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MEMS Non-Latching Type Series Fiber Optical Switch

(1x2, 2x2, Dual 2x2, Quad 1x1. SM, MM, PM)

(Protected by U.S. patent 8,203,775 and pending patents)

Product Description

The MEMS Non-Latching type Series Fiber Optical Switches provide industrial leading performance of fast switching speed, latching, low insertion loss, and high reliability, as well as low cost. The switch connects optical channels using a proprietary thermal activated micro-mirror, moving-in and -out optical paths, uniquely featuring high stability without long-term drift, fail safe latching, fast setting time, and direct 5V drive convenience. The same format can accommodate configurations of 1x1, Dual 1x1, Quad 1x1, 1x2, Dual 1x2, Full 2x2, and Dual Full 2x2 for both single mode and Multimode fibers. The switches are also available with configurations of 1x1, 1x2 PM.



Performance Specifications

enMEMS™ Series Switch	Min	Typical	Max	Unit	
Operation Wavelength	Single Mode	1260~1610		nm	
	Multimode	810~890 and / or 1260/1360			
	PM	980, 1060, 1310, 1550			
Insertion Loss ^{[1], [2]}	Single band	0.6	1.0	dB	
	Dual band ^[3]	1.2			
PDL	Single mode	0.1		dB	
Return Loss ^[1]	SM, PM	50			dB
	Multimode	35			
Cross Talk ^[1]	SM, PM	50			dB
	Multimode	35			
Extinction Ratio	PM	18			dB
Switching Time	5		10	ms	
Repeatability			±0.05	dB	
Repetition Rate	10				Hz
Durability	10 ⁹			Cycle	
Switching Type	Non-Latching				
Operating Temperature	-5	70		°C	
Storage Temperature	-40	85		°C	
Optical Power Handling (CW)	300		500	mW	
Package Dimension	13L x 9W x 6H			mm	
Fiber Type	Single Mode	SMF-28 or equivalent			
	Multimode	MM 50/125, MM 62.5/125 or equivalent			
	PM	Panda 250 PM fiber, or equivalent			

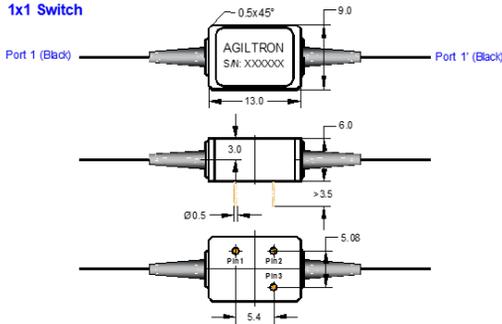
[1]. Excluding connectors.
 [2]. Multimode IL measure @ Light Source CPR<14 dB.
 [3]. Dual band, and Dual 1x2, Full 2x2, Dual Full 2x2.



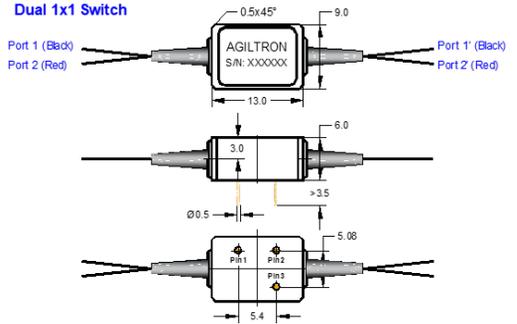
MEMS Non-Latching Type Series Fiber Optical Switch

Mechanical Dimensions (Unit: mm)

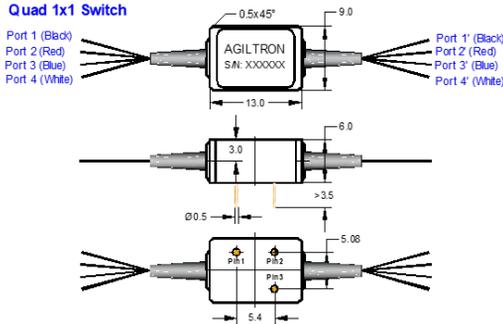
1x1 Switch



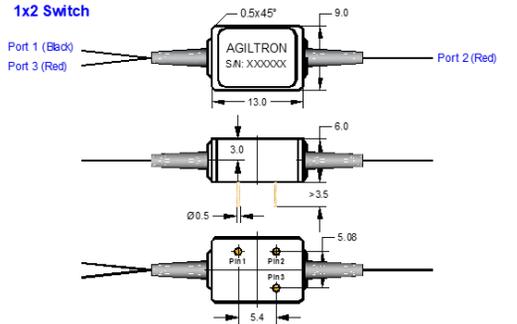
Dual 1x1 Switch



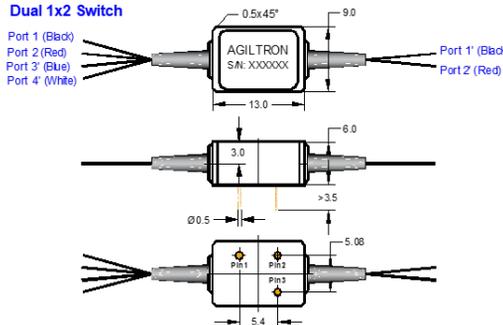
Quad 1x1 Switch



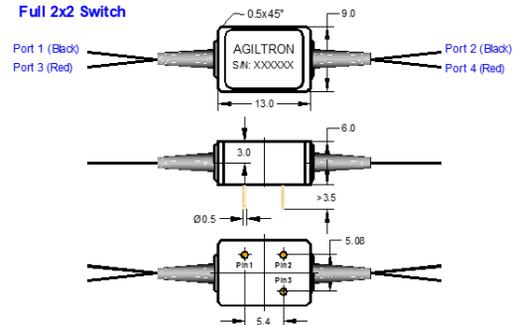
1x2 Switch



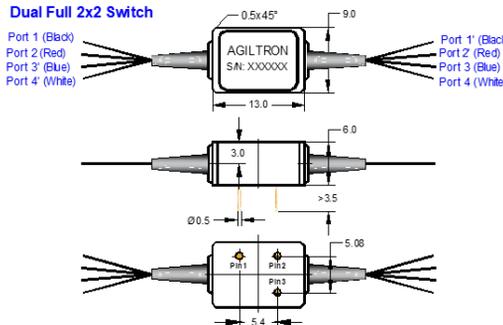
Dual 1x2 Switch



Full 2x2 Switch



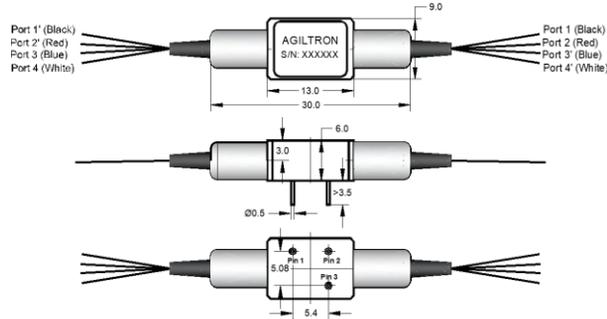
Dual Full 2x2 Switch



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

MEMS Non-Latching Type Series Fiber Optical Switch

Package of MEMS Quad 1x1, Dual 1x2, Dual 2x2 Switch with 900 μm loose tube



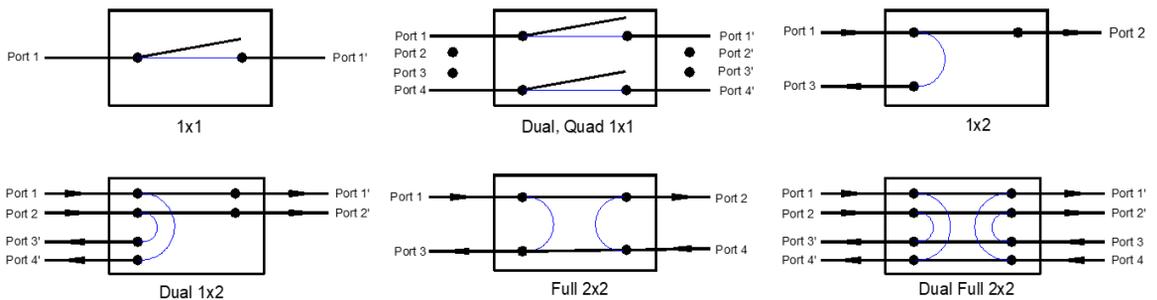
Electrical Driving Requirements

Status	Optical Path						Pin No.		
	1X1 (Normally Transparence)	1X1 (Normally Dark)	Dual 1X1 (Normally Transparence)	Dual 1X1 (Normally Dark)	Quad 1X1 (Normally Transparence)	Quad 1X1 (Normally Dark)	Pin 1	Pin 2	Pin 3
Status I	Dark	Port 1→1'	Dark	Port 1→1' Port 2→2'	Dark	Port 1→1' Port 2→2' Port 3→3' Port 4→4'	NC [1]	0V	+V [2]
Status II	Port 1→1'	Dark	Port 1→1' Port 2→2'	Dark	Port 1→1' Port 2→2' Port 3→3' Port 4→4'	Dark	NC	0V	0V

Status	Optical Path				Pin No.		
	1x2	Dual 1X2	Full 2x2	Dual Full 2x2	Pin 1	Pin 2	Pin 3
Status I	Port 1→2	Port 1→1' Port 2→2'	Port 1→2 Port 4→3	Port 1→1' Port 2→2' Port 3→3' Port 4→4'	NC	0V	+V
Status II	Port 1→3	Port 1→4' Port 2→3'	Port 1→3 Port 4→2	Port 1→4' Port 2→3' Port 3→2' Port 4→1'	NC	0V	0 V

[1]. NC: No electronic connection. [2]. +V: 3.8~4.5 VDC, Typical is 4.0 VDC. [3]. Power Consumption is about 170 mW.

Functional Diagram



MEMS Non-Latching Type Series Fiber Optical Switch

Ordering Information

Type	Wavelength	Switch	Package	Fiber Type	Fiber Length	Connector	
MEMS ^[1] MEDU ^[2] MEQU ^[3] MEPM ^[4]	1x1 N/T ^[5] =1T 1x1 N/D ^[6] =1D 1x2=12 Full 2x2=22 Special=00	1260-1620=B 1060=1 1310=3 1550=5 780=7 850=8 1310/1550=9 850/1310=A Special=0	Non-latching=2	Standard=2 WIP ^[7] =6 Special=0	SMF-28=1 MM 50/125=5 MM 62.5/125=6 PM1550/250=B PM1400/250=C PM1310/250=D PM980/250=E PM850/250=F Special=0	Bare fiber=1 900um loose tube=3 Special=0 0.25m=1 0.5m=2 1.0m=3 Special=0	None=1 FC/PC=2 FC/APC=3 SC/PC=4 SC/APC=5 ST/PC=6 LC=7 Duplex LC=8 Special=0

- [1]. MEMS: MEMS 1x1, 1x2, 2x2 SWITCH.
- [2]. MEDU: MEMS DUAL 1x1, 1x2, 2x2 Switch.
- [3]. MEQU: MEMS QUAD 1x1 Switch.
- [4]. MEPM: MEMS 1x1, 1x2 PM Switch.
- [5]. N/T: MEMS 1x1 Series Normally Transparency Switch,
- [6]. N/D: MEMS 1x1 Series Normally Dark Switch,
- [7]. WIP: With Insulating PCB.

10⁹ Switching Cycle Test

We have tested MEMS 1x2 switch at the resonant frequency ~300Hz for more than 40 days, as shown in the attachment, which corresponding over 10⁹ switching cycles. The measurements show little changes in Insertion loss, Cross Talk, Return loss ect, all parameters are within our specs.

