



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 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 in which the light passing through without the applying a voltage or normally-opaque in which the light is blocked without the applying of a voltage. The attenuation level is related to the stage. The response speed is related to the attenuation level and driver power (repetition rate). Small attenuation can reach MHz response.

The NP Series VOA is mounted on a specially designed electronic driving PCB board with a 0-5V control input and having performance optimized for various repetition rate.

Performance Specifications

NP Series VOA	Min	Typical	Max	Unit
Central wavelength ^[1]	780		960	nm
Insertion Loss ^[2]	780-960nm		2.5	dB
Attenuation Range ^[3]	Single stage	20	30	dB
	Dual stage	30	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, Panda PM, or equivalent			
Driver Repeat Rate ^[3]	10kHz driver	DC	10	
	200kHz driver	DC	200	kHz
	1MHz driver	DC	1000	
Modulation frequency ^[4]			5	MHz
Optic power Handling ^[5]	Normal power VOA	100		mW
	High power VOA			2 W
Operating Temperature	-5		70	°C
Storage Temperature	-40		85	°C

[1] Operation bandwidth is +/- 20nm approximately at the central wavelength. For wavelength > 960nm, please check NVOA.

[2] Measured without connectors.

[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 850nm. For the higher handling power, please contact us for more information.

Features

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

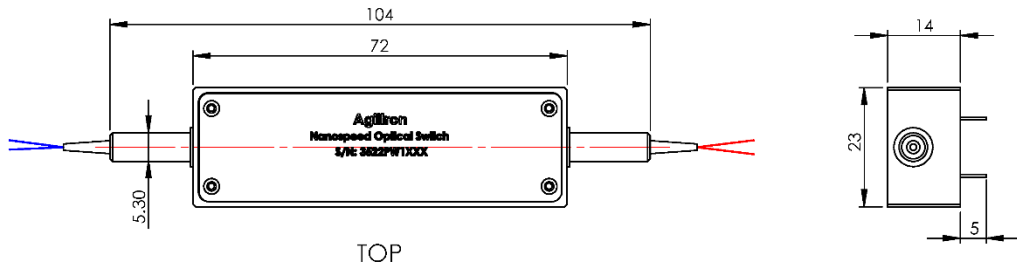
Applications

- Optical blocking
- Configurable operation
- Instrumentation

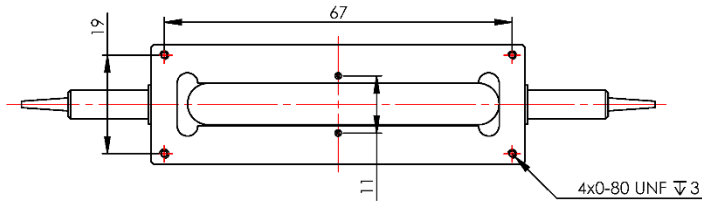


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Mechanical Dimensions (mm)

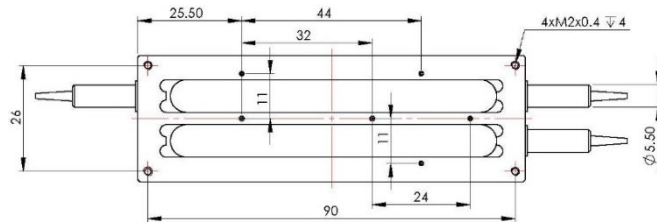
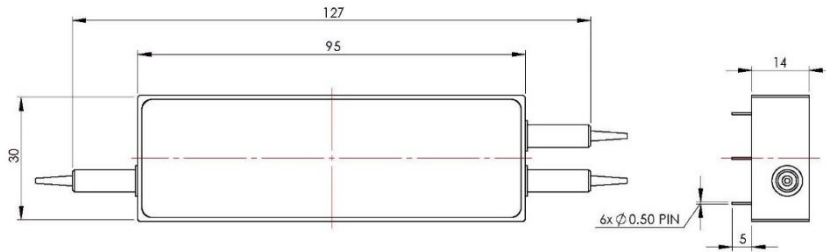


TOP



BOTTOM

Single Stage



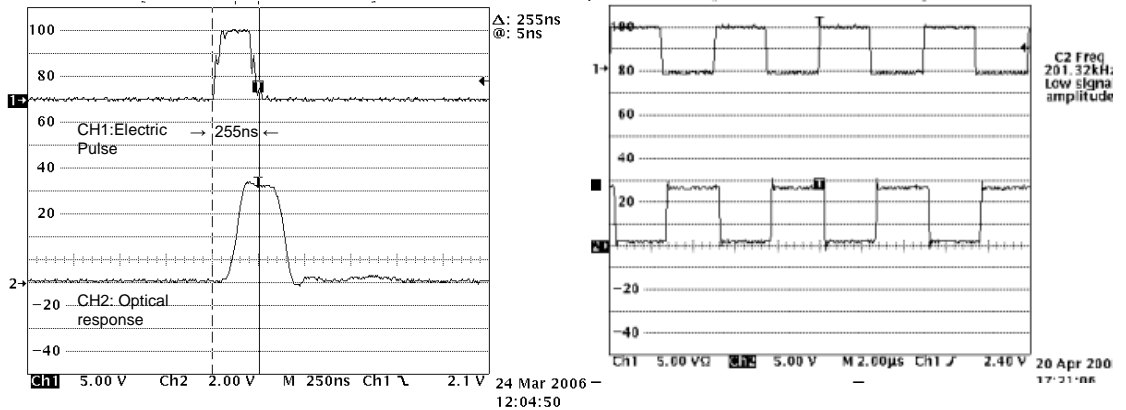
Back

Dual Stage

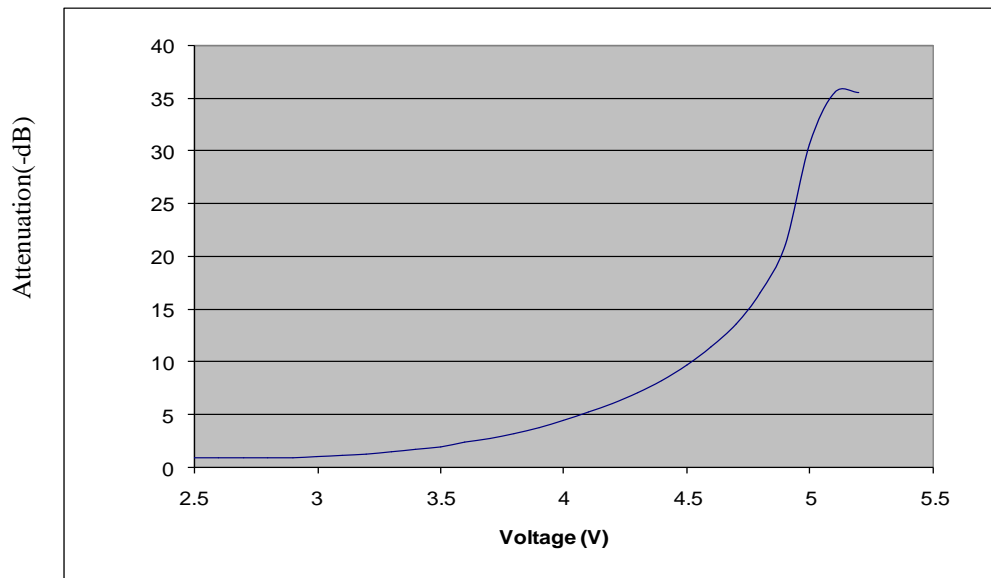
*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

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Typical Speed and Repetition Measurement



Attenuation versus Voltage (Typical)

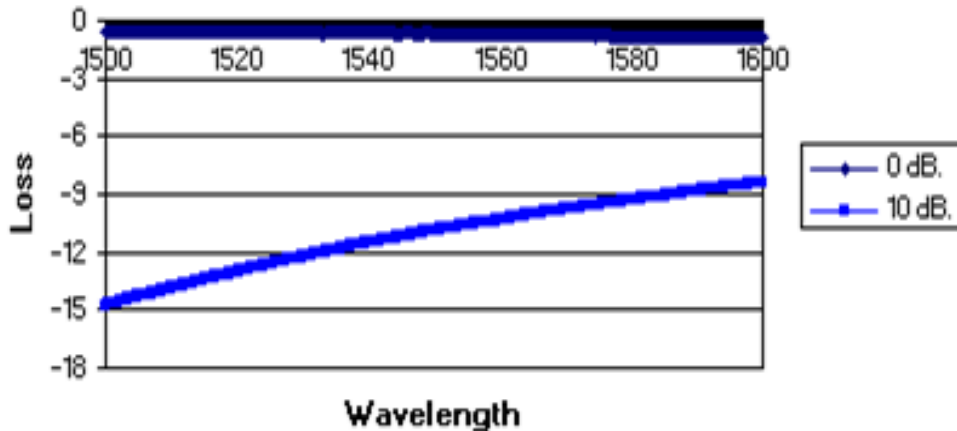


* Measured @ RT with single stage NPOA with Agiltron's NVDR driver

* 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)
100kHz (dual stage)	NVDR-SP2210121
200kHz (single stage)	NVDR-SP2210121
800kHz (single stage)	NVDR-SPH210121

Ordering Information

Prefix	Type	Wavelength	No Power	Stage	Fiber Type	Fiber Cover	Fiber Length	Connector ^[1]
NPOA-	Standard=32 High Power=33 Special= 00	780nm = 7 850nm = 8 Special = 0	Transparent=1 Opaque =2	One = 1 Two = 2	HI780 = 3 PM850 = 8 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 Duplex LC=8 LC/APC=9 Special=0

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

NOTE:

“transparent” means no attenuation without applying a controlling voltage, the “opaque” means the highest attenuation without applying a controlling voltage.



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Q&A

Q: Does the 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 environmental variations. The insertion loss of the device is only affected by the thermal expansion induced mis-alignment. For extended temperature operation, we offer special packaging to -40 -100 °C. The cross-talk value is affected by many EO material characters, including temperature-dependent birefringence, V_p , temperature gradient, and 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's 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 but rather a 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 of 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 can achieve a much faster response when operated at partial extinction value. We also offer resonance devices over 20MHz with low electrical power consumption.

Operation Manual

1. Connect a control signal to the SMA connector on the PCB
2. Attach the accompanied power supply (typically a wall-pluggable unit).
3. The device should then function properly.

Note: Do not alter device factory settings.