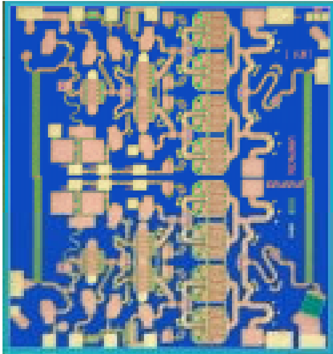
TriQuint SEMICONDUCTOR®

Advance Product Information
May 21, 2003

13 - 15 GHz 4W Power Amplifier TGA2502-EPU



Chip Dimensions 2.5 mm x 2.7 mm x 0.1 mm

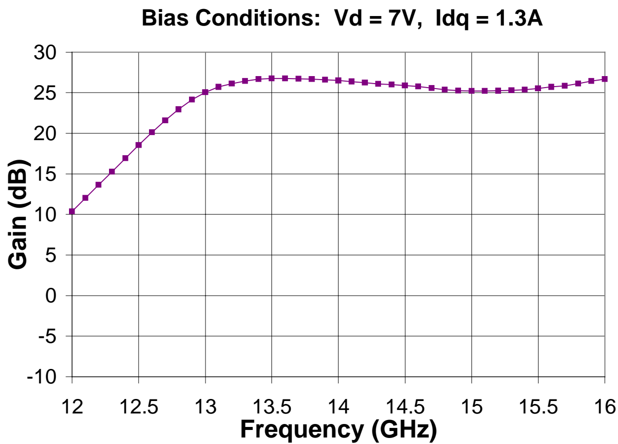
Key Features

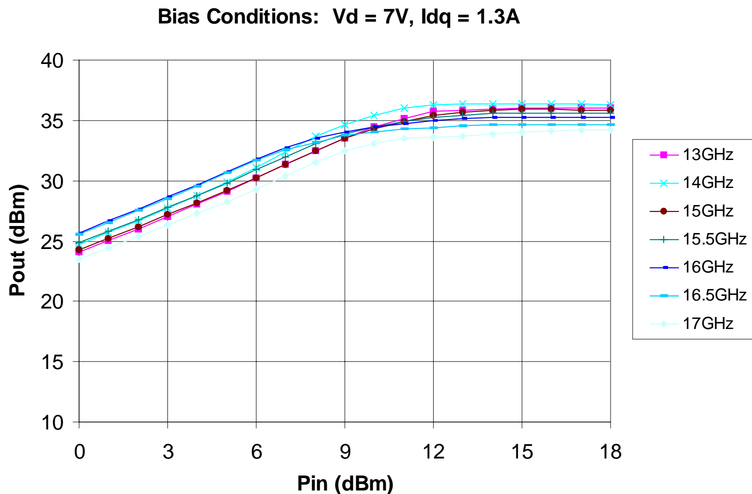
- 0.5 um pHEMT Technology
- >25 dB Nominal Gain
- >36 dBm Nominal Psat
- 44 dBm Nominal IP3 @ 14 GHz
- Bias 7V @ 1.3A Idq
- Chip Dimensions 2.5mm x 2.7mm x 0.1 mm

Primary Applications

- Ku-Band VSAT Transmit

Fixtured Measured Performance





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 1/

Symbol	Parameter	Value	Notes
V^+	Positive Supply Voltage	8V	
I^+	Positive Supply Current	1.7 A	2/
P_D	Power Dissipation	TBD	
P_{IN}	Input Continuous Wave Power	24 dBm	
T_{CH}	Operating Channel Temperature	150 °C	3/, 4/
T_M	Mounting Temperature (30 seconds)	320 °C	
T_{STG}	Storage Temperature	-65 °C to 150 °C	

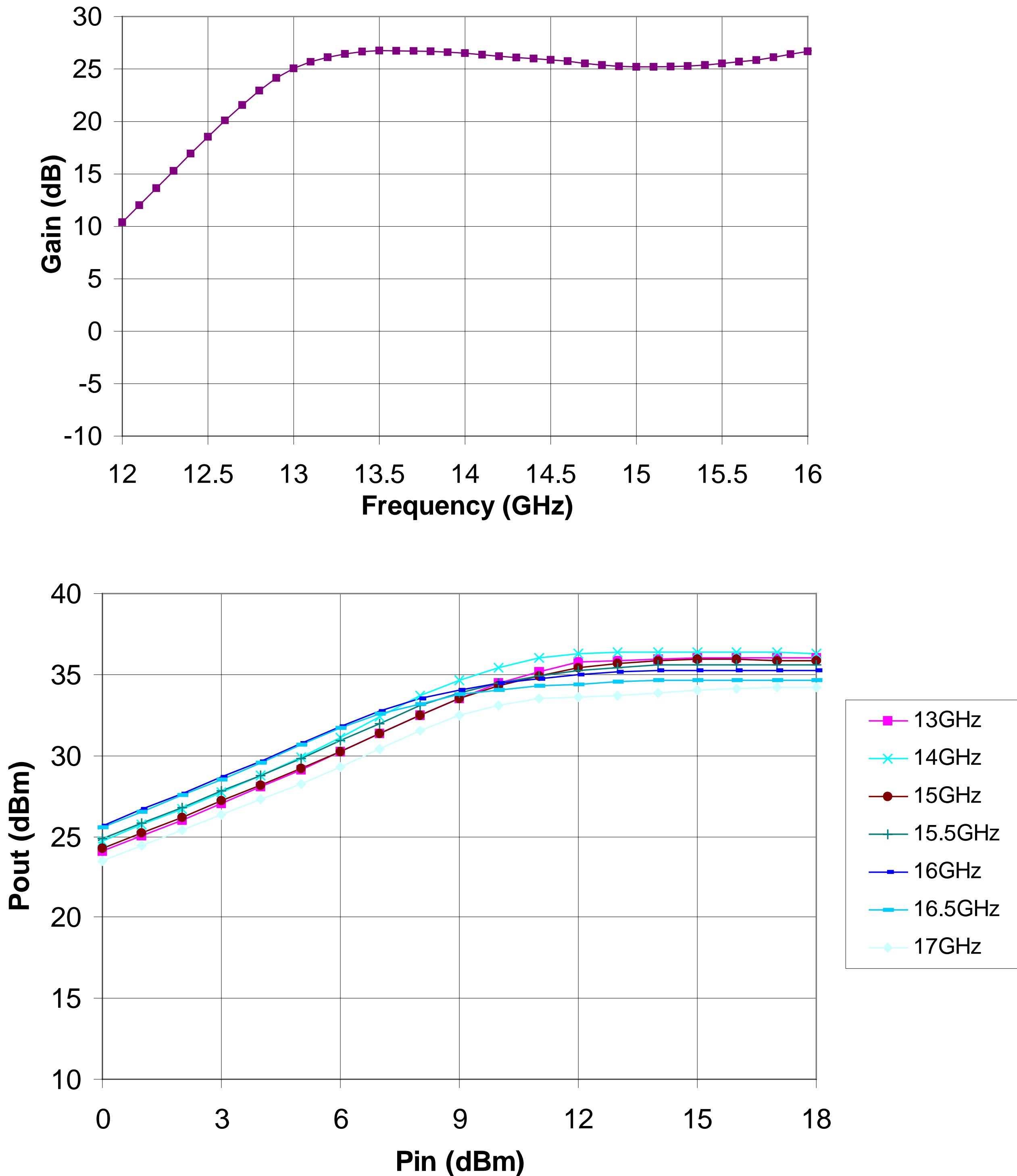
1/ These values represent the maximum operable values of this device
2/ Total current for the entire MMIC
3/ These ratings apply to each individual FET
4/ Junction operating temperature will directly affect the device mean time to failure (MTTF). For maximum life it is recommended that junction temperatures be maintained at the lowest possible levels.

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

Parameter	Units	Typical
Drain Operating Voltage	V	7
Quiescent Current	A	1.3
Small Signal Gain	dB	25.00
Gain Flatness (Freq = 13.5 - 15 GHz)	dB/100MHz	0.1000
Input Return Loss (Linear Small Signal)	dB	-16.00
Output Return Loss (Linear Small Signal)	dB	-16.00
Reverse Isolation	dB	<-50
CW Output Power @Psat at 14.5GHz	dBm	36.0
Power Add Efficiency@PsatdB	%	30
P1dB temperature coeff. TC (-40 to + 70 °C)	dB/deg C	0.0442

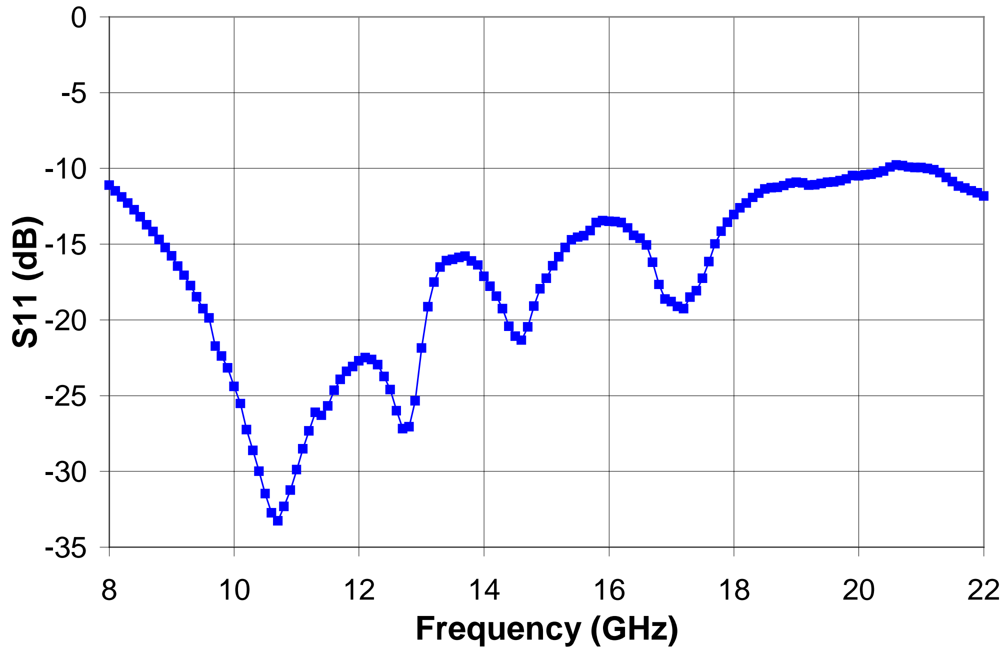
Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

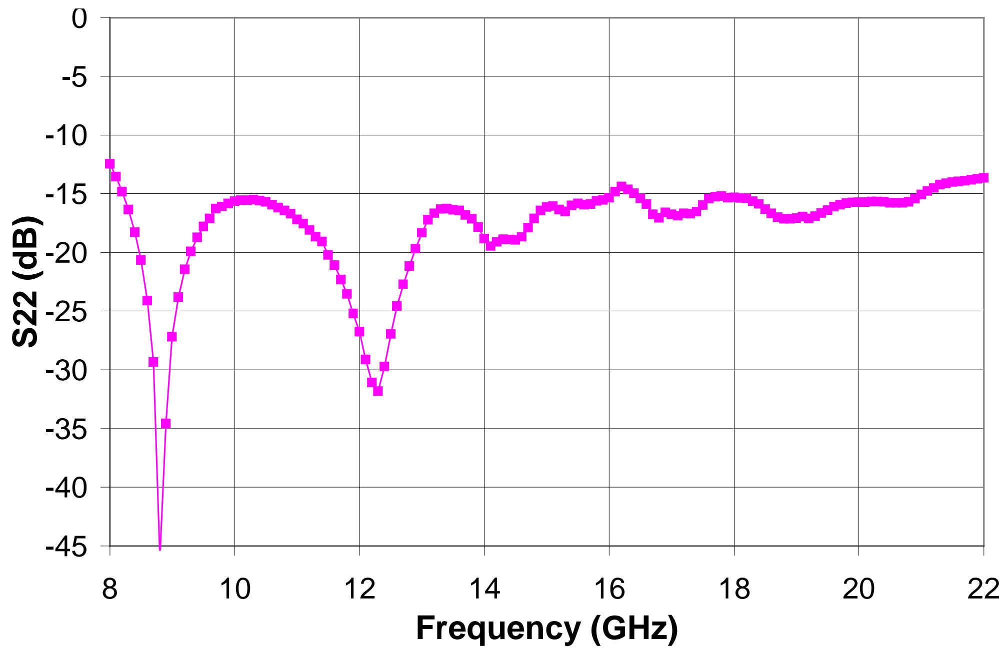
Measured Fixtured Data



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.

Measured Fixtured Data

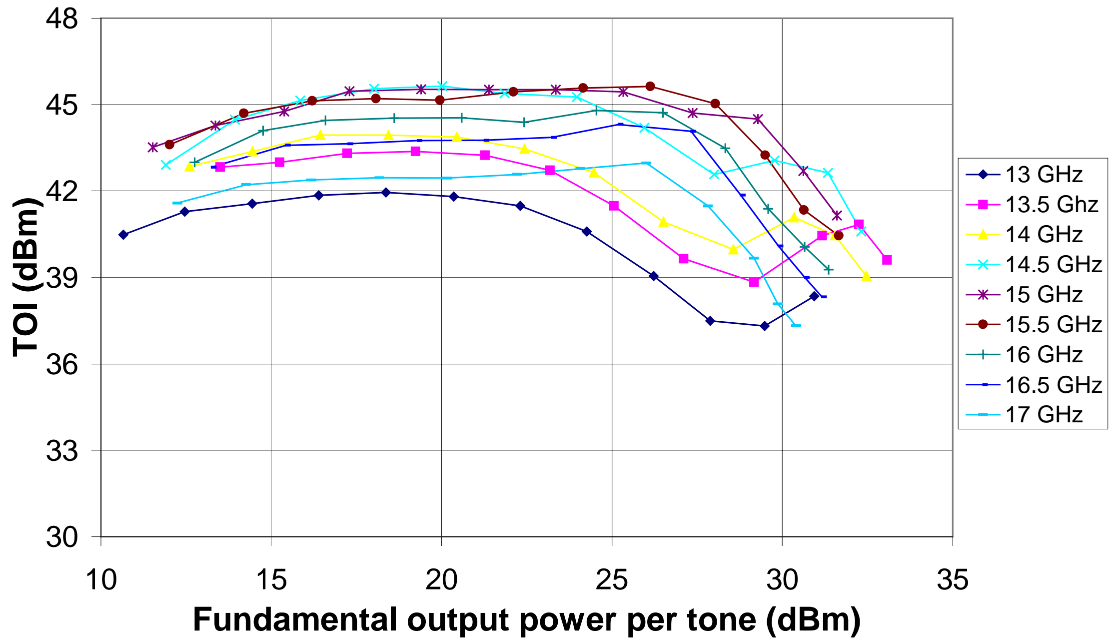


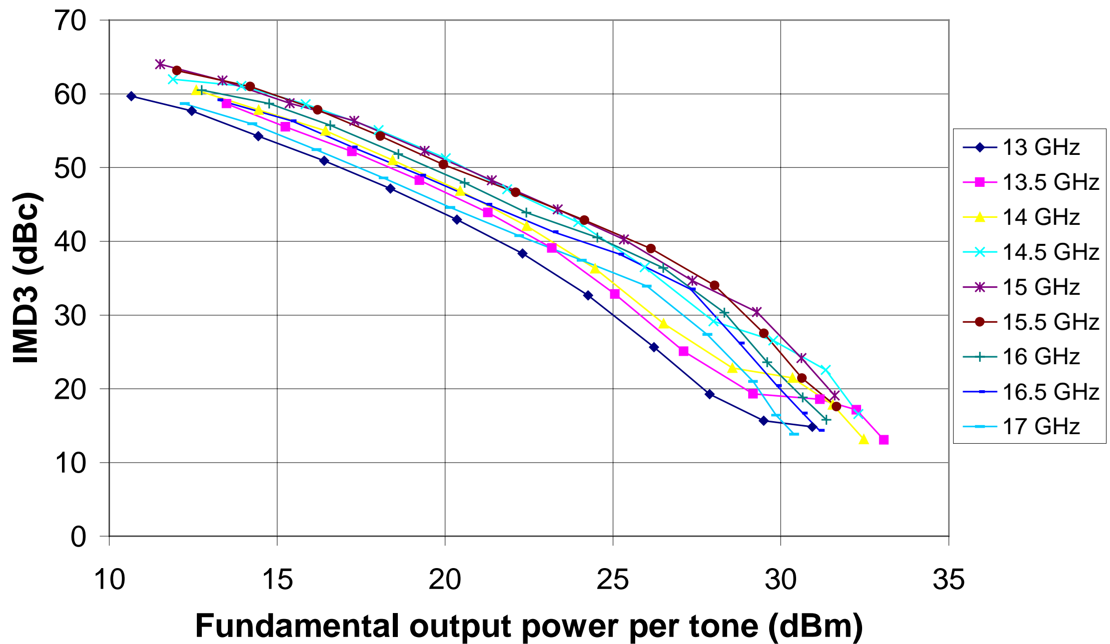


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

Measured Fixtured Data

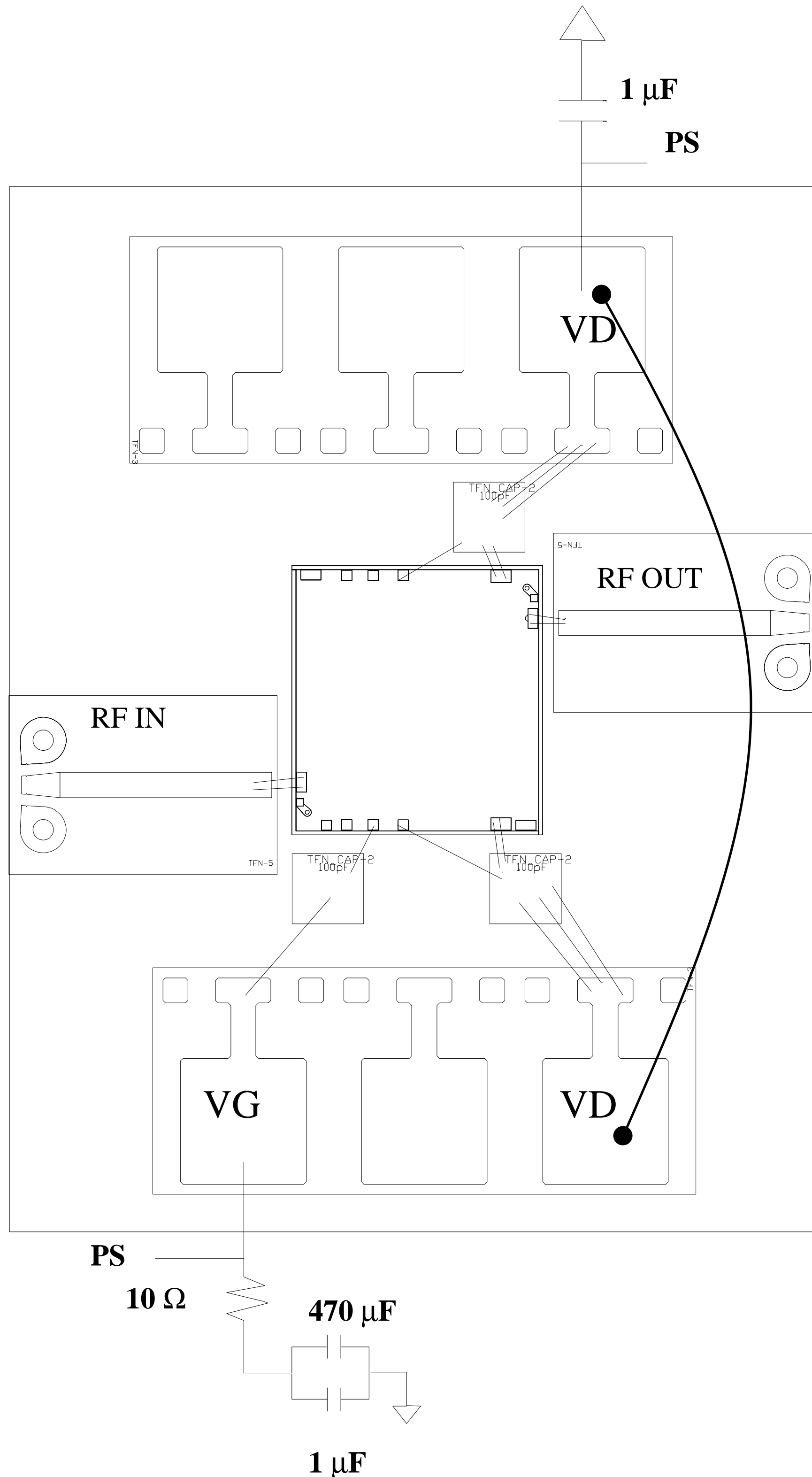
Bias Conditions: Vd = 7V, Idq = 1.3A ± 5%





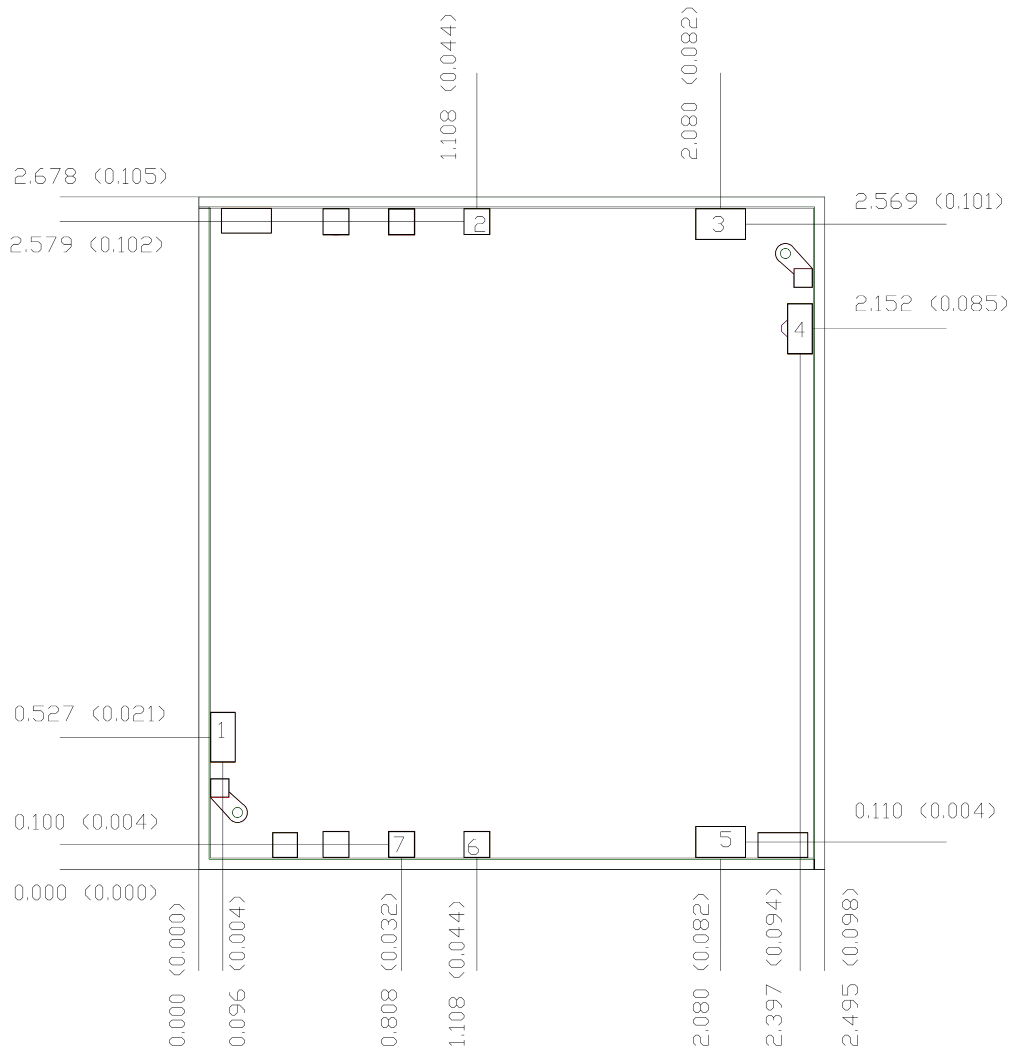
Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

Chip & Assembly Diagram



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 Drawing



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 #1	(RF In)	0.100 x 0.200 (0.004 x 0.008)
Bond pad #2	(Vd)	0.100 x 0.100 (0.004 x 0.004)
Bond pad #3	(Vd)	0.200 x 0.120 (0.008 x 0.005)
Bond pad #4	(RF Out)	0.100 x 0.200 (0.004 x 0.008)
Bond pad #5	(Vd)	0.200 x 0.120 (0.008 x 0.005)
Bond pad #6	(Vd)	0.100 x 0.100 (0.004 x 0.004)
Bond pad #7	(Vg)	0.100 x 0.100 (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.

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 max).
- 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.

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.