

## SINGLE SUPPLY QUAD OPERATIONAL AMPLIFIER

#### **GENERAL DESCRIPTION**

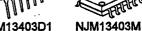
The NJM13403 is single-supply quad operational amplifier, which can operate from 2V supply. The features are low offset voltage, low bias current, high slew-rate, free cross-over distortion through the AB class output stage.

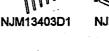
The package lineup is DIP, DMP and others compact, which is SON, so that the NJM13403 is suitable for audio for low voltage operation and any other kind of signal amplifier.

#### PACKAGE OUTLINE



NJM13403E







NJM13403V

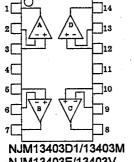
## **FEATURES**

(+2V~+14V) Operating Voltage Slew Rate  $(1.2V/\mu s typ.)$ Operating Current (3.0mA typ.)

Bipolar Technology

DIP14,DMP14,EMP14,SSOP14,SON14(PRELIMINARY) Package Outline

## PIN CONFIGURATION



NJM13403E/13403V

**■ EQUIVALENT CIRCUIT (1/4Shown)** 

## PIN FUNCTION

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

## NJM13403x(PURELIMINARY)

# Ov. OUTPUT +INPUT () -INPUT ()

New Japan Radio Co., Ltd.



■ ABSOLUTE MAXIMUM RATINGS

Π	Га	=2	5°	C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	15	V
Differential Input Voltage	ViD	14	V
Input Voltage	V <sub>iC</sub>	-0.3~+14	V
Power Dissipation	Po	(DIP8) 700 (DMP8) 300 (EMP8) 300 (SSOP8) 300 (SON8) U.D	mW
Operating Temperature Range	Topr	-40~+85	ိုင
Storage Temperature Range	Tstg	-40~+125	ိုင

■ ELECTRICAL CHARACTERISTICS (V+=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	· TYP.	MAX.	UNIT
Operating Voltage	Vopr		2	1	14	٧
Input Offset Voltage	V <sub>IO</sub>	R <sub>s</sub> =0Ω	-	0.5	4	mV
Input Offset Current	110		1	5	50	nΑ
Input Bias Current	l <sub>B</sub>		-	25	150	nΑ
Large Signal Voltage Gain	Av	R <sub>L</sub> ≧2kΩ	88	100		dB
Maximum Output Voltage Swing	V <sub>OM</sub>	R <sub>L</sub> =2kΩ	4.0	4.2	1	<b>&gt;</b>
Input Common Mode Voltage Range	V <sub>ICM</sub>		0~3.5	-	-	٧
Common Mode Rejection Ratio	CMR		70	90	1	dB
Supply Voltage Rejection Ratio	SVR	·	80	94	1	dB
Output Source Current	SOURCE	V <sub>IN</sub> <sup>+</sup> =1V,V <sub>IN</sub> <sup>-</sup> =0V	- 20	35	_	mA
Output Sink Current	I <sub>SINK</sub>	V <sub>IN</sub> <sup>+</sup> =0V,V <sub>IN</sub> <sup>-</sup> =1V	10	30	_	mA
Operating Current	Icc	R <sub>L</sub> =∞	-	3.0	5.0	mA
Slew Rate	SR	$V^*/V^-=\pm 2.5V$ , $R_L=2k\Omega$ , $A_V=0dB$ , $f=1kHz$	_	1.2	_	V/μs
Unity Gain Bandwidth	f <sub>T</sub>	$R_L=2k\Omega$	_	2.0	_	MHz
Total Harmonic Distortion	THD	$R_L$ =2k $\Omega$ , $A_V$ =40dB, f=20kHz, $V_O$ =1.5Vrms	_	0.2	<del></del>	%

## NJM13403

## **MEMO**

[CAUTION]
The specifications on this databook are only given for information , without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.