

### Features

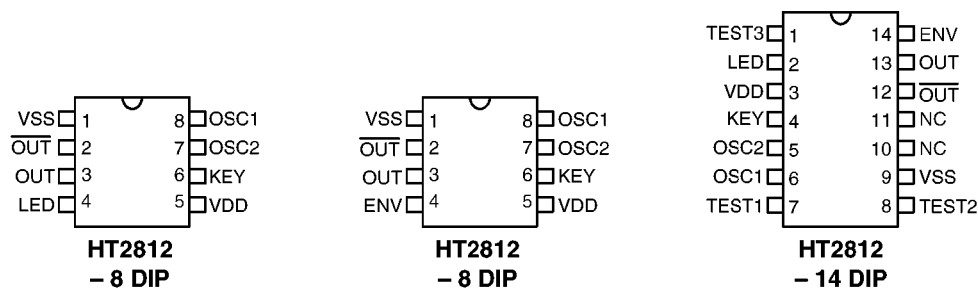
- Single power supply: 2.4V~3.3V
- Low standby current at 3V, 1μA (Typ.)
- Auto power-off function
- Speaker or direct piezo application
- Built-in envelope control circuit
- 1Hz~8Hz programmable LED flash output
- Minimum external components

### General Description

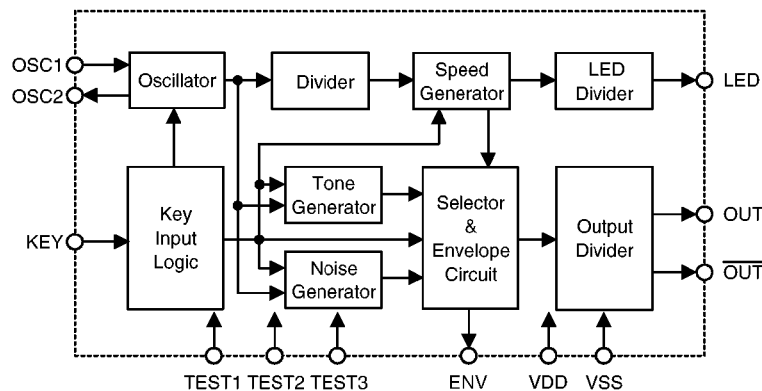
The HT2812 is a CMOS LSI chip designed for use in sound effect products. It is equipped with tone circuit, noise circuit, and other control logic to generate different sounds including rifle gun, machine gun, booming sound, door bell,

alarm etc. The customer supplied sound source can be analyzed and programmed into an internal ROM by changing a mask layer during device fabrication. The HT2812 is suitable for various toy applications.

### Pin Assignment

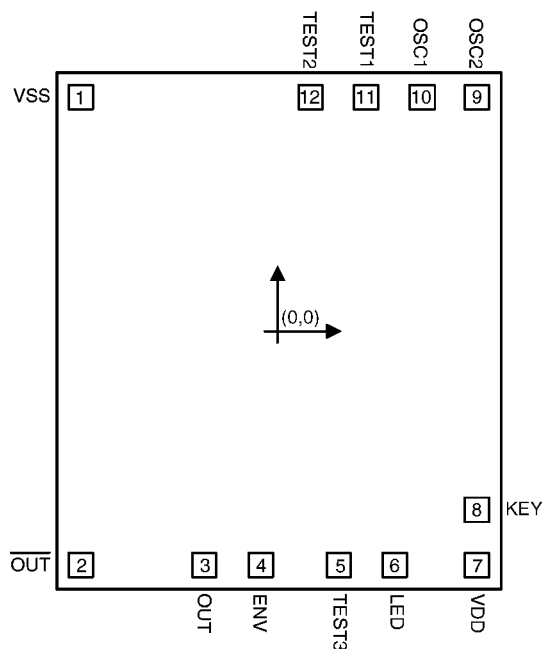


### Block Diagram



**Pad Coordinates**

Unit: mil



| Pad No. | X       | Y      |
|---------|---------|--------|
| 1       | -27.127 | 32.3   |
| 2       | -27.127 | -32.3  |
| 3       | -10.127 | -32.3  |
| 4       | -2.307  | -32.3  |
| 5       | 8.488   | -32.3  |
| 6       | 16.138  | -32.3  |
| 7       | 27.528  | -32.3  |
| 8       | 27.528  | -24.65 |
| 9       | 27.528  | 32.3   |
| 10      | 19.878  | 32.3   |
| 11      | 12.228  | 32.3   |
| 12      | 4.578   | 32.3   |

Chip size :  $67 \times 72 \text{ (mil)}^2$

\* 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 <sub>SS</sub> -0.3 to V <sub>DD</sub> +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)

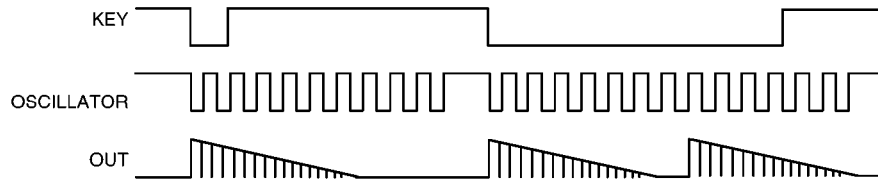
| Symbol           | Parameter             | Test Conditions |                       | Min. | Typ. | Max. | Units |
|------------------|-----------------------|-----------------|-----------------------|------|------|------|-------|
|                  |                       | V <sub>DD</sub> | Conditions            |      |      |      |       |
| V <sub>DD</sub>  | Operating Voltage     | 3V              | —                     | 2.4  | 3    | 3.3  | V     |
| I <sub>STB</sub> | Standby Current       | 3V              | —                     | —    | 1    | 5    | μA    |
| I <sub>DD</sub>  | Operating Current     | 3V              | No load               | —    | 300  | 600  | μA    |
| I <sub>OH</sub>  | Output Source Current | 3V              | V <sub>OH</sub> =2.5V | -1   | -2   | —    | mA    |
| I <sub>OL</sub>  | Output Sink Current   | 3V              | V <sub>OL</sub> =0.5V | 1    | 2    | —    | mA    |
| I <sub>ENV</sub> | ENV Source Current    | 3V              | V <sub>OH</sub> =2.5V | -1   | -2   | —    | mA    |
| I <sub>LED</sub> | LED Source Current    | 3V              | V <sub>OH</sub> =2.5V | -1   | -2   | —    | mA    |
| F <sub>OSC</sub> | Oscillator Frequency  | —               | R=330kΩ               | —    | 64   | —    | kHz   |
| V <sub>IH</sub>  | “H” Input Voltage     | 3V              | —                     | 2.4  | —    | —    | V     |
| V <sub>IL</sub>  | “L” Input Voltage     | 3V              | —                     | —    | —    | 0.6  | V     |

**Pad Description**

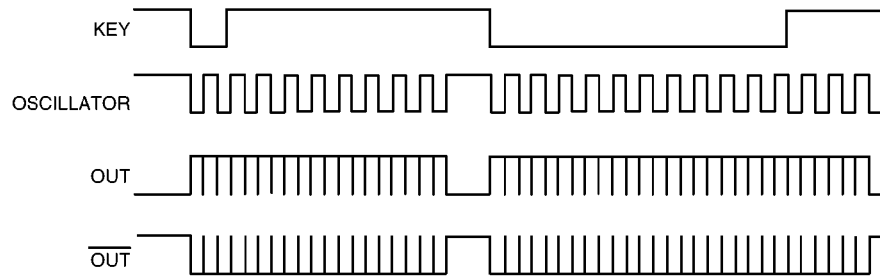
| Pad No. | Pad Name | I/O | Description                             |
|---------|----------|-----|-----------------------------------------|
| 1       | VSS      | —   | Negative power supply, GND              |
| 2       | OUT      | O   | Sound output pad, out of phase to pad 3 |
| 3       | OUT      | O   | Sound output pad                        |
| 4       | ENV      | O   | Sound envelope control pad              |
| 5       | TEST3    | I   | For IC test only                        |
| 6       | LED      | O   | LED flash output pad                    |
| 7       | VDD      | —   | Positive power supply                   |
| 8       | KEY      | I   | Key input pad, low active               |
| 9       | OSC2     | O   | Oscillator output pad                   |
| 10      | OSC1     | I   | Oscillator input pad                    |
| 11      | TEST1    | I   | For IC test only                        |
| 12      | TEST2    | I   | For IC test only                        |

## Timing Diagram

### With an envelope

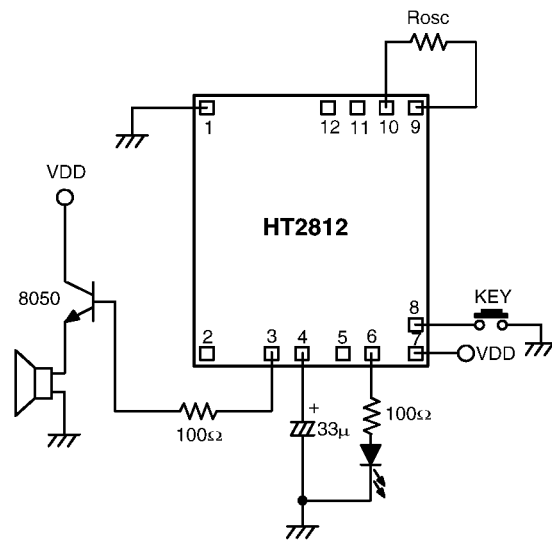


### No envelope

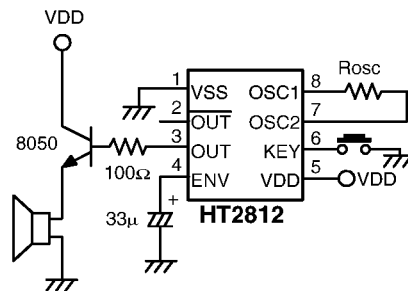


## Application Circuits

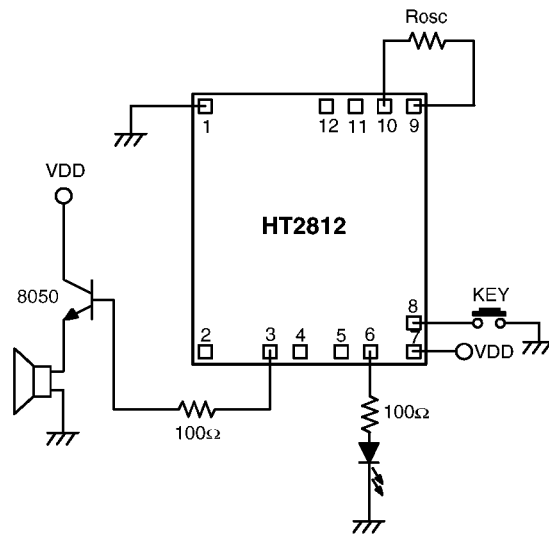
### Speaker output with an envelope



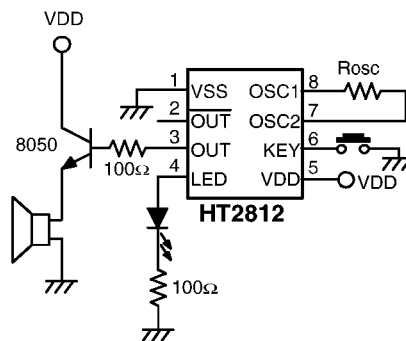
\* The IC substrate should be connected to VDD in the PCB layout artwork.



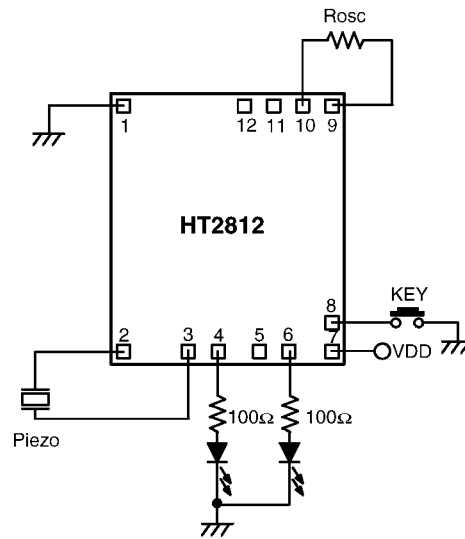
**Speaker output without an envelope**



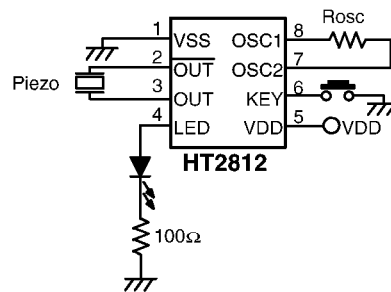
\* The IC substrate should be connected to VDD in the PCB layout artwork.



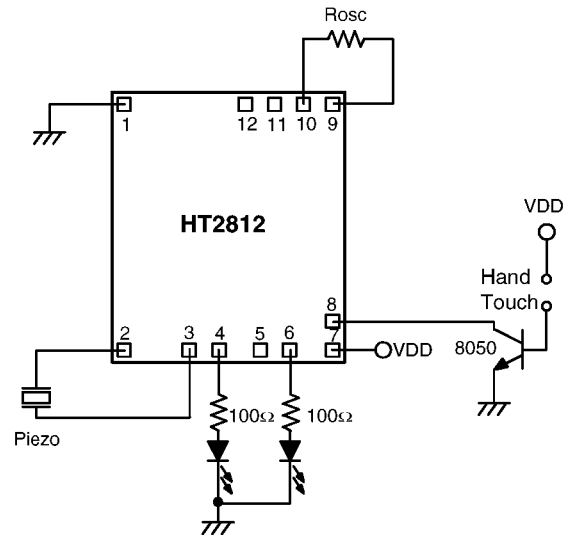
**Piezo output without an envelope**



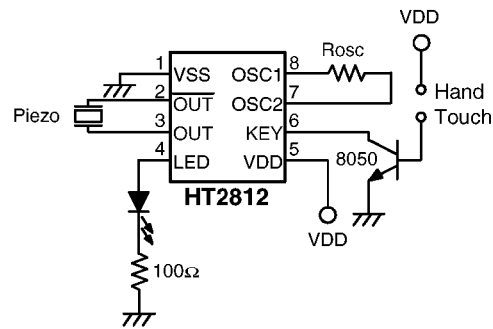
\* The IC substrate should be connected to VDD in the PCB layout artwork.



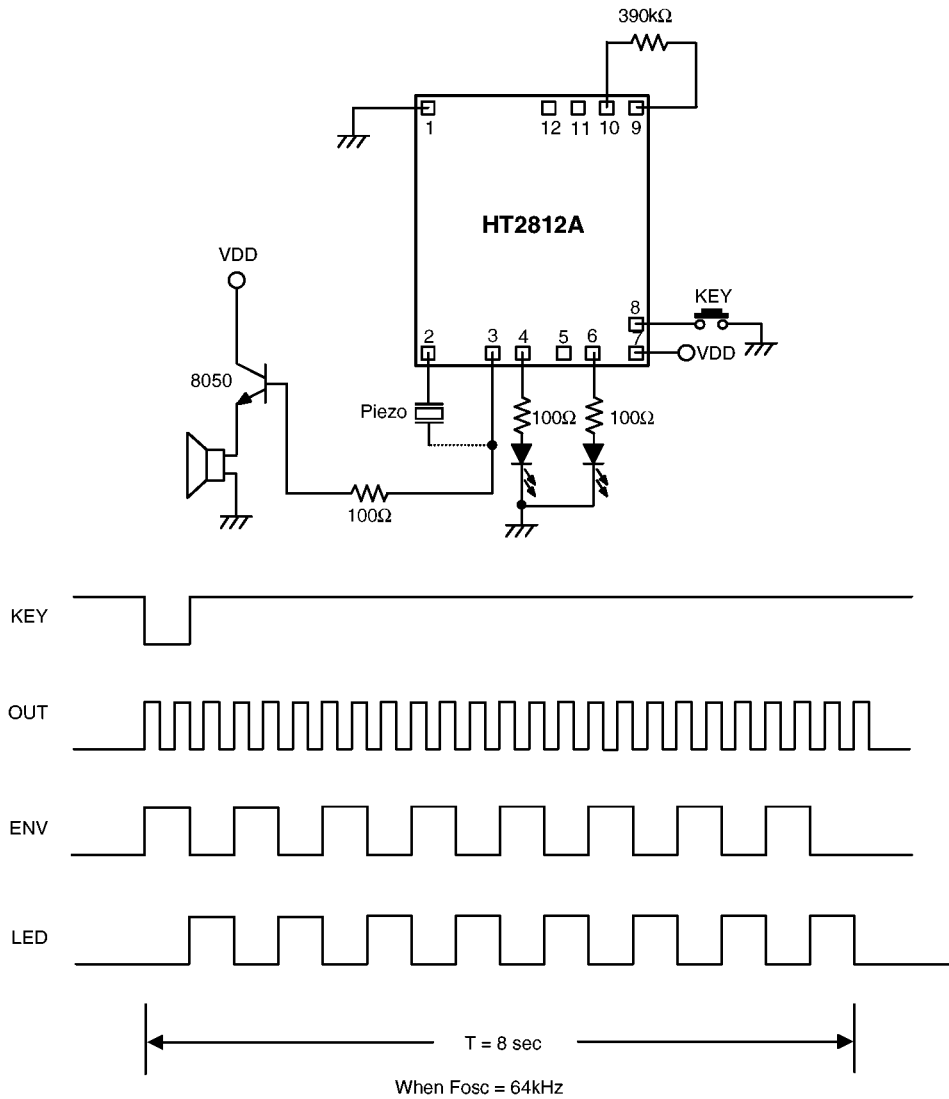
**Hand touch trigger**



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

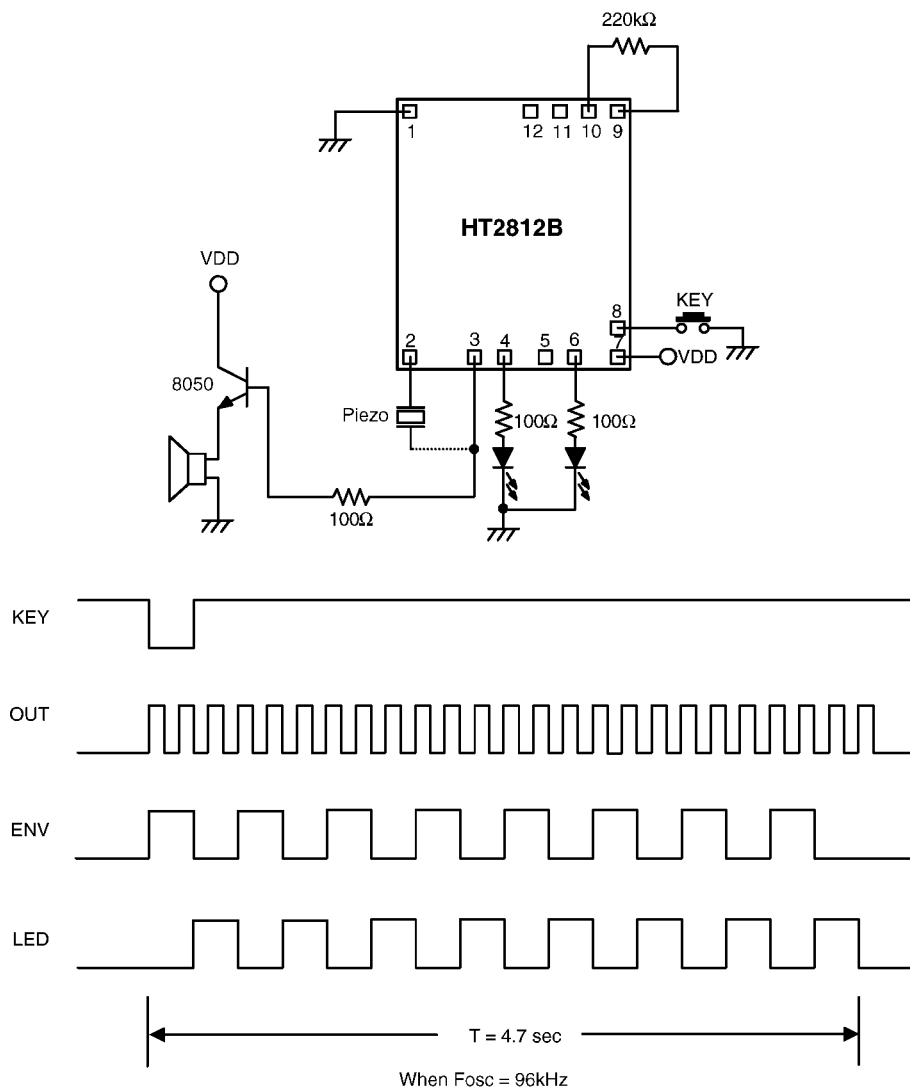


**Application Circuit (HT2812A — Airplane)**



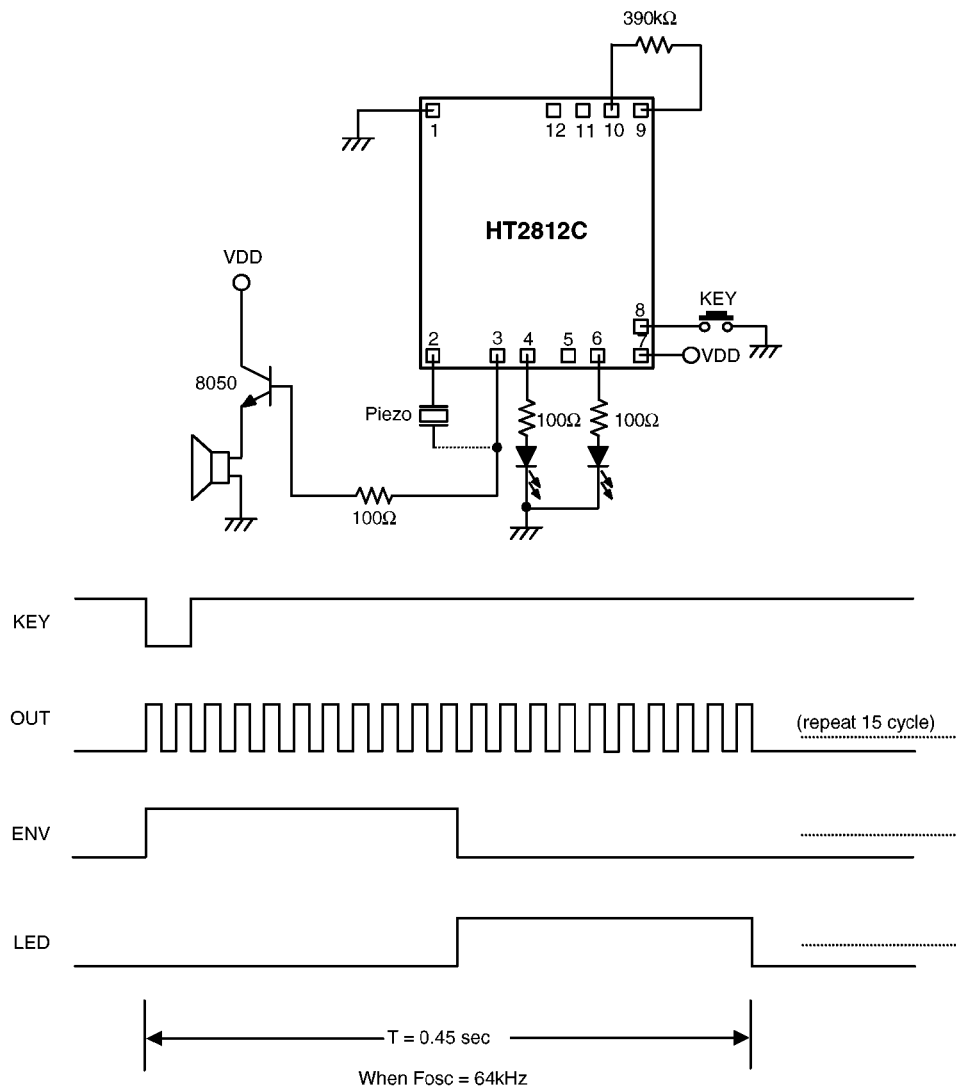
\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Application Circuit (HT2812B — Rocket)**



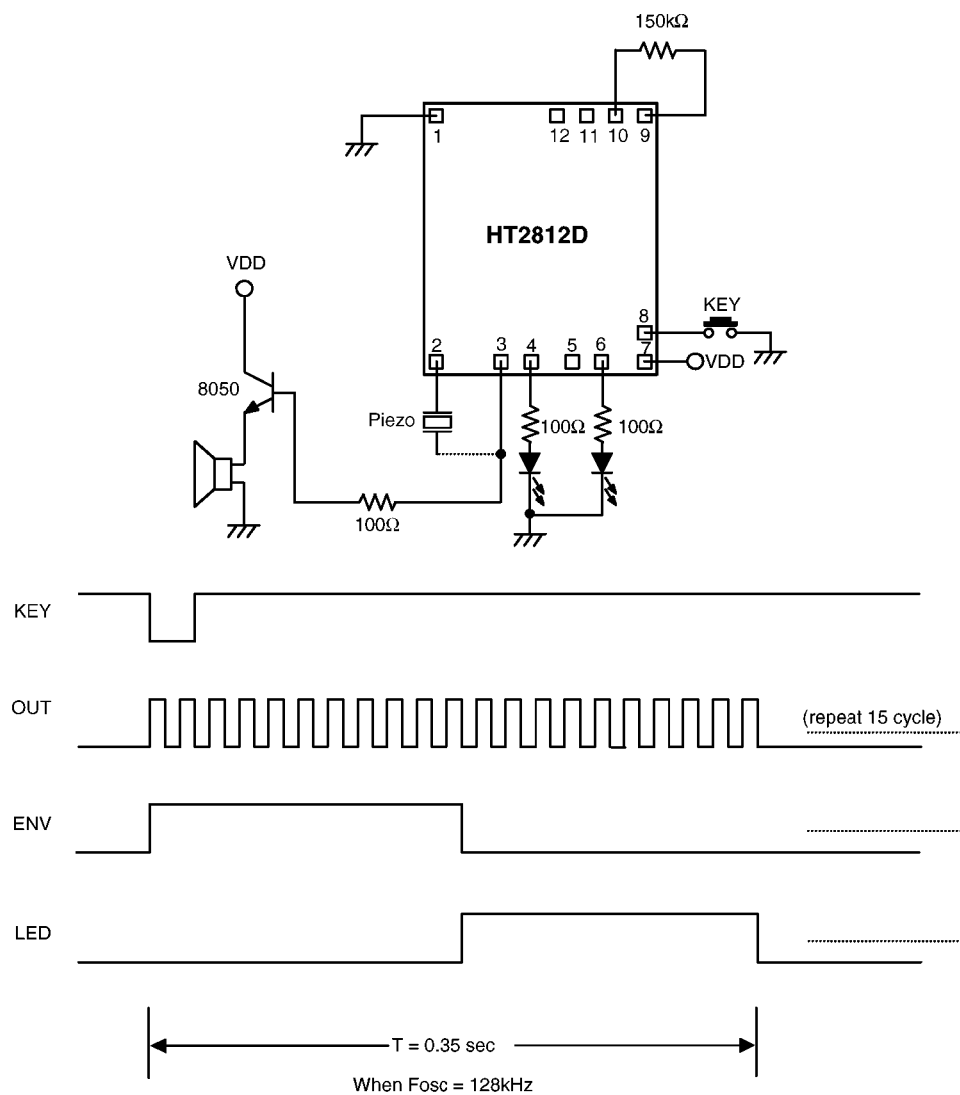
\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Application Circuit (HT2812C — Siren II)**



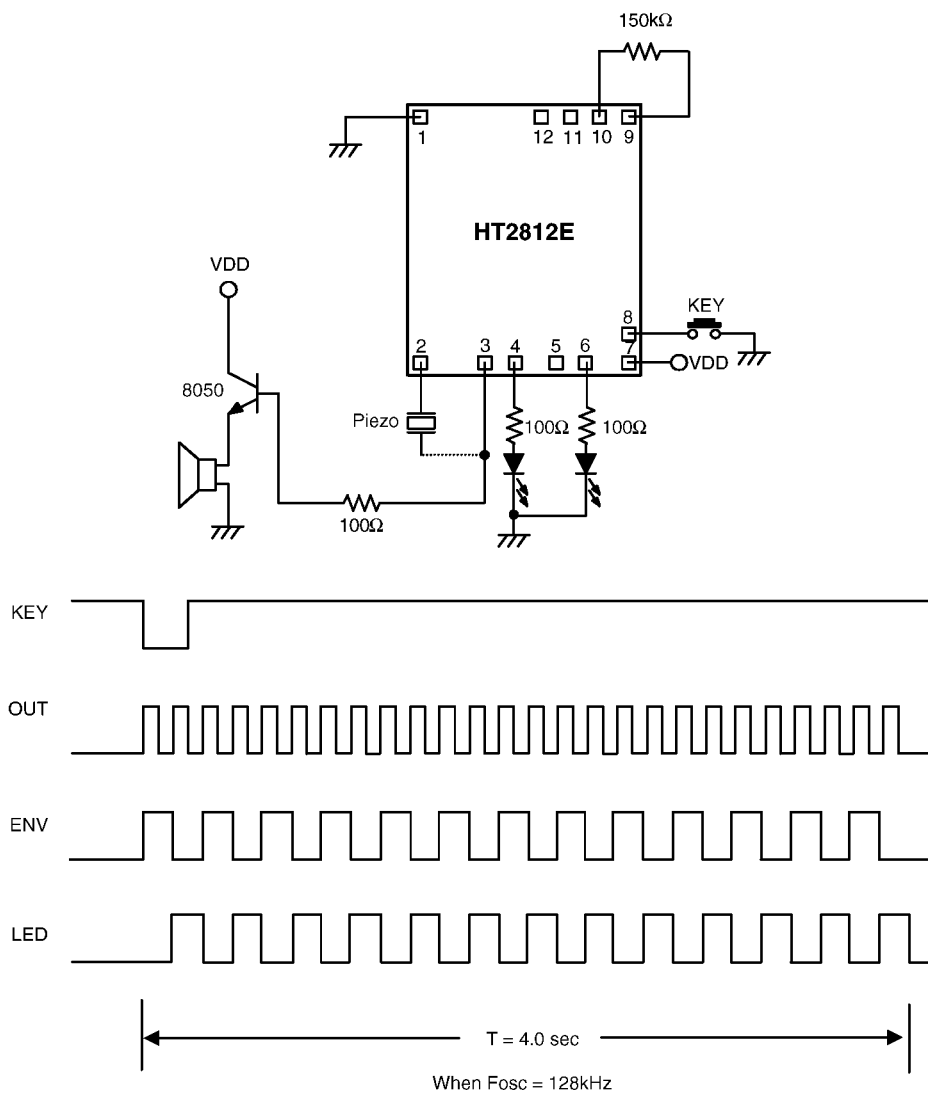
\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Application Circuit (HT2812D — Police Car)**



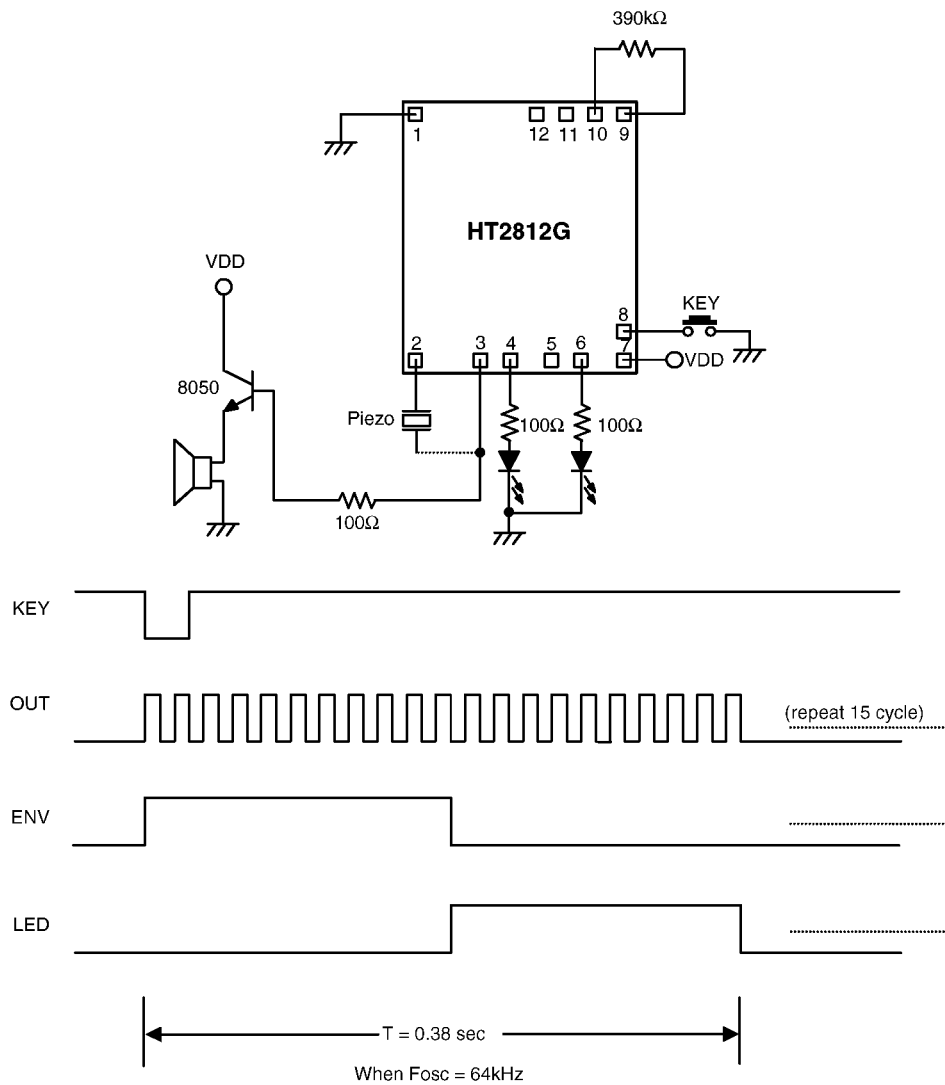
\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Application Circuit (HT2812E — Fire Brigade)**



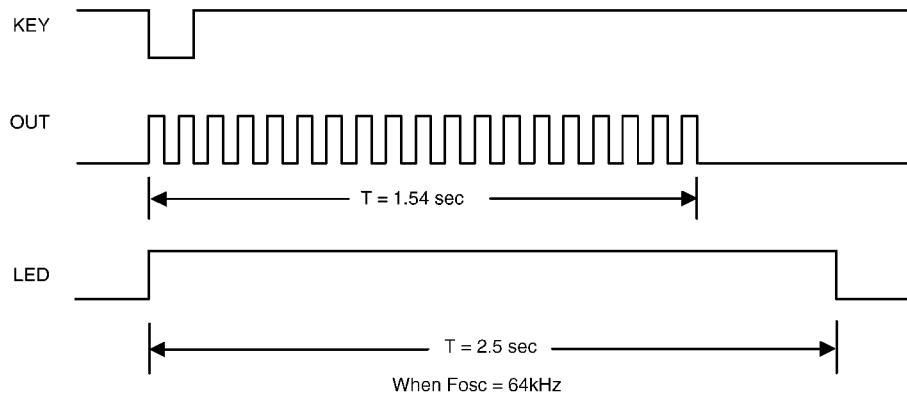
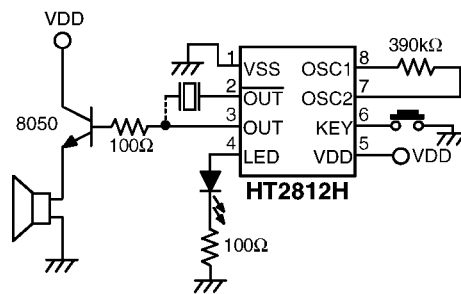
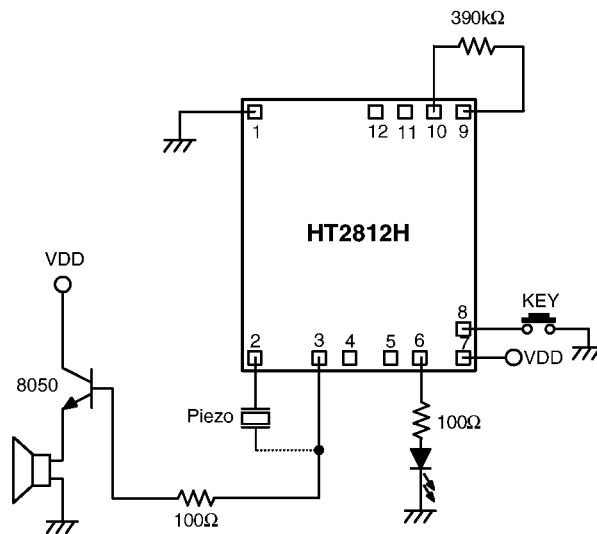
\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Application Circuit (HT2812F — Siren I)**



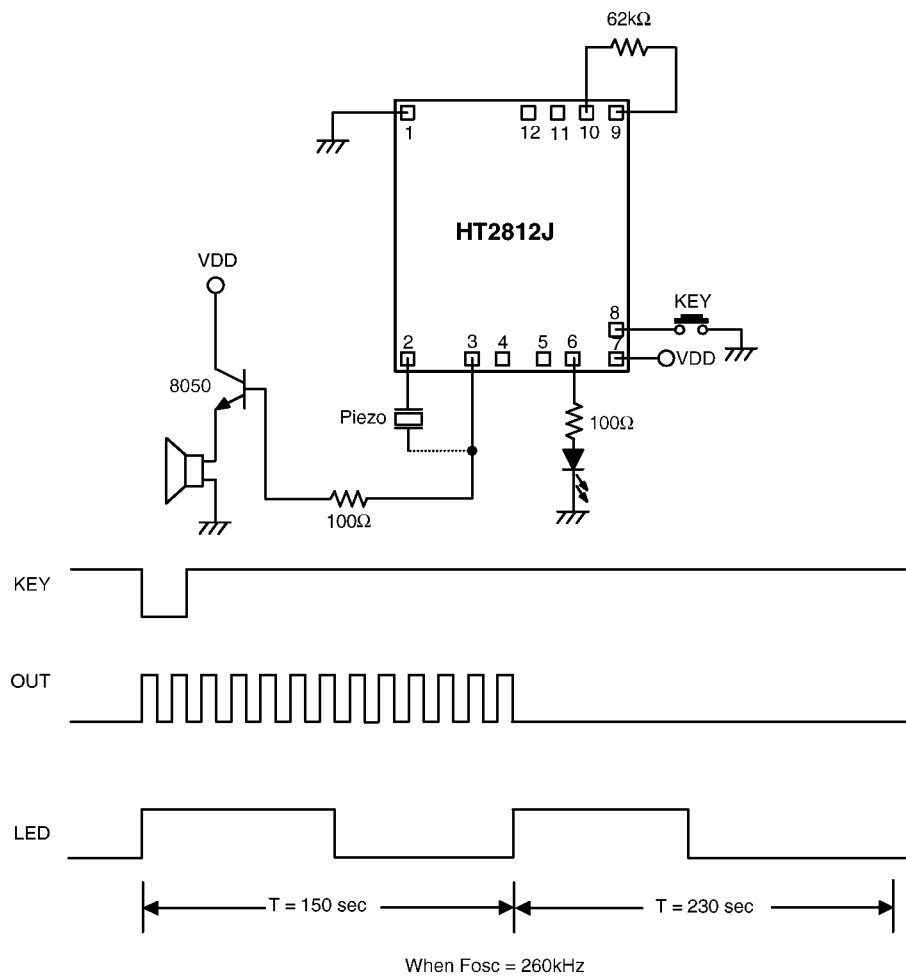
\* The IC substrate should be connected to VDD in the PCB layout artwork.

# Application Circuit (HT2812H — Dialing Tone)



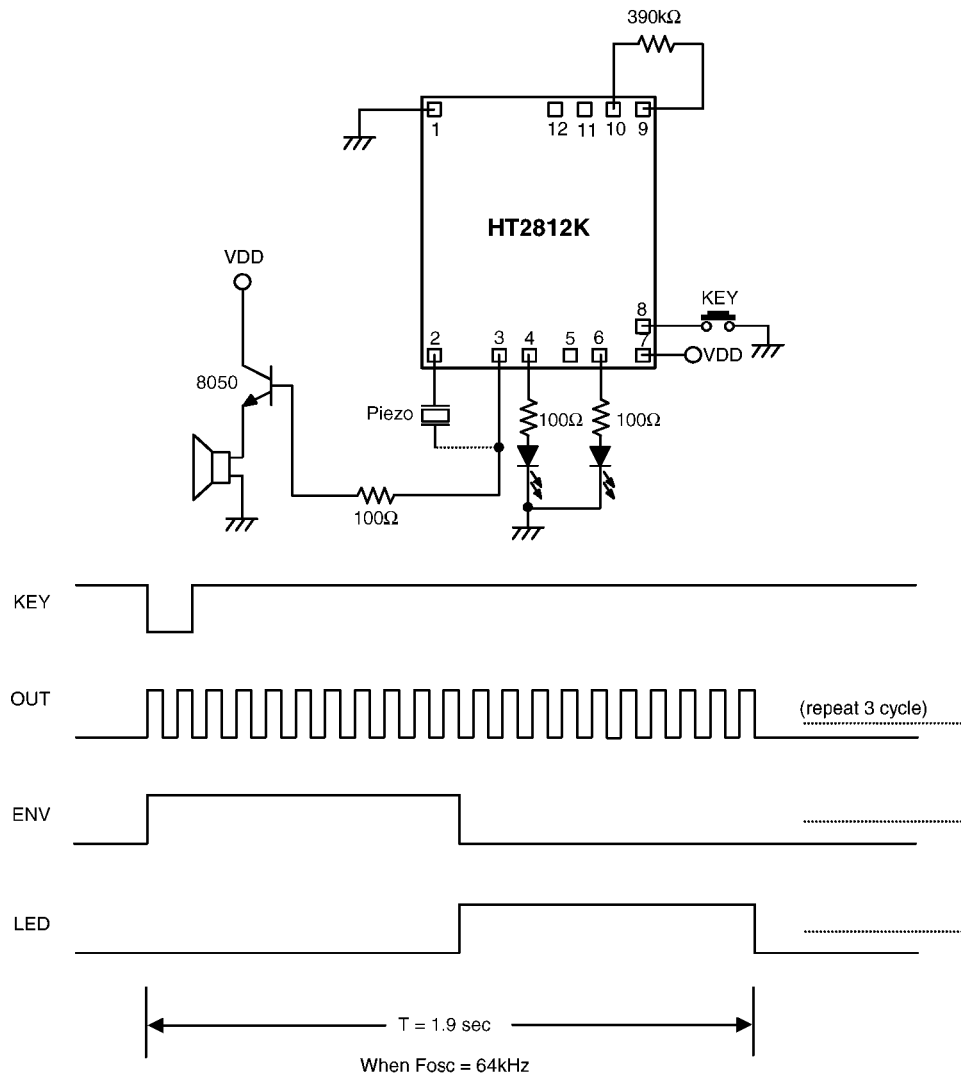
\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Application Circuit (HT2812J — Chicken Sound)**



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

# Application Circuit (HT2812K — Ambulance Sound)



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