

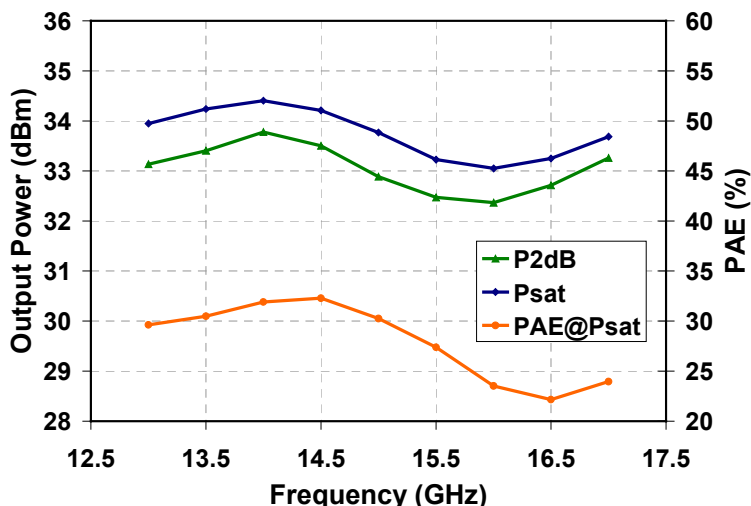
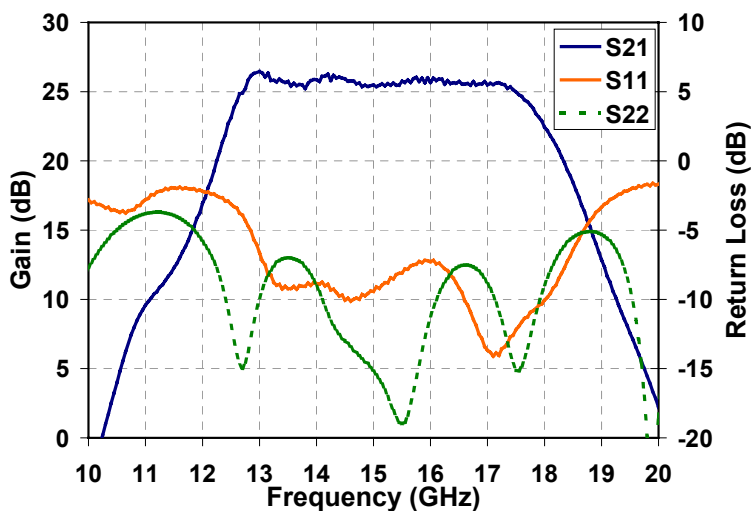
## 2 Watt Packaged Amplifier

## TGA2902-SCC-SG



### Preliminary Measured Performance

Bias Conditions:  $V_D = 7.5V$ ,  $I_D = 650mA$



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.

### Key Features and Performance

- 34 dBm Midband Psat
- 26 dB Nominal Gain
- 8 dB Typical Return Loss
- 13 - 17 GHz Frequency Range
- Directional Power Detector with Reference
- 0.25 $\mu$ m pHEMT Technology
- Bias Conditions: 7.5V, 650mA
- Package Dimensions: 9.4 x 6.4 x 1.8 mm (370 x 250 x 71 mils)

### Primary Applications

- VSAT
- Point to Point

**TABLE I**  
**MAXIMUM RATINGS**

| Symbol           | Parameter                            | Value         | Notes                         |
|------------------|--------------------------------------|---------------|-------------------------------|
| V <sub>D</sub>   | Drain Voltage                        | 8 V           | <u>1/</u> <u>2/</u>           |
| V <sub>G</sub>   | Gate Voltage Range                   | -5V to 0V     | <u>1/</u>                     |
| I <sub>D</sub>   | Drain Supply Current (Quiescent)     | 1300 mA       | <u>1/</u> <u>2/</u>           |
| I <sub>G</sub>   | Gate Supply Current                  | 18 mA         | <u>1/</u>                     |
| P <sub>IN</sub>  | Input Continuous Wave Power          | 24 dBm        | <u>1/</u> <u>2/</u>           |
| P <sub>D</sub>   | Power Dissipation                    | 6.15 W        | <u>1/</u> <u>2/</u> <u>3/</u> |
| T <sub>CH</sub>  | Operating Channel Temperature        | 150 °C        | <u>4/</u>                     |
| T <sub>M</sub>   | Mounting Temperature<br>(30 Seconds) | 220 °C        |                               |
| T <sub>STG</sub> | Storage Temperature                  | -65 to 150 °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<sub>D</sub> at a package base temperature of 70°C
- 3/ When operated at this bias condition with a baseplate temperature of 70°C, the MTTF is reduced from 4.8E+6 to 1.0E+6 hours
- 4/ Junction operating temperature will directly affect the device median time to failure (MTTF). For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.

**TABLE II**  
**THERMAL INFORMATION**

| Parameter  | Test Conditions  | T <sub>CH</sub><br>(°C) | R <sub>θJC</sub><br>(°C/W) | MTTF<br>(hrs) |
|--|--|-------------------------|----------------------------|---------------|
| R <sub>θJC</sub> Thermal Resistance<br>(Channel to Backside of<br>Package) | V <sub>D</sub> = 7.5V<br>I <sub>D</sub> = 650mA<br>P <sub>DISS</sub> = 4.88W<br>T <sub>BASE</sub> = 70°C | 132.3                   | 12.8                       | 4.8E+6        |

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**TABLE III**  
**TGA2902-1-SCC-SG RF CHARACTERIZATION TABLE**  
 (T<sub>A</sub> = 25°C, Nominal)  
 (V<sub>d</sub> = 7.5V, I<sub>d</sub> = 650mA ±5%)

| Symbol         | Parameter                                   | Test Conditions | Limits |      |      | Units | Notes               |
|----------------|---|-----------------|--------|------|------|-------|---------------------|
|                |   |                 | Min    | Typ  | Max  |       |                     |
| Gain           | Small Signal Gain                           | F = 13-17       | 22     | 26   | 29   | dB    | <u>1/</u> <u>2/</u> |
| IRL            | Input Return Loss                           | F = 13-17       |        | 8    |      | dB    |                     |
| ORL            | Output Return Loss                          | F = 13-17       |        | 8    |      | dB    |                     |
| PSAT           | Output Power @<br>Pin = +14dBm              | F = 13-17       | 32.5   | 33.5 |      | dBm   | <u>1/</u>           |
| P2dB           | Output Power @<br>2dB Gain<br>Compression   | F = 13-17       |        | 32.5 |      | dBm   |                     |
| I <sub>D</sub> | Drain Current @<br>Pin = +14dBm             | F = 13-17       |        | 1100 | 1300 | mA    |                     |
| I <sub>G</sub> | Gate Current @<br>Pin = +14dBm              | F = 13-17       |        | 6    | 18   | mA    |                     |
| IP3            | Third Order Intercept<br>Point              | F = 13-17       |        | 38   |      | dBm   |                     |
| PAE            | Power Added<br>Efficiency @<br>Pin = +14dBm | F = 13-17       |        | 30   |      | %     |                     |

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

1/ Data taken at 500MHz steps

2/ Maximum Pin = -10dBm

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 IV**  
**TGA2902-2-SCC-SG RF CHARACTERIZATION TABLE**  
( $T_A = 25^\circ\text{C}$ , Nominal)  
( $V_d = 7.5\text{V}$ ,  $I_d = 650\text{mA} \pm 5\%$ )

| Symbol | Parameter                                   | Test Conditions | Limits |      |      | Units | Notes               |
|--------|---|-----------------|--------|------|------|-------|---------------------|
|        |   |                 | Min    | Typ  | Max  |       |                     |
| Gain   | Small Signal Gain                           | F = 13.75-14.5  | 23     | 26   | 29   | dB    | <u>1/</u> <u>2/</u> |
| IRL    | Input Return Loss                           | F = 13.75-14.5  |        | 8    |      | dB    |                     |
| ORL    | Output Return Loss                          | F = 13.75-14.5  |        | 8    |      | dB    |                     |
| PSAT   | Output Power @<br>Pin = +14dBm              | F = 13.75-14.5  | 33.5   | 34.0 |      | dBm   | <u>1/</u>           |
| P2dB   | Output Power @<br>2dB Gain<br>Compression   | F = 13.75-14.5  |        | 33.5 |      | dBm   |                     |
| $I_D$  | Drain Current @<br>Pin = +14dBm             | F = 13.75-14.5  |        | 1100 | 1300 | mA    |                     |
| $I_G$  | Gate Current @<br>Pin = +14dBm              | F = 13.75-14.5  |        | 6    | 18   | mA    |                     |
| IP3    | Third Order Intercept<br>Point              | F = 13.75-14.5  |        | 38.5 |      | dBm   |                     |
| PAE    | Power Added<br>Efficiency @<br>Pin = +14dBm | F = 13.75-14.5  |        | 30   |      | %     |                     |

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

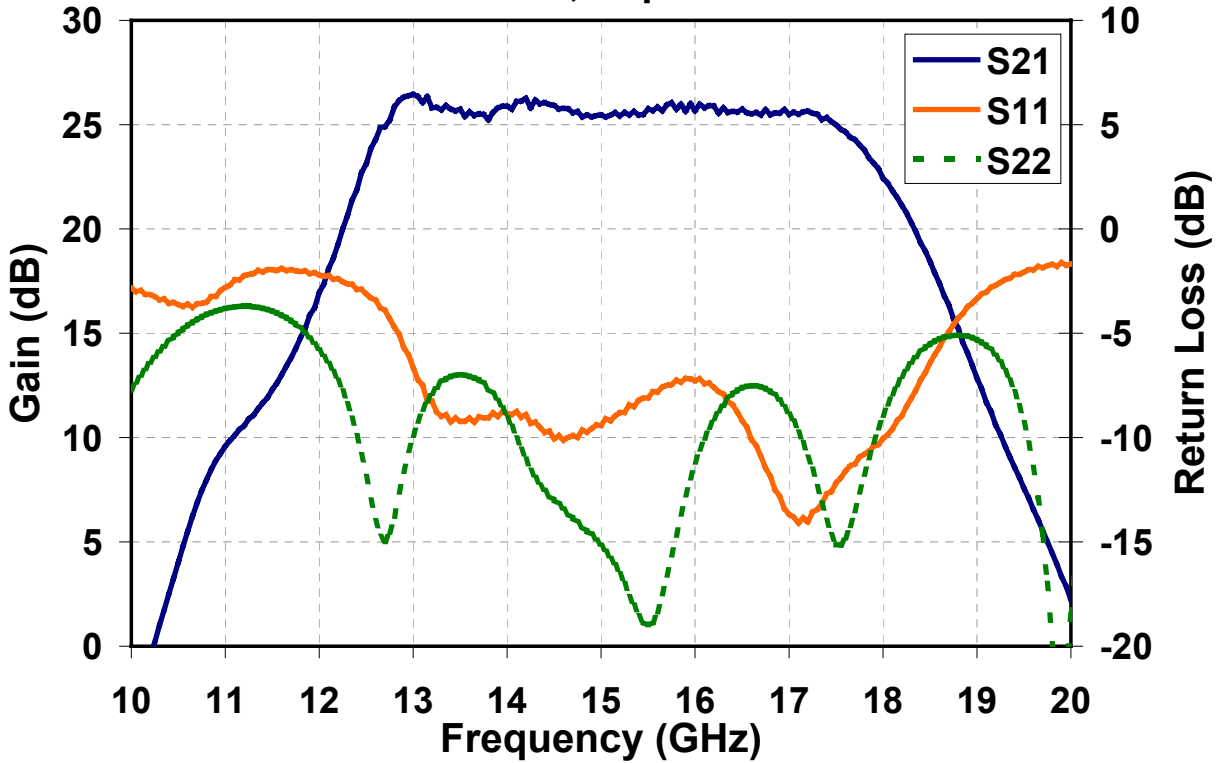
1/ Data taken at 250MHz steps

2/ Maximum Pin = -10dBm

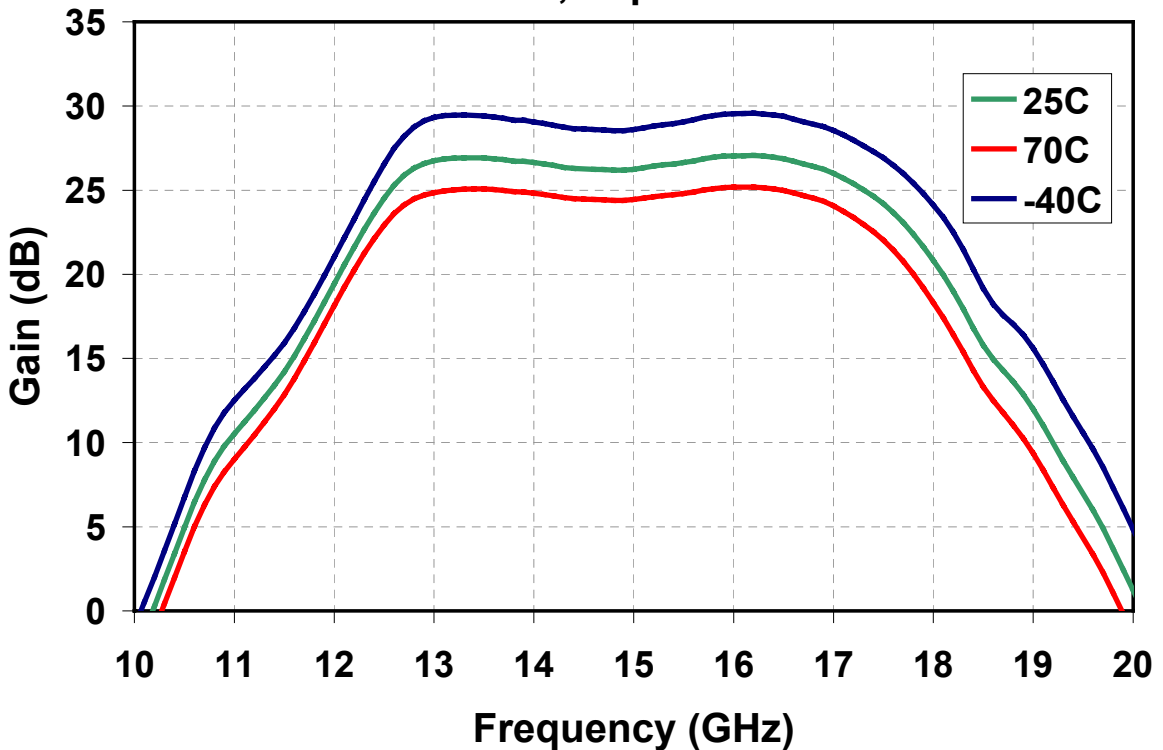
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Typical Fixtured Performance

Vd=7.5V, Idq=650mA



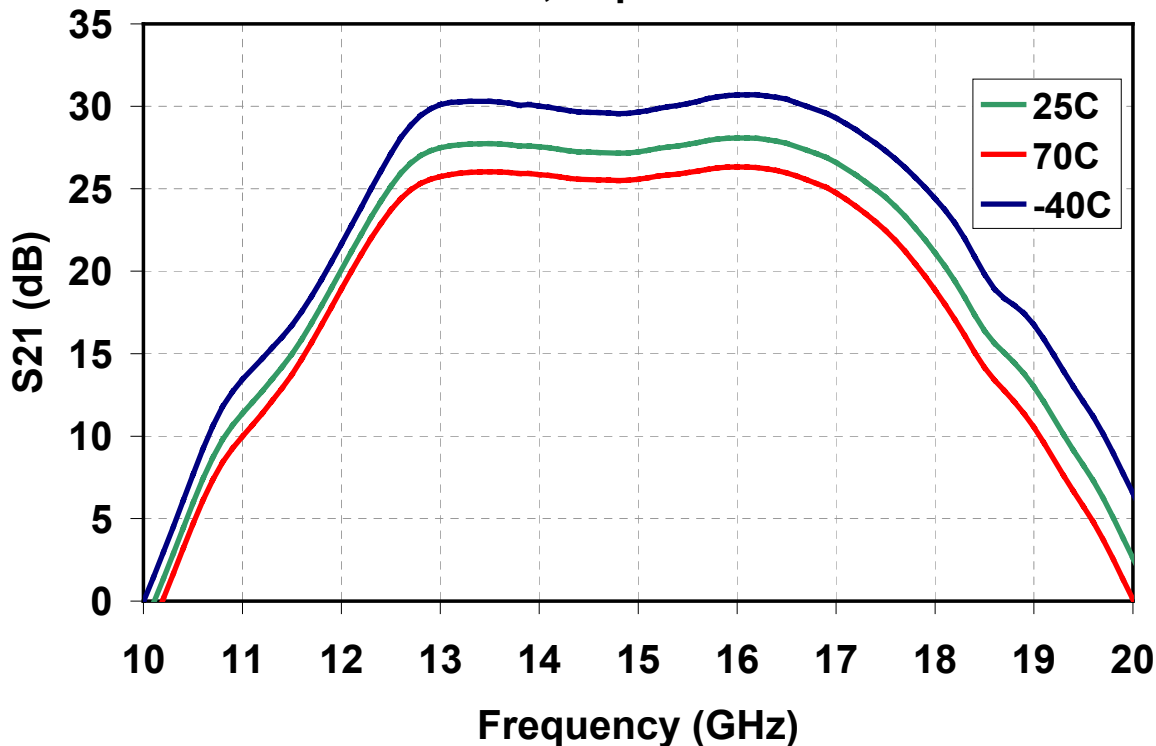
Vd=7.5V, Idq=650mA



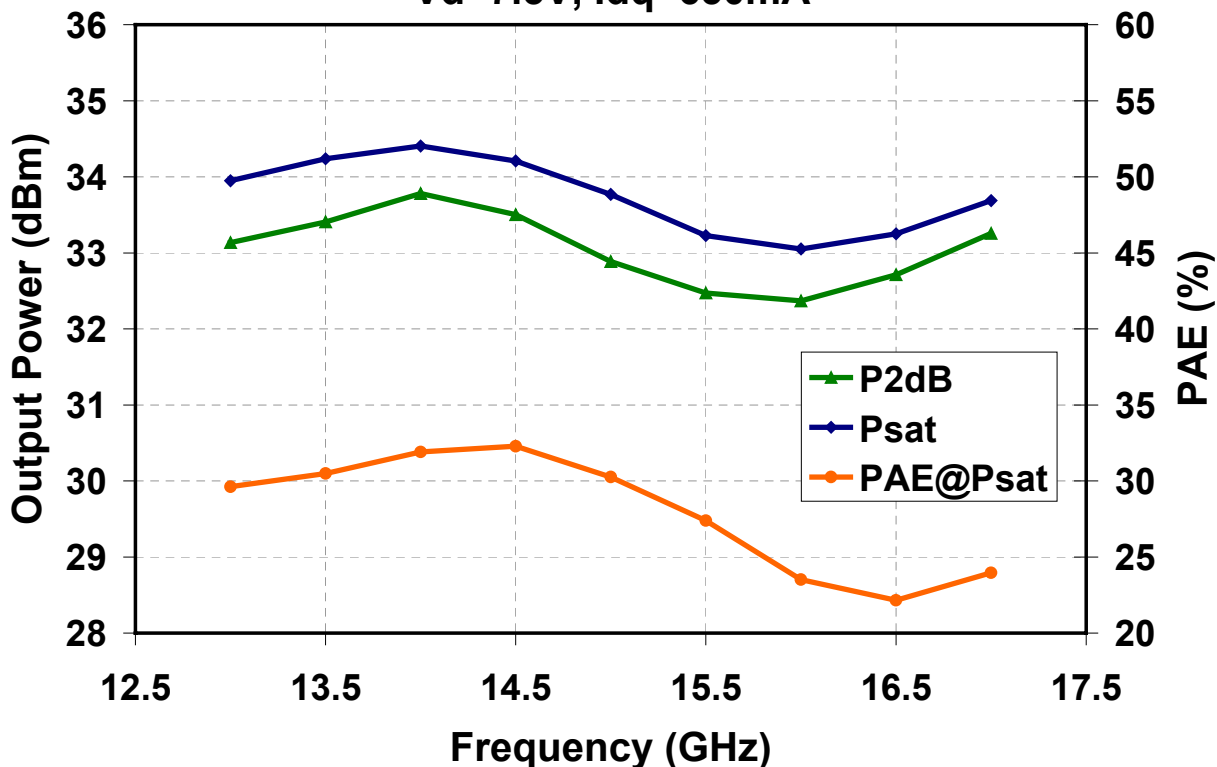
Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

Typical Fixtured Performance

Vd=5V, Idq=650mA

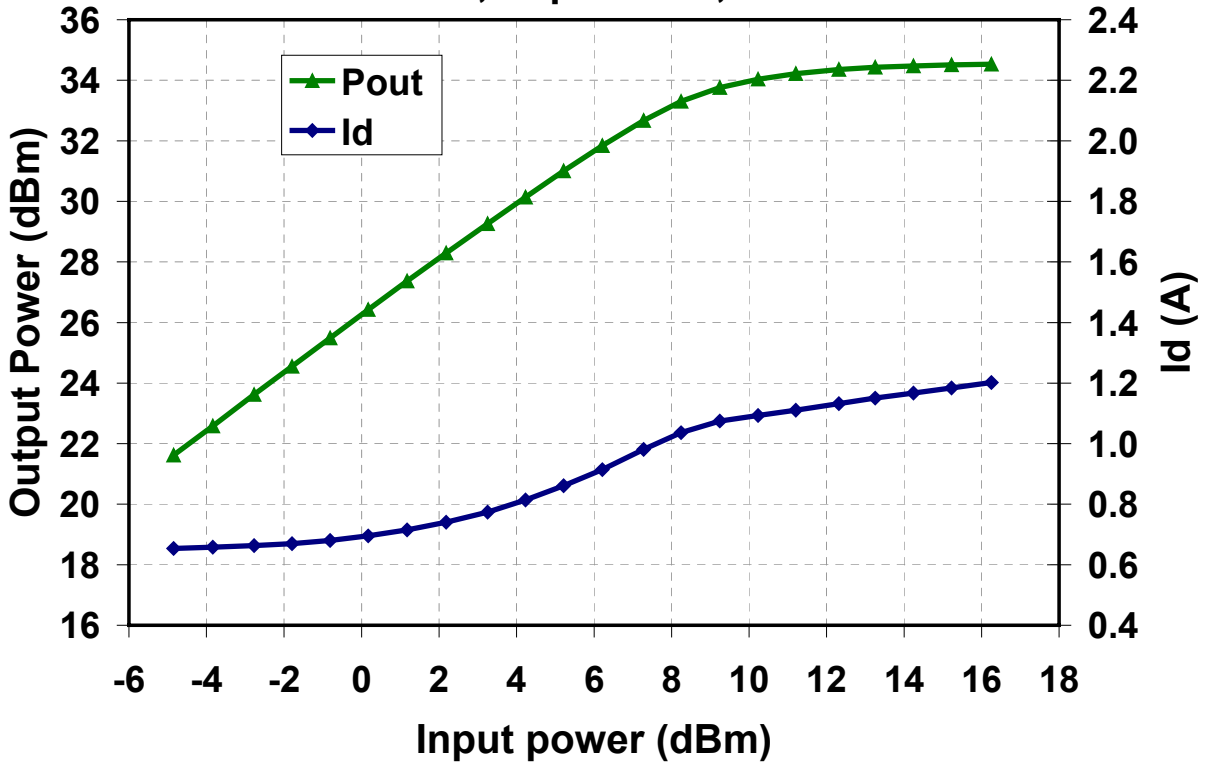


Vd=7.5V, Idq=650mA

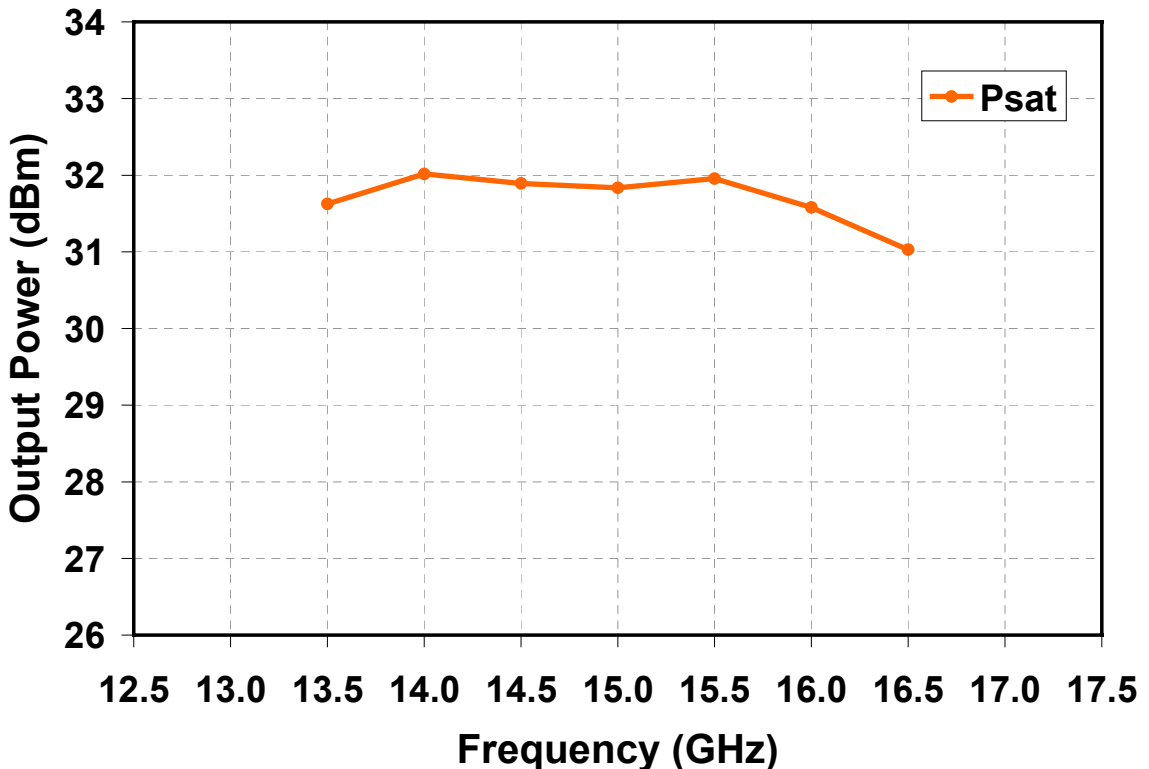


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

Typical Fixtured Performance  
Vd=7.5V, Idq=650mA, f=14GHz

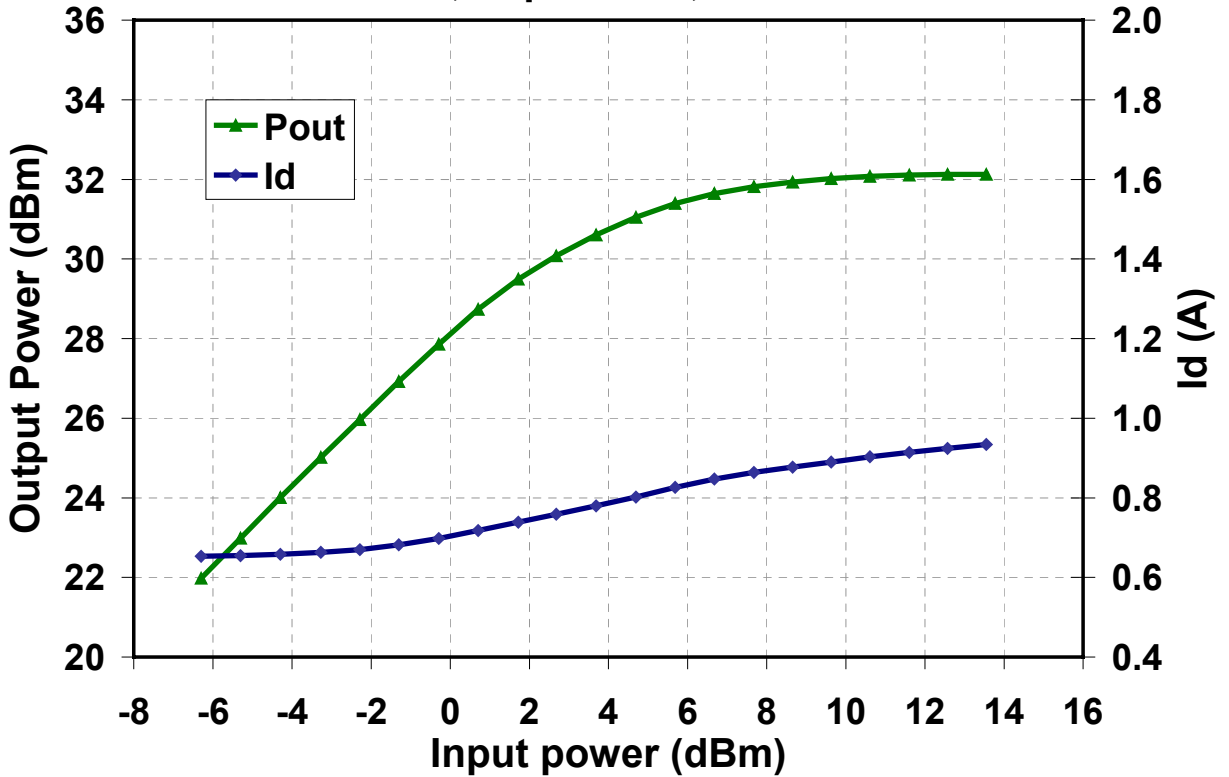


Vd=5V, Idq=650mA

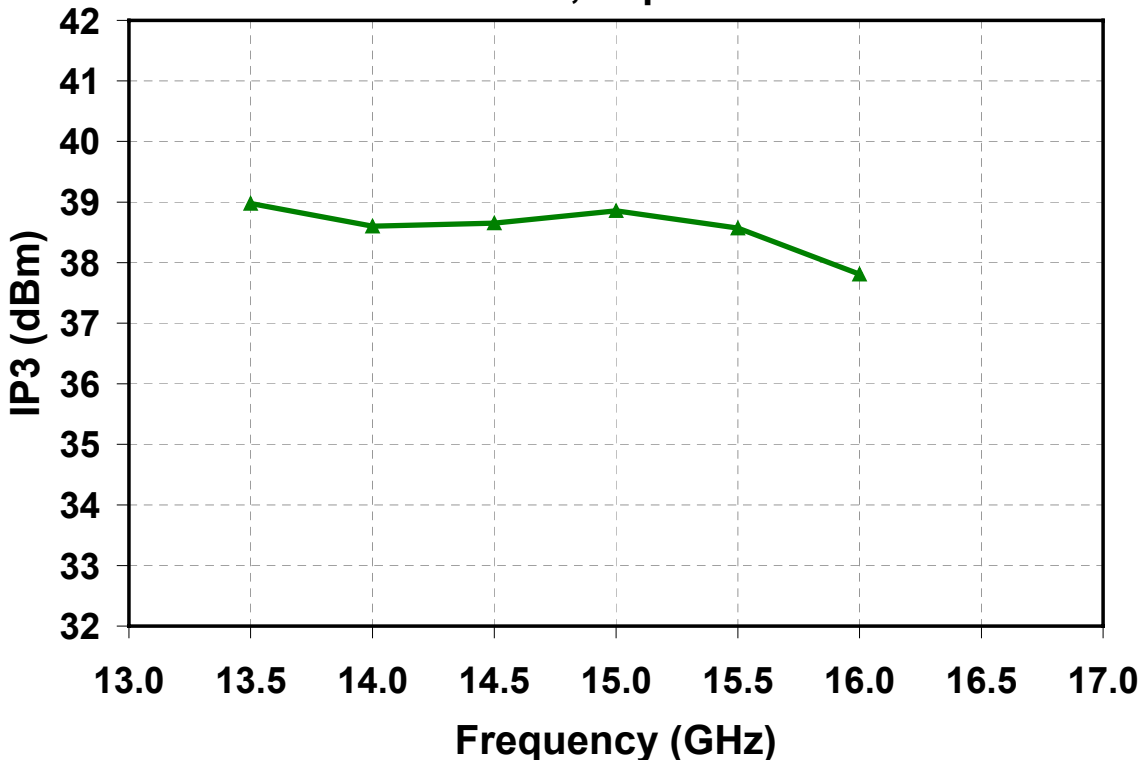


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

Typical Fixtured Performance  
Vd=5V, Idq=650mA, f=14GHz



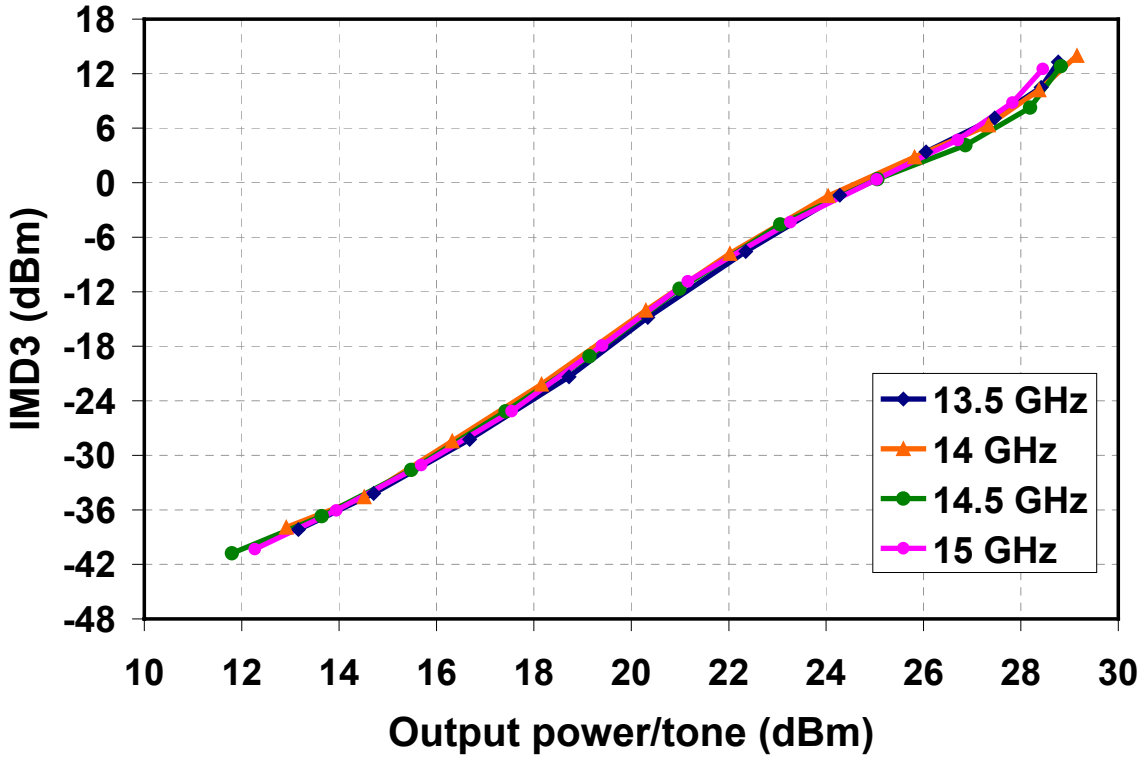
Vd=7.5V, Idq=650mA



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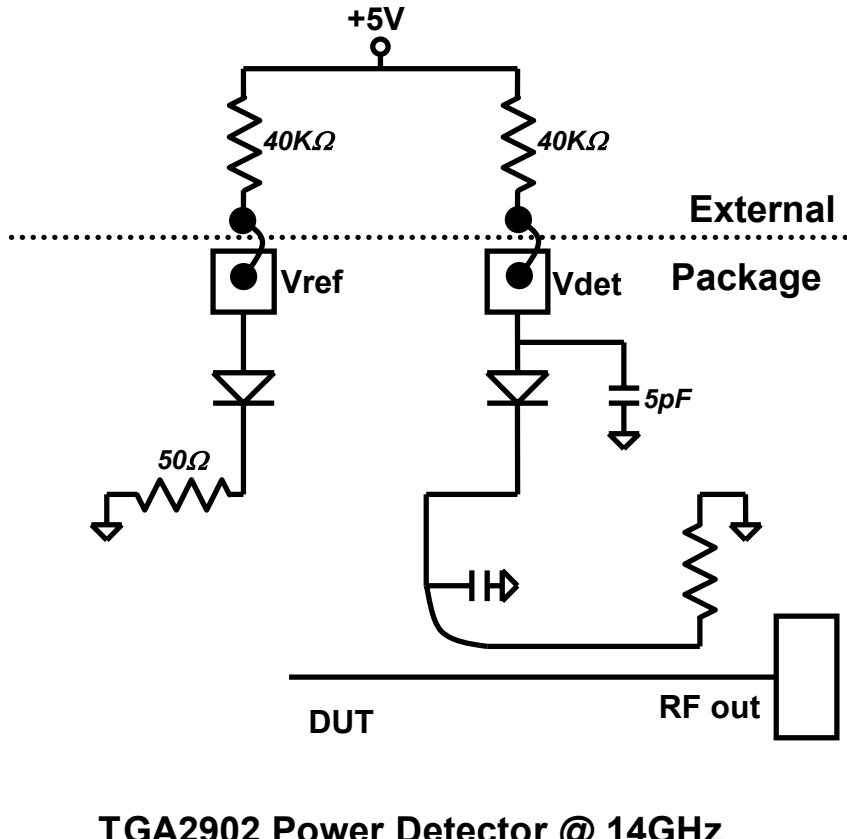


Typical Fixtured Performance  
Vd=7.5V, Id=650mA

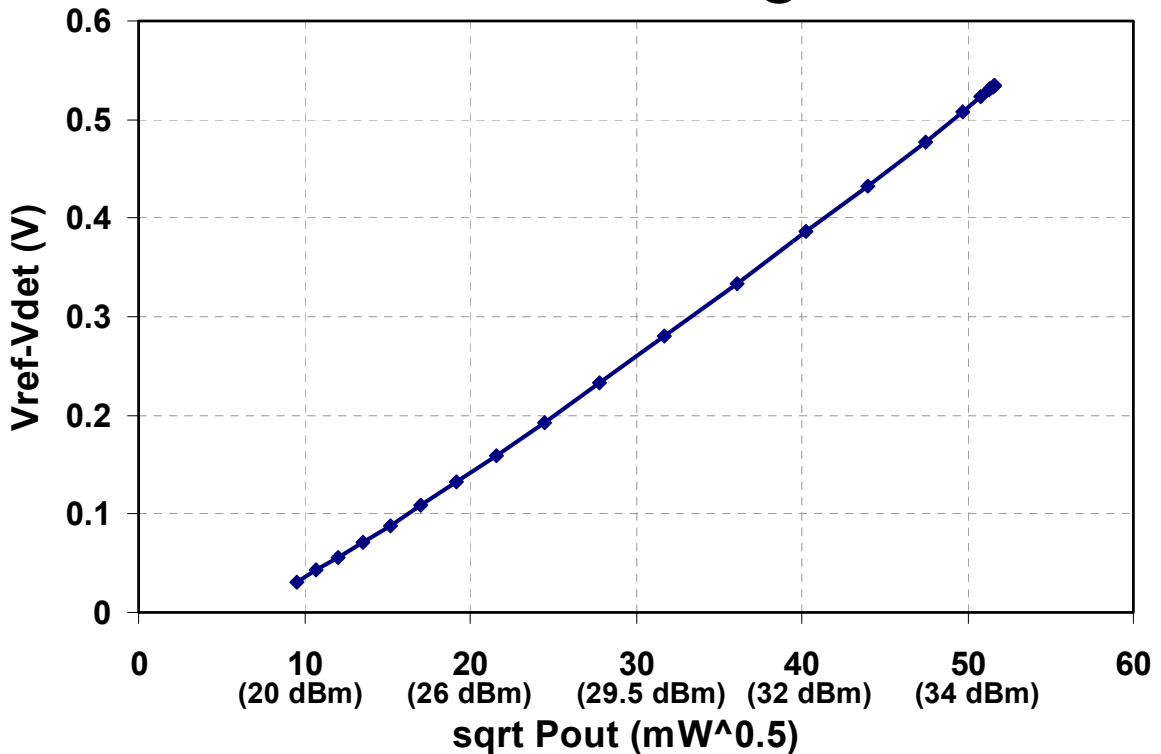


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**Power Detector**

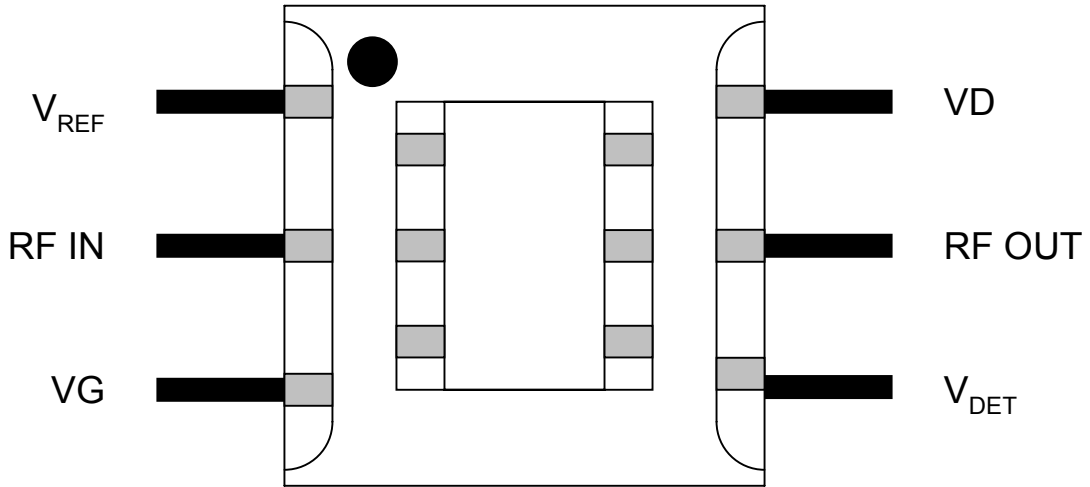


**TGA2902 Power Detector @ 14GHz**



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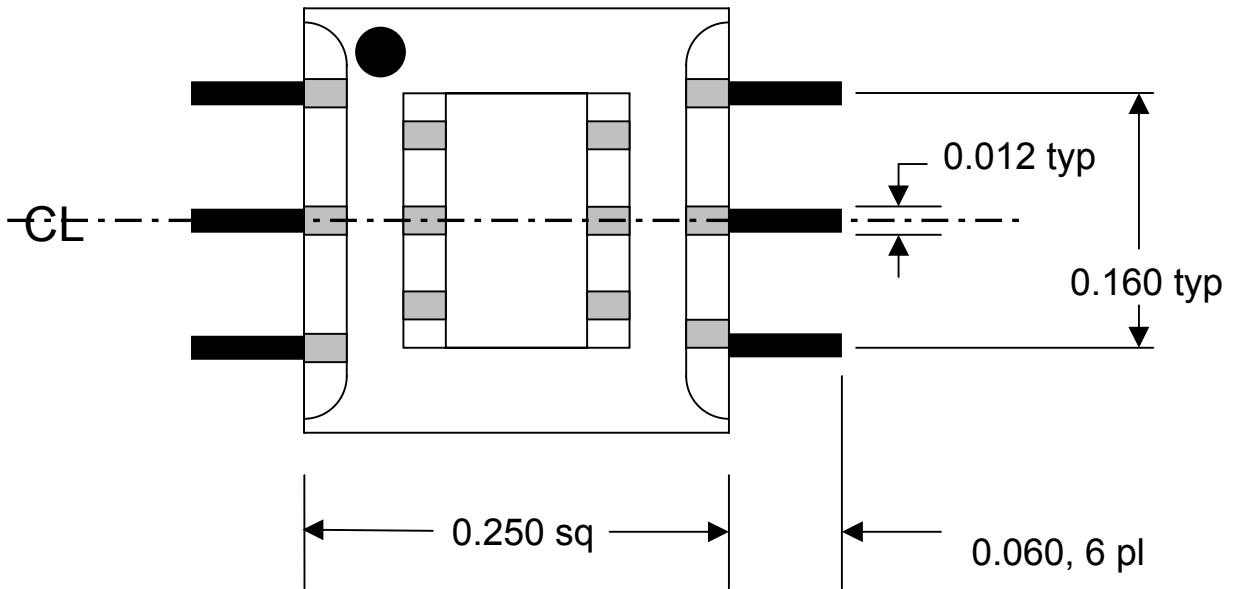
## Package Pinout Diagram



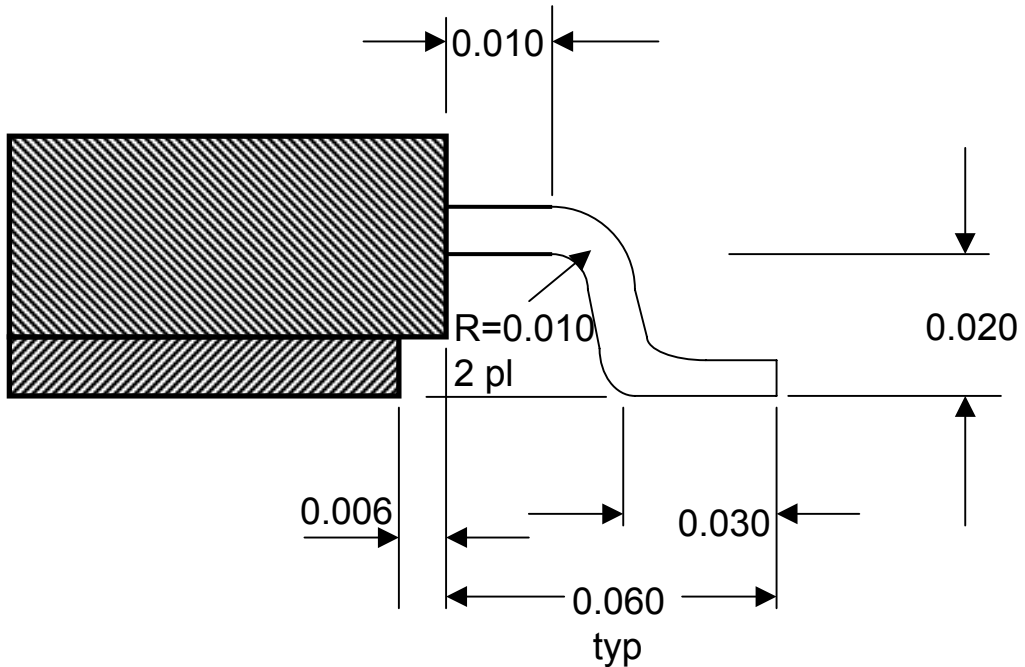
***GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.***

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**Mechanical Drawing**



Top View

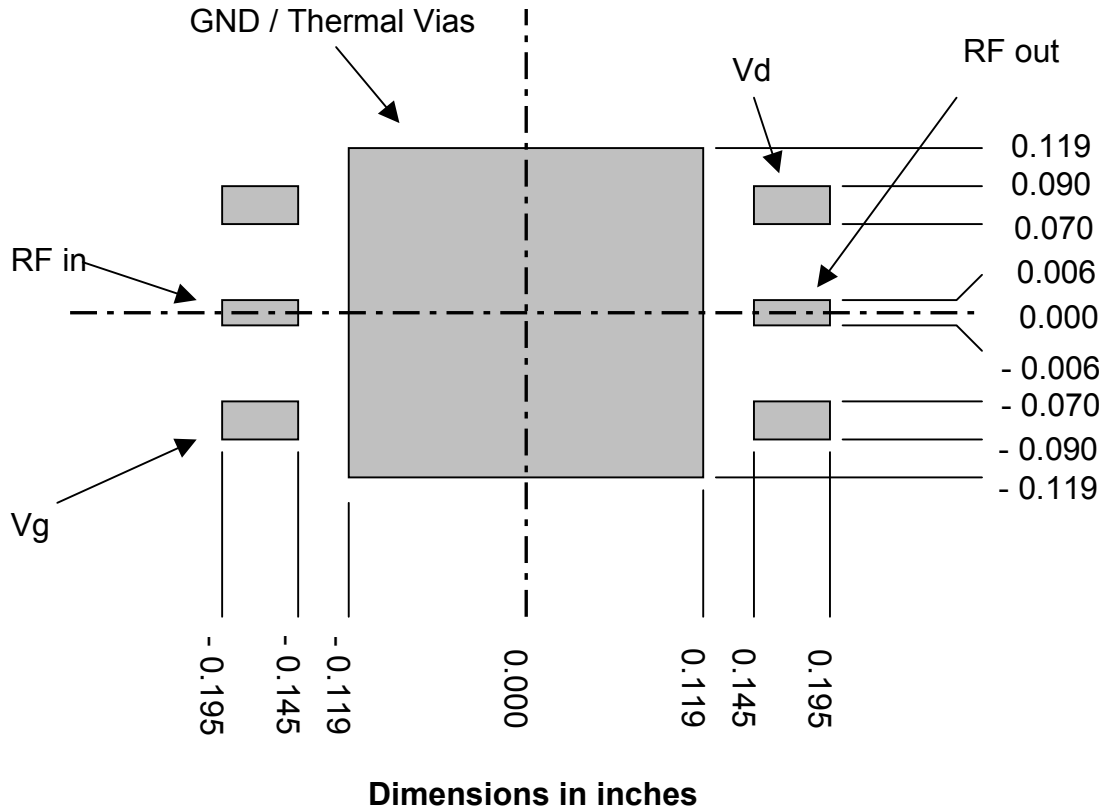


Side View

**Dimensions in inches**  
**Lead planarity is +0.006/-0.002**

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**Recommended PWB Land Pattern**



**Ordering Information**

| PART NUMBER      | AMPLIFIER APPLICATION |
|------------------|-----------------------|
| TGA2902-1-SCC-SG | Wideband              |
| TGA2902-2-SCC-SG | VSAT Band             |

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