TGA4530-SM

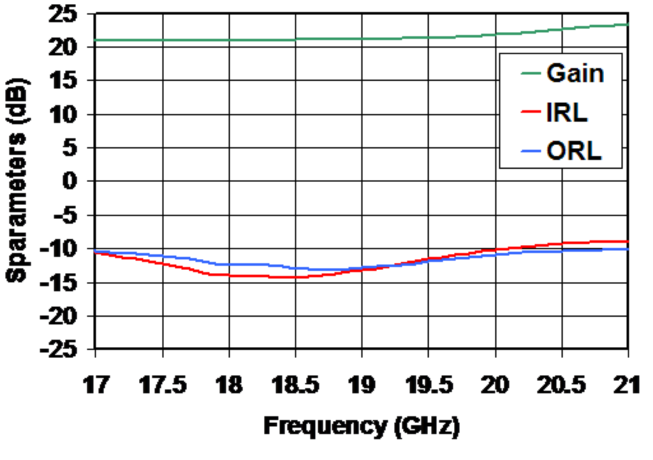
17-21 GHz High Output TOI Packaged Amplifier

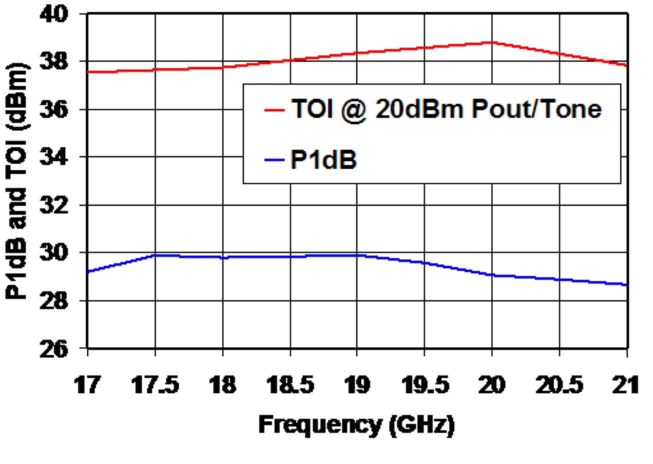
Key Features

- Frequency Range: 17 - 21 GHz
- 38 dBm Nominal Output TOI
- 21 dB Nominal Gain
- 29 dBm Nominal P1dB
- 12 dB Nominal Return Loss
- Bias 6 V @ 825 mA
- 4 x 4 QFN with 20 leads
- Package Dimensions 4.0 x 4.0 x 1.2 mm

Measured Fixtured Data

Bias Conditions: Vd = 6V, Id = 825mA





Primary Applications

- Point-to-Point Radio
- Point-to-Multipoint Communications
- K Band Sat-Com

Product Description

The TriQuint TGA4530-SM is a packaged High Power Amplifier for 17–21 GHz applications. The part is designed using using TriQuint's power pHEMT production process.

The TGA4530-SM nominally provides 29 dBm saturated output power at the 1 dB compression gain and 38 dBm TOI for bias of 6 V, 825 mA. The typical gain is 21dB.

The TGA4530-SM is a QFN 4x4mm surface mount package. It is ideally suited for low cost emerging markets such as Point-to-Point Radio, Point-to-Multi Point Communications, and K-band Satellite Communications.

Evaluation Boards are available upon request.

Lead-Free & RoHS compliant

Datasheet subject to change without notice.

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	Positive Supply Voltage	8 V	
Vg	Negative Supply Voltage Range	-5 TO 0 V	
Id	Positive Supply Current	1.75 A	
$\lvert Ig \rvert$	Negative Supply Current	35 mA	
P_{IN}	Input Continuous Wave Power	26 dBm	
P_D	Power Dissipation	14 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
ELECTRICAL CHARACTERISTICS
(Ta = 25 °C Nominal)

PARAMETER	TYPICAL	UNITS
Frequency Range	17 - 21	GHz
Drain Voltage, Vd	6	V
Drain Current, Id	825	mA
Gate Voltage Typical, Vg	-0.5	V
Small Signal Gain, S21	21	dB
Input Return Loss, S11	12	dB
Output Return Loss, S22	12	dB
Reverse Isolation, S12	55	dB
Saturated Output Power @ 16 dBm Pin, Psat	31	dBm
Output Power @ 1dB Gain Compression, P1dB	29	dBm
Output Third Order Intercepted Point	38	dBm
Small Signal Gain Temperature Coefficient	-0.03	dB/°C

TABLE III
THERMAL INFORMATION

PARAMETER	TEST CONDITIONS	Tchannel (°C)	θ_{JC} (°C/W)	Tm (HRS)
θ_{JC} Thermal Resistance (channel to backside of package)	Vd = 6 V Id = 825 mA P_D = 4.95 W Small Signal T_{base} = 70°C	143	14.8	1.8E+6
θ_{JC} Thermal Resistance (channel to backside of package)	Vd = 6 V Id = 970 mA @ Psat P_D = 4.4 W P_{out} = 1.4 W (RF) T_{base} = 70°C	135	14.8	3.8E+6

Note: Backside of package is the 70°C baseplate temperature. 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.

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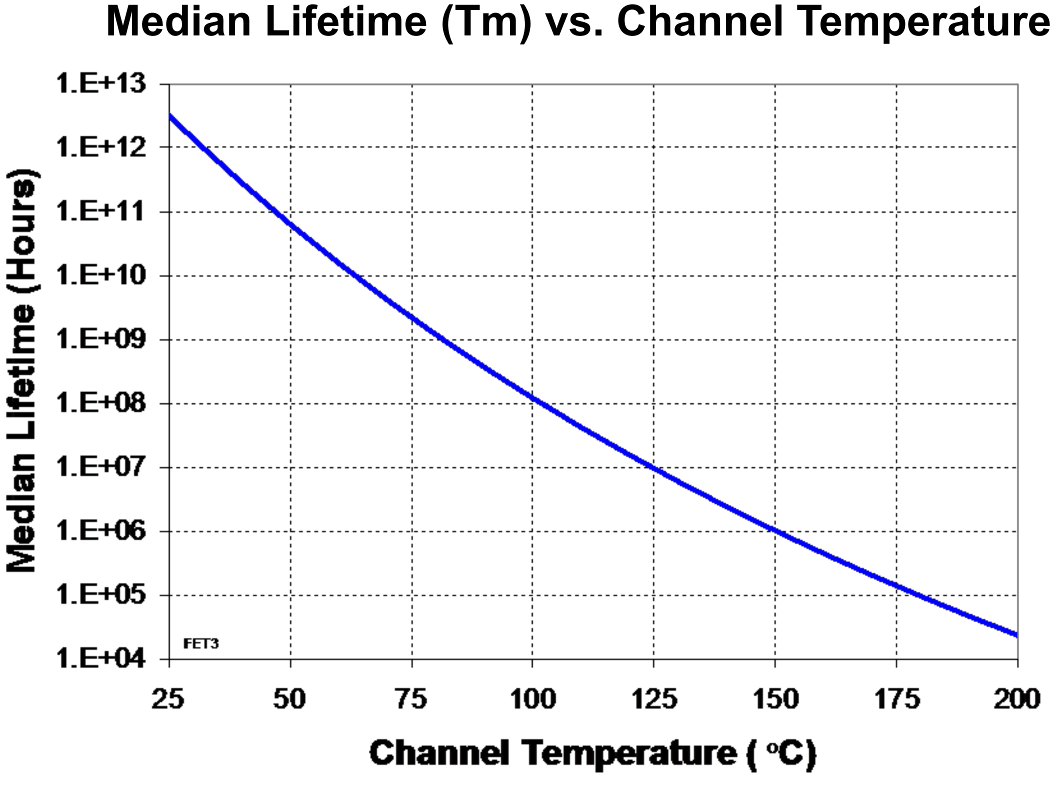
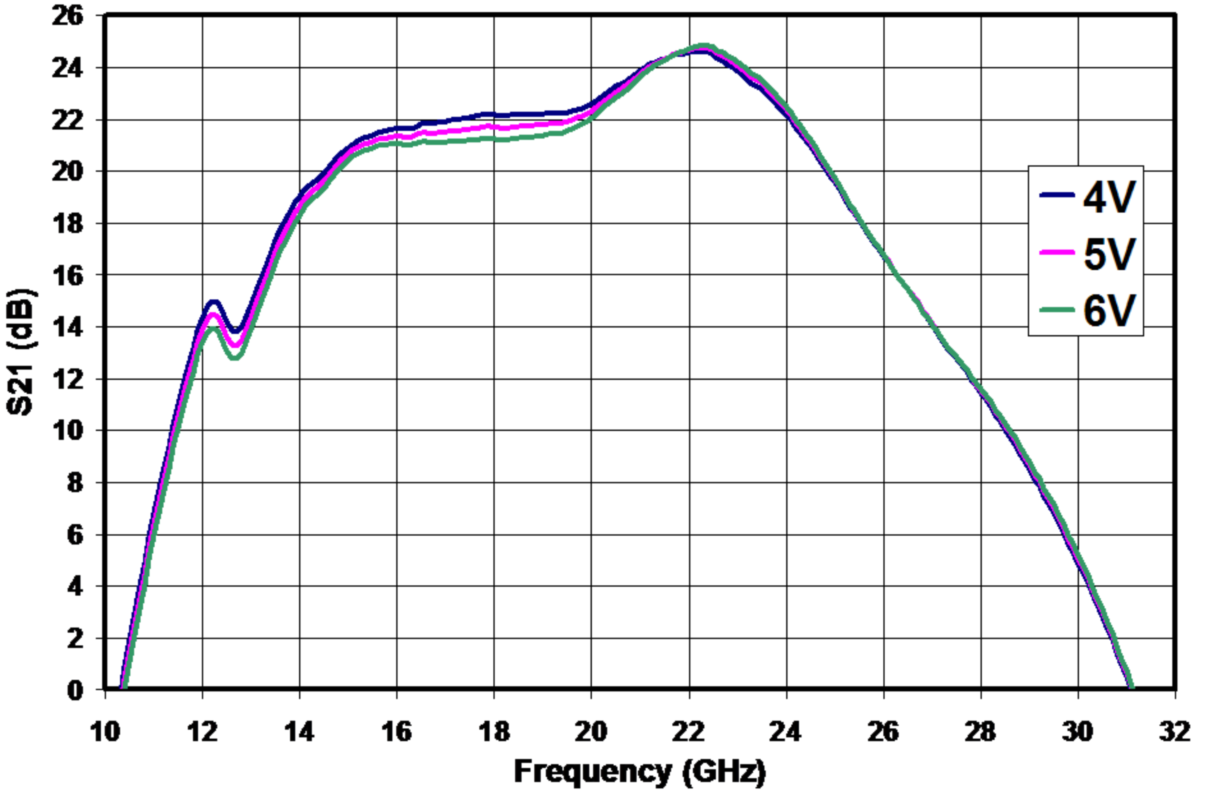
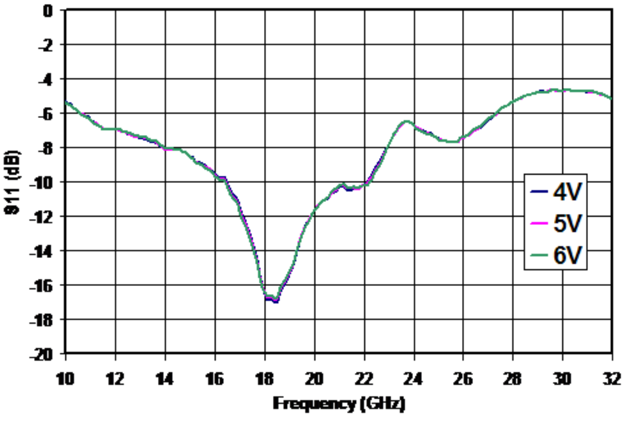
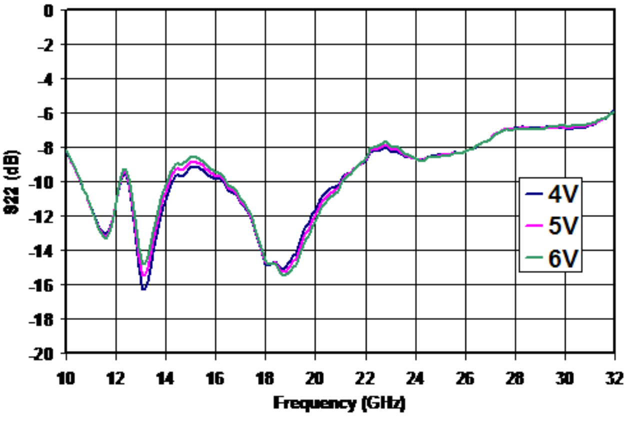


Measured Data

Vd = 4- 6V, Idq = 825mA
Vg = -0.5 V (typ.)

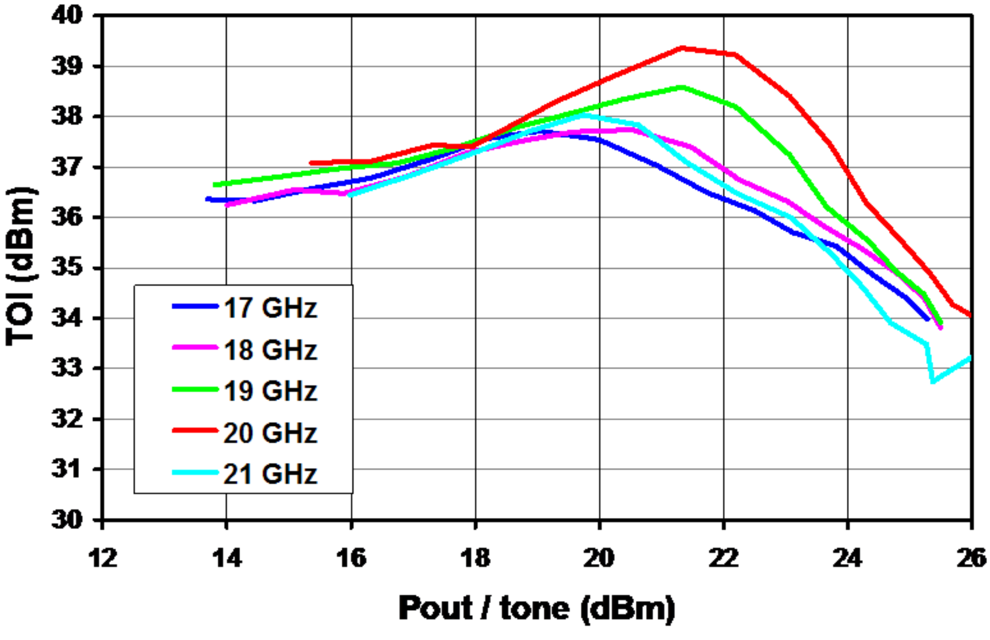


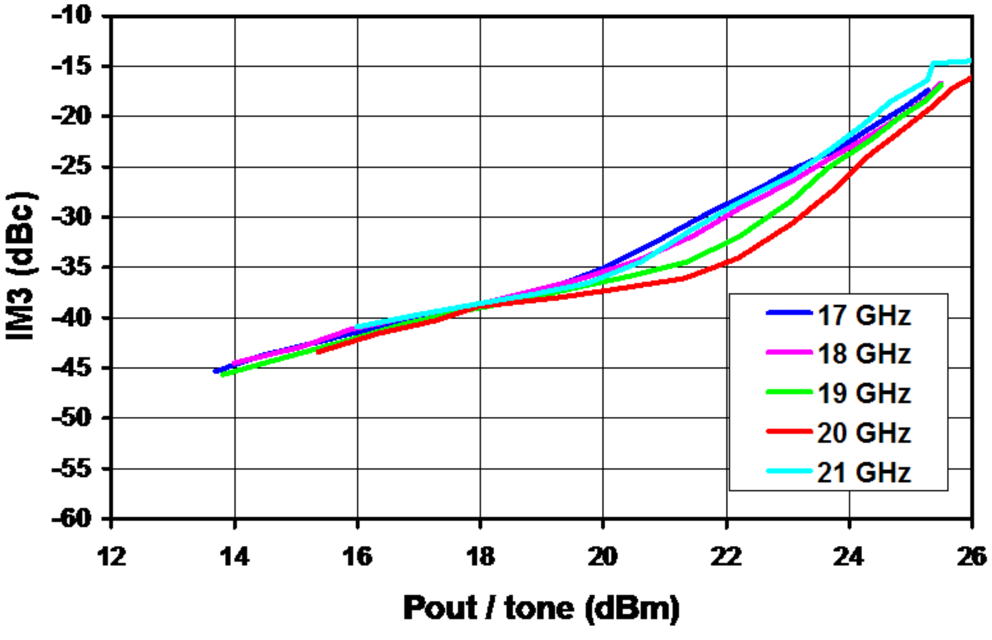




Measured Data

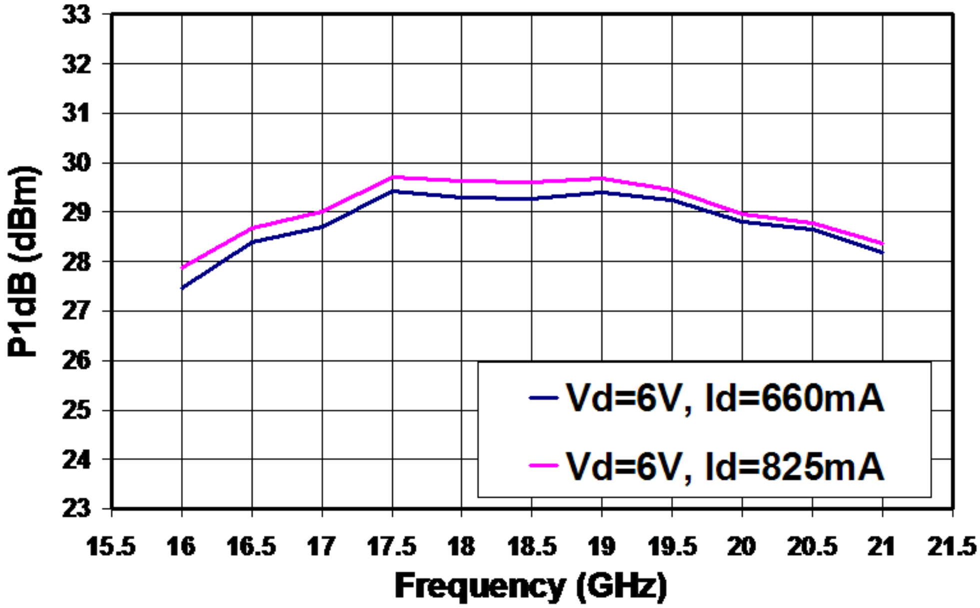
Vd = 6V, Id = 825mA
Vg = -0.5 V (typ.)



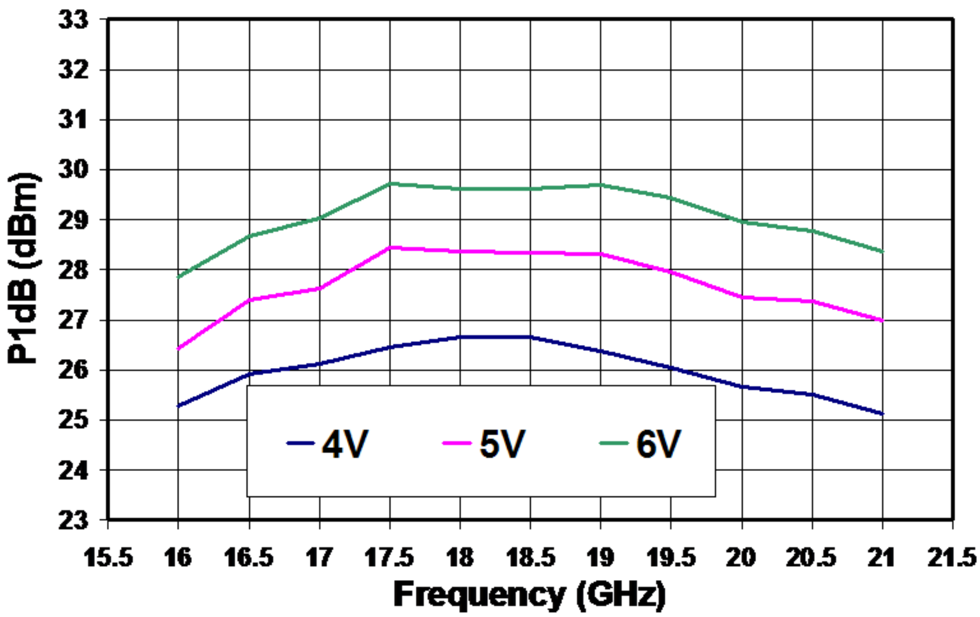


Measured Data

Vd = 6V, Idq = 660, 825mA
Vg = -0.5 V (typ.)

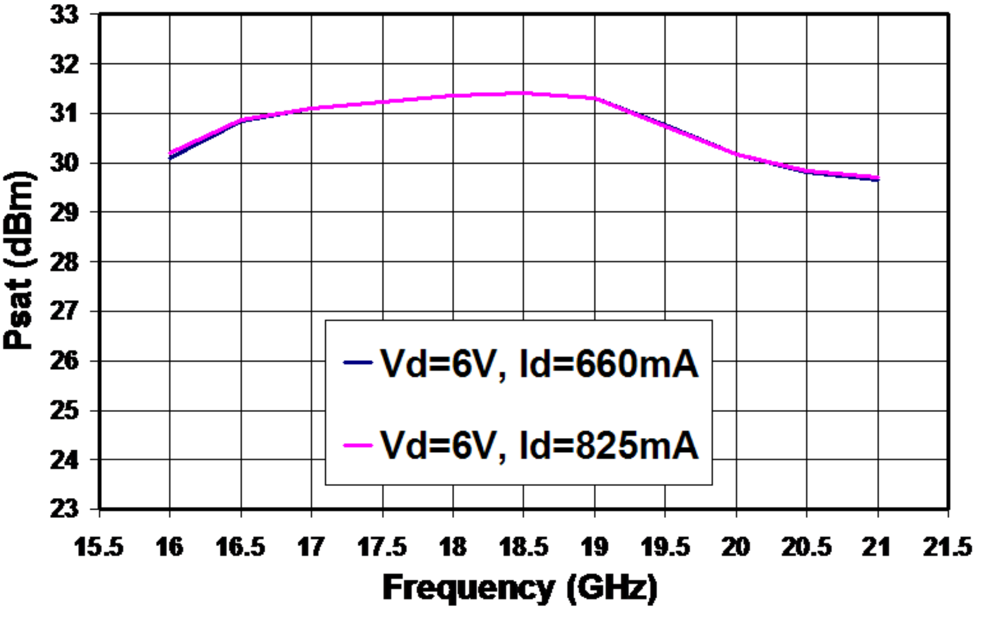


Vd = 4-6V, Idq = 825mA
Vg = -0.5 V (typ.)

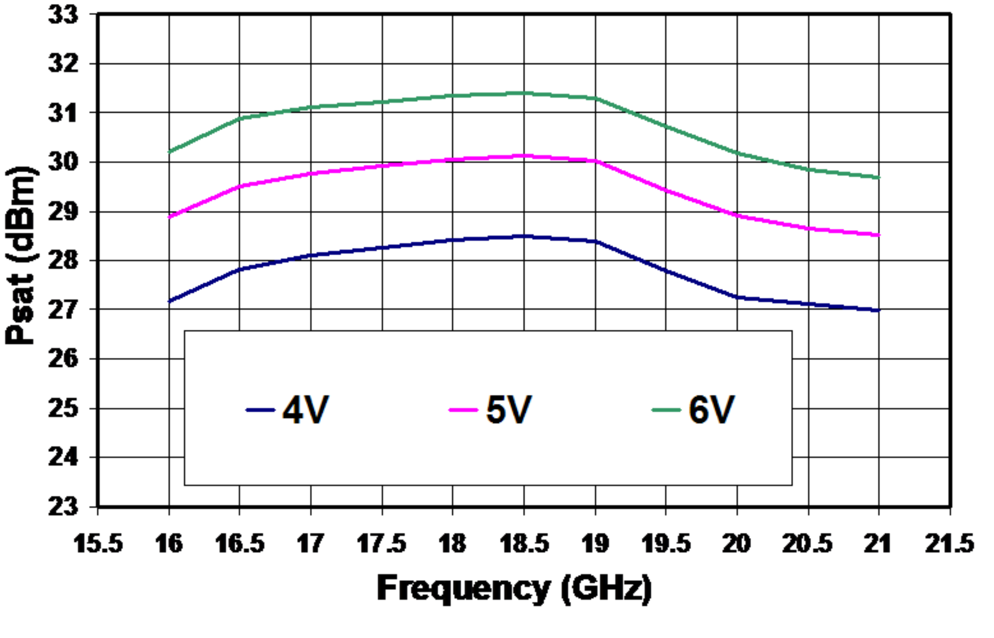


Measured Data

Vd = 6V, Idq = 660, 825mA
Vg = -0.5 V (typ.)

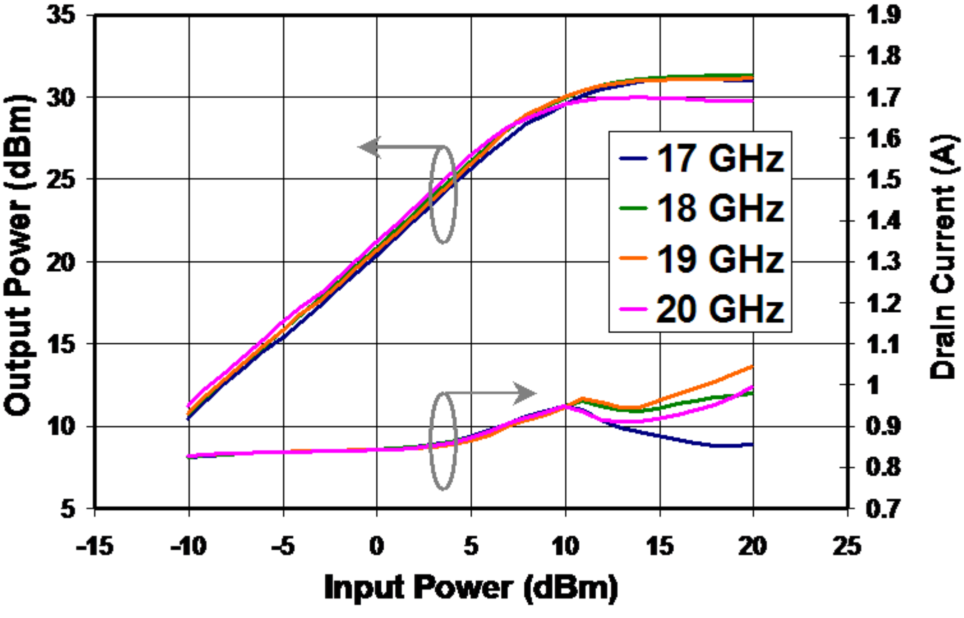


Vd = 4-6V, Idq = 825mA
Vg = -0.5 V (typ.)

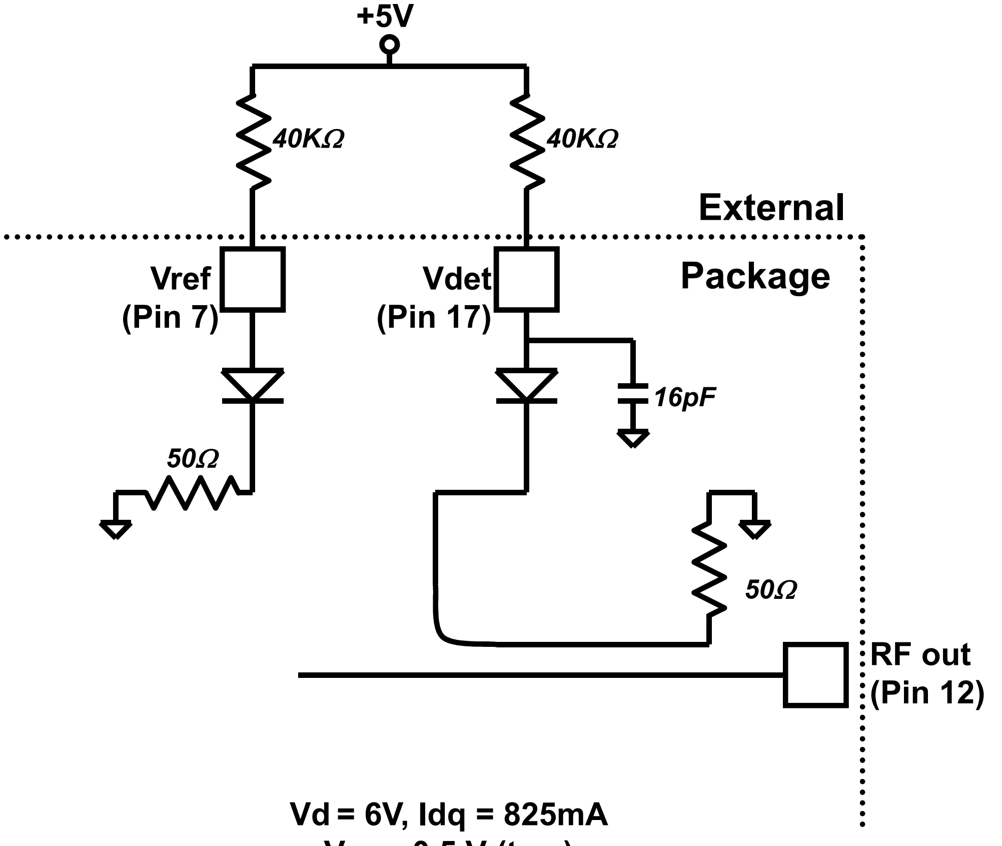


Measured Data

Vd = 6V, Idq = 825mA
Vg = -0.5 V (typ.)



Power Detector



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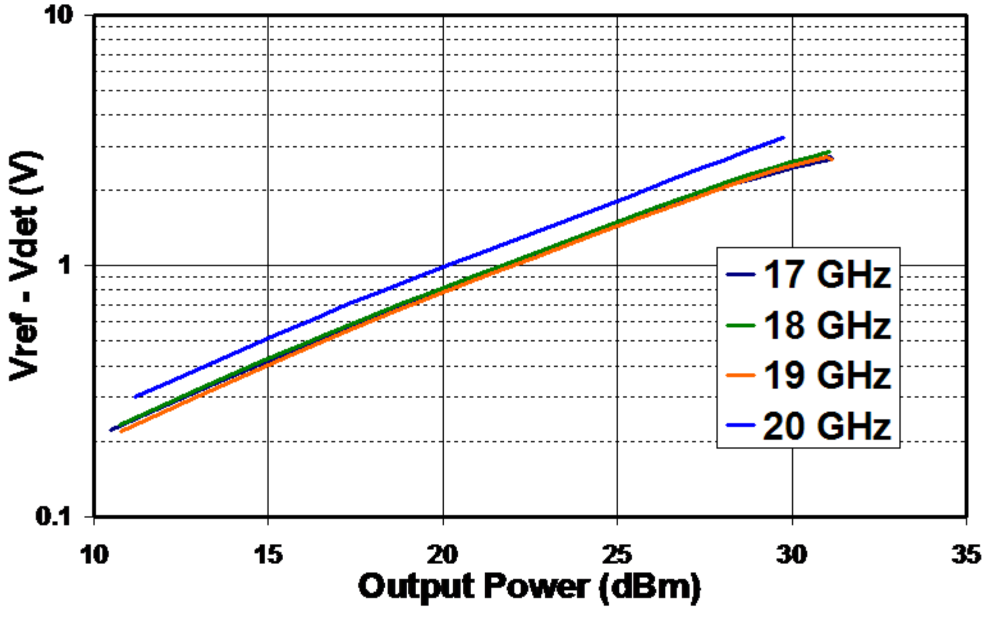
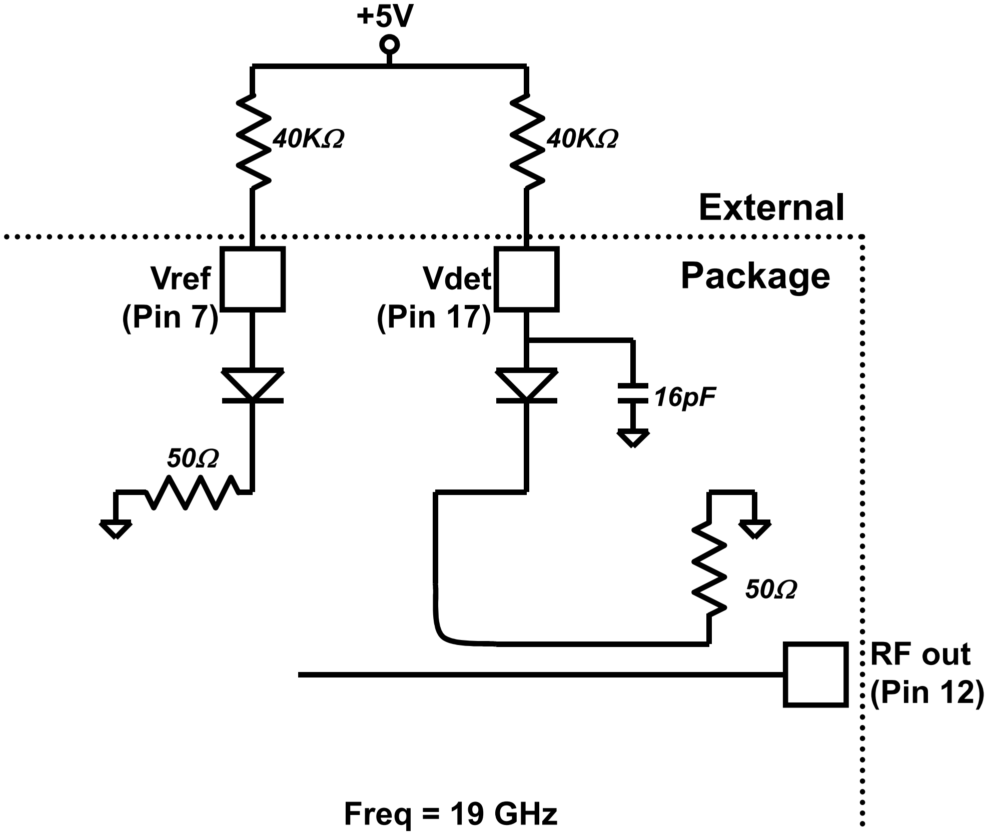
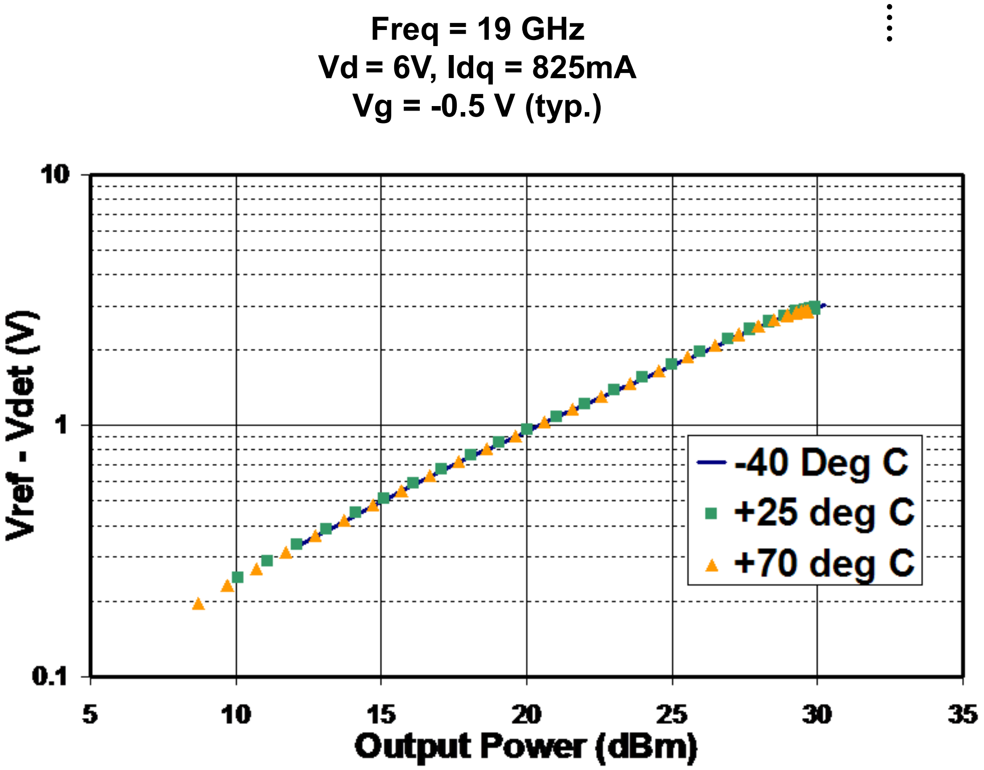
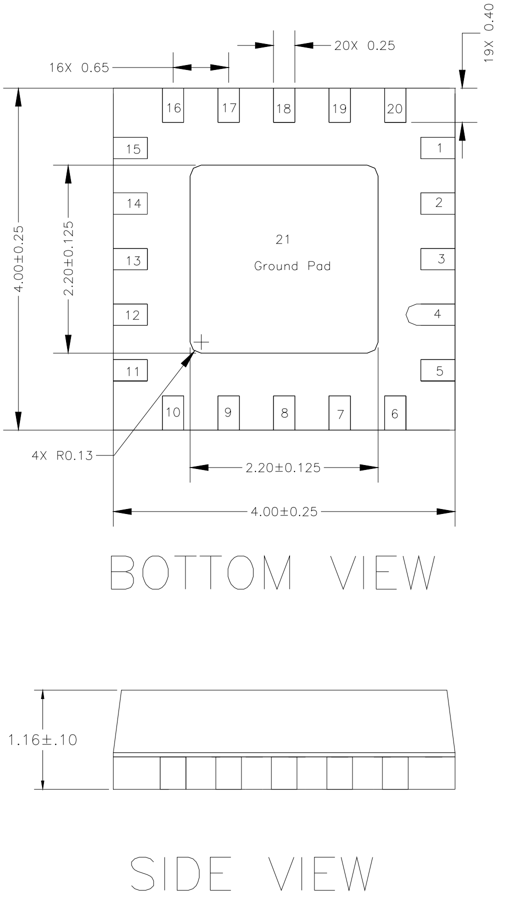


Power Detector





Mechanical Drawing

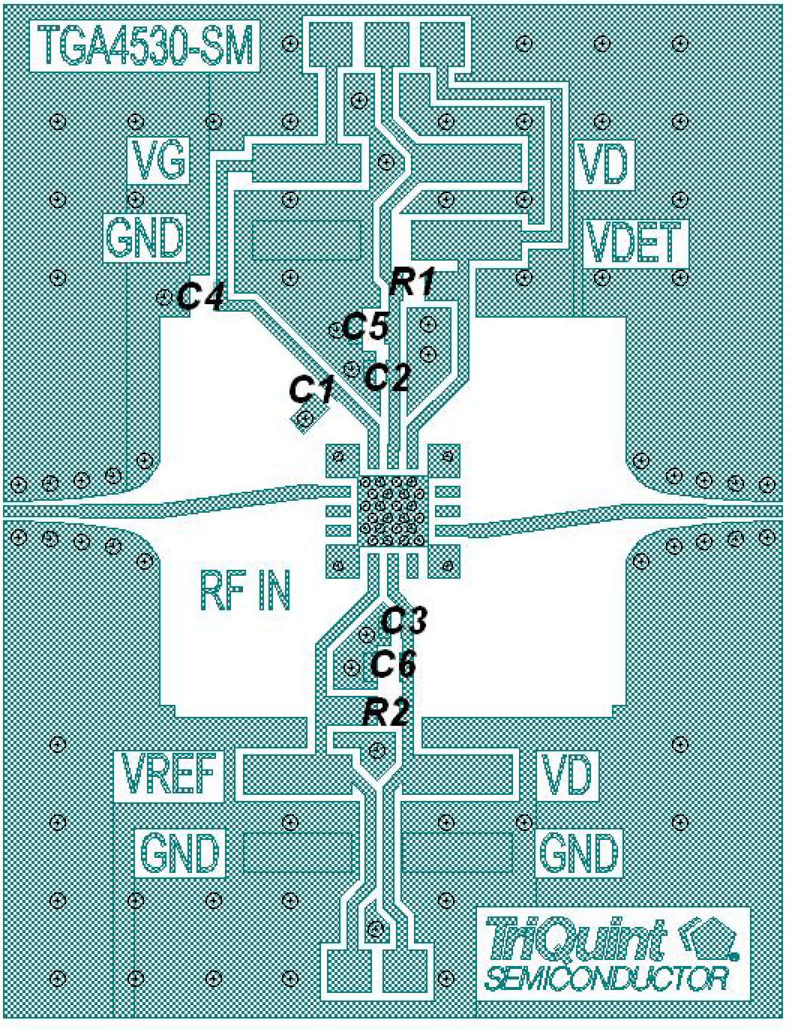


Dimensions are in millimeters
Dot on topside indicates Pin 1
Tolerances: ±0.076, unless otherwise noted

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

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

Recommended Evaluation Board Layout Assembly *



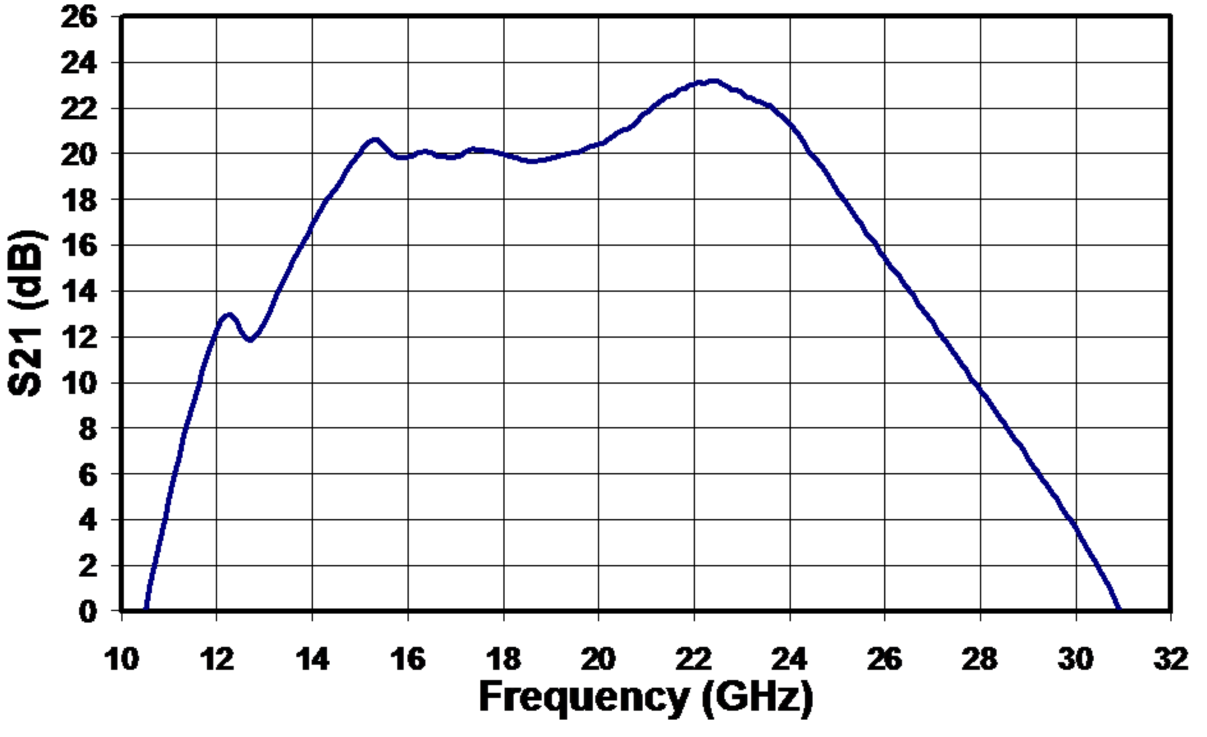
Designator	Component
C1,C2,C3	100pF Capacitor
C4,C5,C6	1uF Capacitor
R1,R2	40.2kOhm Resistor

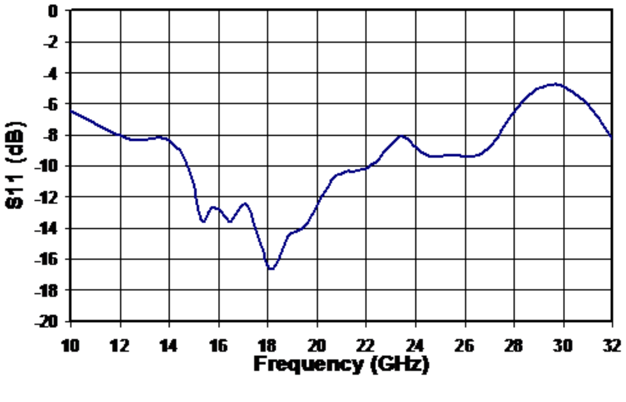
* PCB is RO4003 8 mil thickness, 0.5 oz standard copper cladding, with Er = 3.38.

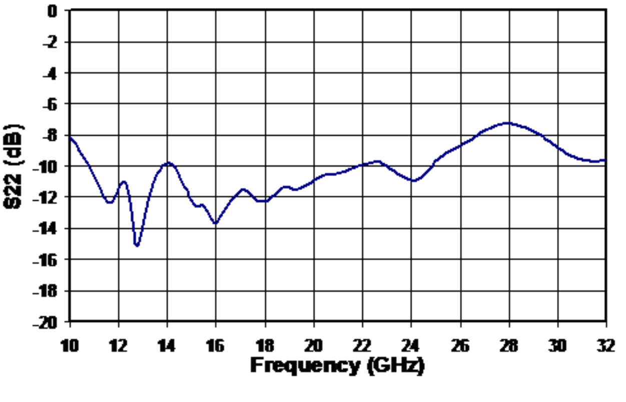
GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Measured Data - Evaluation Board
Data includes connector and board losses

Vd = 6V, Id = 825mA
Vg = -0.5 V (typ.)







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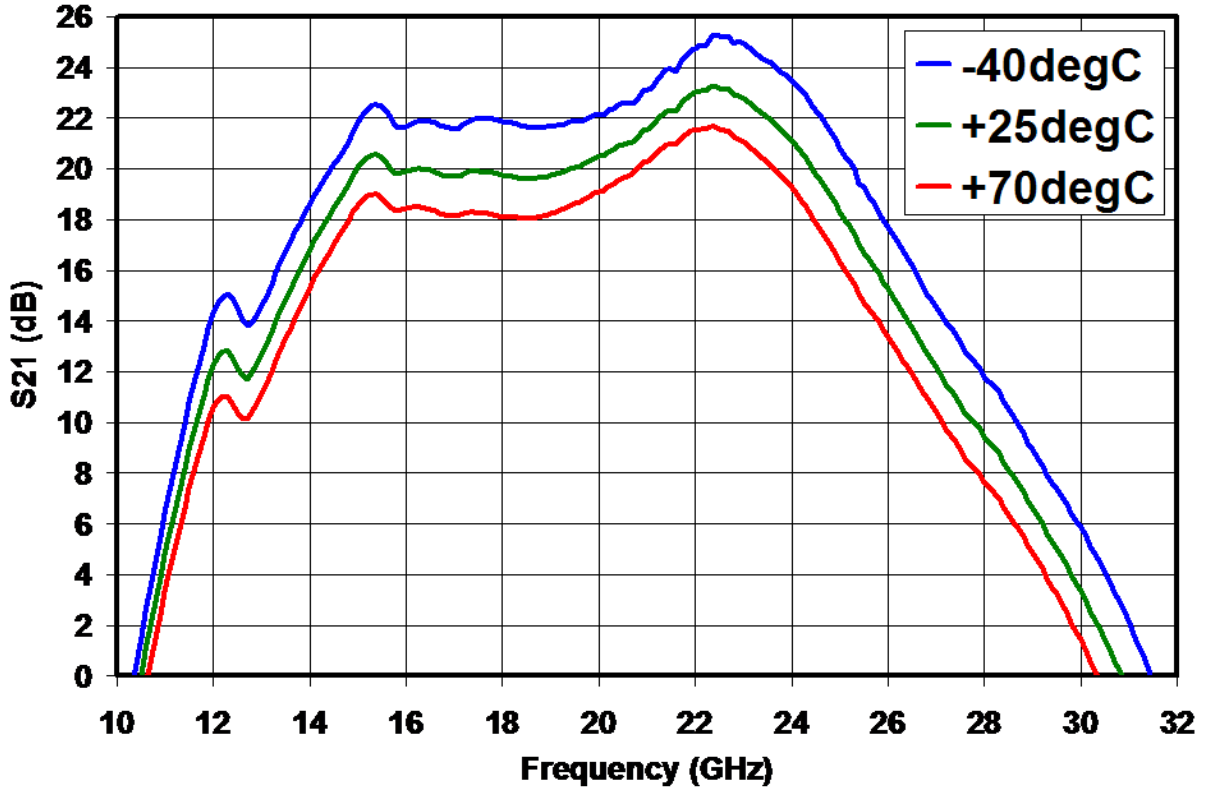
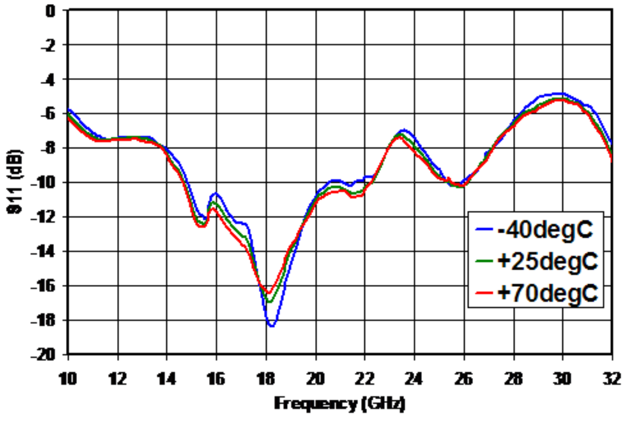
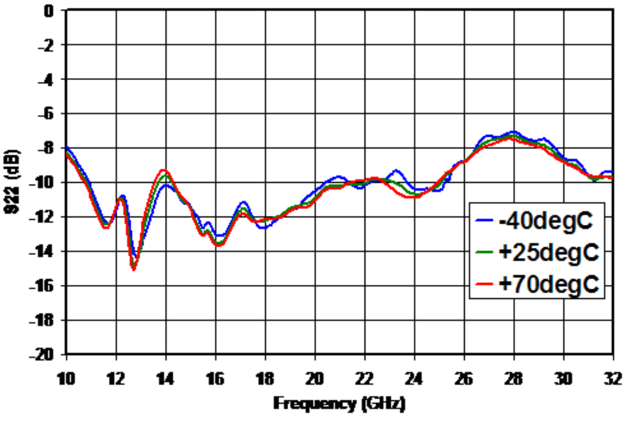
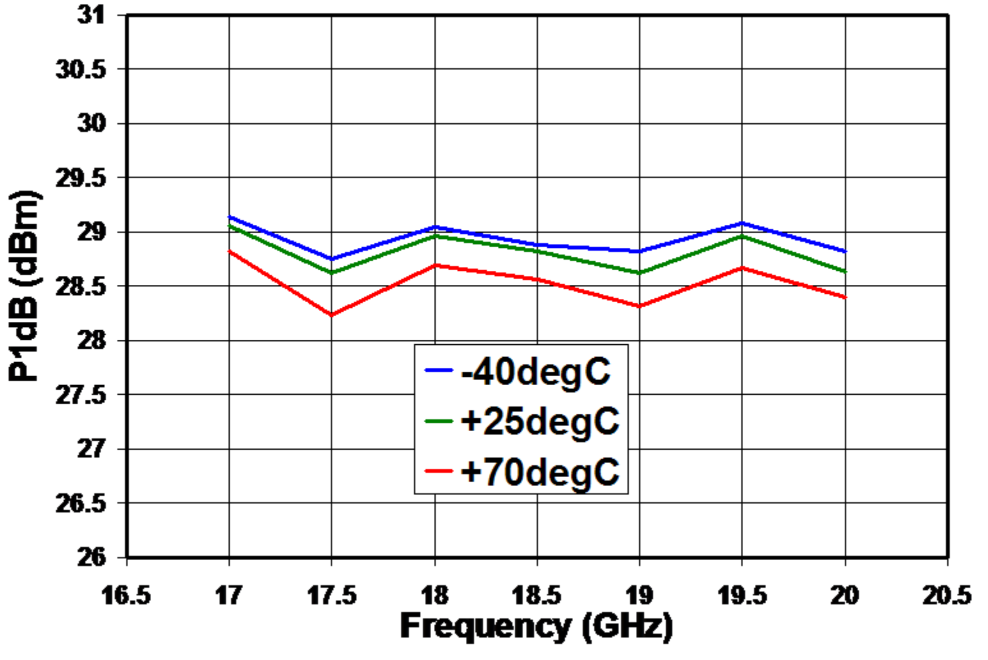


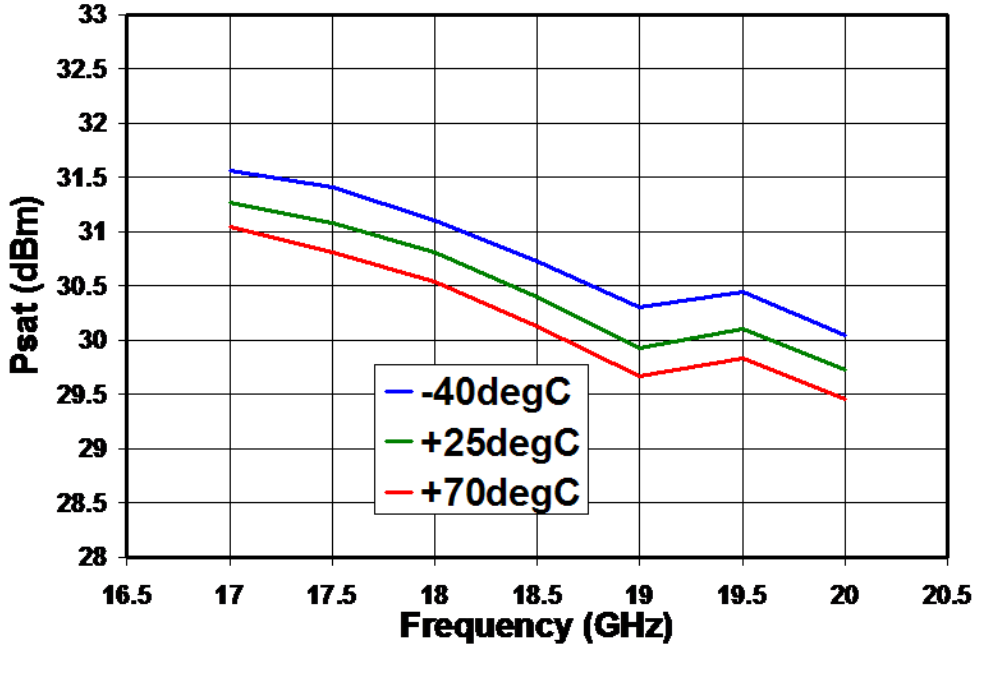




Measured Data - Evaluation Board
Data includes connector and board losses

Vd = 6V, Idq = 825mA
Vg = -0.5 V (typ.)





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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.

Compatible with high volume surface mount assembly processes using 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
TGA4530-SM	QFN 4x4 Surface Mount