

# 28–32 GHz GaAs MMIC Driver Amplifier



AA031P1-00

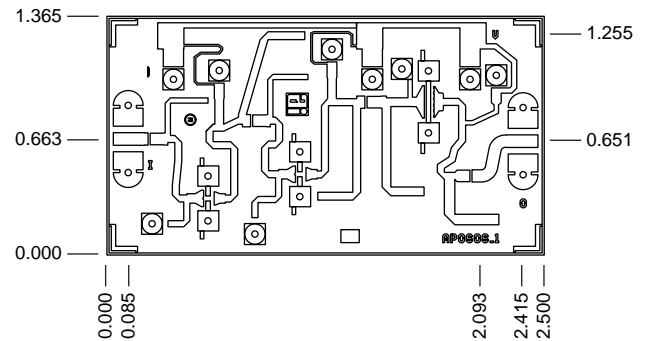
## Features

- Single Bias Supply Operation (5 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 28–32 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 28–32 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

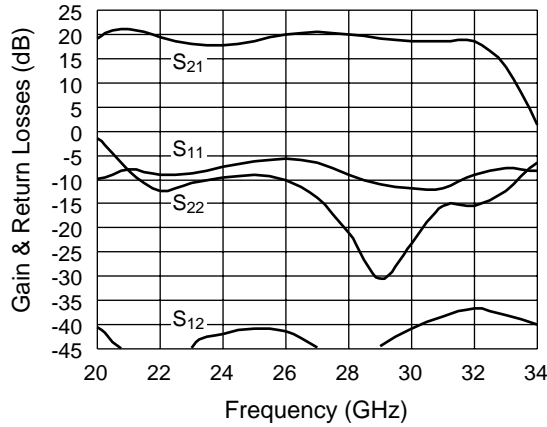
Characteristic	Value
Operating Temperature ( $T_C$ )	-55°C to +90°C
Storage Temperature ( $T_{ST}$ )	-65°C to +150°C
Bias Voltage ( $V_D$ )	7 $V_{DC}$
Power In ( $P_{IN}$ )	16 dBm
Junction Temperature ( $T_J$ )	175°C

## Electrical Specifications at 25°C ( $V_{DS} = 5\text{ V}$ )

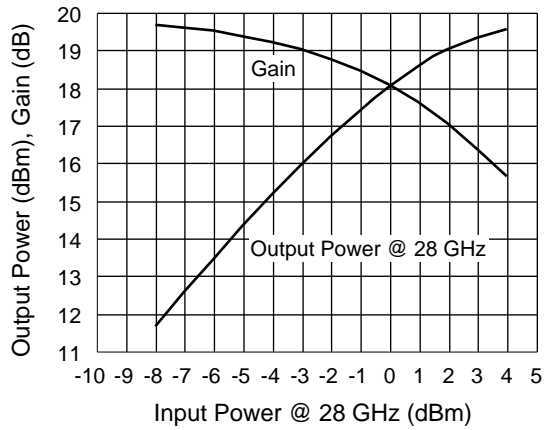
Parameter	Condition	Symbol	Min.	Typ. <sup>2</sup>	Max.	Unit
Drain Current		$I_{DS}$		145	200	mA
Small Signal Gain	$F = 28\text{--}32\text{ GHz}$	$G$	17	19		dB
Input Return Loss	$F = 28\text{--}32\text{ GHz}$	$RL_I$		-10	-6	dB
Output Return Loss	$F = 28\text{--}32\text{ GHz}$	$RL_O$		-15	-10	dB
Output Power at 1 dB Gain Compression	$F = 28\text{ GHz}$	$P_{1\text{ dB}}$	14	16		dBm
Saturated Output Power	$F = 28\text{ GHz}$	$P_{SAT}$	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

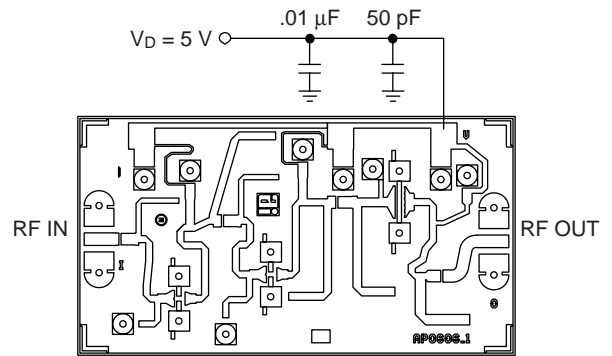


**Typical Small Signal Performance S-Parameters (V<sub>DS</sub> = 5 V)**



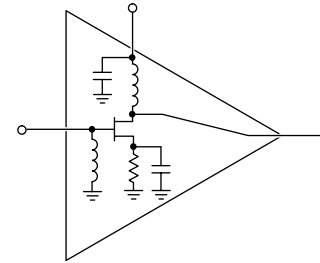
**Typical Power Sweep (V<sub>DS</sub> = 5 V)**

### Bias Arrangement



For biasing on, adjust V<sub>DS</sub> from zero to the desired value (5 V recommended). For biasing off, reverse the biasing on procedure.

### Circuit Schematic



**Detail A**

