

DUAL OPERATIONAL AMPLIFIER

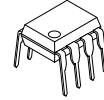
■ GENERAL DESCRIPTION

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 (±4V~±18V)
- Wide Gain Bandwidth Product (4MHz typ.)
- Slew Rate (4V/μs typ.)
- Package Outline DIP8, DMP8, EMP8, SSOP8, SIP8
- Bipolar Technology

■ PACKAGE OUTLINE



NJM4565D



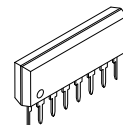
NJM4565M



NJM4565E

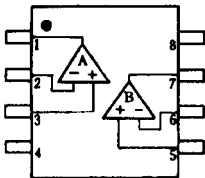


NJM4565V

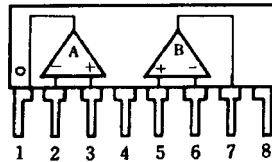


NJM4565L

■ PIN CONFIGURATION



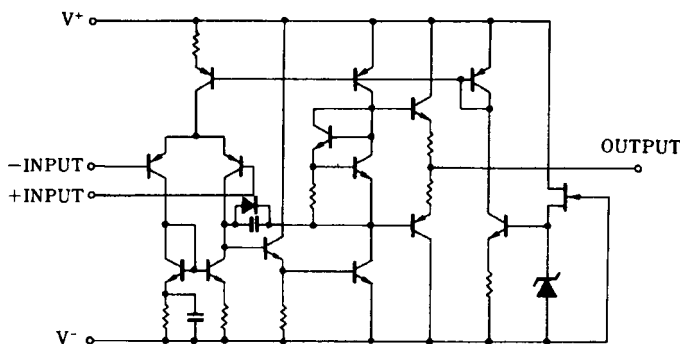
NJM4565D
NJM4565M
NJM4565E
NJM4565V



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)



NJM4565

■ 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) 500 (DMP8) 300 (EMP8) 300 (SSOP8) 250 (SIP8) 800 | mW |
| Operating Temperature Range | T_{opr} | -40~+85 | °C |
| Storage Temperature Range | T_{stg} | -40~+125 | °C |

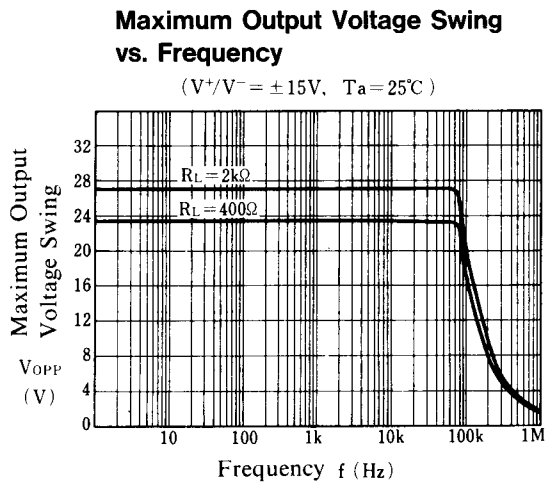
(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, $V^+ / V^- = \pm 15V$)

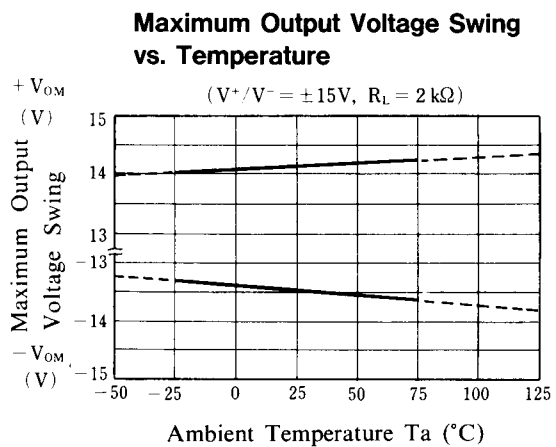
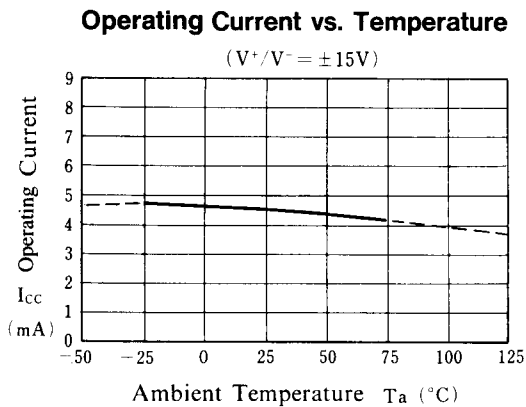
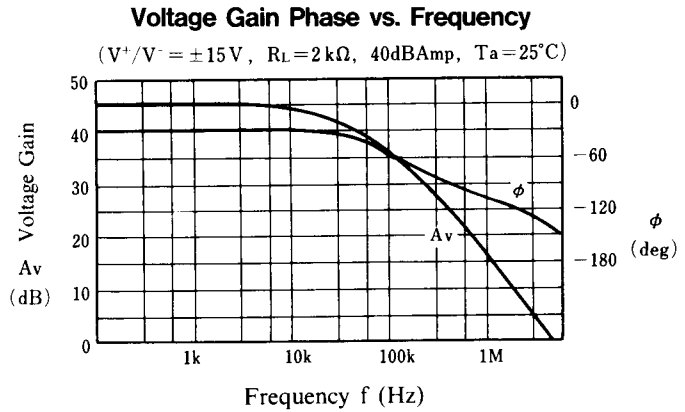
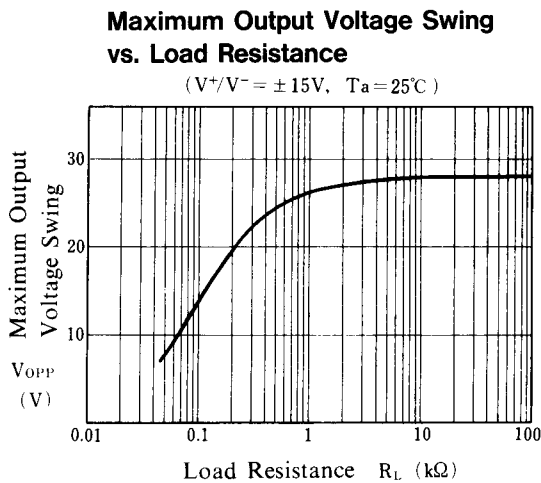
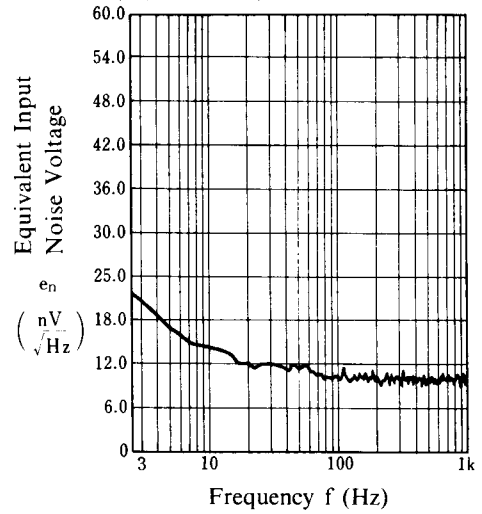
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|-----------|-------------------------------------|------|--------|------|-------|
| Input Offset Voltage | V_{IO} | $R_S \leq 10k\Omega$ | - | 0.5 | 3.0 | mV |
| Input Offset Current | I_{IO} | | - | 2 | 50 | nA |
| Input Bias Current | I_B | | - | 50 | 200 | 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 | ± 14 | - | V |
| Maximum Output Voltage Swing 2 | V_{OM2} | $I_O = 25mA$ | ± 10 | ± 11.5 | - | V |
| Input Common Mode Voltage Range | V_{ICM} | | ± 12 | ± 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} | | - | 4.5 | 7 | mA |
| Slew Rate | SR | | - | 4 | - | V/μs |
| Gain Bandwidth Product | GB | | - | 10 | - | MHz |
| Equivalent Input Noise Voltage | V_{NI} | RIAA, $R_S = 2.2k\Omega, 30kHz$ LPF | - | 1.2 | - | μVrms |

■ TYPICAL CHARACTERISTICS



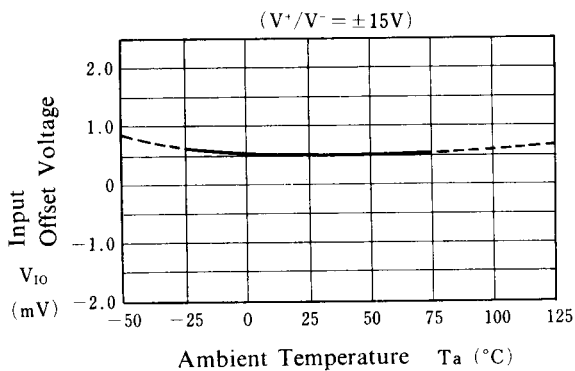
Equivalent Input Noise Voltage vs. Frequency

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

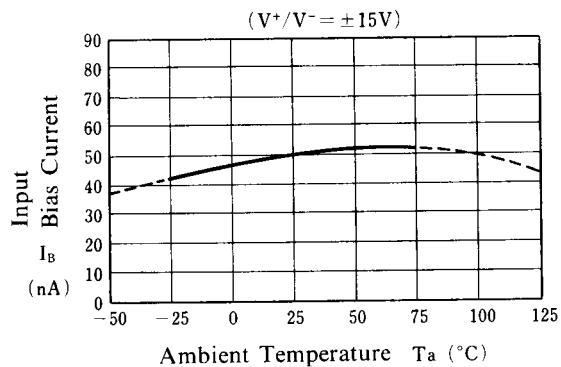


■ TYPICAL CHARACTERISTICS

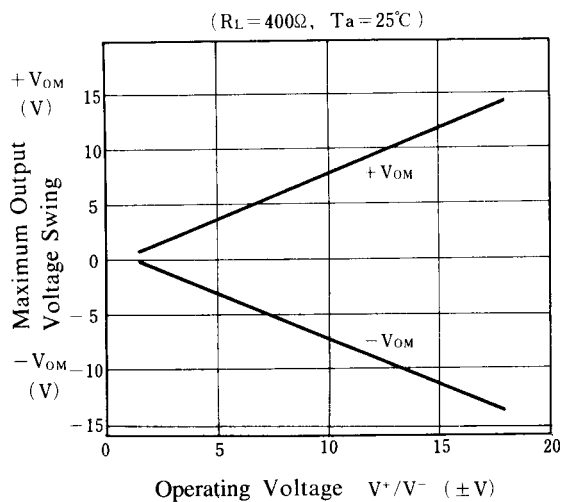
Input Offset Voltage vs. Temperature



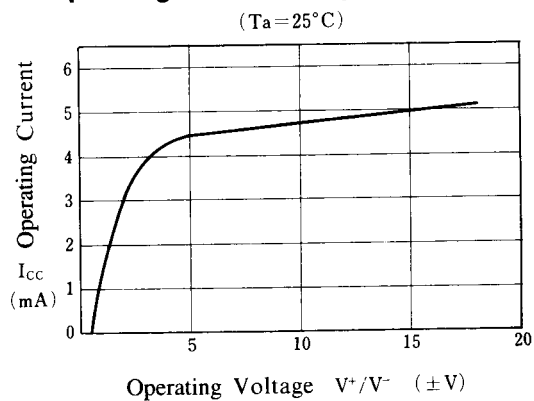
Input Bias Current vs. Temperature



Maximum Output Voltage Swing vs. Operating Voltage



Operating Current vs. Operating Voltage



[CAUTION]

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