Sepitam-SFP1G-SM-DX-20KM

1.25Gbps Single mode dual fiber 1310nm Optical Transceiver 20km

Product 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.

Feature:

- FP laser transmitter and PIN photo-detector
- Dual Data-rate of 1.25Gbps/1.0625Gbps Operation
- Up to 20KM 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

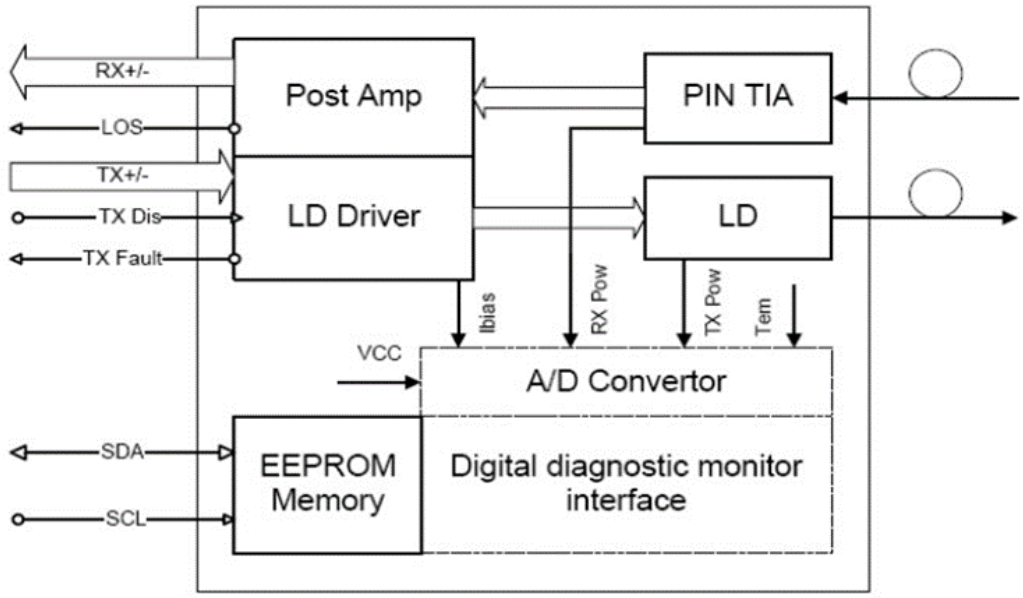
  Extended: -10°C to +80°C

  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

Functional Diagram:



Absolute Maximum Ratings:

Parameter	Symbol	Min.	Max	Unit	Notes
Supply Voltage	Vcc	-0.5	3.60	V	_
Storage Temperature	_	-40	85	℃	_
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.	Type	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:

- **Transmitter:**

Parameter		Symbol	Min.	Type	Max.	Unit	Notes
Diff. Input Voltage Swing		_	300	_	1800	mVpp	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	2
	L	V_{OL}	0	_	0.8		
Input Diff. Impedance		Zin		100	_	Ω	_

- **Receiver :**

Parameter		Symbol	Min.	Type	Max.	Unit	Notes
Diff. Output Voltage Swing		_	400	_	1000	mVpp	3
Rx LOS Output	H	V_{OH}	2.0	_	Vcc+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 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.	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:**

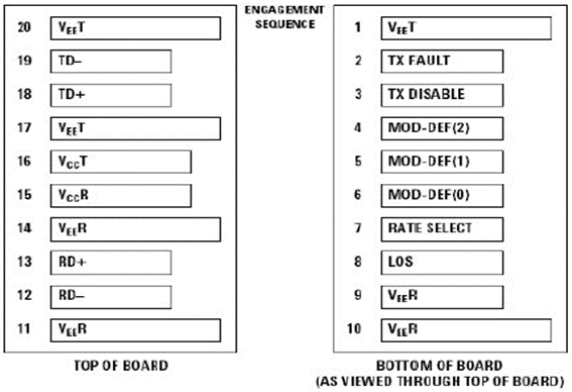
Parameter		Symbol	Min.	Type	Max.	Unit	Notes
Operating Wavelength		_	1270	_	1610	nm	_
Sensitivity	10km	Pimin	_	_	-22	dBm	3
	20km		_	_	_		
Min. Overload		Pimax	-3	_	_	dBm	3
LOS Assert		Pa	-35	_	_	dBm	_
LOS De-assert		Pd	_	_	-23	dBm	_
LOS Hysteresis		Pd-Pa	0.5	_	6	dB	_

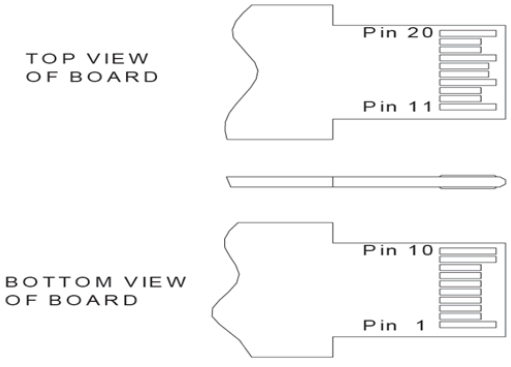
Note 1) Measured at 1250 Mb/s with PRBS 2^{23} – 1 NRZ test pattern.

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 < $1x10^{-1}$

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.

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.

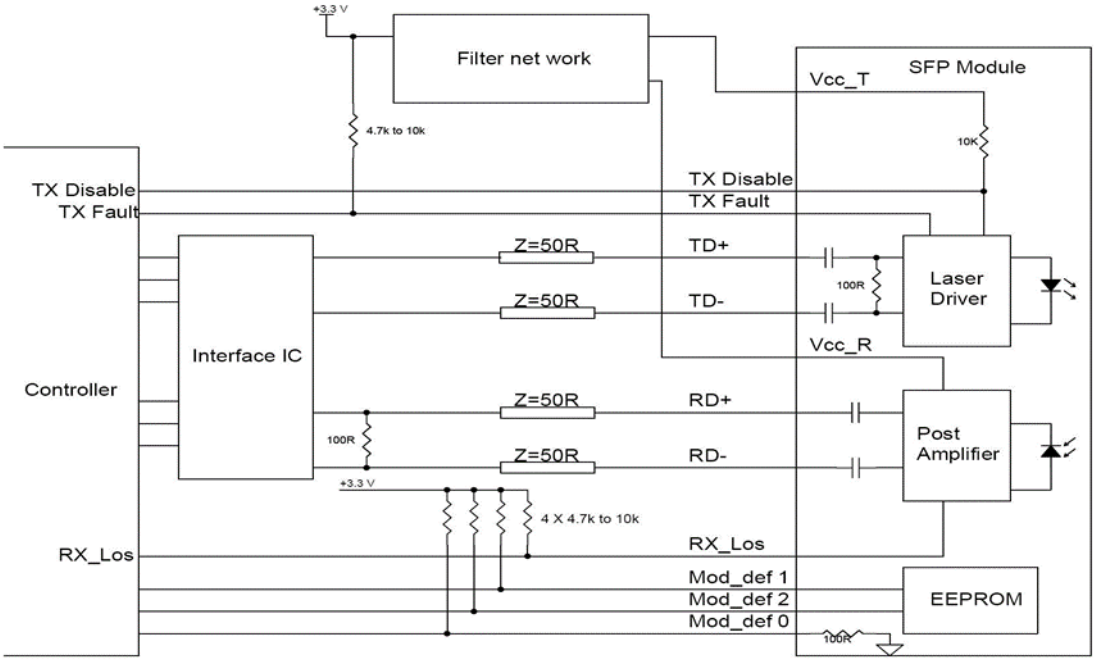
Note 6) TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

Diagnostics:

Diagnostics Specification:

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70 -40 to +85	℃	±3℃	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:



Technical Specification of

TYPE:Sepitam-SFP1G-SM-DX-20KM

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