# MOSEL

APRIL

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
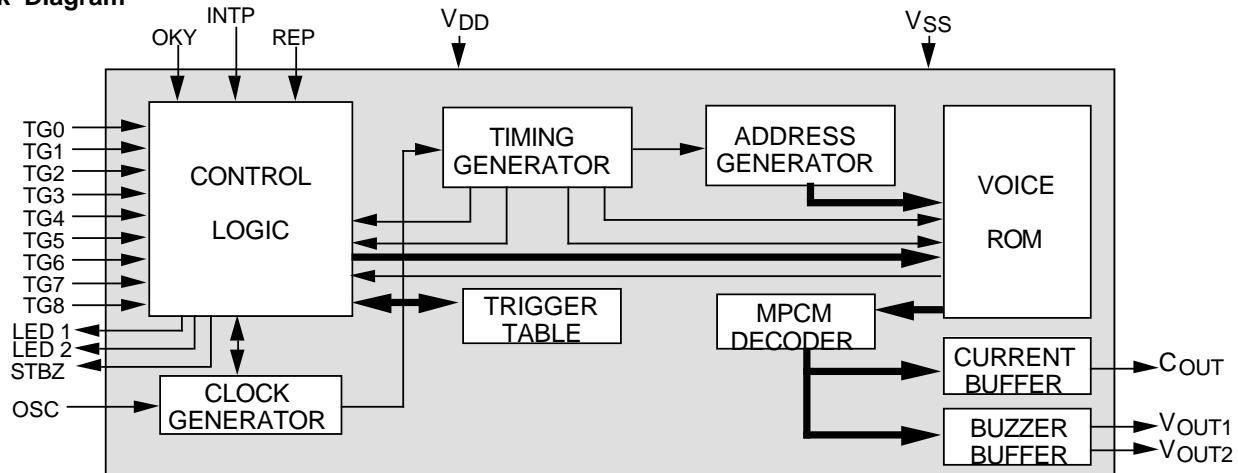
Pad Description

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, hgih 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_{DD}	Power	Positive power supply
14	C_{OUT}	O	Audio signal current output (for speaker)
15	V_{OUT1}	O	Audio signal voltage output (for buzzer)
16	V_{OUT2}	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_{SS}	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_{SB}	Supply Current	Stand by	—	0.1	1	μA	V_{DD} = 4.5V, I/O Open
I_{OP}		Operating	—	—	200		
I_{IH}	Input Current TG0~TG8, OKY, INTP, REP		—	10	—	μA	V_{DD} = 4.5V
I_{IL}			—	0	—		
I_{OH}	O/P Current V_{OUT1}, V_{OUT2}	Drive	—	-13	—	mA	V_{DD} = 4.5V, $V_{O/P}$ = 0V
I_{OL}		Sink	—	13	—		V_{DD} = 4.5V, $V_{O/P}$ = 4.5V
I_{CO}	Output Current (C_{OUT})		—	2.5	—	mA	V_{DD} = 3V, $V_{O/P}$ = 0V
			—	3.8	—		V_{DD} = 4.5V, $V_{O/P}$ = 0V
			—	5.0	—		V_{DD} = 6.0V, $V_{O/P}$ = 0V
I_{OL}	Output Current LED1, LED2		—	13	—	mA	V_{DD} = 4.5V, $V_{O/P}$ = 4.5V
I_{OH}	Output Current STOP / BUSY		—	-8	—	mA	V_{DD} = 4.5V, $V_{O/P}$ = 0V
I_{OL}			—	8	—		V_{DD} = 4.5V, $V_{O/P}$ = 4.5V
$\Delta F/F$	Frequency Stability		—	5	—	%	$\dfrac{F_{OSC}(4.5V) - F_{OSC}(4V)}{F_{OSC}(4.5V)}$
$\Delta F/F$	Fosc Variation		—	10	—	%	V_{DD} = 4.5V, R_{OSC} = 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
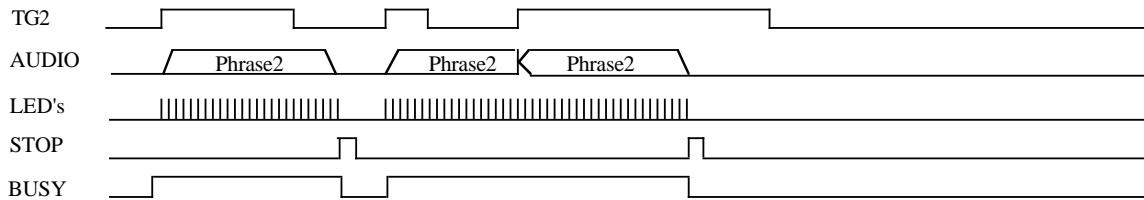
II. Level/Unholdable/Retrigger Trigger Mask

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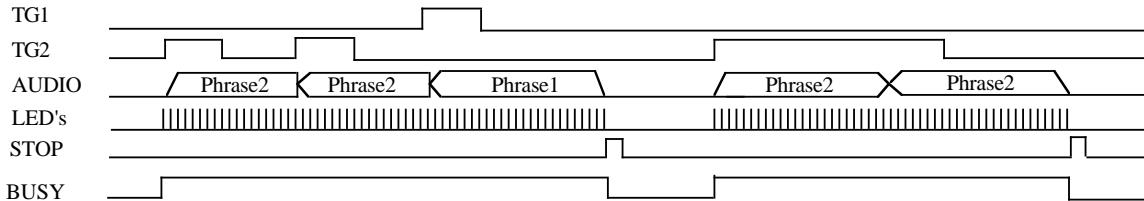

III. Edge/Holdable/Retrigger Trigger Mask

a. When trigger is shorter than a whole section output　　b. When trigger is longer than a whole section output
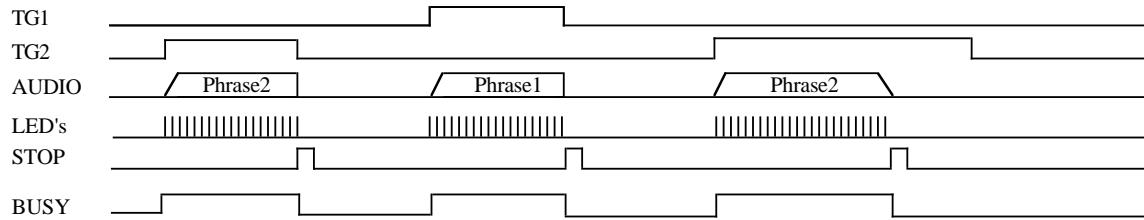
IV. Level/Holdable/Retrigger Trigger Mask

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

TG1

TG2

AUDIO   Phrase2   Phrase1   Phrase2   Phrase2
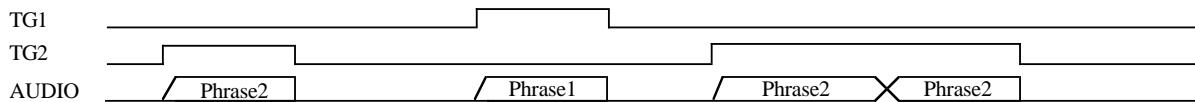
V. One Key Pin Play All Function

  a.EDGE / UNHOLD

One Key

AUDIO   Phrase0   Phrase1   //   PhraseN   Phrase0   //   LNEP

  b.LEVEL / UNHOLD

One Key

AUDIO   Phrase0   Phrase1   //   PhraseN   Phrase0   //   PhraseN   Phrase0   //   LNEP

  c.EDGE / HOLD

One Key

AUDIO   Phrase0   Phrase1   Phrase0   //   LNEP

  d.LEVEL / HOLD

One Key

AUDIO   Phrase0   Phrase1   Phrase0   //   LNEP   Phrase0

  e.RETRIGGER

One Key

AUDIO   Phrase0   Phrase1   Phrase2   Phrase0   Phrase1   Phrase2   //   LNEP
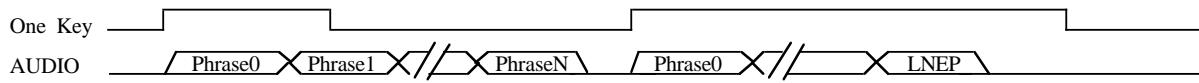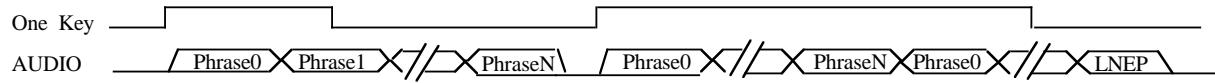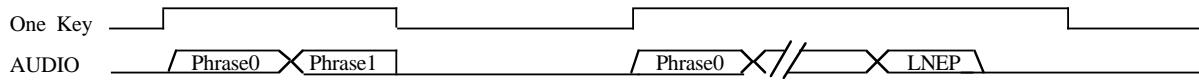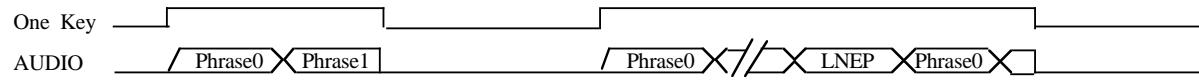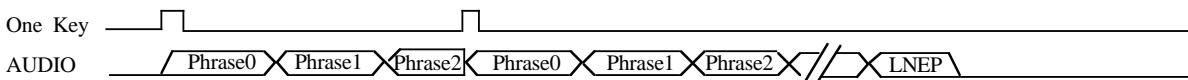
VI. One Key Pin Sequential Play Function

  a.EDGE / UNHOLD

One Key

AUDIO   Phrase0   Phrase1   Phrase2   //   LNEP   Phrase0
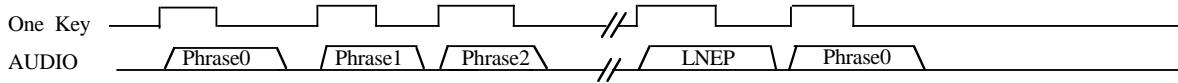
                     LNEP = The last Non-Empty Phrase

  b.LEVEL / UNHOLD

One Key

AUDIO   Phrase0   Phrase1   Phrase1   Phrase1   //   LNEP   Phrase0

  c.EDGE / HOLD

One Key

AUDIO   Phrase0   Phrase1   //   LNEP   Phrase0

  d.LEVEL / HOLD

One Key

AUDIO   Phrase0   Phrase1   Phrase1   Phrase1   //   LNEP   Phrase0

  e.RETRIGGER

One Key

AUDIO   Phrase0   Phrase1   Phrase2
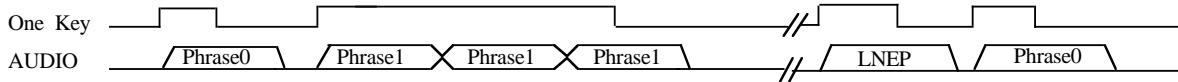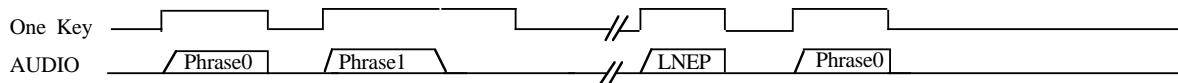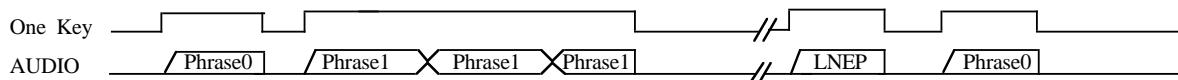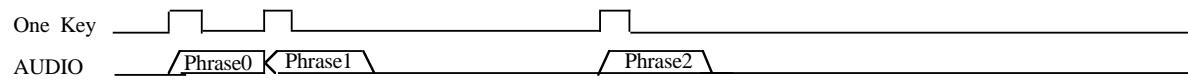
VII. Interrupt Pin Function

TG1

Interrupt

AUDIO Phrase   Phrase   Phrase

VIII. Repeat funtion

TG0

REP

AUDIO Phrase0   Phrase0 Phrase0 Phrase0

IX. DEBOUNCE TIME

TG

T_T (3 optional intervals)

AUDIO
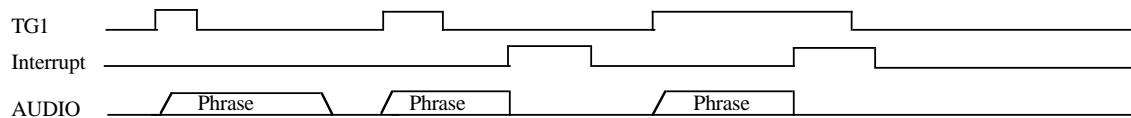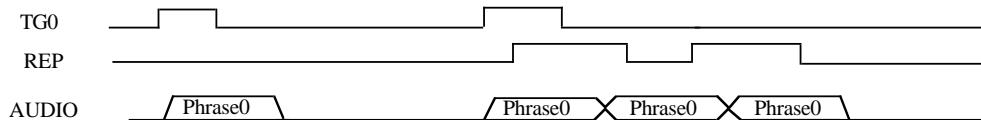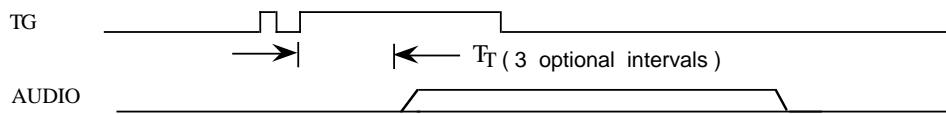
X. Acceptable Power On Signal & Ripple

T_P

T_R

90% V_{DD}

90% V_{DD}

V_{DD}

V_{SS} = 0.0 V

10% V_{DD}
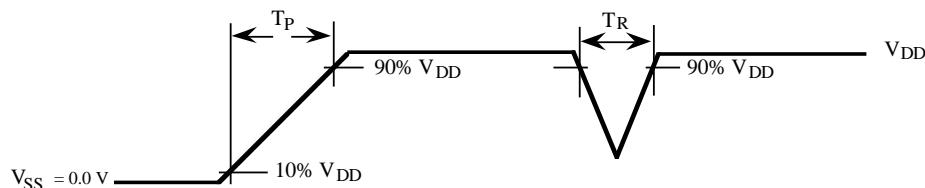
Application Circuit

1. Typical Application

TG0 TG1 TG2 TG3 TG4 TG5 TG6 TG7 TG8 OKY INTP

REP

LED2 LED1

R1

VDD

Cout

R2

PID SIZE = 90 X 90 um

V1   V2

STBZ Vss

NOTE : * SUBTRATE is VDD
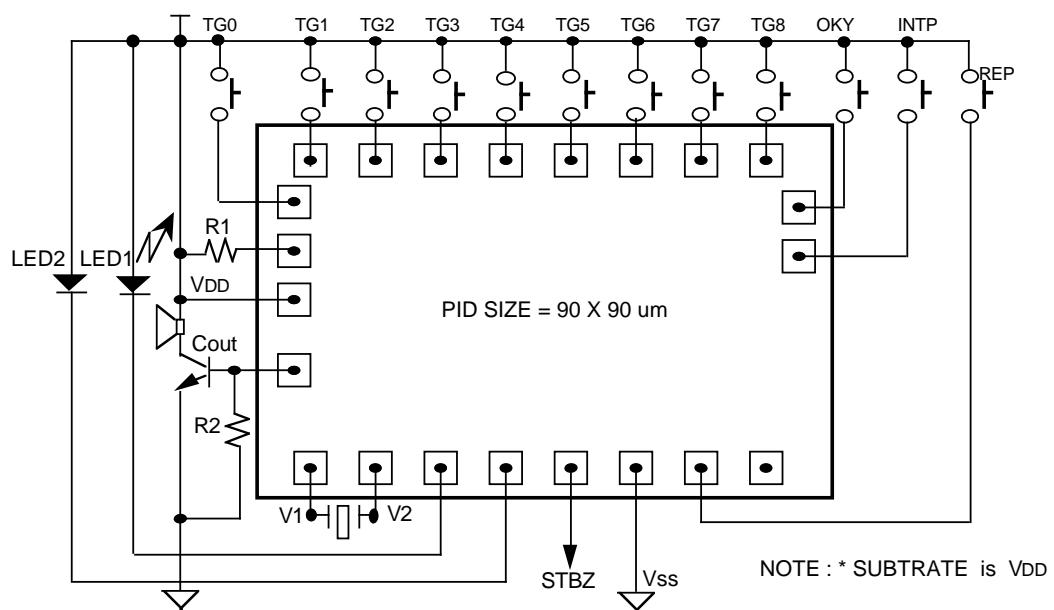
2. Parallel Application
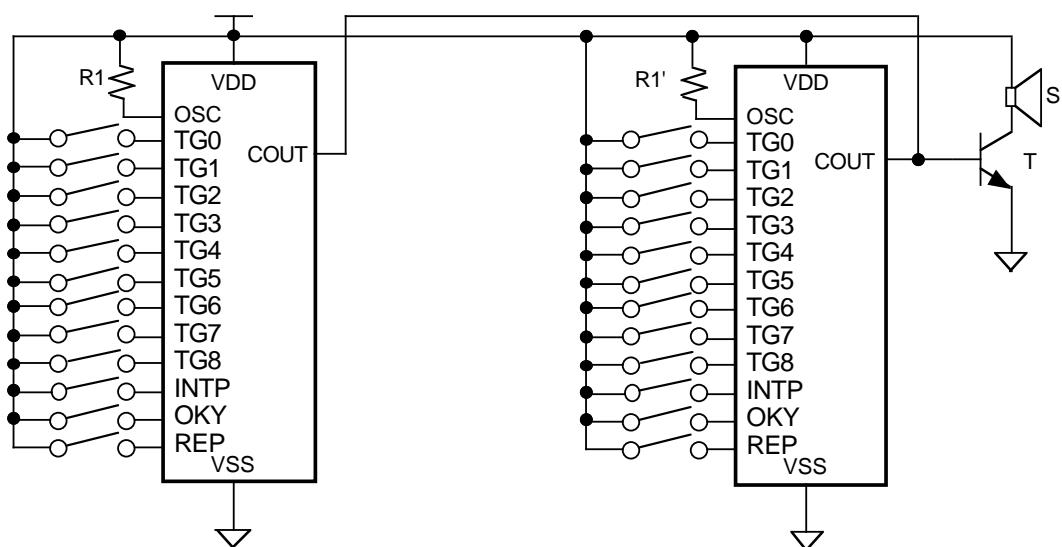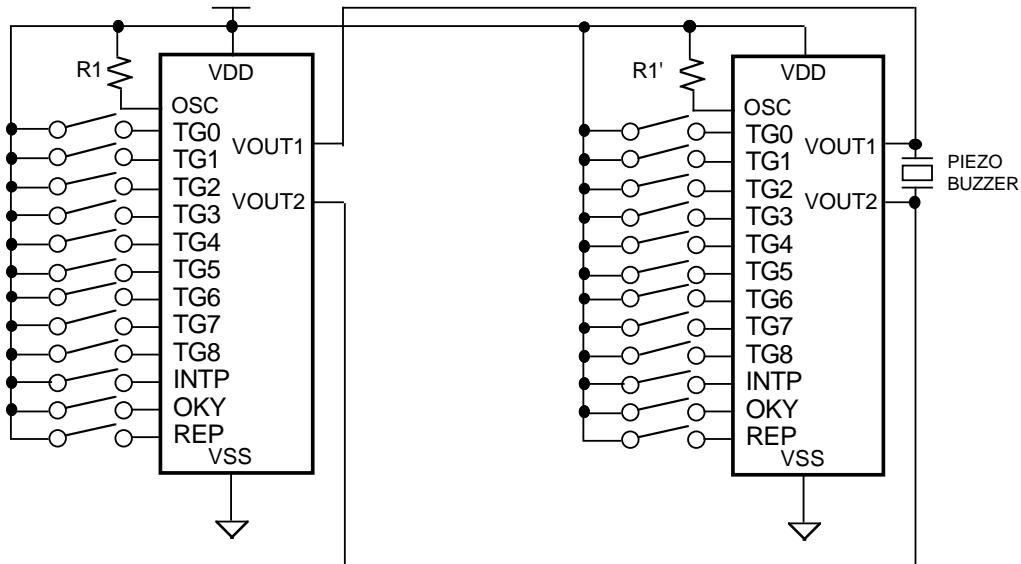
3. Cascade Application
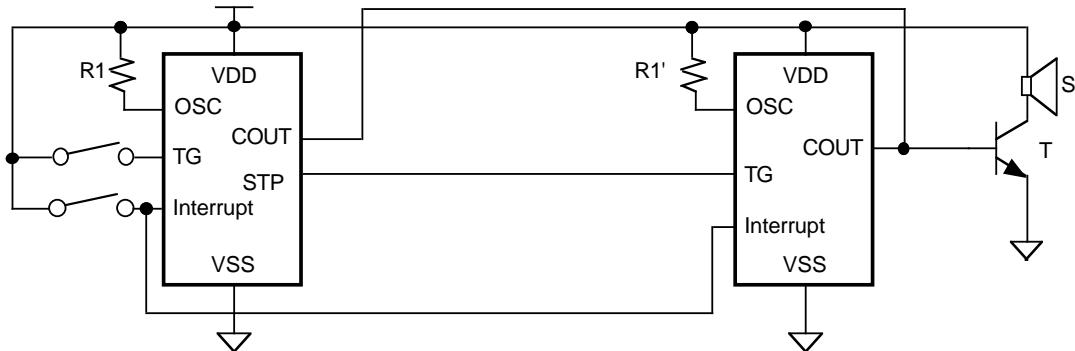
4. CDS Application
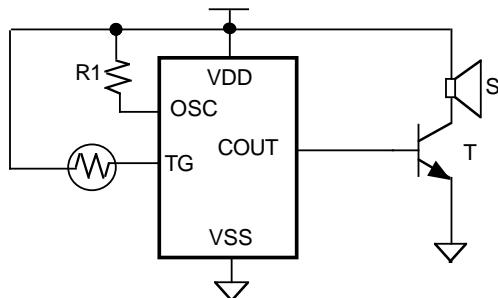
5. Edge Mode Change To Level Mode for TG0

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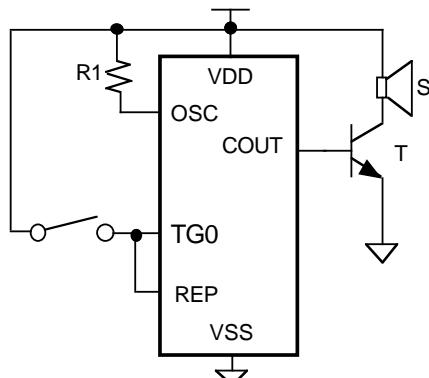
Note: 1. R1 = 1.2 M Ω, T(transistor) = ß > 130, R2 = 470 Ω , S(speaker) = 1/4 w, 8 Ω; all typical.
     2. R2=470Ω (typical) to bypass extra current into base to get rid of waveform saturation
       on collector .
     3. Piezo buzzer resonant frequency being around 1K Hz is   recommended.
     4. Input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