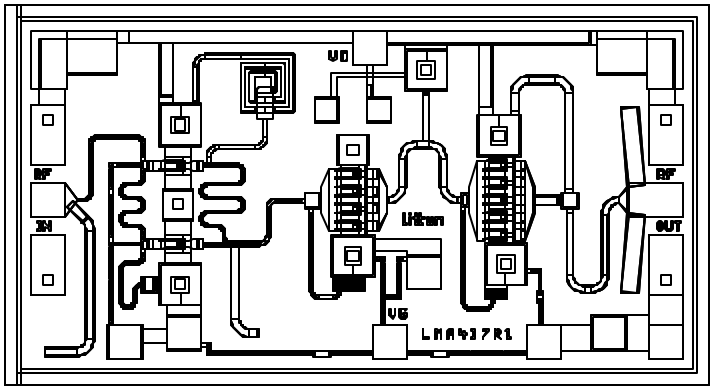
LMA417

MEDIUM POWER PHEMT MMIC

- FEATURES



  - ♦ 18 GHz to 24 GHz Frequency Band
  - ♦ 19 dB Gain
  - ♦ 23 dBm Output Power at Saturation
  - ♦ 14 dB Input/Output Return Loss
  - ♦ +4 V Dual Bias Supply

- DESCRIPTION AND APPLICATIONS

The Filtronic Solid State LMA417 is a 3-stage medium power PHEMT amplifier that provides 19dB linear power gain with 1-dB gain compression power output of greater than +21dBm for commercial mm-W (millimeter-wave) 18 & 23GHz PCN/PCS and 20GHz SatCom application. Ground is provided to the circuitry through vias to the backside metallization.

- ELECTRICAL SPECIFICATIONS @ $T_{Ambient}$ = 25°C

(V_{DD} = +4.0V, Z_{IN} = Z_{OUT} = 50Ω)

Parameter	Symbol	Test Conditions	Operating Frequency	Min	Typ	Max	Units
Small Signal Gain	S_{21}	60% I_{DSS}	18±0.5 GHz	18	19		dB
			20±0.5 GHz	17	18		dB
			23±0.5 GHz	17	18		dB
			24.5-26.5 GHz		18		dB
Saturated Drain Current	I_{DSS}			165	360	495	mA
Small Signal Gain Flatness	ΔS_{21}		18-24 GHz		±1		dB
			24-26.5 GHz		±1.5		dB
Power at 1-dB Compression	P-1dB	60% I_{DSS}			21		dBm
Power at Saturation	P_{SAT}				23		dBm
Input Return Loss	S_{11}				-14		dB
Output Return Loss	S_{22}				-14		dB
Reverse Isolation	S_{12}				-48		dB

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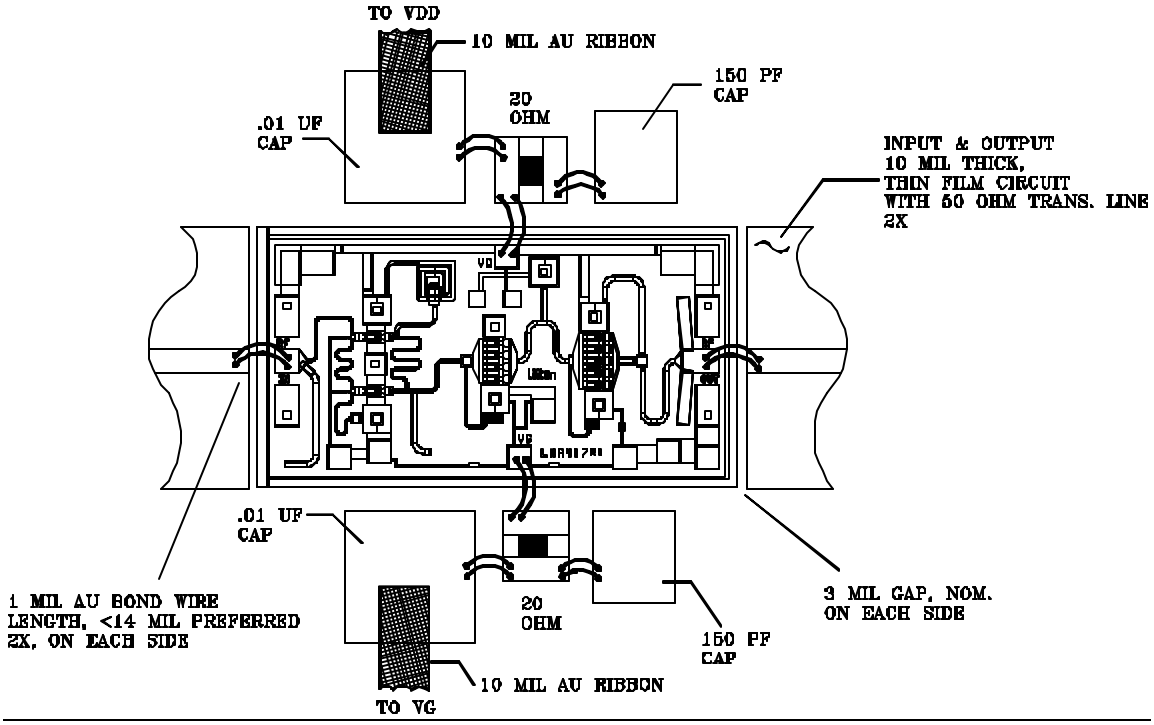
• ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Min	Max	Units
Drain Voltage	V_D	$T_{Ambient} = 22 \pm 3$ °C		7	V
Gate Voltage	V_G	$T_{Ambient} = 22 \pm 3$ °C		-1	V
Operating Current	I_{OP}	$T_{Ambient} = 22 \pm 3$ °C		495	mA
RF Input Power	P_{IN}	$T_{Ambient} = 22 \pm 3$ °C		15	dBm
Total Power Dissipation	P_{TOT}	$T_{Ambient} = 22 \pm 3$ °C		3.5	W
Channel Operating Temperature	T_{CH}	$T_{Ambient} = 22 \pm 3$ °C		150	ºC
Storage Temperature	T_{STG}	—	-65	165	ºC
Maximum Assembly Temperature (1 min. max.)	T_{MAX}	—		300	ºC

Notes:

- Operating conditions that exceed the Absolute Maximum Ratings could result in permanent damage to the device.
- Recommended Continuous Operating Limits should be observed for reliable device operation.
- Power Dissipation defined as: $P_{TOT} \equiv (P_{DC} + P_{IN}) - P_{OUT}$, where
  P_{DC}: DC Bias Power
  P_{IN}: RF Input Power
  P_{OUT}: RF Output Power
- This GaAs MMIC is susceptible to damage from Electrostatic Discharge. Proper precautions should be used when handling these devices.

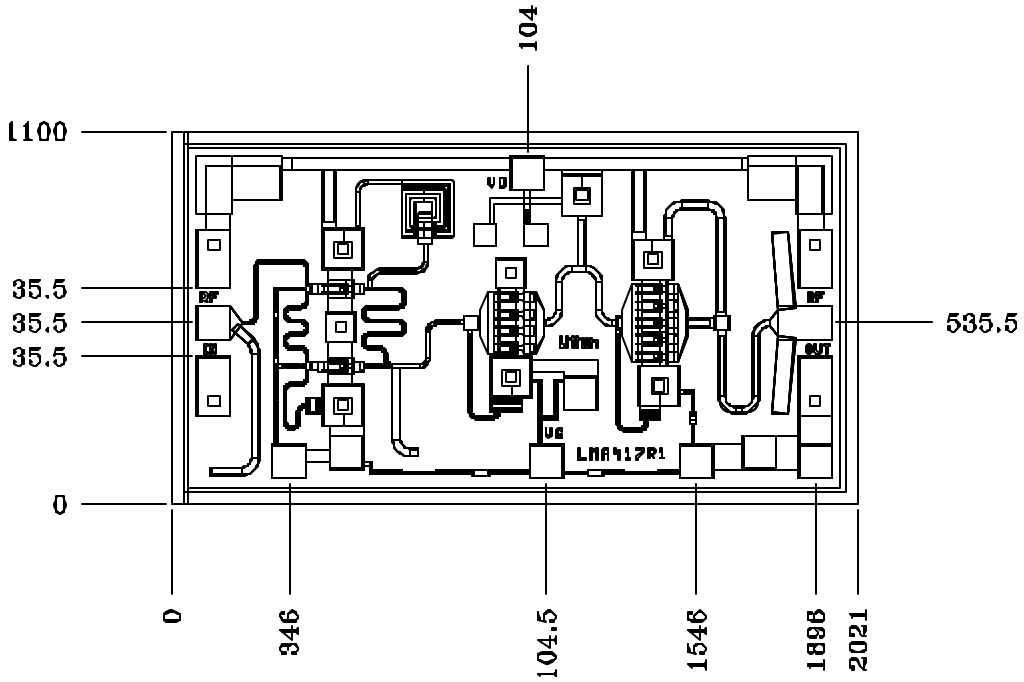
- ASSEMBLY DRAWING



Notes:

- Recommended lead bond technique is thermocompression wedge bonding with 0.001" (25µm) diameter wire. The bond tool force shall be 35-38 gram. Bonding stage temperature shall be 230-240°C, heated tool (150-160°C) is recommended. Ultrasonic bonding is not recommended.
- The recommended die attach is a eutectic 80/20 Gold/Tin solder, using a stage temperature of 285-290°C.
- Bond on bond or stitch bond acceptable.
- Conductor over conductor acceptable. Conductors must not short.

- MECHANICAL OUTLINE



Notes:

- All units are in microns (µm).
- All bond pads are 100 X 100 μm^2.
- Bias pad (V_{DD}) size is 100 X 121.5 μm^2.
- Unless otherwise specified.

- HANDLING PRECAUTIONS

To avoid damage to the devices care should be exercised during handling. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. These devices should be treated as Class 1A (0-500 V). Further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.