

#### 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

multaneously triggering more than one key ac-

cording 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 suit-

- Speaker or direct piezo application
- 0.5Hz~1Hz LED flash output
- Minimal external components

able for various toy applications.

# **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 si-

### **Pin Assignment**

	1	16	□ osc3			
КЕҮ6	2	15	🗆 ТЕЅТЗ			
KEY5	3	14	□ osc1			
KEY4	4	13	□ OSC2			
КЕҮЗ 🗖	5	12				
KEY2	6	11	🗆 Ουτ			
KEY1	7	10	TEST2			
vss 🗆	8	9	🗆 PWR			
HT2860						
- 16 DIP						

osc2 □	1	0	18					
OSC1 🗆	2		17	ουτ				
TEST3 🗆	3		16	🗆 TEST1				
LED 🗆	4		15	TEST2				
OSC3 🗆	5		14	🗆 PWR				
VDD 🗆	6		13	⊐vss				
KEY6 🗆	7		12					
KEY5 🗆	8		11					
KEY4 🗆	9		10	🗆 КЕҮЗ				
HT2860								

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Unit: mil

# **Pad Coordinates**



Pad No.	x	Y	Pad No.	х	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

hip size: 
$$89 imes 90$$
 (mil)

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

### **Block Diagram**



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# **Pad Description**

Pad No.	Pad Name	I/O	Internal Connection	Description
1	LED	0	Inverter Out	LED flash output
2	OSC3	0		Vibration oscillator output
3	VDD	_		Positive power supply
4	KEY6	Ι	Pull-Low	KEY6 input, high active
5	KEY5	Ι	Pull-Low	KEY5 input, high active
6	KEY4	Ι	Pull-Low	KEY4 input, high active
7	KEY3	Ι	Pull-Low	KEY3 input, high active
8	KEY2	Ι	Pull-Low	KEY2 input, high active
9	KEY1	Ι	Pull-Low	KEY1 input, high active
10	VSS	—		Negative power supply, GND
11	PWR	Ι		Power on reset
12	TEST2	I/O		For IC test only
13	TEST1	I/O		For IC test only
14	OUT	0	Inverter Out	Sound output, normally low at the standby state
15	OUT	0	Inverter Out	Sound output, out of phase to pad 14
16	OSC2	0	—	Oscillator output
17	OSC1	Ι	_	Oscillator input
18	TEST3	I/O	_	For IC test only

### **Absolute Maximum Ratings\***

Supply Voltage	–0.3V to 5V
Input Voltage	V <sub>SS</sub> -0.3 to V <sub>DD</sub> +0.3V

Storage Temperature50°C to 1	25°C
Operating Temperature0°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.

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(Ta=25°C)

# **Electrical Characteristics**

Symbol	Donomotor	Test Conditions		Min	<b>T</b>	Man	T
Symbol	Parameter	VDD	Conditions	WIIII.	тур.	Max.	Unit
V <sub>DD</sub>	Operating Voltage	_		2.4	3	4.5	V
I <sub>STB</sub>	Standby Current	3V		_	1	5	μΑ
IDD	Operating Current	3V	No load		100	200	μΑ
Іон	OUT Source Current	3V	Voh=2.5V	-1	-2	_	mA
I <sub>OL</sub>	OUT Sink Current	3V	V <sub>OL</sub> =0.5V	1	2	_	mA
I <sub>LED</sub>	LED Source Current	3V	V <sub>OH</sub> =2.5V	-0.7	-1.5	_	mA
fsys	Oscillator Frequency	3V	$R_{OSC}=120k\Omega$	_	128	_	kHz
V <sub>IH</sub>	"H" Input Voltage	3V	_	2.4	_		V
VIL	"L" Input Voltage	3V	_	_	_	0.6	V

# **Timing Diagram**

# Key1~Key6 Independent output



### Key1~Key6 Cascade output



11th July '97

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# **Application Circuits**

### Speaker application



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

• 18-Pin DIP



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• 16-Pin DIP



- **Piezo application**
- Chip form



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

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• 18-Pin DIP



• 16-Pin DIP



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# Application Circuits (HT2860B — Six Alarm Sounds)

• Chip form

• 18-Pin DIP



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

VDD 120kΩ 1 συτ OSC2 piezo 2 8050 OSC1 OUT ٩ΛΛ, 560Ω~1kΩ 16 TEST3 TEST1  $\overline{H}$ 100Ω 15 TEST2 LED Ť 14 5 OSC3 PWR VDD Q ⊥ 102 13 VDD vss 12 <del>//</del> 7 KEY1 KEY6 8 11 KEY5 KEY2 кеүз 10 9 KEY4 HT2860B

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# Application Circuits (HT2860C — Six Alarm Sounds)

Chip form



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





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