

SVM7500C Series

Melody IC



- Piezo Buzzer Direct Drive
- Selectable Melody Play Modes
- No External Components are Required

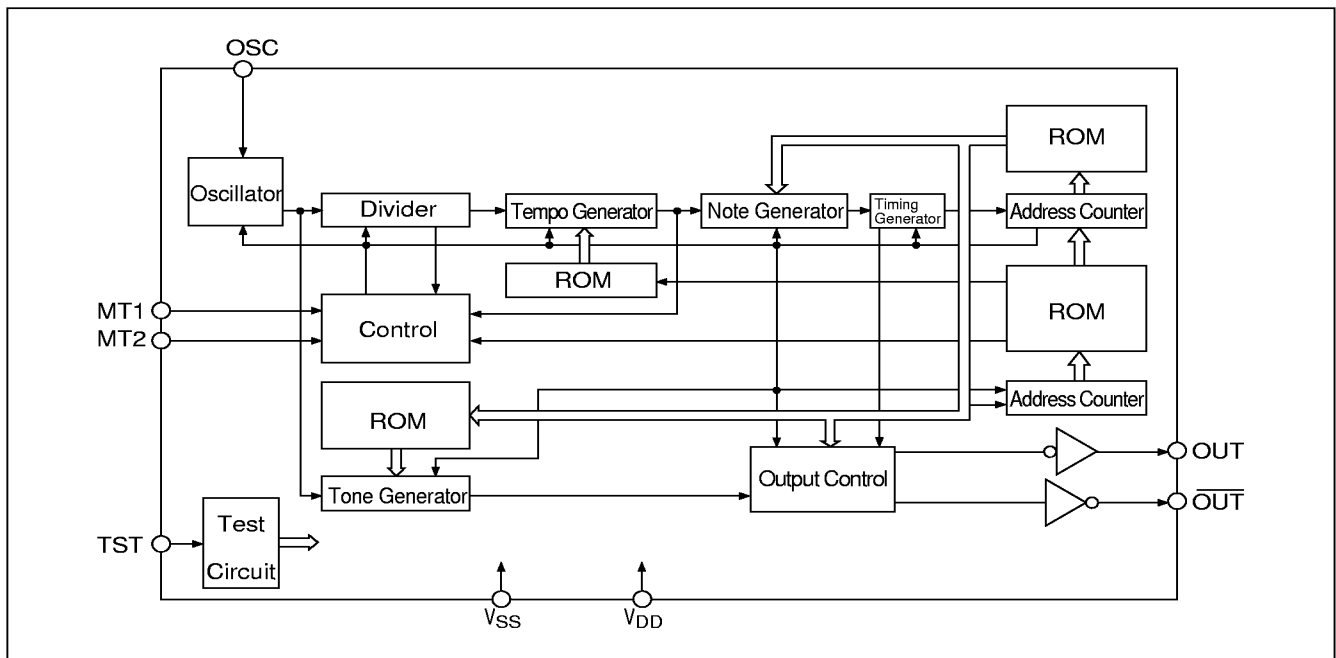
DESCRIPTION

The SVM7500C series are melody CMOS, designed for playing musical tunes automatically. And it is only required 1.5 V battery and Piezo buzzer as external components to minimize the total cost and to make a smallest module. The applications are melody greeting cards and toys etc.

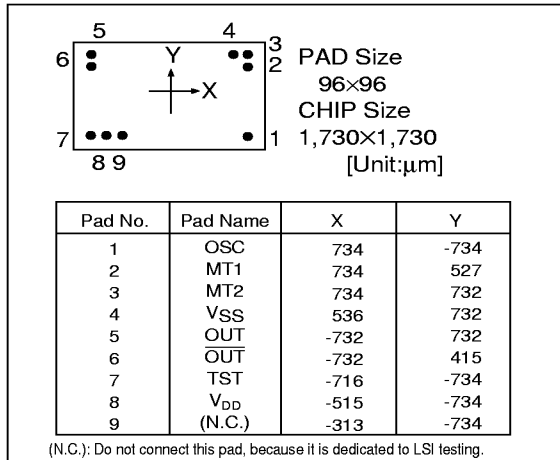
FEATURES

- Operation voltage range: 1.5 V to 3.0 V
- Piezo direct drive capability
- Typical oscillation frequency is 50 kHz. No external components are required for oscillation
- Melody ROM contains 63 words
- Address jump instruction allows a part of tunes play repeatedly
- Low power dissipation
- One button start and stop(mask option)
- Three play modes(one level-hold and two one-shot)selectable by bonding options
 - Level-hold play mode The melody continues on with the melody start input being applied. It stops when the input turns off
 - One-shot multi-play mode The melody starts when the start input is applied. It automatically stops when it comes to its end
- Oscillation suspended and pull-down resistance shifted while the melody is off
- On-chip oscillation resistor and capacitor
- Package: DIP-8pin(plastic)or Die form

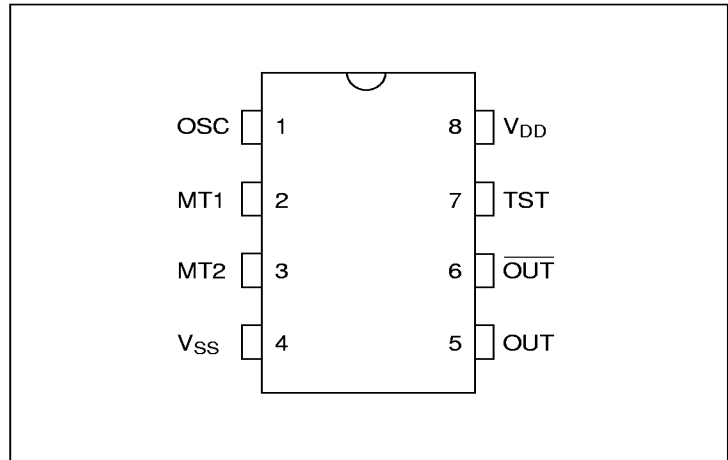
BLOCK DIAGRAM



■PAD LAYOUT AND COORDINATES



■PIN CONFIGURATION



■PAD AND PIN DESCRIPTION

Pad Name Pin Name	Pad No. Pin No.	Function	Pad Name Pin Name	Pad No. Pin No.	Function
OSC	1	Reference signal is to be connected to OSC.	OUT	5	Output terminal for Piezo buzzer
MT1*	2	Input terminal 1 for melody start	$\overline{\text{OUT}}$	6	Output terminal for Piezo buzzer
MT2*	3	Input terminal 2 for melody start (Note)	TST*	7	Test terminal, left open
V _{SS}	4	Power input (0V)	V _{DD}	8	Power input(+)

Note)MT2 is N.C. when select the start and stop with one button function.

*: with pull-down resistor

■ABSOLUTE MAXIMUM RATINGS

(V_{SS}=0V)

Rating	Symbol	Value	Unit
Supply voltage	V _{SS}	-0.3 to 5.0	V
Input/Output voltage	V _{I/O}	-0.2 to V _{DD} +0.2	V
Operating temperature	T _{opr}	-20 to 85(V _{DD} ≤1.5V)	°C
Junction temperature	T _j	-10 to 125	°C

■ELECTRICAL CHARACTERISTICS

(V_{SS}=0V, Ta=25°C)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	V _{DD}	-	1.2	1.5	3.5	V
High level input voltage	V _{IH}	-	V _{DD} -0.3	-	V _{DD}	V
Low level input voltage	V _{IL}	-	V _{SS}	-	V _{SS} +0.3	V
High level input current(1)	I _{IH1}	MT1, MT2, V _{DD} =1.5V, V _{IH1} =V _{DD} *	-	1.5	-	μA
High level input current(2)	I _{IH2}	TST, V _{DD} =1.5V, V _{IH2} =V _{DD}	1.5	4.5	15	μA
Low level input current	I _{IL}	MT, TST, V _{DD} =1.5V, V _{IL} =V _{SS}	-	-	0.05	μA
High level output current(1)	I _{OH1}	$\overline{\text{OUT}}$, OUT, V _{DD} =1.5V, V _{OH1} =0.75V	2.0	-	-	mA
Low level output current(1)	I _{OL1}	$\overline{\text{OUT}}$, OUT, V _{DD} =1.5V, V _{OL1} =0.75V	2.0	-	-	mA
Input amplitude	A _I	V _{DD} ≤1.5V, when external reference signal is applied to OSC	$\frac{V_{DD}}{2} \pm 0.4$		-	V
Standby supply current	I _{DDS}	V _{DD} =1.5V, MT1, MT2 Open	-	-	0.3	μA
Operating supply current	I _{DDO}	No load at OUT, $\overline{\text{OUT}}$	-	-	50	μA
		Direct drive	-	400	-	μA

*A different pull-down resistance results.

■ OSCILLATION CHARACTERISTICS

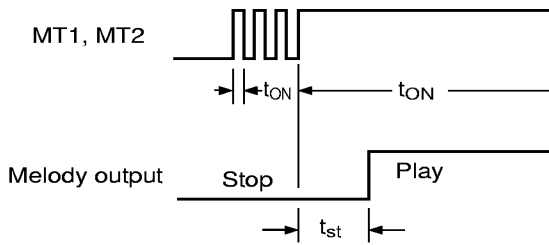
(V_{SS}=0V, T_a=25°C)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Frequency deviation	f _{OSC}	V _{DD} =1.5V	-30	50.0kHz	30	%
Oscillation self-start voltage	V _{STA}	-	1.2	-	-	V
Oscillation stop voltage	V _{STP}	-	-	-	1.2	V
Oscillation frequency voltage deviation	ε _f	-	-	-	30	%

■ CONTROL FUNCTIONS

● Control(f_{osc}=50kHz)

(Melody play start)



If t_{ON} (the MT1 and MT2 pin input ON time) is shorter than 7.68ms, the input is assumed to be chattering.

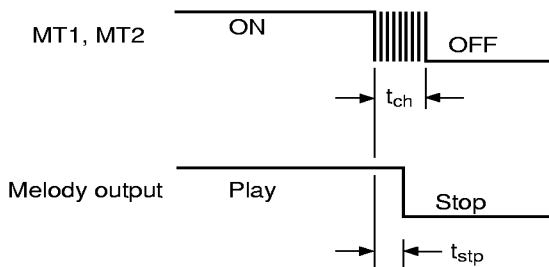
The minimum input pulse width sufficient to start melody playing (t_{ON}) must satisfy the following conditions:

Level-hold, One-shot C mode $t_{ON} > 81.92\text{ms}$

One-shot A, B mode $t_{ON} > 20.48\text{ms}$

As long as t_{ON} is valid, the melody starts 94.72ms ($=t_{st}$) after the MT input turns on.

(Melody stop)
Level-hold mode



If t_{ch} (the chattering ON time) is smaller than

$$K \times \text{time of one beat of } \text{♪}$$

(Where K is a positive integer), then the time from MT input OFF to melody stop (t_{stp}) must satisfy the following condition:

$$\frac{128}{f_{OSC}} \leq t_{stp} \leq K \times (\text{time of one beat of } \text{♪})$$

Any chattering that may continue after the melody has stopped as a result of the input turning off is eliminated by the chattering killer circuit with the input on.

One-shot multiple mode

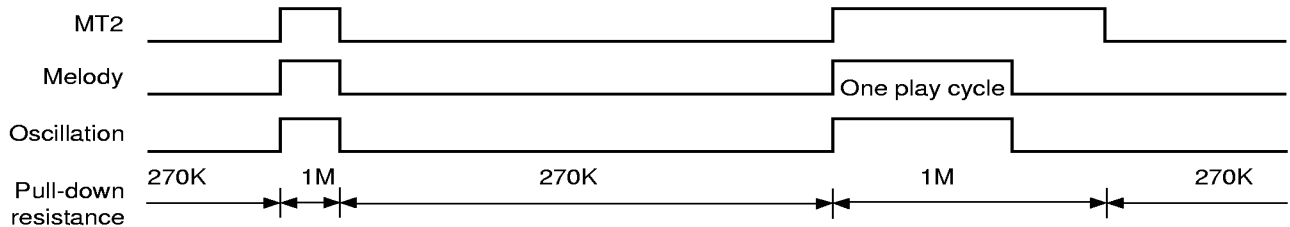
The melody automatically stops at its last note. In this case, the length of the last note is reduced by $384/f_{OSC}$ sec ($=7.68\text{msec}$ at $f_{OSC}=50.0\text{kHz}$).

●Melody play modes

1) One-shot multiple modes

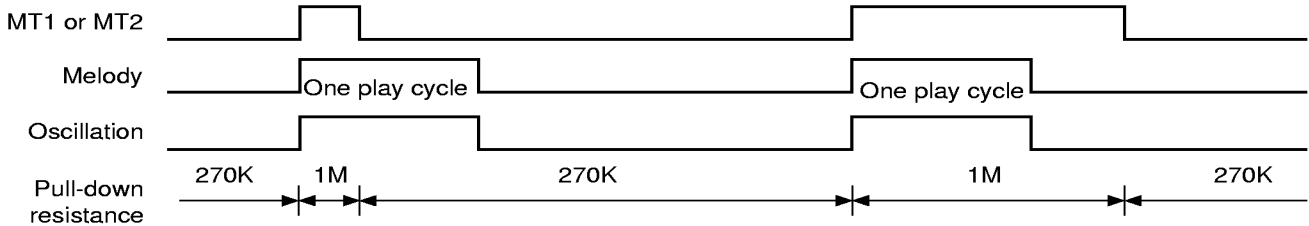
One-shot C

If input is melody length, melody is played in level-hold mode. If input is melody length, melody is played once, then automatically stops at its end.



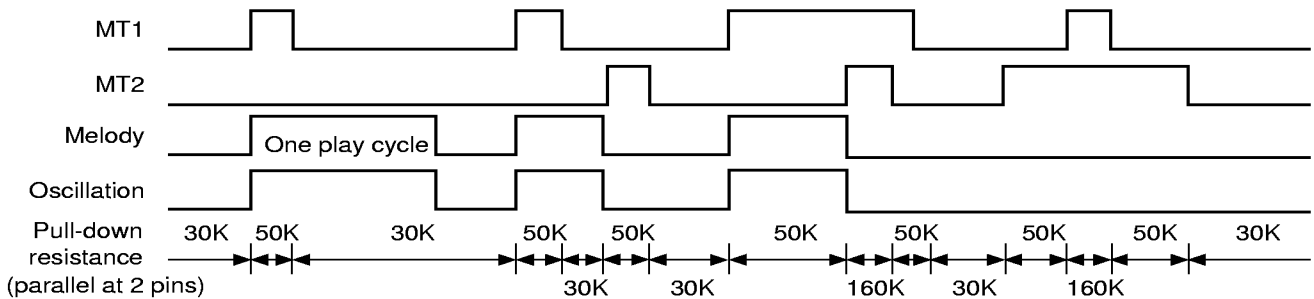
One-shot A

Melody is played once, then automatically stops at its end independently of the length of input.



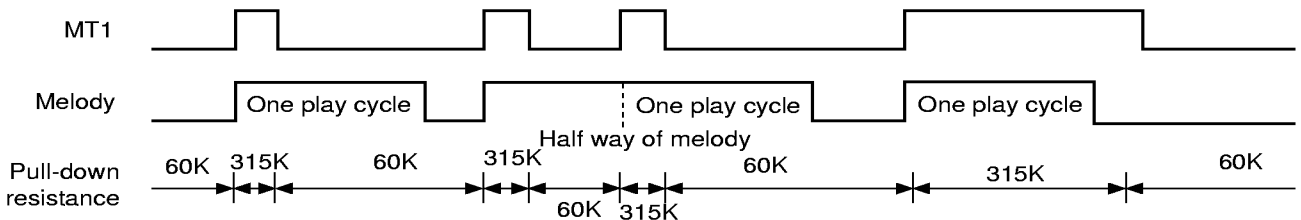
One-shot A, with forced melody play stop function (SVM7826D, SVM7827D)

In one-shot A mode, the melody stops if "MT2" is forced to go high. With "MT2" at high level, the melody does not stop even if "MT1" is forced to go high.



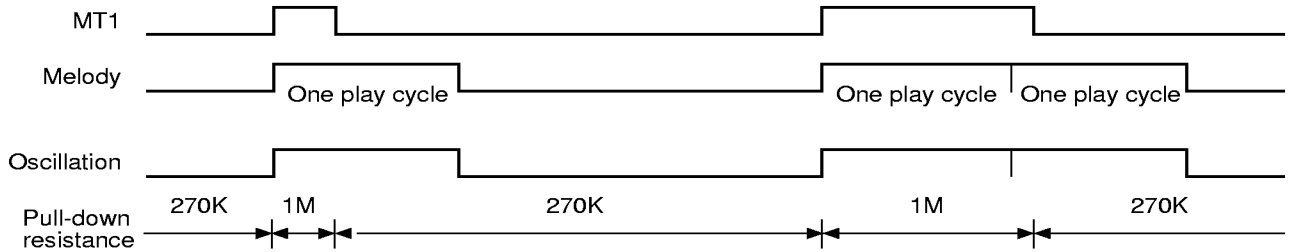
One-shot A, with retrigger function (SVM7828D, SVM7829D)

Each time a melody start input comes, the melody starts from its beginning. It stops when its end is reached.



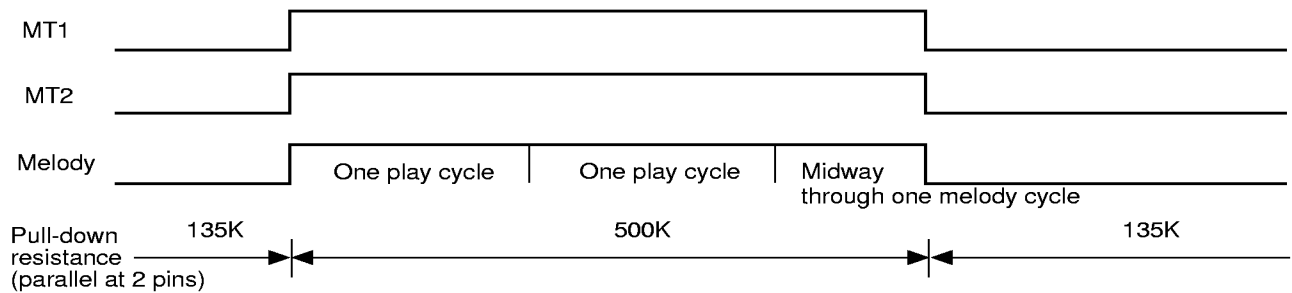
One-shot B

If input melody length, melody is played once, then automatically stops at its end. If input melody length, melody is played repeatedly and automatically stops after the input turns off.



2) Level-hold mode

Melody is repeated while start input remains on. It stops when the input turns off.



●Selection of play modes (BONDING OPTION)

Bond appropriate pads (circled) to V_{DD} either combinedly or independently as required for a target play mode.

Model	Play mode	MT1	MT2
Type A	One-shot A	○	
	One-shot B	○	○
	One-shot C		○
Type B	Level-hold	○	○
	One-shot C		○
	One-shot A	○	
Type C	Level-hold	○	○
	One-shot C		○
	One-shot B	○	
Type D	Level-hold	○	○
	One-shot A		○
	One-shot B	○	
Type E	One-shot A	○	
	melody start merody stop		○
Type F	1button start & stop	○	

●Power saving function

The pull-down resistance is controlled so as to save power according to the oscillation stop input level ("H" or "L") as shown in the play mode time chart. This function provides low current dissipation, assuring long life.

■Oscillation stop function:

When the melody terminates, the internal oscillation stops independently of the input level at MT1/MT2, placing the circuit into standby mode. This reduces the current dissipation to below 3.3μA.

■Pull-down resistance control function:

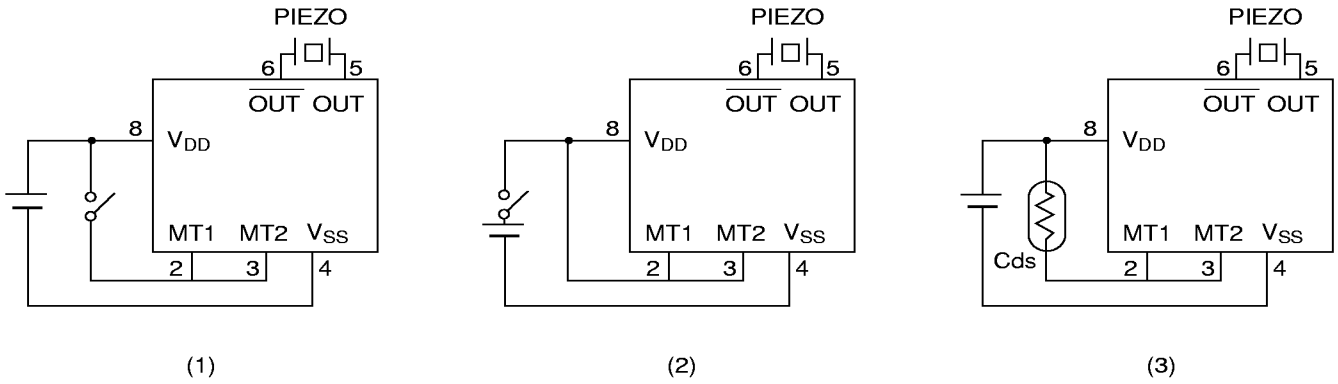
Depending on the input level ("H" or "L", the pull-down resistance at MT1/MT2 changes as follows:

While V_{DD} is being applied (input to MT1) typically 1M-ohm/input

V_{SS}(standby) typically 270k-ohms/input

This function is especially effective for a configuration using Cds. If the resistance of the Cds decreases(bright resistance), the pull-down resistance becomes larger. If the resistance of the Cds increases(dark resistance), the pull-down resistance becomes smaller. Thus the total resistance is increased, minimizing the current to be consumed by the Cds and IC.

■BASIC EXTERNAL CONNECTION



Configuration using Cds

Note: For the circuit using an external reference signal and an external clock, such clock must be supplied at OSC

■PACKAGE DIMENSIONS

