



100GBASE-ER4 1310nm SMF 40km QSFP28 Optical Transceiver with Duplex LC Connector

100GERSFPCL



DESCRIPTION

The 100GERSFPCL QSFP28 transceiver modules are designed for use in 100 Gigabit Ethernet links on up to 40 km of single mode fiber. Digital diagnostics functions are available via the I2C interface, as specified by the QSFP28 MSA.

FEATURES

- Hot-pluggable QSFP28 form factor
- Power dissipation < 4.5W
- Single 3.3V power supply
- RoHS-6 Compliant (lead-free)
- Case Temperature Operating Range: 0°C to 70°C
- 4x25 Gb/s transmitter
- 4x25G retimed electrical interface
- Duplex LC receptacle
- I2C management interface
- Up to 30km reach for G.652 SMF without FEC
- Up to 40km reach for G.652 SMF with FEC

APPLICATION

- 100G Ethernet
- Data Center Interconnect
- 100GBASE-ER4

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT |
|---------------------------|-----------------|------|-----|------|
| Storage Temperature | T _s | -20 | 85 | °C |
| 3.3V Power Supply Voltage | V _{cc} | -0.5 | 3.6 | V |
| Relative Humidity | RH | 5 | 85 | % |

Note: Exceeding these values may cause permanent damage. Function operation under these conditions is not implied.

RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTES |
|----------------------|-----------------|------|------|------|------|-------|
| Case Temperature | T _c | 0 | | 70 | °C | |
| Power Supply Voltage | V _{cc} | 3.14 | 3.3 | 3.46 | V | |
| Power Dissipation | | | | 4.5 | W | @3.3V |

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT |
|-----------------------|-----------------|----------------------|----------|----------------------|------|
| Data Rate, per lane | | | 25.78125 | | Gbps |
| LP Mode/Reset/ModselL | V _{IL} | -0.3 | | 0.8 | V |
| LP Mode/Reset/ModselL | V _{IH} | 2 | | V _{cc} +0.3 | V |
| ModPrsL/IntL | V _{OL} | 0 | | 0.4 | V |
| ModPrsL/IntL | V _{OH} | V _{cc} -0.5 | | V _{cc} +0.3 | V |

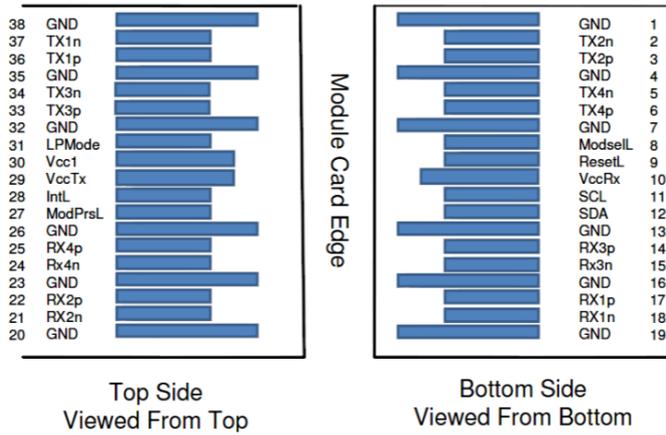
TRANSMITTER OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT |
|-----------------------------------------------------|--------------------|---------|------------------------------------|---------|------|
| Operating Data Rate | DR | | 25.78125 | | Gbps |
| Total Average Launch Power | P _t | | | 10.5 | dBm |
| Average Launch Power, per Lane | | -2.9 | | 4.5 | dBm |
| Extinction Ratio | ER | 6.5 | | | dB |
| Optical Modulation Amplitude, per lane | P _{oma} | -0.5 | | | dBm |
| Transmitter Dispersion Penalty, each lane | TDP | | | 2.5 | dB |
| Lane Center Wavelength | L0 | 1294.53 | 1295.56 | 1296.59 | nm |
| | L1 | 1299.02 | 1300.05 | 1301.09 | |
| | L2 | 1303.54 | 1304.58 | 1305.63 | |
| | L3 | 1308.09 | 1309.14 | 1310.19 | |
| Side Mode Suppression | SMSR | 30 | | | dB |
| Transmitter Reflectance | R _T | | | -12 | dB |
| Disable Output Power | P _{o_off} | | | -30 | dBm |
| Output Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3} | | | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} | | |

RECEIVER OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTES |
|------------------------------------------------|-----------------|-----|------|-------|------|---------------------------|
| Damage Threshold, per lane | P _{th} | -4 | | | dBm | |
| Receiver Sensitivity (OMA), per lane | Sen1 | | | -14.7 | dBm | BER = 1x10 ⁻¹² |
| Stressed Receiver Sensitivity in OMA, per lane | | | | -12.7 | dBm | BER = 1x10 ⁻¹² |
| Receiver Sensitivity (OMA), per lane | Sen2 | | | -18.7 | dBm | BER = 5x10 ⁻¹² |
| Stressed Receiver Sensitivity (OMA), per lane | | | | -16.7 | dBm | BER = 5x10 ⁻¹² |
| Receiver Reflectance | R _R | | | -26.0 | dB | |
| LOS De-Assert | LOSD | | -24 | | dBm | |
| LOS Assert | LOSA | | -26 | | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |

PAD ASSIGNMENT AND DESCRIPTION

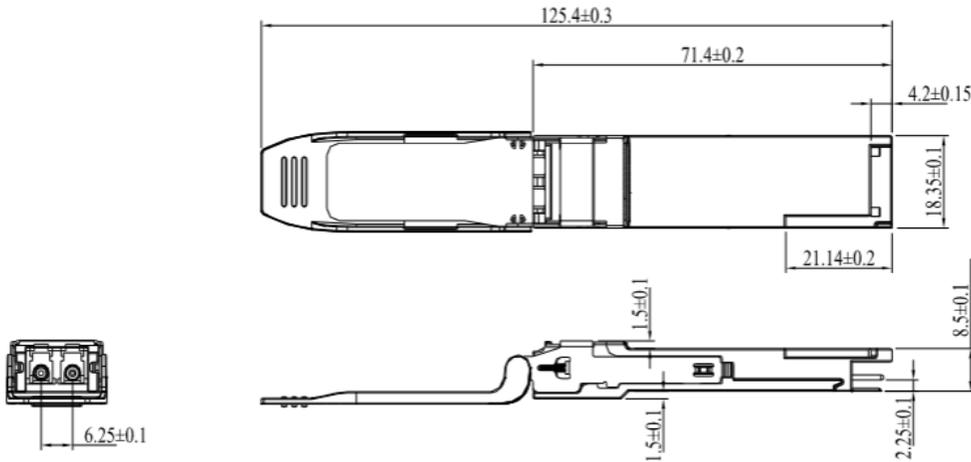


| PIN | LOGIC | SYMBOL | DESCRIPTION | PLUG SEQUENCE | NOTE |
|-----|------------|---------|--------------------------------------|---------------|--------|
| 1 | | GND | Ground | 1 | Note 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | 3 | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input | 3 | |
| 4 | | GND | Ground | 1 | Note 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | 3 | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input | 3 | |
| 7 | | GND | Ground | 1 | Note 1 |
| 8 | LVTTL-I | ModSelL | Module Select | 3 | |
| 9 | LVTTL-I | ResetL | Module Reset | 3 | |
| 10 | | Vcc Rx | +3.3V Power Supply Receiver | 2 | Note 2 |
| 11 | LVCMOS-I/O | SCL | 2-wire serial interface clock | 3 | |
| 12 | LVCMOS-I/O | SDA | 2-wire serial interface data | 3 | |
| 13 | | GND | Ground | 1 | Note 2 |
| 14 | CML-O | Rx3p | Receiver Non- Inverted Data Output | 3 | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | 3 | |
| 16 | | GND | Ground | 1 | Note 1 |
| 17 | CML-O | Rx1p | Receiver Non- Inverted Data Output | 3 | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | 3 | |
| 19 | | GND | Ground | 1 | Note 1 |
| 20 | | GND | Ground | 1 | Note 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | 3 | |
| 22 | CML-O | Rx2P | Receiver Non- Inverted Data Output | 3 | |
| 23 | | GND | Ground | 1 | Note 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | 3 | |
| 25 | CML-O | Rx4p | Receiver Non- Inverted Data Output | 3 | |
| 26 | | GND | Ground | 1 | Note 1 |
| 27 | LVTTL-O | ModPrsL | Module Present | 3 | |
| 28 | LVTTL-O | IntL | Interrupt | 3 | |
| 29 | LVCMOS-I/O | Vcc Tx | +3.3V Power Supply transmitter | 2 | Note 2 |
| 30 | | Vcc1 | +3.3V Power Supply | 2 | Note 2 |
| 31 | LVTTL-I | LPMode | Low Power Mode | 3 | |
| 32 | | GND | Ground | 1 | Note 1 |
| 33 | CML-I | Tx3p | Transmitter Non- Inverted Data Input | 3 | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input | 3 | |
| 35 | | GND | Ground | 1 | Note 1 |
| 36 | CML-I | Tx1p | Transmitter Non- Inverted Data Input | 3 | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input | 3 | |
| 38 | | GND | Ground | 1 | Note 1 |

Note 1: GND is the symbol for signal and supply (power) common for the QSFP module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

Note 2: Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table. Recommended host board power supply filtering is shown in Host board power supply circuit. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP+ module in any combination. The connector pins are each rated for a maximum current of 500 mA.

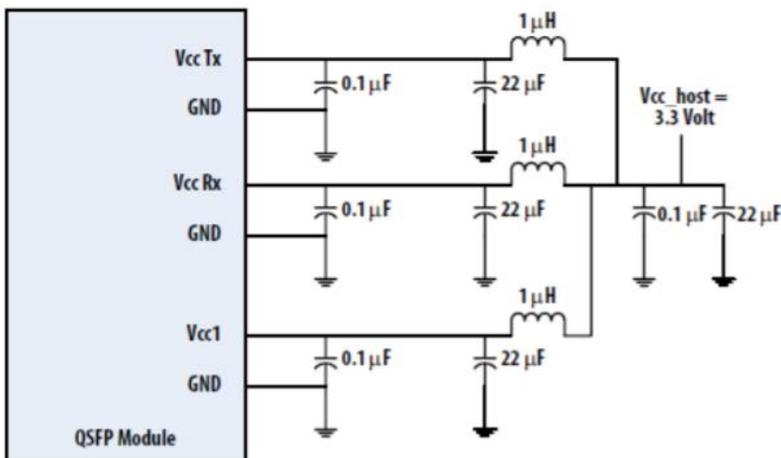
DIMENSIONS



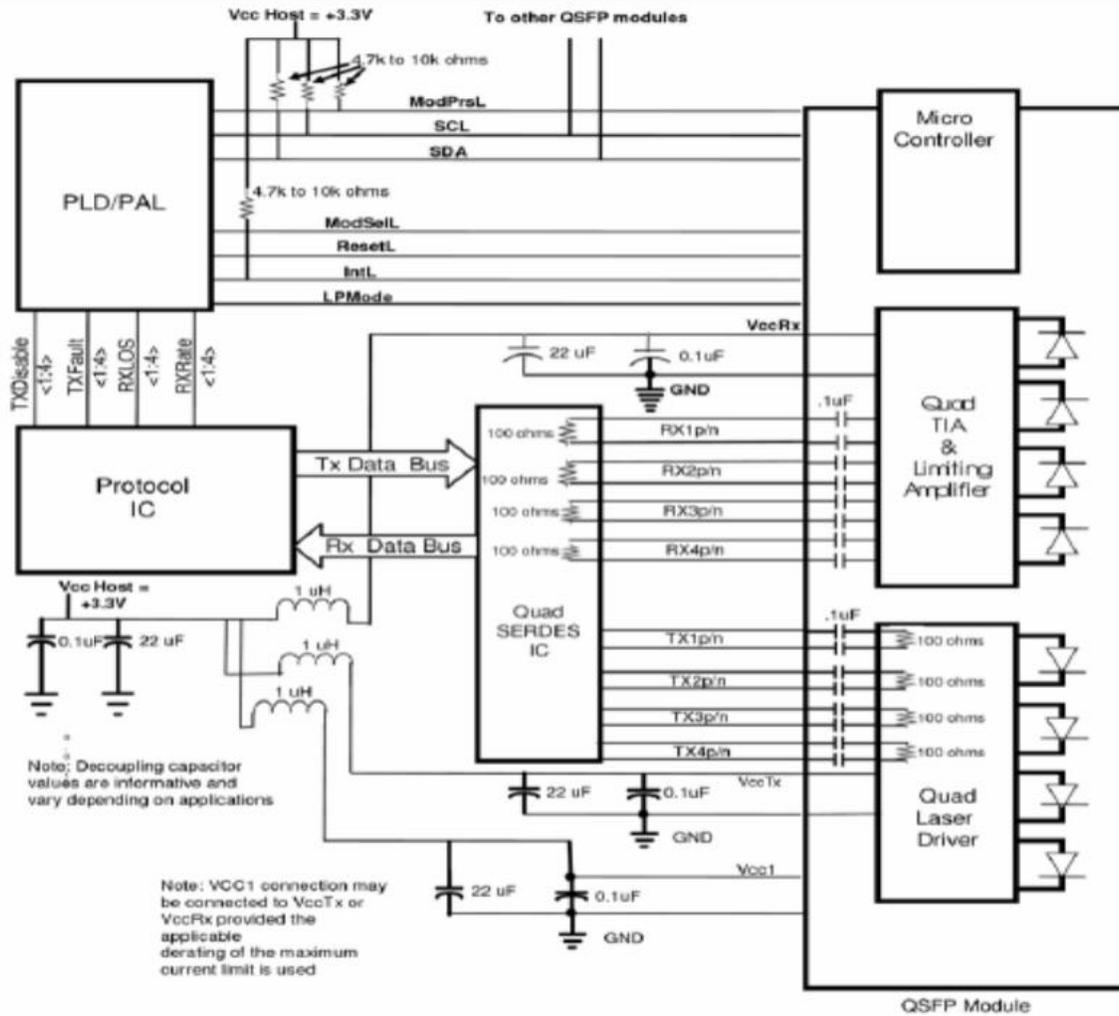
Unit: mm

All Dimensions are ±0.20mm Unless Otherwise Specified

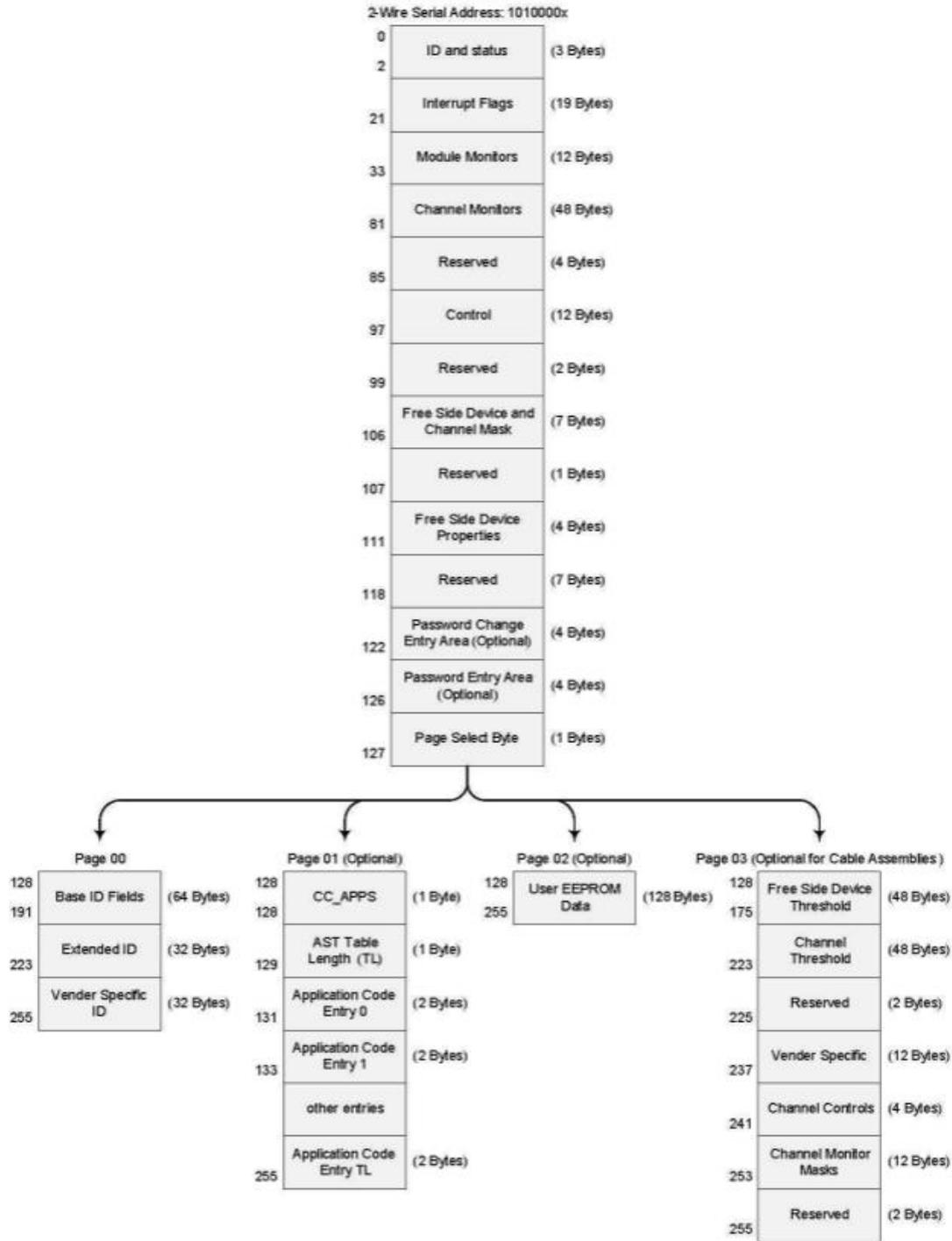
HOST BOARD POWER SUPPLY CIRCUIT



RECOMMENDED INTERFACE CIRCUIT



MEMORY MAP



ADDITIONAL NOTES

- Avoid eye or skin exposure to laser radiations.
- The device is sensitive to electro-static discharge (ESD). The device should be handled with ESD proof tools. To assemble the device on PCB, proper grounding is required to prevent ESD.
- Specifications are subject to change without notice.



Lasermate Group, Inc.
19608 Camino De Rosa
Walnut, CA 91789 USA
Tel: (909)718-0999
Fax: (909)718-0998
sales@lasermate.com
www.lasermate.com