

## DUAL LOW POWER OPERATIONAL AMPLIFIER

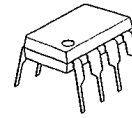
### ■ GENERAL DESCRIPTION

The NJM022 is a dual low-power operational amplifier which was designed to replace higher-power devices in many applications without sacrificing system performance. High input impedance, low supply currents, and low equivalent input noise voltage over a wide range of operating supply voltages result in an extremely versatile operational amplifier for use in a variety of analog applications including battery-operated circuit. Internal frequency compensation, absence of latch-up, high slew rate, and short-circuit protection assure ease of use.

### ■ FEATURES

- Operating Voltage ( $\pm 2V \sim \pm 18V$ )
- Low Operating Current ( $130 \mu A$  typ.)
- Slew Rate ( $0.5V/\mu s$  typ.)
- Short-Circuit Protection
- Package Outline DIP8, DMP8, SSOP8, SIP8
- Bipolar Technology

### ■ PACKAGE OUTLINE



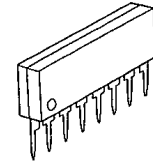
NJM022D



NJM022M

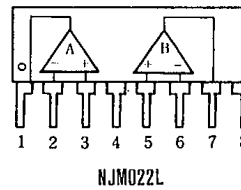
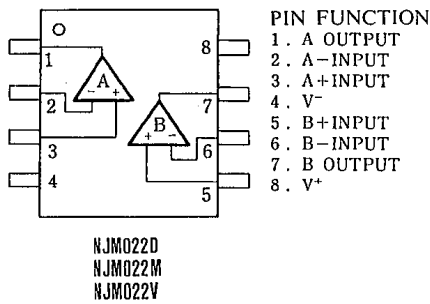


NJM022V

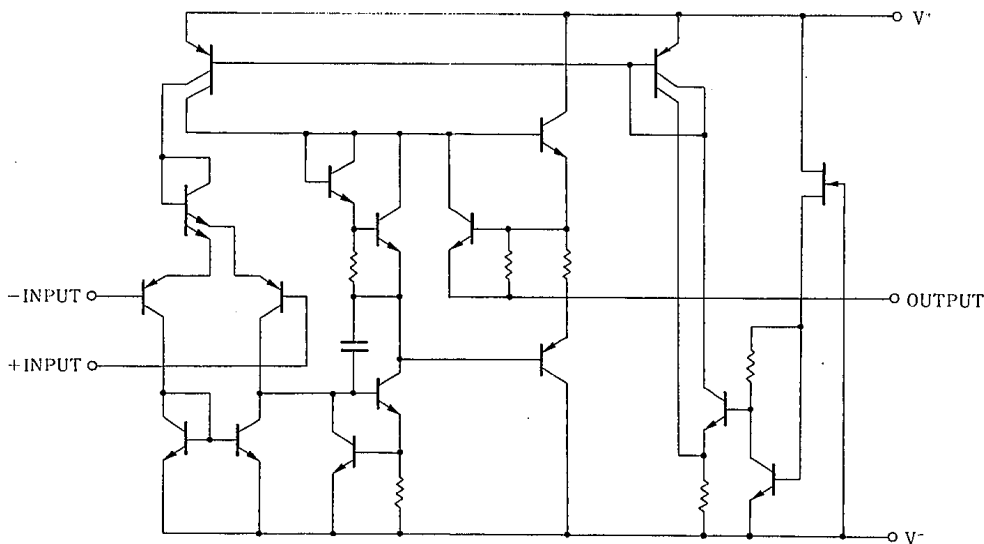


NJM022L

### ■ PIN CONFIGURATION



### ■ 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) 300	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

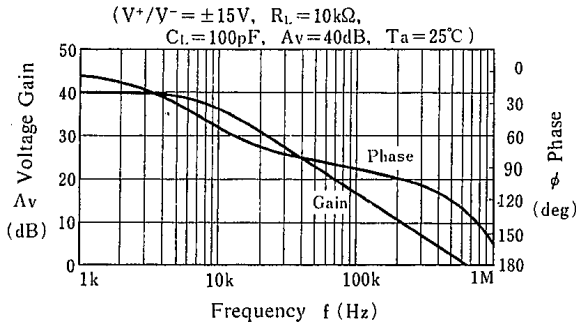
(Ta =+25°C, V<sup>+</sup>/V<sup>-</sup> =±15V)

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>IB</sub>		—	15	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	90	—	dB
Response Time (Rise Time)	t <sub>r</sub>	V <sub>IN</sub> = 20mV, R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 100pF	—	0.3	—	μs
Slew Rate	SR	V <sub>IN</sub> = 10V, R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 100pF	—	0.5	—	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	—	50	—	nV/√Hz
Short-circuit Output Current	I <sub>OS</sub>		—	±6	—	mA
Operating Current	I <sub>CC</sub>		—	130	250	μA
Maximum Peak-to-peak Output Voltage Swing	V <sub>OM</sub>	R <sub>L</sub> = 10kΩ	±10	±14	—	V

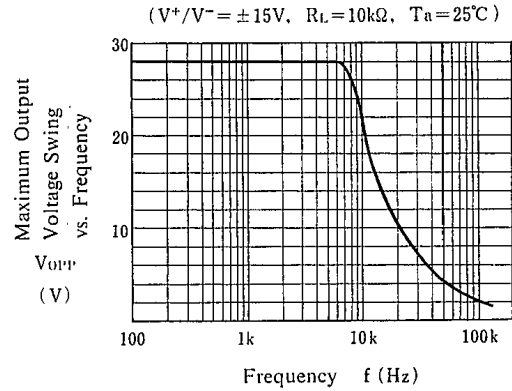
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## TYPICAL CHARACTERISTICS

### Voltage Gain, Phase vs. Frequency

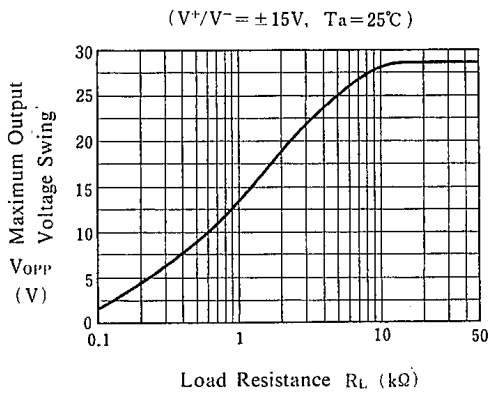


### Maximum Output Voltage Swing vs. Frequency

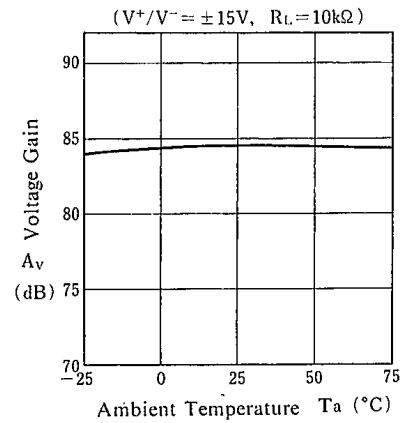


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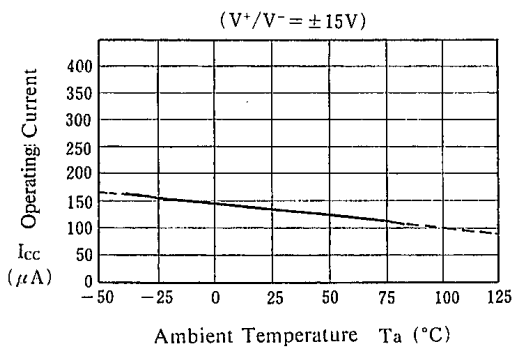
### Maximum Output Voltage Swing vs. Load Resistance



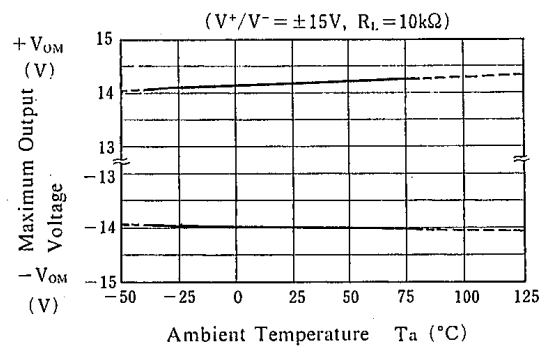
### Voltage Gain vs. Temperature



### Operating Current vs. Temperature

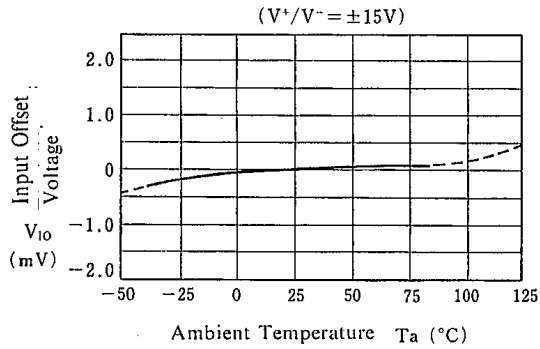


### Maximum Output Voltage vs. Temperature

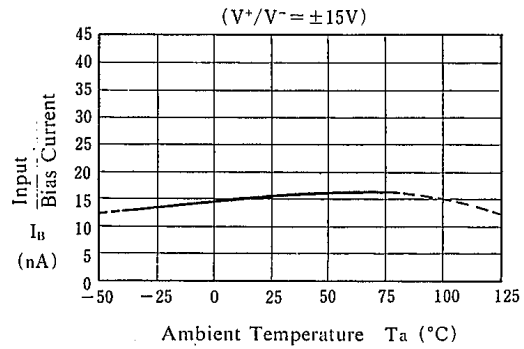


■ TYPICAL CHARACTERISTICS

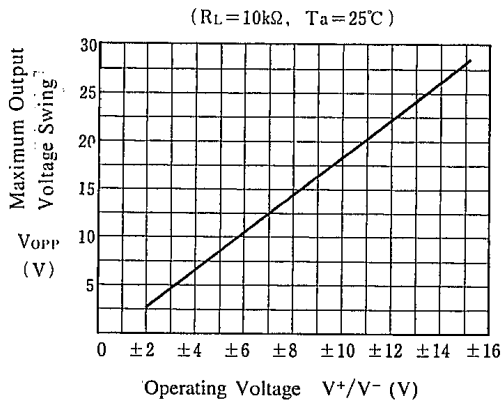
Input Offset Voltage vs. Temperature



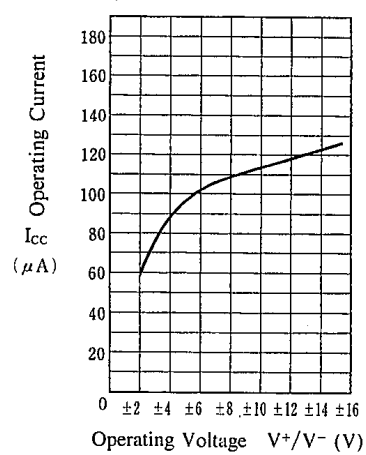
Input Bias Current vs. Temperature



Maximum Output Voltage Swing vs. Operating Voltage



Operating Current vs. Operating Voltage



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## MEMO

**[CAUTION]**

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