

## HIGH-POWER & LOW-VOLTAGE AUDIO POWER AMPLIFIER

### ■ GENERAL DESCRIPTION

The **NJU7089** is an audio power amplifier designed for telephone applications. No external coupling capacitors are required because of the differential outputs. The closed loop gain is adjusted by two external resistors, and a SD pin permit power down with muting the input signal.

The **NJU7089** improves high output power compared with other amplifier.

### ■ PACKAGE OUTLINE



NJU7089R



NJU7089VC3



NJU7089KV1

### ■ FEATURES

- Operating Voltage
- Operating Current
- Output Power
- Supply Current in Shutdown Mode
- Thermal Shutdown Circuit
- Pop Noise Suppression Circuit
- Over Current Protection Circuit
- C-MOS Technology
- Package Outline

$V^+ = 1.8$  to  $5.5V$

$I_{DD1} = 3.0mA$  typ. ( $V^+ = 5V, R_L = \infty$ , no signal)

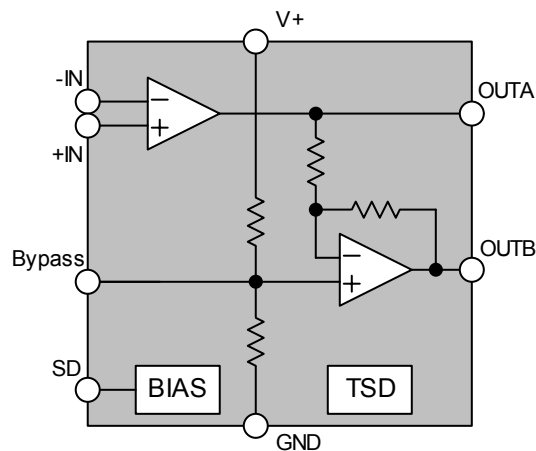
$I_{DD1} = 2.5mA$  typ. ( $V^+ = 3V, R_L = \infty$ , no signal)

$P_0 = 1.2W$  typ. ( $V^+ = 5V, R_L = 8\Omega, THD = 1\%$ )

$P_0 = 500mW$  typ. ( $V^+ = 3.3V, R_L = 8\Omega, THD = 1\%$ )

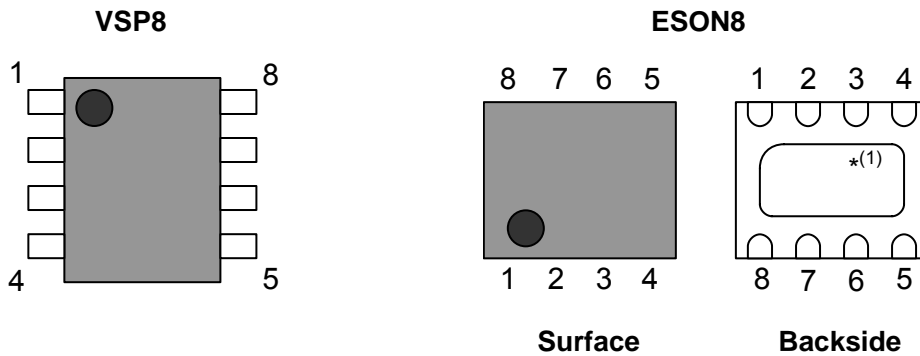
VSP8 / SSOP20 / ESON8

### ■ PIN CONFIGURATION & BLOCK DIAGRAM



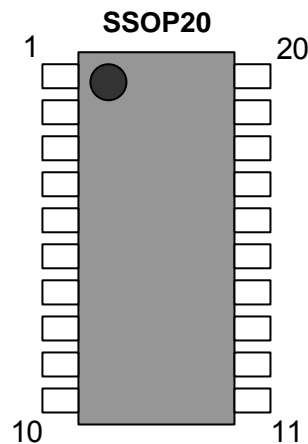
# NJU7089

## ■ PIN CONFIGURATION



\*<sup>(1)</sup> The PAD in the center part on the back is connected with the internal GND, therefore it connects to GND

No.	Symbol	Function
1	SD	Shutdown Enable
2	Bypass	Reference Voltage
3	+IN	Inverted Input
4	-IN	Noninverted Input
5	OUTA	Output A
6	V+	Supply Voltage
7	GND	Ground
8	OUTB	Output B



No.	Symbol	Function	No.	Symbol	Function
1	NC	No Connect	11	NC	No Connect
2	NC	No Connect	12	NC	No Connect
3	NC	No Connect	13	NC	No Connect
4	SD	Shutdown Enable	14	OUTA	Output A
5	Bypass	Reference Voltage	15	V+	Supply Voltage
6	+IN	Inverted Input	16	GND	Ground
7	-IN	Noninverted Input	17	OUTB	Output B
8	NC	No Connect	18	NC	No Connect
9	NC	No Connect	19	NC	No Connect
10	NC	No Connect	20	NC	No Connect

## ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	+7	V
Power Dissipation	P <sub>D</sub>	570 <sup>*1)</sup> / 770 <sup>*2)</sup> (VSP8) 970 <sup>*1)</sup> / 1400 <sup>*2)</sup> (SSOP20C3) 570 <sup>*3)</sup> / 1700 <sup>*4)</sup> (ESON8)	mW
Output Peak Current	I <sub>op</sub>	600	mA
Input Voltage Range	V <sub>IN</sub>	-0.3 to V <sup>+</sup> +0.3 <sup>*5)</sup>	V
Operating Temperature Range	T <sub>opr</sub>	-40 to +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

\*1) EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 2layers, FR-4) mounting.

\*2) EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 4layers, FR-4) mounting.

\*3) EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 2layers, FR-4) mounting. The PAD connecting to GND in the center part on the back

\*4) EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 4layers, FR-4, Applying a thermal via hole to a board based on JEDEC standard JESD51-5) mounting. The PAD connecting to GND in the center part on the back

\*5) SD, IN+, IN-, OUTA, OUTB terminals.

## ■ RECOMMENDED OPERATING VOLTAGE RANGE (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage Range	V <sup>+</sup>	-	1.8	3.0	5.5	V

## ■ ELECTRICAL CHARACTERISTICS

● Amplifier (Ta=25°C, V<sup>+</sup>=5V, G<sub>V</sub>=6dB, f=1kHz, R<sub>L</sub>=8Ω, Active)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I <sub>DD1</sub>	No signal, R <sub>L</sub> =∞, Active	-	3.0	6	mA
Operating Current 2	I <sub>DD2</sub>	No signal, R <sub>L</sub> =∞, V <sub>SD</sub> =0.25V	-	-	2	μA
Output Power 1	P <sub>O1</sub>	THD≤1%	0.9	1.2	-	W
Output Power 2	P <sub>O2</sub>	V <sup>+</sup> =3.3V, THD≤1%	375	500	-	W
Output Power 3	P <sub>O3</sub>	V <sup>+</sup> =1.8V, THD≤1%	-	125	-	W
Total Harmonic Distortion (THD+N)	THD+N	P <sub>O</sub> =1W	-	0.1	-	%
Shutdown Attenuation	ATT <sub>SD</sub>	V <sub>in</sub> =1V <sub>rms</sub> , Shutdown	-	-135	-	dB
Supply Voltage Rejection Ratio	PSRR	V <sub>ripple</sub> =100mV <sub>rms</sub>	-	55	-	dB
Output Offset Voltage	V <sub>OD</sub>	No signal	-	-	35	mV

(Ta=25°C, V<sup>+</sup>=3V, G<sub>V</sub>=6dB, f=1kHz, R<sub>L</sub>=8Ω, Active)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I <sub>DD1</sub>	No signal, R <sub>L</sub> =∞, Active	-	2.5	4	mA
Operating Current 2	I <sub>DD2</sub>	No signal, R <sub>L</sub> =∞, V <sub>SD</sub> =0.25V	-	-	2	μA
Total Harmonic Distortion (THD+N)	THD+N	P <sub>O</sub> =400mW	-	0.1	-	%
Shutdown Attenuation	ATT <sub>SD</sub>	V <sub>in</sub> =500mV <sub>rms</sub> , Shutdown	-	-130	-	dB
Supply Voltage Rejection Ratio	PSRR	V <sub>ripple</sub> =100mV <sub>rms</sub>	-	55	-	dB
Output Offset Voltage	V <sub>OD</sub>	No signal	-	-	35	mV

V<sub>SD</sub>: SD Terminal Voltage

● Mode Control (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
High Level Input Voltage	V <sub>IH</sub>	-	1.5	-	V <sup>+</sup>	V
Low Level Input Voltage	V <sub>IL</sub>	-	0	-	0.25	

## ■ CONTROL TERMINAL EXPLANATION

MODE	CONTROL SIGNAL (SD Terminal)	STATUS
Shutdown	L(=V <sub>IL</sub> )	IC is standby.
Active	H(=V <sub>IH</sub> )	IC is active.