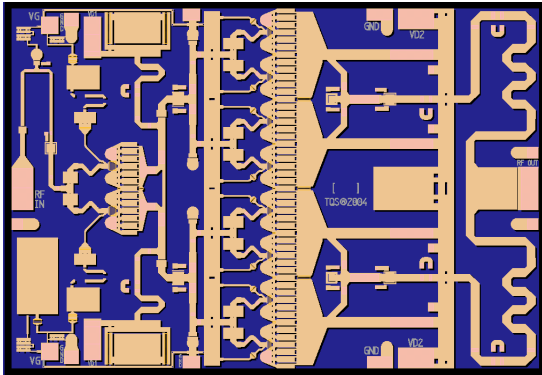


## 7 – 8.5GHz High Power Amplifier



### Key Features

- Frequency Range: 7.0 -8.5 GHz
- 37 dBm Nominal Output Power
- 21 dB Nominal Gain
- Bias: 5 V & 7 V, 1.05 A (2A under RF drive)
- 0.25 um 3MI pHEMT Technology
- Chip Dimensions 3.80 x 2.61 x 0.10 mm (0.150 x 0.103 x 0.004 in)

### Primary Applications

- Point-to-Point Radio
- Communications

### Product Description

The TriQuint TGA2701 is a High Power Amplifier MMIC for 7 – 8.5 GHz applications. The part is designed using TriQuint's 0.25 um 3MI pHEMT production process.

The TGA2701 nominally provides 37 dBm output power and 42% PAE. The typical gain is 21 dB.

The part is ideally suited for low cost markets such as Point-to-Point Radio and Communications.

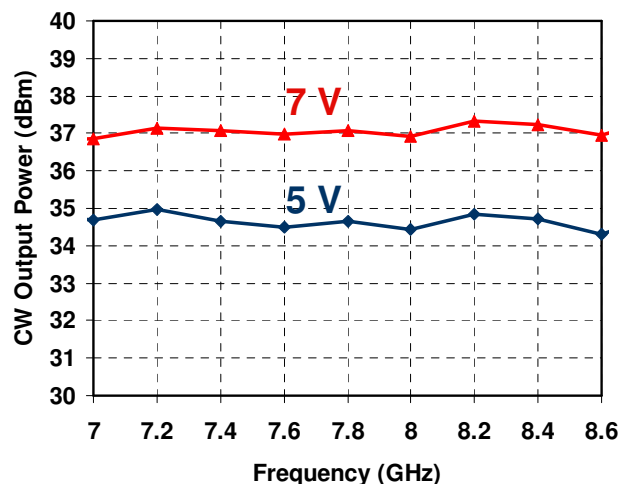
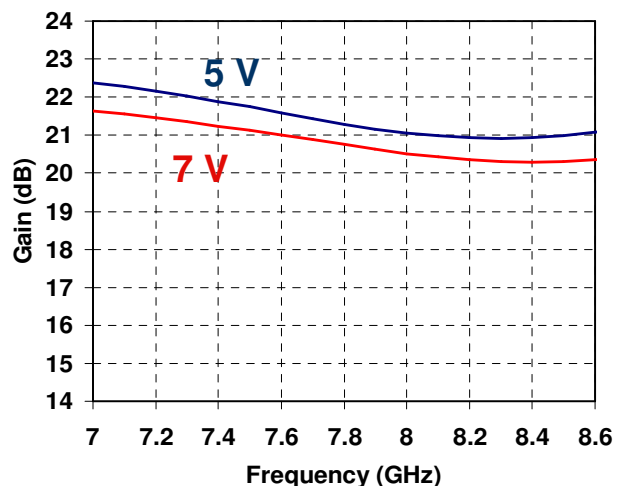
The TGA2701 is 100% DC and RF tested on-wafer to ensure performance compliance.

The TGA2701 has a protective surface passivation layer providing environmental robustness.

Lead-Free & RoHS compliant.

### Measured Fixtured Data

Bias:  $V_d = 5\text{ V} \ \& \ 7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$



Note: Devices is early in the characterization process prior to finalizing all electrical specifications. Specifications are subject to change without notice

**TABLE I**  
**ABSOLUTE MAXIMUM RATINGS 1/**

<b>SYMBOL</b>	<b>PARAMETER</b>	<b>VALUE</b>	<b>NOTES</b>
V <sub>d</sub>	Drain Voltage	10 V	
V <sub>g</sub>	Gate Voltage Range	-1 TO +0.5 V	
I <sub>d</sub>	Drain Current	3.85 A	
I <sub>g</sub>	Gate Current	85 mA	
P <sub>IN</sub>	Input Continuous Wave Power	29 dBm	
P <sub>D</sub>	Power Dissipation	38.5 W	
T <sub>channel</sub>	Channel Temperature	200 °C	<u>2/</u>
	Mounting Temperature (30 Seconds)	320 °C	
	Storage Temperature	-65 to 150 °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/ Junction operating temperature will directly affect the device median lifetime. For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.

**TABLE II**  
**ELECTRICAL CHARACTERISTICS**  
(Ta = 25 °C Nominal)

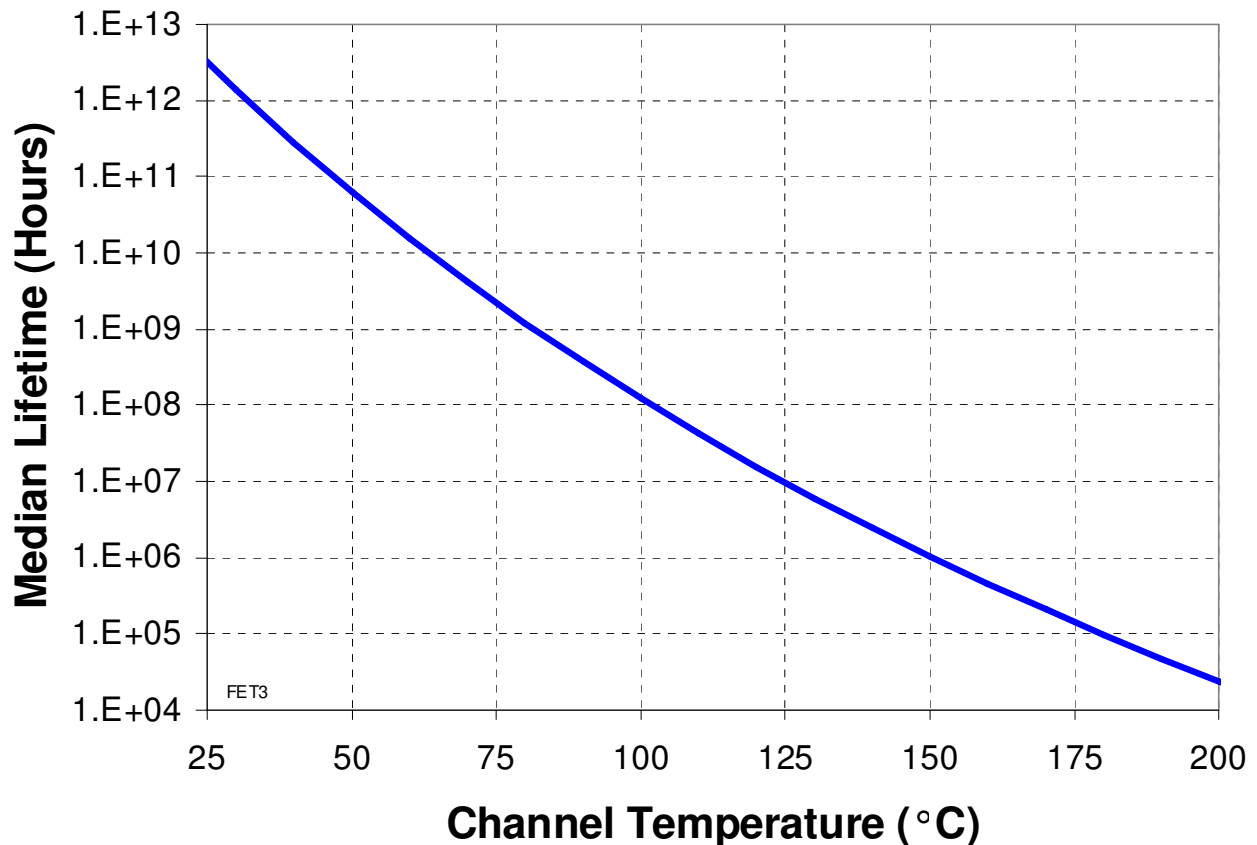
PARAMETER	TYPICAL	TYPICAL	UNITS
Frequency Range	7.0 – 8.5	7.0 – 8.5	GHz
Drain Voltage, Vd	5	7	V
Drain Current, Id	1.05	1.05	A
Gate Voltage, Vg	-0.7	-0.7	V
Small Signal Gain, S21	21	20.5	dB
Input Return Loss, S11	12	12	dB
Output Return Loss, S22	10	10	dB
CW Saturated Output Power @ 22 dBm Pin	34.5	37	dBm
Pulsed Saturated Output Power @ 22 dBm Pin & 25% Duty Cycle	34.5	37	dBm
CW Power Added Eff. @ 22 dBm Pin	40	42	%
Pulsed Power Added Eff. @ 22 dBm Pin & 25% Duty Cycle	40	42	%
Small Signal Gain Temperature Coefficient	-0.03	-0.03	dB/°C

**TABLE III  
THERMAL INFORMATION**

PARAMETER	TEST CONDITIONS	Tchannel (°C)	$\theta_{JC}$ (°C/W)	Tm (HRS)
$\theta_{JC}$ Thermal Resistance (channel to Case)	Vd = 7 V Id = 1.05 A P <sub>diss</sub> = 7.35 W Small Signal	122	7.1	1.2E+7
$\theta_{JC}$ Thermal Resistance (channel to Case)	Vd = 7 V Id = 1.8 A @ Psat P <sub>diss</sub> = 7.4 W P <sub>out</sub> = 5.2 W (RF)	123	7.1	1.2E+7

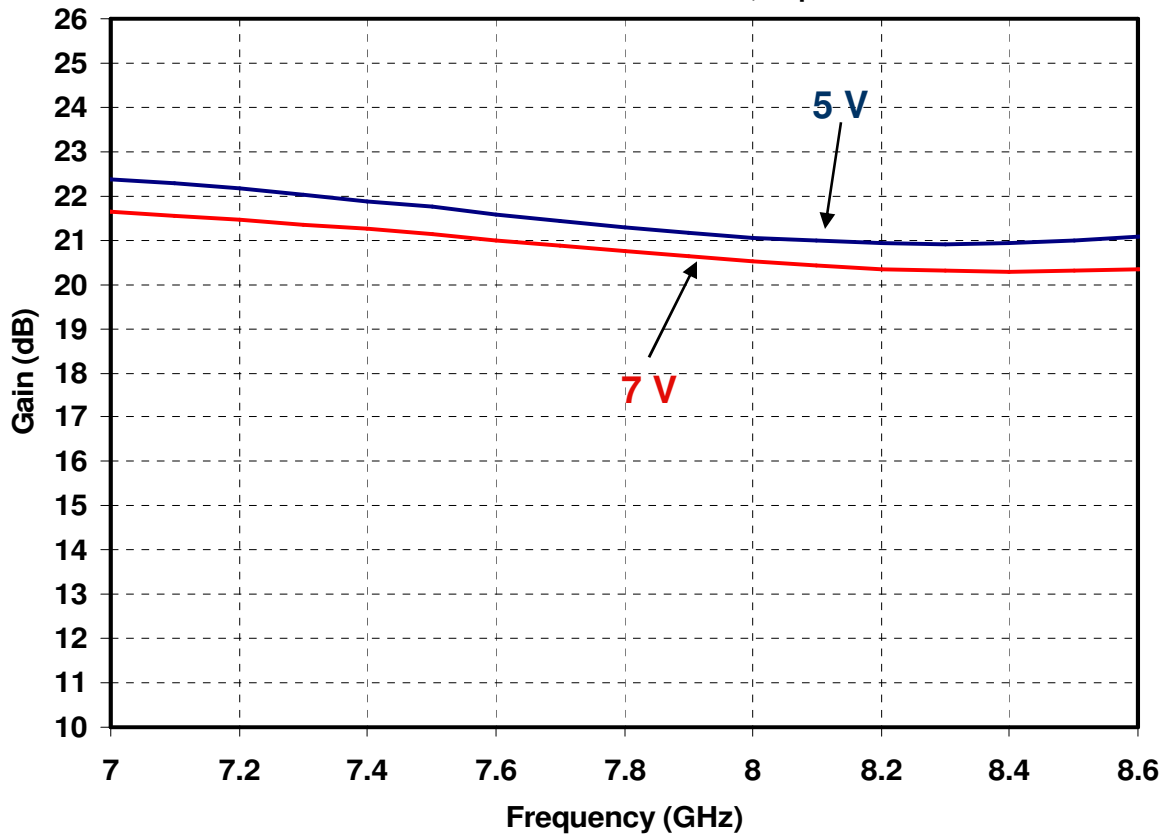
Note: Assumes eutectic attach using 1.5 mil 80/20 AuSn mounted to a 20 mil CuMo Carrier at 70 °C baseplate temperature.

**Median Lifetime (Tm) vs. Channel Temperature**



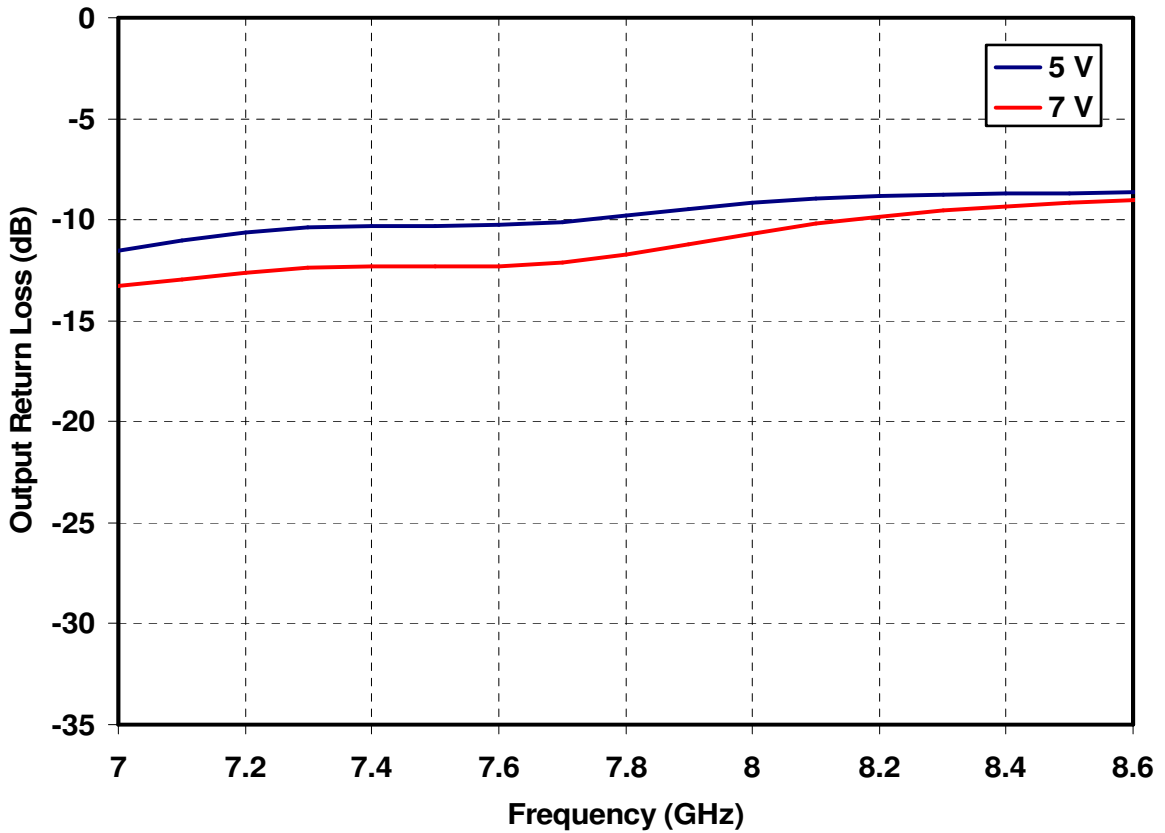
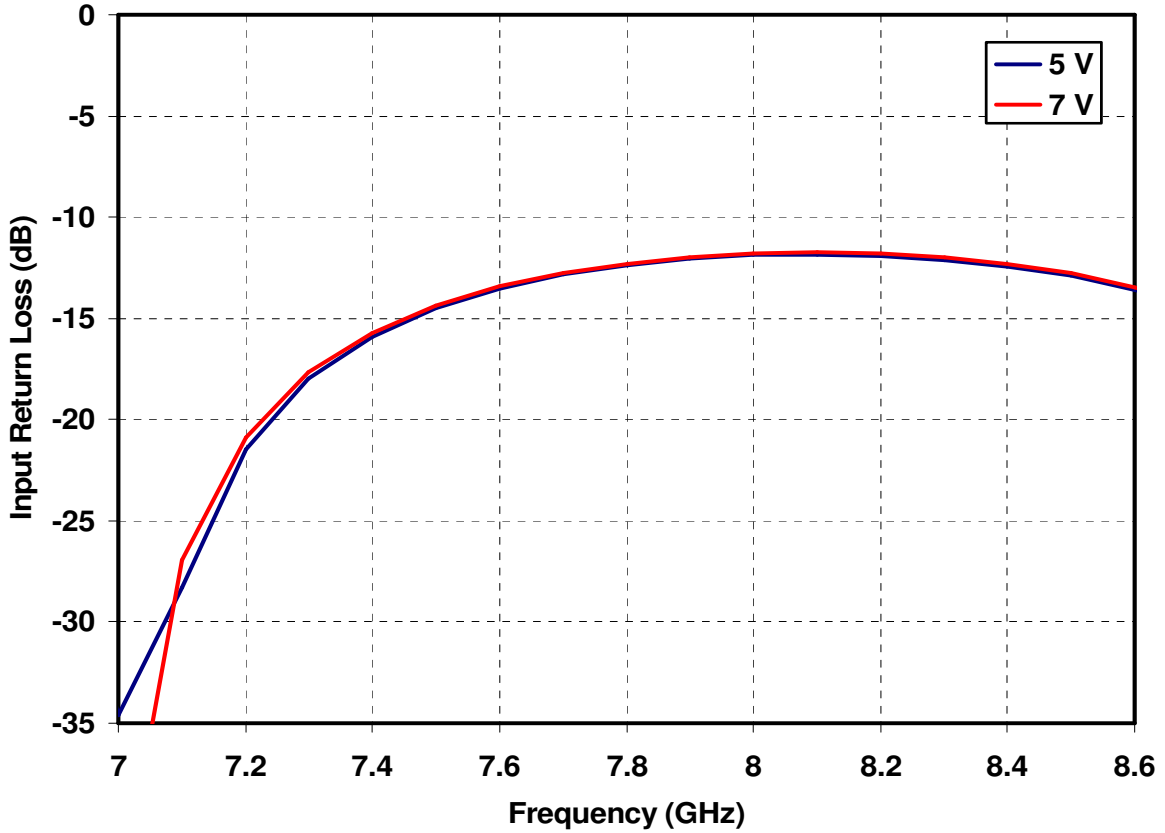
### Measured Data

Bias Conditions:  $V_d = 5\text{ V}$  &  $7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$



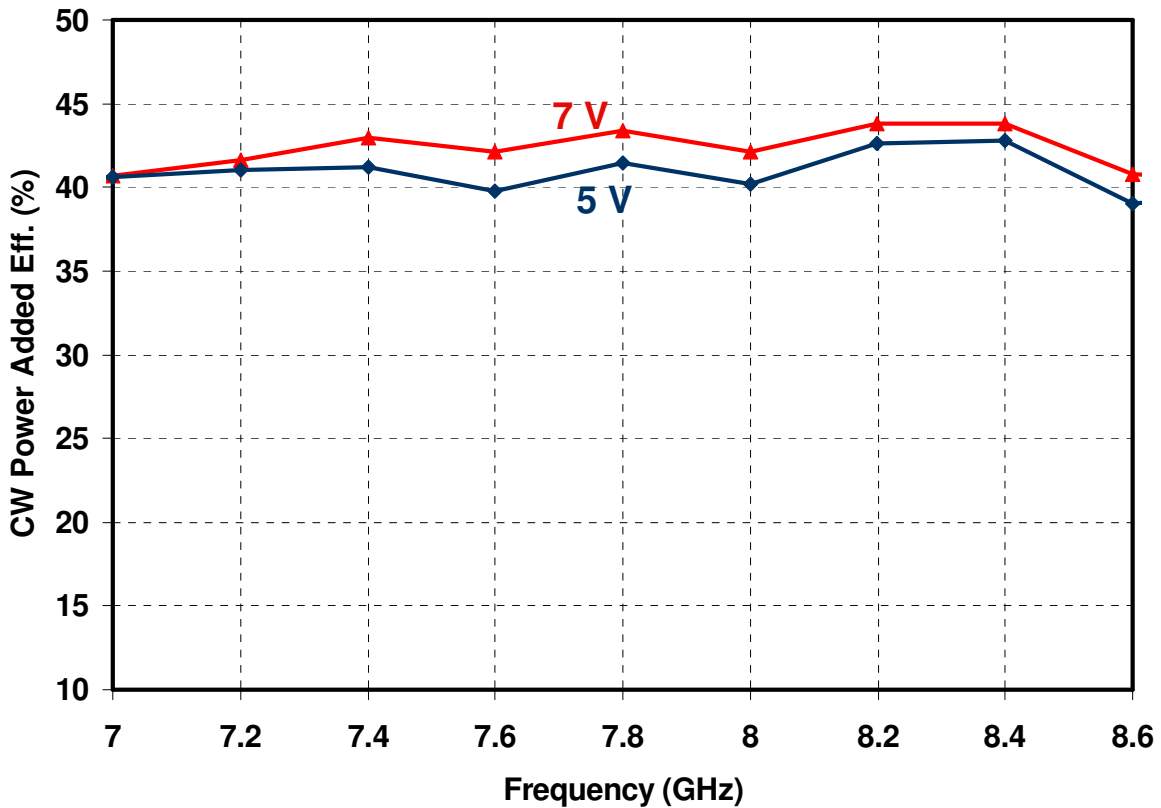
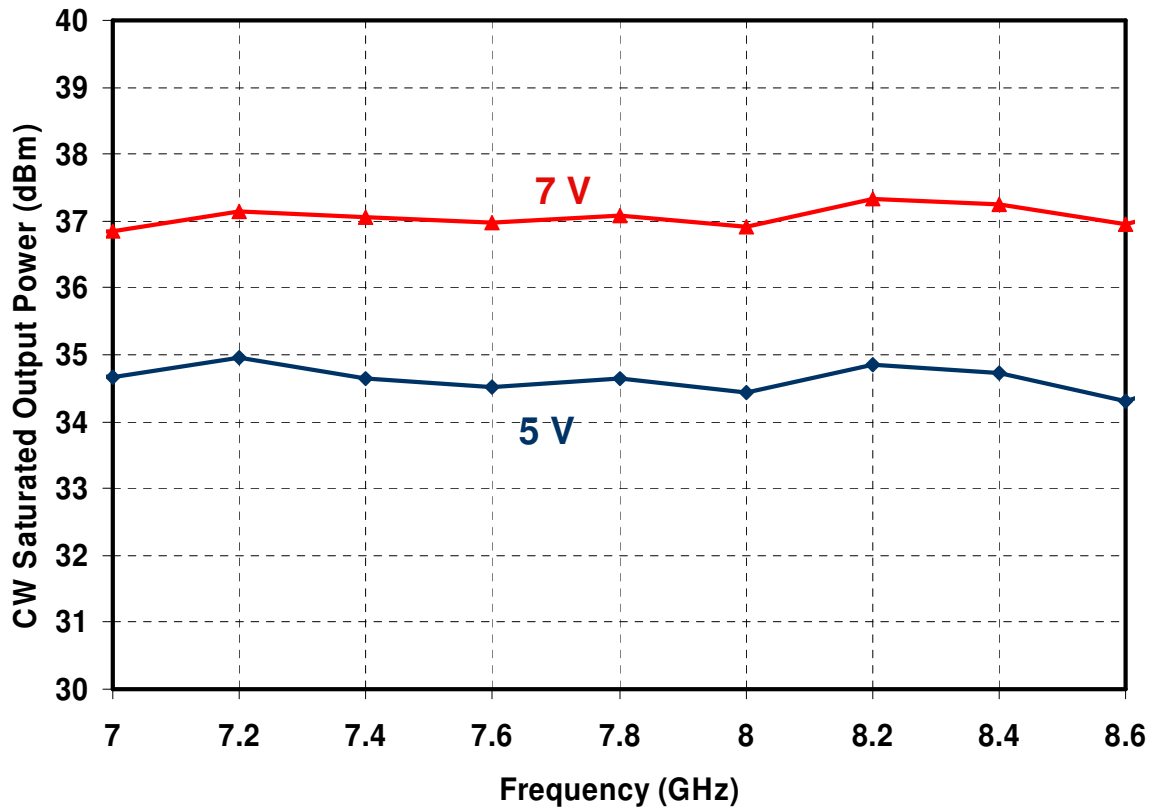
**Measured Data**

Bias Conditions:  $V_d = 5\text{ V}$  &  $7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$



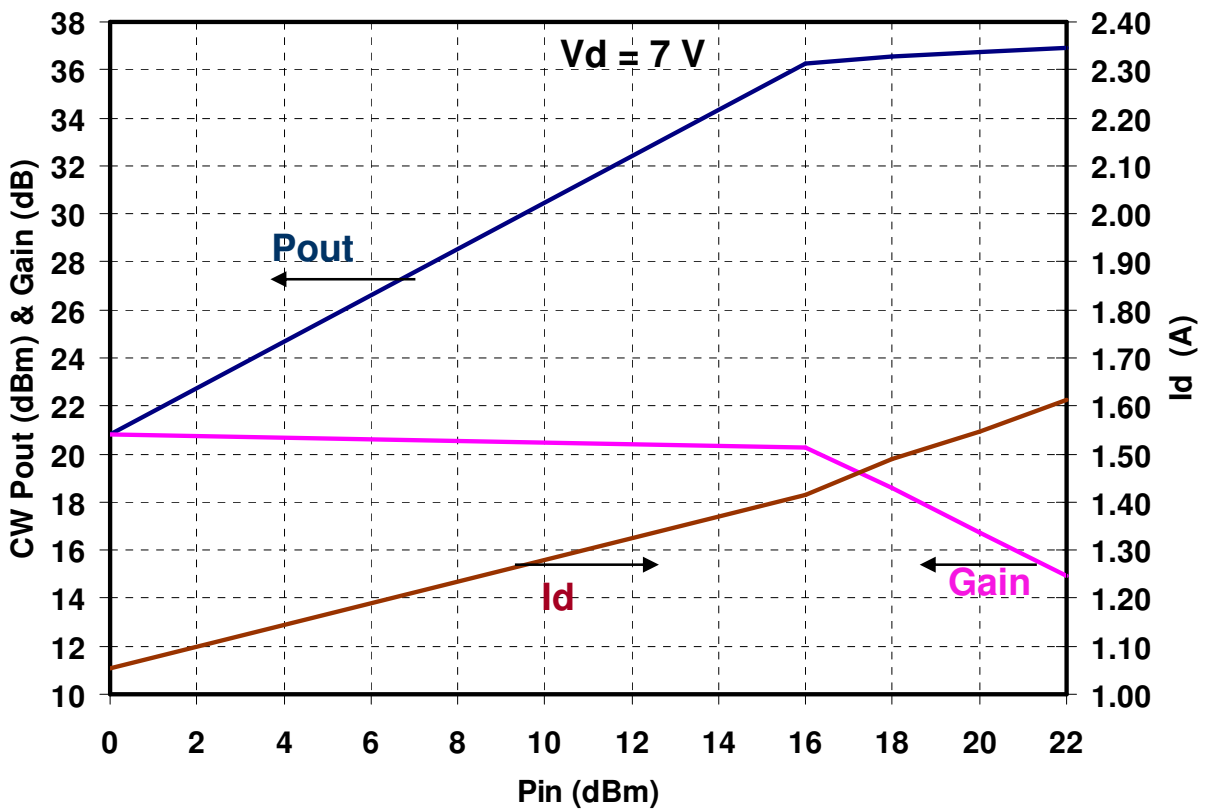
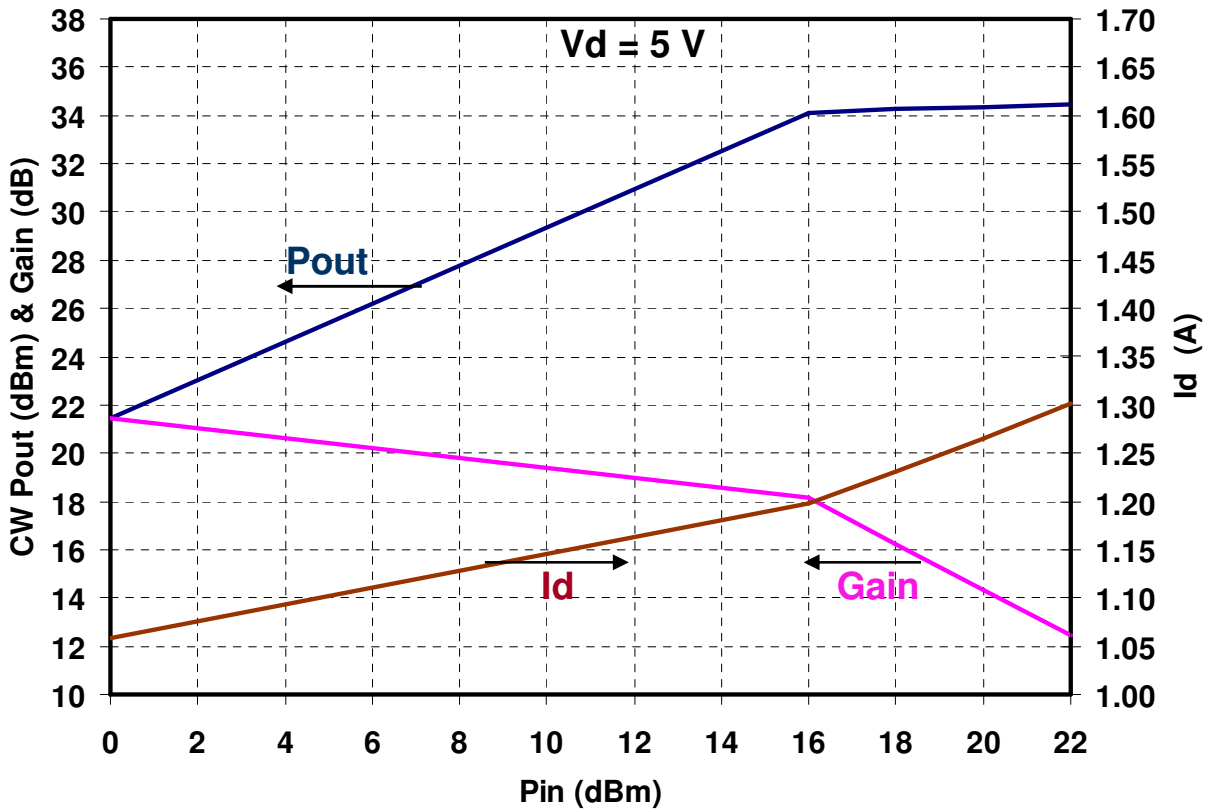
### Measured Data

Bias:  $V_d = 5\text{ V}$  &  $7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$ ,  $P_{in} = 22\text{ dBm}$ , CW Power



**Measured Data**

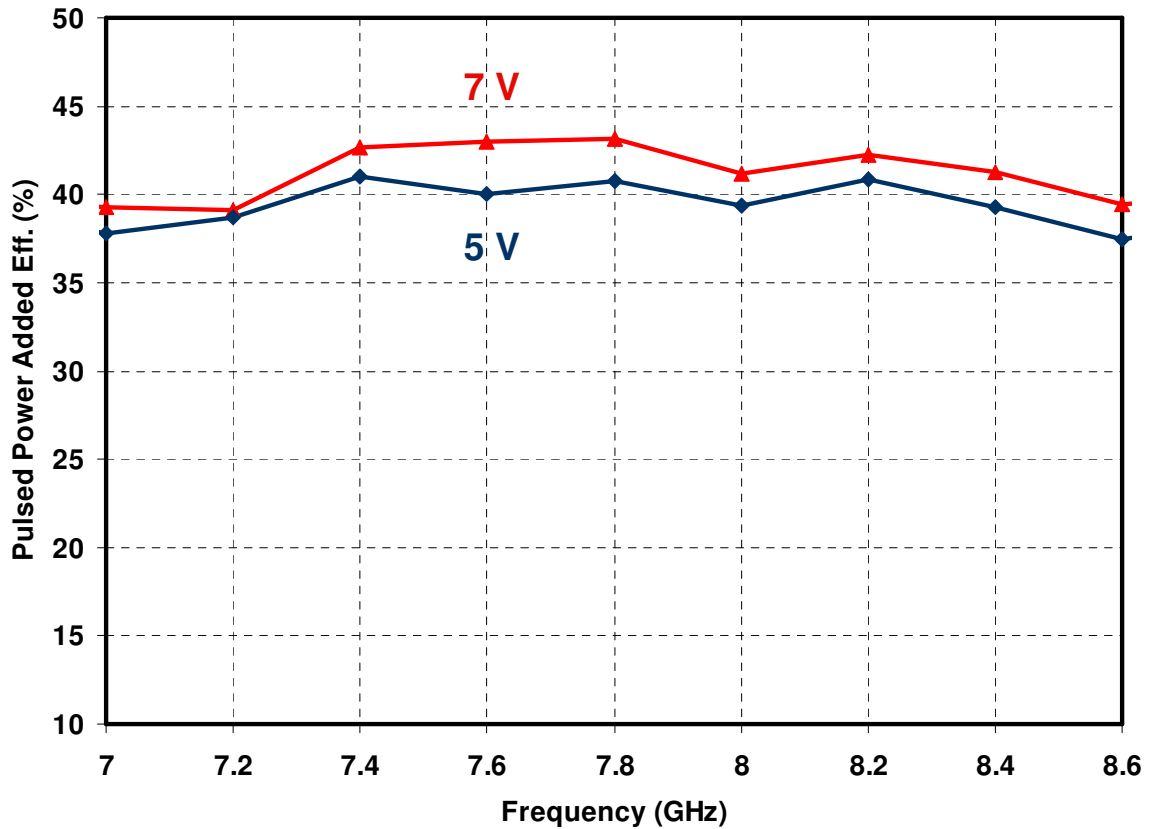
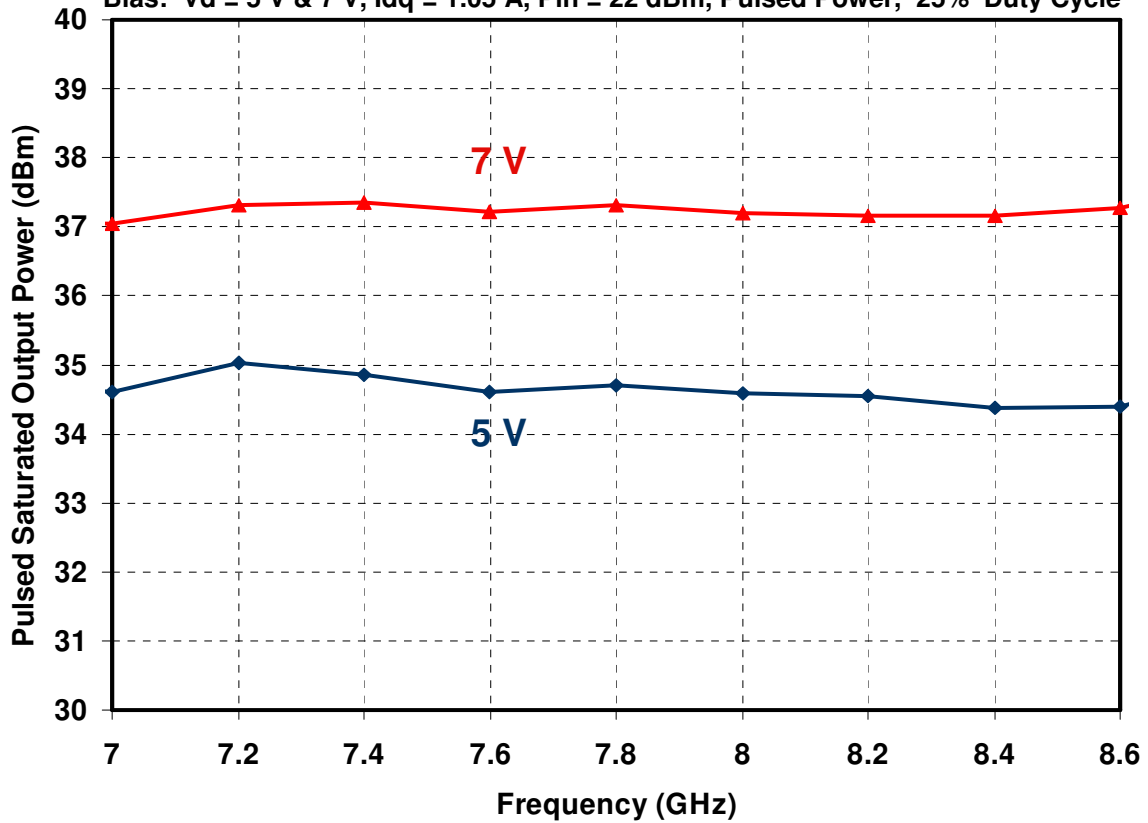
Bias:  $V_d = 5\text{ V} \text{ \& } 7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$ , Freq = 8 GHz, CW Power





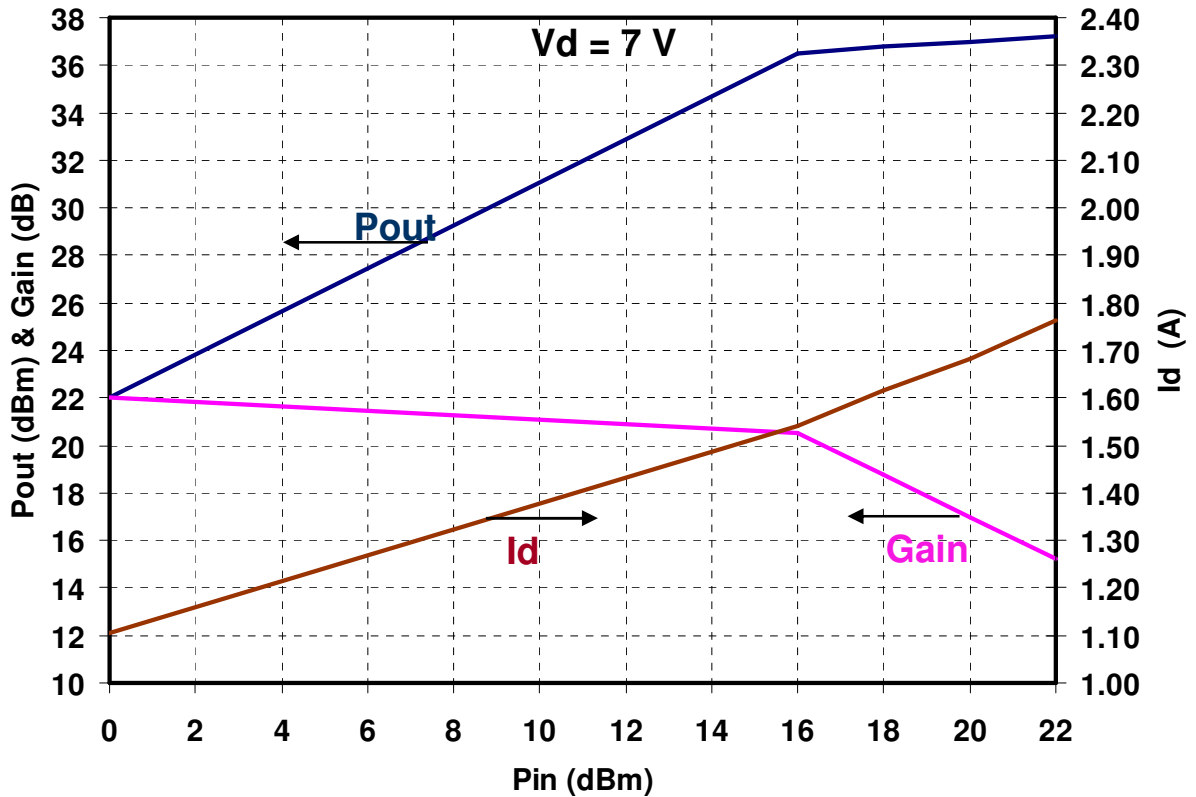
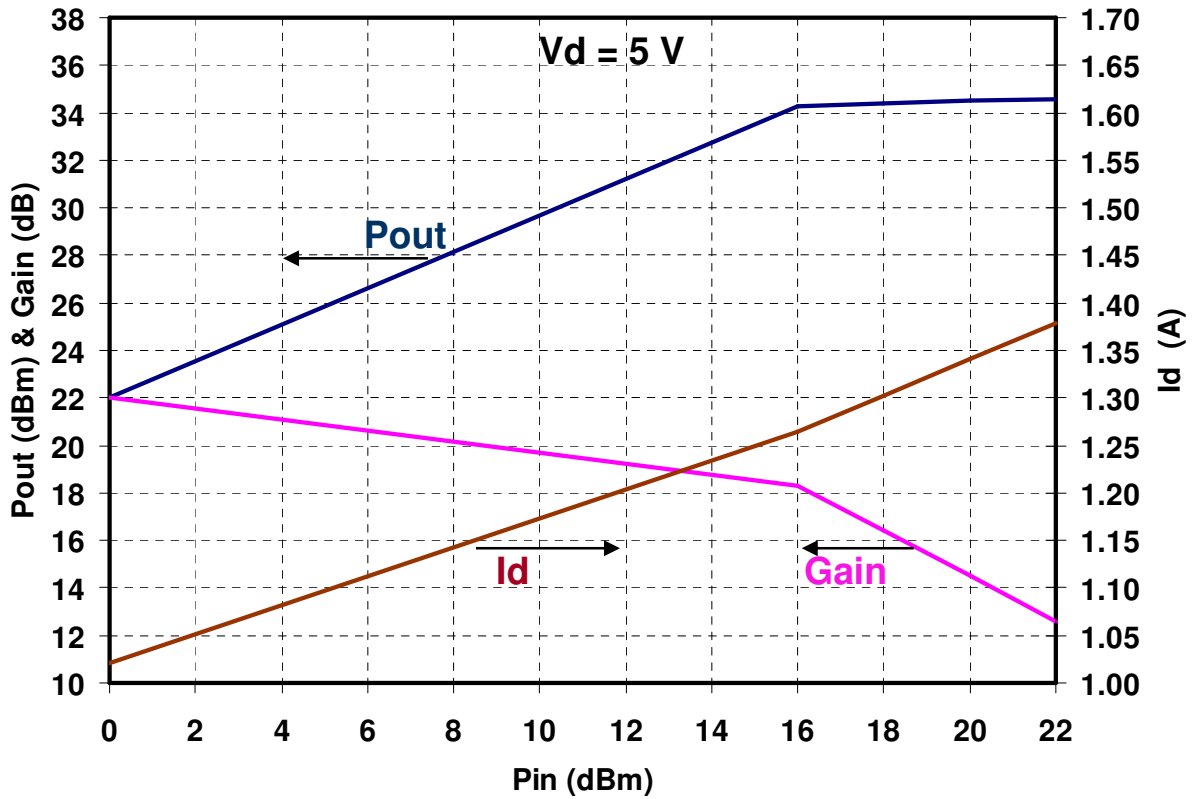
### Measured Data

Bias:  $V_d = 5\text{ V} \text{ \& } 7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$ ,  $P_{in} = 22\text{ dBm}$ , Pulsed Power, 25% Duty Cycle



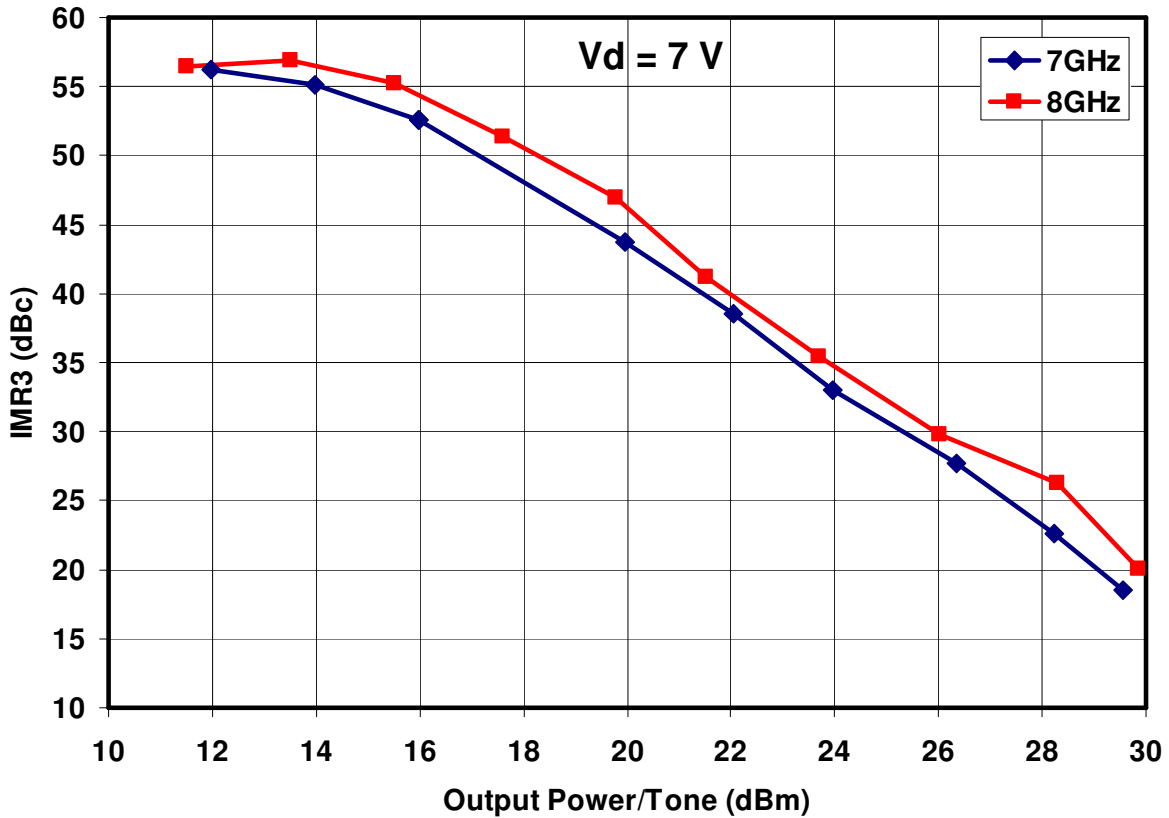
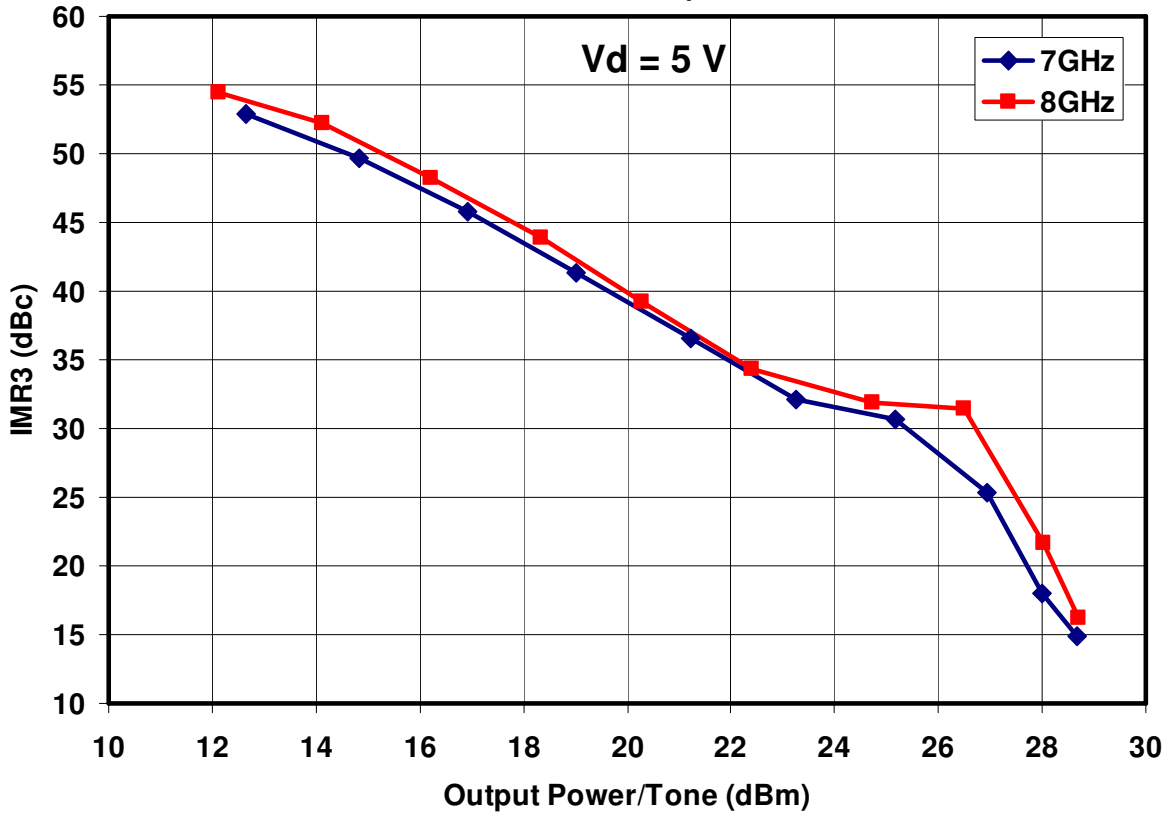
**Measured Data**

Bias:  $I_{dq} = 1.05$  A, Frequency = 8 GHz, Pulsed Power, 25% Duty Cycle



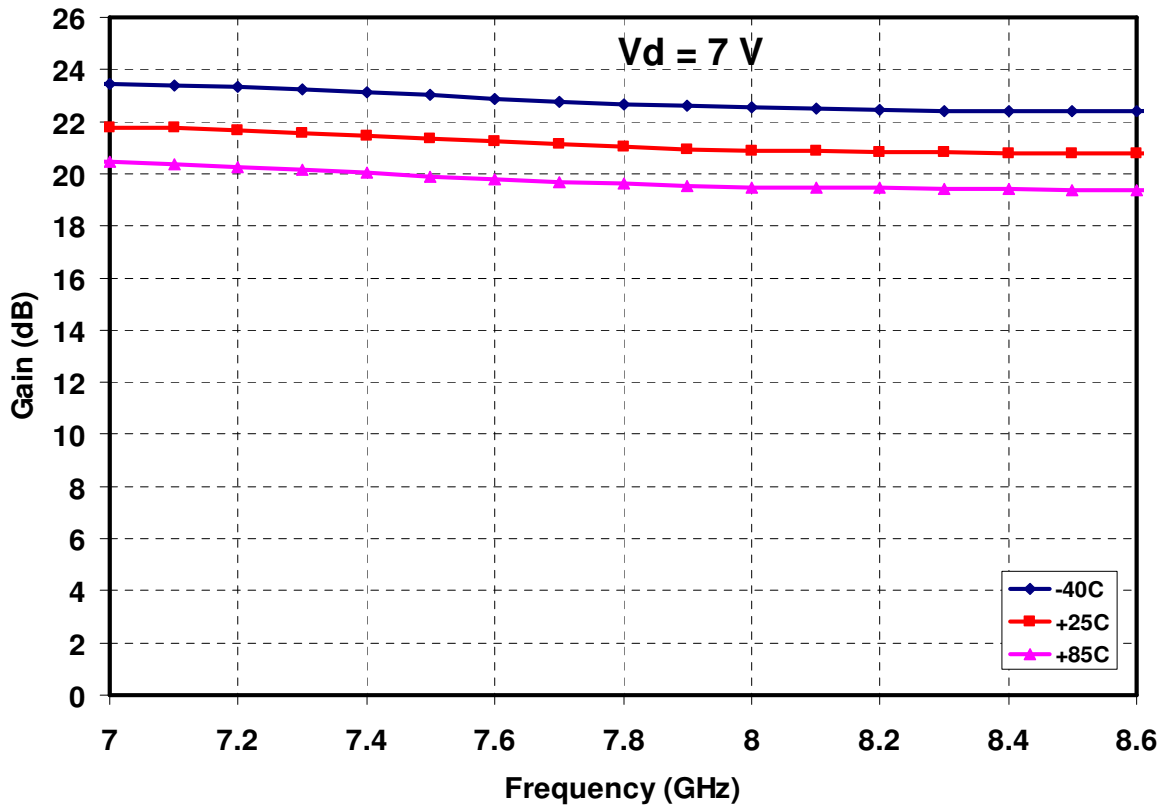
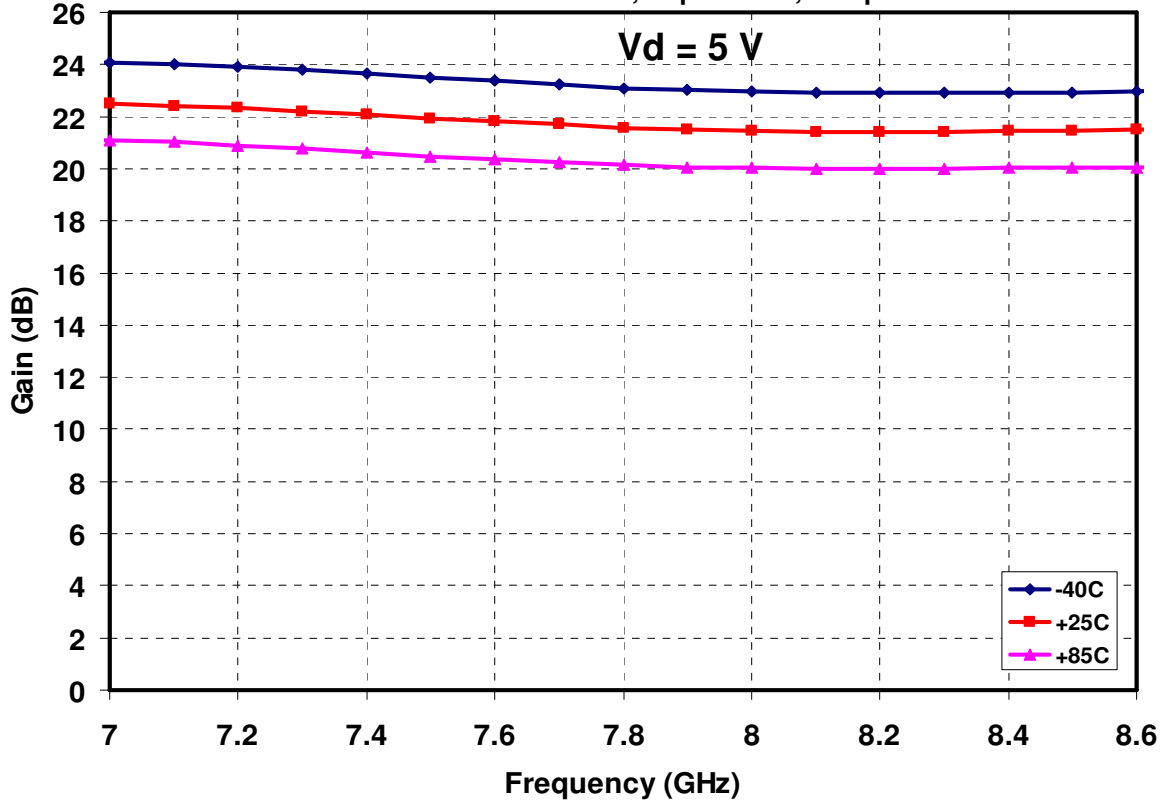
**Measured Data**

Bias:  $V_d = 5\text{ V} \text{ \& } 7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$ , CW TOI



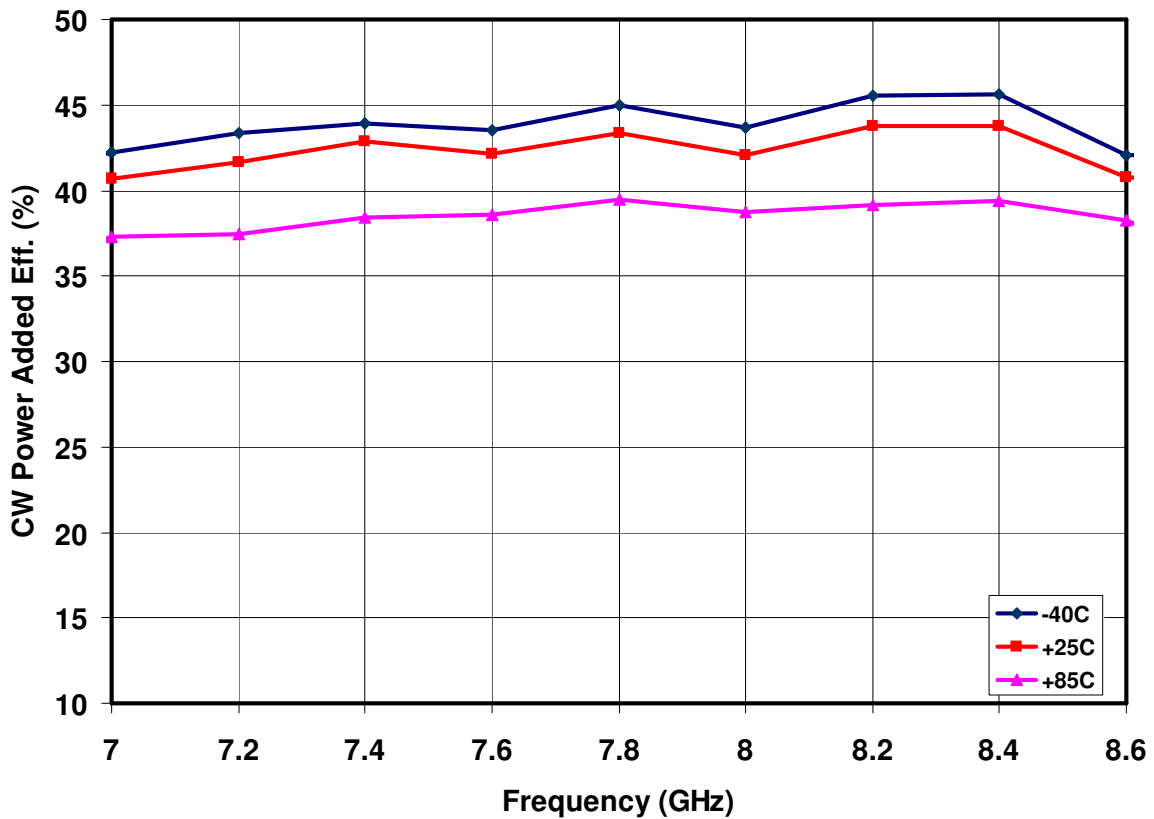
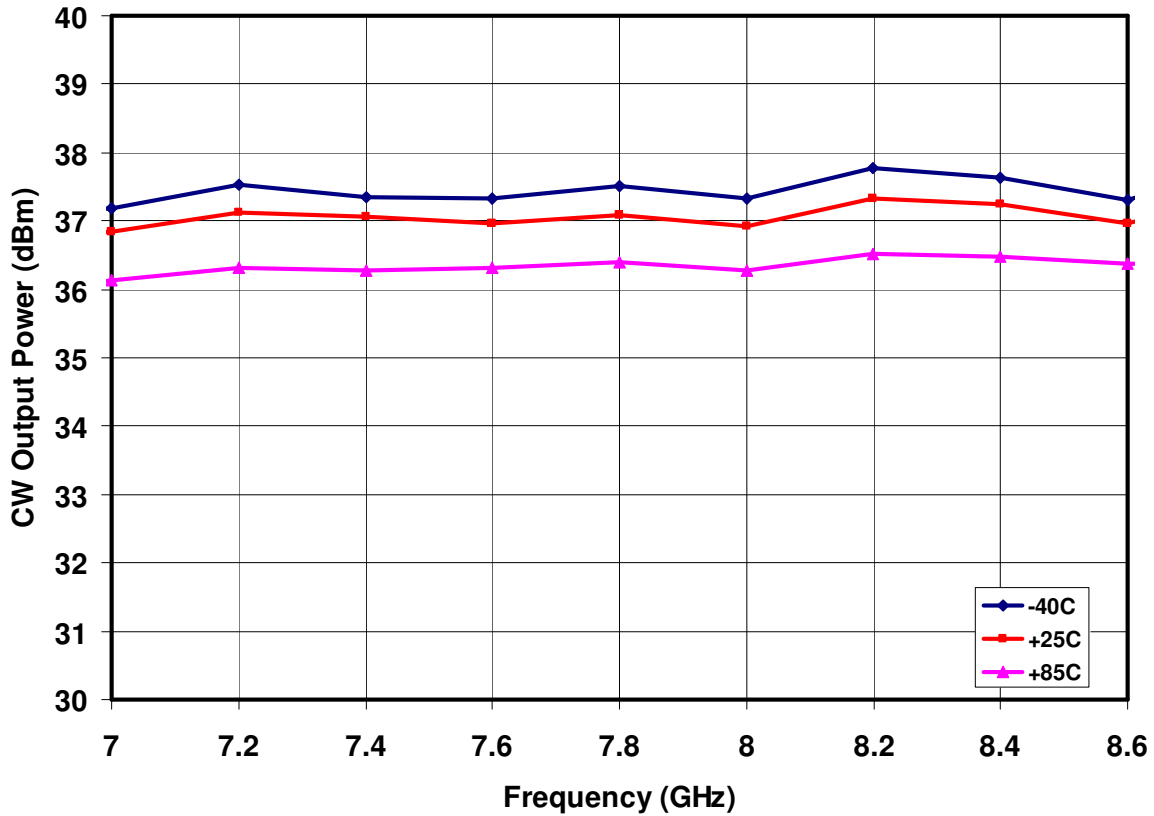
**Measured Data**

Bias Conditions:  $V_d = 5\text{ V}$  &  $7\text{ V}$ ,  $I_{dQ} = 1.05\text{ A}$ , Temperature Data



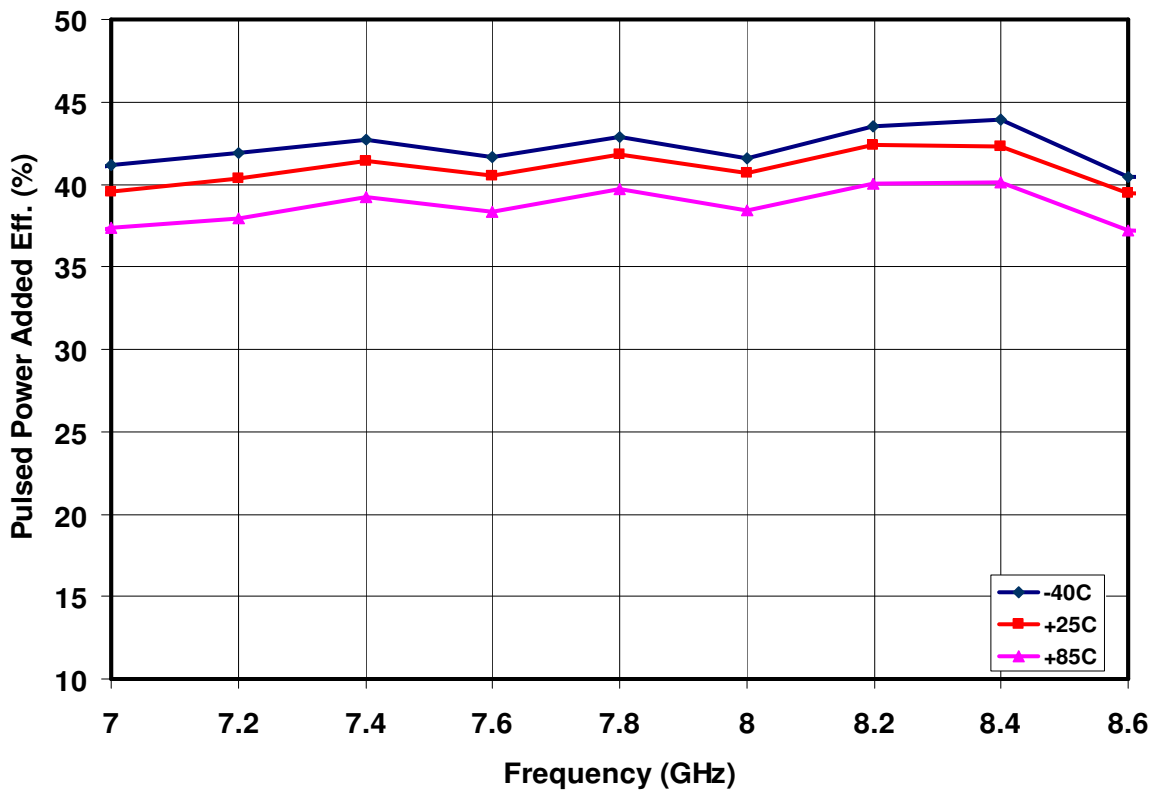
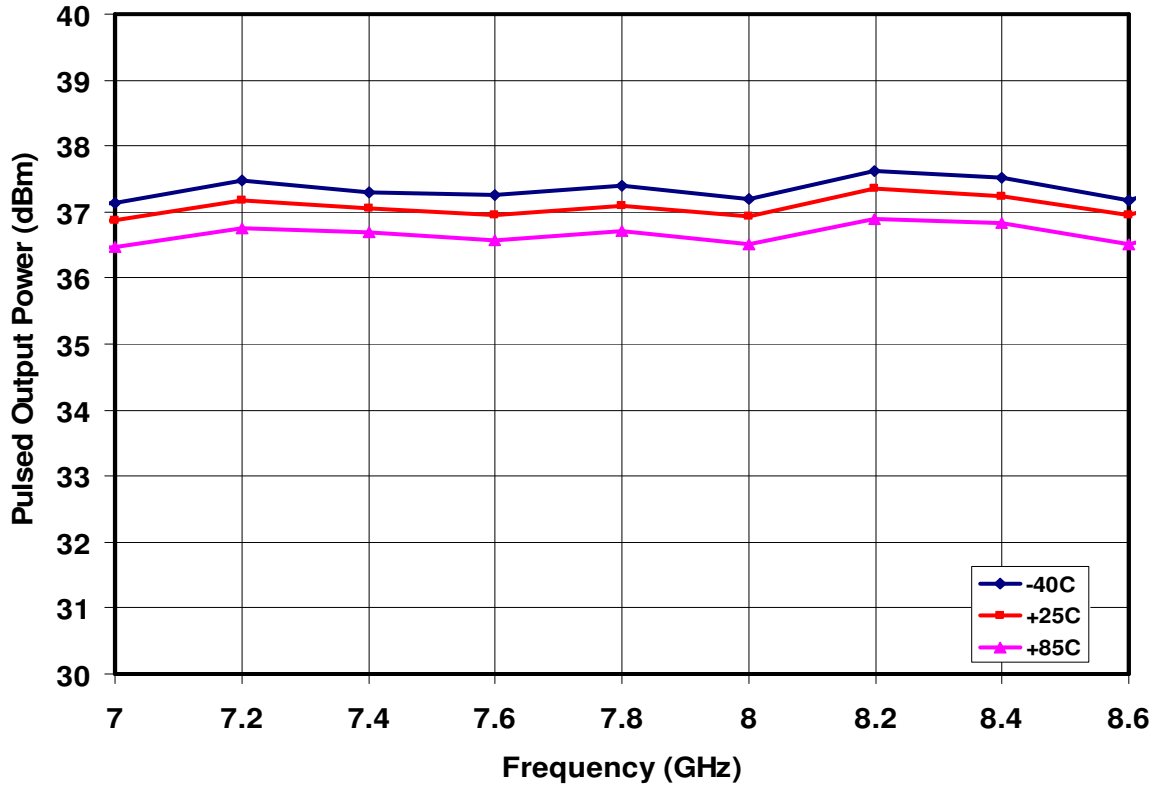
### Measured Data

Bias:  $V_d = 7\text{ V}$ ,  $I_{dq} = 1.05\text{ A}$ ,  $P_{in} = 22\text{ dBm}$ , CW Power, Temperature Data

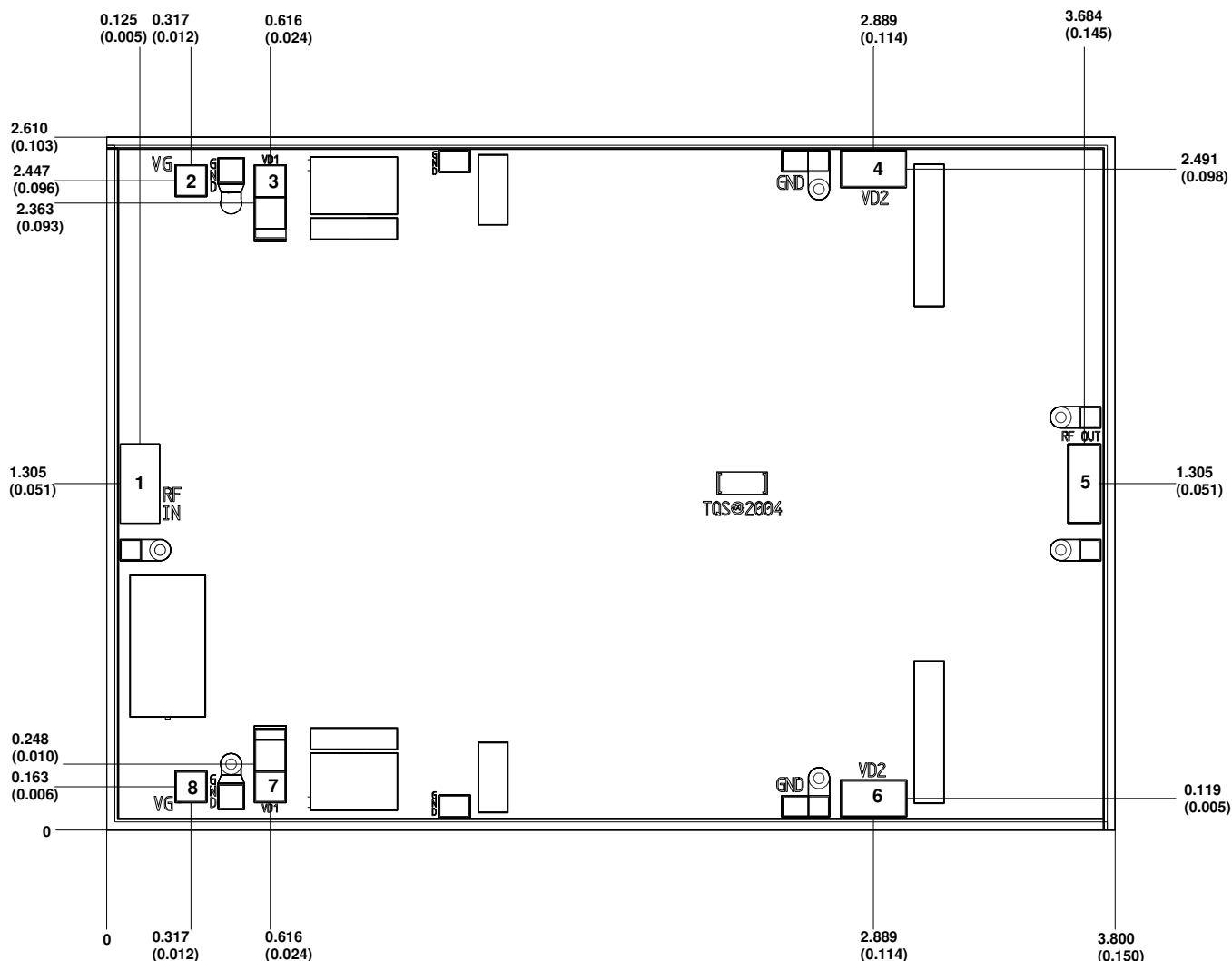


### Measured Data

Bias: Vd = 7 V, Idq = 1.05 A, Pin = 22 dBm, Pulsed Power, 25% Duty Cycle, Temperature Data



**Mechanical Drawing**



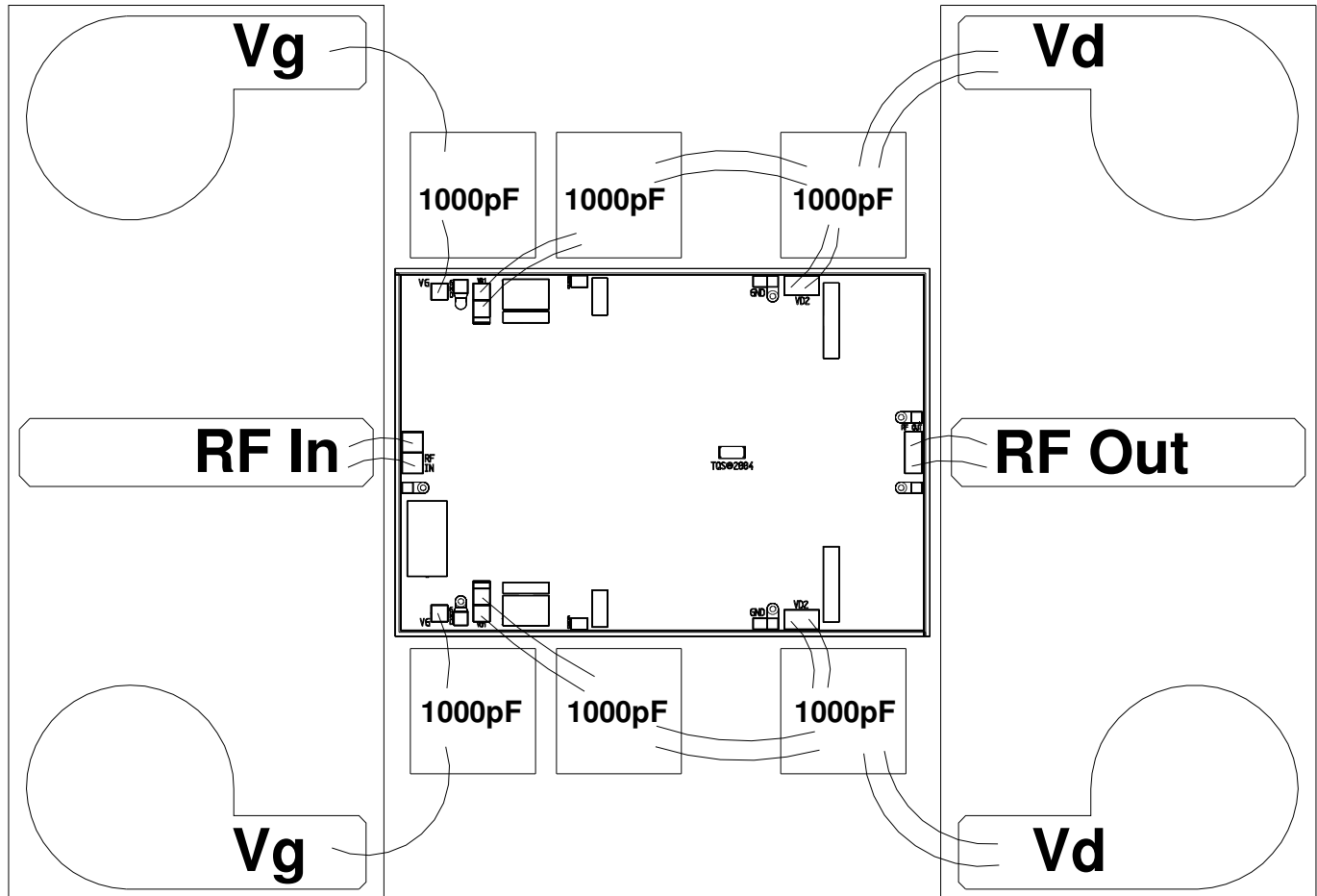
Units: Millimeters (inches)  
 Thickness: 0.10 (0.004)  
 Chip edge to bond pad dimensions are shown to center of bond pad  
 Chip size tolerance: +/- 0.05 (0.002)

**GND IS BACKSIDE OF MMIC**

Bond pad # 1	(RF Input)	0.150 x 0.300 (0.006 x 0.012)
Bond pad # 2, 8	(Vg)	0.120 x 0.120 (0.005 x 0.005)
Bond pad # 3, 7	(Vd1)	0.120 x 0.290 (0.005 x 0.011)
Bond pad # 4, 6	(Vd2)	0.250 x 0.140 (0.010 x 0.006)
Bond pad # 5	(RF Output)	0.125 x 0.300 (0.005 x 0.012)

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

**Recommended Chip Assembly Diagram**



**Vd = 5 to 7 V**

**Vg = -0.7 V Typical**

***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 (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.

## Ordering Information

Part	Package Style
TGA2701	GaAs MMIC Die

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

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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