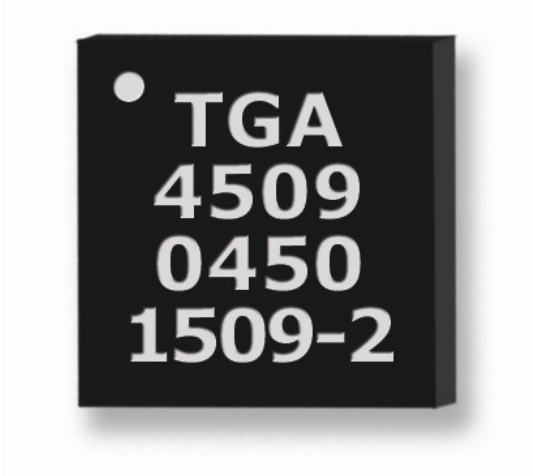
Ka-Band Packaged 1W PA TGA4509-SM



Key Features

- Frequency Range: 28-31 GHz
- 30 dBm Nominal P1dB
- 22 dB Nominal Gain
- Bias Conditions: Vd = 6 V, Idq_tot = 420 mA (Id = 800mA under RF drive)
- Compact 4 x 4 QFN with 20 leads
- Package Dimensions: 4.0 x 4.0 x 1.2 mm

Primary Applications

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

Product Description

The TriQuint TGA4509-SM is a Ka-Band Packaged 1W Power Amplifier. The TGA4509-SM operates from 28-31 GHz and is designed using TriQuint's power pHEMT production process.

The TGA4509-SM typically provides 30 dBm of output power at 1 dB gain compression with small signal gain of 22 dB.

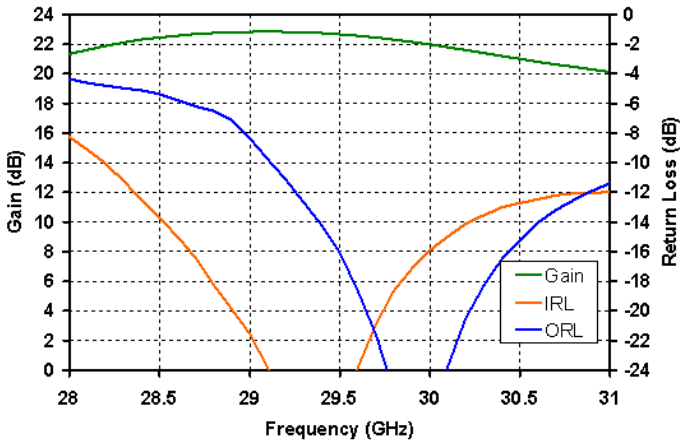
The TGA4509-SM is available in a low-cost, surface mount 4x4 QFN style package and is ideally suited for Ka-band VSAT Ground Terminal, Point-to-Point Radio and Point-to-Multipoint applications.

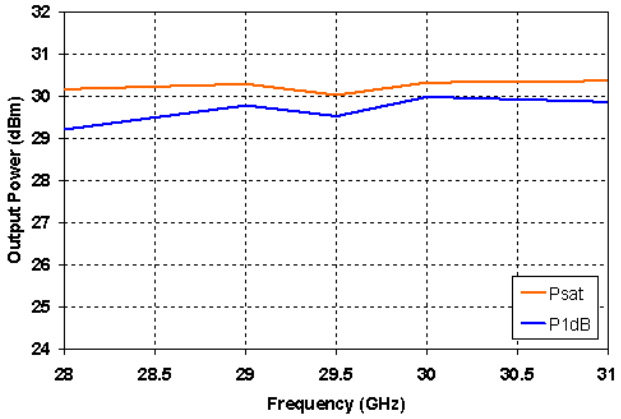
Evaluation Boards are available upon request.

Lead-free and RoHS compliant.

Measured Performance

Bias Conditions: Vd = 6V, Idq = 420mA





Datasheet subject to change without notice

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

TABLE I
ABSOLUTE MAXIMUM RATINGS 1/

Symbol	Parameter	Value	Notes
V^+	Positive Supply Voltage	7 V	
V^-	Negative Supply Voltage Range	-5V to 0V	
I^+	Positive Supply Current	984 mA	
$\| I_G \|$	Gate Supply Current	35 mA	
P_{IN}	Input Continuous Wave Power	22 dBm	
P_D	Power Dissipation	6.9 W	
Tchannel	Channel Temperature	200 °C	2/
	Mounting Temperature (30 Seconds)	260 °C	
	Storage Temperature	-65 to 150 °C	

1/ These ratings represent the maximum operable values for this device. Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device and / or affect device lifetime. These are stress ratings only, and functional operation of the device at these conditions is not implied.

2/ Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.

TABLE II
RF CHARACTERIZATION TABLE
(T_A = 25°C, Nominal)
Bias Conditions: Vd = 6V, Idq = 420mA

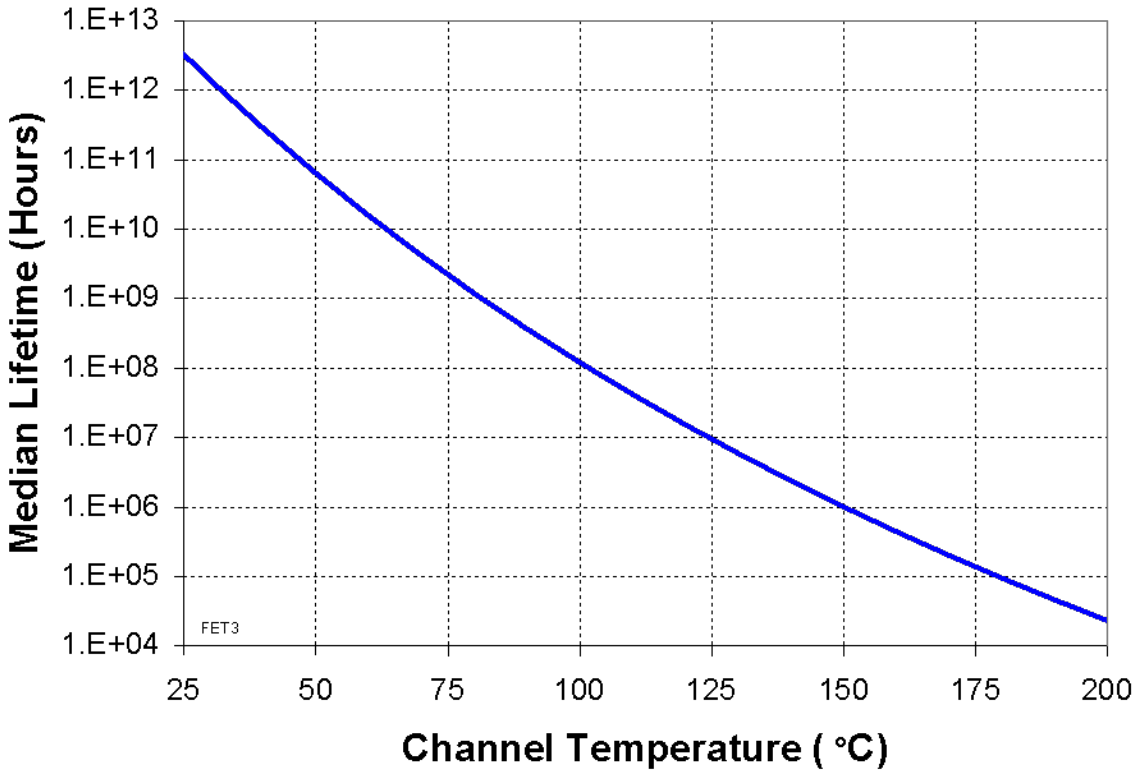
SYMBOL	PARAMETER	TEST CONDITION	NOMINAL	UNITS
Gain	Small Signal Gain	f = 28-31 GHz	22	dB
IRL	Input Return Loss	f = 28-31 GHz	15	dB
ORL	Output Return Loss	f = 28-31 GHz	15	dB
Psat	Saturated Output Power	f = 28-31 GHz	30.5	dBm
P1dB	Output Power @ 1dB Compression	f = 28-31 GHz	30	dBm

TABLE III
THERMAL INFORMATION

PARAMETER	TEST CONDITION	Tchannel (°C)	θ_{jc} (°C/W)	Tm (HRS)
θ_{jc} Thermal Resistance (Channel to package)	V_D = 6V I_{Dq} = 420mA P_D = 2.52 W	141	22.4	2.2 E+6

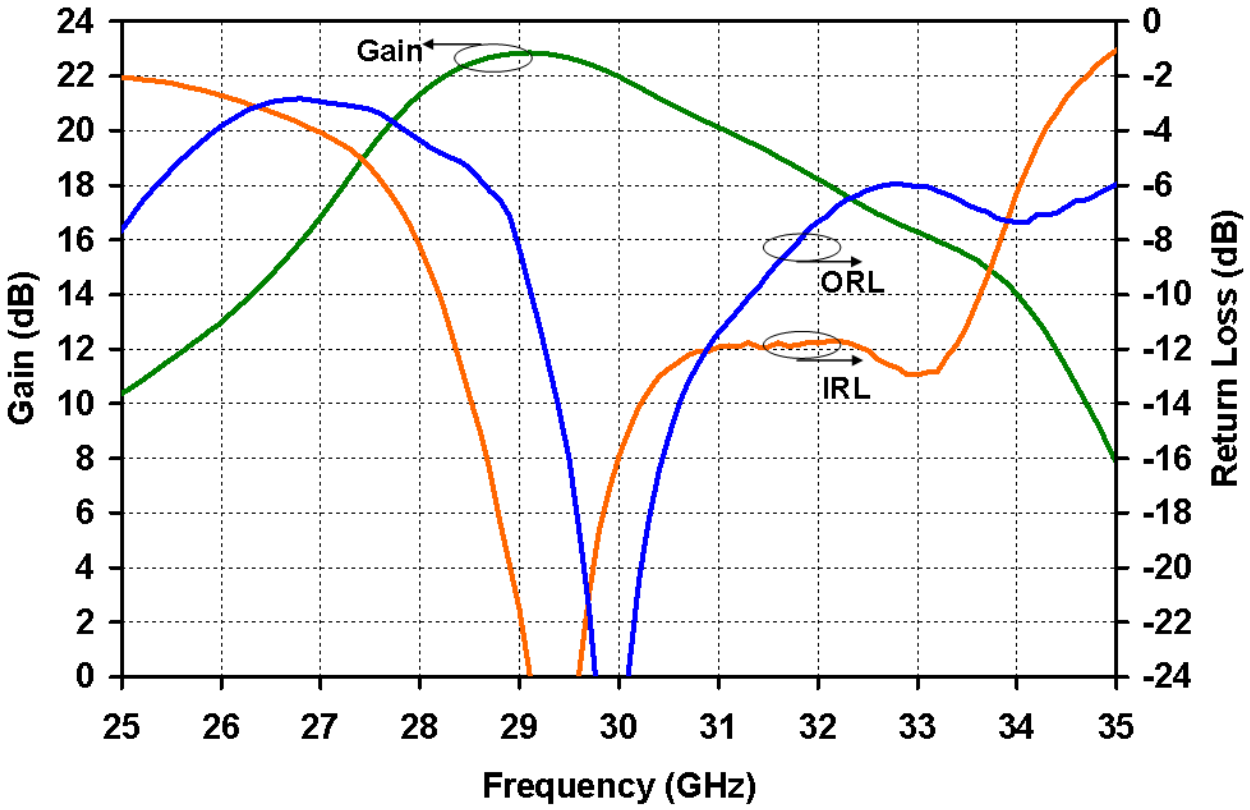
NOTE: Thermal transfer is from the backside of the package through the board. The board must be designed to assure adequate thermal transfer from the package. Worst case condition is with no RF applied, 100% of DC power is dissipated.

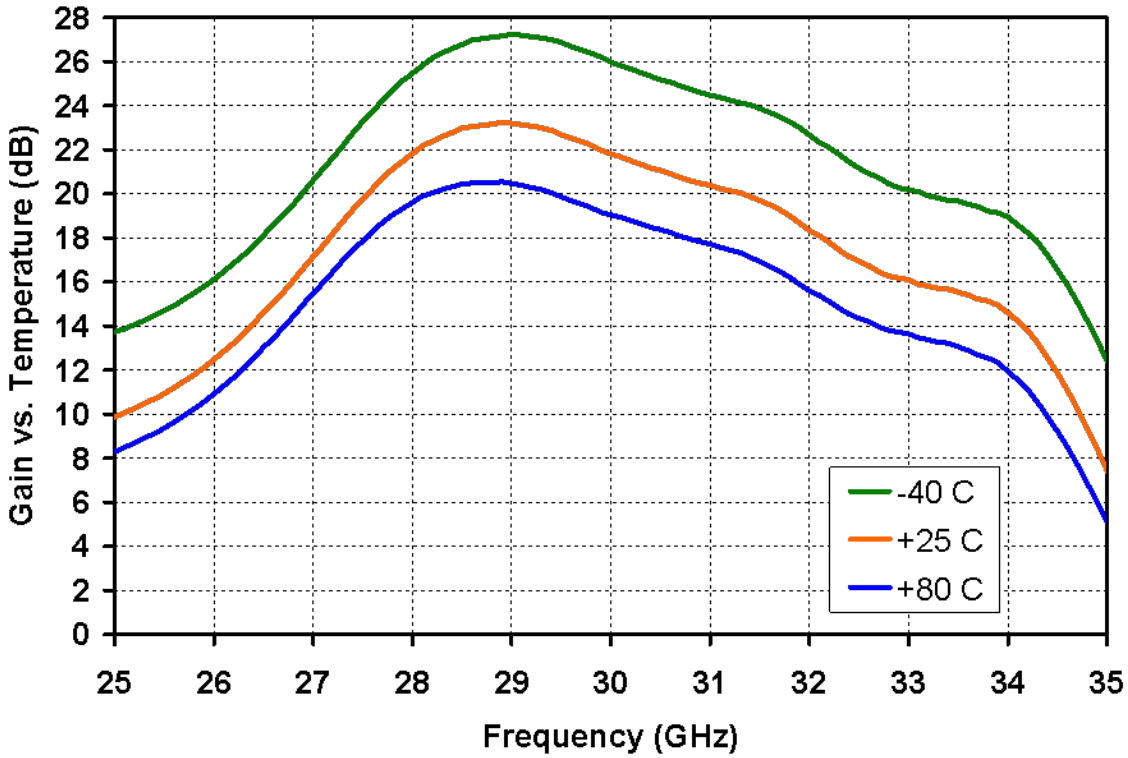
Median Lifetime (Tm) vs. Channel Temperature



Measured Performance

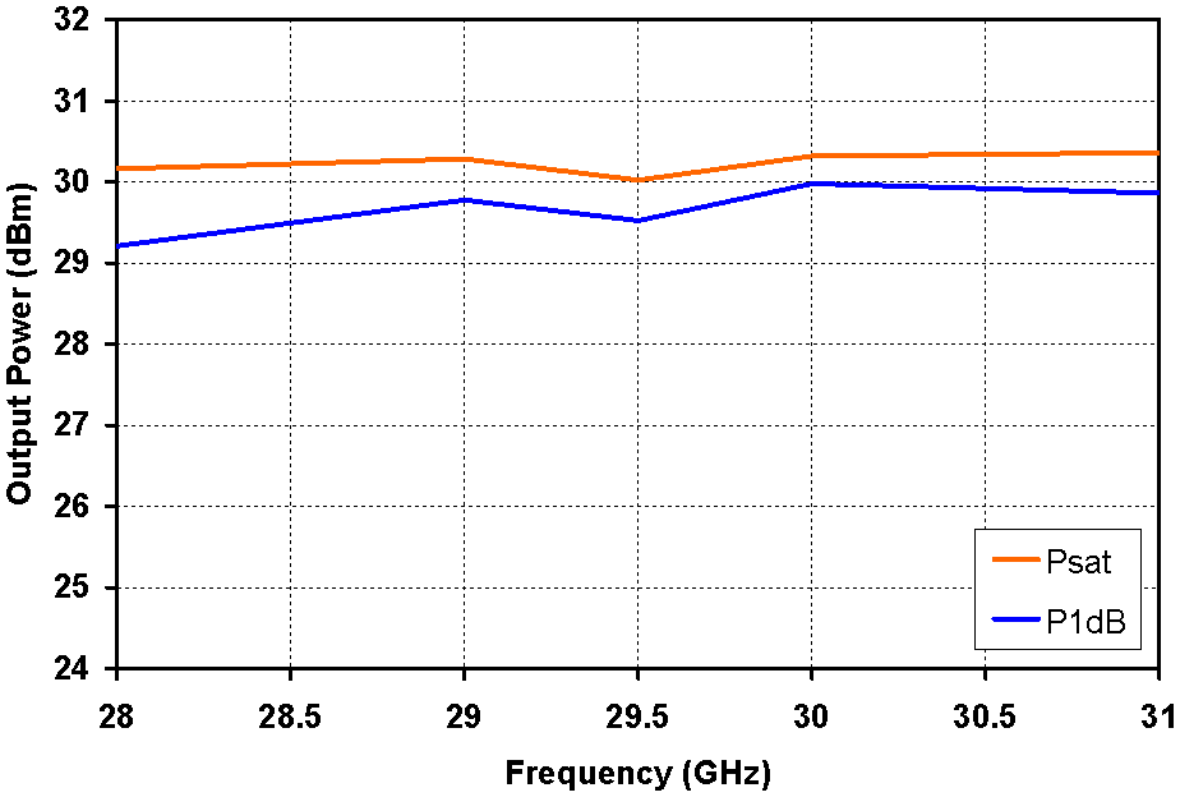
Bias Conditions: Vd = 6 V, Idq = 420 mA

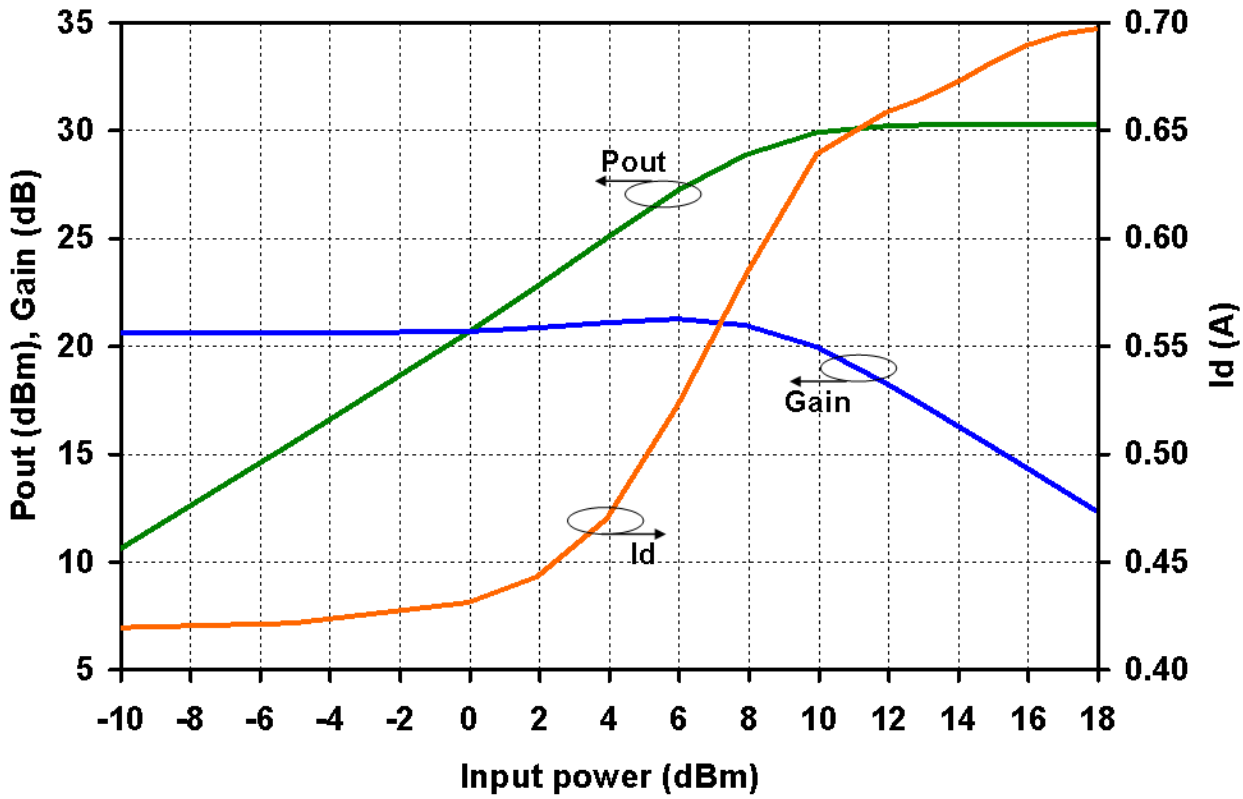




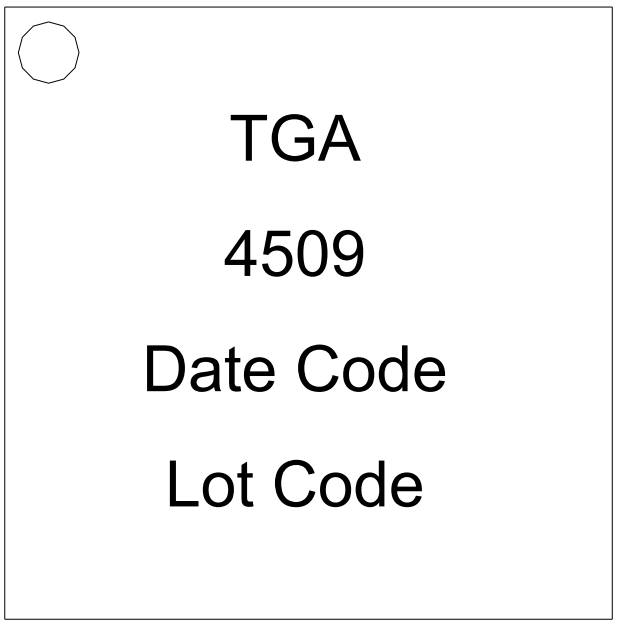
Measured Performance

Bias Conditions: Vd = 6 V, Idq = 420 mA



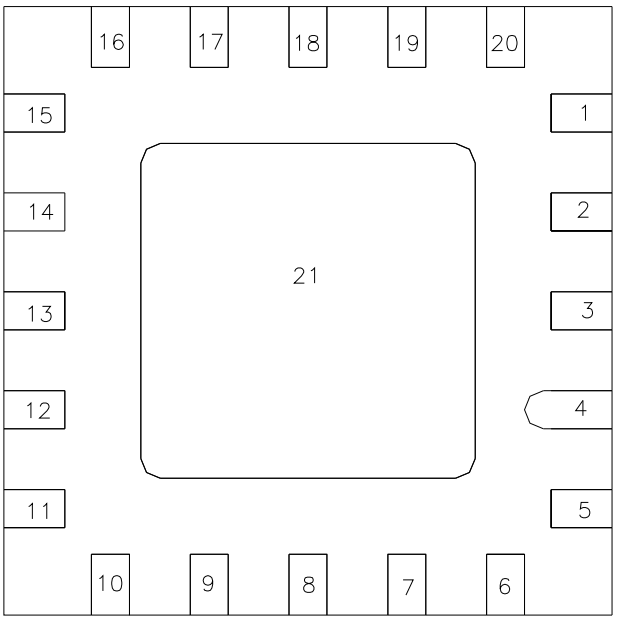


Package Pinout Diagram



Top View

Dot indicates Pin 1



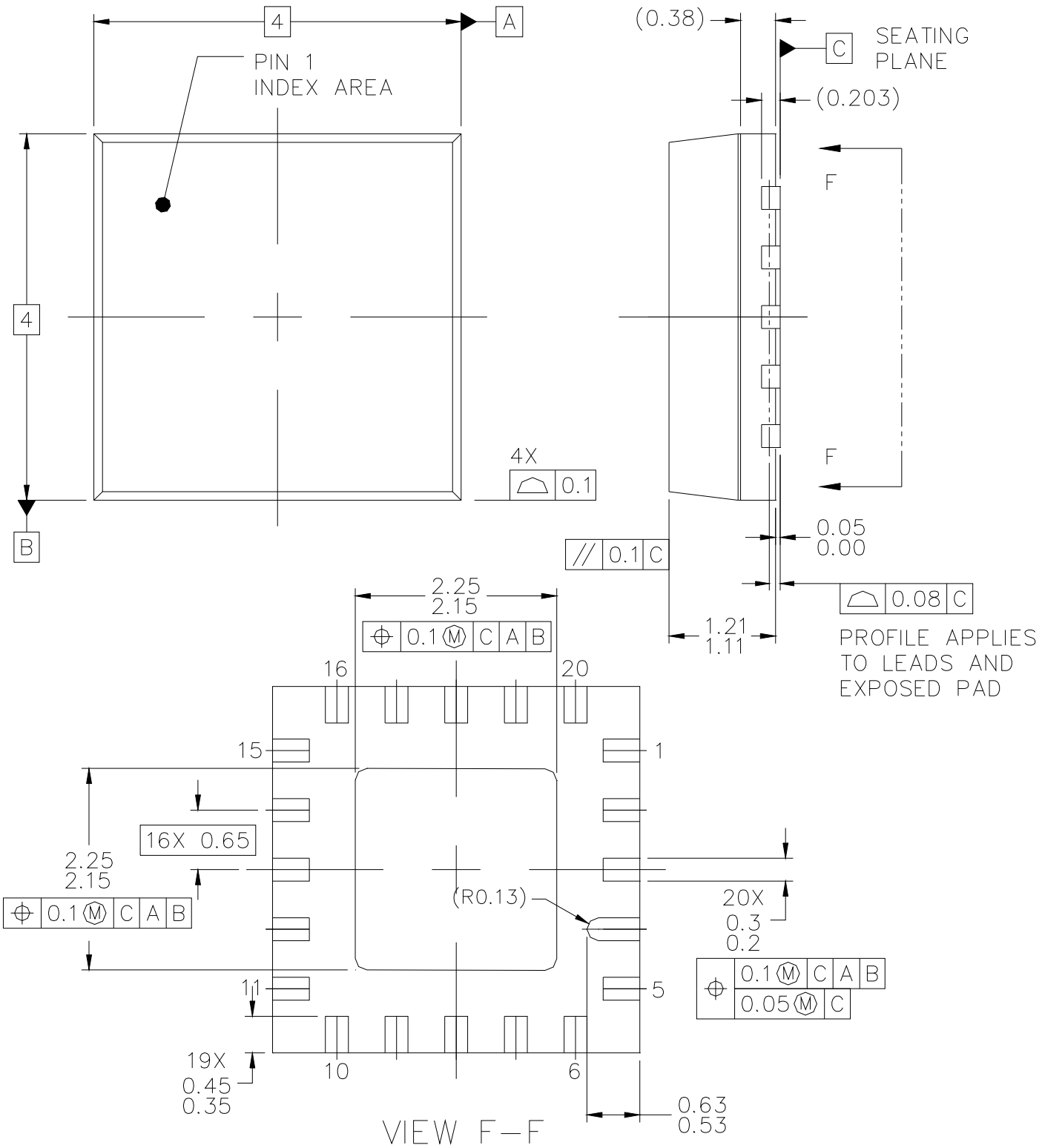
Bottom View

Pin	Description
1, 5, 6, 10, 11, 15, 16, 20, 21	GND
2, 4, 8, 12, 14, 18	NC
3	RF Input
7 and/or 19	Vg
9 and/or 17 1/	Vd
13	RF Output

1/ Drain voltage bias is required from both pin 9 and 17 for drain current, Id > 650 mA.

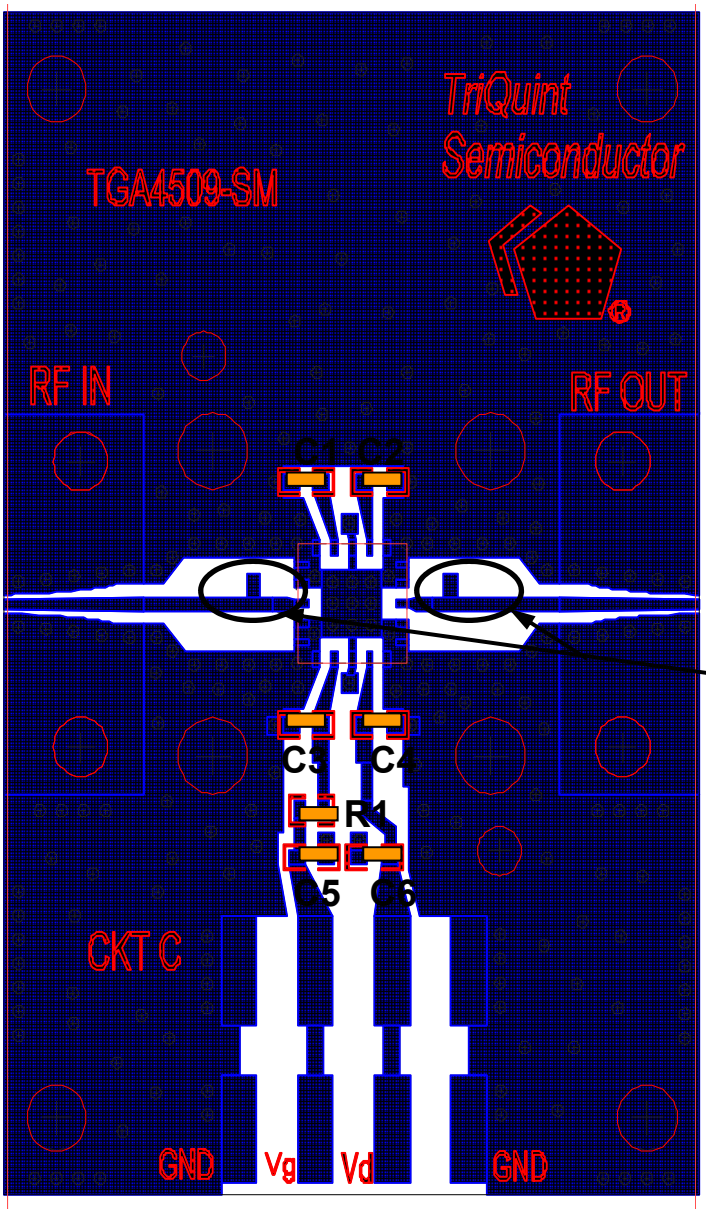
GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Mechanical Drawing
Units: Millimeters



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

Recommended Board Layout Assembly *

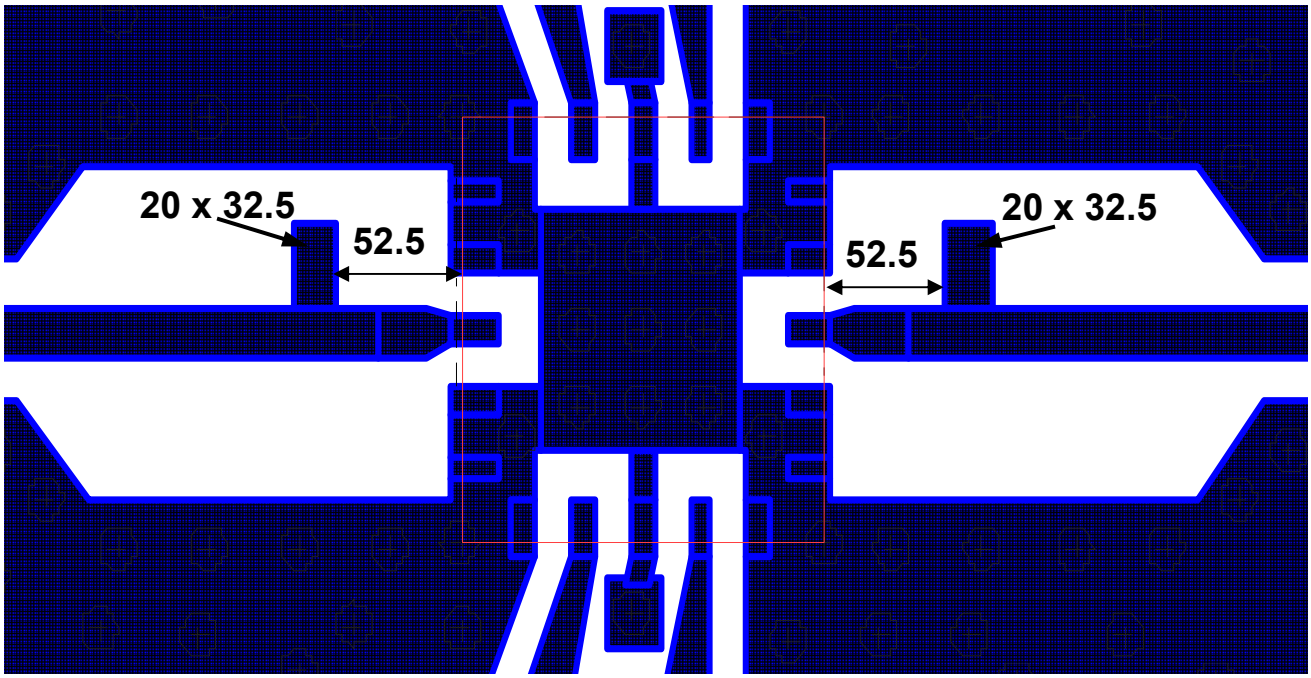


Part	Description
C1, C2, C3, C4	0.01 uF Capacitor (0402)
C5, C6	1.0 uF Capacitor (0402)
R1	15 ohm Resistor (0402)

* The layout is a general purpose drawing that needs to be tuned for the specific application. PCB is RO4003 8 mil thickness, 0.5 oz standard copper cladding, with Er = 3.38.

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

Recommended Tuning Board



All units are in mils

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

Recommended Surface Mount Package Assembly

Proper ESD precautions must be followed while handling packages.

TriQuint recommends using a conductive solder paste for attachment. Follow solder paste and reflow oven vendors' recommendations when developing a solder reflow profile. Typical solder reflow profiles are listed in the table below.

Hand soldering is not recommended. Solder paste can be applied using a stencil printer or dot placement. The volume of solder paste depends on PCB and component layout and should be well controlled to ensure consistent mechanical and electrical performance.

Solder attach process requires the use of no clean flux.

Typical Solder Reflow Profiles

Reflow Profile	SnPb	Pb Free
Ramp-up Rate	3 °C/sec	3 °C/sec
Activation Time and Temperature	60 – 120 sec @ 140 – 160 °C	60 – 180 sec @ 150 – 200 °C
Time above Melting Point	60 – 150 sec	60 – 150 sec
Max Peak Temperature	240 °C	260 °C
Time within 5 °C of Peak Temperature	10 – 20 sec	10 – 20 sec
Ramp-down Rate	4 – 6 °C/sec	4 – 6 °C/sec

Ordering Information

Part	Package Style
TGA4509-SM	QFN 4x4 Surface Mount

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