

PRODUCT SPECIFICATION

Part No.:	AC-SF-8G1-01	
Description:	1.25G SFP Transceiver,MMF 850nm 500m	
Release Date	Rev.	Revision Change Description
2015/06/07	A0	New Release
2020/12/28	A1	Template Update

Features

- ✧ Up to 1.25Gbps data rate
- ✧ 850nm VCSEL Laser and PIN photo detector
- ✧ Duplex LC receptacle optical interface compliant
- ✧ Single +3.3V power supply
- ✧ Hot-pluggable
- ✧ AC coupling of LVPECL signals
- ✧ International Class1 laser safety certified
- ✧ Operating temperature range:
 - ✧ Commercial: 0°C~+70°C
 - ✧ Industrial: -40°C~+85°C
- ✧ RoHS Compliant
- ✧ DDMI function available with internally calibrated mode

Application

- ✧ Gigabit Ethernet
- ✧ Gigabit Fiber Channel

Standard

- ✧ Compliant with MSA SFP specification
- ✧ Compatible with G.959.1
- ✧ Compliant with SFF-8472
- ✧ Compliant with FC-PI v2.0

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	°C
Power Supply Voltage	Vcc	-0.5	+4	V
Relative Humidity	RH	5	95	%

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature (Commercial)	Tc	0		70	°C
Operating Case Temperature (Industrial)		-40		85	
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply Current	Icc			240	mA
Data Rate		-	1.25	-	Gbps
Fiber Length 62.5µm core MMF				300	m
Fiber Length 50µm core MMF		-	-	550	m

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter differential input voltage		400		2400	mV	
Receiver differential output Voltage		600		1200	mV	
Transmit Fault (TX_Fault)	Voh	2.4		Vcc+0.3	V	LVTTL
	Vol	-0.3		0.4	V	LVTTL
Loss of Signal (LOS)	Voh	2.4		Vcc+0.3	V	LVTTL
	Vol	-0.3		0.4	V	LVTTL
TX Disable	Vih	2		Vcc+0.3	V	LVTTL
	Vil	-0.3		0.8	V	LVTTL

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	Pout	-9		-3	dBm	
Operating Wavelength Range	λc	830	850	860	nm	
Spectral Width (RMS)	Δλ			0.85	nm	
Extinction Ratio	ER	9			dB	2

Total Jitter	Tj			0.284	UI	2
Transmitter and Dispersion Penalty	TDP			1	dB	
Relative Intensity Noise	RIN			-120	dB/Hz	
Optical Rise/Fall Time	Tris/Tfall			260	PS	3
Optical Tx Output disable	P _{dis}			-45	dBm	
Output Eye Diagram	Complies with IEEE802.3z eye masks when filtered					
Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Sensitivity	S			-17	dBm	4
Wavelength Range	λ_c	770	850	870	nm	
Receiver Reflectance				-12	dB	
Optical Power Input Overload	P _{in-max}	-3			dBm	4
LOS	Optical De-assert	Pd		-19	dBm	4
	Optical Assert	Pa	-35			
LOS hysteresis		0.5		5	dB	5

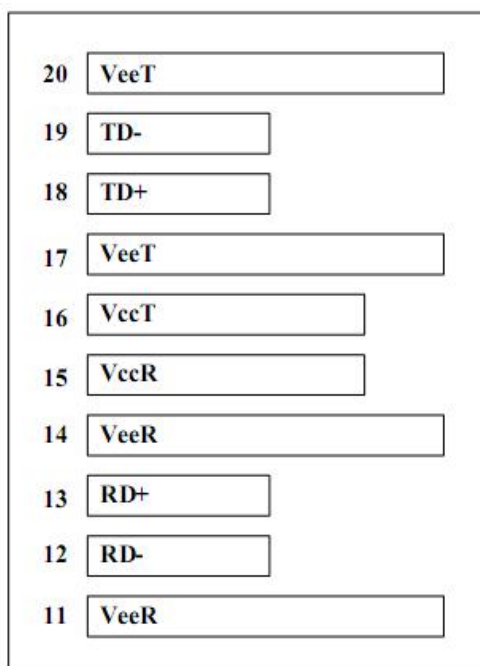
Notes:

- 1) The supply current is SFP module's working current.
- 2) For the measurements, the device was driven with 1.25Gbps data pattern with 2⁷-1 PRBS payload.
- 3) Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between the 20% and 80% amplitudes relative to the logical 1 and 0 levels
- 4) Measured with a PRBS 2⁷-1 test pattern, @1.25Gbps, ER=10dB, BER<10⁻¹²
- 5) The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

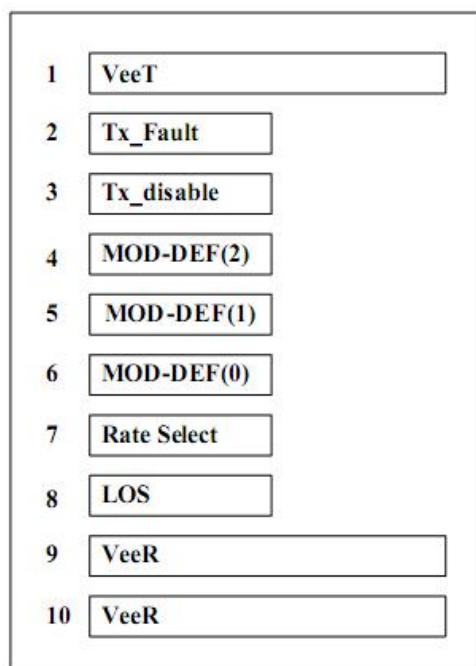
Digital Diagnostic Monitoring Information

Parameter	Accuracy	Calibration	Range
Temperature	±3°C	internal	-40~85
Voltage	±3%	internal	V _{cc} =3.3V±5%
Bias Current	±10%	internal	Specified by normal value
TX Power	±2dB	internal	-9~-3dBm
RX Power	±3dB	internal	-17~0dBm

Pin Descriptions



Top of Board



Bottom of Board

As Viewed Through Top of Board

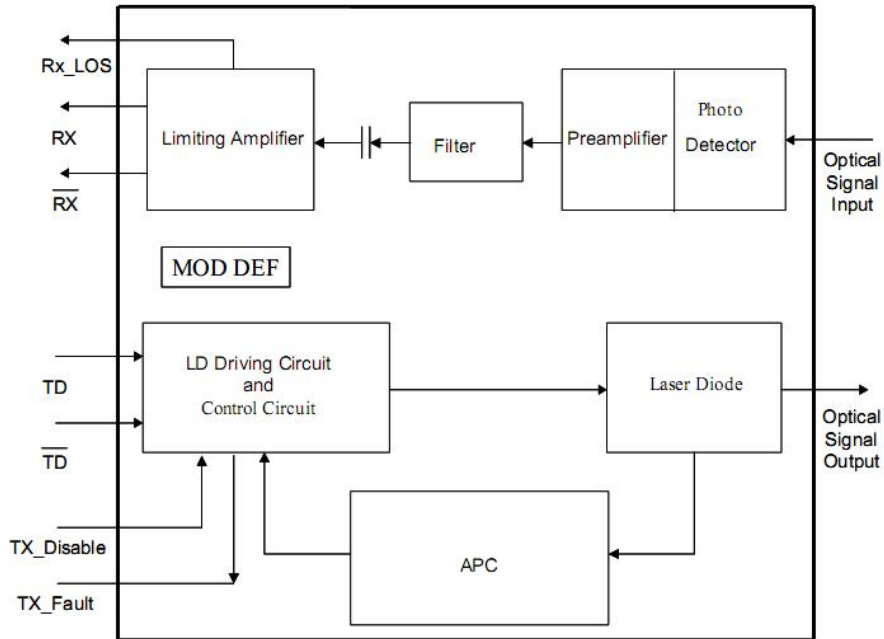
Pin	Name	Function/Description	Engage-ment	Order
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	1
3	TX Disable	Transmitter Disable-Module disables on high or open	3	2
4	MOD-DEF2	Module Definition 2-Two wire serial ID interface	3	3
5	MOD-DEF1	Module Definition 1-Two wire serial ID interface	3	3
6	MOD-DEF0	Module Definition 0-Two wire serial ID interface	3	3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	4
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inverse Received Data out	3	5
13	RD+	Received Data out	3	5
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power —— +3.3V±5%	2	6
16	VccT	Transmitter Power —— +3.3 V±5%	2	6
17	VeeT	Transmitter Ground	1	

18	TD+	Transmitter Data In	3	7
19	TD-	Inverse Transmitter Data In	3	7
20	VeeT	Transmitter Ground	1	

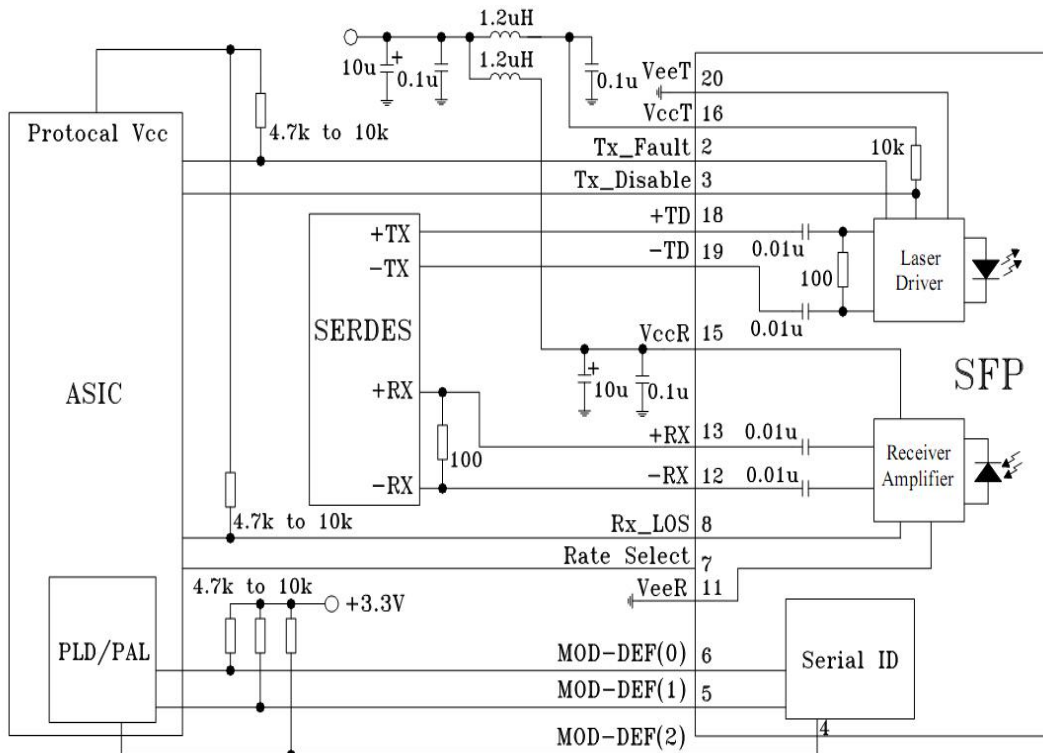
Notes:

- 1) TX Fault is open collector/drain output which should be pulled up externally with a 4.7K – 10K Ω resistor on the host board to supply $<V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.
- 2) TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K – 10K Resistor.
 Low (0 – 0.8V): Transmitter on;
 Between (0.8V and 2V): Undefined High;
 (2.0 – V_{ccT}): Transmitter Disabled;
 Open: Transmitter Disabled.
- 3) Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7 – 10K Resistor on the host board to supply less than $V_{ccT}+0.3V$ or $V_{ccR}+0.3V$.
 Mod-Def 0 is grounded by the module to indicate that the module is present.
 Mod-Def 1 is clock line of two wire serial interface for optional serial ID.
 Mod-Def 2 is data line of two wire serial interface for optional serial ID.
- 4) LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7 – 10K resistor on the host board to supply $<V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.
- 5) RD-/+: These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.
- 6) V_{ccR} and V_{ccT} are the receiver and transmitter power supplies. They are defined as $3.3V\pm 5\%$ at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.
- 7) TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.

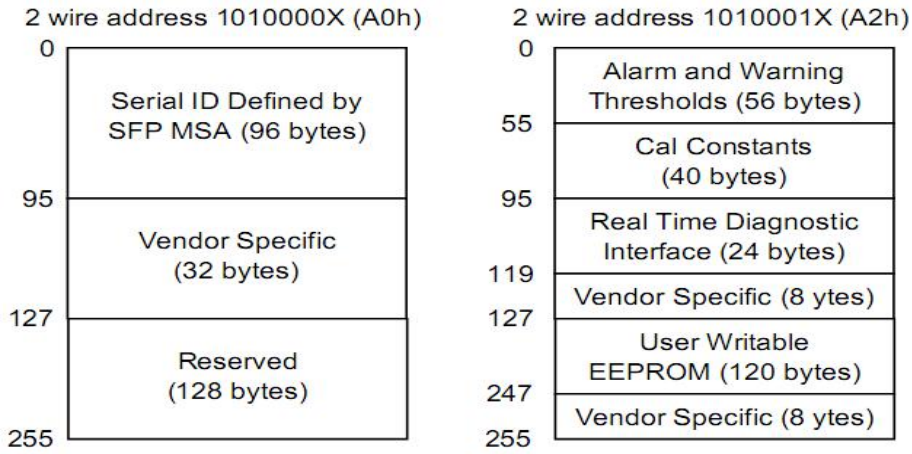
Block Diagram



Typical application Circuit

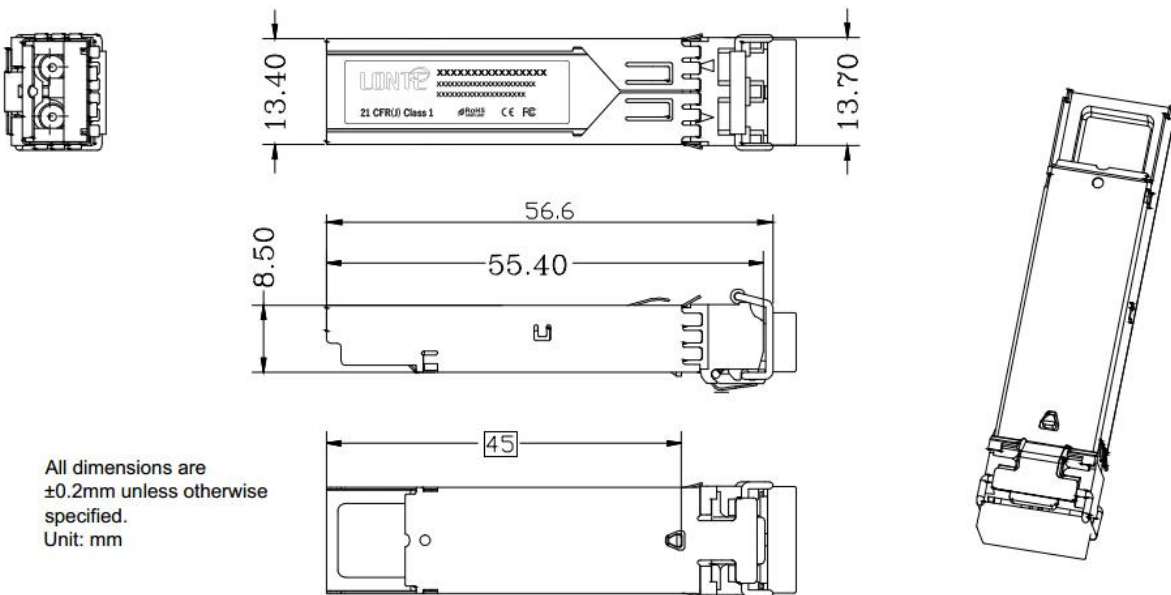


Digital Diagnostic Memory Map



Package Outline

Dimensions are in millimeters. All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified. (Unit: mm)



Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000V for other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I laser Product

Ordering information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (°C)	Reach (m)	DDM
AC-SF-8G1-01	SFP	1.25	850	-9~-3	PIN	<-17	0~70	550	Y
AC-SF-8G1-01F	SFP	1.25	850	-9~-3	PIN	<-17	-40~85	550	Y