

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

SFP1G-ZXC-55



## 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 9/125μm 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

FS' 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.
Power Consumption	P			0.95	W	commercial
				1.0		Industrial
Supply Current	Icc			280	mA	commercial
				300		Industrial
Transmitter						
Single-ended Input Voltage Tolerance	VCC	-0.3		4.0	V	
Differential Input VoltageSwing	Vin,pp	200		2400	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee-0.3		0.8	V	
Receiver						
Differential Output Voltage Swing	Vout,pp	500		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf		100		ps	20% to 80%
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	
LOS De-assert Voltage	VlosL	Vee-0.3		0.8	V	

## IV.Optical Characteristics

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

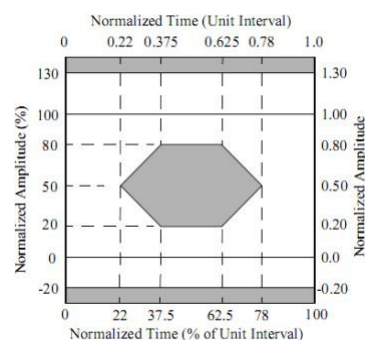
Center Wavelength	$\lambda_C$	1530	1550	1570	nm	
Spectrum Bandwidth(RMS)	$\sigma$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	PAVG	1		6	dBm	1
Optical Extinction Ratio	ER	9			dB	
Transmitter OFF Output Power	POff			-45	dBm	
Transmitter Eye Mask		Compliant with 802.3z(class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

### Receiver

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

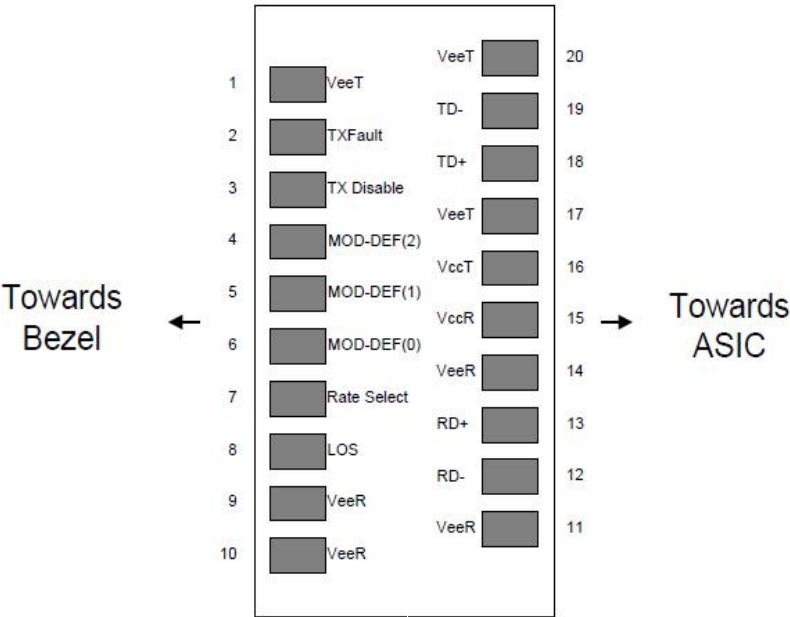


Figure1. Diagram of host board connector block pin numbers and names

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.

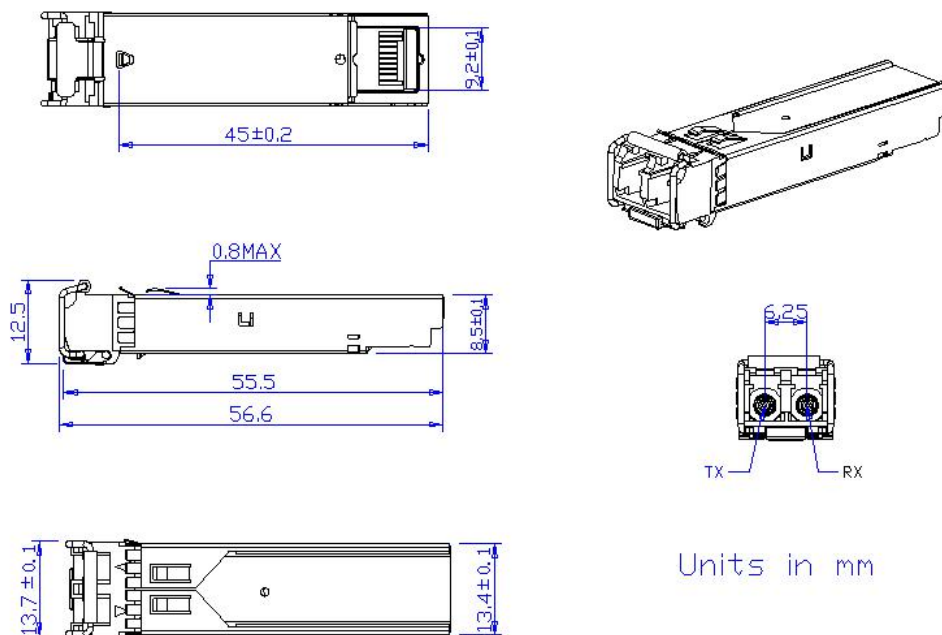
3.Should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V.MOD\_DEF (0) pulls line low to indicate module is plugged in.

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**

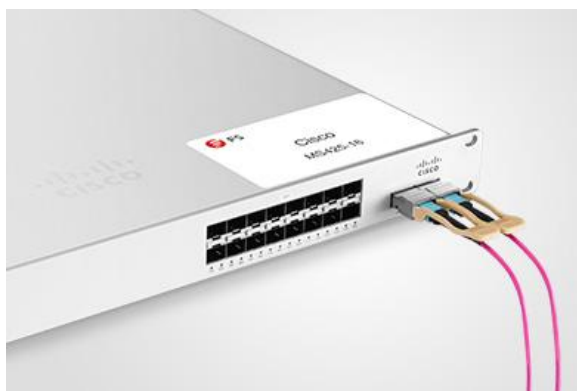
## Test Center

### I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force10 S60-44T



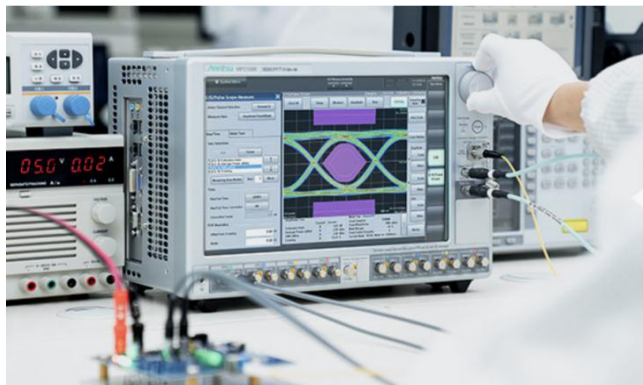
HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the [Test Bed PDF](#). It will be updated in real time as we expand our portfolio.



## II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



### 1. TX/RX Single Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator the input and output signal quality.

- Eye Pattern Measurements: Jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

### 2. Reliability and Stability Testing

Subject the transceivers to dramatic in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0°C to 70°C
- Extended: -5°C to 85°C
- Industrial: -40°C to 85°C



### 3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Networks Master Pro.

- Ethernet
- Fiber Channel
- SDH/SONET
- CPRI

### 4. Optical Spectrum Evaluation

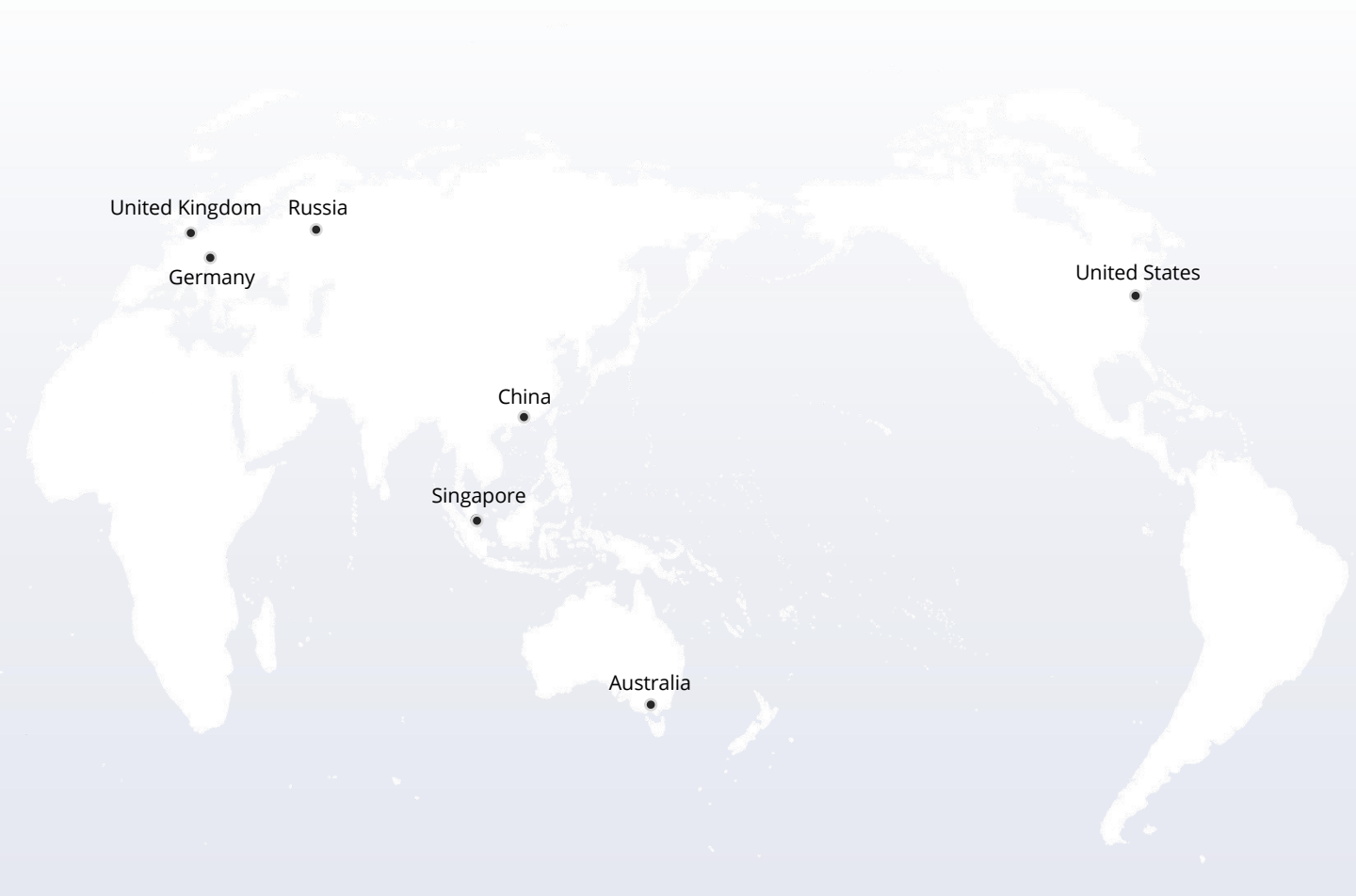
Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Order Information

Part Number	Description
SFP1G-ZXC-55	1000BASE-ZXC SFP 1550nm 160km Transceiver Module



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