MAAV-008022

3 Volt Voltage Variable Absorptive Attenuator 40 dB, 0.5 - 2.0 GHz

Rev. V1

Features

- Single Positive Voltage Control: 0 to +3 Volts
- 40 dB Attenuation Range at 0.9 GHz
- ± 2 dB Linearity from BSL
- Low DC Power Consumption
- 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-113

Description

M/A-COM's MAAV-008022 is a GaAs MMIC voltage variable absorptive attenuator in a lead-free low-cost SOIC 8-lead surface mount plastic package. The MAAV-008022 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.

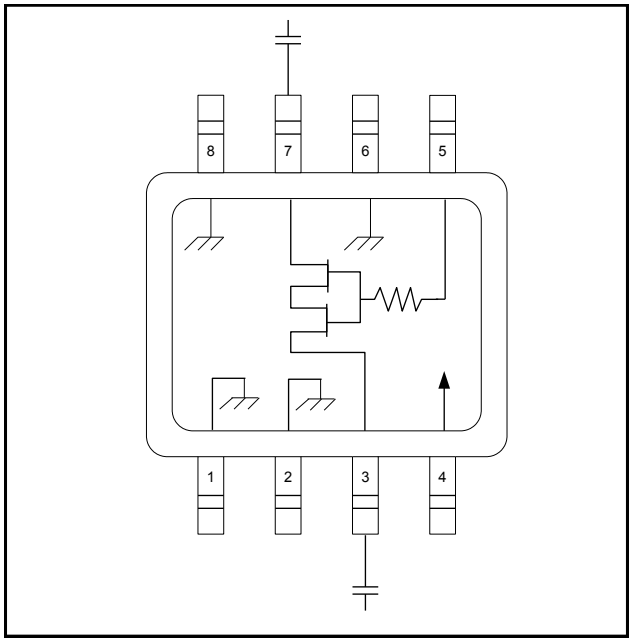
The MAAV-008022 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information [1]

Part Number	Package
MAAV-008022-000000	Bulk Packaging
MAAV-008022-TR3000	3000 piece reel

1. Reference Application Note M513 for reel size information.

Functional Schematic [2,3,4,5]



2. V_{CC} = +3 VDC @ 50 µA maximum.
3. V_C = 0 VDC to +3 VDC @ 50 µA maximum.
4. External DC blocking capacitors are required on all RF ports.
5. 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 [6]

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

6. 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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40 dB, 0.5 - 2.0 GHz

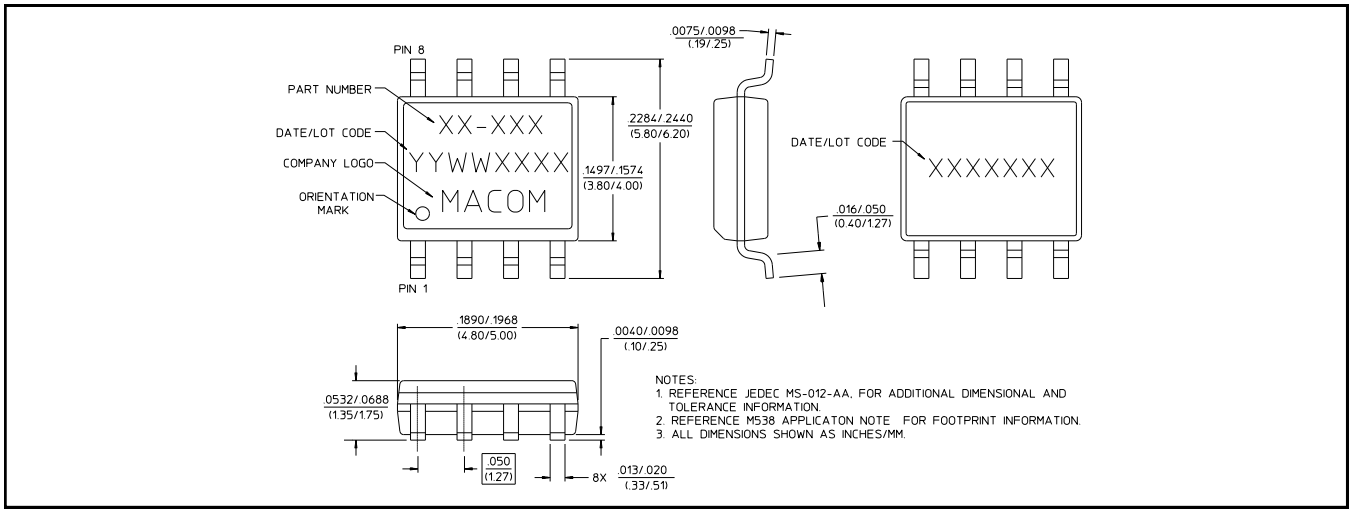
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Electrical Specifications [7]: T_A = 25°C, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB dB	— —	2.7 3.0	3.0 3.5
Attenuation (Relative to Insertion Loss)	Frequency = 0.5 - 2.0 GHz Vc = 0.0 V (max. atten.) Vc = 0.5 V Vc = 1.5 V Vc = 2.7 V	 dB dB dB dB	 34 26 12.5 —	 35 30 15 .5	 — — 17.5 0.7
Slope (at any point on the curve)	Vc delta 0.5 V - 1.5 V Vc delta 1.5 V - 2.7 V	dB/V dB/V	10 0	15 14	23 17
VSWR	—	Ratio	—	2:1	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	µS	—	10	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	µS	—	12	—
Transients	In-band	mV	—	10	—

7. The RF ports must be blocked outside of the package from ground or any other voltage.

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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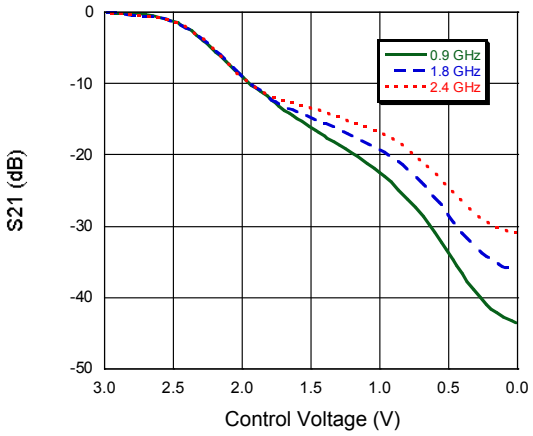
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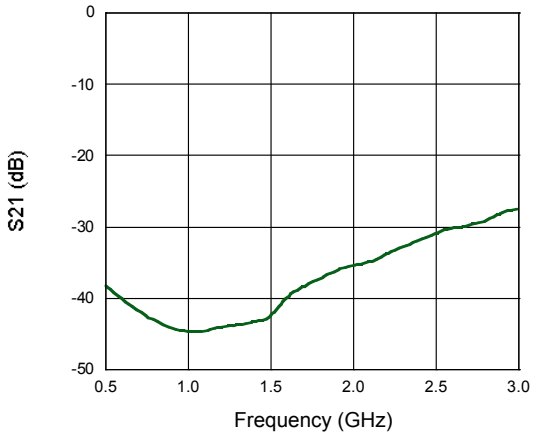
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40 dB, 0.5 - 2.0 GHz

Typical Performance Curves @ 25°C

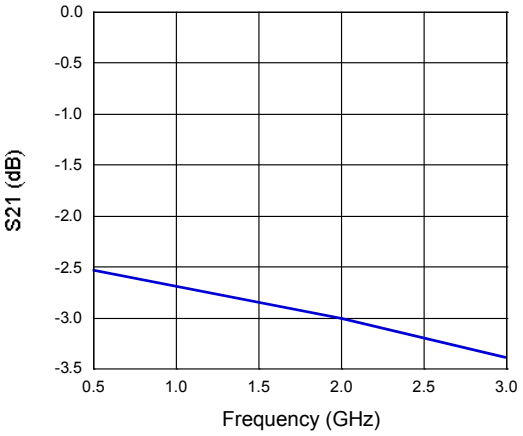
Attenuation vs. Control Voltage



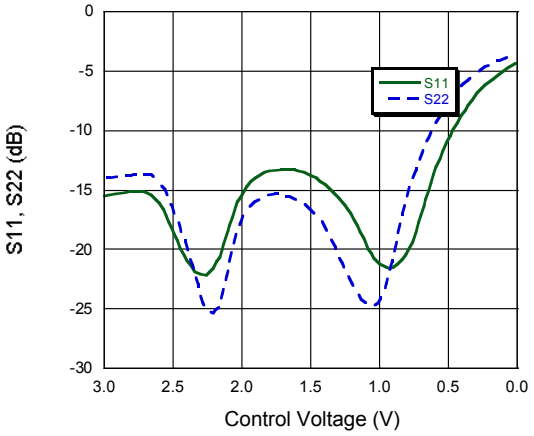
Attenuation vs. Frequency @ 0V



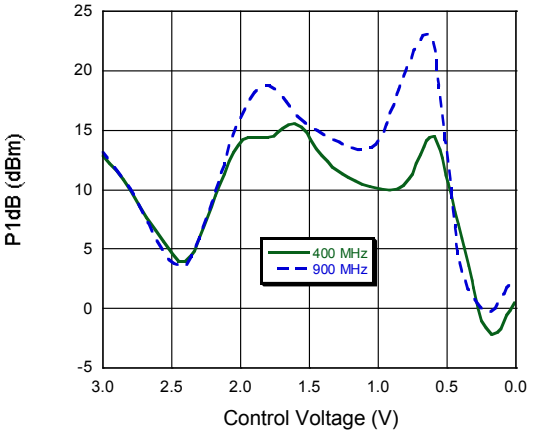
Insertion Loss vs. Frequency



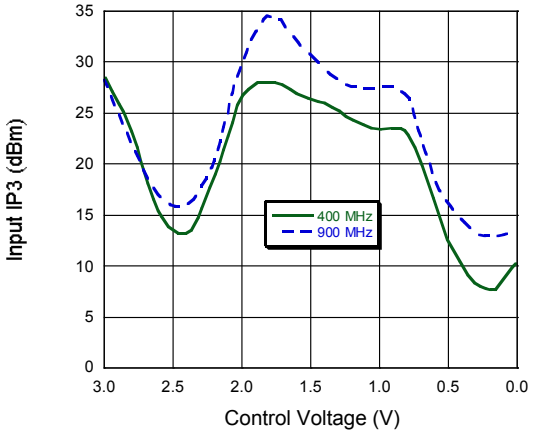
Return Loss vs. Control Voltage, F = 900 MHz



1 dB Compression vs. Control Voltage



IP3 vs. Control Voltage



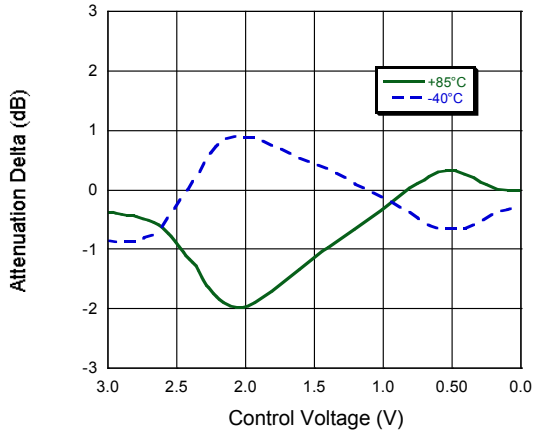
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Typical Performance Curves @ 25°C

Attenuation vs. Temperature
Normalized @ 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.

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