# TSQS-8540G-04MC Optical Transceiver

**QSFP+ 40G SR4 400m Transceiver, With Diagnostic Monitoring**

## Features

- 4 channels full-duplex transceiver modules
- Transmission data rate up to 10.5Gbps per channel
- 4 channels 850nm VCSEL array
- 4 channels PIN photo detector array
- Hot-pluggable QSFP form factor
- Maximum link length of 300m on OM3 Multimode Fiber(MMF) and 400m on OM4 MMF
- Single 1X12 MPO connector receptacle
- Hot-pluggable electrical interface
- 0–70°C operating temp
- Low power consumption < 1.5W
- RoHS6 compliant (lead free)

## Applications

- 40G Ethernet and OTU3
- Datacom/Telecom switch & router connections
- Data Aggregation and Backplane Applications
- Proprietary Protocol and Density Applications
- Infiniband transmission at 4ch SDR, DDR and QDR

## Description

The QSFP+ 40G-SR4-400m module is a highly integrated 4x10G transceiver focused on reach, bandwidth, density and cost for highport-count 40G systems, and client-side 40G interfaces. Each lane can operate at 10.3125Gbps up to 300m using OM3 fiber or 400m using OM4 fiber. These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 38-contact edge type connector. The optical interface uses a 12-fiber MTP/MPO connector.



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## Optical Transmitter Performance

| Parameter | Symbol | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Signaling Speed per Lane | - | - | 10.5 | - | Gb/s |
| Center Wavelength | λC | 840 | 850 | 860 | nm |
| RMS spectral width | Δλ | - | - | 0.4 | nm |
| Average Launch Power per Lane | TXPx | -7.5 | - | 0.5 | dBm |
| Transmit OMA per Lane | TxOMA | -2.5 | - | 3 | dBm |
| Difference in launch power between any two lanes (OMA) | DPx | - | - | 4 | dB |
| Peak Power per Lane | PPx | - | - | 4 | dBm |
| Launch Power [OMA] minus TDP per Lane | P-TDP | -6.5 | - | - | dBm |
| Extinction Ratio | ER | 3 | - | - | dB |
| Optical Return Loss Tolerance | ORL | - | - | 12 | dB |
| Encircled Flux | FLX | > 86% at 19 um<br>< 30% at 4.5 um | | | dBm |
| Average launch power of OFF transmitter, each lane | - | - | - | -30 | dBm |
| Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} | 0.23, 0.34, 0.43, 0.27, 0.35, 0.4 | | | | |

## Optical Receiver Performance

| Parameter | Symbol | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Signaling Speed per Lane | - | - | 10.5 | - | Gb/s |
| Center Wavelength | λC | 840 | 850 | 860 | nm |
| Damage Threshold | DT | 3.4 | - | - | dBm |
| Average receive power, each lane | RXPx | -9.9 | - | 2.4 | dbm |
| Unstressed Sensitivity (OMA) at 10 x 10-12BER | RxOMA | - | - | 3 | dBm |
| Unstressed Receiver Sensitivity (OMA) per Lane | URS | - | - | -11.1 | dBm |
| Stressed Receiver Sensitivity (OMA) per Lane | SRS | - | - | -7.5 | dBm |
| Vertical eye closure penalty, each lane | VECP | - | - | 1.9 | dB |
| Stressed eye J2 jitter, per Lane | - | - | - | 0.3 | UI |
| Stressed eye J9 jitter, per Lane | - | - | - | 0.47 | UI |



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| | | | | | |
|---|---|---|---|---|---|
| OMA of each aggressor lane | - | - | - | -0.4 | dBm |

## Recommended Operating Environment

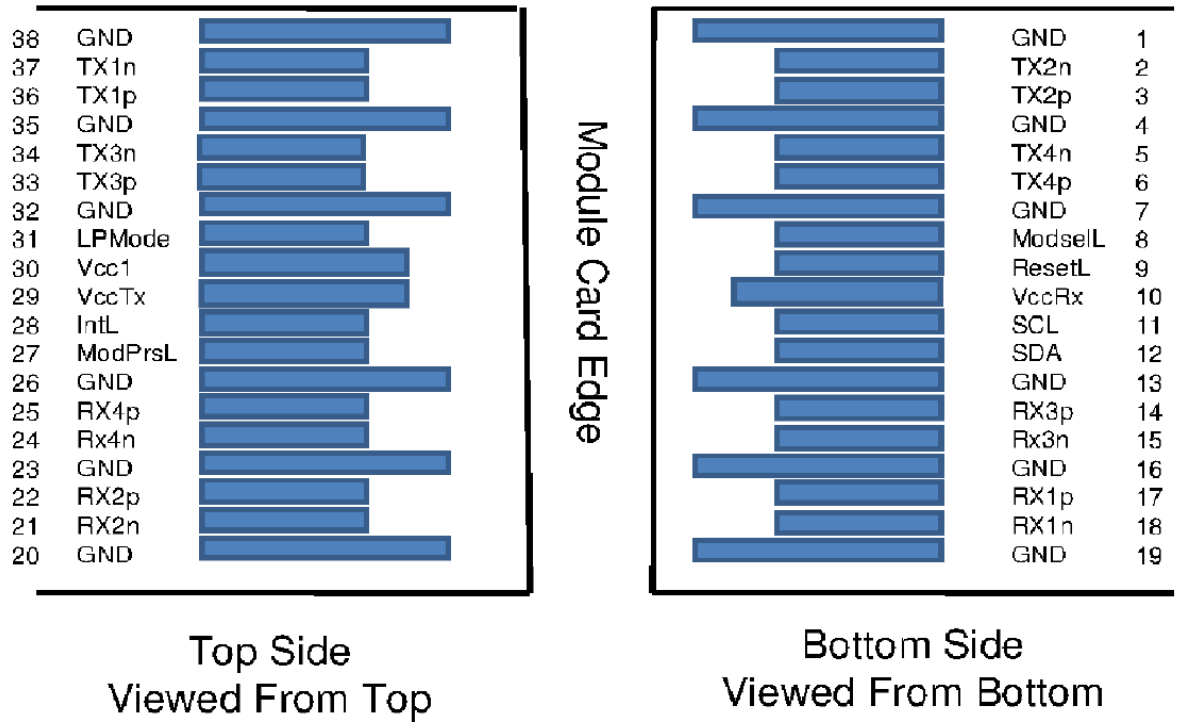
| Parameter | Symbol | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Power Supply Voltage | VCC | 3.135 | 3.300 | 3.465 | V |
| Operating Case Temperature | TC | 0 | 25 | 70 | °C |

## Pin Definition

| 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 |
| 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 |
| 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 |

## Pin Descriptions



## Ordering Information

| Part Number | Product Description |
|---|---|
| TSQS-8540G-04MC | QSFP+ 40G SR4 400m 0°C ~ +70°C |

## Important Notice

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