

# etMEMS™ High Reliability Variable Optical Attenuator

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

## Product Description

The etMEMS™ Series highly stable VOA is based on a specially designed micro-electro-mechanical mechanism featuring high reliability, low drift, easy direct drive, and excellent optical performance. The etMEMS™ Series highly stable VOA exceeds the Telcordia 1209 and 1221 reliability standards. The VOA is available in either normally-open and normally-dark configurations.

The VOA is driven by directly applying an electrical voltage. The improved stability makes it suitable for EDFA, line cards etc applications.



## Optical Specifications

### etMEMS™ Series highly stable VOA

	Min	Max	Unit
Attenuation Type	Bright/Opaque		
Wavelength Range	1260	1620	nm
Attenuation Range	20		dB
Insertion Loss <sup>[1]</sup>		1.0	dB
Wavelength Dependent Loss <sup>[2]</sup>	Flatness	0.3	dB
	Ripple <sup>[3]</sup>	0.15	
Temperature Dependent Attenuation <sup>[4]</sup>	at IL	-0.2	0.2
	<=10dB attenuation	-0.5	0.5
	<=20dB attenuation	-0.8	0.8
Polarization Dependent Loss <sup>[5]</sup>	<=30dB attenuation	-	-
	0 to 10dB attenuation	-0.1	0.1
	10 to 20dB attenuation	-0.2	0.2
PMD	20 to 30dB attenuation	-	-
			0.05
Return Loss <sup>[6]</sup>	-50		dB
Repeatability <sup>[7]</sup>		0.1	dB
Optical Power Capability <sup>[8]</sup>		20	dBm
Fiber color	Input: red; Output: clear		

Notes:

1. This loss is measured at room temperature and entire wavelength range but no connector.
2. The IL is set as 20 dB and measured the IL variation in wavelength range of 1525-1570nm.
3. Ripple is defined as the high frequency and small peaks from its average value.
4. TDA is the relative variation when temperature changed from room temperature to 75 °C or from room temperature to -5 °C.
5. The PDL is measured at different attenuation setting such as 10 dB or 20 dB.
6. The return loss is measure at both In and Out ports when the device is set to 25dB attenuation
7. It is defined as under same optical and electrical setting then repeat set the same controlling voltage, the corresponded attenuation variation.
8. It is defined for continuous wave, CW, power handling capability.

## Features

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

## Applications

- Power Control
- Power Regulate
- Channel Balance
- Instrumentation



# etMEMS™ Variable Optical Attenuator

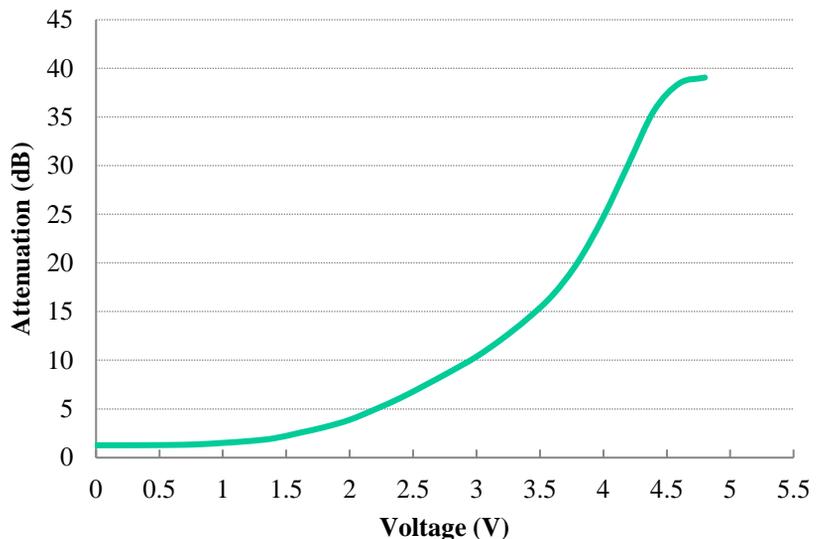
## Environmental Specifications

Parameter	Min	Max	Unit
Storage Temperature Range	-40	85	°C
Operating Temperature Range*	-5	75	°C
Storage relative humidity (non-condensing)		95	%

## Electrical Specifications

Parameter	Min	Max	Unit
Resistance (defined at 25dB attenuation/ maximum applied power)	100	240	Ω
Drive Voltage		5	V
Power Consumption		150	mW
Response Time (full dynamic range)		20	ms
Voltage Damage Threshold		5.2	V

## VOA Performance



### Features

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

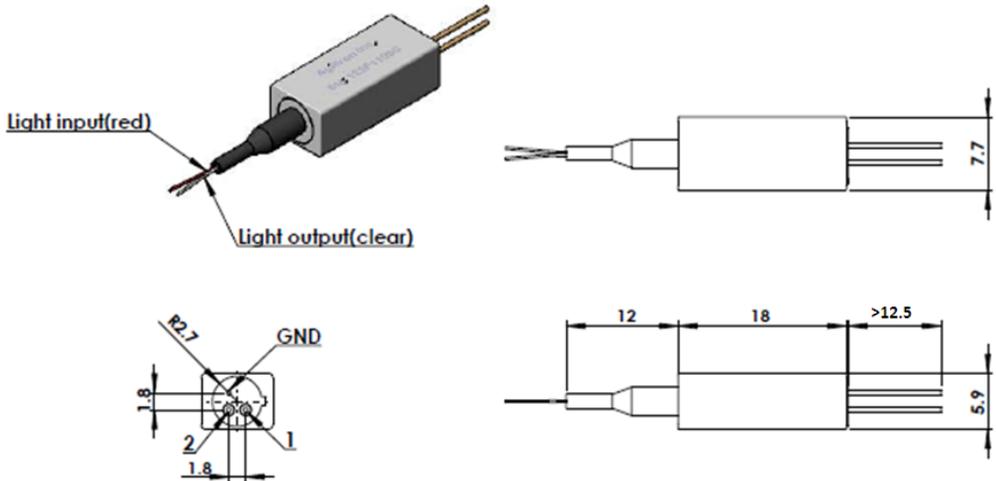
### Applications

- Power Control
- Power Regulate
- Channel Balance
- Instrumentation



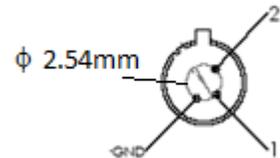
# etMEMS™ Variable Optical Attenuator

## Mechanical Footprint (mm)



### NOTES

- Pin1 and Pin2 are for control voltage without polarity.
- GND connect to the case. It can be cut off.
- Do not apply more than 5.2V.



## Ordering Information

TMOA-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Type	Wavelength	Off State	Package	Fiber Type Corning SMF-28e, 28e XB or equivalent	Fiber Length	Connector	
	Drive Voltage 5V=E1 Special-E0	1310=3 1550 = 5 S+C+L=2 1310&1550= 8 Special = 0	Transparent=1 Opaque = 2	Standard=3 Special=0	SMF-28 = 1 Special = 0	Bare fiber=1 900um loose 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 LC/APC=8 Special = 0

# etMEMS™ Variable Optical Attenuator

## Typical Dynamic Performance Charts

