

## DUAL OPERATIONAL AMPLIFIER

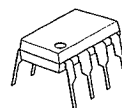
## ■ GENERAL DESCRIPTION

The NJM4565 integrated circuit is a high-gain, wide-bandwidth, dual low noise operational amplifier capable of driving 20V peak-to-peak into 400  $\Omega$  load. The NJM4565 is good characteristics compared to the NJM4560.

## ■ FEATURES

- Operating Voltage  $(\pm 4V \sim \pm 18V)$
- Wide Gain Bandwidth Product (4MHz typ.)
- Slew Rate (4V/ $\mu$ s typ.)
- Package Outline DIP8, DMP8, SSOP8, SIP8
- Bipolar Technology

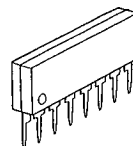
## ■ PACKAGE OUTLINE



NJM4565D



NJM4565M

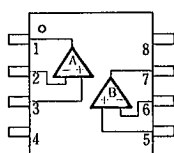


NJM4565L



NJM4565V

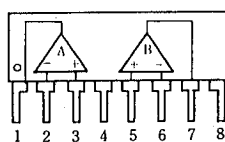
## ■ PIN CONFIGURATION



NJM4565D

NJM4565M

NJM4565V

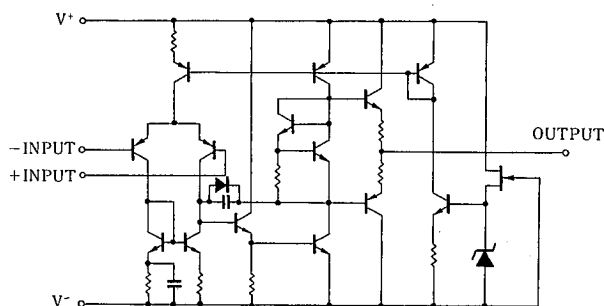


NJM4565L

## 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) 500	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

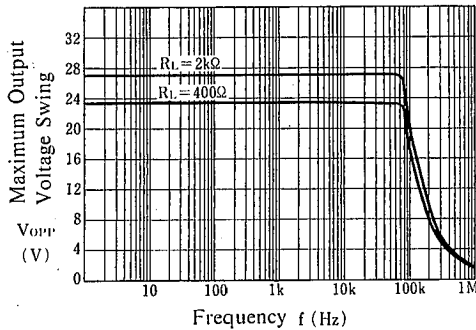
(Ta=25°C, V<sup>+</sup>/V<sup>-</sup>=±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤10kΩ	—	0.5	3.0	mV
Input Offset Current	I <sub>IO</sub>		—	2	50	nA
Input Bias Current	I <sub>B</sub>		—	50	200	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	±14	—	V
Maximum Output Voltage Swing 2	V <sub>OM2</sub>	I <sub>O</sub> =25mA	±10	±11.5	—	V
Input Common Mode Voltage Range	V <sub>ICM</sub>		±12	±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>		—	4.5	7	mA
Slew Rate	SR		—	4	—	V/μs
Gain Bandwidth Product	GB		—	10	—	MHz
Equivalent Input Noise Voltage	V <sub>NI</sub>	RIAA, R <sub>S</sub> =2.2kΩ, 30kHz LPF	—	1.2	—	μVrms

■ TYPICAL CHARACTERISTICS

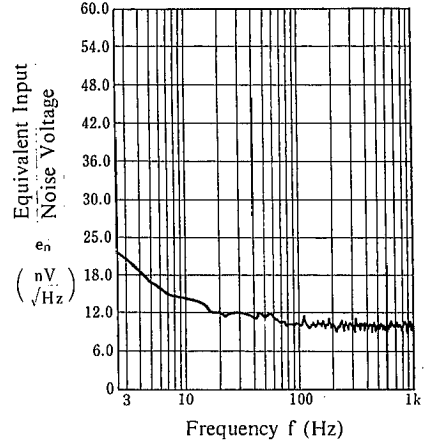
Maximum Output Voltage Swing  
vs. Frequency

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



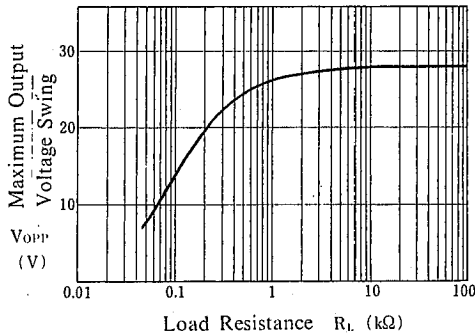
Equivalent Input Noise Voltage  
vs. Frequency

( $V^+/V^- = \pm 15V$ ,  $R_s = 1k\Omega$ ,  $T_a = 25^\circ C$ )



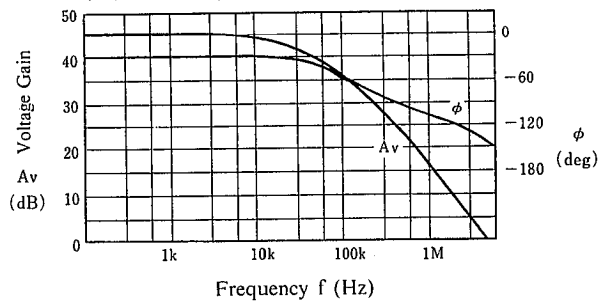
Maximum Output Voltage Swing  
vs. Load Resistance

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



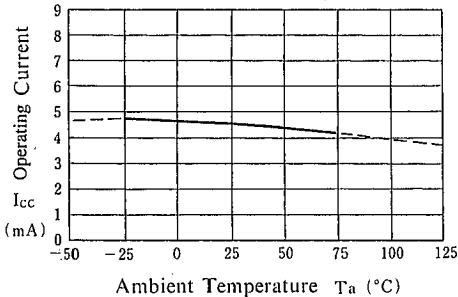
Voltage Gain Phase vs. Frequency

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



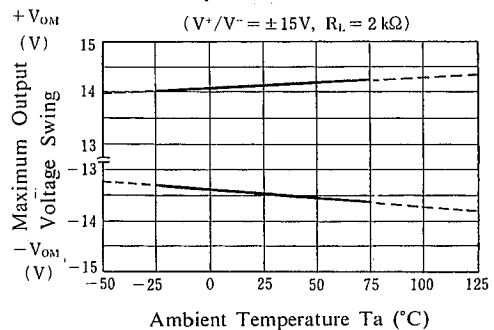
Operating Current vs. Temperature

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



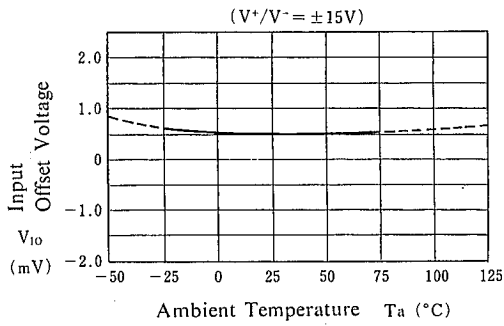
Maximum Output Voltage Swing  
vs. Temperature

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

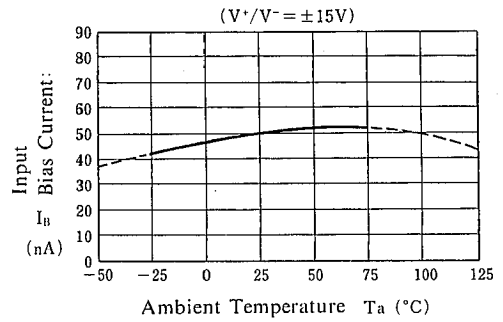


## TYPICAL CHARACTERISTICS

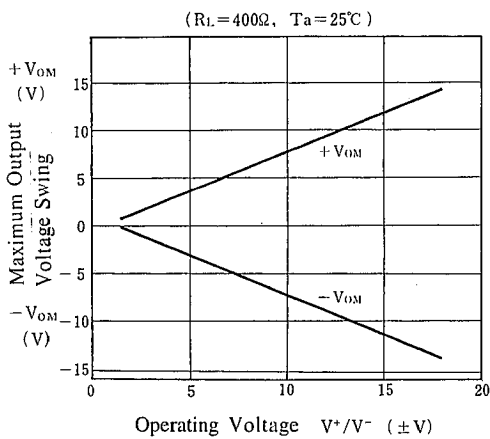
Input Offset Voltage vs. Temperature



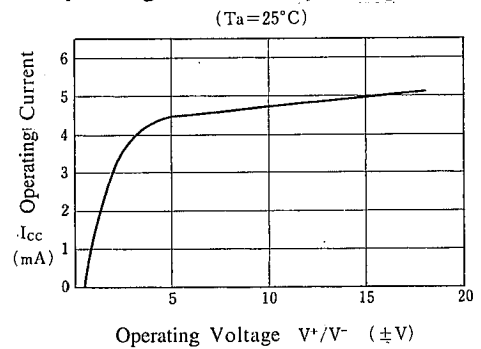
Input Bias Current vs. Temperature



Maximum Output Voltage Swing vs. Operating Voltage



Operating Current vs. Operating Voltage



## MEMO

**[CAUTION]**

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