**SFP28-25G-LRI**

**SFP2825Gb/s 1310nm 10km DDM Transceiver**

**PRODUCT FEATURES**

* Up to 25.7813Gbps Data Links
* 1310nm DFB laser transmitter and PIN/TIA receiver
* Maximum link length of 10km on Single Mode Fiber
* Hot-pluggable SFP28 footprint
* Duplex LC receptacles
* Low power dissipation
* RoHS compliant and lead-free
* Support Digital Diagnostic Monitor interface
* Single +3.3V power supply
* -40°C to +85°C case operating temperature

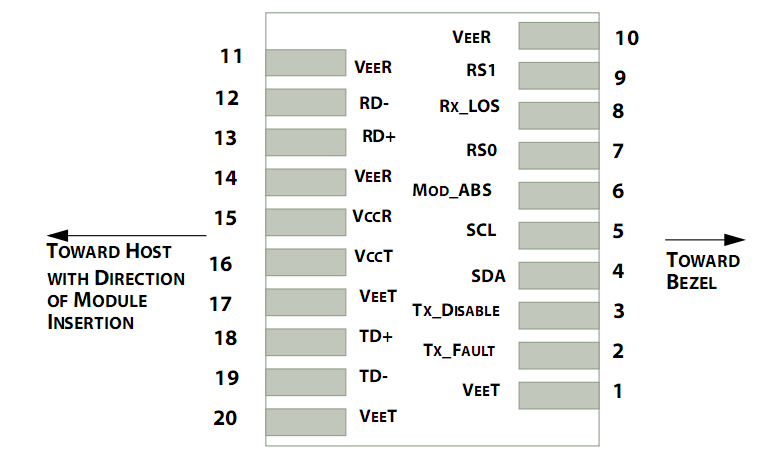
**APPLICATIONS**

**Compliance**

* SFF-8472
* SFF-8402
* SFF-8432
* SFF-8431
* CEI-28G-VSR
* 25GBASE-LR Ethernet
* CPRI

**Ordering information**

|  |  |  |  |
| --- | --- | --- | --- |
| **Package** | **Product part NO.** | **Distance** | **Temperature Range** |
| SFP28 | SFP28-25G-LRI | 10km | -40~85℃ |

1. **Pin Diagram**

Pinout of Connector Block on Host Board

1. **Pin Descriptions**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pin** | **Symbol** | **Name/Description** | **Ref.** |
| 1 | VEET | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | TFAULT | Transmitter Fault. | 2 |
| 3 | TDIS | Transmitter Disable.Laser output disabled on high or open. | 3 |
| 4 | SDA | 2-wire Serial Interface Data Line | 4 |
| 5 | SCL | 2-wire Serial Interface Clock Line | 4 |
| 6 | MOD\_ABS | Module Absent. Grounded within the module | 4 |
| 7 | RS0 | No connection required |  |
| 8 | LOS | Loss of Signal indication.Logic“0” indicates normal operation. | 5 |
| 9 | RS1 | No connection required |  |
| 10 | VEER | Receiver Ground (Common with Transmitter Ground) | 1 |
| 11 | VEER | Receiver Ground (Common with Transmitter Ground) | 1 |
| 12 | RD- | Receiver Inverted DATA out.AC Coupled |  |
| 13 | RD+ | Receiver Non-inverted DATA out.AC Coupled |  |
| 14 | VEER | Receiver Ground(Common with Transmitter Ground) | 1 |
| 15 | VCCR | Receiver Power Supply |  |
| 16 | VCCT | Transmitter Power Supply |  |
| 17 | VEET | Transmitter Ground(Common with Receiver Ground) | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC Coupled. |  |
| 19 | TD- | Transmitter Inverted DATA in. AC Coupled. |  |
| 20 | VEET | Transmitter Ground(Common with Receiver Ground) | 1 |

Notes:

1. Circuit ground is internally isolated from chassis ground.

2. TFAULT is an open collector/drain output, which is pulled up with a 4.7kΩ – 10kΩ resistor on the host board, but is grounded inside the SFP+ cable plug.

3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

4. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD\_ABS pull line low to indicate module is plugged in.

5. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

1. **Absolute Maximum Ratings**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Min** | **Typ** | **Max** | **Unit** | **Ref.** |
| Maximum Supply Voltage | Vcc | -0.5 |  | 3.6 | V |  |
| Storage Temperature | TS | -40 |  | 85 | ℃ | 1 |
| Case Operating Temperature | TOP | -40 |  | 85 | ℃ |  |
| Relative Humidity | RH | 0 |  | 85 | % | 2 |

Notes:

1.Limited by the fiber cable jacket, not the activeends.

2.Non-condensing.

1. **Optical Characteristics(TOP = -40°C to 85°C, VCC = 3.3 ± 5% Volts)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Min.** | **Typ.** | **Max.** | **Unit** | **Remark** |
| **Transmitter** | | | | | | |
| Center Wavelength | λc | 1295 | 1310 | 1325 | nm |  |
| Side Mode Suppression Ratio | SMSR | 30 |  |  | dB |  |
| Spectral Width | Pm |  |  | 1 | nm |  |
| Average Output Power | Pavg | -7 |  | 2 | dBm |  |
| Optical Modulation Amplitude (OMA) | Poma | -4 |  | 2.2 | dBm |  |
| Extinction Ratio | ER | 3.5 |  |  | dB |  |
| Transmitter Dispersion Penalty | TDP |  |  | 2.7 | dB |  |
| Relative Intensity Noise | Rin |  |  | -130 | dB/Hz |  |
| Optical Return Loss Tolerance | TOL |  |  | 20 | dB |  |
| Transmitter OFF Output Power | POff |  |  | -30 | dBm |  |
| Transmitter eye mask definition {X1,X2,X3,Y1,Y2,Y3}, 25Gbase\_LR |  | { 0.31, 0.4, 0.45, 0.34, 0.38, 0.4 } | | |  |  |
| **Receiver** | | | | | | |
| Center Wavelength | λc | 1295 | 1310 | 1325 | nm |  |
| Receiver Stress Sensitivity, OMA |  |  |  | -9.5 | dBm |  |
| Receiver Sensitivity, Average Power |  |  |  | -13.3 | dBm |  |
| Receiver Sensitivity, OMA |  |  |  | -12 | dBm |  |
| Receiver Reflectance | Rfl |  |  | -26 | dBm |  |
| Loss of Signal Assert | PA | -30 |  |  | dBm |  |
| Loss of Signal De-assert | PD |  |  | -16 | dBm |  |
| LOS Hysteresis | PD- PA | 0.5 |  |  | dB |  |

1. **Electrical Characteristics (TOP = -40°C to 85°C, VCC = 3.3 ± 5% Volts)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Min** | **Typ** | **Max** | **Unit** | **Ref.** |
| SupplyVoltage | Vcc | 3.135 | 3.3 | 3.465 | V |  |
| SupplyCurrent | Icc |  |  | 300 | mA |  |
| **Transmitter** | | | | | | |
| Input differential impedance | Rin |  | 100 |  |  | 1 |
| Differential data input swing | Vin,pp | 180 |  | 900 | mV |  |
| Transmit Disable Voltage | VD | 2 |  | VCC | V |  |
| Transmit Enable Voltage | VEN | Vee |  | Vee+0.8 | V |  |
| **Receiver** | | | | | | |
| Differential data output swing | Vout,pp | 400 |  | 800 | mV | 2 |
| LOS Fault | VLOS\_fault | 2 |  | VccHOST | V | 3 |
| LOS Normal | VLOS\_norm | Vee |  | Vee+0.8 | V | 3 |
| Power Supply Noise Tolerance | VCCT/VCCR | Per SFF-8431 Rev 4.1 | | | mVpp | 4 |

Notes:

1.Connected directly to TX data input pins.AC coupling from pins into laser driver IC.

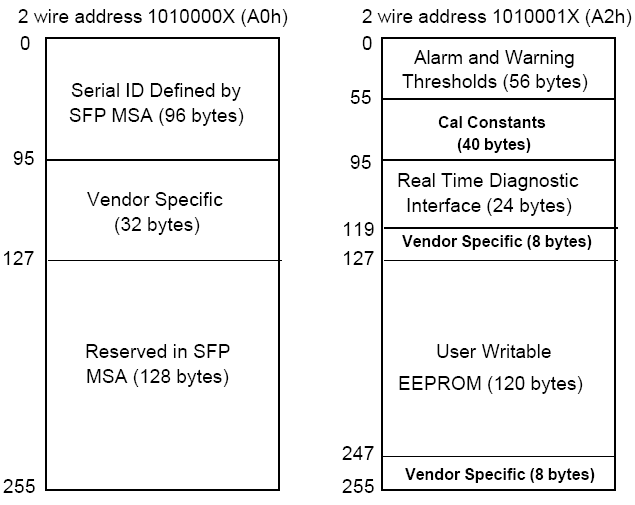
2.Into 100Ω differential termination.

3.20-80%.Measured with Module Compliance Test Board and OMA test pattern. Use of four 1’s and four 0’s in sequence in the PRBS^9 is an acceptable alternative. SFF-8431 Rev 4.1

4. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.

5. Testing methodology per SFF-8431. Rev 4.1.

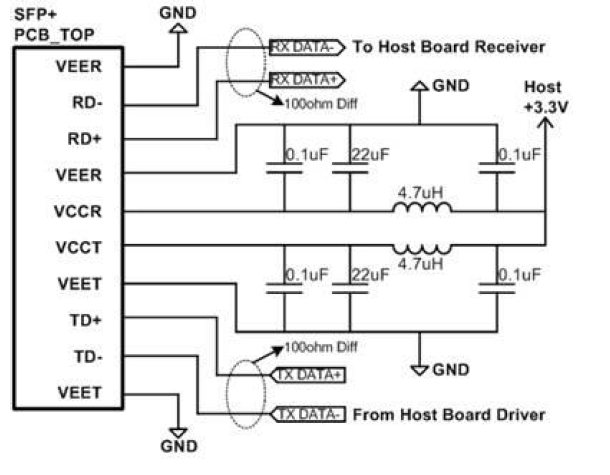
1. **Digital Diagnostic Memory Map**

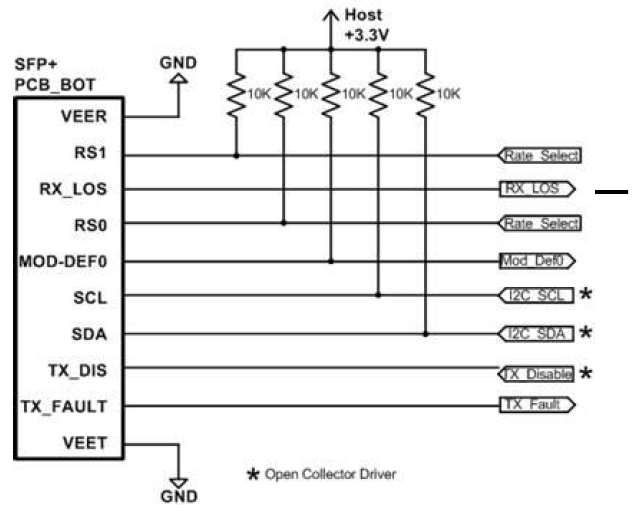
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1. **Digital Diagnostic Monitoring Information**

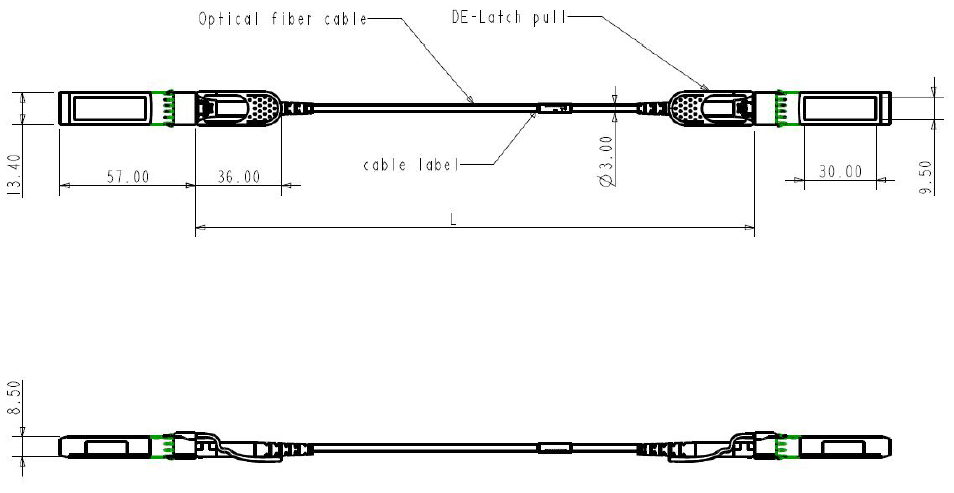
|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Accuracy** |
| Case Temperature | ℃ | ±3 |
| Supply Voltage | V | ±3% |
| Tx Bias Current | mA | ±10% |
| Tx Optical Power | dB | ±3 |
| Rx Optical Power | dB | ±3 |

1. **Recommended Interface Circuit**

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1. **Mechanical Dimensions**



SFP wire mechanicaldrawing(Unit: mm)

**Revision History**

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