



深圳市晶峰达电子科技有限公司

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DL7018

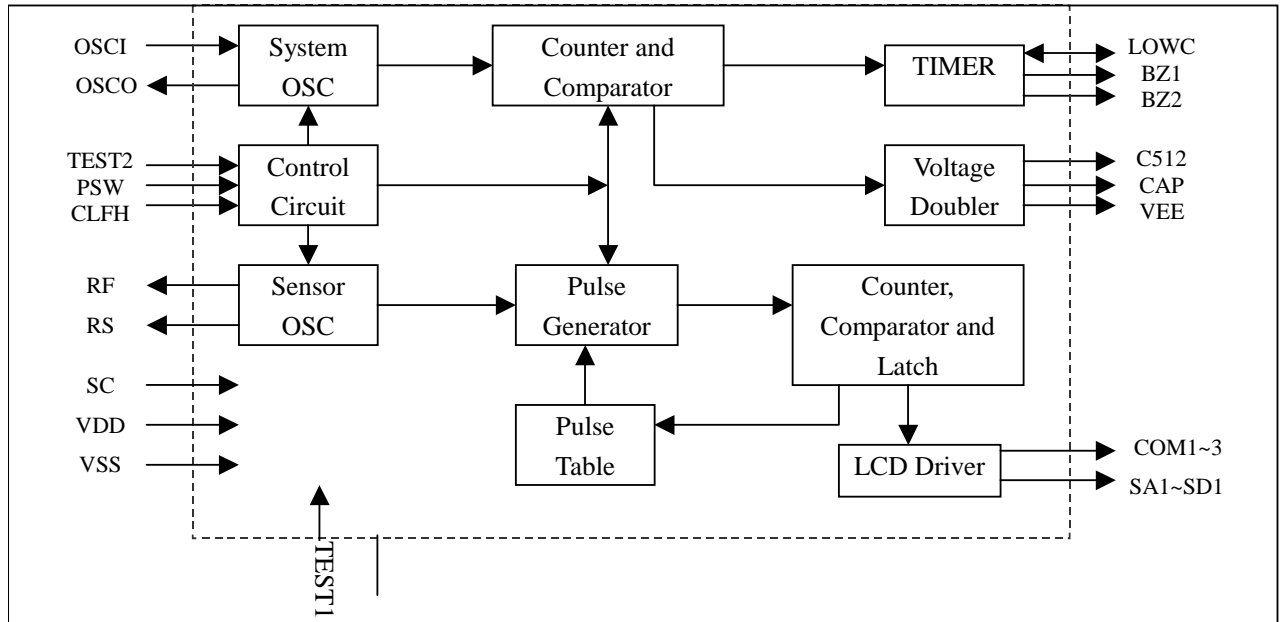
1.General Descriptions

DL7018 is a CMOS digital clinical thermometer IC for measuring body temperature in Centigrade($^{\circ}\text{C}$) or Fahrenheit($^{\circ}\text{F}$) mode by its bonding option. It also provides alarm and auto power off functions. The other electronic components are LCD display, thermistor, 1.5V battery, ON/OFF switch, buzzer, resistors and capacitors.

2.Features

- ◆ Single 1.5V battery operation
- ◆ Single-chip CMOS construction
- ◆ Centigrade/ Fahrenheit measurement by bonding option
- ◆ Measurement range: $+32.0 \sim +42.0^{\circ}\text{C}$ ($+90.0 \sim +108.0^{\circ}\text{F}$)
- ◆ Resolution: 0.1°C (0.1°F)
- ◆ Measurement accuracy: $\pm 0.1^{\circ}\text{C}$ ($\pm 0.2^{\circ}\text{F}$)
- ◆ One-key input for ON/OFF
- ◆ Fever alarm
- ◆ Highest temperature hold
- ◆ Auto power off after 8 min 40 sec
- ◆ Last time measured temperature displaying

3.Function Block Diagram



4. Function Descriptions

4.1 Power sw: push switch to power on or power off.

4.2 When power on: push the switch, then it will generate a “beef” sound for 0.125 sec.

a. First displays all the segments on for 2 sec and tests itself at the same time, if it tests unsuccessfully, the LCD displays “Err”, and it will restore the normal state after obstruction are obviated. If it tests successfully, it will skip to b..

b. After a. as described above, if it tests successfully, then shows the last time measured temperature for 2 sec.

c. After b., shows L°C or °F for 0.75 sec.

d. After c., displays the measured temperature, then °C or °F mark will flash at frequency of 1Hz.

e. If the temperature is <32°C (or 90°F), the display shows L°C (or °F).

f. If the temperature ≥42°C (or 108°F), the display shows H°C (or °F).

g. The display always shows the higher temperature during the temperature measurement.



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

i. When measurement is over, if the temperature >37.5°C(or 99.5°F) the buzzer alarms “beep-beep-beep-beep-beep-beep-” for 4 sec, as follows:

BI ----- BI ----- BI ----- -----
0.125S 0.125S 0.125S 0.125S 0.125S 0.125S 0.375S

If the temperature ≤37.5 °C (or 99.5 °F), the buzzer alarms “beep-beep-beep-beep-”for 4 sec, as follows:

BI -----
0.5S 0.5S

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

k. When measurement is over, but if the temperature rises within 8 min 40 sec, the °C (or°F) mark will flash again (repeat from step d.), and starts to count 8 min 40 sec again.

l. When beep sound is on for 4 sec, the temperature is not measured.

4.3 When power off: the standby current ≤1μA

4.4 The frequency of the buzzer is 5.3KHz.

4.5 °C or °F by bonding option.

4.6 Measurement to 0.01 degree in both °C and °F

4.7 Sensor SPEC is 503ET.

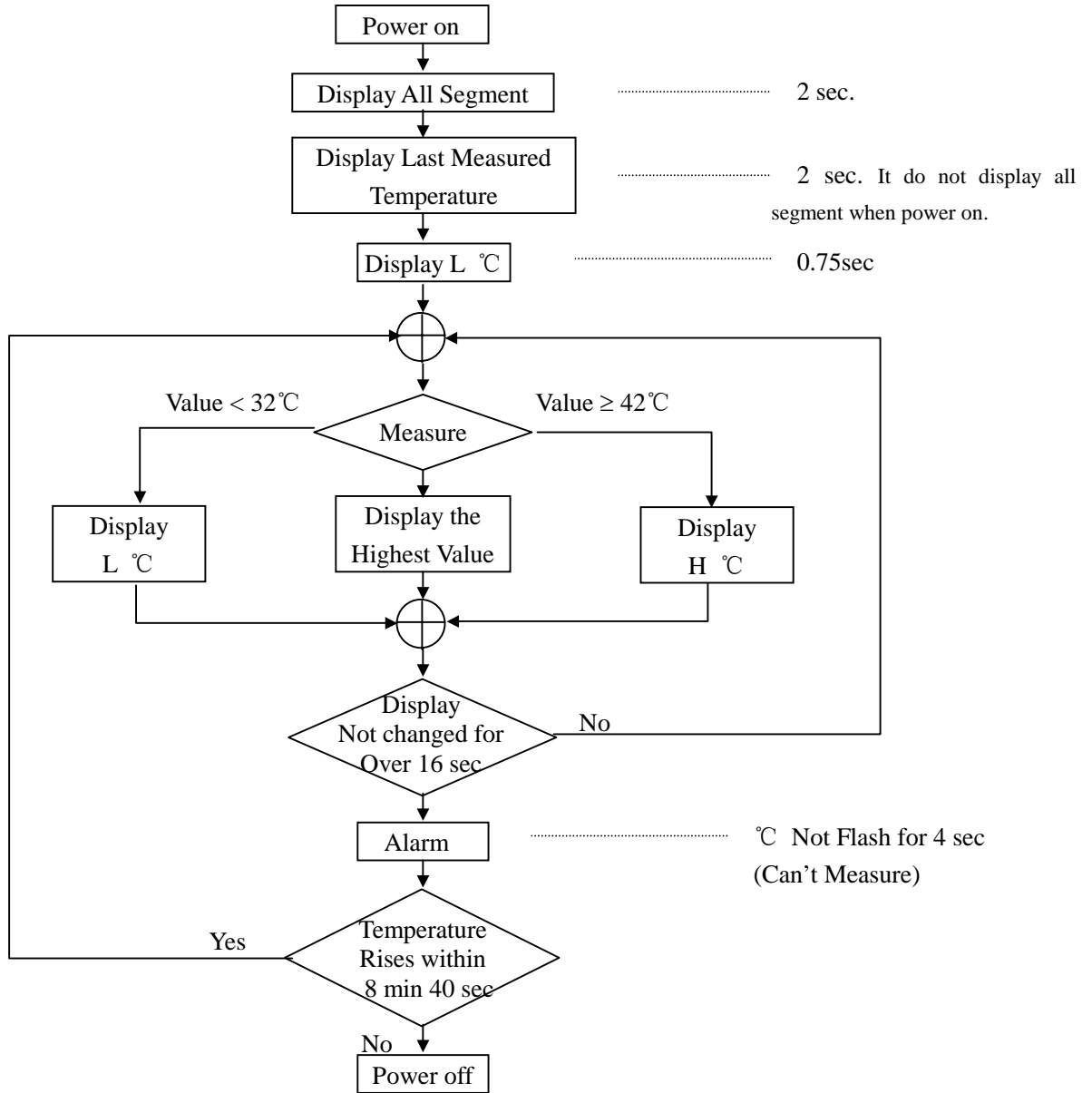
4.8 Reference resistor is the value (sensor in 37.0°C).

4.9 When battery voltage is low, the battery mark “▽ “ flashes at frequency 1 Hz and the measurement may not be accurate. The low voltage detects: 1.35V ±0.05V.

4.10 During the process of mass production, test 2 can be floated to adjust the reference resistance (RF), the measured temperature will be the actual temperature of the measured environment. It can be up or down, not always the higher one.



5.Flow Chart



6.Pin Descriptions



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NO.	Name	I/O	Function
1	LOWC	I/O	For the supply voltage detector, open the pin when not in use
2	VSS		Power supply GND
3	SC	I/O	Common point, NMOS open drain
4	RF	O	Connect reference resistor, PMOS open drain
5	RS	O	Connect sensor resistor, PMOS open drain
6	VDD		Positive power supply
7	PSW	I	Pull-low input pin, push switch to turn power on or off
8	TEST2	I	Pull-low test pin, for production test, floating LCD displays the real time value, when connected to VDD, LCD displays the highest value.
9	CLFH	I	Floating for °C, connect to VDD for °F
10	OSCI	I	For system oscillator in
11	OSCO	O	For system oscillator out



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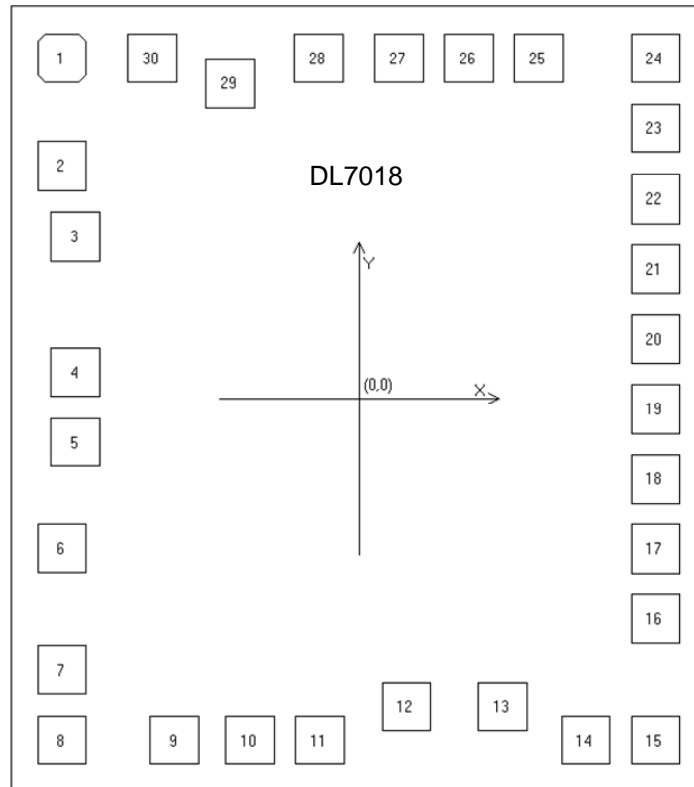
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12	BZ1	O	Buzzer output 1
13	BZ2	O	Buzzer output 2
14-16	COM1~COM3	O	LCD backplane drive, 3-level voltage out
17-19	SA1~SA3	O	LCD segment drive
20~22	SB1~SB3	O	LCD segment drive
23~25	SC1~SC3	O	LCD segment drive
26	SD1	O	LCD segment drive
27	VEE	O	Generate negative voltage (-1.5V)
28	CAP	O	For negative voltage, NMOS output
29	C512	O	For negative voltage, inverter output
30	TEST1	I/O	Test pin for IC



7.Pad Diagram



Chip Size : 1400*1560

Note: The substrate must be connected to VDD!!!.

BONDING PAD LOCATION

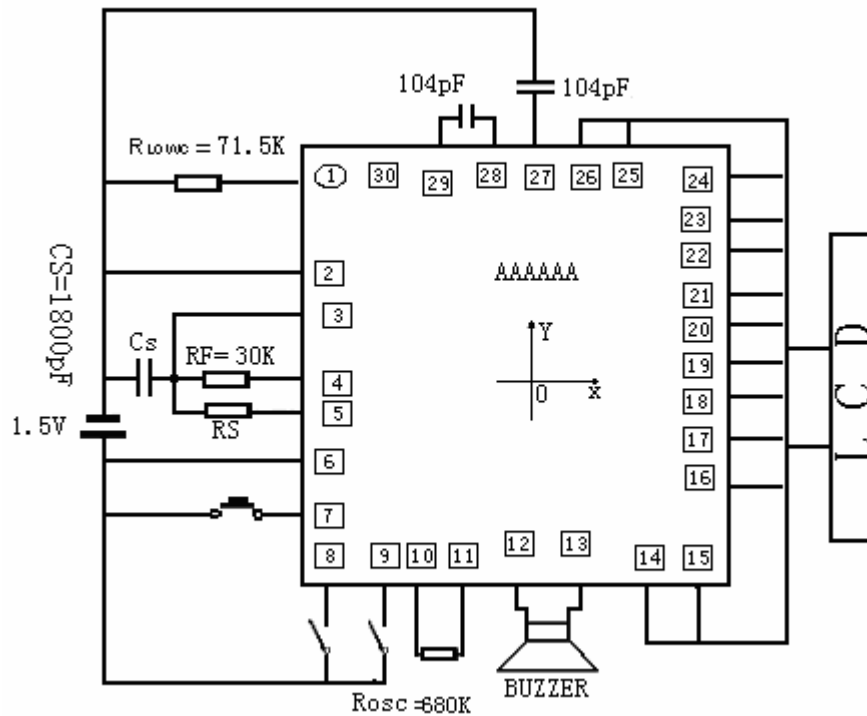
NO.	PAD NAME	X	Y
1	LOWC	-553	632
2	GND	-553	432
3	SC	-528	302
4	RF	-528	49
5	RS	-528	-80
6	VDD	-553	-277
7	PSW	-552	-503
8	TEST2	-553	-633
9	CLFH	-343	-633
10	OSCI	-202	-633
11	OSCO	-72	-633
12	BUZ1	88	-570
13	BUZ2	267	-570
14	COM1	422	-633
15	COM2	552	-633

NO.	PAD NAME	X	Y
16	COM3	552	-408
17	SA1	552	-278
18	SA2	552	-148
19	SA3	552	-18
20	SB1	552	112
21	SB2	552	242
22	SB3	552	372
23	SC1	552	502
24	SC2	552	632
25	SC3	334	632
26	SD1	204	632
27	VEE	74	632
28	CAP	-75	632
29	C512	-239	586
30	TEST1	-385	632



8.Application Circuit

(The value of ROsc,RLOWC,CS is allowed the range of $\pm 5\%$.The value of RF is allowed the range of $\pm 1\%$)

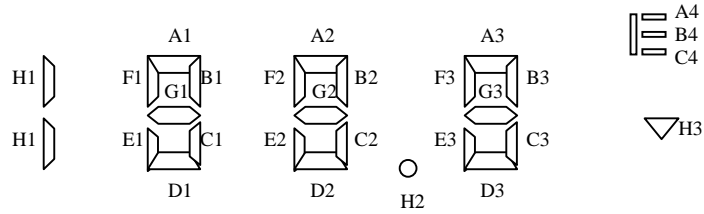


Note:

- (1) Substrate connect to VDD!!!
- (2) VEE, CAP, and C512 are externally connected to capacitors for stabilizing VEE(= -1.5V).
- (3) BZ1 and BZ2 are connected to an external buzzer to generate sounds.
- (4) LOWC is connected to an external resistor for adjusting the detector level of a low voltage detector. Open the pin when not in use.
- (5) OSC1, OSC0 are connected to an external resistor, and form an RC oscillator with a *built-in* capacitor for SYSTEM clock (ROSC=680K FOSC=32Khz).
- (6) RS, RF, SC constitute an alternating RC oscillator, which allows one oscillator, namely RS or RF, active at a time.
- (7) REF(reference resistor) is a resistor value equal to 503ET, sensor is value in 37.0°C or 98.6°F.
- (8) SENSOR is a 503ET thermistor.



9.LCD Electrode Pattern



	SA1	SA2	SA3	SB1	SB2	SB3	SC1	SC2	SC3	SD1
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	---	D3	H3	C4

Note: 1/3 duty, 1/2 bias, (LCD uses 3V)

10.Electrical Characteristics

(Ta = 25°C, VDD=0V, VSS1=-1.55V, All voltage referenced to GND ,unless otherwise specified)

Parameters	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Voltage	VDD		1.3	1.5	1.65	V
Operating Current	IDD	VDD=1.5V, No load	--	30	60	μA
Stand-by Current	ISTB	VDD=1.5V	--	--	1.0	μA
Oscillating Frequency	FOSC	VDD=1.5V ROSC=680KΩ		32		KHz
Temperature Measurement Accuracy at Range 35°C~39°C	R°C		-0.1	--	0.1	°C
Temperature Measurement Accuracy at Range 95°F~102°F	R°F		-0.2	--	0.2	°F



11.Absolute Maximum Ratings

(All voltage referenced to GND)

Parameter	Symbol	Limits	Unit
Supply Voltage	VDD	0 ~ 1.65	V
Input Voltage	VI	GND-0.5 ~ VDD+0.5	V
Output Voltage	VO	GND-0.5 ~ VDD+0.5	V
Operating Temperature	TOPR	-2 ~ +75	°C
Storage Temperature	TSTG	-55 ~ +125	°C

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

13.Notices

- 1.The information contained herein could be changed without notice owing to product and /or technical improvements. Please make sure before using the product that the information you are referring to is up-to-date.
- 2.No responsibility is assumed by us for any consequence resulting from any wrong or improper operation, etc.of the product.