

## SFP28-25GB-CLR-C

MSA and TAA 25GBase-CLR SFP28 Transceiver (SMF, 1310nm, 2km, LC, DOM, No FEC)

### Features:

- Up to 25.78125Gbd Bi-Directional Data Links
- Built-In Dual CDR with Bypass Control
- Electrical Interface Specifications Per SFF-8431
- SFP28 MSA Package with Duplex Connector
- 1.5W Maximum Power Consumption with Established Link
- Class 1 Laser Safety Certified
- Uncooled 1310 DFB Laser
- Up to 2km on 9/125um SMF with No FEC
- Power Supply Lines: 3.3V
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



### Applications:

- 25GBase Ethernet

### Product Description

This Industry Standard SFP28 transceiver provides 25GBase-CLR throughput up to 2km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Industry Standard transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



## Absolute Maximum Ratings

| Parameter                  | Symbol           | Min. | Typ.     | Max. | Unit | Notes |
|----------------------------|------------------|------|----------|------|------|-------|
| Maximum Supply Voltage     | V <sub>CC</sub>  | -0.5 |          | 4    | V    | 1     |
| Storage Temperature        | T <sub>stg</sub> | -40  |          | 85   | °C   |       |
| Operating Case Temperature | T <sub>c</sub>   | 0    | 25       | 70   | °C   |       |
| Relative Humidity          | RH               | 5    |          | 95   | %    |       |
| Signaling Rate             |                  |      | 25.78125 |      | GBd  |       |
| Signaling Rate Variation   |                  | -100 |          | 100  | ppm  |       |

## Electrical Characteristics

| Parameter                     |                      | Symbol               | Min. | Typ. | Max.     | Unit  | Notes |
|-------------------------------|----------------------|----------------------|------|------|----------|-------|-------|
| Module Supply Voltage         |                      | V <sub>CC</sub>      | 3.14 | 3.3  | 3.47     | V     |       |
| Module Supply Current         |                      | I <sub>CC</sub>      |      |      | 478      | mA    |       |
| Power Dissipation             |                      | P <sub>DISS</sub>    |      |      | 1500     | W     |       |
| Transmitter                   |                      |                      |      |      |          |       |       |
| Input Differential Impedance  |                      | Z <sub>IN</sub>      |      | 100  |          | Ω     |       |
| Differential Data Input Swing |                      | V <sub>IN,pp</sub>   | 180  |      | 700      | mVp-p |       |
| Tx_Fault                      | Transmitter Fault    | VOH                  | 2    |      | Host_Vcc | V     |       |
|                               | Normal Operation     | VOL                  | 0    |      | 0.8      | V     |       |
| Tx_Disable                    | Transmitter Disable  | VIH                  | 2    |      | Host_Vcc | V     |       |
|                               | Transmitter Enable   | VIL                  | 0    |      | 0.8      | V     |       |
| Receiver                      |                      |                      |      |      |          |       |       |
| Output Differential Impedance |                      | Z <sub>OUT</sub>     |      | 100  |          | Ω     |       |
| AC Common-Mode Output Voltage |                      | V <sub>OUT,rms</sub> |      |      | 17.5     | mV    |       |
| Differential Output Voltage   |                      | V <sub>OUT,pp</sub>  | 300  |      | 900      | mVp-p | 1     |
| Eye Width                     |                      |                      | 0.57 |      |          | UI    |       |
| Differential Eye Hight        |                      |                      | 228  |      |          | mV    |       |
| Data Output Rise/Fall Time    |                      | Tr/Tf                | 12   |      |          | ps    | 2     |
| Rx_LOS                        | Loss of Signal (LOS) | VOH                  | 2.0  |      | Host_Vcc | V     | 3     |
|                               | Normal Operation     | VOL                  | 0    |      | 0.8      | V     | 3     |

## Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20-80%.
3. LOS is an open collector output and should be pulled up with 4.7kΩ on the host board.

## Optical Characteristics

| Parameter                          | Symbol          | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|-----------------|------|------|------|------|-------|
| Transmitter                        |                 |      |      |      |      |       |
| Launch Optical Power               | Po              | -5   |      | 2    | dBm  | 1     |
| Extinction Ratio                   | ER              | 3.5  |      |      | dB   |       |
| Optical Modulation Amplitude       | OMA             | -4   |      | 2.2  | dB   |       |
| Center Wavelength Range            | $\lambda_C$     | 1295 | 1310 | 1325 | nm   |       |
| Side-Mode Suppression Ratio        | SMSR            | 30   |      |      | dB   |       |
| Spectral Width                     | $\Delta\lambda$ |      |      | 1    | nm   | 2     |
| Launch Power in OMA Minus TDP      |                 | -5   |      |      | dBm  |       |
| Transmitter and Dispersion Penalty | TDP             |      |      | 2.7  | dB   |       |
| Optical Return Loss Tolerance      | ORLT            |      |      | 20   | dB   |       |
| Transmitter Reflectance            |                 |      |      | -26  | dB   |       |
| POUT @Tx_Disable Asserted          | Poff            |      |      | -20  | dBm  |       |
| Receiver                           |                 |      |      |      |      |       |
| Center Wavelength                  | $\lambda_C$     | 1260 | 1310 | 1370 | nm   |       |
| Receiver Sensitivity               | RxSens          |      |      | -8   | dBm  | 3     |
| Damage Threshold                   |                 | 3    |      |      | dBm  |       |
| Receiver Overload (Pavg)           | POL             | 2    |      |      | dBm  |       |
| Optical Return Loss                | ORL             | 26   |      |      | dB   |       |
| LOS De-Assert                      | LOSD            |      |      | -16  | dBm  |       |
| LOS Assert                         | LOSA            | -30  |      |      | dBm  |       |
| LOS Hysteresis                     |                 | 0.5  |      |      | dB   |       |
| Receiver Reflectance               |                 |      |      | -26  | dBm  |       |

### Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Measured with PRBS31 at  $1E^{-12}$  BER.

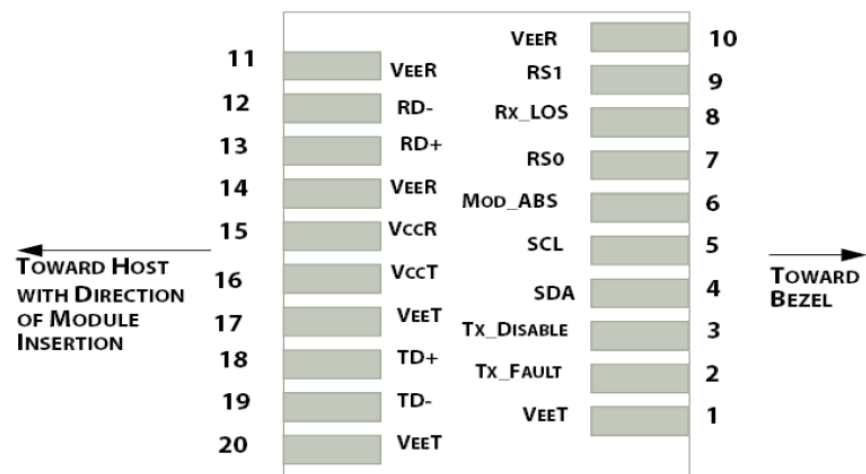
## Pin Descriptions

| Pin | Symbol     | Name/Description                                                          | Notes |
|-----|------------|---------------------------------------------------------------------------|-------|
| 1   | VeeT       | Transmitter Ground.                                                       | 1     |
| 2   | Tx_Fault   | Transmitter Fault. LVTTTL-O. "High" indicates a fault condition.          | 2     |
| 3   | Tx_Disable | Transmitter Disable. LVTTTL-I. "High" or "open" disables the transmitter. | 3     |
| 4   | SDA        | 2-Wire Serial Interface Data. LVCMOS-I/O. MOD-DEF2.                       | 4     |
| 5   | SCL        | 2-Wire Serial Interface Clock. LVCMOS-I/O. MOD-DEF1.                      | 4     |
| 6   | MOD_ABS    | Module Absent (Output). Connected to the VeeT or VeeR in the module.      | 5     |
| 7   | RS0        | Hardware Tx Rate Select Pin.                                              | 6     |
| 8   | Rx_LOS     | Receiver Loss of Signal. LVTTTL-O.                                        | 2     |
| 9   | RS1        | Hardware Rx Rate Select Pin.                                              | 6     |
| 10  | VeeR       | Receiver Ground.                                                          | 1     |
| 11  | VeeR       | Receiver Ground.                                                          | 1     |
| 12  | RD-        | Inverse Received Data Out. CML-O.                                         |       |
| 13  | RD+        | Received Data Out. CML-O.                                                 |       |
| 14  | VeeR       | Receiver Ground.                                                          |       |
| 15  | VccR       | +3.3V Receiver Power.                                                     |       |
| 16  | VccT       | +3.3V Transmitter Power.                                                  |       |
| 17  | VeeT       | Transmitter Ground.                                                       | 1     |
| 18  | TD+        | Transmitter Data In. CML-I.                                               |       |
| 19  | TD-        | Inverse Transmitter Data In. CML-I.                                       |       |
| 20  | VeeT       | Transmitter Ground.                                                       | 1     |

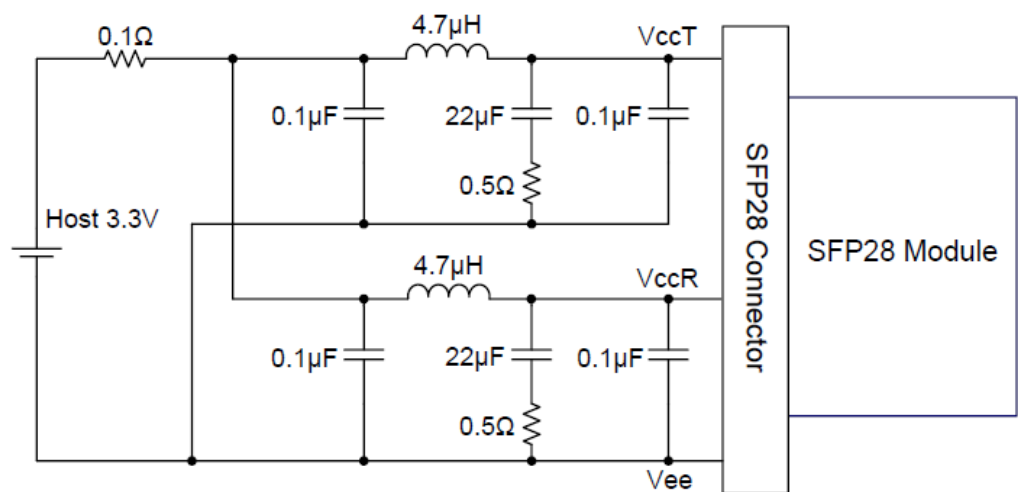
## Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to the Host\_Vcc.
3. This input is internally biased "high" with a 4.7kΩ to 10kΩ pull-up resistor to the VccT.
4. 2-Wire Serial Interface Clock and Data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to the Host\_Vcc.
6. Rate Select can also be set through the 2-wire bus in accordance with SFF-8472 v. 12.1. Rx Rate Select is set at Bit 3, Byte 110, and Address A2h, and Tx Rate Select is set at Bit 3, Byte 118, and Address A2h.  
**Note:** Writing a "1" selects maximum bandwidth operation. Rate Select is the logic OR of the input state of the Rate Select Pin and 2-wire bus.

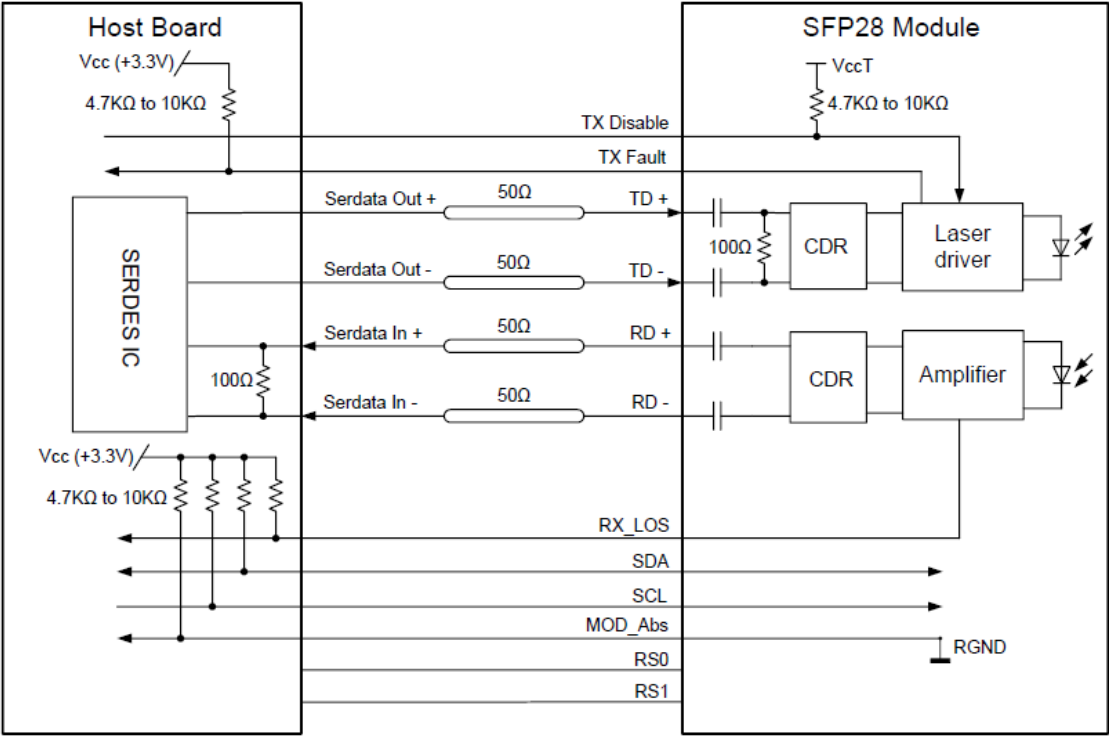
Electrical Pin-Out Details



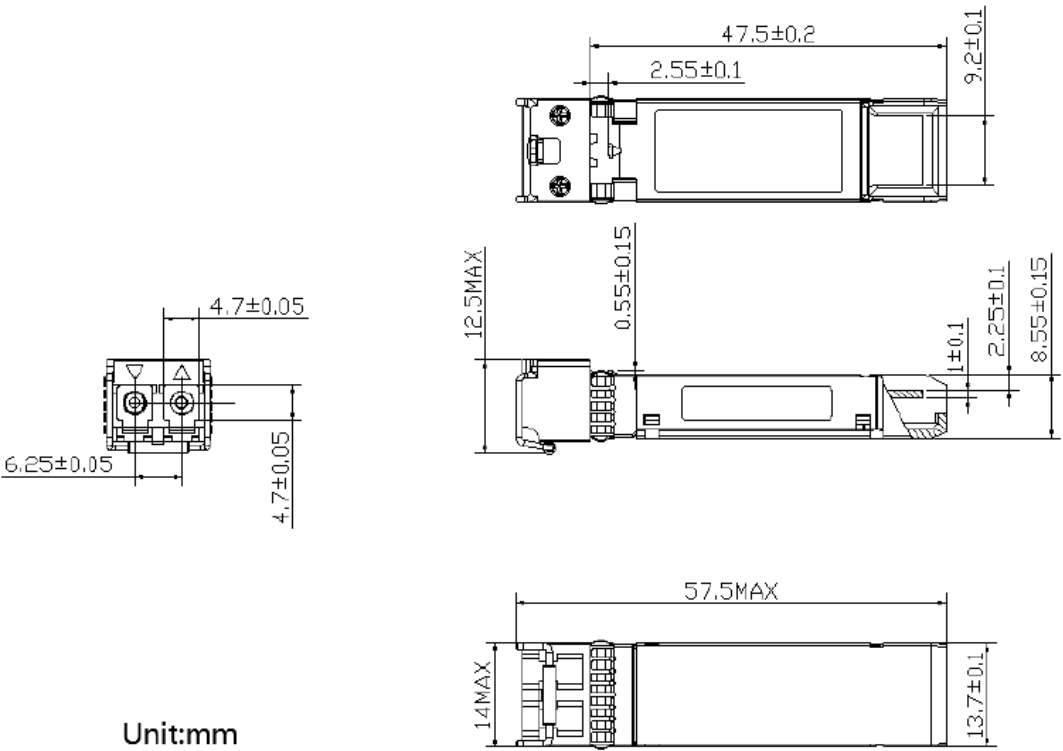
Host Board Power Supply Filter Network



Block Diagram



Mechanical Specifications



## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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