

Product Specification Sheet

TISP3112L-C(D)20

RoHS Compliant 1.25Gbps 1310nm Optical Transceiver 20km Reach

Product Features

- FP laser transmitter and PIN photo-detector
- Dual Data-rate of 1.25Gbps/1.0625Gbps Operation
- Up to 20KM transmission distance on 9/125 μ m 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

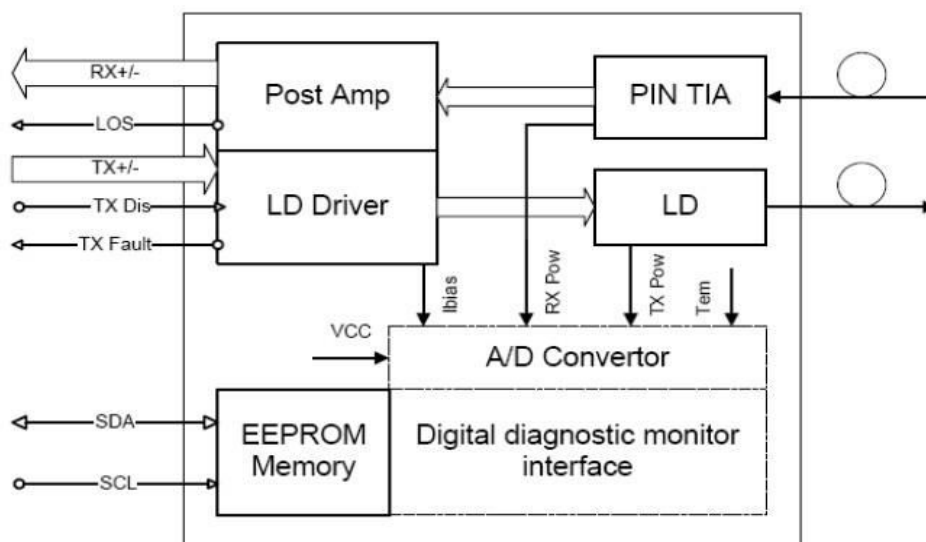
Description

The SFP transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 20km transmission distance with SMF.

The transceiver consists of three sections: a FP laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

Functional Diagram



Ordering information

Product part Number	Data Rate	Media	Wavelength (nm)	Transmission	Temperature Range(Tcase)(°C)	
	(Mbps)			Distance(km)		
TISP3112L-C(D)20	1250	Single mode fiber	1310	20	0~70	commercial
TISP3112L-E(D)20	1250	Single mode fiber	1310	20	-10~8	extended
TISP3112L-I(D)20	1250	Single mode fiber	1310	20	-45~8	industrial

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max	Unit	Notes
Supply Voltage	Vcc	-0.5	3.60	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	I _{cc}			220	mA	
Operating Case Temperature	T _c	0		70	°C	
		-10		80		
		-45		85		

Electrical Input / Output Characteristics

● Transmitter

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Diff. Input Voltage Swing			300		1800	mV _{pp}	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	Notes
Diff. Output Voltage Swing			400		1000	mV _{pp}	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 100Ω differential termination inside the module.

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

Note 3) RD_{+/-} outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

Optical Characteristics

• Transmitter

Parameter		Symbol	Min.	Type	Max.	Unit	Notes
Ave. Output Power (Enable)	10km	Po	-9		-3	dBm	1
	20km						
Extinction Ratio		ER	9			dB	1
Rise/Fall Time (20%-80%)		Tr-Tf			0.26	ns	2
Wavelength Range			1270		1360	nm	
Spectral Width (RMS)					4	nm	
Output Optical Eye		Compliant with IEEE802.3 z (class 1 aser safety)					

• Receiver

Parameter		Symbol	Min.	Type	Max.	Unit	Notes
Operating Wavelength			1270		1610	nm	
Sensitivity	10km	Pimin			-22	dBm	3
	20km						

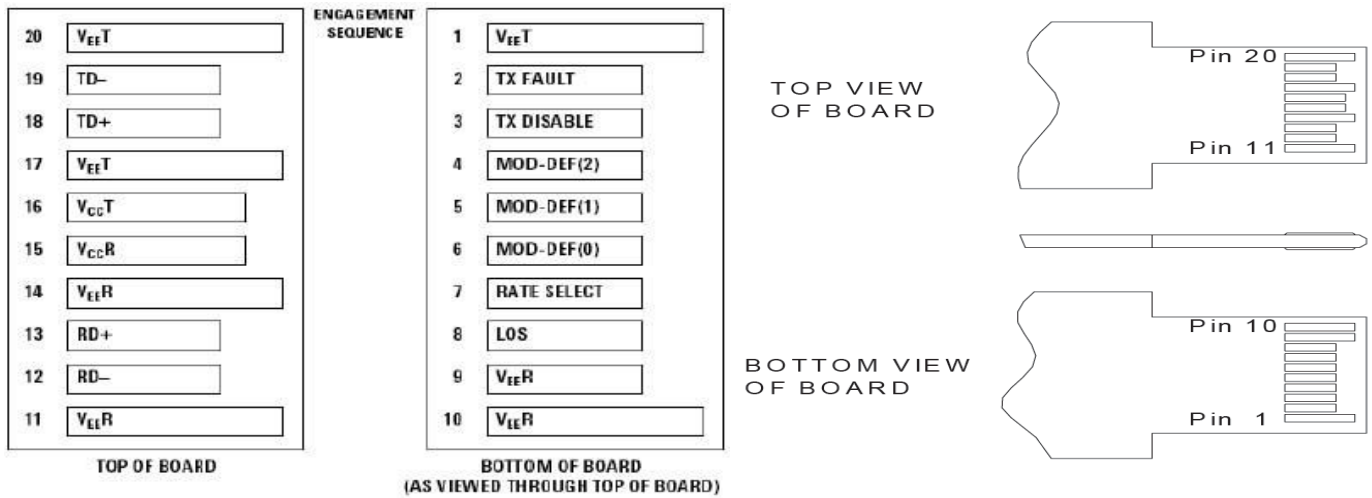
Min. Overload	Pimax	-3			dBm	3
LOS Assert	Pa	-35			dBm	
LOS De-assert	Pd			-23	dBm	
LOS Hysteresis	Pd-Pa	0.5		6	dB	

Note 1) Measured at 1250 Mb/s with PRBS $2^{23} - 1$ NRZ test pattern.

Note 2) Unfiltered, measured with a PRBS $2^{23}-1$ test pattern @1.25Gbps

Note 3) Measured at 1250 Mb/s with PRBS $2^{23} - 1$ NRZ test pattern for BER < 1×10^{-12}

Pin Definitions and Functions



PIN #	Name	Function	Notes
1	VeeT	Tx ground	
2	Tx Fault	Tx fault indication, Open Collector Output, active "H"	1
3	Tx Disable	LVTTL 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	

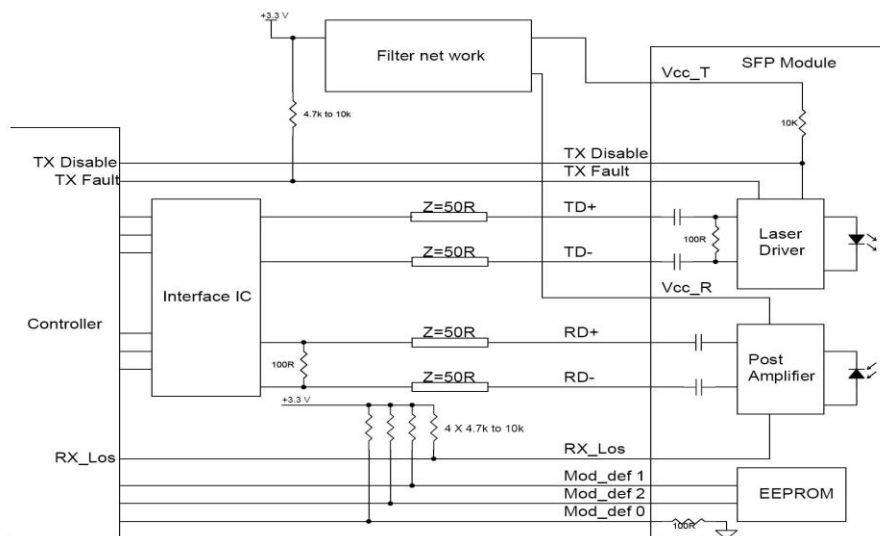
Note 1) When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should be pulled up with a 4.7 – 10KΩ resistor on the host board.

Diagnostics

Diagnostics Specification

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	-12 to -1	dBm	±3dB	Internal/ External
RX Power	-25 to 0	dBm	±3dB	Internal/ External

Typical Interface Circuit



Package Dimensions

