



TOPSTAR TECHNOLOGY INDUSTRIAL CO., LIMITED

# 产 品 规 格 书

## *Product Specification Sheet*

### TOP-BIDI-SFP+-LR-27

RoHS Compliant 10Gb/s Tx1270/Rx1330nm 10km BIDI Optical Transceiver



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## **PRODUCT FEATURES**

- SFPMSA package with duplex LC connector
- Very low EMI and excellent ESD protection
- Digital Diagnostic Monitor Interface
- Hot pluggable
- 10Gb/s serial optical interface
- Upto10 km 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 10.3125 Gb/s
- 10GBASE-BX at 9.953 Gb/s

## **STANDARD**

- SFP+ MSA Compliant
- SFF-8472 revision 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

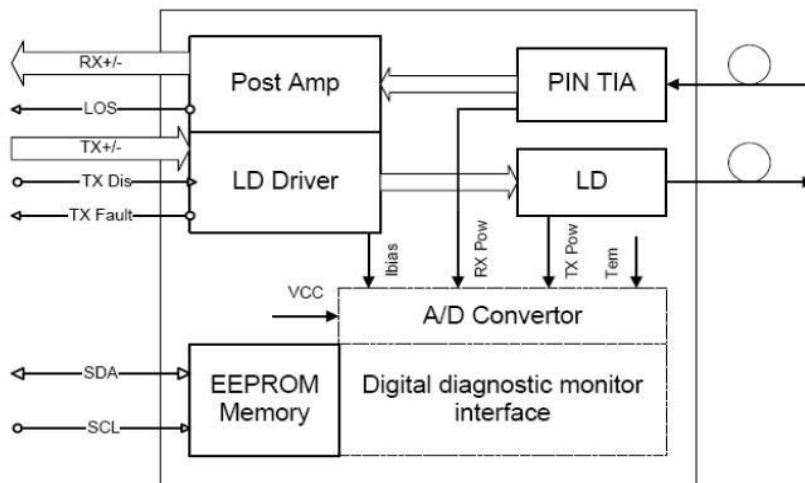
## **PRODUCT DESCRIPTIONS**

SFP+10G 10KM 1270 is hot pluggable 3.3V Small-Form-Factor transceiver module. It is designed expressly for high-speed communication applications that require rates up to 10.7 Gbps, it is designed to be compliant with SFF-8472 and SFP+MSA. The module data link up to 10 km in 9/125 μm single mode fiber. The optical output can be disabled by a LVTTTL logic high-level input of TxDisable. TxFault 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 partner.

**FUNCTIONAL DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Min.	Max.	Unit	Note
SupplyVoltage	Vcc	-0.5	4.0	V	
StorageTemperature		-40	85	°C	
RelativeHumidity			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
DataRate	Ethernet		10.3125		Gb/s	
	FiberChannel		9.953			
SupplyVoltage	Vcc	3.13	3.3	3.47	V	
	Vcc				V	
SupplyCurrent	Icc <sub>s</sub>				mA	
	Icc <sub>3</sub>			400	mA	
OperatingCaseTemp.	Tc	0		70	°C	

**ELECTRICAL INPUT/OUTPUT CHARACTERISTICS****Transmitter**

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Diff.inputvoltage <span>swing</span>		120		820	mVpp	1
TxDisableinput	H	VIH	2.0	Vcc+0.3	V	
	L	VIL	0	0.8		
TxFaultoutput	H	VOH	2.0	Vcc+0.3	V	2
	L	VOL	0	0.8		
InputDiff.Impedance	Zin		100		Ω	

**Receiver**

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Diff.outputvoltage <span>swing</span>		340	650	800	mVpp	3
RxLOSOutput	H	VOH	2.0	Vcc+0.3	V	2
	L	VOL	0	0.8		

Note1)TD+/-are internally AC coupled with100Ω differential termination inside the module.

Note2)TxFault and RxLOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between2.0VandVcc+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
OperatingWavelength			1270		nm	
Ave.outputpower(Enabled)	Po	-7		0.5	dBm	1
ExtinctionRatio	ER	3.5			dB	1
RMS spectralwidth	Δλ			1	nm	
Rise/Falltime(20%~80%)	Tr/Tf			50	ps	2
Opticalmodulationamplitude	OMA	-5.2			dBm	
Dispersionpenalty				1	dB	
OutputOpticalEye		IEEE802.3-2005Compliant				

**Receiver(0~70 @10.3125Gb/s)**

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
OperatingWavelength			1330		nm	
Sensitivity	Psen			-14.4	dBm	3
Min.overload	Pimax	0.5			dBm	
LOSAssert	Pa	-30			dBm	



<b>LOSDe-assert</b>	Pd			-16	dBm
<b>LOSHysteresis</b>	Pd-	0		4	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<sup>-12</sup>

### 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.

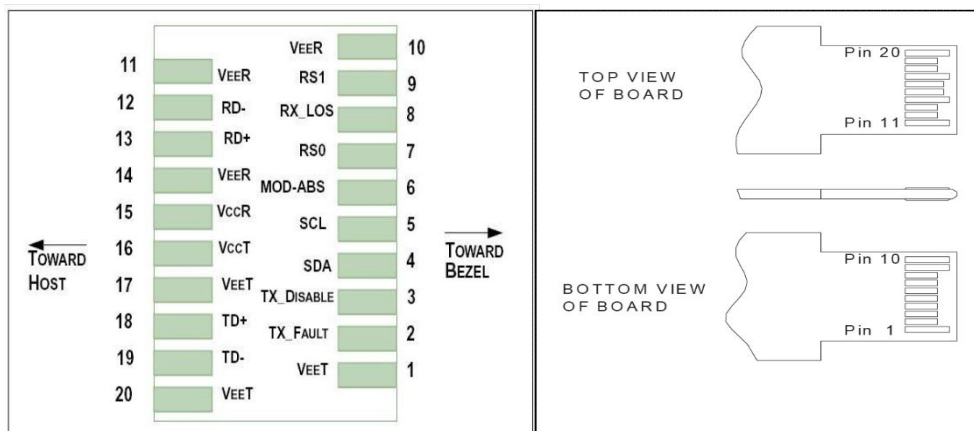
Detailed ID information (A0h) is listed in Table 2. And the DDM specification (A2h) is described in Table 3. For more details of the memory map and byte definitions, please refer to the SFF-8472 (Rev. 9.3, Aug. 2002), "Digital Diagnostic Monitoring Interface for Optical Transceivers".

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 select1, 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

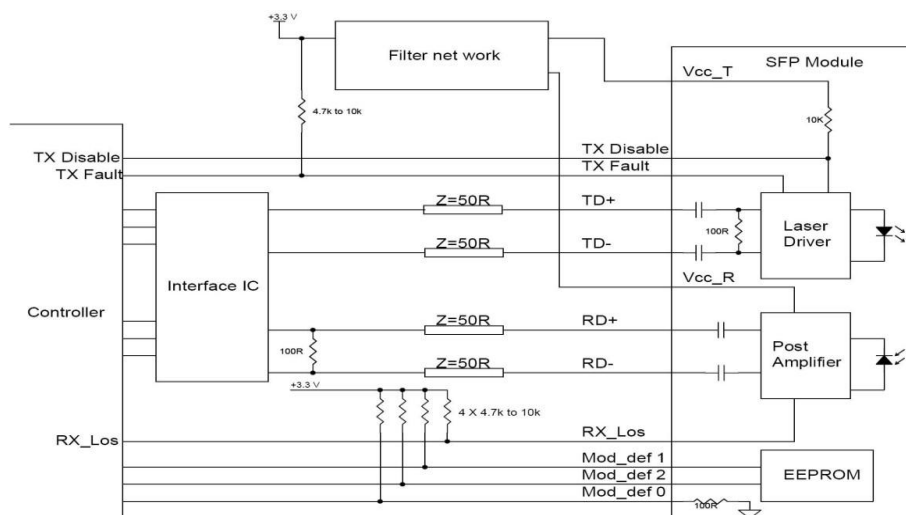
Note 1)The module ground pins shall be isolated from the module case.

Note 2)This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.

Note 3) This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.

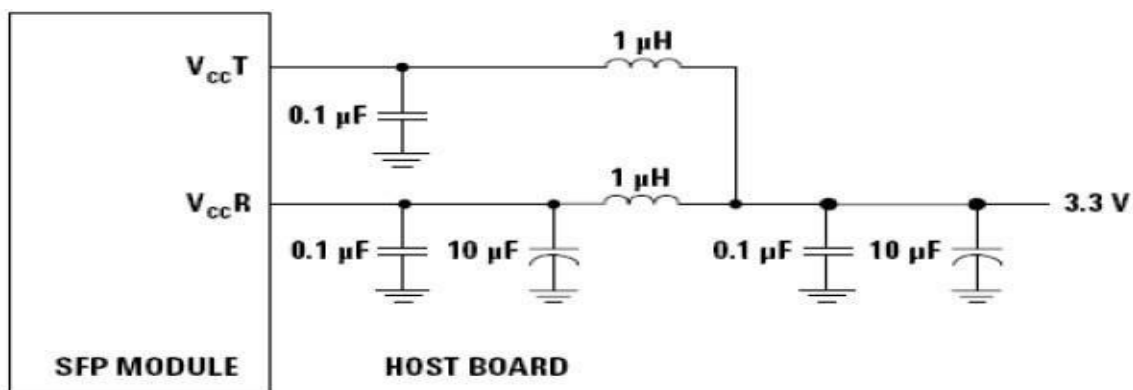
Note4)This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board. In FC designated as RX\_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect.

### TYPICAL INTERFACE CIRCUIT



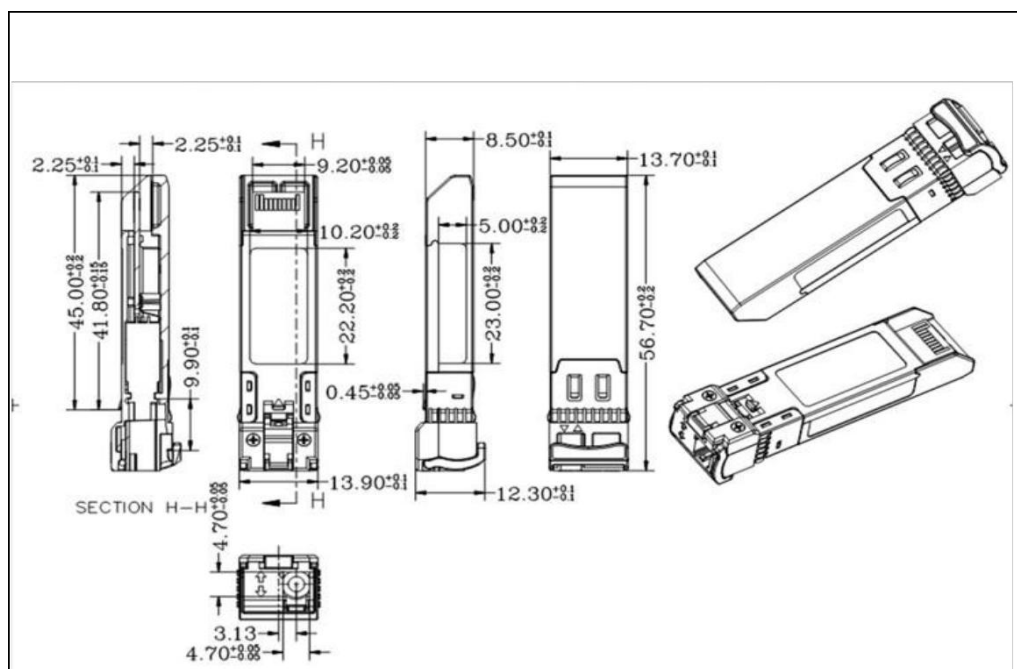


### Recommended power supply filter



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**

<b>PartNumber</b>	<b>Description</b>
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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