



**WINSTAR Display Co.,Ltd.**  
**華凌光電股份有限公司**



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**華凌光電股份有限公司**

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## SPECIFICATION

**CUSTOMER :** \_\_\_\_\_

**MODULE NO.:** **WF43GTIFEDAT0#**

|                                                      |                                          |
|------------------------------------------------------|------------------------------------------|
| <b>APPROVED BY:</b><br><br>( FOR CUSTOMER USE ONLY ) | <br><br><b>PCB VERSION:</b> <b>DATA:</b> |
|------------------------------------------------------|------------------------------------------|

| SALES BY                | APPROVED BY | CHECKED BY | PREPARED BY |
|-------------------------|-------------|------------|-------------|
|                         |             |            | 葉虹蘭         |
| ISSUED DATE: 2018/06/19 |             |            |             |

TFT Display Inspection Specification: <https://www.winstar.com.tw/technology/download.html>

**RECORDS OF REVISION**

DOC. FIRST ISSUE

| VERSION | DATE       | REVISED<br>PAGE NO. | SUMMARY                                                            |
|---------|------------|---------------------|--------------------------------------------------------------------|
| 0       | 2013/09/22 |                     | First issue                                                        |
| A       | 2013/12/18 |                     | Modify the Optical Characteristics                                 |
| B       | 2014/04/16 |                     | Modify Package Specification.                                      |
| C       | 2015/04/07 |                     | Add size ,Surface & Resistance Touch Panel General Specifications. |
| D       | 2015/04/27 |                     | Modify Pixel Data Format & Block Diagram                           |
| E       | 2015/04/27 |                     | Modify Reliability.                                                |
| F       | 2016/01/21 |                     | Modify Static electricity test                                     |
| G       | 2016/08/04 |                     | Remove Package Specification                                       |
| H       | 2016/08/10 |                     | Modify Vibration test.                                             |
| I       | 2016/10/04 |                     | Modify Summary.                                                    |
| J       | 2017/01/24 |                     | Modify tape.                                                       |
|         | 2018/06/19 |                     | Modify Touch Panel                                                 |

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# 1.Module Classification Information

W F 43 G T I F E D A T 0 #  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

|   |                                                                         |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
|---|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------|---------|-----------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------|--------|---------|--------|
| ① | Brand : WINSTAR DISPLAY CORPORATION                                     |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ② | Display Type : F→TFT Type, J→Custom TFT                                 |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ③ | Display Size : 4.3” TFT                                                 |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ④ | Model serials no.                                                       |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ⑤ | Backlight Type :                                                        |                                                                                                                                                                                                                         | F→CCFL, White<br>S→LED, High Light White |         |         |                       |         |                                                                                                                                                                                                                                              | T→LED, White<br>Z→Nichia LED, White |                                |        |         |        |
| ⑥ | LCD Polarize Type/<br>Temperature range/ Gray Scale Inversion Direction | A→Transmissive, N.T, IPS TFT<br>C→Transmissive, N. T, 6:00 ;<br>F→Transmissive, N.T,12:00 ;<br>I→Transmissive, W. T, 6:00<br>K→Transflective, W.T,12:00<br>L→Transmissive, W.T,12:00<br>N→Transmissive, Super W.T, 6:00 |                                          |         |         |                       |         | Q→Transmissive, Super W.T, 12:00<br>R→Transmissive, Super W.T, O-TFT<br>V→Transmissive, Super W.T, VA TFT<br>W→Transmissive, Super W.T, IPS TFT<br>X→Transmissive, W.T, VA TFT<br>Y→Transmissive, W.T, IPS TFT<br>Z→Transmissive, W.T, O-TFT |                                     |                                |        |         |        |
|   |                                                                         | A : TFT LCD<br>B : TFT+SCREW HOLES+CONTROL BOARD<br>C : TFT+ SCREW HOLES +A/D BOARD<br>D : TFT+ SCREW HOLES +A/D BOARD+CONTROL BOARD<br>E : TFT+ SCREW HOLES +POWER BOARD                                               |                                          |         |         |                       |         | F : TFT+CONTROL BOARD<br>G : TFT+ SCREW HOLES<br>H : TFT+D/V BOARD<br>I : TFT+ SCREW HOLES +D/V BOARD<br>J : TFT+POWER BD                                                                                                                    |                                     |                                |        |         |        |
|   |                                                                         | Resolution:                                                                                                                                                                                                             |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
|   |                                                                         | A                                                                                                                                                                                                                       | 128160                                   | B       | 320234  | C                     | 320240  | D                                                                                                                                                                                                                                            | 480234                              | E                              | 480272 | F       | 640480 |
|   |                                                                         | G                                                                                                                                                                                                                       | 800480                                   | H       | 1024600 | I                     | 320480  | J                                                                                                                                                                                                                                            | 240320                              | K                              | 800600 | L       | 240400 |
|   |                                                                         | M                                                                                                                                                                                                                       | 1024768                                  | N       | 128128  | P                     | 1280800 | Q                                                                                                                                                                                                                                            | 480800                              | R                              | 640320 | S       | 480128 |
| ⑧ | T                                                                       | 800320                                                                                                                                                                                                                  | U                                        | 8001280 | V       | 176220                | W       | 1280398                                                                                                                                                                                                                                      | X                                   | 1024250                        | Y      | 1920720 |        |
|   | Z                                                                       | 800200                                                                                                                                                                                                                  | 2                                        | 1024324 | 3       | 7201280               | 4       | 19201200                                                                                                                                                                                                                                     | 5                                   | 1366768                        | 6      | 1280320 |        |
|   |                                                                         |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ⑨ | D: Digital L : LVDS M:MIPI                                              |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ⑩ | Interface:                                                              |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
|   | N                                                                       | Without control board                                                                                                                                                                                                   |                                          |         | A       | 8Bit                  |         | B                                                                                                                                                                                                                                            | 16Bit                               |                                | H      | HDMI    |        |
|   | I                                                                       | I2C Interface                                                                                                                                                                                                           |                                          |         | R       | RS232                 |         | S                                                                                                                                                                                                                                            | SPI Interface                       |                                | U      | USB     |        |
| ⑪ | TS:                                                                     |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
|   | N                                                                       | Without TS                                                                                                                                                                                                              |                                          |         | T       | Resistive touch panel |         |                                                                                                                                                                                                                                              | C                                   | Capacitive touch panel (G-F-F) |        |         |        |
|   | G                                                                       | Capacitive touch panel (G-G)                                                                                                                                                                                            |                                          |         |         |                       | C1      | Capacitive touch panel (G-F-F)+OCA                                                                                                                                                                                                           |                                     |                                |        |         |        |
|   | C2                                                                      | Capacitive touch panel (G-F-F)+OCR                                                                                                                                                                                      |                                          |         |         |                       | G1      | Capacitive touch panel (G-G)+OCA                                                                                                                                                                                                             |                                     |                                |        |         |        |
|   | G2                                                                      | Capacitive touch panel (G-G)+OCR                                                                                                                                                                                        |                                          |         |         |                       | B       | CTP+GG+USB                                                                                                                                                                                                                                   |                                     |                                |        |         |        |
| ⑫ | Version: X:Raspberry pi                                                 |                                                                                                                                                                                                                         |                                          |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |
| ⑬ | Special Code                                                            |                                                                                                                                                                                                                         | #:Fit in with ROHS directive regulations |         |         |                       |         |                                                                                                                                                                                                                                              |                                     |                                |        |         |        |

## **2.Summary**

TFT 4.3" 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 indusrial application and this module follows RoHs,

### **3.General Specifications**

| Item                           | Dimension                         | Unit |
|--------------------------------|-----------------------------------|------|
| Size                           | 4.3                               | inch |
| Dot Matrix                     | 480 x RGBx272(TFT)                | dots |
| Module dimension               | 105.5 x 67.2 x 7.7                | mm   |
| Active area                    | 95.04 x 53.856                    | mm   |
| Dot pitch                      | 0.066 x 0.198                     | 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               |      |
| Controller IC                  | SSD1963                           |      |
| Interface                      | Digital 8080 family MPU           |      |
| With /Without TP               | With RTP                          |      |
| Surface                        | Anti-Glare                        |      |

\*Color tone slight changed by temperature and driving voltage

## 4. Absolute Maximum Ratings

| Item                  | Symbol | Min | Typ | Max | Unit |
|-----------------------|--------|-----|-----|-----|------|
| Operating Temperature | TOP    | -20 | —   | +70 | °C   |
| Storage Temperature   | TST    | -30 | —   | +80 | °C   |

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

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

## 5. Electrical Characteristics

### 5.1. Operating conditions:

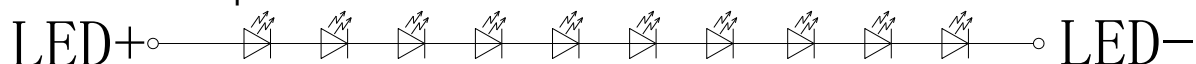
| Item                   | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|------------------------|--------|-----------|-----|-----|-----|------|--------|
| Supply Voltage For LCM | VDD    | —         | 3.0 | 3.3 | 3.5 | V    |        |
| Supply Current For LCM | IDD    | —         | —   | 200 | 300 | mA   | Note1  |

Note1: This value is test for VDD=3.3V , Ta=25 °C only

### 5.2. LED driving conditions

| Parameter         | Symbol | Min. | Typ.   | Max. | Unit | Remark     |
|-------------------|--------|------|--------|------|------|------------|
| LED current       | -      | -    | 20     | -    | mA   | -          |
| Power Consumption | -      | 600  | 640    | 680  | mW   | -          |
| LED voltage       | VBL+   | 30   | 32     | 34   | V    | Note 1     |
| LED Life Time     | -      | -    | 50,000 | -    | Hr   | Note 2,3,4 |

Note 1 : There are 1 Groups LED



Note 2 : Ta = 25 °C

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

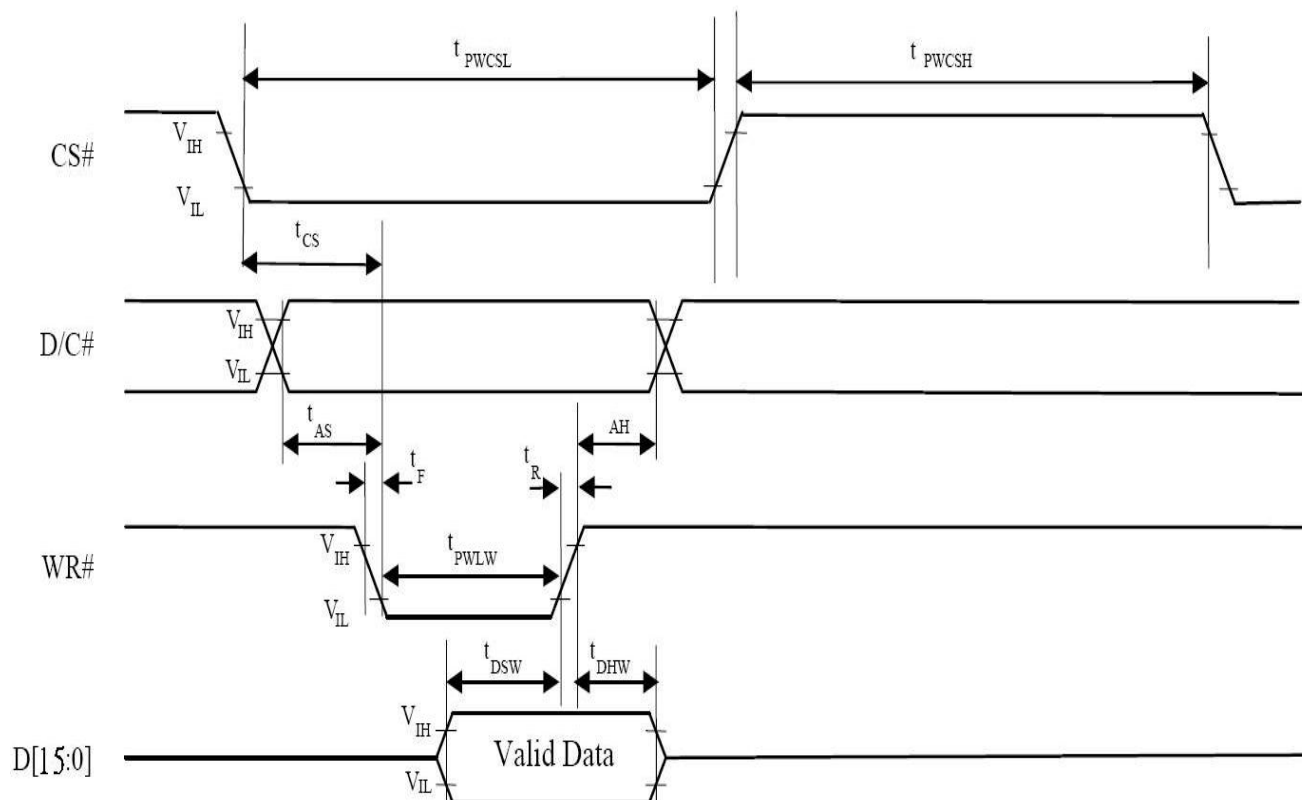
Note 4 : The single LED lamp case

# 6.DC CHARATERISTICS

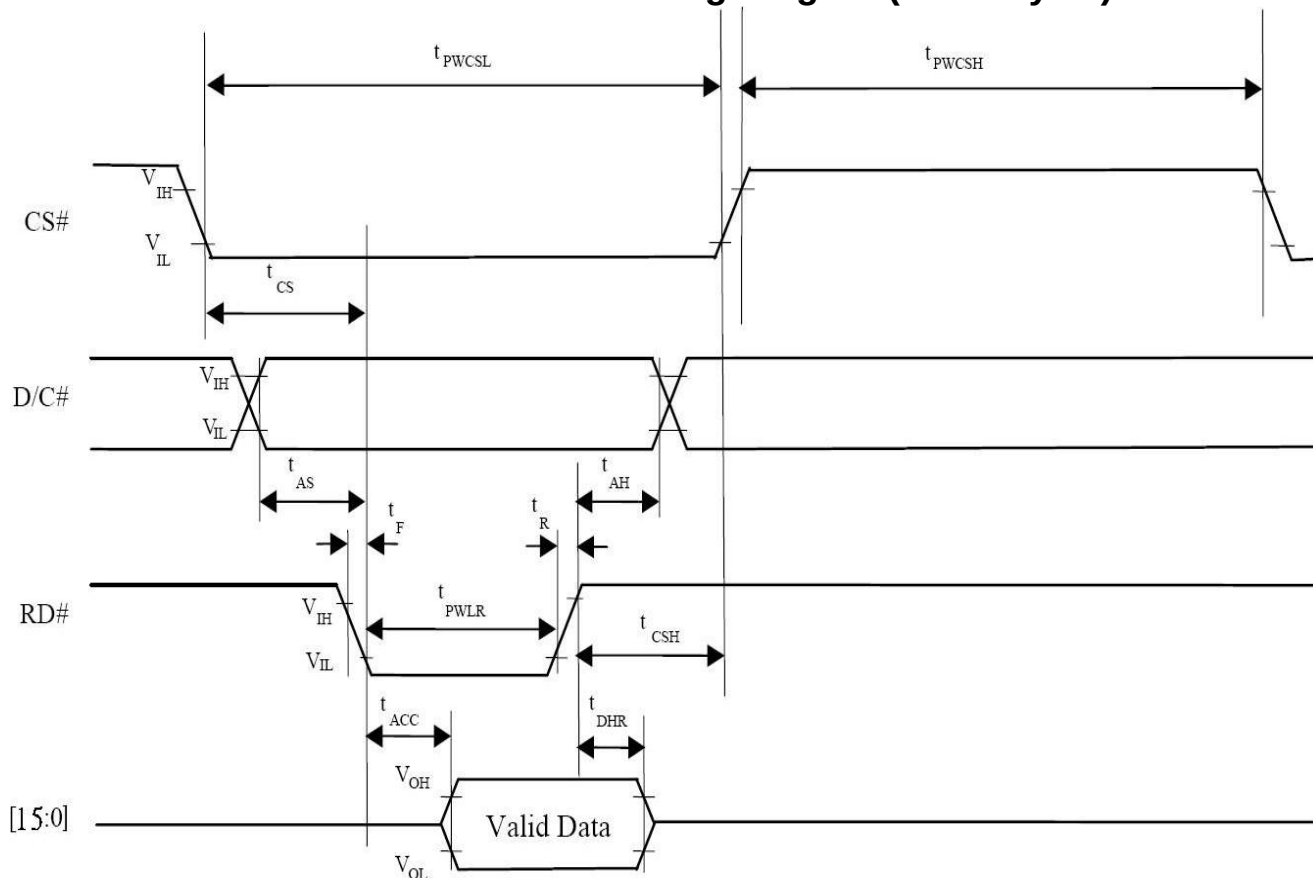
| Parameter                | Symbol          | Rating |     |        | Unit | Condition |
|--------------------------|-----------------|--------|-----|--------|------|-----------|
|                          |                 | Min    | Typ | Max    |      |           |
| Low level input voltage  | V <sub>IL</sub> | 0      | -   | 0.3VDD | V    |           |
| High level input voltage | V <sub>IH</sub> | 0.7VDD | -   | VDD    | V    |           |



### 7.3. Parallel 8080-series Interface Timing Diagram(Write Cycle)



### 7.4. Parallel 8080-series Interface Timing Diagram(Read Cycle)



## 7.5. Pixel Data Format

| Interface            | Cycle           | D[15] | D[14] | D[13] | D[12] | D[11] | D[10] | D[9] | D[8] | D[7] | D[6] | D[5] | D[4] | D[3] | D[2] | D[1] | D[0] |
|----------------------|-----------------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| 16 bits (565 format) | 1 <sup>st</sup> | R5    | R4    | R3    | R2    | R1    | G5    | G4   | G3   | G2   | G1   | G0   | B5   | B4   | B3   | B2   | B1   |
| 16 bits              | 1 <sup>st</sup> | R7    | R6    | R5    | R4    | R3    | R2    | R1   | R0   | G7   | G6   | G5   | G4   | G3   | G2   | G1   | G0   |
|                      | 2 <sup>nd</sup> | B7    | B6    | B5    | B4    | B3    | B2    | B1   | B0   | R7   | R6   | R5   | R4   | R3   | R2   | R1   | R0   |
|                      | 3 <sup>rd</sup> | G7    | G6    | G5    | G4    | G3    | G2    | G1   | G0   | B7   | B6   | B5   | B4   | B3   | B2   | B1   | B0   |
| 8 bits               | 1 <sup>st</sup> |       |       |       |       |       |       |      |      | R7   | R6   | R5   | R4   | R3   | R2   | R1   | R0   |
|                      | 2 <sup>nd</sup> |       |       |       |       |       |       |      |      | G7   | G6   | G5   | G4   | G3   | G2   | G1   | G0   |
|                      | 3 <sup>rd</sup> |       |       |       |       |       |       |      |      | B7   | B6   | B5   | B4   | B3   | B2   | B1   | B0   |

## 8.Optical Characteristics

| Item                                              |       | Symbol     | Condition.                            | Min  | Typ. | Max. | Unit              | Remark            |
|---------------------------------------------------|-------|------------|---------------------------------------|------|------|------|-------------------|-------------------|
| Response time                                     |       | Tr         | $\theta=0^{\circ}$ 、 $\Phi=0^{\circ}$ | -    | 10   | 20   | ms                | Note 3            |
|                                                   |       | Tf         |                                       | -    | 15   | 30   | ms                |                   |
| Contrast ratio                                    |       | CR         | At optimized viewing angle            | 400  | 500  | -    | -                 | Note 4            |
| Color Chromaticity                                | White | Wx         | $\theta=0^{\circ}$ 、 $\Phi=0$         | 0.26 | 0.31 | 0.36 | -                 | Note 2,5          |
|                                                   |       | Wy         |                                       | 0.28 | 0.33 | 0.38 | -                 |                   |
| Viewing angle<br>(Gray Scale Inversion Direction) | Hor.  | $\Theta_R$ | $CR\geq 10$                           | 60   | 70   | -    | Deg.              | Note 1            |
|                                                   |       | $\Theta_L$ |                                       | 60   | 70   | -    |                   |                   |
|                                                   | Ver.  | $\Phi_T$   |                                       | 40   | 50   | -    |                   |                   |
|                                                   |       | $\Phi_B$   |                                       | 60   | 70   | -    |                   |                   |
| Brightness                                        |       | -          | -                                     | 280  | 350  | -    | cd/m <sup>2</sup> | Center of display |

Ta=25±2℃, IL=20mA

Note 1: Definition of viewing angle range

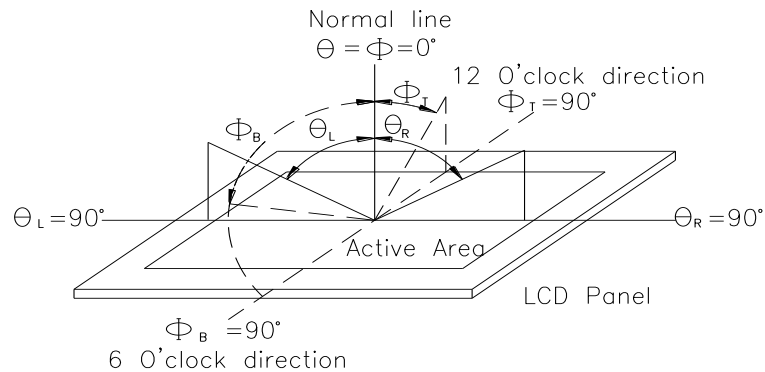


Fig. 8.1. Definition of viewing angle

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.

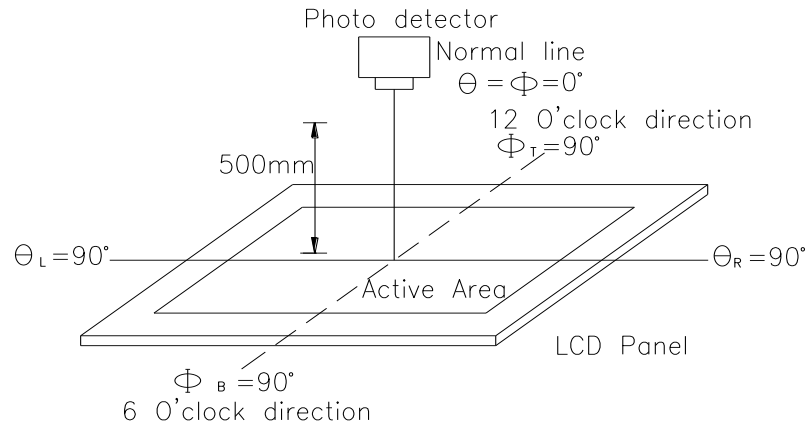
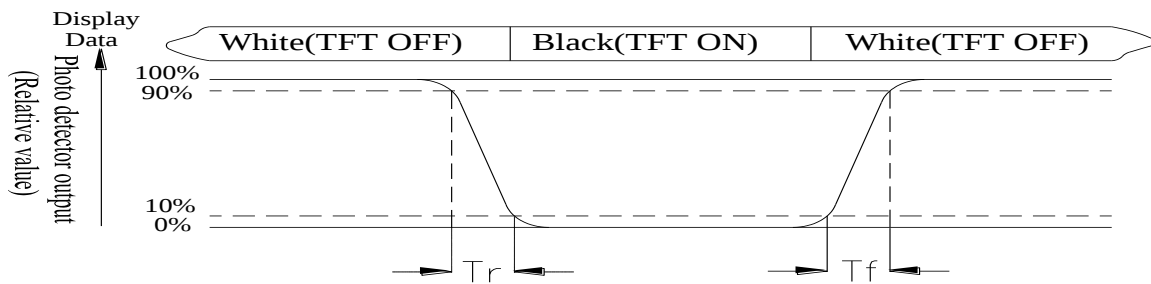


Fig. 8.2. Optical measurement system setup

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

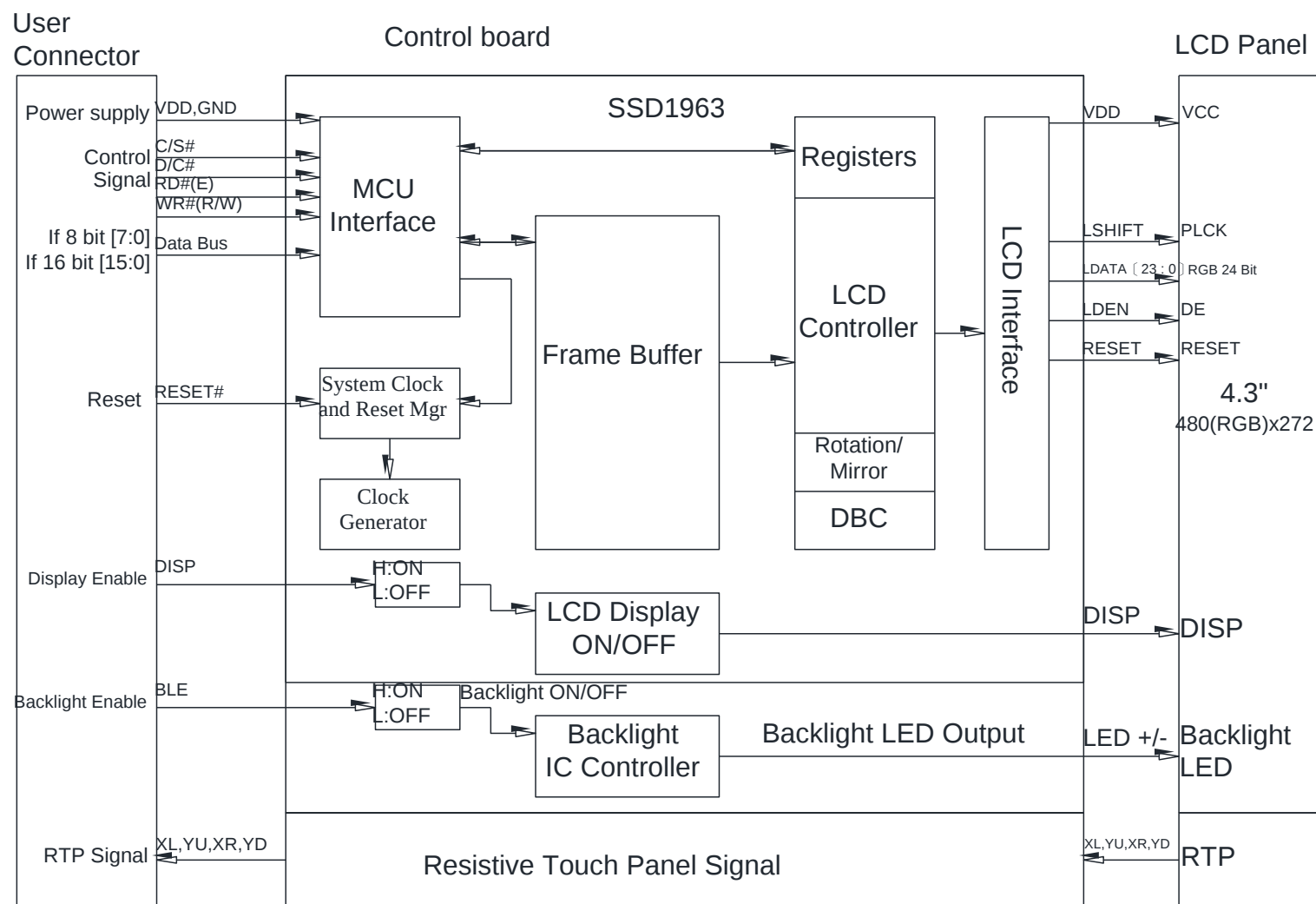
Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

# 9.Interface

## 9.1. LCM PIN Definition

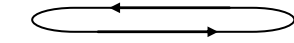
| Pin | Symbol  | Function                                               | Remark |
|-----|---------|--------------------------------------------------------|--------|
| 1   | GND     | System ground pin of the IC. Connect to system ground. |        |
| 2   | VDD     | Power Supply : +3.3V                                   |        |
| 3   | BL_E    | Backlight control signal , H: On \ L:Off               |        |
| 4   | D/C     | Data/Command select                                    |        |
| 5   | WR      | Write strobe signal                                    |        |
| 6   | RD      | Read strobe signal                                     |        |
| 7   | D0      | Data bus                                               |        |
| 8   | D1      | Data bus                                               |        |
| 9   | D2      | Data bus                                               |        |
| 10  | D3      | Data bus                                               |        |
| 11  | D4      | Data bus                                               |        |
| 12  | D5      | Data bus                                               |        |
| 13  | D6      | Data bus                                               |        |
| 14  | D7      | Data bus                                               |        |
| 15  | CS      | Chip select                                            |        |
| 16  | RST     | Hardware reset                                         |        |
| 17  | NC      | No connect                                             |        |
| 18  | XR      | Touch panel signal for Right                           |        |
| 19  | DISP ON | Display On/Off , H: On , L: Off                        |        |
| 20  | YD      | Touch panel signal for Bottom                          |        |
| 21  | XL      | Touch panel signal for Left                            |        |
| 22  | YU      | Touch panel signal for TOP                             |        |

# 10. Block Diagram



# 11. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

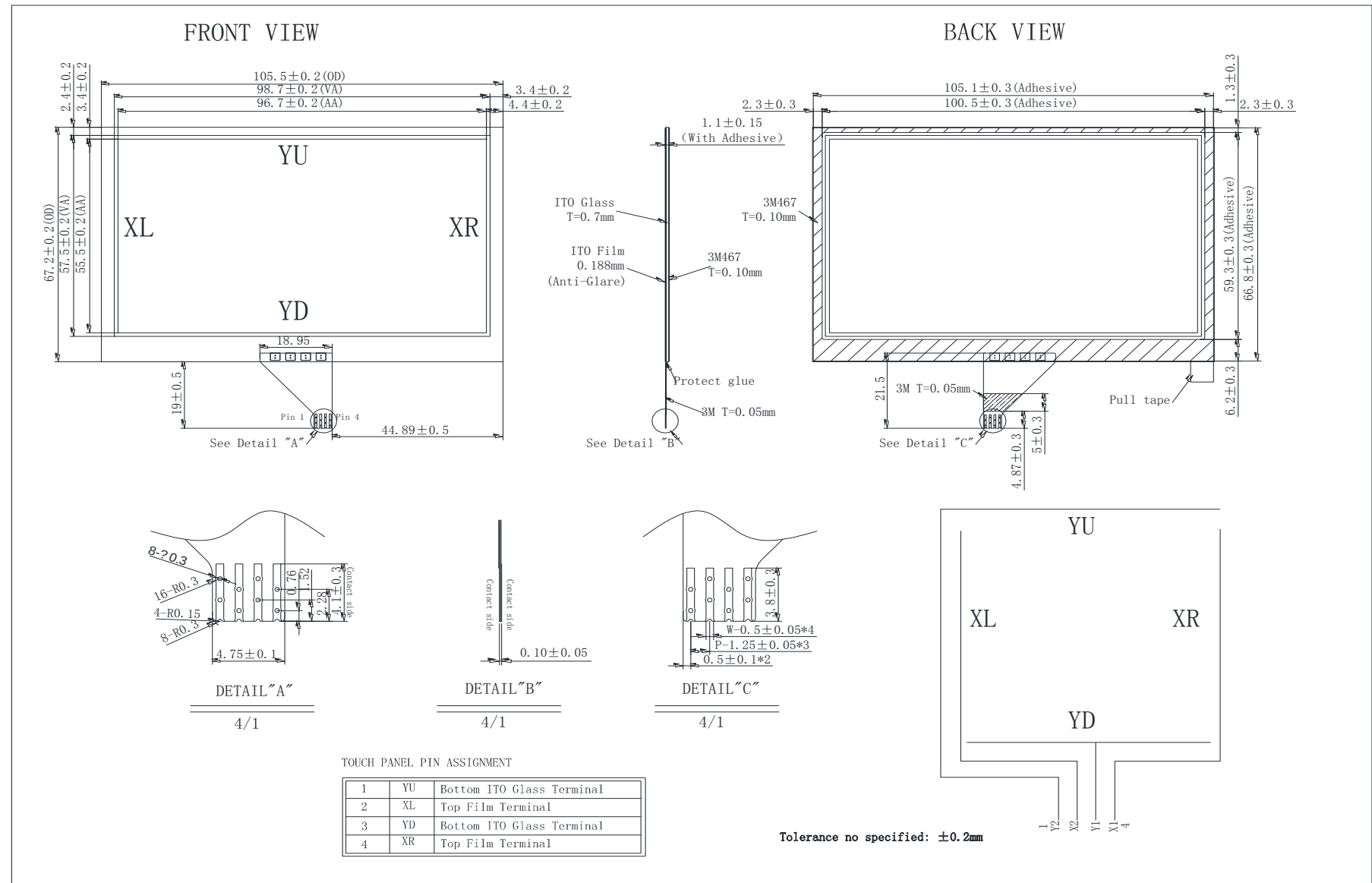
| Environmental Test                   |                                                                                                                                                                                                                                                                                                                     |                                                                                                                                     |      |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------|
| Test Item                            | Content of Test                                                                                                                                                                                                                                                                                                     | Test Condition                                                                                                                      | Note |
| High Temperature storage             | Endurance test applying the high storage temperature for a long time.                                                                                                                                                                                                                                               | 80°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.                                                                                                                                                                                              | 70°C<br>200hrs                                                                                                                      | —    |
| Low Temperature Operation            | Endurance test applying the electric stress under low temperature for a long time.                                                                                                                                                                                                                                  | -20°C<br>200hrs                                                                                                                     | 1    |
| High Temperature/ Humidity Operation | The module should be allowed to stand at 60 °C, 90%RH max                                                                                                                                                                                                                                                           | 60°C, 90%RH<br>96hrs                                                                                                                | 1,2  |
| Thermal shock resistance             | <p>The sample should be allowed stand the following 10 cycles of operation</p> <p style="text-align: center;">           -20°C      25°C      70°C<br/> <br/>           30min    5min    30min<br/>           1 cycle         </p> | -20°C / 70°C<br>10 cycles                                                                                                           | —    |
| Vibration test                       | Endurance test applying the vibration during transportation and using.                                                                                                                                                                                                                                              | Total fixed amplitude : 1.5mm<br>Vibration Frequency : 10~55Hz<br>One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 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.

# 12.Touch Panel Information

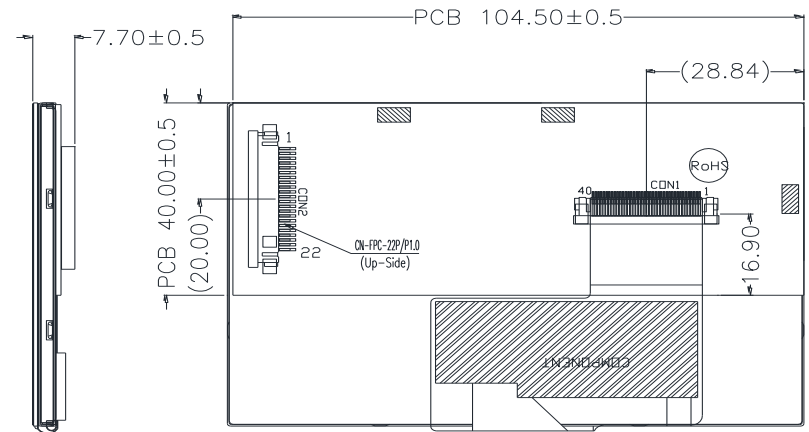
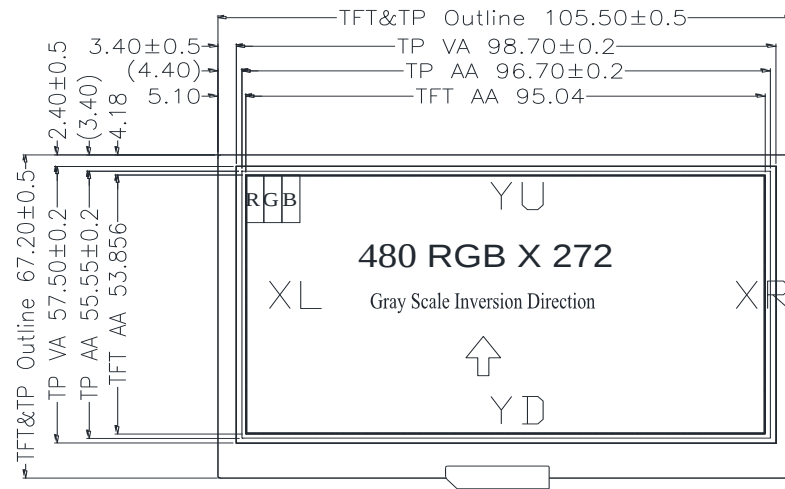


### 12.1. Resistance Touch Panel General Specifications

| Item                                             | Description                    |
|--------------------------------------------------|--------------------------------|
| Driving condition                                | DC 5V Max                      |
| Operating force                                  | 10~120g                        |
| Insulating resistance                            | $> 20\text{M}\Omega$ , 25V(DC) |
| Light transparence                               | 70%                            |
| Structure type                                   | ITO Film/ITO Glass(F/G)        |
| Surface Hardness                                 | 3H typ                         |
| Pen Hitting Durability (with the silicon rubber) | $> 1000,000$ times             |
| X resistance                                     | 200~1200 $\Omega$              |
| Y resistance                                     | 200~900 $\Omega$               |

## 13. Contour Drawing

| PIN | DESC   |
|-----|--------|
| 1   | GND    |
| 2   | VDD    |
| 3   | BL E   |
| 4   | D/C    |
| 5   | WR     |
| 6   | RD     |
| 7   | D0     |
| 8   | D1     |
| 9   | D2     |
| 10  | D3     |
| 11  | D4     |
| 12  | D5     |
| 13  | D6     |
| 14  | D7     |
| 15  | CS     |
| 16  | RST    |
| 17  | NC     |
| 18  | XR     |
| 19  | DIP ON |
| 20  | YD     |
| 21  | XL     |
| 22  | YU     |



The non-specified tolerance of dimension is  $\pm 0.3\text{mm}$ .

# **14.Initial Code For Reference**

```
void Initial_SSD1963()
{

    Write_Command(0x01);
    Delay_ms(10);
    Write_Command(0xe0);
    Write_Parameter(0x01);
    Delay_ms(5);
    Write_Command(0xe0);
    Write_Parameter(0x03);
    Delay_ms(5);


    Write_Command(0xb0);
    Write_Parameter(0x08);
    Write_Parameter(0x80);
    Write_Parameter(0x01);
    Write_Parameter(0xdf);
    Write_Parameter(0x01);
    Write_Parameter(0x0f);
    Write_Parameter(0x00);


    Write_Command(0xf0);
    Write_Parameter(0x00);


    Write_Command(0x3a);
    Write_Parameter(0x50);


    Write_Command(0xe2);
    Write_Parameter(0x1d);
    Write_Parameter(0x02);
    Write_Parameter(0x54);


    Write_Command(0xe6);
    Write_Parameter(0x01);
    Write_Parameter(0x33);
    Write_Parameter(0x33);


    Write_Command(0xb4);
    Write_Parameter(0x02);
    Write_Parameter(0x0d);
    Write_Parameter(0x00);
    Write_Parameter(0x1d);
    Write_Parameter(0x00);
    Write_Parameter(0x00);
    Write_Parameter(0x00);
    Write_Parameter(0x00);


    Write_Command(0xb6);
```

```
Write_Parameter(0x01);  
Write_Parameter(0x20);  
Write_Parameter(0x00);  
Write_Parameter(0x10);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x00);
```

```
Write_Command(0x2a);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x01);  
Write_Parameter(0xdf);
```

```
Write_Command(0x2b);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x01);  
Write_Parameter(0x0f);
```

```
Write_Command(0x29);  
Write_Command(0x2c);
```

```
}
```

---

**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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**5、Electronic Characteristics of Module :**

- |                              |                               |                                     |
|------------------------------|-------------------------------|-------------------------------------|
| 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 , _____ |

**6、Summary :**

Sales signature : \_\_\_\_\_

Customer Signature : \_\_\_\_\_

Date :        /        /