3·1/2 DIGIT SINGLE CHIP A/D CONVERTER

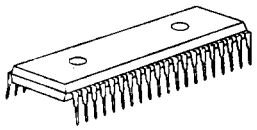
■ GENERAL DESCRIPTION

The NJU9201B/9202B are low-power-consumption, high-performance 3·1/2 digit single chip A/D converters containing a voltage reference, oscillator, 3·1/2 digit A/D converter, 7-segment decoder, display driver and control circuits.

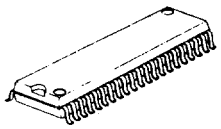
The NJU9201B is designed for direct LCD driving and the NJU9202B for direct LED driving.

The NJU9201B/9202B can be operated on simple application circuits as they require only few external components, therefore they are most suited for digital multimeters, digital thermometers and other likes.

■ PACKAGE OUTLINE



NJU9201BD/9202BD

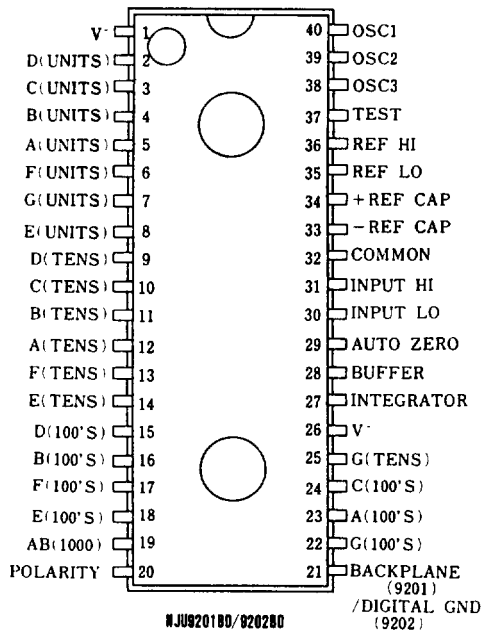


NJU9201BM/9202BM

■ FEATURES

- 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 and reference
- Display device direct driving
  NJU9201B -- LCD
  NJU9202B -- 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



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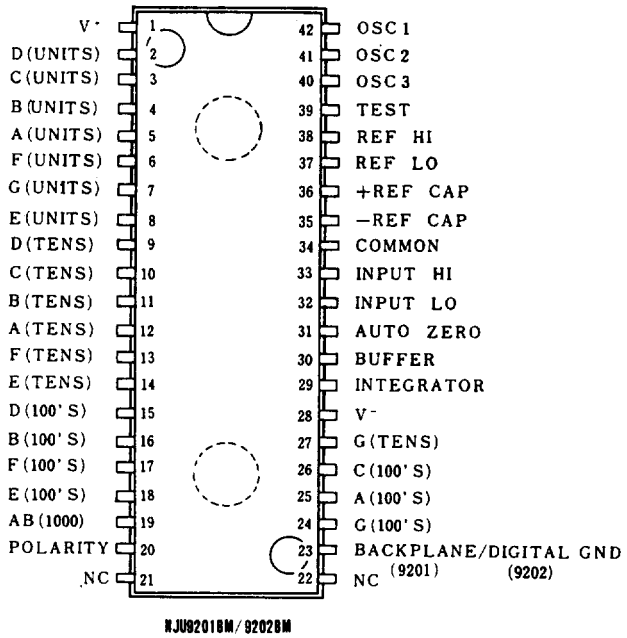


NJU9201BM/9202BM

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	DEVICE	SYMBOL	RATINGS	UNIT
Supply Voltage	9201B Only 9202B Only 9202B Only	$V^+ - V^-$ V^+ V^-	15 +6 -9	V
Analog Input Voltage	9201B/9202B	V_{IN}	$V^+ \sim V^-$	V
Reference Input Voltage	9201B/9202B	Vref	$V^+ \sim V^-$	V
Clock Input	9201B Only 9202B Only	V_{CLK}	Test $\sim V^+$ GND $\sim V^+$	V
Power Dissipation	9201B/9202B	P_D	300 / 800	mW
Operating Temperature Range	9201B/9202B	T_{opr}	0 ~ + 75	℃
Storage Temperature Range	9201B/9202B	T_{stg}	-40 ~ +125	℃

Note 1) The input current is limit by ±100uA when the input voltage is over supply voltage.

■ ELECTRICAL CHARACTERISTICS

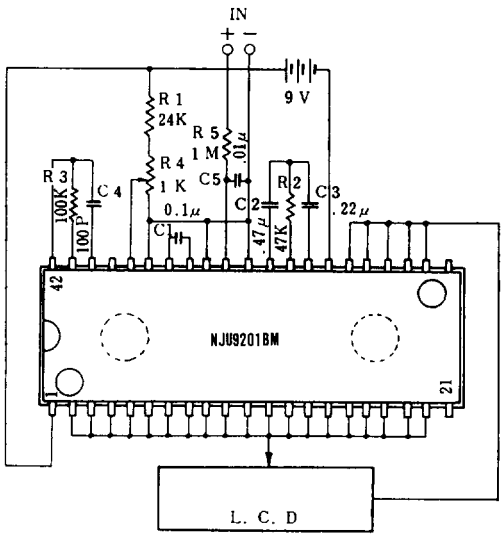
(Ta=25℃, f_{clock}=48kHz)

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}=Vref,Vref=100mV	999	999/1000	1000	
Rollover Error	Err	$-V_{IN}$=$+V_{IN}$-200.0mV (2)	-2	±0.5	+2	Counts
Linearity	Lin	Full Scale=200mV (3)	-2	±0.5	+2	Counts
Common Mode Rejection Ratio	C_{MRR}	Vcm=±1V,VIN=0V, Full Scale=200.0mV		50		μV/V
Noise(P-P Value)	V_{NI}	V_{IN}=0V,FS=200.0mV (4)		30		μV
Leakage Current	I_L	V_{IN}=0V		1	10	pA
Zero Reading Drift	Z_D	V_{IN}=0V,0<Ta<75℃		0.2	1	μV/℃
Scale Factor Temp. Coeff.	Ftemp	V_{IN}=199.0mV,0<Ta<75℃		1	5	ppm/℃
Operating Current	I_{DD}	V_{IN}=0V,No Load		0.8	1.8	mA
Analog Common Voltage		25kΩ Between Common and	2.4	3.0	3.2	V
Temp. Coeff.of Analog Common		Positive Supply		80		ppm/℃
Seg. Drive Voltage (9201B)		V_{DD}=9V	4	5	6	V
BackPlane Drive Volt.(9201B)		V_{DD}=9V	4	5	6	
Seg. Sinking Current (9202B)		V_{DD}=5V, Except Term.19	5.0	8.0		mA
Seg. Sinking Current (9202B)		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

NJU9201B



NJU9202B