# MEMS Straight
# Fiber Optical Variable Attenuator

(Protected by US Patent 10752492B2)

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The MEMS Straight Series Fiber Optical Variable Attenuator uses a patented thermal activated micro-mirror, moving-in and -out optical paths, uniquely featuring large extinction ratio, high stability over wide temperature range, and very long life cycle. The thermal MEMS is insensitive to moisture and ESD without drift issues, providing a high reliability platform for over 25 years continuous operation. The MEMS Straight Series VOAs are configured in single and dual channels (activated at the same time). The VOAs are bidirectional and are Telcordia standards GR1221 qualified.

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

This VOA is designed to be used in a feedback configuration

## Features

- High Reliability
- Direct DC drive
- Ultra Small
- ESD Insensitive

## Specifications

| Parameter | | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Operation Wavelength | Single Mode | | 1260 ~ 1610 | | nm |
| | Multimode | 810-890 | 1260-1360 | 1500-1600 | |
| Insertion Loss [1], [2] | | | 0.6 | 1.0 / 1.2 [3] | dB |
| PDL (SM) | | | | 0.1 | dB |
| PMD (SM) | | 0.0001 | | 0.01 | dB |
| Extinction Ratio | PM fiber | 18 | | | dB |
| Return Loss | SM, PM | 50 | | | dB |
| | MM | 35 | | | |
| Attenuation | SM, PM | 55 [4] | | | dB |
| | MM | 45 | | | dB |
| Response Time | | | 3 | 7 | ms |
| Repetition Rate | | | | 20 | Hz |
| Wavelength Dependence@20dB | | | | 0.5 | dB/100nm |
| Durability | | $10^{12}$ | | | Cycle |
| Power Consumption (at maximum) | | | | 170 | mW |
| Operating Temperature [4] | | -5 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Optical Power Handling (CW) | | | 300 | 500 | mW |
| Fiber Type | Single Mode | SMF-28 or equivalent | | | |
| | PM | Panda 150 PM or equivalent | | | |
| | Multimode | MM 50/125, MM 62.5/125 or equivalent | | | |

**Notes**:
[1]. Excluding connectors.
[2]. Multimode IL measured @ Light Source CPR < 14dB.
[3]. Dual band.
[4]. Lower temperature version is available, please call us

**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]:



Rev 02/26/25

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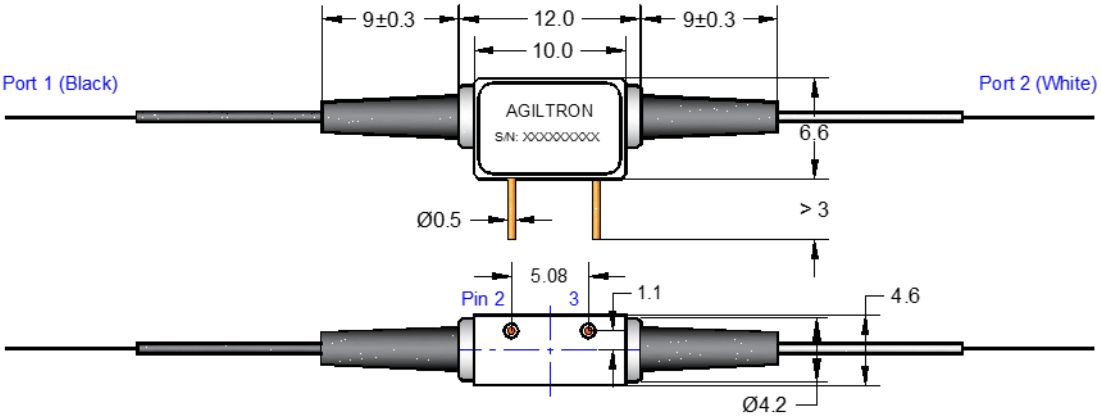
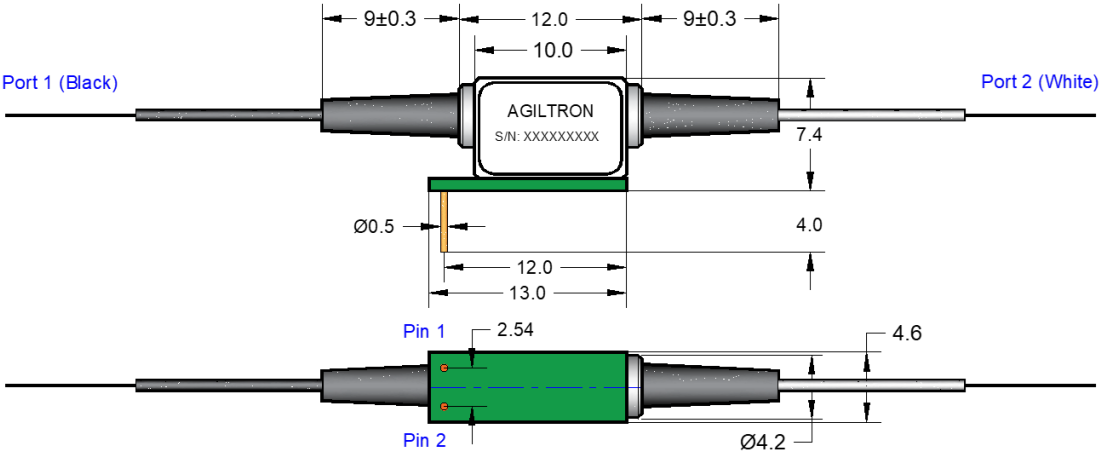
## Mechanical Dimension (unit: mm)

### Package 1: Standard package




### Package D: Add Adapting PCB version




## Electrical Driving Requirements

1. Resistance load device, insensitive to ESD.
2. Highly recommend to add 70 ohm resistor in series on Pin 3 in driver to smooth the attenuation slope.
3. **Warning: Damaged if applying voltage over the maximum (even for a short time)**
4. Pin 2 = 0V, Pin 3 = 0~4.5V (maximum)

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.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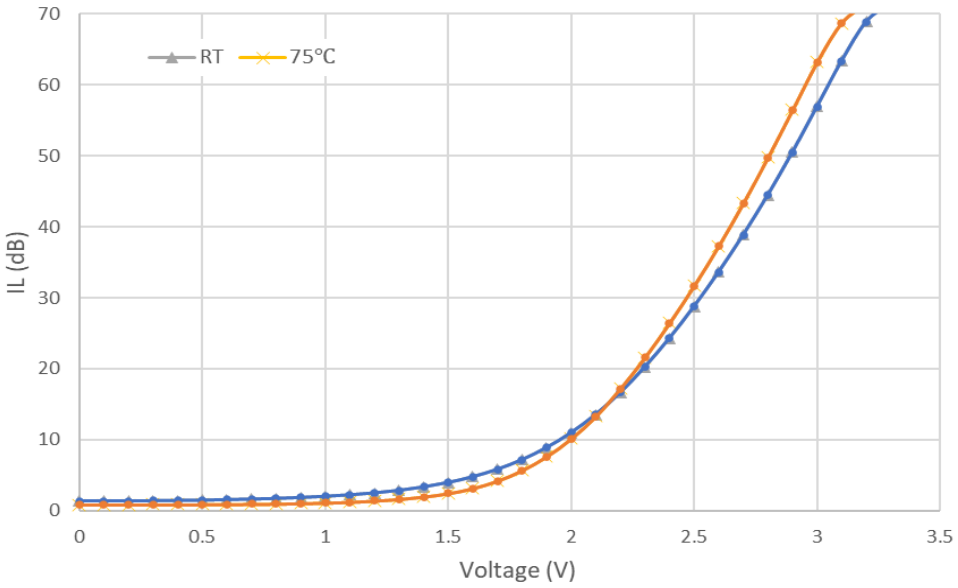
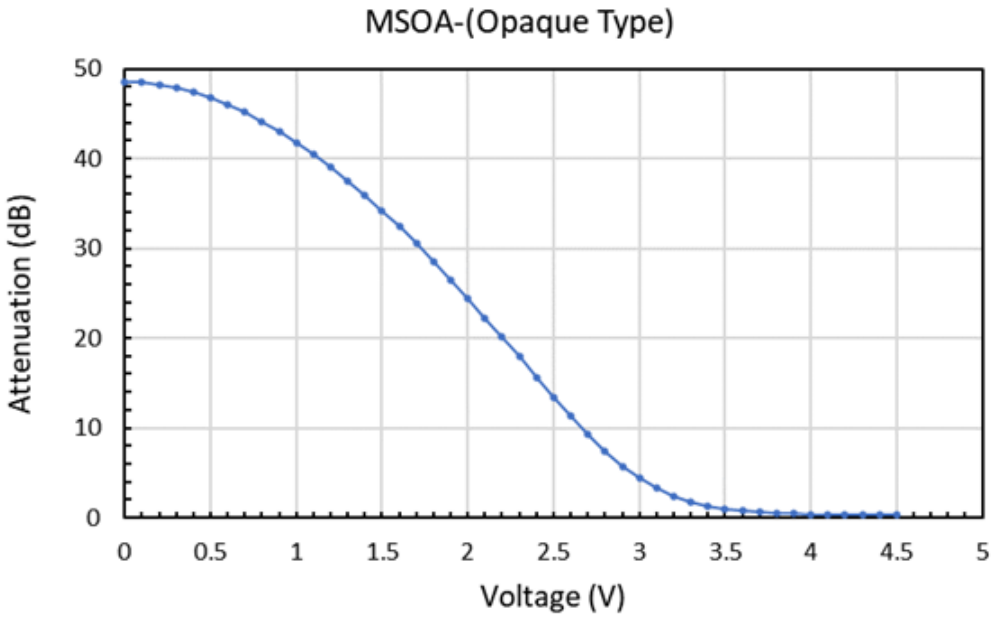
## Typical Attenuation vs. Voltage w/ T compensation for Transparent Type




Note: Measured by adding the resistor and temperature compensation on MSOA.

## Typical Attenuation vs. Voltage for Opaque Type



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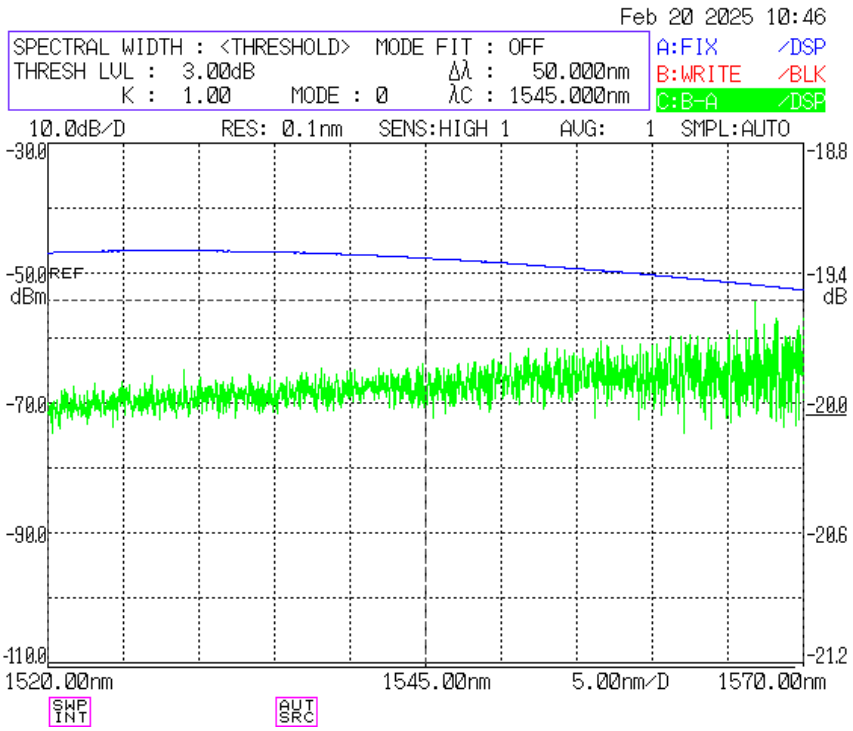
## Typical Wavelength Dependence @20dB Attenuation



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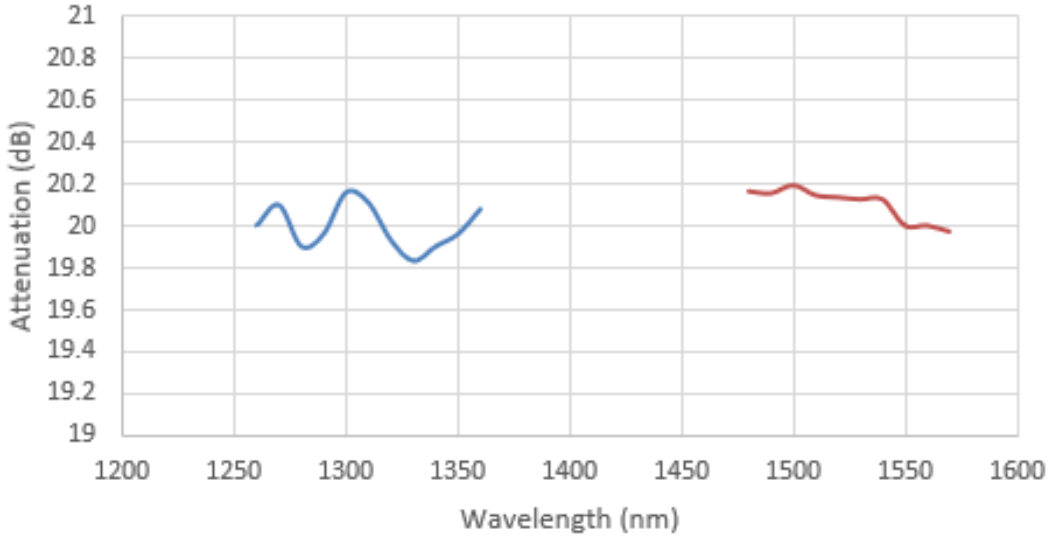
## Typical Attenuation vs. Wavelength for WDL at 20 dB




## Ordering Information

| | ☐☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|---|---|---|---|
| **Prefix** | **Non-Power State** | **Wavelength** | **Temperature Range** | **Package** | **Fiber Type** | **Fiber Cover** | **Fiber Length** | **Connector** |
| **MSOA-** | Single VOA Transparent = 01<br>Single VOA Opaque [1] = 02<br>Dual VOA Transparent = 21<br>Dual VOA Opaque = 22 | 1260~1620 = B<br>1060 = 1<br>1310 = 3<br>1550 = 5<br>850 = 8<br>850/1310 = A<br>Special = 0 | -5 to 75$^0$C = 1<br>-40 to 75$^0$C = 2<br>Special = 0 | Package 1 [2] = 1<br>Package D [3] = D<br>Special = 0 | SMF-28 = 1<br>PM1550 = B<br>PM1310 = D<br>PM980 = E<br>PM850 = F<br>MM 50/125 = 5<br>MM 62.5/125 = 6<br>Special = 0 | Bare fiber = 1<br>900 µm 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>LC/PC = 7<br>Special = 0 |

[1]. Opaque means the light is blocked when no electrical power is present.
[2]. Package 1 (see Drawing) is Standard package.
[3]. Package D (see Drawing) is add Adapting PCB version.

**Note:**
"transparent" means no attenuation without applying a controlling voltage, the "opaque" means the highest attenuation without applying a controlling voltage.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