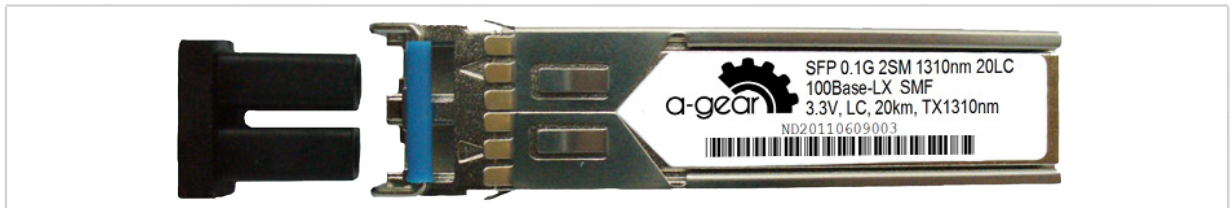


Product Specification

SFP 100M 20km LC

155Mb/s 1310nm Single-mode SFP Transceiver



1. Product Features

- Up to 155Mb/s data links
- 1310nm Fabry-Perot laser transmitter
- Up to 20km on 9/125 μ m SMF
- Hot-pluggable SFP footprint
- Duplex LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- Compliant with SFF-8472
- Operating case temperature
Commercial: 0°C to +70°C
Extended: -10°C to +80°C
Industrial: -40°C to +85°C

2. Applications

- Switch to Switch Interface
- Fast Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

3. Product Description

A-GEAR's SFP 100M 20km LC Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of four sections: the LD driver, the limiting amplifier, the 1310nm FP laser and the PIN photo-detector. The module data link up to 20KM in 9/125 μ m single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

4. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	85	°C
Storage Ambient Humidity	HA	5	95	%
Power Supply Voltage	V _{cc}	-0.5	4	V
Signal Input Voltage		-0.3	V _{cc} +0.3	V
Receiver Damage Threshold		0		dBm
Lead Soldering Temperature/Time	T _{SOLD}		260/10	°C/sec ^[1]
Lead Soldering Temperature/Time	T _{SOLD}		360/10	°C/sec ^[2]

Notes:

- [1] Suitable for wave soldering.
- [2] Only for soldering by iron.

5. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Ambient Operating Temperature	TA	0		70 ^[1]	°C
		-10		80 ^[2]	
		-40		85 ^[3]	
Ambient Humidity	HA	5		70	% ^[4]
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V
Power Supply Current	I _{cc}			280	mA
Power Supply Noise Rejection				100	mVp-p ^[5]
Data Rate			155/155		Mbps ^[6]
Transmission Distance				20	KM
Coupled Fiber					Single mode fiber ^[7]

Notes:

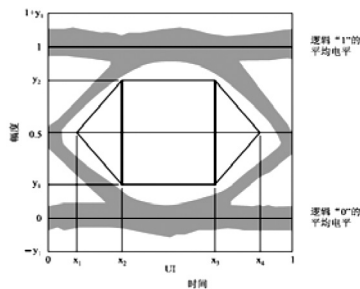
- [1] XGSF-1303-20-F
- [2] XGSF-1303-20E-F
- [3] XGSF-1303-20A-F
- [4] Non-condensing
- [5] 100Hz to 1MHz
- [6] TX Rate/RX Rate
- [7] 9/125um G.652

6. Specification of Transmitter

Parameter	Symbol	Min.	Typical	Max.	Unit
Average Output Power	P_{OUT}	-15		-8	dBm
Extinction Ratio	ER	8.2			dB
Center Wavelength	λ_C	1270	1310	1360	nm ^[1]
Spectrum Width (RMS)	σ			7	nm
Transmitter OFF Output Power	P_{off}			-45	dBm
Differential Line Input Impedance	R_{IN}	90	100	110	Ohm
Optical Rise/Fall Time	tr/tf			3	ns ^[2]
Total Jitter	tj			1	ns ^[3]
Output Eye Mask	Compliant with G957(class 1 laser safety) ^[4]				

Notes:

- [1] FP Laser
- [2] These are unfiltered 20-80% values.
- [3] Measure at 2²³-1 NRZ PRBS pattern
- [4] Transmitter eye mask definition.



	STM-1	STM-4
x1/x2	0.15/0.85	0.25/0.75
x2/x3	0-35/0.65	0.40/0.60
y1/y2	0.20/0.80	0-20/0.80

7. Specification of Receiver

Parameter	Symbol	Min.	Typical	Max.	Unit
Input Optical Wavelength	λ_{IN}	1270	1310	1360	nm ^[1]
Receiver Sensitivity	P_{IN}			-29	dBm ^[2]
Input Saturation Power (Overload)	P_{SAT}	-8			dBm
Signal Detect (Assert Power)	P_A			-30	dBm
Signal Detect (De-Assert Power)	P_D	-38			dBm ^[3]
Signal Detect Hysteresis	$P_A - P_D$	0.5	2	6	dB
Data Output Rise/Fall time	tr/tf			2.5	ns ^[4]

Notes:

- [1] PIN-TIA
- [2] Measured with Light source 1310nm, ER=8.2dB; BER =<10⁻¹⁰ @PRBS=2²³-1 NRZ
- [3] When SD De-Assert, the RX-LOS output is High-level (fixed)
- [4] These are 20%~80% values.

8. Electrical Interface Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter					
Total Supply Current	I _{CC}			A	mA ^[1]
Transmitter Disable Input-High	V _{DISH}	2		V _{CC} +0.3	V
Transmitter Disable Input-Low	V _{DISL}	0		0.8	V
Transmitter Fault Input-High	V _{DISL}	2		V _{CC} +0.3	V
Transmitter Fault Input-Low	V _{TxFH}	0		0.8	V
Receiver					
Total Supply Current	I _{CC}			B	mA ^[1]
LOSS Output Voltage-High	V _{LOSH}	2		V _{CC} +0.3	V ^[2]
LOSS Output Voltage-Low	V _{LOSL}	0		0.8	V

Notes:

- [1] A (TX) + B (RX) = 280mA (Not include termination circuit)
 [2] LVTTTL

9. Pin Descriptions

Pin	Symbol	Name/Description
1	VEET	Transmitter Ground (Common with Receiver Ground) ^[1]
2	TFAULT	Transmitter Fault. Not supported.
3	TDIS	Transmitter Disable. Laser output disabled on high or open. ^[2]
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID. ^[3]
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID. ^[3]
6	MOD_DEF(0)	Module Definition 0. Grounded within the module. ^[3]
7	Rate Select	No connection required ^[4]
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. ^[5]
9	VEER	Receiver Ground (Common with Transmitter Ground) ^[1]
10	VEER	Receiver Ground (Common with Transmitter Ground) ^[1]
11	VEER	Receiver Ground (Common with Transmitter Ground) ^[1]
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver Non-inverted DATA out. AC Coupled
14	VEER	Receiver Ground (Common with Transmitter Ground) ^[1]
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET	Transmitter Ground (Common with Receiver Ground) ^[1]
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.

Pin	Symbol	Name/Description
19	TD-	Transmitter Inverted DATA in. AC Coupled.
20	VEET	Transmitter Ground (Common with Receiver Ground) ^[1]

Notes:

- [1] Circuit ground is internally isolated from chassis ground.
- [2] Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- [3] Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF (0) pulls line low to indicate module is plugged in.
- [4] This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:
 Low (0 - 0.8V): Reduced Bandwidth
 (>0.8, < 2.0V): Undefined
 High (2.0 - 3.465V): Full Bandwidth
 Open: Reduced Bandwidth
- [5] LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

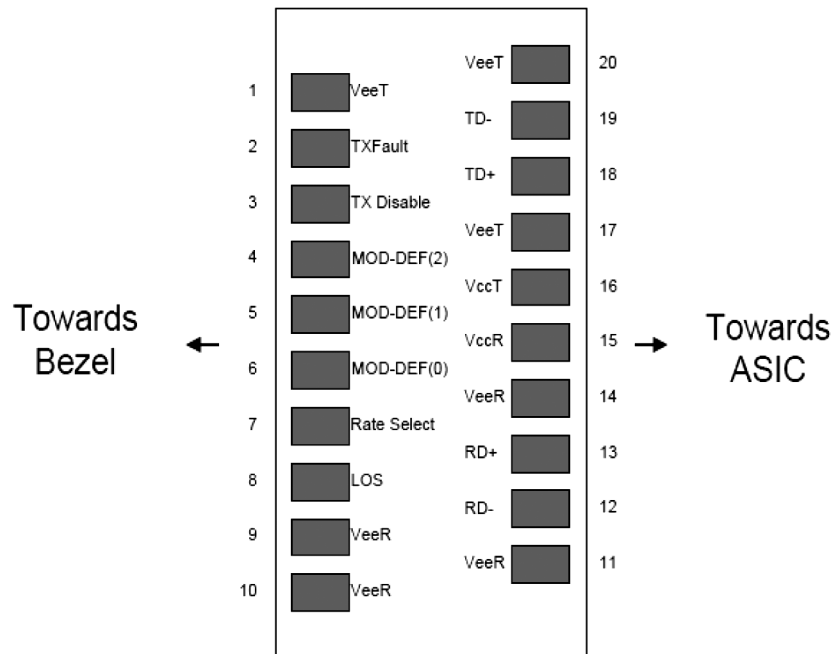
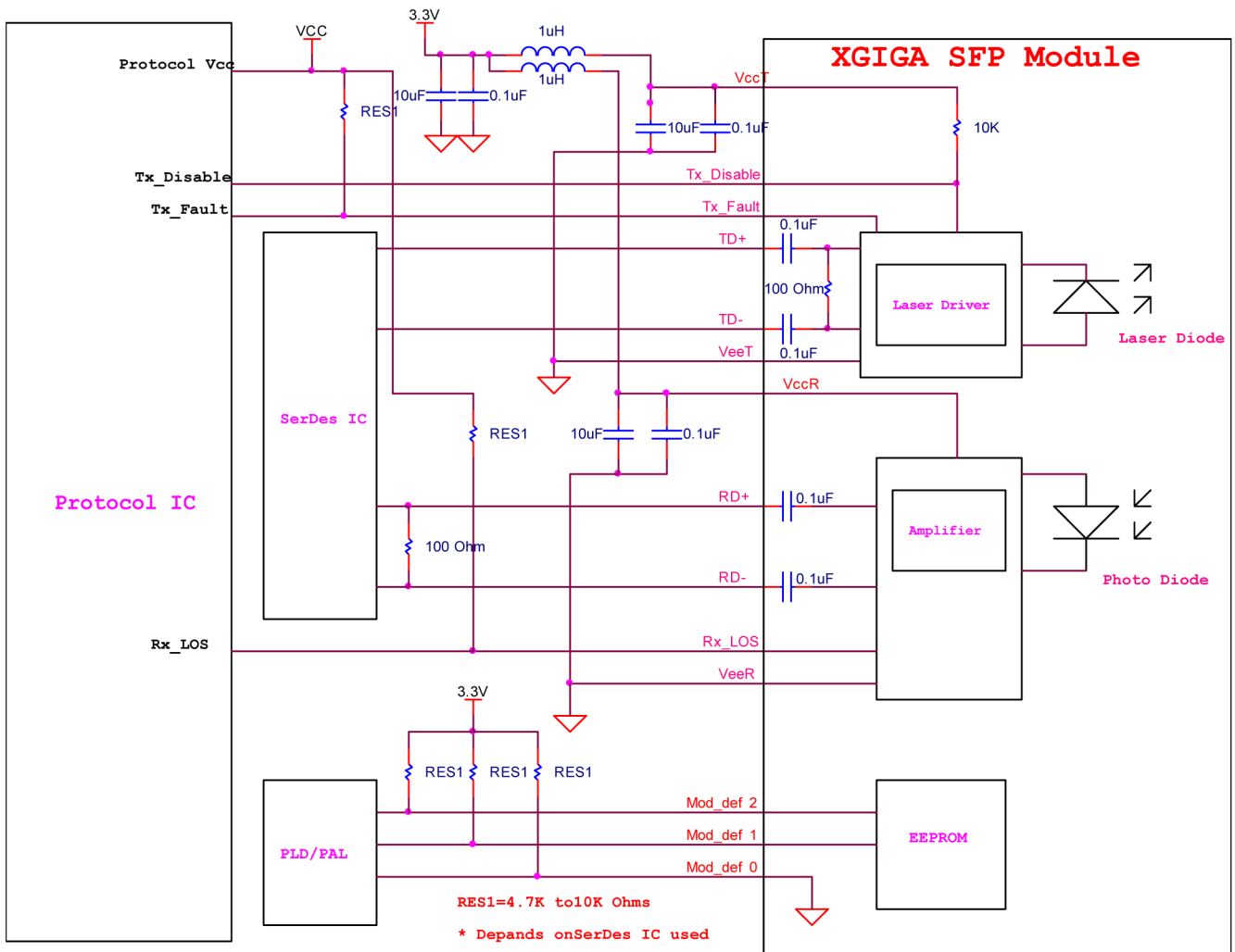


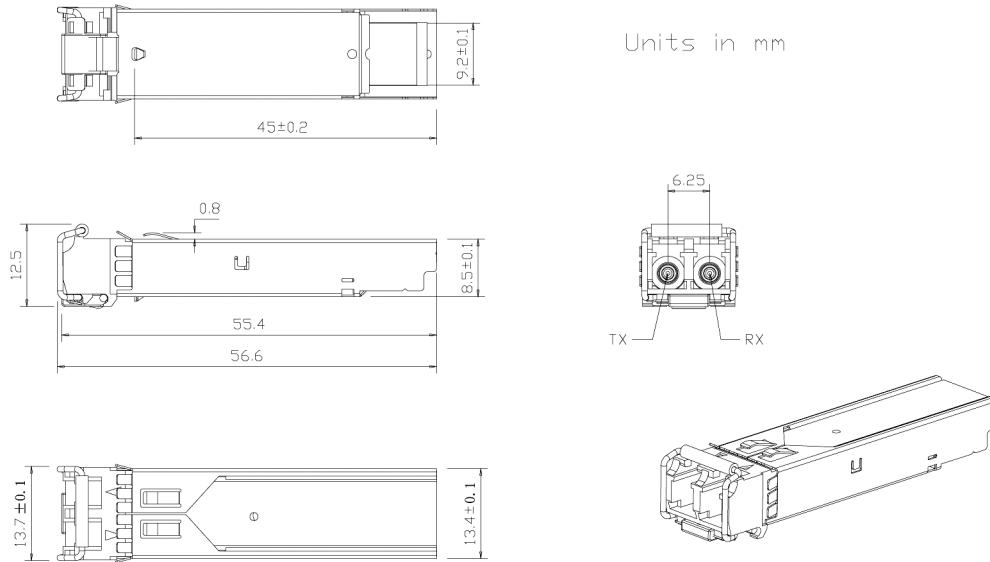
Figure 1. Pin out of Connector Block on Host Board.

10. Recommend Circuit Schematic



11. Mechanical Specifications

(Unit: mm)



12. Regulatory Compliance

Feature	Reference	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7 EIA-JESD22-A114	Class 1
Electrostatic Discharge (ESD) to the Simplex Receptacle	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1 IEC/EN 60825-2	Class 1 laser product
Component Recognition	IEC/EN 60950 UL 60950	Compatible with standards
ROHS	2002/95/EC	Compatible with standards