
100G QSFP28 FR Optical Transceiver

PN: VQ-1CFR1CS-AA

Product Overview

Vitex VQ-1CFR1CS-AA is designed for 2km optical communication applications over a fiber cable. The QSFP28 FR1 transceiver supports 53.125GBd per optical lane, and up to 106.25 Gbps data rate. The digital diagnostic management (DDM) interface and I2C interface are supported.

Features

- Compliant with IEEE 802.3cu
- Compliant with SFF-8679 MSA hardware specification
- Compliant with SFF-8636
- Compliant with SFF-8661
- 1310nm EML laser
- PIN receiver
- Up to 2km on 9/125um SMF
- 100ohm differential impedance system
- Operating temperature options
 - (Commercial) 0 °C to 70 °C
- Trouble-free installation and network bring-up
- RoHS Compliant

Applications

- Data Center
- 100 Gigabit Ethernet

Ordering Information

Part Number	Description
VQ-1CFR1CS-AA	100G QSFP28 FR1 single lambda, 2km SMF, 1310nm, Duplex-LC, C-temp

General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	
Storage Temperature	T_s	-40		+85	°C	
Relative Humidity	R_H	15		85	%	
Supply Voltage (Maximum)	V_{CC}	-0.5		3.6	V	
Supply Voltage (Recommended)	V_{CC}	3.13	3.3	3.47	V	
Operating Case Temperature	T_C	0		70	°C	
Data Rate per Channel			53.125±100ppm		GBd	
Modulation Format			PAM4			
Data Rate	BR		53.125		GBd	
Bit Error Rate	BER			2.4E-4		1
Supported Link Length on 9/125um SMF, 53.125 GBd	L		2		km	2

1. Tested with a PRBS31Q test pattern for 53.125 GBd operation.
2. Distances are based on FC-PI-6 Rev. 3.1 and IEEE 802.3 standards, with FEC.

Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Launch Optical Power (Average)	P_o	-3.1		4	dBm	1
Launch Optical Power (OMA)	P_{oma}	-0.1		4.2	dBm	
OMA minus TDECQ	OMA-TDECQ	-1.5			dBm	
Extinction Ratio	ER	3.5			dB	
Center Wavelength Range	λ_c	1304.5	1311	1317.5	nm	
Transmitter and dispersion penalty eye closure for PAM4	TDECQ			3.4	dB	
RIN17.1OMA (max)	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORLT			17.1	dB	
Pout@TX-Disable Asserted	P_{off}			-15	dBm	

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.

Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Center Wavelength	λ_c	1304.5		1317.5	nm	
Receiver Sensitivity (OMA)	RxSENS			-4.5	dBm	1
Average receive power	P_{avg}	-7.1		4	dBm	
Receive power(OMAouter)				4.2	dBm	
Receiver reflectance				-26	dB	
LOS De-Assert	LOS_D			-10	dBm	
LOS Assert	LOS_A	-16			dBm	
LOS Hysteresis		0.5			dB	

1. Measured with PRBS31Q test pattern, 53.125GBd, BER<2.4E-4.

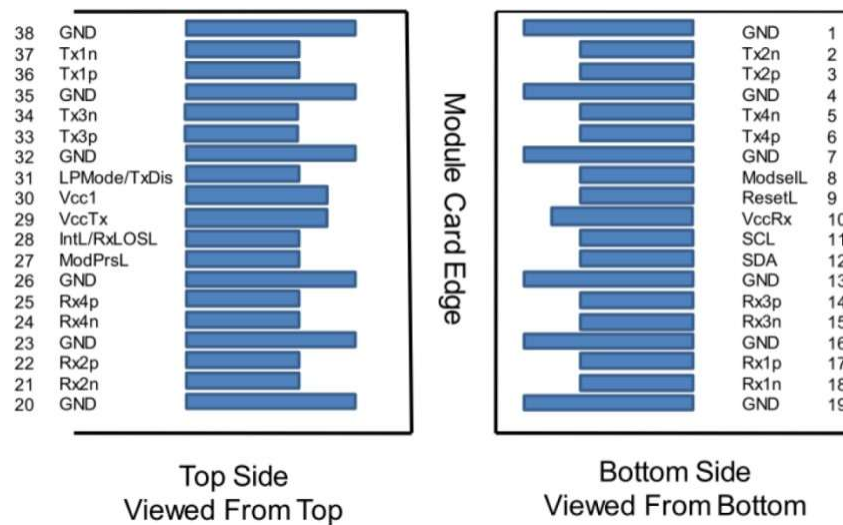
Electrical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit
Module Supply Current	I_{CC}			1276	mA
Power Dissipation	P_D			4000	mW
Input Differential Impedance	Z_{IN}	90	100	110	Ω
Differential Data Input Swing	$V_{IN, P-P}$	180		900	mV _{P-P}

Electrical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit
Output Differential Impedance	Z_O	90	100	110	Ω
Differential Data Output Swing	$V_{OUT, P-P}$	300		850	mV _{P-P}

Electrical Connector Layout



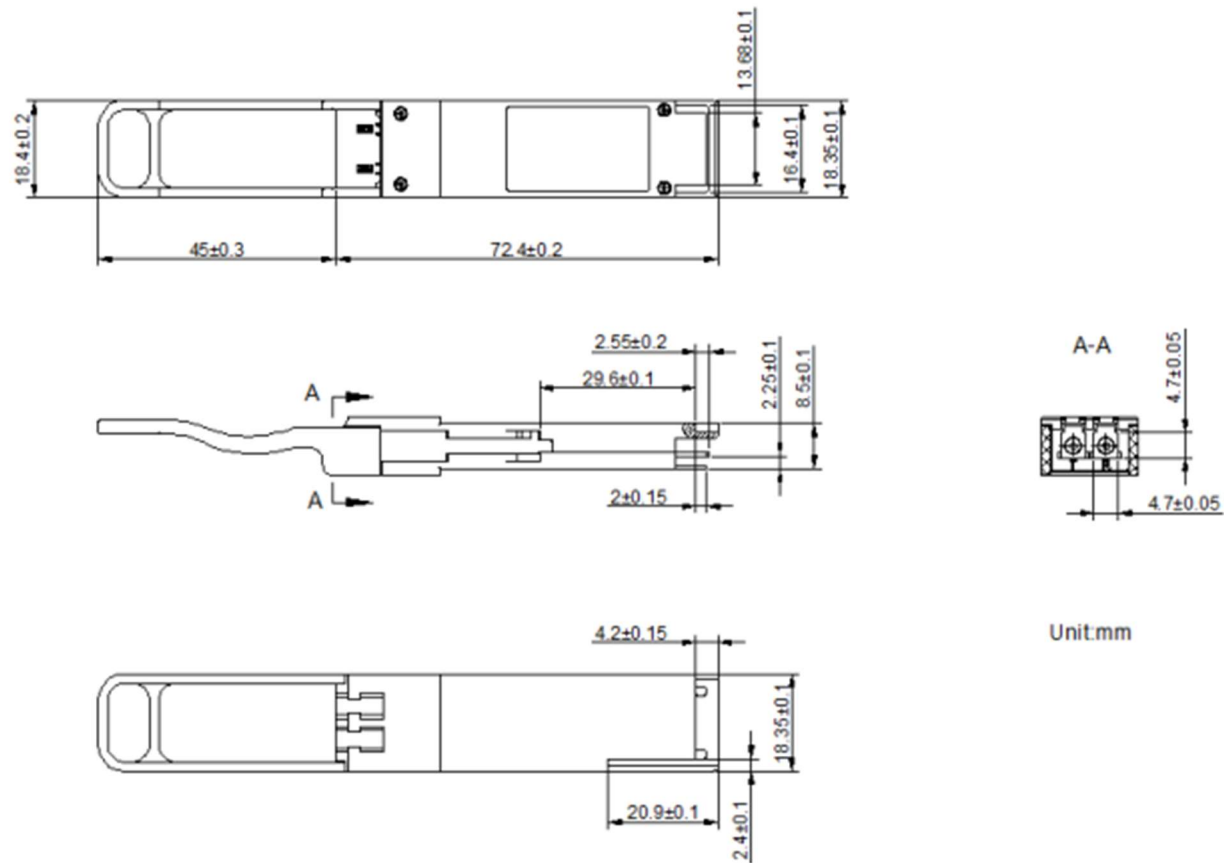
Electrical Pin Definition

PIN #	Logic	Symbol	Description	Remarks
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Output	
7		GND	Ground	1

8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx2n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTLL-O	ModPrsL	Module Present	
28	LVTLL-O	IntL/Rx_LOS	Interrupt/Rx_LOS	
29		VccTx	+3.3V Power Supply Transmitter	2
30		VccI	+3.3V Power Supply	2
31	LVTLL-I	LPMode/TxDIS	Low Power Mode/Tx_Disable	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	1

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. VccRx, VccI and VccTx 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 1A.

Mechanical Dimension



Unit:mm

Revision History

Date	Rev	Description
10/1/2021	1.0	Release version
02/11/2025	2.0	New branding guidelines

For more information

Vitex LLC
32 Mercer St
Hackensack, NJ 07601

201-296-0145
info@vitextech.com
www.vitextech.com

