

## SINGLE-SUPPLY DUAL OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

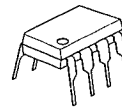
The NJM3404A is high performance single supply dual operational amplifier. The NJM3404A is a half type of the NJM3403A, quad operational amplifier.

The NJM3404A is improved version of the NJM2904 on slew rate & cross-over distortion.

### ■ FEATURES

- Single Supply
- Operating Voltage (+4V ~ +36V)
- Low Operating Current (2.0mA typ.)
- Slew Rate (1.2V/μs typ.)
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

### ■ PACKAGE OUTLINE



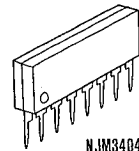
NJM3404AD



NJM3404AM



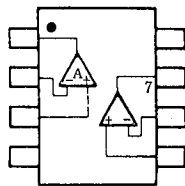
NJM3404AV



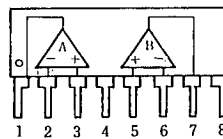
NJM3404AL

\*S-Type (SIP-9) available

### ■ PIN CONFIGURATION



NJM3404AD  
NJM3404AM  
NJM3404AV

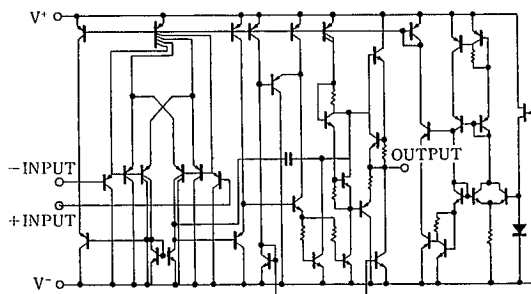


NJM3404AL

#### PIN FUNCTION

1. A OUTPUT
2. A-INPUT
3. A+INPUT
4. V-
5. B+INPUT
6. B-INPUT
7. B OUTPUT
8. V+

### ■ EQUIVALENT CIRCUIT (1/2 Shown)



4

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

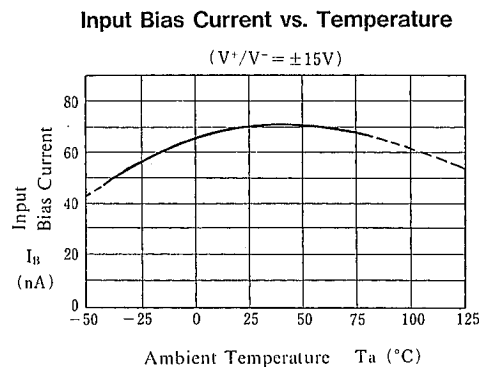
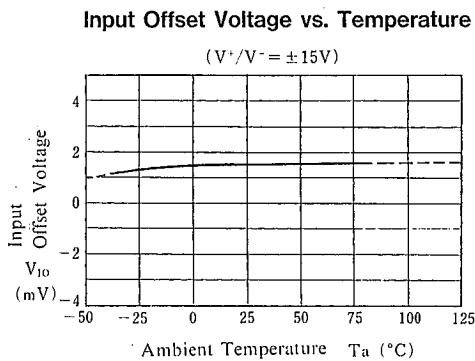
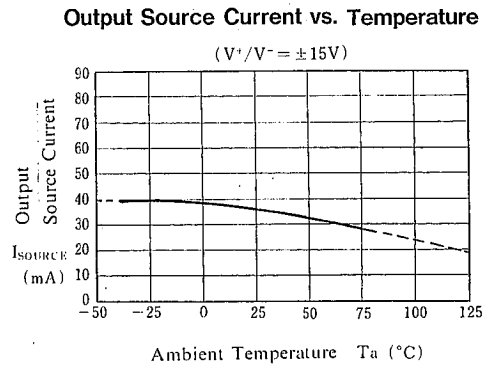
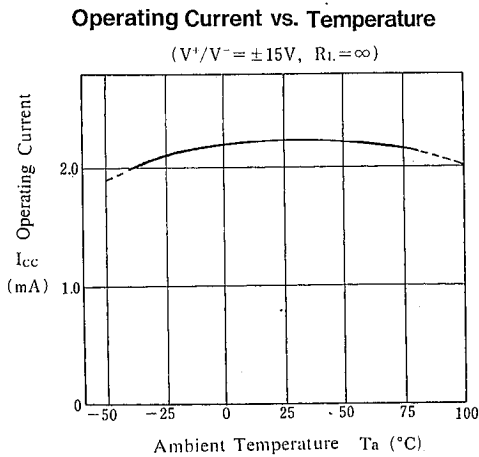
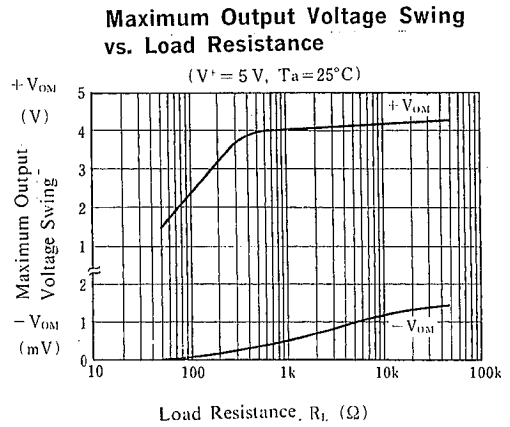
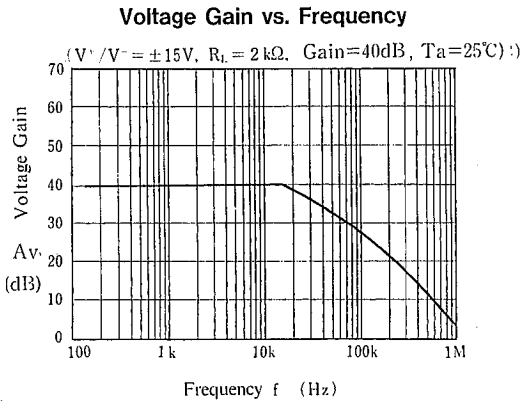
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V*(V+/V-)	36V(or ±18)	V
Differential Input Voltage	V <sub>ID</sub>	36	V
Input Voltage	V <sub>IC</sub>	-0.3 ~ 36	V
Power Dissipation	P <sub>D</sub>	(DIP8) 500	mW
		(DMP8) 300	mW
		(SSOP8) 250	mW
		(SIP8) 800	mW
Operating Temperature Range	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 ~ +125	°C

## ■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V+/V- = ±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> = 0Ω	—	2	5	mV
Input Offset Current	I <sub>IO</sub>		—	5	50	nA
Input Bias Current	I <sub>B</sub>		—	70	200	nA
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> > 2KΩ	88	100	—	dB
Maximum Output Voltage Swing	V <sub>OM</sub>	R <sub>L</sub> = 2kΩ	±13	±14	—	V
Input Common Mode Voltage Range	V <sub>ICM</sub>		-15 ~ +13	—	—	V
Common Mode Rejection Ratio	CMR	DC	70	90	—	dB
Supply Voltage Rejection Ratio	SVR		80	94	—	dB
Operating Current	I <sub>CC</sub>	R <sub>L</sub> = ∞	—	2.0	3.5	mA
Output Source Current	I <sub>SOURCE</sub>	V <sub>IN+</sub> = 1V, V <sub>IN-</sub> = 0V	20	30	—	mA
Output Sink Current	I <sub>SINK</sub>	V <sub>IN+</sub> = 0V, V <sub>IN-</sub> = 1V	10	20	—	mA
Slew Rate	SR		—	1.2	—	v/μS
Unity Gain Bandwidth	f <sub>T</sub>	—	—	1.2	—	MHz

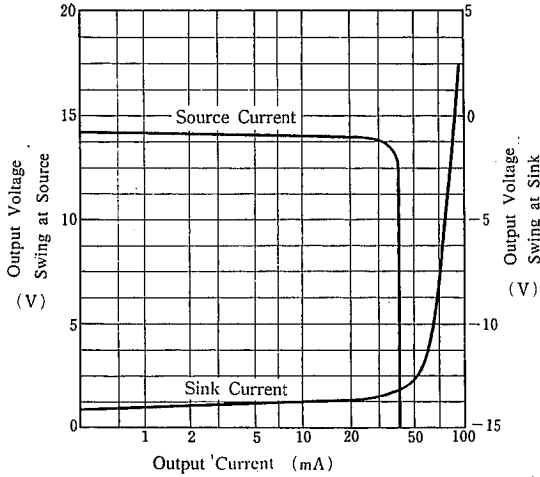
■ TYPICAL CHARACTERISTICS



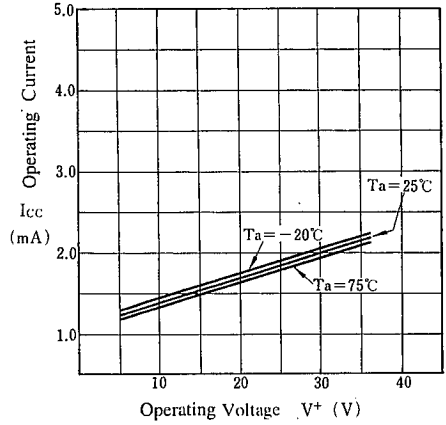
## ■ TYPICAL CHARACTERISTICS

**Output Source Current  
Output Sink Current  
vs. Output Voltage Swing**

( $V^+/V^- = \pm 15V$ ,  $T_a = 25^\circ C$ )

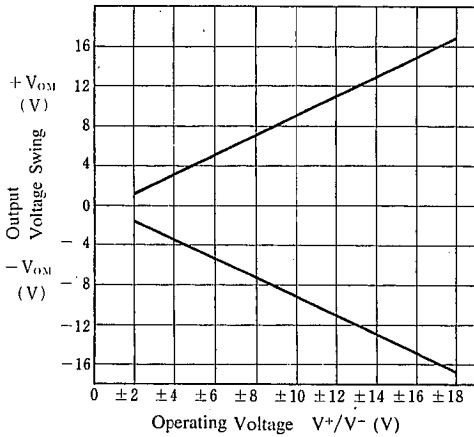


**Operating Current  
vs. Operating Voltage**



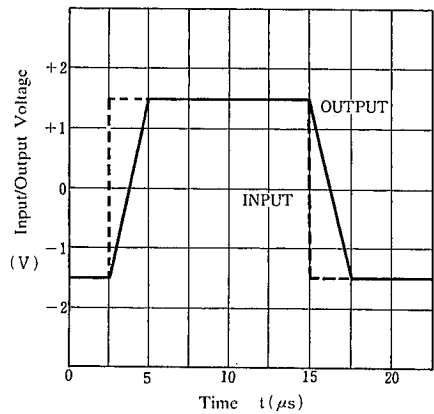
**Output Voltage Swing vs. Operating Voltage**

( $R_L = 2k\Omega$ ,  $T_a = 25^\circ C$ )



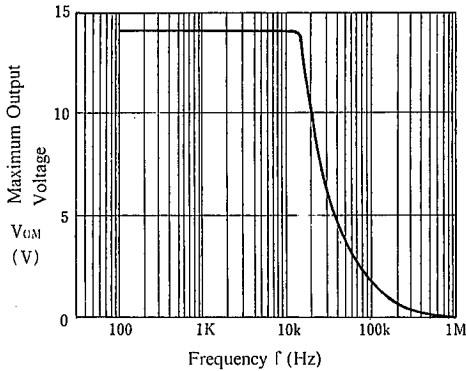
**Pulse Response**

( $V^+/V^- = \pm 15V$ ,  $R_L > 2k\Omega$ ,  $A_v = 1$ ,  $T_a = 25^\circ C$ )



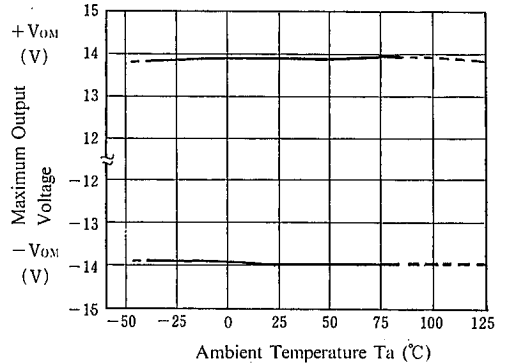
**Maximum Output Voltage vs. Frequency**

( $V^+/V^- = \pm 15V$ ,  $R_L = 2k\Omega$ ,  $T_a = 25^\circ C$ )



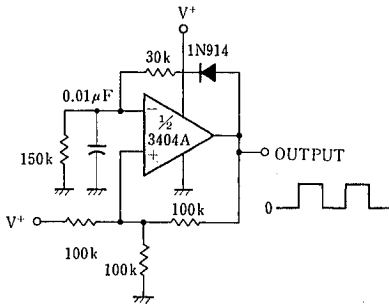
**Maximum Output Voltage vs. Temperature**

( $V^+/V^- = \pm 15V$ ,  $R_L = 2k\Omega$ )

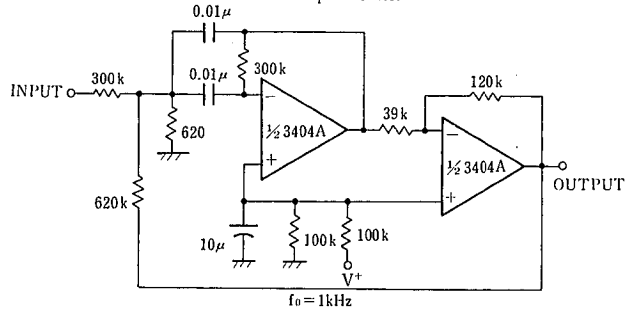


■ TYPICAL APPLICATIONS

Square Wave Oscillator



Bandpass Filter



## MEMO

[CAUTION]

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