

Product Features

- QSFP28 MSA compliant
- Hot pluggable 38 pin electrical interface
- 4 LAN WDM lanes MUX/DEMUX design
- 4x25G electrical interface
- Maximum power consumption 6.5W
- LC duplex connector
- Supports 103.125Gb/s aggregate bit rate
- Up to 80km transmission on single mode fiber
- Operating case temperature: 0°C to 70°C
- Single 3.3V power supply



Applications

- 100GBASE-ZR4 100G Ethernet
- Telecom networking

Ordering Information

Part Number	Operating Case temperature	DDMI
AC-E-Q28ZR4-xx	Commercial (0~70°C)	Yes

Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with RoHS 2 (2015/65/E)

Pin Descriptions

Pin	Symbol	Description	Notes
1	GND	Ground	1

2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data In-put	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data In-put	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Non-Inverted Data Output	
25	Rx4p	Receiver Inverted Data Output	
26	GND	Ground	1
27	Mod-PrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1

36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

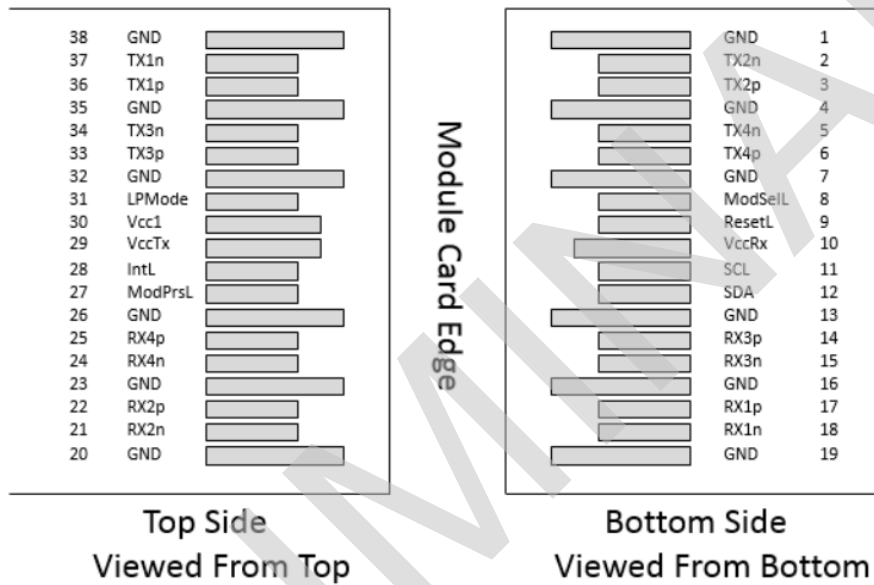
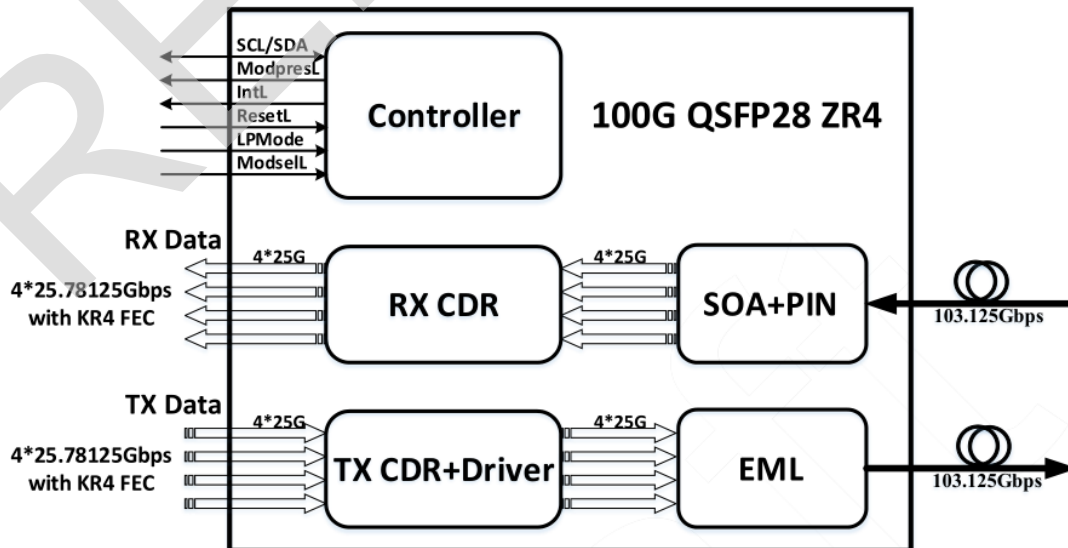


Figure 2. MSA compliant Connector

Transceiver Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	0		+3.6	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	0		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power dissipation	P			6.5	W	
Supply Current	Icc			1.8759	A	
Case Operating Temperature	Tc	0	-	+70	°C	Commercial
9/125um G.652 SMF	Lmax		-	80	km	

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter						
Data Rate, each lane			25.78125		GBd	
Differential Voltage pk-pk	Vpp			900	mV	1
Common Mode Voltage	Vcm	-350		2850	mV	
Transition time	Trise/Tfall	10			ps	2
Differential Termination Resistance Mismatch				10	%	
Eye width	EW15	0.46			UI	
Eye height	EH15	95			mV	
Receiver						
Data Rate, each lane			26.5625		Gbps	
Differential Termination Resistance Mismatch				10	%	1

Differential output voltage swing	Vout, pp			900	mV	
Common Mode Noise, RMS	Vrms			17.5	mV	
Transition time	Trise/Tfall	12			ps	2
Eye width	EW15	0.57			UI	
Eye height	EH15	228			mV	

Notes:

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

Optical Characteristics

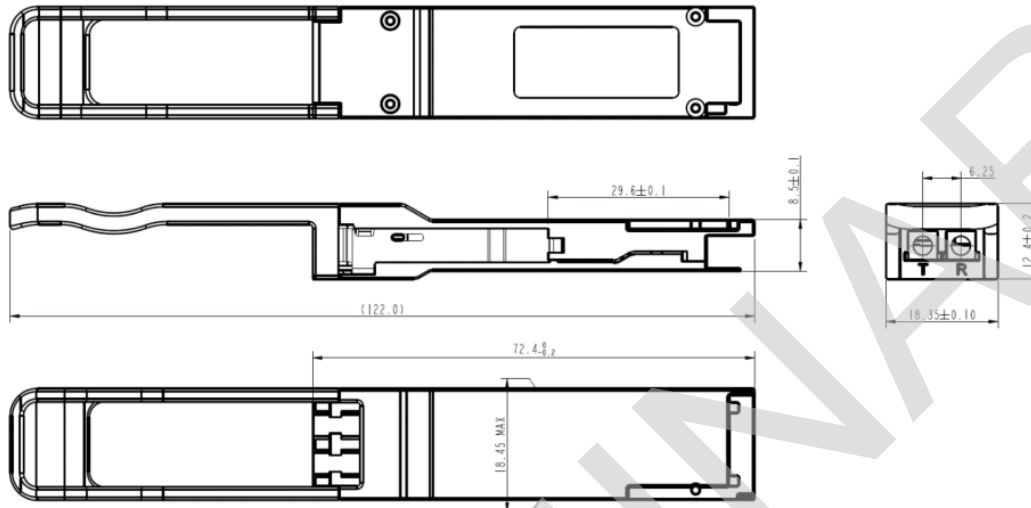
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Signaling Speed per Lane		25.78125 ± 100 ppm			Gb/s	
Transmit wavelengths		1294.53		1296.59	nm	
		1299.02		1301.09	nm	
		1303.54		1305.63	nm	
		1308.09		1310.19	nm	
Side-mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power		8		12.5	dBm	
Average launch power, each lane		2		6.5	dBm	
Difference in launch power between any two lanes(Average and OMA)				3	dBm	
Average launch power of OFF transmitter, each lane				-30	dBm	
Extinction Ratio	ER	6			dB	
RIN OMA				-130	dB/Hz	
Optical return loss tolerance				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 ± 100 ppm			Gb/s	
Receive wavelengths		1294.53		1296.59		
		1299.02		1301.09		
		1303.54		1305.63		
		1308.09		1310.19		
Average receiver power, each lane	SENS	-28		-7	dBm	
Receiver power, each lane (OMA)		-	-	-7	dBm	
Receiver reflectance				-26	dB	
Receiver sensitivity Average, each lane				-28	dBm	1
Receiver 3 dB electrical upper cutoff frequency, each lane				31	GHz	
Damage threshold, each lane		6.5			dBm	
LOS De-Assert	LOSD	-	-	-29	dBm	
LOS Assert	LOSA	-40	-	-	dBm	
LOS Hysteresis	-	0.5	-	-	dB	

Notes

1, Sensitivity is specified at BER@5E-5 with FEC

Mechanical Specifications



Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the Monitor parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C	±3°C	Internal
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	2~+6.5dBm	±3dB	Internal
RX Power	-28 to -7dBm	±3dB	Internal