

### Features

- Input IP3: +35 dBm Min (Full Attenuation Range)
- Input IP3 is **15 -20 dB** Better than GaAs
- Linear Operation: +20 dBm Typ.
- Plastic, 28 Lead, 6 mm CSP, SMT Package
- 35 dB Dynamic Range (With 30 mA Bias Current)
- Single Control Voltage
- 50 ohm Impedance
- Linear Driver, MADR-007098-000100, Available
- Test Boards are Available
- Tape and Reel Packaging Available
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of MAAVCC0001

### Description

M/A-COM's MAAV-007092-000100 is a PIN diode based voltage variable attenuator. This device is in a 6mm square, 28 lead, plastic CSP Package, suitable for surface mounting on PCBs. These attenuators have linear operating power and input intercept point levels 15 - 20 dB better than GaAs FET MMIC voltage variable attenuators. They are ideally suited for use where low distortion, high linear operating power and high dynamic range are required. These devices are optimized for the GSM frequency band, but exhibit excellent performance and repeatability over the entire specified frequency band. The MAAV-007092-000100 is ideally suited for wireless communications systems.

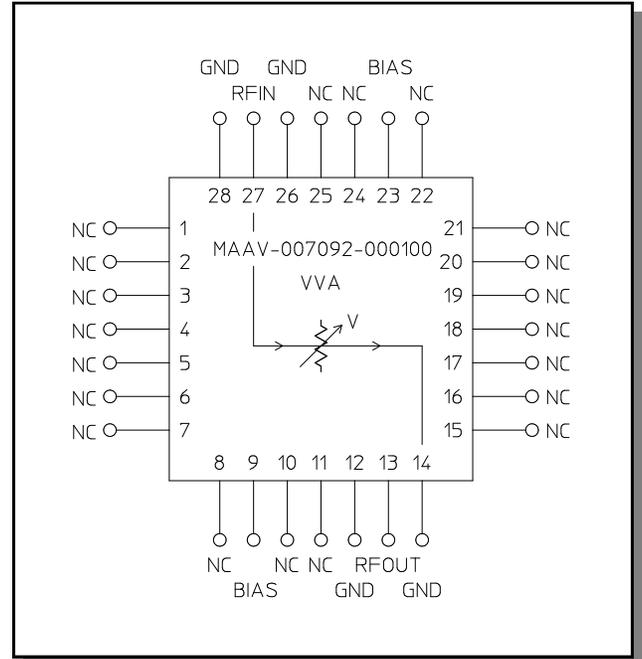
### Ordering Information

| Part Number        | Package           |
|--------------------|-------------------|
| MAAV-007092-000100 | Bulk Packaging    |
| MAAV-007092-0001TR | 1000 piece reel   |
| MAAV-007092-0001TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

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

### Functional Schematic



### Pin Configuration<sup>2</sup>

| Pin # | Function          | Pin # | Function          |
|-------|-------------------|-------|-------------------|
| 1     | N/C               | 15    | N/C               |
| 2     | N/C               | 16    | N/C               |
| 3     | N/C               | 17    | N/C               |
| 4     | N/C               | 18    | N/C               |
| 5     | N/C               | 19    | N/C               |
| 6     | N/C               | 20    | N/C               |
| 7     | N/C               | 21    | N/C               |
| 8     | N/C               | 22    | N/C               |
| 9     | BIAS <sup>1</sup> | 23    | BIAS <sup>1</sup> |
| 10    | N/C               | 24    | N/C               |
| 11    | N/C               | 25    | N/C               |
| 12    | GND               | 26    | GND               |
| 13    | RF OUT            | 27    | RF IN             |
| 14    | GND               | 28    | GND               |

1. Bias current may be applied to Pin 9 or 23. However, the unused Pin must be isolated.
2. The exposed pad centered on the package bottom must be connected to RF and DC ground. (For PQFN Packages)

## Voltage Variable Absorptive Attenuator, 800 - 1000 MHz

Rev. V2

### Electrical Specifications: $T_A = 25^\circ\text{C}$

| Parameter                | Test Conditions               | Frequency     | Units         | Min. | Typ.  | Max.  |
|--------------------------|-------------------------------|---------------|---------------|------|-------|-------|
| Insertion Loss           | 0 volts                       | 800-1000 MHz  | dB            | —    | 3.6   | 4.2   |
|                          |                               | 925 - 960 MHz | dB            | —    | 3.5   | 3.9   |
| Attenuation (Above Loss) | 10 mA bias current            | 800-1000 MHz  | dB            | 30   | 34    | —     |
|                          |                               | 925 - 960 MHz | dB            | 30   | 34    | —     |
| Attenuation Flatness     | 0 to 30 dB attenuation        | 800-1000 MHz  | dB            | —    | 2.3   | 3.0   |
|                          |                               | 925 - 960 MHz | dB            | —    | 0.4   | 0.8   |
| VSWR                     | 0 to 30 dB attenuation        | 800-1000 MHz  | Ratio         | —    | 1.5:1 | 1.9:1 |
|                          |                               | 925 - 960 MHz | Ratio         | —    | 1.3:1 | 1.8:1 |
| Switching Speed          | 50% Control to 90%/10% RF     | 800-1000 MHz  | $\mu\text{s}$ | —    | —     | 10.0  |
| Linear Operation         | —                             | 800-1000 MHz  | dBm           | —    | +20   | —     |
| Input $IP_3$             | Two-tone inputs up to +10 dBm | 800-1000 MHz  | dBm           | +35  | +40   | —     |
| $I_{\text{Control}}$     | —                             | 800-1000 MHz  | mA            | —    | —     | 30    |

### Absolute Maximum Ratings <sup>3,4</sup>

| Parameter             | Absolute Maximum |
|-----------------------|------------------|
| Max. Input Power      | +27 dBm          |
| Operating Temperature | -40°C to +85°C   |
| Storage Temperature   | -65°C to +125°C  |

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

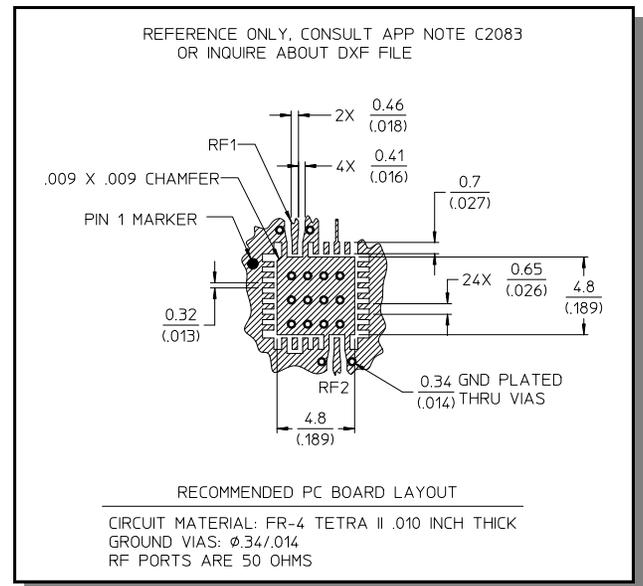
### Handling Procedures

Please observe the following precautions to avoid damage:

### Static Sensitivity

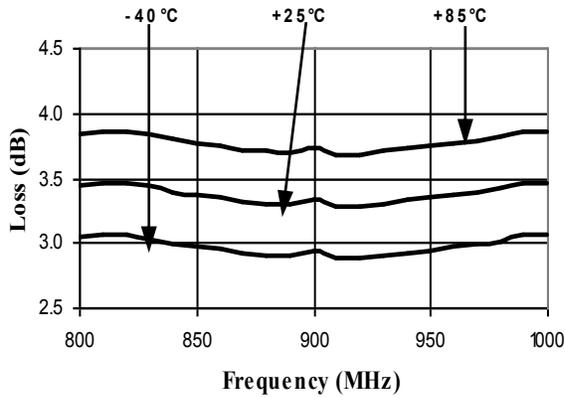
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

### Recommended PCB Layout

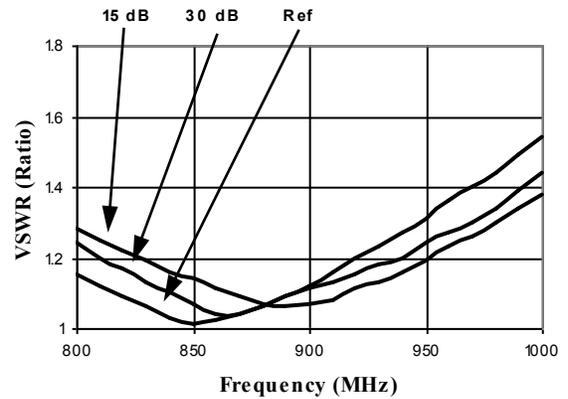


## Typical Performance Curves

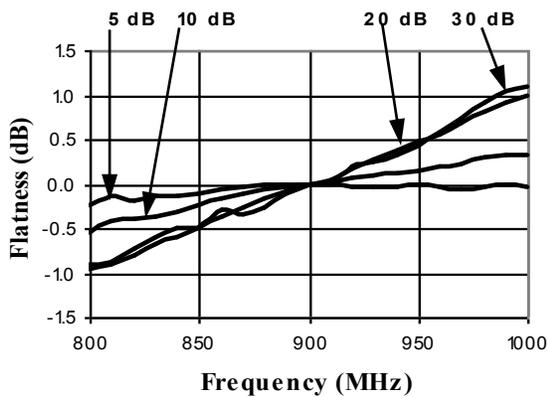
Insertion Loss



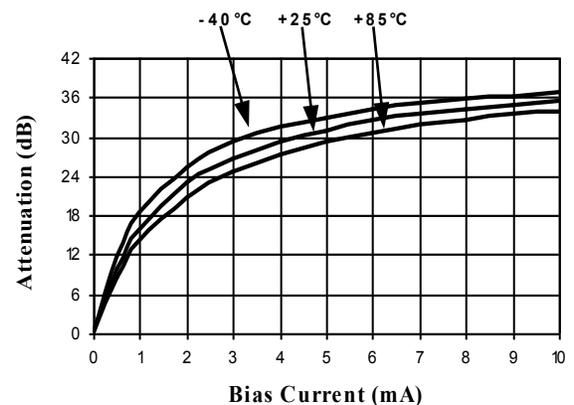
Typical VSWR @ +25°C



Attenuation Flatness @ +25°C



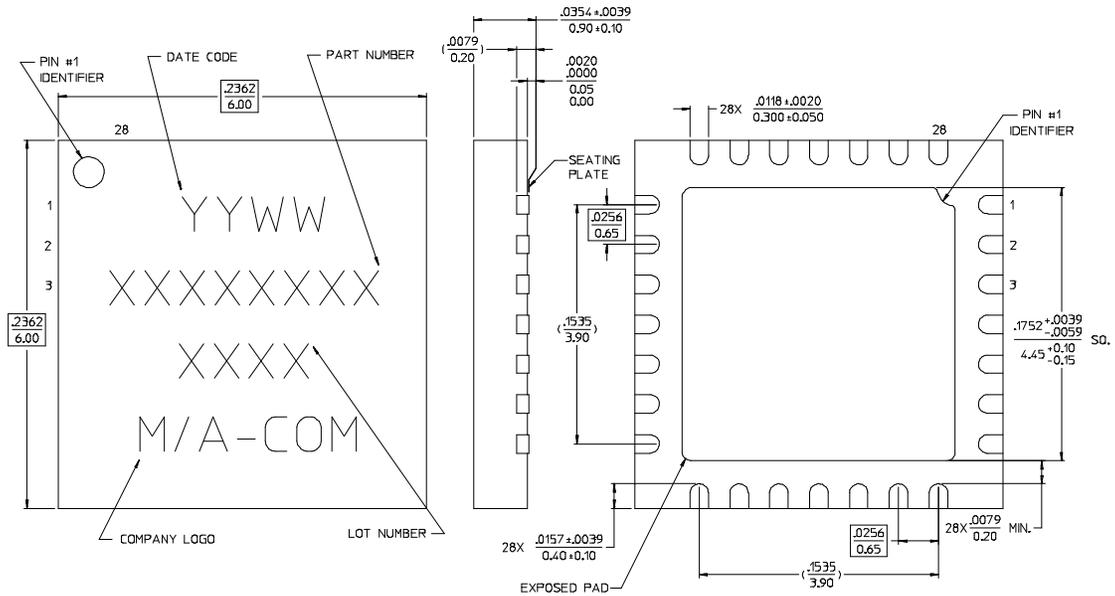
Attenuation vs. Bias Current, Frequency = 1000 MHz



## Voltage Variable Absorptive Attenuator, 800 - 1000 MHz

Rev. V2

### CSP-8, 28 Lead, 6mm



**NOTES:**

1. REFERENCE JEDEC MO-220-VJJC-4 FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. ALL DIMENSIONS SHOWN AS in/mm.
3. REFERENCE S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.

Package outline conforms to JEDEC standard MO-220B.

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.