

SPECIFICATION

[ ]

Preliminary

Specification

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Final

Specification

Description

10.4” 800xRGBx600 TFT-LCD Module

Part Number

P1040SVN1ME10

|                                               |  |                                                                                                                                    |  |
|-----------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------|--|
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## REVISION HISTORY

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## 1. Summary

### 1.1 General Description

This is a 10.4 a-Si TFT-LCD module with Normally White technology. It is composed of a TFT-LCD panel, a driver circuit, FPC, Bezel, and a LED backlight unit.

### 1.2 Features

- Interface: RGB
- Acquisition product for UL62368-1/CSA C22.2 No.62368-1-03.
- Compliant with the European RoHS Directive (2011/65/EU) and Delegated Directive (2015/863/EU, Amending Annex II of 2011/65/EU) .

## 2. General Specification

|                                   | Feature                        | Spec                                         | Unit              |
|-----------------------------------|--------------------------------|----------------------------------------------|-------------------|
| <b>Display Spec</b>               | Size                           | 10.4 inch                                    |                   |
|                                   | Resolution                     | 800(RGB)x600                                 |                   |
|                                   | Pixel Pitch                    | 0.264x0.264                                  | mm                |
|                                   | TFT Active Area                | 211.20x158.40                                | mm                |
|                                   | Technology Type                | a-Si                                         |                   |
|                                   | Pixel Configuration            | R.G.B Vertical Stripe                        |                   |
|                                   | Display Mode                   | TN, Normally White                           |                   |
|                                   | Surface Treatment              | Anti-Glare                                   |                   |
|                                   | Viewing Direction              | 12 o'clock                                   |                   |
|                                   | Gray Scale Inversion Direction | 6 o'clock                                    |                   |
| <b>Mechanical Characteristics</b> | LCM (W x H x D)                | 228.40x175.40x6.20                           | mm                |
|                                   | Weight                         | 350±5%                                       | g                 |
| <b>Optical Characteristics</b>    | Luminance                      | TYP:350                                      | cd/m <sup>2</sup> |
|                                   | Contrast Ratio                 | TYP:500                                      |                   |
|                                   | NTSC                           | TYP:50%                                      | %                 |
|                                   | Viewing Angle                  | 60/70/70/70                                  | degree            |
| <b>Electrical Characteristics</b> | Interface                      | RGB 24 bits                                  |                   |
|                                   | Color Depth                    | 262K/16.2M                                   | color             |
|                                   | Power Consumption              | LCD:435mW(Black pattern)<br>Backlight:2304mW | mW                |

**Table 2.1 General TFT Specifications**

Note 1: For TN LCM: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: LCM weight tolerance: ± 5%

### 3. Input / Output Terminals

#### 3.1 CN1 Pin assignment (LCD Interface)

| Connector Information |                                      |
|-----------------------|--------------------------------------|
| LCD Module connector  | XXXX or equivalent                   |
| Matching connector    | FH28-60S-0.5SH(Hirose) or equivalent |

| Pin | Symbol | I/O | Description                                                          | Remark |
|-----|--------|-----|----------------------------------------------------------------------|--------|
| 1   | GND    | P   | Power Ground                                                         |        |
| 2   | AVDD   | P   | Power Supply                                                         |        |
| 3   | VCC    | P   | Power Supply                                                         |        |
| 4   | R0     | I   | Red data Input(LSB)                                                  |        |
| 5   | R1     | I   | Red data Input                                                       |        |
| 6   | R2     | I   | Red data Input                                                       |        |
| 7   | R3     | I   | Red data Input                                                       |        |
| 8   | R4     | I   | Red data Input                                                       |        |
| 9   | R5     | I   | Red data Input                                                       |        |
| 10  | R6     | I   | Red data Input                                                       |        |
| 11  | R7     | I   | Red data Input(MSB)                                                  |        |
| 12  | G0     | I   | Green data Input(LSB)                                                |        |
| 13  | G1     | I   | Green data Input                                                     |        |
| 14  | G2     | I   | Green data Input                                                     |        |
| 15  | G3     | I   | Green data Input                                                     |        |
| 16  | G4     | I   | Green data Input                                                     |        |
| 17  | G5     | I   | Green data Input                                                     |        |
| 18  | G6     | I   | Green data Input                                                     |        |
| 19  | G7     | I   | Green data Input(MSB)                                                |        |
| 20  | B0     | I   | Blue data Input(LSB)                                                 |        |
| 21  | B1     | I   | Blue data Input                                                      |        |
| 22  | B2     | I   | Blue data Input                                                      |        |
| 23  | B3     | I   | Blue data Input                                                      |        |
| 24  | B4     | I   | Blue data Input                                                      |        |
| 25  | B5     | I   | Blue data Input                                                      |        |
| 26  | B6     | I   | Blue data Input                                                      |        |
| 27  | B7     | I   | Blue data Input(MSB)                                                 |        |
| 28  | DCLK   | I   | Clock input(Latch data at falling edge)                              |        |
| 29  | DE     | I   | Data enable                                                          |        |
| 30  | HSYNC  | I   | Horizontal sync input. Negative polarity                             |        |
| 31  | VSNC   | I   | Vertical sync input. Negative polarity                               |        |
| 32  | MODE   | I   | DE/SYNC mode select .normally pull high<br>H:DE mode .L:HV sync mode |        |
| 33  | NC     | N   | No connection                                                        |        |
| 34  | NC     | N   | No connection                                                        |        |
| 35  | NC     | N   | No connection                                                        |        |
| 36  | VCC    | P   | Power Supply                                                         |        |
| 37  | NC     | -   | No connection                                                        |        |
| 38  | GND    | P   | Power Ground                                                         |        |
| 39  | GND    | P   | Power Ground                                                         |        |
| 40  | AVDD   | P   | Power Supply                                                         |        |
| 41  | VCOM   | P   | VCOM DC input                                                        |        |

|    |      |   |                                                                            |  |
|----|------|---|----------------------------------------------------------------------------|--|
| 42 | DITH | I | Dithering setting<br>DITH="H" 6bit resolution;<br>DITH="L" 8bit resolution |  |
| 43 | NC   | N | No connection                                                              |  |
| 44 | NC   | N | No connection                                                              |  |
| 45 | NC   | N | No connection                                                              |  |
| 46 | NC   | N | No connection                                                              |  |
| 47 | NC   | N | No connection                                                              |  |
| 48 | NC   | N | No connection                                                              |  |
| 49 | NC   | N | No connection                                                              |  |
| 50 | NC   | N | No connection                                                              |  |
| 51 | NC   | N | No connection                                                              |  |
| 52 | NC   | N | No connection                                                              |  |
| 53 | NC   | N | No connection                                                              |  |
| 54 | NC   | N | No connection                                                              |  |
| 55 | NC   | N | No connection                                                              |  |
| 56 | VGH  | P | TFT turn on voltage                                                        |  |
| 57 | VCC  | P | Power Supply                                                               |  |
| 58 | VGL  | P | TFT turn off voltage                                                       |  |
| 59 | GND  | P | Power Ground                                                               |  |
| 60 | NC   | N | No connection                                                              |  |

**Table 3.1 Pin Assignment for LCD Interface**

I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection

Note1: All of the GND pins should be connected to the system ground.

Note 2: This LCD module supports SYNC & SYNC-DE & DE mode, the pin setting is different from each other.  
Please refer to the descriptions.

### 3.2 CN2 Pin assignment (BL Interface)

Matching connector type: BHSR-02VS-1

| No | Symbol | I/O | Description                       | Wire Color |
|----|--------|-----|-----------------------------------|------------|
| 1  | LEDA   | P   | LED driving anode (high voltage)  | Red        |
| 2  | LEDK   | P   | LED driving cathode (low voltage) | White      |

**Table 3.2 Pin Assignment for BL Interface**

I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection

## 4. Absolute Maximum Ratings

GND=0V

| Item                           | Symbol  | MIN   | MAX  | Unit   | Remark                                                                      |
|--------------------------------|---------|-------|------|--------|-----------------------------------------------------------------------------|
| Power Voltage                  | VCC     | -0.3  | 5.0  | V      | Maximum value due to MOS characteristics, user should set on advised value. |
|                                | AVDD    | -0.3  | 15.0 | V      |                                                                             |
|                                | VGH     | -0.3  | 42.0 | V      |                                                                             |
|                                | VGL     | -20.0 | 0.3  | V      |                                                                             |
|                                | VGH-VGL | -0.3  | 40.0 | V      |                                                                             |
| Signal Input                   | Vin     | -0.3  | 5.0  | V      | Note1                                                                       |
| Operating Temperature          | Top     | -20   | 70   | °C     |                                                                             |
| Storage Temperature            | Tst     | -30   | 80   | °C     |                                                                             |
| Operating and Storage Humidity | HSTG    | -     | 90   | % (RH) | Exceed 90%RH may cause abnormal display                                     |
| Relative Humidity (Note2)      | RH      | --    | ≤95  | %      | Ta≤40°C                                                                     |
|                                |         | --    | ≤85  | %      | 40°C<Ta≤50°C                                                                |
|                                |         | --    | ≤55  | %      | 50°C<Ta≤60°C                                                                |
|                                |         | --    | ≤36  | %      | 60°C<Ta≤70°C                                                                |
|                                |         | --    | ≤24  | %      | 70°C<Ta≤80°C                                                                |
| Absolute Humidity              | AH      | --    | ≤70  | g/m³   | Ta>70°C                                                                     |

Table 4.1 Absolute Maximum Ratings

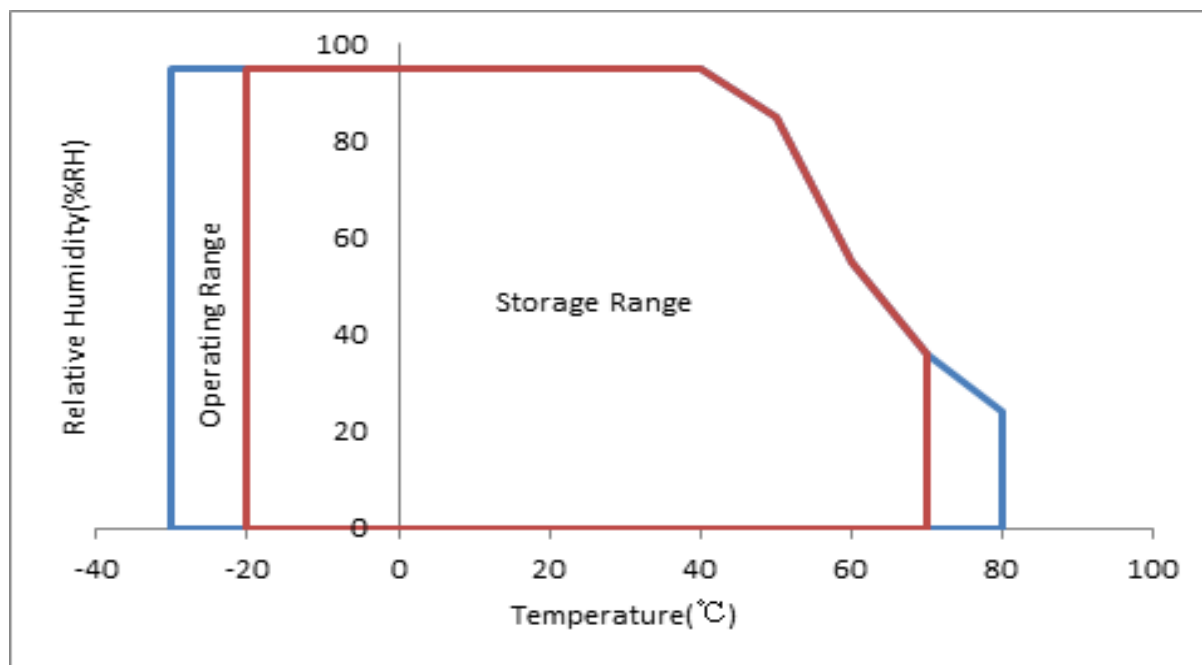


Table 4.2 Absolute Maximum Ratings chart

Note1: Input voltage include all in put data.

Note2: Ta means the ambient temperature. It is necessary to limit the relative humidity to the specified temperature range. Condensation on the module is not allowed.

Note3: The absolute maximum rating values of this product are not allowed to be exceeded at any times. A module should be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme condition, the module may be permanently destroyed.



## 5. Electrical Characteristics

### 5.1 DC Characteristics for Panel Driving

GND=0V, Ta = 25°C

| Item                              |            | Symbol            | MIN     | TYP   | MAX     | Unit | Remark                                                               |
|-----------------------------------|------------|-------------------|---------|-------|---------|------|----------------------------------------------------------------------|
| Digital supply Voltage            |            | VCC               | 3.00    | 3.30  | 3.60    | V    |                                                                      |
| Analog supply Voltage             |            | AVDD              | 10.8    | 11    | 11.2    | V    | Very important voltage, exceed this value may cause abnormal display |
| Gate on voltage                   |            | VGH               | 24      | 25    | 26      | V    |                                                                      |
| Gate off voltage                  |            | VGL               | -7.5    | -7.0  | -6.5    | V    |                                                                      |
| Common Electrode Driving Signal   |            | VCOM              | 4.05    | 4.10  | 4.15    | V    | Very important voltage, exceed this value may cause abnormal display |
| Input Signal Voltage              | Low Level  | V <sub>IL</sub>   | 0       | -     | 0.3xVCC | V    | R0~R7,G0~G7,0~B7,DE, DCLK,HSYNC,VSYNC,MODE, RESET, DITH              |
|                                   | High Level | V <sub>IH</sub>   | 0.7xVCC | -     | VCC     | V    |                                                                      |
| Current of digital supply voltage |            | I <sub>VCC</sub>  | -       | 10.20 | -       | mA   | VCC=3.3V,all white pattern                                           |
| Current of analog supply voltage  |            | I <sub>AVDD</sub> | -       | 34.30 | -       | mA   | AVDD=11V                                                             |
| Current of Gate on voltage        |            | I <sub>VGH</sub>  | -       | 0.70  | -       | mA   | VGH=25V                                                              |
| Current of Gate off voltage       |            | I <sub>VGL</sub>  | -       | 0.70  | -       | mA   | VGL=-7.0V                                                            |
| Current of Vcom                   |            | I <sub>vcom</sub> |         | 0.002 | -       | mA   | VCOM=4.10V                                                           |
| Power consumption                 |            | P                 | -       | 435   | -       | mW   | This value may vary with different patterns.                         |

Table 5.1 DC Characteristics

Note1:To test the current dissipation, use "all Black Pattern".

## 5.2 DC Characteristics for Backlight Driving

GND=0V, Ta = 25°C

| Item                        | Symbol | Min | Typ   | Max | Unit | Remark |
|-----------------------------|--------|-----|-------|-----|------|--------|
| Forward Current             | $I_F$  | -   | 240   | 360 | mA   | Note 1 |
| Forward Current Voltage     | $V_F$  | 9.0 | 9.6   | 9.9 | V    | Note 1 |
| Backlight Power Consumption | WBL    | -   | 2304  | -   | mW   | Note 1 |
| Operating Life Time         | --     | -   | 30000 | -   | hrs  | Note 2 |

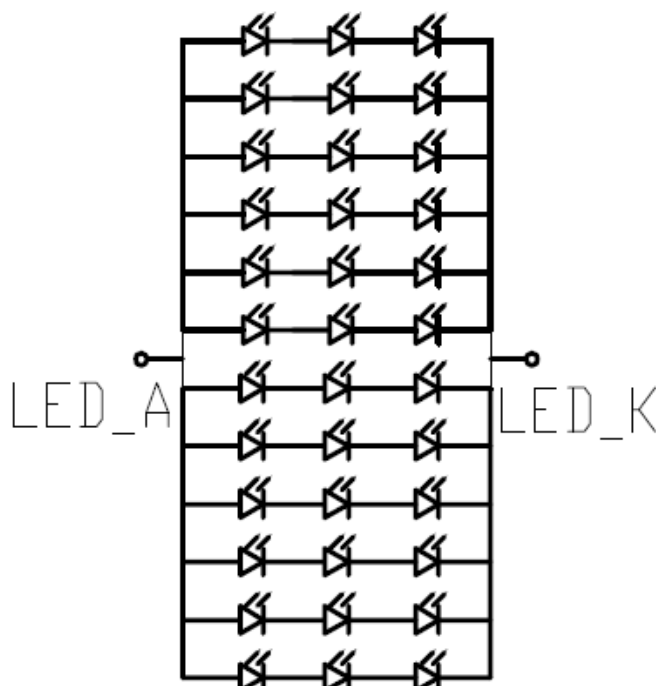
**Table 5.2 LED Backlight Characteristics**

Note1:  $I_F$  is defined for each channel.

Note2: Optical performance should be evaluated at Ta=25°C only.

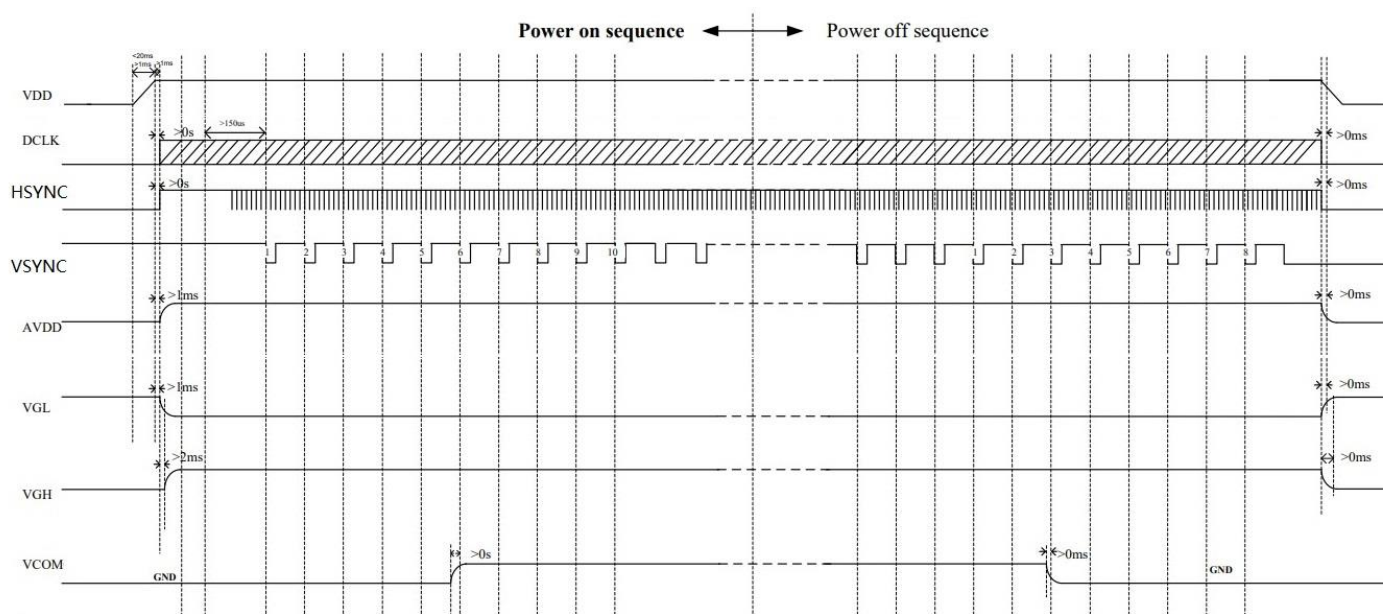
Note3: If LED is driven by high current, high ambient temperature & humidity condition, The life time of LED will be reduced.

Note4: Operating life means brightness goes down to 50% of initial brightness. Typical operating life time is estimated data.



**Figure 5.2 LED Backlight Characteristics**

## 5.3 Recommended Power ON/OFF Sequence



**Table 5.3 Power ON/OFF Sequence**

- Note:
1. When VCC turned on, the rising time  $T_1$  should less than 20ms.
  2. AVDD stable to VCC stable time  $T_2$  should better longer than 1ms.
  3. The power off sequence can be set according to power on settings.
  4. It is advised that LCD power turned on much later than system when RGB pin is multiple used for system initial.

## 5.4 LCD Module Block Diagram

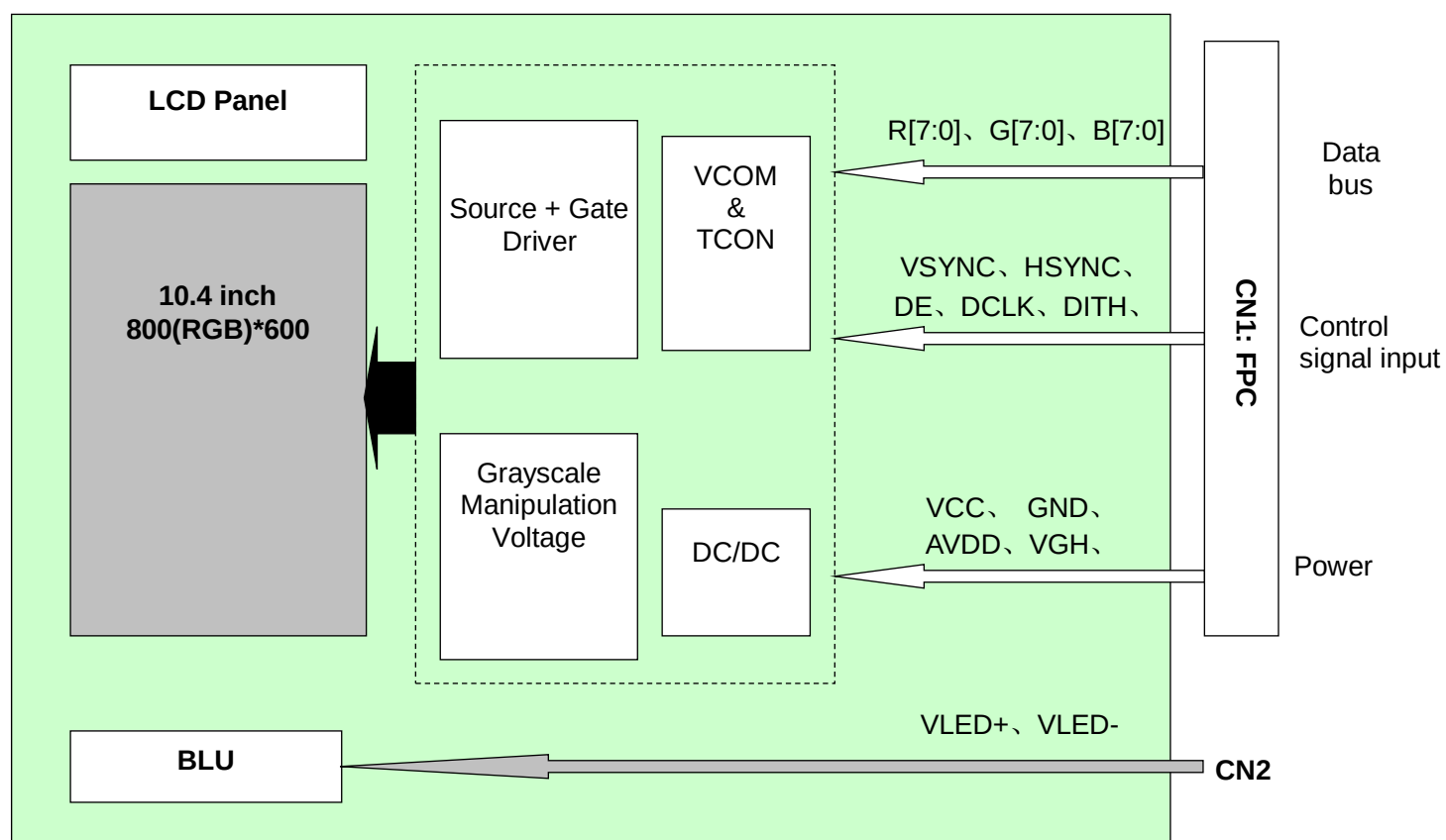


Figure 5.4 LCD Module Block Diagram

## 6. Interface Timing Characteristics

### 6.1 AC characteristics

VCC=3.3V, GND=0V, Ta=25°C

| Parameter              | Symbol         | Min | Typ | Max | Unit | Remark             |
|------------------------|----------------|-----|-----|-----|------|--------------------|
| HSYNC Setup Time       | $T_{B_{hstB}}$ | 5   | -   | -   | ns   |                    |
| HSYNC Hold Time        | $T_{B_{hhdB}}$ | 5   | -   | -   | ns   |                    |
| VSYNC Setup Time       | $T_{B_{vstB}}$ | 5   | -   | -   | ns   |                    |
| VSYNC Hold Time        | $T_{B_{vhdB}}$ | 5   | -   | -   | ns   |                    |
| Data Setup Time        | $T_{B_{dsuB}}$ | 5   | -   | -   | ns   |                    |
| Data Hold Time         | $T_{B_{dhdB}}$ | 5   | -   | -   | ns   |                    |
| DE Setup Time          | $T_{B_{esuB}}$ | 5   | -   | -   | ns   |                    |
| DE Hold Time           | $T_{B_{ehdB}}$ | 5   | -   | -   | ns   |                    |
| CLKIN Cycle Time       | $T_{B_{cphB}}$ | 14  | -   | -   | ns   |                    |
| CLKIN Pulse Width      | $T_{B_{cwhB}}$ | 40  | 50  | 60  | %    |                    |
| Output stable time     | $T_{sst}$      | -   | -   | 6   | us   |                    |
| VCC Power ON Slew rate | $T_{por}$      | -   | -   | 20  | ms   | From 0V to 90% VCC |
| RSTB pulse width       | $T_{Rst}$      | 50  | -   | -   | us   |                    |

Table 6.1 AC characteristics

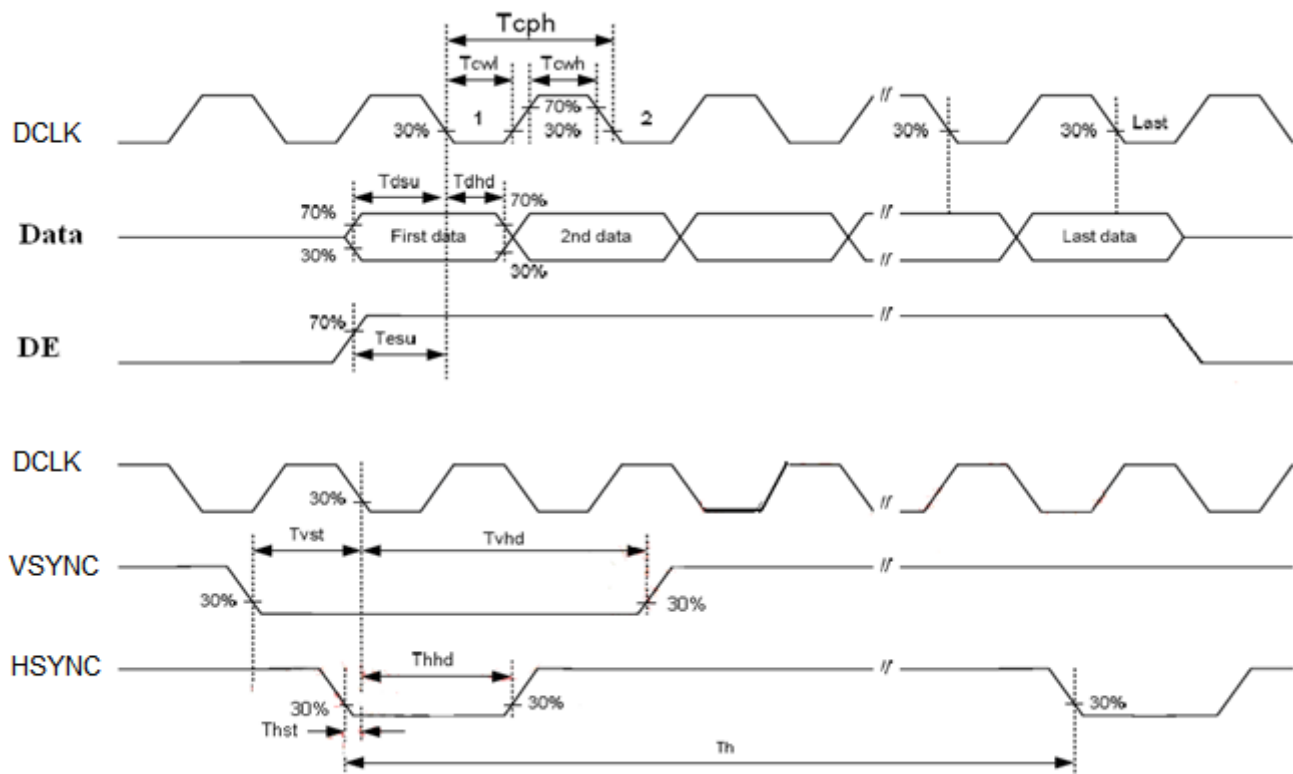


Figure 6.1 AC characteristics

## 6.2 Data input timing table

### i. Input timing at DE mode

VCC=3.3V, GND=0V, Ta=25℃

|                    | Parameter                       | Symbol | Min. | Typ. | Max. | Unit | Remark      |
|--------------------|---------------------------------|--------|------|------|------|------|-------------|
|                    | Dclk frequency(Frame rate=60HZ) | Fclk   | 36.4 | 39.6 | 50.4 | MHz  | Tclk=1/Fclk |
| Horizontal section | Horizontal total                | TH     | 955  | 1000 | 1150 | Tclk |             |
|                    | Horizontal blanking             | THC    | 155  | 200  | 350  | Tclk | Note1       |
|                    | Valid Data Width                | THD    | -    | 800  | -    | Tclk |             |
| Vertical section   | Vertical total                  | TV     | 635  | 660  | 730  | TH   |             |
|                    | Vertical blanking               | TVC    | 35   | 60   | 130  | TH   | Note1       |
|                    | Valid Data Width                | TVD    | -    | 600  | -    | TH   |             |

Table 6.2.1 input timing (DE mode)

### ii. Input timing at HV mode

VCC=3.3V, GND=0V, Ta=25℃

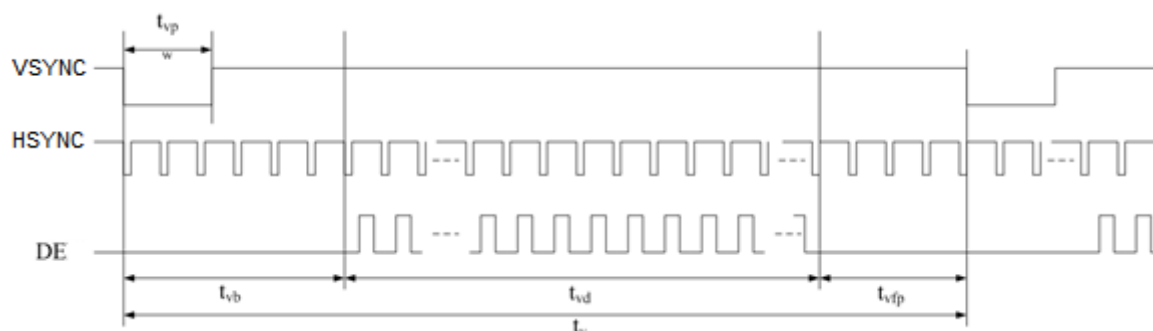
|                    | Parameter                       | Symbol | Min. | Typ. | Max. | Unit | Remark      |
|--------------------|---------------------------------|--------|------|------|------|------|-------------|
|                    | Dclk frequency(Frame rate=60HZ) | Fclk   | 37.1 | 39.6 | 44.9 | MHz  | Tclk=1/Fclk |
| Horizontal section | Horizontal pulse width          | THPW   | 1    | -    | 40   | Tclk |             |
|                    | Horizontal total                | TH     | 950  | 1000 | 1100 | Tclk |             |
|                    | Horizontal back porch           | THB    | 88   | 88   | 88   | Tclk |             |
|                    | Horizontal front porch          | THFP   | 62   | 112  | 212  | Tclk |             |
|                    | Valid Data Width                | THD    | -    | 800  | -    | Tclk |             |
| Vertical section   | Vertical pulse width            | TVPW   | 1    | -    | 20   | TH   |             |
|                    | Vertical total                  | TV     | 650  | 660  | 680  | TH   |             |
|                    | Vertical back porch             | TVB    | 39   | 39   | 39   | TH   |             |
|                    | Vertical front porch            | TVFP   | 11   | 21   | 41   | TH   |             |
|                    | Valid Data Width                | TVD    | -    | 600  | -    | TH   |             |

Table 6.2.2 input timing (HV mode)

Note1: In HV mode, it is necessary to keep it on typical value.

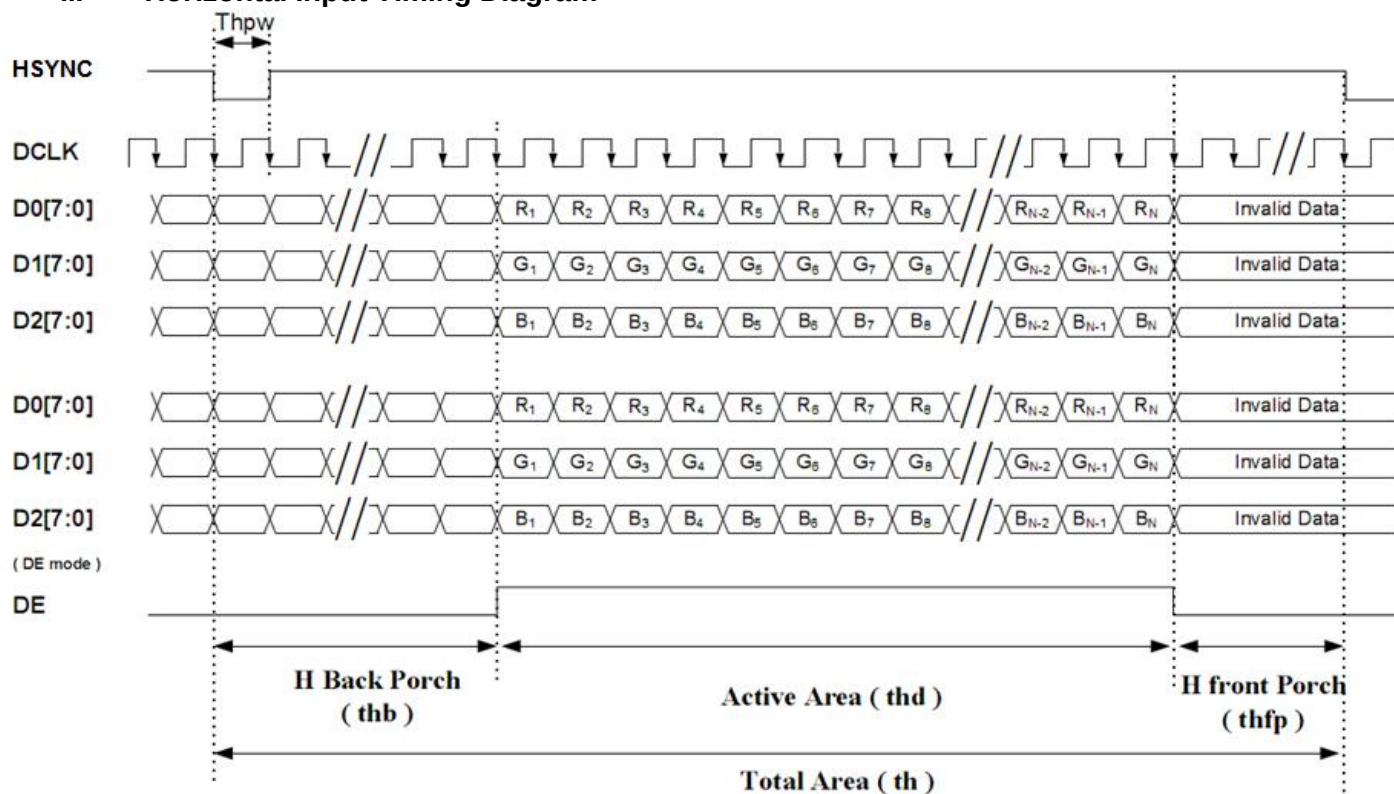
### 6.3 Data input timing diagram

i. **Vertical Input Timing Diagram**



### Figure 6.3.1 Vertical Input Timing Diagram

ii. **Horizontal Input Timing Diagram**



### Figure 6.3.2 Vertical Input Timing Diagram

## 7. Optical Characteristics

| Item           |       | Symbol           | Condition       | Min   | Typ   | Max   | Unit   | Remark   |
|----------------|-------|------------------|-----------------|-------|-------|-------|--------|----------|
| View Angles    |       | θT               | CR≧10           | 50    | 60    | -     | Degree | Note2,3  |
|                |       | θB               |                 | 60    | 70    | -     |        |          |
|                |       | θL               |                 | 60    | 70    | -     |        |          |
|                |       | θR               |                 | 60    | 70    | -     |        |          |
| Contrast Ratio |       | CR               | θ=0°            | 400   | 500   |       |        | Note 3   |
| Response Time  |       | T <sub>ON</sub>  | 25℃             | -     | 25    | 40    | ms     | Note 4   |
|                |       | T <sub>OFF</sub> |                 |       |       |       |        |          |
| Chromaticity   | White | x                | Backlight is on | 0.252 | 0.302 | 0.352 |        | Note 1,5 |
|                |       | y                |                 | 0.269 | 0.319 | 0.369 |        |          |
|                | Red   | x                |                 | 0.549 | 0.599 | 0.649 |        | Note 1,5 |
|                |       | y                |                 | 0.295 | 0.345 | 0.395 |        |          |
|                | Green | x                |                 | 0.278 | 0.328 | 0.378 |        | Note 1,5 |
|                |       | y                |                 | 0.498 | 0.548 | 0.598 |        |          |
|                | Blue  | x                |                 | 0.102 | 0.152 | 0.202 |        | Note 1,5 |
|                |       | y                |                 | 0.047 | 0.097 | 0.147 |        |          |
| Uniformity     |       | U                |                 | 70    | 75    | -     | %      | Note 6   |
| NTSC           |       |                  |                 | 45    | 50    | -     | %      | Note 5   |
| Luminance      |       | L                |                 | 300   | 350   | -     | cd/m²  | Note 7   |

Table 7.1 Optical characteristics

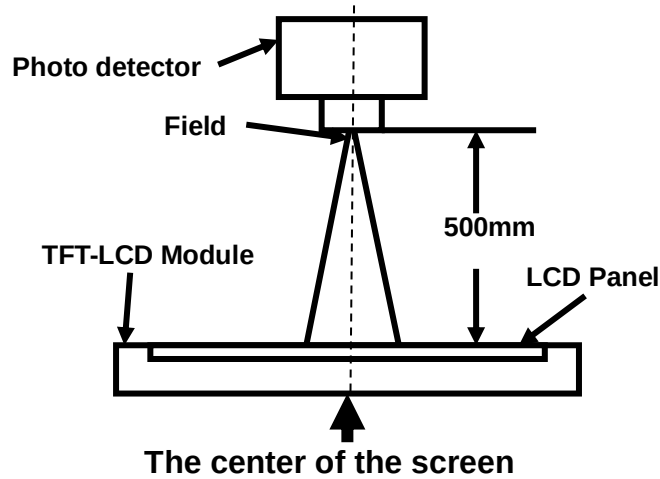
Test Conditions:

1.  $I_F = 240$  mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.



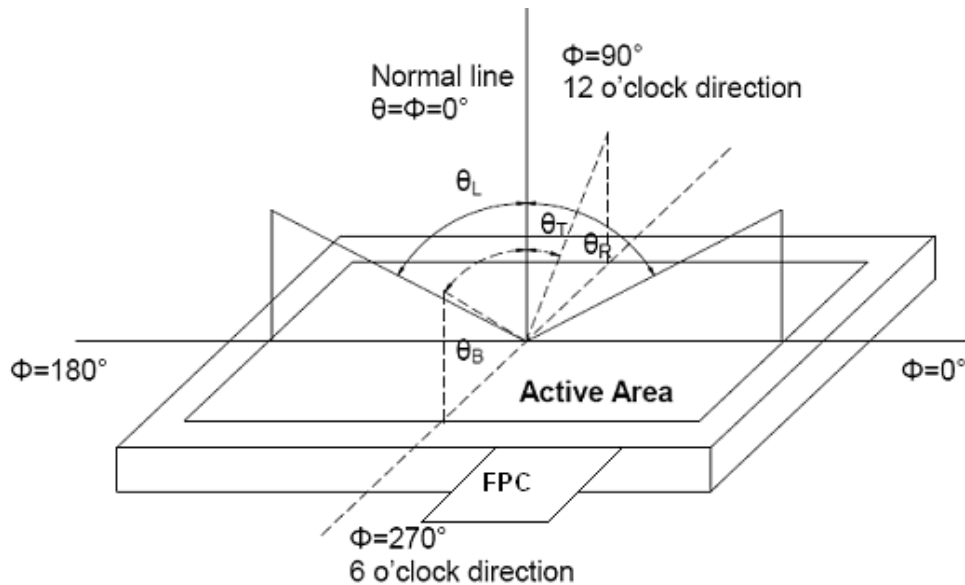
Note1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical characteristics are measured at the center point of the LCD screen.



**Fig1. Measurement Set Up**

Note2: Definition of viewing angle range and measurement system. Viewing angle is measured at the center point of the LCD



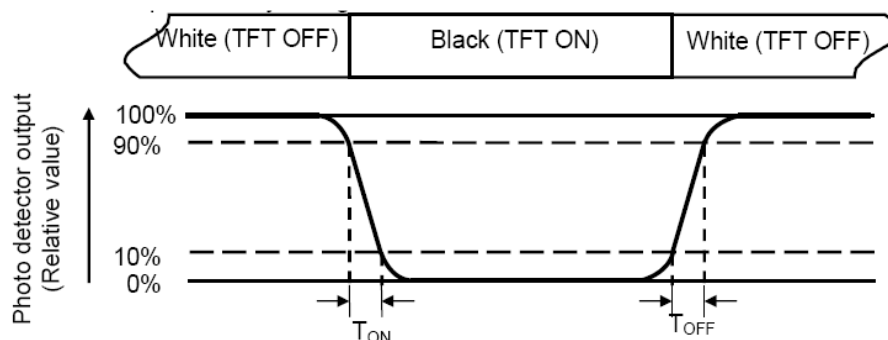
**Fig2. Measurement viewing angle**

Note 3: Definition of contrast ratio

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

Note4: Definition of Response time

For TN LCM, the response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time ( $T_r$ ) is the time between photo detector output intensity changed from 90% to 10%. And fall time ( $T_f$ ) is the time between photo detector output intensity changed from 10% to 90%.



**Fig3. Response Time Testing(TN)**

Note 5: Definition of color chromaticity (CIE1931).Color coordinates measured at center point of LCD.

Note6: Definition of Luminance Uniformity

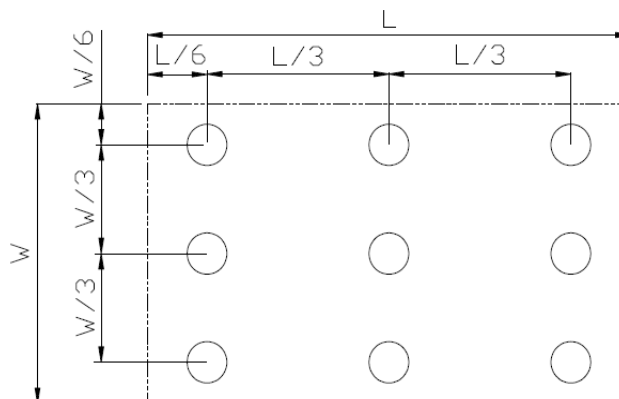
Active area is divided into 9 measuring areas (Refer Fig.5). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) =  $L_{min} / L_{max}$

$L_{max}$ : The measured Maximum luminance of all measurement position.

$L_{min}$ : The measured Minimum luminance of all measurement position.

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



**Fig4. Luminance Uniformity Measurement Locations(9 points)**

Note 7: Definition of Luminance: Measure the luminance of white state at center point.

## 8. Reliability Test

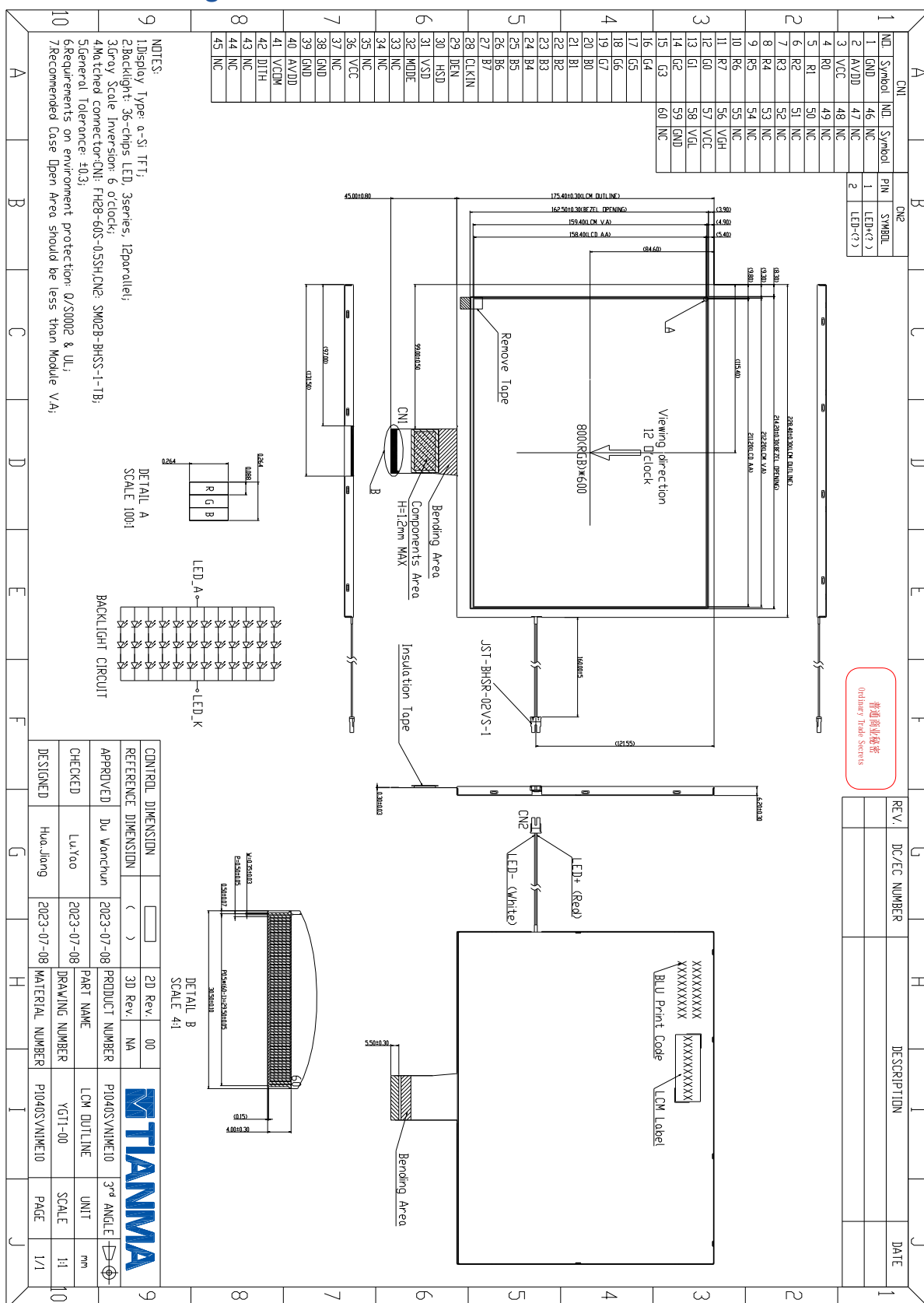
| No | Test Item                                  | Condition                                                                                                                    | Remark                                                                                          |
|----|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1  | High Temperature Operation                 | +70℃, 240hrs                                                                                                                 | Note1<br>IEC60068-2-1:2007,GB2423.2-2008                                                        |
| 2  | Low Temperature Operation                  | -20℃, 240hrs                                                                                                                 | IEC60068-2-1:2007<br>GB2423.1-2008                                                              |
| 3  | High Temperature Storage (non-operation)   | +80℃, 240hrs                                                                                                                 | IEC60068-2-1:2007<br>GB2423.2-2008                                                              |
| 4  | Low Temperature Storage (non-operation)    | -30℃, 240hrs                                                                                                                 | IEC60068-2-1:2007<br>GB2423.1-2008                                                              |
| 5  | High Temperature & High Humidity Operation | +60℃, 90% RH max, 240 hours                                                                                                  | Note2<br>IEC60068-2-78 :2001<br>GB/T2423.3—2006                                                 |
| 6  | Thermal Shock (non-operation)              | -30℃, 30 min~+80℃, 30 min,<br>Change time:5min, 100 Cycles                                                                   | Start with cold temperature,<br>End with high temperature,<br>IEC60068-2-14:1984,GB2423.22-2002 |
| 7  | Electro Static Discharge (operation)       | C=150pF,R=330Ω,<br>5point/panel<br>Air:±8Kv,5times<br>Contact:±4Kv, 5times                                                   | IEC61000-4-2:2001<br>GB/T17626.2-2006                                                           |
| 8  | Vibration (non-operation)                  | Frequency range:10 ~ 55Hz,<br>Stroke:1.5mm<br>Sweep:10Hz ~ 55Hz ~ 10Hz<br>2hours for each direction of X.Y.Z (6 hours total) | IEC60068-2-6:1982<br>GB/T2423.10—1995                                                           |
| 9  | Shock (non-operation)                      | 60G 6ms, ±X,±Y,±Z 3 times for each direction                                                                                 | IEC60068-2-27:1987<br>GB/T2423.5—1995                                                           |
| 10 | Package Drop Test                          | Height:80 cm,1 corner, 3 edges, 6 surfaces                                                                                   | IEC60068-2-32:1990<br>GB/T2423.8—1995                                                           |
| 11 | Package Vibration Test                     | Frequency: 5-20-200HZ,<br>PSD : 0.01-0.01-0.001<br>Total:0.781g <sup>2</sup> /HZ, x/y/z each direction 30min)                | IEC60068-2-34<br>GB/T2423.11                                                                    |

**Table 8.1 Reliability test condition**

Note1: Temperature is the ambient temperature of sample

Note2: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product's function only be guaranteed, but not for all of the cosmetic specification.



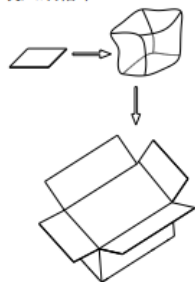
## 10. Packing Instruction

| No | Item            | Model (Material) | Dimensions(mm)       | Unit Weight(Kg) | Quantity | Remark |
|----|-----------------|------------------|----------------------|-----------------|----------|--------|
| 1  | LCM             | TM104SDHG31-71   | 228.40×175.40×6.20   | 0.35            | 22       |        |
| 2  | Carton          | Corrugated paper | 544×365×250          | 1.01            | 1        |        |
| 3  | Anti-Static Bag | PE               | 250×250              | 0.0054          | 22       |        |
| 4  | Dust-Proof Bag  | PE               | 700×545              | 0.06            | 1        |        |
| 5  | Beauty-grain    | Tape             | 30×10                | 0.0005          | 44       |        |
| 6  | Partition_1     | Corrugated paper | 527.00×348.00×185.00 | 0.001           | 1        |        |
| 7  | EPE             | EPE              | 525.00×345.00×20.00  | 0.072           | 2        |        |
| 8  | Label           | Paper            | 100×52               | 0.001           | 1        |        |
| 9  | Total weight    | 9.056 ±5% Kg     |                      |                 |          |        |

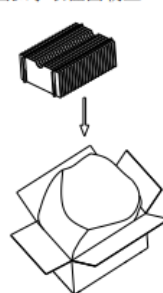
**Table10.1 Packing instruction**

The detail of packing method is shown as below:

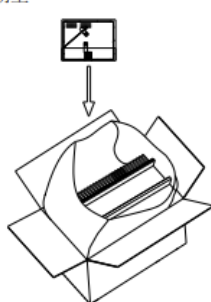
1. 将 EPE 防静电珍珠棉先放入防尘袋中，  
然后整体装入纸箱中



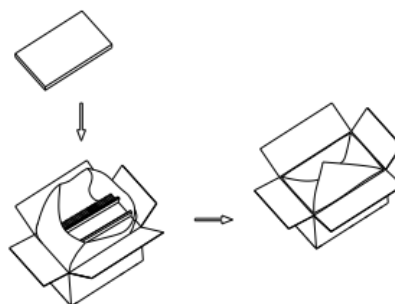
2. 将压线卡放入 A 步骤组装完成后的纸箱  
内，左右圆弧拿取位面朝上



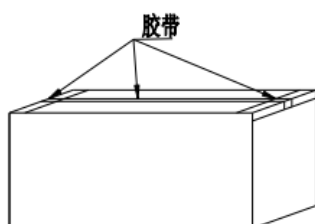
3. 将包装好的单片模组依次放入 B 步骤中  
组装好的纸箱内，防静电袋口折弯部分朝  
下，显示面 朝内放置，每排最后一片模组  
显示面朝里



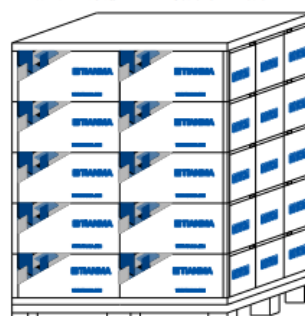
4. 将另一块 EPE 防静电珍珠棉放置在压线  
卡上，封好防尘袋



5. 使用胶带封好纸箱



6. 纸箱堆叠数按 2\*3 每层\*共 5 层



## 11 Precautions for Use of LCD Modules

### 11.1 Handling Precautions

- (1) The display panel is made of glass. Do not subject it to mechanical shock by dropping it, etc.
- (2) If the display panel is damaged and the liquid crystal fluid inside it leaks out be sure not to get any in your mouth. If the fluid comes into contact with your skin or clothes promptly wash it off using soap and water.
- (3) Do not apply excessive force to the display surface or the bezel since this may cause the color tone to vary.
- (4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle the polarizer carefully.
- (5) If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is still not completely clear use a moist cloth with one of the following solvents:
  - Isopropyl alcohol
  - Ethyl alcohol
 Solvents other than those mentioned above may damage the polarizer. Specifically, do not use the following:
  - Water
  - Ketone
  - Aromatic solvents
- (6) Do not disassemble the LCD Module.
- (7) If powered off, do not apply the input signals.
- (8) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
- (9) Be sure to ground your body when handling the LCD Modules.
- (10) Tools used for assembly, must be properly grounded.
- (11) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
- (12) The LCD Module is covered with a film to protect the display surface, remove film slowly under the ionizer.

### 11.2 Storage precautions

- (1) When storing the LCD modules avoid exposure to direct sunlight or to the light of fluorescent lamps.
- (2) The LCD modules should be stored within the rated storage temperature range. The recommend condition is: Temperature: 0 ~ 35 °C at normal humidity.
- (3) The LCD modules should be stored in a room without acid, alkali or other harmful gas.

### 11.3 Transportation Precautions

The LCD modules should not be dropped or subject to violent mechanical shock during transportation. Also they should avoid excessive pressure, water, high humidity and direct sunlight.

### 11.4 Screen saver Precautions

Not display the fixed pattern for a long time. Use a screen saver, if the fixed pattern is displayed on the screen

### 11.5 Safety Precautions

- (1) When you waste damaged or unnecessary LCDs, it is recommended to crush LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned
- (2) Be sure to turn off the power supply when inserting or disconnecting the LED backlight cable.
- (3) LED driver should be designed to limit or stop its function when over current is detected on the LED.