Speech Synthesizer (Voice ROM)

FEATURES

- Single power supply can operate at 2.4V through 6V.
- Directly drive buzzer and one current output could drive speaker.
- Up to 10 seconds voice duration that can be separated into 6 sections.
- Duration of the each section can be different.
- 6 triggering inputs, each input can play one message following its own table content with 8 steps in depth, every step could be one of the 6 voice sections.
- Mute is available for each section, up to 12 seconds totally.
- Combined function that can extend the voice duration by 10 x N seconds with N pieces of MSS1002.
- Status of this chip could be continous 3 PPS (pulse per second) for driving LED.
- Automatic power down function.
- Whatever status the device is, every trigger will reset the device and play from the beginning.
- Mask option for edge trigger or level trigger.
- Mask option for holdable output or unholdable.

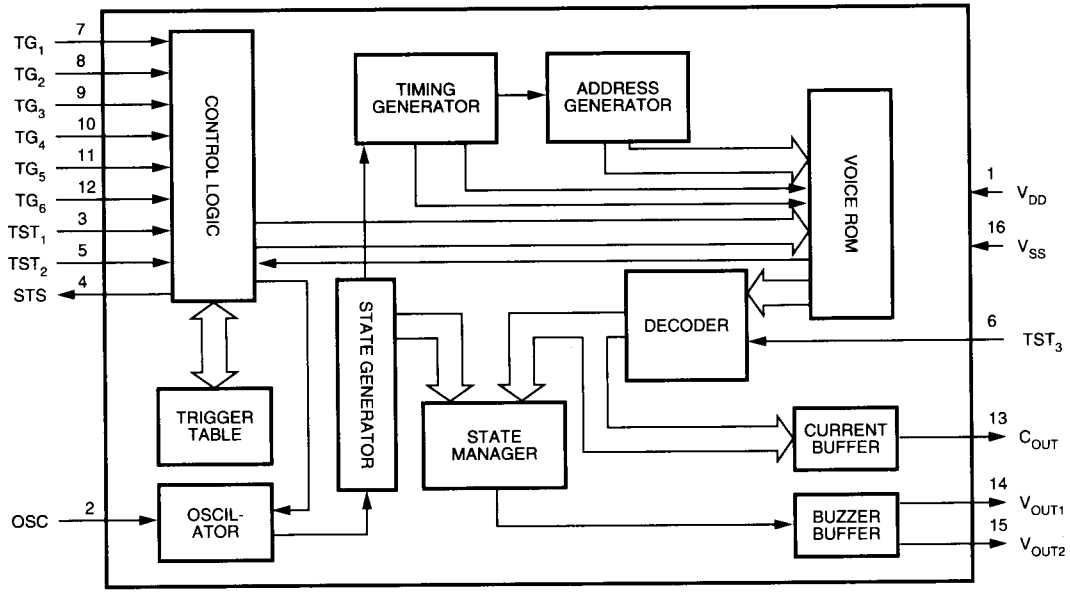
DESCRIPTION

The MSS1002 is a single-chip synthesizing CMOS VLSI that can synthesize voice up to 10 seconds using the MOSEL qualified coding method.

The chip contains most of the necessary circuit like oscillator, ROM, DAC, buzzer buffer, interface logic.

Customer speech data will be edited and programmed into ROM by changing one mask during the device fabrication.

BLOCK DIAGRAM



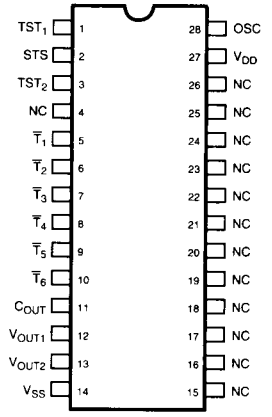
MOSEL Corporation 2 FL., No. 9, Industrial E. IV. Rd., Science-Based Industrial Park, Hsinchu, Taiwan (035) 773-187
914 West Maude Avenue, Sunnyvale, CA 94086 U.S.A 408-733-4556

MSS1002

ABSOLUTE MAXIMUM RATING

SYMBOL	RATING	UNIT
V_{DD} - 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

PIN CONFIGURATIONS



600 MIL P DIP

PAD DESCRIPTION

PIN NO.	SIGNAL NAME	I/O	FUNCTION
1	V_{DD}	I	Positive power supply
2	OSC	I	Oscillator input
3	TST_1	I	Test mode, for production test only
4	STS	O	Continous 3 pulses / sec output for driving LED
5	TST_2	I	Test mode, for production test only
6	TST_3	I	Test mode, for production test only
7	T_1	I	Trigger 1; active high
8	T_2	I	Trigger 2; active high
9	T_3	I	Trigger 3; active high
10	T_4	I	Trigger 4; active high
11	T_5	I	Trigger 5; active high
12	T_6	I	Trigger 6; active high
13	C_{OUT}	O	Audio signal current output (for speaker)
14	V_{OUT1}	O	Audio signal voltage output (for buzzer)
15	V_{OUT2}	O	Audio signal voltage output (for buzzer)
16	V_{SS}	I	Negative power supply

* C_{OUT}, V_{OUT1}, V_{OUT2} are tristate during stand by.

DC CHARACTERISTICS

SYMBOL	PARAMETER		MIN.	TYP.	MAX.	UNIT	CONDITION
V_{DD}	Operating Voltage		2.4	4.5	6	V	
I_{SB}	Supply Current	Stand by	–	–	1	μA	V_{DD} = 4.5V, I/O Open
I_{OP}		Operating	–	–	200		
V_{IH}	Input Voltage		4	4.5	5	V	V_{DD} = 4.5V
V_{IL}			-0.3	0	0.3		
I_{IH}	Input Current ($\overline{T}_1$~$\overline{T}_6$, TST_1, TST_3)		–	–	-15	μA	V_{DD} = 4.5V
I_{IL}			–	0	–		
I_{IH}	Input Current for TST_2		–	–	5	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_{OH}	Output Current (STS)		–	-15	–	mA	V_{DD} = 4.5V, $V_{O/P}$ = 0V
I_{OL}			–	–	–		V_{DD} = 4.5V, $V_{O/P}$ = 4.5V
I_{CO}	Output Current (C_{OUT})		–	-3	–	mA	V_{DD} = 4.5V
ΔF/F	Frequency Stability		-5	–	5	%	$\frac{F_{OSC}(4.5V) - F_{OSC}(4V)}{F_{OSC}(4.5V)}$
ΔF/F	Frequency Variation		-10	–	10	%	V_{DD} = 4.5V, R_{OSC} = 1.2MΩ

8

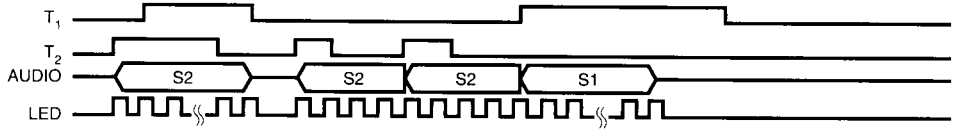
AC CHARACTERISTICS

TIMING		MIN.	MAX.
T_{TD}	Trigger pulse width	10ms	
T_{TA}	Chip triggered to Audio delay time		200μs

TIMING DIAGRAM

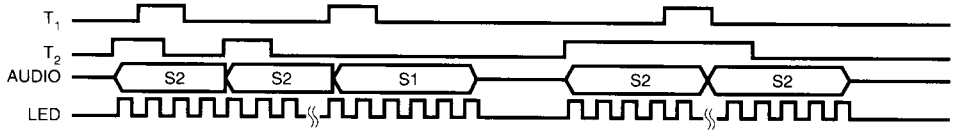
I. Edge/Unholdable Trigger Mask

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



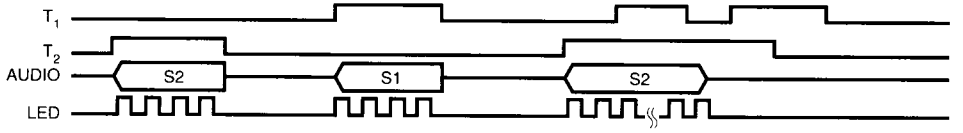
II. Level/Unholdable Trigger Mask

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



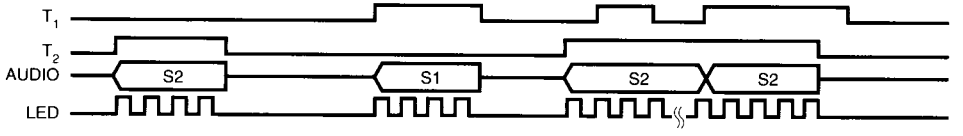
III. Edge/Holdable Trigger Mask

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

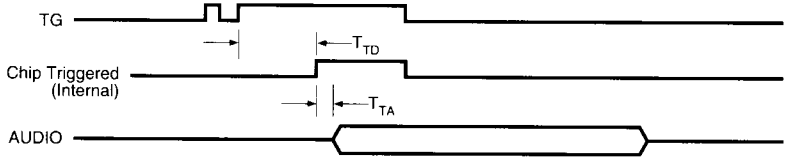


IV. Level/Holdable Trigger Mask

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

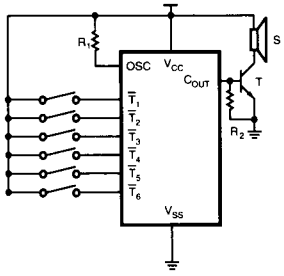


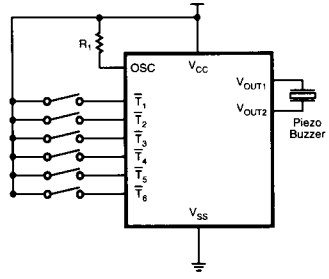
V. Debounce Time



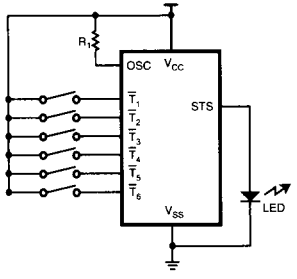
APPLICATION CIRCUIT

Typical Application





Use STS to Drive LED



Note:
1. R_1 = 1.2MΩ, T (transistor) = ß > 150, R_2 = 470Ω, S (speaker) = 1/4w, 8Ω; all typical.
2. Piezo buzzer resonant frequency is around 1K Hz.
3. Input switch could be replaced by CDS.

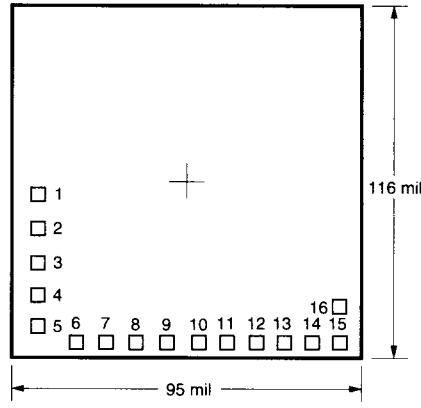
8

BONDING DIAGRAM

Pin. No.	Designation	X	Y
1	V_{DD}	-1020	-389
2	OSC	-1024	-594
3	TST_1	-1024	-800
4	STS	-1024	-1006
5	TST_2	-1024	-1254
6	TST_3	-819	-1272
7	$\overline{T}_1$	-613	-1272
8	$\overline{T}_2$	-408	-1272
9	$\overline{T}_3$	-202	-522
10	$\overline{T}_4$	3	-1272
11	$\overline{T}_5$	208	-1272
12	$\overline{T}_6$	414	-1272
13	C_{OUT}	619	-1267
14	V_{OUT1}	825	-1267
15	V_{OUT2}	1030	-1261
16	V_{SS}	1029	-967

Unit: μm

Note: Substrate is V_{DD}



Pad Size: 4 x 4 mil