体温计 IC

Demerol Description

The DL7018 is an electronic clinical thermometer IC. It's functions compatible TC8492A and enhance the buzzer's frequency (6.4K/8K) option by pad.
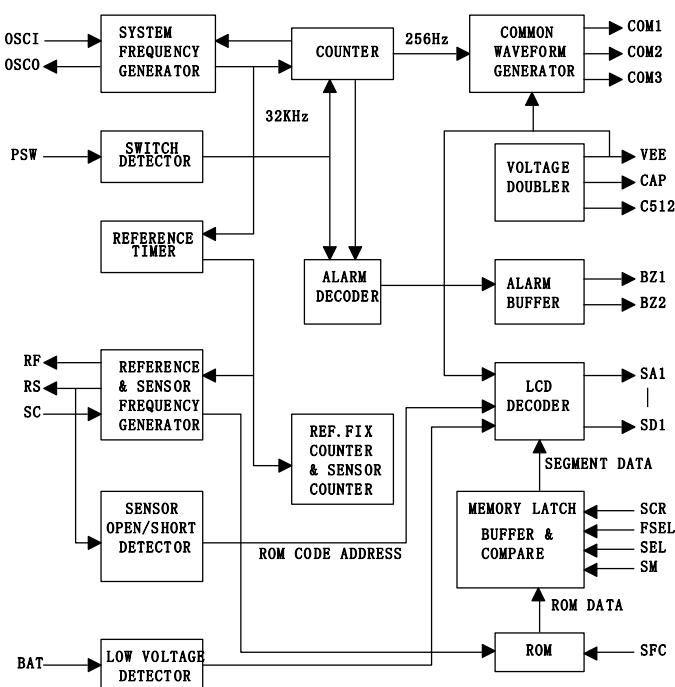
Features

➢ Single 1.5V battery power supply

➢ Provide lower voltage detector function

➢ Provide fever alarm function

➢ Automatic calmly turn-off function

➢ Buzzer alarm indicates ON/OFF button pushes

➢ Buzzer alarm indicates NO increase in temperature

➢ Buzzer alarm indicates fever detected

➢ Within buzzer alarm interval disable peak temperature latch

➢ Bonding option read in the biomedical range of 32℃ to 42℃ or 32℃ to 44℃

➢ Bonding option read in the biomedical range of 89℉ to 107.6℉ or 89.6℉ to 111.2℉

➢ Bonding option memory function

➢ Bonding option ℃ or ℉

➢ Bonding option buzzer alarm frequency 4K/6.4K/8K or 5.3K/6.4K/8K

Application

➢ 60sec digital LCD thermometer

Block Diagram

PAD Description

No	Name	Description
1	SCR	Buzzer alarm frequency select PAD. NO connect: for TC2156 function is 5.3KHz; for TC4367 function is 4KHz. Connect to VSS: for TC2156 &TC4367 function are 6.4KHz or 8KHz.
2	SC	Reference and sensor frequency input PAD. The reference & sensor frequency generator consists of PAD2, 3, 4.
3	RF	PMOS open drain, connect to the reference RESI stance.
4	RS	PMOS open drain, connect to the sensor.
5	TEST1	TEST PAD, for IC TEST only.
6	OSCI	System frequency input PAD.
7	OSCO	System frequency output PAD.
8	BZ1	Output PAD, the buffer of buzzer.
9	BZ2	Output PAD, the buffer of buzzer.
10	COM1	Output PAD, connect to LCD PIN1.
11	COM2	Output PAD, connect to LCD PIN2.
12	COM3	Output PAD, connect to LCD PIN3.
13	SA1	Output PAD, connect to LCD PIN4.
14	SA2	Output PAD, connect to LCD PIN5.
15	SA3	Output PAD, connect to LCD PIN6.
16	SB1	Output PAD, connect to LCD PIN7
17	SB2	Output PAD, connect to LCD PIN8.
18	SB3	Output PAD, connect to LCD PIN9.
19	SC1	Output PAD, connect to LCD PIN10.
20	SC2	Output PAD, connect to LCD PIN11.
21	SC3	Output PAD, connect to LCD PIN12.
22	SD1	Output PAD, connect to LCD PIN13.
23	C512	PAD23, 24 is doublers voltage 3V capacitor connects.
24	CAP	PAD23, 24 is doublers voltage 3V capacitor connects.
25	VEE	The voltage is 3V.
26	VDD	1.5V power PAD.
27	FSEL	FUNCTI ON SELET PAD. NO connect: for TC2156 function. Connect to VDD. For TC4367 function.
28	TEST2	Pull low test PAD, for the test of production when connect to VDD, LCD display the real time value (not the hi ghost value).
29	PSW	Pull low input PAD, push switch to power on or power off.
30	SEL	For TC2156 function.

		No connect: when detecting low voltage, the battery mark will blink at the speed of 1Hz.
		Connect to VSS: when detecting low voltage, LCD display will blink at the speed of 1Hz.
		When SCR PAD connect to VSS.
		For TC4367 select buzzer alarm frequency function.
		No connect: buzzer alarm frequency is 6.4KHz.
		Connect to VSS: buzzer alarm frequency is 8KHz.
31	BAT	For the low voltage detecting.
32	SM	For TC4367 function.
		No connect: memory function.
		Connect to VSS: no memory function.
		When SCR PAD connect to VSS.
		For TC2156 select buzzer alarm frequency function.
		No connect: buzzer alarm frequency is 6.4KHz.
		Connect to VSS: buzzer alarm frequency is 8KHz.
33	VSS	Power PAD.
34	SFC	Select temperature show ℃ or ℉.
		No connect: ℃
		Connect to VSS: ℉
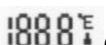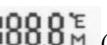
Electrical Parameter

Description		Max	Typ	Min	Unit
Operating voltage		1.65	1.5	1.3	V
Operating average current		30	--	--	uA
Input voltage	V_{IL}	Vss+0.3	--	--	V
	V_{IH}	--	--	VDD-0.3	V
Output voltage	V_{OL}	Vss+0.1	--	--	V
	V_{OH}	--	--	VDD-0.1	V
Buzzer diving current		--	--	1	mA
Buzzer sinking current		--	--	1	mA
Pull low resistor	PSW PAD	--	--	300	KΩ
	TEST2 PAD	--	--	6	KΩ
	TEST1 PAD	--	--	6	KΩ

Function Description

1. When FSEL = NC: (For TC2156)

    1) Power SW push switch to power on or power off.

    2) When power on:

        A. The LCD display ¡88.8℃ (when SEL=NC) or ¡88.8℃ (when SEL=0)about 2 SEC.

        B. After A, show the temperature of last measure (and "M" when SEL=0) about 2 SEC.
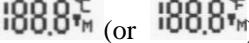
C. After B, show L ℃(or ℉) about 0.6 SEC (don't show M" hen SEL=0).

D. After C, when it is measuring the ℃(or ℉) will flash at the speed of 1Hz.

E. If the temperature < 32℃ (89.6℉), then display L℃(℉).

F. If the temperature > 42℃(107.6℉), then display H℃(℉).

G. When measuring, the LCD will always display the highest temperature.

H. If the measure temperature is not changed more than 16 second, the measurement is over and mark ℃ (℉) flash stop.

I. When measurement is over, if the temperature>37.5℃ (99.5℉),

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℃ (99.5℉), the buzzer alarms "Bi-Bi-Bi-Bi-"for 4SEC,as follows:

Bi——————————

0.5s　　　0.5s

J. It will auto power off when measurement is over than10 minutes.

K. When measurement is over, if the temperature rises within 10 min, the ℃(℉) mark will flash again(repeat from the step of 2-D).

3) When push switch, buzzer will alarm "Bi" about 0.125 sec.

4) When power off: the stand-by current ≤0.5uA

5) The frequency of buzzer:

When SCR = NC or 1, that Fb zIS 5.3KHz.

When SCR=0 and SM=Nc or 1, fhat Fb zIS 6.4KHz.

When SCR=0 and SM=0, that Fb zIS 8KHz.

6) After 2)-A, if detect low voltage (1.35±0.05V):

A: When SEL=1 or NC:

The battery mark " ▮ " flashes as the speed of 1Hz and the measurement maybe not accurate, means thermometer must be changed battery.

B: when SEL=0:

The LCD display lashes as the speed of 1Hz and the measurement maybe not accurate, means thermometer must be changed battery.

7) When TEST2 pin is connected to VDD, the LCD display the real time value not the hi ghost value, in order to adjust the reference resistance if during the process of producing.

8) ℃/℉ (SFC PAD) functions used PAD option.

	PAD connect to VSS	PAD without connect
SFC PAD	℉	℃

SEL PAD when SCR PAD connect to VSS, the SEL PAD select frequency of buzzer 6.4KHz or 8KHz for TC2156 function.

When SCR=0

	PAD connect to VSS	PAD no connect
SM PAD	8KHz	6.4KHz

9) Thermometer others charter is below.

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Temperature range	32℃ ~ 42℃	89.6℉ ~ 107.6℉
Accuracy	±0.1℃	±0.2℉
Resolution	0.1℃	0.1℉

2. When FSEL = 1: (For TC4367)

   1) Power SW push switch to power on or power off.

   2) When power on:

      A. The LCD display $188.8^{℃}_{M}$ (or $188.8^{℉}_{M}$) about 2 SEC. if non-memory function the "M" will not display.

      B. After A, with memory function push switch more than 2 SEC, LCD will display the stable-temperature of last measure, and "M" will display.

      C. After B, LCD display 36.5℃ (97.7℉) about 1 second.

      D. After C, when it is measuring the ℃ (or ℉) will flash at the speed of 1Hz.

      E. With memory function, the stable-temperature time will be counted after releasing switch for 8 second. Without memory function, the stable-temperature time will be counted after turn on 8 second.

      F. If the temperature < 32℃ (89.6℉), then display L℃ (℉).

      G. If the temperature > 44℃ (111.2℉), then display H ℃ (℉).

      H. When measuring, the LCD will always display the highest temperature.

      I. If the measure temperature is not changed more than 16 second, the measurement is over and mark ℃ (℉) flash stop.

      J. When measurement is over, if the temperature>37.5℃ (99.5℉),
         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℃ (99.5℉), the buzzer alarms" Bi-Bi-Bi-Bi-" for 4 SEC, as follows:
         Bi————————————
         0.5s 0.5s

      K. It will auto power off when measurement is over than10 minutes.

      L. When measurement is over, if the temperature rises within 10 minutes, then releaser the temperature, but the ℃(℉) mark will not flash again. When remeasurement is over, the buzzer will not alarm again.

   3) When push switch, buzzer will alarm "Bi" about 0.125 sec.

   4) When power off: the stand-by current ≤0.5uA

   5) The frequency of buzzer:
   When SCR = NC or 1, that Fb zIS 4KHz.
   When SCR=0 and SEL=NC or 1, that Fb zIS 6.4KHz.
   When SCR=0 and SEL=0, that Fb zIS 8KHz.

   6) After 2)-B, if detect low voltage (1.35±0.05V), the LCD will only display battery mark" ▮ " and the measurement maybe not accurate, means thermometer must be changed battery.

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7) When sensor circuit detect error, LCD only display "E", it will not measure normally until the error status cancel.

8) When TEST2   pin is connected to VDD, the LCD display the real time value not the hi ghost value, in order to adjust the reference resistance if during the process of producing.

9) Memory (SM PAD) and ℃/℉ (SFC PAD) functions used PAD option.

	PAD connect to VSS	PAD without connect
SFC PAD	℉	℃
SM PAD	No memory function	Memory function

SEL PAD when SCR PAD connect to VSS, the SEL PAD select frequency of buzzer 6.4KHz or 8KHz for TC4367 function.

When SCR=0

	PAD connect to VSS	PAD no connect
SEL PAD	8KHz	6.4KHz

10) Thermometer others charter is below.
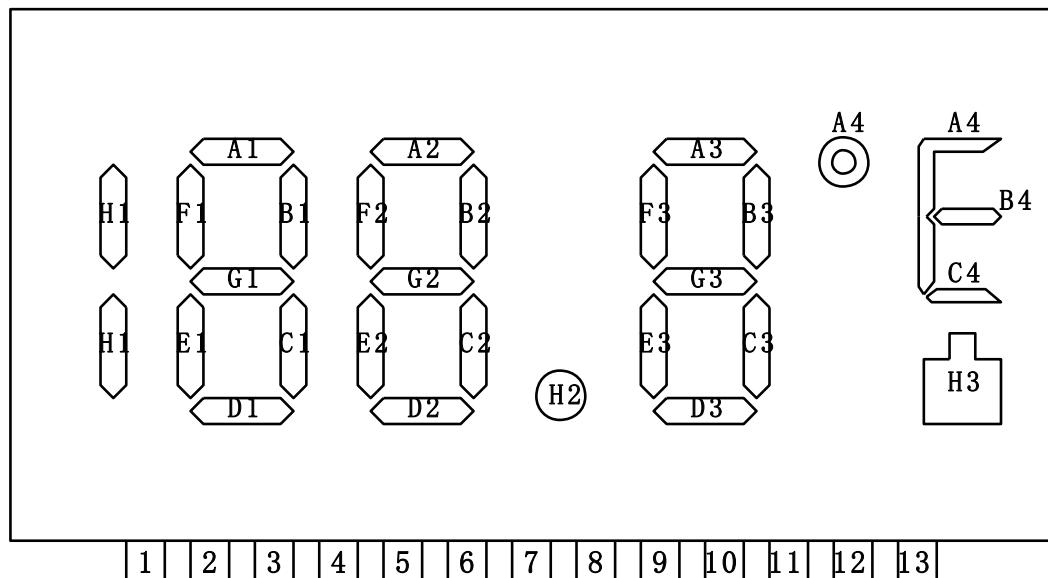
Temperature range	32℃ ~ 44℃	89.6℉ ~ 111.2℉
Accuracy	±0.1℃	±0.2℉
Resolution	0.1℃	0.1℉

LCD Pattern

1. DL7018 LCD connection: (For TC2156, LCD-1)

FSEL Pad: no connect

SEL Pad: no connect (LCD 1)

	1	2	3	4	5	6	7	8	9	10	11	12	13

|	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
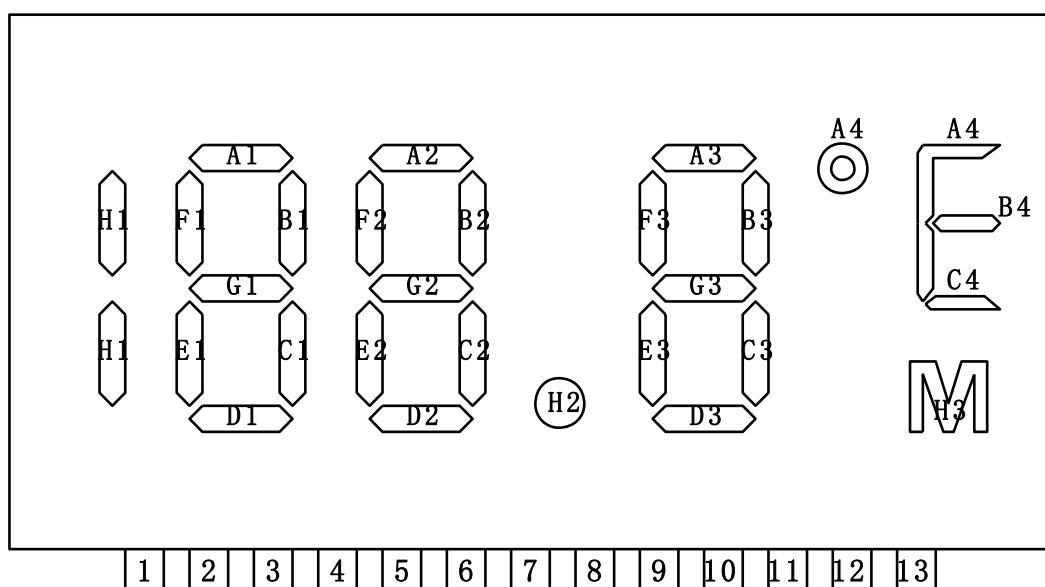
Spec: A. 1/3 duty, 1/2 bias. (LCD uses 3V)

B. $V_{TH} = 1.5V$

2. DL7018 LCD Connection: (For TC2156, LCD-2)

FSEL Pad: no connect

SEL Pad: connect to VSS (LCD 2)

|	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
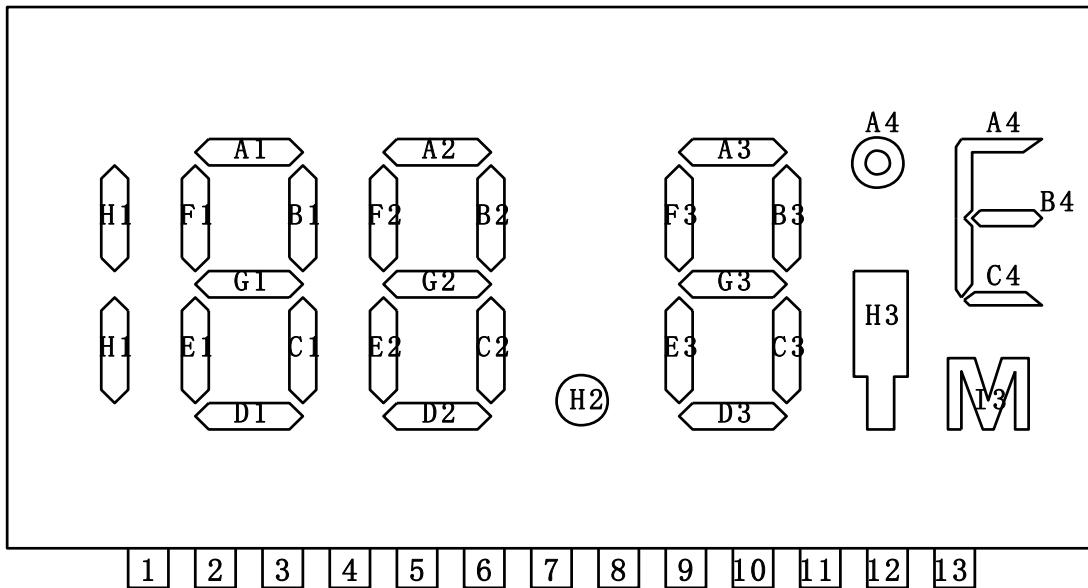
Spec: A. 1/3 duty, 1/2 bias. (LCD uses 3V)

B. $V_{TH} = 1.5V$

3. T8492B LCD Connection: (For TC4367)

FSEL Pad: connect to VDD
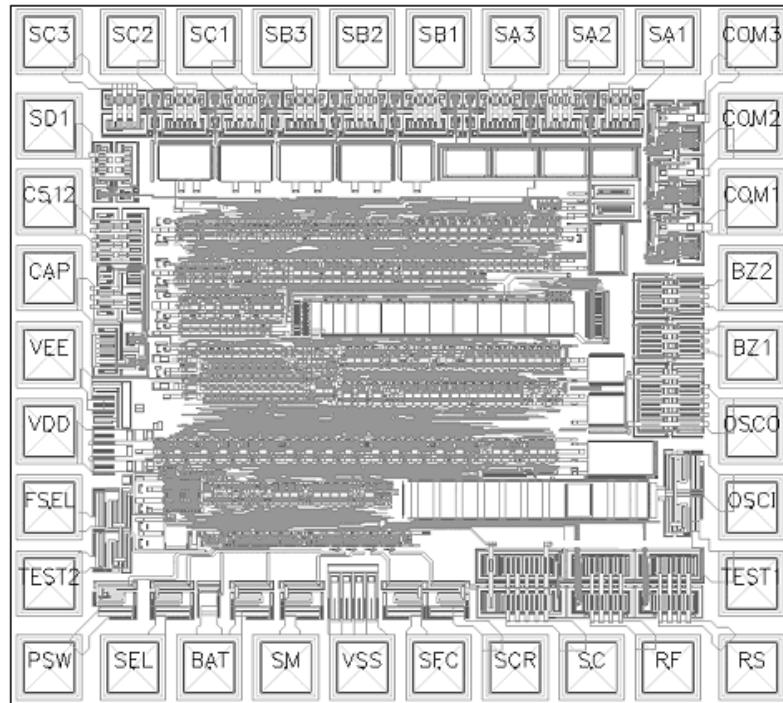
	1	2	3	4	5	6	7	8	9	10	11	12	13
COM1	COM1			F1	A1	B1	F2	A2	B2	F3	A3	B3	A4
COM2		COM2		E1	G1	C1	E2	G2	C2	E3	G3	C3	B4
COM3			COM3	H1	D1			D2	H2	I3	D3	H3	C4

Spec: A. 1/3 duty, 1/2 bias. (LCD uses 3V)

B. $V_{TH} = 1.5V$

PAD LOCATION
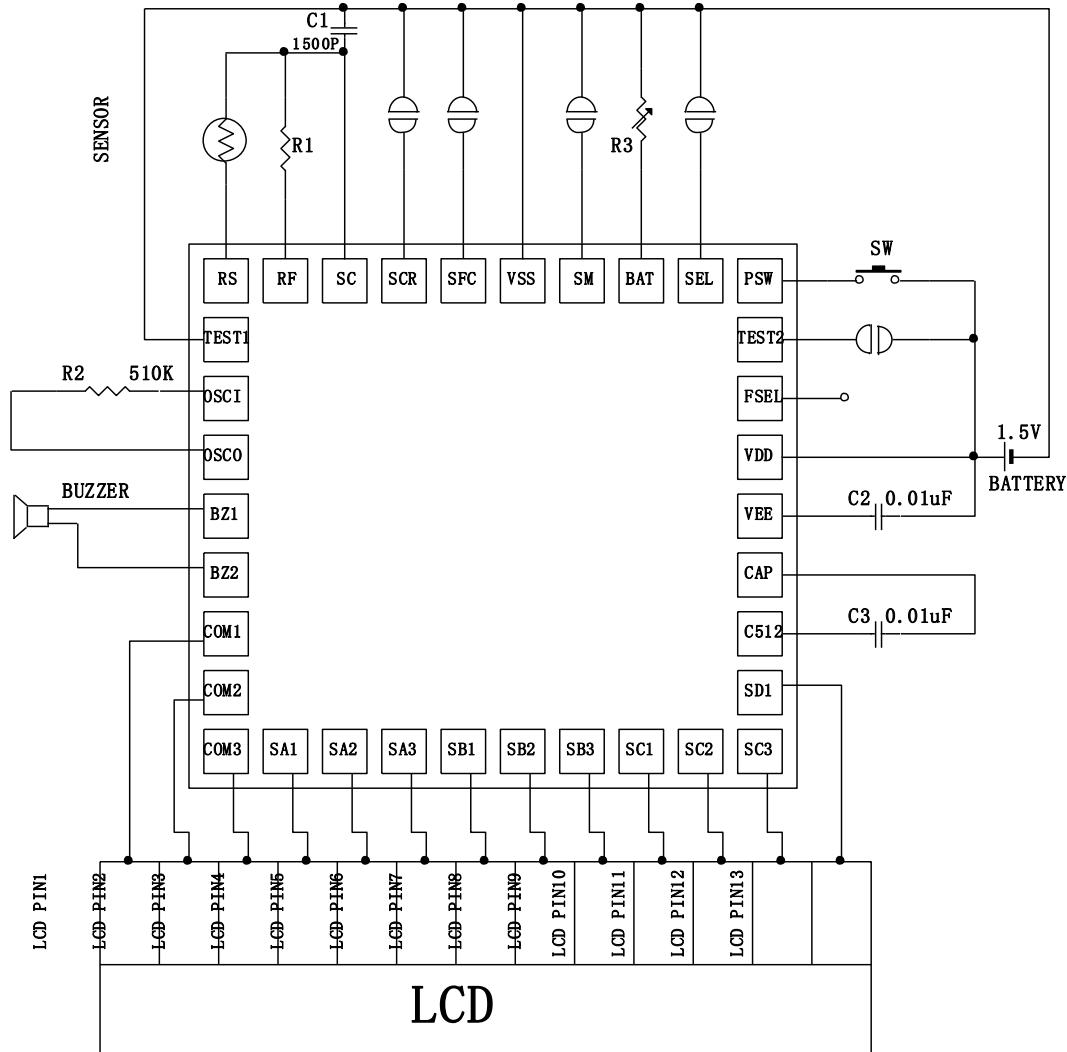
The IC substrate should be connected to VSS in the PCB layout artwork

PAD No	Name	X	Y	PAD No	Name	X	Y
1	SD1	-482.50	315.00	18	TEST1	482.50	-315.00
2	C512	-482.50	210.00	19	OSCI	482.50	-210.00
3	CAP	-482.50	105.00	20	OSCO	482.50	-105.00
4	VEE	-482.50	0.00	21	BZ1	482.50	0.00
5	VDD	-482.50	-105.00	22	BZ2	482.50	105.00
6	FSEL	-482.50	-210.00	23	COM1	482.50	210.00
7	TEST2	-482.50	-315.00	24	COM2	482.50	315.00
8	PSW	-482.50	-430.00	25	COM3	482.50	430.00
9	SEL	-367.50	-430.00	26	SA1	367.50	430.00
10	BAT	-262.50	-430.00	27	SA2	262.50	430.00
11	SM	-157.50	-430.00	28	SA3	157.50	430.00
12	VSS	-52.50	-430.00	29	SB1	52.50	430.00
13	SFC	52.50	-430.00	30	SB2	-52.50	430.00
14	SCR	157.50	-430.00	31	SB3	-157.50	430.00
15	SC	262.50	-430.00	32	SC1	-262.50	430.00
16	RF	367.50	-430.00	33	SC2	-367.50	430.00
17	RS	482.50	-430.00	34	SC3	-482.50	430.00

APPLICATION CIRCUIT

1. FOR TC2156 MODE

REMARK:
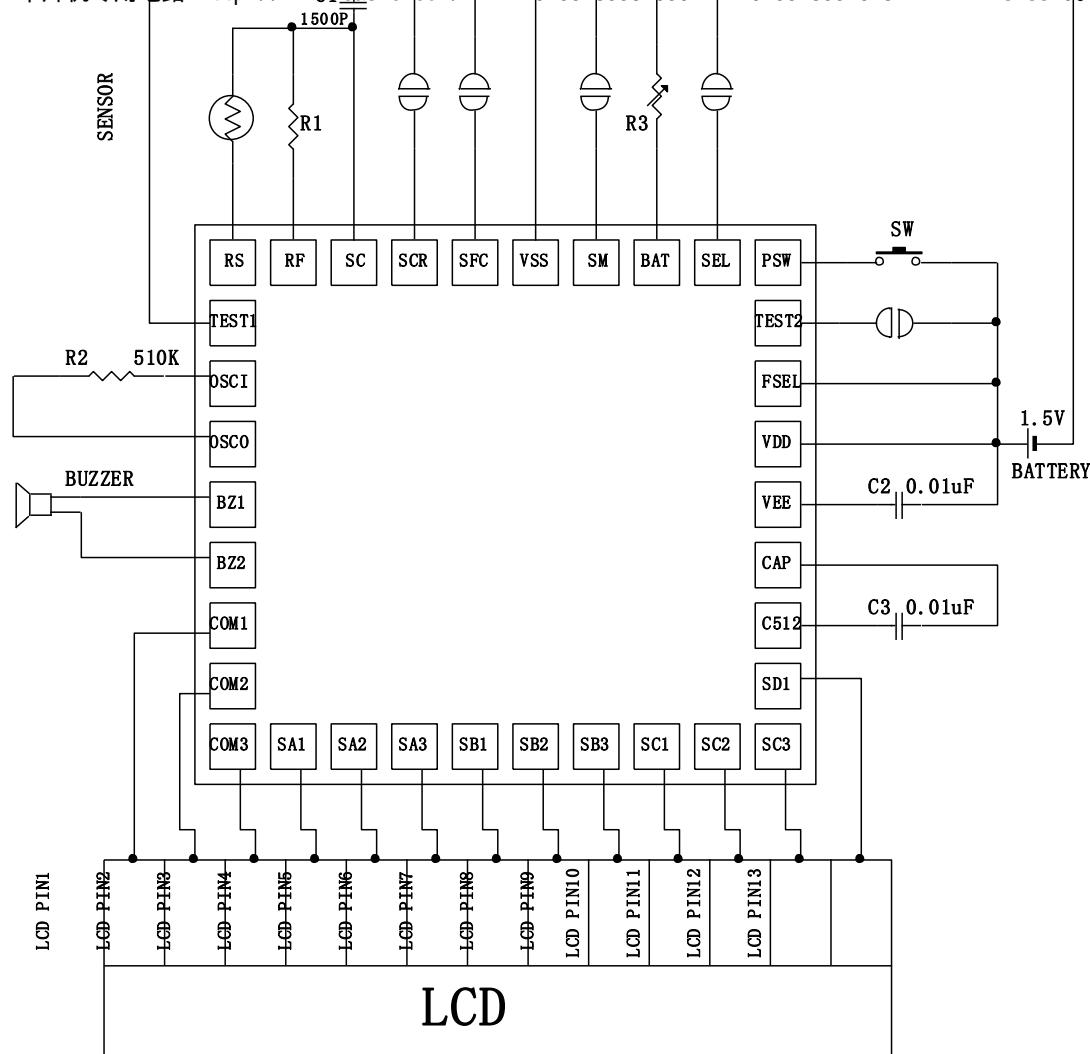
1. Sensor is use ET-503 sensor.

2. RF is selected according to sensor type.

	NC	VSS
SFC pad	℃	℃
SEL pad	LCD-1(▣)	LCD-2(M)

3. SCR pad NC=> The frequency of buzzer is 5.3 KHz.

   SCR pad connect to VSS and SM pad NC => The frequency of buzzer is 6.4KHz.

   SCR pad connect to VSS and SM pad connect to VSS => The frequency of buzzer is 8KHz.

4. R3 VR range 430Kohm～1M.

   The value of VR select by the low-voltage.

2. FOR TC4367 MODE

REMARK:

1. Sensor is use ET-503 sensor.
2. RF is selected according to sensor type.
3.

	NC	VSS
SFC pad	℃	° F
SM pad	MEMORY	NO MEMORY

4. SCR pad NC=> The frequency of buzzer is 4 KHz.

   SCR pad connect to VSS and SM pad NC => The frequency of buzzer is 6.4 KHz.

   SCR pad connect to VSS and SM pad connect to VSS => The frequency of buzzer is 8 KHz.

5. R3 VR range 430K～1M.

   The value of VR select by the low-voltage.