HMC994A

v01.1215

GaAs pHEMT MMIC 0.5 WATT POWER AMPLIFIER, DC - 30 GHz

Typical Applications

The HMC994A is ideal for:

- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

Features

High P1dB Output Power: 28 dBm

High Psat Output Power: 30 dBm

High Gain: 14 dB

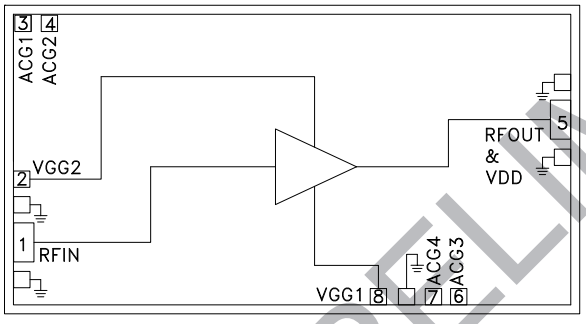
High Output IP3: 36 dBm

Supply Voltage: +10 V @ 250 mA

50 Ohm Matched Input/Output

Die Size: 2.82 x 1.5 x 0.1 mm

Functional Diagram



General Description

The HMC994A is a GaAs MMIC pHEMT Distributed Power Amplifier which operates between DC and 30 GHz. The amplifier provides 14 dB of gain, 36 dBm output IP3 and +28 dBm of output power at 1 dB gain compression while requiring 250 mA from a +10 V supply. The HMC994 exhibits a slightly positive gain slope from 5 to 25 GHz, making it ideal for EW, ECM, Radar and test equipment applications. The HMC994A amplifier I/Os are internally matched to 50 Ohms facilitating integration into Mutli-Chip-Modules (MCMs). All data is taken with the chip connected via two 0.025 mm (1 mil) wire bonds of minimal length 0.31 mm (12 mils).

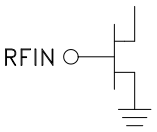
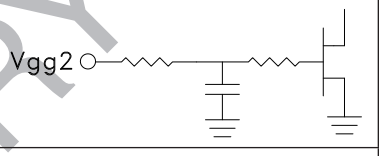
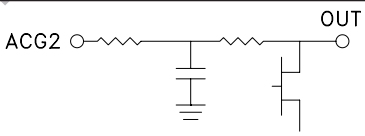
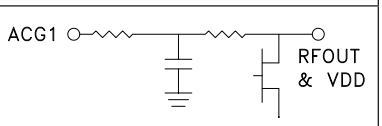
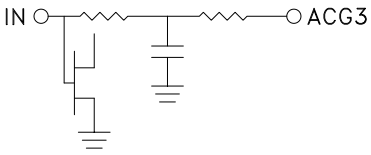
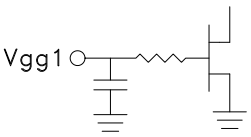
Electrical Specifications, T_A = +25° C, Vdd = +10 V, Vgg2 = +3.5 V, Idd = 250 mA*

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		DC - 18			18 - 26			26 - 30		GHz
Gain	11.5	13.5		12	14		11.5	14		dB
Gain Flatness		±0.25			±0.15			±0.4		dB
Gain Variation Over Temperature		0.011			0.017			0.02		dB/ °C
Input Return Loss		18			18			16		dB
Output Return Loss		20			16			14		dB
Output Power for 1 dB Compression (P1dB)	26	28		25	27		24	26.5		dBm
Saturated Output Power (Psat)		29			29			28		dBm
Output Third Order Intercept (IP3)		38			34			33		dBm
Noise Figure		3.5			4			4.5		dB
Supply Current (Idd) (Vdd= 10V, Vgg1= -0.6V Typ.)		250			250			250		mA

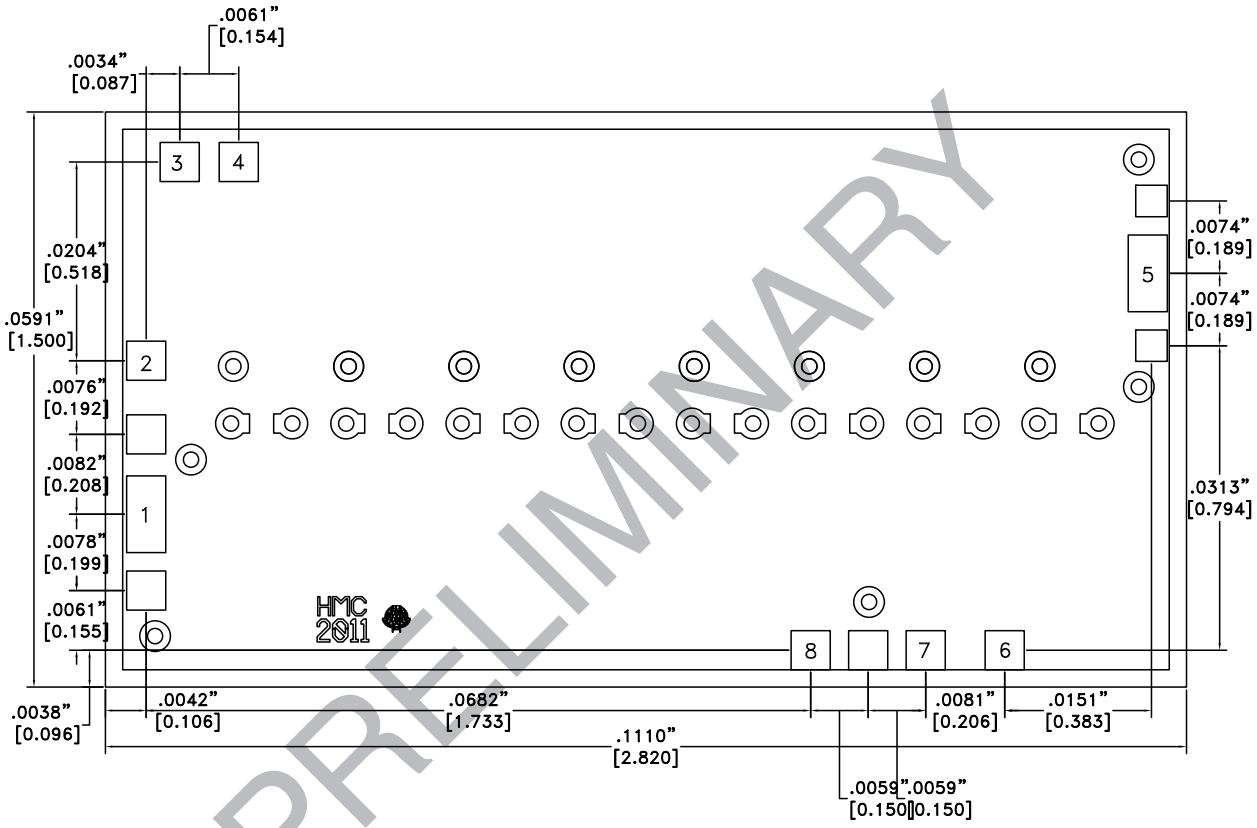
** Adjust Vgg1 between -2 to 0 V to achieve Idd = 250 mA typical.*

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D

Pad Descriptions

Pad Number	Function	Description	Interface Schematic
1	RFIN	This pad is DC coupled and matched to 50 Ohms. Blocking capacitor is required.	
2	VGG2	Gate control 2 for amplifier. Attach bypass capacitors per application circuit herein. For nominal operation +3.5V should be applied to Vgg2.	
4, 7	ACG2, ACG4	Low frequency termination. Attach bypass capacitor per application circuit herein.	
3	ACG1	Low frequency termination. Attach bypass capacitor per application circuit herein.	
5	RFOUT & VDD	RF output for amplifier. Connect DC bias (Vdd) network to provide drain current (Idd). See application circuit herein.	
6	ACG3	Low frequency termination. Attach bypass capacitors per application circuit herein.	
8	VGG1	Gate control 1 for amplifier. Attach bypass capacitor per application circuit herein. Please follow “MMIC Amplifier Biasing Procedure” application note.	
Die Bottom	GND	Die bottom must be connected to RF/DC ground.	

Outline Drawing



NOTES:
1. ALL DIMENSIONS IN INCHES [MILLIMETERS]
2. DIE THICKNESS IS 0.004 (0.100)
3. TYPICAL BOND PAD IS 0.004 (0.100) SQUARE
4. BOND PAD METALIZATION: GOLD
5. BACKSIDE METALLIZATION: GOLD
6. BACKSIDE METAL IS GROUND
7. NO CONNECTION REQUIRED FOR UNLABELED BOND PADS
8. OVERALL DIE SIZE IS ±.002

Die Packaging Information [1]

Standard	Alternate
GP-1 (Gel Pack)	[2]

[1] Refer to the "Packaging Information" section on our website for die packaging dimensions.

[2] For alternate packaging information contact Hittite Microwave Corporation.