

1.25Gb/s SFP DWDM 80km Industrial Type

PRODUCT FEATURES

- Wavelength selectable to C-band and L-band ITU-T grid wavelengths
- Suitable for use in 100GHz channel spacing DWDM systems
- DWDM SFP MSA Compliant PIN photo-detector
- Up to 1.25Gb/s data rate
- Cold Start up Wavelength Compliance
- Low Power Dissipation <1.3W Maximum
- 0°C to 70°C Operating Case Temperature
- Diagnostic Performance Monitoring of module temperature, supply Voltages, laser bias current, transmit optical power, receive optical power, Laser temperature and TEC current
- RoHS compliant and lead free

APPLICATIONS

- SFP Transceivers for DWDM SONET/ SDH
- Ethernet IEEE 802.3ae
- Fiber Channel

STANDARD

- SFP+ MSA Compliant
- SFF-8472 reversion 9.5 compliant
- IEEE802.3-2005 compliant
- Telcordia GR-468-CORE compliant
- FCC 47 CFR Part 15, Class B compliant
- FDA 21 CFR 1040.10 and 1040.11, class1 compliant
- RoHS compliant

ORDERING INFORMATION

Product Part Number	Data Rate	Media	Wavelength	Transmission Distance	Temperature Range (Tcase)
ZSDWXX12-LD80	1.25	SMF	DWDM	80Km	0~70°C
ZSDWXX12-iLD80	1.25	SMF	DWDM	80Km	-40~+85°C

PRODUCT SELECTION

C-band λ_c Wavelength Guide Pin Descriptions

Channl#	Product Code	Frequency (THz)	Cent Wavelength (nm)
17	ZSDW1712-ILD80	191.7	1563.86
18	ZSDW1812-ILD80	191.8	1563.05
19	ZSDW1912-ILD80	191.9	1562.23

20	ZSDW2012-ILD80	192.0	1561.42
21	ZSDW2112-ILD80	192.1	1560.61
22	ZSDW2212-ILD80	192.2	1559.79
23	ZSDW2312-ILD80	192.3	1558.98
24	ZSDW2412-ILD80	192.4	1558.17
25	ZSDW2512-ILD80	192.5	1557.36
26	ZSDW2612-ILD80	192.6	1556.55
27	ZSDW2712-ILD80	192.7	1555.75
28	ZSDW2812-ILD80	192.8	1554.94
29	ZSDW2912-ILD80	192.9	1554.13
30	ZSDW3012-ILD80	193.0	1553.33
31	ZSDW3112-ILD80	193.1	1552.52
32	ZSDW3212-ILD80	193.2	1551.72
33	ZSDW3312-ILD80	193.3	1550.92
34	ZSDW3412-ILD80	193.4	1550.12
35	ZSDW3512-ILD80	193.5	1549.32
36	ZSDW3612-ILD80	193.6	1548.51
37	ZSDW3712-ILD80	193.7	1547.72
38	ZSDW3812-ILD80	193.8	1546.92
39	ZSDW3912-ILD80	193.9	1546.12
40	ZSDW4012-ILD80	194.0	1545.32
41	ZSDW4112-ILD80	194.1	1544.53
42	ZSDW4212-ILD80	194.2	1543.73
43	ZSDW4312-ILD80	194.3	1542.94
44	ZSDW4412-ILD80	194.4	1542.14
45	ZSDW4512-ILD80	194.5	1541.35
46	ZSDW4612-ILD80	194.6	1540.56
47	ZSDW4712-ILD80	194.7	1539.77
48	ZSDW4812-ILD80	194.8	1538.98
49	ZSDW4912-ILD80	194.9	1538.19
50	ZSDW5012-ILD80	195.0	1537.40
51	ZSDW5112-ILD80	195.1	1536.61

52	ZSDW5212-ILD80	195.2	1535.82
53	ZSDW5312-ILD80	195.3	1535.04
54	ZSDW5412-ILD80	195.4	1534.25
55	ZSDW5512-ILD80	195.5	1533.47
56	ZSDW5612-ILD80	195.6	1532.68
57	ZSDW5712-ILD80	195.7	1531.90
58	ZSDW5812-ILD80	195.8	1531.12
59	ZSDW5912-ILD80	195.9	1530.33
60	ZSDW6012-ILD80	196.0	1529.55
61	ZSDW6112-ILD80	196.1	1528.77

ABSOLUTE MAXIMUM RATINGS

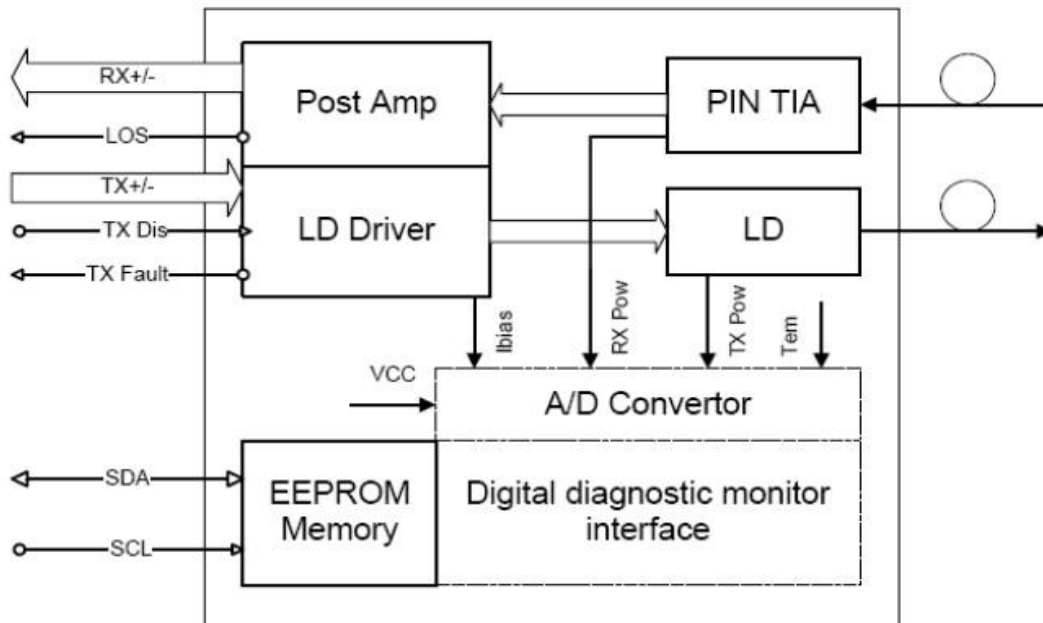
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	-	4.0	V	
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH		-	85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the module.

GENERAL OPERATING CHARACTERISTICS

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	Ethernet		1.25		Gb/s	
	SDH/Sonet					
Supply Voltage	Vcc	3.13	3.3	3.47	V	
	Vcc				V	
Supply Current	Icc ₅				mA	
	Icc ₃			380	mA	
Operating Case Temp.	Tc	0		70	°C	

FUNCTIONAL DIAGRAM



ELECTRICAL INPUT/OUTPUT CHARACTERISTICS

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Diff. input voltage swing		120		820	mVpp	1
Tx Disable input	H	VIH	2.0	Vcc+0.3	V	
	L	VIL	0	0.8		
Tx Fault output	H	VOH	2.0	Vcc+0.3	V	2
	L	VOL	0	0.8		
Input Diff. Impedance	Zin		100		Ω	

Note 1) TD+/- are internally AC coupled with 100Ω differential termination inside the module.

Note 2) Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.

Note 3) RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Operating Wavelength			xx		nm	
Ave. output power (Enabled)	Po	0		+4	dBm	1
Extinction Ratio	ER	8.2			dB	1
RMS spectral width	$\Delta\lambda$			1	nm	
Rise/Fall time (20%~80%)	Tr/Tf			50	ps	2
Optical modulation amplitude	OMA	2			dBm	
Dispersion penalty				2	dB	
Output Optical Eye	Compliant with Bell core GR-253-CORE & ITU G.957 for SONET/SDH and with IEEE 802.3ae for Ethernet and Fibre Channel					
Receiver						
Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Operating Wavelength		1480	xx	1580	nm	
Sensitivity	Psen			-24	dBm	3
Min. overload	Pimax	-7			dBm	
LOS Assert	Pa	-37			dBm	
LOS De-assert	Pd			-25	dBm	
LOS Hysteresis	Pd-Pa	0.5		4	dB	

Note 1) Measured at 1250Mb/s with PRBS $2^{31} - 1$ NRZ test pattern.

Note 2) 20%~80%

Note 3) Under the ER worst case, measured at 1250 Mb/s with PRBS $2^{31} - 1$ NRZ test pattern for BER $< 1 \times 10^{-12}$

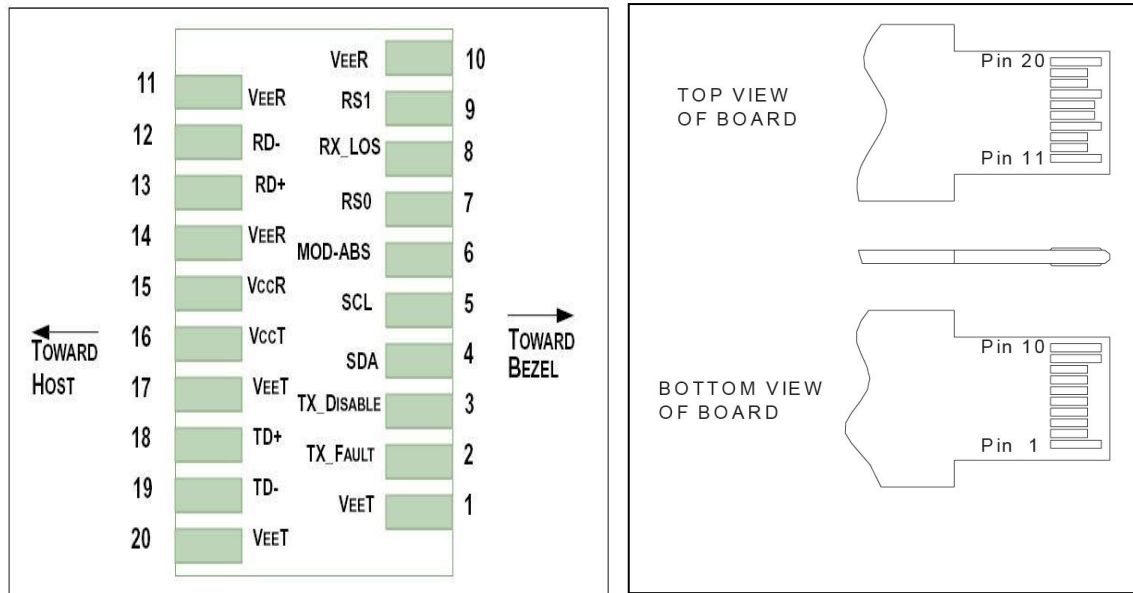
SERIAL INTERFACE FOR ID AND DDM

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP MSA. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h. The memory is mapped in Table 1. For more details of the memory map and byte definitions, please refer to the SFF-8472 (Rev 9.3, Aug. 2002), "Digital Diagnostic Monitoring Interface for Optical Transceivers". The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

2 wire address 1010000X (A0h)		2 wire address 1010001X (A2h)	
Address	Information	Address	Information
0~95	Serial ID Defined by SFP MSA (96 bytes)	0~55	Alarm and Warning Thresholds (56 bytes)
		56~95	Calibration Constants (40 bytes)
96~127	Vendor Specific (32 bytes)	96~119	Real Time Diagnostic Interface (24 bytes)
		120~127	Vender Specific (8 bytes)
128~255	Reserved,SFF8079 (128 bytes)	128~247	User Writable EEPROM (120 bytes)
		248~255	Vender Specific (8 bytes)

PIN DEFINITIONS AND FUNCTIONS



Note 1) When high, this output indicates a laser fault of some kind. Low indicates normal operation. And should be pulled up with a 4.7 – 10K Ω resistor on the host board.

Note 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 – 10K Ω resistor. Its states are:

Low (0 – 0.8V): Transmitter on ($>0.8, < 2.0V$): Undefined
 High (2.0V~Vcc+0.3V): Transmitter Disabled Open: Transmitter Disabled

Note 3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10K Ω resistor on the host board. The pull-up voltage shall be between 2.0V~Vcc+0.3V.

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	Note1
2	Tx Fault	Module transmitter fault	Note 2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	Note 3
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	Note 2
7	RS0	Rate select0,optionally control SFP+ receiver. When high, input data rate >4.5Gb/s;when low, input data rate <=4.5Gb/s	
8	LOS	Receiver Loss of Signal Indication	Note4
9	RS1	Rate select1,optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s;when low, input data rate <=4.5Gb/s	
10	VeeR	Module receiver ground	Note 1
11	VeeR	Module receiver ground	Note 1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	Note 1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	Note 1
18	TD+	Transmitter inverted data out put	
19	TD-	Transmitter non-inverted data out put	
20	VeeT	Module transmitter ground	Note1

Mod-Def 0 has been grounded by the module to indicate that the module is present

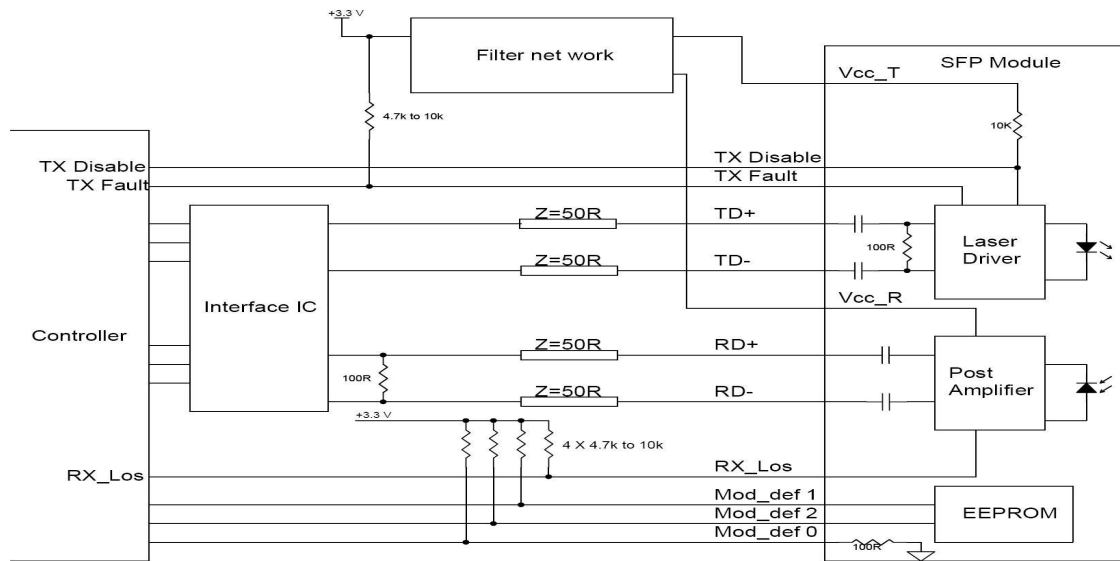
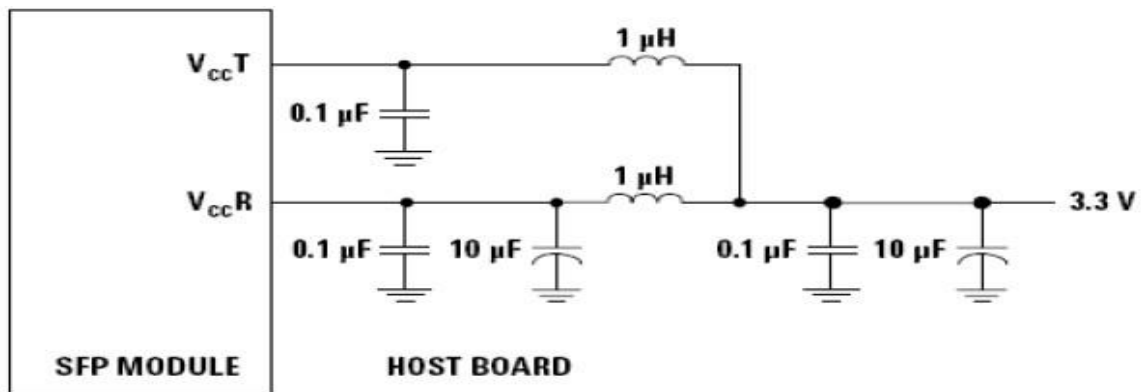
Mod-Def 1 is the clock line of two wire serial interface for serial ID

Mod-Def 2 is the data line of two wire serial interface for serial ID

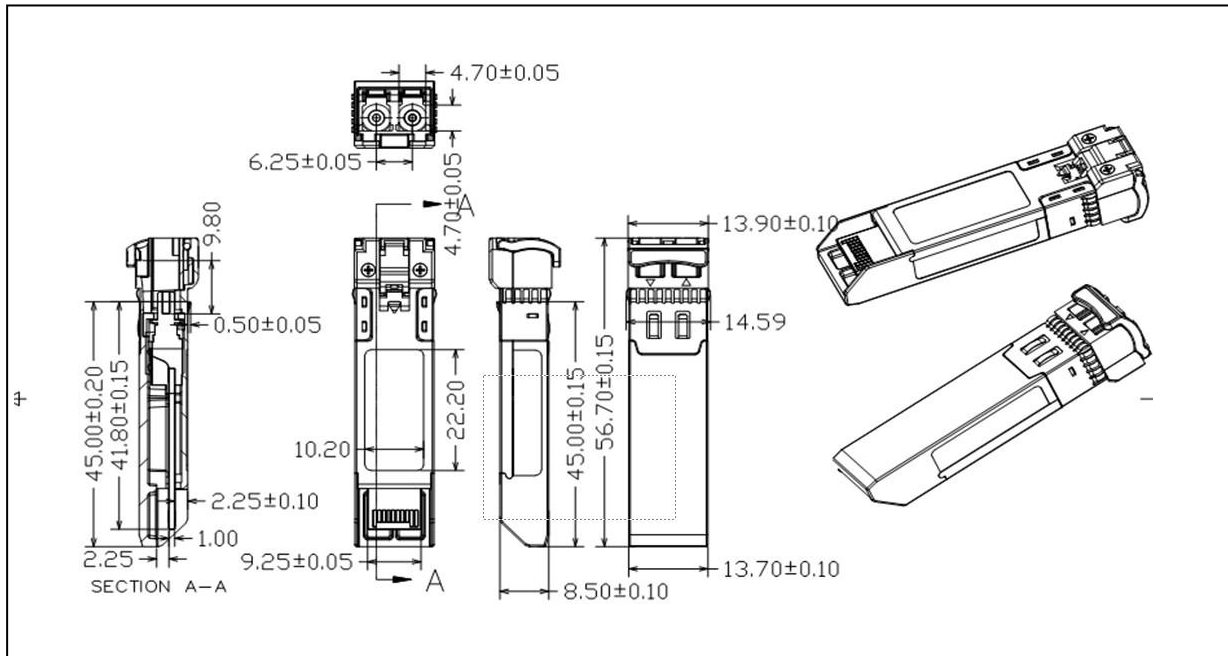
Note 4) When high, this output indicates loss of signal (LOS). Low indicates normal operation.

Note 5) RD+/-: These are the differential receiver outputs. They are AC coupled 100Ω 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.

Note 6) TD+/-: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

TYPICAL INTERFACE CIRCUIT

RECOMMENDED POWER SUPPLY FILTER


Note: Inductors with DC resistance of less than 1Ω 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 30 mA greater than the steady state value.

PACKAGE DIMENSIONS

REGULATORY COMPLIANCE

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

FOR MORE INFORMATION

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