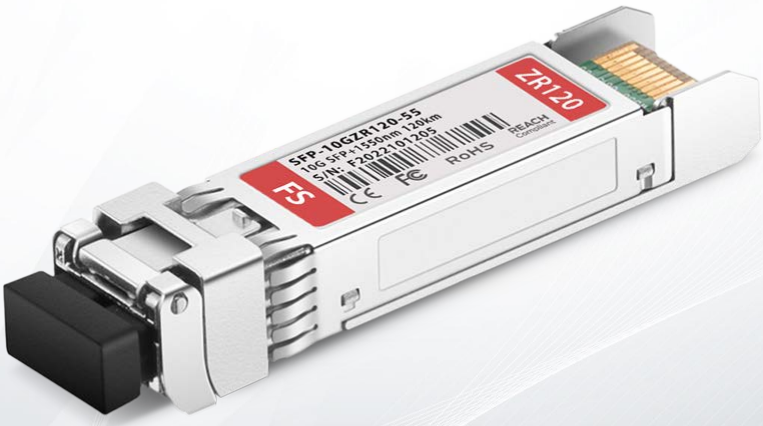
10GBASE-ZR SFP+ 1550nm 120km DOM Transceiver

SFP-10GZR120-55



Application

- 10G Ethernet ZR and 10G Fibre Channel
- OTN G.709 OTU1e/2/2e FEC bit rates
- 8.5Gb/s Fibre Channel

Features

- Hot-pluggable SFP+ footprint
- Supports 8.5 and 9.95 to 11.3 Gb/s
- 120km link length
- 0/70° C case temperature range
- Cooled 1550nm EML laser
- Limiting electrical interface receiver
- Duplex LC connector
- Built-in digital diagnostic functions
- RoHS-6 compliant (lead-free)

Description

10GGBASE-ZR SFP+ transceivers are Enhanced Small Form Factor Pluggable SFP+ transceivers designed for use in 10-Gigabit multi-rate links up to 120km of G.652 single mode fiber. They support 10G Ethernet ZR and 10G Fibre Channel.

Digital diagnostics functions are available via a 2-wire serial interface. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Storage Temperature Range	Ts	-40		85	℃	
Relative Humidity	RH	5		95	%	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Operating Case Temperature Range	Top	0		70	℃	commercial
		-10		80		extended
		-40		85		Industrial
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Data Rate			10.3125		Gb/s	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Control Input Voltage High		2		V_{CC}	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			120	KM	9/125um

III. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Supply Current	I_{CC}			520	mA	
Power Consumption	p			1.8	W	
Transmitter						
Single-ended Input Voltage Tolerance	V_{CC}	-0.3		4.0	V	
AC Common Mode Input Voltage Tolerance (RMS)		15			mV	
Differential Input Voltage Swing	Vin, pp	120		820	mVp-p	
Differential Input Impedance	Zin	90	100	110	Ohm	1
Transmit Disable Assert Time				10	us	
Transmit Disable Voltage	V_{DIS}	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		V_{EE} +0.8	V	2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Receiver						
Differential Output Voltage Swing	Vout, pp	350		850	mVp-p	
Differential Output Impedance	Zout	90	100	110	Ohm	3
Data output rise/fall time	T_R/T_F	28			pS	4
LOS Assert Voltage	V_{LOSH}	Vcc-1.3		Vcc	V	5
LOS De-assert Voltage	V_{LOSL}	V_{EE}		V_{EE} +0.8	V	5
Power Supply Rejection	PSR	100			mVp-p	6

IV. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Transmitter						
Center Wavelength	λ	1530	1550	1565	nm	1
Optical Spectral Width	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	P_{avg}	1		6	dBm	2
Optical Extinction Ratio	ER	8.2			dBm	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Transmitter OFF Output Power	P_{OFF}			-30	dBm	
Transmitter Eye Mask	Compliant with IEEE802.3ae					
Receiver						
Center Wavelength	λ	1270		1610	nm	
Receiver Sensitivity (Average Power)	Sen.			-26	dBm	3
Input Saturation Power (overload)	Psat	-8			dBm	
LOS Assert	LOSA	-35			dBm	
LOS De-assert	LOSD			-27	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Launched power (avg.) is power coupled into a single mode fiber with master connector (Before of Life).
3. Measured with Light source 1550nm, ER=8.2dB; BER =<10^-12 @10.3125Gbps, PRBS=2^31-1 NRZ.

V. Pin Function Definitions

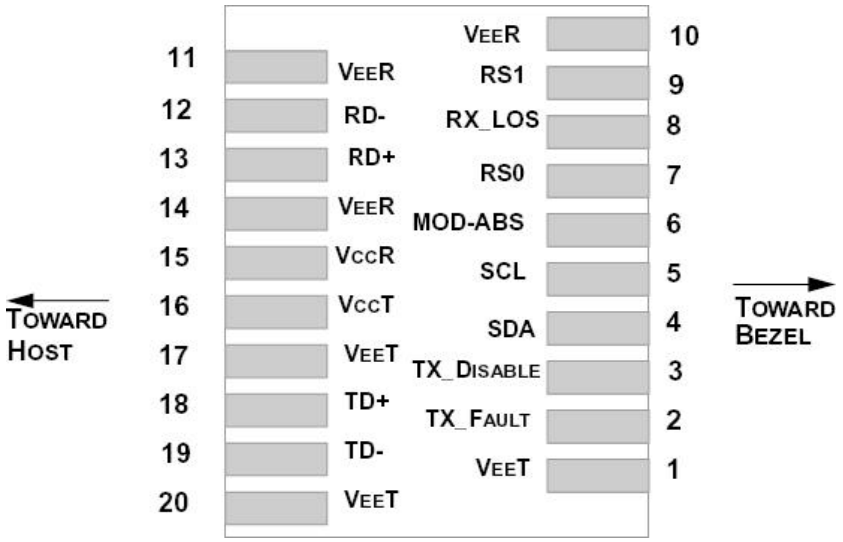


Figure 1 Pin Function Definitions

VI. Transceiver Pin Descriptions

Pin N.	Symbol	Name	Ref.
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	5
6	MOD_ABS	Module Absent. Grounded within the module	6
7	RS0	Rate Select 0	7
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	8

Pin N.	Symbol	Name	Ref.
9	RS1	No connection required	
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	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	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	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	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1

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 4.7kΩ-10kΩ 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.

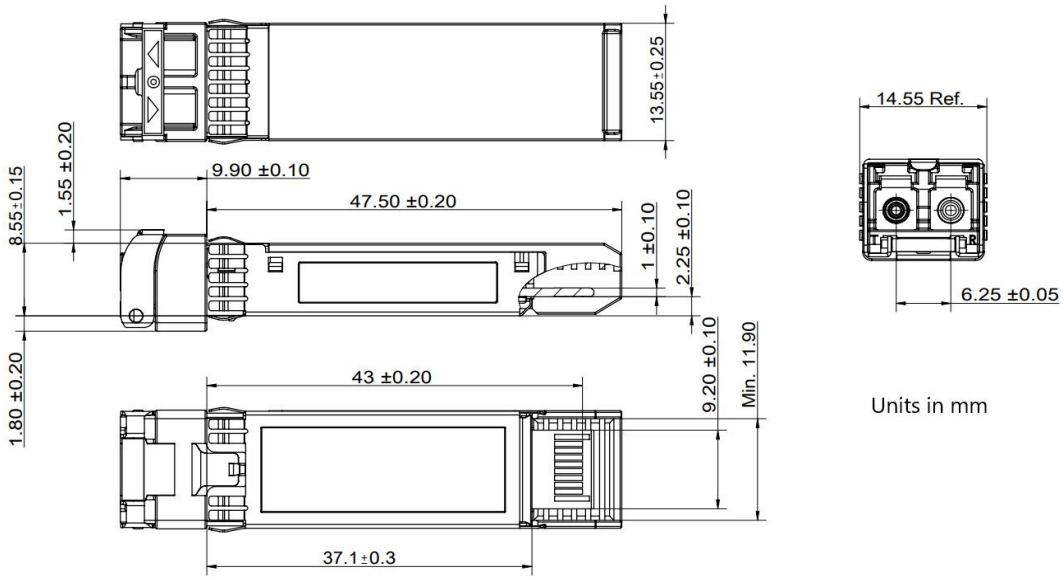
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

4. Should be pulled up with 4.7kΩ-10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.

5. Internally pulled down per SFF-8431 Rev 4.1.

6. LOS is open collector output. It should be pulled up with 4.7kΩ-10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

VII. Package Outline



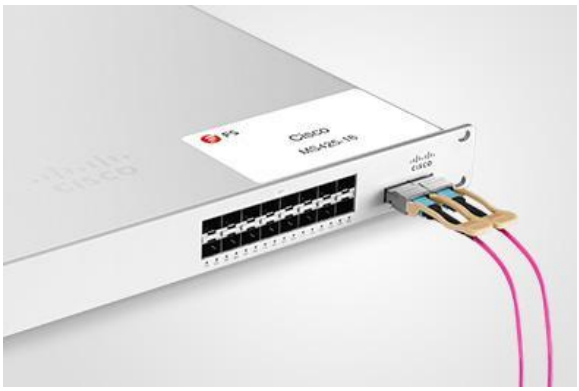
Units in mm

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

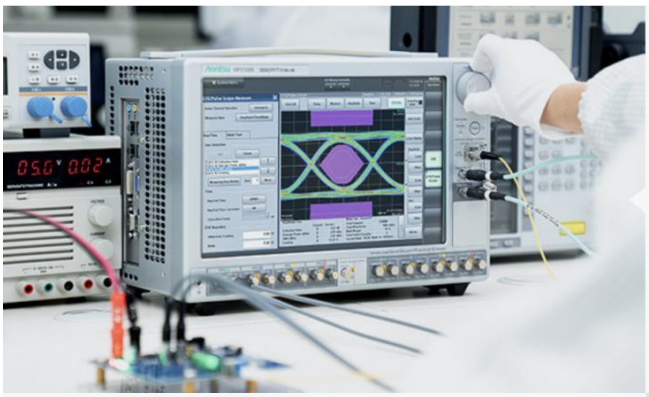
Force⑩tm S60-44T

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 Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure 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 changes 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

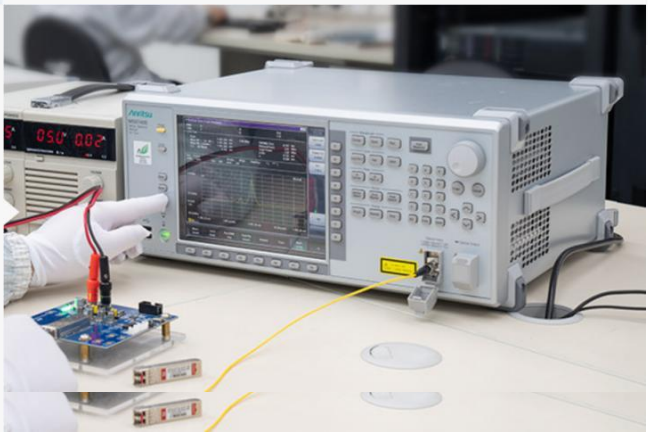
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- Ethernet
- Fibre 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
SFP-10GSR-85	10GBASE-SR SFP+ 850nm 300m DOM Transceiver
SFP-10GLRM-31	10GBASE-LRM SFP+ 1310nm 220m DOM Transceiver
SFP-10GLR-31	10GBASE-LR SFP+ 1310nm 10km DOM Transceiver
SFP-10GER-55	10GBASE-ER SFP+ 1550nm 40km DOM Transceiver
SFP-10GZR-55	10GBASE-ZR SFP+ 1550nm 80km DOM Transceiver
SFP-10GZR100-55	10GBASE-ZR SFP+ 1550nm 100km DOM Transceiver
SFP-10GMSR-85	Dual-Rate 1000BASE-SX and 10GBASE-SR SFP+ 850nm 300m DOM Transceiver
SFP-10GMLR-31	Dual-Rate 1000BASE-LX and 10GBASE-LR SFP+ 1310nm 10km DOM Transceiver

Note:

10G SFP+ transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.