



TOPSTAR TECHNOLOGY INDUSTRIAL CO., LIMITED

产 品 规 格 书

Product Specification Sheet

TOP-BIDI-SFP+-LH-33

RoHS Compliant 10Gb/s Tx1330/Rx1270nm20km BIDI Optical Transceiver



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PRODUCT FEATURES

- SFPMS A package with duplex LC connector
- Very low EMI and excellent ESD protection
- Digital Diagnostic Monitor Interface
- Hot pluggable
- 10Gb/s serial optical interface
- Up to 20km distance
- Compliant with SFP+MSA
- High transmission margin
- +3.3V single power supply
- Below <1.5W power consumption
- SFP mechanical interface

APPLICATIONS

- 10GBASE-BX at 10.3125Gb/s
- 10GBASE-BX at 9.953Gb/s

STANDARD

- SFP+MSA Compliant
- SFF-8472 reversion 9.5 compliant
- IEEE 802.3-2005 compliant
- Telcordia GR-468-CORE compliant
- FCC 47 CFR Part 15, Class B compliant
- FDA 21 CFR 1040.10 and 1040.11, class I compliant
- RoHS compliant

PRODUCT DESCRIPTIONS

SFP+ 10G 20KM 1330 is hot pluggable 3.3V Small-Form-Factor transceiver module. It is designed expressly for high-speed communication applications that require rates up to 10.7Gbps, it is designed to be compliant with SFF-8472 and SFP+MSA. The module data link up to 20km in 9/125um single mode fiber. The optical output can be disabled by a LVTTTL logic high-level input of Tx Disable. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with

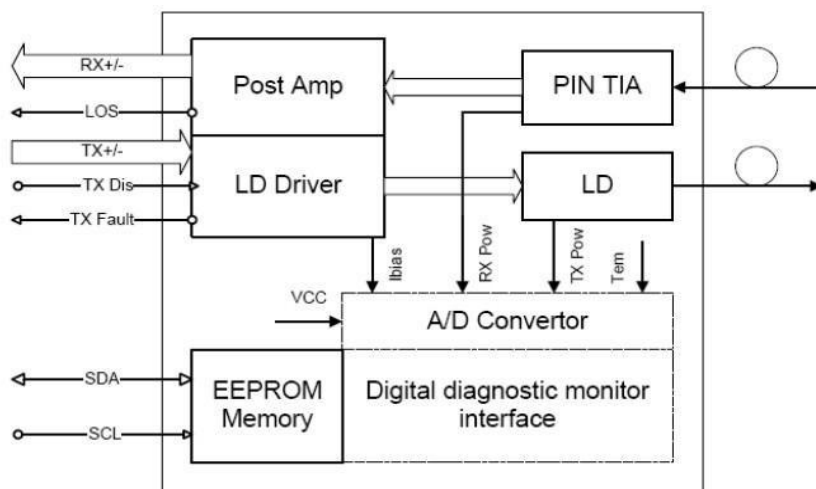
威星科技實業有限公司

<http://www.opticalmodulemanufacturers.com>



partner.

FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Min. | Max. | Unit | Note |
|---------------------|--------|------|------|------|------|
| Supply Voltage | Vcc | -0.5 | 4.0 | V | |
| Storage Temperature | | -40 | 85 | °C | |
| Relative Humidity | | | 85 | % | |

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the module

GERERAL OPERATING CHARACTERISTICS

| Parameter | Symbol | Min. | Typ | Max. | Unit | Note |
|-----------|---------------|------|---------|------|------|------|
| Data Rate | Ethernet | | 10.3125 | | Gb/s | |
| | Fiber Channel | | 9.953 | | | |



| | | | | | | |
|----------------------|-----------------------------|------|-----|------|----|--|
| Supply Voltage | V _{cc} | 3.13 | 3.3 | 3.47 | V | |
| | V _{cc} | | | | V | |
| Supply Current | I _{cc_s} | | | | mA | |
| | I _{cc₃} | | | 400 | mA | |
| Operating Case Temp. | T _c | 0 | | 70 | °C | |

ELECTRICAL INPUT/OUTPUT CHARACTERISTICS

Transmitter

| Parameter | | Symbol | Min. | Typ | Max. | Unit | Note |
|---------------------------|---|-----------------|------|-----|----------------------|------|------|
| Diff. input voltage swing | | | 120 | | 820 | mVpp | 1 |
| Tx Disable input | H | V _{IH} | 2.0 | | V _{cc} +0.3 | V | |
| | L | V _{IL} | 0 | | 0.8 | | |
| Tx Fault output | H | V _{OH} | 2.0 | | V _{cc} +0.3 | V | 2 |
| | L | V _{OL} | 0 | | 0.8 | | |
| Input Diff. Impedance | | Z _{in} | | 100 | | Ω | |

Receiver

| Parameter | | Symbol | Min. | Typ | Max. | Unit | Note |
|----------------------------|---|-----------------|------|-----|----------------------|------|------|
| Diff. output voltage swing | | | 340 | 650 | 800 | mVpp | 3 |
| RxLOS Output | H | V _{OH} | 2.0 | | V _{cc} +0.3 | V | 2 |
| | L | V _{OL} | 0 | | 0.8 | | |

Note1)TD+/-are internally AC coupled with 100Ω differential termination inside the module.

Note2)TxFault and RxLOS are open collector outputs, which should be pulled up with 4.7k to10kΩ resist or son the host board. Pull up voltage between 2.0V and V_{cc}+0.3V.

Note3)RD+/- outputs are internally AC coupled, and should be terminated with100Ω(differential)at the user SERDES.



OPTICAL CHARACTERISTICS

Transmitter(0~70 @10.3125Gb/s)

| Parameter | Symbol | Min. | Typ | Max. | Unit | Note |
|------------------------------|--------------------------|------|------|------|------|------|
| Operating Wavelength | | | 1330 | | nm | |
| Ave. output power(Enabled) | Po | -7 | | 0.5 | dBm | 1 |
| Extinction Ratio | ER | 3.5 | | | dB | 1 |
| RMS spectral width | $\Delta\lambda$ | | | 1 | nm | |
| Rise/Fall time(20%~80%) | Tr/Tf | | | 50 | ps | 2 |
| Optical modulation amplitude | OMA | -5.2 | | | dBm | |
| Dispersion penalty | | | | 1 | dB | |
| Output Optical Eye | IEEE802.3-2005 Compliant | | | | | |

Receiver(-5~70 @10.3125Gb/s)

| Parameter | Symbol | Min. | Typ | Max. | Unit | Note |
|----------------------|--------|------|------|-------|------|------|
| Operating Wavelength | | | 1270 | | nm | |
| Sensitivity | Psen | | | -14.4 | dBm | 3 |
| Min. overload | Pimax | 0.5 | | | dBm | |
| LOS Assert | Pa | -30 | | | dBm | |
| LOS De-assert | Pd | | | -16 | dBm | |
| LOS Hysteresis | Pd-Pa | 0.5 | | 5 | dB | |

Note1) Measured at 10.3125b/s with PRBS231-1NRZ test pattern.

Note2) 20%~80%

Note3) Under the ER worst case, measured at 10.3125Gb/s with PRBS231 -1NRZ test pattern for BER<1x10-12



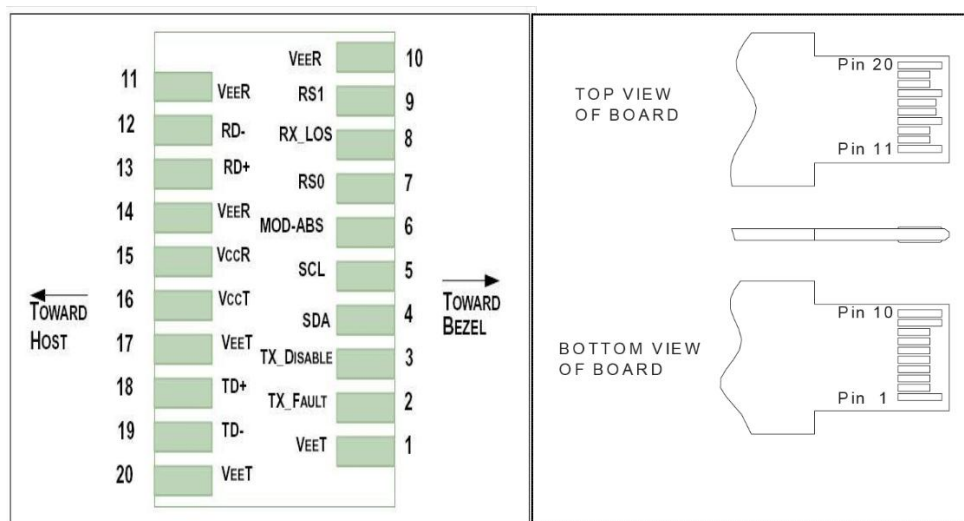
SERIAL INTERFACE FOR ID AND DDM

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP MSA. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h. The memory is mapped in Table 1. Detailed ID information (A0h) is listed in Table 2. And the DDM specification (A2h) is described in Table 3. For more details of the memory map and byte definitions, please refer to the SFF-8472 (Rev9.3, Aug. 2002), “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

| 2 wire address 1010000X (A0h) | | 2 wire address 1010001X (A2h) | |
|-------------------------------|---|-------------------------------|---|
| Address | Information | Address | Information |
| 0~95 | Serial ID Defined by SFP MSA (96 bytes) | 0~55 | Alarm and Warning Thresholds (56 bytes) |
| 96~127 | Vendor Specific (32 bytes) | 56~95 | Calibration Constants (40 bytes) |
| 128~255 | Reserved, SFF8079 (128 bytes) | 96~119 | Real Time Diagnostic Interface (24 bytes) |
| | | 120~127 | Vendor Specific (8 bytes) |
| | | 128~247 | User Writable EEPROM (120 bytes) |
| | | 248~255 | Vendor Specific (8 bytes) |

PIN DEFINITIONS AND FUNCTIONS





| PIN # | Name | Function | Notes |
|-------|------------|---|--------|
| 1 | VeeT | Module transmitter ground | Note1 |
| 2 | Tx Fault | Module transmitter fault | Note 2 |
| 3 | Tx Disable | Transmitter Disable; Turns off transmitter laser output | Note 3 |
| 4 | SDL | 2 wire serial interface data input/output (SDA) | |
| 5 | SCL | 2 wire serial interface clock input (SCL) | |
| 6 | MOD-ABS | Module Absent, connect to VeeR or VeeT in the module | Note 2 |
| 7 | RS0 | Rate select0,optionally control SFP+ receiver. When high, input data rate >4.5Gb/s;when low, input data rate <=4.5Gb/s | |
| 8 | LOS | Receiver Loss of Signal Indication | Note4 |
| 9 | RS1 | Rate select0,optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s;when low, input data rate <=4.5Gb/s | |
| 10 | VeeR | Module receiver ground | Note 1 |
| 11 | VeeR | Module receiver ground | Note 1 |
| 12 | RD- | Receiver inverted data out put | |
| 13 | RD+ | Receiver non-inverted data out put | |
| 14 | VeeR | Module receiver ground | Note 1 |
| 15 | VccR | Module receiver 3.3V supply | |
| 16 | VccT | Module transmitter 3.3V supply | |
| 17 | VeeT | Module transmitter ground | Note 1 |
| 18 | TD+ | Transmitter inverted data out put | |
| 19 | TD- | Transmitter non-inverted data out put | |
| 20 | VeeT | Module transmitter ground | Note1 |

Note1)The module ground pins shall be isolated from the module case.

Note2)This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vccon the host board.

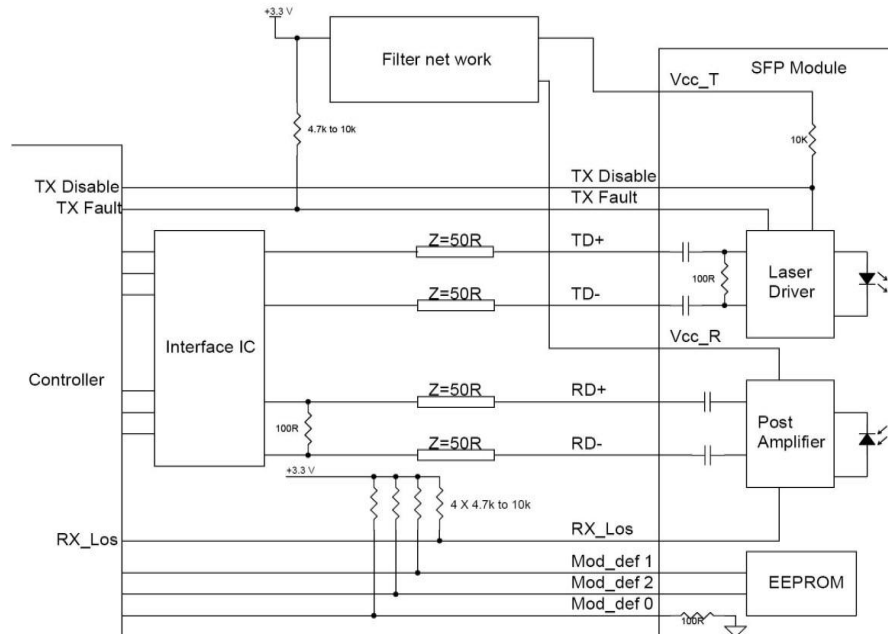
Note3) This pin shall be pulled up with4.7K-10Kohms toVccTin the module.

Note4)This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10KohmstoHost_Vcconthehostboard.InFC

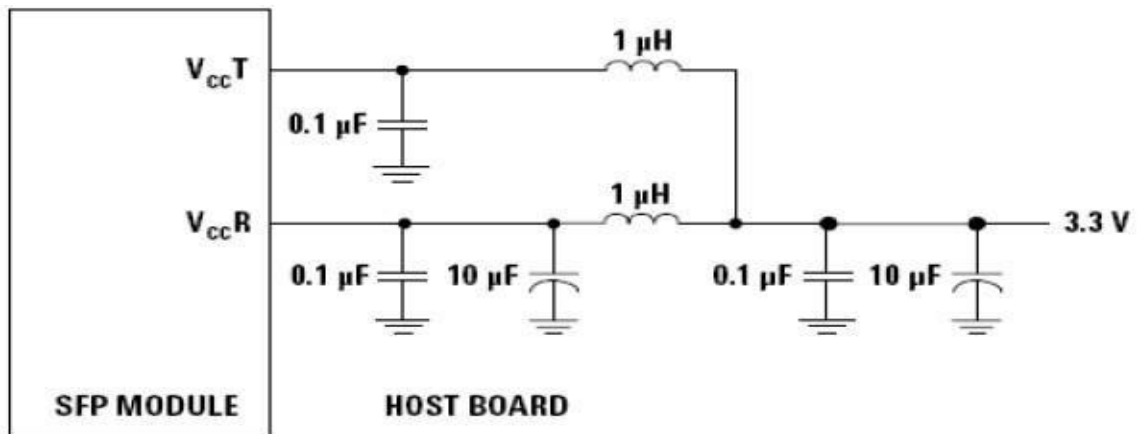
designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect.



TYPICAL INTERFACE CIRCUIT



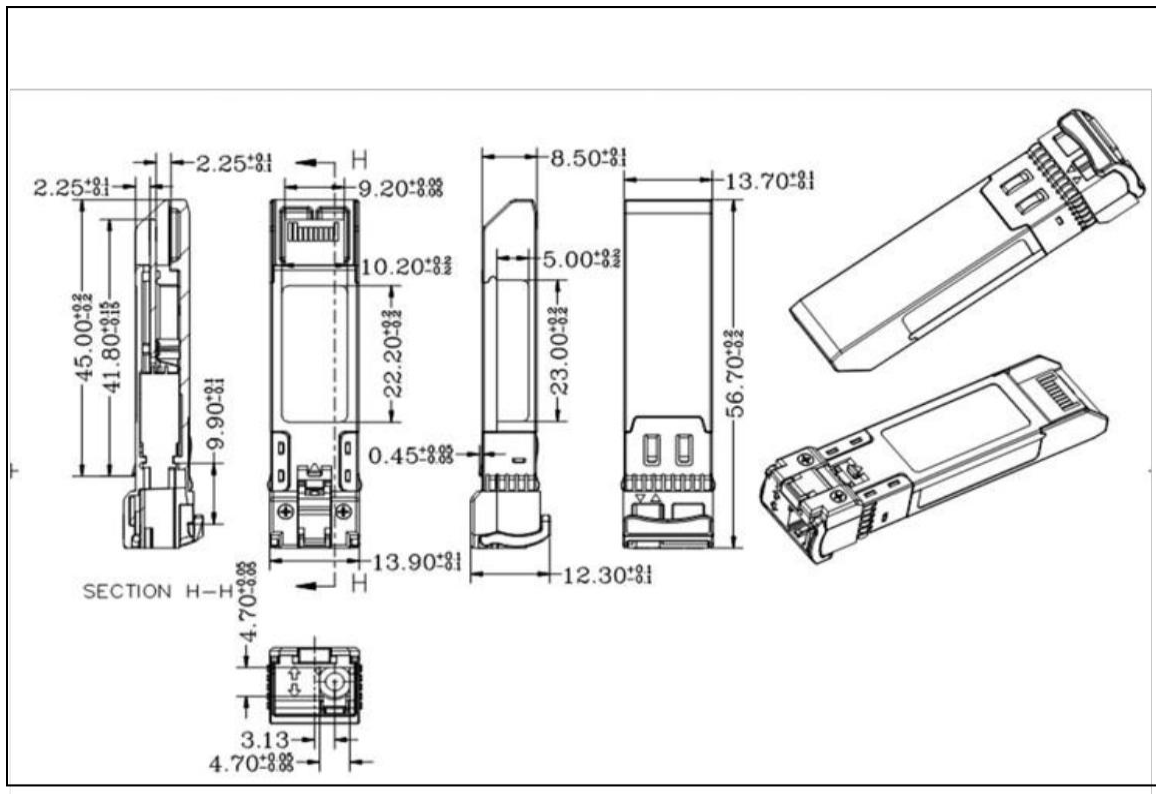
Recommended power supply filter



Note: Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value



PACKAGE DIMENSIONS



ORDERING INFORMATION

| PartNumber | Description |
|-------------------|---|
| SFP+10G 10KM 1270 | SFP+ Plus BiDi, 10.3125Gbps, 1270nm, 10KM, 0~70°C, with DDM |
| SFP+10G 10KM 1330 | SFP+ Plus BiDi, 10.3125Gbps, 1330nm, 10KM, 0~70°C, with DDM |
| SFP+10G 20KM 1270 | SFP+ Plus BiDi, 10.3125Gbps, 1270nm, 20KM, 0~70°C, with DDM |
| SFP+10G 20KM 1330 | SFP+ Plus BiDi, 10.3125Gbps, 1330nm, 20KM, 0~70°C, with DDM |
| SFP+10G 40KM 1270 | SFP+ Plus BiDi, 10.3125Gbps, 1270nm, 40KM, 0~70°C, with DDM |
| SFP+10G 40KM 1330 | SFP+ Plus BiDi, 10.3125Gbps, 1330nm, 40KM, 0~70°C, with DDM |
| SFP+10G 60KM 1330 | SFP+ Plus BiDi, 10.3125Gbps, 1330nm, 60KM, 0~70°C, with DDM |
| SFP+10G 60KM 1330 | SFP+ Plus BiDi, 10.3125Gbps, 1330nm, 60KM, 0~70°C, with DDM |



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