



## DUAL LOW POWER OPERATIONAL AMPLIFIER

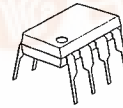
### ■ GENERAL DESCRIPTION

The NJM022B is a dual low-power operational amplifier. Like the NJM022, the NJM022B is the wide operating voltage range, high input impedance, low operating current, low input noise voltage, internally frequency compensated, latch-up free, high slew rate amplifier with the short circuit protection. The NJM022B is twice the slew rate and half the input noise voltage comparing to the NJM022 with increased operating current.

### ■ FEATURES

- Operating Voltage ( $\pm 2V \sim \pm 18V$ )
- Low Operating Current ( $250 \mu A$  typ)
- Slew Rate ( $1V/\mu s$  typ)
- Short-Circuit Protection
- Package Outline DIP8, DMP8, SIP8, (SSOP8)
- Bipolar Technology

### ■ PACKAGE OUTLINE



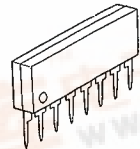
NJM022BD



NJM022BM

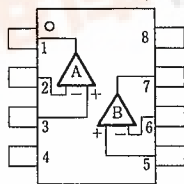


NJM022BV

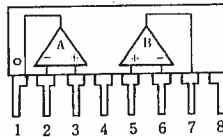


NJM022BL

### ■ PIN CONFIGURATION



NJM022BD  
NJM022BM  
NJM022BV

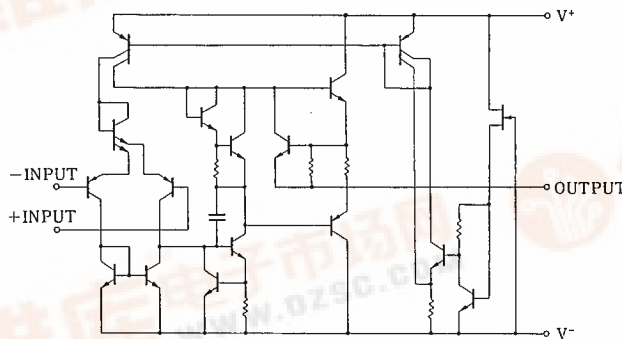


NJM022BL

#### 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)



## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup> /V <sup>-</sup>	±18	V
Input Voltage	V <sub>IC</sub>	±15	V
Differential Input Voltage	V <sub>ID</sub>	±30	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

(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

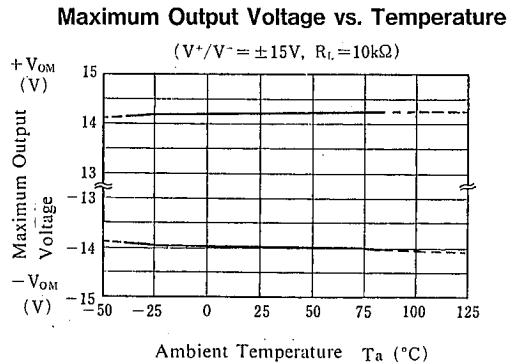
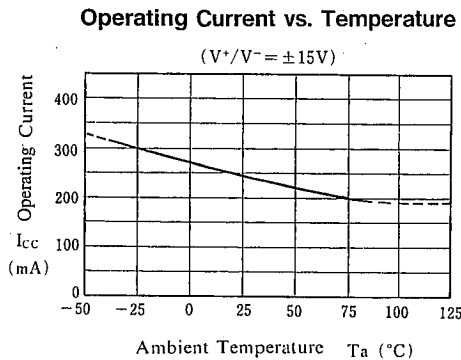
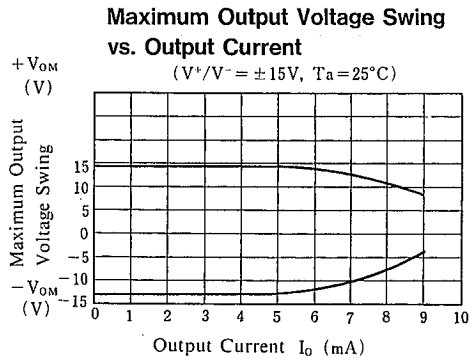
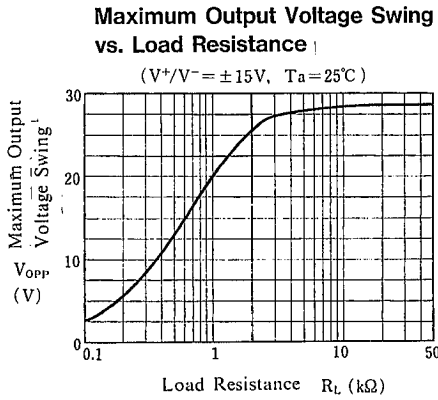
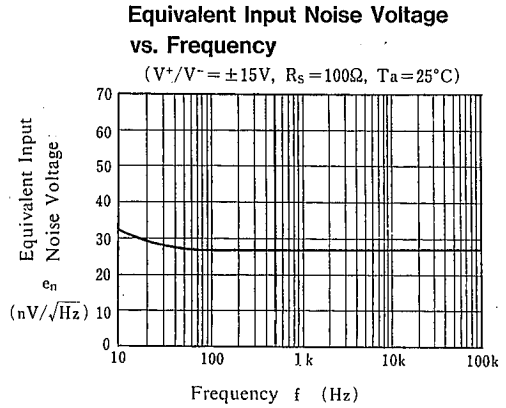
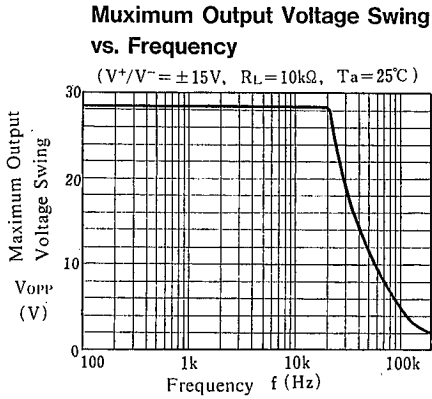
## ■ ELECTRICAL CHARACTERISTICS

(Ta = +25°C, V<sup>+</sup>/V<sup>-</sup> = ±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤ 10kΩ	—	1	5	mV
Input Offset Current	I <sub>IO</sub>		—	1	80	nA
Input Bias Current	I <sub>B</sub>		—	20	250	nA
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> ≥ 10kΩ, V <sub>O</sub> = ±10V	60	88	—	dB
Common Mode Rejection Ratio	CMR	R <sub>S</sub> ≤ 10kΩ	60	92	—	dB
Response Time (Rise Time)	t <sub>R</sub>	V <sub>IN</sub> = 20mV, R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 100pF	—	0.18	—	μs
Slew Rate	SR	V <sub>IN</sub> = 10V, R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 100pF	—	1	—	V/μs
Input Common Mode Voltage Range	V <sub>ICM</sub>		±12	±13	—	V
Supply Voltage Rejection Ratio	SVR	R <sub>S</sub> ≤ 10kΩ	74	110	—	dB
Equivalent Input Noise Voltage	V <sub>NI</sub>	A <sub>V</sub> = 20dB, f = 1kHz	—	25	—	nV/√Hz
Short-circuit Output Current	I <sub>OS</sub>		—	±8	—	mA
Operating Current	I <sub>CC</sub>		—	250	500	μA
Maximum Peak-to-Peak Output Voltage	V <sub>OM</sub>	R <sub>L</sub> = 10kΩ	±10	±14	—	V

# NJM022B

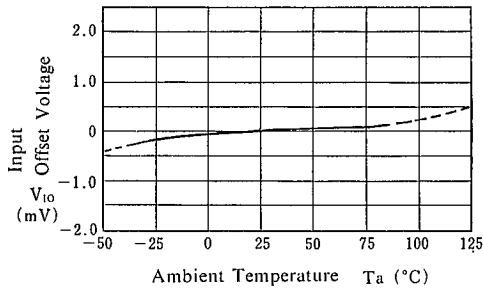
## TYPICAL CHARACTERISTICS



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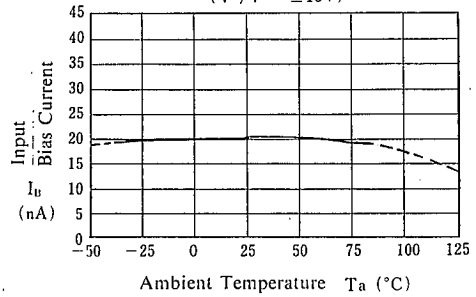
### Input Offset Voltage vs. Temperature

( $V^+/V^- = \pm 15V$ )



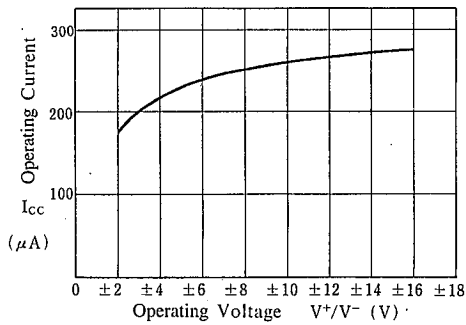
### Input Bias Current vs. Temperature

( $V^+/V^- = \pm 15V$ )



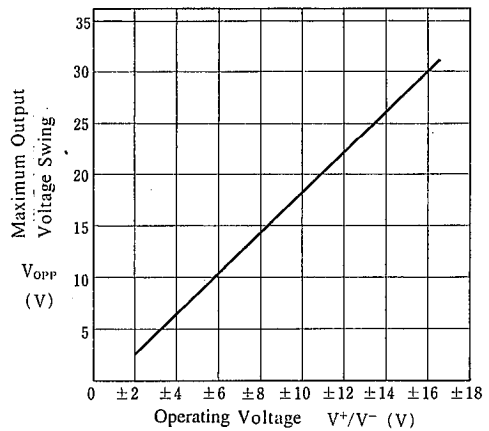
### Operating Current vs. Operating Voltage

(No Input Signal.  $R_L = \infty$ ,  $T_a = 25^\circ C$ )



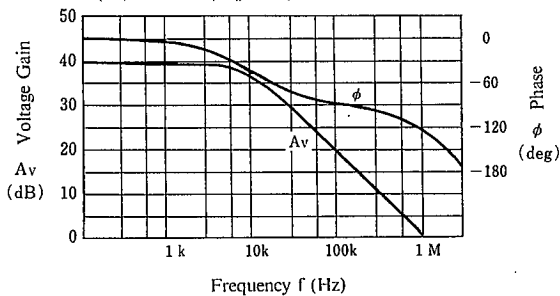
### Maximum Output Voltage Swing vs. Operating Voltage

( $R_L = 10k\Omega$ ,  $T_a = 25^\circ C$ )



### Voltage Gain, Phase vs. Frequency

( $V^+/V^- = \pm 15V$ ,  $R_L = 2k\Omega$ , 40dB Am,  $T_a = 25^\circ C$ )



# NJM022B

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## MEMO

**[CAUTION]**

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