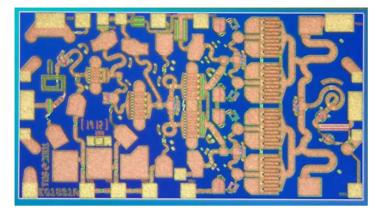


13 - 17 GHz 2 Watt, 32dB Power Amplifier

TGA2503-EPU



Key Features and Performance

- 33 dBm Midband Pout
- 32 dB Nominal Gain
- 10 dB Typical Return Loss
- Built-in Directional Power Detector with Reference
- 0.5µm pHEMT, 3MI Technology
- Bias Conditions: 7V, 680mA
- Chip dimensions: 2.5 x 1.4 x 0.1 mm (98 x 55 x 4 mils)

Preliminary Measured Data Bias Conditions: Vd=7V Id=680mA 40 5 S21 ·S11 0 35 S22 Return Loss (dB) 30 -5 Gain (dB) 25 ·10 20 15 15 -20 10 -25 11 12 13 14 15 16 17 18 19 Frequency (GHz) 35 60 34 55 50 33 32 45 >sat (dBm) 31 40 Psat a PAE 30 35 6 29 30 28 25 20 27 15 26 25 10 11 12 13 14 15 16 17 18 19 Frequency (GHz)

Primary Applications

- VSAT
- Point-to-Point

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.



TGA2503-EPU

TABLE I MAXIMUM RATINGS

Symbol	Parameter <u>1</u> /	Value	Notes
V ⁺	Positive Supply Voltage	8 V	<u>2</u> /
V	Negative Supply Voltage Range	-5V to 0V	
I ⁺	Positive Supply Current (Quiescent)	TBD	<u>2</u> /
_G	Gate Supply Current	18 mA	
P _{IN}	Input Continuous Wave Power	21.4 dBm	<u>2</u> /
PD	Power Dissipation	6.83 W	<u>2/ 3</u> /
Т _{СН}	Operating Channel Temperature	150 ⁰ C	<u>4/ 5</u> /
Τ _M	Mounting Temperature (30 Seconds)	320 ⁰ C	
T _{STG}	Storage Temperature	-65 to 150 ⁰ C	

- <u>1</u>/ These ratings represent the maximum operable values for this device.
- $\underline{2}$ / Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.
- <u>3</u>/ When operated at this bias condition with a base plate temperature of 70°C, the median life is reduced from 8.9E+6 to 1E+6.
- 4/ These ratings apply to each individual FET.
- 5/ Junction operating temperature will directly affect the device median time to failure (T_M). For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.

TABLE IIDC PROBE TEST(TA = 25 °C, Nominal)

NOTES	SYMBOL	LIMI	UNITS	
		MIN	MAX	
<u>1</u> /	I _{DSS}	80	381	mA
<u>1</u> /	G _M	176	424	mS
<u>2</u> /	V _P	0.5	1.5	V
<u>2</u> /	V _{BVGS}	8	30	V
<u>2</u> /	V _{BVGD}	13	30	V

<u>1</u>/ Measurements are performed on a 800μ m FET.

 $\underline{2}$ / V_P, V_{BVGD}, and V_{BVGS} are negative.

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.

 2



TGA2503-EPU

TABLE III RF CHARACTERIZATION TABLE $(T_A = 25^{\circ}C, Nominal)$ $(Vd = 7V, Id = 680mA \pm 5\%)$

SYMBOL	PARAMETER	TEST	LIMITS		UNITS	
		CONDITION	MIN	TYP	MAX	
Gain	Small Signal Gain	F = 13-17		32		dB
IRL	Input Return Loss	F = 13-17		10		dB
ORL	Output Return Loss	F = 13-17		10		dB
PWR	Output Power @ Pin = +5 dBm	F = 13-17		33		dBm

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

TABLE IV THERMAL INFORMATION

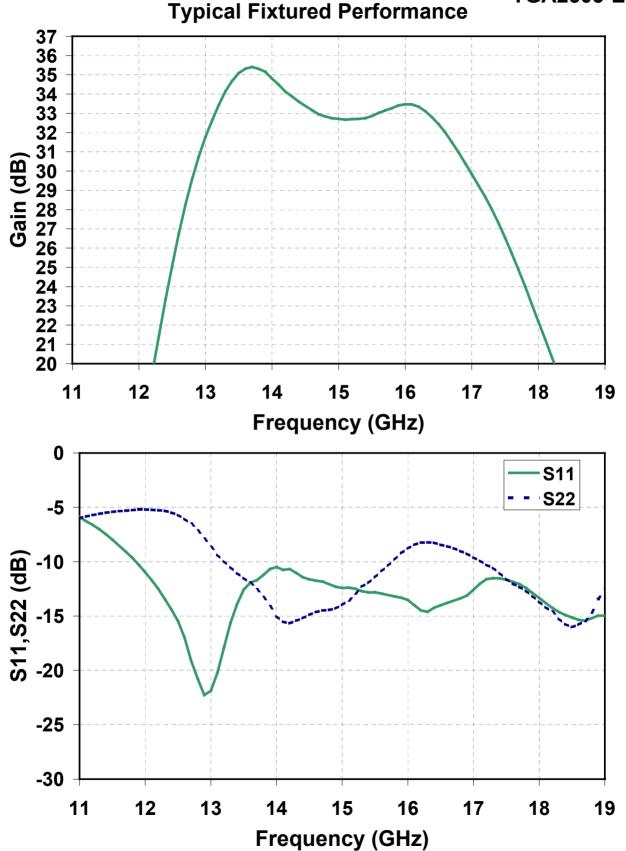
PARAMETER	TEST CONDITION	Т _{сн} (°С)	R _{θjc} (°C/W)	MTTF (HRS)
R _{θjc} Thermal Resistance (Channel to Backside)	$V_D = 7V$ $I_D = 680mA$ $P_D = 4.76W$	125.74	11.71	8.9E+6

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

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.



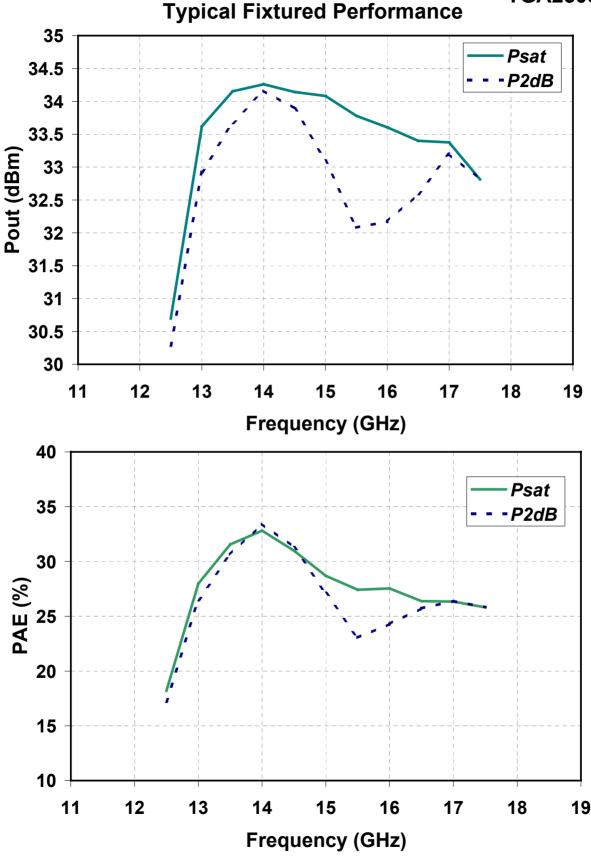
TGA2503-EPU



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.



TGA2503-EPU

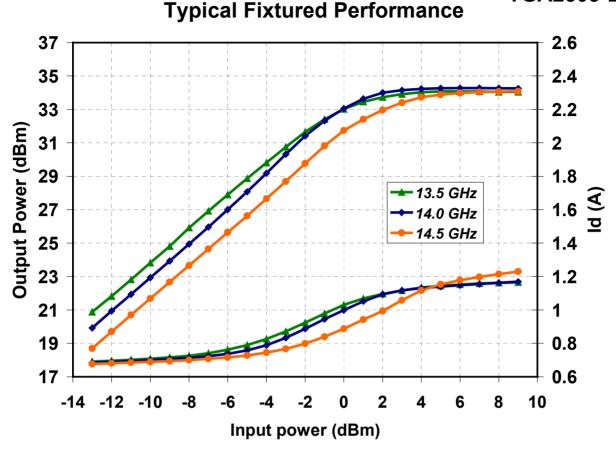


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

(5



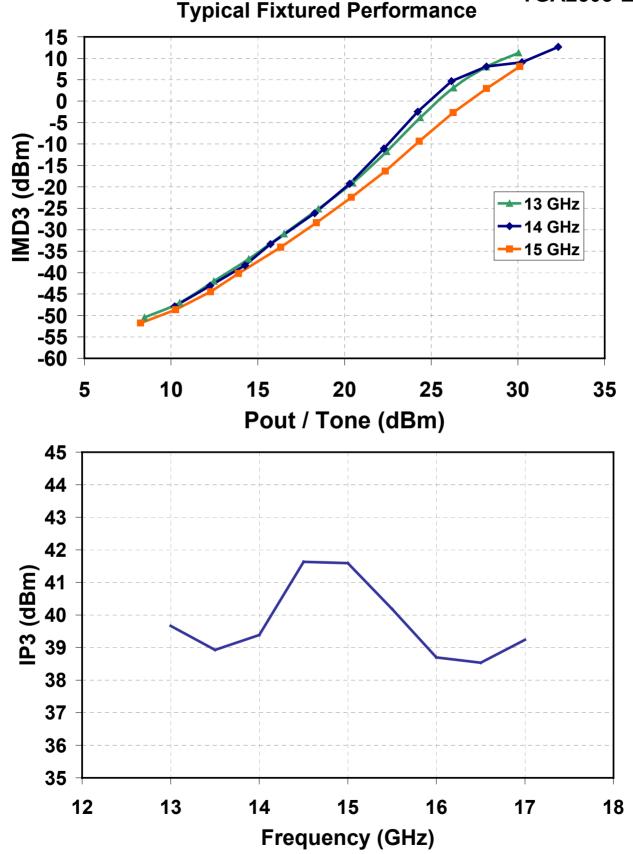
TGA2503-EPU



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.



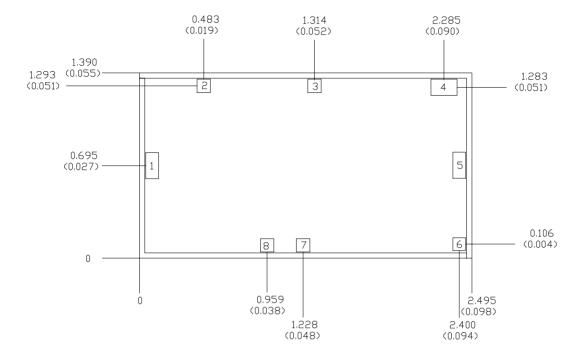
TGA2503-EPU



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.



TGA2503-EPU



Mechanical Drawing

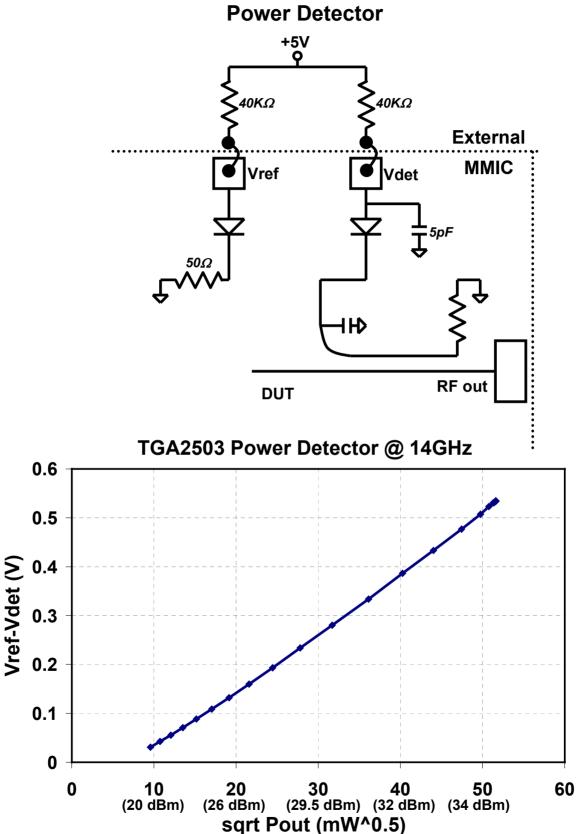
Units: millimeters (inches) Thickness: 0.1016 (0.004) (reference only) Chip edge to bond pad dimensions are shown to center of Bond pads. Chip size tolerance: +/- 0.0508 (0.002) RF Ground through Backside

Bond Pad #1	(RF Input)	0.100×0.200	(0.004×0.008)
Bond Pad #2	(Vref)	0.100×0.100	(0.004×0.004)
Bond Pad #3	(Vd3)	0.100×0.100	(0.004×0.004)
Bond Pad #4	(Vd4)	0.200 × 0.125	(0.008 × 0.005)
Bond Pad #5	(RF Output)	0.100×0.200	(0.004×0.008)
Bond Pad #6	(Vdet)	0.100×0.100	(0.004×0.004)
Bond Pad #7	(Vg4)	0.100×0.100	(0.004×0.004)
Bond Pad #8	(Vg3)	0.100×0.100	(0.004×0.004)

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.



TGA2503-EPU

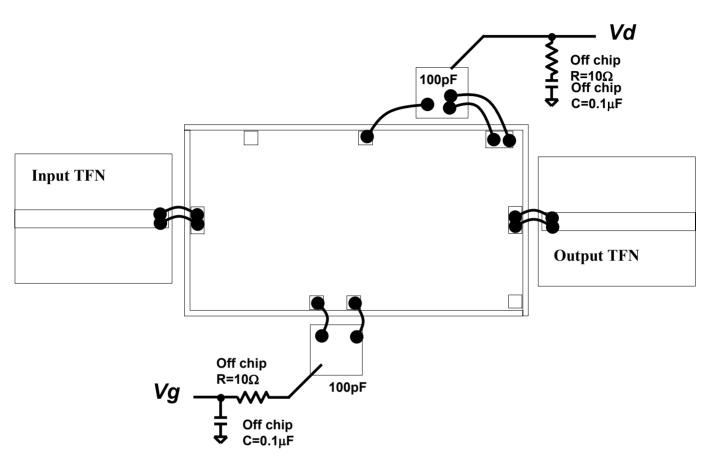


Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.



TGA2503-EPU





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

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.



TGA2503-EPU

Assembly Process Notes

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300°C. (30 seconds maximum)
- 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.

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.