

10G DWDM SFP+ 100GHz 1528.77nm-1563.86nm 40KM DOM Transceiver

DWDM-SFP10G-40



Application

- 10GBASE-ER/EW
- 10G Fiber Channel
- OBSAI rates 6.144 Gb/s, 3.072 Gb/s, 1.536 Gb/s, 0.768Gb/s
- CPRI rates 9.830 Gb/s, 7.373Gb/s, 6.144 Gb/s, 4.915 Gb/s, 2.458 Gb/s, 1.229 Gb/s, 0.614Gb/s
- Other optical links

Features

- Available in all C-Band Wavelengths on the 100GHz DWDM ITU Grid
- Duplex LC Connector
- Temperature-Stabilized DWDM EML Transmitter
- Power Dissipation (0°C to 70°C) < 1.5W
- Power Dissipation (-40°C to 85°C) < 1.8W
- Dispersion tolerance from -300ps/nm to 800ps/nm
- Hot-Pluggable SFP+ Footprint
- Compliant with SFF-8431 MSA and SFF-8432 MSA
- Built-in digital diagnostic functions, including optical power monitoring
- Commercial temperature range: 0°C to 70°C
- Industrial temperature range : -40°C to 85°C

Description

The DWDM-SFP10G-40 series single mode transceiver is small form factor pluggable module for duplex optical data communications. This module is designed to deploy in the DWDM networking equipment in metropolitan access and core networks and operates at a nominal DWDM wavelength from 1528nm to 1566nm as specified by the ITU-T. They are complaint with the SFF-8431 MSA and SFF-8432 MSA .

Product Specifications

I.General Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Module Form Factor	BR	9.95		10.5	Gb/s	1
Number of Lanes	BER			10 ⁻¹²		2
Maximum Aggregate Data Rate	L _{max}		40		km	

Notes:

1. 10GBASE-ER, 10GBASE-EW, 1200-SM-LL-L 10GFC.
2. Tested with a PRBS 2³¹-1 test pattern.

II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T _s	-40		85	°C
Supply Voltage	V _{cc}	-0.5		3.6	V
Operating Relative Humidity				95	%

III. Electrical Characteristics (TOP= 0 to 70 ° C, VCC = 3.14 to 3.46 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Power Supply Current	I _{cc} (0°C to 70°C)		350	455	mA	
	I _{cc} (-40°C to 85°C)		350	545	mA	
Date Rate	DR	0.6		11.3	Gbps	Date Rate

Transmitter

TX_Dis	Disable		2		V _{cc} +0.3	V	
	Enable		0		0.8		
TX_FAULT	Fault		2		V _{cc} +0.3	V	
	Normal		0		0.5		
CML Inputs (Differential)	V _{in}	250		1000	mV _{pp}	AC coupled input	
Input Impedance (Differential)	Z _{in}	85	100	115	ohm	R _{in} > 100 kohm @ DC	

Receiver

CML Outputs (Differential)	V _{out}	350		700	mV _{pp}	AC coupled output	
RX_LOS	LOS		2		V _{cc} +0.3	V	
	Normal		0		0.8	V	
Output Impedance (Differential)	Z _{out}	85	100	115	ohm		
MOD_DEF (0:2)	VoH		2.5			V	With Serial ID
	VoL		0		0.5	V	

IV. Optical Characteristics (TOP = 0 to 70 °C, VCC = 3.14 to 3.46 V)

Parameter	Symbol	Min	Typ.	Max	Unit
Data Rate		0.6		11.3	Gbps
Transmitter					
Side Mode Suppression Ratio	SMSR	30			dB
Center Wavelength Spacing			100		GHz
			0.8		nm
Average Output Power	Pout	-1		4	dBm
Average Launch Power (Tx: OFF)	Poff			-30	dBm
Extinction Ratio	ER	3.5			dB
Transmitter Dispersion Penalty @800ps/nm	TDP			2	dB
Pout@TX Disable Asserted	Pout			-45	dBm
Relative Intensity Noise	RIN			-128	dB/Hz
TX Jitter	TXj	Per 802.3ae requirements			
Receiver					
Receiver Sensitivity	Pmin			-16	dBm
Receiver Overload	Pmax	-1			dBm
LOS De-Assert	LOSD			-17	dBm
LOS Assert	LOSA	-29			dBm
LOS Hysteresis		1			dB

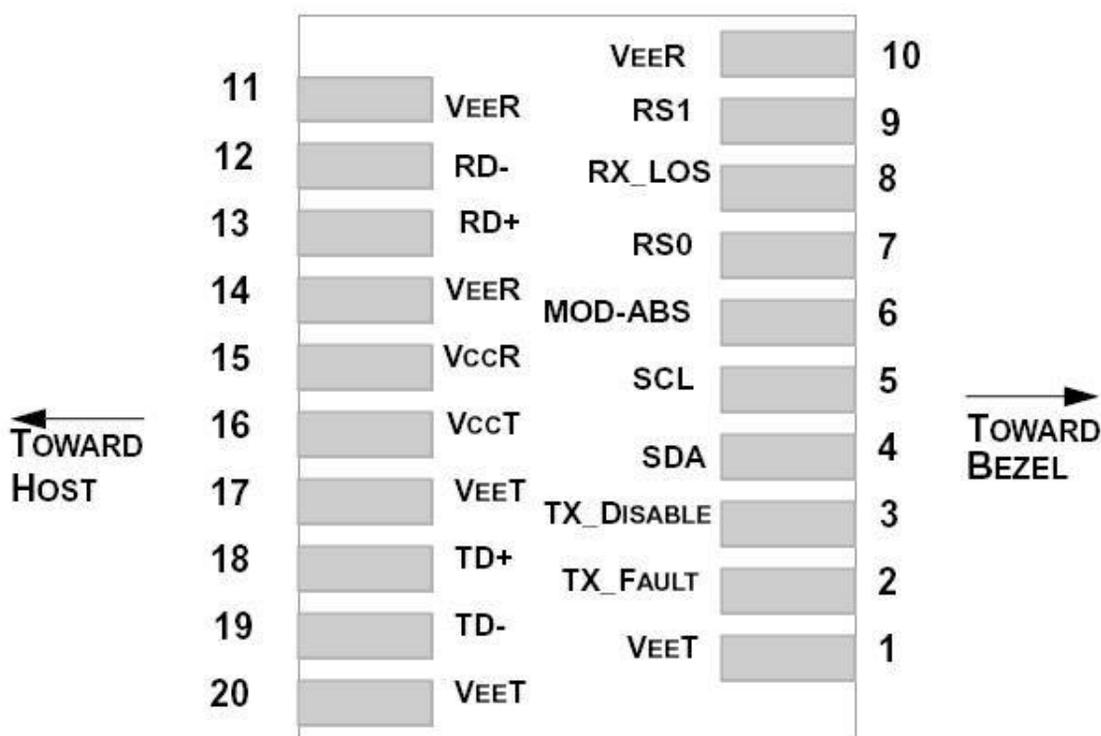
Notes:

- Output is coupled into a 9/125μm single-mode fiber.
- Minimum average optical power measured at the BER less than 1E-12. The measurepattern is PRBS 2³¹-1.
- CML logic, internally AC coupled.

V. Wavelength Table

Channel	Frequency (THz)	Center Wavelength (nm)	Channel	Frequency (THz)	Center Wavelength (nm)
17	191.7	1563.86	40	194	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192	1561.41	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195	1537.4
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.9
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

VI. Pin Description



Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	Note 3, Data line for Serial ID.
5	SCL	Module Definition 1	3	Note 3, Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTTL).	3	Rate Select 0, optionally controls SFP+ module receiver. This pin is pulled low to VeeT with a >30K resistor

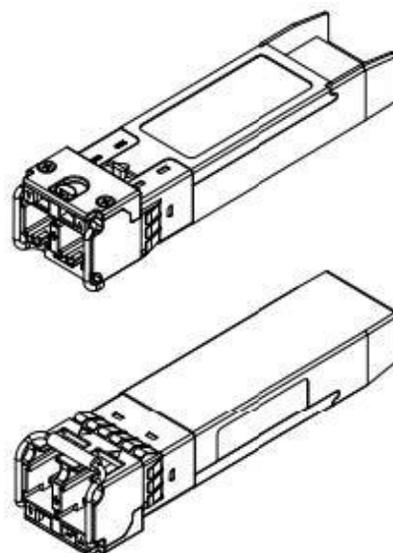
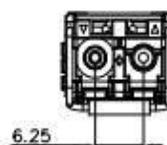
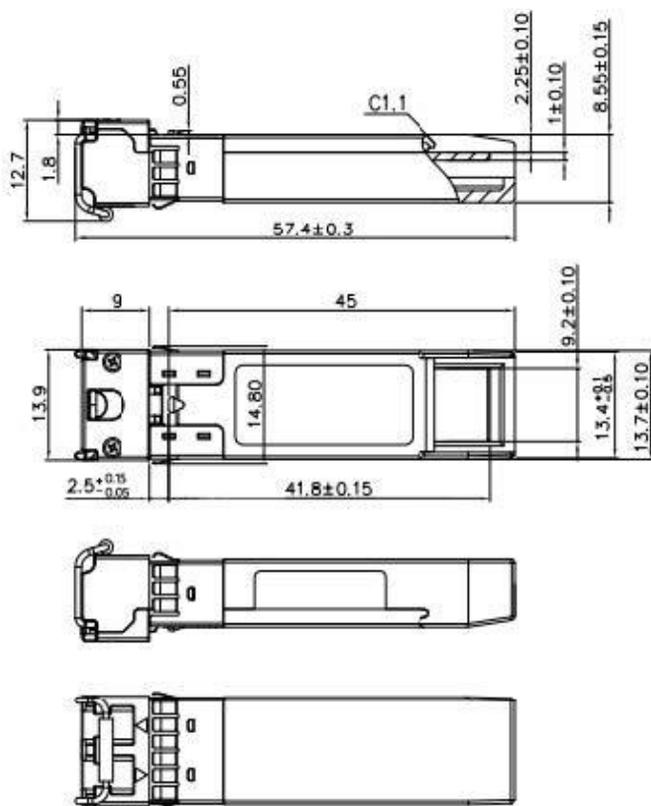
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP+ module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K - 10K resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high,output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7-10 K_x0002_ resistor. Its states are: Low (0 - 0.8V): Transmitter on(>0.8, < 2.0V): Undefined High (2.0 - 3.465V): Transmitter Disabled Open: Transmitter Disabled
3. Module absent, connected to VEET or VEER in the module.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K–10K resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
5. VeeR and VeeT may be internally connected within the SFP+ module.
6. RD-/+: These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 300mA. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP+ transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP+ transceiver module.
8. TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

VII. Mechanical Specifications



Unremarked tolerances ± 0.2 mm

Test Center

I. Compatibility Testing

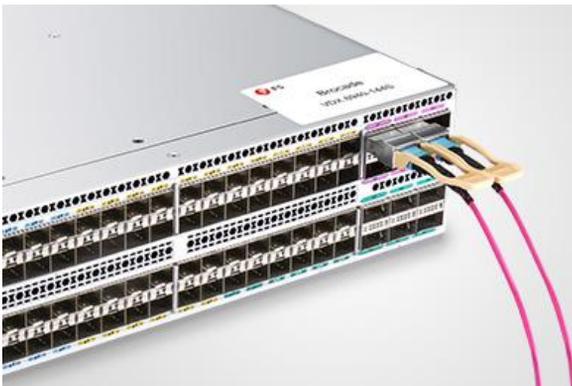
Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force¹⁰ S60-44T

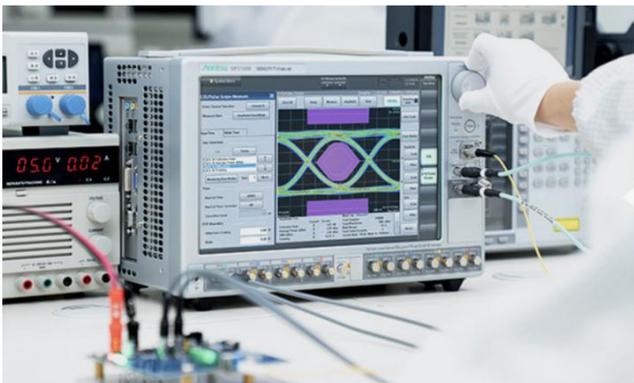


HUAWEI S6720-30L-HI-24S

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
DWDM-SFP10G-40	SFP+, 10GBase-ER, DWDM 100GHz 1528.77nm-1563.86nm, SMF, 40km, LC, DOM
DWDM-SFP10G-80	SFP+, 10GBase-ZR, DWDM 100GHz 1528.77nm-1563.86nm, SMF, 80km, LC, DOM
DWDM-SFP10G-40	SFP+, 10GBase-ER, DWDM 50GHz 1528.77nm-1563.86nm, SMF, 40km, LC, DOM
DWDM-SFP10G-80	SFP+, 10GBase-ZR, DWDM 50GHz 1528.77nm-1563.86nm, SMF, 80km, LC, DOM

Note:

10G DWDM 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.



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