

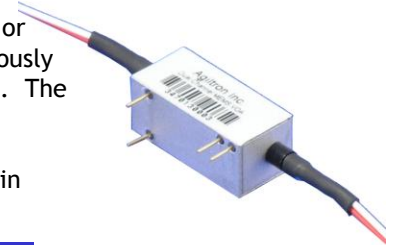
MEMS Variable Optical Attenuator (VOA)

(patents pending)

Product Description

The BM Series VOA is based on a proprietary micro-electro-mechanical mechanism featuring ultra-high reliability, compact design, fiber to fiber directly coupling technology, simple construction, easy drive, and excellent optical performance. The MM series VOA is fully compliant with the Telcordia 1209 and 1221 reliability standards. The MM series VOA is available in either normally-transparent or normally-opaque configurations.

The VOA is driven with an electrical current or voltage; and the attenuation can be continuously adjusted with the applied current or voltage. The MM series can be repackaged with pin-pin compatibility to most VOAs on the market. Standard package contains one or two VOAs in dimensions of 23.2mmx10.1mmx10.7mm.



Performance Specifications

MM Series VOA		Min	Typical	Max	Unit
Wavelength			1310/1550		nm
Insertion Loss ¹			0.6	0.8	dB
Polarization Dependent Loss	@10dB		0.15	0.3	dB
	@20dB		0.25	0.5	dB
Wavelength Dependent Loss	@10dB		0.2	0.4	dB
	@20dB		0.4	0.7	dB
Temperature Dependent Loss ²	@10dB		0.4	0.7	dB
	@20dB		2	3	dB
Attenuation Range		25	30		
Polarization Mode Dispersion			0.01	0.05	ps
Return Loss		45			dB
Attenuation Resolution			Continuous		
Response Time			3	6	ms
Driving Voltage ⁴			5	6 ⁴	V
Power Consumption ³				130	mW
Optical Power Handling			0.3	0.5	W
Operating Temperature		-5		75	°C
Storage Temperature		-40		85	°C
Reliability			Telcordia 1209 and 1221		
Package Dimension			23.2(L)x10.1(W)x10.7(H)		mm

Notes:

1. Excluding connectors

2. Reference to room temperature

3. For full dynamic range. Other drive voltages available

4. Over this value will damage the device

Features

- Broad band
- Low Cost
- High Reliability
- Low IL, PDL, WDL & TDL
- Direct Current Drive
- Low Power Consumption

Applications

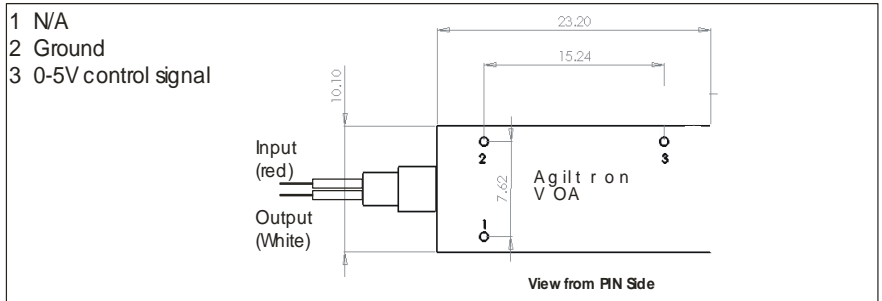
- Power Control
- Power Regulate
- Channel Balance
- Instrumentation



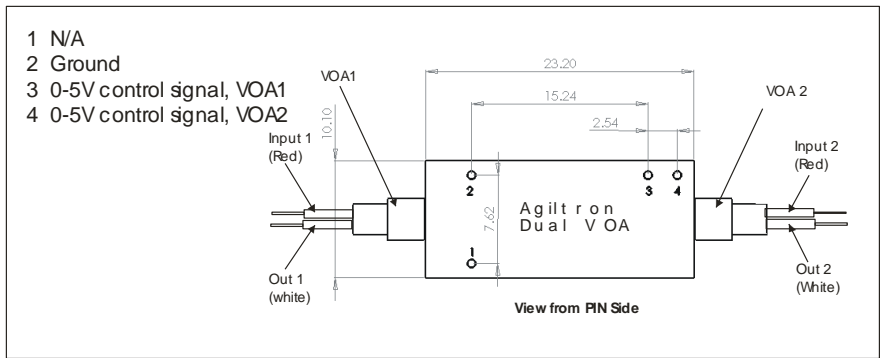
MEMS Variable Optical Attenuator (VOA)

Mechanical Footprint Dimensions (mm)

Single VOA
(Reflect, package type 3)



Dual VOA
(Reflect, package type 2)



All Pin diameter = .45mm

Ordering Information

BMOA	Type	Wavelength	Off State	Package Type	Fiber Type	Fiber Length	Connector Type
-	1 channel=10 2 channel=20 Special=00	1260-1620=1 950-1080=2 740-850 =3 Special =0	Transparent = 1 Opaque = 2	Single VOA =3 Dual VOA = 2 Special=0	SMF 28=1 HI1060=2 HI780=3 Special=0	250 μm fiber=1 400 μm fiber=2 900 μm tube=3 Special=0	0.25m= 1 0.5m = 2 1.0 m= 3 Special =0 None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC = 7 Special = 0



MEMS VOA Typical Performance Charts (1)

Typical Performance of MEMS VOAs (open loop)

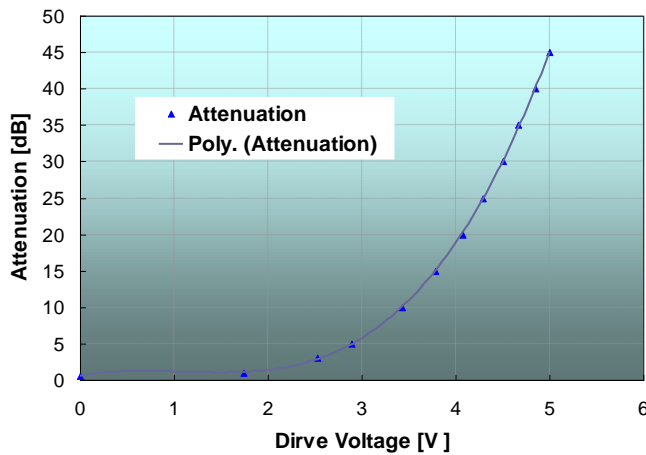
Features

- Compact
- Low Cost
- High Reliability
- Low IL, PDL, WDL & TDL
- Direct Current Drive
- Low Power Consumption

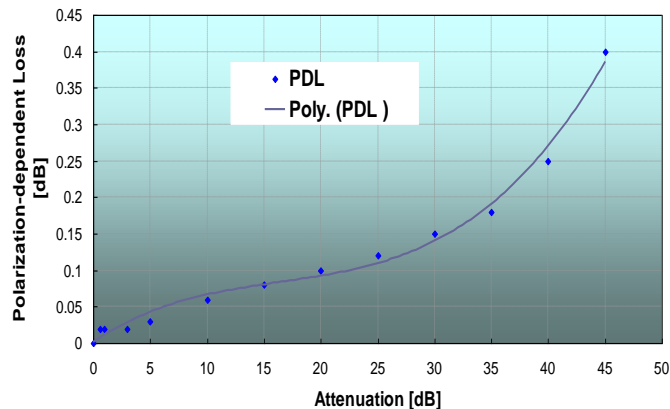
Applications

- Power Control
- Power Regulation
- Channel Balance
- Instrumentation

Typical Attenuation Response vs Drive Voltage



Typical PDL Characteristics vs Attenuation



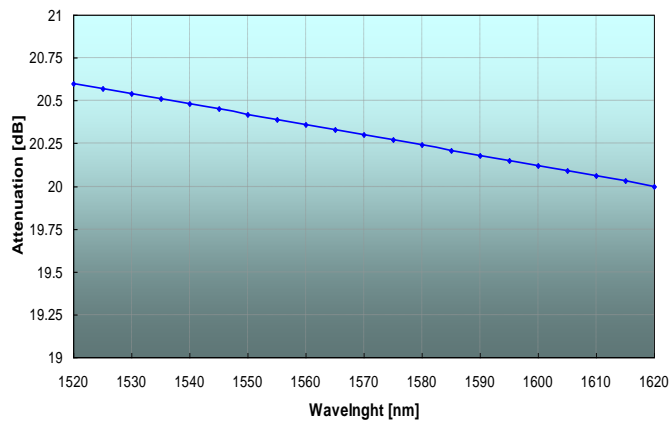
MEMS VOA Typical Performance Charts (2)

Typical Performance of MENS VOAs (open loop)

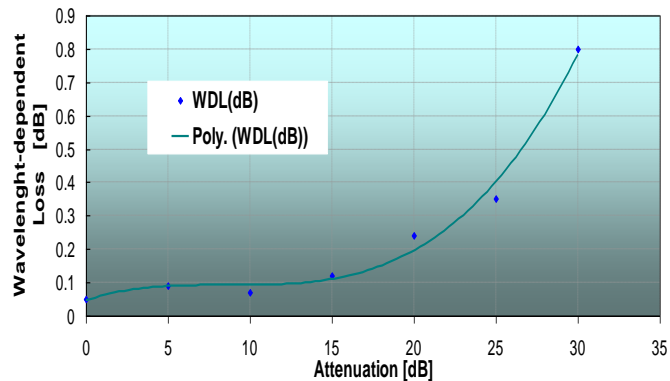
Features

- Compact
- Low Cost
- High Reliability
- Low IL, WDL, PDL & TDL
- Direct Current Drive
- Low Power Consumption

Typical Attenuation Wavelength Dependence of MEMS VOA @ 20 dB



Typical Wavelength-Dependent Loss of MEMS VOA vs Attenuation



Applications

- Power Control
- Power Regulation
- Channel Balance
- Instrumentation



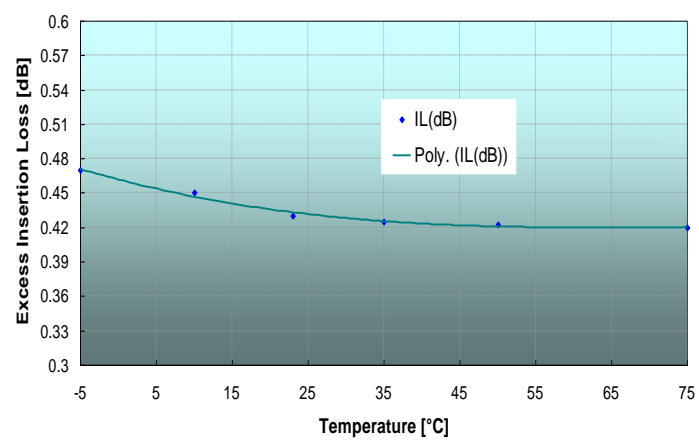
MEMS VOA Typical Performance Charts (3)

Features

- Compact
- Low Cost
- High Reliability
- Low IL, PDL, WDL & TDL
- Direct Current Drive
- Low Power Consumption

Typical Performance of MEMS VOAs (open loop)

Typical Insertion loss Variation vs Temperature of MEMS VOAs



Applications

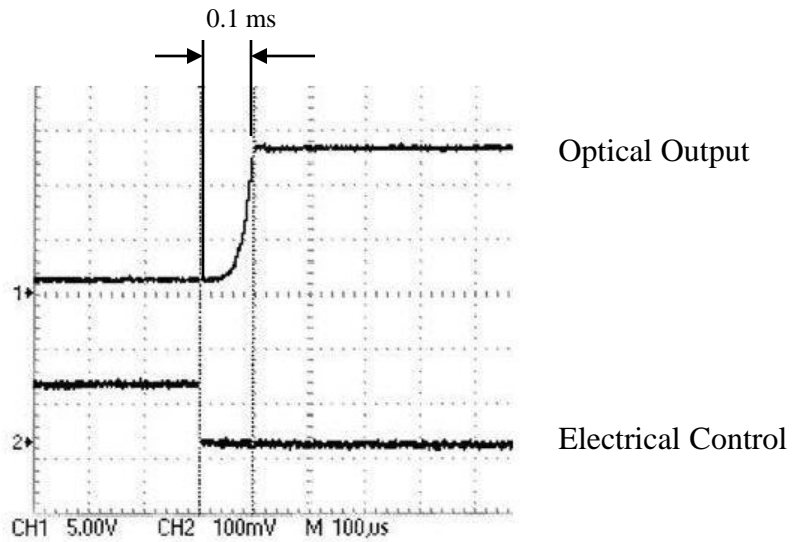
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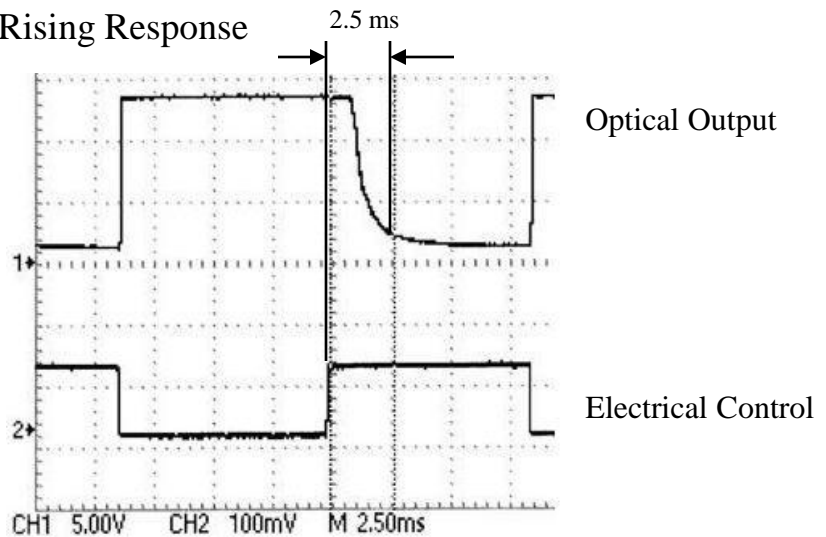
MEMS VOA Typical Performance Charts (4)

VOA Responses (close-loop)

(a) Falling Response



(b) Rising Response



Features

- Compact
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Applications

- Power Control
- Power Regulation
- Channel Balance
- Instrumentation

