100G QSFP28 ZR4 Optical Transceiver

Part Number - VQ-1CZR4CS-AA2

VQ-1CZR4CS-AA2 is a high performance QSFP28 transceiver module for 100 Gigabit Ethernet data links over single mode fiber.

Features

- Compliant with IEEE Std 802.3ba, 100G Ethernet ZR4
- Hot pluggable QSFP28 MSA form factor
- Supports 103.125 Gb/s Data Rate
- 4 cooled 25Gb/s channels LAN-WDM EML TOSA
- 4 channels SOA PIN photo detector
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature: 0°C to +70°C
- Up to 80km on SMF with FEC
- Duplex LC connector
- RoHS compliant
- Built-in digital diagnostic monitoring function (DDM)
- Compatible with major networking product brands (based on requirements)

Applications

- 100GBASE-ZR4 Ethernet links
- Data center

Ordering Information

Part Number	Description
VQ-1CZR4CS-AA2	100G QSFP28 LC Connectors, 80km with DDM function

Product Overview

VQ-1CZR4CS-AA2 QSFP28 transceiver modules are designed for 100 Gigabit Ethernet over single mode fiber. They are compliant with the QSFP28 MSA, 100GBASE-ZR4. Digital diagnostics functions are available via the I2C interface, as specified by the QSFP28 MSA.

VQ-1CZR4CS-AA2 is compliant with RoHS.

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate			25.78125	28.05	Gb/s	
Operating Temperature	T_C	0	25	70	°C	1
Storage Temperature	T_S	-40		85	°C	2
Storage Humidity	RH	5		95	%	
Input Voltage	V_{CC}	3.135	3.3	3.465	V	
Maximum Voltage	V_{MAX}	-0.5		4.0	V	3
Maximum Power Dissipation	P_D			6.5	W	
Operating Distance				80	km	

1. Case temperature
2. Ambient temperature
3. For electrical power interface

Optical – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Total Launch Optical Power	PT			12.5	dBm	1
Average Optical Launch Power (Each Lane)	P_{TX}	+2.0		6.5	dBm	1
Center Wavelength Range	L1	1294.53	1295.56	1296.59	nm	
	L2	1299.02	1300.05	1301.09	nm	
	L3	1303.54	1304.58	1305.63	nm	
	L4	1308.09	1309.14	1310.19	nm	
Extinction Ratio	ER	8.0			dB	2
Side Mode Suppression Ratio	SMSR	30			dB	
Spectral Width (-20dB)	Δλ			1	nm	
Pout @TX-Disable Asserted	P_{off}			-30	dBm	1
Optical Return Loss Tolerance	ORLT			20	dB	

1.The optical power is launched into SMF.
2.Measured with a PRBS 2^{31}-1 test pattern @25.78125Gbps.

Optical- Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Center Wavelength	L1	1294.53	1295.56	1296.59	nm	
	L2	1299.02	1300.05	1301.09	nm	
	L3	1303.54	1304.58	1305.63	nm	
	L4	1308.09	1309.14	1310.19	nm	
Sensitivity (Each Lane)	S			-28.0	dBm	1
				-20.9		2
Total Average Receiver Power	P	-22		-1	dBm	
Average Receiver Power (Each Lane)	P	-28		-7	dBm	
Receiver Power (OMA) (Each Lane)	R_{X_SEN1}			-7	dBm	
Damage Threshold (Each Lane)	P_{damage}	+4.5			dBm	
Receiver Reflectance	Rf			-26	dB	
LOS De-Assert	LOSD			-28.0	dBm	
LOS Assert	LOSA	-35.0			dBm	
LOS Hysteresis		0.5		5.0	dB	

1. Measured with PRBS 2^{31}-1 test pattern, 25.78125Gb/s, BER 5.0E-5.
2. Measured with PRBS 2^{31}-1 test pattern, 25.78125Gb/s, BER 1.0E-12.

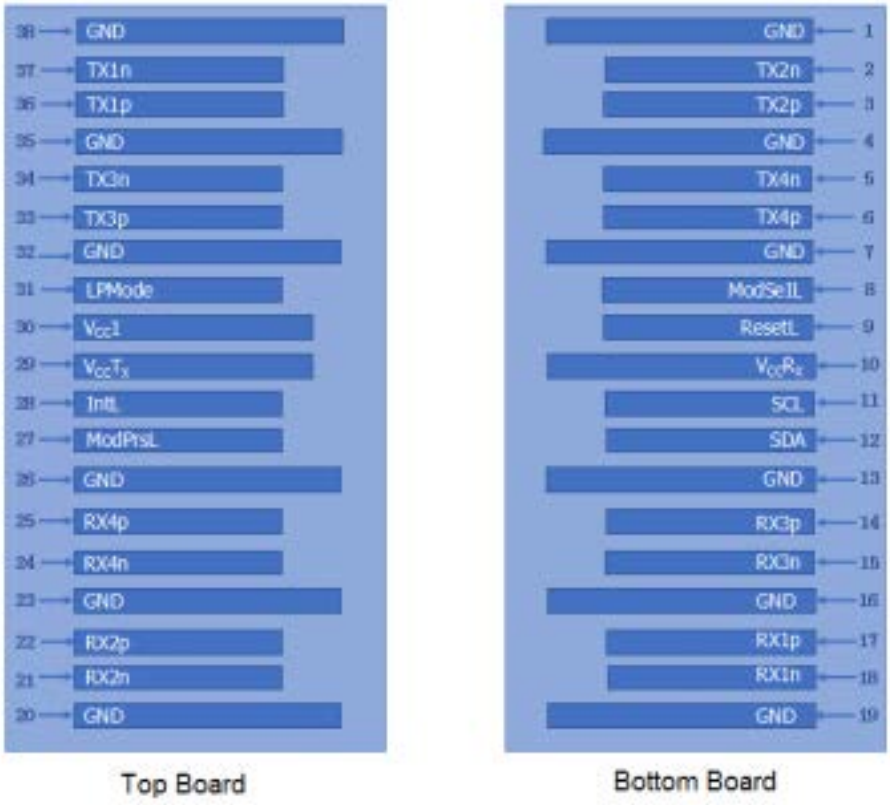
Electrical – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	Z_{in}		100		Ω	
Differential data input swing	$V_{IN\ P-P}$	190		700	mV	
AC Common Mode Input Voltage		15			mV	
Differential Input Voltage Swing Threshold			50		mV	

Electrical – Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Single-ended Output Voltage	-	-0.3	-	4.0	V	
Output Differential Impedance	Z_O	90	100	110	Ω	
Differential Data Output Swing	$V_{OUT\ P-P}$	300	-	850	mV	
AC Common Mode Output		-	-	7.5	mV	

Electrical Connector Layout



Top Board

Bottom Board

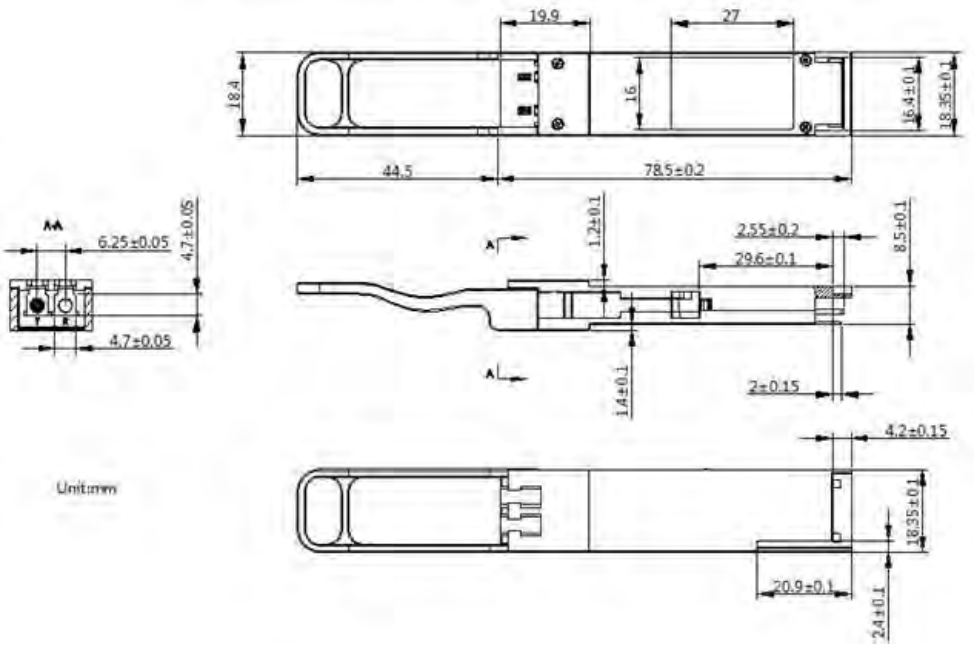
Electrical Pin Definition

PIN #	Symbol	Description	Remarks
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	
3	Tx2+	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	2
9	ResetL	Module Reset	2
10	VccRx	3.3V Power Supply Receiver	
11	SCL	2-Wire serial Interface Clock	2
12	SDA	2-Wire serial Interface Data	2
13	GND	Transmitter Ground (Common with Receiver Ground)	1
14	Rx3+	Receiver Non-Inverted Data Output	
15	Rx3-	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1+	Receiver Non-Inverted Data Output	
18	Rx1-	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2-	Receiver Inverted Data Output	
22	Rx2+	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4-	Receiver Inverted Data Output	1
25	Rx4+	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	2
29	VccTx	3.3V power supply transmitter	
30	Vcc1	3.3V power supply	
31	LPMode	Low Power Mode	2
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3+	Transmitter Non-Inverted Data Input	
34	Tx3-	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7kΩ to 10kΩ pull-up resistor to VccHost.

Mechanical Specifications



Revision History

Date	Rev	Description	By
08/20/2021	1.0	Initial release	Priya Manghat
09/13/2021	1.1	Added the storage humidity rating; added compatibility ordering information; modified table formats.	Raphael Ko

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DSH1: 9AD2A923E7686F155D5288547AB352174D7347C4
U2FsdGVkX18bhiYEmi6K7BEoPqZnUc2wTOm6rOE5gNQmrOILBUfDYPJ/p92K9fjC