

■ OVERVIEW

The M1106 series is Melody C-MOS LSI for playing musical tune with LEDs blinking function. 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.

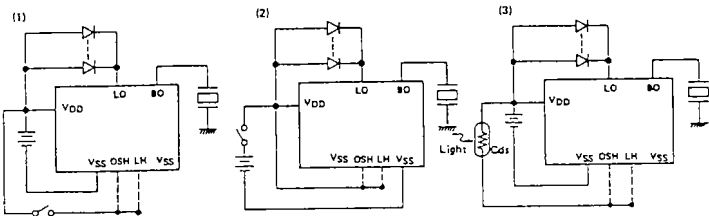
The M1106 series is suitable for low cost and long life of battery module such as Melody Greeting Cards, Toys, and etc.

■ FEATURES

- LEDs blinking function
- Wide range operation voltage (2.0 ~ 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 M1106 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.

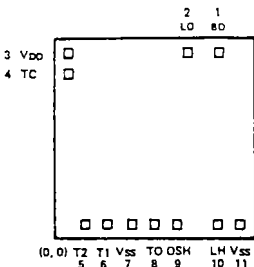
2 pads of OSH and LH should be selected by the playing mode.

BONDING PAD		PLAYING MODE
OSH	LH	
○	○	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

■ PIN OUT



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

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

■ ELECTRICAL CHARACTERISTICS

T_a=25°C, V_{SS}=0V, V_{DD}=3.0V

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V _{DD}		2.0	3.0	3.6	V
Stand-by Current	I _{DD1}	NO PLAYING OSH, LH-OPEN		0.01	0.6	μA
Current Consumption	I _{DD2}	PLAYING BO, LO-OPEN		100	200	μA
Input Current	I _{IL}	V _{in} =0.8V, LH,		9	18	μA
	I _{IH}	V _{in} =2.0V, OSH		9	18	
Output Current (1)	I _{OL1}	V _{OL} =1.0V, BO		4.0		mA
	I _{OH1}	V _{OH} =2.0V, BO		4.0		
Output Current (2)	I _{OL2}	V _{OL} =1.0V, LO		12		mA
	I _{OH2}	V _{OH} =2.0V, LO		8		
Oscillating Frequency	f _{OSC}		35	50	65	kHz
Oscillation Start Voltage	V _{DOB}				2.0	V
Oscillation Stop Voltage	V _{DOS}				2.0	V

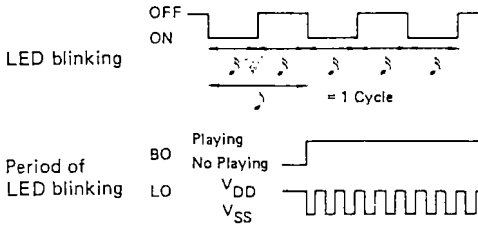
■ COORDINATES

[Unit μm]

NO.	PAD	X	Y	NO.	PAD	X	Y
1	BO	1325	1640	7	Vss	613	150
2	LO	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				

■ LED BLINKING

LEDs blink during playing tune by eighth note cycle.



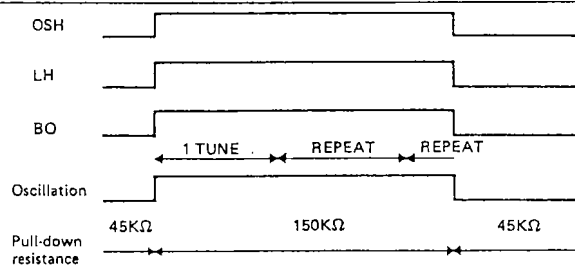
- LED always blinks by eighth note cycle regardless of playing note length during playing tune.

■ PLAYING MODE

The 1106 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.

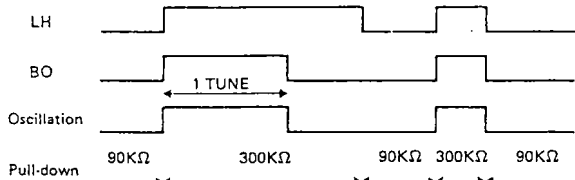
○ LEVEL HOLD 1

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.



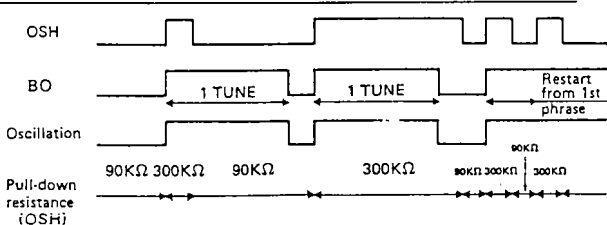
○ LEVEL HOLD 2

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 M1106 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 18.6 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) 300 KΩ/1 input
 During Vss ("L" level) 90 KΩ/1 input

In case of Cds switch, the value of pull-down resistance is shifted about 300KΩ/1 pin when the value of Cds resistance is decreased.

On the contrary, the value of pull-down resistance is about 90KΩ/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.