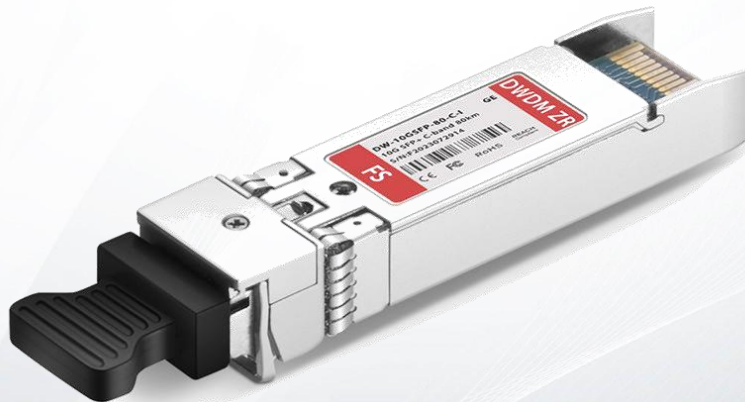


10G DWDM SFP+ 1529.16nm-1567.13nm 80km Industrial DOM Transceiver

DW-10GSFP-80-C-I



Applications

- DWDM 10Gb/s SONET/SDH/OTN10GBASE-ZR/ZW
- DWDM 10Gb/s Ethernet & 10Gb/s Fibre Channel

Features

- Compliant with IEEE 802.3ae
- Compliant with SFF-8472 Rev12.3
- Compliant with SFF-8432 Rev5.2a
- Compliant with SFF-8431 Rev4.1a
- Compliant with SFF-8690 Rev1.4
- Compliant with SFP+ MSA Rev1.0
- 2-wire Interface for Integrated Digital Diagnostic Monitoring
- 50GHz ITU-based Channel Spacing (C-Band) with a Wavelength Locker
- 5C-band-tunable Laser and High-Performance APD Receiver
- Hot-Pluggable SFP+ Footprint and Duplex LC Connector
- RoHS Compliant

Description

The 10G DWDM SFP+ transceiver supports up to 80km link lengths over single-mode fiber (SMF) via an LC duplex connector. This transceiver is compliant with SFF-8472 and SFF-8690 standards. Digital diagnostics functions are available via a 2-wire SFP management interface, to allow access to real-time operating parameters. With these features, this easy to install, hot swappable transceiver is suitable to be deployed in the DWDM networking equipment in metropolitan access and core networks.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Operating Relative Humidity	RH	5	+85	%

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	TC	-40		85	°C	
Supply Current	TS			796	mA	
Supply Voltage	VCC	3.14	3.30	3.47	V	
Instantaneous Peak Current at Hot Plug	ICC_IP			1000	mA	
Sustained Peak Current at Hot Plug	ICC_SP			825	mA	
Maximum Power	Pmax			2.5	W	
Aggregate Bit Rate	ABR	9.83		11.3	Gb/s	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Distance		2		80000	m	1

Note:

1. Reference IEEE P802.3bm Annex 83E, Figure 83E-7 for template.

III. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Center Wavelength	λ_C	1529.16		1567.13	nm	
Wavelength Range	fC	191.30		196.05	THz	
Center Wavelength Accuracy	CWA	$\lambda_C-0.05$	λ_C	$\lambda_C+0.05$	nm	
-20dB Spectral Width	σ		0.3	0.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Output Power	Pout	-1		4	dBm	
OFF_Average Power	POFF			-40	dBm	
Extinction Ratio	ER	8.2			dB	
Eye Mask Margin		10@25°C 5@-40°C&85°C			%	1
Crossing		40		60	%	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter and Dispersion Penalty	TDP			3.5	dB	

Receiver

Optical Input Wavelength	λ_c	1528		1600	nm	
Receiver Overload	Pol	-7			dBm	
Receiver Sensitivity@9.95G	BOL1			-24	dBm	2
Receiver Sensitivity@10.3G	BOL2			-23	dBm	2
Receiver Sensitivity @10.7G/11.1G/11.3G	BOL3			-27	dBm	3
Receiver Sensitivity @9.95G	EOL1			-23.5	dBm	
Receiver Sensitivity @10.3G	EOL2			-22.5	dBm	
Receiver Sensitivity @10.7G/11.1G/11.3G	EOL3			-26.5	dBm	
RX_LOS De-assert	LOS D			-25	dBm	
RX_LOS Assert	LOS A	-34			dBm	
RX_LOS Hysteresis	LOS H	0.5		4	dB	

Note:

- 1. EYE Mask Margin test conditions, sample waveform ≥ 1000 wfms, Hit Ratio 1E-12.
- 2. Measured with a PRBS 231-1 test pattern @10.3125 Gbps, BER $\leq$ 10-12.
- 3. Measured with a PRBS 231-1 test pattern @10.7Gbps/11.1Gbps/11.3Gbps, BER $\leq$ 10-4.

IV. Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Transmitter						
Differential Data Input Amplitude		VIN, P-P	190		700	mVpp
Input Differential Impedance		ZIN	80	100	120	Ω
Tx_Fault	Normal Operation	VOL	-0.3		0.4	V
	Transmitter Fault	VOH	2.4		VCC	V
Tx_Disable	Normal Operation	VIL	-0.3		0.8	V
	Laser Disable	VIH	2.0		VCC+0.3	V
Receiver						
Differential Data Output Amplitude		VOUT,P-P	300		850	mVpp
Output Differential Impedance		ZO	80	100	120	Ω
Rx_LOS	Normal Operation	VOL	-0.3		0.4	V
	Lose Signal	VOH	2.4		VCC	V

V. Wavelength Table: C-band λ_c Wavelength Guide Pin Descriptions

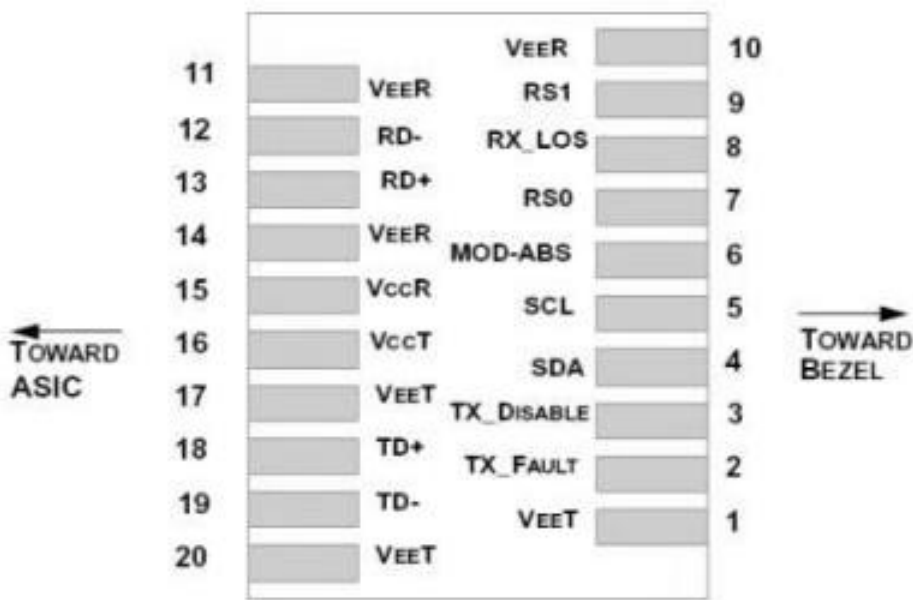
Channel	Wavelength (nm)	Frequency(THZ)	Channel	Wavelength (nm)	Frequency(THZ)
C13	1567.13	191.30	H13	1566.72	191.35
C14	1566.31	191.40	H14	1565.91	191.45
C15	1565.50	191.50	H15	1565.09	191.55
C16	1564.68	191.60	H16	1564.27	191.65
C17	1563.86	191.70	H17	1563.46	191.75
C18	1563.05	191.80	H18	1562.64	191.85
C19	1562.23	191.90	H19	1561.83	191.95
C20	1561.42	192.00	H20	1561.01	192.05
C21	1560.61	192.10	H21	1560.20	192.15
C22	1559.79	192.20	H22	1559.39	192.25
C23	1558.98	192.30	H23	1558.58	192.35
C24	1558.17	192.40	H24	1557.77	192.45
C25	1557.36	192.50	H25	1556.96	192.55
C26	1556.55	192.60	H26	1556.15	192.65
C27	1555.75	192.70	H27	1555.34	192.75
C28	1554.94	192.80	H28	1554.54	192.85
C29	1554.13	192.90	H29	1553.73	192.95
C30	1553.33	193.00	H30	1552.93	193.05
C31	1552.52	193.10	H31	1552.12	193.15
C32	1551.72	193.20	H32	1551.32	193.25
C33	1550.92	193.30	H33	1550.52	193.35
C34	1550.12	193.40	H34	1549.72	193.45
C35	1549.32	193.50	H35	1548.91	193.55
C36	1548.51	193.60	H36	1548.11	193.65
C37	1547.72	193.70	H37	1547.32	193.75
C38	1546.92	193.80	H38	1546.52	193.85
C39	1546.12	193.90	H39	1545.72	193.95

C40	1545.32	194.00	H40	1544.92	194.05
C41	1544.53	194.10	H41	1544.13	194.15
C42	1543.73	194.20	H42	1543.33	194.25
C43	1542.94	194.30	H43	1542.54	194.35
C44	1542.14	194.40	H44	1541.75	194.45
C45	1541.35	194.50	C45	1541.35	194.50
C46	1540.56	194.60	H46	1540.16	194.65
C47	1539.77	194.70	H47	1539.37	194.75
C48	1538.98	194.80	H48	1538.58	194.85
C49	1538.19	194.90	H49	1537.79	194.95
C50	1537.40	195.00	H50	1537.00	195.05
C51	1536.61	195.10	H51	1536.22	195.15
C52	1535.82	195.20	H52	1535.43	195.25
C53	1535.04	195.30	H53	1534.64	195.35
C54	1534.25	195.40	H54	1533.86	195.45
C55	1533.47	195.50	H55	1533.07	195.55
C56	1532.68	195.60	H56	1532.29	195.65
C57	1531.90	195.70	H57	1531.51	195.75
C58	1531.12	195.80	H58	1530.72	195.85
C59	1530.33	195.90	H59	1529.94	196.95
C60	1529.55	196.00	H60	1529.16	196.05

Notes:

1. When the module is power cycled it will automatically go to the last channel selected, or when Tx_Disable asserted and then re-enabled, the module returns to the last channel selected.

VI. Pin Definition



VII. Pin Description

Pin	Logic	Symbol	Description	Note
1		VEET	Module Transmitter Ground	1
2	LVTTL-O	TX_FAULT	Module Transmitter Fault	2
3	LVTTL-I	TX_DISABLE	Transmitter Disable; Turns off Transmitter Laser Output	3
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)	
5	LVTTL-I/O	SCL	2-Wire Serial Interface Clock (MOD-DEF1)	
6		MOD_ABS	Module Absent, Connected to VEET or VEE R in the Module	2
7	LVTTL-I	RS0	Rate Select 0, NOT implement	4
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication	2
9	LVTTL-I	RS1	Rate Select 1, NOT Implement	4

Pin	Logic	Symbol	Description	Note
10		VEE R	Module Receiver Ground	1
11		VEE R	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VEE R	Module Receiver Ground	1
15		VCC R	Module Receiver 3.3 V Supply	
16		VCCT	Module Transmitter 3.3 V Supply	
17		VEET	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VEET	Module Transmitter Ground	1

Note:

- 1. The module ground pins are isolated from the module case.
- 2. The pins shall be pulled up with 4.7K- 10Kohms to a voltage between 3. 14V and 3.47V on host board.
- 3. The pin is pulled up to VCCT with a 4.7K- 10KΩ resistor in the module.
- 4. The pins are pulled low to VEET with a >30kΩ resistor in the module.

VIII. Recommended Host Board Power Supply Circuit

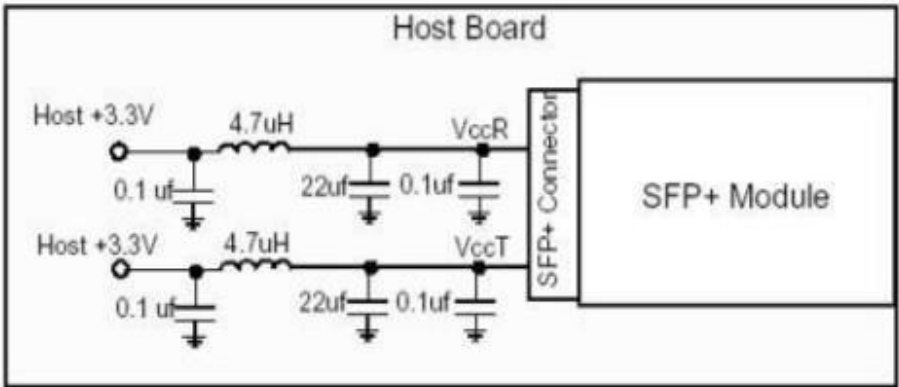


Figure 1. Recommended Host Board Power Supply Circuit

IX. Recommended Interface Circuit

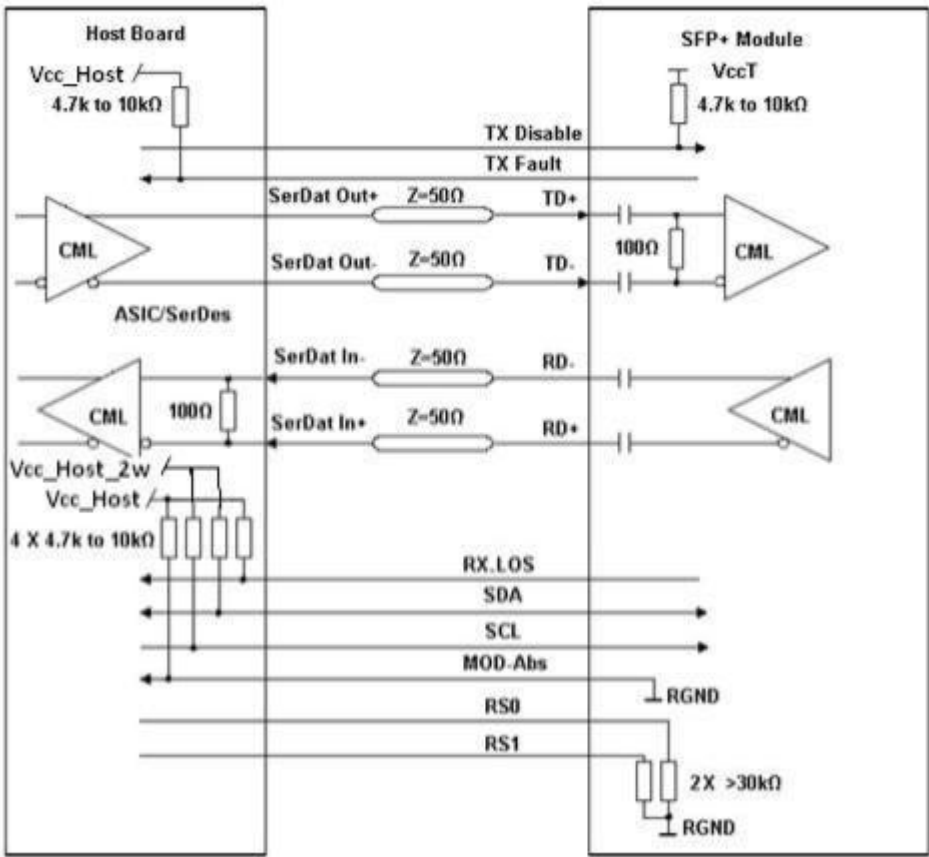


Figure 2. Recommended Interface Circuit

X. Mechanical Dimensions

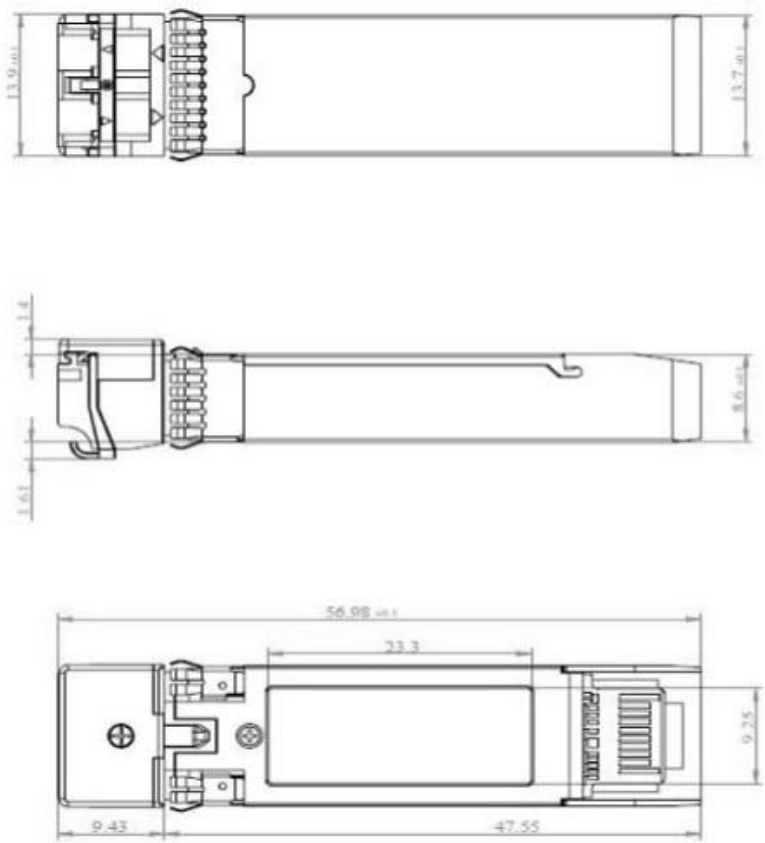


Figure 3. Mechanical Diagram

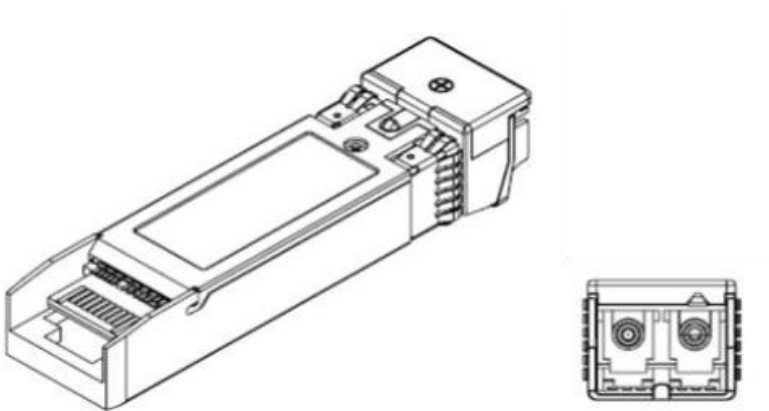


Figure 4. Outline Drawing

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

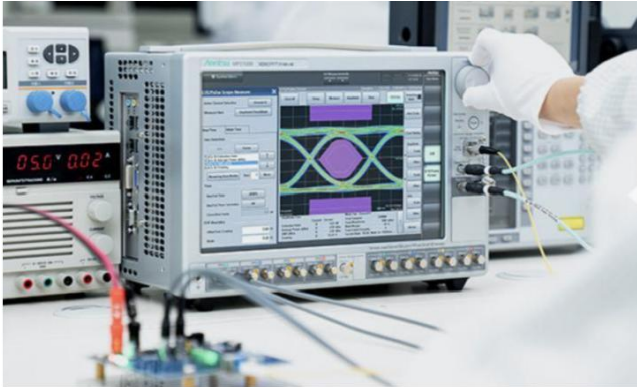


HUAWEI S6720-30L-HI-24S

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 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

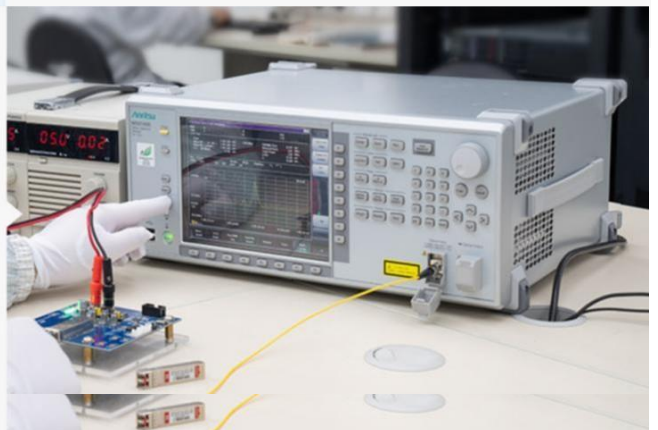
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- 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-SFP10G-40	10G DWDM SFP+ 100GHz 1528.77nm-1563.86nm Transceiver, Duplex LC, 40km over SMF
DW-SFP10G-40-C	10G DWDM C-band Tunable SFP+ 50GHz Transceiver, Duplex LC, 40km over SMF
DWDM-SFP10G-40-I	10G DWDM SFP+ 100GHz Industrial Transceiver, Duplex LC, 40km over SMF
DWDM-SFP10G-80	10G DWDM SFP+ 100GHz 1528.77nm-1563.86nm Transceiver, Duplex LC, 80km over SMF
DW-SFP10G-80-C	10G DWDM C-band Tunable SFP+ 50GHz Transceiver, Duplex LC, 80km over SMF
DWDM-SFP10G-80-I	10G DWDM SFP+ 100GHz Industrial Transceiver, Duplex LC, 80km over SMF
DWDM-SFP10G-C	10G DWDM C-band Tunable SFP+ 50GHz Transceiver, Duplex LC, 80km over SMF
DWC40-10GSFP-100	10G DWDM SFP+ 100GHz 1528.77nm-1563.86nm Transceiver, Duplex LC, 100km over SMF