

# 23.5–26.5 GHz GaAs MMIC Power Amplifier



AA026P2-00

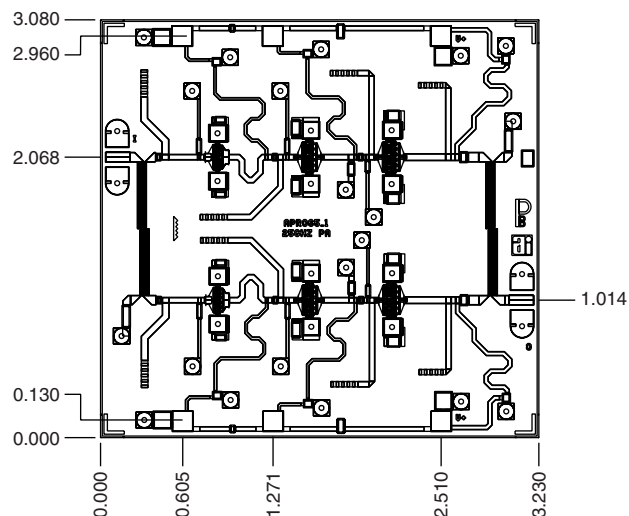
## Features

- Single Bias Supply Operation (6 V)
- 17 dB Typical Small Signal Gain
- 24 dBm Typical  $P_{1\text{ dB}}$  Output Power at 26.5 GHz
- 100% On-Wafer RF and DC Testing
- 100% Visual Inspection to MIL-STD MT 2010

## Description

Skyworks' three-stage balanced K band GaAs MMIC power amplifier has a typical  $P_{1\text{ dB}}$  of 24 dBm and a typical  $P_{\text{SAT}}$  of 26 dBm at 26.5 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 small signal S-parameters and power characteristics prior to shipment for guaranteed performance. A broad range of applications exist in both the commercial and military areas where high power and gain are required.

## 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 ( $P_{IN}$ )	22 dBm
Junction Temperature ( $T_J$ )	175°C

## Electrical Specifications at 25°C ( $V_{DS} = 6\text{ V}$ )

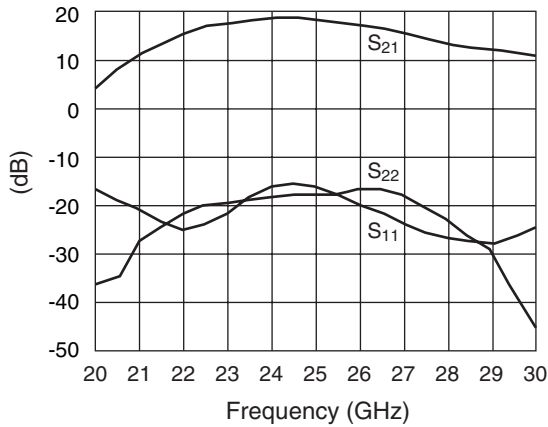
Parameter	Condition	Symbol	Min.	Typ. <sup>3</sup>	Max.	Unit
Drain Current (at Saturation)		$I_{DS}$		520	700	mA
Small Signal Gain	F = 23.5–26.5 GHz	G	15	17		dB
Input Return Loss	F = 23.5–26.5 GHz	$RL_I$		-17	-10	dB
Output Return Loss	F = 23.5–26.5 GHz	$RL_O$		-20	-10	dB
Output Power at 1 dB Gain Compression	F = 26.5 GHz	$P_{1\text{ dB}}$	23	24		dBm
Saturated Output Power	F = 26.5 GHz	$P_{SAT}$	24	26		dBm
Two-Tone Output Third-Order Intercept <sup>1</sup>	F = 26.5 GHz	OIP3		33.5		dBm
Gain at Saturation	F = 26.5 GHz	$G_{SAT}$		14		dB
Thermal Resistance <sup>2</sup>		$\Theta_{JC}$		17		°C/W

1. Not measured on a 100% basis.

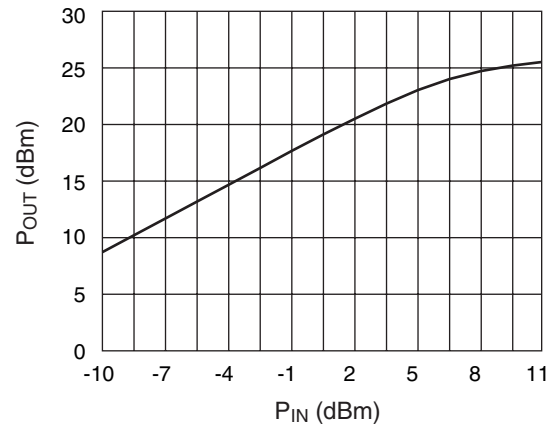
2. Calculated value based on measurement of discrete FET.

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

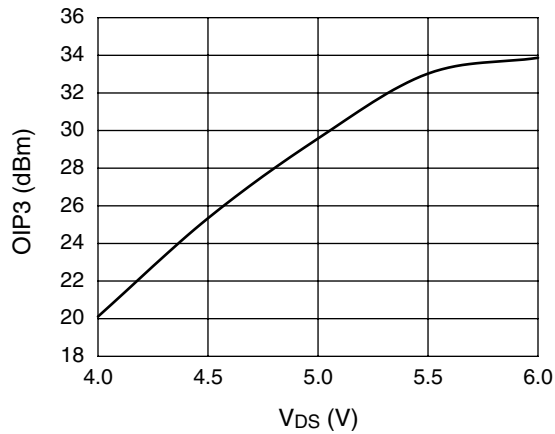
## Typical Performance Data



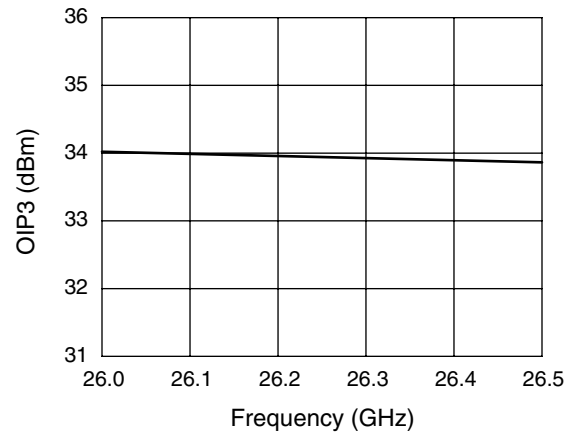
**Typical Small Signal Performance  
S-Parameters ( $V_{DS} = 6$  V)**



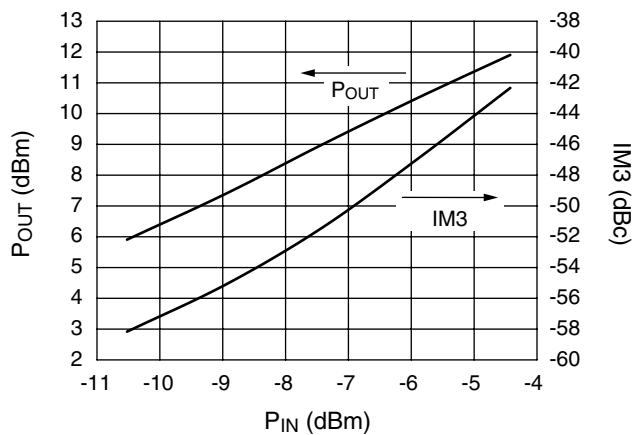
**Output Characteristics as a  
Function of Input Drive Level  
( $F = 26.5$  GHz,  $V_{DS} = 6$  V)**



**Two-Tone Output Third-Order  
Intercept @ 26.5 GHz**

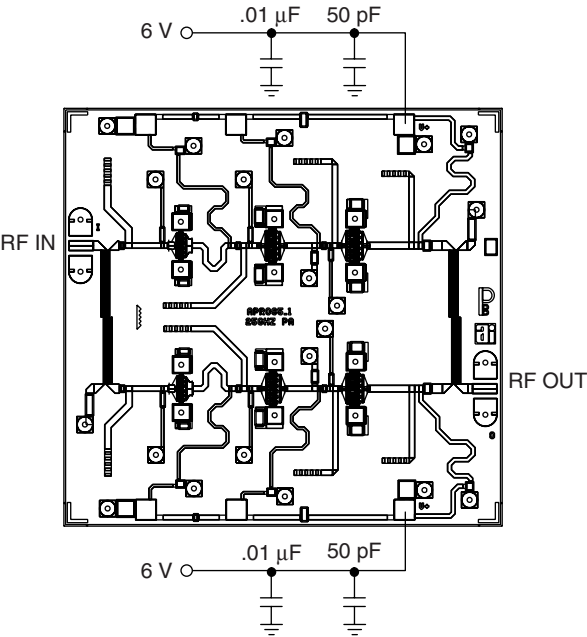


**Two-Tone Output Third-Order  
Intercept @  $V_{DS} = 6$  V**



**Output Power and Relative Third-Order  
Intermodulation Products  
 $F = 26.5$  GHz,  $V_{DS} = 6$  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

