



**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.:** WF50FTWAGDNGO#

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

| SALES BY                       | APPROVED BY | CHECKED BY | PREPARED BY |
|--------------------------------|-------------|------------|-------------|
|                                |             |            | 葉虹蘭         |
| <b>ISSUED DATE: 2023/06/15</b> |             |            |             |

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

Precaution in use of TFT module: <https://www.winstar.com.tw/technology/download/declaration.html>

**RECORDS OF REVISION**

**DOC. FIRST ISSUE**

| VERSION | DATE       | REVISED<br>PAGE NO. | SUMMARY                                |
|---------|------------|---------------------|--|
| 0       | 2021/04/15 |                     | First issue                            |
| A       | 2021/05/20 |                     | Modify VDD                             |
| B       | 2021/07/05 |                     | Correct Aspect Ratio                   |
| C       | 2022/02/21 |                     | Modify VDDT                            |
| D       | 2023/04/27 |                     | Modify Power ON/OFF<br>Sequence        |
| E       | 2023/06/15 |                     | Modify Touchapnel &<br>Contour drawing |

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- 3.General Specifications
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- 5.Electrical Characteristics
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- 9.Interface
- 10.Reliability
- 11.Touch Panel Information
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# 1.Module Classification Information

W F 50 F T W A G D N G 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 : 5.0" 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  |   |         |   |   |  |                                    |               |                                |   |         |

## **2.Summary**

TFT 5.0" is a is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This TFT LCD has a 5.0 inch diagonally measured active display area with 800x480 (800 horizontal by 480 vertical pixel) resolution.

### **3. General Specifications**

| <b>Item</b>      | <b>Dimension</b>                        | <b>Unit</b> |
|------------------|---|-------------|
| Size             | 5.0                                     | inch        |
| Dot Matrix       | 800× 3(RGB) × 480                       | dots        |
| Module dimension | 120.7(W) ×75.8(H) ×4.5                  | mm          |
| Active area      | 108(W) ×64.8 (H)                        | mm          |
| Pixel pitch      | 0.135(W) ×0.135(H)                      | mm          |
| LCD type         | TFT, Normally Black, Transmissive       |             |
| View Direction   | 80/80/80/80                             |             |
| Aspect Ratio     | 5:3                                     |             |
| Driver IC        | ST7262 or equivalent                    |             |
| TFT Interface    | 24 bit R.G.B.                           |             |
| Backlight Type   | LED ,Normally White                     |             |
| CTP IC           | ILI2130 or Equivalent                   |             |
| CTP Interface    | I2C                                     |             |
| CTP FW Version   | 0x07.0x00.0x00.0x00.0xA1.0x25.0x50.0x00 |             |
| CTP Resolution   | 16384*16384                             |             |
| With /Without TP | With CTP                                |             |
| Surface          | Glare                                   |             |

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

## **4. Absolute Maximum Ratings**

| <b>Item</b>           | <b>Symbol</b> | <b>Min</b> | <b>Typ</b> | <b>Max</b> | <b>Unit</b> |
|-----------------------|---------------|------------|------------|------------|-------------|
| Operating Temperature | TOP           | -30        | —          | +80        | °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.  $\square$  60°C, 90% RH MAX. Temp.  $>$  60°C, Absolute humidity shall be less than 90% RH at 60°C



# 5. Electrical Characteristics

## 5.1. Typical Operation Conditions

| Item                      | Symbol           | Values  |      |         | Unit | Remark   |
|---------------------------|------------------|---------|------|---------|------|----------|
|                           |                  | Min.    | Typ. | Max.    |      |          |
| Power voltage             | VDD              | 3.1     | 3.3  | 3.6     | V    |          |
| Current for Driver(Black) | IDD              | -       | 65   | 97.5    | mA   | VDD=3.3V |
| Input logic high voltage  | VIH              | 0.7 VDD | -    | VDD     | V    | Note 1   |
| Input logic low voltage   | VIL              | 0       | -    | 0.3 VDD | V    |          |
| Supply CTP                | VDDT             | 3.1     | 3.3  | 3.5     | V    |          |
|                           | I <sub>CTP</sub> | —       | 51   | 77      | mA   |          |

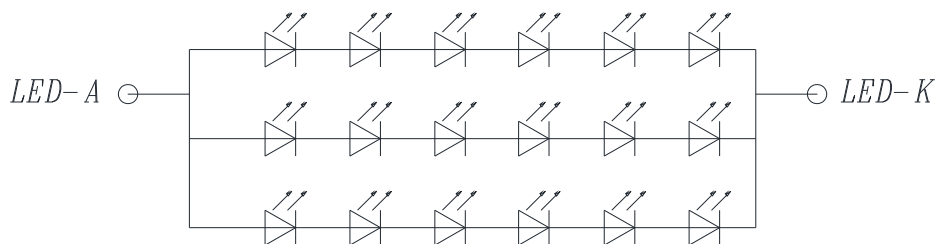
Note1: CLK,DE,R0~R7, G0~7, B0~7.

## 5.2. Backlight Driving Conditions

| Item                      | Symbol | Values |        |      | Unit | Remark |
|---------------------------|--------|--------|--------|------|------|--------|
|                           |        | Min.   | Typ.   | Max. |      |        |
| Voltage for LED backlight | VL     | 16.8   | 19.2   | 20.4 | V    | Note 1 |
| Current for LED backlight | IL     | --     | 60     | --   | mA   |        |
| LED life time             | -      | --     | 50,000 | -    | Hr   | Note 2 |

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I<sub>L</sub>=20mA/pcs.

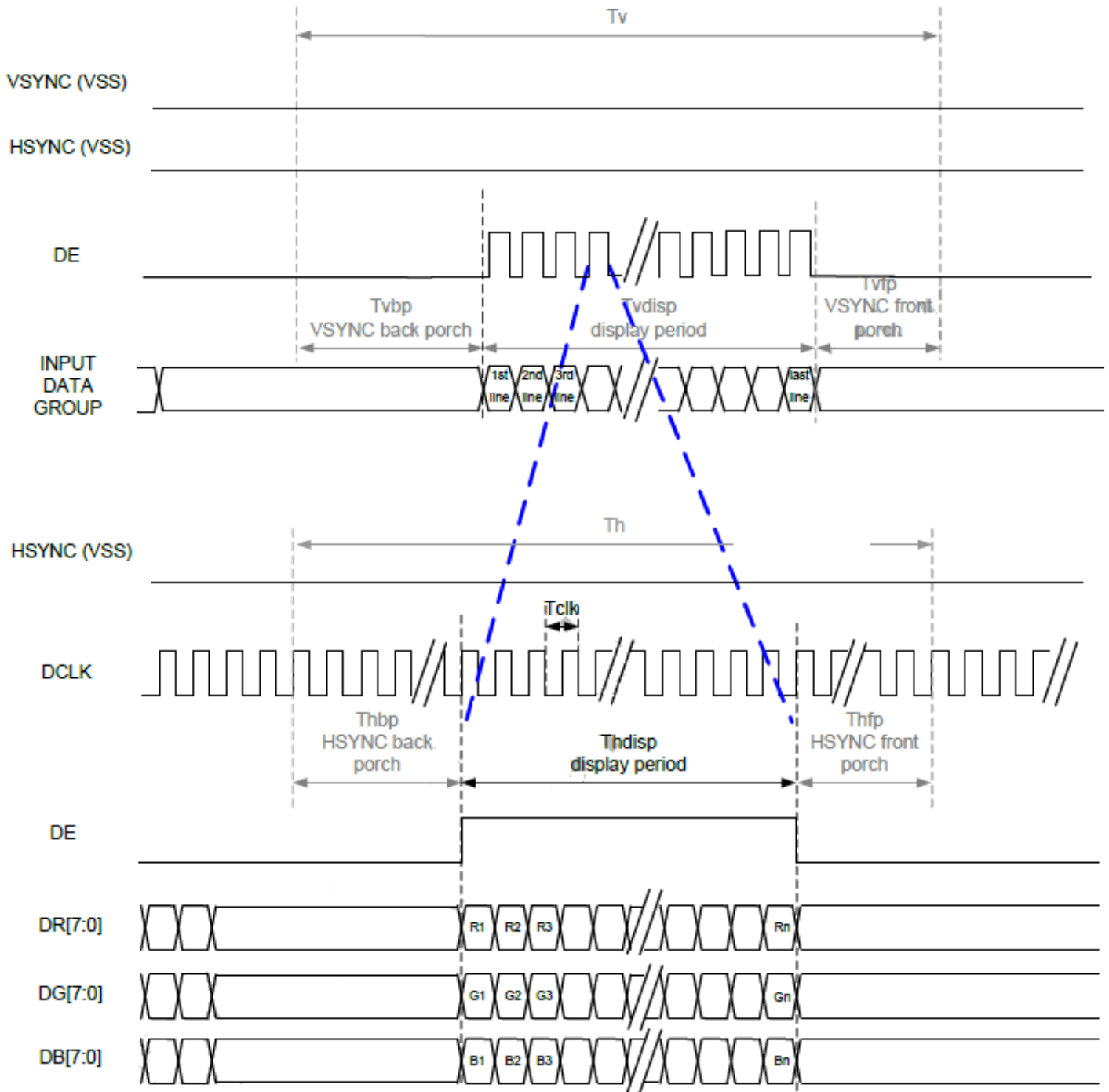
Note 2: The “LED life time” is defined as the module brightness decrease to 50% Original brightness at Ta=25°C and I<sub>L</sub>=20mA/pcs. The LED lifetime could be decreased if operating I<sub>L</sub> is larger than 25mA/pcs.



CIRCUIT DIAGRAM(LED 3\*6=18 DIES)

# 6. Communication Interface

## 6.1. DE Mode



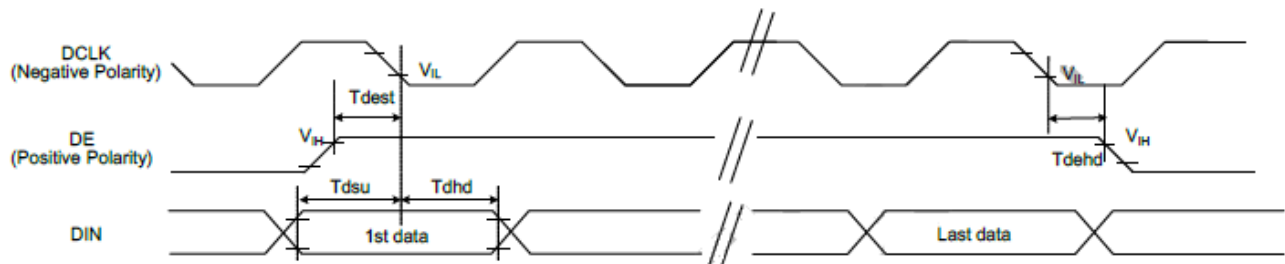
## 6.2. Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (VDD=VDDI= 3.3V, GND= 0V, TA=25°C)

| Parallel 24-bit RGB Interface Timing Table |                |        |      |      |      |        |
|--|----------------|--------|------|------|------|--------|
| Item                                       | Symbol         | Min.   | Typ. | Max. | Unit | Remark |
| DCLK Frequency                             | Fclk           | 23     | 25   | 27   | MHz  |        |
| HSYNC                                      | Period Time    | Th     | 808  | 816  | 896  | DCLK   |
|  | Display Period | Thdisp | 800  |      |      | DCLK   |
|  | Back Porch     | Thbp   | 4    | 8    | 48   | DCLK   |
|  | Front Porch    | Thfp   | 4    | 8    | 48   | DCLK   |
|  | Pulse Width    | Thw    | 2    | 4    | 8    | DCLK   |
| VSYNC                                      | Period Time    | Tv     | 492  | 496  | 504  | HSYNC  |
|  | Display Period | Tvdisp | 480  |      |      | HSYNC  |
|  | Back Porch     | Tvbp   | 6    | 8    | 12   | HSYNC  |
|  | Front Porch    | Tvfp   | 6    | 8    | 12   | HSYNC  |
|  | Pulse Width    | Tvw    | 2    | 4    | 8    | HSYNC  |

Note: 1. The minimum blanking time depends on the GIP timing of the panel specification  
 2. To ensure the compatibility of different panels, it is recommended to use the typical setting.  
 3. It is necessary to keep  $Tvbp = 12$  and  $Thbp = 43$  in sync mode. DE mode is unnecessary to keep it.

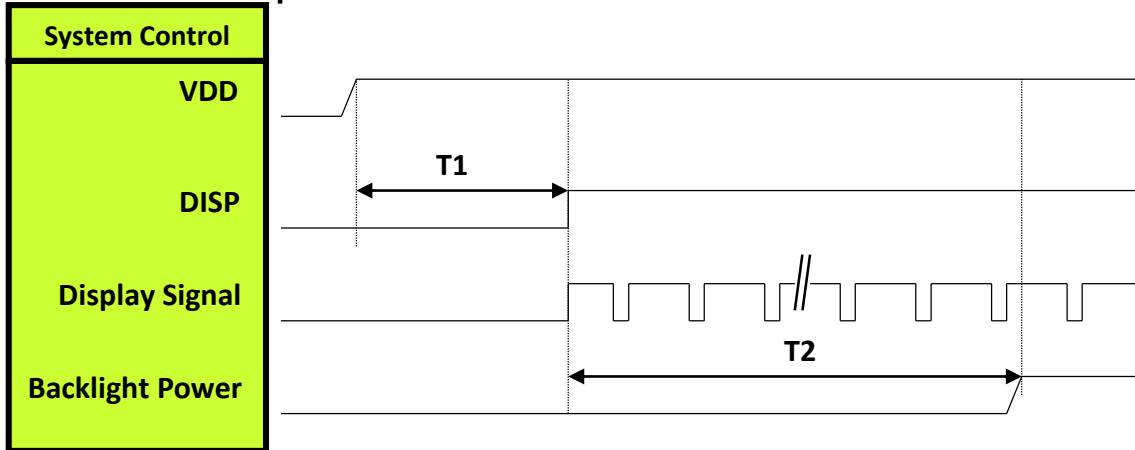
## 6.3. System Bus Timing for RGB Interface



| Item             | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|------------------|--------|------|------|------|------|------------|
| CLK Pulse Duty   | Tclk   | 40   | 50   | 60   | %    |            |
| VSYNC Setup Time | Tvst   | 10   | -    | -    | ns   |            |
| VSYNC Hold Time  | Tvhd   | 10   | -    | -    | ns   |            |
| HSYNC Setup Time | Thst   | 10   | -    | -    | ns   |            |
| HSYNC Hold Time  | Thhd   | 10   | -    | -    | ns   |            |
| Data Setup Time  | Tdsu   | 10   | -    | -    | ns   |            |
| Data Hold Time   | Tdhd   | 10   | -    | -    | ns   |            |
| DE Setup Time    | Tdest  | 10   | -    | -    | ns   |            |
| DE Hold Time     | Tdehd  | 10   | -    | -    | ns   |            |

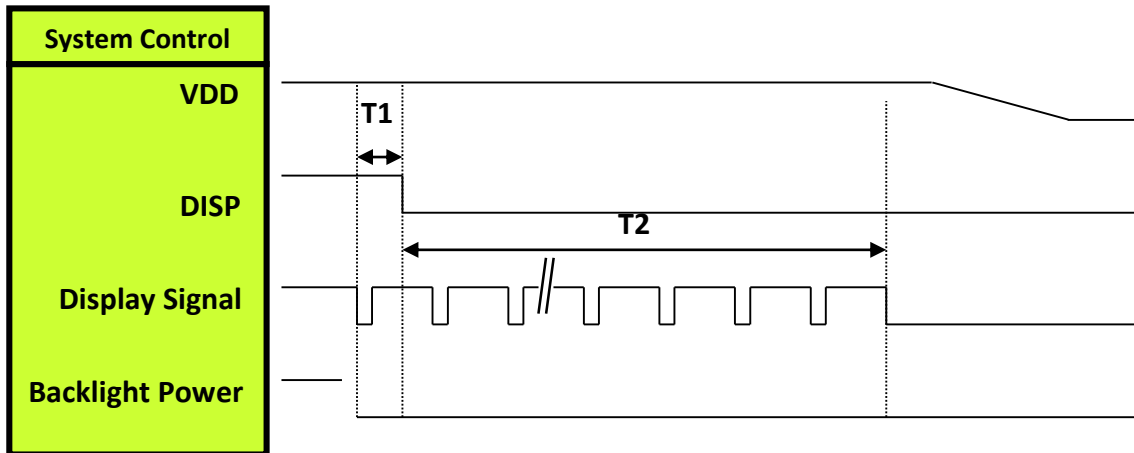
# 7. Power ON/OFF Sequence

## 7.1. Power On Sequence



| Symbol    | Description  | Min. Time  | Unit      |
|-----------|--|------------|-----------|
| <b>T1</b> | <b>System power stability to DISP="High"</b>       | <b>10</b>  | <b>ms</b> |
| <b>T2</b> | <b>Display signal output to Backlight power on</b> | <b>250</b> | <b>ms</b> |

## 7.2. Power Off Sequence



| Symbol    | Description  | Min. Time  | Unit      |
|-----------|--|------------|-----------|
| <b>T1</b> | <b>Backlight Power off to DISP ="Low"</b>                    | <b>5</b>   | <b>ms</b> |
| <b>T2</b> | <b>DISP ="Low" to IC internal voltage discharge complete</b> | <b>100</b> | <b>ms</b> |

# 8. Optical Characteristics

| Item               | Symbol | Condition.                        | Min                               | Typ.  | Max.  | Unit              | Remark            |        |
|--------------------|--------|-----------------------------------|-----------------------------------|-------|-------|-------------------|-------------------|--------|
| Response time      | Tr+Tf  | $\theta=0^\circ$ 、 $\phi=0^\circ$ | -                                 | 30    | 40    | .ms               | Note 3            |        |
| Contrast ratio     | CR     | At optimized viewing angle        | 800                               | 1000  | -     | -                 | Note 4            |        |
| Color Chromaticity | White  | Wx                                | $\theta=0^\circ$ 、 $\phi=0^\circ$ | 0.27  | 0.32  | 0.37              | Note 2,6,7        |        |
|                    |        | Wy                                |                                   | 0.295 | 0.345 | 0.395             |                   |        |
| Viewing angle      | Hor.   | $\theta_R$                        | $CR \geq 10$                      | 70    | 80    | -                 | Deg.              | Note 1 |
|                    |        | $\theta_L$                        |                                   | 70    | 80    | -                 |                   |        |
|                    | Ver.   | $\phi_T$                          |                                   | 70    | 80    | -                 |                   |        |
|                    |        | $\phi_B$                          |                                   | 70    | 80    | -                 |                   |        |
| Brightness         | -      | -                                 | 300                               | 400   | -     | cd/m <sup>2</sup> | Center of display |        |
| Uniformity         | (U)    | -                                 | 75                                | -     | -     | %                 | Note5             |        |

Ta=25±2°C

Note 1: Definition of viewing angle range

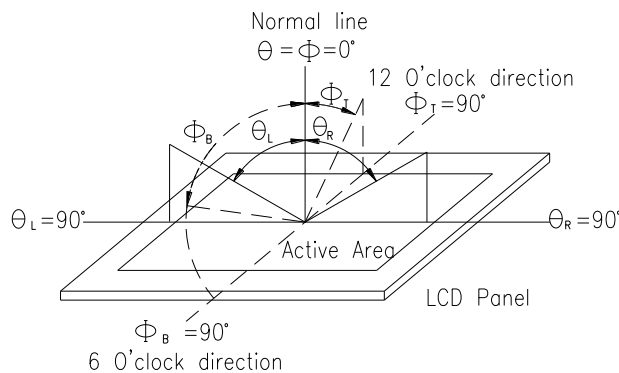


Fig. 8.1. Definition of viewing angle

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

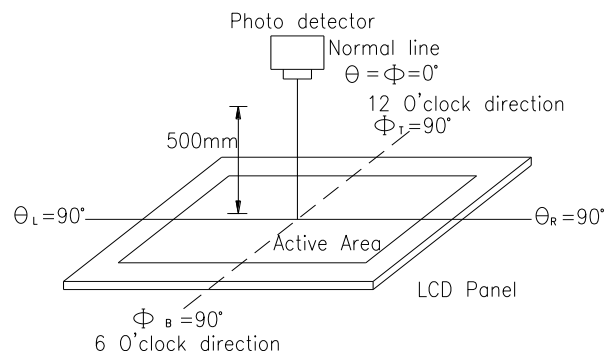
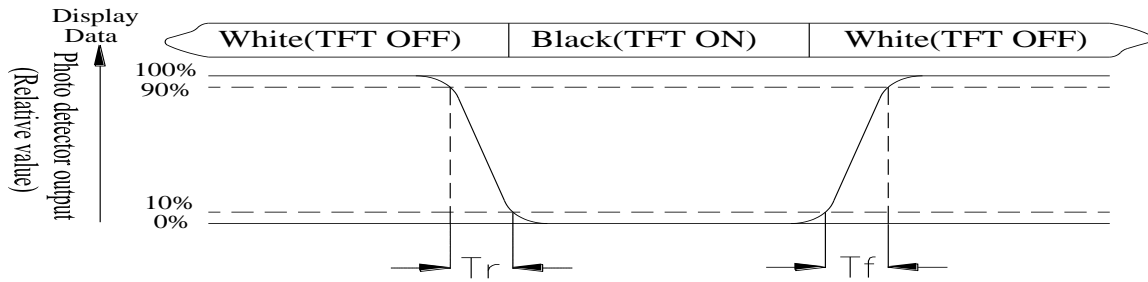


Fig. 8.2. Optical measurement system setup

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: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = \text{Lmin/Lmax} \times 100\%$$

L = Active area length

W = Active area width



Fig8.3. . Definition of uniformity

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

FPC Connector is used for the module electronics interface.

| Pin | Symbol | Function                          | Remark |
|-----|--------|-----------------------------------|--------|
| 1   | VLED-  | Power for LED backlight (Cathode) |        |
| 2   | VLED+  | Power for LED backlight (Anode)   |        |
| 3   | GND    | Power Ground                      |        |
| 4   | VDD    | 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    | Sample clock(DCLK)                |        |

|    |      |                   |  |
|----|------|-------------------|--|
| 31 | DISP | Display on/off    |  |
| 32 | NC   | No connection     |  |
| 33 | NC   | No connection     |  |
| 34 | DE   | Data input enable |  |
| 35 | NC   | No connection     |  |
| 36 | GND  | Power Ground      |  |
| 37 | NC   | No connection     |  |
| 38 | NC   | No connection     |  |
| 39 | NC   | No connection     |  |
| 40 | NC   | No connection     |  |

## 9.2. CTP PIN Definition

| Pin | Symbol | Function                        | Remark |
|-----|--------|---------------------------------|--------|
| 1   | VSS    | Ground for analog circuit       |        |
| 2   | VDDT   | Power Supply : +3.3V            |        |
| 3   | SCL    | I2C clock input I2C clock input |        |
| 4   | NC     | No connect                      |        |
| 5   | SDA    | I2C data input and output       |        |
| 6   | NC     | No connect                      |        |
| 7   | /RST   | External Reset, Low is active   |        |
| 8   | NC     | No connect                      |        |
| 9   | /INT   | External interrupt to the host  |        |
| 10  | VSS    | Ground for analog circuit       |        |



# 10. Reliability

Content of Reliability Test (Super Wide temperature, -30°C~80°C)

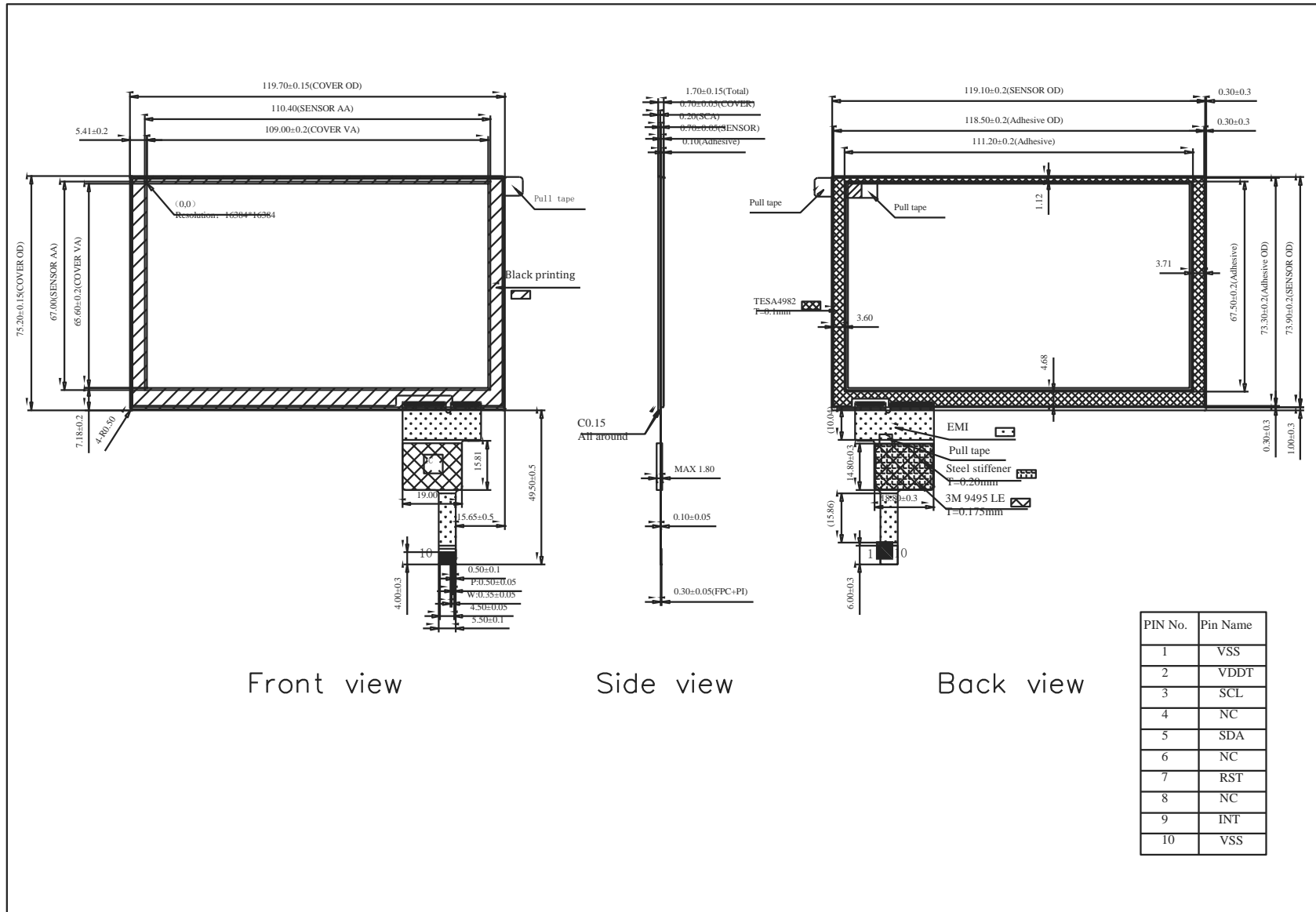
| Environmental Test                 |  |  |      |
|------------------------------------|--|--|------|
| Test Item                          | Content of Test  | Test Condition   | Note |
| High Temperature storage           | Endurance test applying the high storage temperature for a long time.  | 80°C<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.   | 80°C<br>200hrs   | —    |
| Low Temperature Operation          | Endurance test applying the electric stress under low temperature for a long time.   | -30°C<br>200hrs  | 1    |
| High Temperature/ Humidity storage | The module should be allowed to stand at 60°C,90%RH max  | 60°C,90%RH<br>96hrs  | 1,2  |
| Thermal shock resistance           | The sample should be allowed stand the following 10 cycles of operation<br><div style="text-align: center;"> <p style="margin: 0;">-30°C    25°C    80°C</p> <p style="margin: 0;">30min    5min    30min</p> <p style="margin: 0;">1 cycle</p> </div> | -30°C/80°C<br>10 cycles  | —    |
| Vibration test                     | Endurance test applying the vibration during transportation and using.   | Total fixed amplitude : 1.5mm<br>Vibration<br>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>,<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.

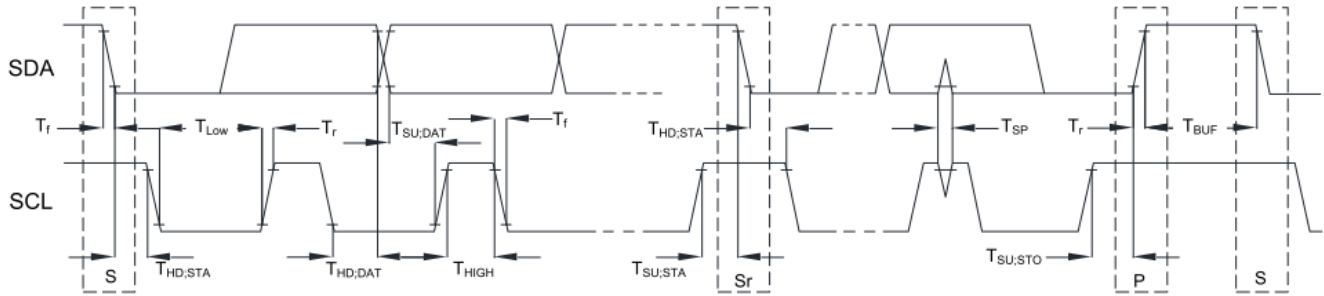
Note3: The packing have to including into the vibration testing.

# 11.Touch Panel Information



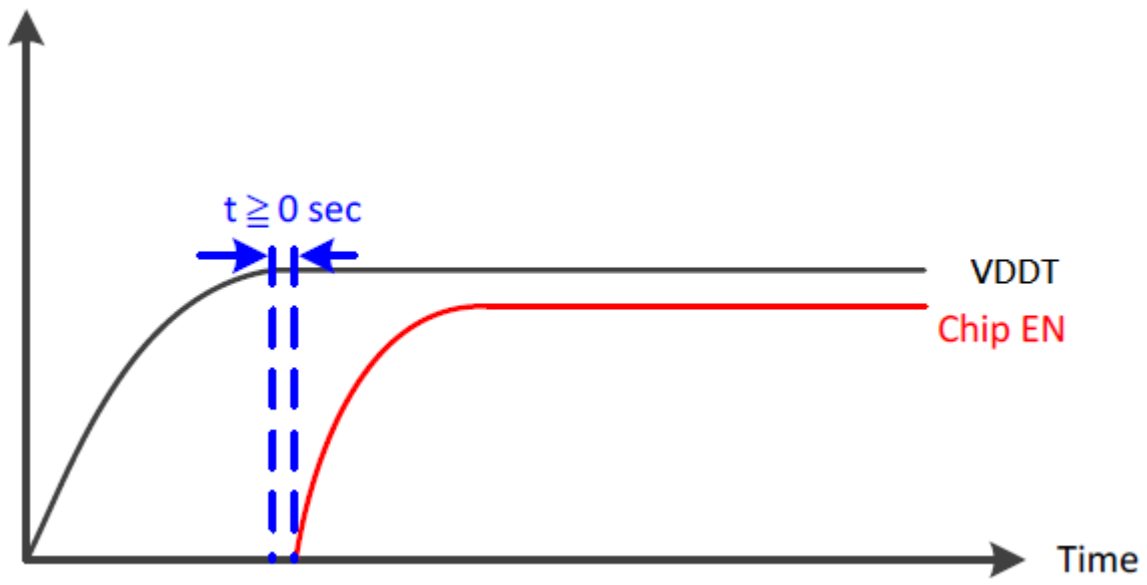
| PIN No. | Pin Name |
|---------|----------|
| 1       | VSS      |
| 2       | VDDT     |
| 3       | SCL      |
| 4       | NC       |
| 5       | SDA      |
| 6       | NC       |
| 7       | RST      |
| 8       | NC       |
| 9       | INT      |
| 10      | VSS      |

## 11.1. I2C AC Characteristics

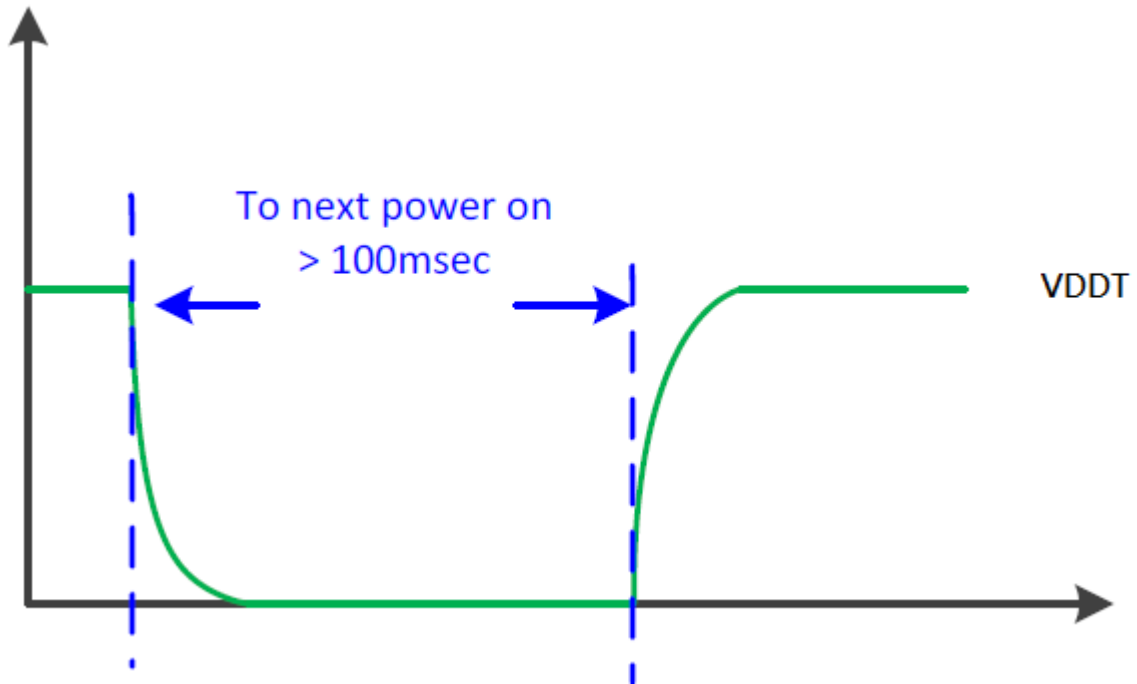


| Item  | Symbol              | 100kHz |      | 400kHz |      | Unit |
|---|---------------------|--------|------|--------|------|------|
|   |                     | Min.   | Max. | Min.   | Max. |      |
| SCL standard mode clock frequency   | F <sub>SCL</sub>    | 0      | 100  | 0      | 400  | kHz  |
| Hold time (repeated) START condition.<br>After this period, the first clock is generated. | T <sub>HD;STA</sub> | 4      | --   | 0.6    | --   | us   |
| LOW period of the SCL clock   | T <sub>LOW</sub>    | 4.7    | --   | 1.3    | --   | us   |
| HIGH period of the SCL clock  | T <sub>HIGH</sub>   | 4      | --   | 0.6    | --   | us   |
| Setup time for a repeat START condition.  | T <sub>SU;STA</sub> | 4.7    | --   | 0.6    | --   | us   |
| Data hold time  | T <sub>HD;DAT</sub> | 0      | 3.45 | 0      | 0.9  | us   |
| Data setup time   | T <sub>SU;DAT</sub> | 250    | --   | 100    | --   | ns   |
| Rising time of both SDA and SCL signals   | T <sub>r</sub>      | --     | 1000 | --     | 300  | ns   |
| Falling time of both SDA and SCL signals  | T <sub>f</sub>      | --     | 300  | --     | 300  | ns   |
| Setup time for STOP condition.  | T <sub>SU;STO</sub> | 4      | --   | 0.6    | --   | us   |
| Free time between STOP and START condition  | T <sub>BUF</sub>    | 4.7    | --   | 1.3    | --   | us   |
| Pulse width of spikes which must be suppressed by input filter                            | T <sub>SP</sub>     | --     | --   | 0      | 50   | ns   |

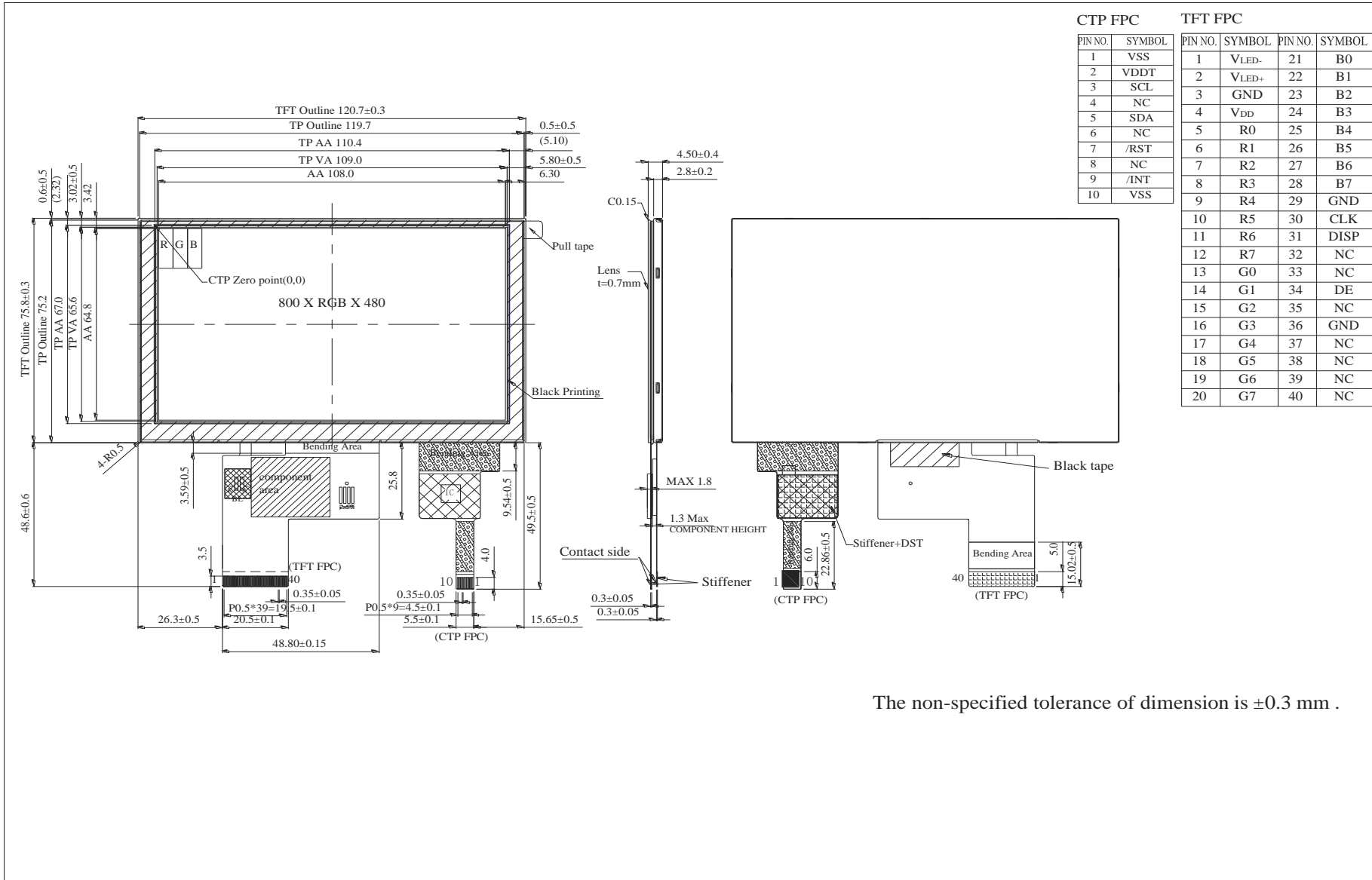
## 11.2. Power On Sequence



### 11.3. Power Off to Power On Sequence



# 12. Contour Drawing



The non-specified tolerance of dimension is ±0.3 mm .



**1、Panel Specification :**

- 1. Panel Type :  Pass  NG , \_\_\_\_\_
- 2. View Direction :  Pass  NG , \_\_\_\_\_
- 3. Numbers of Dots :  Pass  NG , \_\_\_\_\_
- 4. View Area :  Pass  NG , \_\_\_\_\_
- 5. Active Area :  Pass  NG , \_\_\_\_\_
- 6. Operating :  Pass  NG , \_\_\_\_\_
- 7. Storage Temperature :  Pass  NG , \_\_\_\_\_
- 8. Others : \_\_\_\_\_

**2、Mechanical**

- 1. PCB Size :  Pass  NG , \_\_\_\_\_
- 2. Frame Size :  Pass  NG , \_\_\_\_\_
- 3. Material of Frame :  Pass  NG , \_\_\_\_\_
- 4. Connector Position :  Pass  NG , \_\_\_\_\_
- 5. Fix Hole Position :  Pass  NG , \_\_\_\_\_
- 6. Backlight Position :  Pass  NG , \_\_\_\_\_
- 7. Thickness of PCB :  Pass  NG , \_\_\_\_\_
- 8. Height of Frame to PCB :  Pass  NG , \_\_\_\_\_
- 9. Height of Module :  Pass  NG , \_\_\_\_\_
- 10. Others :  Pass  NG , \_\_\_\_\_

**3、Relative Hole Size :**

- 1. Pitch of Connector :  Pass  NG , \_\_\_\_\_
- 2. Hole size of Connector :  Pass  NG , \_\_\_\_\_
- 3. Mounting Hole size :  Pass  NG , \_\_\_\_\_
- 4. Mounting Hole Type :  Pass  NG , \_\_\_\_\_
- 5. Others :  Pass  NG , \_\_\_\_\_

**4、Backlight Specification :**

- 1. B/L Type :  Pass  NG , \_\_\_\_\_
- 2. B/L Color :  Pass  NG , \_\_\_\_\_
- 3. B/L Driving Voltage (Reference for LED) :  Pass  NG , \_\_\_\_\_
- 4. B/L Driving Current :  Pass  NG , \_\_\_\_\_
- 5. Brightness of B/L :  Pass  NG , \_\_\_\_\_
- 6. B/L Solder Method :  Pass  NG , \_\_\_\_\_
- 7. Others :  Pass  NG , \_\_\_\_\_

>> **Go to page 2** <<



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

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**5、Electronic Characteristics of Module :**

- 1. Input Voltage :                       Pass                       NG , \_\_\_\_\_
- 2. Supply Current :                       Pass                       NG , \_\_\_\_\_
- 3. Driving Voltage for LCD :               Pass                       NG , \_\_\_\_\_
- 4. Contrast for LCD :                       Pass                       NG , \_\_\_\_\_
- 5. B/L Driving Method :                       Pass                       NG , \_\_\_\_\_
- 6. Negative Voltage Output :               Pass                       NG , \_\_\_\_\_
- 7. Interface Function :                       Pass                       NG , \_\_\_\_\_
- 8. LCD Uniformity :                       Pass                       NG , \_\_\_\_\_
- 9. ESD test :                               Pass                       NG , \_\_\_\_\_
- 10. Others :                                 Pass                       NG , \_\_\_\_\_

**6、Summary :**

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

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

Date :        /        /        \_\_\_\_\_