

# SVM7570C/M Series

## Music Generator IC



- 4 Sound Sources
- 620 Words Melody ROM
- Max. of 15 Tunes

### DESCRIPTION

SVM7570C/M Series CMOS high quality Melody IC's are able to play 3 different-tone-quality sounds and also rhythm sounds (percussion) such as drums, cymbals, etc. from the internal programmed ROM, memorizing the wave form, for instance, of instrument sound, melody, alarm sound or bells, and envelope. The ROM size storing music notes is 620 words, which memorize up to 15 tunes with 3 different-tone-quality sounds and rhythm sound.

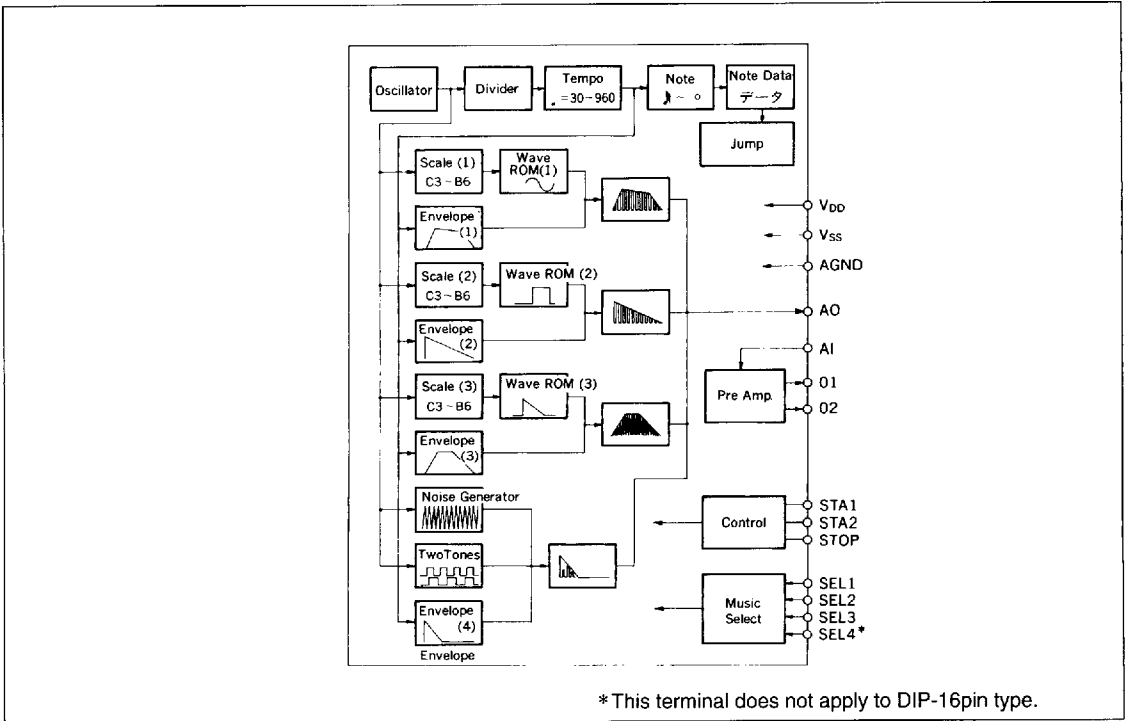
SVM7570C/M Series are suitable for high-grade telephone, high-grade clock, Music Box. Toys, Game Machines, etc.

### FEATURES

- Melody ROM size ..... 620-word
- Maximum number of tunes ..... 15-tune (mask selectable serial selection or binary selection)
- Natural grave sound playable by 3-diferent-tone-quality sound and rhythm sounds.
- Wave form and envelope selectable by wave form Mask ROM.
- Play start mode ..... DC trigger input
- Play mode (level hold play and 2 kinds of one shot play, total of 3 kinds) selectable-play start input pin "STA1" and "STA2".
- Force to stop the play and No play during stop playing input pin "STOP"=H (mask selectable)
- Dinamic speaker (8 Ω) drivable with external transistors.
- Oscillator ..... CR oscillation (C, R built-in)  
Ceramic oscillation (ceramic oscillator, C<sub>G</sub>, C<sub>D</sub>, R<sub>F</sub> external)
- Operating voltage ..... 3.0V (2.4 to 3.5V)/5.0V (3.0 to 5.5V)
- Package ..... DIP-16pin (plastic)/DIP-24pin (plastic)/SOP1-24pin (plastic)

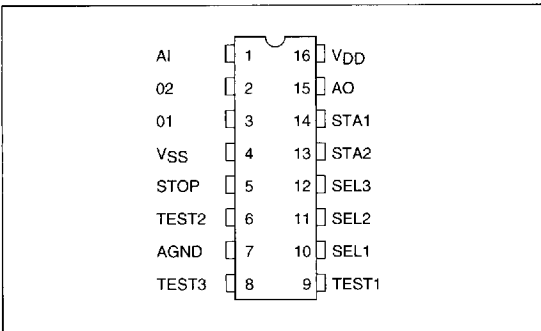
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## ■ BLOCK DIAGRAM

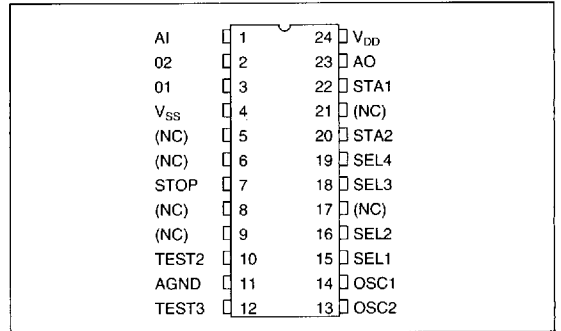


## ■ PIN CONFIGURATION

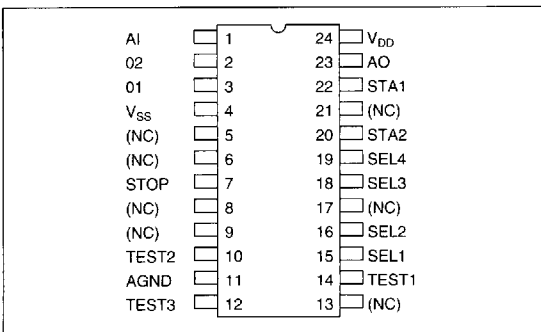
### ● DIP-16pin (CR Oscillator)



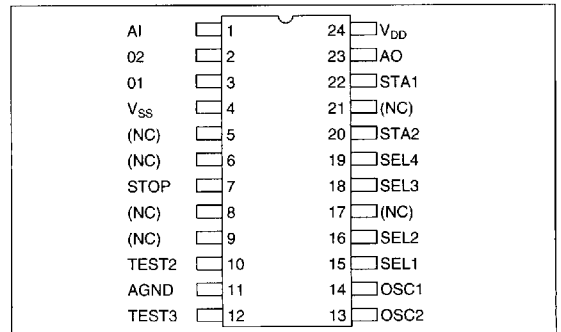
### ● DIP-24pin (Ceramic Oscillator)



### ● DIP-24pin/DIP1-24pin (CR Oscillator)



### ● SOP1-24pin (Ceramic Oscillator)



## ■ PIN DESCRIPTION

Name	Pin No.		I/O	Function
	DIP-16pin	DIP-24pin SOP1-24pin		
AI	1	1	I	Built-in amplifier input
O2	2	2	O	Built-in amplifier output, composing a low frequency linear amplifier with external circuit
O1	3	3	O	
V <sub>SS</sub>	4	4	—	Power terminal (0V)
STOP	5	7	I	Play stop input. Play stops when it turns on.
TEST2	6	10	I	Test input. Should be open or connected to V <sub>SS</sub> for normal use.
AGND	7	11	O	Analog circuit grounding output. Capacitance connection allows its level stable
TEST3	8	12	I	Test input. Should be open or connected to V <sub>SS</sub> for normal use.
OSC2	—	13	I	For ceramic oscillation, ceramic oscillator (CS), gate capacitor (C <sub>G</sub> ), drain capacitor (C <sub>D</sub> ) and feedback resistor (R <sub>f</sub> ) will be connected between terminals to compose of an oscillator circuit.
OSC1	—	14	O	
TEST1	9	14	I	Test input. Should be open for normal use (CR Oscillation only).
SEL1	10	15	I	Binary selection: Selects a tune with SEL2, SEL3 and SEL4. Serial selection: Selects up to 15 tunes sequentially.
SEL2	11	16	I	Binary selection: Selects a tune with SEL1, SEL3 and SEL4. Serial selection: Will not be used, so should be open or connected to V <sub>SS</sub> for normal use.
SEL3	12	18	I	Binary selection: Selects a tune with SEL1, SEL2 and SEL4. Serial selection: It will not be used, so should be open or connected to V <sub>SS</sub> for normal use.
SEL4*	—	19	I	Binary selection: Selects a tune with SEL1, SEL2 and SEL3. Serial selection: Will not be used, so should be open or connected to V <sub>SS</sub> for normal use.
STA2	13	20	I	Play start and play mode selection with STA1.
STA1	14	22	I	Play start and play mode selection with STA2.
AO	15	23	O	Outputs not-amplified acoustic signals and is connected to the built-in amplifier through a volume control and coupling capacitor.
V <sub>DD</sub>	16	24	—	Power terminal (+)
(NC)	—	5, 6, 8, 9, 17, 21	—	Not connected. Should be open for normal use.

\*) At DIP-16pin package device, selectable tunes by binary selection are up to 8, because SEL4 can not use.

## ■ ABSOLUTE MAXIMUM RATINGS

(V<sub>SS</sub>=0V)

Ratings	Symbol	Value	Unit
Power supply	V <sub>DD</sub>	-0.3 to 7.0	V
Input/output voltage	V <sub>I/O</sub>	-0.2 to V <sub>DD</sub> +0.2	V
Operating temperature	T <sub>opr</sub>	-20 to 65	°C
Storage temperature	T <sub>stg</sub>	-55 to 125	°C
Soldering temperature and time	T <sub>sol</sub>	260°C, 10s (lead)	—

## ELECTRICAL CHARACTERISTICS

### ● DC Characteristics

#### ○ 3.0V mode

(V<sub>SS</sub>=0V, T<sub>a</sub>=-20 to 65°C)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit		
Power supply	V <sub>DD</sub>	—	2.4	3.0	3.5	V		
High level input voltage	V <sub>IH</sub>	—	V <sub>DD</sub> -0.1	—	V <sub>DD</sub>	V		
Low level input voltage	V <sub>IL</sub>	—	0	—	0.1	V		
High level input current①	I <sub>IH1</sub>	TEST2, TEST3, STOP V <sub>DD</sub> =3.0V, V <sub>TIH</sub> =V <sub>DD</sub>	10	35	105	μA		
High level input current②	I <sub>IH2</sub>	SEL1, V <sub>DD</sub> =3.0V, V <sub>IH2</sub> =V <sub>DD</sub>	serial selection		10	35	105	μA
			binary selection	standby	—	—	0.2	
		during play		10	35	105		
High level input current③	I <sub>IH3</sub>	SEL2~SEL4, binary selection only, V <sub>DD</sub> =3.0V, V <sub>IH3</sub> =V <sub>DD</sub>	standby		—	—	0.2	μA
			during play		10	35	105	
High level input current④	I <sub>IH4</sub>	STA1, STA2, V <sub>DD</sub> =3.0V, V <sub>IH4</sub> =V <sub>DD</sub>	3	10	30	μA		
High level input current⑤	I <sub>IH5</sub>	A1, V <sub>DD</sub> =3.0V, V <sub>IH5</sub> =V <sub>DD</sub>	standby		20	70	210	μA
			during play		—	—	0.2	
Low level input current①	I <sub>HL</sub>	SEL1~SEL4, STOP, TEST2, TEST3 V <sub>DD</sub> =3.0V, V <sub>HL</sub> =V <sub>SS</sub>	—	—	0.2	μA		
Low level input current②	I <sub>HL2</sub>	STA1, STA2, V <sub>DD</sub> =3.0V, V <sub>IL2</sub> =0.4V	0.8	2.5	8.0	μA		
High level output current①	I <sub>OH1</sub>	O1, standby, V <sub>DD</sub> =V <sub>OH1</sub> =3.0V	—	—	0.2	μA		
High level output current②	I <sub>OH2</sub>	O2, during play, V <sub>DD</sub> =1.2V, V <sub>OH1</sub> =0.7V	2.0	6.0	16.0	mA		
High level output current③	I <sub>OH3</sub>	AO, V <sub>OH</sub> =1.5V, at maximum output	40	120	400	μA		
Low level output current①	I <sub>OL</sub>	O1, during play, V <sub>DD</sub> =1.2V, V <sub>OL1</sub> =0.5V	standby		2.0	6.0	16.0	mA
			during play		—	—	0.2	
Low level output current②	I <sub>OL2</sub>	O2, standby, V <sub>DD</sub> =3.0V, V <sub>OL2</sub> =V <sub>SS</sub>	—	—	0.2	μA		
Low level output current③	I <sub>OL3</sub>	AO, V <sub>OH</sub> =1.5V, at maximum output	40	120	400	μA		
Average current drain during standby	I <sub>SB</sub>	no load, V <sub>DD</sub> =3.0V	—	0.2	10.0	μA		
Average current drain during play	I <sub>OP</sub>	STA1, STA2=V <sub>DD</sub> , V <sub>DD</sub> =3.0V, no load	—	3.0	9.0	mA		

#### ○ 5.0V model

(V<sub>SS</sub>=0V, T<sub>a</sub>=-20 to 65°C)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit		
Power supply	V <sub>DD</sub>	—	4.5	5.0	5.5	V		
High level input voltage	V <sub>IH</sub>	—	V <sub>DD</sub> -0.3	—	V <sub>DD</sub>	V		
Low level input voltage	V <sub>IL</sub>	—	0	—	0.3	V		
High level input current①	I <sub>IH1</sub>	TEST2, TEST3, V <sub>DD</sub> =5.0V, V <sub>TIH</sub> =V <sub>DD</sub>	30	100	300	μA		
High level input current②	I <sub>IH2</sub>	SEL1, V <sub>DD</sub> =5.0V, V <sub>IH2</sub> =V <sub>DD</sub>	serial selection		7.0	25	70	μA
			binary selection	standby	—	—	0.2	
		during play		7.0	25	70		
High level input current③	I <sub>IH3</sub>	SEL2~SEL4, binary selection only, V <sub>DD</sub> =5.0V, V <sub>IH3</sub> =V <sub>DD</sub>	standby		—	—	0.2	μA
			during play		7.0	25	70	

High level input current④	I <sub>IH4</sub>	STA1, STA2, V <sub>DD</sub> =5.0V, V <sub>IH4</sub> =V <sub>DD</sub>	1.5	5.0	15	μA	
High level input current⑤	I <sub>IH5</sub>	AI, V <sub>DD</sub> =5.0V, V <sub>IH5</sub> =V <sub>DD</sub>	standby	60	200	600	μA
			during play	—	—	0.2	
High level input current⑥	I <sub>IH6</sub>	STOP, V <sub>DD</sub> =5.0V, V <sub>IH6</sub> =V <sub>DD</sub>	7.0	25	70	μA	
Low level input current①	I <sub>HI</sub>	SEL1~SEL4, STOP, TEST2, TEST3, V <sub>DD</sub> =5.0V, V <sub>HI</sub> =V <sub>SS</sub>	—	—	0.2	μA	
Low level input current②	I <sub>HI</sub>	STA1, STA2, V <sub>DD</sub> =5.0V, V <sub>IL2</sub> =0.4V	1.5	5.0	15	μA	
High level output current①	I <sub>OH1</sub>	O1, standby, V <sub>DD</sub> =V <sub>OH1</sub> =5.0V	—	—	0.2	μA	
High level output current②	I <sub>OH2</sub>	O2, during play, V <sub>DD</sub> =4.5V, V <sub>OH1</sub> =0.7V	0.8	2.8	6.0	mA	
High level output current③	I <sub>OH3</sub>	AO, V <sub>OH</sub> =2.5V, at maximum output	60	200	600	μA	
Low level output current①	I <sub>OL1</sub>	O1, during play, V <sub>DD</sub> =4.5V, V <sub>OL1</sub> =3.8	0.8	2.8	6.0	mA	
Low level output current②	I <sub>OL2</sub>	O2, standby, V <sub>DD</sub> =5.0V, V <sub>OL2</sub> =V <sub>SS</sub>	—	—	0.2	μA	
Low level output current③	I <sub>OL3</sub>	AO, V <sub>OL</sub> =2.5V, at maximum, output	60	200	600	μA	
Average current drain during standby	I <sub>SB</sub>	all pins open no load V <sub>DD</sub> =5.0V	—	0.2	10	μA	
Average current drain during play	I <sub>OP</sub>	STA1, STA2=V <sub>DD</sub> , no load V <sub>DD</sub> =5.0V	—	6.0	12	mA	

## OSCILLATION AND TEMPERATURE CHARACTERISTICS

### ● 5.2.1 CR Oscillation

#### ○ 3.0V model (CR oscillation)

(V<sub>SS</sub>=0V, Ta=-20 to 65°C)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Oscillation frequency variation	f <sub>OSC1</sub>	V <sub>DD</sub> =3.0V, Ta=25°C, adjusted by the fuse method	-20	262.144 (kHz)	+20	%
Oscillation frequency temperature deviation	f <sub>OSC2</sub>	V <sub>DD</sub> =3.0V, adjusted by the fuse method	-25	f <sub>osc</sub> (25°C)	+25	%
Oscillation selfstart voltage	V <sub>STA</sub>	—	—	—	2.4	V
Oscillation start time	t <sub>OSC</sub>	—	—	—	10	ms
Oscillation stop voltage	V <sub>STP</sub>	—	—	—	2.4	V
Oscillation frequency voltage deviation	εf	$\epsilon f = \frac{f_{osc}(3.5V) - f_{osc}(2.5V)}{f_{osc}(3.5V)}$	—	—	5	%

#### ○ 5.0V model (CR oscillation)

(V<sub>SS</sub>=0V, Ta=-20 to 65°C)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Oscillation frequency variation	f <sub>OSC1</sub>	V <sub>DD</sub> =5.0V, Ta=25°C, adjusted by the fuse method	-20	262.144 (kHz)	+20	%
Oscillation frequency temperature deviation	f <sub>OSC2</sub>	V <sub>DD</sub> =5.0V, adjusted by the fuse method	-25	f <sub>osc</sub> (25°C)	+25	%
Oscillation selfstart voltage	V <sub>STA</sub>	—	—	—	3.0	V
Oscillation start time	t <sub>OSC</sub>	—	—	—	10	ms
Oscillation stop voltage	V <sub>STP</sub>	—	—	—	3.0	V
Oscillation frequency voltage deviation	εf	$\epsilon f = \frac{f_{osc}(5.5V) - f_{osc}(4.5V)}{f_{osc}(5.5V)}$	—	—	5	%

# SVM7570C/M Series

## ○ 3.0V model (Ceramic oscillation)

(CSB262D is used,  $V_{SS}=0V$ ,  $T_a=-20$  to  $65^\circ C$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Oscillation frequency variation	$f_{OSC1}$	$V_{DD}=5V$ , $T_a=25^\circ C$	-0.5	—	+0.5	%
Oscillation frequency temperature deviation	$f_{OSC2}$		-0.5	$f_{OSC}(25^\circ C)$	+0.5	%
Oscillation selfstart voltage	$V_{STA}$	—	—	—	2.4	V
Oscillation stop voltage	$V_{STP}$	—	—	—	2.4	V
Oscillation frequency voltage deviation	$\epsilon f$	$\epsilon f = \frac{f_{OSC}(3.5V) - f_{OSC}(2.5V)}{f_{OSC}(3.5V)}$	—	—	500	PPM

## ○ 5.0V model (Ceramic oscillation)

(CSB262D is used,  $V_{SS}=0V$ ,  $T_a=-20$  to  $65^\circ C$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Oscillation frequency variation	$f_{OSC1}$	$V_{DD}=5.0V$ , $T_a=25^\circ C$	-0.5	—	+0.5	%
Oscillation frequency temperature deviation	$f_{OSC2}$		-0.5	$f_{OSC}(25^\circ C)$	+0.5	%
Oscillation selfstart voltage	$V_{STA}$	—	—	—	3.0	V
Oscillation stop voltage	$V_{STP}$	—	—	—	3.0	V
Oscillation frequency voltage deviation	$\epsilon f$	$\epsilon f = \frac{f_{OSC}(5.5V) - f_{OSC}(4.5V)}{f_{OSC}(5.5V)}$	—	—	500	PPM

## ■ MODEL CLASSIFICATION

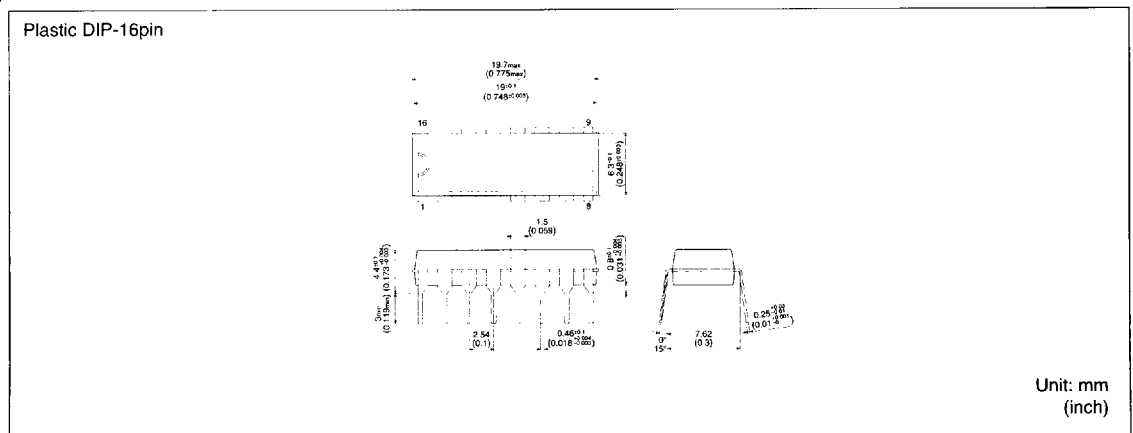
### ● Product name

Model	Package
SVM7571C**	DIP-16pin
SVM7570C**	DIP-24pin
SVM7570M**	SOP-24pin

### ● Power supply (identified by subcode)

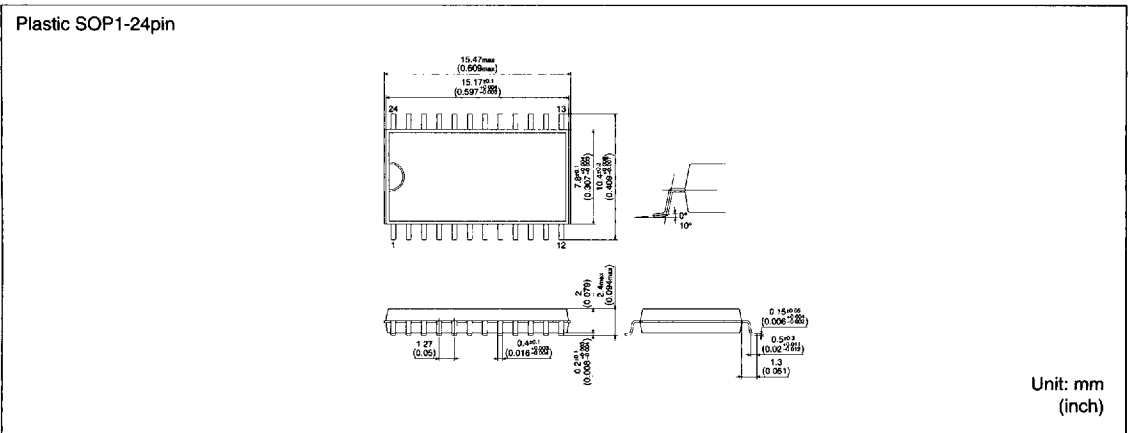
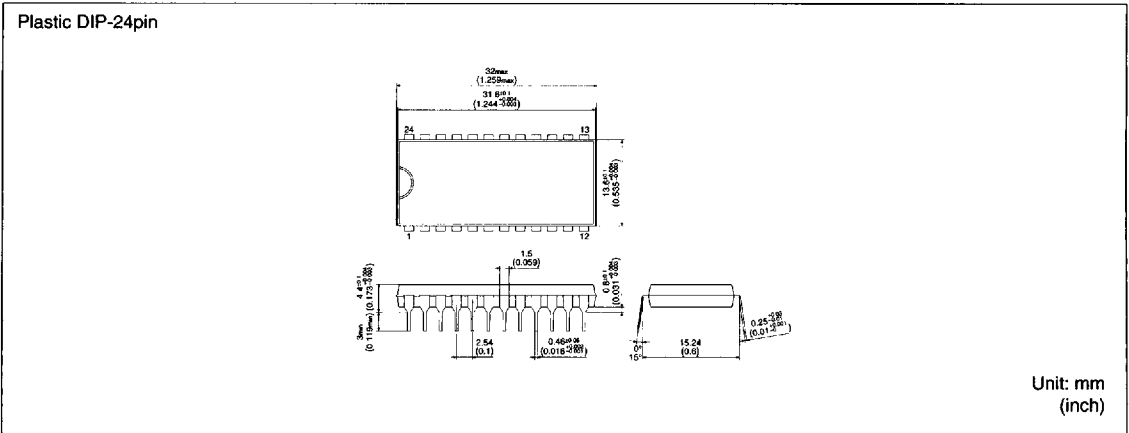
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Subcode	1A, 1B, 1C...	5A, 5B, 5C...

## ■ PACKAGE DIMENSIONS



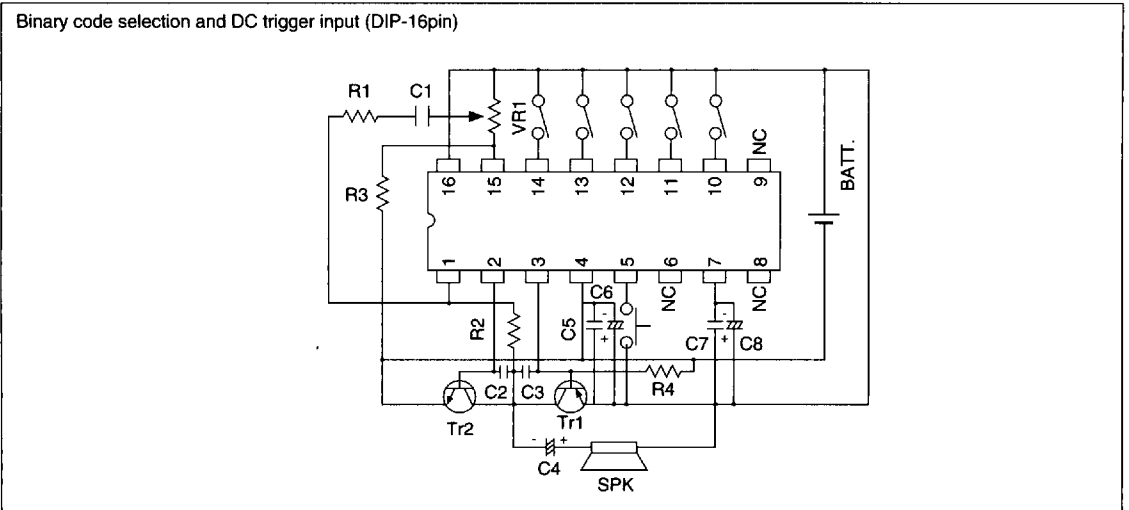
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EPSON



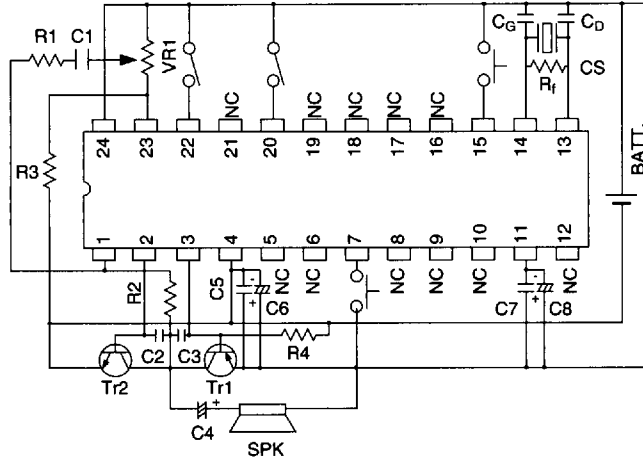
■ SAMPLE CONNECTIONS

● CR Oscillation



## ● Ceramic Oscillation

Serial selection and DC trigger input (DIP-24pin/SOP1-24pin)



## ■ RECOMMENDED STANDARD FOR EXTERNAL COMPONENTS

Symbol	Recommended-value	Unit
SPK	dynamic speaker(8Ω)	—
Tr1	PNP transistor, DC $h_{FE}=160$ (approx.), equivalent to 2SA683	—
Tr2	NPN transistor, DC $h_{FE}=160$ (approx.), equivalent to 2SC1383	—
R1	(50-)150	kΩ
R2	510	kΩ
R3	500	kΩ
R3	2	MΩ
VR1	500	kΩ
C1	0.1	μF
C2	(0.01-) 0.047	μF
C3	(0.01-) 0.047	μF
C4	(100-) 200	μF
C5	0.1	μF
C6	47	μF
C7	0.1	μF
C8	47	μF
CS	262KHz (Ceramic oscillation, RD is not needed)	—
Rf	1 (feedback resistance)	MΩ
CG	330 (Gate capacity)	pF
CD	330 (Drain capacity)	pF

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