



DATASHEET

10067-C

Product specifications



10067-C

155M 1310nm 2km SFP Transceiver

Product Features

- ✓ Up to 155Mb/s data links
- ✓ Duplex LC connector
- ✓ Hot-pluggable SFP footprint
- ✓ 1310nm FP laser transmitter
- ✓ RoHS compliant and Lead Free
- ✓ Up to 2km on 9/125um SMF
- ✓ Metal enclosure for lower EMI
- ✓ Single +3.3V power supply
- ✓ Low power dissipation <800mW
- ✓ Commercial and industrial operating temperature optional
- ✓ SFP MSA SFF-8074i Compliant

Applications

- ✓ SONET OC-3 IR-1 / SDH STM S-1.1
- ✓ Fast Ethernet

Regulatory Compliance

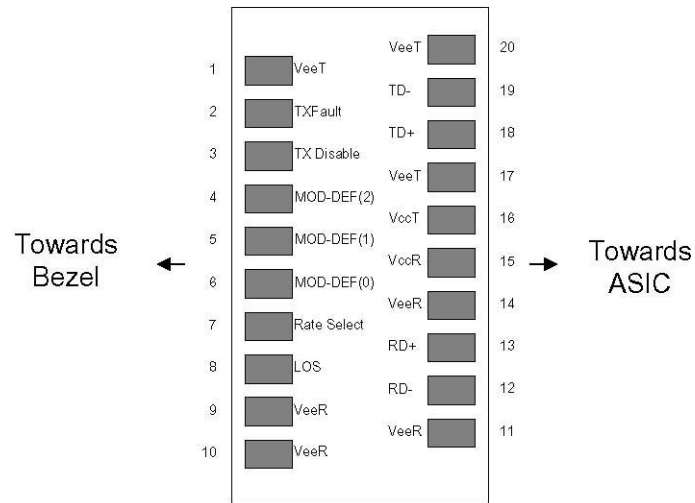
- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHs compliant with 2002/95/EC 4.1&4.2 2005/747/EC

Pin Descriptions

| Pin | Symbol | Name/Description | Ref. |
|-----|-------------|--|------|
| 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 | 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. Logic 0 indicates normal operation. | 4 |
| 9 | VeeR | Receiver Ground (Common with Transmitter Ground) | 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 |

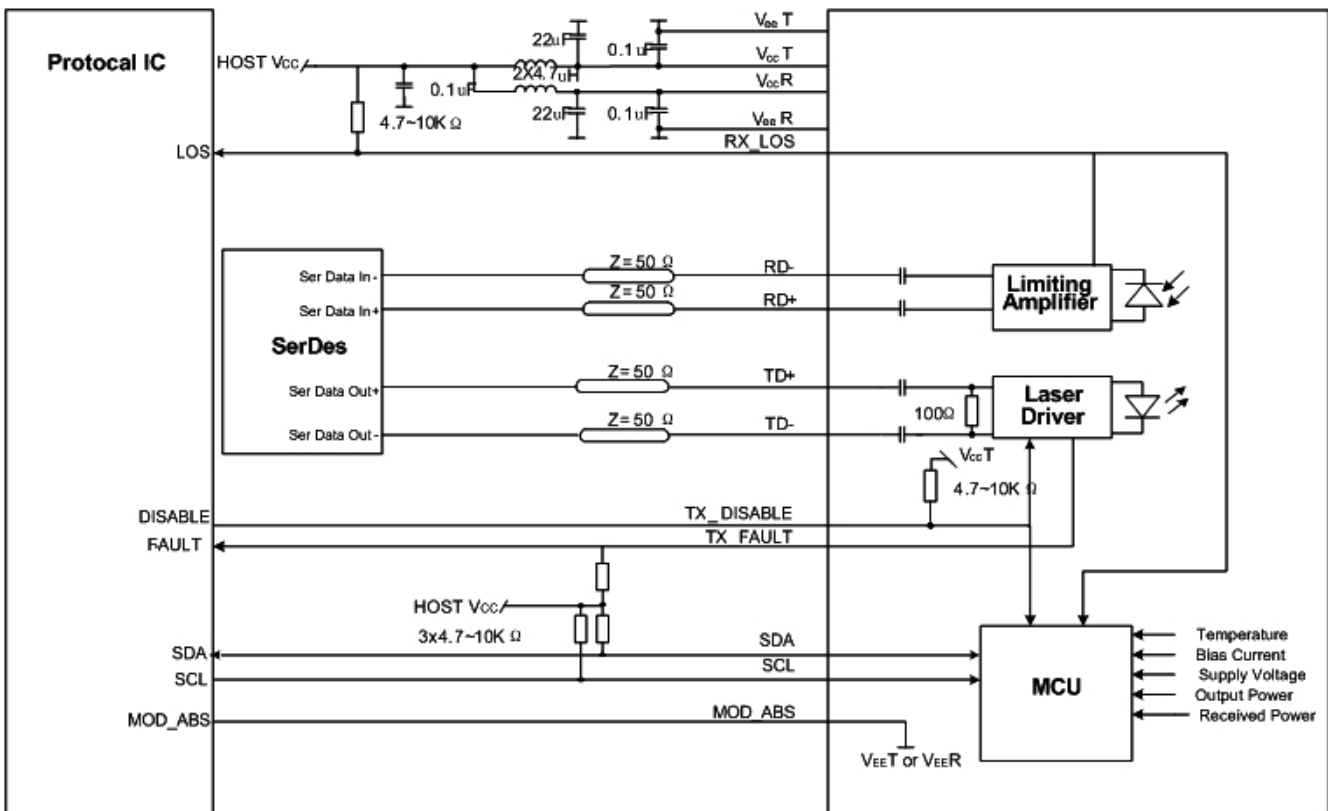
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



Pin-out of Connector Block on Host Board

Recommend Circuit Schematic



Absolute Maximum Ratings

| Parameter | Symbol | Min | Typ | Max | Unit | Ref. |
|------------------------|-----------------|------|-----|------|------|------|
| Maximum Supply Voltage | V _{cc} | -0.5 | | +4.0 | V | |
| Storage Temperature | T _S | -40 | | +85 | °C | |
| Operating Humidity | RH | 5 | | 95 | % | |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Unit | Ref. |
|----------------------------|------------------|------|------|------|------|------|
| Power Supply Voltage | V _{cc} | 3.13 | 3.30 | 3.47 | V | |
| Power Supply Current | I _{cc} | - | - | 250 | mA | |
| Case Operating Temperature | T _c | 0 | - | +70 | °C | 1 |
| | T _i | -40 | - | +85 | | 2 |
| Data Rate(SONET/SDH) | - | - | 155 | - | Mbps | |
| 9/125um G.652 SMF | L _{max} | - | - | 2 | km | |

Notes:

1. For commercial class product.
2. For industrial class product.

Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

| Parameter | Symbol | Min | Typ | Max | Unit | Ref. |
|--------------------------------|----------|-----------|-----|----------|------|------|
| Transmitter | | | | | | |
| Input differential impedance | Rin | - | 100 | - | Ω | 1 |
| Single ended data input swing | Vin, pp | 250 | - | 1200 | mV | |
| TX Disable-High | - | Vcc – 1.3 | - | Vcc | V | |
| TX Disable-Low | - | Vee | - | Vee+ 0.8 | V | |
| TX Fault-High | - | Vcc-0.5 | - | Vcc | V | |
| TX Fault-Low | - | Vee | - | Vee+0.5 | V | |
| Receiver | | | | | | |
| Single ended data output swing | Vout, pp | 300 | 400 | 800 | mV | 2 |
| Data output rise time | tr | - | - | 1500 | ps | 3 |
| Data output fall time | tf | - | - | 1500 | ps | 3 |
| LOS-High | - | Vcc – 0.5 | | Vcc | V | |
| LOS-Low | - | Vee | | Vee+0.5 | V | |

Notes:

1. AC coupled.
2. Into 100 ohm differential termination.
3. 20 – 80 %

Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)

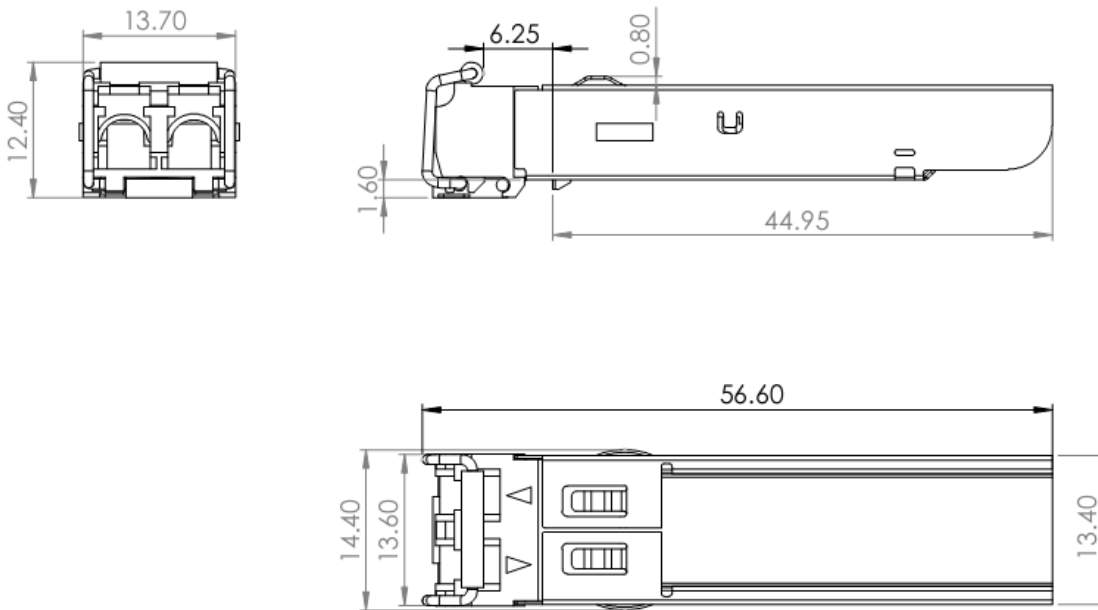
| Parameter | Symbol | Min | Typ | Max | Unit | Ref. |
|--|-------------|------|------|-------|------|------|
| Transmitter | | | | | | |
| Output Opt. Power | PO | -15 | - | -8 | dBm | 1 |
| Optical Wavelength | λ | 1261 | 1310 | 1360 | nm | |
| RMS Spectral Width | σ | - | - | 7.7 | nm | |
| Optical Rise/Fall Time | tr/tf | - | - | 1500 | ps | 2 |
| Total Generated Transmitter Jitter (peak to peak) | | - | - | 0.07 | UI | 3 |
| Total Generated Transmitter Jitter (rms) | | - | - | 0.007 | UI | |
| Optical Extinction Ratio | ER | 10 | - | - | dB | |
| Receiver | | | | | | |
| RX Sensitivity @155Mb/s | SENS | - | - | -28 | dBm | 4 |
| Receiver Overload | | -8 | - | - | dBm | |
| Optical Center Wavelength | λ_C | 1270 | - | 1600 | nm | |
| LOS De-Assert | LOSD | - | - | -29 | dBm | |
| LOS Assert | LOSA | -40 | - | - | dBm | |
| LOS Hysteresis | - | 0.5 | - | 5 | dB | |

Notes:

1. Class 1 Laser Safety.
2. Unfiltered, 20-80%. Complies with OC-3 eye masks when filtered.
3. Measured with DJ-free data input signal .In actual application, output DJ will be the sum of input DJ and ΔDJ .
4. Measured with PRBS $2^{23}-1$ at 10^{-10} BER.

Mechanical Specifications

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



10067-C

EEPROM Information

EEPROM memory map specific data field description is as below:

| 2 wire address 1010000X (A0h) | | 2 wire address 1010001X (A2h) | |
|-------------------------------|---|-------------------------------|---|
| 0 | Serial ID Defined by SFP MSA (96 bytes) | 0 | Alarm and Warning Thresholds (56 bytes) |
| 95 | | 55 | Cal Constants (40 bytes) |
| 127 | Vendor Specific (32 bytes) | 95 | Real Time Diagnostic Interface (24 bytes) |
| | Reserved, SFF8079 (128 bytes) | 119 | Vendor Specific (8 bytes) |
| 255 | | 127 | User Writable EEPROM (120 bytes) |
| | | 247 | Vendor Specific (8 bytes) |
| | | 255 | |

Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

| Parameter | Range | Accuracy | Calibration |
|--------------|------------------|----------|-------------|
| Temperature | 0 to +70°C (C) | ±3°C | Internal |
| | -40 to +85°C (I) | | |
| Voltage | 2.97 to 3.63V | ±3% | Internal |
| Bias Current | 0 to 100mA | ±10% | Internal |
| TX Power | -15 to -8dBm | ±3dB | Internal |
| RX Power | -28 to -8dBm | ±3dB | Internal |