EPSON

SVM7561 Series

CMOS MELODY IC

- Enables to program up to 16 songs
- Provided with two built-in independent sound sources
- A 8-pin package

■ OVERVIEW

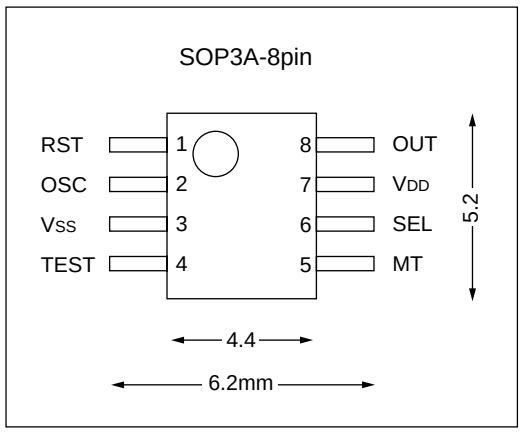
SVM7561Series is the CMOS melody IC that generates melodies and chimes according to the music information programmed in the built-in mask ROM. The melody IC is provided with two built-in independent sound sources of main melody and accompaniment, and the 512-step capacity ROM for each sound source can be allocated to 16 songs, the maximum. When an 8 pins package is adopted, a CR oscillator will be able to be contained in the IC. So, the melody IC is ideal for miniaturized portable telephones and can generate high quality various receive melodies.

■ FEATURES

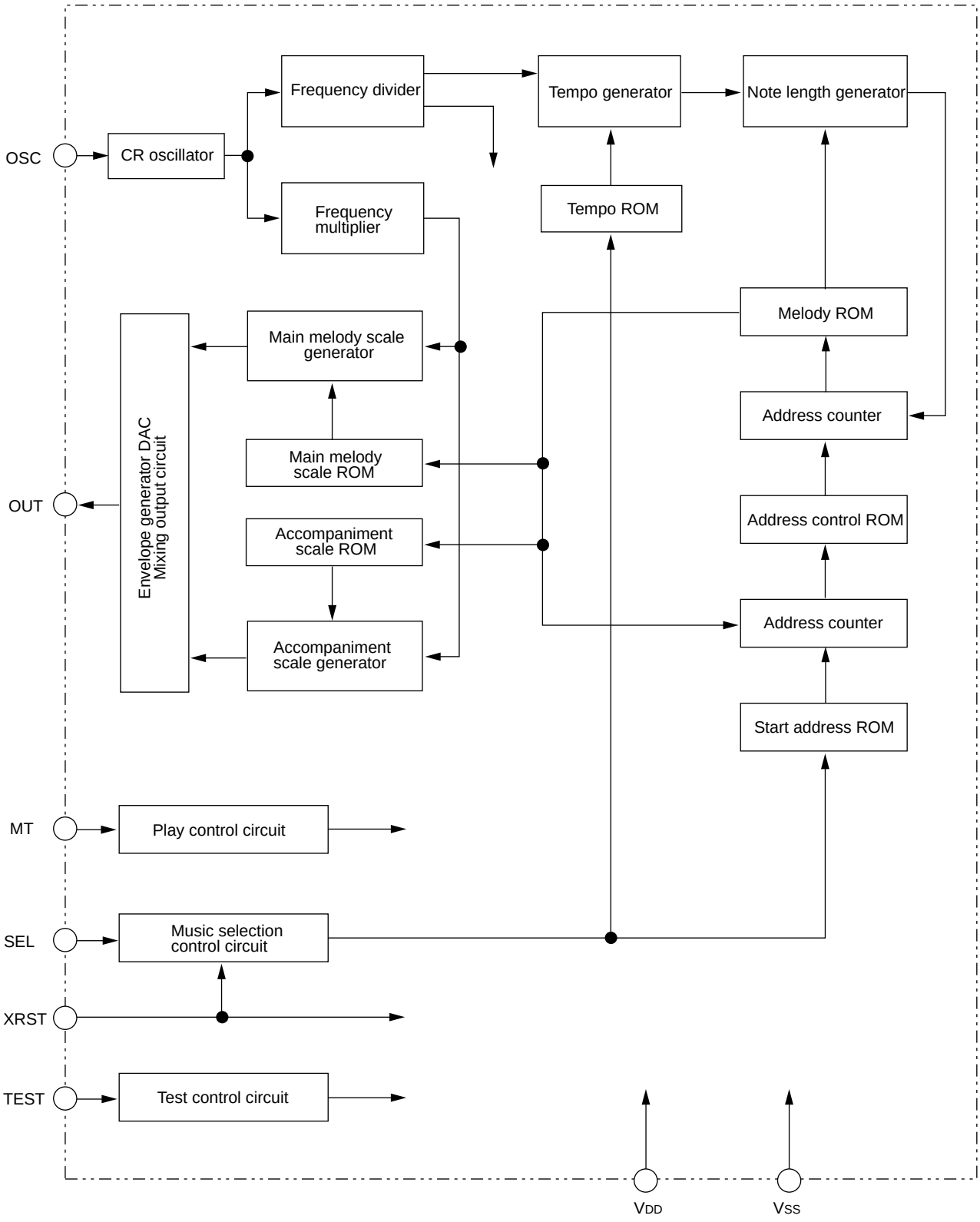
- Number of songs : Up to 16 songs
- Melody ROM : 512 steps (containing main melodies and accompaniments)
- Sound source : Two sounds (Square waves)
- Compass : One pattern can be selected by the mask option out of the four patterns of C4 to G6/C3 to G5/C4 to C7#/C3# to C6#
- Musical interval : 16 sounds of main melodies and accompaniments in the selected compass.
- Music selection : Serial selection with a terminal
- Sound generator : Speaker drive (External amplifier)
- Oscillator : Built-in CR oscillation/External input (to be selected by mask option)
- Play mode : Level hold/One shot (to be selected by mask option) SOP3A-8pin
- Shipping pattern : SOP3A-8Pin package
- Low voltage operation : • Low power oscillator depending on the built-in voltage stabilizer
  • Standby mode in which the internal IC circuits stop when no music is played.
- Power supply voltage : 0.9 to 5.5V
- Current consumption : • Target 1.0μA (during standby)
  • Target 200μA (during operation)

■ TERMINAL EXPLANATION

No.	Terminal name	Function
1	RST	Reset
2	OSC	NC/External clock input
3	V_{SS}	(-) power supply
4	TEST	For test
5	MT	Play start
6	SEL	Music selection serial data input
7	V_{DD}	(+) power supply
8	OUT	Play output



■ BLOCK DIAGRAM



■ TERMINAL FUNCTION

Terminal No.	Terminal Name	Terminal Attribute, Input/Output	Built-in Pull-down Resistor	Terminal Function
1	XRST	Input	Without	For inputting reset signals. • The whole internal logic will be initialized when the “L” level voltage is applied. • A song to be played is selected following the initialization. • When the “H” level voltage is applied, the internal logic initialization will end and a melody will be able to be selected/played. • Since the pull-down resistor is not provided to this terminal, do not leave this terminal open.
2	OSC	(NC) (Input)	Without	1) When selecting “Built-in CR Oscillation” as the reference signal source optionally, this terminal no connect. 2) When selecting “External Clock Input” as the reference signal source optionally, input the square wave of 32.768kHz as the reference signal source.
3	V_{SS}	Power supply	–	GND (0V)
4	TEST	Input	With	For inputting test signals. • Use this terminal when evaluating functions of this IC. • Never apply the “H” level voltage to this terminal. • Though this terminal is provided with the pull-down resistor, we recommend you to connect this terminal to V_{SS} (and apply the “L” level voltage) all the time in order to prevent malfunction.
5	MT	Input	With	For inputting play start signal. • When the “H” level voltage is applied, the operation mode will be selected and play start/stop is controlled according to the optionally selected play mode. • The built-in noise eliminator enables to examine input pulse widths. • When an input is judged as insufficient pulse width like noise, the standby mode will selected. • The pull-down resistor is provided to this terminal.
6	SEL	Input	With	For inputting music selection signals. • As input signals start up, 16 songs can be selected cyclically. • Since this terminal is not provided with noise eliminator, apply input signals not affected by noise/chattering. • Though this terminal is provided with the pull-down resistor, the pull-down resistor is turned off and “high impedance input” prevails the terminal in the standby mode. So, be sure to apply “L” level or “H” level voltage to the terminal. • When the operation mode is selected, the pull-down resistor will turn on. • Input signals become invalid during play, but when the play mode returns to the standby mode and the “H” level voltage is applied to this terminal, the music will proceed to another selected one.
7	V_{DD}	Power supply	–	Power supply terminal (0.9 to 5.5V)
8	OUT	Output	–	For outputting sound signals • Acoustic signals of main melody and accompaniment are mixed the output. • Acoustic signals are output as square waves. • When “Envelopment Attachment” is selected optionally, acoustic signals will be attenuated by the preset time constant. • Connect this terminal to the input terminal of the preamplifier through a volume control resistor or coupling capacitor.

Notes: 1. NC = Non connection (Open or release)
2. Terminal numbers are for plastic PKGs. (S0P 8pin)

■ ELECTRICAL CHARACTERISTICS

● Absolute Maximum Rating

(V_{SS} = 0V)

Items	Symbols	Ratings	Units
Power supply voltage	V_{DD}	-0.3 to +7.0	V
Terminal voltage	V_{IO}	-0.2 to V_{DD} + 0.2	V
Operating temperature range	T_{opr}	-20 to +85	°C
Storage temperature range	T_{stg}	-65 to +150	°C

● DC Characteristics

Unless otherwise specified: V_{DD} = 0.9 to 5.5V, V_{SS} = 0V, Ta = 25°C

Items	Symbols	Applicable Terminals	Conditions		Specification Minimum	Specification Standard	Specification Maximum	Units
Operating voltage	V_{DD}	V_{DD}	Reference signal = 32.768kHz <Note 1>		0.9	3.0	5.5	V
High level input voltage (1)	V_{IH1}	XRST MT, SEL	–	V_{DD} = 1.5V to 5.5V	V_{DD} -0.3	–	V_{DD}	V
		OSC	External clock input					
High level input voltage (2)	V_{IH2}	XRST MT, SEL	–	V_{DD} = 0.9V to 5.5V	V_{DD} -0.2	–	V_{DD}	V
		OSC	External clock input					
Low level input voltage (1)	V_{IL1}	XRST MT, SEL	–	V_{DD} = 1.5V to 5.5V	0	–	0.3	V
		OSC	External clock input					
Low level input voltage (2)	V_{IL2}	XRST MT, SEL	–	V_{DD} = 0.9V to 1.5V	0	–	0.2	V
		OSC	External clock input					
High level input current (1)	I_{IH1}	XRST, SEL	VIH1 = V_{DD}, Standby mode		0	–	0.3	µA
		OSC	VIH1 = V_{DD}, External clock input					
High level input current (2)	I_{IH2}	SEL	VIH2 = V_{DD},	V_{DD}=1.5V	0.4	1.8	4.0	µA
			Operation mode	3.0V	3.0	10.0	30.0	µA
		MT	V_{IH2} = V_{DD}	5.0V	12.5	32.0	80.0	µA
Low level input current	I_{IL}	XRST MT, SEL	V_{IL} = 0V		-0.3	–	0	µA
		OSC	V_{IL} = 0V, External clock input					
Output impedance	Z_{out}	OUT	The resistance value is optionally selected. <Note 2>	High resistance	111	222	444	kΩ
				Low resistance	34	68	136	
Constant voltage output	V_{REG}	(Inside the IC)	Built-in CR oscillator drive voltage V_{DD} = 1.2V to 5.5V <Note 3>		–	1.1	1.2	V

Notes: 1. When the reference signal source is the built-in CR oscillator and V_{DD} is lower than V_{REG}, the oscillation frequency will lower and the tempo and tone will lower in proportion to the oscillation frequency shift. But other circuits will operate normally within the specification range.
2. When a main melody and the accompaniment are attached at the same time and the play signal is output from each sound source.
3. When the reference signal source is the external clock input, the voltage stabilizer will always stop the operation.

Unless otherwise specified: V_{DD} = 0.9 to 5.5V, V_{SS} = 0V, Ta = 25°C

Items	Symbols	Applicable Terminals	Conditions		Specification			Units
					Minimum	Standard	Maximum	
Standby mode current consumption	I_{DDS}	V_{DD}	Standby mode, XRST = V_{DD}, MT = SEL = TEST = 0V, OUT = No load		–	0.1	1.0	µA
Operation mode average current consumption (1)	I_{DDO}	V_{DD} <Note 6>	During play in the operation mode,<Note 4> When the built-in CR oscillates, XRST = MT = V_{DD}, SEL = TEST = 0V, OUT = No load	V_{DD}=1.5V	–	20 <Note 7>	– <Note 7>	µA
				V_{DD}=3.0v	–	40 <Note 8>	– <Note 8>	µA
				V_{DD}=5.0V	–	90 <Note 9>	– <Note 9>	µA
			During play in the operation mode, <Note 4> At external clock input (f_{EXC} = 32.768KHz), XRST = MT = V_{DD}, SEL = TEST = 0V, OUT = No load	V_{DD}=1.5V	–	10 <Note 10>	– <Note 10>	µA
				V_{DD}=3.0V	–	30 <Note 11>	– <Note 11>	µA
				V_{DD}=5.0V	–	80 <Note 12>	– <Note 12>	µA
Operation mode average current consumption (2)	I_{DDD}	V_{DD} <Note 6>	After play in the operation mode, <Note 5> When the built-in CR oscillates, XRST = MT =V_{DD}, SEL = TEST = 0V, OUT = No load	V_{DD}=1.5V	–	20	60	µA
				V_{DD}=3.0V	–	30	90	µA
				V_{DD}=5.0V	–	60	180	µA
			After play in the operation mode, <Note 5> At external clock input (f_{EXC} = 32.768KHz), XRST = MT = V_{DD}, SEL = TEST = 0V, OUT = No load	V_{DD}=1.5V	–	10	40	µA
				V_{DD}=3.0V	–	20	70	µA
				V_{DD}=5.0V	–	45	160	µA

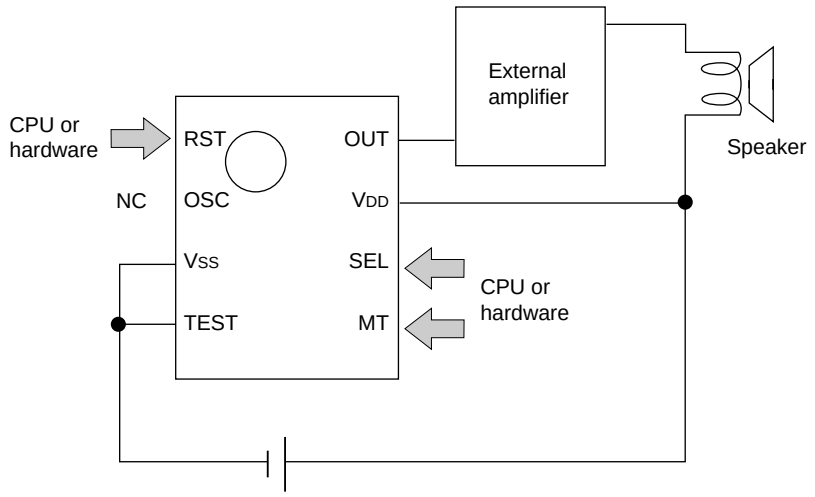
Notes: 4. Sound signals are being output from the OUT terminal.

5. When the play mode is One Shot A and MT = V_{DD}, the melody IC has automatically stopped after playing a song.
6. The IC's total current consumption is set according to terminal setting conditions and does not include I_{IH2} of the MT terminal.
7. to 12.
   The current consumption varies with music information (tone, tempo, musical note, etc.) of programmed songs. So, the current consumption varies during play of a song and each time song changes.
7. The approximate standard value is 20µA, and the approximate maximum value ranges from 50 to 80µA.
8. The approximate standard value ranges from 30 to 50µA, and the approximate maximum value ranges from 70 to 100µA.
9. The approximate standard value ranges from 80 to 100µA, and the approximate maximum value ranges from 150 to 200µA.
10. to 12.
    When the external clock input is selected as the reference signal source, the current consumption will be 10 to 20µA less than the one when the built-in CR oscillation is selected.
10. The approximate standard value is 10µA, and the approximate maximum value ranges from 30 to 70µA.
11. The approximate standard value ranges from 20 to 40µA, and the approximate maximum value ranges from 50 to 90µA.
12. The approximate standard value ranges from 70 to 90µA, and the approximate maximum value ranges from 130 to 190µA.

■ REFERENCE CIRCUIT EXAMPLES

External Connection Diagram

In case of built-in CR oscillation



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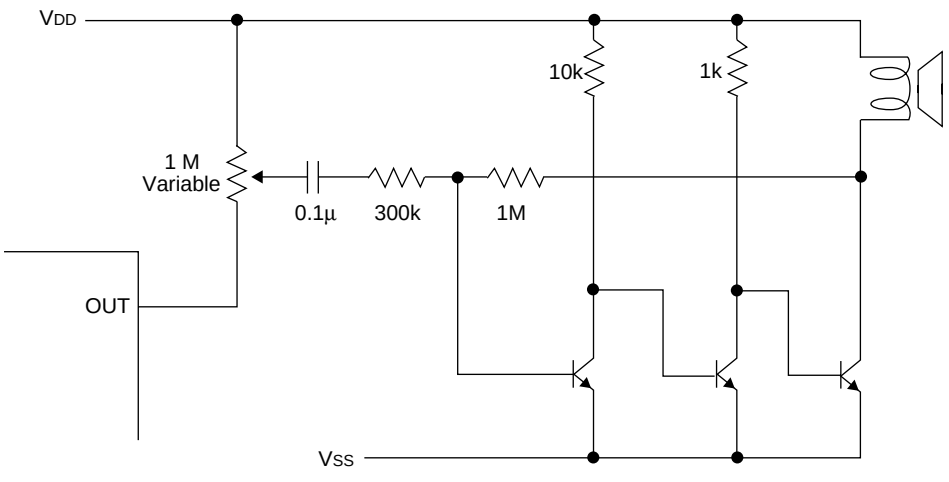
External Amplifier



Tr : NPN DC hFE = 160 approx.

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