

EX85X-03D(I)

10Gbps 850nm 300M XFP Optical Transceiver

PRODUCT FEATURES

- Supports 9.95Gbps to 11.1Gbps bit rates
- Maximum link length of 300m on OM3 MMF
- 850nm VCSEL laser and PIN receiver
- XFP MSA Rev 4.5 Compliant
- No reference clock required
- +3.3V Supply Voltage
- Low Power Dissipation 1.5W Maximum
- XFI and lineside loopback Mode Supported
- Temperature Range:
 - Commercial: 0°C ~70°C
 - Extended: -10°C ~80°C
 - Industrial: -40°C ~85°C
- Diagnostic Performance Monitoring of module temperature, Supply Voltages, laser bias current, transmit optical power, and receive optical power
- RoHS6 compliant (lead free)

APPLICATIONS

- 10GBASE-SR/SW 10G Ethernet
- 1200-Mx-SN-I 10G Fiber Channel
- Other optical links

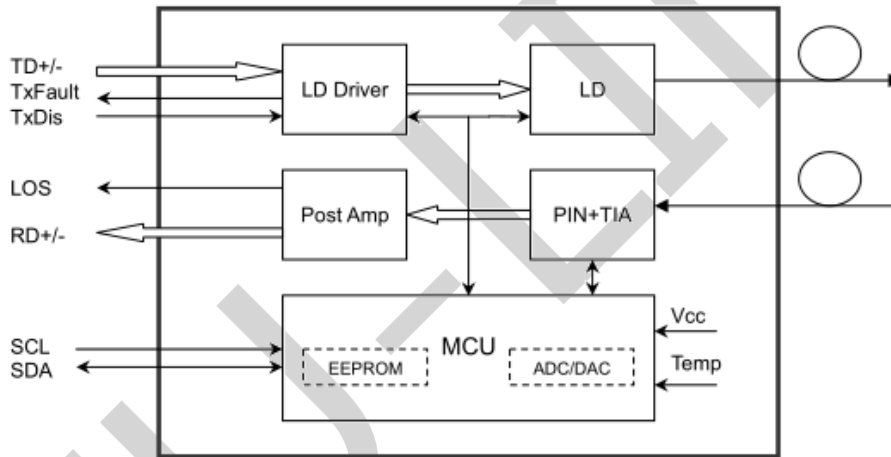
DESCRIPTIONS

ETU-Link EX85X-03D(I) is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source

Agreement (MSA), supporting data-rate of 10.3125Gbps (10GBASE-SR) or 9.953Gbps (10GBASE-SW), and transmission distance is up to 300m on 50µm MMF (2000MHz.km).

The transceiver module comprises a transmitter with 850nm a vertical cavity surface emitting (VCSEL) laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range of 0°C to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10G systems.

Module Block Diagram



Ordering Information

| Part No. | Data Rate(optical) | Laser | Fiber Type | Distance | Optical Interface | Temp | DDMI | Latch Color |
|------------|--------------------|-------|------------|----------|-------------------|----------|------|-------------|
| EX85X-03D | 10.3125Gbps | VCSEL | MMF | 300m | LC | 0~70°C | Y | Black |
| EX85X-03DE | 10.3125Gbps | VCSEL | MMF | 300m | LC | -10~80°C | Y | Black |
| EX85X-03DI | 10.3125Gbps | VCSEL | MMF | 300m | LC | -40~85°C | Y | Black |

Absolute Maximum Ratings

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

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|----------------------------|-----------------|------|---------|------|------|------------|
| Case Operating Temperature | Top | 0 | - | 70 | °C | Commercial |
| | | -40 | | 85 | | Industrial |
| Power Supply Voltage | V _{cc} | 3.13 | 3.3 | 3.47 | V | |
| Transmission Distance | TD | - | - | 300 | m | Over MMF |

Electrical Characteristics

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|------------------------------------|-----------------|------|---------|----------------------|-------|-------|
| Total power supply current | I _{cc} | - | - | 450 | mA | |
| Transmitter (Module Input) | | | | | | |
| Differential Data Input Voltage | VDT | 120 | - | 820 | mVp-p | |
| Differential line input Impedance | RIN | 85 | 100 | 115 | Ohm | |
| Transmitter Fault Output-High | VFaultH | 2.4 | - | V _{cc} | V | |
| Transmitter Fault Output-Low | VFaultL | -0.3 | - | 0.8 | V | |
| Transmitter Disable Voltage- High | VDisH | 2 | - | V _{cc} +0.3 | V | |
| Transmitter Disable Voltage- low | VDisL | -0.3 | - | 0.8 | V | |
| Receiver (Module Output) | | | | | | |
| Differential Data Output Voltage | VDR | 300 | - | 850 | mVp-p | |
| Differential line Output Impedance | ROUT | 80 | 100 | 120 | Ohm | |
| Receiver LOS Pull up Resistor | RLOS | 4.7 | - | 10 | KOhm | |
| Data Output Rise/Fall time | tr/tf | 20 | - | - | ps | |
| LOS Output Voltage-High | VLOSH | 2 | - | V _{cc} | V | |
| LOS Output Voltage-Low | VLOSL | -0.3 | - | 0.4 | V | |

Optical and Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Ref. |
|-----------------------------------|------------------------------|-----|-----|-------|-------|------|
| Transmitter | | | | | | |
| Output Opt. Pwr | POUT | -6 | | -1 | dBm | 1 |
| Optical Wavelength | λ | 840 | 850 | 860 | nm | |
| Optical Extinction Ratio | ER | 3.5 | | | dB | |
| RIN | RIN | | | -128 | dB/Hz | |
| Optical Return Loss Tolerance | ORL | | | -12 | dBm | |
| Output Eye Mask | Compliant with IEEE 0802.3ae | | | | | |
| Receiver | | | | | | |
| Rx Sensitivity | RSSENS | | | -11.1 | dBm | 2 |
| Input Saturation Power (Overload) | Psat | -3 | | | dBm | |
| Wavelength Range | λ_c | 770 | 850 | 860 | nm | |

Optical Communications Products Alliance

| | | | | | | |
|----------------|------|-----|--|-----|-----|--|
| LOS De -Assert | LOSD | | | -14 | dBm | |
| LOS Assert | LOSA | -30 | | | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |

Notes:

- 1) Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
- 2) With worst-case extinction ratio. Measured with a PRBS $2^{31}-1$ test pattern, @10.325Gb/s, BER< 10^{-12} .

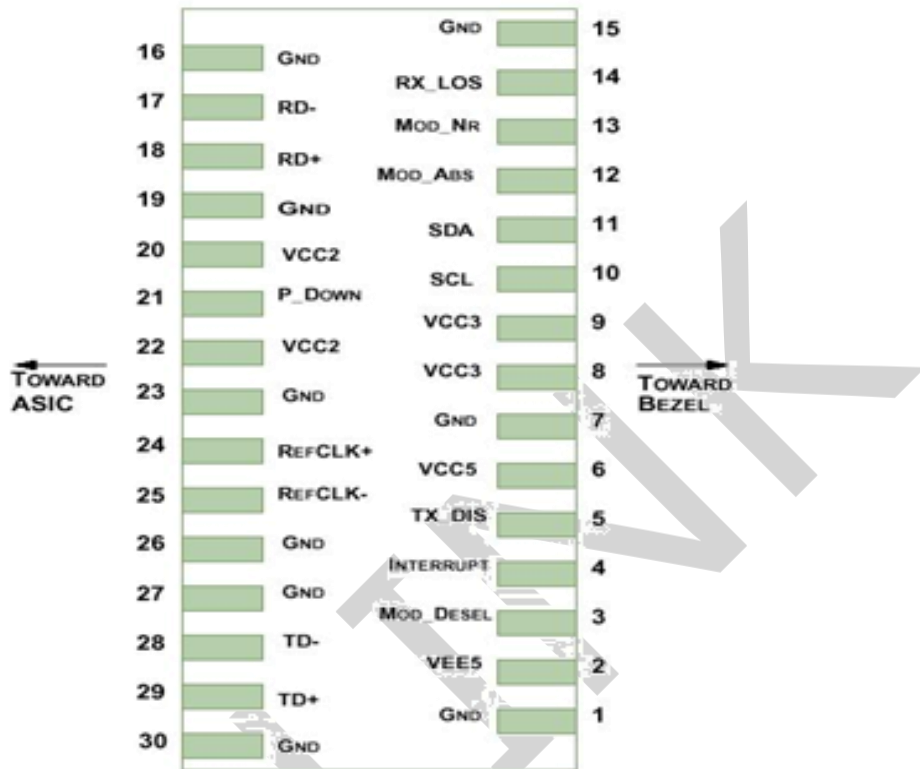
Digital Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration |
|-----------------|-----------|----------|------|-------------|
| Temperature | -40 to 85 | ±3 | °C | Internal |
| Voltage | 0 to Vcc | ±3% | V | Internal |
| Tx Bias Current | 0 to 10 | ±10% | mA | Internal |
| Tx Output Power | -6 to -1 | ±3 | dB | Internal |
| Rx Input Power | -10 to -3 | ±3 | dB | Internal |

Communication Interface Timing Characteristics

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|------------------------|---------------|------|---------|------|------|-------|
| TX_Disable Assert Time | t_off | | | 10 | us | |
| TX_Disable Negate Time | t_on | | | 2 | ms | |
| Time to Initialize | t_int | | | 300 | ms | |
| Interrupt assert delay | Interrupt_on | | | 200 | Ms | |
| Interrupt negate delay | Interrupt_off | | | 500 | us | |
| RX_LOS assert delay | t_loss_on | | | 100 | us | |
| RX_LOS negate delay | t_loss_off | | | 100 | us | |

Pin Diagram



Pin Definitions

| Pin | Logic | Symbol | Name/Description | Ref. |
|-----|------------|-----------|--|------|
| 1 | | GND | Module Ground | 1 |
| 2 | | VEE5 | Optional -5.2 Power Supply – Not required | |
| 3 | LVTTTL-I | Mod-Desel | Module De-select; When held low allows the module to respond to 2-wire serial interface commands | |
| 4 | LVTTTL-O | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface | 2 |
| 5 | LVTTTL-I | TX_DIS | Transmitter Disable; Transmitter laser source turned off | |
| 6 | | VCC5 | +5 Power Supply – Not required | |
| 7 | | GND | Module Ground | 1 |
| 8 | | VCC3 | +3.3V Power Supply | |
| 9 | | VCC3 | +3.3V Power Supply | |
| 10 | LVTTTL-I | SCL | Serial 2-wire interface clock | |
| 11 | LVTTTL-I/O | SDA | Serial 2-wire interface data line | 2 |
| 12 | LVTTTL-O | Mod_Abs | Module Absent; Indicates module is not present. Grounded in the module. | 2 |
| 13 | LVTTTL-O | Mod_NR | Module Not Ready; ETU-LINK's defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX. | 2 |
| 14 | LVTTTL-O | RX_LOS | Receiver Loss of Signal indicator | 2 |
| 15 | | GND | Module Ground | 1 |
| 16 | | GND | Module Ground | 1 |

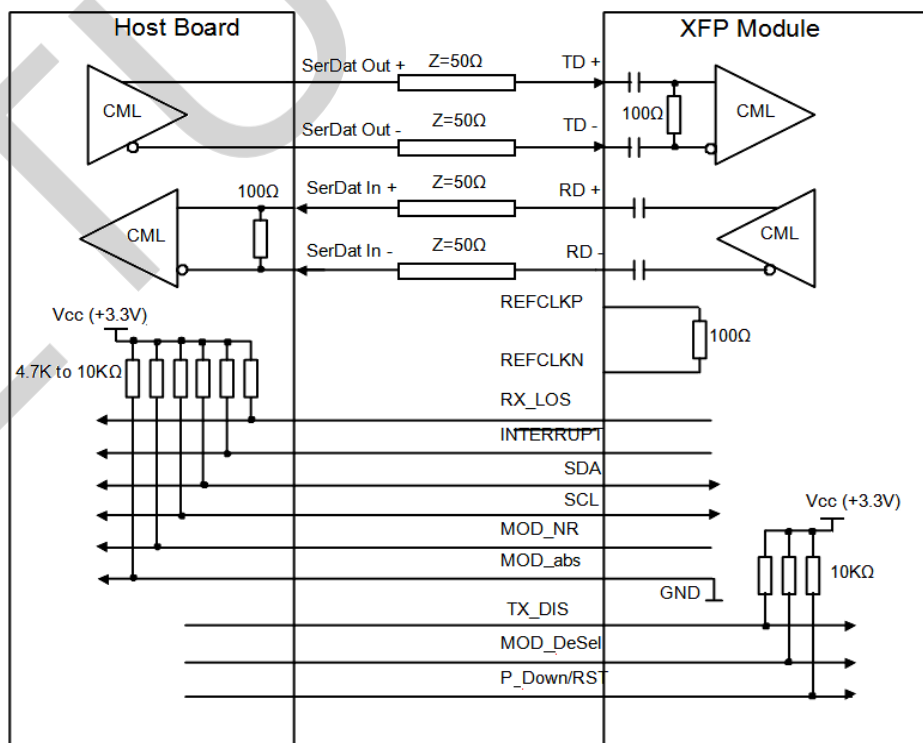
| | | | | |
|----|----------|----------------|--|---|
| 17 | CML-O | RD- | Receiver inverted data output | |
| 18 | CML-O | RD+ | Receiver non-inverted data output | |
| 19 | | GND | Module Ground | 1 |
| 20 | | VCC2 | +1.8V Power Supply – Not required | |
| 21 | LVTTTL-I | P_Down/RS T | Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset | |
| | | | Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. | |
| 22 | | VCC2 | +1.8V Power Supply – Not required | |
| 23 | | GND | Module Ground | 1 |
| 24 | PECL-I | RefCLK+ | Reference Clock non-inverted input, AC coupled on the host board – Not required | 3 |
| 25 | PECL-I | RefCLK- | Reference Clock inverted input, AC coupled on the host board – Not required | 3 |
| 26 | | GND | Module Ground | 1 |
| 27 | | GND | Module Ground | 1 |
| 28 | CML-I | TD- | Transmitter inverted data input | |
| 29 | CML-I | TD+ | Transmitter non-inverted data input | |
| 30 | | GND | Module Ground | 1 |

Notes:

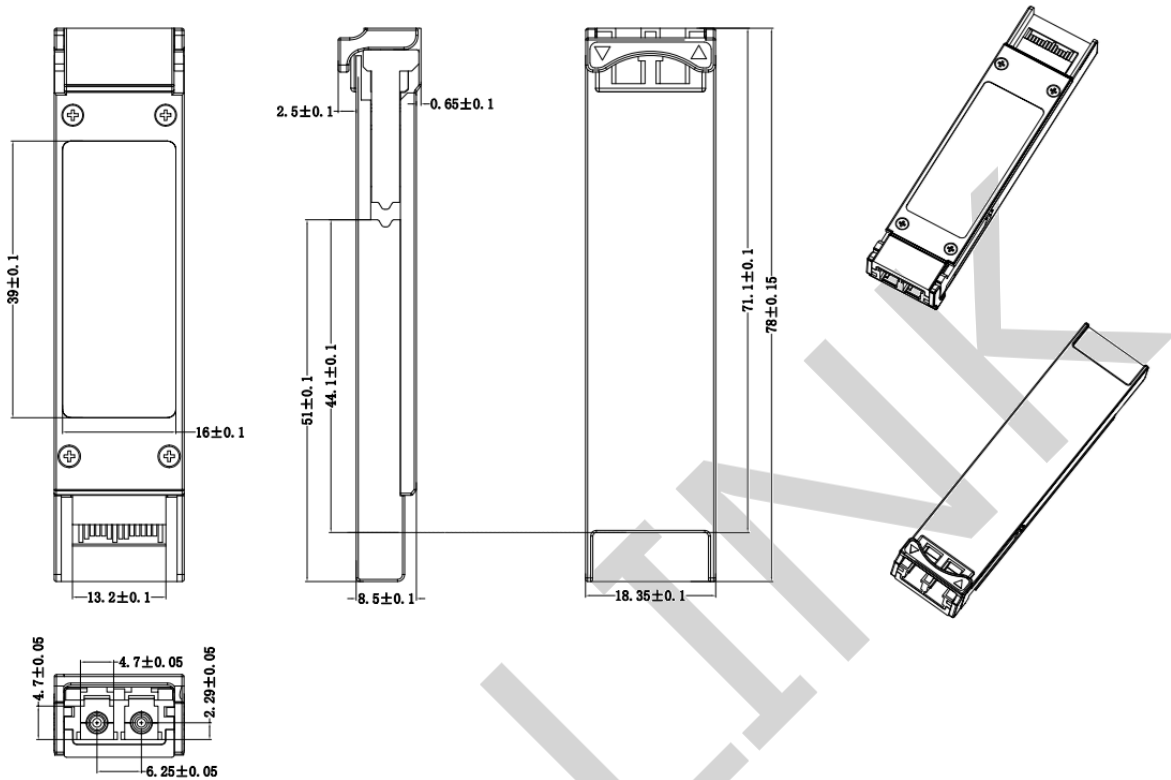
1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.

A Reference Clock input is not required by the EX85X-3LCD03. If present, it will be ignored.

Recommended Interface Circuit



Mechanical Diagram



Revision History

| Version No. | Date | Description |
|-------------|---------------|-----------------------|
| 1.0 | Aug 20, 2015 | Preliminary datasheet |
| 2.0 | July 24, 2024 | Format change |

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