			dB	
conditions of Stress Receiver Sensitivity Test (Note 5)						
Vertical Eye Closure Penalty, each lane				1.8	dB	
Stressed Eye J2 Jitter, each lane				0.3	UI	
Stressed Eye J9 Jitter, each lane				0.47	UI	

Notes:

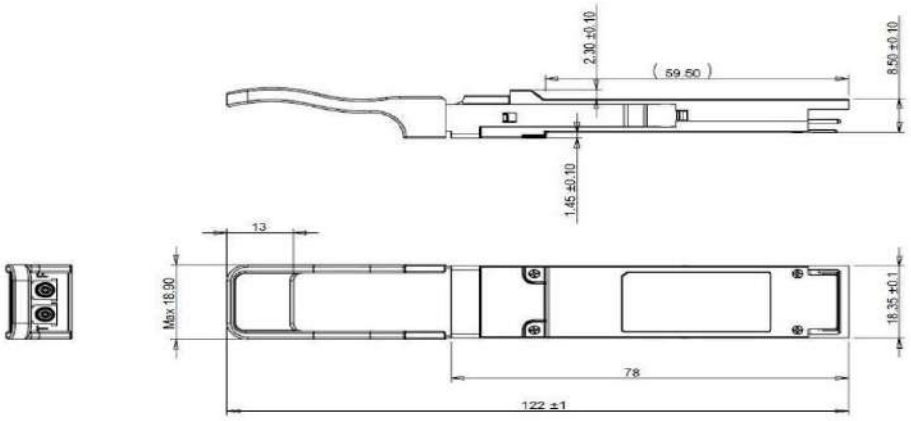
1. Even if the TDP< 1 dB, the OMA min must exceed the minimum value specified here.
2. Hit ratio $5x10^{-5}$
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signalhaving this power level on one lane. The receiver does not have to operate correctly at this input power.
4. Measured with conformance test signal at receiver input for BER=1x10-12
5. Vertical eye closure penalty, stressed eye J2 jitter, and stressed eye J9 jitter are test conditions for measuringstressed receiver sensitivity. They are not characteristics of the receiver.

Pin Assignment (MSA compliant connector)



MSA compliant Connector

Dimensions



Note: Dimensions are in mm, All Dimensions are 0.2mm unless otherwise specified

Pin Descriptions

Pin	Symbol	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	Vcc Rx	+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	
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 Non-Inverted Data Output	
25	Rx4p	Receiver Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	2
30	Vcc1	+3.3V Power supply	2
31	LP Mode	Lower 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

Ordering information:

Model Number	Part Number	Voltage	Temperature
AQSFP28-100G-eLR4	OPCW-S20 -13-CBD	3.3V	0°C to 70 °C

Note: All Information contained in this document is subject to change without notice.