

10Gbps 300m XFP Optical Transceiver

HOLS-XP85M399-LD-xV

Product Features

- 850nm VCSEL laser and PIN receiver
- Maximum link length of 300m(high bandwidth MMF;2000MHz*Km)
- Supports 9.95Gbps to 10.5Gbps bit rates
- Hot-pluggable XFP MSA with duplex LC connect
- XFI electrical interface
- Built-in digital diagnostic function
- +3.3V power supply
- Low power consumption 1.5W(typ.)
- Operating case temperature: -10 to 70 °C
- Excellent EMI performance
- High reliability
- Compatible with RoHS



Product Applications

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

Description

The HOLS-XP85M399-LD-xV is a multi-purpose optical transceiver module for 10Gbit/s data transmission applications at 850nm. It is ideally suited for 10 GbE datacom(belly-to-belly for high density applications) and storage area network(SAN/NAS)applications based on the IEEE 802.3ae and Fibre Channel standards. Designed for short range distances the transceiver module comprises a transmitter with a vertical cavity surface emitting laser (VCSEL) and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range of -10°C to 70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

Performance Specifications

| Absolute Maximum Ratings | | | | |
|-----------------------------|--------|------|------|------|
| Parameter | Symbol | Min. | Max. | Unit |
| Storage Temperature range | - | -40 | +85 | °C |
| operating Temperature range | - | -10 | 70 | °C |
| Operating Relative Humidity | RH | 8 | 80 | % |
| Supply Voltage Range @ 3.0V | Vcc3 | 0.5 | 3.6 | V |

| Recommended Operating Conditions | | | | | | |
|-------------------------------------|--------|------|------|------|-------|------|
| Parameter | Symbol | Min | Typ | Max | Units | Note |
| Operating Case Temperature Range | | -10 | | +70 | °C | 1 |
| Transceiver total Power Consumption | Ptotal | | 1.5 | | W | 1 |
| Power Supply Voltage @ 3.3V | Vcc3V | 3.13 | 3.30 | 3.46 | V | 1 |
| Supply Current | IVCC 3 | | | 600 | mA | 1 |

Note:

1. Please refer to the order information.

| Optical Specification | | | | | | |
|--------------------------|-----------------------|-----|-----|------|-------|------|
| Transmitter | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Units | Note |
| Nominal Wavelength | λ | 840 | 850 | 860 | nm | |
| Spectral Width | $\Delta\lambda$ | | 0.4 | 0.45 | nm | |
| Average Power | P_{out} | -6 | | -1 | dBm | 1 |
| Extinction Ratio | ER | 3.0 | | | dB | |
| Dispersion Penalty | DP | | | 3.9 | dB | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Optical eye mask | Compliant IEEE802.3ae | | | | | 2 |

Notes:

1, launched into MMF.

2. Vertical eye closure penalty and stressed eye jitter are the test conditions for measuring stressed receiver sensitivity. They are not the required characteristic of the receiver.

| Optical Specification | | | | | | |
|-----------------------------|-------------|-----|-----|------|-------|------|
| Receiver | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Units | Note |
| Center Wavelength | λ | 840 | 850 | 860 | Nm | |
| Receiver Sensitivity | <i>PIN</i> | | | -10 | dBm | 1 |
| Receiver Sensitivity in OMA | <i>PIN</i> | | | -7.9 | dBm | 1 |
| Receiver Overload | <i>Pin</i> | 0.5 | | | dBm | 1 |
| Receiver Reflectance | | | | -12 | dB | |
| LOS De-Assert | <i>LOSD</i> | | | -12 | dBm | |
| LOS Assert | <i>LOSA</i> | -25 | | | dBm | |
| LOS Hysteresis | | 0.5 | | 4 | dB | |

Notes:

1, Measured with PRBS 2³¹-1 @10.3125Gbps.

Unless otherwise noted typical data are quoted at nominal voltages and +25°C ambient temperature.

| Electrical Specification | | | | | | |
|----------------------------------|-------------|-----|-----|---------|----------|------|
| Transmitter | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Units | Note |
| Input Differential Impedance | <i>RIND</i> | | 100 | | Ω | 1 |
| Differential input Voltage Swing | <i>VID</i> | 120 | | 1000 | mV | |
| Transmit Disable Voltage | <i>VDis</i> | 2.0 | | VCC3 | | |
| Transmit Enable Voltage | <i>VEN</i> | GND | | GND+0.8 | | |
| Transmit Disable Assert Time | | | | 10 | us | |

Notes:

1, After internal AC coupling.

| Electrical Specification | | | | | | |
|-------------------------------|--------------|-----|-----|-----|----------|------|
| Receiver | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Units | Note |
| Differential Output Impedance | <i>ZOD</i> | | 100 | | Ω | |
| Differential Output Amplitude | <i>VOSPP</i> | 500 | | 800 | mV | 1 |
| Transition Time Low to High | <i>Tr</i> | 40 | | | ps | 2 |
| Transition Time High to Low | <i>Tf</i> | 40 | | | ps | 2 |

Notes:

- 1, Into 100 ohms differential termination.
- 2, 20% – 80 %.
- 3, Loss Of Signal is open collector to be pulled up with a 4.7k Ω – 10k Ω resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

PIN Diagram

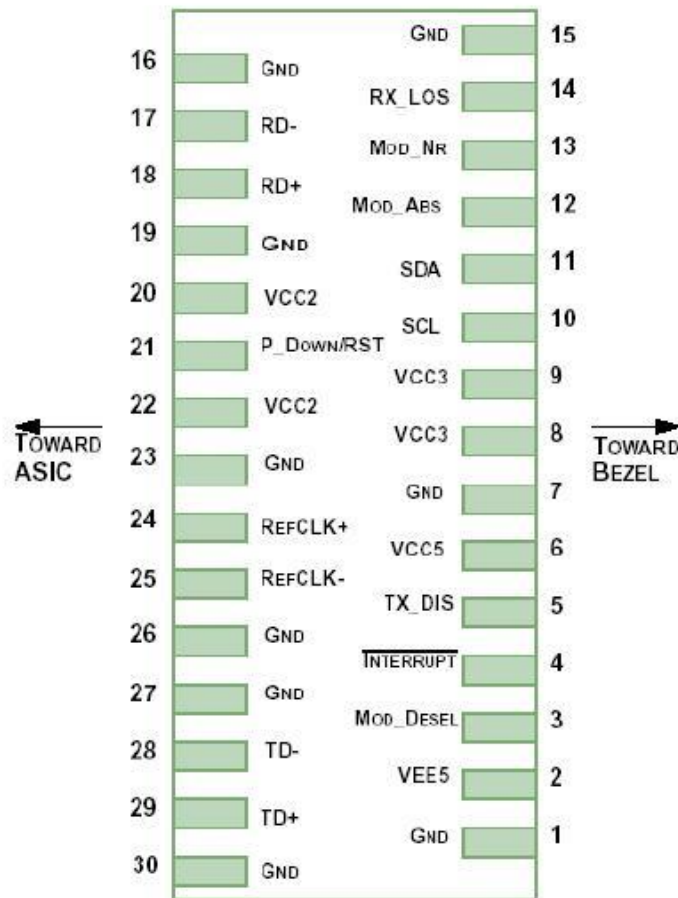


Figure 1

PIN Description

| Pin | Logic | Symbol | Description | Note |
|-----|---------|-----------|---|------|
| 1 | | GND | Module Ground | 1 |
| 2 | | VEE5 | Optional -5.2V Power Supply (Not implemented) | |
| 3 | LVTTL-I | Mod_DeSel | Module De-select; When held low allows the module to respond to 2-wire serial interface | |
| 4 | LVTTL-O | interrupt | interrupt ; Indicates presence of an important condition which can be read over the 2-wire serial interface | 2 |

| | | | | |
|----|------------|----------------|--|---|
| 5 | LVTTTL-I | TX_DIS | Transmitter Disable; Turns off transmitter laser output | |
| 6 | | VCC5 | +5V Power Supply (Not implemented) | |
| 7 | | GND | Module Ground | 1 |
| 8 | | VCC3 | +3.3V Power Supply | |
| 9 | | VCC3 | +3.3V Power Supply | |
| 10 | LVTTTL-I/O | SCL | 2-Wire Serial Interface Clock | 2 |
| 11 | LVTTTL-I/O | SDA | 2-Wire Serial Interface Data Line | 2 |
| 12 | LVTTTL-O | Mod_Abs | Indicates Module is not present. Grounded in the Module | 2 |
| 13 | LVTTTL-O | Mod_NR | Module Not Ready; Indicating Module Operational Fault | 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 | 1 |
| 19 | | GND | Module Ground | 3 |
| 20 | | VCC2 | +1.8V Power Supply (Not implemented) | |
| 21 | LVTTTL-I | P_Down/ RST | Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. 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 implemented) | 3 |
| 23 | | GND | Module Ground | 1 |
| 24 | PECL-I | RefCLK+ | (Not implemented) | |
| 25 | PECL-I | RefCLK- | (Not implemented) | |
| 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 ground pins GND are isolated from the module case and chassis ground within the module.

[2] Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

[3]The pins are open within module.

Block Diagram

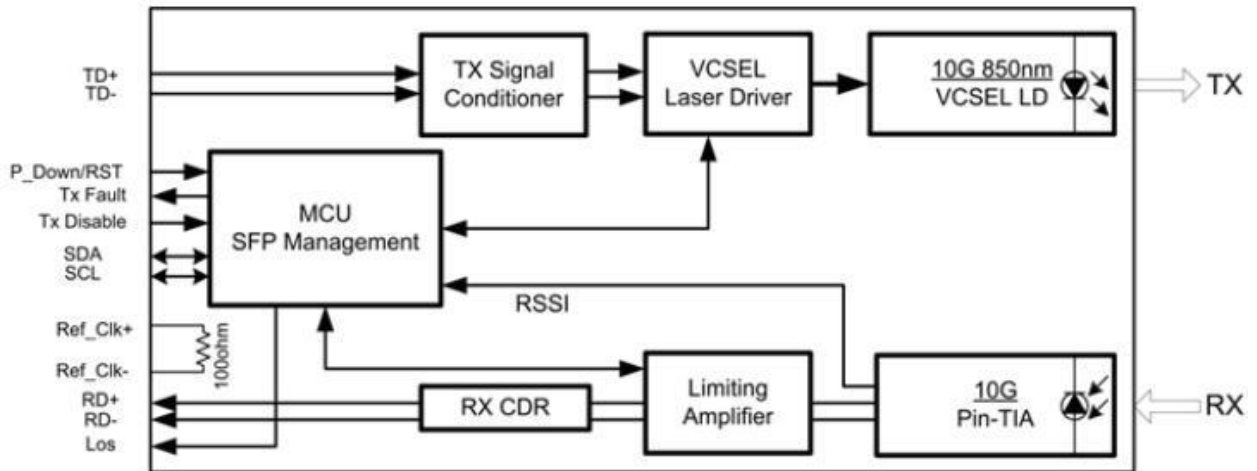


Figure 2

Transmitter Section

The transmitter converts 10Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 10GBASE-SR standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. A logic "1," or no connection on this pin will disable the laser from transmitting. A logic "0" on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supply voltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is a module output contact that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Host in the host with a resistor in the range 4.7-10 k Ω . TX_Disable is a module input contact. When TX_Disable is asserted high or left open, the module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 k Ω to 10 k Ω resistor.

Receiver Section

The receiver converts 10Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to Vcc_Host in the host with a resistor in the range 4.7-10 k Ω , or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the module is installed that the received signal strength is below the specified range. Such an indication typically points to non-installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.

Manage interface

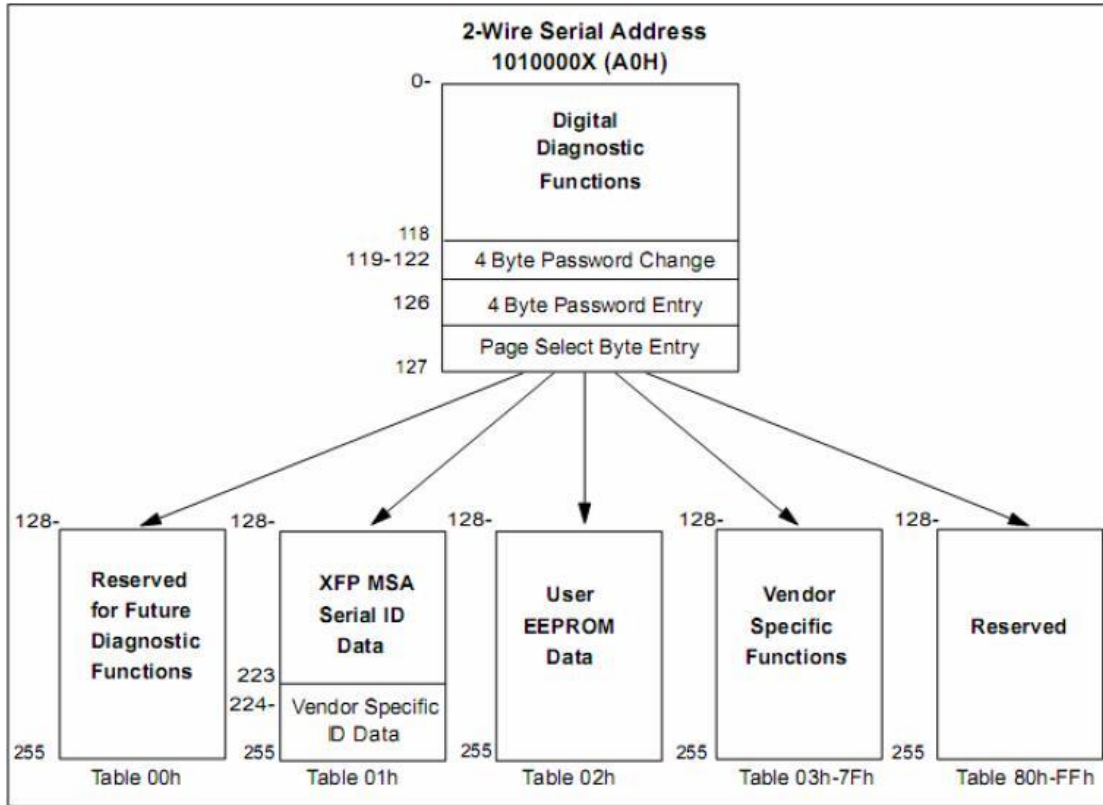


Figure 3

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA). The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The digital diagnostic memory map specific data field defines as following.

Recommended High-Speed Interface Circuit

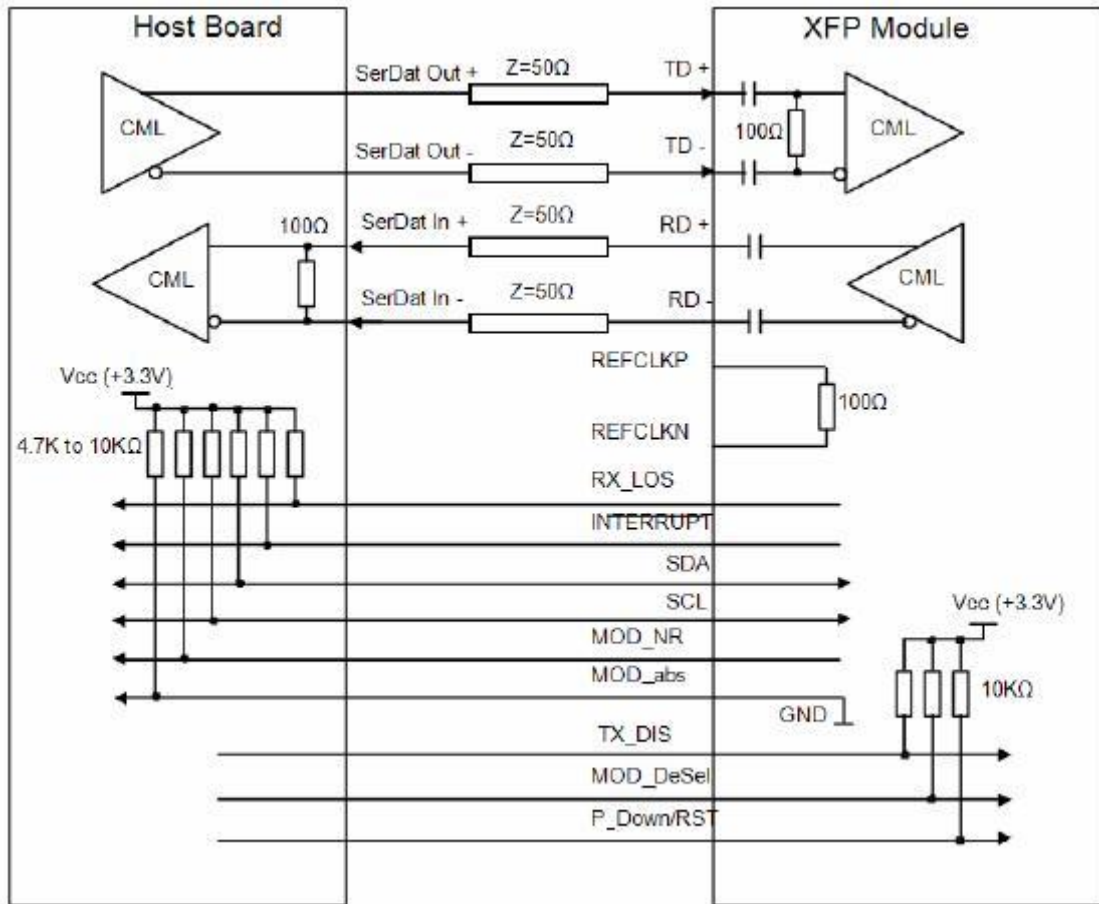
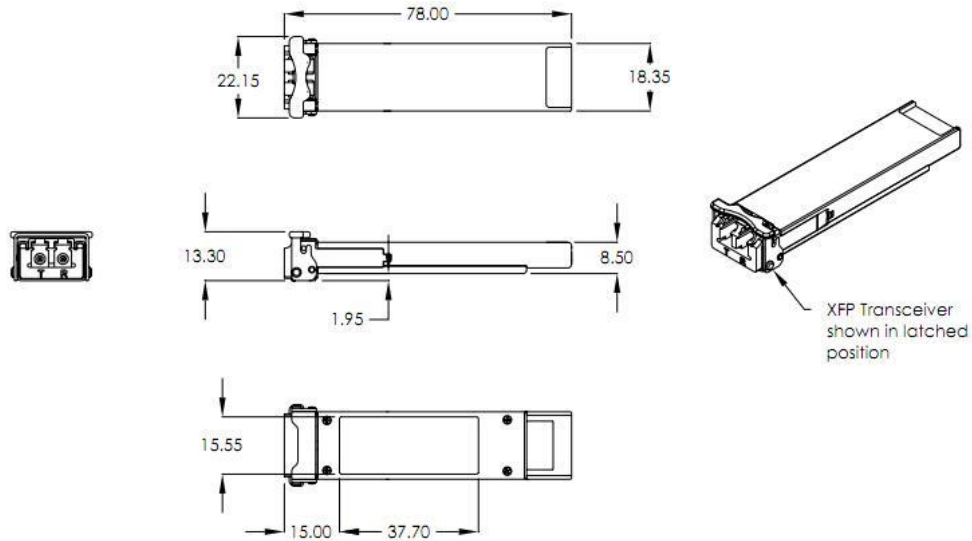


Figure 4

Package Diagram



XFP Transceiver (dimensions are in mm)

Order Information

| Part No. | Application | Data Rate | Operating Temp | Distance |
|---------------------|------------------------|-------------|----------------|----------|
| HOLS-XP85M399-LD-CV | Ethernet/Fiber channel | 9.95G~10.5G | 0 to +70°C | 300m |
| HOLS-XP85M399-LD-IV | Ethernet/Fiber channel | 9.95G~10.5G | -40 to +85°C | 300m |

When the ambient is reaching 85C max as declared, the internal case is hot surface please don't touch.

