

OPTX-GE-T

1000BASE-T 100m SFP Copper



Features

- 1.25 Gigabit Ethernet over Cat 5 cable
- Electrical interface specifications per SFF-8431
- Management interface specifications per SFF-8432 and SFF-8472
- Support 10/100/1000 BASE-T Operation
- Up to 100m over Cat 5 cable
- Single +3.3V power supply
- Class 1 laser safety certified
- 1.2W maximum power consumption with established link
- Operating temperature Options:
0~70°C; -40~85°C
- RoHS Compliant

Description

The **OPTX-GE-T** is full-duplex throughput of 10/100/1000Mbps by transporting data over shielded and unshielded twisted pair category 5 cable with 5-level PAM (Pulse Amplitude Modulation) signals. The module takes signals from both the twisted pair category 5 cable and the SERDES interface. Pin count overhead between the MAC and the PHY is minimized, and Gigabit Ethernet operation is achieved with maximum space savings.

Applications

- High speed storage area networks
- Switched Backplane Applications
- Switch to Switch Interface

Specification

| Parameter | Symbol | Min | Typ | Max | Units | Conditions / Notes |
|-----------------------------|------------------|-----|-----|-----|-------|---------------------|
| Operating Temperature | T _{OP} | -40 | - | 85 | °C | Case temperature |
| Storage Temperature | T _{STO} | -40 | - | 85 | °C | Ambient temperature |
| Operating Relative Humidity | RH | 5 | - | 95 | % | |



| Serial Bus Timing Requirements | | | | | | |
|--------------------------------|--------|-----|-----|---------|-------|--------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Conditions / Notes |
| I ² C Clock Rate | | 0 | - | 100,000 | Hz | |

+3.3V Electrical Power Interface

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|-----------------|------------------|------|-----|------|-------|-------|
| Supply Current | I _s | - | 320 | 400 | mA | |
| Input Voltage | V _{CC} | 3.13 | 3.3 | 3.47 | V | |
| Maximum Voltage | V _{MAX} | - | - | 3.8 | V | |

Low-Speed Signals, Electronic Characteristics

| Parameter | Symbol | Min | Max | Units | Notes |
|-----------------|-----------------|--------------|----------------------|-------|------------------------------------|
| SFP Output LOW | V _{OL} | 0 | 0.5 | V | |
| SFP Output HIGH | V _{OH} | Host_Vcc-0.5 | Host_Vcc+0.3 | V | 4.7k to 10k pull-up to host_Vcc , |
| SFP Input LOW | V _{IL} | 0 | 0.8 | V | measured at host side of connector |
| SFP Input HIGH | V _{IH} | 2 | V _{CC} +0.3 | V | |

High-Speed Electrical Interface, Transmission Line-SFP

| Parameter | Symbol | Min | Typ | Max | Units | Conditions / Notes |
|---------------------|---------------------|-----|-----|-----|-------|---------------------------------------|
| Line Frequency | f _L | - | 125 | - | MHz | 5-level encoding, per IEEE802.3 |
| Tx Output Impedance | Z _{OUT,TX} | - | 100 | - | Ohm | Differential, for all frequencies be- |
| Rx Input Impedance | Z _{IN,RX} | - | 100 | - | Ohm | tween 1MHz and 125MHz |

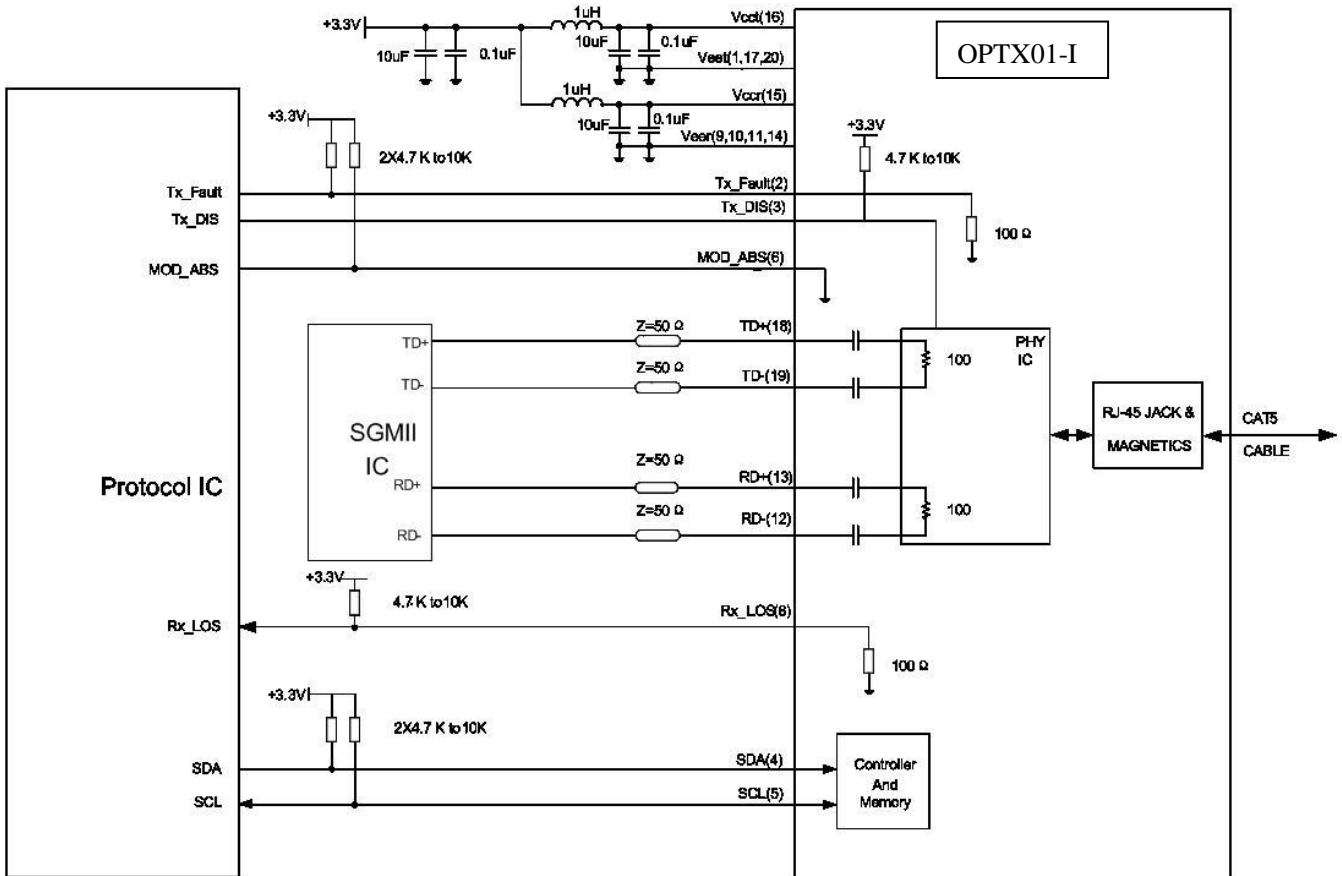
High-Speed Electrical Interface, Host-SFP

| Parameter | Symbol | Min | Typ | Max | Units | Conditions / Notes |
|--|---------------------------------|-----|-----|------|-------|-----------------------------|
| Transmitter Differential Input Voltage | V _{IN} | 500 | - | 2400 | mV | Differential voltage swings |
| Receiver Differential Output Voltage | V _{OUT} | 700 | - | 1600 | mV | Differential voltage swings |
| Rise and Fall Time | t _r / t _f | - | 175 | - | ps | 20% - 80% |
| Tx Input Impedance | Z _{IN} | - | 50 | - | Ohm | Single ended |
| Rx Output Impedance | Z _{OUT} | - | 50 | - | Ohm | Single ended |

General

| Parameter | Symbol | Min | Typ | Max | Units | Conditions / Notes |
|--------------|--------|-----|-----|------|--------|--|
| Data Rate | BR | 10 | | 1000 | Mb/sec | IEEE802.3 compatible. |
| Cable Length | L | - | - | 100 | m | Category 5 UTP. BER <10 ⁻¹² |

Electrical Interface



Serial Communication Protocol

EEPROM Serial ID Memory Contents at address A0

All OptiX² SFP support the 2-wire serial communication protocol outlined in the SFP MSA. These SFP use an 128 byte E2PROM with an address of A0h.

Internal ASIC Registers

The 1000BASE-T physical layer IC can also be accessed via the 2-wire serial bus at address ACh.

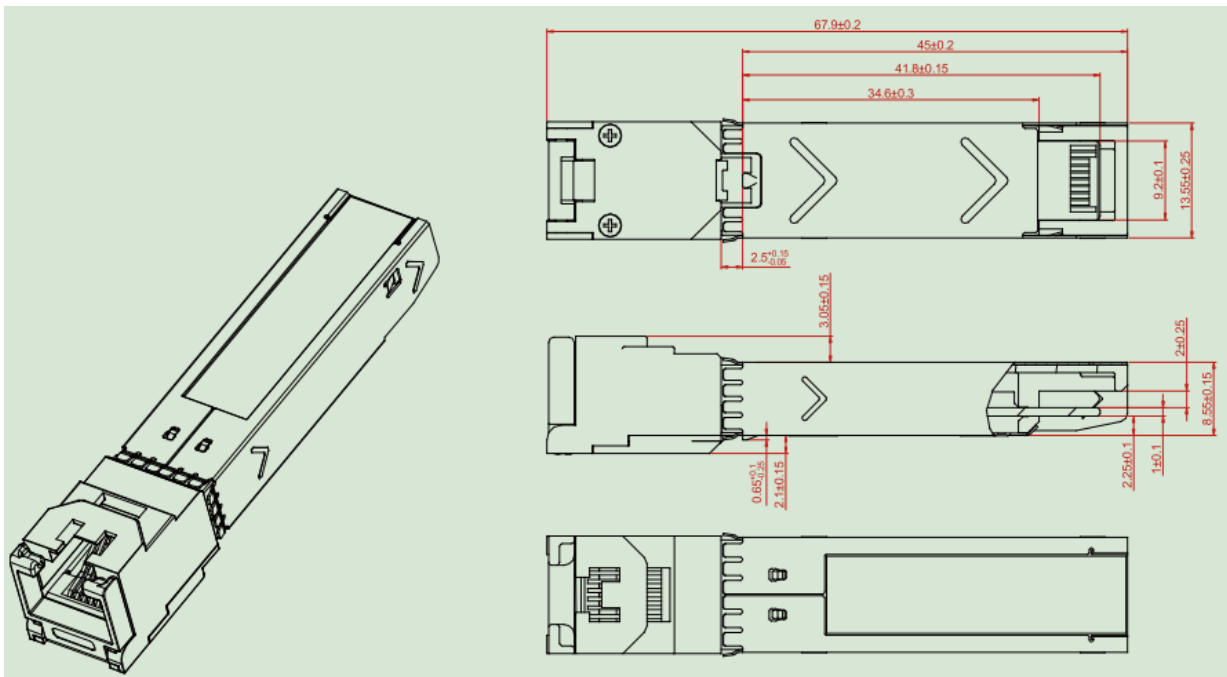
Pin Description

| Pin | Symbol | Name/Description | Note |
|-----|--------------------|---|------|
| 1 | V _{EET} | Transmitter ground (common with receiver ground) | 1 |
| 2 | T _{FAULT} | Transmitter Fault. Not supported | |
| 3 | T _{DIS} | Transmitter Disable. PHY disabled on high or open | 2 |
| 4 | MOD_DEF(2) | Module Definition 2. Data line for serial ID | 3 |
| 5 | MOD_DEF(1) | Module Definition 1. Clock line for serial ID | 3 |
| 6 | MOD_DEF(0) | Module Definition 0. Grounded within the module | 3 |
| 7 | Rate Select | No connection required | |
| 8 | LOS | Loss of Signal indication. | 4 |
| 9 | V _{EER} | Receiver ground (common with transmitter ground) | 1 |
| 10 | V _{EER} | Receiver ground (common with transmitter ground) | 1 |
| 11 | V _{EER} | 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 | V _{EER} | Receiver ground (common with transmitter ground) | 1 |
| 15 | V _{CCR} | Receiver power supply | |
| 16 | V _{CCT} | Transmitter power supply | |
| 17 | V _{EET} | 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 | V _{EET} | Transmitter ground (common with receiver ground) | 1 |

Notes:

1. Circuit ground is isolated from chassis ground
2. PHY disabled on TxDIS > 2.0V or open, enabled on TxDIS < 0.8V
3. Should be pulled up with 4.7k – 10k Ohms on host board to a voltage between 2.0 V and 3.6 V.
MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LVTTTL compatible with a maximum voltage of 2.5V.

Mechanical Dimensions





Ordering Information

| Part No | Package Type | Temp | Reach | RoHS |
|--------------|--------------|----------|-------|-----------|
| OPTX-GE-T | SFP Copper | 0~70°C | 100m | Compliant |
| OPTX-GE-T-HT | SFP Copper | -40~85°C | 100m | Compliant |