

### Q28-100GP4-BXD3327-10-CX-C

Calix® Compatible TAA 100GBase-BX QSFP28 Single Lambda Transceiver (SMF, 1331nmTx/1271nmRx, 10km, LC, DOM, with FEC)

#### **Features:**

- Compliant with 100G Lambda MSA 100G-LR Specifications
- Compliant with SFF-8636 Rev 2.10a
- Single 3.3V Power Supply
- Power dissipation
- Single-mode Fiber
- Bidi LC Connectors
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



## **Applications:**

- 100GBase Ethernet
- Datacenter

### **Product Description**

This Calix® 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 Calix® 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."



## **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.	Тур.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Тс	0		70	°C	
Relative Humidity	RH	5		85	%	
Damage Threshold	RXdmg	5.5			dBm	

## **Electrical Characteristics**

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes		
Power Supply Voltage	Vcc	3.135	3.3	3.465	V			
Power Dissipation	P <sub>DISS</sub>			4.5	W			
Transmitter								
Differential Data Input Swing Per Lane		900			mVp-p			
Differential Input Impedance	ZIN	90	100	110	Ω			
DC Common-Mode Voltage (Vcm)		-350		2850	mV			
Receiver								
Differential Output Amplitude				900	mVp-p			
Differential Output Impedance	ZOUT	90	100	110	Ω			
Output Rise/Fall Time	Tr/Tf	12			ps	20-80%		
Eye Width		0.57			UI			
Eye Height Differential		228			mV	@TP4, 1E <sup>-15</sup>		
DC Common-Mode Voltage (Vcm)		-350		2850	mV	1		

## **Notes:**

1. Vcm is generated by the host. Specification includes effects of ground offset voltage.

## **Optical Characteristics**

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes		
Transmitter								
Signaling Speed			53.125		GBd			
Modulation Format			PAM4					
Center Wavelength	λC	1324.5	1331	1337.5	Nm			
Side-Mode Suppression Ratio	SMSR	30			dB			
Extinction Ratio	ER	3.5			dB			
Transmit OMA	TxOMA	0.7		4.7	dBm			
Transmit Average Power	TxAVG	-1.4		4.5	dBm	1		
Launch Power in OMAouter Minus TDECQ		-0.7			dBm	2		
Launch Power in OMAouter Minus TDECQ		-0.6			dBm	3		
Transmitter and Dispersion Eye Closure	TDECQ			3.4	dB			
Launch Power of Off Transmitter Per Lane				-30	dBm			
Relative Intensity Noise	RIN			-136	dB/Hz			
Optical Return Loss Tolerance				15.6	dB	4		
Transmitter Reflectance				-26	dB			
Receiver								
Signaling Speed			53.125		GBd			
Center Wavelength	λC	1264.5	1271	1277.5	Nm			
Damage Threshold		5.5			dBm			
Receive Power (OMAouter)	RxOMA			4.7	dBm			
Average Receive Power	RxAVG	-7.7		4.5	dBm			
Receiver Sensitivity (OMAouter)	SenOMA			MAX (-6.1, SECQ-7.5)	dBm	5		
Stressed Sensitivity	SRS			-4.1	dBm			
Receiver Reflectance				-26	dB			
LOS Assert	LOSA	-26		-12	dBm			
LOS De-Assert	LOSD			-10	dBm			

## Notes:

- 1. Average launch power (minimum) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
- 2. For ER≥4.5dB.
- 3. For ER<4.5dB.
- 4. Transmitter reflectance is defined looking into the transmitter.
- 5. Sensitivity is specified at 2.4x10<sup>-4</sup> BER.

**Pin Descriptions** 

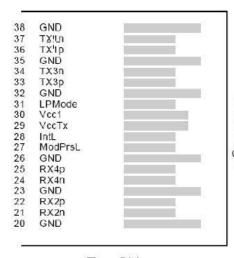
Pin	Logic	Symbol	Name/Descriptions	Notes
1		GND	Module Ground.	1
2	CML-I	Tx2-	Transmitter Inverted Data Input.	
3	CML-I	Tx2+	Transmitter Non-Inverted Data Output.	
4		GND	Module Ground.	1
5	CML-I	Tx4-	Transmitter Inverted Data Input.	
6	CML-I	Tx4+	Transmitter Non-Inverted Data Output.	
7		GND	Module 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

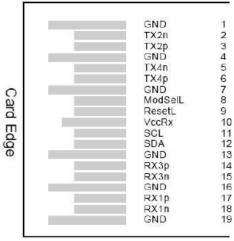
### Notes:

- 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**

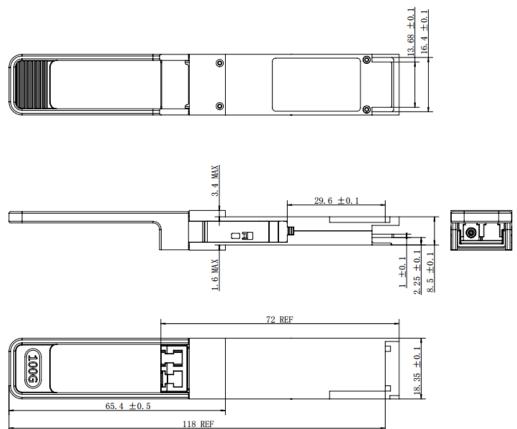


Top Side Viewed from Top



Bottom Side Viewed from Bottom

# **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.















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