

Features

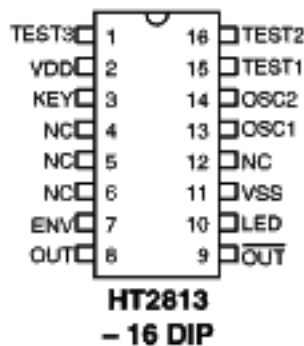
- Single power supply 2.4-3.3V
- Low standby current: 1 μ A (Typ.) at VDD=3
- Speaker or direct buzzer application
- Built-in envelope control circuit
- 1Hz-8Hz programmable LED flash output
- 32 times of sound cycles maximum
- Minimum external components

General Description

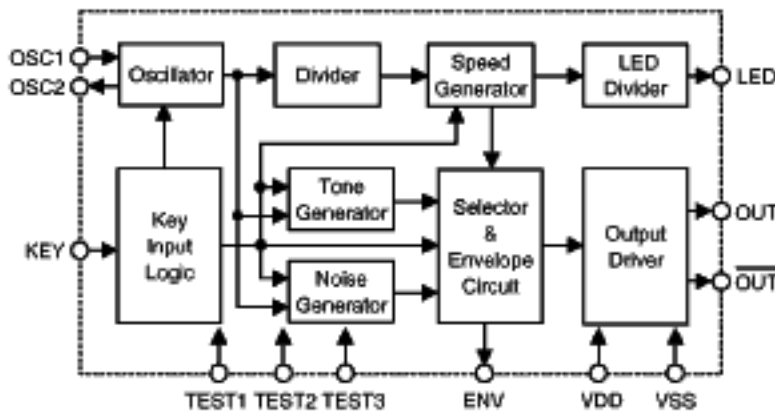
The HT2813 is a CMOS LSI chip designed for use in sound effects products. It is equipped with tone circuit and other control logic to generate different sounds including bird sound, ghost sound, alarm sound, and so forth. The

customer's audio tape can be analyzed and programmed into an internal ROM by changing a mask layer during device fabrication. The HT2813 is suitable for various toy application.

Pin Assignment

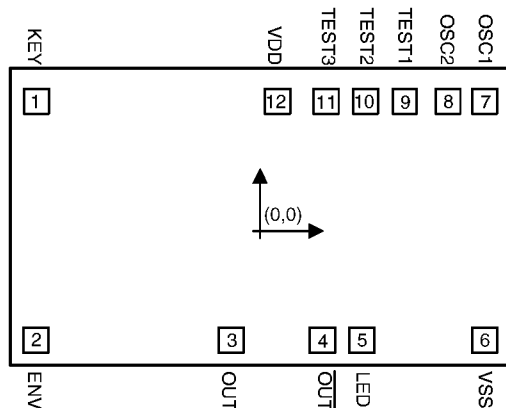


Block Diagram



Pad Coordinates

Unit: mil



| Pad No. | X | Y | Pad No. | X | Y |
|---------|--------|--------|---------|-------|-------|
| 1 | -43.22 | 23.89 | 7 | 43.39 | 23.89 |
| 2 | -43.39 | -23.89 | 8 | 35.74 | 23.89 |
| 3 | -5.65 | -23.89 | 9 | 28.09 | 23.89 |
| 4 | 12.03 | -23.89 | 10 | 20.44 | 23.89 |
| 5 | 19.68 | -23.89 | 11 | 12.79 | 23.89 |
| 6 | 43.39 | -23.89 | 12 | 3.36 | 23.89 |

 Chip size : 98 × 59 (mil)²

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

Absolute Maximum Ratings*

| | | | |
|----------------------|---|----------------------------|----------------|
| Supply Voltage | -0.3V to 5V | Storage Temperature..... | -50°C to 125°C |
| Input Voltage..... | V _{SS} -0.3 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

 (T_a=25°C)

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|------------------|-----------------------|-----------------|-----------------------|------|------|------|------|
| | | V _{DD} | Conditions | | | | |
| V _{DD} | Operating Voltage | 3V | — | 2.4 | 3 | 3.3 | V |
| I _{STB} | Standby Current | 3V | — | — | 1 | 5 | μA |
| I _{DD} | Operating Current | 3V | No load | — | 100 | 300 | μA |
| I _{OH} | Output Source Current | 3V | V _{OH} =2.5V | -1 | -2 | — | mA |
| I _{OL} | Output Sink Current | 3V | V _{OL} =0.5 | 1 | 2 | — | mA |
| I _{ENV} | ENV Source Current | 3V | V _{OH} =2.5V | -1 | -2 | — | mA |
| I _{LED} | LED Source Current | 3V | V _{OH} =2.5V | -1 | -2 | — | mA |
| F _{OSC} | Oscillator Frequency | — | R=56kΩ | — | 256 | — | kHz |
| V _{IH} | “H” Input Voltage | 3V | — | 2.4 | — | — | V |

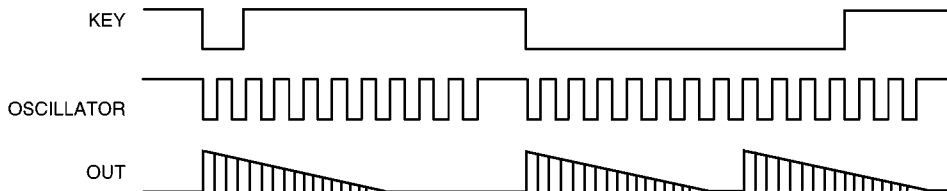
| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|-----------------|-------------------|-----------------|------------|------|------|------|------|
| | | V _{DD} | Conditions | | | | |
| V _{IL} | "L" Input Voltage | 3V | — | — | — | 0.6 | V |

Pin Description

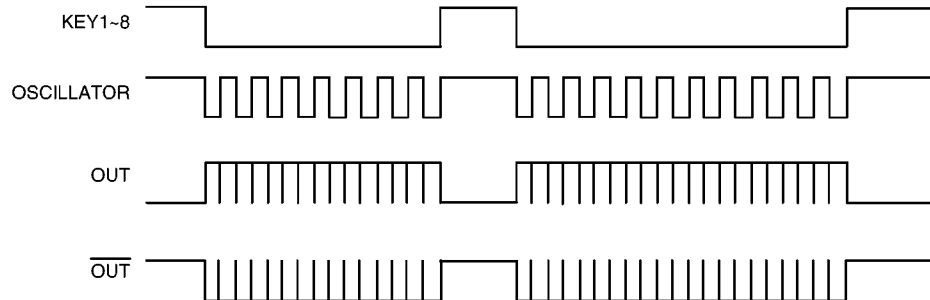
| Pin No. | Pad No. | Pad Name | I/O | Description |
|---------|---------|-------------------------|-----|---|
| 3 | 1 | KEY | I | Key input pad, active low |
| 7 | 2 | ENV | O | Sound envelope effect pad |
| 8 | 3 | OUT | O | Sound output pad |
| 9 | 4 | $\overline{\text{OUT}}$ | O | Sound output pin, out of phase to pad 3 |
| 10 | 5 | LED | O | LED flash output pad |
| 11 | 6 | VSS | — | Negative power supply |
| 13 | 7 | OSC1 | I | Oscillator input pad |
| 14 | 8 | OSC2 | O | Oscillator output pad |
| 15 | 9 | TEST1 | I/O | For IC test only |
| 16 | 10 | TEST2 | I/O | For IC test only |
| 1 | 11 | TEST3 | I/O | For IC test only |
| 2 | 12 | VDD | — | Positive power supply |

Timing Diagram

With an envelope

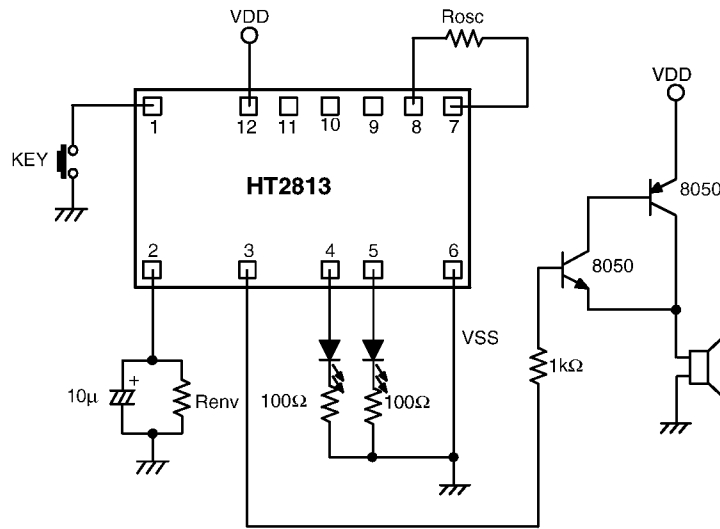


Without an envelope

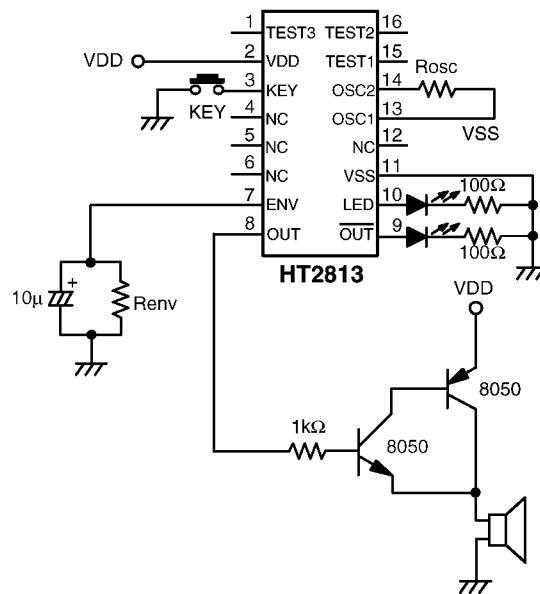


Application Circuits

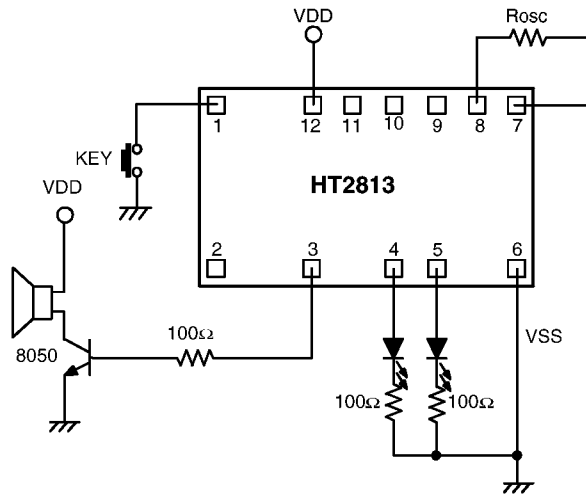
Speaker application with an envelope



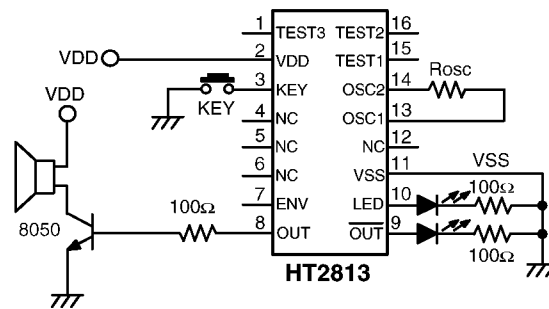
* The IC substrate should be connected to VDD in PCB layout artwork.



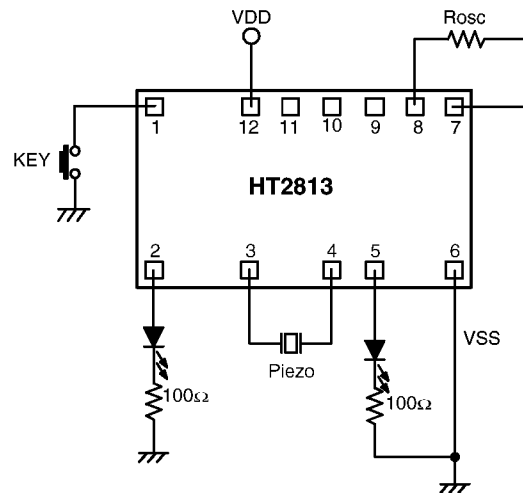
Speaker application without an envelope



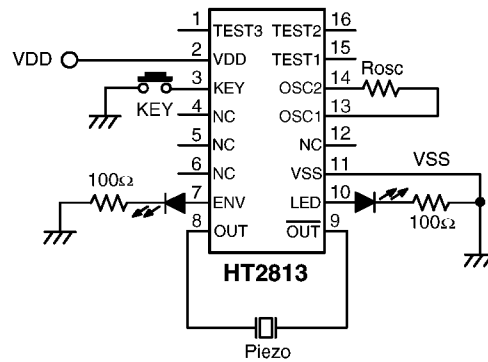
* The IC substrate should be connected to VDD in PCB layout artwork.



Piezo application

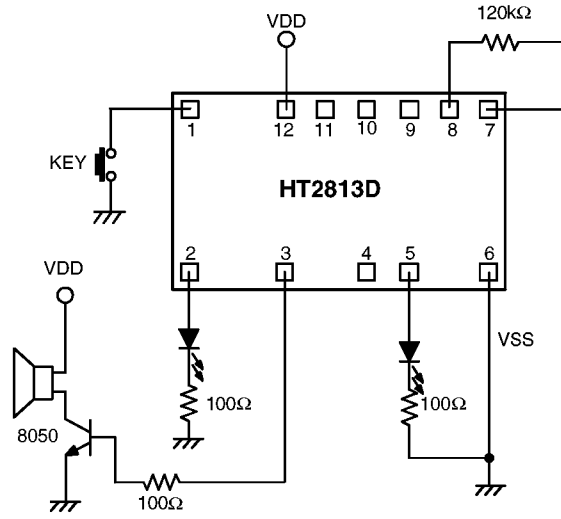


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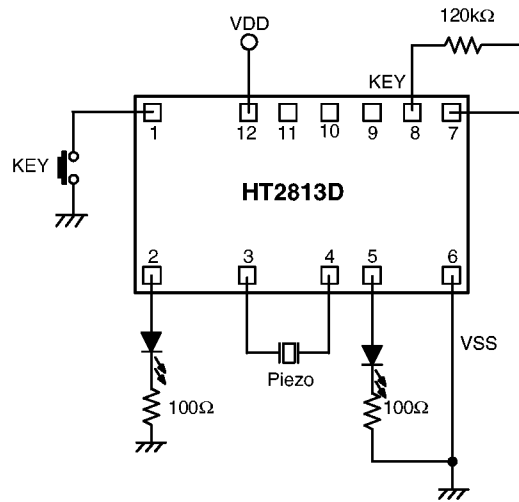


Application Circuit (HT2813D — GHOST)

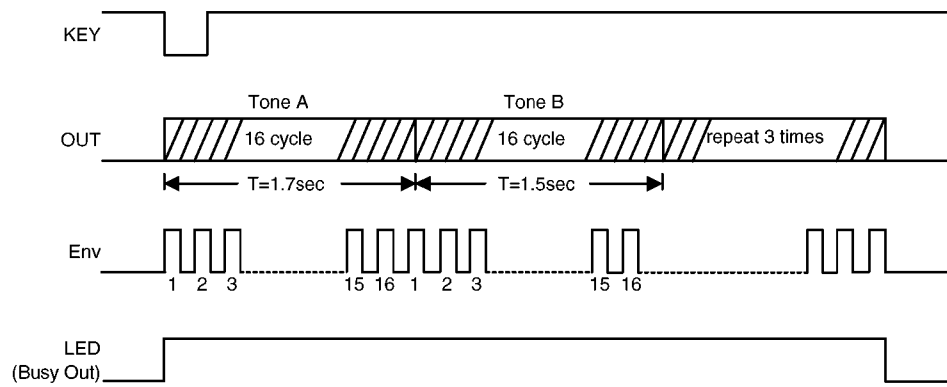
Speaker application



Piezo application

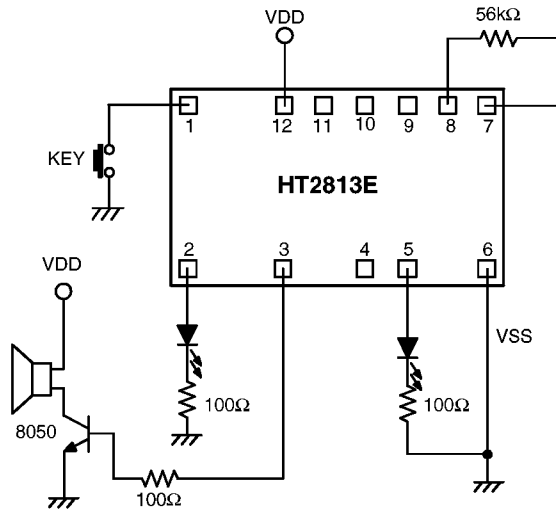


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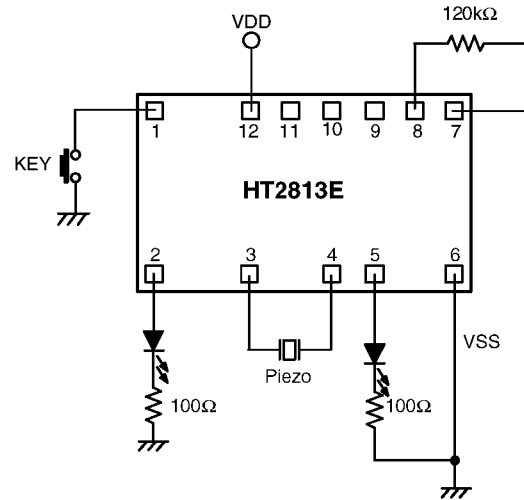


Application Circuit (HT2813E — Bird Song I)

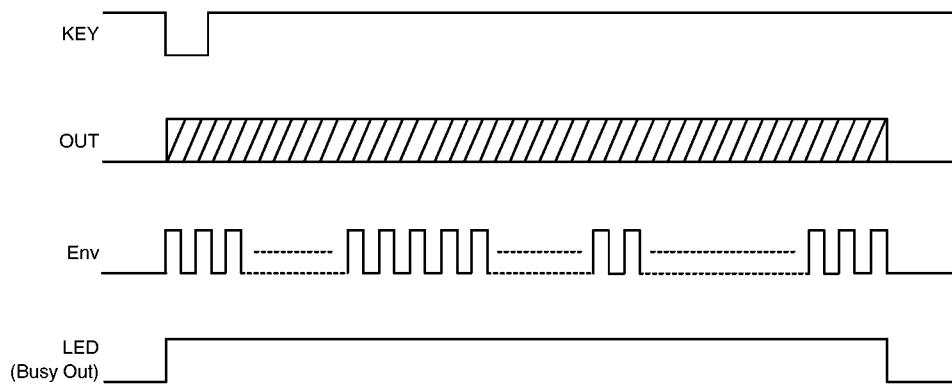
Speaker application



Piezo application

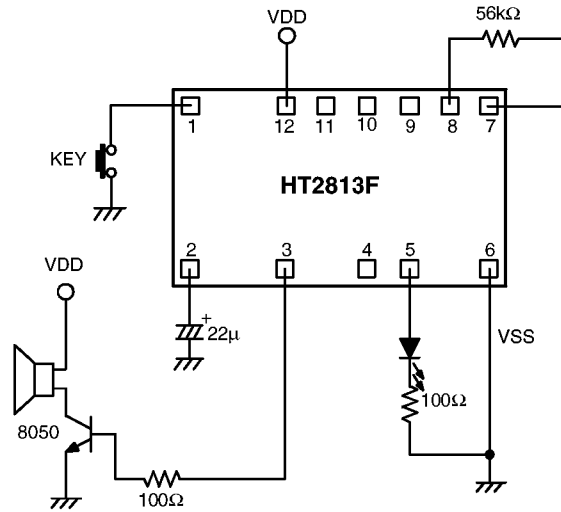


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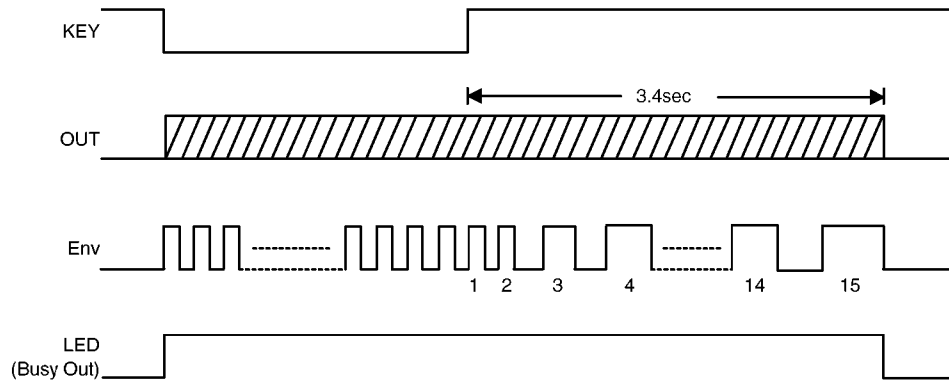


Application Circuit (HT2813F — Bird Song II with an Envelope)

Speaker application with an envelope

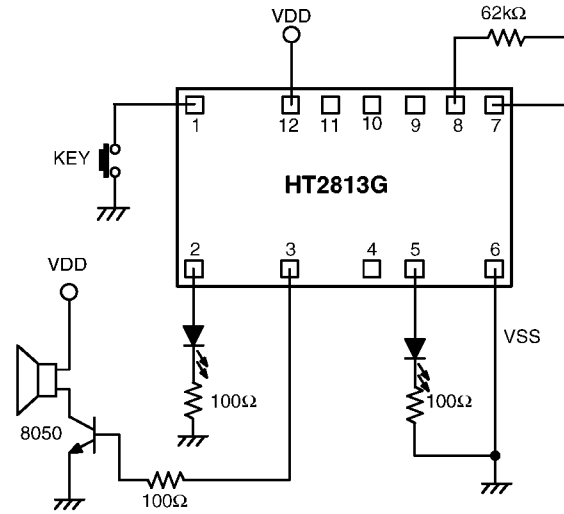


* The IC substrate should be connected to VDD in PCB layout artwork.

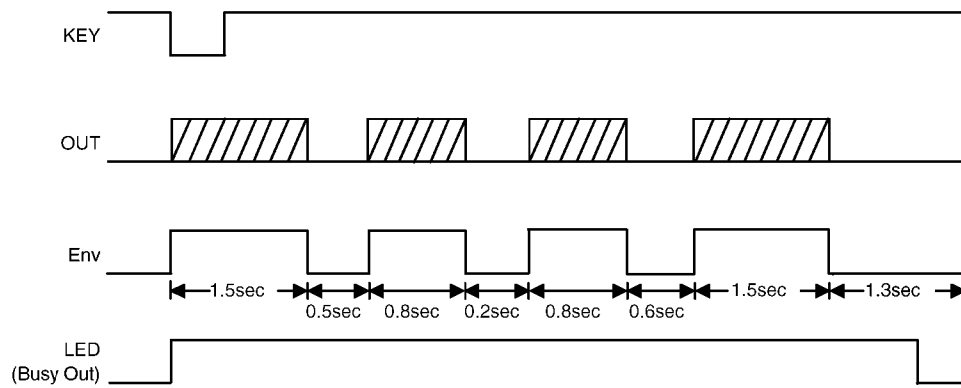


Application Circuit (HT2813G — COW)

Speaker application

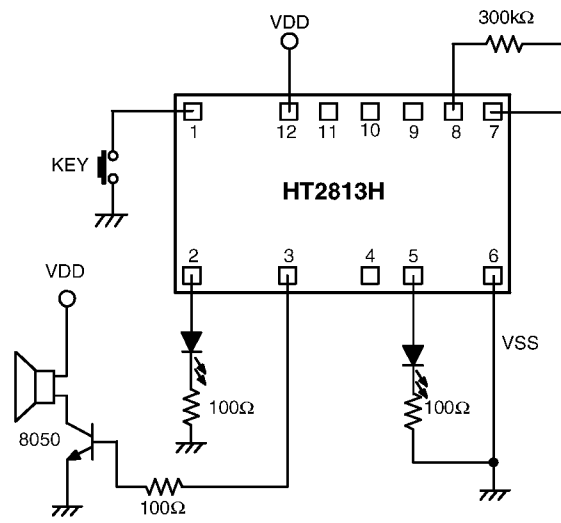


* The IC substrate should be connected to VDD in PCB layout artwork.



Application Circuit (HT2813H — Little Dog)

Speaker application



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

