HT3015A

15 Latin Rhythm Generator

Features

- Operating Voltage: 2.4V~5.0V
- Directly drive an external transistor
- Low stand-by current

- 15 rhythms triggered by 16 keys
- 3Hz LED flash output
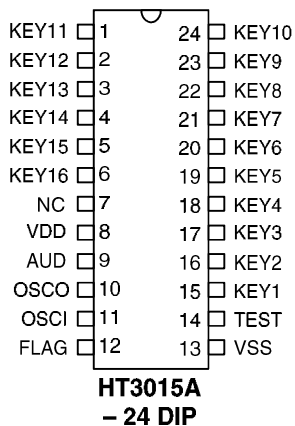- 24 pin dual-in-line package

Applications

- Toys

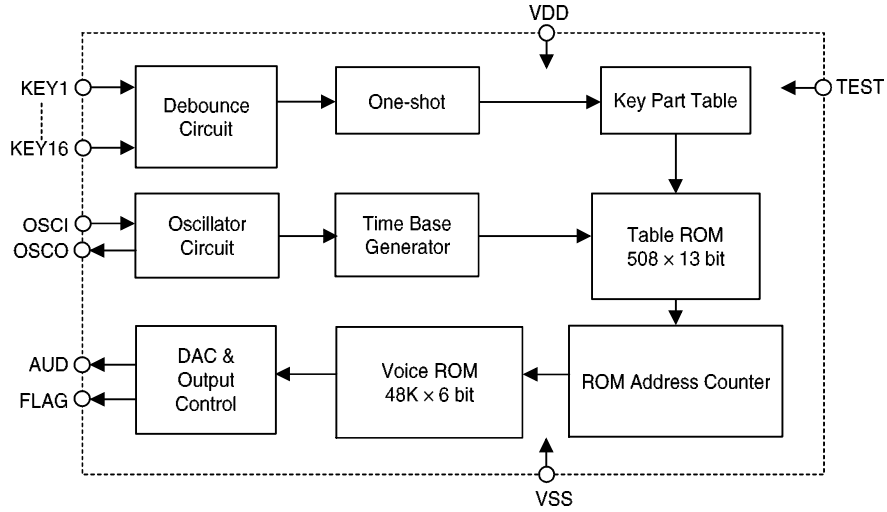- Sound effect generators

General Description

The HT3015A is a single-chip PCM rhythm generator implemented in the CMOS technology. The IC includes 16 keys and can generate 15 kinds of rhythm. While the IC is playing, an LED flashes at a rate of 3Hz. Various types of timbre and rhythm can be generated by coding the internal ROM. The IC is offered in either a dice form or 24 pin dual-in-line package.
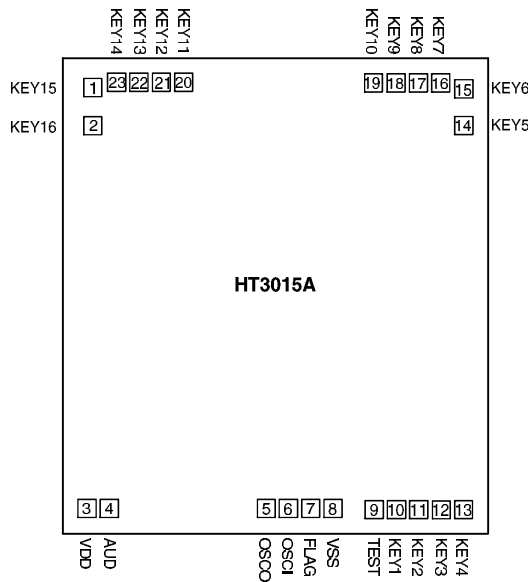
Pin Assignment

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          ┌────────┐
KEY11 ┤1        24├ KEY10
KEY12 ┤2        23├ KEY9
KEY13 ┤3        22├ KEY8
KEY14 ┤4        21├ KEY7
KEY15 ┤5        20├ KEY6
KEY16 ┤6        19├ KEY5
   NC ┤7        18├ KEY4
  VDD ┤8        17├ KEY3
  AUD ┤9        16├ KEY2
 OSCO ┤10       15├ KEY1
 OSCI ┤11       14├ TEST
 FLAG ┤12       13├ VSS
          └────────┘
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HT3015A
– 24 DIP

Block Diagram

Pad Coordinates   Unit: μm

Pad No.	X	Y	Pad No.	X	Y
1	−1528.5	1728.5	13	1545	−1771.5
2	−1528.5	1411.5	14	1547	1414
3	−1577	−1762.5	15	1547	1718.5
4	−1392	−1762.5	16	1355.5	1768.5
5	−91	−1762.5	17	1170.5	1768.5
6	94	−1762.5	18	985.5	1768.5
7	279	−1762.5	19	798	1768.5
8	464	−1762.5	20	−776	1773.5
9	805	−1771.5	21	−961	1773.5
10	990	−1771.5	22	−1146.5	1773.5
11	1175	−1771.5	23	−1331.5	1773.5
12	1360	−1771.5			

Chip size: 3450×3920 (μm)^2

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

Pin Description

Pin No.	Pin Name	I/O	Internal Connection	Description
1~6, 15, 24	KEY1~KEY16	I	Pull-High	Trigger keys, low active, retriggerable keys
7	NC	—	—	No connection
8	VDD	I	—	Positive power supply
9	AUD	O	PMOS Output	Voice output for driving an external transistor
10	OSCO	O	—	Oscillator output pin
11	OSCI	I	—	Oscillator input pin
12	FLAG	O	NMOS Open Drain	3Hz flash, low active output, open drain
13	VSS	I	—	Negative power supply (GND)
14	TEST	I	Pull-High	For IC test only

Absolute Maximum Ratings

Supply Voltage ....−0.3V to 6.0V

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

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

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

Electrical Characteristics

(Ta=25°C)

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
		V_{DD}	Condition				
V_{DD}	Supply Voltage	—	—	2.4	—	5.0	V
I_{DD}	Operating Current	3V	No load	—	200	400	μA
I_{STB}	Stand-by Current	3V	—	—	1	5	μA
I_{AUD}	Max. AUD Output Current	3V	V_{OH}=0.6V	−1.5	−2	—	mA
I_{OL}	FLAG Sink Current	3V	V_{OL}=0.3V	1.5	3.0	—	mA
V_{IL}	"L" Input Voltage	—	—	—	—	0.2V_{DD}	V
V_{IH}	"H" Input Voltage	—	—	0.7V_{DD}	—	—	V
F_{OSC}	System Frequency	3V	R_{OSC}=100K	—	180	—	KHz

Functional Description

KEY2~KEY16

KEY2~KEY16 can individually play a section of the 15 built-in demo-rhythms 4 times continuously. Their corresponding rhythms are as follows:

KEY No.	Rhythm
KEY2	Latin fusion 1
KEY3	Latin fusion 2
KEY4	Latin ballad 1
KEY5	Latin ballad 2
KEY6	Latin ROCK 1
KEY7	Latin ROCK 2
KEY8	Latin fusion 3
KEY9	Samba 1
KEY10	Samba 2
KEY11	Son afro
KEY12	Mambo
KEY13	Latin ROCK 3
KEY14	Rhumba
KEY15	Cha Cha
KEY16	Samba 3

KEY1

KEY1 is a sequential input key. Pressing this key once plays the first rhythm, and re-pressing it plays the second rhythm, and so forth. Any key of KEY2~KEY16 can be pressed to reset KEY1 (return to the first section of the first group).

KEY priority
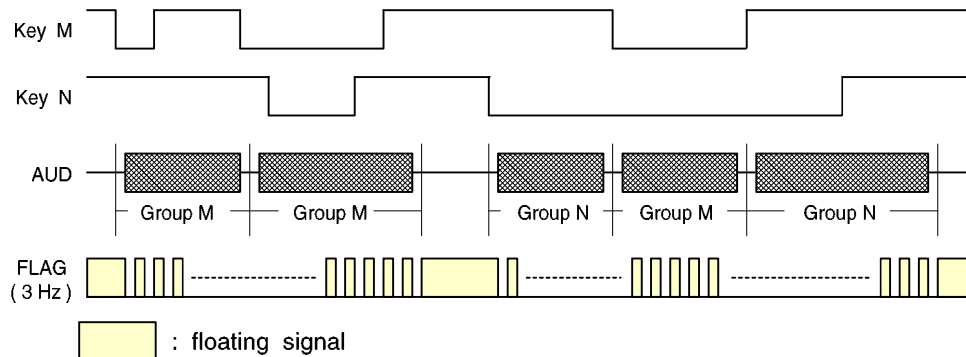
KEY1 > KEY2 > KEY3 > .... > KEY15 > KEY16

KEY features

Pull-high resistance: 100kΩ
Key-in debounce time: 22 ms

FLAG

3Hz flashing LED output during the playing of the IC, active low, NMOS open drain output
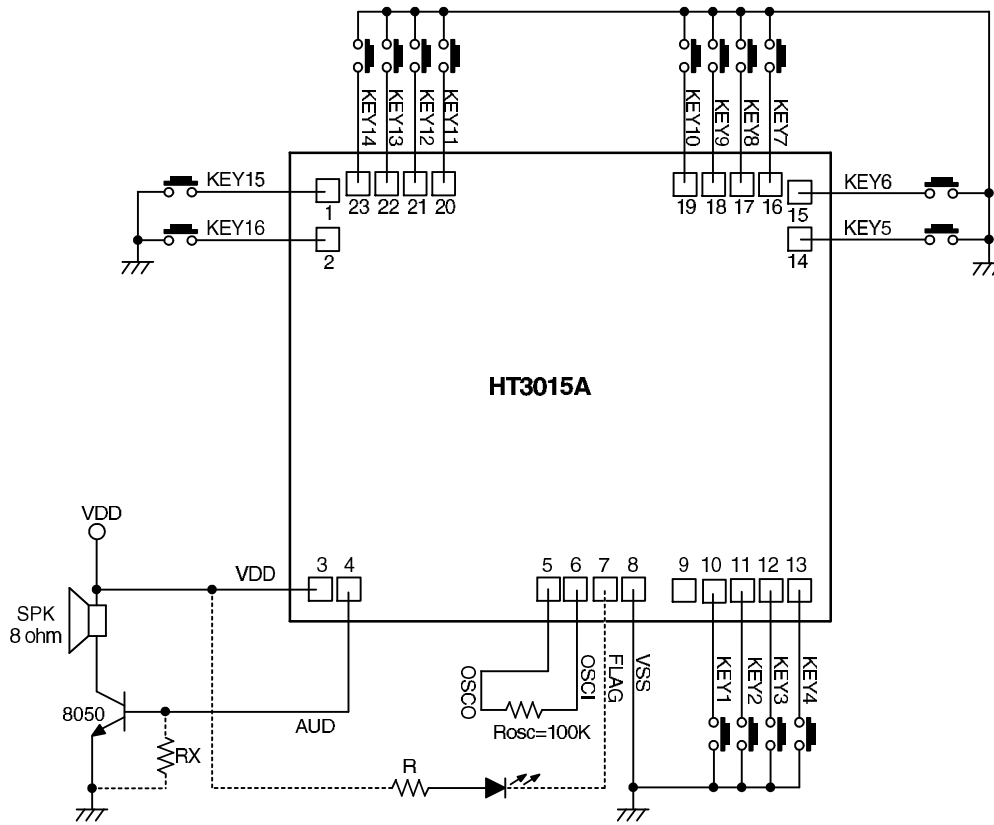
Timing Diagram
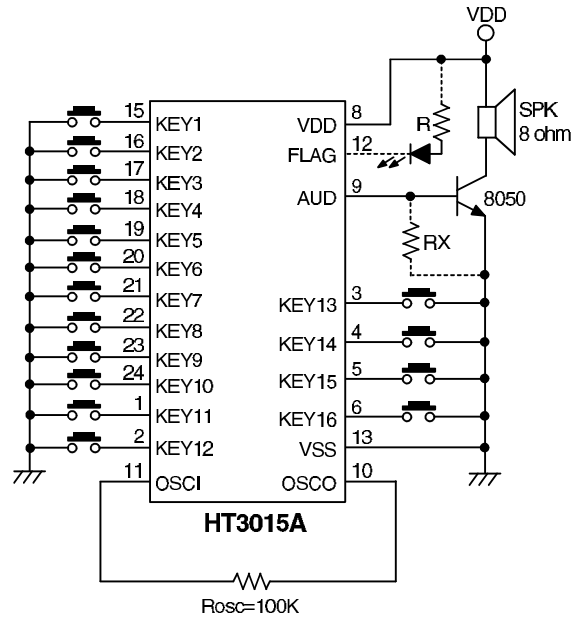

The key priority : Key M > Key N

Application Circuits

Chip form

* Substrate should be connected to VSS in the PCB layout artwork.
  R = 100~330Ω
  RX≅1KΩ for VDD = 4V~5V

Package form

$$R = 100 \sim 330\Omega$$
$$RX \cong 1K\Omega \text{ for VDD=4V} \sim 5V$$