*et*MEMS™
High Reliability Variable Optical Attenuator

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

Product Description

The *et*MEMS™ 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 *et*MEMS™ 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.

Features

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

Optical Specifications

et**MEMS**^{TM} **Series highly stable VOA**

		Min	Max	Unit
Attenuation Type		Bright/Opaque		
Wavelength Range		1260	1620	nm
Attenuation Range		20		dB
Insertion Loss[1]	Begin of life		0.8	dB
	End of life		1.0	
Wavelength Dependent Loss[2]	Flatness		0.3	dB
	Ripple[3]		0.15	
Temperature Dependent Attenuation[4]	at IL	-0.2	0.2	dB
	<=10dB attenuation	-0.5	0.5	
	<=20dB attenuation	-0.8	0.8	
	<=30dB attenuation	-	-	
Polarization Dependent Loss[5]	0 to 10dB attenuation	-0.1	0.1	dB
	10 to 20dB attenuation	-0.2	0.2	
	20 to 30dB attenuation	-	-	
PMD			0.05	ps
Return Loss[6]		-50		dB
Repeatability[7]			0.1	dB
Optical Power Capability[8]			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.

Applications

- Power Control
- Power Regulate
- Channel Balance
- Instrumentation

RoHS
Compliant

*et*MEMS™ 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	%

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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

Applications

- Power Control
- Power Regulate
- Channel Balance
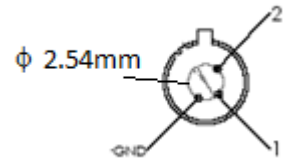- Instrumentation

RoHS Compliant

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Mechanical Footprint (mm)
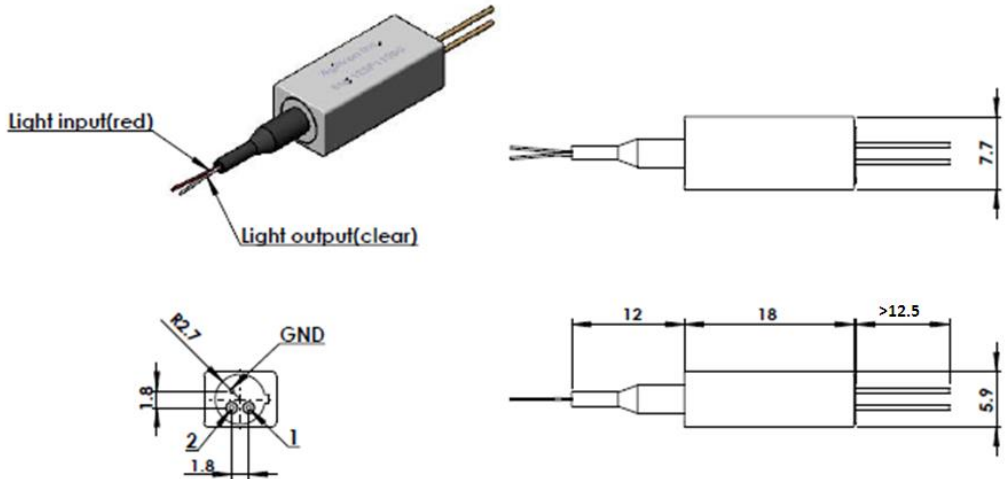
NOTES

- 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- [E][ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

	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

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Typical Dynamic Performance Charts

Tek · Trig'd · M Pos: 0.000s · SAVE/REC

Rise · CH1-Driving voltage · CH2-VOA response

Action — Save Image
File Format — JPEG
About Saving Images
Select Folder
Save — TEK0002.JPG

CH1 2.00V   CH2 10.0V   M 2.50ms   CH1 ∕ 1.60V
5–Mar–13 00:10   12.8961Hz

Tek · Trig'd · M Pos: 38.40ms · SAVE/REC

Fall · CH1-Driving voltage · CH2-VOA response

Action — Save Image
File Format — JPEG
About Saving Images
Select Folder
Save — TEK0000.JPG

CH1 2.00V   CH2 10.0V   M 5.00ms   CH1 ∕ 1.60V
5–Mar–13 00:08   12.8995Hz

RoHS Compliant