

NanoSpeed™ 4x4 Fiber Optical Switch (Bidirectional)

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

Product Description

The NS Series fiber optic switch is developed for fast switching and low optical loss. This is achieved using patented electro-optical configuration featuring clean fast response without ripples. The NS fiber optic switch meet the most demanding switching requirements of continuous operations over 25 years and non-mechanical ultra-high reliability. The 4x4 configuration combines 5 2x2 NS switches mounted on a single control board with TTL signal inputs.

The NS 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

Performance Specifications

NanoSpeed 4x4 Switches		Min	Typical	Max	Unit	
Insertion Loss ^[1]	1900-2200nm		3.2	4	dB	
	1260-1650nm		3	3.5		
	960-1100nm		4	5		
	780-960nm		5	6		
Cross Talk ^[2]		45	50	55	dB	
Durability		10 ¹⁴			cycles	
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	1	dB	
Return Loss		45	50	60	dB	
Optical transition time ^[3]			100	300	ns	
Repetition Rate		DC			200	kHz
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.

High power version available by incorporating fiber core enlargement (expensive).

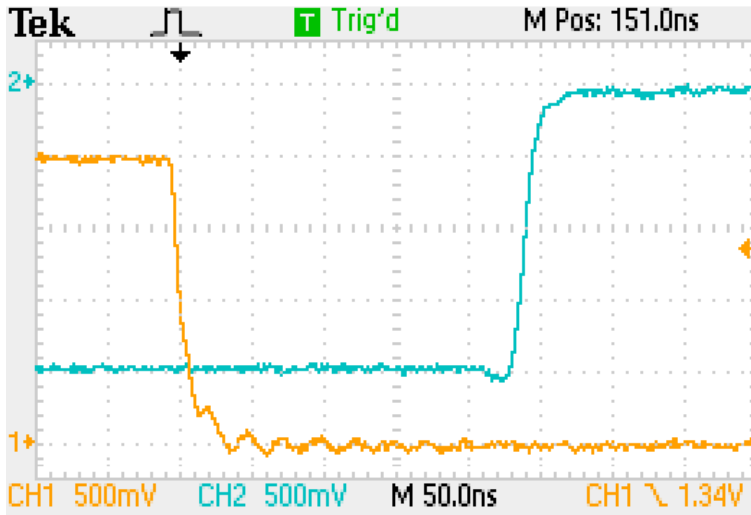
Applications

- Optical blocking
- Configurable operation
- Instrumentation

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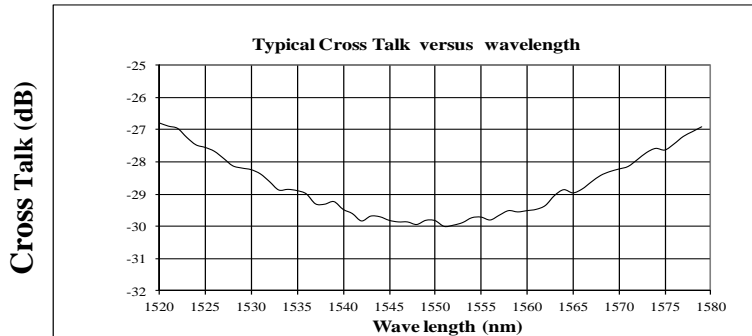


Typical Speed Response Measurement



Optical: —
Electrical: —

Typical Bandwidth Measurement



Ordering Information

NSSW	44	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Type	Wavelength	Optical Power Handling	Repetition Rate	Fiber Type	Fiber Length	Connector ^[1]	
		1060=1 2000=2 1310=3 1480=4 1550=5 1625=6 780=7 850=8 650=E 1565-1620=L Special=0	500mw=1 5W =2	100kHz =1 200kHz=2 500kHz=5 1MHz=9 Special =0	SMF-28=1 HI1060=2 HI780=3 PM1550/400=4 PM1550/250=5 PM850=8 PM980=9 Special=0	900um tube=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 for NPHW version.
[2]: NPLC version is available only for wavelength shorter than 780nm.

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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.