# 10Gb/s SFP+ SR 300m Optical Transceiver

## Features

- Operating data rate 10.3125Gbps
- SFP+ MSA package with duplex LC connector
- Duplex LC connector
- Single +3.3V power supply
- Power dissipation≤1W
- Differential LVPECL inputs and outputs
- Hot-pluggable capability
- RoHS compliant

## Applications

- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

## Compliance

- SFP MSA
- Compliant to SFP+ Electrical MSA SFF-8431
- Compliant to SFP+ Mechanical MSA SFF-8432
- SFF-8472
- IEEE802.3ae
- RoHS

## Description

SFP-10G-SR is a high performance, cost effective modules, which is optimized for 10.3125G Ethernet application, and transmission distance up to 300m on OM3 MMF, The transceiver consists of two sections: The transmitter section incorporates an 850nm VCSEL driver. The receiver section consists of a PIN photo-diode integrated with a transimpedance preamplifier (TIA). The module is hot pluggable into the 20-pin connector.

The high-speed electrical interface is based on low voltage logic, with nominal 100 Ohms differential impedance and AC coupled in the module. The optical output can be disabled by LVTTL logic high-level input of TX_DIS. Loss of signal (RX_LOS) output is provided to indicate the loss of an input optical signal of receiver.

A serial EEPROM in the transceiver allows the user to access transceiver monitoring and configuration data via the 2-wire SFP Management Interface. This interface uses two single addresses: A0h and A2h. Basic digital diagnostic (DD) data is held in the lower area while specific data is held in a series of tables in the high memory area.

## Absolute Maximum Ratings

**Table1-Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Storage Temperature | TS | -40 | +85 | °C |
| Supply Voltage | VCC | 0 | 3.6 | V |
| Relative Humidity | RH | 5 | 85 | % |

## Recommended Operating Conditions

**Table2-Recommended Operating Conditions**

| Parameter | Symbol | Min. | Typical | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Operating Case Temperature | TC | 0 | | 70 | °C | |
| Power Supply Voltage | VCC | 3.135 | 3.3 | 3.475 | V | |
| | ICC | | | 280 | mA | |
| Power Dissipation | PD | | | 1000 | mW | |
| Data Rate | | | 10.3125 | | Gbps | |
| Transmission Distance | | | | 300 | m | OM3 |

## Optical,Electrical Characteristic

Tested under recommended operating conditions, unless otherwise noted

**Table3-Transmitter Operating Characteristic-Optical，Electrical**

| Parameter | Symbol | Min. | Typical | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Center Wavelength | λC | 840 | 850 | 860 | nm | |
| RMS Spectral Width | | | | 0.45 | nm | |
| Optical Power for TX DISABLE | Poff | | | -30 | dBm | |
| Output average power | Pavg | -6.5 | | -1 | dBm | |
| Optical Modulation Amplitude | OMA | | -1.5 | | dBm | |
| Extinction Ratio | ER | 3 | | | dB | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Optical Return Loss Tolerance | | | | 12 | dB | |
| Transmitter Dispersion Penalty | TDP | | | 3.9 | dB | |
| Optical Eye Mask | Compliant with IEEE 802.3ae | | | | | |
| Tx Input Diff Voltage | VI | 180 | | 700 | mV | |
| Tx Fault | VoL | -0.3 | | 0.4 | V | At 0.7mA |
| | IoH | -50 | | 37.5 | uA | |
| Tx_Disable | VIL | -0.3 | | 0.8 | V | |
| | VIH | 2 | | VCC+0.3 | V | |

**Table4-Receiver Operating Characteristic-Optical，Electrical**

| Parameter | Symbol | Min. | Typical | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Center Wavelength | λr | 840 | 850 | 860 | nm | |
| Receiver Sensitivity | Psens | | | -9.9 | dBm | 1 |
| Los Assert | LosA | -30 | | | dBm | |
| Los Dessert | LosD | | | -11 | dBm | |
| Los Hysteresis | LosH | 0.5 | | | dB | |
| Overload | Pin | -1 | | | dBm | |
| Receiver Reflectance | | | | -12 | dB | |
| Operating Data Rate | | | 10.3125 | | Gbps | |
| Rx Output Diff Voltage | Vo | 300 | | 850 | mV | |
| Rx_LOS | VoL | -0.3 | | 0.4 | V | At 0.7mA |
| | IoH | -50 | | 37.5 | uA | 2 |
| RS0 and RS1 | VIL | -0.3 | | 0.8 | V | |
| | VIH | 2 | | VCC+0.3 | V | |

Notes:

[1] Receiver sensitivity is informative. shall be measured with conformance test signal for BER =1x10-12.

[2] Measured with a 4.7 kΩ load pulled up to Vcc.

## Recommended Host Board Power Supply Circuit

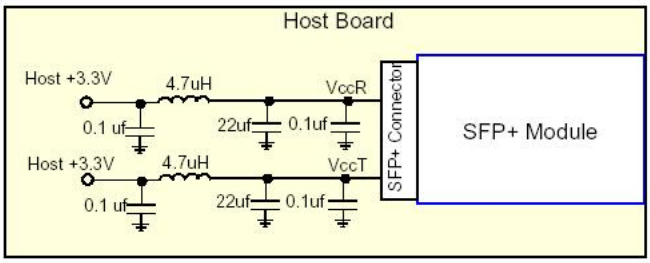



Figure1 Recommended Host Board Power Supply Circuit

## Recommended Interface Circuit

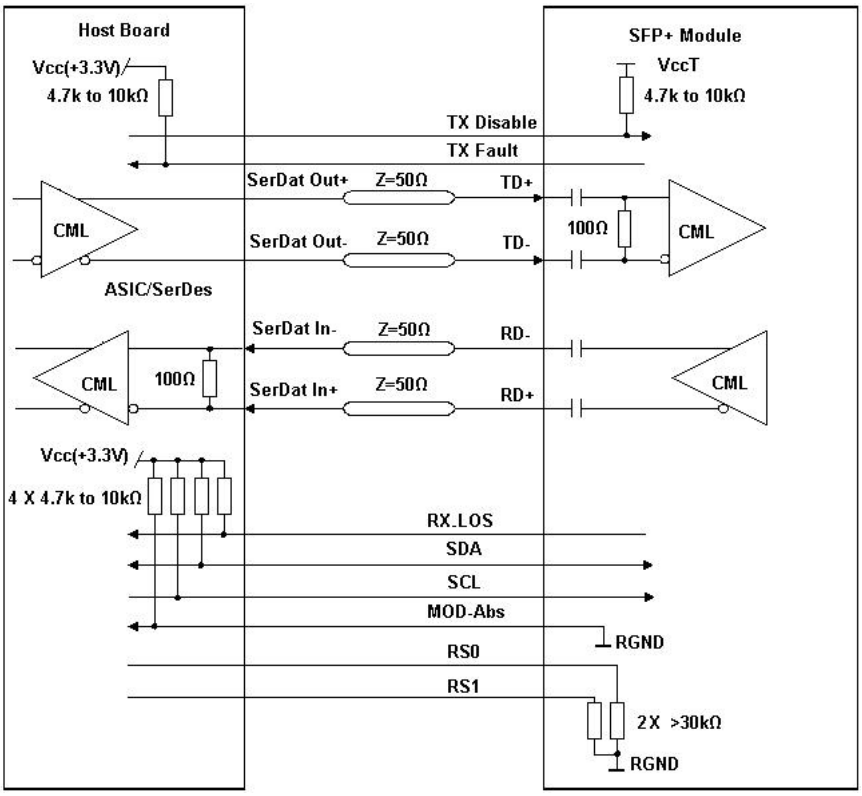



Figure2 Recommended Interface Circuit

## Pin-out Definition

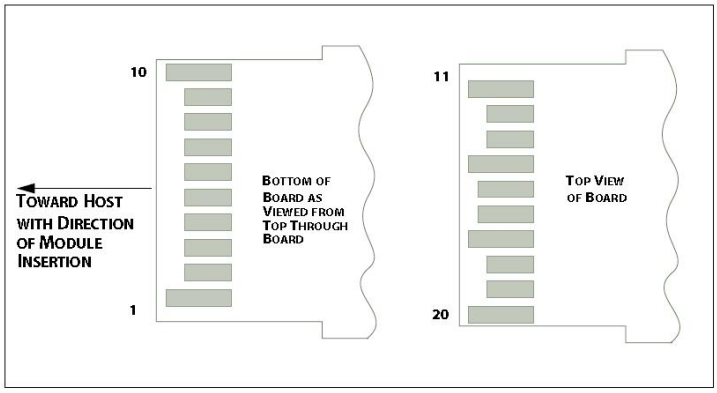



Figure3 Pin view

## Pin Function Definitions

**Table5-Pin Function Definitions**

| Pin | Logic | Symbol | Name/Description | Note |
|---|---|---|---|---|
| 1 | | VeeT | Module Transmitter Ground | 1 |
| 2 | LVTTL-O | TX_Fault | Module Transmitter Fault | 2 |
| 3 | LVTTL-I | TX_Disable | Transmitter Disable; Turns off transmitter laser output | 3 |
| 4 | LVTTL-I/O | SDA | 2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i) | 4 |
| 5 | LVTTL-I/O | SCL | 2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i) | 4 |
| 6 | | MOD_ABS | Module Absent, connected to VeeT or VeeR in the module | 5 |
| 7 | LVTTL-I | RS0 | Adaptive multi-rate operation | 6 |
| 8 | LVTTL-O | RX_LOS | Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect) | 2 |
| 9 | LVTTL-I | RS1 | Adaptive multi-rate operation | 6 |
| 10 | | VeeR | Module Receiver Ground | 1 |
| 11 | | VeeR | Module Receiver Ground | 1 |
| 12 | CML-O | RD- | Receiver Inverted Data Output | |
| 13 | CML-O | RD+ | Receiver Non-Inverted Data Output | |
| 14 | | VeeR | Module Receiver Ground | 1 |
| 15 | | VccR | Module Receiver 3.3 V Supply | |
| 16 | | VccT | Module Transmitter 3.3 V Supply | |
| 17 | | VeeT | Module Transmitter Ground | 1 |
| 18 | CML-I | TD+ | Transmitter Non-Inverted Data Input | |
| 19 | CML-I | TD- | Transmitter Inverted Data Input | |
| 20 | | VeeT | Module Transmitter Ground | 1 |

[1]The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.

[2]This pin is an open collector/drain output pin and shall be pulled up with 4.7kΩ-10kΩ to Host_Vcc on the host board. [3] Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5V.

[3]This pin is an open collector/drain input pin and shall be pulled up with 4.7kΩ-10kΩ to VccT in the module.

[4]See SFF-8431 4.2 2-wire Electrical Specifications.

[5]This pin shall be pulled up with 4.7kΩ-10kΩ to Host_Vcc on the host board.

[6]Connect with 30kΩ load pulled down to GND in the module.

## Monitoring Specification

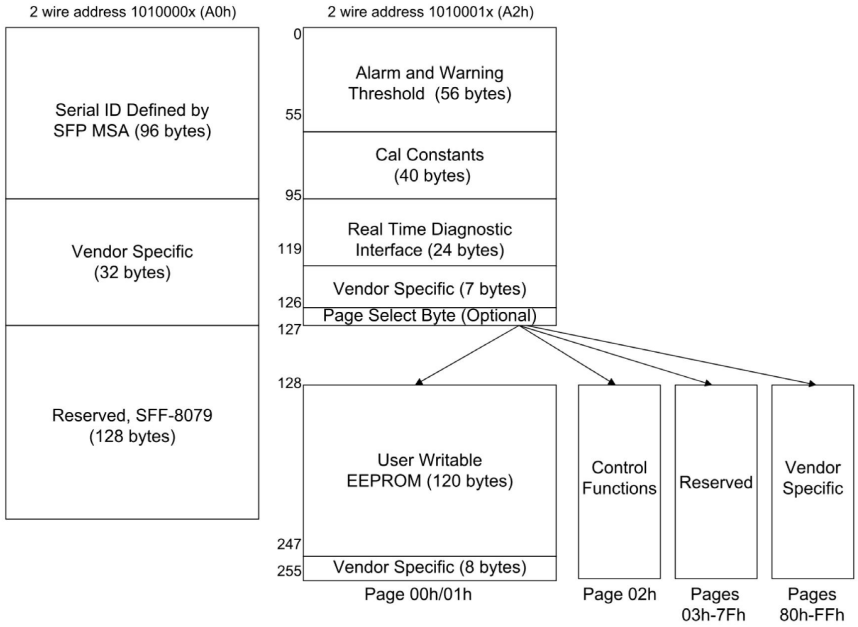
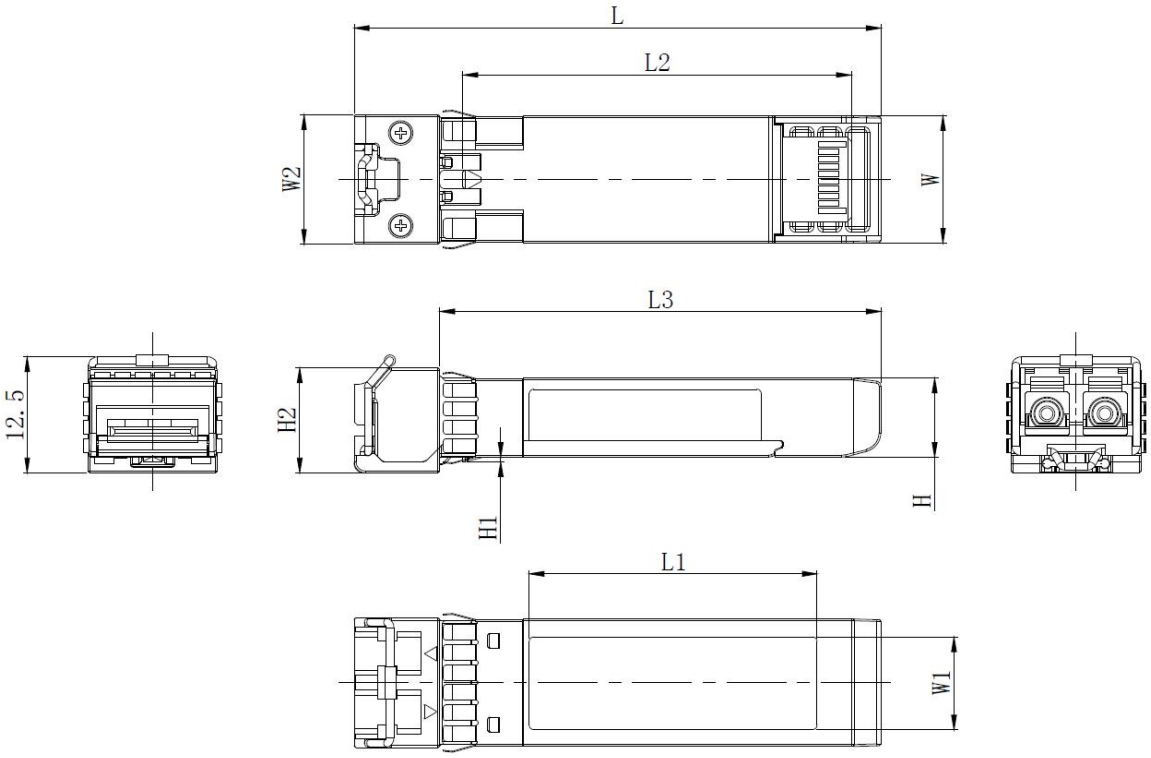



Figure4 Memory map

## Mechanical




Unit: mm

| | L | L1 | L2 | L3 | W | W1 | W2 | H | H1 | H2 |
|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 56.9 | 31.2 | 41.95 | 47.7 | 13.8 | 10.2 | 14.0 | 8.6 | 0.6 | 11.5 |
| Typical | 56.7 | 31.0 | 41.80 | 47.5 | 13.7 | 10.0 | - | 8.5 | 0.5 | 11.3 |
| MIN | 56.5 | 30.8 | 41.65 | 47.3 | 13.5 | 9.8 | - | 8.4 | 0.4 | 11.1 |