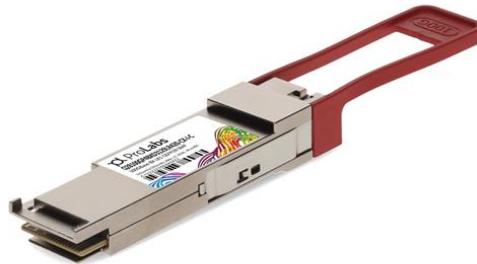


**Q28100GP4BXD3129LR420-CX-I-C**

Calix® Compatible TAA 100GBase-BX LR4 PAM4 QSFP28 Transceiver (SMF, 1311nmTx/1291nmRx, 20km, LC, DOM, -40 to 85C)

**Features:**

- Compliant with Industry Standards 100G-LR1-20 Lambda MSA
- Compliant with SFF-8661, SFF-8636, and SFF-8679 MSA
- PIN Receiver
- EML Laser
- Up to 20km on 9/125 $\mu$ m SMF
- Operating Temperature: -40 to 85 Celsius
- RoHS Compliant and Lead-Free
- Industrial Temperature -40 to 85 Celsius
- RoHS Compliant and Lead Free

**Applications:**

- 100GBase Ethernet
- Datacenter

**Product Description**

This Calix® compatible QSFP28 transceiver provides 100GBase-BX LR4 throughput up to 20km over single-mode fiber (SMF) PAM4 using a wavelength of 1311nmTx/1291nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between -40 and 85C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Calix®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. 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 Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Temperature	T <sub>c</sub>	-40		85	°C	
Storage Temperature	T <sub>stg</sub>	-40		85	°C	
Relative Humidity	RH	15		85	%	
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	
Data Rate	DR		53.125 ± 100ppm		GBd	
Bit Error Rate	BER			2.4E <sup>-4</sup>		1
Supported Link Length on 9/125µm SMF @53.125GBd	L		20		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>	3.13	3.3	3.47	V	
Module Supply Current	I <sub>cc</sub>			1437	mA	1
Power Dissipation	PD			4500	mW	
<b>Transmitter</b>						
Differential Input Impedance	Z <sub>IN</sub>	90	100	110	Ω	
Differential Data Input Swing	V <sub>IN,pp</sub>	180		900	mVp-p	
<b>Receiver</b>						
Differential Output Impedance	Z <sub>OUT</sub>	90	100	110	Ω	
Differential Data Output Swing	V <sub>OUT,pp</sub>	300		900	mVp-p	

### Notes:

1. The maximum current is calculated at the minimum supply voltage.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
<b>Average Launch Optical Power</b>	Po	-0.2		6.6	dBm	1
<b>Launch Optical Power (OMA)</b>	Poma	2.8		6.8	dBm	2
		1.4+TDECQ				3
<b>Extinction Ratio</b>	ER	3.5			dB	
<b>Center Wavelength</b>	$\lambda$ C	1304.5	1311	1317.5	nm	
<b>Transmitter and Dispersion Penalty Eye Closure for PAM4</b>	TDECQ			3.6	dB	
<b>Transmitter Eye Closure for PAM4</b>	TECQ			3.4	dB	
<b>RIN<sub>17.1</sub>OMA (Maximum)</b>	RIN			-136	dB/Hz	
<b>Optical Return Loss Tolerance</b>	ORLT			15.6	dB	
<b>POUT @Tx_Disable Asserted</b>	Poff			-15	dBm	
<b>Receiver</b>						
<b>Center Wavelength</b>	$\lambda$ C	1284.5	1291	1297.5	nm	
<b>Receiver Sensitivity (OMA)</b>	RxSENS			-7.6	dBm	1, 4
				-9+TECQ		5
<b>Receiver Reflectance</b>				-26	dB	
<b>LOS De-Assert</b>	LOSD			-12	dBm	
<b>LOS Assert</b>	LOSA	-18			dBm	
<b>LOS Hysteresis</b>		0.5			dB	

### Notes:

1. Measured with PRBS31Q test pattern, @53.125GBd, and BER<2.4E<sup>-4</sup>.
2. TDECQ < 1.4dB.
3. 1.4dB ≤ TDECQ ≤ TDECQ, maximum.
4. TECQ < 1.4dB.
5. 1.4dB < TECQ ≤ 3.6dB.

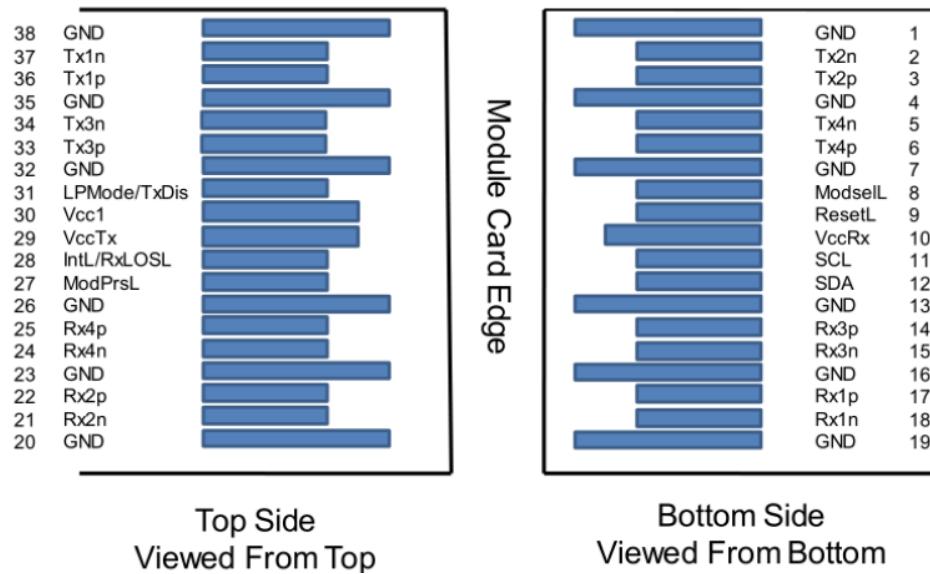
## Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
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 Input.	
7		GND	Module Ground.	1
8	LVTTI-I	ModSelL	Module Select.	2
9	LVTTI-I	ResetL	Module Reset.	2
10		VccRx	+3.3V Receiver Power Supply.	
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	2
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	2
13		GND	Module Ground.	1
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.	
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.	
26		GND	Module Ground.	1
27	LVTTI-O	ModPrsL	Module Present.	
28	LVTTI-O	IntL/RxLOSL	Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636).	2
29		VccTx	+3.3V Transmitter Power Supply.	
30		Vcc1	+3.3V Power Supply.	
31	LVTTI-I	LPMode/TxDis	Low-Power Mode. Optionally configurable as TxDis via the management interface (SFF-8636).	2
32		GND	Module Ground.	1
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.	
34	CML-I	Tx3-	Transmitter Inverted Data Input.	
35		GND	Module Ground.	1
36	CML-I	Tx1+	Transmitter Non-Inverted Data Input.	
37	CML-I	Tx1-	Transmitter Inverted Data Input.	
38		GND	Module Ground.	1

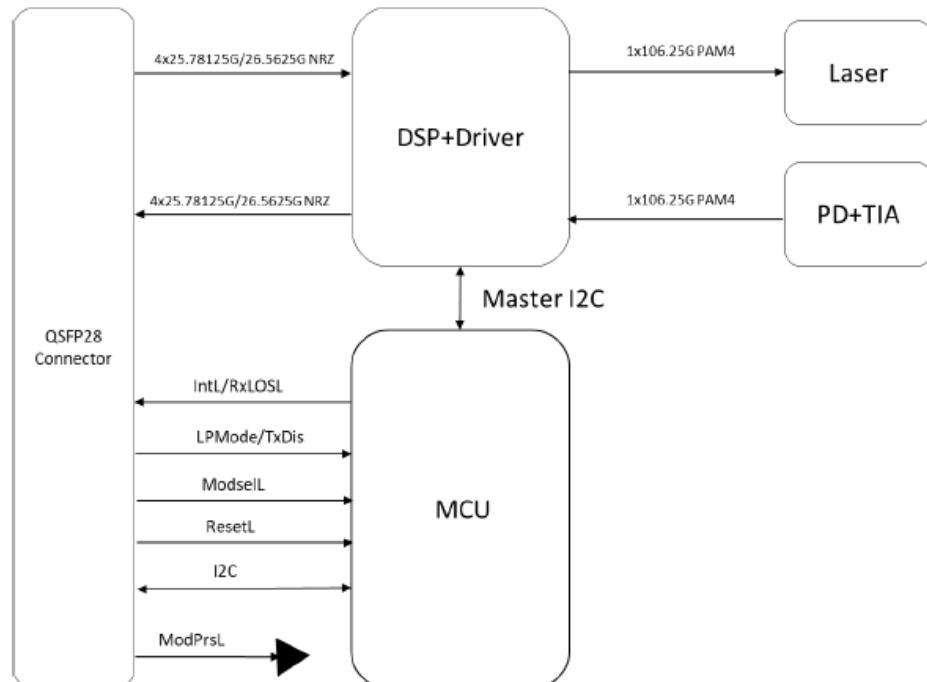
## Notes:

1. GND is the symbol for signal and supply (power) common for the module. All are common within the 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 applied concurrently and may be internally connected within the module in any combination. Vcc contacts in SFF-8662 and SFF-8672 each have a steady state current rating of 1A.

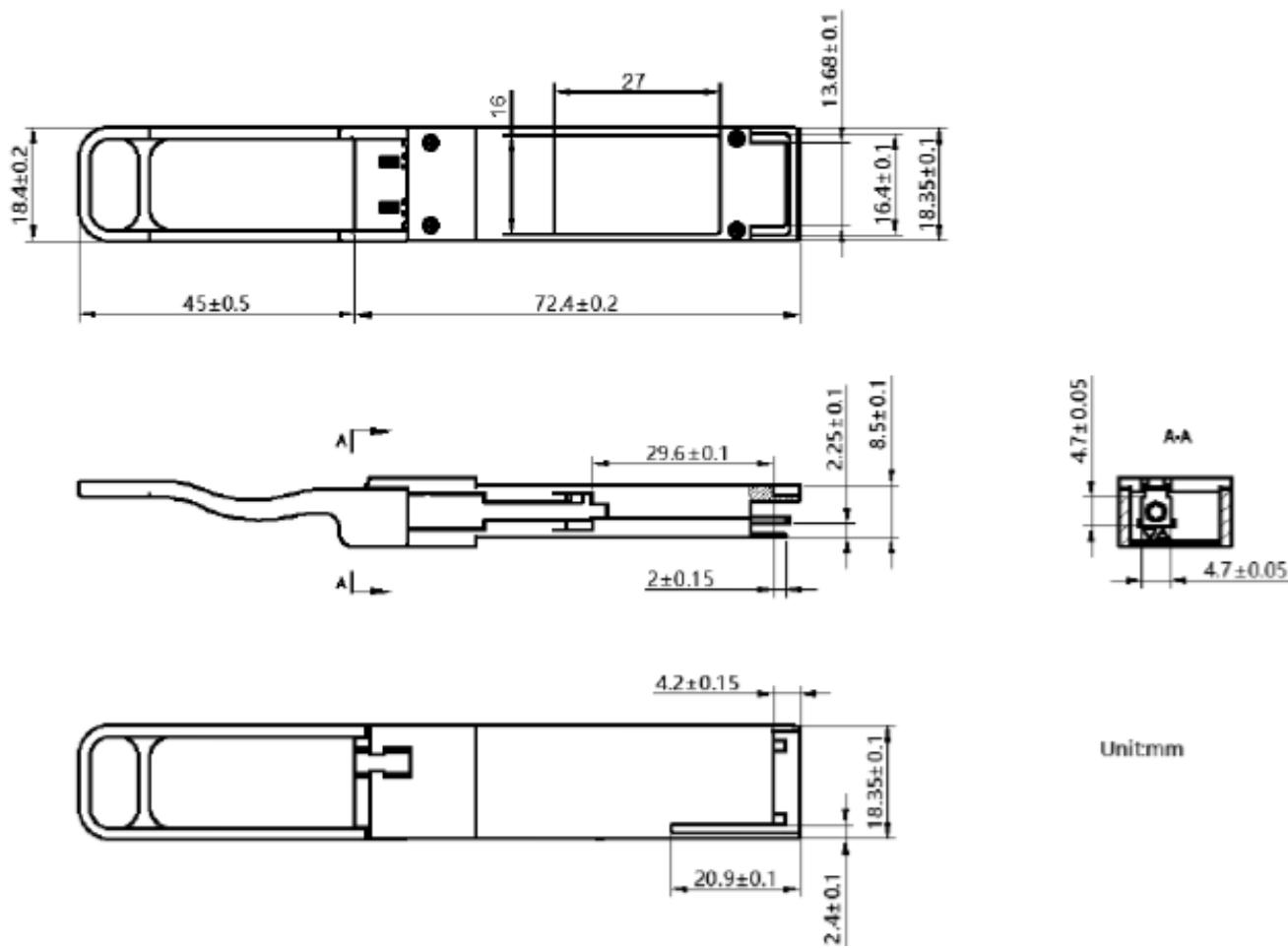
## Electrical Pin-Out Details



## 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: [salessupport@prolabs.com](mailto:salessupport@prolabs.com)

Telephone: +44 1285 719 600