

## 1. General Description

The ARF1102 is a GaN-on-SiC Power Amplifier operating at 2.5-2.7GHz, power supply +50V operation.

## 2. Features

Carrier Output Power (P3dB): 50W

Carrier Linear Gain: 21dB

Carrier DE (P3dB): 76 %

Peaker Output Power (P3dB): 75W

Peaker Linear Gain: 21.5 dB

Peaker DE (P3dB): 76 %

## 3. Applications

Base station

5G Massive MIMO

WCDMA / LTE

Microcell Base Station

Asymmetric Doherty Applications

Civilian radar

Test instrumentation

## 4. Functional Block Diagram

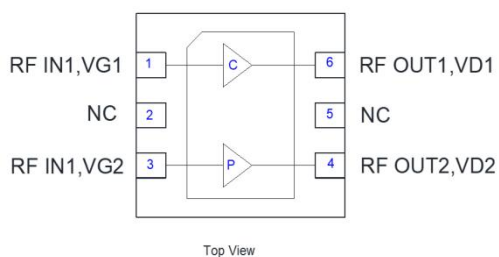


Figure1.

## 5. Order product model

ARF1102

## Directory

1. General Description .....	1
2. Features .....	1
3. Applications .....	1
4. Functional Block Diagram .....	1
5. Order product model .....	1
6. Specifications .....	3
6.1. Electrical Characteristics .....	3
6.2. Handling Ratings .....	3
6.3. Carrier Loadpull Performance .....	3
6.4. Carrier Loadpull Smith Charts .....	4
6.5. Peaker Loadpull Performance .....	5
6.6. Peaker Loadpull Smith Charts .....	5
7. Absolute Maximum Ratings .....	6
8. Pin Assignments and Description .....	7
9. Package Marking and Outline Dimensions .....	8
10. Notice .....	9
10.1. Operating protection condition .....	9
10.2. Operate attention .....	9
10.3. Solderability .....	9
10.4. RoHS Compliance .....	9
10.5. Contact Information .....	9
Important Notices and disclaimers .....	10

## 6. Specifications

### 6.1. Electrical Characteristics

Table1. Electrical Characteristics

Parameter	Test Conditions	Symbol	Min	Typ	Max	Units
Breakdown Voltage (main) (peak)	$V_{GS} = -8\text{ V}, I_D = 3\text{ mA}$	$BV_{DG}$	V	150	-	-
	$V_{GS} = -8\text{ V}, I_D = 6\text{ mA}$	$BV_{DG}$	V	150	-	-
Gate Threshold Voltage (main) (peak)	$V_{DS} = 10\text{ V}, I_D = 3\text{ mA}$	$V_{GS(th)}$	V	-3.4	-2.9	-2.4
	$V_{DS} = 10\text{ V}, I_D = 6\text{ mA}$	$V_{GS(th)}$	V	-3.4	-2.9	-2.4
Gate Quiescent Voltage	$V_{DS} = 50\text{ V}, I_D = 65\text{ mA}$	$V_{GS(Q)}$	V	-	-2.9	-
Gate-Source Leakage Current (main) (peak)	$V_{GS} = -5\text{ V}, V_{DS} = 10\text{ V}$	$I_{GSS}$	-	-3.1	-	uA
	$V_{GS} = -5\text{ V}, V_{DS} = 10\text{ V}$	$I_{GSS}$	-	-6.3	-	uA

### 6.2. Handling Ratings

Table2. Handling Ratings

Symbol	Parameter	Min	Typ	Max	Units
$T_{STG}$	Storage temperature range	-65		+150	°C
	MSL		Level 1		
$V_{ESD}$	Human body model (HBM)		>250		V
	Charged device model (CDM)		>500		V

### 6.3. Carrier Loadpull Performance

Test conditions:  $V_D = +50\text{ V}$ ,  $I_{DQ} = 65\text{ mA}$ , Pulsed (10% Duty Cycle, 100  $\mu\text{s}$  Width), Temp = +25 °C.

Table3. Carrier Power Tuned

Frequency (MHz)	Source Impedance ( $\Omega$ )	Load Impedance ( $\Omega$ )	P3dB (dBm)	Drain Efficiency (%)	Linear Gain (dB)
2500	20.1-j19.3	9.4-j6.3	47.5	69.5	20.5
2600	27.8-j1.3	8.7-j8.9	47.3	70.0	20.8
2700	17.9+j0.8	8.3-j8.9	47.3	70.0	19.5

Table4. Carrier Efficiency Tuned

Frequency (MHz)	Source Impedance ( $\Omega$ )	Load Impedance ( $\Omega$ )	P3dB (dBm)	Drain Efficiency (%)	Linear Gain (dB)
2500	26.3-j15.0	7.8+j0.6	46.7	75.0	21.0
2600	16.3-j4.1	7.1-j1.1	46.4	75.8	21.5
2700	13.3-j1.8	6.6-j1.36	46.1	76.9	20.2

### 6.4. Carrier Loadpull Smith Charts

Test conditions :  $V_D = +50$  V,  $I_{DQ} = 65$  mA, Pulsed (10% Duty Cycle, 100  $\mu$ s Width), Temp = +25 °C.

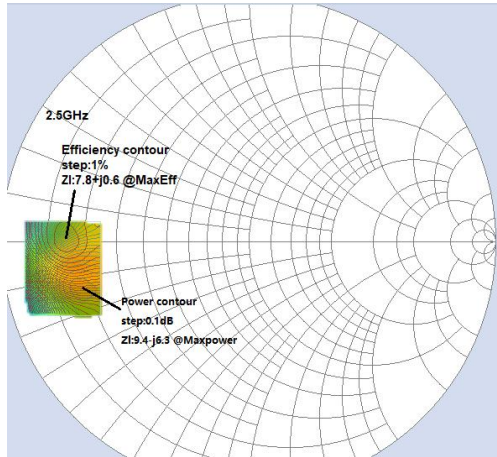


Figure2. 2.5GHz

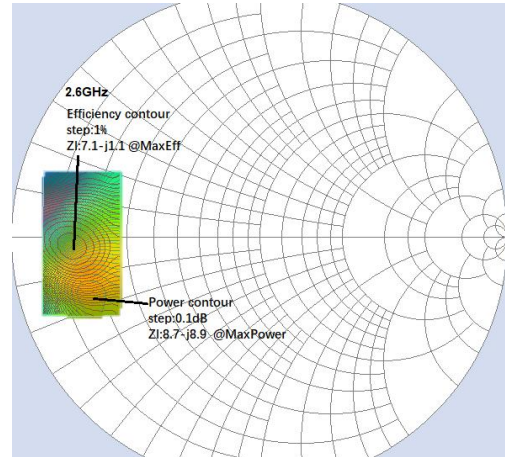


Figure3. 2.6GHz

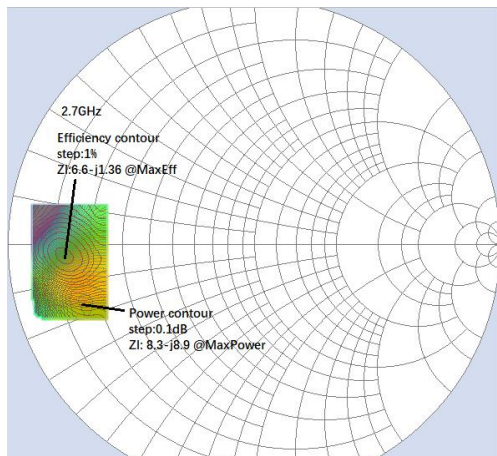


Figure4. 2.7GHz

### 6.5. Peaker Loadpull Performance

Test conditions:  $V_D = +50\text{ V}$ ,  $I_{DQ} = 105\text{ mA}$ , Pulsed (10% Duty Cycle, 100  $\mu\text{s}$  Width), Temp = +25 °C.

Table5. Peaker Power Tuned

Frequency (MHz)	Source Impedance ( $\Omega$ )	Load Impedance ( $\Omega$ )	P3dB (dBm)	Drain Efficiency (%)	Linear Gain (dB)
2500	20.5-j3.2	6.7-j5.5	48.5	66.0	19.5
2600	11.2+j0.8	6.5-j6.3	48.7	69.4	19.8
2700	6.3-j2.5	6.6-j8.1	48.4	65.0	19.0

Table6. Peaker Efficiency Tuned

Frequency (MHz)	Source Impedance ( $\Omega$ )	Load Impedance ( $\Omega$ )	P3dB (dBm)	Drain Efficiency (%)	Linear Gain (dB)
2500	15.9+j1.6	4.6-j0.1	47.4	74.9	20.6
2600	8.0+j2.1	4.4-j1.3	47.4	76.3	20.6
2700	4.5-j3.6	4.0-j2.0	46.4	76.0	20.0

### 6.6. Peaker Loadpull Smith Charts

Test conditions:  $V_D = +50\text{ V}$ ,  $I_{DQ} = 65\text{ mA}$ , Pulsed (10% Duty Cycle, 100  $\mu\text{s}$  Width), Temp = +25 °C.

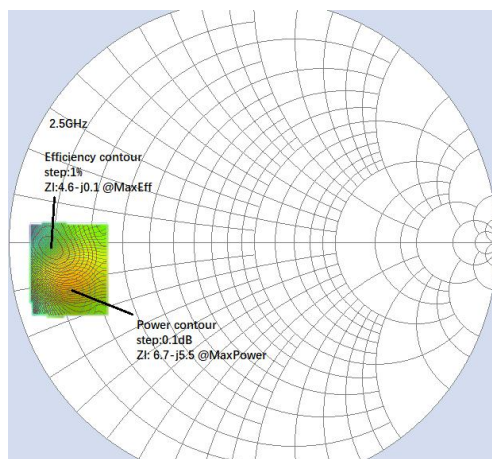


Figure5. 2.5GHz

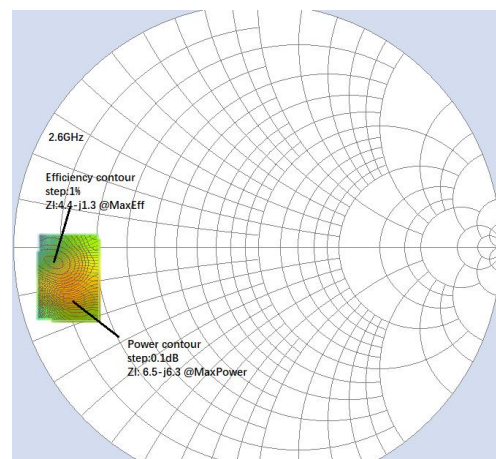


Figure6. 2.6GHz

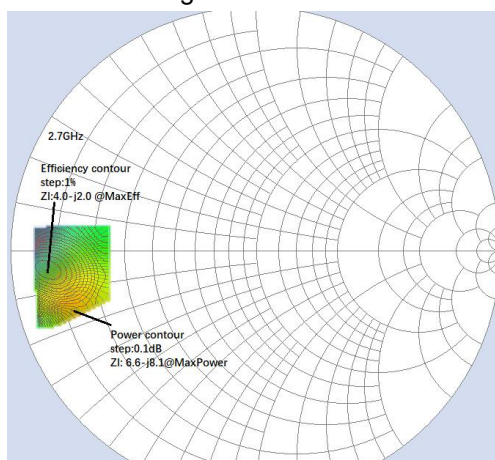


Figure7. 2.7GHz

Table7.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 (main)		3.1		A
(peak)		6.3		A
Maximum Forward Gate Current (main)		4.48		mA
(peak)		9.2		mA
Operating Environment Temp Range	-40		85	°C
Case Operating Temperature		130		°C
Operating Junction Temperature		225		°C

## 8. Pin Assignments and Description

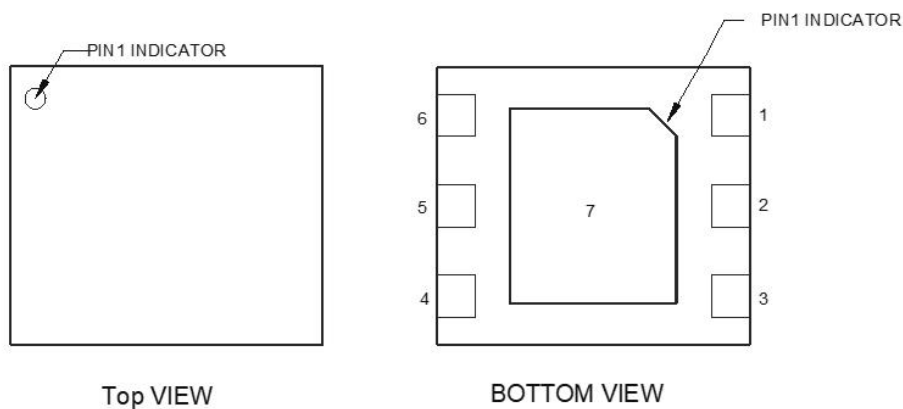


Figure8. Pin Assignments

Table8. Description

Pin No.	Mnemonic	Description
1	RF IN1, VG1	Path 1 RF Input, Gate Bias
2	NC	NC
3	RF IN2, VG2	Path 2 RF Input, Gate Bias
4	RF OUT2, VD2	Path 2 RF Output, Drain Bias
5	NC	NC
6	RF OUT1, VD1	Path 1 RF Output, Drain Bias
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 -1102  
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.

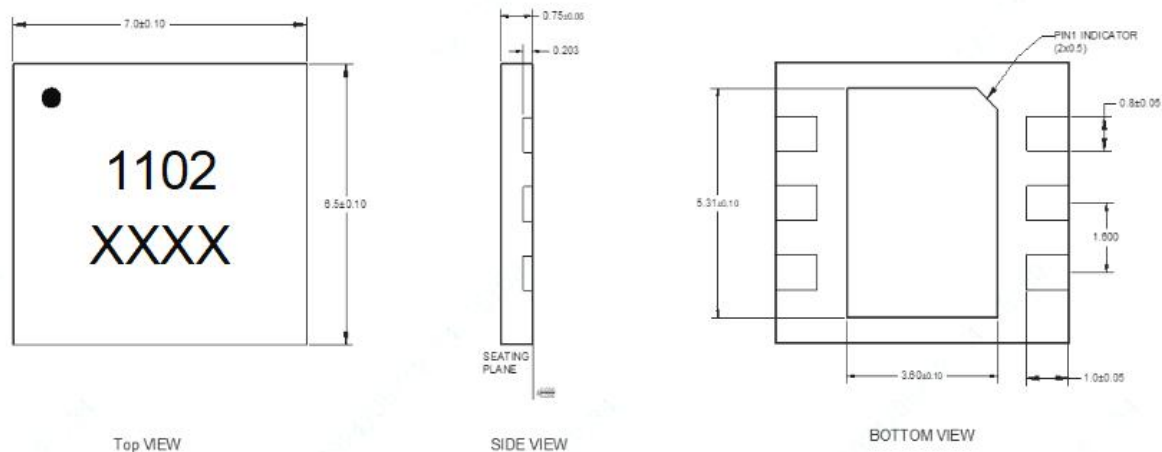


Figure9. Package Marking and Outline Dimensions



## 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

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