

400G QSFP-DD Active Optical Cable

Part Number – V4C-D1DyyyC-AA

V4C-D1DyyyC-AA is a high performance 400G QSFP-DD Active Optical Cable for Gigabit Ethernet data links.

Features

- Low latency DSP-free electronics-based CDR
- Multi-data rate up to 56.15 Gb/s per lane
- PAM4 modulation
- HPC grade BER $\leq 5 \times 10^{-8}$
- Single 3.3 V power supply
- Low power consumption : 7.6 W per cable end with all CDRs enabled
- Up to 100 m length
- QSFP-DD MSA compliant
- CMIS 3.0 compliant
- Commercial operating case temperature range: 0 to 70°C
- Hot pluggable
- RoHS/REACH compliant
- TUV-certified
- LSZH, LSZH/OFNR or OFNP-rated cable

Applications

- IEEE 802.3cm 400GBASE SR8
- Datacenter: servers, switches, storages and NIC adapters
- Proprietary HPC interconnections

Ordering Information

Part Number	Description
V4C-D1DyyyC-AA	400G QSFP-DD Active Optical Cable, yyy is the length in meters. For fractional length up to 10m, please use “P” designation. Example 0.5 meters – V4C-D1D0P5C-AA

Product Overview

Vitex V4C-D1DyyyC-AA is designed for 400Gbase links over fiber InfiniBand or Ethernet applications in LSZH, LSZH/OFNR or OFNP-rated cable jackets.

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Storage Temperature	TS	-40		85	°C	Ambient
Relative Humidity	RH	5		85	%	
Supply Voltage	VIN	0		4.0	V	
Input Swing	VIN-MAX			1500	mVpp	
Operating Case Temperature	TC	0		70	°C	
Power Supply Voltage	Vcc	3.15	3.3	3.47	V	
Power Supply Current	Icc	-	2300	2500	mA	1
Power Consumption		-	7.6	8.0	W	1

1. Per end, all channel CDRs enabled

Electrical – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate (Per Channel)	BR	-	26.562		GBd	1
Input Differential Impedance	ZIN		100		Ω	
Differential Data Input Voltage	VIN P-P	900			mV	
Input High Voltage	VIH	0.7×Vcc			V	
Input Low Voltage	VIL			0.3×Vcc	V	
Output High Voltage	VOH	Vcc-0.7			V	
Output Low Voltage	VOL			0.6	V	

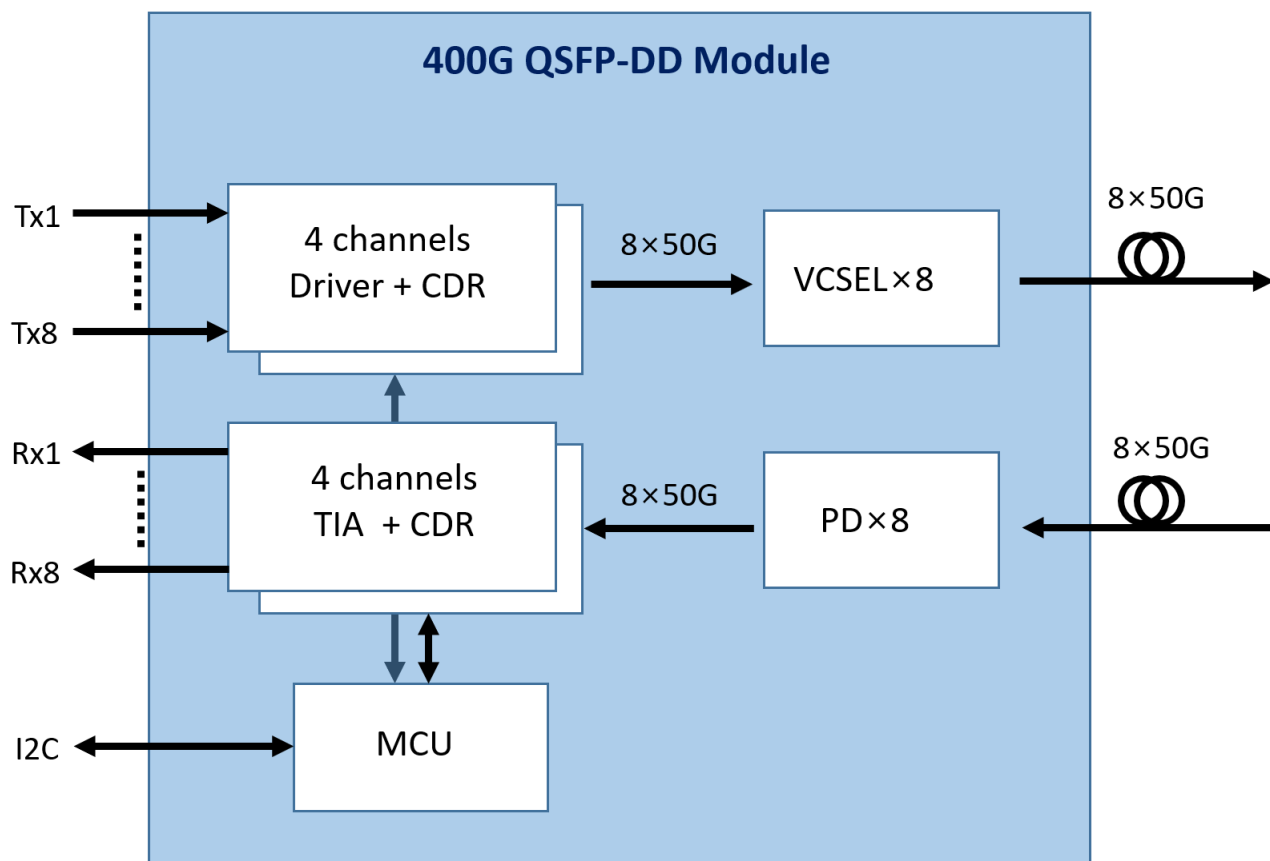
1. Dual data rate of 25.78125 and 28.07618 Gbaud are available upon request.

Electrical – Receiver

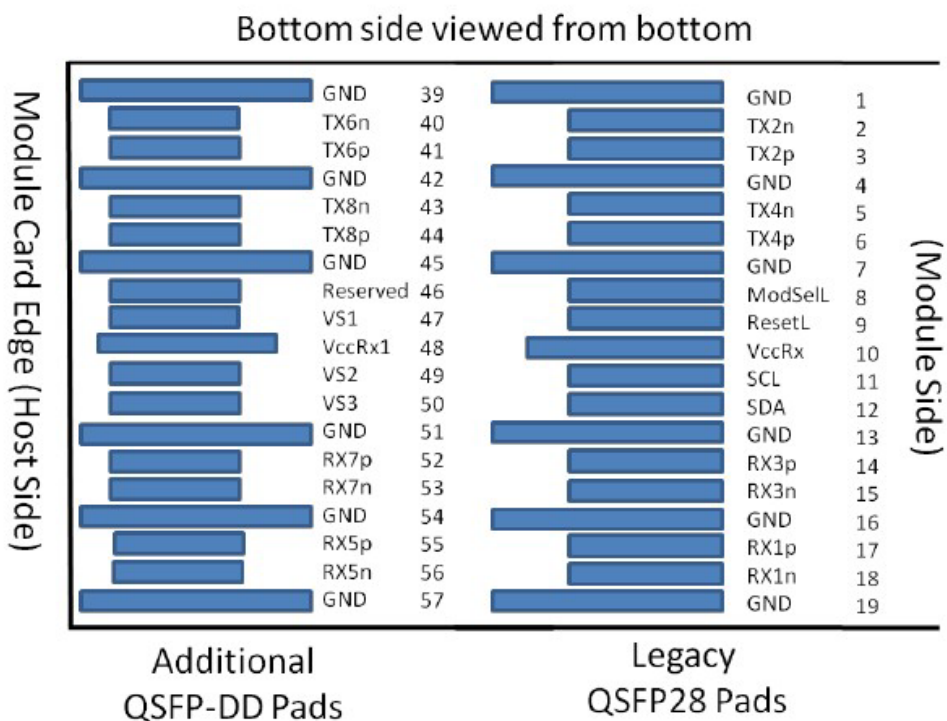
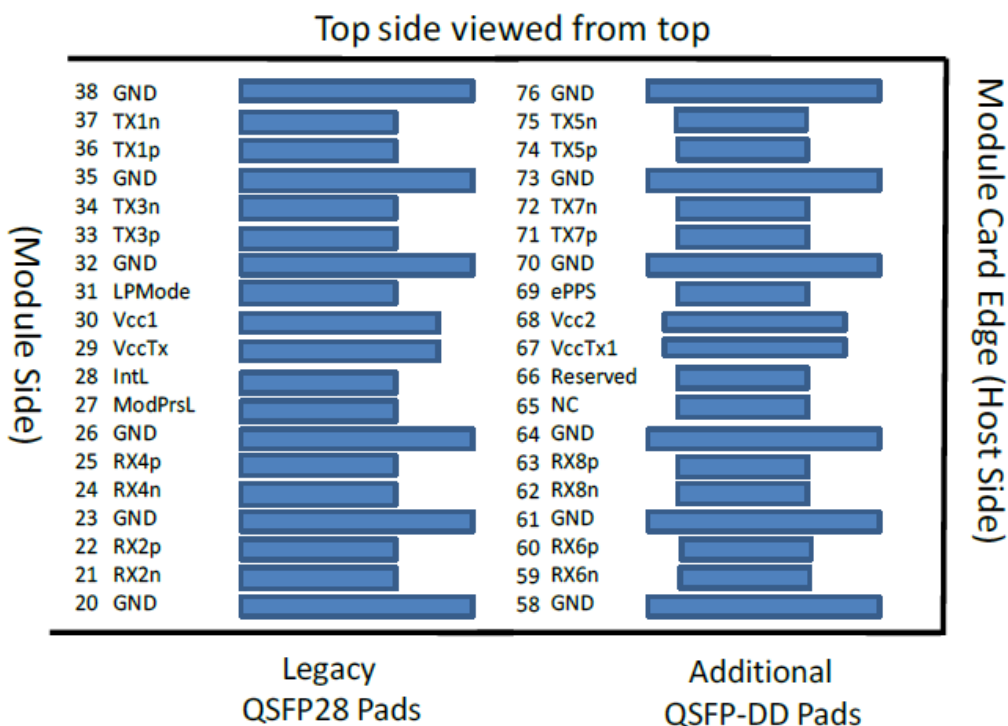
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Differential Impedance	ZO		100		Ω	
Differential Data Output Voltage	VOUT,	700	800	900	mV-P	
Bit Error Ratio (at 26.5625 GBd)	-	-	-	2.4×10 ⁻⁴		1

1. Pre-FEC Bit Error Ratio with a PRBS 231 – 1 test pattern over a normal operating temperature range.

Block Diagram



Electrical Connector Layout



Electrical Pin Definition

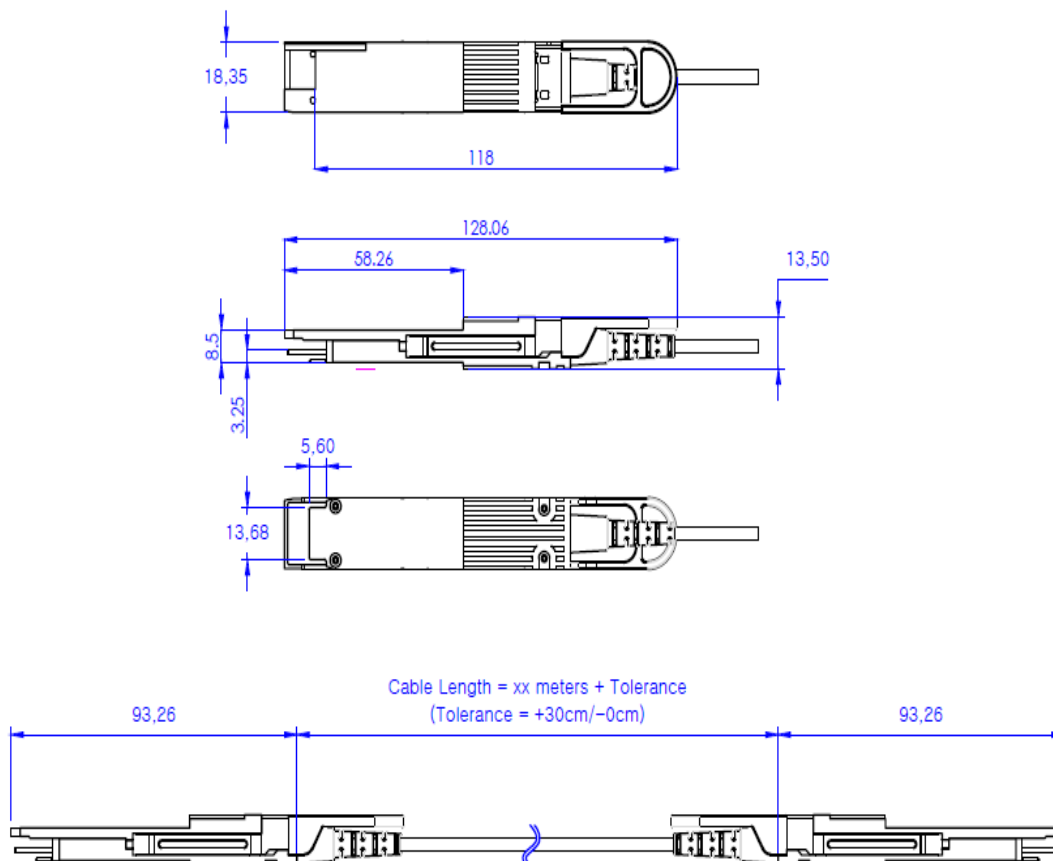
Pin	Name	Description	Note
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+3.3V 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	Interrupt	
29	VccTx	+3.3V Power Supply Transmitter	2
30	Vcc1	+3.3V Power Supply	2
31	InitMode	Initialization Mode; In legacy QSFP applications, LPMode	
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

1. GND is the symbol for signal and supply (power) common for the QSFP-DD module. All are common within the QSFP-DD module and all module voltages are referenced to this potential unless otherwise noted.
2. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. The connector pins are each rated for a maximum current of 1000 mA.
3. All Vendor Specific, Reserved, No Connect and ePPS pins may be terminated with 50 ohms to ground on the host, and not connected within the Module. Pad 65 (No Connect) is left unconnected within the module.

Pin	Logic	Name	Description	Note
39		GND	Ground	1
40	CML-I	Tx6n	Transmitter Inverted Data Input	
41	CML-I	Tx6p	Transmitter Non-Inverted Data Input	
42		GND	Ground	1
43	CML-I	Tx8n	Transmitter Inverted Data Input	
44	CML-I	Tx8p	Transmitter Non-Inverted Data Input	
45		GND	Ground	1
46		Reserved	For future use	3
47		VS1	Module Vendor Specific 1	3
48		VccRx1	3.3V Power supply	2
49		VS2	Module Vendor Specific 2	3
50		VS3	Module Vendor Specific 3	3
51		GND	Ground	1
52	CML-O	Rx7p	Receiver Non-Inverted Data Output	
53	CML-O	Rx7n	Receiver Inverted Data Output	
54		GND	Ground	1
55	CML-O	Rx5p	Receiver Non-Inverted Data Output	
56	CML-O	Rx5n	Receiver Inverted Data Output	
57		GND	Ground	1
58		GND	Ground	1
59	CML-O	Rx6n	Receiver Inverted Data Output	
60	CML-O	Rx6p	Receiver Non-Inverted Data Output	
61		GND	Ground	1
62	CML-O	Rx8n	Receiver Inverted Data Output	
63	CML-O	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	LVTTTL-I	ePPS	Precision Time Protocol (PTP) refence clock input	3
70		GND	Ground	1
71	CML-I	Tx7p	Transmitter Non-Inverted Data Input	
72	CML-I	Tx7n	Transmitter Inverted Data Input	
73		GND	Ground	1
74	CML-I	Tx5p	Transmitter Non-Inverted Data Input	
75	CML-I	Tx5n	Transmitter Inverted Data Input	
76		GND	Ground	1

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Mechanical Dimensions



Active Optical Cable

Parameters	Value	Unit	Remarks
Cable Diameter	- LSZH, LSZH/OFNR: $\varnothing 3.0 \pm 0.15$ - OFNP: $\varnothing 3.0 \pm 0.20$	mm	
Minimum Bend Radius	35	mm	Without tension
Length Tolerance	+300 / -0	mm	
Cable Jacket	LSZH, LSZH/OFNR or OFNP-rated, Aqua		



Datasheet

400G QSFP-DD AOC

Revision History

Date	Rev	Description
6/15/2021	1.0	Initial Release

Contact Information

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