NanoSpeed™ Premium
1x1, 1x2, 2X2 Fiber Optical Switch
(1MHz, -30°C to 85°C Capability, Bidirectional)

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

Product Description

The NS Premium Series fiber optic switch is developed for high repeat rate and moderate driving voltage based on the standard NS series of switching technology. This is achieved using patented electro-optical configuration featuring clean fast response without ripples and temperature compensation for outdoor operation. The NSP fiber optic switch is designed to meet the most demanding switching requirements of continuous operations over 25 years and non-mechanical ultra-high reliability.

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

Features

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

Applications

- Optical blocking
- Configurable operation
- Instrumentation

Performance Specifications

NanoSpeed P Series Switches		Min	Typical	Max	Unit
Insertion Loss [1]	1900-2200nm		0.8	1.5	dB
	1260~1650nm		0.6	1.0	
	960~1100nm		1.2	1.5	
	780-960nm	1.2[1b]	1.5	1.8	
	680 – 780nm	1.5[1b]	1.8	2.0	
Cross Talk [2]	Single stage	18	25	35	dB
	Dual stage	30	36	45	
PDL (SMF Switch only)			0.15	0.3	dB
PMD (SMF Switch only)			0.1	0.3	ps
ER (PMF Switch only)		18	25		dB
IL Temperature Dependency			0.25	0.5	dB
Return Loss		45	50	60	dB
Optical transition time [3]		40	90		ns
Driver Repeat Rate	200kHz driver	DC	200		kHz
	1000kHz driver	DC	1000		
Optic power Handling [4]	Normal power version		300		mW
	High power version			5	W
Operating Temperature	Standard	-5		75	°C
	Large range version	-30		85	
Storage Temperature		-40		100	°C

[1] Measured without connectors. For other wavelengths, please contact us.
[2] Cross talk is measured at 100kHz, which may be degraded at the higher repeat rate.
[3] It is defined as the rising or fall time between 10% and 90% of optical intensities.
[4] Defined at 1310nm/1550nm. For the shorter wavelength, the handling power may be reduced, please contact us for more information.
[1b] NPLC version available for high power and low loss that incorporating fiber core enlargement (expensive).

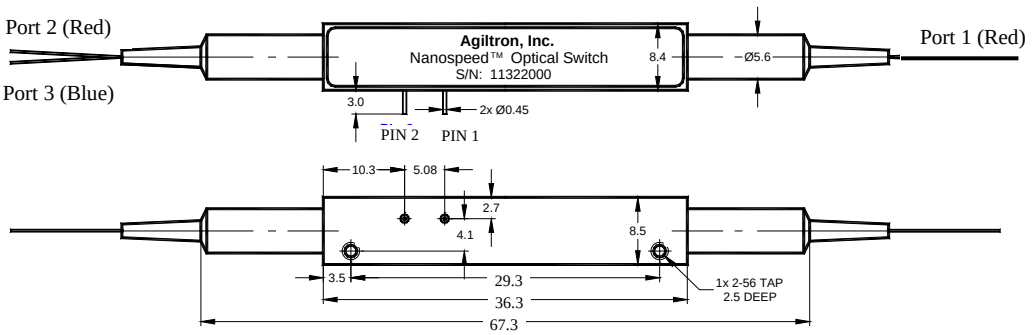
Revised: 11-12-2020

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

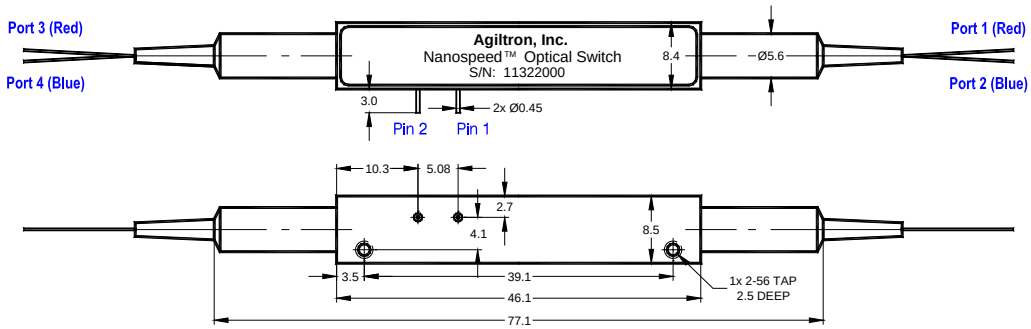
www.agiltron.com

NanoSpeed™ Premium
1x1, 1x2, 2X2 Fiber Optical Switch
(1MHz, -30°C to 85°C Capability, Bidirectional)

Mechanical Dimensions (Unit: mm)

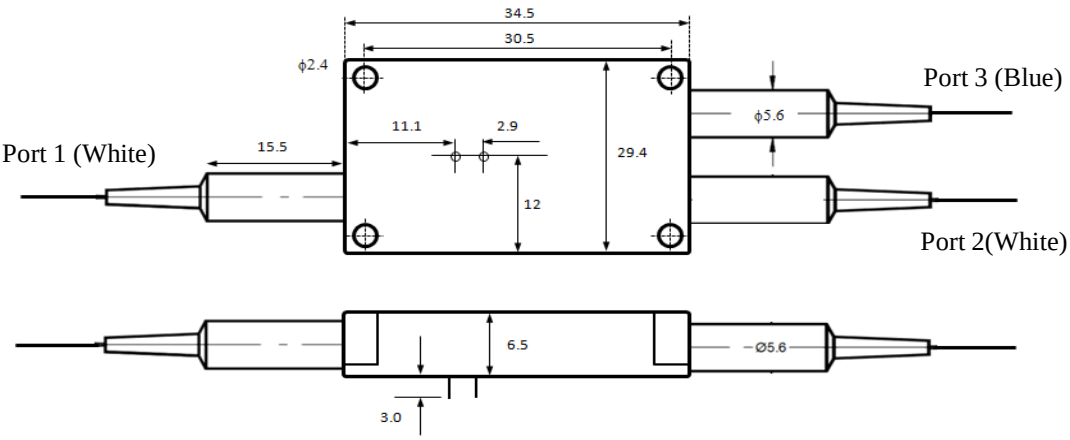


1x2 switch



2x2 switch

Package Type –I: NPSW



Package Type –II: 2-stage NPSW-1x2, NPHW-1x2 and NPTW-1x2

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

www .agiltron.com

NanoSpeed™ Premium
1x1, 1x2, 2X2 Fiber Optical Switch
(1MHz, -30ºC to 85ºC Capability, Bidirectional)

Mechanical Dimensions (Unit: mm)

TBD (65mmx22mmx8.5mm)

Package Type –III: NPTW, 2-stage NPSW-2x2 and NPHW-2x2 under development

Optical Path Driving Table

1x1 Optical Path	TTL Signal
ON for normally-open, OFF for normally-close	L (= 0V)
OFF for normally-open, ON for normally-close	H (> 3.5V)

1x2 Optical Path	TTL Signal
Port 1→ Port 2	L (=0V)
Port 1→ Port 3	H (> 3.5V)

2x2 Optical Path	TTL Signal
Port 1→Port 3, Port 2→Port 4	L (= 0V)
Port 1→Port 4, Port 2→Port 3	H (> 3.5V)

Driving Board Selection

Maximum Repetition Rate	Part Number (P/N)
200kHz	NSDR-1P1aM1111
1MHz	NSDR-1P1aH1111

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

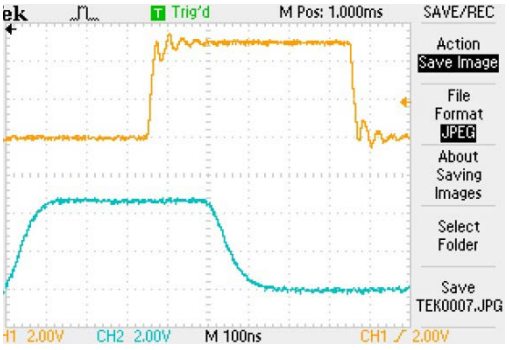
15 Presidential Way, Woburn, MA 01801 Tel: (781) 9351200 Fax: (781) 935-2040

www .agiltron.com

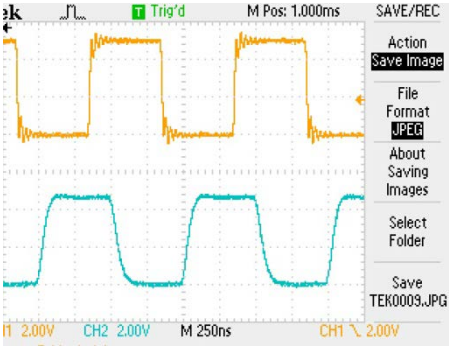
NanoSpeed™ Premium
1x1, 1x2, 2X2 Fiber Optical Switch
(1MHz, -30°C to 85°C Capability, Bidirectional)

Typical Speed and Repetition Measurement

1MHz Response

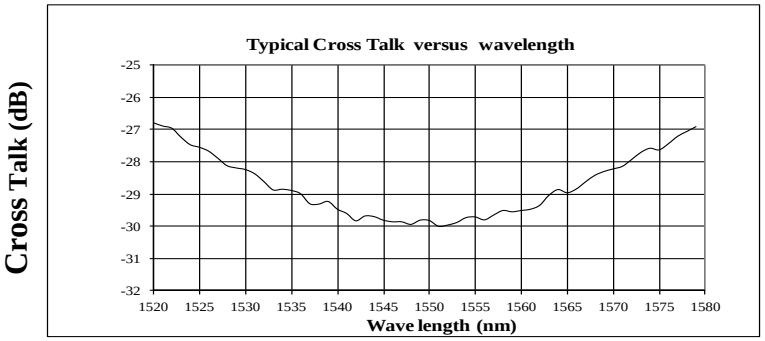


1MHz Response



Note: Top Traces are electrical; Bottom traces are optical

Typical Bandwidth Measurement



Ordering Information

□□□□-	□□	□	□	□	□	□	□	□
	Type	Wavelength	Grade [3]	Repetition Rate	Fiber Type		Fiber Length	Connector [1]
NPSW = Normal power version NPTW = Large temperature range NPHW = High Power version NPLC [2] = Large Core version for high power	1x1=11 1x2=12 2x2=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	Single stage =1 Dual stage = 2	200kHz=1 1MHz=2	SMF-28=1 HI1060=2 HI780=3 PM1550/400=4 PM1550/250=5 PM850=8 PM980=9 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

[1]: Please contact the sale about the high power connector.
[2]: NPLC version is available only for wavelength shorter than 780nm. 2-stage version isn't available.
[3]: 2 stage version is not available for 2x2 currently.

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

www.agiltron.com

NanoSpeed™ Premium
1x1, 1x2, 2X2 Fiber Optical Switch
(1MHz, -30°C to 85°C Capability, Bidirectional)

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.

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

www.agiltron.com