

# 27–31 GHz GaAs MMIC Driver Amplifier



AA028P3-00

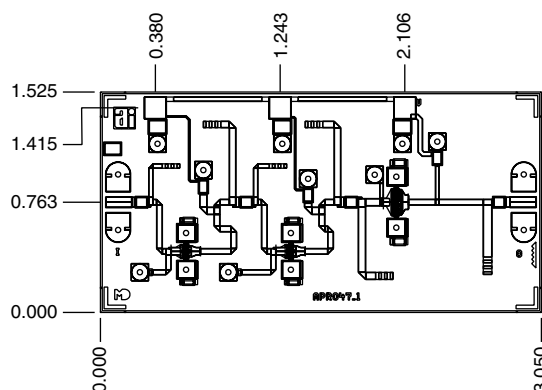
## Features

- Single Bias Supply Operation (6 V)
- 19 dB Typical Small Signal Gain
- 16 dBm Typical  $P_{1\text{ dB}}$  Output Power at 28 GHz
- 0.25  $\mu\text{m}$  Ti/Pd/Au Gates
- 100% On-Wafer RF and DC Testing
- 100% Visual Inspection to MIL-STD-883 MT 2010

## Description

Alpha's three-stage reactively-matched 27–31 GHz GaAs MMIC driver amplifier has typical small signal gain of 19 dB with a typical  $P_{1\text{ dB}}$  of 16 dBm at 28 GHz. The chip uses Alpha's proven 0.25  $\mu\text{m}$  MESFET technology, and is based upon MBE layers and electron beam lithography for the highest uniformity and repeatability. The FETs employ surface passivation to ensure a rugged, reliable part with through-substrate via holes and gold-based backside metallization to facilitate a conductive epoxy die attach process. All chips are screened for gain, output power and S-parameters prior to shipment for guaranteed performance. Designed for 27–31 GHz LMDS and digital radio bands.

## Chip Outline



Dimensions indicated in mm.  
All DC (V) pads are 0.1 x 0.1 mm and RF In, Out pads are 0.07 mm wide.  
Chip thickness = 0.1 mm.

## Absolute Maximum Ratings

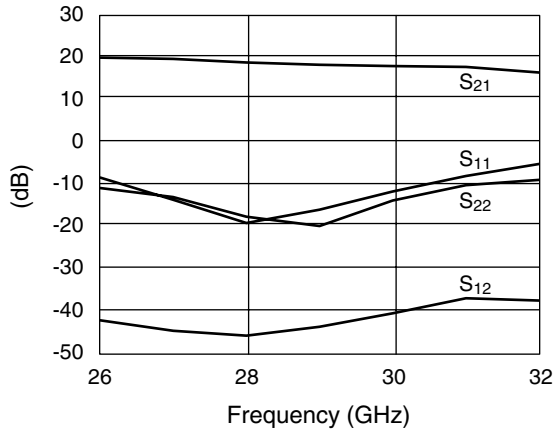
| Characteristic                   | Value           |
|----------------------------------|-----------------|
| Operating Temperature ( $T_C$ )  | -55°C to +90°C  |
| Storage Temperature ( $T_{ST}$ ) | -65°C to +150°C |
| Bias Voltage ( $V_D$ )           | 7 $V_{DC}$      |
| Power In ( $P_{IN}$ )            | 16 dBm          |
| Junction Temperature ( $T_J$ )   | 175°C           |

## Electrical Specifications at 25°C ( $V_{DS} = 6\text{ V}$ )

| Parameter                             | Condition     | Symbol            | Min. | Typ. <sup>2</sup> | Max. | Unit |
|---------------------------------------|---------------|-------------------|------|-------------------|------|------|
| Drain Current                         |               | $I_{DS}$          |      | 145               | 200  | mA   |
| Small Signal Gain                     | F = 27–31 GHz | G                 | 17   | 19                |      | dB   |
| Input Return Loss                     | F = 27–31 GHz | $RL_I$            |      | -10               | -6   | dB   |
| Output Return Loss                    | F = 27–31 GHz | $RL_O$            |      | -10               | -6   | dB   |
| Output Power at 1 dB Gain Compression | F = 28 GHz    | $P_{1\text{ dB}}$ | 14   | 16                |      | dBm  |
| Saturated Output Power                | F = 28 GHz    | $P_{SAT}$         | 15   | 18                |      | dBm  |
| Thermal Resistance <sup>1</sup>       |               | $\theta_{JC}$     |      | 101               |      | °C/W |

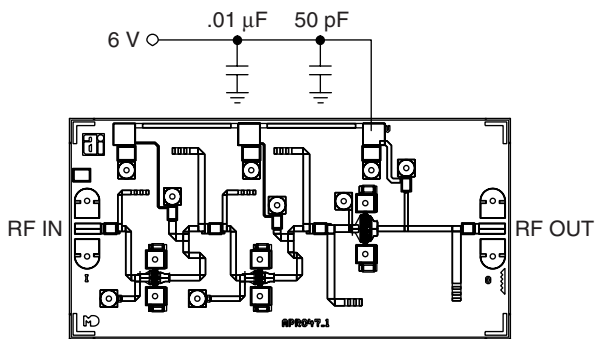
1. Calculated value based on measurement of discrete FET.  
2. Typical represents the median parameter value across the specified frequency range for the median chip.

### Typical Performance Data



Typical Small Signal Performance S-Parameters ( $V_{DS} = 6\text{ V}$ )

### Bias Arrangement



For biasing on, adjust  $V_{DS}$  from zero to the desired value (6 V recommended). For biasing off, reverse the biasing on procedure.

### Circuit Schematic

