



200 mW Ku-Band Power Amplifier 12.0-19.0 GHz

Preliminary Information

MAAPGM0005-DIE

Features

- ◆ 12.0 to 19.0 GHz Operation
- ◆ 200 Milliwatt Saturated Output Power Level
- ◆ Single Bias Operation (5-8V)
- ◆ Self-Aligned MSAG[®] MESFET Process

Primary Applications

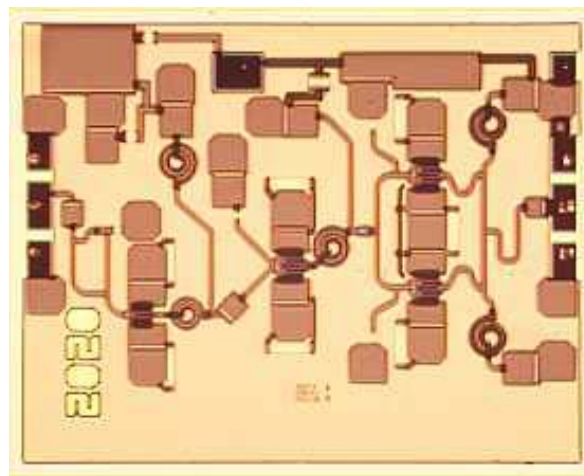
- ◆ Point-to-Point 15 GHz
- ◆ Point-to-Point 18 GHz

Description

The MAAPGM0005-Die is a 3-stage 200 mW power amplifier with on-chip bias networks. This product is fully matched to 50 ohms on both the input and output. It can be used as a power amplifier stage or as a driver stage in high power applications.

Each device is 100% RF tested on wafer to ensure performance compliance. The part is fabricated using M/A-COM's repeatable, high performance and highly reliable GaAs Multifunction Self-Aligned Gate (MSAG[®]) MESFET Process. This process features silicon oxynitride passivation and polyimide scratch protection.

12.0-19.0 GHz GaAs MMIC Amplifier



Electrical Characteristics: $T_B = 40^\circ\text{C}^1$, $Z_0 = 50\Omega$, $V_{DD} = 7\text{V}$, $V_{GG} = -2\text{V}$, $P_{in} = 12\text{ dBm}$

Parameter	Symbol	Typical	Units
Bandwidth	f	12.0-19.0	GHz
Output Power	P_{OUT}	23	dBm
Power Added Efficiency	PAE	16	%
1-dB Compression Point	P1dB	22	dBm
Small Signal Gain	G	15	dB
Drain Current	I_{DD}	<250	mA
Output Third Order Intercept	OTOI	27	dBm
Noise Figure	NF	15	dB

1. T_B = MMIC Base Temperature

Maximum Operating Conditions ¹

Parameter	Symbol	Absolute Maximum	Units
Input Power	P _{IN}	17	dBm
Drain Supply Voltage	V _{DD}	+10.0	V
Quiescent Drain Current (No RF)	I _{DQ}	380	mA
Quiescent Power Dissipation (No RF)	P _{DISS}	2.5	W
Junction Temperature	T _J	180	°C
Storage Temperature	T _{STG}	-55 to +150	°C

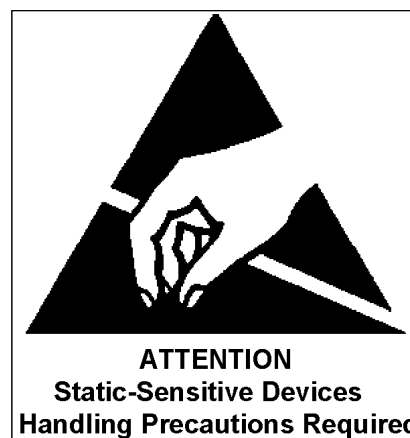
1. Operation outside of these ranges may reduce product reliability. Operation at other than the typical values may result in performance outside the guaranteed limits.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ	Max	Unit
Drain Voltage ³	V _{DD}	5.0	7.0	8.0	V
Input Power	P _{IN}		12.0	15.0	dBm
Junction Temperature	T _J			150	°C
MMIC Base Temperature	T _B			Note 2	°C

2. Maximum MMIC Base Temperature = 150°C — 75.7°C/W * V_{DD} * I_{DQ}

3. Recommended CW operation.



Specifications subject to change without notice.

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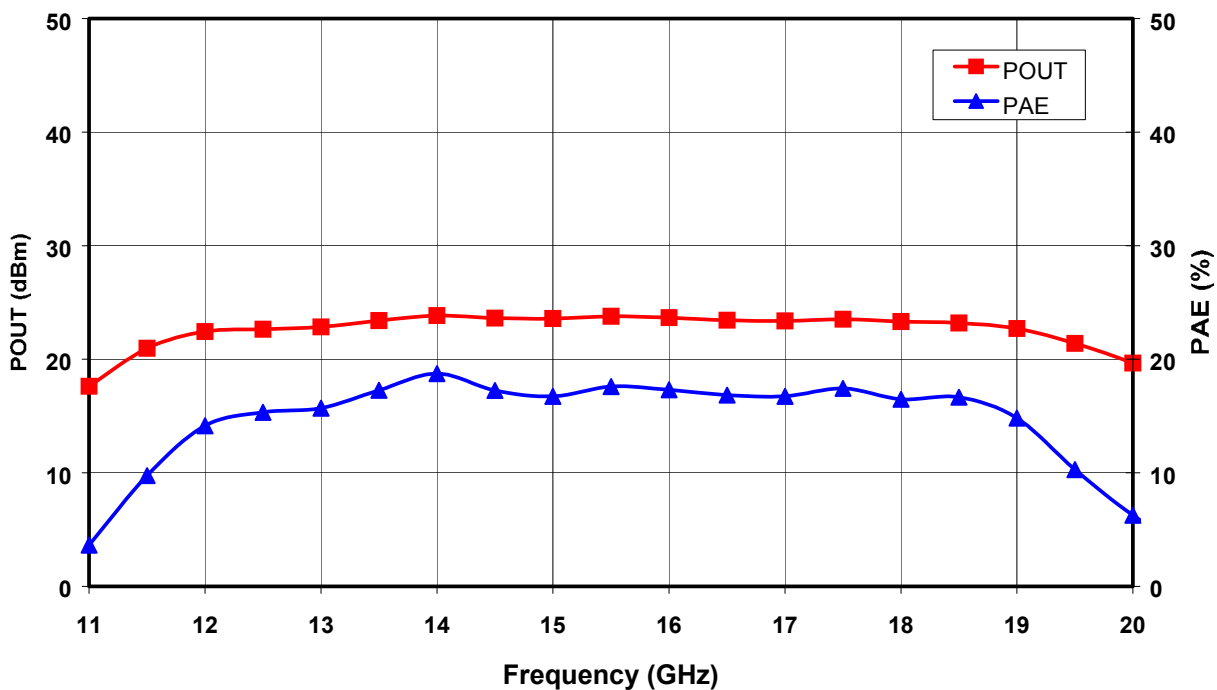


Figure 1. Output Power and Power Added Efficiency vs. Frequency at $V_{DD} = 7V$ and $P_{in} = 12$ dBm.

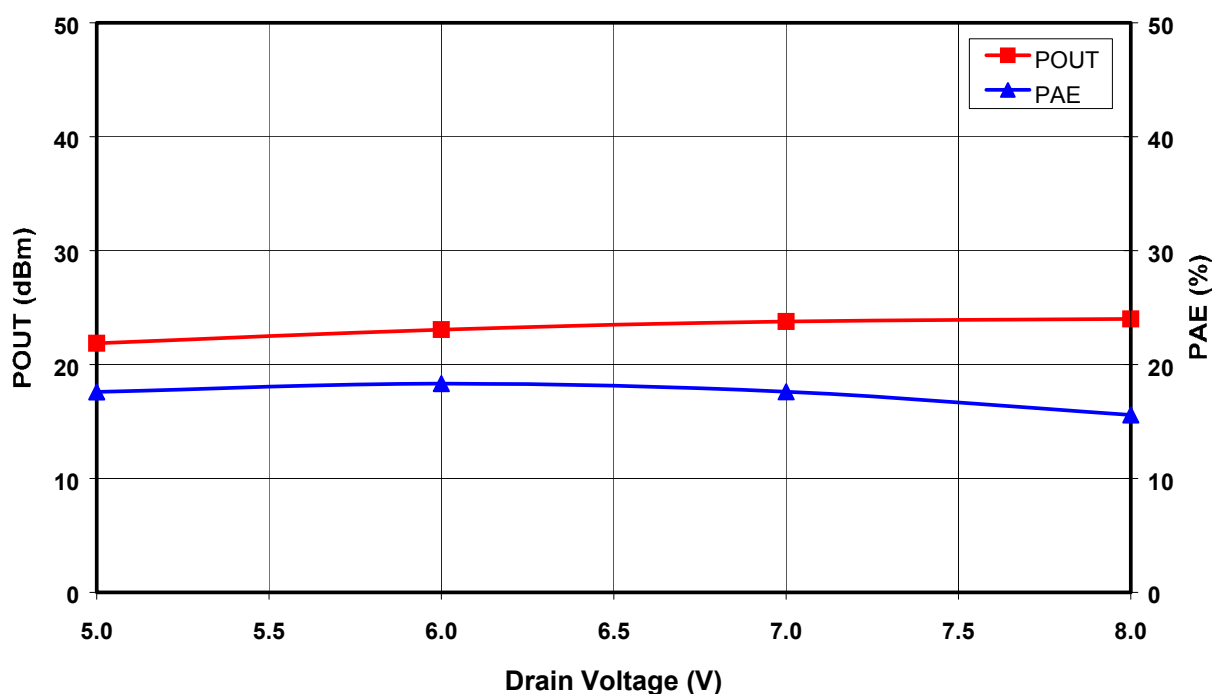


Figure 2. Saturated Output Power and Power Added Efficiency vs. Drain Voltage at $f_o = 15.5$ GHz.

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2mW Ku-Band Power Amplifier

MAAPGM0005-DIE

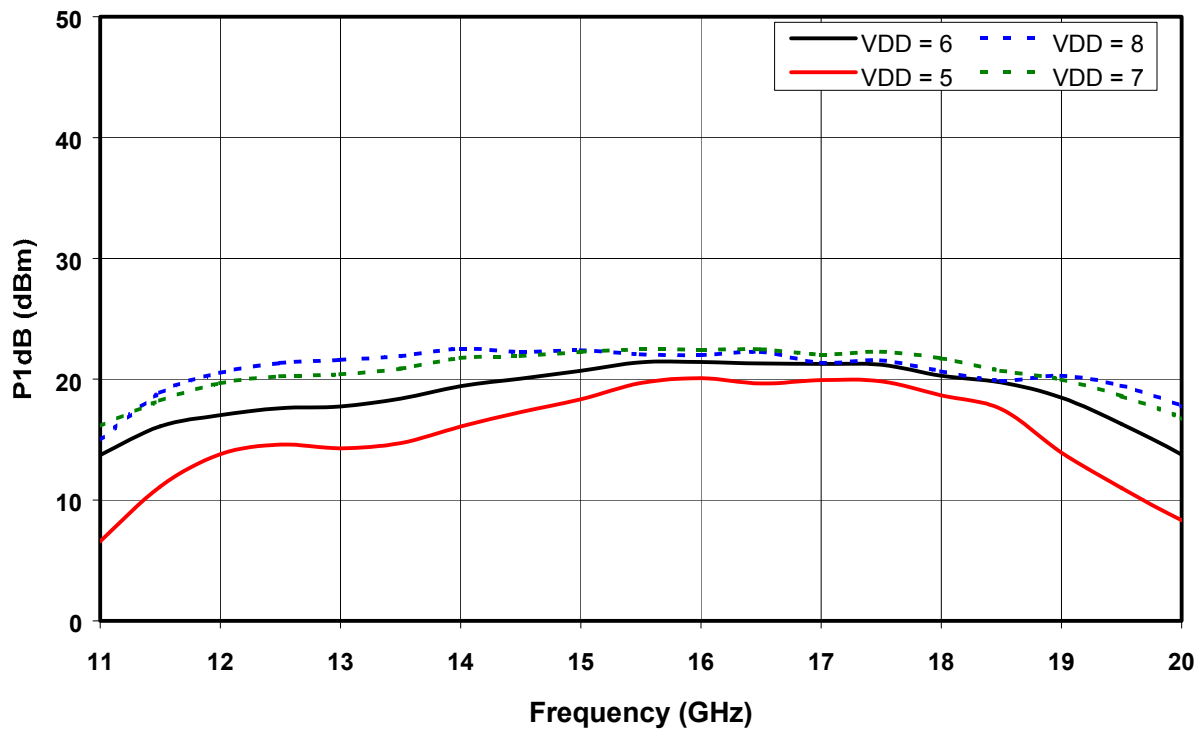
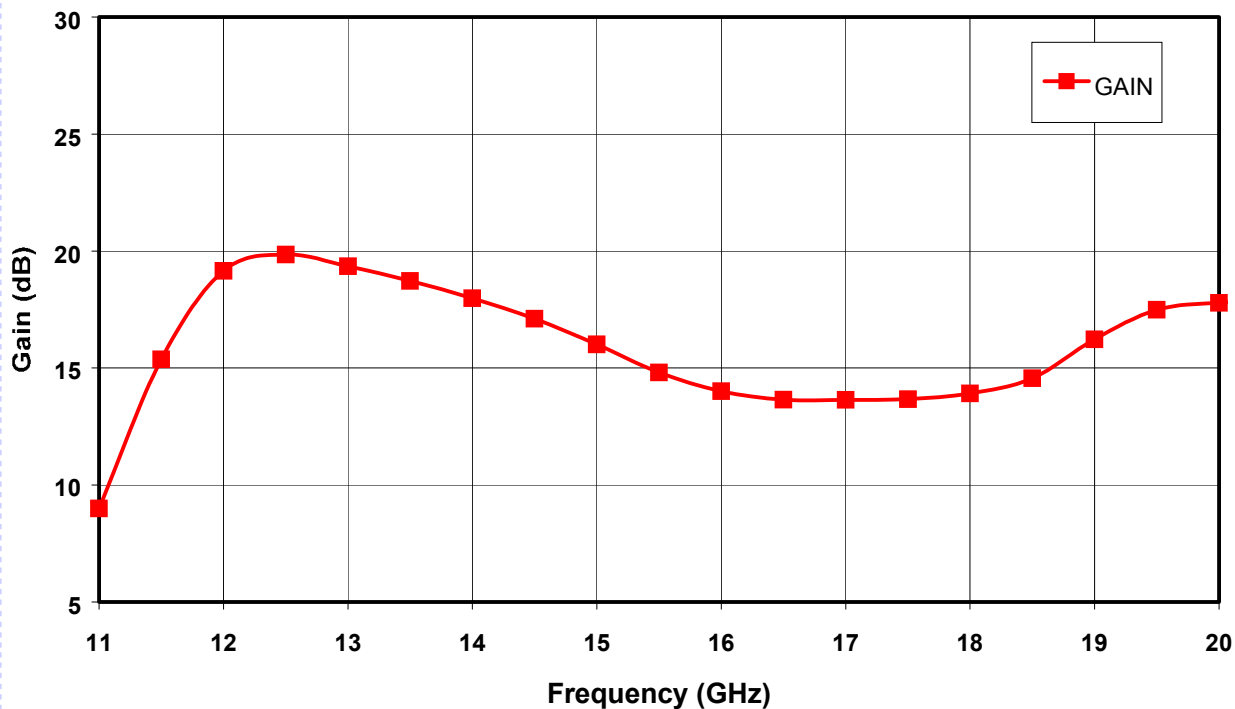


Figure 3. 1dB Compression Point vs. Drain Voltage

Figure 4. Small Signal Gain vs. Frequency at $V_{DD} = 7V$.

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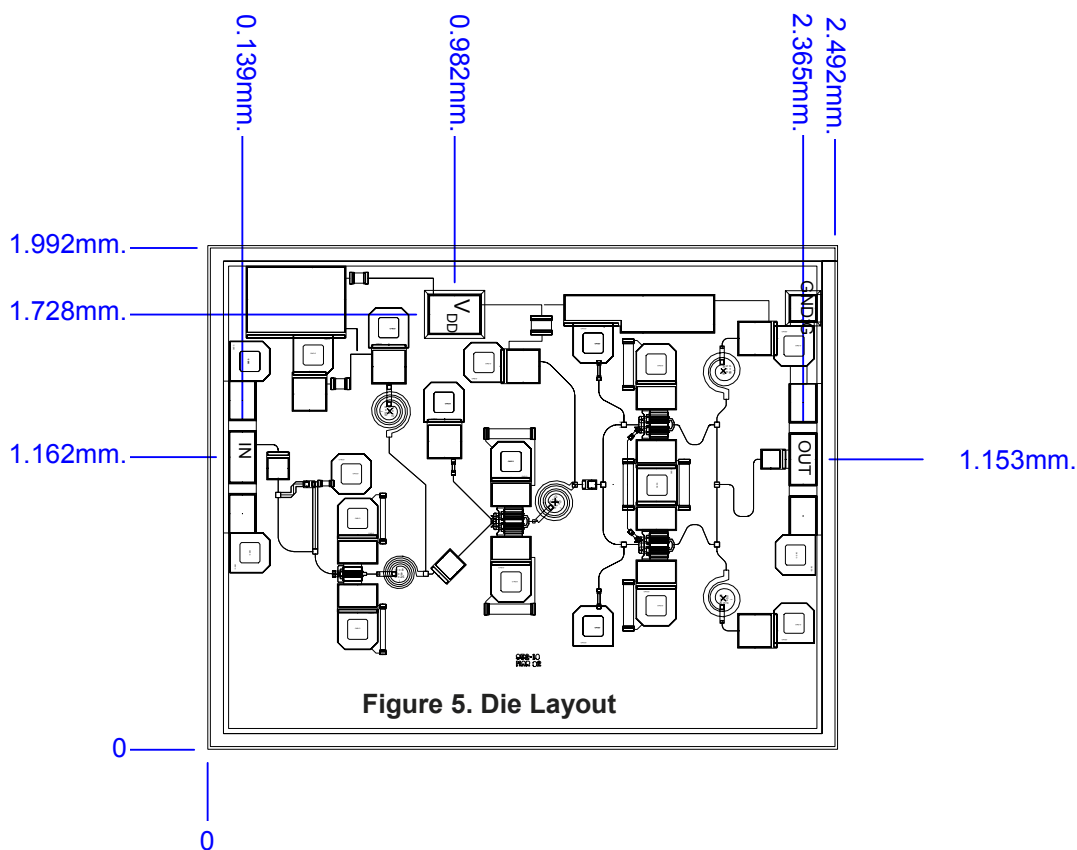
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Mechanical Information

Chip Size: 2.492 x 1.992 x 0.075 mm (98 x 78 x 3 mils)



Bond Pad Dimensions

Pad	Size (μm)	Size (mils)
RF In and Out	100 x 200	4 x 8
DC Drain Supply Voltage VDD	200 x 150	8 x 6

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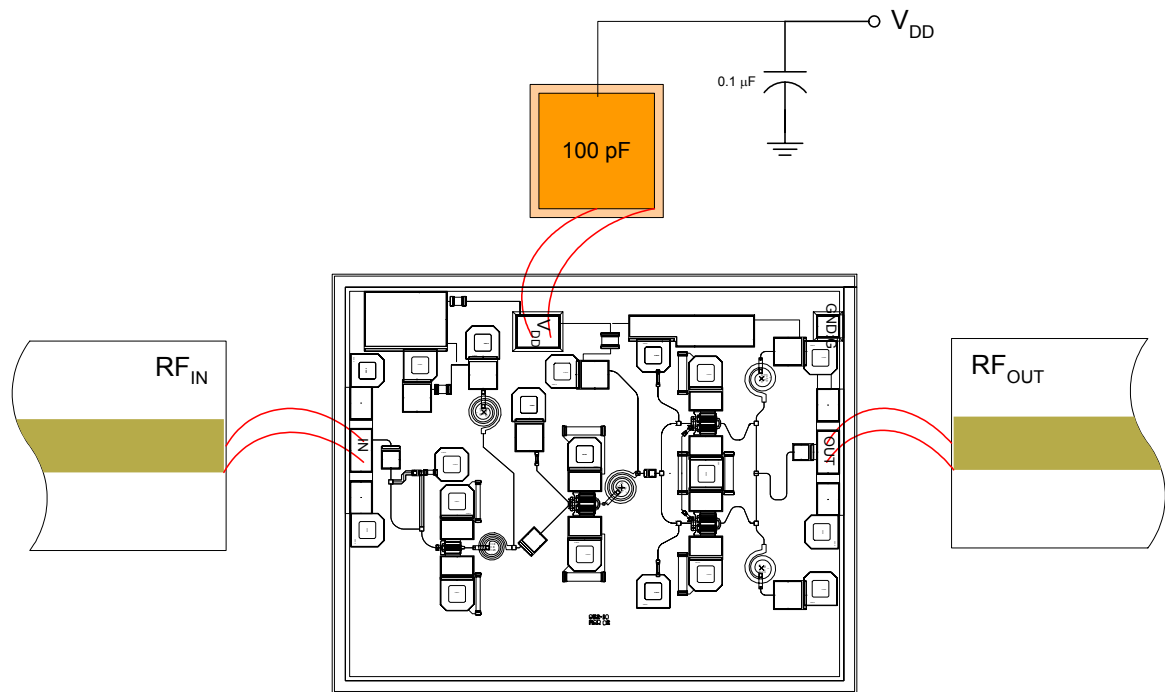


Figure 6. Recommended operational configuration. Wire bond as shown.

Assembly Instructions:

Die attach: Use AuSn (80/20) 1-2 mil. preform solder. Limit time @ 300 °C to less than 5 minutes.

Wirebonding: Bond @ 160 °C using standard ball or thermal compression wedge bond techniques. For DC pad connections, use either ball or wedge bonds. For best RF performance, use wedge bonds of shortest length, although ball bonds are also acceptable.

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