



# TLCA01981

## Ka-Band MMIC Amplifier

### Description

The TLCA01981 is a two-stage, MMIC medium-power amplifier. A 0.25mm PHEMT was chosen to provide medium-power output through Ka-Band. The wide bandwidth and gain profile make it an excellent candidate for power applications and for making high gain, power chip sets with other TLC MMICs.

### Features

- 0.25mm PHEMT Process
- 12 to 33.5 GHz
- Small-signal gain 12 dB
- $P_{SAT} = 20$  dBm
- Chip Dimensions 2.17 x 1.3 x 0.1 mm



### Maximum Ratings

Symbol	Parameter	Rating
$V_D$	Positive Supply Voltage	6 V
$V_G$	Negative Supply Voltage	-2 V
$I_D$	Positive Supply Current	200 mA
$T_C$	Operating Temperature	-50 to 130 °C
$T_{STG}$	Storage Temperature	-65 to 150 °C

### Performance Summary

(At 25 °C, 50 ohm system)	Min	Typ	Max	
Frequency	12	24	33	GHz
P1dB		16		dBm
PAE	19	20	21	%
Gain Small Signal		12	18	dB
Drain Supply Voltage	3	5		V
Gate Supply Voltage	-1.5	-1	-0.5	V
Drain Supply Current	75	100	150	mA

TLC reserves the right to change performance data and specifications without notice



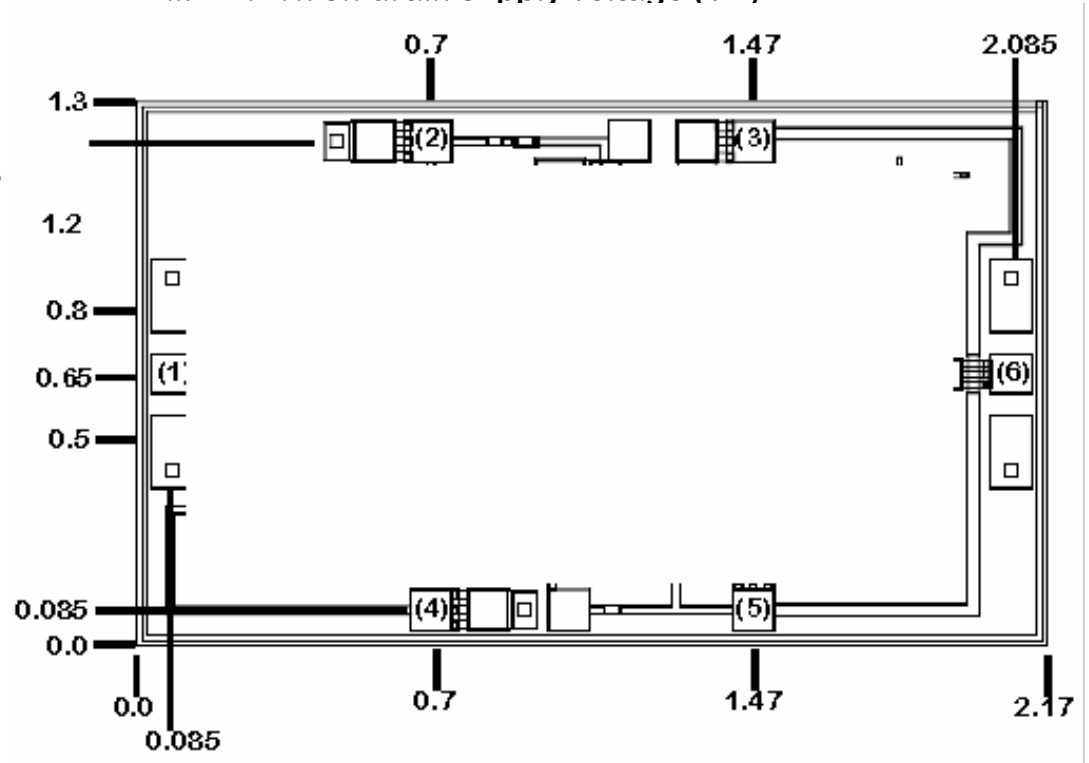
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### Recommended Operating Procedure

1. Set RF input power to 0 dBm.
2. Apply gate supply voltage of  $-0.5\text{ V}$  to  $V_G$ .
3. Slowly apply drain supply voltage of  $3.5\text{ V}$  to  $V_D$ ,  $I_D$  should be between  $100 - 120\text{ mA}$ .
4. Set RF to desired input power.
5. Adjust gate and drain supply voltages to given specifications or to maximize gain.
6. Turn off in the following sequence:
  - i. Turn off RF input power
  - ii. Turn off drain supply voltage (VD)

### MMIC Layout and Bond Pad Locations



Units: millimeters

Bond Pad 1 (RF Input)	0.1x0.1
Bond Pad 2 (VG)	0.1x0.1
Bond Pad 3 (VD)	0.1x0.1
Bond Pad 4 (VG)	0.1x0.1
Bond Pad 5 (VD)	0.1x0.1
Bond Pad 6 (RF Output)	0.1x0.1

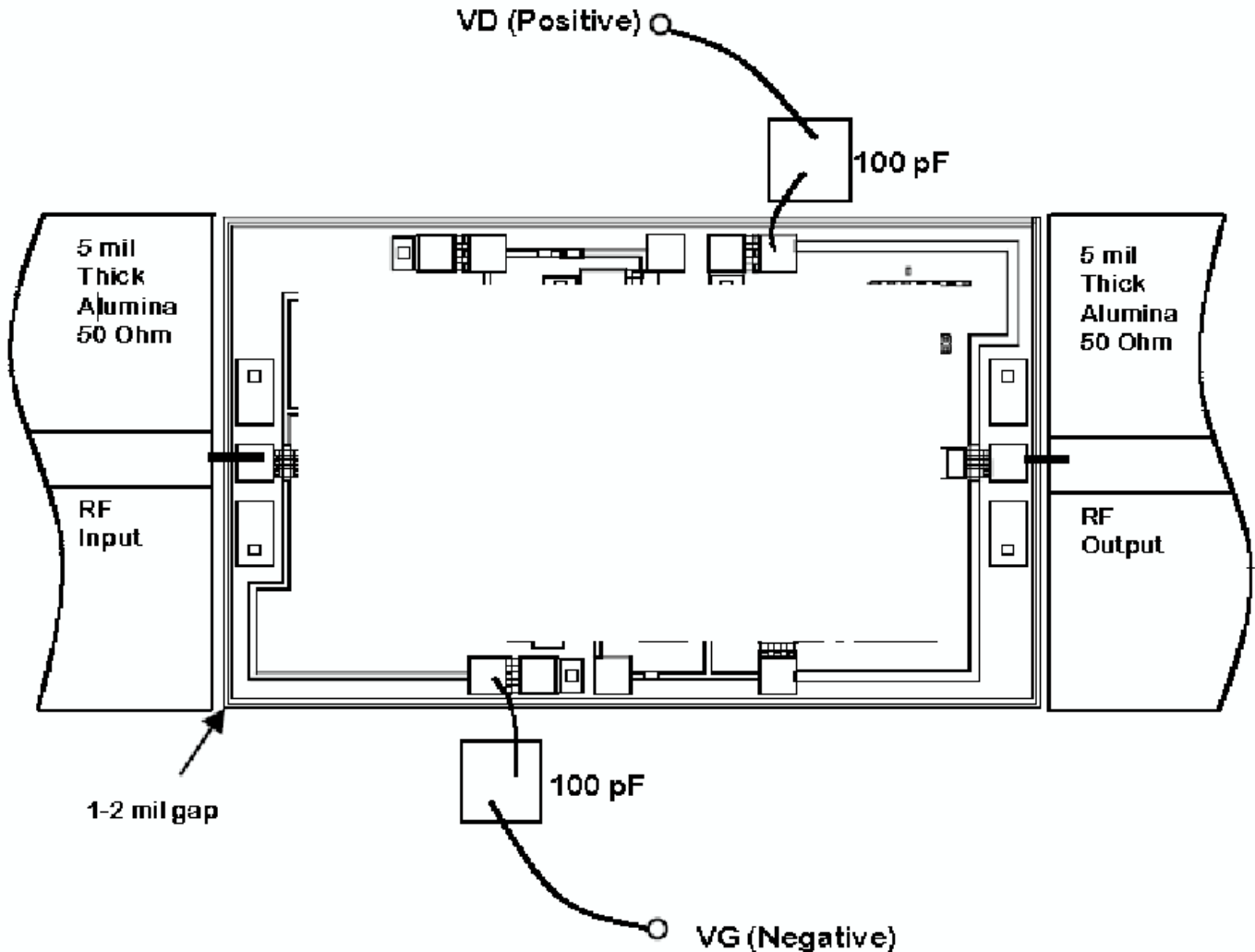
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### Recommended Assembly Diagram



**Note:** Use one (1) 0.002" by 0.0005" gold ribbon or two (2) 0.0005" wire for bonding the RF input and output. Mount chip using silver epoxy (e.g. Epo-Tek H32C) or Gold-Tin (AuSn:80/20) solder. For best heat sinking, use either gold plated copper or composite matrix material, e.g. Thermocon.

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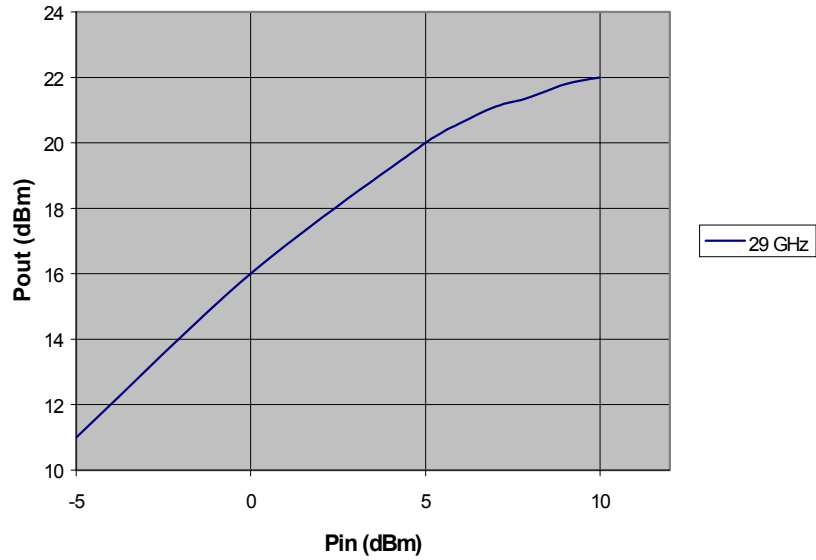


# TLCA01981

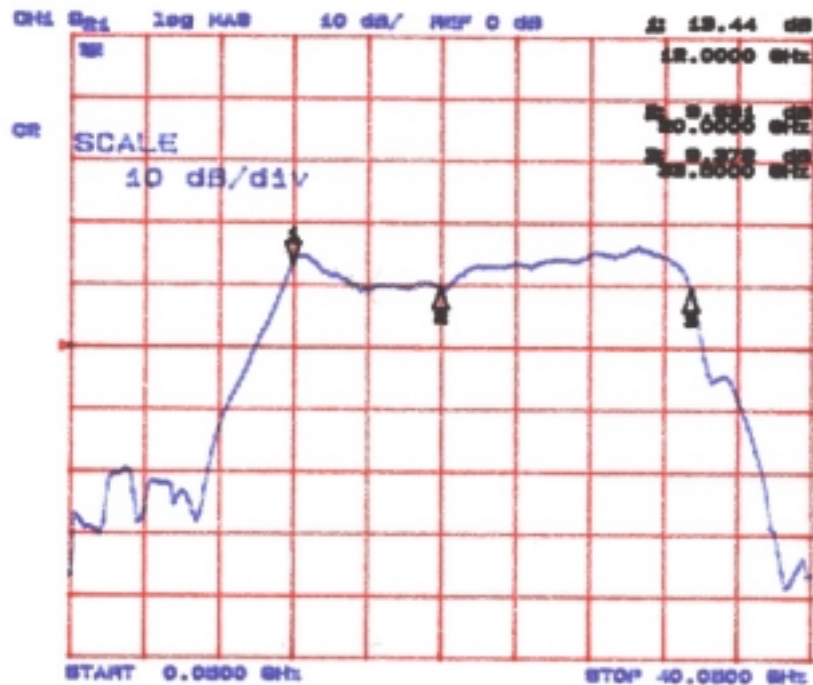
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### Performance Data

Pout vs Pin  
(Vd=5V, Id=120 mA)



Small Signal Gain  
(Vd=5 V, Id=120 mA)



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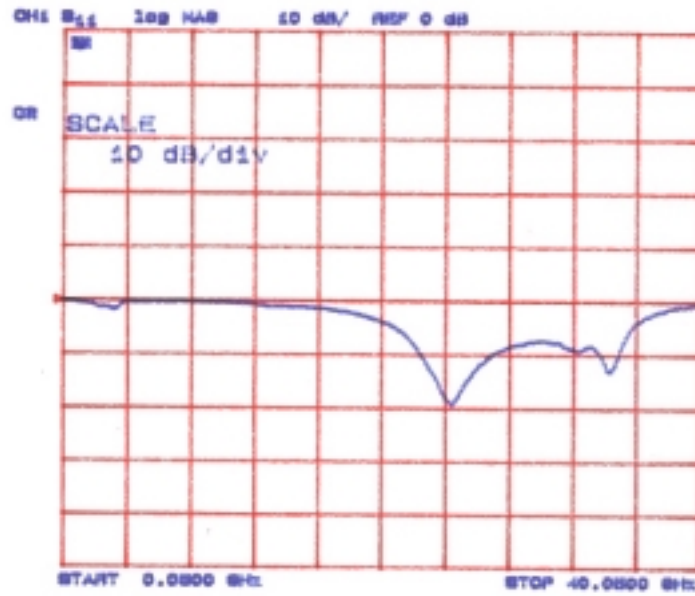


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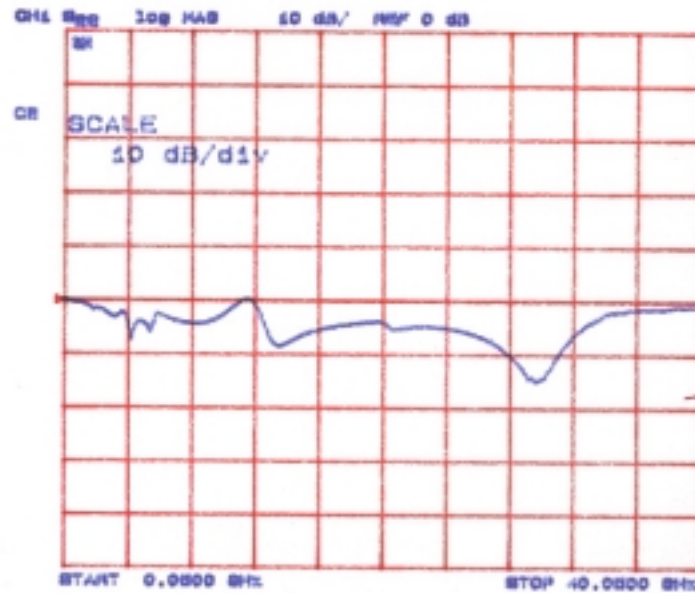
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### Performance Data

S11



S22



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