PSP-1G010/20-13TI SFP Optical Transceivers

(Up to 10/20km transmission)

Features

- Transceiver unit with independent
  - 1310nm MQW FP Laser diode transmitter
  - InGaAs PIN photodiode receiver
- Dual data-rate of 1.25Gbps/1.0625Gbps operation
- Up to 10km/20km on 9/125μm SMF
- Standard serial ID information compliant with SFP MSA
- SFP MSA package with duplex LC connector
- Digital Diagnostic Monitor Interface
- Very low EMI and excellent ESD protection
- +3.3V single power supply
- Wide operating temperature range
- RoHS compliant



Applications

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

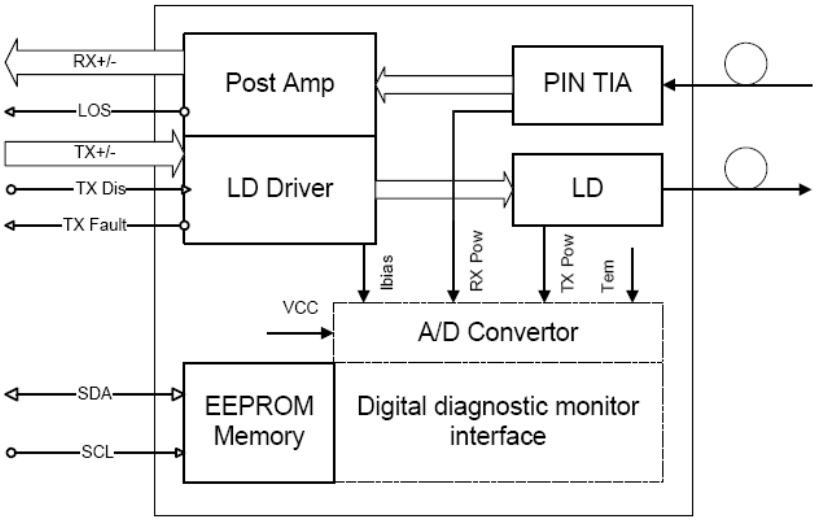
Standard

- SFP MSA (Version Sept.14 2000) compliant
- SFF-8472 (Rev 9.3, Aug. 2002) Digital Diagnostic Monitoring Interface for Optical Transceivers compliant
- IEEE 802.3z compliant
- ANSI specifications for Fiber Channel compliant
- Telcordia GR-468-CORE compliant

Description

- Premier's PSP-1G010/20 optical transceivers are designed for GE/1×FC optical interfaces for data communications with single mode fiber (SMF), and multimode fiber (MMF) as well. They operate at both 1.25Gbps for GE and 1.0625Gbps for 1×FC.
- The transceiver designs are optimized for high performance and cost effective to supply customers the best solutions for datacom applications.

Functional Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	3.60	V	
Storage temperature		-40	85	℃	
Relative Humidity		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	Note
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			300	mA	
Operating case temperature		Tc	-40		85	℃	

Electrical Input/Output Characteristics

- **Transmitter**

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Diff. input voltage swing			300		1800	mVpp	Note 1
Tx Disable input	H	V_{IH}	2.0		Vcc+0.3	V	
	L	V_{IL}	0		0.8		
Tx Fault output	H	V_{OH}	2.0		Vcc+0.3	V	Note 2
	L	V_{OL}	0		0.8		
Input Diff. Impedance		Zin		100		Ω	

- **Receiver**

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Diff. output voltage swing			400		1000	mVpp	Note 3
Rx LOS Output	H	VOH	2.0		Vcc+0.3	V	Note 2
	L	VOL	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 Vcc+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.	Typ.	Max.	Unit	Note
Ave. output power (Enabled)	PSP-1G010-13TI	Po	-9		-3	dBm	Note 1
	PSP-1G020-13TI		-8		-3		
Extinction Ratio		ER	9			dB	Note 1
Rise/Fall time (20%~80%)		Tr/Tf			0.26	ns	Note 2
Total Jitter	1. 25G	T_J			0.431	UI	Note 3
	1.0625G				0.43	UI	
Wavelength range			1270		1355	nm	
Spectral width (RMS)					4	nm	
Output Optical Eye		IEEE 802.3z and ANSI Fibre Channel Compliant					

- Receiver

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Operating wavelength			1270		1620	nm	
Sensitivity	PSP-1G010-13TI	Pimin			-21	dBm	Note 4
	PSP-1G020-13TI				-23		
Total Jitter	1. 25G	T_J			0.749	UI	Note 3
	1.0625G				0.61	UI	
Min. overload		Pimax	-3			dBm	Note 4
LOS Assert		Pa	-34			dBm	
LOS De-assert		Pd			-24	dBm	
LOS Hysteresis		Pd-Pa	1		4	dB	

Note 1) Measured at 1250 Mb/s with PRBS 2^7 – 1 NRZ test pattern.
Note 2) Unfiltered, measured with a PRBS 2^7-1 test pattern @1.25Gbps
Note 3) Meet the specified maximum output jitter requirements if the specified maximum input jitter is present.
Note 4) Measured at 1250 Mb/s with PRBS 2^7 – 1 NRZ test pattern for BER < $1x10^{-12}$

Table 2 - EEPROM Serial ID Memory Contents (A0h)

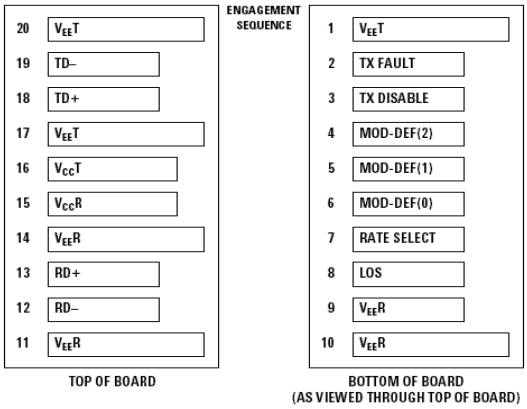
Data Address	Size (Bytes)	Name of Field	Value(Hex)	Description of Field
BASE ID FIELDS				
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	MOD4
2	1	Connector	07	LC
3-10	8	Transceiver	00 00 00 02 12 00 0D 01	
11	1	Encoding	01	8B10B
12	1	BR, Nominal	0D	1.25Gbps
13	1	Reserved	00	
14	1	Length(9μm,km)	0A/14	10km/20km
15	1	Length (9μm)	64/C8	
16	1	Length (50μm)	37	550m
17	1	Length (62.5μm)	37	550m
18	1	Length (Copper)	00	
19	1	Reserved	00	
20-35	16	Vendor name	50 72 65 6D 69 65 72 20 4F 70 74 6F 20 20 20 20	Premier Opto
36	1	Reserved	00	
37-39	3	Vendor OUI	000000	
40-55	16	Vendor PN	50 53 50 2D 31 47 30 3X 30 2D 31 33 54 49 54 20	PSP-1G0X0-13TI
56-59	4	Vendor rev	31 30 20 20	10
60-61	2	Wavelength	051E	1310nm
62	1	Reserved	00	
63	1	CC_BASE	XX	Check code for Base ID Fields
EXTENDED ID FIELDS				
64-65	2	Options	001A	Los,Tx_falt, Tx_diable
66	1	BR, max	00	Upper bit rate margin, units of %
67	1	BR, min	00	Lower bit rate margin, units of %
68-83	16	Vendor SN	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	Serial number(ASCII)
84-91	8	Date code	xx xx xx xx xx xx xx xx	Vendor's manufacturing date code (ASCII)
92	1	Diagnostic Monitoring Type	68	Digital diagnostics and internal calibration
93	1	Enhanced Options	80	Alarm/Warning flags implemented
94	1	SFF-8472 Compliance	01	
95	1	CC_EXT	xx	Check code for the Extended ID Fields
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific		Vendor Specific EEPROM
128-255	128	Reserved		Reserved for SFF-8079.

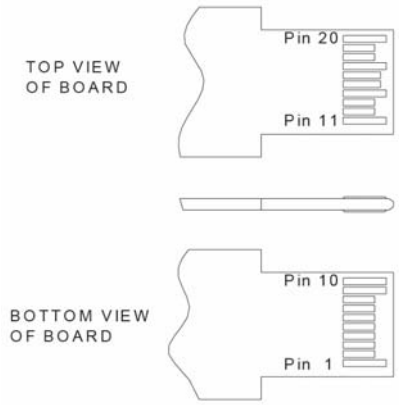
Note: The "xx" byte should be filled in according to practical case. For more information, please refer to the related document of SFF-8472 Rev 9.3.

Table 3 - DDM Specification

Parameter	Range	Accuracy	Calibration
Temperature	-40 ～ +85°C	±3°C	Internal
Voltage	3.0 ～ 3.6V	±3%	Internal
Bias Current	0 ～ 60mA	±10%	Internal
TX Power	-10 ～ -2dBm	±3dB	Internal
RX Power	-24 ～ -3dBm	±3dB	Internal

Pin Definitions and Functions





PIN #	Name	Function	Notes
1	VeeT	Tx ground	
2	Tx Fault	Tx fault indication, Open Collector Output, active “H”	Note 1
3	Tx Disable	LVTTL Input, internal pull-up, Tx disabled on “H”	Note 2
4	MOD-DEF2	2 wire serial interface data input/output (SDA)	Note 3
5	MOD-DEF1	2 wire serial interface clock input (SCL)	Note 3
6	MOD-DEF0	Model present indication	Note 3
7	Rate select	No connection	
8	LOS	Rx loss of signal, Open Collector Output, active “H”	Note 4
9	VeeR	Rx ground	
10	VeeR	Rx ground	
11	VeeR	Rx ground	
12	RD-	Inverse received data out	Note 5
13	RD+	Received data out	Note 5
14	VeeR	Rx ground	
15	VccR	Rx power supply	
16	VccT	Tx power supply	
17	VeeT	Tx ground	
18	TD+	Transmit data in	Note 6
19	TD-	Inverse transmit data in	Note 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.

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 – 10KΩ 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 – 10KΩ 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

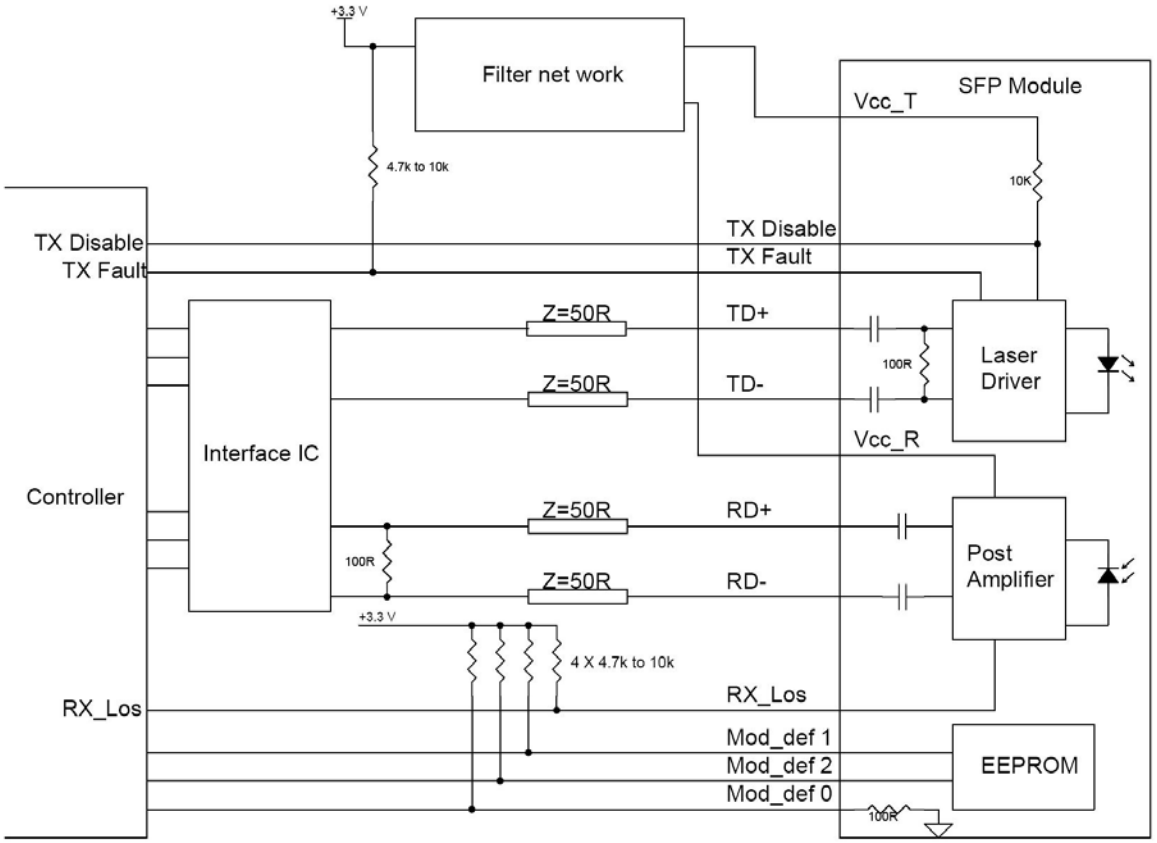
Mod-Def 2 is the data line of two wire serial interface for serial ID

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

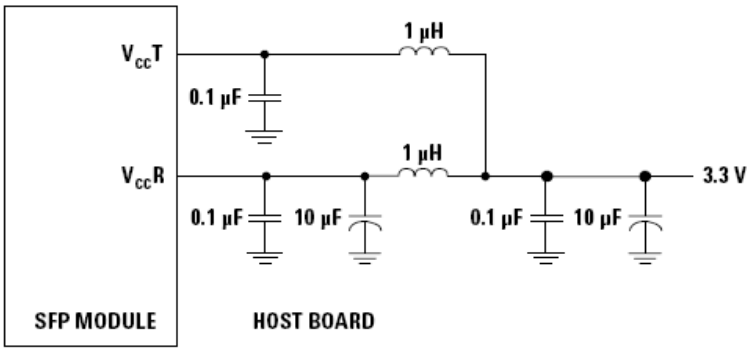
Note 5) RD+/-: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.

Note 6) TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω 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

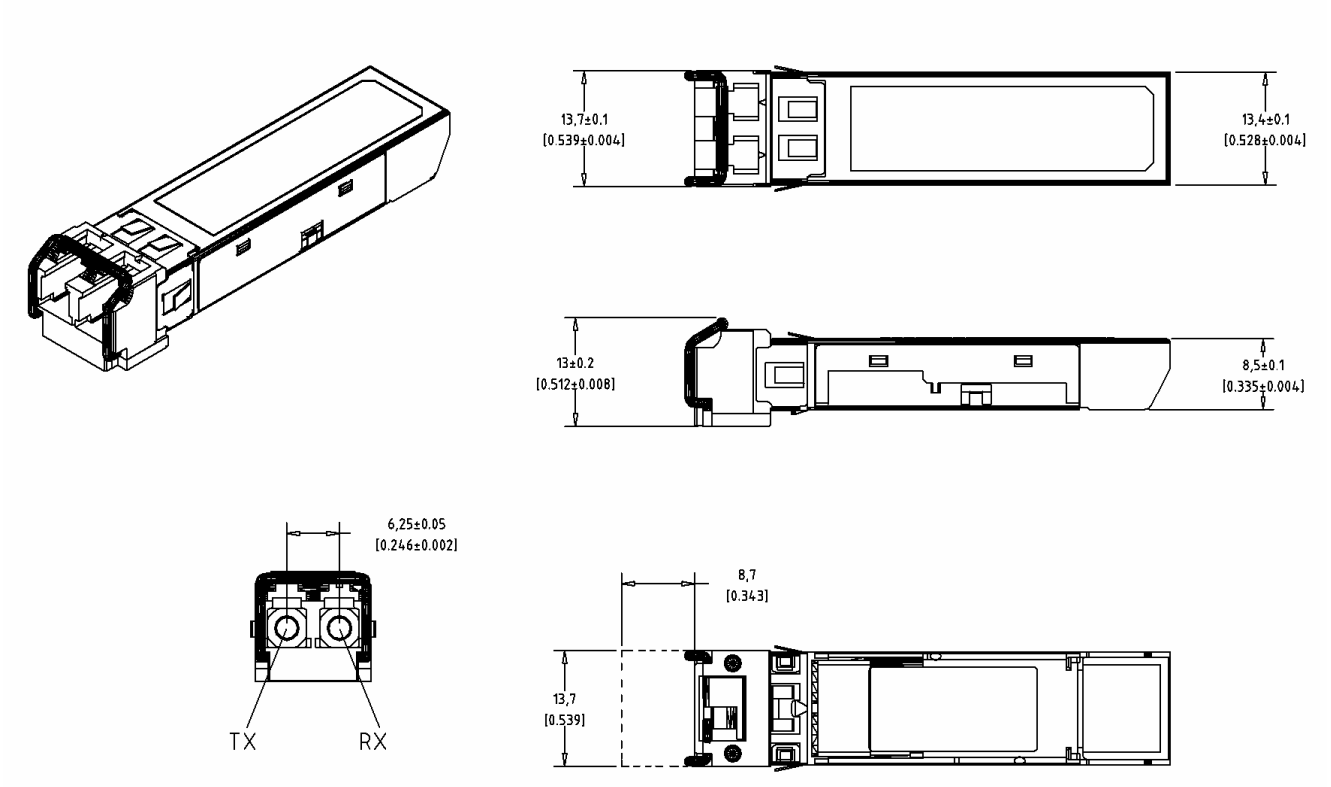


Recommended power supply filter



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

Package Dimensions



Ordering Information

	Form		Data Rate		Distance		Wavelength (nm)		Temperature (℃)		DDM	
P	**SP**	**—**	**1G0**		**❑❑**		**— 13**			**❑**		**❑**
Premier	SP	SFP	1G0	1.25Gbps/1.0625Gbps	10	10km	13	1310	T	-40~85	I	DDMI
					20	20km						

Note: Some option codes may not be applicable to all the product models, please contact our sales representatives for further information.

Contact Information

Premier Opto-Electronics Technology Co., Ltd.

Fuzhou (China headquarters)
Premier Opto Campus, Changle,
Fuzhou, Fujian 350200, China
Tel: +86-591-2861-7777
Fax: +86-591-2862-2862

Shenzhen Sales & Marketing Center
3/F, Kejian Building, 6th industrial Road,
Shekou, Shenzhen 518067, China
Tel : +86-755-2681-9060
Fax: +86-755-2681-9062

迅捷光电科技有限公司

福州(中国总部)
福建省福州长乐市迅捷光电工业园区
邮编：350209
电话：+86-591-2861-7777
传真：+86-591-2862-2862

深圳营销中心
深圳市南山区蛇口工业六路科健大厦三层
邮编：518067
电话：+86-755-2681-9060
传真：+86-755-2681-9062

Web site: www.premieropto.com

Disclaimer

This datasheet contains confidential information and is subject to change without notice.

The PSP-1G0 series contain circuitry to aid the implementation of eye safety functions in equipment using Laser devices.

Premier Opto-Electronics Technology Co., Ltd accepts no liability for failure of this function in this product nor for injury to persons as a result of use of this product. Testing of the functionality of eye safety circuits in equipment using this product is the responsibility of the manufacturer of the equipment.

This document does not transfer or license any intellectual property rights to the user.

Premier Opto-Electronics Technology Co., Ltd assumes no liability or warranty for infringement of patent, copyright or other intellectual property rights through the use of this product.

Premier Opto-Electronics Technology Co., Ltd assumes no liability for fitness for particular use or claims arising from sale or use of its products.

Premier Opto-Electronics Technology Co., Ltd products are not intended for use in life critical or sustaining applications.