

## DUAL HIGH CURRENT OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

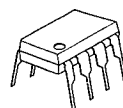
The NJM4556A integrated circuit is a high-gain, high output current dual operational amplifier capable of driving  $\pm 70\text{mA}$  into  $150\ \Omega$  loads ( $\pm 10.5\text{V}$  output voltage), and operating low supply voltage ( $V^+/V^- = \pm 2\text{V} \sim$ ).

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 ( $8\text{MHz typ.}$ )
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

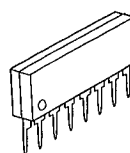
### ■ PACKAGE OUTLINE



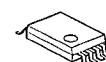
NJM4556AD



NJM4556AM

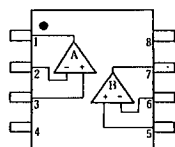


NJM4556AL

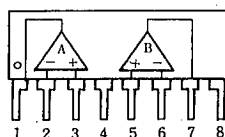


NJM4556AV

### ■ PIN CONFIGURATION



NJM4556AD.  
NJM4556AM  
NJM4556AV

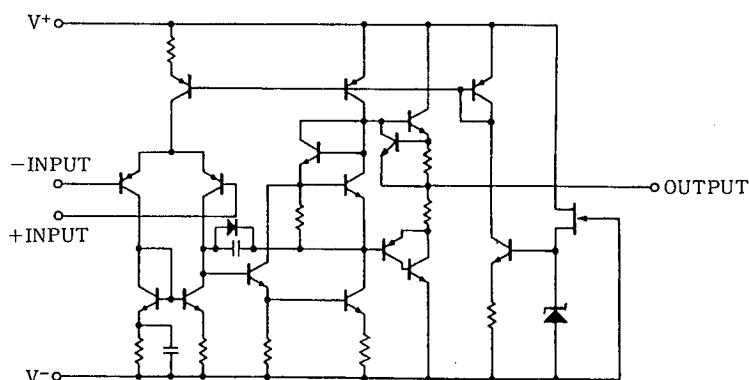


NJM4556AL

#### 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°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup> /V <sup>-</sup>	±18	V
Differential Input Voltage	V <sub>ID</sub>	±30	V
Input Voltage	V <sub>IC</sub>	±15 (note)	V
Power Dissipation	P <sub>D</sub>	(DIP8) 700	mW
		(DMP8) 300	mW
		(SSOP8) 250	mW
		(SIP8) 800	mW
Operating Temperature Range	T <sub>opr</sub>	-20~+75	°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 (NJM4556AD/NJM4556AS)

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤ 10kΩ	—	0.5	6.0	mV
Input Offset Current	I <sub>IO</sub>		—	5	60	nA
Input Bias Current	I <sub>B</sub>		—	50	500	nA
Input Resistance	R <sub>IN</sub>		0.3	5	—	MΩ
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> ≥ 2kΩ, V <sub>O</sub> = ±10V	86	100	—	dB
Maximum Output Voltage Swing 1	V <sub>OM1</sub>	R <sub>L</sub> ≥ 2kΩ	±12	±13.5	—	V
Maximum Output Voltage Swing 2	V <sub>OM2</sub>	R <sub>L</sub> ≥ 150Ω	±10.5	±11	—	V
Input Common Mode Voltage Range	V <sub>ICM</sub>		±13.5	±14	—	V
Common Mode Rejection Ratio	CMR	R <sub>S</sub> ≤ 10kΩ	70	90	—	dB
Supply Voltage Rejection Ratio	SVR	R <sub>S</sub> ≤ 10kΩ	76.5	90	—	dB
Operating Current	I <sub>CC</sub>		—	9	12	mA
Slew Rate	SR		—	3	—	V/μS
Gain Bandwidth Product	GB		—	8	—	MHz

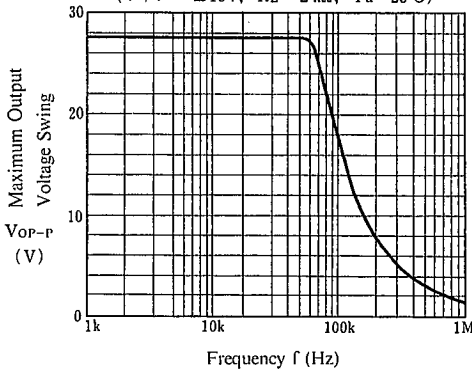
## ■ ELECTRICAL CHARACTERISTICS (NJM4556AM/NJM4556AV)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤ 10kΩ	—	0.5	6.0	mV
Input Offset Current	I <sub>IO</sub>		—	5	60	nA
Input Bias Current	I <sub>B</sub>		—	50	500	nA
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> ≥ 2kΩ, V <sub>O</sub> = ±10V	86	100	—	dB
Maximum Output Voltage Swing 1	V <sub>OM1</sub>	V <sub>IN</sub> <sup>+</sup> =4V, V <sub>IN</sub> <sup>-</sup> =3V, V <sup>+</sup> =9V I <sub>source</sub> =40mA	7.5	—	—	V
Maximum Output Voltage Swing 2	V <sub>OM2</sub>	V <sub>IN</sub> <sup>+</sup> =3V, V <sub>IN</sub> <sup>-</sup> =4V, V <sup>+</sup> =9V I <sub>sink</sub> =40mA	—	—	2.1	V
Input Common Mode Voltage Range 1	V <sub>ICM1</sub>	V <sup>+</sup> =9V, V <sub>IL</sub>	—	—	1.5	V
Input Common Mode Voltage Range 2	V <sub>ICM2</sub>	V <sup>+</sup> =9V, V <sub>IH</sub>	8	—	—	V
Common Mode Rejection Ratio	CMR	R <sub>S</sub> ≤ 10kΩ	70	90	—	dB
Supply Voltage Rejection Ratio	SVR	R <sub>S</sub> ≤ 10kΩ	76.5	90	—	dB
Supply Current	I <sub>CC</sub>	V <sup>+</sup> =9V	—	8	12	mA
Slew Rate	SR		—	3	—	V/μS
Gain Bandwidth Product	GB		—	8	—	MHz

■ TYPICAL CHARACTERISTICS

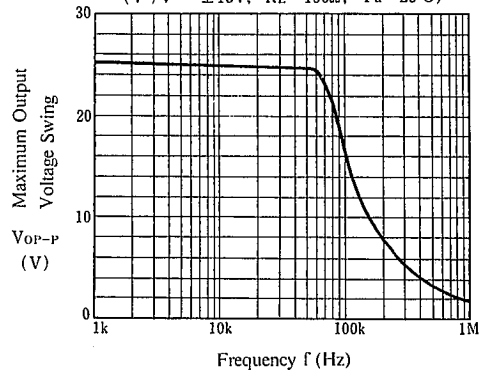
Maximum Output Voltage Swing  
vs. Frequency

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



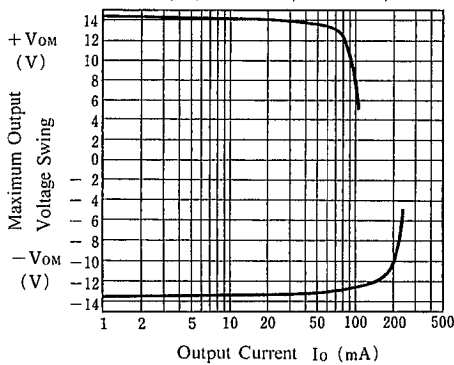
Maximum Output Voltage Swing  
vs. Frequency

( $V^+/V^- = \pm 15V$ ,  $R_L = 150\Omega$ ,  $T_a = 25^\circ C$ )



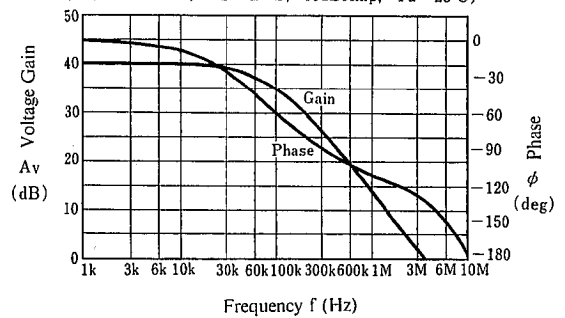
Maximum Output Voltage Swing  
vs. Output Current

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



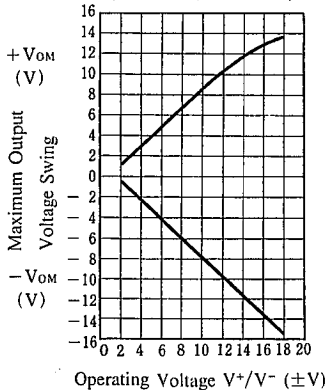
Voltage Gain, Phase Shift vs. Frequency

( $V^+/V^- = \pm 15V$ ,  $R_L = 2k\Omega$ , 40dBamp,  $T_a = 25^\circ C$ )



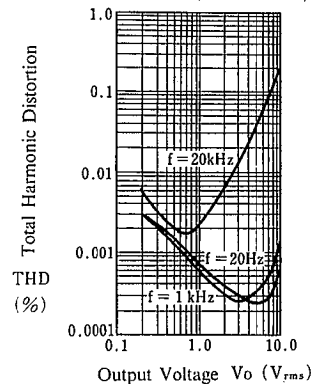
Maximum Output Voltage Swing  
vs. Operating Voltage

( $R_L = 150\Omega$ ,  $T_a = 25^\circ C$ )



Total Harmonic Distortion  
vs. Output Voltage

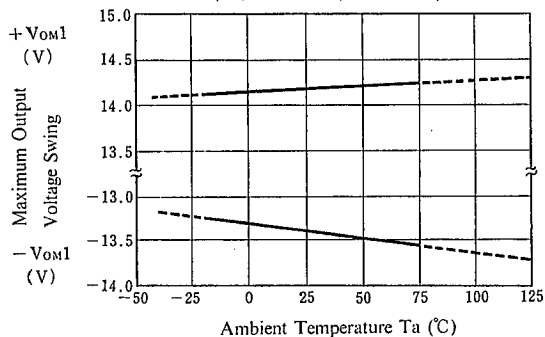
( $V^+/V^- = \pm 15V$ ,  $R_L = 200\Omega$ ,  $G_{ain} = 30dB$ ,  $T_a = 25^\circ C$ )



## TYPICAL CHARACTERISTICS

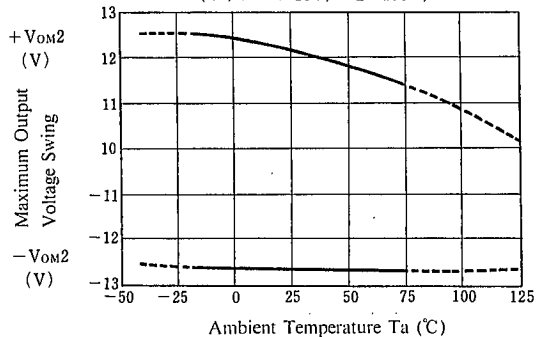
Maximum Output Voltage Swing  
vs. Temperature

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



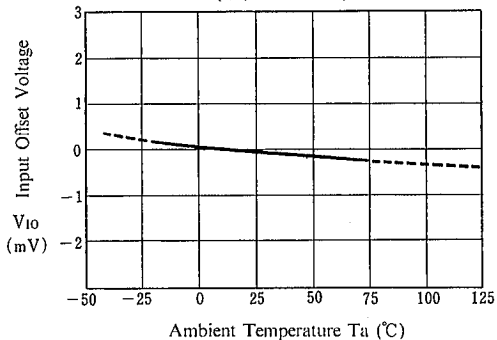
Maximum Output Voltage Swing  
vs. Temperature

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



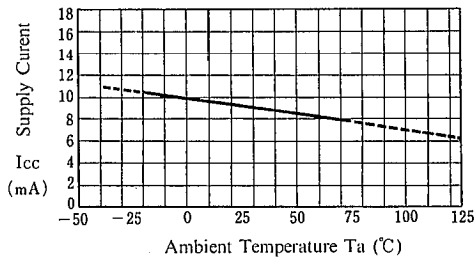
Input Offset Voltage vs. Temperature

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



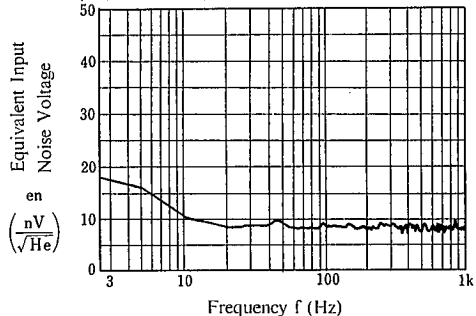
Supply Current vs. Temperature

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



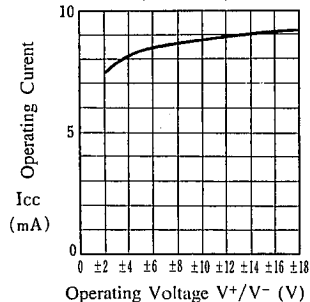
Equivalent Input Noise Voltage  
vs. Frequency

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



Operating Current vs. Operating Voltage

( $T_a = 25^\circ C$ )



## MEMO

**[CAUTION]**

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