

SS0401C/F THERMOMETER

攝氏及華氏體溫計

FEATURES 功能敘述：

- TEMPERATURE RANGE 溫度範圍 32.0°C (89.6°F) ~ 42.0°C (107.6°F)
- RESOLUTION 0.1°C (0.1°F), ACCURACY ±0.1°C (±0.2°F)
- LOW BATTERY DETECTOR 低電壓檢測
- BUZZER ALARM 警示聲及 AUTO POWER-OFF

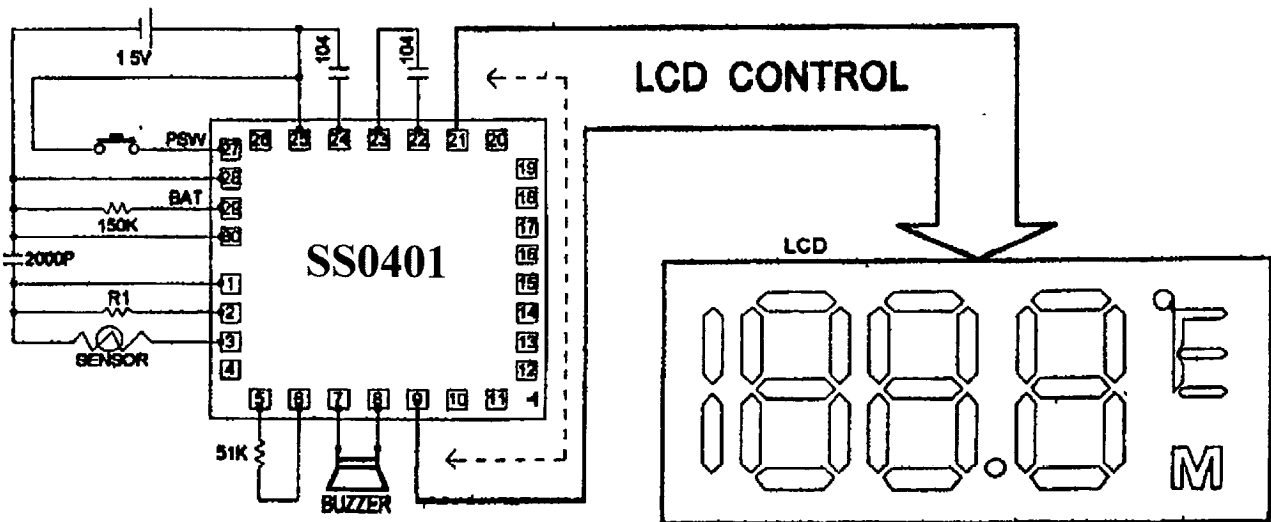
SS0401C 為 °C DISPLAY SS0401F 為 °F DISPLAY

- SENSOR 溫度感測使用 503ET
- CHIP SIZE = 1760 X 1590 um*um

ELECTRICAL CHARACTERISTICS 電氣規格：

CHARACTERISTICS	SYMBOL	MIN.	TYPE	MAX.	UNIT	REMARK
工作電壓 Operating Voltage	Vdd	1.30	1.50	1.65	V	
工作電流 Operating Current	Idd	—	—	80	uA	For Full Display
靜態電流 Stand-by Current	Ist	—	—	0.5	uA	LCD not Display
推動電流 BZ Driving Current	Idv	1.5	—	—	mA	Vout=1/2Vdd
推動電流 BZ Sinking Current	Isk	—	—	-2.0	mA	Vout=1/2Vdd
振盪頻率 Oscillate Frequency	Fosc	—	128	—	KHz	RC Oscillator
工作溫度 Operating Temperature	Topr	-20	—	75	°C	
儲存溫度 Storage Temperature	Tstg	-20	—	125	°C	

APPLICATION DIAGRAM 參考電路圖：



- IC chip substrate don't connect to VDD or VSS.
- All SPEC and applications shown above subject to change without prior notice, 以上電路及規格僅供參考，本公司得逕行修正。(詳細資料請來電索取)

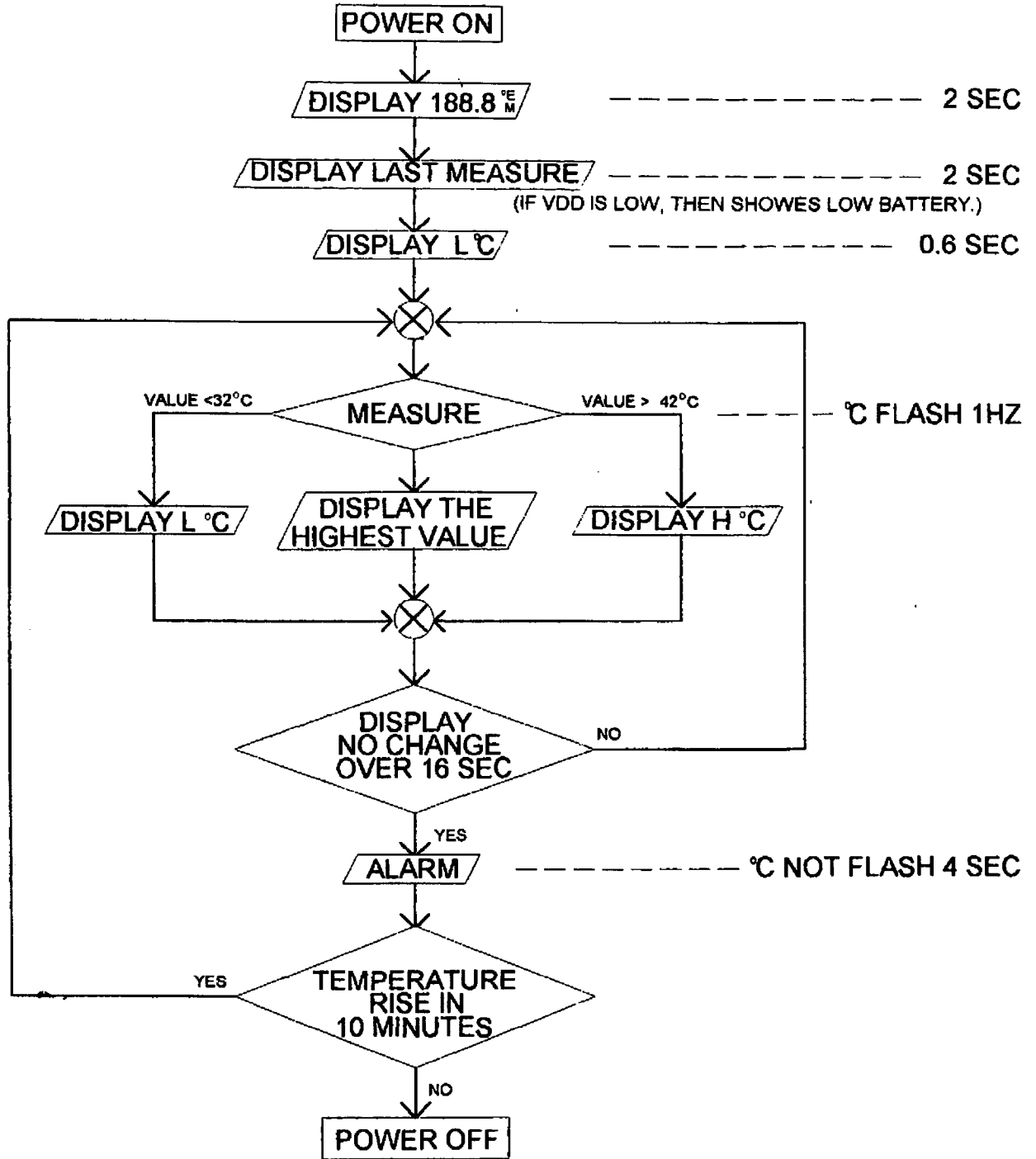
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SS0401C PRODUCT SPECIFICATION (LCD-2)

FUNCTION FLOW DIAGRAM :



REFERENCE ONLY
DATE: 6/10/1999
VERSION: 3.0

SS0401C PRODUCT SPECIFICATION (LCD-2)

GENERAL DESCRIPTION:

- <1> POWER SW: PUSH SWITCH TO POWER ON OR POWER OFF.
- <2> WHEN POWER ON:
- A. THE DISPLAY FIRSTLY SHOW **188.8** ABOUT 2 SEC.
 - B. AFTER A, SHOW THE TEMPERATURE OF THE LAST TIME AND " M " ABOUT 2 SEC.
 - C. AFTER B, SHOW L °C ABOUT 0.6 SEC (DON'T SHOW " M ").
 - D. AFTER C, WHEN IT IS MEASURING. THE °C MARK WILL FLASH AT THE SPEED OF 1HZ.
 - E. IF THE TEMPERATURE < 32.0 °C, THE DISPLAY SHOW L °C.
 - F. IF THE TEMPERATURE > 42.0 °C, THE DISPLAY SHOW H °C.
 - G. THE DISPLAY ALWAYS SHOW THE HIGHER TEMPERATURE DURING THE TEMPERATURE MEASUREMENT.
 - H. IF THE MEASURED TEMPERATURE DOES NOT CHANGE MORE THEN 16 SEC., THE MEASUREMENT IS OVER AND THE °C MARK FLASH STOPS.
 - I. WHEN MEASUREMENT IS OVER, IF THE TEMPERATURE > 37.5 °C, THE BUZZER ALARMS "Bi-Bi-Bi——Bi-Bi-Bi——" FOR 4 SEC, AS FOLLOWS:
Bi———Bi———Bi———
0.125S 0.125S 0.125S 0.125S 0.125S 0.375S
 - IF THE TEMPERATURE ≤ 37.5 °C, THE BUZZER ALARMS "Bi-Bi-Bi-Bi-" FOR 4 SEC, AS FOLLOWS:
Bi———
0.5S 0.5S
 - J. IT WILL AUTOMATICALLY POWER OFF WHEN MEASUREMENT IS OVER FOR 10 MIN.
 - K. WHEN MEASUREMENT IS OVER, IF THE TEMPERATURE RISES WITHIN 10 MIN, THE °C MARK WILL FLASH AGAIN (REPEAT FROM THE STEP OF 2-D).
- <3> PUSH THE SWITCH, THEN IT WILL GENERATE A "Bi" SOUND FOR 0.125 SEC.
- <4> WHEN POWER OFF: THE STAND-BY CURRENT ≤ 0.5 uA.
- <5> THE FREQUENCY OF BUZZER IS 5.3KHZ.

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- <6> AFTER <2>-A, WHEN BATTERY VOLTAGE IS LOW, THE LCD DISPLAY FLASHES AT THE SPEED OF 1HZ AND THE MEASUREMENT MAYBE NOT ACCURATE. LOW BATTERY RESISTER IS ABOUT $95.6K\Omega$ ($R3=120K\Omega$ PARALLEL TO $R_{adj}=470K\Omega$). IF IT SHOWES LOW BATTERY WHEN VDD IS MORE THEN 1.4V, THEN CANCEL R_{adj} .
THE LOW VOLTAGE DETECT: $1.35 \pm 0.05 V$.
- <7> WHEN TEST2 PIN IS CONNECTED TO VDD, THE DISPLAY SHOWS THE REALTIME VALUE NOT THE HIGHEST VALUE, IN ORDER TO ADJUST THE REFERENCE RESISTANCE R_F DURING THE PROCESS OF PRODUCING.
- <8> DURING THE PROCESS OF MASS PRODUCTION, IN ORDER TO ADJUST THE REFERENCE RESISTANCE (R_F), CONNECT TEST2 PIN TO VDD, THE MEASURED TEMPERATURE WILL BE THE ACTURAL TEMPERATURE OF THE MEASURED ENVIRONMENT. IT CAN BE UP OR DOWN, NOT ALWAYS THE HIGHER ONE.
- <9> THE ACCURACY SPECIFICATION IS FOLLOWING BELOW:

Temperature	Specification
$T < 34.0^{\circ}C$	$\pm 0.2^{\circ}C$
$34.0^{\circ}C \leq T < 40.0^{\circ}C$	$\pm 0.1^{\circ}C$
$40.0^{\circ}C \leq T$	$\pm 0.2^{\circ}C$

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PIN DESCRIPTION:

Pin Name	Description
1 SC	REFERENCE AND SENSOR FREQUENCY INPUT PIN. THE REFERENCE & SENSOR FREQUENCY GENERATOR CONSISTS OF PIN 1,2,3.
2 RF	PMOS OPEN DRAIN ,CONNECT TO THE REFERENCE RESISTANCE.
3 RS	PMOS OPEN DRAIN ,CONNECT TO THE SENSOR.
4 TEST1	TEST PIN ,FOR IC TEST ONLY.
5 OSC1	SYSTEM FREQUENCY INPUT PIN.
6 OSC0	SYSTEM FREQUENCY OUTPUT PIN.
7 BZ1	OUTPUT PIN ,THE BUFFER OF BUZZER.
8 BZ2	OUTPUT PIN ,THE BUFFER OF BUZZER.
9 COM1	OUTPUT PIN ,CONNECT TO LCD PIN 1.
10 COM2	OUTPUT PIN ,CONNECT TO LCD PIN 2.
11 COM3	OUTPUT PIN ,CONNECT TO LCD PIN 3.
12 SA1	OUTPUT PIN ,CONNECT TO LCD PIN 4.
13 SA2	OUTPUT PIN ,CONNECT TO LCD PIN 5.
14 SA3	OUTPUT PIN ,CONNECT TO LCD PIN 6.
15 SB1	OUTPUT PIN ,CONNECT TO LCD PIN 7.
16 SB2	OUTPUT PIN ,CONNECT TO LCD PIN 8.
17 SB3	OUTPUT PIN ,CONNECT TO LCD PIN 9.
18 SC1	OUTPUT PIN ,CONNECT TO LCD PIN 10.
19 SC2	OUTPUT PIN ,CONNECT TO LCD PIN 11.
20 SC3	OUTPUT PIN ,CONNECT TO LCD PIN 12.
21 SD1	OUTPUT PIN ,CONNECT TO LCD PIN 13.
22 C512	PIN 24,25,26 CONNECT TO THE VOLTAGE DOUBLER IN ORDER TO GENERATE THE VOLTAGE OF 3V.
23 CAP	
24 VEE	THE VOLTAGE IS 3V.
25 VDD	1.5V

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- 26 TEST2 PULL LOW TEST PIN ,FOR THE TEST OF PRODUCTION. WHEN CONNECT TO VDD ,LCD DISPLAY THE REALTIME VALUE (NOT THE HIGHEST VALUE).
- 27 PSW PULL LOW INPUT PIN ,PUSH SWITCH TO POWER ON OR POWER OFF.
- 28 SEL CONNECT TO VSS : WHEN DETECTING LOW VOLTAGE ,THE LCD DISPLAY WILL BLINK AT THE SPEED OF 1HZ
- 29 BAT FOR THE LOW VOLTAGE DETECTING.
- 30 VSS
-
-

OPERATING PARAMETER:

1. OPERATING VOLTAGE : 1.3 V - 1.65 V
2. OPERATING CURRENT : $\leq 80 \mu\text{A}$
3. INPUT VOLTAGE : $V_{IL} \leq V_{SS} + 0.3 \text{ V}$
 $V_{IH} \geq V_{DD} - 0.3 \text{ V}$
4. OUTPUT VOLTAGE : $V_{OL} \leq V_{SS} + 0.1 \text{ V}$
 $V_{OH} \geq V_{DD} - 0.1 \text{ V}$
5. BUZZER DRIVING CURRENT : $\geq 1.5 \text{ mA}$ ($V_{out}=1/2 V_{DD}$)
BUZZER SINKING CURRENT : $\leq -2.0 \text{ mA}$ ($V_{out}=1/2 V_{DD}$)

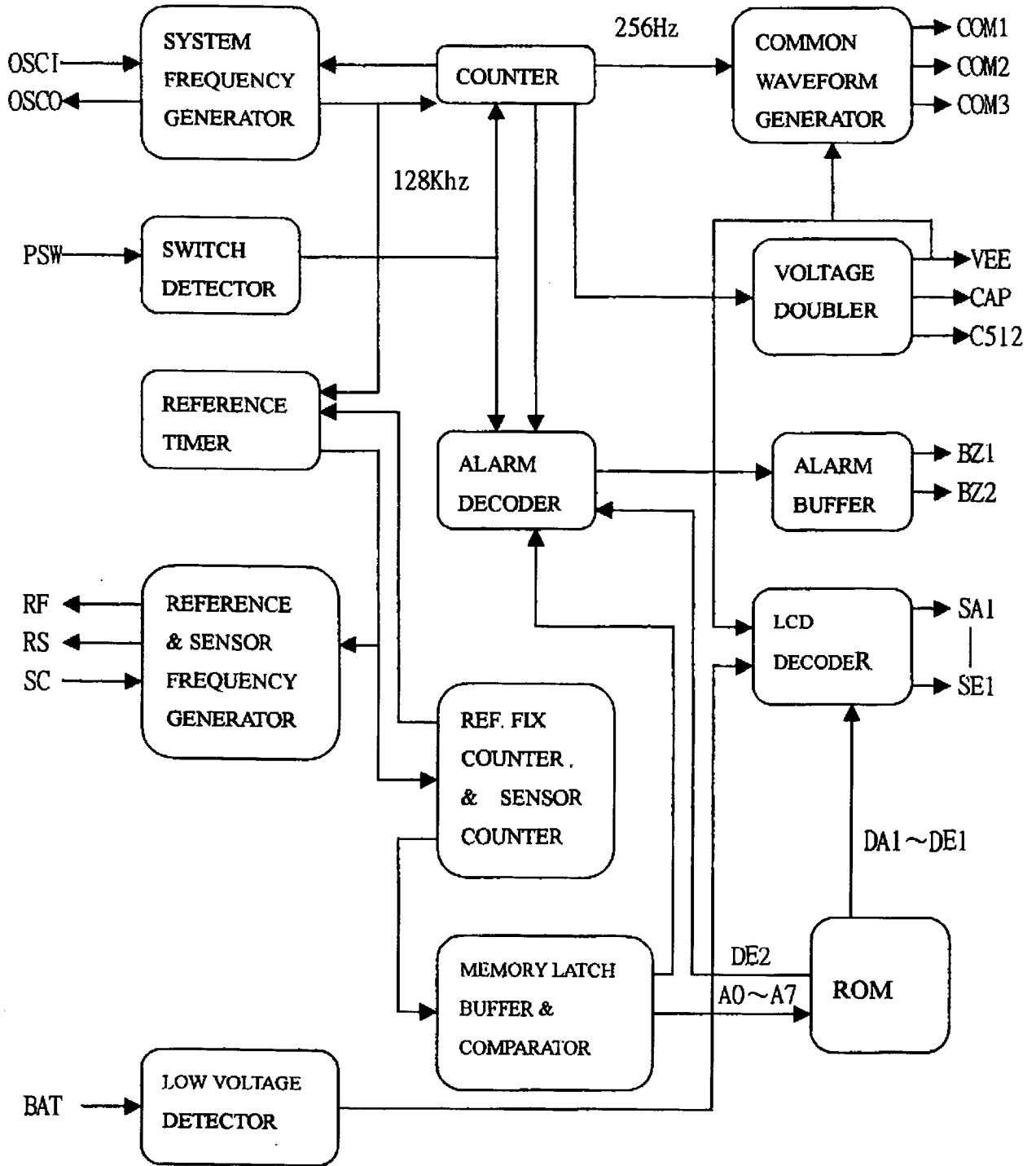
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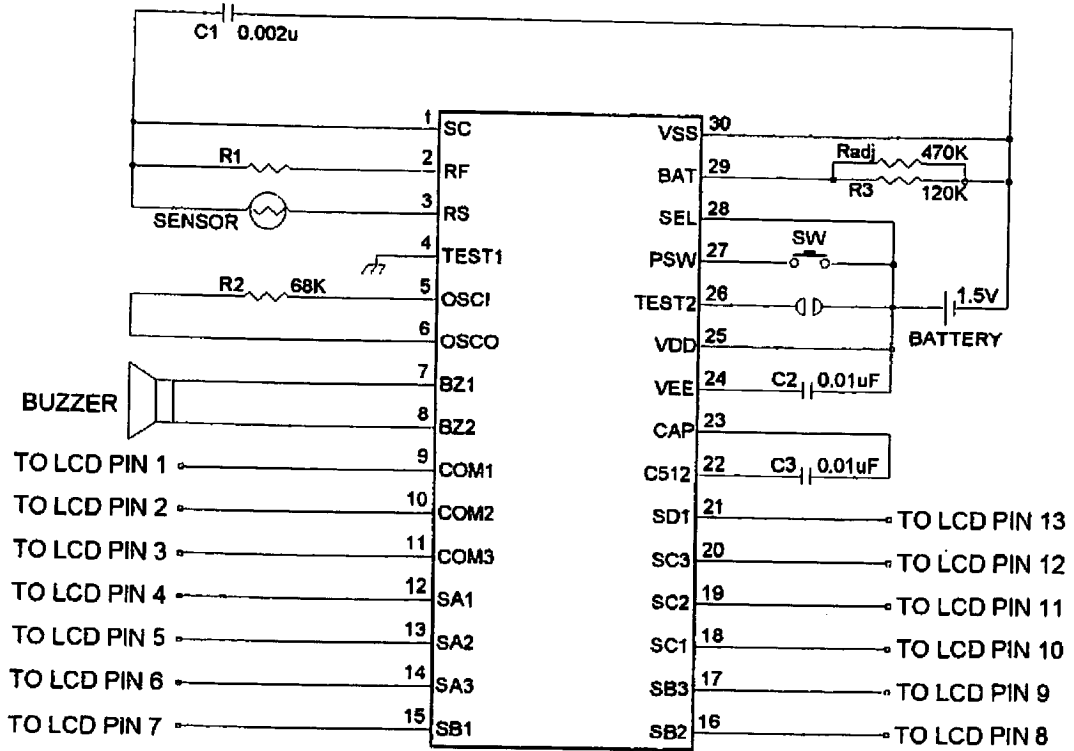
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BLOCK DIAGRAM :



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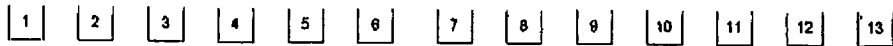
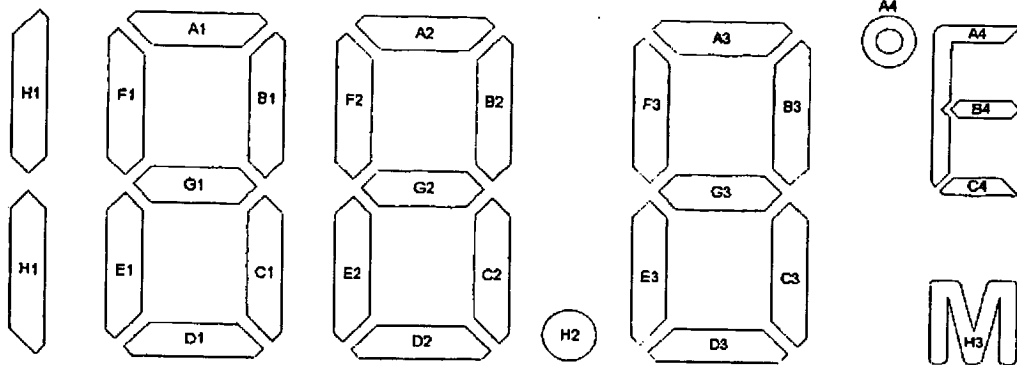
SS0401C THERMOMETER APPLICATION (LCD1)



REMARK:

1. THE VALUE OF R1 IS ACCORDING TO THE SENSOR TYPE (SEE PAGE 10).
2. $R3(120K) \parallel Radj(470K) = 95.6K$

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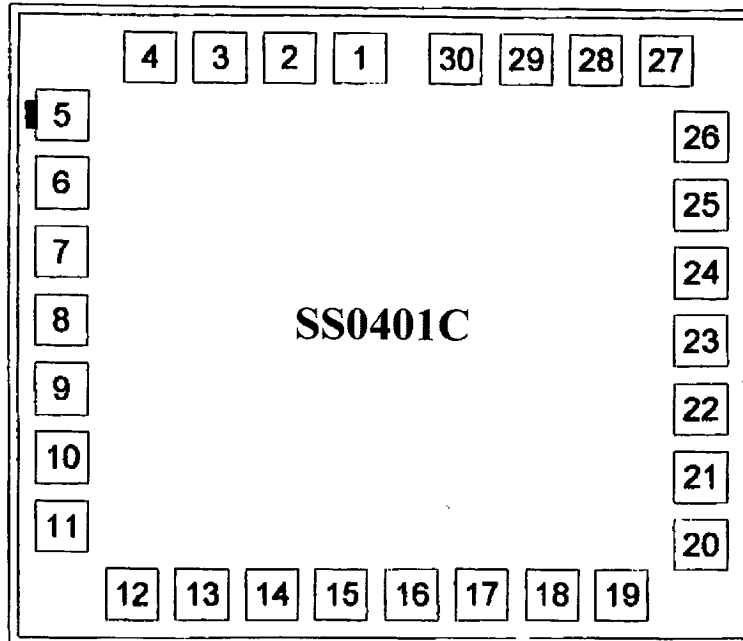
	1	2	3	4	5	6	7	8	9	10	11	12	13
COM1	COM1			F1	A1	B1	F2	A2	B2	F3	A3	B3	A4
COM2		COM2		E1	G1	C1	E2	G2	C2	E3	G3	C3	B4
COM3			COM3	H1	D1			D2	H2		D3	H3	C4

SPEC: A. 1/3 DUTY, 1/2 BIAS. (LCD USES 3V)

B. $V_{TH} = 1.5V$

REFERENCE ONLY
DATE : 6/10/1999
VERSION : 3.0

SS0401C PAD'S DIAGRAM



CHIP SIZE : 1460 um X 1380 um

PAD NAME	PAD No.	COORDINATE (X,Y)	PAD NAME	PAD No.	COORDINATE (X,Y)
SC	1	(- 32.64, 539.80)	SB2	16	(50.24, -539.80)
RF	2	(-155.76, 539.80)	SB3	17	(181.44, -539.80)
RS	3	(-278.88, 539.80)	SC1	18	(312.64, -539.80)
TEST1	4	(-403.36, 539.80)	SC2	19	(443.84, -539.80)
OSCI	5	(-604.80, 394.28)	SC3	20	(604.80, -440.44)
OSCO	6	(-604.80, 269.96)	SD1	21	(604.80, -309.24)
BZ1	7	(-604.80, 123.72)	C512	22	(604.80, -177.68)
BZ2	8	(-604.80, 3.88)	CAP	23	(604.80, - 46.04)
COM1	9	(-604.80, -123.80)	VEE	24	(604.80, 78.20)
COM2	10	(-604.80, -255.00)	VDD	25	(604.80, 201.32)
COM3	11	(-604.80, -386.20)	TEST2	26	(604.80, 347.64)
SA1	12	(-474.56, -539.80)	PSW	27	(548.56, 539.80)
SA2	13	(-343.12, -539.80)	SEL	28	(425.44, 539.80)
SA3	14	(-212.16, -539.80)	BAT	29	(302.32, 539.80)
SB1	15	(- 80.96, -539.80)	VSS	30	(179.20, 539.80)

NOTICE: On PCB, IC Substrate should not connect directly with vss or vdd!

IC TESTING RESULT (FOR REFERENCE ONLY):

SENSOR 503ET ZERO-POWER RESISTANCE AND THE MATCHING RF RESISTANCE TEST:

TYPE	SENSOR SPEC. (37°C) RESISTANCE	RF APPLICATION RESISTANCE
A	29.137	29.730
B	29.242	29.838
C	29.348	29.939
D	29.454	29.044
E	29.561	29.152
F	29.668	29.253
G	29.775	29.356
H	29.883	29.465

TYPE	SENSOR SPEC. (37°C) RESISTANCE	RF APPLICATION RESISTANCE
I	29.991	29.572
J	30.100	29.677
K	30.209	29.779
L	30.318	29.890
M	30.428	29.998
N	30.538	30.104
O	30.649	30.211
P	30.759	30.325

UNIT:KΩ

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