■ OVERVIEW

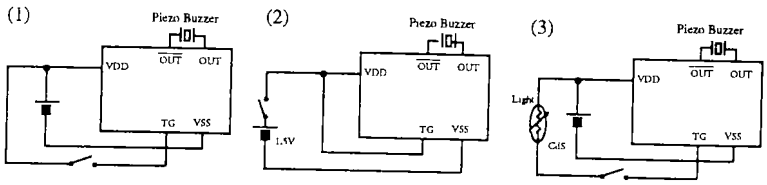
The M1105 series is Melody C-MOS LSI for playing musical tune by connecting only Battery and Piezo Buzzer as external components. 3 kinds of remarkable playing modes can be selectable by bonding option with extremely low current consumption after playing by the oscillation stop function and by the shifting function of pull-down resistance value depending on input level.
The M1105 series is suitable for low cost and long life of battery module such as Melody Greeting Cards, Toys, and etc.

■ FEATURES

- No external parts
- Wide range operation voltage (1.2 ~ 3.6V)
- Low power consumption
- 3 kinds of playing modes selectable by bonding option
- The oscillation stop function after playing
- The Shifting function of pull-down resistance value
- CR oscillation on chip
- Power on Initialize function
- 2 positions of Vss pads on chip
- Wide compass (G3-D7)

■ STANDARD CIRCUITS

3 types of circuits are available as standard circuits.



*1 – The M1105 series has 2 positions of Vss pads. Please select one pad according to your PCB design.
*2 – (1) for ONE-SHOT, LEVEL HOLD 1 and LEVEL HOLD 2 application.
(2) for LEVEL HOLD 1 and LEVEL HOLD 2 application.
(3) for Cds application.

2 pads of OSH and LH should be selected by the playing mode.

BONDING PAD OSH	BONDING PAD LH	PLAYING MODE
○	○	LEVEL HOLD 1
	○	LEVEL HOLD 2
○		ONE-SHOT

■ ABSOLUTE MAXIMUM RATINGS

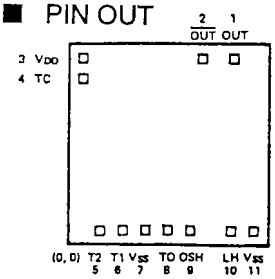
Item	Symbol	Ratings	Unit
Supply voltage	V_{DD}—V_{SS}	−0.3 to 7.0	V
Input voltage	V_{IN}	V_{SS} −0.2 to V_{DD} +0.2	V
Operating temp.	T_{OPR}	−20 to +80	°C
Storage temp.	T_{STG}	−55 to +125	°C

■ ELECTRICAL CHARACTERISTICS

T_a=25°C, V_{SS}=0V, V_{DD}=1.5V

ITEM	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Operating Voltage	V_{DD}			1.2	1.5	3.6	V
Stand-by Current	I_{DD1}	NO PLAYING OSH, LH-OPEN			0.01	0.3	μA
Current Consumption	I_{DD2}	PLAYING OUT, $\overline{OUT}$-OPEN			25	50	μA
Input Current	I_{IL}	V_{IL}=0.4V	LH,	0.7	1.5	3.0	μA
	I_{IH}	V_{IH}=1.5V	OSH	0.7	1.5	3.0	
Output Current	I_{OL}	V_{OL}=0.75V	OUT,	2.0			mA
	I_{OH}	V_{OH}=0.75V	$\overline{OUT}$	2.0			
Oscillating Frequency	fosc			35	50	65	kHz
Oscillation Start Voltage	V_{DDB}					1.2	V
Oscillation Stop Voltage	V_{DDS}					1.2	V

■ PIN OUT



* No connection to pads 4, 5, 6 and 8

[Chip size 1.80 × 1.79 mm
Chip thickness 400 ± 30 μm]

■ COORDINATES

[Unit μm]

NO.	PAD	X	Y	NO.	PAD	X	Y
1	OUT	1325	1640	7	Vss	613	150
2	$\overline{OUT}$	994	1640	8	NC	819	150
3	VDD	150	1640	9	OSH	1076	150
4	NC	140	1404	10	LH	1432	150
5	NC	176	130	11	Vss	1650	150
6	NC	410	130				

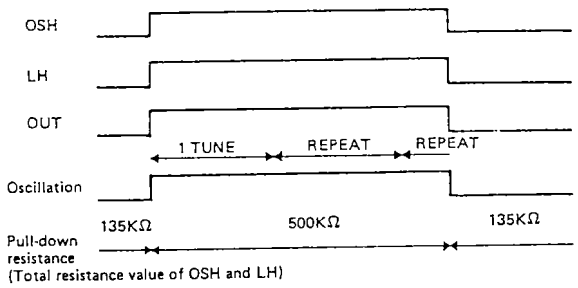
■ PLAYING MODE

The 1105 series has two input pads, OSH and LH, to select the playing mode and starts the play. 3 kinds of playing modes, LEVEL HOLD 1, LEVEL HOLD 2 and ONE-SHOT can be selectable by connecting VDD to OSH and/or LH accordingly.

○ LEVEL HOLD 1

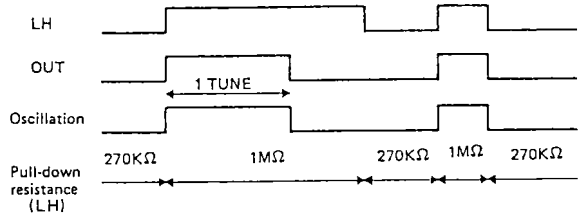
The melody starts and plays repeatedly while both OSH and LH are connected to VDD. In this mode, the play stops halfway by releasing LH from VDD during the play.

* OSH and LH must be connected to VDD at the same time by the same switch.



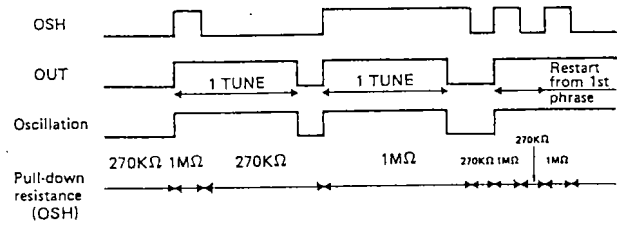
○ LEVEL HOLD 2

The melody starts and plays once during LH is connected to VDD. In this mode, the play stops halfway by releasing LH from VDD even if during the play.



○ ONE-SHOT

The melody starts and plays once completely when the OSH connected to VDD, regardless of the input trigger pulse length. In case trigger pulse is input on OSH again during the play, the melody restarts from the first phrase and plays.



■ POWER SAVE FUNCTION

The M1105 series has the Oscillation stop function after the play and the Shifting function of resistance value depending on input level ("H" level or "L" level) as shown above Time Chart. These 2 functions save idle power consumption and realize long-life of battery.

○ The Oscillation stop function ..... When the play ends, oscillation stops and circuits return to the stand-by condition regardless of input level of OSH and LH. In this mode, the current consumption is less than 3.3 μA (Max.).

○ The Shifting function of Pull-down resistance value ..... The pull-down resistance of OSH and LH is shifted as below (depending on input level, "H" or "L" level);

During VDD ("H" level) ..... 1 MΩ/1 input

During Vss ("L" level) ..... 270 KΩ/1 input

In case of Cds switch, the value of pull-down resistance is shifted about 1 MΩ/1 pin when the value of Cds resistance is decreased.

On the contrary, the value of pull-down resistance is about 270 KΩ/1 pin when the value of Cds resistance is increased.

These functions make total resistance value large and save current flow on LSI and Cds.