Features:

- ✧ Up to 155Mb/s Data Links
- ✧ Hot-Pluggable
- ✧ Duplex LC connector
- ✧ Up to 80Km on 9/125μm SMF
- ✧ DWDM 100GHz ITU Grid C Band Available
- ✧ DWDM DFB laser transmitter
- ✧ Single +3.3V Power Supply
- ✧ Monitoring Interface Compliant with SFF-8472
- ✧ Low power dissipation <1W typically
- ✧ Operating temperature range: 0°C to 70°C
- ✧ RoHS compliant and Lead Free

Applications:

- ✧ Gigabit Ethernet
- ✧ 1×Fiber Channel
- ✧ DWDM Networks

Description:

OPWAY's OP3280D-DXX Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and SFF-8472. The transceiver consists of two sections: The transmitter section incorporates a cooled DWDM DFB laser, and the receiver section consists of a PIN photodiode integrated with a TIA. The module data link up to 80km in 9/125um single mode fiber. It offers a simple and convenient way to interface PCBs to single mode fiber optic cables in Dense Wavelength Division Multiplexing (DWDM) applications. It is a high performance, cost effective module for serial optical data communication applications。

● Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T_S	-40		+85	°C
Supply Voltage	V_{CC}	-0.5		4	V
Relative Humidity	RH	0		85	%

● Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	Tc	0		+70	°C
Supply Voltage	V_{CC}	3.135		3.465	V
Supply Current	Icc			300	mA
Inrush Current	I_{surge}			Icc+30	mA
Maximum Power	P_{max}			1	W

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● Electrical Characteristics (T_{OP} = Tc, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Input differential impedance	R_{in}	90	100	110		
Single ended data input swing	$V_{in\ PP}$	250		1200	mVp-p	
Transmit Disable Voltage	V_D	V_{cc} – 1.3		V_{cc}	V	2
Transmit Enable Voltage	V_{EN}	V_{ee}		Vee+ 0.8	V	
Transmit Disable Assert Time	$T_{dessert}$			10	us	
Receiver Section:						
Single ended data output swing	V_{out},pp	300		800	mv	3
Data output rise time	t_r			260	ps	4
Data output fall time	t_f			260	ps	4
LOS Fault	$V_{losfault}$	Vcc – 0.5		V_{CC_host}	V	5
LOS Normal	$V_{los\ norm}$	V_{ee}		V_{ee}+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6

Note:

1. AC coupled.
2. Or open circuit.
3. Into 100 ohm differential termination.
4. 20 – 80 %
5. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.

● Optical Characteristics (T_{OP} = Tc, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Optical Wavelength-End Of Life	λ	X-100	X	X+100	pm	
Optical Wavelength-Beginning Of Life	λ	X-25	X	X+25	pm	
Spectral Width	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Output Power	P_{out}	-5		0	dBm	1
Optical Rise/Fall Time	t_r / t_f			260	ps	2
Extinction Ratio	ER	9			dB	
Generated Jitter (peak to peak)	J_{TX}p-p			0.07	UI	3
Generated Jitter (rms)	J_{TX}rms			0.007	UI	3
Eye Mask for Optical Output	Compliant with IEEE802.3z(class 1 laser safety)					
Receiver Section:						
Optical Input Wavelength	λ_c	1480		1580	nm	
Receiver Overload	P_{ol}	0			dBm	4
RX Sensitivity	Sen			-34	dBm	4
RX_LOS Assert	LOS_A	-45			dBm	
RX_LOS De-assert	LOS_D			-37	dBm	

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RX_LOS Hysteresis	LOS_H	0.5			dB	
General Specifications:						
Data Rate	BR		155		Mb/s	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125μm SMF@155Mb/s	L_{MAX}		80		km	
Total System Budget	LB	31			dB	

Note

1. The optical power is launched into SMF.
2. 20-80%.
3. Jitter measurements taken using Agilent OMNIBERT 718 in accordance with GR-253.
4. Measured with PRBS 2^7 -1at 10^{-12} BER .

Pin Assignment:

Diagram of Host Board Connector Block Pin Numbers and Name

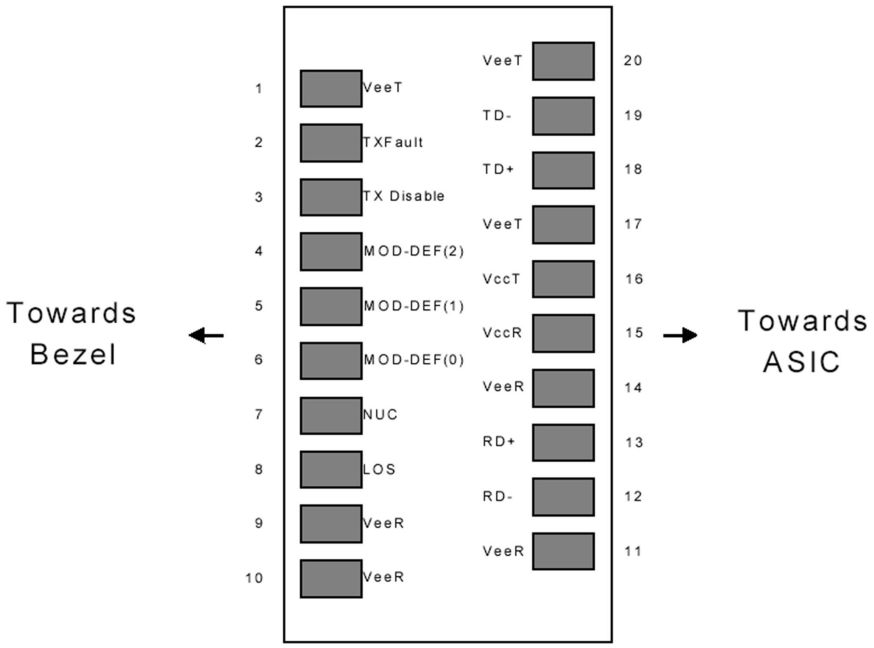

Diagram of Host Board Connector Block Pin Numbers and Names

● Pin Function Definitions

Pin No	Name	Function	Plug Seq	Notes
1	V_{eeT}	Transmitter Ground	**1**	**1**
2	TX Fault	Transmitter Fault Indication	**3**	
3	TX Disable	Transmitter Disable	**3**	2
4	MOD-DEF2	Module Definition	**2**	3
5	MOD-DEF1	Module Definition 1	**3**	3
6	MOD-DEF0	Module Definition 0	**3**	3
7	Rate Select	Not Connected	**3**	**4**
8	LOS	Loss of Signal	**3**	5
9	V_{eeR}	Receiver Ground	**1**	**1**
10	V_{eeR}	Receiver Ground	**1**	**1**
11	V_{eeR}	Receiver Ground		**1**

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12	RD-	Inv. Received Data Out	**3**	**6**
13	RD+	Received Data Out	**3**	**6**
14	V_{eeR}	Receiver Ground	**3**	**1**
15	V_{ccR}	Receiver Power	**2**	**1**
16	V_{ccT}	Transmitter Power	**2**	
17	V_{eeT}	Transmitter Ground	**1**	
18	TD+	Transmit Data In	**3**	6
19	TD-	Inv. Transmit In	**3**	6
20	V_{eeT}	Transmitter 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 - 10 kohms 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. Rate select is not used
5. LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. AC Coupled

SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I^2C interface at address A0h and A2h.

The memory is mapped in Table 1.

Detailed ID information (A0h) is listed in Table 2.

And the DDM specification at address A2h.

For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

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

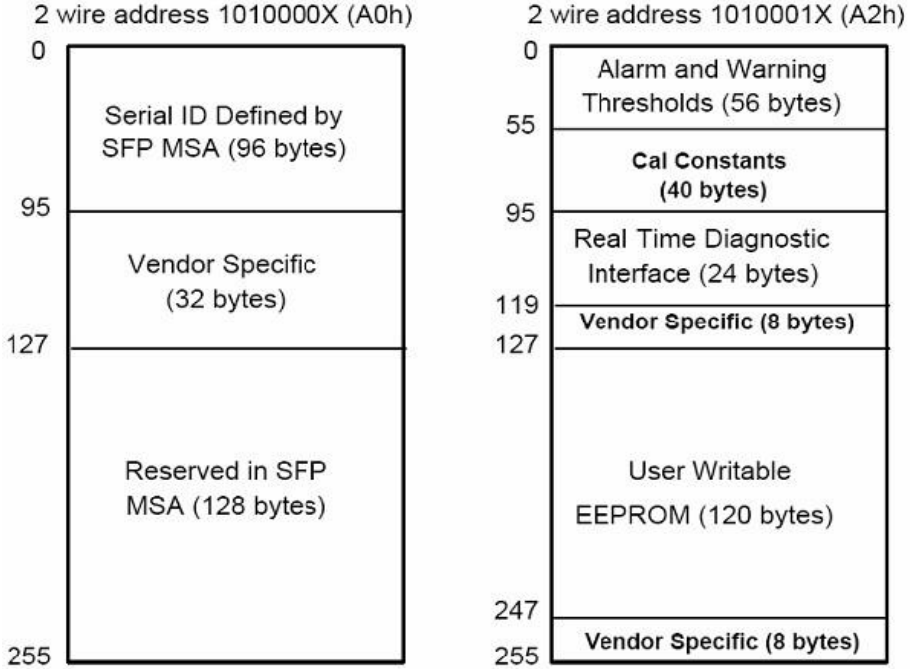

Table 2 - EEPROM Serial ID Memory Contents (**A0h**)

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	
11	1	Encoding	NRZ(03h)
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: OPWAY
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: “OP3280D-Dxx” (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	OPWAY’s Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	OPWAY specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

● Digital Diagnostic Monitor Characteristics

Data Address	Parameter	Accuracy	Unit
96-97	Transceiver Internal Temperature	±3.0	°C
98-99	VCC3 Internal Supply Voltage	±3.0	%
100-101	Laser Bias Current	±10	%
102-103	Tx Output Power	±3.0	dBm
104-105	Rx Input Power	±3.0	dBm

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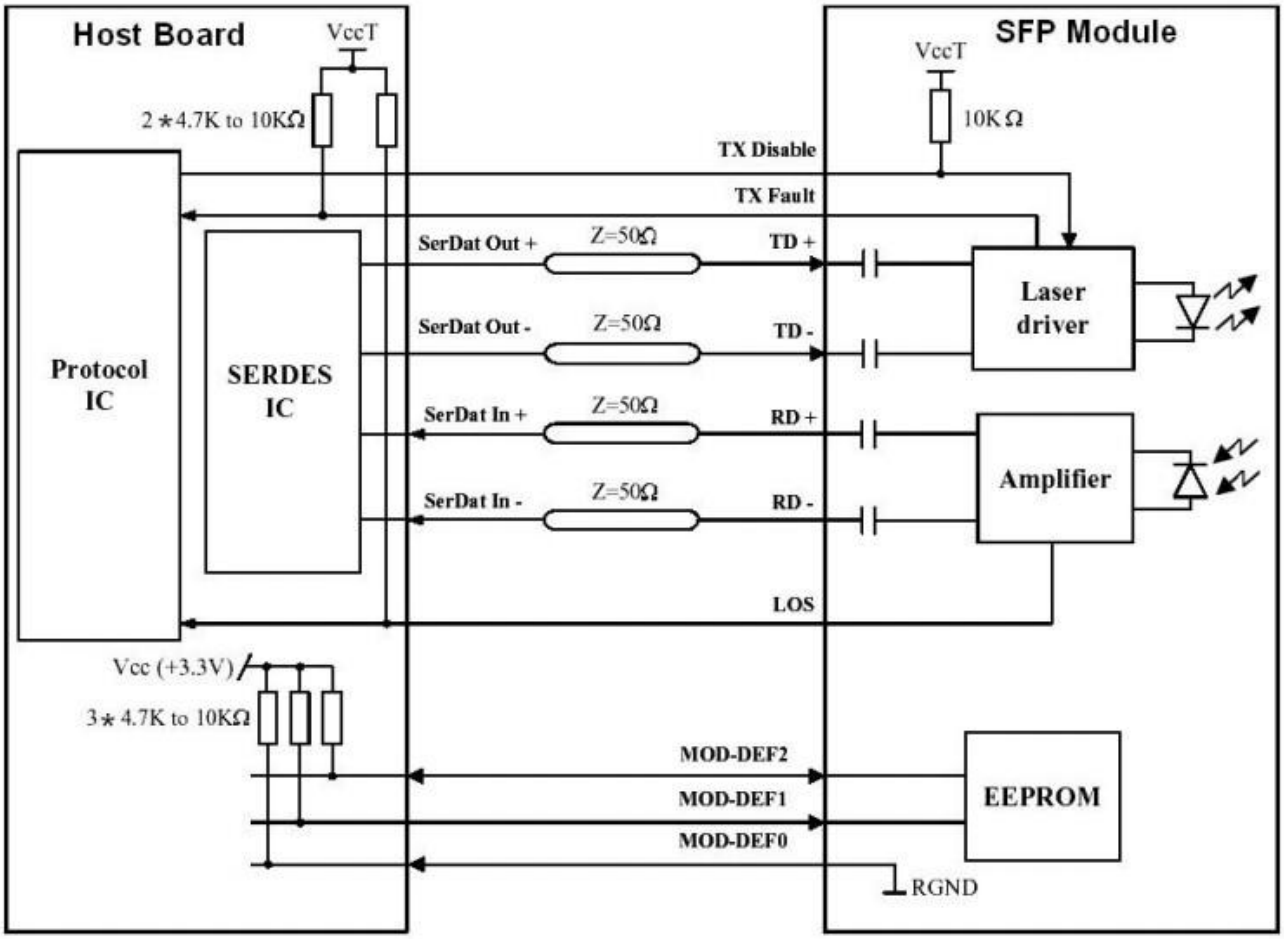
Regulatory Compliance

The OP3280D-Dxx complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

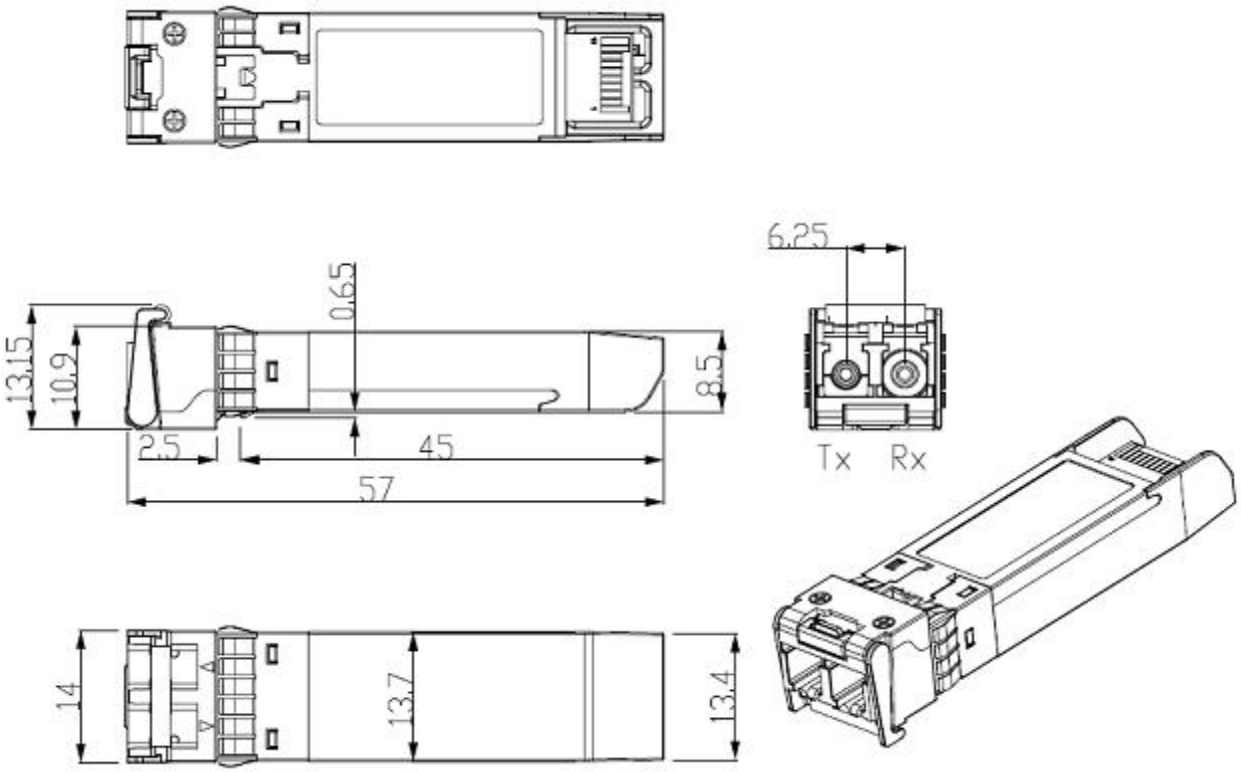
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD)to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.

Recommended Circuit:



SFP Host Recommended Circuit

Mechanical Dimensions:



Mechanical Drawing

● Order Information:

OP3280D-Dxx **XX: 100GHZ ITU Grid Wavelength**

Part No.	Central Wavelength(nm)	Frequency (THZ)
OP3280D-D61	1528.77	196.1
OP3280D-D60	1529.55	196.0
OP3280D-D59	1530.33	195.9
OP3280D-D58	1531.12	195.8
OP3280D-D57	1531.90	195.7
OP3280D-D56	1532.68	195.6
OP3280D-D55	1533.47	195.5
OP3280D-D54	1534.25	195.4
OP3280D-D53	1535.04	195.3
OP3280D-D52	1535.82	195.2
OP3280D-D51	1536.61	195.1
OP3280D-D50	1537.40	195.0
OP3280D-D49	1538.19	194.9
OP3280D-D48	1538.98	194.8
OP3280D-D47	1539.77	194.7
OP3280D-D46	1540.56	194.6
OP3280D-D45	1541.35	194.5
OP3280D-D44	1542.14	194.4
OP3280D-D43	1542.94	194.3
OP3280D-D42	1543.73	194.2

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OP3280D-D41	1544.53	194.1
OP3280D-D40	1545.32	194.0
OP3280D-D39	1546.12	193.9
OP3280D-D38	1546.92	193.8
OP3280D-D37	1547.72	193.7
OP3280D-D36	1548.51	193.6
OP3280D-D35	1549.32	193.5
OP3280D-D34	1550.12	193.4
OP3280D-D33	1550.92	193.3
OP3280D-D32	1551.72	193.2
OP3280D-D31	1552.52	193.1
OP3280D-D30	1553.33	193.0
OP3280D-D29	1554.13	192.9
OP3280D-D28	1554.94	192.8
OP3280D-D27	1555.75	192.7
OP3280D-D26	1556.55	192.6
OP3280D-D25	1557.36	192.5
OP3280D-D24	1558.17	192.4
OP3280D-D23	1558.98	192.3
OP3280D-D22	1559.79	192.2
OP3280D-D21	1560.61	192.1
OP3280D-D20	1561.42	192.0
OP3280D-D19	1562.23	191.9
OP3280D-D18	1563.05	191.8
OP3280D-D17	1563.86	191.7