ZHM 22G/1
SPECIAL MICROWAVE WIDEBAND AMPLIFIER DC - 22 GHz

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This is a medium power broadband amplifier for labs or testing purposes. This amplifier is excellent for SUHF band DC - 22 GHz. The gain is over 28 dB. The maximum power is 1.5 W. Minimum required driving power is only 1 mW. This amplifier is recommended for Space research, Mil applications, laser optics etc.

This is a medium power, super broadband RF amplifier that operates from DC to 22 GHz, ideal for broadband military platforms as well as commercial applications because it is robust and offers high power over an extremely large bandwidth with decent power added efficiency. It was designed for broad band jamming and communication systems platforms. It is packaged in a modular housing that is approximately 2.5" (width) by 3.25" (long) by 0.8" (height). This amplifier has a typical saturated output power of 5-10 watts at room temperature.

Noise figure at room temperature is 10.0 dB typical. It offers a typical gain of 50 dB with a typical gain flatness of ± 4.0 dB. The power and gain flatness across the band is very flat for the bandwidth. Input VSWR is 2.0:1 typical. This amplifier operates from -40C to +85C base plate temperature.

FOR US GOVERNMENT AGENCIES ONLY!

Typical Applications

- Telecom Infrastructure
- Microwave Radio & VSAT
- Military
- Space
- Test Instrumentation
- Fiber Optics

Features

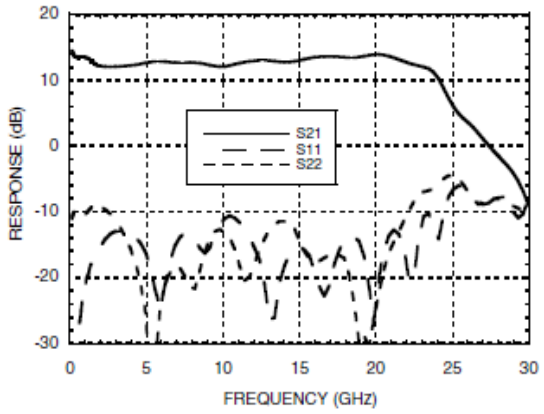
- High P1dB Output Power: 28 dBm
- High Psat Output Power: 29.5 dBm
- High Gain: 13.5 dB
- High Output IP 3: 39 dBm
- Supply Voltage: +10 V @ 400 mA
- 50 Ohm Matched Input/Output
- 32 Lead 5x5 mm SM T Package: 25 mm^2

Electrical Specifi cations, T_A = +25° C, Vdd= +10V, Vgg2= +3.5V, Idd= 400 mA*

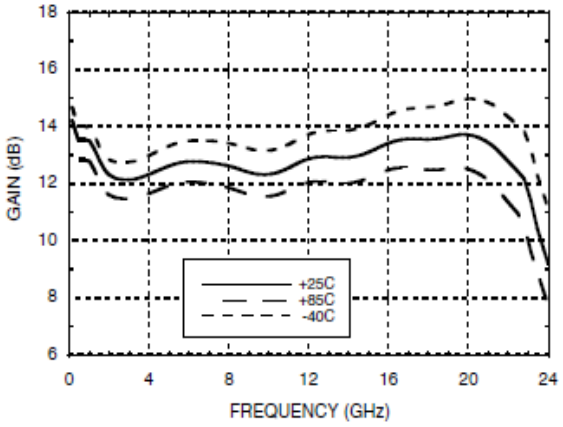
Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		DC - 12			12.0 - 18.0			18.0 - 22.0		GHz
Gain	11	12.5		11	13.5		11	13.5		dB
Gain Flatness		±0.7			±0.5			±0.5		dB
Gain Variation Over Temperature		0.012			0.008			0.008		dB/ °C
Input Return Loss		13			15			15		dB
Output Return Loss		12			16			13		dB
Output Power for 1 dB Compression (P1dB)	28	28		25	27		23.5	25.5		dBm
Saturated Output Power (Psat)		29.5			29			27		dBm
Output Third Order Intercept (IP3)		39			37			35		dBm
Noise Figure		3.5			4			6		dB
Supply Current (Idd) (Vdd= +12V, Vgg1= -0.8V Typ.)		400	440		400	440		400	440	mA

* Adjust Vgg1 between -2 to 0V to achieve Idd= 400 mA typical.

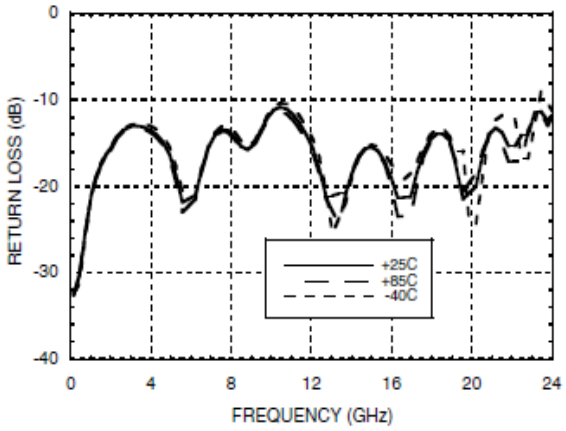
Gain & Return Loss



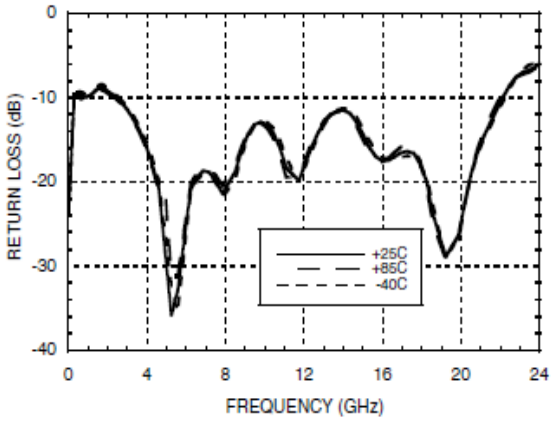
Gain vs. Temperature



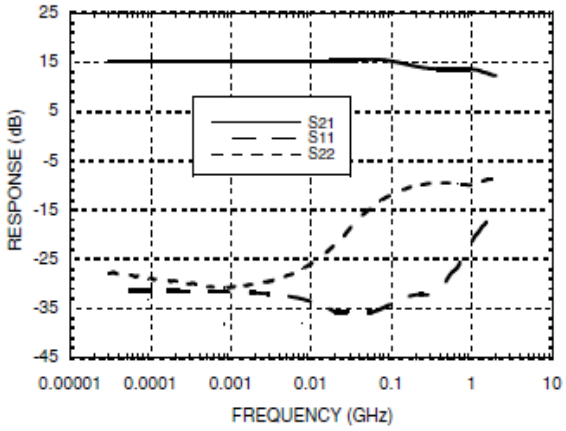
Input Return Loss vs. Temperature



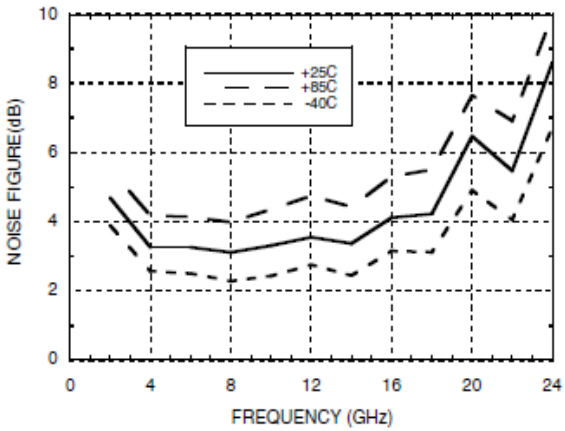
Output Return Loss vs. Temperature



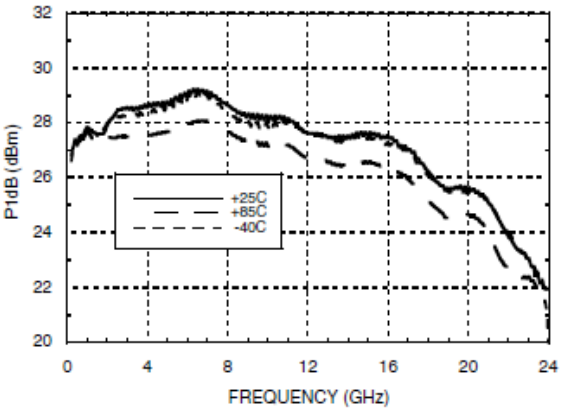
Low Frequency Gain & Return Loss



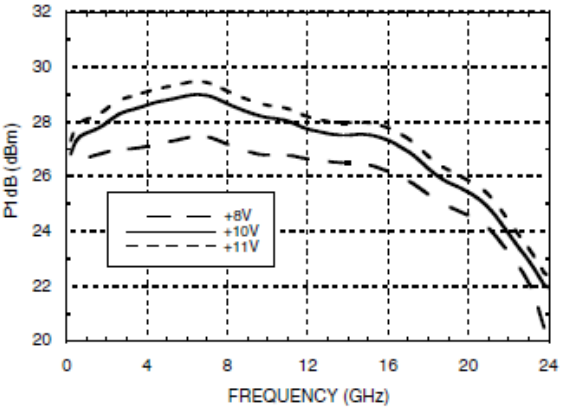
Noise Figure vs. Temperature



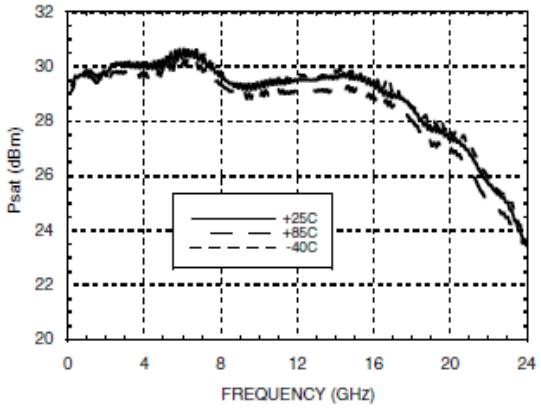
P1dB vs. Temperature



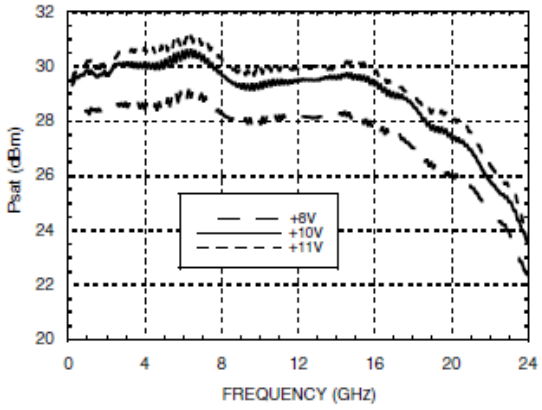
P1dB vs. Supply Voltage



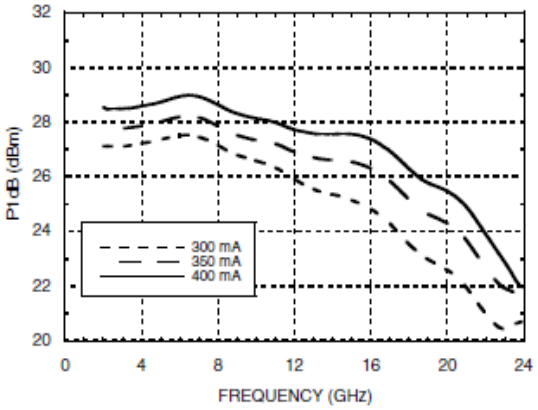
Psat vs. Temperature



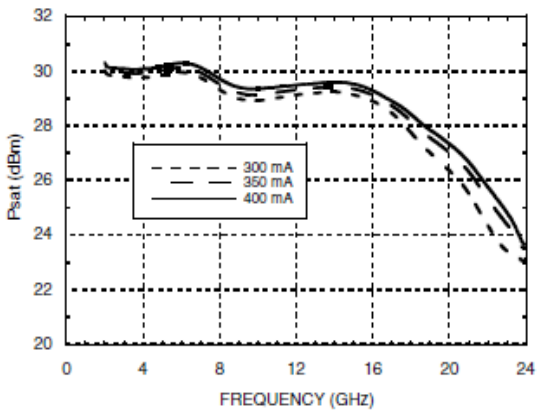
Psat vs. Supply Voltage



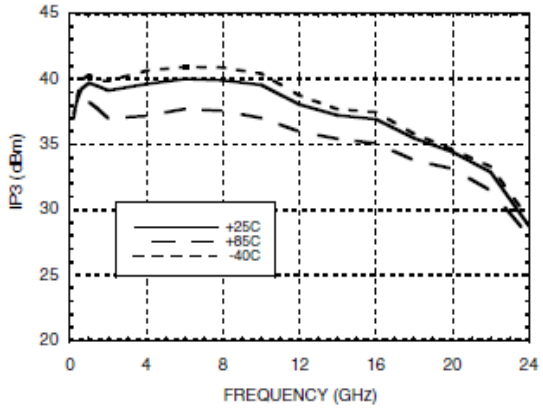
P1dB vs. Supply Current



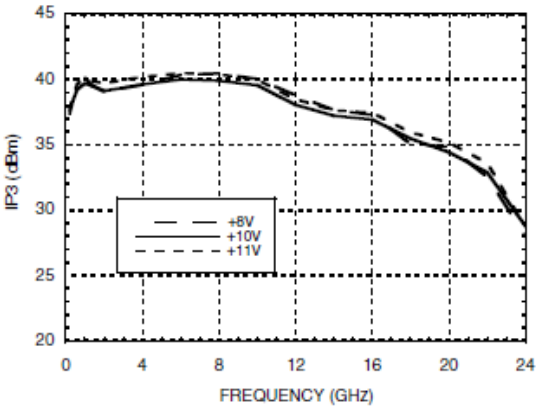
Psat vs. Supply Current



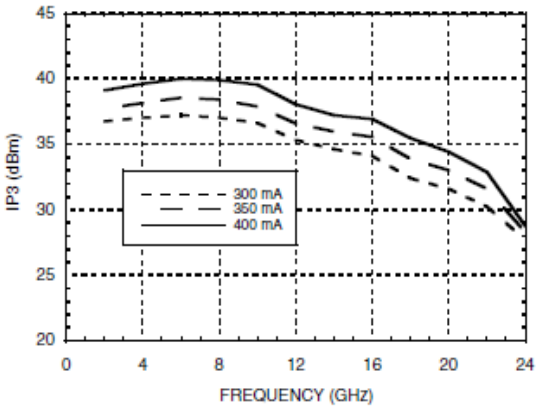
Output IP3 vs. Temperature @ Pout = 18 dBm / Tone



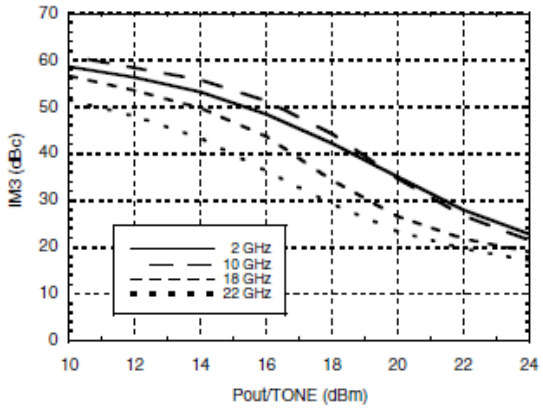
Output IP3 vs. Supply Voltage @ Pout = 18 dBm / Tone



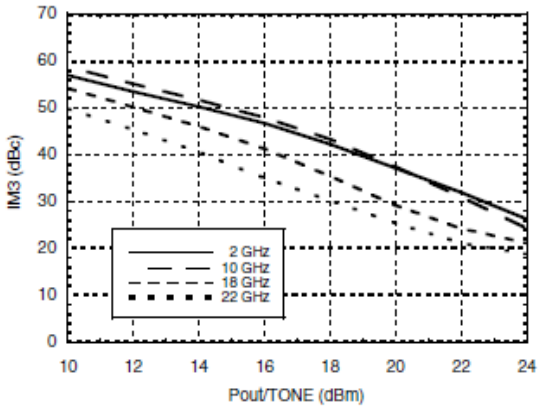
Output IP3 vs.
Supply Currents @ Pout = 18 dBm / Tone



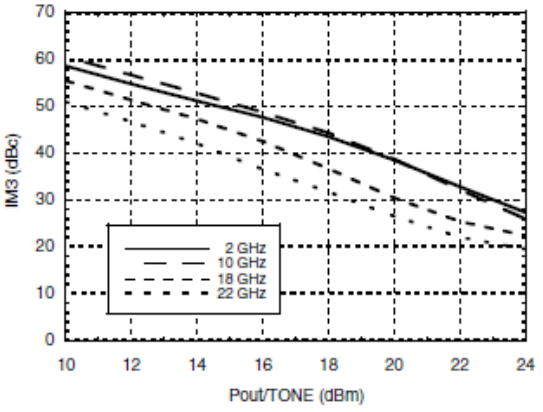
Output IM3 @ Vdd = +8V



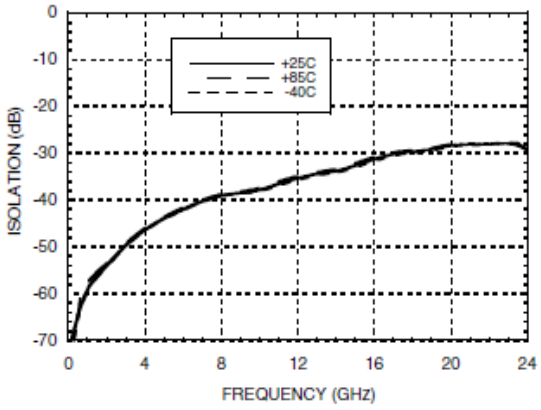
Output IM3 @ Vdd = +10V



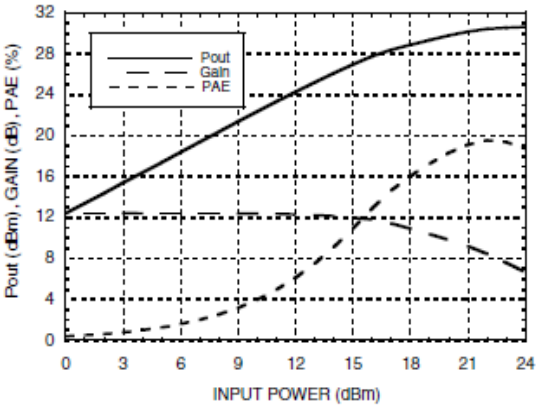
Output IM3 @ Vdd = +11V



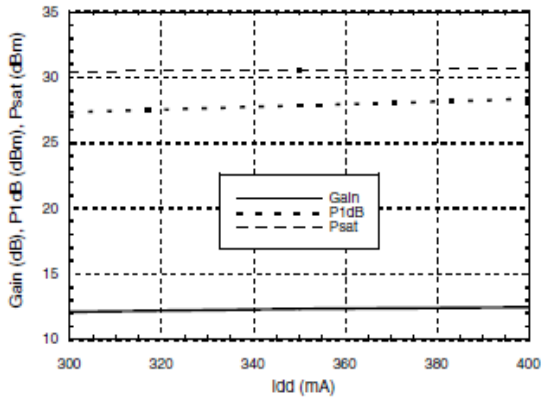
Reverse Isolation vs. Temperature



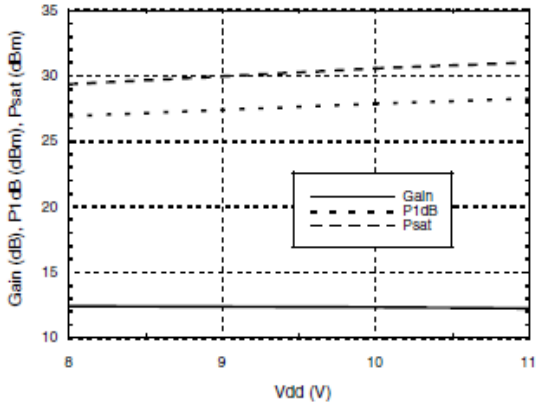
Power Compression @ 10 GHz



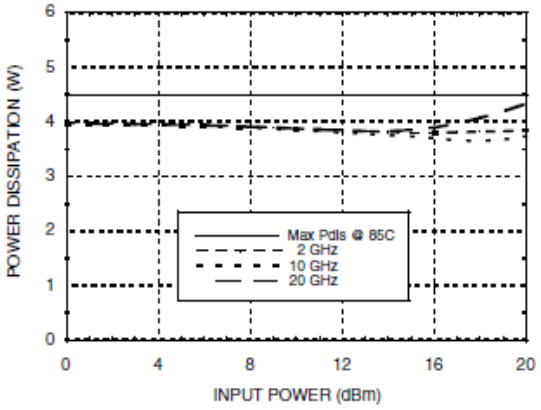
Gain & Power vs. Supply Current @ 10 GHz



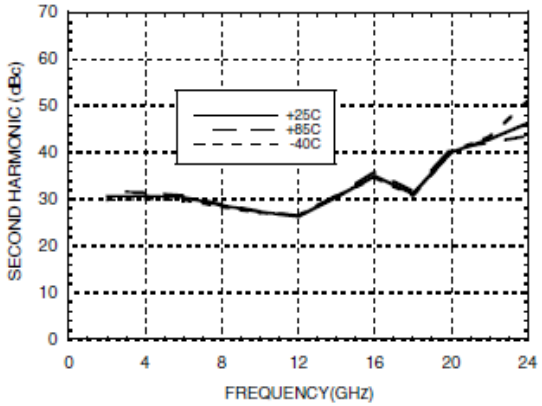
Gain & Power vs. Supply Voltage @ 10 GHz



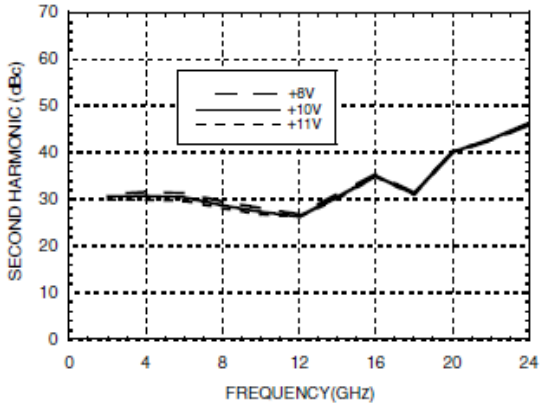
Power Dissipation



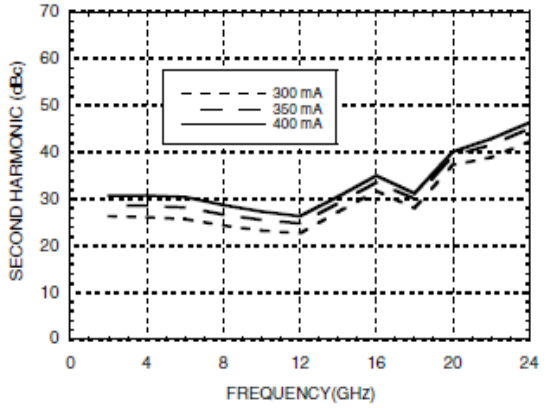
Second Harmonics vs. Temperature @ Pout = 18 dBm, Vdd = 10V & Vgg = 3.5V



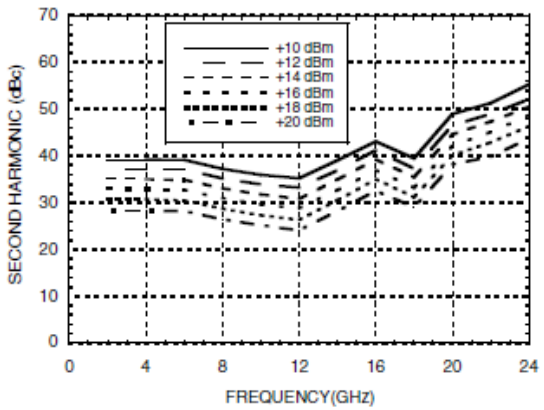
Second Harmonics vs. Vdd @ Pout = 18 dBm, Idd = 400 mA [1]



Second Harmonics vs.
Idd @ Pout = 18 dBm, Vgg2 = 3.5V



Second Harmonics vs. Pout
Vdd = 10V & Vgg = 3.5V & Idd = 400 mA



Absolute Maximum Ratings

Nominal Drain Supply to GND	12 Vdc
Gate Bias Voltage (Vgg1)	-3 to 0 Vdc
Gate Bias Current (Igg1)	< +10 mA
Gate Bias Voltage (Vgg2)	+2.0 V to (Vdd - 6.5 V)
Gate Bias Current (Igg2)	< +10 mA
Continuous Pdiss (T= 85 °C) (derate 69 mW/°C above 85 °C)	4.5 W
RF Input Power	27 dBm
Output Power into VSWR >7:1	+29 dBm
Storage Temperature	-65 to 150 °C
Max Peak Reflow Temperature	260 °C
ES D Sensitivity (HBM)	Class 1A

Reliability Information

Junction Temperature to Maintain 1 Million Hour MTTF	150 °C
Nominal Junction Temperature (T=85 °C, Vdd = 10 V)	144 °C
Thermal Resistance (channel to ground paddle)	14.6 °C/W
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vdd

Vdd (V)	Idd (mA
11.5	299
12.0	300
12.5	301