



NanoSpeed™ Dual-stage 1x1 Series Fiber Optical Switch (SM, PM, High Power)

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

Product Description

The NS Series dual-stage 1x1 solid-state fiber optic switch connects optical channels by redirecting an incoming optical signal into a selected output optical fiber. This is achieved using patent pending non-mechanical configurations with solid-state all-crystal designs, which eliminates the need for mechanical movement and organic materials. The dual-stage series of NS fiber-optic switch is designed to meet the demand of high cross-talk in addition of ultra-high reliability, fast response time, and continuous switching operation. The device is bidirectional.

Agiltron's PCB driver listed in the web is recommended to operate this device, featuring high efficiency and low cost with 12V DC power and TTL control signal.

Features

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

Performance Specifications

NS Series Dual-stage 1x1 Switch	Min	Typical	Max	Unit
Central wavelength ^[1]	780		1650	nm
Insertion Loss ^[2]	1260-1650nm	0.6	1.0	dB
	860-1100nm	0.8	1.3	
	780-860nm	1.0	1.5	
	480-760nm	1.5	2.0	
On-Off ratio	30	35	45	dB
Durability	10 ¹⁴			cycles
PDL (SMF Switch only)		0.2	0.35	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
Response Time (Rise, Fall)	30		300	ns
Fiber Type	SMF-28, Panda PM, or equivalent			
Repeat Rate	5kHz driver	DC	5	kHz
	100kHz driver	DC	100	
	500kHz driver	DC	500	
Optic power Handling ^[3]	Normal power switches		300	mW
	High power switches		5	W
Operating Temperature	-5		70	°C
Storage Temperature	-40		85	°C

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

[2] Measured without connectors. Wavelength with red color can be implemented in the special version.

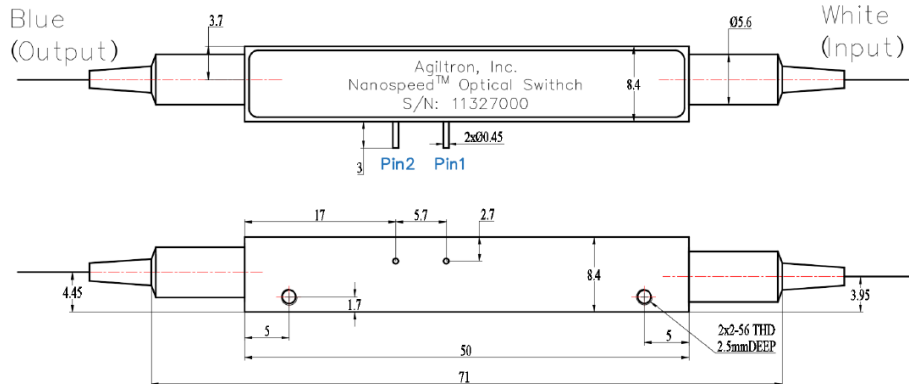
[3] Defined at 1310nm/1550nm. For the shorter wavelength, the handling power may be reduced, please contact us for more information.

Applications

- Optical blocking
- Configurable operation
- Instrumentation

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Mechanical Dimensions (mm)



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

Optical Path Driving Table

Optical Path	Pin 1	Pin 2
Port 1→Port 2	No Power	
Port 1→ Port 3	H	GND
H: 360 ~ 420 V		

Driving Board Selection

Maximum Repetition Rate	Part Number (P/N)
60kHz	NSDR-2s1a61111
300kHz	NSDR-2s1a91111

* 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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Ordering Information

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	1 1			2				
	Type	Wavelength ^[1]	Configuration	Fiber Type	Fiber Length	Connector ^[2]		
NSSW = Low power switch NHSW = High power switch	1x1=11	1060=1 2000=2 1310=3 1550=5 1625=6 850=8 780=7 650=E 550=F 400=G Special=0	Normally-on and Dual stage = 12 Normal off & dual-stage = 22	SMF-28=1 HI1060=2 HI780=3 PM 1550/250=5 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 Duplex LC=8 LC/APC=9 Special=0	

[1]. Wavelength with red color will be implemented with the special version with a long lead time.

[2]. Please contact us for high power connectors in high power switch.

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, 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.

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Q&A (Conti)

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.