NanoSpeed™
Fiber Optical Polarization Modulator/Switch
(Low-Loss, Bidirectional, 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 polarization 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 signal through SMA input and a 12V power supply (wall pluggable). The maximum phase change can be adjusted by a pot on the board

Performance Specifications

NanoSpeed P Series Switches		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 Mode Dispersion (Non PM)			0.1	0.3	ps
Return Loss		45	50		dB
Polarization State Rotation				90	Degree
Analog Modulation rate [2]		DC	50	200	KHz
Digital Modulation Rate [3]		DC		1	MHz
Optic power Handling [4]	Normal power version		300		mW
	High power version			10	W
Operating Temperature	Standard	-5		75	°C
	Special version	-30		85	
Storage Temperature		-40		100	°C

[1] Measured without connectors.
[2] The phase change is proportionally to the 0-5V control signal
[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
- Data process
- Instrumentation

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15 Presidential Way, Woburn, MA 01801 Tel: (781) 9351200 Fax: (781) 935-2040

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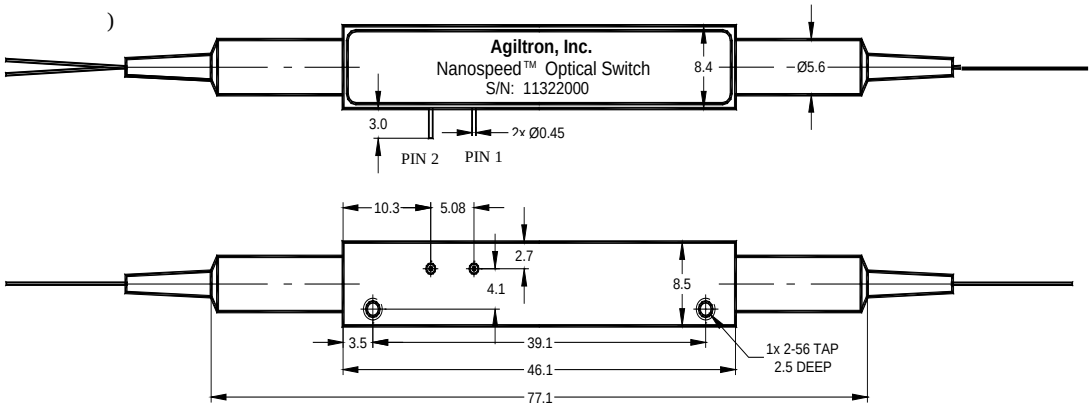
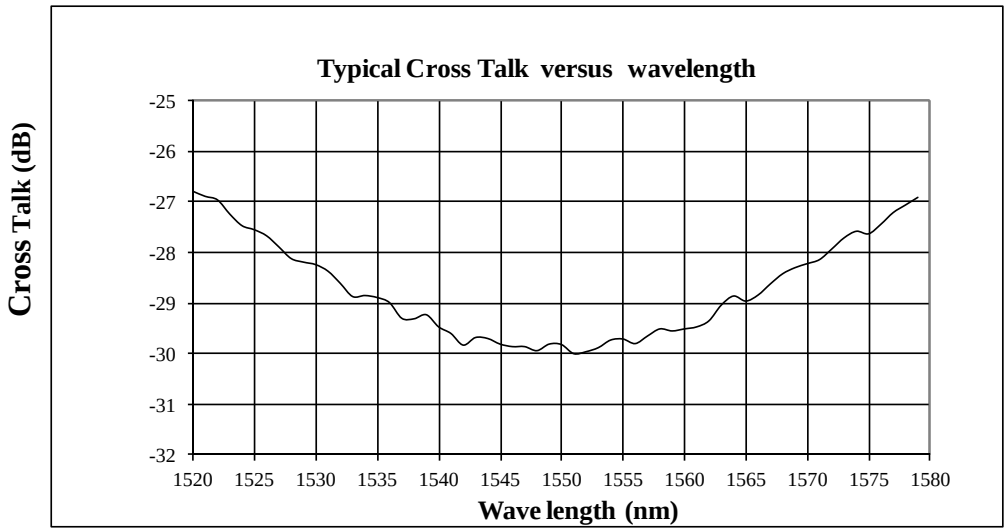
Mechanical Dimensions (Unit: mm)



Typical Wavelength Dependence Extinction Measurement



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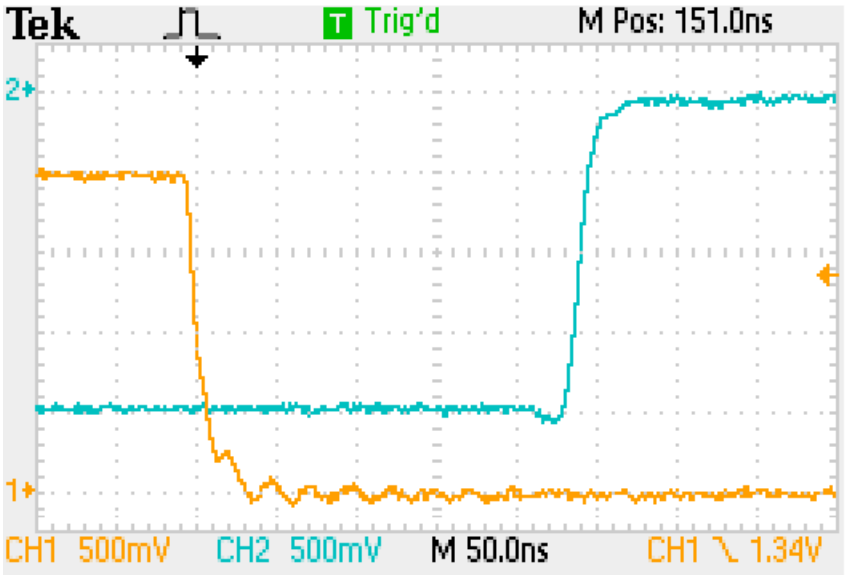
Typical Speed Response Measurement



Optical:

Electrical:

Ordering Information

NSPS -	☐☐	☐	☐	☐	☐	☐	☐	☐
	Type	Wavelength	Temperature range	Repetition Rate	Fiber Type (input/output)		Fiber Length	Connector
	Standard = 11 1W = 01 5W =05 10W = 10 20W =20	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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