

Voltage Variable Absorptive Attenuator 12 dB, DC - 2.0 GHz

Rev. V1

Features

- 12 dB Voltage Variable Attenuation
- Low Intermodulation Products
- Low DC Power Consumption: 50 μ W
- Single Voltage Control: 0 to -4 Volts
- Nanosecond Switching Speed
- Temperature Range: -40°C to +85°C
- Lead-Free SOIC-8 Plastic Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of AT-250

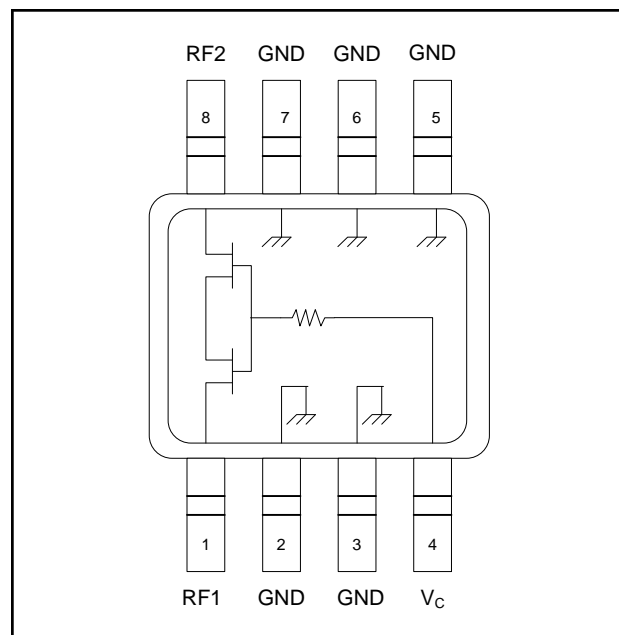
Description

M/A-COM's MAAV-007941 is a GaAs MMIC voltage variable absorptive attenuator in a low cost lead-free SOIC 8-lead surface mount plastic package. The MAAV-007941 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 MAAV-007941 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Functional Schematic



Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------------|---------|----------|
| 1 | RF1 | 5 | Ground |
| 2 | Ground | 6 | Ground |
| 3 | Ground | 7 | Ground |
| 4 | V _c | 8 | RF2 |

Ordering Information ¹

| Part Number | Package |
|--------------------|-----------------|
| MAAV-007941-000000 | Bulk Packaging |
| MAAV-007941-TR3000 | 3000 piece reel |

1. Reference Application Note M513 for reel size information.

Absolute Maximum Ratings ²

| Parameter | Absolute Maximum |
|-----------------------|------------------|
| Input Power | +21 dBm |
| Control Voltage | +5V, -8.5V |
| Operating Temperature | -40°C to +85°C |
| Storing Temperature | -65°C to +150°C |

2. Exceeding any one or combination of these limits may cause permanent damage to this device.

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

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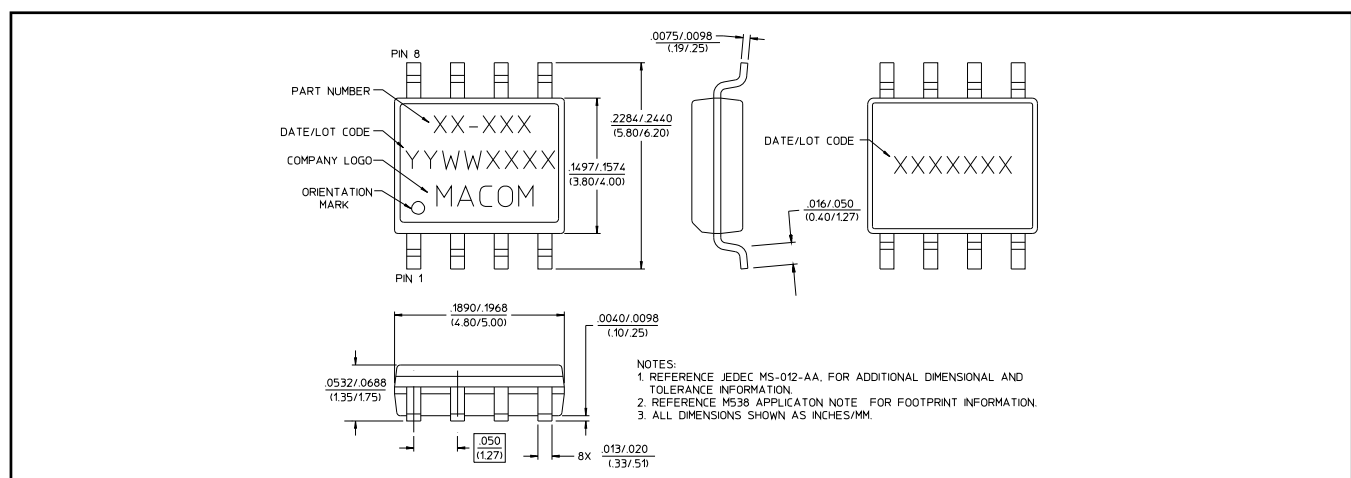
Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50\ \Omega$

| Parameter | Test Conditions ³ | 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) | DC - 0.1 GHz | dB | — | ± 0.1 | ± 0.3 |
| | DC - 0.5 GHz | dB | — | ± 0.2 | ± 0.4 |
| | DC - 1.0 GHz | dB | — | ± 0.5 | ± 0.8 |
| | DC - 2.0 GHz | dB | — | ± 1.2 | ± 1.5 |
| VSWR | | 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 | — |
| Power Handling | Linear Operation | dBm | — | 13 | — |
| | Absolute Maximum Input Power | dBm | — | 21 | — |
| IP ₂ | 0.05 GHz | dBm | 28 | 34 | — |
| | 0.5 - 2.0 GHz Measured Relative to Input Power (For two-tone Input Power Up to +5 dBm) | dBm | 40 | 47 | — |
| IP ₃ ⁴ | 0.05 GHz | dBm | 18 | 31 | — |
| | 0.5 - 2.0 GHz Measured Relative to Input Power (For two-tone Input Power Up to +5 dBm) | dBm | 18.5 | 36 | — |

3. Control voltage: 0 to -4 volts @ 20 μA typical.

4. Typical readings are for levels above 6 dB attenuation. For levels below 6 dB, the minimum specification numbers apply.

Lead-Free SOIC-8[†]



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

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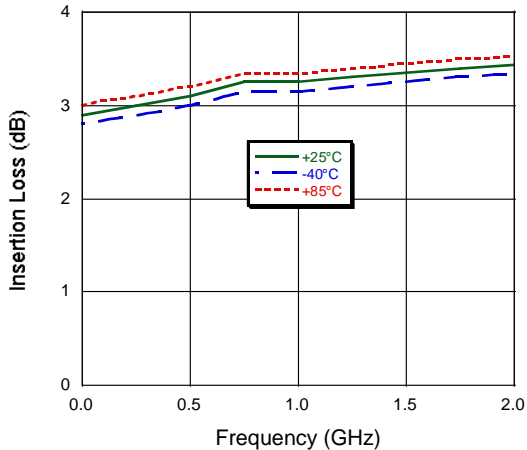
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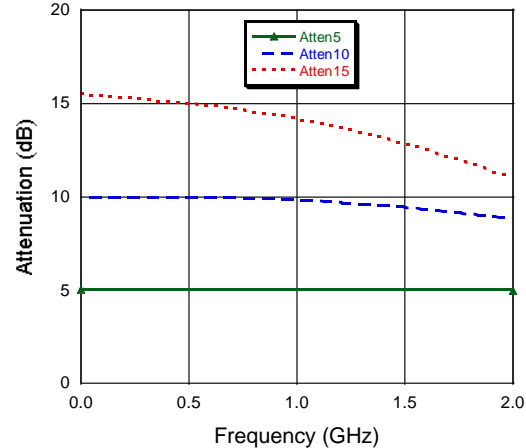
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Typical Performance Curves

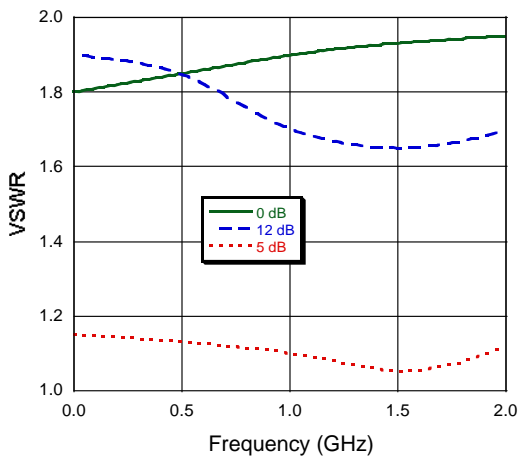
Insertion Loss vs. Frequency



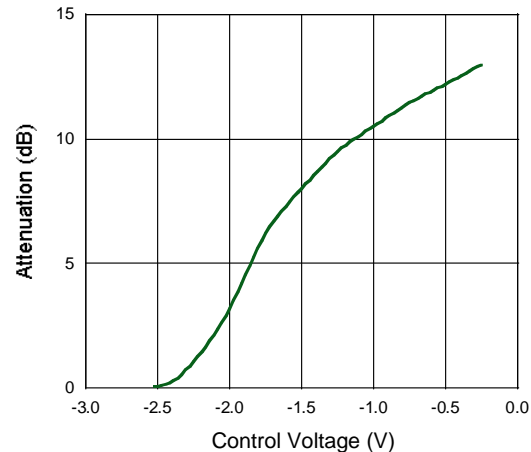
Attenuation vs. Frequency



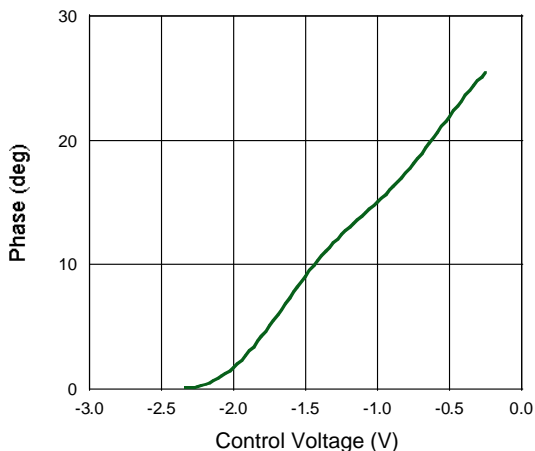
VSWR vs. Frequency



Attenuation vs. Control Voltage, F = 950 MHz



Phas



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.