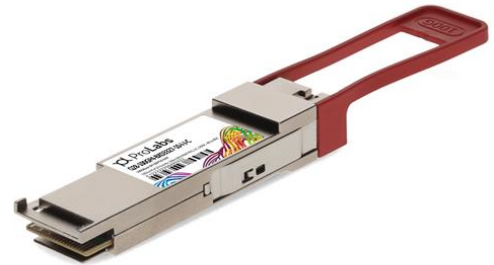


### Q28-100GP4-BXD3327-10-I-J-C

Juniper Networks® Compatible TAA 100GBase-BX QSFP28 Transceiver Single Lambda (SMF, 1331nmTx/1271nmRx, 10km w/FEC, LC, DOM, -40 to 85C)

#### Features:

- Compliant with 100G Lambda MSA 100G-LR Specifications
- Compliant with SFF-8636
- Single 3.3V Power Supply
- Single-mode Fiber
- Bidi LC Connectors
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### Applications:

- 100GBase Ethernet
- Datacenter

#### Product Description

This Juniper Networks® QSFP28 transceiver provides 100GBase-BX throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1331nmTx/1271nmRx 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's 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."



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4.
- ESD to the LC Receptacle: compatible with IEC 61000-4-3.
- EMI/EMC: compatible with FCC Part 15 Subpart B Rules, EN55022:2010.
- Laser Eye Safety: compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1, 2.
- RoHS: compliant with EU RoHS 2.0 directive 2015/863/EU.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	V <sub>cc</sub>	0		3.6	V	
Data Input Voltage		-0.3		3.6	V	
Control Input Voltage		-0.3		4	V	
Storage Temperature	T <sub>stg</sub>	-40		85	°C	
Operating Case Temperature	T <sub>c</sub>	0		70	°C	
Relative Humidity	RH	5		85	%	
Data Rate	BR		53.125		GBd	
Bit Error Rate	BER			2.4x10 <sup>-4</sup>		1
Supported Link Length on 9/125µm SMF, 53.125GBd	L		10		km	2

## Notes:

1. Tested with a PRBS31Q test pattern for 53.125GBd operation.
2. Distances are based on FC-PI-6 Rev. 3.1 and IEEE 802.3 standards with FEC.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V <sub>cc</sub>	3.135	3.3	3.465	V	
Module Supply Current	I <sub>cc</sub>			1212	mA	
Power Dissipation	P <sub>DISS</sub>			4000	mW	
<b>Transmitter</b>						
Differential Data Input Swing	V <sub>IN,pp</sub>	90	100	110	mVp-p	
Differential Input Impedance	Z <sub>IN</sub>	90	100	110	Ω	
<b>Receiver</b>						
Differential Data Output Swing	V <sub>OUT,pp</sub>	300		900	mVp-p	
Differential Output Impedance	Z <sub>OUT</sub>	90	100	110	Ω	

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_C$	1324.5	1331	1337.5	nm	
Extinction Ratio	ER	3.5			dB	
Launch Optical Power (Average)	Pavg	-1.4		4.5	dBm	1
Launch Optical Power (OMA)	POMA	0.7		4.7	dBm	
Transmitter and Dispersion Penalty Eye Closure for PAM4	TDECQ			3.4	dB	
RIN17.1OMA (Maximum)	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORLT			15.6	dB	
POUT @ Tx_Disable Asserted	Poff			-30	dBm	
<b>Receiver</b>						
Center Wavelength	$\lambda_C$	1264.5	1271	1277.5	nm	
Receiver Sensitivity (OMA)	RxSENS			-6.1	dBm	2
Receiver Overload (Pavg)	POL	4.5			dBm	
Receiver Reflectance				-26	dB	
LOS De-Assert	LOSD			-12	dBm	
LOS Assert	LOSA	-18			dBm	
LOS Hysteresis		0.5			dB	

### Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. Measured with PRBS31Q test pattern, 53.125GBd, and  $BER < 2.4 \times 10^{-4}$ .

## Pin Descriptions

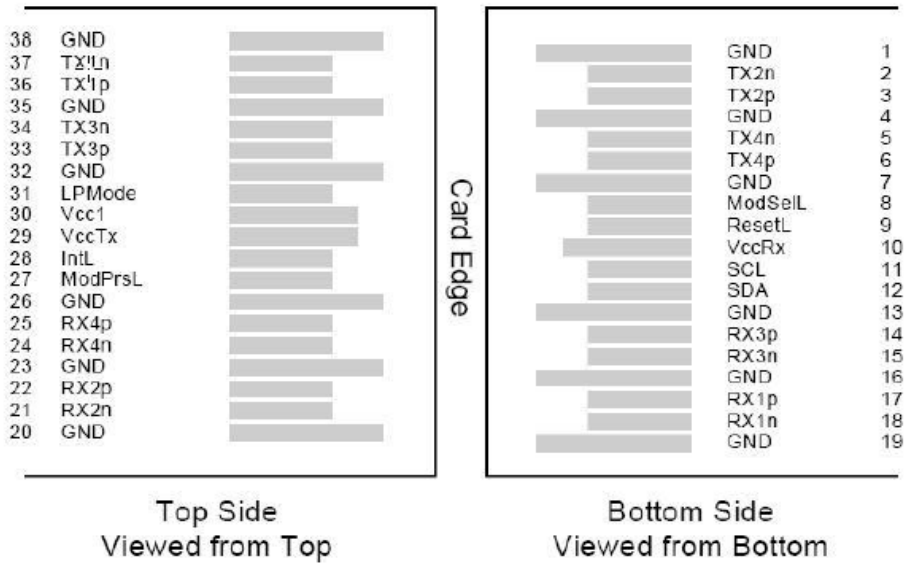
Pin	Logic	Symbol	Name/Description	Note
1		GND	Module Ground.	1
2	CML-I	Tx2-	Transmitter Inverted Data Input.	
3	CML-I	Tx2+	Transmitter Non-Inverted Data Output.	
4		GND	Module Ground.	1
5	CML-I	Tx4-	Transmitter Inverted Data Input.	
6	CML-I	Tx4+	Transmitter Non-Inverted Data Output.	
7		GND	Module Ground.	1
8	LVTLL-I	ModSelL	Module Select.	
9	LVTLL-I	ResetL	Module Reset.	
10		VccRx	+3.3V Receiver Power Supply.	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	
13		GND	Module Ground.	
14	CML-O	Rx3+	Receiver Non-Inverted Data Output.	
15	CML-O	Rx3-	Receiver Inverted Data Output.	
16		GND	Module Ground.	1
17	CML-O	Rx1+	Receiver Non-Inverted Data Output.	
18	CML-O	Rx1-	Receiver Inverted Data Output.	
19		GND	Module Ground.	1
20		GND	Module Ground.	1
21	CML-O	Rx2-	Receiver Inverted Data Output.	
22	CML-O	Rx2+	Receiver Non-Inverted Data Output.	
23		GND	Module Ground.	1
24	CML-O	Rx4-	Receiver Inverted Data Output.	1
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.	
26		GND	Module Ground.	1
27	LVTTL-O	ModPrsL	Module Present.	
28	LVTTL-O	IntL	Interrupt.	
29		VccTx	+3.3V Transmitter Power Supply.	2
30		Vcc1	+3.3V Power Supply.	2
31	LVTTL-I	LPMoDe	Low-Power Mode.	
32		GND	Module Ground.	1
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.	
34	CML-I	Tx3-	Transmitter Inverted Data Output.	
35		GND	Module Ground.	1

36	CML-I	Tx1+	Transmitter Non-Inverted Data Input.	
37	CML-I	Tx1-	Transmitter Inverted Data Output.	
38		GND	Module Ground.	1

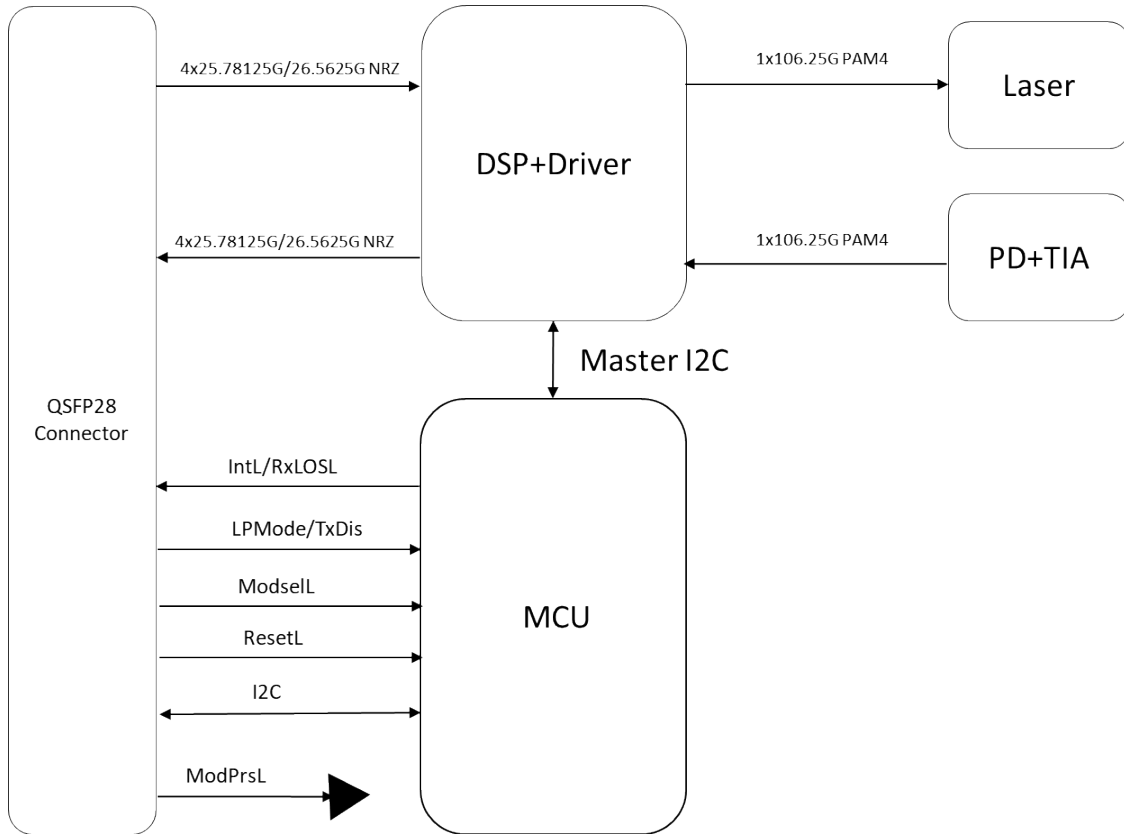
**Notes:**

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. VccRx, Vcc1, and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown below. VccRx, Vcc1, and VccTx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

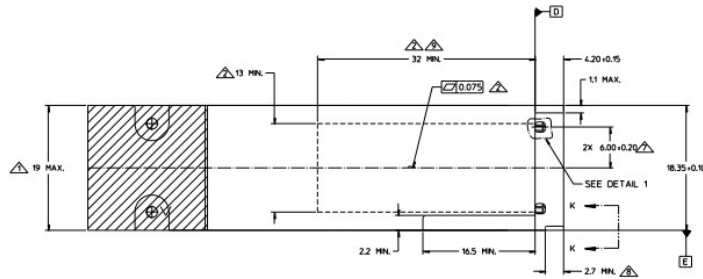
**Electrical Pin-Out Details**



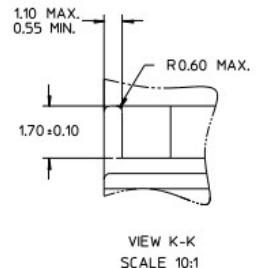
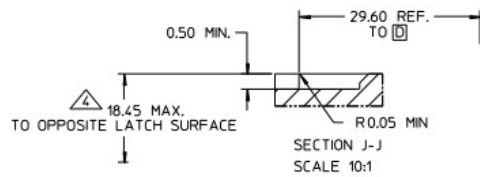
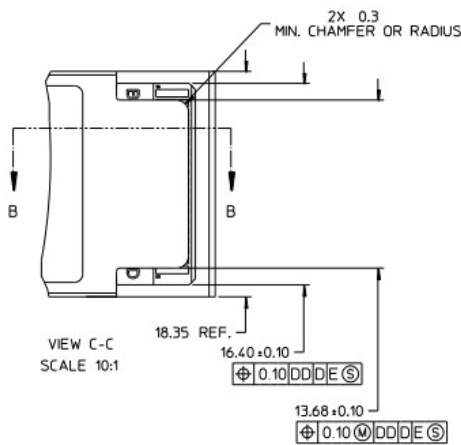
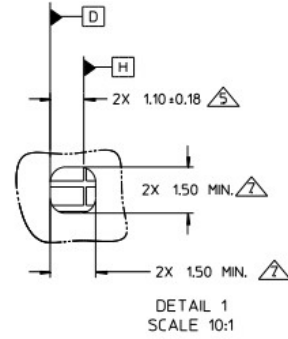
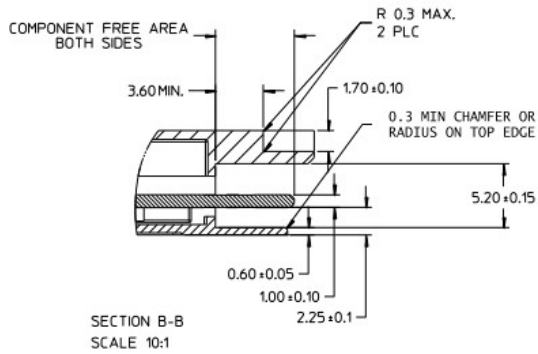
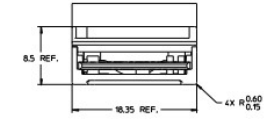
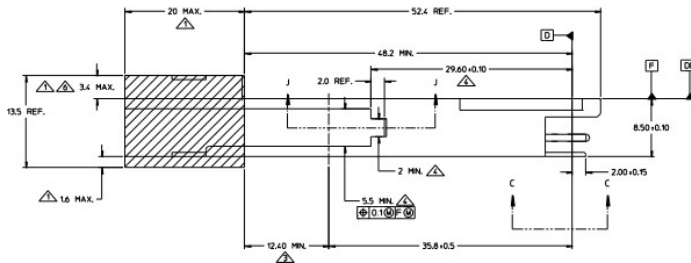
# Block Diagram



# Mechanical Specifications



- ⊥ INDICATED DIMENSIONS DEFINE ENLARGED SECTION OF TRANSCEIVER THAT EXTENDS OUTSIDE OF CAGE TO ACCOMMODATE MATING PLUG AND ACTUATOR MECHANISM
- ⊥ FLATNESS APPLIES FOR INDICATED LENGTH AND A MIN WIDTH OF 13MM - SURFACE TO BE THERMALLY CONDUCTIVE
- ⊥ INDICATED SURFACES (ALL 4 SIDES) TO BE CONDUCTIVE FOR CONNECTION TO CHASSIS GROUND
- ⊥ DIMENSION APPLIES TO LATCH MECHANISM
- ⊥ INDICATED DIMENSION APPLIES TO THE LOCATION OF THE EDGE OF THE MODULE BOARD PAD. DATUM H, CONTACTS 21, 22, 36, AND 37 ARE VISIBLE.
- ⊥ INDICATED DIMENSION TO INCLUDE BALL TRAVEL
- ⊥ INDICATED DIMENSIONS APPLY TO OPENINGS IN HOUSING
- ⊥ FEATURE MAY BE LONGER THAN SHOWN
- ⊥ HIGHER WATTAGE MODULES MAY REQUIRE ADDITIONAL SPACE FOR COOLING



## **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.

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