

3·1/2 DIGIT SINGLE CHIP A/D CONVERTER

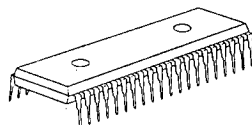
GENERAL DESCRIPTION

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

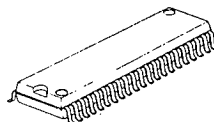


NJU9201BD/9202BD

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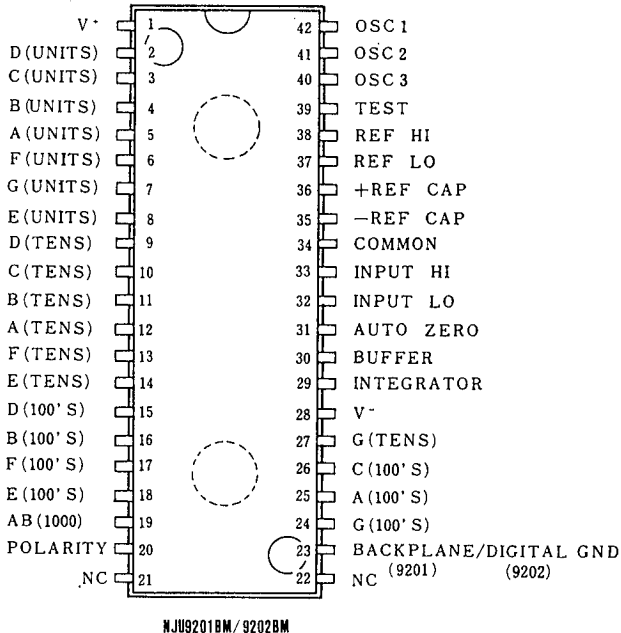
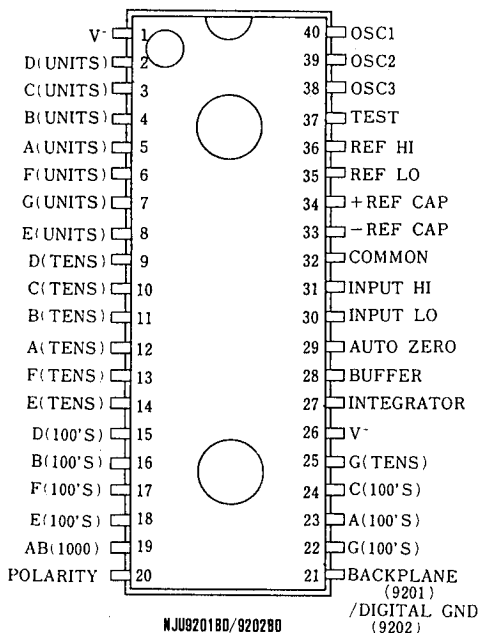
FEATURES

- 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



NJU9201BM/9202BM

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | DEVICE | SYMBOL | RATINGS | UNIT |
|-----------------------------|-------------|-------------|-----------------|------|
| Supply Voltage | 9201B Only | $V^+ - V^-$ | 15 | V |
| | 9202B Only | V^+ | +6 | |
| | 9202B Only | V^- | -9 | |
| Analog Input Voltage | 9201B/9202B | V_{IN} | $V^+ \sim V^-$ | V |
| Reference Input Voltage | 9201B/9202B | V_{ref} | $V^+ \sim V^-$ | V |
| Clock Input | 9201B Only | V_{CLK} | Test $\sim V^+$ | V |
| | 9202B Only | | GND $\sim V^+$ | |
| Power Dissipation | 9201B/9202B | P_D | 300 / 800 | mW |
| Operating Temperature Range | 9201B/9202B | T_{OPR} | 0 \sim +75 | °C |
| Storage Temperature Range | 9201B/9202B | 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 | |
| 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 | $CMRR$ | $V_{cm}=\pm 1V, V_{IN}=0V,$ Full Scale=200.0mV | | 50 | | $\mu V/V$ |
| Noise(P-P Value) | V_{NI} | $V_{IN}=0V, FS=200.0mV$ (4) | | 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 | | |
| 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 | | |

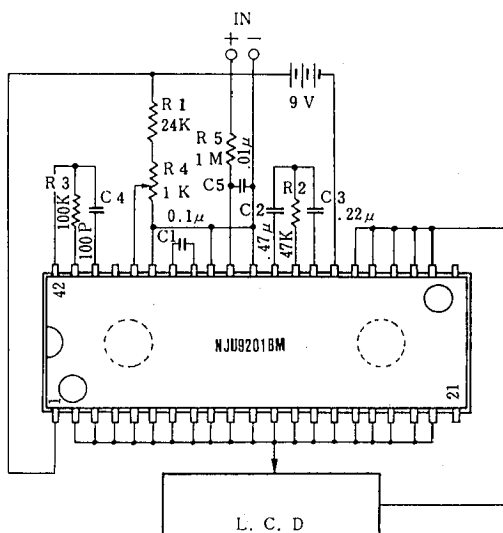
Note 2) Differential read out value of positive and negative voltage input.

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.

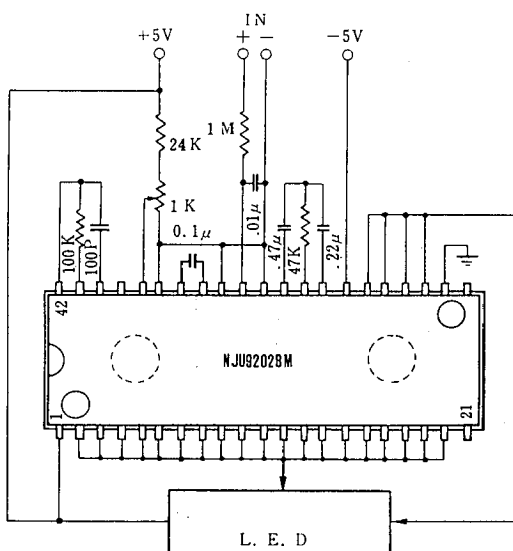
■ APPLICATION CIRCUITS

NJU9201B



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NJU9202B



MEMO

[CAUTION]

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