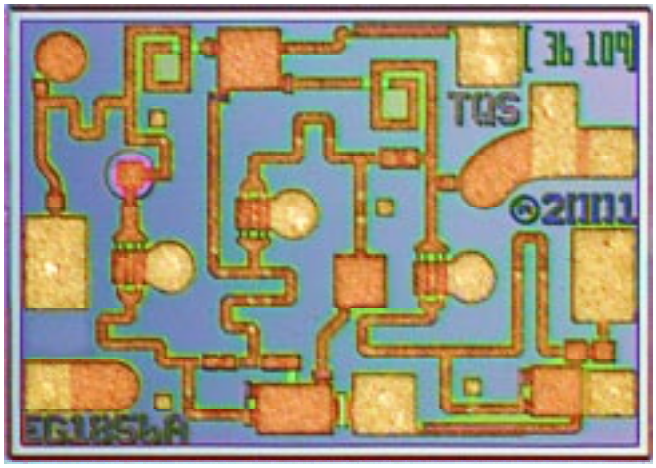
Advance Product Information
August 5, 2002

29-37 GHz Compact Driver Amplifier **TGA4510-EPU**



Key Features

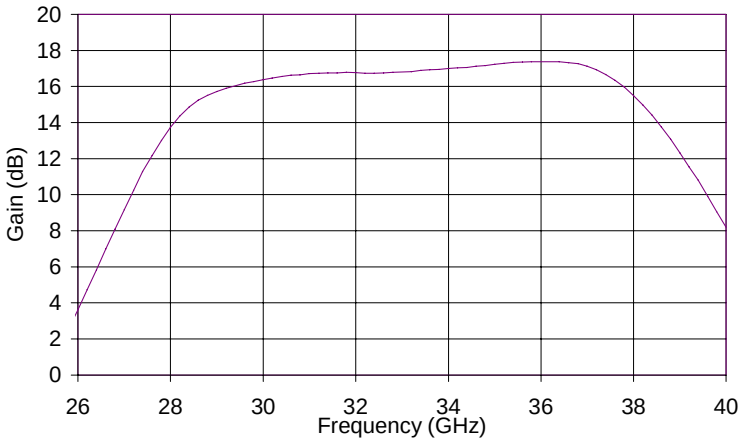
- 0.25 um pHEMT Technology
- >16 dB Nominal Gain @ 30 GHz
- 16 dBm Nominal Psat
- Bias Conditions: Vd = 6V, Id = 60 mA
- Compact Chip Size: 1.1 x 0.8 x 0.1 mm^3

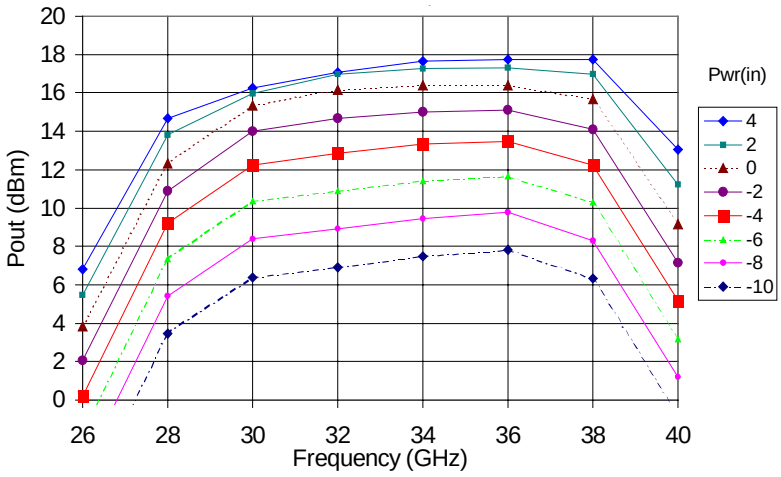
Primary Applications

- LMDS
- Point-to-Point
- Base Stations

Fixtured Measured Performance

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





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 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
(Ta = 25ºC ± 5ºC)

Parameter	Units	Typical
Frequency Band	GHz	29 - 37
Drain Operating Voltage	V	6
Gate Operating Voltage	V	-0.6
Drain Current, Quiescent	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

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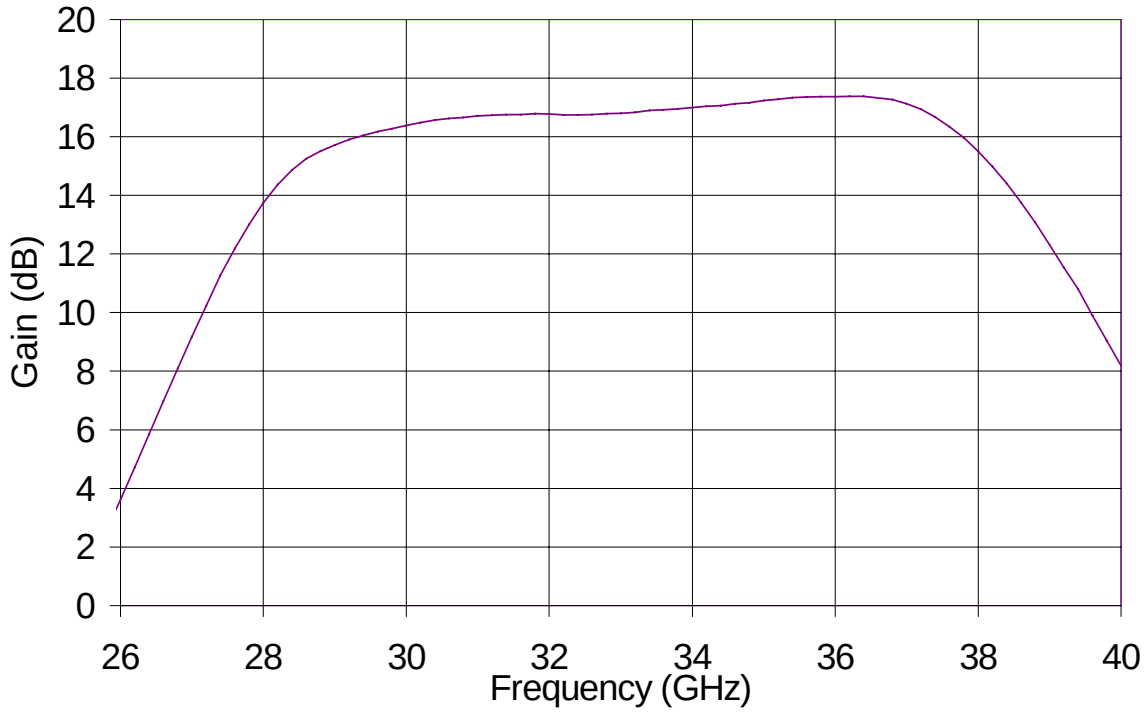
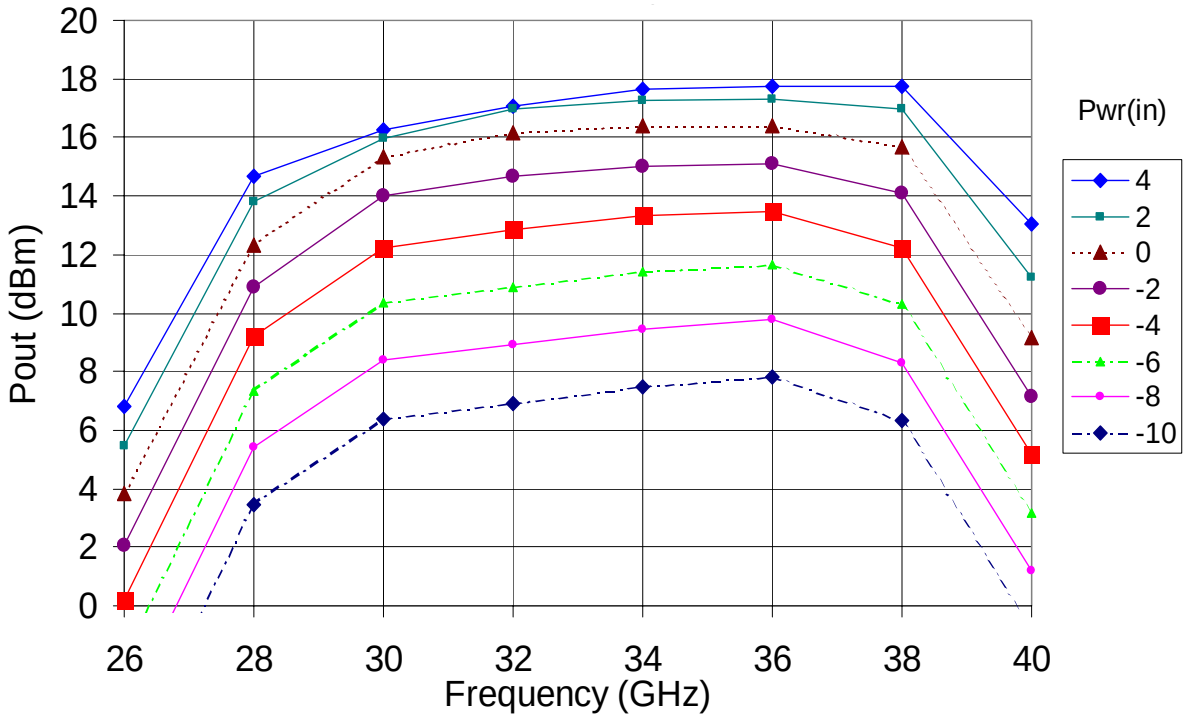
Measured Fixtured Data

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





Note: Pwr (in) = 0dBm is approximately P1dB (dbM)

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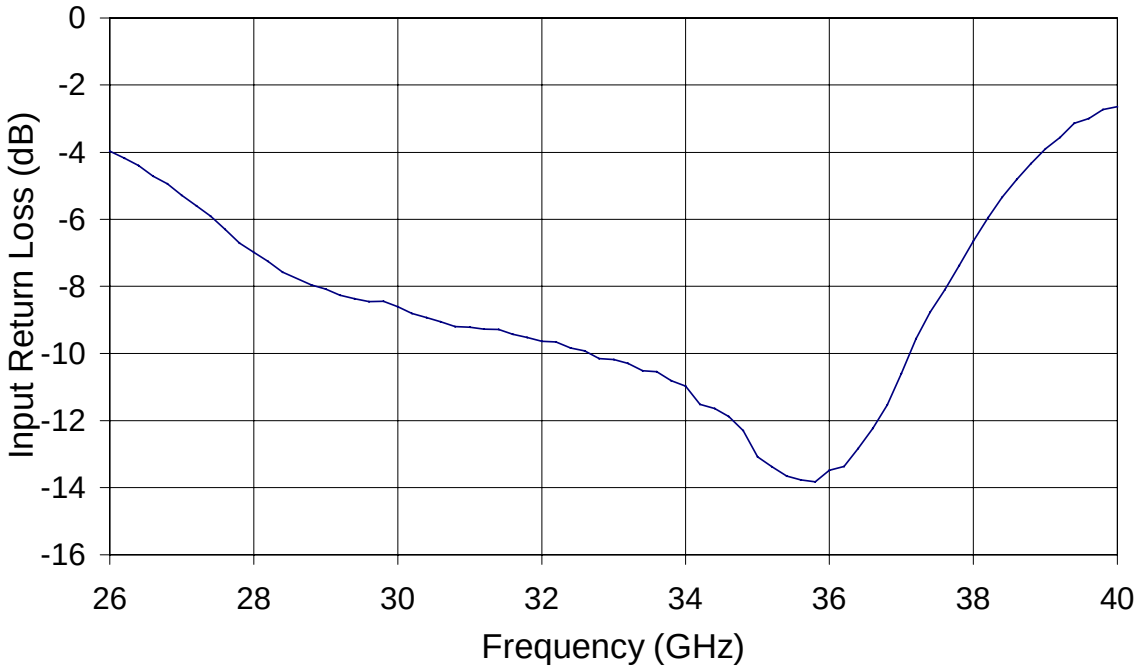
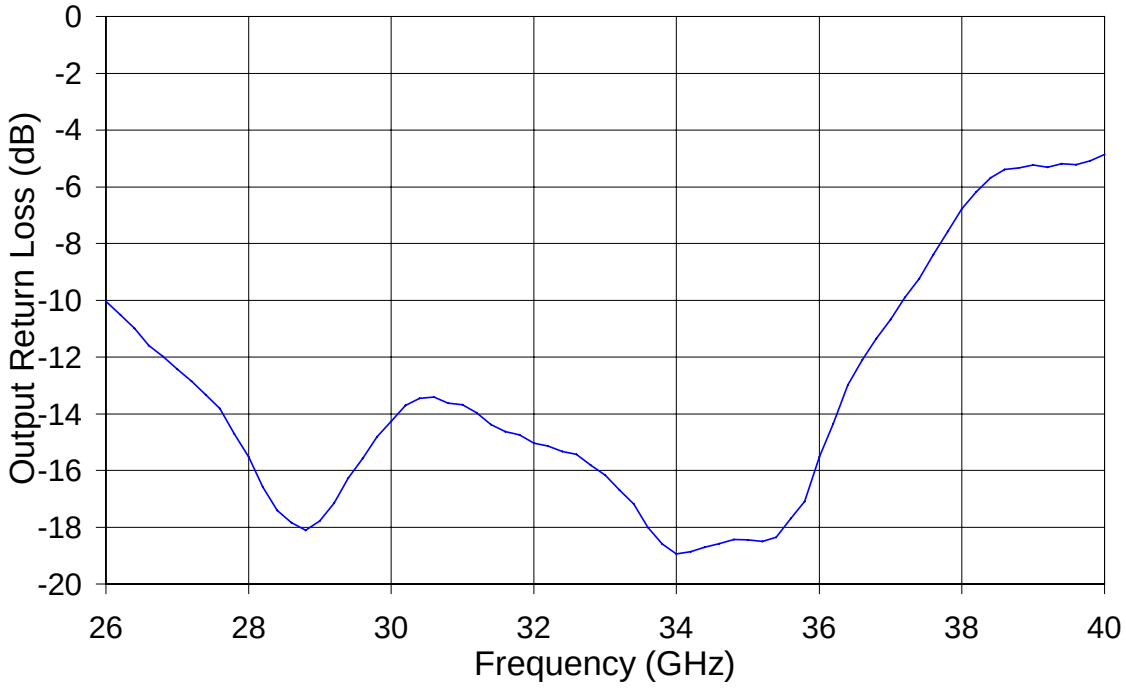
Bias Conditions: Vd = 6V, Id = 60mA ± 5%





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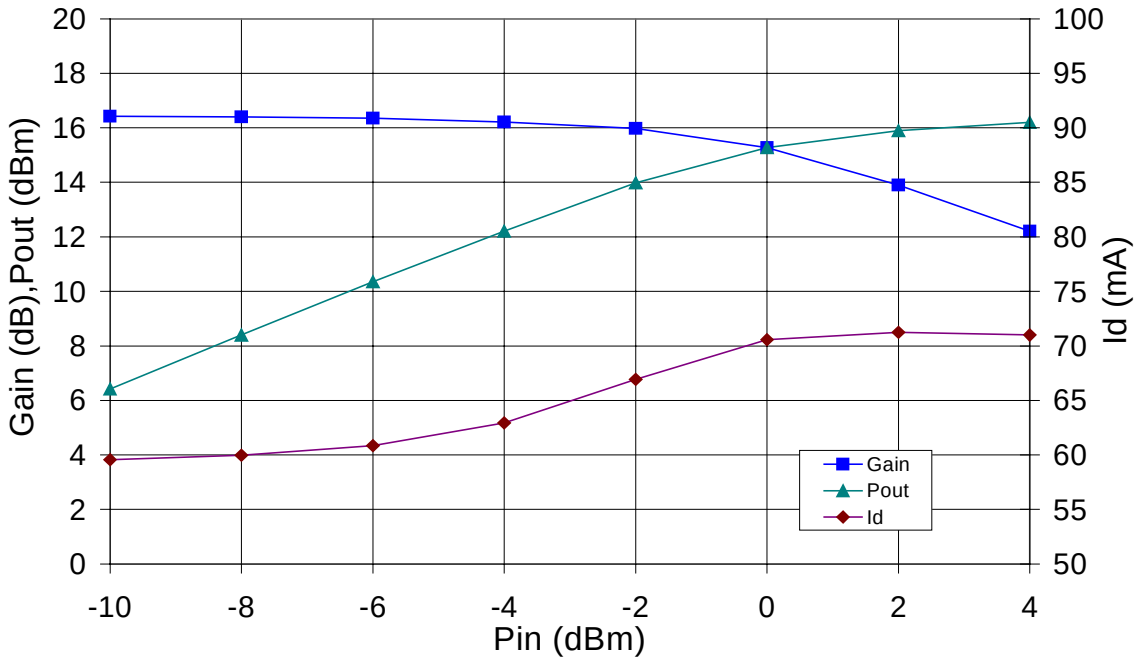
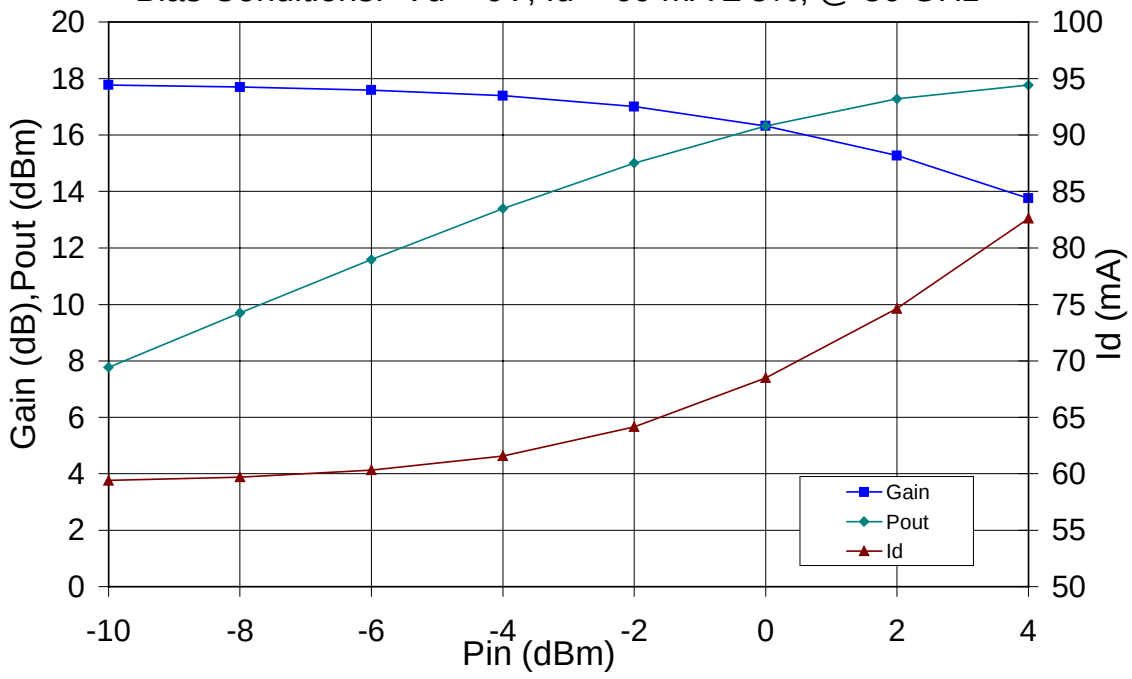
Measured Fixtured Data

Bias Conditions: Vd = 6V, Id = 60 mA ± 5%, @ 30 GHz



Bias Conditions: Vd = 6V, Id = 60 mA ± 5%, @ 36 GHz



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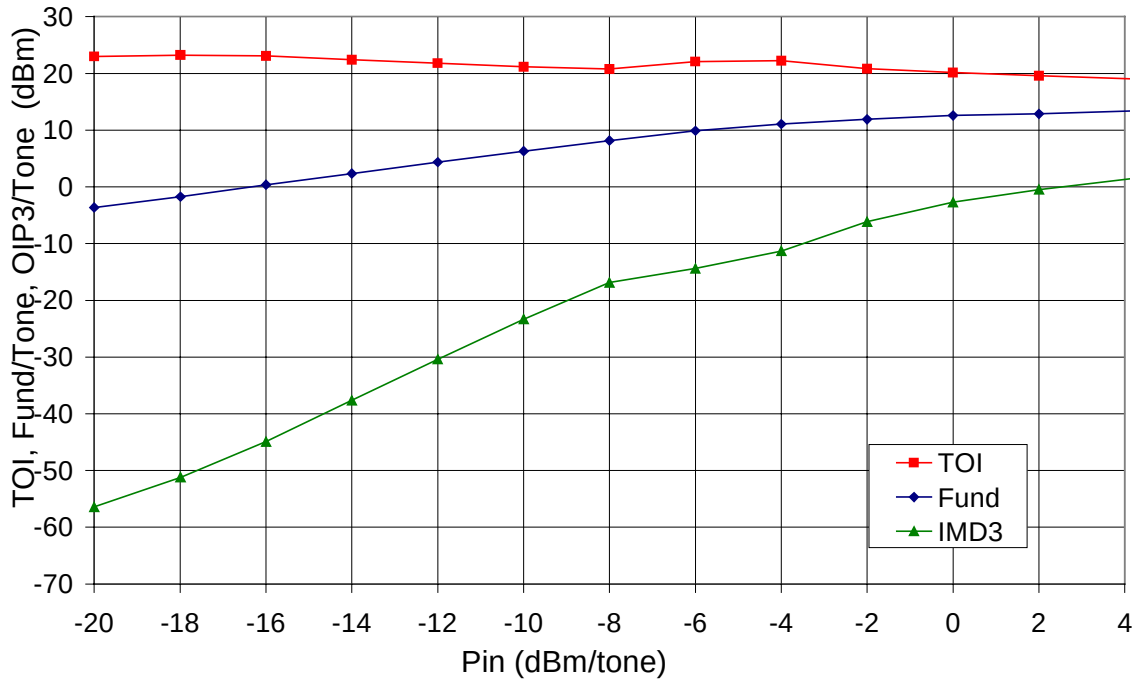
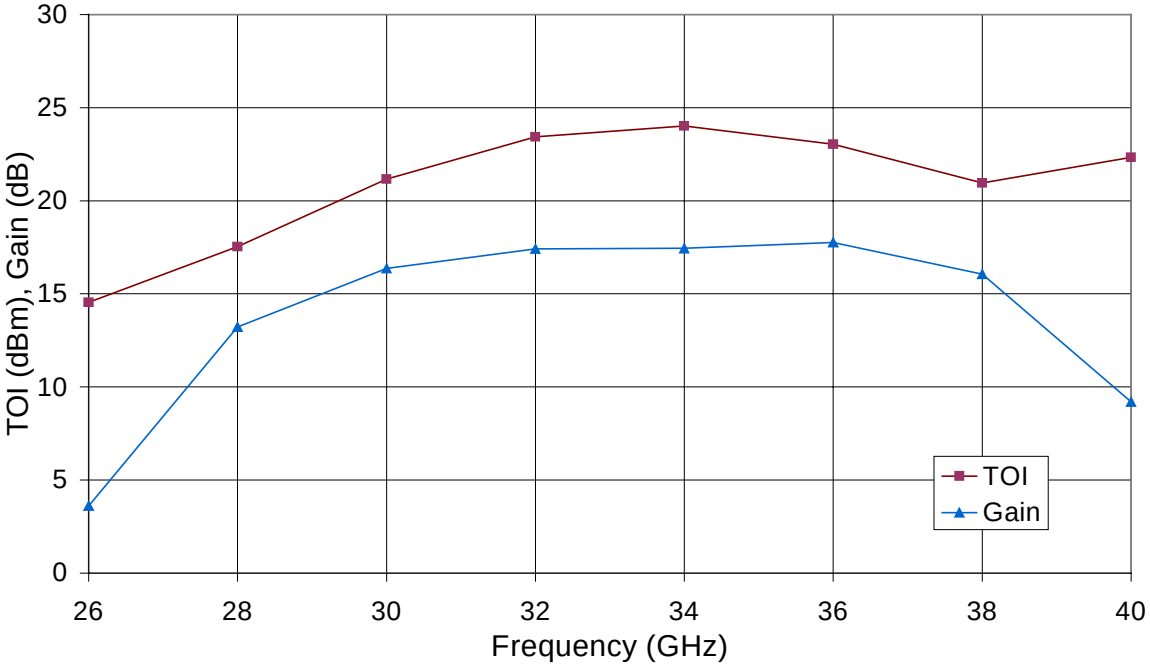
Measured Fixtured Data

Bias Conditions: Vd = 6V, Id = 60 mA ± 5%, @ 30 GHz



Bias Conditions: Vd = 6V, Id = 60 mA ± 5%, @ Pin = -10dBm/Tone



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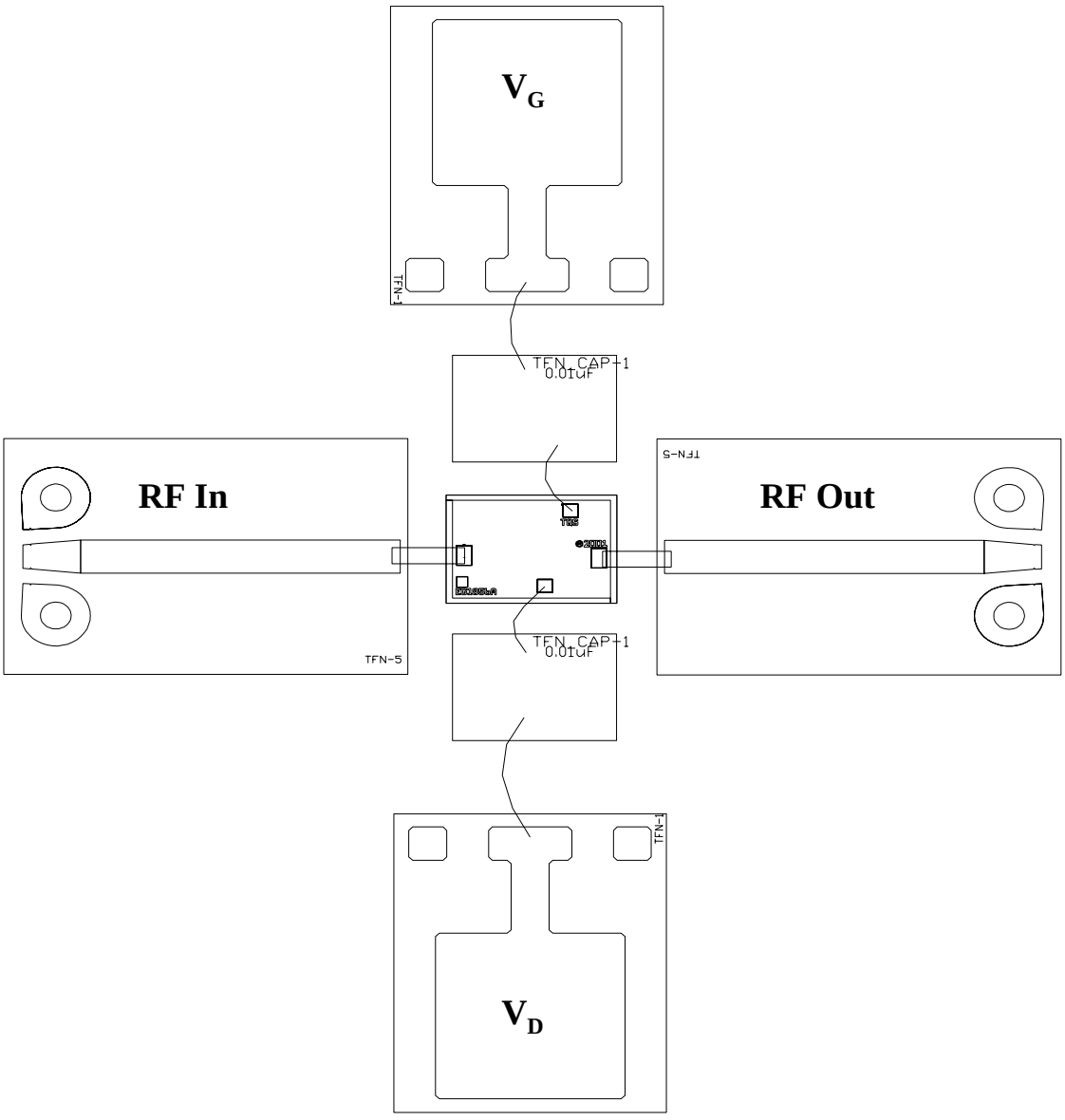
Chip Assembly and Bonding Diagram



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

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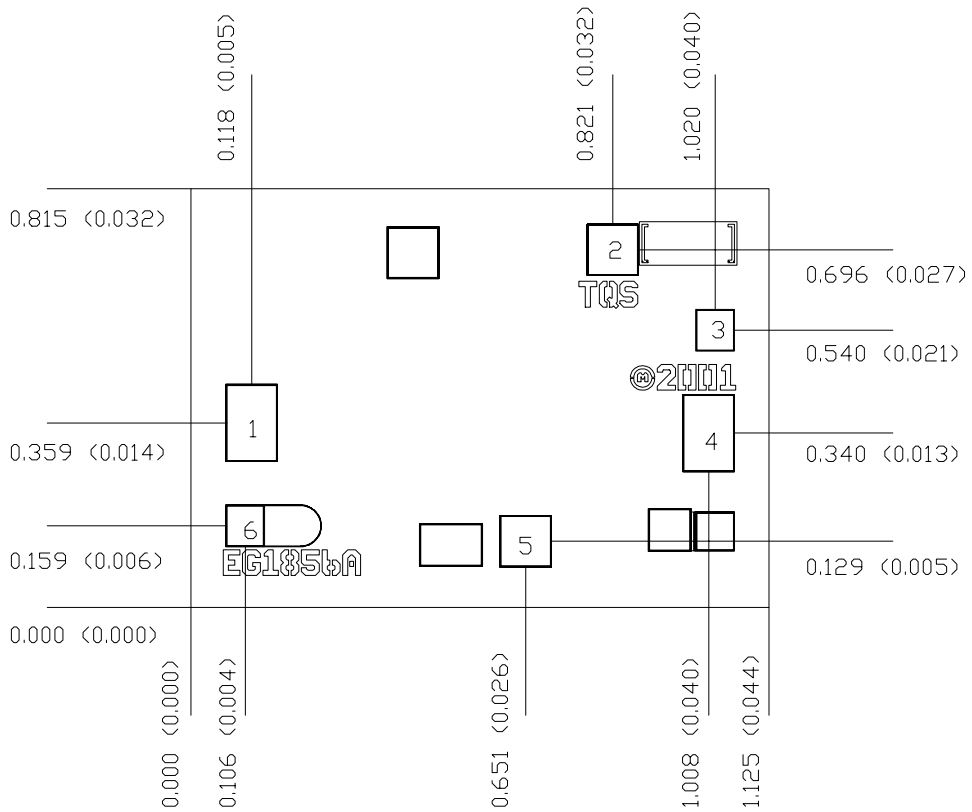
Mechanical Drawing



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

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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.
- 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.

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