

100-05071-C

Calix® 100-05071 Compatible TAA Compliant 2.4Gbs/1.2Gbs-C+ SFP Transceiver (SMF, 1490nmTx/1310nmRx, SC, -40C to 85C)

Features:

- 1310nm Burst-Mode APD/TIA Receiver and 1490nm Continuous DFB Laser Transmitter
- Integrated Single Fiber Bi-Directional Optical Sub-Assembly
- Excellent EMI and EMC
- Single SC Receptacle Optical Interface
- Hot-Pluggable
- Low Power Consumption
- Guard Time Squelch Function
- Digitized Burst-Mode Optical Power Monitoring
- CML Compatible Data Input and Output Interface
- Operating Temperature: -40 to 85 Celsius
- RoHS Compliant and Lead-Free



Applications:

- GPON OLT
- Access and Enterprise

Product Description

This Calix® SFP transceiver provides 2.5Gbps/1.25Gbps-C++ throughput up to 60km over single-mode fiber (SMF) using a wavelength of 1490nmTx/1310nmRx via a SC connector. It is guaranteed to be 100% compatible with the equivalent Calix® 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 |
|----------------------------|---------|--------|------|---------|------|------|-------|
| Storage Temperature | | TS | -40 | | 85 | °C | |
| Operating Case Temperature | | Tc | -40 | | 85 | °C | |
| Relative Humidity | | RH | 5 | | 95 | % | |
| Supply Voltage | | Vcc | 0 | | 4.0 | V | |
| Input Voltage | | Vin | -0.5 | | Vcc | V | |
| Pin Input Voltage | | V | GND | | Vcc | | |
| Receiver Damage Threshold | | dBm | 3 | | | | |
| Data Rate | Tx Side | | | 2488.32 | | Mbps | |
| | Rx Side | | | 1244.16 | | Mbps | |

Electrical Characteristics

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---------------------------------------|--|--------|-------|------|-------|------|-------|
| Power Supply Voltage | | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Module Supply Current | | Icc | | | 500 | mA | |
| LVPECL Differential Data Input Swing | | | 200 | | 1600 | mV | 1 |
| LVPECL Differential Data Output Swing | | | 400 | | 1600 | mV | 2 |
| Differential Data Input Impedance | | | | 100 | | Ω | 1 |
| Input Signal Level (LVTTL H) | | | 2.0 | | Vcc | V | |
| Input Signal Level (LVTTL L) | | | 0 | | 0.8 | V | |
| Output Signal Level (LVTTL H) | | | 2.4 | | Vcc | V | |
| Output Signal Level (LVTTL L) | | | 0 | | 0.4 | V | |

Notes:

1. AC Coupled Internal.
2. DC Coupled Internal.

Optical Characteristics

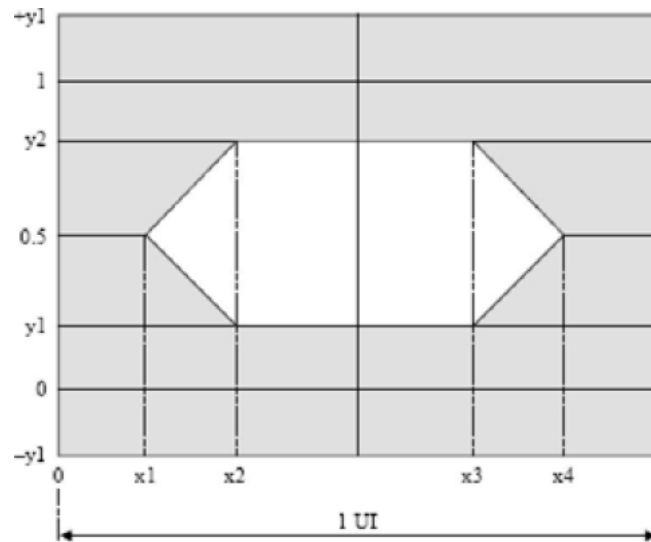
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|-------------------|------------------------------|------|------|----------|-------|
| Transmitter | | | | | | |
| Center Wavelength Range | λ_c | 1480 | 1490 | 1500 | nm | 1 |
| Spectral Width(@-20Db) | $\Delta\lambda$ | | | 1 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dBm | |
| Launch Optical Power(BOL) | PBOL | +5.0 | | 9 | dB | 2 |
| Off level light | | | | -39 | dB | 3 |
| Extinction Ratio | EX | 8.2 | | | Ω | 4 |
| Total Jitter | Jtotal | | | 0.2 | us | |
| Rise/Fall time(20-80%) | Tr/Tf | | | 250 | ms | 5 |
| RIN15OMA | | | | -115 | us | |
| Optical Return Loss Tolerance | | | | 15 | ms | |
| Maximum reflectance | | | | -12 | us | 6 |
| Eye Diagram | | Compliant with ITU-T G.984.2 | | | | 4,7 |
| Receiver | | | | | | |
| Centre Wavelength | λ_c | 1260 | 1310 | 1360 | nm | |
| Receiver Sensitivity(EOL) | Pmin | | | -33 | dBm | 8 |
| Input Optical Power Overload | Pin | -14 | | | dBm | 8 |
| Receiver Settling Time | Tsettling | | | 35 | ns | 9,15 |
| Reset to Data Time | Trd | 15 | | | ns | 11,15 |
| Reset Pulse Width | Treset | | 16 | | bit | 15 |
| Guard Time | Tguard | 32 | | | bit | 11,15 |
| Receiver reflectance | | | | -20 | dB | 12 |
| Signal Detect (LVTTTL) | Optical De-Assert | -45 | | | dBm | |
| | Optical Assert | | | -34 | | |
| Signal Detect Hysteresis | | 0.5 | | 6 | dB | |
| Measurement Accuracy of Received Burst Optical Power | | -3 | | 3 | dB | 13 |
| Burst Optical Power Conversion Settling Time | BOPCS Time | 25 | | | ns | 16 |
| Burst Optical Power Conversion Holding Time | Holding Time | 350 | | | ns | 16 |
| Burst Optical Power Conversion Time | | | | 500 | us | 14 |

Notes:

1. DFB-LD
2. Coupled into 9/125 SMF.
3. Measured without data input.

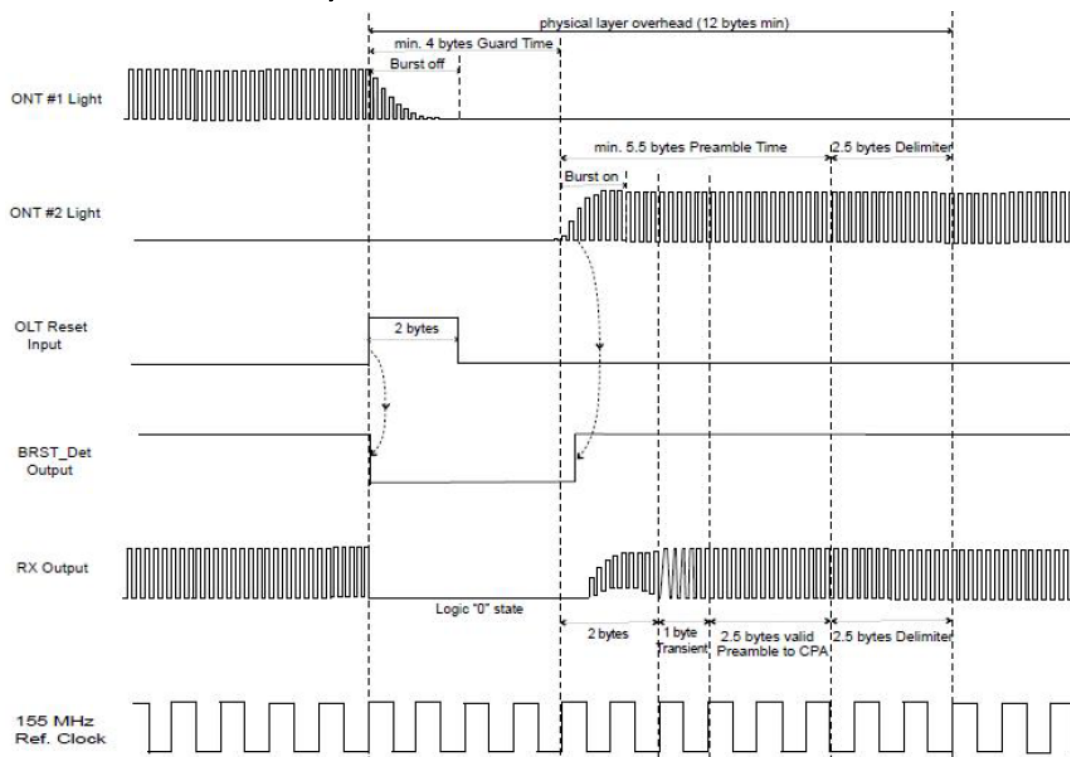
4. Measured with PRBS $2^{23}-1$ test pattern @2.488Gbps.
5. Measured with the Bessel-Thompson Filter OFF.
6. $\lambda=1.49\text{nm}$.
7. See Mask Diagram below.
8. Measured with PRBS $2^{23}-1$ test pattern @1.244 Gbps with Gbps on ER=10dB, $\text{BER}\leq 10\text{E-}10$.
9. Time from the arrival of data to the output data settling to within 15% of final amplitude and duty-cycle.
10. Time from a falling edge on reset signal input to the start of preamble at the data input of the receiver.
11. Time from end of previous data burst to beginning of the next data burst.
12. $\lambda=1.31\text{nm}$.
13. Measured with PRBS23 data pattern @1.244Gbps
14. result can be read out since rising edge of the trigger pulse.
15. See Time parameter definition in GPON system.
16. See Trigger sequence definition in GPON system.

Eye Mask Diagram

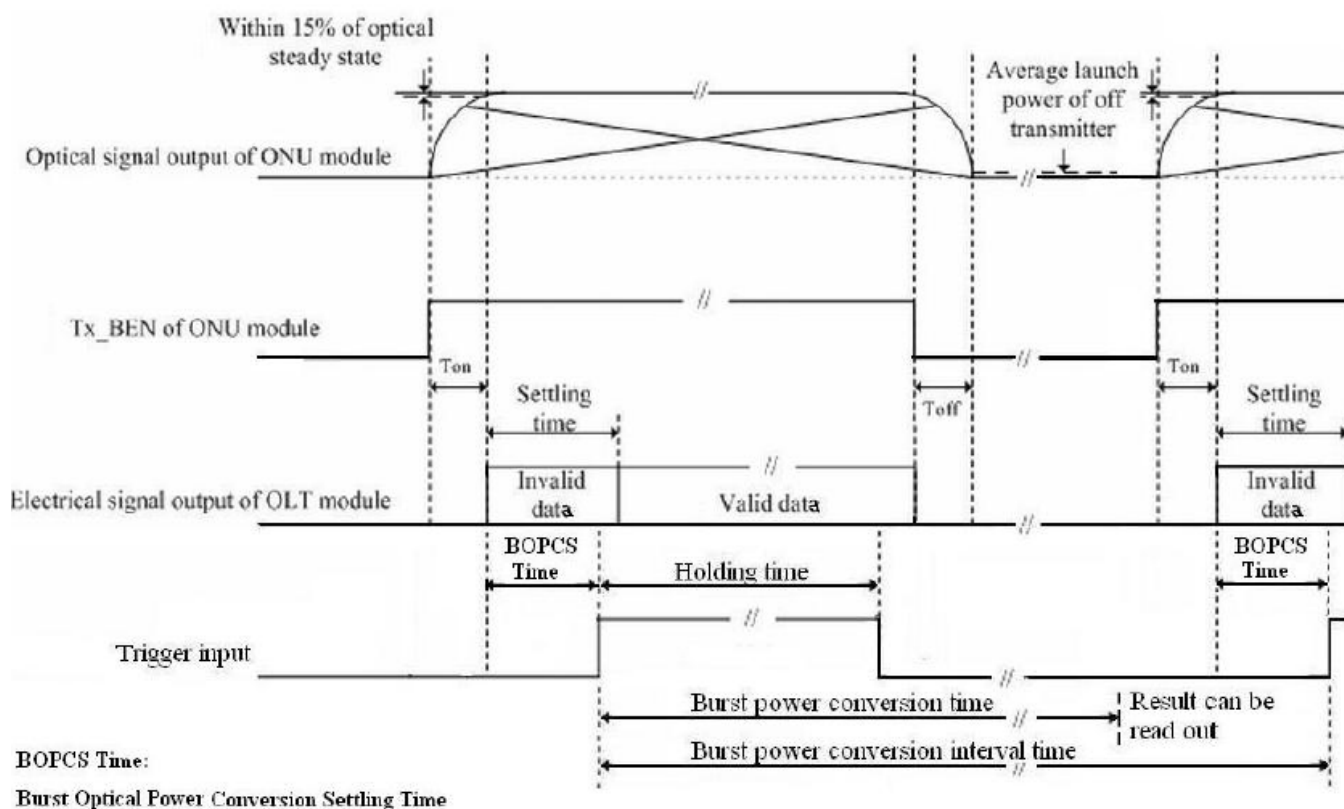


| | 1244.16 Mbps | 2488.32 Mbps |
|---------|--------------|--------------|
| $x1/x4$ | 0.28/0.72 | |
| $x2/x3$ | 0.40/0.60 | |
| $x3-x2$ | | 0.2 |
| $y1/y2$ | 0.20/0.80 | 0.25/0.75 |

Time parameter definition in GPON system



Trigger sequence definition in GPON system



Pin Description

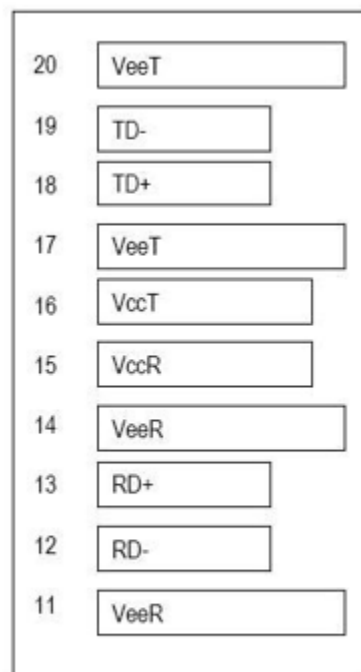
| Pin | Symbol | Name/Description | Plug Seq. | Notes |
|-----|------------|--|-----------|-------|
| 1 | VeeT | Transmitter Ground. | 1 | |
| 2 | TX Fault | Transmitter Fault Indication. | 3 | 1 |
| 3 | TX Disable | Transmitter Disable-Module disables on high or open. | 3 | 2 |
| 4 | MOD-DEF2 | Module Definition 2-Two wire serial ID interface. | 3 | 3 |
| 5 | MOD-DEF1 | Module Definition 1-Two wire serial ID interface. | 3 | 3 |
| 6 | MOD-DEF0 | Module Definition 0-Two wire serial ID interface | 3 | 3 |
| 7 | Reset | Reset signal input. | 3 | 8 |
| 8 | BPD | Burst Power Detect (active HIGH). | 3 | 4 |
| 9 | Trigger | Trigger input of burst signal packet received. | 3 | 9 |
| 10 | VeeR | Receiver Ground. | 1 | |
| 11 | VeeR | Receiver Ground. | 1 | |
| 12 | RD- | Inverted Received Data out. | 3 | 5 |
| 13 | RD+ | Received Data out. | 3 | 5 |
| 14 | VeeR | Receiver Ground. | 1 | |
| 15 | VccR | Receiver Power supply, +3.3V±5% | 2 | 6 |
| 16 | VccT | Transmitter Power supply, +3.3 V±5% | 2 | 6 |
| 17 | VeeT | Transmitter Ground. | 1 | |
| 18 | TD+ | Transmitter Data In. | 3 | 7 |
| 19 | TD- | Inverted Transmitter Data In. | 3 | 7 |
| 20 | VeeT | Transmitter Ground. | 1 | |

Notes:

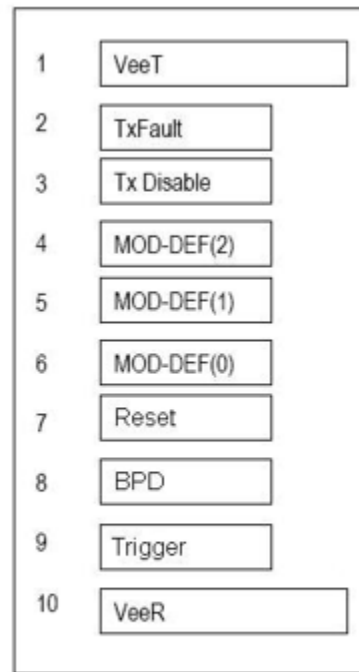
1. Tx_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board to supply VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.
2. Tx_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:
 - Low (0V to 0.8V): Transmitter On
 - (>0.8 and <2V): Undefined
 - High (2.0V to 3.465V): Transmitter Disabled
 - Open: Transmitter Disabled
3. MOD-DEF0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7kΩ–10kΩ resistor on the host board to supply less than VccT/R+0.3V.
 - MOD-DEF 0 is grounded by the module to indicate that the module is present.
 - MOD-DEF 1 is the clock line of 2-wire serial interface for optional serial ID.
 - MOD-DEF 2 is the data line of 2-wire serial interface for optional serial ID.

4. BPD (Burst Power Detect) is pulled up internally with a 10K resistor to VccR. When LOW, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). HIGH indicates normal operation. In the low state, the output will be pulled to <0.8V.
5. RD-/+. These are the differential receiver outputs. They are DC-coupled, 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The DC coupling is done inside the module.
6. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.
7. TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.
8. Reset input compliant with LVTTTL. It will be asserted HIGH at the end of a burst packet.
9. Trigger input compliant with LVTTTL. One positive pulse will issue a burst optical power conversion.

Electrical Pad Layout

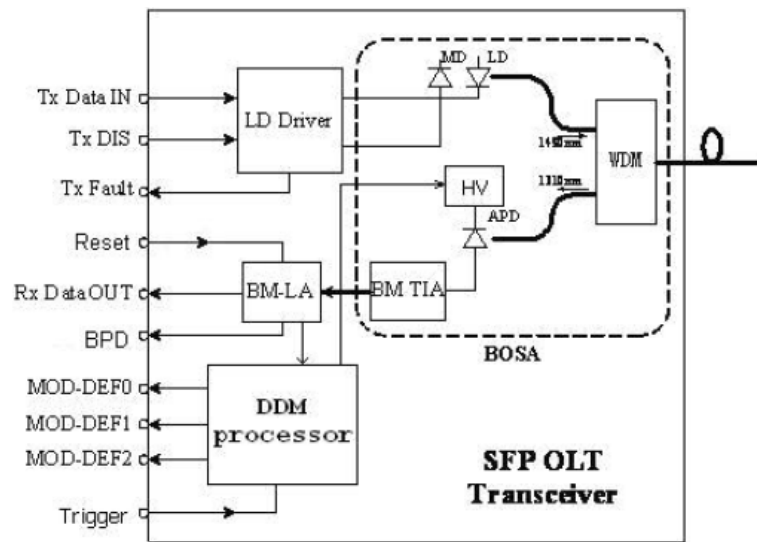


Top of Board

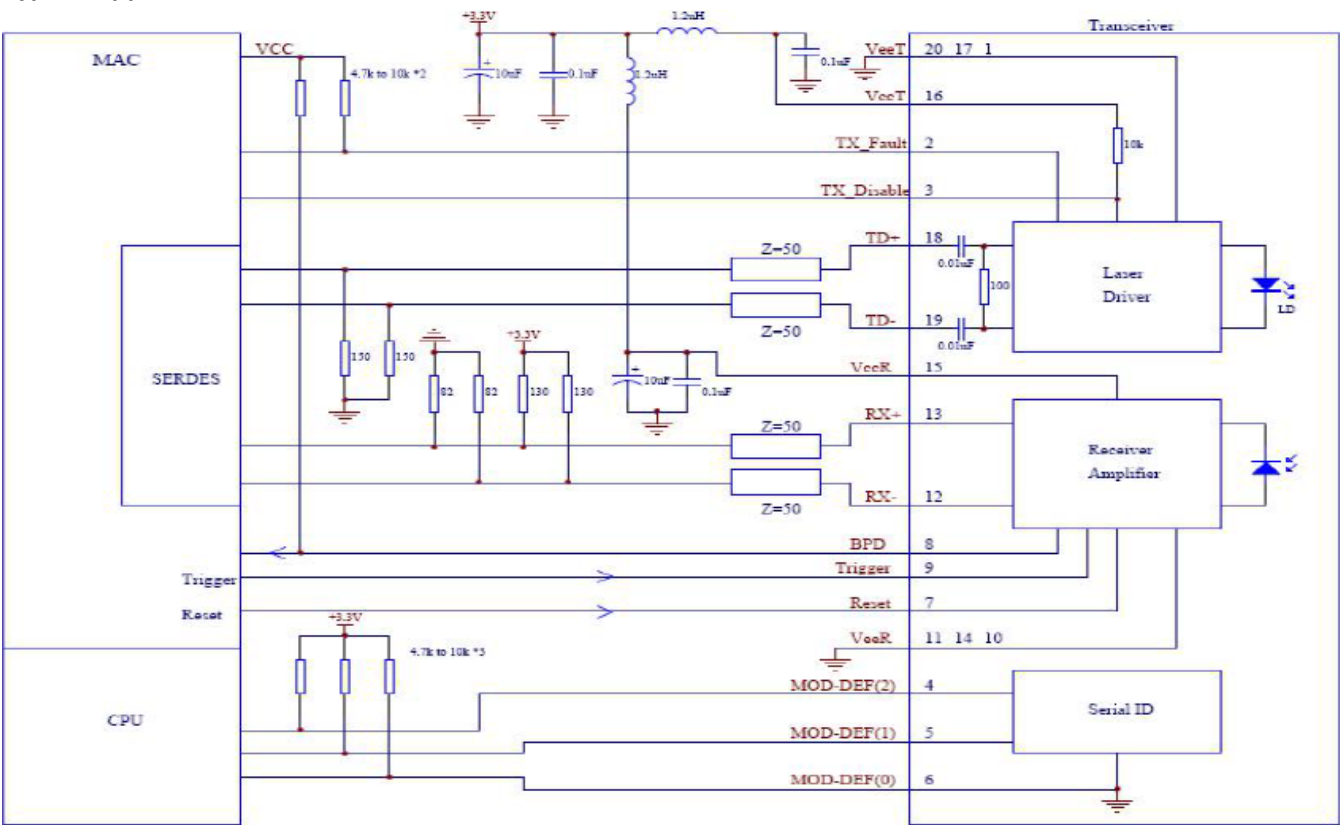


Bottom of Board (as viewed thru top of board)

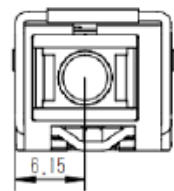
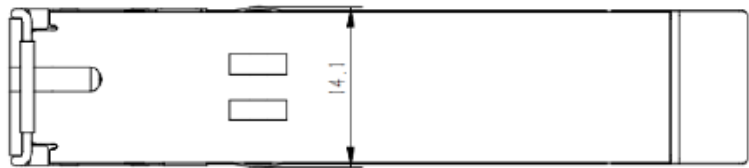
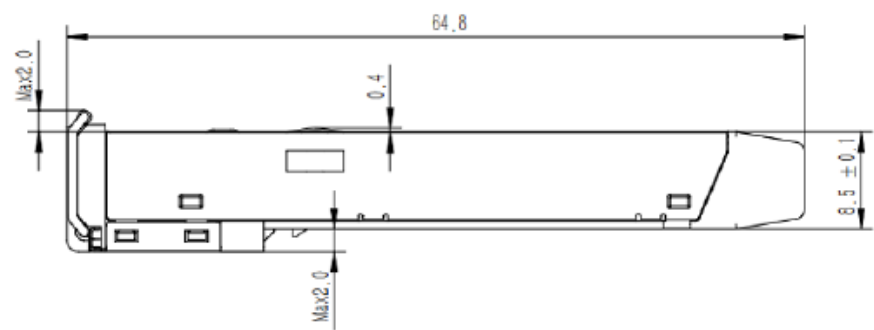
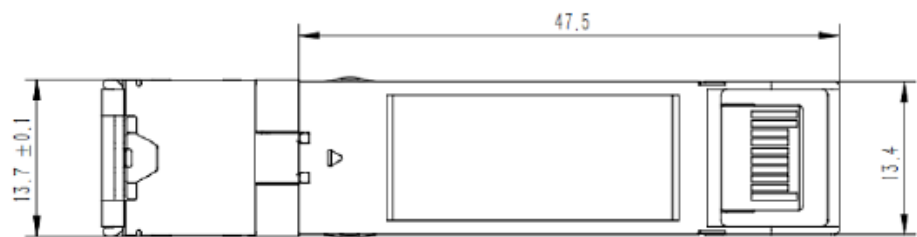
Block Diagram



Typical Application Circuit



Mechanical specifications



Unit: mm
Unspecified Tolerance: ± 0.1mm

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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