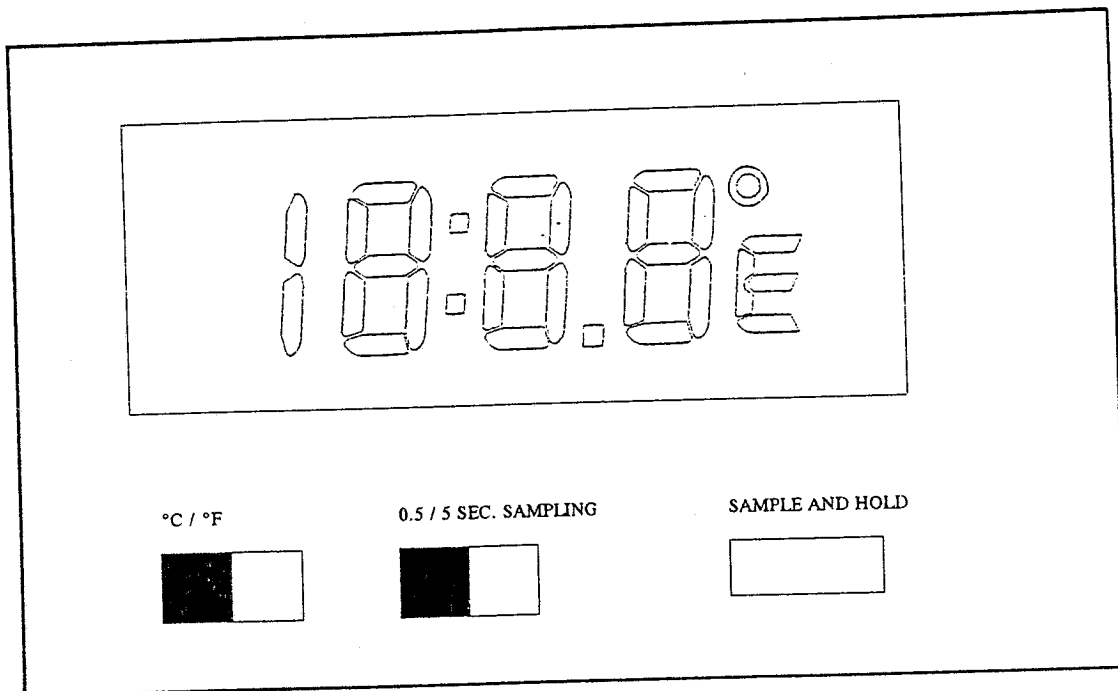


SS0105

WIDE RANGE THERMOMETER -50°C(-58°F) ~ +300°C(+572°F)



Features:

1. 1.5 Volts battery power supply
2. Temperature sensing rate (0.5 sec. / 5 sec.)
3. Temperature data hold
4. Measure range from -50°C(-58°F) to +300°C(572°F)

VI. Logic symbol

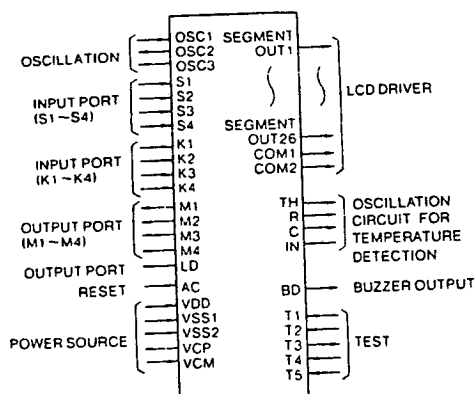


Figure 1.

VII. Chip PAD Layout

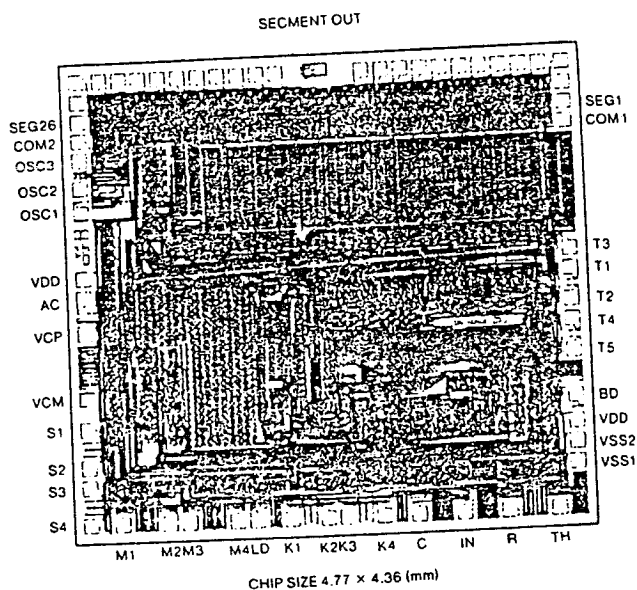


Figure 2.

VIII. Pin description

Designation	Function
V_{DD}	Circuit ground potential
V_{SS1}	Power source (-1.5V)
V_{SS2}	Power source for LCD driver (-3.0V) This terminal is connected to V_{DD} terminal through a $0.1\mu F$ capacitor.
V_{CP} , V_{CM}	Booster capacitor connection terminals V_{CP} terminal is connected to V_{CM} terminal through a $0.1\mu F$ capacitor.
OSC1, OSC3	Input and output terminals of oscillator inverter. 32.768 kHz crystal is connected to these terminals.
$T_1 \sim T_5$	Terminals to test internal logic, $T_1 \sim T_3$ and T_5 are pulled down to V_{SS1} . T_4 is output. Test pins must be normally open.
AC	Terminal to clear internal logic pulled down to V_{SS1} . After power is turned on, the SS0104 must be reset by this terminal.
BD	Buzzer output
TH, R, C, IN	Terminal to CR oscillation circuit for temperature detection, fundamental resistor, thermistor, capacitor connection terminal.

III. Mode Description

3.1 Temperature mode (Assume using LCD VCD0101-1)

- User can choose between °C and °F by switching K_4 .

For °F, $K_4 = V_{DD}$

For °C, $K_4 = \text{OPEN}(V_{SS1})$

- Sampling rate can be chosen by switching S_4 .

For 0.5 sec. sampling, $S_4 = \text{OPEN}(V_{SS1})$

For 5 sec. sampling, $S_4 = V_{DD}$

- Sample and hold function is activated by pushing S_2 once. This is indicated by a flashing °C or °F flag. To return to normal temperature measurement, just push S_2 again.

- Function of Temperature Mode

Terminal	Level	Function
K_4	V_{DD}	°F is chosen
	$\text{OPEN}(V_{SS1})$	°C is chosen
S_2	TOGGLE	Sample and hold
S_4	$\text{OPEN}(V_{SS1})$	0.5 sec. sampling
	V_{DD}	5 sec. sampling

IV. Function of Terminals

Terminal	Level	Function
S_1	$\text{OPEN}(V_{SS1})$	NC
S_2	V_{DD} $\text{OPEN}(V_{SS1})$	Sample and Hold Release
S_3	$\text{OPEN}(V_{SS1})$	NC
S_4	$\text{OPEN}(V_{SS1})$	0.5 sec. sampling
	V_{DD}	5 sec. sampling
K_1	$\text{OPEN}(V_{SS1})$	NC
K_2	$\text{OPEN}(V_{SS1})$	NC
K_3	$\text{OPEN}(V_{SS1})$	NC
K_4	V_{DD}	°F is chosen
	$\text{OPEN}(V_{SS1})$	°C is chosen
$M_1 - M_4$	$\text{OPEN}(V_{SS1})$	NC
LD	$\text{OPEN}(V_{SS1})$	NC

I. General Description

SS0105 is a CMOS low power IC specially programmed to detect wide temperature range. Using a special custom made thermistor S258 as sensor, this IC can measure temperature range between -50°C (-58°F) to +300°C (572°F). Measured temperature is displayed on a 3½ digits liquid crystal display.

Application is in cooking thermometer, laboratory thermometer and anywhere when digital temperature measurement with wide range is required.

II. Features

- Measurement of temperature by thermistor. (Ishizuka S258 available from VSL)
- 3½ Digits LCD with °C, °F, indicators. (LCD VCD0101-1) or 3½ Digits LCD (LCD VCD0104-1)
- Temperature data hold.
- Temperature sensing rate (0.5 sec. / 5 sec.) selectable.
- Wide temperature range: -50°C (-58°F) to +300°C (572°F)

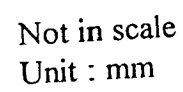
Resolution	0.1° (-19.9° to +199.9°) 1.0° (Otherwise)
Accuracy	1%(-50°C to 120°C) 2%(120°C to 200°C) 5%(200°C to 250°C) 8%(250°C to 300°C)

- 1.5V battery operation.
- LCD VCD0101-1 or VCD0104-1 available from SUNSTAR

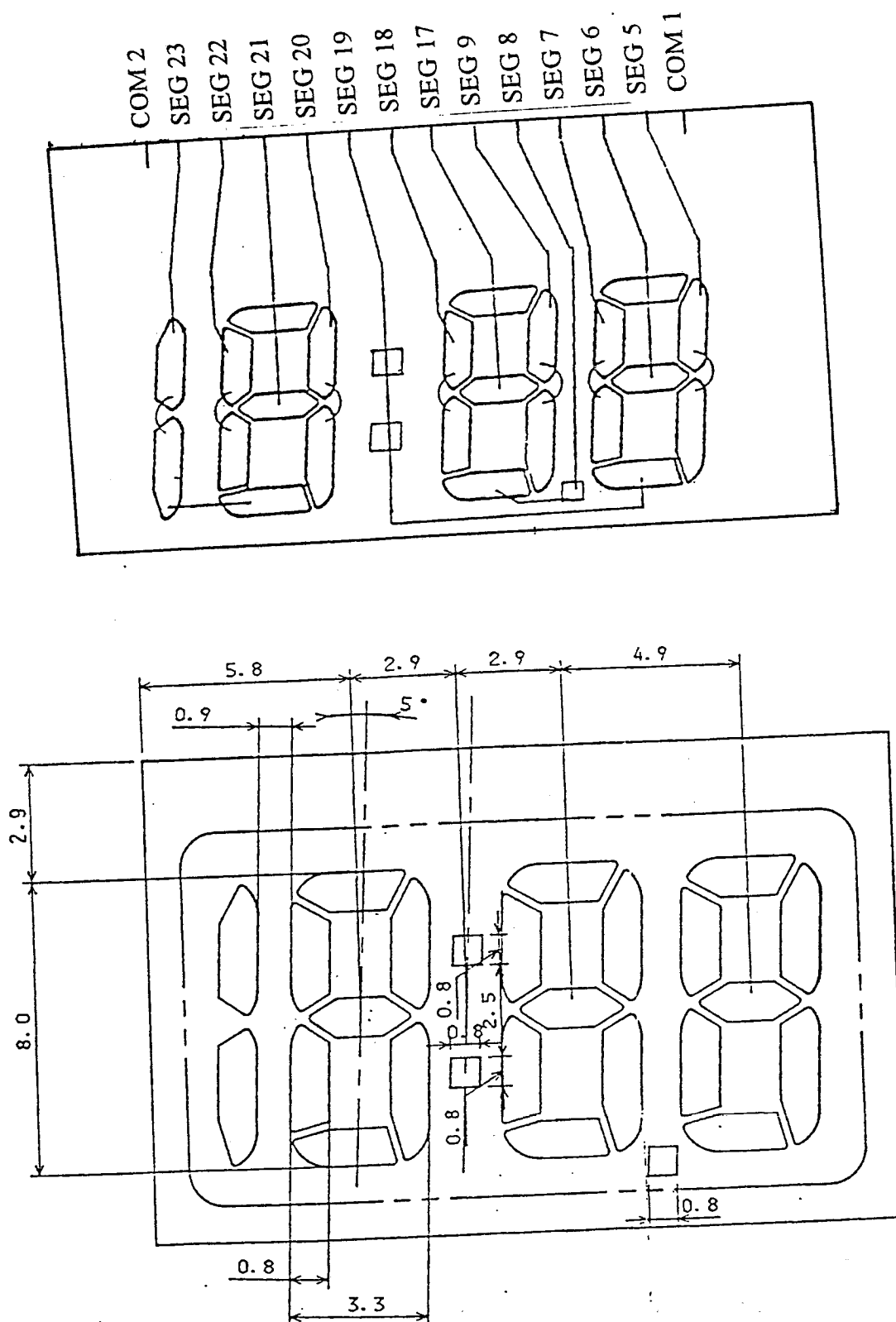
SUNSTAR 深圳市商斯达电子有限公司
SHENZHEN SUNSTAR ELECTRONICS CO.,LTD.

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地址(Add):深圳福田区福华路福庆街鸿图大厦1602室
RM 1602,Hongtu Bldg,Fuhua Rd, Futian Region,Shenzhen China
电话(Tel):0755-3600718 3758073 邮编(PC):518033
传真(Fax):0755-3376182 E-mail:szsunstr@public.wptt.net.cn
网址: Http://www.sunstare.com/ 手机:(0)13902971329
西安办事处电话:(0)13609291696 191-8454356
北京办事处电话:(0)13501189838 191-8886650
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(Using VCD0104-1)



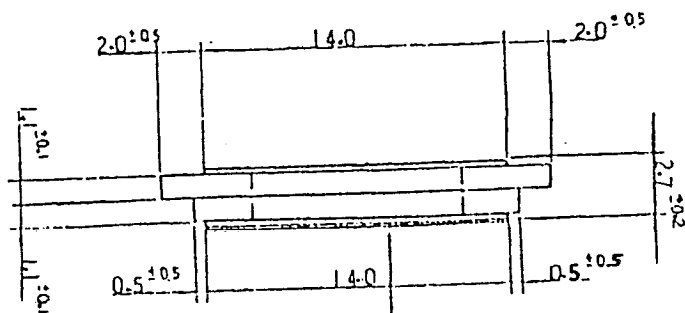
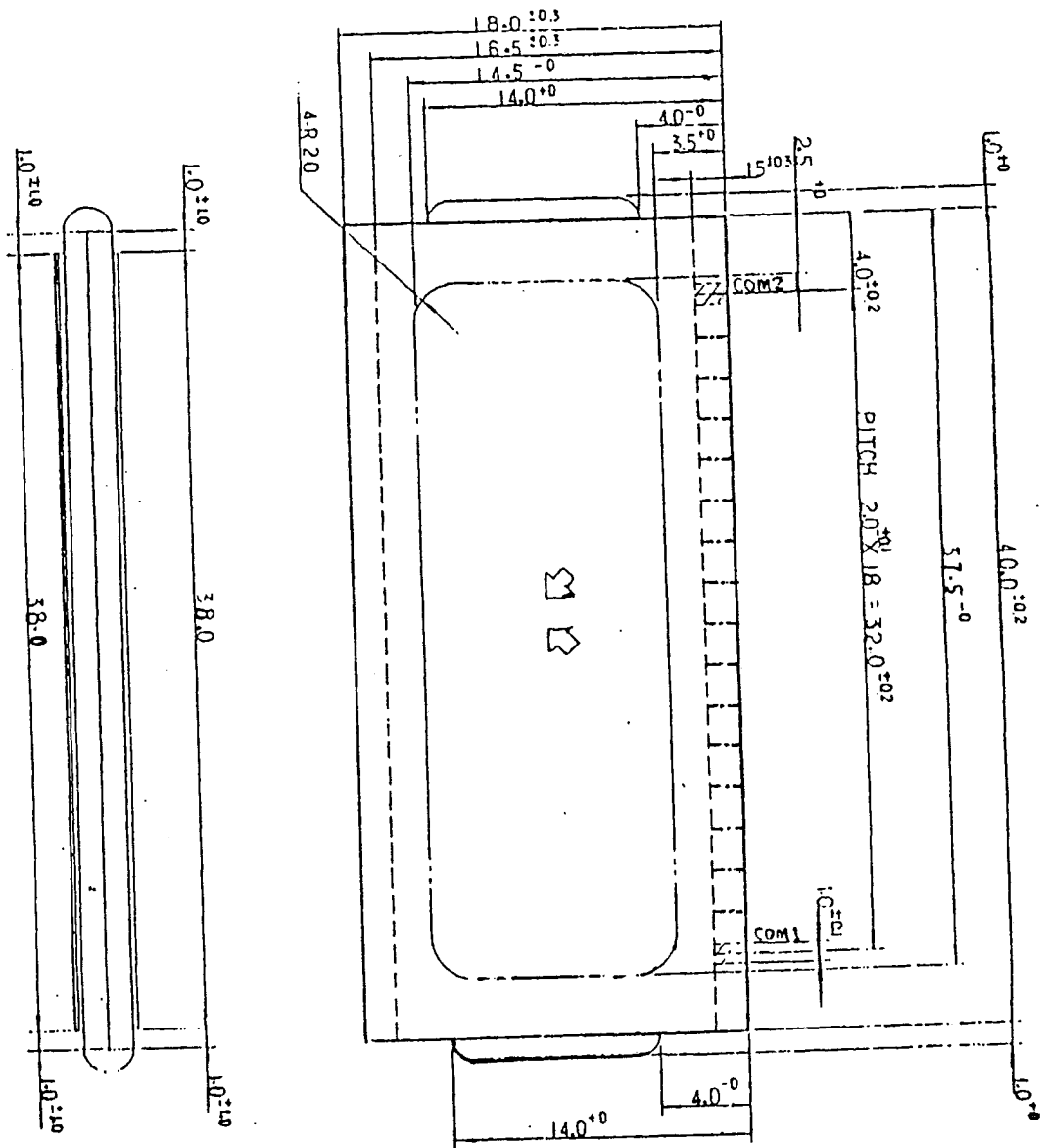
Not in scale
Unit : mm

IX. PAD Layout

No.	Signal	X	Y
1	S ₄	-2230	-2,025
2	M ₁	-1,940	-2,025
3	M ₂	-1,510	-2,025
4	M ₃	-1,330	-2,025
5	M ₄	-900	-2,025
6	LD	-720	-2,025
7	K ₁	-400	-2,025
8	K ₂	-62	-2,025
9	K ₃	118	-2,025
10	K ₄	456	-2,025
11	C	778	-2,025
12	IN	1,190	-2,025
13	R	1,600	-2,025
14	TH	2,042	-2,025
15	V _{SS1}	2,230	-1,615
16	V _{SS2}	2,230	-1,435
17	V _{DD}	2,230	-1,225
18	BD	2,230	-1,025
19	T ₅	2,230	-615
20	T ₄	2,230	-335
21	T ₂	2,230	-155
22	T ₁	2,230	125
23	T ₃	2,230	305
24	COM ₁	2,230	1,475
25	NC	2,230	1,655
26	NC	2,230	1,835
27	SEG 3	2,230	2,025
28	SEG 4	2,020	2,025
29	SEG 5	1,840	2,025
30	SEG 6	1,660	2,025
31	SEG 7	1,480	2,025
32	SEG 8	1,300	2,025
33	SEG 9	1,120	2,025
34	NC	940	2,025

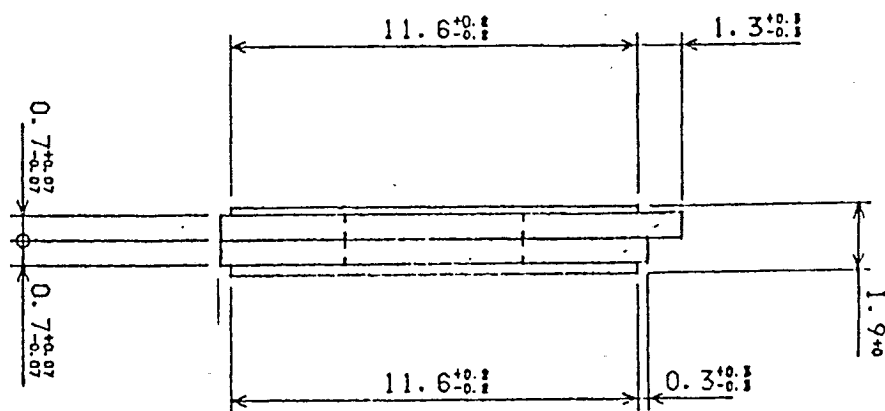
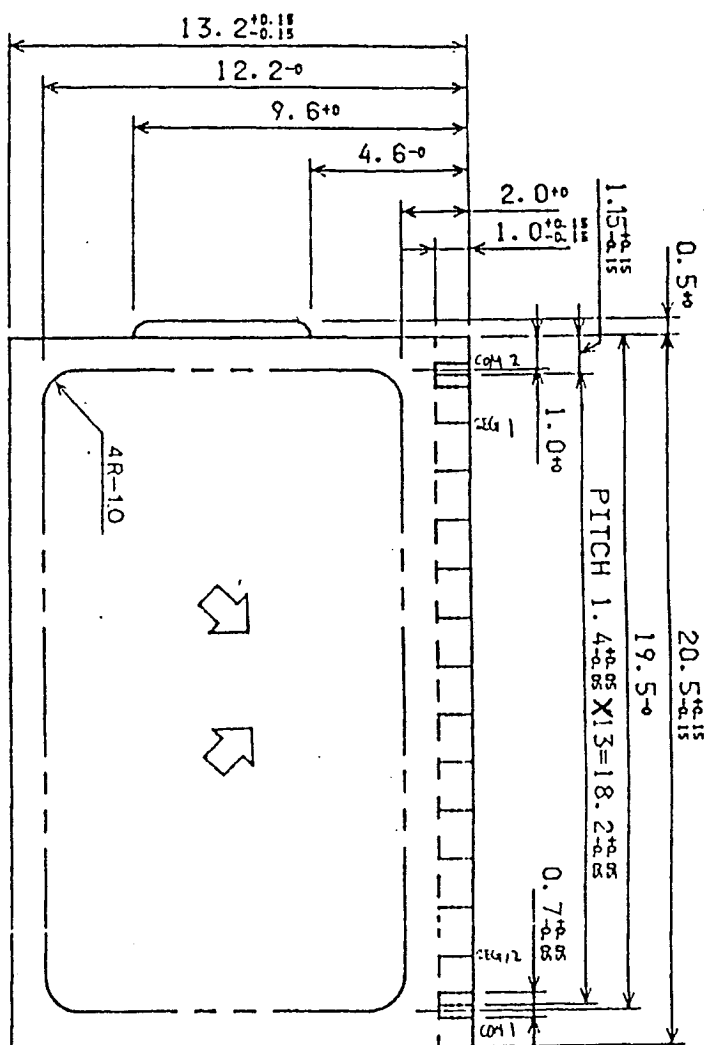
No.	Signal	X	Y
35	NC	760	2,025
36	NC	580	2,025
37	NC	400	2,025
38	NC	-400	2,025
39	NC	-580	2,025
40	NC	-760	2,025
41	SEG 17	-940	2,025
42	SEG 18	-1,120	2,025
43	SEG 19	-1,300	2,025
44	SEG 20	-1,480	2,025
45	SEG 21	-1,660	2,025
46	SEG 22	-1,840	2,025
47	SEG 23	-2,020	2,025
48	NC	-2,230	2,025
49	NC	-2,230	1,835
50	NC	-2,230	1,655
51	COM ₂	-2,230	1,475
52	OSC ₃	-2,230	1,295
53	NC	-2,230	1,033
54	OSC ₁	-2,230	805
55	V _{DD}	-2,230	205
56	AC	-2,230	25
57	V _{CP}	-2,230	-295
58	V _{CM}	-2,230	-885
59	S ₁	-2,230	-1,169
60	S ₂	-2,230	-1,507
61	S ₃	-2,230	-1,687

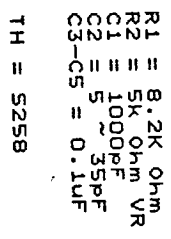
Chip size: 4.77 x 4.36 [mm]
 PAD size: 110 x 110 [μm]



LOWER POLARIZER
WITH REFLECTOR
(REFLECTIVE TYPE)

SCALE: $\frac{4}{1}$
UNIT : mm





Appendix: Accuracy of SS0105

The following is the test result of the accuracy of SS0105

It does not take into account the error of S258. If the user does not trim on each S258 on production, the $\pm 3\%$ error has to be added to the thermometer.

Actual Temp °C	Software Error °C R1+R2=9.14K Trimmed at 81°C	Error of S258	Total Error
-50	+0.5	± 1.6	-1.6, +2.1
0	+0.5	± 1.1	-1.1, +1.6
50	+0.5	± 1.3	-1.3, +1.8
81	0	± 2.2	-2.2, +2.2
100	+0.5	± 2.8	-2.8, +3.3
120	+1.1	± 3.5	-3.5, +4.6
150	+2	± 4.7	-4.7, +6.7
200	+4	± 6.9	-6.9, +10.9
220	+7	± 7.9	-7.9, +14.9
250	+12	± 9.6	-9.6, +21.6
280	+20	± 11.4	-11.4, +31.4

Remarks:

1. Software error are calculated by assuming there is a perfect S258. During the test, the thermistor is replaced by a variable resistor .
2. The total error is calculated by adding the error of S258 and the software error. It is the WORST case.
3. If the customer wants to reduce the total error, she may use a variable resistor to replaced the 9.14kOhm fix resistor. Then trim every pieces of S258 at 81°C water bath. This can reduce the error incurred by the thermistor.

SUNSTAR 深圳市商斯达电子有限公司

SHENZHEN SUNSTAR ELECTRONICS CO.,LTD.

集成电路
传感器
单片机

地址(Add):深圳福田区福华路福庆街鸿图大厦1602室
RM 1602,Hongtu Bldg,Fuhua Rd, Futian Region,Shenzhen China
电话(Tel):0755-3600718 3758073 邮编(PC):518033
传真(Fax):0755-3376182 E-mail:szsunstr@public.wptt.net.cn
网址: Http://www.sunstare.com/ 手机:(0)13902971329
西安办事处电话:(0)13609291696 191-8454356
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QQ：195847376

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电话：0755-83376549 83376489 83387030 83387016

传真：0755-83376182 83338339 邮编：518033 手机：(0)13902971329

深圳展销部：深圳华强北路赛格电子市场 2583 号 TEL/FAX：
0755-83665529 25059422

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL：010-81159046 82615020 13501189838 FAX：010-82613476

上海分公司：上海市北京东路 668 号上海赛格电子市场 2B35 号

TEL：021-28311762 56703037 13701955389 FAX：021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)
西安劳动南路 88 号电子商城二楼 D23 号

TEL：029-81022619 13072977981 FAX:029-88789382

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