

NanoSpeed™ Premium Variable Fiber Optical Attenuator (SMF, PMF, High Power, Bidirectional)

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

Product Description

The Nano-speed Premium grade of Variable Fiber Optical Attenuator (NPOA) 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 NP Series Variable Optical Attenuators are designed to meet the most demanding operation requirements of ultra-high reliability and fast response time with minimal mechanical footprint. Agiltron also offers customized electronic designs to meet special control requirements and applications. The NPOA is bidirectional.

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

The NP Series VOA is controlled by 5V TTL signals with a specially designed electronic driver having performance optimized for various repetition rate.

Performance Specifications

NanoSpeed Series VOA	Min	Typical	Max	Unit	
Central wavelength ^[1]	780		1650	nm	
Insertion Loss ^[2]	1260-1650nm	0.8	1.2	dB	
	960-1100nm	1.0	1.3		
	780-960nm	1.2	1.5		
Attenuation Range ^[3]	Single stage	20	28	36	dB
	Dual stage	30	40	50	
PDL (SMF VOA only)		0.1	0.3	dB	
PMD (SMF VOA only)		0.1	0.3	ps	
ER (PMF VOA only)	18	25		dB	
Resolution		Continuous		dB	
Return Loss	45	50	60	dB	
Fiber Type	SMF-28, Panda PM, or equivalent				
Driver Repeat Rate	10kHz driver	DC	10	kHz	
	200kHz driver	DC	200		
	1MHz driver	DC	1000		
Modulation frequency ^[4]			5	MHz	
Optic power Handling ^[5]	Normal power VOA	300		mW	
	High power VOA			5	W
Operating Temperature	-5		70	°C	
Storage Temperature	-40		85	°C	

[1] Operation bandwidth is +/- 25nm approximately at 1550nm.

[2] Measured without connectors. For other wavelength, please contact us.

[3] Full attenuation is measured at 5kHz, which may be degraded at the high repeat rate.

[4] It is defined based on the driver's repeat rate. The modulation depth will be reduced as the frequency increases, from ~100% down to ~15% at 5MHz.

[5] Defined at 1310nm/1550nm. For the shorter wavelength, the handling power may be reduced, please contact us for more information.

Features

- Solid-State
- High speed
- Ultra-high reliability
- Low insertion loss
- Compact

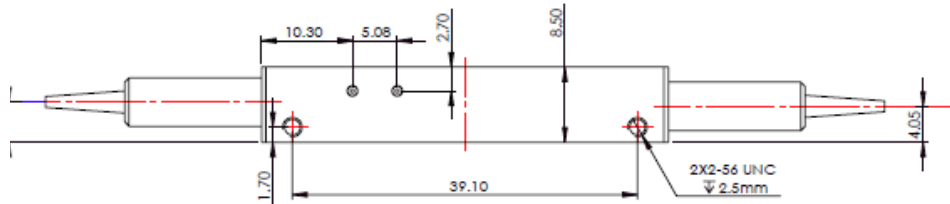
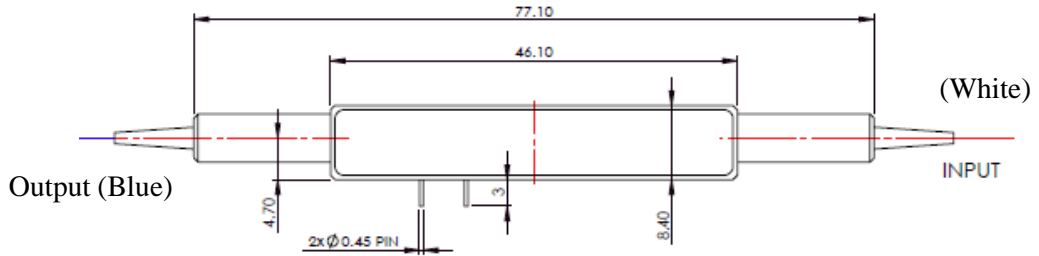
Applications

- Optical blocking
- Configurable operation
- Instrumentation

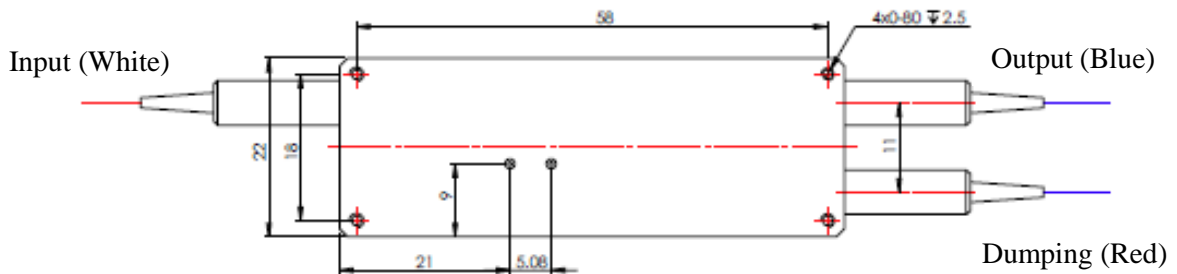
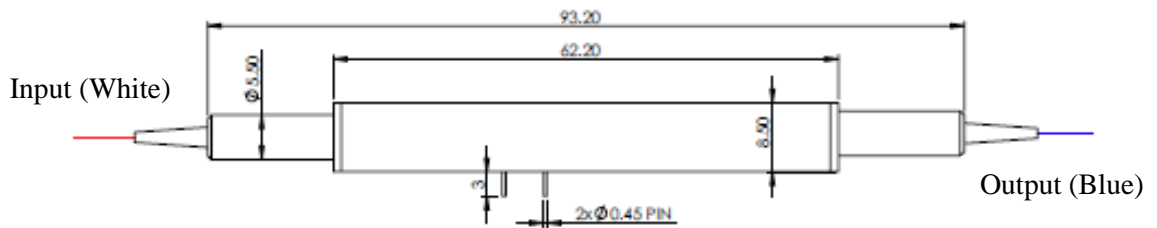


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Mechanical Dimensions (mm)



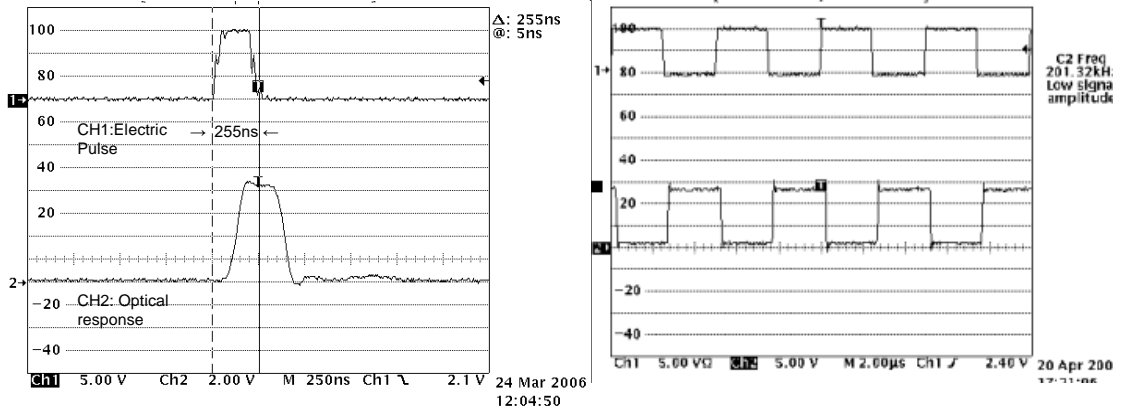
Normal Power VOA



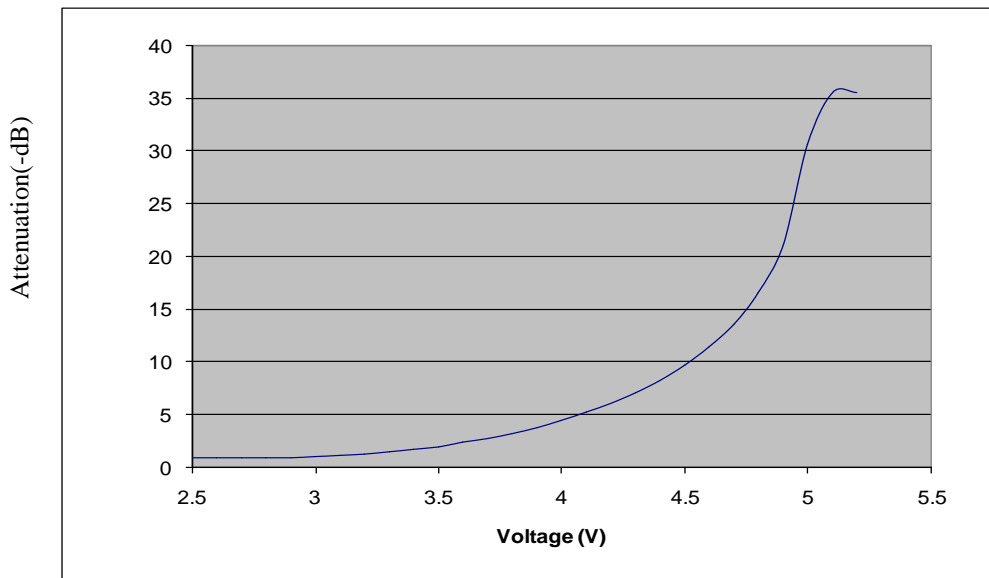
High Power VOA

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Typical Speed and Repetition Measurement



Attenuation versus Voltage (Typical)

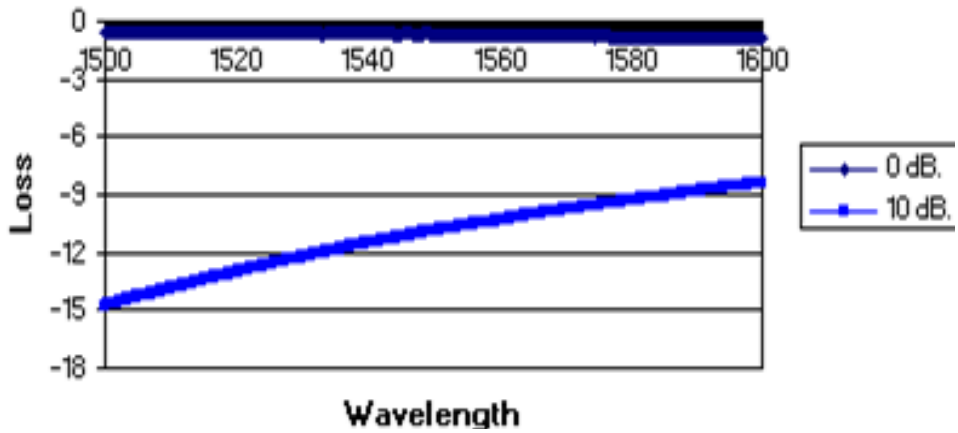


* Measured @ RT with single stage NPOA with Agiltron’s NVDR driver

* Note: For customers that prefer to design their own driving circuit, they are responsible for the optical performance. For more technical information, please contact us.

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Typical WDL @10dB attenuation



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

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	Type	Wavelength	Configuration	Fiber Type		Fiber Length	Connector ^[1]
NPOA = Premium, Normal power VOA		1060nm=1 L Band=2 1310nm=3 1410nm=4 1550nm=5 780nm=7 850nm=8 Special=0	Transparent & single stage =11 Transparent & dual-stage =12	SMF-28=1 HI1060=2 HI780=3 PM 1550/400=4 PM 1550/250=5 PM980=9 PM850=8 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 Duplex LC=8 LC/APC=9 Special=0
NPHA = Premium, High power VOA			Opaque & single stage = 21 Opaque & dual stage = 22				

[1]. There isn't connector in the high power VOA normally. Please contact us for high power connectors.



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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 °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.