



TOPSTAR TECHNOLOGY INDUSTRIAL CO., LIMITED

# 产品规格书

## *Product Specification Sheet*

### TOP-SFP-155M-40D

RoHS Compliant 155Mbps 1310nm 40KM Single-mode Optical Transceiver



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## Product Features

- Transceiver unit with independent
- 1310nmFP Laser diode transmitter
- In GaAs PIN photo diode receiver
- Up to 155Mbps data rate operation
- Up to 40KM on 9/125 $\mu$ mSMF
- Standard serial ID information compliant with SFPMSA
- Digital Diagnostic Monitor Interface
- Very low EMI and excellent ESD protection
- +3.3V single power supply
- RoHS compliant
- Case operating temperature Commercial:0°Cto +70°C Extended:-10°Cto +80°C Industrial:-40°Cto+85°C

## Applications

- Switch/Router
- SAN/Server
- Other optical transmission systems

## Standard

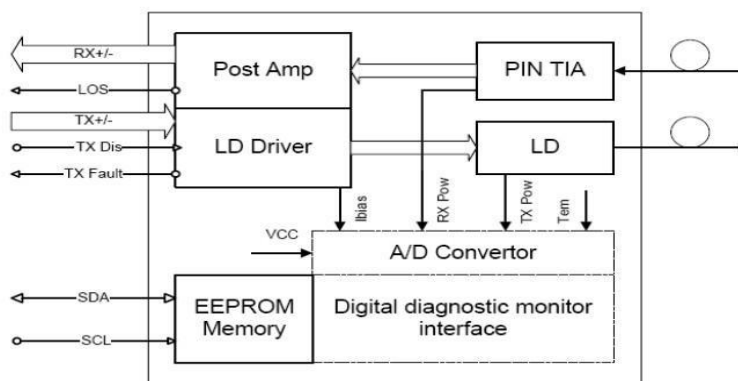
- SFPMSA(VersionSept.142000)compliant
- SFF-8472(Rev9.3,Aug.2002) Digital Diagnostic Monitoring Interface for Optical Transceivers compliant
- TelcordiaGR-253-CORECompliant
- ITU-TG.957andG.958Compliant
- TelcordiaGR-468-COREcompliant



**Description**

SFP 155M 40KM 1310nm optical transceivers are designed for optical interfaces for data communications with single mode fiber(SMF).The transceiver designs are optimized for high performance and cost effective to supply customers the best solutions for telecom applications.

**Functional Diagram**



**Ordering information**

Roductpart Number	Data Rate (Mbps)	Media	Wavelen gth(nm)	Transmission Distance(k m)	TemperatureRange (Tcase) (°C)	
TOP-SFP-155M-40D-c	155	Singlemode fiber	1310	40	0~70	commercial
TOP-SFP-155M-40D-e	155	Singlemode fiber	1310	40	-10~80	extended
TOP-SFP-155M-40D-i	155	Singlemode fiber	1310	40	-45~85	industrial



### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max	Unit	Notes
SupplyVoltage	Vcc	-0.5	3.60	V	
StorageTemperature		-40	85	°C	
RelativeHumidity		5	95	%	

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

### General Operating Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
DataRate			155		Mb/s	
SupplyVoltage	Vcc	3.1	3.3	3.5	V	
SupplyCurrent	Icc			270	mA	
Operating Case Temperature	Tc	0		70	°C	
		-10		80		
		-40		85		

### Electrical Input/Output Characteristics

#### Transmitter

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Diff. Input Voltage Swing		300		186	mVp	1
TxDisable Input	H	VIH	2.0	Vcc	V	
	L	VIL	0	0.8		
TxFault Output	H	VO	2.0	Vcc	V	2
	L	VO	0	0.8		
InputDiff. Impedance	Zin		100		Ω	

#### Receiver



Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Diff.OutputVoltageSwing		370		180	mVp	3
RxLOS Output	H	$V_{OH}$	2.0		$V_{CC}$	2
	L	$V_{OL}$	0		0.8	

Note1)TD+/-are internally AC coupled with100Ωdifferential termination inside the module.  
 Note2)TxFault and RxLOS are open collector outputs,which should be pulled up with 4.7kto10kΩ resistors on the host board. Pull up voltage between2.0V 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

Parameter	Symbol	Min.	Type	Max.	Unit	Notes
Ave.OutputPower (Enable)	Po	-5		0	dBm	1
ExtinctionRatio	ER	8.2			dB	1
Rise/FallTime(20%-80%)	Tr-Tf			0.26	ns	2
Wavelength Range		1270	1310	1360	nm	
Spectral Width(RMS)				4	nm	
Output Optical Eye	ITU G.957Compliant					
LOSDe-assert	Pd			-35	dBm	
LOSHy steresis	Pd-Pa	0.5		6	dB	

Note1)Measured at155Mb/s with PRBS223–1NRZ test pattern.  
 Note2)Unfiltered ,measured with a PRBS223-1test pattern@155Mbps  
 Note3)Measured at155Mb/s with PRBS223–1NRZ test pattern for BER<1x10-10



**Pin Definitions and Functions**

20	V <sub>EE</sub> T
19	TD-
18	TD+
17	V <sub>EE</sub> T
16	V <sub>CC</sub> T
15	V <sub>CC</sub> R
14	V <sub>EE</sub> R
13	RD+
12	RD-
11	V <sub>EE</sub> R

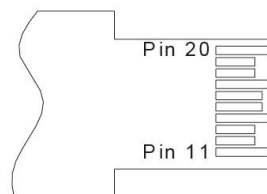
TOP OF BOARD

ENGAGEMENT  
SEQUENCE

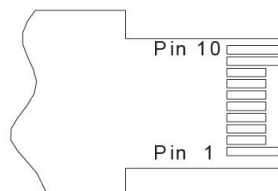
1	V <sub>EE</sub> T
2	TX FAULT
3	TX DISABLE
4	MOD-DEF(2)
5	MOD-DEF(1)
6	MOD-DEF(0)
7	RATE SELECT
8	LOS
9	V <sub>EE</sub> R
10	V <sub>EE</sub> R

BOTTOM OF BOARD  
(AS VIEWED THROUGH TOP OF BOARD)

TOP VIEW  
OF BOARD



BOTTOM VIEW  
OF BOARD



PIN #	Name	Function	Notes
1	V <sub>EE</sub> T	Tx ground	
2	Tx Fault	Txfaultindication,OpenCollectorOutput,active“H”	Note1
3	TxDisable	LVTTLInput,internalpull-up,Txdisabledon“H”	Note2
4	MOD-DEF2	2wireserialinterfacedatainput/output(SDA)	Note3
5	MOD-DEF1	2wireserialinterfaceclockinput(SCL)	Note3
6	MOD-DEF0	Modelpresentindication	Note3
7	Rateselect	Noconnection	
8	LOS	Rxlossofsignal,OpenCollectorOutput,active“H”	Note4
9	V <sub>EE</sub> R	Rxground	
10	V <sub>EE</sub> R	Rxground	
11	V <sub>EE</sub> R	Rxground	
12	RD-	Inversereceiveddataout	Note5
13	RD+	Receiveddataout	Note5
14	V <sub>EE</sub> R	Rxground	
15	V <sub>CC</sub> R	Rxpower supply	
16	V <sub>CC</sub> T	Txpowersupply	
17	V <sub>EE</sub> T	Tx ground	
18	TD+	Transmitdatain	Note6
19	TD-	Inversetransmitdatain	Note6
20	V <sub>EE</sub> T	Tx ground	



Note1) When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should be pulled up with a 4.7–10K $\Omega$  resistor on the host board.

Note2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7–10K $\Omega$  resistor. Its states are:

Low(0–0.8V): Transmitter on ( $>0.8, <2.0V$ ): Undefined  
High(2.0V–Vcc+0.3V): Transmitter Disabled

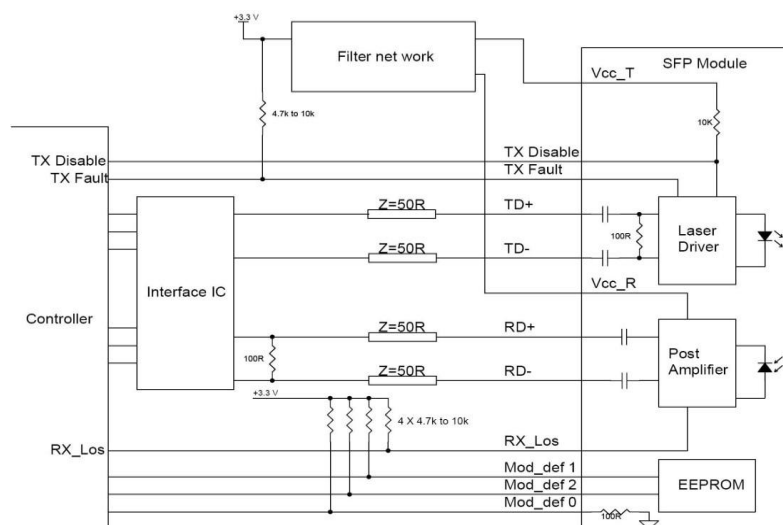
Note3) Mod-Def0,1,2. These are the module definition pins. They should be pulled up with a 4.7K–10K $\Omega$  resistor on the host board. The pull-up voltage shall be between 2.0V–Vcc+0.3V. Mod-Def0 has been grounded by the module to indicate that the module is present  
Mod-Def1 is the clock line of two wire serial interface for serial ID  
Mod-Def2 is the data line of two wire serial interface for serial ID

Note4) When high, this output indicates loss of signal (LOS). Low indicates normal operation.

Note5) RD+/-: These are the differential receiver outputs. They are AC coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.

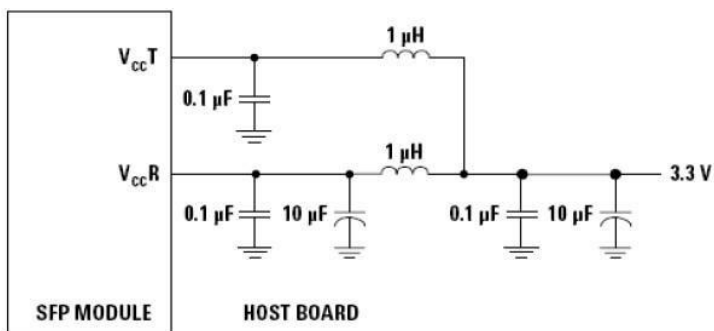
Note6) TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 $\Omega$  differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

## Typical Interface Circuit



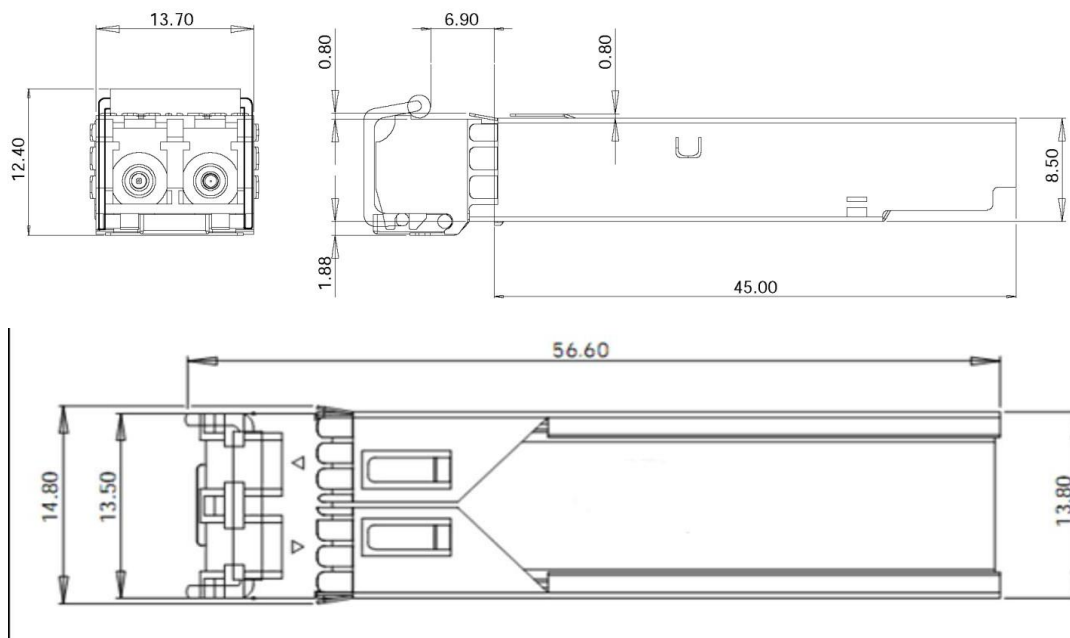


### Recommended power supply filter



Note: Inductors with DC resistance of less than  $1\Omega$  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 30 mA greater than the steady state value.

### Package Dimensions







**Ordering Information & Related Products**

TOP-SFP-155M-40	Dual Fiber SFP, 155Mbps, 1310nm, 40KM, withoutDDM
TOP-SFP-155M-40D	Dual Fiber SFP, 155Mbps, 1310nm, 40KM, withDDM



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