

## LOW VOLTAGE MICROPHONE AMPLIFIER for PORTABLE AUDIO

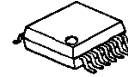
### ■ GENERAL DESCRIPTION

The **NJM2173A** is a low voltage microphone amplifier designed for portable audio items.

It includes standby, two-type gain selector, and power ripple rejection adjustment circuit. It realizes very low turn-noise at standby mode.

It is suitable for portable audio and other microphone amplifier application.

### ■ PACKAGE OUTLINE

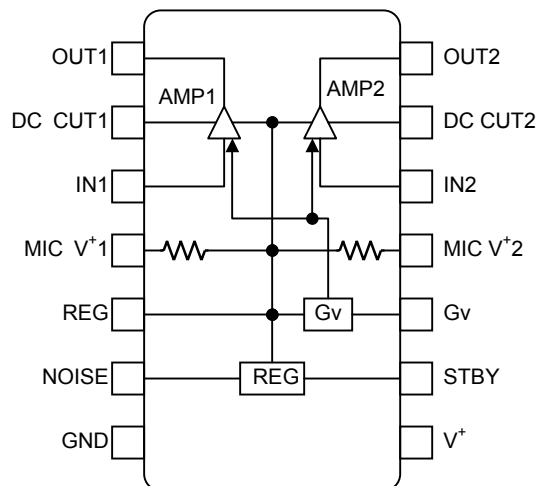


**NJM2173AV**

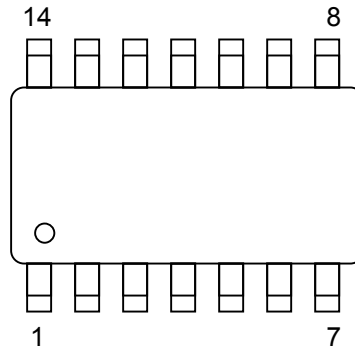
### ■ FEATURES

- |  |                            |
|--|----------------------------|
| ● Operating Voltage Range                | 2.7 to 4.5V                |
| ● Operating Current                      | 2.2mA typ. at $V^+ = 2.7V$ |
| ● Supply Current in Standby Mode         | 1 $\mu$ A max.             |
| ● Maximum Output Voltage                 | -1.5dBV typ. at THD=0.1%   |
| ● Internal Two-type Gain Select Function | 13dB typ./ 29dB typ.       |
| ● Internal Standby Function              |                            |
| ● Power Ripple Rejection Terminal        | 95dB typ. at $G_v = 13dB$  |
| ● Bipolar Technology                     |                            |
| ● Package Outline                        | SSOP14                     |

### ■ BLOCK DIAGRAM



## ■ PIN FUNCTION



No.	SYMBOL	FUNCTION
1	OUT1	AMP1 Output
2	DC CUT1	DC Cut Capacitor 1
3	IN1	AMP1 Input
4	MIC V <sup>+</sup> 1	MIC1 Power Output
5	REG	Internal Regulator Output
6	NOISE	Internal Regulator Noise Rejection Capacitor
7	GND	Ground
8	V <sup>+</sup>	Power Supply
9	STBY	Stand-By Control
10	Gv	Gain Select
11	MIC V <sup>+</sup> 2	MIC2 Power Output
12	IN2	AMP2 Input
13	DC CUT2	DC Cut Capacitor 2
14	OUT2	AMP2 Output

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	5	V
Maximum Input Voltage	V <sub>IN</sub>	(IN1,IN2 pin) -0.3 to V <sub>REG</sub> +0.3	V
Power Dissipation	P <sub>D</sub>	300	mW
Operating Temperature Range	Topr	-20 to +75	°C
Storage Temperature Range	Tstg	-40 to +125	°C

### ■ ELECTRICAL CHARACTERISTICS ( V<sup>+</sup>=2.7V, Gv=13dB, V<sub>IN</sub>=-40dBV, R<sub>L</sub>=9kΩ, f=1kHz, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage Range	V <sup>+</sup>		2.7	-	4.5	V
Operating Current 1	I <sub>CC1</sub>	Standby On:STBY= V <sup>+</sup>	-	-	1.0	μA
Operating Current 2	I <sub>CC2</sub>	G <sub>V</sub> =29dB, No Signal, Standby Off STBY=GND	-	2.2	2.8	mA
Output Voltage	V <sub>O</sub>	No Signal	1.28	1.35	1.42	V
Voltage Gain 1	G <sub>V1</sub>	10pin=L	12	13	14	dB
Voltage Gain 2	G <sub>V2</sub>	10pin=H	28	29	30	dB
Maximum Output Voltage	V <sub>OM</sub>	THD=0.1%	-2.7	-1.5	-	dBV
Total Harmonic Distortion	THD1	V <sub>O</sub> =-28.2dBV	-	0.013	0.026	%
	THD2	G <sub>V</sub> =29dB, V <sub>O</sub> =-28.2dBV	-	0.05	0.1	%
Output Noise Voltage	V <sub>NO1</sub>	Rg=600Ω, A-Weighted	-	-105 (5.63)	-100 (10)	dBV (μVrms)
	V <sub>NO2</sub>	Rg=600Ω, A-Weighted, G <sub>V</sub> =29dB	-	-95 (17.8)	-90 (32)	dBV (μVrms)
Channel Separation	CS1	Rg=600Ω, V <sub>IN</sub> =-18dBV	-	105	-	dB
	CS2	Rg=600Ω, V <sub>IN</sub> =-34dBV, G <sub>V</sub> =29dB	80	90	-	dB
Supply Voltage Rejection Ratio	SVR1	V <sup>+</sup> =3V, ΔV <sup>+</sup> =-20dBV, Rg=600Ω	-	95	-	dB
	SVR2	V <sup>+</sup> =3V, ΔV <sup>+</sup> =-20dBV, Rg=600Ω G <sub>V</sub> =29dB	70	80	-	dB
Microphone Regulator Output Voltage	V <sub>REG</sub>	R <sub>L</sub> =3.55kΩ	2.3	2.42	2.54	V
High Level Input Voltage G	V <sub>IHG</sub>	Gv Terminal	2.0	-	V <sup>+</sup>	V
Low Level Input Voltage G	V <sub>ILG</sub>	Gv Terminal	0	-	0.5	V
High Level Input Voltage S	V <sub>IHS</sub>	STBY Terminal	V <sup>+</sup> -0.5	-	V <sup>+</sup>	V
Low Level Input Voltage S	V <sub>ILS</sub>	STBY Terminal	0	-	V <sup>+</sup> -2.0	V

### ■ CONTROL TERMINAL EXPLANATION

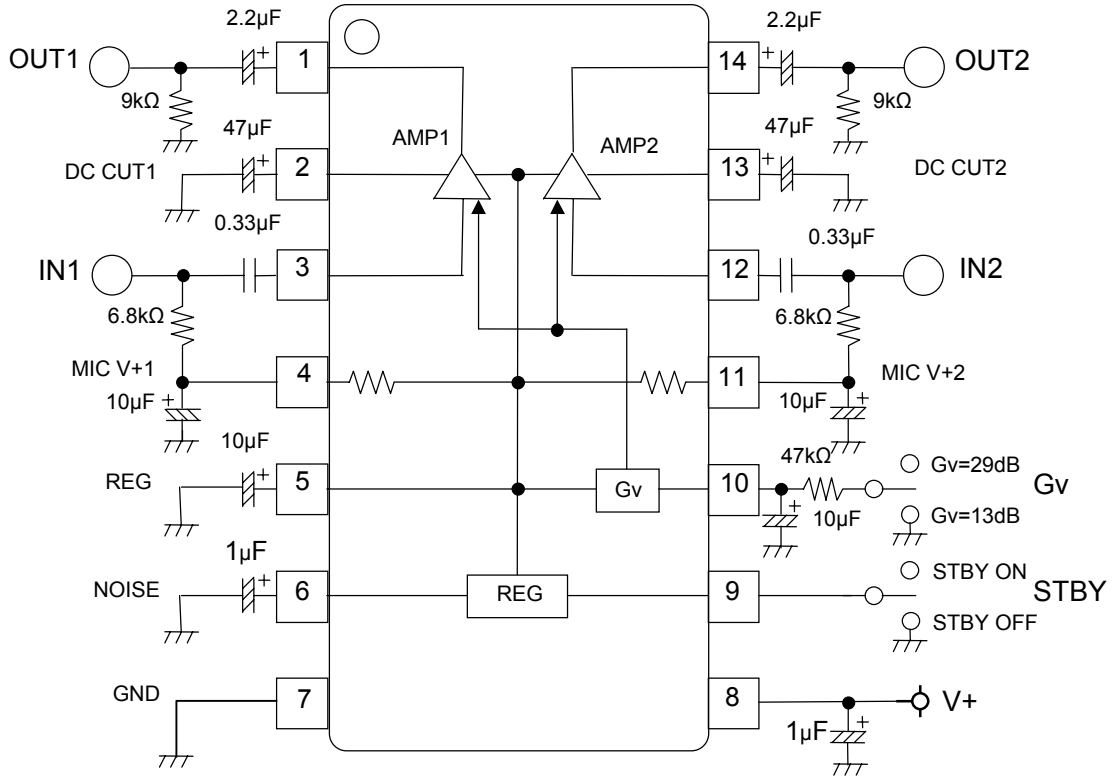
#### ● STBY

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

#### ● Gv

PARAMETER	CONTROL SIGNAL	STATUS
Gv1	L	IC set up 13dB typ. voltage gain.
Gv2	H	IC set up 29dB typ. voltage gain.

■ APPLICATION CIRCUIT (SSOP14)



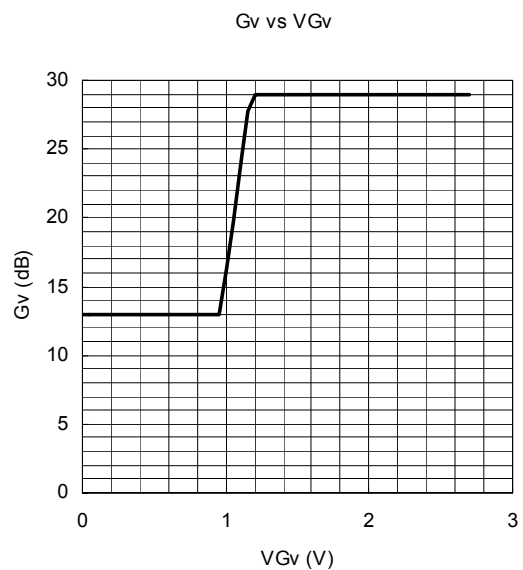
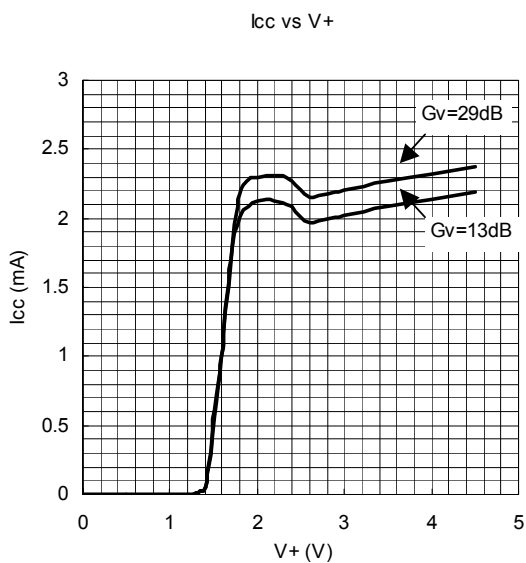
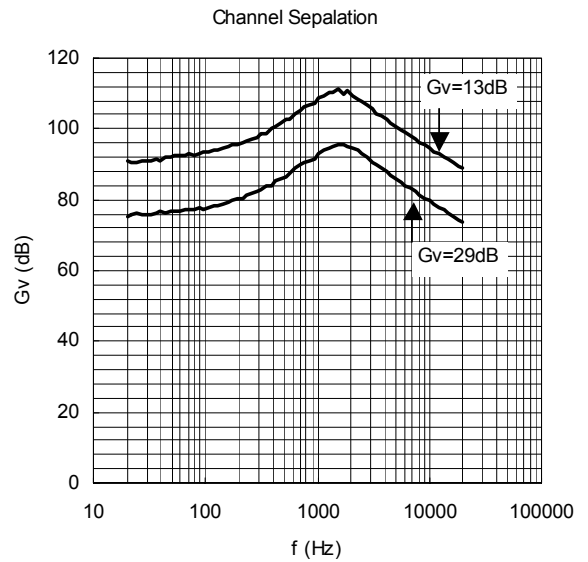
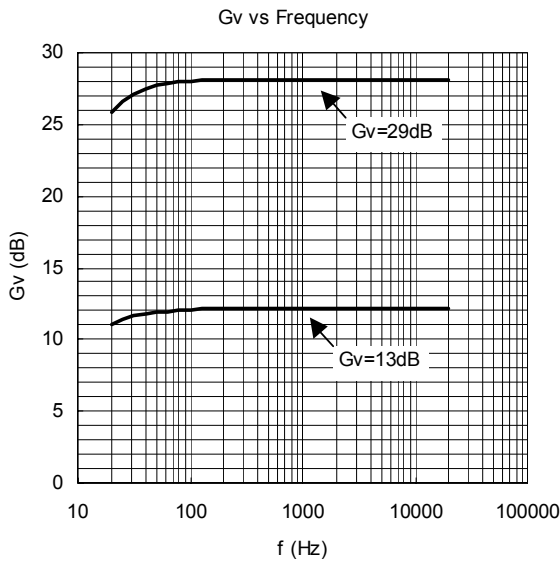
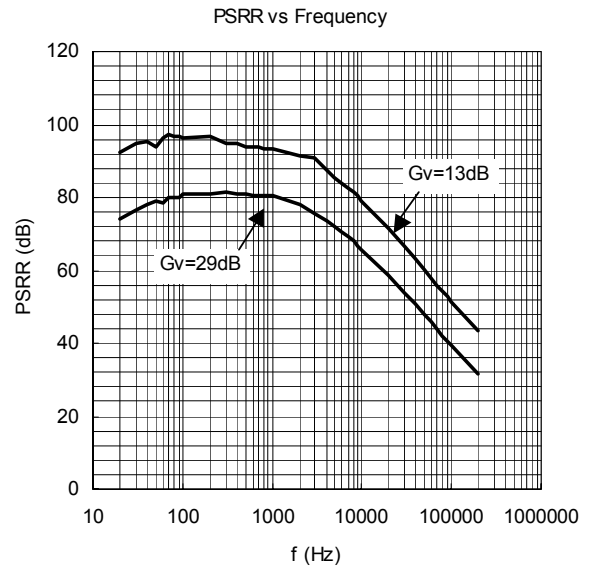
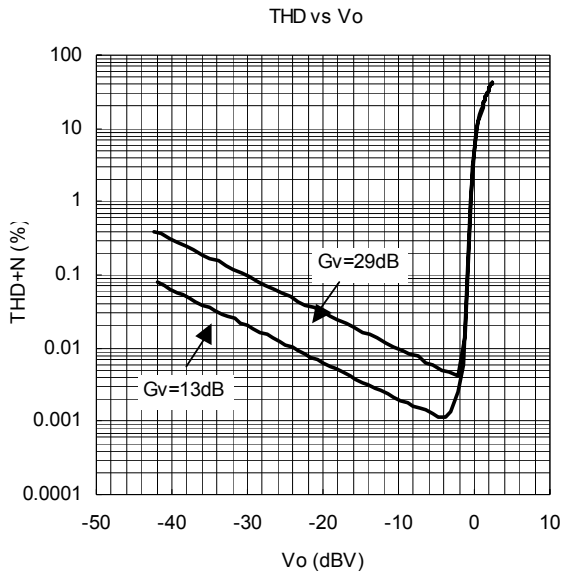
## ■TERMINAL DESCRIPTION

PIN No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE
1 14	OUT1 OUT2	AMP1 Output AMP2 Output		1.35V
2 13	DC CUT1 DC CUT2	DC Cut Capacitor 1 DC Cut Capacitor 2		1.35V
3 12	IN1 IN2	AMP1 Input AMP2 Input		1.35V
4 11	MIC V <sup>+</sup> 1 MIC V <sup>+</sup> 2	MIC1 Power Output MIC2 Power Output		2.42V
5	REG	Internal Regulator Output		2.42V

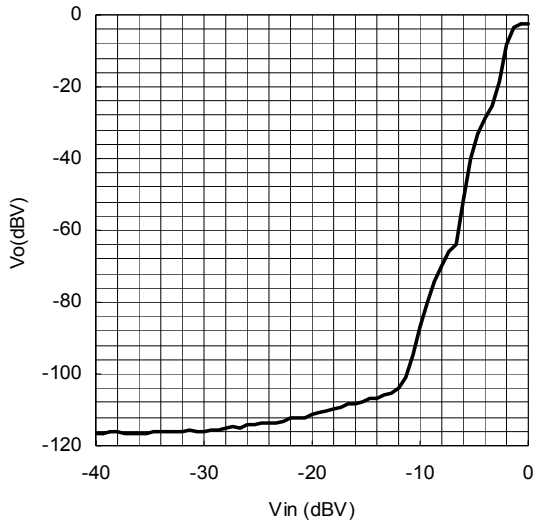
## ■TERMINAL DESCRIPTION

PIN No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE
6	NOISE	Internal Regulator Noise Rejection Capacitor		0.54V
9	STBY	Stand-By Control		-
10	Gv	Gain Select		-

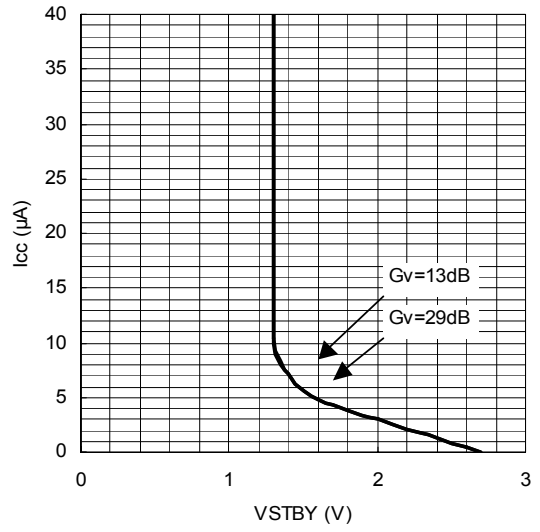
## ■ TYPICAL CHARACTERISTICS



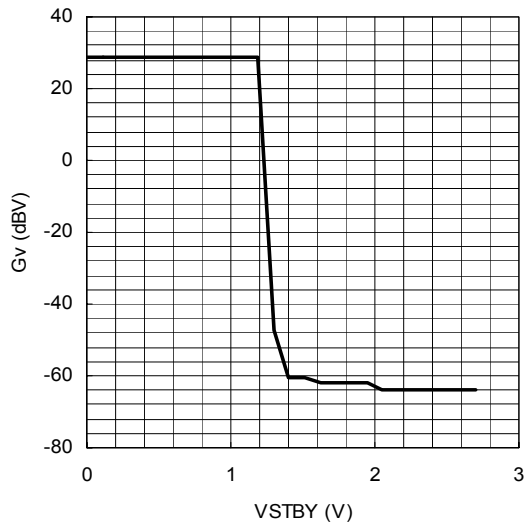
Vo vs Vin  
(STBY)



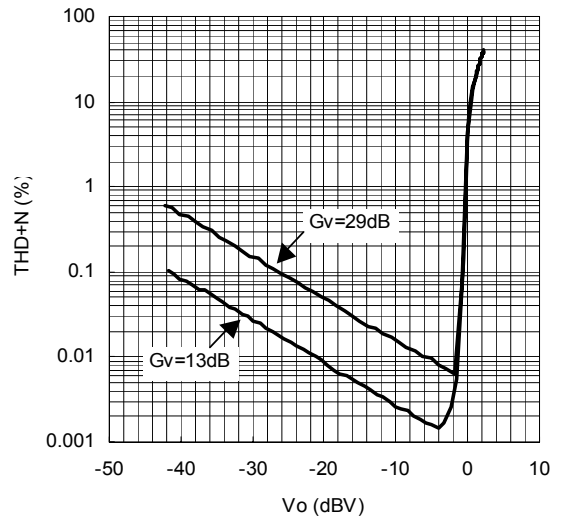
Icc vs VSTBY



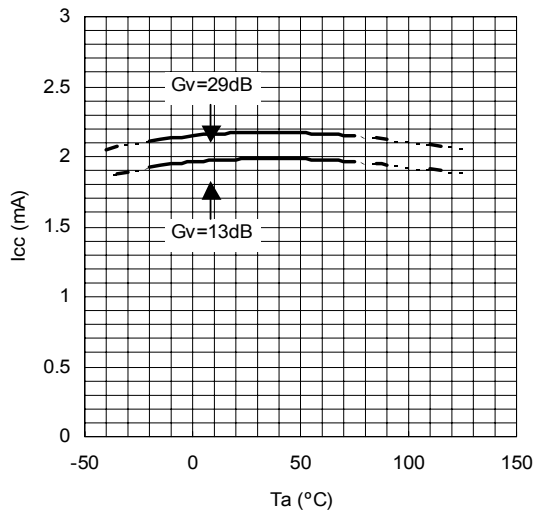
Gv vs VSTBY



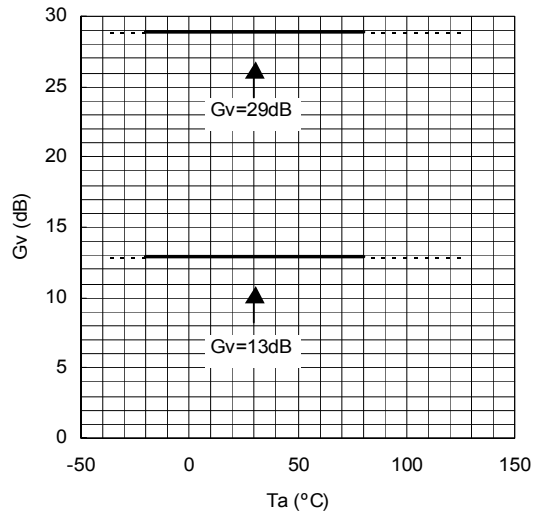
THD vs Vo



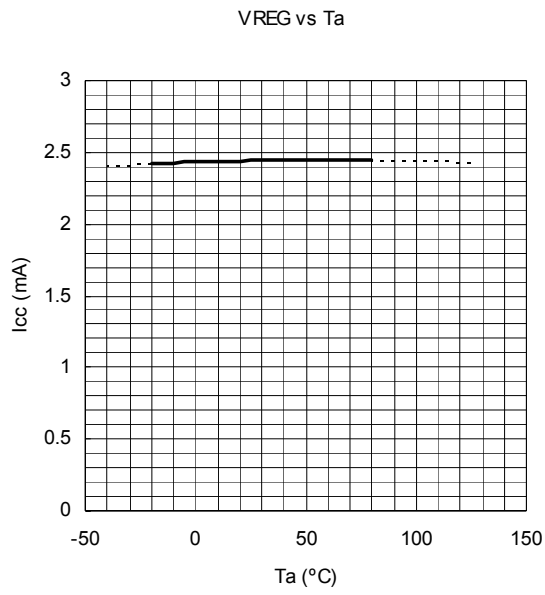
Icc2 vs Ta



Gv vs Ta







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