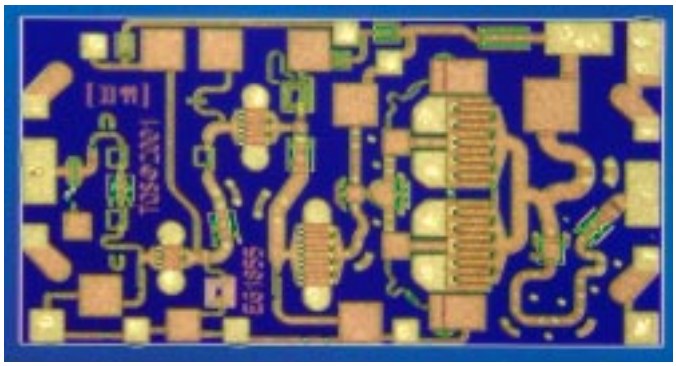
12-19 GHz VSAT Amplifier

TGA2508-EPU

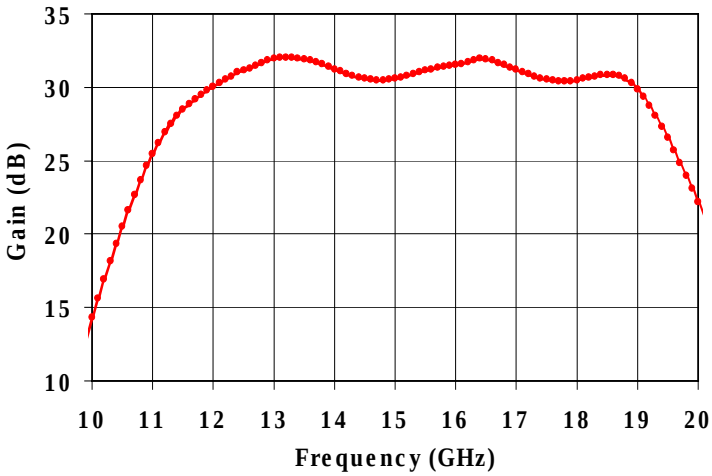


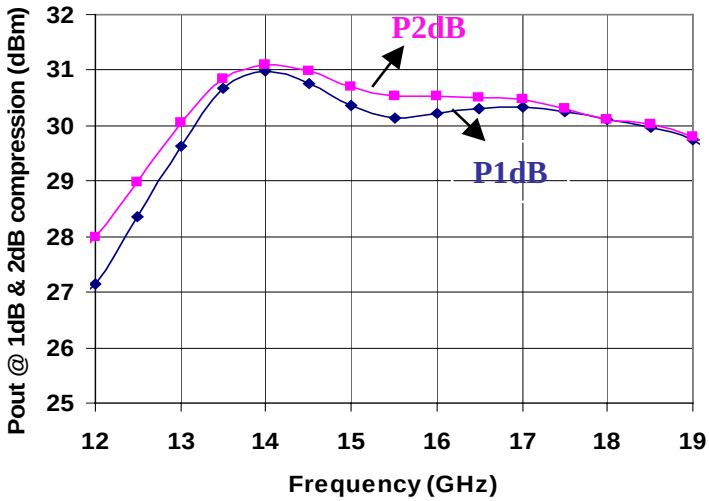
Key Features

- 0.50 um pHEMT Technology
- 30 dB Nominal Gain
- 30 dBm P1dB @ 15 GHz
- Bias Conditions: 7 V, 433 mA
- Chip Dimensions: 2.1 x 1.1 x 0.1 mm

Preliminary Measured Data

Bias Conditions: Vd = 7 V, Id = 433 mA





Primary Applications

- VSAT Ground Terminals
- Point to Point Radio
- Military Ku Band

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

TABLE I
MAXIMUM RATINGS 5/

SYMBOL	PARAMETER	VALUE	NOTES
V^+	Positive Supply Voltage	8 V	4/
V^-	Negative Supply Voltage Range	-2 to 0 V	
I^+	Positive Supply Current (Quiescent)	591 mA	4/
$\| I_G \|$	Gate Supply Current	16 mA	
P_{IN}	Input Continuous Wave Power	17 dBm	
P_D	Power Dissipation	6.75 W	3/ 4/
T_{CH}	Operating Channel Temperature	150 ^{0}C	1/ 2/
T_M	Mounting Temperature (30 Seconds)	320 ^{0}C	
T_{STG}	Storage Temperature	-65 to 150 ^{0}C	

1/ These ratings apply to each individual FET.

2/ 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.

3/ When operated at this bias condition with a base plate temperature of 70 ^{0}C, the median life is reduced from 6.4E+7 to 1E+6 hrs.

4/ Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.

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

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TABLE II
ELECTRICAL CHARACTERISTICS
(Ta = 25°C ± 5°C)

PARAMETER	TYPICAL	UNITS
Drain Operating	7	V
Quiescent Current	433	mA
Small Signal Gain	30	dB
Input Return Loss (Linear Small Signal)	17	dB
Output Return Loss (Linear Small Signal	7	dB
Output Power @ 1 dB Compression Gain @ 15GHz	30	dBm

TABLE III
THERMAL INFORMATION*

PARAMETER	TEST CONDITIONS	T_{CH} (°C)	$R_{\theta JC}$ (°C/W)	T_M (HRS)
$R_{\theta JC}$ Thermal Resistance (channel to backside of carrier)	Vd = 7 V I_D = 433 mA Pdiss = 3.031 W	105.92	11.85	6.4E+7

Note: Assumes eutectic attach using 1.5 mil 80/20 AuSn mounted to a 20 mil CuMo Carrier at 70°C baseplate temperature. Worst case condition with no RF applied, 100% of DC power is dissipated.

* This information is a result of a thermal model.

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Preliminary Measured Data

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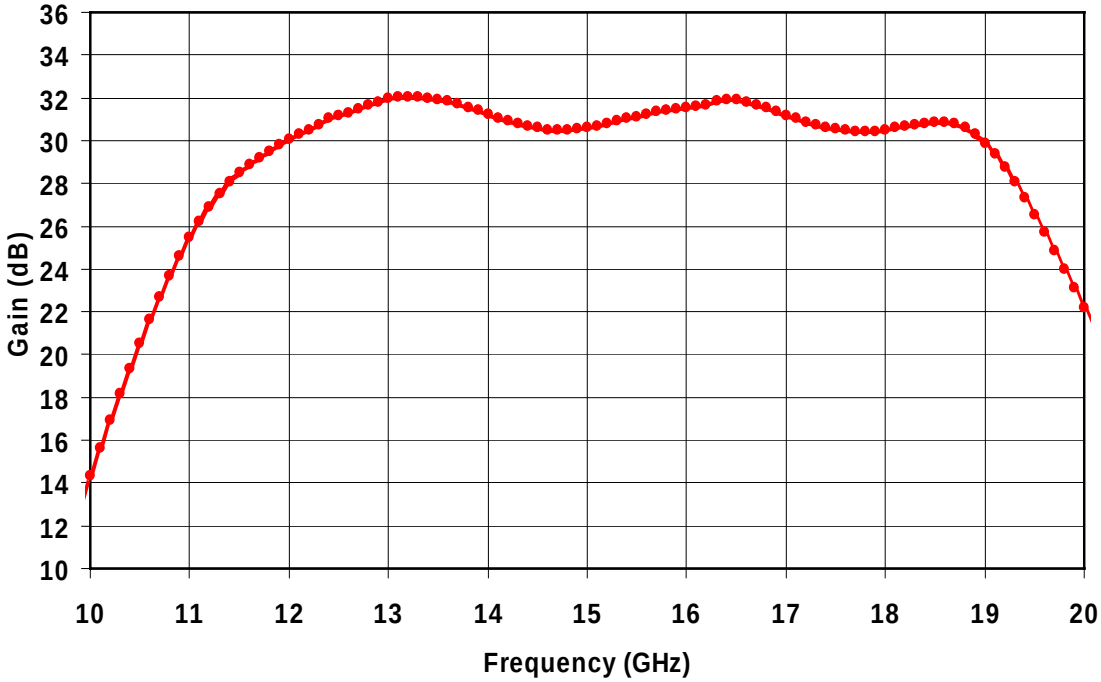

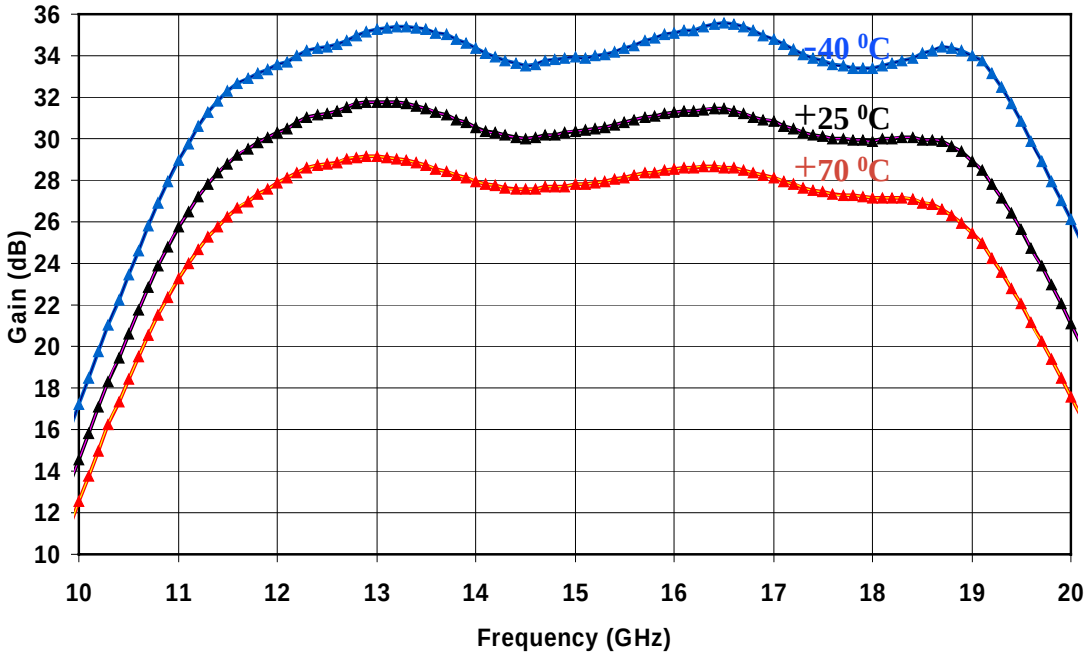

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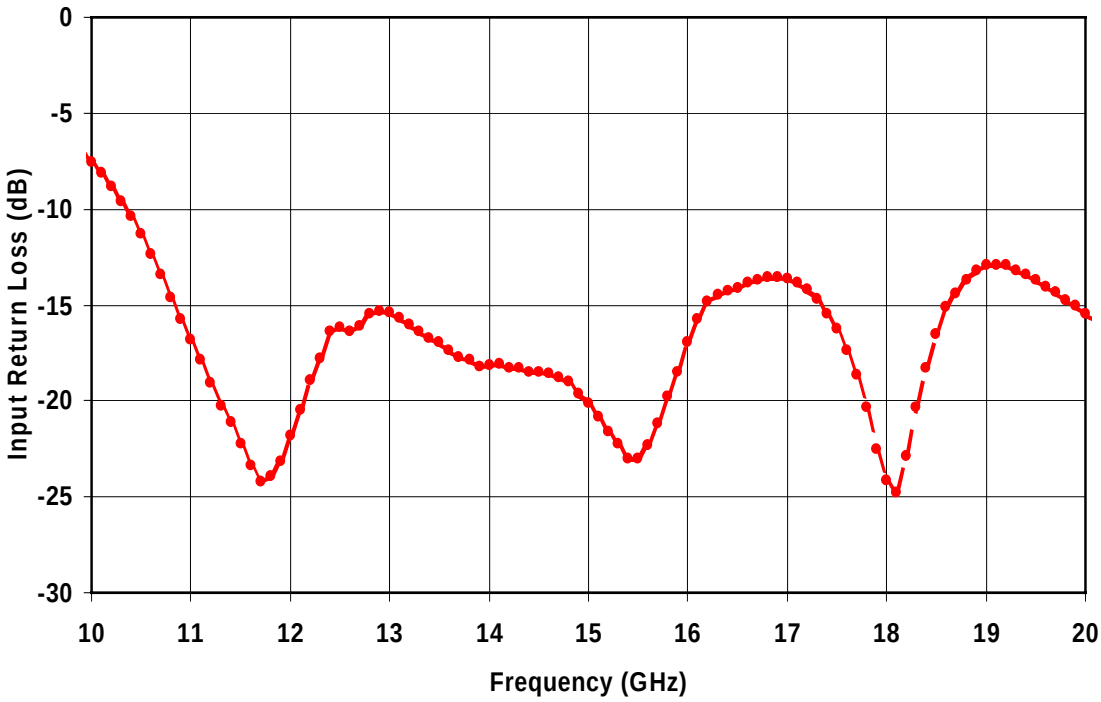

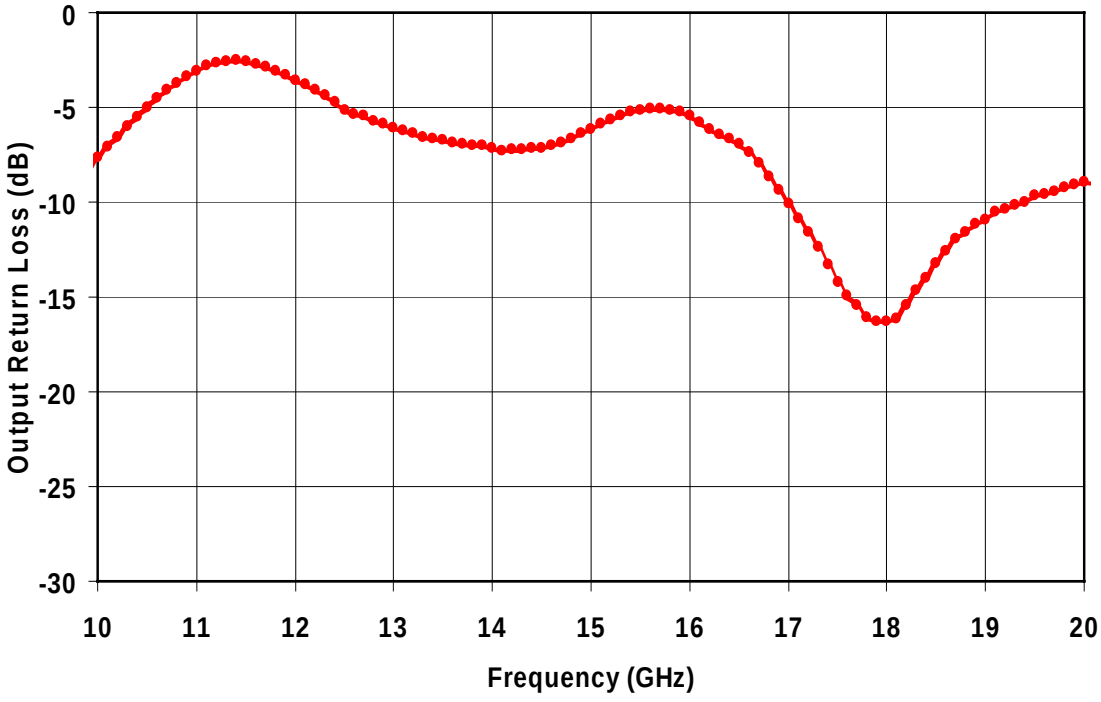

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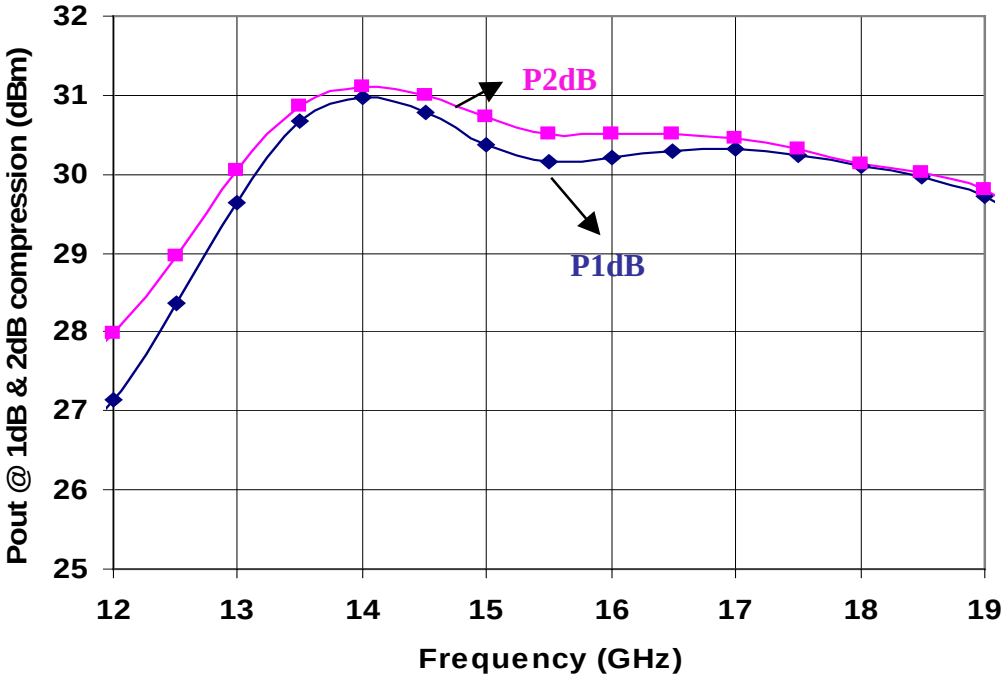
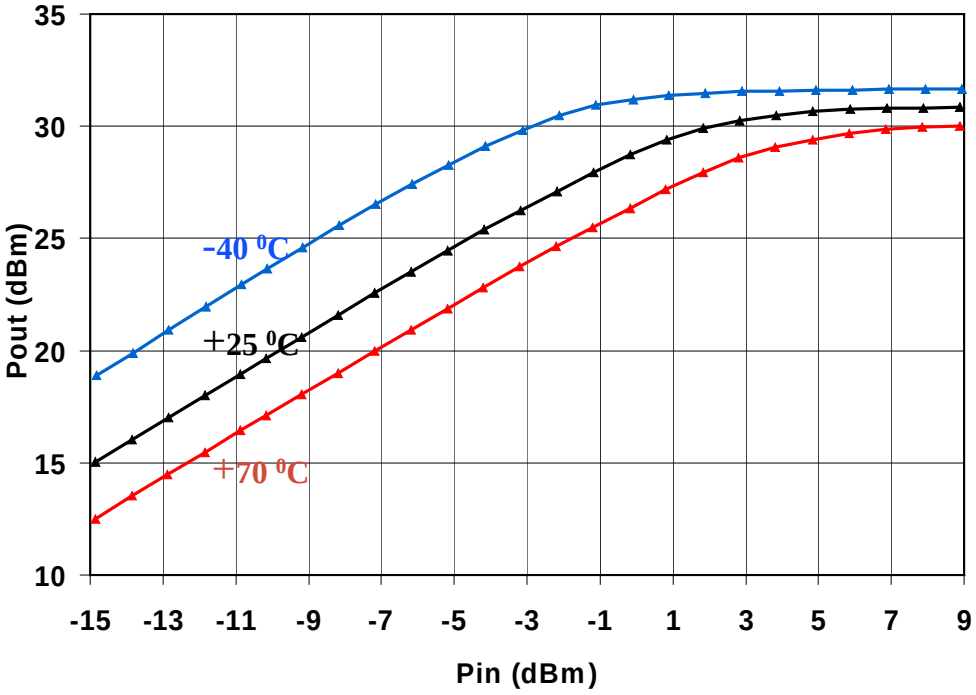


Frequency @ 15 GHz



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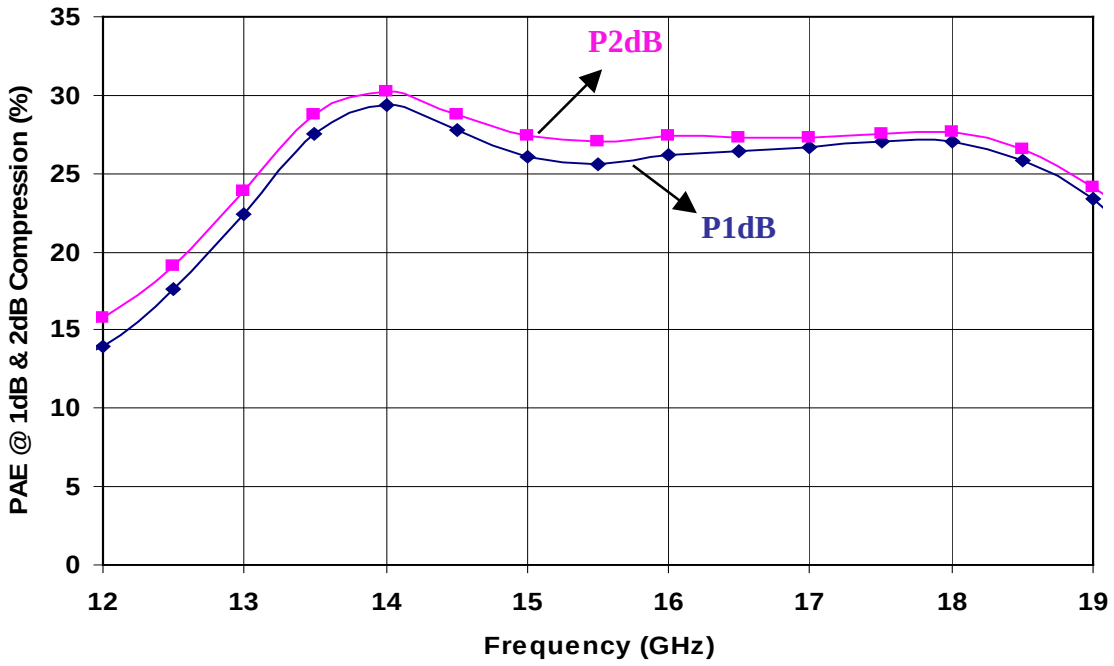

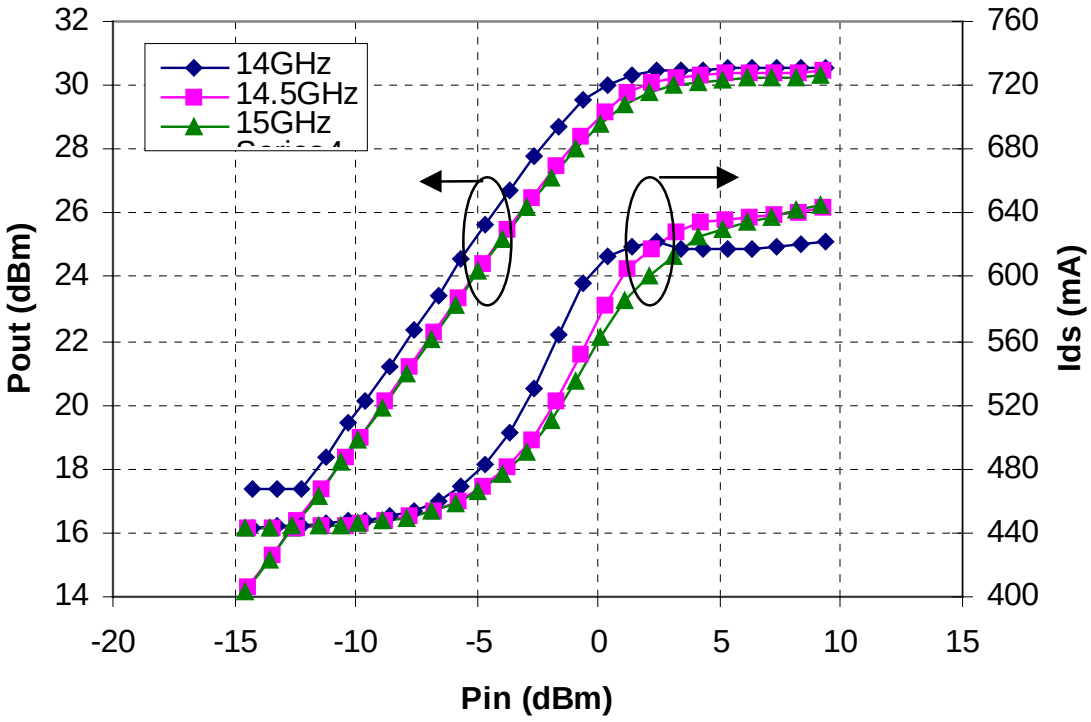

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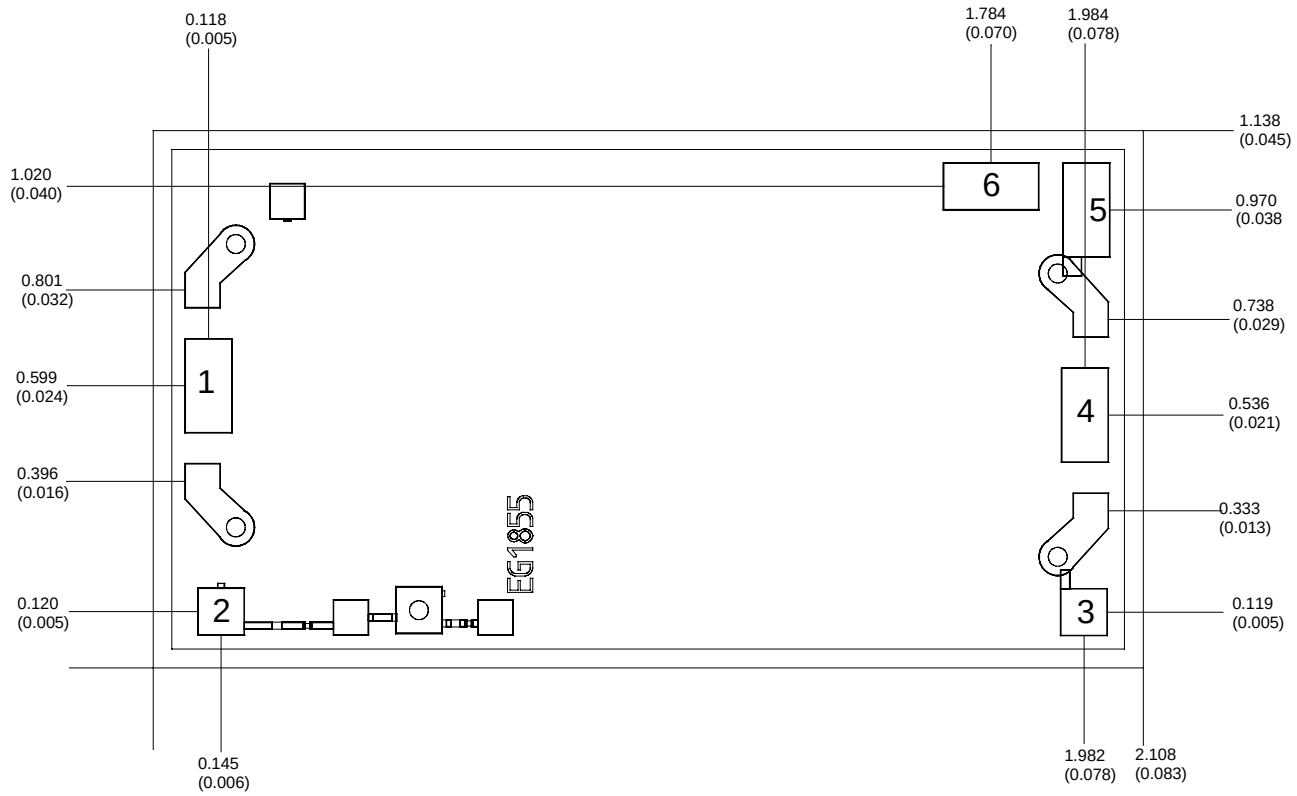
Mechanical Drawing



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)

Bond pad #1:	(RF In)	0.098 x 0.199	(0.004 x 0.008)
Bond pad #2:	(Vg)	0.099 x 0.099	(0.004 x 0.004)
Bond pad #3:	(DC GND)*	0.098 x 0.099	(0.004 x 0.004)
Bond pad #4:	(RF Out)	0.099 x 0.198	(0.004 x 0.008)
Bond pad #5:	(DC GND)*	0.098 x 0.198	(0.004 x 0.008)
Bond pad #6:	(Vd)	0.202 x 0.098	(0.008 x 0.004)

* Note: RF GND is back side of MMIC.

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

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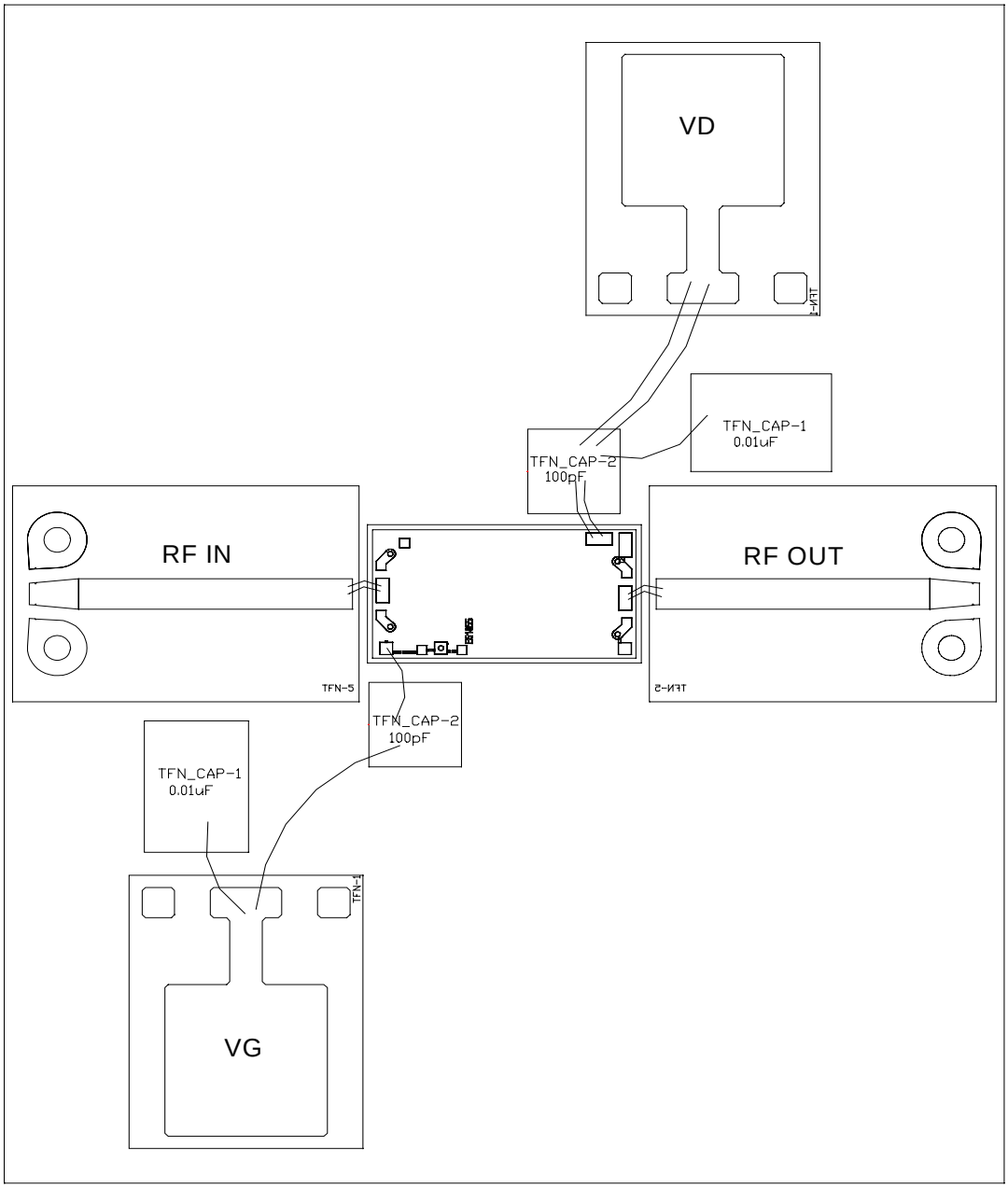
Chip Assembly Diagram



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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.

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