DESCRIPTION

RT2061 is a CMOS LSI digital clinical thermometer IC for measuring body temperature. It can measure the body temperature in Centigrade (℃) or Fahrenheit (℉) mode by bonding option. It also provides buzzer alarm, the highest temperature remember and auto power off functions.

FEATURES

1. Operating Voltage：1.5V 。
2. Measurement Range：32℃ 44℃ (Centigrade mode).
   90℉ 110℉ (Fahrenheit mode).
   Measurement accuracy：0.1℃ (0.1℉).
3. Bonding option for Centigrade (℃) or Fahrenheit (℉) mode measurement.
4. Buzzer alarm for the first stability temperature.
5. Remember the highest temperature.
6. Auto power off after 8min 40sec.
7. Battery low detect function.
8. Self-detected and error display function.

APPLICATIONS

1. Digital clinical thermometer in Centigrade(℃) mode.
2. Digital clinical thermometer in Fahrenheit (℉) mode.

PIN DESCRIPTION

Pad No.	Pad Name	I/O	Function
1	SC	I/O	The common point for reference resistor and sensor resistor clock, NMOS open drain.
2	RF	O	Connect reference resistor, PMOS open drain.
3	RS	O	Connect sensor resistor, PMOS open drain.
4	TIMB	I	Testing pin for IC.
5	TV	I/O	Testing pin for IC.
6	TEST1	I	Testing pin for IC.
7	OSCI	I	System oscillator input and output. Connect a resistor(R=680KΩ).
8	OSCO	O	
9,10	BZ1,BZ2	O	Buzzer output.
11 13	COM1 COM3	O	LCD backplane drive, 3-level voltage out.
14 16	SSA1 SSA3	O	LCD Segment drive.
17 19	SSB1 SSB3	O	LCD Segment drive.
20 22	SSC1 SSC3	O	LCD Segment drive.
23	SSD1	O	LCD Segment drive.
24,25	C512,CAP	O	Connect a capacitance to get a negative voltage(-1.5V).
26	VEE	I	Generate negative voltage (-1.5V)。
27	VDD	I	Positive power supply (+1.5V)。
28	NC1	I	Testing pin for IC.
29	NC2	I	Testing pin for IC.
30	TS816	I	Testing pin for IC.
31	TEST2	I	Testing pin for IC. Floating→Display the highest temperature. Connect to VDD→Display the real time temperature.
32	NC3	I	Testing pin for IC.
33	NC4	I	Testing pin for IC.
34	PSW	I	Push to turn power on or off。
35	PWRB	I	Initial power reset pin
36	LOWC	I/O	For the supply voltage detector, open the pin when not use this function.
37	MEMORY	I	Bonding option for memory function Floating→LCD will display the memory value if you push the switch >2sec. Connect to VDD→LCD must be display the memory value.
38	VSS	I	Power supply ground.
39	CLHF	I	Bonding option for ℃/℉ mode Floating → Centigrade (℃) mode Connect to VDD → Fahrenheit (℉) mode

FUNCTIONAL DESCRIPTION

1. Push the switch, buzzer will generate a 4KHz “Beep” sound for 0.125sec.

   a. First displays all the segments on for 2sec.

   b. After a, LCD will display the memory value of the last measurement or jump to c for MEMORY PIN bonding option and the time that we push the switch.

   (1) MEMORY PIN floating:

   Ⅰ.Push the switch > 2 sec：LCD will display the memory value of the last measurement, and display the memory mark “M”.

   Ⅱ. Push the switch < 2sec：LCD will not display the memory value, and jump to the step c function.

   (2) MEMORY PIN connect to VDD :

   Don’t care the time of pushing the switch, LCD will display the memory value of the last measurement.

   c. After b, LCD will display L°C (L°F) or 36.5°C (97.7°F) for MEMORY PIN bonding option.

   Ⅰ. MEMORY PIN floating : Display 36.5°C (97.7°F) for 0.75sec.
   Ⅱ. MEMORY PIN connect to VDD : Display L°C (L°F) for 0.75sec.

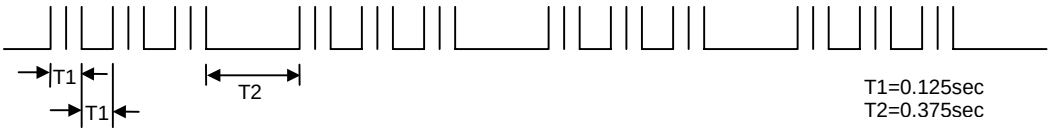
   d. After c, Display the measured temperature, then °C (or°F) mark will flash at a speed 1Hz. The LCD always display the highest temperature during the temperature measurement.

   Ⅰ. In this step, if the temperature < 32°C (or 90°F), LCD will display L°C (or L°F)。
   Ⅱ. In this step, if the temperature > 44°C (or 110°F), LCD will display H°C (or H°F)。

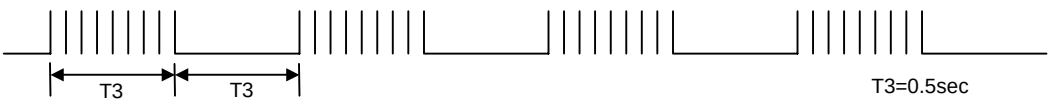
   e. If the measured temperature does not change for more than 16sec, the measurement is over and the °C (or°F) mark flash stops.

   f. When the measurement is over, the buzzer has two kinds of alarm sounds with 4KHz.

   Ⅰ. If the temperature > 37.5°C(or 99.5°F), Buzzer will generate “beep – beep - beep ---” sound for 4sec :



   Ⅱ. If the temperature ≤37.5°C(or 99.5°F), Buzzer will generate “beep –beep- beep-beep---” sound for 4sec :



g. When the measurement is over, but the temperature rises within 8 min. 40 sec., the ℃ (or ℉) mark will flash again and repeat from step e, and starts to count 8 min. 40 sec. again.

h. It will automatically turn the power off when measurement is over for 8 min 40 sec.

2. CLHF Bonding option for ℃/℉ mode

CLHF floating	CLHF Connect to VDD
Centigrade (℃) mode	Fahrenheit (℉) mode

3. The frequency of buzzer is 4KHz。

4. External reference resistor is the value of sensor resistor in 37℃.

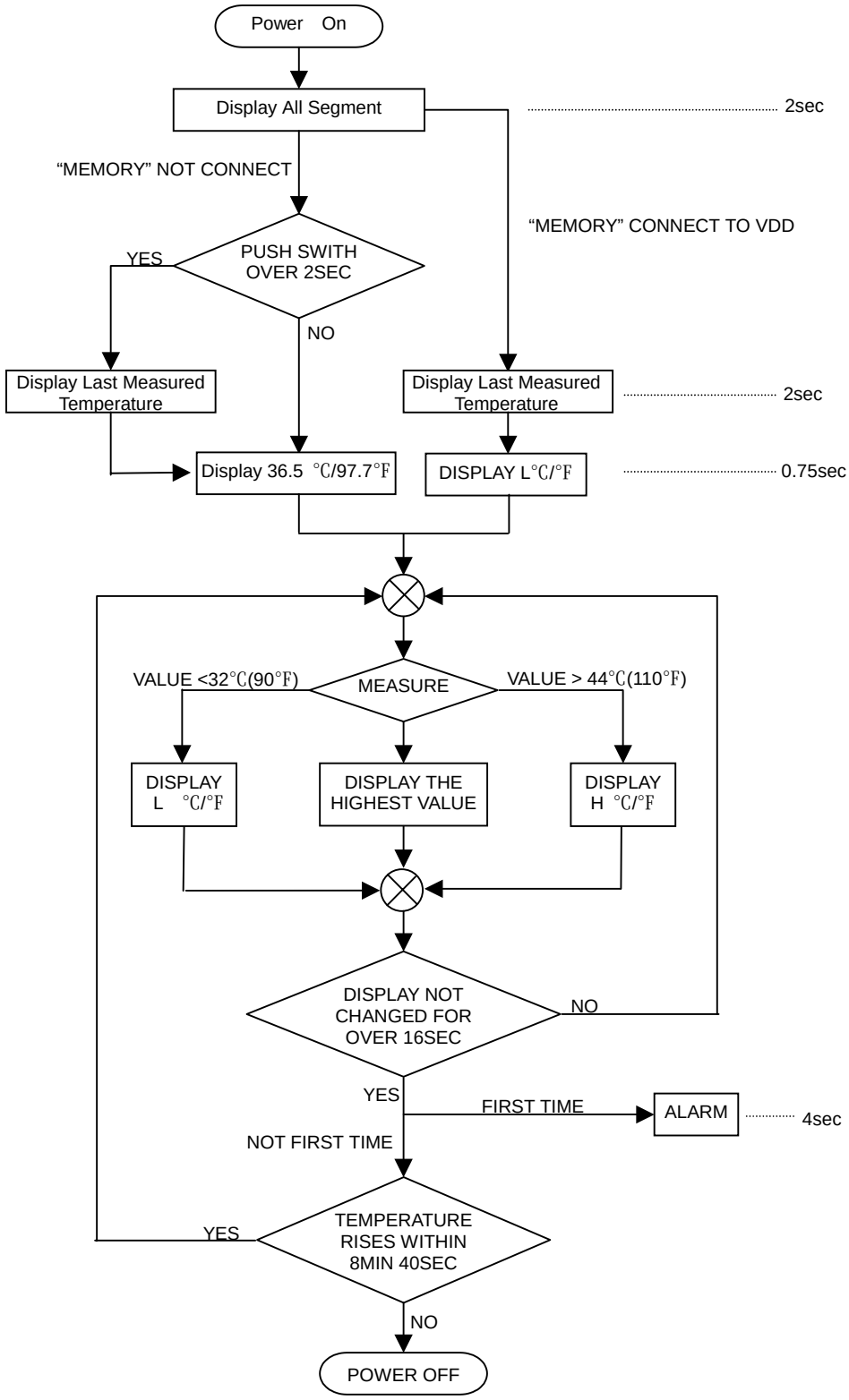
5. Sensor Resistor use 503ET 。

6. If the supply voltage is low(1.35V ±0.05V), LCD will display the battery mark "▽", and flash at the speed of 1KHz. The measurement may be not accurate.

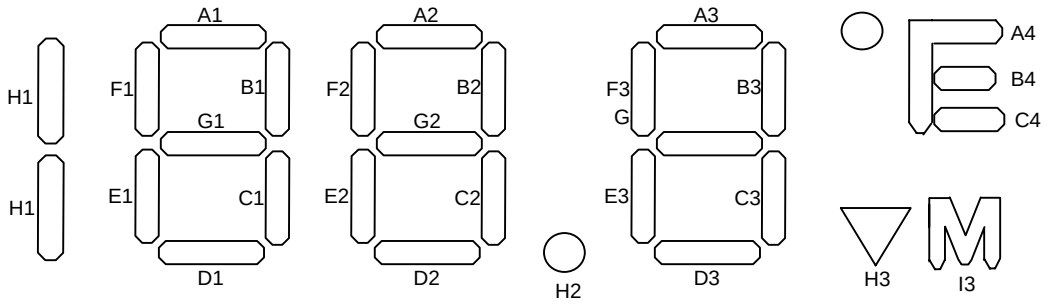
7. If the TEST2 PIN is floating, LCD will display the real time temperature. It can be up or down, not always the higher one. If the TEST2 PIN is connecting to VDD, LCD will display the highest temperature.

8. When sensor circuit detect error, LCD only display "E". It will not measurement normally until we reset the thermometer.

Flow Chart


Power On
Display All Segment
2sec
"MEMORY" NOT CONNECT
"MEMORY" CONNECT TO VDD
YES
PUSH SWITH OVER 2SEC
NO
Display Last Measured Temperature
Display Last Measured Temperature
2sec
Display 36.5 ℃/97.7°F
DISPLAY L℃/°F
0.75sec
VALUE <32℃(90°F)
MEASURE
VALUE > 44℃(110°F)
DISPLAY L ℃/°F
DISPLAY THE HIGHEST VALUE
DISPLAY H ℃/°F
DISPLAY NOT CHANGED FOR OVER 16SEC
NO
YES
FIRST TIME
ALARM
4sec
NOT FIRST TIME
YES
TEMPERATURE RISES WITHIN 8MIN 40SEC
NO
POWER OFF

LCD Electrode Pattern



	SSA1	SSA2	SSA3	SSB1	SSB2	SSB3	SSC1	SSC2	SSC3	SSD1
COM1	F1	A1	B1	F2	A2	B2	F3	A3	B3	A4
COM2	E1	G1	C1	E2	G2	C2	E3	G3	C3	B4
COM3	H1	D1	-	-	D2	H2	I3	D3	H3	C4

Note : 1/3 duty. 1/2 bias (LCD use 3V)

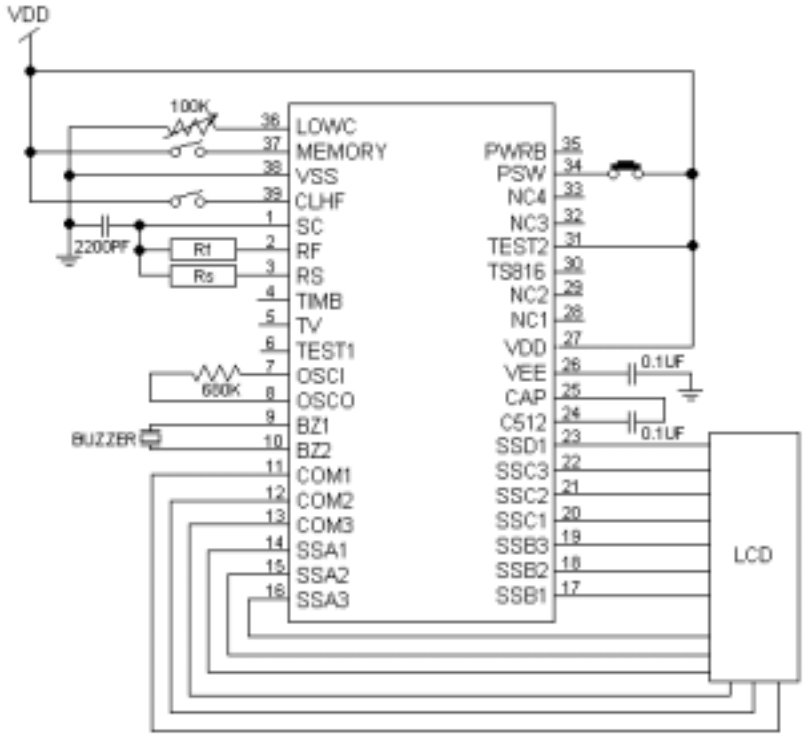
Maximum Ratings

Characteristic	Symbol	Rating	Unit
Supply voltage	V_{DD}	0~ 2.0	V
Operation Temperature	T_{OP}	-20 ~ +75	℃
Input voltage	V_{IN}	(VSS-0.5) ~ (VDD+0.5)	V
Storage Temperature	T_{STR}	-55 ~ +125	℃

Electrical Characteristics

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Voltage	V_{DD}	-	1.3	1.5	1.65	V
Operating Current	I_{DD}	1.5V	-	30	50	μA
Stand-by Current	Ist	1.5V	-	0.1	1	μA
Oscillator Frequency	fosc	R_{OSC}=680KΩ	25.6	32	38.4	KHz
Temperature Accuracy for Centigrade measurement	T_{CA}	35℃~39℃	-0.1	-	+0.1	℃
Temperature Accuracy for Fahrenheit measurement	T_{FA}	95℉~102℉	-0.2	-	+0.2	℉
Buzzer Sinking Current	Isink	$1/2V_{DD}$	-	-	-1.0	mA
Buzzer Source Current	Isource	$1/2V_{DD}$	1.0	-	-	mA

APPLICATION CIRCUIT



<Note>:

1. Rs : Sensor resistor(503ET).
2. Rf : Reference resistor with value =Rs(37℃).
3. VEE,CAP and C512 : Connect two capacitance (0.1uF) to get a stability negative voltage(VEE=-1.5V).
4. BZ1,BZ2 : Connect a buzzer for alarm sound(freq=4KHz)。
5. OSCI,OSCI : Connect a resistor(Rosc=680Ω)to get system oscillator(freq=32KHz).
6. LOWC : Connect a resistor(R=100KΩ)to be the battery-low detector.