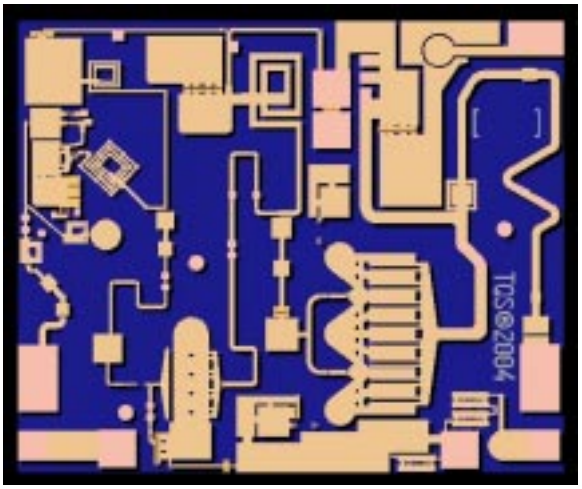
Advance Product Information
November 8, 2004

X-Band Driver Amplifier

TGA2700-EPU



Key Features

- Frequency Range: 8-13 GHz
- 25 dB Nominal Gain
- 30dBm Output Power @ Pin=10dBm, Midband
- 12 dB Input Return Loss
- 10 dB Output Return Loss
- 0.25 um 3MI pHEMT Technology
- Nominal Bias 9V @ 300 mA
- Chip Dimensions: 1.57 x 1.33 x 0.10 mm
  (0.062 x 0.052 x 0.004 in)

Primary Applications

- X-band Driver
- Point-to-Point Radio

Product Description

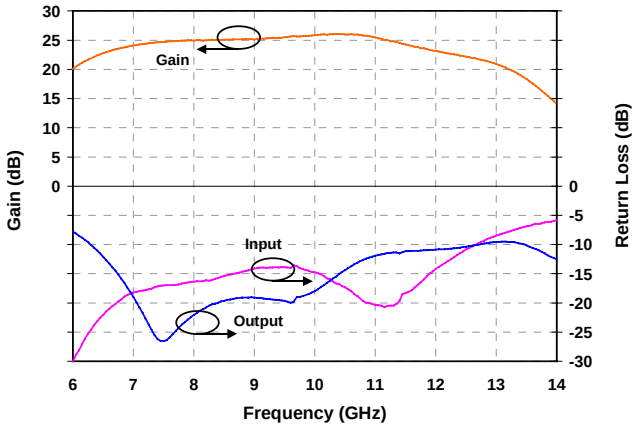
The TriQuint TGA2700-EPU is an X-band Driver Amplifier that operates between 6.5-12 GHz, The Driver Amplifer is designed using TriQuint's proven standard 0.25 um gate pHEMT production process.

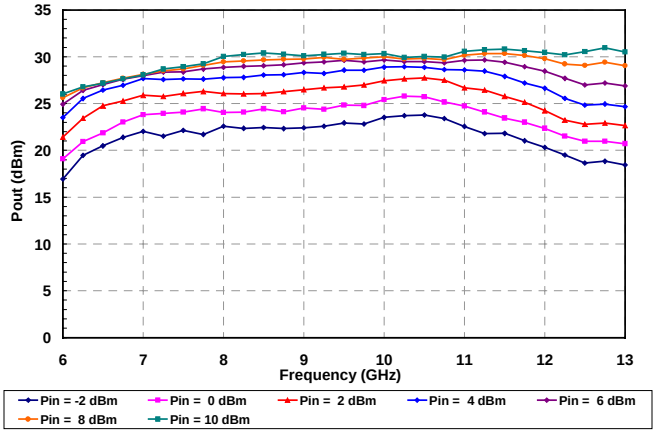
The TGA2700-EPU provides typical 30dBm output power at +10 dBm input power @ 8 GHz and has a small signal gain of 25 dB.

The TGA2700-EPU is 100% DC and RF tested on-wafer to ensure performance compliance.

Measured Fixtured Data

Bias Conditions: Vd = 9V, Idq= 300mA





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

TriQuint Semiconductor Texas Phone: (972)994-8465 Fax: (972)994-8504 Email: info-mmw@tqs.com Web: www.triquint.com

TABLE I
MAXIMUM RATINGS

Symbol	Parameter 1/	Value	Notes
V^+	Positive Supply Voltage	12.5 V	2/
V^-	Negative Supply Voltage Range	-5V TO 0V	
I^+	Positive Supply Current	536 mA	2/
$\| I_G \|$	Gate Supply Current	14 mA	
P_{IN}	Input Continuous Wave Power	20 dBm	2/
P_D	Power Dissipation	2.7 W	2/, 3/
T_{CH}	Operating Channel Temperature	150 ^{0}C	4/, 5/
T_M	Mounting Temperature (30 Seconds)	320 ^{0}C	
T_{STG}	Storage Temperature	-65 to 150 ^{0}C	

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

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

3/ When operated at this bias condition with a base plate temperature of 55 ^{0}C, the median life is 1E+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
DC PROBE TESTS
(T_A = 25 °C, Nominal)

Symbol	Parameter	Minimum	Maximum	Value
Idss	Saturated Drain Current	75	353	mA
Gm	Transconductance	165	398	mS
V_P	Pinch-off Voltage	-1.5	-0.5	V
B_{VGS}	Breakdown Voltage gate-source	-30	-8	V
B_{VGD}	Breakdown Voltage gate-drain	-30	-12	V

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 III
RF CHARACTERIZATION TABLE
(T_A = 25 °C, Nominal)
Vd = 9 V, Id = 300 mA

SYMBOL	PARAMETER	TEST CONDITION	NOMINAL	UNITS
Gain	Small Signal Gain	f = 6.5-12 GHz	25	dB
IRL	Input Return Loss	f = 6.5-12 GHz	12	dB
ORL	Output Return Loss	f = 6.5-12 GHz	10	dB
P_{sat}	Saturated Output Power	f = 8-12 GHz	30	dBm
TOI	Output TOI @ Pin = -5dBm	f = 8-12 GHz	> 36	dBm
PAE	Power Added Efficiency	f = -12 GHz	27	%

TABLE IV
THERMAL INFORMATION

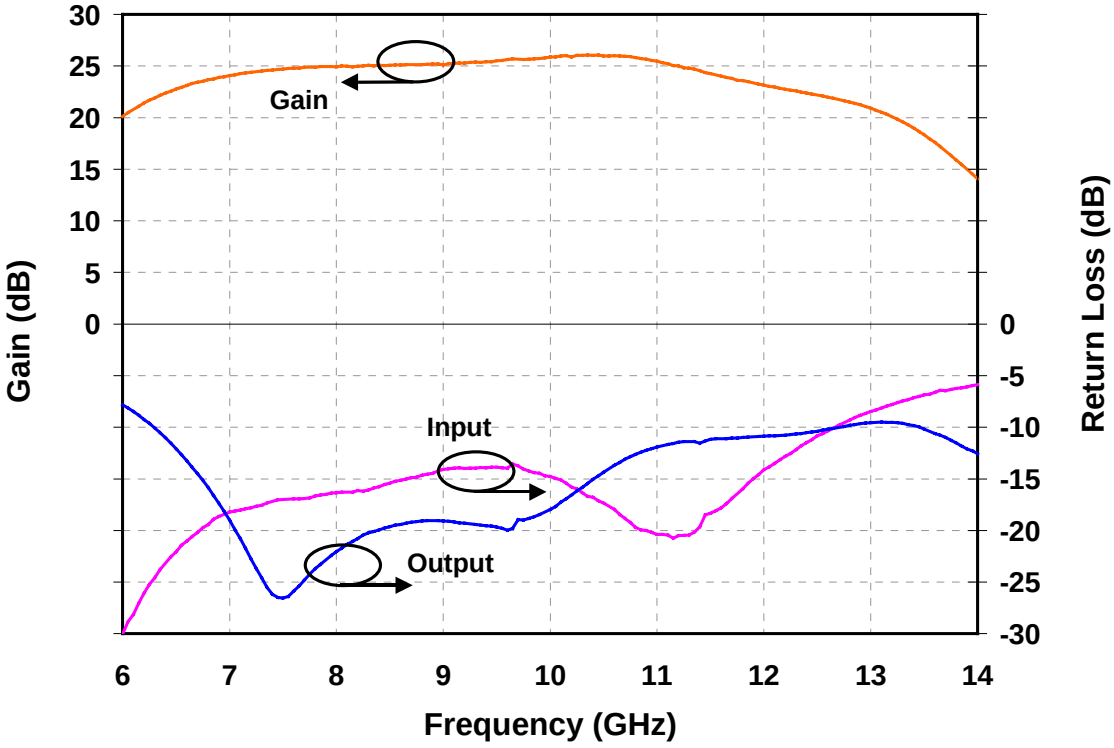
Parameter	Test Conditions	$T_{baseplate}$ (°C)	T_{CH} (°C)	$R_{\theta JC}$ (°C/W)	T_M (HRS)
$R_{\theta JC}$ Thermal Resistance (channel to backside of package)	Vd = 9 V I_D = 225 mA Pdiss = 2.0 W	70	140	34.7	2.4 E+6
	Vd = 9 V I_D = 300 mA Pdiss = 2.7 W	55	150		1 E+6

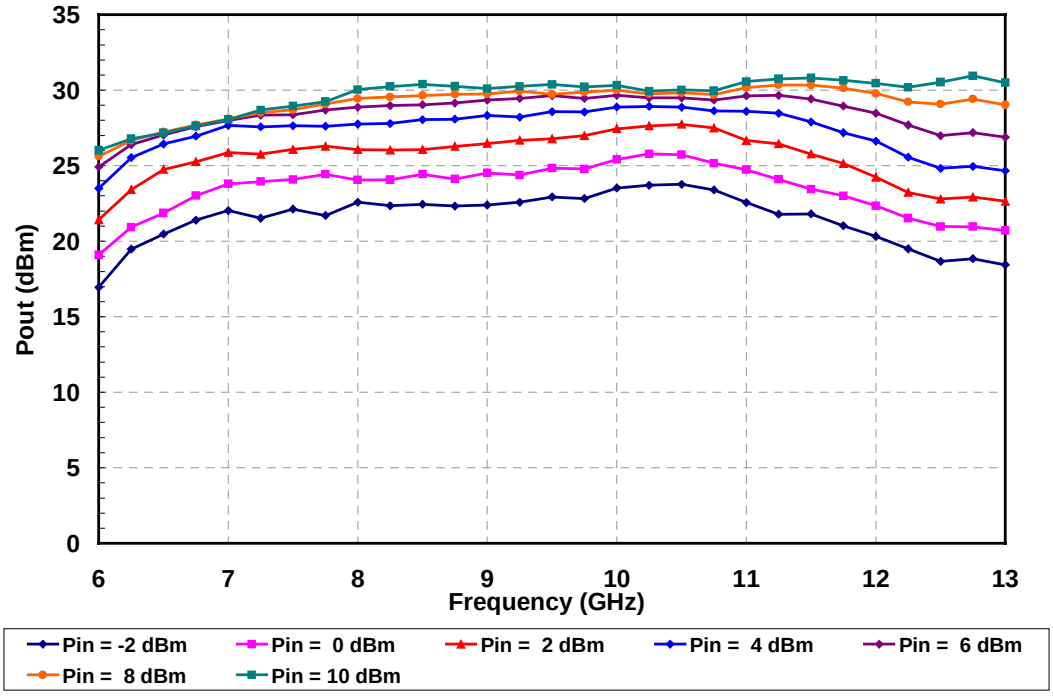
Note: Assumes eutectic attach using 1.5 mil 80/20 AuSn mounted to a 20 mil CuMo Carrier. Worst case condition with no RF applied, 100% of DC power is dissipated.

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

Typical Fixtured Performance

Bias Conditions: Vd = 9V, Idq = 300mA

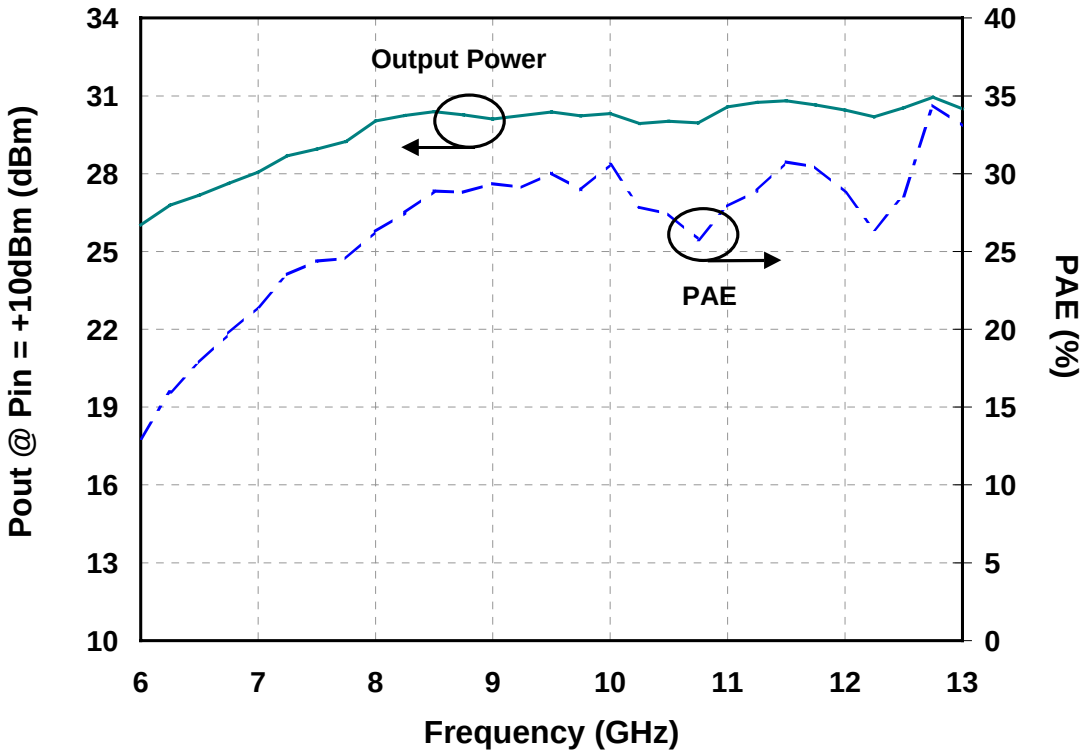


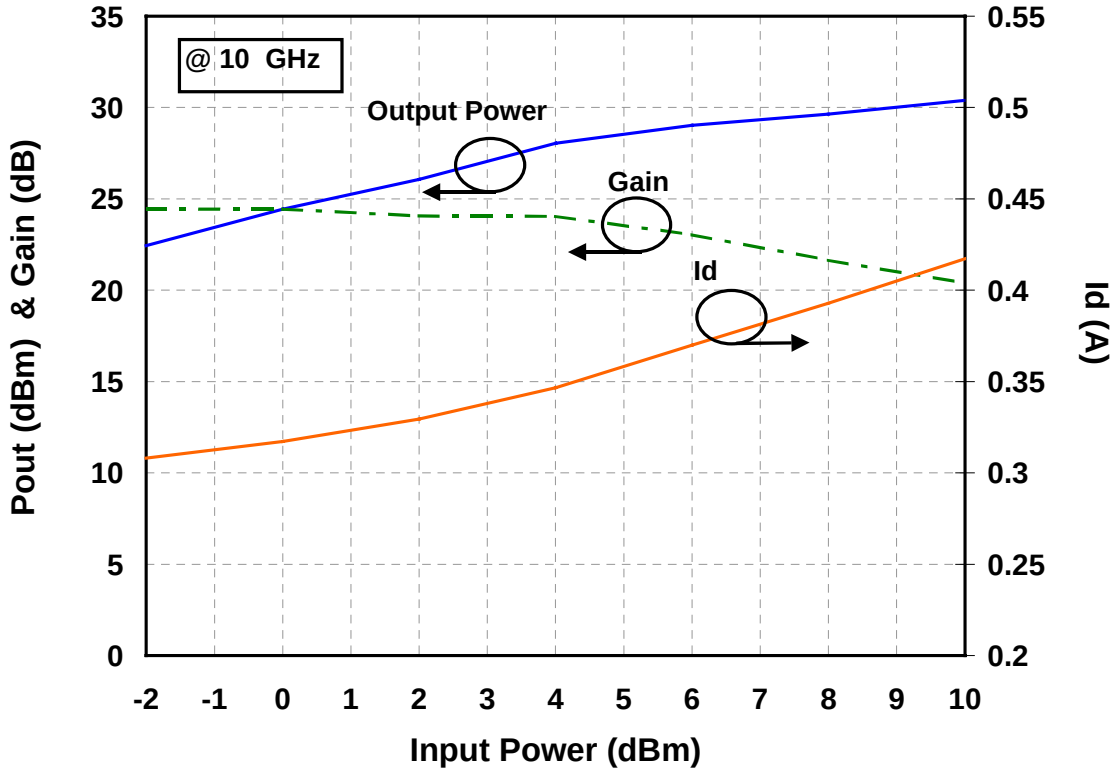


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

Typical Fixtured Performance

Bias Conditions: Vd = 9V, Idq = 300mA

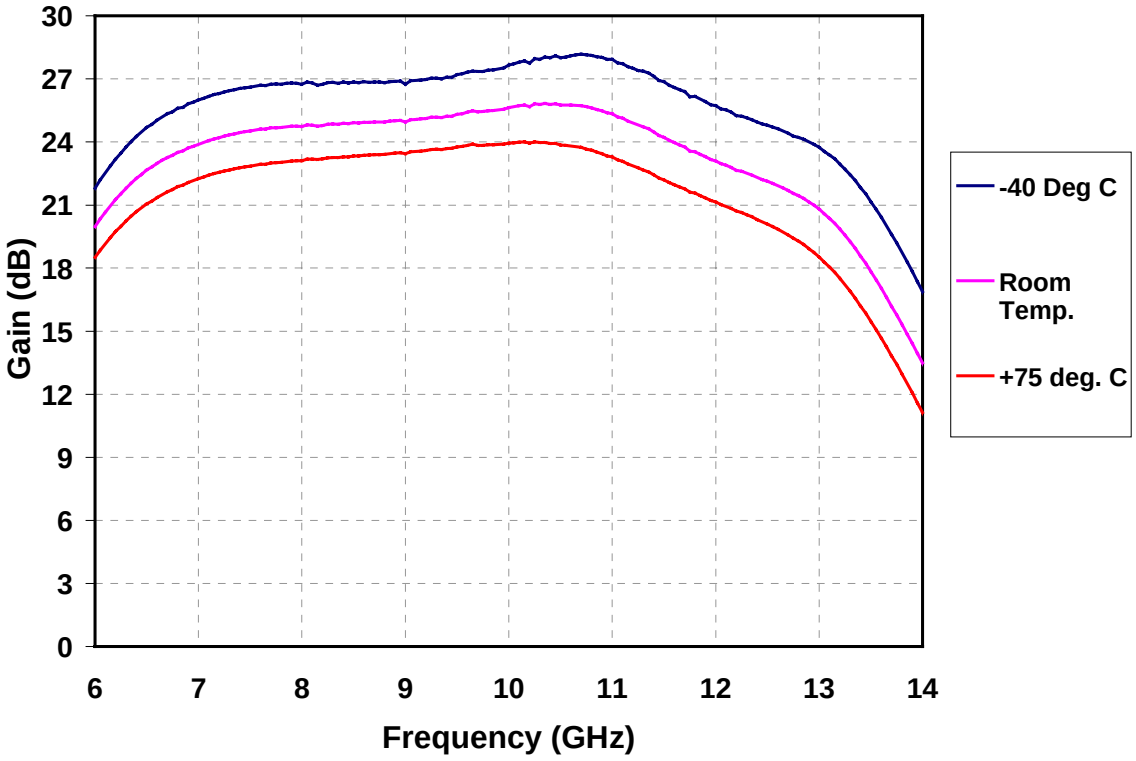


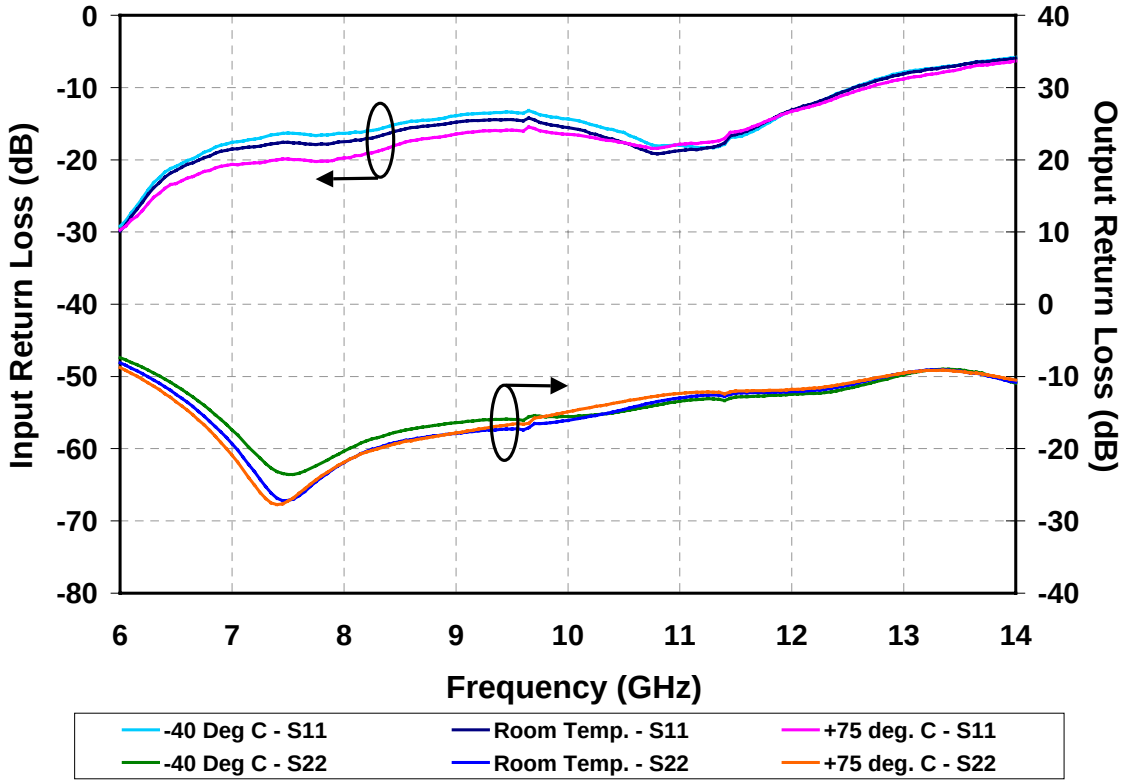


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

Typical Fixtured Performance

Bias Conditions: Vd = 9V, Idq = 300mA

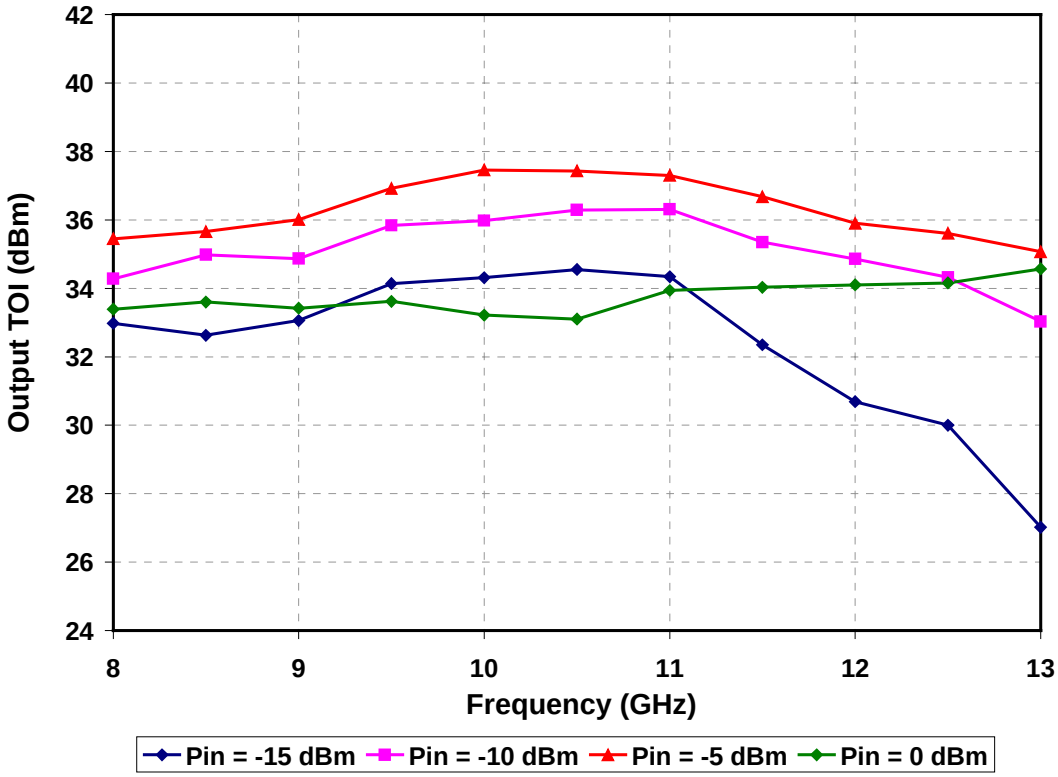




Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

Typical Fixtured Performance

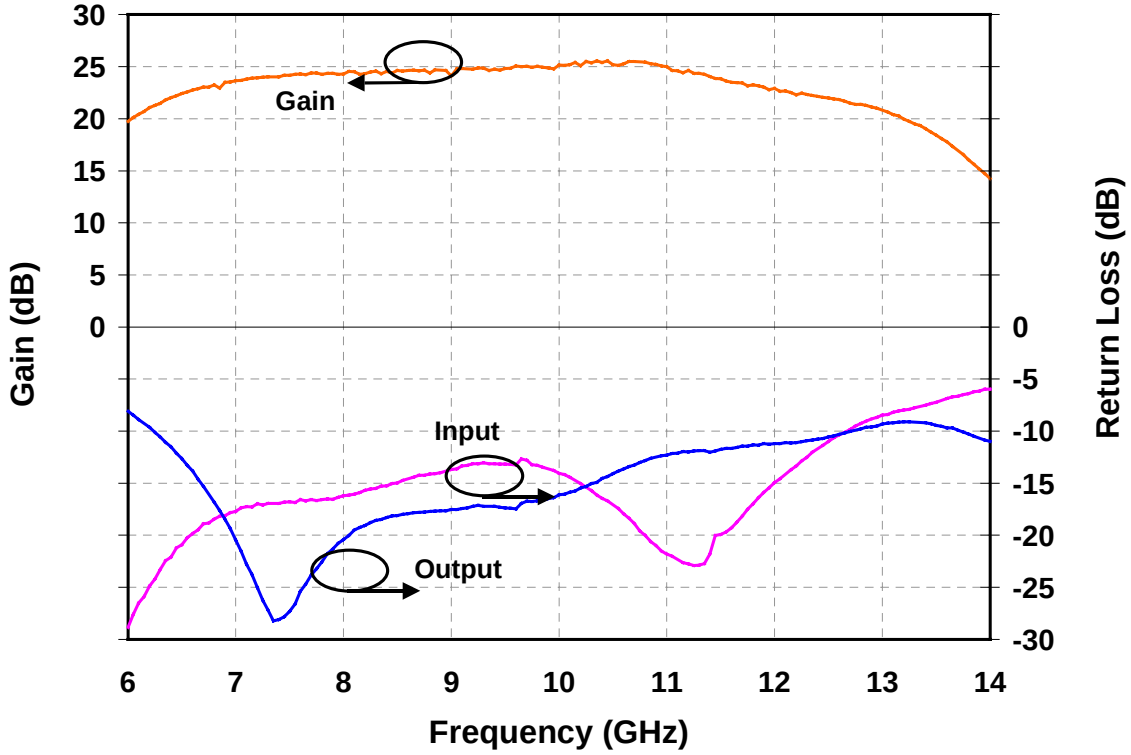
Bias Conditions: Vd = 9V, Idq = 300mA

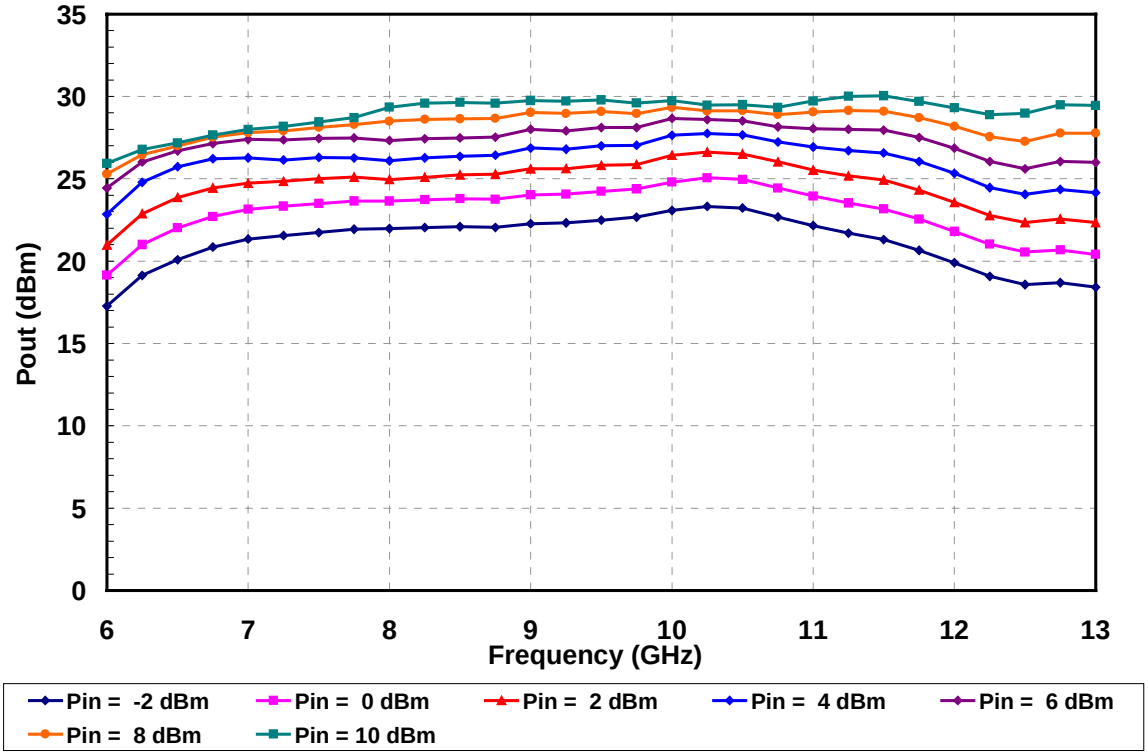


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

Typical Fixtured Performance

Bias Conditions: Vd = 9V, Idq = 225mA

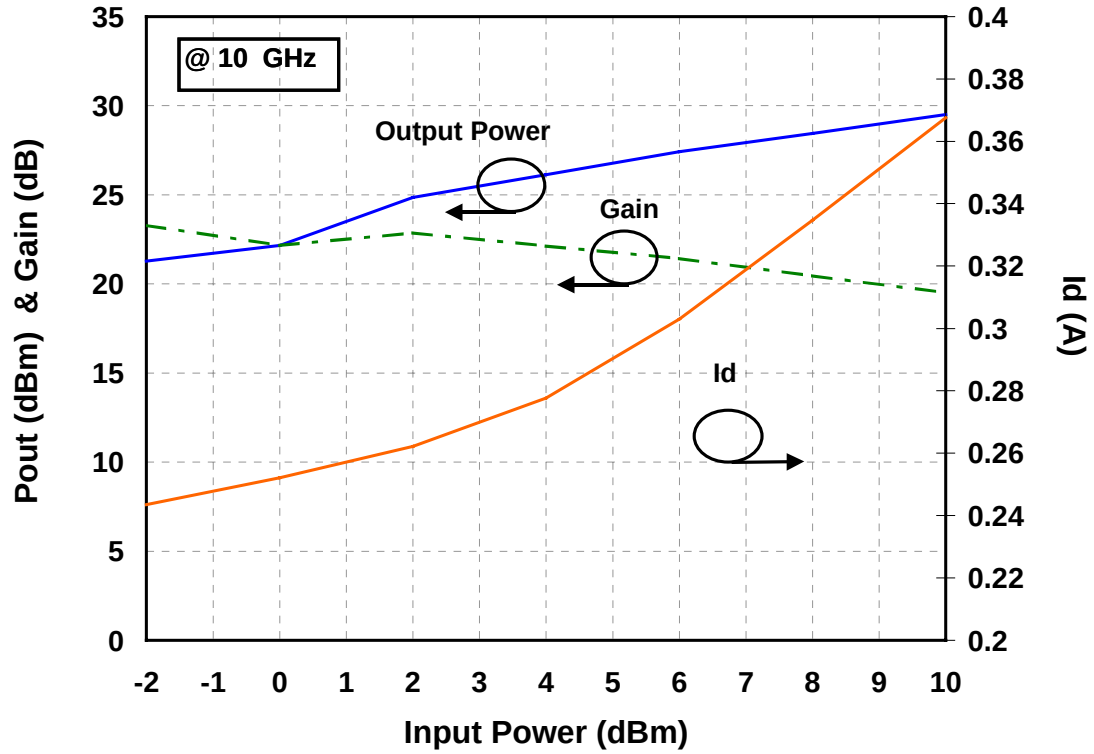


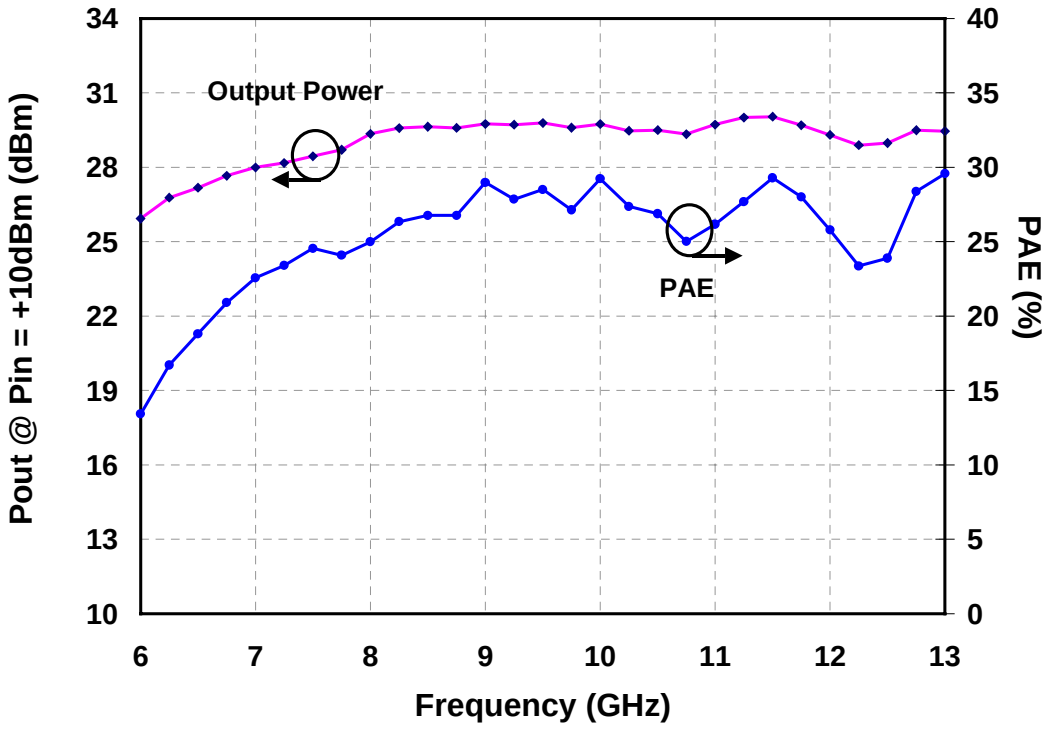


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

Typical Fixtured Performance

Bias Conditions: Vd = 9V, Idq = 225mA

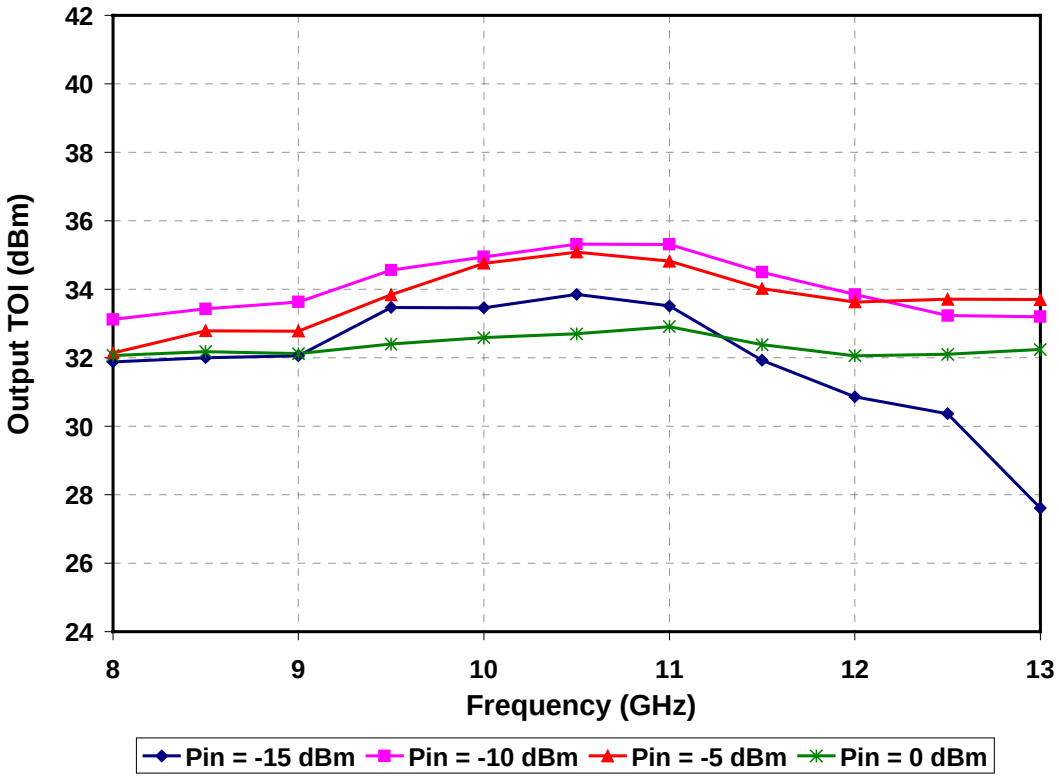




Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

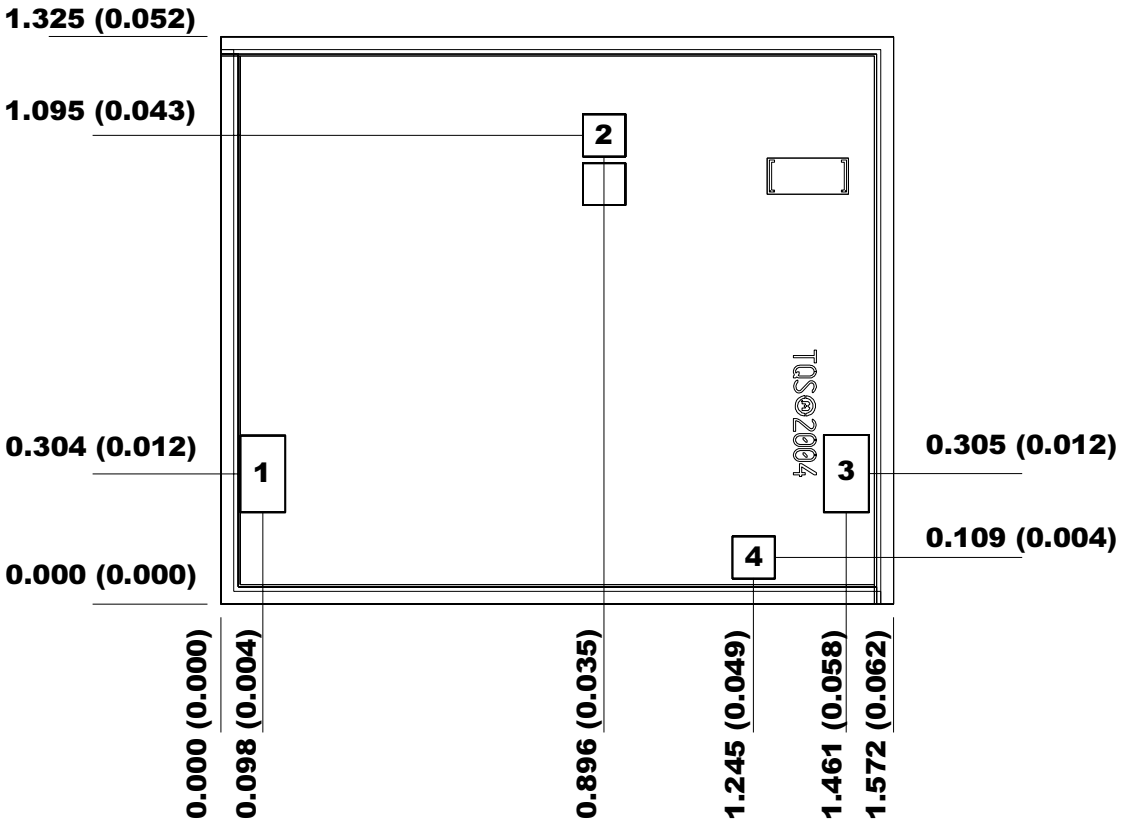
Typical Fixtured Performance

Bias Conditions: Vd = 9V, Idq = 225mA



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

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)

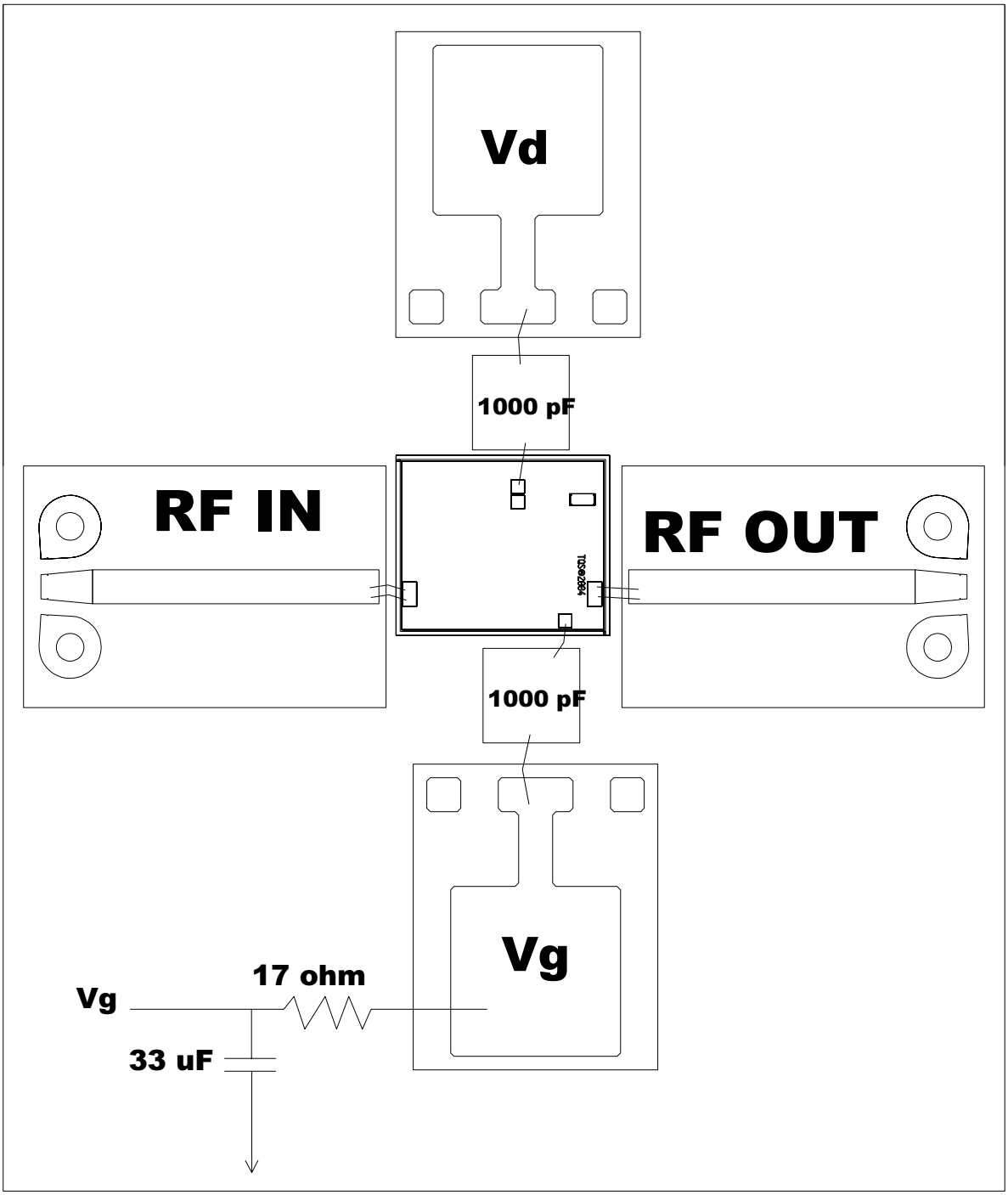
GND IS BACKSIDE OF MMIC

Bond pad #1	**(RF In)**	**0.105 x 0.180 (0.004 x 0.007)**
Bond pad #2	**(Vd)**	**0.098 x 0.098 (0.004 x 0.004)**
Bond pad #3	**(RF Out)**	**0.105 x 0.180 (0.004 x 0.007)**
Bond pad #4	**(Vg)**	**0.098 x 0.098 (0.004 x 0.004)**

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

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

Recommended Assembly Diagram



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

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

Assembly Process Notes

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300 °C for 30 sec
- 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.
- 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.

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