

# Product Specification

**Product Name: 90025\_L8**

**Product Code : BJ128064-024Y-009\_L8**

<b>Customer</b>
<b>Approved by Customer</b>
<b>Approved Date:</b>

---

## CONTENT

<b>REVISION RECORD</b> .....	<b>1</b>
<b>1 OVERVIEW</b> .....	<b>1</b>
<b>2 FEATURES</b> .....	<b>1</b>
<b>3 MECHANICAL DATA</b> .....	<b>1</b>
<b>4 MECHANICAL DRAWING</b> .....	<b>2</b>
<b>5 MODULE INTERFACE</b> .....	<b>3</b>
<b>6 FUNCTION BLOCK DIAGRAM</b> .....	<b>4</b>
6.1 PANEL LAYOUT DIAGRAM .....	4
<b>7 ABSOLUTE MAXIMUM RATINGS</b> .....	<b>4</b>
<b>8 ELECTRICAL CHARACTERISTICS</b> .....	<b>5</b>
8.1 DC ELECTRICAL CHARACTERISTICS .....	5
8.2 ELECTRO-OPTICAL CHARACTERISTICS .....	5
8.3 AC ELECTRICAL CHARACTERISTICS .....	6
<b>9 FUNCTIONAL SPECIFICATION AND APPLICATION CIRCUIT</b> .....	<b>7</b>
9.1 APPLICATION CIRCUIT .....	7
9.2 DISPLAY CONTROL INSTRUCTION.....	7
9.3 RECOMMENDED SOFTWARE INITIALIZATION .....	7
<b>10 RELIABILITY</b> .....	<b>8</b>
10.1 RELIABILITY TEST.....	8
10.2 FAILURE CHECK STANDARD .....	8
<b>11 OUTGOING QUALITY CONTROL SPECIFICATIONS</b> .....	<b>9</b>
11.1 SAMPLING METHOD .....	9
11.2 INSPECTION CONDITIONS .....	9
11.3 QUALITY ASSURANCE ZONES.....	9
11.4 INSPECTION STANDARD.....	10
<b>12 PRECAUTIONS FOR OPERATION AND STORAGE</b> .....	<b>13</b>
12.1 PRECAUTIONS FOR OPERATION .....	13
12.2 SOLDERING .....	13
12.3 PRECAUTIONS FOR STORAGE.....	13



## 1 Overview

90025 is a monochrome OLED display module with 128×64 dot matrix. The characteristics of this display module are high brightness, self-emission, high contrast ratio, slim/thin outline, wide viewing angle, wide temperature range, and low power consumption.

## 2 Features

- Display Color: Yellow
- Dot Matrix:128×64
- Driver IC: SSD1305
- Interface: 4-SPI
- Wide range of operating temperature: -40°C to 80°C

## 3 Mechanical Data

NO.	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128(W)×64(H)	-
2	Dot Size	0.4(W)×0.4 (H)	mm <sup>2</sup>
3	Dot Pitch	0.43(W)×0.43(H)	mm <sup>2</sup>
4	Aperture Rate	86	%
5	Active Area	55.01(W)×27.49 (H)	mm <sup>2</sup>
6	Module Size	61.3(W)×52(H)×6.0MAX.(T)	mm <sup>3</sup>
7	Diagonal A/A Size	2.4	inch

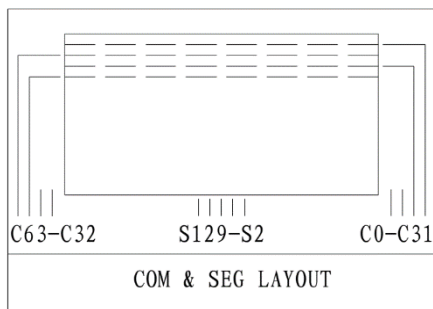


## 5 Module Interface

PIN NO.	PIN NAME	DESCRIPTION
1	GND	Ground
2	NC	Floating.
3	VDD-5V	Power supply,5V.
4	NC	Floating.
5	D/C#	Data/Command control pin. H: Data; L : Command.
6	SCLK	Clock.
7	SDIN	Data.
8	CS#	Chip Select, active low.
9	RES #	Reset, active low.
10	FG	Frame Ground/ Floating.

## 6 Function Block Diagram

### 6.1 Panel Layout Diagram



## 7 Absolute Maximum Ratings

ITEM	SYMBOL	MIN	MAX	UNIT	REMARK
DC Supply Voltage	VDD	-0.3	+5.0	V	IC maximum rating
Operating Temp.	Top	-40	+80	°C	-
Storage Temp	Tstg	-40	+80	°C	-

Note (1): All of the voltages are on the basis of “VSS = 0V”.

Note (2): Permanent breakage of module may occur if the module is used beyond the maximum rating. The module can be normal operated under the conditions according to Section 8 “Electrical Characteristics”. Malfunctioning of the module may occur and the reliability of the module may deteriorate if the module is used beyond the conditions.

## 8 Electrical Characteristics

### 8.1 DC Electrical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Logic Supply Voltage	VDD	22±3°C, 55±15%R.H		5.0		V
High-level Input Voltage	V <sub>IH</sub>	-	0.8×VDD	-	VDD	V
Low-level Input Voltage	V <sub>IL</sub>	-	VSS	-	0.2×VDD	V
High-level Output Voltage	V <sub>OH</sub>	-	0.8×VDD	-	VDD	V
Low-level Output Voltage	V <sub>OL</sub>	-	VSS	-	0.1×VDD	V

Note : The VDD input must be kept in a stable value; ripple and noise are not allowed.

### 8.2 Electro-optical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Normal Mode Brightness	L <sub>br</sub>	All pixels ON(1)	60	80	-	cd/m <sup>2</sup>
Sleep mode current Consumption		During sleep,TA=+25°C VDD=5V	-	-	20	uA
Normal Mode Power Consumption	Pt	All pixels ON(1)	-	299	364	mW
C.I.E(Yellow)	(x)	x,y(CIE1931)	0.37	0.41	0.45	-
	(y)		0.50	0.54	0.58	-
Dark Room Contrast	CR	-	≥2000:1	-	-	-
Response Time	-	-	-	10	-	μs
View Angle	-	-	≥160	-	-	Degree

Note(1):

Normal Mode test conditions are as follows:

- Driving voltage : 5V
- Contrast setting : 0X90
- Frame rate : 105Hz
- Duty setting : 1/64



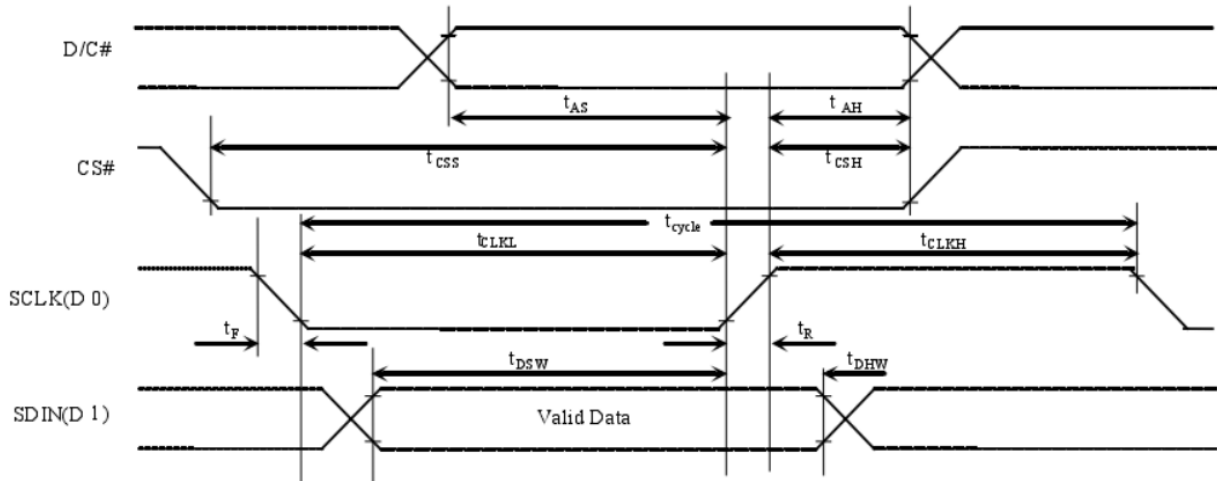
### 8.3 AC Electrical Characteristics

#### Serial Interface Timing Characteristics

(VDD = 5V, TA = 25 °C)

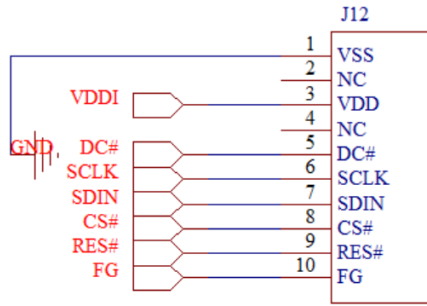
Symbol	Parameter	Min	Typ	Max	Unit
$t_{cycle}$	Clock Cycle Time	250	-	-	ns
$t_{AS}$	Address Setup Time	150	-	-	ns
$t_{AH}$	Address Hold Time	150	-	-	ns
$t_{CSS}$	Chip Select Setup Time	120	-	-	ns
$t_{CSH}$	Chip Select Hold Time	60	-	-	ns
$t_{DSW}$	Write Data Setup Time	50	-	-	ns
$t_{DHW}$	Write Data Hold Time	15	-	-	ns
$t_{CLKL}$	Clock Low Time	100	-	-	ns
$t_{CLKH}$	Clock High Time	100	-	-	ns
$t_R$	Rise Time	-	-	40	ns
$t_F$	Fall Time	-	-	40	ns

Serial Interface characteristics



## 9 Functional Specification and Application Circuit

### 9.1 Application Circuit



### 9.2 Display Control Instruction

Refer to SSD1305 IC Specification.

### 9.3 Recommended Software Initialization

```
void Init_IC()
{
    Write_Command(0xae);           // display off
    Write_Command(0xa1);           //segment remap
    Write_Command(0xda);           //common pads hardware: alternative
    Write_Command(0x12);           //Set Multiplex Ratio
    Write_Command(0xc8);           //common output scan direction:com63~com0
    Write_Command(0xa8);           //multiplex ration mode:63
    Write_Command(0x3f);
    Write_Command(0xd5);           //display divide ratio/osc. freq. mode
    Write_Command(0x50);           //Osc. Freq:320kHz,DivideRatio:1
    Write_Command(0x81);           //Set Contrast Control
    Write_Command(0x10);
    Write_Command(0xd9);           //set pre-charge period
    Write_Command(0xf1);           //set period 1:1;period 2:15
    Write_Command(0x20);           //Set Memory Addressing Mode
    Write_Command(0x02);           //page addressing mode
    Write_Command(0xdb);           //VCOM deselect level mode
    Write_Command(0x20);
    Write_Command(0xad);           //master configuration
    Write_Command(0x8e);
    Write_Command(0xa4);           //Entire Display Off
    Write_Command(0xa6);           //Display Normal
    Write_Command(0xaf);           //display on
}
```

## 10 Reliability

### 10.1 Reliability Test

NO.	ITEM	CONDITION	QUANTITY
1	High Temperature (Non-operation)	85°C,240hrs	4
2	Low Temperature (Non-operation)	-40°C,240hrs	4
3	High Temperature (Operation)	70°C,240hrs	4
4	Low Temperature (Operation)	-40°C,240hrs	4
5	High Temperature / High Humidity (Operation)	60°C,90%RH,240hrs	4
6	Thermal shock (Non-operation)	-40°C~85°C(-40°C/30min;transit/3min;85°C/30min;transit/3min) 1cycle: 66min,30cycles	4
7	Vibration	Frequency: 5~50Hz,0.5G Scan rate: 1 oct/min Time: 2 hrs/axis Test axis: X,Y, Z	1 Carton
8	Drop	Height: 100 cm Sequence: 1 angle, 3 edges and 6 faces	1 Carton

#### Test and measurement conditions

1. All measurements shall not be started until the specimens attain to temperature stability, the stable time is at least 15 minutes.
2. The degradation of polarizer is ignored for item 5.
3. The tolerance of temperature is  $\pm 3^{\circ}\text{C}$ , and the tolerance of relative humidity is  $\pm 5\%$ .

#### Evaluation criteria

1. The function test is OK.
2. No observable defects.
3. Luminance:  $\geq 50\%$  of initial value.
4. Current consumption: within  $\pm 50\%$  of initial value.

### 10.2 Failure Check Standard

After the completion of the described reliability test, the samples were left at room temperature for 2 hrs prior to conducting the failure test at  $22 \pm 3^{\circ}\text{C}$ ;  $55 \pm 15\%$  RH.

## 11 Outgoing Quality Control Specifications

### 11.1 Sampling Method

- (1) GB/T 2828.1-2003/ISO2859-1: 1999, inspection level II, normal inspection, single sample inspection
- (2) AQL: Major 0.65; Minor 1.0

### 11.2 Inspection Conditions

The environmental conditions for test and measurement are performed as follows.

Temperature:  $22 \pm 3^{\circ}\text{C}$

Humidity:  $55 \pm 15\% \text{R.H}$

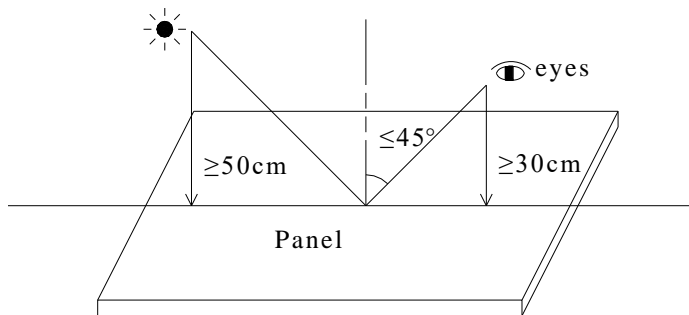
Fluorescent Lamp: 30W

Distance between the Panel & Lamp:  $\geq 50\text{cm}$

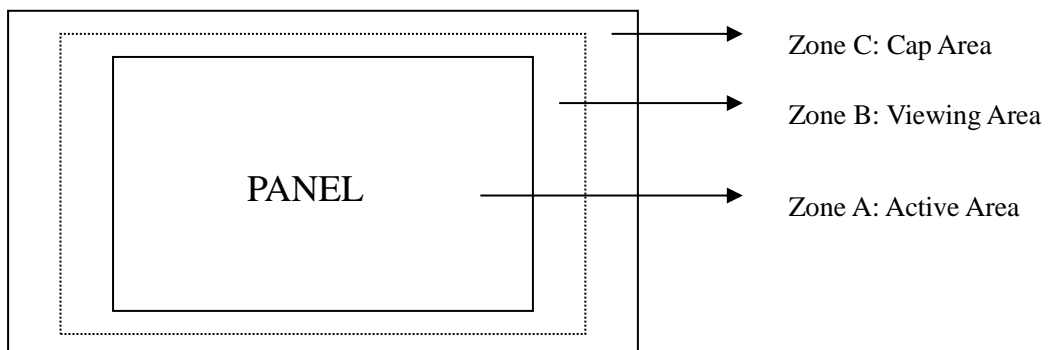
Distance between the Panel & Eyes:  $\geq 30\text{cm}$

Viewing angle from the vertical in each direction:  $\leq 45^{\circ}$

(See the sketch below)

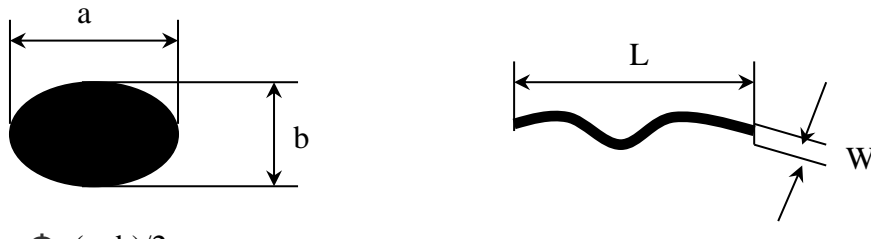


### 11.3 Quality Assurance Zones

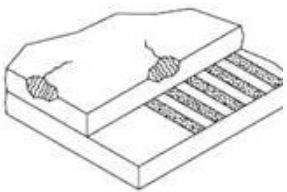


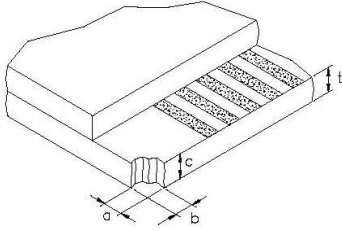
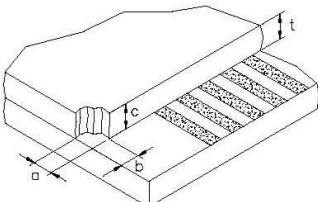
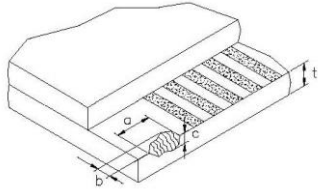
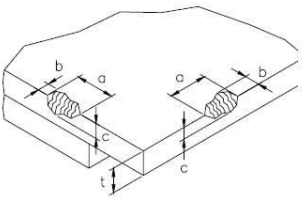
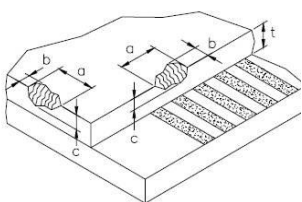
## 11.4 Inspection Standard

Definition of  $\Phi$ &L&W (Unit: mm)



### I. Appearance Defects

NO.	ITEM	CRITERIA	CLASSIFICATION																	
1	Polarizer Black or White spot, Dirty spot, Foreign matter, Dent on the polarizer	<table border="1"> <thead> <tr> <th rowspan="2">Average Diameter (mm)</th> <th colspan="2">Acceptable Number</th> </tr> <tr> <th>Zone A,B</th> <th>Zone C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.15</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>0.15 &lt; \Phi \leq 0.30</math></td> <td>3</td> <td rowspan="2">Ignore</td> </tr> <tr> <td><math>\Phi &gt; 0.30</math></td> <td>0</td> </tr> </tbody> </table>	Average Diameter (mm)	Acceptable Number		Zone A,B	Zone C	$\Phi \leq 0.15$	Ignore		$0.15 < \Phi \leq 0.30$	3	Ignore	$\Phi > 0.30$	0	Minor				
Average Diameter (mm)	Acceptable Number																			
	Zone A,B	Zone C																		
$\Phi \leq 0.15$	Ignore																			
$0.15 < \Phi \leq 0.30$	3	Ignore																		
$\Phi > 0.30$	0																			
2	Scratch/line on the glass/Polarizer	<table border="1"> <thead> <tr> <th rowspan="2">Width (mm)</th> <th rowspan="2">Length (mm)</th> <th colspan="2">Acceptable Number</th> </tr> <tr> <th>Zone A,B</th> <th>Zone C</th> </tr> </thead> <tbody> <tr> <td><math>W \leq 0.03</math></td> <td>---</td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.08</math></td> <td><math>L \leq 5.0</math></td> <td>3</td> <td rowspan="2">Ignore</td> </tr> <tr> <td><math>W &gt; 0.08</math></td> <td>---</td> <td>0</td> </tr> </tbody> </table>	Width (mm)	Length (mm)	Acceptable Number		Zone A,B	Zone C	$W \leq 0.03$	---	Ignore		$0.03 < W \leq 0.08$	$L \leq 5.0$	3	Ignore	$W > 0.08$	---	0	Minor
Width (mm)	Length (mm)	Acceptable Number																		
		Zone A,B	Zone C																	
$W \leq 0.03$	---	Ignore																		
$0.03 < W \leq 0.08$	$L \leq 5.0$	3	Ignore																	
$W > 0.08$	---	0																		
3	Polarizer Bubble	<table border="1"> <thead> <tr> <th rowspan="2">Average Diameter (mm)</th> <th colspan="2">Acceptable Number</th> </tr> <tr> <th>Zone A,B</th> <th>Zone C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi &gt; 0.5</math></td> <td>0</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.5</math></td> <td>3</td> </tr> <tr> <td><math>\Phi \leq 0.2</math></td> <td>Ignore</td> </tr> </tbody> </table>	Average Diameter (mm)	Acceptable Number		Zone A,B	Zone C	$\Phi > 0.5$	0	Ignore	$0.2 < \Phi \leq 0.5$	3	$\Phi \leq 0.2$	Ignore	Minor					
Average Diameter (mm)	Acceptable Number																			
	Zone A,B	Zone C																		
$\Phi > 0.5$	0	Ignore																		
$0.2 < \Phi \leq 0.5$	3																			
$\Phi \leq 0.2$	Ignore																			
4	Any Dirt & Scratch on Polarizer's Protective Film	Ignore for not affect the polarizer.	Acceptable																	
5	Glass Crack	 <p>Propagation crack is not acceptable.</p>	Major																	

6	Corner Chip	 <p>t= Glass thickness Accept <math>a \leq 2.0\text{mm}</math> or <math>b \leq 2.0\text{mm}</math>, <math>c \leq t</math></p>	Minor
7	Corner Chip on Cap Glass	 <p>t= Glass thickness Accept <math>a \leq 1.5\text{mm}</math> or <math>b \leq 1.5\text{mm}</math>, <math>c \leq t</math></p>	Minor
8	Chip on Contact Pad	 <p>t= Glass thickness Accept <math>a \leq 3.0\text{mm}</math> or <math>b \leq 0.8\text{mm}</math>, <math>c \leq t</math> (on the contact pin) <math>a \leq 3.0\text{mm}</math> or <math>b \leq 1.5\text{mm}</math>, <math>c \leq t</math> (outside of the contact pin)</p>	Minor
9	Chip on Face of Display	 <p>t= Glass thickness Accept <math>a \leq 1.5\text{mm}</math> or <math>b \leq 1.5\text{mm}</math>, <math>c \leq t</math></p>	Minor
10	Chip on Cap Glass	 <p>t= Glass thickness Accept <math>a \leq 3.0\text{mm}</math> or <math>b \leq 3.0\text{mm}</math>, <math>c \leq t/2</math> <math>a \leq 1.5\text{mm}</math> or <math>b \leq 1.5\text{mm}</math>, <math>t/2 \leq c \leq t</math></p>	Minor
11	Stain on Surface	Stain removable by soft cloth or air blow is acceptable.	Minor
12	TCP/FPC Damage	(1) Crack, deep scratch, deep hole and deep pressure mark on the TCP/FPC are not acceptable. (2) Terminal lead twisted or broken is not allowable. (3) Copper exposed is not allowed by naked eye inspection.	Minor
13	Dimension Unconformity	Checking by mechanical drawing.	Major

## II. Displaying Defects

NO.	ITEM	CRITERIA	CLASSIFICATION
-----	------	----------	----------------

1	Black/White spot Dirty spot Foreign matter	Average Diameter (mm)	Pieces Permitted		Minor
			Zone A,B	Zone C	
		$\Phi \leq 0.10$	Ignore	Ignore	
		$0.10 < \Phi \leq 0.20$	3		
	$\Phi > 0.20$	0			
2	No Display	Not allowable.			Major
3	Irregular Display	Not allowable.			Major
4	Missing Line (row or column)	Not allowable.			Major
5	Short	Not allowable.			Major
6	Flicker	Not allowable.			Major
7	Abnormal Color	Refer to the SPEC.			Major
8	Luminance NG	Refer to the SPEC.			Major
9	Over Current	Refer to the SPEC.			Major

---

## 12 Precautions for operation and Storage

### 12.1 Precautions for Operation

- (1) Since OLED panel is made of glass, do not apply any mechanical shock or impact or excessive force to it when installing the OLED module. Any strong mechanical impact due to falling dropping etc. may cause damage (breakage or cracking).
- (2) The polarizer on the OLED surface is made of soft material and is easily scratched. Please take most care when handing. When the surface of the polarizer of OLED Module is contaminated, please wipe it off gently by using moisten soft cloth with isopropyl alcohol, do not use water, ketone or aromatics. If there is saliva or water on the OLED surface, please wipe it off immediately.
- (3) When handling OLED module, please be sure that the body and the tools are properly grounded. And do not touch I/O pins with bare hands or contaminate I/O pins, it will cause disconnection or defective insulation of terminals.
- (4) Do not attempt to disassemble or process the OLED module.
- (5) OLED module should be used under recommended operating conditions shown in the specification. Since the higher voltage leads to the shorter lifetime, be sure to use the specified operating voltage.
- (6) Foggy dew, moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage, the deteriorated display quality and electrochemical reaction then leads to shorter life time and permanent damage to the module probably. Please pay attention to the environmental temperature and humidity.
- (7) An afterimage is created by the difference in brightness between unused dot and the fixed dot, according to the decrease of brightness of the emitting time. Therefore, to avoid having an afterimage, the full set should be thoroughly used instead of using a fixed dot. When the fixed dot emits, an afterimage can be created.
- (8) Flicker could be come out at full on display. And it disappears when frame frequency increase, but brightness decreases too.

### 12.2 Soldering

- (1) Soldering should be performed only on the I/O terminals.
- (2) Use soldering irons with proper grounding and no leakage.
- (3) Iron: no higher than 300°C and 3~4 sec during soldering.

### 12.3 Precautions for Storage

- (1) Please store OLED module in a dark place. Avoid exposure to sunlight, the light of fluorescent lamp or any ultraviolet ray.
- (2) Keep the environment temperature between 10°C and 35°C and the relative humidity less than 60%. Avoid high temperature and high humidity.
- (3) Keep the OLED modules stored in the container when shipped from supplier before using them is recommended.
- (4) Do not leave any article on the OLED module surface for an extended period of time.