

3.1/2 DIGIT SINGLE CHIP A/D CONVERTER WITH DISPLAY HOLD

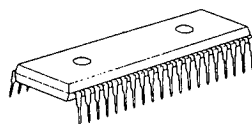
GENERAL DESCRIPTION

The NJU9203B/9204B are low-power-consumption, high-performance 3.1/2 digit single chip A/D converters with display hold containing a voltage reference, oscillator, 3.1/2 digits A/D converter, 7-segment decoder, display driver and control circuits.

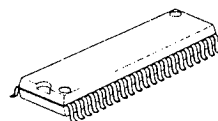
The NJU9203B is designed for direct LCD driving and the NJU9204B for LED direct driving.

The NJU9203B/9204B can be operated on simple application circuits as they require only few external components, therefore they are most suited for digital multimeter, digital thermometer and other likes.

PACKAGE OUTLINE



NJU9203BD/9204BD

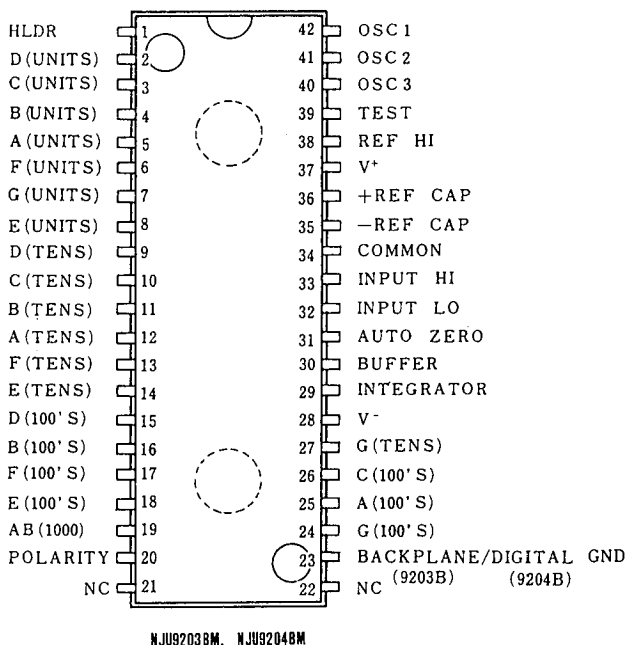
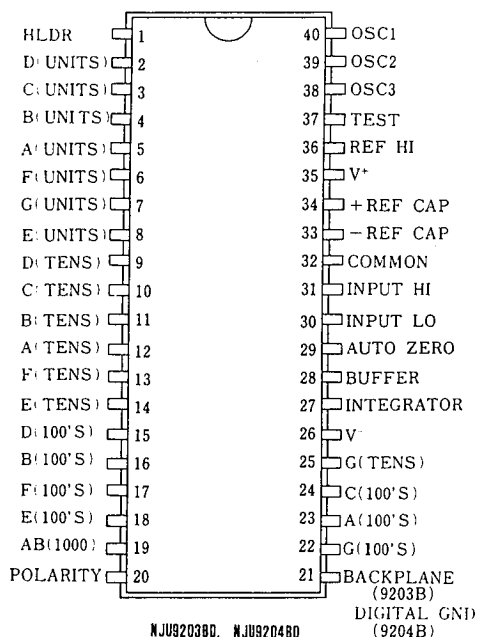


NJU9203BM/9204BM

FEATURES

- Display Hold Function
- Guaranteed 0 reading for 0 input on all scales
- Polarity detection at 0 point
using a high-accuracy null-detection
- Low Input Current — 1pA typ.
- True differential input
- Display device direct driving
NJU9203B — LCD
NJU9204B — LED
- Reference and Oscillation Circuits incorporated
- Low power consumption
- No external active components required
- Package Outline — DIP 40 /DMP 42
- C-MOS Technology

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	DEVICE	SYMBOL	RATINGS	UNIT
Supply Voltage	9203B Only	$V^+ - V^-$	15	V
	9204B Only	V^+	+6	
	9204B Only	V^-	-9	
Analog Input Voltage	9203B/9204B	V_{IN}	$V^+ \sim V^-$	V
Reference Input Voltage	9203B/9204B	V_{ref}	$V^+ \sim V^-$	V
Clock Input	9203B Only	V_{CLK}	Test $\sim V^+$	V
	9204B Only		GND $\sim V^+$	
Power Dissipation	9203B/9204B	P_D	300 / 800	mW
Operating Temperature Range	9203B/9204B	T_{OPR}	0 $\sim$ + 75	°C
Storage Temperature Range	9203B/9204B	T_{STG}	-40 $\sim$ +125	°C

Note 1) The input current is limit by $\pm 100\mu A$ when the input voltage is over supply voltage.

ELECTRICAL CHARACTERISTICS

(Ta=25°C, $f_{clock}=48kHz$)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Zero Input Reading	No	$V_{IN}=0.0V, FS=200.0mV$	-000.0	± 000.0	+000.0	Counts
Ratiometric Reading	N1000	$V_{IN}=V_{ref}, V_{ref}=100mV$	999	999/1000	1000	Counts
Rollover Error	Err	$-V_{IN}=+V_{IN}-200.0mV$	-2	± 0.5	+2	Counts
Linearity	Lin	Full Scale=200mV	-2	± 0.5	+2	Counts
Common Mode Rejection Ratio	$CMRR$	$V_{cm}=\pm 1V, V_{IN}=0V,$ Full Scale=200.0mV		50		$\mu V/V$
Noise(P-P Value)	V_{NI}	$V_{IN}=0V, FS=200.0mV$		30		μV
Leakage Current	I_L	$V_{IN}=0V$		1	10	pA
Zero Reading Drift	Z_D	$V_{IN}=0V, 0 < Ta < 75^\circ C$		0.2	1	$\mu V/^\circ C$
Scale Factor Temp. Coeff.	F_{temp}	$V_{IN}=199.0mV, 0 < Ta < 75^\circ C$		1	5	ppm/°C
Operating Current	I_{DD}	$V_{IN}=0V, No Load$		0.8	1.8	mA
Analog Common Voltage		25k Ω Between Common and	2.4	3.0	3.2	V
Temp. Coeff.of Analog Common		Positive Supply		80		ppm/°C
Seg. Drive Voltage (9203B)		$V_{DD}=9V$	4	5	6	V
BackPlane Drive Volt.(9203B)		$V_{DD}=9V$	4	5	6	
Seg. Sinking Current (9204B)		$V_{DD}=5V,$ Except Term.19	5.0	8.0		mA
Seg. Sinking Current (9204B)		Seg.V=3V Term.19 only	10	16		

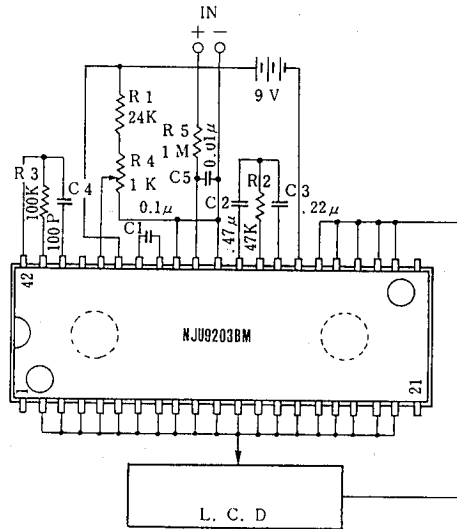
Note 2) Differential read out value of positive and negative voltage input.

3) Error from the input-output linear characteristics getting from positive and negative full-scale input read out.

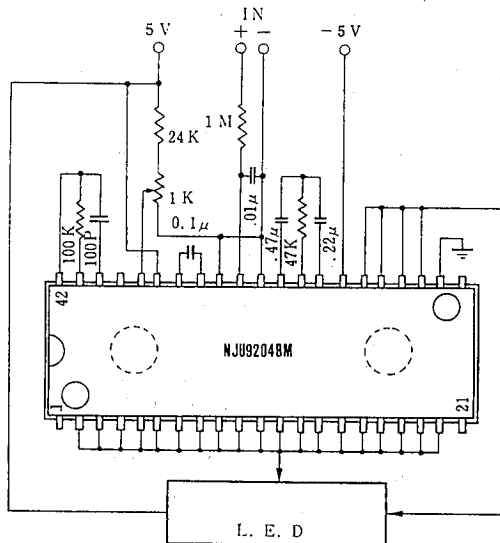
4) The peak value of noise must be not over 95% period in the measurement time.

■ APPLICATION CIRCUITS

NJU9203B



NJU9204B



MEMO

[CAUTION]

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