

HIGH PERFORMANCE LOW-NOISE DUAL OPERATIONAL AMPLIFIER

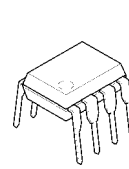
■ GENERAL DESCRIPTION

NJM2114 is a high performance dual low noise operational amplifier that could be replaced in application with NJM5532. Comparing to NJM5532; it has superior specifications on Slew Rate, Bandwidth and Offset Voltage. Furthermore lower noise and distortion are achieved, it is applicable for Hi-Fi audio equipments.

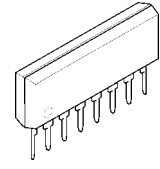
■ FEATURES

- Operating Voltage ($\pm 3.0V \sim \pm 22.0V$)
- High Slew Rate ($15V/\mu s$ typ.)
- Wide Unity Gain Bandwidth ($13MHz$ typ.)
- Low Noise Voltage ($0.9\mu V_{rms}$ typ.)
- High Output Current ($60mA$ typ.)
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

■ PACKAGE OUTLINE



NJM2114D

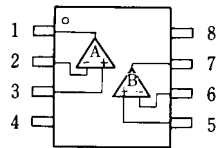


NJM2114L

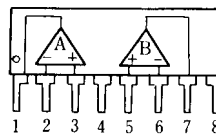


NJM2114M

■ PIN CONFIGURATION



NJM2114D
NJM2114M

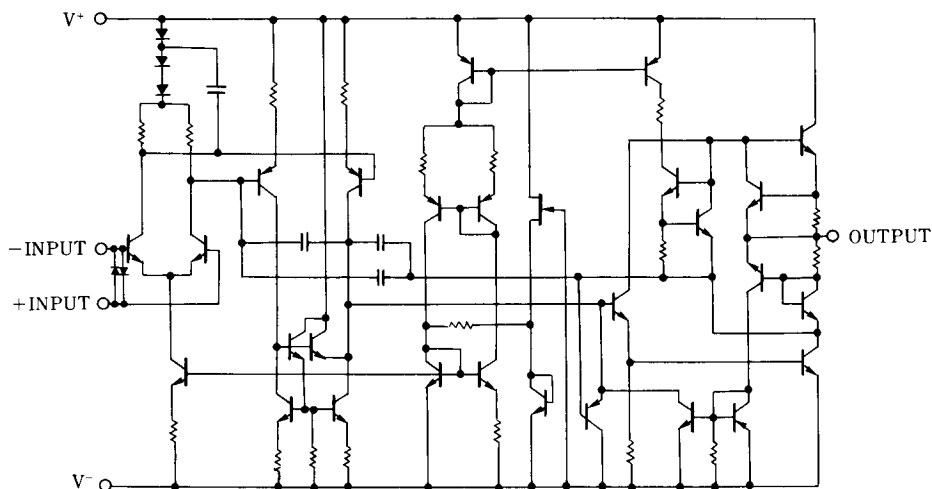


NJM2114L

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



NJM2114

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------|-------------|---|------|
| Supply Voltage | V^+ / V^- | ± 22 | V |
| Input Voltage | V_{IC} | V^+ / V^- | V |
| Differential Input Voltage | V_{ID} | ± 0.5 | V |
| Power Dissipation | P_D | (DIP8) 800 (SIP8) 800 (DMP8) 600 (note) | mW |
| Operating Temperature Range | T_{opr} | -20~+75 | °C |
| Storage Temperature Range | T_{stg} | -40~+125 | °C |

(note) At on PC board

■ ELECTRICAL CHARACTERISTICS

Direct Current Characteristics

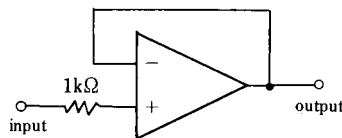
($V^+ / V^- = \pm 15V, Ta = 25^\circ C$)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|-----------|---|----------|----------|------|-----------------|
| Operating Current | I_{CC} | | - | 9 | 16 | mA |
| Input Offset Voltage | V_{IO} | | - | 0.2 | 3 | mV |
| Input Offset Current | I_{IO} | | - | 0.01 | 0.3 | uA |
| Input Bias Current | I_B | | - | 0.5 | 1.8 | uA |
| Common Mode Input Voltage Range | V_{ICM} | | ± 12 | ± 13 | - | V |
| Common Mode Rejection Ratio | CMR | $V_{ICM} = 12V$ | 70 | 100 | - | dB |
| Supply Voltage Rejection Ratio | SVR | $V^+ / V^- = \pm 22 \rightarrow \pm 11V$ | 80 | 100 | - | dB |
| Large Swing Voltage Gain 1 | A_{V1} | $R_L \geq 2k\Omega, V_O = \pm 10V$ | 88 | 110 | - | dB |
| Large Swing Voltage Gain 2 | A_{V2} | $R_L \geq 600\Omega, V_O = \pm 10V$ | 83 | 104 | - | dB |
| Maximum Output Voltage 1 | V_{OM1} | $R_L \geq 600\Omega$ | ± 12 | +14/-13 | - | V |
| Maximum Output Voltage 2 | V_{OM2} | $R_L \geq 600\Omega, V^+ / V^- = \pm 18V$ | ± 15 | +17/-16 | - | V |
| Input Resistance | R_{IN} | | - | 100 | - | k Ω |
| Output Current | I_O | | - | 60 | - | mA |
| Slew Rate | SR | $G_V = 20dB, R_L = 2k\Omega$ | - | 15 | - | V/ μs |
| Gain Bandwidth product | GB | | - | 13 | - | MHz |
| Equivalent Input Noise Voltage | V_{NI} | 20Hz~20kHz | - | 0.9 | - | μV_{rms} |
| Equivalent Input Noise Voltage | e_N | $f_o = 30Hz$ | - | 5.5 | - | nV/ \sqrt{Hz} |
| Equivalent Input Noise Voltage | e_N | $f_o = 1kHz$ | - | 3.3 | - | nV/ \sqrt{Hz} |
| Equivalent Input Noise Current | I_{NI} | $f_o = 30Hz$ | - | 1.5 | - | pA/ \sqrt{Hz} |
| Equivalent Input Noise Current | I_{NI} | $f_o = 1kHz$ | - | 0.4 | - | pA/ \sqrt{Hz} |
| Total Harmonic Distortion | THD | $f = 1kHz, V_O = 5V$ | - | 0.0005 | - | % |

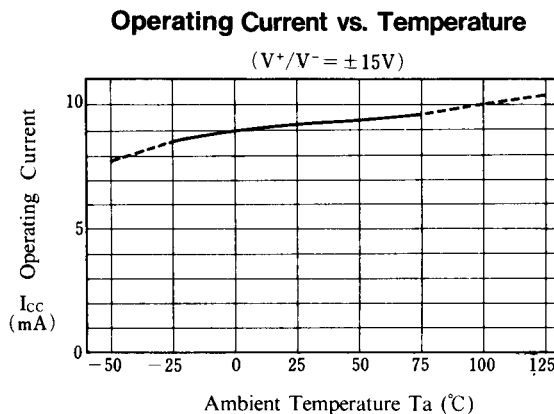
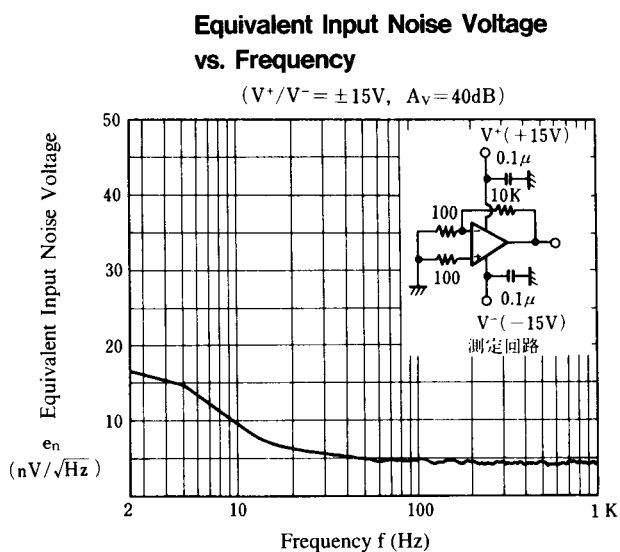
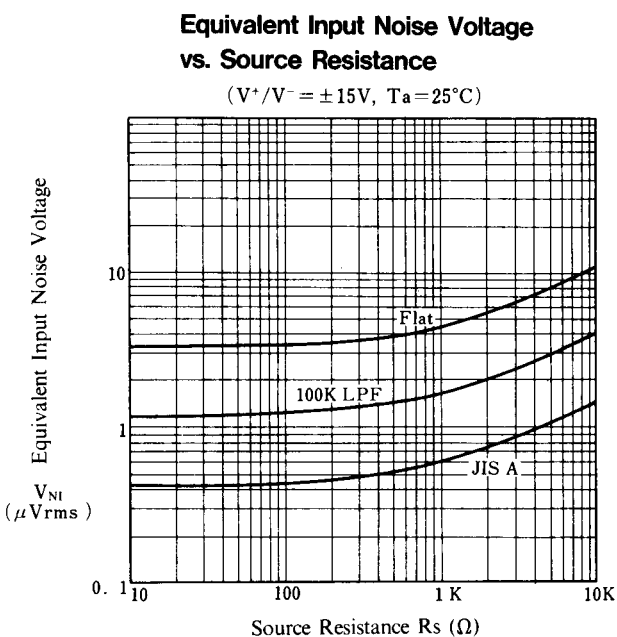
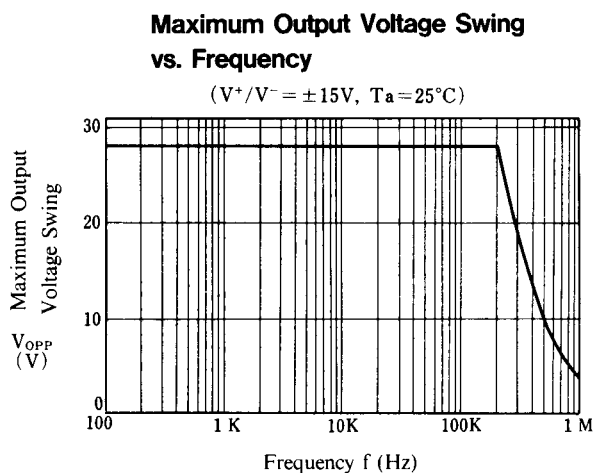
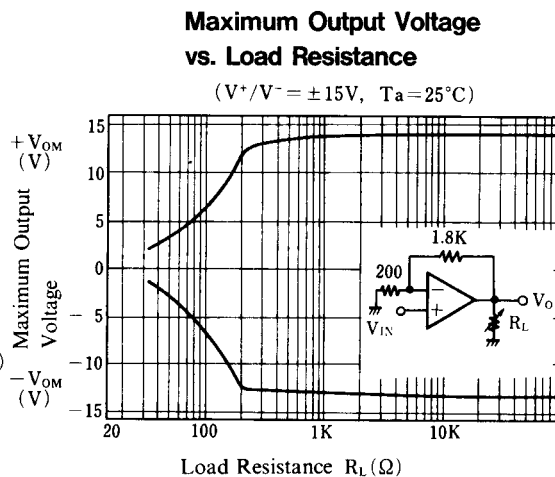
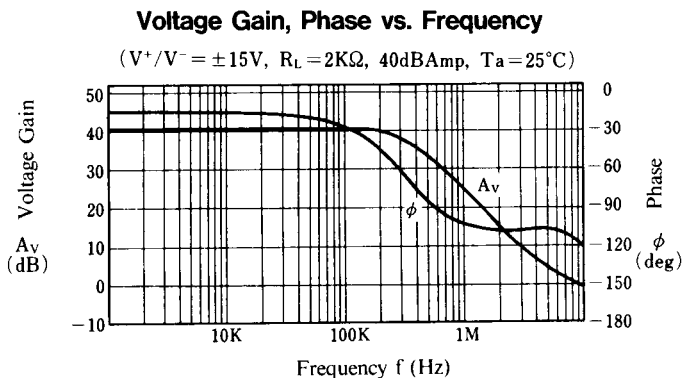
■ NOTE

In the application as a voltage follower, there might be the case the inputs are damaged especially the moment the supply voltage is switched on.

That's why we recommend you to put the current limiting resistor at the input pin.



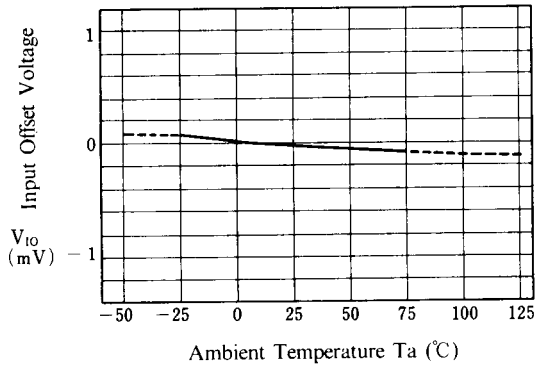
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS

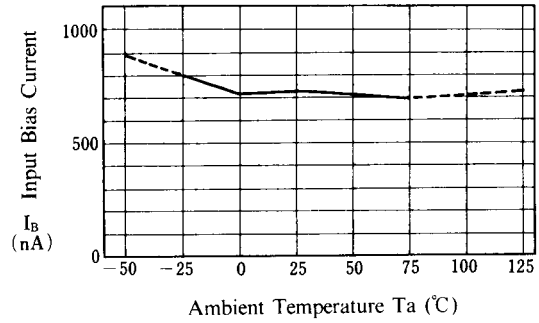
Input Offset Voltage vs. Temperature

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



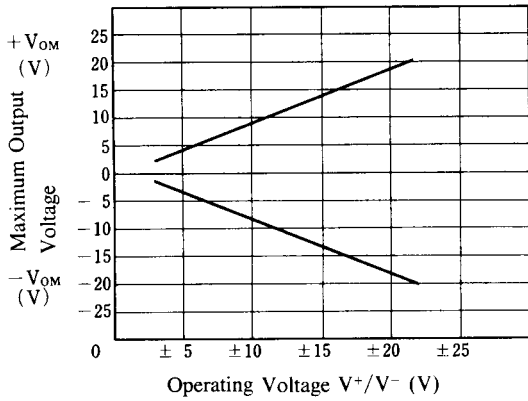
Input Bias Current vs. Temperature

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



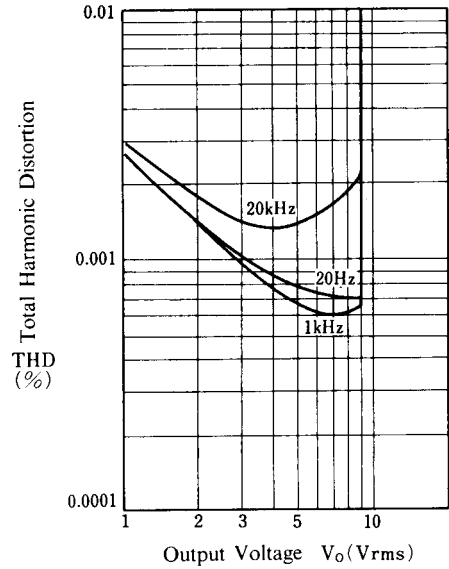
Maximum Output Voltage vs. Operating Voltage

($R_L = 600\Omega$, $T_a = 25^\circ C$)



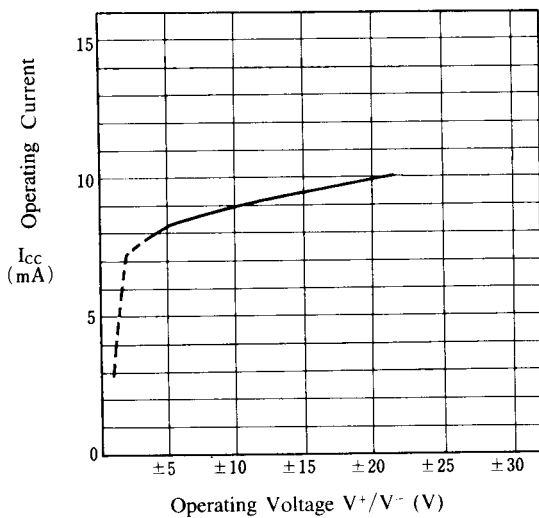
Total Harmonic distortion vs. Output Voltage

($V^+/V^- = \pm 15V$, $R_L = 10k\Omega$, Gain = 20dB, $T_a = 25^\circ C$)



Operating Current vs. Operating Voltage

($T_a = 25^\circ C$)



[CAUTION]

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