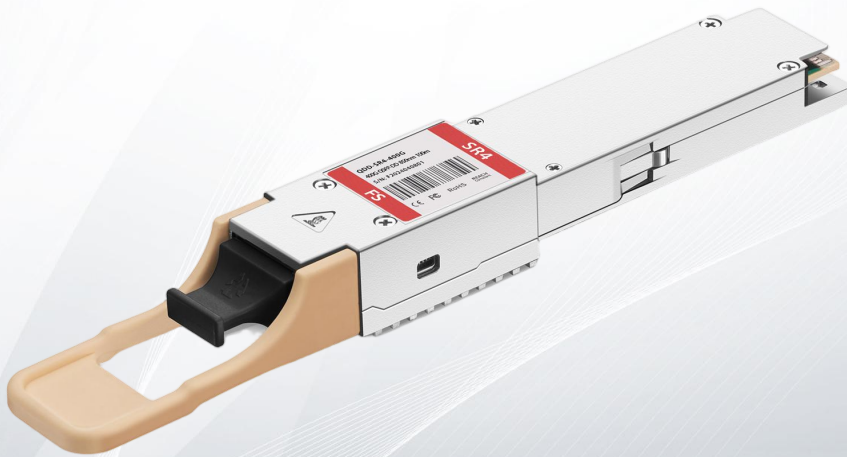


400GBASE-SR4 QSFP-DD 850nm MPO-12 50m DOM Transceiver

QDD-SR4-400G



Application

- 400GBASE-SR4

Features

- Hot-pluggable QSFP-DD Form Factor
- Maximum Link Length of 50m OM4 Fiber with FEC
- +3.3V Single Power Supply
- Power Dissipation ≤ 8 W
- Operating Case Temp Commercial: 0°C to +70 °C
- Single MPO-12 APC Connector
- RoHS Compliant
- High-speed Electrical Compliant to IEEE802.3df-2024
- 8x 50G PAM4 Retimed 400GAUI-8 Electrical Interface

Description

The 400GBASE-SR8 module, MTP/MPO-12 connector, up to 50m over parallel OM4 multi-mode fiber. It is compliant to IEEE 802.3df-2024 protocol and 400GAUI-8 standard.

The 400 Gigabit Ethernet signal is carried over four parallel lanes by one wavelength per lane.And it can Support 2 x 200G-SR and 4 x 100G-SR.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V_{CC3}	-0.5		3.6	V	
Storage Temperature	T_s	-40		85	°C	
Operating Humidity	RH	0		85	%	1
Control Input Voltage	V_I	-0.3		$V_{CC}+0.5$	V	1

Note:

- 1. No condensation

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T_C	0		70	°C	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Power Dissipation	P_d			8	W	
Supply Current	I_{CC}			2550	mA	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Pre-FEC Bit Error Ratio				2.4x10 ⁻⁴		
Post-FEC Bit Error Ratio				1x10 ⁻¹²		1
Link Distance (OM4)		2		50	m	2
Link Distance (OM3)		2		30	m	2

Notes:

- 1. FEC provided by host system.
- 2. FEC required on host system to support maximum distance.

III. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Differential pk-pk Input Voltage Tolerance		900		900	mV	
Differential Termination Mismatch				10	%	
Single-ended Voltage Tolerance Range		-0.4		3.3	V	
DC Common Mode Voltage		-350		2850	mV	
Receiver						
AC Common-mode Output Voltage (RMS)				17.5	mV	
Differential Output Voltage				900	mV	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Near-end Eye height, differential		70			mV	
Far-end Eye height, differential		30			mV	
Far end pre-cursor ISI ratio		-4.5		2.5	%	
Differential Termination Mismatch		10			%	
Transition Time (min, 20% to 80%)		9.5			ps	
DC common mode Voltage		mV		2850	mV	

IV. Optical Characteristics

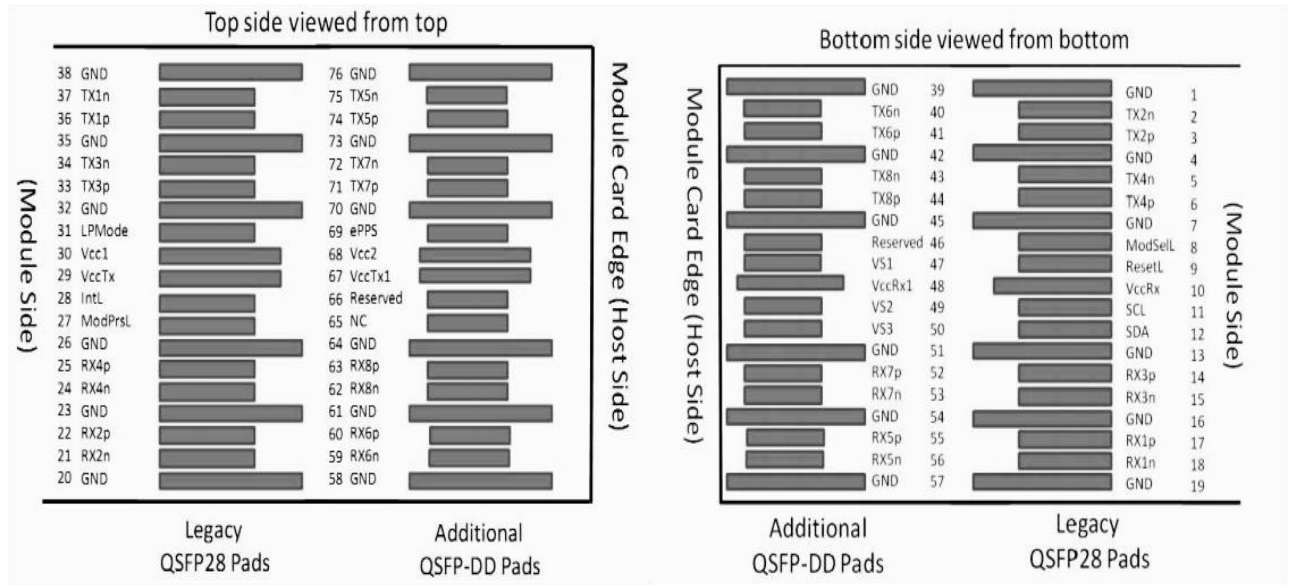
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Rate Per Lane	SR	53.125 ± 100 ppm			Gbd	
Modulation Format	PAM4					
Center Wavelength	CW	842		948	nm	
RMS Spectral Width	SW			0.65	dBm	1
Average Launch Power Per Lane	AOP	-4.6		4.0	dBm	
Outer Optical Modulation Amplitude (OMA _{outer}), Each Lane (min) For max(TECQ,TDECQ)≤1.8dB For 1.8<max(TECQ,TDECQ)≤4.4dB	TxOMA	-2.6 4.4+max(T ECQ,TDEC Q)		3.5	dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), Each Lane	TDECQ			4.4	dB	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Overshoot/Undershoot				29	%	
Transmitter Power Excursion, Each Lane				2.3	dBm	
Transition Time	T _t			17	ps	
Average Launch Power of OFF Transmitter, Each Lane	T _{OFF}			-30	dBm	
Extinction Ratio, Each Lane	ER	2.5			dB	
Encircled Flux		≥86% at 19μm ≤30% at 4.5μm			dBm	2
Receiver						
Signaling Rate Per Lane	SR	53.125 ± 100 ppm			Gbd	
Modulation Format	PAM4					
Wavelength	W	842		948	nm	
Damage Threshold, Average Optical Power, Each Lane	DT	5			dBm	3
Average Receive Power, Each Lane	RXP _x	-6.4		4	dBm	4
Receive Power (OMA) Per Lane	RxOMA			3.5	dBm	
LOS Assert	LOS _A	-15			dBm	
LOS De-assert	LOS _D			-9.2	dBm	
LOS Hysteresis	LOS _H	0.5			dB	
OMA _{outer} of Each Aggressor Lane			3.5		dBm	

Notes:

- 1.RMS spectral width is the standard deviation of the spectrum.
- 2.If measured into type A1a.2 or type A1a.3, or A1a.4, 50 μm fiber, in accordance with IEC 61280-1-4.
- 3.The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power
- 4.Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance

V. Pin Descriptions



VI. Pin Definitions

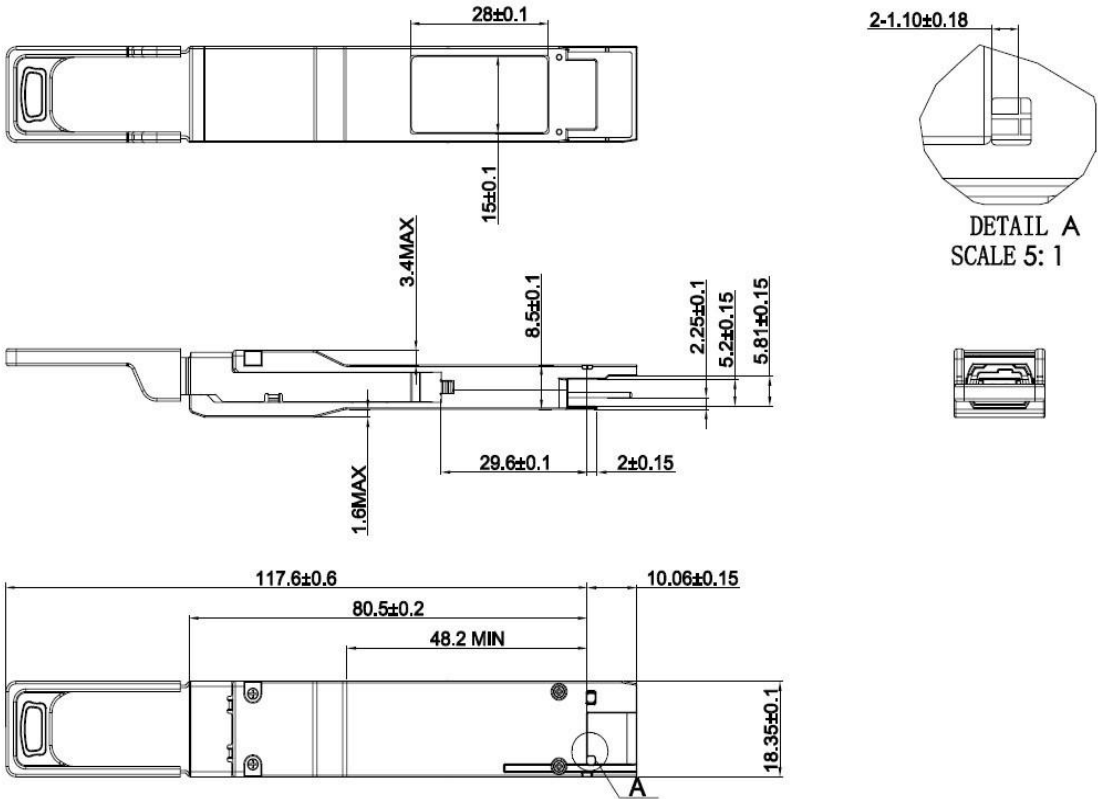
Pin	Logic	Symbol	Definition	Pin	Logic	Symbol	Definition
1		GND	Ground	39		GND	Ground
2	CML-I	Tx2n	Transmitter Inverted Data Input	40	CML-I	Tx6n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-inverted Data Input	41	CML-I	Tx6p	Transmitter Non-inverted Data Input
4		GND	Ground	42		GND	Ground

Pin	Logic	Symbol	Definition	Pin	Logic	Symbol	Definition
5	CML-I	Tx4n	Transmitter Inverted Data Input	43	CML-I	Tx8n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-inverted Data Input	44	CML-I	Tx8p	Transmitter Non-inverted Data Input
7		GND	Ground	45		GND	Ground
8	LVTTL-I	ModSelL	Module Select	46		Reserved	
9	LVTTL-I	ResetL	Module Select	47		VS1	Module Vendor Specific 1
10		V _{cc} Rx	+3.3V Power Supply Receiver	48		V _{cc} Rx1	3.3V Power Supply
11	LVC MOS-I/O	SCL	2-wire serial interface clock	49		VS2	Module Vendor Specific 2
12	LVC MOS-I/O	SDA	2-wire serial interface data	50		VS3	Module Vendor Specific 3
13		GND	Ground	51		GND	Ground
14	CML-O	Rx3p	Receiver Non-inverted Data Output	52	CML-O	Rx7p	Receiver Non-inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output	53	CML-O	Rx7n	Receiver Inverted Data Output
16		GND	Ground	54		GND	Ground
17	CML-O	Rx1p	Receiver Non-inverted Data Output	55	CML-O	Rx5p	Receiver Non-inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output	56	CML-O	Rx5n	Receiver Inverted Data Output
19		GND	Ground	57		GND	Ground
20		GND	Ground	58		GND	Ground

Pin	Logic	Symbol	Definition	Pin	Logic	Symbol	Definition
21	CML-O	Rx2n	Receiver Inverted Data Output	59	CML-O	Rx6n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-inverted Data Output	60	CML-O	Rx6p	Receiver Non-inverted Data Output
23		GND	Ground	61		GND	Ground
24	CML-O	Rx4n	Receiver Inverted Data Output	62	CML-O	Rx8n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-inverted Data Output	63	CML-O	Rx8p	Receiver Non-inverted Data Output
26		GND	Ground	64		GND	Ground
27	LVTTTL-O	ModPrsL	Module Present	65		NC	Not connected
28	LVTTTL-O	IntL	Interrupt	66		Reserved	
29		VccTx	+3.3V Power Supply Transmitter	67		VccTx1	3.3V Power Supply
30		Vcc1	+3.3V Power Supply	68		Vcc2	3.3V Power Supply
31	LVTTTL-I	InitMode	Initialization mode	69		Reserved	
32		GND	Ground	70		GND	Ground
33	CML-I	Tx3p	Transmitter Non-inverted Data Input	71	CML-I	Tx7p	Transmitter Non-inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Input	72	CML-I	Tx7n	Transmitter Inverted Data Input
35		GND	Ground	73		GND	Ground
36	CML-I	Tx1p	Transmitter Non-inverted Data Input	74	CML-I	Tx5p	Transmitter Non-inverted Data Input

Pin	Logic	Symbol	Definition	Pin	Logic	Symbol	Definition
37	CML-I	Tx1n	Transmitter Inverted Data Input	75	CML-I	Tx5n	Transmitter Inverted Data Input
38		GND	Ground	76		GND	Ground

VII. Mechanical Dimensions



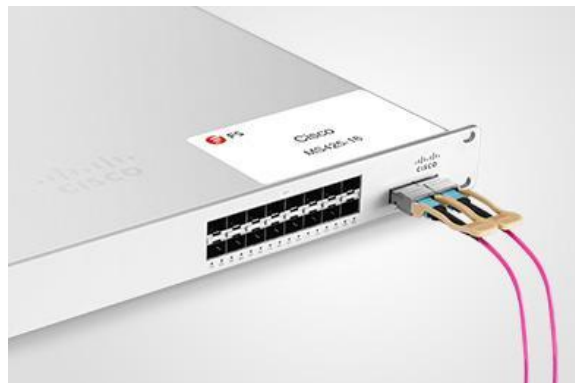
Test Center

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

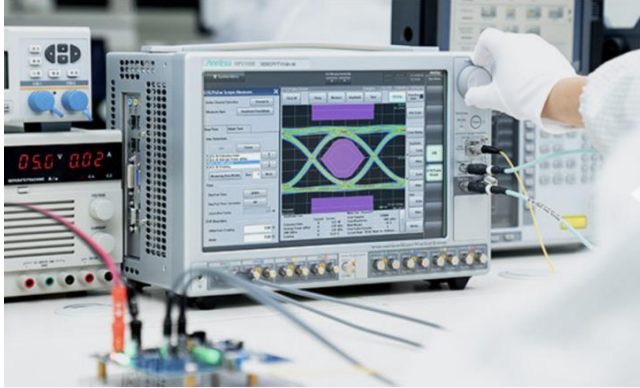


HUAWEI S6720-30L-HI-24S

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.

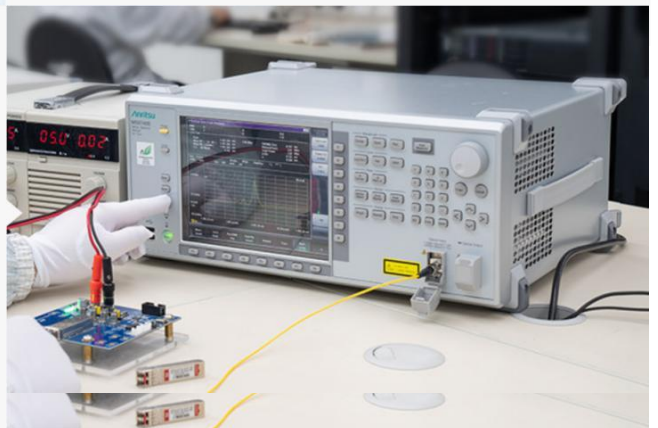
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



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
QDD-SR8-400G	400GBASE-SR8 QSFP-DD Transceiver, MPO-16, 100m over MMF
QDD-SR4.2-400G	400GBASE-SR4.2 QSFP-DD Transceiver, MPO-12, 100m over MMF
QDD-DR4-400G-Si	400GBASE-DR4 QSFP-DD Transceiver, MPO-12, 500m over SMF
QDD-DR4-400G	400GBASE-DR4 QSFP-DD Transceiver, MPO-12, 500m over SMF
QDD-4X100G-FR-Si	400GBASE-FR QSFP-DD Transceiver, MPO-12, 2km over SMF
QDD-XDR4-400G	400GBASE-XDR4 QSFP-DD Transceiver, MPO-12, 2km over SMF
QDD-FR4-400G	400GBASE-FR4 QSFP-DD Transceiver, Duplex LC, 2km over SMF
QDD-LR4L-400G	400GBASE-LR4L QSFP-DD Transceiver, Duplex LC, 6km over SMF
QDD-LR8-400G	400GBASE-LR8 QSFP-DD Transceiver, Duplex LC, 10km over SMF
QDD-LR4-400G	400GBASE-LR4 QSFP-DD Transceiver, Duplex LC, 10km over SMF
QDD-PLR4-400G	4 x 100GBASE-LR QSFP-DD Transceiver, MPO-12, 10km over SMF
QDD-ER8-400G	400GBASE-ER8 QSFP-DD Transceiver, Duplex LC, 40km over SMF