

# SZ TOMO Electronics co., Ltd

## INNOLUX 8 INCH IPS lcd module SPECIFICATION

|                      |     |
|----------------------|-----|
| 承 认 印<br>Approved by |     |
| 审核:                  | 确认: |
| 客户确认结果:              |     |

客 户: \_\_\_\_\_

品 名: INNOLUX8DIPS

模组外形: 174\*136\*2.5 mm

日 期: 2017.09.23

| Approved<br>核 准 | Checked<br>审 核 | Prepared<br>制 作 |
|-----------------|----------------|-----------------|
|                 |                |                 |

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| 规格书更改记录 |            |      |    |     |
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# 东茂伟业科技有限公司

## 1. 适用范围

本承认书适用东茂伟业科技有限公司生产的 8 寸模组

## 2. 产品规格

### 2. 1 主要零部件构成

| 序号 | 部件名称 | 备注                | 用量    |
|----|------|-------------------|-------|
| 1  | 上框   | 不锈钢201 T=0.2      | 1PCS  |
| 2  | 下框   | 不锈钢201 T=0.2      | 1PCS  |
| 3  | 胶框   | PC白               | 1PCS  |
| 4  | 导光板  | 透明PMMA            | 1PCS  |
| 5  | 反射片  | 白反射               | 1PCS  |
| 6  | 扩散片  | 半透明               | 1PCS  |
| 7  | 增光片  | 棱镜结构              | 1PCS  |
| 8  | DBEF | DBEF 0度           | 1PCS  |
| 9  | FPC  | PI+压延铜            | 2PCS  |
| 10 | LED  | 白光发光二极管           | 39PCS |
| 11 | FOG  | 8寸INNOLUX IPS FOG | 1PCS  |
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3. 玻璃特性

3.Glasses

Customer: \_\_\_\_\_  
Model Name: HE080IA-01D  
Date: 2012/07/14  
Version: 01

Preliminary Specification  
 Final Specification

For Customer's Acceptance

| Approved by | Comment |
|-------------|---------|
|             |         |

| Approved by         | Reviewed by | Prepared by  |
|---------------------|-------------|--------------|
| STANLEY<br>CW LEUNG | Wenyi Wang  | Laurels.Yang |
| 2012/08/06          | 2012/08/01  | 2012/07/14   |

## Record of Revision

| Version     | Revise Date | Page | Content          |
|-------------|-------------|------|------------------|
| Pre-Spec.01 | 2011/07/14  |      | Initial Release. |

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# 1. General Specifications

| No. | Item                    | Specification                        | Remark |
|-----|-------------------------|--------------------------------------|--------|
| 1   | LCD size                | 8.0 inch(Diagonal)                   |        |
| 2   | Driver element          | a-Si TFT active matrix               |        |
| 3   | Resolution              | 1024 × 3(RGB) × 768                  |        |
| 4   | Display mode            | Normally Black                       |        |
| 5   | Dot pitch               | 0.05275(W) × 0.15825(H) mm           |        |
| 6   | Active area             | 162.05(W) × 121.54(H) mm             |        |
| 7   | Panel size              | 171.12 (W) × 132.62 (H) × 1.07(D) mm | Note 1 |
| 8   | Surface treatment       | Hard coating                         |        |
| 9   | Color arrangement       | RGB-stripe                           |        |
| 10  | Interface               | Digital                              |        |
| 11  | Panel power consumption | 0.383W (Typ.)                        |        |
| 12  | Weight                  | TBD                                  |        |

Note 1: Refer to Mechanical Drawing.



## 2. Pin Assignment

### 2.1. TFT LCD Panel Driving Section

| Pin No. | Symbol   | I/O | Function  | Remark |
|---------|----------|-----|---|--------|
| 1       | VCOM     | P   | Common Voltage  |        |
| 2       | VDD      | P   | Power Voltage for digital circuit   |        |
| 3       | VDD      | P   | Power Voltage for digital circuit   |        |
| 4       | NC       | --- | No connection   |        |
| 5       | Reset    | I   | Global reset pin  |        |
| 6       | STBYB    | I   | Standby mode, Normally pulled high<br>STBYB = "1", normal operation<br>STBYB = "0", timing controller, source driver will turn off, all output are High-Z |        |
| 7       | GND      | P   | Ground  |        |
| 8       | RXIN0-   | I   | - LVDS differential data input  |        |
| 9       | RXIN0+   | I   | + LVDS differential data input  |        |
| 10      | GND      | P   | Ground  |        |
| 11      | RXIN1-   | I   | - LVDS differential data input  |        |
| 12      | RXIN1+   | I   | + LVDS differential data input  |        |
| 13      | GND      | P   | Ground  |        |
| 14      | RXIN2-   | I   | - LVDS differential data input  |        |
| 15      | RXIN2+   | I   | + LVDS differential data input  |        |
| 16      | GND      | P   | Ground  |        |
| 17      | RXCLKIN- | I   | - LVDS differential clock input   |        |
| 18      | RXCLKIN+ | I   | + LVDS differential clock input   |        |
| 19      | GND      | P   | Ground  |        |
| 20      | RXIN3-   | I   | - LVDS differential data input  |        |
| 21      | RXIN3+   | I   | + LVDS differential data input  |        |
| 22      | GND      | P   | Ground  |        |
| 23      | NC       | --- | No connection   |        |
| 24      | NC       | --- | No connection   |        |

|    |         |     |   |       |
|----|---------|-----|---|-------|
| 25 | GND     | P   | Ground                                  |       |
| 26 | NC      | --- | No connection                           |       |
| 27 | DIMO    | O   | Backlight CABC controller signal output |       |
| 28 | SELB    | I   | 6bit/8bit mode select                   | Note1 |
| 29 | AVDD    | P   | Power for Analog Circuit                |       |
| 30 | GND     | P   | Ground                                  |       |
| 31 | LED-    | P   | LED Cathode                             |       |
| 32 | LED-    | P   | LED Cathode                             |       |
| 33 | L/R     | I   | Horizontal inversion                    | Note3 |
| 34 | U/D     | I   | Vertical inversion                      | Note3 |
| 35 | VGL     | P   | Gate OFF Voltage                        |       |
| 36 | CABCEN1 | I   | CABC H/W enable                         | Note2 |
| 37 | CABCEN0 | I   | CABC H/W enable                         | Note2 |
| 38 | VGH     | P   | Gate ON Voltage                         |       |
| 39 | LED+    | P   | LED Anode                               |       |
| 40 | LED+    | P   | LED Anode                               |       |

I: input, O: output, P: Power

Note1: If LVDS input data is 6 bits ,SELB must be set to High;  
If LVDS input data is 8 bits ,SELB must be set to Low.

Note2: When CABC\_EN="00", CABC OFF.

When CABC\_EN="01", user interface image.

When CABC\_EN="10", still picture.

When CABC\_EN="11", moving image.

When CABC off, don't connect DIMO, else connect it to backlight.

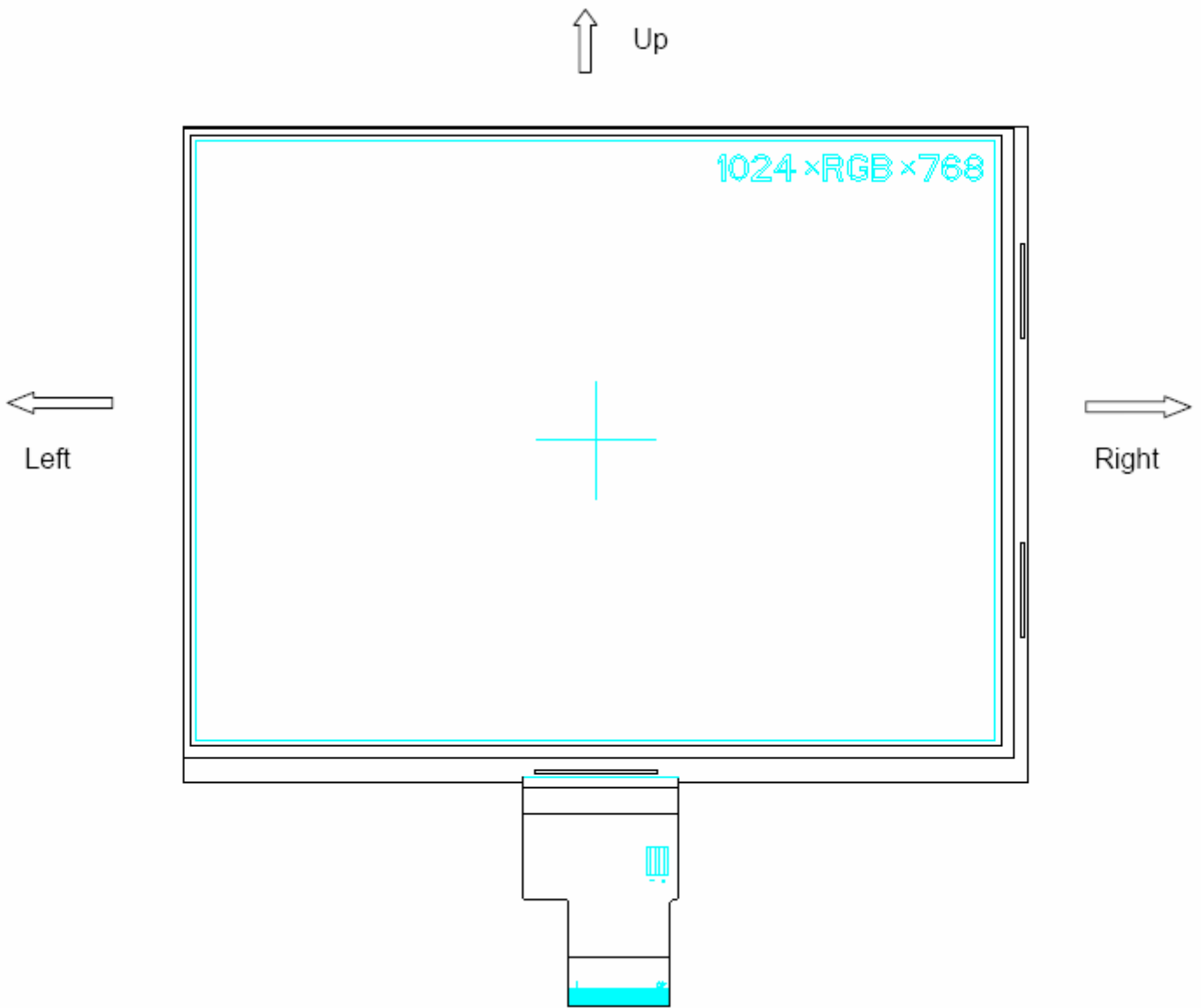
Note3: When L/R="0", set right to left scan direction.

When L/R="1", set left to right scan direction.

When U/D="0", set top to bottom scan direction.

When U/D="1", set bottom to top scan direction.

Note: Definition of scanning direction.  
Refer to the figure as below:



## 3. Operation Specifications

### 3.1. Absolute Maximum Rating

(GND=AV<sub>SS</sub>=0V, Note 1)

| Item   | Symbol                           | Values |      | Unit | Remark |
|--|----------------------------------|--------|------|------|--------|
|  |                                  | Min.   | Max. |      |        |
| Power voltage                                | V <sub>CC</sub>                  | -0.3   | 5.0  | V    |        |
|  | AV <sub>DD</sub>                 | 6.5    | 13.5 | V    |        |
|  | V <sub>GH</sub>                  | -0.3   | 40   | V    |        |
|  | V <sub>GL</sub>                  | -20    | 0.3  | V    |        |
|  | V <sub>GH</sub> -V <sub>GL</sub> | -      | 40   | V    |        |
| Operation Temperature<br>Storage Temperature | T <sub>OP</sub>                  | -20    | 70   | °C   |        |
|  | T <sub>ST</sub>                  | -30    | 70   | °C   |        |

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

## 3.1.1. Typical Operation Conditions

(GND=AV<sub>SS</sub>=0V, Note 1)

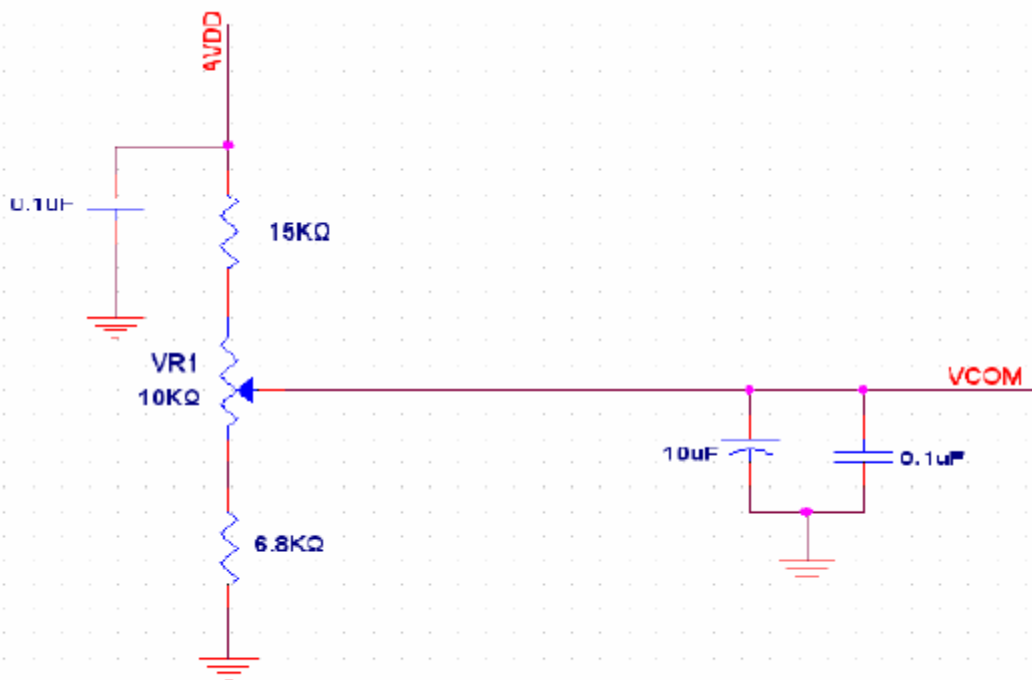
| Item                     | Symbol           | Values             |      |                    | Unit | Remark |
|--------------------------|------------------|--------------------|------|--------------------|------|--------|
|                          |                  | Min.               | Typ. | Max.               |      |        |
| Power voltage            | V <sub>CC</sub>  | 3.0                | 3.3  | 3.6                | V    | Note 2 |
|                          | AV <sub>DD</sub> | 9.8                | 10   | 10.2               | V    |        |
|                          | V <sub>GH</sub>  | 18.6               | 18.9 | 19.2               | V    |        |
|                          | V <sub>GL</sub>  | -8.1               | -7.8 | -7.5               | V    |        |
| Input signal voltage     | V <sub>COM</sub> | 2.6                | 3.6  | 4.6                | V    | Note 3 |
| Input logic high voltage | V <sub>IH</sub>  | 0.7V <sub>CC</sub> | -    | V <sub>CC</sub>    | V    | Note 4 |
| Input logic low voltage  | V <sub>IL</sub>  | 0                  | -    | 0.3V <sub>CC</sub> | V    |        |

Note 1: Be sure to apply V<sub>CC</sub> and V<sub>GL</sub> to the LCD first, and then apply V<sub>GH</sub>.

Note 2: V<sub>CC</sub> setting should match the signals output voltage (refer to Note 3) of customer's system board .

Note 3: Typical V<sub>com</sub> is only a reference value, it must be optimized according to each LCM, please use VR and base on below application circuit.

Note 4: RESET, STBYB, SELB, L/R, U/D, CABEN0, CABEN1.



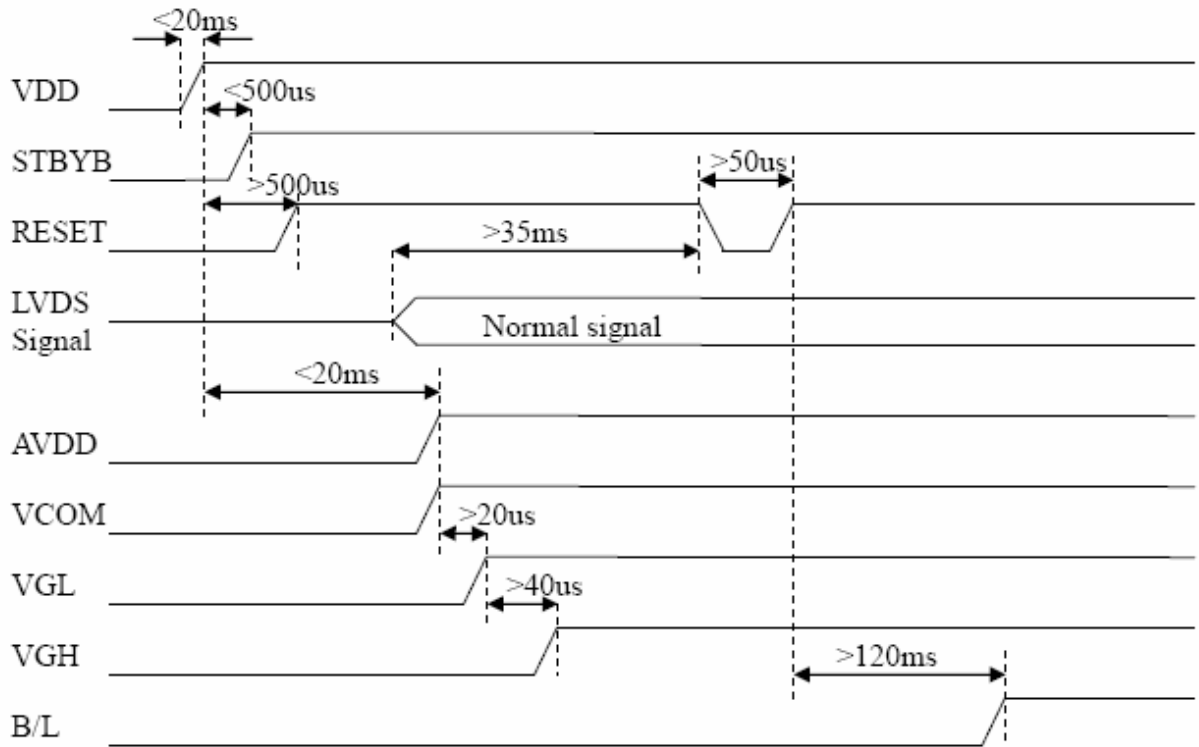
## 3.1.2. Current Consumption

(GND=AV<sub>SS</sub>=0V)

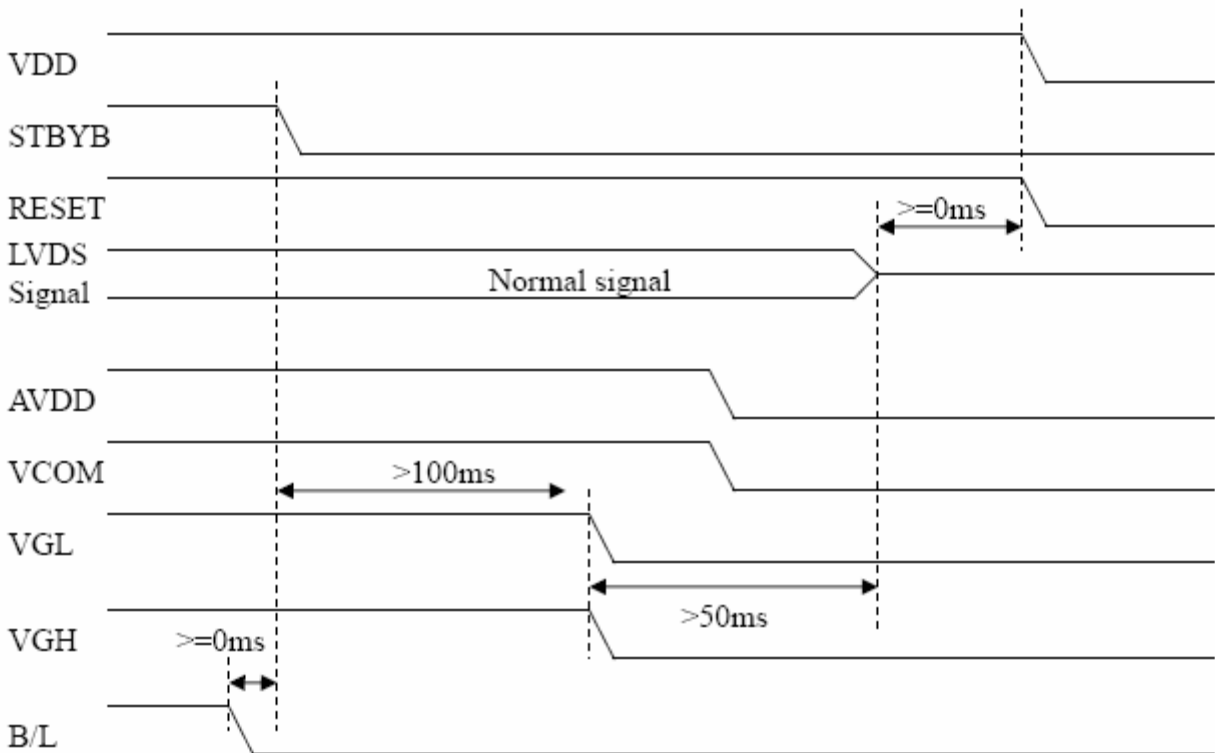
| Item               | Symbol                       | Values |      |      | Unit | Remark                  |
|--------------------|------------------------------|--------|------|------|------|-------------------------|
|                    |                              | Min.   | Typ. | Max. |      |                         |
| Current for Driver | I <sub>GH</sub>              | -      | 0.65 | 1.0  | mA   | V <sub>GH</sub> =18.9V  |
|                    | I <sub>GL</sub>              | -      | 0.65 | 1.0  | mA   | V <sub>GL</sub> =-7.8V  |
|                    | I <sub>CC</sub>              | -      | 35   | 60   | mA   | V <sub>CC</sub> =3.3V   |
|                    | I <sub>AV<sub>DD</sub></sub> | -      | 25   | 40   | mA   | AV <sub>DD</sub> =10.0V |

## 3.2. Power Sequence

### 3.2.1. Power on:



### 3.2.2. Power off:

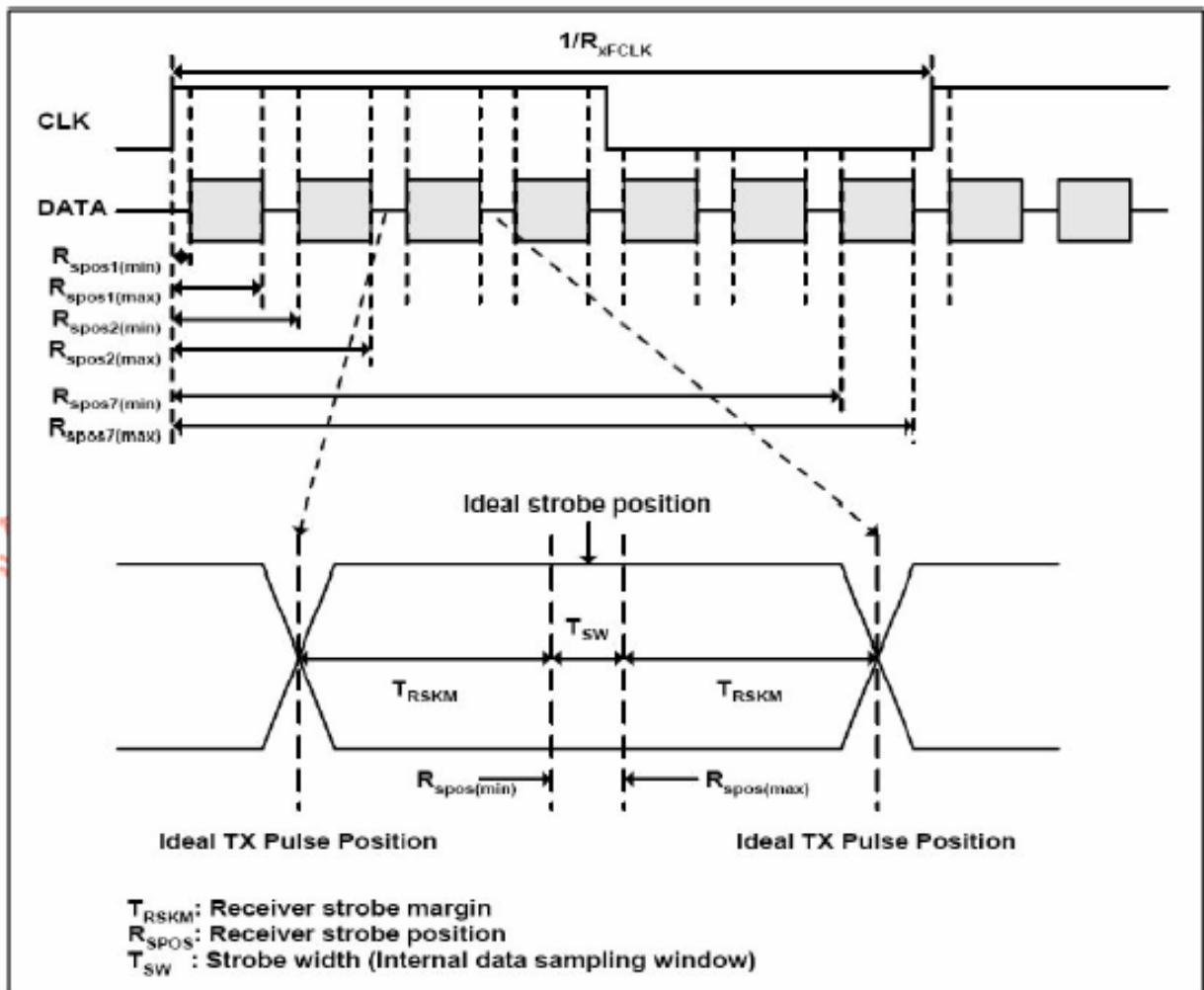


### 3.3. Timing Characteristics

#### 3.3.1. AC Electrical Characteristics

| Parameter              | Symbol      | Values |                     |      | Unit | Remark |
|------------------------|-------------|--------|---------------------|------|------|--------|
|                        |             | Min.   | Typ.                | Max. |      |        |
| Clock frequency        | $R_{XFCLK}$ | 20     | -                   | 71   | MHz  |        |
| Input data skew margin | $T_{RSKM}$  | 500    | -                   | -    | ps   |        |
| Clock high time        | $T_{LVCH}$  | -      | $4/(7 * R_{XFCLK})$ | -    | ns   |        |
| Clock low time         | $T_{LVCL}$  | -      | $3/(7 * R_{XFCLK})$ | -    | ns   |        |

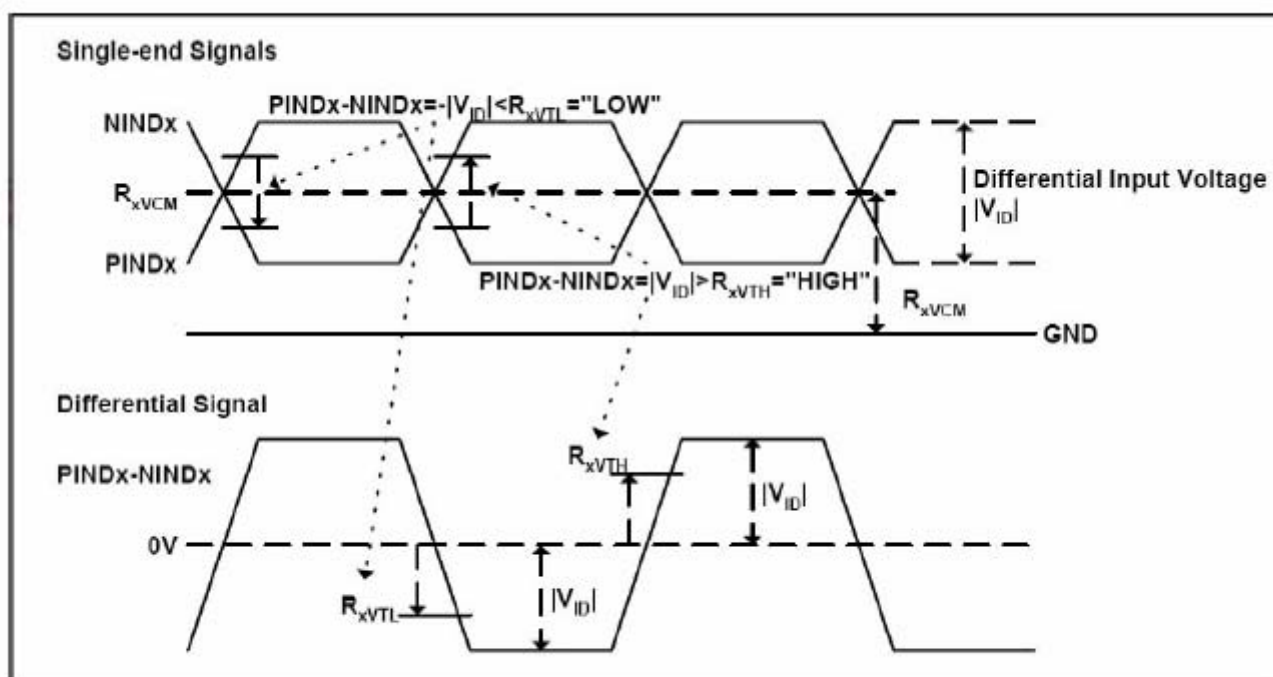
#### 3.3.2. Input Clock and Data Timing Diagram





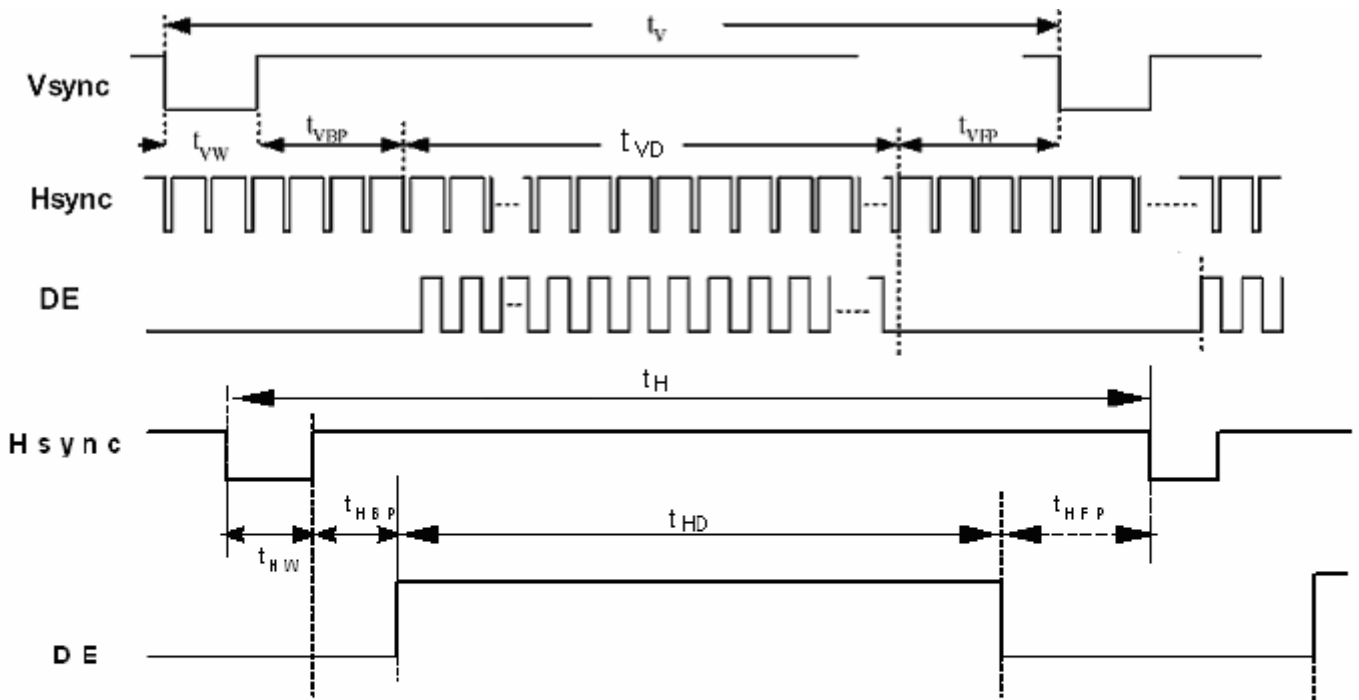
### 3.3.3. DC Electrical Characteristics

| Parameter                                 | Symbol        | Values       |      |                  | Unit | Remark |
|---|---------------|--------------|------|------------------|------|--------|
|   |               | Min.         | Typ. | Max.             |      |        |
| Differential input high Threshold voltage | $R_{xVTH}$    | -            | -    | +0.1             | V    |        |
| Differential input low Threshold voltage  | $R_{xVTL}$    | -0.1         | -    | -                | V    |        |
| Input voltage range (singled-end)         | $R_{xVIN}$    | 0            | -    | 2.4              | V    |        |
| Differential input common mode voltage    | $R_{xVCM}$    | $ V_{ID} /2$ | -    | $2.4- V_{ID} /2$ | V    |        |
| Differential voltage                      | $ V_{ID} $    | 0.2          | -    | 0.6              | V    |        |
| Differential input leakage current        | $R_{V_{xIz}}$ | -10          | -    | +10              | uA   |        |



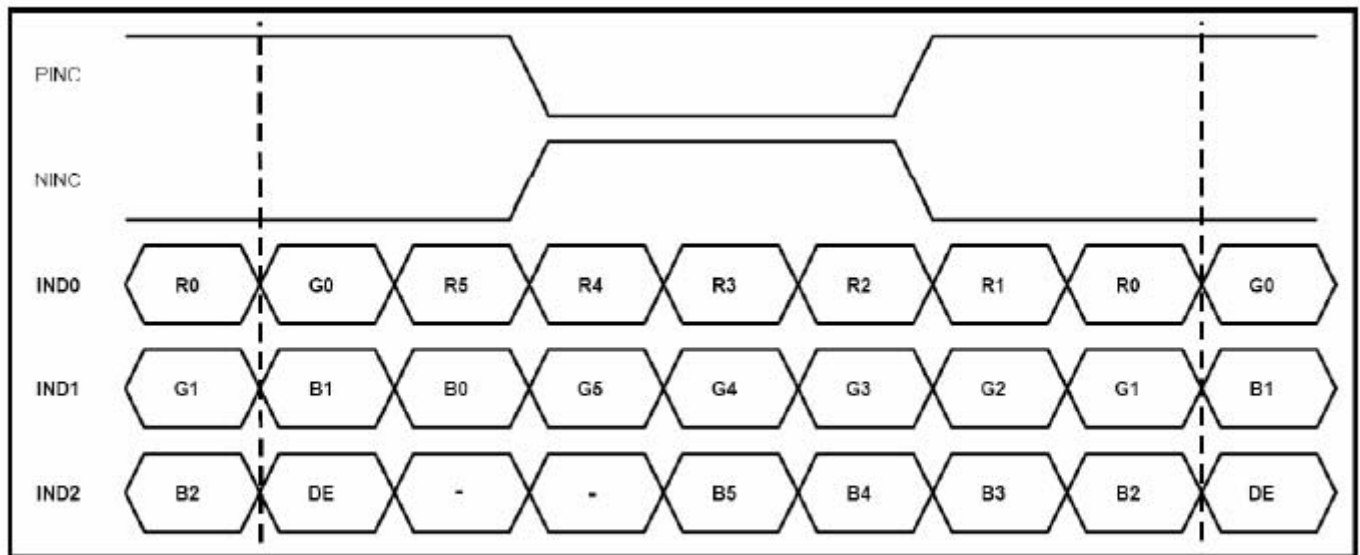
### 3.3.4. Timing

| Item                    | Symbol   | Values |      |      | Unit | Remark          |
|-------------------------|----------|--------|------|------|------|-----------------|
|                         |          | Min.   | Typ. | Max. |      |                 |
| Clock Frequency         | fclk     | 52     | 65   | 71   | MHz  | Frame rate =TBD |
| Horizontal display area | thd      | 1024   |      |      |      |                 |
| HS period time          | th       | 1114   | 1344 | 1400 | DCLK |                 |
| HS Blanking             | thb+thfp | 90     | 320  | 376  | DCLK |                 |
| Vertical display area   | tvd      | 768    |      |      |      |                 |
| VS period time          | tv       | 778    | 806  | 845  | H    |                 |
| VS Blanking             | tvb+tvfp | 10     | 38   | 77   | H    |                 |

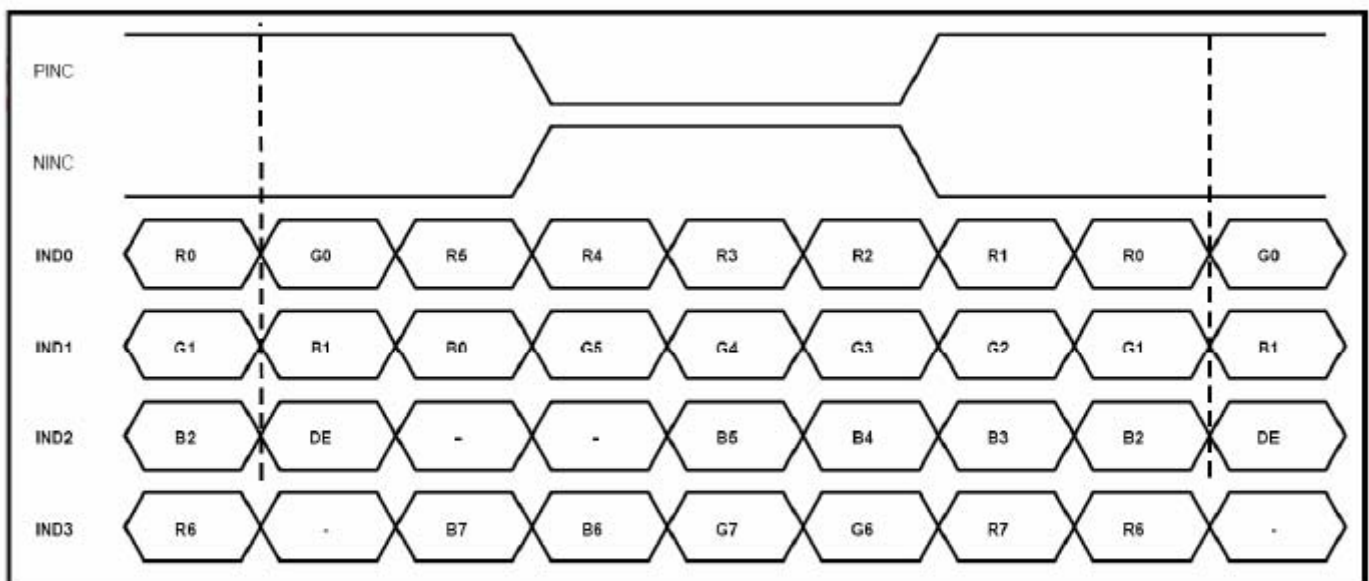


### 3.3.5. Data Input Format

#### 6bit LVDS input



### 8bit LVDS input



Note: Support DE timing mode only, SYNC mode not supported.

## 4. Optical Specifications

| Item                      | Symbol            | Condition                       | Values |       |       | Unit   | Remark           |
|---------------------------|-------------------|---------------------------------|--------|-------|-------|--------|------------------|
|                           |                   |                                 | Min.   | Typ.  | Max.  |        |                  |
| Viewing angle<br>(CR≥ 10) | $\theta_L$        | $\Phi=180^\circ$ (9 o'clock)    | 75     | 85    | -     | degree | Note 1           |
|                           | $\theta_R$        | $\Phi=0^\circ$ (3 o'clock)      | 75     | 85    | -     |        |                  |
|                           | $\theta_T$        | $\Phi=90^\circ$ (12 o'clock)    | 75     | 85    | -     |        |                  |
|                           | $\theta_B$        | $\Phi=270^\circ$ (6 o'clock)    | 75     | 85    | -     |        |                  |
| Response time             | $T_{ON+ T_{OFF}}$ | Normal<br>$\theta=\Phi=0^\circ$ |        | 25    | 50    | msec   | Note 2<br>Note 3 |
| Contrast ratio            | CR                |                                 | 600    | 800   | -     | -      | Note 4           |
| Color chromaticity        | $W_X$             |                                 | 0.238  | 0.288 | 0.338 | -      | Note 5           |
|                           | $W_Y$             |                                 | 0.276  | 0.326 | 0.376 | -      |                  |
| Transmittance             | Tr                | -                               | 3.8    | 4.3   | -     | %      |                  |

### Test Conditions:

1.  $V_{CC}=3.3V$ , the ambient temperature is  $25^\circ C$ .
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

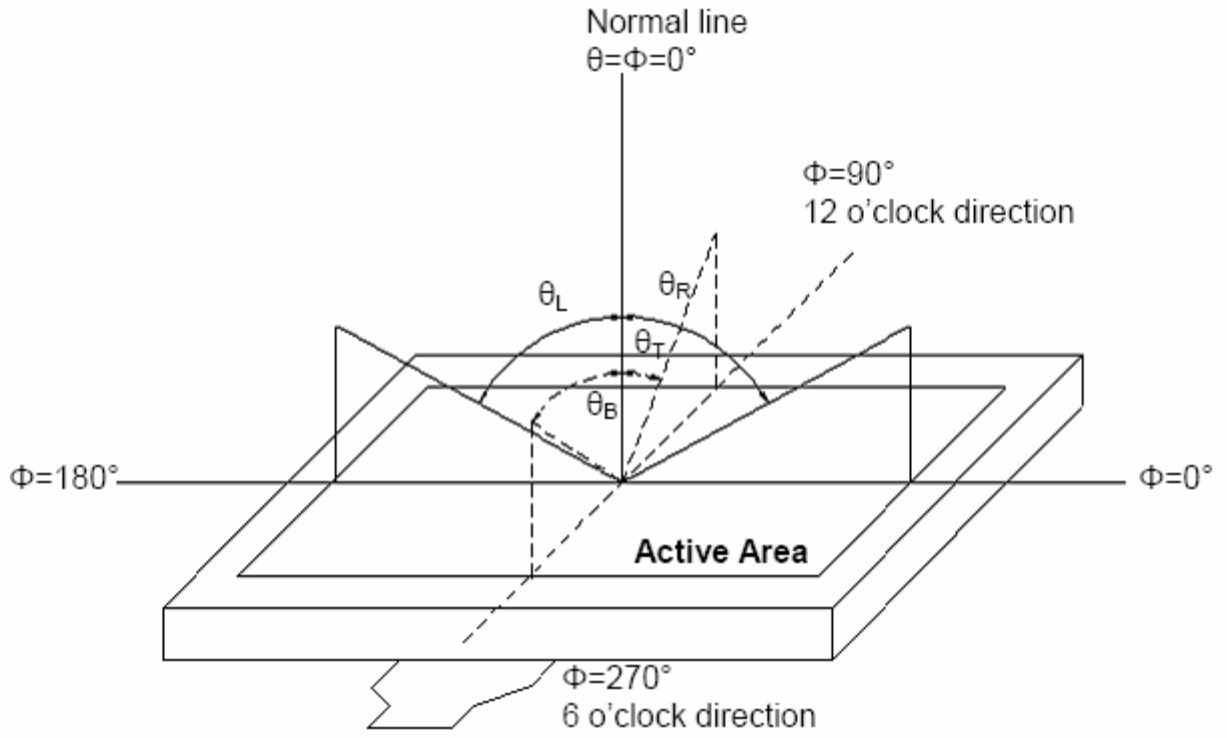


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view:  $1^\circ$  /Height: 500mm.)

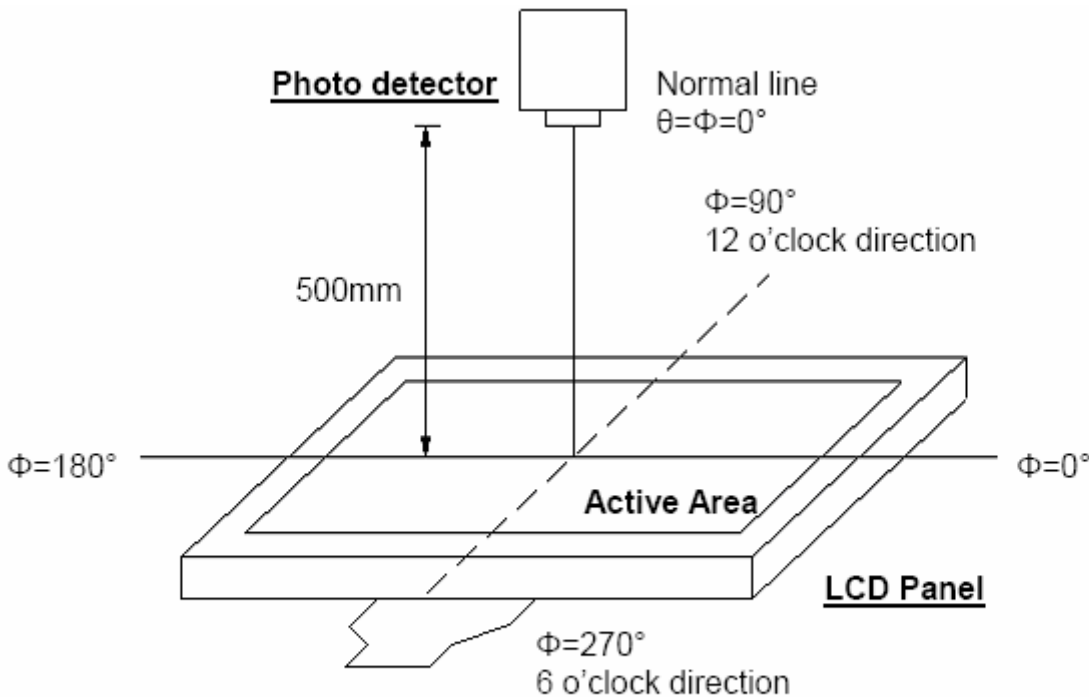


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time ( $T_{ON}$ ) is the time between photo detector output intensity changed from 90% to 10%. And fall time ( $T_{OFF}$ ) is the time between photo detector output intensity changed from 10% to 90%.

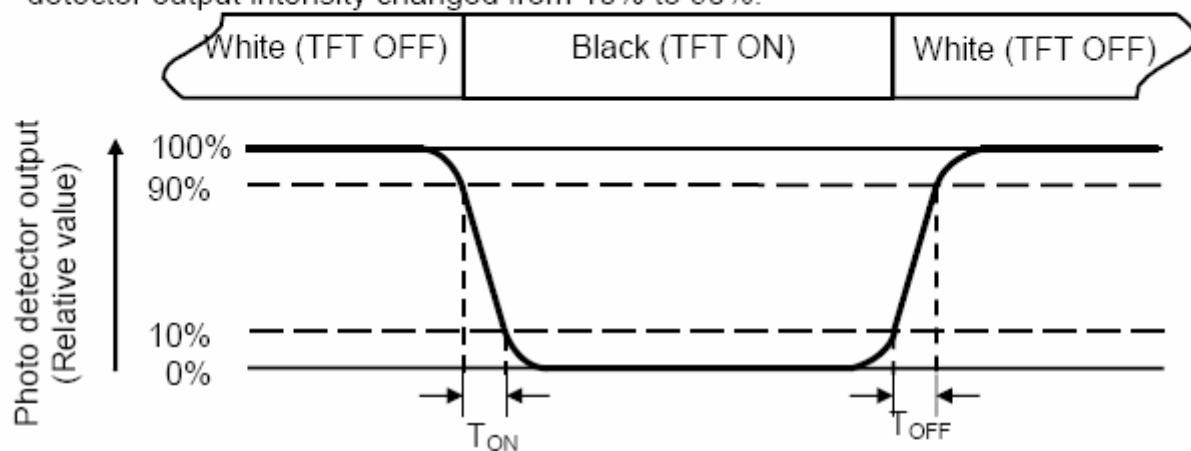


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of backlight

The backlight used C light.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4 ).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L-----Active area length      W----- Active area width

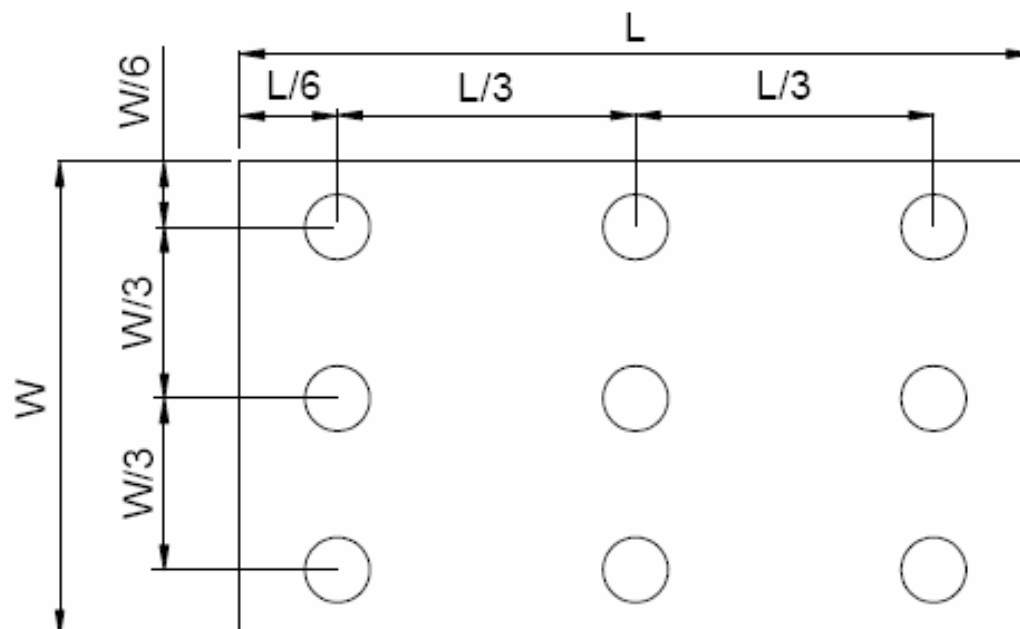


Fig. 4-4 Definition of measuring points

**B<sub>max</sub>**: The measured maximum luminance of all measurement position.

**B<sub>min</sub>**: The measured minimum luminance of all measurement position.

## 5. Reliability Test Items

(Note3)

| Item                                     | Test Conditions    |        | Remark         |
|--|--------------------|--------|----------------|
| High Temperature Storage                 | Ta = 60°C          | 240hrs | Note 1, Note 4 |
| Low Temperature Storage                  | Ta = -20°C         | 240hrs | Note 1, Note 4 |
| High Temperature Operation               | Ts = 50°C          | 240hrs | Note 2, Note 4 |
| Low Temperature Operation                | Ta = -10°C         | 240hrs | Note 1, Note 4 |
| Operate at High Temperature and Humidity | Ta=40°C    H=90%RH | 240hrs | Note 4         |

Note 1: Ta is the ambient temperature of samples.

Note 2: Ts is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.



## 6. General Precautions

### 6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

### 6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

### 6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

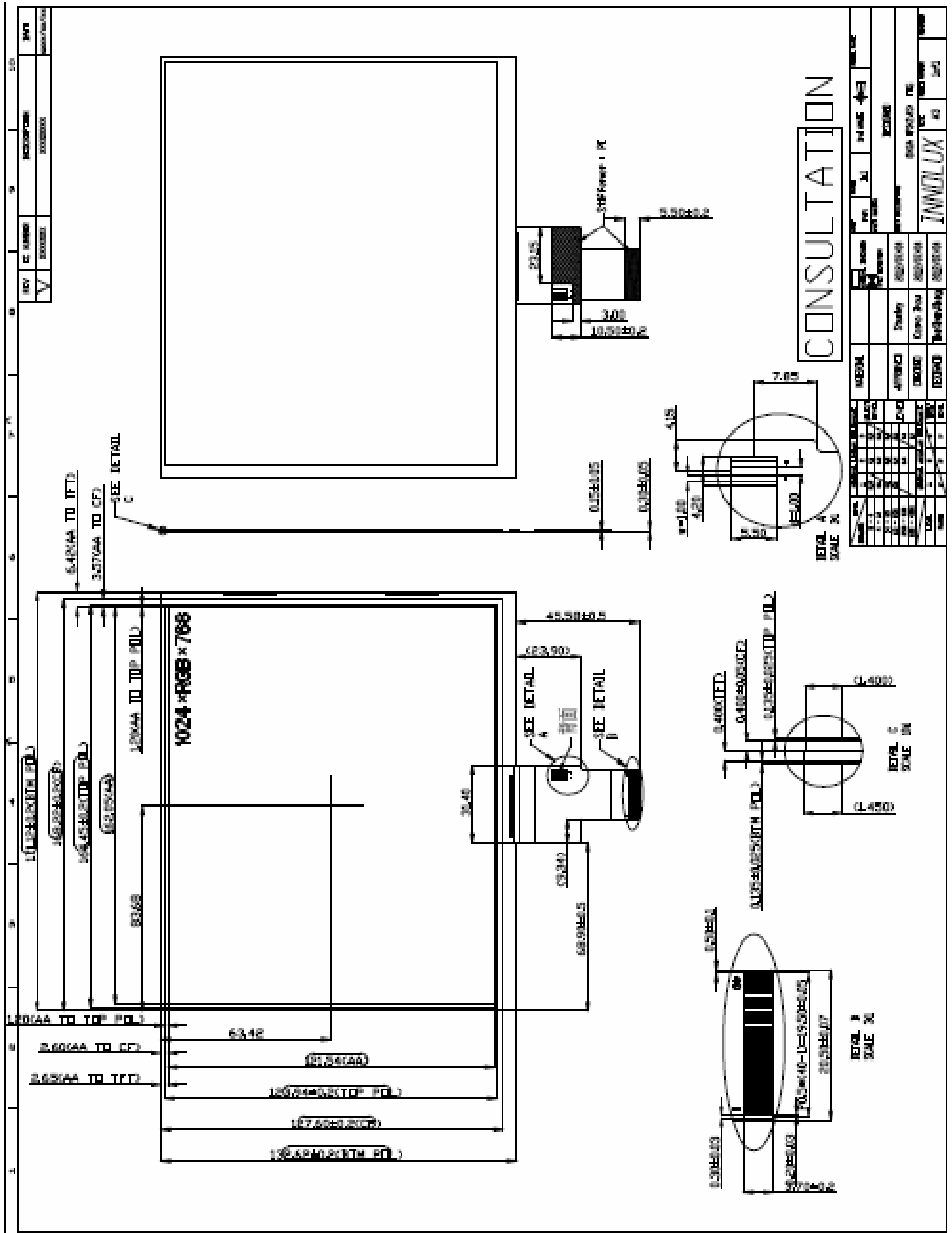
### 6.4. Storage

1. Store the module in a dark room where must keep at  $25\pm 10^{\circ}\text{C}$  and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

### 6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

## 7. Mechanical Drawing



### 8.1 Packaging Material Table

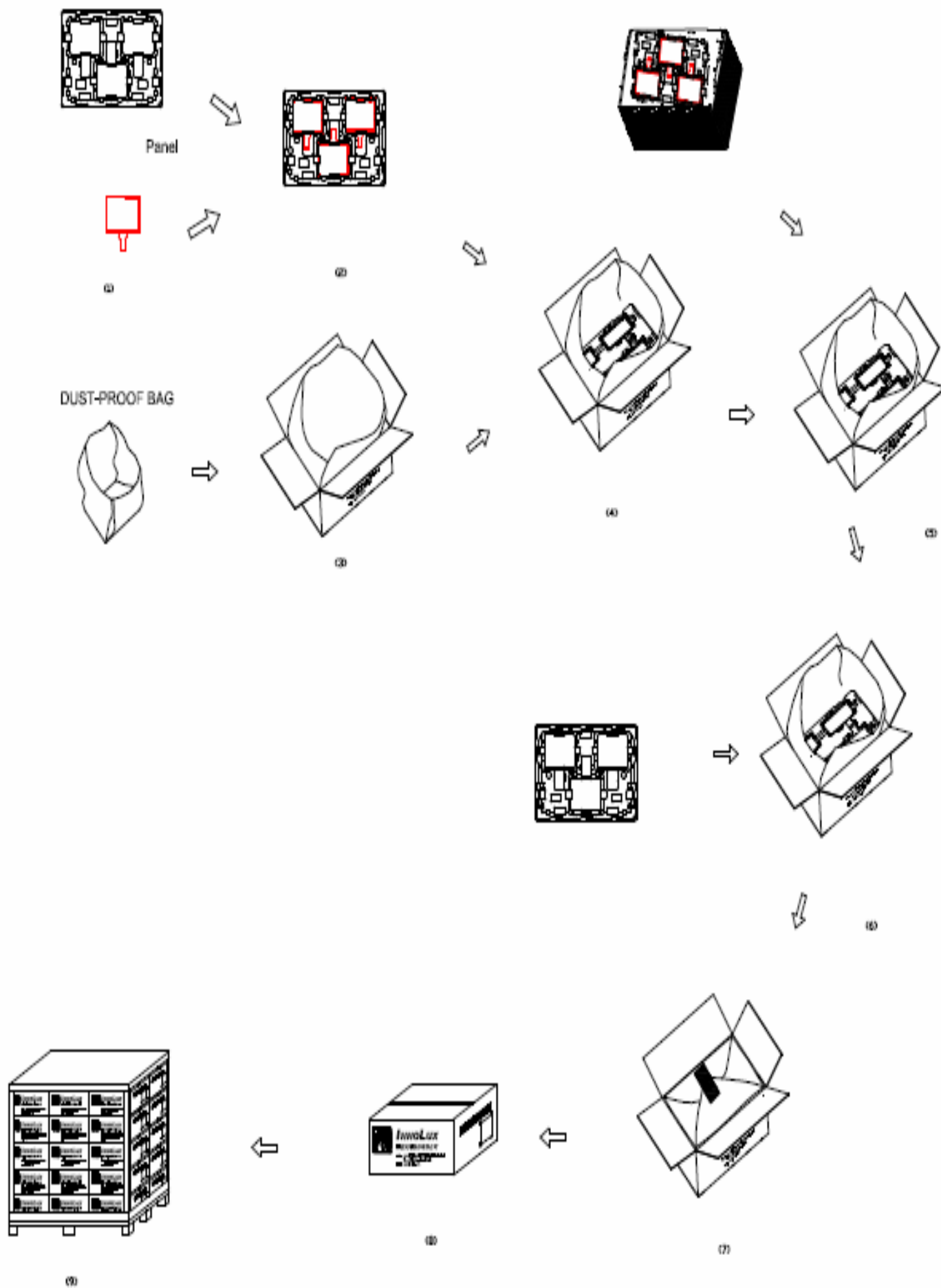
| No | Item           | Model (Material)    | Dimensions(mm)     | Unit Weight (Kg) | Quantity (pcs) | Remark |
|----|----------------|---------------------|--------------------|------------------|----------------|--------|
| 1  | Panel size     | HE080IA-01D         | 171.12×132.62×1.07 | TBD              | 60             |        |
| 2  | Partition      | BC Corrugated Paper | 512 × 350 × 225    | 0.290            | 1              |        |
| 3  | Dust-Proof Bag | PE                  | 700 × 530          | 0.050            | 1              |        |
| 4  | PET-Tray       | PE                  | 505 × 338 × 16.5   | 0.24             | 21             |        |
| 5  | Carton         | Corrugated Paper    | 530 × 355 × 255    | 0.810            | 1              |        |
| 6  | Total weight   | 9.346KG±5%          |                    |                  |                |        |

### 8.2 Packaging Quantity

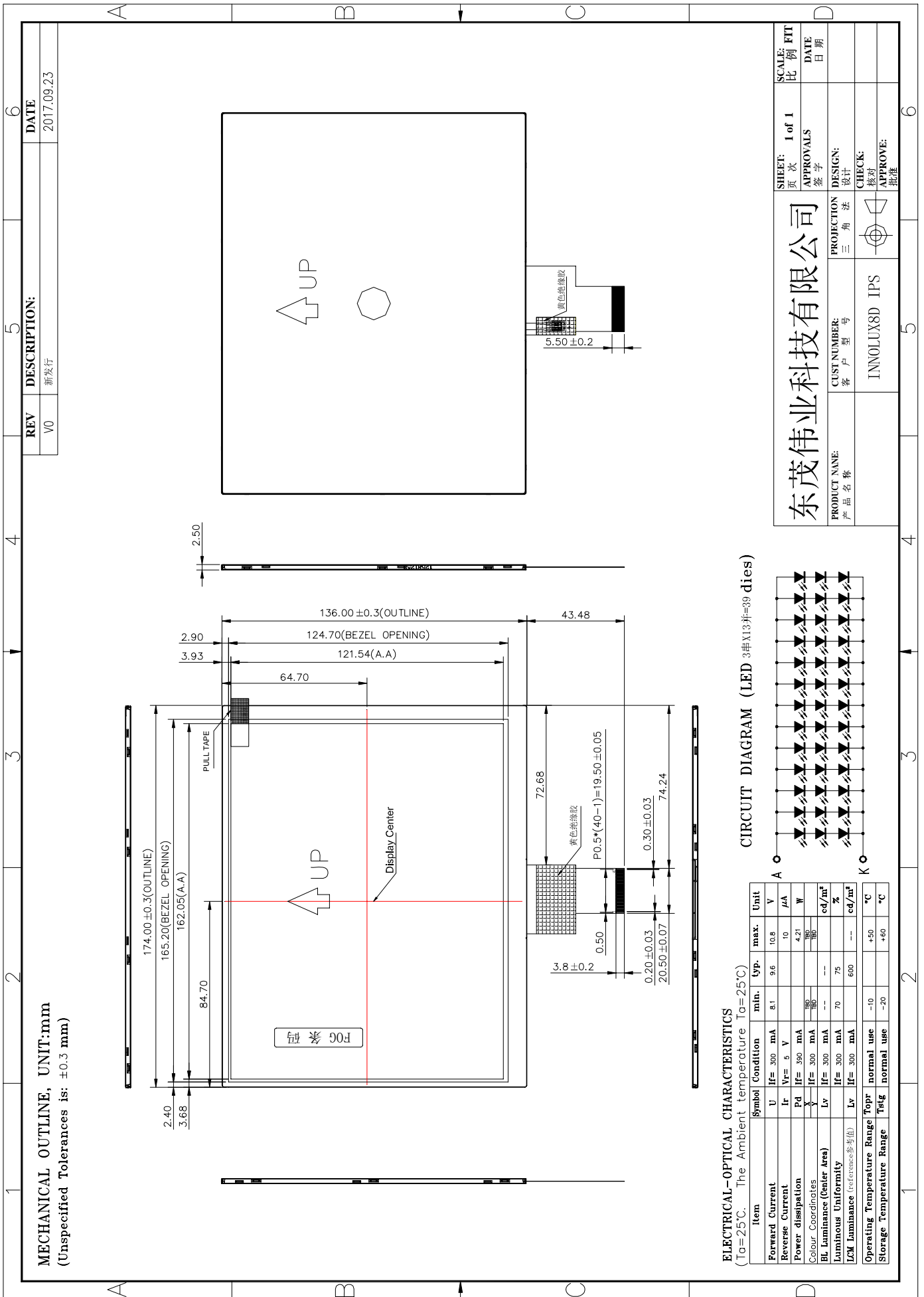
(1) FOG quantity per PET-Tray:      row x pcs = 3pcs

(2) Total FOG quantity in Carton:      layer x pcs/PET-Tray = 60 pcs

### 8.3 Packaging Drawing



## 3. 1 产品成品图纸



## 3. 2测定条件

在无特别指定条件下，产品于温度  $25 \pm 2^{\circ}\text{C}$ ，湿度  $60 \pm 10\%$ 环境条件进行测试。

## 4. 品质要求

### 4. 1 光学特性

| 项目   | 符号         | 条件   | 规格  |     |     | 单位                | 备注 |
|------|------------|------|-----|-----|-----|-------------------|----|
|      |            |      | Min | Typ | Max |                   |    |
| 均匀度  | $\Delta I$ | 面内九点 | 70  | 75  | -   | %                 |    |
| 色度   | X          | 中心点  | --  |     | --  |                   |    |
|      | Y          | 中心点  | --  |     | --  |                   |    |
| 模组亮度 | I          | 中心点  |     | 600 | -   | cd/m <sup>2</sup> |    |

注 1：表内测定点规格需在发光条电流(300)mA，周围环境温度  $25 \pm 2^{\circ}\text{C}$ 测试。

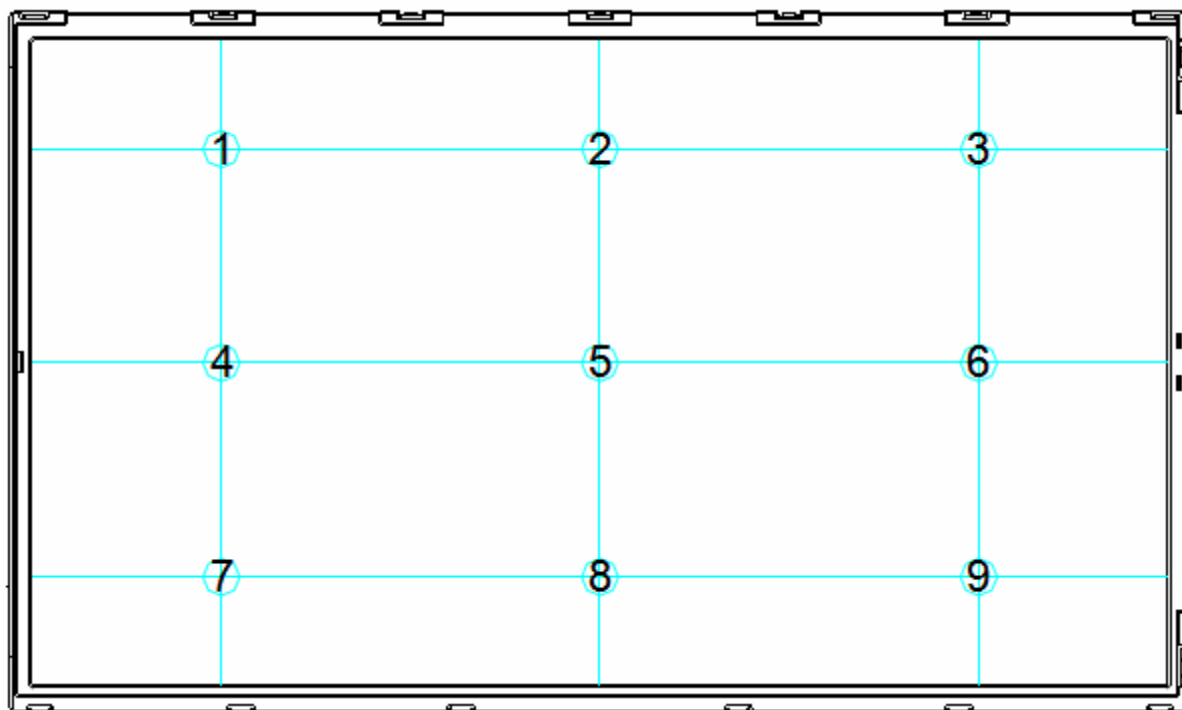
注 2：测试条件：1) 以规定的电流电压正常点亮；

2) 测试环境：暗室（10Lux 以下）

3) 辉度、色坐标测试点：见下图

4) 光学特性测试点图

注 3：均匀性  $\Delta I = (I_{\text{MIN}} \div I_{\text{MAX}}) \times 100\%$



## 4. 2 电气特性

### 4. 2. 1 LED电性规格

| 项目    | 符号 | 条件    | 规格  |     |     | 单位  | 备注      |
|-------|----|-------|-----|-----|-----|-----|---------|
|       |    |       | Min | Typ | Max |     |         |
| LED电流 | IL | 常温25℃ | -   | 300 | -   | mA  |         |
| LED电压 | VL | 常温25℃ | 2.7 | 3.2 | 3.6 | V   | IL=23mA |
| 点亮延迟到 | TD | 注2    |     |     |     | sec |         |

注1：LED点亮电流不可超过最大电流限定值，否则LED寿命和亮度将会受到严重影响。  
注2：点亮测试延迟时间：ON 30sec--OFF 30sec

### 4. 2. 2 LED灯条适用电性规格

| 项目   | 符号 | 条件    | 规格  |     |        | 单位    | 备注       |
|------|----|-------|-----|-----|--------|-------|----------|
|      |    |       | Min | Typ | Max    |       |          |
| 灯条电压 | VL | 常温25℃ | 8.1 | 9.6 | 10.8   | Vrms  | IL=300mA |
| 灯条电流 | IL | 常温25℃ |     | 300 |        | mArms |          |
| 点亮功率 | WL | 常温25℃ |     |     | (4.21) | Wrms  | IL=390mA |

注1：灯条点亮功率需在要求范围以内。

## 4. 3 产品寿命

周围温度+25℃±2℃，湿度 60±20%RH，以每灯 20mA 工作电流之推荐使用条件，背光源之寿命为：

辉度减半平均寿命： 30,000 小时以上

辉度减半保证寿命： 20,000 小时以上

注：辉度减半平均寿命指背光源平均辉度衰减到初期平均辉度的 50%所需时间。