

1.25Gb/s SFP 1550nm 40km Optical Transceiver

Features

- Operating Data Rate up to 1.25Gbps
- 1550nm DFB Laser Transmitter
- 40km with 9/125 μ m SMF
- Single 3.3V Power Supply and TTL Logic Interface
- Hot-Pluggable SFP Footprint Duplex LC Connector Interface
- Class 1 FDA and IEC60825- 1 Laser Safety Compliant
- Built-in digital diagnostic functions, including optical power monitoring
- Commercial Temperature Range: 0~+70°C
- Compliant with MSA SFP Specification
- Compliant with SFF-8472

Applications

- Gigabit Ethernet Switches and Routers
- Fiber Channel Switch Infrastructure
- Other Optical Links

Compliance

- SFP MSA(INF-8074i)
- SFF-8472
- IEEE802.3z Gigabit Ethernet
- ROHS

Description

The SFP-1G-EX series single-mode transceiver is small form factor pluggable module for serial optical data communications such as Gigabit Ethernet 1000BASE-ZX and Fiber Channel 1x SM-LC-L FC-PI. It is with the SFP 20-pin connector to allow hot plug capability. This module is designed for single mode fiber and operates at a nominal wavelength of 1550nm.

The transmitter section uses a multiple quantum well 1550nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The SFP1G-EX-55 series are designed to be compliant with SFF-8472 SFP Multi-Source Agreement (MSA).

General Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit
Bit Rate	BR			1.25	Gb/s
Max. Supported Link Length	L _{MAX}			40	km

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	+85	°C
Supply Voltage	V _{cc}	-0.5	3.6	V
Operating Relative Humidity			95	%

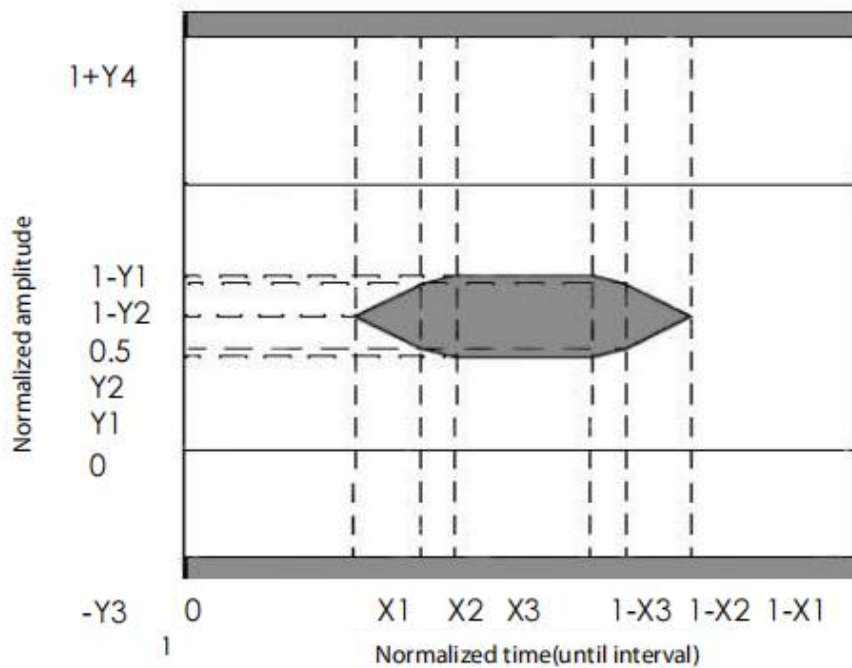
Optical and Electrical Characteristics

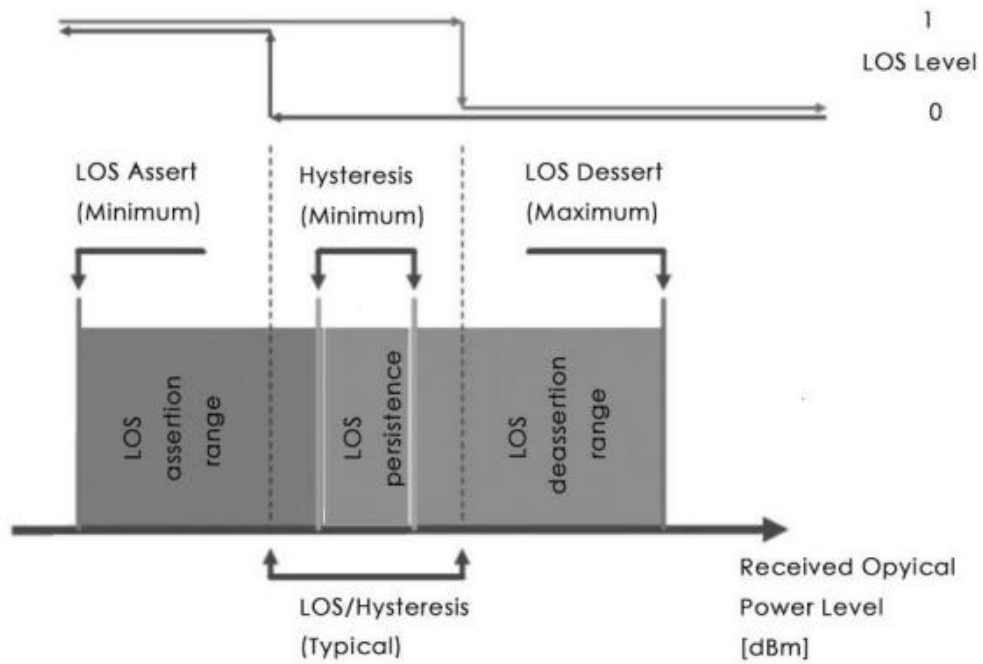
Parameter	Symbol	Min.	Typical	Max.	Unit
9 μm Diameter SMF	L			40	km
Power Supply Voltage	V _{cc}	3.15	3.3	3.45	V
Power Supply Current	I _{cc}			300	Ma
Date Rate	Top	15	1.25	60	Gbps
			1.063		
Relative Humidity	RH	0		85	%
Damage Threshold, per Lane	DT	3.4			dBm
Transmitter					
Center Wavelength	λ _C	1500	1550	1580	nm

Spectral Width (RMS)	$\Delta \lambda$			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power* (note1)	Pout	-5		0	dBm
Extinction Ratio* (note2)	ER	9			dB
Rise/Fall Time(20% ~ 80%)	tr/tf			0.26	ps
Total Jitter* (note2)	TJ			0.43	UI
Output Optical Eye* (note2)	Compliant with IEEE 802.3ah-2004* (note5)				
TX_Disable Assert Time	t_off			10	us
Pout@ TX Disable Asserted	Pout			-45	dBm
Receiver					
Center Wavelength	λC	1260		1600	nm
Receiver Sensitivity* (note3)	Pmin			-24	dBm
Receiver Overload	Pmax	-3			dBm
Return Loss		12			dB
Optical PathPenalty* (note4)				1	dB
LOS De- Assert	LOSD			-25	dB
LOS Assert	LOSA	-35			dBm
LOS Hysteresis* (note6)		0.5			dB

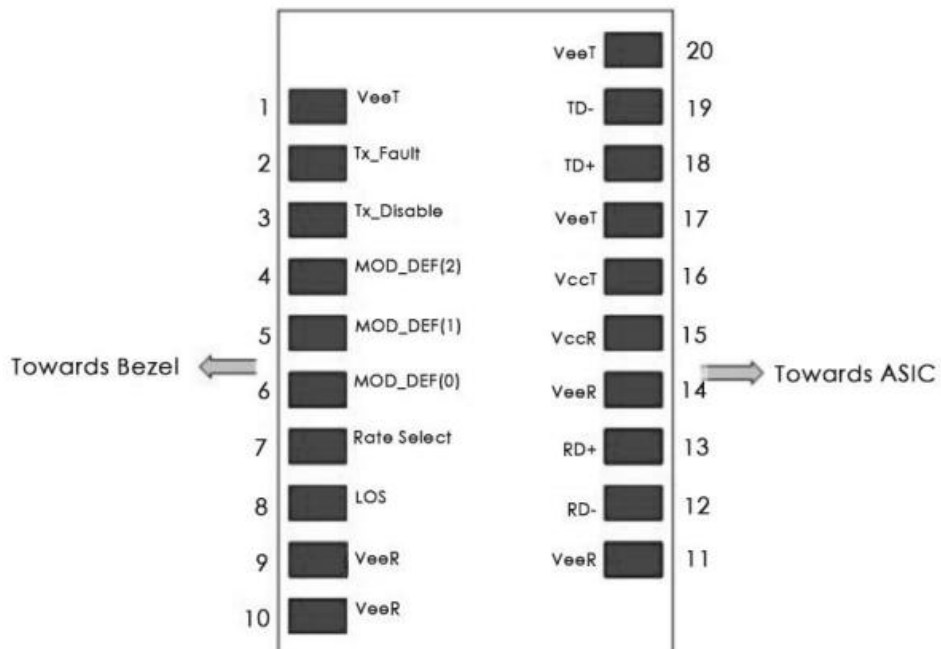
Notes:

- [1] Output is coupled into a 9/125 μ m single mode fiber.
- [2]. Filtered, measured with a PRBS 27- 1 test pattern @1.25Gbps
- [3]. Minimum average optical power measured at BER less than 1E- 12, with a 27- 1 PRBS and ER=9 Db.
- [4]. Measured with a PRBS 27- 1 test pattern @1.25Gbps, G.652 SMF, BER<1 \times 10- 10.
- [5]. Eye Pattern Mask





Pin Description



PIN Description

PIN	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	Note5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2 Module disables on high or open
4	MOD-DEF2	SDA	3	Note 3 2 wire serial ID interface.
5	MOD-DEF1	SCL	3	Note 3 2 wire serial ID interface.
6	MOD-DEF0	MOD_ABS	3	Note 3 Grounded within the module.
7	Rate Select	Not Connect	3	Function not available
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	Note 7 3.3V ± 5%
16	VccT	Transmitter Power	2	Note 7 3.3V ± 5%
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

[1] TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kinds. Low indicates normal operation. In low state, the output will be pulled to <0.8V.

[2] TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10 K Ω resistor. Its states are: Low (0 – 0.8V): Transmitter on (> 0.8, < 2.0V): Undefined High (2.0 – 3.465V): Transmitter Disabled Open: Transmitter Disabled

[3] Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with 4.7 – 10 K Ω resistor on the host board. The

pull- up voltage shall be VccT or VccR .Mod-Def 0 is grounded by the module to indicate that the module is present Mod-Def 1 is the clock line of two wire serial interface for serial ID. Mod-Def 2 is the data line of two wire serial interface for serial ID

[4] LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT/R+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.

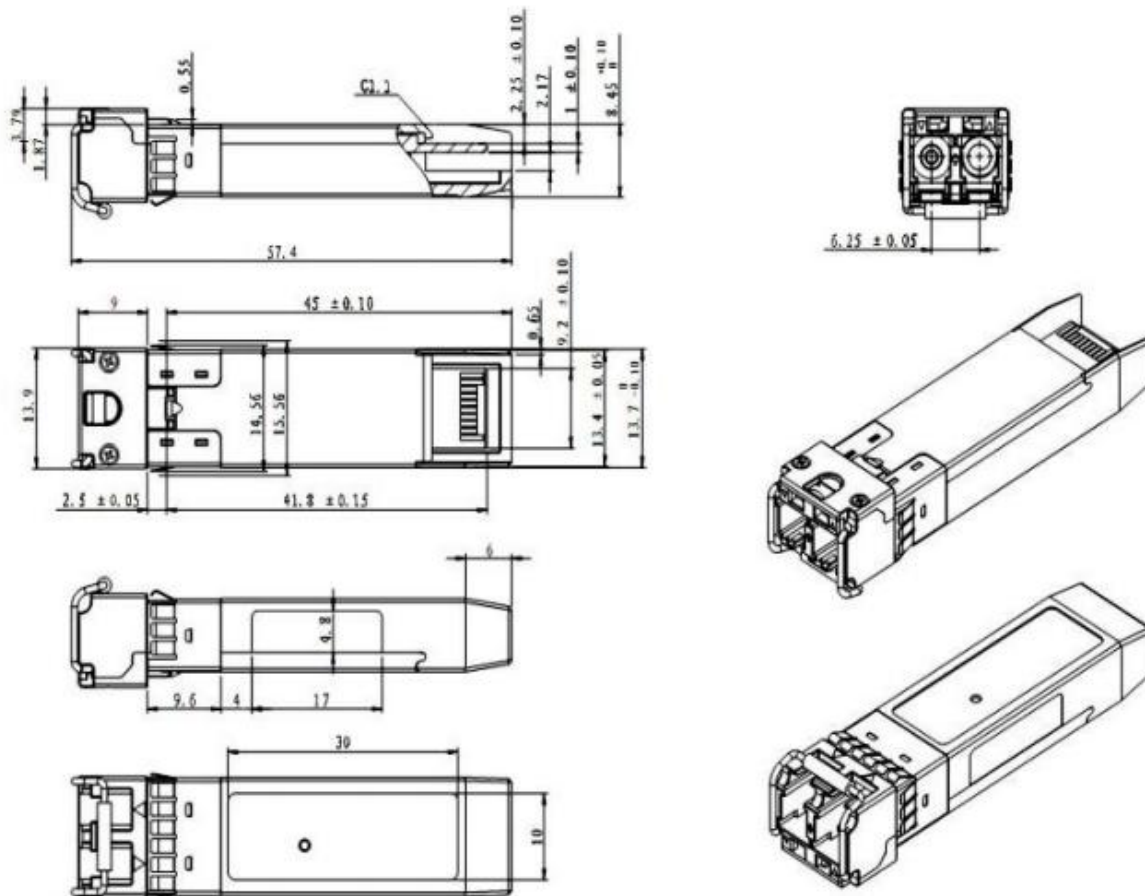
[5] VeeR and VeeT may be internally connected within the SFP module.

[6] RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on host board. The voltage swing on these lines will be between 400 and 2000 mV differential (200 – 1000 mV single ended) when properly terminated.

[7] VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

[8] TD-/+: TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 400–2000mV (200– 1000mV single- ended).

Mechanical Specifications



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