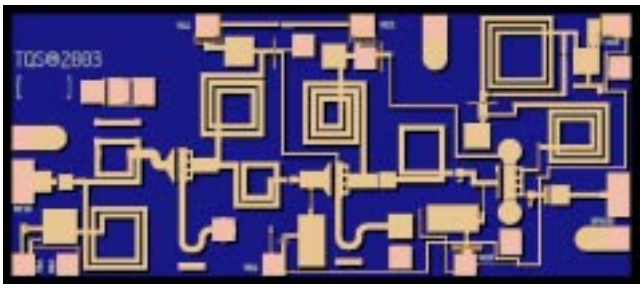
X-band Ultra Low Noise Amplifier TGA2600



Key Features

- Frequency Range: 6-12 GHz
- 0.7 dB Noise Figure
- 30 dB Nominal Gain
- 2 dBm Nominal P1dB
- > 12 dB Return Loss
- Nominal Bias 2.5V @ 17 mA
- 0.15-um 3MI mHEMT Technology
- Chip Dimensions: 2.20 x 0.99 x 0.10 mm (0.087 x 0.039 x 0.004 in)

Primary Applications

- Radar
- X band LNA, ECM

Product Description

The TriQuint TGA2600-EPU is an Ultra Low-Noise Amplifier. This LNA operates from 7-11 GHz with a typical mid-band noise figure of 0.7 dB.

The device features 30dB of gain across the band, while providing a nominal output power at P1dB gain compression of 2 dBm. Typical input and output return loss is 12 dB. Ground is provided to the circuitry through vias to the backside metallization.

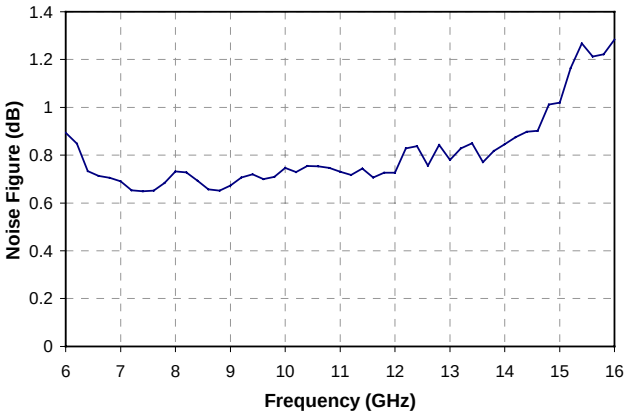
The TGA2600-EPU LNA is suitable for a variety of C and X band applications such as radar receivers, electronic counter measures,decoys, jammers, and phased array systems.

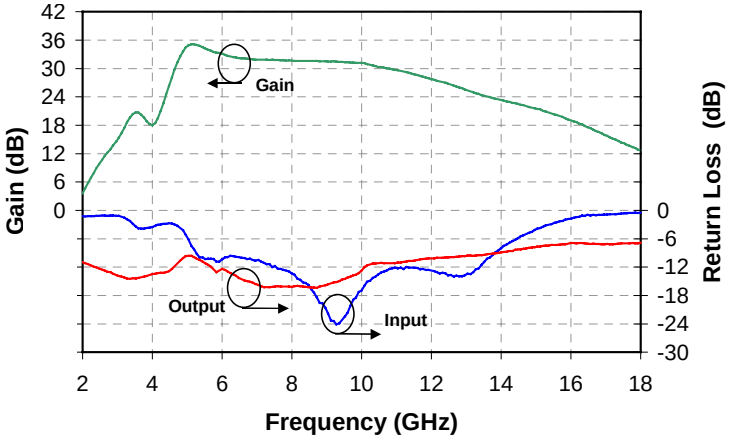
The TGA2600-EPU is 100% DC and RF tested on-wafer to ensure performance compliance.

Lead-free and RoHS compliant.

Measured Fixtured Data

Bias Conditions: Vd = 2.5V, Id= 17mA





Note: This device is early in the characterization process prior to finalizing all electrical specifications. Specifications are subject to change without notice.

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TABLE I
MAXIMUM RATINGS 1/

SYMBOL	PARAMETER	VALUE	NOTES
V^+	Positive Supply Voltage	4.5 V	2/
V_g	Gate Supply Voltage Range	-2V to +1 V	
I^+	Positive Supply Current	50 mA	2/
$\| I_G \|$	Gate Supply Current	2 mA	
P_{IN}	Input Continuous Wave Power	TBD	2/
P_D	Power Dissipation	0.23 W	2/, 3/
T_{CH}	Operating Channel Temperature	110 °C	4/, 5/
T_M	Mounting Temperature	175 °C	
T_{STG}	Storage Temperature	-65 to 110°C	

1/ These ratings represent the maximum operable values for this device.

2/ Current is defined under no RF drive conditions. Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.

3/ When operated at this power dissipation with a base plate temperature of 70 °C, the median life is greater than 1 E+6 hours.

4/ 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.

5/ These ratings apply to each individual FET.

TABLE II
RF CHARACTERIZATION TABLE
(T_A = 25 °C, Nominal)
Vd = 2.5V, Id = 17 mA

SYMBOL	PARAMETER	TEST CONDITION	NOMINAL	UNITS
Gain	Small Signal Gain	f = 7-11 GHz	30	dB
IRL	Input Return Loss	f = 7-11 GHz	12	dB
ORL	Output Return Loss	f = 7-11 GHz	12	dB
NF	Noise Figure	f = 7-11 GHz	0.7	dB
P_{1dB}	Output Power @ 1dB Gain Compression	f = 7-11 GHz	2	dBm
TOI	Output Third Order Intercept	f = 7-11 GHz	14	dBm

TABLE III
THERMAL INFORMATION*

Parameter	Test Conditions	T_{CH} (^oC)	$R_{\theta JC}$ (°C/W)	T_M (HRS)
$R_{\theta JC}$ Thermal Resistance (channel to backside of carrier)	Vd = 2.5 V I_D = 16 mA Pdiss = 0.04 W	73	75	> 1 E+6

Note: Assumes epoxy mounted at 70°C baseplate temperature. Worst case condition with no RF applied, 100% of DC power is dissipated.

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Measured Fixtured Data

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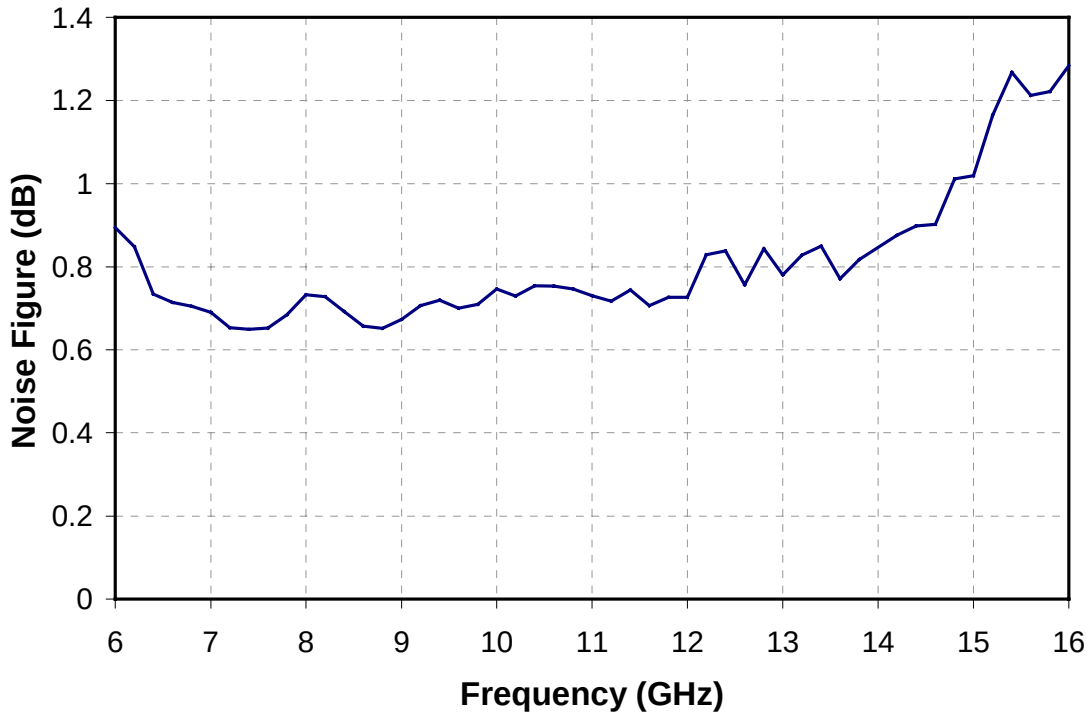

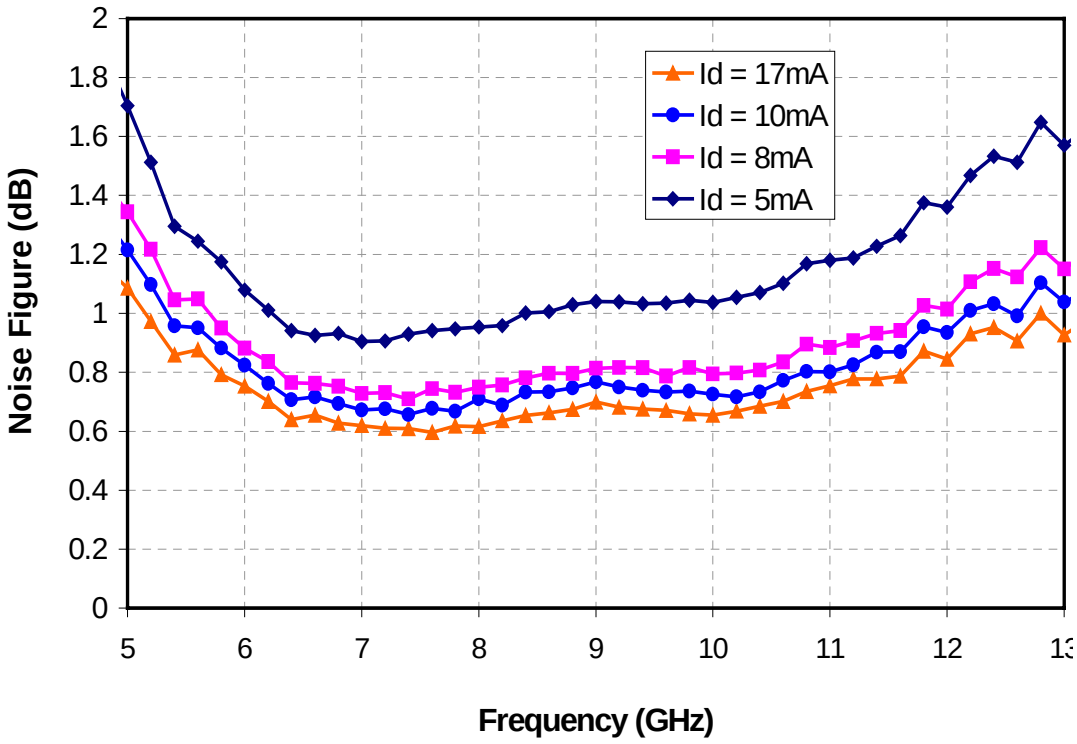

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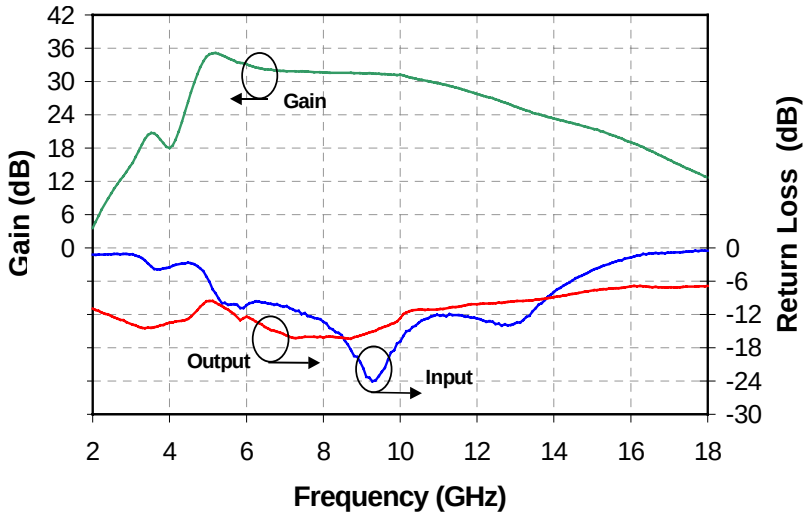

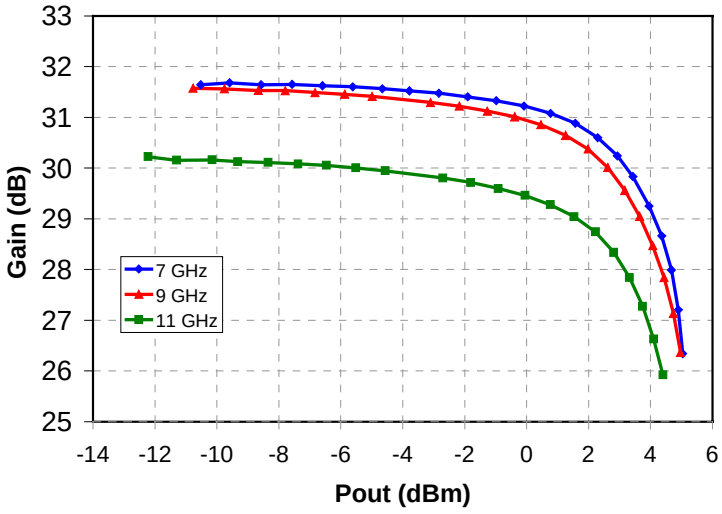

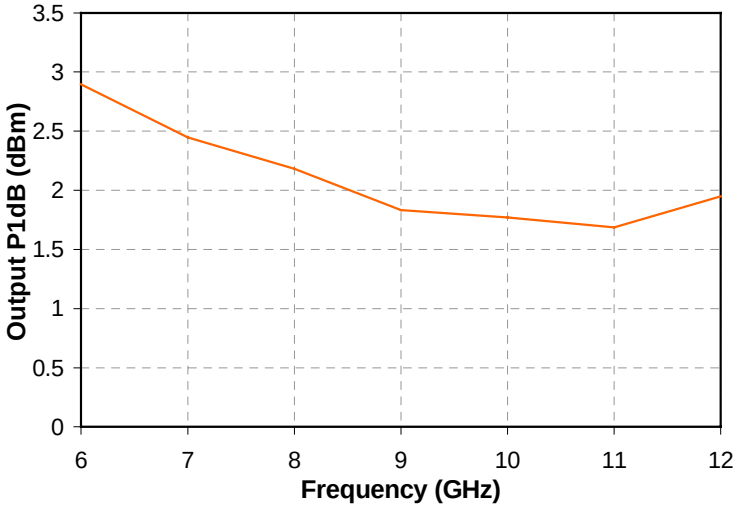

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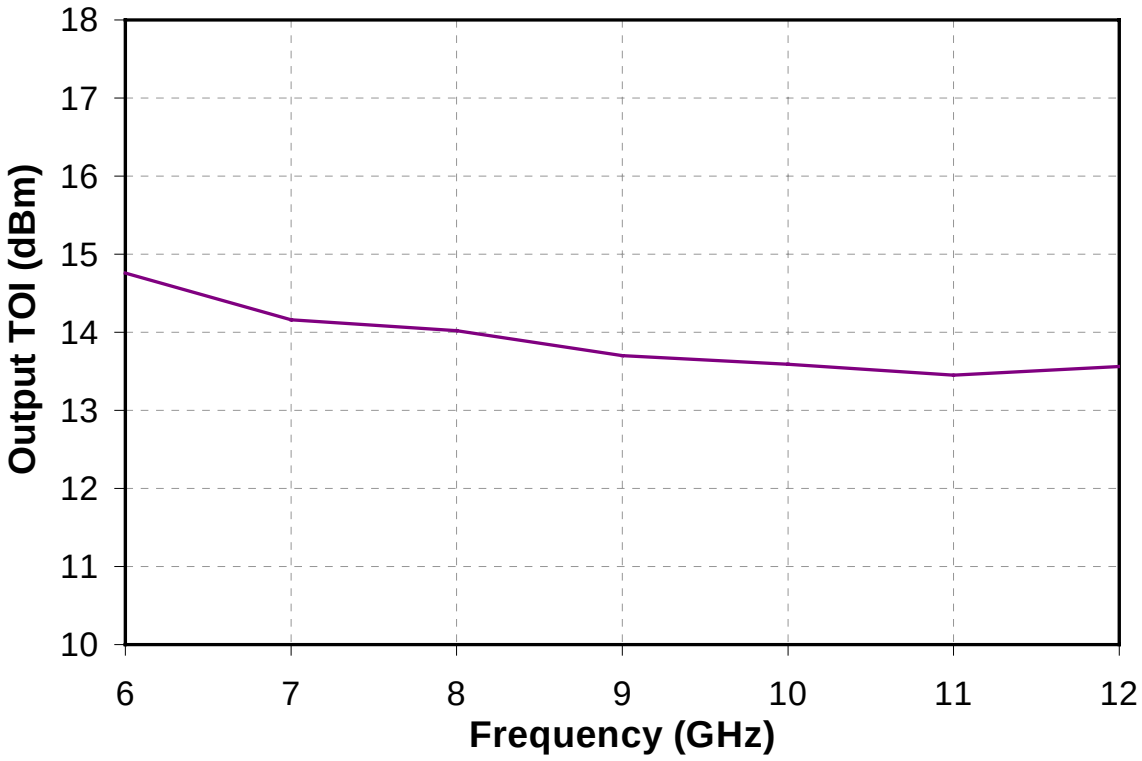

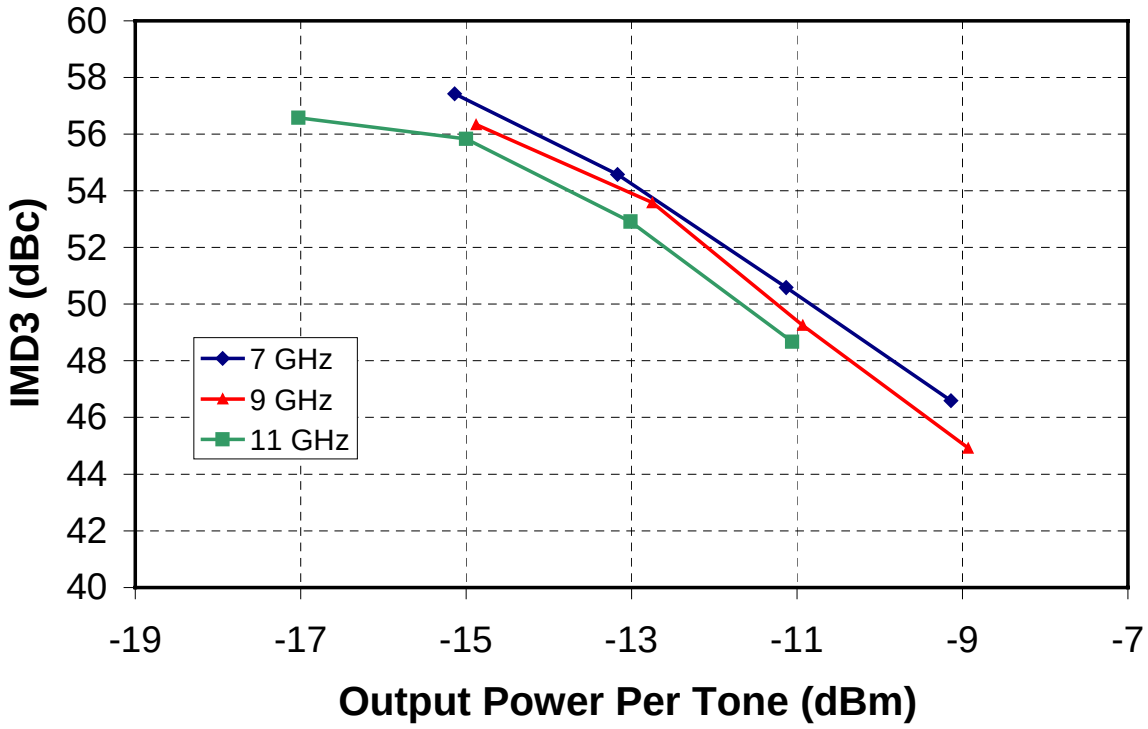

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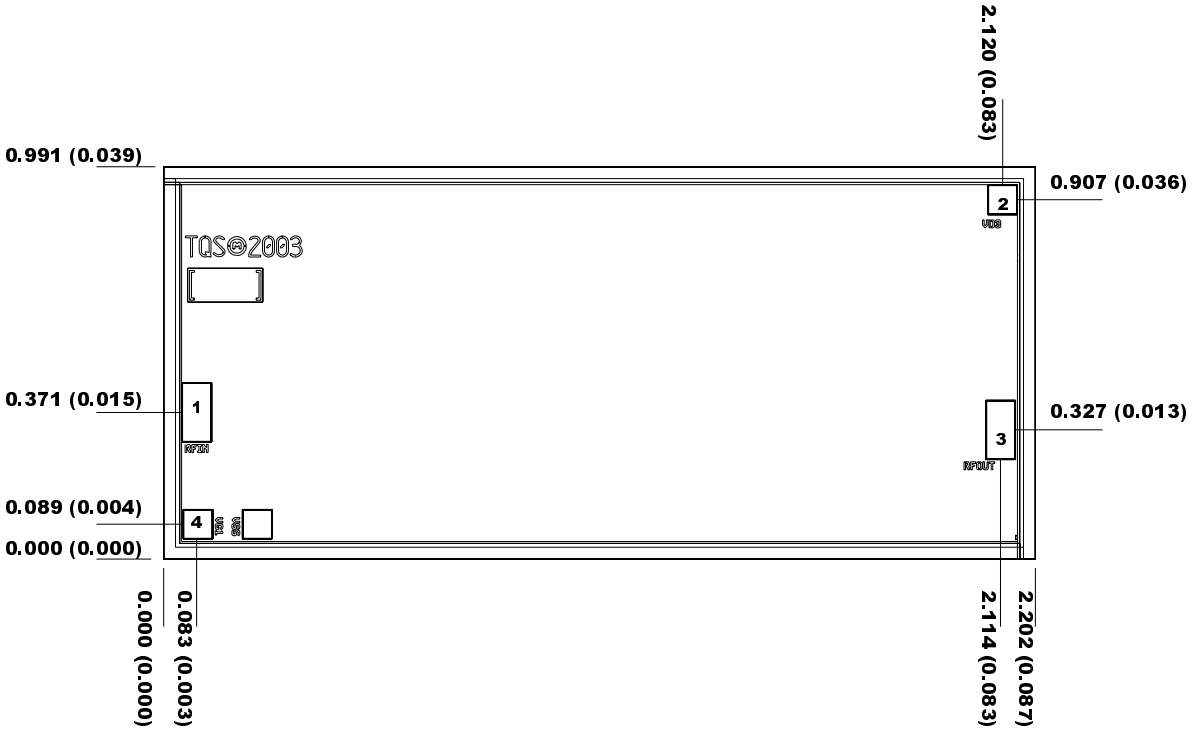
Mechanical Characteristics



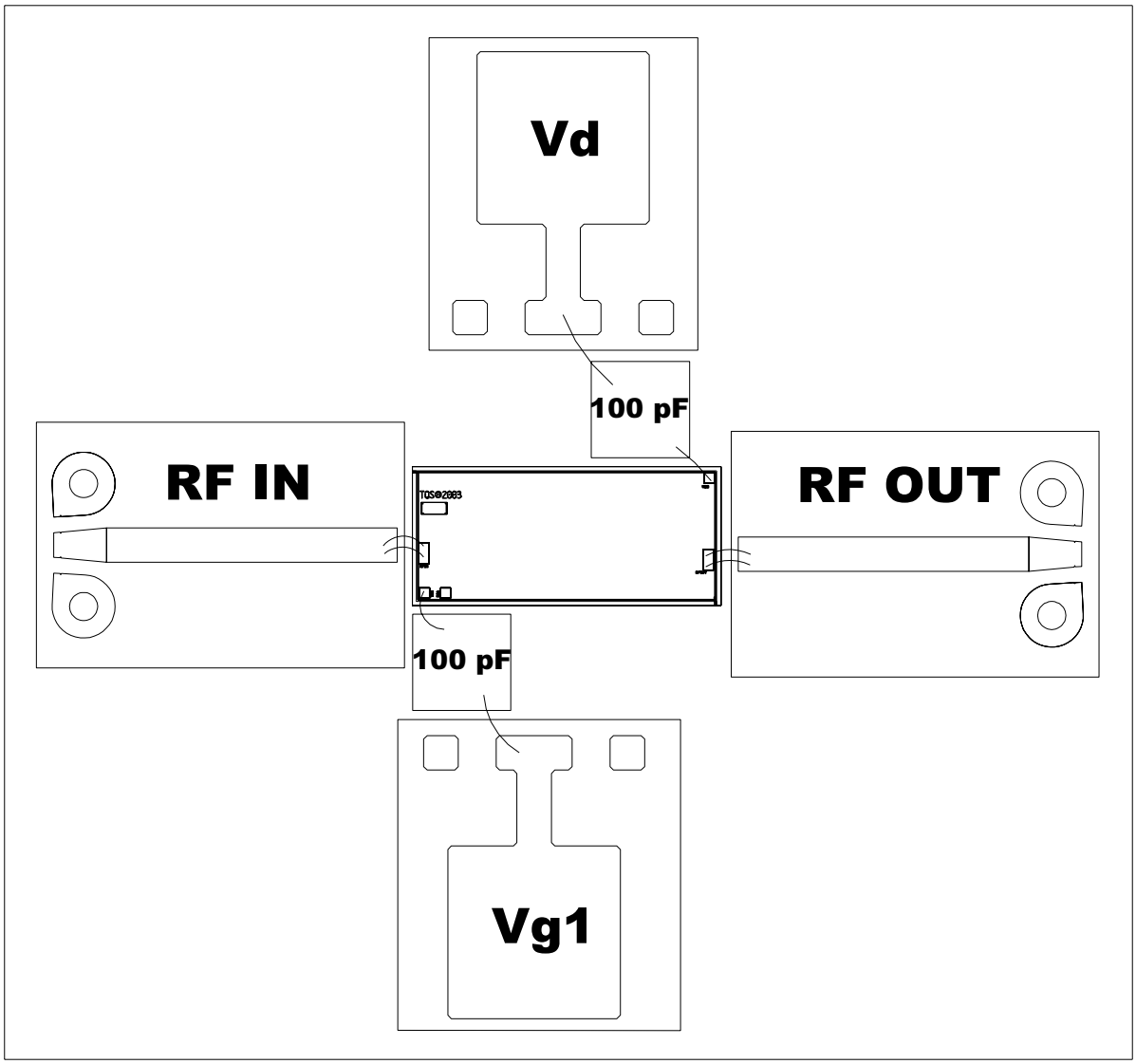
Units: millimeters (inches)
Thickness: 0.100 (0.004)
Chip edge to bond pad dimensions are shown to center of bond pad
Chip size tolerance: +/- 0.051 (0.002)

GND IS BACKSIDE OF MMIC

Bond pad #1	**RF In**	**0.075 x 0.0150 (0.003 x 0.006)**
Bond pad #2	**Vd**	**0.075 x 0.075 (0.003 x 0.003)**
Bond pad #3	**RF Out**	**0.075 x 0.150 (0.003 x 0.006)**
Bond pad #4	**Vg1**	**0.075 x 0.075 (0.003 x 0.003)**

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

Recommended Assembly Diagram



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Assembly Process Notes

Assembly notes:

- Use conductive epoxy with limited exposure to temperatures at or above 175 °C.
- 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.
- 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.

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.
- Maximum stage temperature is 150 °C.

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