10G DWDM SFP+ 100GHz 1528.77nm-1563.86nm 80KM Industrial DOM Transceiver

DWDM-SFP10G-80-I

Application

- 10GBASE-ZR/ZW
- SDH STM64

Features

- Up to 11.3Gbps Data Links
- Up to 80km transmission on SMF
- DWDM EML transmitter and APD receiver
- Metal enclosure for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Commercial/Industrial case operating temperature range: 0°C to 70°C /-40°C to 85°C
- Without CDR or with CDR supported 9.95 to 11.3Gb/s reference-free

Description

FS's serial SFP+ transceiver is designed for use in 10-Gigabit Ethernet links up to 80km over single mode fiber. The module consists of DWDM EML Laser, APD and Preamplifier in a high-integrated optical sub-assembly. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF8472. The module data link up to 80km in 9/125um single mode fiber.

Product Specifications

I.General Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Module Form Factor	BR	9.95		11.3	Gb/s	1
Number of Lanes	BER			10^{-12}		2
Maximum Aggregate Data Rate	L_{max}		80		km	

Notes:

1. 10GBASE-ZR, 10GBASE-ZW, 1200-SM-LL-L 10GFC.
2. Tested with a PRBS 2^{31}-1 test pattern.

II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	Ts	-40		85	℃
Power Supply Voltage	Vcc	-0.3		4	V
Relative Humidity	RH	5		95	%
Signal Input Voltage		Vcc-0.3		Vcc+0.3	V

III. Electrical Characteristics (TOP= -40 to 85 °C, VCC = 3.14 to 3.46 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			450	mA	
				550		
				515		1
				610		
Transmitter						
Input differential impedance	Rin		100		Ω	2
Single ended data input swing	Vin-pp	180		700	mV	
Transmit Disable Voltage	V_{Dis}	2.0		V_{cc}	V	3
Transmit Enable Voltage	V_{EN}	Vee		Vee+ 0.8	V	
Receiver						
Differential data output swing	Vout-pp	400		800	mV	4
LOS output high level	V_{LOS-H}	2.0		V_{CCHOST}	V	5
LOS output low level	V_{LOS-L}	Vee		Vee+0.8	V	5

Notes:

1. 1.Measured with receive Pin=Psen,Vcc=3.3V, operation temperature range, without air flow
2. Connected directly to TX data input pins. AC coupled
3. Or open circuit.
4. Into 100 ohms differential termination.
5. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

IV. Optical Characteristics (TOP = -40 to 85 ℃, VCC = 3.14 to 3.46 V)

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Case Operating Temperature	Top	0		70	ºC	
		-40		85		
Power Supply Voltage	V_{CC}	3.14	3.3	3.47	V	
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD			80	km	
Coupled fiber	Single mode fiber					9/125um SMF
Transmitter						
Average Launched Power	PO	0		5	dBm	1
Extinction Ratio	ER	6			dB	
Center Wavelength	λc	λc -0.1		λc +0.1	nm	2
Center Wavelength Spacing			100		GHz	2
Spectrum Band Width (-20dB)	σ			1.0	nm	
SMSR		30			dB	
Transmitter OFF Output Power	POff			-30	dBm	
Output Eye Mask	Compliant with IEEE 802.3ae					

Receiver

Input Optical Wavelength	λ	1270		1610	nm	
Receiver Sensitivity	Psen			-23.0	dBm	3
Input Saturation Power (Overload)	Psat	-6.0			dBm	
Receiver Reflectance	R_{rx}			-27	dB	
LOS Assert	LOSA	-35			dBm	
LOS De-assert	LOSD			-24	dBm	
LOS Detect Hysteresis	P_{hys}	0.5			dB	

Notes:

1. Launched power (avg.) is power coupled into a single mode fiber with master connector.

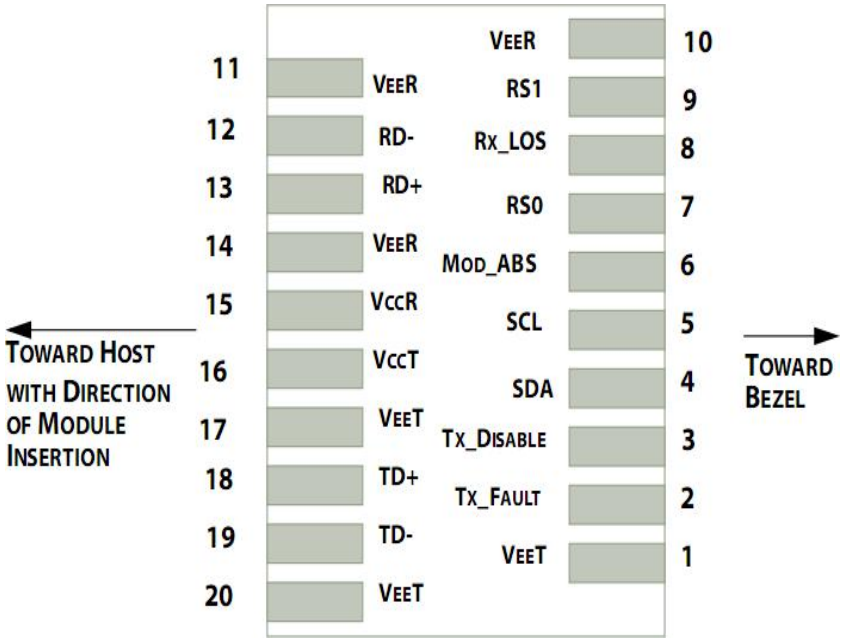
2. λc refer to wavelength selection, and corresponds to approximately 0.8 nm.

3. Measured with conformance test signal for BER = 10^–12.@10.3125Gbps, PRBS=2^31-1,NRZ,Optical source with worst ER，Wavelength between 1528.77nm and 1563.86nm；back to back

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	1561.42	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.	Symbol	Name/Description	Notes
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	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	no connection	

8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	RS1	Internally connect to circuit ground	1
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. T_{FAULT} is an LVTTL output.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power or the laser temperature 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 T_{DIS}>2.0V or open, enabled on T_{DIS}<0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ on host board to a typical 3.3V voltage. MOD_ABS pulls low to indicate module is plugged in.
5. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a typical 3.3V voltage. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

VII. Recommended Interface Circuit

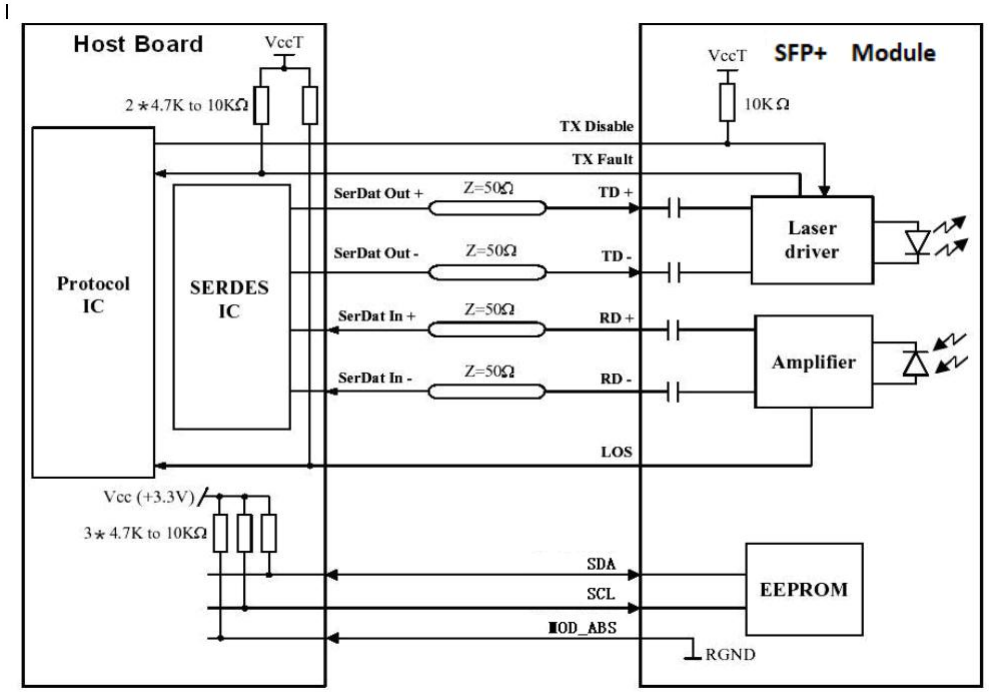
FS's serial transceivers support the 2-wire serial communication protocol as defined in the SFP+MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, FS SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

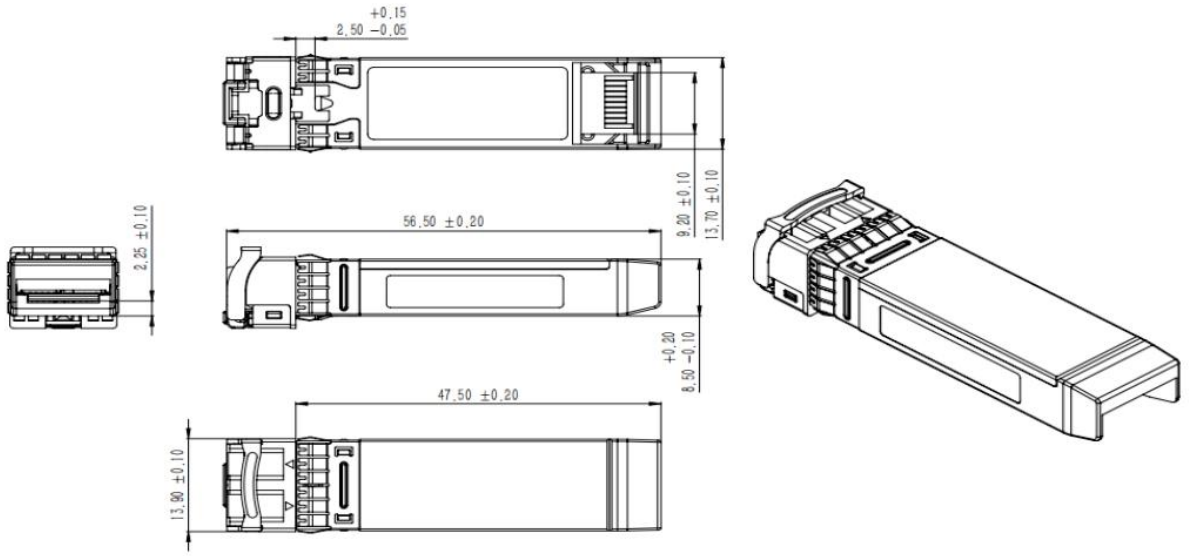
The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h).The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

VIII. Recommended Interface Circuit



IX. Recommended Interface Circuit



Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.

Cisco ASR 9000 Series(A9K-MPA-1X40GE)


ARISTA 7050S-64(DCS-7050S-64)

Juniper MX960


Brocade ICX 7750-26Q

Extreme Networks X670V VIM-40G4X

Mellanox M3601Q


Dell N4032F

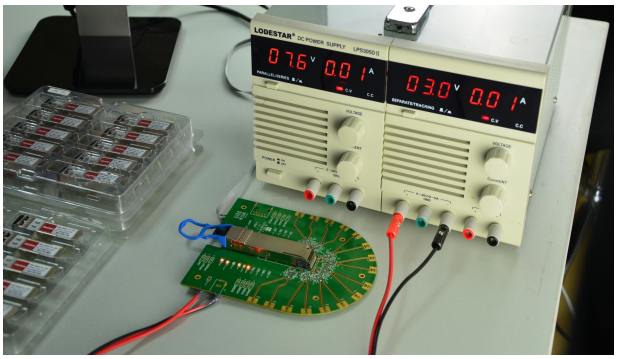
HP 5406R ZL2 V3(J9996A)

AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.

Our smart data system allows effective product management and quality control according to the unique serial number, properly tracing the order, shipment and every part.



Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.

With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

The last test assured step to ensure our products to be shipped with perfect package.

Order Information

Product part Number	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range（Tcase）（℃）	With/Without CDR
	Single-mode fiber	Refer to wavelength selection	80	0~70	Without CDR
	Single-mode fiber	Refer to wavelength selection	80	-40~85	Without CDR
	Single-mode fiber	Refer to wavelength selection	80	0~70	With CDR
	Single-mode fiber	Refer to wavelength selection	80	-40~85	With CDR

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