



TLCA01981

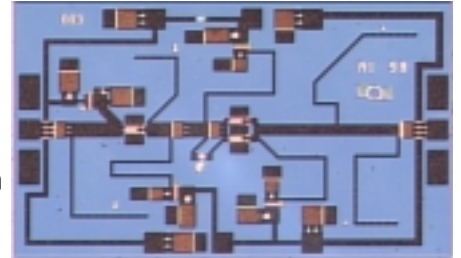
Ka-Band MMIC Amplifier

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



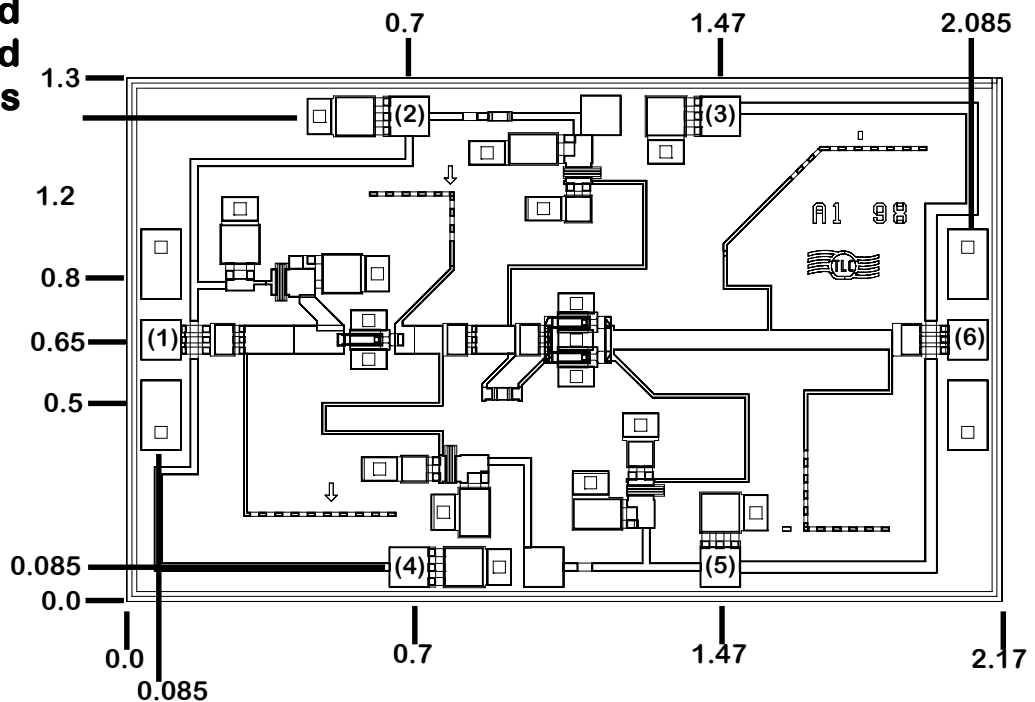
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Recommended Operating Procedure

1. Set RF input power to 0 dBm.
2. Apply gate supply voltage of -0.5 V to V_G .
3. Slowly apply drain supply voltage of 3.5 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)
 - iii. Turn off gate supply voltage (VG)

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 |

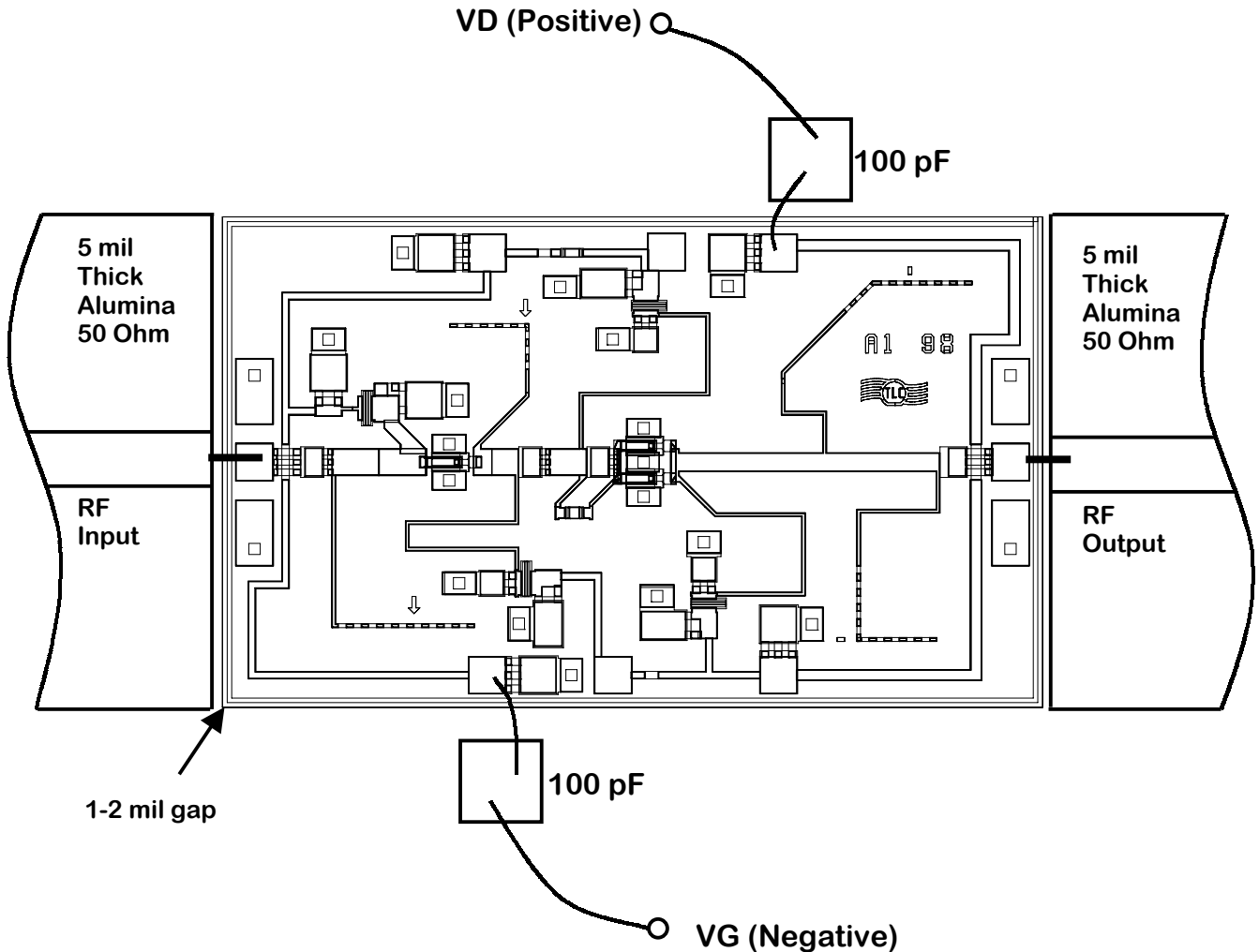
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Recommended Assembly Diagram



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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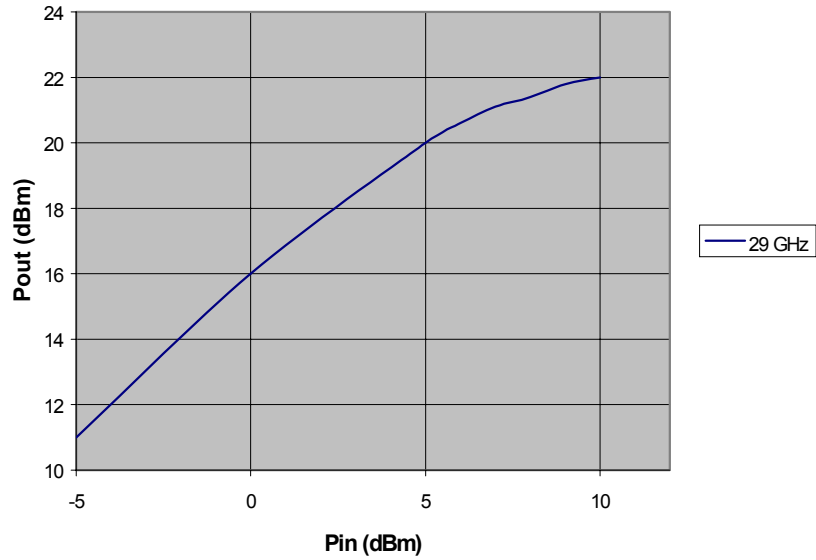


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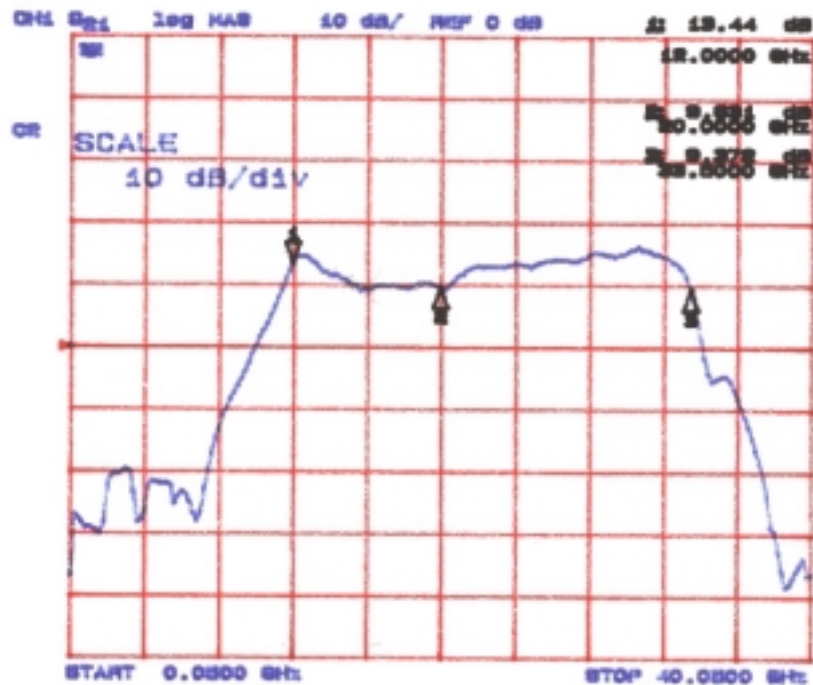
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Performance Data

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



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



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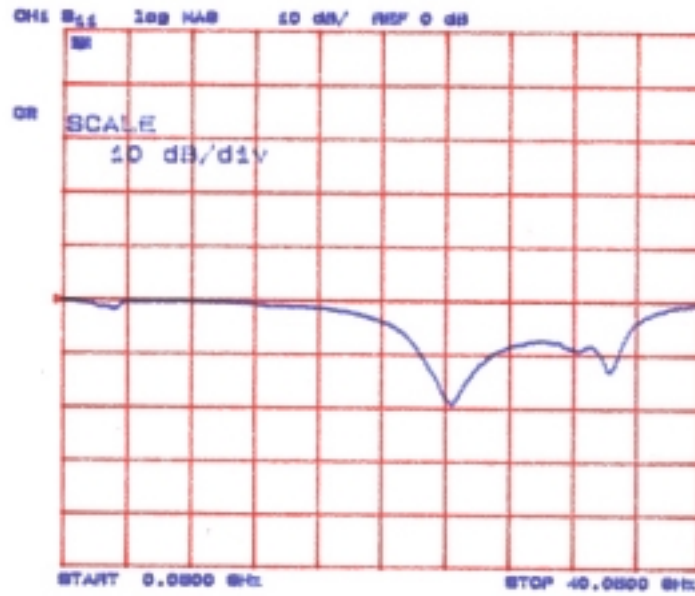


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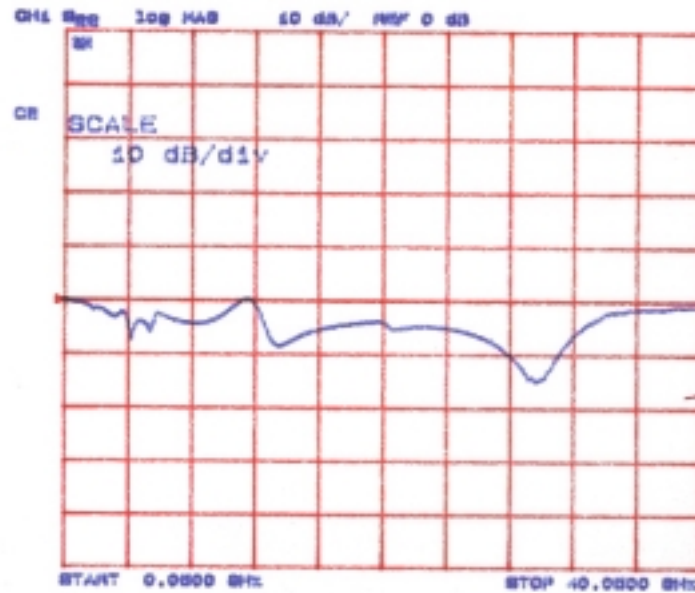
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Performance Data

S11



S22



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