

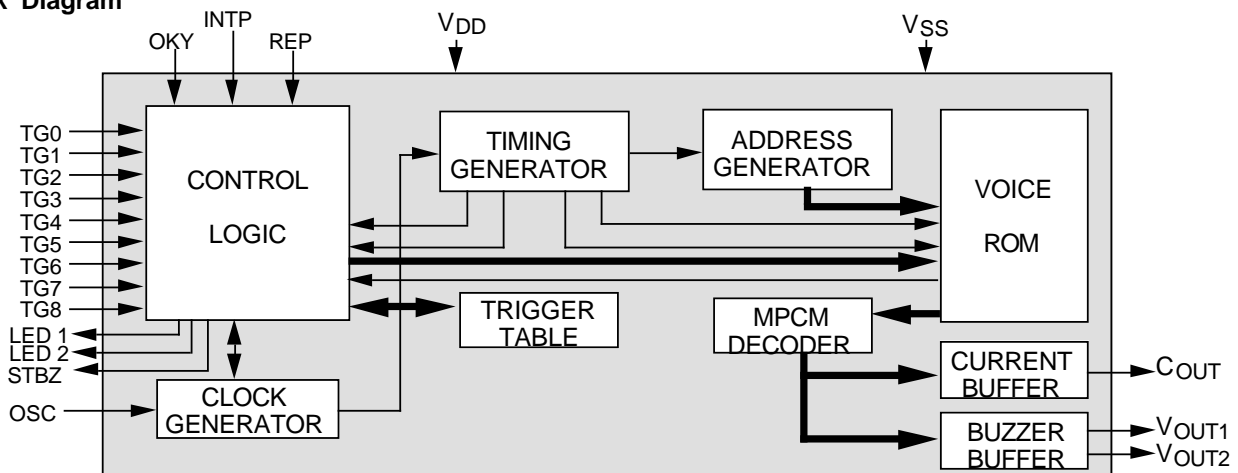
## Features

- Single power supply can operate at 2.4V through 6V.
- Current output can drive 8 ohm speaker with a transistor, Vout can drive buzzer directly.
- The voice content is stored up to 6 seconds and can be separated to 9 sections.
- Nine trigger input pins are provided. Each trigger pin can access a phrase instead of simple section. A phrase is composed of one or more than one section(s) and called a section - combination of sections.
- Total section number of all phrases is up to 64.
- Total duration of all sections with mute is up to 24 seconds.
- Interrupt function (INTP) stops the audio output at once.
- Playall function (OKY) plays all 9 phrases one by one by single trigger.
- Sequential function (OKY): one trigger plays next phrase of 9 phrases circularly.
- 2 LED function with 6 or 3 Hz flash is provided to tell the audio status in alternate flash.
- A STOP pulse comes out when audio signal is finished.
- CDS input interface with debounce is provided for 9 trigger pins, OKY pin and INTP pin.
- Extra pad for REPEAT playing.
- Mask option for either real Busy or Ground Busy on BUSY signal.
- Mask option for 10ms, 0.4ms, 10us on debounce time.
- Mask option for either PLAYALL or SEQUENTIAL for one-key function.
- Separate option setting on 9 individual trigger pins and OKY pin for below four masks:
  - a. Mask option for either Level or Edge trigger type.
  - b. Mask option for either Holdable or Unholdable output type.
  - c. Mask option for either BUSY output or STOP pulse on STBZ output.
  - d. Mask option for either Retrigger or Irretrigger .

## Description

The MSS0605 is a monolithic CMOS VLSI ASIC that can memorize voice up to 6 seconds using MOSEL qualified coding method (MPCM). It can play 9 phrases instead of 9 simple sections. Most of the necessary circuit are built in like oscillator, ROM, DAC and interface logic. 2 LEDs and separate option setting is provided . Customer voice data will be edited and built in by mask programming during the device fabrication.

## Block Diagram



**Pad Description**

| Pad No. | Signal Name       | I/O   | Function   |
|---------|-------------------|-------|--|
| 1       | INTP              | I     | Interrupt input, internal pull low, high active        |
| 2       | OKY               | I     | One key function input, internal pull low, high active |
| 3       | TG8               | I     | Trigger 8 input, internal pull low, high active        |
| 4       | TG7               | I     | Trigger 7 input, internal pull low, high active        |
| 5       | TG6               | I     | Trigger 6 input, internal pull low, high active        |
| 6       | TG5               | I     | Trigger 5 input, internal pull low, high active        |
| 7       | TG4               | I     | Trigger 4 input, internal pull low, high active        |
| 8       | TG3               | I     | Trigger 3 input, internal pull low, high active        |
| 9       | TG2               | I     | Trigger 2 input, internal pull low, high active        |
| 10      | TG1               | I     | Trigger 1 input, internal pull low, high active        |
| 11      | TG0               | I     | Trigger 0 input, internal pull low, high active        |
| 12      | OSC               | I     | Oscillator Resistor input                              |
| 13      | V <sub>DD</sub>   | Power | Positive power supply                                  |
| 14      | C <sub>OUT</sub>  | O     | Audio signal current output (for speaker)              |
| 15      | V <sub>OUT1</sub> | O     | Audio signal voltage output (for buzzer)               |
| 16      | V <sub>OUT2</sub> | O     | Audio signal voltage output (for buzzer)               |
| 17      | LED 1             | O     | LED signal output , sink current output.               |
| 18      | LED 2             | O     |  |
| 19      | STBZ              | O     | One shot stop signal output / BUSY signal output       |
| 20      | V <sub>SS</sub>   | Power | Negative power supply                                  |
| 21      | REP               | I     | High use as repeat                                     |
| 22      | NC                | NC    | No connection  |

**DC Characteristics**

| Symbol          | Parameter  |           | Min. | Typ. | Max. | Unit | Condition   |
|-----------------|--|-----------|------|------|------|------|---|
| I <sub>SB</sub> | Supply Current                                       | Stand by  | —    | 0.1  | 1    | μA   | V <sub>DD</sub> = 4.5V, I/O Open                    |
| I <sub>OP</sub> |  | Operating | —    | —    | 200  |      |   |
| I <sub>IH</sub> | Input Current<br>TG0~TG8, OKY,<br>INTP, REP          |           | —    | 10   | —    | μA   | V <sub>DD</sub> = 4.5V                              |
| I <sub>IL</sub> |  |           | —    | 0    | —    |      |   |
| I <sub>OH</sub> | O/P Current<br>V <sub>OUT1</sub> , V <sub>OUT2</sub> | Drive     | —    | -13  | —    | mA   | V <sub>DD</sub> = 4.5V, V <sub>O/P</sub> = 0V       |
| I <sub>OL</sub> |  | Sink      | —    | 13   | —    |      | V <sub>DD</sub> = 4.5V, V <sub>O/P</sub> = 4.5V     |
| I <sub>CO</sub> | Output Current (C <sub>OUT</sub> )                   |           | —    | 2.5  | —    | mA   | V <sub>DD</sub> = 3V, V <sub>O/P</sub> = 0V         |
|                 |  |           | —    | 3.8  | —    |      | V <sub>DD</sub> = 4.5V, V <sub>O/P</sub> = 0V       |
|                 |  |           | —    | 5.0  | —    |      | V <sub>DD</sub> = 6.0V, V <sub>O/P</sub> = 0V       |
| I <sub>OL</sub> | Output Current<br>LED1, LED2                         |           | —    | 13   | —    | mA   | V <sub>DD</sub> = 4.5V, V <sub>O/P</sub> = 4.5V     |
| I <sub>OH</sub> | Output Current<br>STOP / BUSY                        |           | —    | -8   | —    | mA   | V <sub>DD</sub> = 4.5V, V <sub>O/P</sub> = 0V       |
| I <sub>OL</sub> |  |           | —    | 8    | —    |      | V <sub>DD</sub> = 4.5V, V <sub>O/P</sub> = 4.5V     |
| ΔF/F            | Frequency Stability                                  |           | —    | 5    | —    | %    | $\frac{F_{osc}(4.5V) - F_{osc}(4V)}{F_{osc}(4.5V)}$ |
| ΔF/F            | Fosc Variation                                       |           | —    | 10   | —    | %    | V <sub>DD</sub> = 4.5V, R <sub>osc</sub> = 1.2MΩ    |

**Absolute Maximum Rating**

| Symbol               | Rating                                 | Unit |
|----------------------|--|------|
| $V_{DD} \sim V_{SS}$ | -0.5 ~ +7.0                            | V    |
| $V_{IN}$             | $V_{SS} - 0.3 < V_{IN} < V_{DD} + 0.3$ | V    |
| $V_{OUT}$            | $V_{SS} < V_{OUT} < V_{DD}$            | V    |
| T (Operating)        | -10 ~ +60                              | °C   |
| T (Storage)          | -55 ~ +125                             | °C   |

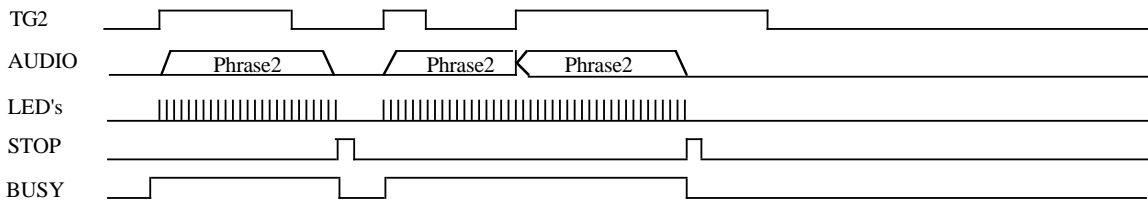
**AC Characteristics**

| Timing     |                    | Min. | Typ. | Max. | Unit |
|------------|--------------------|------|------|------|------|
| $T_{STOP}$ | Stop pulse         | 20   | —    | —    | ms   |
| $T_P$      | Power rise up time | —    | —    | 1    | ms   |
| $T_R$      | Power Ripple width | —    | —    | 1    | ms   |

**Timing Diagram**

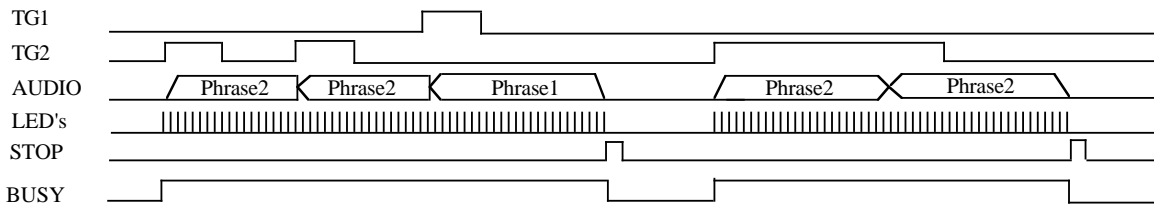
**I. Edge/Unholdable/Retrigger Trigger Mask**

- a. When trigger is shorter than a whole section output
- b. When trigger is longer than a whole section output



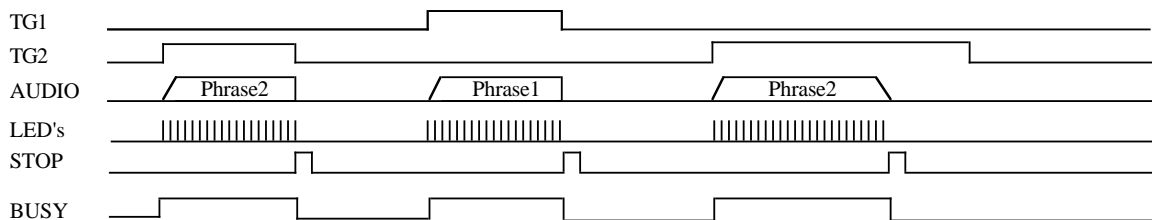
**II. Level/Unholdable/Retrigger Trigger Mask**

- a. When trigger is shorter than a whole section output
- b. When trigger is longer than a whole section output



**III. Edge/Holdable/Retrigger Trigger Mask**

- a. When trigger is shorter than a whole section output
- b. When trigger is longer than a whole section output



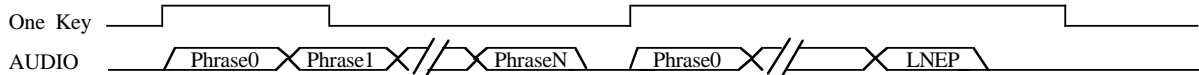
**IV. Level/Holdable/Retrigger Trigger Mask**

- a. When trigger is shorter than a whole section output      b. When trigger is longer than a whole section output

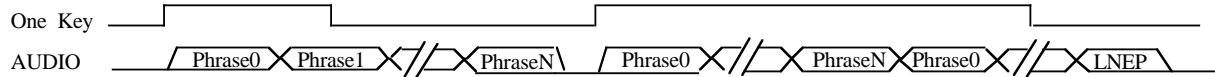


**V. One Key Pin Play All Function**

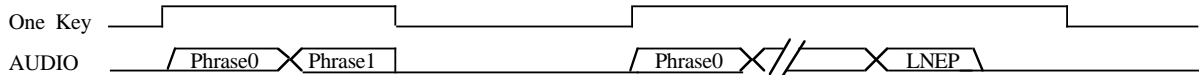
**a.EDGE / UNHOLD**



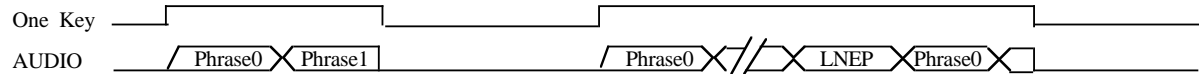
**b.LEVEL / UNHOLD**



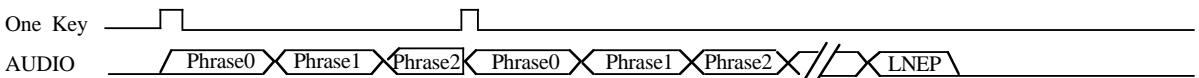
**c.EDGE / HOLD**



**d.LEVEL / HOLD**

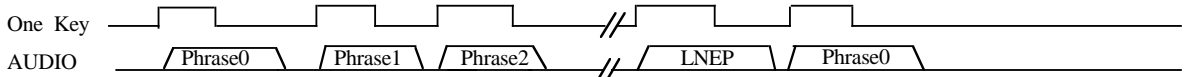


**e.RETRIGGER**



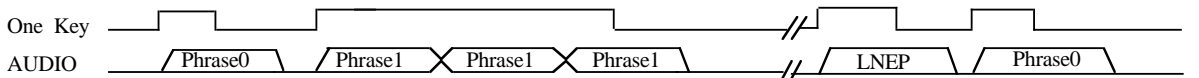
**VI. One Key Pin Sequential Play Function**

**a.EDGE / UNHOLD**

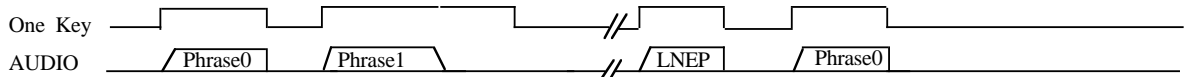


LNEP = The last Non-Empty Phrase

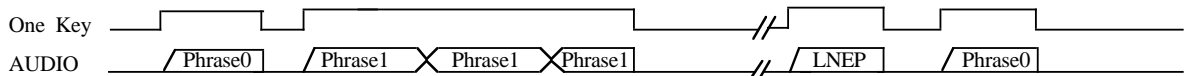
**b.LEVEL / UNHOLD**



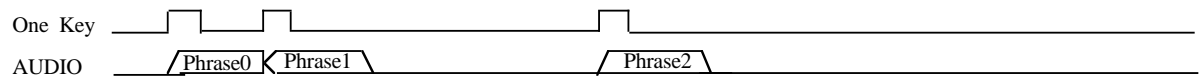
**c.EDGE / HOLD**



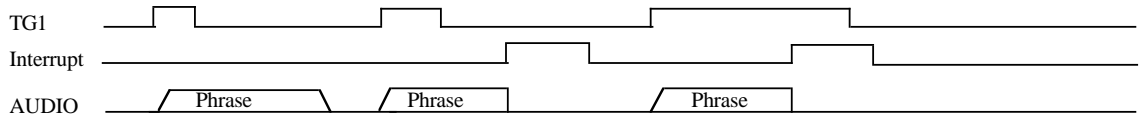
**d.LEVEL / HOLD**



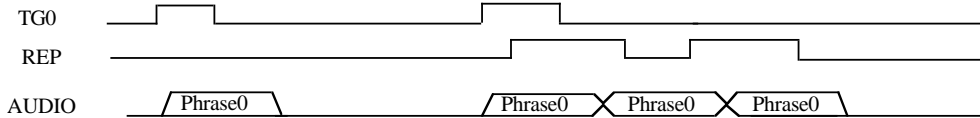
**e.RETRIGGER**



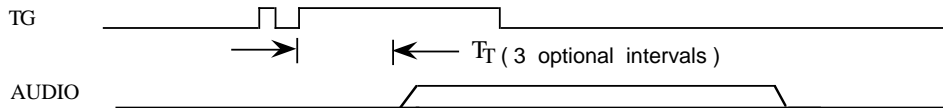
**VII. Interrupt Pin Function**



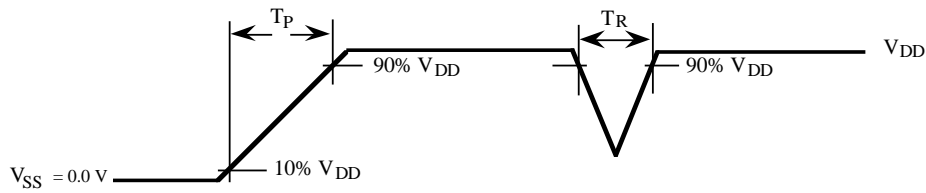
**VIII. Repeat function**



**IX. DEBOUNCE TIME**

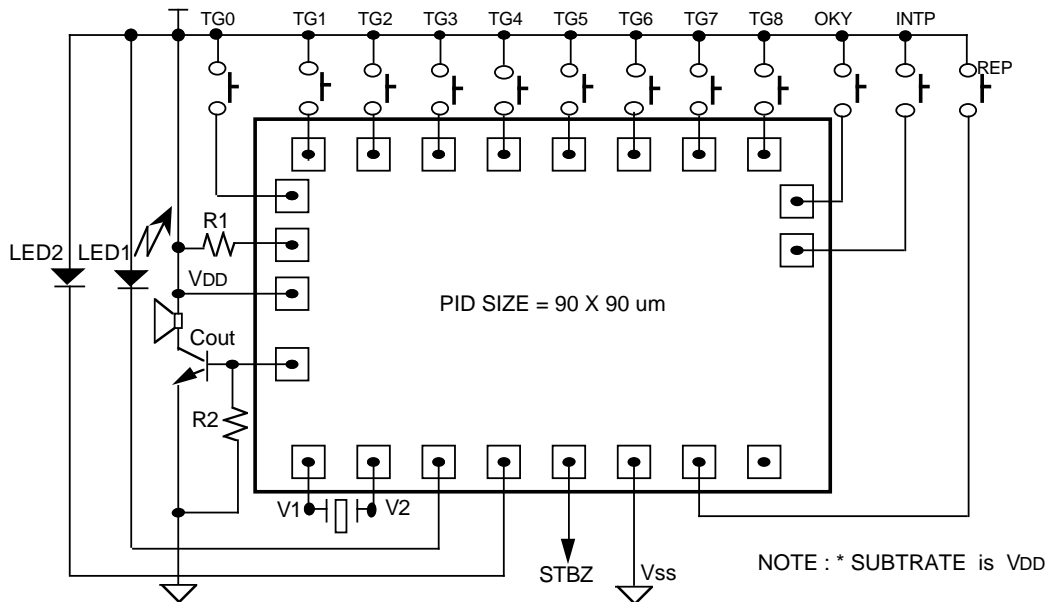


**X. Acceptable Power On Signal & Ripple**

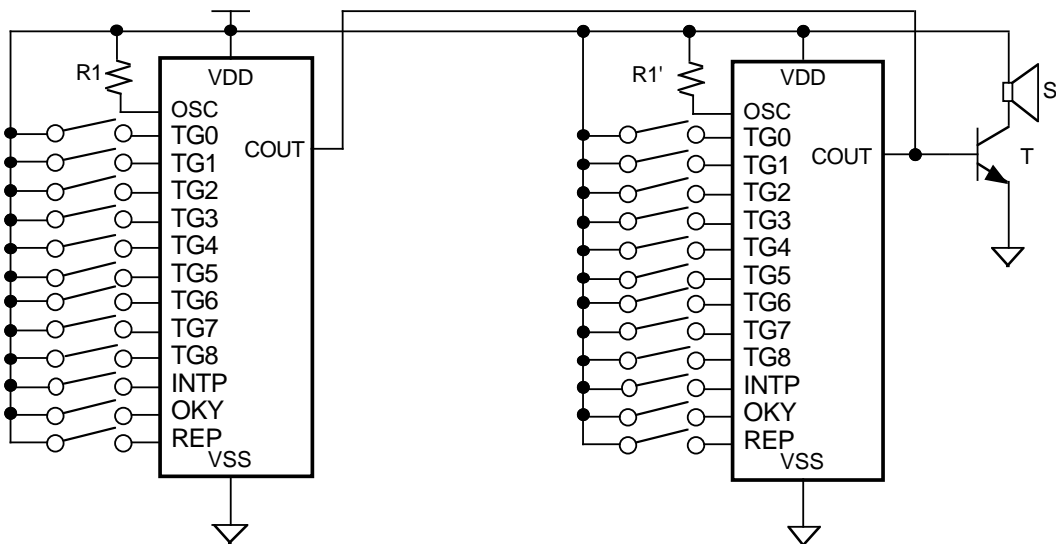
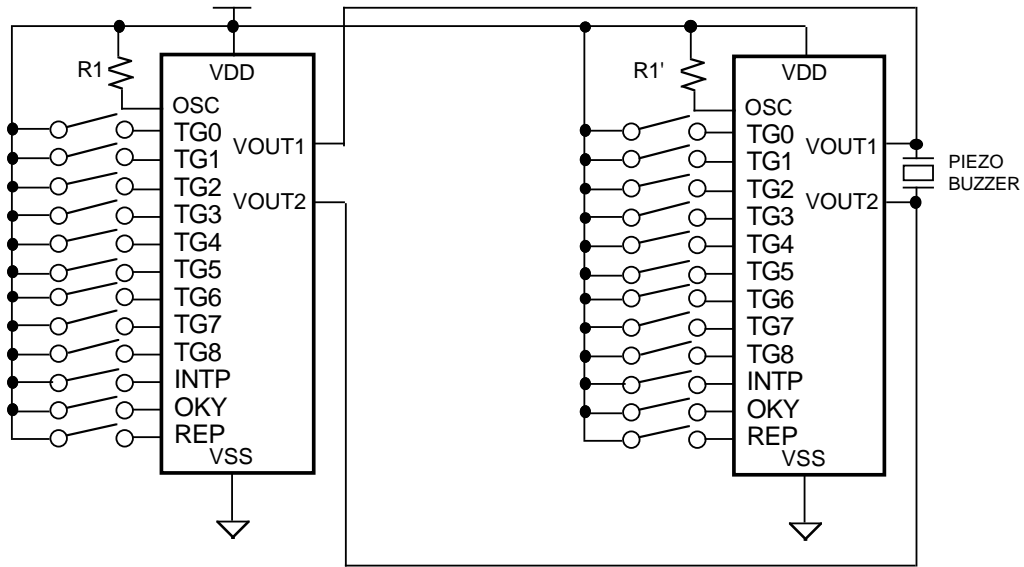


**Application Circuit**

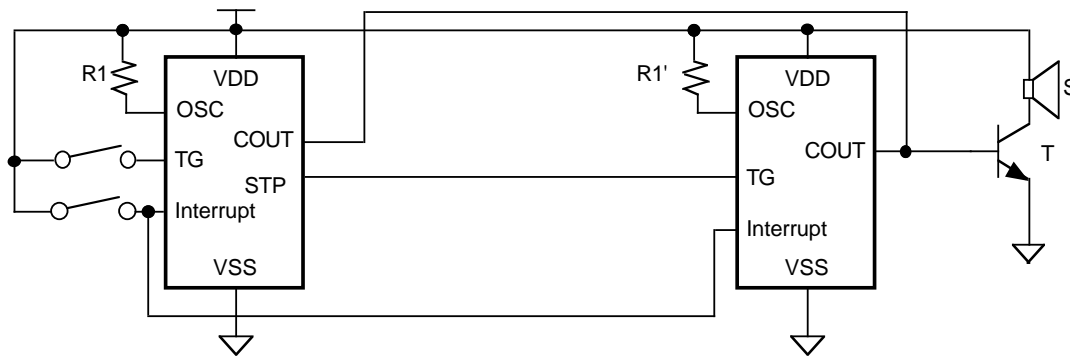
**1. Typical Application**



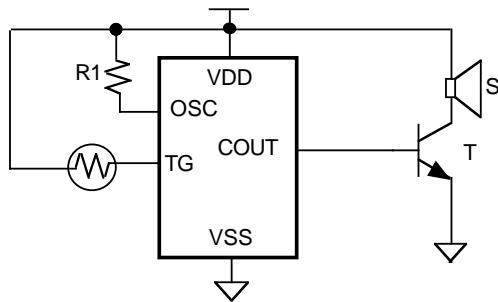
2. Parallel Application



3. Cascade Application

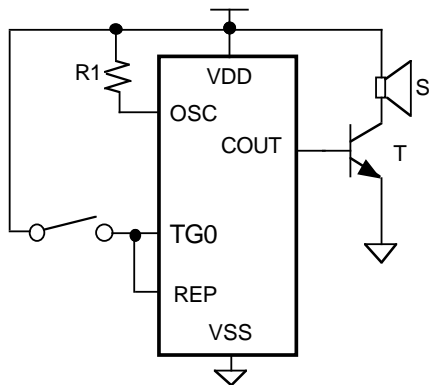


4. CDS Application



5. Edge Mode Change To Level Mode for TG0

(The pin "REP" connects to VDD)



- Note: 1.  $R1 = 1.2\text{ M}\Omega$ ,  $T(\text{transistor}) = \beta > 130$ ,  $R2 = 470\ \Omega$ ,  $S(\text{speaker}) = 1/4\text{ w}, 8\ \Omega$ ; all typical.
- 2.  $R2=470\Omega$  ( typical ) to bypass extra current into base to get rid of waveform saturation on collector .
- 3. Piezo buzzer resonant frequency being around 1K Hz is recommended.
- 4. Input switch could be replaced by CDS.
- 5.COUT,VOUT1,VOUT2 are tristate during stand by state.