

## DUAL OPERATIONAL AMPLIFIER

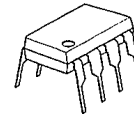
### ■ GENERAL DESCRIPTION

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

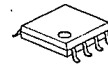
### ■ FEATURES

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

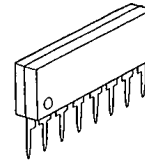
### ■ PACKAGE OUTLINE



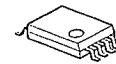
NJM4565D



NJM4565M

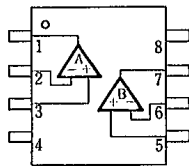


NJM4565L

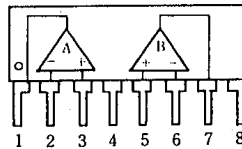


NJM4565V

### ■ PIN CONFIGURATION



NJM4565D  
NJM4565M  
NJM4565V



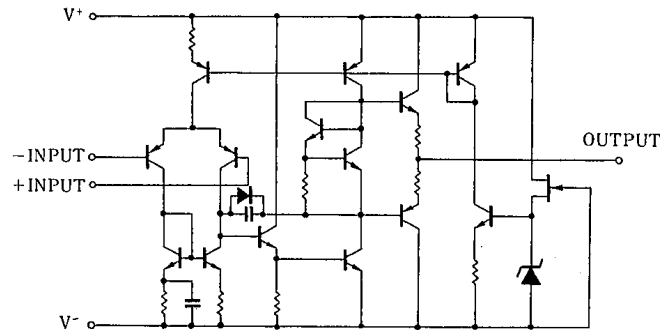
NJM4565L

### PIN FUNCTION

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

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### ■ 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.

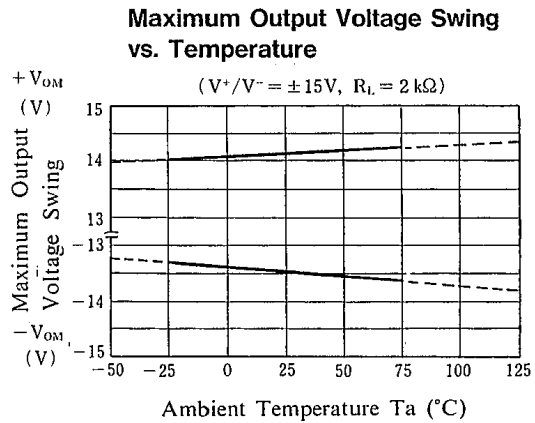
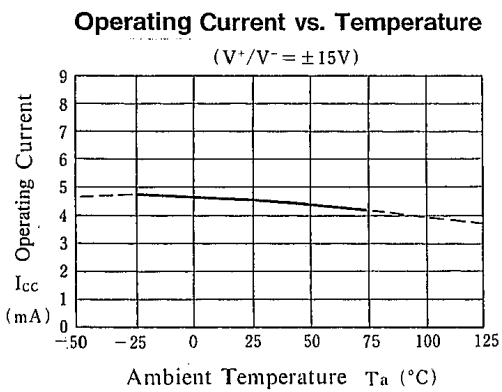
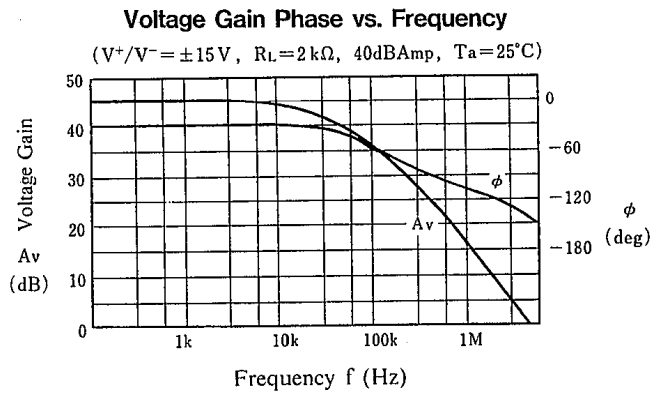
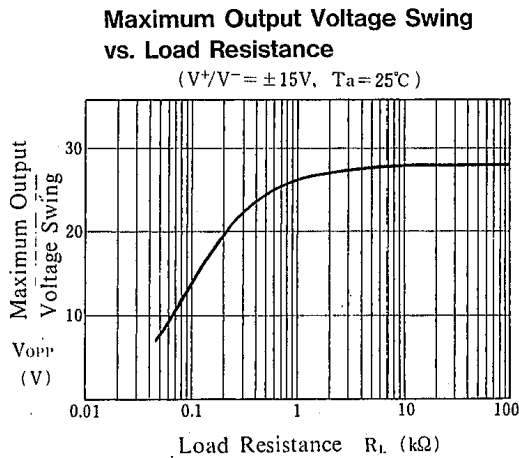
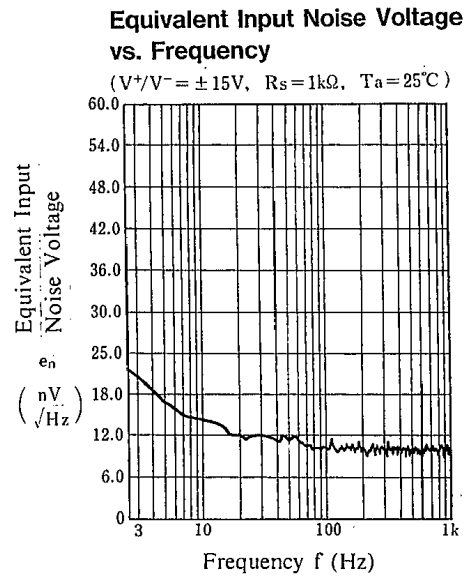
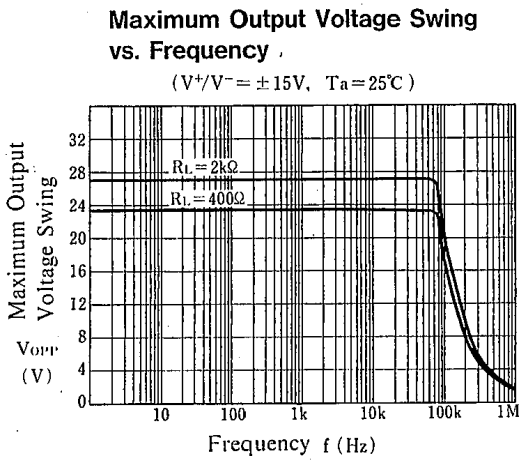
## ■ ELECTRICAL CHARACTERISTICS

(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 <sub>v</sub>
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

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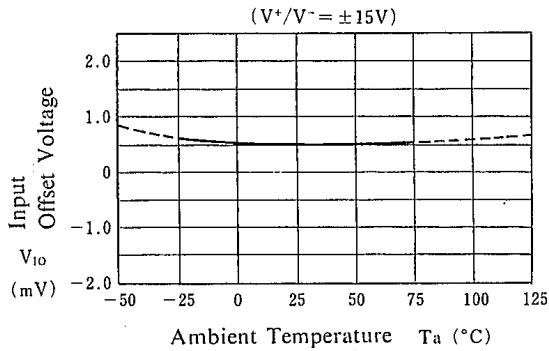
■ TYPICAL CHARACTERISTICS



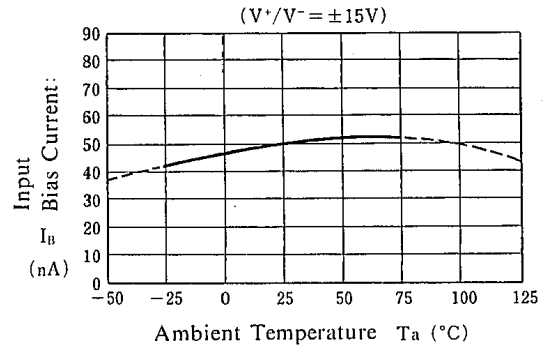
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## TYPICAL CHARACTERISTICS

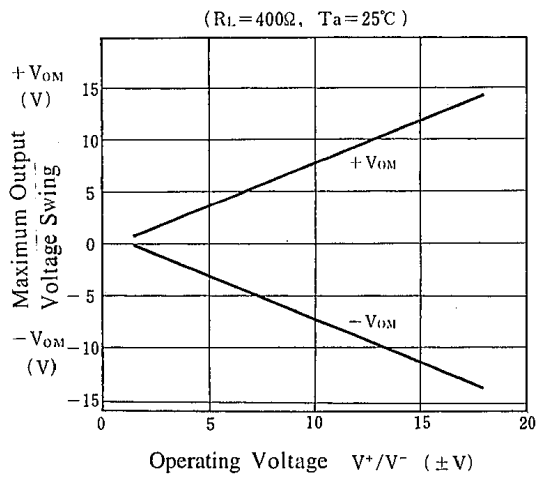
Input Offset Voltage vs. Temperature



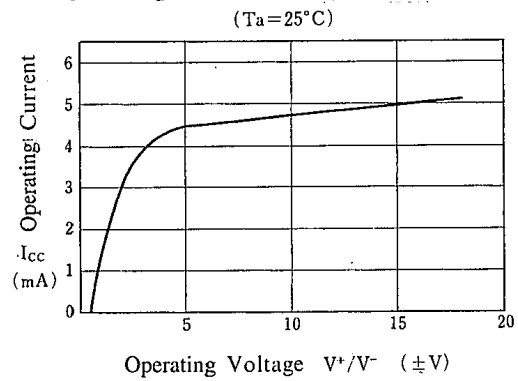
Input Bias Current vs. Temperature



Maximum Output Voltage Swing vs. Operating Voltage



Operating Current vs. Operating Voltage



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# NJM4565

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## MEMO

**[CAUTION]**

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*New Japan Radio Co., Ltd.*