

DUAL OPERATIONAL AMPLIFIER

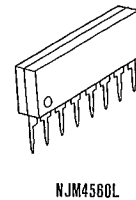
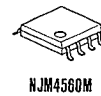
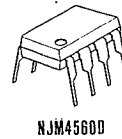
■ GENERAL DESCRIPTION

The NJM4560 integrated circuit is a high-gain, wide-bandwidth, dual operational amplifier capable of driving 20V peak-to-peak into 400 Ω loads. The NJM4560 combines many of the features of the NJM4558 as well as providing the capability of wider bandwidth, and higher slew rate make the NJM4560 ideal for active filters, data and telecommunications, and many instrumentation applications. The availability of the NJM4560 in the surface mounted micro-package allows the NJM4560 to be used in critical applications requiring very high packing densities.

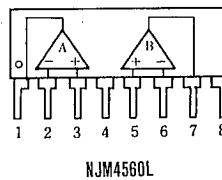
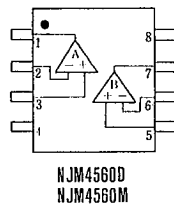
■ FEATURES

- Operating Voltage ($\pm 4V \sim \pm 18V$)
- Wide Gain Bandwidth Product (10MHz typ.)
- Slew Rate ($4V/\mu s$ typ.)
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

■ PACKAGE OUTLINE



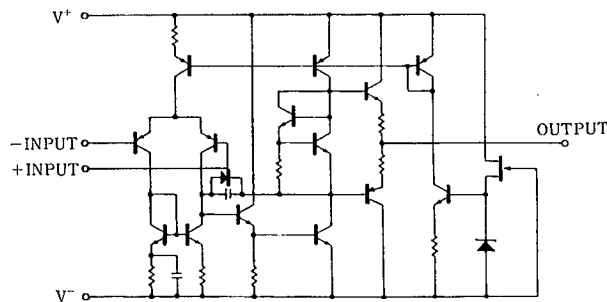
■ PIN CONFIGURATION



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 ⁺ /V ⁻ | ±18 | V |
| Differential Input Voltage | V _{ID} | ±30 | V |
| Input Voltage | V _{IC} | ±15 (note) | V |
| Power Dissipation | P _D | (DIP8) 500 | mW |
| | | (DMP8) 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

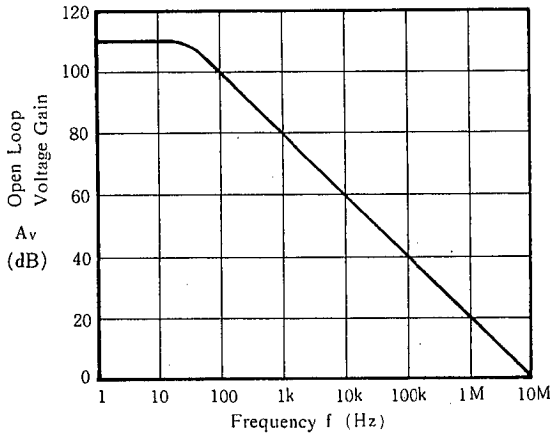
(Ta=25°C, V⁺/V⁻=±15V)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|------------------|---|------|-------|------|-------------------|
| Input Offset Voltage | V _{IO} | R _S ≤10kΩ | — | 0.5 | 6 | mV |
| Input Offset Current | I _{IO} | | — | 5 | 200 | nA |
| Input Bias Current | I _B | | — | 40 | 500 | nA |
| Input Resistance | R _{IN} | | 0.3 | 5 | — | MΩ |
| Large Signal Voltage Gain | A _V | R _L ≥2kΩ, V _O =±10V | 86 | 100 | — | dB |
| Maximum Output Voltage 1 | V _{OM1} | R _L ≥2kΩ | ±12 | ±14 | — | V |
| Maximum Output Voltage 2 | V _{OM2} | I _O =25mA | ±10 | ±11.5 | — | V |
| Input Common Mode Voltage Range | V _{ICM} | | ±12 | ±14 | — | V |
| Common Mode Rejection Ratio | CMR | R _S ≤10kΩ | 70 | 90 | — | dB |
| Supply Voltage Rejection Ratio | SVR | R _S ≤10kΩ | 76.5 | 90 | — | dB |
| Operating Current | I _{CC} | | — | 4.3 | 5.7 | mA |
| Slew Rate | SR | | — | 4 | — | V/μs |
| Gain Bandwidth Product | GB | | — | 10 | — | MHz |
| Equivalent Input Noise Voltage | V _{NI} | RIAA, R _S =2kΩ, 30kHz LPF | — | 1.2 | — | μV _{rms} |

■ TYPICAL CHARACTERISTICS

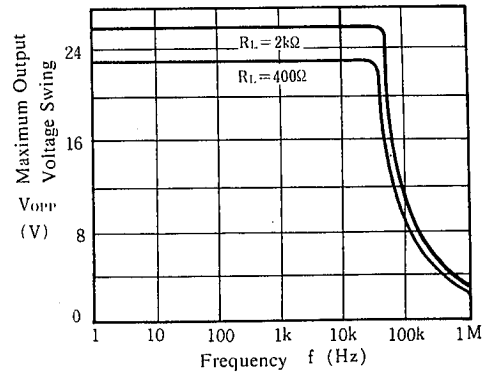
Open Loop Voltage Gain
vs. Frequency

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



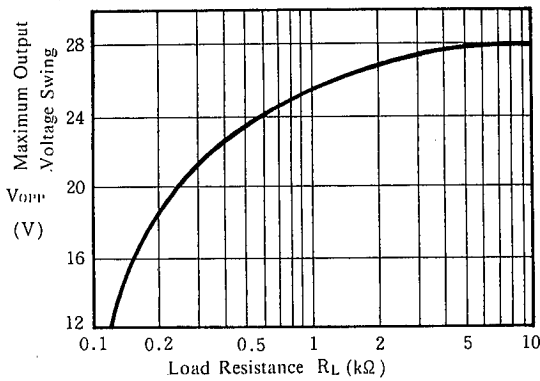
Maximum Output Voltage Swing
vs. Frequency

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



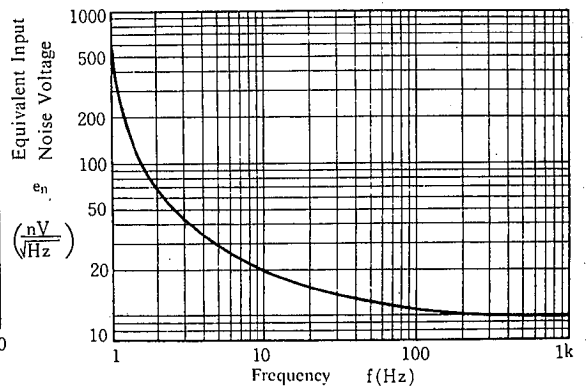
Maximum Output Voltage Swing
vs. Load Resistance

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



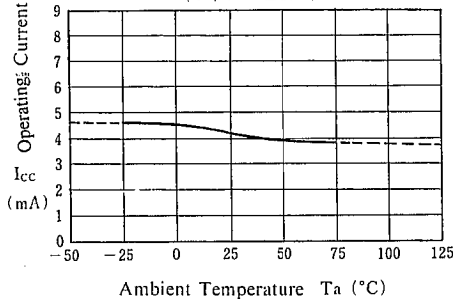
Equivalent Input Noise Voltage
vs. Frequency

($V^+/V^- = \pm 15V$, $R_s = 50\Omega$, $A_v = 60dB$, $T_a = 25^\circ C$)



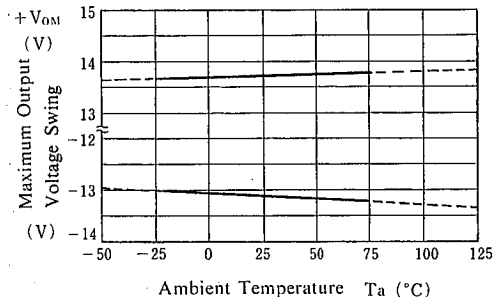
Operating Current vs. Temperature

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



Maximum Output Voltage Swing
vs. Temperature

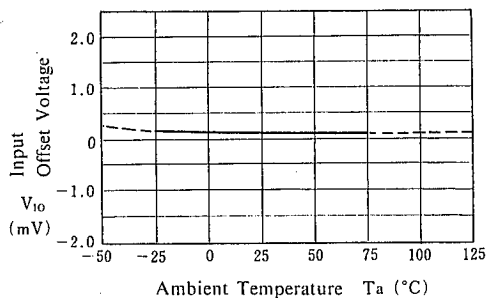
($V^+/V^- = \pm 15V$, $R_L = 2k\Omega$)



TYPICAL CHARACTERISTICS

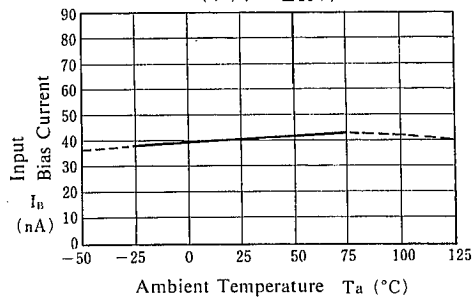
Input Offset Voltage vs. Temperature

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



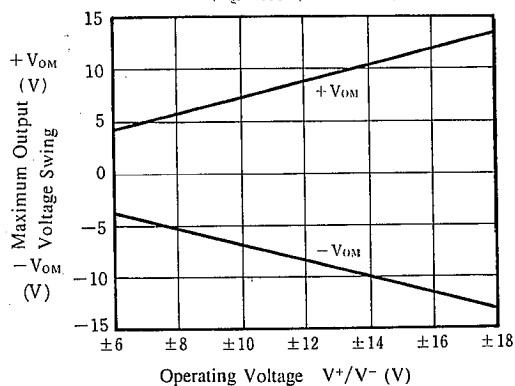
Input Bias Current vs. Temperature

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



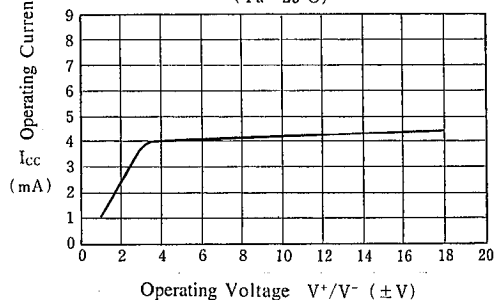
Maximum Output Voltage Swing vs. Supply Voltage

($R_L = 400\Omega$, $T_a = 25^\circ C$)



Operating Current vs. Operating Voltage

($T_a = 25^\circ C$)



NJM4560

MEMO

[CAUTION]

The specifications on this databook are only given for information , without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.