

# 40GBASE-PLR4L QSFP+ 1310nm 2km MTP/MPO Transceiver for SMF

QSFP-PIR4-40G



## Application

- 40GBASE-PLR4L 40G Ethernet

## Features

- Hot-pluggable QSFP+ form factor
- Maximum link length of 2km on single mode fiber (SMF)
- Built-in digital diagnostic functions, including Tx/Rx power monitoring
- Four-channel full-duplex transceiver modules
- Commercial case temperature range 0° C to 70° C
- RoHS-6 compliant
- Power dissipation < 2.5W
- Single 3.3V power supply
- Single MPO connector receptacle

Description

QSFP+ transceiver modules are designed for use in high density 40 Gigabit Ethernet links over single mode fiber. Digital diagnostics functions are available via an I2C interface, including Tx and Rx power monitoring. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

Product Specifications

I. General Product Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Operating Case Temperature	TOP	0	-	70	°C	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Consumption			1.7	2.5	W	
Data Speed Tolerance	ΔDR	-100		100	ppm	
Data Rate per Lane	DR		10.3		Gb/s	
Link Distance with G.652	D	0		2	km	

II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Power Supply Voltage	Vcc	-0.3		3.6	V	
Storage Temperature	T <sub>s</sub>	-40		85	° C	
Case Operating Temperature	Top	0		70	° C	
Relative Humidity	RH	0		85	%	
Input Voltage	Vin	-0.3		Vcc+0.3	V	

III. Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Differential Input Impedance	Zin	90	100	110	ohm	
Differential Output Impedance	Zout	90	100	110	ohm	
Differential Input Voltage Amplitude	ΔVin	300		1100	mVp-p	
Differential Output Voltage Amplitude	ΔVout	500		800	mVp-p	
Bit Error Rate	BR			E-12		
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	

IV. Optical Characteristics

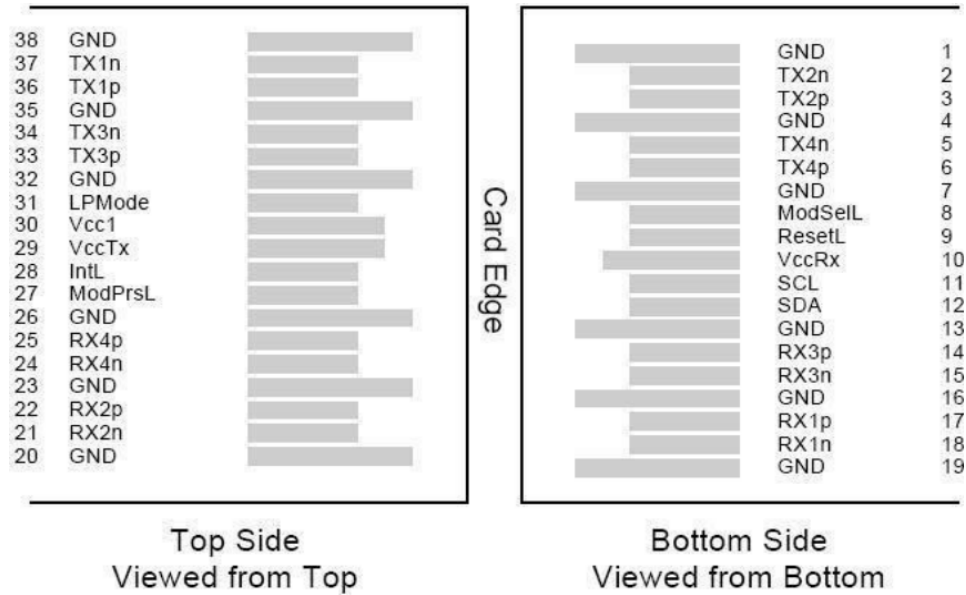
Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Transmitter						
RMS Spectral Width	$\lambda_{rms}$			3.5	nm	1
Center Wavelength	$\lambda_c$	1270	1310	1350	nm	1
Average Launch Power, each lane	PAVG	-5.5	-0.5	2.3	dBm	
Optical Modulation Amplitude (OMA)	POMA	-4.5	-0.5	3.5	dBm	1
Difference in Launch Power between any two lanes	Ptx,diff			5.0	dB	
Launch Power in OMA Minus Transmitterand TDP, each Lane	OMA-TDP	-9.7			dB	1
Rise/Fall Time	Tr/Tf			50	ps	
Extinction Ratio	ER	3.5			dB	
Optical Return Loss Tolerance	TOL			12	dB	
Average Launch Power of OFF Transmitter, per lane	Poff			-30	dBm	
Relative Intensity Noise	Rin			-128	dB/Hz	
Transmitter Eye Mask Definition {X1, X2,X3, Y1, Y2, Y3}			{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			
Transmitte Reflectance	RT			12	dB	
Transmitter Eye Mask Definition	EMM	10			%	2

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Receiver						
Overload, each lane	OVL	2.3			dBm	
Center Wavelength	$\lambda_c$	1270	1310	1350	nm	
Damage Threshold	THd	3			dBm	
Difference in Receive Power between any two Lanes (OMA)	Prx,diff			5.0	dB	
Receiver Sensitivity (OMA) per Lane	SEN			-11.5	dBm	
Signal Loss Assert Threshold	LOSA	-30			dBm	
Signal Loss Deassert Threshold	LOSD			-15	dBm	
Receive Electrical 3 dB Upper Cutoff Frequency, each Lane	Fc			12	GHz	
Optical Return Loss	ORL			-12	dBm	
LOS Hysteresis	LOSH	0.5		6	dB	

Notes:

- 1. Transmitter wavelength, RMS spectral width and power need to meet the OMA minus TDP specs to guarantee link performance.
- 2. The eye diagram is tested with 1000 waveform.

V. Pin Description



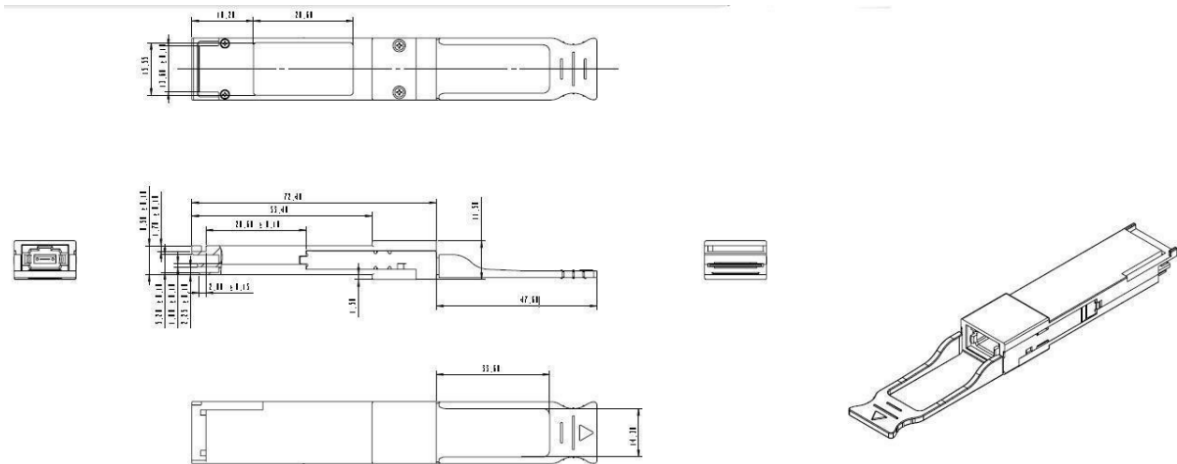
Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Output	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Output	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3 V Power supply receiver	2
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	

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	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3 V Power supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Output	
38	GND	Ground	1

Notes:

- 1. Module circuit ground is isolated from module chassis ground within the module. GND is the symbol for signal and supply (power) common for QSFP modules.
- 2. The connector pins are each rated for a maximum current of 500mA.

VI. Mechanical Specifications





Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.



Cisco ASR 9000 Series(A9K-MPA-1X40GE)



ARISTA 7050S-64(DCS-7050S-64)



Juniper MX960



Cisco ASR 9000 Series(A9K-MPA-1X40GE)



ARISTA 7050S-64(DCS-7050S-64)



Juniper MX960



Brocade ICX 7750-26Q



Extreme Networks X670V VIM-40G4X



Mellanox M3601Q



Dell N4032F



HP 5406R ZL2 V3(J9996A)



AVAYA 7024XLS(7002QQ-MDA)



Dell N4032F



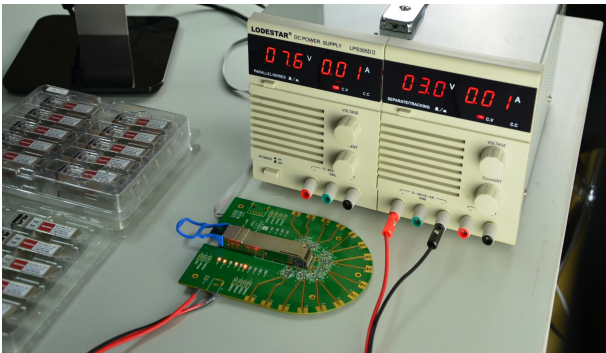
HP 5406R ZL2 V3(J9996A)



AVAYA 7024XLS(7002QQ-MDA)

## Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.



Our smart data system allows effective product management and quality control according to the unique serial number, properly tracking the order, shipment and every part.

Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.



With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

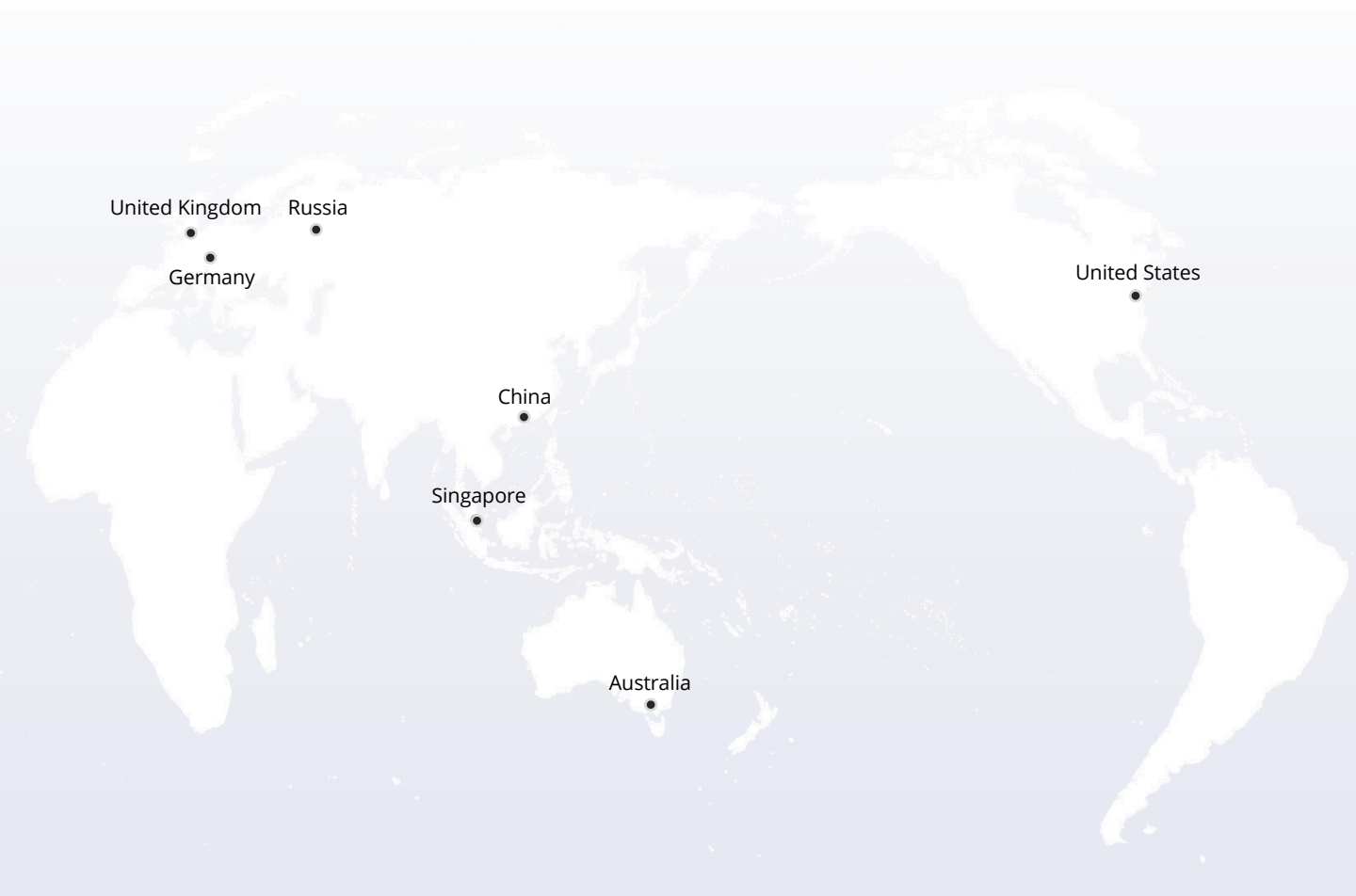
The last test assured step to ensure our products to be shipped with perfect package.

Order 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 2km 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-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

Notes:

40G QSFP+ transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.



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