



**RAYSTAR**

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## RFF102AA-AIW-DNS

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### SPECIFICATION

CUSTOMER:

|                    |  |
|--------------------|--|
| <b>APPROVED BY</b> |  |
| <b>PCB VERSION</b> |  |
| <b>DATE</b>        |  |

FOR CUSTOMER USE ONLY

| <b>SALES BY</b> | <b>APPROVED BY</b> | <b>CHECKED BY</b> | <b>PREPARED BY</b> |
|-----------------|--------------------|-------------------|--------------------|
|                 |                    |                   |                    |

Release DATE:

TFT Display Inspection Specification: <https://www.raystar-optronics.com/download/products.htm>

Precaution in use of TFT module: <https://www.raystar-optronics.com/download/declaration.htm>

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## Revision History

| VERSION | DATE       | REVISED PAGE NO. | Note                               |
|---------|------------|------------------|------------------------------------|
| 0       | 2014/03/14 |                  | First issue                        |
| A       | 2014/10/31 |                  | Modify Package Specification.      |
| B       | 2015/04/13 |                  | Add size & Surface                 |
| C       | 2015/04/28 |                  | Modify Reliability                 |
| D       | 2016/01/21 |                  | Modify Static electricity test     |
| E       | 2016/08/11 |                  | Modify Vibration test              |
| F       | 2017/01/18 |                  | Modify Summary<br>Add Aspect Ratio |

RAYSTAR OPTRO

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## 2.Summary

TFT 10.2" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT\_LCD module. It is usually designed for industrial application and this module follows RoHs.

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### 3.General Specifications

- Size: 10.2 inch
- Dot Matrix: 800 x RGBx480(TFT) dots
- Module dimension: 235 x 145.8 x 7.6 mm
- Active area: 222 x 132.48 mm
- Dot pitch: 0.0925 x 0.2775 mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- Aspect Ratio: 16:9
- Backlight Type: LED ,Normally White
- With /Without TP: With RTP
- Surface: Anti-Glare

\*Color tone slight changed by temperature and driving voltage.

## 4.Interface

### 4.1. TFT LCD Panel Driving Section

FPC connector is used for the module electronics interface. The recommended model is "AF 730L-A2G1T" manufactured by P-TWO.

| Pin No. | Symbol           | I/O | Function                                  | Remark   |
|---------|------------------|-----|---|----------|
| 1       | POL              | I   | Polarity selection                        |          |
| 2       | STVD             | I/O | Vertical start pulse input when U/D= H    | Note 1   |
| 3       | OEV              | I   | Output enable                             |          |
| 4       | CKV              | I   | Vertical clock                            |          |
| 5       | STVU             | I/O | Vertical start pulse input when U/D= L    | Note 1   |
| 6       | GND              | P   | Power ground                              |          |
| 7       | EDGSL            | I   | Select rising edge or rising/falling edge |          |
| 8       | V <sub>CC</sub>  | P   | Power supply for digital circuit          |          |
| 9       | V <sub>9</sub>   | I   | Gamma voltage level 9                     |          |
| 10      | V <sub>GL</sub>  | P   | Gate OFF voltage                          |          |
| 11      | V <sub>2</sub>   | I   | Gamma voltage level 2                     |          |
| 12      | V <sub>GH</sub>  | P   | Gate ON voltage                           |          |
| 13      | V <sub>6</sub>   | I   | Gamma voltage level 6                     |          |
| 14      | U/D              | I   | Up/down selection                         | Note 1,2 |
| 15      | V <sub>COM</sub> | I   | Common voltage                            |          |
| 16      | GND              | P   | Power ground                              |          |
| 17      | AV <sub>DD</sub> | P   | Power supply for analog circuit           |          |
| 18      | V <sub>14</sub>  | I   | Gamma voltage level 14                    |          |
| 19      | V <sub>11</sub>  | I   | Gamma voltage level 11                    |          |
| 20      | V <sub>8</sub>   | I   | Gamma voltage level 8                     |          |
| 21      | V <sub>5</sub>   | I   | Gamma voltage level 5                     |          |
| 22      | V <sub>3</sub>   | I   | Gamma voltage level 3                     |          |
| 23      | GND              | P   | Power ground                              |          |
| 24      | R <sub>5</sub>   | I   | Red data(MSB)                             |          |
| 25      | R <sub>4</sub>   | I   | Red data                                  |          |
| 26      | R <sub>3</sub>   | I   | Red data                                  |          |
| 27      | R <sub>2</sub>   | I   | Red data                                  |          |
| 28      | R <sub>1</sub>   | I   | Red data                                  |          |
| 29      | R <sub>0</sub>   | I   | Red data(LSB)                             |          |
| 30      | GND              | P   | Power ground                              |          |

|    |      |     |  |          |
|----|------|-----|--|----------|
| 31 | GND  | P   | Power ground   |          |
| 32 | G5   | I   | Green data(MSB)  |          |
| 33 | G4   | I   | Green data   |          |
| 34 | G3   | I   | Green data   |          |
| 35 | G2   | I   | Green data   |          |
| 36 | G1   | I   | Green data   |          |
| 37 | G0   | I   | Green data(LSB)  |          |
| 38 | STHL | I/O | Horizontal start pulse input when R/L = L                            | Note 1   |
| 39 | REV  | P   | Control signal are inverted or not                                   | Note 3   |
| 40 | GND  | I   | Power ground   |          |
| 41 | DCLK | I   | Sample clock   |          |
| 42 | VCC  | P   | Power supply for digital circuit                                     |          |
| 43 | STHR | I/O | Horizontal start pulse input when R/L = H                            | Note 1   |
| 44 | LD   | I   | Latches the polarity of outputs and switches the new data to outputs |          |
| 45 | B5   | I   | Blue data (MSB)  |          |
| 46 | B4   | I   | Blue data  |          |
| 47 | B3   | I   | Blue data  |          |
| 48 | B2   | I   | Blue data  |          |
| 49 | B1   | I   | Blue data  |          |
| 50 | B0   | I   | Blue data (LSB)  |          |
| 51 | R/L  | I   | Right/ left selection  | Note 1,2 |
| 52 | V1   | I   | Gamma voltage level 1  |          |
| 53 | V4   | I   | Gamma voltage level 4  |          |
| 54 | V7   | I   | Gamma voltage level 7  |          |
| 55 | V10  | I   | Gamma voltage level 10   |          |
| 56 | V12  | I   | Gamma voltage level 12   |          |
| 57 | V13  | I   | Gamma voltage level 13   |          |
| 58 | AVDD | P   | Voltage for analog circuit   |          |
| 59 | GND  | P   | Power ground   |          |
| 60 | VCOM | I   | Common voltage   |          |

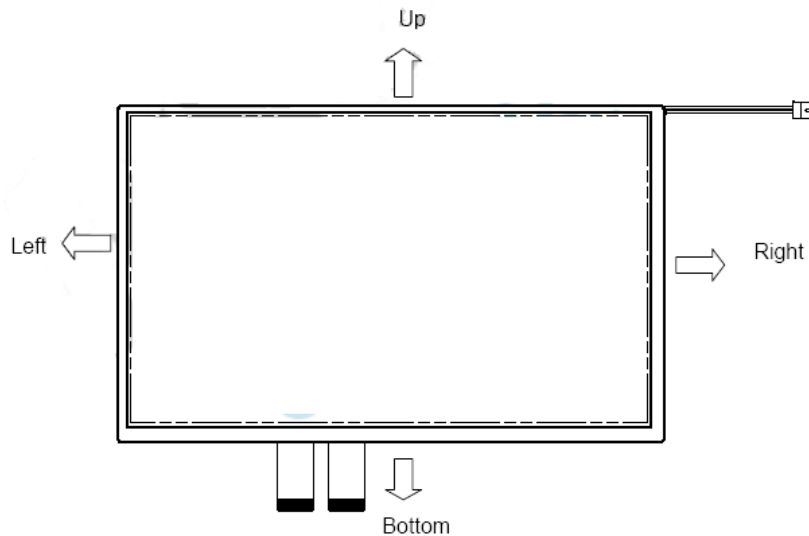
I: input, O: output, P: Power



Note 1: Selection of scanning mode

| Setting of scan control input |                 | IN/OUT state for start pulse |      |      |      | Scanning direction        |
|-------------------------------|-----------------|------------------------------|------|------|------|---------------------------|
| U/D                           | R/L             | STVD                         | STVU | STHR | STHL |                           |
| GND                           | V <sub>CC</sub> | O                            | I    | I    | O    | Up to down, left to right |
| V <sub>CC</sub>               | GND             | I                            | O    | O    | I    | Down to up, right to left |
| GND                           | GND             | O                            | I    | O    | I    | Up to down, right to left |
| V <sub>CC</sub>               | V <sub>CC</sub> | I                            | O    | I    | O    | Down to up, left to right |

Note 2: Definition of scanning direction.  
Refer to the figure as below:



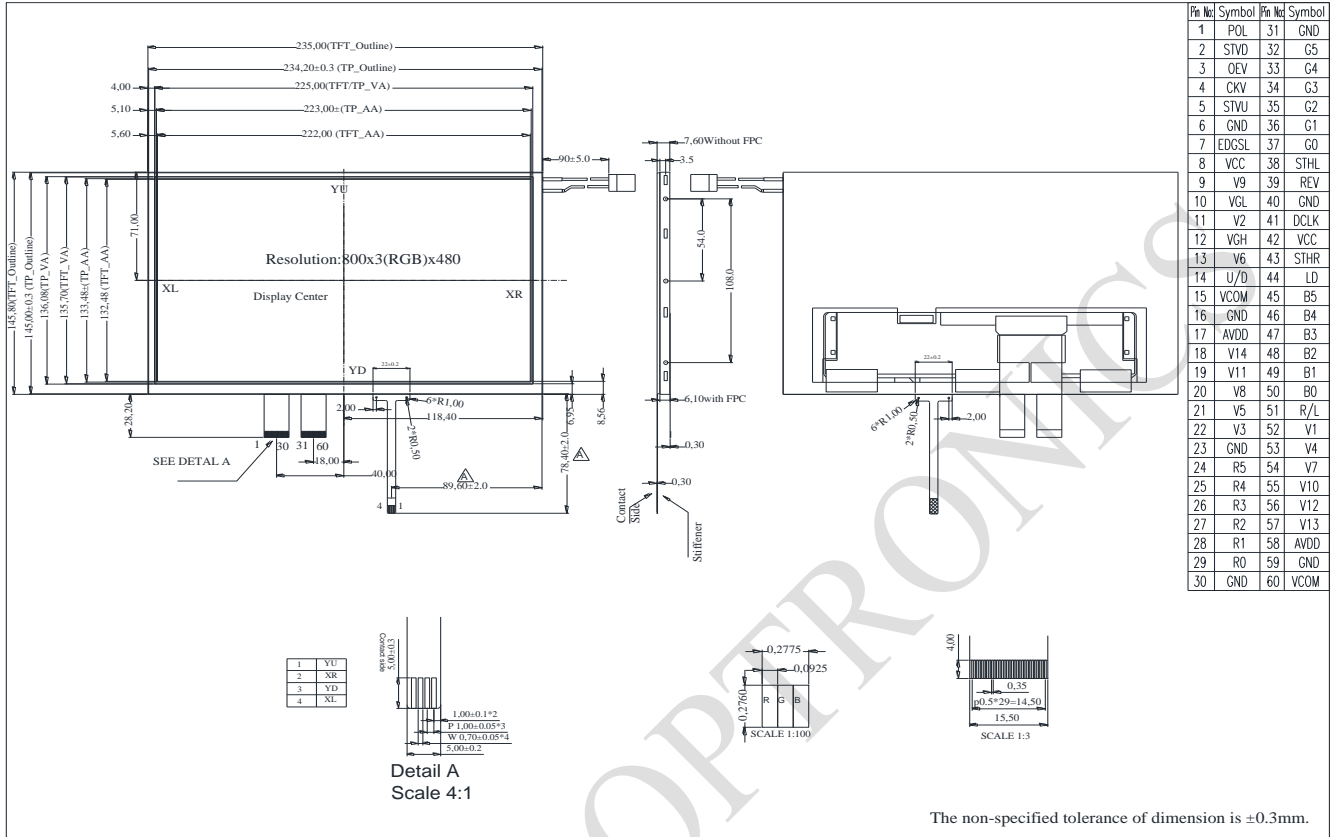
Note 3: When REV="L" , normally REV="H", these data will be inverted.

#### 4.2. Backlight Unit Section

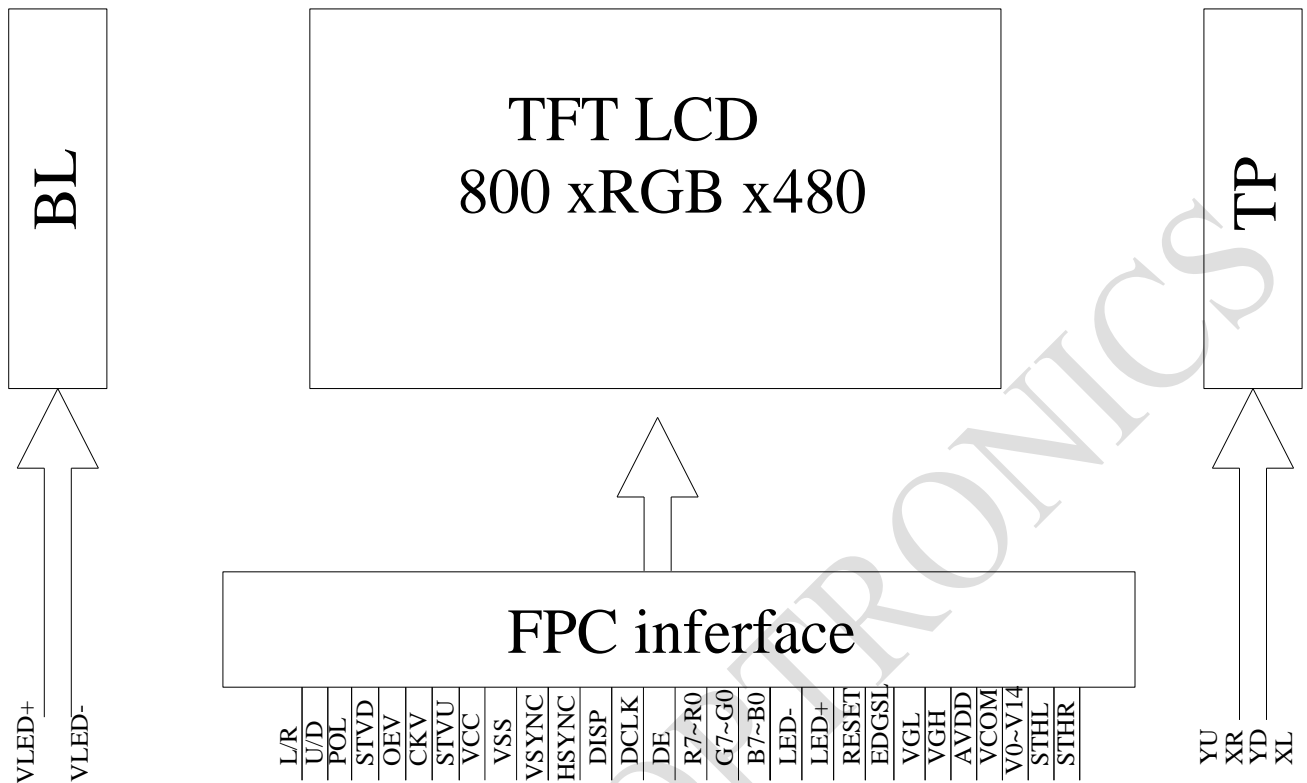
LED Light Bar connector is used for the the integral backlight system. The recommended model is "BHSR-02VS-1" manufactured by JST.

| Pin No. | Symbol            | I/O | Function                        | Remark |
|---------|-------------------|-----|---------------------------------|--------|
| 1       | V <sub>LED+</sub> | P   | Power for LED backlight anode   | Pink   |
| 2       | V <sub>LED-</sub> | P   | Power for LED backlight cathode | White  |

# 5. Contour Drawing



## 6. Block Diagram

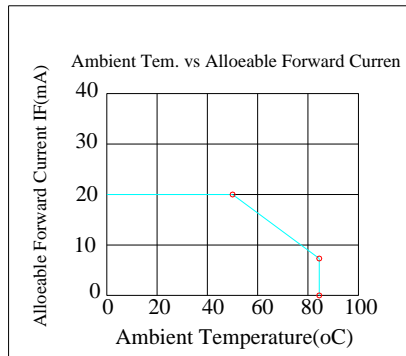


## 7. Absolute Maximum Ratings

| Item                  | Symbol | Min | Typ | Max | Unit |
|-----------------------|--------|-----|-----|-----|------|
| Operating Temperature | TOP    | -30 | —   | +85 | °C   |
| Storage Temperature   | TST    | -30 | —   | +85 | °C   |

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

- Temp.  $\leq 60^{\circ}\text{C}$ , 90% RH MAX. Temp.  $> 60^{\circ}\text{C}$ , Absolute humidity shall be less than 90% RH at  $60^{\circ}\text{C}$



## 8. Electrical Characteristics

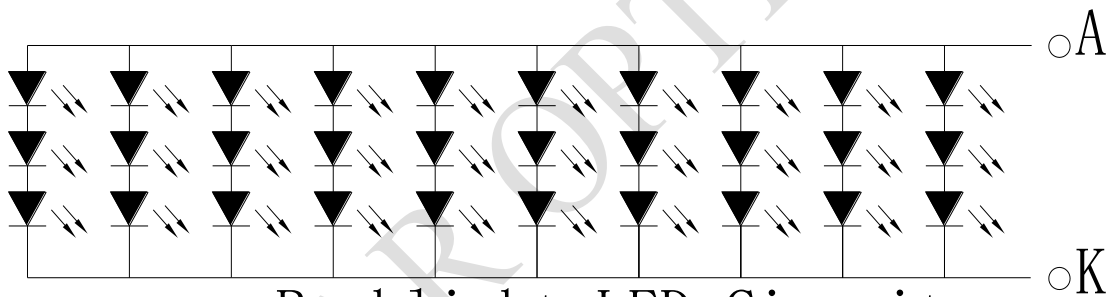
### 8.1. Operating conditions:

| Item                 | Symbol | Condition | Min  | Typ  | Max      | Unit |
|----------------------|--------|-----------|------|------|----------|------|
| Supply Voltage       | VCC    | —         | 3.0  | 3.3  | 3.6      | V    |
|                      | AVDD   | —         | 9.0  | 9.2  | 9.4      | V    |
|                      | VGH    | —         | 15.3 | 16   | 16.7     | V    |
|                      | VGL    | —         | -7.7 | -7.0 | -6.3     | V    |
| Input signal voltage | VCOM   | —         | 3.65 | 3.85 | 4.05     | V    |
|                      | V1~V7  | —         | 0.4  | —    | AVDD-0.1 | V    |
|                      | V8~V14 | —         | 0.1  | —    | 0.6AVDD  | V    |

### 8.2. LED driving conditions

| Parameter         | Symbol | Min.   | Typ. | Max. | Unit | Remark     |
|-------------------|--------|--------|------|------|------|------------|
| LED current       | -      | 180    | 200  | 220  | mA   | -          |
| Power Consumption | -      | 1512   | 1860 | 2310 | mW   | -          |
| LED voltage       | -      | 8.4    | 9.3  | 10.5 | V    | Note 1     |
| LED Life Time     | -      | 20,000 | -    | -    | Hr   | Note 2,3,4 |

Note 1 : There are 1 Groups LED



Backlight LED Circuit

Note 2 :  $T_a = 25\text{ }^\circ\text{C}$

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

## 9.DC CHARATERISTICS

| Parameter                | Symbol   | Rating |     |        | Unit | Condition |
|--------------------------|----------|--------|-----|--------|------|-----------|
|                          |          | Min    | Typ | Max    |      |           |
| Low level input voltage  | $V_{IL}$ | 0      | -   | 0.3VCC | V    |           |
| High level input voltage | $V_{IH}$ | 0.7VCC | -   | VCC    | V    |           |

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## 10. Timing Characteristics

### 10.1. Timing Conditionsa

| Symbol            | Parameter                       | Min | Typ  | Max  | Unit |
|-------------------|---------------------------------|-----|------|------|------|
| F <sub>dclk</sub> | DCLK frequency                  | -   | 40   | 45   | MHz  |
| T <sub>cph</sub>  | DCLK cycle                      | 22  | 25   | -    | ns   |
| T <sub>cw</sub>   | DCLK pulse width                | 8   | -    | -    | ns   |
| T <sub>su</sub>   | Data set-up time                | 4   | -    | -    | ns   |
| T <sub>hd</sub>   | Data hold time                  | 2   | -    | -    | ns   |
| T <sub>ld</sub>   | Time that the last data to LD   | 1   | -    | -    | Tcph |
| T <sub>wld</sub>  | Pulse width of LD               | 2   | -    | -    | Tcph |
| T <sub>lds</sub>  | Time that LD to STHL/R          | 5   | -    | -    | Tcph |
| T <sub>psu</sub>  | POL set-up time                 | 6   | -    | -    | ns   |
| T <sub>phd</sub>  | POL hold time                   | 6   | -    | -    | ns   |
| F <sub>vclk</sub> | CKV frequency                   | -   | -    | 200  | KHz  |
| T <sub>rck</sub>  | CKV rise time                   | -   | -    | 100  | ns   |
| T <sub>fcck</sub> | CKV falling time                | -   | -    | 100  | ns   |
| P <sub>WCLK</sub> | CKV pulse width                 | 500 | -    | -    | ns   |
| T <sub>dh</sub>   | Horizontal display timing range | -   | 800  | -    | Tcph |
| T <sub>h</sub>    | Horizontal timing range         | -   | 1056 | -    | Tcph |
| T <sub>suV</sub>  | STVU/D setup time               | 200 | -    | -    | ns   |
| T <sub>hdV</sub>  | STVU/D hold time                | 300 | -    | -    | ns   |
| T <sub>dt</sub>   | STVU/D delay time               | -   | -    | 500  | ns   |
| T <sub>do</sub>   | Driver output delay time        | -   | -    | 900  | ns   |
| T <sub>tth</sub>  | Output rise time                | -   | 500  | 1000 | ns   |
| T <sub>thl</sub>  | Output falling time             | -   | 400  | 800  | ns   |
| T <sub>wcl</sub>  | OEV pulse width                 | 1   | -    | -    | ns   |
| T <sub>oe</sub>   | OEV to Driver output delay time | -   | -    | 900  | us   |
| T <sub>v</sub>    | Horizontal lines per field      | 512 | 525  | 610  | Line |
| T <sub>vd</sub>   | Vertical display timing range   | -   | 480  | -    | Line |

## 10.2. Timing Diagram1

<EDGSL="0",Default>

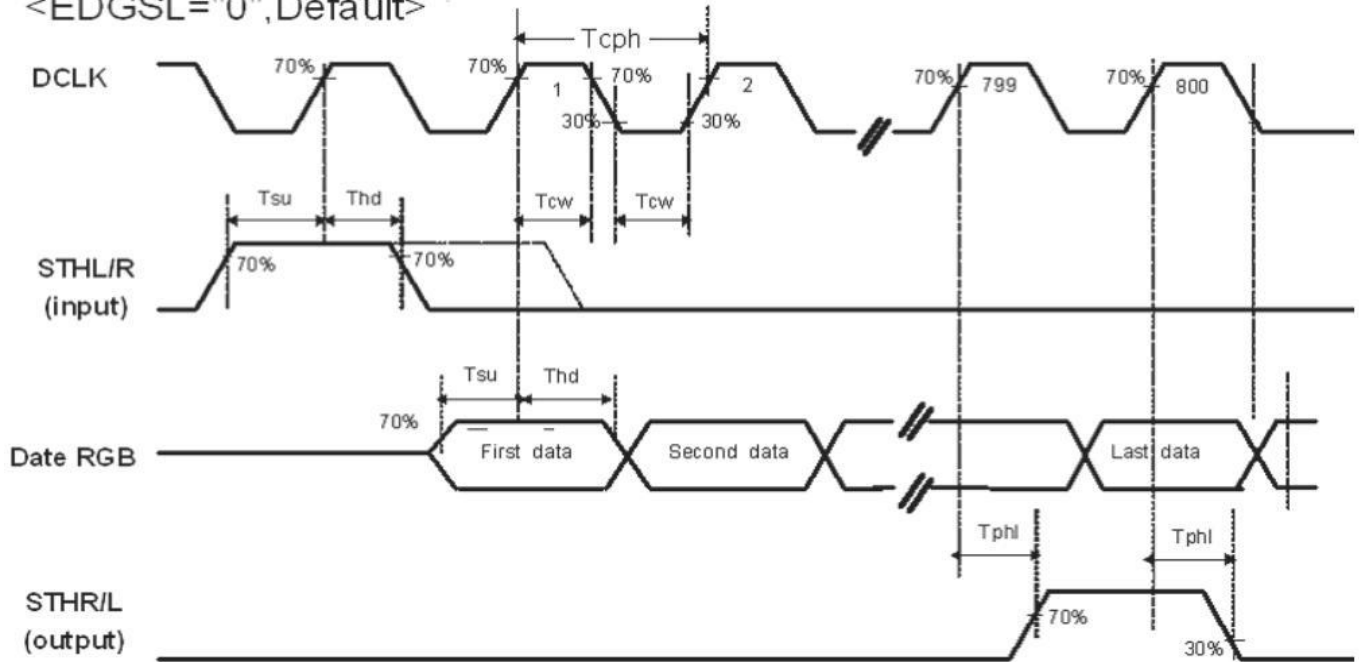


Fig.1 operation model 1

< EDGSL ="1">

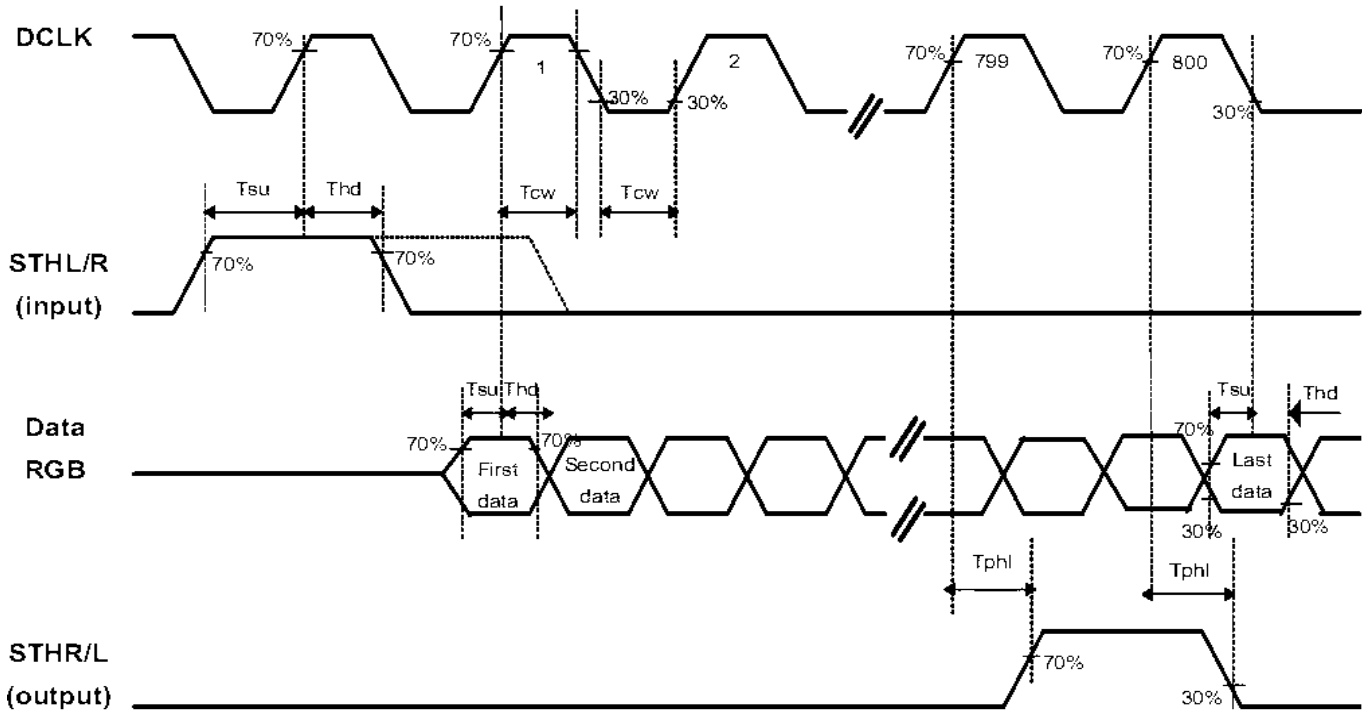


Fig.2 operation model 2



### 10.3. Timing Diagram2

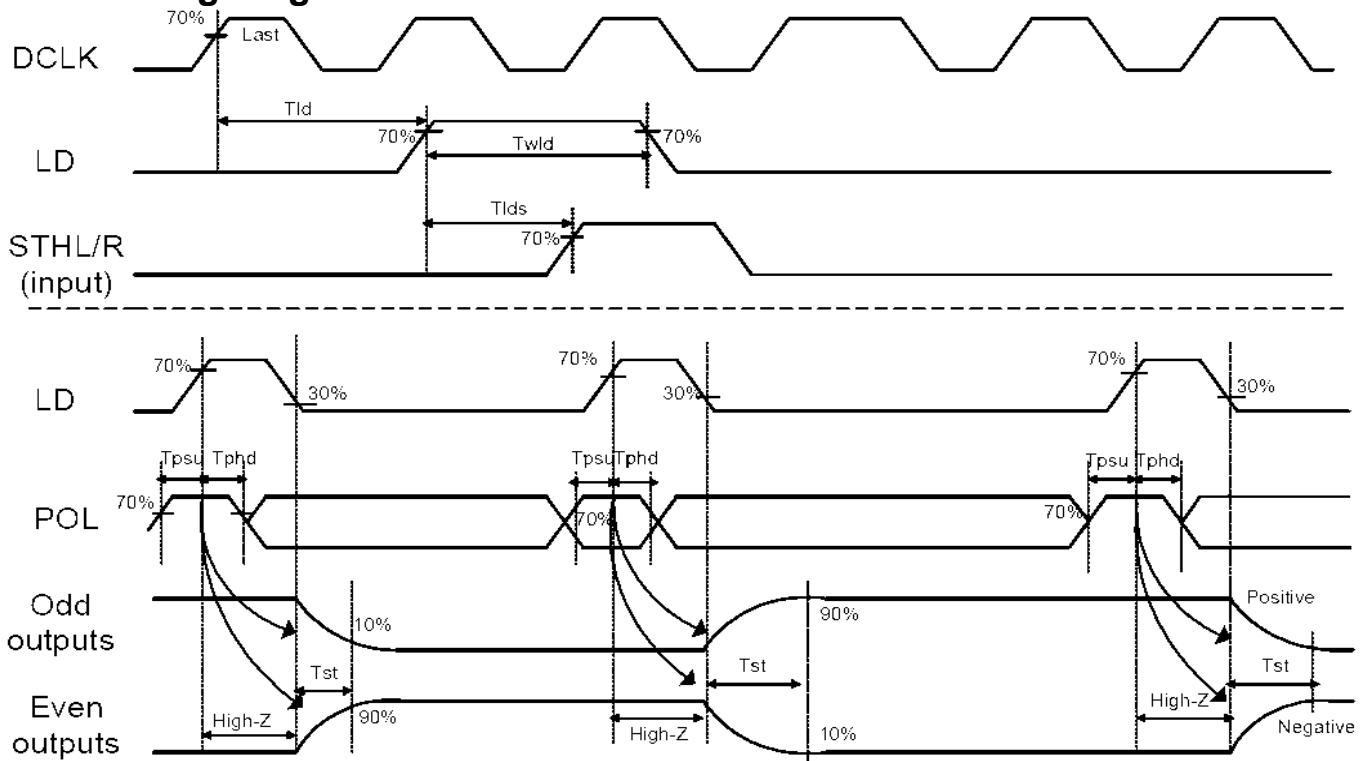


Fig.3 Horizontal timing 1

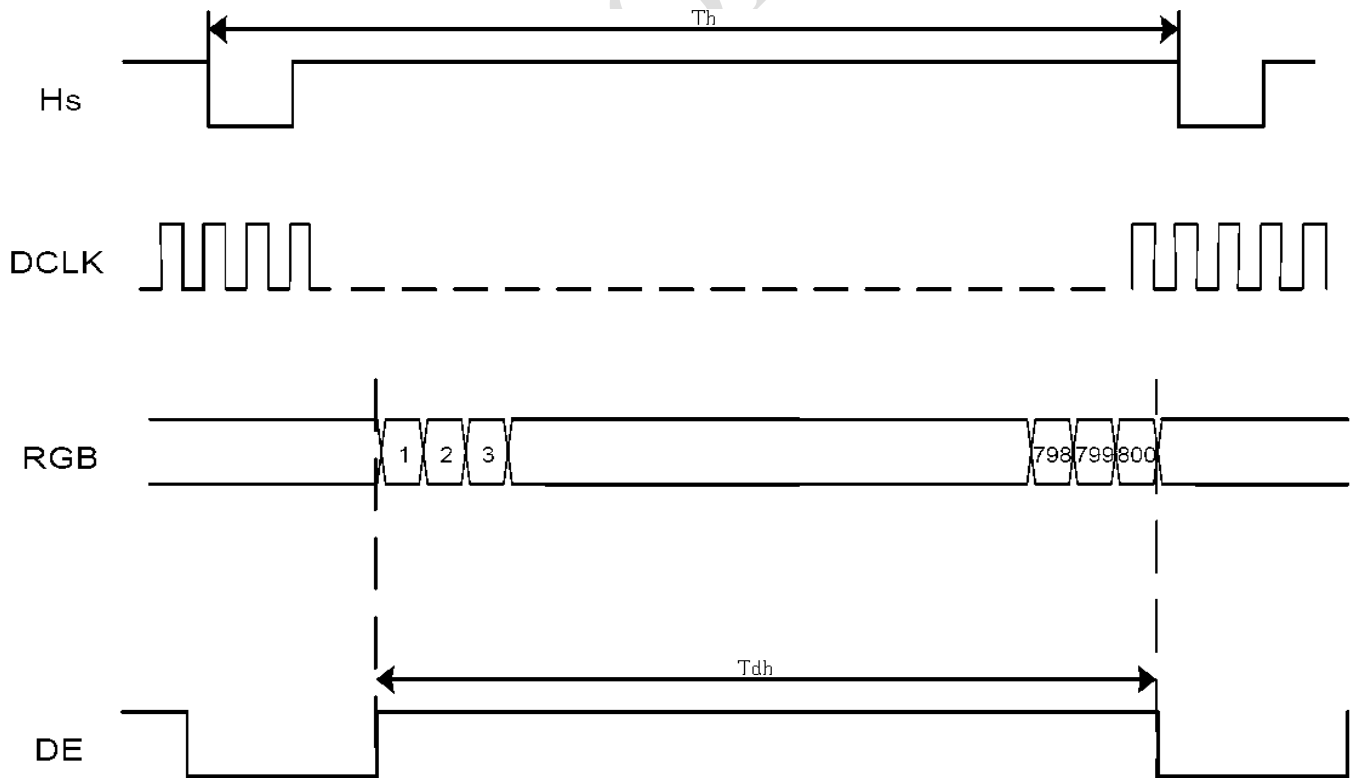


Fig.4 Horizontal timing 2

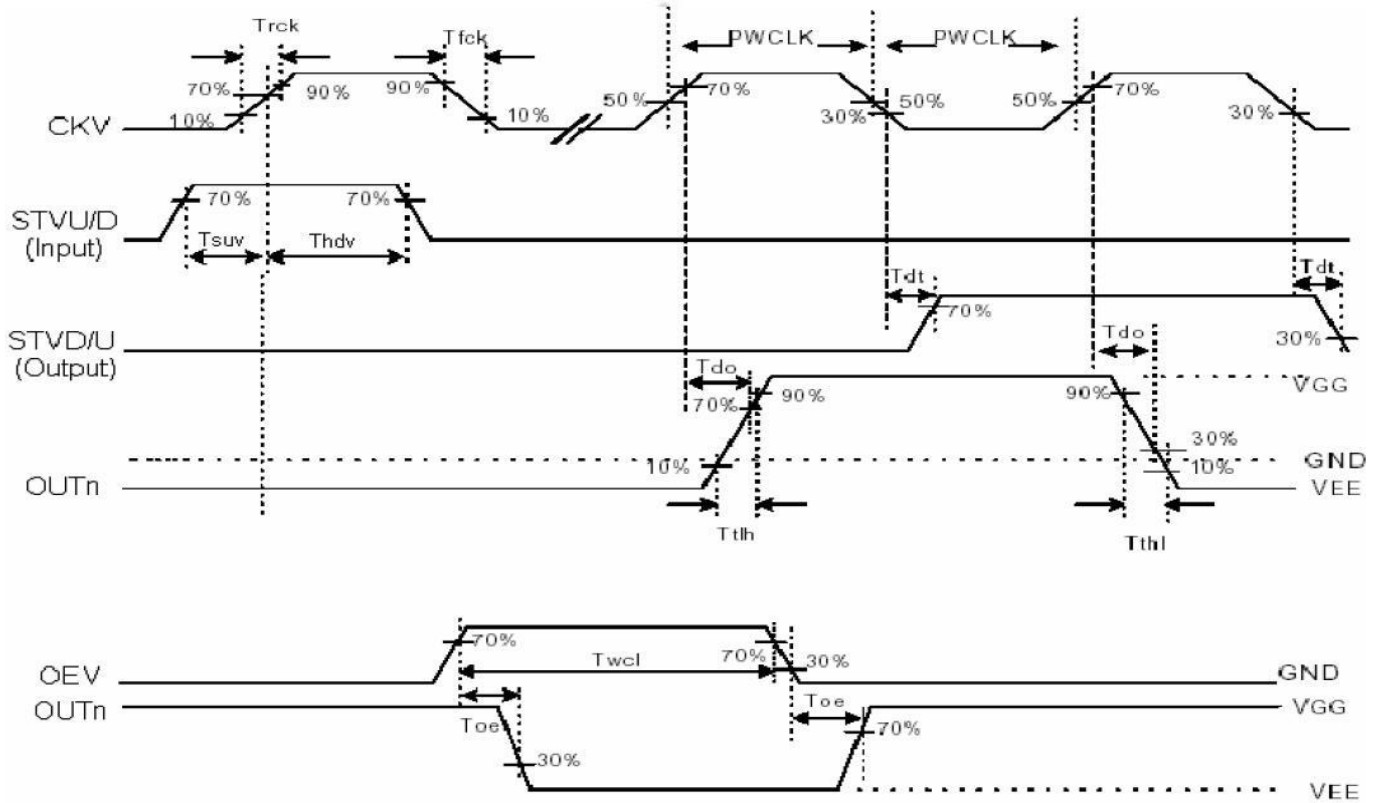


Fig.5 Vertical shift clock timing

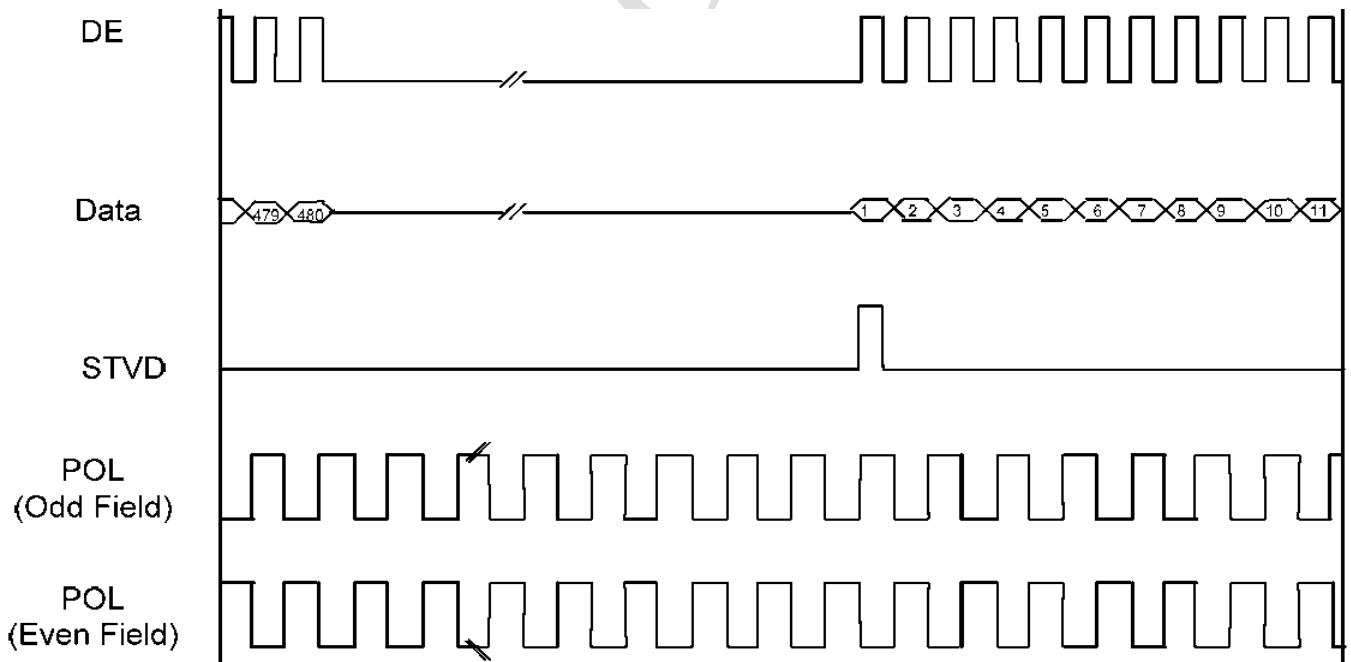


Fig.6 Vertical timing (from up to down)

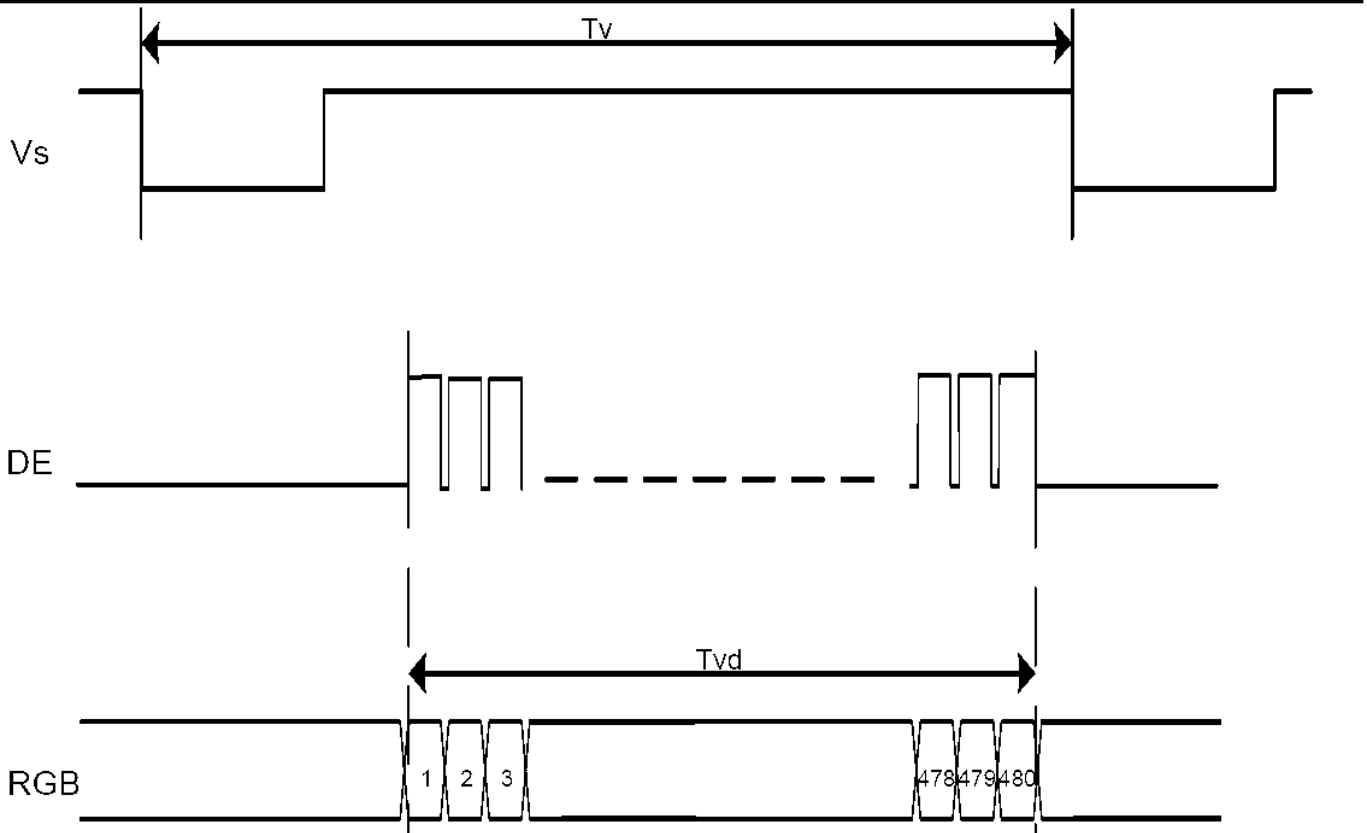


Fig.7 Vertical timing

#### 10.4. TFT-LCD Timing controller

WF102ATIA series needs to add TFT-LCD Timing controller, TFT-LCD timing controller input signal is digital R/G/B with HS(HSYNC),VS(VSYNC) or DE. User can use the MODE pin to select input signal to be either SYNC mode or DE mode

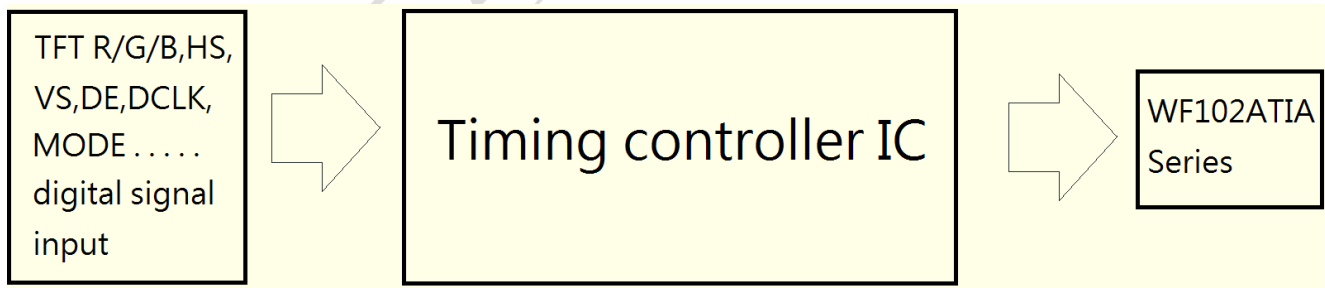


Fig.8 Example of Timing controller IC bloc

# 11. Optical Characteristics

## TFT LCD characteristic (Without Capacitive Touch Panel)

| Item  | Symbol | Condition.                          | Min        | Typ. | Max. | Unit              | Remark            |            |
|---|--------|-------------------------------------|------------|------|------|-------------------|-------------------|------------|
| Response time                                     | $T_r$  | $\theta=0^\circ \cdot \phi=0^\circ$ | -          | 15   | 30   | ms                | Note 3,5          |            |
|   | $T_f$  |                                     | -          | 20   | 40   | ms                |                   |            |
| Contrast ratio                                    | CR     | At optimized viewing angle          | 250        | 300  | -    | -                 | Note 4,5          |            |
| Color Chromaticity                                | White  | $\theta=0^\circ \cdot \phi=0$       | $W_x$      | 0.26 | 0.31 | 0.36              | -                 | Note 2,6,7 |
|   |        |                                     | $W_y$      | 0.28 | 0.33 | 0.38              | -                 | -          |
| Viewing angle<br>(Gray Scale Inversion Direction) | Hor.   | $CR \geq 10$                        | $\theta_R$ | 55   | 65   | -                 | Deg.              | Note 1     |
|   |        |                                     | $\theta_L$ | 55   | 65   | -                 |                   |            |
|   | Ver.   |                                     | $\phi_T$   | 35   | 45   | -                 |                   |            |
|   |        |                                     | $\phi_B$   | 55   | 65   | -                 |                   |            |
| Brightness  | -      | -                                   | 200        | 250  | -    | cd/m <sup>2</sup> | Center of display |            |

Ta=25±2°C, IL=200mA

Note 1: Definition of viewing angle range

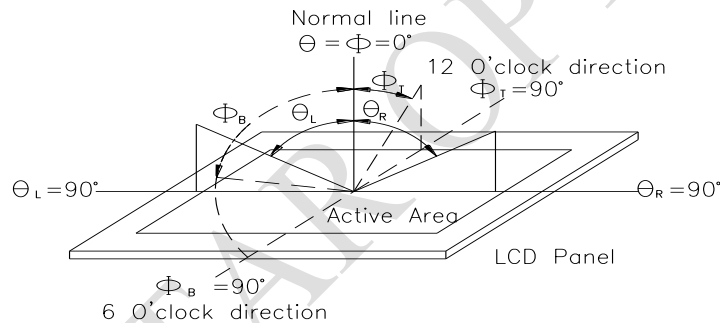


Fig.11.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

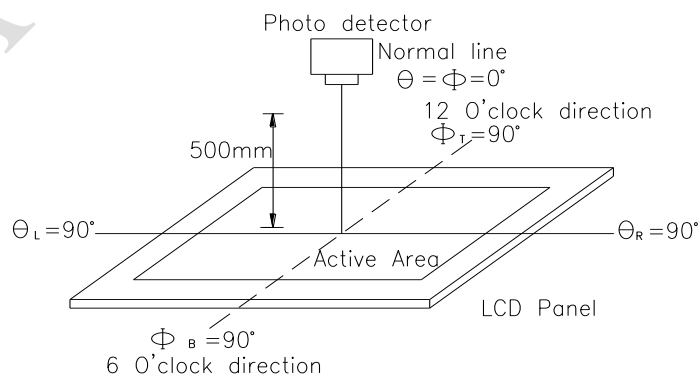
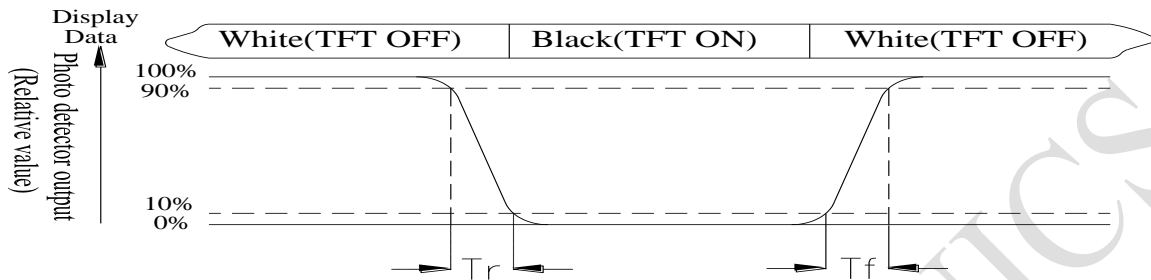


Fig. 11.2. Optical measurement system setup

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,  $T_r$ , 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%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note 5: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

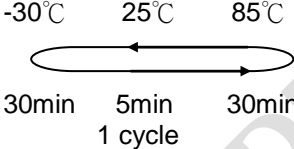
Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

## 12. Reliability

Content of Reliability Test (Super Wide temperature, -30°C~85°C)

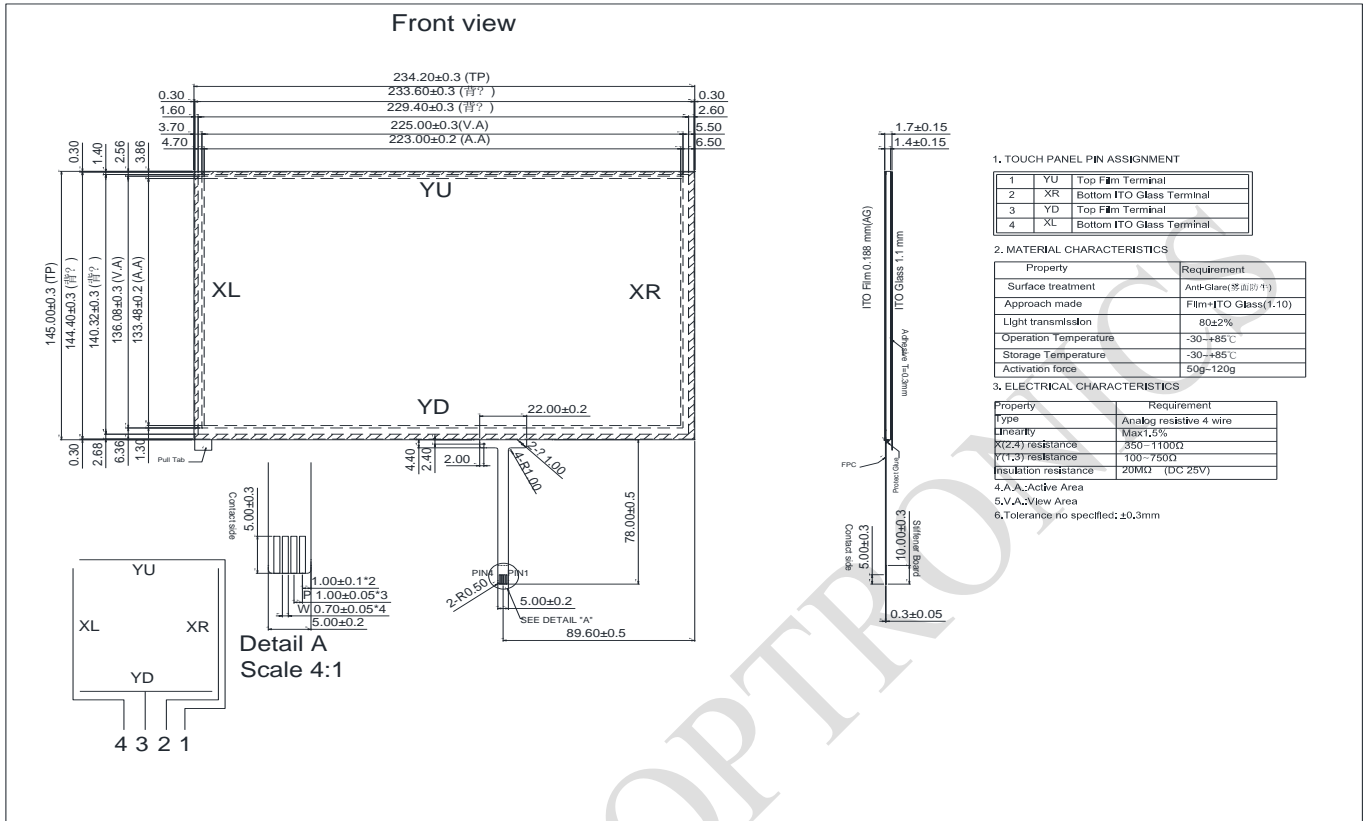
| Environmental Test                 |   |   |      |
|------------------------------------|---|---|------|
| Test Item                          | Content of Test   | Test Condition  | Note |
| High Temperature storage           | Endurance test applying the high storage temperature for a long time.   | 85°C<br>200hrs  | 2    |
| Low Temperature storage            | Endurance test applying the low storage temperature for a long time.  | -30°C<br>200hrs   | 1,2  |
| High Temperature Operation         | Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.  | 85°C<br>200hrs  | —    |
| Low Temperature Operation          | Endurance test applying the electric stress under low temperature for a long time.  | -30°C<br>200hrs   | 1    |
| High Temperature/ Humidity storage | The module should be allowed to stand at 60°C,90%RH max   | 60°C,90%RH<br>96hrs   | 1,2  |
| Thermal shock resistance           | The sample should be allowed stand the following 10 cycles of operation<br><br><div style="text-align: center;">  <p>-30°C    25°C    85°C</p> <p>30min    5min    30min</p> <p>1 cycle</p> </div> | -30°C/85°C<br>10 cycles   | —    |
| Vibration test                     | Endurance test applying the vibration during transportation and using.  | Total fixed amplitude : 3<br>1.5mm<br>Vibration Frequency :<br>10~55Hz<br>One cycle 60<br>seconds to 3<br>directions of<br>X,Y,Z for Each 15<br>minutes | 3    |
| Static electricity test            | Endurance test applying the electric stress to the terminal.  | VS=±600V(contact)<br>,±800v(air),<br>RS=330Ω<br>CS=150pF<br>10 times  | —    |

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

# 13.Touch Panel Information



1. TOUCH PANEL PIN ASSIGNMENT

|   |    |                           |
|---|----|---------------------------|
| 1 | YU | Top Film Terminal         |
| 2 | XR | Bottom ITO Glass Terminal |
| 3 | YD | Top Film Terminal         |
| 4 | XL | Bottom ITO Glass Terminal |

2. MATERIAL CHARACTERISTICS

| Property              | Requirement          |
|-----------------------|----------------------|
| Surface treatment     | Anti-Glare(雾面防眩)     |
| Approach made         | Film+ITO Glass(1,10) |
| Light transmission    | 80±2%                |
| Operation Temperature | -30→+85℃             |
| Storage Temperature   | -30→+85℃             |
| Activation force      | 50g~120g             |

3. ELECTRICAL CHARACTERISTICS

| Property              | Requirement             |
|-----------------------|-------------------------|
| Type                  | Analog resistive 4 wire |
| Disparity             | Max1.5%                 |
| X(Z,3) resistance     | 350~1100Ω               |
| Y(T,3) resistance     | 100~750Ω                |
| Insulation resistance | 20MΩ (DC 25V)           |

- 4.A.A.:Active Area
- 5.V.A.:View Area
- 6.Tolerance: no specified; ±0,3mm

# 14.PACKAGE SPECIFICATION

|                    |                      |   |                |              |                |
|--------------------|----------------------|---|----------------|--------------|----------------|
| <b>LCM Model</b>   | RFF102AA-AIW-DN<br>S | <b>LCM 包裝規格書</b><br><b>LCM Packaging Specifications</b> | <b>Approve</b> | <b>Check</b> | <b>Contact</b> |
| <b>Drawing NO.</b> |                      |   | <b>DATE</b>    | 初版           | 版次Ver          |
|                    |                      |   | 2/6/14'        | 2/6/14'      | 0              |

**1.包裝材料規格表 (Packaging Material) :(per carton)**

| NO. | Item                   | Model                 | Dimensions    | Quantity |
|-----|------------------------|-----------------------|---------------|----------|
| 1   | 成品 (LCM)               | RFF102AA-AIW-DNS      |               | 30       |
| 2   | TRAY 盤 (2)             | PKCA1XXXXXXXXXXXX0288 | 315*265mm     | 30       |
| 3   | BP01 內盒 (3)Product Box | PK3Y1XXXXXXXXXXXX0001 | 332*280*100mm | 6        |
| 4   | 泡棉(4)Foam              | -                     | -             | 6        |
| 5   | 外紙箱(5)Carton           | PK4X1XXXXXXXXXXXX0000 | 565*340*320mm | 1        |
| 6   |                        |                       |               |          |
| 7   |                        |                       |               |          |
| 8   |                        |                       |               |          |
| 9   |                        |                       |               |          |

**2.單箱數量規格表(Packaging Specifications and Quantity) :**

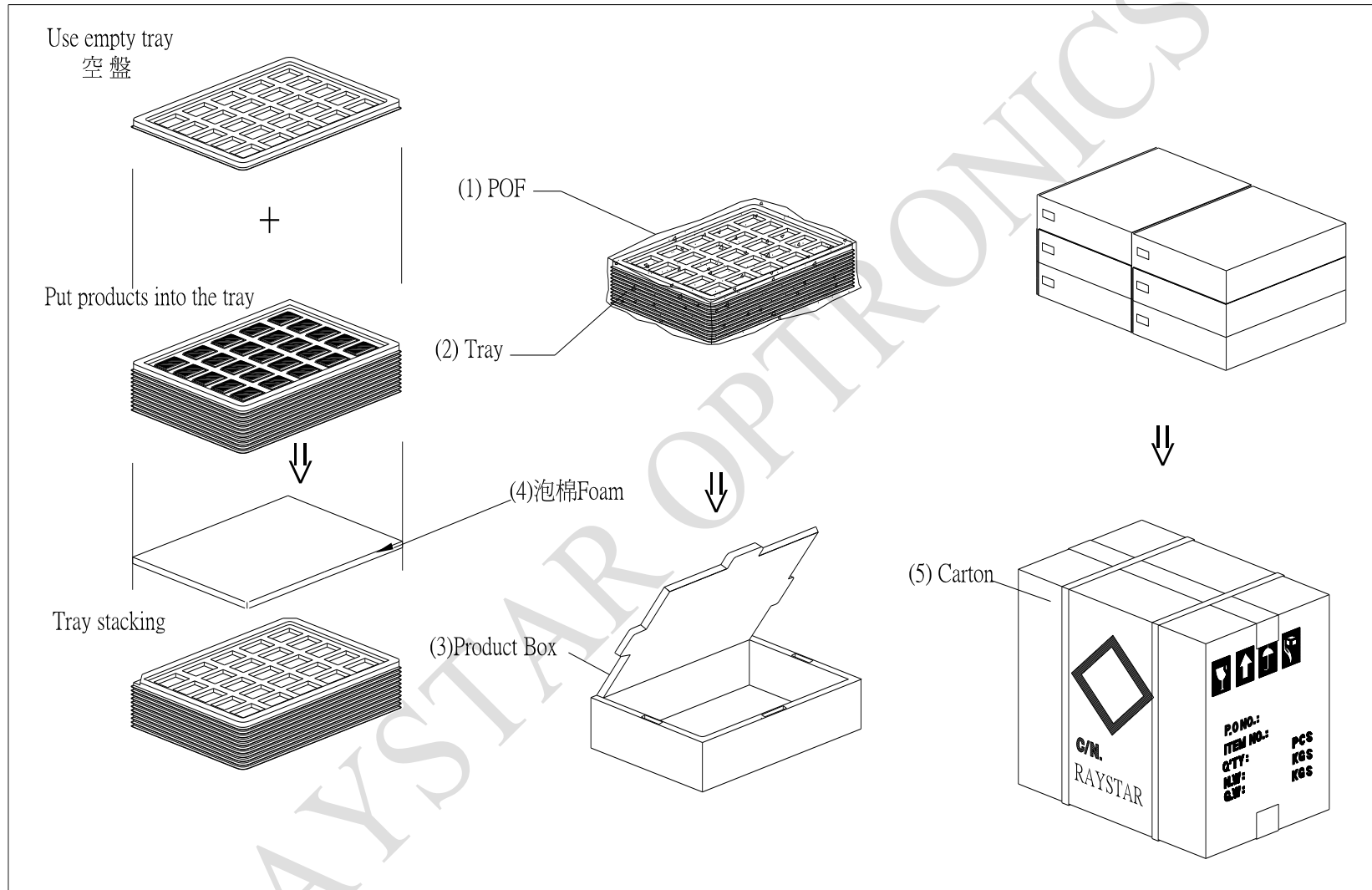
(1)LCM quantity per box : no per tray                      1 x no of tray      5 = 5

(2)Total LCM quantity in carton : quantity per box      5 x no of boxes    6 = 30

**特 記 事 項 (REMARK)**

|  |  |
|--|--|
| <b>1. Label Specifications :</b><br><div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> MOOEL:<br/> LOT NO :<br/> QUANTITY:<br/> CHECK: </div> |  |
|--|--|





**LCM Sample Estimate Feedback Sheet**

**Module Number :** \_\_\_\_\_

**1 、 Panel Specification :**

|                            |                               |                                     |
|----------------------------|-------------------------------|-------------------------------------|
| 1. Panel Type :            | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. View Direction :        | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Numbers of Dots :       | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. View Area :             | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Active Area :           | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. Operating Temperature : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Storage Temperature :   | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8. Others :                | _____                         |                                     |

**2 、 Mechanical Specification :**

|                             |                               |                                     |
|-----------------------------|-------------------------------|-------------------------------------|
| 1. PCB Size :               | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. Frame Size :             | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Material of Frame :      | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. Connector Position :     | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Fix Hole Position :      | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. Backlight Position :     | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Thickness of PCB :       | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8. Height of Frame to PCB : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 9. Height of Module :       | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 10. Others :                | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

**3 、 Relative Hole Size :**

|                             |                               |                                     |
|-----------------------------|-------------------------------|-------------------------------------|
| 1. Pitch of Connector :     | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. Hole size of Connector : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Mounting Hole size :     | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. Mounting Hole Type :     | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Others :                 | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

**4 、 Backlight Specification :**

|   |                               |                                     |
|---|-------------------------------|-------------------------------------|
| 1. B/L Type :                                     | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. B/L Color :                                    | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. B/L Driving Voltage (Reference for LED Type) : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. B/L Driving Current :                          | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Brightness of B/L :                            | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. B/L Solder Method :                            | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Others :                                       | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

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|   |                               |                                     |
|---|-------------------------------|-------------------------------------|
| <b>Module Number :</b> _____  |                               |                                     |
| <b>5 · <u>Electronic Characteristics of Module</u> :</b>  |                               |                                     |
| 1.Input Voltage :   | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2.Supply Current :  | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3.Driving Voltage for LCD :   | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4.Contrast for LCD :  | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5.B/L Driving Method :  | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6.Negative Voltage Output :   | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7.Interface Function :  | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8.LCD Uniformity :  | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 9.ESD test :  | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 10.Others :   | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| <b>6 · <u>Summary</u> :</b>   |                               |                                     |
| <p style="text-align: right;">Sales signature : _____</p> <p style="text-align: right;">Customer Signature : _____      <u>Date</u> :   /   / _____</p> |                               |                                     |