HIGH PERFORMANCE LOW-NOISE DUAL OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

NJM 2114 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.
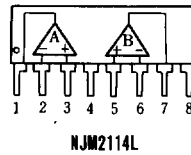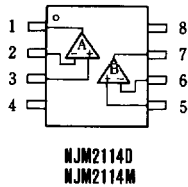
■ FEATURES

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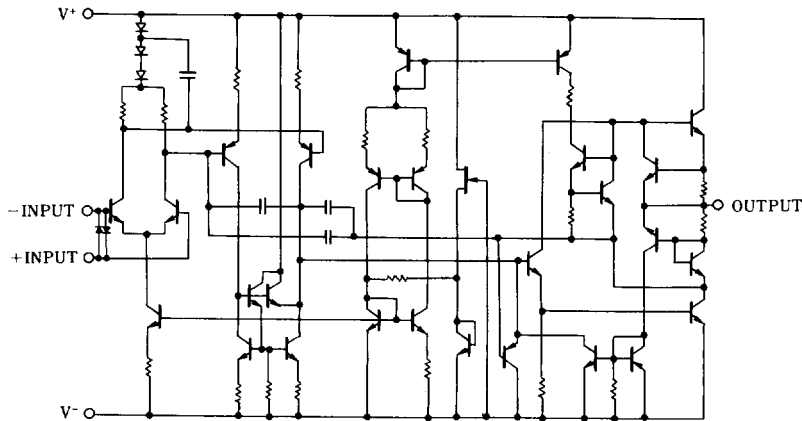- Bipolar Technology

■ PACKAGE OUTLINE

NJM2114D   NJM2114L

NJM2114M

■ PIN CONFIGURATION

NJM2114D
NJM2114M

NJM2114L
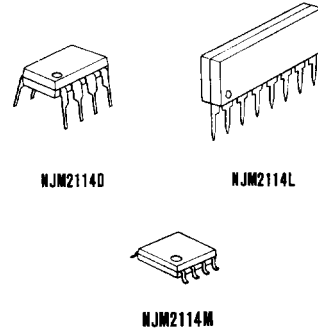
1. A OUTPUT
2. A −INPUT
3. A +INPUT
4. V−
5. B +INPUT
6. B −INPUT
7. B OUTPUT
8. V+

■ EQUIVALENT CIRCUIT

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

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

(note 2) At on PC board

■ ELECTRICAL CHARACTERISTICS

(V^+/V^-=±15V, Ta=25°C)

Direct Current Characteristics

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	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	CMR	V_{ICM} =12V	70	100	—	dB
Supply Voltage Rejection Ratio	SVR	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

Alternating Current Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
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.

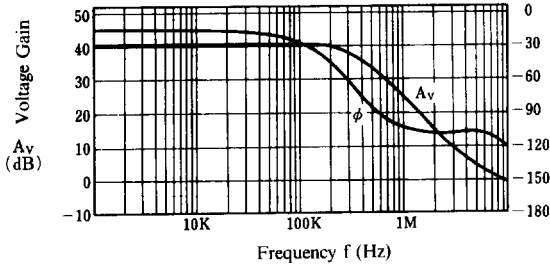That's why we recommend you to put the current limiting resistor at the input pin.
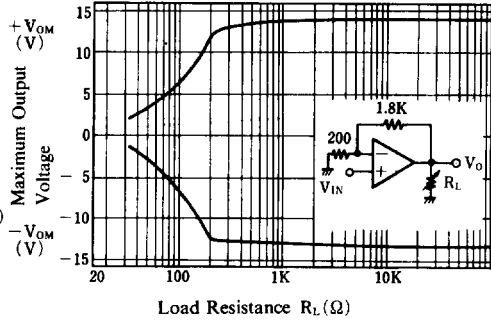
NJM2114
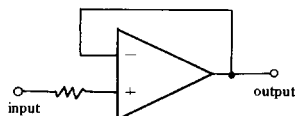
■ TYPICAL CHARACTERISTICS

Voltage Gain, Phase vs. Frequency
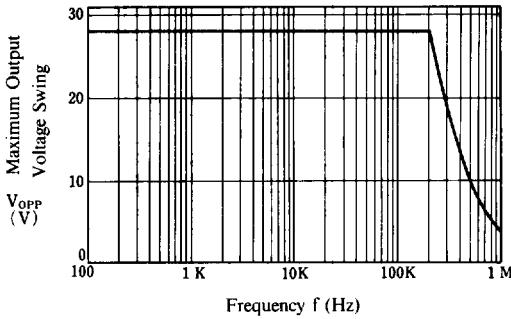$(V^+/V^- = \pm 15V, R_L = 2K\Omega, 40dBAmp, Ta = 25°C)$

Maximum Output Voltage vs. Load Resistance
$(V^+/V^- = \pm 15V, Ta = 25°C)$

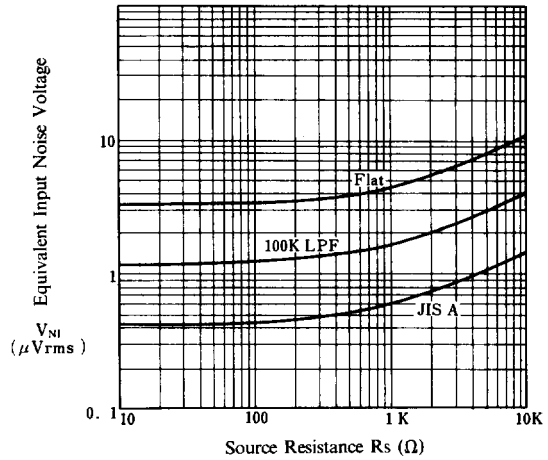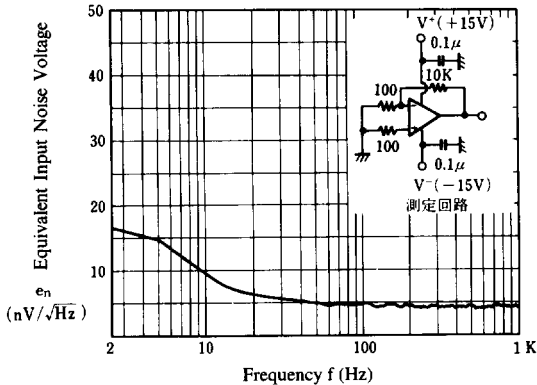### Maximum Output Voltage Swing vs. Frequency
$(V^+/V^- = \pm 15V, Ta = 25°C)$

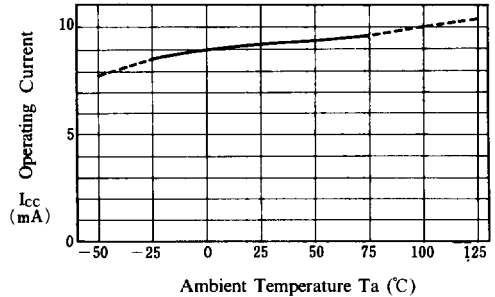### Equivalent Input Noise Voltage vs. Source Resistance
$(V^+/V^- = \pm 15V, Ta = 25°C)$

Equivalent Input Noise Voltage vs. Frequency
$(V^+/V^- = \pm 15V, Av = 40dB)$
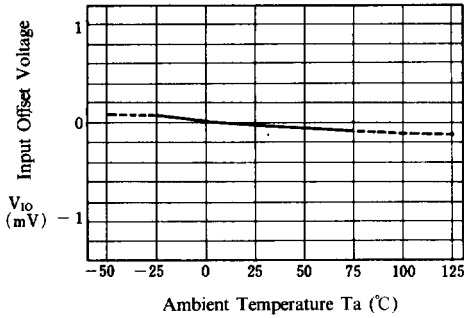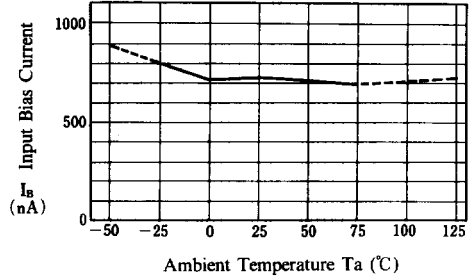
Operating Current vs. Temperature
$(V^+/V^- = \pm 15V)$

NJM2114

Input Offset Voltage vs. Temperature
$(V^+/V^- = \pm 15V)$

Input Offset Voltage V_{IO} (mV)

Ambient Temperature Ta (℃)

Input Bias Current vs. Temperature
$(V^+/V^- = \pm 15V)$

Input Bias Current I_B (nA)

Ambient Temperature Ta (℃)

Maximum Output Voltage vs. Operating Voltage
$(R_L = 600\Omega, \ Ta = 25°C)$

$+V_{OM}$ (V) Maximum Output Voltage $-V_{OM}$ (V)

Operating Voltage V^+/V^- (V)
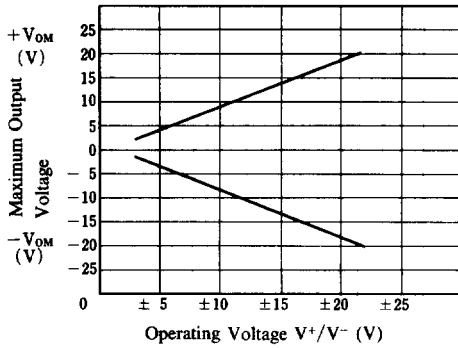
Total Harmonic distortion vs. Output Voltage
$(V^+/V^- = \pm 15V, \ R_L = 10k\Omega, \ Gain = 20dB, \ Ta = 25°C)$

Total Harmonic Distortion THD (%)

20kHz

20Hz

1kHz

Output Voltage V_O (Vrms)
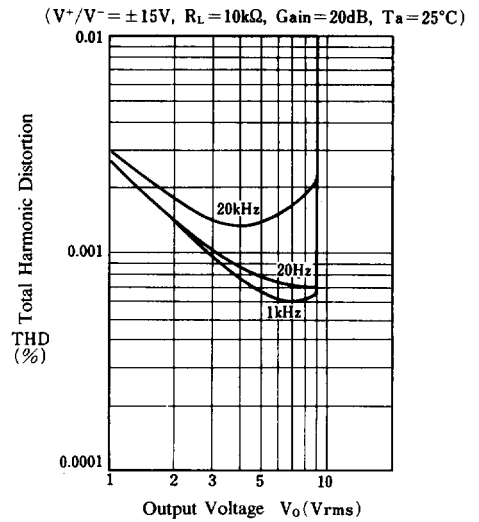
Operating Current vs. Operating Voltage
$(Ta = 25°C)$

Operating Current I_{CC} (mA)

Operating Voltage V^+/V^- (V)