

QSFP28-100GB-ZR4-I-CX-OPC

Calix® Compatible TAA 100GBase-ZR4 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 80km, LC, DOM, -40 to 85C)

Features

- QSFP28 MSA Compliant
- Supports 103.125Gbps Aggregate Bit Rate
- 4 LAN-WDM Lanes MUX/DEMUX Design
- 4x25G Electrical Interface
- EML Laser and PIN+SOA Receiver
- Single 3.3V Power Supply
- Maximum Power Consumption of 6.5W
- Duplex LC Connector
- Industrial Temperature: -40 to 85 Celsius
- Single-Mode Fiber
- Hot Pluggable
- RoHS Compliant and Lead-Free



Applications:

- 100GBase Ethernet
- Access and Enterprise

Product Description

This Calix® compatible QSFP28 transceiver provides 100GBase-ZR4 throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via an LC connector. It is capable of withstanding rugged environments and 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. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Maximum Supply Voltage	V _{cc}	0	3.6	V	
Storage Temperature	T _{stg}	-40	85	°C	
Operating Case Temperature	T _c	-40	85	°C	1
Operating Humidity	RH	0	85	%	

Notes:

1. Industrial temperature range.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V _{cc}	3.13	3.30	3.47	V	
Power Dissipation				6.5	W	
Transmitter						
Data Rate Per Lane			25.78125		Gbps	
Differential Voltage Pk-Pk	V _{pp}			900	mV	1
Common-Mode Voltage	V _{cm}	-350		2850	mV	
Transition Time	T _r /T _f	10			ps	2
Differential Termination Resistance Mismatch				10	%	
Eye Width	EW ₁₅	0.46			UI	
Eye Height	EH ₁₅	95			mV	
Receiver						
Data Rate Per Lane			25.78125		Gbps	
Differential Termination Resistance Mismatch				10	%	1
Differential Output Voltage Swing	V _{OUT,pp}			900	mV	
Common-Mode Noise (RMS)	V _{rms}			17.5	mV	
Transition Time	T _r /T _f	12			ps	2
Eye Width	EW ₁₅	0.57			UI	
Eye Height	EH ₁₅	228			mV	

Notes:

1. At 1MHz.
2. 20-80%.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
9/125μm G.652 SMF	Lmax			80	km	
Transmitter						
Signaling Speed Per Lane		25.78125±100ppm			Gbps	
Optical Wavelength	L0	1294.53		1296.59	nm	
	L1	1299.02		1301.09	nm	
	L2	1303.54		1305.63	nm	
	L3	1308.09		1310.19	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power		8		12.5	dBm	
Average Launch Power Per Lane		2		6.5	dBm	
Difference in Launch Power Between Any Two Lanes (Average and OMA)				3	dBm	
Average Launch Power of Off Transmitter Per Lane				-30	dBm	
Extinction Ratio	ER	6			dB	
RIN OMA				-130	dB/Hz	
Optical Return Loss Tolerance	ORLT			20	dB	
Transmitter Reflectance				-12	dB	
Transmitter Eye Mask Definition: (X1, X2, X3, Y1, Y2, Y3)		(0.25, 0.4, 0.45, 0.25, 0.28, 0.4)				1
Mask Margin		5			%	
Receiver						
Signaling Speed Per Lane		25.78125±100ppm			Gbps	
Receive Wavelengths	L0	1294.53		1296.59	nm	
	L1	1299.02		1301.09	nm	
	L2	1303.54		1305.63	nm	
	L3	1308.09		1310.19	nm	
Average Receiver Power Per Lane		-28		-7	dBm	
Receiver Power Per Lane (OMA)				-7	dBm	
Receiver Reflectance				-26	dB	
Receiver Sensitivity Average Per Lane				-28	dBm	1
Receiver 3dB Electrical Upper Cutoff Frequency Per Lane				31	GHz	
Damage Threshold Per Lane		6.5			dBm	
LOS De-Assert	LOSD			-29	dBm	
LOS Assert	LOSA	-40			dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Sensitivity is specified at BER@5E⁻⁵ with FEC.

Pin Descriptions

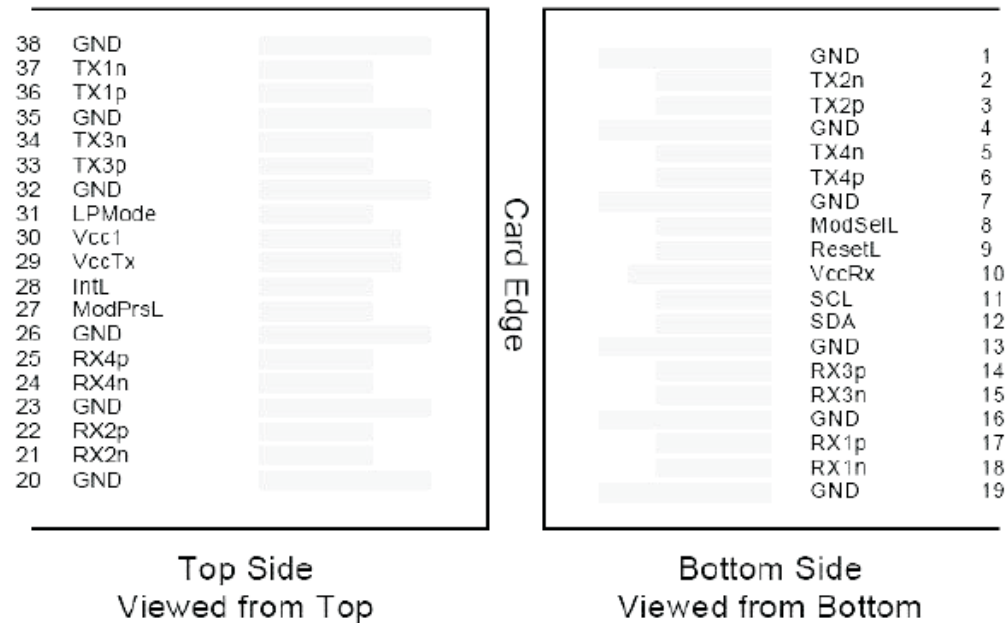
Pin	Symbol	Name/Description	Notes
1	GND	Module Ground.	1
2	Tx2-	Transmitter Inverted Data Input.	
3	Tx2+	Transmitter Non-Inverted Data Input.	
4	GND	Module Ground.	1
5	Tx4-	Transmitter Inverted Data Input.	
6	Tx4+	Transmitter Non-Inverted Data Input.	
7	GND	Module Ground.	1
8	ModSelL	Module Select.	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

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

Notes:

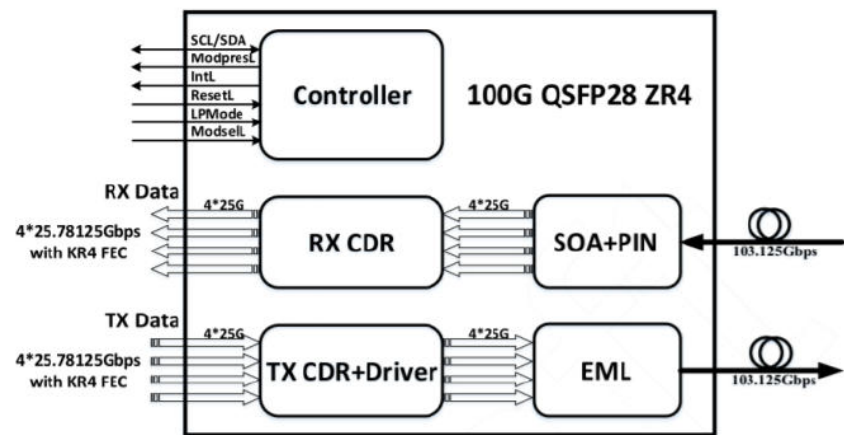
1. Circuit ground is internally isolated from the chassis ground.

Electrical Pad Layout



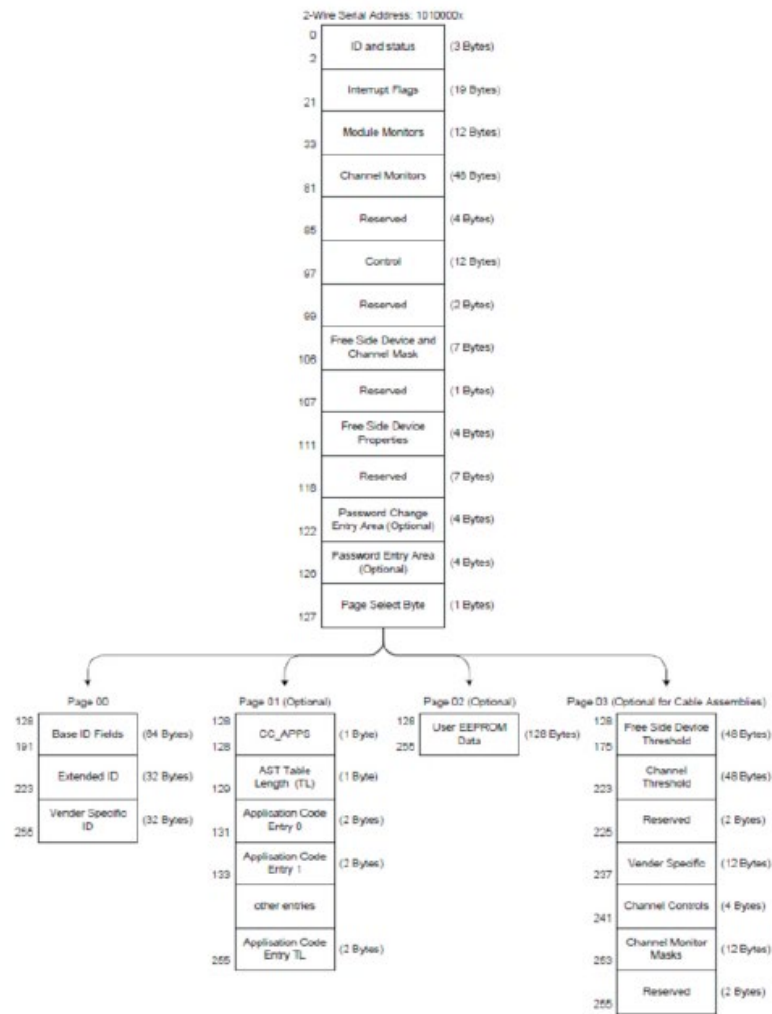
Pin-Out of Connector Block on the Host Board

Transceiver Block Diagram



EEPROM Information

EEPROM memory map-specific data field description is as below:



Digital Diagnostic Monitoring Interface

Parameter	Related Bytes (A0[00] Memory)	Accuracy	Notes
Temperature	22 to 23	±3°C	1, 2
Voltage	26 to 27	<3%	2
Bias Current	42 to 49	<10%	2
Tx Power	50 to 57	<3dB	2
Rx Power	34 to 41	<3dB	2

Notes:

- 1. Actual temperature test point is fixed on the module case around the laser.
- 2. Full operating temperature range.
- 3. Five transceiver parameter values are monitored. The table above defines the Monitory parameter’s accuracy.

Mechanical Specifications

