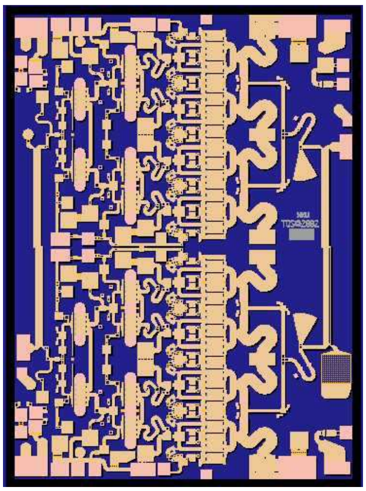
Ku Band 6.5 W Power Amplifier TGA2514



Key Features

- Frequency Range: 13 - 18 GHz
- 38.5 dBm Nominal Psat from 13.75 - 14 GHz
- 38 dBm Nominal Psat from 13-16 GHz
- 37.5 dBm Nominal Psat from 16-18 GHz
- 33 dBc IMD3 @ 27 dBm Pout/tone @ 14 GHz
- 24 dB Nominal Gain
- 12 dB Nominal Return Loss
- 0.25-µm 3MI pHEMT Technology
- Bias Conditions: 8 V @ 2.6 A Idq
- Chip size: 2.87 x 3.90 x .10 mm
- (0.113 x 0.154 x 0.004)

Primary Applications

- Ku band VSAT Transmitter
- Point to Point Radio

Product Description

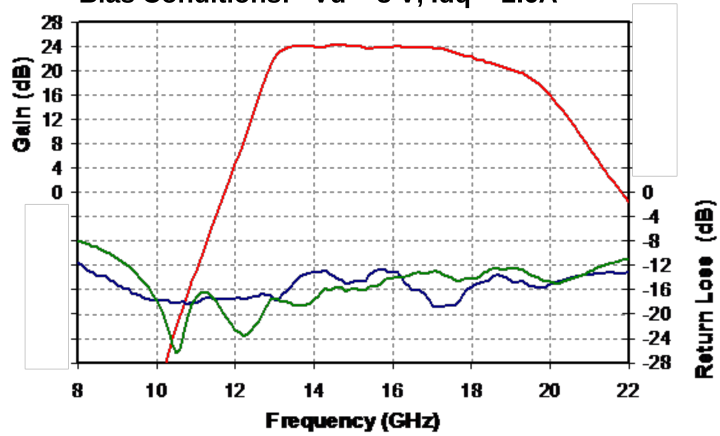
The TriQuint TGA2514 is a compact 6.5 W Ku-band Power Amplifier which operates from 13-18 GHz. The TGA2514 is designed using TriQuint's proven standard 0.25-µm gate pHEMT production process.

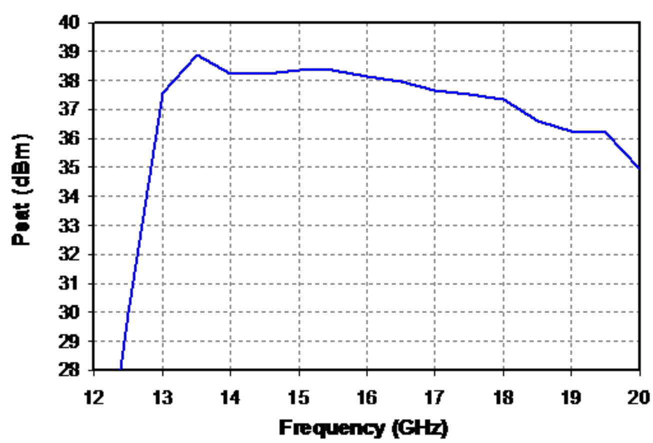
The TGA2514 provides a nominal 38 dBm of saturated power with a small signal gain of 24 dB. Typical return loss is 14 dB.

The TGA2514 is 100% DC and RF tested on-wafer to ensure performance compliance.

Measured Fixtured Data

Bias Conditions: Vd = 8 V, Idq = 2.6A





Note: Datasheet is subject to change without notice.

TABLE I
Absolute Maximum Ratings 1/

Symbol	Parameter	Value	Notes
V+	Positive Supply Voltage	9 V	2/
V-	Negative Supply Voltage Range	-5V TO 0V	
Id	Drain Current	3.8 A	2/
Ig	Gate Current Range	-18 to 18 mA	
Pin	Input Continuous Wave Power	21 dBm	2/
Tchannel	Channel Temperature	200 °C	

1/ These ratings represent the maximum operable values for this device. Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device and/or affect device lifetime. These are stress ratings only, and functional operation of the device at these conditions is not implied.

2/ Combinations of supply voltage, supply current, input power, and output power shall not exceed maximum power dissipation listed in Table IV.

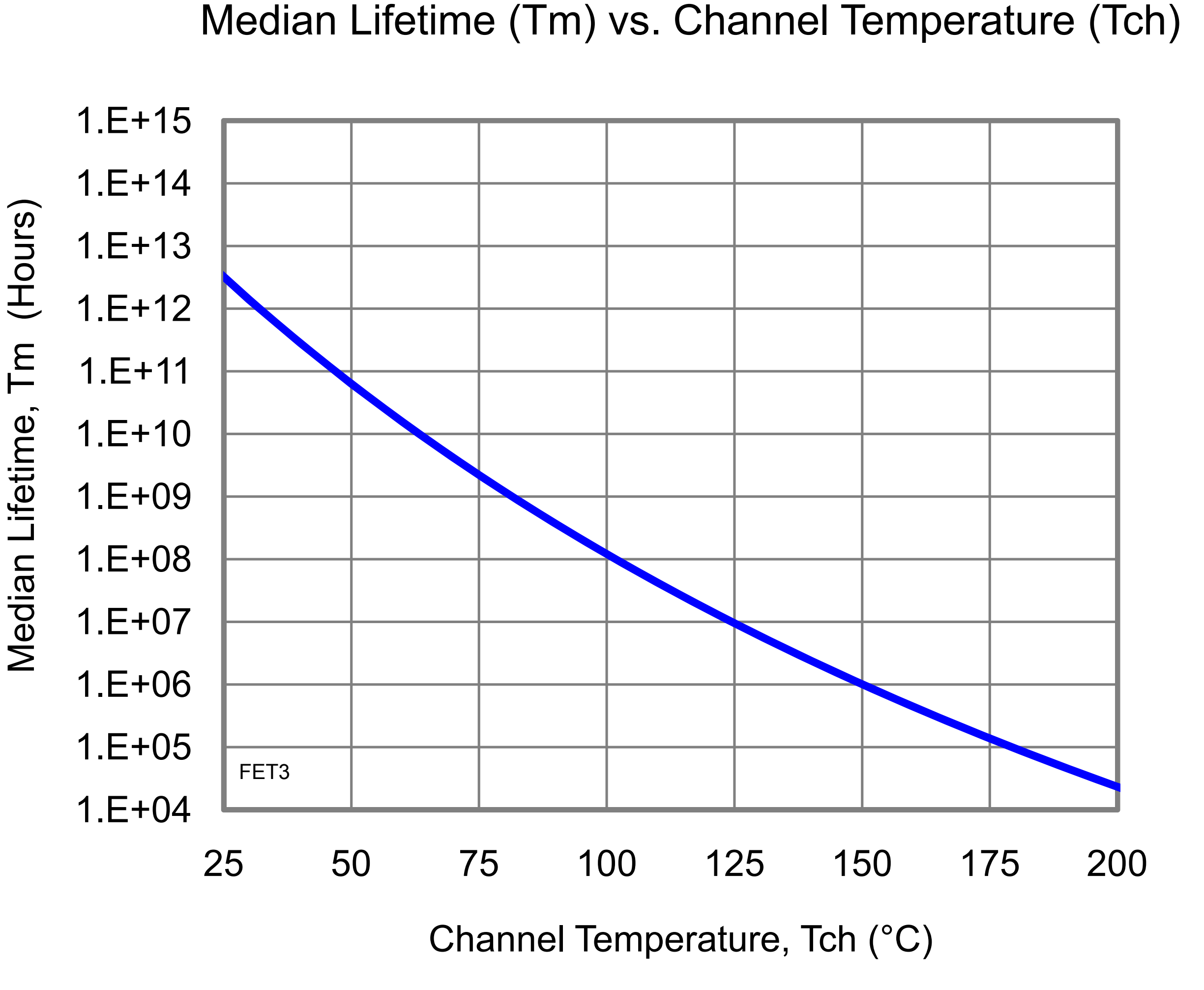
TABLE II
RF CHARACTERIZATION TABLE
(T_A = 25°C, Nominal)
(Vd = 8V, Id = 2.6 A)

SYMBOL	PARAMETER	TEST CONDITION	TYPICAL	UNITS
Gain	Small Signal Gain	f = 13-18 GHz	24	dB
IRL	Input Return Loss	f = 13-18 GHz	12	dB
ORL	Output Return Loss	f = 13-18 GHz	12	dB
Psat	Saturated Power	f = 13-16 GHz f = 16-18 GHz	38 37.5	dBm
TOI	Third Order Intercept @ Pout/tone = 27dBm	f = 14 GHz	44	dBm
IMD3	Output IMD3 @ Pout/tone = 27 dBm	f = 14 GHz	33	dBc

Note: Table III Lists the RF Characteristics of typical devices as determined by fixtured measurements.

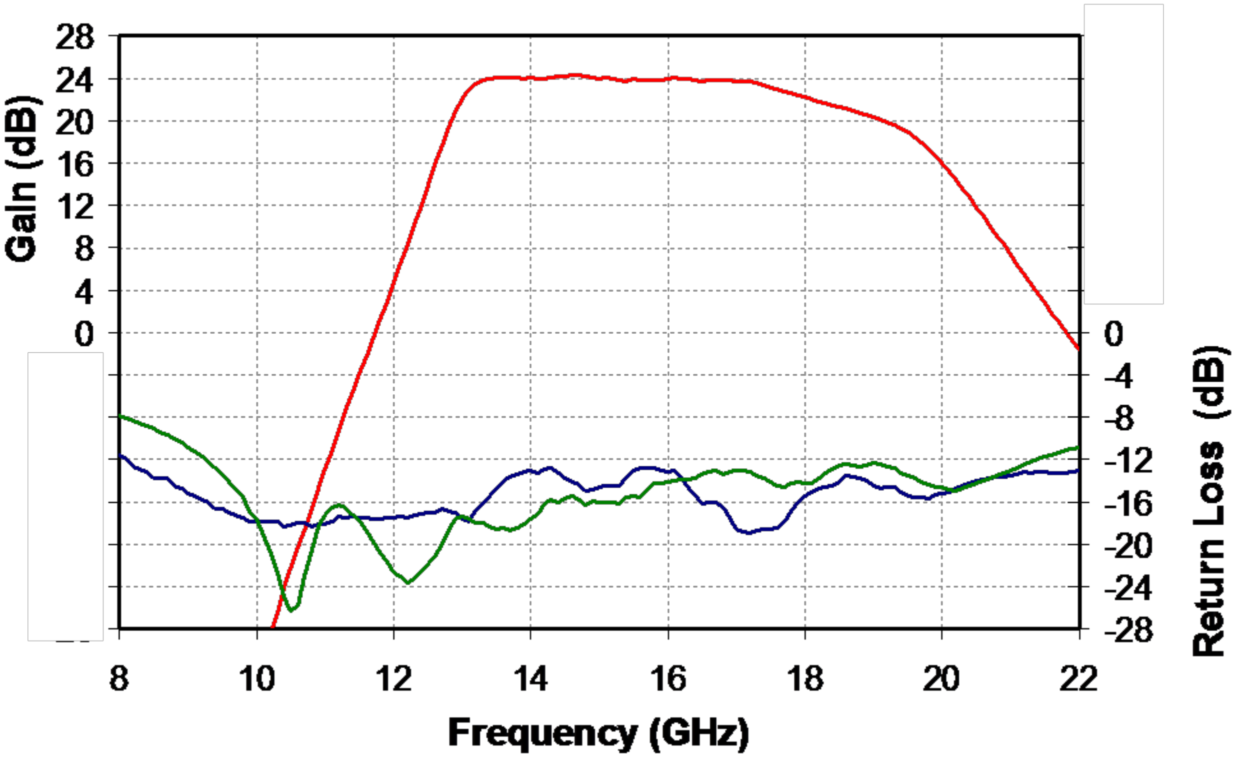
TABLE III
Power Dissipation and Thermal Properties

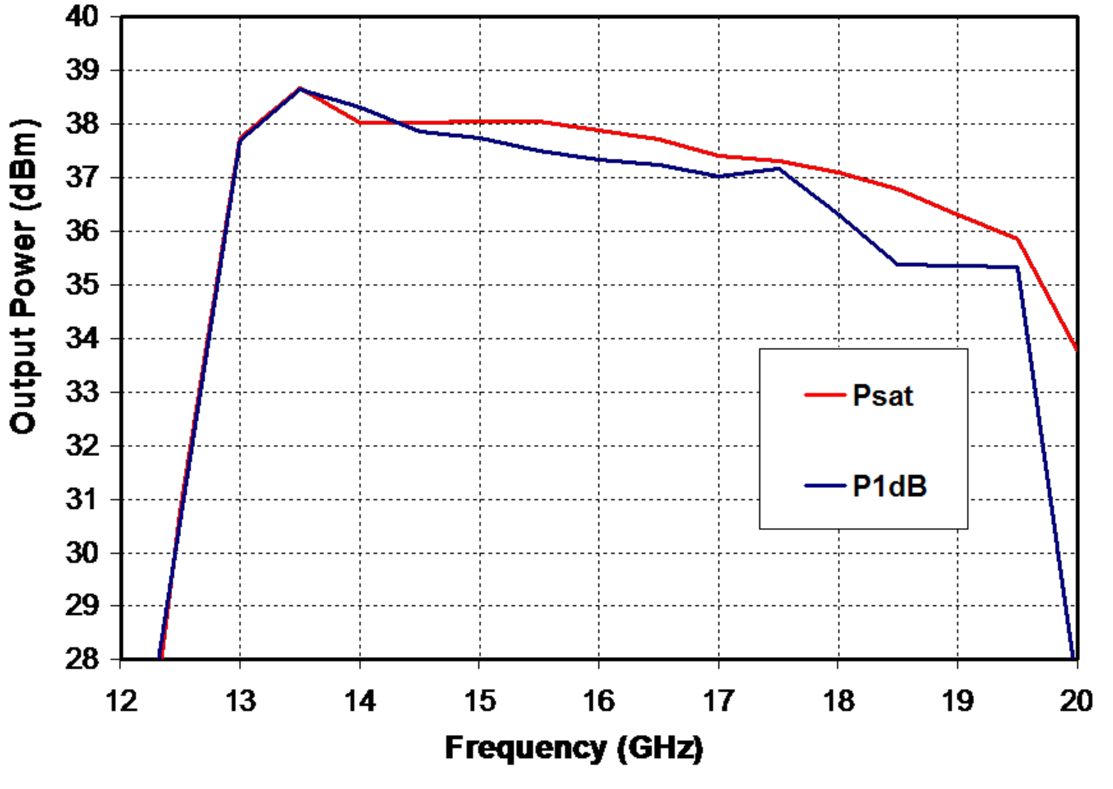
Parameter	**Test Conditions**	Value
Maximum Power Dissipation	Tbaseplate = 70	Pd = 33.3 W Tchannel = 200 °C
Thermal Resistance, θjc	Vd = 8V Id = 2.6 A Pd = 20.8 W	θjc = 3.9 °C/W Tchannel = 151 °C Tm = 9.3E5 hrs
Thermal Resistance, θjc Under RF Drive	Vd = 8 V Id = 3.6 A Pout = 38 dBm Pd = 22.5 W	θjc = 3.9 °C/W Tchannel = 158 °C Tm = 5.2E5 hrs
Mounting Temperature	30 Seconds	320°C
Storage Temperature		-65 to 150°C



Measured Fixture Data

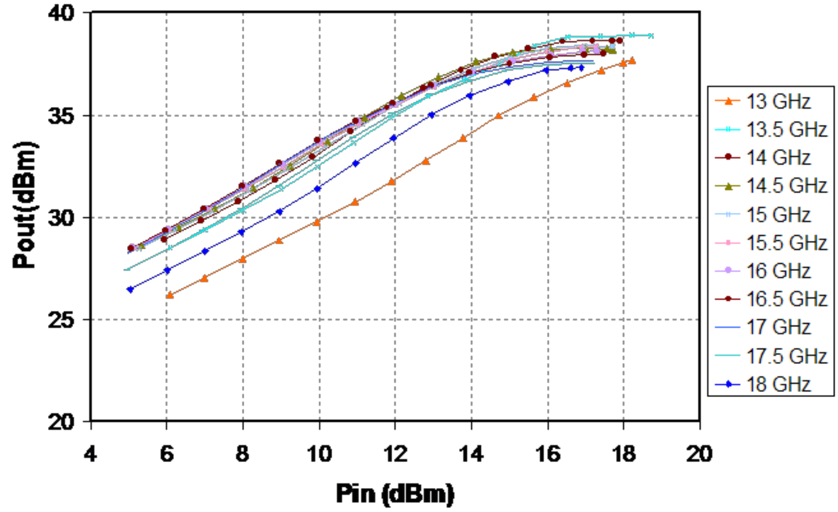
Bias Conditions: Vd = 8 V, Idq = 2.6A

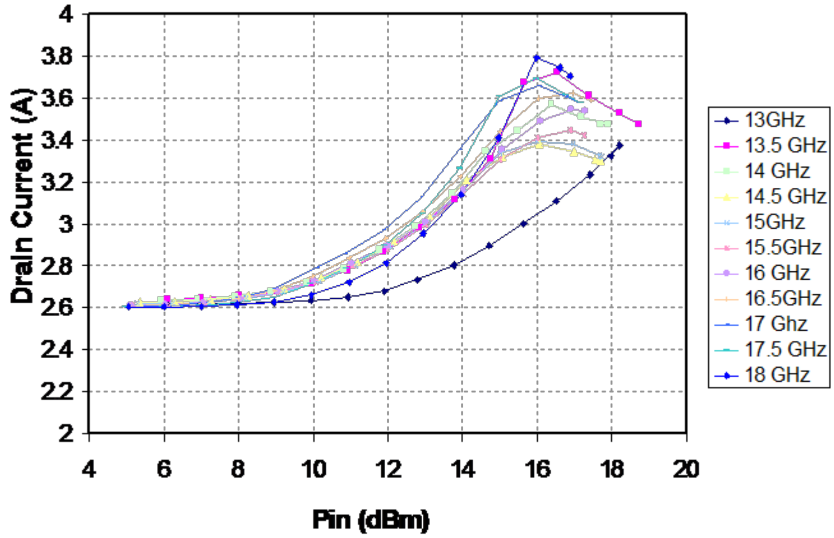


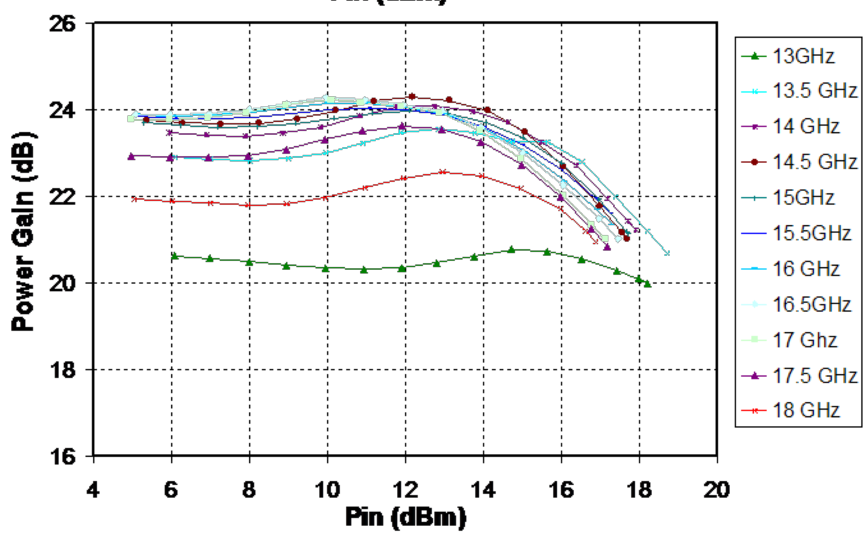


Measured Fixture Data

Bias Conditions: Vd = 8 V, Idq = 2.6A

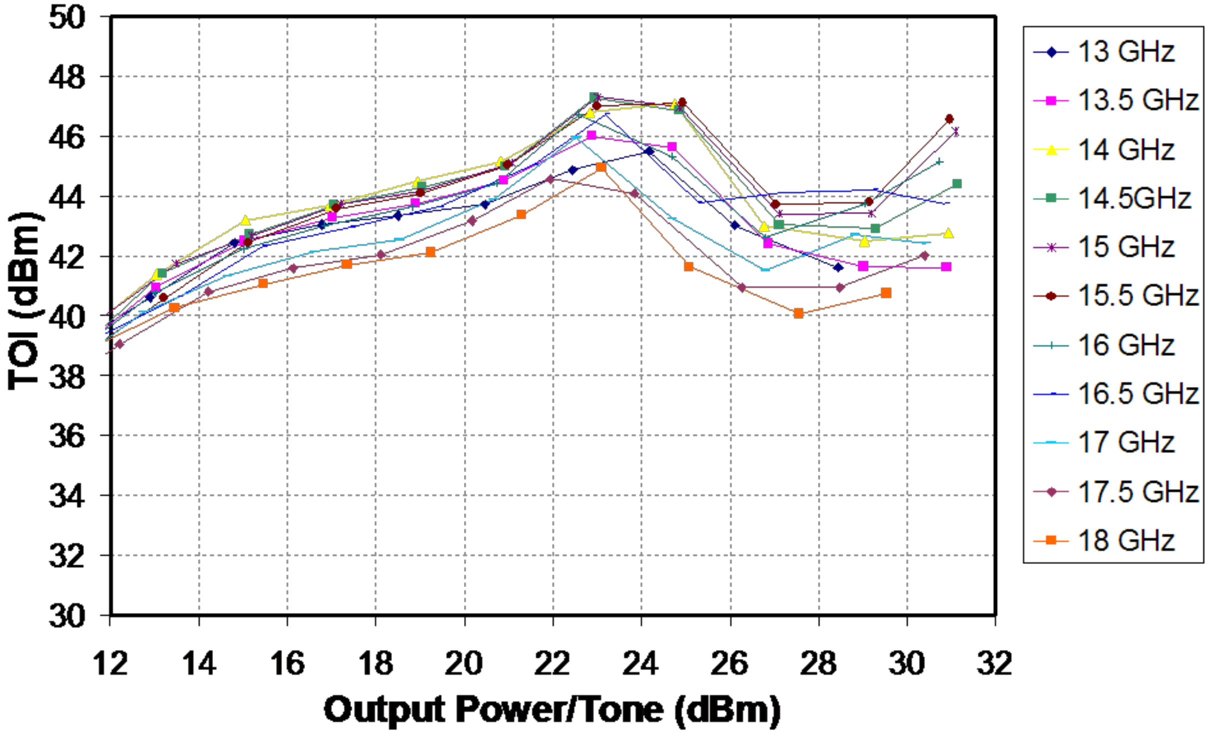


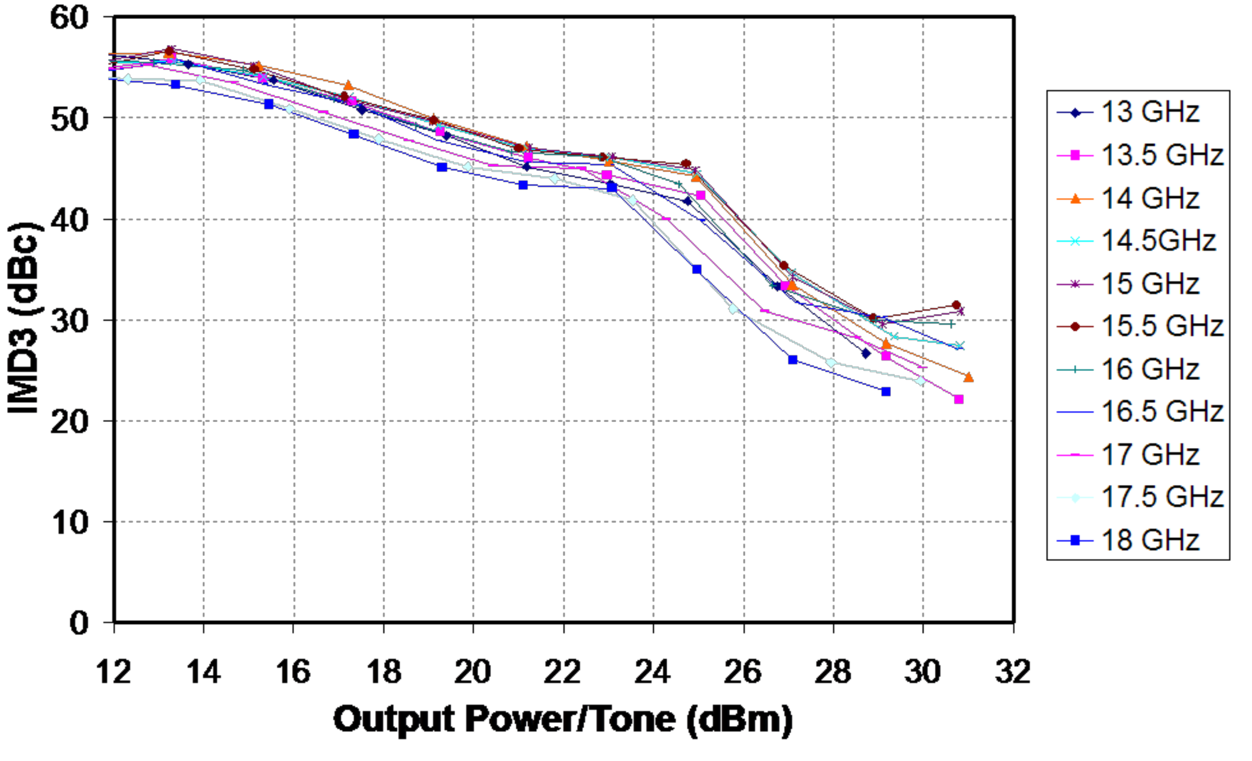




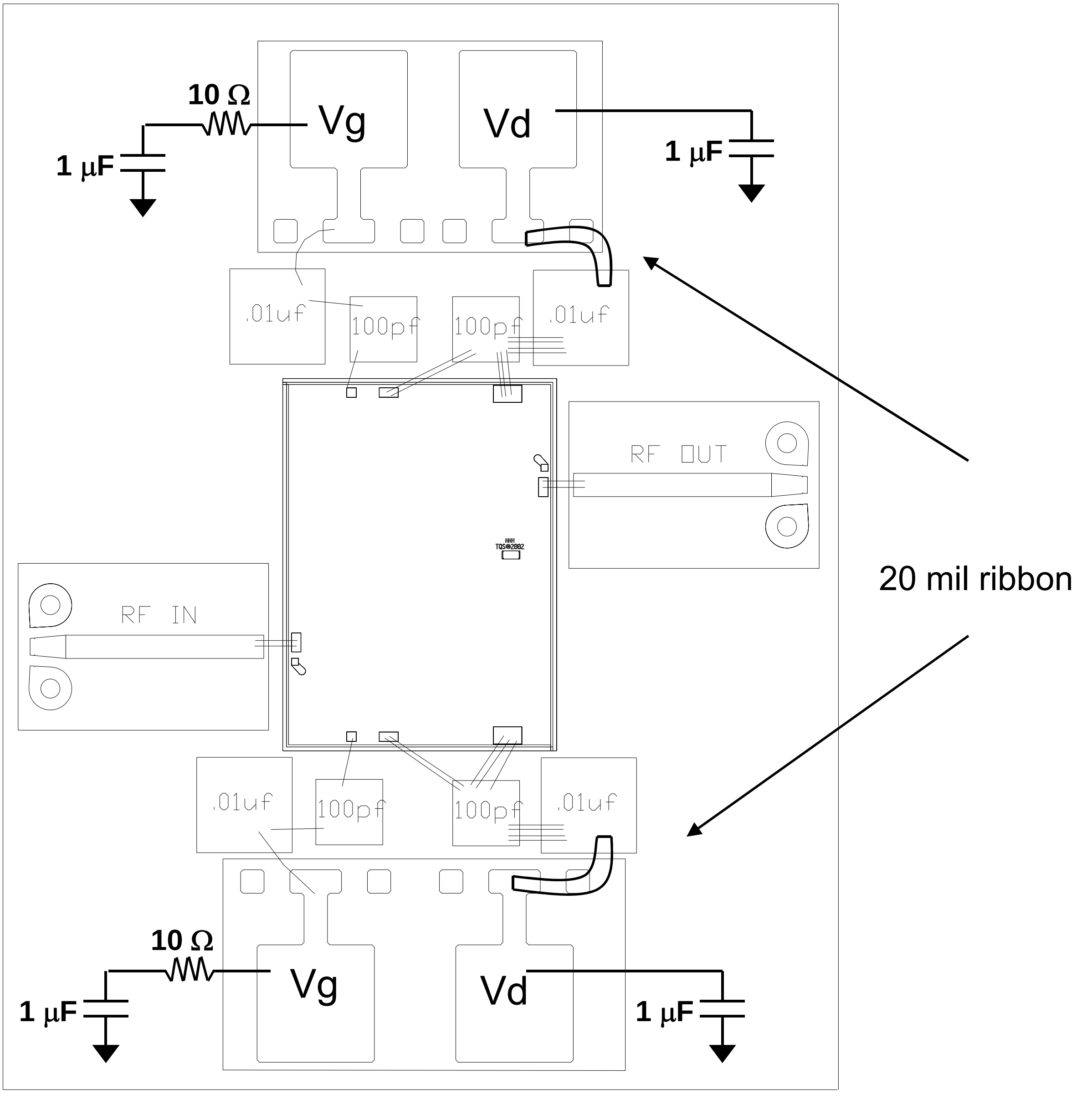
Measured Fixture Data

Bias Conditions: Vd = 8 V, Idq = 2.6A





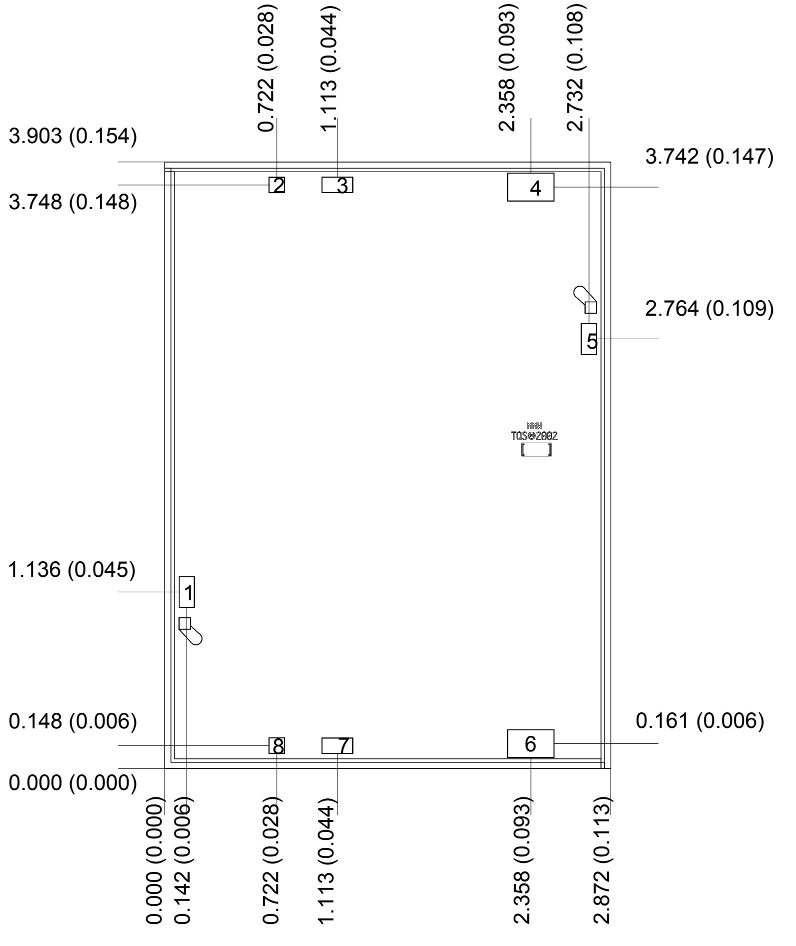
Recommended Chip Assembly Diagram



Notes:
1. Vg can be connected from either side, but 100 pf, 0.01 uf , 1uf caps and 10 ohm resistor are needed for both sides.
2. Vd connection must be biased from both sides.

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

Mechanical Drawing



Units: Millimeters (inches)
Thickness: 0.100 (0.004) (reference only)
Chip edge to bond pad dimensions are shown to center of bond pad
Chip size +/- 0.05 (0.002)

GND IS BACKSIDE OF MMIC

Bond pad #1	**RF Input**	**0.096 x 0.200 (0.004 x 0.008)**
Bond pads #2, 8	**Vg**	**0.098 x 0.098 (0.004 x 0.004)**
Bond pads #3, 7	**Vd**	**0.198 x 0.100 (0.008 x 0.004)**
Bond pads # 4, 6	**Vd**	**0.296 x 0.178 (0.012 x 0.007)**
Bond pad #5	**RF Output**	**0.096 x 0.200 (0.004 x 0.008)**

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°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.