

QUAD SINGLE-SUPPLY OPERATIONAL AMPLIFIER

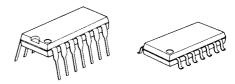
■ GENERAL DESCRIPTION

The NJM2902 consists of four independent high-gain operational amplifiers that are designed for single-supply operation.

Operation from split power supplies is also possible and the low power supply drain is independent of the magnitude of the power supply voltage.

Used with a dual supply the circuit will operate over a wide range of supply voltages. However, a large amount of crossover distortion may occur with loads to ground. An external current-sinking resistor to- $V_{\rm S}$ will reduce crossover distortion. There is no crossover distortion problem in single-supply operation if the load is direct-coupled to ground.

■ PACKAGE OUTLINE



NJM2902N NJM2902M



NJM2902V

■ FEATURES

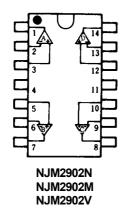
• Single Supply

Operating Voltage (+3V~+30V)
 High Output Voltage (V⁺-2V)
 Slew Rate (0.5V/µs typ.)
 Low Operating Current (1mA typ.)

• Package Outline DIP14,DMP14,SSOP14

Bipolar Technology

■ PIN CONFIGURATION



PIN FUNCTION

1.A OUTPUT

2.A – INPUT

3.A + INPUT

4.V 11.GND

5.B + INPUT

6.B – INPUT

7.B OUTPUT

8.C OUTPUT

10.C + INPUT

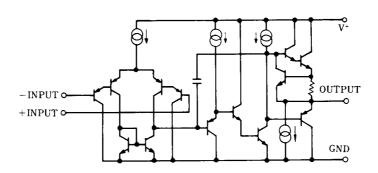
11.GND

12.D + INPUT

13.D - INPUT

14.D OUTPUT

■ EQUIVALENT CIRCUIT (1/4 Shown)



NJM2902

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺ (V ⁺ \(\(\nabla\)\)	32 (or ± 16)	V
Differential Input Voltage	V _{ID}	32	V
Input Voltage	V _{IC}	-0.3~+32	V
Power Dissipation	P _D	(DIP14) 570 (DMP14) 300 (SSOP14) 300	mW
Operating Temperature Range	T _{opr}	-40~+85	°C
Storage Temperature Range	T _{stg}	-50~+125	°C

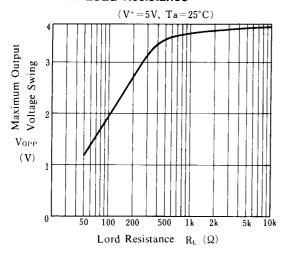
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C,V⁺=5V)

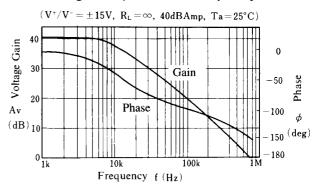
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V _{IO}	$R_S=0\Omega$	-	2	10	mV
Input Offset Current	I _{IO}		-	5	50	nA
Input Bias Current	I_{B}	I _{IN} ⁺ or I _{IN} ⁻	-	20	500	nA
Large Signal Voltage Gain	A_{V}	R _L >2kΩ	-	100	-	V/mV
Maximum Output Voltage Swing	V_{OM}	$R_L=2k\Omega$	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	ISOURCE	$V_{IN}^{+}=1V, V_{IN}^{-}=0V$	20	40	-	mA
Output Sink Current	I _{SINK}	$V_{IN}^{+}=0V, V_{IN}^{-}=1V$	8	20		mA
Channel Separation	CS	f=1k~20kHz,Input Referred	-	120	-	dB
Operating Current	Icc	R _L =∞	-	1	2	mA
Slew Rate	SR	V ⁺ /√=±15V	-	0.5	-	V/µs
Gain Bandwidth Product	GB	V ⁺ /√=±15V	-	0.5	-	MHz

■ TYPICAL CHARACTERISTICS

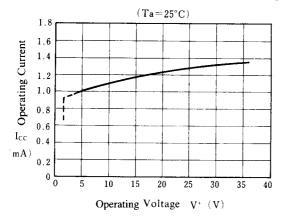
Maximum Output Voltage Swing vs. Load Resistance



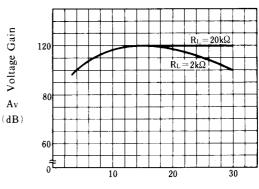
Voltage Gain, Phase vs. Frequency



Operating Current vs. Operating Voltage

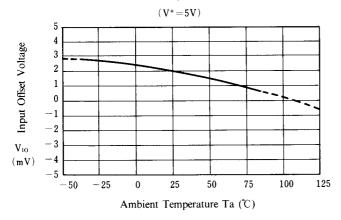


Voltage Gain vs. Operating Voltage

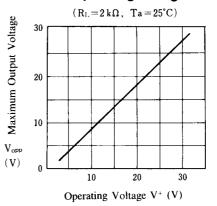


Operating Voltage V+ (V)

Input Offset Voltage vs. Temperature

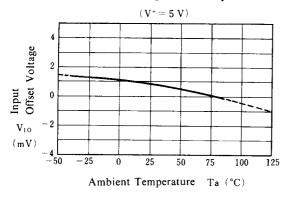


Maximum Output Voltage vs. Operating Voltage

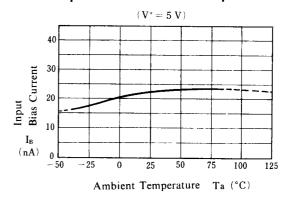


■ TYPICAL CHARACTERISTICS

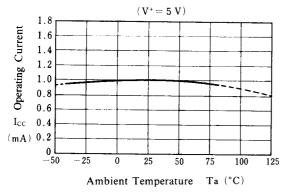
Input Offset Voltage vs. Temperature



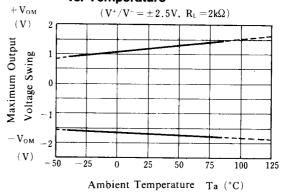
Input Bias Current vs. Temperature



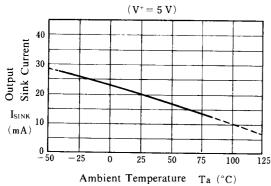
Operating Current vs. Temperature



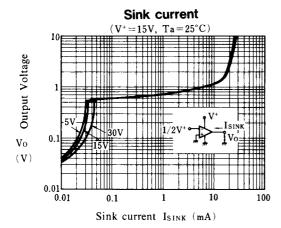
Maximum Output Voltage Swing vs. Temperature

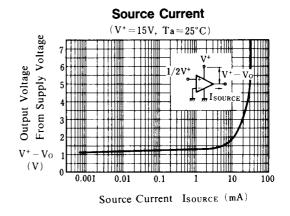


Output Sink Current vs. Temperature

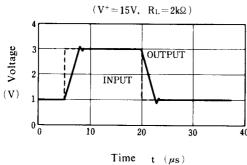


■ TYPICAL CHARACTERISTICS

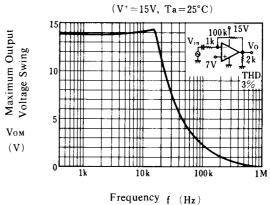




Pulse Response

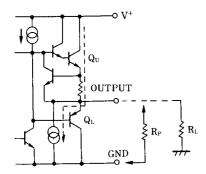


Maximum Output Voltage Swing vs. Frequenccy



■ APPLICATION

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

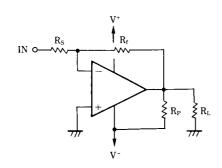


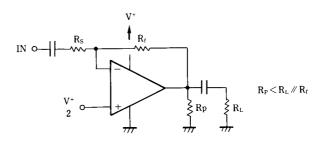
NJM2902,in its static state (No in and output condition) when design, $Q_{\rm U}$ being biassed by constant current (break down beam) yet, $Q_{\rm L}$ stays OFF.

While using with both power source mode, the cross-over distortion might occur instantly when Q_I 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 adjustable 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 resister R_P at the part between output and GND pins.





[CAUTION]

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