# MAAVSS0007

## Voltage Variable Absorptive Attenuator
## 40 dB, 0.5 - 3.0 GHz

Rev. V2

### Features

- Single Positive Voltage Control: 0 to +5 Volts
- 40 dB Attenuation Range at 900 MHz
- ± 2 dB Linearity from BSL
- Low DC Power Consumption
- Tape and Reel Packaging Available
- Lead-Free SOIC-8 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of AT-108

### Description

M/A-COM's MAAVSS0007 is a GaAs MESFET MMIC voltage variable absorptive attenuator in a lead-free SOIC-8 surface mount plastic package. The MAAVSS0007 is ideally suited for use where linear attenuation, fine tuning and very low power consumption are required.

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

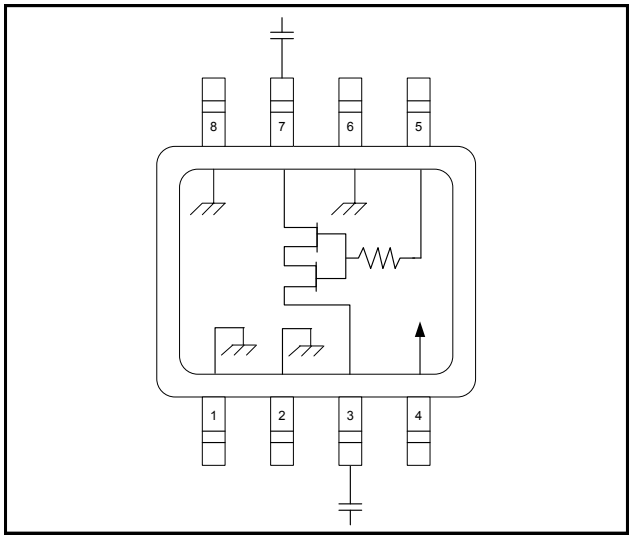
The MAAVSS0007 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

### Ordering Information [1,2]

| Part Number | Package |
|---|---|
| MAAVSS0007 | Bulk Packaging |
| MAAVSS0007TR | 1000 piece reel |
| MAAVSS0007SMB | Sample Board |

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

### Functional Schematic [3,4,5,6]




3. $V_{cc}$ = +5 VDC @ 50 µA maximum.
4. $V_c$ = 0 VDC to +5 VDC @ 50 µA maximum.
5. External DC blocking capacitors are requirements on all RF ports.
6. 39 pF used for data measurements.

### Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| 1 | Ground | 5 | $V_C$ |
| 2 | Ground | 6 | Ground |
| 3 | RF Port | 7 | RF Port |
| 4 | $V_{CC}$ | 8 | Ground |

### Absolute Maximum Ratings [7,8]

| Parameter | Absolute Maximum |
|---|---|
| Input Power | +21 dBm |
| Supply Voltage $V_{CC}$ | -1 V ≤ $V_{CC}$ ≤ +8 V |
| Control Voltage $V_C$ | -1 V ≤ $V_C$ ≤ $V_{CC}$ +0.5 V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

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

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

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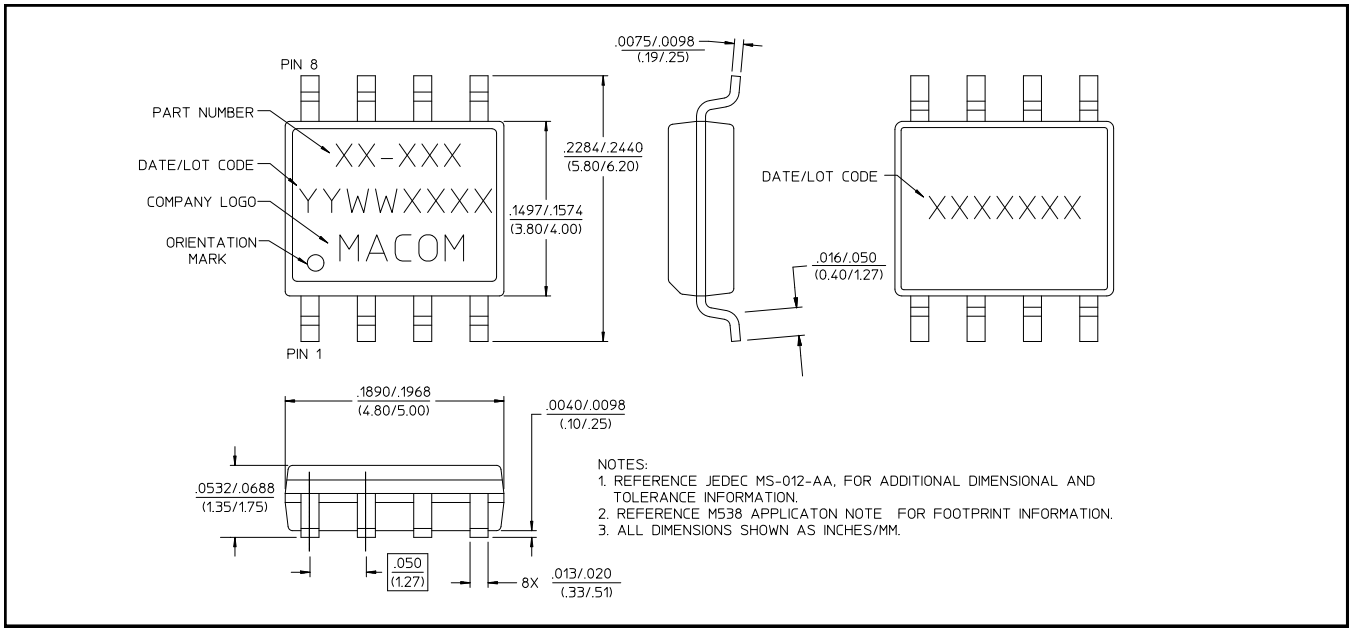
### Electrical Specifications: $T_A$ = 25°C, $Z_0$ = 50 Ω

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Insertion Loss | 0.5 - 1.0 GHz<br>1.0 - 3.0 GHz | dB<br>dB | —<br>— | 2.5<br>2.6 | —<br>3.5 |
| Attenuation | 0.5 - 1.0 GHz<br>1.0 - 2.0 GHz<br>2.0 - 3.0 GHz | dB<br>dB<br>dB | —<br>35<br>— | 43<br>40<br>33 | —<br>—<br>— |
| Flatness<br>(peak-to-peak) | 0.5 - 1.0 GHz<br>1.0 - 2.0 GHz<br>2.0 - 3.0 GHz | dB<br>dB<br>dB | —<br>—<br>— | ± 0.5<br>± 1.2<br>± 1.5 | —<br>—<br>— |
| VSWR | 0.5 - 3.0 GHz | Ratio | — | 2:1 | — |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | µS | — | 15 | — |
| Ton, Toff | 50% Control to 90% RF, 50% Control to 10% RF | µS | — | 25 | — |
| Transients | In-Band | mV | — | 12 | — |

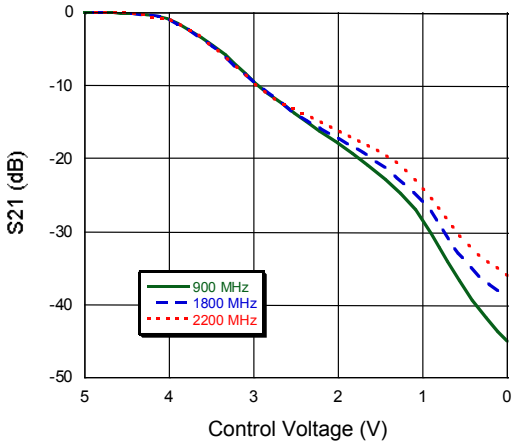
### Lead-Free SOIC-8†



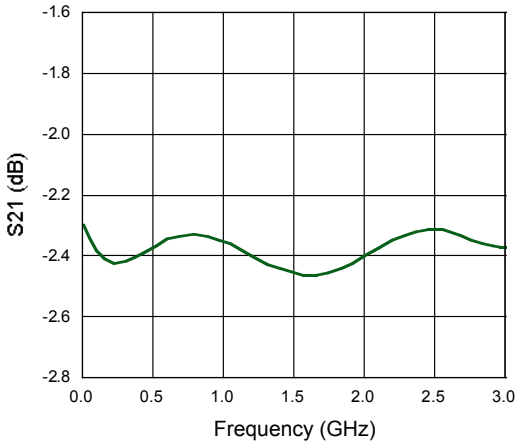

† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.

## Typical Performance Curves @ 25°C

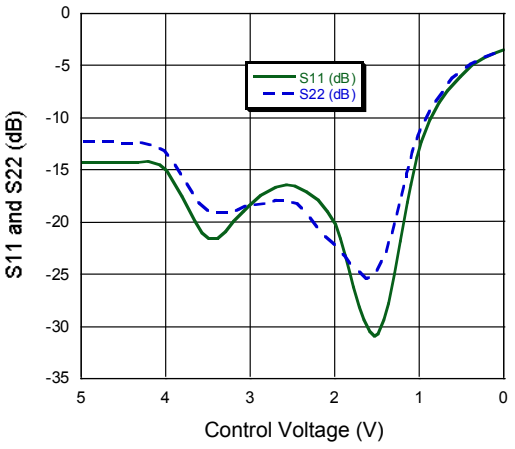
***Attenuation vs. Control Voltage***



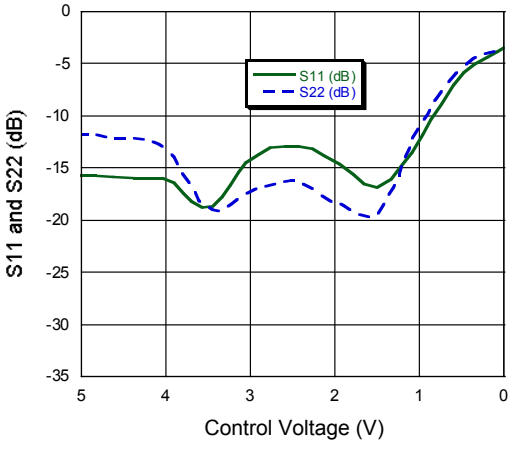

***Insertion Loss vs. Frequency***



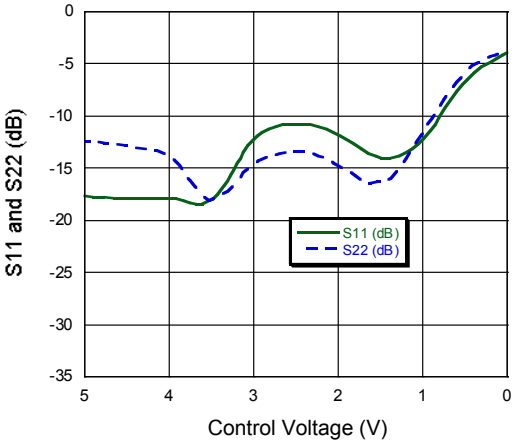

***Return Loss vs. Control Voltage, F = 900 MHz***



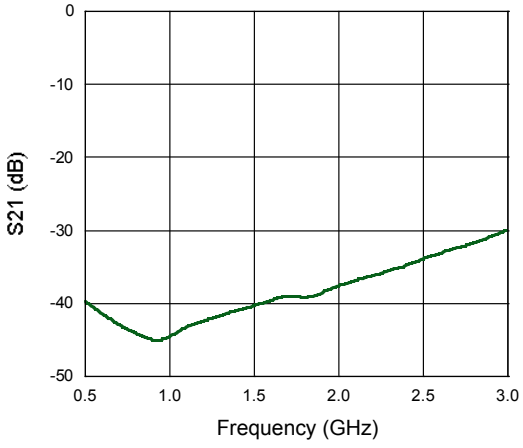

***Return Loss vs. Control Voltage, F = 1800 MHz***




***Return Loss vs. Control Voltage, F = 2200 MHz***

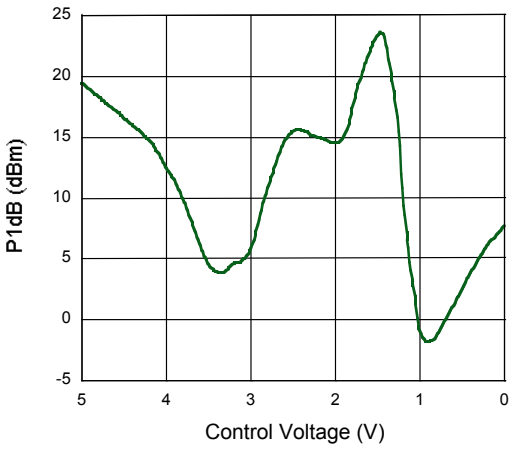



***Maximum Attenuation vs. Frequency***

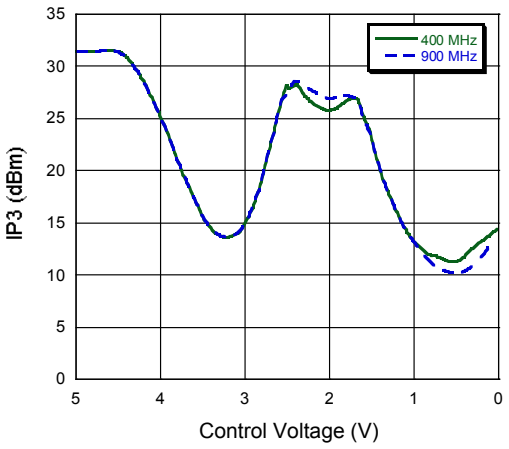


## Typical Performance Curves @ 25°C

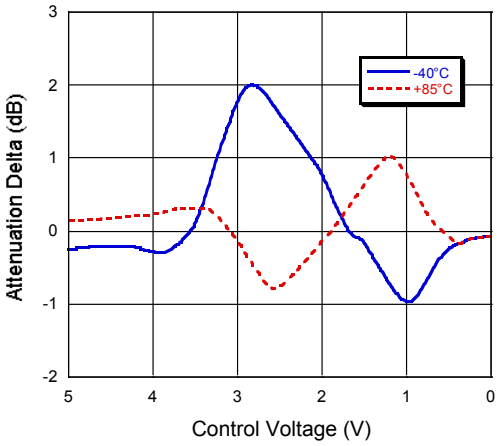
***1 dB Compression vs. Control Voltage, F = 900 MHz***




***IP3 vs. Control Voltage***




***Attenuation vs. Temperature***
***Normalized to 25°C, F = 900 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.