NanoSpeed™ 1x2 Series Multi-Mode Fiber Optical Switch (Bidirectional)

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

Product Description

The NanoSpeed™ series multi-mode 1x2 solid-state fiber (MMF) optic switch connects optical channels by redirecting an incoming optical signal into a selected output optical fiber. This is achieved using patent non-mechanical configurations with solid-state all-crystal designs, which eliminates the need for mechanical movement and organic materials. The NS fiber optic switch is designed to meet the most demanding switching requirements of ultra-high reliability, fast response time, and continuous switching operation. This series of switches are **bidirectional** intrinsically.

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

Applications

- Optical protection
- Configurable operation
- Instrumentation

Performance Specifications

NanoSpeed MMF 1x2 Switch		Min	Typical	Max	Unit
Central wavelength [1]		630		2000	nm
Durability		10^{14}			cycles
Insertion Loss [2]			1.5	1.8	dB
Cross Talk [3]		15	18		dB
MDL			0.3		dB
IL Temperature Dependency			0.25	0.5	dB
Return Loss		20	25		dB
Response Time (Rise, Fall)				300	ns
Fiber Type		50/125, 62.5/125, or equivalent			
Driver Repeat Rate	100kHz driver	DC	100		kHz
	500kHz driver	DC	500		
Optic power handling [4]			0.5	2	W
Operating Temperature		-5		70	°C
Storage Temperature		-40		85	°C

[1] Operation bandwidth is +/- 25nm approximately at 1550nm.
[2] Measured without connector under source with CPR =13dB
[3] Cross talk is measured at 100kHz under source with CPR =13dB, which may be degraded at the high repeat rate.
[4] Defined at wavelength >1300nm. For the shorter wavelength, the handling power may be reduced, please contact us for more information.

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Revised on 1-27-20

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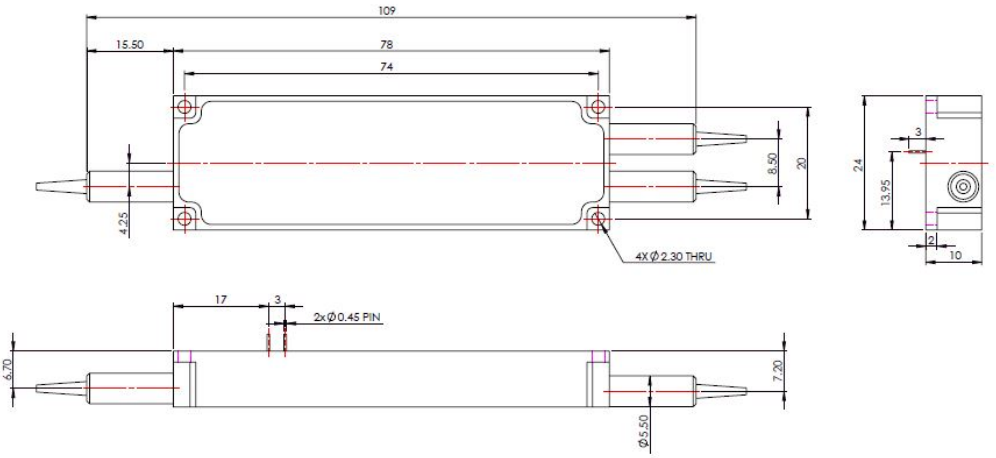
Mechanical Dimensions (mm)



Optical Path Driving Table

Optical Path	TTL Signal
Port 1→ Port 2	L (< 0.8V)
Port 1→ Port 3	H (> 3.5V)

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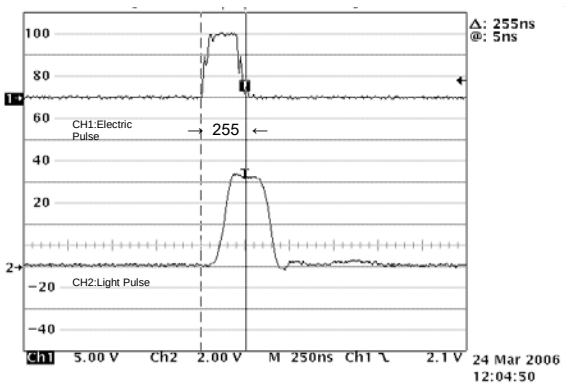
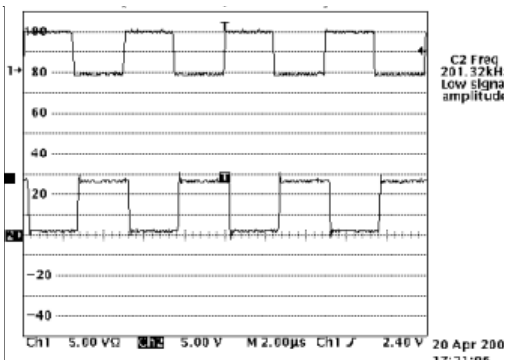
Driving Board Selection

Maximum Repetition Rate	Part Number (P/N)
100kHz	SWDR-11a261111
500kHz	SWDR-11a291111

* 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.

Speed and Repetition Measurement





Ordering Information

NSMS -	1 2	☐	1	☐	☐	☐	☐	☐
	Type	Wavelength	Configuration	Package	Fiber Type		Fiber Length	Connector [2]
NSMS = Nanospeed MMF Switch	1x 2=12	1060nm=1 L Band=2 1310nm=3 1410nm=4 1550nm=5 660nm=6 850nm=8 Special=0	Single stage = 1	Standard = 1 Special = 0	50/125 MMF = 5 62.5/125 MMF = 6 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

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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 ^{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.

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