

## Voltage Variable Absorptive Attenuator DC - 2.0 GHz

M/A-COM Products  
Rev. V2

### Features

- 12-dB Attenuation at 1 GHz
- Low Intermodulation Products
- Low DC Power Consumption
- Single Voltage Control: 0 to -4 Volts
- Nanosecond Switching Speed
- Temperature Range: -40°C to +85°C
- Lead-Free SOT-143 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of AT-259

### Description

M/A-COM's MAAVSS0005 is a GaAs MMIC voltage variable absorptive attenuator in a lead-free SOT-143 4-lead surface mount plastic package. The MAAVSS0005 is ideally suited for use where attenuation fine tuning, fast switching and very low power consumption are required.

Typical applications include radio, cellular, GPS equipment and other automatic gain/level control circuits.

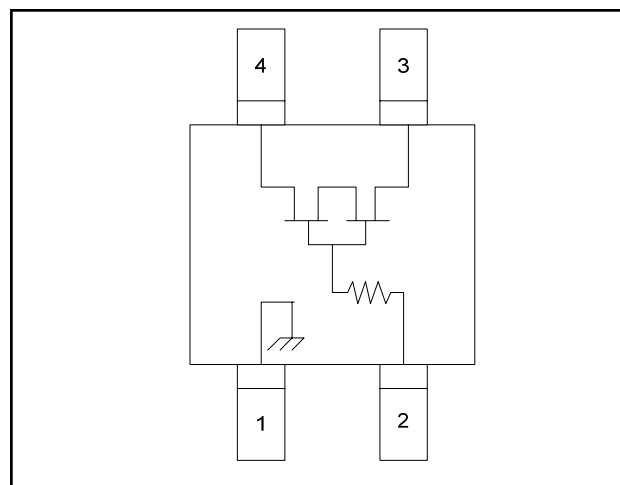
The MAAVSS0005 is fabricated with a monolithic GaAs MMIC using a mature 1 micron process. The process features full chip passivation for increased performance and reliability.

### Ordering Information <sup>1,2</sup>

Part Number	Package
MAAVSS0005	Bulk Packaging
MAAVSS0005TR-3000	3000 piece reel
MAAVSS0005SMB	Sample Board

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

### Functional Schematic



### Pin Configuration

Pin No.	Function	Pin No.	Function
1	Ground	3	RF2
2	V <sub>C</sub>	4	RF1

### Absolute Maximum Ratings <sup>3,4</sup>

Parameter	Absolute Maximum
Input Power	+21 dBm
Control Voltage	-8.5 V ≤ V <sub>C</sub> ≤ +5 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.  
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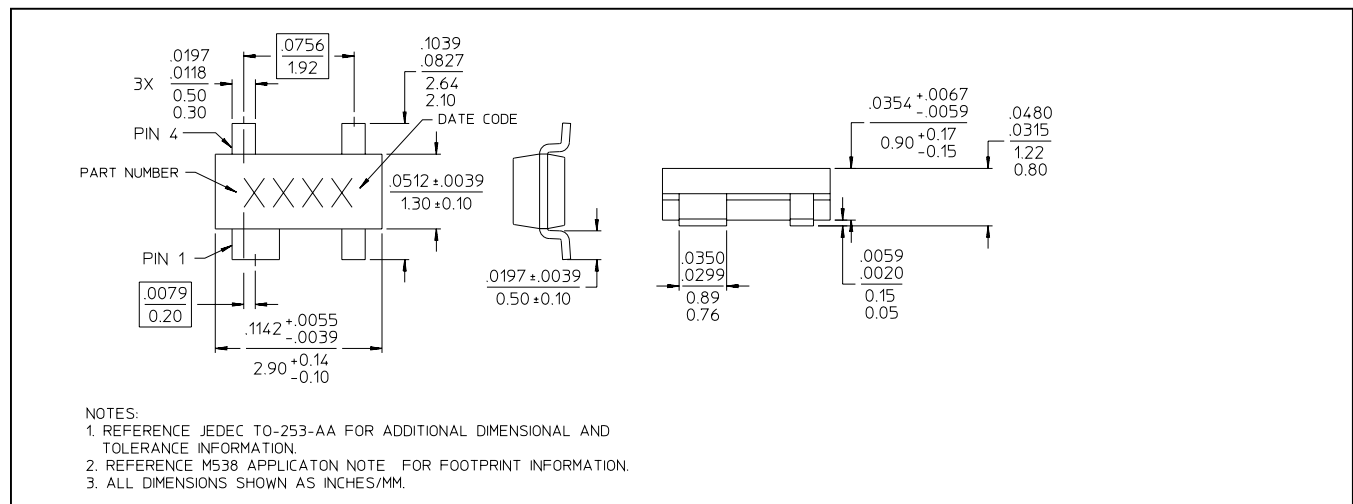
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### Electrical Specifications: $T_A = 25^\circ\text{C}$ , $Z_0 = 50 \Omega$

Parameter	Test Conditions <sup>5</sup>	Frequency	Units	Min.	Typ.	Max.
Insertion Loss	—	DC - 0.1 GHz	dB	—	2.9	3.1
		DC - 0.5 GHz	dB	—	3.0	3.2
		DC - 1.0 GHz	dB	—	3.2	3.5
		DC - 2.0 GHz	dB	—	3.4	3.8
Flatness (Peak to Peak)	5 dB Attenuation	DC - 2.0 GHz	dB	—	$\pm 0.2$	—
	10 dB Attenuation	DC - 2.0 GHz	dB	—	$\pm 2.3$	—
	15 dB Attenuation	DC - 2.0 GHz	dB	—	$\pm 7.0$	—
Output Impedance	—	—	Ohms	—	50	—
VSWR	—	DC - 2.0 GHz	Ratio	—	2.1:1	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	—	nS	—	3	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	—	nS	—	5	—
Transients	In Band	—	mV	—	10	—
$IP_2$	Measured Relative to Input Power (For two-tone Input Power Up to +5 dBm)	0.05 GHz	dBm	—	34	—
		0.5 - 2.0 GHz	dBm	—	47	—
$IP_3$	Measured Relative to Input Power (For two-tone Input Power Up to +5 dBm)	0.05 GHz	dBm	—	31	—
		0.5 - 2.0 GHz	dBm	—	36	—

5. Control voltage: 0 to -4 volts @ 20  $\mu\text{A}$  typical.

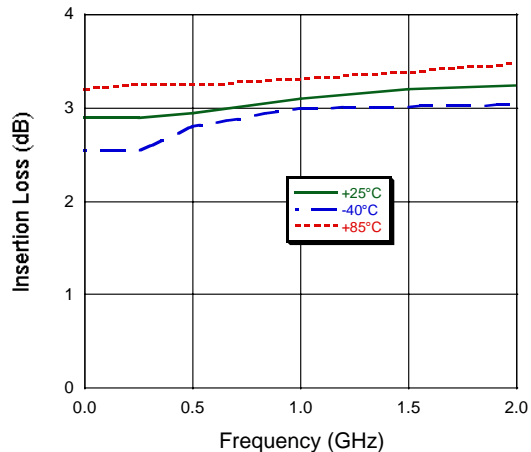
### Lead-Free SOT-143<sup>†</sup>



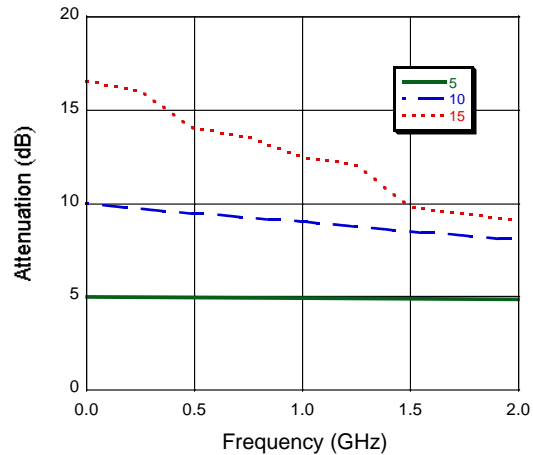
<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.  
Meets JEDEC moisture sensitivity level 1 requirements.

### Typical Performance Curves

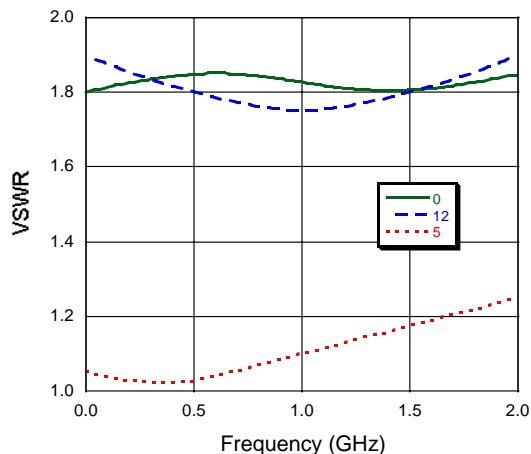
**Insertion Loss vs. Frequency**



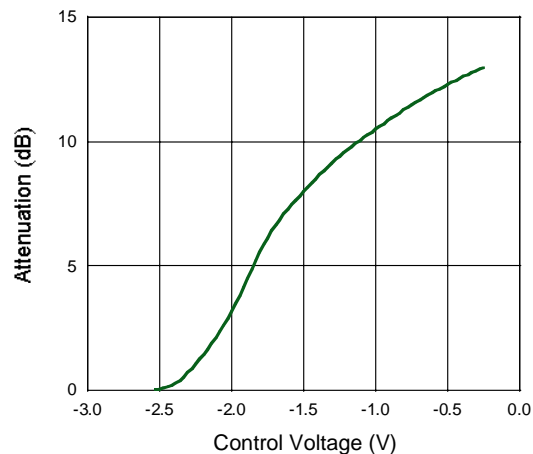
**Attenuation vs. Frequency**



**VSWR vs. Frequency**



**Attenuation vs. Control Voltage, F = 950 MHz**



### Handling Procedures

Please observe the following precautions to avoid damage:

### Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.