SINGLE TONE MELODY WITH LED BLINKING C-MOS

■ GENERAL DESCRIPTION

The NJU502 series is a single tone melody with LED blinking function C-MOS IC incorporated with 64 notes ROM.

It plays the melody with LED blinking using a piezo buzzer, 3V battery and LED(s).

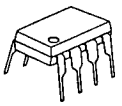
The NJU502 has 3 kinds of playing modes and these modes can be selected by either bonding or soldering option.

After melody playing, the LSI shifts mode to the power saving mode with oscillation stop to realize the long battery life.

The NJU502 series is suitable for melody greeting cards, toys, telephone rests and so on.

■ PACKAGE OUTLINE

NJU502CXX



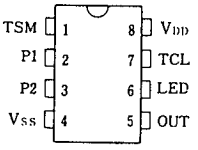
NJU502DXX

NJU502MXX

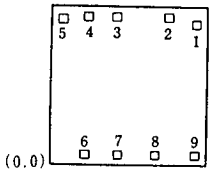
■ FEATURES

- Operating Voltage --- 2.0 ~ 3.6V
- Low Current Consumption
- 3 kinds of Playing Modes
  Bonding or Soldering Option
- CR Oscillation Circuits On-chip
- LED Blinking Function
- Piezo Buzzer Direct Drive
- Minimum External Components
- Power Saving Function
  Oscillation Stop After Replay
  Value Shifted Pull-down Resistance
- Package Outline : DIP / DMP / CHIP 8
- C-MOS Technology

■ PIN CONFIGURATION



■ PAD LOCATION



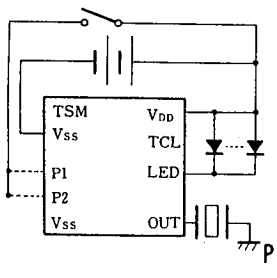
■ COORDINATES

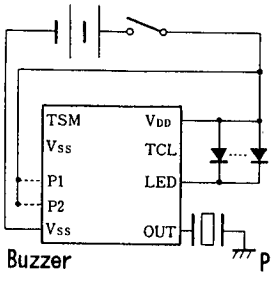
UNIT: μm

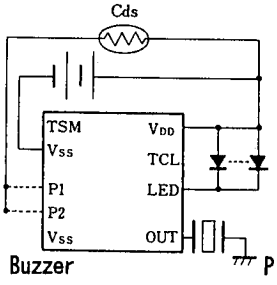
No.	PAD Name	X	Y
1	TSM(NC)	1830	1780
2	V_{SS}	1540	1870
3	P_1	870	1870
4	P_2	460	1870
5	V_{SS}	130	1840
6	OUT	460	130
7	LED	870	130
8	TCL(NC)	1320	130
9	V_{DD}	1830	130

CHIP SIZE: 1.96X2.00mm
CHIP THICKNESS: 400μm±30μm

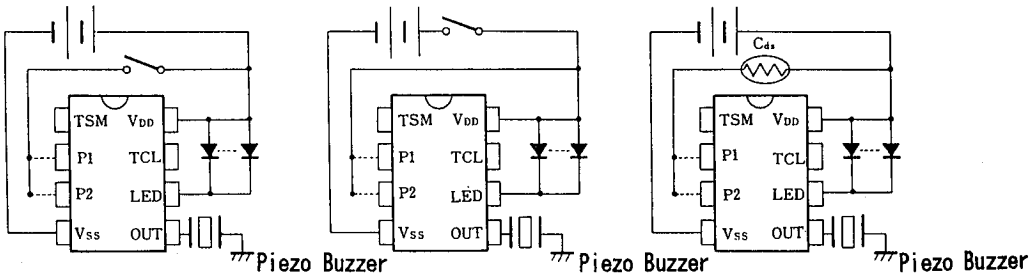
■ APPLICATION CIRCUITS (CHIP FORM)







■ APPLICATION CIRCUITS (PACKAGE FORM)



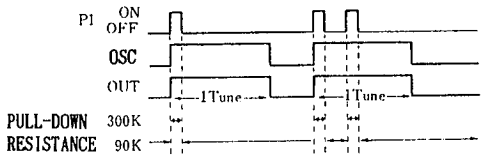
■ PLAYING MODE

The NJU502 series have following three kinds of playing mode selected by P1 and/or P2 terminal.

P1	P2	Playing Mode
O		One-shot 1 (Edge trigger type)
	O	One-shot 2 (Level control type)
O	O	Level hold

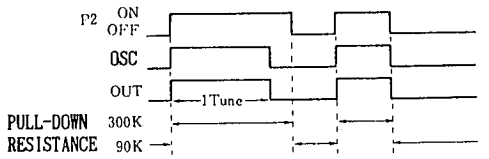
(1) One-shot 1

Melody is playing once when the P1 input turns on, then automatically stops at its end. The P1 input is disregard during the play.



(2) One-shot 2

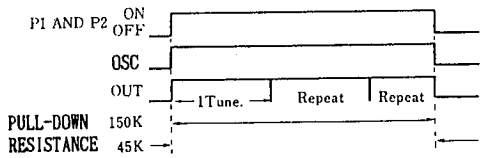
When the P2 input is remaining on over the one play cycle, melody is played once then auotmatially stops at its end. When the P2 input is turned off before the melody end, the melody stops halfway.



(3) Level hold

Melody is repeated while the both input of P1 and P2 remaining on.

Its stops when both input of P1 and P2 are turned off.

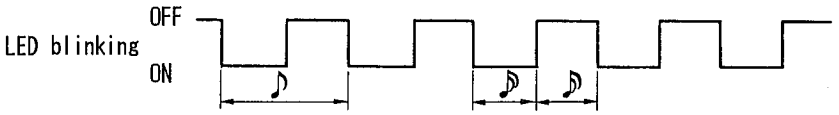


Note 1 : Turn on level of P1 and P2 is VDD.
Note 2 : Minimum pulse with of all input are required over than 64 msec as chatter free time.
note 3 : LED Blinking during play by eight note cycle.

■ LED BLINKING FUNCTION

LED Blinking

LED blinks during the playing, and the blinking period is 1/8 musical note.



LED is out of relations to the playing musical note and usually blinking by 1/8 musical note period.

■ POWER SAVE FUNCTION

(1) Oscillation Stop Function.....Oscillation stops automatically when melody stops.
The current consumption is less then 0.3μA while no playing.

(2) Input Current on P1 and P2.....Variable Pull-down resistance of P1 and P2 is controlled by switch conditions is as follows:
During making (V_{DD}).....300KΩ/1 Input
During breaking (V_{SS})..... 90KΩ/1 Input
This function is especially effective for Cds using application.

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}-V_{SS}	- 0.3 ~ + 5.0	V
Input Voltage	V_{IN}	V_{SS}-0.2 ~ V_{DD}+0.2	V
Operating Temperature	T_{opr}	- 30 ~ + 85	℃
Storage Temperature	T_{stg}	- 65 ~ + 125	℃

■ ELECTRICAL CHARACTERISTICS

(Ta=25℃, V_{DD}=3.0V)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Operating Voltage	V_{DD}			2.0	3.0	3.6	V
Stand-by Current	I_{DD1}	No Play, P1, P2 Open			0.01	0.6	μA
Operating Current	I_{DD2}	Playing, OUT,LED Open			120	250	μA
Input Current	I_{IL}	P1, P2	V_{IL}=0.8V		9.0	18	μA
	I_{IH}		V_{IH}=2.2V		9.0	18	
Output Current (1)	I_{OL1}	OUT	V_{OL}=0.75V	2.0			mA
	I_{OH1}		V_{OH}=0.75V	2.0			
Output Current (2)	I_{OL2}	LED	V_{OL}=1.0V	8.0			mA
	I_{OH2}		V_{OH}=2.0V	8.0			
Oscillation Frequency	fo			80	100	120	kHz
Osc. Stop Voltage	V_{DS}					2.0	V

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■ MUSICAL SPECIFICATION

(1) TEMPO

NJU502 series can take from any one of following 15 different tempos.

♩ =	Tempo
43.5	LARGO
46.4	
49.7	
53.5	ADAGIO
58	
63.3	
69.6	
77.3	ANDANTE
87	
99.4	MODERATO
116	ALLEGRETTO
139	
174	PREST
232	
348	

(2) NOTE/REST

The following 8 different notes and rest are Provided. Other kinds of note and rests may also be played by using TIE function.

notes	rests
𝅘𝅥𝅯	𝄾
♪	𝄾
♪.	𝄾.
♩	𝄽
♩+♪	𝄽+𝄾
♩.	𝄽.
♩..	𝄽..
𝅗𝅥	𝄻

(3) JUMP FUNCTION

Jump function saves the number of notes programed by repeating the same part.

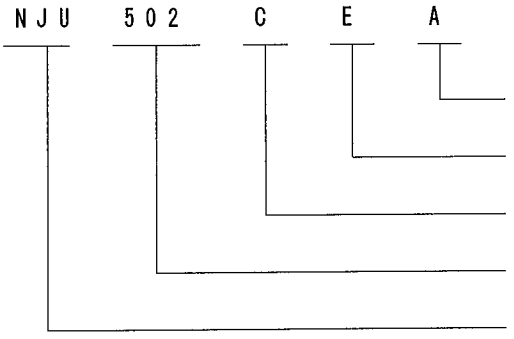
Maximum 7 jumps are available.

(4) COMPASS & SCALE

NJU502 series can poly 15 kinds of scales over 3 1/2 octave of G3 to D7 or G4 to D8.

■ ORDERING INFORMATION

The NJU502 series is named by following rules:



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