M/A-COM

GaAs MMIC VSAT Power Amplifier, 2W 6.40 - 7.025 GHz

Features

- High Linear Gain: 30 dB Typ.
- High Saturated Output Power: +33 dBm Typ.
- High Power Added Efficiency: 22% Typ.
- 50Ω Input/Output Broadband Matched
- High Performance Ceramic Bolt Down Package

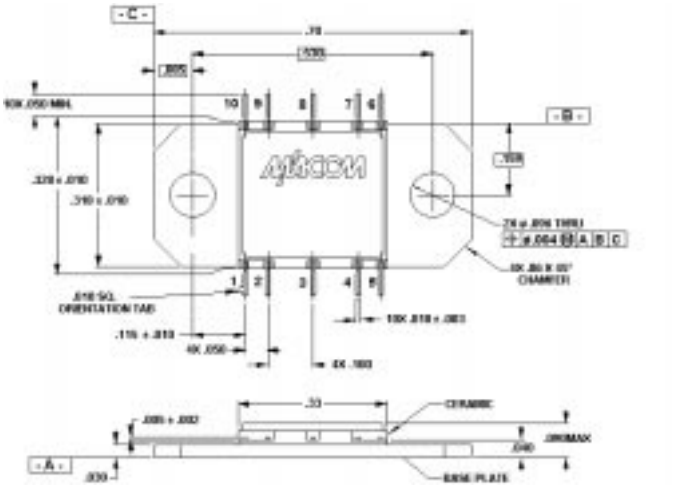
Description

M/A-COM's AM42-0039 is a three-stage MMIC power amplifier in a ceramic bolt down style hermetic package. The AM42-0039 employs a fully matched monolithic chip with internally decoupled Gate and Drain bias networks. The AM42-0039 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 AM42-0039 is designed for use as an output stage or driver amplifier for VSAT transmitter systems. This amplifier is monolithic and requires a minimum of external components.

M/A-COM's AM42-0039 is fabricated using a mature 0.5 micron GaAs MESFET process. The chip is fully passivated for increased performance and reliability. These amplifiers are 100% RF tested to ensure compliance to performance specifications.

CR-15



Notes: (unless otherwise specified)
1. Dimensions are in inches.
2. Tolerance: .XXX = ± 0.005
   .XX = ± 0.010

Ordering Information

Part Number	Package
AM42-0039	Ceramic Bolt Down Package

Electrical Specifications: T_A = +25°C, V_{DD} = +9V, V_{GG} adjusted for I_{DD} = 1050 mA, Freq. = 6.40 to 7.025 GHz

Parameter	Abbv.	Test Conditions	Units	Min.	Typ.	Max.
Linear Gain	G_L	$P_{IN} \leq$ -10 dBm	dB	27	30	—
Input VSWR	$VSWR_{IN}$	$P_{IN} \leq$ -10 dBm	—	—	2.3:1	2.7:1
Output VSWR	$VSWR_{OUT}$	$P_{IN} \leq$ -10 dBm	—	—	2.3:1	—
Output Power	P_{SAT}	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ.	dBm	31.5	33.0	34.0
Output Power vs. Frequency	P_{SAT}	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ.	dB	—	1.0	1.5
Output Power vs. Temperature (with respect to T_A=+25°C)	P_{SAT}	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ. T_A= -40°C to +70°C	dB	—	±0.4	—
Drain Bias Current	I_{DD}	P_{IN} = +10 dBm	mA	900	1050	1100
Gate Bias Voltage	V_{GG}	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ.	V	-2.4	-1.2	-0.4
Gate Bias Current	I_{GG}	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ.	mA	—	20	40
Thermal Resistance	θ_{JC}	25°C Heat Sink	°C/W	—	7 (Est.)	—
Second Harmonic	f_2	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ.	dBc	—	-35	—
Third Harmonic	f_3	P_{IN} = +10 dBm, I_{DD}=1050 mA Typ.	dBc	—	-45	—

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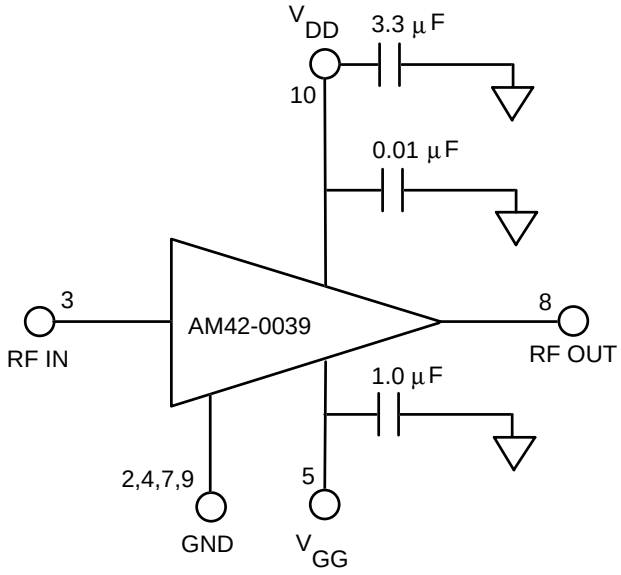
Absolute Maximum Ratings[1,2,3,4]

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 a combination of these limits may cause permanent damage.
2. Case Temperature (T_C) = +25°C.
3. Nominal bias is obtained by first connecting -2 volts to pin 5 (V_{GG}), followed by connecting +9 volts to pin 10 (V_{DD}). Note sequence. Adjust V_{GG} for a drain current of 1050 mA typical.
4. RF ground and thermal interface is the flange (case bottom). Adequate heat sinking is required.
5. No dc supply voltage will appear at the RF ports.
6. The dc resistance at the input and output ports is a short circuit. No voltage is allowed on these ports.
7. For optimum IP_3 performance, the V_{DD} bypass capacitors should be placed within 0.5 inches of the V_{DD} leads.

Typical Bias Configuration[4,5,6,7]



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	GND	DC and RF Ground
8	RF Out	RF Output
9	GND	DC and RF Ground
10	V_{DD}	Drain Supply

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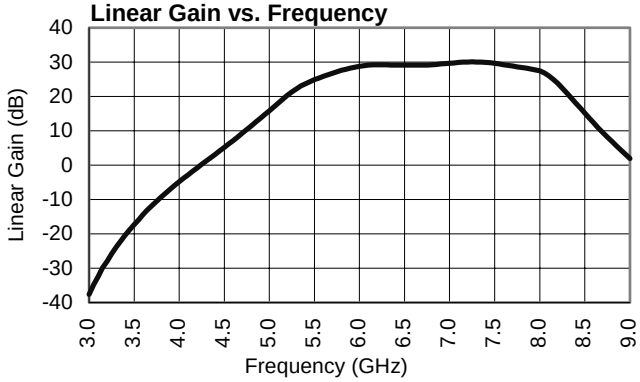
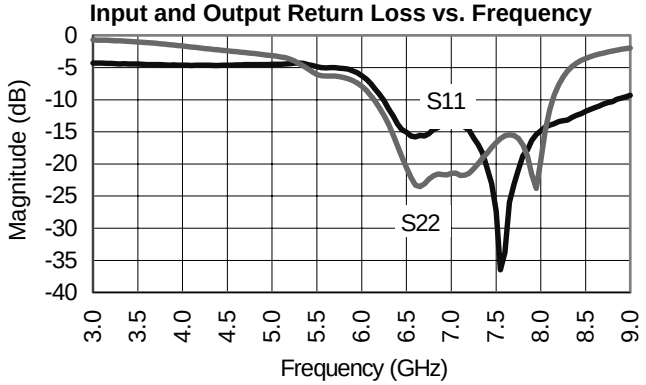
Typical Performance @ +25°C

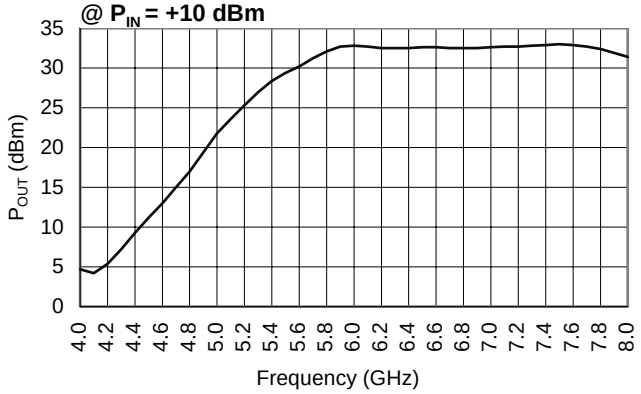
Linear Gain vs. Frequency



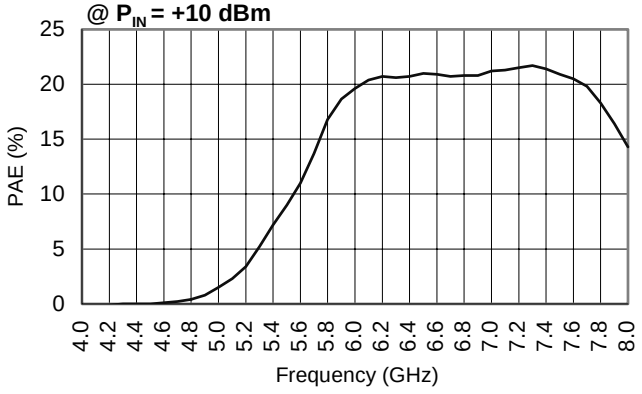
Input and Output Return Loss vs. Frequency



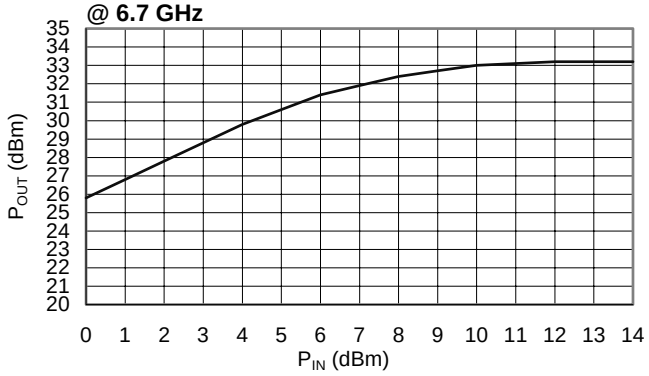
Output Power vs Frequency
@ P_{IN} = +10 dBm



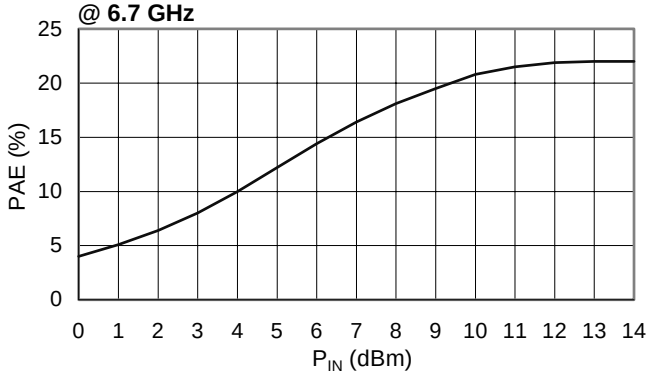
Power Added Efficiency (PAE) vs. Frequency
@ P_{IN} = +10 dBm



Output Power vs. Input Power
@ 6.7 GHz



Power Added Efficiency vs. Input Power
@ 6.7 GHz



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