

# MEMS Mini 4x4 Fiber Optical Switch



(Low Latency, Fast, Latching, ER 30dB, Bidirectional, SM, PM)

(Protected by U.S. patent 8,203,775, 20170184840A1, and other patents pending)

DATASHEET

BUY NOW



The 1D MEMS 4x4 Series Fiber Optic switch redirects incoming optical signals into four selected output fibers. It offers unique advantages of low latency, high on/off ratio, high polarization extinction ratio, and fast switching. It is a true nonblocking device that accommodates all possible light paths. This is achieved using a patented MEMS configuration and activated via an electrical control signal. The light path is bidirectional and nonblocking.

The switch is available with driving electronics.

## Features

- Reliable
- Compact
- No Drift
- Low Loss

## Specifications

Parameter		Min	Typical	Max	Unit
Operation Wavelength	Singe Band	1260~1360 or 1510~1610			nm
	Dual Band	1260~1360 and 1510~1610			
	Broad Band	1260~1620			
Insertion Loss <sup>[1], [2]</sup>			1.0	1.5	dB
Wavelength Dependent Loss			0.2	0.3	dB
Polarization Dependent Loss (SM)				0.2	dB
Extinction Ratio (PM)		18	25	30	dB
Return Loss <sup>[1], [2]</sup>		55			dB
Cross Talk On/Off <sup>[1], [2]</sup>		55		70	dB
Response Time		3	10	15	ms
Repetition Rate			5		Hz
Latency				10	ns
Repeatability				± 0.05	dB
Durability		10 <sup>9</sup>			Cycle
Operating Temperature <sup>[3]</sup>		-5		70	°C
Storage Temperature		-40		85	°C
Optical Power Handling (CW)			300	500	mW
Standard Package Dimension		25 x 25 x 6.5			mm

### Notes:

[1]. Within operating temperature and SOP

[2]. Excluding connectors

[3] -40 °C version is available

**Note:** The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link](#):

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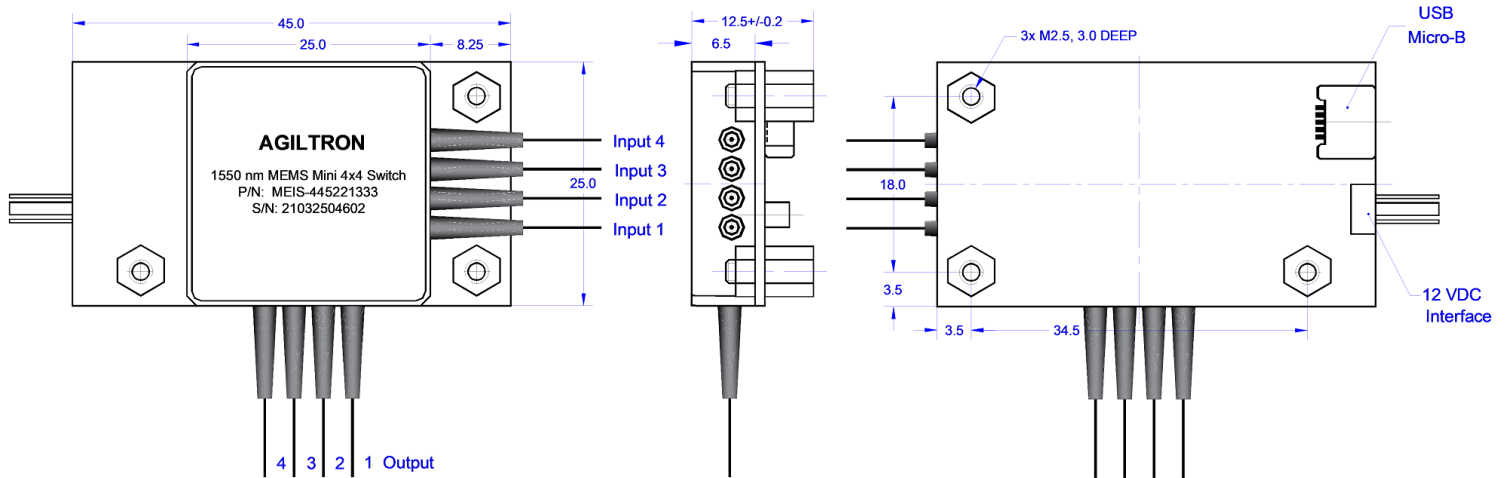
# MEMS Mini 4x4 Fiber Optical Switch

(Latching Type, Bidirectional, SM, PM)

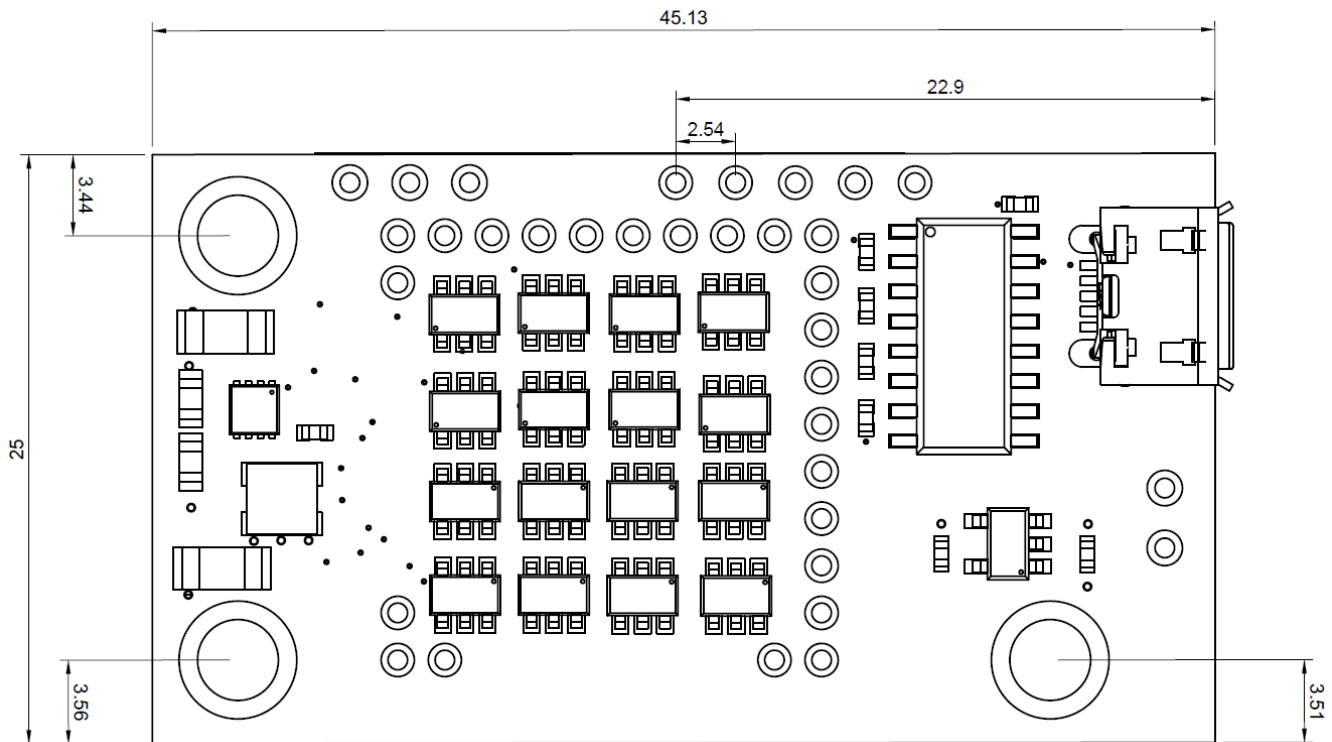


## DATASHEET

### Mechanical Dimensions (mm)



### Mechanical Dimensions MEMS 4x4 Mini Driver – RS232 (mm)



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

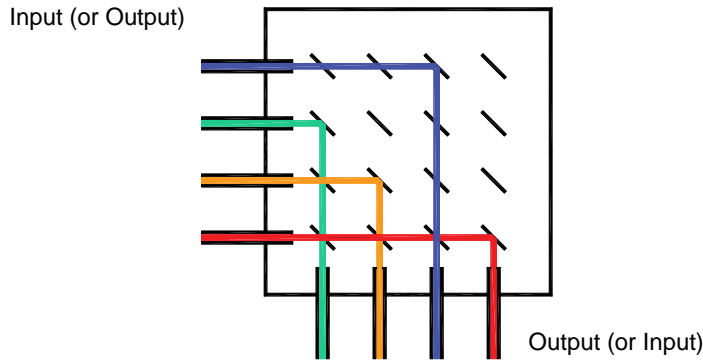
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## DATASHEET

### Functional Diagram



### Control Interface Information

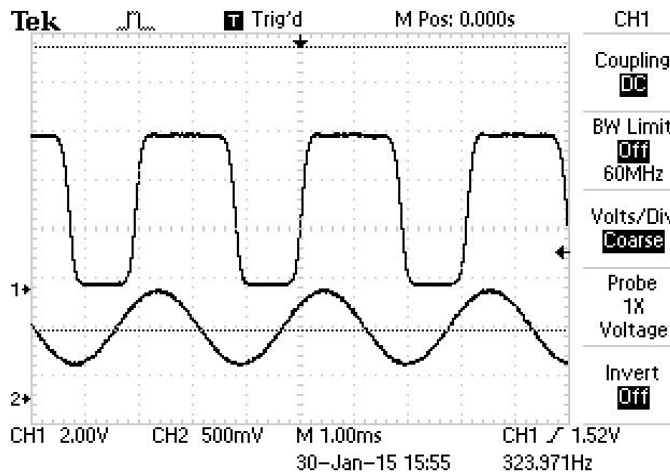
The control interface is Micro-USB with GUI and/or command list. RS232 can be an alternative option with the adaption cable of converter, but USB and RS232 can't be implement on same driver.



Cable for RS232

### 10<sup>9</sup> 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<sup>9</sup> switching cycles. The measurements show little changes in Insertion loss, Cross Talk, Return loss etc., all parameters are within our specs.



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### Ordering Information

Prefix	Type	Wavelength	Switch	Driver	Fiber Type	Fiber Cover	Fiber Length	Connector	PER
MEIS- [1]	2x4 = 24 3x4 = 34 4x4 = 44 Special = 00	1260~1620 = B 780 = 7 850 = 8 Special = 0	Non Latching = 2 Latching = 1	USB = 2 RS232 = 3 None = 5	SMF-28 = 1 PM 1550 = B PM 980 = E PM 850 = F Special = 0	900 um 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/PC = 7 Duplex LC/PC = 8 Special = 0	Non = 1 18 = 2 25 = 3 29 = 4 30 = 5

[1]. MEIS: MEMS MINI 4x4 SM Switch

#### 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 handling by expanding the core side at the fiber ends.

### Operation Manual

1. Connect the device to a PC using the accompanied cable
2. Plug in the accompanied power supply
3. Install the accompanied software in the PC
4. Run the software, using the GUI to control the device.

**Warning** do not touch the PCB since the static will damage the ICs, do not adjust the setting on the PCB.

# MEMS Mini 4x4 Fiber Optical Switch

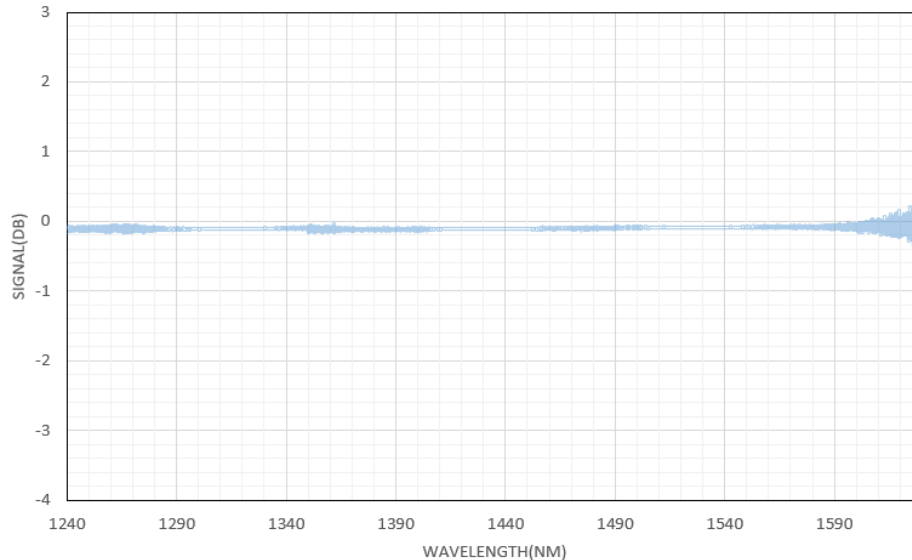
(Latching Type, Bidirectional, SM, PM)



## DATASHEET

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

1x2 MEMS Switch



### GUI SCREEN SHOT

File Edit Device Configure Info

Online Mode

**PHOTONWARES**

## Switch Operation Program

MEMS 4X4 Switch Run Time Test

**Running Status**

Current Step	Step Duration (ms)	Loop Count

**Action Buttons**

# of Loops: 0 **Run**

Loop Activate:  **Pause**

**Programmable Running Sheet**

Steps	Duration(ms)	Status (Click to Set to Light Path/Double Click to Reset The Light Paths)
1	1000	I1-01 I2-02 I3-03 I4-04
2	1000	I1-01 I2-02 I3-04 I4-03
3	1000	I1-01 I2-03 I3-02 I4-04
4	1000	I1-01 I2-03 I3-04 I4-02
5	1000	I1-01 I2-04 I3-02 I4-03
6	1000	I1-01 I2-04 I3-03 I4-02
7	1000	I1-02 I2-01 I3-03 I4-04
8	1000	I1-02 I2-01 I3-04 I4-03
9	1000	I1-02 I2-03 I3-01 I4-04
10	1000	I1-02 I2-03 I3-04 I4-01
11	1000	I1-02 I2-04 I3-01 I4-03

**Light Path Status**

Input 1  Output 1

Input 2  Output 2

Input 3  Output 3

Input 4  Output 4

**Start Status #**

0

1

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## DATASHEET

### Command List

Command/Echo /Comments

BaudRate Setting: 9600-N-8-1

CMD: 0x01 0x12 0x00 x(HEX) /Switch to CH, x: 0, 1, 2, 3 ... 23.  
Echo: 0x01 0x12 0x00 x(HEX) /Succeeded  
0x01 0x12 0xFF 0xFF /Failed

CH	Status
0	I1-01 I2-02 I3-03 I4-04
1	I1-01 I2-02 I3-04 I4-03
2	I1-01 I2-03 I3-02 I4-04
3	I1-01 I2-03 I3-04 I4-02
4	I1-01 I2-04 I3-02 I4-03
5	I1-01 I2-04 I3-03 I4-02
6	I1-02 I2-01 I3-03 I4-04
7	I1-02 I2-01 I3-04 I4-03
8	I1-02 I2-03 I3-01 I4-04
9	I1-02 I2-03 I3-04 I4-01
10	I1-02 I2-04 I3-01 I4-03
11	I1-02 I2-04 I3-03 I4-01
12	I1-03 I2-01 I3-02 I4-04
13	I1-03 I2-01 I3-04 I4-02
14	I1-03 I2-02 I3-01 I4-04
15	I1-03 I2-02 I3-04 I4-01
16	I1-03 I2-04 I3-01 I4-02
17	I1-03 I2-04 I3-02 I4-01
18	I1-04 I2-01 I3-02 I4-03
19	I1-04 I2-01 I3-03 I4-02
20	I1-04 I2-02 I3-01 I4-03
21	I1-04 I2-02 I3-03 I4-01
22	I1-04 I2-03 I3-01 I4-02
23	I1-04 I2-03 I3-02 I4-01

CMD: 0x01 0x13 0x00 0x00 /Check current CH  
Echo: 0x01 0x13 0x00 x(HEX) /Return current CH

CMD: 0x01 0x02 0x00 0x00 /Check Version  
Echo: 0x01 0x02 0x41 0x30