

Ka Band Low Noise Amplifier

TGA1319A-EPU



Chip Dimensions 1.984 mm x .923 mm

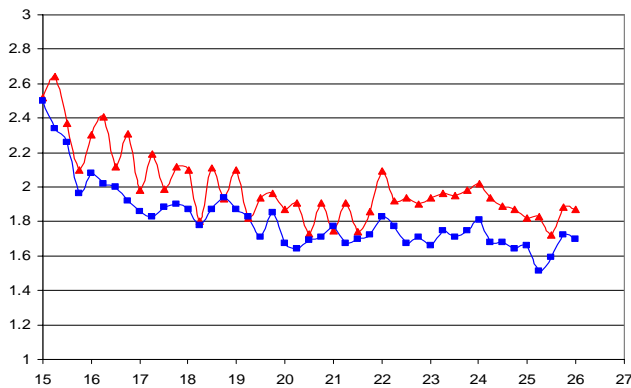
Key Features and Performance

- 0.15um pHEMT Technology
- 21-27 GHz Frequency Range
- 2 dB Nominal Noise Figure
- 19 dB Nominal Gain
- 12 dBm Pout
- 3V, 45 mA with $-0.5V < V_g < +0.5V$

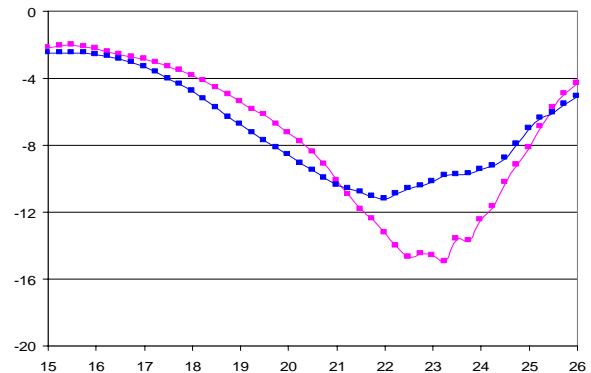
Primary Applications

- Point-to-Point Radio
- Point-to-Multipoint Communications

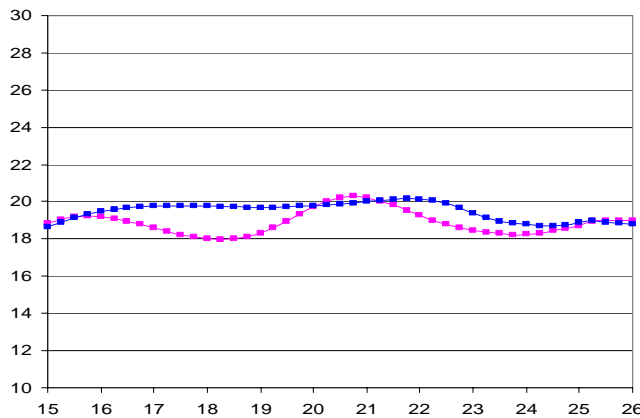
Preliminary Data, 2 Fixtured samples @ 25C



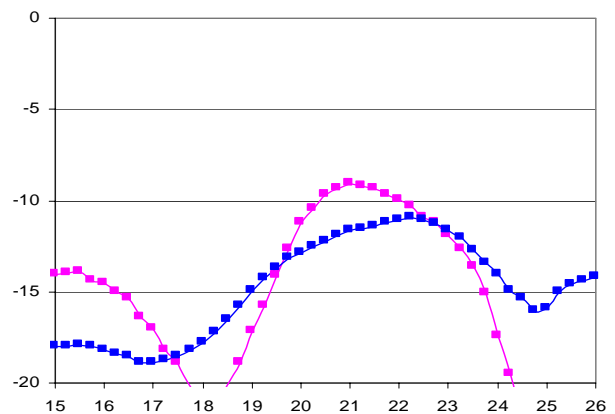
Typical NF @ 25C



Typical S11 @ 25C



Typical Gain @ 25C



Typical S22 @ 25C

Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications subject to change without notice

MAXIMUM RATINGS

SYMBOL	PARAMETER ^{4/}	VALUE	NOTES
V ⁺	POSITIVE SUPPLY VOLTAGE	5 V	
I ⁺	POSITIVE SUPPLY CURRENT	60 mA	<u>1/</u>
I ⁻	NEGATIVE GATE CURRENT	5.28 mA	
P _{IN}	INPUT CONTINUOUS WAVE POWER	15 dBm	
P _D	POWER DISSIPATION	.3 W	
T _{CH}	OPERATING CHANNEL TEMPERATURE	150 °C	<u>2/</u> <u>3/</u>
T _M	MOUNTING TEMPERATURE (30 SECONDS)	320 °C	
T _{STG}	STORAGE TEMPERATURE	-65 to 150 °C	

1/ Total current for all stages.

2/ These ratings apply to each individual FET.

3/ Junction operating temperature will directly affect the device median time to failure (T_M). For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.

4/ These ratings represent the maximum operable values for the device.

DC PROBE TESTS

(T_A = 25 °C ± 5°C)

Symbol	Parameter	Minimum	Maximum	Value
I _{DSS}	Saturated Drain Current	---	---	mA
V _p	Pinch-off Voltage	-1.5	-0.5	V
BVGS	Breakdown Voltage gate-source	---	---	V
BVGD	Breakdown Voltage gate-drain	---	---	V

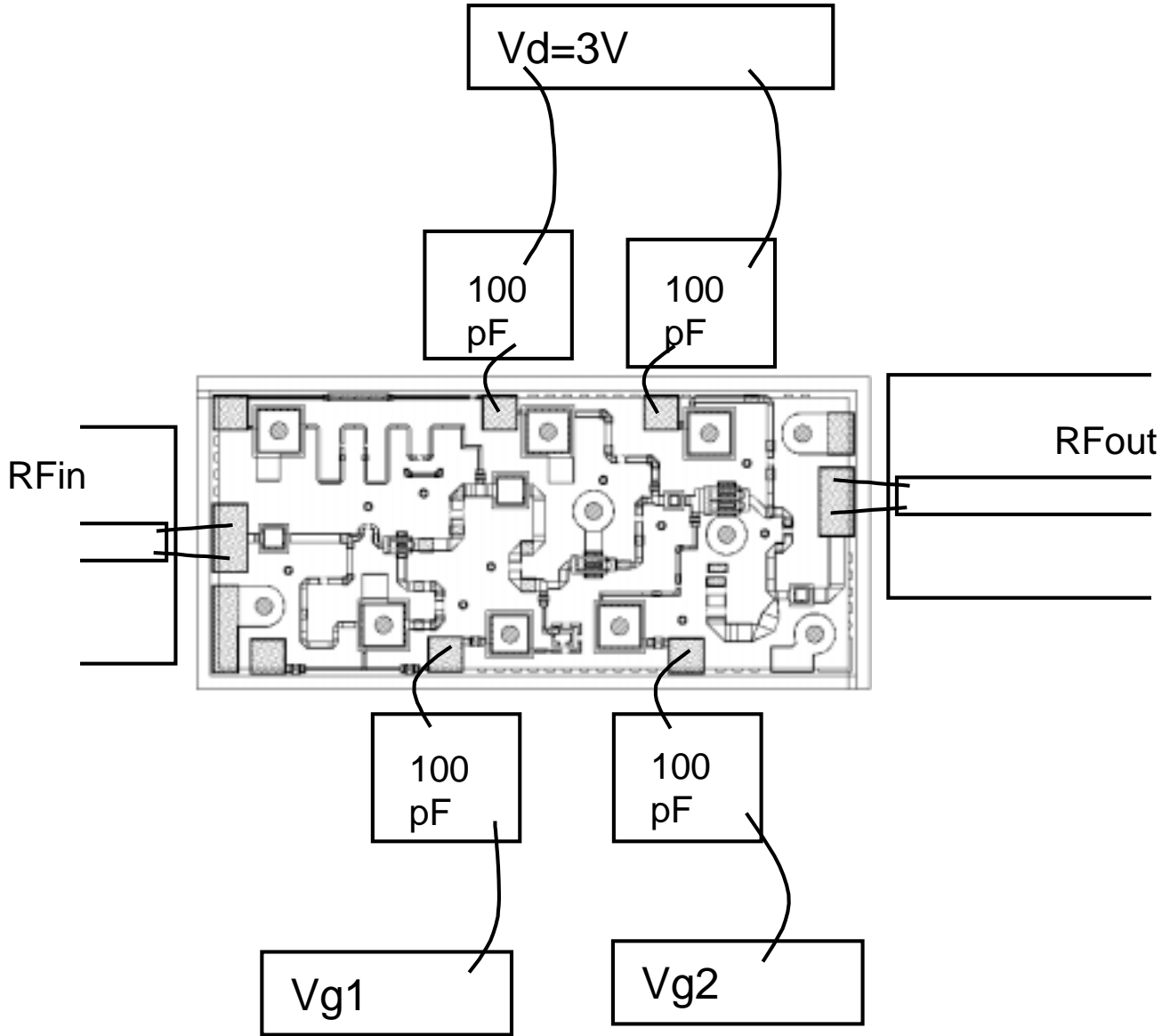
ON-WAFER RF PROBE CHARACTERISTICS

(T_A = 25 °C ± 5°C)

V_d = 3 V, I_{d1} = 15 mA, I_{d2} = 30 mA

Symbol	Parameter	Test Condition	Limit			Units
			Min	Typ	Max	
Gain	Small Signal Gain	F = 21 – 27 GHz	18		---	dB
NF	Noise Figure	F = 21 – 26.5 GHz	---		2	dB
PWR	Output Power @ P1dB	F = 21 – 27 GHz	10		---	dBm

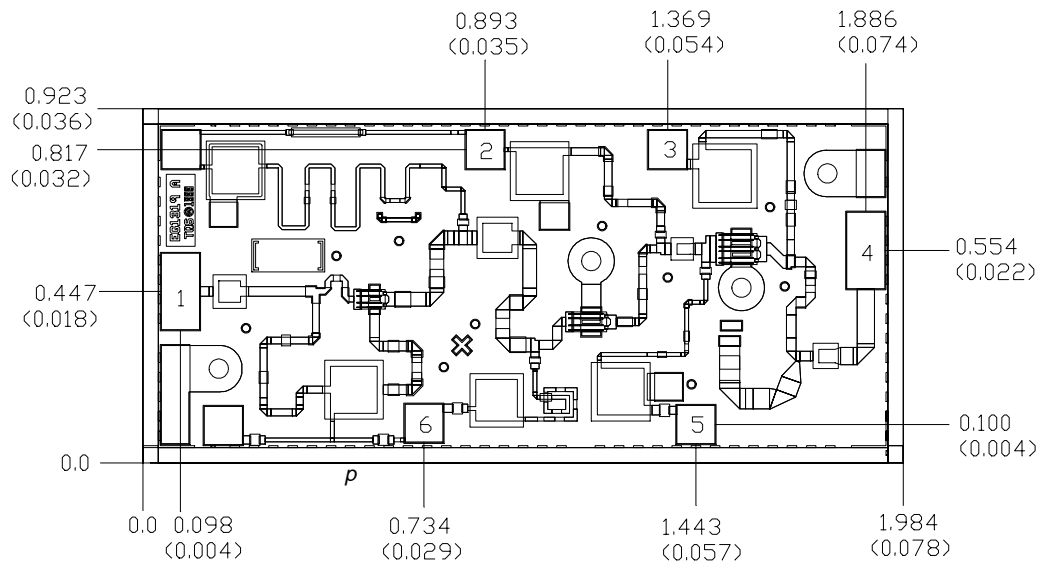
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- Notes: 1. Vg1 and Vg2 may be sourced from the same supply.
 2. Positive or negative gate bias may be required to achieve recommended operating point.

TGA1319A - Recommended Assembly Drawing

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Units: millimeters (inches)

Thickness: 0.1016 (0.004)

Chip edge to bond pad dimensions are shown to center of bond pad

Chip size tolerance: +/- 0.051 (0.002)

Bond Pad #1 (RF Input)	0.100 x 0.200 (0.004 x 0.008)
Bond Pad #2 (Vd1)	0.100 x 0.100 (0.004 x 0.004)
Bond Pad #3 (Vd2)	0.100 x 0.100 (0.004 x 0.004)
Bond Pad #4 (RF Output)	0.100 x 0.200 (0.004 x 0.008)
Bond Pad #5 (Vg2)	0.100 x 0.100 (0.004 x 0.004)
Bond Pad #6 (Vg1)	0.100 x 0.100 (0.004 x 0.004)

Mechanical Drawing

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Assembly Process Notes

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300°C.
- An alloy station or conveyor furnace with reducing atmosphere should be used.
- No fluxes should be utilized.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- Devices must be stored in a dry nitrogen atmosphere.

Component placement and adhesive attachment assembly notes:

- Vacuum pencils and/or vacuum collets are the preferred method of pick up.
- Air bridges must be avoided during placement.
- The force impact is critical during auto placement.
- Organic attachment can be used in low-power applications.
- Curing should be done in a convection oven; proper exhaust is a safety concern.
- Microwave or radiant curing should not be used because of differential heating.
- Coefficient of thermal expansion matching is critical.

Interconnect process assembly notes:

- Thermosonic ball bonding is the preferred interconnect technique.
- Force, time, and ultrasonics are critical parameters.
- Aluminum wire should not be used.
- Discrete FET devices with small pad sizes should be bonded with 0.0007-inch wire.
- Maximum stage temperature is 200°C.

GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.