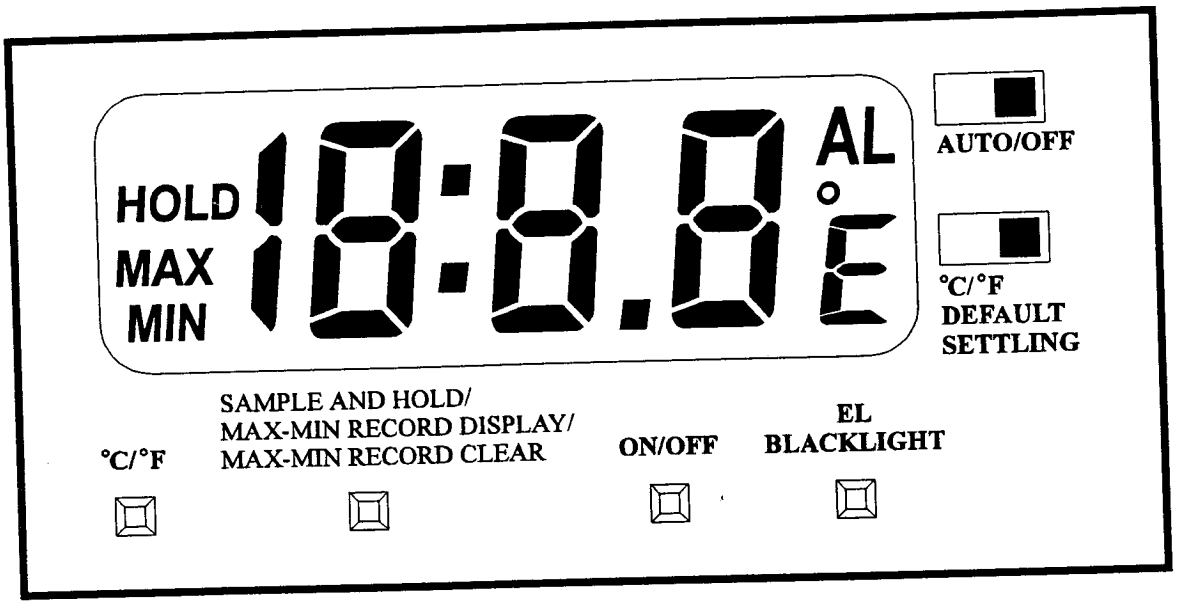
SS0109

WIDE RANGE TEMPERTURE
-20°C (-4°F) to +200°C (+392°F)



Features:

- 1.5 Volts battery power supply
- Max-Min temperature record display (with data reset)
- seconds sampling rate
- Temperature data hold
- Measure range from -20°C (-4°F) to +200°C (+392°F).

III. Mode Description

3.1. Temperature Mode (Assume using LCD VCD0201-1)

- Full segment-on when power-up
- User can toggle °C/°F by pushing key K_4, the °C/°F status when power-up is selected by K_1. Readings in C at power-up stage will be shown when K_1=0 and readings in °F at power-up stage will be shown when K_1=1.

3.2. Sample and Hold / Max and Min Temperature Record Function

The control keys for sample and hold / max and min temperature record functions are depended on the voltage level of K_3.

For K_3=0

Sample and hold function activated by pressing S_2 once. Flag "OUT" is shown .
Maximum temperature value will be displayed by pressing S_2 again. Flag "MAX" is shown *.

- Minimum temperature value will be displayed by pressing S_2 again. Flag "MIN" is shown *.
- Normal temperature reading will resume after pressing S_2 at minimum temperature value stage.

For K_3=0

- Sample and hold function activated by pressing S_1 once. Flag "OUT" is shown *.
- Normal temperature reading will be resume after pressing S_1 again.
- Maximum temperature value will be displayed by pressing S_2 once. Flag "MAX" is shown*.
- Minimum temperature value will be displayed by pressing S_2 again. Flag "MIN" is shown*.
- Normal temperature reading will resume after pressing S_2 at minimum temperature value stage.

I. General Description

SS0109 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 from -20°C (-4°F) to +200°C (+392°F). Measured temperature is displayed on a 3 ½ digits liquid crystal display.

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

II. Features

- 1.5 Volts battery power supply
- Max-Min temperature record display and can be reset
- seconds sampling rate
- Temperature data hold

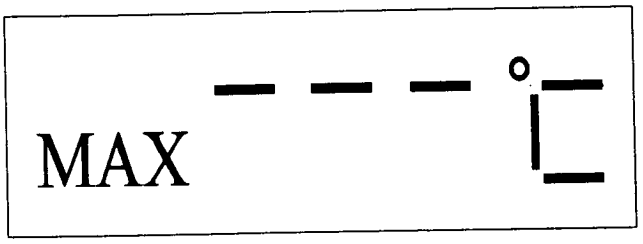
Measure range from -20°C (-4°F) to +200°C (392°F).

- Resolution and range listed below.

Resolution	0.1°C (-19.9°C to 199.9°C)	1.0°C (otherwise)
Accuracy	1.0°C (-10.0°C to +100°C)	2.0°C(otherwise)

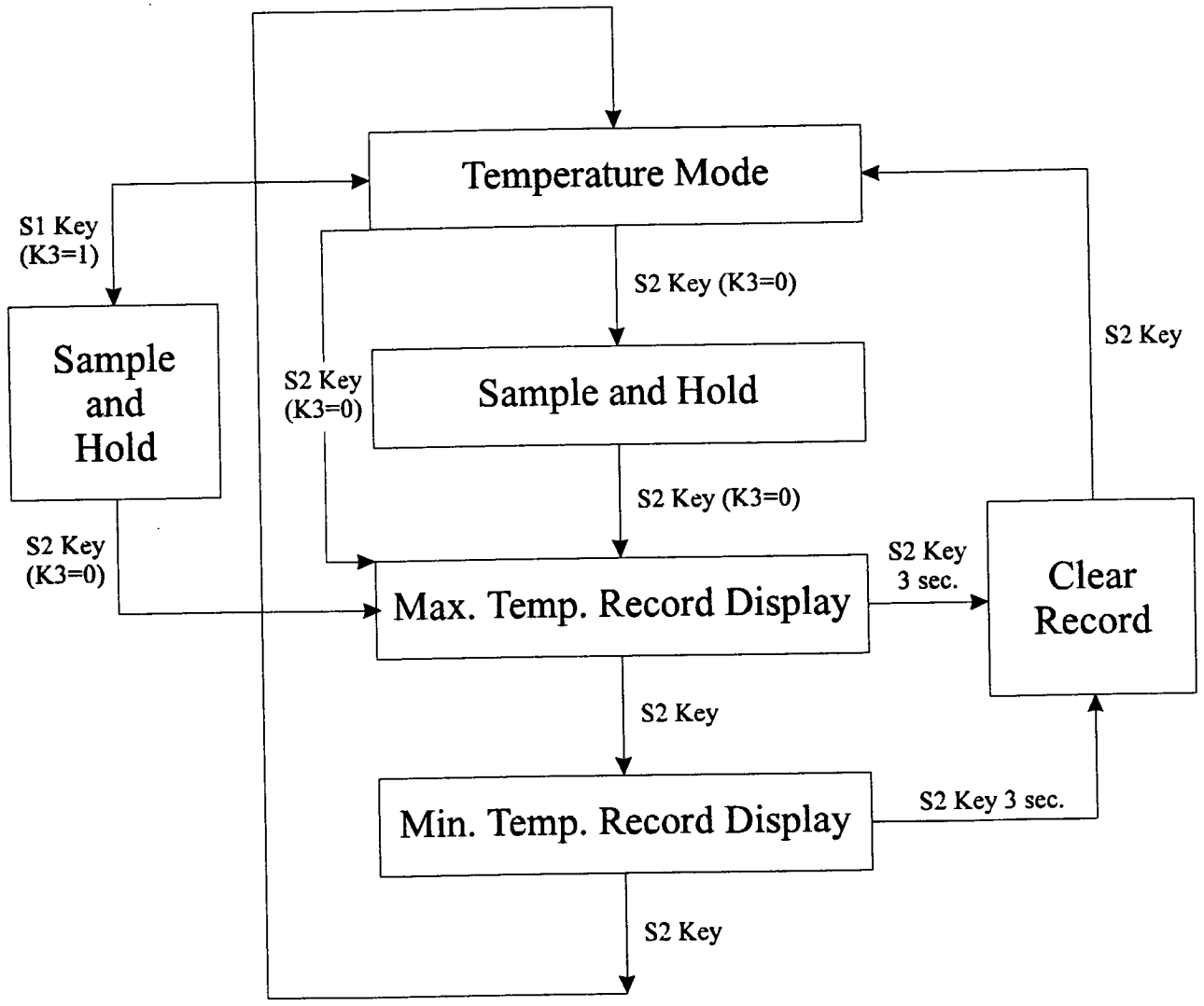
- ON/OFF key and Auto-off function to save power
- Support Back Light function
- °C/°F selected by either slide switch or key
- LCD VCD 0101-1 or VCD 0104-1 available from VSL
- Full Segment test

– To reset the max-min temperature record, hold S_2 for 3 seconds at maximum or minimum temperature record stage. The display will show as following.



This indicated that the maximum temperature record is cleared and the current temperature is set at the maximum temperature. Minimum temperature record can be cleared similarly.

**Assume LCD VCD0101-1 being used*



3.3. ON/OFF function

As to save the power consumption, SS0109 can be ON/OFF by toggle the status of S_3.

- If SS0109 is turn ON, the display and temperature sensing will be turn OFF by pressing S_3 once.
- SS0109 will be resumed by pressing S_3 again.

Note : The maximum and minimum record will retain at OFF mode.

3.4. Auto-OFF function

The auto-OFF function activated by K_2. When K_2=1, auto-OFF function is enabled. When temperature change is very small and sampling rate stays in slow mode for 5 minutes, SS0109 turns OFF temperature sensing and display automatically. It will be resumed by pressing S_1, S_2, S_3 or S_4.

Note : When auto-OFF function is enabled (K_2=1). ON/OFF button (S_3) still in function.

3.5. EL Back Light control function

When S_4 is being pressed, EL back light control signal (M_1) will remain high for 5 seconds as to turn on the EL back light module.

IV. Function of Terminals

Terminal	Level	Function
S_1	-	Sample and hold push button (K_3=1)
S_2	-	Sample and hold (K_3=0)/Max-min temp. display/Clear record push button
S_3	-	ON/OFF push button
S_4	-	EL back light ON/OFF push button
K_1	V_{DD} OPEN(V_{SS1})	°F is selected at power up °C is selected at power up
K_2	V_{DD} OPEN(V_{SS1})	Auto-OFF function enabled Auto-OFF function disabled
K_3		
K_4	-	°C/°F push button
M_1	-	EL back light control signal. M_1 will remain high for 5 seconds. When key S_4 being pressed.

V. Logic symbol

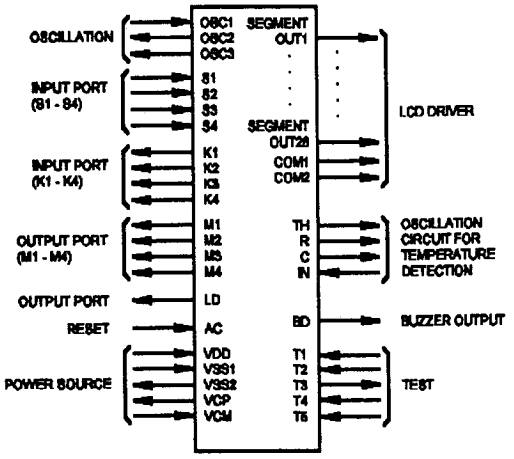


Figure 1.

VI. Chip PAD Layout

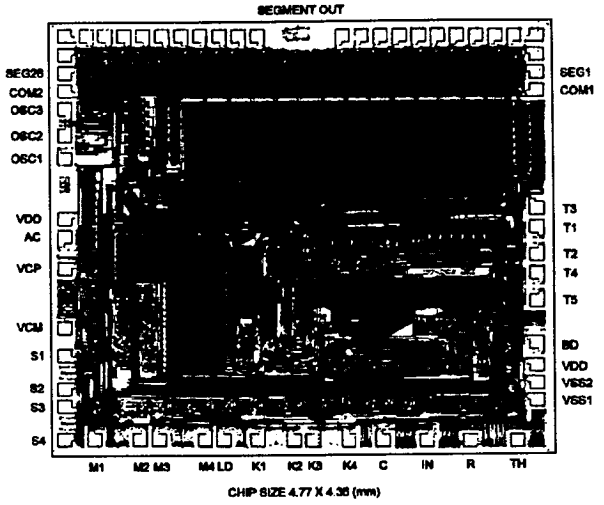


Figure 2.

VII. 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 0.1μF capacitor
V_{CP}, V_{CM}	Booster capacitor connection terminals V_{CP} terminal is connected to V_{CM} terminal through a 0.1μF capacitor
OSC1, OSC3	Input and output terminals of oscillator inverter. 32.768 kHz crystal is connected to these terminals.
T_1 ~ T_5	Terminals to test internal logic, T_1 ~ 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 SS0109 must be reset by this terminal.
BD	Buzzer output
TH, R, C, IN	Terminal to CR oscillation circuit for temperature detection, fundamental resistor, thermistor, and capacitor connection terminal.

VIII. PAD Layout

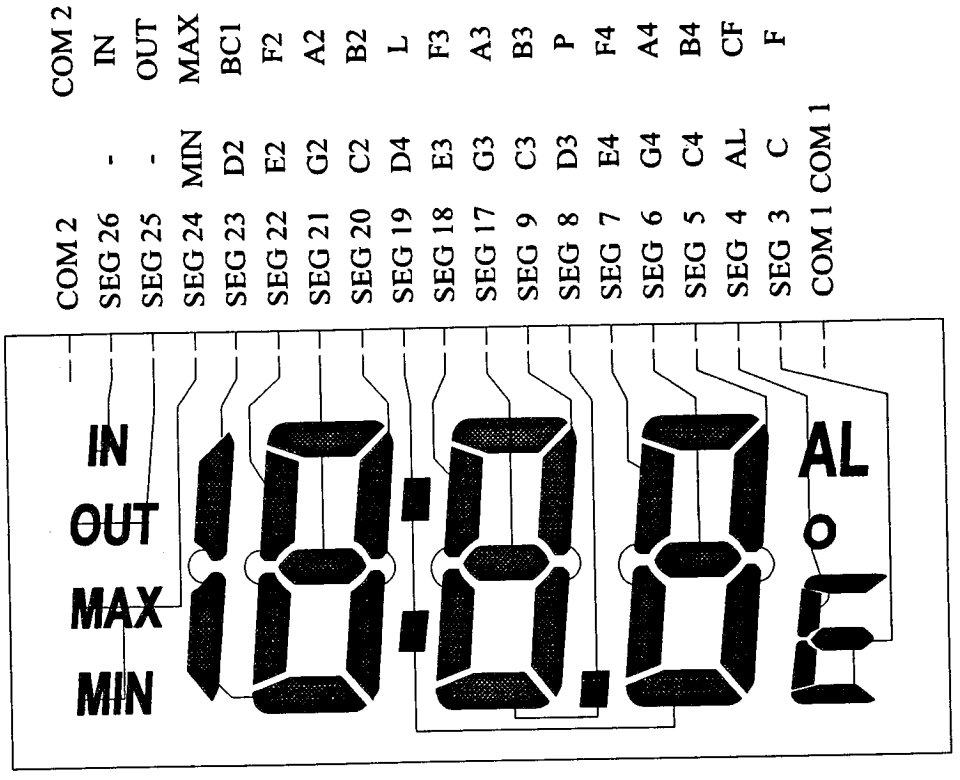
No.	Signal	X	Y
1	S4	-2,230	-2,025
2	M1	-1,940	-2,025
3	M2	-1,510	-2,025
4	M3	-1,330	-2,025
5	M4	-900	-2,025
6	LD	-720	-2,025
7	K1	-400	-2,025
8	K2	-62	-2,025
9	K3	118	-2,025
10	K4	456	-2,025
11	C	778	-2,025
12	IN	1,190	-2,025
13	R	1,600	-2,025
14	TH	2,042	-2,025
15	VSS1	2,230	-1,615
16	VSS2	2,230	-1,435
17	VDD	2,230	-1,225
18	BD	2,230	-1,025
19	T5	2,230	-615
20	T4	2,230	-335
21	T2	2,230	-155
22	T1	2,230	125
23	T3	2,230	305
24	COM1	2,230	1,475
25	SEG1	2,230	1,655
26	SEG2	2,230	1,835
27	SEG3	2,230	2,025
28	SEG4	2,020	2,025
29	SEG5	1,840	2,025
30	SEG6	1,660	2,025
31	SEG7	1,480	2,025
32	SEG8	1,300	2,025
33	SEG9	1,120	2,025
34	NC	940	2,025
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	SEG17	-940	2,025
42	SEG18	-1,120	2,025
43	SEG19	-1,300	2,025
44	SEG20	-1,480	2,025

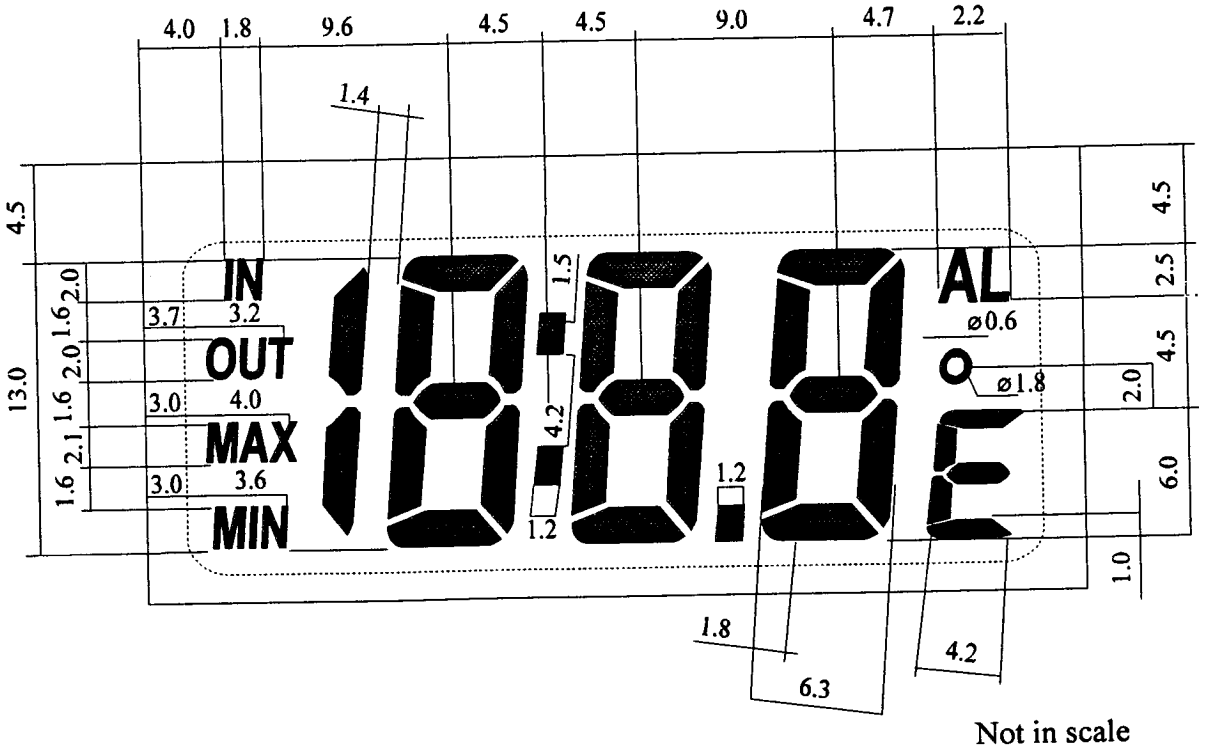
No.	Signal	X	Y
45	SEG21	-1,660	2,025
46	SEG22	-1,840	2,025
47	SEG23	-2,020	2,025
48	SEG24	-2,230	2,025
49	SEG25	-2,230	1,835
50	SEG26	-2,230	1,655
51	COM2	-2,230	1,475
52	OSC3	-2,230	1,295
53	NC	-2,230	1,033
54	OSC1	-2,230	805
55	VDD	-2,230	205
56	AC	-2,230	25
57	VCP	-2,230	-295
58	VCM	-2,230	-885
59	S1	-2,230	-1,169
60	S2	-2,230	-1,507
61	S3	-2,230	-1,687

Chip size: 4.77 x 4.36 [mm]

PAD size: 110 x 110 [μm]

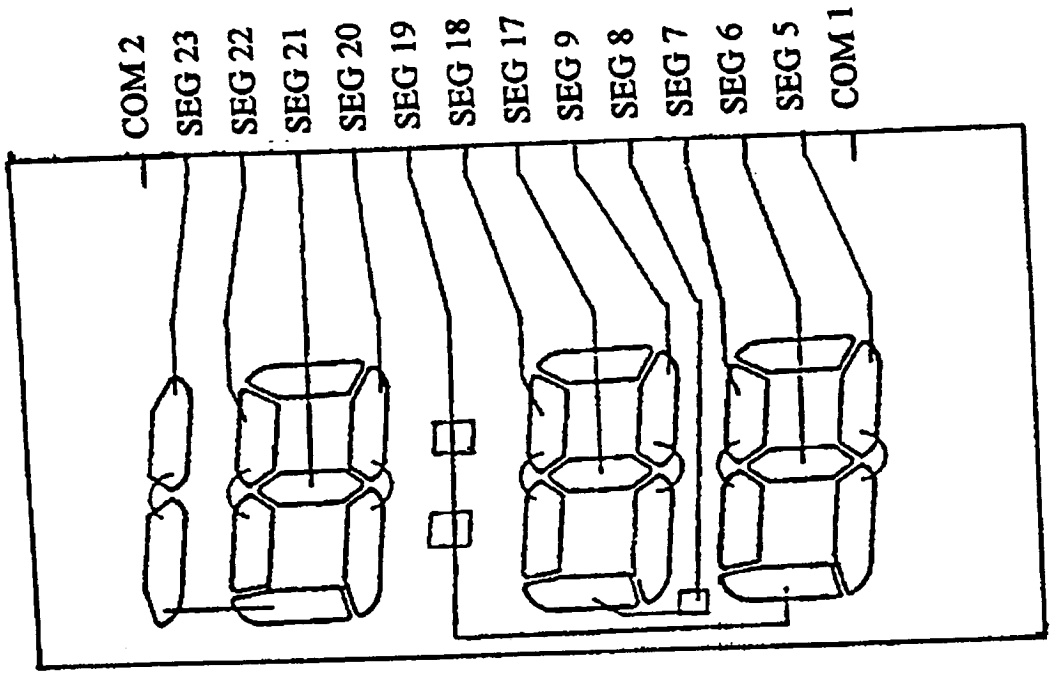
X. LCD Format (Using VCD0202-1)

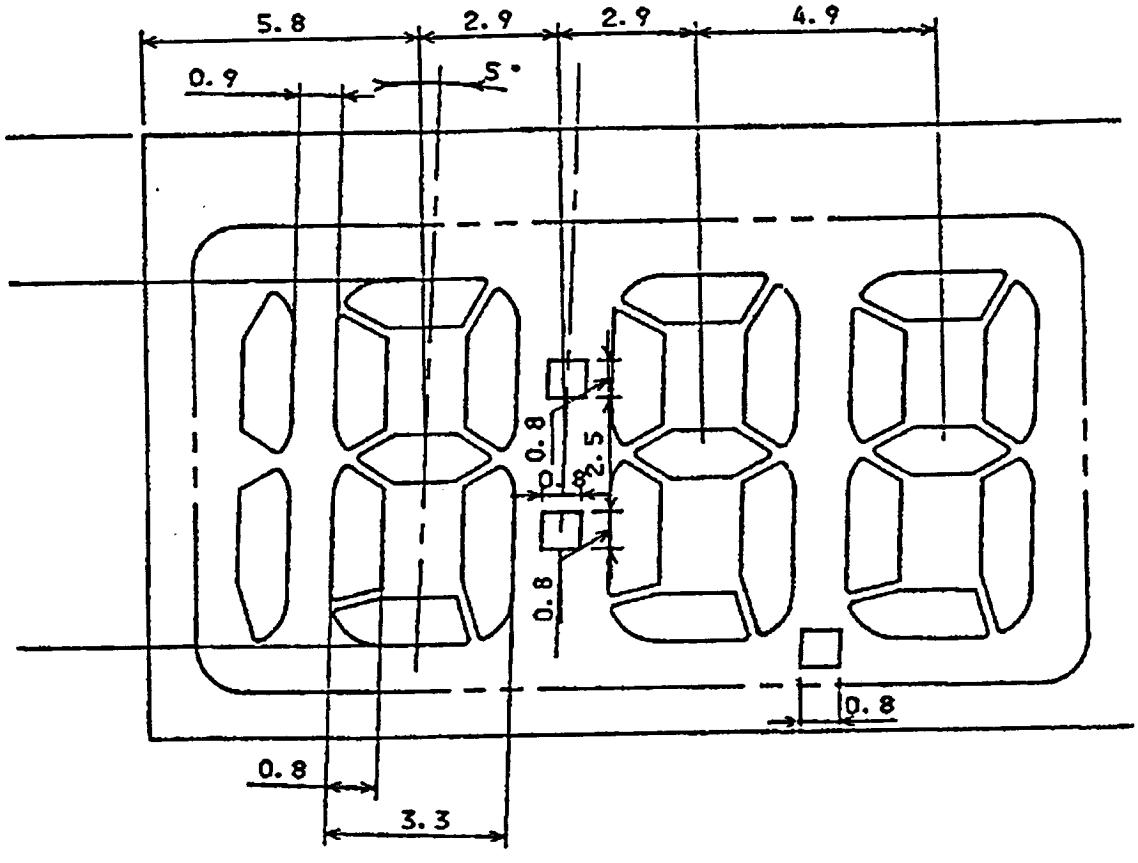




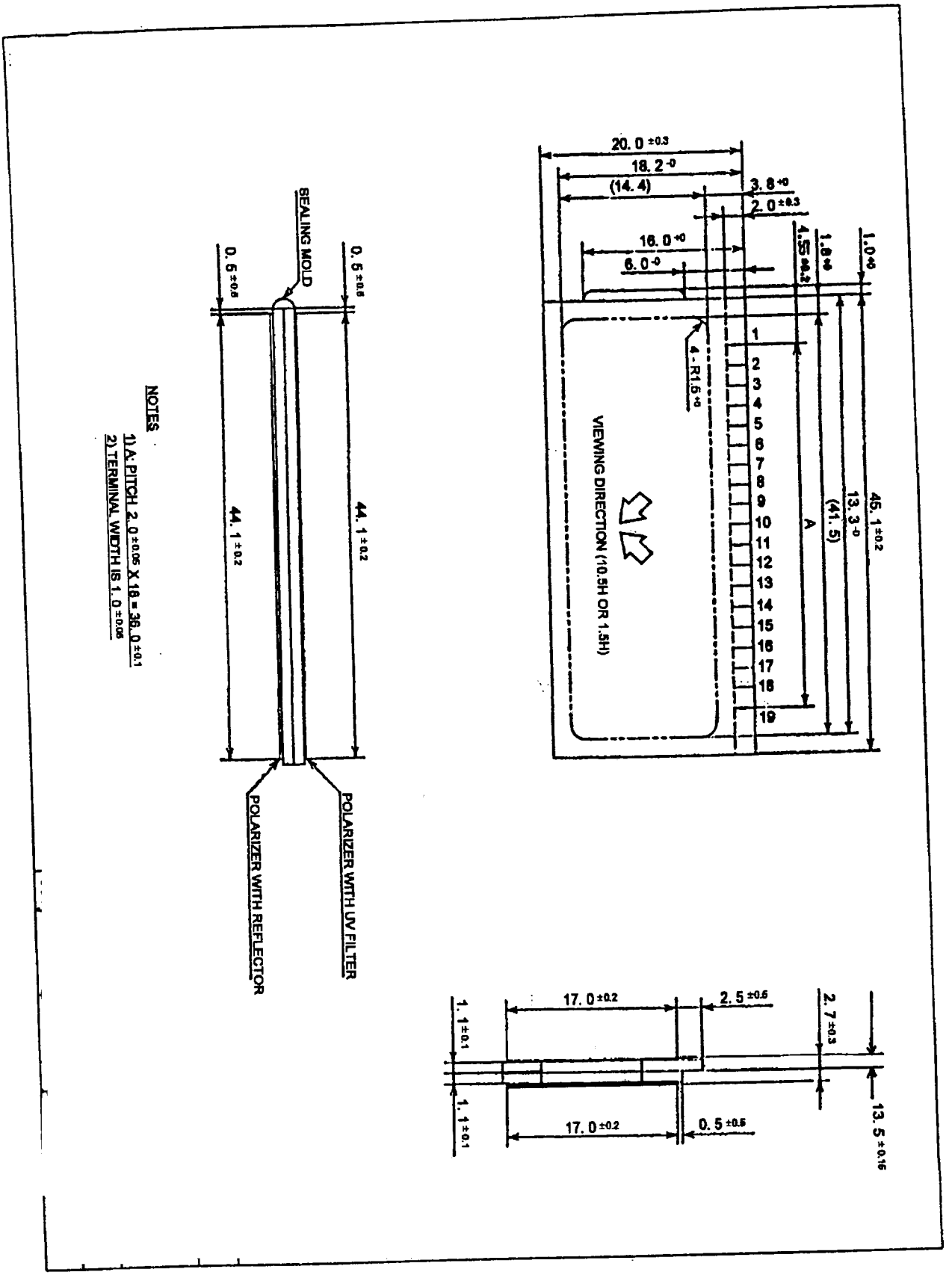
Not in scale
Unit : mm

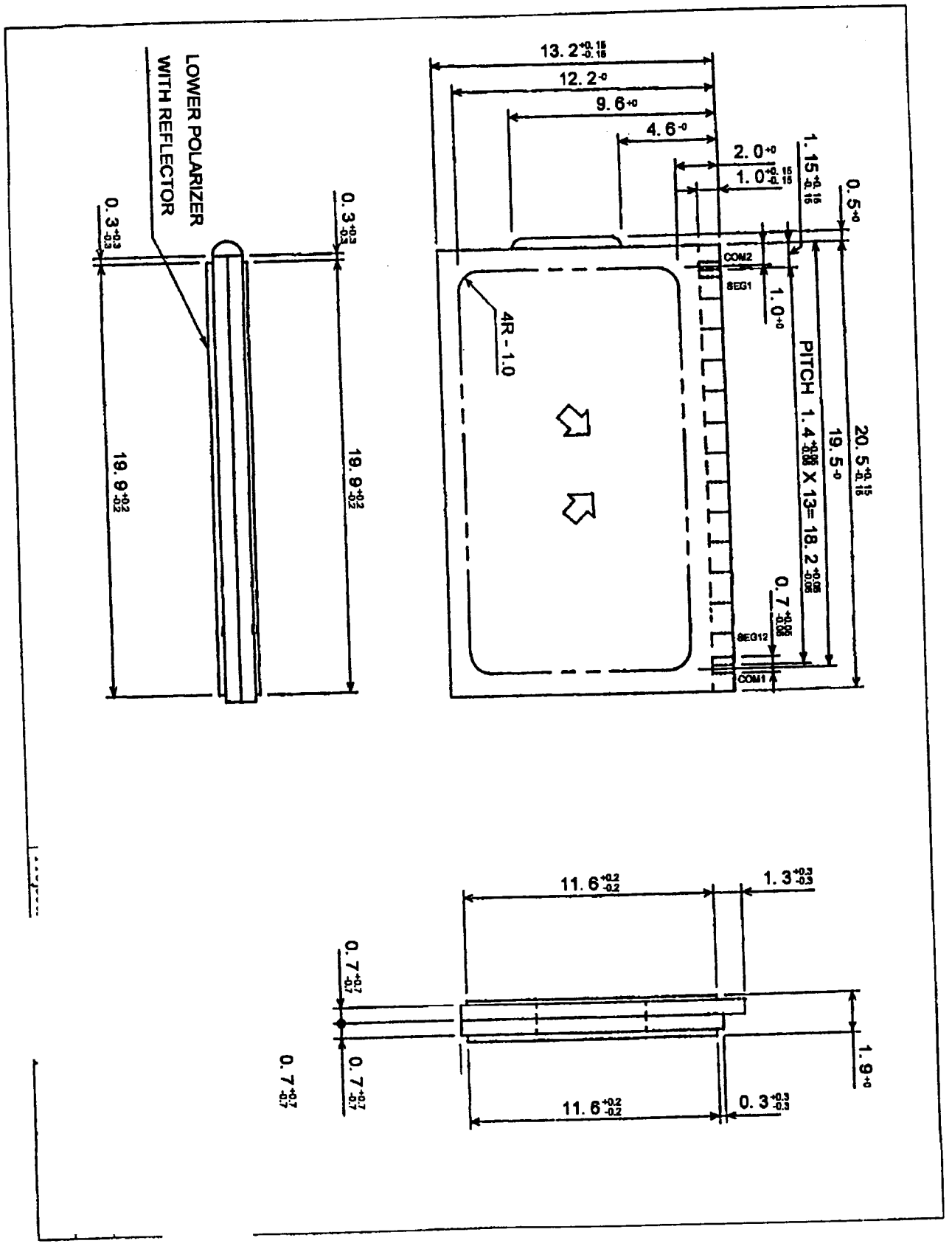
(Using VCD0204-1)

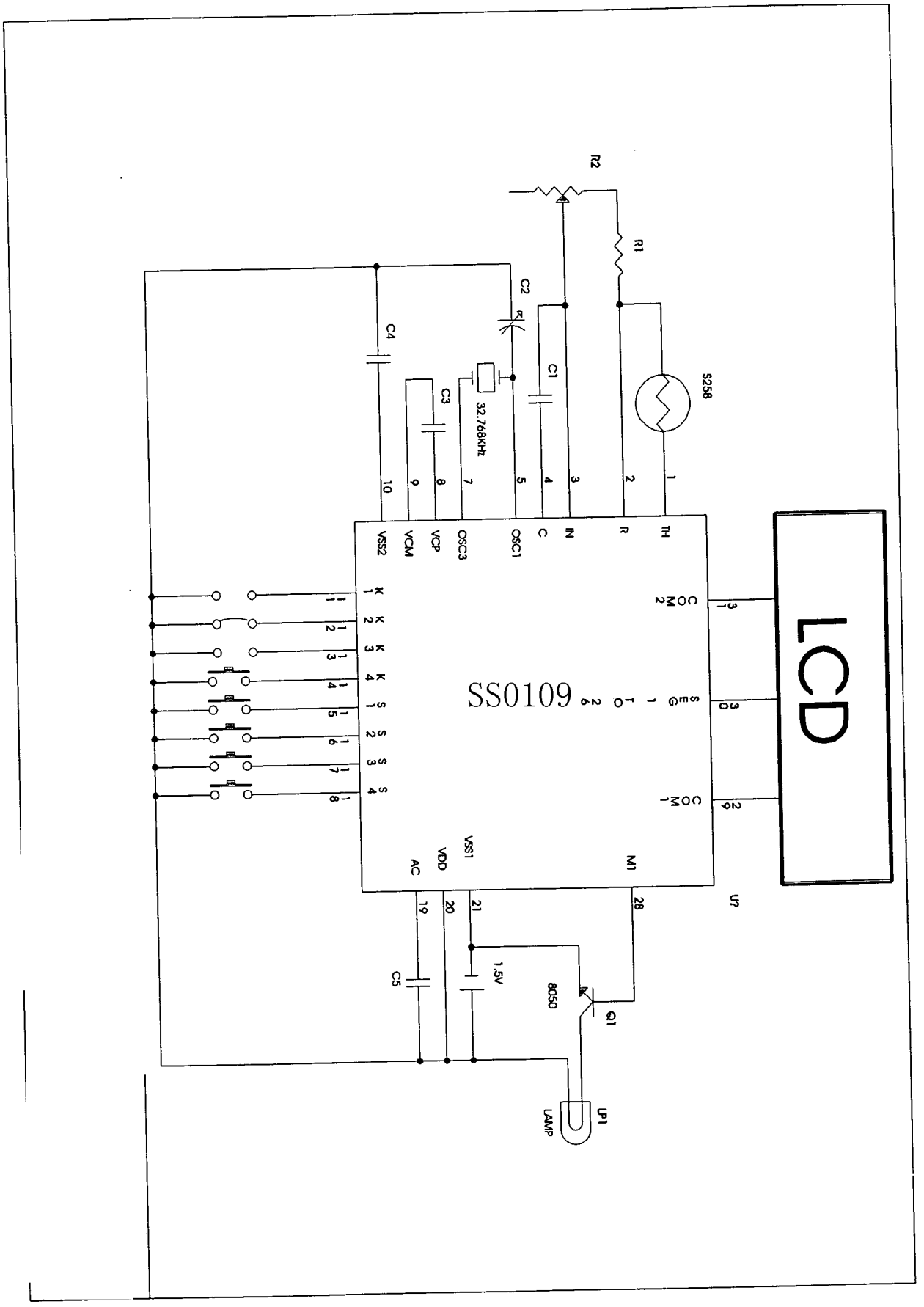




Not in scale
Unit : mm






R2
R1
C2
C4
C1
C3
32.768KHz
S258
SS0109
LCD
VSS2
VCM
VCP
OSC3
OSC1
C
IN
R
TH
COM2
SEG1
SEG26
COM1
VSS1
VDD
AC
M1
U2
C5
1.5V
8050
Q1
LAMP
LP1

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