

# etMEMS™ Ultra-Mini Series Fiber Optical Switch

(\*SM & MM: 1x1, 1x2, 2x2, Dual 1x1, Dual 1x2, Dual 2x2, Quad 1. \*PM: 1x1, 1x2)

## Product Description

The etMEMS™ Series Ultra-Mini Fiber Optical Switch connects optical channels by redirecting incoming optical signals into selected output fibers. This is achieved by using a proprietary thermal activated micro-mirror, moving-in and -out optical paths, uniquely featuring high stability over wide temperature range without compensation, small size and very long life cycle. The ultra-mini switches are configured in 1x1 straight, 1x1 Reflection, Dual 1x1, Quad 1x1, 1x2 straight, 1x2 Reflection, Dual 1x2 straight, Full 2x2, and Dual Full 2x2 with single or multimode fibers. The Ultra-Mini switches are Telcordia standards GR1221 qualified.

Agiltron provides customized design and modular assemblies to meet control and integration applications.



## Features

- High Reliability
- Direct DC drive
- Intrinsic tolerance to ESD

## Performance Specifications

etMEMS™ Ultra-Mini Series Switch	Min	Typical	Max	Unit
Operation Wavelength	Single Mode	1260~1360 and / or 1510~1610		nm
	Multimode	810~890 and/or 1260/1360		
Insertion Loss <sup>[1], [2]</sup>		0.6	1.0 / 1.2 <sup>[3]</sup>	dB
PDL (Single mode)			0.1	dB
Extinction Ratio	PM fiber	18		dB
Return Loss <sup>[1]</sup>	SM, PM	50		dB
	Multimode	35		
Cross Talk <sup>[1]</sup>	SM, PM	50		dB
	Multimode	35		
Switching Time		6	10	ms
Repeatability			±0.05	dB
Repetition Rate			20	Hz
Durability		10 <sup>9</sup>		Cycle
Switching Type		Non-Latching		
Operating Temperature <sup>[5]</sup>		-5	70	°C
Storage Temperature		-40	85	°C
Optical Power Handling		300	500	mW
Package Dimension		10L x 6.6W x 4.6H		mm
Fiber Type <sup>[4]</sup>	Single Mode	SMF-28 or equivalent		
	PM	Panda 250 PM or equivalent		
	Multimode	MM 50/125, MM 62.5/125 or equivalent		

[1]. Excluding connectors.  
 [2]. Multimode IL measured @ Light Source CPR < 14dB.  
 [3]. Dual band, and Dual 1x2, Full 2x2, Dual Full 2x2.  
 [4]. PM fiber version only in 1x1 and 1x2 configuration.  
 [5]. Lower temperature version is available, please call us.

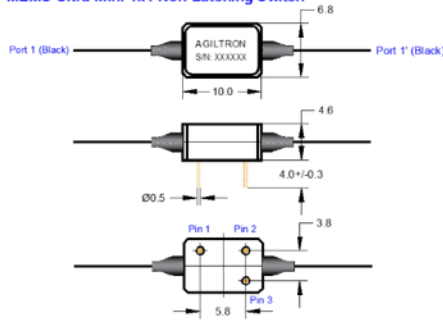


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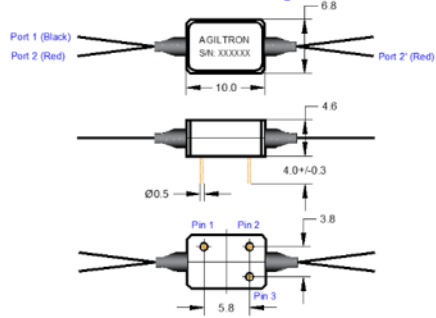
(\*SM & MM: 1x1, 1x2, 2x2, Dual 1x1, Dual 1x2, Dual 2x2, Quad 1. \*PM: 1x1, 1x2)

## Mechanical Dimensions without Build-in Driver (Unit: mm)

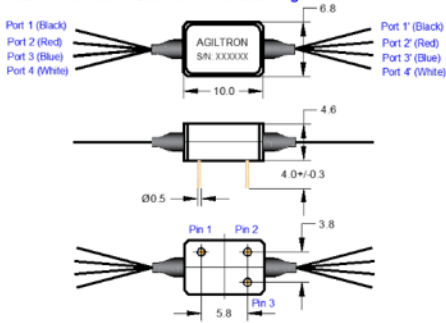
**MEMS Ultra-Mini 1x1 Non-Latching Switch**



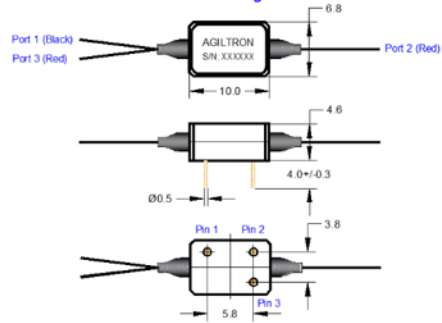
**MEMS Ultra-Mini Dual 1x1 Non-Latching Switch**



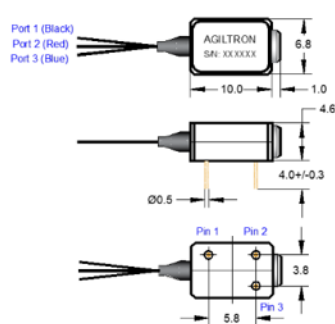
**MEMS Ultra-Mini Quad 1x1 Non-Latching Switch**



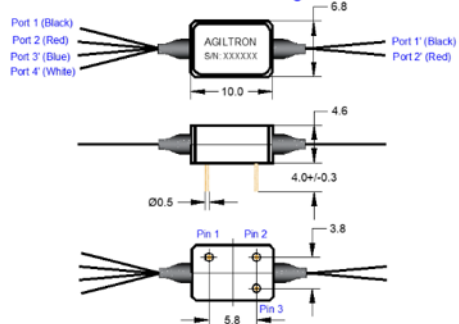
**MEMS Ultra-Mini 1x2 Non-Latching Switch**



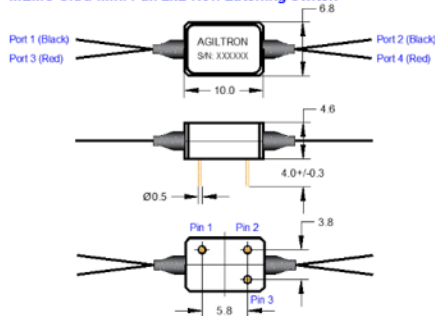
**MEMS Ultra-Mini 1x1, 1x2 Reflection Non-Latching Switch**



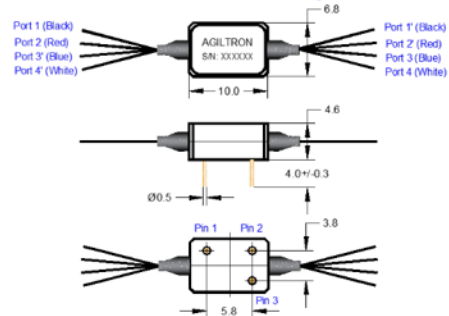
**MEMS Ultra-Mini Dual 1x2 Non-Latching Switch**



**MEMS Ultra-Mini Full 2x2 Non-Latching Switch**



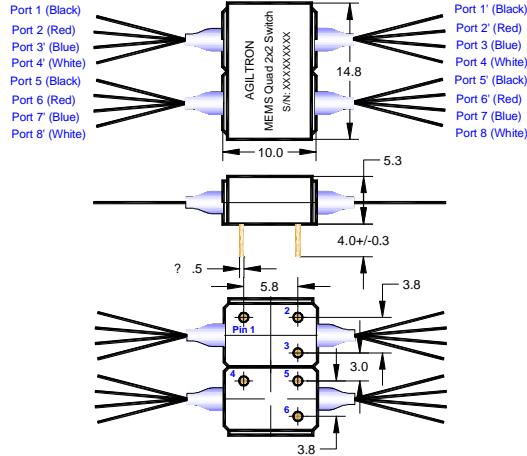
**MEMS Ultra-Mini Dual Full 2x2 Non-Latching Switch**



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## MEMS U-Mini Quad Full 2x2 Non-Latching Switch



## Electrical Driving Requirements

Status	Optical Path						Pin No.		
	1X1 & 1x1 R <sup>[1]</sup> (Normally Transparency)	1X1 & 1x1 R (Normally Dark)	Dual 1X1 (Normally Transparency)	Dual 1X1 (Normally Dark)	Quad 1X1 (Normally Transparency)	Quad 1X1 (Normally Dark)	Pin 1	Pin 2	Pin 3
Status 1	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 <sup>[2]</sup>	GND	L <sup>[2]</sup>
Status 2	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	GND	H <sup>[3]</sup>

Status	Optical Path					Pin No.		
	1x2 & 1x2 R	Dual 1X2	Full 2x2	Dual Full 2x2	Quad Full 2x2	Pin 1	Pin 2	Pin 3
Status 1	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'	Port 1→1', Port 2→2' Port 3→3', Port 4→4' Port 5→5', Port 6→6' Port 7→7', Port 8→8'	NC	GND	L
Status 2	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'	Port 1→4', Port 2→3' Port 3→2', Port 4→1' Port 5→8', Port 6→7' Port 7→6', Port 8→5'	NC	GND	H

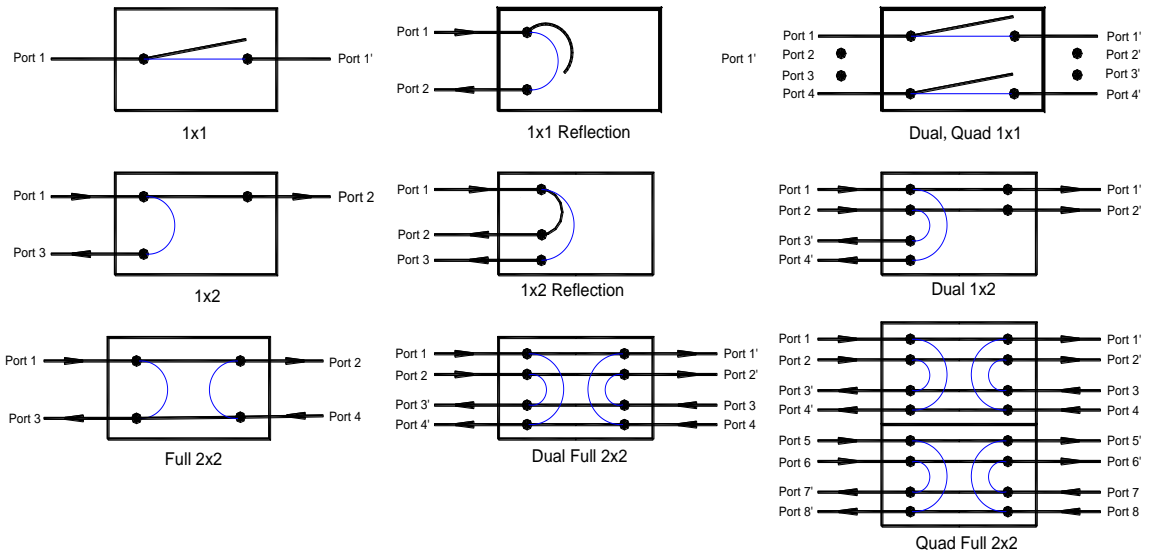
[1]. 1x1 R: MEMS U-mini 1x1 Reflection Switch. [2]. NC: No electronic Connection. [3]. Power Consumption is about 170 mW.

Driving Voltage		Min	Typical	Max	Unit
H	H1 version	4.0	4.5	5.0	VDC
	H2 version	3.5	3.6	4	VDC
L				0.8	VDC

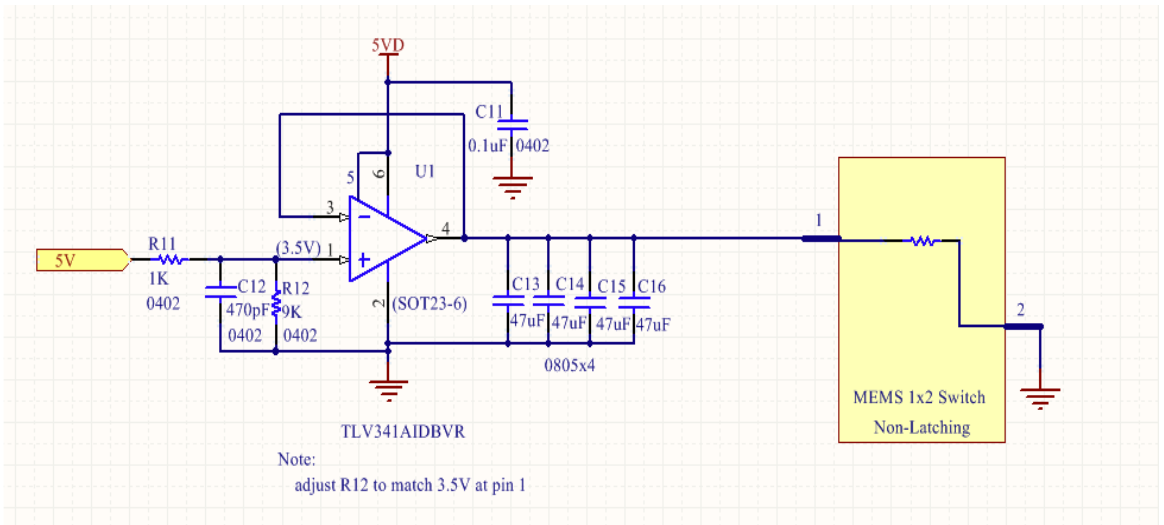
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## Functional Diagram



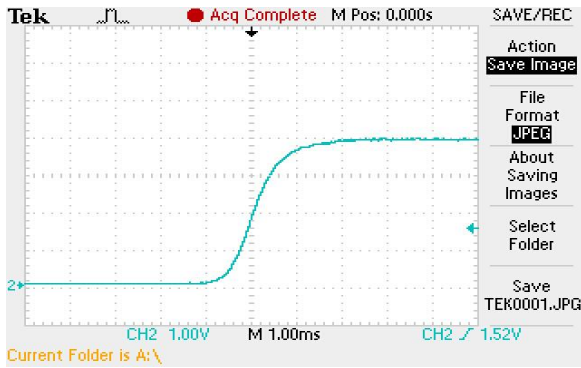
## Recommendation Control Circuit



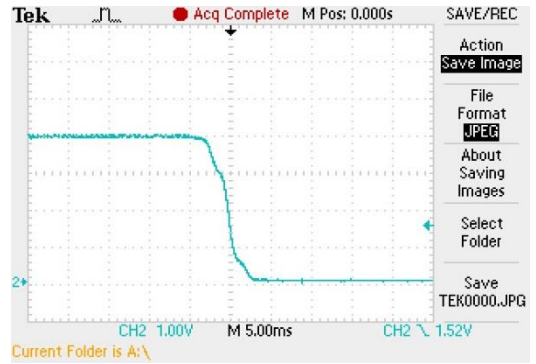
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## MEMS 1X1 Switch Response Time Test Report



**Switch Time (Rise): 1.64ms**



**Switch Time (Fall): 5.4ms**



**Working at 1Hz**

## Ordering Information

Type	Wavelength	Switch	Package	Fiber Type	Fiber Length	Connector
MUSW [1] MURS [2] MUDU [3] MUQU [4] MUPM [5]	1x1 N/T [6]=1T 1x1 N/D [7]=1D 1x2=12 2x2=22 Special=00 1060=1 1310=3 1550=5 780=7 850=8 1310/1550=9 850/1310=A 1260-1620=B Special=0	Non-latching=2	H1 [8]=1 H2 [9]=2	SMF-28=1 Panda 250 PM=B MM 50/125=5 MM 62.5/125=6 Special=0	0.25m=1 0.5m=2 1.0m=3 Special=0	None=1 FC/PC=2 SC/APC=3 SC/PC=4 SC/APC=5 ST/PC=6 LC=7 Duplex LC=8 MTP=9 Special=0

- [1]. **MUSW**: MEMS Ultra-Mini 1x1, 1x2, 2x2 **SWITCH**.
- [2]. **MURS**: MEMS Ultra-Mini 1x1, 1x2 **R**eflection Switch.
- [3]. **MUDU**: MEMS Ultra-Mini **D**Ual 1x1, 1x2, 2x2 Switch.
- [4]. **MUQU**: MEMS Ultra-Mini **Q**Uad 1x1, 1x2, 2x2 Switch.
- [5]. **MUPM**: MEMS Ultra-Mini 1x1, 1x2 **P**M Switch.
- [6]. **N/T**: MEMS Ultra-Mini Non-Latching 1x1 Switch, **N**ormally **T**ransparence.
- [7]. **N/D**: MEMS Ultra-Mini Non-Latching 1x1 Switch, **N**ormally **D**ark.
- [8]. H1: Driving voltage is 4.5 VDC typically.
- [9]. H2: Driving voltage is 3.6 VDC typically.



Revision: 6-18-19

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