# 3sec SPEAKER(&PIEZO) DRIVE VOICE SYNTHESIZER

## ■ GENERAL DESCRIPTION

The NJU5506 series is a PCM method voice synthesizer which consists of 98k bits data ROM, ladder type D/A converter, CR oscillator and control logics.

The operating voltage of 2.4V or over enables the operation using a small button cell or other types batteries.

The 98k bits data ROM can be divided into two independent sections of any desired length, where, using either or both of the ROM sections, sounds of human and animal voices or other kinds of sound effects can be programmed approximately for up to 3 sec in total.

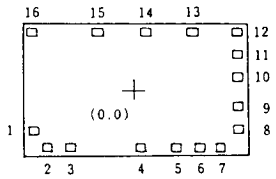
The voltage operation mode ladder type D/A converter can drive dynamic speakers with some amplifier and piezo buzzer also without any amplifier.

The NJU5506 can be applied to thinnest and smallest voice synthesis modules as it requires one resistor, capacitor and simple amplifier only as external components (in case of speaker driving). Consequently it can widely be utilized for applications in the consumer field.

## ■ FEATURES

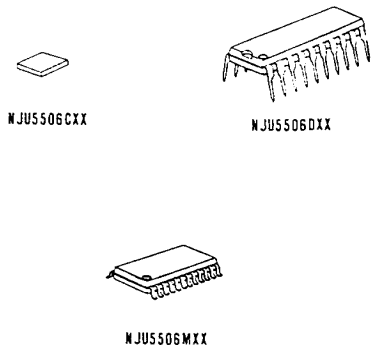
- Synthesis Method : 6 bits PCM
- Sampling Rate : 6kHz
- Internal ROM size : 98k bits
- Synthesis Time : 2.730 seconds (MAX)
- D/A Converter : Ladder Type ( Voltage Mode )
- Divided ROMs Output 2 kinds of Voice or Sound Effects
- One-Shot with Repeat and Level-Hold Mode
- Dynamic Speaker Drive
- Piezo Buzzer Direct Drive
- Minimum External Components
- Low Current Consumption
- Power Save Function : Oscillation Stop After Replay
  Value Shifted Pull-down Resistance
- Operating Voltage : 2.4V ~ 3.6V
- Package Outline : DIP 20 / DMP 24 / CHIP 16
- C-MOS Technology

## ■ PAD LOCATION

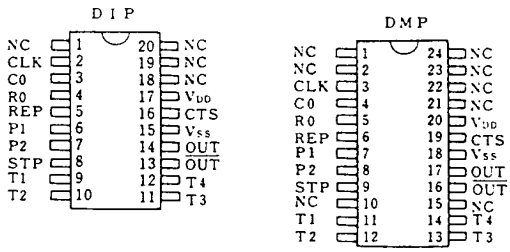



CHIP SIZE =4.45×2.88mm
CHIP THICKNESS =400μm±30μm

## ■ PACKAGE OUTLINE




## ■ PIN CONFIGURATION



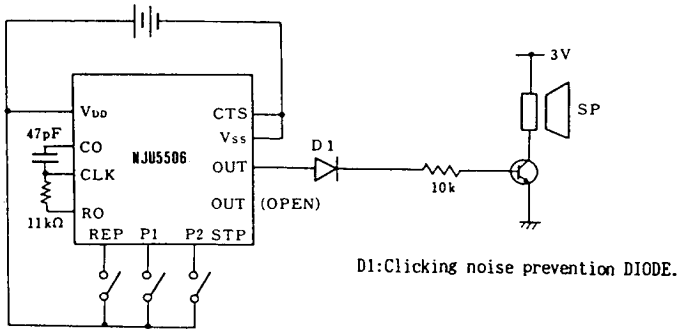

## ■ COORDINATES

Unit : μm

| No | PAD | X | Y | No | PAD | X | Y |
|---|---|---|---|---|---|---|---|
| 1 | CLK | −2120 | −1180 | 9 | T2 | 2030 | − 590 |
| 2 | C0 | −1900 | −1330 | 10 | T3 | 2030 | 180 |
| 3 | R0 | −1430 | −1330 | 11 | T4 | 2030 | 510 |
| 4 | REP | − 190 | −1330 | 12 | $\overline{OUT}$ | 2030 | 1250 |
| 5 | P1 | 960 | −1330 | 13 | OUT | 890 | 1250 |
| 6 | P2 | 1380 | −1330 | 14 | VSS | 480 | 1250 |
| 7 | STP | 1710 | −1330 | 15 | CTS | − 260 | 1250 |
| 8 | T1 | 2030 | − 910 | 16 | VDD | −2120 | 1250 |

## ■ APPLICATION CIRCUITS

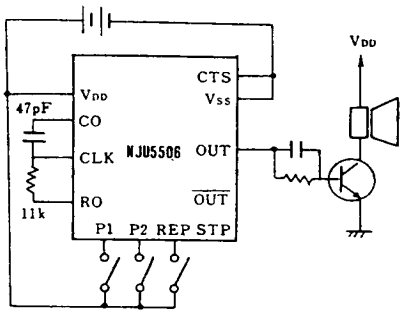
(1)Speaker Drive




D1:Clicking noise prevention DIODE.

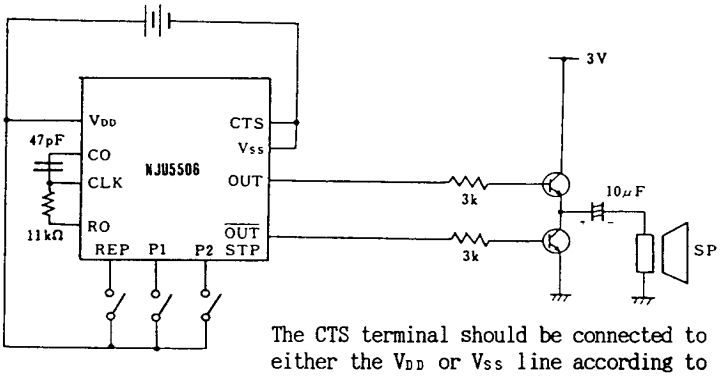
The CTS terminal should be connected to either the $V_{DD}$ or $V_{SS}$ line according to the operating mode.

(2)Speaker Drive



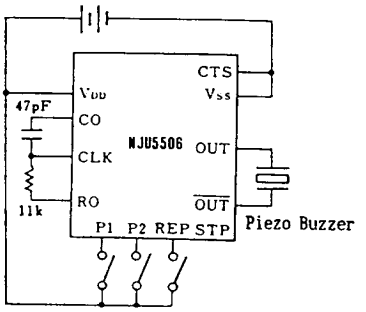

The CTS terminal should be connected to either the $V_{DD}$ or $V_{SS}$ line according to the operating mode.

(3)Speaker Drive



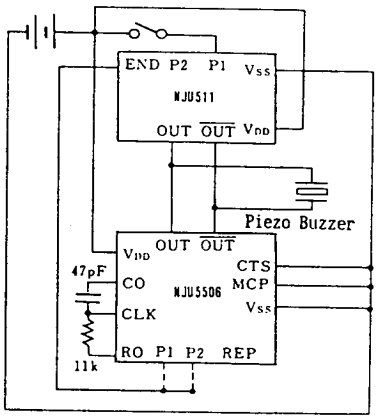

The CTS terminal should be connected to either the $V_{DD}$ or $V_{SS}$ line according to the operating mode.

(4)Piezo Buzzer Direct Drive




The CTS terminal should be connected to either the $V_{DD}$ or $V_{SS}$ line according to the operating mode.

(5)NJU5506 (Voice Synthesizer) Combain with NJU511




The CTS terminal should be connected to either the $V_{DD}$ or $V_{SS}$ line according to the operating mode.

## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{DD}$-$V_{SS}$ | - 0.3 ~ + 5.0 | V |
| Input Voltage | $V_{IN}$ | $V_{SS}$-0.3 ~ $V_{DD}$+0.3 | V |
| Output Voltage | $V_{OUT}$ | $V_{SS}$-0.3 ~ $V_{DD}$+0.3 | V |
| Operating Temperature | Topr | - 20 ~ + 70 | °C |
| Storage Temperature | Tstg | - 55 ~ + 125 | °C |

## ■ ELECTRICAL CHARACTERISTICS

( Ta=25°C, $V_{DD}$=3.0V, $V_{SS}$=0V )

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Operating Voltage | $V_{DD}$ | | | 2.4 | 3.0 | 3.6 | V |
| Stand-by Current | $I_{DD1}$ | | | | 0.01 | 0.3 | uA |
| Operating Current | $I_{DD2}$ | Internal Osc. OUT,$\overline{OUT}$ Open | | | 3.0 | 5.0 | mA |
| Oscillation Frequency | Fosc | R=11kΩ, C=47pF | | | 768 | | kHz |
| Input Voltage | $V_{IH}$ | | | $V_{DD}$-0.3 | | $V_{DD}$ | V |
| | $V_{IL}$ | | | $V_{SS}$ | | $V_{SS}$+0.3 | |
| Input Current ( Power Saving Mode ) | $I_{IH1}$ | P1, P2, REP | $V_{IH}$=2.2V | | 3.0 | 10.0 | uA |
| | $I_{IL1}$ | | $V_{IL}$=0.8V | | 3.0 | 10.0 | |
| Input Current ( C-MOS Input ) | $I_{IH2}$ | CTS | $V_{IH}$=2.2V | | 0.01 | 0.1 | uA |
| | $I_{IL2}$ | | $V_{IL}$=0.8V | | 0.01 | 0.1 | |
| Output Current | $I_{OH1}$ | OUT, $\overline{OUT}$ | $V_{OH}$=1.5V | 1.0 | 2.0 | | mA |
| | $I_{OL1}$ | | $V_{OL}$=1.5V | 1.0 | 2.0 | | |
| | $I_{OH2}$ | STP | $V_{OH}$=2.2V | 50 | 250 | | uA |
| | $I_{OL2}$ | | $V_{OL}$=0.8V | 50 | 250 | | |