

XFP-S1015L-100

Optical XFP Module

10Gbps XFP Transceiver SM 1550nm 100km LC



Features

- Supports 9.95Gb/s to 11.3Gb/s bit rates
- 1550nm Cooled EML laser and APD photodiode
- Maximum link length of 100km with SMF
- XFP MSA package with duplex LC connector
- Hot-pluggable XFP footprint, Built-in digital diagnose
- No reference clock required
- Single +3.3V power supply
- Power dissipation <3.5W
- Compatible with RoHS
- Operating case temperature:
Standard: -5 to +70°C

Application

- 10GBASE-ZR/ZW 10G Ethernet
- 10G Fiber Channel
- SONET OC-192 & SDH STM 64

Standard

- Compliant with XFP MSA
- Compliant with SFF-8472
- Compliant with IEEE 802.3ae

Description

The XFP module is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), supporting data-rate of 9.95~11.3Gbps, and transmission distance up to 100km on SMF.

The transceiver module comprises a transmitter with 1550nm Cooled EML laser and a receiver with a APD photodiode. Transmitter and receiver are separate within a wide temperature range and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|----------------------|--------|------|------|------|
| Power Supply Voltage | Vcc3 | -0.3 | +3.6 | V |
| Power Supply Voltage | Vcc2 | -0.3 | +2.0 | V |
| Storage Temperature | Ts | -40 | +85 | °C |
| Operating Humidity | - | 5 | 85 | % |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Unit |
|---|--------|------|---------|------|------|
| Operating Case Temperature (Commercial) | Tc | 0 | | +70 | °C |
| Power Supply Voltage | Vcc | 3.13 | 3.30 | 3.47 | V |
| Power Supply Current | Icc | | | 760 | mA |
| Data Rate | | | 10.3 | 11.3 | Gbps |
| Transmission Distance | | - | 100 | - | km |

Optical and Electrical Characteristics

| Electrical Characteristics | | | | | | |
|--|--------|---------|---------|-----|----------|--------|
| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
| Transmitter differential input voltage | | 120 | | 820 | mV | |
| Receiver differential output Voltage | | 340 | 650 | 850 | mV | |
| Input differential impedance | R | | 100 | | Ω | |
| Transmit Disable Assert Time | | | 10 | | us | |
| Data output rise time | tr | | | 38 | ps | |
| Data output fall time | tf | | | 38 | ps | |
| Transmit Fault (TX_Fault) | Voh | 2 | | Vcc | V | LVTTTL |
| | Vol | 0 | | 0.8 | V | LVTTTL |
| Loss of Signal (LOS) | Voh | Vcc-0.5 | | Vcc | V | LVTTTL |
| | Vol | 0 | | 0.5 | V | LVTTTL |
| TX Disable | Vih | 2 | | Vcc | V | LVTTTL |
| | Vil | 0 | | 0.8 | V | LVTTTL |

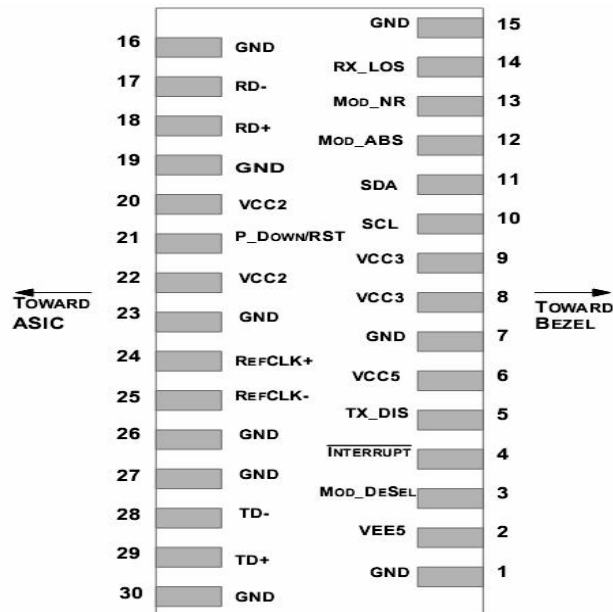
| Optical Transmitter Characteristics | | | | | | |
|-------------------------------------|--|------|---------|------|-------|-------|
| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
| Launched Power (avg.) | Pout | 0 | | 5 | dBm | |
| Operating Wavelength Range | λ_c | 1530 | 1550 | 1570 | nm | |
| Extinction Ratio | ER | 9 | | | dB | 2 |
| Relative Intensity Noise | RIN | | | -130 | dB/Hz | |
| Average Launch power of transmitter | P _{OFF} | | | -30 | dBm | |
| Side mode Suppression ratio | SMSR | | 30 | | PS | 3 |
| Eye Mask Margin | | 30 | | | % | |
| Output Eye Diagram | Complies with IEEE802.3z eye masks when filtered | | | | | |
| Optical Receiver Characteristics | | | | | | |
| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
| Receiver Sensitivity | S | | | -24 | dBm | 4 |
| Wavelength Range | λ_c | 1270 | | 1610 | nm | |
| Optical Power Input Overload | P _{in-max} | -6 | | | dBm | 4 |
| Receiver Reflectance | R | | | -27 | dB | |

| | | | | | | | |
|----------------|-------------------|----|-----|--|-----|-----|---|
| LOS | Optical De-assert | Pd | | | -27 | dBm | 4 |
| | Optical Assert | Pa | -37 | | | | |
| LOS hysteresis | | | 0.5 | | | dB | 5 |

Notes:

- 1) The supply current is XFP module's working current.
- 2) For the measurements, the device was driven with 10Gbps data pattern with $2^{31}-1$ PRBS payload.
- 3) Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between the 20% and 80% amplitudes relative to the logical 1 and 0 levels
- 4) Measured with a PRBS $2^{31}-1$ test pattern, @10Gbps, ER=9dB, BER< 10^{-12}
- 5) The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

Pin Description



| Pin | Logic | Symbol | Name/Description | Re |
|-----|-----------|-----------|--|----|
| 1 | | GND | Module Ground | 1 |
| 2 | | VEE5 | Optional -5.2 Power Supply – Not required | |
| 3 | LVTTL-I | Mod-Desel | Module De-select; When held low allows the module to, respond to 2-wire serial interface commands | |
| 4 | LVTTL-O | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface | 2 |
| 5 | LVTTL-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 | LVTTL-I | SCL | Serial 2-wire interface clock | 2 |
| 11 | LVTTL-I/O | SDA | Serial 2-wire interface data line | 2 |
| 12 | LVTTL-O | Mod_Abs | Module Absent; Indicates module is not present. Grounded in the | 2 |
| 13 | LVTTL-O | Mod_NR | Module Not Ready; | 2 |
| 14 | LVTTL-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 | LVTTL-I | P_Down/RST | 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 | 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:

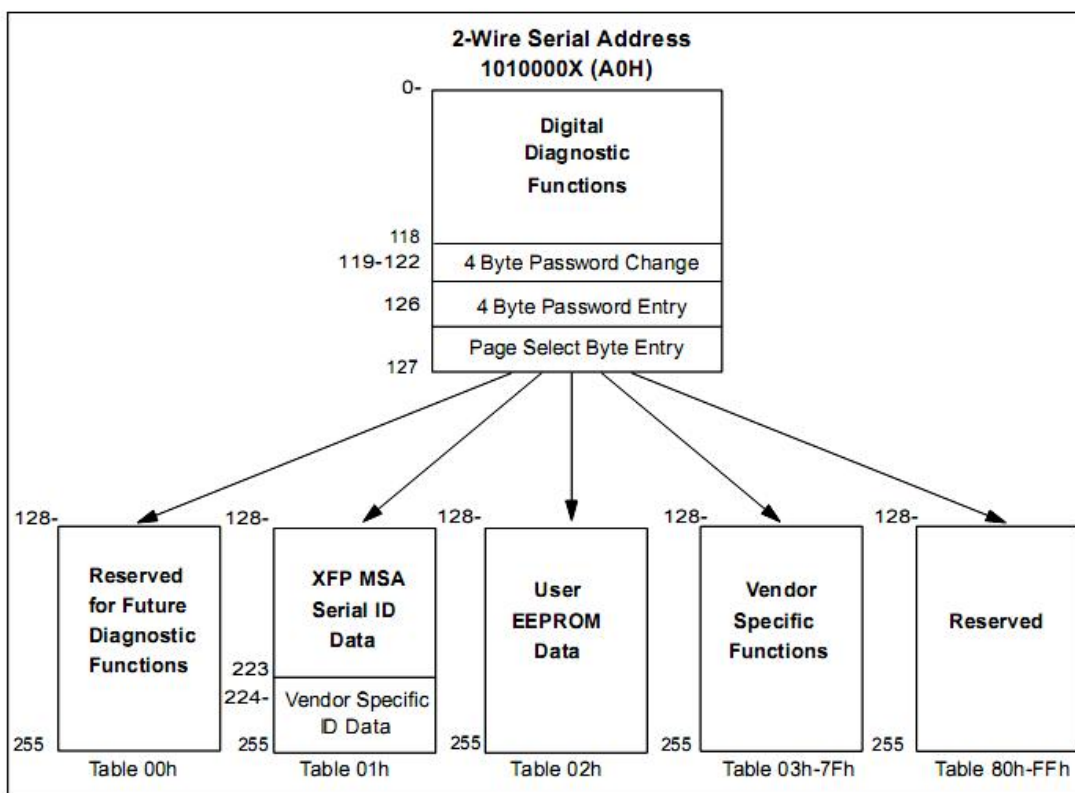
1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector, should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required.

Management Interface

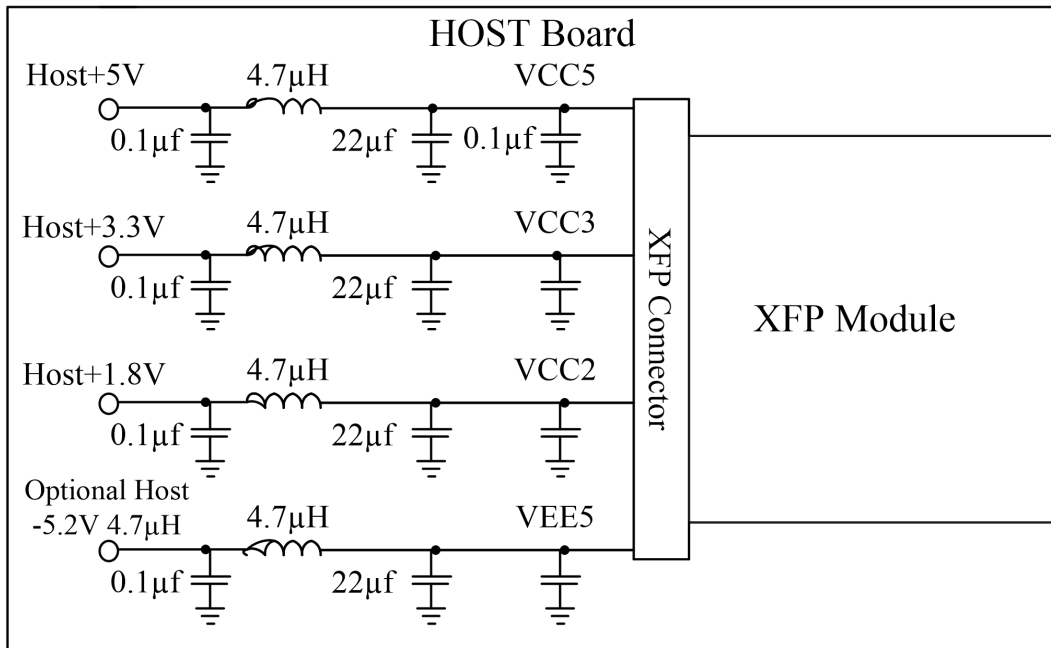
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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.

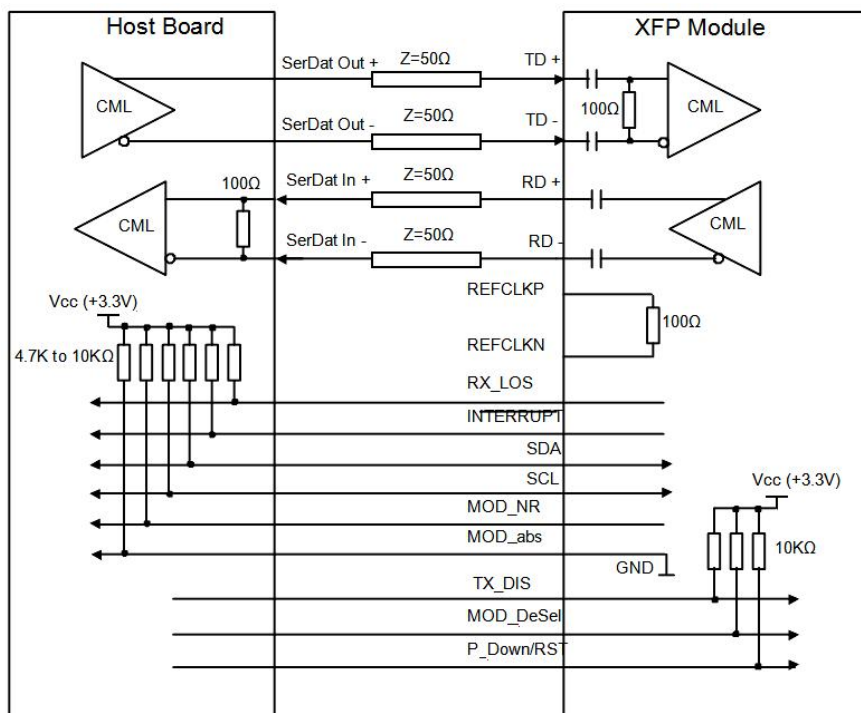
The digital diagnostic memory map specific data field defines as following.



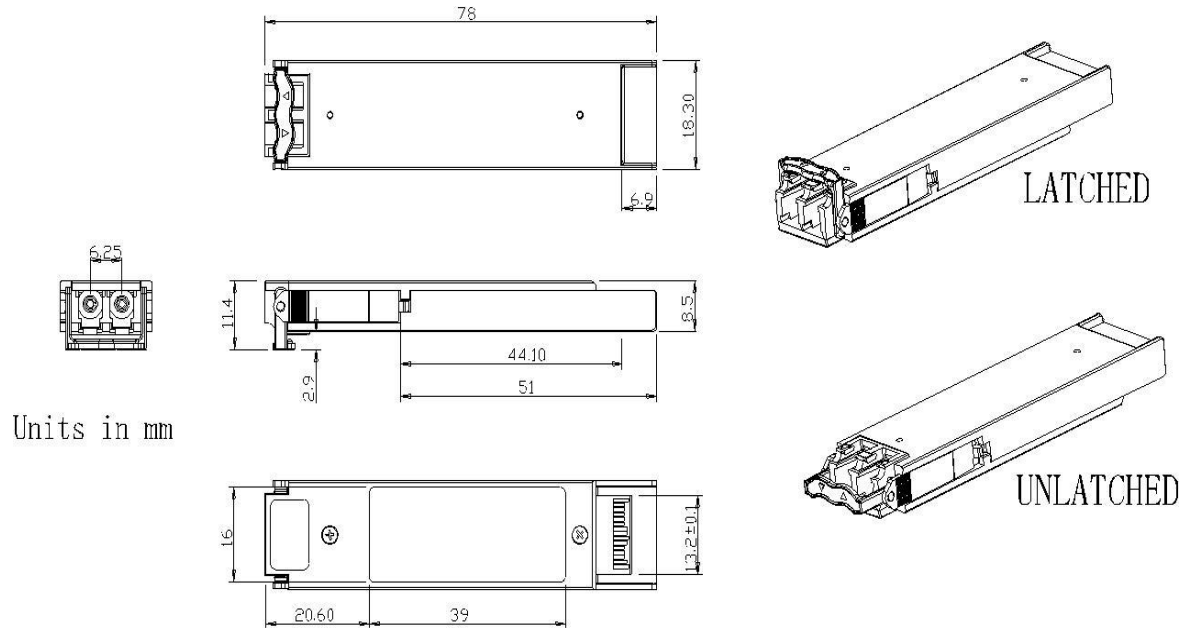
Recommended Host Board Power Supply Circuit



Recommended High-speed Interface Circuit



Mechanical Dimensions



Ordering information

| Model No. | Product Description |
|----------------|---|
| XFP-S1015L-100 | 10Gbps, 1550nm, SMF, 100km, 0°C ~ +70°C, with DDM |



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