

PRODUCT SPECIFICATION

Part No.:	AC-SF-Q1G1-120	
Description:	1.25G SFP Transceiver, CWDM 1270-1610nm 120km	
Release Date	Rev.	Revision Change Description
2015/06/07	A0	New Release
2020/12/28	A1	Template Update

Features

- ✧ Up to 1.25Gbps Data Links
- ✧ DFB laser transmitter and APD receiver
- ✧ Metal enclosure, for lower EMI
- ✧ Single +3.3V power supply
- ✧ Hot-pluggable
- ✧ Duplex LC/UPC type pluggable optical interface
- ✧ Operating temperature range:
 - ✧ Commercial: 0°C~+70°C
 - ✧ Industrial: -40~+85°C
- ✧ RoHS Compliant
- ✧ 2-wire interface with integrated Digital Diagnostic monitoring
- ✧ Up to 120km transmission distance over Single Mode Fiber(SMF)
- ✧ Low power dissipation

Application

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

Standard

- ✧ Compliant with SFF-8472
- ✧ Compliant with SFP MSA
- ✧ Compliant to IEEE 802.3ae

Wavelength selection

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1270 nm	27	Gray	1370 nm	37	Green
1290 nm	29	Gray	1390 nm	39	Yellow
1310 nm	31	Gray	1410 nm	41	Orange
1330 nm	33	Purple	1430 nm	43	Red
1350 nm	35	Blue	1450 nm	45	Brown
1470 nm	47	Gray	1550 nm	55	Yellow
1490 nm	49	Purple	1570 nm	57	Orange
1510 nm	51	Blue	1590 nm	59	Red
1530 nm	53	Green	1610 nm	61	Brown

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	°C
Power Supply Voltage	Vcc3	-0.5	+4	V
Relative Humidity	RH	5	95	%
Signal Input Voltage		-0.3	Vcc+0.3	V

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature (Commercial)	Tc	0		70	°C
Operating Case Temperature (Industrial)	Tc	-40		85	
Power Supply Voltage	Vcc3	3.13	3.3	3.47	V
Supply Current	Icc3			300	mA
Power Supply Noise Rejection				100	100 mVp-p
Data Rate			1.25		Gbps
Fiber Length 9/125µm core SMF		-	120	-	km

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmit Total Supply Current	Icc			A	mA	
Transmit disable voltage	VIH	2		Vcc+0.3	V	1
Transmit enable voltage	VIL	0		0.8	V	1

Transmitter Fault Input-High	VDISL	2		V _{cc} +0.3	V	
Transmitter Fault Input-Low	VTxFH	0		0.8	V	
Receiver Total Supply Current	I _{cc}			300-A	mA	
LOS output high level	VLOS-H	2.0		V _{cc} +0.3	V	2
LOS output low level	VLOS-L	0		0.8	V	2

Notes:

- 1) Connected directly to TX data input pins. AC coupled thereafter.
- 2) Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	P _{out}	0		5	dBm	3
Operating Wavelength Range	λ _c	λ-10	λ	λ+10	nm	4
Spectral Width(-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	9			dB	
Transmitter OFF Output Power	P _{Off}			-45	dBm	
Differential Line Input Impedance	R _{IN}	90	100	110	Ohm	
Jitter P-P	t _J			0.1	UI	
Output Eye Diagram	Compliant with IEEE802.3ae eye mask					
Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Sensitivity	S			-31	dBm	5
Wavelength Range	λ _c	1270		1610	nm	
Optical Power Input Overload	P _{in-max}	-10			dBm	
Receiver Damage Threshold				5	dBm	
LOS	Optical De-assert	P _d		-33	dBm	
	Optical Assert	P _a	-40			
LOS hysteresis		0.5	2	6	dB	

Notes:

- 3) Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
- 4) “λ” is: 1270,1290,1310,1330,1350,1370,1390,1410,1430,1450,1470,1490,1510,1530,1550,1570,1590,1610 , please the “product selection” .
- 5) Receiver Reflectance Measured with a PRBS 2⁷-1 test pattern, @1250Mbps, ER=9dB, BER<10⁻¹².

Pin Descriptions

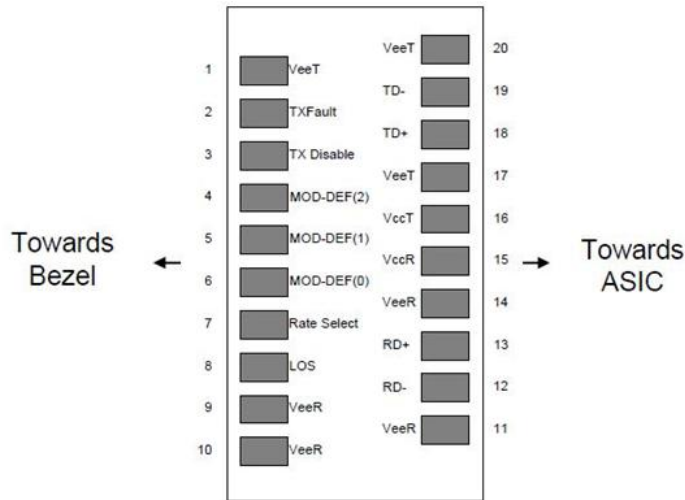


Diagram of Host Board Connector Block Pin Numbers and Name

Pin Assignment

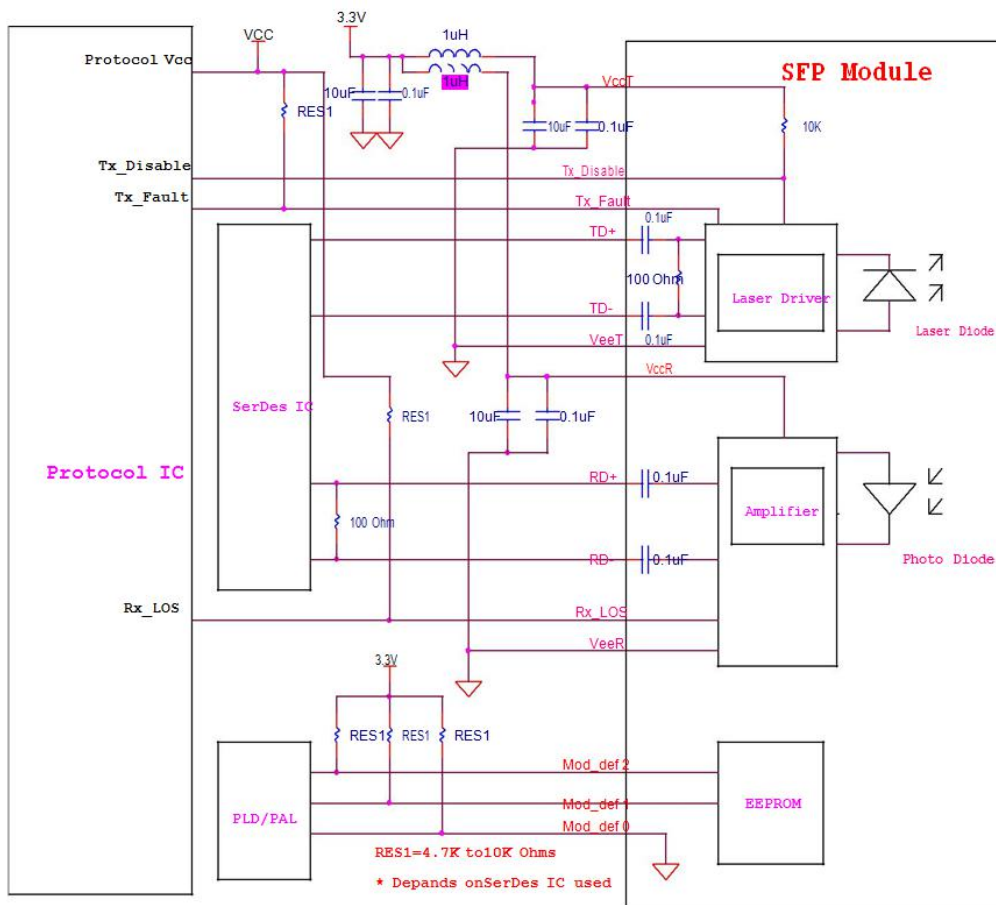
Pin	Symbol	Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	2
3	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module 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. CML-O	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	

20	VeeT	Transmitter Ground (Common with Receiver Ground)	1
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Notes:

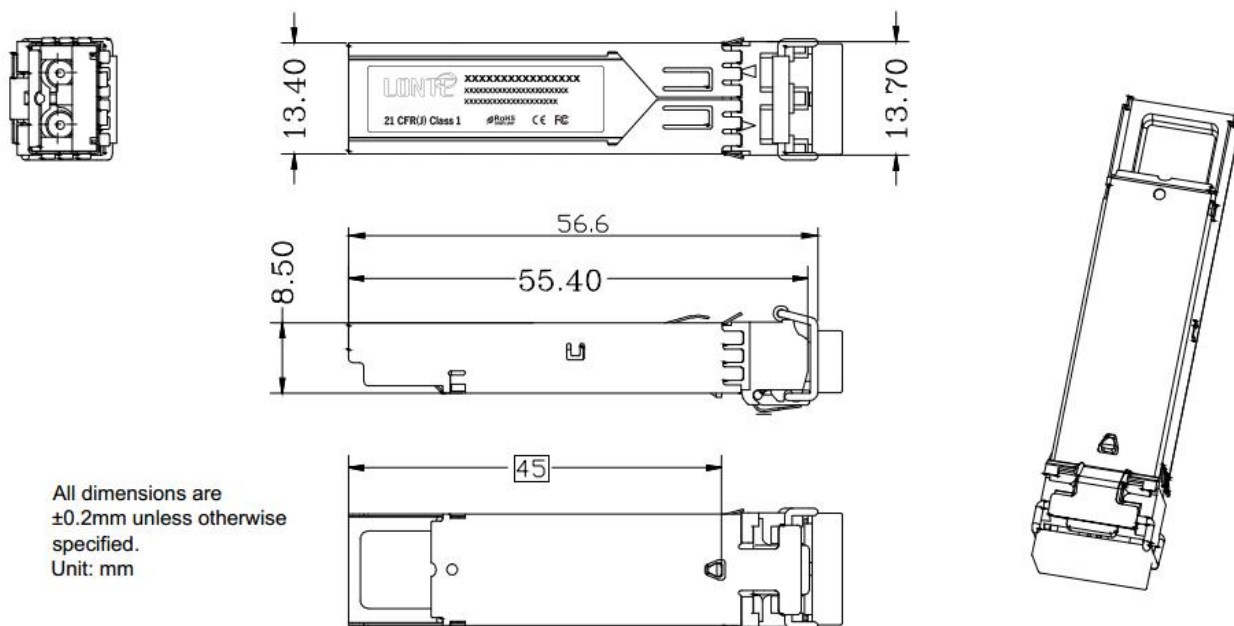
- 1) Circuit ground is internally isolated from chassis ground.
- 2) TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- 3) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 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
- 5) LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a typical 3.3V voltage. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Block Diagram



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 (km)	DDM
AC-SF-Q1G1-120	SFP	1.25	DFB CWDM	0~5	APD	<-31	0~70	120	Y
AC-SF-Q1G1-120F	SFP	1.25	DFB CWDM	0~5	APD	<-31	-40~85	120	Y