Pro**Labs**

160-9401-900-2DW21-C

Ciena[®] 160-9401-900-2DW21 Compatible TAA 100GBase-DWDM 100GHz PAM4 QSFP28 Transceiver (SMF, 1560.61nm, 80km w/EDFA/DCM, LC, DOM)

Features:

- SFF-8665 Compliance
- Duplex LC Connector
- 100GHz DWDM ITU Grid
- Single-mode Fiber
- Commercial Temperature 20 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



Applications:

- 100GBase Ethernet
- Access, Metro and Enterprise

Product Description

This Ciena[®] 160-9401-900-2DW21 compatible QSFP28 transceiver provides 100GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1560.61nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Ciena[®] transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



Rev. 090122

Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

Channel # Frequency (GHz) Wavelength (nm) Frequency (GHz) Wavelength (nm) LO L1 191600 1564.68 1564.27 191650 16 17 191700 1563.86 191750 1563.45 191800 1562.64 18 1563.05 191850 19 191900 1562.23 191950 1561.83 20 192000 1561.42 192050 1561.01 192100 1560.61 1560.2 21 192150 22 192200 1559.79 192250 1559.39 23 192300 1558.98 192350 1558.58 192400 1557.77 24 1558.17 192450 192500 1557.36 192550 1556.96 25 26 192600 1556.56 192650 1556.15 27 192700 1555.75 192750 1555.34 192800 1554.94 1554.54 28 192850 1554.13 1553.73 29 192900 192950 30 193000 1553.33 193050 1552.93 31 193100 1552.52 193150 1552.12 32 1551.32 193200 1551.72 193250 193300 1550.92 193350 1550.52 33 34 193400 1550.12 193450 1549.72 35 193500 1549.32 193550 1548.91 36 193600 1548.52 193650 1548.11 37 193700 1547.72 193750 1547.32 38 193800 1546.92 193850 1546.52 193900 1546.12 193950 1545.72 39 40 194000 1545.32 194050 1544.92 41 194100 1544.53 194150 1544.13 194200 1543.73 194250 1543.33 42 43 194300 1542.94 194350 1542.54 194400 1541.75 44 1542.14 194450 45 194500 1541.35 194550 1540.95 194600 1540.56 194650 1540.16 46 194700 1539.77 194750 1539.37 47 194800 194850 1538.58 48 1538.98

Wavelength Guide (100GHz ITU-T Channel)

49	194900	1538.19	194950	1537.79
50	195000	1537.4	195050	1537
51	195100	1536.61	195150	1536.22
52	195200	1535.82	195250	1535.43
53	195300	1535.04	195350	1534.64
54	195400	1534.25	195450	1533.86
55	195500	1533.47	195550	1533.07
56	195600	1532.68	195650	1532.29
57	195700	1531.9	195750	1531.51
58	195800	1531.12	195850	1530.72
59	195900	1530.33	195950	1529.94
60	196000	1529.55	196050	1529.16
61	196100	1528.77	196150	1528.38

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Signal Input Voltage	Vin	-0.5		Vcc+0.5	V
Power Supply Voltage	Vcc	-0.5		3.6	°C
Storage Temperature	TS	5		85	°C
Operating Temperature	Tcase	20		70	°C

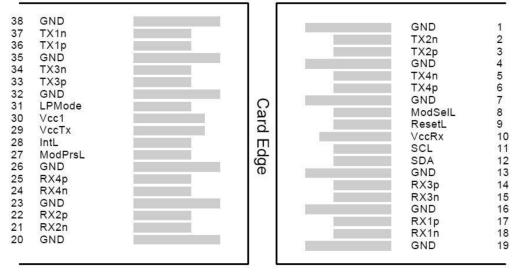
Electrical Characteristics

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Dissipation	P _D		4	5	W	

Optical Characteristics

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
Transmitter						
Optical Wavelength	λC	1480	λ	1580	nm	
Channel Spacing	Δf		100		GHz	
Optical Extinction Ratio	ER		6		dB	
Side-Mode Suppression Ratio	SMSR	30			dB	
Spectral Width	Δλ		+/-25	1	GHz	
Optical Transmit Power	Pout/lane	-11	-10	-8	dBm	
Receiver			1			
Optical Wavelength	λC	1480		1580	nm	
Receiver Max. Sensitivity	Pmin	-3	-2.5	-2	dBm	
Damage Threshold	Pmax	10			dBm	
Optical Return Loss	ORL			20	dBm	
LOS Hysteresis	LOSH		1.0		dB	
LOS Assert	LOSA	-10			dBm	
LOS De-Assert	LOSD			-3	dBm	

Electrical Pin-out Details



Top Side Viewed from Top Bottom Side Viewed from Bottom

Pin Descriptions

Pin	Logic	Symbol	Name/Descriptions	Plug Sequence	Ref.
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Тх4р	Transmitter Non-Inverted Data output	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCMOS- I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCMOS- I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data output	3	
15	CML-O	Rx3n	Receiver Inverted Data output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data output	3	
18	CML-O	Rx1n	Receiver Inverted Data output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3V Power Supply Transmitter	2	2
30		Vccl	+3.3V Power Supply	2	2
31	LVTTL-I	LPMode	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-I	Тх3р	Transmitter Non-Inverted Data input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

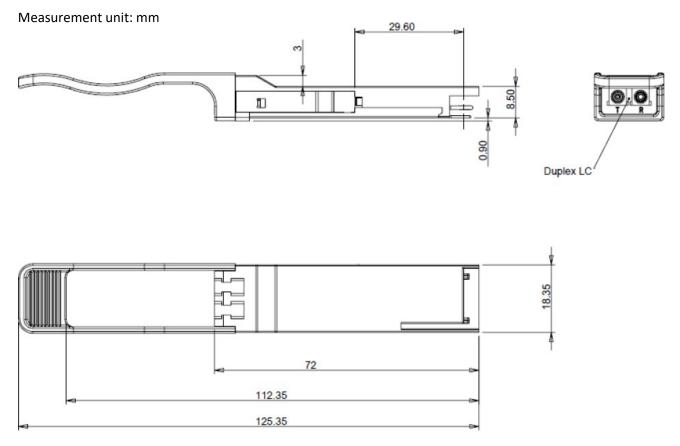
Notes:

- 1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
- VccRx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table
 Recommended host board power supply filtering is shown in Figures 3 and 4. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 500Ma.

DOM Specifications

Parameter	Min.	Тур.	Max.	Unit
Receive Power Monitor Accuracy	-2		2	dB
Transmit Power Monitor	-2		2	dB
Laser Bias Current Monito Accuracy	-10		10	%
Transceiver Temperature Monitor Accuracy	-5		5	°C
Internally Measured Transceiver Supply Voltage			3	%

Mechanical Specifications



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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