

QSFP-100G-ZR4

100GBASE ZR4 QSFP28 Transceiver, LC, SMF, 80km, DOM

Features

- Supports 100GBASE 100GE
- Lane bit rate 25.78 Gb/s 100GE
- Up to 80km transmission on SMF
- LAN WDM EML laser and PIN receiver with SOA
- Support Multi-Pin function with IntL/RxLOSL and LPMode/TxDIS
- High speed I/O electrical interface (CAUI-4)
- I2C interface with integrated Digital Diagnostic monitoring
- QSFP28 MSA package with duplex LC connector
- Single +3.3V power supply
- Typical power consumption 6.5 W;
- Operating case temperature: 0 to +70 °C
- Compliant to IEEE 802.3bm and ITU-T G.959
- Compliant to SFF-8665 and SFF-8679
- Complies with EU Directive 2015/863/EU

Application

- 100GBASE-ZR4

Order Information

Table 1- order information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
QSFP-100G-ZR4	103.1Gbps	LWDM	SMF	80km	LC	0~70C	Y

Absolute Maximum Ratings

Table 2-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T _S	-40	-	+85	°C	
Supply Voltage	V _{CC}	-0.5	-	+4.0	V	
Operating Relative Humidity	RH	-	-	+85	%	

Recommended Operating Conditions

Table 3-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T _C	0	-	+70	°C	
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V	
Power Supply Current	I _{CC}	-	-	1.95	A	
Typical Power Dissipation	P _D	-	6.5	-	W	
Aggregate Bit Rate	BR _{AVE}	-	103.125	-	Gb/s	
Lane Bit Rate	BR _{LANE}	-	25.78	-	Gb/s	
Transmission Distance	TD		-	80	km	Over SMF

Optical Characteristics

Table 4-Optical Characteristics

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Total Launch Power, 100GE	P_{ALL}	7	-	12.5	dBm	1
Average Launch Power per Lane, 100GE	P_{TX_LANE}	1	-	6.5	dBm	1
Difference in launch power between lanes	$P_{TX_DELTA_LANE}$	-	-	3	dB	
Average Output Power (Laser Turn off)	$P_{OUT-OFF}$	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio, 100GE	ER	6	-	-	dB	
Receiver						
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Damage threshold	P_{damage}	-	-	5.5	dBm	
Average Receive Power, each Lane	-28			-3.5	dBm	
Receive Power (OMA), each Lane				-3.5	dBm	
Receiver reflectance	SEN1		-	-26	dBm	BER = 1x10 ⁻¹²
Receiver sensitivity Average, each lane	SEN2			-28	dBm	BER = 5x10 ⁻⁵
Los Assert	LosA	-40	-	-	dBm	
Los De-assert	LosDA	-	-	-29	dBm	
Los Hysteresis	LosH	0.5	-	-	dB	

Notes:

1. The optical power is launched into SMF.

2. Measured with a PRBS $2^{31}-1$ test pattern @25.78125/27.952 Gb/s, Hit ratio $\leq$ 5E-5.
3. Measured with a PRBS $2^{31}-1$ test pattern @25.78125 Gb/s, BER $\leq$ 5E-5.

Electrical Characteristics

High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3bm)

Low-Speed Signal: Compliant to SFF-8679

Table 5-Electrical Characteristics

Transmitter (Module Input)						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential Data Input Amplitude	$V_{IN,P-P}$	85	-	900	mVpp	
Differential Termination Mismatch		-	-	10	%	
Differential input return loss(min)	RLd(f)	Compliance with IEEE802.3ba Equation (83A-5)			dB	
Differential to common mode input return loss (min)	RLdc(f)	Compliance with IEEE802.3ba Equation (83A-6)			dB	
LPMode, Reset and ModSelL, V in low	V_{IL}	-0.3	-	0.8	V	
LPMode, Reset and ModSelL, V in high	V_{IH}	2.0	-	$V_{CC}+0.3$	V	
Receiver (Module Output)						
Differential Data Output Amplitude	$V_{OUT,P-P}$	200	-	900	mVpp	
Differential Termination Mismatch (1MHZ)		-	-	10	%	
Transition time, 20% to 80%	Tr Tf	12	-	-	ps	
Differential output return loss (min)	RLd(f)	Compliance with IEEE802.3ba Equation (83A-7)			dB	
Common to differential mode conversion return loss (min)	RLdc(f)	Compliance with IEEE802.3ba Equation (83A-8)			dB	
ModPrsL and IntL, V out low	V_{OL}	0	-	0.4	V	
ModPrsL and IntL, V out high	V_{OH}	$V_{CC}-0.5$	-	$V_{CC}+0.3$	V	

Digital Diagnostics

Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to V _{CC}	0.1	V	Internal
Tx Bias Current Per Lane	0 to 100	10%	mA	Internal
Tx Output Power Per Lane	1.0 to 6.5	±3	dBm	Internal
Rx Power (Each Lane)	-28 to 4.5	±3	dBm	Internal

Pin Definitions

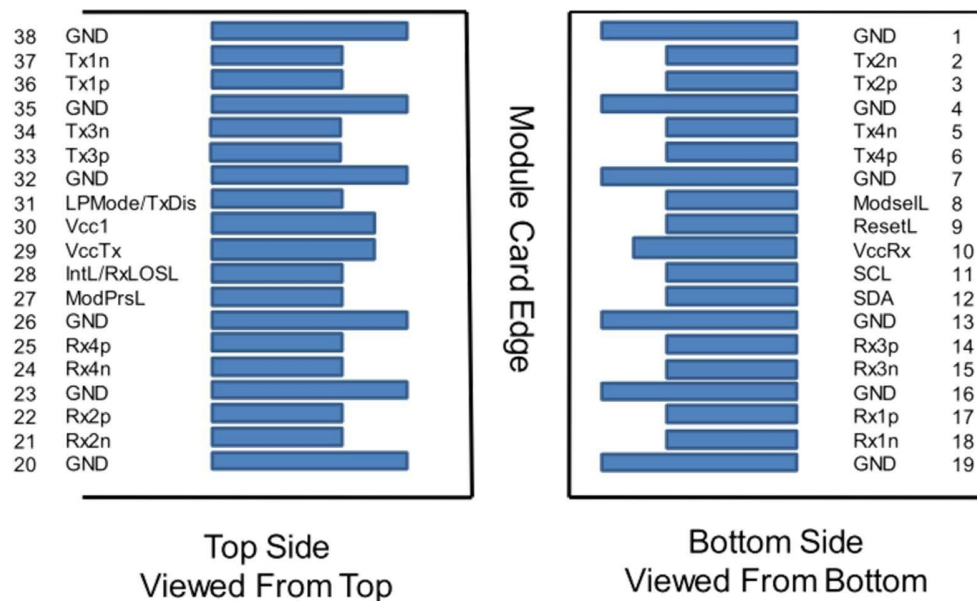
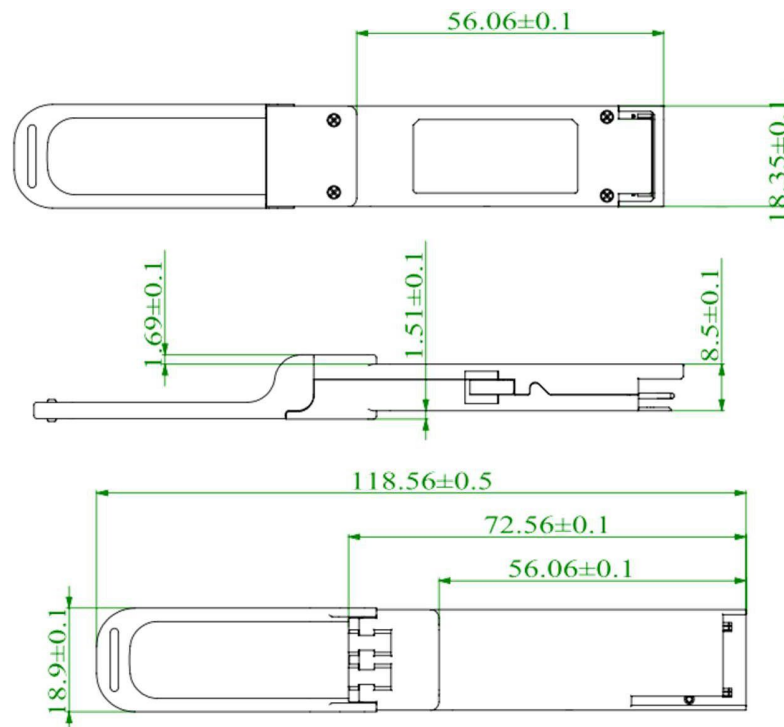


FIGURE 5-1 MODULE PAD LAYOUT

PIN	Logic	Symbol	Description	Plug Seq.	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	3	
7		GND	Ground	1	1
8	LVTTLL-I	ModSelL	Module Select	3	
9	LVTTLL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCNOS-I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCNOS-I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	

25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/Rx_LOS	Interrupt/Rx_LOS	3	
29		VccTx	+3.3 V Power Supply transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2
31	LVTTL-I	LPMODE/TxDIS	Low Power Mode/Tx_Disable	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Output	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Output	3	
38		GND	Ground	1	1
Note 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.					
Note 2: Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in MSA. The connector pins are each rated for a maximum current of 1000 mA.					

Mechanical Dimension



Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: This transceiver uses a semiconductor laser system and is a laser class1 product acc. FDA, which complies with 21CFR1040.10 and 1040.11. It is also a laser class1 product acc. IEC 60825-1.