

TITLE 1G SFP Bidi T15/R13 20km Transceiver	DOC No. RFD-20241031002-002	
	REVISION : 01	AUTHORIZED BY : Albert Lin
	DATE : 2024.12.24	CLASSIFICATION : CONFIDENTIAL

1. SCOPE

1G Bidi T15/R13 transceiver is a high-performance, cost-effective module, which is supporting up to 1.25Gbps, and transmission distance up to 20km on SM fiber. The transceiver consists of two sections: The transmitter section incorporates a laser driver and a 1550nm DFB laser. The receiver section consists of a PIN photodiode integrated with a transimpedance preamplifier (TIA) and a Limited Amplifier. The module is hot pluggable into the 20-pin connector. The high-speed electrical interface is based on low voltage logic, with nominal 100Ohms differential impedance and AC coupled in the module.

2. PRODUCT FEATURES

- Up to 20 km transmission on SMF
- Up to 1.25 Gbps
- 1550nm DFB laser and 1310nm PIN receiver
- Single LC receptacle optical interface compliant
- 2-wire interface for integrated Digital Diagnostic monitoring
- Hot pluggable
- Very low EMI and excellent ESD protection
- +3.3V power supply
- Power consumption less than 1.0W
- Operating temperature range: Commercial: 0°C to +70°C // Industrial: -40°C to +85°C

3. PRODUCT DESCRIPTION

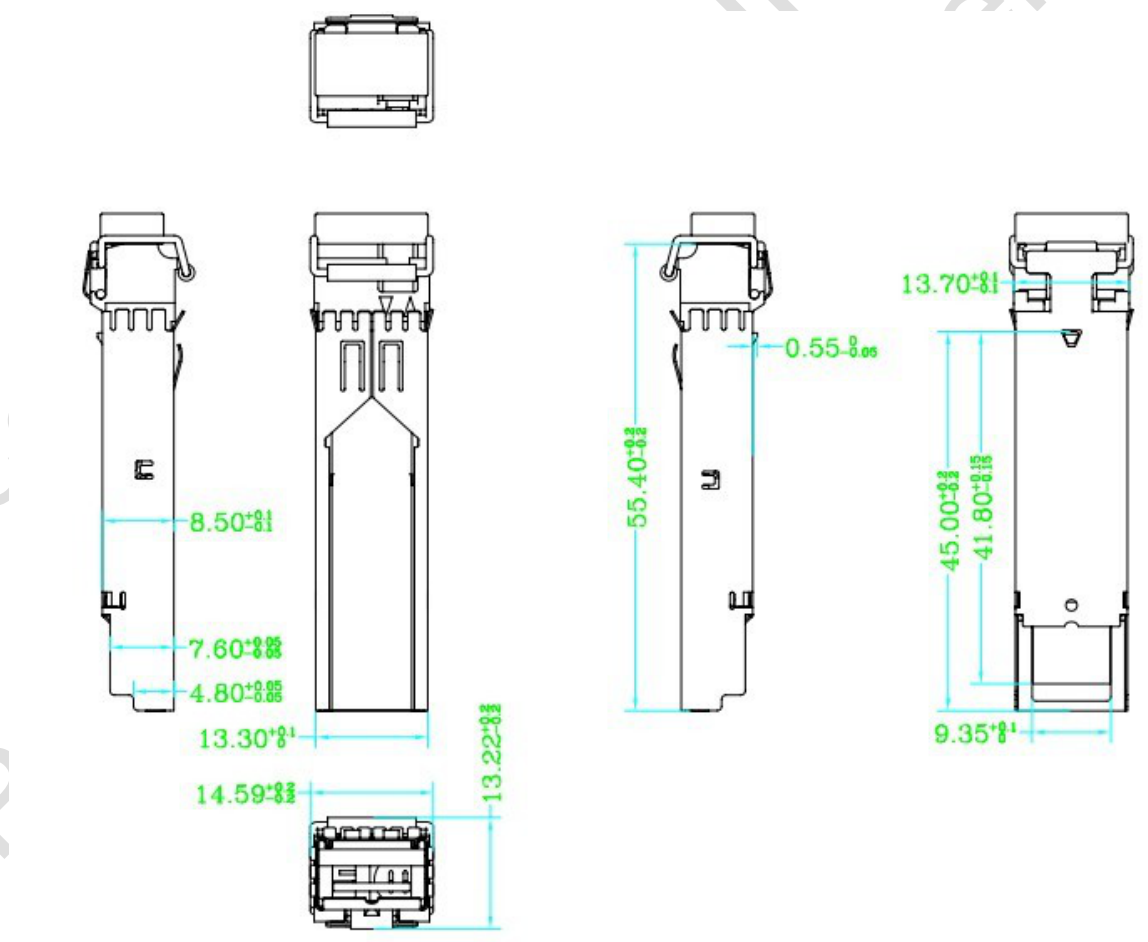
3.1 PRODUCT NAME

Category	Wavelength (nm)	Distance	Media	Power(dBm)	Sen. (dBm)	Connector	Tem.
1G BIDI	1550	20km	SMF	-9 ~ 3	-22	LC	C
1G BIDI	1550	20km	SMF	-9 ~ 3	-22	LC	I

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1G SFP Bidi Transceiver

3.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKING



Unit is millimeter. All dimensions are $\pm 0.1\text{mm}$ unless otherwise specified.

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4. APPLICABLE DOCUMENTS AND SPECIFICATIONS

- High-speed storage area networks
- Computer cluster cross-connect
- Compliant with IEEE802.3ah 1000Base-BX
- Compliant with MSA SFF-8472
- Compliant with SFP MSA

5. Absolute Maximum Ratings & Recommended Operating Conditions

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	Ts	−40	85	°C
Relative humidity	RH	5	85	%
Signal Input Voltage	0	-	3.6	V
Rx Input Average Power	Pmax		1	dBm

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temperature	Tc/Ti	0	-	70	°C
		−40	-	85	°C
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V
Power Supply Current	I _{CC}	-	-	300	mA
Data Rate	BR	-	1.25	-	Gbps
Transmission Distance	TD	-	-	20	km

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Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit
Centre Wavelength	λ_c	1530	1550	1570	nm
Spectral Width	$\Delta\lambda$			1	nm
Average Optical Power	Pavg	-9	-	-3	dBm
Laser Off Power	Poff	-	-	-40	dBm
Extinction Ratio	ER	8.2	-	-	dB
Operating Data Rate		-	1.25	-	Gbps
Optical Eye Mask	Compliant with 802.3ah eye masks when filtered				
Tx Input Diff. Voltage	VI	500	-	2400	mV
Tx Fault Output Voltage -- Low	VoL	-0.3	-	0.4	V
Tx Fault Output Voltage -- High	VoH	2.4	-	Vcc+0.3	V

Receiver Operating Characteristics-Optical, Electrical

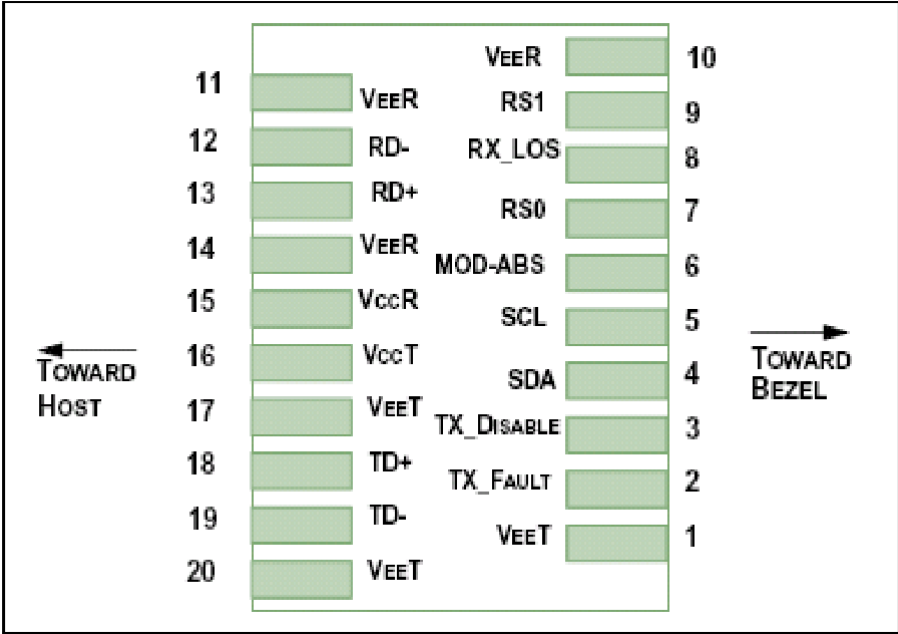
Parameter	Symbol	Min.	Typ.	Max.	Unit
Center Wavelength	λ_r	1260	1310	1360	nm
Receiver Sensitivity In Average Power	Psen	-	-	-22	dBm
Los Assert	LosA	-35	-	-	dBm
Los Dessert	LosD	-	-	-23	dBm
Los Hysteresis	LosH	0.5	-	-6	dB
Overload	Pin	-	-	-3	dBm
Rx Output Diff Voltage	Vo	370	-	2000	mV
Operating Data Rate	-	-	1.25	-	Gbps

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Digital Diagnostic Functions

Parameter	Symbol	Min	Max.	Unit
Temperature monitor absolute error	DMI_Temp	-3	3	°C
Laser power monitor absolute error	DMI_TX	-3	3	dB
RX power monitor absolute error	DMI_RX	-3	3	dB
Supply voltage monitor absolute error	DMI_VCC	-3%	+3%	V
Bias current monitor absolute error	DMI_Ibias	-10%	10%	mA

6. Applications Note:

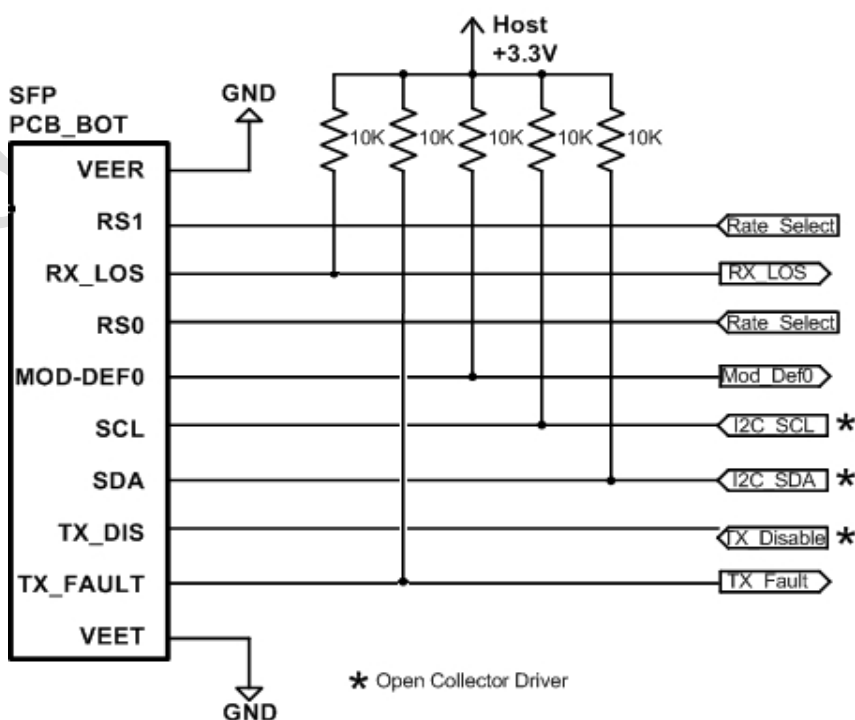
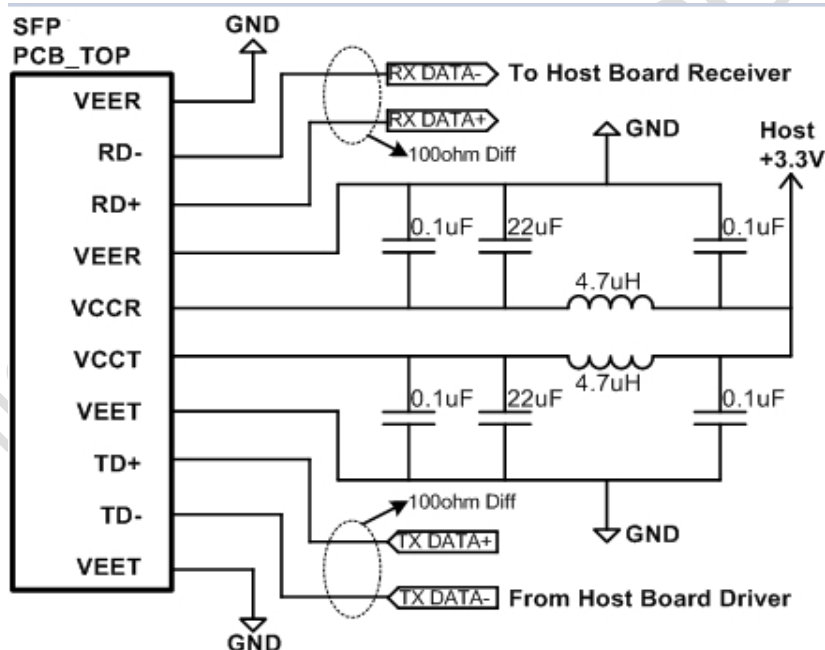


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Pin	Symbol	Description
1	VeeT	Module Transmitter Ground
2	TX_Fault	Module Transmitter Fault
3	TX_Disable	Transmitter Disable; Turns off transmitter laser output
4	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)
5	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)
6	MOD_ABS	Module Absent, connected to VeeT or VeeR in the module
7	RS0	Not used
8	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)
9	RS1	Not used
10	VeeR	Module Receiver Ground
11	VeeR	Module Receiver Ground
12	RD-	Receiver Inverted Data Output
13	RD+	Receiver Non-Inverted Data Output
14	VeeR	Module Receiver Ground
15	VccR	Module Receiver 3.3 V Supply
16	VccT	Module Transmitter 3.3 V Supply
17	VeeT	Module Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input
19	TD-	Transmitter Inverted Data Input
20	VeeT	Module Transmitter Ground

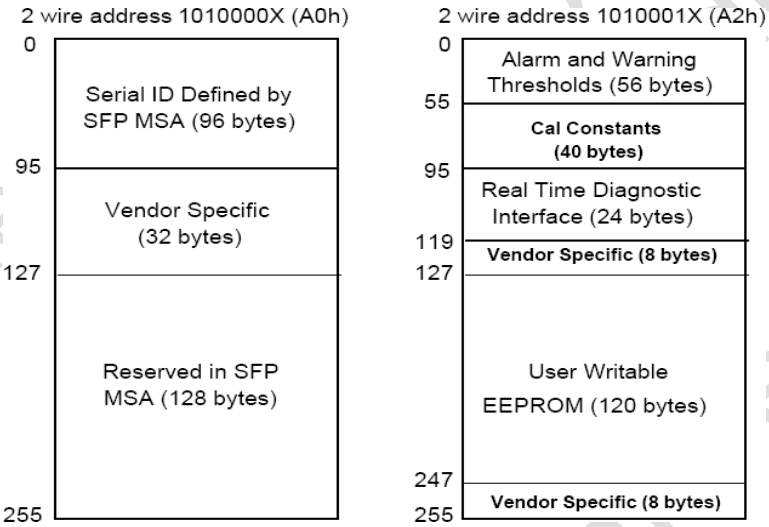
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Recommended Interface Circuit



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Digital Diagnostic Memory Map



7. Modification History

Rev.	Comments	Date	Originator	Approval
01	Initial	2024.12.24	Albert Lin	Mike Sun