K Band Packaged Low Noise Amplifier TGA4506-SM

Key Features

- 21-27 GHz Bandwidth
- 21 dB Nominal Gain
- 2.5 dB Nominal Noise Figure
- 10 dBm Nominal P1dB
- Bias: 3.5 V, 60 mA
- Package Dimensions:
  4.0 x 4.0 x 1.1 mm
  (0.157 x 0.157 x 0.043 in)

Primary Applications

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

www.DataSheet

Product Description

The TriQuint TGA4506-SM is a K-Band Packaged low noise amplifier. The TGA4506-SM operates from 21-27 GHz and is designed using TriQuint's production pHEMT process.

The TGA4506-SM typically provides 2.5 dB noise figure and 21 dB small signal gain.

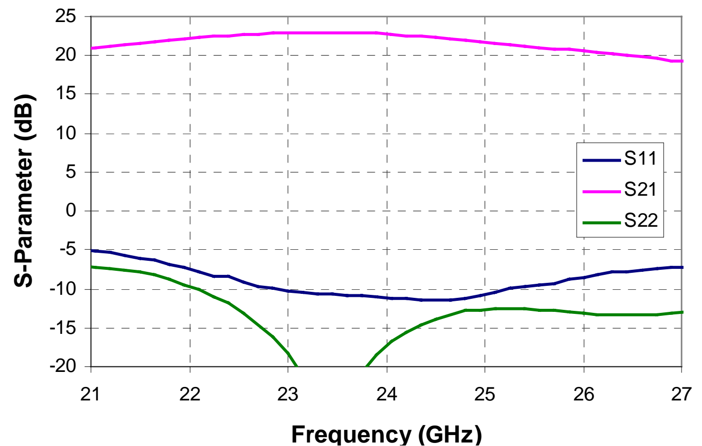
The TGA4506-SM is ideally suited for Point-to-Point Radio and Point-to-Multipoint Radio Communications.

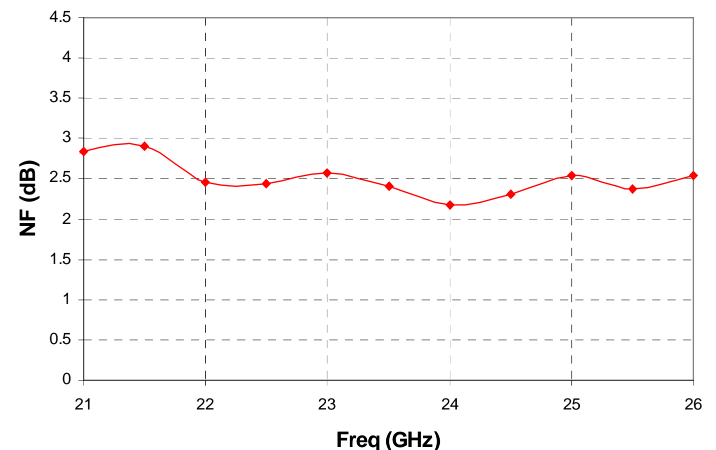
Evaluation Boards are available upon request.

Lead-Free & RoHS compliant.

Measured Data

Bias Conditions: Vd = 3.5 V, Id = 60 mA





Note: This device is early in the characterization process prior to finalizing all electrical specifications. Specifications are subject to change without notice.

TABLE I
MAXIMUM RATINGS 1/

SYMBOL	PARAMETER	VALUE	NOTES
Vd	Drain Voltage	5 V	2/
Vg	Gate Voltage Range	-1.5 TO 0V	
Id	Drain Current	190 mA	2/
$\|Ig\|$	Gate Current	6 mA	
P_{IN}	Input Continuous Wave Power	9 dBm	
P_D	Power Dissipation	0.24W	2/ 3/
T_{CH}	Operating Channel Temperature	117 ^{0}C	4/
T_M	Mounting Temperature (30 Seconds)	260 ^{0}C	
T_{STG}	Storage Temperature	-65 to 150 ^{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/ When operated at this bias condition with a package base plate temperature of 85, the median life is 1E+6 hrs.

4/ 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.

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

PARAMETER	TYPICAL	UNITS
Drain Voltage, Vd	3.5	V
Drain Current, Id	60	mA
Gate Voltage, Vg	-0.5 to 0.0	V
Small Signal Gain, S21	21	dB
Input Return Loss, S11	11	dB
Output Return Loss, S22	15	dB
Noise Figure, NF	2.5	dB
Output Power @ 1 dB Compression Gain, P1dB	10	dBm

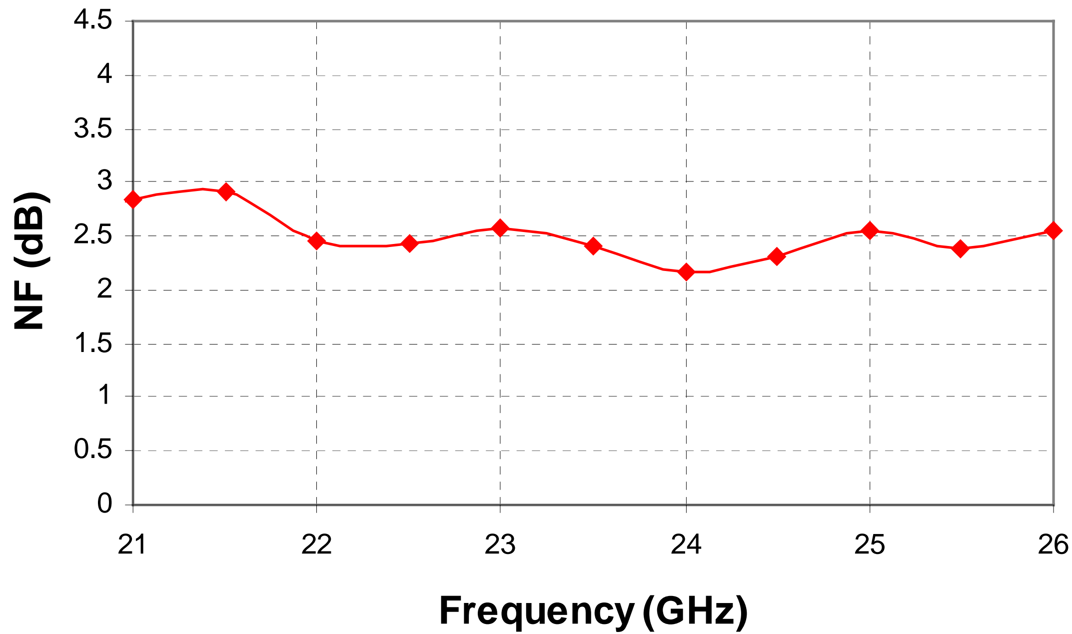
TABLE III
THERMAL INFORMATION

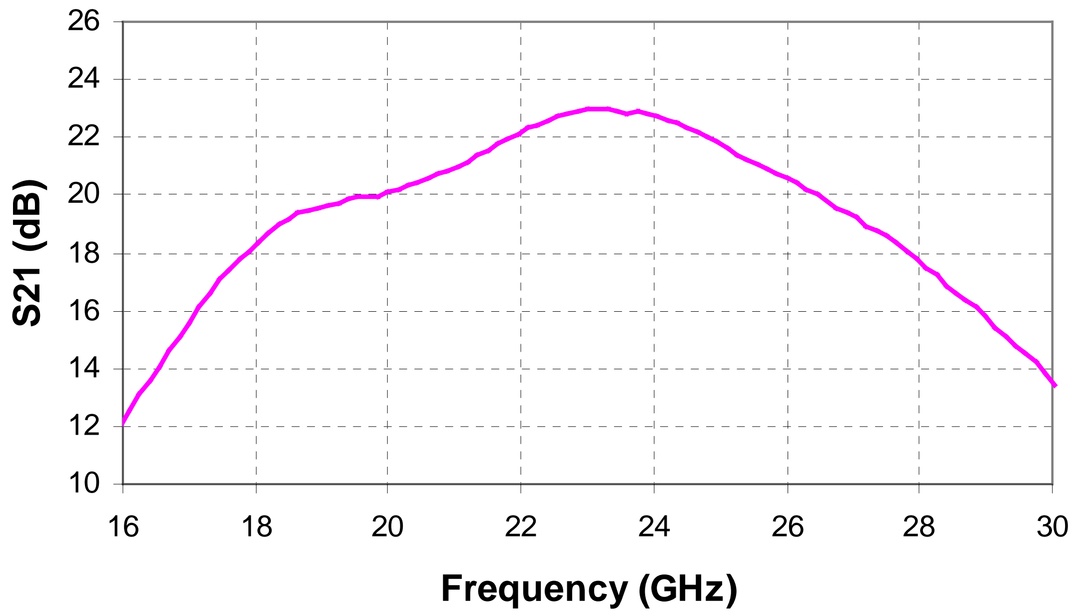
Parameter	Test Conditions	T_{CH} (°C)	$R_{\theta JC}$ (°C/W)	T_M (HRS)
$R_{\theta JC}$ Thermal Resistance (channel to backside of package)	Vd = 3.5V I_D = 0.06 A Pdiss = 0.21 W	112.7	132	1.52E+6

Note: Package backside SnPb soldered to carrier at 85°C baseplate temperature.

Measured Data

Bias Conditions: Vd = 3.5 V, Id =60 mA





Measured Data

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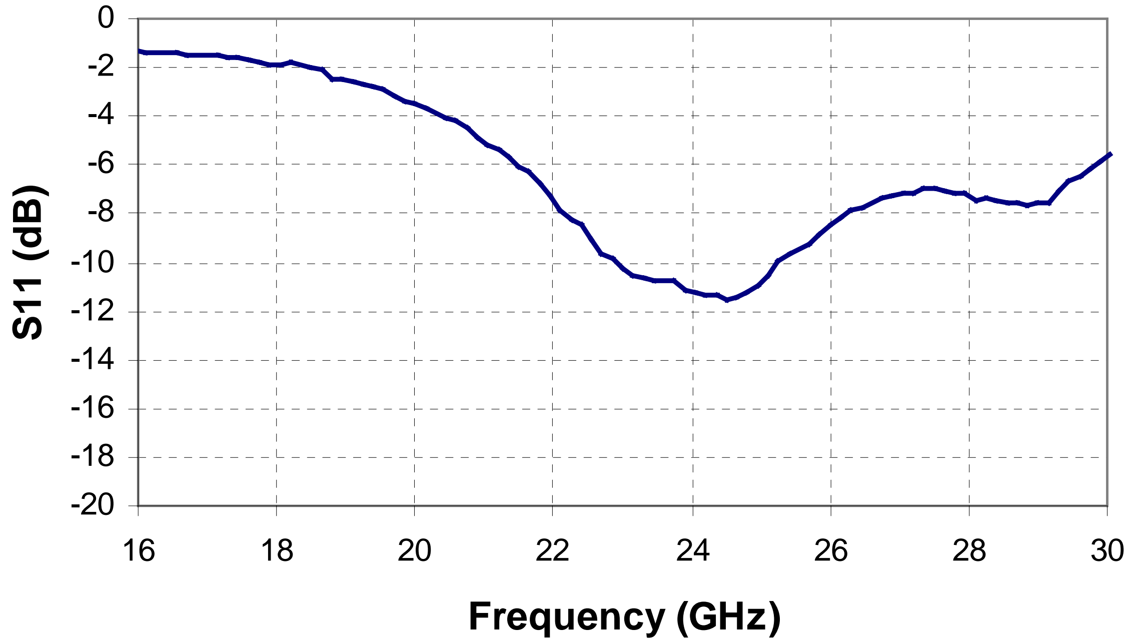
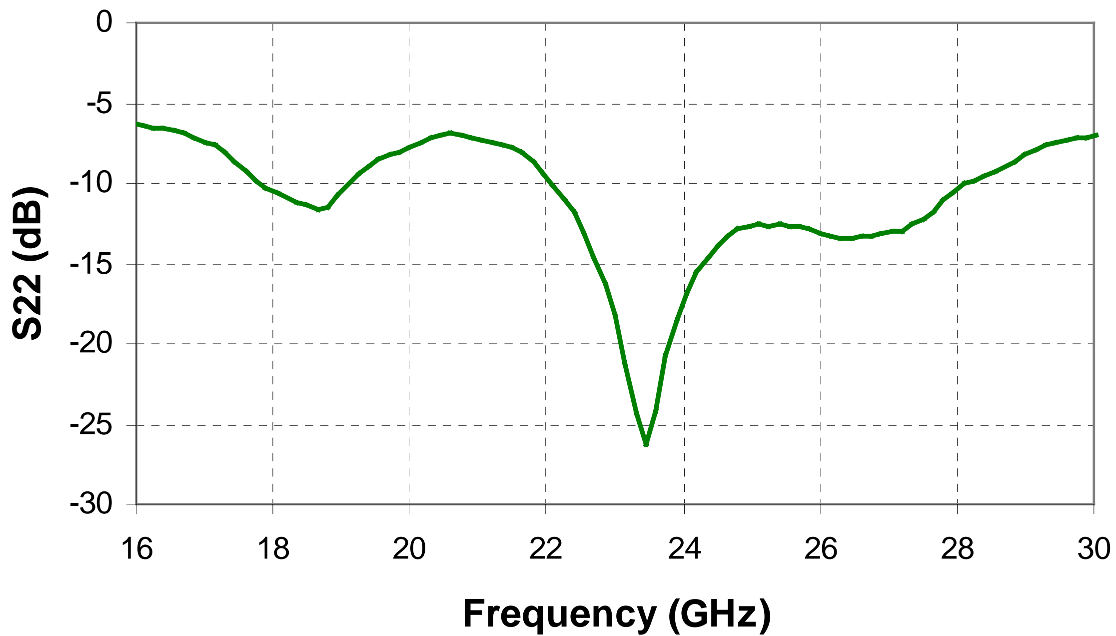
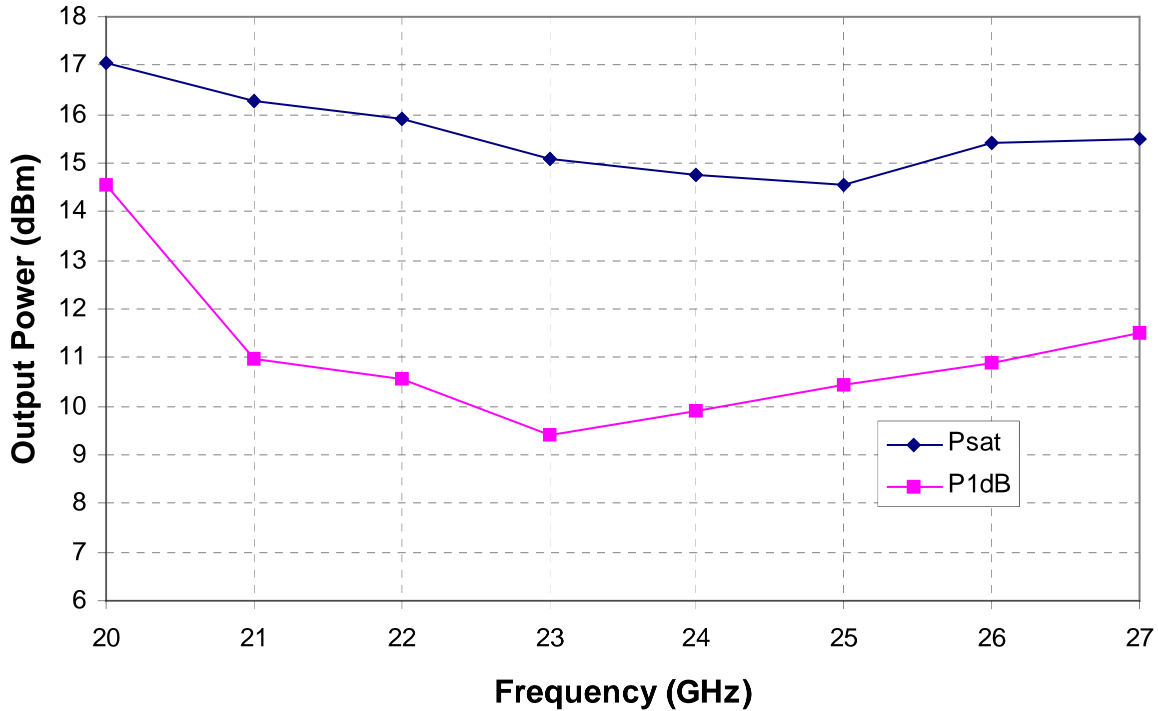


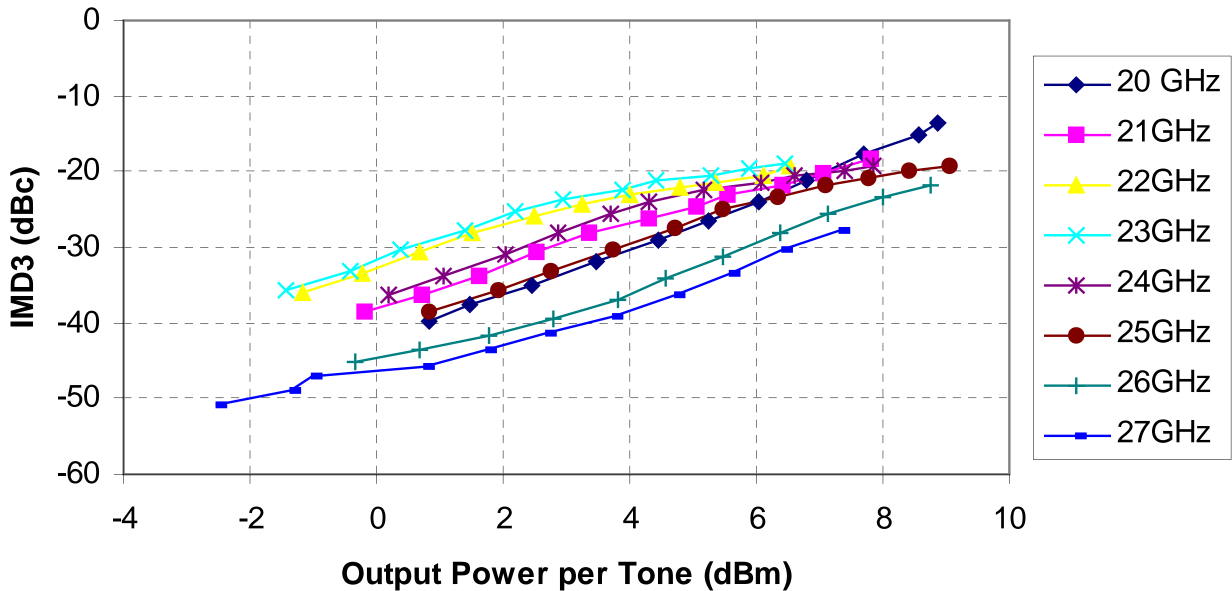


TriQuint Semiconductor Texas: Phone (972)994-8465 Fax (972)994-8504 Email: Info-mmw@tqs.com Web: www.triquint.com

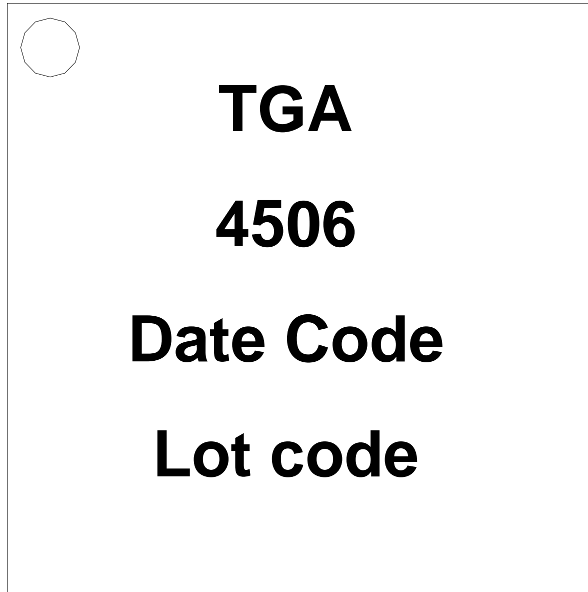
Measured Data

Bias Conditions: Vd = 3.5 V, Id =60 mA



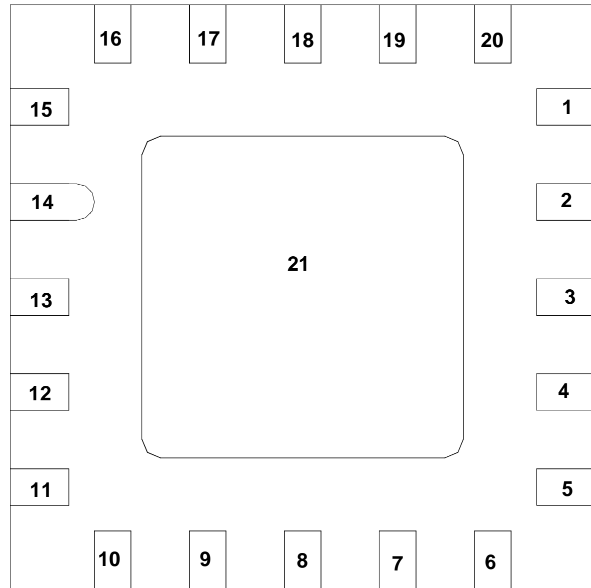


Package Pinout Diagram



Top View

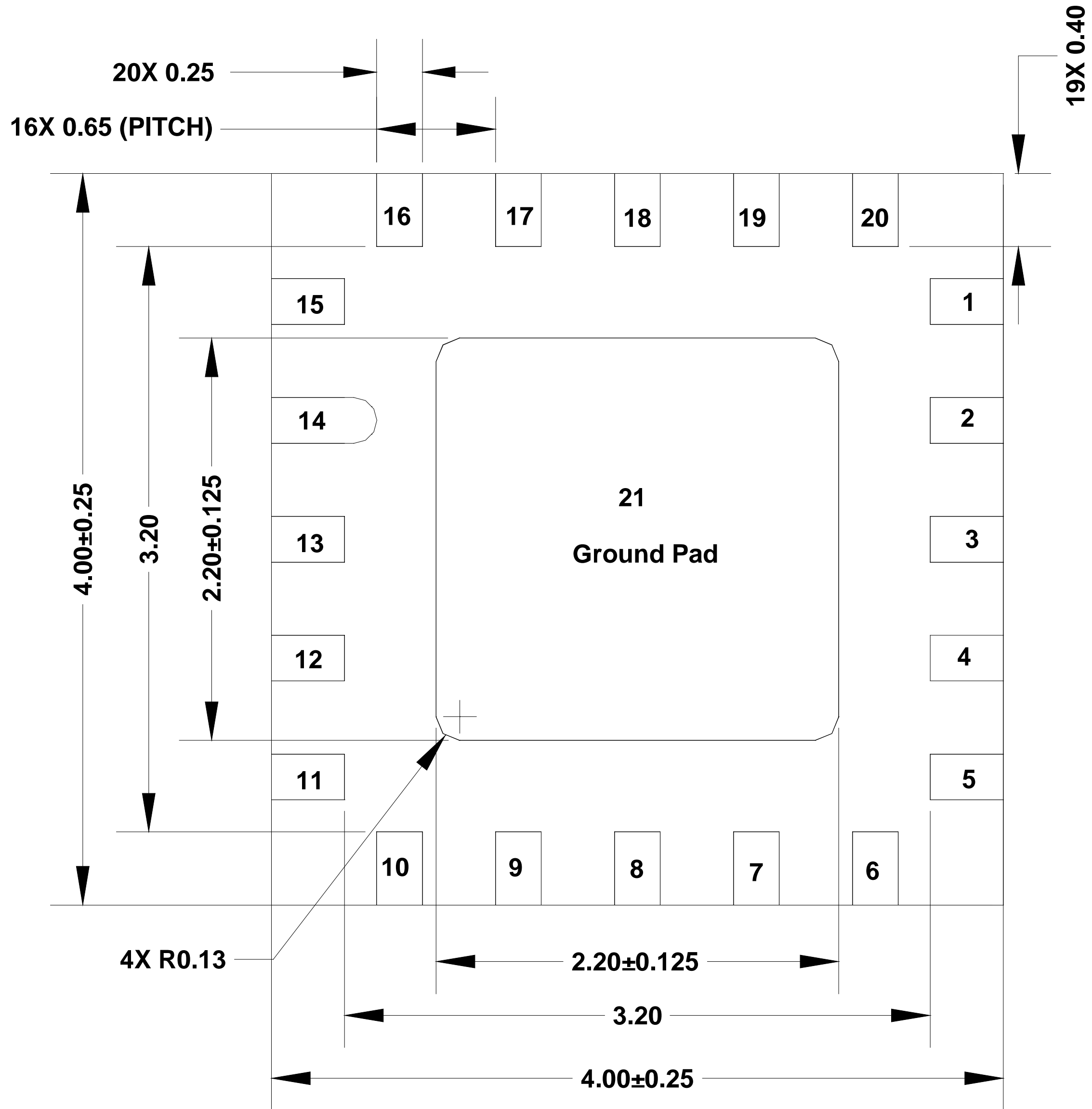
Dot indicates Pin 1



Bottom View

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

Mechanical Drawing
(Bottom Side)



Units: millimeters. Tolerance is ± 0.076mm unless otherwise specified

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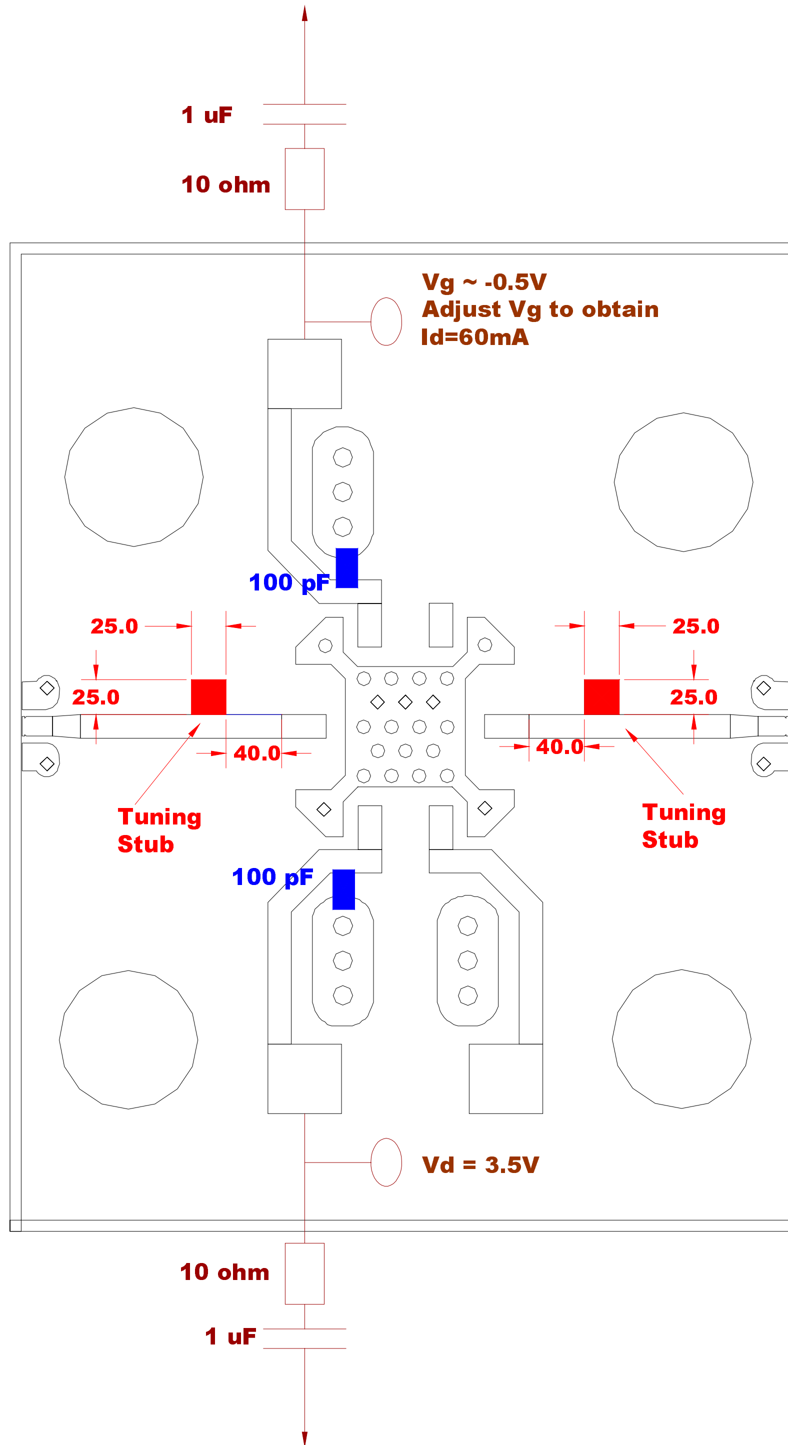
Recommended Board Layout Assembly



All measurements were made with the part soldered to 0.008 in thick RO4003

Recommended Surface Mount Package Assembly

Proper ESD precautions must be followed while handling packages.

Clean the board with acetone. Rinse with alcohol. Allow the circuit to fully dry.

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.

Clean the assembly with alcohol.

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