# HT2823
Triple Tone Generator

Features

- Single power supply: 2.4V~5.1V
- Low standby current: 1μA (typically at VDD=3V)
- Single, dual or triple tone output
- 128-step D/A output
- Auto power off function
- System clock of 65.5kHz
- Minimal external components
- Built-in envelop control circuit
- Tone frequency programmable

General Description

The HT2823 is a CMOS LSI specially designed for single, dual and triple tone generators. It provides three built-in D/A converters to generate tones.
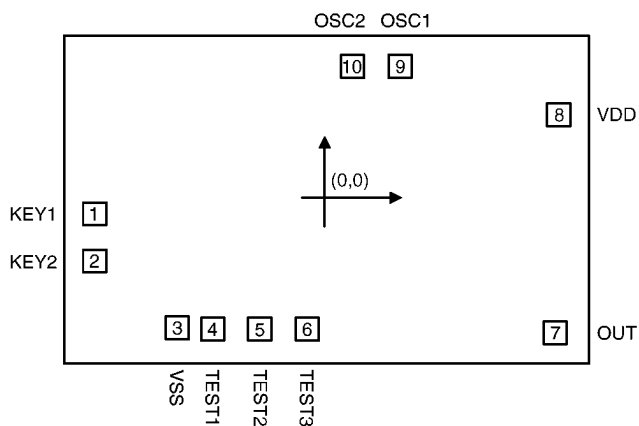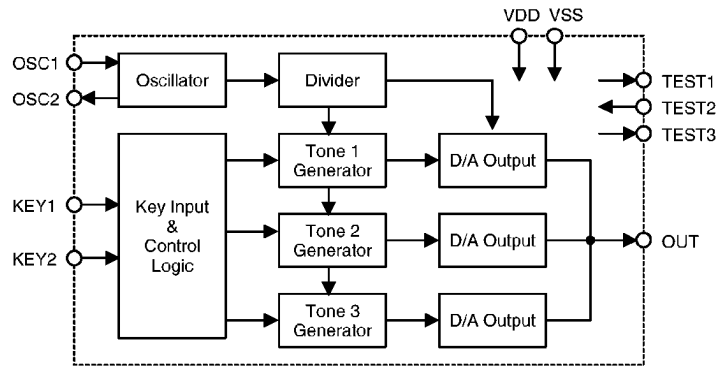
Pin Assignment

HT2823
– 8 DIP/SOP
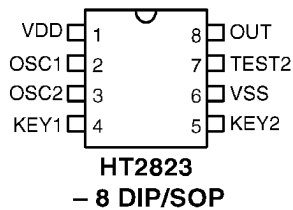
Pad Coordinates

Unit: mil

Pad No.	X	Y
1	–48.32	–3.4
2	–48.32	–13.34
3	–30.94	–27.37
4	–23.55	–27.67
5	–13.64	–27.67
6	–3.66	–27.67
7	48.41	–28.47
8	49.13	17.38
9	15.85	27.58
10	5.91	27.58

Chip size: 109 × 69 $(mil)^2$

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

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Block Diagram

Pad Description

Pad No.	Pad Name	I/O	Internal Connection	Description
1, 2	KEY1, KEY2	I	CMOS Pull-Low	Key tone trigger input, high active. A single tone/dual tone is generated by connecting KEY1 or KEY2 to VDD. If KEY2 and KEY2 are both connected to VDD, a triple tone output is generated.
3	VSS	I	—	Power supply (negative)
4~6	TEST1~ TEST3	I,O	—	For IC test only
7	OUT	O	PMOS Open Drain	Tone signal output to drive a speaker via an NPN transistor for applications
8	VDD	I	—	Power supply (positive)
9	OSC1	I	CMOS	Oscillator input
10	OSC2	O	CMOS	Oscillator output

Absolute Maximum Ratings*

Supply Voltage .... –0.3V to 5.2V

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

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

Operating Temperature............... –20°C to 75°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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Electrical Characteristics

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V_{DD}	Operating Voltage	—	—	2.4	3	5.1	V
I_{STB}	Standby Current	3V	R_{OSC}=430kΩ KEY1 and KEY2 are both open.	—	1	5	μA
I_{DD}	Operating Current	3V	F_{OSC}=65.5kHz No load	—	80	200	μA
I_{IH}	KEY1, KEY2 Input High Current	3V	V_{IH}=3V	3	10	24	μA
I_{OUT}	Max. OUT Output Current (One Channel D/A Output)	3V	V_{OH}=0.6V	−0.9	−1.8	−2.6	mA
V_{IH}	"H" Input Voltage	—	—	$0.8V_{DD}$	—	—	V
V_{IL}	"L" Input Voltage	—	—	0	—	$0.2V_{DD}$	V
F_{OSC}	System Frequency	3V	R_{OSC}=430kΩ	—	65.5	—	kHz

Functional Description
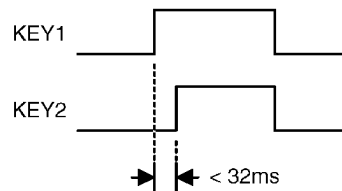
Single tone and dual tone outputs

The single tone (tone1) is generated by connecting KEY1 to VDD. As for the dual tone (tone1 and tone2), it is produced by connecting KEY2 to high. The following table shows the tone frequency as well as the tone duration of HT2823A.

| Key Tone	Frequency	Duration (F_{OSC}=65.5kHz)
Tone1	660Hz	4.5 secs
Tone2	550Hz	4.125 secs
Tone3	440Hz	4.125 secs

Notice the system frequency is 65.5kHz.

Triple tone output

The triple tone (tone1, tone2 and tone3) is generated by connecting both KEY1 and KEY2 to VDD. The frequency of tone3 is 440Hz, and its duration is around 4.125 secs. The time difference for connecting KEY1 and KEY2 to VDD must be less than 32ms.
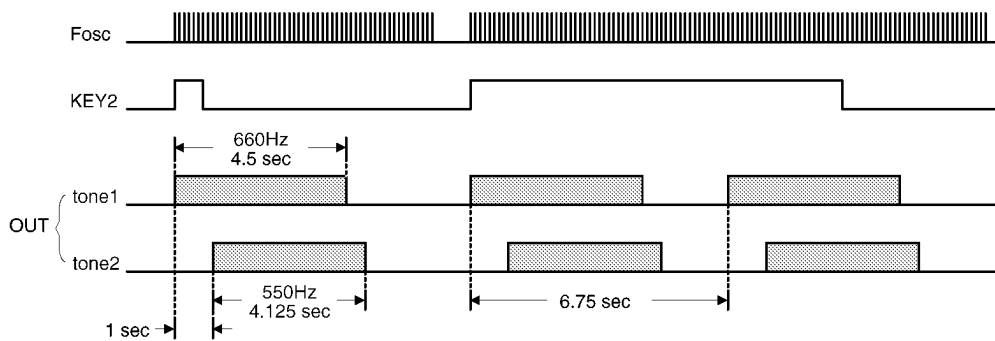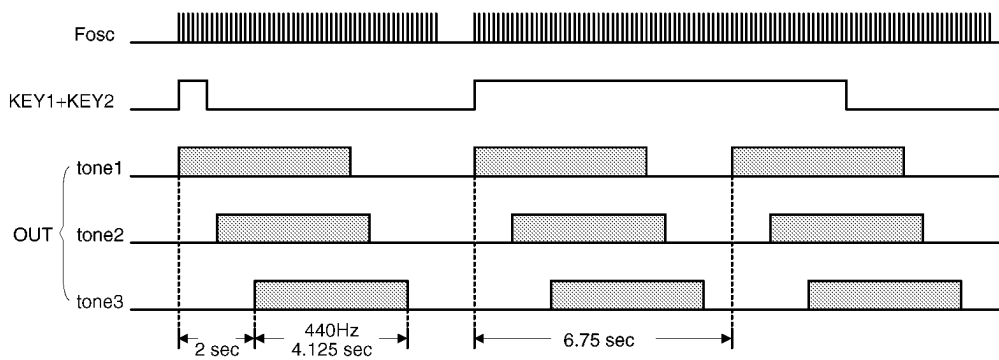

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Timing Diagram (HT2823A)

Single tone
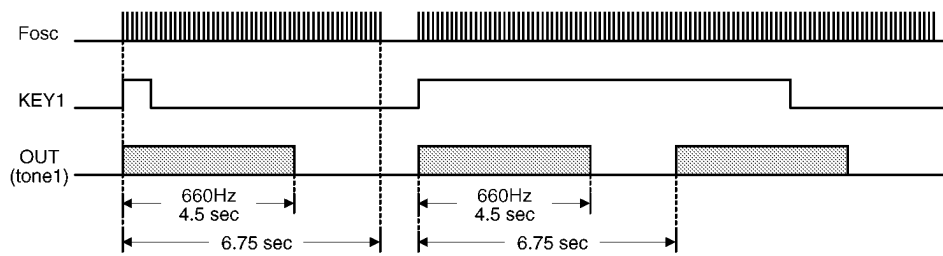
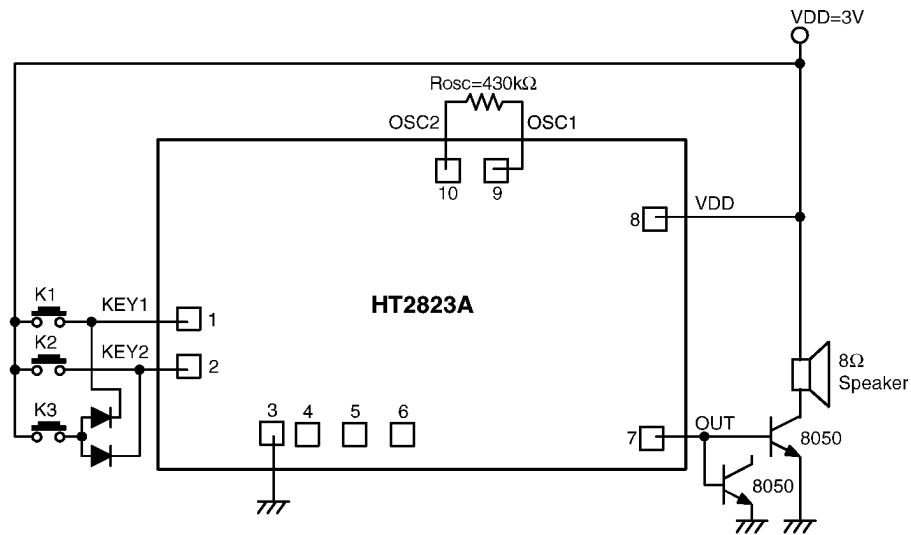

Dual tone

Triple tone

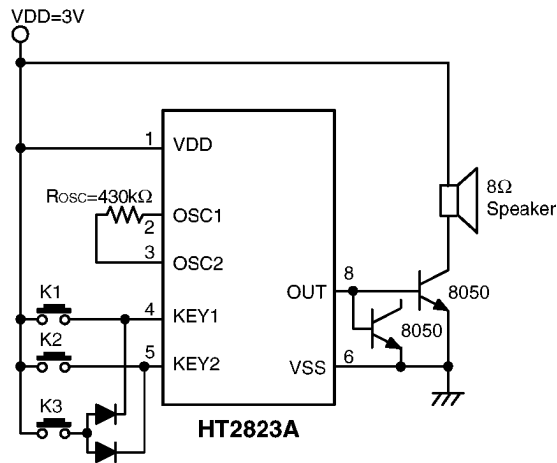* Note: The time of key pressing must be greater than 8ms.

Application Circuits

Chip form

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

Package form

* The output of the HT2823A is a "door bell" sound.

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