

# 27–31 GHz GaAs MMIC Driver Amplifier



AA028P2-00

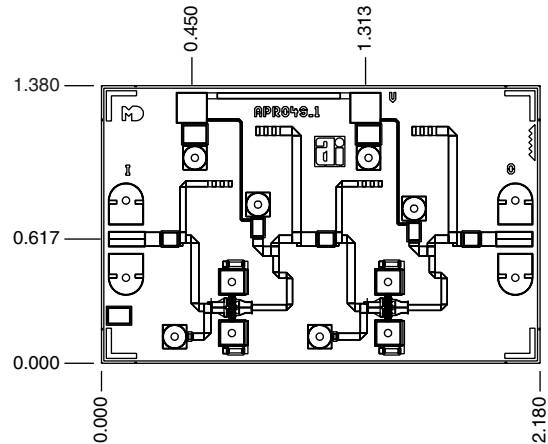
## Features

- Single Bias Supply Operation (6 V)
- 14 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

Skyworks' two-stage reactively-matched 27–31 GHz GaAs MMIC driver amplifier has typical small signal gain of 14 dB with a typical  $P_{1\text{ dB}}$  of 16 dBm at 28 GHz. The chip uses Skyworks' 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 ( $V_{DS} = 6\text{ V}$ )

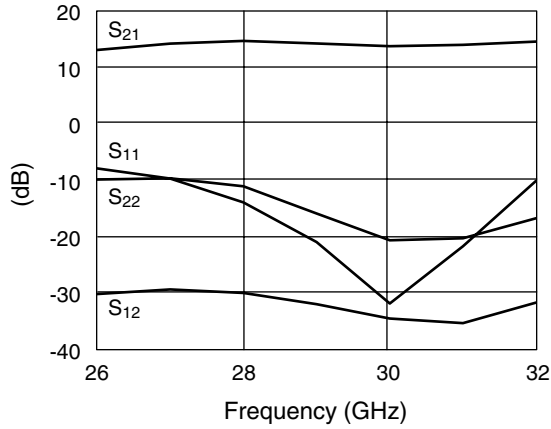
Parameter	Condition	Symbol	Min.	Typ. <sup>3</sup>	Max.	Unit
Drain Current		$I_{DS}$		80	110	mA
Small Signal Gain	F = 27–31 GHz	G	12	14		dB
Input Return Loss	F = 27–31 GHz	$RL_I$		-11	-6	dB
Output Return Loss	F = 27–31 GHz	$RL_O$		-12	-6	dB
Output Power at 1 dB Gain Compression	F = 28 GHz	$P_{1\text{ dB}}$	13	16		dBm
Saturated Output Power	F = 28 GHz	$P_{SAT}$	14	17		dBm
Two-Tone Output Third-Order Intercept <sup>1</sup>	F = 28 GHz	OIP3		26.5		dBm
Thermal Resistance <sup>2</sup>		$\Theta_{JC}$		198		°C/W

1. Not measured on a 100% basis.

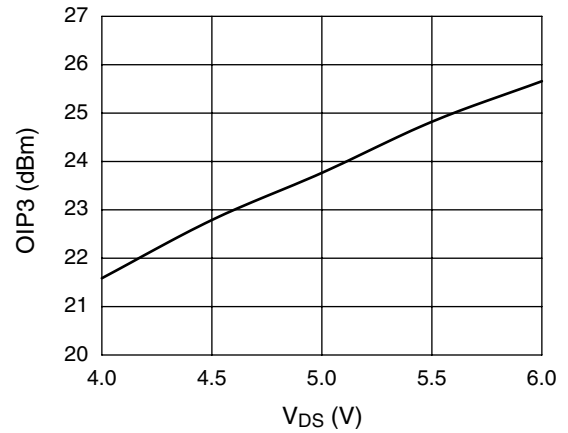
2. Calculated value based on measurement of discrete FET.

3. Typical represents the median parameter value across the specified frequency range for the median chip.

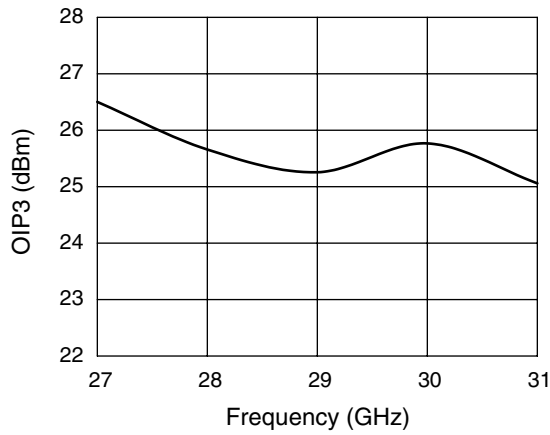
### Typical Performance Data



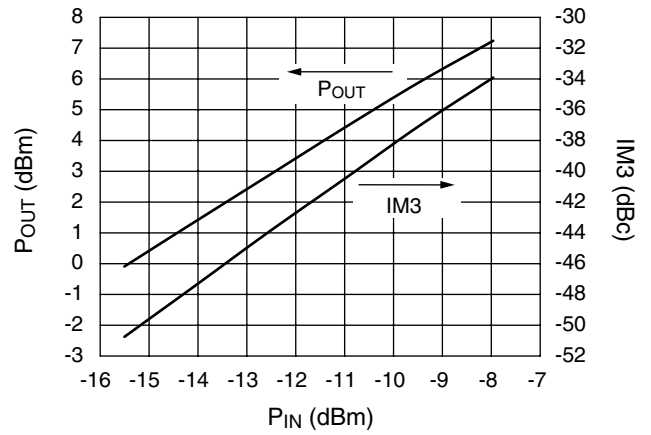
**Typical Small Signal Performance S-Parameters ( $V_{DS} = 6\text{ V}$ )**



**Two-Tone Output Third-Order Intercept @ 28 GHz**

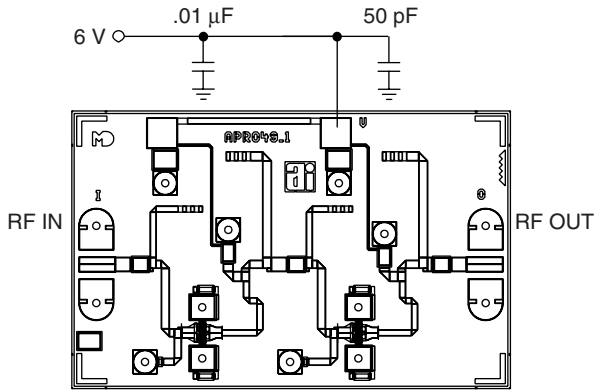


**Two-Tone Output Third-Order Intercept @  $V_{DS} = 6\text{ V}$**



**Output Power and Relative Third-Order Intermodulation Products  
F = 28 GHz,  $V_{DS} = 6\text{ V}$**

### 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

