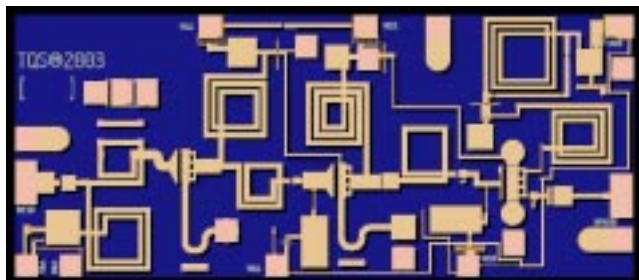


X-band Ultra Low Noise Amplifier

TGA2600



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.

Key Features

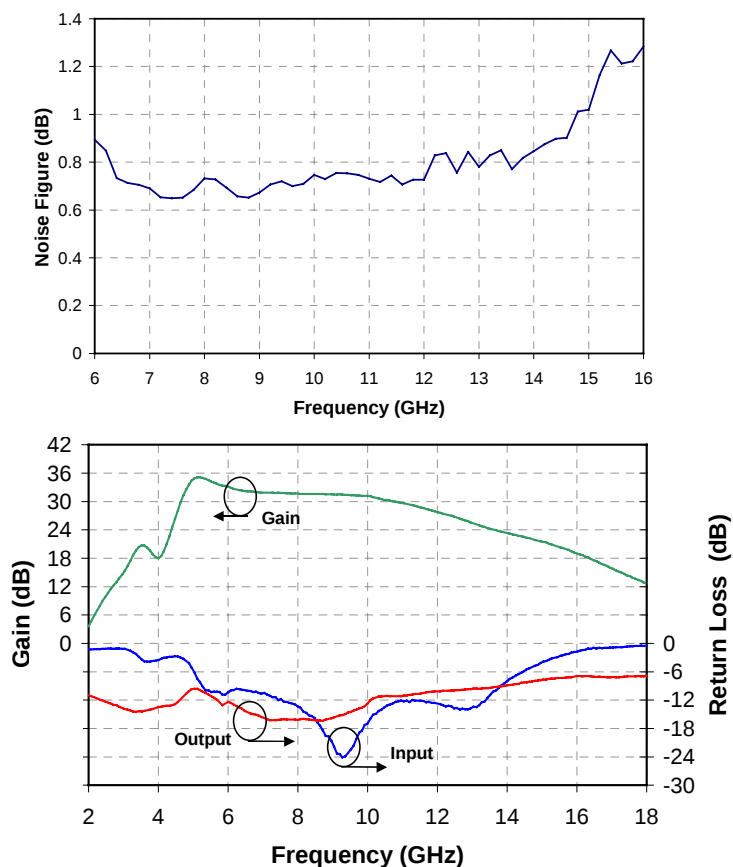
- Frequency Range: 6-12 GHz
- 0.7 dB Noise Figure
- 30 dB Nominal Gain
- 2 dBm Nominal P1dB
- > 12 dB Return Loss
- Nominal Bias 2.5V @ 17 mA
- 0.15-um 3MI mHEMT Technology
- Chip Dimensions: 2.20 x 0.99 x 0.10 mm
(0.087 x 0.039 x 0.004 in)

Primary Applications

- Radar
- X band LNA, ECM

Measured Fixtured Data

Bias Conditions: $V_d = 2.5V$, $I_d = 17mA$



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

TABLE I
MAXIMUM RATINGS 1/

SYMBOL	PARAMETER	VALUE	NOTES
V^+	Positive Supply Voltage	4.5 V	<u>2/</u>
V_g	Gate Supply Voltage Range	-2V to +1 V	
I^+	Positive Supply Current	50 mA	<u>2/</u>
$ I_G $	Gate Supply Current	2 mA	
P_{IN}	Input Continuous Wave Power	TBD	<u>2/</u>
P_D	Power Dissipation	0.23 W	<u>2/</u> , <u>3/</u>
T_{CH}	Operating Channel Temperature	110 °C	<u>4/</u> , <u>5/</u>
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
($T_A = 25\text{ }^{\circ}\text{C}$, Nominal)
 $V_d = 2.5\text{V}$, $I_d = 17\text{ mA}$

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

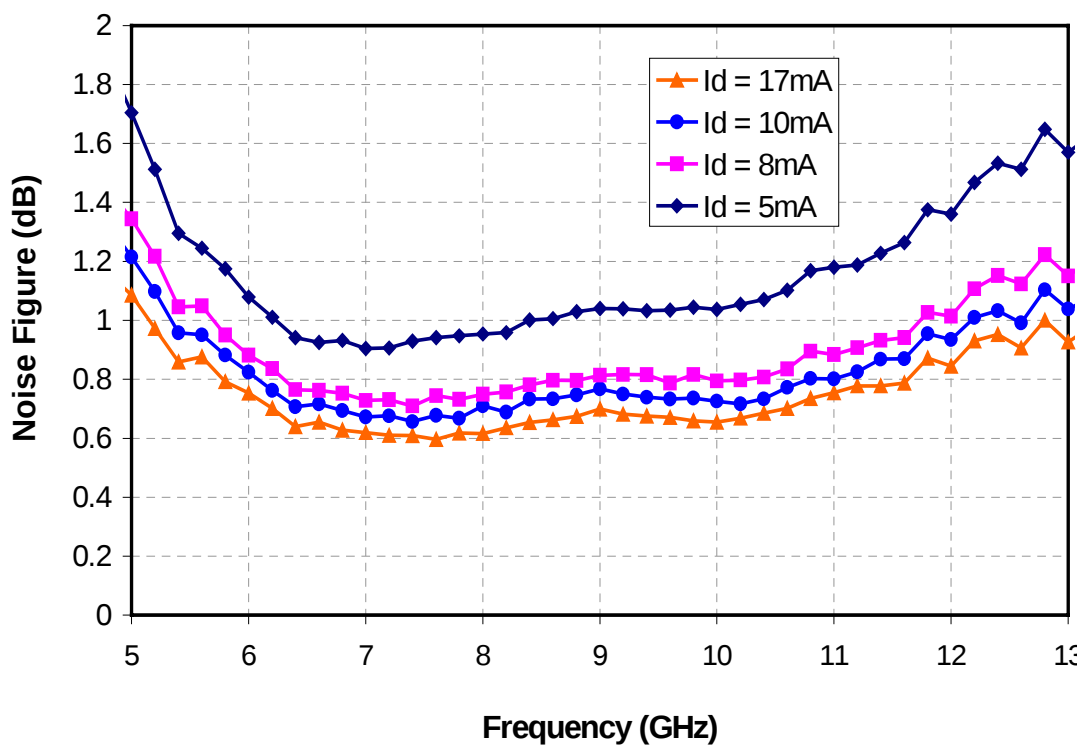
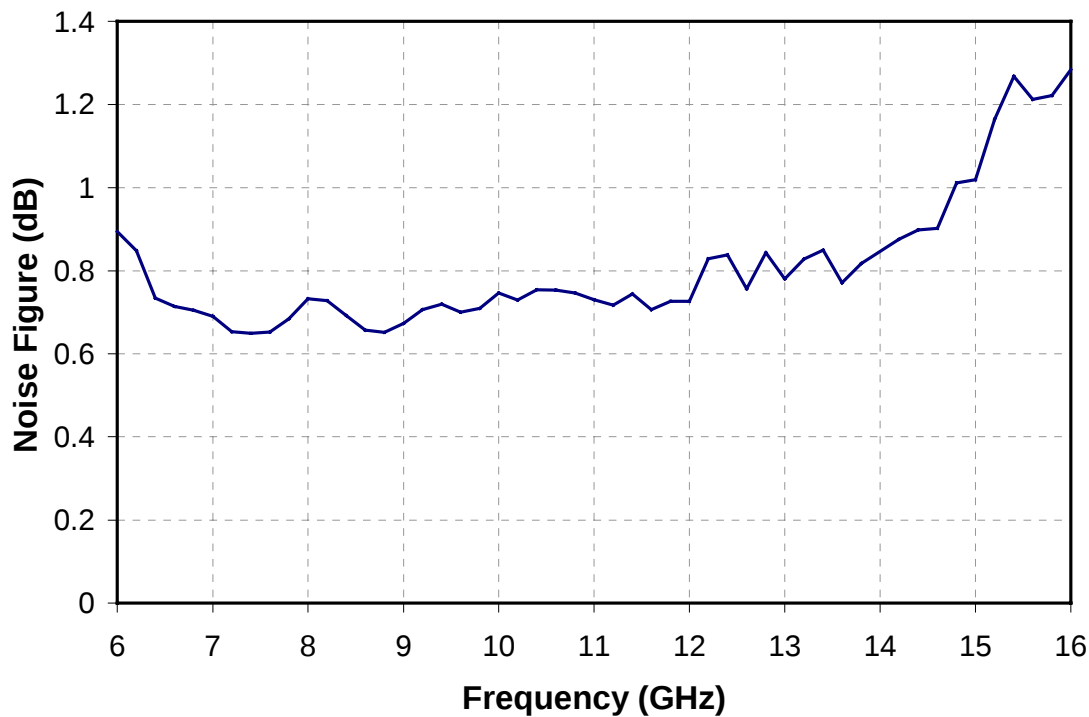
TABLE III
THERMAL INFORMATION*

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

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

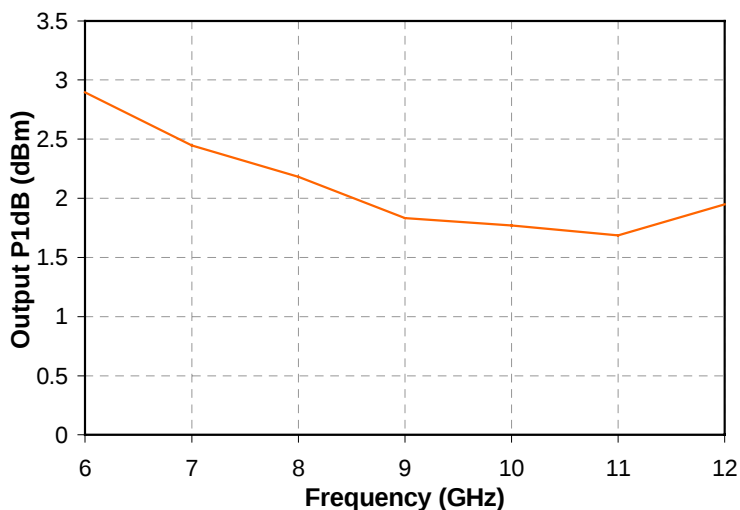
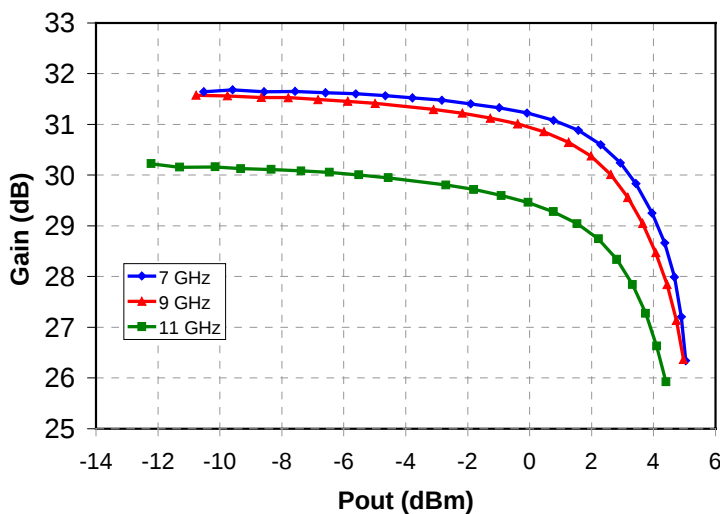
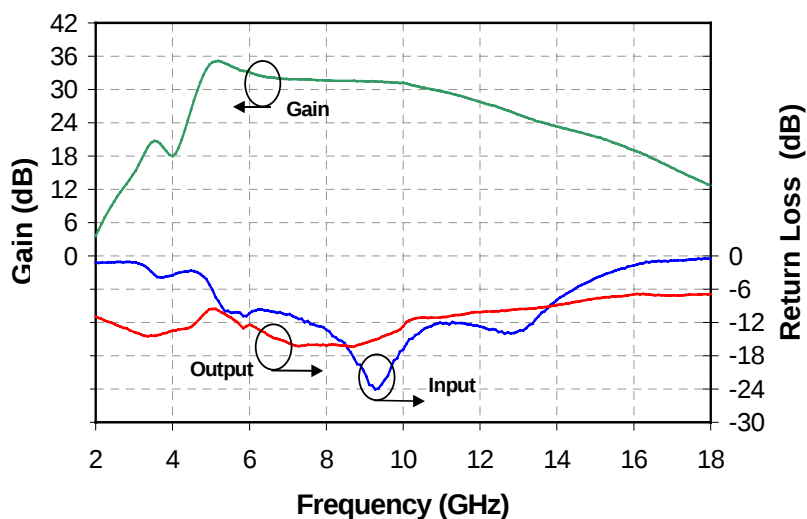
Measured Fixtured Data

Bias Conditions: $V_d = 2.5V$, $I_d = 17mA$



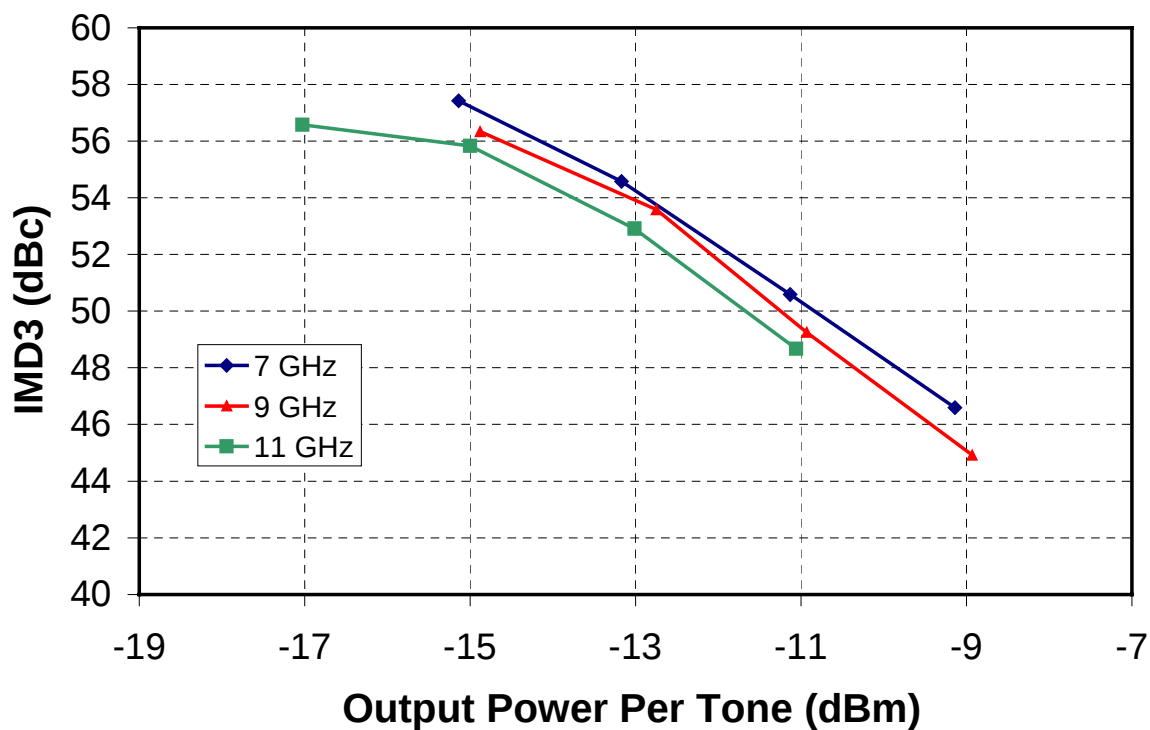
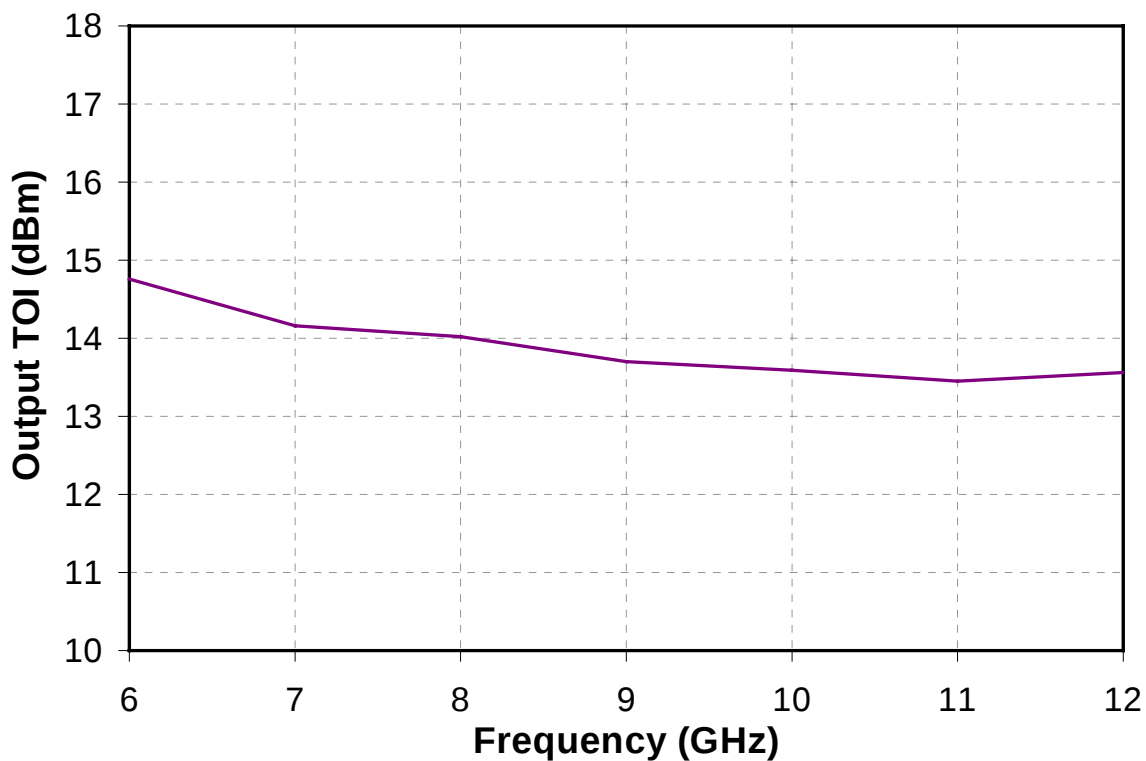
Measured Fixtured Data

Bias Conditions: $V_d = 2.5V$, $I_d = 17mA$

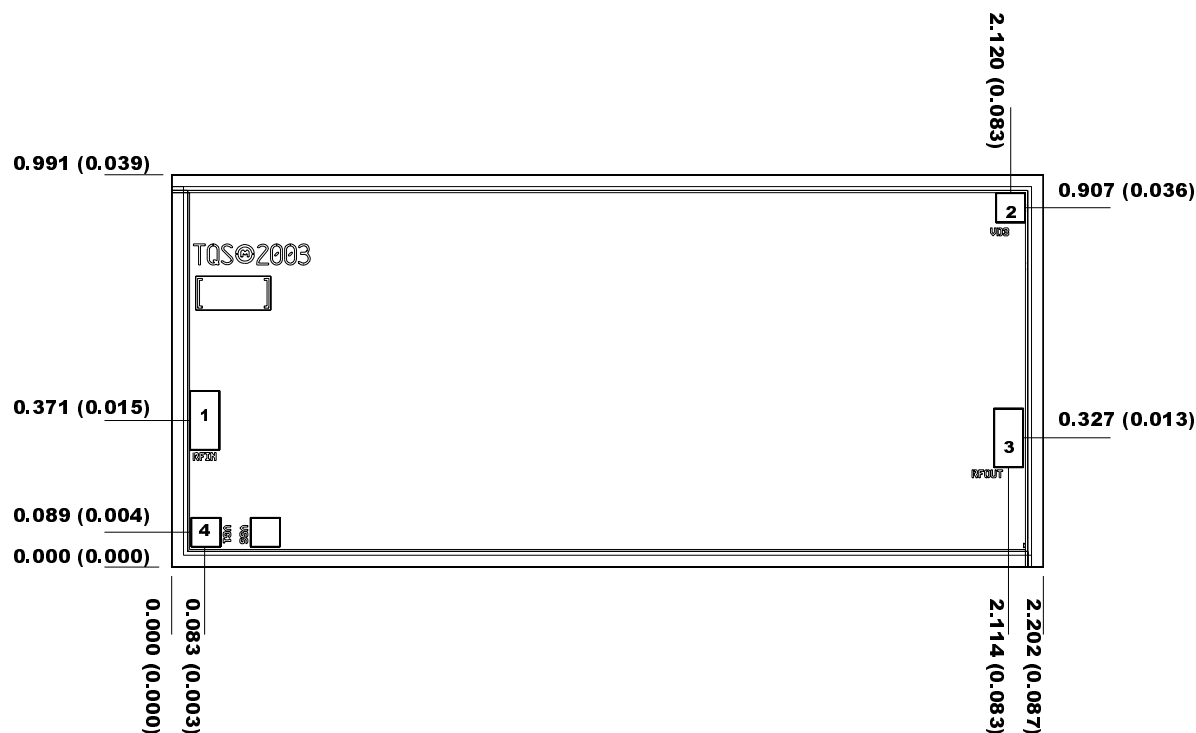


Measured Fixtured Data

Bias Conditions: $V_d = 2.5V$, $I_d = 17mA$



Mechanical Characteristics



Units: millimeters (inches)

Thickness: 0.100 (0.004)

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

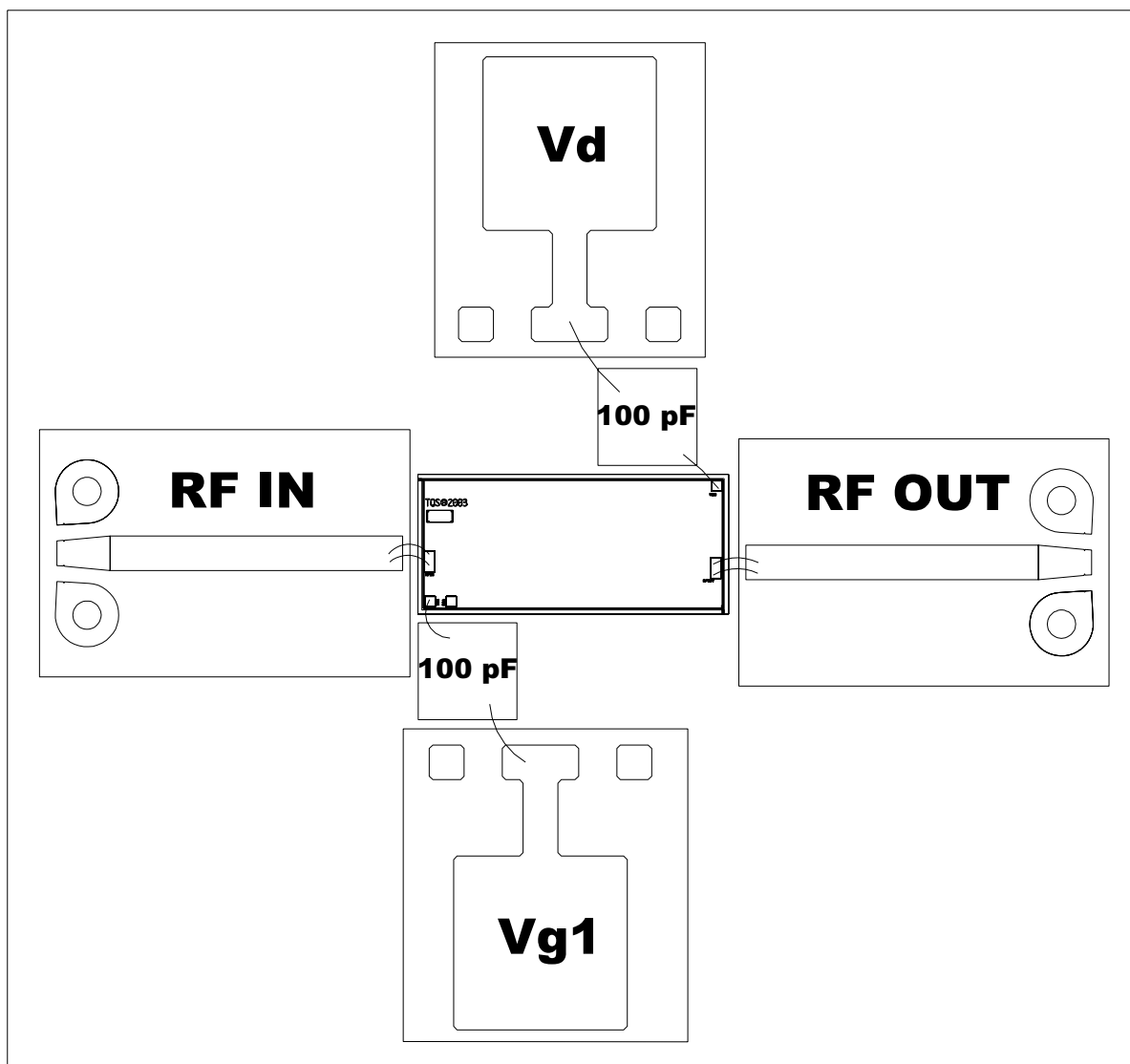
Chip size tolerance: +/- 0.051 (0.002)

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



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

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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