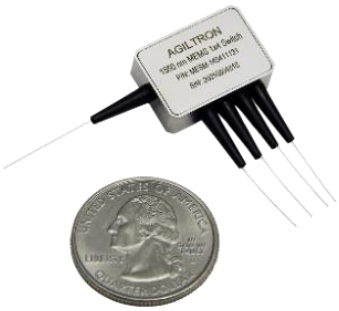
# MEMS 1x4 Mini Latching Series Fiber Optic Switch

## (Bidirectional, SM, PM)

(Protected by U.S. pending patents)

DATASHEET

BUY NOW




The MEMS 1x4 Latching Type Series Fiber Optic Switch connects optical channels by redirecting incoming optical signals into selected output fibers. This is achieved using a patent pending MEMS™ configuration and activated via an electrical control signal. It uniquely features rugged thermal activated micro-mirror movement instead of rotation.

This novel design significantly reduces packaging requirement and simplifies driving electronics, offering unprecedented high stability as well as an unmatched low cost.

## Applications

- Channel Blocking
- Configurable Add/Drop
- System Monitoring
- Instrumentation

## Features

- High reliability
- Intrinsic tolerance to ESD

## Specifications

| Parameter | | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Operation Wavelength | Single Band | 850±40, 1310±40 or 1510±40 | | | nm |
| | Dual Band | 850±40 and 1310±40 1310±40 and 1510±40 | | | |
| | Broad Band | 1260~1620 | | | |
| Insertion Loss [1] | | | 0.6 | 1.0 (1.2 [2]) | dB |
| Wavelength Dependent Loss | | | 0.15 | 0.3 [2] | dB |
| PDL (SM) | | | | 0.1 | dB |
| Extinction Ratio (PM) | | 18 | | | dB |
| Cross Talk [1] | | 50 | | | dB |
| Return Loss [1] | | 50 | | | W |
| Switching Time | | | 5 | 10 | ms |
| Repeatability | | | | ± 0.05 | dB |
| Repetition Rate | | | | 5 | Hz |
| Durability | | $10^9$ | | | cycle |
| Switching Type | | Latching | | | |
| Operating Temperature | | -5 | | 70 | °C |
| Storage Temperature | | -40 | | 85 | °C |
| Optical Power Handling (CW) | | | 300 | 500 | mW |
| Fiber Type | SM | SMF-28, or equivalent | | | |
| | PM | Panda 250, Panda 400 fiber, or equivalent | | | |
| | MM | MM 50/125, MM 62.5/125, or equivalent | | | |

**Notes**:

[1]. Exclude connectors.

[2]. Dual and Broad band.



Rev 02/07/24

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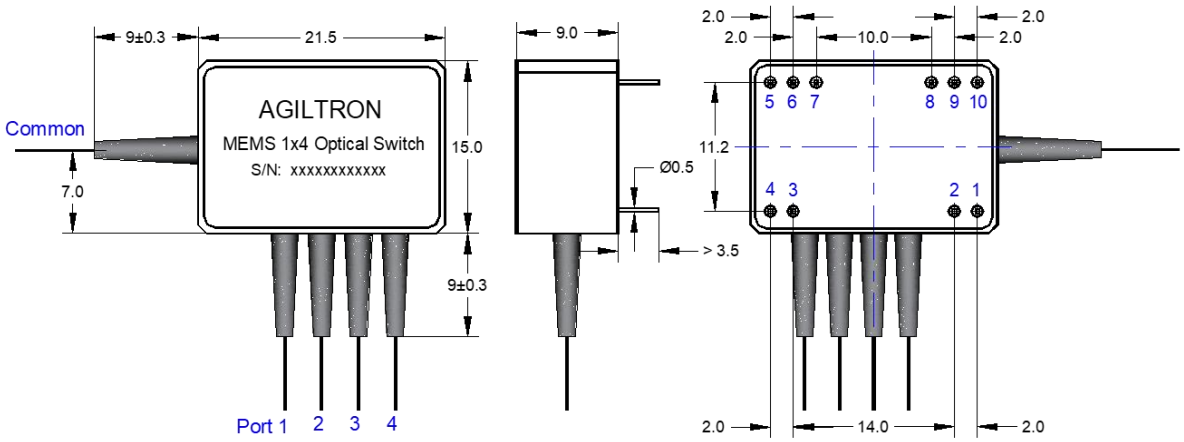
## Mechanical Footprint Dimensions (mm)




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

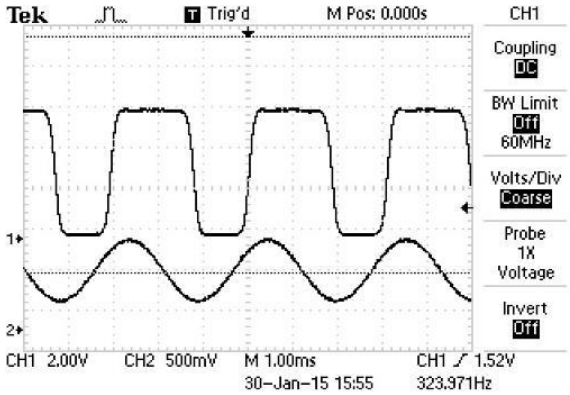
## Electronic Control Requirements

| Optical Path | Pin Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Com ↔ Port 1 | 5 VDC [1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5V Pulse |
| Com ↔ Port 2 | | | 0 | 0 | 0 | 0 | 0 | 5V Pulse | 5V Pulse | 0 |
| Com ↔ Port 3 | | | 0 | 5V Pulse [2] | 0 | 5V Pulse | 5V Pulse | 0 | 5V Pulse | 0 |
| Com ↔ Port 4 | | | 0 | 0 | 5V Pulse | 0 | 5V Pulse | 0 | 5V Pulse | 0 |

[1]. 5VDC: 5.0±02 V. Static 3 mA; During Pulse Current is 100 mA. The switch will remain in its previous light path state, if this voltage is removed (latching).
[2]. 5V Pulse: 5.0±02 V. Pulse width is 40±5 ms.

## $10^9$ 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 $10^9$ switching cycles. The measurements show little changes in Insertion loss, Cross Talk, Return loss ect, all parameters are within our specs.





P +1 781-935-1200 E sales@photonwares.com W www.agiltron.com

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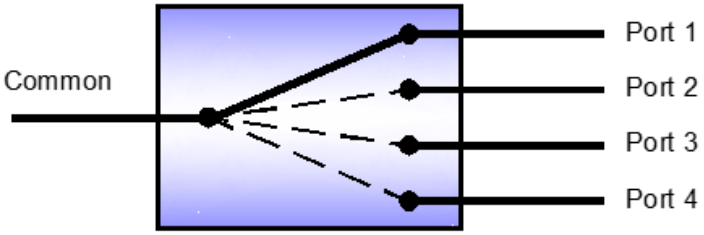
## Functional Diagram




MEMS 1x4 Series Switch

## Ordering Information

| | ☐☐ | ☐ | 1 | 1 | ☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|---|---|---|---|
| **Prefix** | **Type** | **Wavelength** | **Switch** | **Package** | **Fiber Type** | **Fiber Cover** | **Fiber Length** | **Connector** |
| **MESM-** [1]<br>**MEMP-** [2] | 1x3=13<br>1x4=14<br>Special=00 | 1260~1620=B<br>1060=1<br>C+L=2<br>1310=3<br>1550=5<br>780=7<br>850=8<br>1310/1550=9<br>Special=0 | Latching=1 | Standard=1 | SMF-28 = 1<br>PM1550 = B<br>Special = 0 | Bare fiber=1<br>900um tube=3<br>Special=0 | 0.25m=1<br>0.5m=2<br>1.0m=3<br>Special=0 | None=1<br>FC/PC=2<br>FC/APC=3<br>SC/PC=4<br>SC/APC=5<br>ST/PC=6<br>LC/PC = 7<br>Duplex LC/PC = 8<br>LC/APC = A<br>LC/UPC = U<br>Special = 0 |

[1]. **MESM**: **ME**MS 1x4 **S**M **M**ini Switch
[2]. **MEMP**: **ME**MS 1x4 **M**ini **P**M Switch

NOTE:

- **PM1550** fiber works well for **1310nm**

**Fiber Core Alignment**

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

**Fiber Cleanliness**

Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

**Maximum Optical Input Power**

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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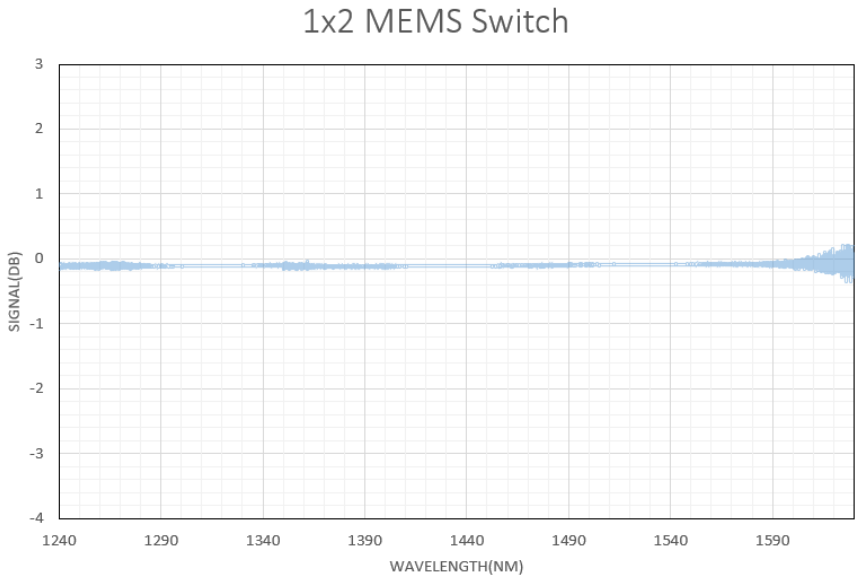
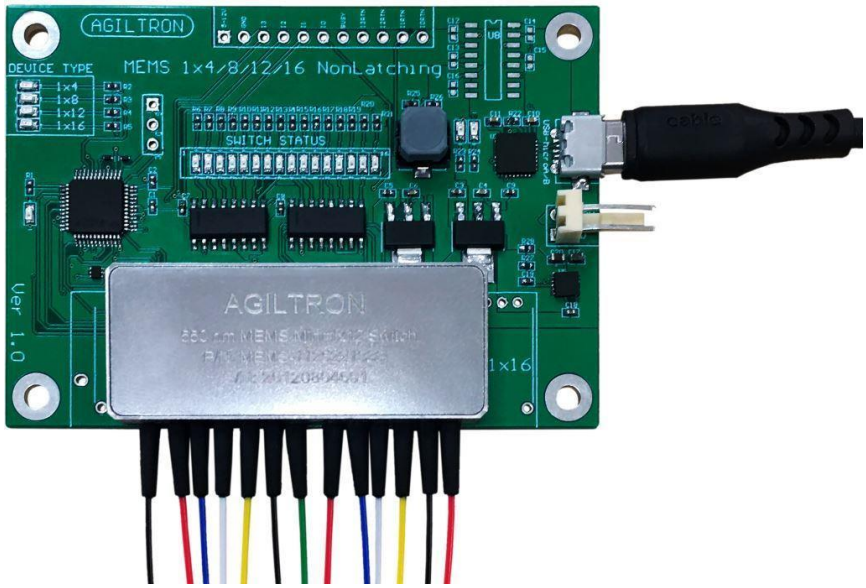
## Typical Insertion Loss vs Wavelength (1240-1630nm)




## Demo Driver

**USB RS232/GUI, Pushbutton/LED Channel Indicators ($255)**






P +1 781-935-1200 E sales@photonwares.com W www.agiltron.com