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New Japan Radio Co.,Ltd.

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## DUAL LOW POWER OPERATIONAL AMPLIFIER

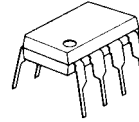
### ■ GENERAL DESCRIPTION

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
- Bipolar Technology

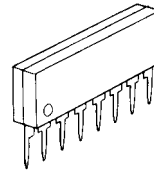
### ■ PACKAGE OUTLINE



NJM022BD

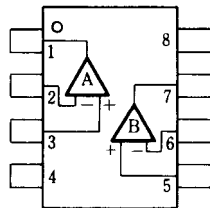


NJM022BM

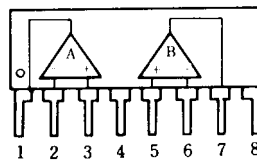


NJM022BL

### ■ PIN CONFIGURATION



NJM022BD  
NJM022BM

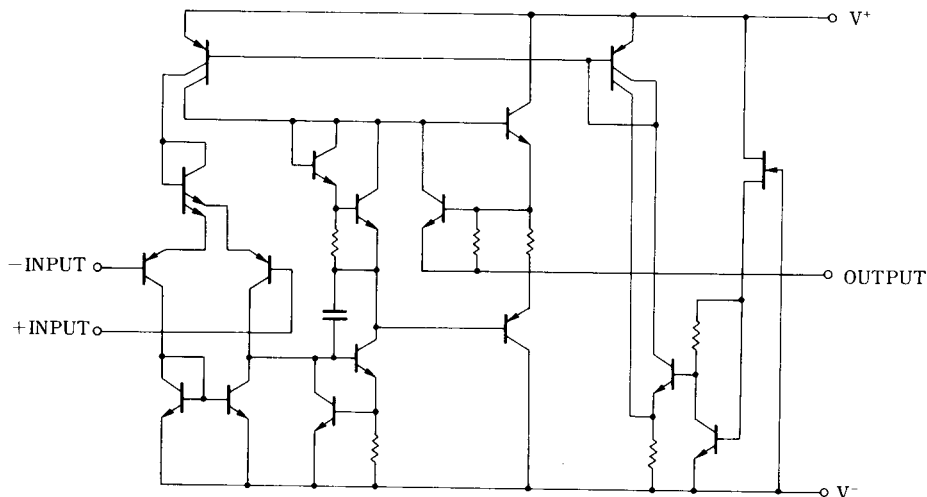


NJM022BL

### PIN FUNCTION

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

### ■ EQUIVALENT CIRCUIT ( 1/2 Shown )



# NJM022B

## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ / V^-$	$\pm 18$	V
Input Voltage	$V_{IC}$	$\pm 15$	V
Differential Input Voltage	$V_{ID}$	$\pm 30$	V
Power Dissipation	$P_D$	( DIP8 ) 500 ( DMP8 ) 300 ( SIP8 ) 800	mW
Operating Temperature Range	$T_{opr}$	-40~+85	°C
Storage Temperature Range	$T_{stg}$	-40~+125	°C

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

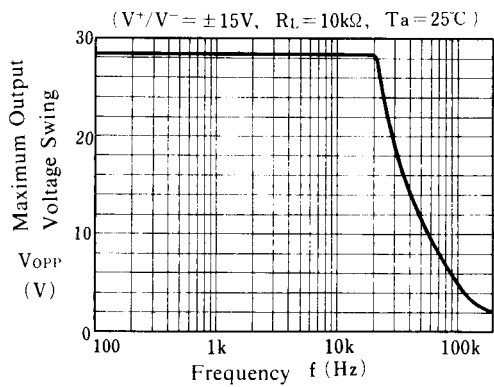
## ■ ELECTRICAL CHARACTERISTICS

( Ta=+25°C,  $V^+ / V^- = \pm 15V$  )

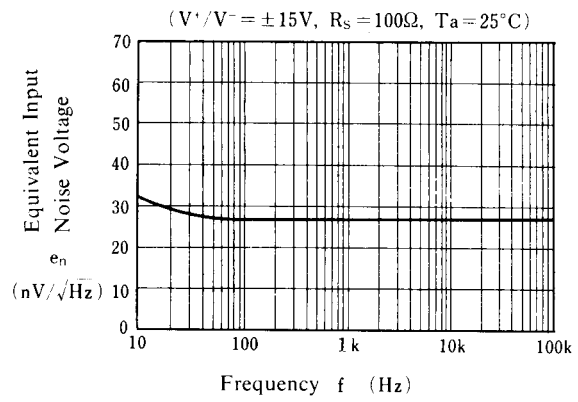
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	$V_{IO}$	$R_S \leq 10k\Omega$	-	1	5	mV
Input Offset Current	$I_{IO}$		-	1	80	nA
Input Bias Current	$I_B$		-	20	250	nA
Large Singal Voltage Gain	$A_V$	$R_L \geq 10k\Omega, V_O = \pm 10V$	60	88	-	dB
Common Mode Rejection Ratio	CMR	$R_S \leq 10k\Omega$	60	92	-	dB
Response Time ( Rise Time )	$t_R$	$V_{IN} = 20mV, R_L = 10k\Omega, C_L = 100pF$	-	0.18	-	$\mu s$
Slew Rate	SR	$V_{IN} = 10V, R_L = 10k\Omega, C_L = 100pF$	-	1	-	V/ $\mu s$
Input Common Mode Voltage Range	$V_{ICM}$		$\pm 12$	$\pm 13$	-	V
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10k\Omega$	74	110	-	dB
Equivalent Input Noise Voltage	$e_n$	$A_V = 20dB, f = 1kHz$	-	25	-	nV/ $\sqrt{Hz}$
Short-circuit Output Current	$I_{OS}$		-	$\pm 8$	-	mA
Operating Current	$I_{CC}$		-	250	500	$\mu A$
Maximum Peak-to-Peak Output Voltage	$V_{OM}$	$R_L = 10k\Omega$	$\pm 10$	$\pm 14$	-	V

## ■ TYPICAL CHARACTERISTICS

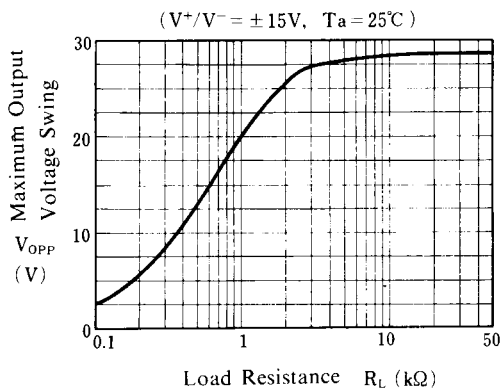
**Maximum Output Voltage Swing vs. Frequency**



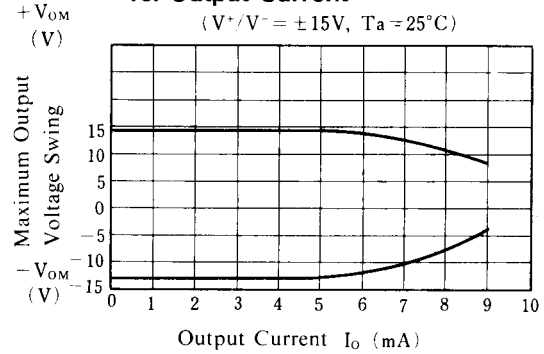
**Equivalent Input Noise Voltage vs. Frequency**



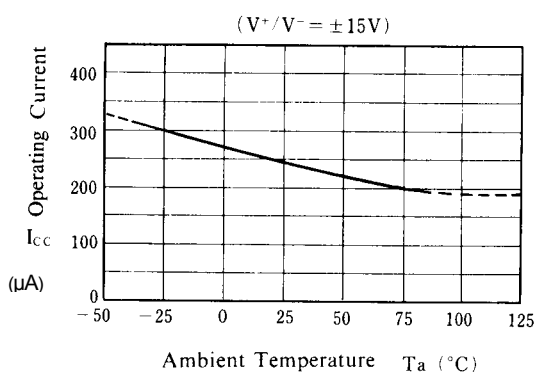
**Maximum Output Voltage Swing vs. Load Resistance**



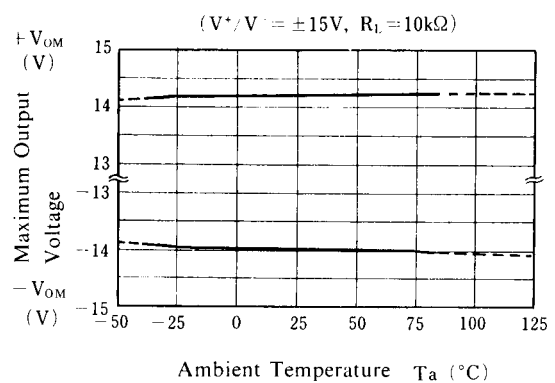
**Maximum Output Voltage Swing vs. Output Current**



**Operating Current vs. Temperature**

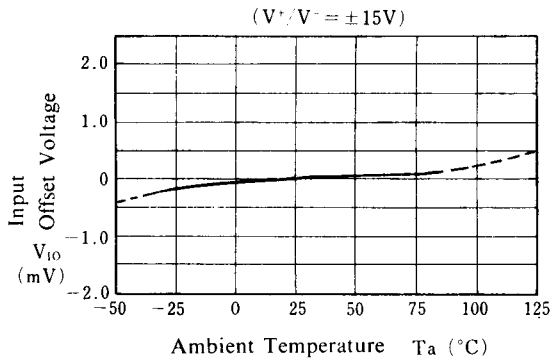


**Maximum Output Voltage vs. Temperature**

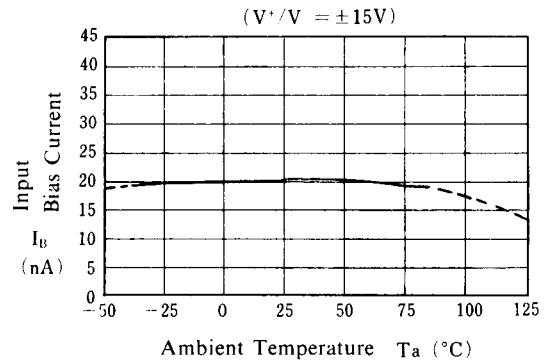


## ■ TYPICAL CHARACTERISTICS

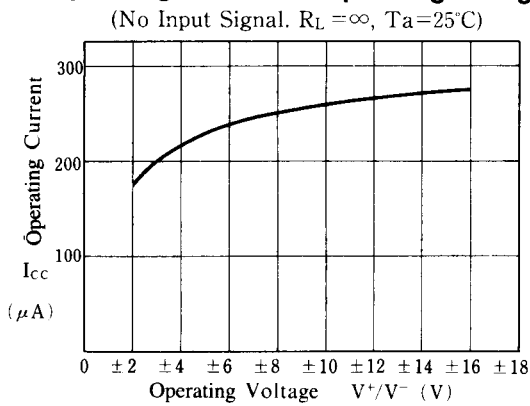
**Input Offset Voltage vs. Temperature**



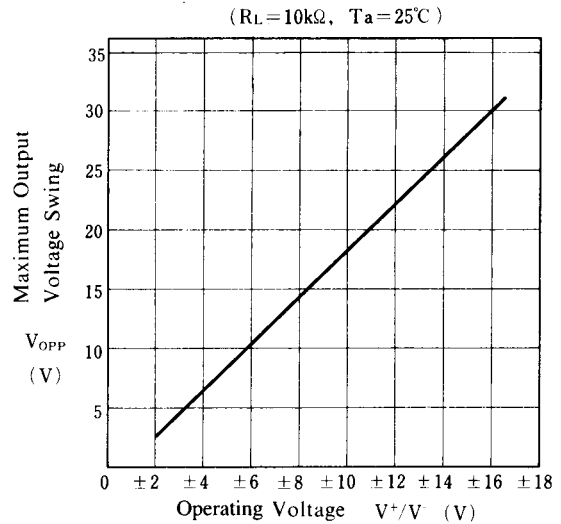
**Input Bias Current vs. Temperature**



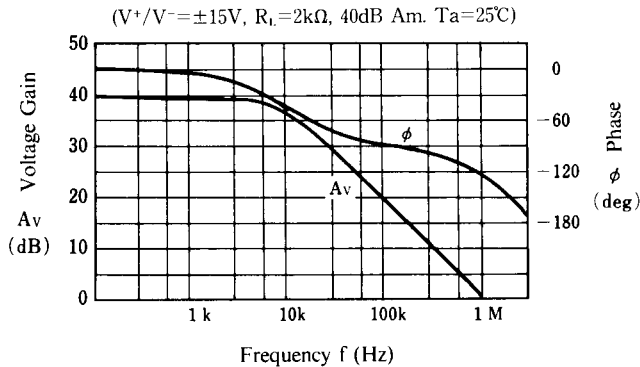
**Operating Current vs. Operating Voltage**



**Maximum Output Voltage Swing vs. Operating Voltage**



**Voltage Gain, Phase vs. Frequency**



**[CAUTION]**

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