

**Voltage Variable Absorptive
Attenuator, 1700 - 2200 MHz**

**MAAV-007091-000100
V2**

Features

- Input IP3: +31 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 MAAVCC0002

Description

M/A-COM's MAAV-007091-000100 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 PCS and UMTS frequency bands, but exhibit excellent performance and repeatability over the entire specified frequency band. The MAAV-007091-000100 is ideally suited for wireless communications systems.

Ordering Information

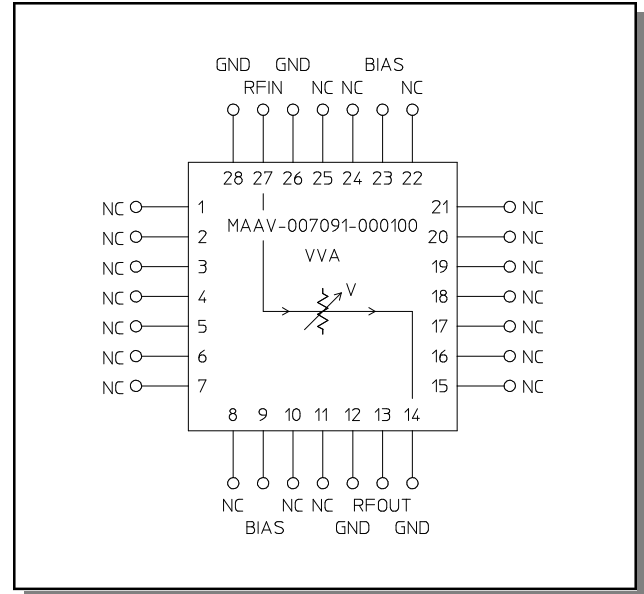
| Part Number | Package |
|--------------------|-------------------|
| MAAV-007091-000100 | Bulk Packaging |
| MAAV-007091-0001TR | 1000 piece reel |
| MAAV-007091-0001TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

Note: Die quantity varies.

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

Functional Schematic



Pin Configuration^{2,3}

| Pin # | Function | Pin # | Function |
|-------|-------------------|-------|-------------------|
| 1 | NC | 15 | NC |
| 2 | NC | 16 | NC |
| 3 | NC | 17 | NC |
| 4 | NC | 18 | NC |
| 5 | NC | 19 | NC |
| 6 | NC | 20 | NC |
| 7 | NC | 21 | NC |
| 8 | NC | 22 | NC |
| 9 | BIAS ¹ | 23 | BIAS ¹ |
| 10 | NC | 24 | NC |
| 11 | NC | 25 | NC |
| 12 | GND | 26 | GND |
| 13 | RFOUT | 27 | RFIN |
| 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)
3. It is preferable to ground all "NC" pins, except for the unused bias pin, which must be left open.

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Electrical Specifications: T_A = 25°C

| Parameter | Test Conditions | Frequency | Units | Min. | Typ. | Max. |
|-----------------------------|-------------------------------|---------------|-------|------|------|-------|
| Insertion Loss | 0 volts | 1700-2200 MHz | dB | — | 2.9 | 4.0 |
| Attenuation (Above Loss) | 10 mA bias current | 1700-2200 MHz | dB | 30 | 33 | — |
| Attenuation Flatness | 0 to 30 dB attenuation | 1700-2200 MHz | dB | — | 1.0 | 2.0 |
| VSWR | 0 to 30 dB attenuation | 1700-2200 MHz | Ratio | — | 2:1 | 2.2:1 |
| Switching Speed | 50% Control to 90%/10% RF | 1700-2200 MHz | µs | — | — | 3.0 |
| Linear Operation | — | 1700-2200 MHz | dBm | — | +20 | — |
| Input IP ₃ | Two-tone inputs up to +10 dBm | 1700-2200 MHz | dBm | +31 | — | — |
| P1 dB | Full Attenuation Range | 1700-2200 MHz | dBm | — | +23 | — |
| I _{Control} | — | 1700-2200 MHz | mA | — | — | 30 |

Absolute Maximum Ratings ⁴

| Parameter | Absolute Maximum |
|-------------------------------------|------------------|
| Max. Input Power 1700 - 2200 MHz | +27 dBm |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +125°C |

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

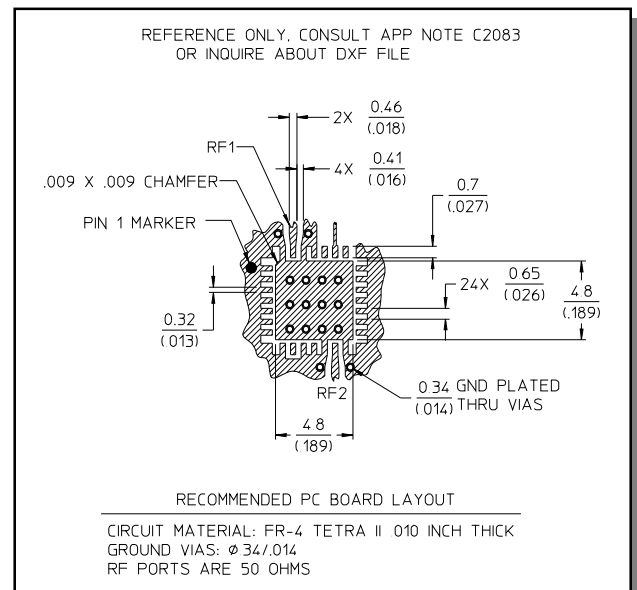
Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

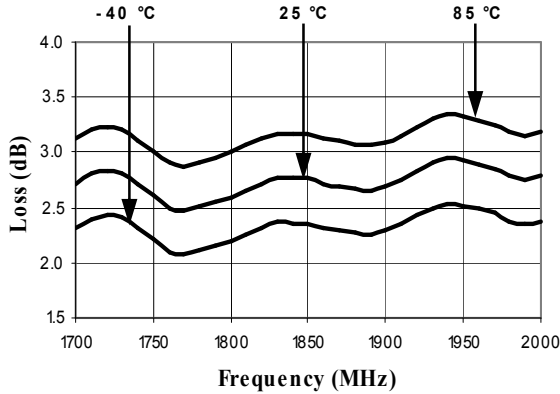
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Recommended PCB Layout

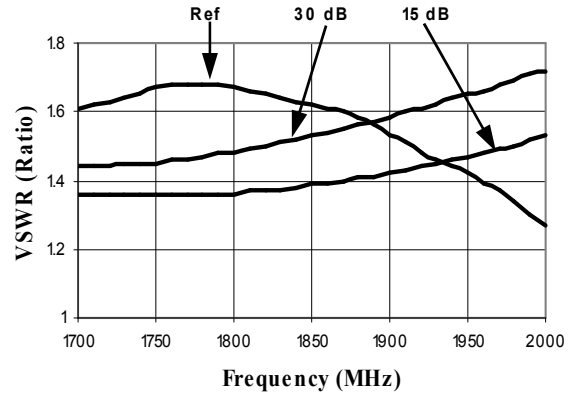


Typical Performance Curves

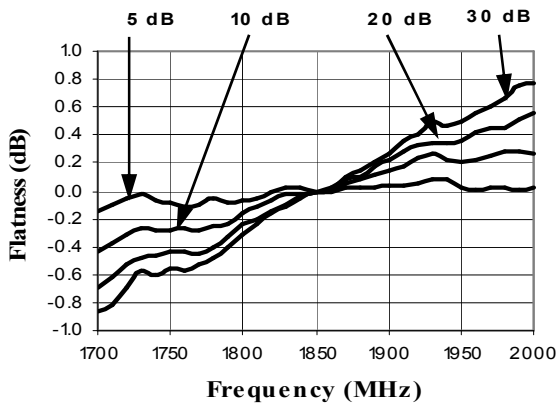
Insertion Loss



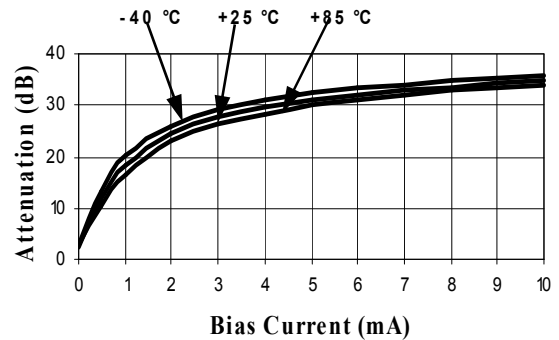
Typical VSWR @ +25°C



Attenuation Flatness @ +25°C

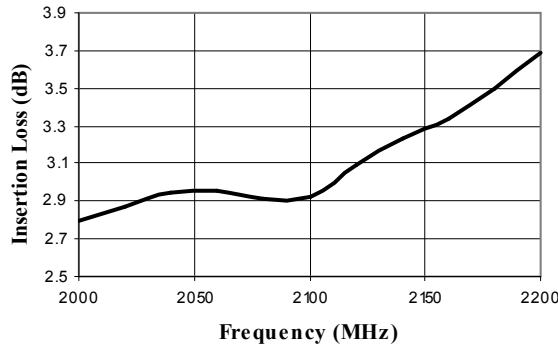


*Attenuation vs. Bias Current,
Frequency = 2000 MHz*

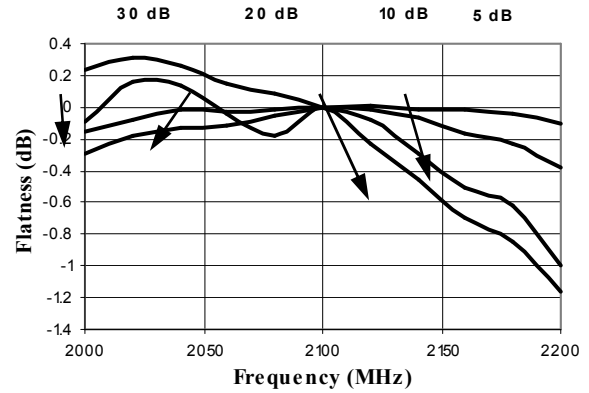


Typical Performance Curves (beyond 2GHz)

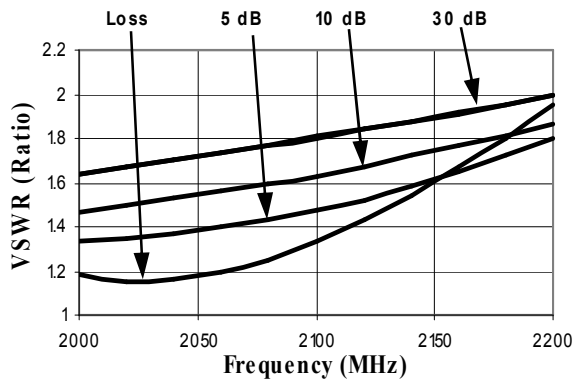
Insertion Loss @ 25°C



Attenuation Flatness @ 25°C



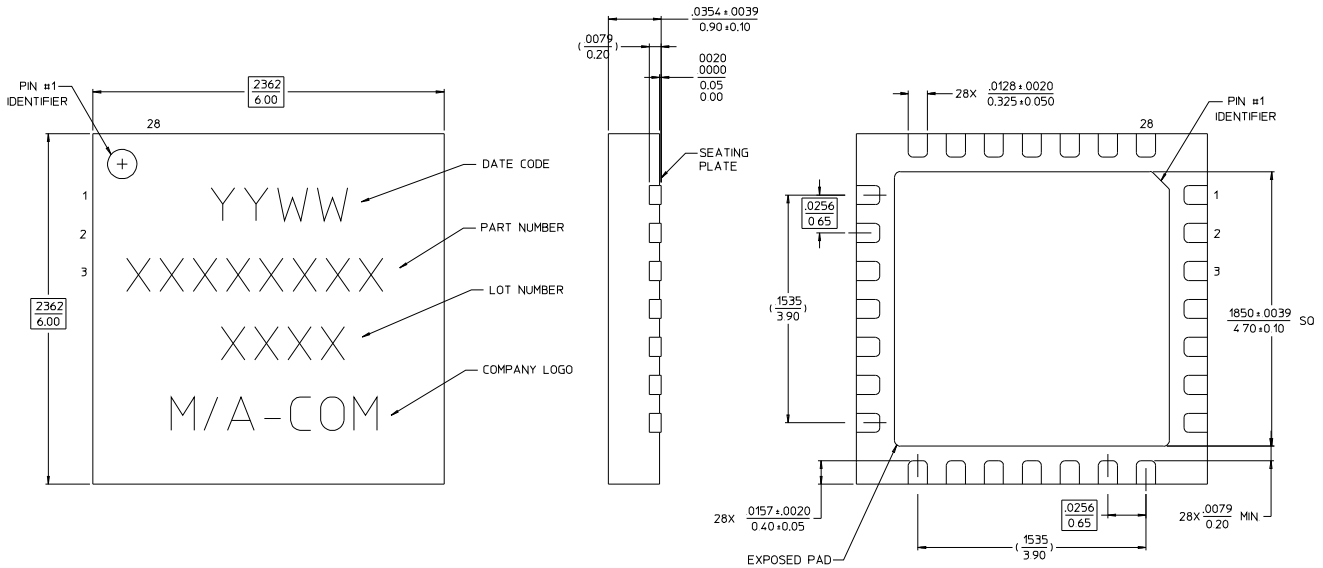
Typical VSWR @ +25°C



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CSP-8, 28 Lead, 6mm



- NOTES 1. REFERENCE JEDEC MO-220, VAR. VJJC-3 FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION
2. REFERENCE S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION
3. ALL DIMENSIONS SHOWN AS INCHES/MM.

Package outline conforms to JEDEC standard MO-220B.