800G QSFP-DD 2FR4 Optical Transceiver

PN: VD-8CFR4CS-AA

Product Overview

Vitex VD-8CFR4CS-AA is designed for use in 800G network applications, with a maximum transmission distance of 2km. It is a fully integrated optical transceiver modulated using 4-level pulse amplitude modulation (PAM4) format that transmits and receives optical signals with an aggregated data rate of 850Gbps over 8 lanes each running at 106.25Gbps. They are compliant with the QSFP-DD MSA and 400GBASE-FR4 optical specifications.

Features

- 8x100G PAM4/8x50G PAM4 data rates
- Compliant with IEEE Std 802.3cu 400GBASE-FR4
- 5nm DSP for low power dissipation: <14W
- Compliant with QSFP-DD MSA
- Electrical interface compliant with 100Gbps per lane defined by IEEE 802.3ck
- I2C Management interface compliant to CMIS Rev5.0
- Dual LC receptacles
- Cooled 1271/1291/1311/1331 EML laser
- Up to 2km on 9/125um SMF
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature:0oC to +70oC
- RoHS6 Compliant

Applications

- High speed storage area networks
- 2x400G-FR4 applications
- 2x200G-FR4 applications

Ordering Information

Part Number	Description
VD-8CFR4CS-AA	800G QSFP-DD 2FR4, 2km SMF, 1310nm, CWDM, Dual LC, C-temp

General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	
Storage Temperature	T_S	-40		85	°C	
Relative Humidity	RH	0		85	%	
Supply Voltage	V_{CC}	-0.5		3.6	V	
Operating Case Temperature	T_C	0	25	70	°C	
Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Data Rate			106.25		Gb/s	
			53.125		Gb/s	

Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Optical Wavelength Range	CH1	1264.5		1277.5	nm	1
	CH2	1284.5		1297.5	nm	1
	CH3	1304.5		1317.5	nm	1
	CH4	1324.5		1337.5	nm	1
	CH5	1264.5		1277.5	nm	1
	CH6	1284.5		1297.5	nm	1
	CH7	1304.5		1317.5	nm	1
	CH8	1324.5		1337.5	nm	1
Side-mode suppression ratio	SMSR	30	-	-	dB	2
Average launch power, each lane	Pavr (100G)	-3.2	-	4.4	dBm	3
	Pavr (50G)	-4.2	-	4.7	dBm	3
Transmitter and dispersion penalty eye closure for PAM4, each lane	TDECQ(100G)	-	-	3.4	dB	4
	TDECQ(50G)			3.1	dB	5
100G OMAouter per Channel for TDECQ<1.4dB for 1.4dB≤TDECQ≤3.4dB	OMA(100G)	-0.2		3.7	dBm	3
		-1.6+TDECQ		3.7	dBm	3
50G OMAouter per Channel	OMA(50G)	-1.2		4.5	dBm	3
50G OMAouter minus TDECQ per Channel for ER≧4.5dB for ER<4.5dB	OMAouter	-2.6			dBm	-
		-2.5			dBm	-
Extinction Ratio	ER	3.5			dB	6
Average launch power of OFF transmitter	Poff			-16	dBm	
Optical Return Loss Tolerance	ORLT			17.1	dB	
Transmitter reflectance				-26	dB	

1. 13nm width.
2. Modulated.
3. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
4. 106.25Gbps PAM4.
5. 53.125Gbps PAM4.
6. 106.25/53.125Gbps PAM4.

Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Optical Wavelength Range	CH1	1264.5		1277.5	nm	1
	CH2	1284.5		1297.5	nm	1
	CH3	1304.5		1317.5	nm	1
	CH4	1324.5		1337.5	nm	1
	CH5	1264.5		1277.5	nm	1
	CH6	1284.5		1297.5	nm	1
	CH7	1304.5		1317.5	nm	1
	CH8	1324.5		1337.5	nm	1
100G Receiver Sensitivity, each lane (OMA_{outer})	RxSENS1			-4.6	dBm	2
50G Receiver Sensitivity, each lane (OMA_{outer})	RxSENS2			-5.5	dBm	3
Receiver Overload, each lane (P_{avg})	POL	4.4			dBm	4
Damage Threshold, each lane		5.4			dBm	
Receive power, each lane (OMA_{outer})	OMA			3.7	dBm	
Receiver Reflectance				-26	dB	
LOS De-Assert	LOSD			-10	dBm	5
LOS Assert	LOSA	-16			dBm	5
LOS Hysteresis		0.5			dB	

1. 13nm width.
2. 106.25Gbps@BER<$2.4x10^{-4}$ and $PRBS2^{31}$-1, per Channel.
3. 53.125Gbps@BER<$2.4x10^{-4}$ and $PRBS2^{31}$-1, per Channel.
4. Per Channel.
5. Average power.

Electrical – Transmitter

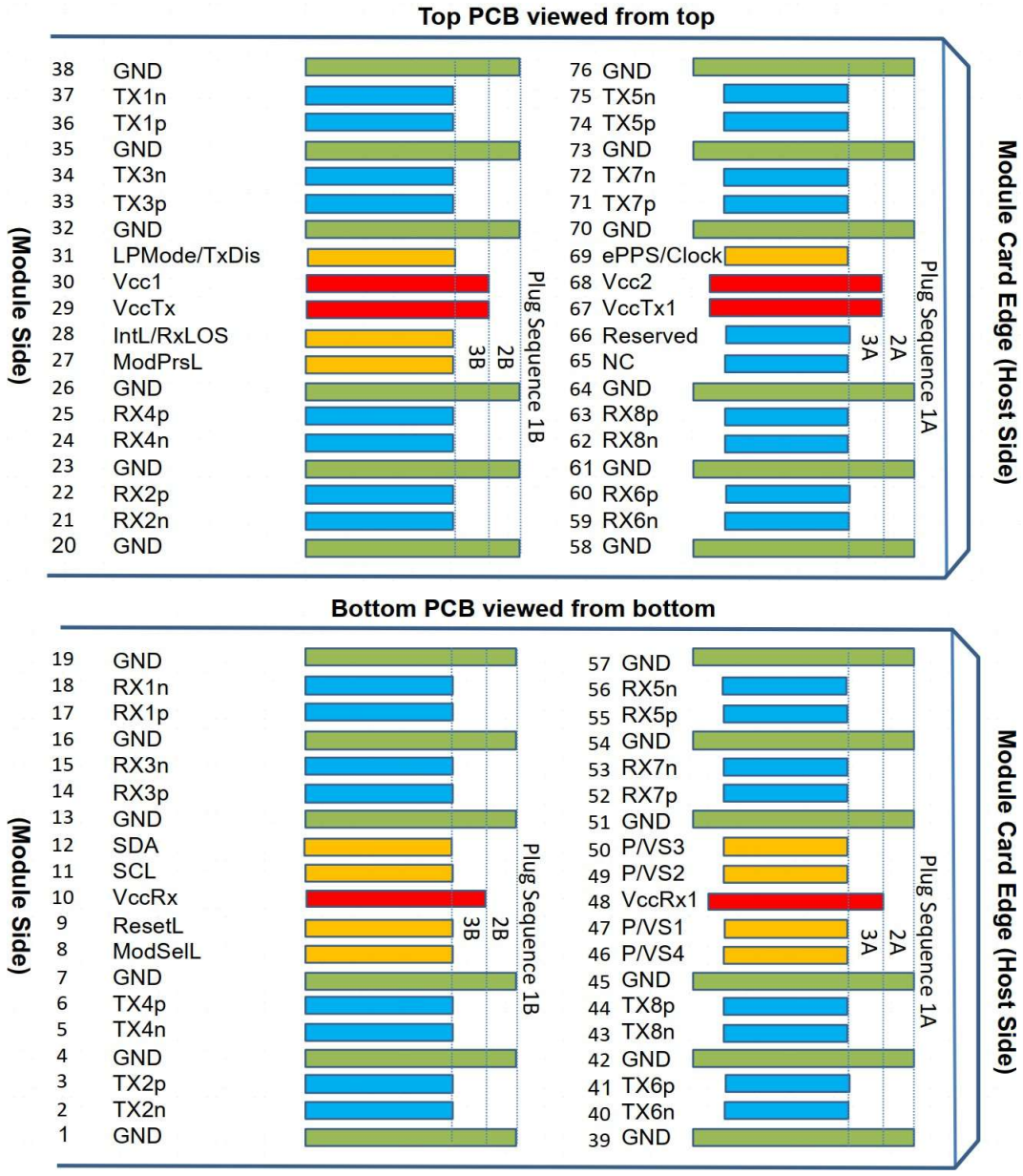
Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Module Supply Current	Icc			4.46	A	
Power Dissipation	PD			14	W	
Input Differential Impedance	ZIN		100		Ω	
Differential Data Input Swing	VIN, P-P			750	mVP-P	

Electrical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Output Differential Impedance	ZO		100		Ω	
Differential Data Output Swing	VOUT, P-P			845	mVP-P	1

1. Internally AC coupled but requires an external 100Ω differential load termination.

Electrical Connector Layout



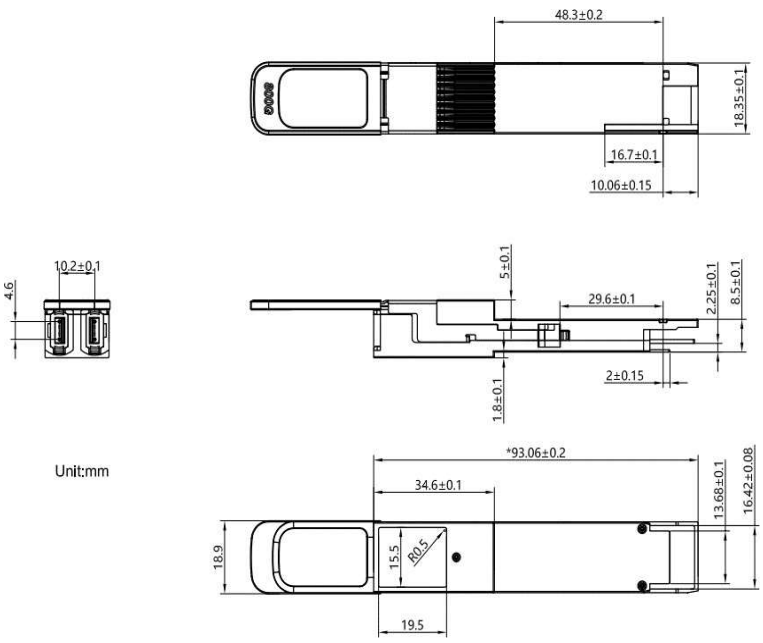
Electrical Pin Definition

PIN #	Symbol	Description	Remarks
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	VccRx	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 Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL/RxLOS	Interrupt/optional RxLOS	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	LPMode/TxDis	Low Power mode/optional TX Disable	
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
39	GND	Ground	1
40	Tx6n	Transmitter Inverted Data Input	
41	Tx6p	Transmitter Non-Inverted Data Input	
42	GND	Ground	1

43	Tx8n	Transmitter Inverted Data Input	
44	Tx8p	Transmitter Non-Inverted Data Input	
45	GND	Ground	1
46	P/VS4	Programmable/Module Vendor Specific 4	4
47	P/VS1	Programmable/Module Vendor Specific 1	4
48	VccRx1	3.3V Power Supply	2
49	P/VS2	Programmable/Module Vendor Specific 2	4
50	P/VS3	Programmable/Module Vendor Specific 3	4
51	GND	Ground	1
52	Rx7p	Receiver Non-Inverted Data Output	
53	Rx7n	Receiver Inverted Data Output	
54	GND	Ground	1
55	Rx5p	Receiver Non-Inverted Data Output	
56	Rx5n	Receiver Inverted Data Output	
57	GND	Ground	1
58	GND	Ground	1
59	Rx6n	Receiver Inverted Data Output	
60	Rx6p	Receiver Non-Inverted Data Output	
61	GND	Ground	1
62	Rx8n	Receiver Inverted Data Output	
63	Rx8p	Receiver Non-Inverted Data Output	
64	GND	Ground	1
65	NC	No Connect	3
66	Reserved	For Future Use	3
67	VccTx1	3.3V power supply	2
68	Vcc2	3.3V power supply	2
69	ePPS/Clock	1PPS PTP clock or reference clock input	5
70	GND	Ground	1
71	Tx7p	Transmitter Non-Inverted Data Input	
72	Tx7n	Transmitter Inverted Data Input	
73	GND	Ground	1
74	Tx5p	Transmitter Non-Inverted Data Input	
75	Tx5n	Transmitter Inverted Data Input	
76	GND	Ground	1

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane. Each connector GND contact is rated for a steady state current of 500mA.
2. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. Supply requirements defined for the host side of the Host Card Edge Connector are listed in Table 13. For power classes 4 and above the module differential loading of input voltage pads must not result in exceeding contact current limits. Each connector Vcc contact is rated for a steady state current of 1500mA.
3. Reserved pad recommended to be terminated with 10 k⊠ to ground on the host. Pad 65 (No Connect) Shall be left unconnected within the module, optionally pad 65 may get terminated with 10 k⊠ to ground on the host.
4. Full definitions of the P/VSx signals currently under development. For module designs using programmable/vendor specific inputs P/VS1 and P/VS4 signals it is recommended each to be terminated in the module with 10 k⊠⊠ For host designs using programmable/vendor specific outputs P/VS2 and P/VS3 signals it is recommended each to be terminated on the host with 10 k⊠⊠
5. for host not implementing ePPS/Clock, it is not necessary to parallel terminate the ePPS/Clock signal to ground on the host. ePPS/Clock already has parallel termination in the module.

Mechanical Dimension



Revision History

Date	Rev	Description
04/09/2023	1.0	Release version
02/13/2025	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