

# 37–39 GHz GaAs MMIC Power Amplifier



AA038P5-00

## Features

- Single Bias Supply Operation (5.5 V)
- 18 dB Typical Small Signal Gain
- 19 dBm Typical  $P_{1\text{ dB}}$  Output Power at 39 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

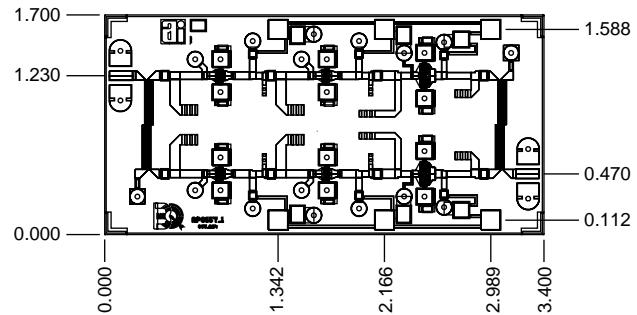
Alpha's three-stage reactively-matched Ka band GaAs MMIC amplifier has a typical  $P_{1\text{ dB}}$  of 19 dBm with 17 dB associated gain over the band 37–39 GHz. The chip uses Alpha's proven 0.25  $\mu\text{m}$  MESFET technology, and is based upon MBE layers and electron beam lithography for the highest 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 an epoxy die attach process. All chips are screened for small signal S-parameters and power characteristics prior to shipment for guaranteed performance. A broad range of applications exist in both the high reliability and commercial areas where power and gain are required.

## Electrical Specifications at 25°C ( $V_{DS} = 5.5$ V)

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Drain Current (at Saturation)		$I_{DS}$		200	370	mA
Small Signal Gain	$F = 37\text{--}39$ GHz	$G$	16	18		dB
Input Return Loss	$F = 37\text{--}39$ GHz	$RL_I$		-13	-10	dB
Output Return Loss	$F = 37\text{--}39$ GHz	$RL_O$		-20	-10	dB
Output Power at 1 dB Gain Compression	$F = 39$ GHz	$P_{1\text{ dB}}$	16	19		dBm
Saturated Output Power	$F = 39$ GHz	$P_{SAT}$	19	21		dBm
Gain at Saturation	$F = 39$ GHz	$G_{SAT}$		15		dB
Thermal Resistance <sup>1</sup>		$\Theta_{JC}$		51		°C/W

1. Calculated value based on measurement of discrete FET.

## Chip Outline

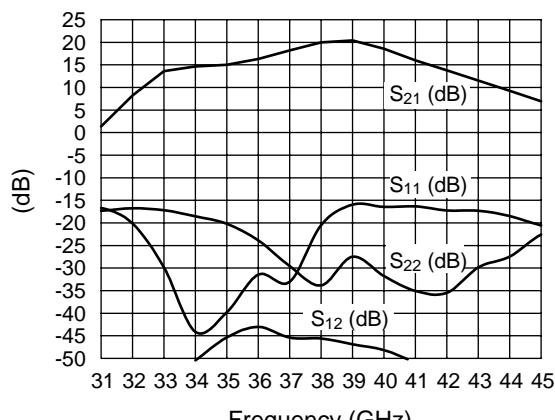


Dimensions indicated in mm.  
All DC (V) pads are 0.1 x 0.1 mm and RF In, Out pads are 0.07 mm wide.  
Chip thickness = 0.1 mm.

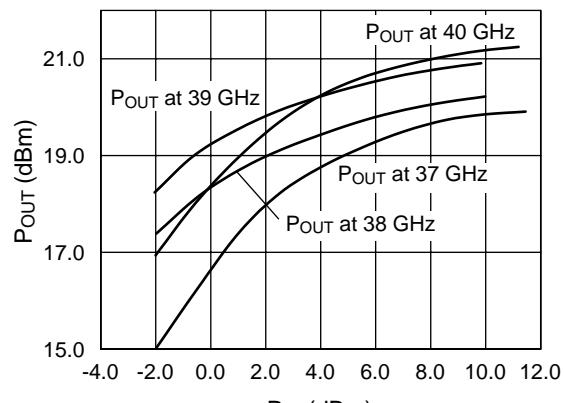
## Absolute Maximum Ratings

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 <sub>DC</sub>
Power In ( $P_{IN}$ )	19 dBm
Junction Temperature ( $T_J$ )	175°C

## Typical Performance Data

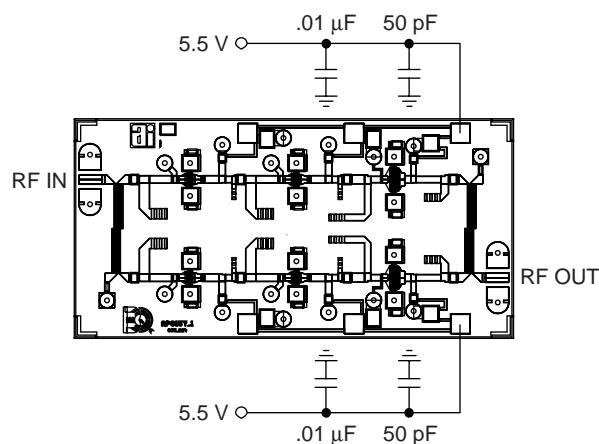


Typical S-Parameters



Typical Power Sweep

## Bias Arrangement



For biasing on, adjust  $V_{DS}$  from zero to the desired value (5.5 V recommended). For biasing off, reverse the biasing on procedure.

## Circuit Schematic

