

# UA2709E

## Broadband Amplifier MMICs

### Data Sheet

### DS-2709-02

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## UA2709E

Broadband Amplifier MMICs

### 1. Product Description

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The UA2709E general purpose wideband amplifier IC with internal input/output matching and ESD diodes inside is packaged in a 6-pin SOT363 plastic package.

### 2. Features

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- Single 5V power supply
- Internally matched to 50 $\Omega$
- Very wide frequency over DC to 4.3 GHz
- Over 24.5 dB linear gain at 2.2 GHz
- High frequency gain peaking for cable loss compensation
- Unconditionally stable
- P1dB over 8 dBm at 2.2GHz

### 3. Typical Applications

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- DBS
- LNB IF Amplifier
- DVB
- Cable
- ISM
- General Purpose

## 4. Pin Configuration

Table 1 Pin Descriptions

Pin #	Description
1	Vcc
2, 5	GND1
3	RF out
4	GND2
6	RF in

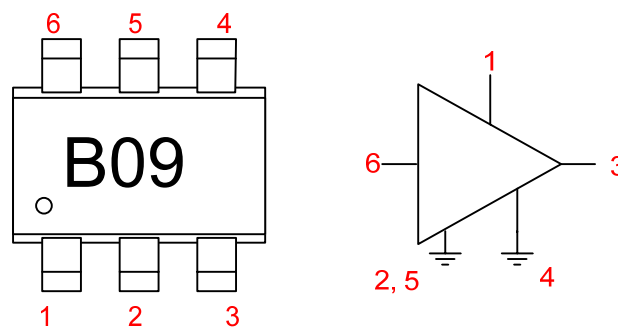
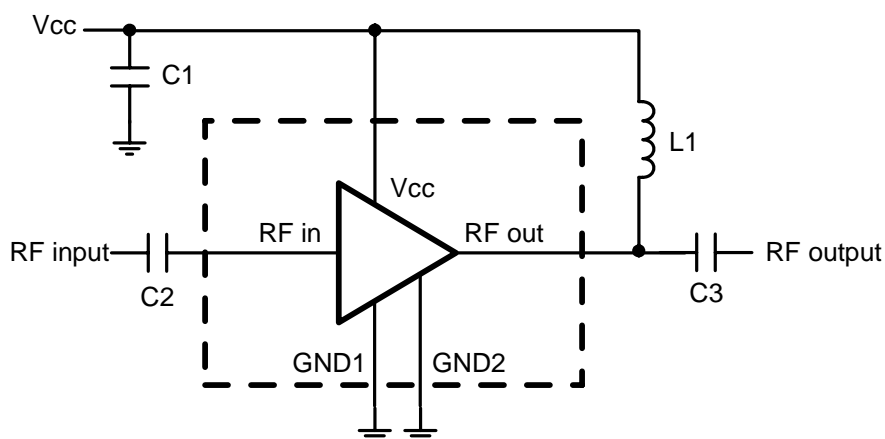


Figure 1. Simplified Outline (SOT363) and Symbol.

## 5. Application Circuit



$C1=1\text{nF}$ ,  $C2=100\text{pF}$ ,  $C3=100\text{pF}$ . The nominal value of the RF choke,  $L1$  is  $33\text{ nH}$ . Increasing the inductor value will shift the curve towards the lower frequency region. The operating frequency can be lowered to  $50\text{MHz}$  when  $L1$  is larger than  $220\text{nH}$ .

Figure 2. Application Circuit

## 6. Operating Condition

**Table 2. Absolute Maximum Ratings**

Symbol	Parameters	Conditions	Min.	Max.	Unit
V <sub>cc</sub>	DC Supply Voltage	RF input AC coupled	-	8	V
I <sub>cc</sub>	Supply Current		-	30	mA
P <sub>tot</sub>	Total Power Dissipation	T <sub>a</sub> ≤ 90 °C	-	200	mW
T <sub>st</sub>	Storage Temperature		-65	150	°C
T <sub>j</sub>	Operating Junction Temperature		-40	150	°C
P <sub>D</sub>	Maximum Drive Power		-	0	dBm

**Table 3. Thermal Characteristics**

Symbol	Parameters	Conditions	Value	Unit
R <sub>th</sub>	Thermal Resistance from Junction to Solder Point	P <sub>tot</sub> = 125 mW; T <sub>a</sub> ≤ 90 °C	300	K/W

## 7. Electrical Characteristics

**Table 4. Electrical Characteristics**

$V_{CC} = 5\text{ V}$ ;  $I_{CC} = 22.5\text{ mA}$ ;  $T_a = 25\text{ }^\circ\text{C}$ ; unless otherwise specified.

Symbol	Parameters	Conditions	Min.	Typ.	Max.	Unit
$I_{CC}$	Supply Current		-	22.5	-	mA
$ S_{21} ^2$	Insertion Power Gain	f = 100 MHz	-	18	-	dB
		f = 0.9 GHz	-	23	-	dB
		f = 1.8 GHz	-	24	-	dB
		f = 2.2 GHz	-	24.5	-	dB
		f = 2.5 GHz	-	25	-	dB
$ S_{11} ^2$	Input Return Loss	f = 0.9 GHz	10	-	-	dB
		f = 2.2 GHz	10	-	-	dB
$ S_{22} ^2$	Output Return Loss	f = 0.9 GHz	10	-	-	dB
		f = 2.2 GHz	10	-	-	dB
$ S_{12} ^2$	Isolation	f = 0.9 GHz	-	32	-	dB
		f = 2.2 GHz	-	33	-	dB
NF	Noise Figure	f = 0.9 GHz	-	3.5	-	dB
		f = 2.2 GHz	-	3.8	-	dB
BW	Bandwidth	at $ S_{21} ^2$ -3 dB below flat gain at 0.9 GHz	-	4.3	-	GHz
K	Stability Factor	f = 0.9 GHz	-	1.4	-	-
		f = 2.2 GHz	-	1.5	-	-
$P_{L(sat)}$	Saturated Load Power	f = 0.9 GHz	-	13	-	dBm
		f = 2.2 GHz	-	13	-	dBm
$P_{L,1\text{dB}}$	Load Power	at 1 dB gain compression; f = 0.9 GHz	-	9	-	dBm
		at 1 dB gain compression; f = 2.2 GHz	-	8	-	dBm



Caution: ESD sensitive.

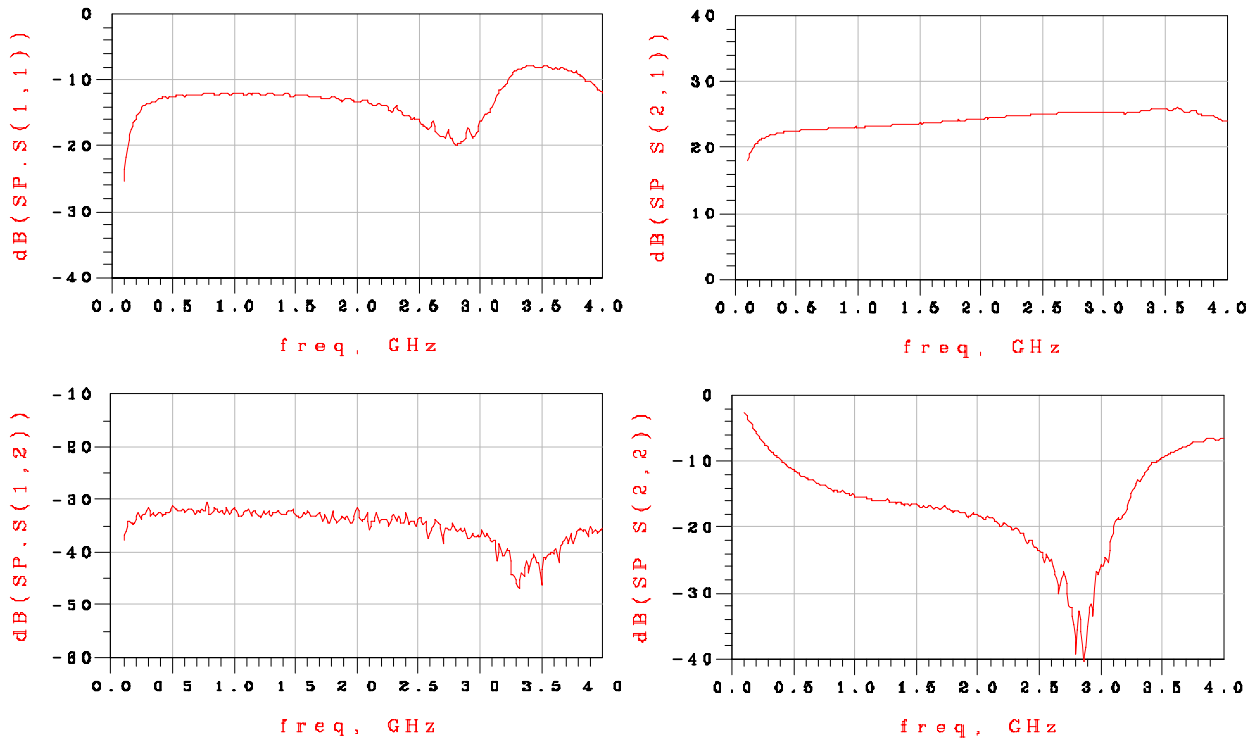


Figure 3. S-parameter ( $V_{cc} = 5\text{ V}$ ,  $I_{cc} = 22.5\text{ mA}$ ,  $P_{in} = -40\text{ dBm}$ ,  $Z_o = 50\ \Omega$ )

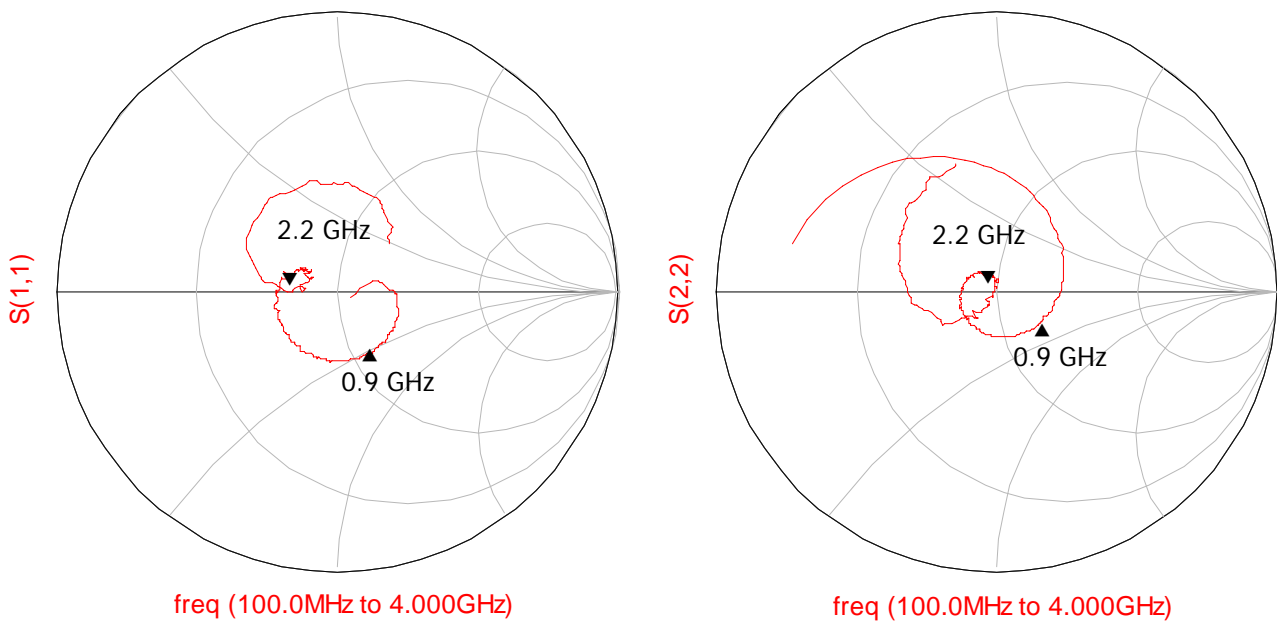


Figure 4.  $S_{11}$  &  $S_{22}$  ( $V_{cc} = 5\text{ V}$ ,  $I_{cc} = 22.5\text{ mA}$ ,  $P_{in} = -40\text{ dBm}$ ,  $Z_o = 50\ \Omega$ )

## 8. Package Drawing

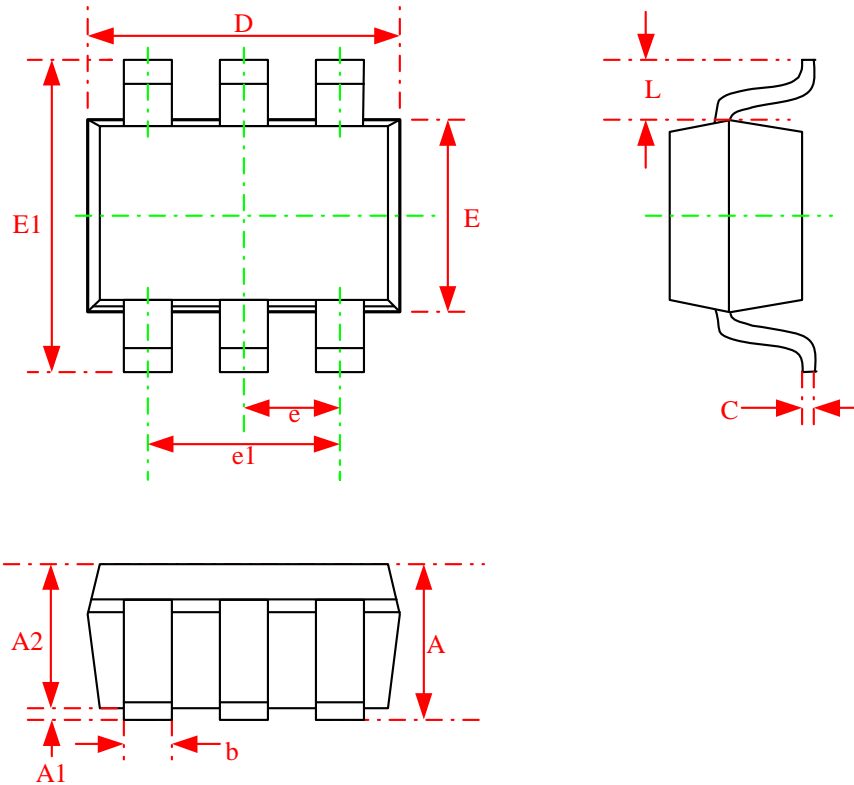


Figure 5. Package Outline

Table 5. Dimension Description

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.10	.038	.044
A1	0.025	0.10	.001	.004
A2	0.875	1.00	.035	.040
b	0.20	0.40	.008	.016
C	0.10	0.15	.004	.006
D	1.90	2.10	.076	.084
E	1.15	1.35	.046	.054
E1	2.00	2.20	.080	.088
e	0.65 BSC.		.026 BSC.	
e1	1.30 BSC.		.052 BSC.	
L	0.425 REF.		.017 BSC.	

## Revision History

Revision	Date	Description of Change
1.0	2007/01/05	Original

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