

SP-SMxxDW040D-GP
10G Ethernet 40km DWDM SFP+ Transceiver
10GBASE-ER

Product Features

- Electrical interface specifications per SFF-8431
- Management interface specifications per SFF-8431 and SFF-8472
- SFP+ MSA package with duplex LC connector
- DWDM-rated EML Transmitter
- Up to 10.3Gb/s bi-directional data links
- 100GHz ITU Grid, C-Band
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature: 0°C to +70°C
- Up to 40km on 9/125µm SMF
- RoHS Compliant

Applications

- 10G Ethernet 10GBASE-ER/EW
- 40km 10G DWDM Network

Ordering information

Part No.	Description
SP-SMxxDW040D-GP	SFP+ DWDM 10Gbs xch xnm LC DDM SMF 40km EML laser

Notes: See Table 1 – Wavelength Guide for “xx” value.

Table 1. Wavelength Guide for “xx” value (100GHz ITU-T channel)

Channel #	Product Part Number	Frequency (THz)	Center Wavelength (nm)
17	SP-SM17DW040D-GP	191.7	1563.86
18	SP-SM18DW040D-GP	191.8	1563.05
19	SP-SM19DW040D-GP	191.9	1562.23
20	SP-SM20DW040D-GP	192.0	1561.42
21	SP-SM21DW040D-GP	192.1	1560.61
22	SP-SM22DW040D-GP	192.2	1559.79
23	SP-SM23DW040D-GP	192.3	1558.98
24	SP-SM24DW040D-GP	192.4	1558.17
25	SP-SM25DW040D-GP	192.5	1557.36
26	SP-SM26DW040D-GP	192.6	1556.55
27	SP-SM27DW040D-GP	192.7	1555.75
28	SP-SM28DW040D-GP	192.8	1554.94
29	SP-SM29DW040D-GP	192.9	1554.13
30	SP-SM30DW040D-GP	193.0	1553.33
31	SP-SM31DW040D-GP	193.1	1552.52
32	SP-SM32DW040D-GP	193.2	1551.72
33	SP-SM33DW040D-GP	193.3	1550.92
34	SP-SM34DW040D-GP	193.4	1550.12
35	SP-SM35DW040D-GP	193.5	1549.32
36	SP-SM36DW040D-GP	193.6	1548.51
37	SP-SM37DW040D-GP	193.7	1547.72
38	SP-SM38DW040D-GP	193.8	1546.92
39	SP-SM39DW040D-GP	193.9	1546.12
40	SP-SM40DW040D-GP	194.0	1545.32
41	SP-SM41DW040D-GP	194.1	1544.53
42	SP-SM42DW040D-GP	194.2	1543.73
43	SP-SM43DW040D-GP	194.3	1542.94
44	SP-SM44DW040D-GP	194.4	1542.14
45	SP-SM45DW040D-GP	194.5	1541.35
46	SP-SM46DW040D-GP	194.6	1540.56
47	SP-SM47DW040D-GP	194.7	1539.77
48	SP-SM48DW040D-GP	194.8	1538.98
49	SP-SM49DW040D-GP	194.9	1538.19
50	SP-SM50DW040D-GP	195.0	1537.40
51	SP-SM51DW040D-GP	195.1	1536.61

52	SP-SM52DW040D-GP	195.2	1535.82
53	SP-SM53DW040D-GP	195.3	1535.04
54	SP-SM54DW040D-GP	195.4	1534.25
55	SP-SM55DW040D-GP	195.5	1533.47
56	SP-SM56DW040D-GP	195.6	1532.68
57	SP-SM57DW040D-GP	195.7	1531.90
58	SP-SM58DW040D-GP	195.8	1531.12
59	SP-SM59DW040D-GP	195.9	1530.33
60	SP-SM60DW040D-GP	196.0	1529.55
61	SP-SM61DW040D-GP	196.1	1528.77

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T _s	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V _{CC}	-0.5	4.0	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T _c	0	25	70	°C
Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Data Rate	-	-	10.3125	-	Gb/s

Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes	
Module Supply Current	I _{CC}	-	-	450	mA	-	
Power Dissipation	P _D	-	-	1500	mW	-	
Transmitter							
Input Differential Impedance	Z _{IN}	-	100	-	Ω	-	
Differential Data Input Swing	V _{IN, P-P}	180	-	700	mV _{P-P}	-	
TX_FAULT	Transmitter Fault	V _{OH}	2.0	-	V _{CCHOST}	V	-
	Normal Operation	V _{OL}	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	V _{IH}	2.0	-	V _{CCHOST}	V	-
	Transmitter Enable	V _{IL}	0	-	0.8	V	-

Receiver							
Output Differential Impedance	Z_o	-	100	-	Ω	-	
Differential Data Output Swing	$V_{OUT, P-P}$	300	-	850	mV _{P-P}	1	
Data Output Rise Time, Fall Time	t_r, t_f	28	-	-	ps	2	
RX_LOS	Loss of signal (LOS)	V_{OH}	2.0	-	V_{CCHOST}	V	3
	Normal Operation	V_{OL}	0	-	0.8	V	3

Notes:

1. Internally AC coupled, but requires a external 100 Ω differential load termination.
2. 20–80%.
3. LOS is an open collector output. Should be pulled up with 4.7K Ω on the host board.

Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P_o	-1	-	+2.0	dBm	1
Center Wavelength Range	λ_c	1528.77	-	1563.86	nm	-
Center Wavelength Spacing	-	-	100	-	GHz	
Center Wavelength Tolerance	$\Delta\lambda_c$	-100	-	100	pm	
Extinction Ratio	EX	8.2	-	-	dB	2
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	3.0	dB	-
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Return Loss Tolerance	ORLT	-	-	21	dB	-
Pout @TX-Disable Asserted	P_{off}	-	-	-30	dBm	1
Eye Diagram	IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ER compatible					

Notes:

1. The optical power is launched into 9/125 μ m SMF.
2. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps.

Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ_c	1528	-	1565	nm	-
Receiver Sensitivity (P_{avg})	S	-	-	-15.8	dBm	1
Receiver Overload (P_{avg})	P_{OL}	-1.0	-	-	dBm	1
Optical Return Loss	ORL	26	-	-	dB	-
LOS De-Assert	LOS_D	-	-	-25	dBm	-
LOS Assert	LOS_A	-35	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:

1. Measured with PRBS 2³¹-1 test pattern, 10.3125Gb/s, BER<10⁻¹².
2. Comply with IEEE 802.3-2005.

Mechanical specifications

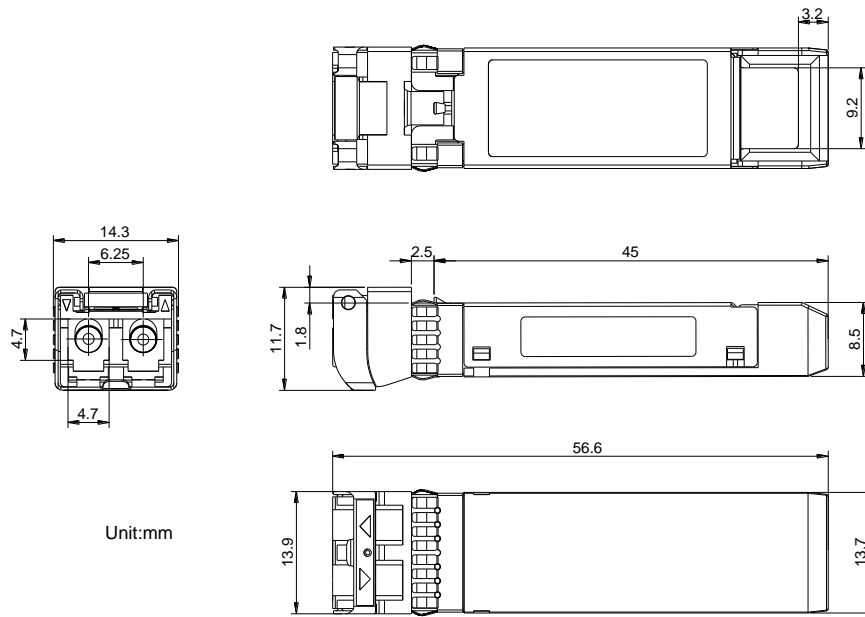


Figure 5. Outline Drawing