



Winstar Display Co., LTD

華凌光電股份有限公司

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SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF57CTLECDNNO#

| | |
|---|--|
| <p align="center">APPROVED BY:</p> <p align="center">(FOR CUSTOMER USE ONLY)</p> | <p>PCB VERSION: _____</p> <p>DATA: _____</p> |
|---|--|

| SALES BY | APPROVED BY | CHECKED BY | PREPARED BY |
|--------------------------------|-------------|------------|-------------|
| | | | 葉虹蘭 |
| ISSUED DATE: 2014/02/12 | | | |

TFT Display Inspection Specification: <http://www.winstar.com.tw/service.php>

| RECORDS OF REVISION | | | DOC. FIRST ISSUE |
|---------------------|------------|------------------|-----------------------------|
| VERSION | DATE | REVISED PAGE NO. | SUMMARY |
| 0 | 2012/09/06 | | First issue |
| A | 2014/02/12 | | Correct CN2. Updata Rev. |

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1. Module Classification Information

| | | | | | | | | | | | | |
|---|---|----|---|---|---|---|---|---|---|---|---|---|
| W | F | 57 | C | T | L | E | C | D | N | N | 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 : 5.7" TFT | | | | | | | | | | | | |
| ④ | Model serials no. | | | | | | | | | | | | |
| ⑤ | Backlight Type : | F→CCFL, White S→LED, High Light White | | | | | | T→LED, White | | | | | |
| ⑥ | LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction | I→Transmissive, W. T, 6:00 L→Transmissive, W.T,12:00 Z→Transmissive, W.T, Wide Viewing Angle for O-FILM | | | | | | | | | | | |
| ⑦ | A : TFT LCD B : TFT+FR+CONTROL BOARD C : TFT+FR+A/D BOARD D : TFT+FR+A/D BOARD+CONTROL BOARD E : TFT+FR+POWER BOARD F : TFT+CONTROL BOARD | | | | | | G : TFT+FR H : TFT+D/V BOARD I : TFT+FR+D/V BOARD J : TFT+POWER BD | | | | | | |
| ⑧ | Solution: | | | | | | | | | | | | |
| | 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 | | | | | | | |
| ⑨ | D: Digital L : LVDS | | | | | | | | | | | | |
| ⑩ | Interface : N : without control board A : 8Bit B : 16Bit | | | | | | | | | | | | |
| ⑪ | TS : N : Without TS T : resistive touch panel C : capacitive touch panel | | | | | | | | | | | | |
| ⑫ | Version | | | | | | | | | | | | |
| ⑬ | Special Code | #:Fit in with ROHS directive regulations | | | | | | | | | | | |

2.Summary

This technical specification applies to 5.7' color TFT-LCD panel. The 5.7' color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

3.General Specifications

| Item | Dimension | Unit |
|--------------------------------|-----------------------------------|------|
| Dot Matrix | 320 x RGBx240(TFT) | dots |
| Module dimension | 143.5 x 104.1 x 12.35 | mm |
| Active area | 115.2 x 86.4 | mm |
| Dot pitch | 0.12 x 0.36 | mm |
| LCD type | TFT, Normally White, Transmissive | |
| View Direction | 6 o'clock | |
| Gray Scale Inversion Direction | 12 o'clock | |
| Backlight Type | LED, Normally White | |

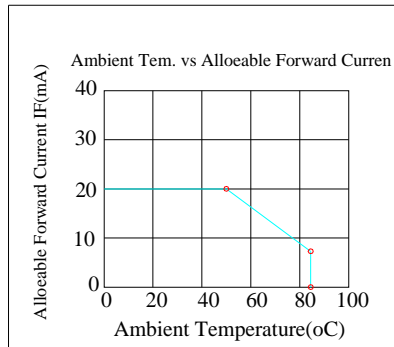
*Color tone slight changed by temperature and driving voltage.

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

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



5. Electrical Characteristics

5.1. Operating conditions:

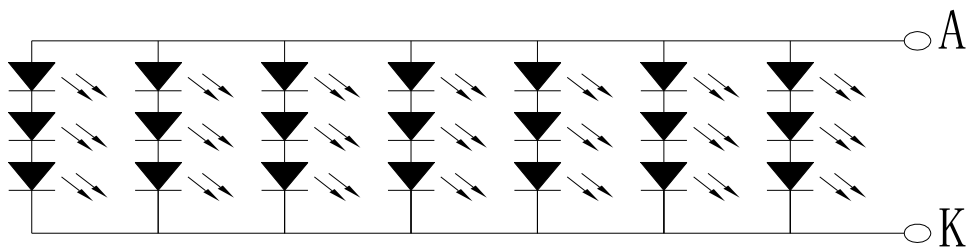
| Item | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|------------------------|--------|-----------|-----|-----|-----|------|----------|
| Supply Voltage For LCM | VCC | — | 3.0 | 3.3 | 3.6 | V | |
| Supply Current For LCM | ICC | — | — | 110 | 170 | mA | Note1 |
| Power Consumption | — | — | — | 363 | 612 | mW | VCC=3.3V |

Note 1 : This value is test for VCC=3.3V , Ta=25 °C only

5.2. LED driving conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|-------------------|--------|------|--------|------|------|------------|
| LED current | | - | 140 | - | mA | |
| Power Consumption | | 1260 | - | 1470 | mW | |
| LED voltage | VBL+ | 9.0 | - | 10.5 | V | Note 1 |
| LED Life Time | | - | 50,000 | - | Hr | Note 2,3,4 |

Note 1 : There are 1 Groups LED



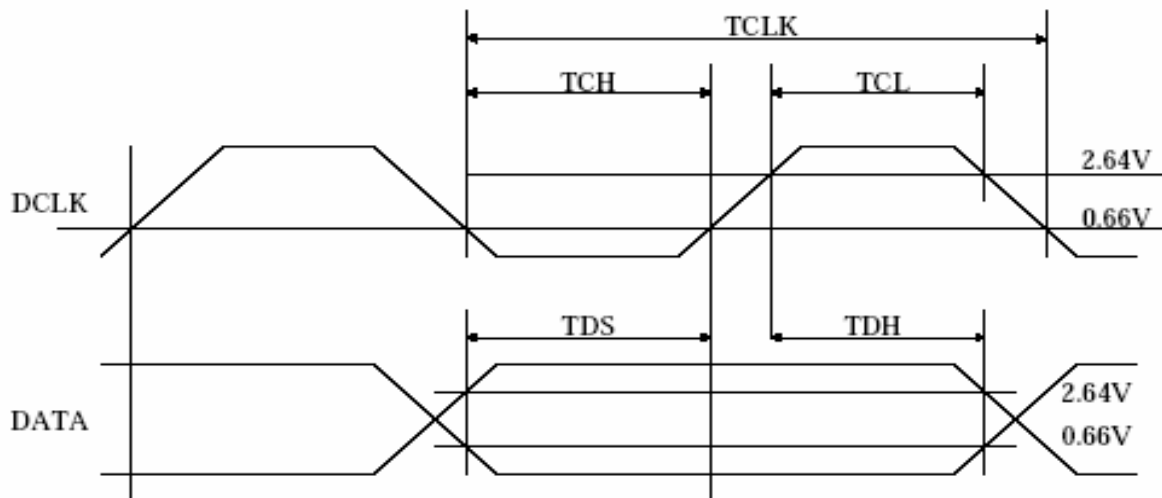
Note 2 : Ta = 25 °C

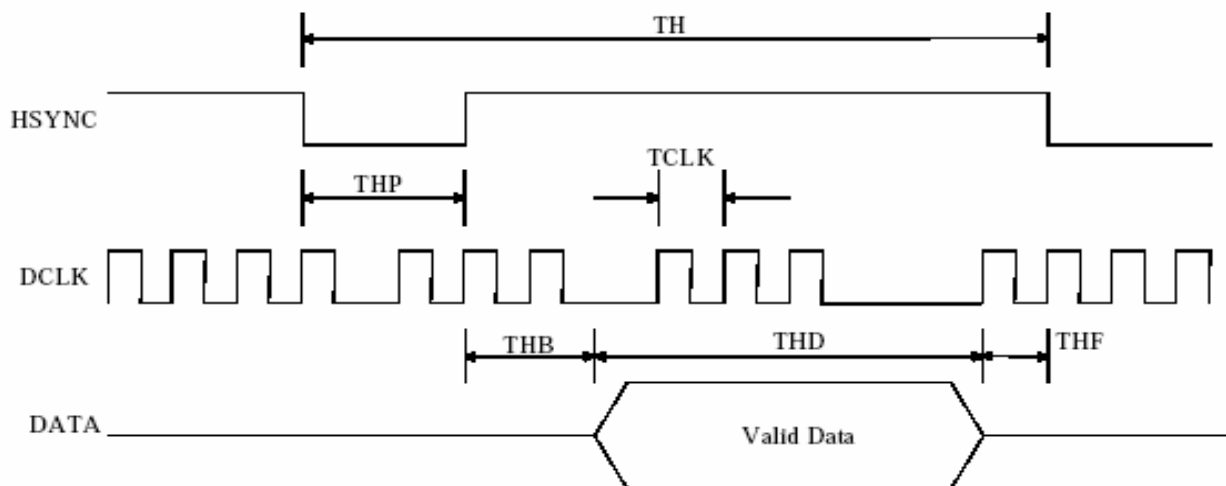
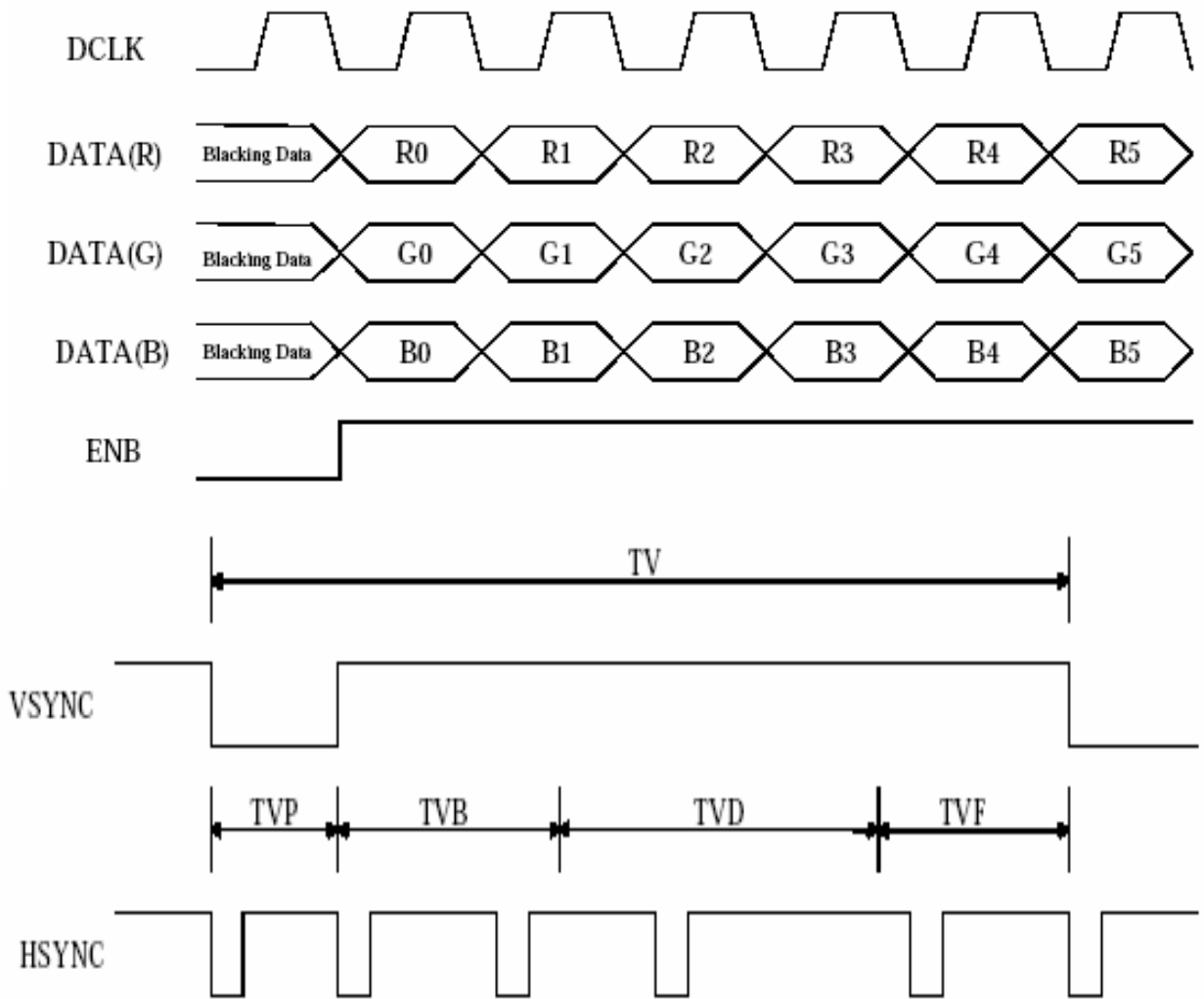
Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

6. Timing Characteristics

| Signal | Item | Symbol | Min. | Typ. | Max. | Unit | |
|--------|----------------|--------|------|------|-------|------|------|
| Dclk | Frequency | Dclk | - | 6.4 | - | MHZ | |
| | High time | Tch | - | 78 | - | ns | |
| | Low time | Tcl | - | 78 | - | ns | |
| Data | Setup time | Tds | 12 | - | - | ns | |
| | Hold time | Tdh | 12 | - | - | ns | |
| Hsync | Period | TH | - | 408 | - | DCLK | |
| | Pulse Width | Thp | - | 30 | - | DCLK | |
| | Back-Porch | Thb | - | 38 | - | DCLK | |
| | Display Period | Thd | - | 320 | - | DCLK | |
| | Front-Porch | Thf | - | 20 | - | DCLK | |
| Vsync | Period | NTSC | TV | - | 262.5 | - | DCLK |
| | | PAL | | | 312.5 | | |
| | Pulse Width | | Tvp | 1 | 3 | 5 | TH |
| | Back-Porch | NTSC | Tvb | - | 15 | - | TH |
| | | PAL | | | 23 | | |
| | Display Period | | Tvd | - | 240 | - | TH |
| | Front-Porch | NTSC | Tvf | - | 4.5 | - | TH |
| PAL | | 46.5 | | | | | |





6.1. Basic Display Color and Gray Scale

| | Color & Gray scale | Data signal | | | | | | | | | | | | | | | | | | |
|--------------------|---------------------|-------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | Gray Scale | R0 | R1 | R2 | R3 | R4 | R5 | G0 | G1 | G2 | G3 | G4 | G5 | B0 | B1 | B2 | B3 | B4 | B5 |
| Basic color | Black | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Green | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Cyan | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Red | - | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Magenta | - | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gray Scale of red | Black | CS0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | CS1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | CS2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | ↓ | | | | ↓ | | | | | | ↓ | | | | | | ↓ | | |
| | Brighter | CS61 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | CS62 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | CS63 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gray Scale of green | Black | CS0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Darker | | CS1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | CS2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | ↓ | | | | ↓ | | | | | | ↓ | | | | | | ↓ | | |
| Brighter | | CS61 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | CS62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | CS63 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of blue | | Black | CS0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | CS1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | | CS2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| | | ↓ | | | | ↓ | | | | | | ↓ | | | | | | ↓ | | |
| | Brighter | CS61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| | | CS62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| | | CS63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

7. Optical Characteristics

| Item | Symbol | Condition. | Min | Typ. | Max. | Unit | Remark |
|--------------------|--------|---------------------------------------|---------------------------------------|-------|-------|-------------------|-------------------|
| Response time | Tr | $\theta = 0^\circ$ 、 $\Phi = 0^\circ$ | - | 15 | 30 | .ms | Note 3,5 |
| | Tf | | - | 35 | 50 | .ms | |
| Contrast ratio | CR | At optimized viewing angle | 150 | 200 | - | - | Note 4,5 |
| Color Chromaticity | White | Wx | $\theta = 0^\circ$ 、 $\Phi = 0^\circ$ | 0.282 | 0.312 | 0.342 | Note 2,6,7 |
| | | Wy | | 0.319 | 0.349 | 0.379 | |
| Viewing angle | Hor. | Θ_R | $CR \geq 10$ | 60 | 70 | Deg. | Note 1 |
| | | Θ_L | | 60 | 70 | | |
| | Ver. | Φ_T | | 40 | 50 | | |
| | | Φ_B | | 60 | 70 | | |
| Brightness | - | - | 400 | 500 | - | cd/m ² | Center of display |

Ta=25±2°C, IL=140mA

Note 1: Definition of viewing angle range

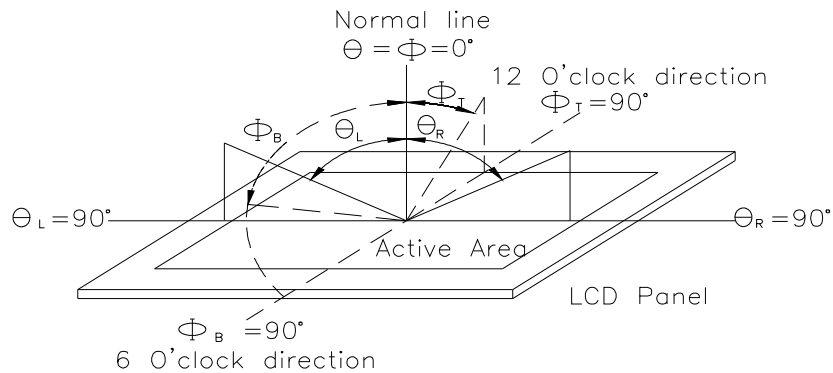


Fig.7.1. Definition of viewing angle

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.

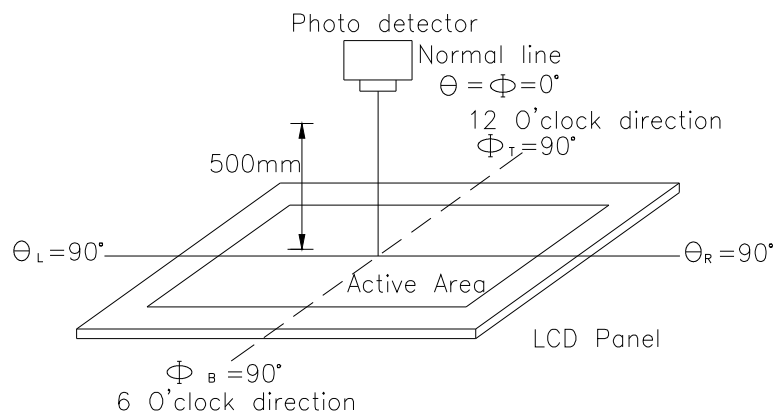
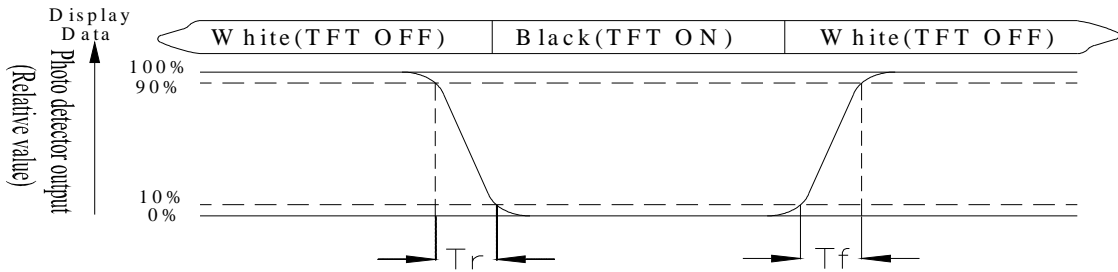


Fig. 7.2. Optical measurement system setup

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.

8.Interface

8.1. LCM PIN Definition

| Pin | Symbol | Function | Remark |
|-----|--------|--|--------|
| 1 | GND | Ground | |
| 2 | CK | Clock signal for sampling each data signal | |
| 3 | Hsync | Horizontal synchronous signal | |
| 4 | Vsync | Vertical synchronous signal | |
| 5 | GND | Ground | |
| 6 | R0 | Red Data bit(LSB) | |
| 7 | R1 | Red Data bit | |
| 8 | R2 | Red Data bit | |
| 9 | R3 | Red Data bit | |
| 10 | R4 | Red Data bit | |
| 11 | R5 | Red Data bit(MSB) | |
| 12 | GND | Ground | |
| 13 | G0 | Green Data bit(LSB) | |
| 14 | G1 | Green Data bit | |
| 15 | G2 | Green Data bit | |
| 16 | G3 | Green Data bit | |
| 17 | G4 | Green Data bit | |
| 18 | G5 | Green Data bit(MSB) | |
| 19 | GND | Ground | |
| 20 | B0 | Blue Data bit(LSB) | |
| 21 | B1 | Blue Data bit | |
| 22 | B2 | Blue Data bit | |
| 23 | B3 | Blue Data bit | |
| 24 | B4 | Blue Data bit | |
| 25 | B5 | Blue Data bit(MSB) | |
| 26 | GND | Ground | |
| 27 | ENAB | Signal to settle the horizontal display position | Note 1 |
| 28 | VCC | +3.3V power supply | |
| 29 | VCC | +3.3V power supply | |
| 30 | R/L | Selection signal for horizontal scanning direction (L: Normally H: Right-and-left reversal) | Note 2 |
| 31 | U/D | Selection signal for vertical scanning direction (H: Normally L: Up-and-Down reversal) | Note 2 |
| 32 | NC | No connect | |
| 33 | GND | Ground | |

Note 1: The horizontal display start timing is settled in accordance with a rising timing of ENAB signal. In case ENAB is fixed “Low”, the horizontal start timing is determined as described in 6-4 . Don’t keep ENAB “High” during operation.

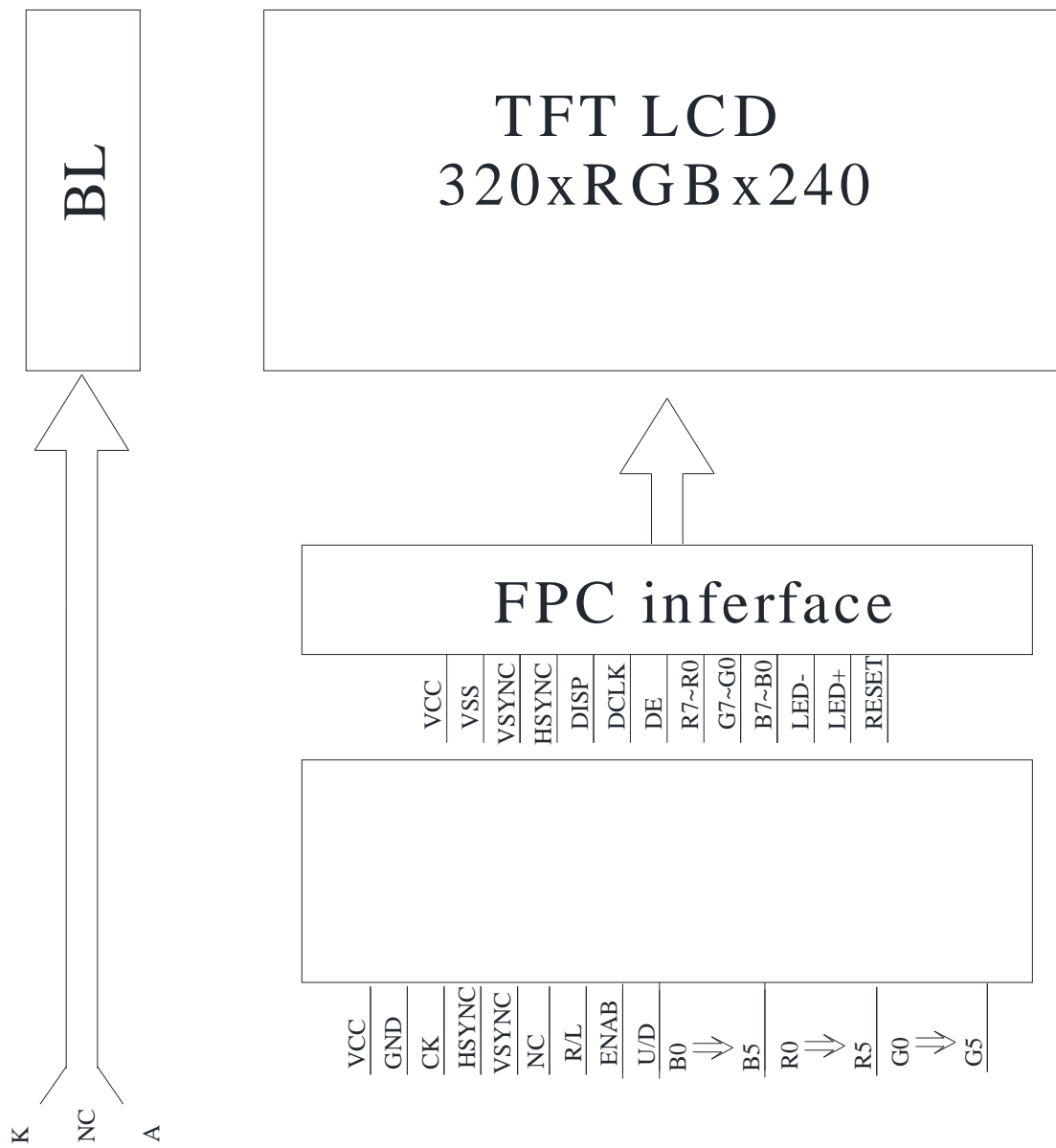
Note2:



8.2. Backlight PIN Definition

| Pin No. | Symbol | Description |
|---------|---------|---------------------|
| 1 | LED-(K) | Black, LED_ Cathode |
| 2 | NC | No connection |
| 3 | LED+(A) | Red, LED_ Anode |

9. Block Diagram



10. Reliability

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

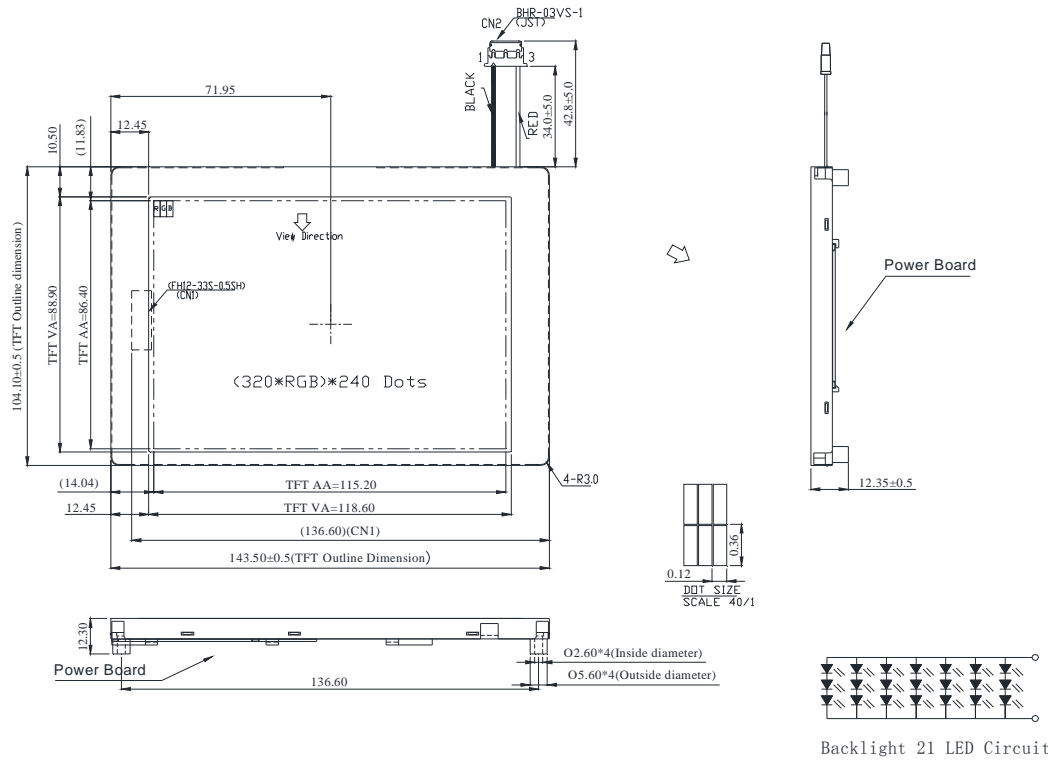
| Environmental Test | | | |
|---|---|--|----------|
| Test Item | Content of Test | Test Condition | Note |
| High Temperature storage | Endurance test applying the high storage temperature for a long time. | 80°C 200hrs | 2 |
| Low Temperature storage | Endurance test applying the high storage temperature for a long time. | -30°C 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 200hrs | — |
| Low Temperature Operation | Endurance test applying the electric stress under low temperature for a long time. | -20°C 200hrs | 1 |
| High Temperature/ Humidity Operation | The module should be allowed to stand at 60 °C,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature. | 60°C,90%RH 96hrs | 1,2 |
| Thermal shock resistance | The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p style="text-align: center;">-20°C 25°C 70°C</p> <p style="text-align: center;">30min ← 5min → 30min</p> <p style="text-align: center;">1 cycle</p> </div> | -20°C/70°C 10 cycles | — |
| Vibration test | Endurance test applying the vibration during transportation and using. | Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz 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=800V, RS=1.5kΩ CS=100pF 1 time | — |

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: Vibration test will be conducted to the product itself without putting it in a container.

11. Contour Drawing



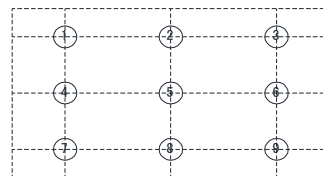
| PIN NO. | SYMBOL | PIN NO. | SYMBOL |
|---------|--------|---------|--------|
| 1 | GND | 18 | G5 |
| 2 | CK | 19 | GND |
| 3 | Hsync | 20 | B0 |
| 4 | Vsync | 21 | B1 |
| 5 | GND | 22 | B2 |
| 6 | R0 | 23 | B3 |
| 7 | R1 | 24 | B4 |
| 8 | R2 | 25 | B5 |
| 9 | R3 | 26 | GND |
| 10 | R4 | 27 | ENAB |
| 11 | R5 | 28 | Vcc |
| 12 | GND | 29 | Vcc |
| 13 | G0 | 30 | R/L |
| 14 | G1 | 31 | U/D |
| 15 | G2 | 32 | NC |
| 16 | G3 | 33 | GND |
| 17 | G4 | | |

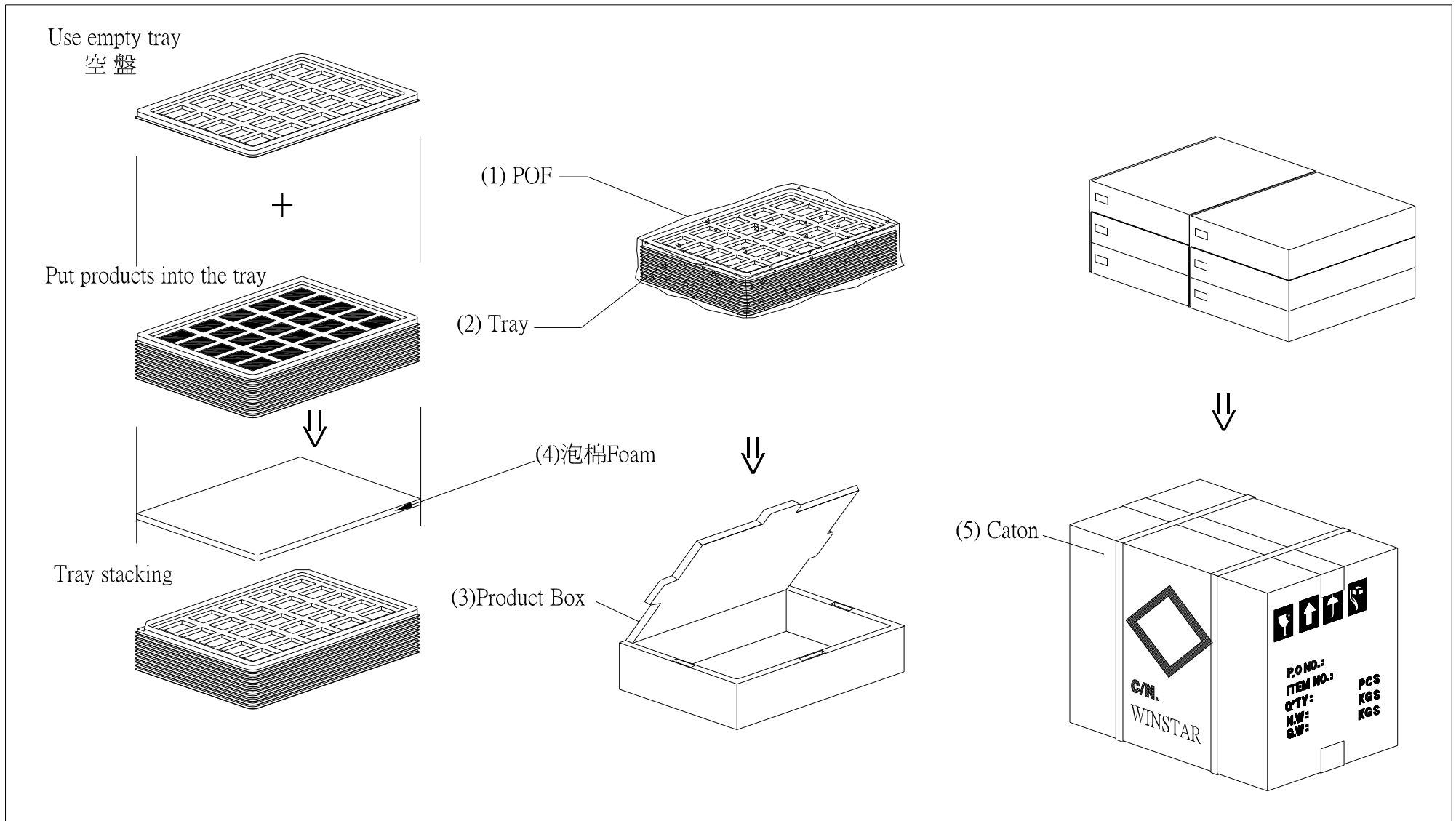
CN1

| PIN NO. | SYMBOL |
|---------|--------|
| 1 | K |
| 2 | NC |
| 3 | A |

CN2

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







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 Temperature : Pass NG , _____
- 7. Storage Temperature : Pass NG , _____
- 8. Others : _____

2、Mechanical Specification :

- 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 Type) : 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 : _____

Page: 2

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 : / / _____