**SFP-10G-ER-1350-C**

Cisco® SFP-10G-ER-1350 Compatible TAA 10GBase-CWDM SFP+ Transceiver (SMF, 1350nm, 40km, LC, DOM)

**Features:**

- SFF-8432 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:**

- 10x Gigabit Ethernet over CWDM
- 8x/10x Fibre Channel
- Access, Metro and Enterprise
- Mobile Fronthaul CPRI/OBSAI

**Product Description**

This Cisco® SFP-10G-ER-1350 compatible SFP+ transceiver provides 10GBase-CWDM throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1350nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® 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."

**CWDM Available Wavelengths**

| Wavelengths | Min. | Typ. | Max. |
|---|---|---|---|
| 27 | 1264.5 | 1271 | 1277.5 |
| 29 | 1284.5 | 1291 | 1297.5 |
| 31 | 1304.5 | 1311 | 1317.5 |
| 33 | 1324.5 | 1331 | 1337.5 |
| 35 | 1344.5 | 1351 | 1357.5 |
| 37 | 1364.5 | 1371 | 1377.5 |
| 39 | 1384.5 | 1391 | 1397.5 |
| 41 | 1404.5 | 1411 | 1417.5 |
| 43 | 1424.5 | 1431 | 1437.5 |
| 45 | 1444.5 | 1451 | 1457.5 |

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Maximum Supply Voltage | Vcc | -0.5 | | 3.6 | V |
| Storage Temperature | Tstg | -40 | | 85 | °C |
| Operating Case Temperature | Tc | 0 | | 70 | °C |
| Relative Humidity (Non-Condensing) | RH | 0 | | 85 | % |
| Data Rate | DR | 0.6 | 9.953/10.3125 | | Gbps |

**Notes:**

1. Exceeding any one of these values may destroy the device immediately.

## Electrical Characteristics

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|---|
| Power Supply Voltage | | Vcc | 3.15 | 3.30 | 3.43 | V | |
| Power Consumption | | P$_{DISS}$ | | | 1.5 | W | |
| **Transmitter** | | | | | | | |
| CML Differential Inputs | | VIN | 150 | | 1200 | mVp-p | AC Coupled Inputs |
| Input AC Common-Mode Voltage | | | 0 | | 25 | mV | RMS |
| Input Differential Impedance | | ZIN | 85 | 100 | 115 | Ω | RIN>100kΩ @DC |
| Tx_Disable | High | | 2 | | Vcc | V | |
| | Low | | 0 | | 0.8 | | |
| Tx_Fault | High | | 2 | | Vcc+0.3 | V | lo = 400µA; Host_Vcc |
| | Low | | 0 | | 0.5 | | lo = -4.0mA |
| **Receiver** | | | | | | | |
| CML Differential Outputs | | VOUT | 350 | | 700 | mVp-p | AC Coupled Outputs |
| Output Differential Impedance | | ZOUT | 85 | 100 | 115 | Ω | |
| Rx_LOS | High | | 2 | | Vcc+0.3 | | lo = 400µA; Host_Vcc |
| | Low | | 0 | | 0.8 | | lo = -4.0mA |
| MOD_DEF(0.2) | | VOH | 2.5 | | | V | With Serial ID |
| | | VOL | 0 | | 0.5 | V | With Serial ID |

**Optical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| Center Wavelength | λC | λ-6.5 | λ | λ+6.5 | nm | |
| Average Output Power | POUT | 0 | | 6 | dBm | 1 |
| Extinction Ratio | ER | 3.5 | | dB | dB | |
| Average Power of Off Transmitter | Poff | | | -30 | dBm | |
| Side-Mode Suppression Ratio | SMSR | 30 | | dB | | |
| -20dB Spectral Width | Δλ | | | 1 | nm | |
| Transmitter Dispersion Penalty | TDP | | | 3 | dB | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Tx_Disable Assert Time | T_off | | | 10 | us | |
| **Receiver** | | | | | | |
| Center Wavelength | λC | 1260 | | 1620 | nm | |
| Receiver Sensitivity | Pmin | | | -15 | dBm | 2 |
| Receiver Overload | Pmax | 0 | | dBm | nm | |
| LOS De-Assert | LOSD | | | -17 | dBm | |
| LOS Assert | LOSA | -28 | | dBm | | |
| LOS Hysteresis | LOSH | 0.5 | | dB | | |

**Notes:**
1. Output is coupled into a 9/125μm SMF.
2. Measured with worst ER, BER less than $1E^{-12}$, and PRBS $2^{31}-1$ @10.3125Gbps.

**Pin Descriptions**

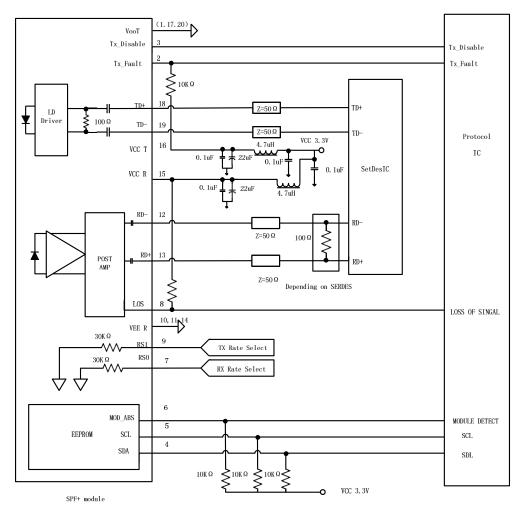| Pin | Symbol | Name/Description | Notes |
|-----|--------|------------------|-------|
| 1 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| 2 | Tx_Fault | Transmitter Fault. LVTTL-O. | 2 |
| 3 | Tx_Disable | Transmitter Disable. Laser output disabled on "high" or "open." LVTT-I. | 3 |
| 4 | SDA | 2-Wire Serial Interface Data (Same as MOD-DEF2 in INF-8074i). LVTTL-I/O. | |
| 5 | SCL | 2-Wire Serial Interface Clock (Same as MOD-DEF2 in INF-8074i). LVTTL-I. | |
| 6 | MOD_ABS | Module Absent. Connect to the VeeT or VeeR in the module. | 4 |
| 7 | RS0 | Rate Select 0. Not Used. | 5 |
| 8 | LOS | Loss of Signal Indication. "Logic 0" indicates normal operation. LVTTL-O. | 2 |
| 9 | RS1 | Rate Select 1. Not Used. | 5 |
| 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. CML-O. | |
| 13 | RD+ | Receiver Non-Inverted Data Out. AC Coupled. CML-O. | |
| 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. CML-I. | |
| 19 | TD- | Transmitter Inverted Data In. AC Coupled. CML-O. | |
| 20 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |

**Notes:**

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Host_Vcc with resistor in the range 4.7kΩ to 10kΩ. Pull-ups can be connected to one or several power supplies; however, the host board design shall ensure that no module contact has a voltage exceeding the module VccT/R+0.5V.
3. Tx_Disable is an input contact with a 4.7kΩ to 10kΩ pull-up resistor to the VccT inside the module.
4. MOD_ABS is connected to the VeeT or VeeR in the SFP+ module. The host may pull the contact up to the Host_Vcc with a resistor in the range from 4.7kΩ to 10kΩ. MOD_ABS is asserted "high" when the SFP+ module is physically absent from a host slot.
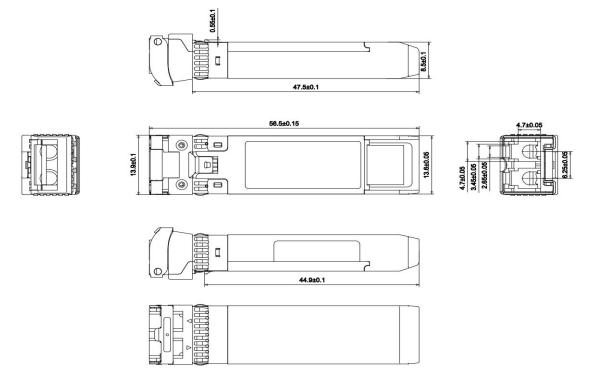5. Internally pulled down per SFF-8431.

Pin-Out of Connector Block on the Host Board

## Recommended Circuit Schematic

## Mechanical Specifications

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).

**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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