

## GaAs pHEMT MMIC 1 WATT POWER AMPLIFIER, DC - 22 GHz

### Typical Applications

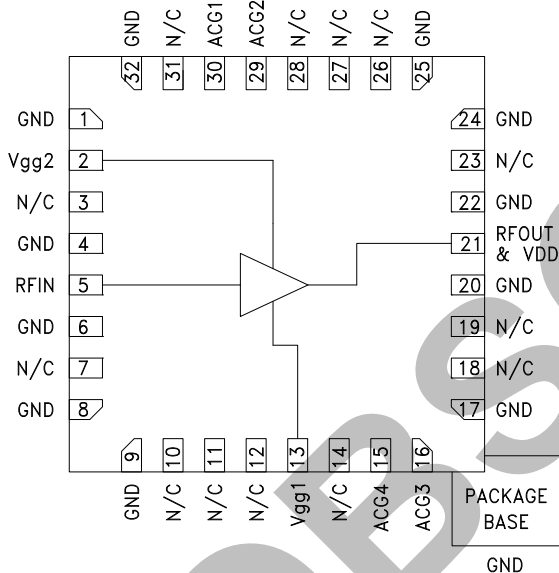
The HMC797ALP5E is ideal for:

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

### Features

- High P1dB Output Power: 28 dBm
- High Psat Output Power: 29.5 dBm
- High Gain: 13.5 dB
- High Output IP3: 39 dBm
- Supply Voltage: +10 V @ 400 mA
- 50 Ohm Matched Input/Output
- 32 Lead 5x5 mm SMT Package: 25 mm<sup>2</sup>

### Functional Diagram



### General Description

The HMC797ALP5E is a GaAs MMIC pHEMT Distributed Power Amplifier which operates between DC and 22 GHz. The amplifier provides 13.5 dB of gain, 39 dBm output IP3 and +28 dBm of output power at 1 dB gain compression while requiring 400 mA from a +10 V supply. This versatile PA exhibits a positive gain slope from 4 to 20 GHz making it ideal for EW, ECM, Radar and test equipment applications. The HMC797ALP5E amplifier I/Os are internally matched to 50 Ohms facilitating integration into multi-chip-modules (MCMs), is packaged in a leadless QFN 5x5 mm surface mount package, and requires no external matching components.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $V_{dd} = +10\text{V}$ , $V_{gg2} = +3.5\text{V}$ , $I_{dd} = 400\text{mA}^*$

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range	DC - 12			12 - 18			18 - 22			GHz
Gain	11	12.5		11	13.5		11	13.5		dB
Gain Flatness		±0.7			±0.5			±0.5		dB
Gain Variation Over Temperature		0.012			0.008			0.008		dB/°C
Input Return Loss		13			15			15		dB
Output Return Loss		12			16			13		dB
Output Power for 1 dB Compression (P1dB)	26	28		25	27		23.5	25.5		dBm
Saturated Output Power (Psat)		29.5			29			27		dBm
Output Third Order Intercept (IP3)		39			37			35		dBm
Noise Figure		3.5			4			6		dB
Supply Current (Idd) (Vdd= 10V, Vgg1= -0.8V Typ.)		400	440		400	440		400	440	mA

\* Adjust Vgg1 between -2 to 0 V to achieve Idd = 400 mA typical.

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1 WATT POWER AMPLIFIER, DC - 22 GHz**
**Absolute Maximum Ratings**

Nominal Drain Supply to GND	+12.0 V
Gate Bias Voltage (V <sub>gg1</sub> )	-3.0 to 0 Vdc
Gate Bias Current (I <sub>gg1</sub> )	< +10 mA
Gate Bias Voltage (V <sub>gg2</sub> )	+2.0 V to (V <sub>dd</sub> - 6.5 V)
Gate Bias Current (I <sub>gg2</sub> )	< +10 mA
Continuous P <sub>diss</sub> (T = 85 °C) (derate 69 mW/°C above 85 °C)	4.5 W
RF Input Power	+27 dBm
Output Power into VSWR >7:1	+29 dBm
Storage Temperature	-65 to 150 °C
Max Peak Reflow Temperature	260 °C
ESD Sensitivity (HBM)	Class 1A

**Reliability Information**

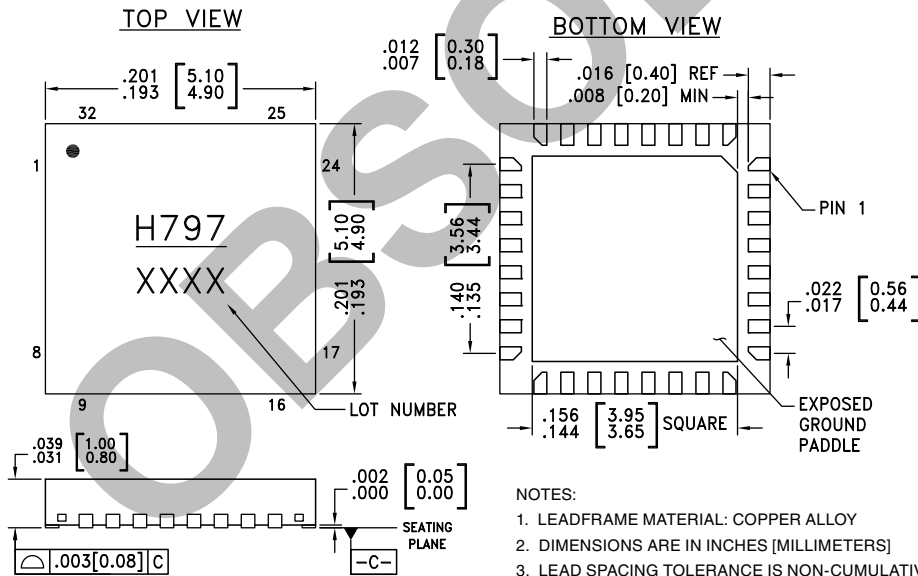
Junction Temperature to Maintain 1 Million Hour MTF	150 °C
Nominal Junction Temperature (T=85 °C, V <sub>dd</sub> = 10 V)	144 °C
Thermal Resistance (channel to ground paddle)	14.6 °C/W
Operating Temperature	-40 to +85 °C



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Typical Supply Current vs. V<sub>dd</sub>**

V <sub>dd</sub> (V)	I <sub>dd</sub> (mA)
+9	400
+10	400
+11	400

**Outline Drawing**

**NOTES:**

- LEADFRAME MATERIAL: COPPER ALLOY
- DIMENSIONS ARE IN INCHES [MILLIMETERS]
- LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
- PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM.  
PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
- PACKAGE WARP SHALL NOT EXCEED 0.05mm.
- ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
- REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.