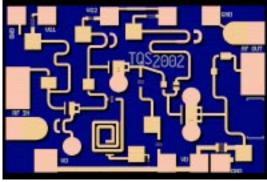


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# **K Band Low Noise Amplifier**



**Preliminary Measured Data** 

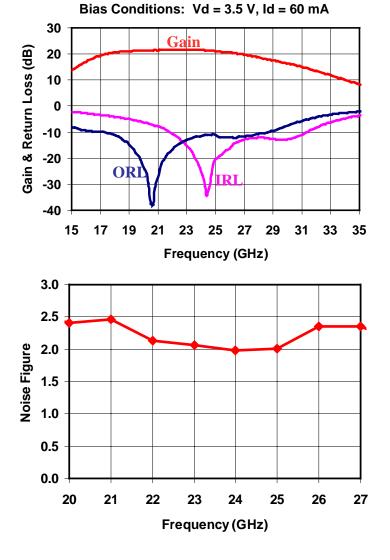
# **TGA4506**

#### **Key Features**

- Typical Frequency Range: 20 27 GHz
- 21 dB Nominal Gain
- 2.2 dB Nominal Noise Figure
- 12 dBm Nominal P1dB
- Bias 3.5 V. 60 mA
- 0.15 um 3MI pHEMT Technology
- Chip Dimensions 1.2 x 0.8 x 0.1 mm (0.047 x 0.031 x 0.004) in

#### **Primary Applications**

- Point-to-Point Radio
- Point-to-MultiPoint Radio
- LMDS



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



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**TGA4506** 

#### TABLE I MAXIMUM RATINGS <u>1</u>/

SYMBOL	PARAMETER	VALUE	NOTES
Vd	Drain Voltage	5 V	<u>2/</u>
Vg	Gate Voltage Range	-1 TO +0.5 V	
ld	Drain Current	190 mA	<u>2</u> / <u>3</u> /
Ig	Gate Current	6 mA	<u>3</u> /
P <sub>IN</sub>	Input Continuous Wave Power	TBD	
PD	Power Dissipation	TBD	<u>2/ 4</u> /
Т <sub>сн</sub>	Operating Channel Temperature	150 <sup>0</sup> C	<u>5</u> / <u>6</u> /
Τ <sub>M</sub>	Mounting Temperature (30 Seconds)	320 <sup>0</sup> C	
T <sub>STG</sub>	Storage Temperature	-65 to 150 <sup>0</sup> 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>.

- <u>3</u>/ Total current for the entire MMIC.
- 4/ When operated at this bias condition with a base plate temperature of TBD, the median life is reduced from TBD to TBD hrs.
- 5/ 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.
- 6/ These ratings apply to each individual FET.



**TGA4506** 

# TABLE IIDC PROBE TESTS(Ta = 25 °C Nominal)

SYMBOL	PARAMETER	MINIMUM	MAXIMUM	VALUE
V <sub>P3</sub>	Pinch-off Voltage	-1.0	-0.1	V

Q3 is 300 um FET

#### TABLE III ELECTRICAL CHARACTERISTICS

#### (Ta = 25 °C Nominal)

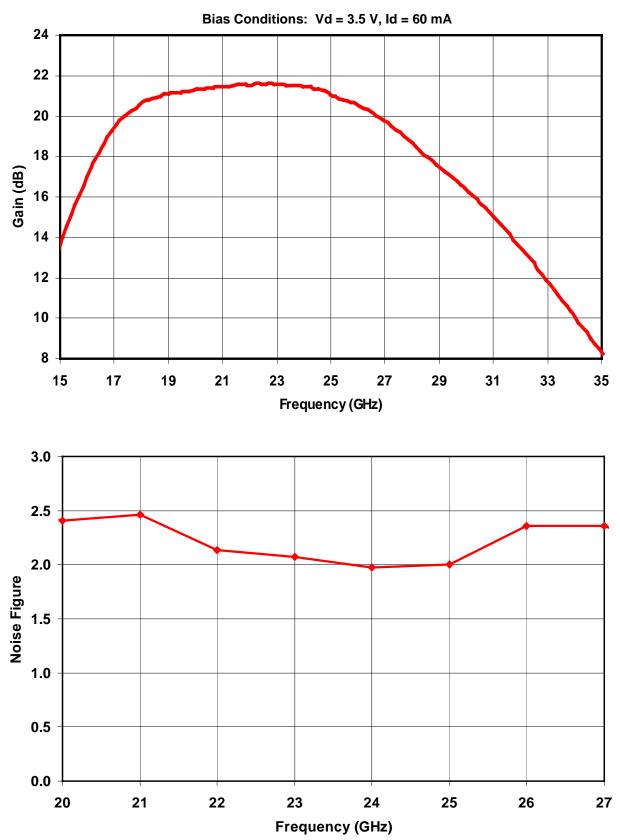
PARAMETER	TYPICAL	UNITS
Drain Voltage, Vd	3.5	V
Drain Current, Id	60	mA
Gate Voltage, Vg	-0.5 to 0	V
Small Signal Gain, S21	21	dB
Input Return Loss, S11	15	dB
Output Return Loss, S22	11	dB
Noise Figure, NF	2.2	dB
Output Power @ 1 dB Compression Gain, P1dB	12	dBm



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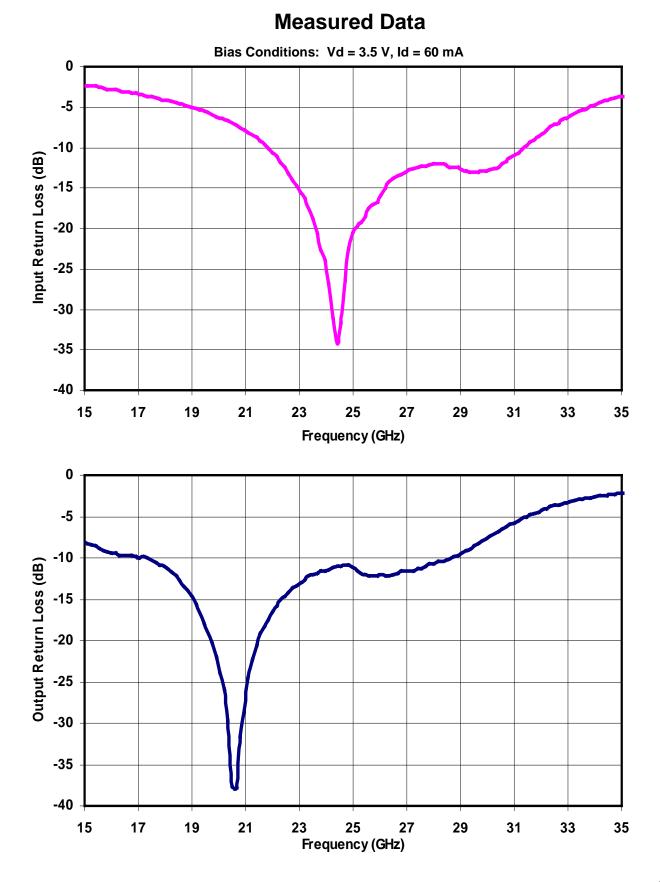






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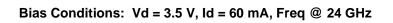


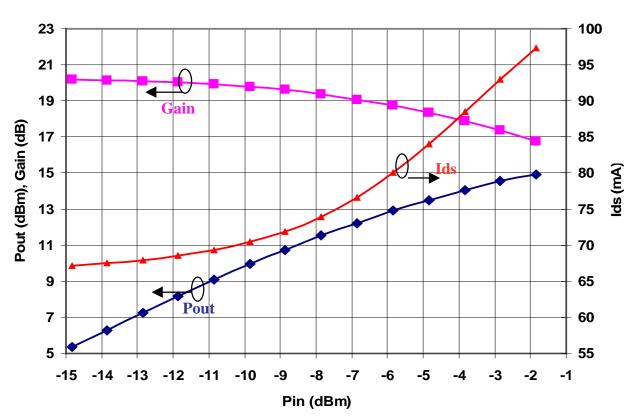


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### **Measured Data**



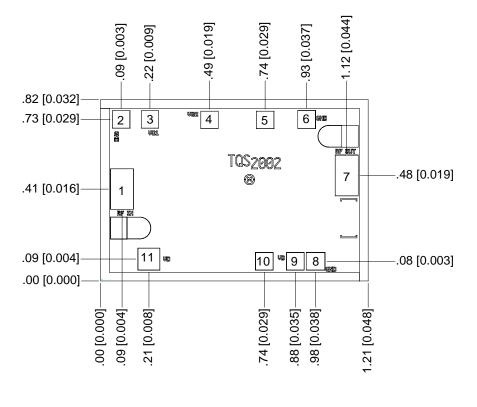




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# **Mechanical Drawing**



Units: millimeters [inches] Thickness: 0.10 [0.004] (reference only) Chip edge to bond pad dimensions are shown to center of bond pads. Chip size tolerance: ±0.05 [0.002] RF ground through backside

Bond Pad #1	RF Input	0.11 x 0.19	[0.004 x 0.007]
Bond Pad #2	N/C	0.08 x 0.08	[0.003 x 0.003]
Bond Pad #3	VG1	0.08 x 0.08	[0.003 x 0.003]
Bond Pad #4	VG2	0.08 x 0.08	[0.003 x 0.003]
Bond Pad #5	N/C	0.08 x 0.08	[0.003 x 0.003]
Bond Pad #6	N/C	0.08 x 0.08	[0.003 x 0.003]
Bond Pad #7	RF Output	0.11 x 0.19	[0.004 x 0.007]
Bond Pad #8	N/C	0.09 x 0.08	[0.004 x 0.003]
Bond Pad #9	VD	0.09 x 0.08	[0.004 x 0.003]
Bond Pad #10	VD	0.09 x 0.08	[0.004 x 0.003]
Bond Pad #11	VD	0.10 x 0.10	[0.004 x 0.004]

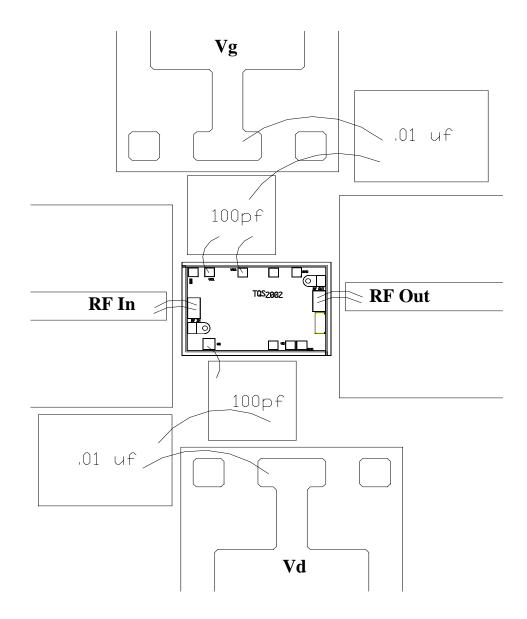
GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

TriQuint Semiconductor Texas: Phone (972)994-8465 Fax (972)994-8504 Email: Info-mmw@tqs.com Web: www.triquint.com



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## Chip Assembly Diagram



All three Vd pads (pad # 9, 10, 11 from mechanical drawing) do not need to be connected

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



#### Advance Product Information July 19, 2005 TGA4506

### **Assembly Process Notes**

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300<sub>1</sub> 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.

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