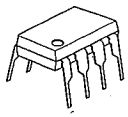
ULTRA LOW NOISE DUAL OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

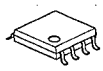
The NJM2122 is an ultra low noise dual operational amplifier.

The features of ultra low noise, low operating voltage, and low saturation voltage are suitable for microphone amplifier of digital audio items such as portable MD, DAT, and others.

■ PACKAGE OUTLINE



NJM2122D

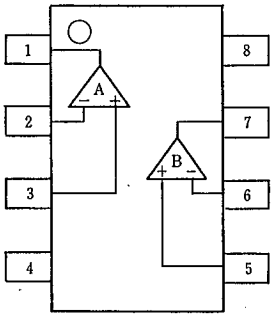


NJM2122M

■ FEATURES

- Operating Voltage (±2.0V ~ ±10.0V)
- Ultra Low Noise Voltage (1.5nV/√Hz typ. @f=1kHz)
- Low Saturation Output Voltage (0.3V typ.)
- Bipolar Technology
- Package Outline DIP8, DMP8

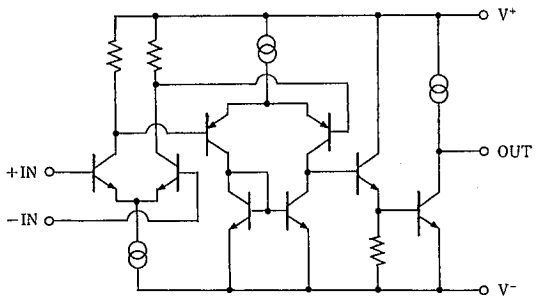
■ PIN CONFIGURATION



NJM2122D
NJM2122M

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℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	±10	V
Differential Input Voltage	V_{ID}	±0.5	V
Input Voltage	V_{IC}	±10(note)	V
Power Dissipation	P_D	(DIP-8) 500	mW
		(DMP-8) 300	mW
Operating Temperature Range	T_{opr}	−20～+75	℃
Storage Temperature Range	T_{stg}	−40～+125	℃

(note) When the supply voltage is less than ±10V, the absolute maximum input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

(V^+=5V, Ta=25℃)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Voltage 1	Vope1	DIP Package	±2.0	−	±10.0	V
Operating Voltage 2	Vope2	DMP Package	±2.0	−	±7.0	V
Operating Current	I_{CC}	V_{IN}=0V, R_L=∞ Ω	−	7.0	9.5	mA
Input Offset Voltage	V_{IO}		−	1.0	6.0	mV
Input Offset Current	I_{IO}		−	0.45	1.50	μA
Input Bias Current	I_B		−	3.6	8.0	μA
Large Signal Voltage Gain	A_V	R_L≧10kΩ	80	100	−	dB
Input Common Mode Voltage Range	V_{ICM}		±0.7	±1.0	−	V
Common Mode Rejection Ratio	CMR		60	74	−	dB
Supply Voltage Rejection Ratio	SVR		60	80	−	dB
Maximum Output Voltage	V_{OM}	R_L≧2.5kΩ	±2.0	±2.2	−	V
Slew Rate	SR	G_V=20dB, V_{IN}=±0.1V	−	2.4	−	V/μs
Gain Bandwidth Product	GB		−	12	−	MHz
Equivalent Input Noise Voltage 1	e_n1	R_S=10Ω, f=1kHz	−	1.5	−	nV/√Hz
Equivalent Input Noise Voltage 2	e_n2		−	0.56	0.75	μVrms
Channel Separation	CS	f=1kHz	−	90	−	dB
Total Harmonic Distortion	THD	V_O=1Vrms, f=1kHz G_V=20dB, R_L=2.5kΩ	−	0.003	−	%

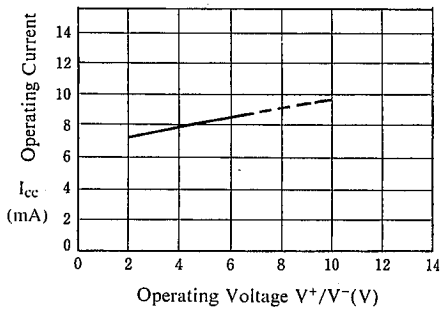
(note)

Between 30 to 50dB voltage gain is recommended.
In case of voltage gain less than 30dB, phase compensation by external circuit is required.
The voltage follower circuit must not be used.
DMP package should be used in operating voltage less than ±7V, because of the P_D limitation.

■ TYPICAL CHARACTERISTICS

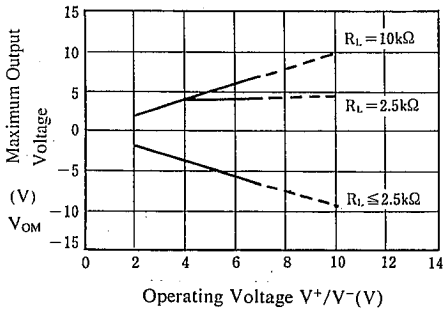
Operating Current vs. Operating Voltage

(Ta=25℃)



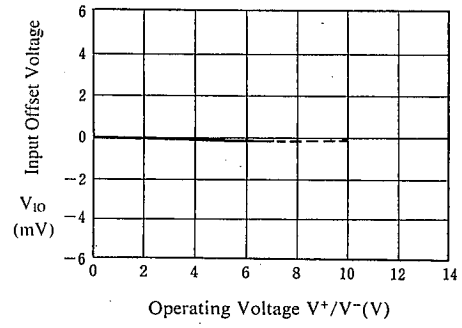
Maximum Output Voltage vs. Operating Voltage

(Ta=25℃)



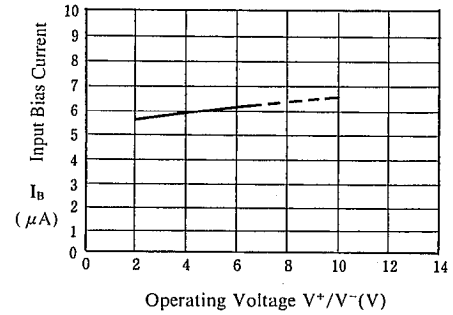
Input Offset Voltage vs. Operating Voltage

(Ta=25℃)



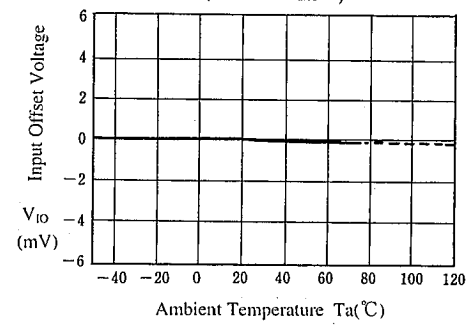
Input Bias Current vs. Operating Voltage

(Ta=25℃)



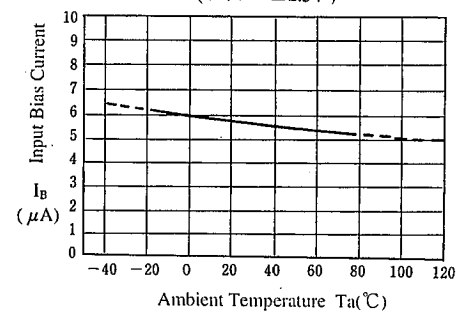
Input Offset Voltage vs. Temperature

($V^+/V^-=\pm 2.5V$)



Input Bias Current vs. Temperature

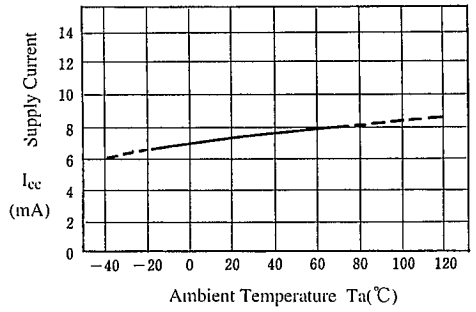
($V^+/V^-=\pm 2.5V$)



■ TYPICAL CHARACTERISTICS

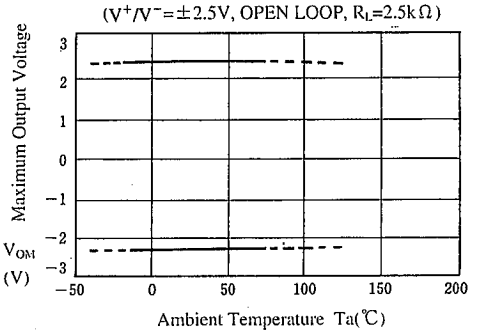
Operating Current vs. Temperature

($V^+/V^-=\pm2.5V$)



Maximum Output Voltage vs. Temperature

($V^+/V^-=\pm2.5V$, OPEN LOOP, $R_L=2.5k\Omega$)



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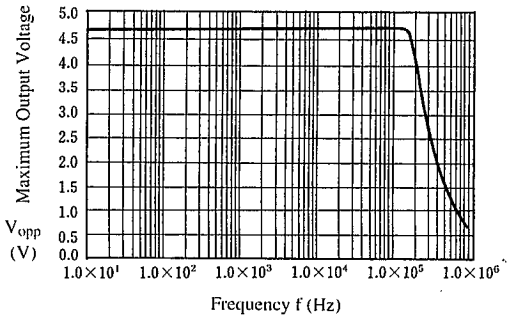
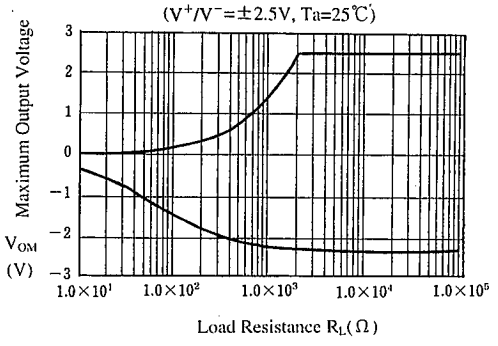
Maximum Output Voltage vs. Frequency

($V^+/V^-=\pm2.5V$, $R_L=2.5k\Omega$, Ta=25℃)



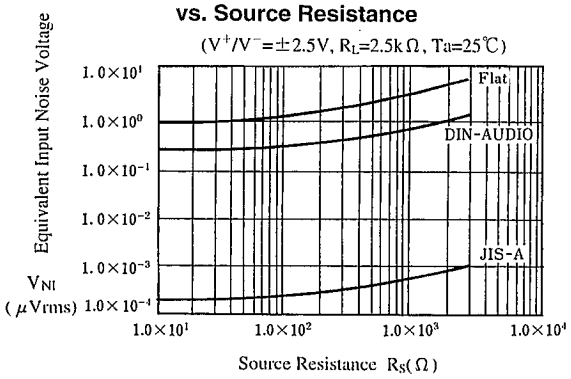
Maximum Output Voltage vs. Load Resistance

($V^+/V^-=\pm2.5V$, Ta=25℃)



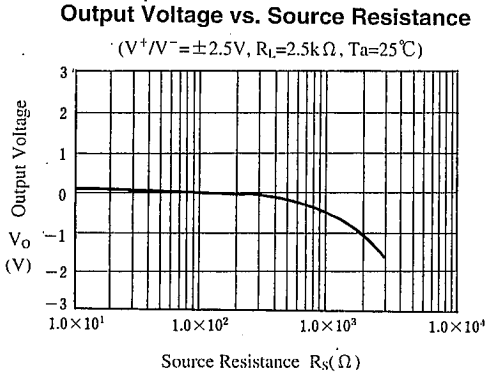
Equivalent Input Noise Voltage vs. Source Resistance

($V^+/V^-=\pm2.5V$, $R_L=2.5k\Omega$, Ta=25℃)



Output Voltage vs. Source Resistance

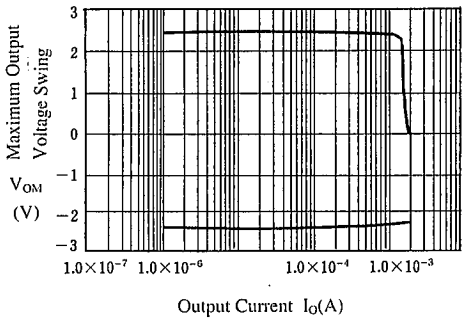
($V^+/V^-=\pm2.5V$, $R_L=2.5k\Omega$, Ta=25℃)



■ TYPICAL CHARACTERISTICS

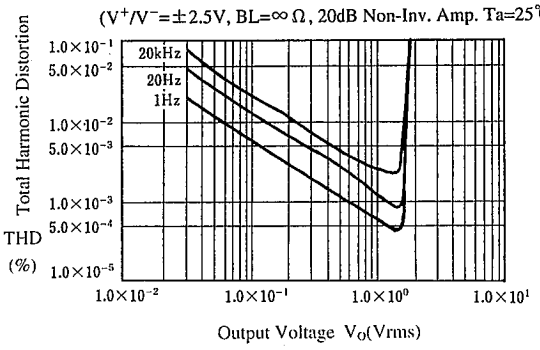
Maximum Output Voltage Swing vs. Output Current

($V^+/V^-=\pm2.5V$, Ta=25℃)



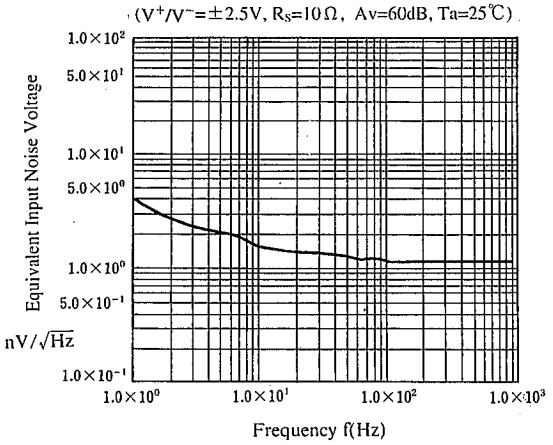
Total Harmonic Distortion vs. Output Voltage

($V^+/V^-=\pm2.5V$, BL=∞Ω, 20dB Non-Inv. Amp. Ta=25℃)



Equivalent Input Noise Voltage vs. Frequency

($V^+/V^-=\pm2.5V$, R_S=10Ω, Av=60dB, Ta=25℃)



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