

40G QSFP+ 850nm 150m Industrial DOM Transceiver

QSFP-SR4-40G-I



Application

- IEEE 802.3ba 40G Ethernet
- Infiniband Transmission at 4ch SDR, DDR and QDR

Features

- 4 Channels Full-Duplex Transceiver Modules
- Transmission Data Rate Up to 10.3125Gbps per Channel
- Compliant with QSFP+ Electrical MSA SFF-8436
- 4 Channels 850nm VCSEL Array
- 4 Channels PIN Photo Detector Array
- Low Power Consumption <1.5W
- Hot Pluggable QSFP form Factor
- Maximum Link Length of 100m on OM3 Multimode
- Fiber (MMF) and 150m on OM4 MMF
- MPO12 Connector Receptacle
- Built-in Digital Diagnostic Functions
- Operating Case Temperature -40 °C to +85 °C
- 3.3V Power Supply Voltage
- RoHS Compliant (lead free)

Description

The 40G SR4 QSFP+ transceiver is a high performance module for short-range multi-lane data communication and interconnection applications with digital diagnostics functions. The transceiver integrates four data lanes in each direction with 4x10.3125Gbps bandwidth. Each lane can operates at 10.3125Gbps up to 100 m using OM3 fiber or 150 m using OM4 fiber. These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm.

Product Specifications

I. Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameter	Symbol	Min.	Max.	Unit
Power Supply Voltage	V _{CC}	-0.3	+3.6	V
Input Voltage	V _{in}	-0.3	V _{CC} +0.3	V
Storage Temperature	T _s	-40	+85	°C
Operating Case Temperature	T _c	-40	+85	°C
Humidity(non-condensing)	RH	5	95	%

II. Recommended Operating Conditions

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	V _{CC}	3.13	3.300	3.46	V
Operating Case Temperature	T _c	-40		85	°C
Data Rate Per Lane	fd		10.3125		Gbps
Humidity(non-condensing)	Rh	5		85	%
Power Dissipation	Pm			1.5	W

III. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Transmitter					
Lane Wavelength Range	λ_c	840	850	860	nm
RMS Spectral Width	$\Delta\lambda$			0.65	nm
Average Launch Power (each lane)	P_{Out}	-7.6	—	2.4	dBm
Optical Modulation Amplitude (each lane)	OMA	-5.6		3	dBm
Transmitter and dispersion penalty (TDP), each lane	TDEC			3.5	dB
Extinction Ratio	ER	3	—	—	dB
Average Launch Power of OFF Transmitter (each lane)	P_{OFF}			-30	dB
Eye Mask Coordinates ¹ :X1, X2, X3, Y1, Y2, Y3	{0.23, 0.34, 0.43, 0.27, 0.35, 0.4}				
Receiver					
Center Wavelength	λ_c	840	850	860	nm
Stressed Receiver Sensitivity in OMA ²				-5.4	dBm
Average Power at Receiver Input (each lane)		-9.5			dBm
Receiver Reflectance	R_R			-12	dB
LOS Assert	LOS_A	-30			dBm
LOS De-Assert – OMA	LOS_D			-14	dBm
LOS Hysteresis	LOS_H	0.5		4	dB

Notes:
1. Hit Ratio = 1×10^{-12}
2. Measured with conformance test signal at TP3 for BER= 10^{-12}

IV. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Differential Input Impedance	Z_{in}	90	100	110	ohm
Differential Output Impedance	Z_{out}	90	100	110	ohm
Differential Input Voltage Amplitude ¹	ΔV_{in}	300		1100	mVp- p
Differential Input Voltage Amplitude ²	ΔV_{out}	500		800	mVp-p
Skew	S_w			300	ps
Bit Error Rate	BER			1E- 12	
Input Logic Level High	V_{IH}	2.0		V_{CC}	V
Input Logic Level Low	V_{IL}	0		0.8	V
Output Logic Level High	V_{OH}	$V_{CC}-0.5$		V_{CC}	V
Output Logic Level Low	V_{OL}	0		0.4	V

Notes:
1. Differential input voltage amplitude is measured between TxnP and TxnN.
2. Differential output voltage amplitude is measured between RxnP and RxnN.

V. Pin Definition

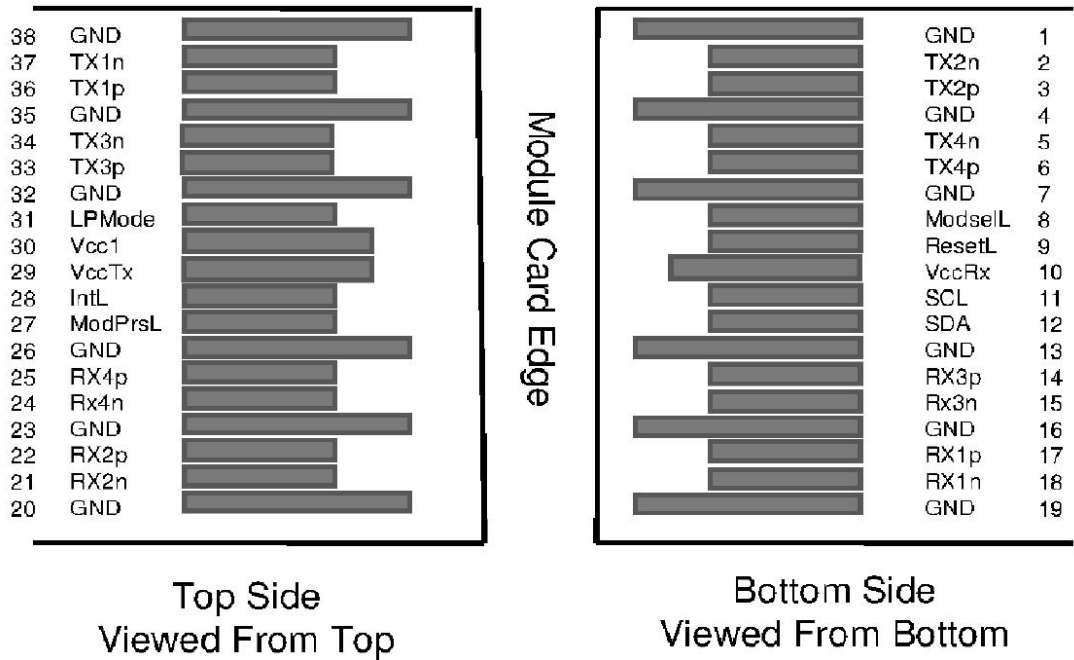


Figure1. Pin Definition of the Module High Speed Inputs/Outputs

VI. Pin Description

Pin	Symbol	Name/Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input

Pin	Symbol	Name/Description
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power Supply Receiver
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
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output
22	Rx2p	Receiver Non-Inverted Data Output

Pin	Symbol	Name/Description
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output
25	Rx4p	Receiver Non-Inverted Data Output
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt
29	Vcc Tx	+3.3 V Power Supply Transmitter
30	Vcc1	+3.3 V Power Supply
31	LPMode	Low Power Mode
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input
34	Tx3n	Transmitter Inverted Data Input
35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input
37	Tx1n	Transmitter Inverted Data Input
38	GND	Ground

VII. Mechanical Dimensions

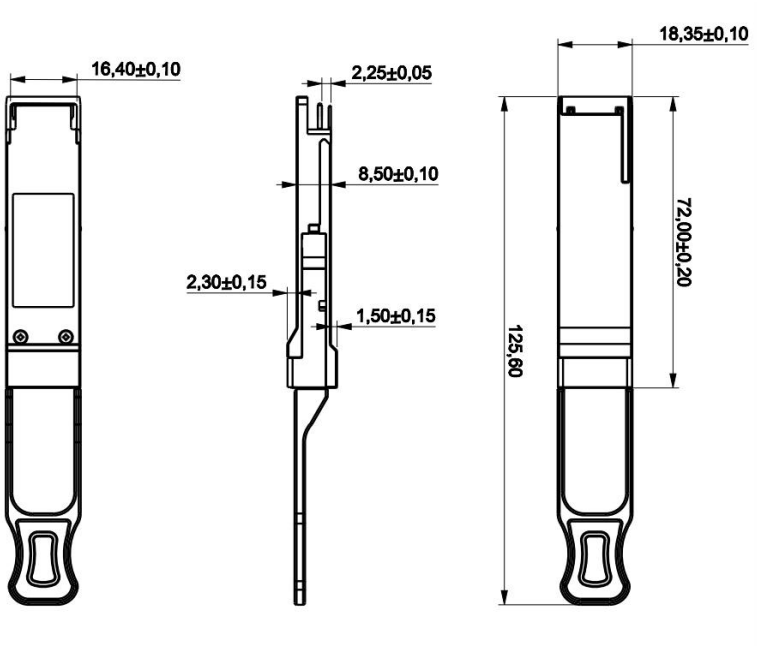


Figure 2. Mechanical dimensions

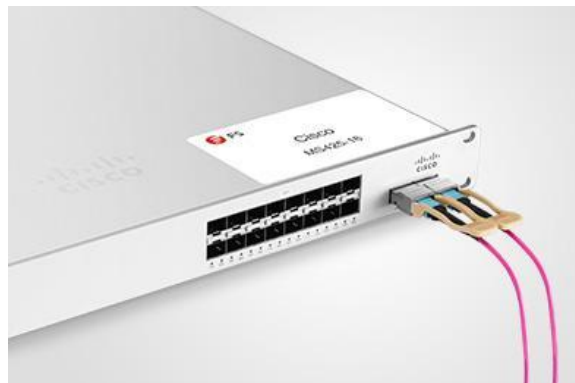
Test Center

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

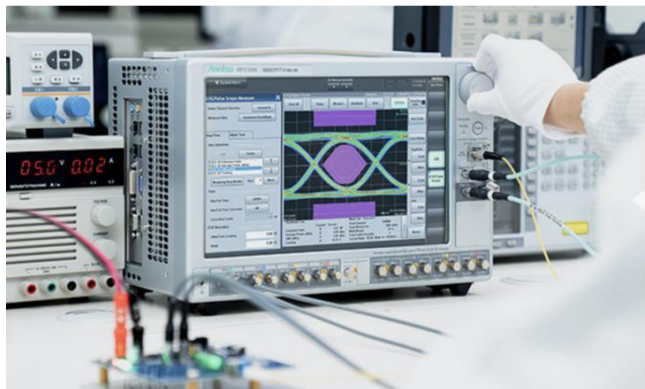


HUAWEI S6720-30L-HI-24S

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

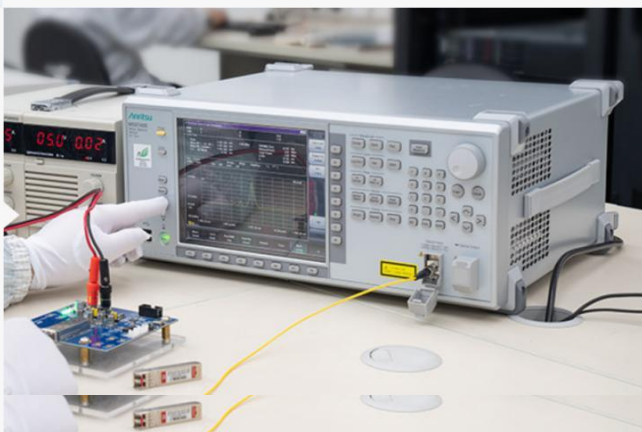
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- 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-SR4-40G	40GBASE-SR4 QSFP+ 850nm 150m MTP/MPO-12 Transceiver for MMF
QSFP-SR4-40G-I	40GBASE-SR4 QSFP+ 850nm 150m MTP/MPO-12 Industrial Transceiver for MMF
QSFP-BIDI-40G	40GBASE-SR SWDM4 BiDi QSFP+ 850nm 300m Duplex LC Transceiver for MMF
QSFP-CSR4-40G	40GBASE-CSR4 QSFP+ 850nm 400m MTP/MPO-12 Transceiver for MMF
QSFP-LR4-40G	40GBASE-LR4L QSFP+ 1310nm 2km Duplex LC Transceiver for SMF
QSFP-LX4-40G	40GBASE-UNIV QSFP+ 1310nm 2km Duplex LC Transceiver for SMF&MMF
QSFP-PLR4L-40G	40GBASE-PLR4L QSFP+ 1310nm 2km MTP/MPO-12 Transceiver for SMF
QSFP-LR4-40G	40GBASE-LR4 QSFP+ 1310nm 10km Duplex LC Transceiver for SMF
QSFP-LR4-40G-I	40GBASE-LR4 QSFP+ 1310nm 10km Duplex LC Industrial Transceiver for SMF
QSFP-PLR4-40G	4x 10GBASE-LR QSFP+ 1310nm 10km MTP/MPO-12 Transceiver for SMF
QSFP-ELR4-40G	40GBASE-ELR4 QSFP+ 1310nm 20km Duplex LC Transceiver for SMF
QSFP-ER4-40G	40GBASE-ER4 QSFP+ 1310nm 40km Duplex LC Transceiver for SMF
QSFP-ZR4-40G	40GBASE-ZR4 QSFP+ 1310nm 80km Duplex LC Transceiver for SMF