

TITLE 1G SFP SX Transceiver	DOC No.	DTRX-180017
	REVISION : 04	AUTHORIZED BY : Mike Sun
	DATE : 2022.05.26	CLASSIFICATION : Optical 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

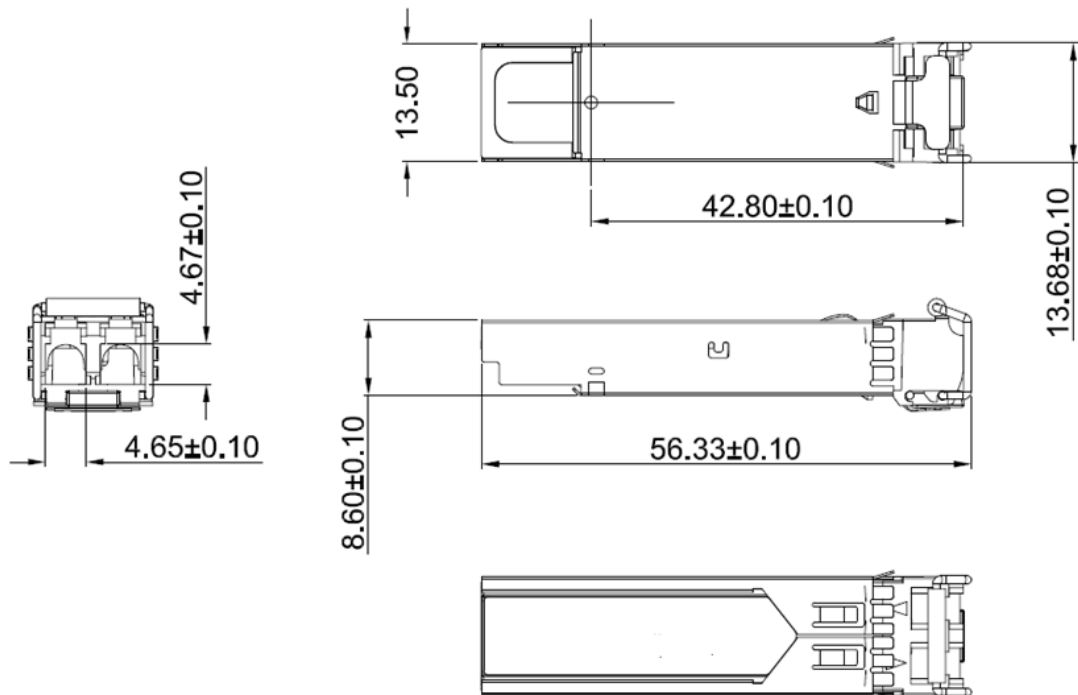
2.1 PRODUCT NAME AND SERIES NUMBER(S)

SFP 1G SX Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Tem.
P58000ABCA01-1	1G	850	550m	MMF	-9.5 ~ -3	-17	LC	C
P58000ABIA01-1	1G	850	550m	MMF	-9.5 ~ -3	-17	LC	I

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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

JPC 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 JPC 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	°C
Supply Voltage	V _{CC3}	-0.5	4	V
Relative Humidity(Non-condensing)	RH	5	95	%
RX Input Average Power	P _{max}	-	-3	dBm

Recommended Operating Conditions					
Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature(I-temp)	T _i	-40		85	°C
Operating Case Temperature(C-temp)	T _c	0		70	°C
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	P _o	-9.5	-6.5	-3	dBm	850nm VCSEL-LD
Spectral width	Δλ			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	

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Receiver Operating Characteristic-Optical, Electrical						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Sensitivity	S			-17	dBm	550m
Overload		0			dBm	
LOS	Optical Dessert			-21	dBm	
LOS	Optical Dessert			-21	dBm	
	Optical Assert	-35			dBm	
LOS Hysteresis		0.5		5	dB	

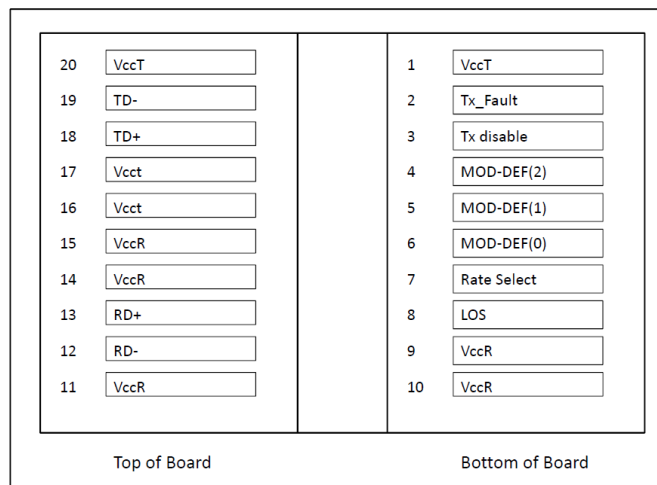
Notes:

[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 :

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Pin Definitions

Pin Assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTTL-O	TX_Fault	Module Transmitter Fault	3
3	LVTTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	3
5	LVTTTL-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	LVTTTL-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	LVTTTL-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

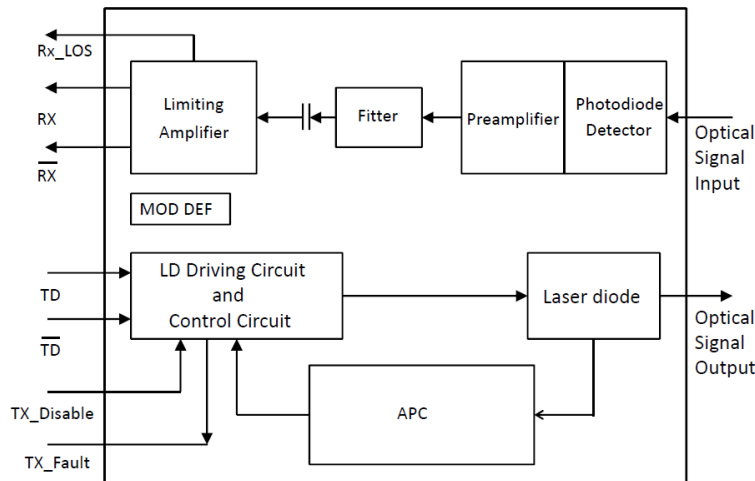
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11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	3
13	CML-O	RD+	Receiver Non-Inverted Data Output	3
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	2
16		VccT	Module Transmitter 3.3 V Supply	2
17		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

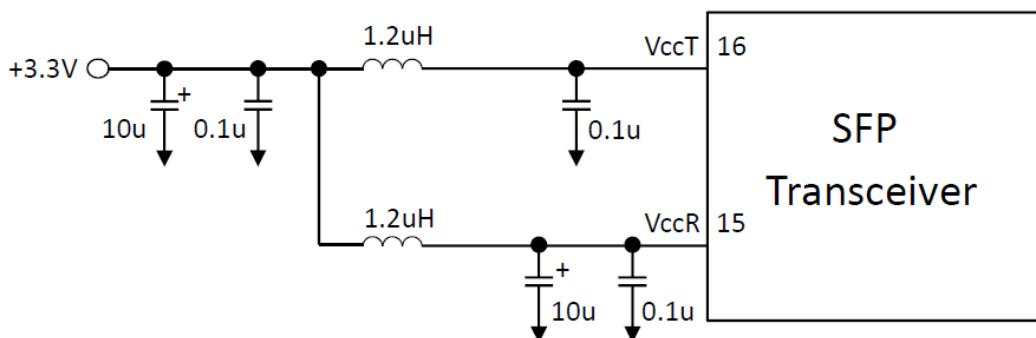
Transmitter Section

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.

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Receiver Section

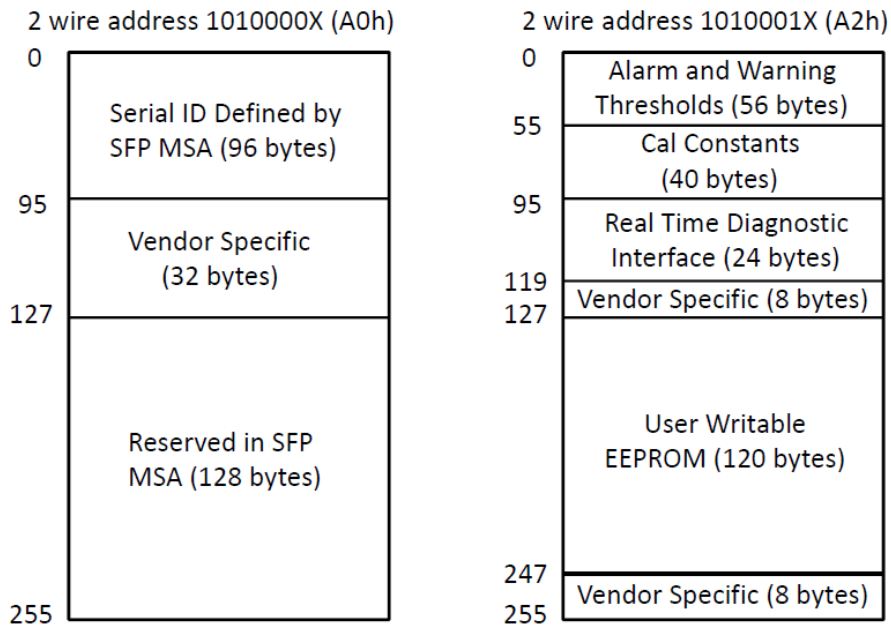
The receiver converts 1.25Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and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

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7. Digital Diagnostic Memory Map



Addr.	Field Size	Name of Field	Hex	Description
	(Bytes)			
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	07	LC Connector
3-10	8	Transceiver	10 00 00 00 20 40 0C 54	Transceiver Codes
11	1	Encoding	03	NRZ
12	1	BR, Nominal	01	1Gb/s
13	1	Rate Identifier	00	Unspecified
14	1	Length (9um) km	00	Transceiver transmit distance

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15	1	Length (9um) 100m	00	Transceiver transmit distance
16	1	Length (50um OM2)	00	
17	1	Length (62.5um) 10m	00	Transceiver transmit distance
18	1	Length (Copper)	00	Not compliant
19	1	Length (50um OM3)	00	
20-35	16	Vendor name	59 69 20 56 61 6C 6C 65 79 20 20 20 20 20 20 20	"JPC" Vendor Name(ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	59 56 30 31 2D 50 30 32 20 20 20 20 20 20 20 20	Part No.(ASCII)
56-59	4	Vendor rev	31 2E 30 20	"1.0" (ASCII)
60-61	2	Wavelength	03 52	Transceiver wavelength
62	1	Reserved	00	
63	1	CC_BASE	87	Check code for Base ID Fields
64-65	2	Options	00 1A	TX_DISABLE, TX_FAULT and Loss of Signal implemented.
66	1	BR,MAX	00	Not Specified
67	1	BR,MIN	00	Not Specified
68-83	16	Vendor SN	SN(Variable)	Serial Number of transceiver(ASCII).
84-91	8	Date code	DC(Variable)	Manufactory Date Code.
92	1	Diagnostic Monitoring Type	68	Digital diagnostic monitoring implemented, "Internally calibrated" is implemented

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93	1	Enhanced Options	F0	Optional Alarm/Warning flags implemented for all monitored quantities, Optional Soft TX_Disable control and monitoring implemented, <hr/> Optional Soft TX_FAULT monitoring implemented, Optional Soft RX_LOS monitoring implemented
94	1	SFF_8472 Compliance	04	Includes functionality described in Rev10.4 SFF-8472
95	1	CC_EXT	CS(Variable)	Check sum for Extended ID Field.
96-127	32	Vendor Specific	Read only	Depends on customer information Filled by zero
128-255	128	Reserved	Read only	Filled by zero

8. Modification History

Rev.	Comments	Date	Originator	Approval
01	Preliminary Draft	2017.11.26	Mike Sun	Ray_Yang
02	Revise Part Number	2018.05.10	Mike Sun	Ray Yang
03	Add Certificate	2020.11.6	Mike Sun	Ray_Yang
04	Modify Receiver Sensitivity	2022.05.26	Albert	Mike Sun

