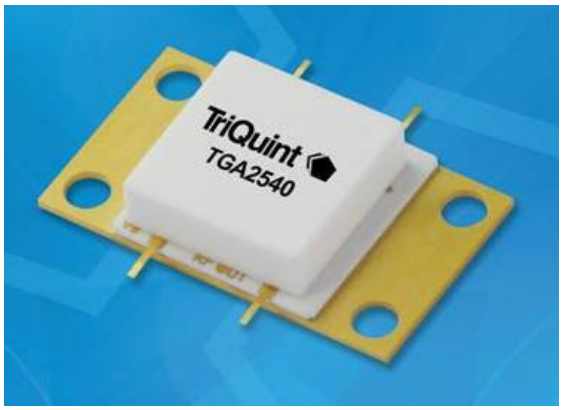
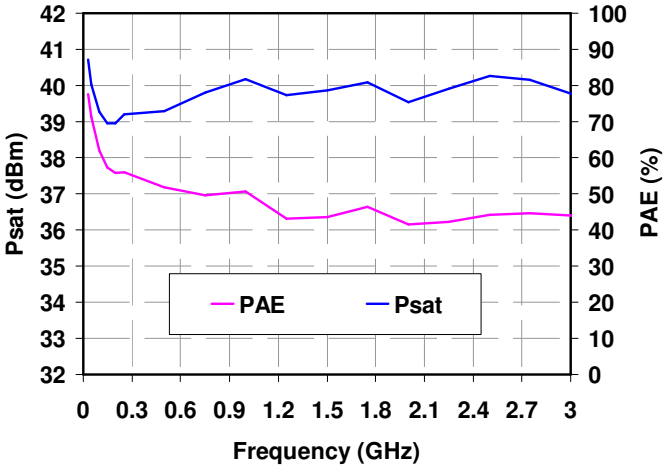
TGA2540-FL

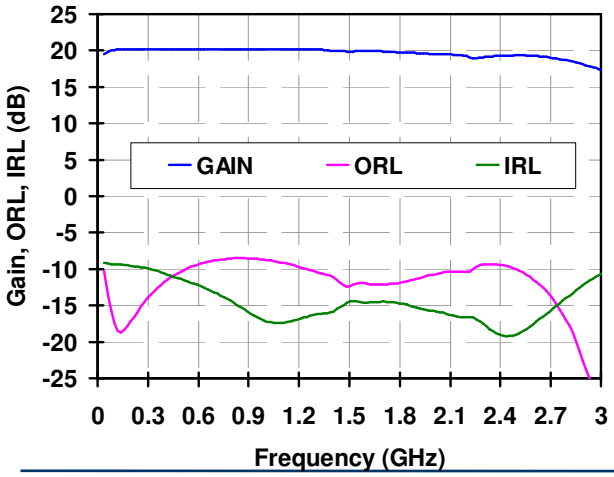
30 to 3000 MHz GaN Power Amplifier



Measured Performance

Bias conditions: Vd = 30 V, Idq = 360 mA, Vg = -3.32 V, Typical





Key Features

- Frequency Range: 30 to 3000 MHz
- Psat: 39.5 dBm, P1dB: 35 dBm
- PAE: >40%
- Small Signal Gain: 19.5 dB
- TOI: 43 dBm
- NF: 4 dB
- Bias: Vd = 30 V, Idq = 360 mA, Vg = -3.32 V Typical
- Package Dimensions: 25.15 x 14.48 x 4.85 mm

Primary Application

- Military Communication

Product Description

The TGA2540-FL Power Amplifier provides 19.5 dB of small signal gain and greater than 8 W of output power across 30 to 3000 MHz band. The TGA2540-FL is designed using TriQuint's standard 0.25-µm GaN HEMT production process.

The TGA2540-FL is available in a 4 lead flange mount package and is ideally suited for wideband communication transceivers.

Evaluation boards are available upon request.

Lead-free and RoHS compliant.

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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
Vd-Vg	Drain to Gate Voltage	65 V	
Vd	Drain Voltage	40 V	2/
Vg	Gate Voltage Range	-30 to 0 V	
Id	Drain Current	850 mA	2/
Ig	Gate Current Range	-2.4 to 1.5 mA	
Pin	Input Continuous Wave Power	28 dBm	2/
Tchannel	Channel Temperature	200 ℃	

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 1/	Value
Vd	Drain Voltage	30 V
Id	Drain Current	360 mA
Id_Drive	Drain Current under RF Drive	740 mA
Vg	Gate Voltage	-3.32 V

1/ See assembly diagram for bias instructions.

Table III
RF Characterization Table

Bias: Vd = 30 V, Idq = 360 mA, Vg = -3.32 V, Typical

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	NOMINAL	MAX	UNITS
Gain	Small Signal Gain	f = 30 - 3000 MHz	-	19.5	-	dB
IRL	Input Return Loss	f = 30 - 3000 MHz	-	12	-	dB
ORL	Output Return Loss	f = 30 - 3000 MHz	-	10	-	dB
Psat	Saturated Output Power	f = 30 - 3000 MHz	-	39.5	-	dBm
P1dB	Output Power @ 1dB Compression	f = 30 - 3000 MHz	-	35	-	dBm
TOI	Output TOI	f = 30 - 3000 MHz	-	43	-	dBm
NF	Noise Figure	f = 30 - 3000 MHz	-	4	-	dB

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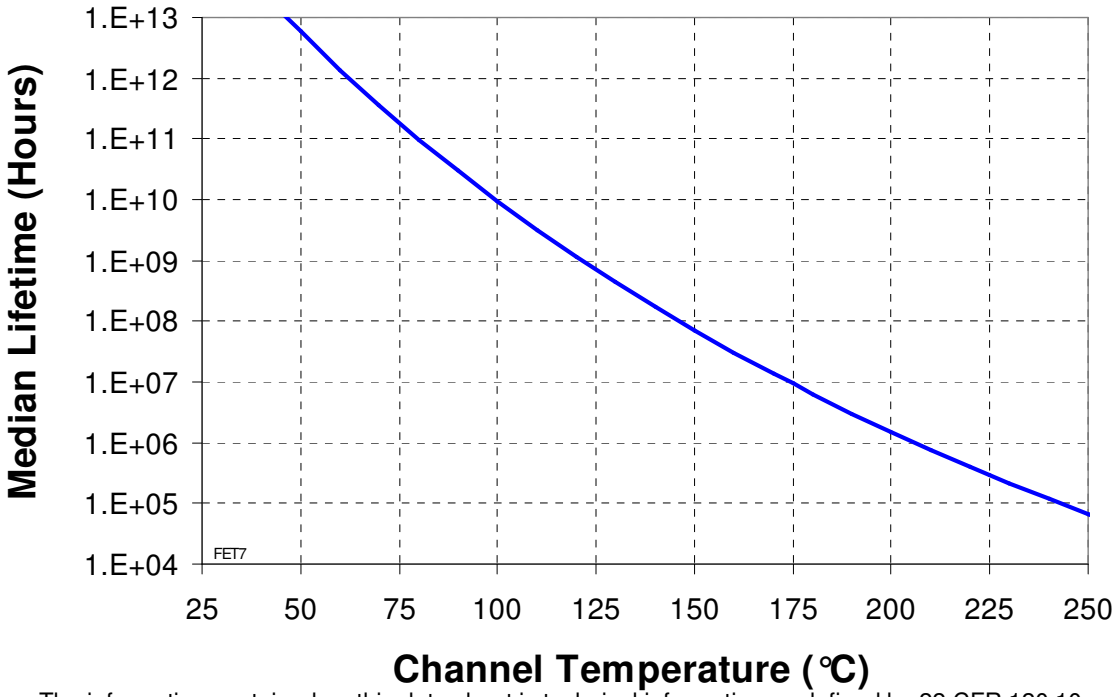
Table IV
Power Dissipation and Thermal Properties

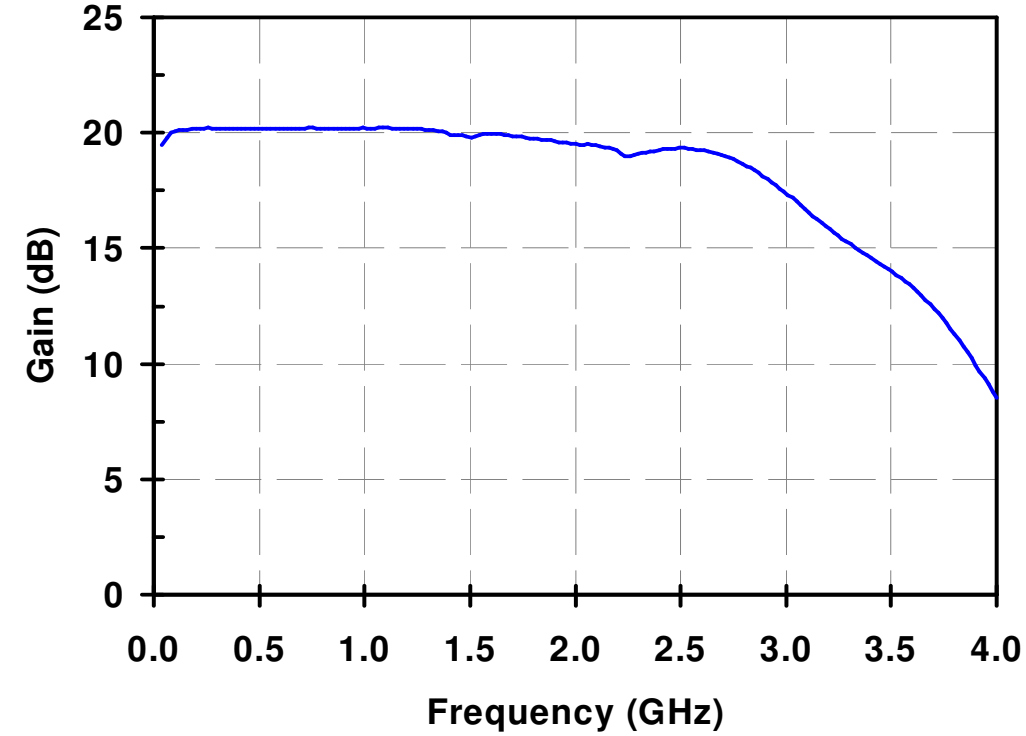
Parameter	Test Conditions	Value	Notes
Maximum Power Dissipation	Tbaseplate = 70 °C	Pd = 18.8 W Tchannel = 200 °C Tm = 1.3E+5 Hrs	
Thermal Resistance, θ_{JC}	Vd = 30 V Id = 360 mA Pd = 10.8 W Tbaseplate = 70 °C	θ_{JC} = 6.9 °C/W Tchannel = 145 °C Tm = 4.1E+6 Hrs	
Thermal Resistance, θ_{JC} Under RF Drive	Vd = 30 V Id = 740 mA Pout = 39.5 dBm Pd = 13.3 W Tbaseplate = 70 °C	θ_{JC} = 6.9 °C/W Tchannel = 162 °C Tm = 1.3E+6 Hrs	
Mounting Temperature	30 seconds	180 °C	
Storage Temperature		-65 to 150 °C	

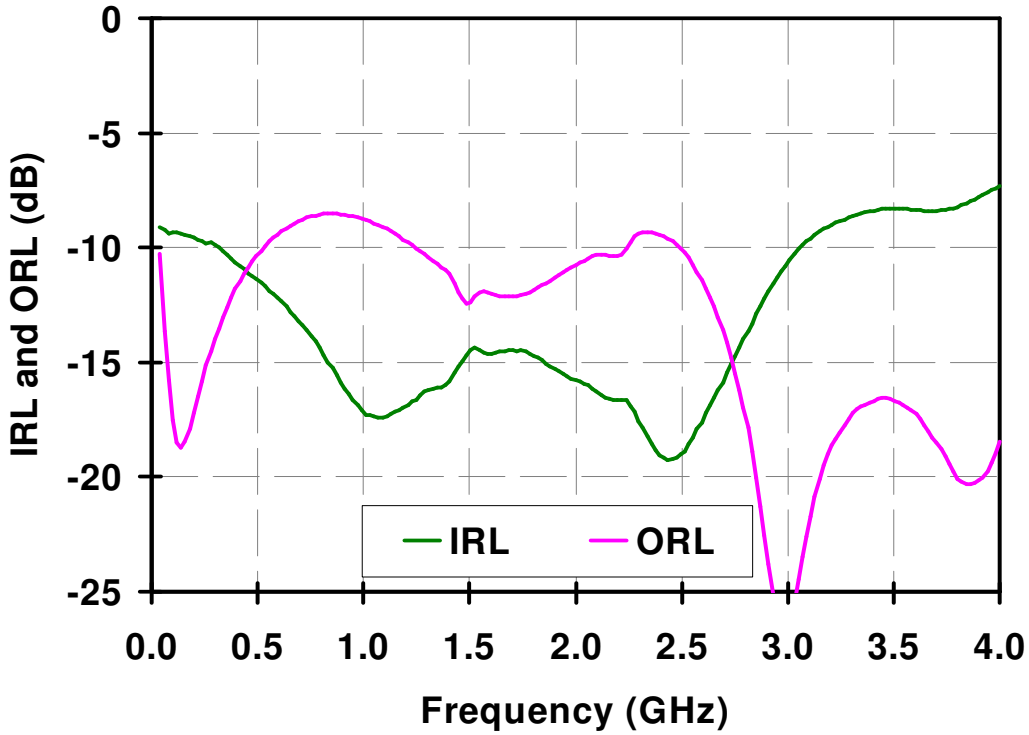
Median Lifetime vs Channel Temperature



Measured Data

Bias conditions: Vd = 30 V, Idq = 360 mA, Vg = -3.32 V, Typical





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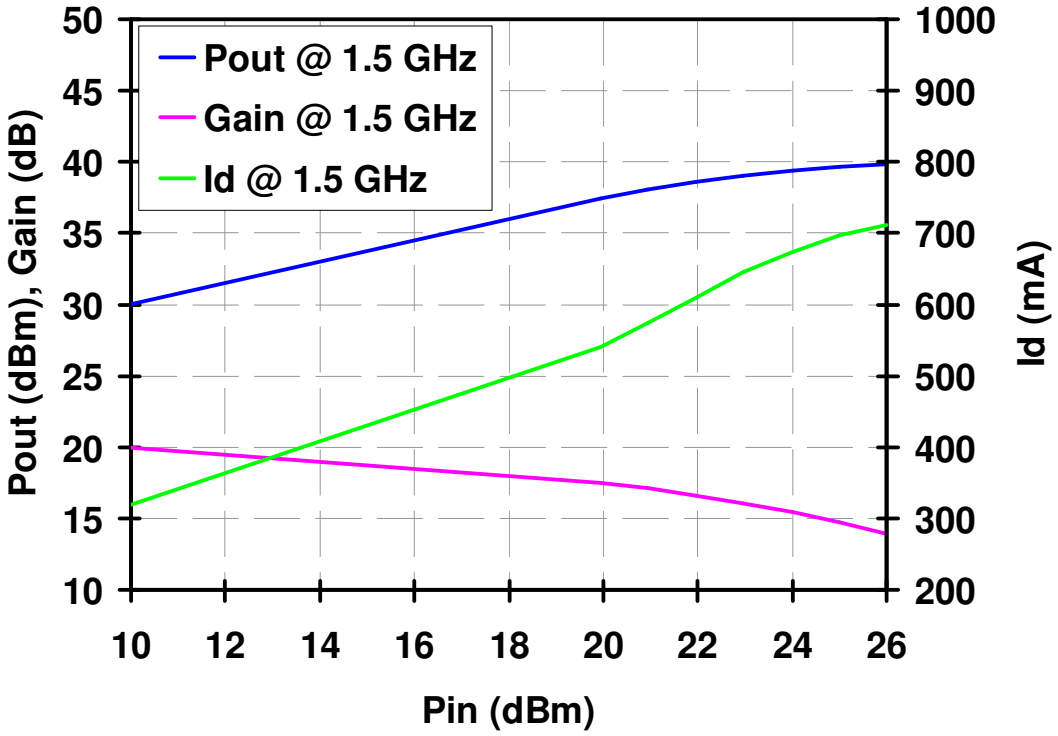

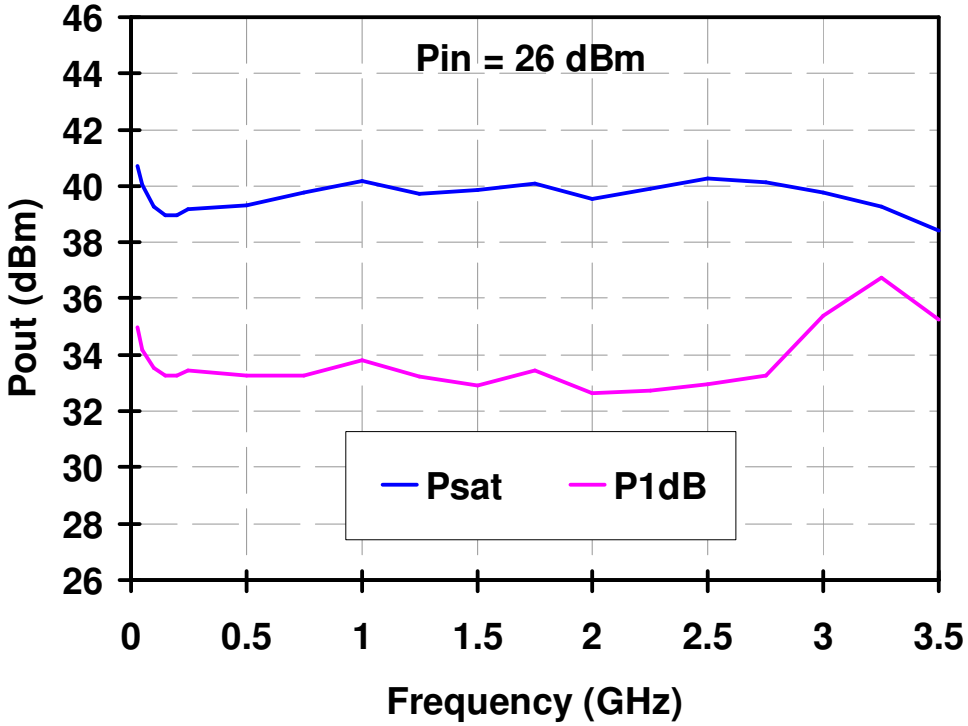

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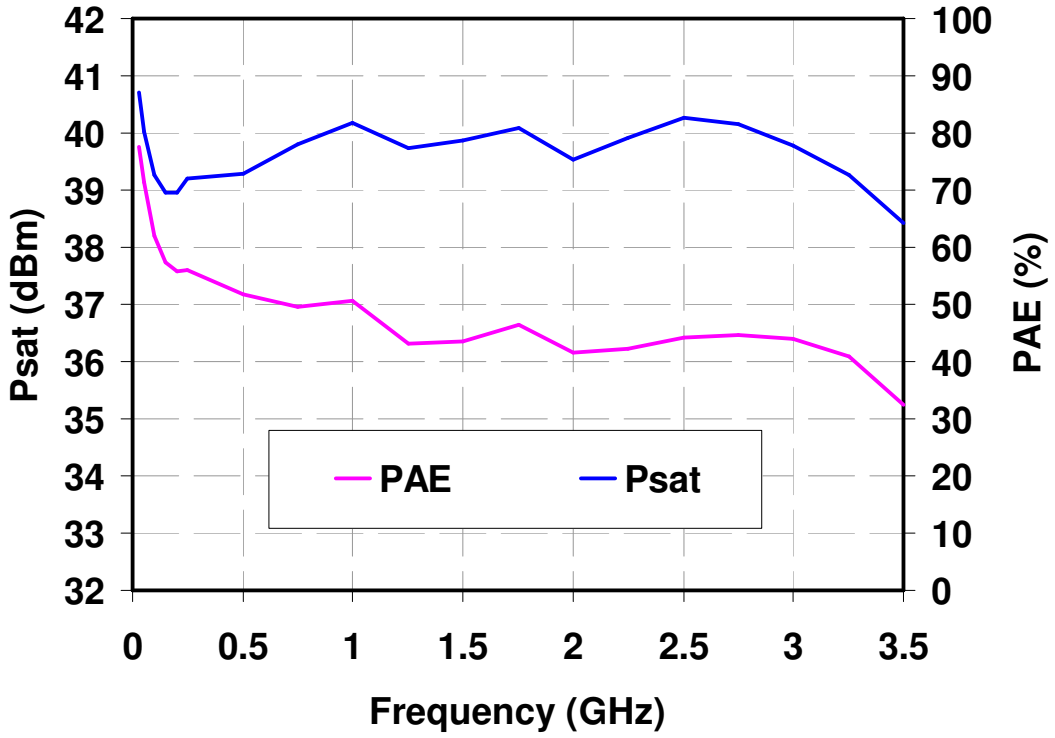
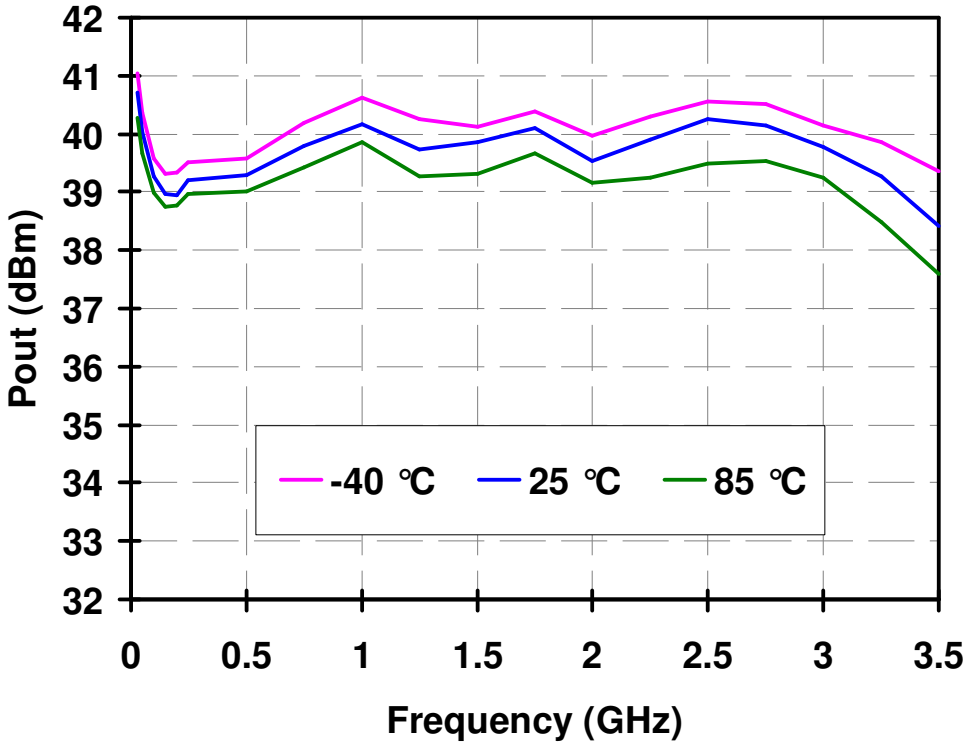
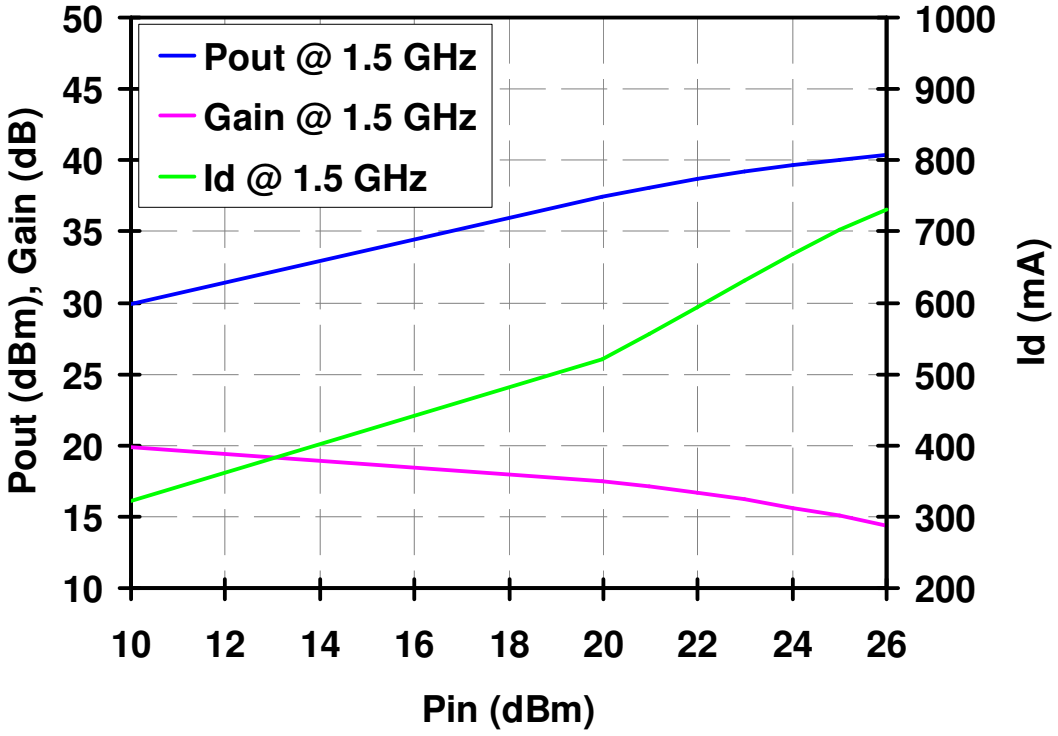
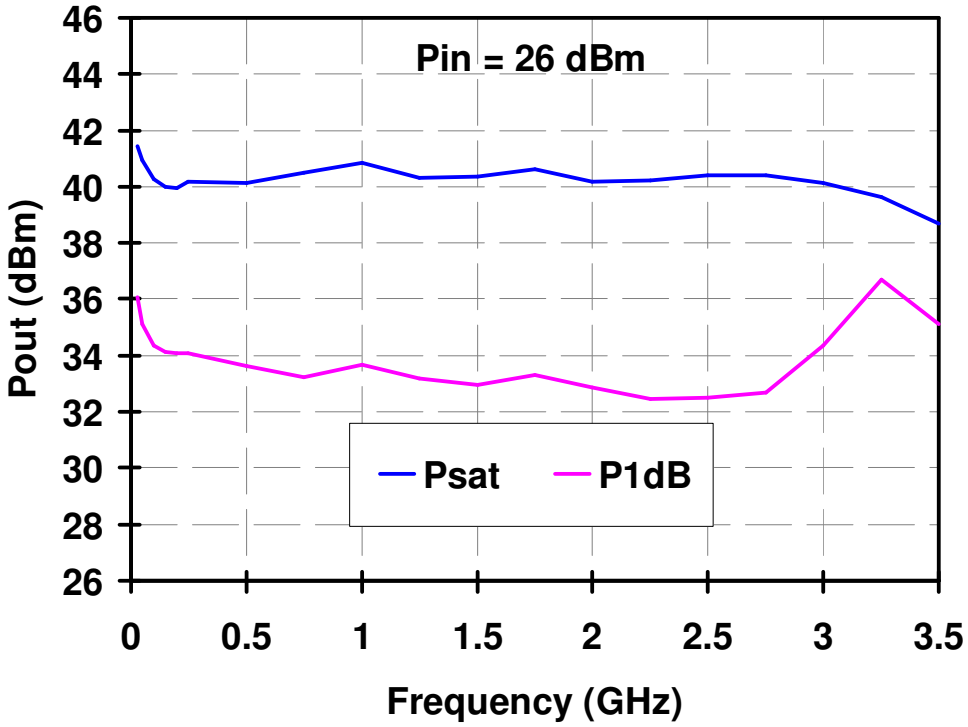




Measured Data

Bias conditions: Vd = 35 V, Idq = 360 mA, Vg = -3.35 V, Typical





Measured Data

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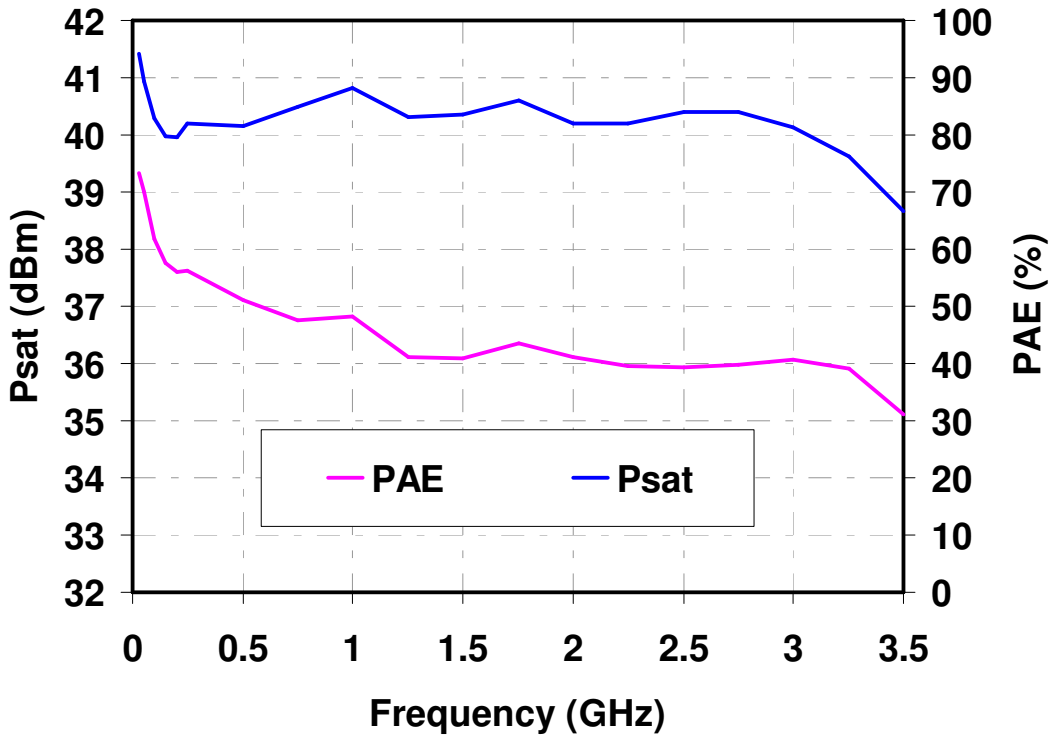

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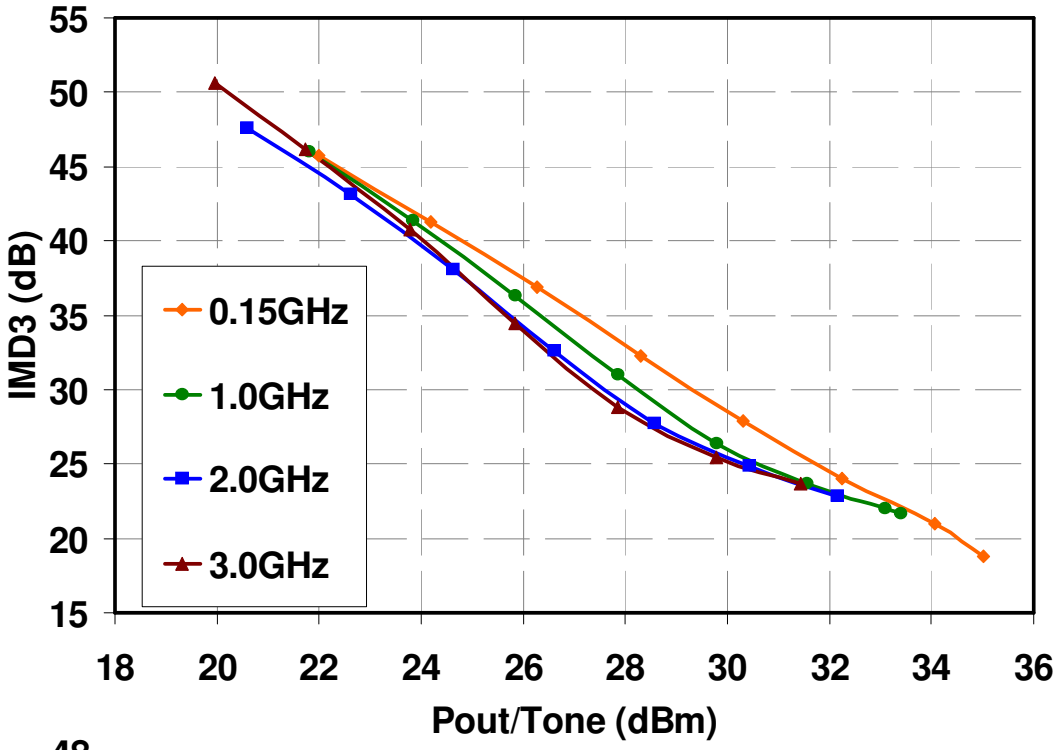

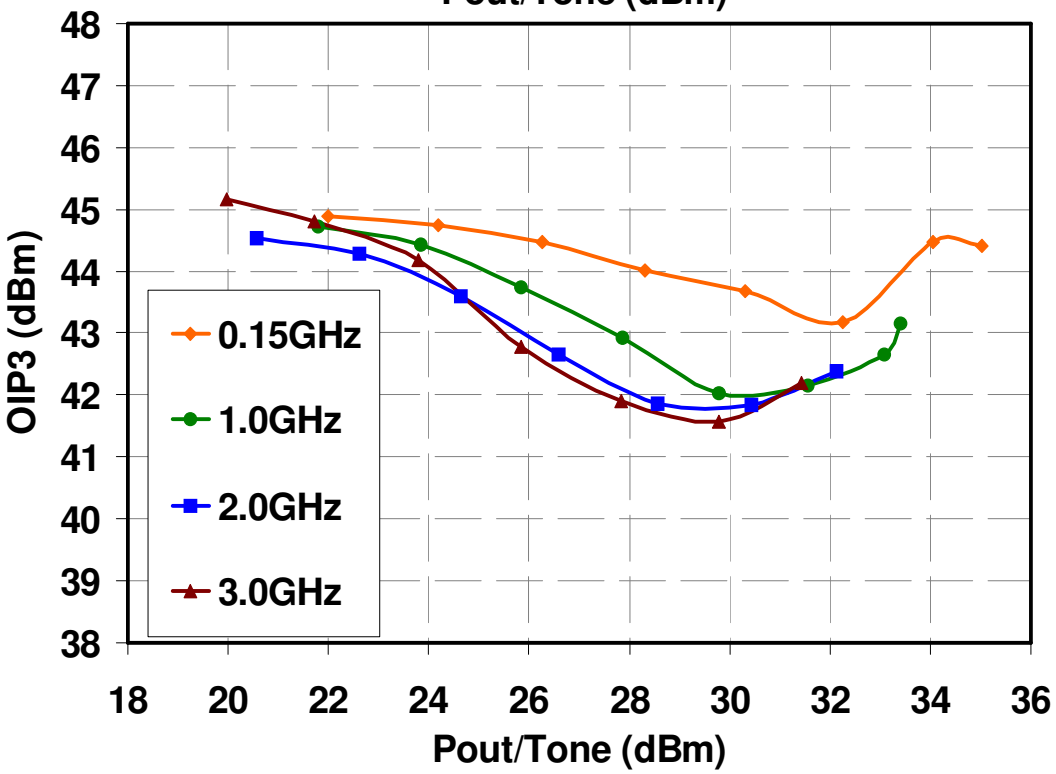

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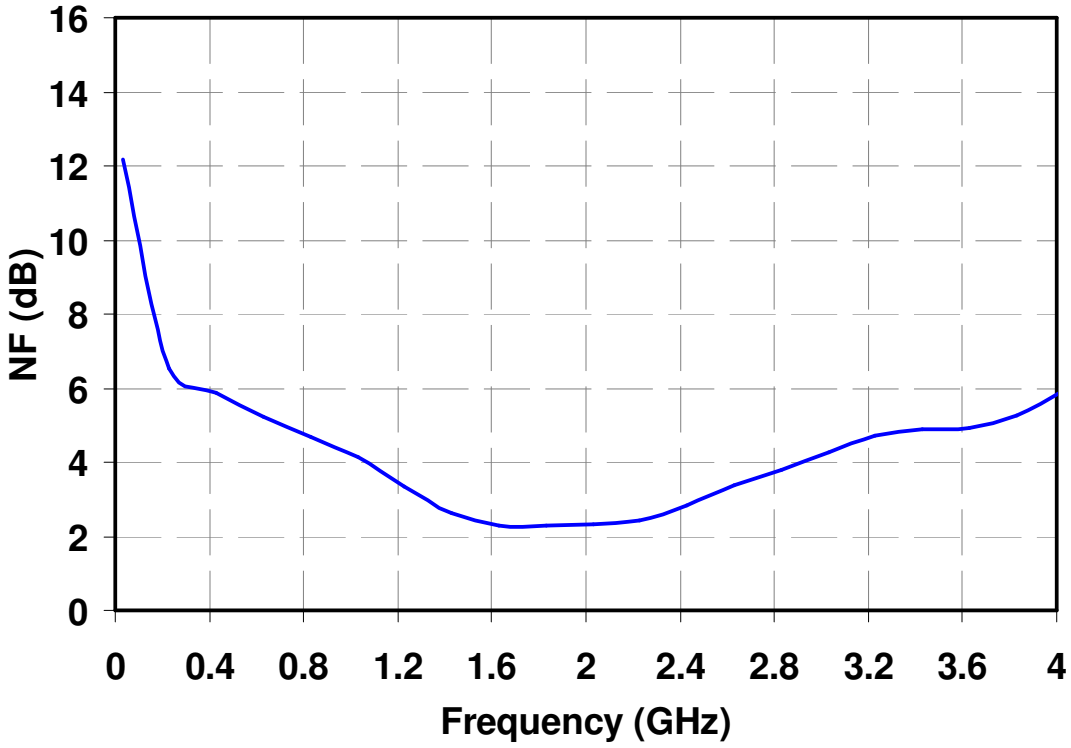
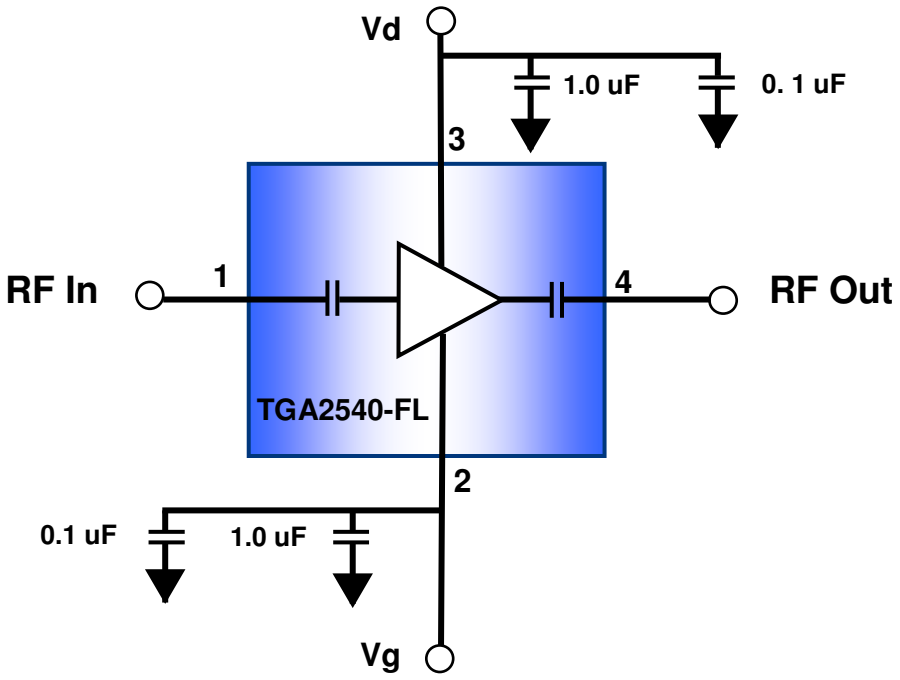


Electrical Schematic



Bias Procedures

Bias-up Procedure

Set Vg to -6.0 V

Set Vd to +30 V

Adjust Vg more positive until Id is 360 mA.
This will be Vg ~ -3.3 V

Apply RF signal to input

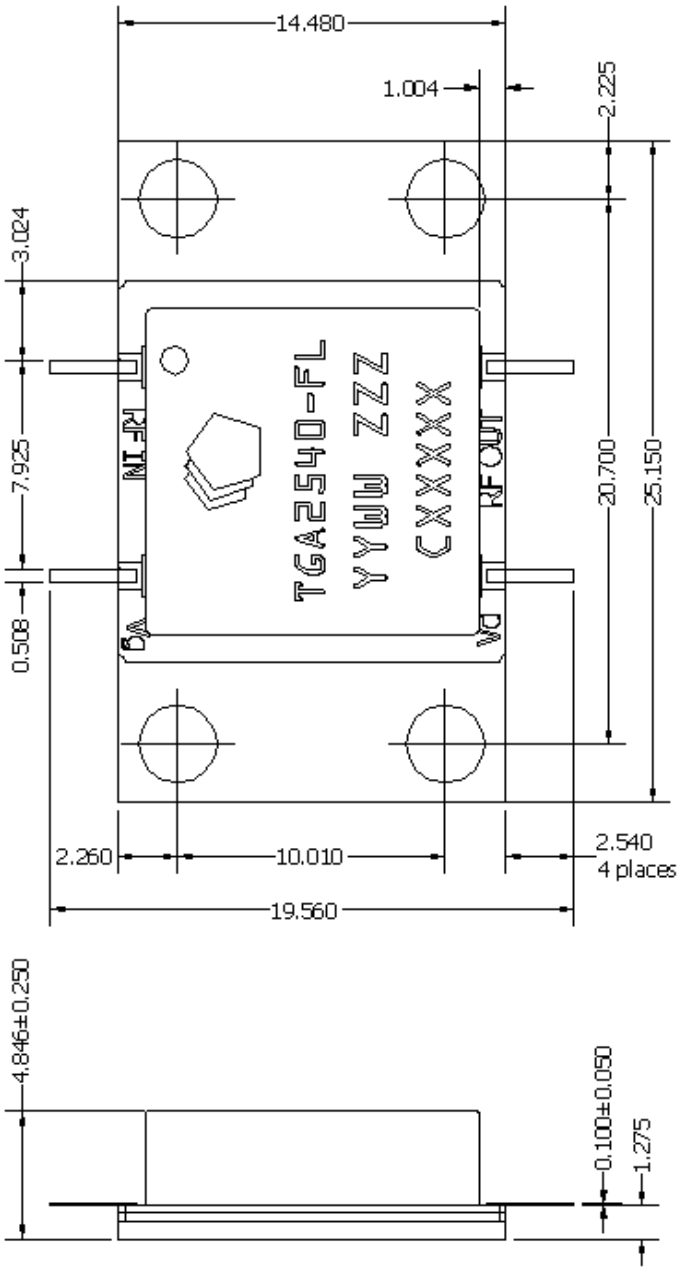
Bias-down Procedure

Turn off RF supply

Reduce Vg to -6.0V. Ensure Id ~ 0 mA

Turn Vd to 0 V

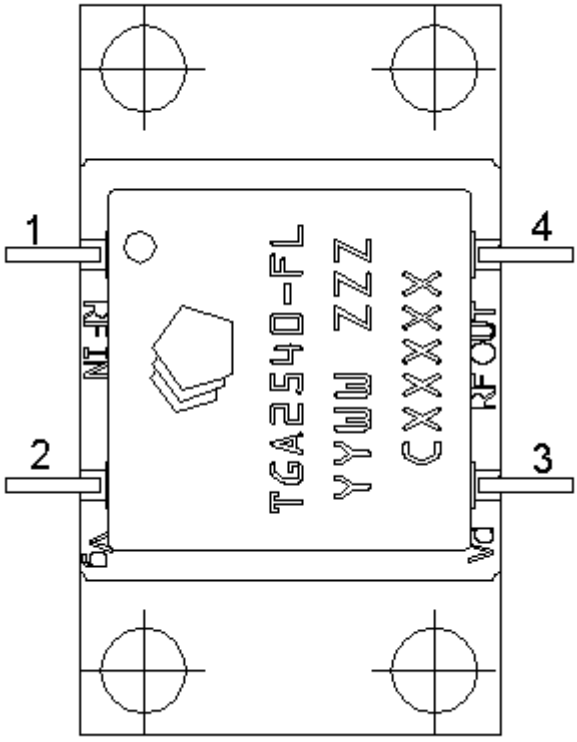
Mechanical Drawing



All dimensions are in mm.

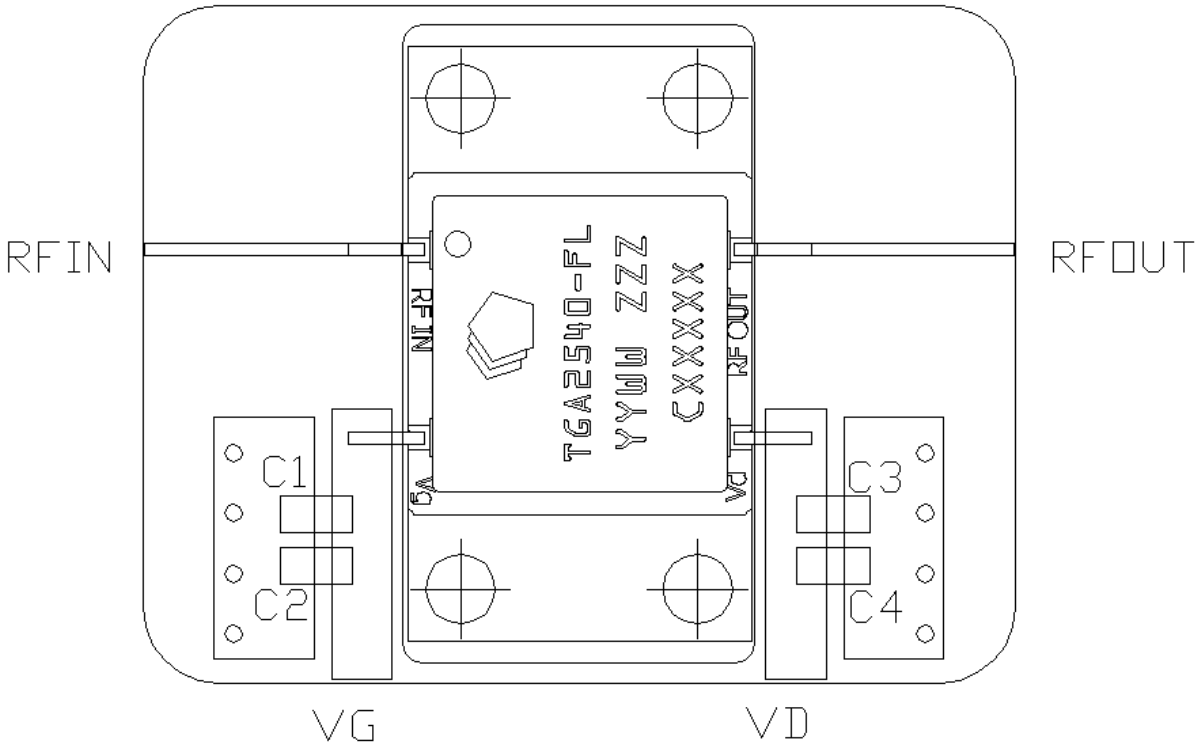
GaN MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Package Pin out



Pin 1	RF In
Pin 2	Vg
Pin 3	Vd
Pin 4	RF Out

Recommended Evaluation Board Layout



Board Material: Roger 4350; Thickness: 0.010 in.

Designators	Values
C1	1 uF
C2	0.1 uF
C3	1 uF/ 100 V
C4	0.1 uF/ 100 V

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Assembly of a TGA2540-FL Package

1. Clean the board or module with alcohol. Allow it to fully dry.
2. Nylock screws are recommended for mounting the TGA2540-FL to the board.
3. To improve the thermal and RF performance, we recommend a heat sink attached to the bottom of the TGA2540-FL and/or apply Indium alloy shim (80In/15Pb/ 5Ag) to the bottom of TGA2540-FL.
4. Apply solder to each pin of TGA2540-FL.
5. Clean the assembly with alcohol.

Ordering Information

Part	ECCN	Package Style
TGA2540-FL	XI(c)	Flange (Package bolted down)

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