

## Features

- High Linear Gain: 22 dB Typical
- High Saturated Output Power: +33 dBm Typical
- High Power Added Efficiency: 22% Typical
- High P1dB: 32 dBm Typ.
- 50  $\Omega$  Input/Output Broadband Matched
- Integrated Output Power Detector
- Lead-Free Ceramic Bolt Down Package
- RoHS\* Compliant and 260°C Reflow Compatible

## Description

M/A-COM's AM42-0007 is a three-stage MMIC linear power amplifier in a lead-free, ceramic bolt down style hermetic package. The AM42-0007 employs a fully matched chip with internally decoupled gate and drain bias networks and an output power detector. The AM42-0007 is designed to be operated from a constant voltage drain supply.

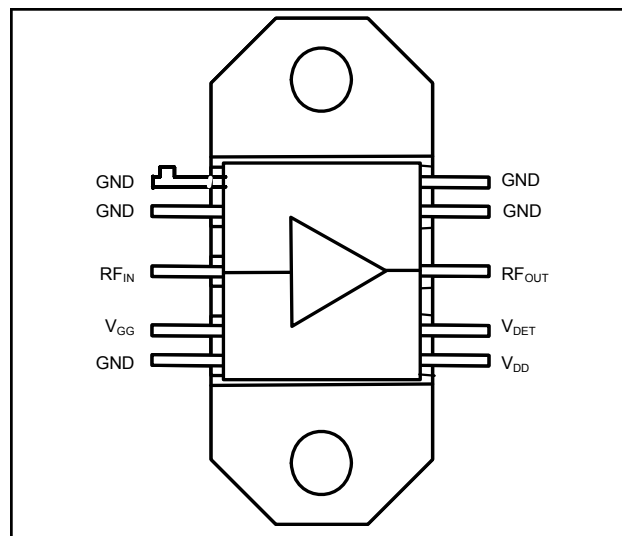
The AM42-0007 is designed for use as an output stage or a driver, in applications for VSAT systems. This design is fully monolithic and requires a minimum of external components.

M/A-COM's AM42-0007 is fabricated using a mature 0.5 micron GaAs MESFET process. The process features full passivation for increased performance and reliability. This product is 100% RF tested to ensure compliance to performance specifications.

## Ordering Information

| Part Number | Package                   |
|-------------|---------------------------|
| AM42-0007   | Ceramic Bolt Down Package |

## Functional Schematic



## Pin Configuration

| Pin No. | Pin Name         | Description           |
|---------|------------------|-----------------------|
| 1       | GND              | DC and RF Ground      |
| 2       | GND              | DC and RF Ground      |
| 3       | IN               | RF Input              |
| 4       | V <sub>GG</sub>  | Gate Supply           |
| 5       | GND              | DC and RF Ground      |
| 6       | V <sub>DD</sub>  | Voltage Drain Supply  |
| 7       | V <sub>DET</sub> | Output Power Detector |
| 8       | OUT              | RF Output             |
| 9       | GND              | DC and RF Ground      |
| 10      | GND              | DC and RF Ground      |

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

**GaAs MMIC VSAT Power Amplifier, 2.0 W**  
**14.0 - 14.5 GHz**
**M/A-COM Products**  
**Rev. V6**
**Electrical Specifications:  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = +9\text{ V}$ ,  $V_{GG} = -5.0\text{ V}$ ,  $Z_0 = 50\Omega$ ,  $F = 14.0\text{-}14.5\text{ GHz}$** 

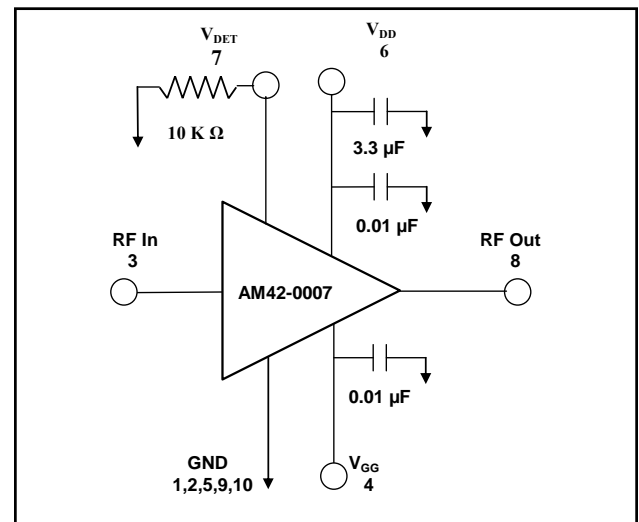
| Parameter               | Test Conditions  | Units              | Min.   | Typ.      | Max.    |
|-------------------------|--|--------------------|--------|-----------|---------|
| Linear Gain             | $P_{IN} \leq 0\text{ dBm}$                               | dB                 | 19     | 22        | —       |
| Input VSWR              | $P_{IN} \leq 0\text{ dBm}$                               | Ratio              | —      | 2.5:1     | 2.7:1   |
| Output VSWR             | $P_{IN} \leq 0\text{ dBm}$                               | Ratio              | —      | 2.7:1     | —       |
| Saturated Output Power  | $P_{IN} = +14\text{ dBm}$                                | dBm                | —      | 33        | —       |
| Output Power at P1dB    | —  | dBm                | 31     | 32        | —       |
| Output IP3 <sup>1</sup> | —  | dBm                | —      | 41        | —       |
| Power Added Efficiency  | $P_{IN} = +14\text{ dBm}$                                | %                  | —      | 22        | —       |
| Bias Current            | $I_{DD}$ (No RF)<br>$I_{GG}$ (No RF)                     | mA<br>mA           | —<br>— | 850<br>18 | —<br>25 |
| Thermal Resistance      | $25^\circ\text{C}$ Heat Sink                             | $^\circ\text{C/W}$ | —      | 9.5       | —       |
| Detector Output Voltage | $R_L = 10\text{ K } \Omega$ , $P_{OUT} = +31\text{ dBm}$ | V                  | —      | +3.5      | —       |

1. IP<sub>3</sub> is measured with two +24 dBm output tones @ 1 MHz spacing

**Absolute Maximum Ratings<sup>2,3,4</sup>**

| Parameter           | Absolute Maximum                            |
|---------------------|---|
| $V_{DD}$            | 12 Volts                                    |
| $V_{GG}$            | -10 Volts                                   |
| Power Dissipation   | 13.2 W                                      |
| RF Input Power      | +23 dBm                                     |
| Channel Temperature | $150^\circ\text{C}$                         |
| Storage Temperature | $-65^\circ\text{C}$ to $+150^\circ\text{C}$ |
| $I_{DS}$            | 2100 mA                                     |

- 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.
- Case Temperature ( $T_C$ ) =  $+25^\circ\text{C}$ .

**Typical Bias Configuration<sup>5,6,7,8,9</sup>**


- Nominal bias is obtained by first connecting  $-5\text{ volts}$  to pin 4 ( $V_{GG}$ ), followed by connection  $+9\text{ volts}$  to pin 6 ( $V_{DD}$ ). Note sequence.
- RF ground and thermal interface is the flange (case bottom). Adequate heat sinking is required.
- No DC bias voltage appears at the RF ports.
- For optimum IP<sub>3</sub> performance, the  $V_{DD}$  bypass capacitors should be placed within 0.5 inches of pin 6.
- Resistor and capacitors surrounding the amplifier are suggestions and not included as part of the AM42-0007.

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM 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 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.

• **North America** Tel: 800.366.2266 / Fax: 978.366.2266  
 • **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300  
 • **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

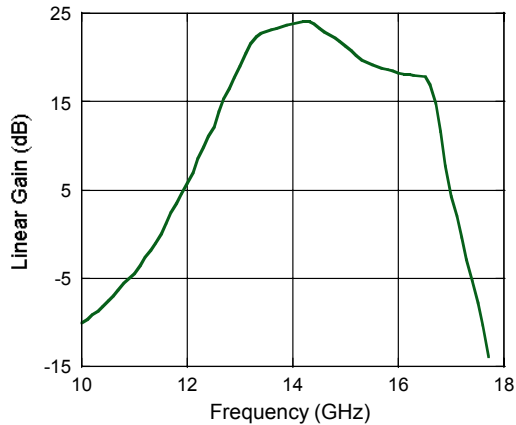
M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

## GaAs MMIC VSAT Power Amplifier, 2.0 W 14.0 - 14.5 GHz

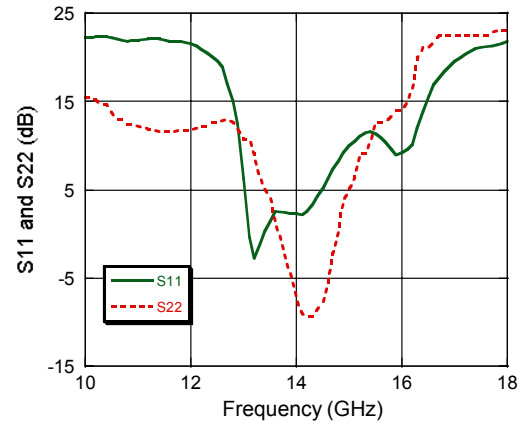
M/A-COM Products  
Rev. V6

### Typical Performance Curves @ +25°C

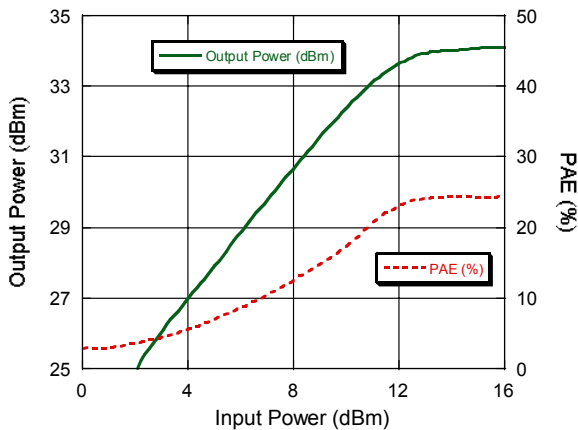
Linear Gain vs. Frequency



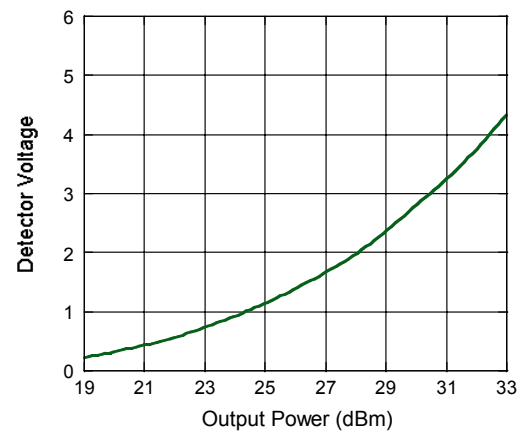
Input and Output Return Loss vs. Frequency



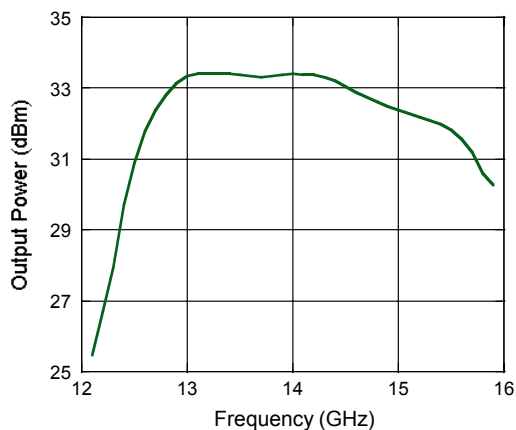
Output Power vs. Input Power @ 14.25 GHz



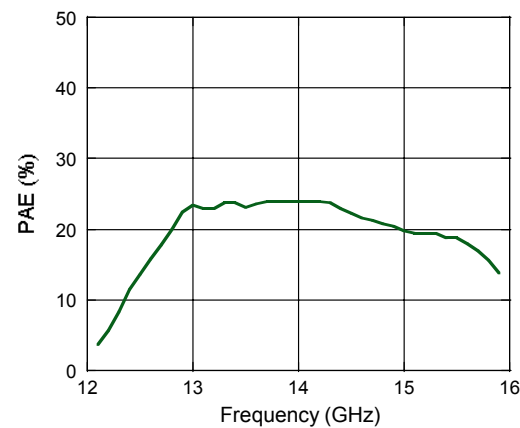
Detector Voltage vs. Output Power @ 14.25 GHz



Output Power vs. Frequency @  $P_{IN} = +14$  dBm



PAE vs. Frequency @  $P_{IN} = +14$  dBm



**ADVANCED:** Data Sheets contain information regarding a product M/A-COM 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 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.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

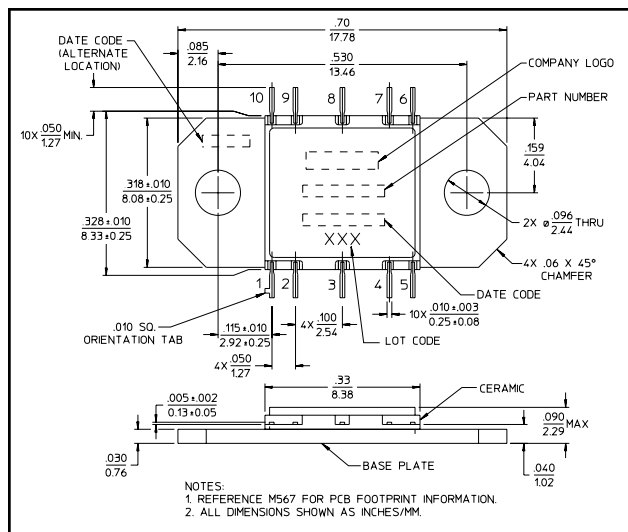
M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

M/A-COM Products  
Rev. V6

## Handling Procedures

## 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.



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