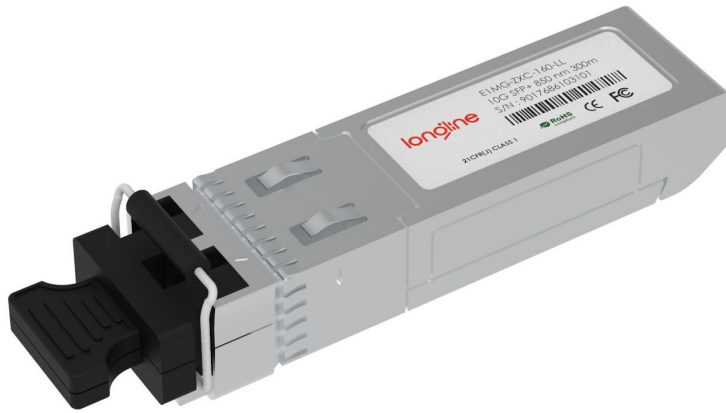


# 1000BASE-ZXC SFP 1550nm 160km Transceiver Module

E1MG-ZXC-160-LL



## Application

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

## Features

- Up to 1250Mb/s data links
- 1550nm DFB laser transmitter and APD photo-detector
- Up to 160km on 9/125 $\mu$ 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
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Commercial temperature range: 0 ~ +70 ° C

## Description

Longline' SFP1G-ZXC-55 Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor , the DFB laser and the APD photo-detector .The module data link up to 160km in 9/125um 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.

## I. Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Storage Temperature</b>	TS	-40		85	° C	
<b>Power Supply Voltage</b>	VCC	-0.3		3.6	V	
<b>Relative Humidity (non-condensation)</b>	RH	5		95	%	
<b>Damage Threshold</b>	THd	0			dBm	

## II. Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Operating Case Temperature</b>	TOP	0		70	° C	commercial
		-10		80		extended
		-40		85		industrial
<b>Power Supply Voltage</b>	VCC	3.135	3.3	3.465	V	
<b>Data Rate</b>			1250		Mb/s	
<b>Control Input Voltage High</b>		2		Vcc	V	
<b>Control Input Voltage Low</b>		0		0.8	V	
<b>Link Distance (SMF)</b>	D			160	km	9/125um

### III. Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Power Consumption</b>	P			0.95	W	commercial
				1.0		Industrial
<b>Supply Current</b>	I <sub>cc</sub>			280	mA	commercial
				300		Industrial
<b>Transmitter</b>						
<b>Single-ended Input Voltage Tolerance</b>	V <sub>CC</sub>	-0.3		4.0	V	
<b>Differential Input Voltage Swing</b>	V <sub>in,pp</sub>	200		2400	mV <sub>pp</sub>	
<b>Differential Input Impedance</b>	Z <sub>in</sub>	90	100	110	Ohm	
<b>Transmit Disable Assert Time</b>				5	us	
<b>Transmit Disable Voltage</b>	V <sub>dis</sub>	V <sub>cc</sub> -1.3		V <sub>cc</sub>	V	
<b>Transmit Enable Voltage</b>	V <sub>en</sub>	V <sub>ee</sub> -0.3		0.8	V	
<b>Receiver</b>						
<b>Differential Output Voltage Swing</b>	V <sub>out,pp</sub>	500		900	mV <sub>pp</sub>	
<b>Differential Output Impedance</b>	Z <sub>out</sub>	90	100	110	Ohm	
<b>Data output rise/fall time</b>	T <sub>r</sub> /T <sub>f</sub>		100		ps	20% to 80%
<b>LOS Assert Voltage</b>	V <sub>losH</sub>	V <sub>cc</sub> -1.3		V <sub>cc</sub>	V	
<b>LOS De-assert Voltage</b>	V <sub>losL</sub>	V <sub>ee</sub> -0.3		0.8	V	

## IV.Optical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
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### Transmitter

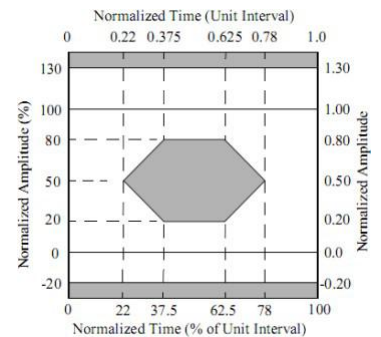
<b>Center Wavelength</b>	$\lambda_C$	1530	1550	1570	nm	
<b>Spectrum Bandwidth(RMS)</b>	$\sigma$			1	nm	
<b>Side Mode Suppression Ratio</b>	SMSR	30			dB	
<b>Average Optical Power</b>	PAVG	1		6	dBm	1
<b>Optical Extinction Ratio</b>	ER	9			dB	
<b>Transmitter OFF Output Power</b>	POff			-45	dBm	
<b>Transmitter Eye Mask</b>		Compliant with 802.3z(class 1 laser safety)				2

### Receiver

<b>Center Wavelength</b>	$\lambda_C$	1270		1610	nm	
<b>Receiver Sensitivity (Average Power)</b>	Sen.			-33	dBm	3
<b>Input Saturation Power(overload)</b>	Psat	-10			dBm	
<b>LOS Assert</b>	LOSA	-41			dB	4
<b>LOS De-assert</b>	LOSD			-34	dBm	4
<b>LOS Hysteresis</b>	LOSH	0.5	2	6	dBm	

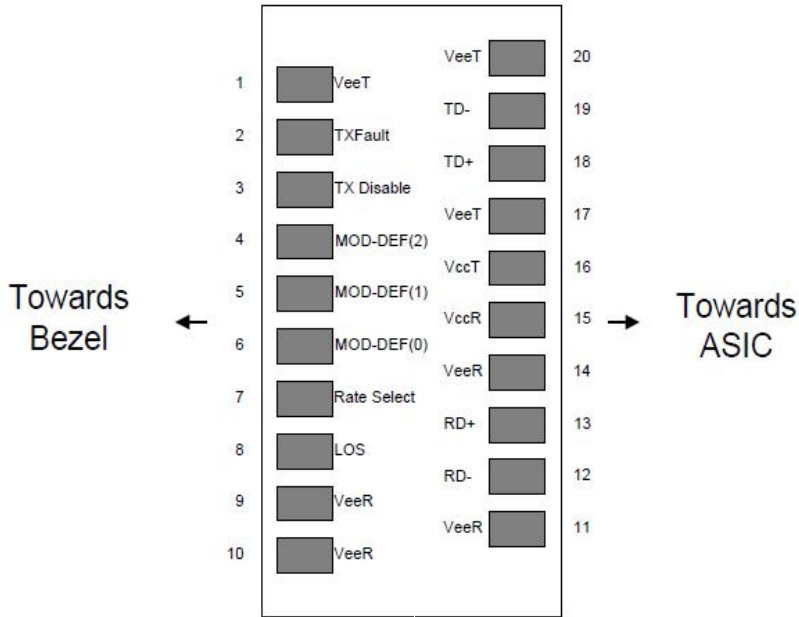
#### Notes:

- 1.Measure at 2<sup>7</sup>-1 NRZ PRBS pattern
- 2.Transmitter eye mask definition.
- 3.Measured with Light source 1550nm, ER=9dB; BER =<10<sup>-12</sup> @PRBS=2<sup>7</sup>-1 NRZ
- 4.When LOS de-asserted, the RX data+/- output is High-level (fixed).



## V. Pin Assignment

### Diagram of Host Board Connector Block Pin Numbers and Name



**Figure1. Diagram of host board connector block pin numbers and names**

Pin	Name	Function	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TXFAULT	Transmitter Fault.	
3	TXDIS	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	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.	
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-10k ohms 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:
  - 1) Low (0 – 0.8V): Reduced Bandwidth
  - 2) (>0.8, < 2.0V): Undefined
  - 3)High (2.0 – 3.465V): Full Bandwidth
  - 4)Open: Reduced Bandwidth
- 5.LOS is open collector output should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

## VI. Mechanical Specifications

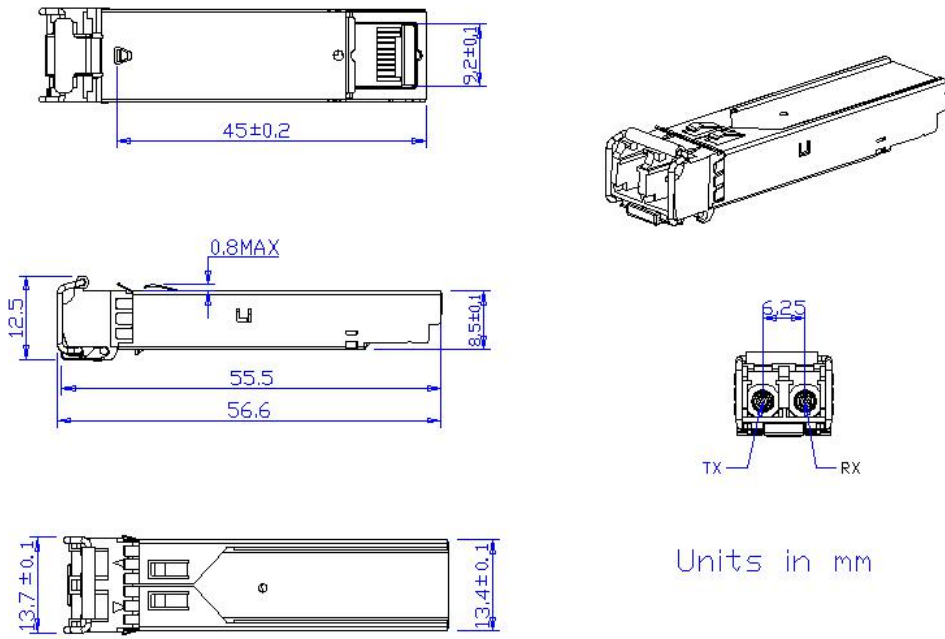


Figure2. Mechanical Outline