40GBASE-PLR4 QSFP+ PSM4 1310nm 10km Industrial MTP/MPO Transceiver for SMF

QSFP-PLR4-40G-I

Applications

- Datacenter and Enterprise Networking
- Switch Router and HBAs
- 40G Ethernet
- Infiniband QDR, DDR and SDR
- High-performance Backplane
- 4G-LTE Advanced Networking

Features

- Low Power Consumption of 3.5W (Max.)
- Up to 11.2 Gbps Data Rate Per Channel
- MPO Optical Connector (IEC61754-7-1)
- Transmission Length up to 10km
- Compliant with QSFP+ MSA (SFF-8636)
- Operating Case Temperature (-40~85° C)
- RoHS-6 Complaint

Description

QSFP+ 40G 10km PSM4 industrial transceiver is a high-performance, cost-effective module which has an MPO optics interface and Digital diagnostics functions. Standard CML for high-speed signal and LVTTL control and monitor signals. The receiver section uses a PIN receiver and the transmitter uses a 1310 nm DFP laser. They are compliant with QSFP+ MSA, SFF-8636, IEEE 802.3ba XLPPI.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	$T_{Storage}$	-40		+85	℃
Relative Humidity	RH	0		+85	%
Supply Voltage	V_{CC}	0		3.8	V
Power Consumption				3.5	W
Supply Current	I_{CC}			800	mA

II. Recommended Operating Environment (T= 25° C, unless noted)

Parameter	Symbol	Min.	Typical	Max.	Unit
Case Temperature	T_C	-40		85	℃
Power Supply Voltage	V_{CC}	3.15	3.30	3.45	V
Data Rate			10.3125		Gbps
Data Speed Tolerance	ΔDR	-100		+100	ppm
Power Supply Noise				50	mVpp
Supply Noise Rejection				100	mV
Operating Distance	D			2	km

III. Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typical	Max.	Unit
		Transmitter				
Operating Wavelength, Each Lane	λ	T_c = -40~85 ° C	1260		1355	nm
Side-mode Suppression Ratio	SMSR	T_c = -40~85 ° C	30			dB
Average Launch Power, Each Lane	P_{AVG}		-7.0		+0.5	dBm
Optical Modulation Amplitude (OMA), Each Lane	P_{OMA}	T_c = -40~85 ° C	-5.5		+2.0	dBm
Extinction Ratio	ER	T_c = -40~85 ° C	3.5			dB
Relative Intensity Noise	RIN				-128	dB/Hz
Optical Return Loss Tolerance	TOL				12	dB
Transmitter Reflectance					-12	dB
Transmitter Eye Mask Margin	EMM		5			%
		Receiver				
Center Wavelength, Each Lane	λ_C	T_c = -40~85 ° C	1260		1355	nm
Damage Threshold	TH_d	T_c = -40~85 ° C	+3			dBm
Overload, Each Lane	OVL		+1.0			dBm
Receiver Sensitivity (OMA), Each Lane	S_{OMA}	T_c = -40~85 ° C @BER=5E-5			-10.6	dBm
Difference in Receive Power Between Any Two Lanes	Prx, diff				7.5	dBm
Receiver Reflectance					-12	dB

Parameter	Symbol	Conditions	Min.	Typical	Max.	Unit
LOS Assert	LOS_A		-30			dBm
LOS De-Assert	LOS_D				-15	dBm
LOS Hysteresis	LOS_H		0.5		6	dB

IV. Electrical Characteristics (T= 25° C, unless noted))

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section						
Tx Disable Assert Time				100	ms	
Tx Disable Negate Time				400	ms	
Differential Input Impedance		90	100	110	Ω	
Differential Input Swing		200		800	mV	
TP1/TP1a Interface	Compliant to IEEE 802.3ba XLPPI					
Receiver Section						
Differential Output Impedance		90	100	110	Ω	
Differential Output Swing		400	600	800	mV	
TP4 Interface	Compliant to IEEE 802.3ba XLPPI					

V. Digital Diagnostic Monitor Functions

Parameter	Symbol	Min.	Max.	Unit	Notes
Temperature Monitor Absolute Error	DMI_Temp	-3	3	° C	Over operating temp
Supply Voltage Monitor Absolute Error	DMI_V_{CC}	-0.165	0.165	V	Full operating range
Channel RX Power Monitor Absolute Error	DMI_RX_Ch	-3	3	dB	Ch1 ~ Ch4
Channel Bias Current Monitor	DMI_I_{bias}_Ch	-10%	10%		Ch1 ~ Ch4
Channel TX Power Monitor Absolute Error	DMI_TX_Ch	-3	3	dB	Ch1 ~ Ch4

VI. Pin Assignment

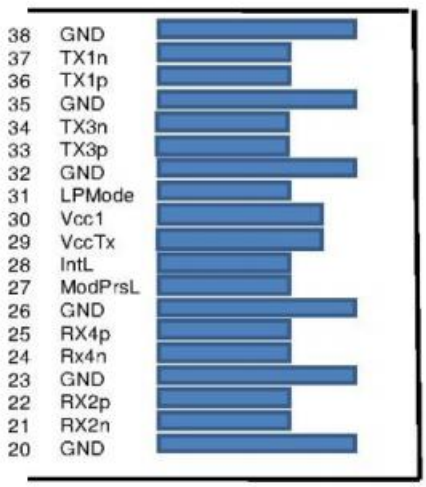


Figure 1. Top side viewed from top

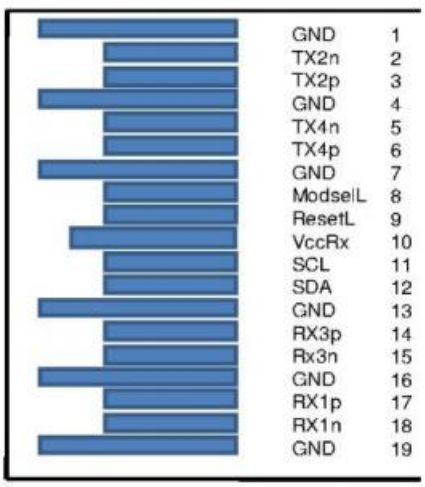


Figure 2. Bottom side viewed from bottom

VII. Pin Description

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Ground	
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Output	
4		GND	Ground	
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Output	
7		GND	Ground	
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		V_{cc}Rx	+ 3.3V Power Supply Receiver	
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	

Pin	Logic	Symbol	Name/Description	Notes
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	
20		GND	Ground	
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		V_{cc}Tx	+3.3 V Power Supply Transmitter	
30		V_{cc}1	+3.3 V Power Supply	
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	

Pin	Logic	Symbol	Name/Description	Notes
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	

VIII. Package Outline

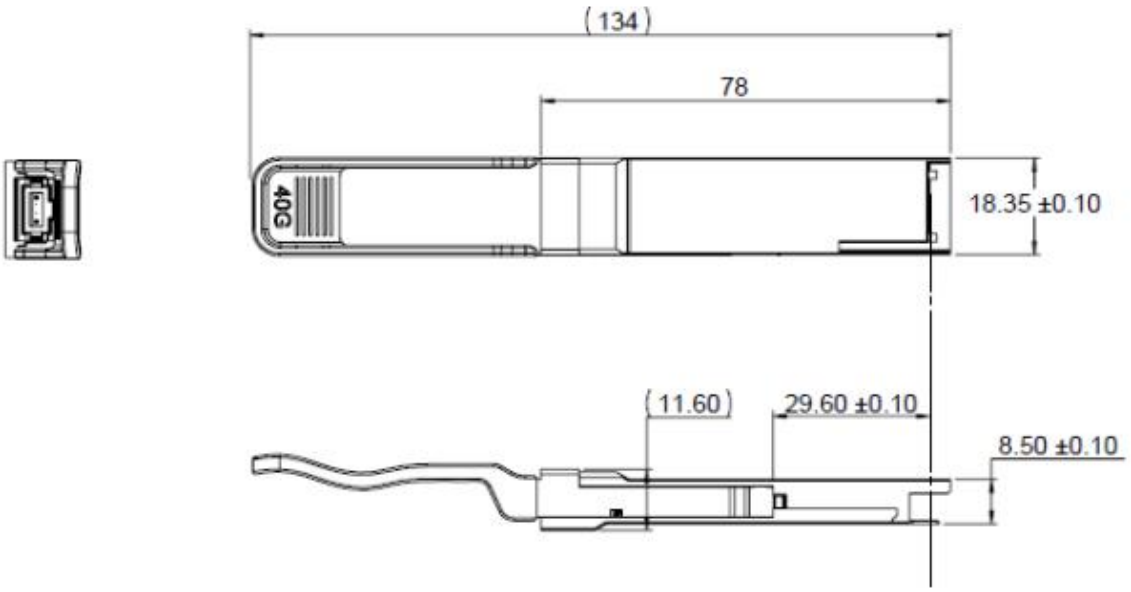


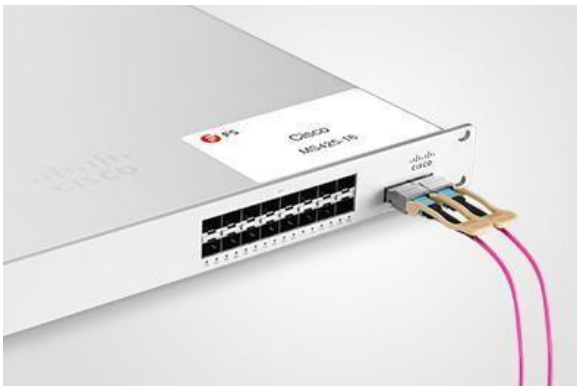
Figure 3. Mechanical Drawing

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

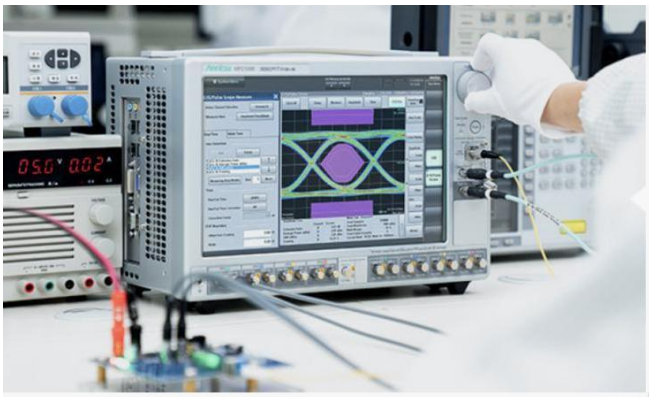
Force⑩tm S60-44T

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

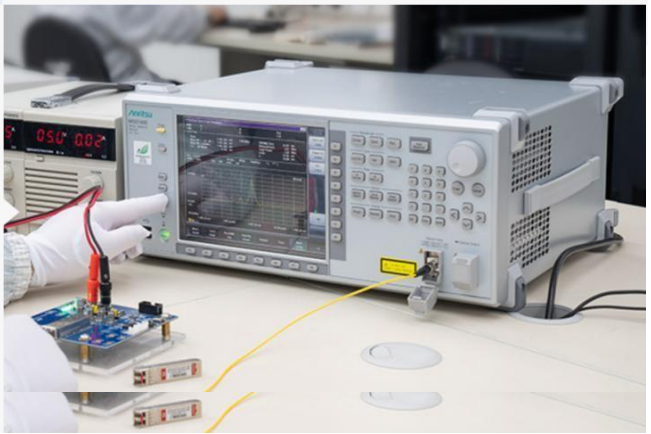
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- 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



Ordering Information

Part Number	Description
QSFP-SR4-40G	40GBASE-SR4 QSFP+ 850nm 150m MTP/MPO Transceiver for MMF
QSFP-CSR4-40G	40GBASE-CSR4 QSFP+ 850nm 400m MTP/MPO Transceiver for MMF
QSFP-PIR4-40G	40GBASE-PLRL4 QSFP+ 1310nm 1.4km MTP/MPO Transceiver for SMF
QSFP-LX4-40G	40GBASE-UNIV QSFP+ 1310nm 2km LC Transceiver for SMF&MMF
QSFP-IR4-40G	40GBASE-LR4L QSFP+ 1310nm 2km LC Transceiver for SMF
QSFP-LR4-40G	40GBASE-LR4 and OTU3 QSFP+ 1310nm 10km LC Transceiver for SMF
QSFP-LR4-40G-20	40GBASE-LR4 QSFP+ 1310nm 20km LC Transceiver for SMF
QSFP-PLR4-40G	40GBASE-PLR4 QSFP+ 1310nm 10km MTP/MPO Transceiver for SMF
QSFP-ER4-40G	40GBASE-ER4 and OTU3 QSFP+ 1310nm 40km LC Transceiver for SMF
QSFP-BD-40G	40GBASE-SR Bi-Directional QSFP LC Duplex Transceiver for MMF
QSFP-BIDI-40G	40GBASE Bi-Directional QSFP+ 850nm 300m DOM LC Transceiver for MMF
QSFP-PLR4-40G-I	40GBASE-PLR4 QSFP+ PSM4 1310nm 10km Industrial MTP/MPO Transceiver for SMF

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