

# BroadBand 1260-1650nm NanoSpeed™ Miniature Variable Optical Attenuator/ Modulator (Bidirectional)

(Protected by U.S. patent 7,403,677B1 and pending patents)

## Product Description

The NS Miniature series variable fiber optic attenuator provides electrical control of optical power. This is achieved using a patent pending non-mechanical configuration and activated via a voltage electrical control signal. The solid-state optical crystal design eliminates mechanical movement and organic materials. The NS series variable optical attenuators are designed to meet the most demanding operation requirements of ultra-high reliability and fast response time with minimum mechanical footprint. The device is bidirectional.

The NS Series VOA is available in either normally-transparent or normally-opaque configurations.

Agiltron's PCB driver listed in the web is recommended to operate this device, featuring high efficiency and low cost with 12VDC power and 0-5V control input.



## Performance Specifications

NS Variable Optical Attenuator	Min	Typical	Max	Unit
Wavelength	1260		1625	nm
Insertion Loss <sup>[1]</sup>		0.7	1.0	dB
Polarization Dependent Loss		0.1	0.35	dB
Return Loss	45	50		dB
Attenuation Range <sup>[2]</sup>	20			dB
Response Time (Rise, Fall)			300	ns
Repetition Rate <sup>[3]</sup>	DC	5	100	kHz
Modulation Rate <sup>[4]</sup>	0.1		5	MHz
Resolution		Continous		dB
Operating Optical Power			500	mW
Operating Temperature	-5	~ 70		°C
Storage Temperature	-40	~ 85		°C
Package Dimension		56 X8.2X5.95		mm

[1] Excluding connectors.

[2] this attenuation range is for central wavelength +/- 30 nm.

[3] 5kHz repeat rate is in the standard Agiltron's driver. High repetition rate of 100 kHz with 100% modulation depth is available with special circuit, please call us.

[4] Special circuit for narrow frequency range, maximum modulation depth is 5-10%

## Features

- Solid state
- High Reliability
- High Speed
- Broadband
- Bidirectional
- Low Insertion Loss
- Compact

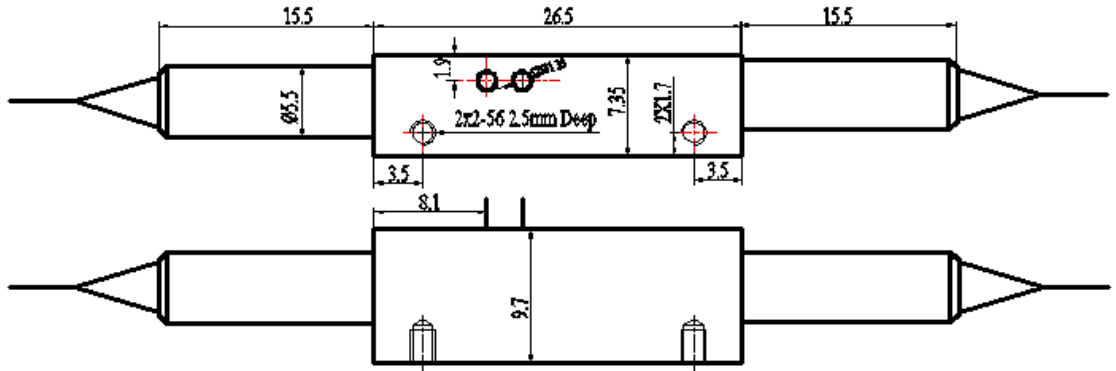
## Applications

- Power Control
- Power Regulation
- Power Balance
- Instrumentation

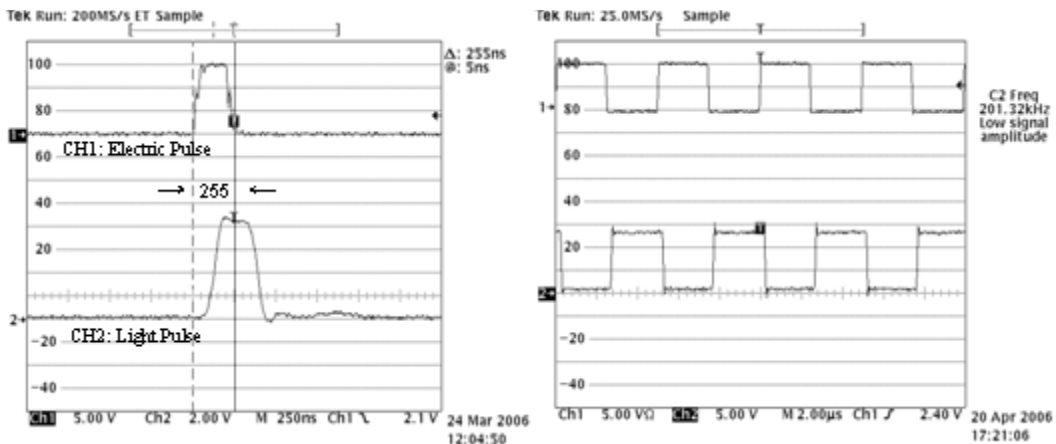


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## Mechanical Footprint Dimensions (Unit:mm)

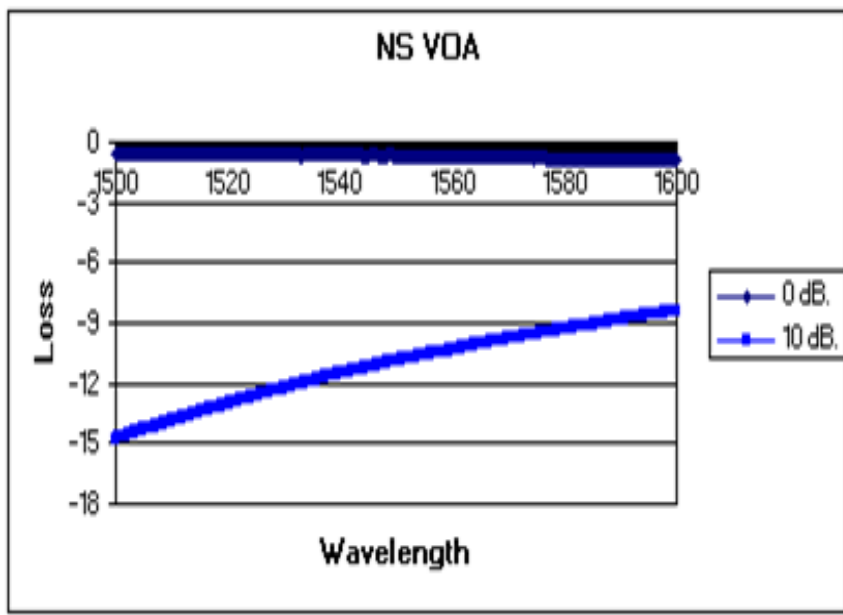


## Speed and Repetition Measurement

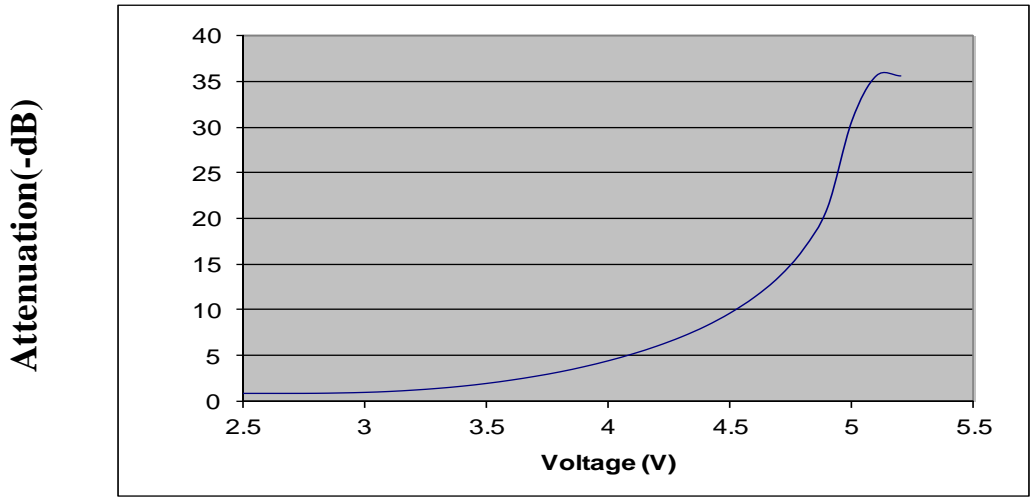


# BroadBand 1260-1650nm NanoSpeed™ Miniature Variable Optical Attenuator/ Modulator

Specify wavelength dependent loss @10dB attenuation



Typical curve of Attenuation versus Voltage



# BroadBand 1260-1650nm NanoSpeed™ Miniature Variable Optical Attenuator/ Modulator



## Ordering Information

NVOA-	4 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Type	Wavelength	State	Optical power	Fiber Type	Fiber Length	Connector	
	Regular slope=2	1260-1620nm=1 Special=0	Transparent = 1 Opaque = 2	500 mW=8 1W CW=1 2W CW=2 5W CW=5	SMF-28 =1 Special=0	Bare fiber =1 900um loose 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

## 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 °C. The extinction or cross-talk value is affected by many EO material characters, including temperature-dependent birefringence,  $V_p$ , 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.

