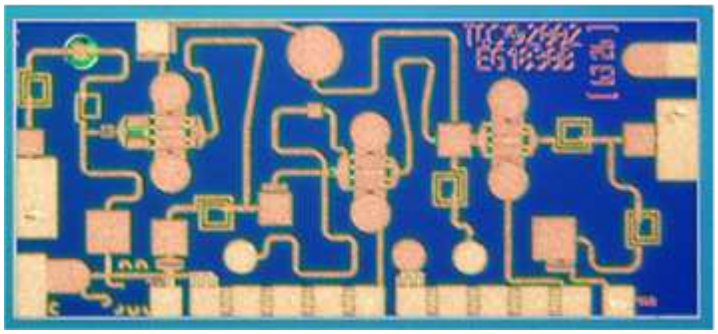
TriQuint SEMICONDUCTOR

Product Data Sheet
August 5, 2008

12-18 GHz Ku-Band 3-Stage Driver Amplifier TGA2507

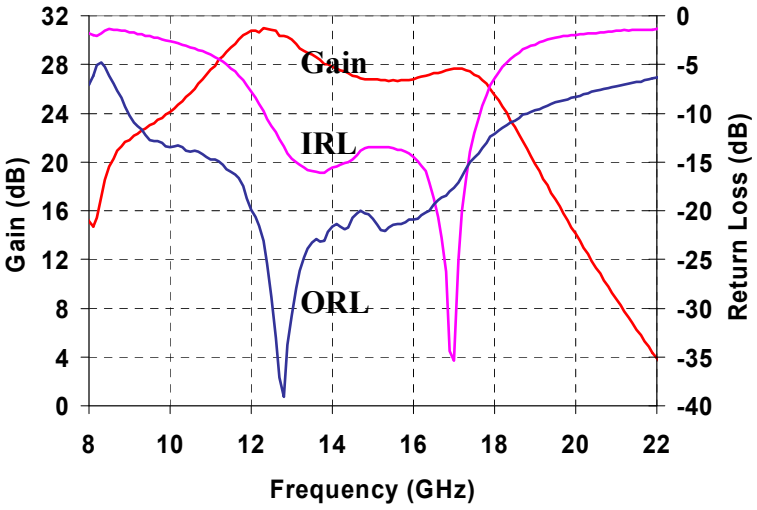


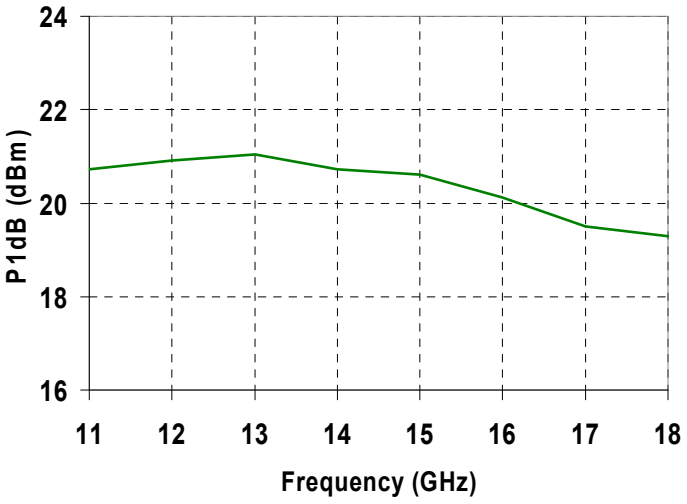
Key Features

- 12-18 GHz Bandwidth
- 28 dB Nominal Gain
- 20 dBm P1dB
- Bias: 5,6,7 V, 80 ± 10% mA Self Bias
- 0.5 um 3MI mmW pHEMT Technology
- Chip Dimensions: 1.80 x 0.83 x 0.1 mm (0.071 x 0.031 x 0.004) in

Preliminary Measured Data

Bias Conditions: Vd = 6 V, Id = 80 mA





Primary Applications

- Point to Point Radio
- Military Ku-Band
- Ku-Band Space
- VSAT

Note: Datasheet is subject to change without notice.

TABLE I
MAXIMUM RATINGS 1/

SYMBOL	PARAMETER	VALUE	NOTES
V^+	Positive Supply Voltage	8 V	2/
I^+	Positive Supply Current	114 mA	2/
P_{IN}	Input Continuous Wave Power	20 dBm	
P_D	Power Dissipation	0.91 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 power dissipation with a base plate temperature of 70° C, the median life is 1.8 E+6 hrs.

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

5/ These ratings apply to each individual FET.

TABLE II
DC PROBE TESTS
(T_A = 25 °C Nominal)

SYMBOL	PARAMETER	MINIMUM	MAXIMUM	VALUE
V_{BVGS3}	Breakdown Voltage gate-source	-30	-11	V
V_{BVGD3}	Breakdown Voltage gate-drain	-30	-11	V
V_{P2}	Pinch-off Voltage	-1.5	-0.3	V
V_{P3}	Pinch-off Voltage	-1.5	-0.3	V

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TABLE III
ELECTRICAL CHARACTERISTICS
(Ta = 25 ^{0}C, Nominal)

PARAMETER	TYPICAL	UNITS
Drain Operating	6	V
Quiescent Current	80 ± 10% Self Bias	mA
Small Signal Gain	28	dB
Input Return Loss	15	dB
Output Return Loss	20	dB
Output Power @ 1 dB Compression Gain	20	dBm

TABLE IV
THERMAL INFORMATION

Parameter	Test Conditions	T_{CH} (^{o}C)	$R_{\theta JC}$ (°C/W)	T_M (HRS)
$R_{\theta JC}$ Thermal Resistance (channel to backside of carrier)	Vd = 6 V Id = 80 mA Pdiss = 0.48 W	108	80	5.2 E+7

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

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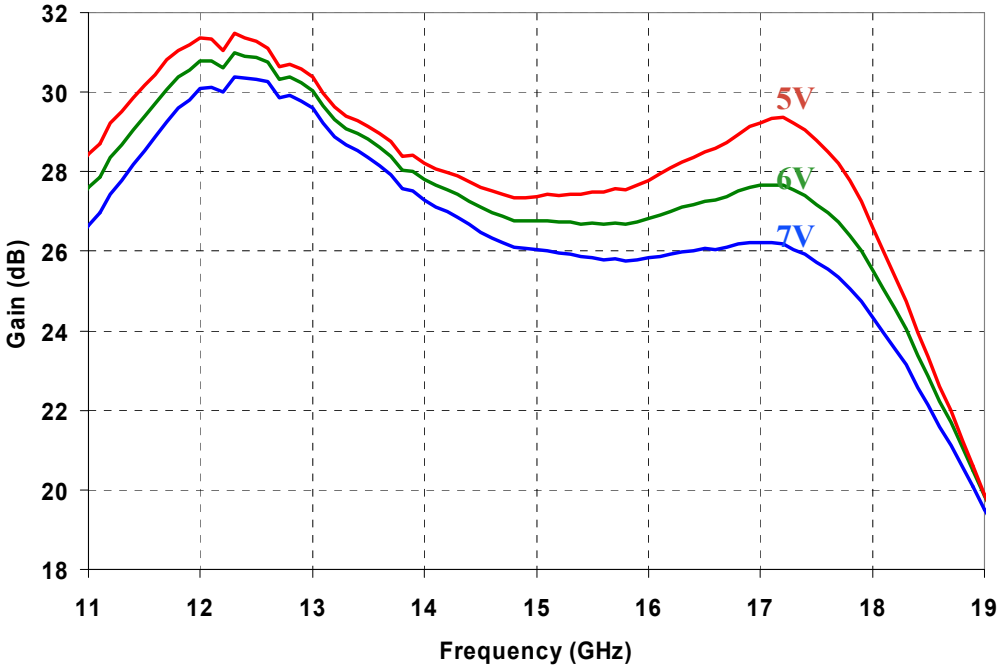
Preliminary Measured Data

Bias Conditions: Vd = 5, 6, 7 V, Id = 80 mA



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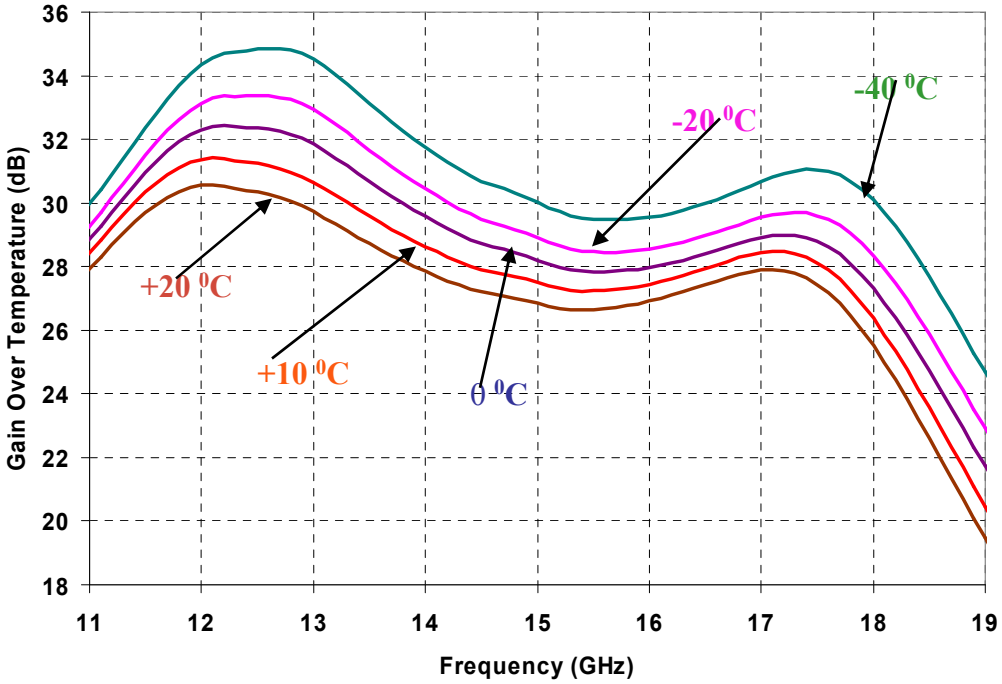

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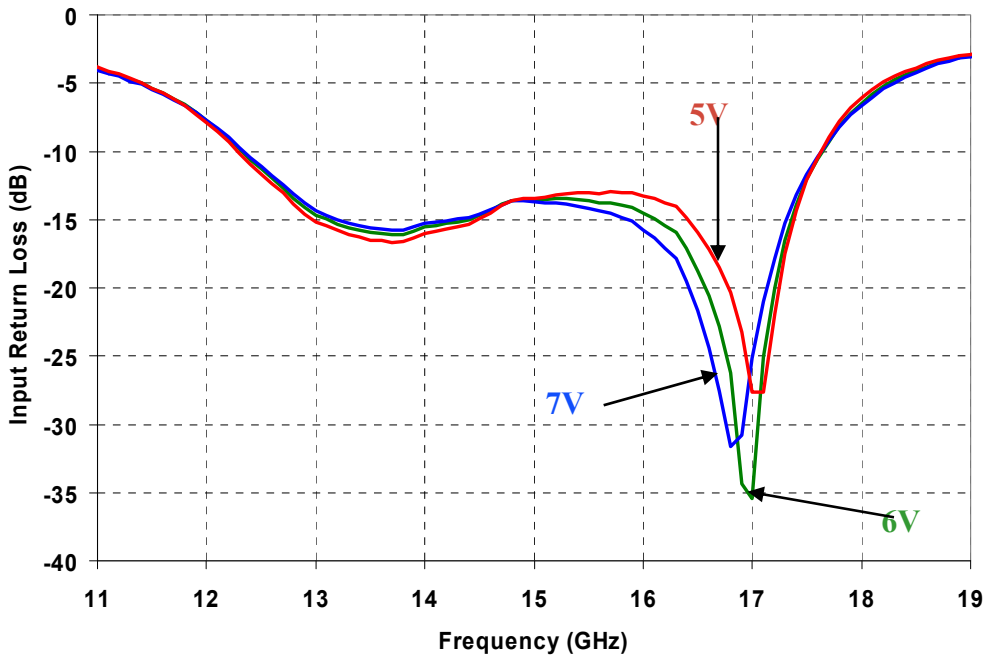

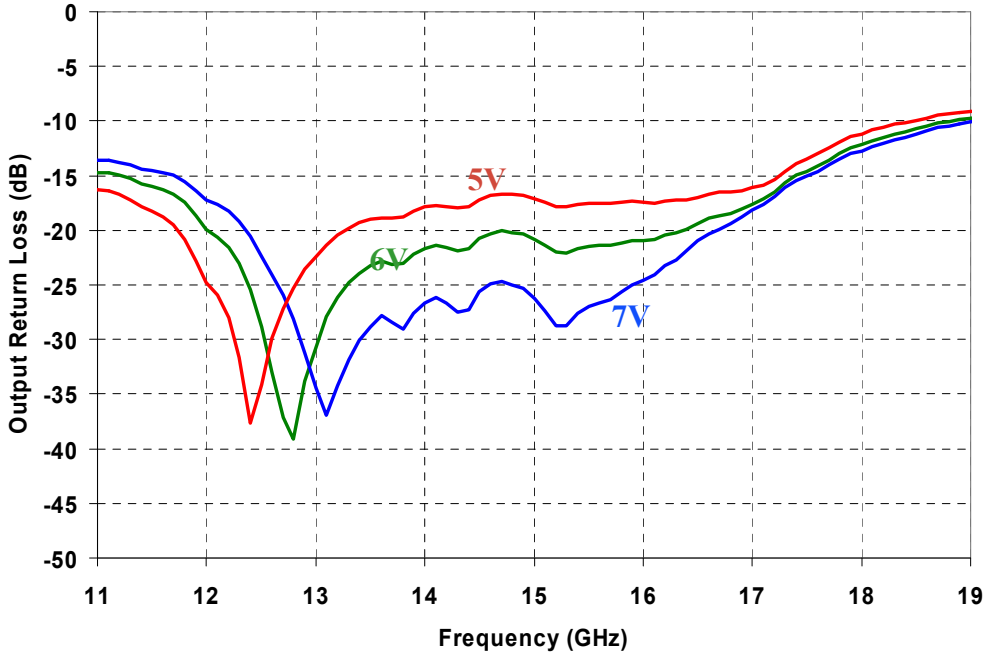

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Preliminary Measured Data

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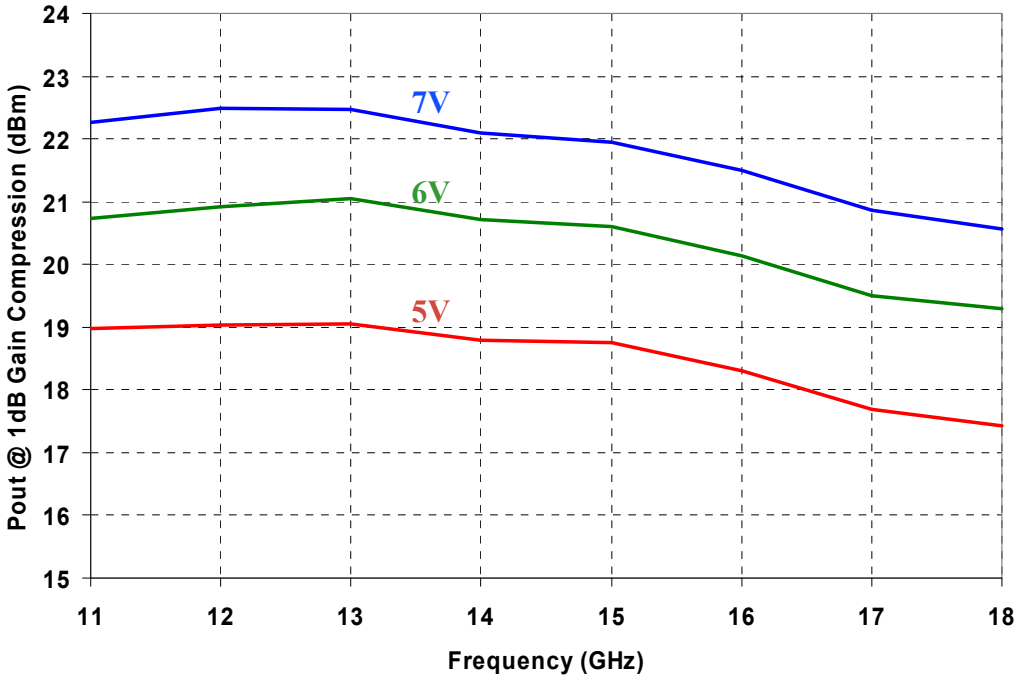
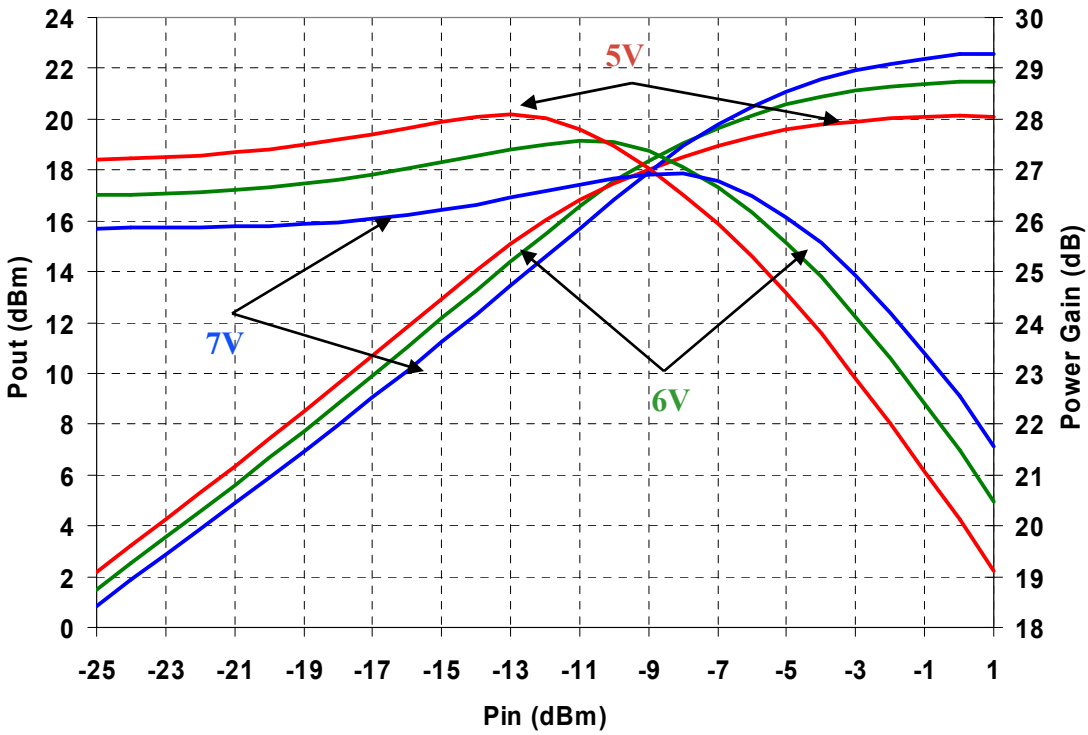
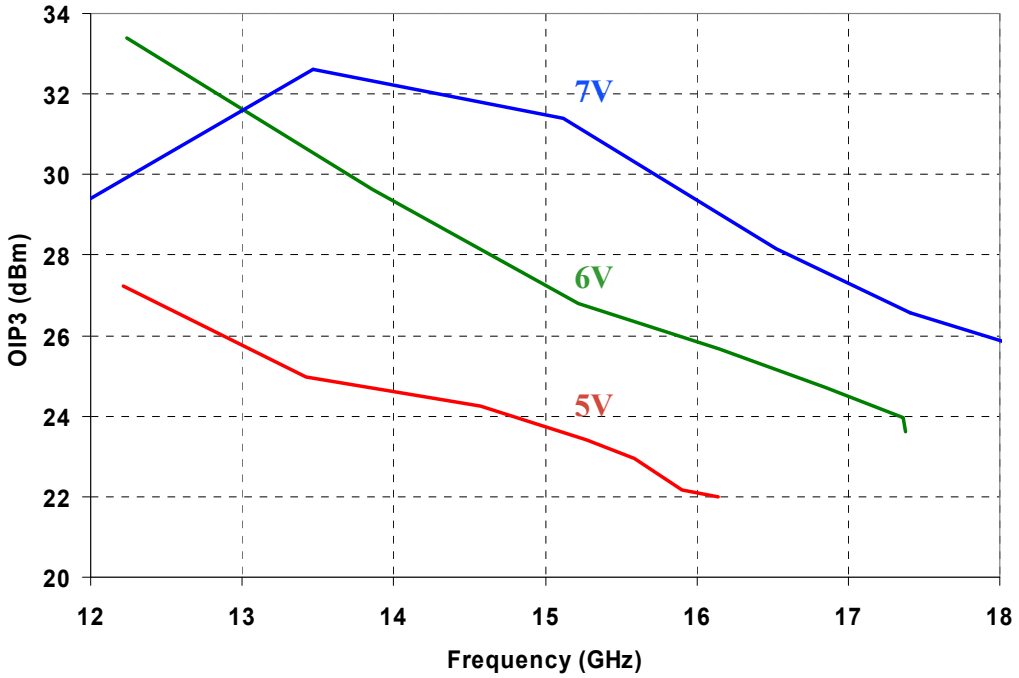


Bias Conditions: Vd = 5, 6, 7 V, Id = 80 mA, Frequency @ 15GHz

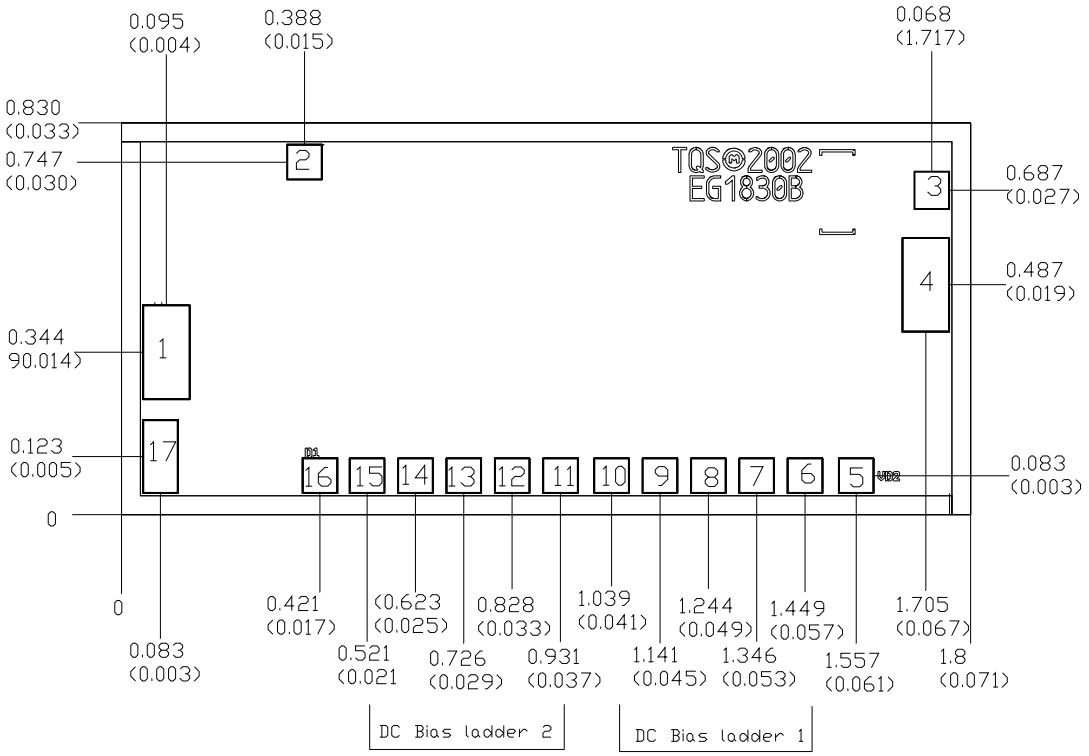


Preliminary Measured Data

Bias Conditions: Vd = 5, 6, 7 V, Id = 80 mA



Mechanical Drawing

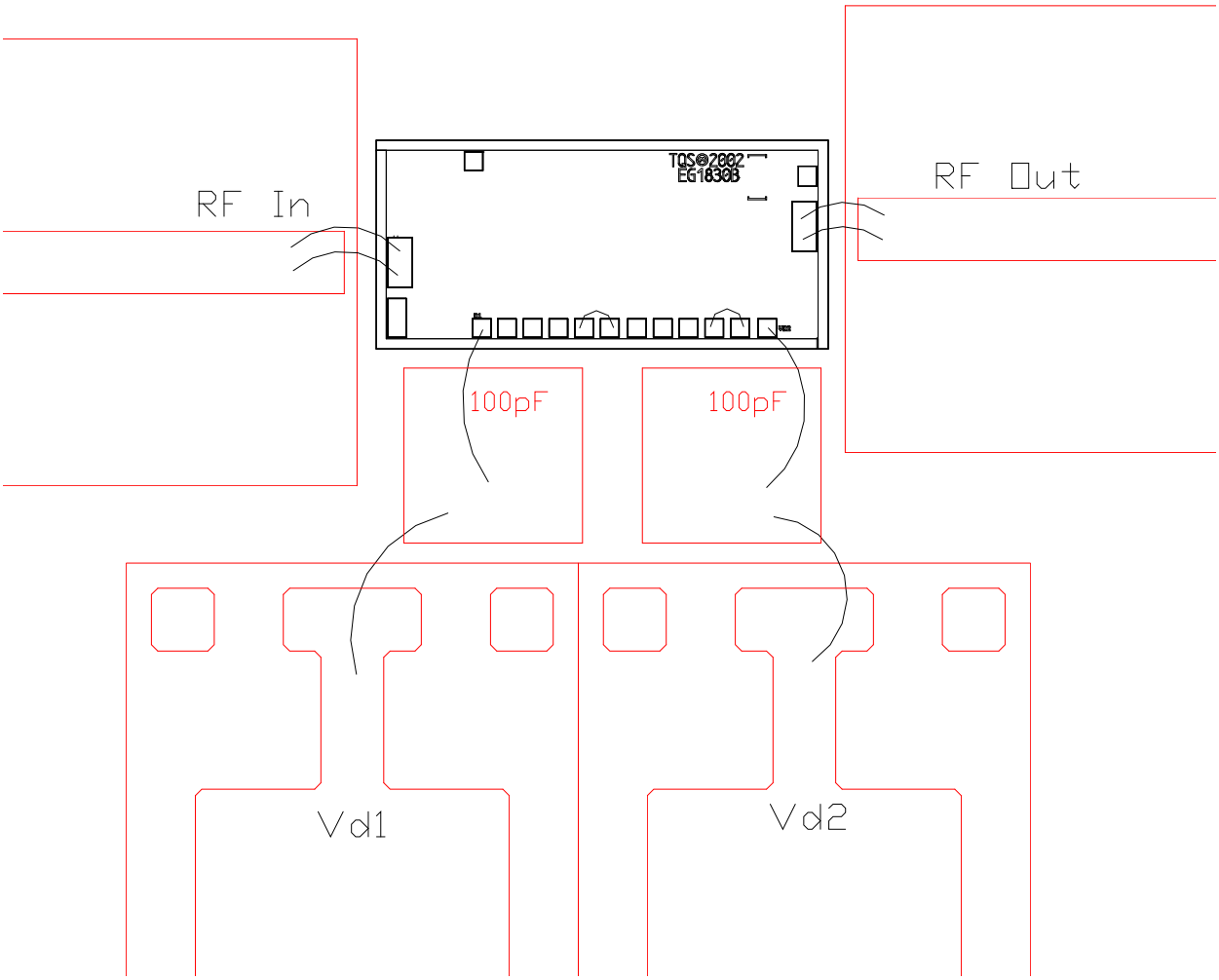


Units: millimeters (inches)
Thickness: 0.100 (0.004)
Chip edge to bond pad dimensions are shown to center of bond pad
Chip size tolerance: +/- 0.051 (0.002)
GND is back side of MMIC

Bond pad #1	(RF In)	0.100 x 0.200 (0.004 x 0.008)
Bond pad #2	(N/C)	0.075 x 0.075 (0.003 x 0.003)
Bond pad #3	(N/C)	0.075 x 0.081 (0.003 x 0.003)
Bond pad #4	(RF Out)	0.100 x 0.200 (0.004 x 0.008)
Bond pad #5	(Vd2)	0.075 x 0.075 (0.003 x 0.003)
Bond pad #6 thru #10	(DC Bias ladder 1)	0.075 x 0.075 (0.003 x 0.003)
Bond pad #11 thru #15	(DC Bias ladder 2)	0.075 x 0.075 (0.003 x 0.003)
Bond pad #16	(Vd1)	0.075 x 0.075 (0.003 x 0.003)
Bond pad #17	(N/C)	0.075 x 0.155 (0.003 x 0.006)

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

Chip Assembly Diagram



This configuration is for a self-bias logic pad current search with connections for bin #1. See Table IV for alternate bin # to get the current of typical 80 ± 10% mA.

TABLE V
PAD CONNECTIONS

BIN No.	DC BIAS LADDER 1	DC BIAS LADDER 2
1	Pad 6 to Pad 7	Pad 11 to Pad 12
2	Pad 6 to Pad 8	Pad 11 to Pad 13
3	Pad 6 to Pad 9	Pad 11 to Pad 14
4	Pad 6 to Pad 10	Pad 11 to Pad 15

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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 (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▪ C.

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