

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 | V _{CC} | 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 | V _{cc} | -0.3 | | 3.6 | V | |
| Storage Temperature | T _s | -40 | | 85 | ° C | |
| Case Operating Temperature | T _{op} | 0 | | 70 | ° C | |
| Relative Humidity | RH | 0 | | 85 | % | |
| Input Voltage | V _{in} | -0.3 | | V _{cc} +0.3 | V | |

III. Electrical Characteristics

| Parameter | Symbol | Min | Typ. | Max | Unit | Ref. |
|--|-------------------|----------------------|------|-----------------|-------|------|
| Differential Input Impedance | Z _{in} | 90 | 100 | 110 | ohm | |
| Differential Output Impedance | Z _{out} | 90 | 100 | 110 | ohm | |
| Differential Input Voltage Amplitude | ΔV _{in} | 300 | | 1100 | mVp-p | |
| Differential Output Voltage Amplitude | ΔV _{out} | 500 | | 800 | mVp-p | |
| Bit Error Rate | BR | | | E-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 | |

IV. Optical Characteristics

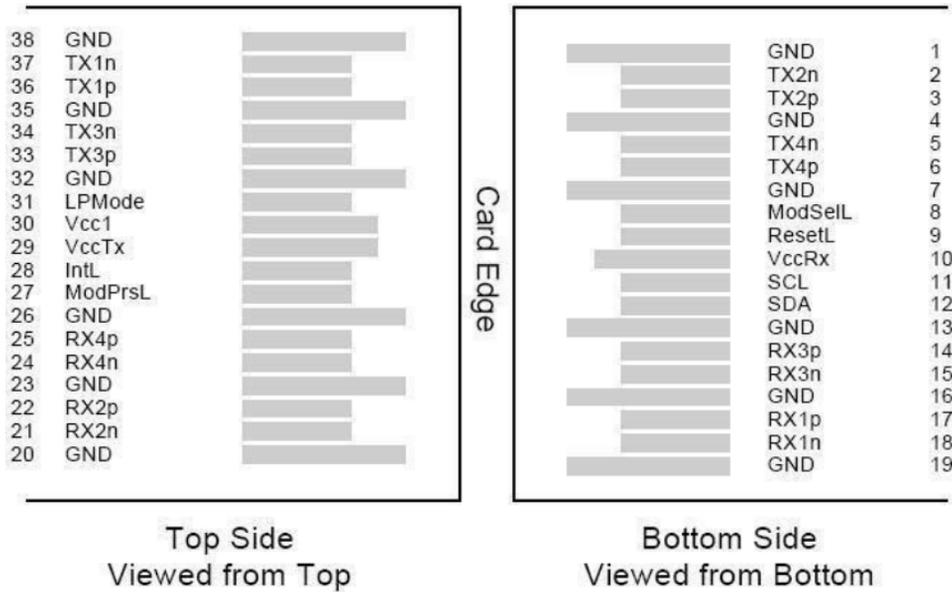
| Parameter | Symbol | Min | Typ. | Max | Unit | Ref. |
|---|-----------------|------|------|------------------------------------|-------|------|
| Transmitter | | | | | | |
| RMS Spectral Width | λ_{rms} | | | 3.5 | nm | 1 |
| Center Wavelength | λ_c | 1270 | 1310 | 1350 | nm | 1 |
| Average Launch 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 Transmitter and 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} | | |
| Transmitter 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 | λ_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



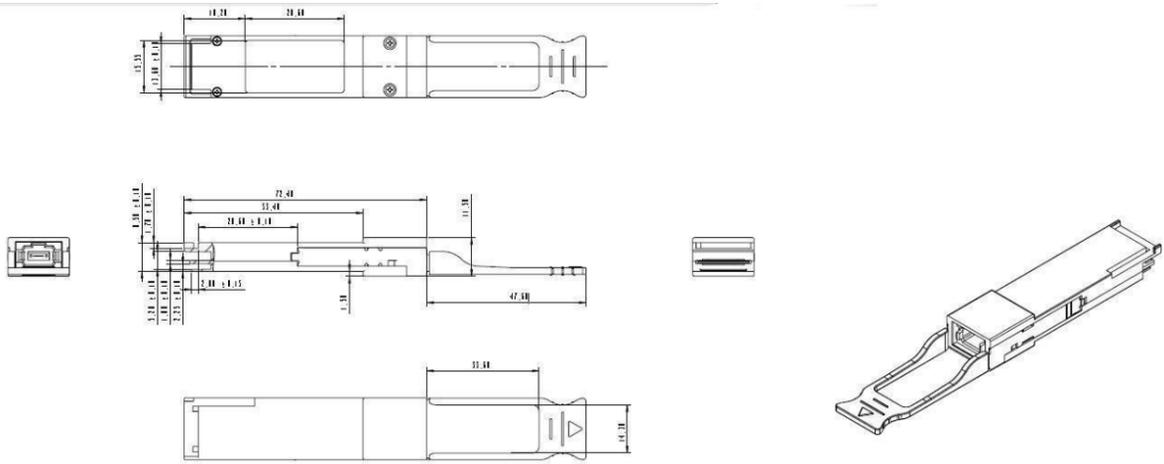
| Pin | Symbol | Name/Description | Notes |
|-----|---------|--------------------------------------|-------|
| 1 | GND | Ground | 1 |
| 2 | Tx2n | Transmitter Inverted Data Input | |
| 3 | Tx2p | Transmitter Non-Inverted Data Output | |
| 4 | GND | Ground | 1 |
| 5 | Tx4n | Transmitter Inverted Data 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)

Brocade ICX 7750-26Q



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

Extreme networks X670V VIM-40G4X



Juniper MX960

Mellanox M3601Q



Brocade ICX 7750-26Q

Dell N4032F



Extreme Networks X670V VIM-40G4X

HP 5406R ZL2 V3(J9996A)



Mellanox M3601Q

AVAYA 7024XLS(7002QQ-MDA)

Dell N4032F

HP 5406R ZL2 V3(J9996A)

AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

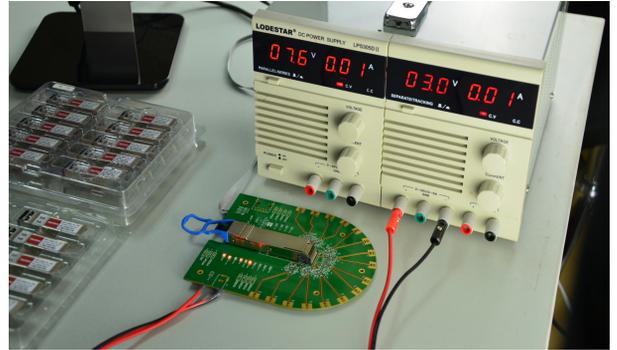
FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to 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.



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.



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.



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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