

Features

- Single power supply: 2.4V~3.3V
- Low standby current: 1μA (Typ.) at V_{DD}=3V
- Auto power-off function
- Eight different sound sections
- KEY2 to KEY8 can be independently or sequentially controlled
- Two kinds of sequential control using the SCAN key (see the timing diagram)
- Level hold or one shot playing
- Speaker or direct piezo application
- Minimum external components

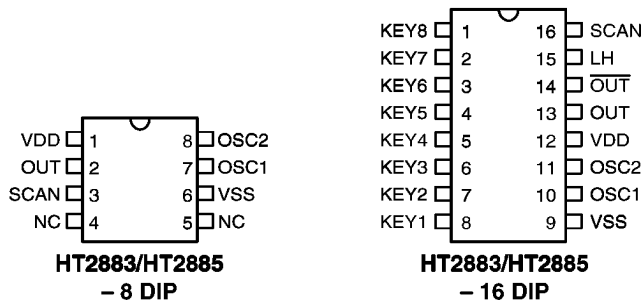
General Description

The HT2883 and HT2885 are CMOS fabricated LSIs designed for use in sound effect products. They can generate eight different sounds from eight different sound sections of programmable sound ROM. The LSIs are equipped with tone circuit, noise circuit, and control logic to generate various sounds including door bell, alarm, melodies, etc. The features of the customer's

sound sample — on CDs, cassette tapes, etc. — can be programmed into an internal ROM by changing a mask layer during device fabrication. The HT2883 and HT2885 are suitable for various toy applications.

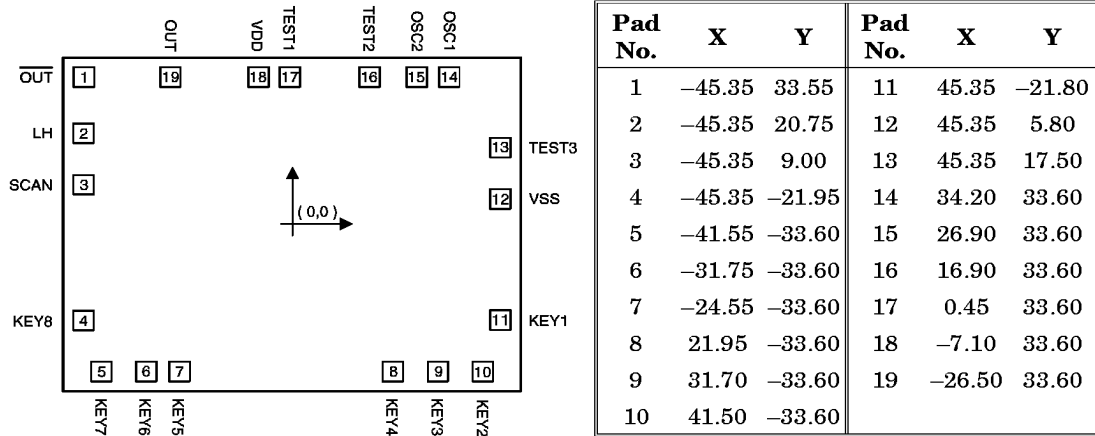
The difference between the HT2883 and HT2885 relies on the SCAN key function (refer to the timing diagram).

Pin Assignment



Pad Coordinates

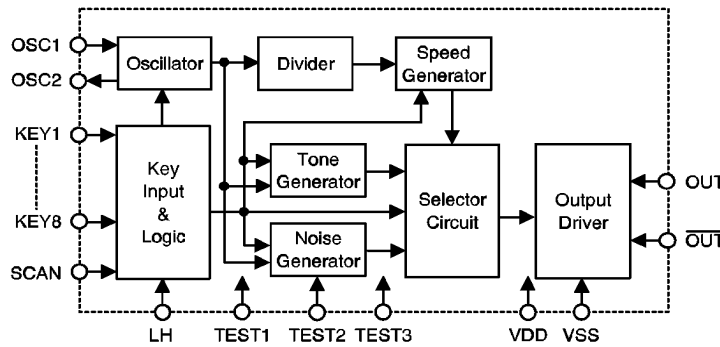
Unit: mil



Chip size: 103 × 79 (mil)²

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

Block Diagram



Pin Description — (16-pin package)

Pin No	Pin Name	I/O	Description
1	KEY8	I	KEY8 input, low active
2	KEY7	I	KEY7 input, low active
3	KEY6	I	KEY6 input, low active
4	KEY5	I	KEY5 input, low active
5	KEY4	I	KEY4 input, low active

Pin No	Pin Name	I/O	Description
6	KEY3	I	KEY3 input, low active
7	KEY2	I	KEY2 input, low active
8	KEY1	I	KEY1 input, low active
9	VSS		Negative power supply, GND
10	OSC1	I	Oscillator input
11	OSC2	O	Oscillator output
12	VDD	—	Positive power supply
13	OUT	O	Sound output
14	$\overline{\text{OUT}}$	O	Sound output, out of phase to pin 13
15	LH	I	Level hold control
16	SCAN	I	Scan key for sequential function of KEY1~KEY8

Absolute Maximum Ratings*

Supply Voltage -0.3V to 5V Storage Temperature..... -50°C to 125°C
 Input Voltage..... $V_{SS}-0.3V$ to $V_{DD}+0.3V$ Operating Temperature..... 0°C to 70°C

*Note: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to 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

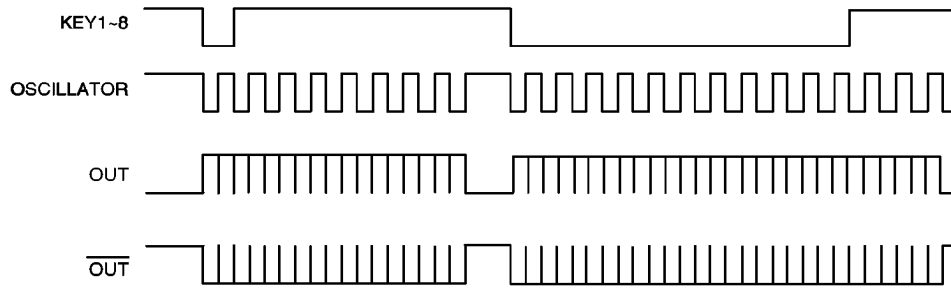
(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{DD}	Conditions				
V _{DD}	Operating Voltage	—	—	2.4	3	3.3	V
I _{STB}	Standby Current	3V	—	—	1	5	μA
I _{DD}	Operating Current	3V	No load	—	300	600	μA
I _{OH}	Output Source Current	3V	V _{OH} =2.5V	-1	-2	—	mA
I _{OL}	Output Sink Current	3V	V _{OL} =0.5V	0.7	2	—	mA
F _{OSC}	Oscillator Frequency	—	R=150kΩ	—	128	—	kHz
V _{IH}	“H” Input Voltage	3V	—	2.4	—	—	V
V _{IL}	“L” Input Voltage	3V	—	—	—	0.6	V

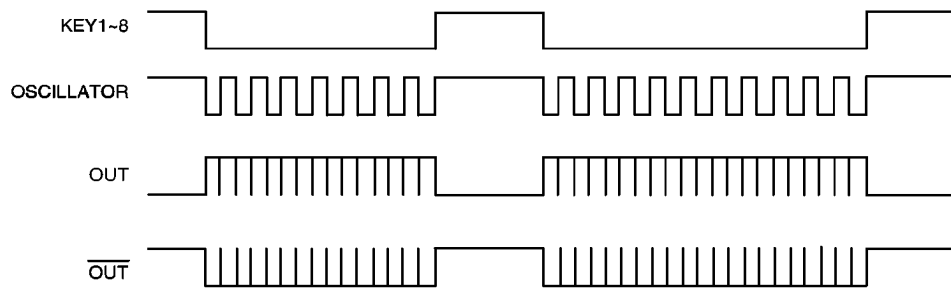
Timing Diagram

KEY~KEY8 trigger

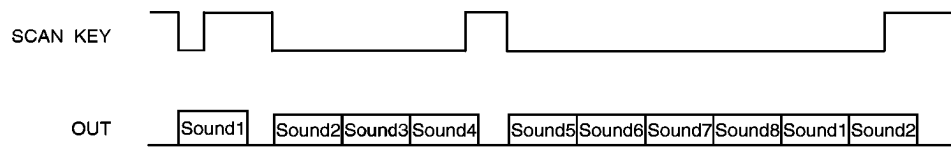
- One shout mode: (LH=Open)



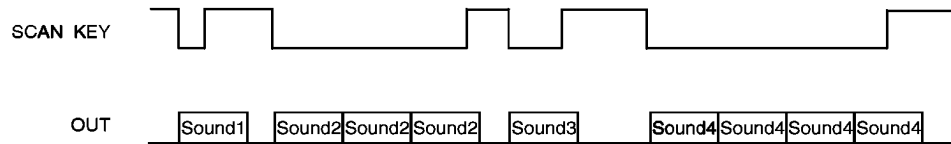
- Level hold mode: (LH=VSS)



Scan key trigger for the HT2883



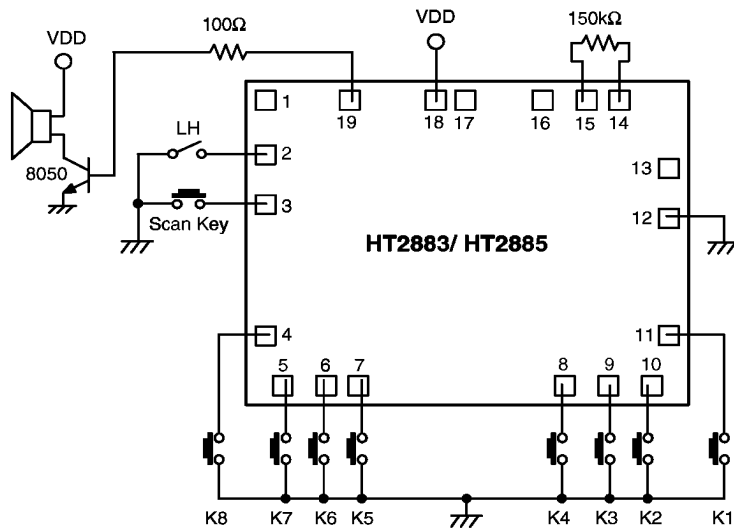
Scan key trigger for the HT2885



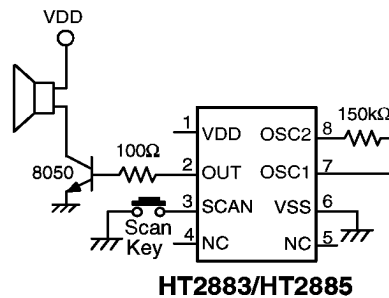
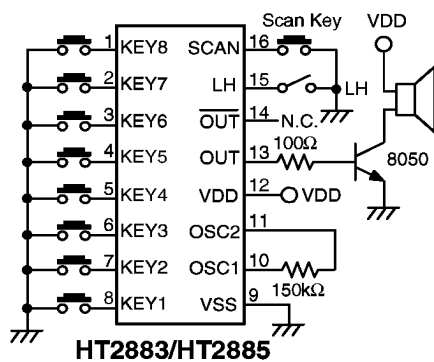
* The function of scan key is independent of LH key.

Application Circuits (HT2883/HT2885 — Eight Toy Gun Sounds)

- Speaker application



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

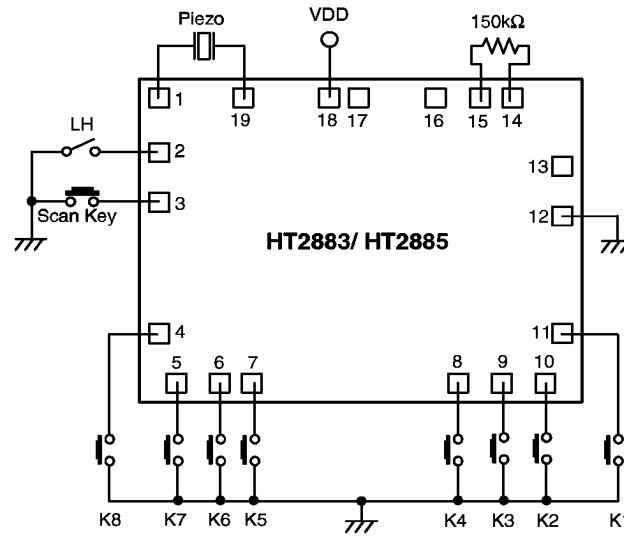


- KEY1: Rifle Gun
- KEY2: Machine Gun 3
- KEY3: TV Game
- KEY4: Dual Tone
- SCAN KEY: Sequential sound from key1 to key8

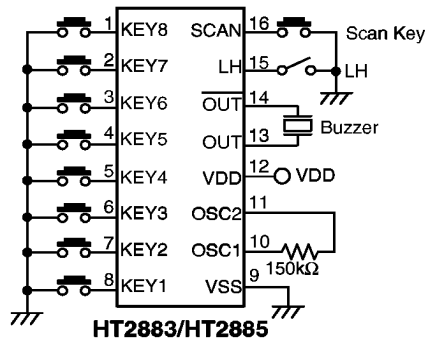
- KEY5: Bombing 2
- KEY6: Bombing 1
- KEY7: Machine Gun 2
- KEY8: Machine Gun 1

Note: See timing diagram for the difference of HT2883/HT2885.

- Piezo application



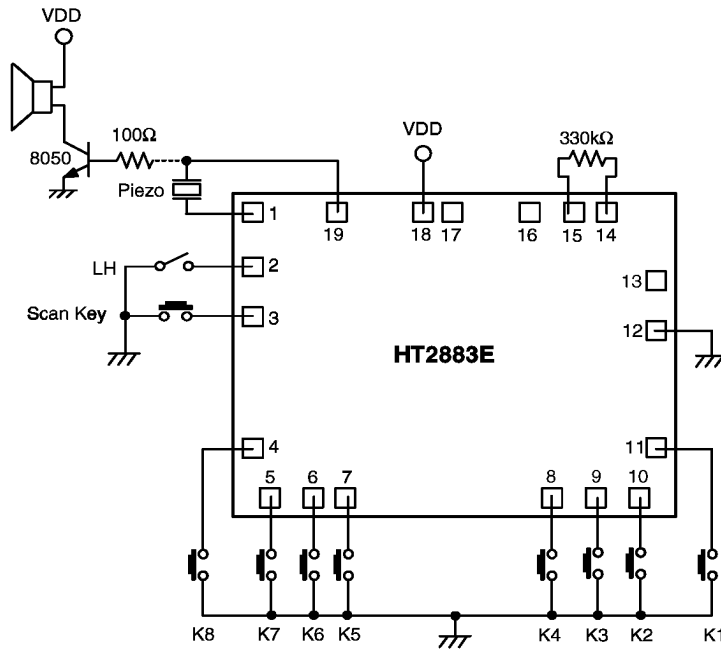
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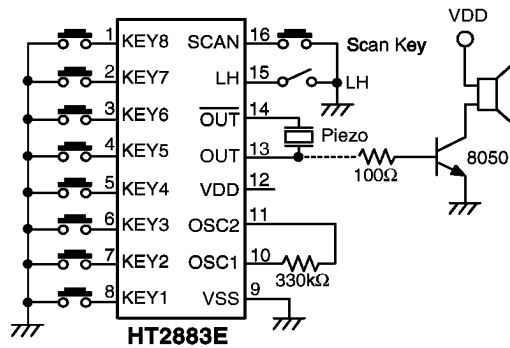
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|--|---------------------|
| KEY1: Rifle Gun | KEY5: Bombing 2 |
| KEY2: Machine Gun 3 | KEY6: Bombing 1 |
| KEY3: TV Game | KEY7: Machine Gun 2 |
| KEY4: Dual Tone | KEY8: Machine Gun 1 |
| SCAN KEY: Sequential sound from key1 to key8 | |

Note: See timing diagram for the difference of HT2883/HT2885.

Application Circuits (HT2883E — Eight Submarine War Sounds)

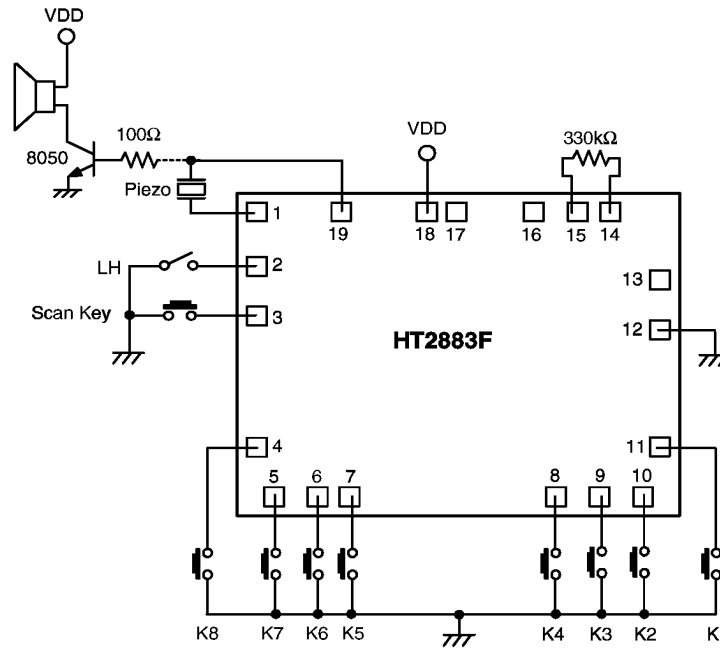


* The IC substrate should be connected to VDD in the PCB layout artwork.

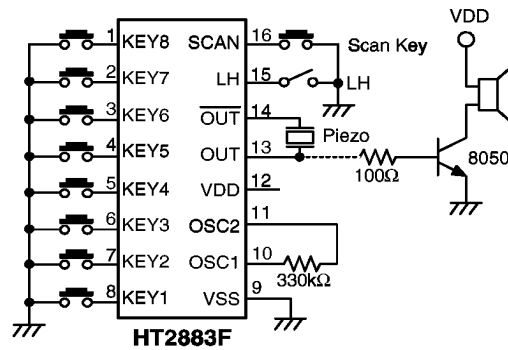


- KEY1: Bonus Music
- KEY2: Game Start Music
- KEY3: Game Over Music
- KEY4: Bombing Sound of Plane
- KEY5: Shooting Sound of Torpedo
- KEY6: Shooting Sound of Missile
- KEY7: "Do" Sound
- KEY8: Explosion Sound
- SCAN KEY: Sequential sound from key1 to key8

Application Circuits (HT2883F — Eight Helicopter War Sounds)

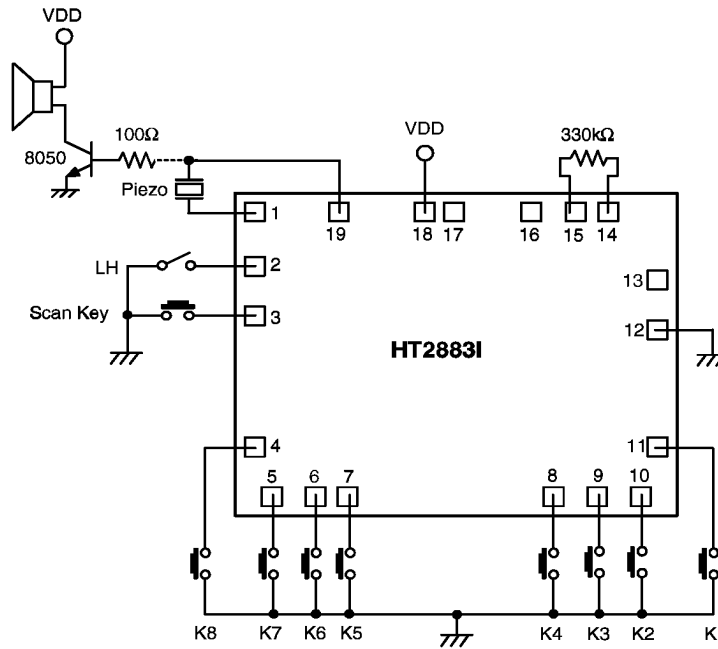


* The IC substrate should be connected to VDD in the PCB layout artwork.

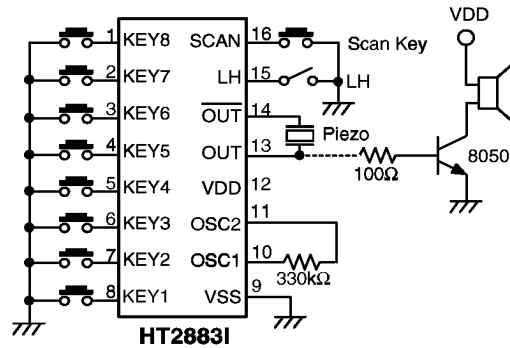


- KEY1: Bonus Music
- KEY2: Game Start Music
- KEY3: Game Over Music
- KEY4: Helicopter Propeller Sound
- KEY5: Bombing Sound
- KEY6: Helicopter Drop Sound
- KEY7: Shooting Sound of Missile
- KEY8: Explosion Sound
- SCAN KEY: Sequential sound from key1 to key8

Application Circuits (HT2883I — Eight Racing Car Sounds)

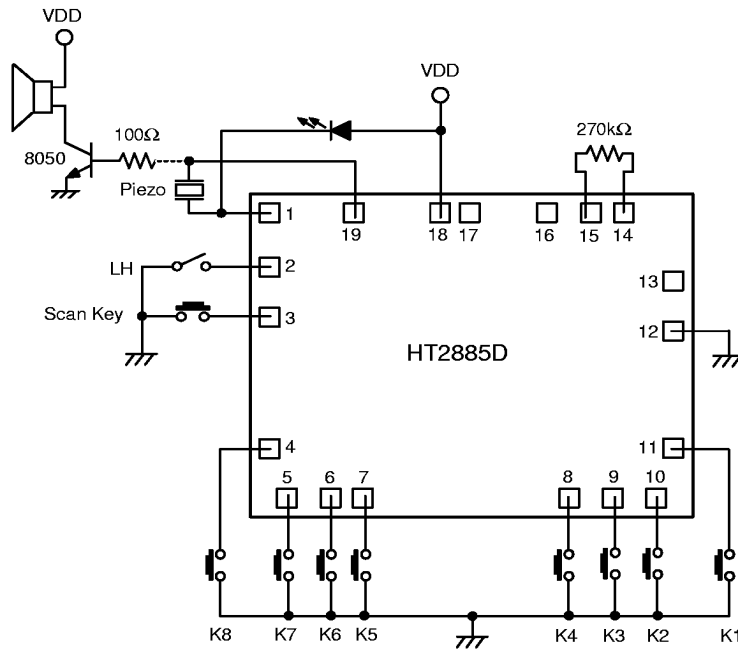


* The IC substrate should be connected to VDD in the PCB layout artwork.

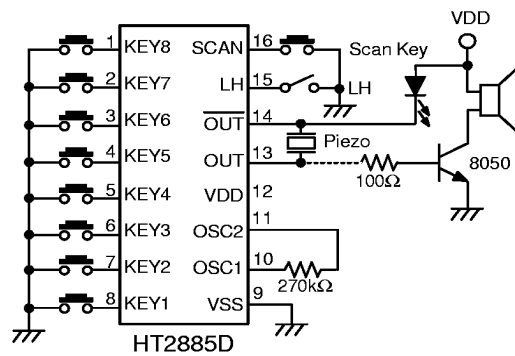


- | | |
|--|--------------------|
| KEY1: Game Start Music | KEY5: Low Speed |
| KEY2: Bonus Music | KEY6: Brake Sound |
| KEY3: Game Over Music | KEY7: Crash Sound |
| KEY4: High Speed | KEY8: Start Engine |
| SCAN KEY: Sequential sound from key1 to key8 | |

Application Circuits (HT2885D — Eight Toy Phone Sounds)



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



- KEY1: Dialing Tone
- KEY2: Key Tone 1
- KEY3: Key Tone 2
- KEY4: Key Tone 3
- KEY5: Redialing Tone
- KEY6: Ringing Tone
- KEY7: Busy Tone
- KEY8: Melody – London Bridge
- SCAN KEY: Sequential sound from key1 to key8

Application Circuits (HT2885F — Eight Toy Phone Sounds)

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

KEY1: Dialing Tone
KEY2: Key Tone 1
KEY3: Key Tone 2
KEY4: Key Tone 3
SCAN KEY: S