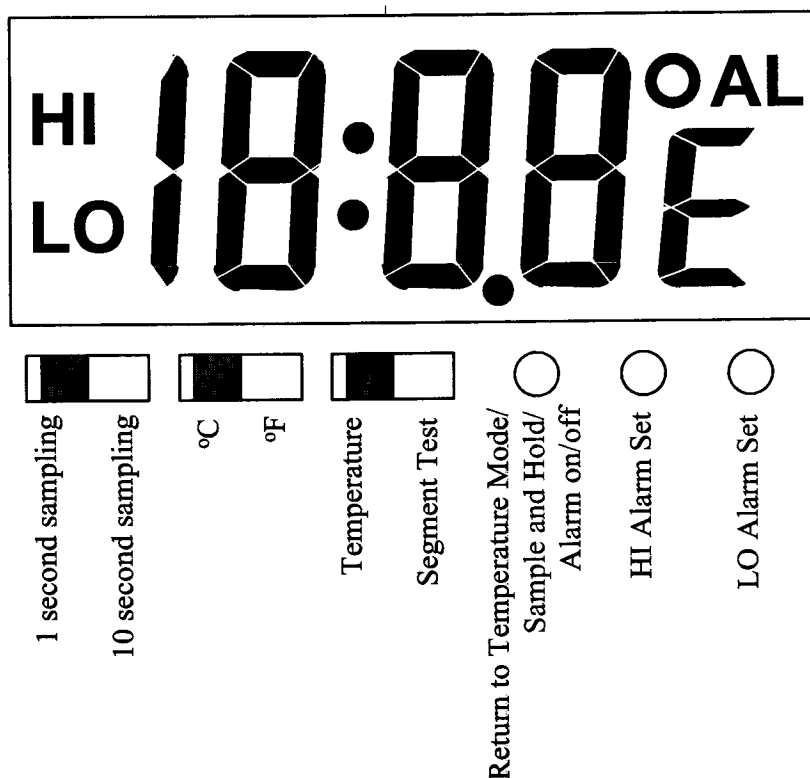


SS0503

SS0503

Wide Range Thermometer
-50°C to +150°C (-58°F to +302°F)



FEATURES

- 1.5V battery operation with very low power consumption
- High and Low temperature alarms
- Selectable 1 second and 10 seconds temperature sensing rate
- Temperature data hold function
- Measure ranging from – 50°C to +150°C (-58°F to +302°F)
- Segment test function

SS0503

DESCRIPTIONS

The SS0503 is a CMOS, low power consumption IC to detect wide temperature range. By using a special made thermistor SE238 as sensor, SS0503 can measure temperature range from -50°C to $+150^{\circ}\text{C}$ (-58°F to $+302^{\circ}\text{F}$). The measured temperature is displayed on a $3\frac{1}{2}$ digits liquid crystal display (LCD). Besides, the SS0503 embed the high and low temperature alarm function for monitoring the measured temperature. Data hold function is also available. A segment test function is included in SS0503 for production testing.

The application for SS0503 is cooking thermometer, laboratory thermometer and any other applications where wide range, digital temperature measurement required.

MODE DESCRIPTIONS

a. Keys and Switches definitions

S1	1 second or 10 seconds Sampling
S2	$^{\circ}\text{C}$ or $^{\circ}\text{F}$ Switching Terminal
S3	All Segment Test / Temperature Mode
K1	Low Temperature Alarm
K2	High Temperature Alarm
K3	Temperature / Sample and Hold / Alarm on-off

b. Temperature Mode (S3 = Open)

User can choose between $^{\circ}\text{C}$ and $^{\circ}\text{F}$ by switching S2.

- For $^{\circ}\text{C}$, S2=Open. For $^{\circ}\text{F}$, S2=Close.

Sample rate can be chosen by switching S1

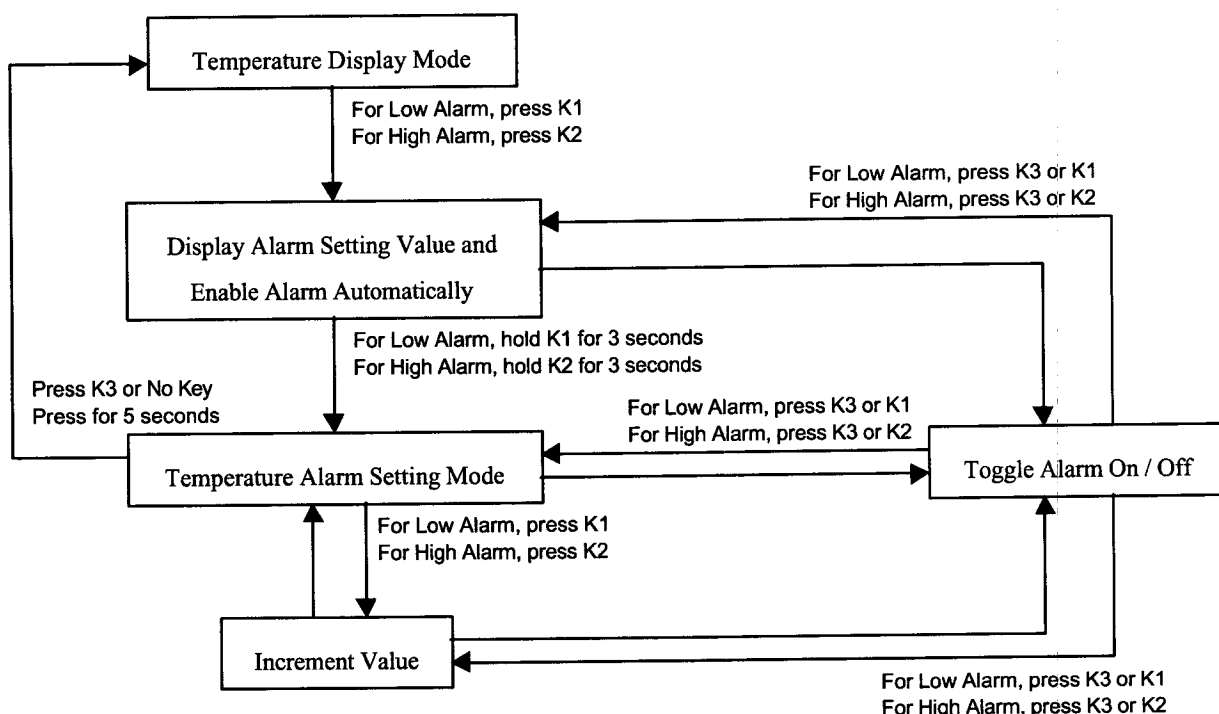
- For 10 seconds sampling, S1=Open. For 1 second sampling, S1=Close.

The Sample and hold function is activated by pushing K3 once. This is indicated by a flashing $^{\circ}\text{C}$ or $^{\circ}\text{F}$ on the LCD. To return to the temperature measuring mode, simply push K3 once again.

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c. Temperature HI/LO Alarm Setting Mode

- For high temperature alarm (HI alarm). Press and hold K2 for 3 seconds
- For low temperature alarm (LO alarm). Press and hold K1 for 3 seconds
- Enable or disable of high temperature alarm are toggled by holding K2 and pushing K3
- Enable or disable of low temperature alarm are toggled by holding K1 and pushing K3
- The HI or LO icon will be turned on when temperature alarm is set
- Temperature alarm is automatically enable by pressing K1 or K2
- K1 is used to set the low temperature alarm value
- K2 is used to set the high temperature alarm value
- The temperature alarm value will be incremented at 8Hz rate when K1 or K2 is held for 1-2 seconds
- Alarm Temperature is set by 1°C (1°F) step and the range is from – 50°C to +150°C (-58°F to +302°F)
- The IC will return to temperature display mode if no key is pressed for 5 seconds or K3 is pressed in the temperature HI/LO alarm setting mode
- The temperature HI/LO alarm value can be set by the following sequence



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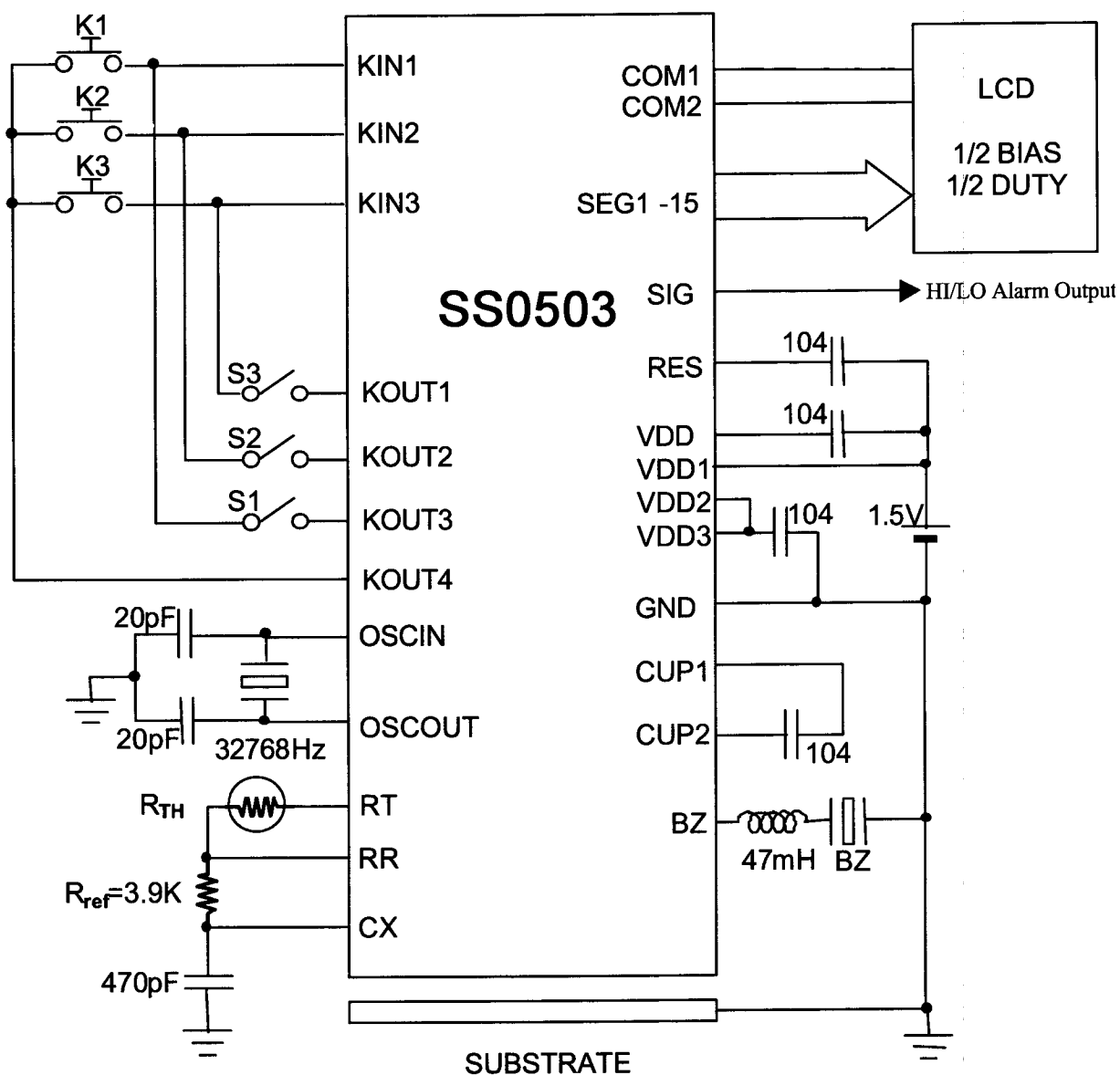
ALARM OPERATIONS

When Temperature exceeds the high temperature alarm value (HI) or temperature drops below the low temperature value (LO), the temperature alarm will be activated and beep tones will be heard at 5 times per minutes. If no key is pressed, this 4 times per minute beep tones will be repeated and stopped after any key is pressed.

The SIG pin will be changed to VDD when temperature exceeds HI value or temperature drops below LO value. It keeps at VDD unless the measured temperature is fall within the LO and HI values.

SS0503

APPLICATION CIRCUIT



SS0503

ABSOLUTE RATINGS

at Ta = 25°C, VDD = 1.5V

Parameters	Symbol	Min	Max	Unit
Maximum Supply Voltage	V _{DD}	-0.3	+5.5	V
Maximum Input Voltage	V _{in}	-0.3	VDD+0.3	V
Maximum Output Voltage	V _{out}	-0.3	VDD+0.3	V
Maximum Operating Temperature	T _{opg}	0	70	°C
Maximum Storage Temperature	T _{stg}	-25	125	°C

ELECTRICAL CHARACTERISTICS

at Ta = 25°C, VDD = 1.5V

Parameters	Symbol	Min	Typ.	Max	Unit
Operating Voltage	VDD	1.2	1.5	1.8	V
Operating Current	I _d		15		μA
Standby Current	I _{st}		3		μA
LCD Supply Voltage	V _{lcd}		3		V
LCD Frame Frequency	F _{lcd}		32		Hz
Operating Frequency	F _{opg}		32.768		KHz

Accuracy and Resolution

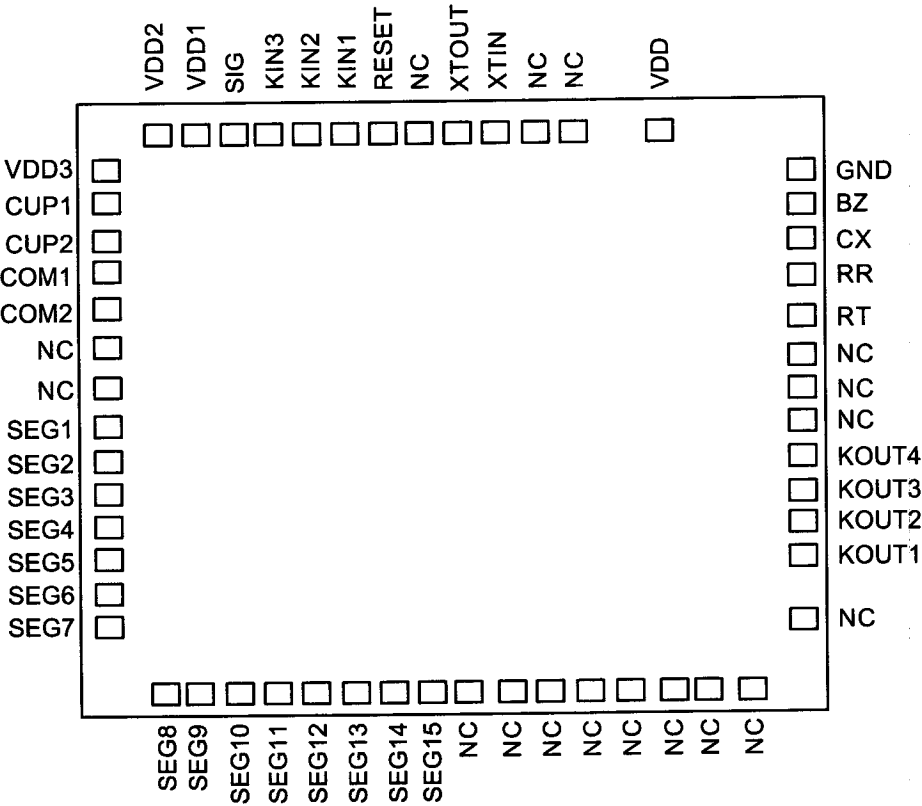
Parameters	
Measurement Resolution	0.1° for – 9.9° to +150.0° , 1.0° otherwise
Measurement Accuracy	1°C for – 10°C to +100°C, 2.5°C for +100 °C to +150 °C , 3.7 °C otherwise

SS0503

CHIP INFORMATION

Chip size 2195 x 2270 (μm²)
Pad pitch min. 115μm

PIN/PAD DIAGRAM



SS0503

PIN/PAD ASSIGNMENT

Unit : μm

Pad No.	Pad Name	Coordinate		Pad No.	Pad Name	Coordinate	
		X	Y			X	Y
1	VDD	1833.25	2118.50	29	SEG9	442.00	73.75
2	NC	1569.50	2118.50	30	SEG10	557.00	73.75
3	NC	1453.00	2118.50	31	SEG11	672.00	73.75
4	XTIN	1338.00	2118.50	32	SEG12	787.00	73.75
5	XTOUT	1223.00	2118.50	33	SEG13	902.00	73.75
6	NC	1108.00	2118.50	34	SEG14	1017.00	73.75
7	RESET	993.00	2118.50	35	SEG15	1132.00	73.75
8	KIN1	878.00	2118.50	36	NC	1247.00	73.75
9	KIN2	763.00	2118.50	37	NC	1362.00	73.75
10	KIN3	648.00	2118.50	38	NC	1477.00	73.75
11	SIG	533.00	2118.50	39	NC	1592.00	73.75
12	VDD1	418.00	2118.50	40	NC	1707.00	73.75
13	VDD2	303.00	2118.50	41	NC	1822.00	73.75
14	VDD3	74.25	1979.50	42	NC	1940.00	73.75
15	CUP1	74.25	1864.50	43	NC	2070.75	74.50
16	CUP2	74.25	1735.50	44	NC	2193.00	427.75
17	COM1	74.25	1618.50	45	KOUT1	2193.00	643.50
18	COM2	74.25	1487.75	46	KOUT2	2193.00	758.50
19	NC	74.25	1358.25	47	KOUT3	2193.00	873.50
20	NC	74.25	1227.50	48	KOUT4	2193.00	988.50
21	SEG1	74.25	1102.75	49	NC	2193.00	1107.00
22	SEG2	74.25	987.75	50	NC	2193.00	1222.00
23	SEG3	74.25	872.75	51	NC	2193.00	1337.00
24	SEG4	74.25	757.75	52	RT	2193.00	1460.25
25	SEG5	74.25	642.75	53	RR	2193.00	1583.50
26	SEG6	74.25	527.75	54	CX	2193.00	1706.25
27	SEG7	74.25	412.75	55	BZ	2193.00	1821.25
28	SEG8	327.00	73.75	56	GND	2193.00	1936.25

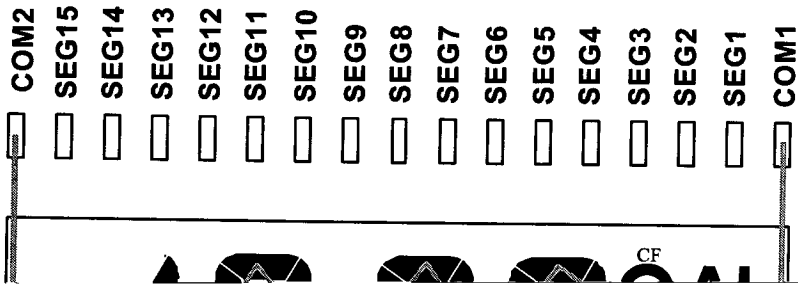
N.B : The Substrate must be connected to GND

LCD CHARACTERISTICS REQUIREMENT

Parameters	Symbol	Min	Typ.	Max	Unit
Operating Voltage	Vop		3.0		V
Duty			1/2		
Bias			1/2		

SS0503

LCD Layout



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