

DUAL LOW POWER OPERATIONAL AMPLIFIER

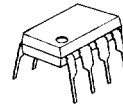
■ GENERAL DESCRIPTION

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 $(0.5V/\mu s \text{ typ.})$
- Short-Circuit Protection
- Package Outline DIP8, DMP8, SSOP8, SIP8
- Bipolar Technology

■ PACKAGE OUTLINE



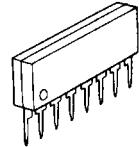
NJM022D



NJM022M

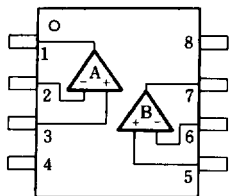


NJM022V



NJM022L

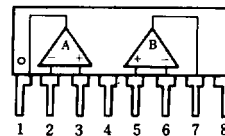
■ PIN CONFIGURATION



NJM022D
NJM022M
NJM022V

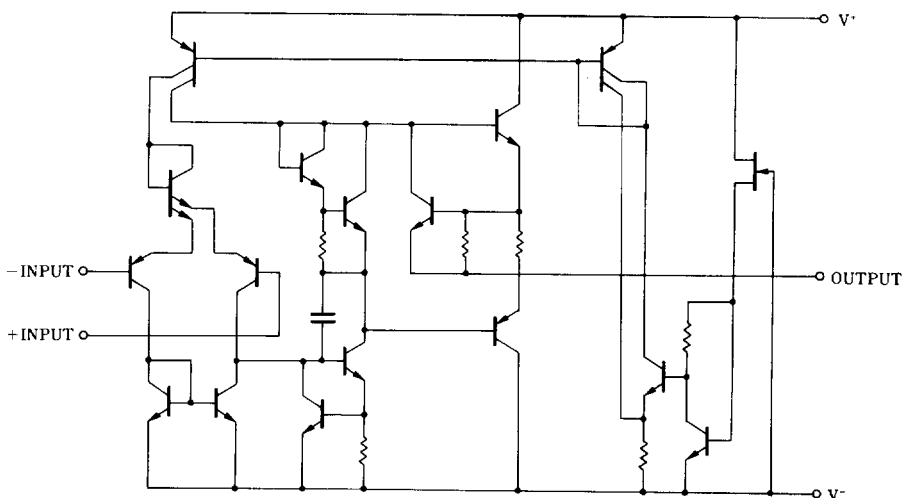
PIN FUNCTION

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



NJM022L

■ EQUIVALENT CIRCUIT (1/2 Shown)





■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺ /V ⁻	± 18	V
Input Voltage	V _{IC}	± 15	V
Differential Input Voltage	V _{ID}	± 30	V
Power Dissipation	P _D	(DIP8) 500	mW
		(DMP8) 300	mW
		(SSOP8) 300	mW
		(SIP8) 800	mW
Operating Temperature Range	T _{opr}	-20 ~ +75	°C
Storage Temperature Range	T _{stg}	-40 ~ +125	°C

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

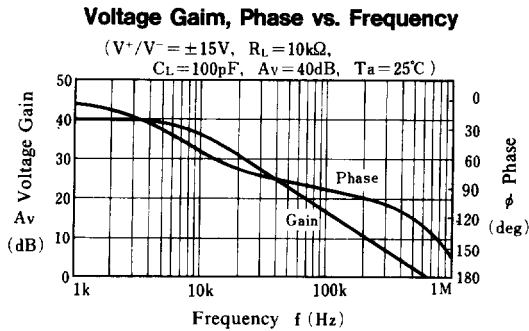
■ ELECTRICAL CHARACTERISTICS

(Ta = +25°C, V⁺/V⁻ = ±15V)

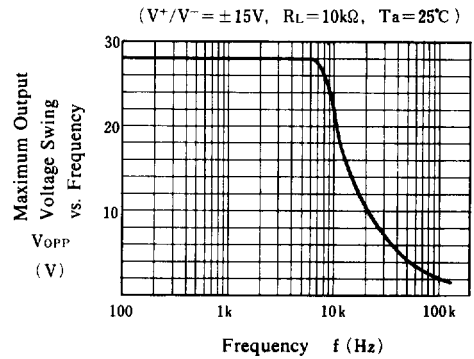
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V _{IO}	R _S ≤ 10kΩ	—	1	5	mV
Input Offset Current	I _{IO}		—	1	80	nA
Input Bias Current	I _{IB}		—	15	250	nA
Large Signal Voltage Gain	A _V	R _L ≥ 10kΩ, V _O = ±10V	60	88	—	dB
Common Mode Rejection Ratio	CMR	R _S ≤ 10kΩ	60	90	—	dB
Response Time (Rise Time)	t _R	V _{IN} = 20mV, R _L = 10kΩ, C _L = 100pF	—	0.3	—	μs
Slew Rate	SR	V _{IN} = 10V, R _L = 10kΩ, C _L = 100pF	—	0.5	—	V/μs
Input Common Mode Voltage Range	V _{ICM}		±12	±13	—	V
Supply Voltage Rejection Ratio	SVR	R _S ≤ 10kΩ	74	110	—	dB
Equivalent Input Noise Voltage	V _{NI}	A _V = 20dB, f = 1kHz	—	50	—	nV/√Hz
Short-circuit Output Current	I _{OS}		—	±6	—	mA
Operating Current	I _{CC}		—	130	250	μA
Maximum Peak-to-peak Output Voltage Swing	V _{OM}	R _L = 10kΩ	±10	±14	—	V



TYPICAL CHARACTERISTICS

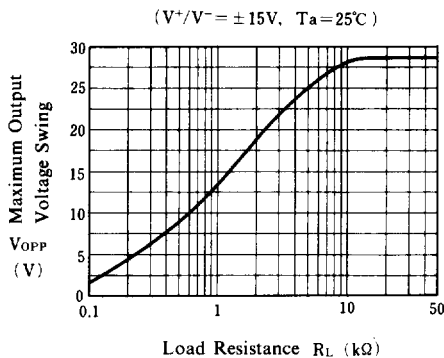


Maximum Output Voltage Swing vs. Frequency

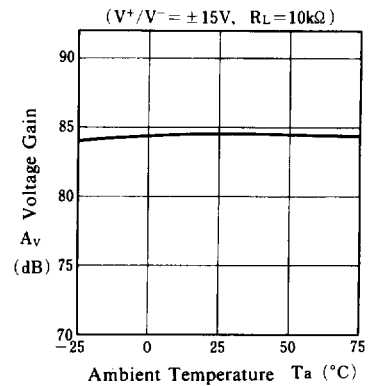


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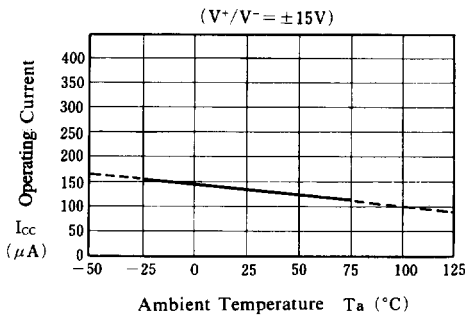
Maximum Output Voltage Swing vs. Load Resistance



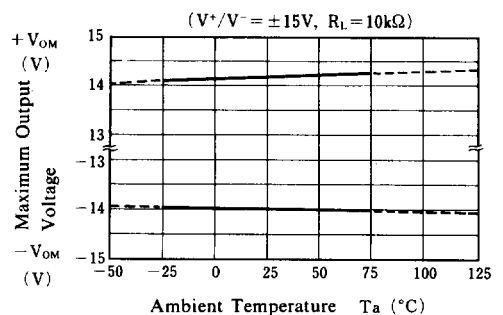
Voltage Gain vs. Temperature



Operating Current vs. Temperature



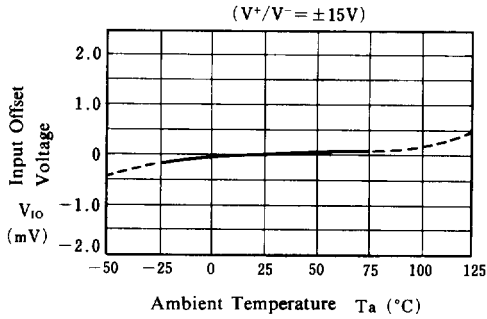
Maximum Output Voltage vs. Temperature



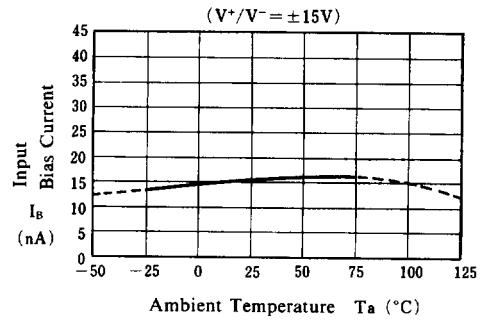


■ TYPICAL CHARACTERISTICS

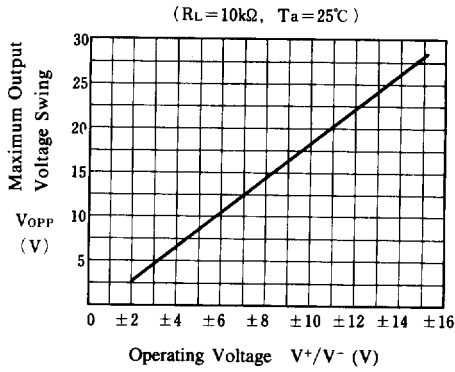
Input Offset Voltage vs. Temperature



Input Bias Current vs. Temperature



Maximum Output Voltage Swing vs. Operating Voltage



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

