

# 36–39 GHz GaAs MMIC Driver Amplifier



AA038P1-00

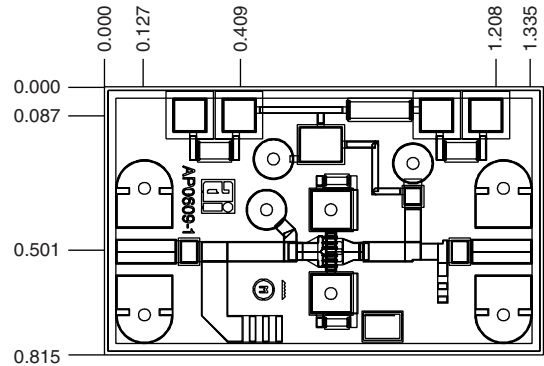
## Features

- Single Bias Supply Operation (5 V)
- 7 dB Typical Small Signal Gain
- 14 dBm Typical  $P_{1\text{ dB}}$  Output Power
- 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 single-stage, reactively-matched 36–39 GHz GaAs MMIC driver amplifier has a typical small signal gain of 7 dB with a typical  $P_{1\text{ dB}}$  of 14 dBm at 38 GHz. The chip uses Alpha's proven 0.25 mm 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 or eutectic die attach process. All chips are screened for gain, output power and S-parameters prior to shipment for guaranteed performance. Designed for 36–39 GHz digital radio band.

## Chip Outline



Dimensions indicated in mm.  
All DC pads are 0.1 x 0.1 mm and RF pads are 0.07 mm wide.  
Chip thickness = 0.1 mm.

## Absolute Maximum Ratings

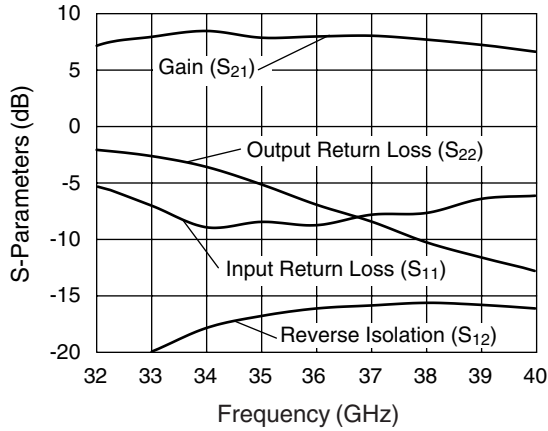
Characteristic	Value
Operating Temperature ( $T_C$ )	-55°C to +90°C
Storage Temperature ( $T_{ST}$ )	-65°C to +150°C
Bias Voltage ( $V_D$ )	7 $V_{DC}$
Power In ( $P_{IN}$ )	16 dBm
Junction Temperature ( $T_J$ )	175°C

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

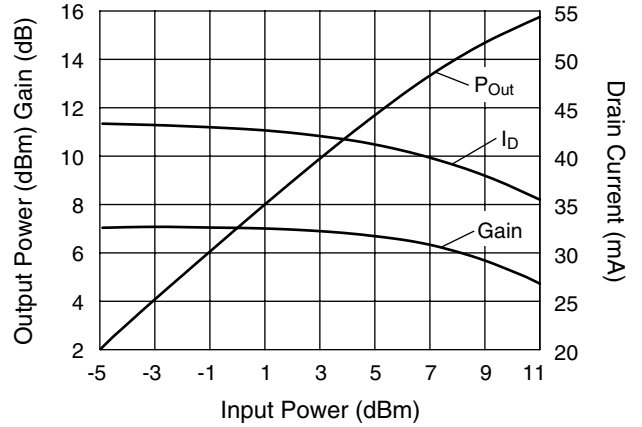
Parameter	Condition	Symbol	Min.	Typ. <sup>2</sup>	Max.	Unit
Drain Current	$V_D = 5\text{ V}$	$I_{DS}$		50	60	mA
Small Signal Gain	$F = 36\text{--}39\text{ GHz}$	G	6	7		dB
Input Return Loss	$F = 36\text{--}39\text{ GHz}$	$RL_I$	6	10		dB
Output Return Loss	$F = 36\text{--}39\text{ GHz}$	$RL_O$	6	10		dB
Output Power at 1 dB Gain Compression	$F = 38\text{ GHz}$	$P_{1\text{ dB}}$	12	14		dBm
Saturated Output Power	$F = 38\text{ GHz}$	$P_{SAT}$	14	16		dBm
Thermal Resistance <sup>1</sup>		$\Theta_{JC}$		280		°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

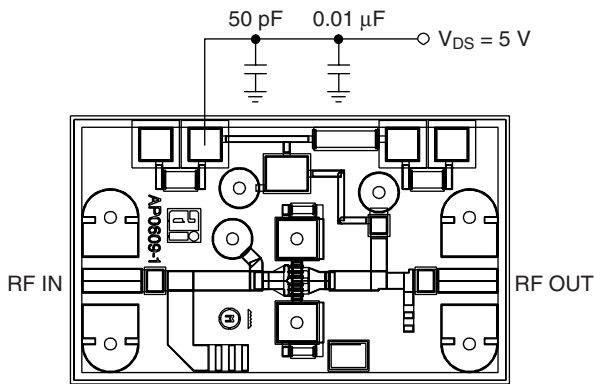


Typical Small Signal Performance S-Parameters ( $V_{DS} = 5\text{ V}$ )

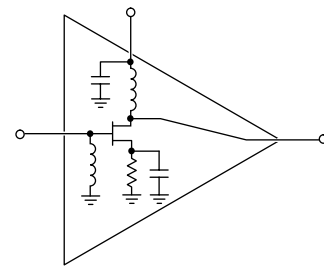


Typical Power Performance ( $V_{DS} = 5\text{ V}$ , Frequency = 38 GHz)

### Bias Arrangement



### Circuit Schematic



Detail A

