



## LOW VOLTAGE HEADPHONE AMPLIFIER for PORTABLE AUDIO

### ■ GENERAL DESCRIPTION

The **NJM2171A** is a low voltage headphone amplifier designed for portable audio items.

The **NJM2171A** operates directly for battery supply. It includes mute and standby circuit which require few external components and realize low current consumption and very low turn-noise at standby mode.

It is suitable for portable Mini-Disc, portable Compact-Disc, and other headphone amplifier application.

### ■ PACKAGE OUTLINE



NJM2171AR

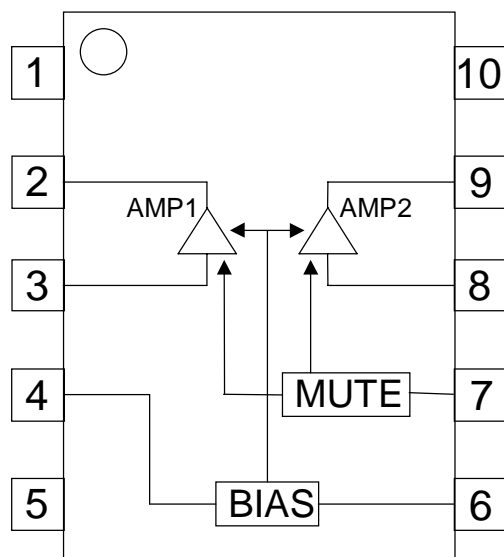
### ■ FEATURES

- Operating Voltage  $V^+1=1.8$  to  $4.5V$   
 $V^+2=0.9$  to  $4.5V$
- Operating Current  $450\mu A$  typ. @  $V^+1=2.3V$   
 $700\mu A$  typ. @  $V^+2=1.2V$
- Supply Current in Power Down Mode  $10\mu A$  typ. @  $V^+1=2.3V$   
 $25\mu A$  typ. @  $V^+2=1.2V$
- Output Power Exceeds  $5mW$   $R_L=16\Omega$  @  $THD=10\%$
- Fixed Voltage Gain  $11.5dB$  typ.
- Package Outline VSP10
- Bipolar Technology

### ■ PIN CONFIGURATION

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#### PIN FUNCTION

- 1.  $V^+2$
- 2. OUT1
- 3. IN1
- 4. STBY
- 5.  $V^+1$
- 6.  $V_{REF}$
- 7. MUTE
- 8. IN2
- 9. OUT2
- 10. GND


**■ ABSOLUTE MAXIMUM RATINGS**

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	5	V
Power Dissipation	P <sub>D</sub>	(VSP8) 320	mW
Operating Temperature Range	T <sub>opr</sub>	-20 to +75	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +125	°C

**■ RECOMMENDED OPERATING CONDITIONS**

(Ta=25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Voltage Range1	V <sup>+</sup> 1	1.8	2.3	4.5	V
Operating Voltage Range2	V <sup>+</sup> 2	0.9	1.2	4.5	V

**■ ELECTRICAL CHARACTERISTICS** (V<sup>+</sup>1=2.3V, V<sup>+</sup>2=1.2V, R<sub>g</sub>=600Ω, R<sub>L</sub>=16Ω, f=1kHz, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I <sub>CC0</sub>	V <sup>+</sup> 1=0V(1pin)	-	-	1	μA
	I <sub>CC1</sub>	STANDBY ON, MUTE ON(1pin)	-	25	40	
	I <sub>CC2</sub>	STANDBY ON, MUTE ON(5pin)	-	10	15	
	I <sub>CC3</sub>	No signal(1pin)	-	700	1200	
	I <sub>CC4</sub>	No signal(5pin)	-	450	700	
		I <sub>CC5</sub>	P <sub>O</sub> =0.5mW+0.5mW(1pin)	-	5.5	-
I <sub>CC6</sub>		P <sub>O</sub> =0.5mW+0.5mW(5pin)	-	0.8	-	
Reference Voltage	V <sub>REF</sub>	No signal	0.55	0.60	0.65	V
Closed Loop Gain	G <sub>V</sub>	V <sub>IN</sub> =-30dBV	10.5	11.5	12.5	dB
Output Power	P <sub>O1</sub>	THD=10%	5.0	8.5	-	mW
	P <sub>O2</sub>	V <sup>+</sup> 1=1.8V, V <sup>+</sup> 2=0.9V, THD=10%	2.0	4.0	-	
Total Harmonic Distortion	THD1	P <sub>O</sub> =1mW, R <sub>L</sub> =16Ω	-	0.15	0.3	%
	TED2	P <sub>O</sub> =5mW, R <sub>L</sub> =16Ω	-	0.4	0.6	
Output Noise Voltage	V <sub>NO</sub>	A-Weighted	-	-100	-96	dBV
Crosstalk	CT	V <sub>IN</sub> =-30dBV	-	-80	-70	dBV
Mute Level	MUTE	MUTE-ON, V <sub>IN</sub> =-30dBV, A-Weighted	-	-95	-80	dBV
Supply Voltage Rejection Ratio	SVR1	V <sup>+</sup> 1=1.8V+0.1Vrms, V <sup>+</sup> 2=0.9V	60	70	-	dB
	SVR2	V <sup>+</sup> 1=1.8V, V <sup>+</sup> 2=0.9V+0.1Vrms	60	70	-	



### CONTROL TERMINAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
High Level Input Voltage	$V_{IH}$	STBY(4pin), MUTE(7pin)	1.2	-	$V^+1$	V
Low Level Input Voltage	$V_{IL}$	STBY(4pin), MUTE(7pin)	0	-	0.3	V

### CONTROL TERMINAL EXPLANATION

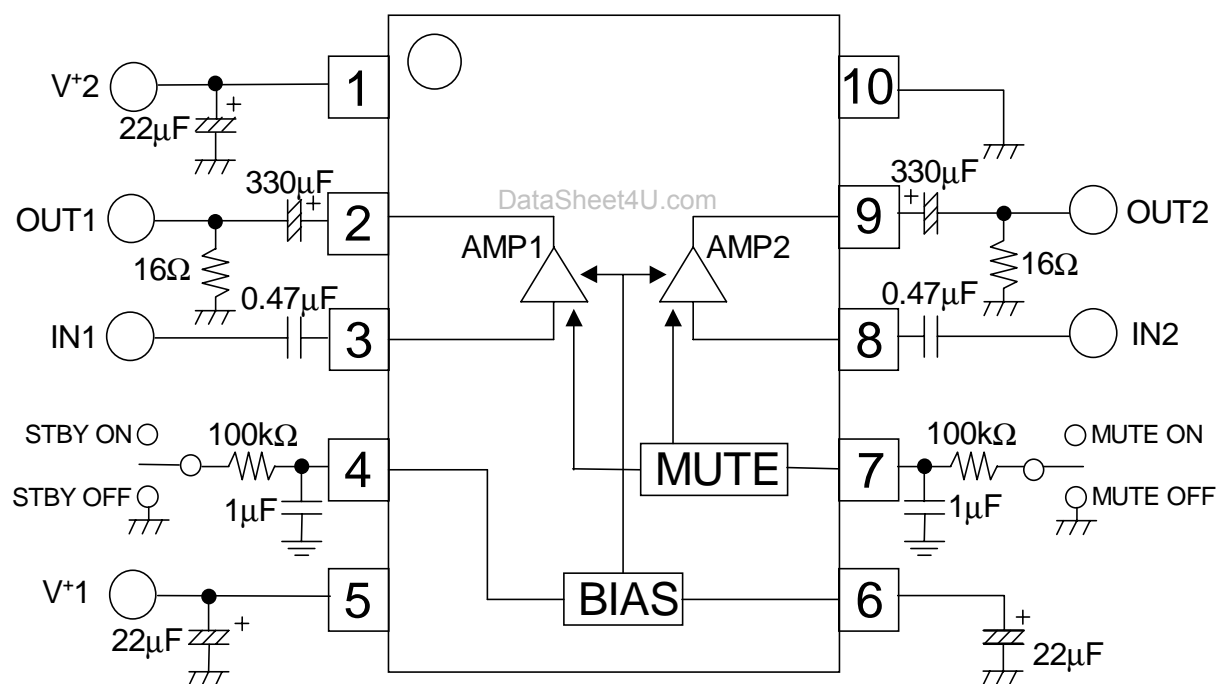
#### •STBY (4Pin)

PARAMETER	CONTROL SIGNAL	STATUS
STANDBY ON	H	IC is non-active.
STANDBY OFF	L	IC is active.

#### •MUTE (7Pin)

PARAMETER	CONTROL SIGNAL	STATUS
MUTE ON	H	IC doesn't output the signal.
MUTE OFF	L	IC output the signal.

### APPLICATION CIRCUIT



#### [CAUTION]

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