

LOW VOLTAGE AUDIO POWER AMPLIFIER

■ GENERAL DESCRIPTION

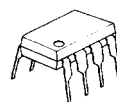
The NJM2113 is a audio power amplifier designed for telephone applications, such as in speakerphones.

Coupling capacitors to the speaker are not required, as it has differential speaker outputs. The closed loop gain is set with two external resistors. A CD pin permit powering down with muting the input signal.

■ FEATURES

- Wide Operating Voltage (2 ~ 16V)
- Low Operating Current (2.7mA Typ.)
- CD Input to Power Down the IC with Mute
- Low Power-Down Operating Current (72 μ A Typ.)
- Output Power Exceeds 250mW ($V^+=6V$, $R_L=32\Omega$)
- Gain Adjustable ($G_{VD}=0 \sim 43dB$, Voice Band)
- Package Outline DMP8, DMP8, SIP8, SSOP8
- Bipolar Technology

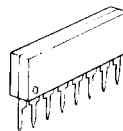
■ PACKAGE OUTLINE



NJM2113D



NJM2113M



NJM2113L

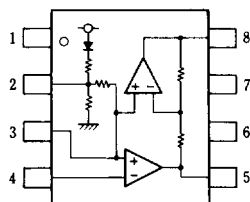


NJM2113V

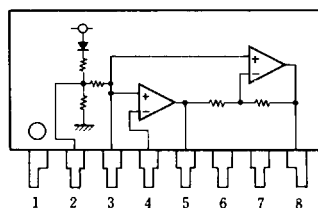
■ RECOMMENDED OPERATING CONDITIONS

- | | | |
|-----------------------|----------|---------------------------|
| ● Load Impedance | R_L | 8 ~ 200 Ω |
| ● Differential Gain | G_{VD} | 0 ~ 43dB (5kHz bandwidth) |
| ● Input Voltage at CD | V_{CD} | 0 ~ V^+ Vdc |

■ PIN CONFIGURATION



NJM2113D
NJM2113M
NJM2113V

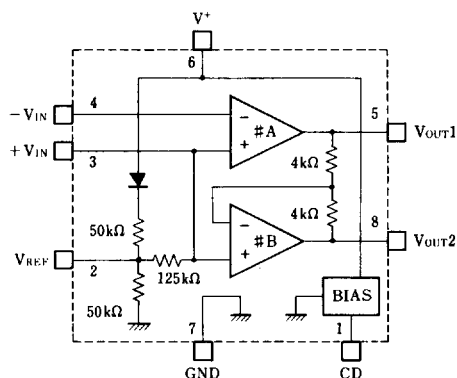


NJM2113L

Pin Function

1. CD
2. V_{REF}
3. $+V_{IN}$
4. $-V_{IN}$
5. V_{OUT1}
6. V^+
7. GND
8. V_{OUT2}

■ BLOCK DIAGRAM





■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	+18	V
Output Peak Current	I _{OP}	±250	mA
Input Voltage Range	V _{IN}	(1~4pin) -0.3 to V ⁺ +0.3	V
		(5,8pin) -0.3 to V ⁺ +0.3(when Power-Down)	V
Power Dissipation	P _D	(DIP8) 500	mW
		(SIP8) 800	mW
		(DMP8) 500 (note 1)	mW
		(SSOP8) 360 (note 1)	mW
Operating Temperature Range	T _{opr}	-20~+75	°C
Storage Temperature Range	T _{stg}	-40~+125	°C

(note 1) At on PC board

■ ELECTRICAL CHARACTERISTICS

(V⁺=6V, Ta=25°C, unless otherwise specified)

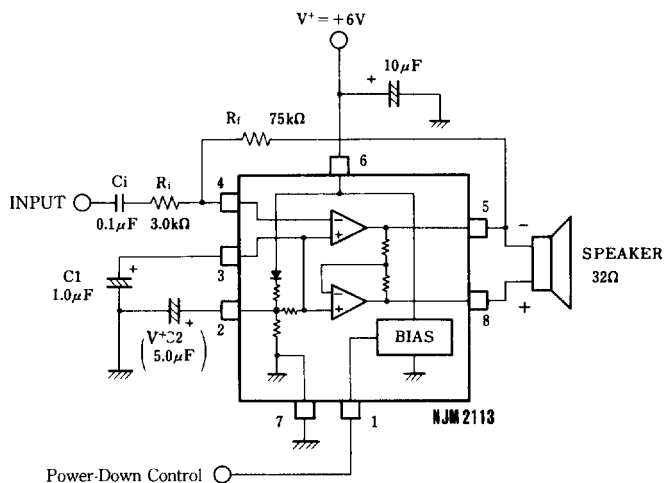
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current (no signal)	I _{CC1}	V ⁺ =3V, R _L =∞, I _{pin} =0.8V	—	2.7	4.0	mA
	I _{CC2}	V ⁺ =16V, R _L =∞, I _{pin} =0.8V	—	3.4	5.0	mA
	I _{CCD}	V ⁺ =3V, R _L =∞, I _{pin} =2V	—	72	100	μA
Open Loop Gain	A _{v1}	Amplifier#A, f<100Hz	77	83	—	dB
Closed Loop Gain	A _{v2}	Amplifier#B, f=1kHz, R _L =32Ω	-0.35	0	+0.35	dB
Output Power (note2)	P _{O1}	V ⁺ =3V, R _L =16Ω, THD≤10%	55	—	—	mW
	P _{O2}	V ⁺ =6V, R _L =32Ω, THD≤10%	250	—	—	mW
	P _{O3}	V ⁺ =12V, R _L =100Ω, THD≤10%(note3)	400	—	—	mW
Total Harmonic Distortion (f=1kHz)	THD1	V ⁺ =6V, R _L =32Ω, P _O =125mW, G _{VD} =34dB	—	0.5	1.0	%
	THD2	V ⁺ ≥3V, R _L =8Ω, P _O =20mW, G _{VD} =12dB	—	0.5	—	%
	THD3	V ⁺ ≥12V, R _L =32Ω, P _O =200mW, G _{VD} =34dB	—	0.6	—	%
Power Supply Rejection Ratio (V ⁺ =6V, ΔV ⁺ =3V)	PSRR1	C1=∞, C2=0.01μF, DC	50	—	—	dB
	PSRR2	C1=0.1μF, C2=0, f=1kHz	—	12	—	dB
	PSRR3	C1=1μF, C2=5μF, f=1kHz	—	52	—	dB
Mute Attenuation	MAT	f=1kHz~20kHz, I _{pin} =2V	—	70	—	dB
Output Voltage (R _f =75kΩ, DC)	V _{O1}	V ⁺ =3V, R _L =16Ω	1.00	1.18	1.25	V
	V _{O2}	V ⁺ =6V	—	2.68	—	V
	V _{O3}	V ⁺ =12V	—	5.71	—	V
Output High Level	V _{OH}	I _{OUT} =-75mA, V ⁺ =2~16V	—	V ⁺ -1.1	—	V
Output Low Level	V _{OL}	I _{OUT} =75mA, V ⁺ =2~16V	—	0.21	—	V
Output DC Offset	ΔV _O	R _f =75kΩ, R _L =32Ω, 5pin-8pin	-30	0	+30	mV
Input Bias Current	I _B	4pin	—	-30	-200	nA
Equivalent Resistance	R _{+IN}	3pin	100	150	220	kΩ
	R _{REF}	2pin	18	25	40	kΩ
CD Input Voltage H	V _{CDH}	1pin	2.0	—	V ⁺	V
CD Input Voltage L	V _{C DL}	1pin	0.0	—	0.8	V
CD Input Resistance	R _{CD}	V _{CD} =16V, 1pin	50	75	175	kΩ

(note2) NJM2113M, NJM2113V:At on PC Board

(note3) Not specified for NJM2113V



■ APPLICATION CIRCUIT



Notice: 1. CD—A logic "Low" (<0.8V) sets normal operation.

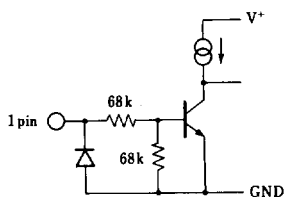
A logic "High" (>2.0V) sets the power down mode.

2. Power supply rejection is provided by C1 and C2.

C2 is unnecessary, if C1 is sufficient capacitances.

3. C1 and C2 also effect the turn-on time of the circuit at power-up.

4. Equivalent Circuit of CD is as in the following diagram.



Equivalent Circuit of CD

5. Normally a snubber is not needed at the output of the NJM2113, un-like many other audio amplifiers (NJM2073 etc.). However the PC board layout, stray capacitances, and the manner in which the speaker wires configured, may dictate otherwise.