

1G DWDM SFP C17-C61 120km DOM Transceiver

DWCxx-SFP1G-120



Application

- SONET/SDH Networks
- Gigabit Ethernet
- C-Band DWDM Networks
- Fiber Channel

Features

- Compliant with SFF-8472 Rev12.4
- Compliant with SFF-8432 Rev5.2a
- Compliant with SFP+ MSA Rev1.0
- Compliant with IEEE802.3
- DWDM DML Laser Transmitter and APD Photo-detector
- 100 GHz ITU Channel Spacing with Integrated Wavelength Locker
- Hot-Pluggable SFP Footprint Duplex LC Connector Interface
- RoHS Compliant and Lead Free
- Operating Data Rate up to 1.25Gbps

Description

This DWCxx-SFP1G-120 transceiver supports up to 120km link lengths over single-mode fiber (SMF). This transceiver is compliant with SFF-8472 standard. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, to allow access to real-time operating parameters. With these features, this easy to install, hot swappable transceiver is suitable for fiber communications application up to 1000BASE.

Product Specifications

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.	Max.	Unit
Storage Temperature	T _s	-40	85	°C
Operating Case Temperature	T _{case}	0	70	°C
Power Supply Voltage	V _{CC}	-0.5	3.6	V
Relative Humidity (non-condensation)	RH	5	95	%
Damage Threshold	TH _d	0		dBm

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Case operating Temperature	T _C	0		70	°C
Storage Temperature	T _s	-40		85	°C
Supply Voltage	V _{CC}	3.13	3.30	3.46	V
Instantaneous Peak Current at Hot Plug	ICC_IP			400	mA



Parameter	Symbol	Min.	Typ.	Max.	Unit
Sustained Peak Current at Hot Plug	ICC_SP			330	mA
Maximum Power	P _{max}			1	W
Aggregate Bit Rate	ABR		1.25		Gb/s
Operating Distance		2		120000	m

III. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_c	± 0.1			nm	
Spectral Width	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Output Power	P _{out}	0		5	dBm	
Optical Modulation Amplitude	OMA	2		7	dBm	
OFF_Average Power	P _{OFF}			-40	dBm	
Extinction Ratio	ER	9			dB	
Eye Mask Margin		10@25°C 5@0°C&70°C			%	1
Crossing		40	50	60	%	



Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver						
Optical Input Wavelength	λ_c	1270		1610	nm	
Receiver Overload	Pol	-10			dBm	
Receiver Sensitivity (Average Power)	BOL			- 30	dBm	2
Receiver Sensitivity	EOL	-5		-29	dBm	
Receiver Reflectance	RXR			-12	dB	
RX_LOS Assert	LOS _A	-41			dBm	
RX_LOS De-assert	LOS _D			-31	dBm	
RX_LOS Hysteresis	LOS _H	0.5		4	dB	

- Notes:
- 1. EYE Mask Margin test conditions, sample waveform ≥1000 wfms, Hit Ratio 1E-12.
 - 2. Measured with a PRBS 2⁷-1 test pattern @1250Mbps, BER≤1E-12.

IV. Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Consumption	P			1.0		commercial
				1.5	W	Industrial



Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Current	I _{CC}			300	mA	commercial
				450		Industrial
Transmitter						
Single-ended Input Voltage Tolerance	V _{CC}	-0.3		4.0	V	
Differential Input Voltage Swing	V _{in,pp}	200		2400	mV _{pp}	
Differential Input Impedance	Z _{in}	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	V _{dis}	V _{cc} -1.3		V _{CC}	V	
Transmit Enable Voltage	V _{en}	V _{ee} -0.3		0.8	V	
Receiver						
Differential Output Voltage Swing	V _{out,pp}	500		900	mVpp	
Differential Output Impedance	Z _{out}	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf		100		ps	20% to 80%
LOS Assert Voltage	V _{los} H	V _{cc} -1.3		V _{cc}	V	
LOS De-assert Voltage	V _{los} L	V _{ee} -0.3		0.8	V	



V. Wavelength Selection: C-band λ c Wavelength Guide Pin Descriptions

Channel	Wavelength (nm)	Frequency (THZ)	Channel	Wavelength (nm)	Frequency (THZ)
C17	1563.86	191.70	C39	1546.12	193.90
C18	1563.05	191.80	C40	1545.32	194.00
C19	1562.23	191.90	C41	1544.53	194.10
C20	1561.42	192.00	C42	1543.73	194.20
C21	1560.61	192.10	C43	1542.94	194.30
C22	1559.79	192.20	C44	1542.14	194.40
C23	1558.98	192.30	C45	1541.35	194.50
C24	1558.17	192.40	C46	1540.56	194.60
C25	1557.36	192.50	C47	1539.77	194.70
C26	1556.55	192.60	C48	1538.98	194.80
C27	1555.75	192.70	C49	1538.19	194.90
C28	1554.94	192.80	C50	1537.40	195.00
C29	1554.13	192.90	C51	1536.61	195.10
C30	1553.33	193.00	C52	1535.82	195.20
C31	1552.52	193.10	C53	1535.04	195.30
C32	1551.72	193.20	C54	1538.98	194.80

Channel	Wavelength (nm)	Frequency (THZ)	Channel	Wavelength (nm)	Frequency (THZ)
C33	1550.92	193.30	C55	1533.47	195.50
C34	1550.12	193.40	C56	1532.68	195.60
C35	1549.32	193.50	C57	1531.90	195.70
C36	1548.51	193.60	C58	1531.12	195.80
C37	1547.72	193.70	C59	1530.33	195.90
C38	1546.92	193.80	C60	1529.55	196.00
C33	1550.92	193.30	C55	1533.47	195.50

VI. Pin Descriptions

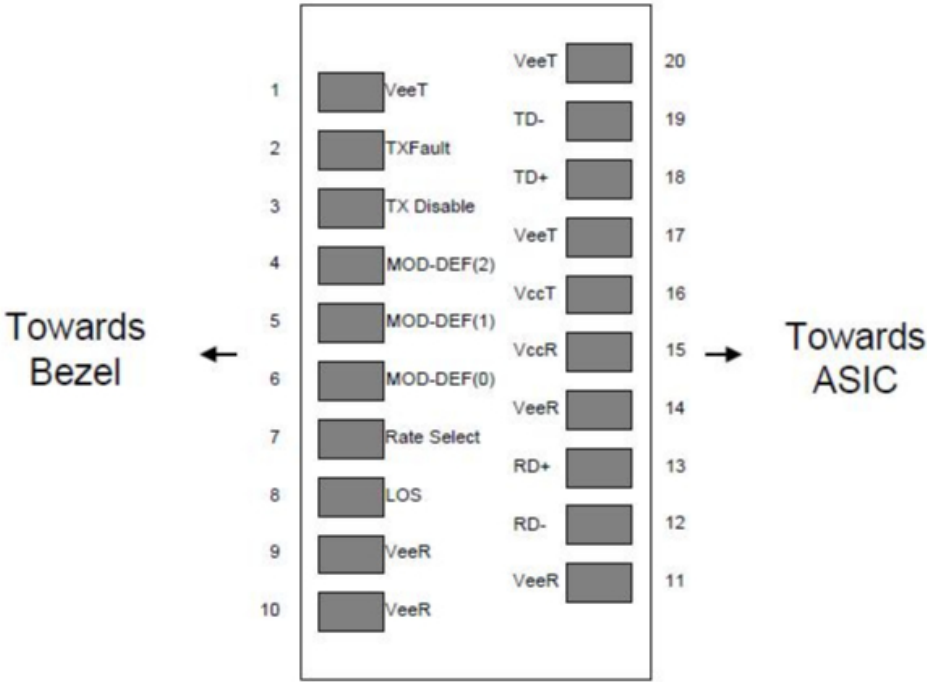


Figure 1. Diagram of host board connector block pin numbers and names



VII. Pin Definitions

Pin	Name	Name/Description	Notes
1	V _{EE} T	Transmitter Ground (Common with Receiver Ground)	1
2	TX FAULT	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 operation.	5
9	V _{EE} R	Receiver Ground (Common with Transmitter Ground)	1
10	V _{EE} R	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EE} R	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 _{EE} R	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CC} R	Receiver Power Supply	
16	V _{CC} T	Transmitter Power Supply	



Pin	Name	Name/Description	Notes
17	V _{EE} T	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 _{EE} T	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.

VIII. DDM Accuracy

Parameter	Range	Accuracy	Unit
Temperature	0 to 70	± 3	°C
Voltage	0 to V _{CC}	± 0.1	V
Tx Bias Current	4 to 85	± 10%	mA
Tx Output Power	-1 to 5	± 2	dB
Rx Power	-31 to -10	± 2	dB

VX. Mechanical Dimensions

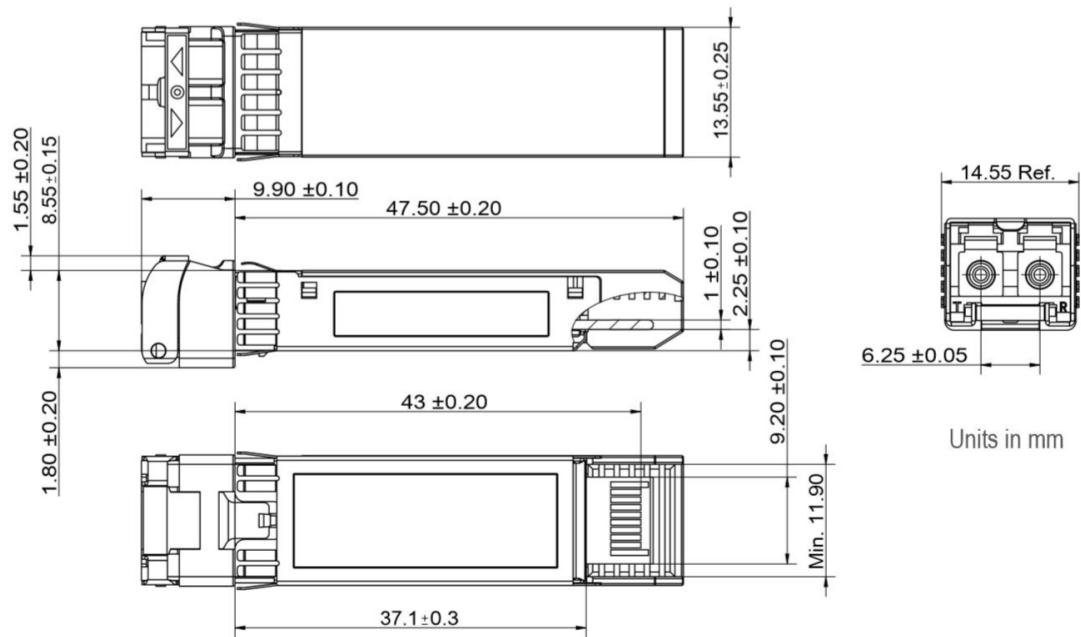


Figure 2. Mechanical Outline

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



Force@tm S60-44T

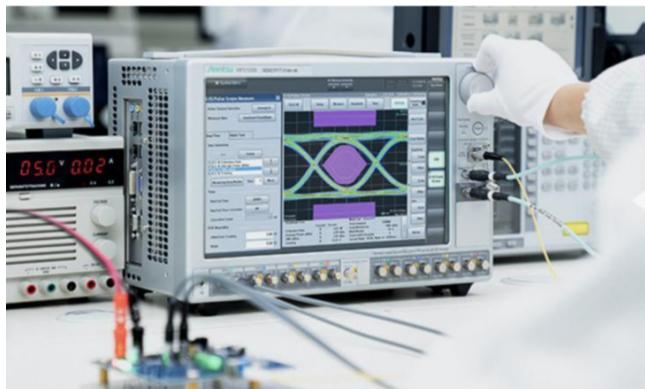


HUAWEI S6720-30L-HI-24S

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

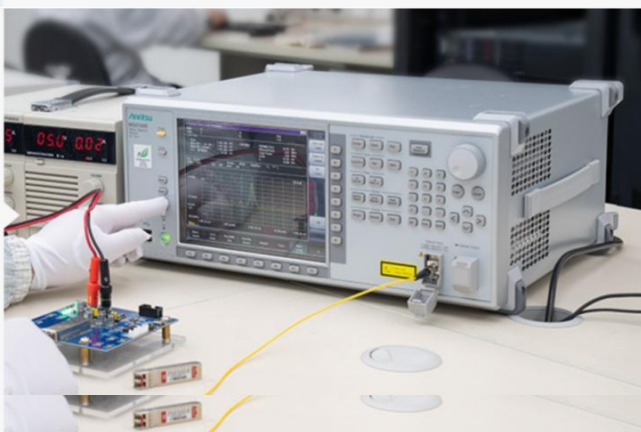
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- 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
DWDM-SFP1G-ZX	1G DWDM SFP Transceiver, C17-C61, Duplex LC, 40km over SMF
DWDM-SFP1G-ZX	1G DWDM SFP Transceiver, C17-C61, Duplex LC, 80km over SMF
DWDM-SFP1G-EZX	1G DWDM SFP Transceiver, C17-C61, Duplex LC, 100km over SMF
DWCxx-SFP1G-120	1G DWDM SFP Transceiver, C17-C61, Duplex LC, 120km over SMF