HMC-AUH320

v04.0412

GaAs HEMT MMIC MEDIUM POWER AMPLIFIER, 71 - 86 GHz

Typical Applications

This HMC-AUH320 is ideal for:

- Short Haul / High Capacity Links
- Wireless LAN Bridges
- Automotive Radar
- Military & Space
- E-Band Communication Systems

Features

Gain: 16 dB @ 74 GHz

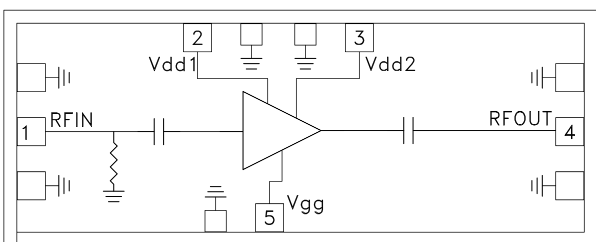
P1dB: +15 dBm

Supply Voltage: +4V

50 Ohm Matched Input/Output

Die Size: 2.20 x 0.87 x 0.1 mm

Functional Diagram



General Description

The HMC-AUH320 is a high dynamic range, four stage GaAs HEMT MMIC Medium Power Amplifier which operates between 71 and 86 GHz. The HMC-AUH320 provides 16 dB of gain at 74 GHz, and an output power of +15 dBm at 1 dB compression from a +4V supply voltage. All bond pads and the die backside are Ti/Au metallized and the amplifier device is fully passivated for reliable operation. The HMC-AUH320 GaAs HEMT MMIC Medium Power Amplifier is compatible with conventional die attach methods, as well as thermocompression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown herein is measured with the chip in a 50 Ohm environment and RF probes contacting the die pads.

Electrical Specifications, T_A = +25° C, Vdd1=Vdd2 = 4V, Idd1+Idd2 = 130mA [2]

Parameter	Min.	Typ.	Max.	Units
Frequency Range		71 - 86		GHz
Gain	10	16		dB
Input Return Loss		4		dB
Output Return Loss		6		dB
Output power for 1dB Compression (P1dB)		15		dBm
Saturated Output Power (Psat)		16		dBm
Supply Current (Idd1+Idd2)		130		mA

[1] Unless otherwise indicated, all measurements are from probed die
[2] Adjust Vgg between -0.8V to +0.3V (typ -0.1V) to achieve Idd_1 = 40mA, Idd_2 = 90mA or Idd_{total} = 130 mA.

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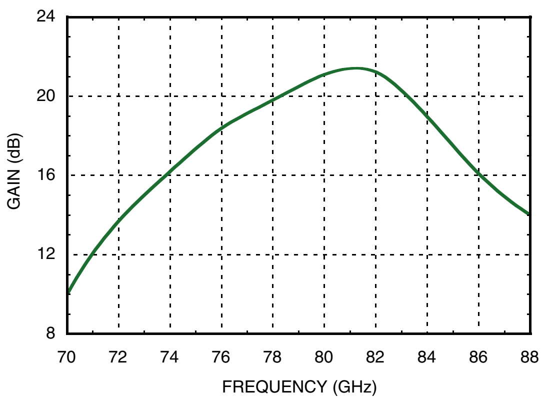
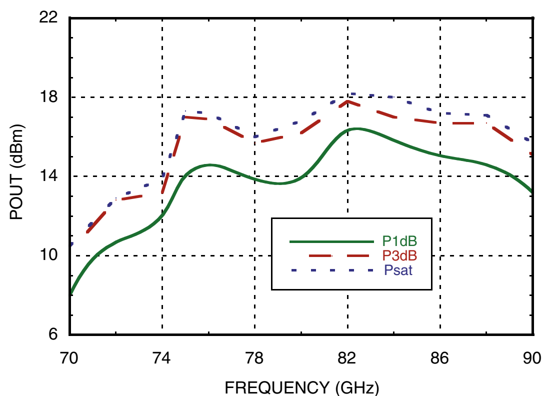
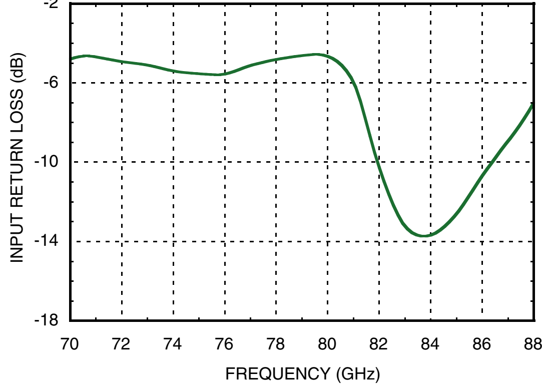
Linear Gain vs. Frequency



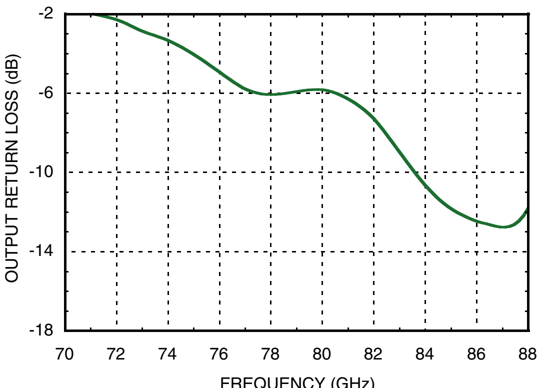
Fixtured Output Power vs. Frequency



Input Return Loss vs. Frequency



Output Return Loss vs. Frequency



Note: Measured Performance Characteristics (Typical Performance at 25°C) Vdd1 = Vdd2 = 4V and Idd1 = 40mA, Idd2 = 90mA

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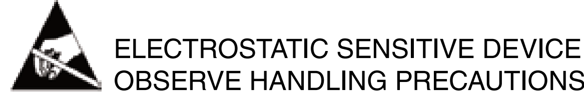
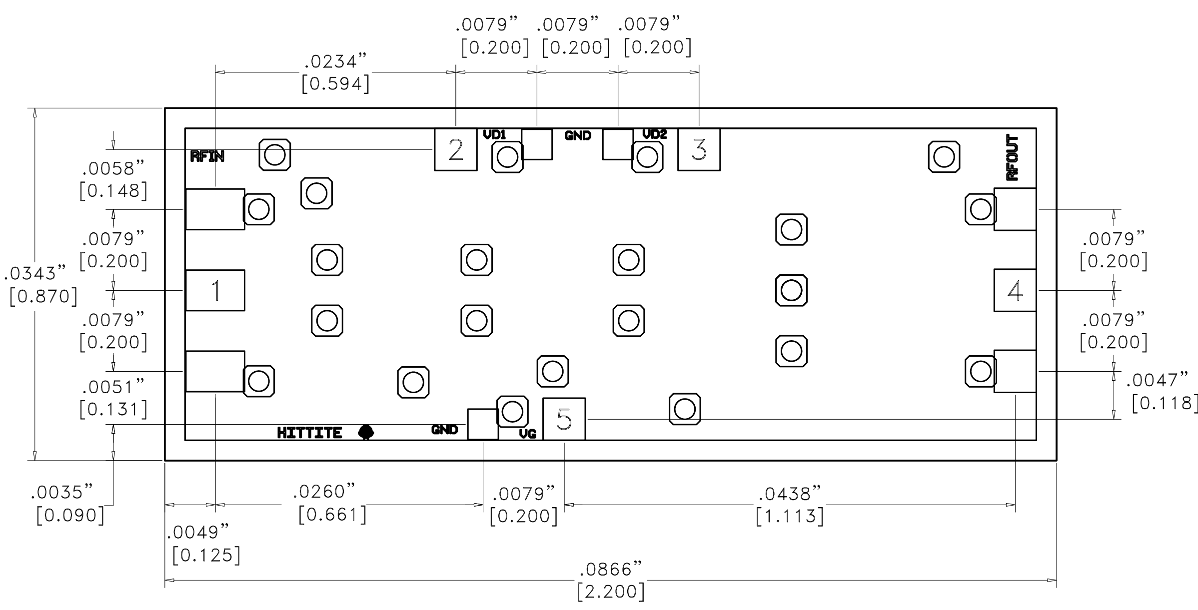
Absolute Maximum Ratings

Drain Bias Voltage	+4.5 Vdc
Gate Bias Voltage	-0.8 to +0.3 Vdc
Thermal Resistance (Channel to die bottom)	92.1 °C/W
Channel Temperature	180 °C
Storage Temperature	-65 °C to +150 °C
Operating Temperature	-55 °C to +85 °C
Drain Bias Current (Idd1)	50mA
Drain Bias Current (Idd2)	100mA



Outline Drawing



Die Packaging Information [1]

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

[1] Refer to the "Packaging Information" section for die packaging dimensions.
[2] For alternate packaging information contact Hittite Microwave Corporation.

NOTES:
1. ALL DIMENSIONS ARE IN INCHES [MM].
2. TYPICAL BOND PAD IS .004" SQUARE.
3. BACKSIDE METALLIZATION: GOLD.
4. BACKSIDE METAL IS GROUND.
5. BOND PAD METALLIZATION: GOLD.
6. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.
7. OVERALL DIE SIZE ±.002"
8. DIE THICKNESS = .004"

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Pad Descriptions

Pad Number	Function	Description	Interface Schematic
1	RFIN	This pad is DC coupled (for ESD) and matched to 50 Ohms.	RFIN
2, 3	Vdd1, Vdd2	Power Supply Voltage for the amplifier. See assembly for required external components.	Vdd1, Vdd2
4	RFOUT	This pad is AC coupled and matched to 50 Ohms.	RFOUT
5	Vgg	Gate control for amplifier. See Assembly Drawing for required external components. Please follow “MMIC Amplifier Biasing Procedure” application note.	Vgg
Die Bottom	GND	Die bottom must be connected to RF/DC ground.	GND

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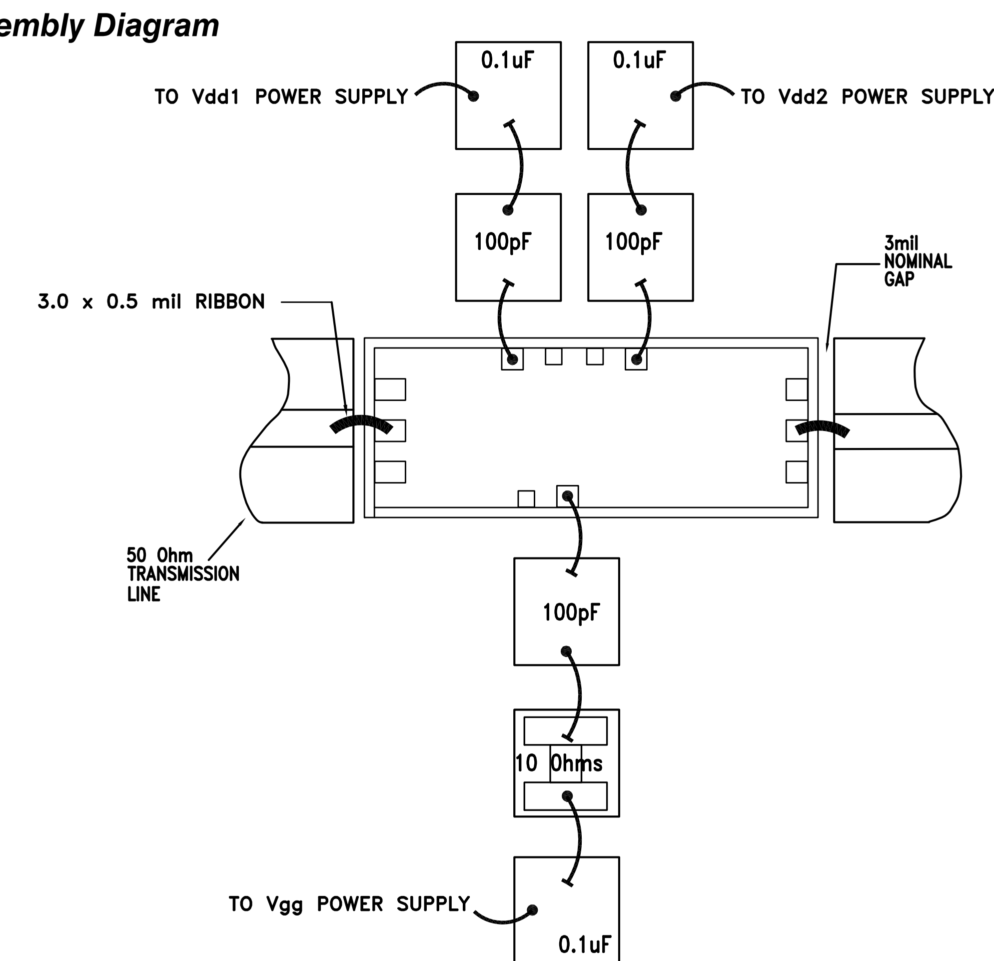
Assembly Diagram



Note 1: Bypass caps should be 100 pF (approximately) ceramic (single-layer) placed no farther than 30 mils from the amplifier

Note 2: Best performance obtained from use of <10 mil (long) by 3 by 0.5mil ribbons on input and output.

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