

## DUAL HIGH CURRENT OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

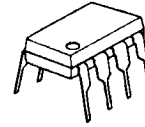
The NJM4556A integrated circuit is a high-gain, high output current dual operational amplifier capable of driving  $\pm 70\text{mA}$  into  $150\Omega$  loads ( $\pm 10.5\text{V}$  output voltage), and operating low supply voltage ( $V^+V^-=\pm 2\text{V}$ ).

The NJM4556A combines many of the features of the popular NJM4558 as well as having the capability of driving  $150\Omega$  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.

### ■ FEATURES

- Operating Voltage ( $\pm 2\text{V} \sim \pm 18\text{V}$ )
- High Output Current ( $I_o = 70\text{mA}$ )
- Slew Rate ( $3\text{V}/\mu\text{s}$  typ.)
- Gain Band Width Product ( $8\text{MHz}$  typ.)
- Equivalent Input Noise Voltage ( $10\text{nV}/\sqrt{\text{Hz}}$  typ.)
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

### ■ PACKAGE OUTLINE



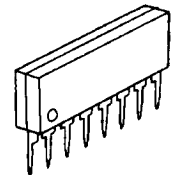
NJM4556AD



NJM4556AM

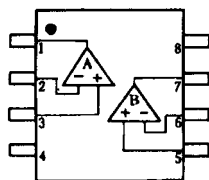


NJM4556AV

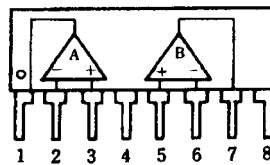


NJM4556AL

### ■ PIN CONFIGURATION



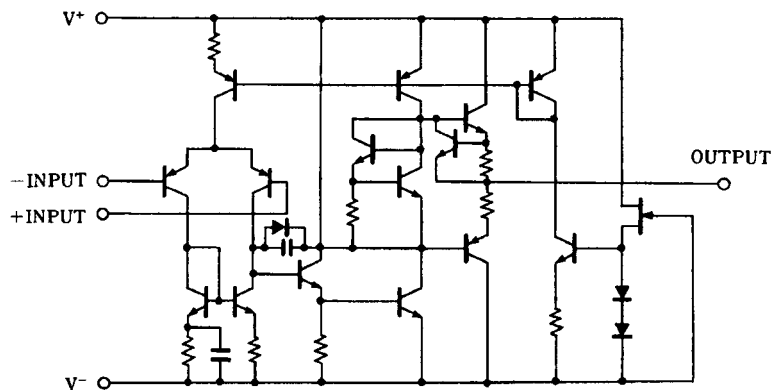
NJM4556AD  
NJM4556AM  
NJM4556AV



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 )



# NJM4556A

## ■ 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 ) 700 ( DMP8 ) 300 ( SSOP8 ) 250 ( 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 ±15V, the absolute maximum input voltage is equal to the supply voltage.

## ■ ELECTRICAL CHARACTERISTICS ( NJM4556AD / NJM4556AL )

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	$V_{IO}$	$R_S \leq 10k\Omega$	-	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	$A_V$	$R_L \geq 2k\Omega, V_O = \pm 10V$	86	100	-	dB
Maximum Output Voltage Swing 1	$V_{OM1}$	$R_L \geq 2k\Omega$	± 12	± 13.5	-	V
Maximum Output Voltage Swing 2	$V_{OM2}$	$R_L \geq 150\Omega$	± 10.5	± 11	-	V
Input Common Mode Voltage Range	$V_{ICM}$		± 13.5	± 14	-	V
Common Mode Rejection Ratio	CMR	$R_S \leq 10k\Omega$	70	90	-	dB
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10k\Omega$	76.5	90	-	dB
Operating Current	$I_{CC}$		-	9	12	mA
Slew Rate	SR		-	3	-	V/μs
Gain Bandwidth Product	GB		-	8	-	MHz

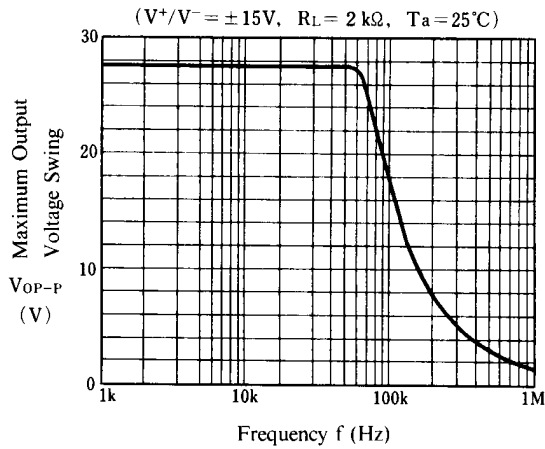
## ■ ELECTRICAL CHARACTERISTICS ( NJM4556AM / NJM4556AV )

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

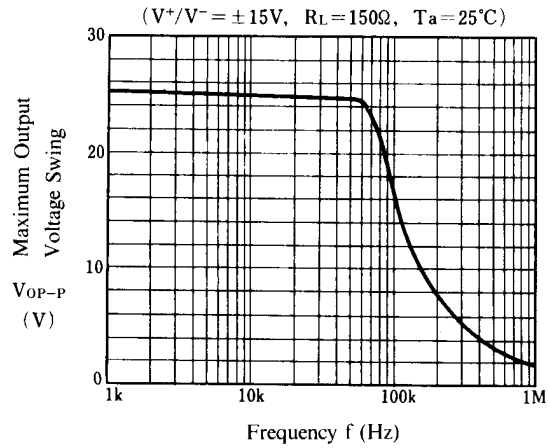
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	$V_{IO}$	$R_S \leq 10k\Omega$	-	0.5	6.0	mV
Input Offset Current	$I_{IO}$		-	5	60	nA
Input Bias Current	$I_B$		-	50	500	nA
Large Signal Voltage Gain	$A_V$	$R_L \geq 2k\Omega, V_O = \pm 10V$	86	100	-	dB
Maximum Output Voltage Swing 1	$V_{OM1}$	$V_{IN}^+ = 4V, V_{IN}^- = 3V, V^+ = 9V, V^- = 0V$ $I_{SOURCE} = 40mA$	7.5	-	-	V
Maximum Output Voltage Swing 2	$V_{OM2}$	$V_{IN}^+ = 3V, V_{IN}^- = 4V, V^+ = 9V, V^- = 0V$ $I_{SINK} = 40mA$	-	-	2.1	V
Input Common Mode Voltage Range 1	$V_{ICM1}$	$V^+ = 9V, V^- = 0V, V_{IL}$	-	-	1.5	V
Input Common Mode Voltage Range 2	$V_{ICM2}$	$V^+ = 9V, V^- = 0V, V_{IH}$	8	-	-	V
Common Mode Rejection Ratio	CMR	$R_S \leq 10k\Omega$	70	90	-	dB
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10k\Omega$	76.5	90	-	dB
Supply Current	$I_{CC}$	$V^+ = 9V, V^- = 0V$	-	8	12	mA
Slew Rate	SR		-	3	-	V/μs
Gain Bandwidth Product	GB		-	8	-	MHz

## ■ TYPICAL CHARACTERISTICS

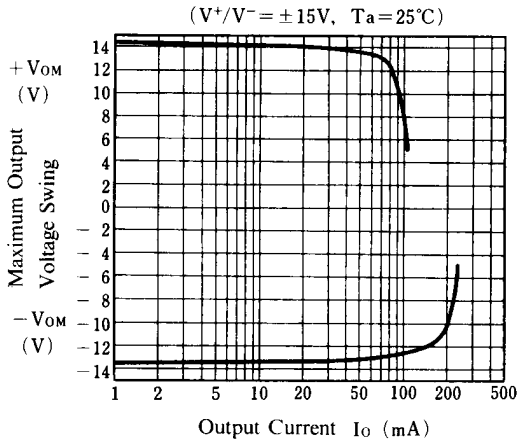
**Maximum Output Voltage Swing vs. Frequency**



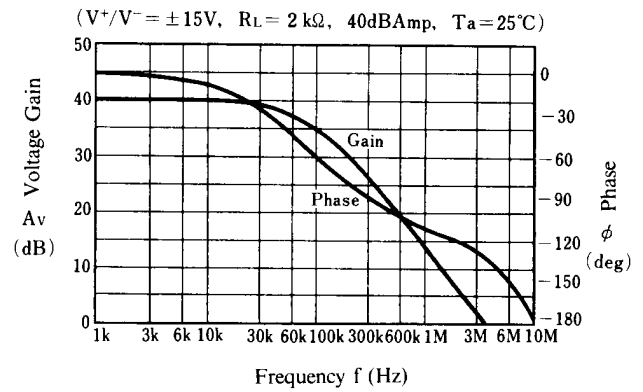
**Maximum Output Voltage Swing vs. Frequency**



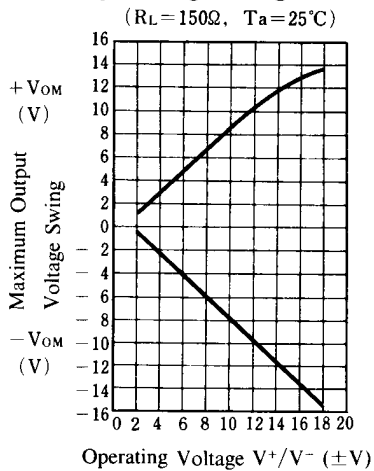
**Maximum Output Voltage Swing vs. Output Current**



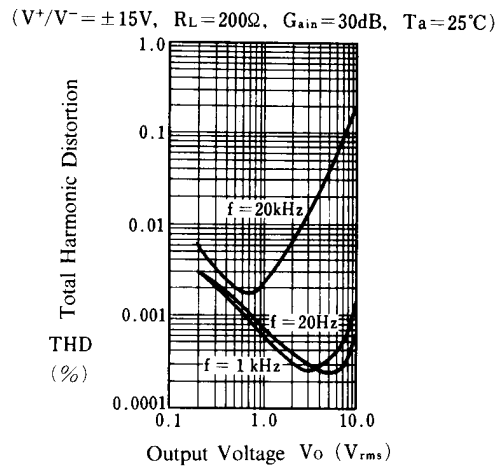
**Voltage Gain, Phase Shift vs. Frequency**



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



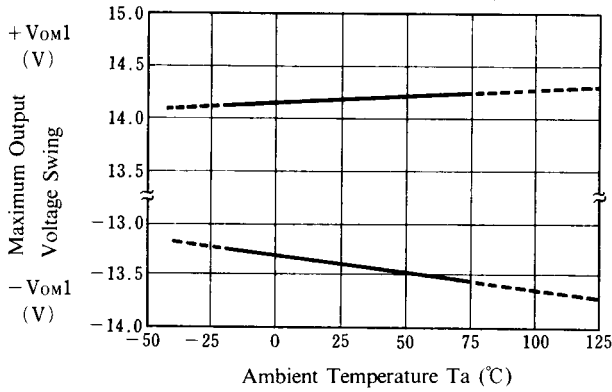
**Total Harmonic Distortion vs. Output Voltage**



## ■ TYPICAL CHARACTERISTICS

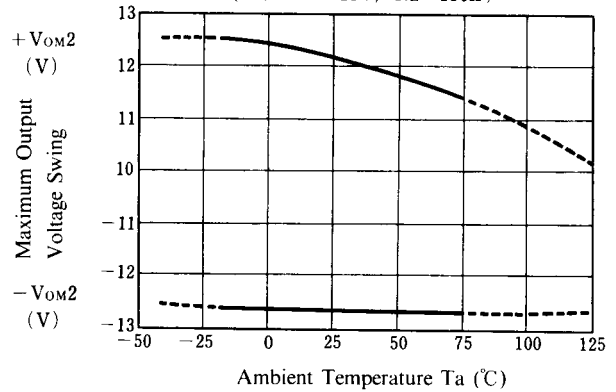
**Maximum Output Voltage Swing vs. Temperature**

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



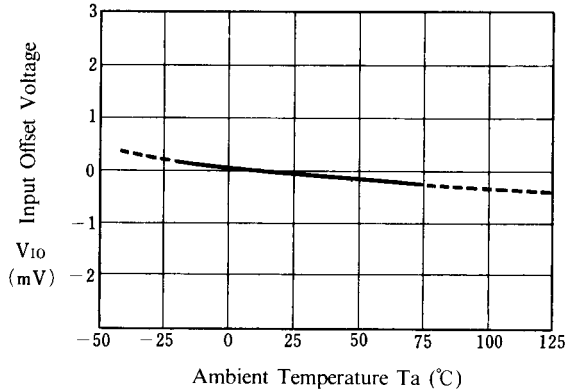
**Maximum Output Voltage Swing vs. Temperature**

( $V^+/V^- = \pm 15V$ ,  $R_L = 150\Omega$ )



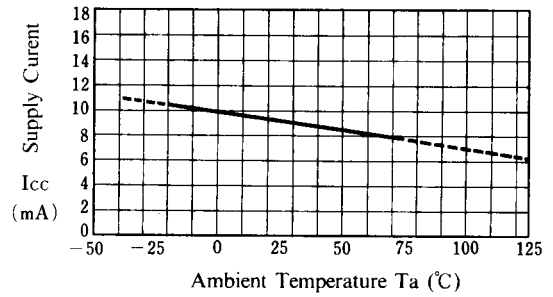
**Input Offset Voltage vs. Temperature**

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



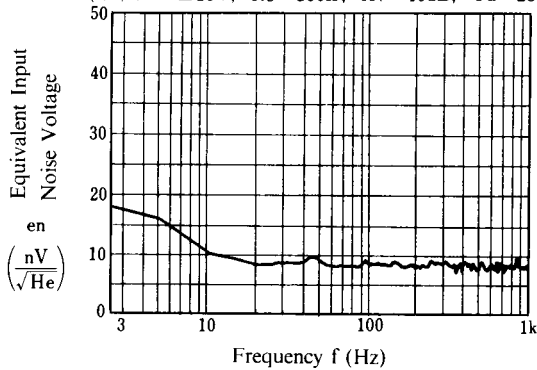
**Supply Current vs. Temperature**

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



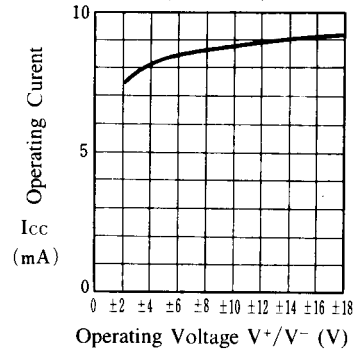
**Equivalent Input Noise Voltage vs. Frequency**

( $V^-/V^+ = \pm 15V$ ,  $R_s = 100\Omega$ ,  $A_v = 40\text{dB}$ ,  $T_a = 25^\circ\text{C}$ )



**Operating Current vs. Operating Voltage**

( $T_a = 25^\circ\text{C}$ )



**[CAUTION]**

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