**LQP40-CSR4**

**QSFP+40Gb/s SR4 (100~400)m DDM**

**PRODUCT FEATURES**

* Multi rate capability: 1.06Gb/s

 to 10.5Gb/s per channel

* Reliable VCSEL array technology
* Maximum link length of 300m on OM3

Multimode Fiber(MMF) and 400m ON OM4 MMF

* Hot-pluggable QSFP+ footprint
* Single 1x12 MPO receptacle
* Maximum power dissipation<1W
* Four-channel full-duplex transceiver module
* RoHS-6 compliant and lead-free
* Support Digital Diagnostic Monitor interface
* Un retimed XLPPI electrical interface
* Case operating temperature Commercial: 0°C to +70°C

**APPLICATIONS**

**Compliance**

* QSFP+ MSA.
* IEEE802.3ba
* SFF-8436
* RoHS
* 40GBASE-SR4 40G Ethernet
* Breakout to10GBASE-SR Ethernet
* Proprietary interconnections

**PRODUCT DESCRIPTION**

LQP40-CSR4 are designed for use in 40 Gigabit per second links over multimode fiber. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-SR4.Module-level digital diagnostic functions are available via an I2C interface, as specified by the QSFP+ MSA. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

**Ordering information**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Package** | **Product part NO.** | **Data Rate(Gbps)** | **Media** | **Wavelength(nm)** | **TransmissionDistance(m)** | **Temperature Range（℃）** |
| QSFP+ | LQP40-CSR4 | 42.0 | multi-mode fiber | 850 | 100~400 | 0~70 | Commercial |

1. **Pin Diagram**



1. **Pin Descriptions**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pin**  | **Symbol**  | **Name/Description**  | **Ref.** |
| 1  | GND | Ground | 1 |
| 2  | Tx2n | Transmitter Inverted Data Input |  |
| 3  | Tx2p | Transmitter Non-Inverted Data Input |  |
| 4  | GND | Ground | 1 |
| 5  | Tx4n | Transmitter Inverted Data Input |  |
| 6  | Tx4p | Transmitter Non-Inverted Data Input |  |
| 7  | GND | Ground | 1 |
| 8  | ModSe1L | Module Select |  |
| 9  | ResetL | Module Reset |  |
| **Pin**  | **Symbol**  | **Name/Description**  | **Ref.** |
| 10  | Vcc Rx | +3.3V Power supply receiver |  |
| 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 | VccTx | +3.3V Power supply transmitter |  |
| 30 | Vcc1 | +3.3V Power Supply |  |
| 31 | LPMode | Low Power Mode |  |
| 32 | GND | Ground | 1 |
| 33 | Tx3p | Transmitter Non-Inverted Data Input |  |
| 34 | Tx3n | Transmitter Inverted Data Input |  |
| 35 | GND | Ground | 1 |
| 36 | Tx1p | Transmitter Non-Inverted Data Input |  |
| 37 | Tx1n | Transmitter Inverted Data Input |  |
| 38 | GND | Ground | 1 |

Note：

1. Circuit ground is internally isolated from chassis ground.

1. **Absolute Maximum Ratings**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter**  | **Symbol**  | **Min.**  | **Typ.**  | **Max.**  | **Unit**  | **Ref.** |
| Storage Temperature  | TS | -40 |  | 85 | ºC  |  |
| Storage Ambient Relative Humidity  | HA | 0 |  | 85 | %  |  |
| Maximum Supply Voltage  | VCC1,VCCTX,VCCRX | -0.5 |  | 3.6 | V  |  |
| Signal Input Voltage  |  | Vcc-0.3 |  | Vcc+0.3  | V  |  |
| Receiver Damage Threshold  |  | +3.4 |  |  | dBm |  |
| Lead Soldering Temperature/Time  | TSOLD  |  |  | 260/10  | ºC/sec  | 1 |
| Lead Soldering Temperature/Time  | TSOLD  |  |  | 360/10  | ºC/sec  | 2 |

Note:

1.Suitable for wave soldering.

2. Only for soldering by iron.

1. **General Product Characteristics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter**  | **Value** | **Unit**  | **Ref.** |
| Module Form Factor | QSFP+ |  |  |
| Number of Lanes | 4 Tx and 4 Rx |  |  |
| Maximum Aggregate Data Rate | 42.0 | Gb/s |  |
| Maximum Data Rate per Lane | 10.5 | Gb/s | Higher bit rates may be supported. Please contact M-optocom |
| Protocols Supported | Typical applications include 40G Ethernet, Infiniband, Fibre Channel, SATA/SAS3  |  |  |
| Management Interface | Serial,I2c-based,400kHz maximum frequency |  | As defined by the QSFP+ MSA |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Data Rate Spcifications** | **Symbol**  | **Min.**  | **Typ.**  | **Max.**  | **Unit**  | **Ref.** |
| Bit Rate per Lane | BR | 1062 |  | 10500 | Mb/s | 1 |
| Bit Error Ratiio | BER |  |  | 10-12 |  | 2 |
| Link distance on OM3 MMF | d |  |  | 300 | meters | 3 |
| Link distance on OM4 MMF | d |  |  | 400 | meters | 3 |

Notes:

1. Compliant with 40G Ethernet. Compatible with 1/10 Gigabit Ethernet and 1/2/4/8/10G Fibre Channel.

2. Tested with a PRBS 231-1 test pattern.

3. Per 40GBASE-SR4, IEEE 802.3ba.

1. **Optical Characteristics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter**  | **Symbol**  | **Min.**  | **Typ.**  | **Max.**  | **Unit**  | **Ref.** |
| **Transmitter(per Lane)** |
| Average Output Power | POUT | -7.6 |  | 2.4 | dBm |  |
| Transmit OMA per Lane | TxOMA | -5.6 |  | 3.0 | dBm | 1 |
| Extinction Ratio  | ER  | 3.0 |  |  | dB |  |
| Center Wavelength  | λC | 840 | 850 | 860 | nm  |  |
| RMS Spectral Width | σ |  |  | 0.65 | nm |  |
| Transmitter and Dispersion Penalty | TDP |  |  | 3.5 | dB |  |
| Transmitter OFF Output Power  | POff |  |  | -30 | dBm |  |
| Relative Intensity Noise | RIN |  |  | -128 | dB/Hz |  |
| Transmitter eye mask definition {X1,X2,X3,Y1,Y2,Y3} |  | 0.23,0.34,0.43,0.27,0.35,0.4 |  |  |
| **Receiver(per Lane)** |
| Input Optical Wavelength | λIN | 840 | 850 | 860 | nm |  |
| Rx Sensitivity per lane  | RSENS |  |  | -9.5 | dBm |  |
| InputSaturation Power (Overload)  | PSAT | +2.4 |  |  | dBm |  |
| Receiver Reflectance | Rfl |  |  | -12 | dBm |  |
| Loss of Signal Assert  | PA | -30 |  |  | dBm |  |
| Loss of Signal De-assert  | PD |  |  | -12 | dBm |  |
| LOS Hysteresis  | PD - PA |  0.5  |  | 6  | dB  |  |

Note:

1.Even if TDP is <0.9dB, the OMA min must exceed this value.

1. **Memory Map and Control Registers**

Compatiable with SFF-8436Rev.4.8(QSFP+).

1. **Electrical Interface Characteristics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Min.** | **Typ.** | **Max.** | **Unit** | **Ref.** |
| Supply Voltage | VCC1,VCCTX,VCCRX | 3.15 |  | 3.45 | V |  |
| Supply Current | ICC |  |  | 300 | mA |  |
| **Transmitter(per Lane)** |
| Input different impedance | Rin | 90 | 100 | 110 | Ω  | 1 |
| Single ended input voltage tolerance | VinT | -0.3 |  | 4.0 | V |  |
| Single ended data input swing | Vin,pp | 180 |  | 1200 | mV  | 2 |
| **Receiver (per Lane)** |
| Output different impedance | Rout | 90 | 100 | 110 | Ω | 1 |
| Single ended data output swing | Vout,pp | 0 |  | 800 | mV | 3 |
| Single-ended output voltage |  | -0.3 |  | 4.0 | V |  |
| Power Supply Rejection | PSR | 50 |  |  | mVpp |  |

Note :

1.Connected directly to TX data input pins. AC coupled thereafter.

2.After internal AC coupling. Self-biasing 100Ω differential input

3.Into 100Ωdifferential termination.

1. **Mechanical Specifications**(Unit: mm)



**LQP40-CSR4**

1. **Regulatory Compliance**

LQP40-CSR4transeciverare RoHS-6 Compliant.

LQP40-CSR4transceiver modules are Class 1 laser eye safety compliant per IEC 60825-1, which means that they are eye safe under normal “unaided” viewing conditions. Laser radiation may be hazardous if viewed with magnifying optics.

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**Revision History**

|  |  |  |
| --- | --- | --- |
| **Version No.**  | **Date**  | **Description**  |
| 1.0 | June 24, 2019 | Preliminary datasheet  |