

## Product Features

- ✧ DFB laser transmitter and PIN photo-detector
- ✧ Dual Data-rate of 1.25Gbps/1.0625Gbps Operation
- ✧ Up to 40KM transmission distance on 9/125μm SMF
- ✧ Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- ✧ Digital Diagnostic Monitor Interface
- ✧ Very low EMI and excellent ESD protection
- ✧ +3.3V single power supply
- ✧ Compatible with RoHS
- ✧ Operating case temperature Commercial: 0°C to +70°C
- ✧ Extended: -10°C to +80°C
- ✧ Industrial: -40°C to +85°C



## Applications

- ✧ Gigabit Ethernet
- ✧ Fiber Channel
- ✧ Switch to Switch interface
- ✧ Switched backplane applications
- ✧ Router/Server interface
- ✧ Other optical transmission systems

## Ordering Information

Part Number	Output Power	Rec. Sens	Data Rate	Wavelength	Distance
<i>FH-S5512CDL40</i>	-6 ~ +1db	-22db	1.25/1.0625Gbps	1550nm	40KM
<i>FH-S5512EDL40</i>					
<i>FH-S5512IDL40</i>					

## General

FH-S5512CDL40 SFP transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 40km transmission distance with SMF.

The transceiver consists of three sections: a DFB laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements. Transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	3.6	V	
Storage Temperature		-40	85	°C	
Relative Humidity		5	85	%	

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
Data Rate	Gigabit Ethernet			1.25		Gb/s	
	Fiber Channel			1.0625			
Supply Voltage		Vcc	3.1	3.3	3.5	V	
Supply Current		Icc			220	mA	
Operating Case Temperature		Tc	0		70	°C	
			-10		80		
			-45		85		

## Electrical Input/Output Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
<b>Transmitter</b>						
Diff. Input Voltage Swing		300		1800	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		$\Omega$	
<b>Receiver</b>						
Diff. Output Voltage Swing		400		1000	mVpp	3
Rx LOS Output	H	$V_{OH}$	2.0	$V_{CC}+0.3$	V	2
	L	$V_{OL}$	0	0.8		

Note: 1) TD+/- are internally AC coupled with 100 $\Omega$  differential termination inside the module.

2) Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10k $\Omega$  resistors on the host board. Pull up voltage between 2.0V and  $V_{CC}+0.3V$ .

3) RD+/- outputs are internally AC coupled, and should be terminated with 100 $\Omega$  (differential) at the user SERDES.

## Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
<b>Transmitter</b>						
Ave. Output Power (Enable)	Po	-6		1	dBm	1
Extinction Ratio	ER	9			dB	1
Rise/Fall Time (20%-80%)	Tr-Tf			0.26	ns	2
Wavelength Range		1530	1550	1570	nm	
Spectral Width (RMS)				1	nm	
Output Optical Eye	Compliant with IEEE802.3 z (class 1 user safety)					
<b>Receiver</b>						
Operating Wavelength		1270		1610	nm	
Sensitivity	Pimin			-22	dBm	3
Min. Overload	Pimax	-3			dBm	3
LOS Assert	Pa	-35			dBm	
LOS De-assert	Pd			-23	dBm	
LOS Hysteresis	Pd-Pa	0.5		6	dB	

Note 1) Measured at 1250 Mb/s with PRBS 223 – 1 NRZ test pattern.

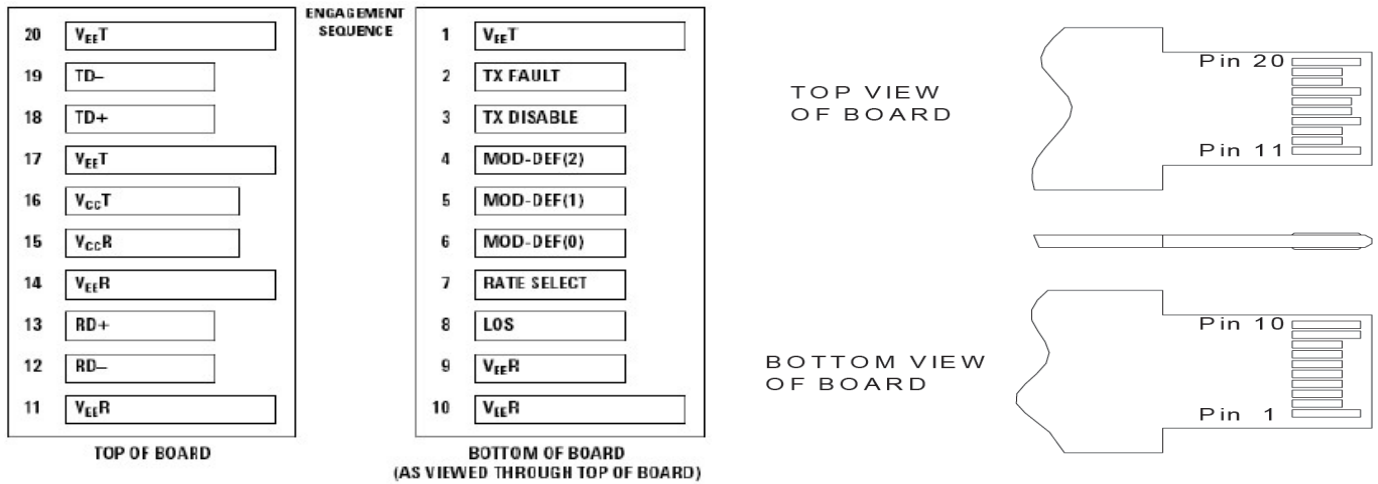
2) Unfiltered, measured with a PRBS 223-1 test pattern @1.25Gbps

3) Measured at 1250 Mb/s with PRBS 223 – 1 NRZ test pattern for BER < 1x10<sup>-12</sup>

## Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70 -40 to +85	°C	±3°C	Internal/ External
Voltage	3.0 to 3.6	V	±3%	Internal/ External
Bias Current	2 to 80	mA	±10%	Internal/ External
TX Power	-8to 1	dBm	±3dB	Internal/ External
RX Power	-25 to 0	dBm	±3dB	Internal/ External

## Pin Definitions And Functions



PIN #	Name	Function	Notes
1	V <sub>EE</sub> T	Tx ground	
2	Tx Fault	Tx fault indication, Open Collector Output, active "H"	1
3	Tx Disable	LVTTTL Input, internal pull-up, Tx disabled on "H"	2
4	MOD-DEF2	2 wire serial interface data input/output (SDA)	3
5	MOD-DEF1	2 wire serial interface clock input (SCL)	3
6	MOD-DEF0	Model present indication	3
7	Rate select	No connection	

8	LOS	Rx loss of signal, Open Collector Output, active "H"	4
9	VeeR	Rx ground	
10	VeeR	Rx ground	
11	VeeR	Rx ground	
12	RD-	Inverse received data out	5
13	RD+	Received data out	5
14	VeeR	Rx ground	
15	VccR	Rx power supply	
16	VccT	Tx power supply	
17	VeeT	Tx ground	
18	TD+	Transmit data in	6
19	TD-	Inverse transmit data in	6
20	VeeT	Tx ground	

Notes: 1) 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.

Note 2) 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 Open: Transmitter Disabled

Note 3) Mod-Def 0,1,2. 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-Def 0 has been grounded by the module to indicate that the module is present

Mod-Def 1 is the clock line of two wire serial interface for serial ID

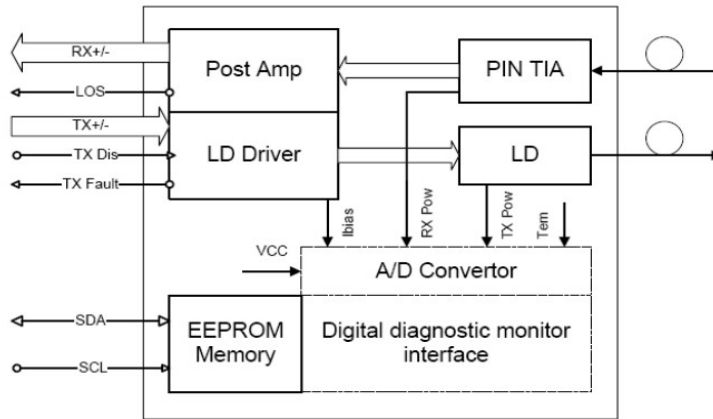
Mod-Def 2 is the data line of two wire serial interface for serial ID

Note 4) When high, this output indicates loss of signal (LOS). Low indicates normal operation.

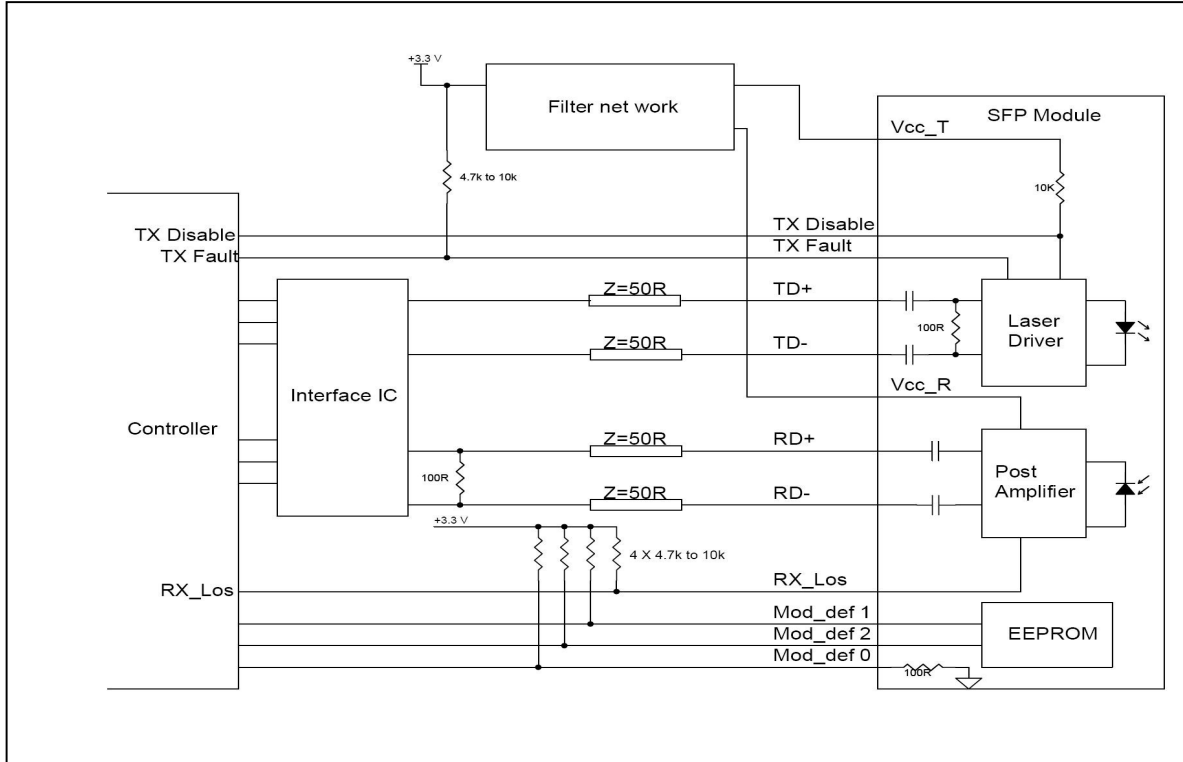
Note 5) RD+/-: These are the differential receiver outputs. They are AC coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.

Note 6) 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.

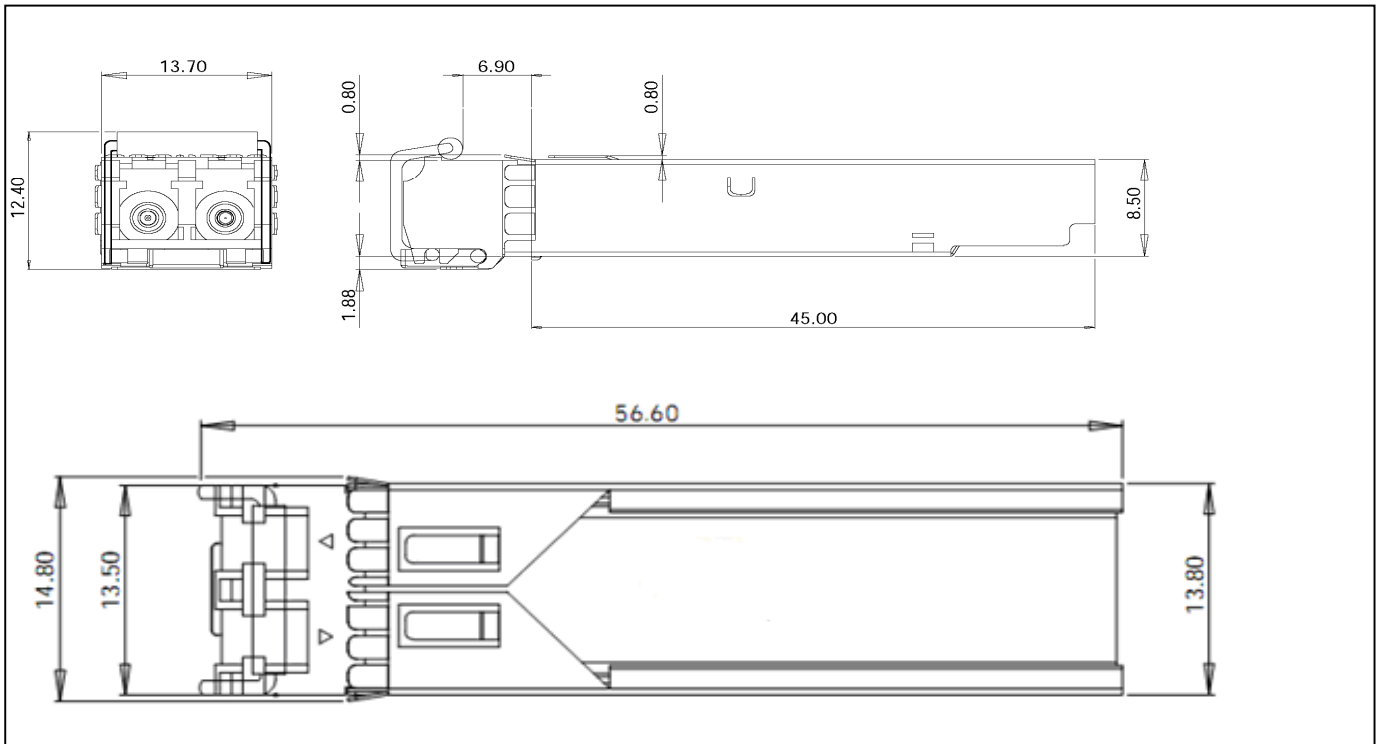
## Functional Diagram



## Typical Interface Circuit



## Package Dimensions



## For More Information

FANG HANG TECH LIMITED

Add: Room 908, Jingyuan Building, 28 Bulong Rd, Longgang District, Shenzhen China

Tel: +86-755-89584520

Fax: +86-755-89584520

sales@fanghangtech.com

www.fanghangtech.com