# HMC-AUH256

## GaAs HEMT MMIC DRIVER AMPLIFIER, 17.5 - 41.0 GHz

### Typical Applications

This HMC-AUH256 is ideal for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios
- VSAT
- SATCOM

### Features

Gain: 21 dB

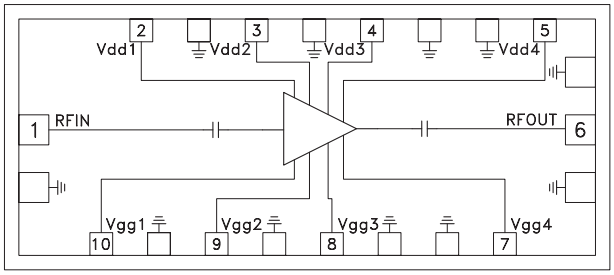
P1dB Output Power: +20 dBm

Wideband Performance: 17.5 to 40 GHz

Supply Voltage: +5V @ 295 mA

Small Chip Size: 2.1 x 0.92 x 0.1 mm

### Functional Diagram




### General Description

The HMC-AUH256 is a GaAs MMIC HEMT four stage Driver Amplifier which covers the frequency range of 17.5 to 40 GHz. The chip can easily be integrated into Multi-Chip-Modules (MCMs) due to its small (1.93 mm²) size. The HMC-AUH256 offers 21 dB of gain and +20 dBm output power at 1 dB compression from a bias supply of +5V @ 295 mA. The HMC-AUH256 may also be used as a frequency doubler. Detail bias condition to achieve doubler operation.

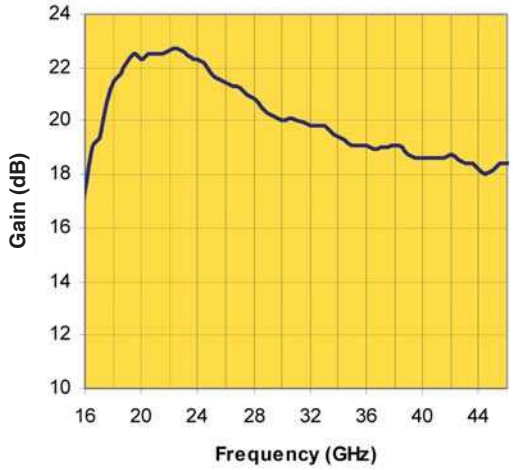
### Electrical Specifications [1], $T_A$ = +25°C
### Vdd1 = Vdd2 = Vdd3 = Vdd4 = 5V, Idd1 + Idd2 + Idd3 + Idd4 = 295mA [2]

| Parameter | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | | 17.5 - 41 | | GHz |
| Gain | | | 21 | | dB |
| Input Return Loss | | | 8 | | dB |
| Output Return Loss | 20 - 30 GHz<br>30 - 45 GHz | | 15<br>8 | | dB<br>dB |
| Output Power for 1 dB Compression | | | 20 | | dBm |
| Saturated Output Power | | | 23 | | dBm |
| Output IP3 | | | 27 | | dBm |
| Supply Current (Idd1 + Idd2 + Idd3 + Idd4) | | | 295 | | mA |

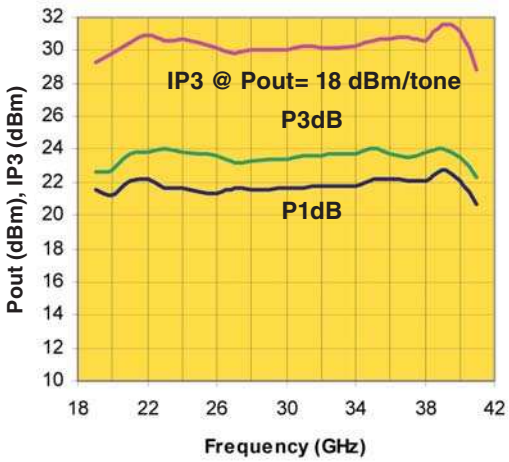
[1] Unless otherwise indicated, all measurements are from probed die

[2] Adjust Vgg1 = Vgg2 = Vgg3 = Vgg4 between -1V to +0.3V (Typ. -0.3V) to achieve Idd1 = 50 mA, Idd2 = 50 mA, Idd3 = 75 mA, Idd4 = 120 mA

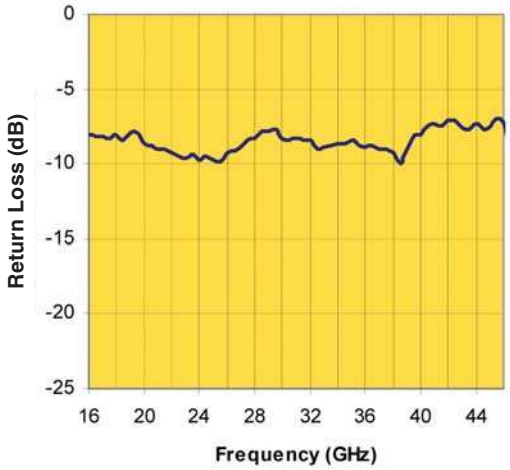
### Linear Gain vs. Frequency



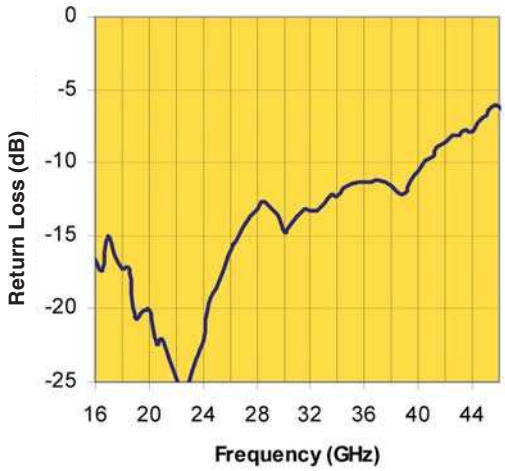

### Fixtured Pout vs. Frequency



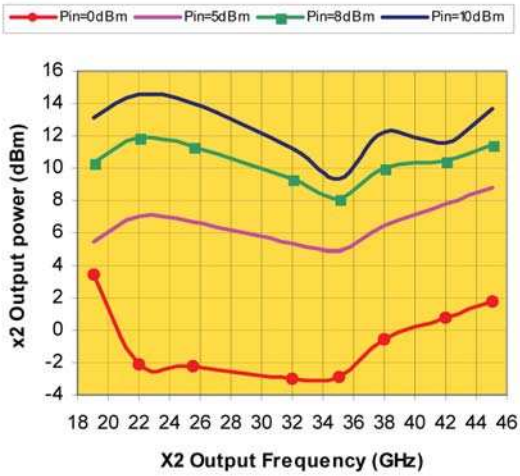

### Input Return Loss vs. Frequency



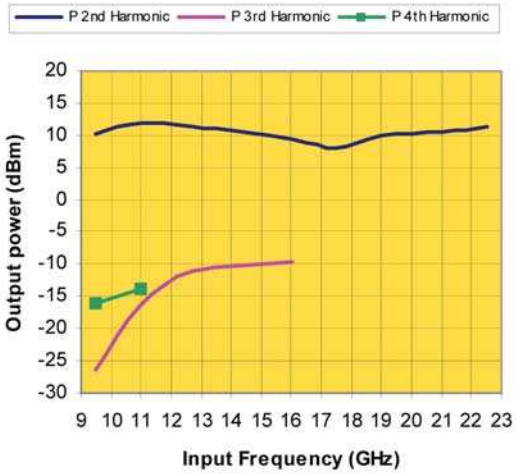

### Output Return Loss vs. Frequency



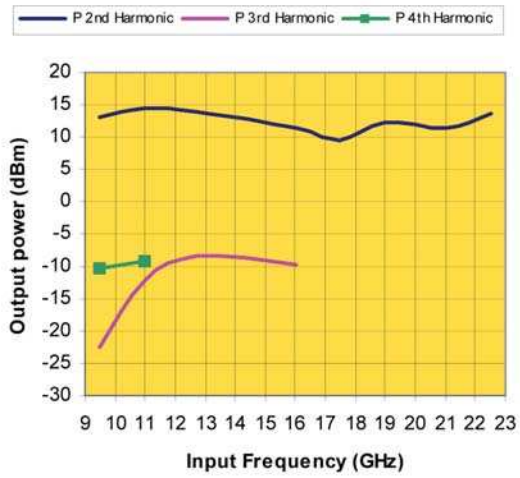
### x2 Pout vs. Frequency (vs Pad)




### Fixtured Pout vs. Frequency @ Pin= 8 dBm




### Fixtured Pout vs. Frequency @ Pin= 10 dBm



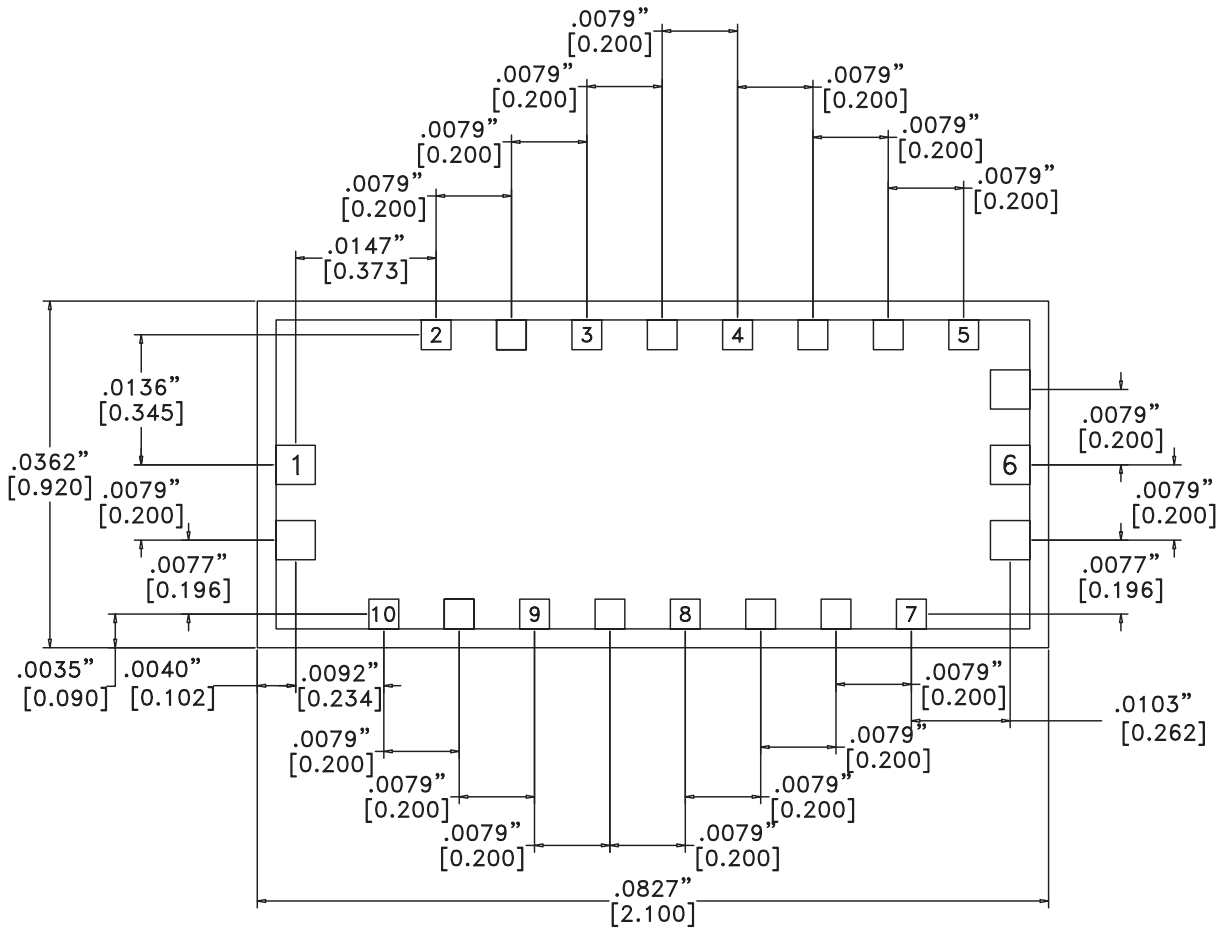

### Absolute Maximum Ratings

| | |
|---|---|
| Drain Bias Voltage | +5.5 Vdc |
| RF Input Power | 15 dBm |
| Drain Bias Current (Idd1, Idd2) | 62 mA |
| Drain Bias Current (Idd3) | 93 mA |
| Drain Bias Current (Idd4) | 150 mA |
| Gate Bias Voltage | -1 to +0.3 Vdc |
| Channel Temperature | 180 °C |
| Thermal Resistance (channel to die bottom) | 77.5 °C/W |
| Storage Temperature | -65 to +150 °C |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Note: Multiplier Performance Characteristics (Typical Performance at 25°C)
Vd1= 2V, Vd2= Vd3= Vd4= 5V, Id1= 5mA, Id2+Id3+Id4= 245mA

## Outline Drawing




NOTES:

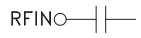
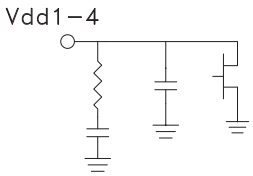
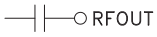
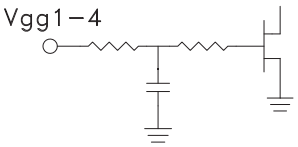
1. ALL DIMENSIONS ARE IN INCHES [MM].
2. TYPICAL BOND PAD IS .004" SQUARE.
3. BACKSIDE METALLIZATION: GOLD.
4. BACKSIDE METAL IS GROUND.
5. BOND PAD METALLIZATION: GOLD.
6. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.
7. OVERALL DIE SIZE ±.002"

## Die Packaging Information [1]

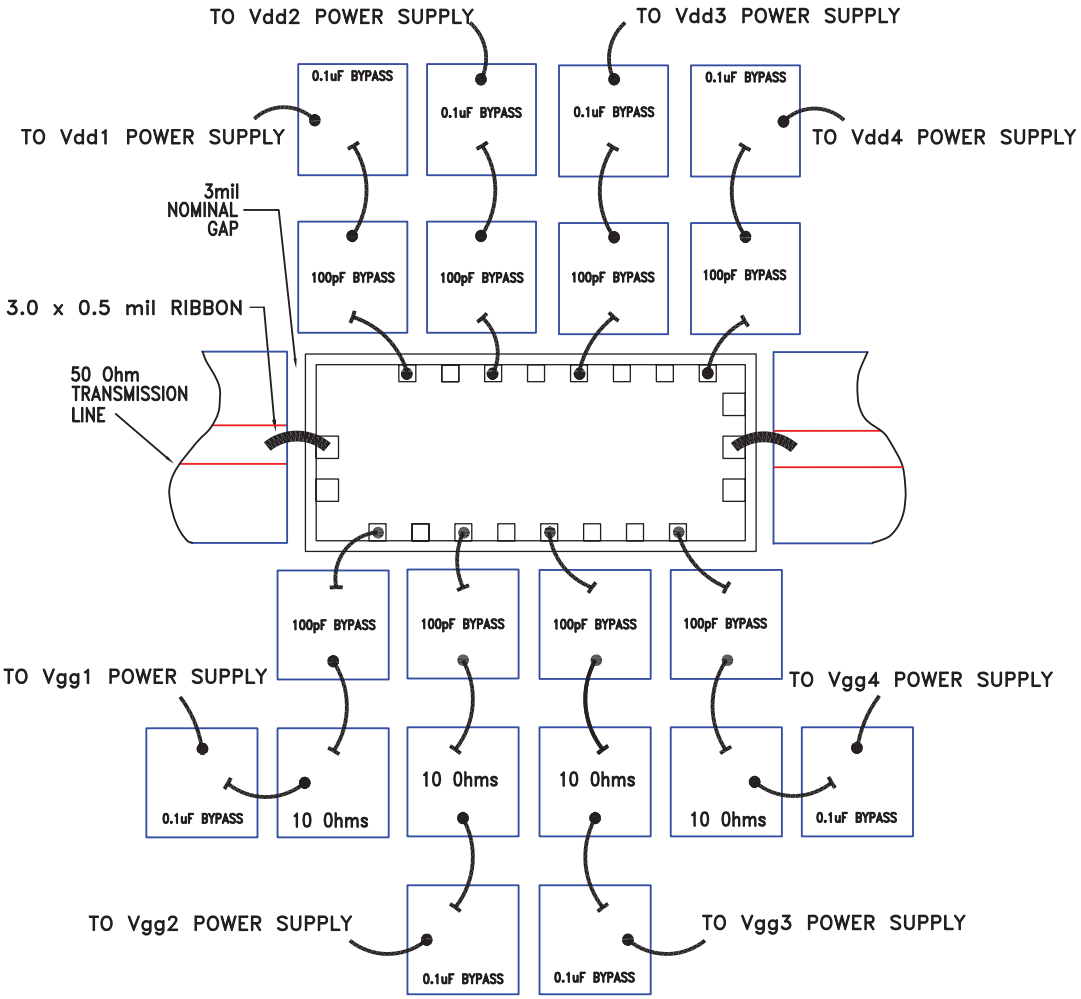
| Standard | Alternate |
|---|---|
| GP-2 (Gel Pack) | [2] |

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

## Pad Descriptions

| Pad Number | Function | Pad Description | Interface Schematic |
|---|---|---|---|
| 1 | RFIN | This pad is AC coupled and matched to 50 Ohms. |   |
| 2 - 5 | Vdd1-4 | Power supply voltage for amplifier. See Assembly Diagram for required external components. |   |
| 6 | RFOUT | This pad is AC coupled and matched to 50 Ohms. |   |
| 7 - 10 | Vgg1-4 | Gate control for amplifier. Please follow “MMIC Amplifier Biasing Procedure” application note. See assembly for required external components. |   |
| Die Bottom | GND | Die Bottom must be connected to RF/DC ground. |   |

### 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.

Note 3: Vdd3 can be biased using on-chip pads Vdd3 or Vdd4