

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.

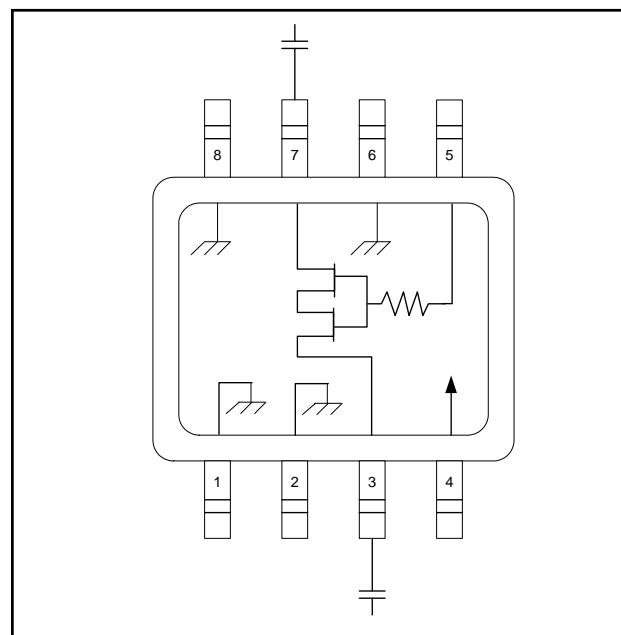
The MAAV-008022 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

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 μ A maximum.
3. $V_c = 0$ VDC to +3 VDC @ 50 μ A 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 $\leq V_{CC} \leq$ +8 V
Control Voltage V_c	-1 V $\leq V_c \leq V_{CC} + 0.5$ 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.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

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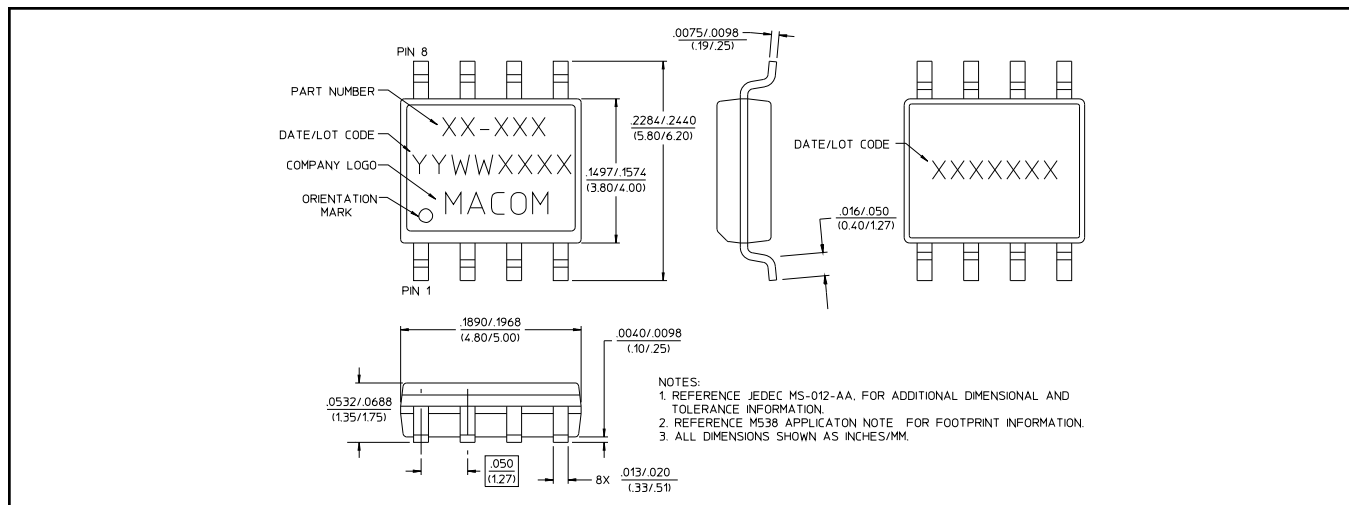
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Electrical Specifications ⁷: $T_A = 25^\circ\text{C}$, $Z_0 = 50\ \Omega$

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	0.5 - 1.0 GHz	dB	—	2.7	3.0
	1.0 - 2.0 GHz	dB	—	3.0	3.5
Attenuation (Relative to Insertion Loss)	Frequency = 0.5 - 2.0 GHz				
	$V_c = 0.0\ \text{V}$ (max. atten.)	dB	34	35	—
	$V_c = 0.5\ \text{V}$	dB	26	30	—
	$V_c = 1.5\ \text{V}$	dB	12.5	15	17.5
	$V_c = 2.7\ \text{V}$	dB	—	.5	0.7
Slope (at any point on the curve)	V_c delta 0.5 V - 1.5 V	dB/V	10	15	23
	V_c delta 1.5 V - 2.7 V	dB/V	0	14	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[†]



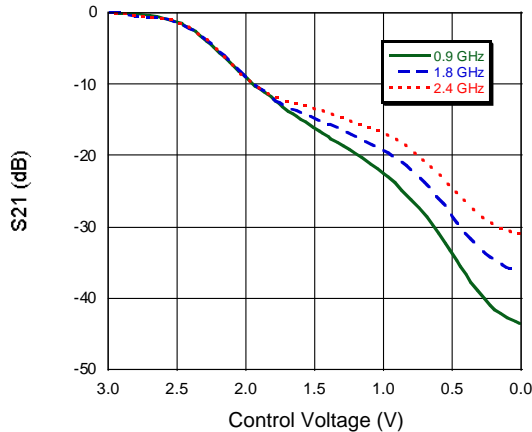
[†] Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.

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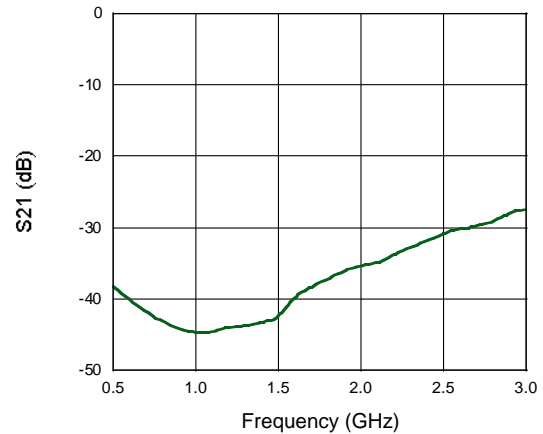
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Typical Performance Curves @ 25°C

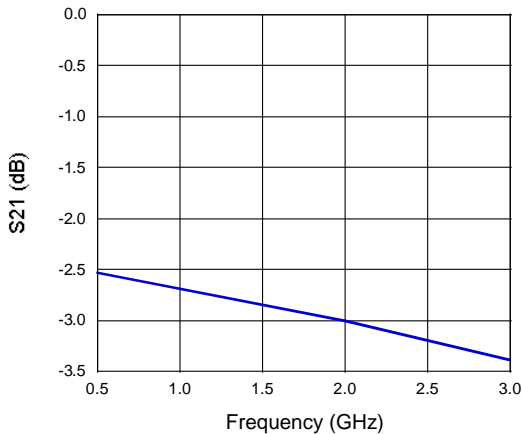
Attenuation vs. Control Voltage



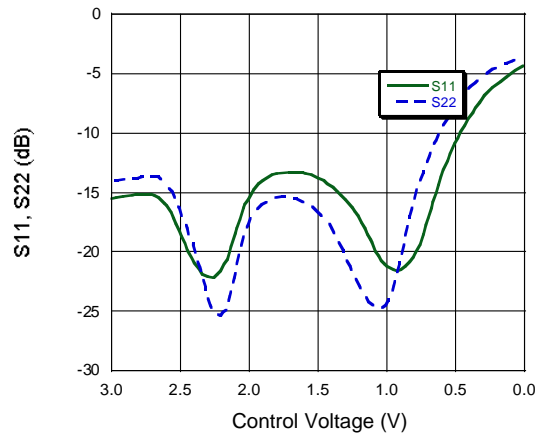
Attenuation vs. Frequency @ 0V



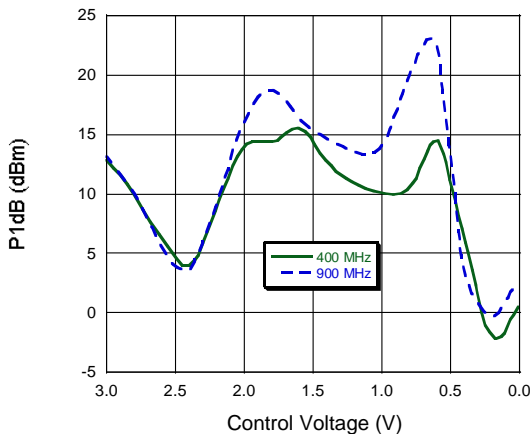
Insertion Loss vs. Frequency



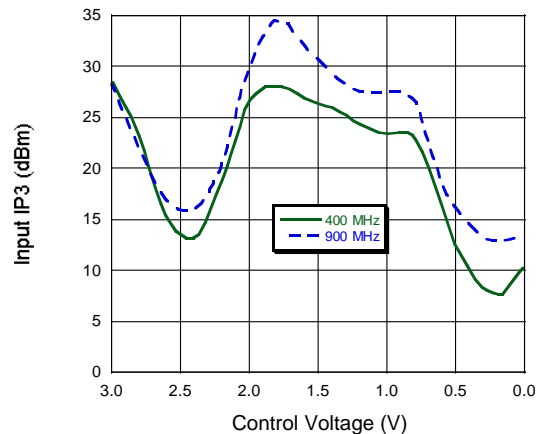
Return Loss vs. Control Voltage, F = 900 MHz



1 dB Compression vs. Control Voltage



IP3 vs. Control Voltage

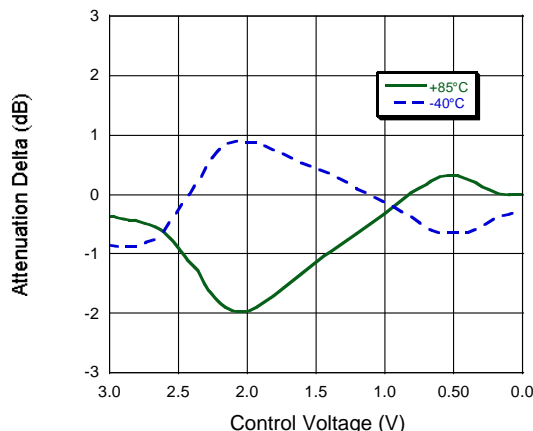


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Typical Performance Curves @ 25°C

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.

AMEYA360

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