



**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**

WEB: <https://www.winstar.com.tw> E-mail: sales@winstar.com.tw



## SPECIFICATION

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

**MODULE NO.:** **WF43UTIAEDNT0#000**

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

| SALES BY                | APPROVED BY | CHECKED BY | PREPARED BY |
|-------------------------|-------------|------------|-------------|
|                         |             |            | 葉虹蘭         |
| ISSUED DATE: 2018/05/16 |             |            |             |

This TFT Display item is for Economical Version TFT LCM Inspection Specification:

<https://www.winstar.com.tw/technology/download.html>



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MODLE NO :

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# 1.Module Classification Information

W F 43 U T I A E D N T 0 #000  
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|   |                                                                                                                                                                           |                                                                                                                                                                                                                         |                                                                         |         |   |                       |                                                                                                                           |                                                                                                                                                                                                                                              |   |                                |      |         |  |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------|---|-----------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|------|---------|--|
| 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 |   |                                |      |         |  |
| ⑦ | 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 |                                                                                                                                                                                                                                              |   |                                |      |         |  |
| ⑧ | 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  |  |
|   | 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<br>00 : Sales code 0 : Version |         |   |                       |                                                                                                                           |                                                                                                                                                                                                                                              |   |                                |      |         |  |

## **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               | 105.4(W) x 67.1(H) x 4.05 (D)     | 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                              |      |
| Interface                      | 24-bit RGB                        |      |
| Backlight Type                 | LED,Normally White                |      |
| 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

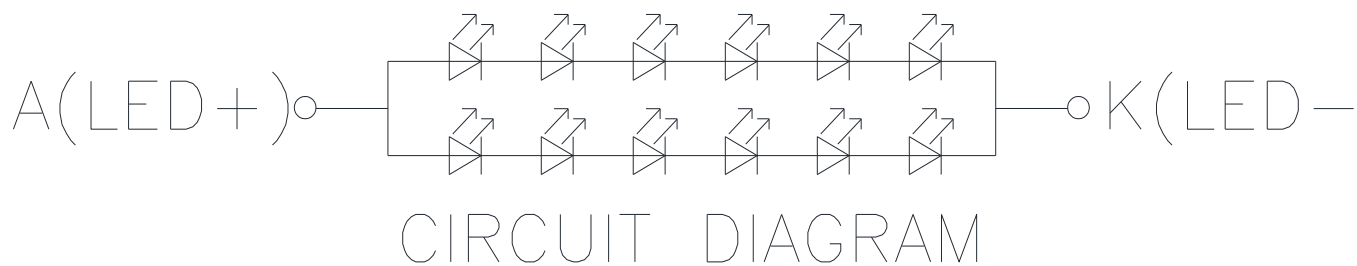
### 5.1. Operating conditions:

| Item                      | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------|--------|-----------|-----|-----|-----|------|
| Supply Voltage For Logic  | VCC    | —         | 3.1 | 3.3 | 3.5 | V    |
| Digital operation current | Icc    | —         | —   | 22  | 33  | mA   |

### 5.2. LED driving conditions

| Item              | Symbol | Min    | Typ  | Max  | Unit | Remark     |
|-------------------|--------|--------|------|------|------|------------|
| LED current       | —      | —      | 40   | —    | mA   | —          |
| Power Consumption | —      | —      | 774  | 792  | mW   | —          |
| LED voltage       | LED+   | 16.8   | 18.6 | 19.8 | V    | Note 1     |
| LED Life Time     | —      | 20,000 | —    | —    | 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  | $V_{IL}$ | 0      | -   | 0.2VCC | V    |           |
| High level input voltage | $V_{IH}$ | 0.8VCC | -   | VCC    | V    |           |

# 7.AC CHARACTERISTICS

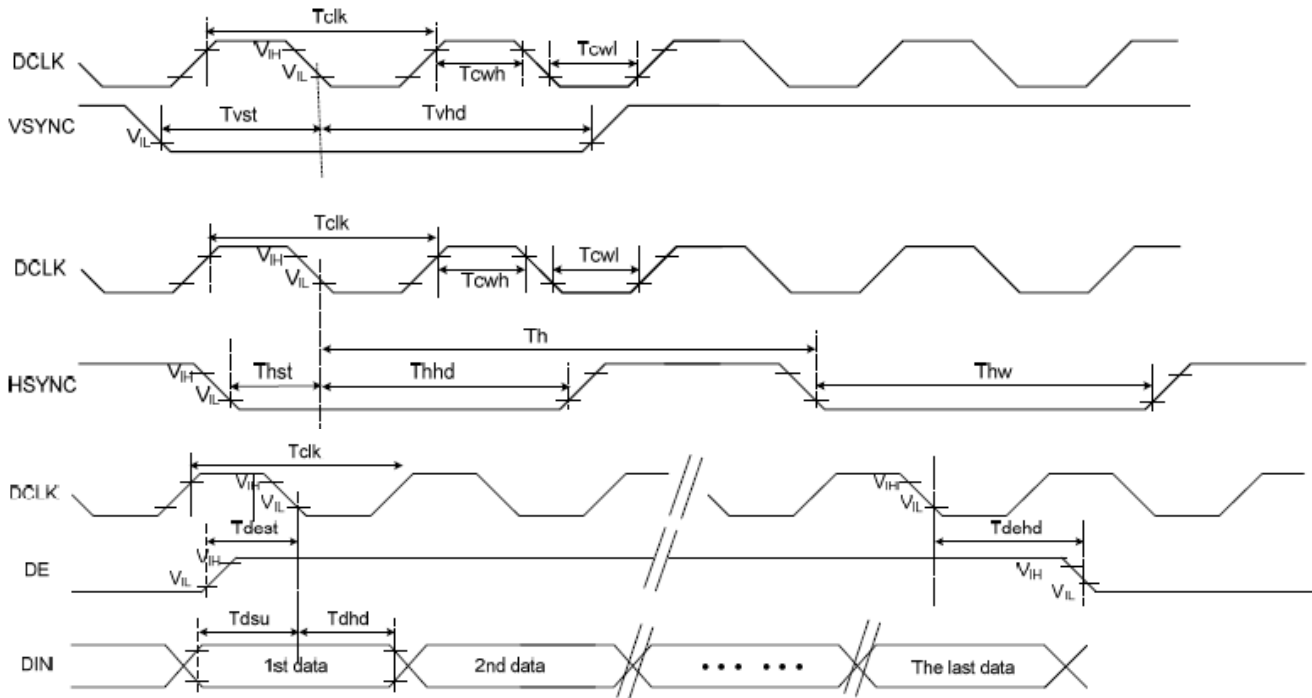
## 7.1. AC Characteristics

AC Electrical Characteristics (VDD= 3.3V, GND= 0V, TA=25°C)

| Item                       | Symbol | Min. | Typ. | Max. | Unit | Conditions         |
|----------------------------|--------|------|------|------|------|--------------------|
| System operation timing    |        |      |      |      |      |                    |
| VDD power source slew time | TPOR   | -    | -    | 20   | Ms   | From 0V to 99% VDD |
| GRB pulse width            | tRSTW  | 10   | 50   | -    | us   | R=10Kohm, C=1uF    |
| Input/ Output timing       |        |      |      |      |      |                    |
| CLK pulse duty             | Tcw    | 40   | 50   | 60   | %    |                    |
| Hsync width                | Thw    | 2    | -    | -    | DCLK |                    |
| Hsync period               | Th     | 55   | 60   | 65   | us   |                    |
| Vsync setup time           | Tvst   | 12   | -    | -    | ns   |                    |
| Vsync hold time            | Tvhd   | 12   | -    | -    | ns   |                    |
| Hsync setup time           | Thst   | 12   | -    | -    | ns   |                    |
| Hsync hold time            | Thhd   | 12   | -    | -    | ns   |                    |
| Data setup time            | Tdsu   | 12   | -    | -    | ns   |                    |
| Data hold time             | Tdhd   | 12   | -    | -    | ns   |                    |
| DE setup time              | Tdest  | 10   | -    | -    | ns   |                    |
| DE setup time              | Tdehd  | 10   | -    | -    | ns   |                    |

## 7.2. AC Timing Diagram

### Clock and Data Input Timing Diagram

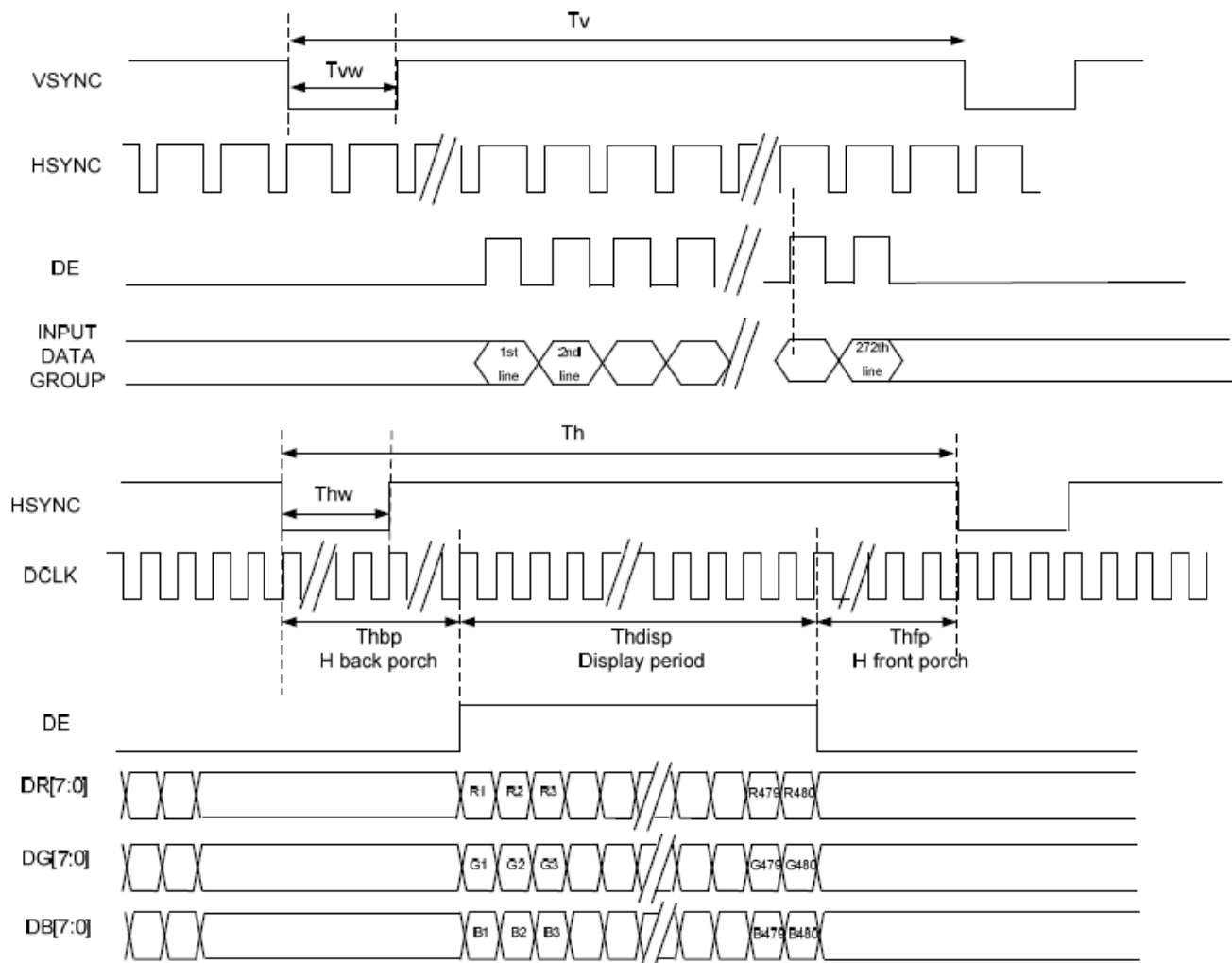


### 7.3. Parallel 24-bit RGB Timing Table

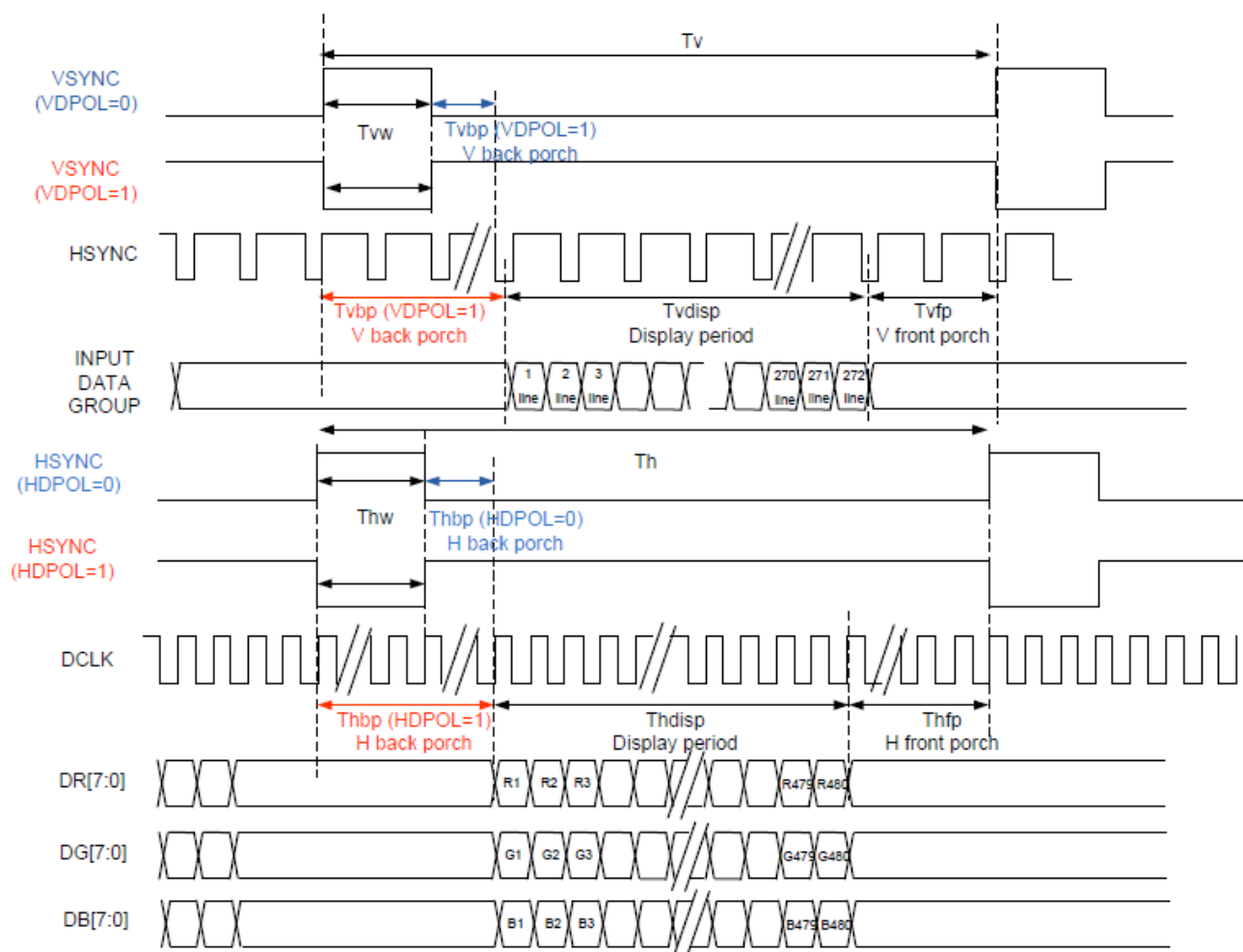
| Item          |                | Symbol | Min | Typ | Max | Unit | Remark                |
|---------------|----------------|--------|-----|-----|-----|------|-----------------------|
| CLK frequency |                | Fclk   | 8   | 9   | 12  | MHz  |                       |
| DCLK Period   |                | Tclk   | 83  | 111 | 125 | ns   |                       |
| HSYNC         | Period Time    | Th     | 485 | 531 | 598 | DCLK |                       |
|               | Display Period | Thdisp |     | 480 |     | DCLK |                       |
|               | Back Porch     | Thbp   | 3   | 43  | 43  | DCLK | By H_Blanking setting |
|               | Front Porch    | Thfp   | 2   | 8   | 75  | DCLK |                       |
|               | Pulse Width    | Thw    | 2   | 4   | 75  | DCLK |                       |
| VSYNC         | Period Time    | Tv     | 276 | 292 | 321 | H    |                       |
|               | Display Period | Tvdisp |     | 272 |     | H    |                       |
|               | Back Porch     | Tvbp   | 2   | 12  | 12  | H    | By V_Blanking setting |
|               | Front Porch    | Tvfp   | 2   | 8   | 37  | H    |                       |
|               | Pulse Width    | Tvw    | 2   | 4   | 37  | H    |                       |

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

### 7.4. SYNC-DE Mode Timing Diagram



## 7.5. SYNC Mode Timing Diagram



## 8. Optical Characteristics

| Item                                                 |       | Symbol     | Condition.                            | Min  | Typ. | Max. | Unit              | Remark            |
|------------------------------------------------------|-------|------------|---------------------------------------|------|------|------|-------------------|-------------------|
| Response time                                        |       | Tr         | $\theta=0^{\circ}$ 、 $\Phi=0^{\circ}$ | -    | 25   | 30   | ms                | Note 3            |
|                                                      |       | Tf         |                                       |      |      |      |                   |                   |
| Contrast ratio                                       |       | CR         | At optimized viewing angle            | -    | 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<br>Inversion Direction) | Hor.  | $\Theta R$ | $CR \geq 10$                          | -    | 70   | -    | Deg.              | Note 1            |
|                                                      |       | $\Theta L$ |                                       | -    | 70   | -    |                   |                   |
|                                                      | Ver.  | $\Phi T$   |                                       | -    | 50   | -    |                   |                   |
|                                                      |       | $\Phi B$   |                                       | -    | 70   | -    |                   |                   |
|                                                      |       |            |                                       |      |      |      |                   |                   |
| Brightness                                           |       | -          | -                                     | 350  | 420  | -    | cd/m <sup>2</sup> | Center of display |

Ta=25±2°C, IL=40mA

Note 1: Definition of viewing angle range

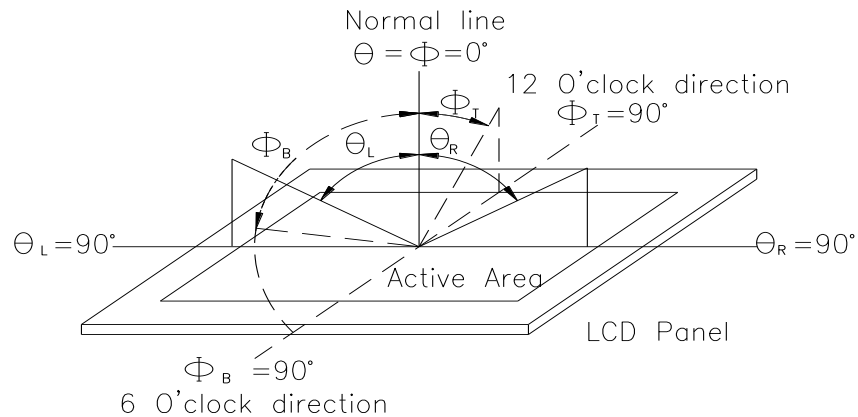


Fig. 8.1. Definition of viewing angle

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-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

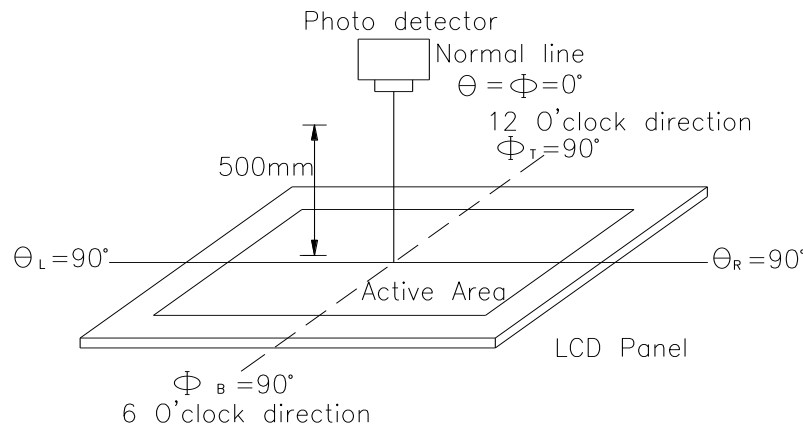
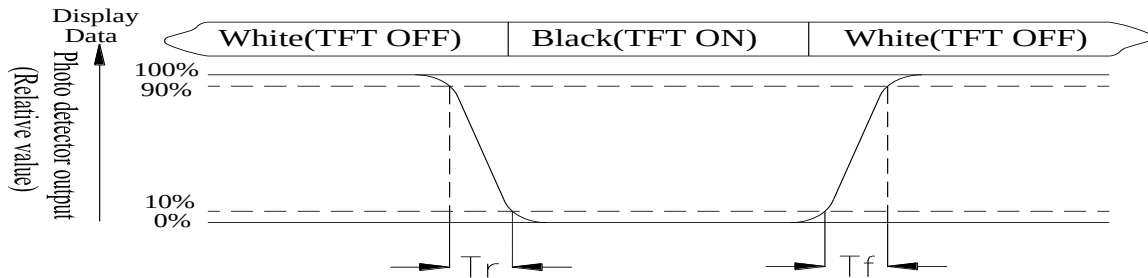


Fig. 8.2. Optical measurement system setup

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

“ $\pm$ ” means that the analog input signal swings in phase with VCOM signal.

“ $\pm$ ” 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

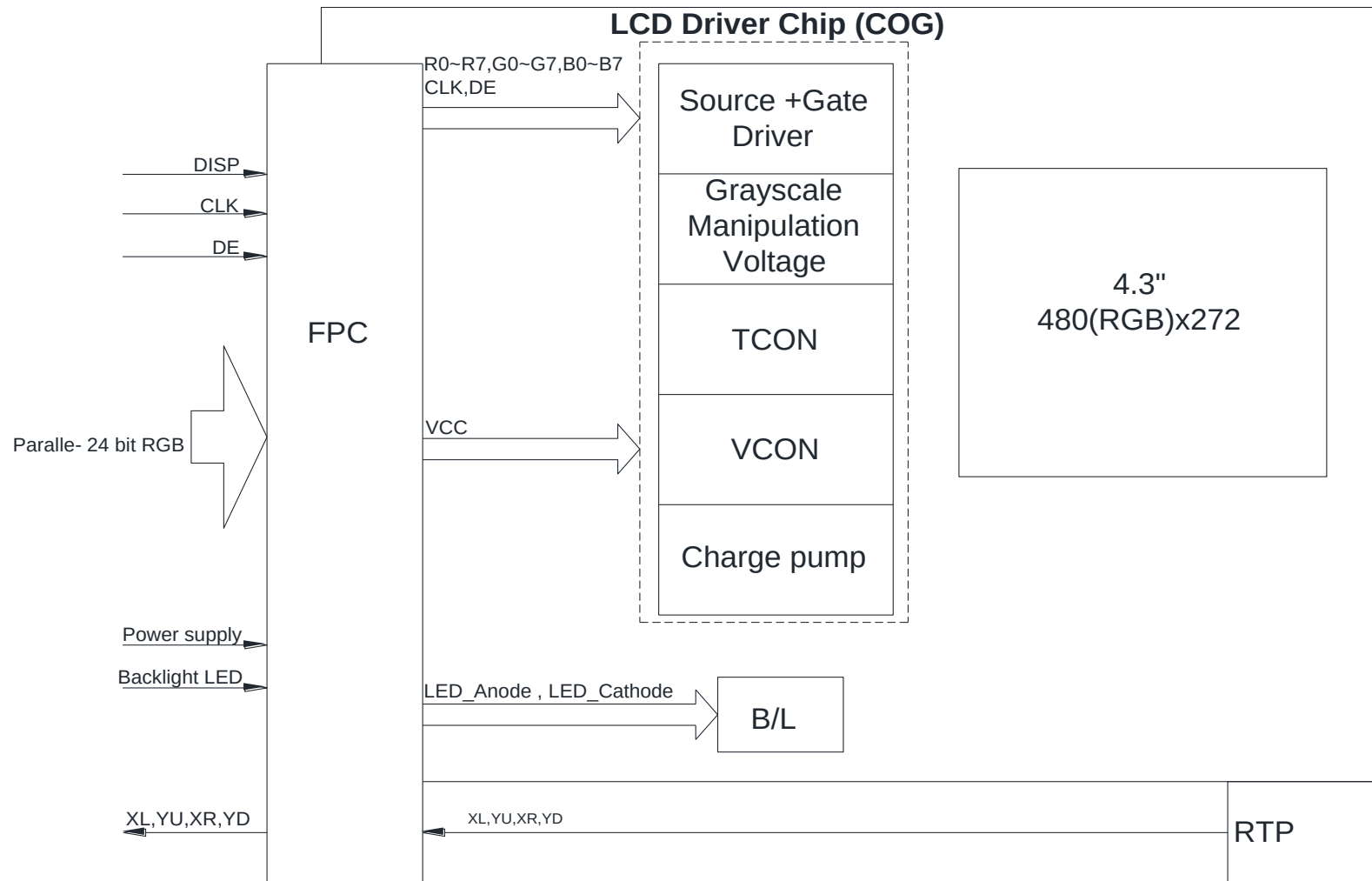
| Pin | Symbol | Function                        | Remark |
|-----|--------|---------------------------------|--------|
| 1   | LED-   | Power for LED backlight cathode |        |
| 2   | LED+   | Power for LED backlight anode   |        |
| 3   | GND    | Power ground                    |        |
| 4   | VCC    | Power voltage                   |        |
| 5   | R0     | Red data (LSB)                  |        |
| 6   | R1     | Red data                        |        |
| 7   | R2     | Red data                        |        |
| 8   | R3     | Red data                        |        |
| 9   | R4     | Red data                        |        |
| 10  | R5     | Red data                        |        |
| 11  | R6     | Red data                        |        |
| 12  | R7     | Red data (MSB)                  |        |
| 13  | G0     | Green data (LSB)                |        |
| 14  | G1     | Green data                      |        |
| 15  | G2     | Green data                      |        |
| 16  | G3     | Green data                      |        |
| 17  | G4     | Green data                      |        |
| 18  | G5     | Green data                      |        |
| 19  | G6     | Green data                      |        |
| 20  | G7     | Green data (MSB)                |        |
| 21  | B0     | Blue data (LSB)                 |        |
| 22  | B1     | Blue data                       |        |
| 23  | B2     | Blue data                       |        |
| 24  | B3     | Blue data                       |        |
| 25  | B4     | Blue data                       |        |
| 26  | B5     | Blue data                       |        |
| 27  | B6     | Blue data                       |        |
| 28  | B7     | Blue data (MSB)                 |        |
| 29  | GND    | Power ground                    |        |
| 30  | CLK    | Pixel clock                     |        |
| 31  | DISP   | Display on/off                  |        |



|    |     |                  |  |
|----|-----|------------------|--|
| 32 | NC  | No connection    |  |
| 33 | NC  | No connection    |  |
| 34 | DE  | Data Enable      |  |
| 35 | NC  | No connection    |  |
| 36 | GND | Power ground     |  |
| 37 | XR  | Right electrode  |  |
| 38 | YD  | Bottom electrode |  |
| 39 | XL  | Left electrode   |  |
| 40 | YU  | Top electrode    |  |

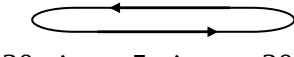
# 10.Block Diagram

## LCD Panel



# 11. Reliability

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

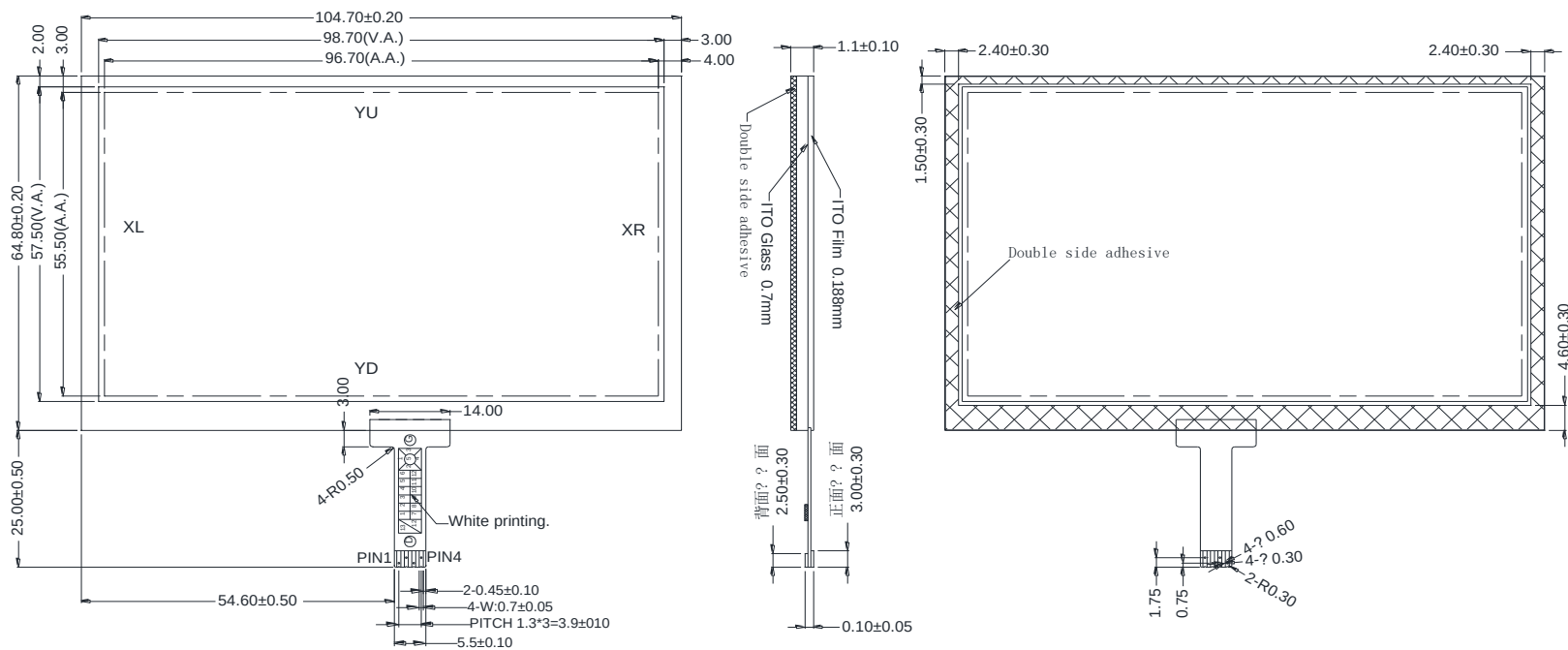
| Environmental Test                   |                                                                                                                                                                                                                                                                                                                     |                                                                                                                                     |      |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------|
| 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>96hrs                                                                                                                       | 2    |
| Low Temperature storage              | Endurance test applying the low storage temperature for a long time.                                                                                                                                                                                                                                                | -30°C<br>96hrs                                                                                                                      | 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>96hrs                                                                                                                       | —    |
| Low Temperature Operation            | Endurance test applying the electric stress under low temperature for a long time.                                                                                                                                                                                                                                  | -20°C<br>96hrs                                                                                                                      | 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

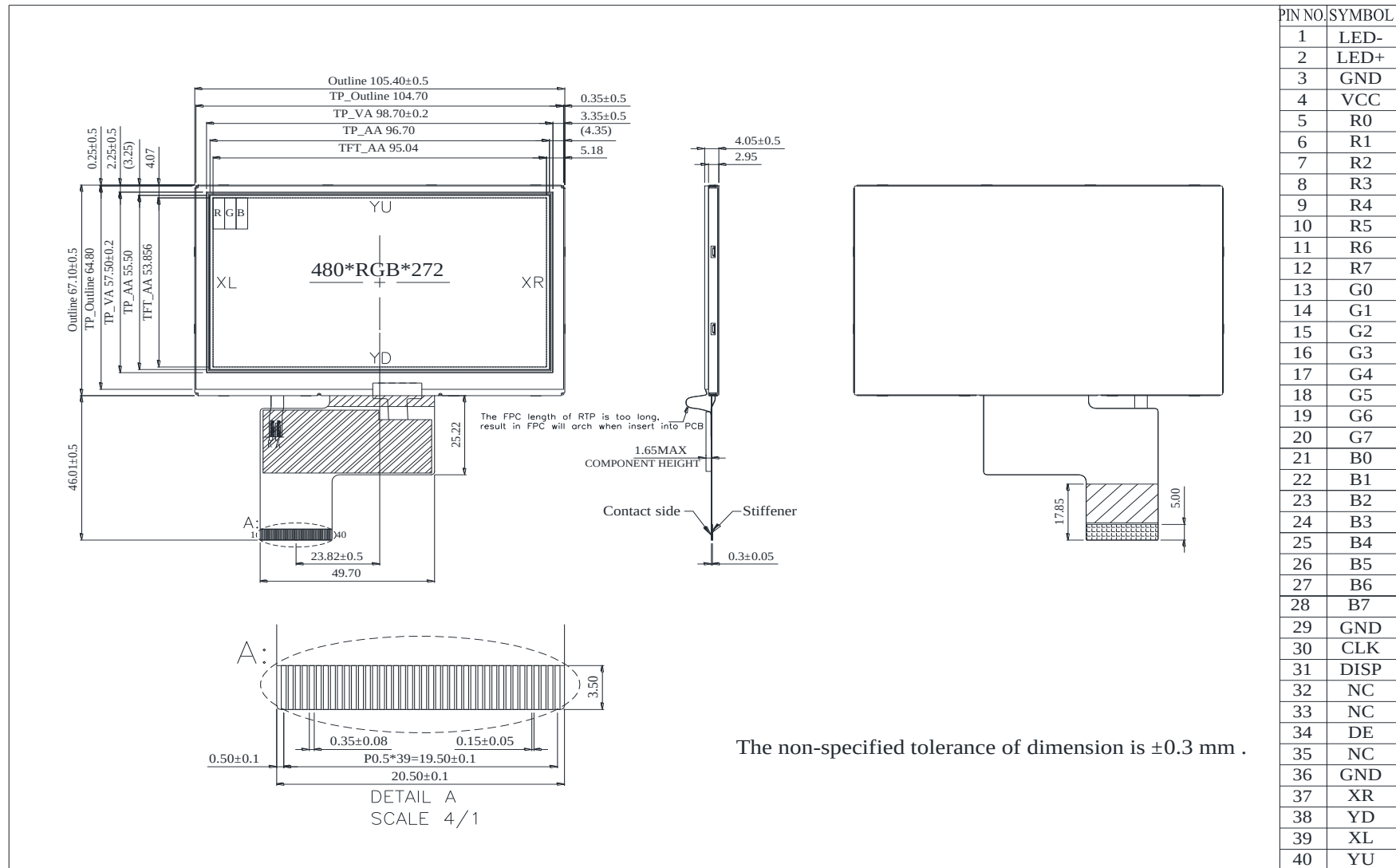


| PIN | LOGIC |
|-----|-------|
| 1   | YU    |
| 2   | XL    |
| 3   | YD    |
| 4   | XR    |

### 12.1. Resistance Touch Panel General Specifications

| Item                                             | Description                    |
|--------------------------------------------------|--------------------------------|
| Driving condition                                | DC3~7V                         |
| Operating force                                  | 60~100g                        |
| Linearity max                                    | $\leq \pm 1.5\%$               |
| Insulating resistance                            | $> 20\text{M}\Omega$ , 25V(DC) |
| Light transparence                               | 75%                            |
| Structure type                                   | ITO Film/ITO Glass(F/G)        |
| Surface Hardness                                 | $\geq 3\text{H}$               |
| Pen Hitting Durability (with the silicon rubber) | $> 1000,000$ times             |
| X resistance                                     | 450~1050 $\Omega$              |
| Y resistance                                     | 100~500 $\Omega$               |

# 13. Contour Drawing



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

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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 :      /      /      \_\_\_\_\_