

Voltage Variable Absorptive Attenuator DC - 2.0 GHz

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.

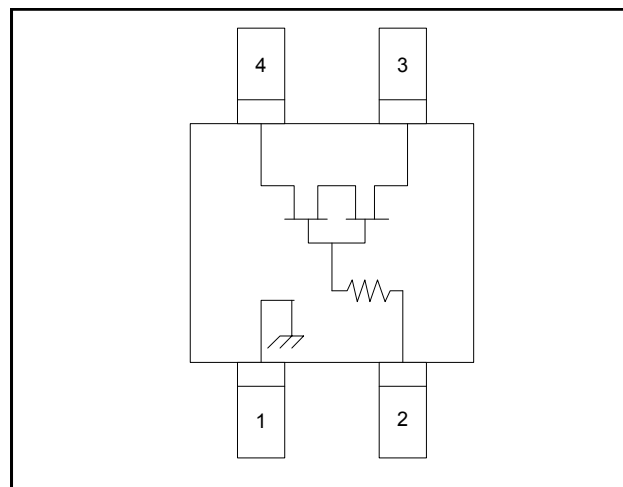
The MAAVSS0005 is fabricated with a monolithic GaAs MMIC using a mature 1 micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information ^{1,2}

| 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 _C | 4 | RF1 |

Absolute Maximum Ratings ^{3,4}

| Parameter | Absolute Maximum |
|-----------------------|--------------------------------|
| Input Power | +21 dBm |
| Control Voltage | -8.5 V ≤ V _C ≤ +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.

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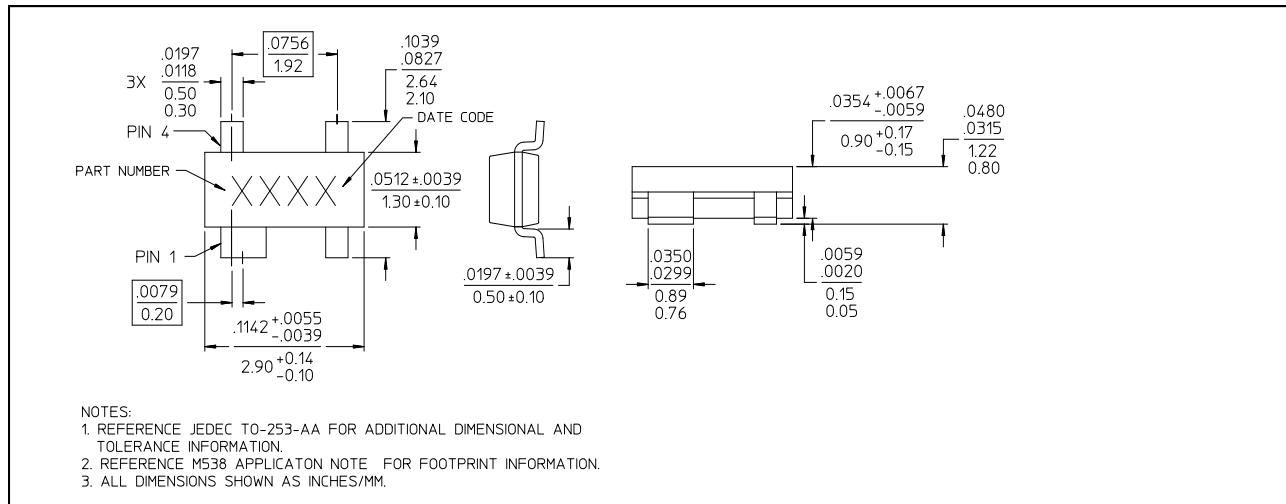
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Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50 \Omega$

| Parameter | Test Conditions ⁵ | 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 | — | ± 0.2 | — |
| | 10 dB Attenuation | DC - 2.0 GHz | dB | — | ± 2.3 | — |
| | 15 dB Attenuation | DC - 2.0 GHz | dB | — | ± 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 μA typical.

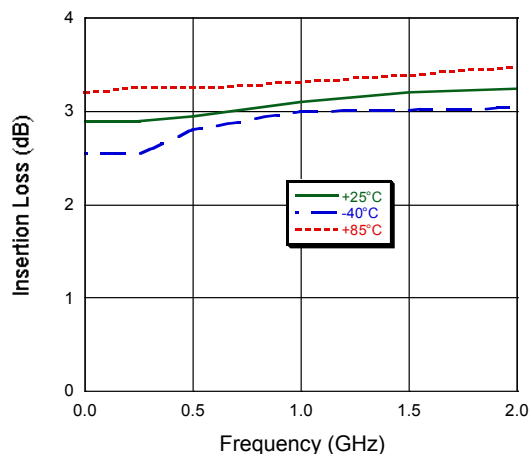
Lead-Free SOT-143[†]



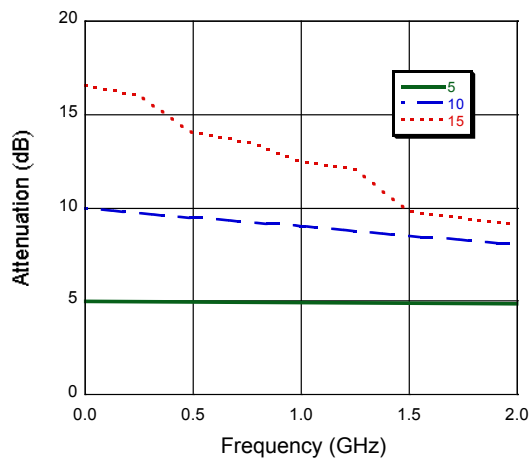
[†] Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.

Typical Performance Curves

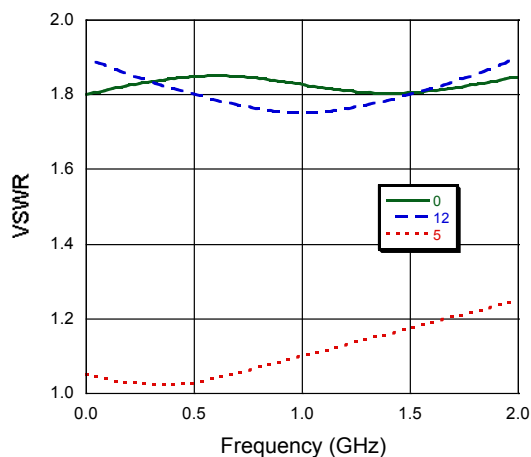
Insertion Loss vs. Frequency



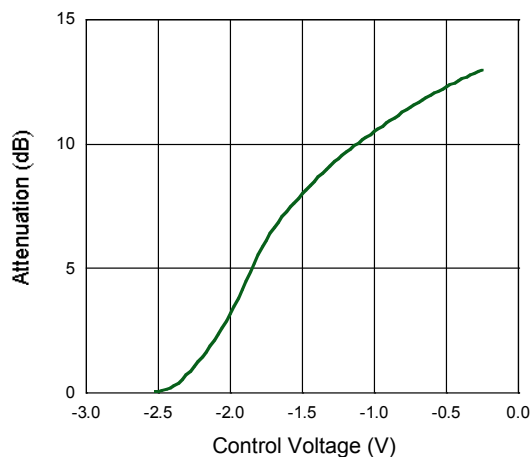
Attenuation vs. Frequency



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.

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