

etMEMS™ Variable Optical Attenuator Integrated With Input Tap

(US patent 8,666,218 and other patents pending)

Product Description

The **etMEMS™** Series VOA is based on a micro-electro-mechanical mechanism featuring integrated compact design, simple construction, easy direct drive, and excellent optical performance of ultra low insertion loss, low PDL, and broad wavelength operation range. The **etMEMS™** Series VOA is compliant with the Telcordia 1209 and 1221 reliability standards. The **etMEMS™** Series VOA is available in either normally-open or normally-closed configurations and with an integrated input tap option.

The VOA is driven by applying an electrical voltage



Performance Specifications

etMEMS™ Series TVOA	Min	Typical	Max	Unit
Operation Wavelength	1260 -1360 or 1510-1620			nm
Insertion Loss ^[1]		0.5	0.8	dB
Polarization Dependent Loss ^[2] (SM version only)		0.15	0.5	dB
Wavelength Dependence Loss ^{[3], [4]}		0.2	0.6	dB
Attenuation Range		25	30	dB
Attenuation Resolution	Continuous			
Extinction Ratio (PM version only)	18	23	25	dB
Polarization Mode Dispersion (SM version only)		0.01	0.05	ps
Return Loss	45			dB
Response Time		3	6	ms
Driving Voltage ^[5]		4.5	5.2 ^[7]	V
Device Resistance	80	100	120	Ω
Optical Power handling (CW)		300	500	mW
Tap Response @ 1550nm ^[8]	12	15	40	mA/W
Tap directivity		N/A or 25		dB
Tap Wavelength Dependence Response ^[6]	0.010	0.013	0.02	dB/nm
Tap Polarization Dependence Response	0.02	0.10	0.25	dB
Tap Temperature Dependence Response			0.01	dB/°C
Tap Dark Current at 5V bias @ 23°C		0.2	1	nA
Tap Dark Current at 5V bias @ 70°C		30	70	nA
Tap 3dB Bandwidth (cutoff frequency)	10			MHz
Tap Capacitance		12		pF
Operating Temperature	-5		75	°C
Storage Temperature	-40		85	°C
Reliability	Telcordia 1209 and 1221			
Package Dimension	Φ6.1 X 35.2			mm

Notes:

- [1]. Without connector and at room temperature
- [2]. At attenuation equal or less than 20 dB
- [3]. At 0dB attenuation and at whole temperature range
- [4]. Within 40nm Bandwidth
- [5]. At 20dB attenuation for transparent version, at 0.8dB attenuation for opaque version.
- [6]. This is related to tap ratio. The spec data is regarding 3% tap.
- [7]. Over this value will damage the device.
- [8] Tap response depends on tap ratio.

Features

- VOA + Tap
- Compact Size
- Low Cost
- High Reliability
- Low IL, PDL, WDL and TDL
- Direct Drive

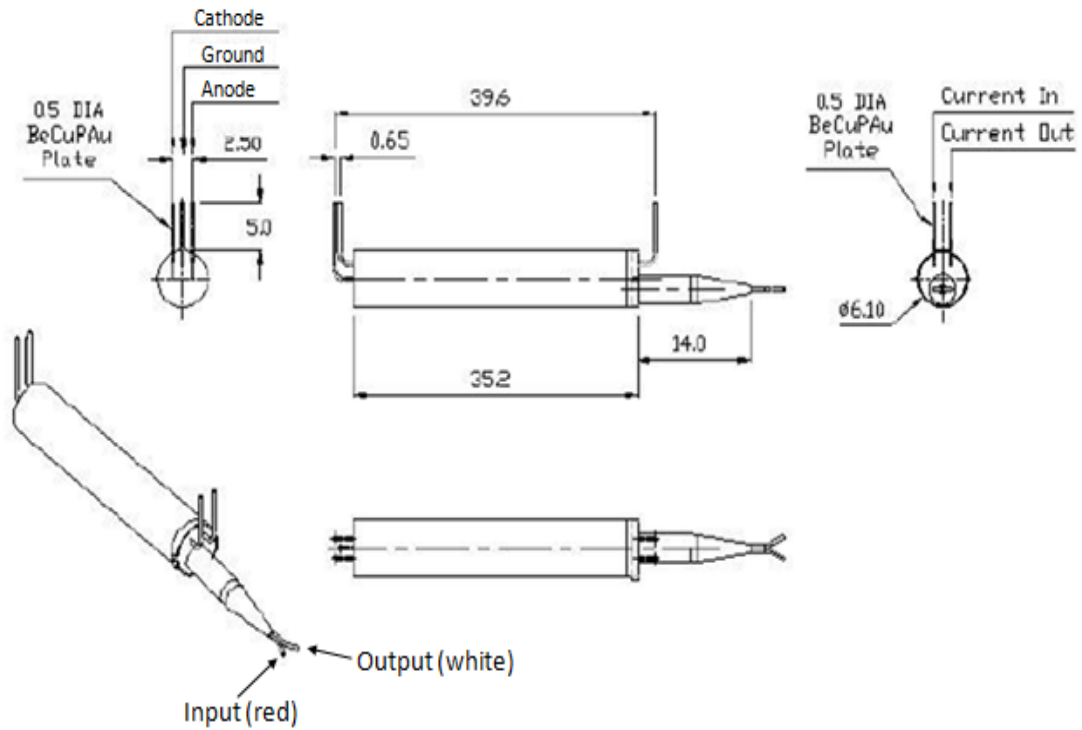
Applications

- Power Control
- Power Regulation
- Channel Balance
- Instrumentation



etMEMS™ Variable Optical Attenuator Integrated With Input Tap

Mechanical Footprint Dimensions (Unit:mm)



Ordering Information

Prefix	Type	Wavelength	Off State	Package	Fiber	Fiber Cover	Fiber Length	Connector ^[1]
MMAO-	Input tap=21	C+L = 2 1260-1620 = 8 1550 = 5 1310 = 3 Special = 0	Transparent =1 Opaque =2	Without directivity =1 With directivity =2 Special =0	SMF-28 =1 PM1550=5 Special =0	Bare fiber=1 900um 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 Special = 0

[1] NOTE: connector cannot be installed directly onto bare fiber, as it is prone to damage during shipping. However, the connector can be assembled on bare fiber with a protective sleeve with the application of controlled heat to the cap and over the sleeve after testing. The applying power controlling voltage standard connector is less than 0.5 W for SM28 fiber and decreases further with smaller core fibers.



etMEMS™ Variable Optical Attenuator Integrated With Input Tap

Typical Insertion Loss vs Wavelength (1240-1630nm)

1x2 MEMS Switch

