

TELECOM/DATACOM SYSTEM

Lightem 10G SFP+ Duplex LC Transceiver 1310nm Singlemode 40km LSFP+S1340-ER

FEATURES

- Up to 11.1Gbps Data Links
- Maximum link length of 40km on SMF
- Power dissipation < 1.2W
- 1310nm DFB transmitter, PIN photo-detector
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Standard Operating Range: 0°C to 70°C Operating temperature
- Optional Industrial grade: -40°C to 85°C Operating temperature



APPLICATIONS

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------|--------|---------|------|---------|------|------|
| Storage Temperature | Ts | -40 | - | 85 | °C | |
| Relative Humidity | RH | 5 | - | 95 | % | |
| Power Supply Voltage | VCC | -0.3 | - | +4 | V | |
| Signal Input Voltage | | Vcc-0.3 | - | Vcc+0.3 | V | |

RECOMMENDED OPERATING CONDITIONS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------------|--------|------|-------------------|------|------|------------------|
| Case Operating Temperature | Tcase | -5 | | +70 | °C | Commercial grade |
| | Tcase | -40 | | +85 | °C | Industrial grade |
| Power Supply Voltage | VCC | 3.14 | 3.3 | 3.47 | V | |
| Power Supply Current | ICC | - | | 360 | mA | |
| Data Rate | BR | | 10.3125 | | Gbps | |
| Transmission Distance | TD | | - | 40 | m | |
| Coupled fiber | | | Single mode fiber | | | SMF |

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ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|-----------------------------------|------------|---------|-----|---------|----------|------|
| Supply Voltage | Vcc | 3.14 | 3.3 | 3.46 | V | |
| Supply Current | Icc | | | 360 | mA | |
| Transmitter | | | | | | |
| Industrial differential impedance | RIN | | 100 | | Ω | 1 |
| Differential data input swing | Vin, pp | 180 | | 700 | mV | |
| Transmit disable voltage | VD | Vee-1.3 | | Vee | V | |
| Transmit enable voltage | Ven | Vcc | | Vee+0.8 | V | 2 |
| Transmit disable assert time | | | | 10 | us | |
| Receiver | | | | | | |
| Differential data output swing | Vout, pp | 300 | | 850 | mV | 3 |
| Data output rise time | tr | 30 | | | ps | 4 |
| Data output fall time | tf | 30 | | | ps | 4 |
| LOS Fault | VLOS fault | Vee-1.3 | | VeeHost | V | 5 |
| LOS Normal | VLOS norm | Vee | | Vee+0.8 | V | 5 |
| Power supply rejection | PSR | 100 | | | mVpp | 6 |

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. 20 – 80 %.
5. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

OPTICAL CHARACTERISTICS

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|-----------------------------------|-------------|-----------------------------|------|------|------|------|
| Transmitter | | | | | | |
| Average Launch Power | POUT | -1 | | 4.0 | dBm | |
| Optical Wavelength | λ | 1260 | 1310 | 1355 | nm | |
| Optical Extinction Ratio | ER | 3.5 | | | dB | |
| Output Eye Mask | | Compliant with IEEE 802.3aq | | | | |
| Receiver | | | | | | |
| Receiver Sensitivity | Sen | | | -15 | dBm | 2 |
| Input Saturation Power (Overload) | Psat | 0.5 | | | dBm | |
| Wavelength Range | λ_C | 1270 | | 1610 | nm | |
| LOS De -Assert | LOSD | | | -17 | dBm | |
| LOS Assert | LOSA | -30 | | | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulation
2. Measured with a PRBS 2³¹-1 test pattern, @ 10.3125Gb/s, BER<10⁻¹²

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PIN DESCRIPTION

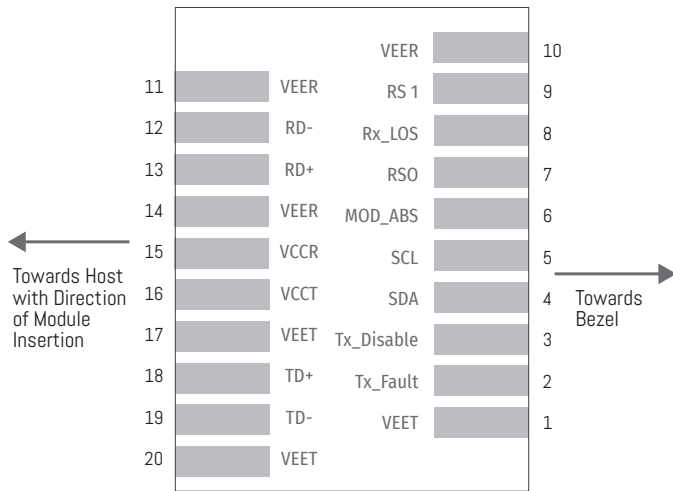
| Pin | Symbol | Name /Description | NOTE |
|-----|---------|--|------|
| 1 | VEET | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | T FAULT | Transmitter Fault. | 2 |
| 3 | T DIS | Transmitter Disable. Laser output disabled on high or open. | 3 |
| 4 | SDA | 2-wire Serial Interface Data Line | 4 |
| 5 | SCL | 2-wire Serial Interface Clock Line | 4 |
| 6 | MOD_ABS | Module Absent. Grounded within the module | 4 |
| 7 | RS0 | Rate Select 0 | 5 |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. | 6 |
| 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 | VCCR | Transmitter Power Supply | |
| 17 | VEER | 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 | VEER | Transmitter Ground (Common with Receiver Ground) | 1 |

Notes:

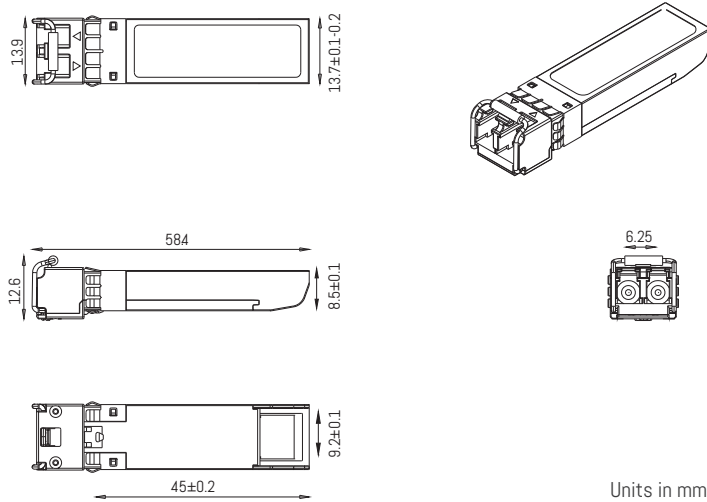
- 1.Circuit ground is internally isolated from chassis ground.
- 2.TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- 3.Laser output disabled on TDIS >2.0V or open, enabled on TDIS<0.8V.
- 4.Should be pulled up with 4.7k Ω - 10k Ω host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
- 5.Internally pulled down per SFF-8431 Rev 4.1.
- 6.LOS is open collector output. It should be pulled up with 4.7k Ω – 10k Ω on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

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PIN OUT OF CONNECTOR BLACK ON HOST BOARD



MECHANICAL DIMENSIONS



ORDERING INFORMATION

| PN | Description |
|--------------------|--|
| LSFP+S1340-ER-x | Lightem 10G SFP+ Duplex LC SM 1310n |
| x- | l: optional industrial grade |
| eg LSFP+S1340-ER-l | Lightem 10G SFP+ Duplex LC SM 1310nm 40km Industrial grade |