# SINGLE-SUPPLY DUAL COMPARATOR

■ GENERAL DESCRIPTION

The NJM2903/2403 consist of two independent precision voltage comparators with an offset voltage specification as low as 5.0mV max for two comparators, 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. The NJM2903/2403 have unique characteristic: the input common-mode voltage range includes ground, even though operated from a single power supply voltage. Application areas include limit comparators, simple analog-to-digital converters; pulse, square-wave and time delay generators; wide range V_{CO}; MOS clock timers; multivibrators and high voltage digital logic gates. The NJM2903/2403 were designed to directly interface with TTL and MOS. When operated from both plus and minus power supplies, the NJM2903/2403 will directly interface with MOS logic where their low power drain is a distinct advantage over standard comparators.

■ FEATURES

- Operating Voltage   +2V~+36V
- Single Supply Operation
- Open Collector Output
- High Output Sink Current   15mA (@ NJM2403)
- Package Outline   DIP8, DMP8, SIP8, SSOP8,
                              NJM2903 only: SOP8 JEDEC 150mil,
                              :MSOP8 (TVSP8) MEET JEDEC MO-187-DA / THIN TYPE
- Bipolar Technology

■ PACKAGE OUTLINE

NJM2903D/2403D
(DIP8)

NJM2903M/2403M
(DMP8)

NJM2903V/2403V
(SSOP8)
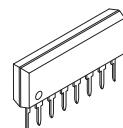
NJM2903L/2403L
(SIP8)

NJM2903E
(SOP8)

NJM2903RB1
(MSOP8 (TVSP8))

■ PIN CONFIGURATION

(Top View)
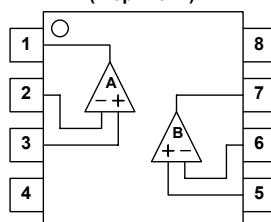
NJM2903D/2403D, NJM2903M/2403M
NJM2903V/2403V, NJM2903E/2903RB1
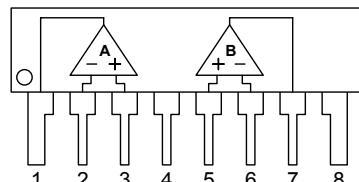
NJM2903L/2403L

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

■ EQUIVALENT CIRCUIT   (1/2 Shown)
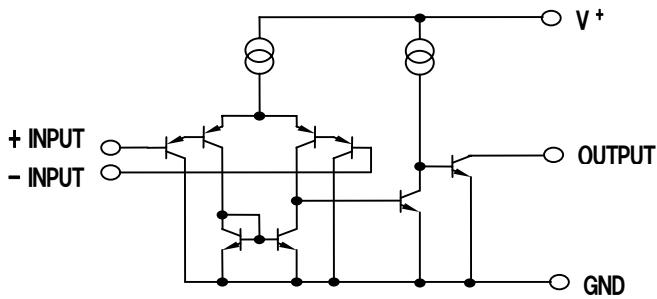
NJM2903/2403

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	36 (or ±18)	V
Differential Input Voltage	V_{ID}	36	V
Input Voltage	V_{IN}	-0.3~+36	V
Power Dissipation	P_D	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (SIP8) 800 (SOP8) 300 (MSOP8(TVSP8))320	mW
Operating Temperature Range	T_{opr}	-40~+85	°C
Storage Temperature Range	T_{stg}	-50~+125	°C

■ ELECTRICAL CHARACTERISTICS

(V^+=5V,Ta=25°C)

| PARAMETER	SYMBOL	TEST CONDITION	2903 MIN.	2903 TYP.	2903 MAX.	2403 MIN.	2403 TYP.	2403 MAX.	UNIT
Input Offset Voltage	V_{IO}	R_S=0Ω,V_O=1.4V	-	-	7	-	-	10	mV
Input Offset Current	I_{IO}		-	-	50	-	-	100	nA
Input Bias Current	I_B		-	30	250	-	40	500	nA
Input Common Mode Voltage Range	V_{ICM}		0~3.5	-	-	0~3.5	-	-	V
Large Signal Voltage Gain	A_V	R_L=15kΩ	-	106	-	-	106	-	dB
Response Time	t_R	R_L=5.1kΩ	-	1.5	-	-	1.5	-	μs
Output Sink Current	I_{SINK}	V_{IN}^-=1V,V_{IN}^+=0V,V_O=1.5V	6	-	-	20	-	-	mA
Output Saturation Voltage	V_{SAT}	V_{IN}^-=1V,V_{IN}^+=0V,I_{SINK}=3mA	-	200	400	-	-	-	mV
Output Saturation Voltage	V_{SAT}	V_{IN}^-=1V,V_{IN}^+=0V,I_{SINK}=15mA	-	-	-	-	200	400	mV
Output Leakage Current	I_{LEAK}	V_{IN}^-=0V,V_{IN}^+=1V,V_O=5V	-	-	1.0	-	-	1.0	μA
Operating Current	I_{CC}		-	0.4	1.0	-	0.5	1.5	mA
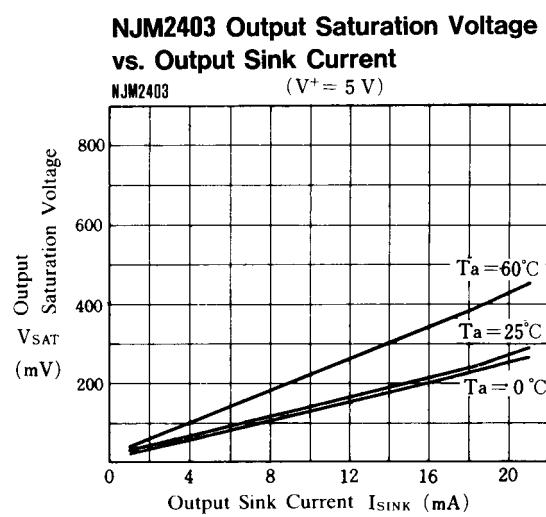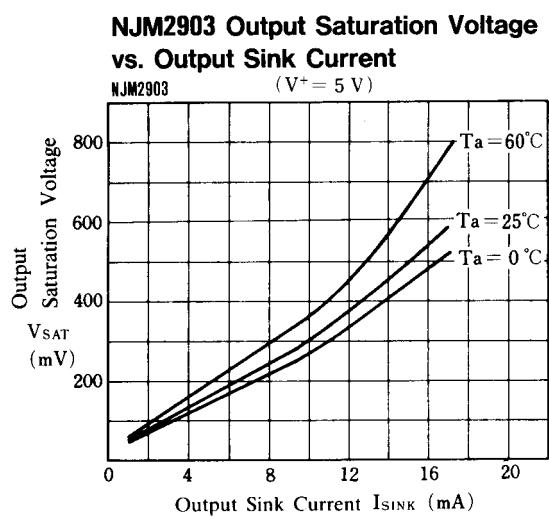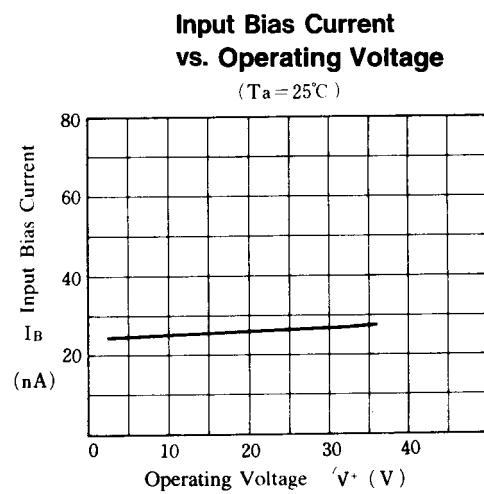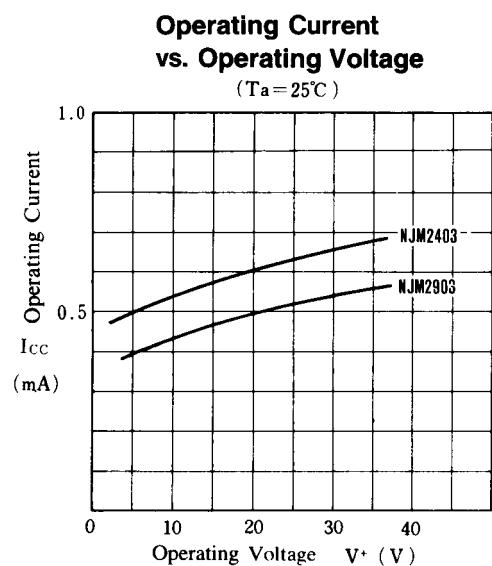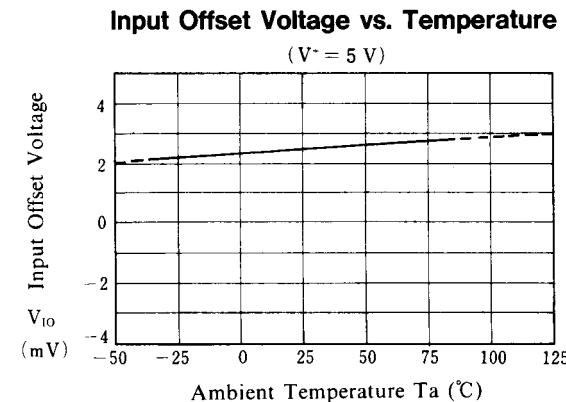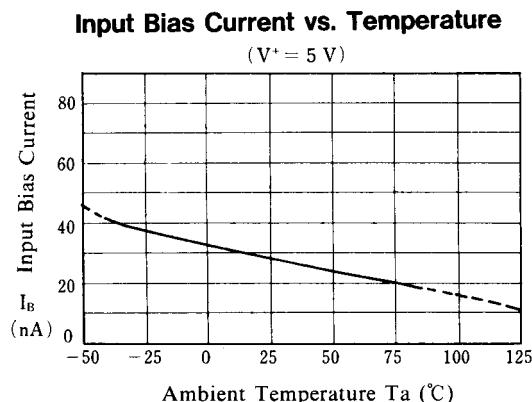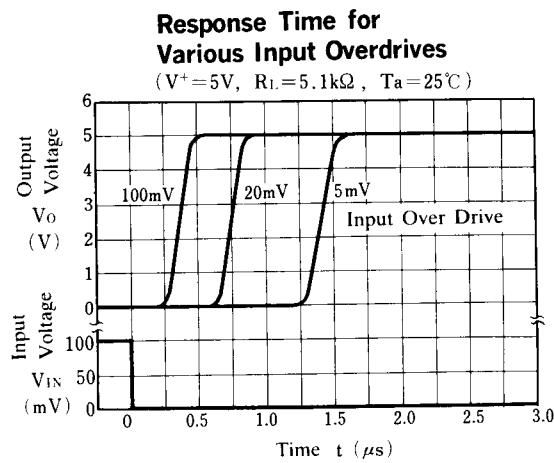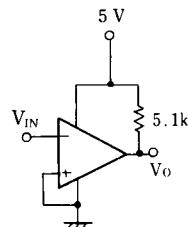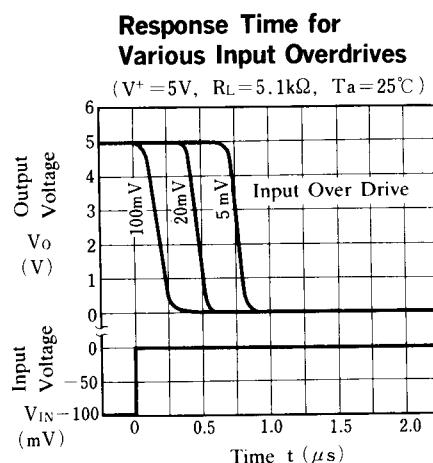
Ver.2012-09-14

■ TYPICAL CHARACTERISTICS

Input Bias Current vs. Temperature
(V⁺ = 5 V)

Input Offset Voltage vs. Temperature
(V⁺ = 5 V)

Operating Current vs. Operating Voltage
(Ta = 25℃)


Input Bias Current vs. Operating Voltage
(Ta = 25℃)

### NJM2903 Output Saturation Voltage vs. Output Sink Current
NJM2903   (V⁺ = 5 V)

NJM2403 Output Saturation Voltage vs. Output Sink Current
NJM2403   (V⁺ = 5 V)

■ TYPICAL CHARACTERISTICS

Response Time for Various Input Overdrives

(V^+ = 5V, R_L = 5.1kΩ, Ta = 25℃)

Response Time for Various Input Overdrives

(V^+ = 5V, R_L = 5.1kΩ, Ta = 25℃)

NJM2903 Output Saturation Voltage vs. Operating Voltage

(Ta = 25℃)

NJM2403 Output Saturation Voltage vs. Operating Voltage

(Ta = 25°C)
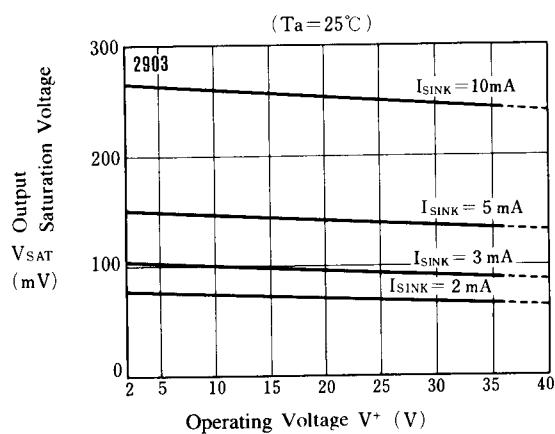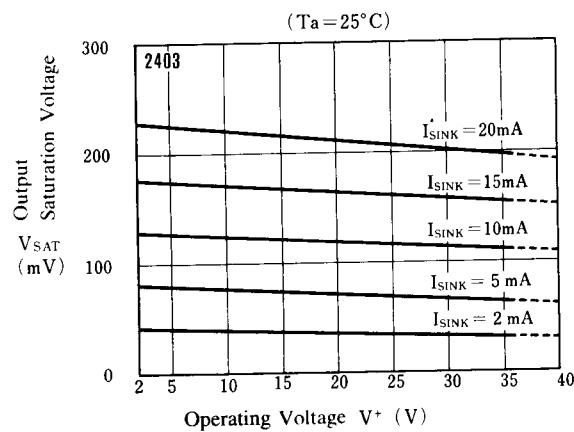
■ TYPICAL APPLICATIONS

Comparator With Hysteresis
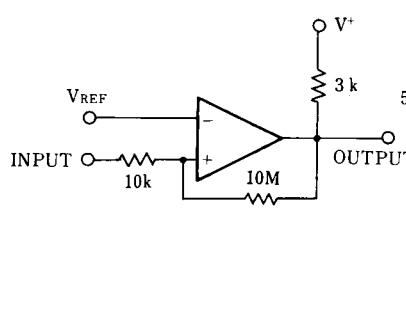
Pulse Generator
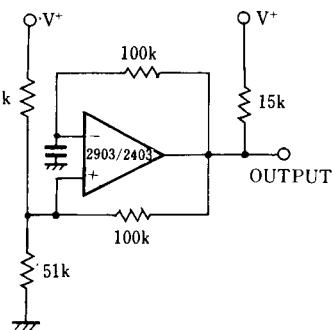
Output Strobing Circuit
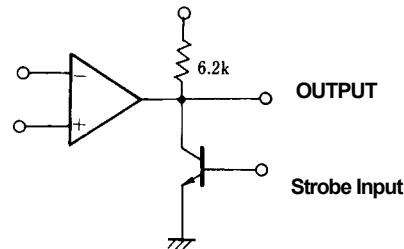
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