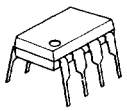
# DUAL HIGH CURRENT OPERATIONAL AMPLIFIER

## ■ GENERAL DESCRIPTION

The NJM4556A integrated circuit is a high-gain, high output current dual operational amplifier capable of driving ±70mA into 150 Ω loads (±10.5V output voltage), and operating low supply voltage ($V^+/V^-$=±2V~).

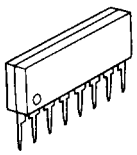
The NJM4556A combines many of the fetures of the popular NJM4558 as well as having the capability of driving 150Ω loads. In addition, the wide band-width, low noise, high slew rate and low distortion of the NJM4556A make it ideal for many audio, telecommunications and instrumentation applications.

## ■ PACKAGE OUTLINE

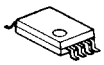


NJM4556AD

NJM4556AM



NJM4556AL

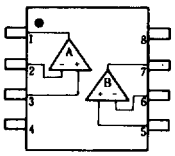


NJM4556AV

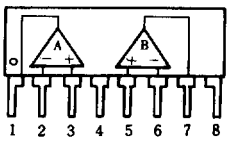
## ■ FEATURES

- Operating Voltage (±2V~±18V)
- High Output Current (Io=70mA)
- Slew Rate (3V/μs typ.)
- Gain Band Width Product (8MHz typ.)
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

## ■ PIN CONFIGURATION



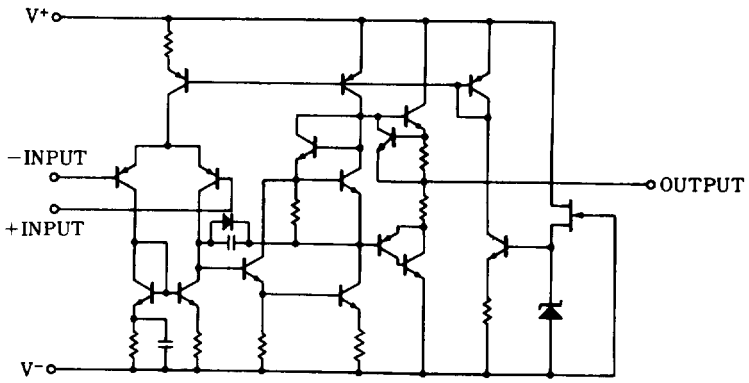

NJM4556AD
NJM4556AM
NJM4556AV




NJM4556AL

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℃)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+/V^-$ | ±18 | V |
| Differential Input Voltage | $V_{ID}$ | ±30 | V |
| Input Voltage | $V_I$ | ±15 (note) | V |
| Power Dissipation | $P_D$ | (DIP8) 700 | mW |
| | | (DMP8) 300 | mW |
| | | (SSOP8) 250 | mW |
| | | (SIP8) 800 | mW |
| Operating Temperature Range | $T_{opr}$ | −20～+75 | ℃ |
| Storage Temperature Range | $T_{stg}$ | −40～+125 | ℃ |

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

## ■ ELECTRICAL CHARACTERISTICS (NJM4556AD/NJM4556AS)

($V^+/V^-$=±15V Ta=25℃)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{IO}$ | $R_S \leqq 10k\Omega$ | — | 0.5 | 6.0 | mV |
| Input Offset Current | $I_{IO}$ | | — | 5 | 60 | nA |
| Input Bias Current | $I_B$ | | — | 50 | 500 | nA |
| Input Resistance | $R_{IN}$ | | 0.3 | 5 | — | MΩ |
| Large Signal Voltage Gain | $A_V$ | $R_L \geqq 2k\Omega$, $V_O$=±10V | 86 | 100 | — | dB |
| Maximum Output Voltage Swing 1 | $V_{OM1}$ | $R_L \geqq 2k\Omega$ | ±12 | ±13.5 | — | V |
| Maximum Output Voltage Swing 2 | $V_{OM2}$ | $R_L \geqq 150\Omega$ | ±10.5 | ±11 | — | V |
| Input Common Mode Voltage Range | $V_{ICM}$ | | ±13.5 | ±14 | — | V |
| Common Mode Rejection Ratio | CMR | $R_S \leqq 10k\Omega$ | 70 | 90 | — | dB |
| Supply Voltage Rejection Ratio | SVR | $R_S \leqq 10k\Omega$ | 76.5 | 90 | — | dB |
| Operating Current | $I_{CC}$ | | — | 9 | 12 | mA |
| Slew Rate | SR | | — | 3 | — | V/μS |
| Gain Bandwidth Product | GB | | — | 8 | — | MHz |

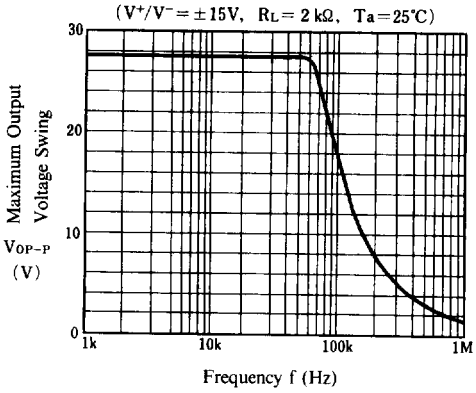
## ■ ELECTRICAL CHARACTERISTICS (NJM4556AM/NJM4556AV)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{IO}$ | $R_S \leqq 10k\Omega$ | — | 0.5 | 6.0 | mV |
| Input Offset Current | $I_{IO}$ | | — | 5 | 60 | nA |
| Input Bias Current | $I_B$ | | — | 50 | 500 | nA |
| Large Signal Voltage Gain | $A_V$ | $R_L \geqq 2k\Omega$, $V_O$=±10V | 86 | 100 | — | dB |
| Maximum Output Voltage Swing 1 | $V_{OM1}$ | $V_{IN}^+$=4V, $V_{IN}^-$=3V, $V^+$=9V Insource=40mA | 7.5 | — | — | V |
| Maximum Output Voltage Swing 2 | $V_{OM2}$ | $V_{IN}^+$=3V, $V_{IN}^-$=4V, $V^+$=9V Isink=40A | — | — | 2.1 | V |
| Input Common Mode Voltage Range 1 | $V_{ICM}1$ | $V^+$=9V, $V_{IL}$ | — | — | 1.5 | V |
| Input Common Mode Voltage Range 2 | $V_{ICM}2$ | $V^+$=9V, $V_{IH}$ | 8 | — | — | V |
| Common Mode Rejection Ratio | CMR | $R_S \leqq 10k\Omega$ | 70 | 90 | — | dB |
| Supply Voltage Rejection Ratio | SVR | $R_S \leqq 10k\Omega$ | 76.5 | 90 | — | dB |
| Supply Current | $I_{CC}$ | $V^+$=9V | — | 8 | 12 | mA |
| Slew Rate | SR | | — | 3 | — | V/μS |
| Gain Bandwith Product | GB | | — | 8 | — | MHz |

## ■ TYPICAL CHARACTERISTICS

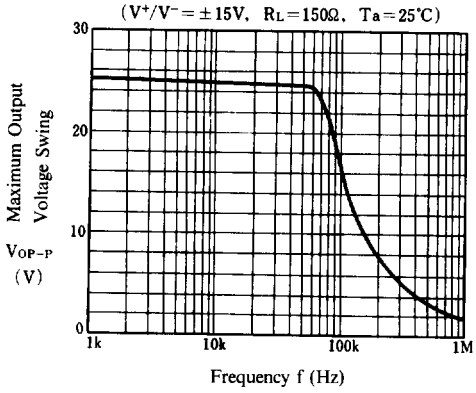
**Maximum Output Voltage Swing vs. Frequency**

($V^+/V^-=\pm15V$, $R_L=2\,k\Omega$, $Ta=25°C$)



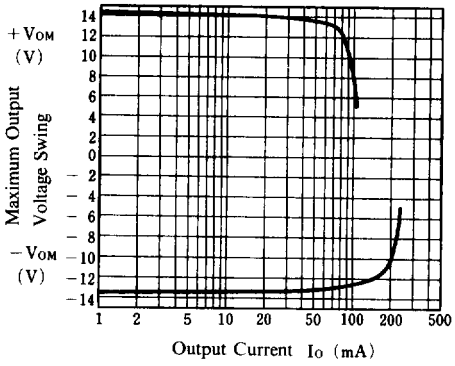

**Maximum Output Voltage Swing vs. Frequency**

($V^+/V^-=\pm15V$, $R_L=150\Omega$, $Ta=25°C$)



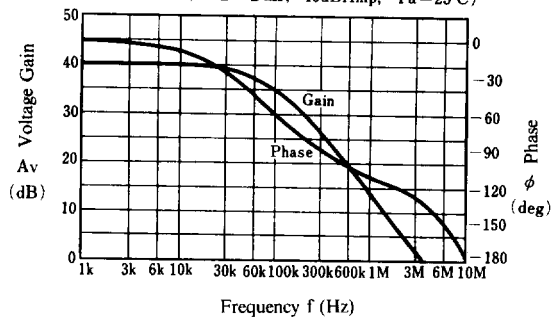

**Maximum Output Voltage Swing vs. Output Current**

($V^+/V^-=\pm15V$, $Ta=25°C$)



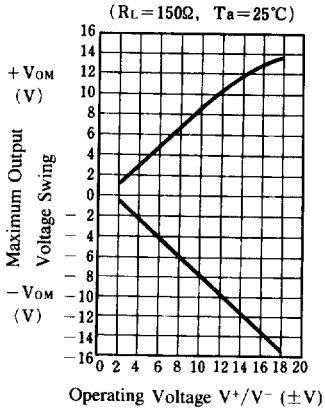

**Voltage Gain, Plase Shift vs. Frequency**

($V^+/V^-=\pm15V$, $R_L=2\,k\Omega$, 40dBAmp, $Ta=25°C$)



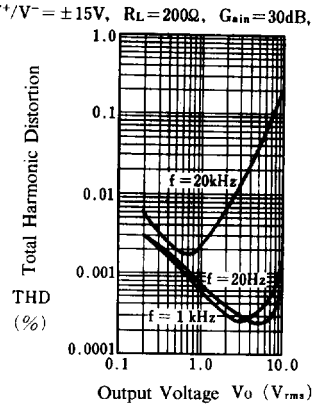

**Maximum Output Voltage Swing vs. Operating Voltage**

($R_L=150\Omega$, $Ta=25°C$)




**Total Harmonic Distortion vs. Output Voltage**

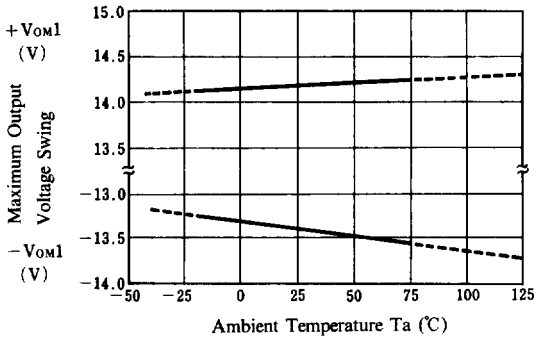
($V^+/V^-=\pm15V$, $R_L=200\Omega$, $G_{ain}=30dB$, $Ta=25°C$)



## ■ TYPICAL CHARACTERISTICS

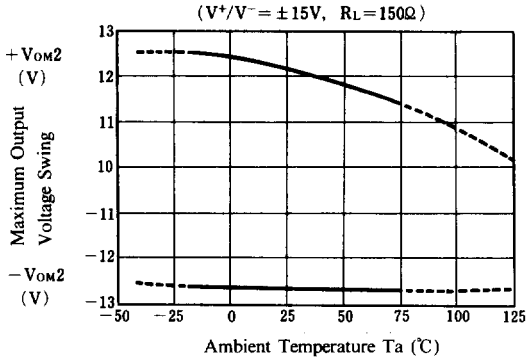
**Maximum Output Voltage Swing vs. Temperature**

($V^+/V^-=\pm15V$, $R_L=2\,k\Omega$)




**Maximum Output Voltage Swing vs. Temperature**

($V^+/V^-=\pm15V$, $R_L=150\Omega$)

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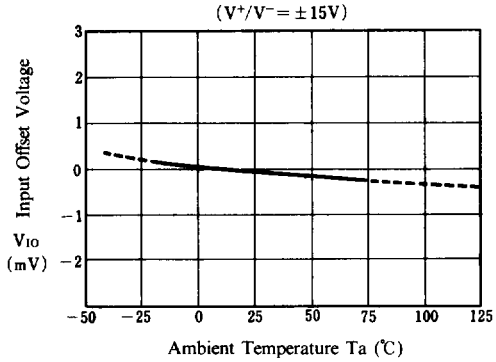
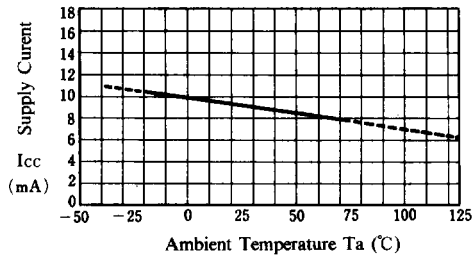
**Input Offset Voltage vs. Temperature**

($V^+/V^-=\pm15V$)



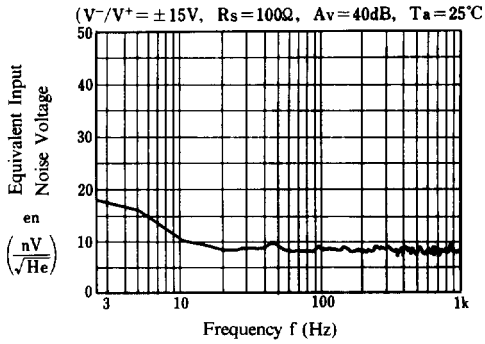

**Supply Current vs. Temperature**

($V^+/V^-=\pm15V$)




**Equivalent Input Noise Voltage vs. Frequency**

($V^-/V^+=\pm15V$, $R_S=100\Omega$, $A_V=40dB$, $Ta=25℃$)




**Operating Current vs. Operating Voltage**

($Ta=25℃$)