

### SFP-1GB-CW-53-160-FT-C

Fortinet® Compatible TAA 1000Base-CWDM SFP Transceiver (SMF, 1530nm, 160km, LC, DOM)

#### Features:

- INF-8074 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### Applications:

- Gigabit Ethernet over CWDM
- 1x Fibre Channel
- Access, Metro and Enterprise

#### Product Description

This Fortinet® Compatible SFP transceiver provides 1000Base-CWDM throughput up to 160km over single-mode fiber (SMF) using a wavelength of 1530nm via an LC connector. It can operate at temperatures between 0 and 70C. The listed reach has been determined using a link budget calculation and tested in a standard environment. Actual link distances achieved will be dependent upon the deployed environment. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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 |
|----------------------------|--------|-------|------|-------------------|------|-------|
| Data Rate                  | DR     | 0.622 |      | 1.25              | Gbps |       |
| Bit Error Rate             | BER    |       |      | 10 <sup>-12</sup> |      |       |
| Operating Case Temperature | Tc     | 0     |      | 70                | C    | 1, 4  |
| Storage Temperature        | Tstg   | -40   |      | 85                | C    | 2     |
| Supply Current             | Icc    |       | 200  | 300               | mA   | 3     |
| Maximum Voltage            | VMAX   | -0.5  |      | 4                 | V    | 3     |

### Notes:

1. Case temperature.
2. Ambient temperature.
3. For the electrical power interface.
4. Commercial temperature.

## Electrical Characteristics

| Parameter                      | Symbol  | Min.    | Typ. | Max.     | Unit | Notes |
|--------------------------------|---------|---------|------|----------|------|-------|
| Input Voltage                  | Vcc     | 3.14    | 3.3  | 3.46     | V    |       |
| Supply Current                 | Icc     |         | 200  | 300      | mA   | 3     |
| <b>Transmitter</b>             |         |         |      |          |      |       |
| Input Differential Impedance   | RIN     |         | 100  |          | Ω    |       |
| Single-Ended Data Input Swing  | VIN,pp  | 250     |      | 1200     | mV   |       |
| Transmit Disable Voltage       | VD      | Vcc-1.3 |      | Vcc      | V    |       |
| Transmit Enable Voltage        | VEN     | Vee     |      | Vee+0.8  | V    |       |
| Transmit Disable Assert Time   |         |         |      | 10       | us   |       |
| <b>Receiver</b>                |         |         |      |          |      |       |
| Single-Ended Data Output Swing | VOUT,pp | 300     | 400  | 800      | mV   |       |
| Data Output Rise/Fall Time     | Tr/Tf   |         | 100  | 175      | ps   |       |
| LOS Asserted                   | VLOSA   | Vcc-0.5 |      | Host_Vcc | V    |       |
| LOS De-Asserted                | VLOSD   | Vee     |      | Vee+0.5  | V    |       |

## Optical Characteristics

| Parameter                       | Symbol                    | Min. | Typ. | Max. | Unit  | Notes |
|---------------------------------|---------------------------|------|------|------|-------|-------|
| <b>Transmitter</b>              |                           |      |      |      |       |       |
| Output Optical Power            | PTX                       | 3    |      | 7    | dBm   | 1     |
| Optical Center Wavelength       | $\lambda_C$               | 1525 | 1531 | 1537 | nm    |       |
| Extinction Ratio                | ER                        | 9    |      |      | dB    |       |
| Side-Mode Suppression Ratio     | SMSR                      | 30   |      |      | dB    |       |
| Spectral Width (-20dB)          | $\Delta\lambda$           |      |      | 1    | nm    |       |
| Optical Rise/Fall Time (20-80%) | $T_r/T_f$                 |      |      | 180  | ps    |       |
| Relative Intensity Noise        | RIN                       |      |      | -120 | dB/Hz |       |
| Transmitter Jitter (Pk-Pk)      | TJ                        |      |      | 100  | ps    |       |
| Output Eye                      | Compliant with IEEE 802.3 |      |      |      |       |       |
| <b>Receiver</b>                 |                           |      |      |      |       |       |
| Optical Input Wavelength        | $\lambda_C$               | 1270 |      | 1620 | nm    |       |
| Receiver Sensitivity            | Rx_SEN                    |      |      | -34  | dBm   | 2     |
| Receiver Overload               | POL                       | -7   |      |      | dBm   |       |
| LOS Assert                      | LOSA                      | -42  |      |      | dBm   |       |
| LOS De-Assert                   | LOSD                      |      |      | -34  | dBm   |       |
| LOS Hysteresis                  | LOSH                      | 0.5  |      |      | dB    |       |

### Notes:

1. Average launch power.
2. Measured with a 2<sup>7</sup>-1 test pattern over 120km @1.25Gbps with BER<10<sup>-12</sup>.

## Pin Descriptions

| Pin | Symbol     | Name/Description   | Notes |
|-----|------------|--|-------|
| 1   | VeeT       | Transmitter Ground (Common with Receiver Ground).                | 1     |
| 2   | Tx_Fault   | Transmitter Fault.   |       |
| 3   | Tx_Disable | Transmitter Disable. Laser output disabled on "high" or "open."  | 2     |
| 4   | SDA        | 2-Wire Serial Interface Data.                                    | 3     |
| 5   | SCL        | 2-Wire Serial Interface Clock.                                   | 3     |
| 6   | MOD_ABS    | Module Absent. Grounded within the module.                       | 3     |
| 7   | RS0        | No Connection Required.  |       |
| 8   | LOS        | Loss of Signal Indication. "Logic 0" indicates normal operation. | 4     |
| 9   | RS1        | No Connection Required.  | 1     |
| 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. The circuit ground is isolated from the chassis ground.
2. Disabled: TDIS>2V or open, enabled: TDIS<0.8V.
3. Should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and 3.6V.
4. LOS is open collector output.

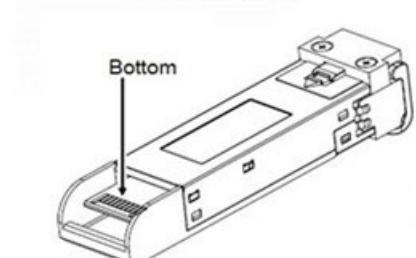
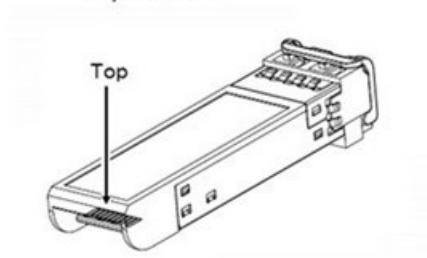
### Electrical Pad Layout



Top of Board



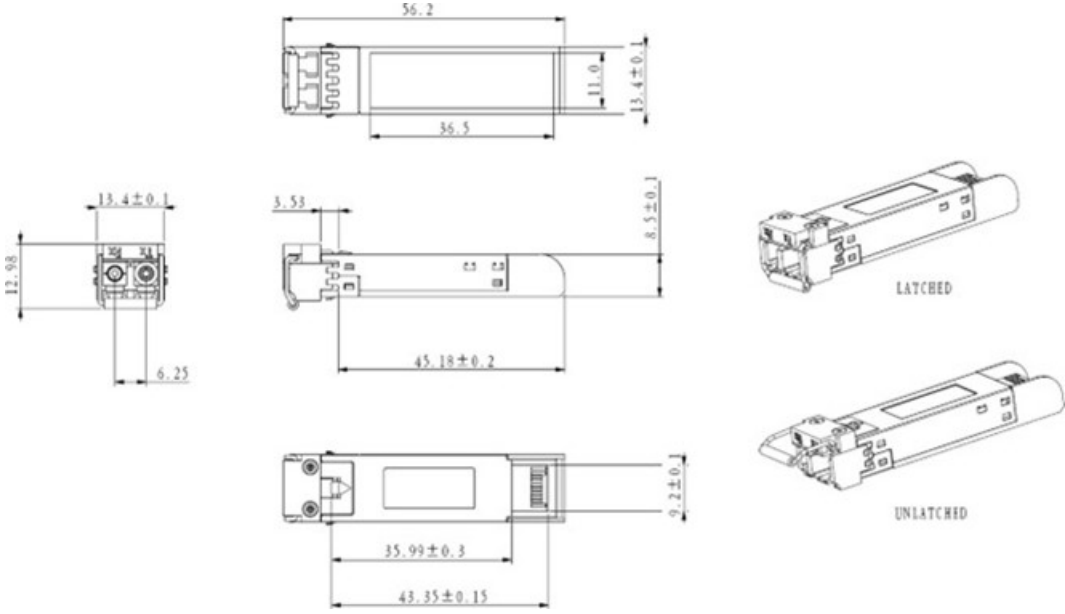
Bottom of Board



### Block Diagram of Transceiver



**Mechanical Specifications**



All dimensions are ±0.2mm unless otherwise specified.  
Unit: mm

## About ProLabs

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

## A 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 1.6T 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.

## The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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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