40G QSFP+ LR4 PSM Optical Transceiver

PN: VQ-40IR4CP-AA

Product Overview

Vitex VQ-40IR4CP-AA are designed for use in 40G connections over single mode fiber. They integrate four independent transmit and receive channels; each channel operates at 10.3125G/s. The module can operate at 40 Gbps up to 2km using 9/125um SMF. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE standards.

Features

- 4 Parallel lanes design
- Compliant with QSFP+MSA
- Management interface specifications per SFF-8436
- 4 channels PIN photo detector
- Up to 11.2Gb/s per channel data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature: 0 °C to 70 °C
- Up to 2km on SMF
- RoHS Compliant

Applications

- 40GBASE-LR4 Ethernet
- InfiniBand QDR, DDR and SDR
- Data center

Ordering Information

Part Number	Description
VQ-40IR4CP-AA	40G QSFP+ LR4, 2km SMF, 1310nm, PSM, MPO12, 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	TC	0	25	70	°C	
Data Rate PER Channel			10.3125	11.2	Gbps	

Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Launch Optical Power per lane	Po	-6		+1.5	dBm	1
Side Mode Suppression Ratio	SMSR	30			dB	
Center Wavelength Range	λ0	1260	1310	1355	nm	
Extinction Ratio	Er	3.5			dB	2
Optical Return Loss Tolerance	ORLT			12	dB	
Pout @TX-Disable Asserted	P_{off}			-30	dBm	1
Eye Diagram	IEEE Std 802.3ba compatible					

1. The optical power is launched into SMF.
2. Measured with a PRBS 2^{31}-1 test pattern @ 10.3125Gbps.

Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Center Wavelength	λc	1260		1340	nm	
Receiver Sensitivity, per lane	S			-12.6	dBm	1
Receiver Overload, per lane	P_{OL}	2.3			dBm	1
LOS De-Assert	LOS_D			-15	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Hysteresis		0.5			dB	

1. Measured with PRBS 2^{31}-1 test pattern, 10.3125Gb/s, BER<10^{-12}.

Electrical – Transmitter

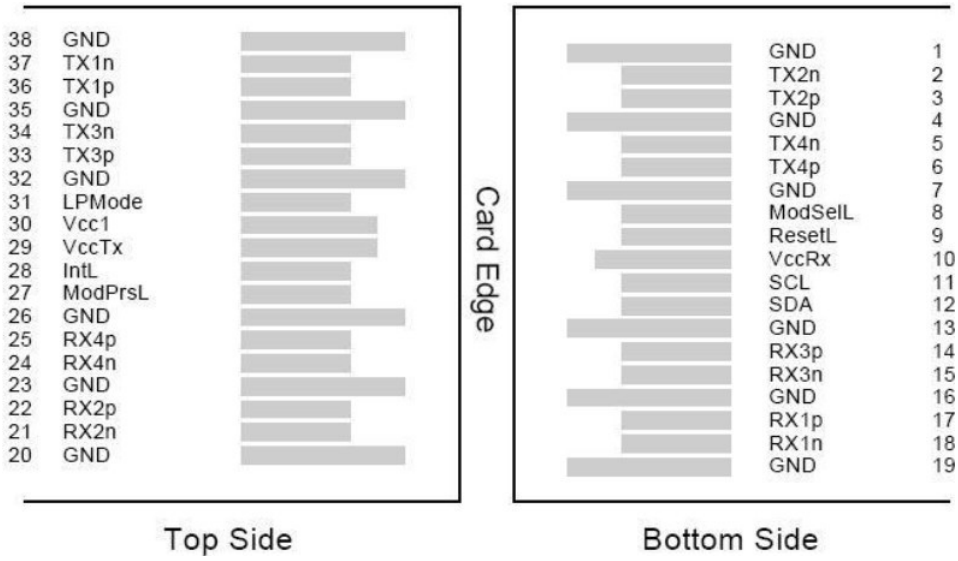
Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Module Supply Current	Icc			1100	mA	
Power Dissipation	P_D			3500	mW	
Input Differential Impedance	Z_{IN}		100		Ω	
Differential Data Input Swing	$V_{IN, P-P}$	180		900	mV_{P-P}	

Electrical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Remarks
Output Differential Impedance	Z_O		100		Ω	
Differential Data Output Swing	$V_{OUT, P-P}$	300		850	mV_{P-P}	1

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

Electrical Connector Layout



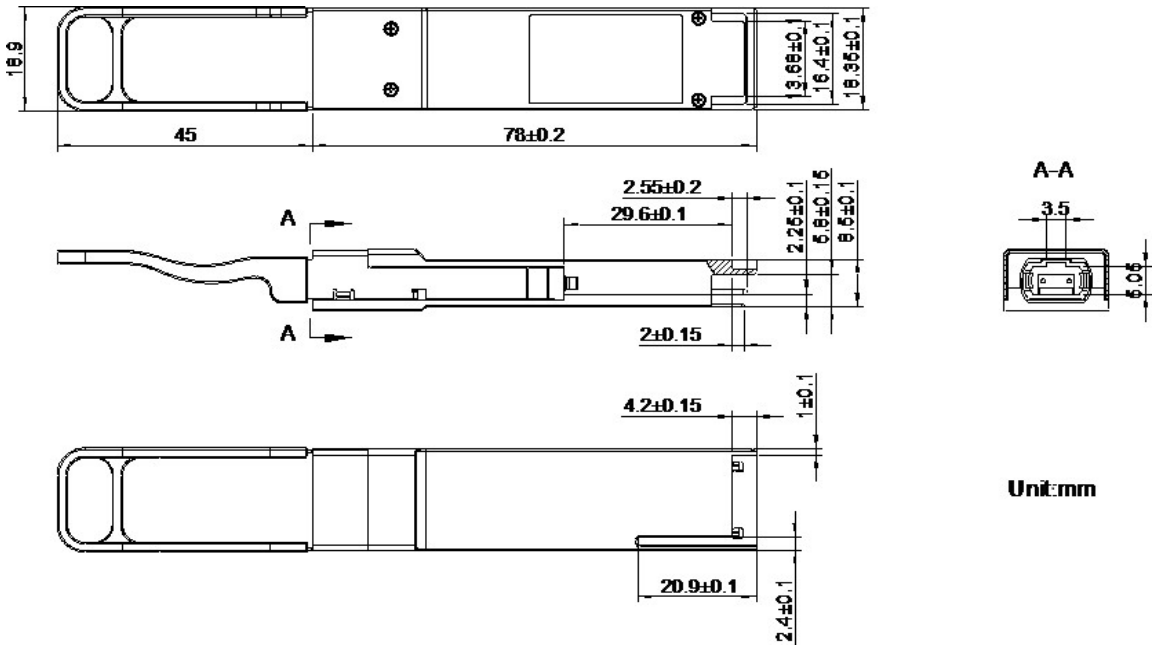
Electrical Pin Definition

PIN #	Symbol	Description	Remarks
1	GND	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	Vcc1	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 an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.

Mechanical Dimension



Revision History

Date	Rev	Description
06/19/2023	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

CELEBRATING 20 YEARS OF COLLABORATION AND INNOVATION