

100Gbps QSFP28 Transceiver, Single Mode, 40km Reach

DESCRIPTION

100Gb/s QSFP28 ER4 transceiver. It is compliant with the QSFP28 MSA and IEEE 802.3ba. QSFP28 ER4 transceiver modules are designed for use in 100 Gigabit Ethernet interfaces over single mode fiber.

FEATURES

- Hot-pluggable QSFP28 form factor
- Supports 103.1Gb/s aggregate bit rates
- Maximum link length of 40km on Single Mode Fiber (SMF)
- Power consumption <4.5W
- Built-in digital diagnostic functions
- APD receiver
- 4x25.78Gb/s DFB-based LAN-WDM transmitter
- Duplex LC receptacles
- Single 3.3V power supply
- RoHS compliant
- Operating case temperature: 0~+70°C



APPLICATION

- 100GBASE-ER4 100G Ethernet
- Backbone/metro connection, 100G data, high-speed connection between network devices.

ABSOLUTE MAXIMUM RATINGS (TC=25°C, UNLESS OTHERWISE NOTED)

Module performance is not guaranteed beyond the operating range.

Exceeding the limits below may damage the transceiver module permanently.

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|-----------------------------|--------|------|---------|-----|------|-------|
| Storage Temperature | Ts | -40 | - | +85 | °C | |
| Maximum Supply Voltage | Vcc | -0.3 | - | 3.6 | V | |
| Operating Relative Humidity | RH | 15 | - | +85 | % | |

RECOMMENDED OPERATING CONDITIONS

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|----------------------------|--------|--------------|---------|-----|------|----------|
| Data Rate | DR | 25.78±100ppm | | | Gb/s | 1 |
| Operating Case Temperature | Tcase | 0 | | 70 | °C | |
| Fiber Length on SMF | L | | | 40 | km | With FEC |

Notes:

1. Supports 100GBASE-ER4 per IEEE 802.3ba.

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 | 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 | 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 | |

100G QSFP28 ER4 Receiver (UQ28-ER4)

| | | | |
|----|---------|-------------------------------------|---|
| 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 | 2 |
| 29 | Vcc Tx | +3.3 V Power supply transmitter | |
| 30 | Vcc1 | +3.3 V 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 |

1. Circuit ground is internally isolated from chassis ground.
2. IntL is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board. The INTL pin is deasserted "High" after completion of reset, when byte 2 bit 0 (Data Not Ready) is read with a value of '0' and the flag field is read (see SFF-8636).

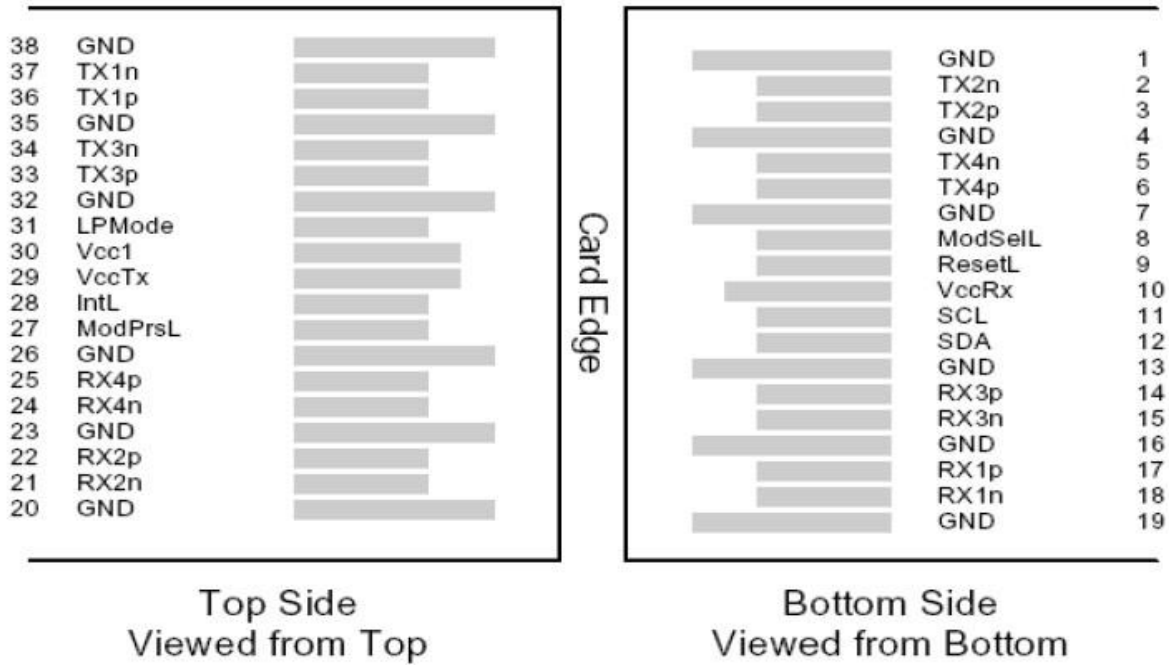


Figure 1 – QSFP28-Compliant 38-Pin Connector (Per SFF-8679)

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Min | Typical | Max | Units | Notes |
|---------------------------------------|--------|--------------|---------|-------|-------|-------|
| Supply Voltage | Vcc | 3.135 | | 3.465 | V | |
| Supply Current | Icc | | | 1.5 | A | |
| Module Total Power | P | | | 4.5 | W | 1 |
| Transmitter | | | | | | |
| Signaling rate per lane | | 25.78±100ppm | | | Gb/s | |
| Differential input impedance | Zin | | 100 | | Ohm | |
| Differential input voltage amplitude | Vin | | | 900 | mVp-p | |
| Receiver | | | | | | |
| Signaling rate per lane | | 25.78±100ppm | | | Gb/s | |
| Differential Output impedance | Zout | | 100 | | Ohm | |
| Differential output voltage amplitude | Vout | 400 | | 900 | mVp-p | |
| Eye width | | 0.57 | | | UI | |
| Vertical eye closure | | | | 5.5 | dB | |
| Transition time, 20% to 80% | Tr/Tf | 12 | | | ps | |

Notes:

- Maximum total power value is specified across the full temperature and voltage range.

OPTICAL SPECIFICATION

| Parameter | Symbol | Min | Typical | Max | Units | Notes |
|--|-----------|--|--|--|-------|-------|
| Transmitter | | | | | | |
| Signaling rate per lane | | 25.78125±100ppm | | | Gb/s | 1 |
| Center wavelength | λ | 1294.53 1299.02 1303.54 1308.09 | 1295.56 1300.05 1304.58 1309.14 | 1296.59 1301.09 1305.63 1310.19 | nm | |
| Sidemode Suppression ratio | SMSR | 30 | | | nm | |
| Transmit OMA per Lane | TXP | 0.5 | | 6.5 | dBm | |
| Transmit Average Power per Lane | Pout | -2.5 | | 6.5 | dBm | |
| Optical Extinction Ratio | ER | 4 | | | dB | |
| Average launch power of OFF transmitter, per lane | | | | -30 | dBm | |
| Optical return loss tolerance | RL | | | 20 | dB | |
| Relative Intensity Noise | RIN | | | -130 | dB/Hz | |
| Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} | | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} | | | | 2 |
| Receiver | | | | | | |
| Signaling rate per lane | | 25.78125±100ppm | | | Gb/s | 1 |
| Center wavelength | λ | 1294.53 1299.02 1303.54 1308.09 | 1295.56 1300.05 1304.58 1309.14 | 1296.59 1301.09 1305.63 1310.19 | nm | |
| Average Receive Power per Lane | RXP | -20 | | -4 | dBm | 3 |
| Overload Input Optical Power | Pmax | -4 | | | dBm | |
| Receive Power (OMA) per Lane | RxOMA | | | -3.5 | dBm | |
| Receive Sensitivity in OMA, each Lane | SEN | | | -18.5 | dBm | 4 |
| Receiver Reflectance | Rfl | | | -26 | dB | |
| LOS De-Assert | LOSD | | | -23 | dBm | |
| LOS Assert | LOSA | -35 | | | dBm | |
| LOS Hysteresis | LOSh | 0.5 | | | dB | |

Notes:

1. Transmitter and Receiver consists of 4 lasers and photodiode operating at 25.78Gb/s each for 100GBASE-ER4,
2. Hit ratio 5E-5.
3. 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.
4. Receiver sensitivity (OMA), each lane (max) at 5E-5 BER is a normative specification.

DIGITAL DIAGNOSTIC FUNCTIONS

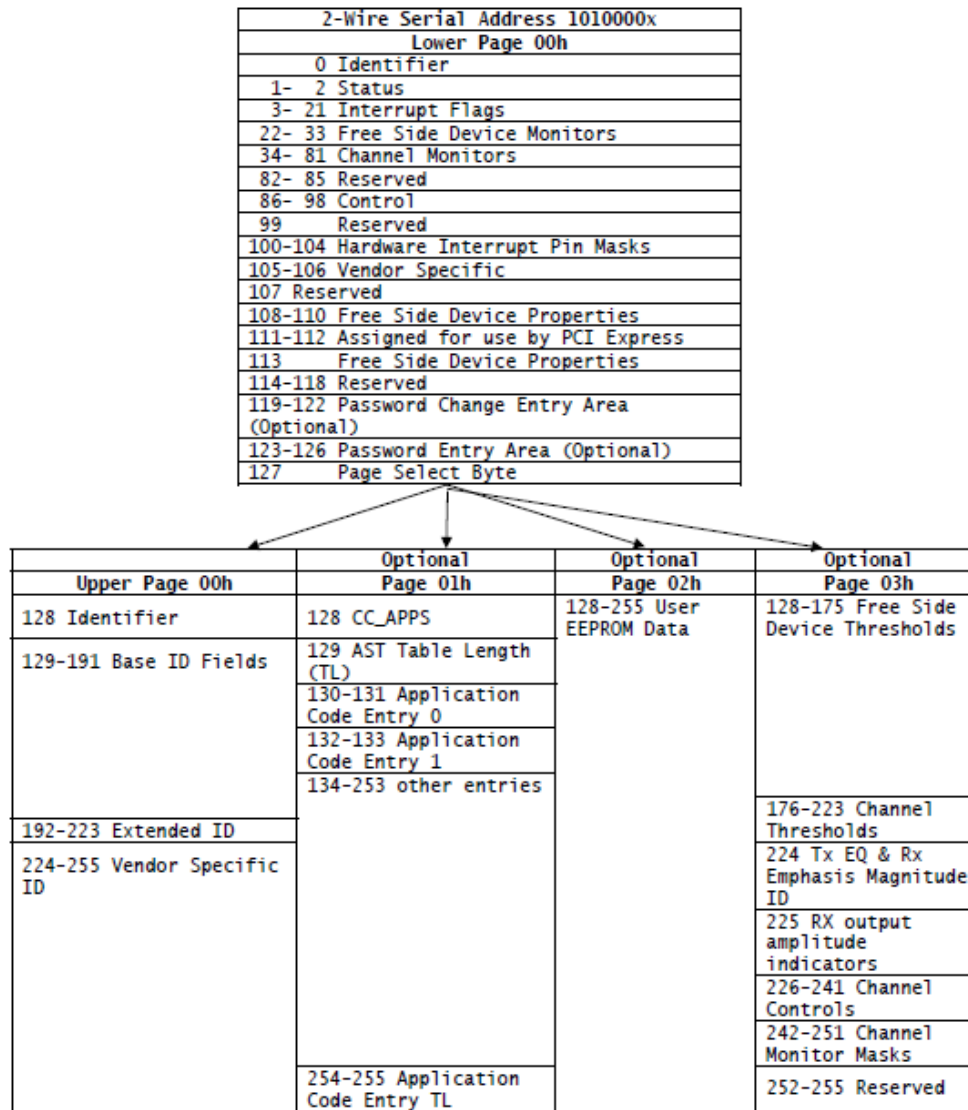
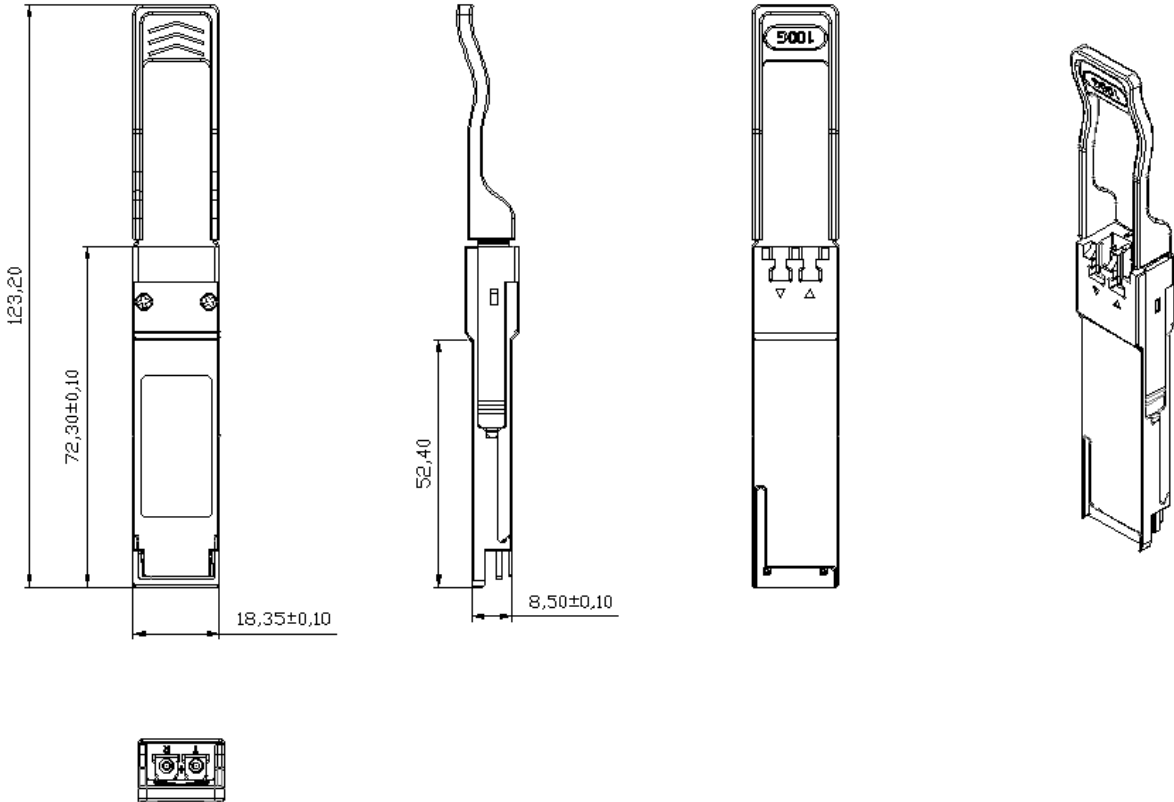


Figure 2 – Two-Wire Interface Fields

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. The 2-wire serial interface shall consist of a master and slave. The fixed side shall be the master and the free side shall be the slave. Control and data are transferred serially. The master shall initiate all data transfers. Data can be transferred from the master to the slave and from the slave to the master. The 2-wire interface shall consist of clock (SCL) and data (SDA) signals. The master utilizes SCL to clock data and control information on the 2-wire bus. The master and slave shall latch the state of SDA on the positive transitioning edge of SCL. The SDA signal is bi-directional. During data transfer, the SDA signal shall transition when SCL is low. A transition on the SDA signal while SCL is high shall indicate a stop or start condition. For more information, please see the QSFP28 MSA documentation.

MECHANICAL SPECIFICATIONS

Unit:mm



Ordering information

| Part Number | Product Description |
|------------------|---|
| QSFP28-100G-40km | 100Gbps QSFP28 ER4, LC, 40km, 0°C~+70°C, with DDM |