

100GBASE-PLR4 QSFP28 1310nm 10km MTP/MPO-12 Transceiver

QSFP-PLR4-100G



Application

- 100G BASE-LR Ethernet
- Data Centers

Features

- Four-Channel Full-Duplex Transceiver Modules
- Transmission Data Rate up to 26Gbit/s per Channel
- Up to 10km Transmission of Single Mode Fiber
- Low Power Consumption <3.5W
- Operating Case Temperature 0°C To 70°C
- 3.3V Power Supply Voltage
- Rohs 6 Compliant
- Hot Pluggable QSFP28 form Factor
- Single MPO Connector Receptacle
- Built-in Digital Diagnostic Function

Description

The Cisco compatible 100GBASE-PLR4 optical transceiver module supports link lengths of up to 10km over single-mode fiber (SMF) with MTP/MPO-12 connector. This transceiver is compliant with SFF-8636 and QSFP28 MSA standards. The built-in digital diagnostics monitoring (DDM) allows access to real-time operating parameters. It is suitable for 100G ethernet and data center interconnect applications.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Temperature	T _s	-40	85	°C	
Supply Voltage	V _{CC}	-0.3	3.6	V	
Relative Humidity (Non-condensing)	RH	0	85	%	
Control Input Voltage	V _I	-0.3	V _{CC} +0.5	V	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	TOP	0		70	degC
Power Supply Voltage	VCC	3.135	3.3	3.465	V
Power Consumption		-		3.5	W
Data Rate	DR		25.78125		Gbps
Data Speed Tolerance	ΔDR	-100		+100	ppm
Link Distance with G.652	D	0		10	km

III. Transmitter Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength	λ_C	1295		1325	nm	1
Average Optical Launch Power (Each Lane)	P_{AVG}	-6	-0.5	2.0	dBm	
Average Launch Power Off Transmitter, each lane	P_{off}			-30	dBm	
Extinction Ratio	ER	3.5	-	-	dB	
Optical Modulation Amplitude(Each Lane)	OMA	-5	-0.5	2.2	dBm	1
Difference in launch power between any two lanes	DT	-	-	5	dB	
Transmitter and Dispersion Penalty(Each Lane)	TDP	-	-	2.9	dB	1
Optical Return Loss Tolerance	ORLT	-	-	20	dB	
Transmitter Eye Mask Definition	-	{0.31,0.4,0.45,0.34,0.38,0.4}				
RIN_{OMA}	RIN	-	-	-128	dB/Hz	

Note:

1: Transmitter wavelength, RMS spectral width and power need to meet the OMA minus TDP specs to guarantee link performance.

IV. Receiver Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Units	Notes
Center Wavelength	λ_C	1295		1325	nm	
Receiver Sensitivity (OMA) per Lane	SEN			-12	dBm	Note
Damage Threshold for Receiver	$P_{in, damage}$	3	-	-	dBm	
Receive Power (Each Lane), Overload	OVL	2.5	-		dBm	
Signal Loss Assert Threshold	LOSA	-30			dBm	
Signal Loss Deassert Threshold	LOSD			-12	dBm	

Parameter	Symbol	Min.	Typical	Max.	Units	Notes
Optical Return Loss	ORL	-	-	-12	dB	

Note: Measured with a PRBS231-1 test pattern @25.78125Gbps, BER≤5x10-5

V. Transmitter Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Units	Notes
Differential Input Impedance	Zin	90	100	110	ohm	
Differential Output Impedance	Zout	90	100	110	ohm	
Differential Input Amplitude	V _{IN,P-P}	300	-	1100	mVpp	
Differential Output Amplitude	V _{OUT,P-P}	300	-	800	mVpp	
Input Logic Level High	VIH	2.0		VCC	V	
Input Logic Level Low	VIL	0		0.8	V	
Output Logic Level High	VOH	VCC-0.5		VCC	V	
Output Logic Level Low	VOL	0		0.4	V	

VI. Digital Diagnostics

Parameter	Accuracy	Unit	Notes
Temperature	± 3	°C	Over operating temperature
Voltage	± 0.1	V	Full operating range
Tx Bias Current (Each Lane)	± 10%	mA	Per channel
Tx Output Power (Each Lane)	± 3	dB	Per channel

Rx Power (Each Lane)	± 3	dB	Per channel
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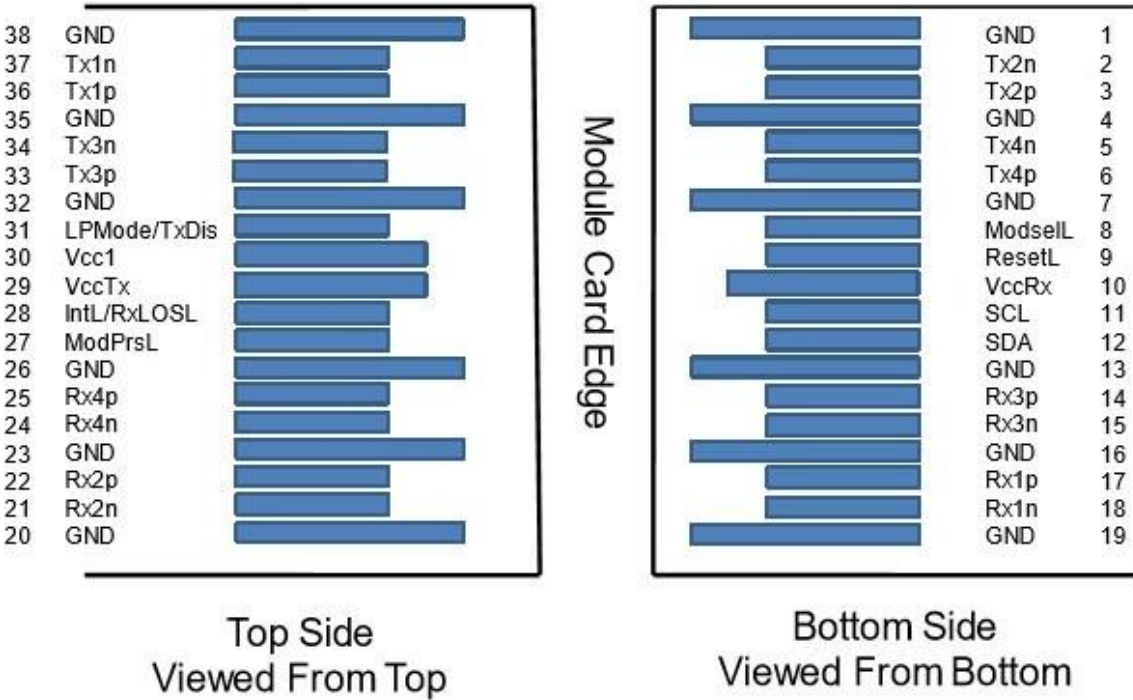
VII. Pin Definitions

Pin	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	
8	LVTTL-I	ModselL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		Vcc Rx	+3.3V Power Supply Receiver	2	
11	LVC MOS-I/O	SCL	2-wire serial interface clock	3	
12	LVC MOS-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	
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	

Pin	Logic	Symbol	Name/Description	Plug Sequence	Notes
19		GND	Ground	1	
20		GND	Ground	1	
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	
27	LVTTTL-O	ModPrsL	Module Present	3	
28	LVTTTL-O	IntL/RxL OS L	Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636). Interrupt. Optionally configurable as RxLOSL via the management interface(SFF-8636).	3	
29		Vcc Tx	+3.3V Power supply transmitter	2	
30		Vcc1	+3.3V Power supply	2	
31	LVTTTL-I	LPMode/TxD is	Low Power Mode. Optionally configurable as TxDis via the management interface (SFF-8636).	3	
32		GND	Ground	1	
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	

Pin	Logic	Symbol	Description	Plug Sequence	Notes
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	

VIII. QSFP+ Module Pad Layout



IX. Recommended Host Board Power Supply Filtering

The host board should use the power supply filtering shown in Figure1.

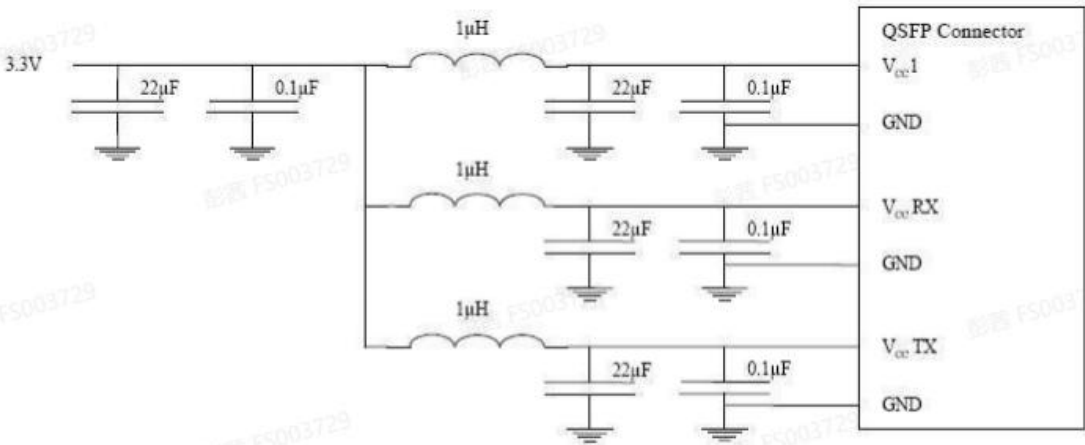


Figure 1 Host Board Power Supply Filtering

X. Optical Interface Lanes and Assignment

The optical interface port is a male MPO connector. The four fiber positions on the left as shown in Figure 2, with the key up, are used for the optical transmit signals (Channel 1 through4).The fiber positions on the right are used for the optical receive signals (Channel 4 through 1). The central four fibers are physically present.

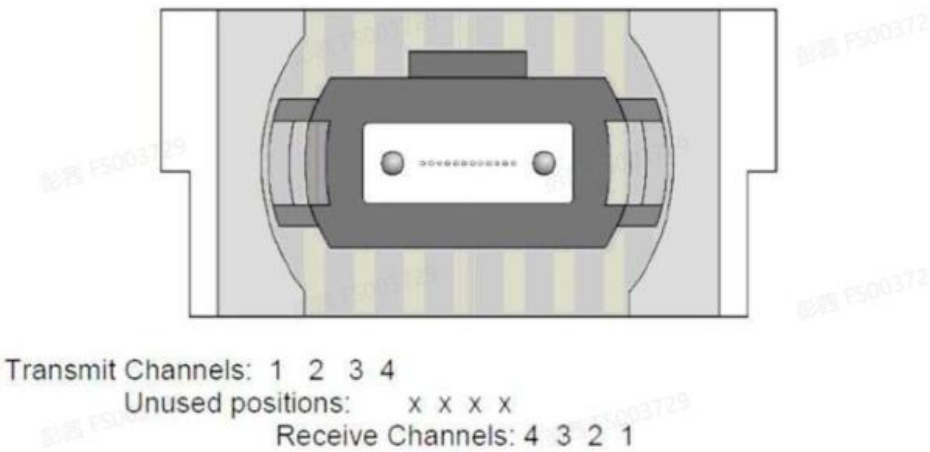
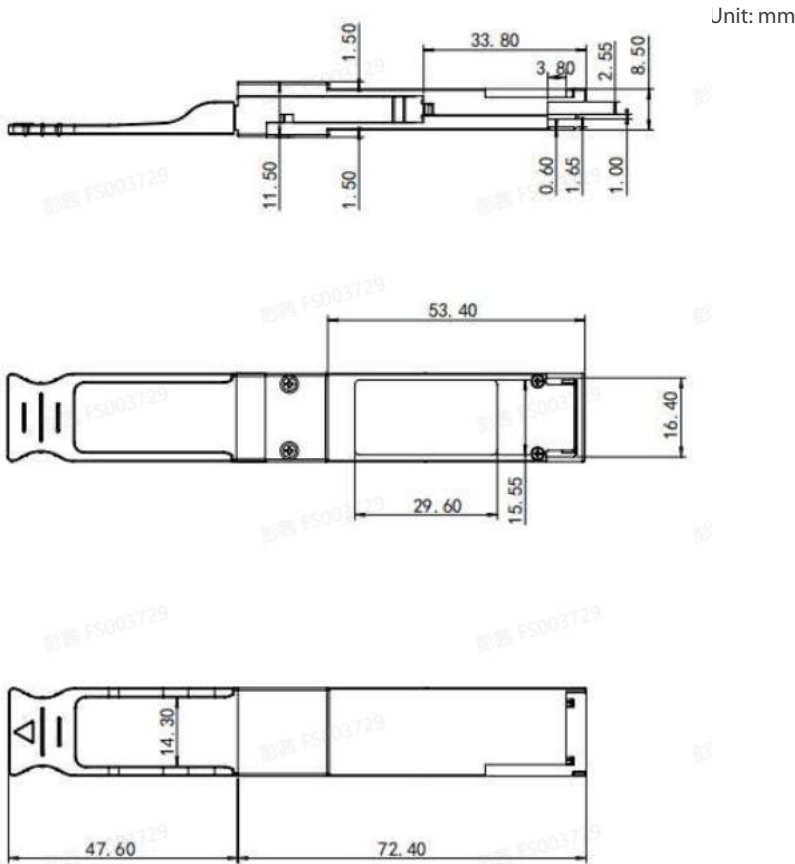
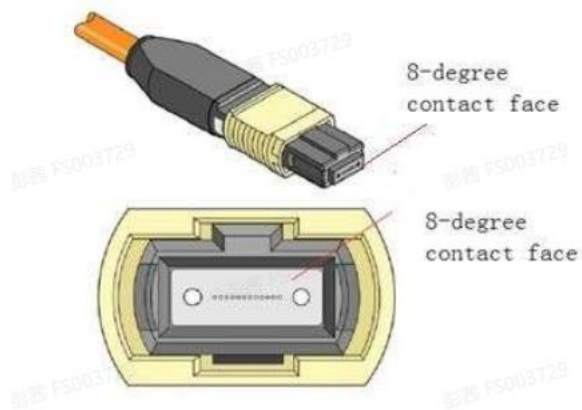


Figure 2 Optical Receptacle and Channel Orientation

XI. Mechanical Diagram



Attention: To minimize MPO connection induced reflections, an MPO receptacle with 8-degree angled end-face is utilized for this product. A male MPO connector with 8-degree end-face should be used with this product as illustrated in below Figure .



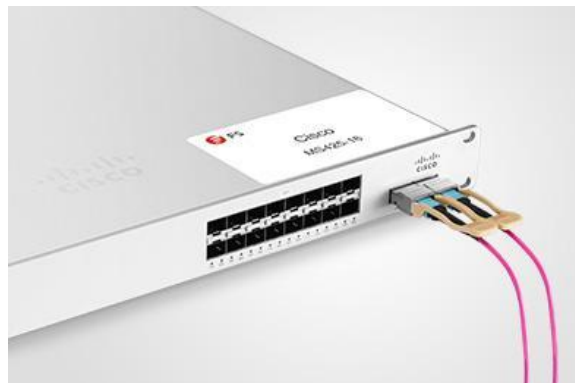
Test Center

I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force@tm S60-44T

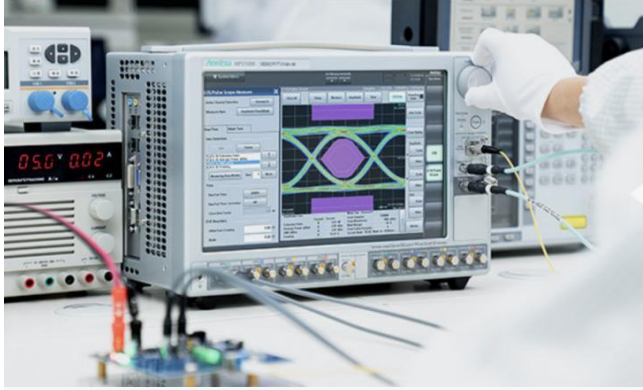


HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

II. Performance Testing

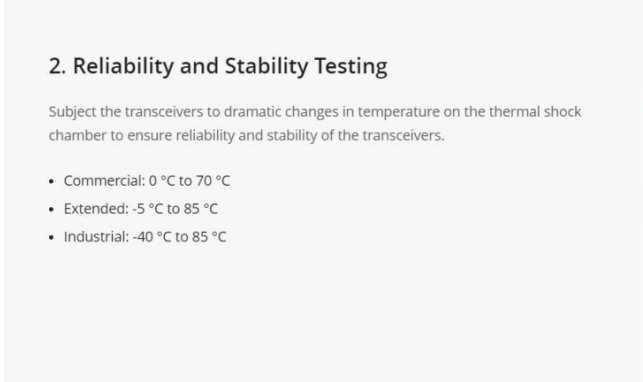
Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve



2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C



3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

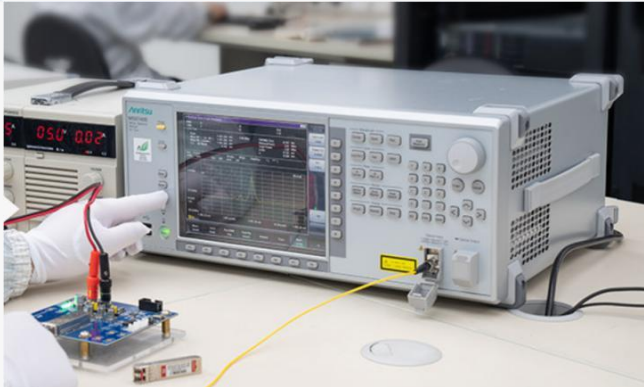
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Order Information

Part Number	Description
QSFP-PLR4-100G	QSFP28 100GBASE-PLR4 1310nm 10km Transceiver
QSFP28-LR4-100G	QSFP28 100GBASE-LR4 1310nm 10km Transceiver
QSFP-LR-100G	QSFP28 100GBASE-LR Single Lambda 1310nm 10km Transceiver
QSFP-4W10-100G	QSFP28 100GBASE-4WDM-10 1310nm 10km Transceiver
QSFP28-LR4-100GE	QSFP28 100GBASE-LR4 1310nm 10km Duplex LC Transceiver for InfiniBand EDR