

Light Optics

Building a brighter future

Ordering information

Part Number	Product Description
LO-SP-10G-Dxx-40	SFP+ DWDM 10G 40km xxnm LC DDM SMF EML Laser

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

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LO-SP-10G-Dxx-40	DWDM EML	-4.7~ +4dBm	PIN	< -15.8dBm	40km	0 ~ 70 °C	Available	Compliant

Light Optics

Building a brighter future

Notes: See Wavelength Guide for “xx” value.

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

Channel #	Product Part Number	Frequency (THz)	Center Wavelength (nm)
17	LO-SP-10G-D17-40	191.7	1563.86
18	LO-SP-10G-D18-40	191.8	1563.05
19	LO-SP-10G-D19-40	191.9	1562.23
20	LO-SP-10G-D20-40	192.0	1561.42
21	LO-SP-10G-D21-40	192.1	1560.61
22	LO-SP-10G-D22-40	192.2	1559.79
23	LO-SP-10G-D23-40	192.3	1558.98
24	LO-SP-10G-D24-40	192.4	1558.17
25	LO-SP-10G-D25-40	192.5	1557.36
26	LO-SP-10G-D26-40	192.6	1556.55
27	LO-SP-10G-D27-40	192.7	1555.75
28	LO-SP-10G-D28-40	192.8	1554.94
29	LO-SP-10G-D29-40	192.9	1554.13
30	LO-SP-10G-D30-40	193.0	1553.33
31	LO-SP-10G-D31-40	193.1	1552.52
32	LO-SP-10G-D32-40	193.2	1551.72
33	LO-SP-10G-D33-40	193.3	1550.92
34	LO-SP-10G-D34-40	193.4	1550.12
35	LO-SP-10G-D35-40	193.5	1549.32
36	LO-SP-10G-D36-40	193.6	1548.51
37	LO-SP-10G-D37-40	193.7	1547.72
38	LO-SP-10G-D38-40	193.8	1546.92
39	LO-SP-10G-D39-40	193.9	1546.12
40	LO-SP-10G-D40-40	194.0	1545.32
41	LO-SP-10G-D41-40	194.1	1544.53
42	LO-SP-10G-D42-40	194.2	1543.73
43	LO-SP-10G-D43-40	194.3	1542.94
44	LO-SP-10G-D44-40	194.4	1542.14
45	LO-SP-10G-D45-40	194.5	1541.35
46	LO-SP-10G-D46-40	194.6	1540.56
47	LO-SP-10G-D47-40	194.7	1539.77
48	LO-SP-10G-D48-40	194.8	1538.98

Light Optics

Building a brighter future

49	LO-SP-10G-D49-40	194.9	1538.19
50	LO-SP-10G-D50-40	195.0	1537.40
51	LO-SP-10G-D51-40	195.1	1536.61
52	LO-SP-10G-D52-40	195.2	1535.82
53	LO-SP-10G-D53-40	195.3	1535.04
54	LO-SP-10G-D54-40	195.4	1534.25
55	LO-SP-10G-D55-40	195.5	1533.47
56	LO-SP-10G-D56-40	195.6	1532.68
57	LO-SP-10G-D56-40	195.7	1531.90
58	LO-SP-10G-D58-40	195.8	1531.12
59	LO-SP-10G-D59-40	195.9	1530.33
60	LO-SP-10G-D60-40	196.0	1529.55
61	LO-SP-10G-D61-40	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	-

Light Optics

Building a brighter future

	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	-4.7	-	+4.0	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	5	-	-	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.

Light Optics

Building a brighter future

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

