TriQuint SEMICONDUCTOR

Product Data Sheet

32 dBm Ku-Band Amplifier

TGA2503-SM

Key Features

- Typical Frequency Range: 12.5 - 16 GHz
- 32 dBm Nominal Psat
- 32 dB Nominal Gain
- 37 dBm Output TOI @ Pin = -20dBm
- 8 dB Typical Return Loss
- Bias Conditions: Vd = 6V, Idq = 600 mA
  (Id = 1200mA under RF drive)
- Package Dimensions: 4.0 x 4.0 x 0.9 mm

Primary Applications

- Ku-Band VSAT
- Point-to-Point Radio

Product Description

The TriQuint TGA2503-SM is a Ku-Band Packaged Power Amplifier. The TGA2503-SM operates from 12.5-16 GHz and is designed using TriQuint's proven standard 0.5-um power pHEMT production process.

The TGA2503-SM typically provides 32 dBm of saturated output power with small signal gain of 32 dB.

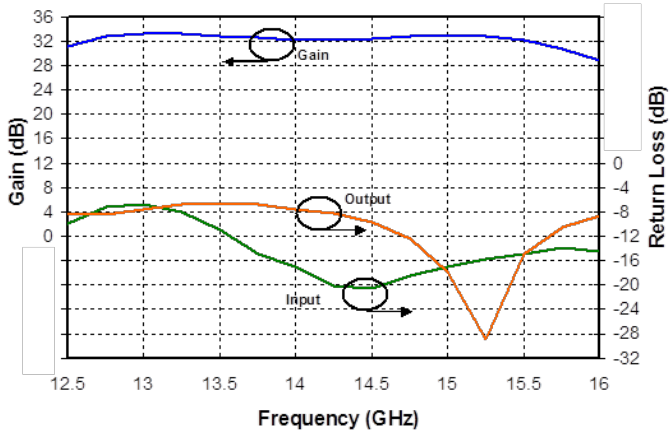
The TGA2503-SM is ideally suited for the VSAT ground terminal market and Point-to-Point Radio.

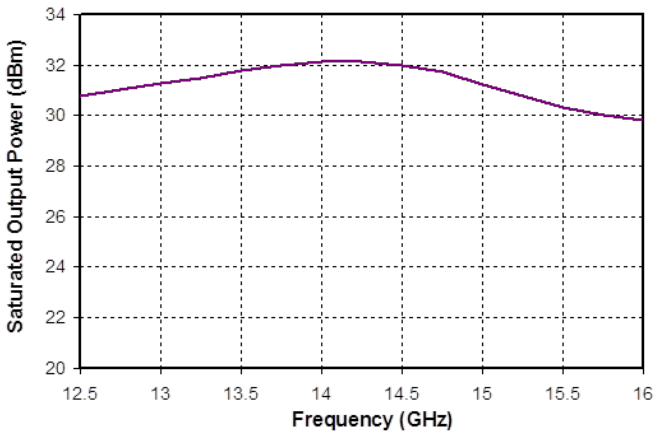
Evaluation Boards are available upon request.

Lead-free and RoHS compliant

Measured Performance

Bias Conditions: Vd = 6 V, Idq = 600 mA





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

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Table I
Absolute Maximum Ratings 1/

Symbol	Parameter	Value	Notes
Vd-Vg	Drain to Gate Voltage	13 V	
Vd	Drain Voltage	8 V	2/
Vg	Gate Voltage Range	-5 to 0 V	
Id	Drain Current	1300 mA	2/
Ig	Gate Current Range	-18 to 18 mA	
Pin	Input Continuous Wave Power	21 dBm	2/
Tchannel	Channel Temperature	200 °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 the maximum power dissipation listed in Table IV.

Table II
Recommended Operating Conditions

Symbol	Parameter	Value
Vd	Drain Voltage	6 V
Idq	Drain Current	600 mA
Id_Drive	Drain Current under RF Drive	1200 mA
Vg	Gate Voltage	-0.6 V

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TABLE III
RF CHARACTERIZATION TABLE
(T_A = 25°C, Nominal)
Bias Conditions: Vd = 6V, Idq = 600mA

SYMBOL	PARAMETER	TEST CONDITION	NOMINAL *	UNITS
Gain	Small Signal Gain	f = 12.5 – 16 GHz	32	dB
IRL	Input Return Loss	f = 12.5 – 16 GHz	10	dB
ORL	Output Return Loss	f = 12.5 – 16 GHz	8	dB
NF	Noise Figure	f = 12.5 – 16 GHz	9	dB
Psat	Saturated Output Power	f = 12.5 – 16 GHz f = 13.75 – 14.5 GHz	31 32	dBm
TOI	Third Order Intercept @ Pin = -20dBm	f = 12.5 – 16 GHz	36	dBm

* Note:
All measured data is taken using connectorized evaluation boards. The reference plane is at RF connectors, and hence connector and board loss has not been de-embedded.

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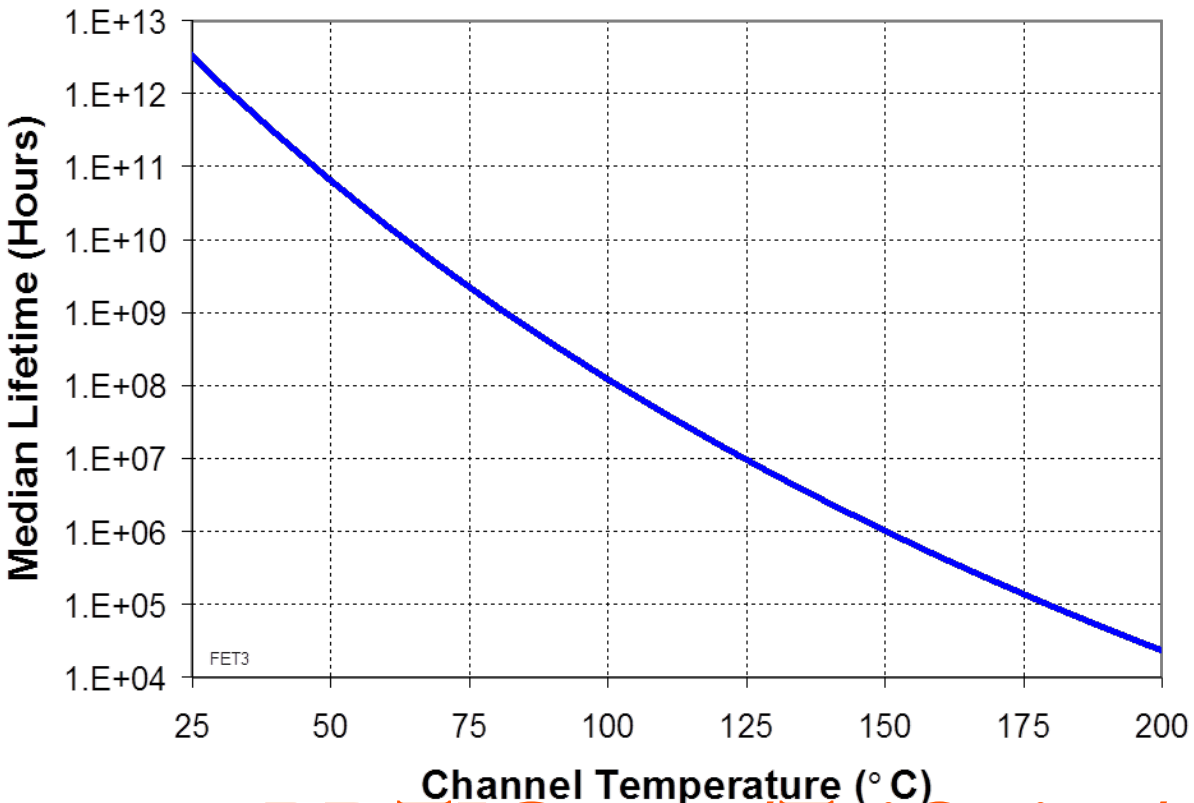
Table IV
Power Dissipation and Thermal Properties

Parameter	Test Conditions	Value
Maximum Power Dissipation	Tbaseplate = 85 ºC	Pd = 9.8 W Tchannel = 200 ºC
Thermal Resistance, θjc	Vd = 6 V Id = 600 mA Pd = 3.6 W Tbaseplate = 85 ºC	θjc = 11.7 (ºC/W) Tchannel = 127 ºC Tm = 7.9E+6 Hrs
Thermal Resistance, θjc Under RF Drive	Vd = 6 V Id = 1200 mA Pout = 31.8 dBm Pd = 5.7 W Tbaseplate = 85 ºC	θjc = 11.7 (ºC/W) Tchannel = 152 ºC Tm = 8.6E+5 Hrs
Mounting Temperature	30 Seconds	260 °C
Storage Temperature		-65 to 150 ºC

Median Lifetime (Tm) vs. Channel Temperature



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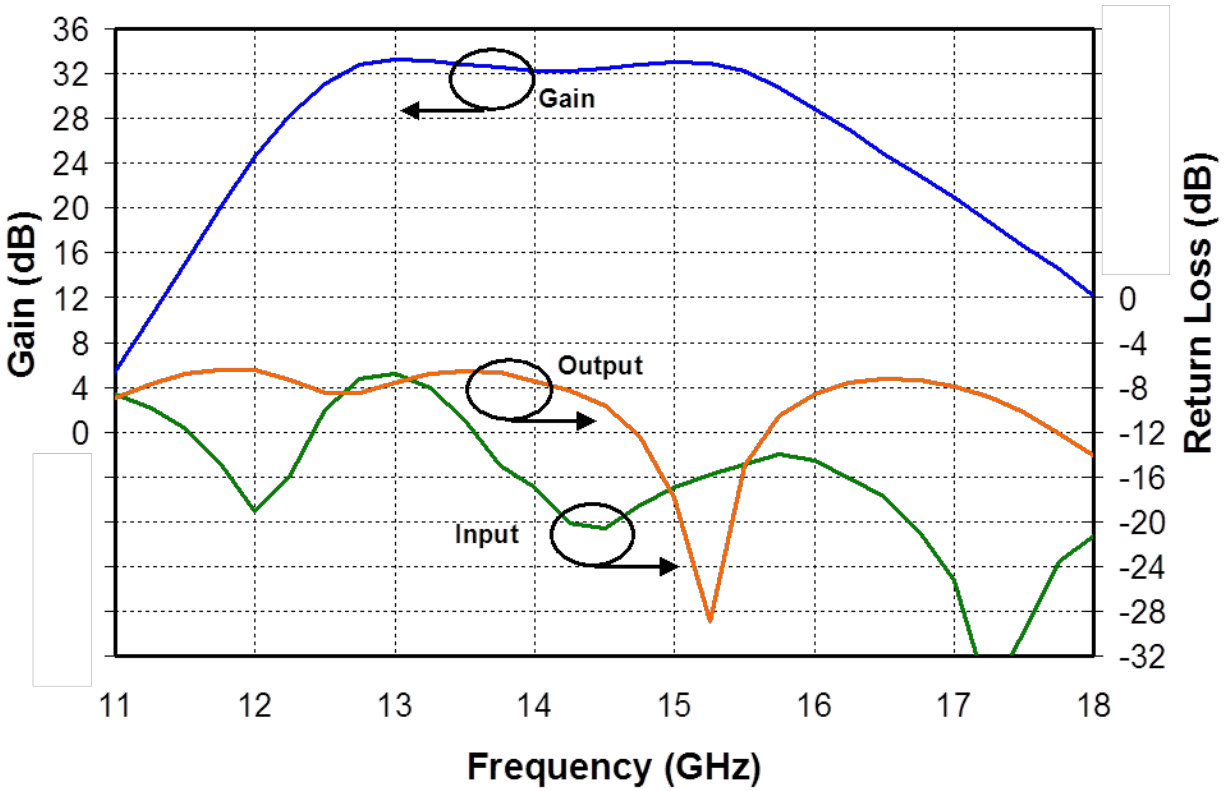
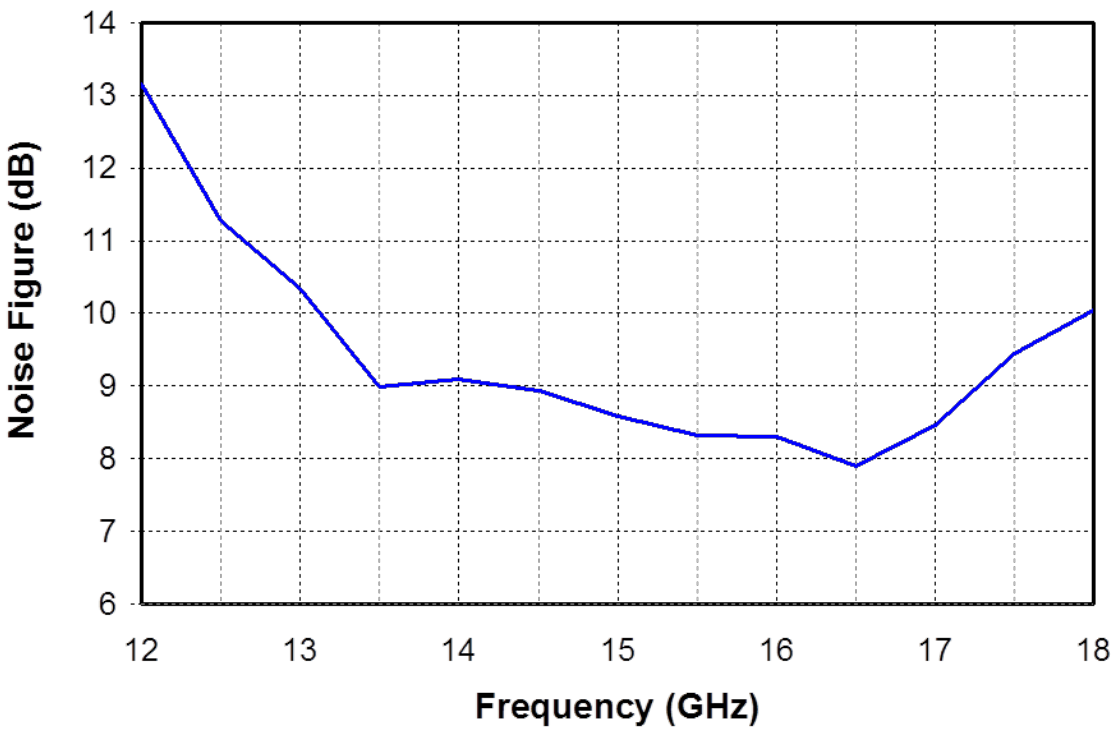
Measured Performance*

Bias Conditions: Vd = 6 V, Idq =600 mA





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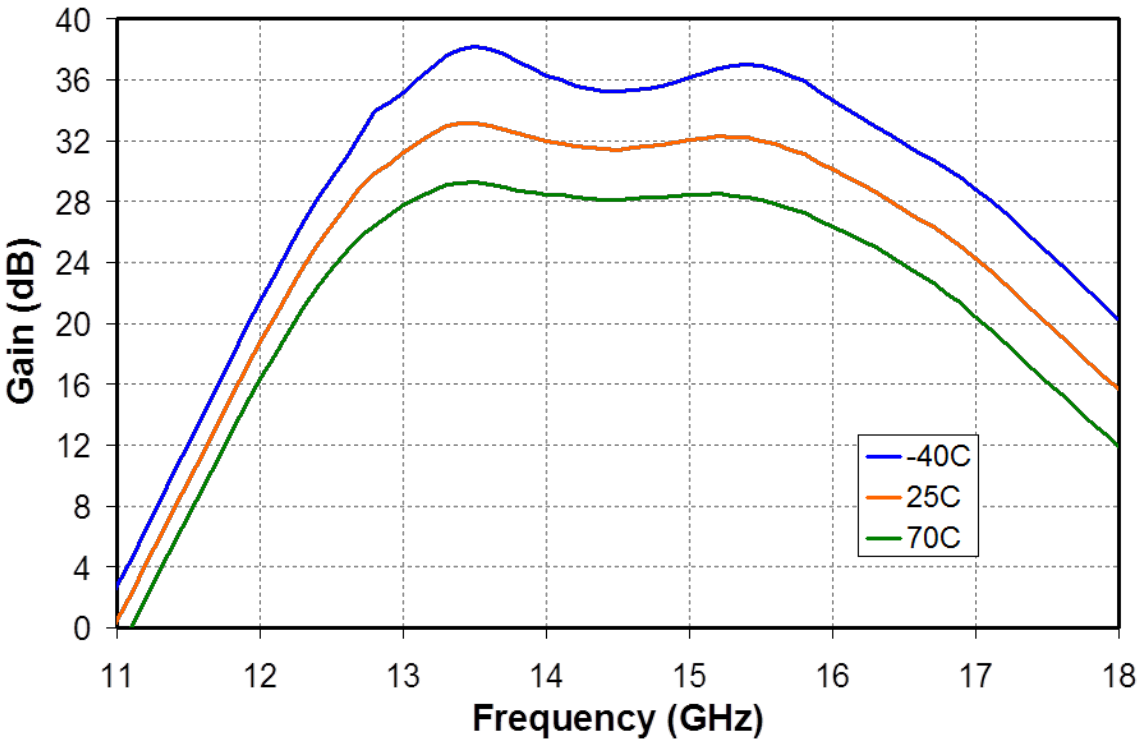

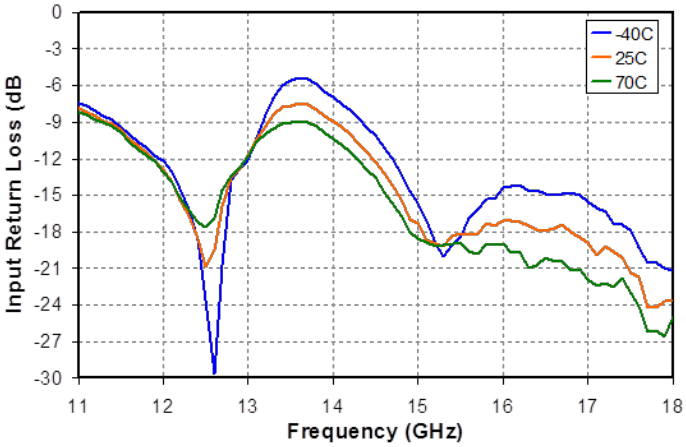

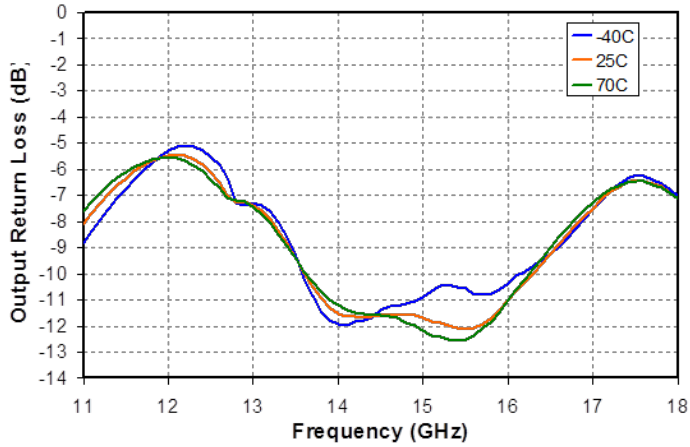

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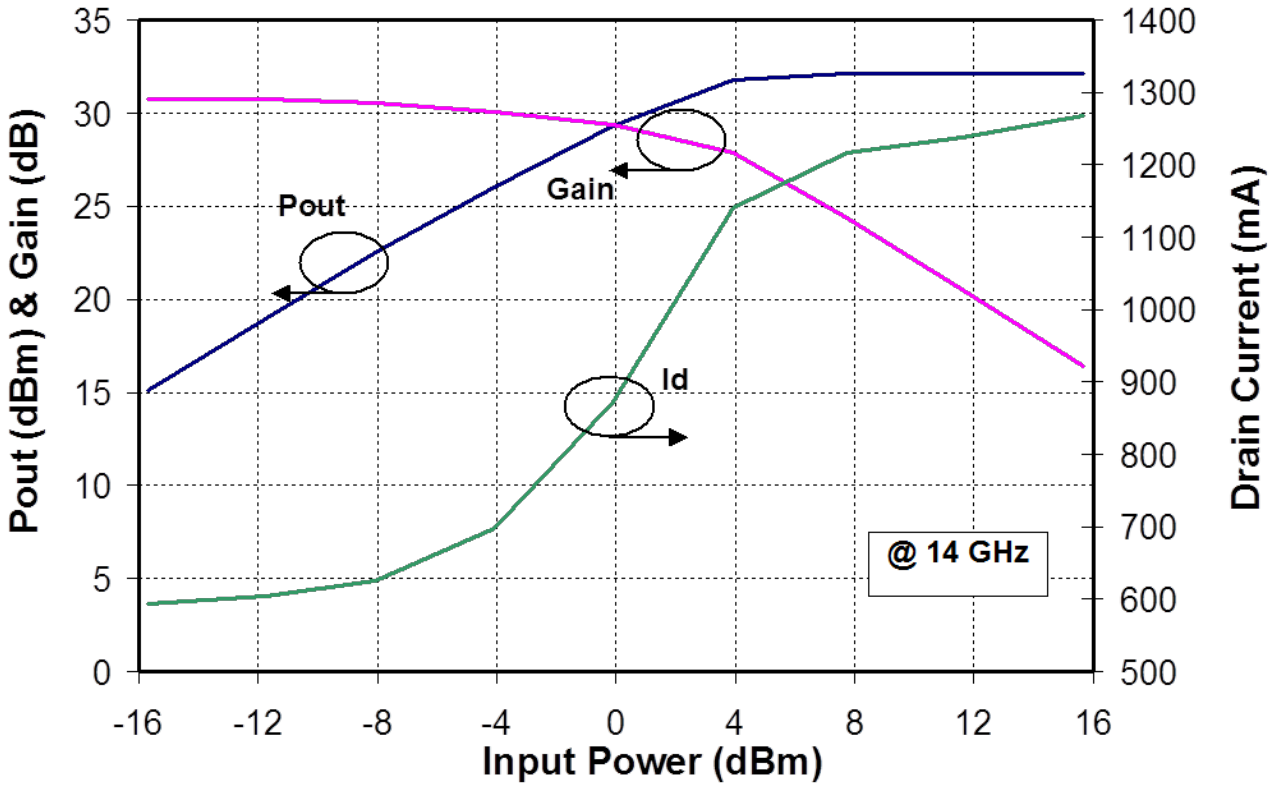

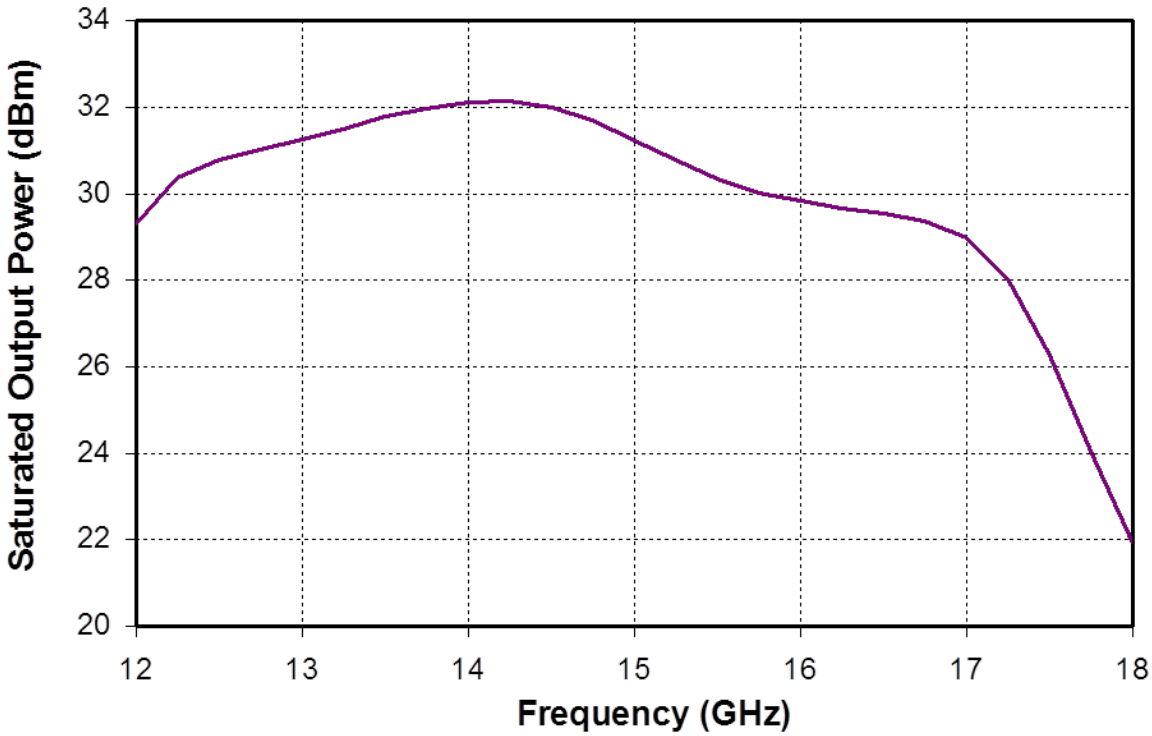

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Measured Performance

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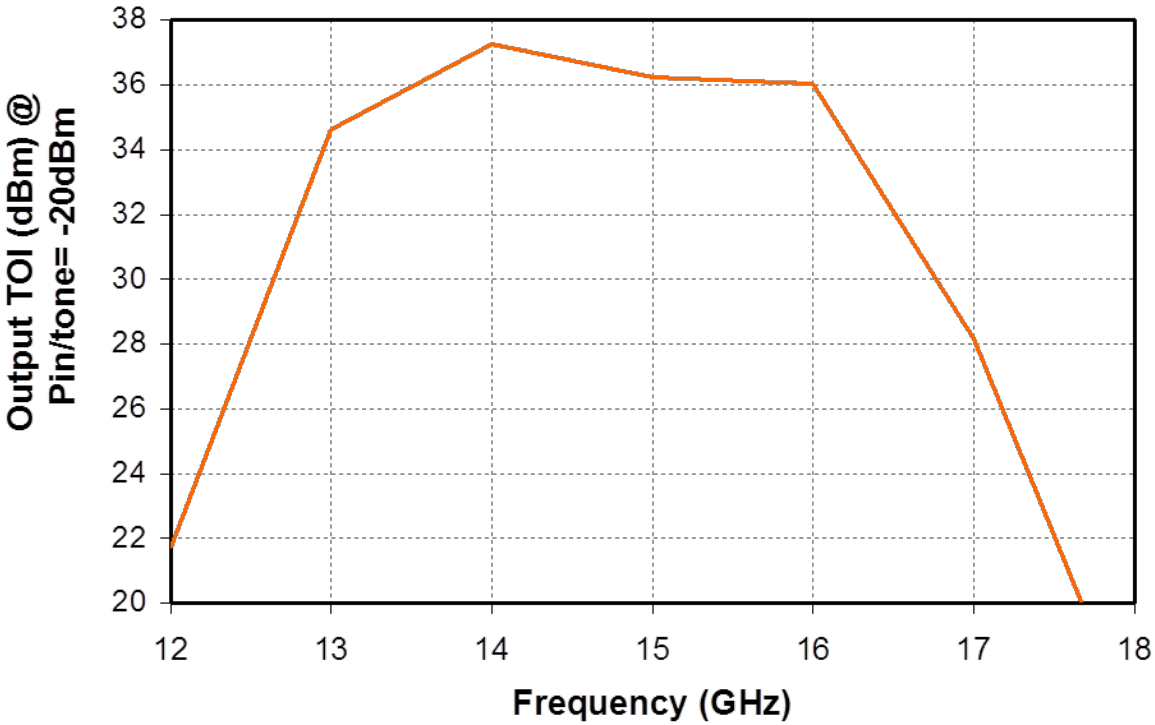

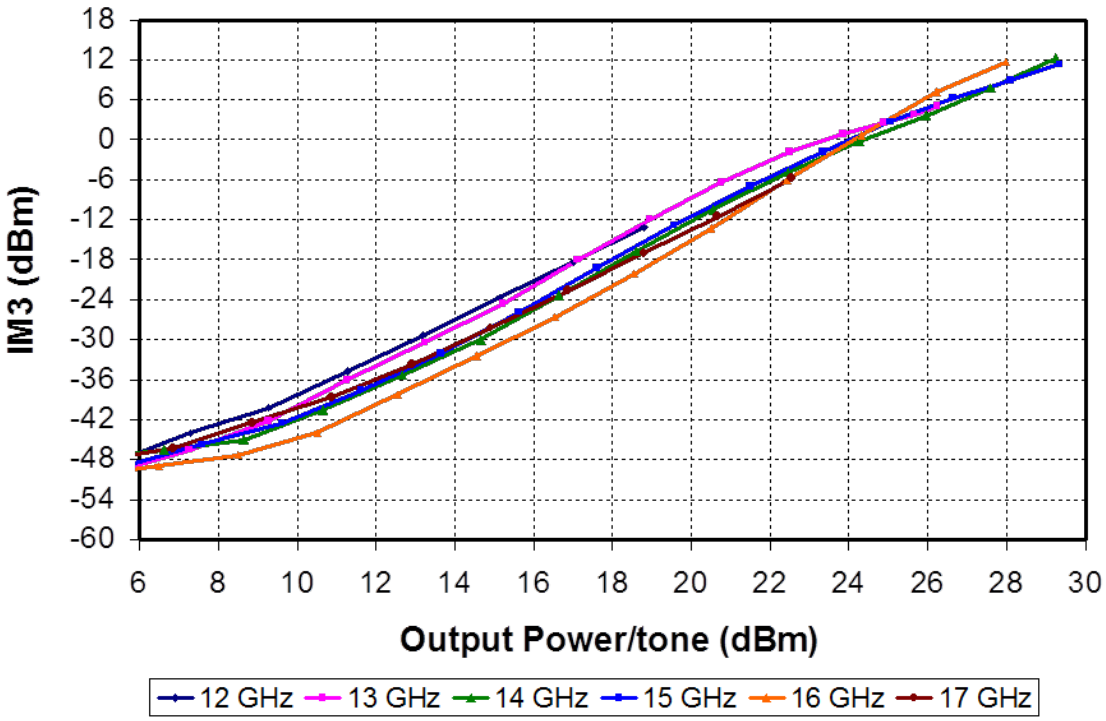

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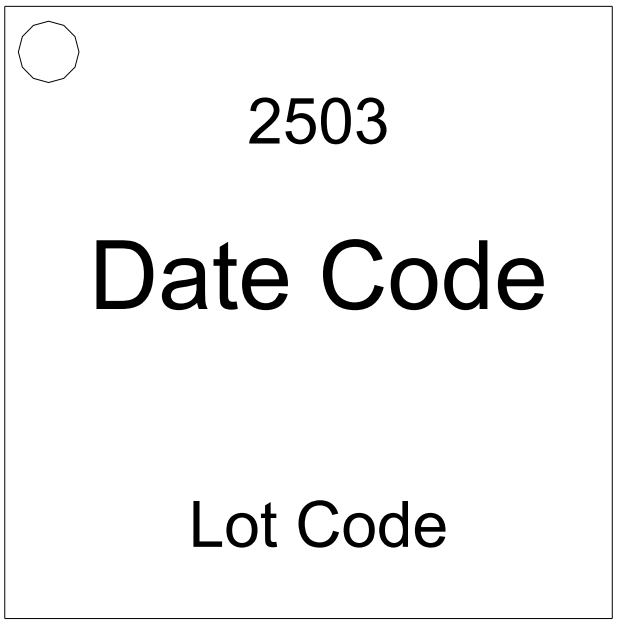
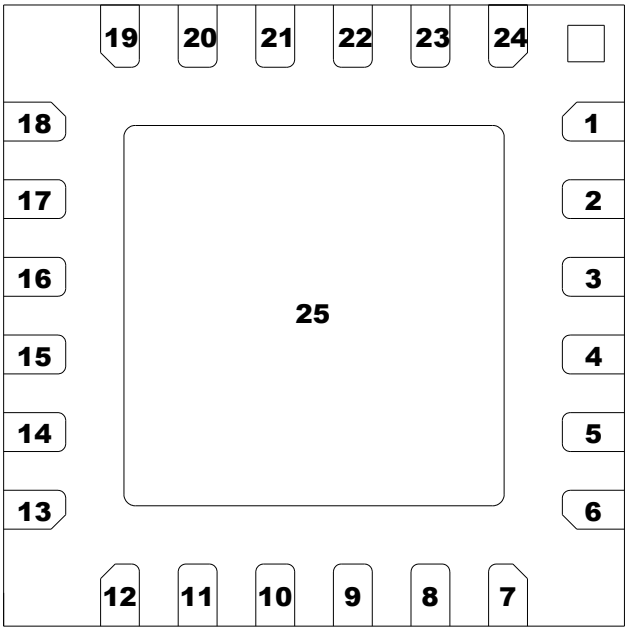
Package Pinout Diagram



Top View

Dot indicates Pin 1



Bottom View

Parts manufactured after date code 0637 will use the marking plan shown.

Parts manufactured prior to this date use the marking plan shown in the prior revision of this data sheet (May 2006)

Pin	Description
1, 2, 4, 5, 6, 7, 9, 11, 13, 14, 15, 17, 18, 20, 22, 24	N/C
3	RF Input
8	Vg1
10	Vg2
12	Power Ref
16	RF Output
19	Vd2
21	Vd1
23	Ref
25	Gnd

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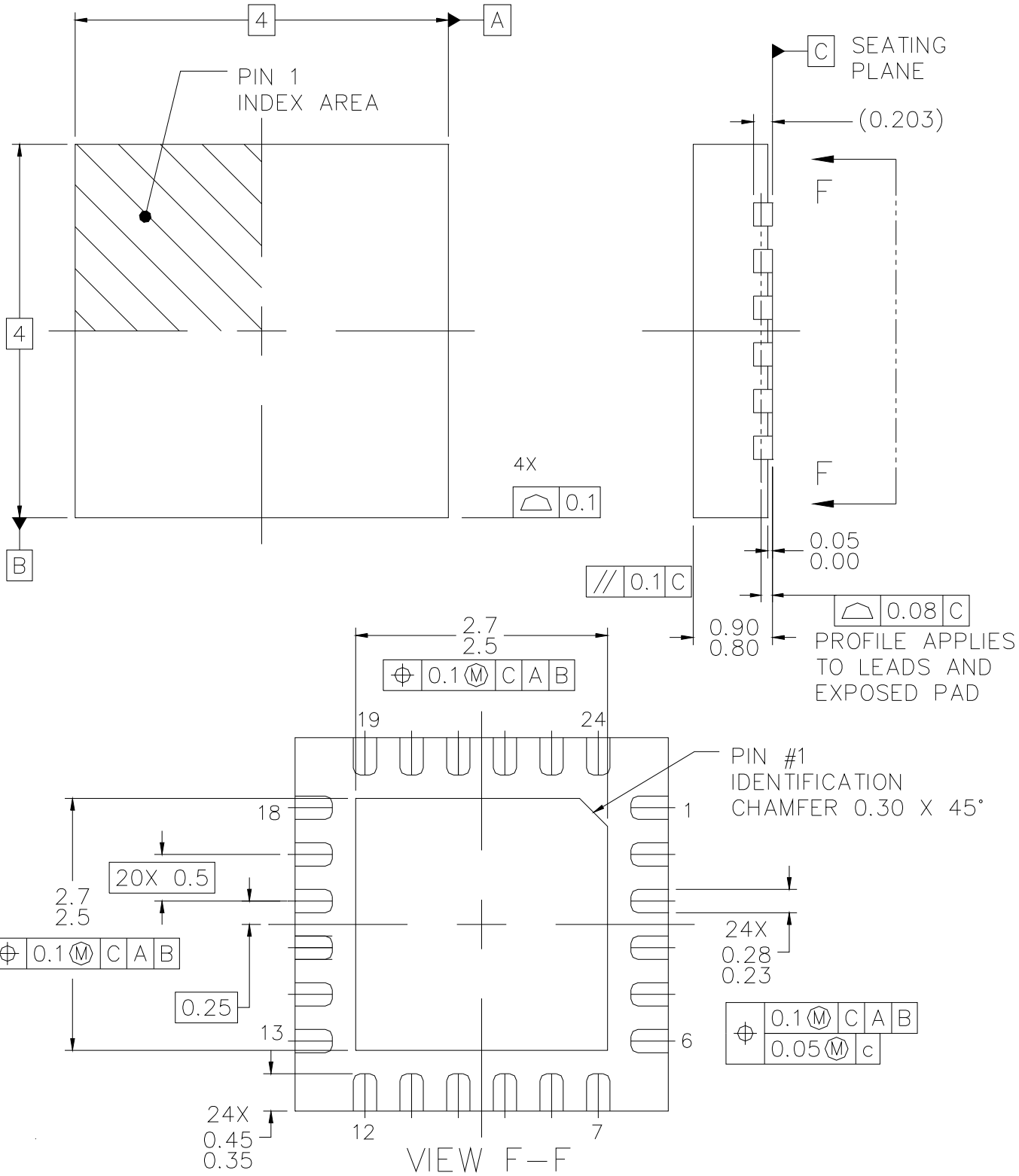
Mechanical Drawing

Units: Millimeters



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

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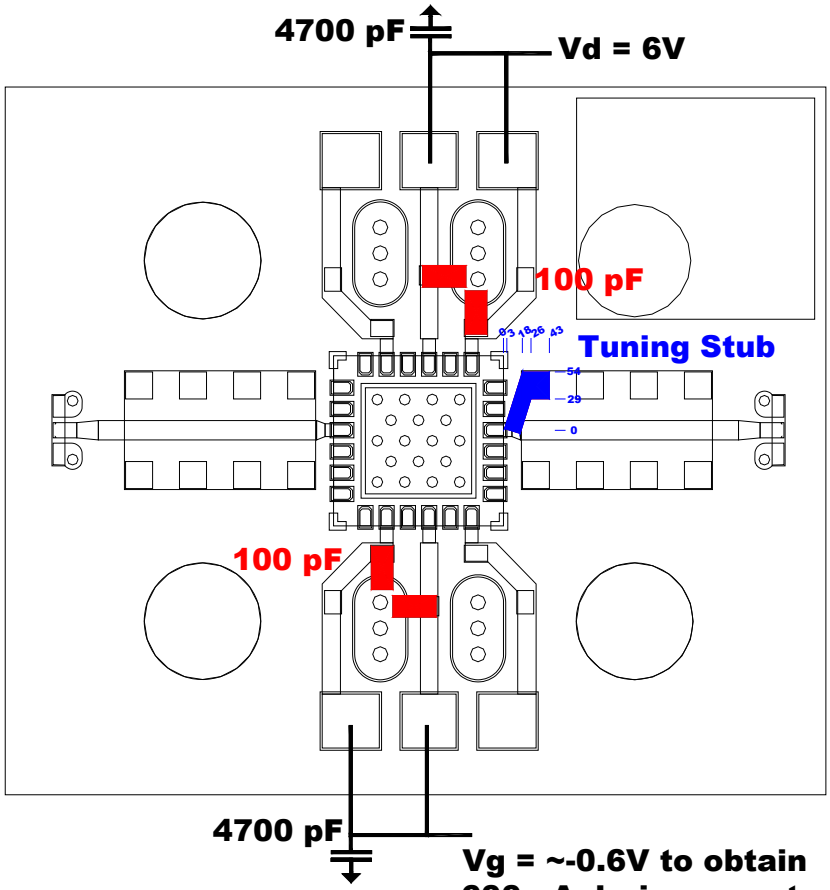
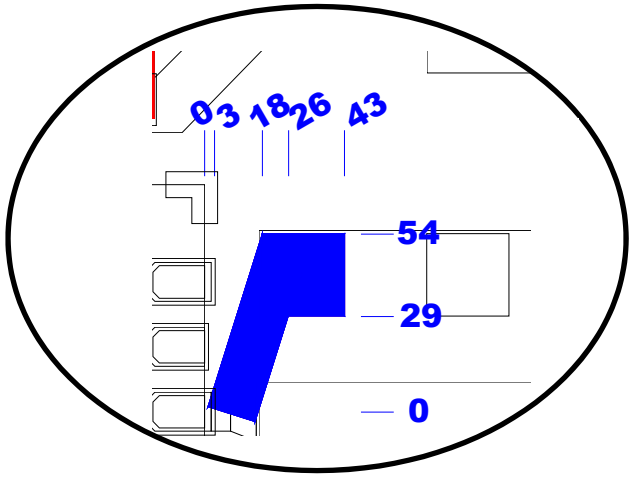
Recommended Board Layout Assembly *





Units: mils

* This layout shows the tuning configuration used to obtain the measured data. The layout configuration may vary depending on the specific application.

PCB is RO4003 8 mil thickness, 0.5 oz standard copper cladding, with Er = 3.38.

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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

Ordering Information

Part	Package Style
TGA2503-SM	QFN 24L 4x4 Surface Mount

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