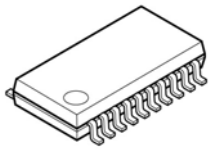
2-DIGIT SINGLE CHIP A/D CONVERTER

■GENERAL DESCRIPTION

The **NJU9252P** is a low operating current, high performance 2-digit single chip A/D converter containing a sample/hold circuit, an oscillator, a 7-segment decoder, LED display driver and a control circuit. The LED display changes by the high-speed sampling rate of 4 times/s (typ).

The **NJU9252P** realizes to apply with few external components, therefore it is most suited for digital meters, digital thermometers and the others.

■PACKAGE OUTLINE



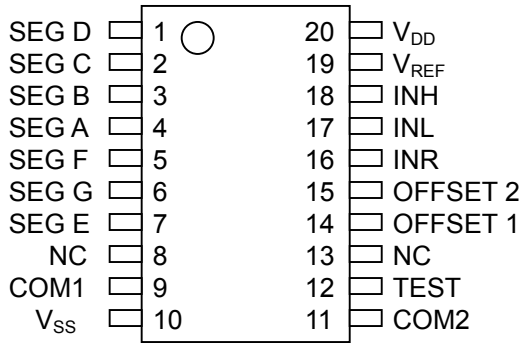
NJU9252PM

■FEATURES

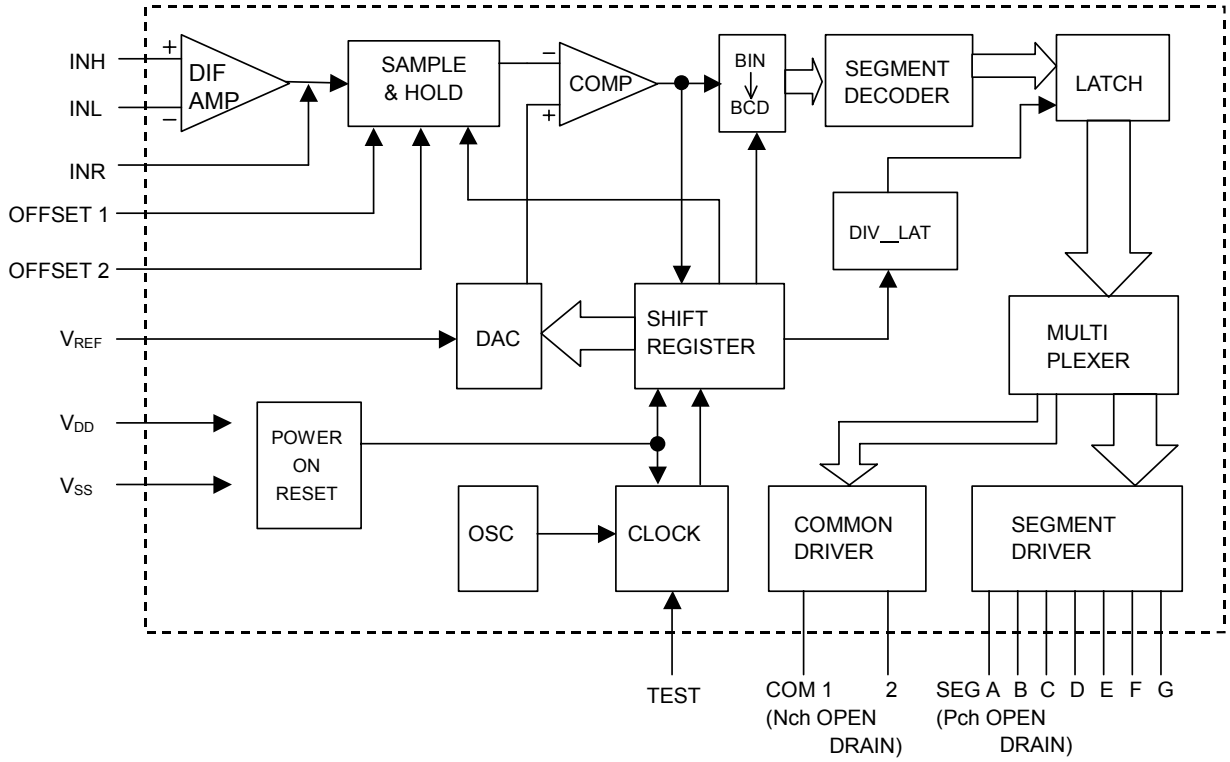
- ●8bit Resolution, Successive Approximation Method
- ●Low Input Current (1μA typ)
- ●Dynamic LED direct drive
- ●Sampling-rate (4 times/s typ)
- ●Sample/Hold Circuit On-Die
- ●CR Oscillation Circuit On-Die
- ●Power-on Initialization
- ●Offset Adjustment Terminal
- ●Low operating current
- ●Applicable with Few External Components
- ●C-MOS technology
- ●Package DMP20

■PAD LOCATION

DMP20



■BLOCK DIAGRAM



■TERMINAL DESCRIPTION

SYMBOL	FUNCTION
SEG D	LED Segment Driver D output (Pch open-drain)
SEG C	LED Segment Driver C output (Pch open-drain)
SEG B	LED Segment Driver B output (Pch open-drain)
SEG A	LED Segment Driver A output (Pch open-drain)
SEG F	LED Segment Driver F output (Pch open-drain)
SEG G	LED Segment Driver G output (Pch open-drain)
SEG E	LED Segment Driver E output (Pch open-drain)
COM1	LED Common Driver output 1 (Nch open-drain)
V_{SS}	GND
COM2	LED Common Driver output 2 (Nch open-drain)
TEST	Test Terminal
OFFSET 1	Offset Adjustment Terminal 1
OFFSET 2	Offset Adjustment Terminal 2
INR	Input Gain setup Resistor Connecting Terminal
INL	Analog Differential Input (Lo)
INH	Analog Differential Input (Hi)
V_{REF}	Reference Voltage
V_{DD}	Supply Voltage
NC	Non Connection

■ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	-0.3 to +7.0	V
Analog Input Voltage	V_{IN}	GND to V_{REF}	V
Reference Input Voltage	V_{REF}	GND to V_{DD}	V
Power Dissipation	P_D	500	mW
Operating Temperature Range	Topr	-20 to +75	°C
Storage Temperature Range	Tstg	-40 to +125	°C

Note1) The input current is limited to ±100μA when the input voltage is more than supply voltage.

■ELECTRICAL CHARACTERISTICS

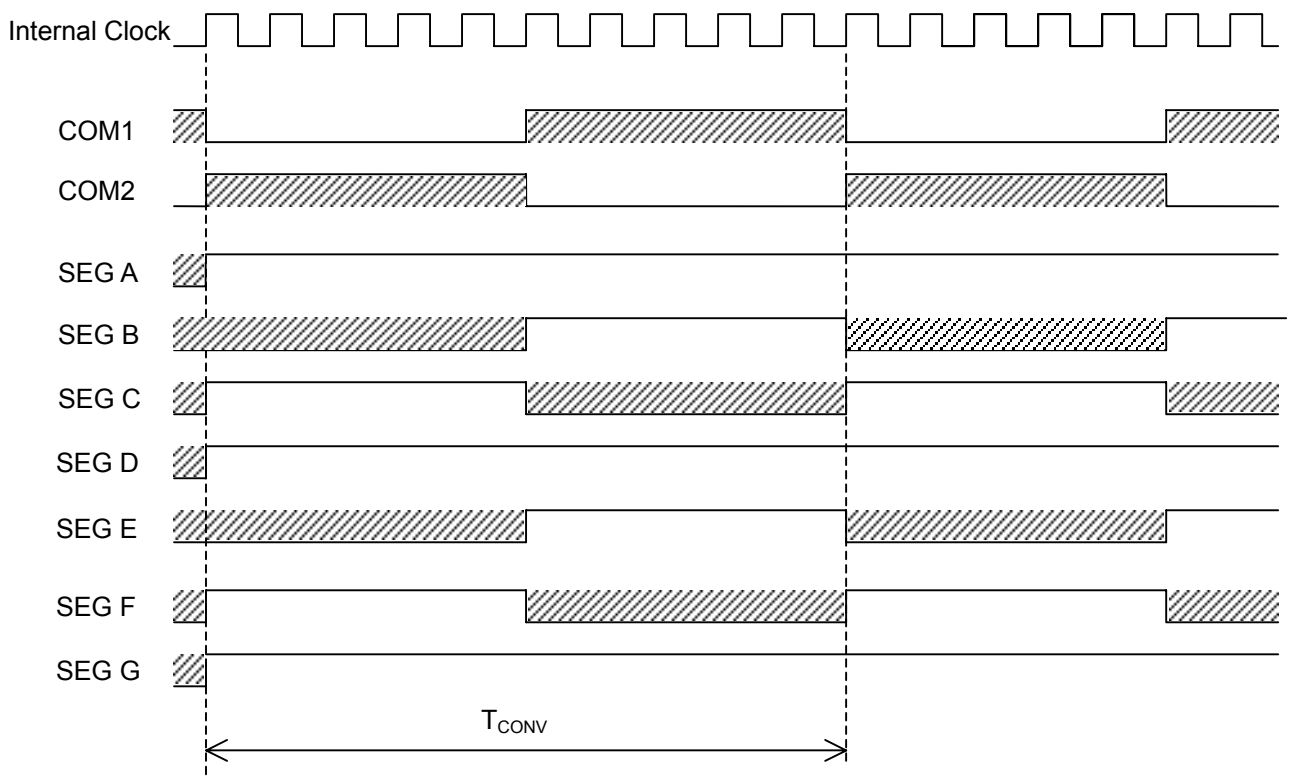
(V_{DD}=5V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{DD}		4.5	5.0	5.5	V
Ratiometric Reading	N99	V_{IN}=2.475V, V_{REF}=3.2V	98	98/99	99	Counts
Linearity	D_L	Full Scale=2.475V Note2)		±0.5	±2	LSB
Offset	E_{OFF}	V_{REF}=3.2V		±1	±2	LSB
Noise (P-P Value)	V_{NI}	V_{IN}=0.0V Note3) Full Scale=2.475V		30		μV
Leakage Current	I_L	V_{IN}=0.0V		1	5	μA
Zero Reading Drift	Z_D	V_{IN}=0.0V, V_{REF}=3.2V, -20<Ta<+75°C		0.2	1	μV/°C
Scale Factor Temperature Coefficient	Ftemp	V_{IN}=2.475V, V_{REF}=3.2V, -20<Ta<+75°C (Ext.ref, 0ppm/°C)		1	5	ppm /°C
Sampling-rate	Ts		3	4	5	times/s
Operating Current	I_{DD}	V_{IN}=0.0V		0.8	1.8	mA
Segment Sink Current	I_{S1}	Segment Voltage=3V SEG A to SEG G Terminals	10	14		mA
	I_{S2}	Segment Voltage=3V COM1, COM2 Terminals	70	98		mA

Note2) Linearity indicates an error of the input-output linearity characteristics getting with the two read data of zero and full scale input values.

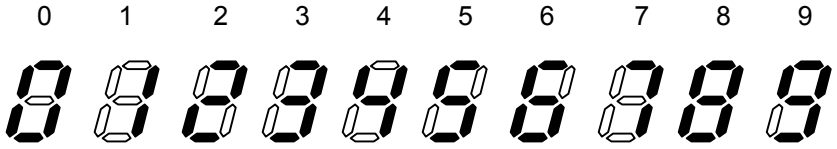
Note3) The peak value of noise must be kept within this value during 95% period in the measurement time.

■TIMING CHART



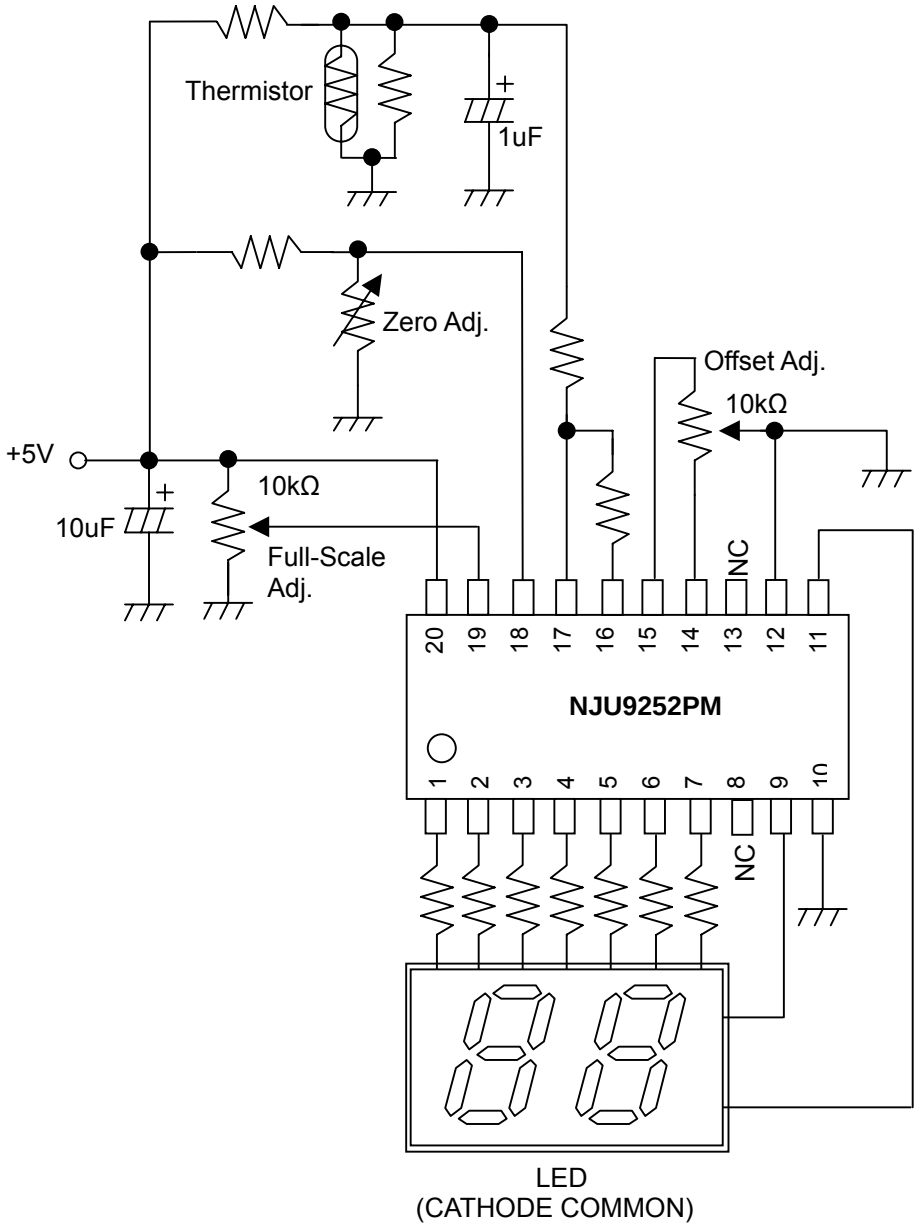
Note4) SEG A to SEG G are an example to display " 25 ".
The duty of COM1 and COM2 are 50% respectively.
COM1 and COM2 are Nch-FET open-drain type, SEG A to SEG G are Pch-FET open-drain type.
▨ : The state of Output Terminal is high impedance.

■DISPLAY PATTERN



■APPLICATION CIRCUIT (Ex. NJU9252PM)

●Thermometer



LED
(CATHODE COMMON)