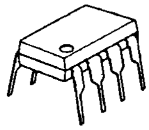
LOW-NOISE DUAL OPERATIONAL AMPLIFIER

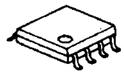
■ GENERAL DESCRIPTION

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

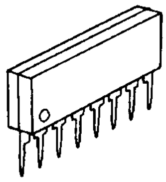


NJM2068D



NJM2068M

NJM2068V

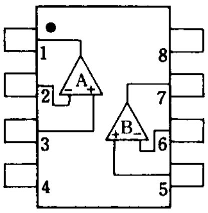


NJM2068L

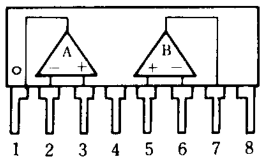
■ FEATURES

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

■ PIN CONFIGURATION



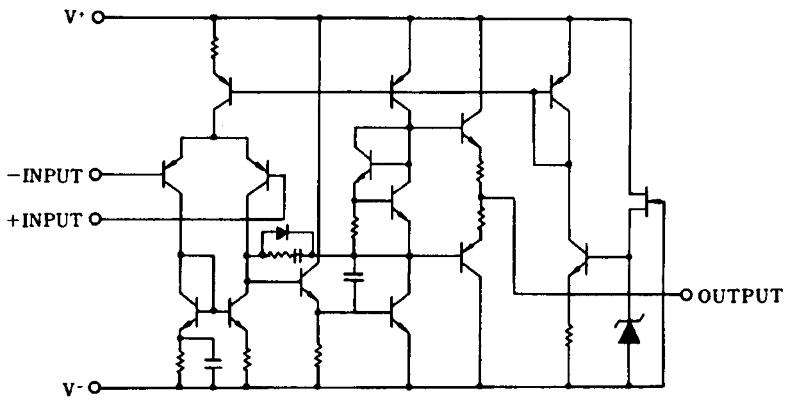
NJM2068D
NJM2068M
NJM2068V



NJM2068L

PIN 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)



■ 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
Power Dissipation	P_D	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (SIP8) 800	mW
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)

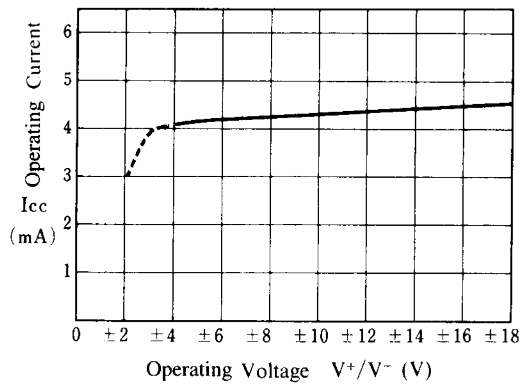
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	R_S≤10kΩ	-	0.3	3	mV
Input Offset Current	I_{IO}		-	5	200	nA
Input Bias Current	I_B		-	150	1000	nA
Input Resistance	R_{IN}		50	300	-	kΩ
Large Signal Voltage Gain	A_V	R_L≥2kΩ,V_O=±10V	90	120	-	dB
Maximum Output Voltage Swing	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_{NI1}	FLAT+JISA,R_S=300Ω	-	0.44	0.56	µV
Operating Current	I_{CC}		-	5.0	8.0	mA

(note1) 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.
(note2) In regard to Noise Standard, NJRC is preparing for special D rank type products (R_S=2.2kΩ,RIAA,V_{NI}=1.4µV Max.)

■ TYPICAL CHARACTERISTICS

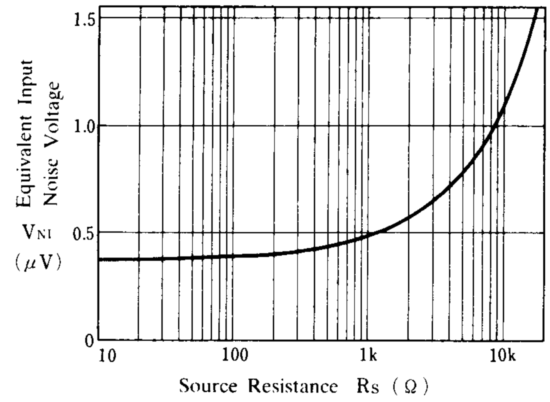
Operating Current vs. Operating Voltage

(No Input Signal, $R_L=\infty$, $Ta=25°C$)



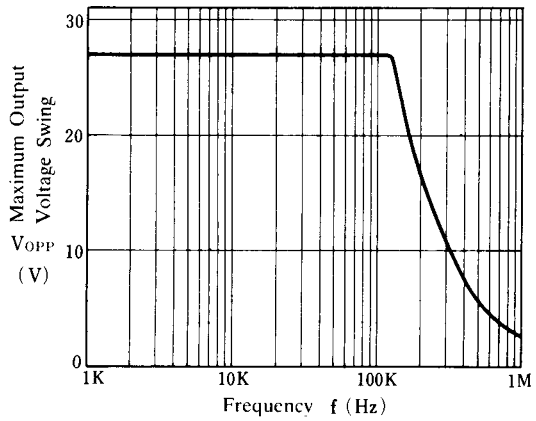
Equivalent Input Noise Voltage vs. Source Resistance

($V^+/V^-=\pm15V$, JIS A, $Ta=25°C$)



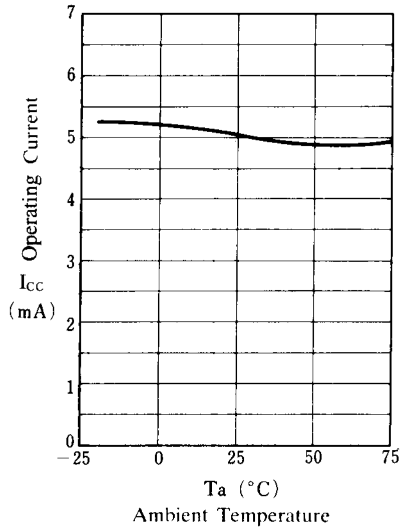
Maximum Output Voltage Swing vs. Frequency

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



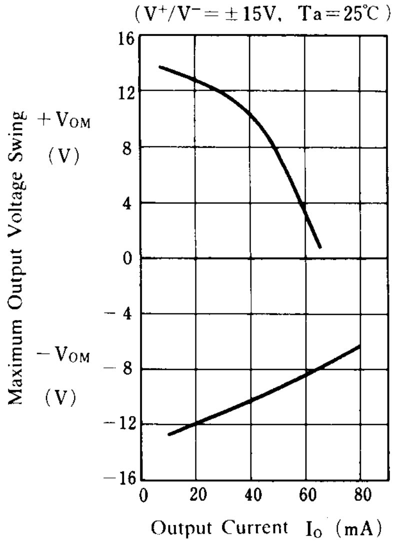
Operating Current vs. Temperature

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



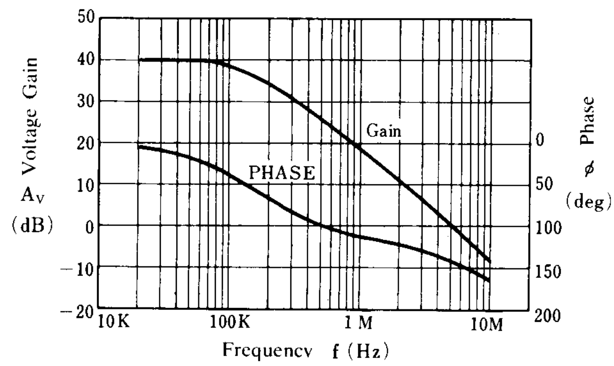
Maximum Output Voltage Swing

($V^+/V^-=\pm15V$, $Ta=25°C$)



Voltage Gain, Phase vs. Frequency

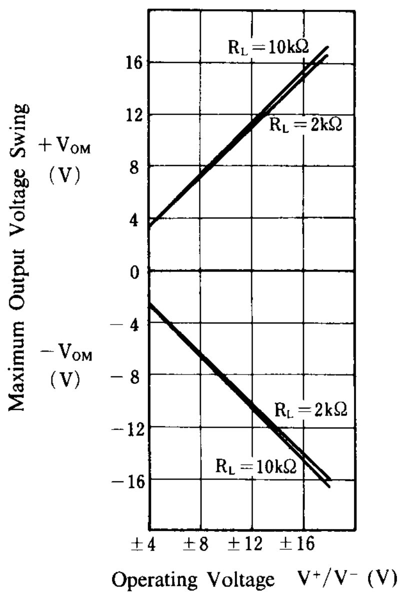
($V^+/V^-=\pm15V$, $R_L=2k\Omega$, $C_L=100pF$, 40dB Amp, $Ta=25°C$)



■ TYPICAL CHARACTERISTICS

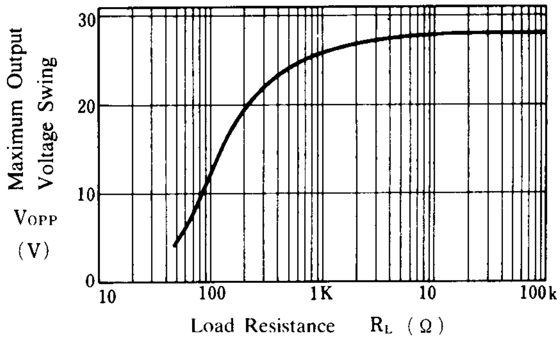
Maximum Output Voltage Swing vs. Operating Voltage

(Ta=25°C)



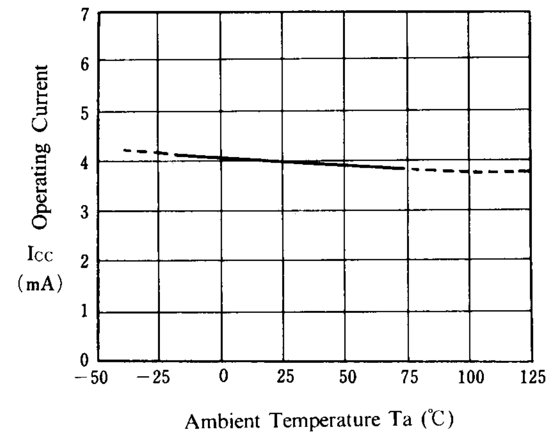
Maximum Output Voltage Swing vs. Load Resistance

(V^+/V^-=±15V, Ta=25°C)



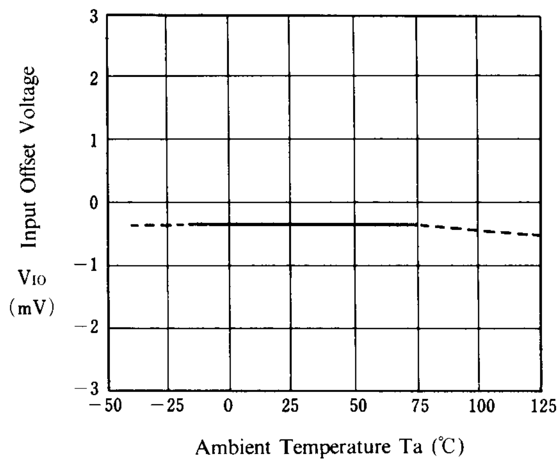
Operating Current vs. Temperature

(V^+/V^-=±15V)



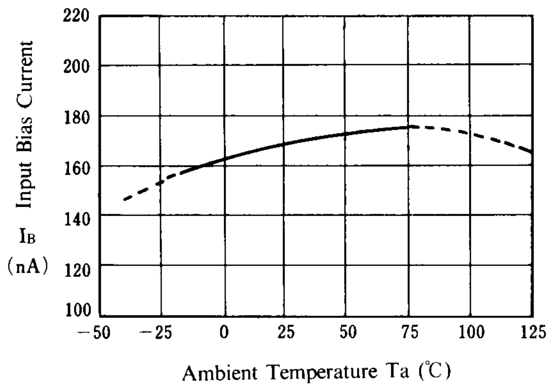
Input Offset Voltage vs. Temperature

(V^+/V^-=±15V)



Input Bias Current vs. Temperature

(V^+/V^-=±15V)



Maximum Output Voltage vs. Temperature

(V^+/V^-=±15V, R_L=2kΩ)