

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

### ■ GENERAL DESCRIPTION

The **NJM2770** is a high-power and low-voltage audio power amplifier with standby function. No external coupling capacitors required because of the differential output type. Two external resistors adjust the closed loop gain. The output power is 250mW typical at 3V-supply 8ohm-load, and 400mW typical at 4.5v-supply 16ohm-load. The standby current is only 0.1μA typical.

The package of the **NJM2770** is MSOP8(VSP8)\*, and the **NJM2770** is suitable for PCS, codeless telephone, speaker amplifier for hands free system, and especially cellular phone because of low operating current, low standby current, and high power output.

### ■ PACKAGE OUTLINE



**NJM2770R**  
MSOP8(VSP8)



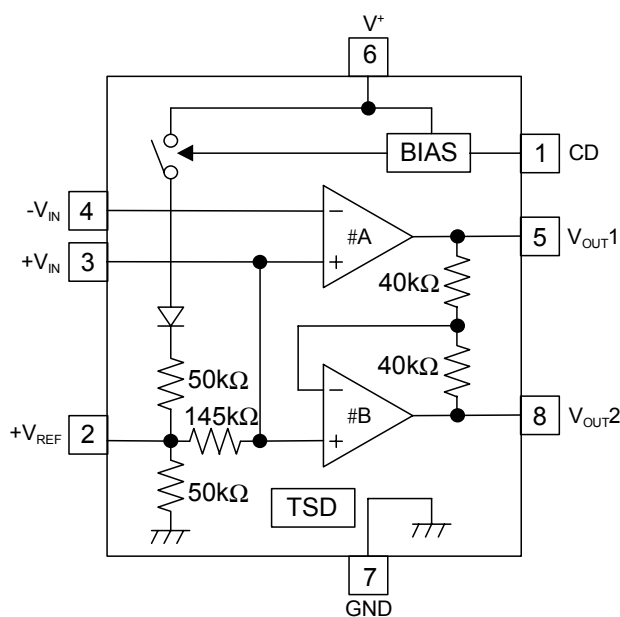
**NJM2770RB1**  
MSOP8(TVSP8)

### ■ FEATURES

- Operating Voltage                            +2-+4.5V
- Operating Current                            2.0mA typ., at  $V^+=3V$
- Low Power-Down Current                    0.1μA typ
- High Power Output 250mW typ.            at  $V^+=3V, R_L=8\Omega$
- 400mW typ.    $V^+=4.5V, R_L=16\Omega$
- Gain Range at Voice Band                 $G_v=0-43dB$
- Load Impedance                             $R_L=4-200\Omega$
- Thermal Shut Down Function
- Bipolar Technology
- Package Outline                              MSOP8 (VSP8)\*   MSOP8 (TVSP8)\*\*

\*MEET JEDEC MO-187-DA   \*\*MEET JEDEC MO-187-DA / THIN TYPE

### ■ PIN CONFIGURATION & BLOCK DIAGRAM



#### Pin Function

- 1. CD
- 2. +V<sub>REF</sub>
- 3. +V<sub>IN</sub>
- 4. -V<sub>IN</sub>
- 5. V<sub>OUT1</sub>
- 6. V<sup>+</sup>
- 7. GND
- 8. V<sub>OUT2</sub>

# NJM2770

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	+5	V
Power Dissipation	P <sub>D</sub>	(MSOP8 (VSP8), MSOP8 (TVSP8)) 400	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +150	°C

## ■ ELECTRICAL CHARACTERISTICS (V<sup>+</sup>=3.0V, R<sub>L</sub>=8Ω, f=1kHz, 1pin=2V, Ta=25°C, unless otherwise specified)

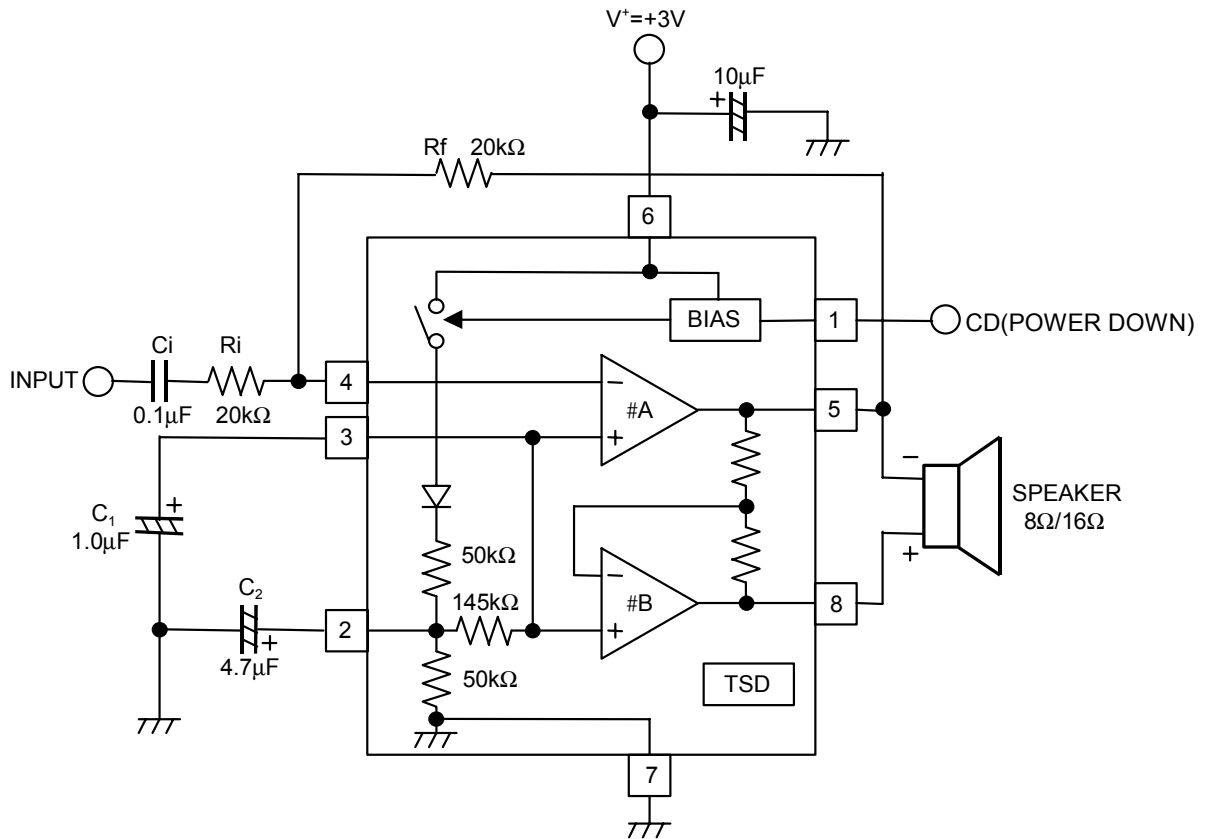
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage Range	V <sup>+</sup>		2.0	-	4.5	V
Operating Current	I <sub>CC</sub>	R <sub>L</sub> =∞, no signal	-	2.0	4.0	mA
Power Down Current	I <sub>CCD</sub>	R <sub>L</sub> =∞ 1pin=0.8V, no signal	-	0.1	1.0	μA
Open Loop Gain	A <sub>V1</sub>	Amp#A, f<100Hz	80	85	-	dB
Closed Loop Gain	A <sub>V2</sub>	Amp#B	-0.35	0	+0.35	dB
Output Power	P <sub>O1</sub>	THD=10%	110	250	-	mW
	P <sub>O2</sub>	V <sup>+</sup> =4.5V, R <sub>L</sub> =16Ω, THD=10%	200	400	-	mW
Total Harmonic Distortion	THD1	P <sub>O</sub> =100mW, G <sub>VD</sub> =6dB	-	0.1	0.5	%
	THD2	V <sup>+</sup> =4.5V, R <sub>L</sub> =16Ω, P <sub>O</sub> =150mW, G <sub>VD</sub> =6dB	-	0.1	-	%
Power Supply Rejection Ratio (V <sup>+</sup> =3.0V-4.5V)	SVR1	C1=∞, C2=0.01μF, DC	50	-	-	dB
	SVR2	C1=0.1μF, C2=0	-	35	-	dB
	SVR3	C1=1.0μF, C2=4.7μF	-	70	-	dB
Mute Attenuation	MAT	f=1kHz-20kHz, 1pin=0.8V	-	80	-	dB
Output Voltage (R <sub>f</sub> =20kΩ, DC)	V <sub>O1</sub>		0.95	1.10	1.25	V
	V <sub>O2</sub>	V <sup>+</sup> =4.5V, R <sub>L</sub> =16Ω	-	1.85	-	V
Output High Level	V <sub>OH</sub>	I <sub>OUT</sub> =-75mA, V <sup>+</sup> =2.0-4.5V	-	V <sup>+</sup> -1.0	-	V
Output Low Level	V <sub>OL</sub>	I <sub>OUT</sub> =75mA, V <sup>+</sup> =2.0-4.5V	-	0.21	-	V
Output DC Offset	ΔV <sub>O</sub>	R <sub>f</sub> =20kΩ, 5pin-8pin	-30	0	+30	mV
Input Bias Current	I <sub>B</sub>	4pin	-100	-	100	nA
Equivalent Resistance	R <sub>+IN</sub>	3pin	100	170	220	kΩ
	R <sub>REF</sub>	2pin	18	26	40	kΩ
CD Input Voltage H	V <sub>CDH</sub>	1pin	2.0	-	V <sup>+</sup>	V
CD Input Voltage L	V <sub>CDL</sub>	1pin	0.0	-	0.8	V
CD Input Resistance	R <sub>CD</sub>	V <sup>+</sup> =V <sub>CD</sub> =4.5V, 1pin	50	85	175	kΩ

## ■ CONTROL TERMINAL EXPLANATION

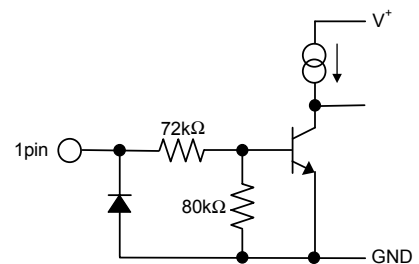
CHIP DISABLE CONTROL(CD PIN)

PARAMETER	CONTROL SIGNAL	STATUS
CD OFF	H(=V <sub>CDH</sub> )	IC is active.
CD ON	L(=V <sub>CDL</sub> )	IC is standby. (with Mute)

## APPLICATION CURCUIT



- note:1.The CD terminal(1pin) should connect High level(>2.0V), when NJM2770 is active.  
 The standby mode, when the CD terminal is Low level(<0.8V).  
 2.To add the C1 and C2 capacitor, the power-supply-rejection-ratio will be improved.  
 When C1 is large value, C2 will be unnecessary.  
 3.The power-up time depend on the C1 and C2 capacitor.  
 4.The input current of CD terminal is as shown below figure.



- 5.No connect oscillation-protect RC required.  
 To connect oscillation-protect RC, if the NJM2770 oscillate with PC board/stray capacitor/long speaker wire and others condition.

## MEMO

**[CAUTION]**

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