

1.25Gbps 10km RJ Mini SFF Transceiver (3CF-413L1SM-LX)

Features

- Ø LC Duplex optical interface
- Ø Up to 10km transmission distance
- Ø Up to 1.25Gbps data links
- Ø Single 3.3 V power supply
- Ø Low DC power consumption
- Ø High performance FP laser
- Ø High sensitivity PIN/TIA optical receiver
- Ø Single Mode operation
- Ø Case Operating temperature ranges:
 - Industrial: -40 to 85°C
 - Commercial: 0 to 70°C
- Ø ROHS compliance



Applications

- 2 Fiber communication
- 2 Video transmission
- 2 Other optical connections

Standards

- 2 SFF-8472

Description

3C-LINK 3CF-413L1SM-LX Mini SFF transceiver is intended for 10km reach service from 155Mbps to 1.25Gbps high-speed communications equipment where low-cost, extraordinary performance and reliability are essential.

The transceiver consists of three sections: a 1310nm FP transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA). The differential AC coupled Tx and Rx data interfaces are CML compatible. The device is Class I laser safety compliant.

The transceiver are compatible with SFF-8472. For further information, please refer to MSA.

Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Units |
|---|--------|-----|-----|-------|
| Storage Temperature | Tstg | -40 | +85 | °C |
| Case Operating Temperature (Industrial) | TO | -40 | 85 | °C |
| Case Operating Temperature (Commercial) | TO | 0 | 70 | °C |
| Relative Humidity - Storage | RHS | 0 | 95 | % |
| Relative Humidity - Operating | RHO | 0 | 85 | % |
| DC Supply Voltage | VCC | 0 | 3.6 | V |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---|-------------------|-------|-----|-------|-------|-------|
| Case Operating Temperature (Industrial) | T _{CASE} | -40 | | 85 | °C | |
| Case Operating Temperature (Commercial) | T _{CASE} | 0 | | 70 | °C | |
| DC Supply Voltage | VCC | 3.135 | 3.3 | 3.465 | V | |
| Module Supply Current | ICC | | | 300 | mA | |
| Data Rate | | 155 | - | 1250 | Mbps | |

Transmitter Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---------------------------------|-----------------|-----|-----|----------------------|-------|-------|
| Differential Data input Swing | V _{IN} | 200 | | 2400 | mV | |
| Tx Differential Input Impedence | Z _{IN} | | 100 | | Ω | |
| Transmitter Disable Voltage | V _D | 2.0 | | V _{CC} +0.3 | V | |
| Transmitter Enable Voltage | V _{EN} | 0 | | 0.8 | V | |

Receiver Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|----------------------------------|-------------------|-----------------|-----|----------------------|-------|-------|
| Differential Data Output Swing | V _{OUT} | 400 | | 1000 | mV | |
| Rx Differential Output Impedence | Z _{OUT} | | 100 | | Ω | |
| LOS Assert Voltage | V _{LOSA} | 2.4 | | V _{CC} | V | |
| LOS De-assert Voltage | V _{LOSD} | V _{EE} | | V _{EE} +0.4 | V | |

Transmitter Optical Characteristics

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|------------------------|------------------|--|------|------|-------|----------|
| Transmitter Laser Type | | FP | | | | |
| Average Output Power | P _{out} | -6 | - | -2 | dBm | 25±10°C |
| | | -7 | - | -1 | dBm | -40~85°C |
| Extinction Ratio | ER | 9 | - | - | dB | |
| Wavelength Range | λ | 1260 | 1310 | 1355 | nm | |
| RMS Spectral Width | Δλ | - | - | 4 | nm | |
| Eye Diagram | | Complies with IEEE802.3z eye masks when filtered | | | | |

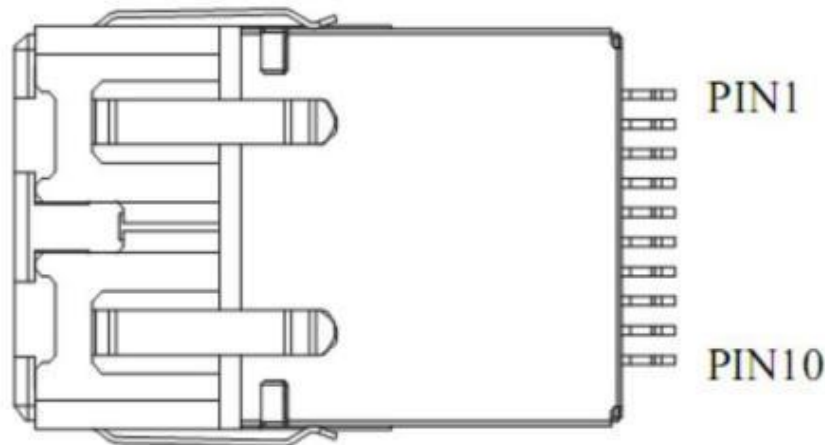
Receiver Optical Characteristics

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---------------|--------|---------|-----|------|-------|-------|
| Receiver Type | | PIN/TIA | | | | |
| Wavelength | λ | 1260 | - | 1600 | nm | |

| | | | | | | |
|--------------------------|-----------------|-----|---|-----|-----|---|
| Sensitivity | Sen | - | - | -16 | dBm | 1 |
| Overload | OVL | -1 | - | - | dBm | |
| Signal Detect Assert | SD _A | - | - | -18 | dBm | |
| Signal Detect De-assert | SD _D | -35 | - | - | dBm | |
| Signal Detect Hysteresis | SD _H | 0.5 | - | - | dB | |

Note1: Measured at 1.25Gbps with PRBS 2⁷⁻¹ NRZ test pattern for BER < 1x10⁻¹²

Top view



Pin Description

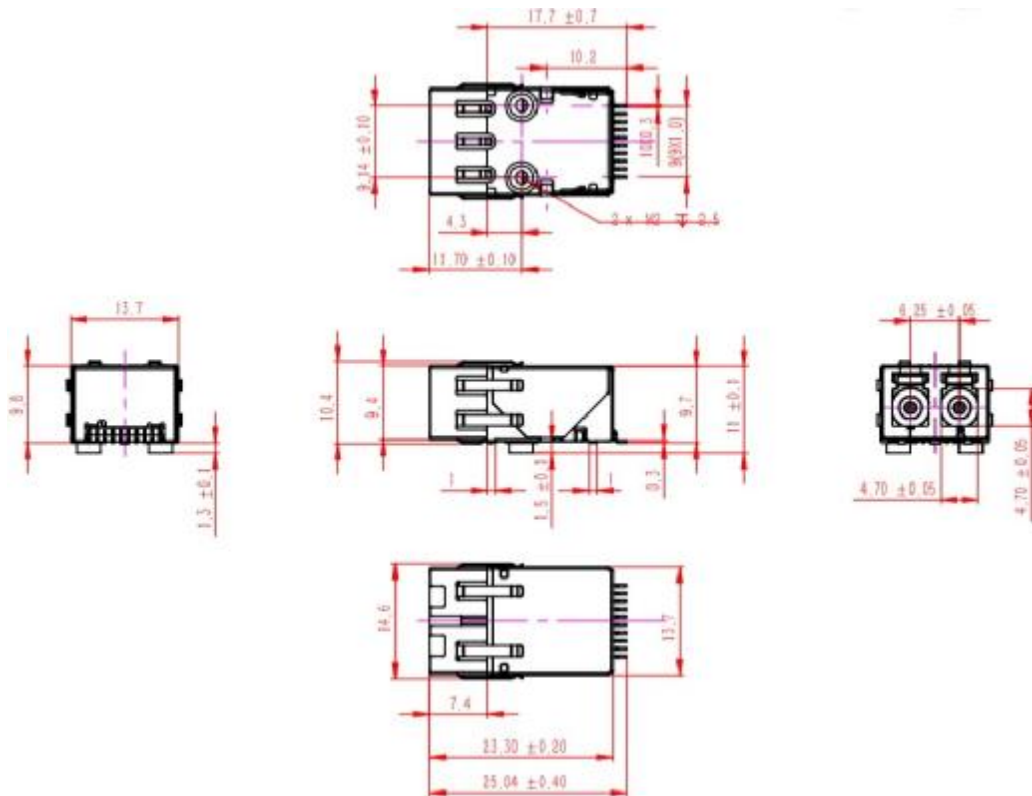
| Pin | Name | Function/Description | Notes |
|-----|-------------------|--|-------|
| 1 | TD+ | Transmitter Non-Inverted DATA in | 3 |
| 2 | GND | Ground | |
| 3 | TD- | Transmitter Inverted DATA in | 3 |
| 4 | VCC | DC Power Supply | |
| 5 | SD | Loss of Signal indication. Logic 1 indicates normal operation.(LVTTTL) | 1 |
| 6 | TX _{DIS} | Transmitter Disable-Module disables on high or open | 1 |
| 7 | RD+ | Receiver Non-inverted DATA out | 2 |
| 8 | SDA | 2-wire Serial Interface Data Line (MOD-DEF2) | |
| 9 | RD- | Receiver Inverted DATA out | 2 |
| 10 | SCL | 2-wire Serial Interface Clock (MOD-DEF1) | |

Notes:

1. Shall be pulled up with 4.7k-10k ohms to a voltage between 3.15V and 3.6V on the host board.
2. The 100Ohms differential Rx Data output is internally AC coupled and terminated.

3. The 1000ohms differential Tx Data input is internally AC coupled and terminated.

Mechanical Dimensions



Outline Drawing

Notes:

1. Tolerance: +/-0.1mm.
2. Light port according with fiber connector SPEC.

Regulatory Compliance

| Feature | Test Method | Performance |
|--|---|--|
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883C Method 3015.7 | Class 1 (> 1500 Volts) |
| Electrostatic Discharge (ESD) Immunity | Variation of IEC 61000-4-2 | LV4(Air discharge: 15KV; Contact discharge: 8 KV) Performance criterion: B |
| Electromagnetic Interference (EMI) | CISPR22 ITE Class B EN55022 Class B FCC Class B | Compliant with standards |

| | | |
|----------|---------------------------------|--|
| Immunity | IEC61000-4-3 Class 2 EN55024 | Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure. |
|----------|---------------------------------|--|

Ordering Information

| Part. No | Specifications | | | | | | | | |
|----------------|----------------|-------------|---------|---------|---------|-----------|-----------|------------|-------|
| | Pack | Rate (Gbps) | Tx (nm) | P (dBm) | Rx | Sen (dBm) | TEMP (°C) | Reach (km) | Other |
| 3CF-413L1SM-LX | MINI SFF | 1.25 | 1310 | -7 ~ -1 | PIN/TIA | ≤-16 | - 40~85 | 10 | RoHS |

Warnings

Handling Precautions:

This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Please follow guidelines according to proper ESD procedures.

Laser Safety:

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.



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