



SPT-P136G-40D

Hot Pluggable, Duplex LC, +3.3V 1310nm DFB-LD, 40km



Features

- Up to 6.144 Gb/s bi-directional data links
- Electrical interface compliant to SFF-8431 specifications for small form factor pluggable module “SFP+”
- 1310nm DFB transmitter, PIN photo-detector
- 2-wire interface for management specifications compliant with SFF 8472 digital diagnostic monitoring interface for optical transceivers
- Operating case temperature: 0 to 70°C
- All-metal housing for superior EMI performance
- Low power consumption
- Advanced firmware allow customer system encryption information to be stored in transceiver
- Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- RoHS compliant

Applications

- High-speed storage area networks
- Computer cluster cross-connect
- Custom high-speed data pipes
- Inter Rack Connection

Description

The SPT-P136G-40D is a high performance, cost effective modules for serial optical data communications such as CPRI and OBSAI. which is supporting Multi Rate Up to 6.144Gbps, and transmission distance up to 40km on SM fiber. It consists of two sections: The transmitter section incorporates a 1310nm DFB driver and re-timer. The receiver section consists of a PIN photodiode integrated with a transimpedance preamplifier (TIA). The module is hot pluggable into the 20-pin connector. The high-speed electrical interface is base on low voltage logic, with nominal 100 Ohms differential impedance and AC coupled in the module.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V _{CC}	0		3.6	V
Storage Temperature	T _c	-40		85	°C
Operating Case Temperature	T _c	0		70	°C
Relative Humidity	RH	5		95	%
RX Input Average Power	P _{max}	-		0	dBm

Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Power Supply Current	I _{cc}			360	mA
Operating Case Temperature	T _C	0	25	70	°C

Electrical Characteristics (TOP = 0 to 70 °C, VCC = 3.0 to 3.60 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Data Rate		-	6.144	-	Gbps	
Power Consumption		-		1	W	
Transmitter Section:						
Single Ended Output Voltage Tolerance		-0.3	-	4	V	
Common mode voltage tolerance		15	-	-	mV	
Tx Input Diff Voltage	V _I	180		600	mV	
Tx Fault	V _{oL}	-0.3		0.4	V	At 0.7mA
Data Dependent Input Jitter	DDJ			0.1	UI	
Data Input Total Jitter	TJ			0.28	UI	
Receiver Section:						
Single Ended Output Voltage Tolerance		-0.3	-	4	V	

Rx Output Diff Voltage	Vo	300		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	28			ps	20% to 80%
Total Jitter	TJ			0.7	UI	
Deterministic Jitter	DJ			0.42	UI	

Optical Parameters(TOP = 0 to 70°C, VCC = 3.00 to 3.60 Volts)

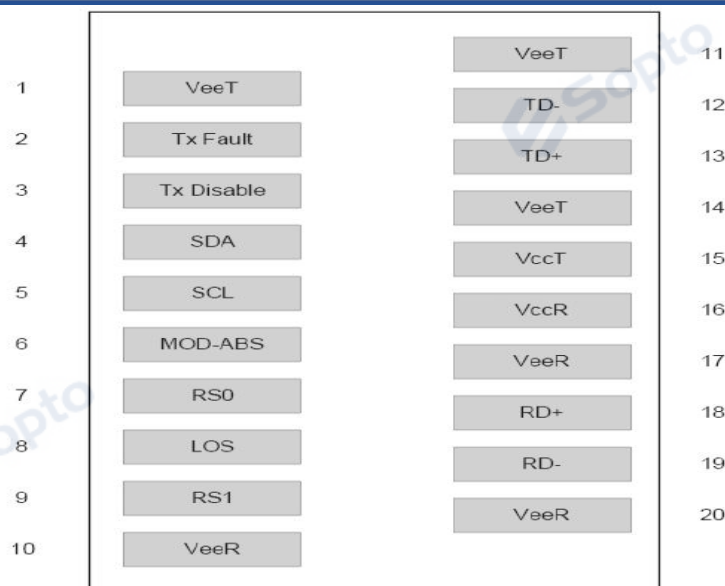
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λ_t	1260	1310	1355	nm	
RMS spectral width	Pm	-	-	3.5	nm	
Average Optical Power	Pavg	-1	-	+4	dBm	1
Laser Off Power	Poff	-	-	-30	dBm	
Extinction Ratio	ER	3.5	-	-	dB	
Transmitter Dispersion Penalty	TDP	-	-	3.9	dB	
Relative Intensity Noise	Rin	-	-	-128	dB/Hz	12dB reflection
Optical Return Loss Tolerance		-	-	12	dB	
Receiver Section:						
Center Wavelength	λ_r	1270		1610	nm	
Receiver Sensitivity	Psens	-	-	-16	dBm	2
Los Assert	LosA	-30	-	-	dBm	
Los Dessert	LosD	-	-	-18	dBm	
Los Hysteresis	LosH	0.5	-	-	dB	
Overload	Pin	-	-	0.5	dBm	
Receiver Reflectance		-	-	-12	dB	

Note:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Measured with a PRBS 2³¹-1 test pattern, @6.25Gb/s, BER<10⁻¹²

Pin Assignment:

Diagram of Host Board Connector Block Pin Numbers and Name



Pin Function Definitions

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 select0,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.

Note 4) 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.

SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP -8472. 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 at address A2h. For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

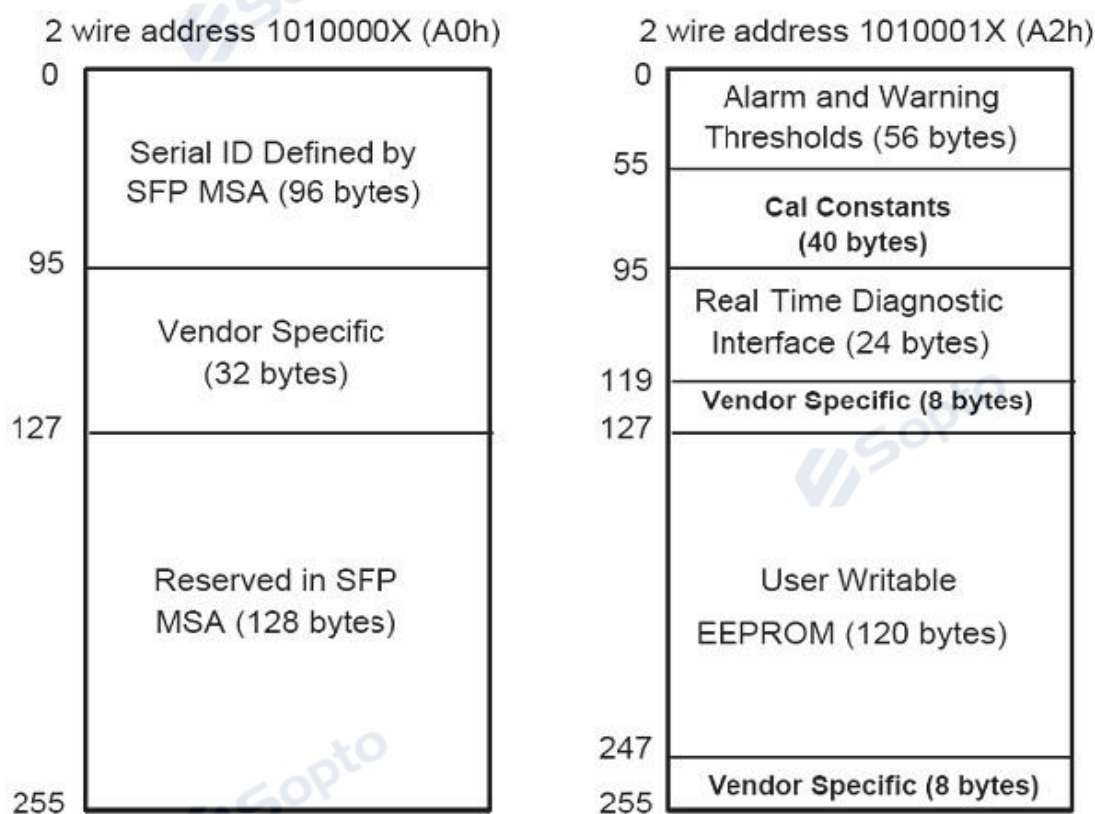


Table 2 - EEPROM Serial ID Memory Contents (A0h)

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	
11	1	Encoding	NRZ(03h)
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m

17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: TIBTRONIX
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: “SPT-P136G-40D” (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	TIBTRONIX’s Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	TIBTRONIX specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

Digital Diagnostic Monitor Characteristics

Data Address	Parameter	Range	Accuracy	Unit
96-97	Transceiver Internal Temperature	-10 to +80°C	±3.0	°C
100-101	Laser Bias Current	8 to 90mA	±10	%
100-101	Tx Output Power	-8.5 to +1dBm	±3.0	dBm
100-101	Rx Input Power	-15.5 to 0.5dBm	±3.0	dBm
100-101	VCC3 Internal Supply Voltage	+3.0V to +3.7V	±3.0	%

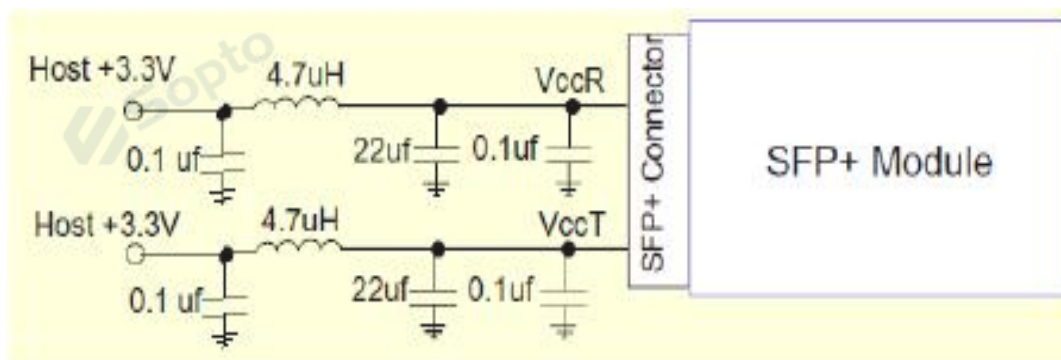
Regulatory Compliance

The HXFP-3831MF complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

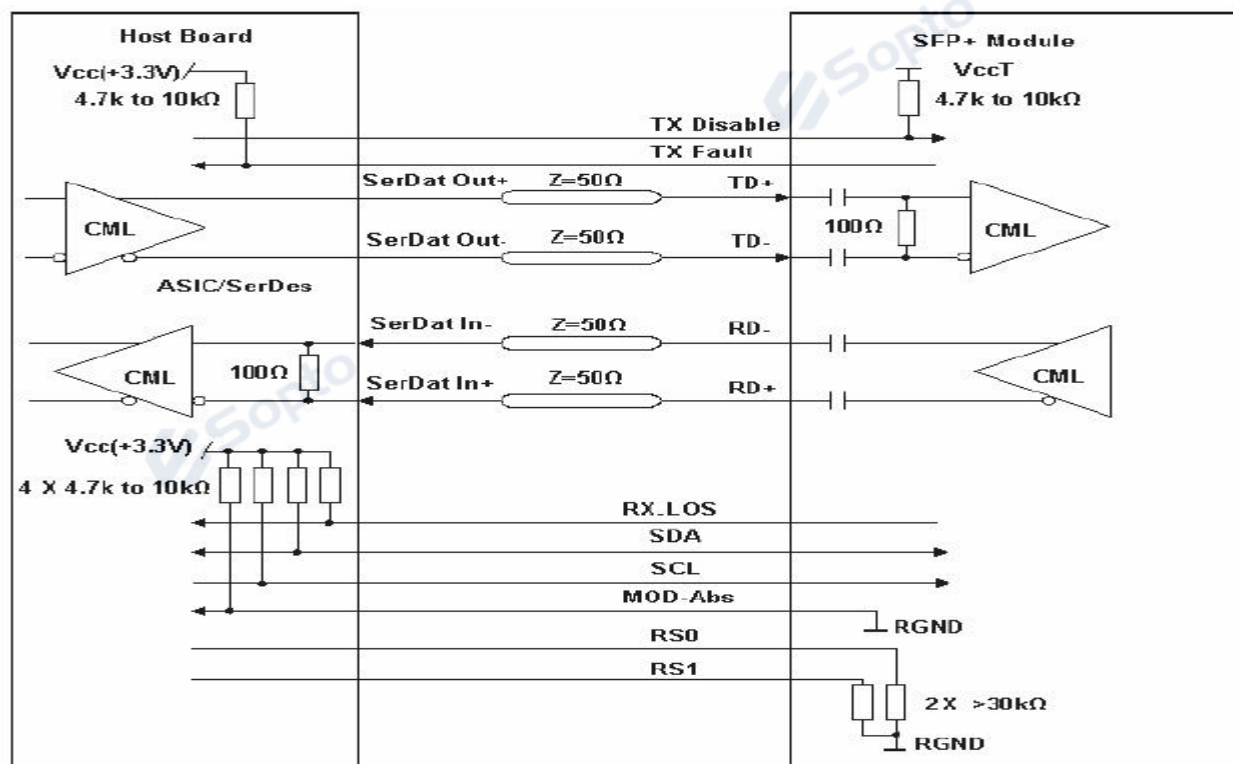
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards

Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.

Recommended Circuit:

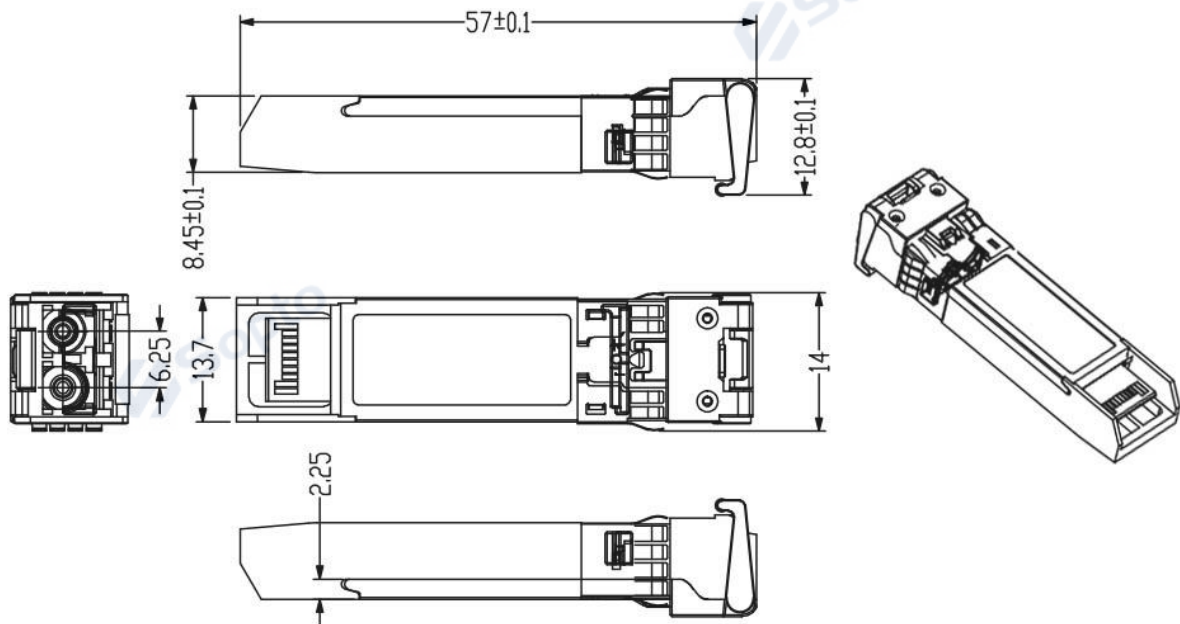


Recommended Host Board Power Supply Circuit



Recommended High-speed Interface Circuit

Mechanical Dimensions



Ordering information

Part Number	Product Description
SPT-P136G-10D	1310nm, 4.9G/6.144Gbs, 10km, $0^{\circ}\text{C} \sim +70^{\circ}\text{C}$,DDM

Note: If you need more customized services, please contact us.

E-mail: info@sopto.com.cn

Web : <http://www.sopto.com.cn>