

QSFP28 100G Duplex LR4 20km LC Optical Transceiver

TQ13L2T-CN Product Specification

FEATURES

- Hot-pluggable QSFP28 form factor
- Supports 103.125Gb/s aggregate bit rates
- Low power dissipation <3.5W
- Commercial case temperature range of 0°C to 70°C
- Maximum link length of 20km on SMF
- 4 channels LAN-WDM DML arrays and 4 channels PIN arrays
- DDM function implemented
- Duplex LC receptacle
- Single 3.3V power supply
- RoHS compliant (lead free)

APPLICATIONS

- 100GBASE-LR4 100G Ethernet

ORDERING INFORMATION

| Part Number | Form Factor | Data Rate (Gbps) | Media | Distance (km) | Wavelength (nm) | Temperature (°C) |
|-------------|-------------|------------------|-------|---------------|-----------------|------------------|
| TQ13L2T-CN | QSFP28 | 103.125 | SMF | 20 | LWDM4 | 0~70 |

ABSOLUTE MAXIMUM RATINGS

Exceeding the limits below may damage the transceiver permanently.

| Parameter | Symbol | Min | Typ | Max | Unit. | Note |
|-----------------------------|--------|------|-----|-----|-------|------|
| Storage Temperature | TSTG | -40 | - | 85 | °C | |
| Operating Relative Humidity | RH | 5 | - | 95 | % | |
| Supply Voltage | VCC | -0.3 | - | 3.6 | V | |

RECOMMENDED OPERATING CONDITIONS

| Parameter | Symbol | Min | Typ | Max | Unit. | Note |
|----------------------------|--------|------|----------|------|-------|--------------|
| Operating Case Temperature | Tc | 0 | - | 70 | °C | |
| Supply Voltage | VCC3 | 3.13 | 3.3 | 3.47 | V | |
| Supply Current | ICC3 | - | - | 1060 | mA | +3.3V Supply |
| Data Rate | DR | - | 25.78125 | - | Gbps | |

OPTICAL CHARACTERISTICS

| Parameter | Symbol | Min | Typ | Max | Unit. | Note |
|---|---------|---------|-----|---------|-------|------|
| Transmitter | | | | | | |
| Tx Differential Input Amplitude | Vin p-p | 95 | - | 900 | mV | |
| Input Differential Impedance | Zin | 90 | 100 | 110 | Ω | |
| Center Wavelength Range | L0 | 1294.53 | - | 1296.59 | nm | |
| | L1 | 1299.02 | - | 1301.09 | nm | |
| | L2 | 1303.54 | - | 1305.63 | nm | |
| | L3 | 1308.09 | - | 1310.19 | nm | |
| Side-Mode Suppression Ratio | SMSR | 30 | - | - | dB | |
| Average Launch power, each lane | Pavg | -1 | - | 4.5 | dBm | |
| Outer Optical Modulation Amplitude, each lane | Poma | -1.3 | - | 4.5 | dBm | |
| Launch power in OMA minus TDP | | -2.3 | - | - | dBm | |
| Transmitter and Dispersion Penalty (TDP) | TDP | - | - | 2.2 | dB | |
| Extinction ratio, each lane | ER | 4 | - | - | dB | |
| Relative Intensity Noise | RIN | - | - | -130 | dB/Hz | |
| Optical Return Loss Tolerance | Tol | - | - | 20 | dB | |
| Transmitter Reflectance | Rt | - | - | -12 | dBm | |
| Average Launch Power of OFF transmitter each lane | Poff | - | - | -30 | dBm | |

| Parameter | Symbol | Min | Typ | Max | Unit. | Note |
|--|----------|---------|-----|---------|-------|--------|
| Receiver | | | | | | |
| Rx Differential Output Amplitude | Vout p-p | 300 | - | 850 | mV | |
| Receiver Optical Wavelength | L0 | 1294.53 | - | 1296.59 | nm | |
| | L1 | 1299.02 | - | 1301.09 | nm | |
| | L2 | 1303.54 | - | 1305.63 | nm | |
| | L3 | 1308.09 | - | 1310.19 | nm | |
| Damage threshold | Rdam | 5.5 | | | dBm | |
| Average Receive Power, each lane | Pin | -13.5 | - | 4.5 | dBm | |
| Receiver Power, each lane | | - | - | 4.5 | dBm | |
| Stressed Receiver Sensitivity (OMA), each lane | Sens | | | -6.8 | dBm | |
| Receiver Sensitivity(OMA), each lane | Sen | | | -12 | dBm | Note 1 |
| LOS Assert Level | LOSA | -30 | - | - | dBm | |
| LOS De-Assert Level | LOSD | - | - | -14 | dBm | |
| LOS Hysteresis | LOSH | 0.5 | | | dB | |

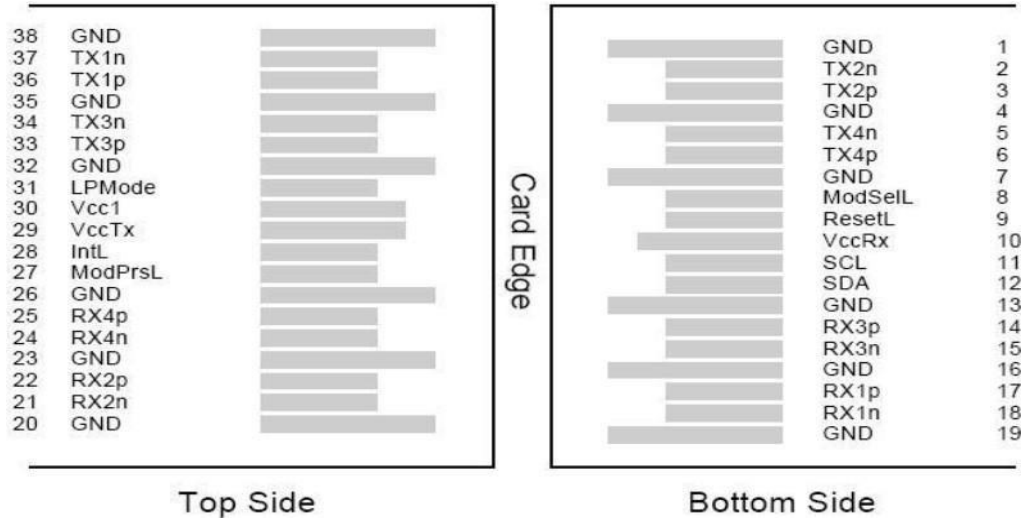
Notes:

1. Measured with a test pattern of PRBS 2³¹-1 at Pre-fec BER 1E-12.

Digital Diagnostic Functions

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|------------------|------------|------|------|------|--------------|
| Temperature | DDMI_Temp | -3 | 3 | °C | 1LSB=1/256°C |
| Supply Voltage | DDMI_Vcc | -3% | 3% | V | 1LSB=0.1mV |
| Bias Current | DDMI_Ibias | -10% | 10% | mA | 1LSB=2uA |
| TX Optical Power | DDMI_TX | -3 | +3 | dB | 1LSB=0.1uW |
| RX Optical Power | DDMI_RX | -3 | +3 | dB | 1LSB=0.1uW |

PIN DIAGRAM



PIN DESCRIPTIONS

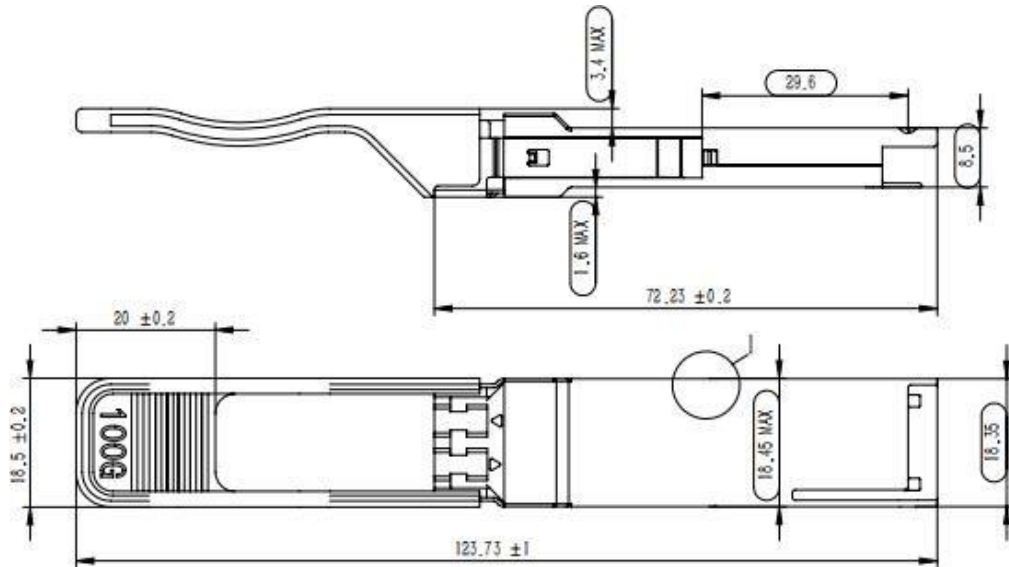
| Pin | Logic | Symbol | Name/Description | Notes |
|-----|-------------|---------|--|-------|
| 1 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data output | |
| 4 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data output | |
| 7 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 8 | LVTTL-I | ModSelL | Module Select | 2 |
| 9 | LVTTL-I | ResetL | Module Reset | 2 |
| 10 | | VccRx | 3.3V Power Supply Receiver | |
| 11 | LVC MOS-I/O | SCL | 2-Wire serial Interface Clock | 2 |
| 12 | LVC MOS-I/O | SDA | 2-Wire serial Interface Data | 2 |
| 13 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | |
| 16 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | |
| 19 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 20 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | |

| | | | | |
|----|----------|---------|--|---|
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | |
| 23 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | |
| 26 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 27 | LVTTTL-O | ModPrsl | Module Present | |
| 28 | LVTTTL-O | IntL | Interrupt | |
| 29 | | VccTx | 3.3V power supply transmitter | |
| 30 | | Vcc1 | 3.3V power supply | |
| 31 | LVTTTL-I | LPMODE | Low Power Mode | 2 |
| 32 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Output | |
| 35 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Output | |
| 38 | | GND | Transmitter Ground (Common with Receiver Ground) | 1 |

Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector should be pulled up with 4.7K to 10K ohms on host board to a voltage between 3.15V and 3.6V.

MECHANICAL SPECIFICATION



LABEL DIAGRAM



TQ13L2T-CN

QSFP28 100G Duplex LR4 20km LC

Class 1 Laser
MADE IN CHINA

S/N: ??????????



X.XX.XX.XXX