# NJM2114

NJM2114 is a high performance dual low noise operational amplifier which 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.

## ■ Characteristics

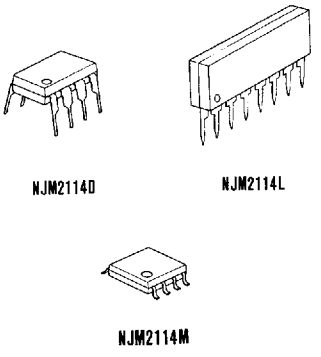
| | |
|---|---|
| High slew rate | 15 (V/μs) |
| Wide bandwidth | 15 (MHz) |
| Low noise voltage | 0.9μVrms |
| High output current | 60mA |

## ■ Absolute Maximum Rating (Ta=25℃)

| | |
|---|---|
| Supply Voltage | ±22 (V) |
| Input Voltage | $V^+/V^-$ (V) |
| Differential Input Voltage | ±0.5 (V) |
| Power Dissipation (D, L-Type) | 800 (mW) |
| (M-Type) | 600mW(Note) |
| Operating Temperature Range | −20~75 (℃) |
| Storage Temperature Range | −40~125 (℃) |

(note) At on PC board

## ■ Package Outline

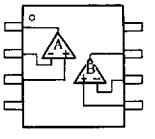


NJM2114D NJM2114L

NJM2114M

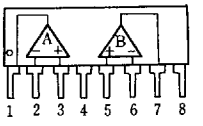
## ■ Connection Diagram

D, M-Type (Top View)

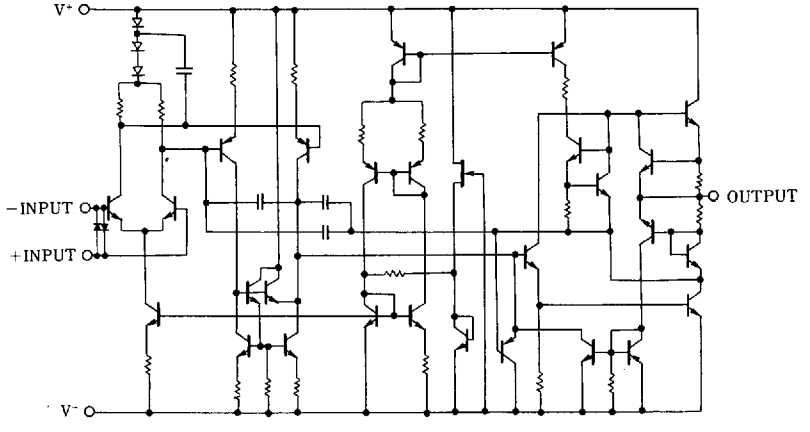


1. A OUTPUT
2. A −INPUT
3. A +INPUT
4. $V^-$
5. B +INPUT
6. B −INPUT
7. B OUTPUT
8. $V^+$

L-Type




## ■ Equivalent Circuit



## ■ Electrical Characteristics

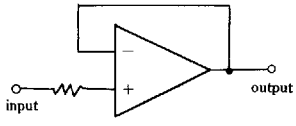
| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Direct Current Characteristics | | | | | | |
| Quiescent Current | $I_{CC}$ | | — | 9 | 16 | mA |
| Input Offset Voltage | $V_{IO}$ | | — | 0.2 | 3 | mV |
| Input Offset Current | $I_{IO}$ | | — | 0.01 | 0.3 | μA |
| Input Bias Current | $I_B$ | | — | 0.5 | 1.8 | μA |
| Maximum Peak To Peak Output Voltage Swing | $V_{OM}$ | | ±12 | ±13 | — | V |
| Common Mode Rejection Ratio | $C_{MR}$ | VICM=12V | 70 | 100 | — | dB |
| Supply Voltage Rejection Ratio | $S_{VR}$ | $V^+/V^-$=±22 → ±11V | 80 | 100 | — | dB |
| Large Swing Voltage Gain .1 | $A_{V1}$ | RL≧2K. $V_O$=±10V | 88 | 110 | — | dB |
| Large Swing Voltage Gain .2 | $A_{V2}$ | RL≧600. $V_O$=±10V | 83 | 104 | — | dB |
| Maximum Output Voltage Swing .1 | $V_{OH1}$ | RL≧600 | ±12 | 14/−13 | — | V |
| Maximum Output Voltage Swing .2 | $V_{OH2}$ | RL≧600. $V^+/V^-$=±18V | ±15 | 17/−16 | — | V |
| Input Resistance | $R_{IN}$ | | — | 100 | — | KΩ |
| Maximum Output Current Swing | $I_{OH}$ | | — | 60 | — | mA |

## ■ Electrical Characteristics

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Alternating Current Characteristics | | | | | | |
| Slew Rate | SR | $G_V$=20dB. RL=2K | — | 15 | — | V/μS |
| Gain-bandwidth product | GB | | — | 13 | — | MHz |
| Equivalent input noise voltage | $V_{NI}$ | 20Hz~20kHz | — | 0.9 | — | uVrms |
| Equivalent input noise voltage | $V_{NI}$ | fo=30Hz | — | 5.5 | — | nV/$\sqrt{Hz}$ |
| Equivalent input noise voltage | $V_{NI}$ | fo=1kHz | — | 3.3 | — | nV/$\sqrt{Hz}$ |
| Equivalent input noise current | $I_{NI}$ | fo=30Hz | — | 1.5 | — | pA/$\sqrt{Hz}$ |
| Equivalent input noise current | $I_{NI}$ | fo=1kHz | — | 0.4 | — | pA/$\sqrt{Hz}$ |
| Total harmonic distotion | THD | f=1kHz,$V_O$=5V | — | 0.0005 | — | % |

## ■ NOTE

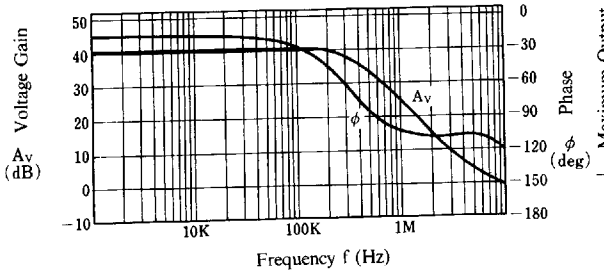
In the application as a voltage follower, there might be the case the inputs are damaged especially the moment the supply voltage is switched on.
That's why we recommend you to put the current limiting resistor at the input pin.



## ■ Typical Characteristics

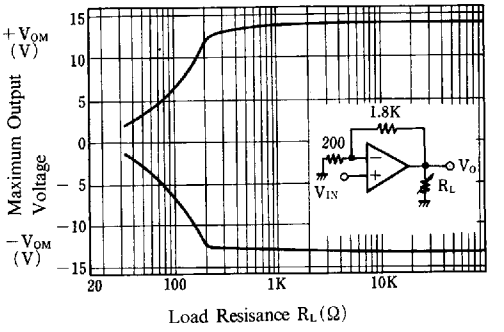
### Voltage Gain, Phase vs. Frequency

($V^+/V^-=\pm15V$, $R_L=2K\Omega$, 40dBAmp, Ta=25°C)



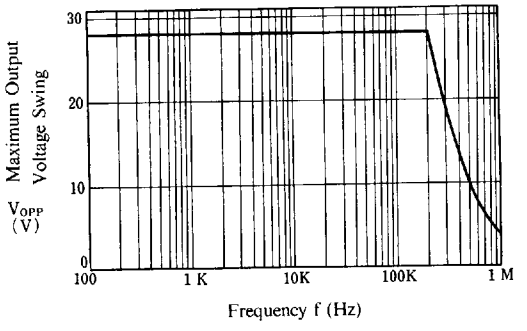

### Maximum Output Voltage vs. Load Resistance

($V^+/V^-=\pm15V$, Ta=25°C)



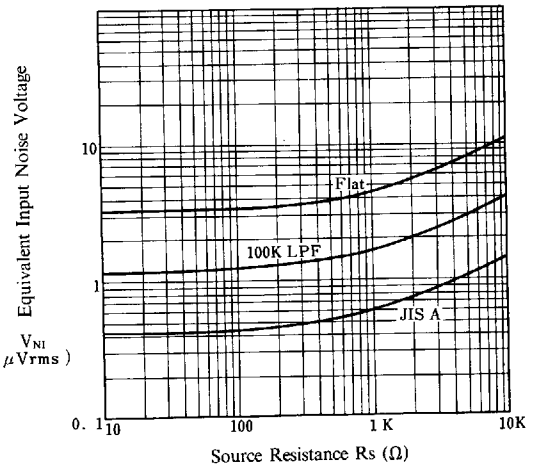

### Maximum Output Voltage Swing vs. Frequency

($V^+/V^-=\pm15V$, Ta=25°C)



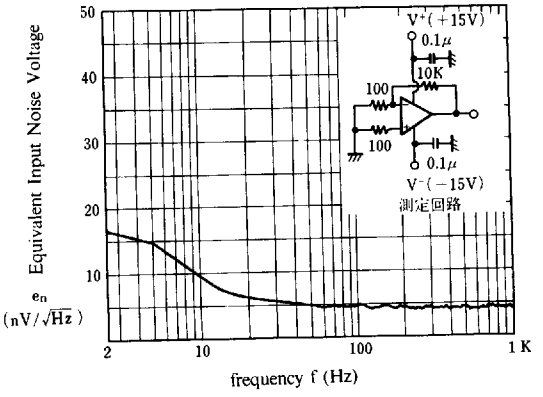

### Equivalent Input Noise Voltage vs. Source Resistance

($V^+/V^-=\pm15V$, Ta=25°C)



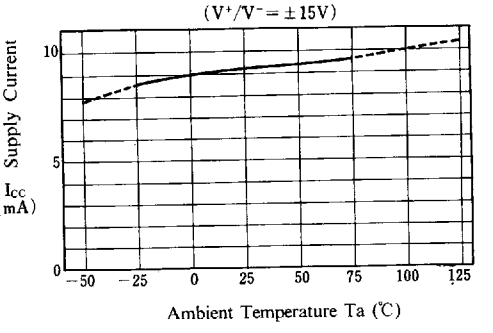

### Equivalent Input Noise Voltage vs. Frequency

($V^+/V^-=\pm15V$, $A_V=40dB$)




### Supply Current vs. Temperature

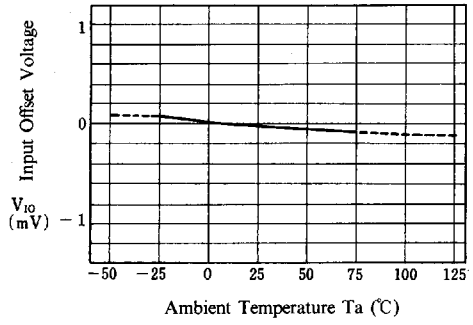
($V^+/V^-=\pm15V$)



## ■ Typical Characteristics

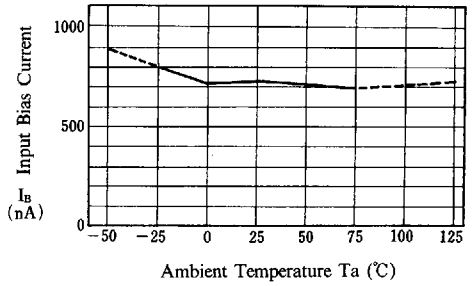
### Input Offset Voltage vs. Temperature

($V^+/V^-=\pm15V$)



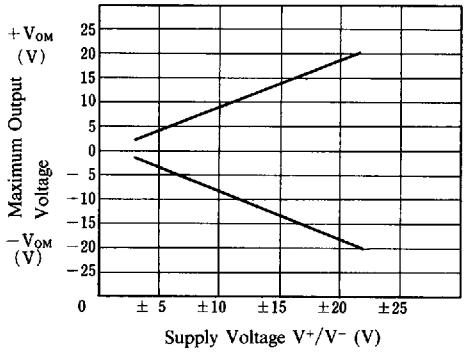

### Input Bias Current vs. Temperature

($V^+/V^-=\pm15V$)



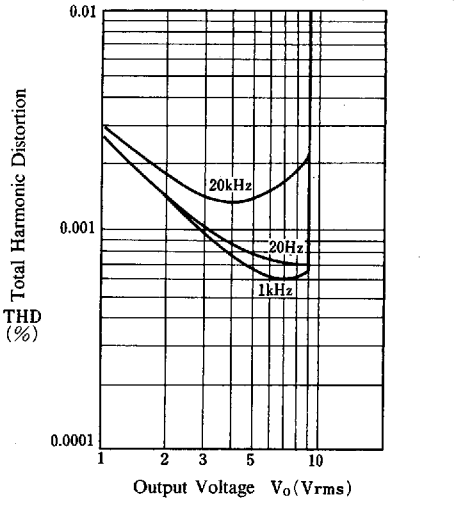

### Maximum Output Voltage vs. Supply Voltage

($R_L=600\Omega$, Ta=25°C)




### Total Harmonic distortion vs. Output Voltage

($V^+/V^-=\pm15V$, $R_L=10k\Omega$, Gain=20dB, Ta=25°C)




### Supply Current vs. Supply Voltage

(Ta=25°C)