NanoSpeed™ Fiber Optical Phase Modulator/Switch

(Bidirectional, Polarization Insensitive, All Wavelengths)

(Protected by U.S. patents 7,403,677B1; 6,757,101B2; and pending patents)

Features

- High Reliability
- High Speed
- Low loss
- Compact

Product Description

The NS Series fiber optical phase modulator/switch is based on a patented electro-optical configuration, featuring low optical loss and wide temperature operation with built-in compensation. The device dynamically controls the optical phase of the transmitting light, meeting the most demanding requirements of continuous operations over 25 years and non-mechanical ultra-high reliability (passed Telcordia and space qualifications)

The device is bidirectional in which the input and output ports are interchangeable.

This device is mounted on a specially designed electronic driver using a 5V TTL control or analog signal and a 12V power supply (wall pluggable).

Performance Specifications

NS Phase Modulator/Switch		Min	Typical	Max	Unit
Insertion Loss [1]	1900-2200nm		0.8	1.8	dB
	1260~1650nm		0.6	1.0	
	960~1100nm		0.8	1.3	
	780-960nm		1.2	1.5	
	520 – 680nm		1.5	2.3	
IL Temperature Dependency			0.25	0.5	dB
Durability		10^{14}			cycles
Polarization Dependent Loss (SM version)			0.15	0.3	dB
Polarization Mode Dispersion (SM version)			0.1	0.3	ps
Polarization extinction ratio (PM version)		18			dB
Return Loss		45	50		dB
Phase Change [2]		0		180	Degree
Analog Modulation rate [3]		DC	50	200	KHz
Digital Modulation Rate [4]		DC		1	MHz
Optic power Handling [4]	Normal power version		300		mW
	High power version			5	W
Operating Temperature	Standard	-5		75	°C
	Special version	-30		85	
Storage Temperature		-40		100	°C

[1] Measured without connectors.
[2] Phase change vs. voltage is linear ideally.
[2] The phase change is proportionally to the 0-5V control signal with NVDR driver
[3] The maximum phase change is set at a predetermined value
[4] Defined at 1310nm/1550nm. For the shorter wavelength, the handling power may be reduced, please contact us for more information.

Applications

- Sensor
- Phase shift/delay
- Data process
- Instrumentation

Revised: 1-27-2021

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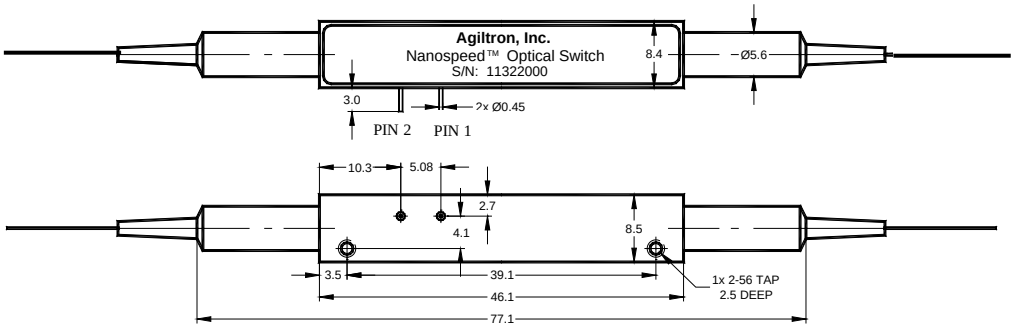
Mechanical Dimensions (Unit: mm)



Driving Board Selection

Maximum Repetition Rate	Part Number (P/N)
10kHz	NVDR-1P1210121
200kHz	NVDR-1P2210121
1000kHz	NVDR-1PH210121[1]

[1]: 1MHz frequency of driver will be available soon. Please contact us for availability.

Ordering Information

NSPM -	□□	□	□	□	□	□	□	□
	Type	Wavelength	Temperature range	Repetition Rate	Fiber Type		Fiber Length	Connector
	Standard = 11 High Power = 22	1060=1 2000=2 1310=3 1480=4 1550=5 1625=6 780=7 850=8 650=E 550=F 400=G 1565~1620=L Special=0	Standard=1 Large = 2	100kHz=1 200KH =2 1MHz=6	SMF-28=1 HI1060=2 HI780=3 PM1550/400=4 PM1550/250=5 PM850=8 PM980=9 Special=0	Bare fiber=1 900um tube=3 Special=0	0.25m=1 0.5m=2 1.0 m=3 Special=0	None=1 FC/PC=2 FC/APC=3 SC/PC=4 SC/APC=5 ST/PC=6 LC/PC=7 LC/APC=8 Special=0

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Q&A

Q: Does NS device drift over time and temperature?

A: NS devices are based on electro-optical crystal materials that can be influenced to a certain range by the environmental variations. The insertion loss of the device is only affected by the thermal expansion induced miss-alignment. For extended temperature operation, we offer special packaging to -40 -100 ^{0}C. The extinction or cross-talk value is affected by many EO material characters, including temperature-dependent birefringence, Vp, temperature gradient, optical power, at resonance points (electronic). However, the devices are designed to meet the minimum extinction/cross-talk stated on the spec sheets. It is important to avoid a temperature gradient along the device length.

Q: What is the actual applying voltage on the device?

A: 100 to 400V depending on the version.

Q: How does the device work?

A: NS devices are not based on Mach-Zander Interference, rather birefringence crystal's nature beam displacement, in which the crystal creates two different paths for beams with different polarization orientations.

Q: What is the limitation for faster operation?

A: NS devices have been tested to have an optical response of about 300 ps. However, practical implementation limits the response speeds. It is possible to achieve a much faster response when operated at partial extinction value. We also offer resonance devices over 20MHz with low electrical power consumption.

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