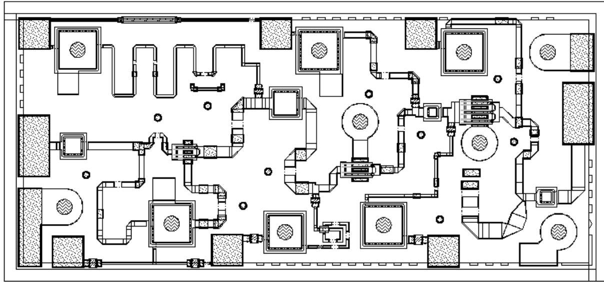
TriQuint SEMICONDUCTOR®

Advance Product Information
January 19, 2001

Ka Band Low Noise Amplifier TGA1319A



Chip Dimensions 1.984 mm x .923 mm

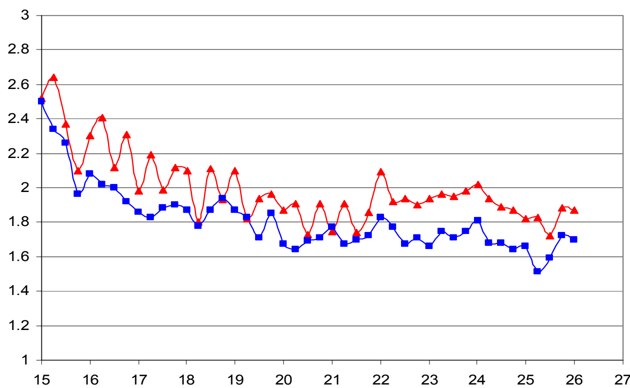
Key Features and Performance

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

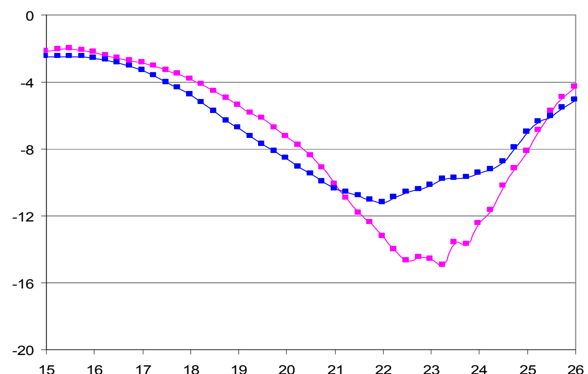
Primary Applications

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

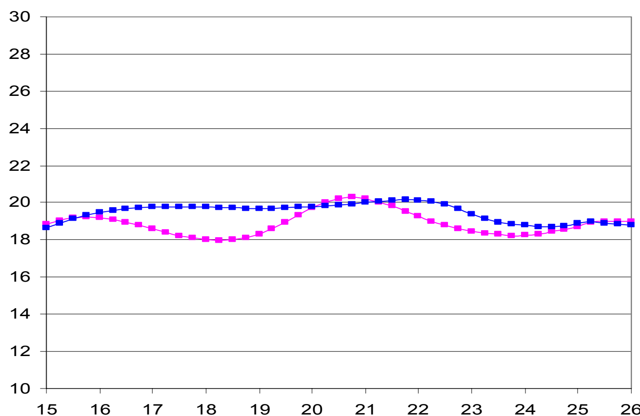
Preliminary Data, 2 Fixtured samples @ 25C



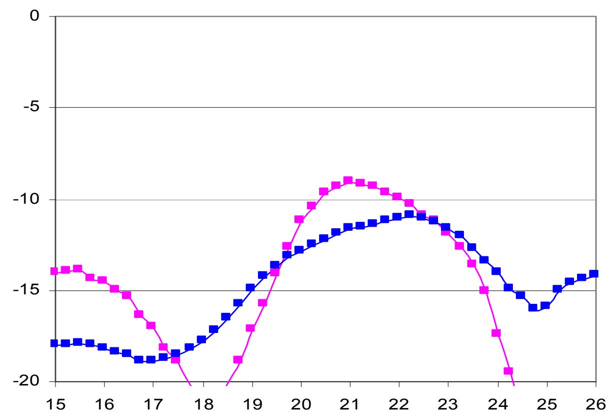
Typical NF @ 25C



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	1/
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 ^{0}C	2/ 3/
T_M	MOUNTING TEMPERATURE (30 SECONDS)	320 ^{0}C	
T_{STG}	STORAGE TEMPERATURE	-65 to 150 ^{0}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
Idss	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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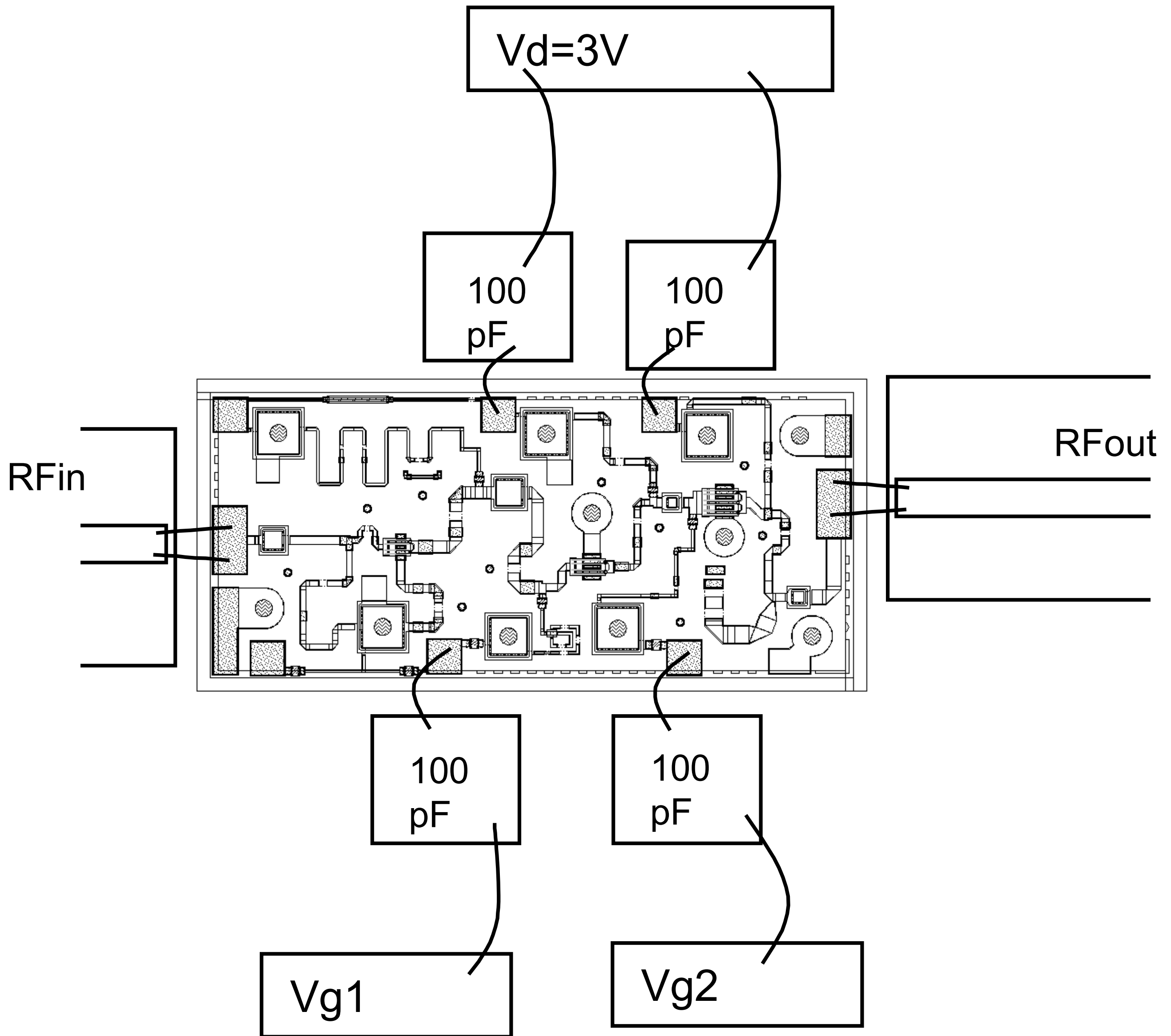

Note: Vg1 and Vg2 may be sourced from the same supply.

TGA1319A - Recommended Assembly Drawing

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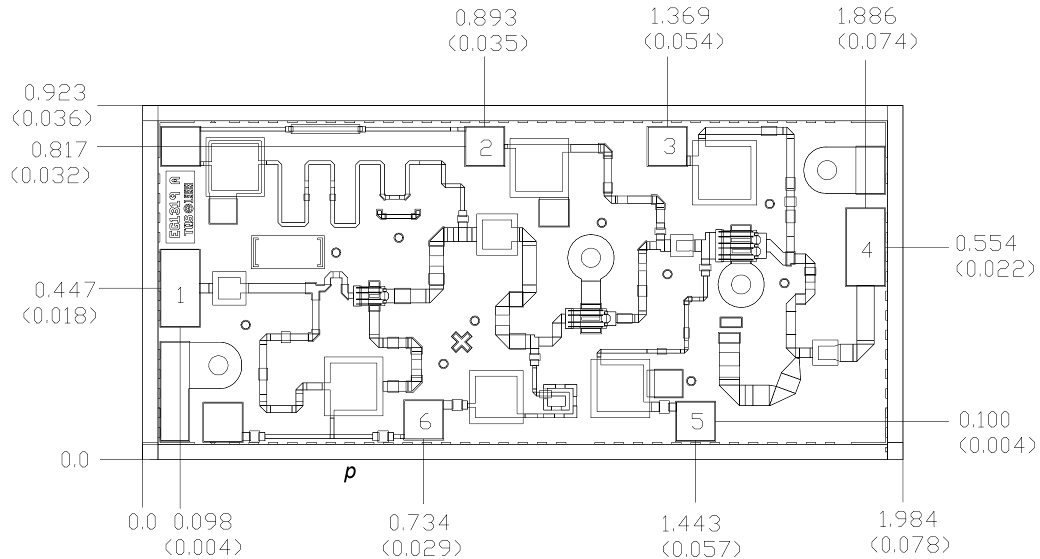

Units: millimeters (inches)
Thickness: 0.1016 (0.004)
Chip edge to bond pad dimensions are shown to center of bond pad
Chip size tolerance: +/- 0.051 (0.002)

Bond Pad	Size
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:

- AuSn (80/20) solder with limited exposure to temperatures at or above 300°C
- alloy station or conveyor furnace with reducing atmosphere
- no fluxes should be utilized
- coefficient of thermal expansion matching is critical for long-term reliability
- storage in dry nitrogen atmosphere

Component placement and adhesive attachment assembly notes:

- vacuum pencils and/or vacuum collets preferred method of pick up
- avoidance of air bridges during placement
- force impact 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: 200°C

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

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