Advance Product Information

September 16, 2004

Ka-Band Packaged MPA

TGA4902-EPU-SM

Key Features

- Typical Frequency Range: 25 - 35 GHz
- 25 dBm Nominal P1dB
- 18 dB Nominal Gain
- Bias 6 V, 220 mA
- Package Dimensions:
  4.0 x 4.0 x 0.9 mm

Primary Applications

- Ka-Band VSAT
- Point-to-Point Radio
- Point-to-Multipoint Communications

Product Description

The TriQuint TGA4902-EPU-SM is a Ka-Band Packaged Medium Power Amplifier. The TGA4902-SM operates from 25-35 GHz and is designed using TriQuint's proven standard 0.25 um power pHEMT production process.

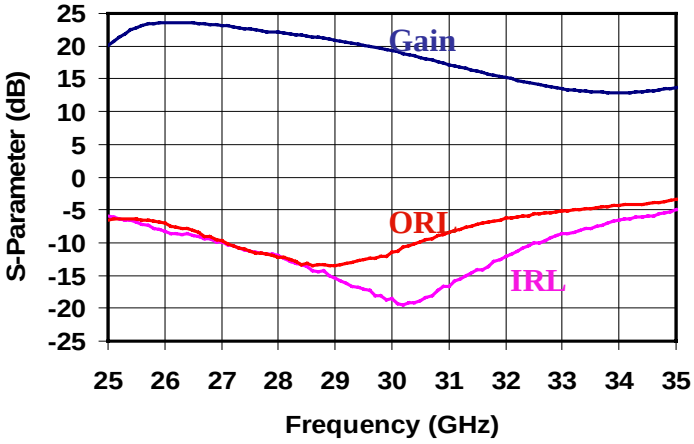
The TGA4902-EPU-SM typically provides 25 dBm of output power at 1 dB gain compression, with small signal gain of 18 dB.

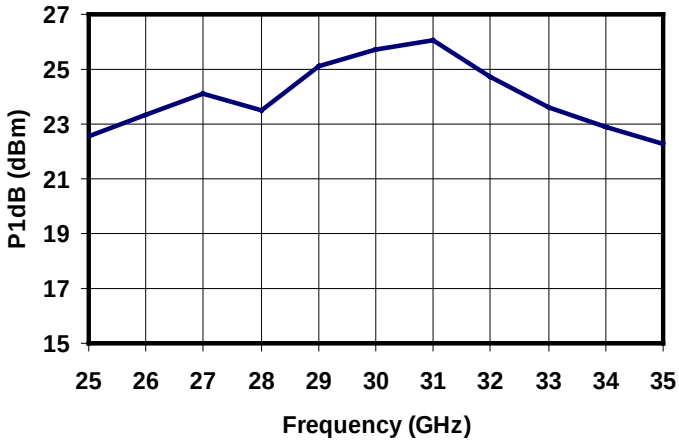
The TGA4902-EPU-SM is ideally suited for VSAT ground terminal market, Point-to-Point Radio, Point-to-Multipoint Communications.

Evaluation Boards are available.

Preliminary Measured Data

Bias Conditions: Vd = 6 V, Id = 220 mA, Tuned





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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TABLE I
MAXIMUM RATINGS 1/

SYMBOL	PARAMETER	VALUE	NOTES
Vd	Drain Voltage	8 V	2/
Vg	Gate Voltage Range	-5 TO 0 V	
Id	Drain Current	296 mA	2/ 3/
$\|Ig\|$	Gate Current	8.8 mA	3/
P_{IN}	Input Continuous Wave Power	20 dBm	
P_D	Power Dissipation	See note 4/	2/
T_{CH}	Operating Channel Temperature	150 ^{0}C	5/ 6/
T_M	Mounting Temperature (30 Seconds)	250 ^{0}C	
T_{STG}	Storage Temperature	-65 to 150 ^{0}C	
T_{CASE}	Package Operating Temperature	-40 to 110 ^{0}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_D.

3/ Total current for the entire MMIC.

4/ For a median life time of 1E+6 hrs, Power dissipation is limited to:

$$P_D(max) = (150\ ^0C - T_{BASE}\ ^0C) / 60.71\ (^0C/W)$$

Where T_{BASE} is the base plate temperature.

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.

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TABLE II
ELECTRICAL CHARACTERISTICS
(Ta = 25 ^{0}C, Nominal)

PARAMETER	TYPICAL	UNITS
Frequency Range	25 - 35	GHz
Drain Operating	6	V
Quiescent Current	220	mA
Small Signal Gain	18	dB
Input Return Loss	15	dB
Output Return Loss	10	dB
Output Power @ 1 dB Compression Gain	25	dBm
Temperature Coefficient	-0.017	dB/^{0}C

TABLE III
THERMAL INFORMATION

PARAMETER	TEST CONDITIONS	T_{CH} (^{O}C)	$R_{\theta JC}$ ($^\circ$C/W)	T_M (HRS)
$R_{\theta JC}$ Thermal Resistance (channel case)	Vd = 6 V I_D = 220 mA Pdiss = 1.32 W	150	60.71	1.0E+6

Note: Worst case condition with no RF applied, 100% of DC power is dissipated, Case Temperature @ 70 ^{O}C

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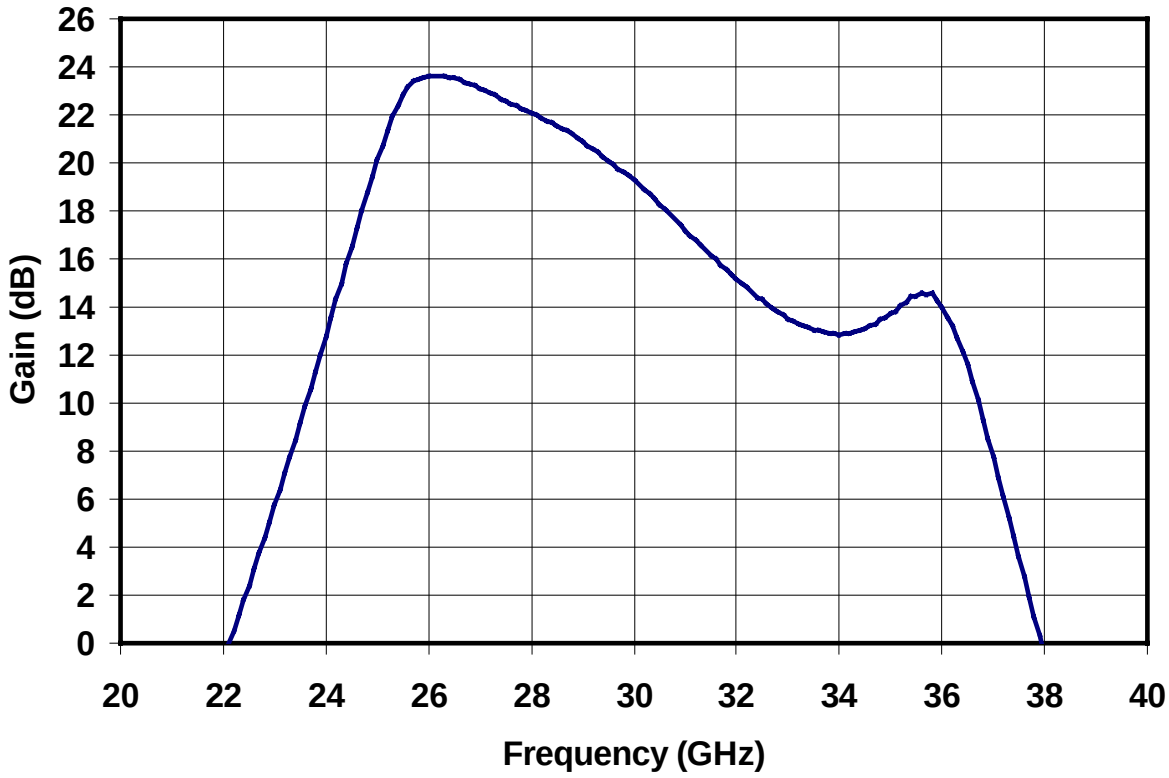

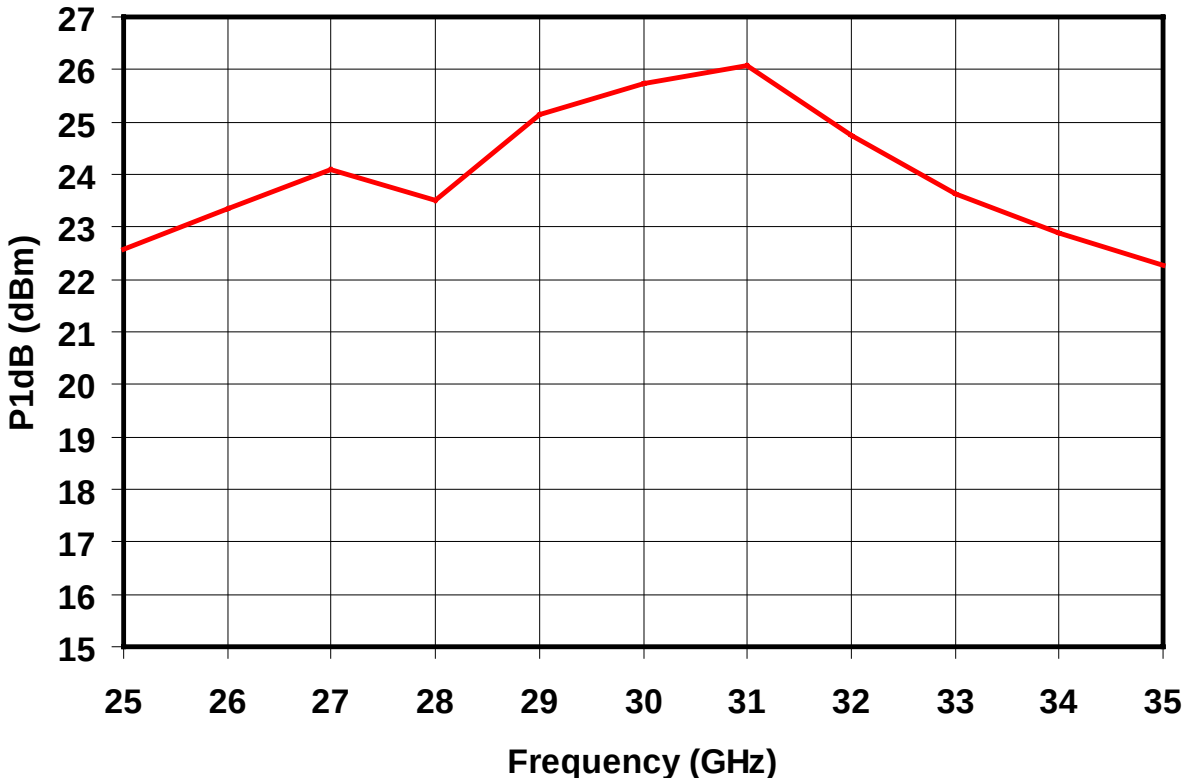

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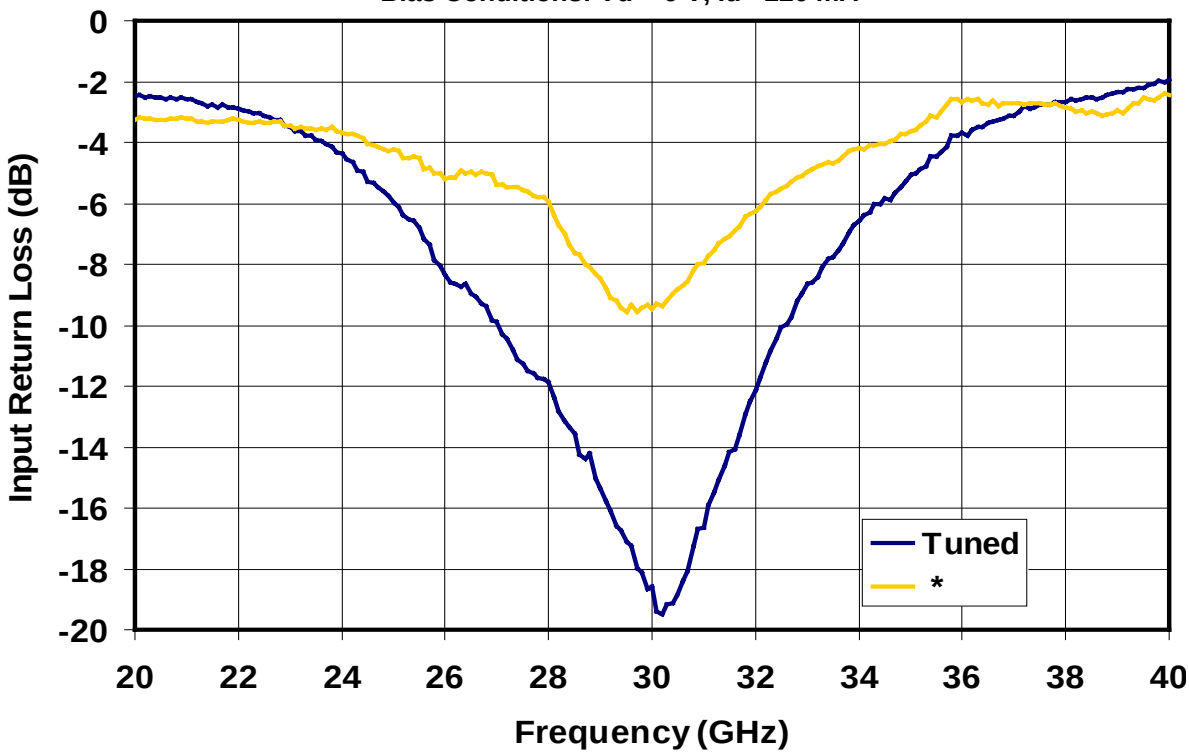

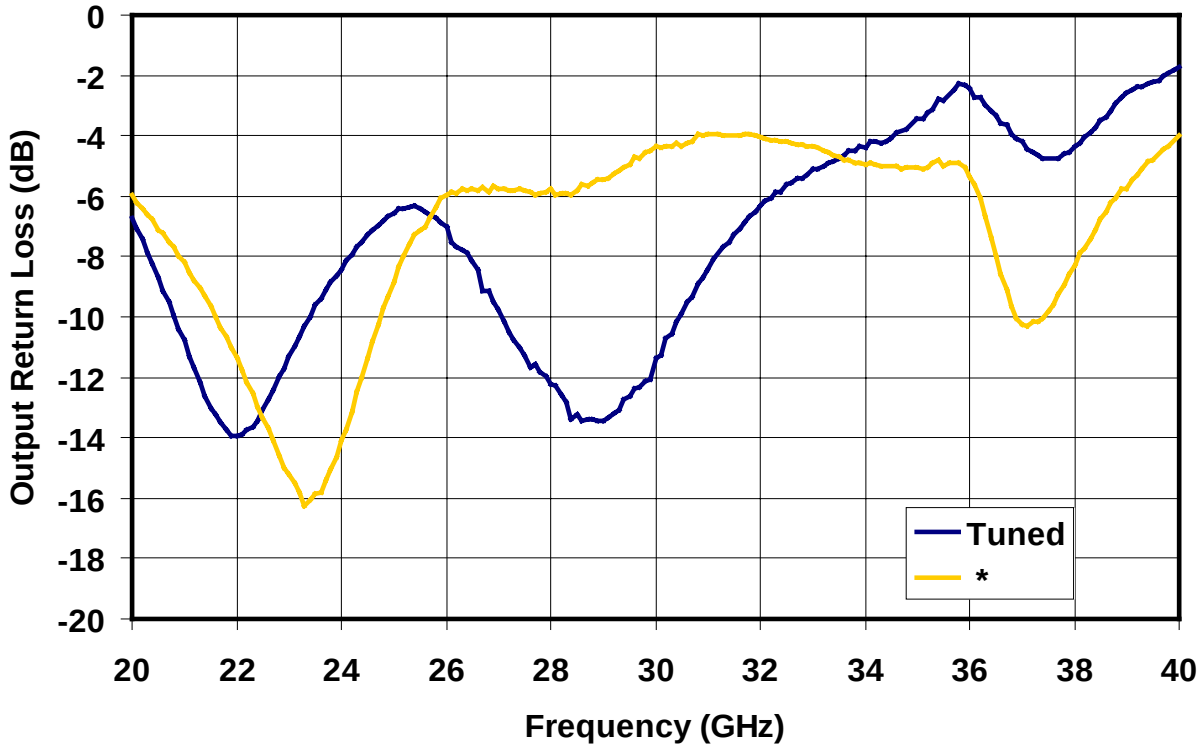

*** As build performance without tuning stubs**

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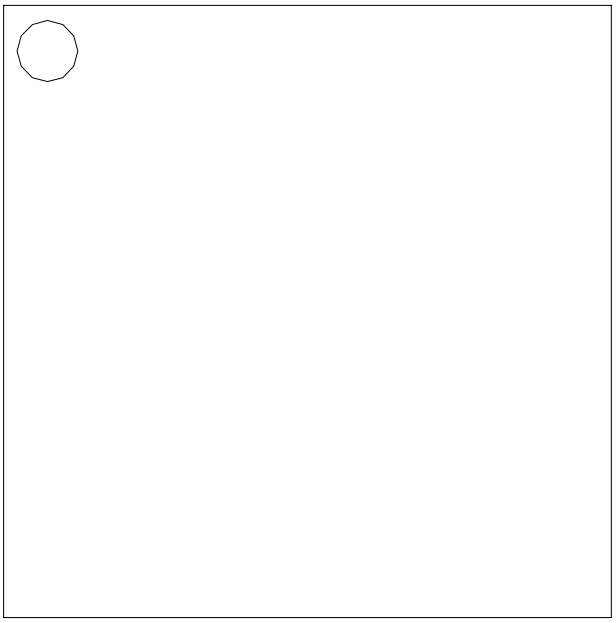
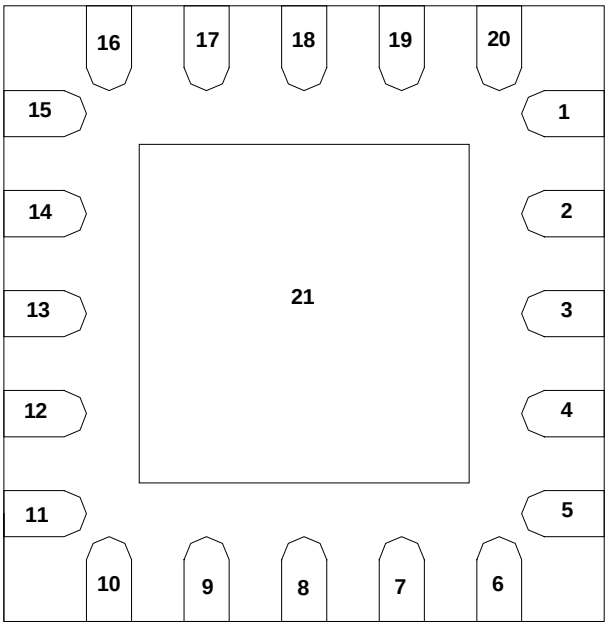
Package Pinout Diagram



Top View

Dot indicates Pin 1



Bottom View

Pin	Description
1, 5, 6, 10, 11, 15, 16, 20, 21	GND
2, 4, 7, 12, 14, 19	NC
3	RF Input
8	Vg1
9	Vg2
13	RF Output
17	Vd1
18	Vd2

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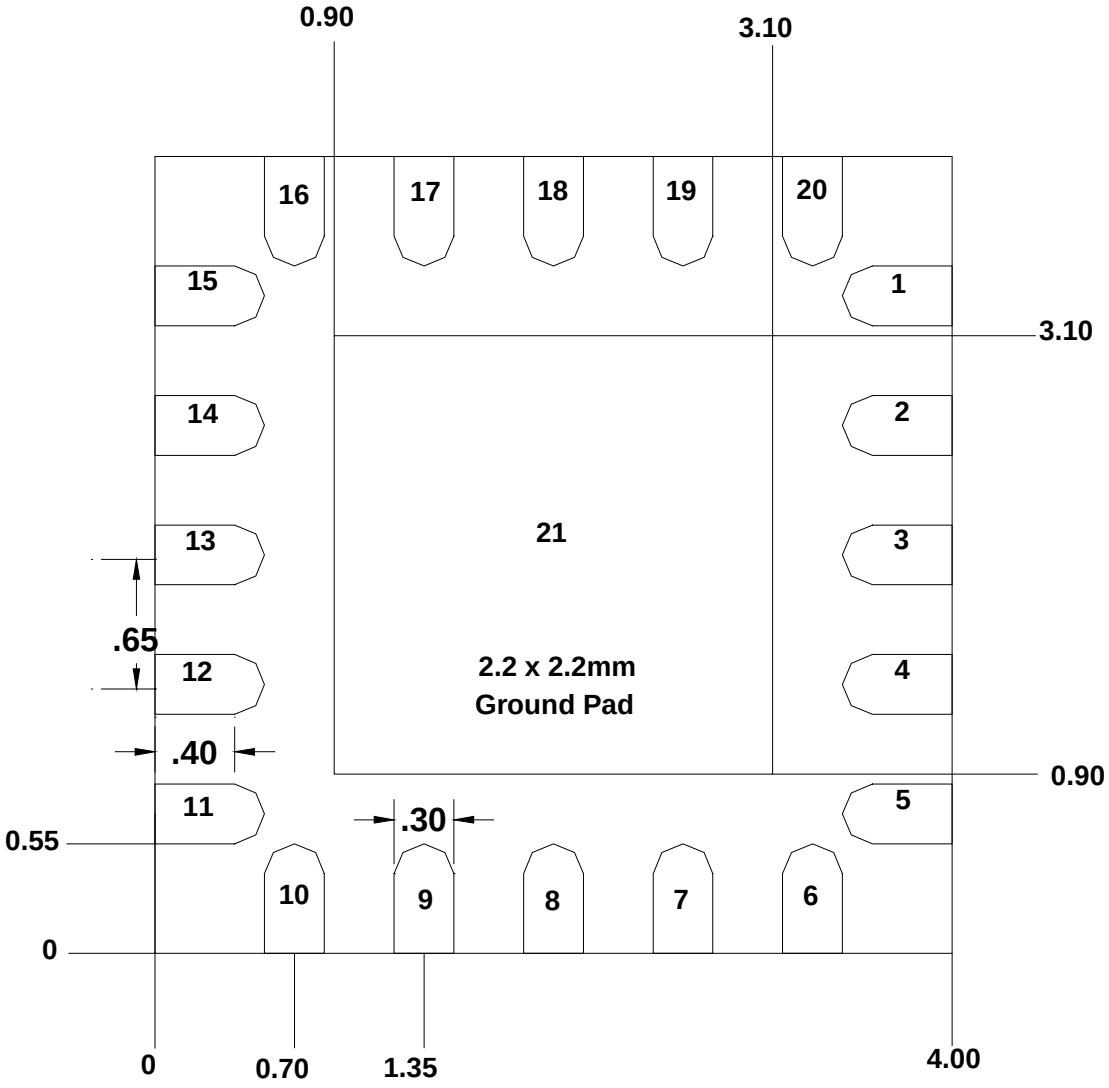
Mechanical Drawing



Bottom View

Units: Millimeters. Package tolerance: +/- 0.10

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

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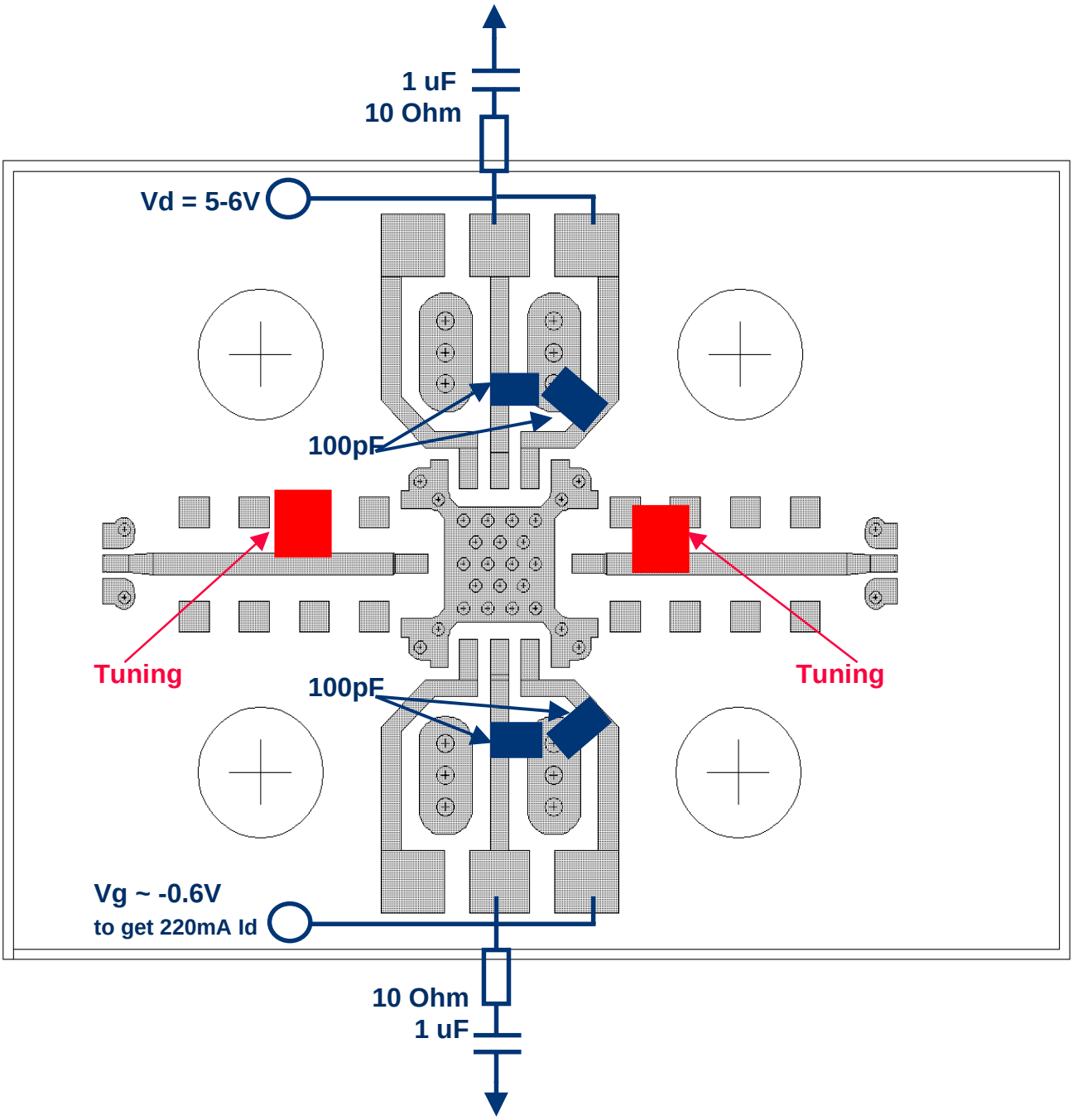
Recommended Board Layout Assembly



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Assembly of a TGA4902-EPU Surface Mount Package onto a Motherboard

1. Clean the motherboard or module with acetone. Rinse with alcohol and DI water. Allow the circuit to fully dry. Set hot plate to 210C.

2. To improve the thermal and RF performance, we recommend a heat sink attach to the bottom of the package and apply SnPb or equivalent solder to the bottom of TGA4902-SM.

3. Apply flux # 5RMA (product of Indium corporation of America) to housing, PCB and base of TGA4902-SM. Put Sn62 (product of Indium corporation of America) between housing and PCB, housing and TGA4902-SM.

4 Set the whole fixture on the hot plate until the solder melts. After 5 or 6 seconds, carefully remove the fixture from the hot plate and that it cool down quickly.

5. Clean the assembly with alcohol.

High Volume Assembly of the Package

The TGA4902-EPU-SM can be a surface mounted with standard high volume assembly processes using a standard SN63 solder paste, such as Kester R560. Refer to Kester R560 manufacture data sheet for recommended reflow profile, cleaning, and handling. Dispense solder paste using standard solder printing techniques such as stencil solder printing. Pick-and-place using a standard machine such as MRSI machine. Perform solder reflow using a Sikama Reflow System. Recommended solder stencil and motherboard interface layout are available upon request. To improve thermal and RF performance, it is recommend to maximize the number of vias on the mother board where the TGA4902-EPU-SM will be attached.

Ordering Information

Part	Package Style
TGA4902-EPU-SM	QFN 4x4 Surface Mount

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