AM42-0040



GaAs MMIC VSAT Power Amplifier 2.0 W 5.9 - 6.4 GHz

Features

- High Linear Gain: 30 dB Typical
- High Saturated Output Power: +33 dBm Typ.
- High Power Added Efficiency: 26% Typ.
- 50 Ω Input/Output Broadband Matched
- Lead-Free Ceramic Bolt Down Package
- RoHS* Compliant and 260°C Reflow Compatible

Description

The AM42-0040 is a three-stage MMIC power amplifier in a lead-free, ceramic bolt down style hermetic package. The AM42-0040 employs an internally matched monolithic chip with internally decoupled Gate and Drain bias networks. The AM42-0040 is designed to be operated from a constant current Drain supply. By varying the Gate bias voltage, the saturated output power performance of this device can be tailored for various applications.

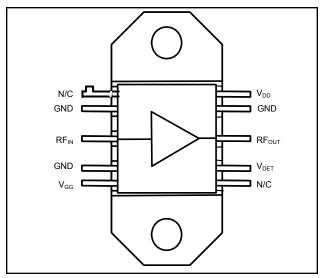
The AM42-0040 is designed for use as an output stage or driver amplifier for C-band VSAT transmitter systems. This amplifier employs a fully monolithic chip and requires a minimum of external components.

The AM42-0040 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
AM42-0040	Ceramic Bolt Down

Functional Schematic



Pin Configuration

_					
Pin No.	Pin Name	Description			
1	N/C	No Connection			
2	GND	DC and RF Ground			
3	RF In	RF Input			
4	GND	DC and RF Ground			
5	V_{GG}	Gate Supply			
6	N/C	No Connection			
7	V _{DET}	Detector			
8	RF Out	RF Output			
9	GND	DC and RF Ground			
10	V _{DD}	Drain Supply			

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

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Rev. V5

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Rev. V5

Electrical Specifications: $T_A = 25^{\circ}C$, $V_{DD} = +9 V$, V_{GG} adjusted for $I_{DD} = 1050 mA$

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Linear Gain	P _{IN} <u>≤</u> -10 dBm	dB	27	30	—
Input VSWR	P _{IN} <u>≤</u> -10 dBm	Ratio	—	2.3:1	2.7:1
Output VSWR	P _{IN} <u>≤</u> -10 dBm	Ratio	—	3.0:1	_
Output Power	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ.	dBm	31.7	33.0	34.5
Output Power vs. Frequency	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ.	dB		1.0	1.5
Output Power vs. Temperature (with respect to $T_A = 25^{\circ}C$)	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ. T_{A} = -40°C to +70°C	dB		±0.4	
Drain Bias Current	P _{IN} = +10 dBm	mA	900	1050	1100
Gate Bias Voltage	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ.	V	-2.4	-1.2	-0.4
Gate Bias Current	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ.	mA	_	5	20
Thermal Resistance	25°C Heat Sink	°C/W		5.6	_
Second Harmonic	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ.	dBc		-35	_
Third Harmonic	P_{IN} = +10 dBm, I_{DD} = 1050 mA Typ.	dBc		-45	—
V _{DET}		V	2	_	_

Absolute Maximum Ratings ^{1,2,3}

Parameter	Absolute Maximum		
Input Power	+23 dBm		
V _{DD}	+12 Volts		
V _{GG}	-3 Volts		
V _{DD} - V _{GG}	+12 Volts		
I _{DD}	1700 mA		
Channel Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +150°C		

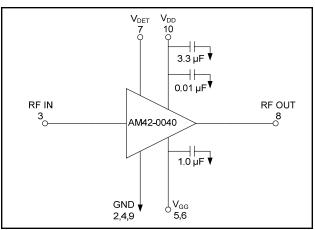
1. Exceeding any one or combination of these limits may cause permanent damage to this device.

 M/A-COM Technology does not recommend sustained operation near these survivability limits.

3. Case Temperature (TC) = +25°C.

2

Typical Bias Configuration^{4,5,6,7,8}



- Nominal bias is obtained by first connecting -2.4 volts to pin 5 (VGG), followed by connection +9 volts to pin 10 (VDD). Note sequence. Adjust VGG for a drain current of 1050 mA typical.
- 5. RF ground and thermal interface is the flange (case bottom). Adequate heat sinking is required.
- 6. No DC bias voltage appears at the RF ports.
- 7. For optimum IP3 performance, the VDD bypass capacitors should be placed within 0.5 inches of the VDD leads.
- Resistor and capacitors surrounding the amplifier are suggestions and not included as part of the AM42-0040.

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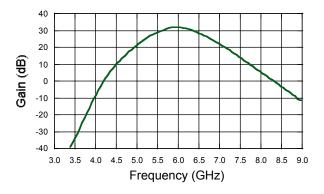


Rev. V5

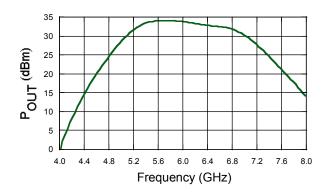
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Typical Performance Curves @ +25°C

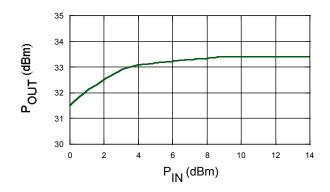
Linear Gain vs. Frequency



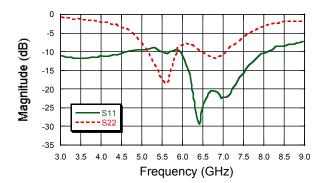
Output Power vs. Frequency @ $P_{IN} = +10 \ dBm$



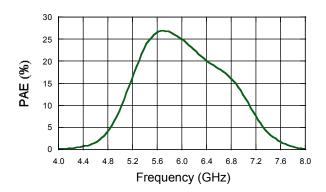
Output Power vs. Input Power @ 6.15 GHz



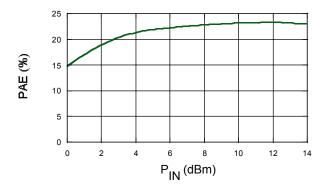
Input and Output Return Loss vs. Frequency



PAE vs. Frequency @ $P_{IN} = +10 \text{ dBm}$



PAE vs. Input Power @ 6.15 GHz



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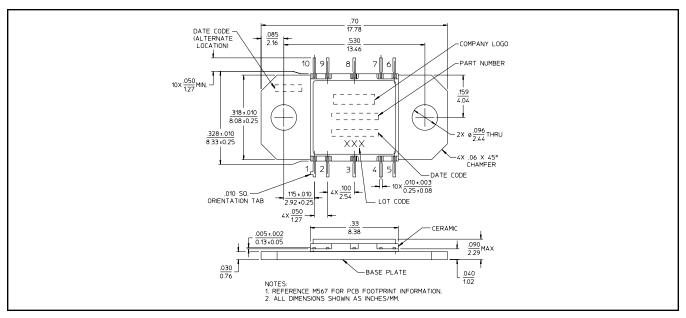
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Lead-Free CR-15[†]



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

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.

4

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