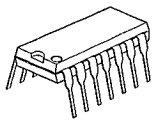
QUAD OPERATIONAL AMPLIFIER

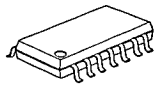
■ GENERAL DESCRIPTION

NJM 2112 is low operating voltage (±1.0 V min.) and low saturation output voltage (±2.0 V p-p at operating voltage ±25V) operational amplifier. It is applicable to HANDY TYPE CD, RADIO CASSETE CD, and PORTABLE DAT, that are digital audio apparatus which require the 5 V single supply operation and high output voltage. The NJM2112 is quad operational amplifier. Each amplifier of the NJM2112 has the same electrical characteristic of the NJM2115.

■ PACKAGE OUTLINE



NJM2112D



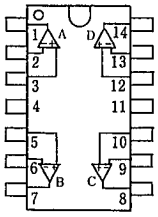
NJM2112M

NJM2112V

■ FEATURES

- Operating Voltage (±1.0V～±7.0V)
- Low Saturation Output Voltage ($\pm 2.0V_{p\text{-}p}$ @$V^+ = \pm 2.5V$)
- Package Outline DIP14, DMP14, SSOP14
- Bipolar Technology

■ PIN CONFIGURATION

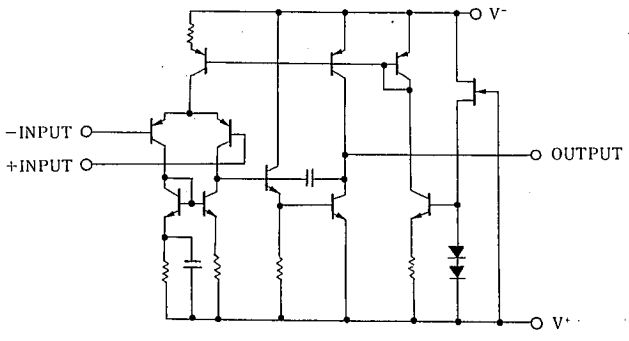


NJM2112D
NJM2112M
NJM2112V

PIN FUNCTION

1. A OUTPUT	8. C OUTPUT
2. A −INPUT	9. C −INPUT
3. A +INPUT	10. C +INPUT
4. V^+	11. V^-
5. B +INPUT	12. D +INPUT
6. B −INPUT	13. D −INPUT
7. B OUTPUT	14. D OUTPUT

■ EQUIVALENT CIRCUIT (1/4 Shown)



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	±7.0	V
Differential Input Voltage	V_{ID}	±14	V
Power Dissipation	P_D	(DIP14) 500	mW
		(DIM14) 300	mW
		(SSOP14) 300	mW
Operating Temperature Range	T_{opr}	−40～+85	℃
Storage Temperature Range	T_{stg}	−40～+125	℃

■ ELECTRICAL CHARACTERISTICS

(V^+/V^-=±2.5V, Ta=25℃)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	$R_S \leqq 10k\Omega$	—	1	6	mV
Input Bias Current	I_B		—	100	300	nA
Large Signal Voltage Gain	A_V	$R_L \geqq 10k\Omega$	60	80	—	dB
Maximum Output Voltage Swing	V_{OM}	$R_L \geqq 2.5k\Omega$	±2	±2.2	—	V
Input Common Mode Voltage Range	V_{ICM}		±1.5	—	—	V
Common Mode Rejection Ratio	CMR		60	74	—	dB
Supply Voltage Rejection Ratio	SVR		60	80	—	dB
Operating Current	I_{CC}	V_{IN}=O, R_L=∞	—	8	11	mA
Slew Rate	SR	A_U=1, V_{IN}=±1V	—	3.2	—	V/μs
Gain Bandwidth product	GB	f=10kHz	—	9	—	MHz

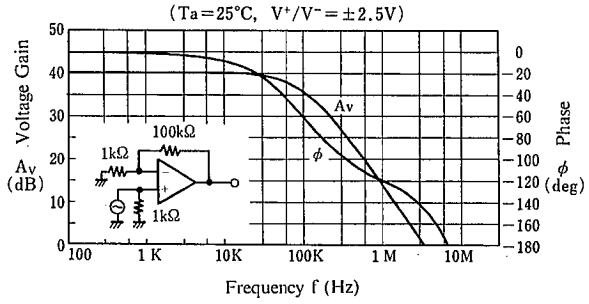
(note 1)Applied circuit voltage gain is desired to be operated within the range of 3 dB to 30 dB.

(note 2)Special care being required for input common mode voltage range and the oscillation due to the capacitive load when operating follower.

■ TYPICAL CHARACTERISTICS

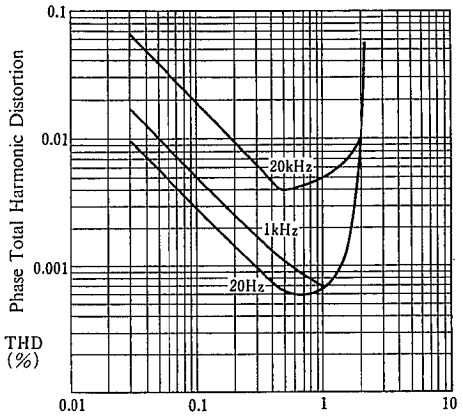
Voltage Gain, Phase vs. Frequency

(Ta=25°C, V⁺/V⁻=±2.5V)



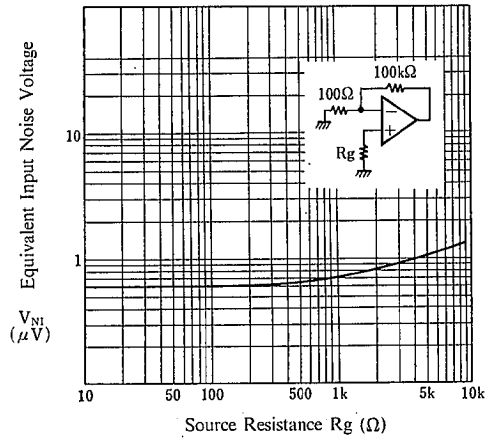
Total Harmonic Distartion vs. Output Voltage

(V⁺/V⁻=±3V, R_L=2.4kΩ, A_V=10dB, Ta=25°C)



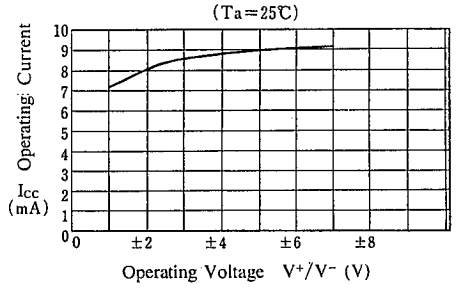
Equivalent Input Noise Voltage vs. Source Resistance

(V⁺/V⁻=±3V, Ta=25°C)



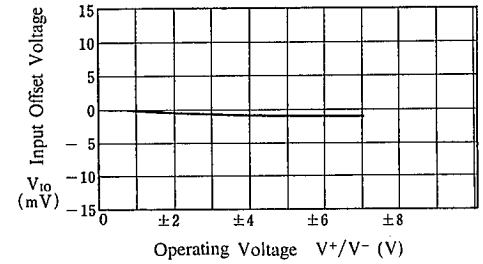
Operating Current vs. Operating Voltage

(Ta=25℃)



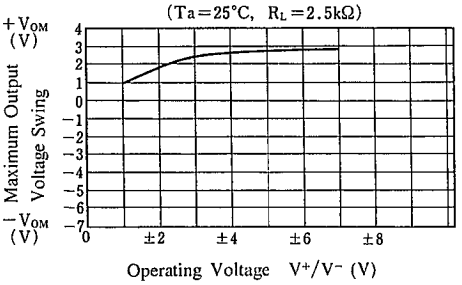
Input Offset Voltage vs. Operating Voltage

(Ta=25°C, R_L=10kΩ)



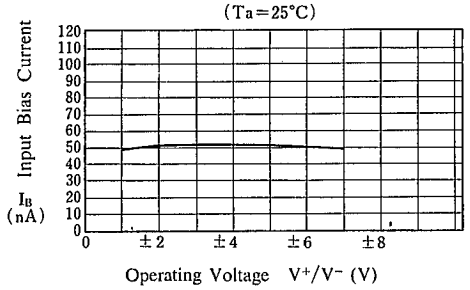
Maximum Output Voltage Swing vs. Operating Voltage

(Ta=25°C, R_L=2.5kΩ)

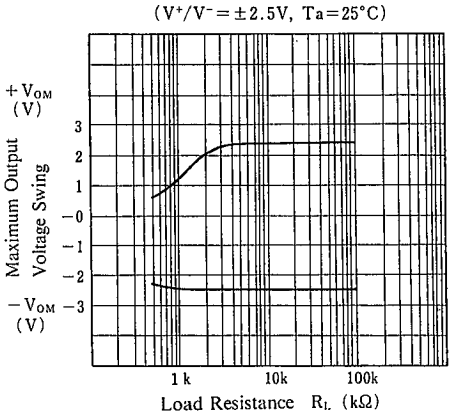


■ TYPICAL CHARACTERISTICS

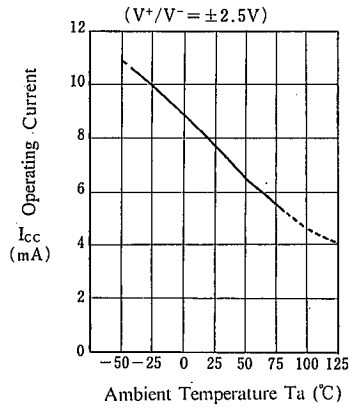
Input Bias Curent vs. Operating Voltage



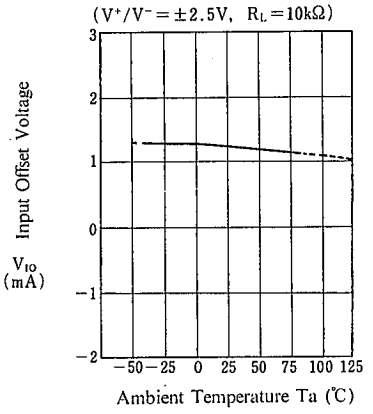
Maximum Output Voltage Swing vs. Load Resistance



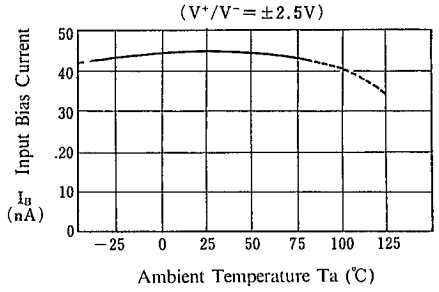
Operating Current vs. Temperature



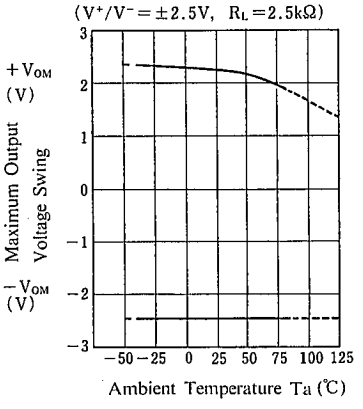
Input Offset Voltage vs. Temperature



Input Bias Current vs. Temperature



Maximum Output Voltage Swing vs. Temperature



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