HT2860
6-Sound Generator

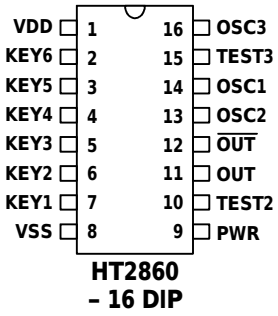
Features

- Single power supply: 2.4V~4.5V
- Low standby current: 1μA (Typ.) at V_{DD}=3V
- Auto power-off function
- Six different sound sections
- K1 to K6 independently chosen or as a cascade control
- Speaker or direct piezo application
- 0.5Hz~1Hz LED flash output
- Minimal external components

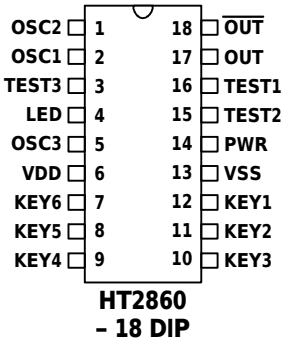
General Description

The HT2860 is a CMOS LSI chip designed for use in sound effect products. It can generate six sections of programmable sounds. The LSI is equipped with tone circuit and control logic to generate various sounds including door bell, alarm, melodies, etc. Users can play not only sound sections (S1~S6) by triggering a single key (K1~K6), but serial sound sections by simultaneously triggering more than one key according to the key priority where K1 is the highest and K6 is the lowest. The customer's sound sample is analyzed and programmed into an internal ROM by changing a mask layer during device fabrication. The HT2860 is suitable for various toy applications.

Pin Assignment



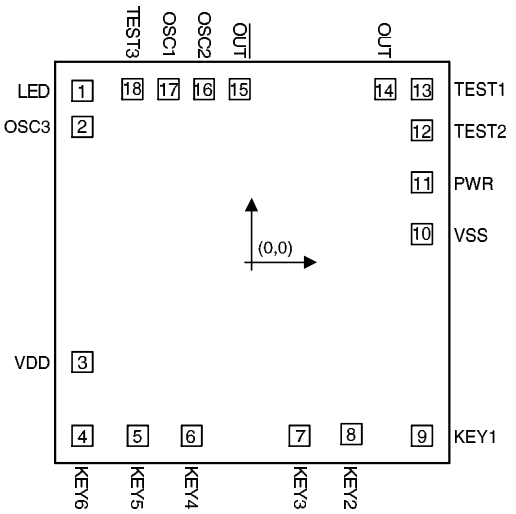
HT2860
– 16 DIP



HT2860
– 18 DIP

Pad Coordinates

Unit: mil

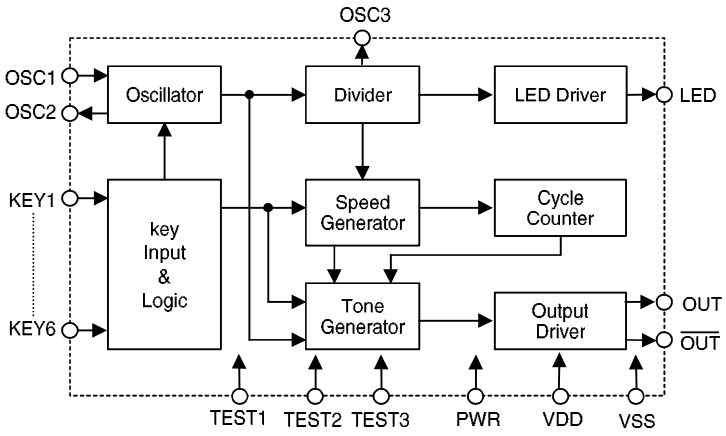


Pad No.	X	Y	Pad No.	X	Y
1	–38.21	39.10	10	38.38	6.38
2	–38.21	30.60	11	38.38	18.10
3	–38.21	–22.44	12	38.38	29.84
4	–38.21	–39.10	13	38.38	39.10
5	–25.71	–39.10	14	30.14	39.10
6	–13.56	–39.10	15	–2.68	39.10
7	10.75	–39.10	16	–10.75	39.10
8	22.91	–39.10	17	–18.83	39.10
9	38.38	–39.10	18	–26.90	39.10

Chip size: 89×90 (mil)^2

∗ The IC substrate should be connected to VDD in the PCB layout artwork.

Block Diagram



Pad Description

Pad No.	Pad Name	I/O	Internal Connection	Description
1	LED	O	Inverter Out	LED flash output
2	OSC3	O	—	Vibration oscillator output
3	VDD	—	—	Positive power supply
4	KEY6	I	Pull-Low	KEY6 input, high active
5	KEY5	I	Pull-Low	KEY5 input, high active
6	KEY4	I	Pull-Low	KEY4 input, high active
7	KEY3	I	Pull-Low	KEY3 input, high active
8	KEY2	I	Pull-Low	KEY2 input, high active
9	KEY1	I	Pull-Low	KEY1 input, high active
10	VSS	—	—	Negative power supply, GND
11	PWR	I	—	Power on reset
12	TEST2	I/O	—	For IC test only
13	TEST1	I/O	—	For IC test only
14	OUT	O	Inverter Out	Sound output, normally low at the standby state
15	$\overline{\text{OUT}}$	O	Inverter Out	Sound output, out of phase to pad 14
16	OSC2	O	—	Oscillator output
17	OSC1	I	—	Oscillator input
18	TEST3	I/O	—	For IC test only

Absolute Maximum Ratings*

Supply Voltage ..... –0.3V to 5V

Input Voltage..... V_{SS}–0.3 to V_{DD}+0.3V

Storage Temperature..... –50°C to 125°C

Operating Temperature..... 0°C to 70°C

*Note: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damageto the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

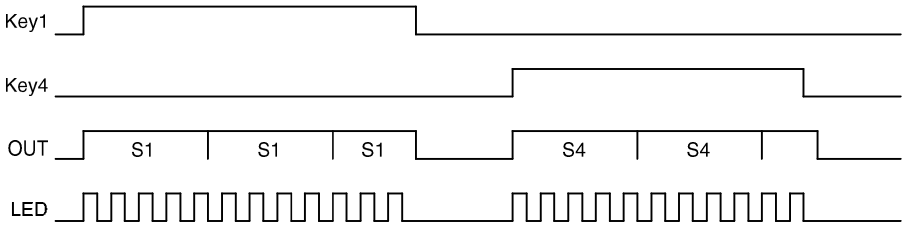
Electrical Characteristics

(Ta=25°C)

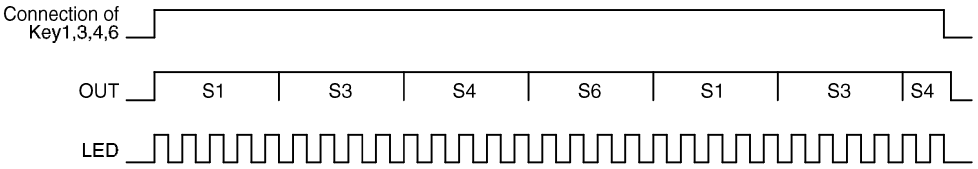
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V_{DD}	Operating Voltage	—	—	2.4	3	4.5	V
I_{STB}	Standby Current	3V	—	—	1	5	μA
I_{DD}	Operating Current	3V	No load	—	100	200	μA
I_{OH}	OUT Source Current	3V	V_{OH}=2.5V	–1	–2	—	mA
I_{OL}	OUT Sink Current	3V	V_{OL}=0.5V	1	2	—	mA
I_{LED}	LED Source Current	3V	V_{OH}=2.5V	–0.7	–1.5	—	mA
f_{SYS}	Oscillator Frequency	3V	R_{OSC}=120kΩ	—	128	—	kHz
V_{IH}	"H" Input Voltage	3V	—	2.4	—	—	V
V_{IL}	"L" Input Voltage	3V	—	—	—	0.6	V

Timing Diagram

Key1~Key6 Independent output



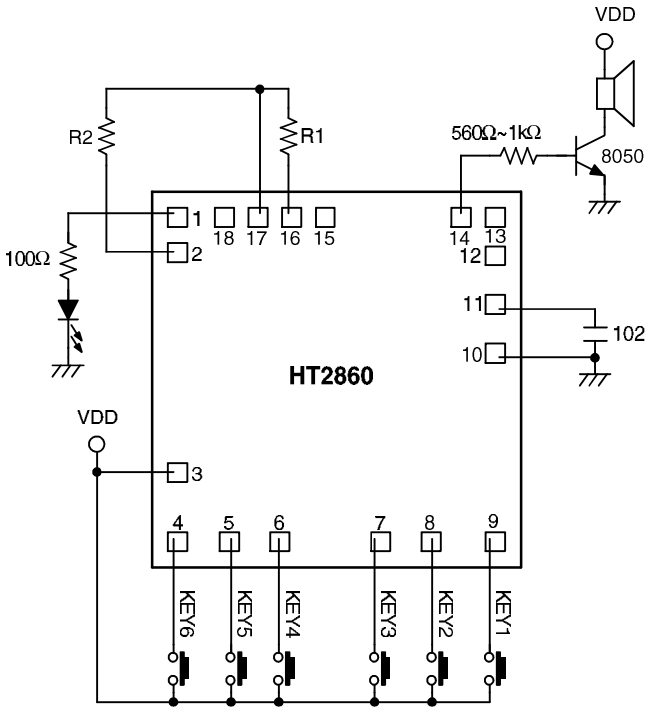
Key1~Key6 Cascade output



Application Circuits

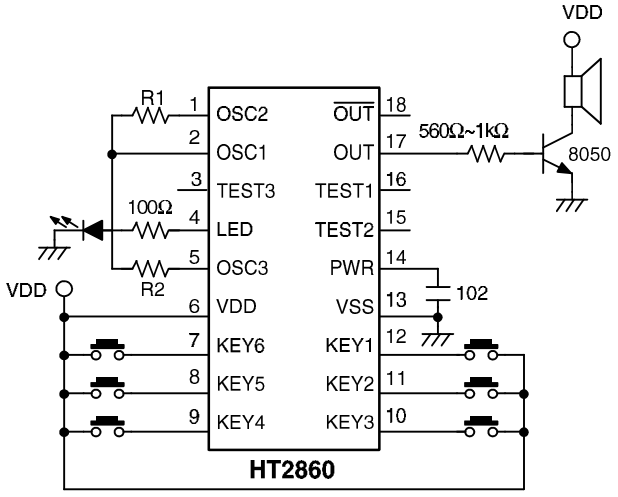
Speaker application

• Chip form

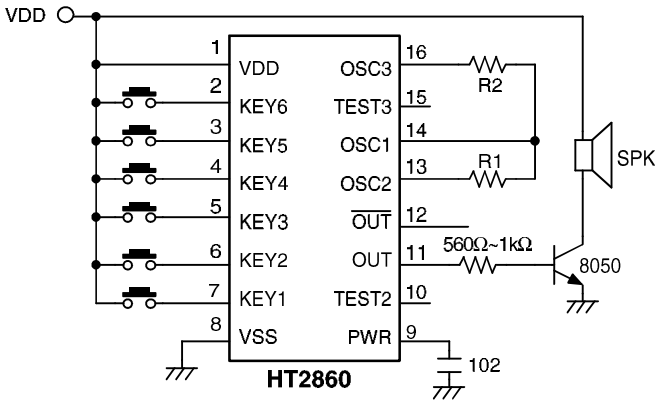


∗ The IC substrate should be connected to VDD in the PCB layout artwork.

• 18-Pin DIP

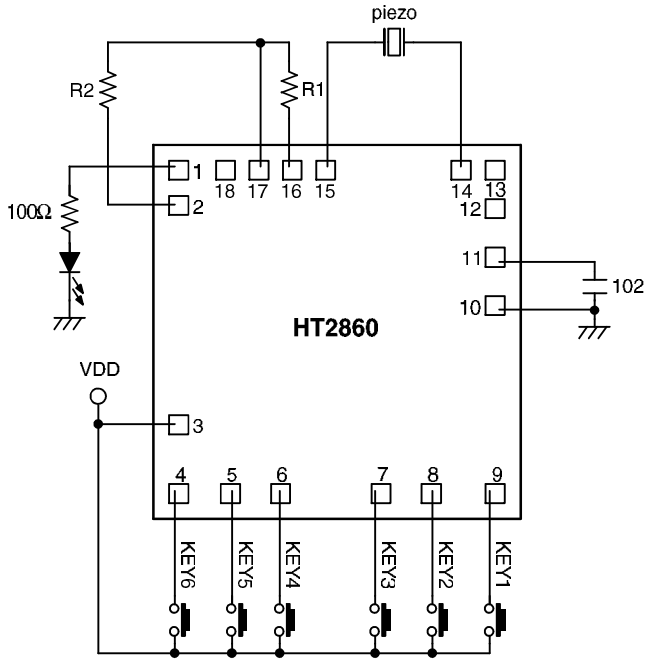


• 16-Pin DIP



Piezo application

• Chip form



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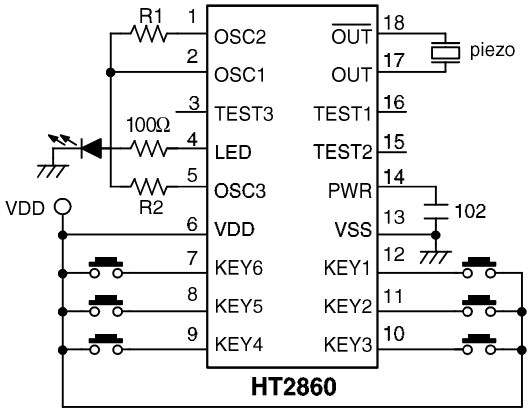
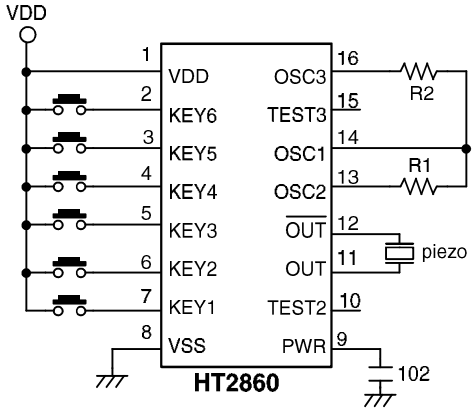
• 18-Pin DIP

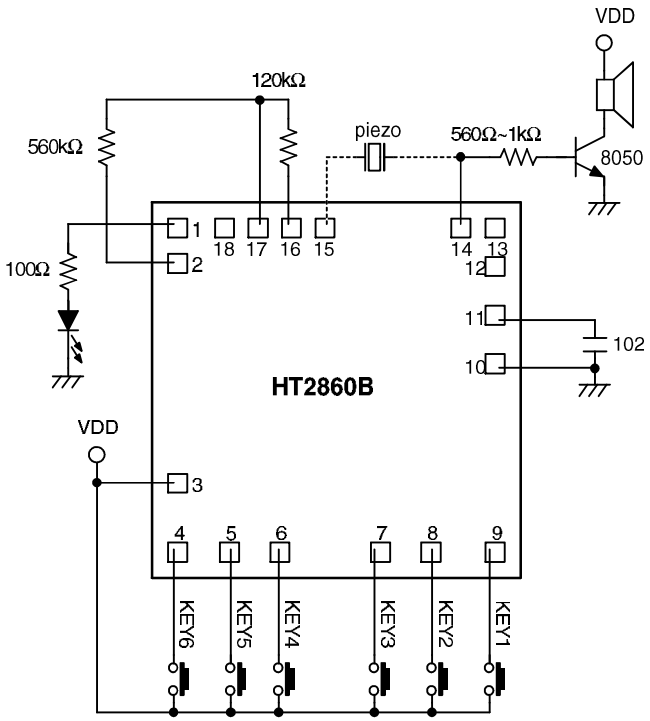


• 16-Pin DIP



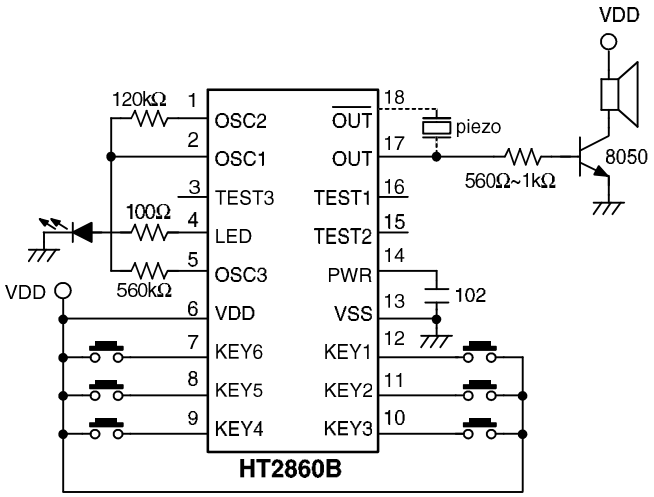
Application Circuits (HT2860B — Six Alarm Sounds)

• Chip form



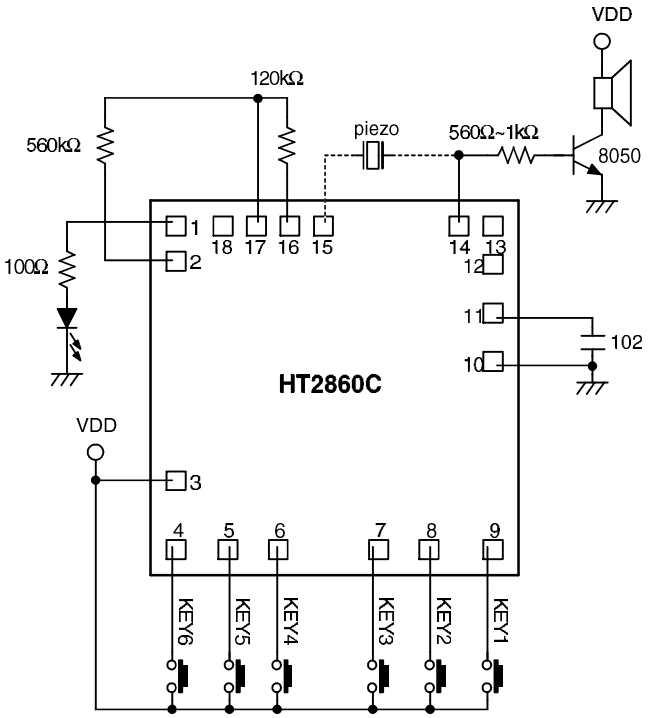
∗ The IC substrate should be connected to VDD in the PCB layout artwork.

• 18-Pin DIP



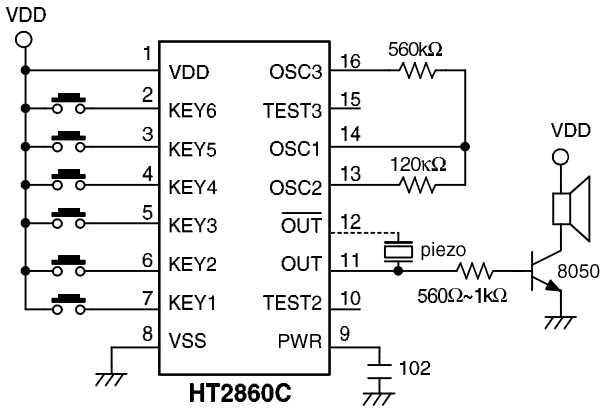
Application Circuits (HT2860C — Six Alarm Sounds)

• Chip form



* The IC substrate should be connected to VDD in the PCB layout artwork.

• 16-Pin DIP



K1: Alarm Sound (1)
K2: Alarm Sound (2)
K3: Alarm Sound (3)
K4: Alarm Sound (4)
K5: Horn
K6: Ambulance