

## DUAL OPERATIONAL AMPLIFIER

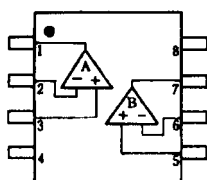
### ■ GENERAL DESCRIPTION

The NJM4565 is a high-gain, wide-bandwidth, dual low noise operational amplifier capable of driving 20V peak-to-peak into 400Ω loads. The NJM4565 is good characteristics compared to the NJM4560.

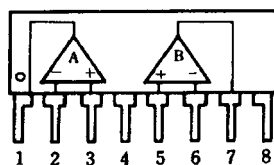
### ■ FEATURES

- Operating Voltage (  $\pm 4V \sim \pm 18V$  )
- Wide Gain Bandwidth Product ( 4MHz typ. )
- Slew Rate ( 4V/μs typ. )
- Package Outline DIP8, DMP8, EMP8, SSOP8, SIP8
- Bipolar Technology

### ■ PIN CONFIGURATION



NJM4565D  
NJM4565M  
NJM4565E  
NJM4565V



NJM4565L

#### PIN FUNCTION

- 1.A OUTPUT
- 2.A -INPUT
- 3.A +INPUT
- 4.V<sup>-</sup>
- 5.B +INPUT
- 6.B -INPUT
- 7.B OUTPUT
- 8.V<sup>+</sup>

### ■ PACKAGE OUTLINE



NJM4565D



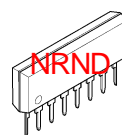
NJM4565M



NJM4565E

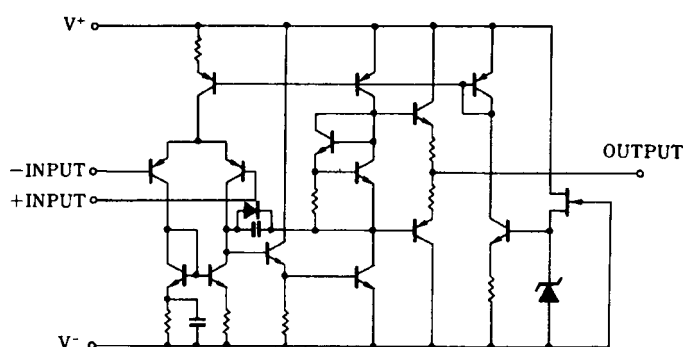


NJM4565V



NJM4565L

### ■ 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 (DMP8) 300 (EMP8) 300 (SSOP8) 250 (SIP8) 800	mW
Operating Temperature Range	T <sub>opr</sub>	-40~+85	°C
Storage Temperature Range	T <sub>stg</sub>	-40~+125	°C

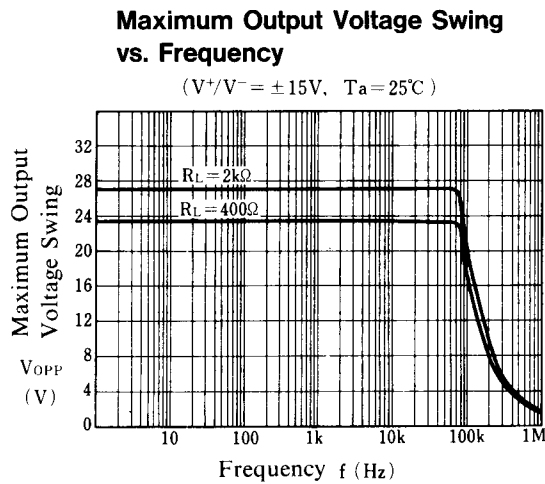
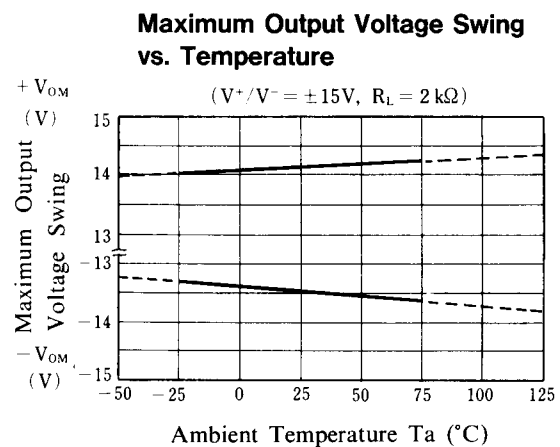
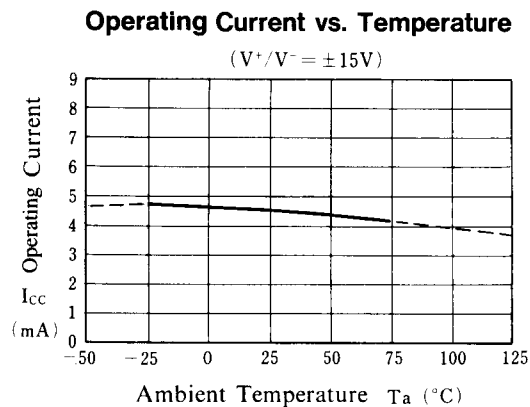
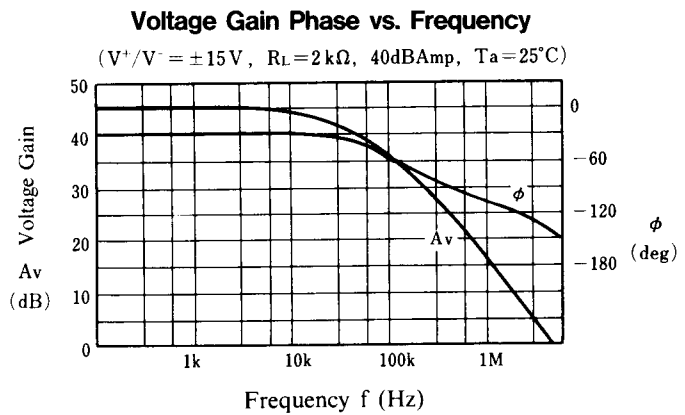
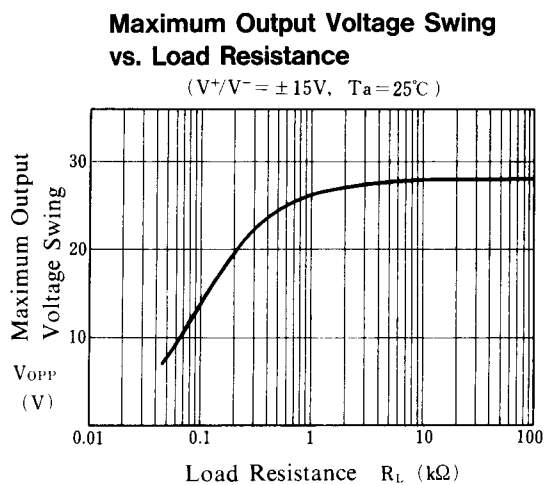
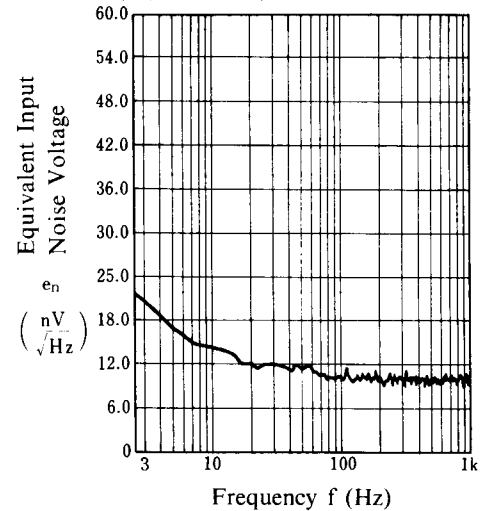
(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

## ■ ELECTRICAL CHARACTERISTICS

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

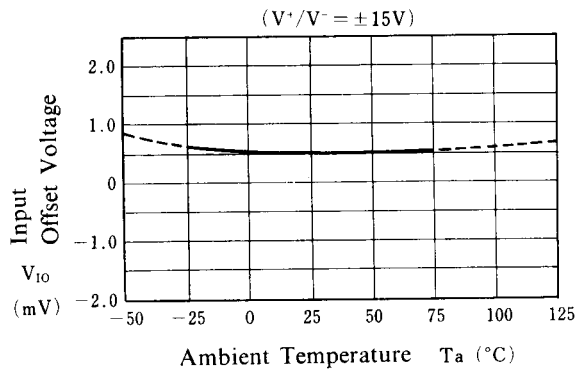
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤10kΩ	-	0.5	3.0	mV
Input Offset Current	I <sub>IO</sub>		-	2	50	nA
Input Bias Current	I <sub>B</sub>		-	50	200	nA
Input Resistance	R <sub>IN</sub>		0.3	5	-	MΩ
Large Signal Voltage Gain	A <sub>V</sub>	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

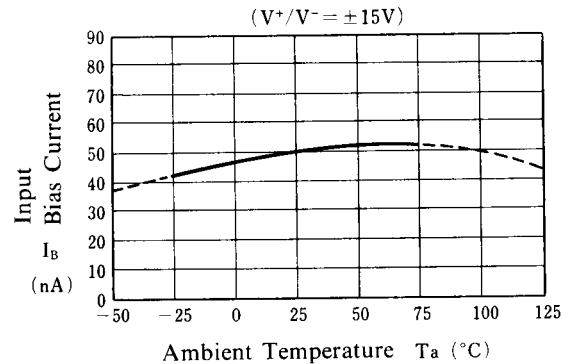
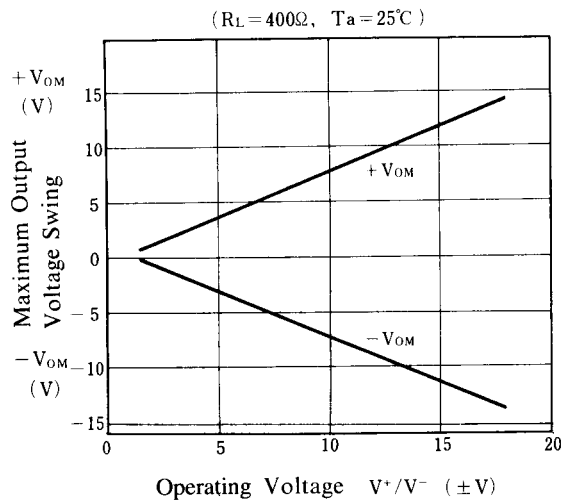
**Equivalent Input Noise Voltage vs. Frequency**(  $V^+/V^- = \pm 15V$ ,  $R_S = 1k\Omega$ ,  $T_a = 25^\circ C$  )

## ■ TYPICAL CHARACTERISTICS

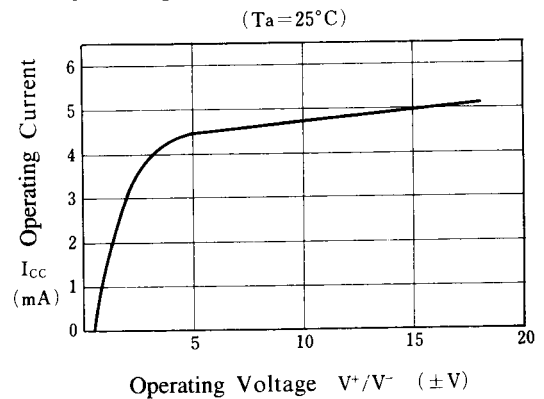
Input Offset Voltage vs. Temperature



Input Bias Current vs. Temperature

Maximum Output Voltage Swing  
vs. Operating Voltage

Operating Current vs. Operating Voltage



## [CAUTION]

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