

## 1. General Description

The ARF1002 is a GaN-on-Sic Power Amplifier operating at DC-3.8GHz, power supply +50V operation, can provide 20dB Small Signal Gain, 44dBm P3dB.

## 2. Features

20 dB Small Signal Gain

44 dBm P3dB

54% Darin Efficiency@P3dB

50V Operating Voltage

6 Pin DFN Package

## 3. Applications

Base station

Microwave oven

Military radar

Civilian radar

Test instrumentation

Wideband or narrowband amplifiers

Jammers

## 4. Functional Block Diagram

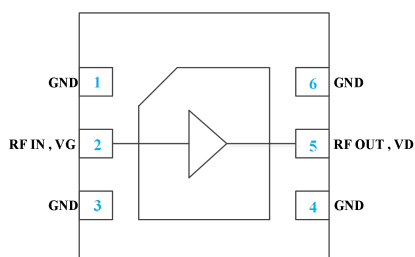


Figure1.

## 5. Order product model

ARF1002

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## 6. Specifications

### 6.1. Electrical Characteristics

Table1. Electrical Characteristics

Parameter	Test Conditions	Symbol	Min	Typ	Max	Units
Breakdown Voltage	$V_{GS} = -8\text{ V}, I_D = 3\text{ mA}$	$BV_{DG}$	150	-	-	V
Gate Threshold Voltage	$V_{DS} = 10\text{ V}, I_D = 3\text{ mA}$	$V_{GS(th)}$	-3.4	-2.9	-2.4	V
Gate Quiescent Voltage	$V_{DS} = 50\text{ V}, I_D = 36\text{ mA}$	$V_{GS(Q)}$	-	-2.85	-	V
Gate-Source Leakage Current	$V_{GS} = -5\text{ V}, V_{DS} = 10\text{ V}$	$I_{GSS}$	-	-2.5	-	uA

### 6.2. Handling Ratings

Table2. Handling Ratings

Symbol	Parameter	Min	Typ	Max	Units
$T_{STG}$	Storage temperature range	-65		+150	°C
$V_{ESD}$	Human body model (HBM)		250		V
	Charged device model (CDM)		500		V

### 6.3. Loadpull Performance

Test conditions unless otherwise noted:  $V_D = +50\text{ V}, I_{DQ} = 36\text{ mA}, \text{Temp} = +25\text{ °C}$ .

Table3. Efficiency Tuned

Frequency (MHz)	Source Impedance ( $\Omega$ )	Load Impedance ( $\Omega$ )	P3dB (dBm)	Drain Efficiency (%)	Linear Gain (dB)
2600	$3.3-j*17.3$	$21.0+j*33.7$	43.8	74	20.4

Table4. Power Tuned

Frequency (MHz)	Source Impedance ( $\Omega$ )	Load Impedance ( $\Omega$ )	P3dB (dBm)	Drain Efficiency (%)	Linear Gain (dB)
2600	$3.3-j*17.1$	$27.2+j*21.7$	44.6	66.7	19.2

### 6.4. Loadpull Smith Charts

Test conditions unless otherwise noted:  $V_D = +50\text{ V}$ ,  $I_{DQ} = 36\text{ mA}$ , Pulse Width = 100 us, Duty Cycle = 10%, Temp = +25 °C.

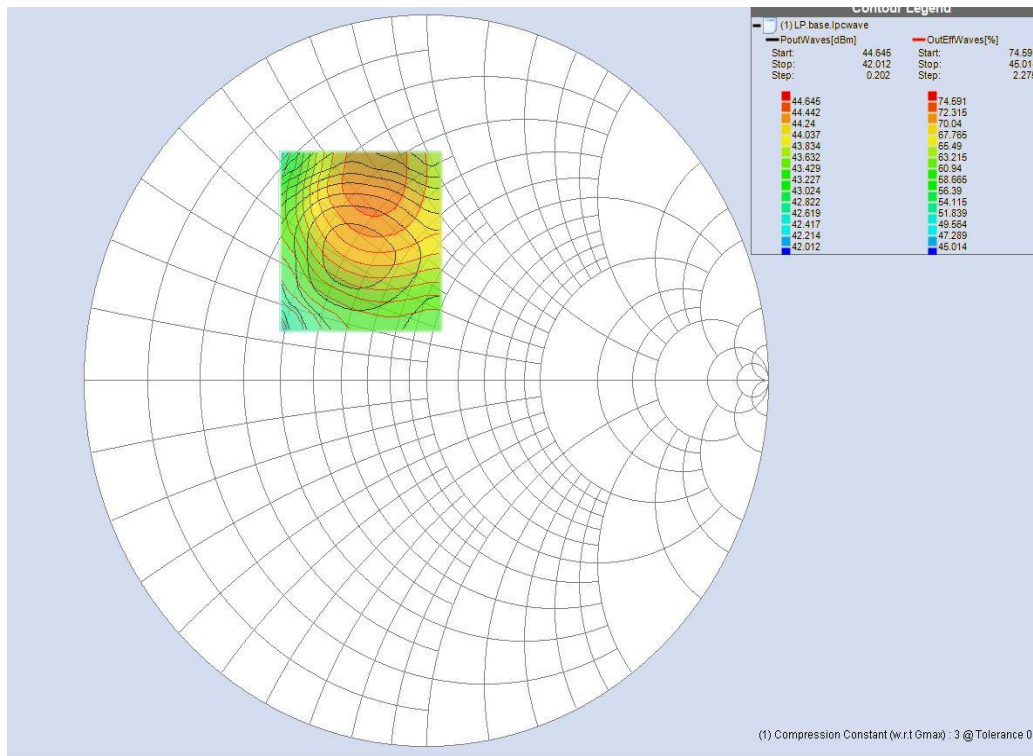


Figure2.

Table5. Absolute Maximum Ratings

### 7. Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Parameter	Min	Typ	Max	Units
Gate Voltage Range	-10		1.3	V
Operating Drain Voltage Rang	25		55	V
Max Drain Current		1.7		A
Operating Environment Temp Range	-40		85	°C
Case Operating Temperature		130		°C
Operating Junction Temperature		225		°C

### 8. Pin Assignments and Description

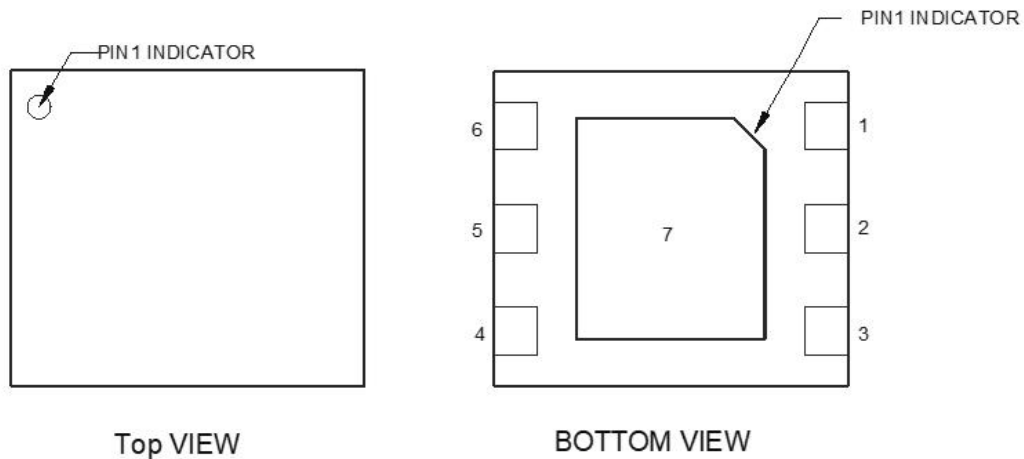


Figure3. Pin Assignments

Table6. Description

Pin No.	Mnemonic	Description
1	NC	NC
2	RF IN, Vg	RF Input, Gate Bias
3	NC	NC
4	NC	NC
5	RF Out, Vd	RF Output, Drain Bias
6	NC	NC
7(Back Paddle)	GND	RF and DC Ground

## 9. Package Marking and Outline Dimensions

- 1) All dimensions are in millimeters.
- 2) 6Pin DFN Package.
- 3) Marking: Part number -1002  
Lot code - XXXX
- 4) Coplanarity applies to the exposed heat sink slug as well as the terminals.
- 5) The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

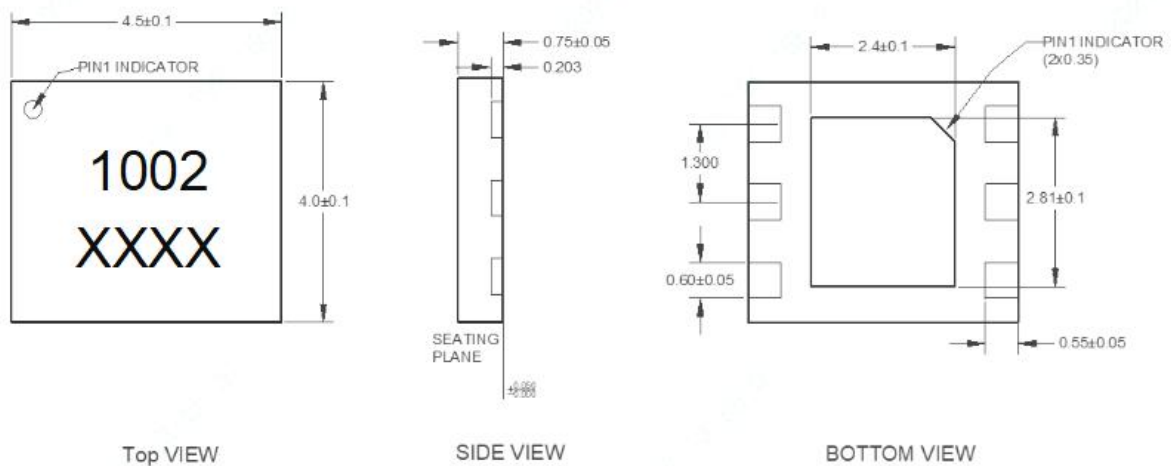


Figure4. Package Marking and Outline Dimensions

## 10. Notice

### 10.1. Operating protection condition



Devices and circuit boards may be undetected. Although this product has an ESD protection circuit, the device may be damaged when encountering high energy ESD. Therefore, appropriate ESD prevention measures should be taken to avoid deterioration of device performance or loss of function.

### 10.2. Operate attention

1. Must be placed in a container with electrostatic protection function, dry environment, conditions permit the best storage nitrogen environment.
2. Please strictly comply with the ESD protection requirements to avoid electrostatic damage.
3. Use vacuum clamps or tweezers to avoid tools or fingers touching the product surface.

### 10.3. Solderability

Compatible with lead-free (260 °C maximum reflow temperature) soldering processes.

### 10.4. RoHS Compliance

This product is compliant with the EU RoHs2.0, EU Directive 2015/863.

### 10.5. Contact Information

Telephone: 65-31580333 / 65-80673575

Email: [sales@arf-semi.com](mailto:sales@arf-semi.com)

Website: [www.arf-semi.com](http://www.arf-semi.com)

Address: 3E Gambas Crescent Singapore 757033

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