

100G QSFP28 LR4/OTU4 Optical Transceiver

PN: VQ-1CLR4CS-FA

Product Overview

Vitex VQ-1CLR4CS-FA is designed for 100G Ethernet applications over single-mode fiber cables. They are compliant with the QSFP28 MSA and IEEE 802.3ba 100GBASE-LR4 standards, as well as G.959.1 OTU-4. The digital diagnostic functions are available via the I2C interface.

Features

- Compliant with IEEE Std 802.3ba, 100G Ethernet LR4/OTU4
- Compliant with G.959.1 OTU-4
- Compliant with QSFP28 MSA
- 4 cooled 25Gb/s channels LAN WDM DFB TOSA
- 4 channels PIN photo detector
- Single +3.3V power supply
- Class 1 laser safety certified
- Power consumption less than 3.5W
- Commercial operating temperature: 0 °C to 70 °C
- Up to 10km on SMF
- Duplex LC Connector
- RoHS Compliant

Applications

- Data Center
- 100G BASE-LR4 Ethernet
- OTN OTU4

Ordering Information

Part Number	Description
VQ-1CLR4CS-FA	100G QSFP28 OTU4/LR4, 10km SMF, 1310nm, Duplex-LC, C-temp

General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	
Storage Temperature	T _s	-40		85	°C	
Relative Humidity	RH	5		95	%	
Supply Voltage (Maximum)	V _{CC}	-0.5		4.0	V	
Supply Voltage (Recommended)	V _{CC}	3.135	3.3	3.465	V	
Operating Case Temperature (Commercial)	TC	0	25	70	°C	
Data Rate PER Channel			25.78125		Gb/s	

Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Launch Optical Power per lane	P _o	-4.3		+4.5	dBm	1
Total Launch Optical Power	P _o			+10.5	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	EX	4.0			dB	2
Spectral width(-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Return Loss Tolerance	ORLT			20	dB	
Pout @TX-Disable Asserted	P _{off}			-30	dBm	1
Eye Mask {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}					

1. The optical power is launched into SMF
2. Measured with a PRBS 2³¹-1 test pattern @25.78Gbps.

Optical – Receiver

Parameter	Symbol	Min	Typical	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	
Receiver Sensitivity (OMA)	S			-8.6	dBm	1
Overload (each channel)	P _{OL}	4.5			dBm	1
Damage Threshold (each channel)	P _{damage}	5.5			dBm	
Optical Return Loss	ORL	26			dB	
LOS De-Assert	LOSD			-11.6	dBm	
LOS Assert	LOSA	-24			dBm	
LOS Hysteresis		0.5			dB	

1. Measured with PRBS 231-1 test pattern, 25.78 Gbps, BER<1E-1

Optical – Transmitter for OTU4

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Launch Optical Power per lane	P _o	-0.6		+4.0	dBm	1
Total Launch Optical Power	P _o			+10	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	EX	4.0			dB	2
Spectral width(-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Return Loss Tolerance	ORLT			20	dB	
Pout @TX-Disable Asserted	P _{off}			-30	dBm	1
Eye Mask {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				

1. The optical power is launched into SMF.
2. Measured with a PRBS 2³¹-1 test pattern @27.95Gbps.

Optical – Receiver for OTU4

Parameter	Symbol	Min	Typical	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 per channel (OMA)	S			-8.4	dBm	1
Overload (each channel)	POL	4.5			dBm	1
Damage Threshold (each channel)	P _{damage}	5.5			dBm	
Optical Return Loss	ORL	26			dB	
LOS De-Assert	LOSD			-11.6	dBm	
LOS Assert	LOSA	-24			dBm	
LOS Hysteresis		0.5			dB	

1. Measured with PRBS 2³¹-1 test pattern, 27.95 Gbps, BER<1.0E-6.

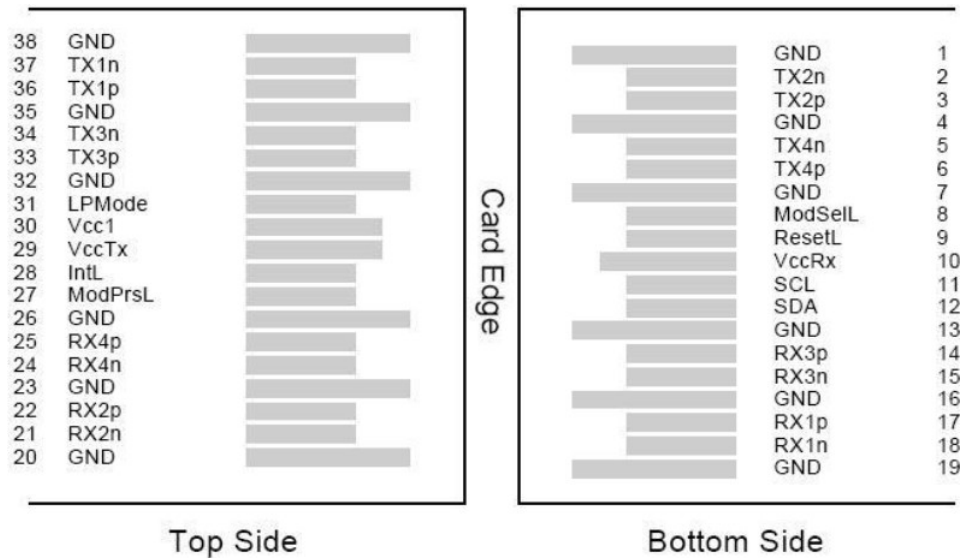
Electrical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Module Supply Current	I _{cc}			1100	mA	
Power Dissipation	P _D			3500	mW	
Single-ended Input Voltage Tolerance		-0.3		4.0	V	
Input Differential Impedance	Z _{IN}		100		Ω	
Differential Data Input Swing	V _{IN, P-P}	190		700	mV _{P-P}	
AC Common Mode Input Voltage Tolerance		15			mV	
Differential Input Voltage Swing Threshold		50			mV _{pp}	

Electrical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Single-ended Output Voltage		-0.3		4.0	V	
Output Differential Impedance	Zo	90	100	110	Ω	
Differential Data Output Swing	VOUT,P-P	300		850	mVP-P	
AC Common Mode Output Voltage				7.5	mV	

Electrical Connector Layout

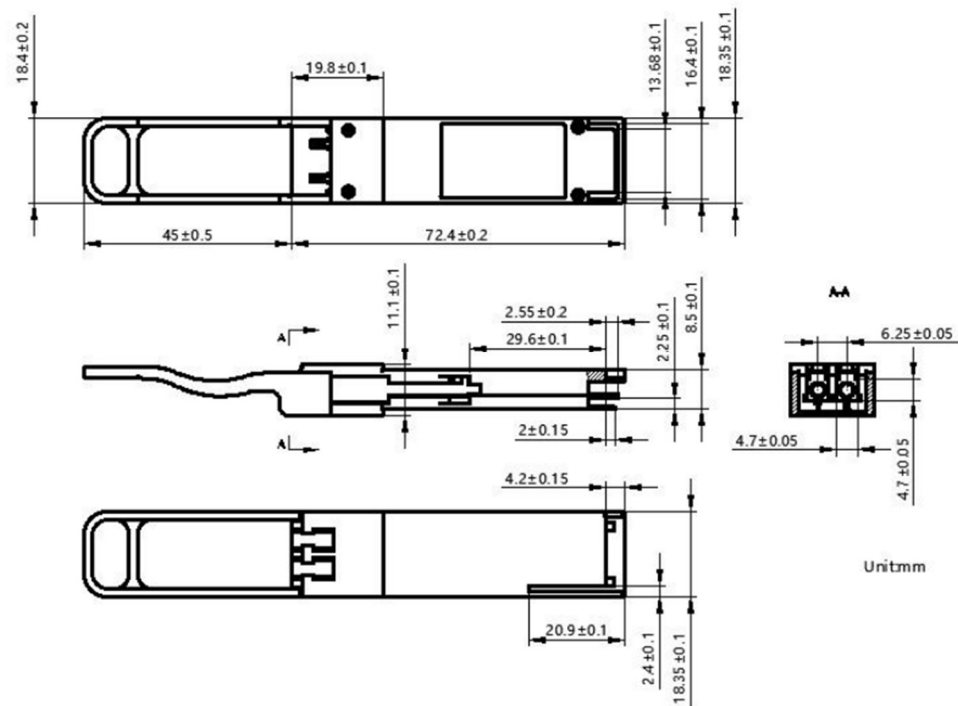


Electrical Pin Definition

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 Input	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data Input	
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	VccI	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 Input	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Input	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

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

Mechanical Dimension



Revision History

Date	Rev	Description
12/20/2023	1.0	Release version
02/12/2025	2.0	New branding guidelines

For more information

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