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1G SFP SX Transceiver

SFP 1G SX Transceiver

1. SCOPE

The scope of this specification is the definition of a high performance, cost effective modules, which is optimized for 1000BASE-SX, and transmission distance up to 550m. The transceiver consists of two sections: The transmitter section incorporates an 850nm VCSEL driver. The receiver section consists of a PIN photodiode integrated with a transimpedance preamplifier (TIA). The module is hot pluggable into the 20-pin connector.

2. PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER(S)

SFP 1G SX Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Tem.
ZFTBSXB0850A1ST	1G	850	550m	MMF	-9.5 ~ -3	-17	LC	**C**

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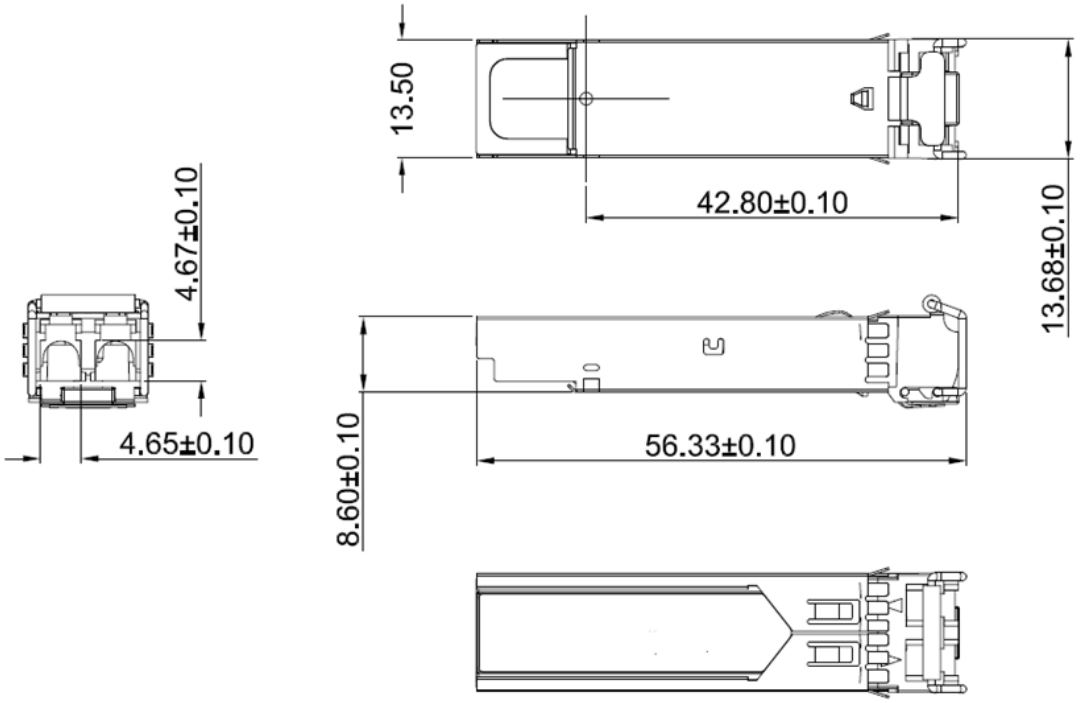
2.2 DIMENSIONS,MATERIALS,PLATINGS AND MARKING



3. APPLICABLE DOCUMENTS AND SPECIFICATIONS

- Compliant with SFP MSA
- Compliant with IEEE802.3z Gigabit Ethernet
- Compliant with SFF-8472 v9.3
- TUV certification

4. Regulatory Compliance

ZCables transceivers are Class 1 Laser Products and comply with US FDA regulations. These products are certified by TÜV and CSA to meet the Class 1 eye safety requirements of IEC 60825-1 and IEC 60825-2. Copies of certificates are available at ZCables Corporation upon request

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5. Absolute Maximum Ratings & Recommended Operating Conditions

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_S	-40	+85	℃
Supply Voltage	V_{CC3}	-0.5	4	V
Relative Humidity(Non-condensing)	RH	5	95	%
RX Input Average Power	Pmax	-	-3	dBm

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature(I-temp)	T_I	-40		85	℃
Operating Case Temperature(C-temp)	T_C	0		70	℃
Power Supply Voltage	V_{CC3}	3.135	3.3	3.465	V
Data Rate			1.25/1.0625		Gbps

Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength Range	λ_C	830	850	860	nm	VCSEL LD
Optical Power	Po	-9.5	-6.5	-3	dBm	850nm VCSEL-LD
Spectral width	$\Delta\lambda$			0.85	nm	VCSEL LD
Extinction Ratio	ER	9	12	-	dB	
Relative Intensity Noise	RIN			-120	dB/Hz	
Eye Diagram	Complies with IEEE802.3z eye masks when filtered					
Optical Rise/Fall Time	Trise/Tfall			260	Ps	

Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Sensitivity	S			-20	dBm	550m
Overload		0			dBm	
LOS	Optical Dessert			-21	dBm	

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LOS	Optical Dessert			-21	dBm	
	Optical Assert	-35			dBm	
LOS Hysteresis		0.5		5	dB	

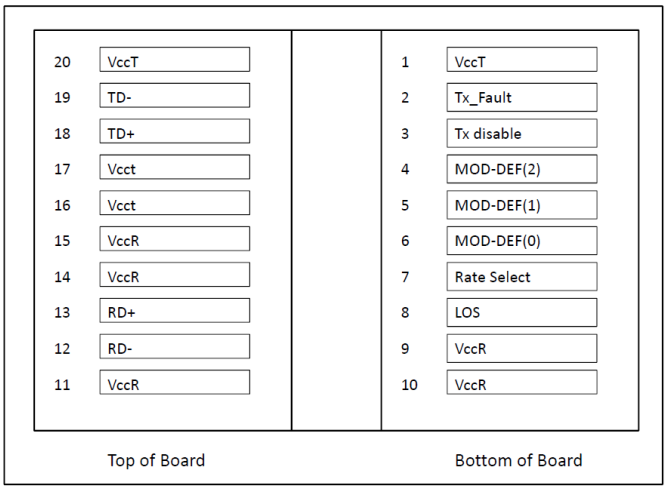
Notes:

[1] Receiver sensitivity is informative and shall be measured with conformance test signal for BER =1x 10^{-12}.

Control and Status I/O Timing Characteristics

Parameter	Symbol	Min.	Max.	Unit	Note
Electrical Characteristics					
Supply current			300	mA	
Single Ended Data Input Swing		500	2400	mV	
Single Ended Data Output Swing		370	2000	mV	
TX_fault /LOS output (TTL)	VOH	2.0	Vcc	V	
	VOL	0	0.8		
TX_disable input (TTL)	VOH	2.0	Vcc	V	
	VOL	0	0.8		

6. Applications Note :



Pin Definitions

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Pin Assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	3
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	3
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	3
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	3
7	LVTTL-I	RS	Rate select, optionally controls SFP module receiver. When High input data rate 10.3GBd and when LOW data-rate 1.25GBd.	3
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	3
9		VeeR	Module Receiver Ground	1
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	3
13	CML-O	RD+	Receiver Non-Inverted Data Output	3
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	2
16		VccT	Module Transmitter 3.3 V Supply	2
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	3
19	CML-I	TD-	Transmitter Inverted Data Input	3
20		VeeT	Module Transmitter Ground	

Notes:

1. The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.
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. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5 V.
3. This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10kohms to VccT in the module.

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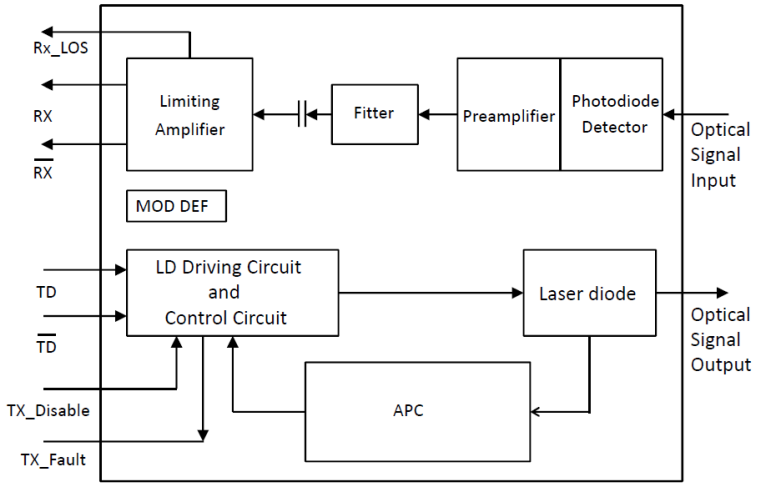
Block Diagram of Transceiver



Block Diagram of Transceiver

Transmitter Section

The transmitter converts 1.25Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 1G BASE standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. A logic “1,” or no connection on this pin will disable the laser from transmitting. A logic “0” on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supply voltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is a module output contacts that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Host in the host with a resistor in the range 4.7-10 kΩ. TX_Disable is a module input contact. When TX_Disable is asserted high or left open, the SFP module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 kΩ to 10 kΩ resistor.

Receiver Section

The receiver converts 1.25Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to

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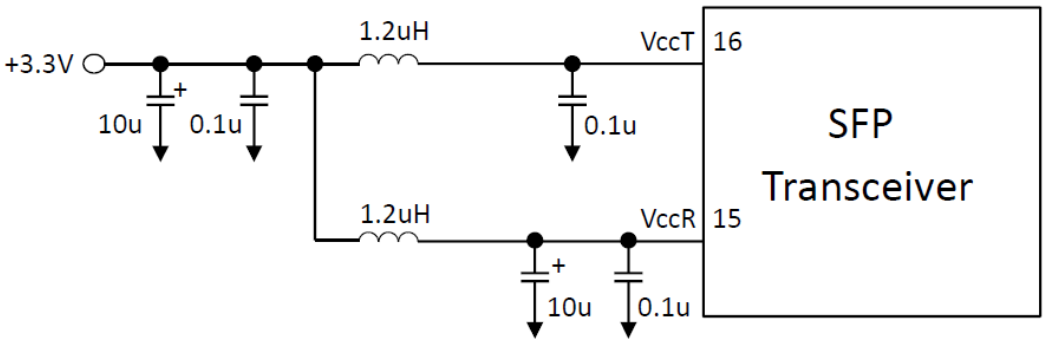
Vcc_Host in the host with a resistor in the range 4.7-10 kΩ, or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the SFP is installed that the received signal strength is below the specified range. Such an indication typically points to non-installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.



Recommended Interface Circuit