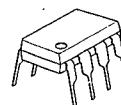


LOW-NOISE DUAL OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

The NJM2068 is a high performance, low noise dual operational amplifier. This amplifier features popular pin-out, superior noise performance, and superior total harmonic distortion. This amplifier also features guaranteed noise performance with substantially higher gain-bandwidth product and slew rate which far exceeds that of the 4558 type amplifier. The specially designed low noise input transistors allow the NJM2068 to be used in very low noise signal processing applications such as audio preamplifiers and servo error amplifier.

■ PACKAGE OUTLINE



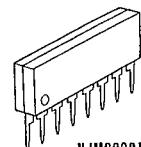
NJM2068D



NJM2068M



NJM2068V

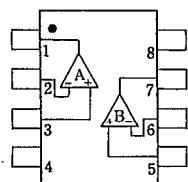


NJM2068L

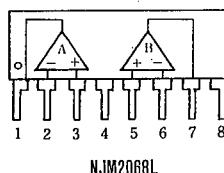
■ FEATURES

- Operating Voltage ($\pm 4V \sim \pm 18V$)
- Low Total Harmonic Distortion (0.001% typ.)
- Low Noise Voltage (FLAT+JISA, 0.56 μV typ.)
- High Slew Rate (6V/ μs typ.)
- Unity Gain Bandwidth (27MHz @ $f=10kHz$)
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

■ PIN CONFIGURATION



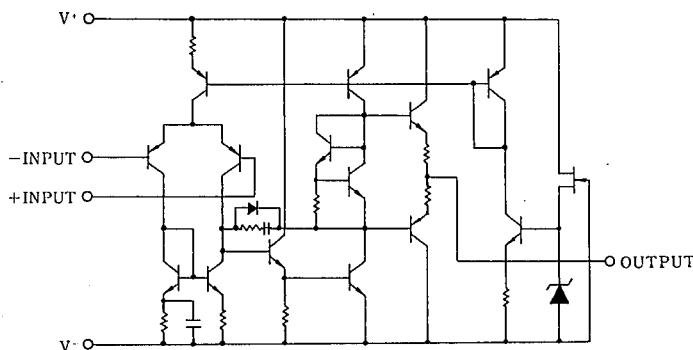
NJM2068D
NJM2068M
NJM2068V



NJM2068L

PIN FUNCITON	
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)



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺ /V ⁻	±18	V
Input Voltage	V _{IC}	±15 (note)	V
Differential Input Voltage	V _{ID}	±30	V
	P _D	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (SIP8) 800	mW mW mW mW
Power Dissipation			
Operating Temperature Range	T _{opr}	-20~+75	°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⁻=±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V _{IO}	R _S ≤10kΩ	—	0.3	3	mV
Input Offset Current	I _{IO}		—	5	200	nA
Input Bias Current	I _B		—	150	1000	nA
Input Resistance	R _{IN}		50	300	—	kΩ
Large Signal Voltage Gain	A _V	R _L ≥2kΩ, V _O =±10V	90	120	—	dB
Maximum Output Voltage Swing	V _{OM}	R _L ≥2kΩ	±12	±13.5	—	V
Input Common Mode Voltage Range	V _{ICM}		±12	±13.5	—	V
Common Mode Rejection Ratio	CMR	R _S ≤10kΩ	80	110	—	dB
Supply Voltage Rejection Ratio	SVR	R _S ≤10kΩ	80	120	—	dB
Slew Rate	SR	R _L ≤2kΩ	—	6	—	V/μs
Gain Bandwidth Product 1	GB1	f=10kHz	—	27	—	MHz
Gain Bandwidth Product 2	GB2	f=100kHz	—	19	—	MHz
Unity Gain Bandwidth	f _T	A _V =1	—	5.5	—	MHz
Total Harmonic Distortion	THD	A _V =20dB, V _O =5V, R _L =2kΩ, f=1kHz	—	0.001	—	%
Equivalent Input Noise Voltage 1	V _{NI} 1	FLAT+JISA, R _S =300Ω	—	0.44	0.56	μV
Operating Current	I _{CC}		—	5.0	8.0	mA

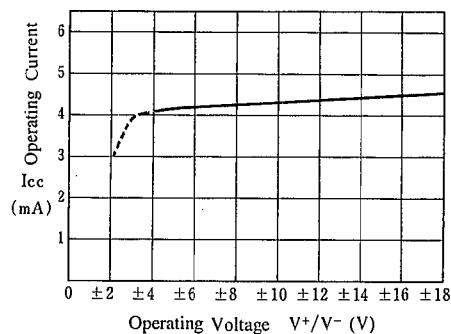
(note 1)Oscillation might be caused when capacitor type load were connected. It is recommendable to insert series resistor (about 50Ω) at the output for preventing oscillation.

(note 2)In regard to Noise Standard, NJRC is preparing for special D rank type products (R_S = 2.2kΩ, RIAA, V_{NI}=1.4mV Max.)

■ TYPICAL CHARACTERISTICS

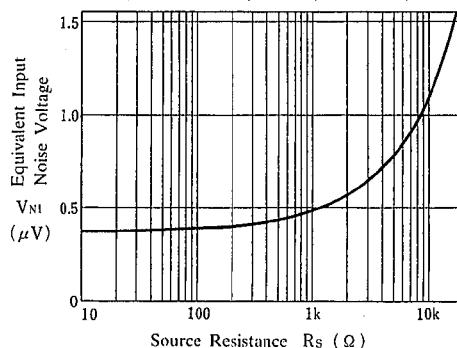
Operating Current vs. Operating Voltage

(No Input Signal, $R_L = \infty$, $T_a = 25^\circ\text{C}$)



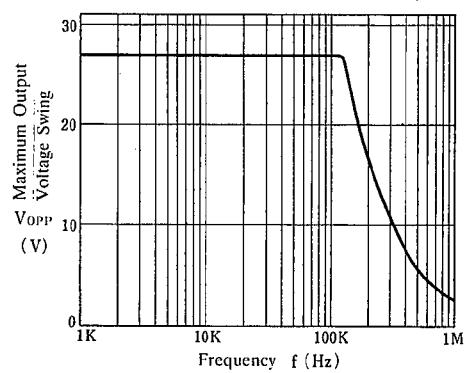
Equivalent Input Noise Voltage vs. Source Resistance

($V^+/V^- = \pm 15\text{V}$, JIS A, $T_a = 25^\circ\text{C}$)



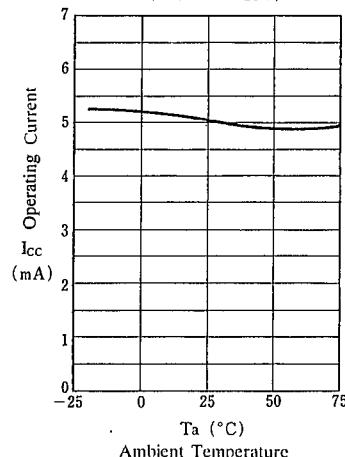
Maximum Output Voltage Swing vs. Frequency

($V^+/V^- = \pm 15\text{V}$, $R_L = 2\text{k}\Omega$, $T_a = 25^\circ\text{C}$)



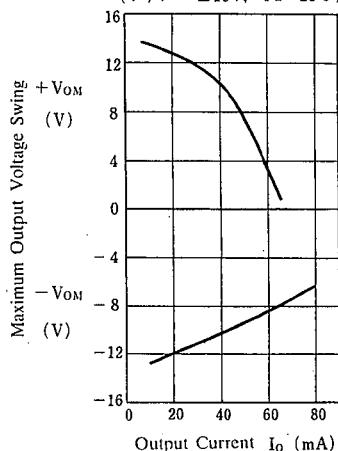
Operating Current vs. Temperature

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



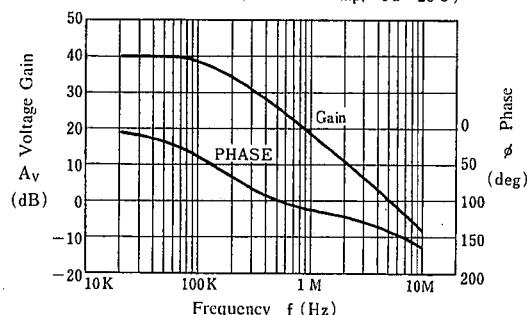
Maximum Output Voltage Swing

($V^+/V^- = \pm 15\text{V}$, $T_a = 25^\circ\text{C}$)



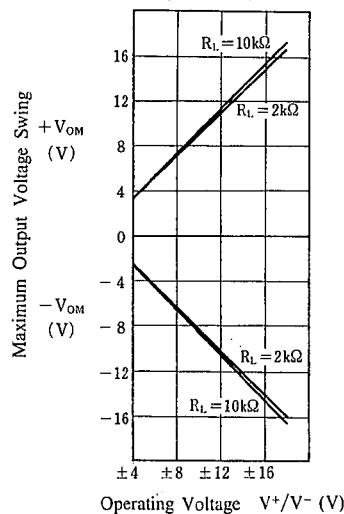
Voltage Gain, Phase vs. Frequency

($V^+/V^- = \pm 15\text{V}$, $R_L = 2\text{k}\Omega$, $C_L = 100\text{pF}$, 40dB Amp, $T_a = 25^\circ\text{C}$)

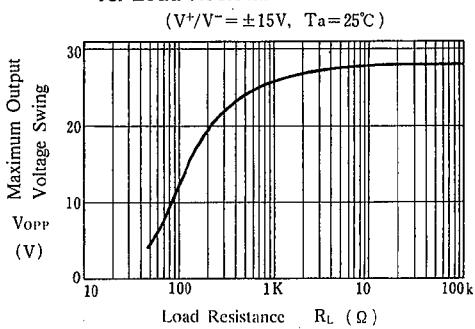


■ TYPICAL CHARACTERISTICS

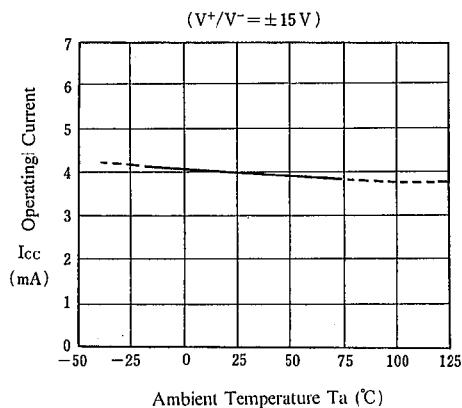
**Maximum Output Voltage Swing
vs. Operating Voltage**
($T_a = 25^\circ C$)



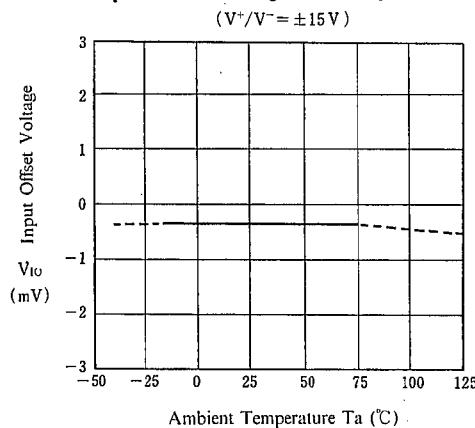
**Maximum Output Voltage Swing
vs. Load Resistance**



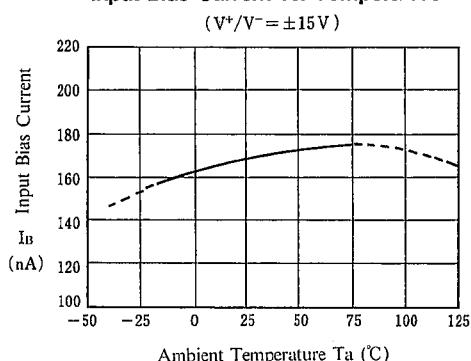
Operating Current vs. Temperature



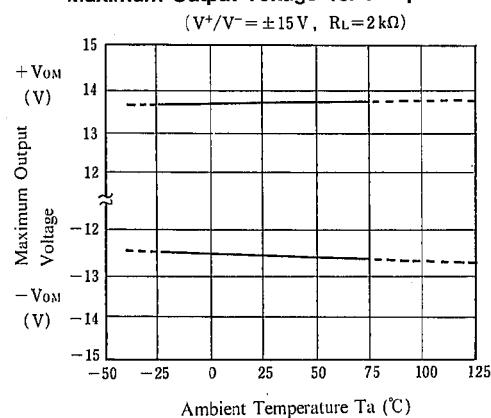
Input Offset Voltage vs. Temperature



Input Bias Current vs. Temperature



Maximum Output Voltage vs. Temperature



MEMO

[CAUTION]

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