
40G QSFP+ ER4 Optical Transceiver

PN: VQ-40ER4CS-AA

Product Overview

Vitex VQ-40ER4CS-AA is designed for use in 40G applications up to 40km. It is compliant with IEEE802.3ba and 40GBASE-ER4 standards.

Features

- 4 CWDM lanes MUX/DEMUX design
- Up to 11.2Gbps per channel bandwidth
- Aggregate bandwidth of > 40Gbps
- Duplex LC connector
- Compliant with 40G Ethernet IEEE802.3ba and 40GBASE-ER4 Standard
- QSFP MSA compliant
- APD photo detector
- Up to 40 km transmission
- Compliant with QDR/DDR Infiniband data rates
- Single +3.3V power supply operating
- Built-in digital diagnostic functions
- Temperature range 0°C to 70°C
- RoHS Compliant Part

Applications

- Rack to rack
- Data centers Switches and Routers
- Metro networks
- 40G BASE-ER4 Ethernet Links

Ordering Information

Part Number	Description
VQ-40ER4CS-AA	40G QSFP+ ER4, 40km SMF, 1310nm, 4CWDM, Duplex LC, C-temp

General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Temperature	TS	-40		+85	°C	
Supply Voltage (Maximum)	VCC	-0.5		4	V	
Operating Relative Humidity	RH	0		85	%	
Case operating Temperature	TC	0		+70	°C	
Supply Voltage (Recommended)	VCC	+3.13	3.3	+3.47	V	
Supply Current	ICC			1000	mA	
Power Dissipation	PD			3.5	W	

Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Lane Wavelength	L0	1264.5	1271	1277.5	nm	
	L1	1284.5	1291	1297.5	nm	
	L2	1304.5	1311	1317.5	nm	
	L3	1324.5	1331	1337.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power	Ptol			8.3	dBm	
Average Launch Power (Each Lane)	Pavg	-3		5	dBm	
TDP, each Lane	TDP			2.3	dB	
Extinction Ratio	ER	3.5	6.0		dB	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Optical Return Loss Tolerance				20	dB	
Average Launch Power OFF Transmitter (each Lane)	Poff			-30	dBm	
Relative Intensity Noise	Rin			-128	dB/HZ	1
Optical Return Loss Tolerance				12	dB	

1. 12dB Reflection

Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Damage Threshold	THd	3			dBm	1
Average Power at Receiver Input, each Lane	R	-21		-6	dBm	
Receive Electrical 3 dB upper Cut off Frequency, each Lane				12.3	GHz	
RSSI Accuracy		-2		2	dB	
Receiver Reflectance	Rrx			-26	dB	
Receiver Power (OMA), each Lane				3.5	dBm	
Receive Electrical 3 dB upper Cutoff Frequency, each Lane				12.3	GHz	
LOS De-Assert	LOSD			-25	dBm	
LOS Assert	LOSA	-35			dBm	

VQ-40ER4CS-AA Product Specification



LOS Hysteresis	LOSH	0.5			dB	
----------------	------	-----	--	--	----	--

1. 12dB Reflection

Electrical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate per Channel			10.3125	11.2	Gbps	
Power Consumption			2.5	3.5	W	
Supply Current	Icc		0.75	1.0	A	
Control I/O Voltage-High	VIH	2.0		Vcc	V	
Control I/O Voltage-Low	VIL	0		0.7	V	
Inter-Channel Skew	TSK			150	Ps	
RESETL Duration			10		Us	
RESETL De-assert time				100	ms	
Power On Time				100	ms	
Single Ended Output Voltage Tolerance		0.3		4	V	1
Common mode Voltage Tolerance		15			mV	
Transmit Input Diff Voltage	VI	150		1200	mV	
Transmit Input Diff Impedance	ZIN	85	100	115		
Data Dependent Input Jitter	DDJ		0.3		UI	

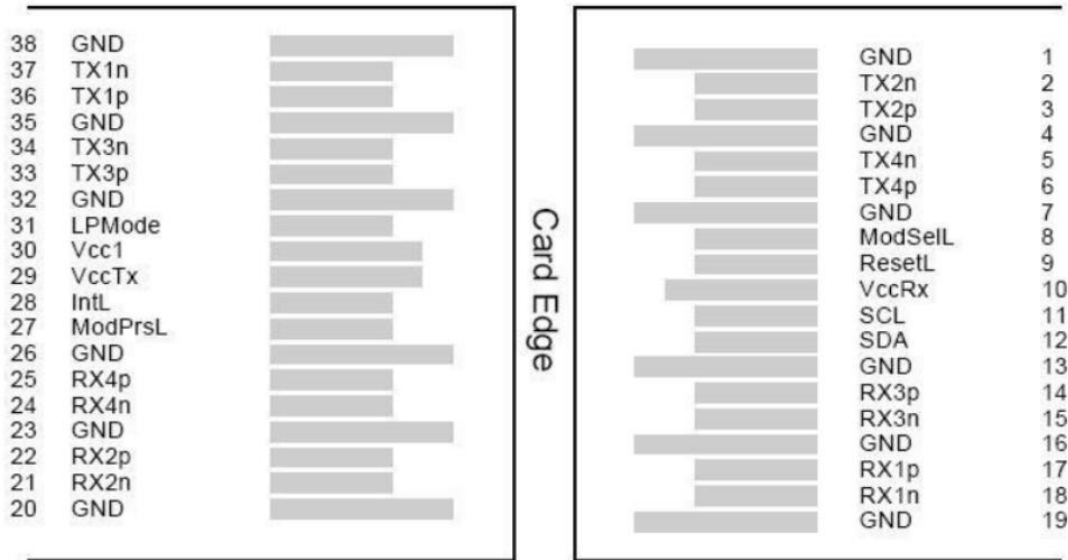
1. 20 ~ 80%

Electrical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Single Ended Output Voltage Tolerance		0.3		4	V	
Rx Output Diff Voltage	Vo	370	600	950	mV	
Rx Output Rise and Fall Voltage	Tr/Tf			35	ps	1
Total Jitter	TJ		0.3		UI	

1. 20 ~ 80%

Electrical Connector Layout



Electrical Pin Definition

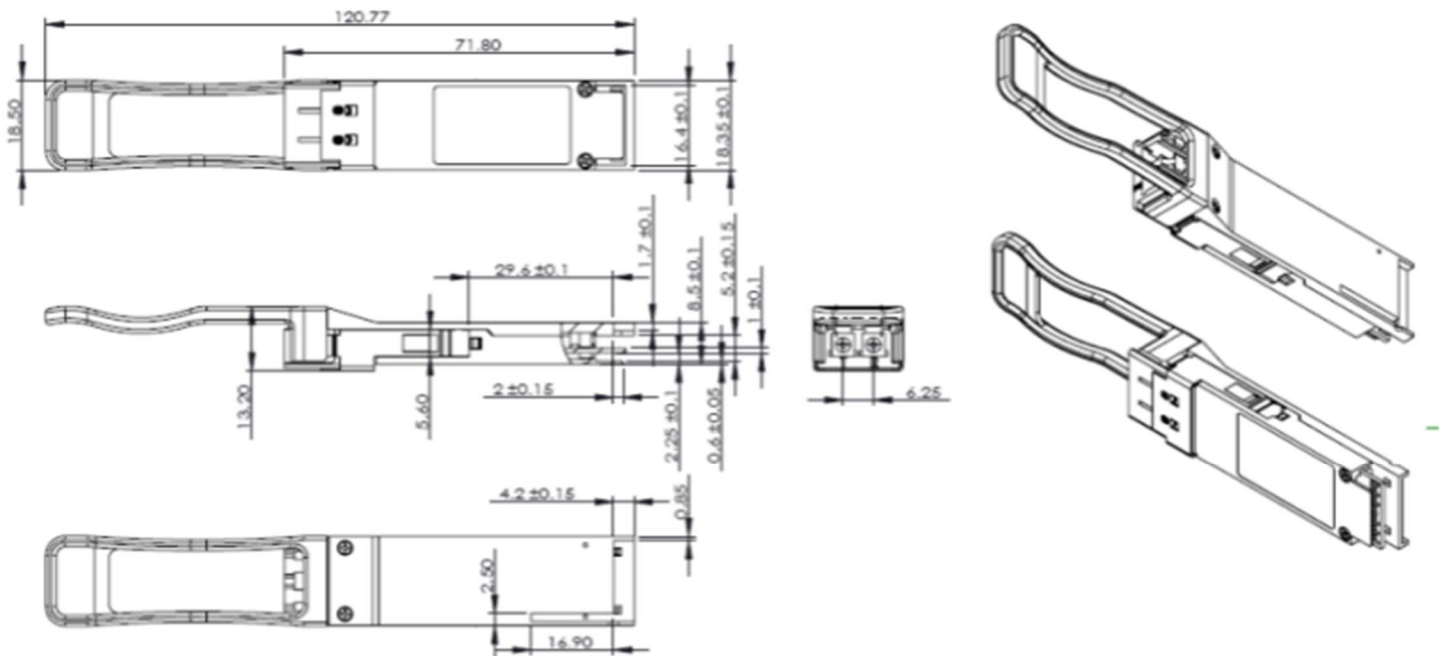
PIN #	Logic	Symbol	Description	Remarks
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module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

VQ-40ER4CS-AA Product Specification

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	Interrupt	
29		VccTx	+3.3V Power Supply Transmitter	2
30		VccI	+3.3V Power Supply	2
31	LVTLL-I	LPMode	Low Power Mode	
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

- GND is the symbol for single and supply (power) common for QSFP modules, All are common within the QSFP module and all module voltages are referenced to this potential otherwise noted. Connect these directly to the host board signal common ground plane. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- VccRx, VccI and VccTx are the receiver and transmitter power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. VccRx, VccI and VccTx may be internally connected within the QSFP transceiver module in any combination. The connector pins are each rated for maximum current of 500mA

Mechanical Dimensions





Revision History

Date	Rev	Description
09/20/2023	1.0	Release version
02/17/2025	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

