# 37–40 GHz GaAs MMIC Driver Amplifier

**AA038P2-00**

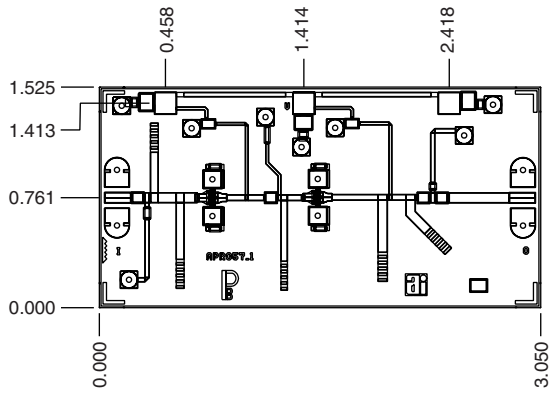
## Features

- Single Bias Supply Operation (5 V)
- 13 dB Typical Small Signal Gain
- 14 dBm Typical $P_{1\ dB}$ Output Power at 38 GHz
- 0.25 µm Ti/Pd/Au Gates
- 100% On-Wafer RF and DC Testing
- 100% Visual Inspection to MIL-STD-883 MT 2010

## Description

Alpha's two-stage reactively-matched 37–40 GHz GaAs MMIC driver amplifier has typical small signal gain of 13 dB with a typical $P_{1\ dB}$ of 14 dBm at 38 GHz. The chip uses Alpha's proven 0.25 µm 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.

## 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

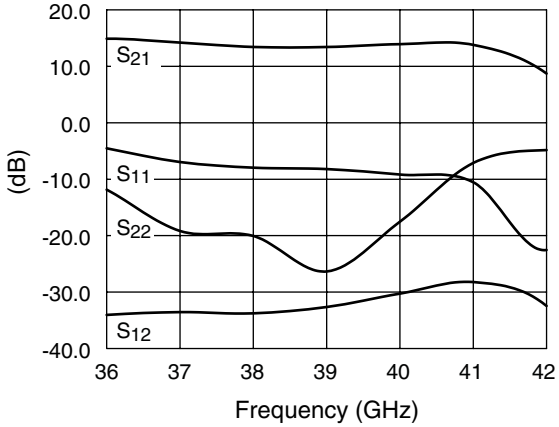
| Characteristic | Value |
|---|---|
| Operating Temperature ($T_C$) | -55°C to +90°C |
| Storage Temperature ($T_{ST}$) | -65°C to +150°C |
| Bias Voltage ($V_D$) | 7 $V_{DC}$ |
| Power In ($P_{IN}$) | 16 dBm |
| Junction Temperature ($T_J$) | 175°C |

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

| Parameter | Condition | Symbol | Min. | Typ.[2] | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain Current | | $I_{DS}$ | | 75 | 100 | mA |
| Small Signal Gain | F = 37–40 GHz | G | 11 | 13 | | dB |
| Input Return Loss | F = 37–40 GHz | $RL_I$ | | -9 | -6 | dB |
| Output Return Loss | F = 37–40 GHz | $RL_O$ | | -12 | -10 | dB |
| Output Power at 1 dB Gain Compression | F = 38 GHz | $P_{1\ dB}$ | 13 | 14 | | dBm |
| Saturated Output Power | F = 38 GHz | $P_{SAT}$ | 15 | 16 | | dBm |
| Thermal Resistance[1] | | $\Theta_{JC}$ | | 199 | | °C/W |

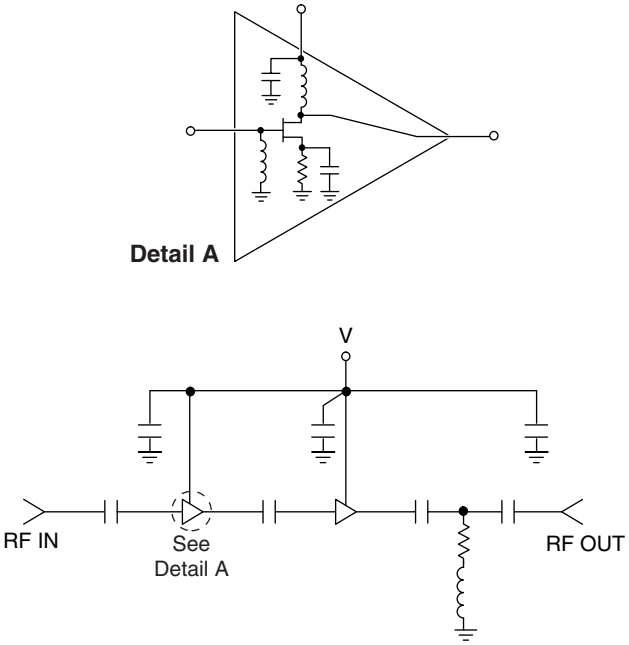
1. Calculated value based on measurement of discrete FET.
2. Typical represents the median parameter value across the specified frequency range for the median chip.

## Typical Performance Data

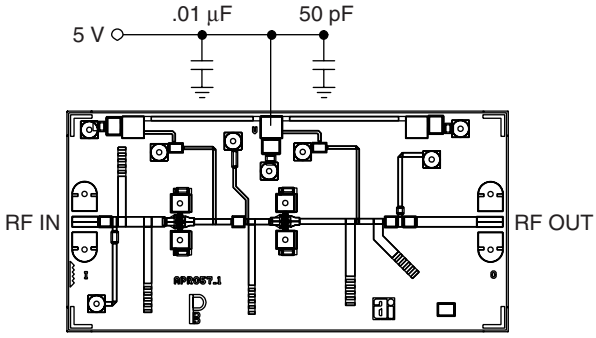



**Typical Small Signal Performance S-Parameters ($V_{DS}$ = 5 V)**

## Circuit Schematic




## Bias Arrangement




For biasing on, adjust $V_{DS}$ from zero to the desired value (5 V recommended). For biasing off, reverse the biasing on procedure.