

NXS10-D176-S4D

SFP+ 10G ER DWDM 40km

Features

- SFP+ Form Factor
- 10 Gb/s bitrate
- Up to 40 km over Singlemode
- LC connector
- C17~C61, EML laser, PIN photodiode
- Up to 1,5W power consumption
- +0/+70°C temperature range
- Built in digital diagnostic monitoring



Applications

- 10x Gigabit Ethernet over DWDM
- Access, Metro and Enterprise

Optical specifications



Optical budget : 14 dB

Transmitter & Receiver optical Specifications

Parameter	Min	Max	Unit
Tx Power	-1	4	dBm
Rx Sensitivity	-15	-1	dBm

Wavelength Guide (100GHz ITU-T Channel)

Channel #	Frequency (THz)	Center Wavelength (nm)
17	191.7	1563.86
18	191.8	1563.05
19	191.9	1562.23
20	192.0	1561.42
21	192.1	1560.61
22	192.2	1559.79
23	192.3	1558.98
24	192.4	1558.17
25	192.5	1557.36
26	192.6	1556.55
27	192.7	1555.75
28	192.8	1554.94
29	192.9	1554.13
30	193.0	1553.33
31	193.1	1552.52
32	193.2	1551.72
33	193.3	1550.92
34	193.4	1550.12
35	193.5	1549.32
36	193.6	1548.51
37	193.7	1547.72
38	193.8	1546.92
39	193.9	1546.12
40	194.0	1545.32
41	194.1	1544.53
42	194.2	1543.73
43	194.3	1542.94
44	194.4	1542.14
45	194.5	1541.35
46	194.6	1540.56
47	194.7	1539.77
48	194.8	1538.98
49	194.9	1538.19

50	195.0	1537.40
51	195.1	1536.61
52	195.2	1535.82
53	195.3	1535.04
54	195.4	1534.25
55	195.5	1533.47
56	195.6	1532.68
57	195.7	1531.90
58	195.8	1531.12
59	195.9	1530.33
60	196.0	1529.55
61	196.1	1528.77

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ	Max.	Unit
Storage Temperature	Tstg	-40		85	°C
Supply Voltage	Vcc	-0.5		4.0	V
Operating Case Temperature	Tc	0	25	70	°C
Relative Humidity	RH	5		95	%
Data Rate			10.3125		Gbps

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage		V _{CC}	3.135	3.3	3.465	V	
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 an external 100Ω differential load termination.
2. 20-80%.
3. LOS is an open collector output. Should be pulled up with 4.7KΩ on the host board.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Launch Optical Power	PO	-1		4	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	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			2.0	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Return Loss Tolerance	ORLT			21	dB	
Pout @ TX-Disable Asserted	Poff			-30	dBm	
Eye Diagram	IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ER compatible					
Receiver						
Center Wavelength	λ_c	1528		1565	nm	
Receiver Sensitivity (Pavg)	S			-15	dBm	
Receiver Overload (Pavg)	POL	-1			dBm	
Optical Return Loss	ORL	26			dB	
LOS De-Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. The optical power is launched into 9/125 μ m SMF.
2. Measured with a PRBS $2^{31}-1$ test pattern @10.3125Gbps.
3. Measured with PRBS $2^{31}-1$ test pattern, 10.3125Gb/s, BER< 10^{-12} .
4. Comply with IEEE 802.3-2005.

Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground.	1
2	TX_Fault	Transmitter Fault (LVTTTL-O) - High indicates a fault condition.	2
3	TX_Disable	Transmitter Disable (LVTTTL-I) – High or open disables the transmitter.	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2).	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module.	5
7	RS0	Rate Select 0 – Not used, Presents high input impedance.	
8	RX_LOS	Receiver Loss of Signal (LVTTTL-O).	2
9	RS1	Rate Select 1 – Not used, Presents high input impedance.	
10	VeeR	Receiver Ground.	1
11	VeeR	Receiver Ground.	1
12	RD-	Inverse Received Data out (CML-O).	
13	RD+	Received Data out (CML-O).	
14	VeeR	Receiver Ground.	
15	VccR	Receiver Power - +3.3V.	
16	VccT	Transmitter Power - +3.3 V.	
17	VeeT	Transmitter Ground.	1
18	TD+	Transmitter Data In (CML-I).	
19	TD-	Inverse Transmitter Data In (CML-I).	
20	VeeT	Transmitter Ground.	1

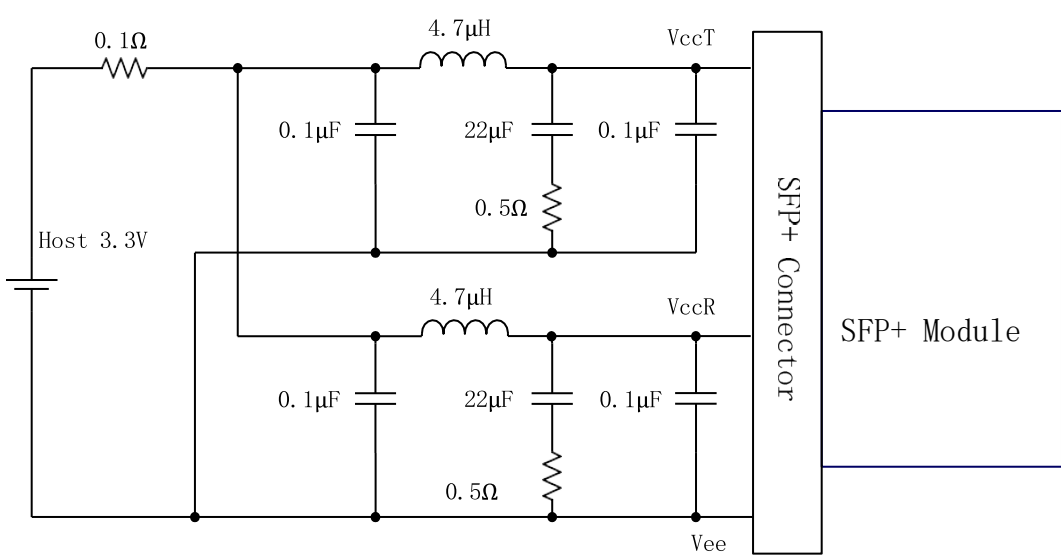
Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7K Ω to 10K Ω pull-up resistor to VccHost.
3. This input is internally biased high with a 4.7K Ω to 10K Ω pull-up resistor to VccT.
4. 2-Wire Serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
5. This is the ground return that on the host board requires a 4.7K Ω to 10K Ω pull-up resistor to VccHost.

Host PCB SFP+ Pad Assignment Top View



Recommended Host Board Power Supply Filter Network



Recommended Application Interface Block Diagram



Mechanical Specifications



PCB Layout Recommendation

Notes:

1. Datum and basic dimensions established by customer
2. Pads and vias are chassis ground, 11 places
3. Thru holes, plating optional

