

NJM2904

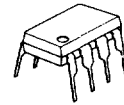
The NJM2904 consists of two independent, high gain, internally frequency compensated operation amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks, and all the conventional op amp circuits which now can be more easily implemented in single power supply systems. For example, the NJM2904 can be directly operated off of the standard +5V power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional $\pm 15V$ power supplies.

Absolute Maximum Ratings (Ta=25°C)

Supply Voltage	V^+ (V^+/V^-)	32V (or $\pm 16V$)
Differential Input Voltage	V_{ID}	32V
Input Voltage	V_I	-0.3~+32V
Power Dissipation	P_D (D-Type)	500mW
	(M, V-Type)	300mW
	(L-Type)	800mW
Operating Temperature Range	T_{opr}	-40~+85°C
Storage Temperature Range	T_{stg}	-50~+125°C

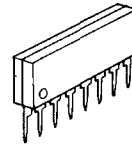
Package Outline



NJM2904D



NJM2904M
NJM2904E



NJM2904L

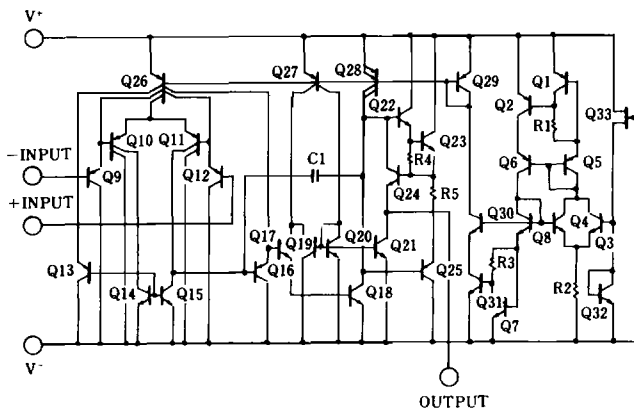


NJM2904V

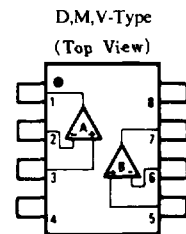
Electrical Characteristics (Ta=25°C, V+=5V)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input Offset Voltage	V_{IO}	$R_S=0\Omega$	—	2	7	mV
Input Offset Current	I_{IO}		—	5	50	nA
Input Bias Current	I_b		—	25	250	nA
Large Signal Voltage Gain	A_v	$R_L \geq 2k\Omega$	—	100	—	dB
Maximum Output Voltage Swing	V_{OPP}	$R_L=2k\Omega$	3.5	—	—	V
Input Common Mode Voltage Range	V_{ICM}		0~3.5	—	—	V
Common Mode Rejection Ratio	CMR		—	85	—	dB
Supply Voltage Rejection Ratio	SVR		—	100	—	dB
Output Source Current	I_{SOURCE}	$V_{IN^+}=1V, V_{IN^-}=0V$	20	30	—	mA
Output Sink Current	I_{SINK}	$V_{IN^+}=0V, V_{IN^-}=1V$	8	20	—	mA
Channel Separation	CS	$f=1k\sim 20kHz$, Input Referred	—	120	—	dB
Supply Current	I_{CC}	$R_L=\infty$	—	0.7	1.2	mA
Slew Rate	SR		—	0.5	—	V/ μs
Gain Bandwidth Product	GB		—	0.2	—	MHz

Equivalent Circuit (1/2 Shown)

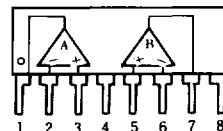


Connection Diagrams



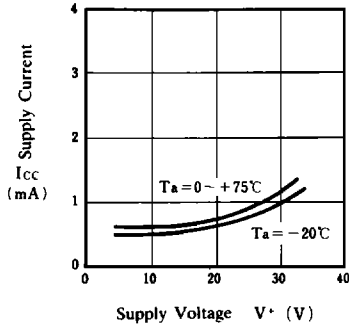
- PIN FUNCTION**
1. A OUTPUT
 2. A- INPUT
 3. A+ INPUT
 4. GND
 5. B+ INPUT
 6. B- INPUT
 7. B OUTPUT
 8. V+

L-Type

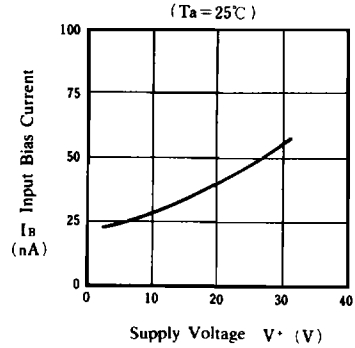


■ Typical Characteristics

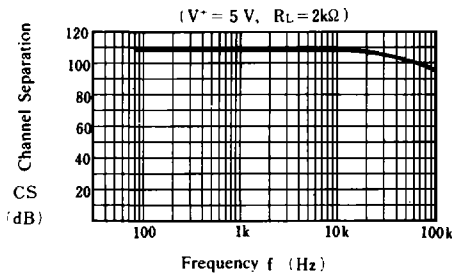
Supply Current vs. Supply Voltage



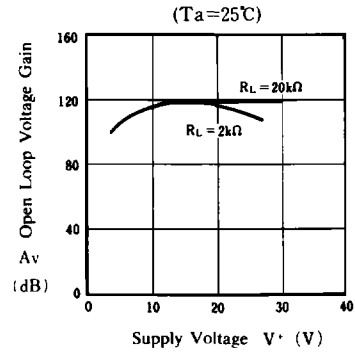
Input Bias Current vs. Supply Voltage



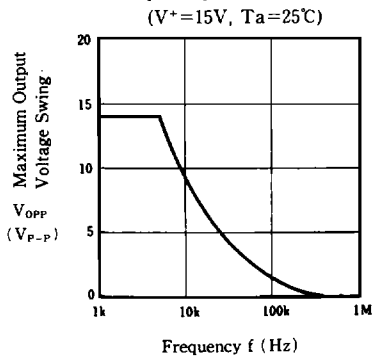
Channel Separation vs. Frequency



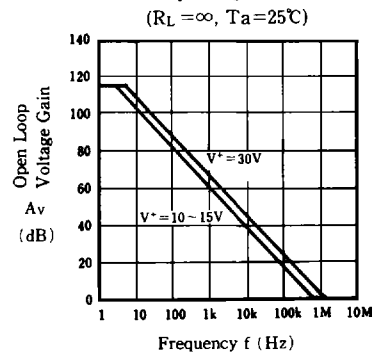
Voltage Gain vs. Supply Voltage



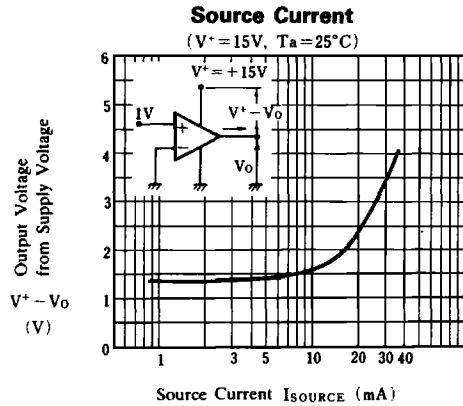
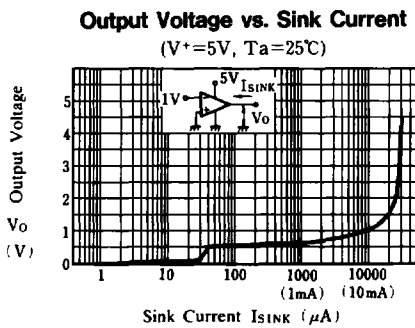
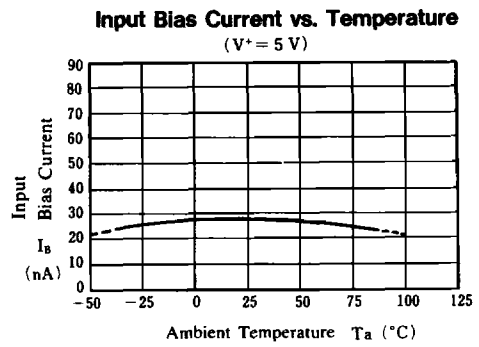
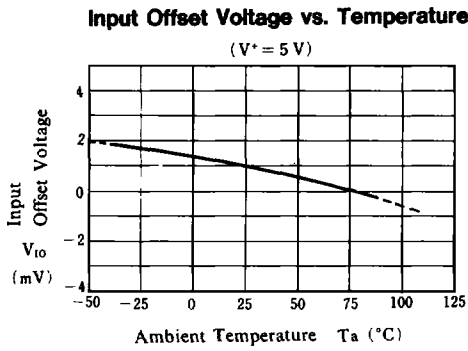
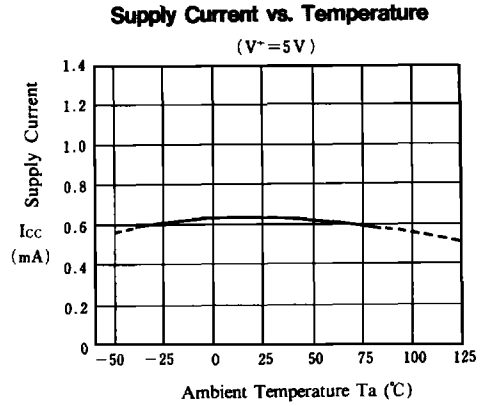
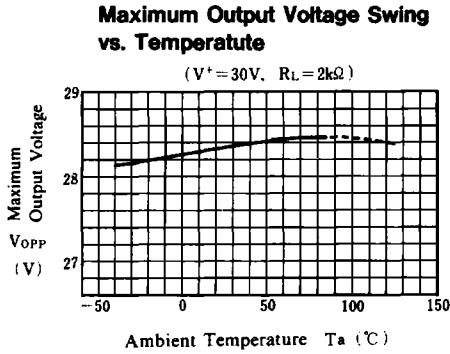
Maximum Output Voltage Swing vs. Frequency



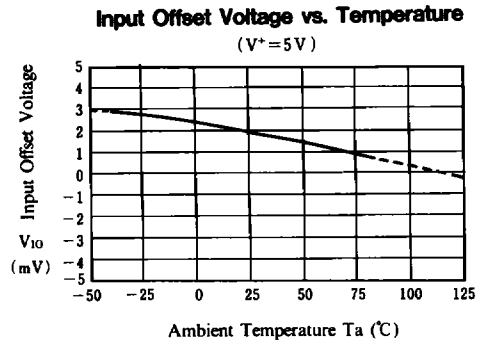
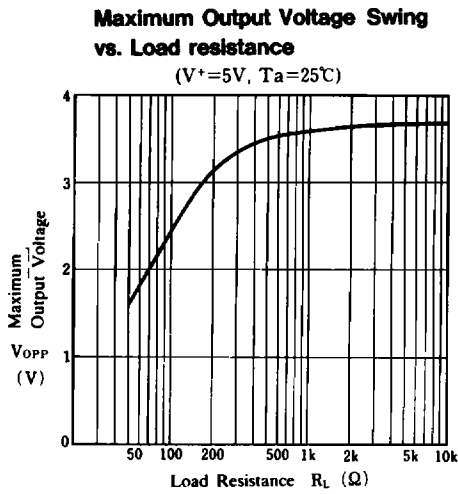
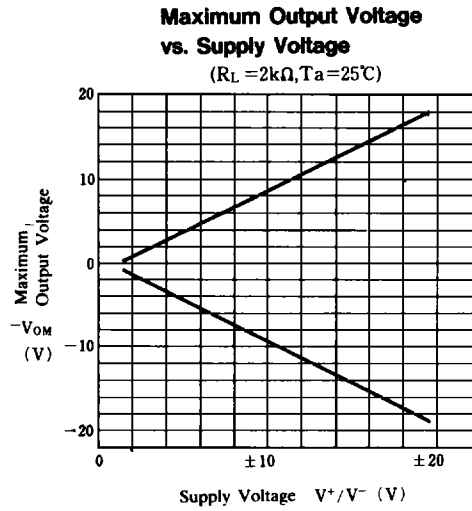
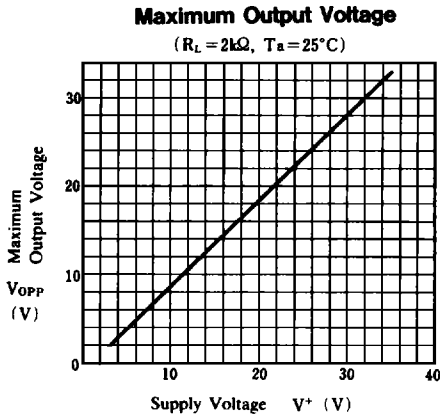
Open Loop Voltage Gain vs. Frequency



■ Typical Characteristics

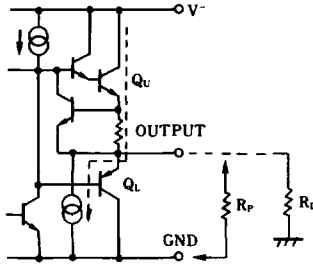


■ Typical Characteristics



■ Application

- Improvement of Cross-over Distortion
Equivalent circuit at the output stage



NJM2904, in its static state (No in and output condition) when design, Q_U being biased by constant current (break down beam) yet, Q_L stays OFF.

While using with both power source mode, the cross-over distortion might occur instantly when Q_L ON.

There might be cases when application for amplifier of audio signals, not only distortion but also the apparent frequency bandwidth being narrowed remarkably.

It is advisable especially when using both power source mode, constantly to use with higher current on Q_U than the load current (including feedback current), and then connect the pull-down resistor R_P at the part between output and GND pins.

