

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

M/A-COM's 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.

M/A-COM's 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

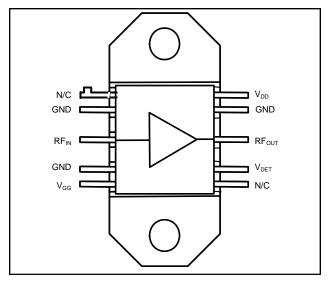
Part Number	Package	
AM42-0040	Ceramic Bolt Down Package	





AM42-0040 V3

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.

1

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- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
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[•] North America Tel: 800.366.2266 / Fax: 978.366.2266



RoHS Compliant



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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 ≤} -10 dBm	Ratio	_	2.3:1	2.7:1
Output VSWR	P _{IN ≤} -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	$P_{IN} = +10 \text{ dBm}$	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		

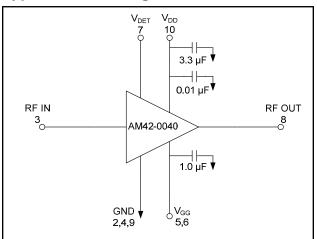
1. Exceeding any one or combination of these limits may cause permanent damage to this device.

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

3. Case Temperature $(T_c) = +25^{\circ}C$.

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



- 4. Nominal bias is obtained by first connecting -2.4 volts to pin 5 (V_{GG}), followed by connection +9 volts to pin 10 (V_{DD}). Note sequence. Adjust V_{GG} 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 V_{DD} bypass capacitors should be placed within 0.5 inches of the V_{DD} leads.
- 8. Resistor and capacitors surrounding the amplifier are suggestions and not included as part of the AM42-0040.
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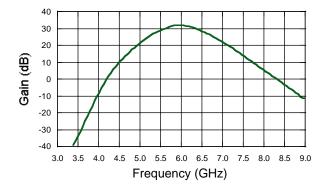
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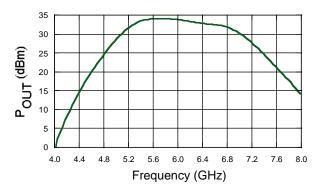
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Typical Performance Curves @ +25°C

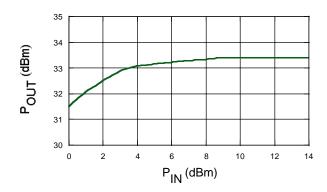
Linear Gain vs. Frequency



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



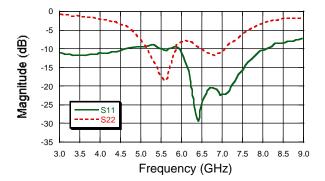
Output Power vs. Input Power @ 6.15 GHz



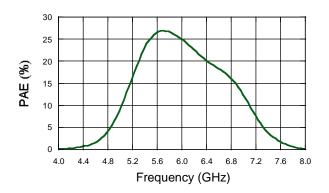
RoHS Compliant



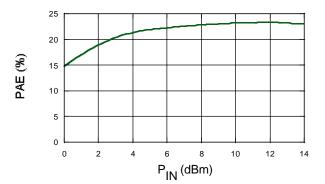
Input and Output Return Loss vs. Frequency



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







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3



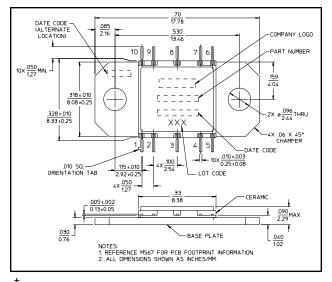
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AM42-0040 V3

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.

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4