

### Features

- Single power can operate at 2.4 V through 6 V.
- Current output can directly drive either buzzer or speaker without a transistor.
- Built-in Oscillating Resistor.
- Single section, 2.79 seconds (4380h).
- Speech with mute (behind) is up to 21.1 seconds (20000h).
- Repeat function that can repeat up to 8 times.
- To turn on LED in sink connection.
- Automatic power down.
- CDS interface is provided.

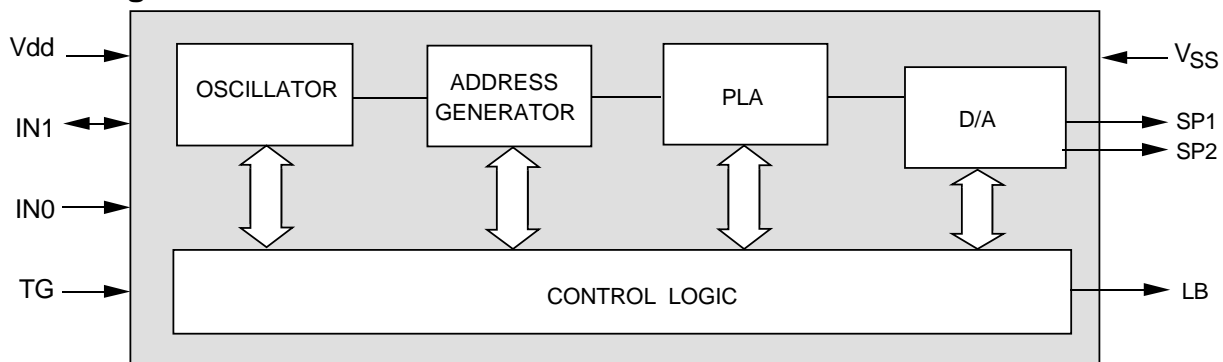
### Mask options

- Either level or edge trigger type at pin TG.
- Either LED flasher or BUSY output at pin LED/BZ.
- Either 6200Hz or 8400Hz S.R. for built-in Rosc.
- Either holdable output or not.
- Either retriggerable output or not.
- Either fixed or dynamic type on LED flasher.
- Either 3Hz or 6Hz LED fixed flasher, (S.R. dependent).
- Either Fast or Slow debounce time.

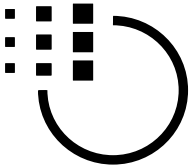
### General Description

The MSS0271 is a single-chip CMOS LSI demands minimal external components and memorizes voice up to 2.88 seconds (at 6 KHz S.R.) using the MOSEL qualified coding method (MPCM-4). The chip contains most of the necessary circuit like oscillator, PLA, D/A converter, buzzer buffer, control and timing logic. Therefore, it can apply to various voice systems with minimum external parts. Customer speech data will be edited and programmed into PLA by changing one mask during the device fabrication.

### Block Diagram



Specifications subject to change without notice, contact your sales representatives for the most recent information.



**Pad Description**

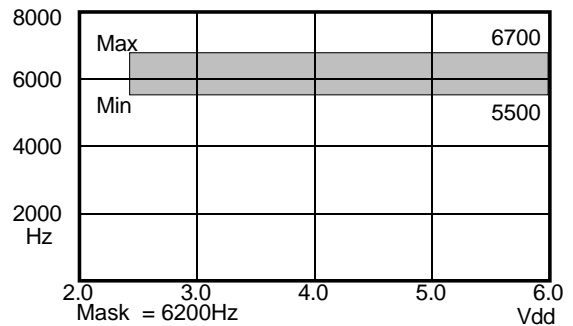
P20 COB pin #	P28 COB pin #	Pad#	Symbol	Active	i/o	Names
1	1	1	TG	high	i	trigger to play sound, internal pull low
3	3	2	LB		o	LED flasher output or high true Busy signal output
5	7	3	IN0		i	input control 0
7	11	4	IN1		i/o	input control 1
14	19	5	NC			no connection
15	21	6	SP2		o	speaker drive 2
16	23	7	Vss			ground
17	24	8	SP1		o	speaker drive 1
18	26	9	Vdd			positive power supply

**Absolute Maximum Rating**

Symbol	Rating	Unit
V <sub>DD</sub> ~ V <sub>SS</sub>	-0.5 ~ +7.0	V
V <sub>IN</sub> (TG)	V <sub>SS</sub> -0.3 < V <sub>IN</sub> < V <sub>DD</sub> +0.3	V
V <sub>OUT</sub> (STP)	V <sub>SS</sub> < V <sub>OUT</sub> < V <sub>DD</sub>	V
T (Operating)	-10 ~ +60	°C
T (Storage)	-55 ~ +125	°C

Operation beyond Absolute Maximal Rating can adversely affect device reliability

**FOSC Characteristics**



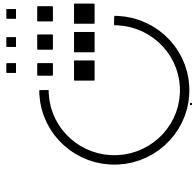
**Operating Conditions**

Symbol	Description	Min.	typ.	Max	Unit	Remarks
TA	Ambient temperature under bias	-10		60	°C	
VCC	supply voltage	2.4		6.0	V	
SR	sample rate		6200		Hz	or 8400

**AC Characteristics at 4.5 V, 6200 Hz SR**

Symbol	Parameter	Valid	Min.	typ.	Max	Unit	Remarks
T T1	trigger pulse width	TG		5		mS	slow debounce time, SRD
T T2	trigger pulse width	TG		1		uS	fast debounce time, SRD
T PUD	power up delay	Vdd, TG		0		uS	
T THLO	trigger high to LED on	TG, LED				uS	mask = edge, SRD
T THZH	trigger high to busy high	TG, BUSY				uS	mask = edge, SRD
T THAS	trigger high to audio start	TG, SPs				uS	mask = edge, SRD
T TLLF	trigger low to LED off	TG, LED		0		uS	mask = level, SRD
T TLZL	trigger low to busy low	TG, BUSY		0		uS	mask = level, SRD
T THAE	trigger low to audio end	TG, SPs		0		uS	mask = level, SRD
T AELF	audio end to LED off	TG, LED		0		uS	holdable output, SRD
T AEZL	audio end to busy low	TG, BUSY		0		uS	holdable output, SRD
T IWR1	interval when repeat	SPs		0		uS	inside sentence
T IWR2	interval when repeat	SPs		322		uS	between sentences, SRD
T LED3	LED on time at 3 Hz	LED		161		mS	SRD
T LED6	LED on time at 6 Hz	LED		81		mS	SRD
T P	power rise up time	Vdd			1	mS	
T R	power ripple width	Vdd			1	mS	

Specifications subject to change without notice, contact your sales representatives for the most recent information.



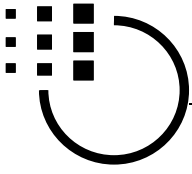
**DC Characteristics at 4.5 V**

Symbol	Parameter	Valid	Min.	typ.	Max	Unit	conditions
I SB	standby I	Vdd			1	uA	
I OP	operation I	Vdd			200	uA	
I IH	input high I	TG		10	20	uA	
I IL	input low I	TG			2	uA	
I LED	output low I	LED		9		mA	
I OH	output high I	BUSY		-8		mA	
I OL	output low I	BUSY		8		mA	
I OHS	output high drive I	SPs		-90		mA	
I OLS	output low sink I	SPs		200		mA	
I LEDT	threshold sound to furn LED on			75		%	of IOHS
R TG	pull low R	TG	23			Kohm	
d F/F	frequency stability				5	%	[F(4.5V) - F(4V)] / F(4.5V)
d F/F	frequency variation				10	%	

Note:A bulk capacitor 0.1uF across the Vdd to Vss is demanded.

**DC Characteristics at 3.0 V**

Symbol	Parameter	Valid	Min.	typ.	Max	Unit	conditions
I SB	standby I	Vdd			1	uA	
I OP	operation I	Vdd			150	uA	
I IH	input high I	TG		5	15	uA	
I IL	input low I	TG		1	2	uA	
I LED	output low I	LED		8		mA	
I OH	output high I	BUSY		-3		mA	
I OL	output low I	BUSY		3		mA	
I OHS	output high drive I	SPs		-45		mA	
I OLS	output low sink I	SPs		100		mA	
I LEDT	threshold sound to furn LED on			75		%	of IOHS
R TG	pull low R	TG	20			Kohm	
d F/F	frequency stability				5	%	[F(3V) - F(2.7V)] / F(3V)
d F/F	frequency variation				10	%	



## Signals

### SP+ and SP-

They are tristate during standby.

They are not at standby current when the data is in the middle.

These two pins can drive buzzer or speaker, 8 ohm or 16 ohm, directly. The speaker used should have its band width (BW) at the center of your sound frequency domain or you are unable to play your sound good by this speaker.

For instance, you have your sound spans over frequency from 100 Hz through 10 KHz. A speaker with BW meets requirement will play this sound good. A speaker with BW narrower than requirement (either has higher low-cut or lower high-cutoff) will distort the sound very much because that most of the energy of the playback sound is unable to be played by this speaker.

This pair has zero output when sound data is zero. This pair has full output when sound data is the highest. This pair has half of full output when sound is silence at middle data value. This pair has half of full output when playing sound at appended memory-less mute.

The output depends on Vdd bias very much.

Herein zero output does not mean zero potential, neither ground.

It is recommended to select voltage source carefully and do not supply this chip with a voltage potential source in poor flatness or in poor drive capability.

What the poor source means either its potential drops as the load varies or its potential drops as its capacity exhausted.

The speaker characteristics and housing impacts the loudness very much.

### TG

This is a high true activating signal input pin. An internal pull low R TG is built in.

There is no schmit trigger circuit implemented.

### IN0 and IN1

They should be bonded to ground both regularly.

While abnormal lot (pitch shifted) is encountered, special bonding could be done herein.

### LB

This pin could be optionally masked as either high true Busy signal or LED flasher which is turned on in sink way by I LED. Refers to paragraphs "Mask option" and "terms". Up to 3 types of LED flasher could be chosen.

## Terms

### Audio

Audio means the signal from the pin pair SP+ and SP-. Due to a sophisticated architecture, there demands no ramp up (or ramp down) to eliminate the pop noise at the sound starting and ending.

### Ramp up and Ramp down

See the explanation of Audio.

### Sample Rate

All the AC parameters depend on sample rate except three - t PUD, t P and t R. The numbers mentioned in this data sheet are based on 6 KHz sample rate if not specified. Higher SR has quicker LED flasher, quicker response. Lower SR has slower LED flasher, slower response.

### Retriggerable TG

Retriggerable TG means the sound played could be terminated immediately while further TG activated and play the sound from the very beginning.

### Holdable and retriggerable

This combination allows user controlling both the output and the input. Its output is holdable and the input could retrigger the former. This is an exquisite feature. It is not provided on this single trigger voice chip.

### Fix flash LED

Fix 3 Hz flash means this pin turns LED lamp on for T LED3 and then turns it off for T LED3 alternately. Fix 6 Hz flash means quicker, it turns on T LED6 and then turns off T LED6.

The 3 Hz as well as 6 Hz is sample rate dependent.

When repeatedly playing a word, interesting LED flash may happen in concatenation. The word length may not be the multiples of T LED3 (or T LED6), a new flash cycle will start before the last flash cycle terminates.

### Dymanic Flash LED

The LED turns on whenever the sound amplitude (the current from SPs) is over a certain threshold potential (I LEDT). The sound potential could be measured in data value as an alternative.

### Debounce time

Either Fast or Slow debounce are provided by mask options. The Fast debounce acknowledges very short trigger. So, the sound will play "sensitively". User should be very carefully to choose trigger switch while "Fast debounce" is specified.

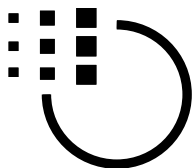
## Application Notes

### Speaker

The typical application speaker is 8 ohm, 1/4 watt. Refers to above paragraph SP+ and SP- for more description on required speaker.

### Buzzer

The recommended resonant frequency should be 1 KHz to get the best sound response. The response BW also should be fit to the required sound band width. Refer to above paragraph SP+ and SP- for more description.



**Choice of sample rate**

The sample rate should be chosen before chip manufactured. Two sample rates are provided on S0271 - either 6200 KHz or 8400 KHz. User is able to select them on the attached PRF (product request form).

**Rosc**

No external Rosc is required.

**Audio band amplifier transistor**

No amplifier transistor is demanded.

**PCB layout**

To minimize the interference, the route from trigger switch to chip should be as short as possible. The route of trigger signal is recommended to as far away as possible to speaker output.

**CDS as trigger**

to be defined.

**Power On play**

This chip provides power on play function. User should be noted that the time parameter T PUD is zero. To connect the trigger to Vdd, the sound will be played whenever power is turned on.

**Cascading**

Cascading chips to have longer duration is possible by special wiring but not recommended.

**Paralleling**

Paralleling chips to have more triggers is possible by special wiring but not recommended.

**Bulk Capacitor**

A bulk capacitor 0.1uF across the Vdd to Vss is demanded when using 4.5V (or higher) working voltage. At every working voltage, the value of bulk capacitor should be less than or equal to 0.47uF.

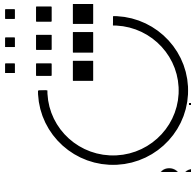
**Bonding change while Rosc shifts**

MVI S0271 provides reliable built-in Rosc by advance technology. In case Rosc is shifted (pitch shifted), the bonding change is able to bias Rosc into nominal value. The bonding changes are described on page 11/12.

While the pitch shift encountered even it is rarely, the part number will have a postfix letter-capital "Z" while the lot number will have the two letter extension simultaneously. The two-letter extension could be "LH", "HL" or "HH". This two-letter extension tells how the bonding should be done which are described on page 11/12.

**Standard Code Line Up**

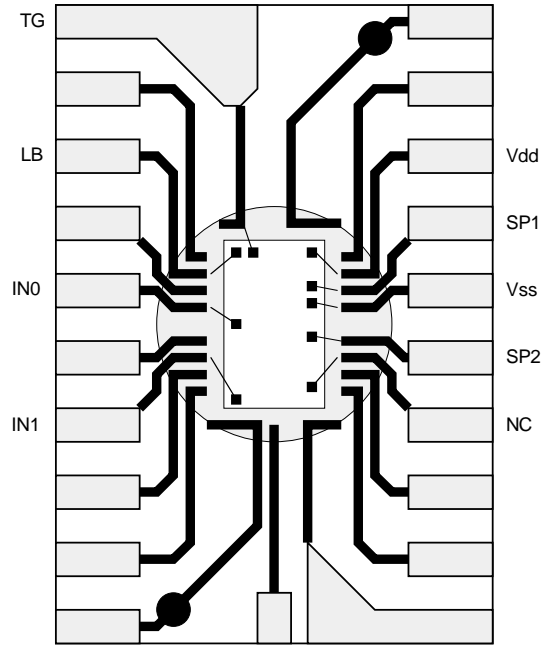
	Code#	Title	Times to Repeat	Times to Play	Trigger			LB	Deb.	SR (Hz)	Remarks
1	002	Ho, Ho, Ho, Merry X'mas!!	0	1	Edge	Unhold	Irret.	Busy	Fast	6.2 K	
2	010	Happy Hollween!!	1	2	Edge	Unhold	Irret.	Busy	Fast	6.2 K	
3	017	Barking Dog	2	3	Edge	Unhold	Irret.	Busy	Fast	8.4 K	
4	018	Screaming Girl	0	1	Edge	Unhold	Irret.	6 Hz LED	Fast	8.4 K	
5	020	Croaking Frog	2	3	Edge	Unhold	Irret.	3 Hz LED	Slow	6.2 K	
6	021	Sound of Cow	1	2	Level	Unhold	Irret.	3 Hz LED	Slow	6.2 K	



**COB Information**

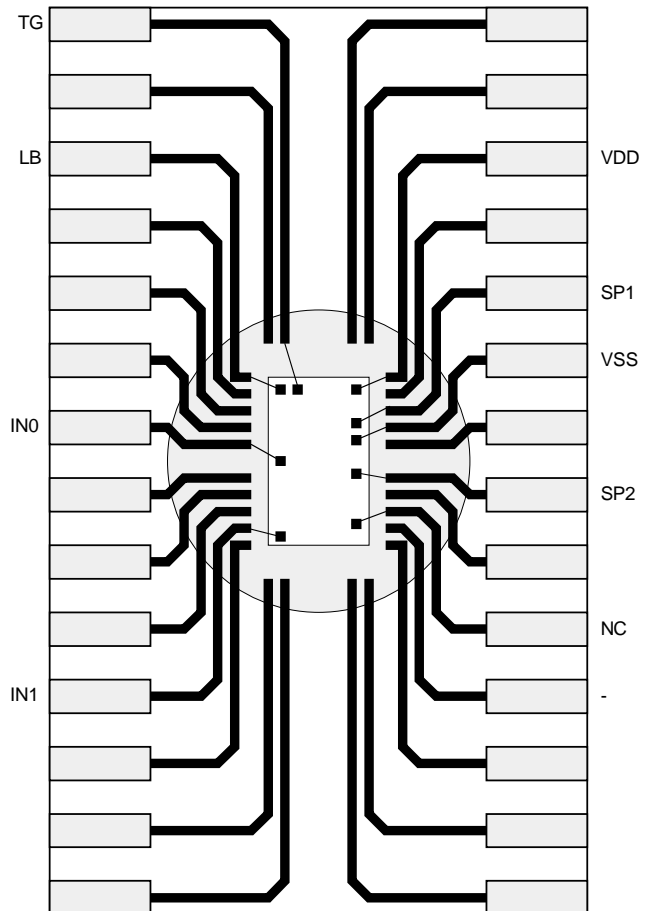
**Model Number : M9220 (P20)**

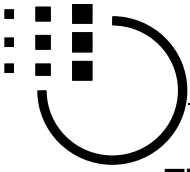
[for codes 050 and later



**Model Number : M9228 (P28)**

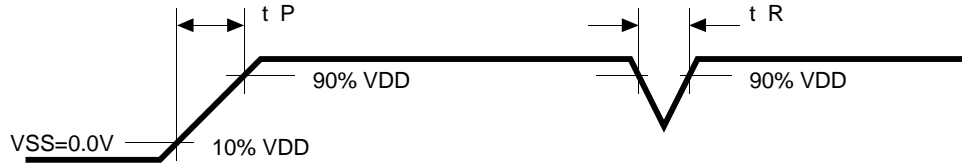
[for codes 001~049]





### Timing Critical

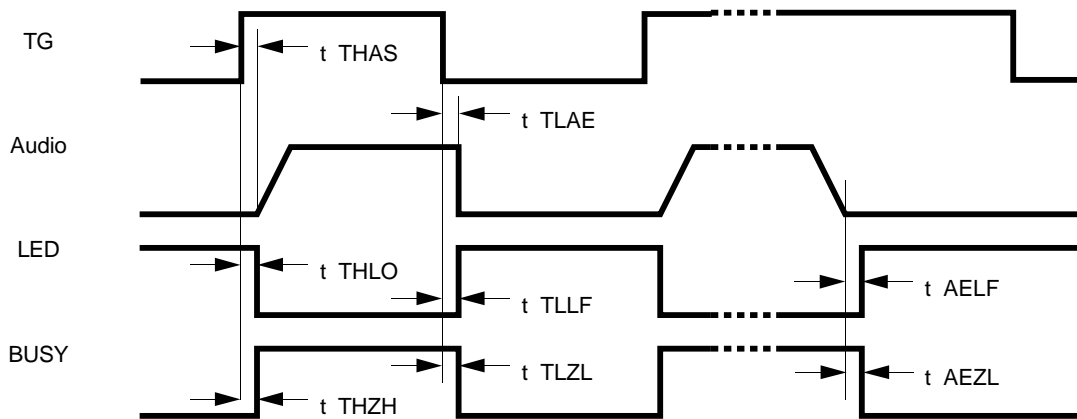
#### Acceptable Power on Signal & Ripple



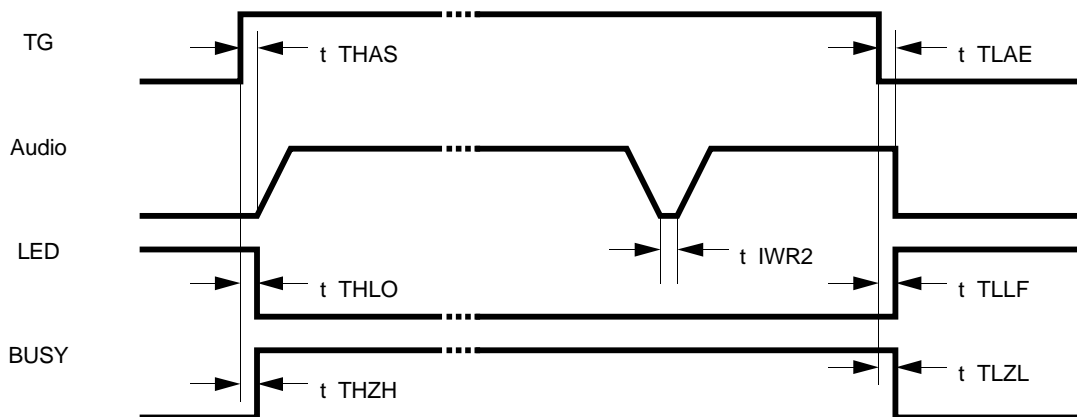
#### Power Up Delay

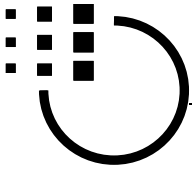


#### To play



#### To play repeatedly

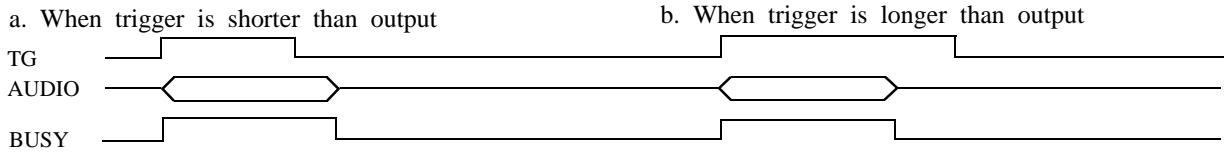




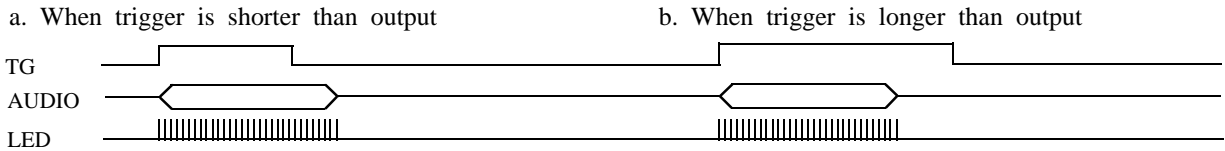
### Timing Diagram

#### I. Edge Trigger Mask

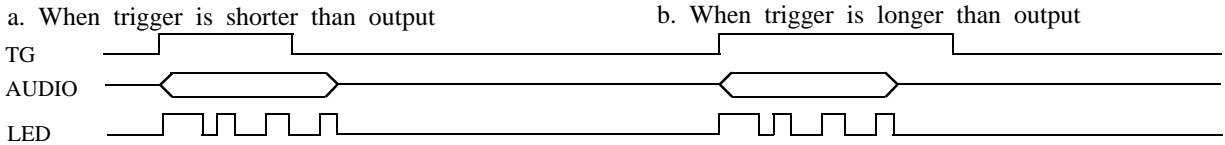
##### I.1. Unholdable output with BUSY



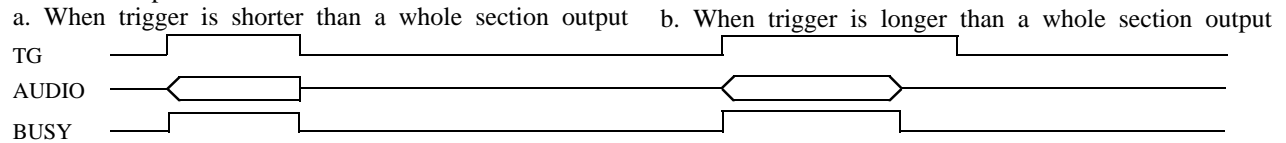
##### I.2. Unholdable output with Fixed-Type LED Flasher



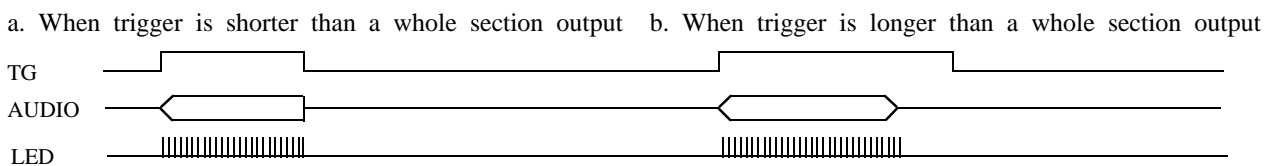
##### I.3. Unholdable output with Dynamic-Type LED Flasher



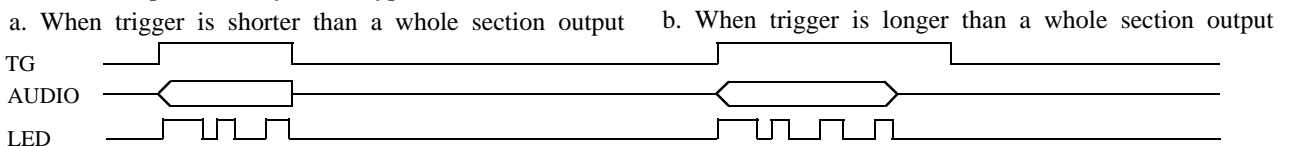
##### I.4. Holdable output with BUSY



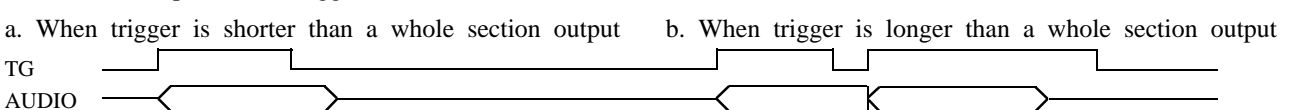
##### I.5. Holdable output with Fixed-Type LED Flasher



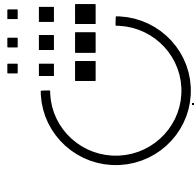
##### I.6. Holdable output with Dynamic-Type LED Flasher



##### I.7. Unholdable output with Retrigger

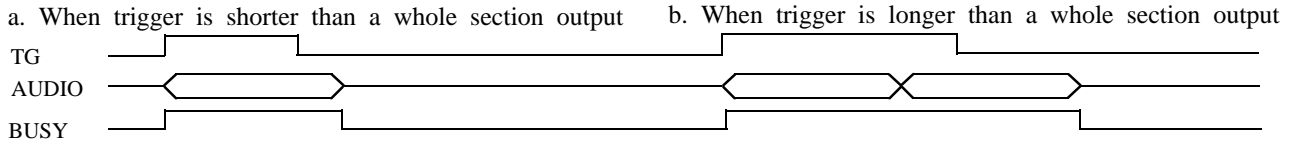




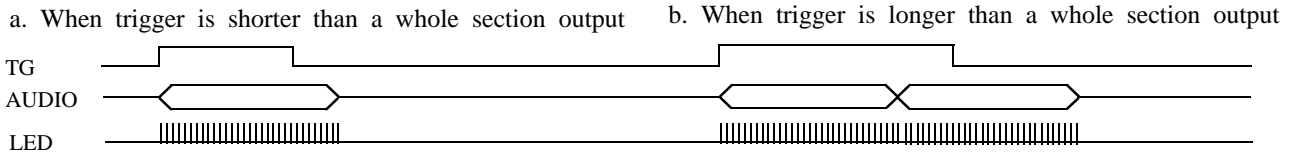


II. Level Trigger Mask

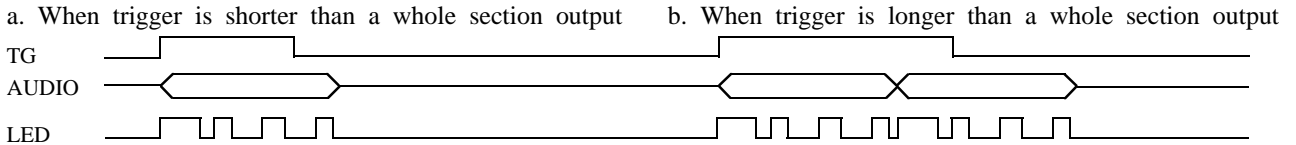
II.1. Unholdable output with BUSY output



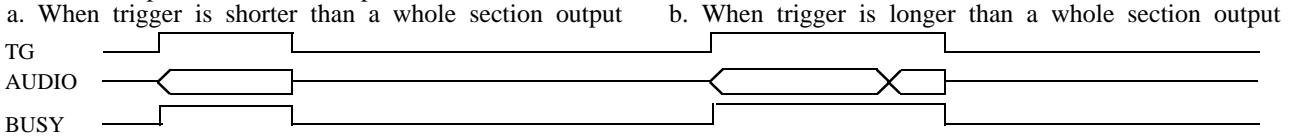
II.2. Unholdable output with Fixed-Type LED Flasher



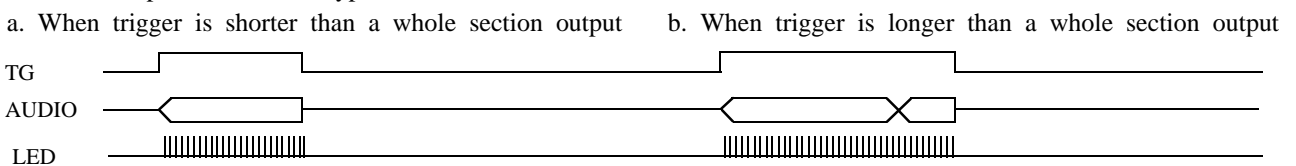
II.3. Unholdable output with Dynamic-Type LED Flasher



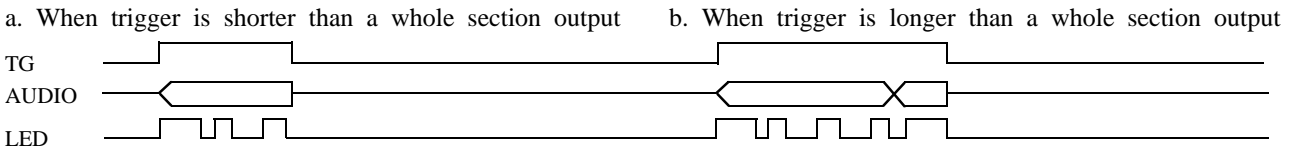
II.4. Holdable output with BUSY output



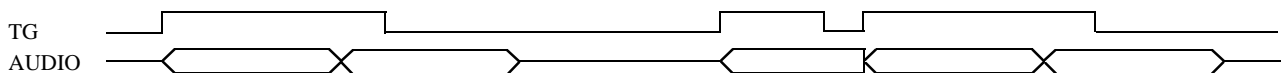
II.5. Holdable output with Fixed-Type LED Flasher

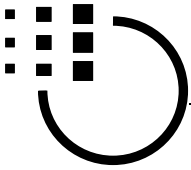


II.6. Holdable output with Dynamic-Type LED Flasher

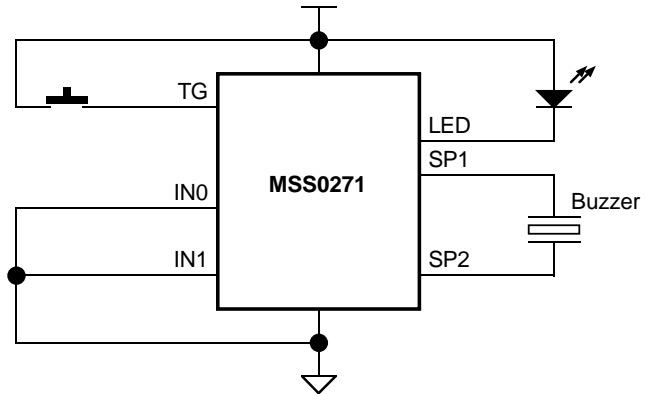
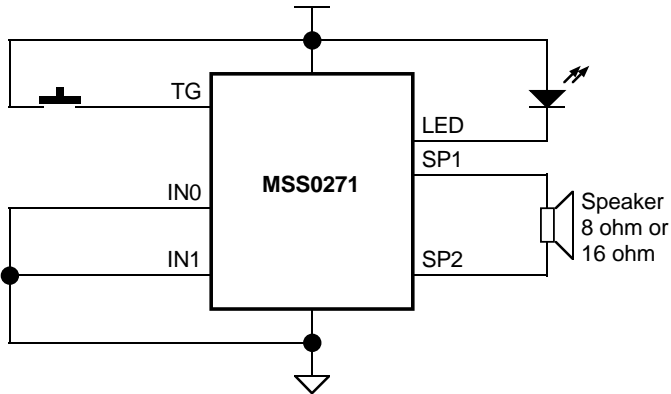


II.7. Unholdable output with Retrigger

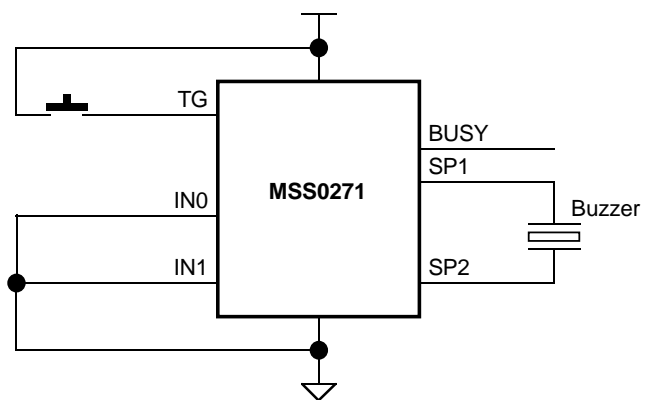
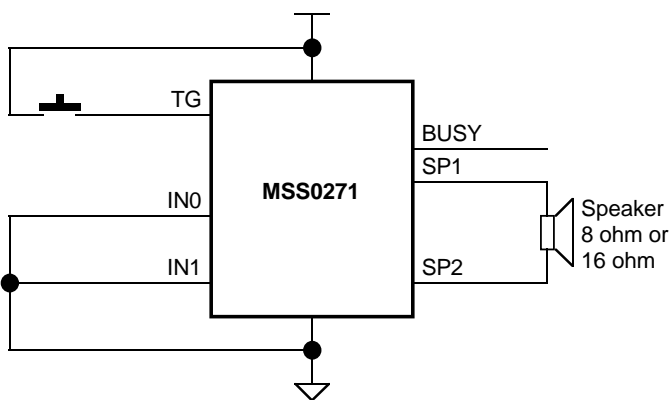




**I. Typical Application Circuit I, Rosc less, LED output**

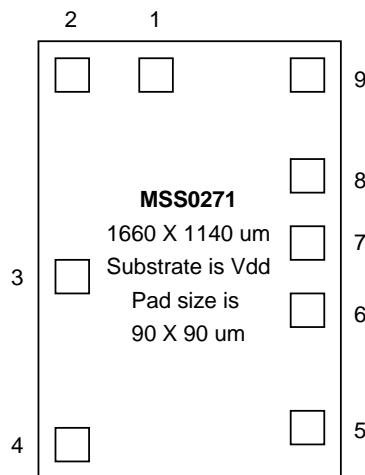


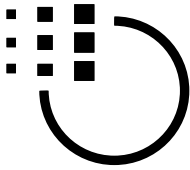
**II. Typical Application Circuit II, Rosc less, Busy output**



**Pad Information**

Pad#	Signal	X	Y
1	TG	-669	-170
2	LB	-663	-409
3	IN0	67	-409
4	IN1	656	-409
5	NC	570	390
6	SP2	195	390
7	Vss	-63	390
8	SP1	-322	390
9	Vdd	-681	390



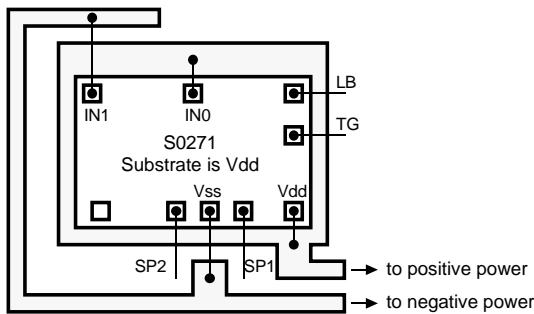


### Bonding to Offset the Shifted Pitch

Below three special bonding means are used to offset the shifted pitch (frequency) and let it perform normally. This happens only for those chip lots have their part number with postfix letter "Z". To not use these special bonding means on normal part is strongly recommended. Of course, the copper route may have different layout on PCB (printed circuit board). It should be decided by user himself. Below shows only what we recommended, not restricted.

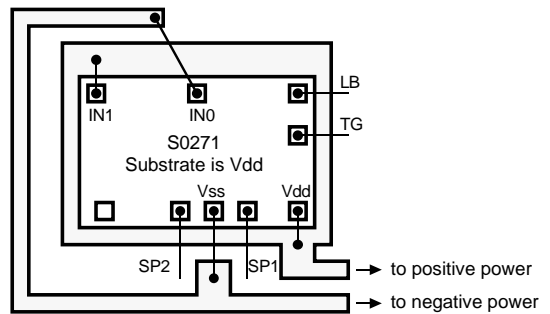
#### I. Type LH Bonding

For lot number with extension letters "LH"



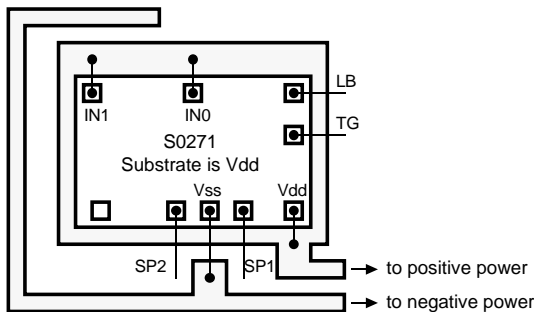
#### II. Type HL Bonding

For lot number with extension letters "HL"



#### III. Type HH Bonding

For lot number with extension letters "HH"



Revision history:  
pid 257\* 12/96  
pid 257\*\* 02/97  
pid 257\*\*\* 05/97

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FAX: 86-755-332-3995  
Mdm: 86-755-332-3995

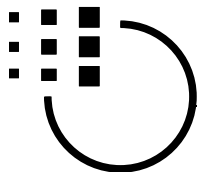
**Hongkong**  
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Taipo, N.T.  
Hongkong  
TEL: 852-2388-8277 (MKO)  
TEL: 852-2665-4883  
FAX: 852-2664-2406  
FAX: 852-2770-8011 (MKO)  
Mdm: 852-2388-0244 (MKO)

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<http://www.moselvitelic.com>

Specifications subject to change without notice, contact your sales representatives for the most recent information.



To : Mosel Vitelic Inc. 886-3-578-4732 (fax)  
 Attn : Sales & Marketing Department

## Product Request Form

I hereby request MVI to start preparing produce **MSS0271** which is specified as below description. I already read this data sheet PID257 \*\*\* and understand **MSS0271** completely and know how to specify to fit my requirement. Its voice storage limitation is 4380h.

General Descriptions		Chip descriptions		
Customer		Title:	Output Device	<input type="checkbox"/> Buzzer (F fr =1KHz)
Agent	Cannot proceed when empty	<input type="checkbox"/> Edge <input type="checkbox"/> Level		<input type="checkbox"/> Speaker (0.25W, 16 ohm, 1" diam.)
Sales Repr'tives	Who is MVI sales you contact ?	<input type="checkbox"/> Built-in Rosc at 6200 Hz <input type="checkbox"/> Built-in Rosc at 8400 Hz		<input type="checkbox"/> Speaker (0.25W, 8 ohm, 1" diam.) <input type="checkbox"/> Other: _____
Providing to MVI	<input type="checkbox"/> 8-bit PCM sound files <input type="checkbox"/> .WAV sound files <input type="checkbox"/> DAT or equivalent <input type="checkbox"/> application is special, see our written memo <input type="checkbox"/> Others _____	<input type="checkbox"/> Debounce = Slow, T T1 <input type="checkbox"/> Debounce = Fast, T T2	Working Voltage	<input type="checkbox"/> 2.5 V <input type="checkbox"/> 3.5 V <input type="checkbox"/> 3.0 V <input type="checkbox"/> 4.0 V <input type="checkbox"/> 4.5 V w/Bulk Cap. <input type="checkbox"/> 5.0 V w/Bulk Cap. <input type="checkbox"/> 5.5 V w/Bulk Cap. <input type="checkbox"/> 6.0 V w/Bulk Cap.
Service Required from MVI	<input type="checkbox"/> EPROMs with data inside <input type="checkbox"/> files to be programmed into EPROM <input type="checkbox"/> emulation board & Eprom <input type="checkbox"/> Confirm table <input type="checkbox"/> Others _____	<input type="checkbox"/> Holdable & Irretriggerable <input type="checkbox"/> Unholdable & Irretriggerable <input type="checkbox"/> Unholdable & Retriggerable <input type="checkbox"/> No use & don't care		Power Source
		<input type="checkbox"/> LB = Busy output <input type="checkbox"/> LB = dynamic LED flasher <input type="checkbox"/> LB = 3Hz LED flasher <input type="checkbox"/> LB = 6Hz LED falsher <input type="checkbox"/> No use and don't care		

Voice content	Voice Length	Mute length (behind)	Total Length	repeat times	total play times
	S ≤2.79 s	S	00h		
	00h ≤4380h	00h	≤20000h	0≤	≤7 1≤ ≤8

Company Name : \_\_\_\_\_ Fax number : \_\_\_\_\_  
 Signature : \_\_\_\_\_ Date : \_\_\_\_\_  
 Department/Section : \_\_\_\_\_ Position Title : \_\_\_\_\_

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