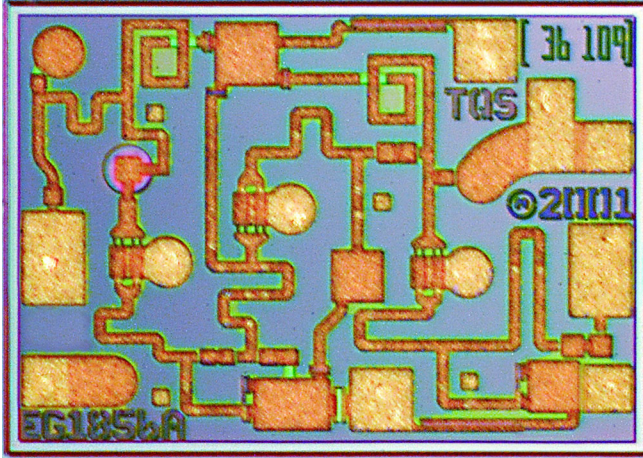


29-37 GHz Compact Driver Amplifier

TGA4510



Key Features

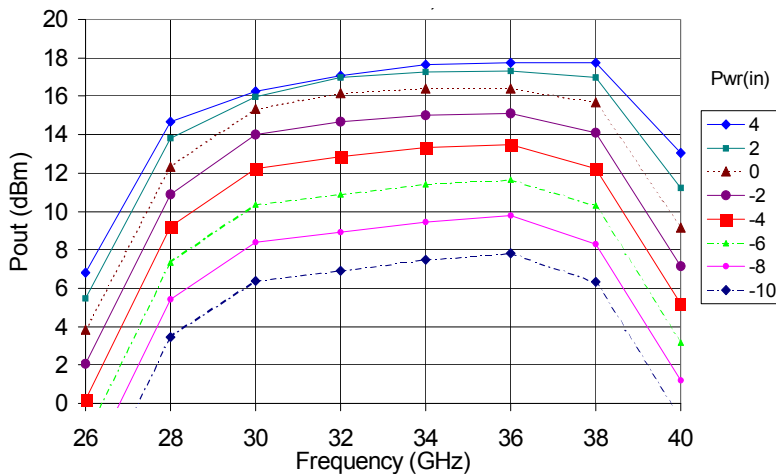
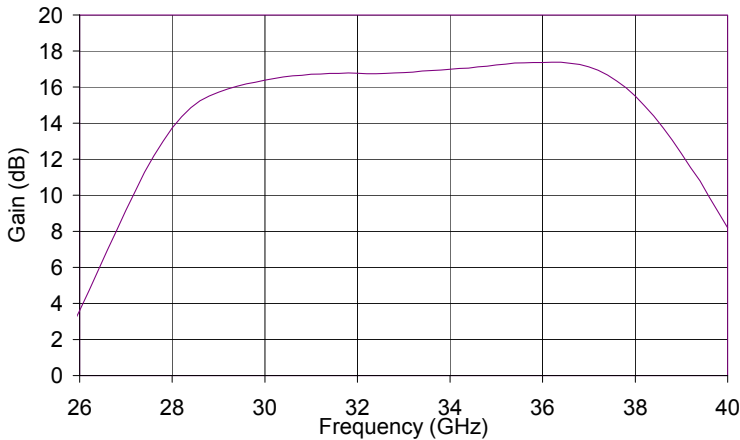
- 0.25 um pHEMT Technology
- >16 dB Nominal Gain @ 30 GHz
- 16 dBm Nominal Psat
- Bias Conditions: Vd = 6V, Id = 60 mA
- Compact Chip Size: 1.1 x 0.8 x 0.1 mm³

Primary Applications

- LMDS
- Point-to-Point
- Base Stations

Fixtured Measured Performance

Bias Conditions: Vd = 6V, Id = 60 mA ± 5%



Note: Datasheet is subject to change without notice.

**TABLE I
MAXIMUM RATINGS 1/**

Symbol	Parameter	Value	Notes
V ⁺	Positive Supply Voltage	8V	
I ⁺	Positive Supply Current (Quiescent)	81mA	2/
I _G	Gate Current	3.5 mA	
P _D	Power Dissipation	TBD	
P _{IN}	Input Continuous Wave Power	18 dBm	
T _{CH}	Operating Channel Temperature	150 °C	3/, 4/
T _M	Mounting Temperature (30 seconds)	320 °C	
T _{STG}	Storage Temperature	-65 °C to 150 °C	

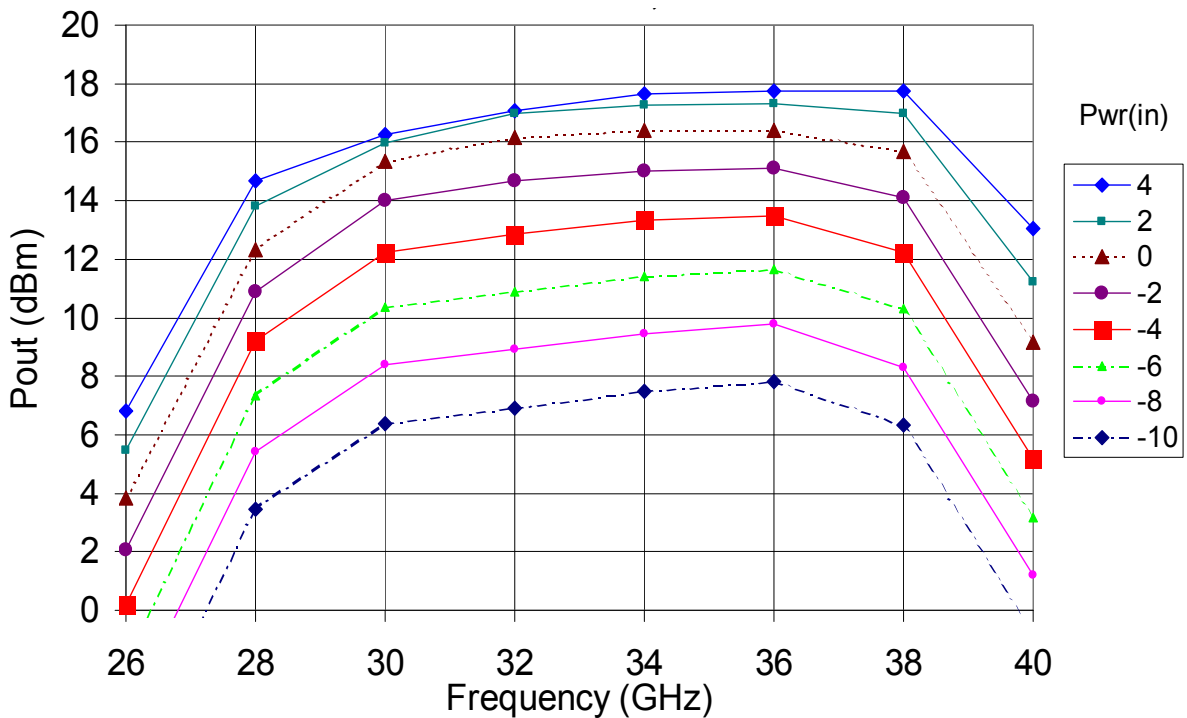
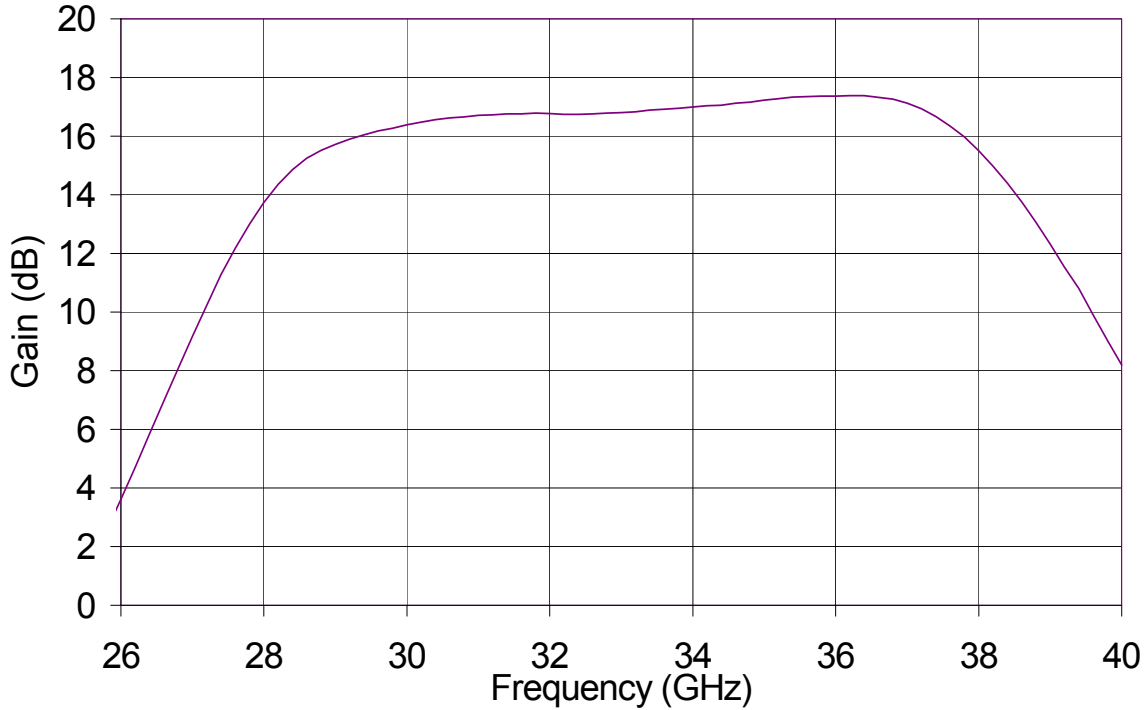
- 1/ These values represent the maximum operable values of this device
 2/ Total current for the entire MMIC
 3/ These ratings apply to each individual FET
 4/ Junction operating temperature will directly affect the device mean time to failure (MTTF). For maximum life it is recommended that junction temperatures be maintained at the lowest possible levels.

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

Parameter	Units	Typical
Frequency Band	GHz	29 - 37
Drain Operating Voltage	V	6
Gate Operating Voltage	V	-0.6
Drain Current	mA	60
Typical DC Power Consumption	W	0.36
Small Signal Gain	dB	15.8 – 17.6
Gain Flatness	dB	< 0.05
Input Return Loss	dB	> 8
Output Return Loss	dB	> 11
TOI (Single Tone Power) @ 30 GHz	dBm	22
CW Output Power @ P1dB (dBm)	dBm	14.0 – 16.2

Measured Fixtured Data

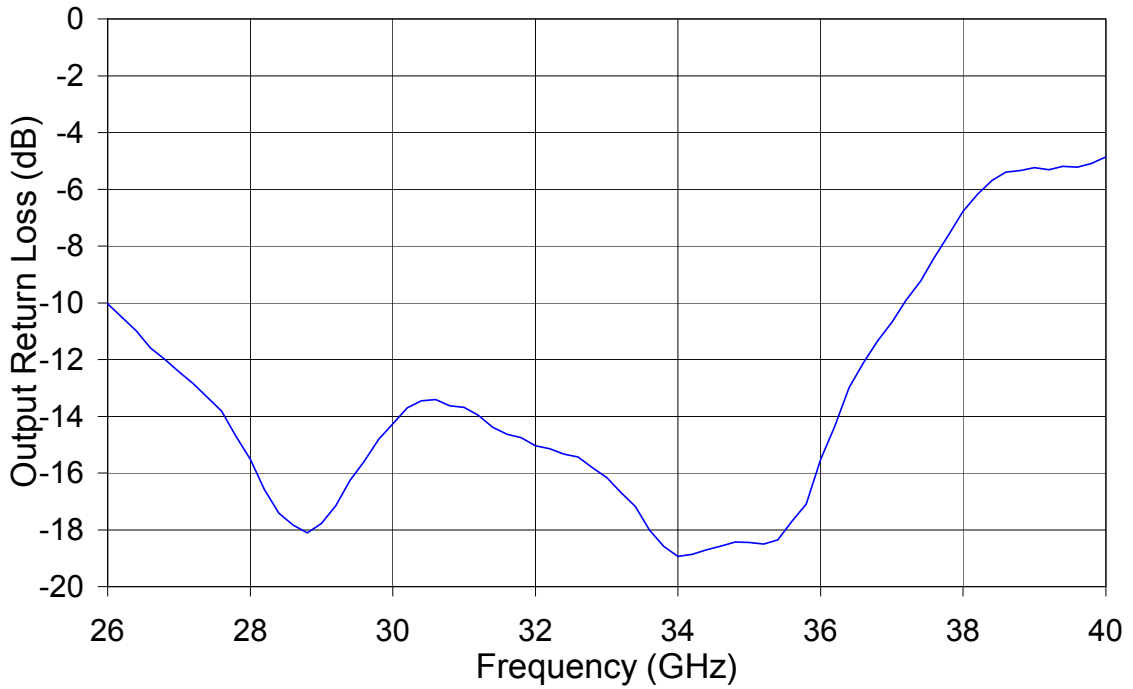
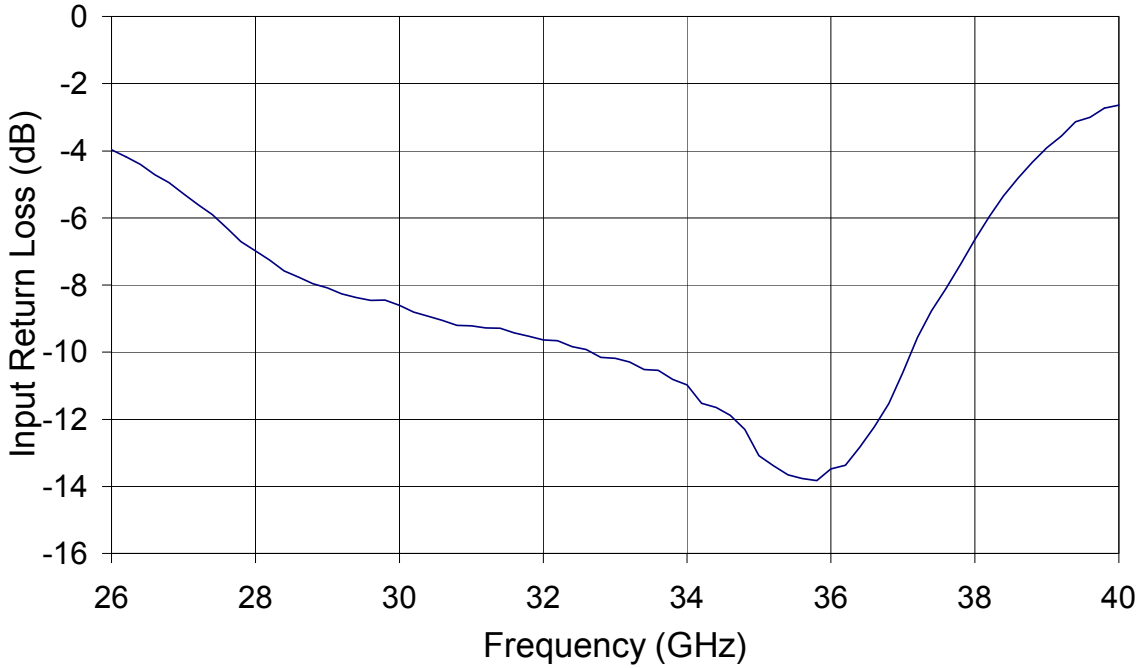
Bias Conditions: $V_d = 6V$, $I_d = 60mA \pm 5\%$



Note: $P_{wr}(in) = 0dBm$ is approximately $P1dB$ (dbM)

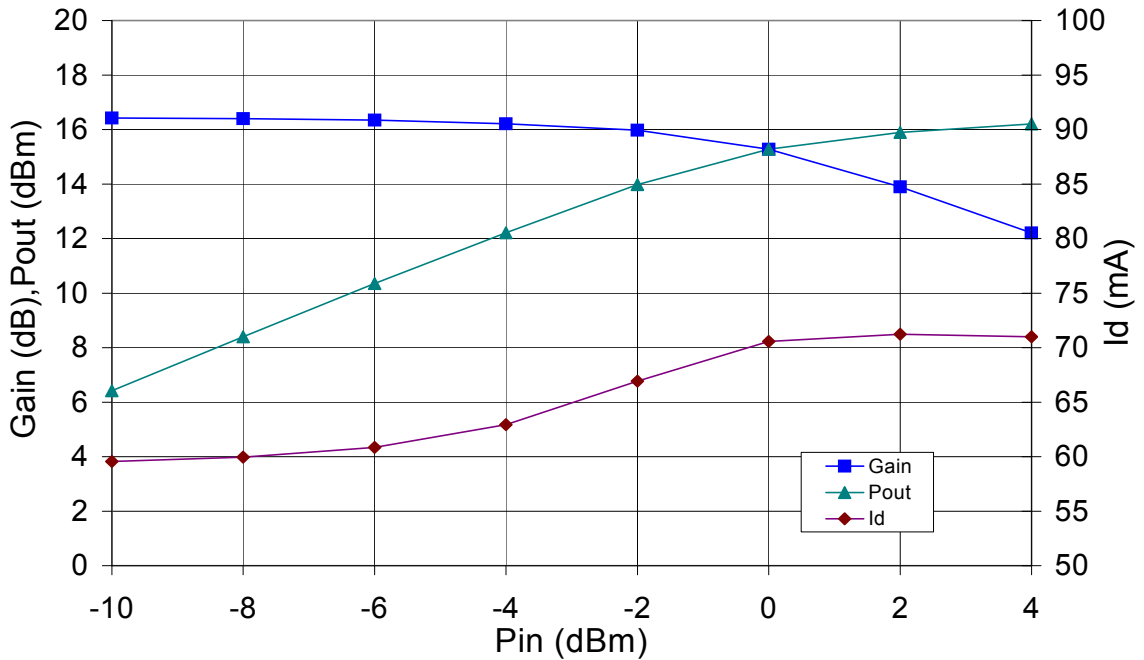
Measured Fixtured Data

Bias Conditions: $V_d = 6V$, $I_d = 60mA \pm 5\%$

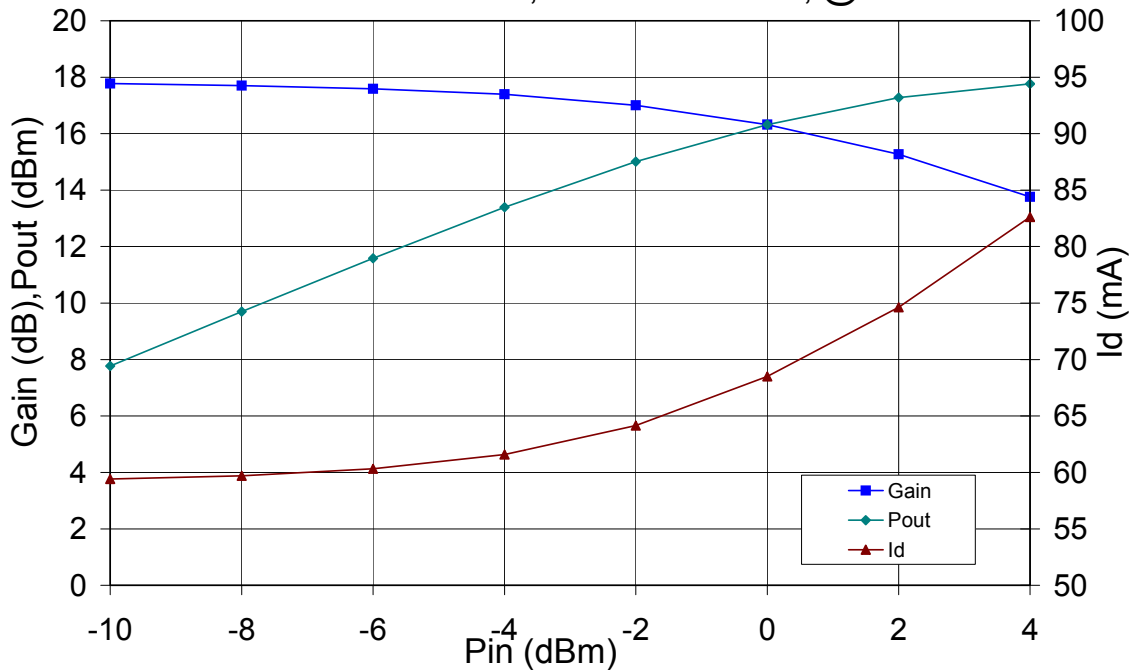


Measured Fixtured Data

Bias Conditions: $V_d = 6V$, $I_d = 60\text{ mA} \pm 5\%$, @ 30 GHz

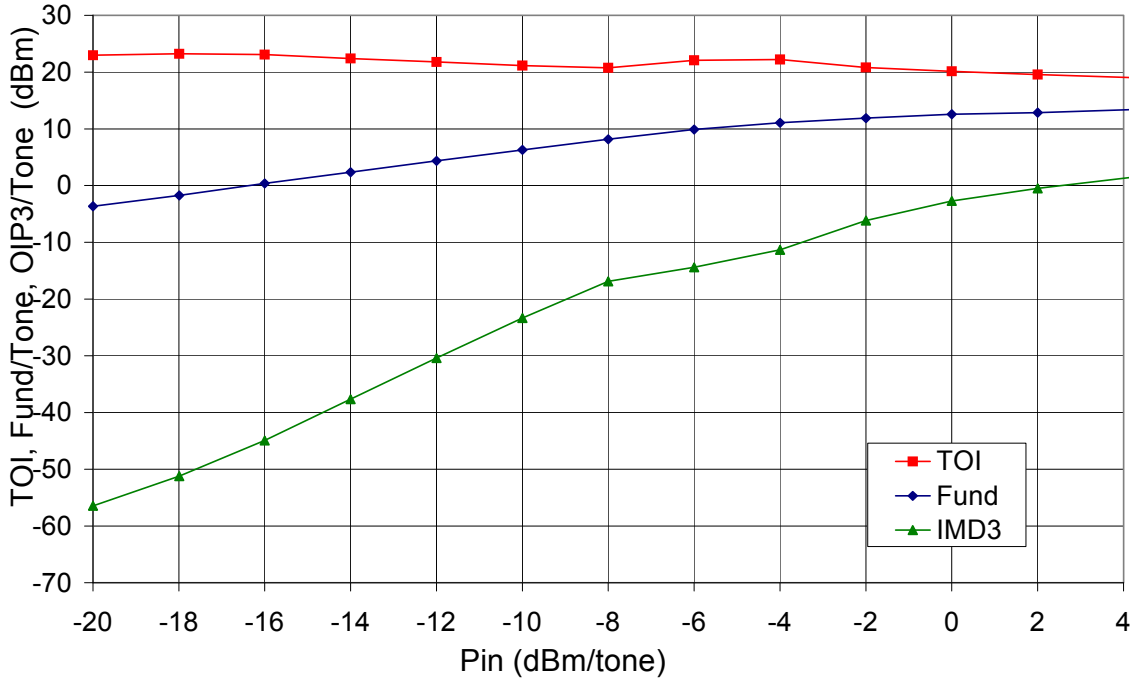


Bias Conditions: $V_d = 6V$, $I_d = 60\text{ mA} \pm 5\%$, @ 36 GHz

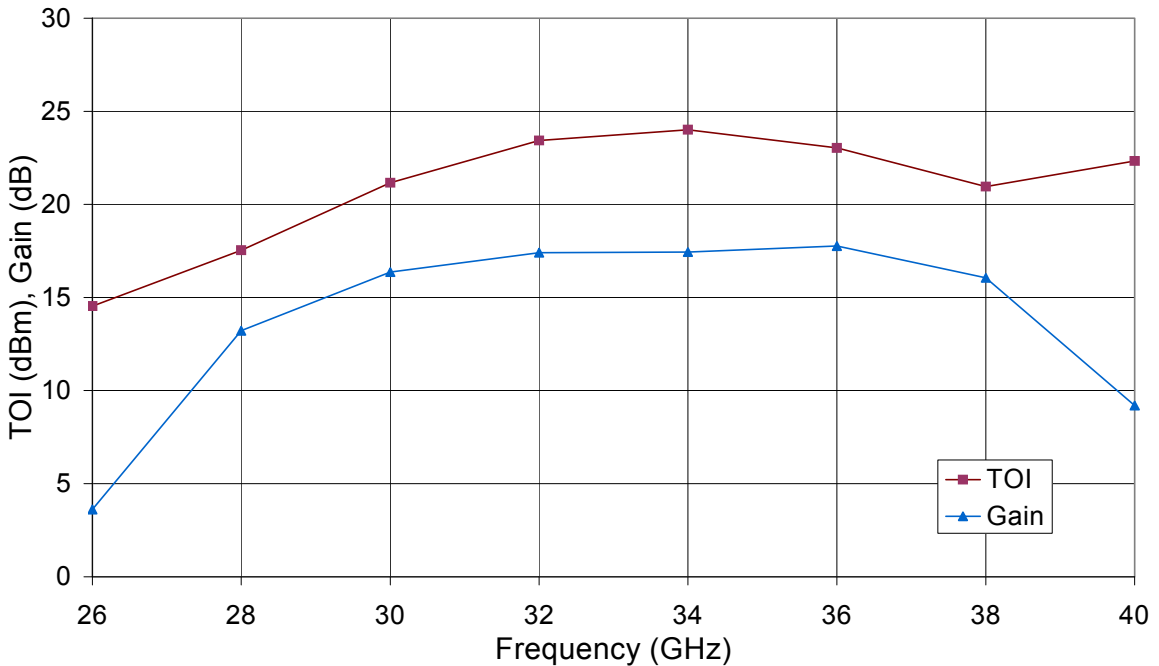


Measured Fixtured Data

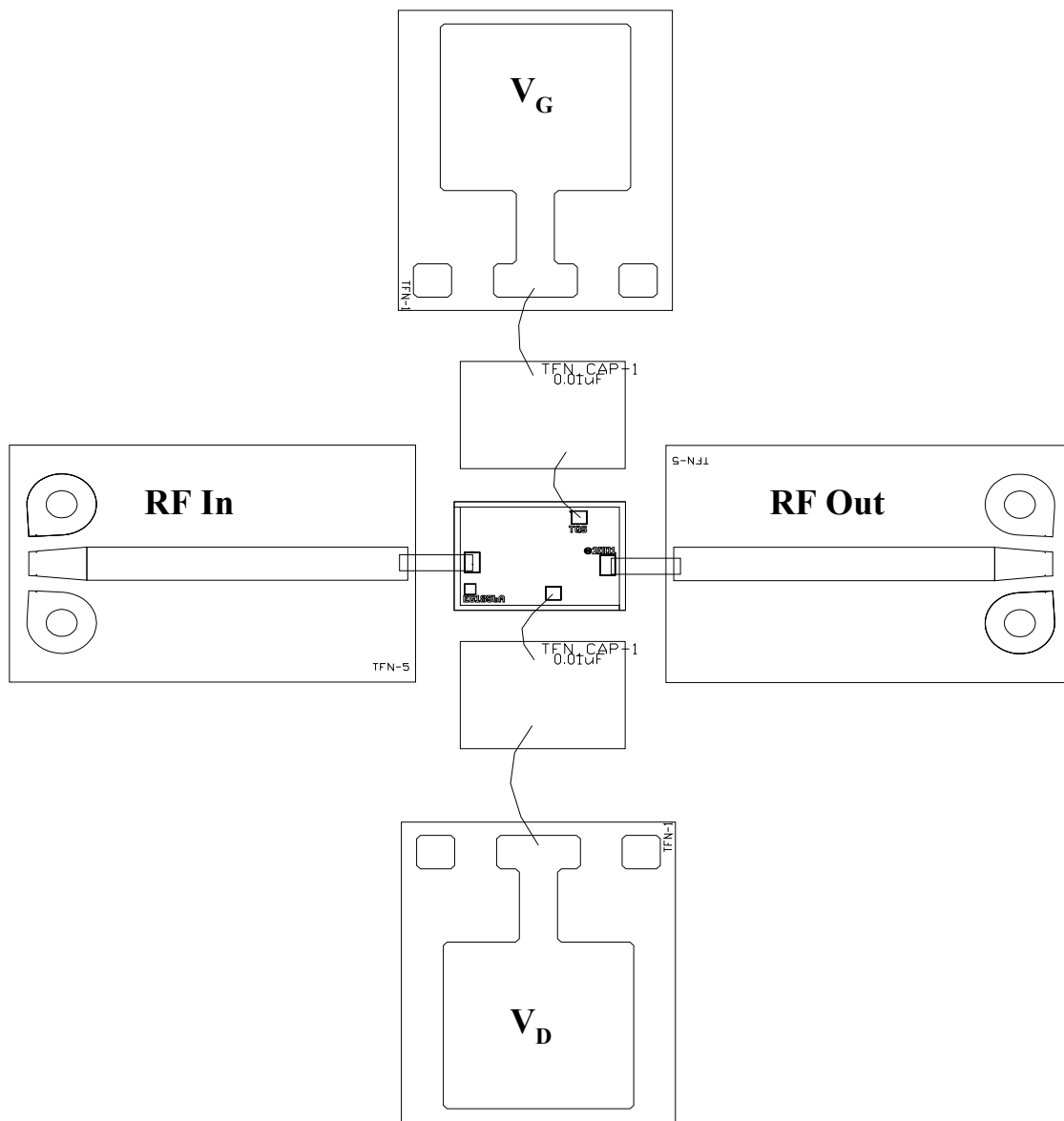
Bias Conditions: $V_d = 6V$, $I_d = 60 \text{ mA} \pm 5\%$, @ 30 GHz



Bias Conditions: $V_d = 6V$, $I_d = 60 \text{ mA} \pm 5\%$, @ Pin = -10dBm/Tone

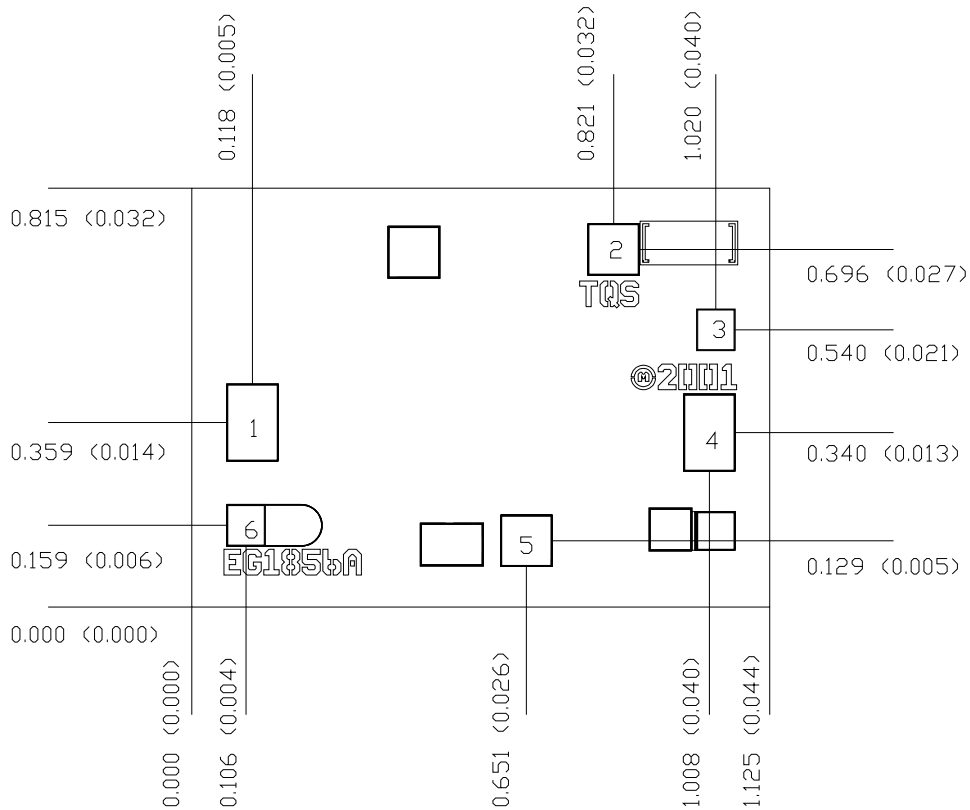


Chip Assembly and Bonding Diagram



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: 0.1016 (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 Input)	0.096 × 0.146 (0.004 × 0.006)
Bond Pad #2 (VG)	0.096 × 0.096 (0.004 × 0.004)
Bond Pad #3 (GND)	0.075 × 0.075 (0.003 × 0.003)
Bond Pad #4 (RF OUT)	0.098 × 0.148 (0.004 × 0.006)
Bond Pad #5 (VD)	0.096 × 0.096 (0.004 × 0.004)
Bond Pad #6 (GND)	0.075 × 0.075 (0.003 × 0.003)

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.
- 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.

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