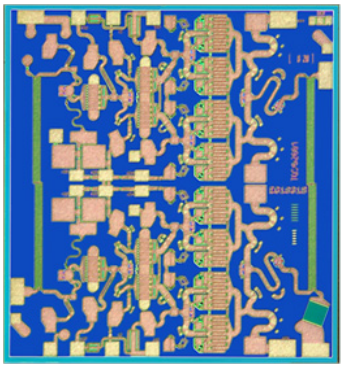
TriQuint SEMICONDUCTOR

TGA2502

13 - 15 GHz 4W Power Amplifier

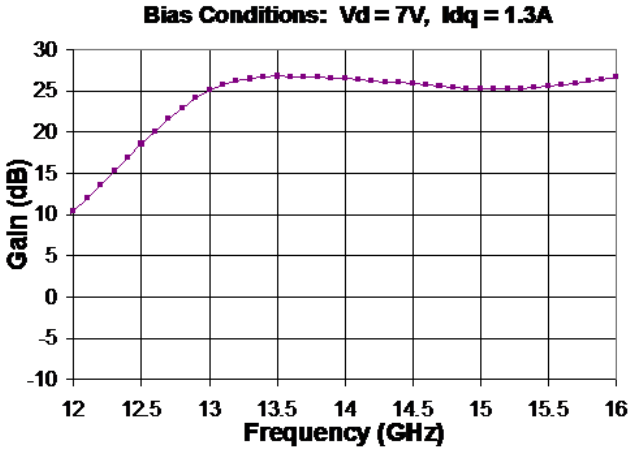


Chip Dimensions 2.5 mm x 2.7 mm x 0.1 mm

Key Features

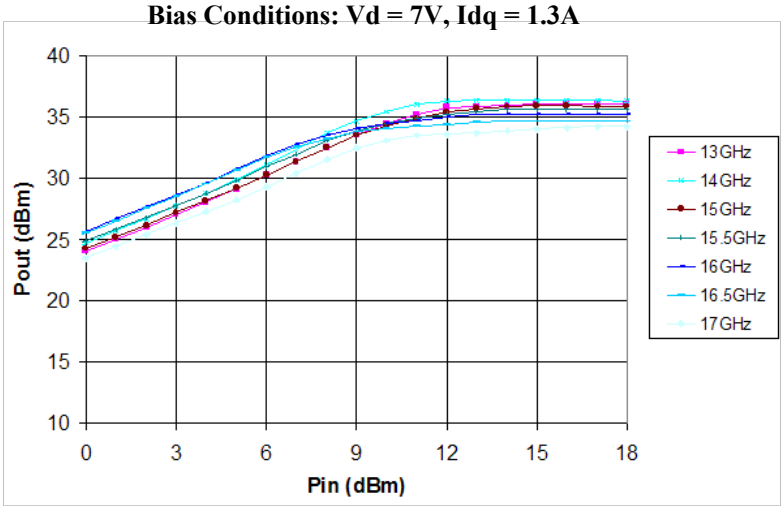
- 0.5 um pHEMT Technology
- >25 dB Nominal Gain
- >36 dBm Nominal Psat
- 44 dBm Nominal IP3 @ 14 GHz
- Bias 7V @ 1.3A Idq, 2.1A under RF drive
- Chip Dimensions 2.5mm x 2.7mm x 0.1 mm

Fixtured Measured Performance



Primary Applications

- Ku-Band VSAT Transmit



Datasheet subject to change without notice

TriQuint Semiconductor: www. triquint.com (972)994-8465 Fax (972)994-8504 Info-mmw@tqs.com

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TABLE I
MAXIMUM RATINGS 1/

Symbol	Parameter	Value	Notes
V^+	Positive Supply Voltage	8V	
I^+	Positive Supply Current	2.3 A	2/
P_D	Power Dissipation	18.4	
P_{IN}	Input Continuous Wave Power	24 dBm	
T_{CH}	Operating Channel Temperature	200 °C	3/, 4/
	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 (Tm). For maximum life it is recommended that junction temperatures be maintained at the lowest possible levels.

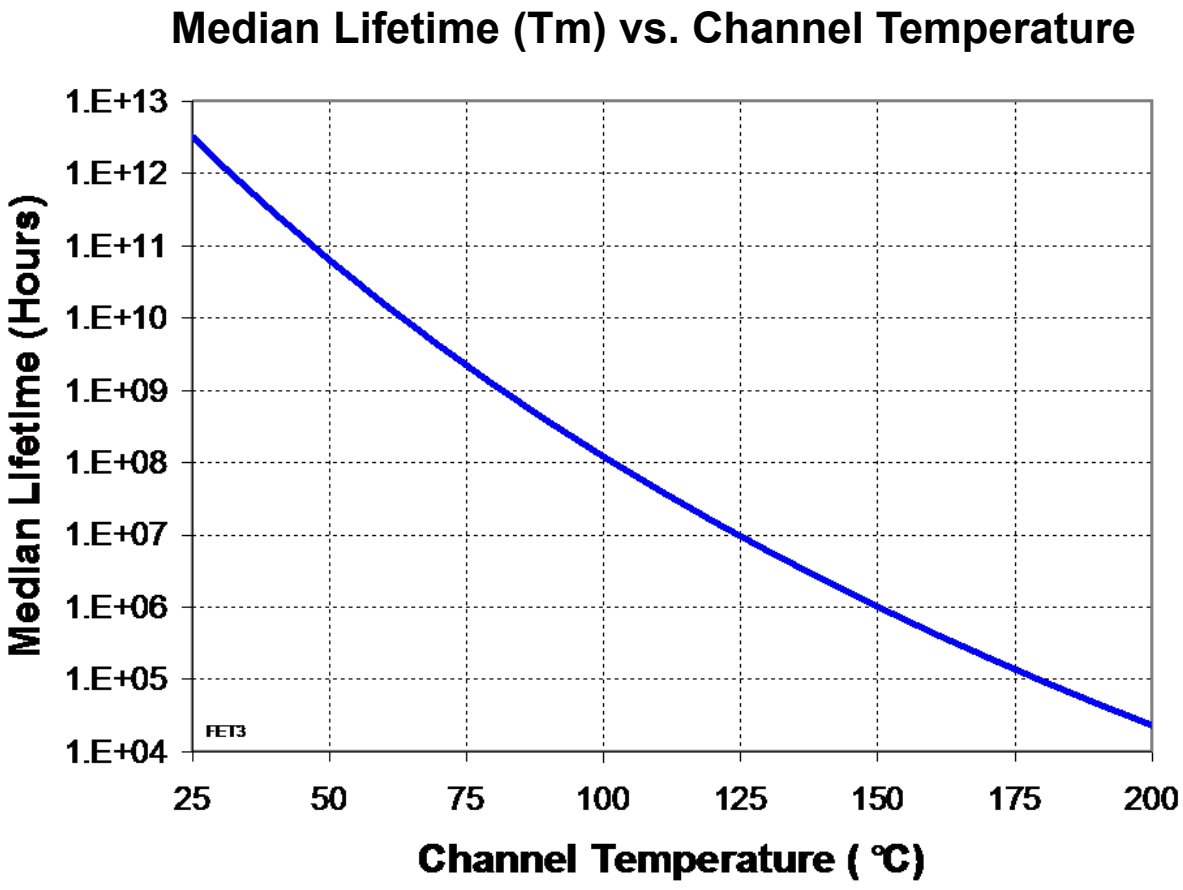
TABLE II
ELECTRICAL CHARACTERISTICS
(Ta = 25°C ± 5°C)

PARAMETER	TYPICAL	UNITS
Drain Operating Voltage	7	V
Quiescent Current	1.3	A
Small Signal Gain	25	dB
Gain Flatness (Freq=13.5 – 15 GHz)	0.1	dB/100MHz
Input Return Loss (Linear Small Signal)	16	dB
Output Return Loss (Linear Small Signal)	16	dB
Reverse Isolation	<-50	dB
CW Output Power @ Psat at 14.5Ghz	36	dBm
Power Add Efficiency @ Psat	30	%
P1dB Temperature Coeff. TC (-40 to + 70 ^{0}C)	-0.01	dB/^{0}C

TABLE IV
THERMAL INFORMATION

PARAMETER	TEST CONDITIONS	T_{CH} (°C)	θ_{JC} (°C/W)	T_m (HRS)
θ_{JC} Thermal Resistance (channel to Case)	Vd = 7 V Id = 1.3 A Pdiss = 9.1 W	123	5.8	1.2E+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.



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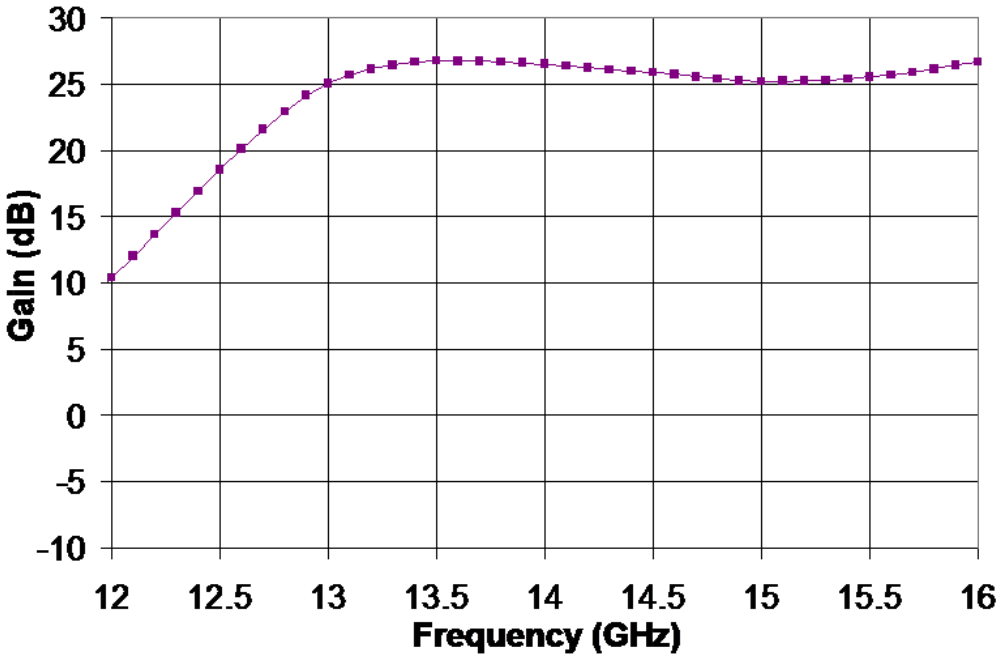
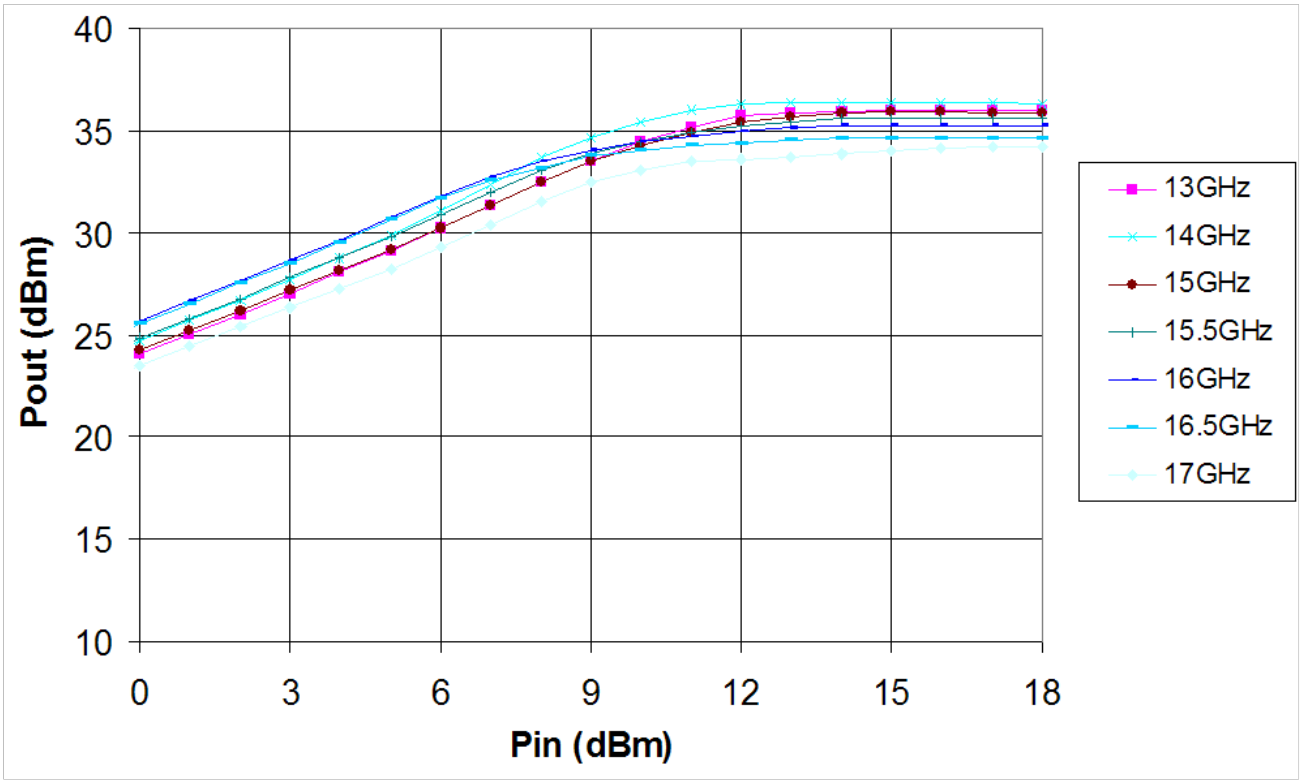
Measured Fixtured Data

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





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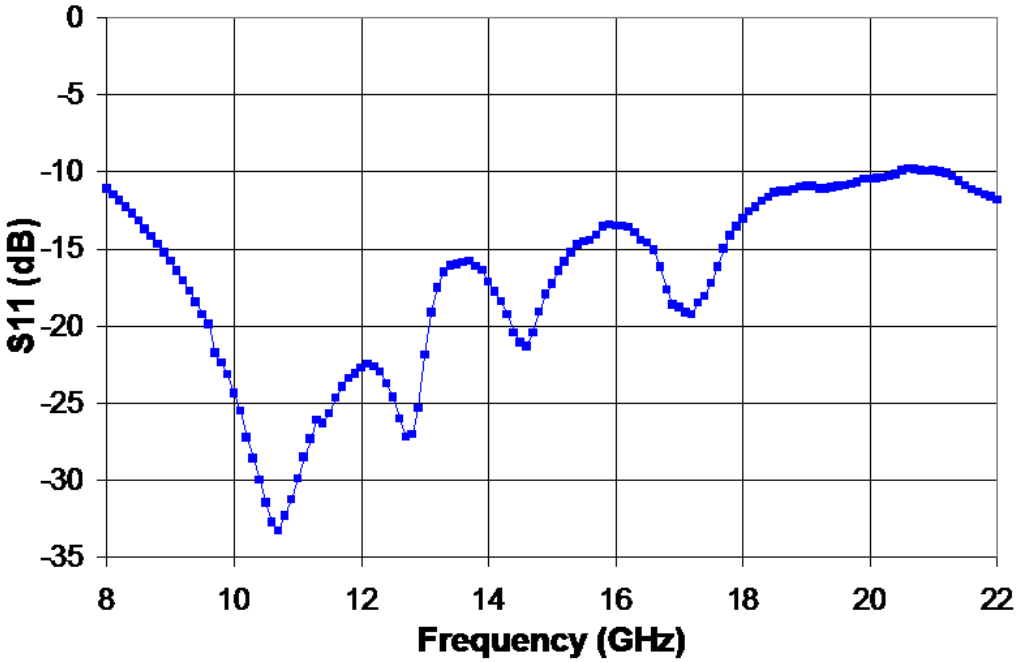

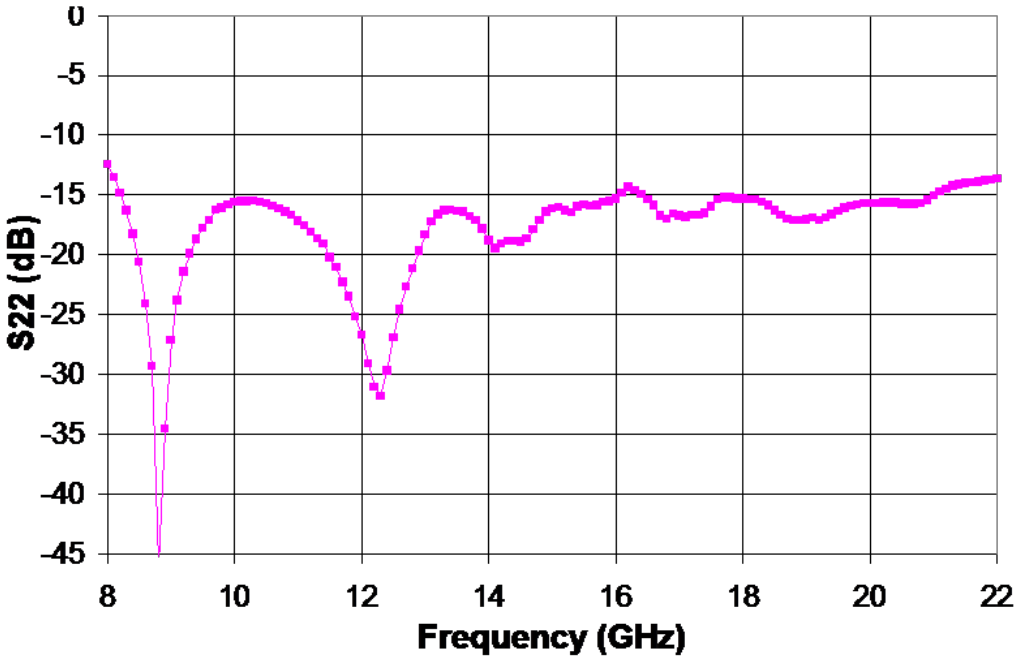

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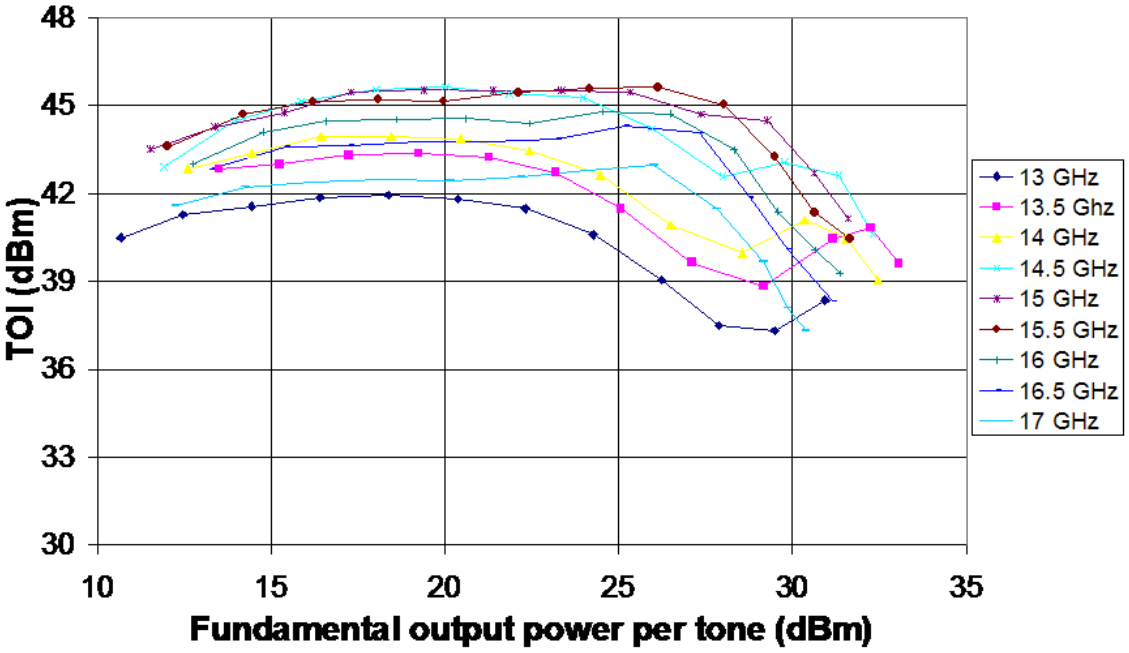
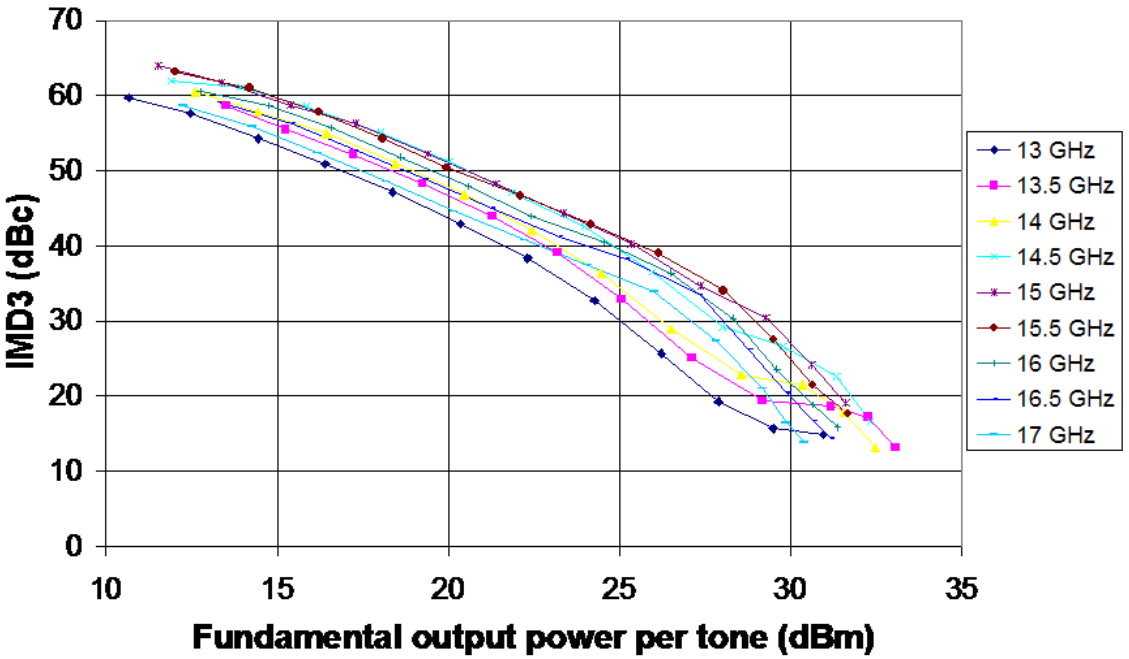
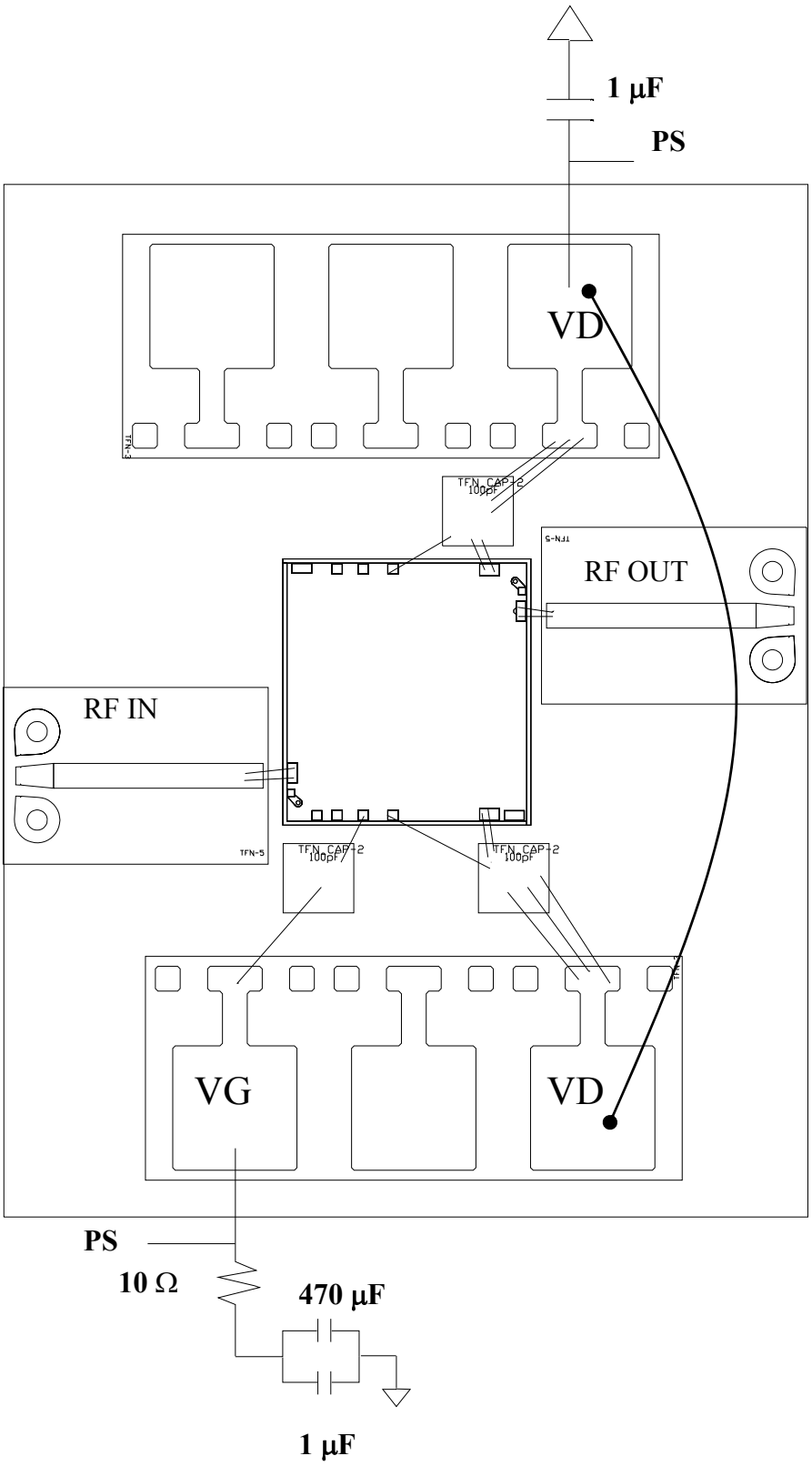
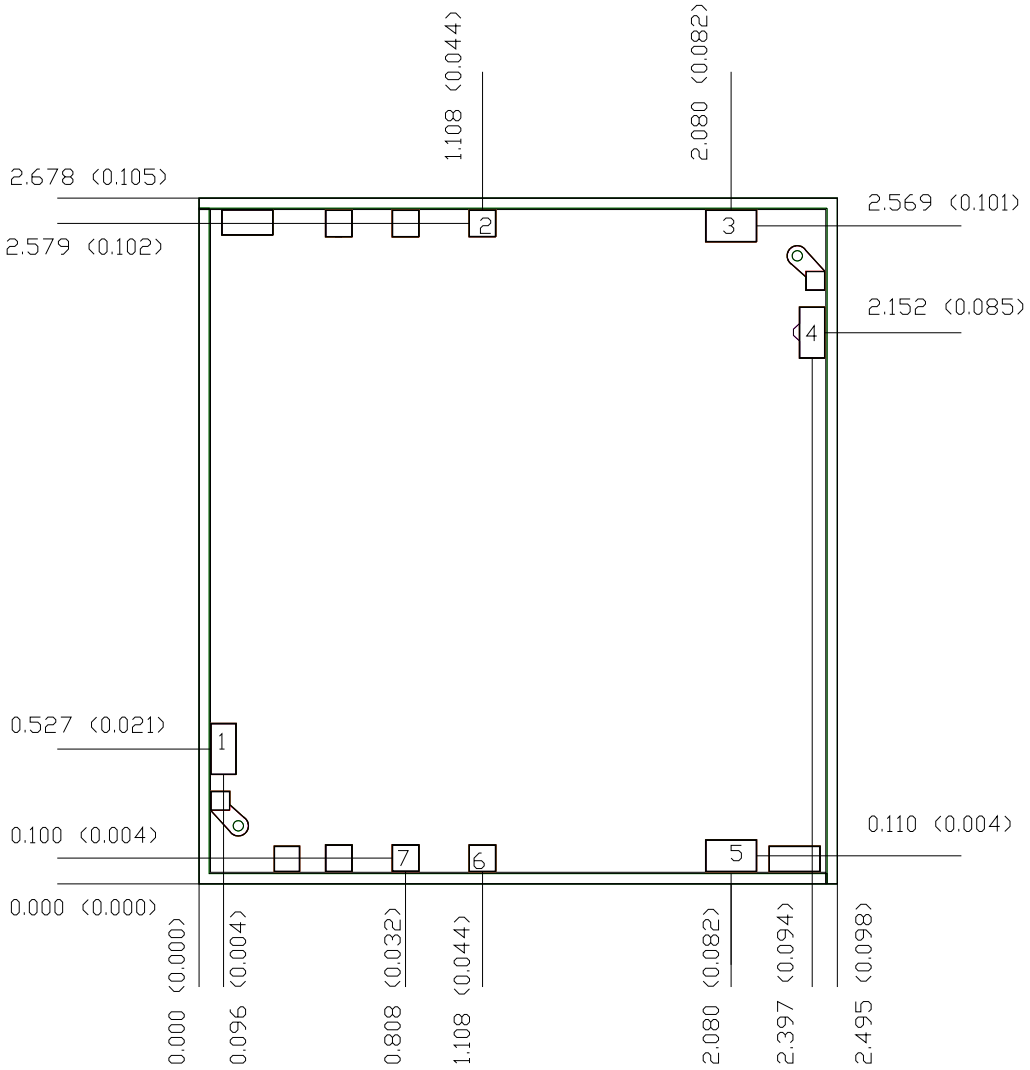




Chip & Assembly Diagram



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 □ut)	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.

Assembly Process Notes

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300^{0}C (30 seconds 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.
- Maximum stage temperature is 200^{0}C.

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