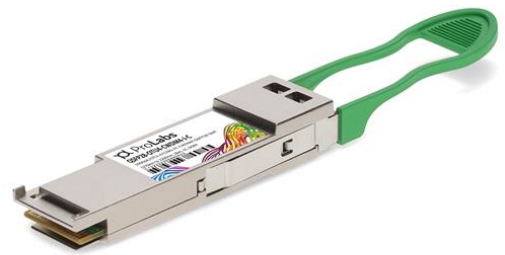


### QSFP28-OTU4-CWDM4-J-C

Juniper Networks® Compatible TAA 100GbE/OTU-4/128G FC CWDM4 QSFP28 Transceiver (SMF, 1270nm to 1330nm, 2km, LC, DOM)

#### Features:

- Compliant with IEEE Std 802.3ba, 100G Ethernet/128G FC/112G OTU4
- Compliant with QSFP28 MSA
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



#### Applications:

- OTU4

#### Product Description

This Juniper Networks® QSFP28 transceiver provides 100GBase/OTU4-CWDM4 throughput up to 2km over single-mode fiber (SMF) using wavelengths between 1270nm to 1330nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Juniper Networks® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



## Absolute Maximum Rating

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	T <sub>S</sub>	-40		85	°C
Relative Humidity	RH	5		95	%
Maximum Supply Voltage	V <sub>CC</sub>	-0.5		4.0	V
Operating Case Temperature	T <sub>C</sub>	0		70	°C
Data Rate Per Channel			28.05		Gb/s

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V <sub>CC</sub>	-0.5		4.0	V	
Module Supply Current	I <sub>CC</sub>			1100	mA	
Power Dissipation	P <sub>D</sub>			3500	mW	
Transmitter						
Single-Ended Input Voltage Tolerance	Z <sub>IN</sub>	-0.3		4.0	V	
Input Differential Impedance	V <sub>IN,P-P</sub>		100		Ω	
Differential Data Input Swing		190		700	mV <sub>p-p</sub>	
AC Common Mode Input Voltage Tolerance		15			mV	
Differential Input Voltage Swing Threshold		50			mV <sub>p-p</sub>	
Receiver						
Single-Ended Output Voltage		-0.3		4.0	V	
Output Differential Impedance	Z <sub>O</sub>	90	100	110	Ω	
Differential Data Output Swing	V <sub>OUT,P-P</sub>	300		850	mV <sub>p-p</sub>	
AC Common Mode Output Voltage				7.5	mV	

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Launch Optical Power per lane	P <sub>o</sub>	-4.5		+2.5	dBm	1
Total Launch Optical Power	P <sub>o</sub>			+8.5	dBm	1
Center Wavelength Range	L1	1264.5	1271	1277.5	nm	
	L2	1284.5	1291	1297.5	nm	
	L3	1304.5	1311	1317.5	nm	
	L4	1324.5	1331	1337.5	nm	
Extinction Ratio	EX	3.5			dB	2
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Return Loss Tolerance	ORLT			20	dB	
Pout @TX-Disable Asserted	P <sub>off</sub>			-30	dBm	1
Eye Mask {X1, X2, X3, Y1, Y2, Y3}	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}					
Receiver						
Center Wavelength	L1	1264.5	1271	1277.5	nm	
	L2	1284.5	1291	1297.5	nm	
	L3	1304.5	1311	1317.5	nm	
	L4	1324.5	1331	1337.5	nm	
Sensitivity per Channel	S			-9	dBm	3
Overload (each channel)	P <sub>OL</sub>	2.5			dBm	3
Damage Threshold (each channel)	P <sub>damage</sub>	3.5			dBm	
Optical Return Loss	ORL	26			dB	
LOS De-Assert	LOSD			-12.0	dBm	
LOS Assert	LOSA	-24			dBm	
LOS Hysteresis		0.5			dB	

### Notes:

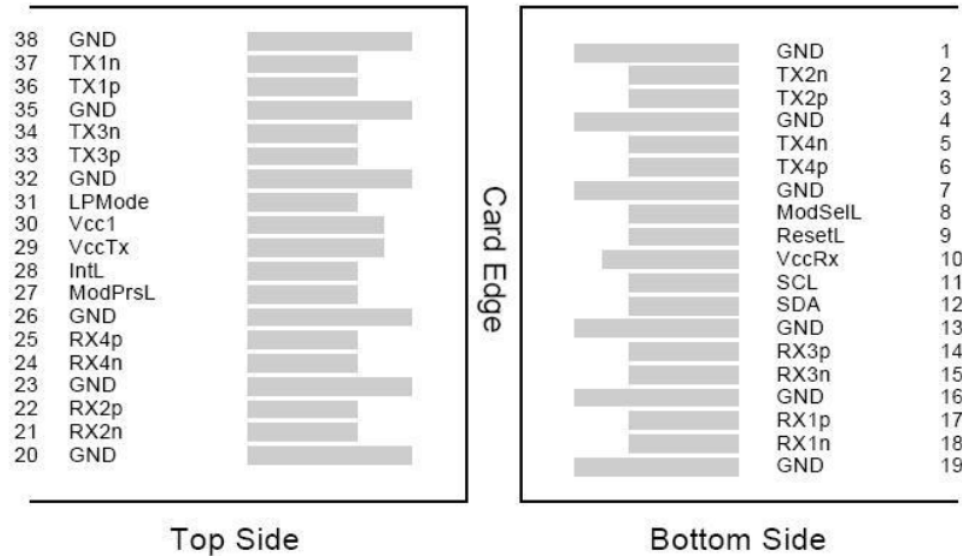
1. The optical power is launched into SMF
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @28.05Gbps
3. Measured with PRBS 2<sup>31</sup>-1 test pattern, 28.05Gb/s, BER 1E-6

## Pin Descriptions

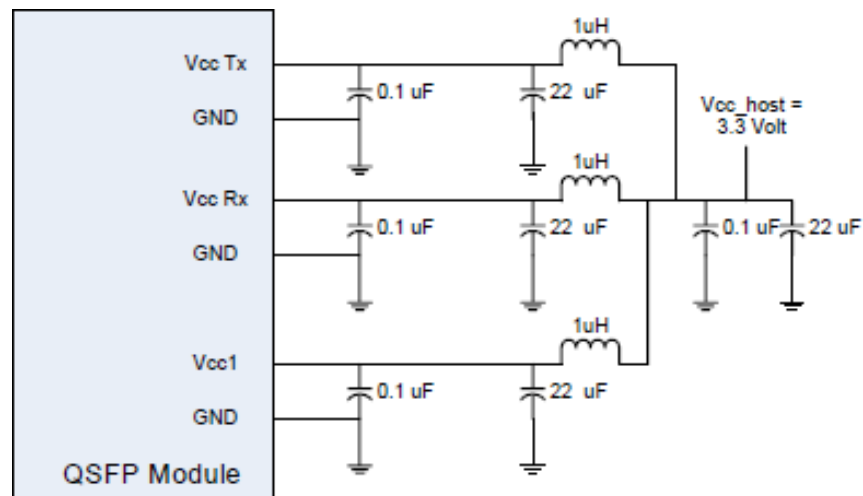
Pin	Symbol	Name/Descriptions	Ref.
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	
3	Tx2+	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data output	
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 Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver Ground)	1

**Notes:**

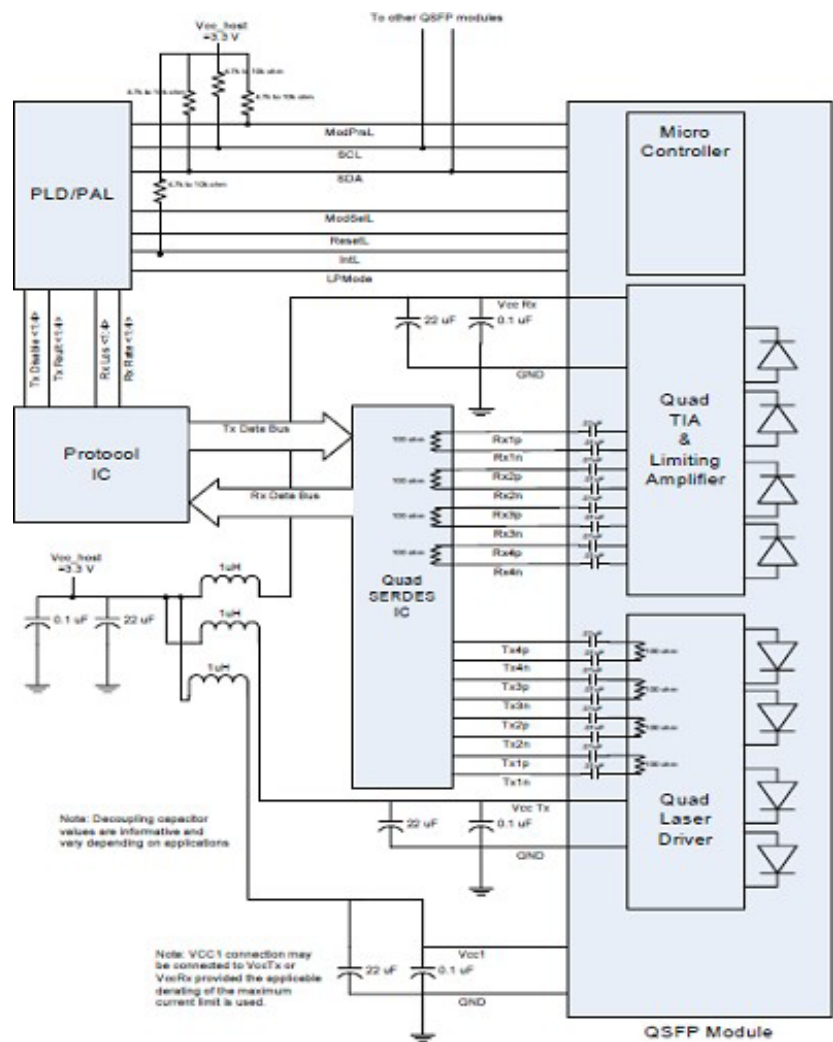
1. The module signal grounds are isolated from the module case
2. This is an open collector/drain output that on the host board requires a 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccHost



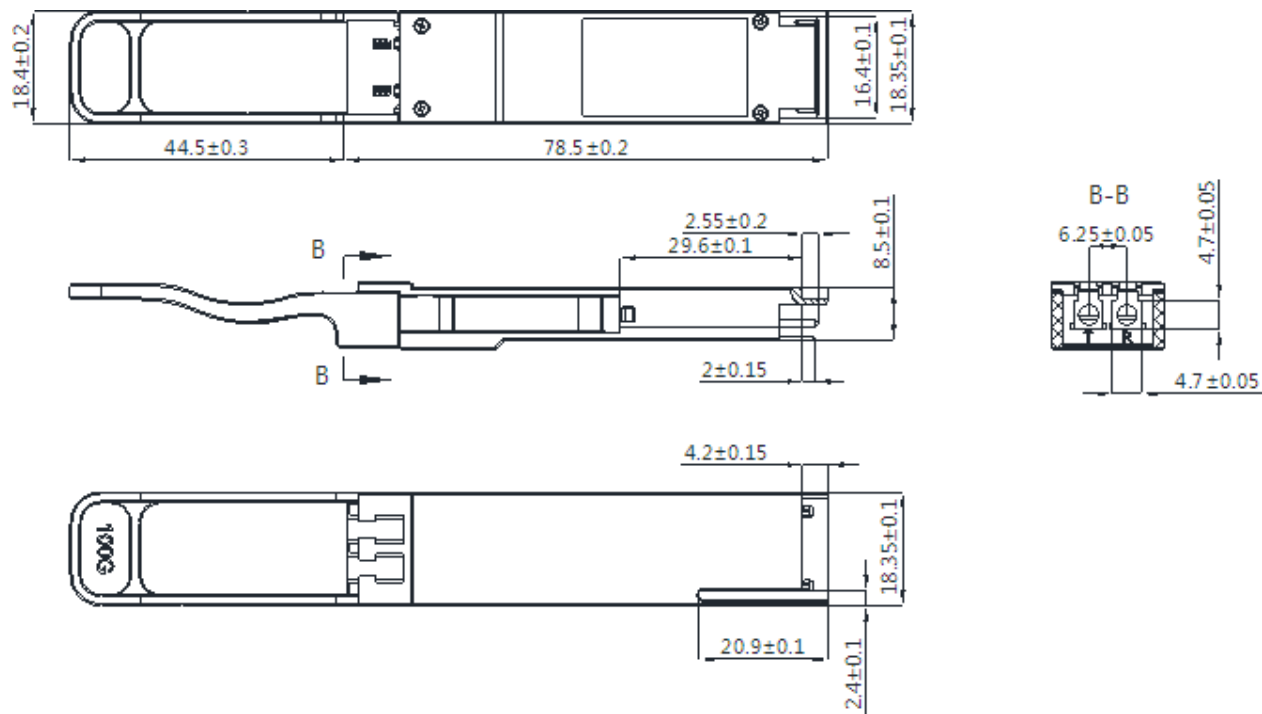
Host PCB QSFP28 pad assignment top view

**Recommended Host Board Power Supply Filter Network**

Recommended Application Block Diagram



Mechanical Specifications



## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salesupport@prolabs.com](mailto:salesupport@prolabs.com)

Telephone: +44 1285 719 600