



MODEL NO : TM101JDHG38

MODEL VERSION: 00

SPEC VERSION : V1.0

ISSUED DATE: 2018-11-19

☒ **Preliminary Specification**

☐ **Final Product Specification**

Customer : _____

| Approved by | Notes |
|-------------|-------|
| | |

TIANMA Confirmed :

| Prepared by | Checked by | Approved by |
|-------------|------------|-------------|
| Panpan Cao | | |

This technical specification is subjected to change without notice



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Record of Revision

| Rev | Issued Date | Description | Editor |
|-----|-------------|-------------------------------------|------------|
| 1.0 | 2018-11-19 | Preliminary Specification Released. | Panpan Cao |
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1 General Specifications

| Feature | | Spec |
|----------------------------|---------------------------------|---------------------------------|
| Display Spec. | Size | 10.1 inch |
| | Resolution | 1280(RGB) x 800 |
| | Technology Type | SFT |
| | Pixel Configuration | R.G.B. Vertical Stripe |
| | Pixel Pitch (mm) | 0.1695x0.1695 |
| | Display Mode | Transmissive, Normally Black |
| | Surface Treatment(Up Polarizer) | HC |
| | Viewing Direction | All direction |
| Mechanical Characteristics | LCM (W x H x D) (mm) | 231.22x150.60x4.4 |
| | Active Area(mm) | 216.96x135.60 |
| | With /Without TSP | Without TSP |
| | Matching Connection Type | IPEX 20453-040T-1 or compatible |
| | Weight (g) | TBD |
| Electrical Characteristics | Interface | 1port LVDS, 6/8bit selectable |
| | Color Depth | 262K/16.7M |
| | Driver IC | ST5084*1,ST5821*3 |

Note 1: Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.

Note 2 : Requirements on Environmental Protection: Q/S0002

Note 3 : LCM weight tolerance : +/- 5%



2 Input/Output Terminals

2.1 TFT LCD Panel

Connector type: JAE HD1S040HA1 or compatible
Mating Connector: IPEX 20453-040T-1 or compatible

| No | Symbol | I/O | Description | Comment |
|----|----------|-----|--|---------------------------------|
| 1 | NC | - | No Connection | |
| 2 | VDD | P | Power Supply +3.3V | |
| 3 | VDD | P | Power Supply +3.3V | |
| 4 | VDD | P | Power Supply +3.3V | |
| 5 | NC | - | No Connection | |
| 6 | NC | - | No Connection | |
| 7 | NC | - | No Connection | |
| 8 | Rxin0- | I | -LVDS differential data input(R0~R5,G0) | |
| 9 | Rxin0+ | I | +LVDS differential data input(R0~R5,G0) | |
| 10 | GND | P | Power ground | |
| 11 | Rxin1- | I | -LVDS differential data input(G1~G5,B0~B1) | |
| 12 | Rxin1+ | I | +LVDS differential data input(G1~G5,B0~B1) | |
| 13 | GND | P | Power ground | |
| 14 | Rxin2- | I | -LVDS differential data input(B2~B5,HS,VS,DE) | |
| 15 | Rxin2+ | I | +LVDS differential data input(B2~B5,HS,VS,DE) | |
| 16 | GND | P | Power ground | |
| 17 | RxCLK- | I | -LVDS differential data input | |
| 18 | RxCLK+ | I | +LVDS differential data input | |
| 19 | GND | P | Power ground | |
| 20 | Rxin3- | I | -LVDS differential data input(R6~R7,G6~G7,B6~B7) | Connect to GND in 6 bit mode |
| 21 | Rxin3+ | I | +LVDS differential data input(R6~R7,G6~G7,B6~B7) | |
| 22 | GND | P | Power ground | |
| 23 | NC | - | No Connection | |
| 24 | NC | - | No Connection | |
| 25 | GND | P | Power ground | |
| 26 | NC | - | No Connection | |
| 27 | SEL6/8 | - | SEL6/8="H", 6bit; SEL6/8="L", 8bit | |
| 28 | GND | P | Power ground | |
| 29 | NC | - | No Connection | |
| 30 | NC | - | No Connection | |
| 31 | VLED_GND | P | VLED Ground | |
| 32 | VLED_GND | P | VLED Ground | |
| 33 | VLED_GND | P | VLED Ground | |
| 34 | NC | - | No Connection | |
| 35 | VLED_PWM | P | Backlight dimming control (NC: 100%duty cycle) | |
| 36 | VLED_EN | P | Backlight on/off control (1 or NC:ON, 0:OFF) | |
| 37 | NC | - | No Connection | |
| 38 | VLED | P | Backlight power supply | |
| 39 | VLED | P | Backlight power supply | |
| 40 | VLED | P | Backlight power supply | |

Note: I/O definition:

I-----Input P----Power/Ground

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3 Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V

| Item | Symbol | MIN | MAX | Unit | Remark |
|------------------------------|-----------------|-------|------|------------------|--------------|
| Voltage Input | V _{in} | -0.50 | 5.00 | V | Note1 |
| Operating Temperature | T _{op} | -20.0 | 70.0 | °C | |
| Storage Temperature | T _{st} | -30.0 | 80.0 | °C | |
| Relative Humidity (Note2) | RH | -- | ≤95 | % | Ta≤40°C |
| | | -- | ≤85 | % | 40°C<Ta≤50°C |
| | | -- | ≤55 | % | 50°C<Ta≤60°C |
| | | -- | ≤36 | % | 60°C<Ta≤70°C |
| | | -- | ≤24 | % | 70°C<Ta≤80°C |
| Absolute Humidity | AH | -- | ≤70 | g/m ³ | Ta>70°C |

Table 3.1 absolute maximum rating

Note1: Input voltage include Rxin0-/+, Rxin1-/+, Rxin2-/+, Rxin3-/+, RxCLK-/+, SEL6/8,VDD.

Note2: Ta means the ambient temperature.

It is necessary to limit the relative humidity to the specified temperature range.

Condensation on the module is not allowed.



4 Electrical Characteristics

4.1 Driving TFT LCD Panel

 $V_{CC}=3.3V, GND=0V, T_a=25^{\circ}C$

| Item | | Symbol | MIN | TYP | MAX | Unit | Remark |
|--------------------------------------|------------|--------|------|------|------|------|--------|
| Power supply Voltage | | VDD | 3.00 | 3.30 | 3.60 | V | |
| Power supply ripple | | Vp-p | - | - | 100 | mV | |
| Power supply current | | IDD | - | 280 | - | mA | |
| Power consumption | | P | - | 924 | - | mW | Note1 |
| Differential input voltage | | Vid | 200 | - | 600 | mV | |
| Differential input common voltage | | Vcm | - | 1.2 | - | V | |
| Differential input threshold voltage | Low level | VTL | -100 | - | - | mV | |
| | High level | VTH | - | - | 100 | mV | |
| Inrush current | | Irush | - | - | 1.5 | A | |

Table 4.1 LCD module electrical characteristics

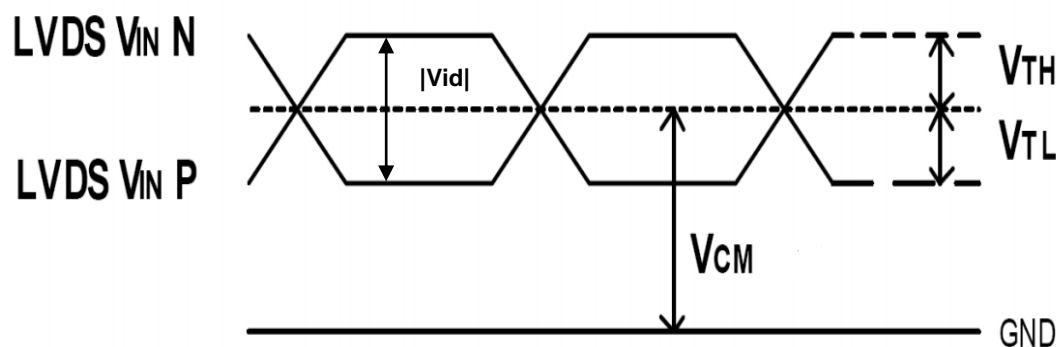


Figure 4.1 LVDS DC characteristics

Note1: To test the current dissipation, using the “color bar” testing pattern shown as below:

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

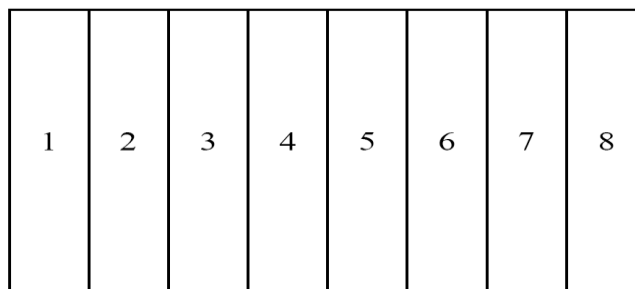


Figure 4.1.2 Current dissipation testing pattern



4.2 Driving Backlight

Ta=25℃

| Item | | Symbol | Min | Typ | Max | Unit | Remark | |
|-----------------------------------|------------|--------|-----|-------|------|------|--------|--|
| Backlight power supply voltage | | VLED | 5.5 | 12 | 12.5 | V | | |
| Backlight power supply current | | I_LED | - | 322 | - | mA | | |
| Backlight power consumption | | P_LED | - | 3864 | - | mW | | |
| Input voltage for VLED_PWM signal | High level | - | 2.0 | - | 5.0 | V | | |
| | Low level | - | 0 | - | 0.4 | V | | |
| Input voltage for VLED_EN | High level | - | 2.0 | - | 5.0 | V | | |
| | Low level | - | 0 | - | 0.4 | V | | |
| VLED_PWM frequency | | Fpwm | 200 | - | 20k | HZ | | |
| VLED_PWM duty | | D | 5 | | 100 | % | Note1 | |
| Operating Life Time | | -- | -- | 30000 | -- | hrs | Note2 | |

Note 1: According to LED driver IC characteristics, the minimum value of VLED_PWM duty may vary with VLED_PWM frequency, higher the frequency, bigger the duty.

Note 2: Optical performance should be evaluated at Ta=25℃ only.

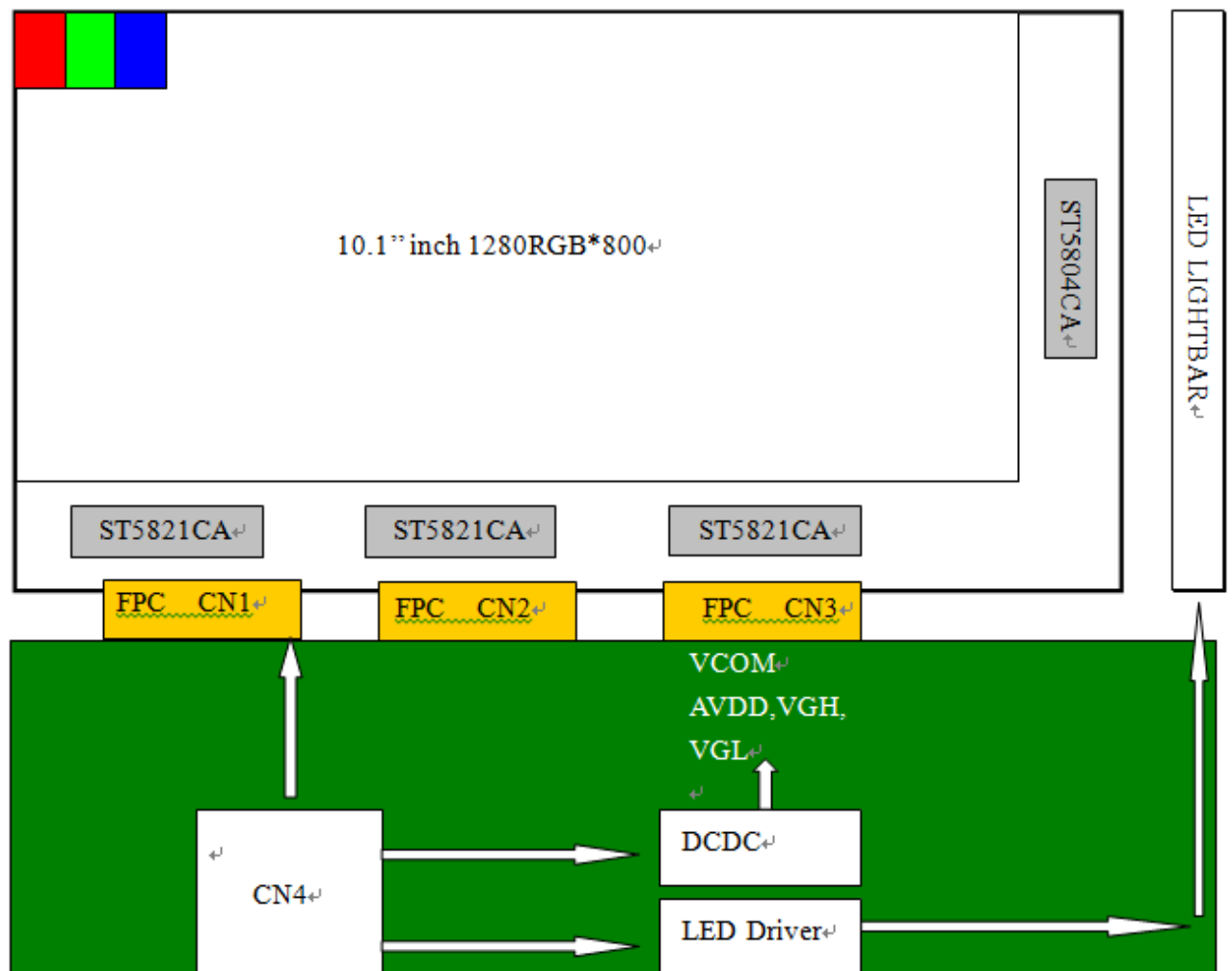
If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced.

Operating life means brightness goes down to 50% of initial brightness.

Typical operating life time is estimated data.



4.3 Block Diagram





5 Timing Chart

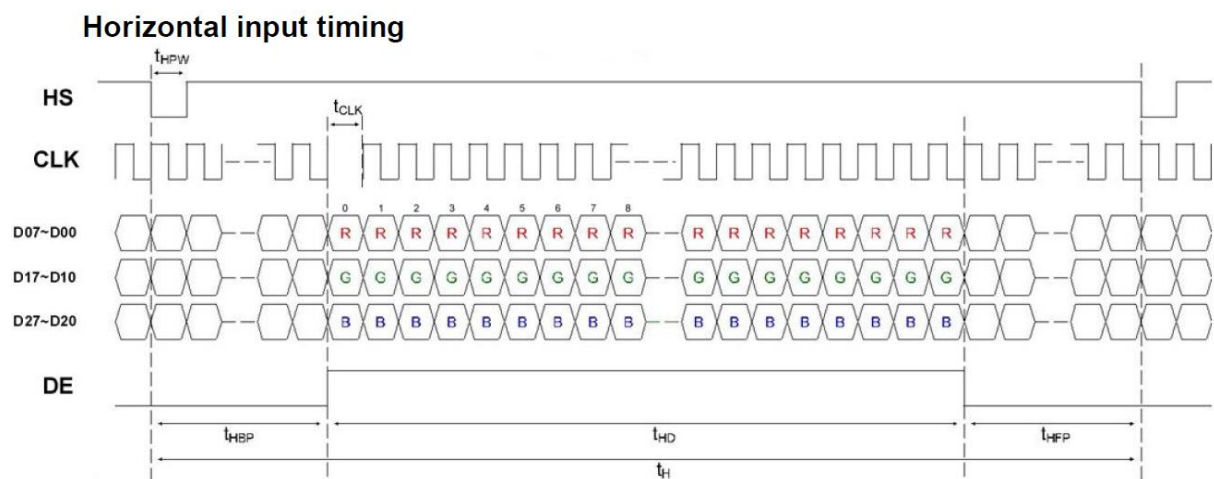
5.1 LVDS signal timing characteristics

VCC=3.3V, GND=0V, Ta=25°C

| Parameter | Symbol | Min | Typ | Max | Unit | Remark |
|--------------------------|--------------------|------|------|-----------------------|------------------|-------------------------------------|
| CLK frequency | 1/t _{clk} | 62.6 | 68.2 | 78.1 | MHz | |
| Horizontal blanking time | t _{HBT} | 20 | 69 | 164 | t _{clk} | t _{hbp} + t _{HFP} |
| Horizontal back porch | t _{HBP} | - | 5 | 164- t _{HFP} | t _{clk} | |
| Horizontal display area | t _{HD} | - | 1280 | - | t _{clk} | |
| Horizontal front porch | t _{HFP} | 15 | 64 | 159 | t _{clk} | |
| Horizontal period | t _H | 1300 | 1349 | 1444 | t _{clk} | |
| Horizontal pulse width | t _{HPW} | - | 1 | 256 | t _{clk} | |
| Vertical blanking time | t _{VBT} | 5 | 42 | 101 | t _H | t _{vbp} + t _{VFP} |
| Vertical back porch | t _{VBP} | - | 2 | 101- t _{VFP} | t _H | |
| Vertical display area | t _{VD} | - | 800 | - | t _H | |
| Vertical front porch | t _{VFP} | 3 | 40 | 99 | t _H | |
| Vertical period | t _V | 803 | 842 | 901 | t _H | |
| Vertical pulse width | t _{VPW} | - | 1 | 128 | t _H | |
| Frame Rate | F | - | 60 | - | HZ | |

Table 5.1 timing parameter

5.2 Input Clock and Data timing Diagram:



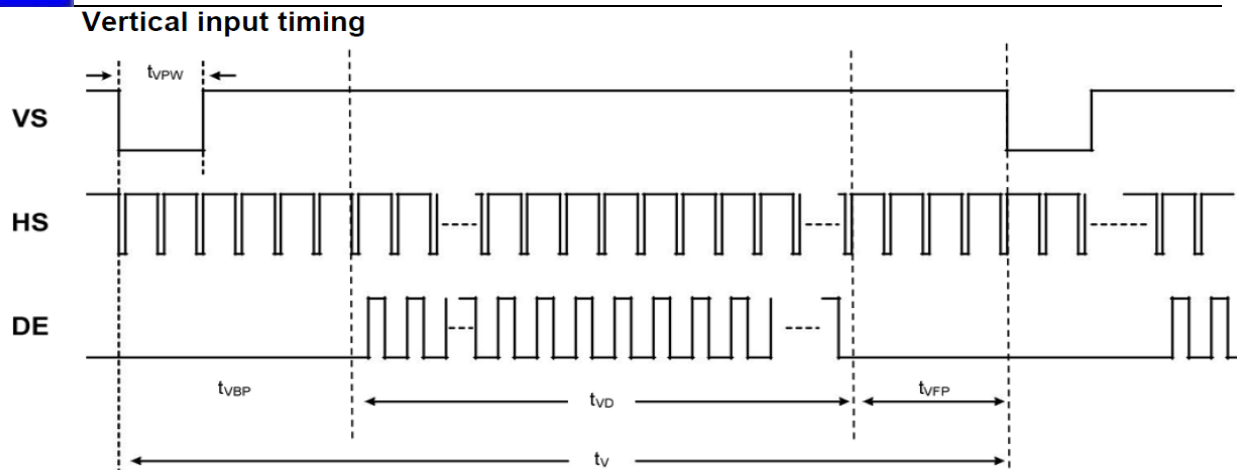
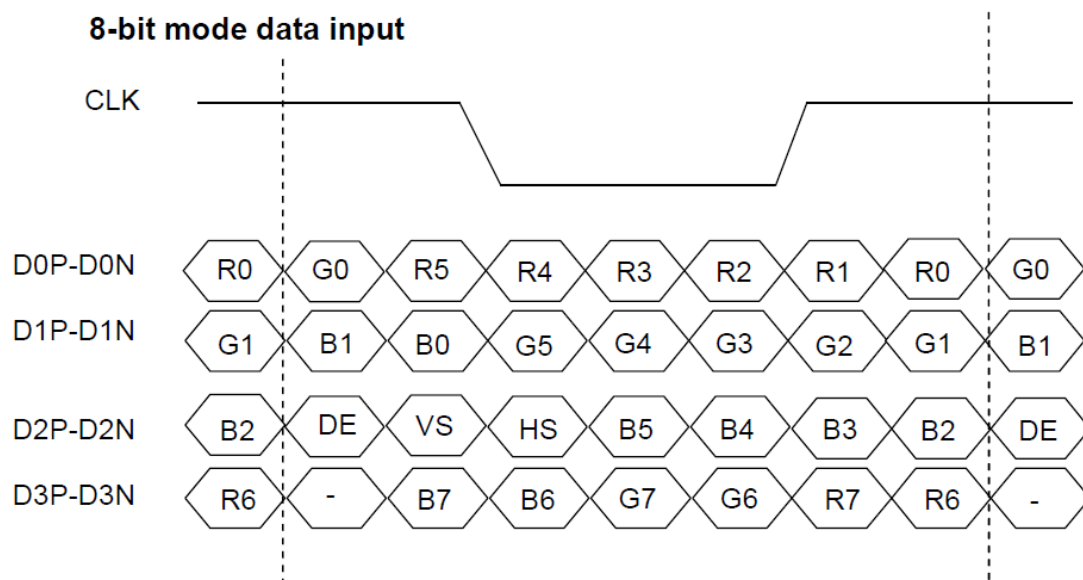


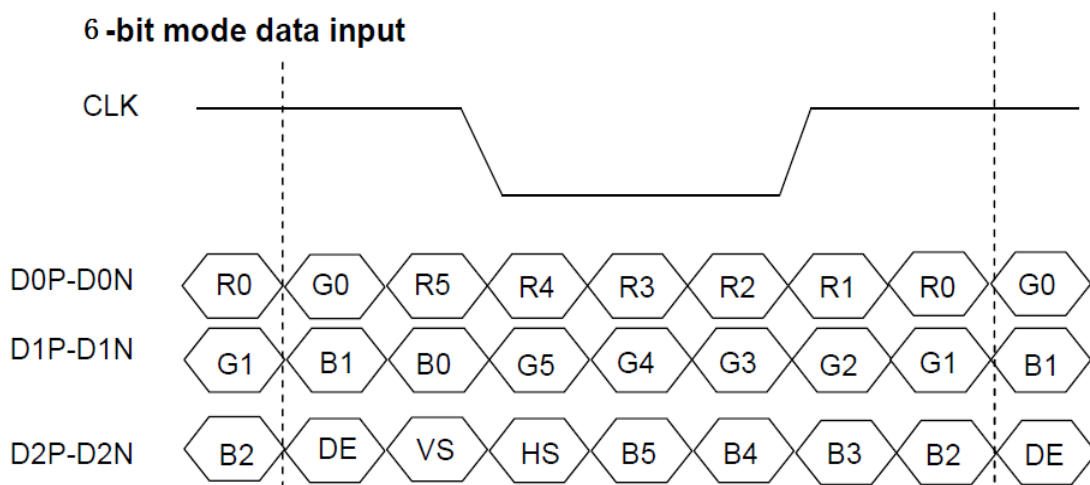
Figure 5.2 Input signal data timing

5.3 LVDS data input format

8-bit mode data input



6-bit mode data input





5.4 Power On/Off Sequence

| Item | Symbol | Min | Typ | Max | Unit | Remark |
|-------------------------------|--------|-----|-----|-----|------|--------|
| VDD on to VDD stable | Tp1 | 0.5 | - | 10 | ms | |
| VDD stable to signal on | Tp2 | 0 | - | 50 | ms | |
| Signal on to VLED_EN on | Tp3 | 200 | - | - | ms | |
| PWM on to VLED_EN on | Tp4 | 0 | - | 200 | ms | |
| VLED to PWM on | Tp5 | 10 | - | - | ms | |
| VLED on to VLED stable | Tp6 | 0.5 | - | 10 | ms | |
| VDD off time | Tp7 | 0 | - | 10 | ms | |
| VDD off to next VDD on | Tp8 | 500 | - | - | ms | |
| Signal off before VDD off | Tp9 | 0 | - | 50 | ms | |
| VLED_EN off before signal off | Tp10 | 200 | - | - | ms | |
| VLED_EN off before PWM off | Tp11 | 0 | - | 200 | ms | |
| PWM off before VLED off | Tp12 | 10 | - | - | ms | |

Table 5.1 Power on/off sequence

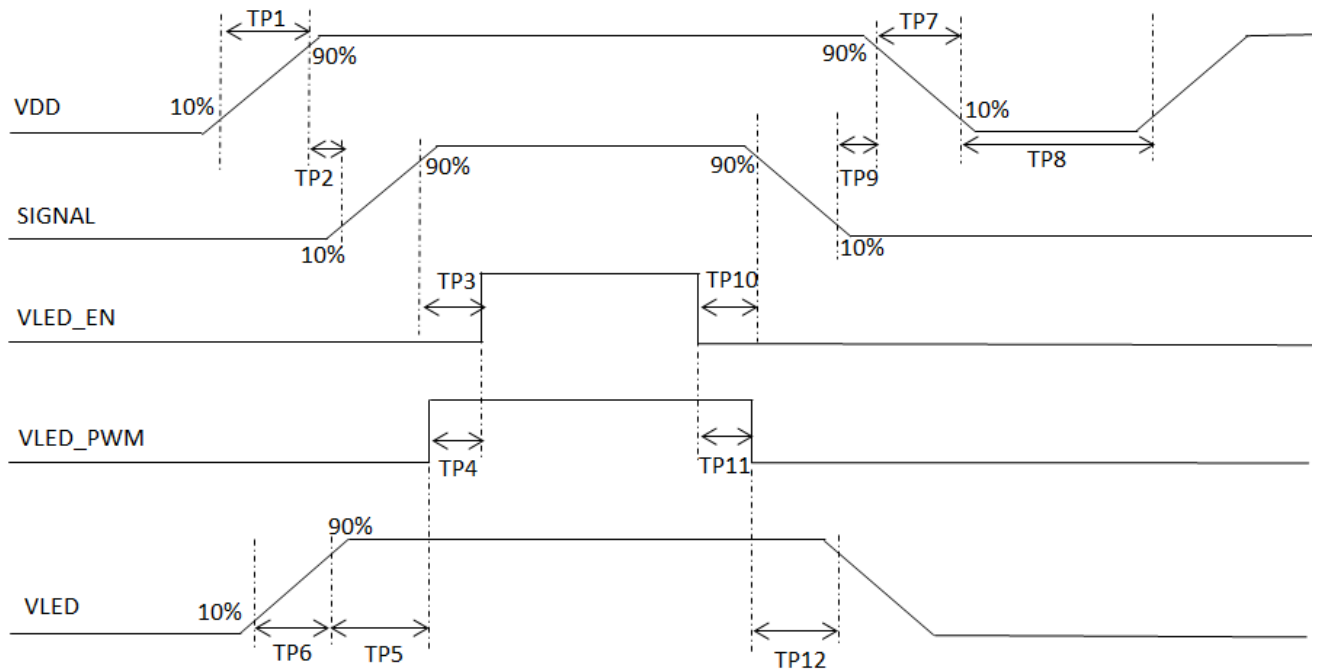


Figure 5.2 Interface power on/off sequence



6 Optical Characteristics

6.1 Optical Specification

Ta=25℃

| Item | | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|----------------|-------|-----------------------------------|-----------------|-----|-----|-----|-------------------|----------------|
| View Angles | | θT | CR≧10 | 75 | 85 | - | Degree | Note 2 |
| | | θB | | 75 | 85 | - | | |
| | | θL | | 75 | 85 | - | | |
| | | θR | | 75 | 85 | - | | |
| Contrast Ratio | | CR | θ=0° | 600 | 800 | - | - | Note1 Note3 |
| Response Time | | T _{ON} +T _{OFF} | 25℃ | - | 25 | 40 | ms | Note1 Note4 |
| Chromaticity | White | x | Backlight is on | TBD | TBD | TBD | - | Note5 Note1 |
| | | y | | TBD | TBD | TBD | | |
| | Red | x | | TBD | TBD | TBD | | |
| | | y | | TBD | TBD | TBD | | |
| | Green | x | | TBD | TBD | TBD | | |
| | | y | | TBD | TBD | TBD | | |
| | Blue | x | | TBD | TBD | TBD | | |
| | | y | | TBD | TBD | TBD | | |
| Uniformity | | U | - | 75 | 80 | - | % | Note1 Note6 |
| NTSC | | - | - | - | 50 | - | % | Note 5 |
| Luminance | | L | | 350 | 400 | - | cd/m ² | Note1 Note7 |

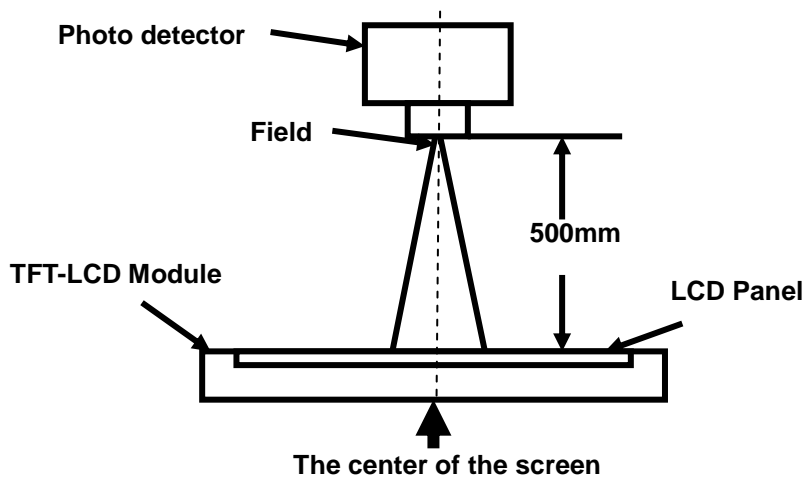
Test Conditions:

1. The ambient temperature is 25±2℃.humidity is 65±7%
2. The test systems refer to Note 1 and Note 2.



Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by LCD5200.

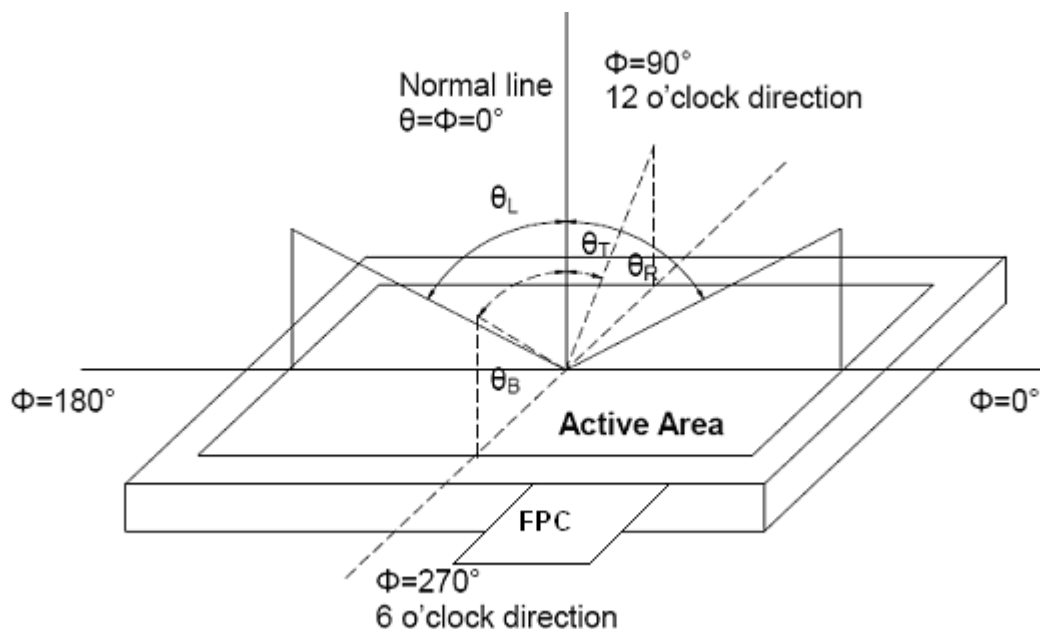


Fig. 1 Definition of viewing angle

**Note 3: Definition of contrast ratio**

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

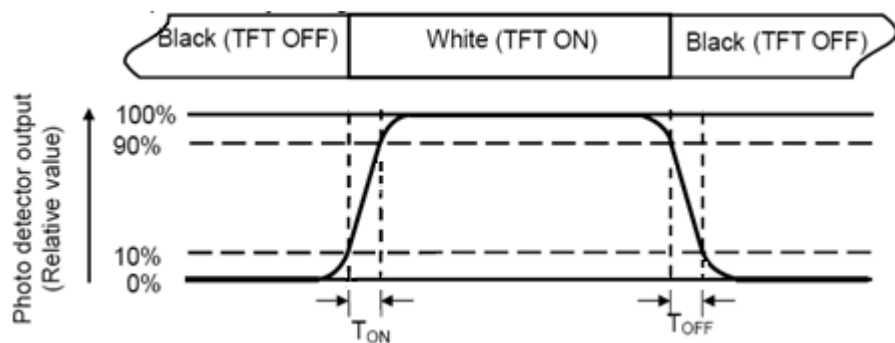
"White state ":The state is that the LCD should driven by Vwhite.

"Black state": The state is that the LCD should driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

**Note 5: Definition of color chromaticity (CIE1931)**

Color coordinates measured at center point of LCD.

**Note 6: Definition of Luminance Uniformity**

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity}(U) = L_{\min} / L_{\max}$$

L-----Active area length W----- Active area width

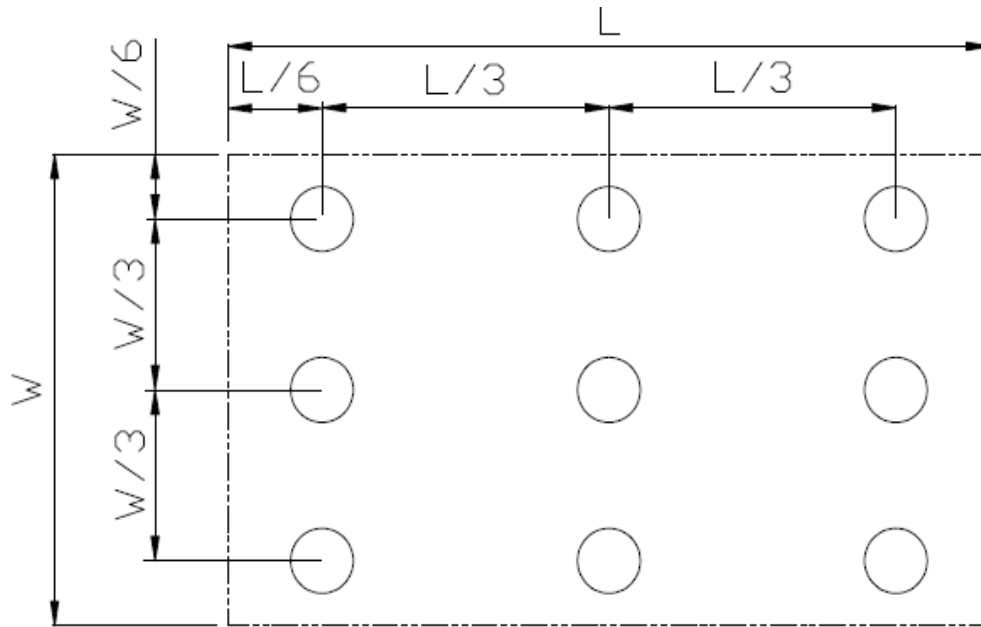


Fig. 2 Definition of uniformity

L_{\max} : The measured maximum luminance of all measurement position.

L_{\min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

Measure the luminance of white state at center point.



7 Environmental / Reliability Test

| No | Test Item | Condition | Remark |
|----|--|--|---|
| 1 | High Temperature Operation | Ta=+70℃, 240hrs | (Note1) IEC60068-2-1:2007,GB2423.2-2008 |
| 2 | Low Temperature Operation | Ta=-20℃, 240hrs | IEC60068-2-1:2007 GB2423.1-2008 |
| 3 | High Temperature Storage (non-operation) | Ta=+80℃, 240hrs | IEC60068-2-1:2007 GB2423.2-2008 |
| 4 | Low Temperature Storage (non-operation) | Ta=-30℃, 240hrs | IEC60068-2-1:2007 GB2423.1-2008 |
| 5 | High Temperature & High Humidity Operation | Ta = +60℃, 90% RH max,240 hours | (Note2) IEC60068-2-78 :2001 GB/T2423.3—2006 |
| 6 | Thermal Shock (non-operation) | -30℃ 30 min~+80℃ 30 min, Change time:5min,100cycles | Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002 |
| 7 | Electro Static Discharge (operation) | C=150pF,R=330Ω; 5point/panel Contact:±4Kv, 5times; Air: ± 8KV,5times; | IEC61000-4-2:2001 GB/T17626.2-2006 |
| 8 | Package Drop Test | Height:80 cm,1 corner, 3 edges, 6 surfaces | GB/T 4857.5-1992 |

Note1: Ta is the ambient temperature of sample.



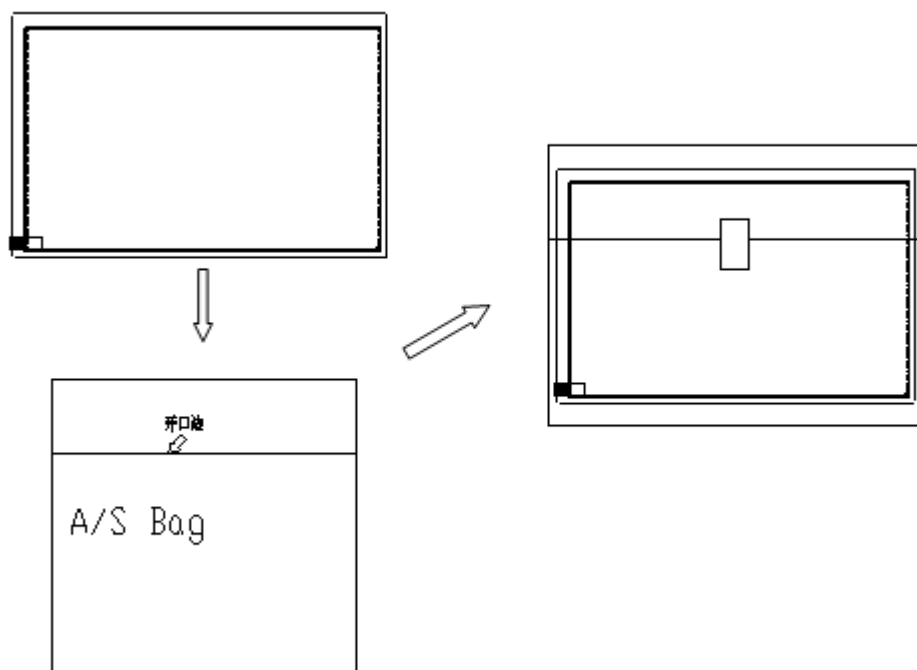


9 Packing Drawing

| No | Item | Model (Material) | Dimensions(mm) | Unit Weight(Kg) | Quantity | Remark |
|----|------------------|------------------|--------------------|-----------------|----------|--------|
| 1 | LCM module | TM101JDHG38-00 | 231.22x150.60x4.40 | TBD | 19 | |
| 2 | Dust-Proof Bag | PE | 700x545mm | 0.046 | 1 | |
| 3 | Anti-Static Bag | PE | 246x240mm | 0.004 | 1 | |
| 4 | Partition_1 | Corrugated paper | 527x348x217mm | 1.571 | 1 | |
| 5 | Partition_2 | Corrugated Paper | 505x332x5mm | 0.098 | 2 | |
| 6 | Corrugated Bar | Corrugated Paper | 527x244x7mm | 0.057 | 2 | |
| 7 | Carton | Corrugated paper | 544x365x250mm | 1.12 | 1 | |
| 8 | Lable | Lable | 100*52mm | TBD | 1 | |
| 8 | Total weight(Kg) | TBD kg \pm 5% | | | | |

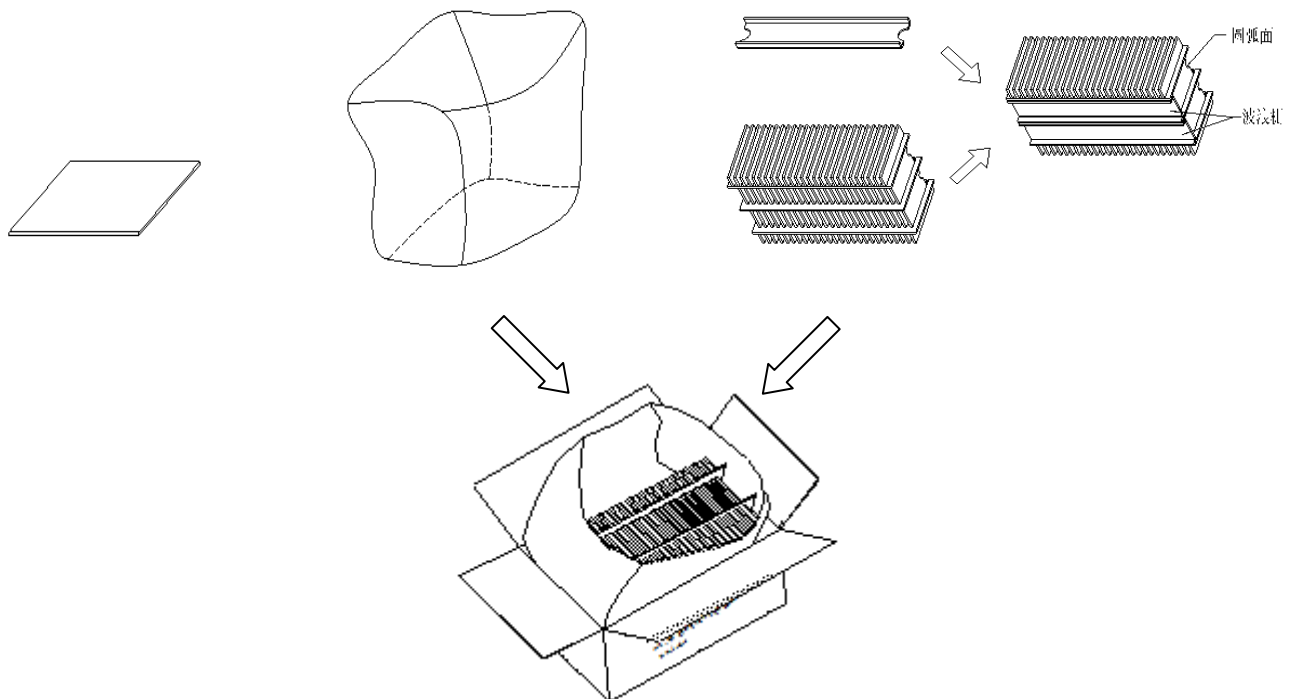
The packing method is shown as below:

9.1 Put module into anti-static bag

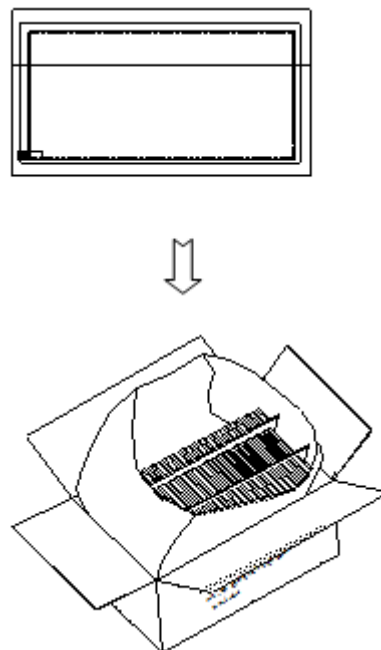




9.2 Dummy packing assembling

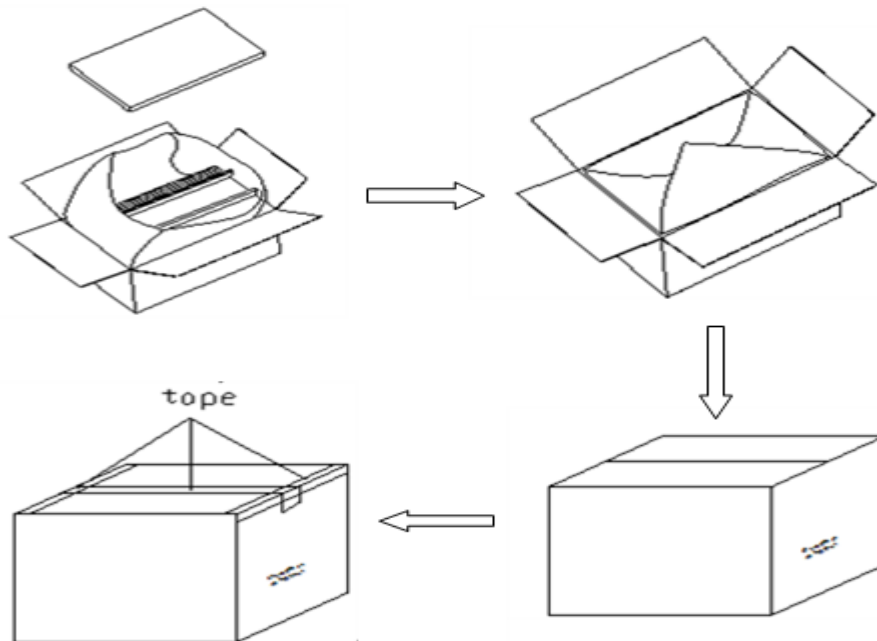


9.3 LCD module assembling

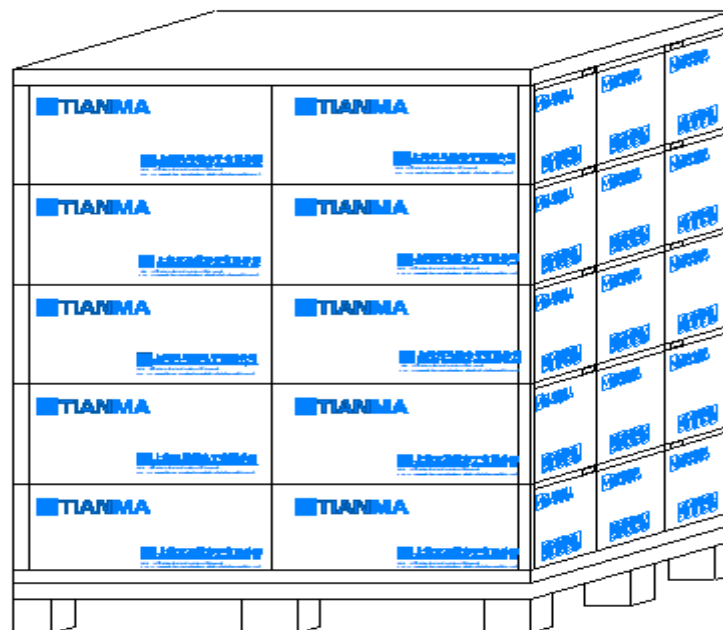




9.4 Box sealent



9.5 Stacking method(2x3x5)





10 Precautions For Use of LCD Modules

10.1 Handling Precautions

- 10.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 10.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.
- 10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- 10.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:
 - Isopropyl alcohol
 - Ethyl alcoholSolvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
 - Water
 - Ketone
 - Aromatic solvents
- 10.1.6 Do not attempt to disassemble the LCD Module.
- 10.1.7 If the logic circuit power is off, do not apply the input signals.
- 10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - 10.1.8.1 Be sure to ground the body when handling the LCD Modules.
 - 10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.
 - 10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
 - 10.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage Precautions

- 10.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 10.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%
- 10.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.