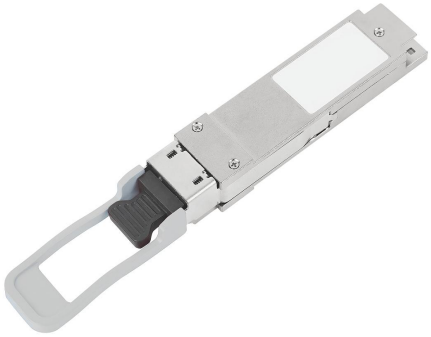
100G QSFP28 ZR4 LAN WDM 80KM LC SMF Fiber Optical Transceiver



Zion Code and Description

Zion Code	Zion Description
7211070	100G QSFP28 ZR4 LAN WDM 80KM LC SMF Fiber Optical Transceiver

Applications

- 100GBASE-ZR4 100G Ethernet
- Telecom networking

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
- RoHS 2.0 compliant

Description

100G QSFP28 SR4 100M is designed for 80km optical communication applications. This module contains 4- lane
optical transmitter, 4-lane optical receiver and module management block including 2 wire serial inter-face.
The optical signals are multiplexed to a single-mode fiber through an industry standard LC connector. A block
diagram is shown in Figure 1

Main product parameters

Form Factor	QSFP28	Max Data Rate	100 Gbps
Wavelength	1294-1310nm	Center Wavelength	1295,1300,1304,1309nm
Max Cable Distance	80KM	Connector type	LC
Fiber cable Type	SMF	Vendor Name	ZION COMMUNICATION
Transimitter Type	EML	Receiver Type	SOA+PIN
Transmit Power	2 to +6.5 dBm	Max Receiver sensitivity	- 28 dBm
Overload Power	6.5 dBm	Extinction Ratio	6 dB
DDM	Supported	Operating Temp.	0°C to 70°C (32°F to 158°F)

Zion Communication's Hot 100G transceiver types

Zion Code	Zion Description
7211010	100G QSFP28 SR4 850nm 100M MPO MMF Fiber Optic Transceiver
7211020	100G QSFP28 PSM4 1310nm 2KM MPO SMF Fiber Optic Transceiver
7211030	100G QSFP28 LR4 CWDM 2KM LC SMF Fiber Optic Transceiver
7211050	100G QSFP28 LR4 LAN WDM 10KM LC SMF Fiber Optic Transceiver
7211060	100G QSFP28 ER4 LAN WDM 30KM/40KM LC SMF Fiber Optic Transceiver
7211070	100G QSFP28 ZR4 LAN WDM 80KM LC SMF Fiber Optic Transceiver

1 Transceiver Block Diagrams

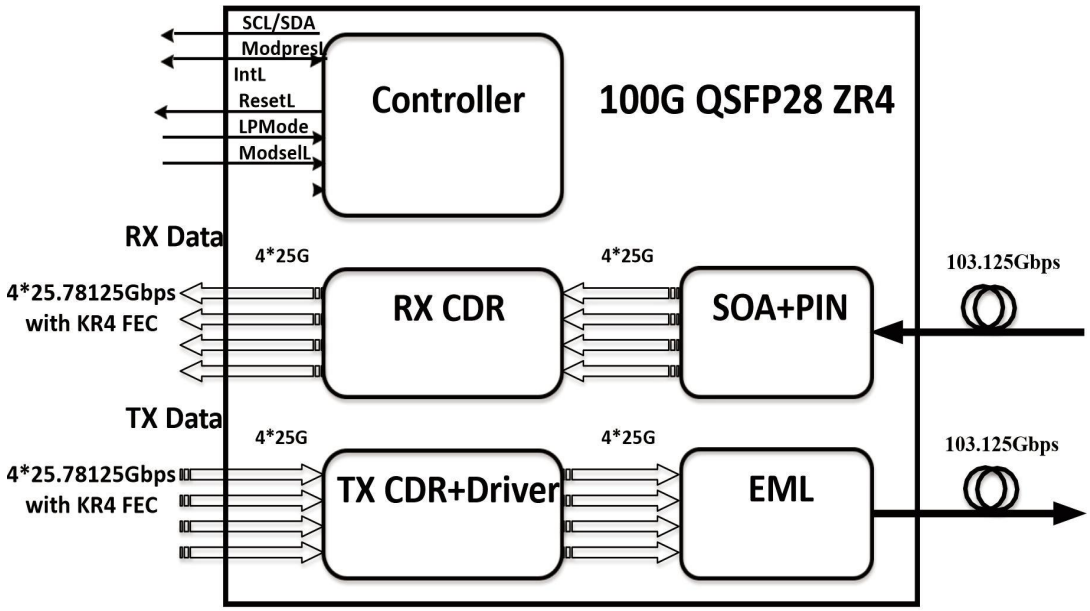


Figure 1. Transceiver Block Diagram

ModSelL

The ModSelL is an input pin. When held low by the host, the module responds to 2-wire serial communication commands. The ModSelL allows the use of multiple modules on a single 2-wire interface bus.

When the ModSelL is "High", the module shall not respond to or acknowledge any 2-wire interface communication from the host. ModSelL signal input node shall be biased to the "High" state in the module.

In order to avoid conflicts, the host system shall not attempt 2-wire interface communications within the ModSelL de-assert time after any modules are deselected. Similarly, the host shall wait at least for the period
of the ModSelL assert time before communicating with the newly selected module. The assertion and deasserting
periods of different modules may overlap as long as the above timing requirements are met.

ResetL

The ResetL pin shall be pulled to Vcc in the module. A low level on the ResetL pin for longer than the minimum pulse length (t_Reset_init) initiates a complete module reset, returning all user module settings to their default state.
Module Reset Assert Time (t_init) starts on the rising edge after the low level on the ResetL pin is released. During the execution of a reset (t_init) the host shall disregard all status bits until the module indicates a completion of the reset interrupt.
The module indicates this by asserting "low" an IntL signal with the Data_Not_Ready bit negated. Note that on power up (including hot insertion) the module should post this completion of reset interrupt without requiring a reset.

LPMode

The LPMode pin shall be pulled up to Vcc in the module. The pin is a hardware control used to put modules into a low power mode when high. By using the LPMode pin and a combination of the Power override, Power_set and High_Power_Class_Enable software control bits (Address A0h, byte 93 bits 0,1,2).

ModPrsL

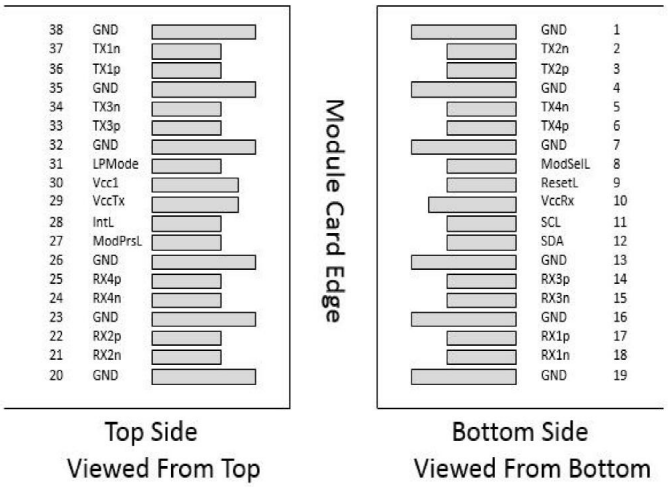
ModPrsL is pulled up to Vcc_Host on the host board and grounded in the module. The ModPrsL is asserted "Low" when inserted and deasserted "High" when the module is physically absent from the host connector.

IntL

IntL is an output pin. When IntL is "Low", it indicates a possible module operational fault or a status critical to the host system. The host identifies the source of the interrupt using the 2-wire serial interface.

The IntL pin is an open collector output and shall be pulled to host supply voltage on the host board. The INTL pin is deasserted "High" after completion of reset, when byte 2 bit 0 (Data Not Ready) is read with a value of '0' and the flag field is read (see SFF-8636).

2 Pin Description



Pin	Symbol	Name/Description	Note
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	2
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
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	1
25	Rx4p	Receiver Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	2
30	Vcc1	+3.3V Power supply	2
31	LPMode	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

Note:

1.Circuit ground is internally isolated from chassis ground.

3 Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min.	Typical	Max.	Unit	
Maximum Supply Voltage	Vcc	0		3.6	V	
Storage Temperature	Ts	-40		85	°C	
Relative Humidity	RH	15		85	%	1
Damage Threshold, each lane	THd	6.5			dBm	

Note:

1. Non-condensing

4 Operating Environments

Electrical and optical characteristics below are defined under this operating environment, unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max.	Unit	
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Case Temperature	Top	0		70	°C	
Link Distance with G.652				80	%	

5 Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power dissipation				6.5	W	
Supply Current	Icc	-40		1.8759	A	Steady
Transmitter						
Data Rate, each lane			25.78125		Gbps	
Differential Voltage pk-pk	Vpp			900	mV	At 1 MHz
Common Mode Voltage	Vcm	-350		2850	mV	
Transition time	Trise/Tfall	10			ps	20%~80%
Differential Termination Resistance Mismatch				10	%	
Eye width	EW15	0.46			UI	
Eye height	EH15	95			mV	

6 Optical Characteristics

100GBASE-ZR4 Operation（EOL, TOP = 0 to +70 ℃ , VCC = 3.135 to 3.465 Volts）

Parameter	Unit	min	Typical	Max.	Note
Transmitter					
Signaling Speed per Lane	Gb/s	25.78125 ± 100 ppm			
Transmit wavelengths	nm	1294.53		1296.59	
		1299.02		1301.09	
		1303.54		1305.63	
		1308.09		1310.19	
Side-Mode Suppression Ratio (SMSR)	dB	30			
Total Average Launch Power	dBm	8.0		12.5	
Average launch power, each lane	dBm	2.0		6.5	
Difference in launch power between any two lanes (Average and OMA)	dBm			3	
Average launch power of OFF transmitter, each lane	dBm			-30	
Extinction Ratio (ER)	dB	6			
RIN OMA	dB/Hz			-130	
Optical return loss tolerance	dB			20	
Transmitter reflectance	dB			-12	
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			

Transmitter					
Signaling Speed per Lane	Gb/s	25.78125 ± 100 ppm			
Receive wavelengths	nm	1294.53		1296.59	
		1299.02		1301.09	
		1303.54		1305.63	
		1308.09		1310.19	
Average receiver power, each lane	dBm	-28		-7	
Receiver power, each lane(OMA)	dBm			-7	
Receiver reflectance	dBm			-26	
Receiver sensitivity Average, each lane	dBm			-28	1
Receiver 3 dB electrical upper cutoff frequency, each lane	GHz			31	
Damage threshold, each lane	dBm	6.5			
LOS Assert	dBm	-40			
LOS Deassert	dBm			-29	
LOS Hysteresis	dB	0.5			

Note:

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

7 Digital Diagnostic Monitoring Functions

100G QSFP28 ZR4 80KM support the I2C-based Diagnostic Monitoring Interface (DMI) defined in document SFF-8636. The host can access real-time performance of transmitter and receiver optical power, temperature, supply voltage and bias current.

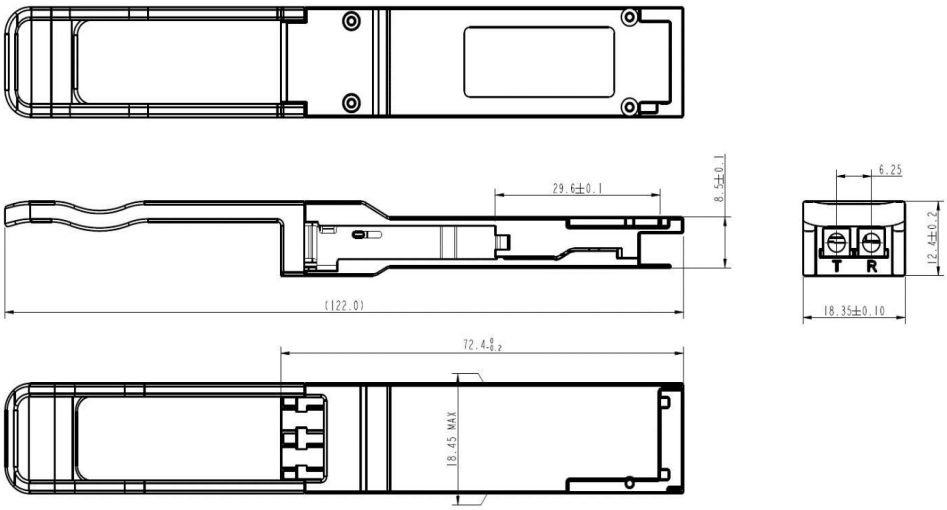
Performance Item	Related Bytes(A0[00] memory)	Monitor Error	Notes
Module temperature	22 to 23	+/-3°C	1, 2
Module voltage	26 to 27	< 3%	2
LD Bias current	42 to 49	< 10%	2
Transmitter optical	50 to 57	< 3dB	2
Receiver optical power	34 to 41	< 3dB	2
2	1		2

Note:

1，Actual temperature test point is fixed on module case around Laser.
2，Full operating temperature range

8 Alarm and Warning Thresholds

100G QSFP28 ZR4 80KM support alarms function, indicating the values of the preceding basic performance are lower or higher than the thresholds.

Performance Item	Related Bytes(A0[00] memory)	Unit	Low threshold	Notes
Temp Alarm	128 to 131	℃	-10	80
Temp Warning	132 to 135	℃	0	70
Voltage Alarm	144 to 147	V	2.97	3.63
Voltage Warning	148 to 151	V	3.135	3.465
TX Power Alarm	192 to 195	dBm	-4	8.2
TX Power Warning	196 to 199	dBm	-1	6.5
RX Power Alarm	176 to 179	dBm	-31	-4
RX Power Warning	180 to 183	dBm	-28	-7

9 Mechanical Specifications