

02312MLF-C

Huawei® 02312MLF Compatible TAA Compliant 50GBase-ZR2 QSFP28 Transceiver (SMF, 1310nm, 80km, LC, DOM)

Features:

- QSFP28 MSA compliant
- Hot pluggable 38 pin electrical interface
- 2 LAN-WDM lanes MUX/DEMUX design
- 2x25G electrical interface
- Maximum power consumption 5W
- LC duplex connector
- Supports 51.5625Gb/s aggregate bit rate
- Up to 80km transmission on single mode fiber with KR4 FEC
- Operating case temperature: 0°C to 70°C
- Single 3.3V power supply
- RoHS 2.0 compliant

**Applications**

- 50GBASE-ZR Ethernet
- Telecom networking

Product Description

This Huawei® 02312MLF compatible QSFP28 transceiver provides 50GBase-ZR2 throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Huawei® 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. It is built to meet or exceed the specifications of Huawei®, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' QSFP28 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

Feature	Standard	Performance
Safety		
TUV	EN 60950-1	TUV certificate
	EN/IEC 60825-1:2007, Edition 2	
	EN/IEC 60825-1:2014, Edition 3	
	EN/IEC 60825-2:2004+A1:2006+A2:2010	
Electromagnetic Compatibility		
Radiated emissions	EMC Directive 2014/30/EU	Class B digital device with a mini- mum -6dB margin to the limit when tested with a metal enclosure. Final margin may vary de-pending on system application, good system EMI de- sign practice, ie: suitable metal enclosure and well-bonding, is required to achieve Class B margins at the systemlevel. Tested frequency range: 30 MHz to 40 GHz or 5th harmonic (5 times the highest frequency), whichever is less.
	EN 55032	
	CISPR 32	
	AS/NZS CISPR 32	
ESD	EN 55024	Withstands discharges of ±8 k Vcontact, ±15 k V air.
	CISPR 24	
	IEC/EN 61000-4-2	
Radiated immunity	EN 55024	Field strength of 10 V/m from 80MHz to 6 GHz.
	CISPR 24	
	IEC/EN 61000-4-3	
Restriction of Hazardous Substances		
RoHS	EU Directive 2011/65/EU (EU) 2015/863	

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Maximum Supply Voltage	Vcc	0		3.6	V
Storage Temperature	Ts	-40		85	°C
Operating Case Temperature	Top	0		70	°C
Relative Humidity (Non-condensing)	RH	15		85	%
Damage Threshold, each lane	THd	-2.3			dBm
Link Distance with G.652				80	km

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	PD			5.0	W	
Supply Current	Icc			1.4430	A	Steady state
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	
Receiver						
Data Rate, each lane			25.78125		Gbps	
Differential Termination Resistance Mismatch				10	%	At 1 MHz
Differential output voltage swing	Vout, pp			900	mV	
Common Mode Noise, RMS	Vrms			17.5	mV	
Transition time	Trise/Tfall	12			ps	20%~80%
Eye width	EW15	0.57			UI	
Eye height	EH15	228			mV	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Speed per Lane		25.78125 ± 100 ppm			Gb/s	
Lane_0 Transmit Wavelength	λC0	1294.53		1296.59	nm	
Lane_1 Transmit Wavelength	λC1	1299.02		1301.09	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power	Po	5.0		9.5	dBm	
Average Launch Power, Each Lane	P _{each}	2.0		6.5	dBm	
Difference in launch power between any two lanes (Average and OMA)				3	dBm	
Average launch power of OFF transmitter, each lane	Poff			-30	dBm	
Extinction Ratio	ER	6			dB	
RIN OMA				-130	dB/Hz	
Optical Return Loss Tolerance	ORL			20	dB	
Transmitter Reflectance				-12	dB	
Mask Margin		5			%	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}					1
Receiver						
Signaling Speed per Lane		25.78125 ± 100 ppm			Gb/s	
Lane_0 Receive Wavelength	λC0	1294.53		1296.59	nm	
Lane_1 Receive Wavelength	λC1	1299.02		1301.09	nm	
Average receiver power, each lane	Rx_pow	-28		-3.5	dBm	
Receiver reflectance				-26	dB	
Receiver sensitivity Average, each lane	Rx_sens			-28	dBm	1
Receiver 3 dB electrical upper cutoff frequency, each lane				31	GHz	
Damage threshold, each lane	Pdamage	-2.3			dBm	
Saturation Power, each lane		-7			dBm	

Notes:

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

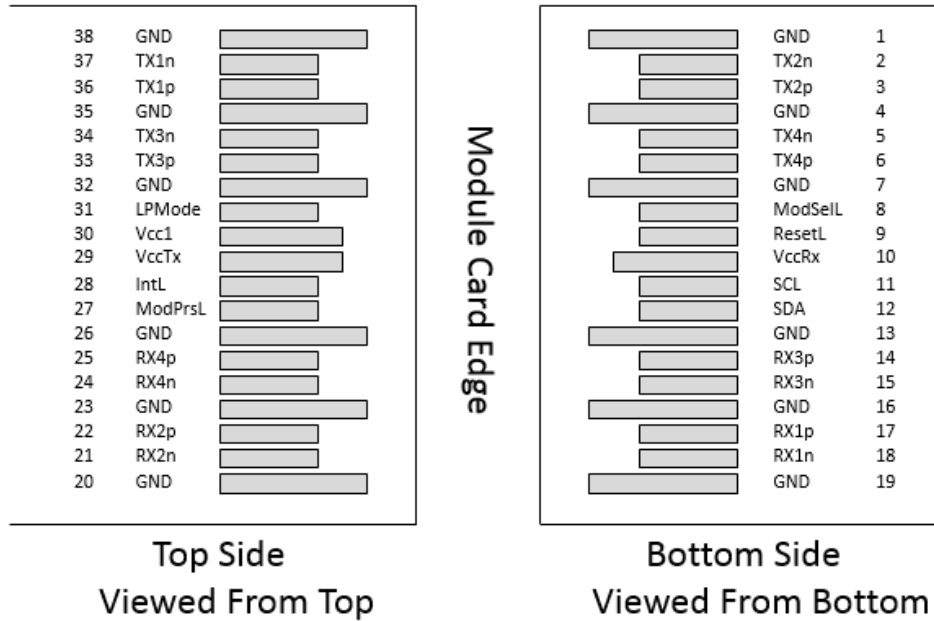
Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Not Used	
6	Tx4p	Not Used	
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	Not Used	
15	Rx3n	Not Used	
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	Not Used	
25	Rx4p	Not Used	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Not Used	
34	Tx3n	Not Used	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

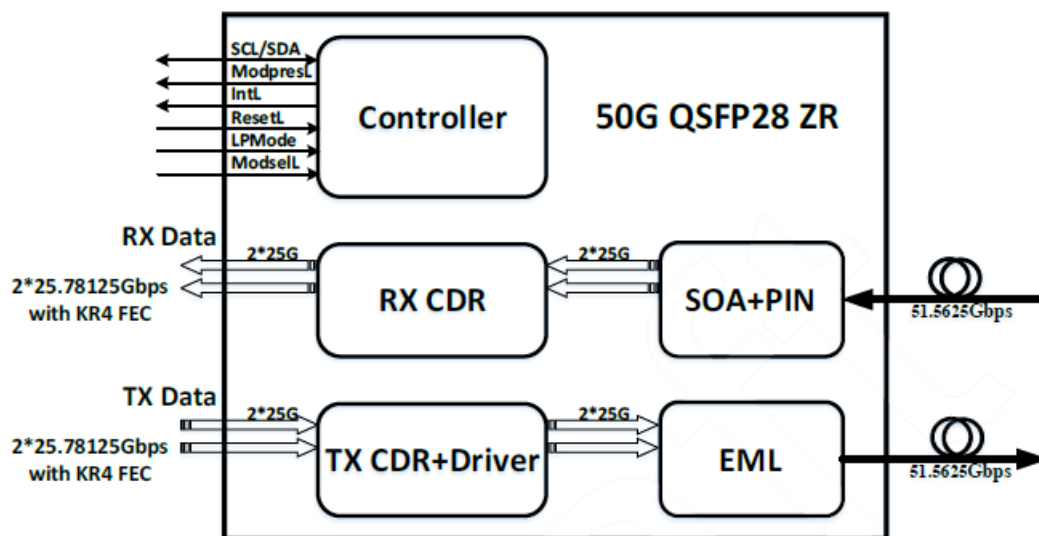
Notes:

1. Circuit ground is internally isolated from chassis ground.

Electrical Pin-out Details



Transceiver Block Diagram



Digital Diagnostic Monitoring Functions

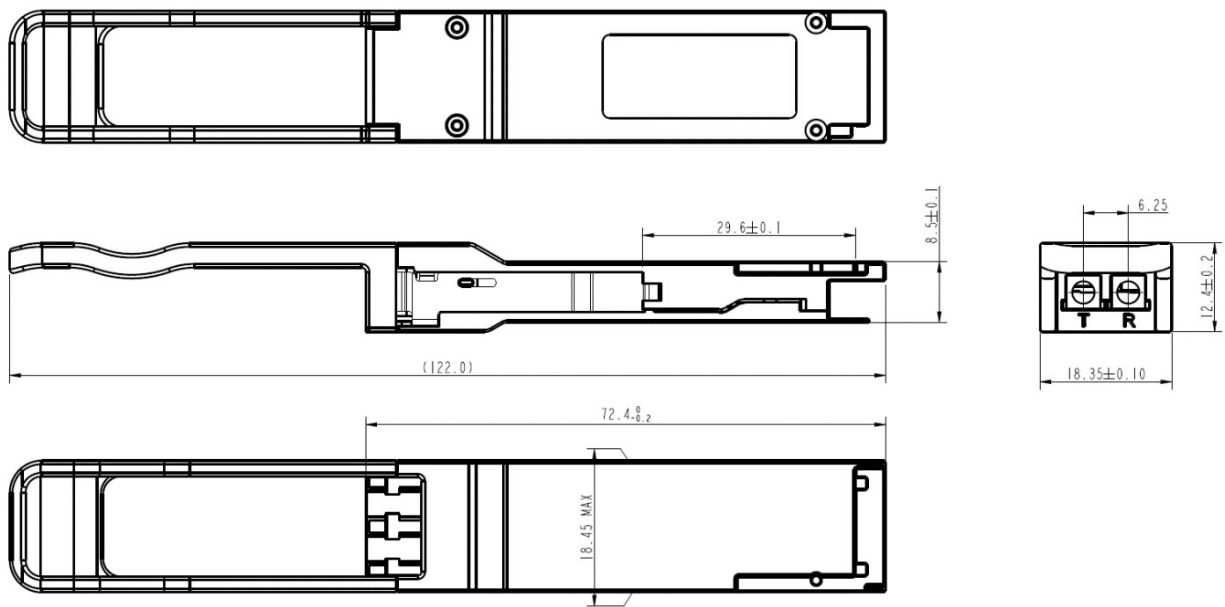
This module support the I2C-based Diagnostic Monitoring Interface (DMI) defined in document SFF-8636. The host can access real-time performance of transmitter and receiver optical power, temperature, supply voltage and bias current.

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 power	50 to 57	< 3dB	2
Receiver optical power	34 to 41	< 3dB	2

Notes:

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

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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