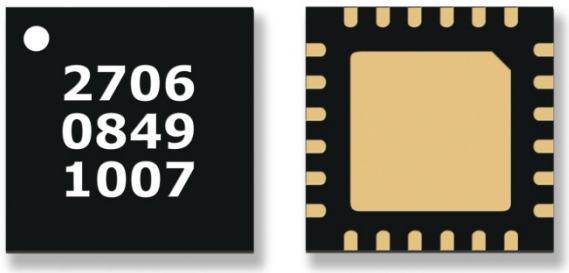
2 Watt C-Band Packaged Power Amplifier

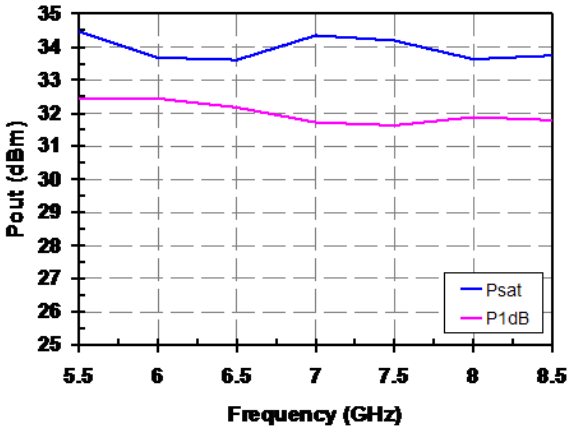


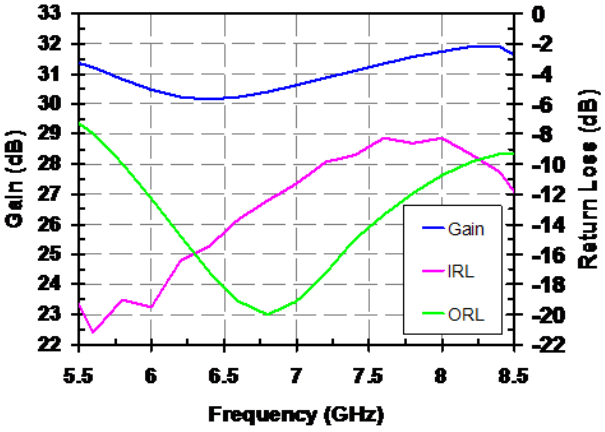
Key Features

- Frequency Range: 5.5 – 8.5 GHz
- Power: 34 dBm Psat, 32 dBm P1dB
- Gain: 31 dB
- TOI: 42 dBm
- NF: 7 dB
- Bias: Vd = 6 V, Id = 1.26 A, Vg = +0.6 V Typical
- Package Dimensions: 5 x 5 x 0.85 mm

Measured Performance

Bias conditions: Vd = 6 V, Id = 1.26 A, Vg = +0.6 V Typical





Primary Applications

- Point-to-Point Radio
- Communications

Product Description

The TriQuint TGA2706-SM is a packaged 2 Watt Power Amplifier for C-band applications. The part is designed using TriQuint's proven standard 0.5um E/D pHEMT production process. The TGA2706-SM provides a nominal 34 dBm of output power at an input power level of 12 dBm with a small signal gain of 31 dB. Nominal TOI is 42 dBm and noise figure is 7 dB.

The TGA2706-SM is a QFN 5x5 mm surface mount package. It is ideally suited for low cost emerging markets such as point to point radio and communications.

Lead-Free & RoHS compliant.

Evaluation boards are available upon request.

Datasheet subject to change without notice.

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Table I
Absolute Maximum Ratings 1/

Symbol	Parameter	Value	Notes
Vd-Vg	Drain to Gate Voltage	16 V	
Vd	Drain Voltage	13 V	2/
Vg	Gate Voltage Range	-0.65 to +2 V	
Id	Drain Current	2.7 A	2/
Ig	Gate Current Range	-16 to 120mA	
Pin	Input Continuous Wave Power	26 dBm	2/

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 Pd (as listed in “Thermal Information”).

Table II
Recommended Operating Conditions

Symbol	Parameter 1/	Value
Vd	Drain Voltage	6 V
Idq	Drain Current	1.26 A
Id_Drive	Drain Current under RF Drive	1.7 A
Vg	Gate Voltage	+0.6 V

1/ See assembly diagram for bias instructions.

Table III
RF Characterization Table

Bias: Vd = 6 V, Id = 1.26 A, Vg = +0.6 V Typical

SYMBOL	PARAMETER	TEST CONDITIONS	NOMINAL	UNITS
Gain	Small Signal Gain	F = 5.5 – 8.5 GHz	31	dB
IRL	Input Return Loss	F = 5.5 – 8.5 GHz	-12	dB
ORL	Output Return Loss	F = 5.5 – 8.5 GHz	-15	dB
Psat	Saturated Output Power	F = 5.5 – 8.5 GHz	34	dBm
P1dB	Output Power @ 1dB Compression	F = 5.5 – 8.5 GHz	32	dBm
TOI	Output TOI	F = 5.5 – 8.5 GHz	42	dBm
NF	Noise Figure	F = 5.5 – 8.5 GHz	7	dB
	Gain Temperature Coefficient	F = 5.5 – 8.5 GHz	-0.03	dB/°C
	Power Temperature Coefficient	F = 5.5 – 8.5 GHz	-0.015	dBm/°C

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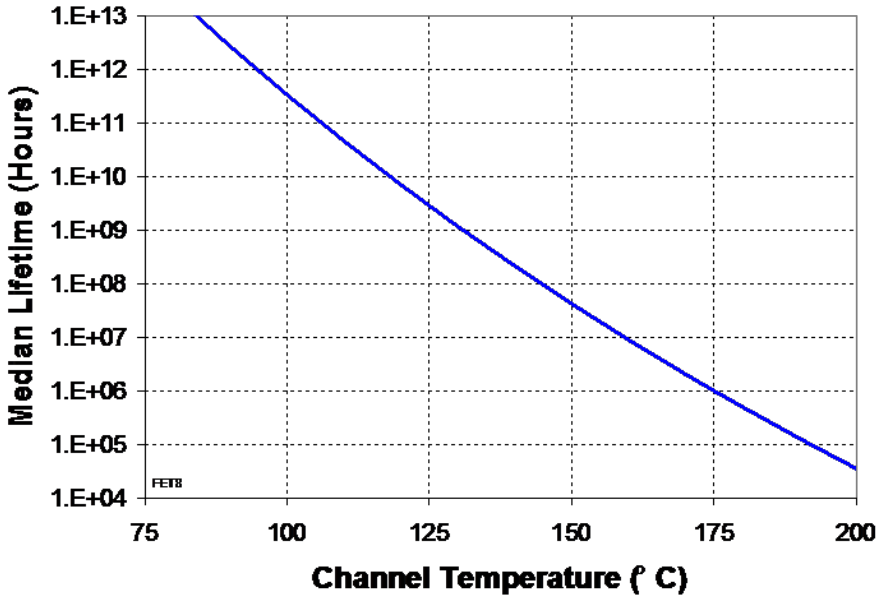
Table IV
Power Dissipation and Thermal Properties

Parameter	Test Conditions	Value
Maximum Power Dissipation	Tbaseplate = 85 °C	Pd = 15 W Tchannel = 200 °C
Thermal Resistance, θjc	Vd = 6 V Id = 1.26 A Pd = 7.56 W Tbaseplate = 85 ºC	θjc = 7.7 °C/W Tchannel = 143 °C Tm = 1.3E+8 Hrs
Thermal Resistance, θjc Under RF Drive	Vd = 6 V Id = 1.7 A Pout = 34 dBm Pd = 7.7 W Tbaseplate = 85 ºC	θjc = 7.7 °C/W Tchannel = 144 °C Tm = 1.1E+8 Hrs
Mounting Temperature	30 Seconds	320 °C
Storage Temperature		-65 to 150 °C

Median Lifetime (Tm) vs. Channel Temperature



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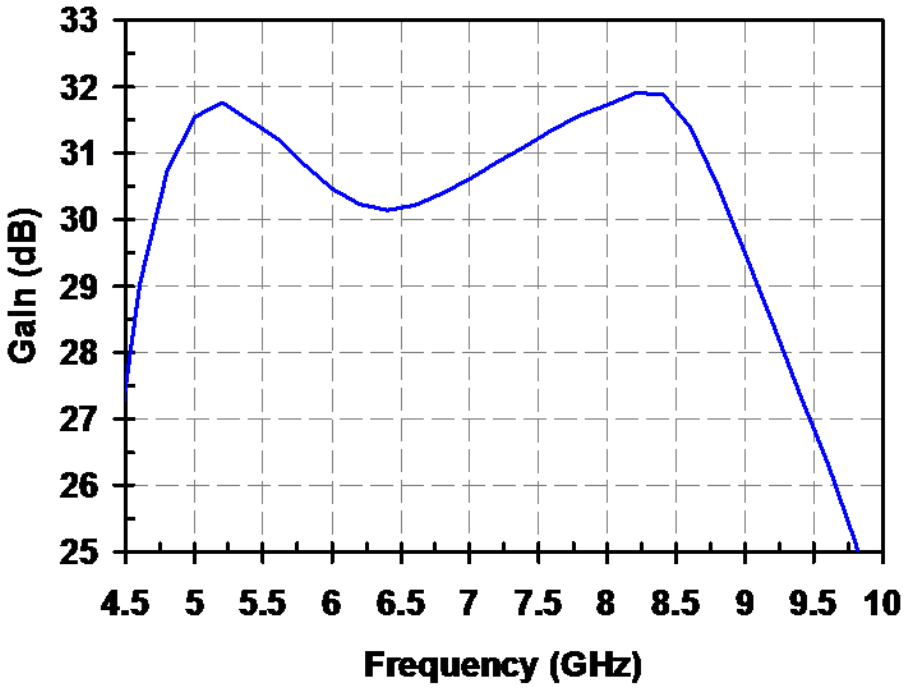
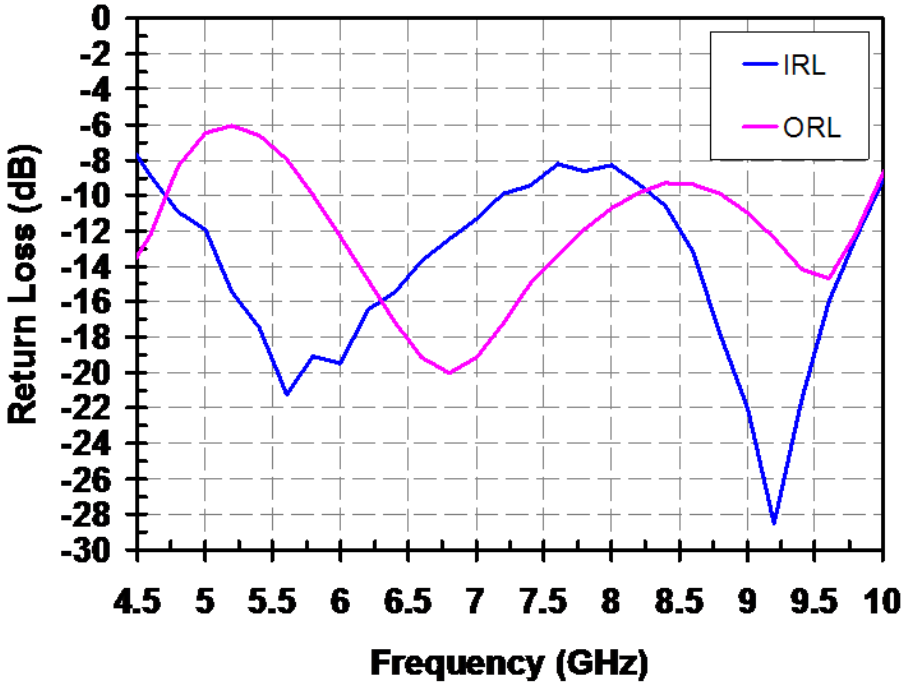
Measured Data

Bias conditions: Vd = 6 V, Id = 1.26 A, Vg = +0.6 V Typical





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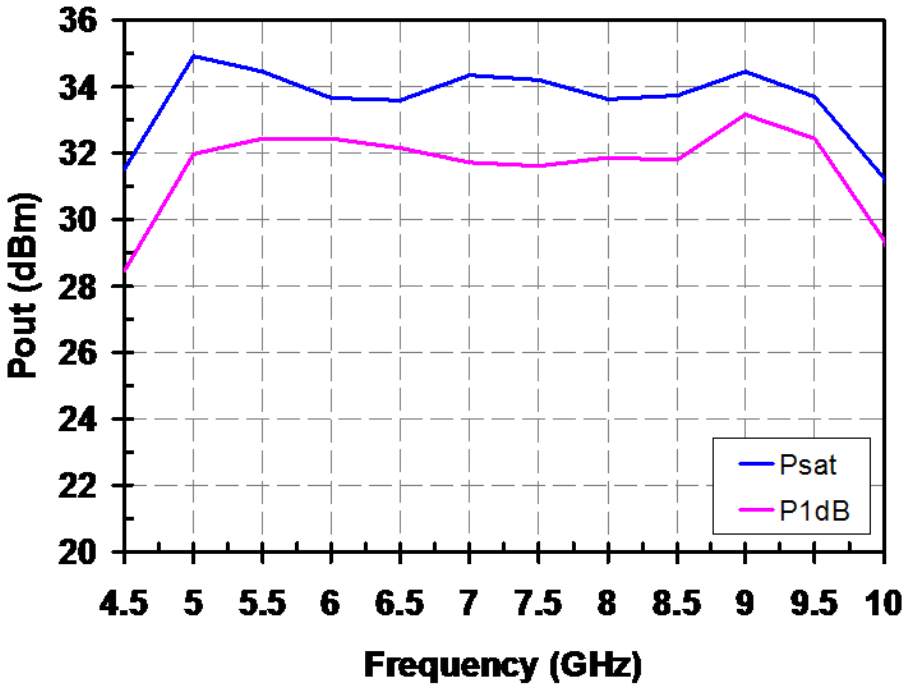

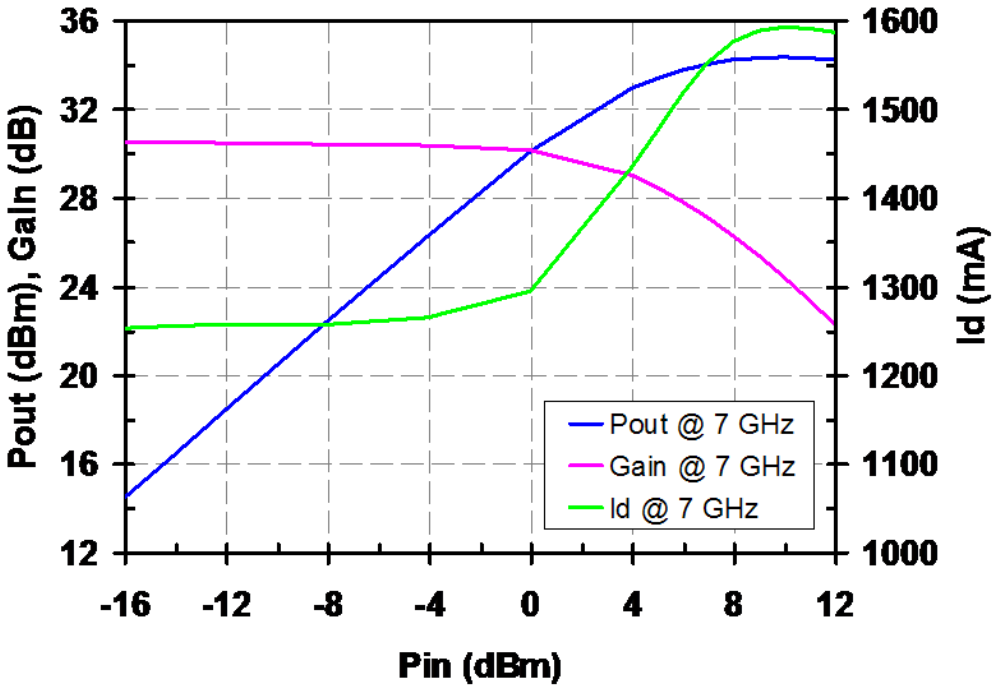

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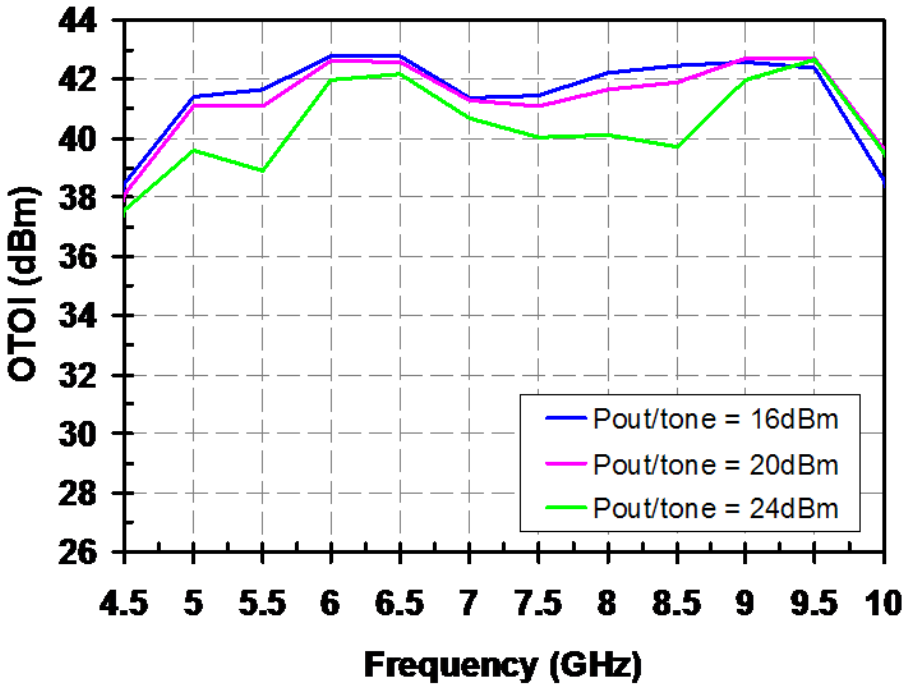

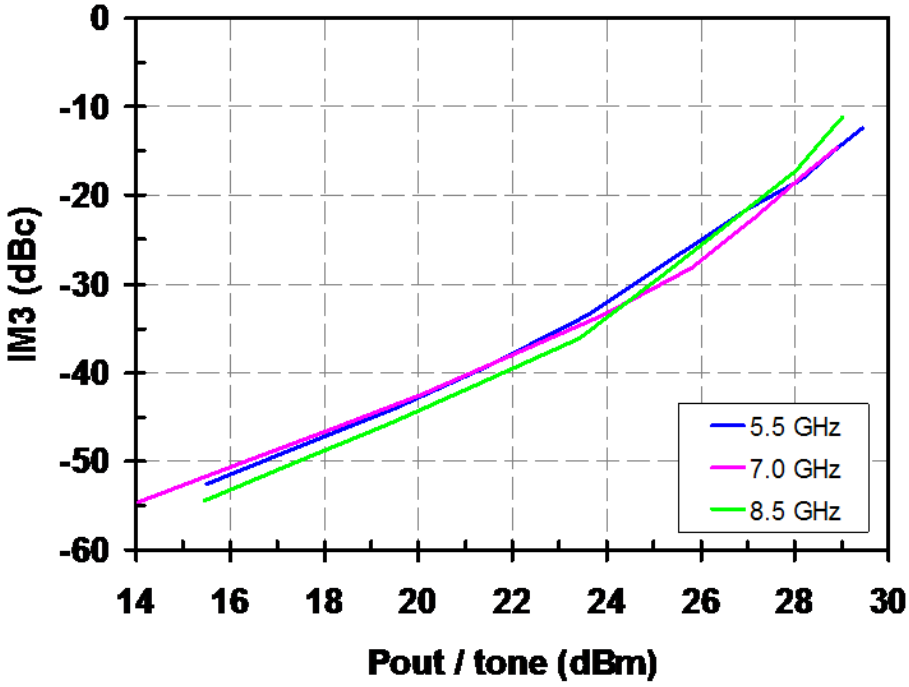

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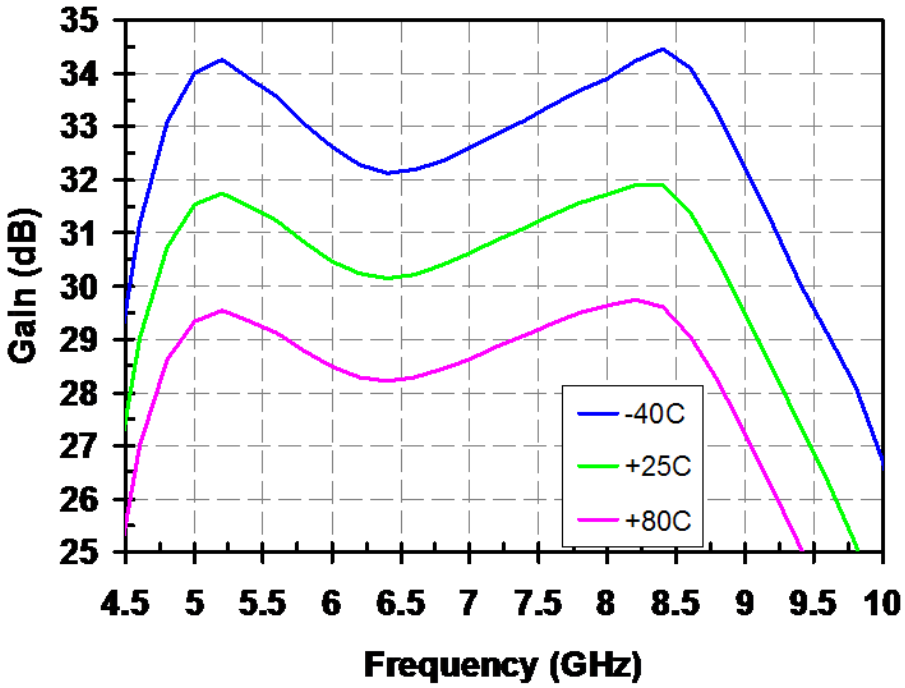

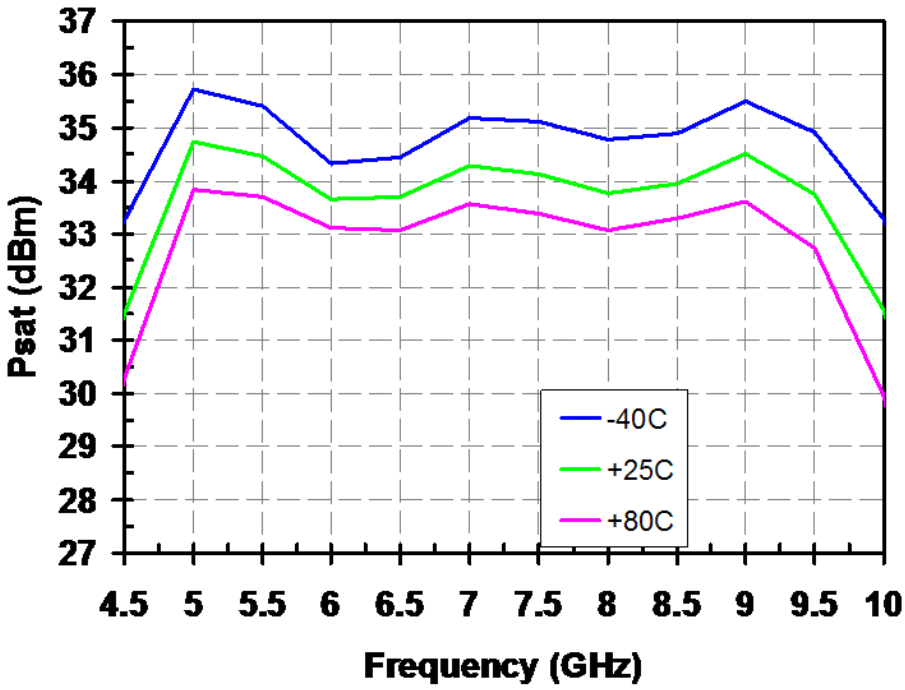

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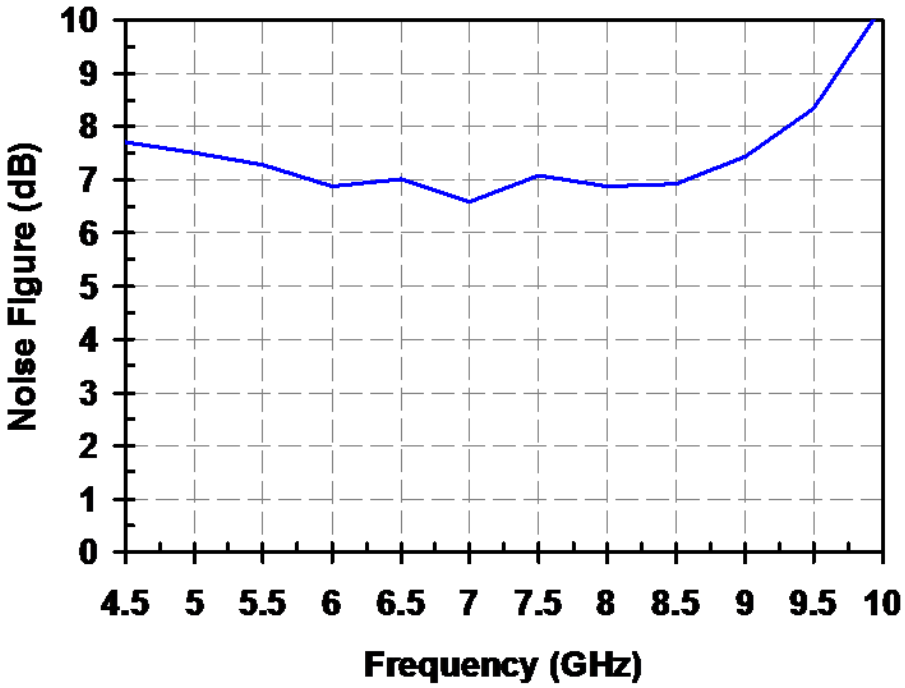

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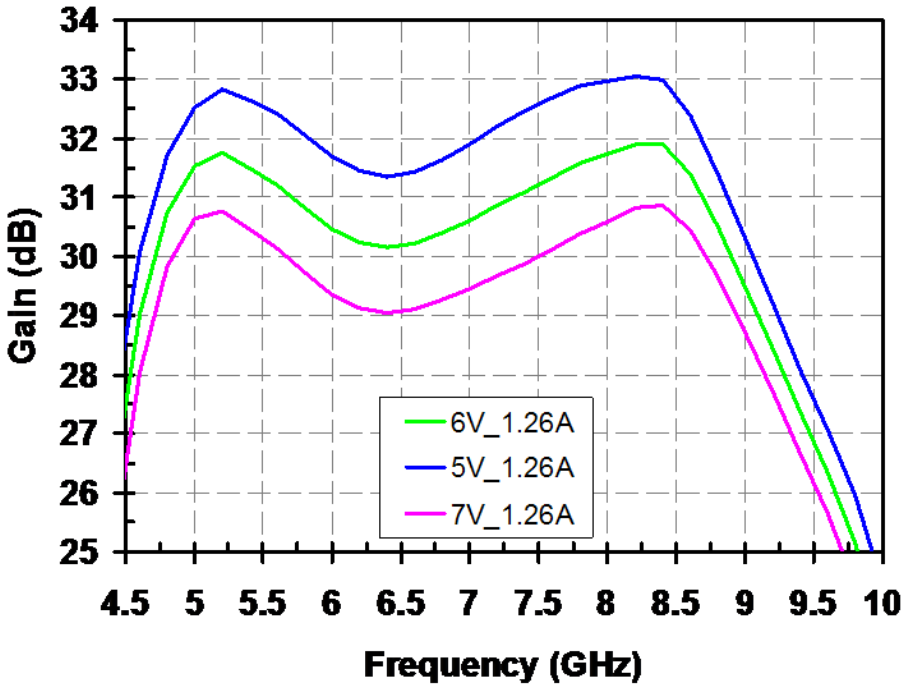
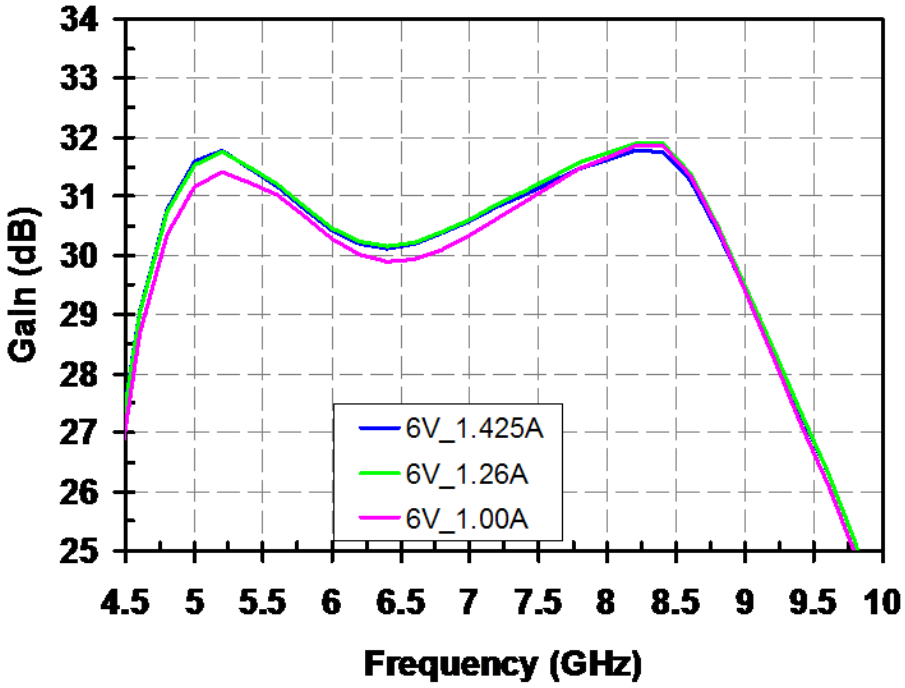
Measured Data

Bias conditions: Varies





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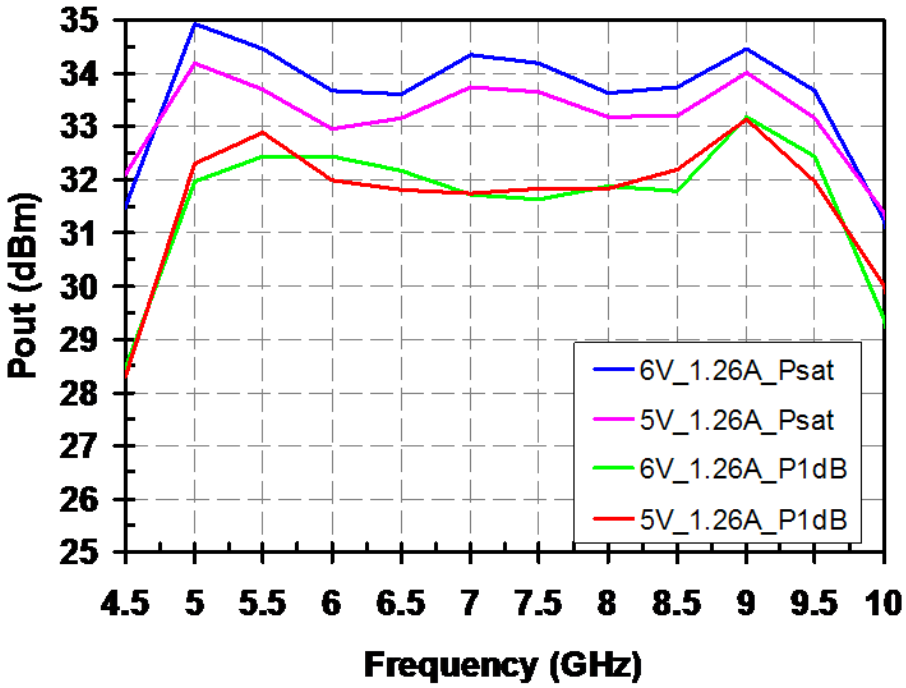
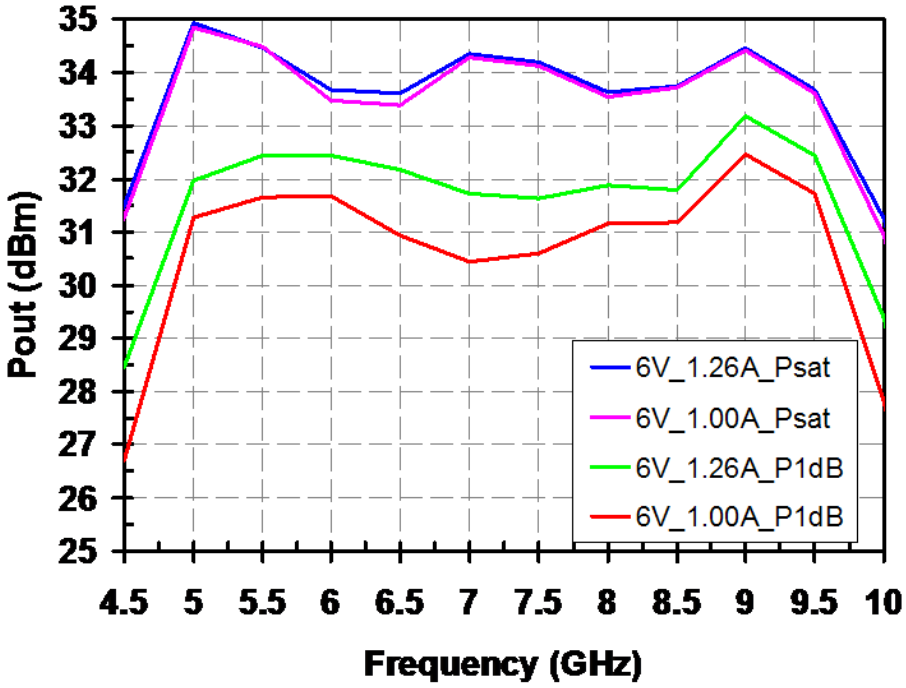
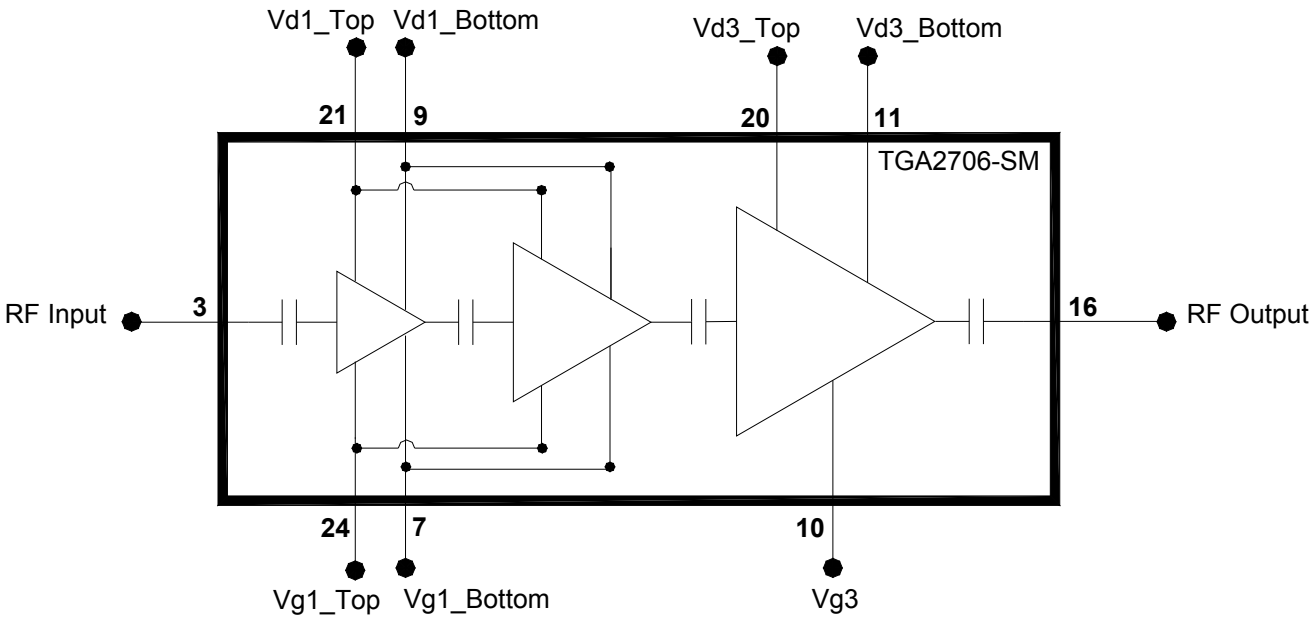
Measured Data

Bias conditions: Varies





Electrical Schematic



Bias Procedures

Bias-up Procedure

Vg set to 0 V

Vd_set to +6 V

Adjust Vg more positive until Idq is 1.26 A.
This will be ~ Vg = +0.6 V

Bias-down Procedure

Turn off RF supply

Reduce Vg to 0 V. Ensure Id ~ 0 mA

Turn Vd to 0 V

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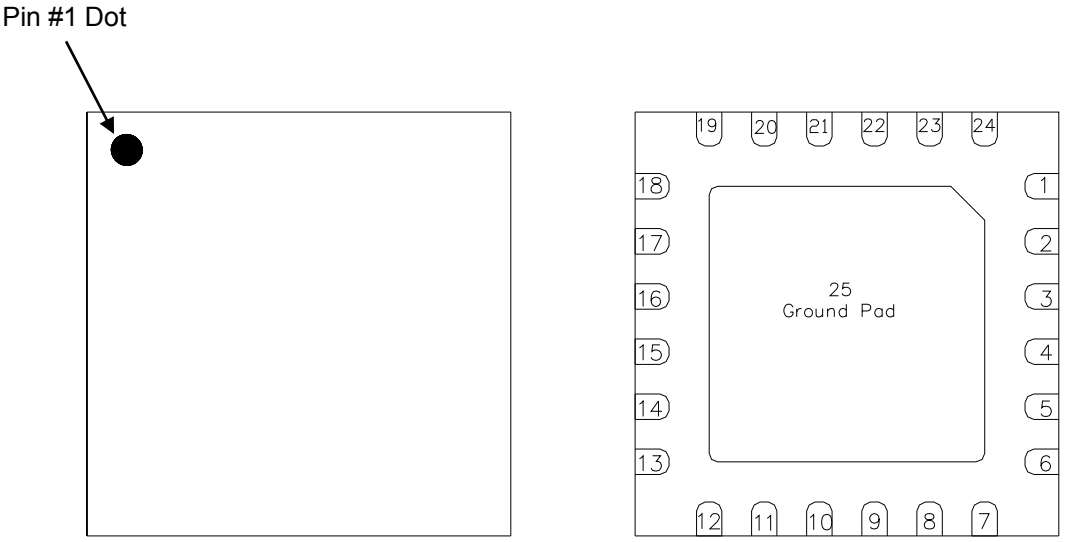
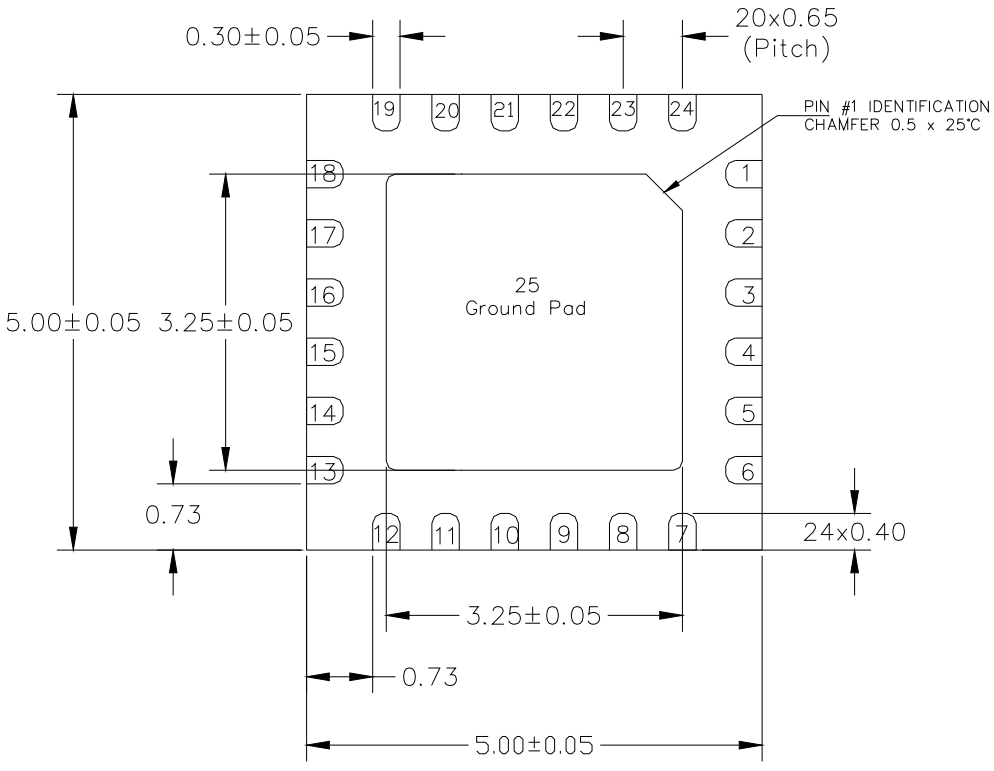
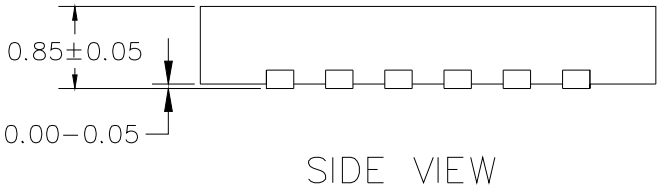
Package Pinout



Pin	Description
3	RF Input
7, 24	Vg1
9, 21	Vd1
10	Vg3
11, 20	Vd3
16	RF Output
25	Ground
1, 2, 4, 5, 6, 8, 12, 13, 14, 15, 17, 18, 22, 23	N/C

Mechanical Drawing



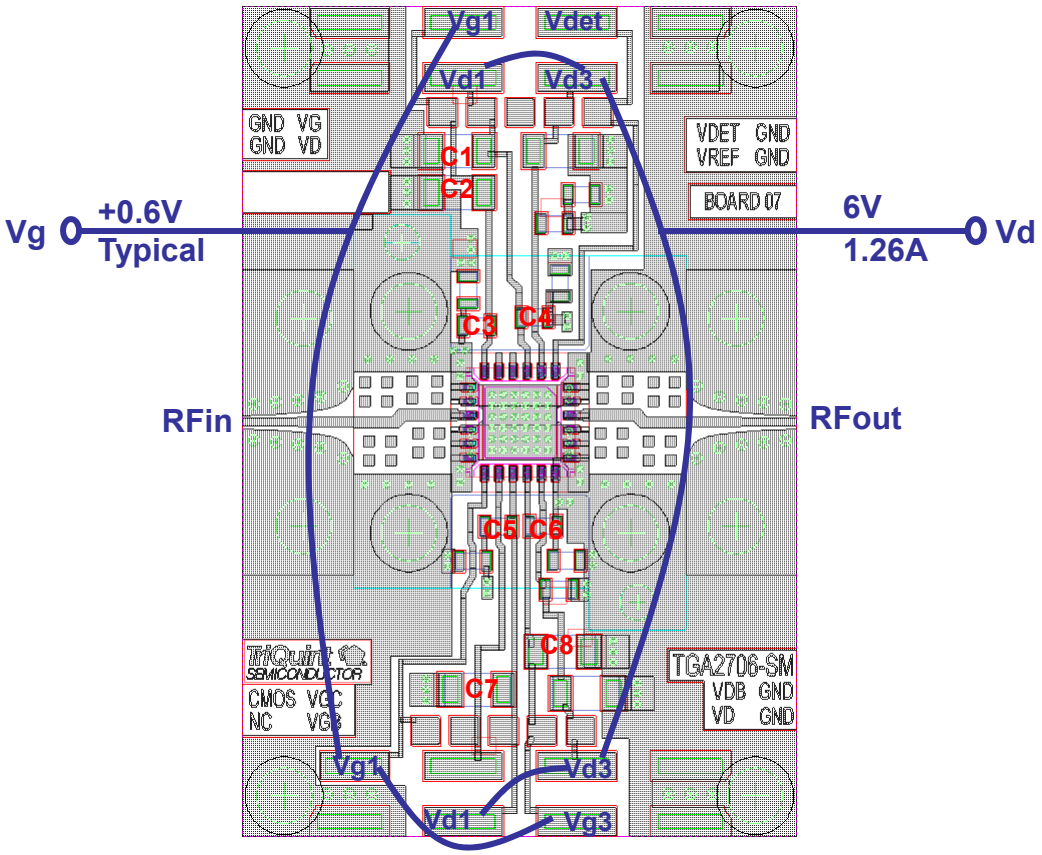


Units: millimeters

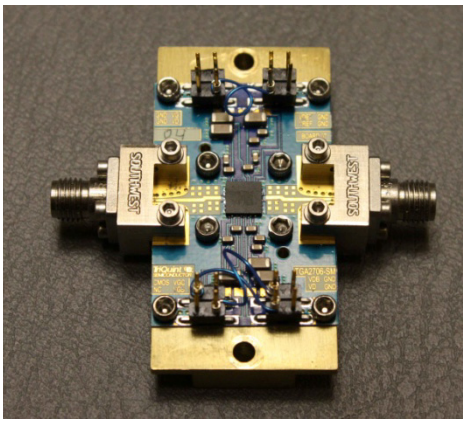
Pkg x, y, z size tolerance: +/- 0.050

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

Recommended Assembly Board



Part	Description
C1, C2, C7, C8	1 uF Capacitor (1206)
C3, C4, C5, C6	0.01 uF Capacitor (0603)



Board is 10mil thick RO4350 with 0.5oz copper cladding.

Board is mounted on metal block and adequate heatsinking with fan is required.

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Assembly Notes

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
TGA2706-SM	QFN 5x5 Surface Mount

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