

# SS0504

## LCD Dual Display Thermometer

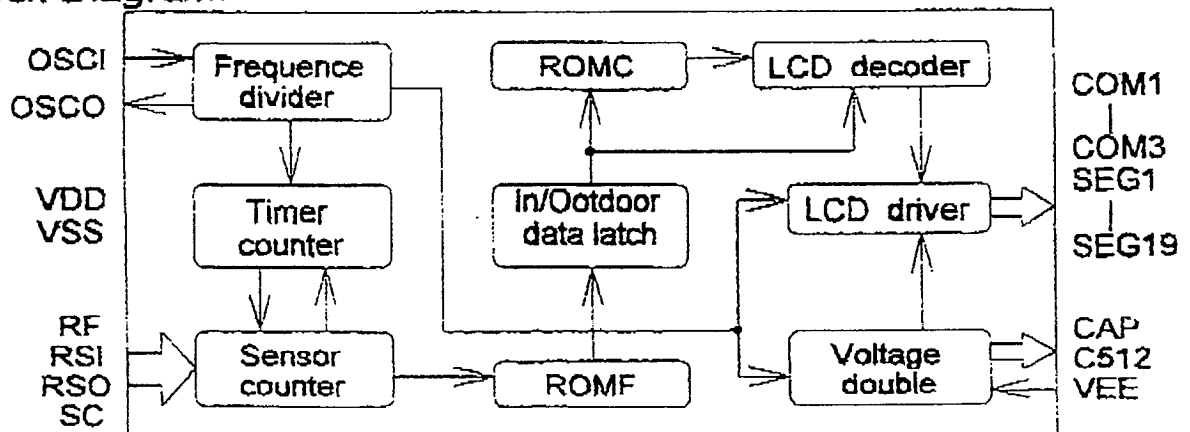
### General Description :

SS0504 is a high-performance LCD Dual Display Thermometer CMOS IC. It will be used to measure Indoor and Outdoor Temperature, the temperature of environment can be measured from  $-50.0^{\circ}\text{C}$  ( $-58.0^{\circ}\text{F}$ ) to  $70.0^{\circ}\text{C}$  ( $158.0^{\circ}\text{F}$ ), and it also can be set in the  $^{\circ}\text{C}$  or  $^{\circ}\text{F}$  mode.

### Features :

- Range of Temperature :  $-50.0^{\circ}\text{C}$  ( $-58.0^{\circ}\text{F}$ )  $\sim$   $70.0^{\circ}\text{C}$  ( $158.0^{\circ}\text{F}$ )  
If temperature  $\geq 70.0^{\circ}\text{C}$  ( $158.0^{\circ}\text{F}$ ), display H.  $^{\circ}\text{C}$  ( $^{\circ}\text{F}$ )  
If temperature  $\leq -50.0^{\circ}\text{C}$  ( $-58.0^{\circ}\text{F}$ ), display L.  $^{\circ}\text{C}$  ( $^{\circ}\text{F}$ )
- Number of channel : 2 channels, one is Indoor & another is Outdoor
- Operating voltage :  $1.3\text{V} \sim 1.65\text{V}$
- No-measuring current : Operating current is less than  $15\text{uA}$
- Sampling period : 10 sec approximate
- Resolution :  $0.1^{\circ}\text{C}$  ( $^{\circ}\text{F}$ )
- Accuracy :  $\pm 1^{\circ}\text{C}$  ( $\pm 2^{\circ}\text{F}$ )
- Sensor : 103AT-2B  $\times 2$ , use a 3M wire for the outdoor sensor
- Oscillator : RC Oscillator only
- Change unit : Bond to VSS -  $^{\circ}\text{C}$  and Bond to VDD -  $^{\circ}\text{F}$
- LCD self -test : Power On full segment test 2 second

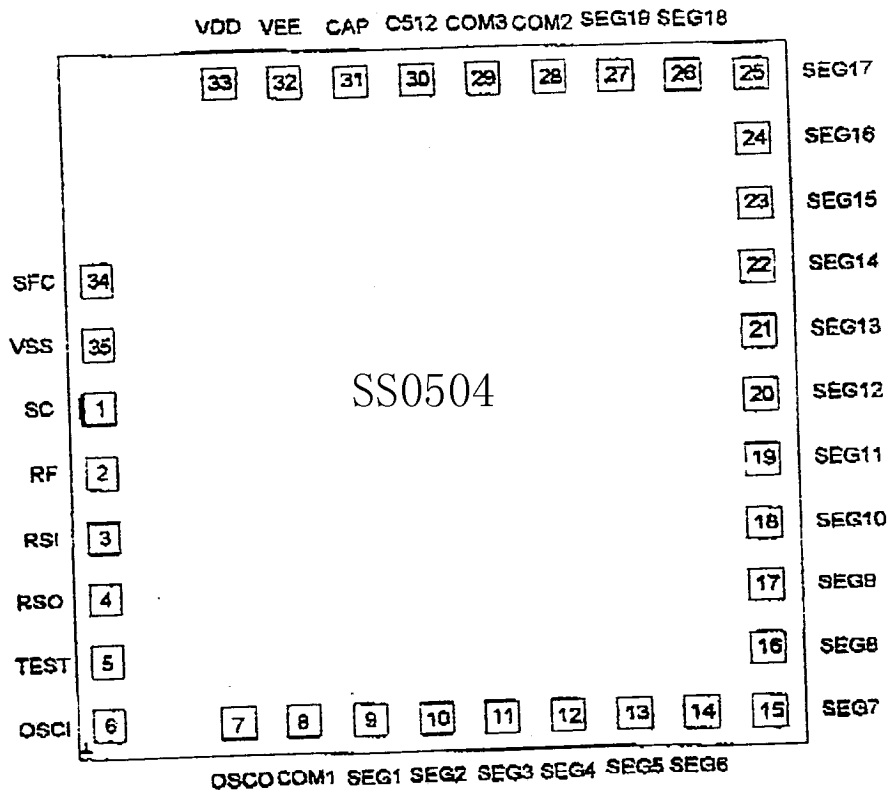
### Block Diagram:



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| Pad No. | Pad name | Coordinate (X, Y)  | Pad No. | Pad name | Coordinate (X, Y) |
|---------|----------|--------------------|---------|----------|-------------------|
| 1       | SC       | (-673.00, 3.00)    | 19      | SEG11    | (673.00, -143.00) |
| 2       | RF       | (-673.00, -143.00) | 20      | SEG12    | (673.00, 3.00)    |
| 3       | RSI      | (-673.00, -283.00) | 21      | SEG13    | (673.00, 143.00)  |
| 4       | RSO      | (-673.00, -423.00) | 22      | SEG14    | (673.00, 283.00)  |
| 5       | TEST     | (-673.00, -563.00) | 23      | SEG15    | (673.00, 423.00)  |
| 6       | OSCI     | (-673.00, -712.00) | 24      | SEG16    | (673.00, 563.00)  |
| 7       | OSCO     | (-382.00, -712.00) | 25      | SEG17    | (673.00, 712.00)  |
| 8       | COM1     | (-252.00, -712.00) | 26      | SEG18    | (522.00, 712.00)  |
| 9       | SEG1     | (-122.00, -712.00) | 27      | SEG19    | (392.00, 712.00)  |
| 10      | SEG2     | (2.00, -712.00)    | 28      | COM2     | (262.00, 712.00)  |
| 11      | SEG3     | (132.00, -712.00)  | 29      | COM3     | (122.00, 712.00)  |
| 12      | SEG4     | (262.00, -712.00)  | 30      | C512     | (-2.00, 712.00)   |
| 13      | SEG5     | (392.00, -712.00)  | 31      | CAP      | (-132.00, 712.00) |
| 14      | SEG6     | (522.00, -712.00)  | 32      | VEE      | (-262.00, 712.00) |
| 15      | SEG7     | (673.00, -712.00)  | 33      | VDD      | (-392.00, 712.00) |
| 16      | SEG8     | (673.00, -563.00)  | 34      | SFC      | (-673.00, 283.00) |
| 17      | SEG9     | (673.00, -423.00)  | 35      | VSS      | (-673.00, 143.00) |
| 18      | SEG10    | (673.00, -283.00)  |         |          |                   |

CHIP SIZE : X = 1580 um Y = 1710 um  
 IC chip substrate don't connect to VDD or VSS

# PAD DESCRIPTION :

| Pad No. | Pad Name | I/O | DESCRIPTION                                  |
|---------|----------|-----|----------------------------------------------|
| 1       | SC       | I   | PAD 1 is sensor clock generator input pad.   |
| 2       | RF       | O   | PAD 2 is reference resister output pad.      |
| 3       | RSI      | O   | PAD 3 is indoor sensor resister output pad.  |
| 4       | RSO      | O   | PAD 4 is outdoor sensor resister output pad. |
| 5       | TEST     | I   | IC test pad.internal pull low resistor.      |
| 6       | OSCI     | I   | Oscillator generator input pad.              |
| 7       | OSCO     | O   | Oscillator generator output pad. f = 32 KHz  |
| 8       | COM1     | O   | LCD common pad.                              |
| 9       | SEG1     | O   | LCD segment pad.                             |
| 10      | SEG2     | O   | LCD segment pad.                             |
| 11      | SEG3     | O   | LCD segment pad.                             |
| 12      | SEG4     | O   | LCD segment pad.                             |
| 13      | SEG5     | O   | LCD segment pad.                             |
| 14      | SEG6     | O   | LCD segment pad.                             |
| 15      | SEG7     | O   | LCD segment pad.                             |
| 16      | SEG8     | O   | LCD segment pad.                             |
| 17      | SEG9     | O   | LCD segment pad.                             |
| 18      | SEG10    | O   | LCD segment pad.                             |
| 19      | SEG11    | O   | LCD segment pad.                             |
| 20      | SEG12    | O   | LCD segment pad.                             |
| 21      | SEG13    | O   | LCD segment pad.                             |
| 22      | SEG14    | O   | LCD segment pad.                             |
| 23      | SEG15    | O   | LCD segment pad.                             |
| 24      | SEG16    | O   | LCD segment pad.                             |
| 25      | SEG17    | O   | LCD segment pad.                             |
| 26      | SEG18    | O   | LCD segment pad.                             |
| 27      | SEG19    | O   | LCD segment pad.                             |
| 28      | COM2     | O   | LCD common pad.                              |
| 29      | COM3     | O   | LCD common pad.                              |
| 30      | C512     | O   | Doubler voltage capacitor input pad.         |
| 31      | CAP      | I   | Doubler voltage capacitor output pad.        |
| 32      | VEE      | O   | Doubler voltage (3V) output pad.             |
| 33      | VDD      | P   | IC Vdd pad.                                  |
| 34      | SFC      | I   | °C/°F select pad                             |
| 35      | VSS      | P   | IC Vss pad.                                  |

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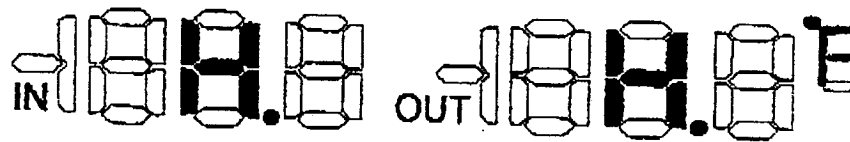
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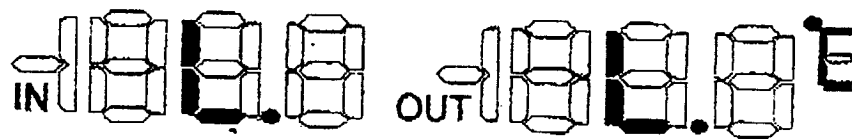
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上海办事处电话:(0)13701955389 191-3789221

## LCD display description :

- If temperature  $\geq 70.0\text{ }^{\circ}\text{C}$  (  $158.0\text{ }^{\circ}\text{F}$  ), display H.  $^{\circ}\text{C}$ (  $^{\circ}\text{F}$  )



- If temperature  $\leq -50.0\text{ }^{\circ}\text{C}$  (  $-58.0\text{ }^{\circ}\text{F}$  ), display L.  $^{\circ}\text{C}$ (  $^{\circ}\text{F}$  )



- From  $-0.1^{\circ}$  ~  $-9.9^{\circ}$  temperature is used to represent the negative sign for indoor and outdoor temperature LCD display

Example : indoor Temp. =  $-0.1\text{ }^{\circ}\text{F}$  & outdoor Temp. =  $-9.9\text{ }^{\circ}\text{F}$



- The temperature  $< -9.9^{\circ}$  is used to represent the negative sign for indoor and outdoor temperature LCD display

Example : indoor Temp. =  $-10.0\text{ }^{\circ}\text{C}$  & outdoor Temp. =  $-49.9\text{ }^{\circ}\text{C}$



- The other temperature is used for indoor and outdoor temperature LCD display

Example : indoor Temp. =  $0.0\text{ }^{\circ}\text{F}$  & outdoor Temp. =  $157.9\text{ }^{\circ}\text{F}$



### SFC Pad Function :

- If SFC is connected to VSS , it displays Temp. in °C.  
If SFC is connected to VDD , it displays Temp. in °F.
- When the SFC state is changed , the temperature will be converted and display in the corresponding scale ( °C or °F ) at a delay time less than 0.2 second.

### Electrical characteristics :

| ITEM  | PARAMETER                              | TEST CONDITION             | STAND VALUE |      |      | UNIT |
|-------|----------------------------------------|----------------------------|-------------|------|------|------|
|       |                                        |                            | MIN.        | TYP. | MAX. |      |
| VDD   | Supply Voltage                         |                            | 1.30        | 1.50 | 1.65 | V    |
| VEE   | Voltage double                         |                            | —           | 3.0  | —    | V    |
| IOP1  | Operating current<br>No Measurecurrent | VDD = 1.5V<br>LCD display  | —           | 9.0  | 15   | uA   |
| IOP2  | Operating current<br>Measurecurrent    | VDD = 1.5V<br>LCD Display  | —           | 55   | —    | uA   |
| VIL   | Input Low Voltage                      | VDD = 1.5V                 | —           | 0    | 0.2  | V    |
| VIH   | Input High Voltage                     | VDD = 1.5V                 | 1.3         | 1.5  | —    | V    |
| VOL   | Output Low Voltage                     | VDD = 1.5V                 | —           | 0    | 0.1  | V    |
| VOH   | Output High Voltage                    | VDD = 1.5V                 | 1.4         | 1.5  | —    | V    |
| Irf   | Driving Current ( RF )                 | VDD = 1.5V<br>Vds = -0.75V | 1.0         | —    | —    | mA   |
| Irsi  | Driving current ( RSI )                | VDD = 1.5V<br>Vds = -0.75V | 1.0         | —    | —    | mA   |
| Irso  | Driving current ( RSO )                | VDD = 1.5V<br>Vds = -0.75V | 1.0         | —    | —    | MA   |
| Icomd | Driving current<br>( COM1 -- COM3 )    | Vds = -0.3V                | 30          | —    | —    | uA   |
| Icoms | Sinking current<br>( COM1 -- COM3 )    | Vds = 0.3V                 | 60          | —    | —    | uA   |
| Isegd | Driving current<br>( SEG1 -- SEG19 )   | Vds = -0.3V                | 30          | —    | —    | uA   |
| Isegs | Sinking current<br>( SEG1 -- SEG19 )   | Vds = 0.3V                 | 60          | —    | —    | uA   |
| Fosc  | Oscillator frequency                   | RC oscillator              | —           | 32   | —    | KHz  |
| Topr  | Operating temperature                  |                            | -50         | —    | 75   | °C   |
| Tstg  | Storage temperature                    |                            | -50         | —    | 125  | °C   |

LCD description diagram : ( Page 6/7 )

Application description diagram : ( Page 7/7 )



## 1



## 3

- A

A

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