1 PRODUCT INFORMATION

Lumentum Part Number: **22153543**
Lumentum Catalog Number: **WSS9PE22153543**

RoHS: **EU 6/ 6**

Customer: **Multiple**

Description: Wavelength Selective Switch C-Band, 1x9 V2, TrueFlex®, bidirectional, non-monitored, 26 Pin Bottom Entry Connector

Application: Single/Multiple Channel Blocking, Wavelength Routing and Channel Equalization with TrueFlex® capabilities

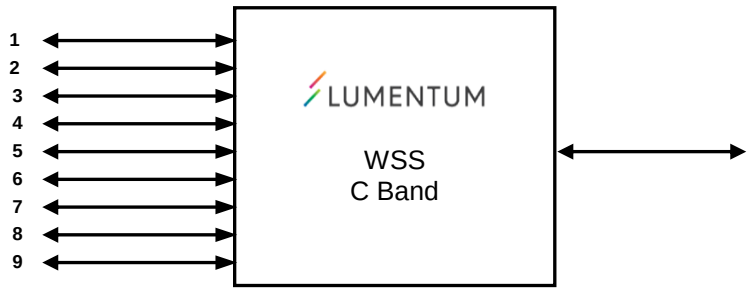
© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

2 REVISION SUMMARY

Revision	Date	Changes	Author
000	April 3, 2018	Initial Release	Jason Zawalek

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

3 FUNCTIONAL DIAGRAM



© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

4 Optical Performance Specifications

Parameters are specified per module, over passband, over operating temperature, 15 dB attenuation range, and all polarization states unless stated otherwise. Please refer to "Measurement Details" document for further details on measurement conditions for each parameter. Specifications are subject to change during the development cycle of the product.

Parameter	Condition	Min	Max	Comments	Units	Test Code
Port Configuration		1x9				
Number of ports		10		1 Common, 9 Input/Output Ports		
Operating WL Range		191.50 - 196.25		96 x 50GHz channels	THz	
Bi-directional		Yes	Each module can be used as add or drop			
Sub channel Width		6.25			GHz	
Total # of Sub Channels		768				
# of sub channel/ user channel (N)		6	80			
User Channel Width		37.5	500		GHz	
Passband/Stopband	BW over which parameters are defined	± (3.125N-12.5)		±12.5GHz for 50GHz channel	GHz	
Insertion Loss (IL)			6.5		dB	IL.00
Insertion Loss Uniformity	Channel Uniformity		1.5		dB	ILU.00
	Port to Port Uniformity		2.5		dB	ILU.01
Insertion Loss Ripple	Up to 10 dB attn.		0.6		dB	ILR.00
	to 15 dB attn.		0.8		dB	ILR.00
PDL	Up to 10 dB attn		0.8		dB	PDL.00
	at 15 dB attn.		1.0		dB	PDL.00
0.5 dB Channel Bandwidth	Where N is the number of slots	±(3.125N – 11)		Equal to ±14GHz for a 50GHz channel. Applicable at 0dB attenuation only.	GHz	BW.00
3.0 dB Channel Bandwidth	Where N is the number of slots	±(3.125N – 7)		Equal to ±18GHz for a 50GHz channel. Over full attenuation range.	GHz	BW.00
Port Isolation	Worst case	33			dB	ISO.18
Extinction Ratio		38			dB	ER.06
Out of Band Suppression		25			dB	OBS.01
Attenuation Accuracy	Up to 10 dB attenuation		±1.0		dB	AA.00
	10.1-15 dB attenuation		±1.5		dB	AA.00

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

Parameter	Condition	Min	Max	Comments	Units	Test Code
Maximum Input Power	Single in/ out Port (including Common)		24	Performance within specification	dBm	MIP.01
	Single 12.5GHz Window		9	Performance within specification	dBm	MIP.02
Directivity	Between unconfigured input ports	15			dB	DIR.00
Adjacent Channel Isolation		35			dB	ER.00
Return loss	Excluding Directivity		30		dB	RL.00
Attenuation setting resolution			0.1		dB	
Attenuation Dynamic Range		0	15		dB	
Dynamic Crosstalk			+/-1		dB	DXT.00
Response Time	< 2dB step		1400	All channels	ms	CRT.00
	< 15dB step		2000			
	Port Switching		3000			
PMD	0-15dB attenuation		1		ps	PMD.00
Chromatic Dispersion	0-15dB attenuation		±10		ps/nm	CD.00
Group Delay Ripple	0-15dB attenuation	-1.5	1.5		ps	GDR.02

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

5 DIRECTIVITY DETAILS

C	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	C	P1/-	P1/2	P2/3	P3/4	P4/5	P5/6	P6/7	P7/8
P2	#N/A	C	P1/-	P1/2	P2/3	P3/4	P4/5	P5/6	P6/7
P3	#N/A	#N/A	C	P1/-	P1/2	P2/3	P3/4	P4/5	P5/6
P4	#N/A	#N/A	#N/A	C	P1/-	P1/2	P2/3	P3/4	P4/5
P5	#N/A	#N/A	#N/A	#N/A	C	P1/-	P1/2	P2/3	P3/4
P6	#N/A	#N/A	#N/A	#N/A	#N/A	C	P1/-	P1/2	P2/3
P7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	C	P1/-	P1/2
P8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	C	P1/-
P9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	C

	Free of Directivity
C	Desired connection to common
Px/y	Directivity leakage between ports x and y

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

6 MECHANICAL & FIBER LABELING

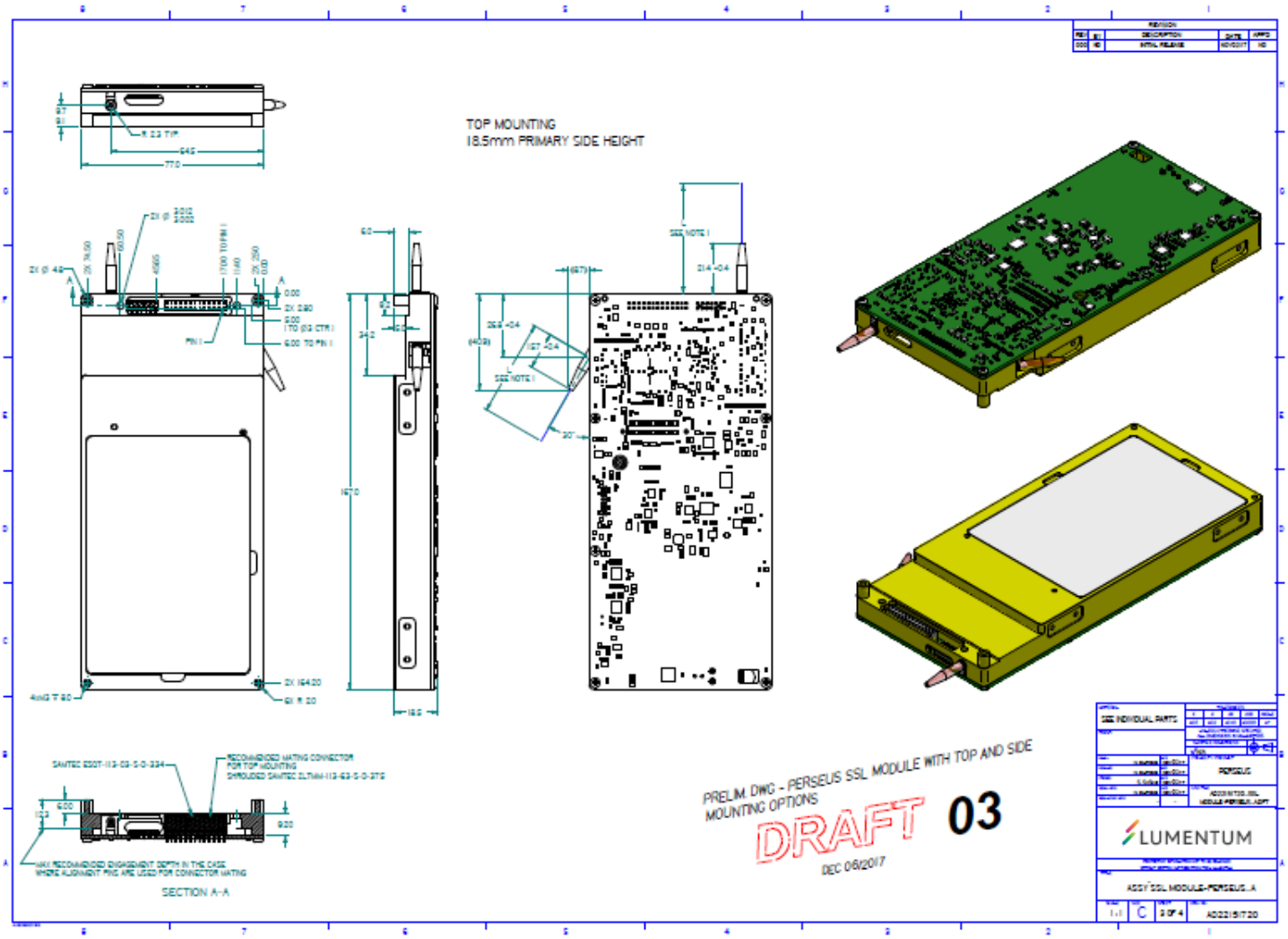
Parameters	Conditions	Specifications	Units
Module Dimensions (WxDxH)	Nominal	167x77x18.5	mm
Fiber Type	All ports	Clearcurve ZBL	
Fiber Length		95 ± 5	cm
Fiber Exit		2 Exits available (see drawing) **Angled side exit is default.**	
Optical Connector	All ports	Bare fiber	

Port	Fiber Color
Com	Rose
P1	Violet
P2	Yellow
P3	Black
P4	Red
P5	White
P6	Grey
P7	Brown
P8	Green
P9	Orange

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

6.1 Mechanical details

Note: Angled side exit (long side of module) is the default configuration unless otherwise specified.



PLEASE REFER TO DOCUMENT 21086738 FOR COSMETIC SPECIFICATION CRITERIA.

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

7 ELECTRICAL

7.1 Input

Parameters	Specification	Typical Current consumption	Max Current
Supply Voltage	5 V ± 5%	2.5A (at 35C ambient)	6 A

7.2 Startup time

Parameters	Condition	Specification	Units
Warm-up Time	From 0C	5	Min
	From 25C	3	Min

7.3 Consumption

Parameters	Condition	Specification	Units
Power	Startup/ During Warm-up	< 30	W
	Steady State (after Warm-up)	< 12	W

7.4 Electrical Pin out

Pin	Function	Pin	Function
1	+5V	2	+5V
3	+5V	4	+5V
5	+5V	6	+5V
7	GND	8	GND
9	GND	10	GND
11	GND	12	GND
13	SPI_CLK (input)	14	SPI_MOSI (input)
15	SPI_MISO (output)	16	SPI_CS (input)
17	Reserved	18	Reserved
19	Serial Port TXD (output)	20	Serial Port RXD (input)
21	MASTER RESET (input, active low)	22	HARD RESET (input, active low)
23	Reserved	24	DONE (output, active high)
25	ERROR (output, active high)	26	Reserved

Note: SPI_MISO (output) line is not buffered.

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

8 HARDWARE SPECIFICATIONS

Parameters	Value
Firmware Version	FW 7.2.82

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

9 ENVIRONMENTAL & OPERATIONAL SPECIFICATIONS

Parameters	Conditions	Specifications		Units
		Min.	Max.	
Operating Case Temperature		0	70	°C
Operating Ambient Temperature		0	65	°C
Air Flow Required		2		m/s
Operating Altitude	Above sea level	0	2300	m
Operating Humidity[1]		5	85	% RH
Storage Temperature		-40	85	°C
Storage Humidity		5	95	% RH

[1] Non-condensing

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

10 LABEL & TEST REPORT SPECIFICATIONS

10.1 Unit Labeling

Note: Serial Number format will be #12345678-X prior to GA and serial number will be #12345678 (with no suffix) after GA.

10.1.1 Top Label Minimum label contents:

- Lumentum Logo
- Vendor Name: Lumentum
- Product name: TrueFlex® Nano™ 1x9 V2 WSS
- Model Number: **WSS9PE22153543**
- Part number: **22153543** (text, 1D barcode (Code 39) and 2D barcode (QR Code))
- Serial Number (text, 1D barcode (Code 39) and 2D barcode (QR Code))
- Date of manufacturing
- Country of Origin

Example Only – Content may Vary

Place Label Top Center

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

10.1.2 Short Side Label Minimum label contents:

- **Small Label Side Label**
- **Part number: 22153543** (text)
- Serial Number (text, 1D barcode (Code 39))

Example Only – Content may Vary
Place Label Short Side Center

10.1.3 Long Side Label Minimum label contents

- **Part number: 22153543** (text, 1D barcode (Code 39) and 2D barcode (QR Code))
- Serial Number (text, 1D barcode (Code 39) and 2D barcode (QR Code))

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

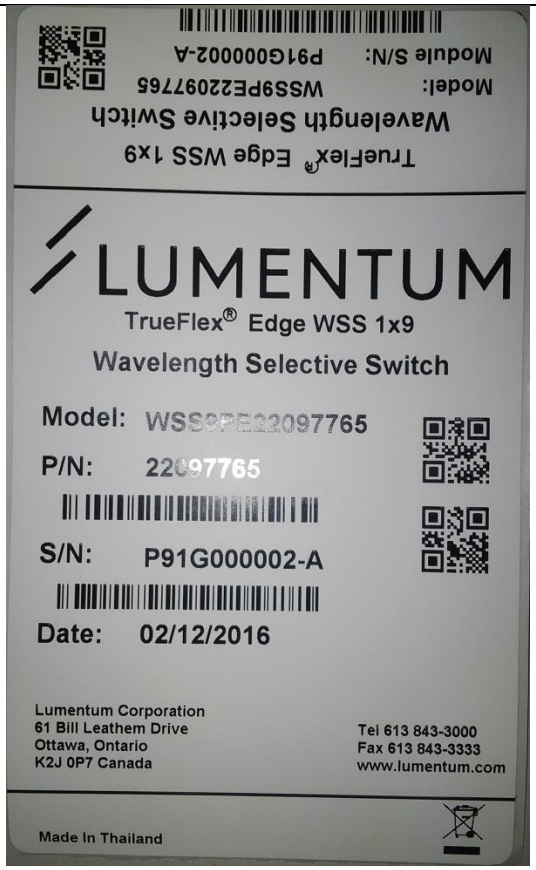
Example Only – Content may Vary
Place Label Long Side Center

10.2 Shipping Labels

Minimum label Contents:

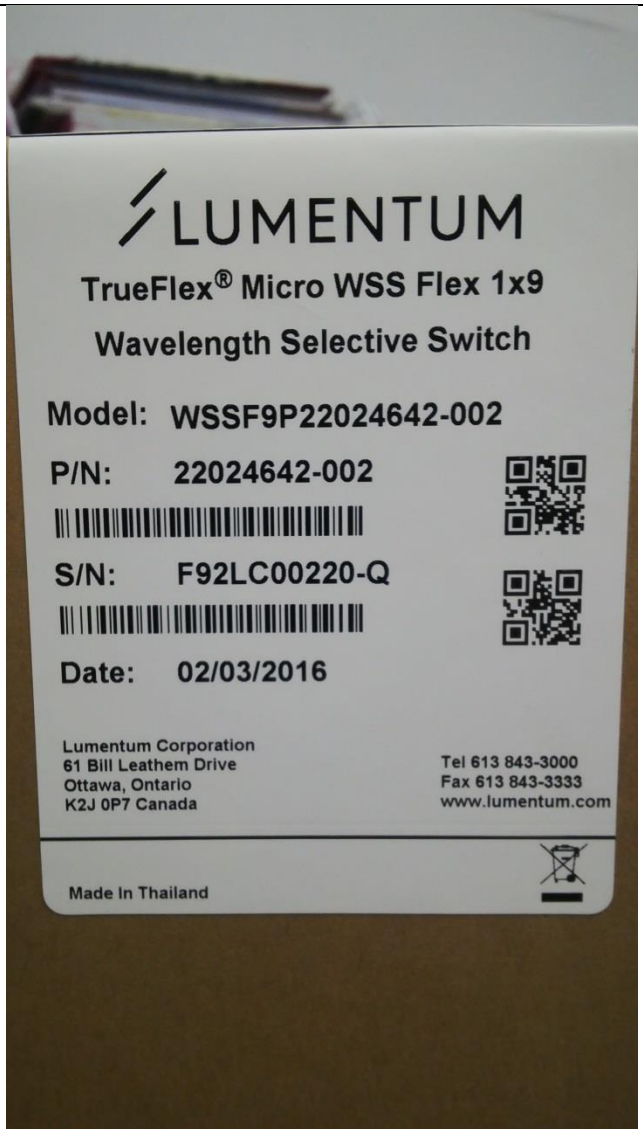
- Lumentum Logo
- Vendor Name: **Lumentum**
- Product name**: 22153543** (text, 1D barcode (Code 39) and 2D barcode (QR Code))
- Lumentum Model Number : **WSS9PE22153543**
- Short Description : TrueFlex® Nano™ 1x9 V2 WSS
- Serial Number (text, 1D barcode (Code 39) and 2D barcode (QR Code))
- Date of Manufacture
- Lumentum Address: **Lumentum Corporation**
  61 Bill Leathem Drive
  Ottawa, Ontario
  K2J 0P7
- Lumentum Phone : **613-843-3000**
- Lumentum Fax : **613-843-3333**
- Lumentum URL : **www.lumentum.com**
- Country of Origin

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.



Example Only – Content may Vary

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.



Example Only – Content may Vary

Additional Labels

- Fragile Label
- ESD Label

Label placement as per example:

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

Example Only – Content may Vary

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.

11 TEST RECORD

For each device shipped, the following information must be available:

- Lumentum Oracle Part Number
- Date of Manufacture/Test
- Serial Number
- Firmware Version
- Pass/Fail Result

© Lumentum. All rights reserved.
This document, and its contents, are proprietary and confidential to Lumentum Corporation, or its subsidiaries and affiliates. Neither this document, nor any part of it, may be disclosed or conveyed to, used by or copied for, any third party without the prior written consent of Lumentum.