

# TFT-DISPLAY DATASHEET

ONation  
Model: OT070MADDLT-14

## BRIEF SPEC.:

|                       |   |
|-----------------------|---|
| Main Feature          | Landscape Type<br>White LED Backlight<br>Touch Screen |
| Active Screen Area    | 153,6 x 90 (mm)                                       |
| Diagonal   Format     | 7"   16:9   |
| Resolution            | 1024 x 600  |
| Colors                | N / A   |
| Backlight             | LED, Edge-Light                                       |
| Brightness            | 500 cd/m <sup>2</sup>                                 |
| LED Life Time         | 50.000h (Typ.)  |
| Interface             | LVDS  |
| Viewing Angle         | -65~75(H), -60~70(V)                                  |
| Touchscreen           | yes   |
| Power Supply          | 3,3V (Typ.)   |
| Module Outline        | 188 x 127 x 9.33 (mm)                                 |
| Operation Temperature | -20... +60 °C   |
| Storage Temperature   | -30... +70 °C   |
| Surface Treatment     |   |



# ONation Corporation

## TFT COLOR LCD MODULE

**MODEL: OT070MADDLT-14**  
(Complied with RoHS)

**WSVGA**  
**LVDS interface (1port)**

**Version: P0.1**

|                            |
|----------------------------|
| <b>Customer :</b> _____    |
| <b>Approved By :</b> _____ |
| <b>Date:</b> _____         |

| ONATION    |            |             |
|------------|------------|-------------|
| APPROVAL   | CHECKER    | PREPARE     |
| <i>Ian</i> | <i>Ian</i> | <i>Josh</i> |

[All information is subject to change without notice.](#)  
[Please confirm the sales representative before starting to design your system](#)

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### 1.RECORD OF REVISION

| REV | DATE       | PAGE | SUMMARY                                     |
|-----|------------|------|---|
| 0.1 | 2016.03.28 | ALL  | Preliminary specification was first issued. |
|     |            |      |   |

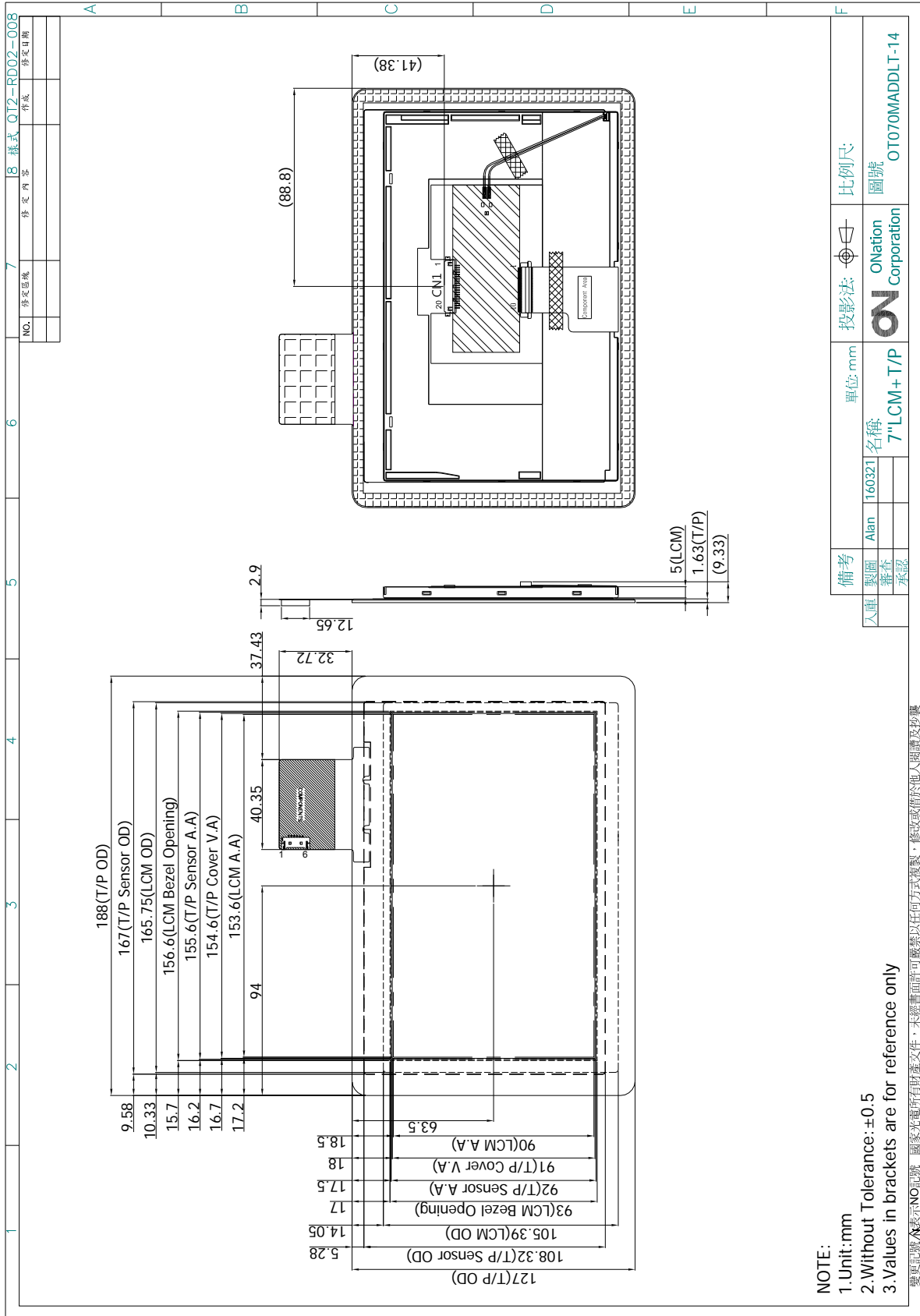
## 2.MECHANICAL SPECIFICATIONS

|      |                                |   |
|------|--------------------------------|---|
| (1)  | Number Of Dots (Dots)          | 1024(R.G.B) X 600   |
| (2)  | Module Size(mm)                | 188(H) X 127(V) X9.33(D)  |
| (3)  | Active Area(mm)                | 153.6(H) X 90.0(V)  |
| (4)  | Pixel Pitch(mm)                | 0.15(H) X 0.15(V)   |
| (5)  | LCD Model                      | TFT , Transmissive, Normally/White  |
| (6)  | Backlight Color                | White, LED  |
| (7)  | Viewing Direction              | 12 O'clock<br>Horizontal : Right side 75°(typ.), Left side 75°(typ.)<br>Vertical : Up side 70°(typ.), Down side 75°(typ.) |
| (8)  | Gray Scale Inversion Direction | 6 O'clock   |
| (9)  | Electrical Interface           | LVDS Interface  |
| (10) | Color Configuration            | R.G.B Stripe  |
| (11) | Touch Panel Mode               | PCAP  |
| (12) | Module Weight(g)               | TBD±5%  |

\*\*Viewing direction for best image quality is different from TFT definition, there is the 180 degrees shift

Note : Values in brackets are for reference only

### 3. OUTLINE DIMENSIONS



## 4. INTERFACE PIN CONNECTION

### 4.1 LCM PANEL DRIVING SECTION

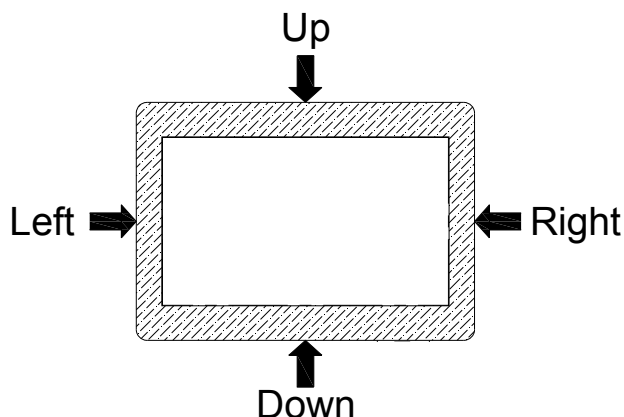
CN1 Connector : STM MSB24013P20HA or Equivalen

Mating Connector : STM P24013P20 or Equivalen

| PIN NO. | SIGNAL | FUNCTION                               | REMARK |
|---------|--------|--|--------|
| 1       | VDD    | Power Supply For Digital Circuit       |        |
| 2       | VDD    | Power Supply For Digital Circuit       |        |
| 3       | U/D    | Up/Down Scan                           | Note1  |
| 4       | L/R    | Left/Right Scan                        | Note1  |
| 5       | RxIN0- | Differential Data Input, CH0(Negative) |        |
| 6       | RxIN0+ | Differential Data Input, CH0(Positive) |        |
| 7       | GND    | Ground                                 |        |
| 8       | RxIN1- | Differential Data Input, CH1(Negative) |        |
| 9       | RxIN1+ | Differential Data Input, CH1(Positive) |        |
| 10      | GND    | Ground                                 |        |
| 11      | RxIN2- | Differential Data Input, CH2(Negative) |        |
| 12      | RxIN2+ | Differential Data Input, CH2(Positive) |        |
| 13      | GND    | Ground                                 |        |
| 14      | RxCLK- | Differential Clock Input(Negative)     |        |
| 15      | RxCLK+ | Differential Clock Input(Positive)     |        |
| 16      | GND    | Ground                                 |        |
| 17      | NC     | No connection                          |        |
| 18      | NC     | No connection                          |        |
| 19      | VLED   | LED Driving Voltage                    |        |
| 20      | ADJ    | Adjust Brightness Control For LED B/L  |        |

Note1:

| U/D | L/R | FUNCTION                                      |
|-----|-----|---|
| 0   | 1   | Normal display                                |
| 0   | 0   | Inverse Left and Right                        |
| 1   | 1   | Inverse Up and Down                           |
| 1   | 0   | Inverse Left and Right<br>Inverse Up and Down |



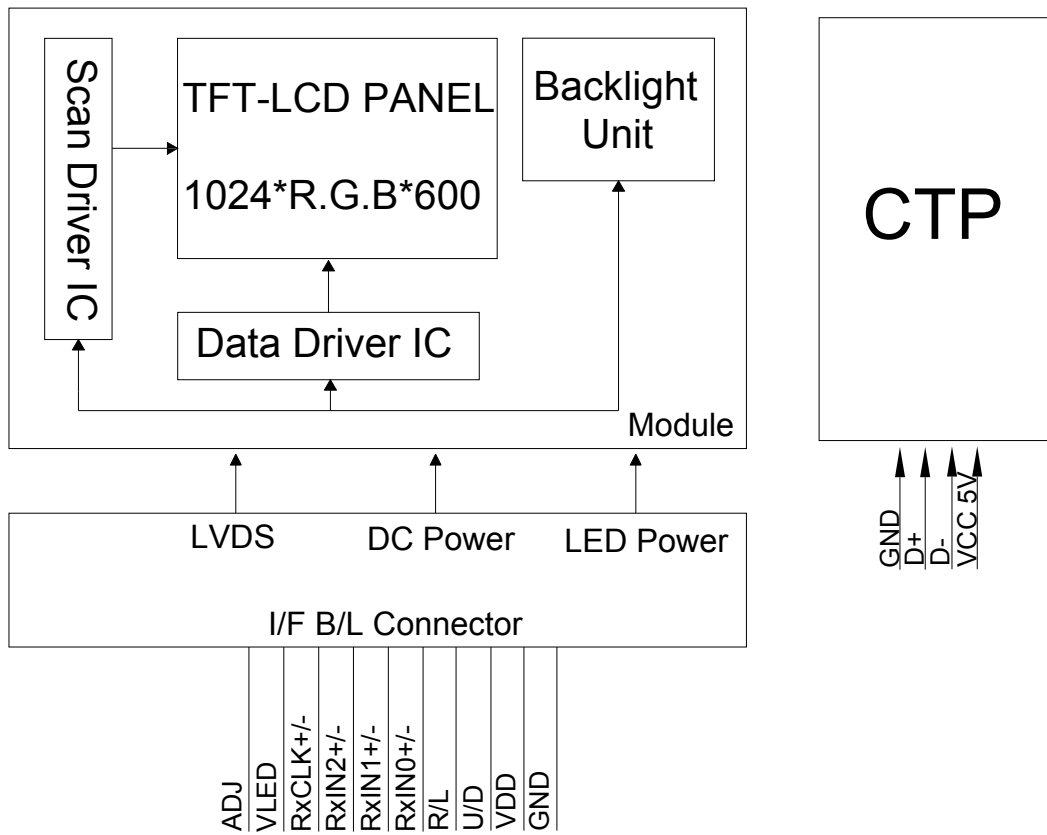
## 4.2 CTP PIN ASSIGNMENT

Mating Connector : 3808K-Q06N-03R or Equivalen

| PIN NO. | SIGNAL | FUNCTION                             |
|---------|--------|--------------------------------------|
| 1       | VCC 5V | Power Supply For Digital Circuit(5V) |
| 2       | D-     | Data -                               |
| 3       | D+     | Data +                               |
| 4       | GND    | Ground                               |
| 5       | NC     | No connection                        |
| 6       | NC     | No connection                        |



### 5. BLOCK DIAGRAM



## 6 ABSOLUTE MAXIMUM RATINGS

### 6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

| ITEM                  | SYMBOL | MIN. | MAX. | UNIT | REMARK |
|-----------------------|--------|------|------|------|--------|
| Power Supply Voltage  | VDD    | -0.5 | 5.0  | V    |        |
| Power Voltage For CTP | VCC 5V | 4.4  | 5.25 | V    |        |

Note: The absolute maximum rating values of this product not allowed to be exceeded at any times. Should be module be used with any of absolute maximum ratings exceeded. The characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

### 6.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

| ITEM                    | OPERATING |      | STORAGE |      | REMARK               |
|-------------------------|-----------|------|---------|------|----------------------|
|                         | MIN.      | MAX. | MIN.    | MAX. |                      |
| Ambient Temperature(°C) | -20       | 60   | -30     | 70   | Note 1,2             |
| Humidity(% RH)          | Note 3    |      | Note 3  |      | Without condensation |

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Storage Ta=40°C & RH=90% ≤ 240Hrs

## 7. ELECTRICAL CHARACTERISTICS

### 7.1 LCM ELECTRICAL CHARACTERISTICS

Ta=25°C

| ITEM                                 | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMARK |
|--------------------------------------|--------|------|------|------|------|--------|
| Power Voltage For LCD                | VDD    | 3.0  | 3.3  | 3.6  | V    |        |
|                                      | IDD    | -    | 150  | 180  | mA   | Note1  |
| Differential Input Threshold Voltage | VTH    | -    | -    | +100 | mV   | Note2  |
|                                      | VTL    | -100 | -    | -    | mV   | Note2  |

Note 1 : Test Condition: VDD=3.3V ; Test Pattern: Black.

Note 2 : VTH and VTL is defined in RxIN0+/- 、RxIN1+/- 、RxIN2+/- 、RxCLK+/- signal voltage level.

### 7.2 CTP ELECTRICAL CHARACTERISTICS

Ta=25°C

| ITEM                | SYMBOL         | MIN.   | TYP. | MAX. | UNIT | REMARK           |       |
|---------------------|----------------|--------|------|------|------|------------------|-------|
| LED Driving Voltage | VLED           | 11.7   | 12   | 12.3 | V    |                  |       |
| LED Driving Current | ILED           | -      | 220  | 250  | mA   |                  |       |
| LED Life Time       | -              | 50,000 | -    | -    | Hr   | Note1            |       |
| Brightness Control  | Analog Dimming | ADJ    | 0.7  | -    | 1.4  | V <sub>bc</sub>  | Note4 |
|                     | PWM Dimming    |        | 1.4  | -    | 5.0  | V <sub>P-P</sub> | Note5 |
| ADJ Frequency       | -              | 100    | -    | 1000 | Hz   |                  |       |

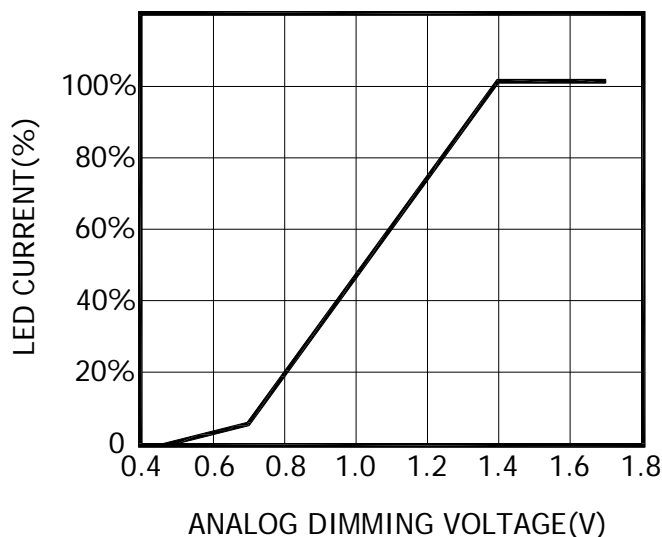
Note1 : The LED life time define as the estimated time to 50% degradation of initial luminous.

Note2 : Operating temperature 25°C ,humidity 55%RH.

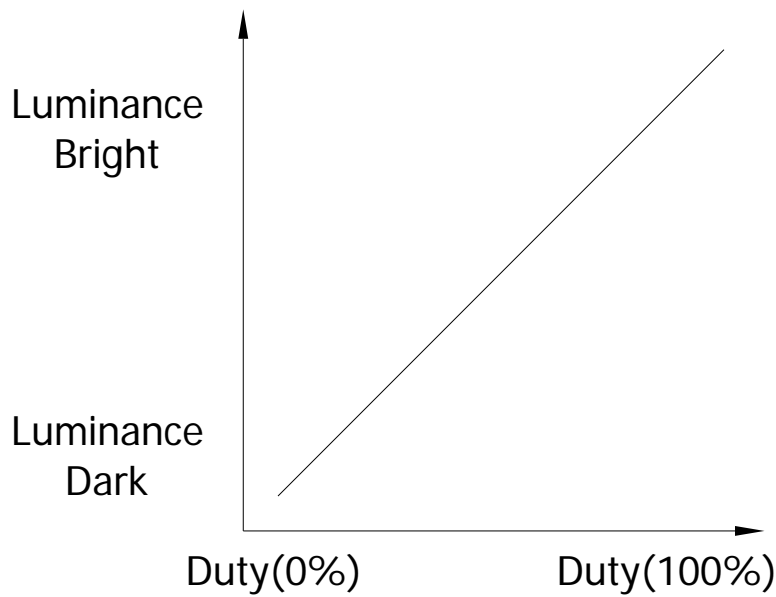
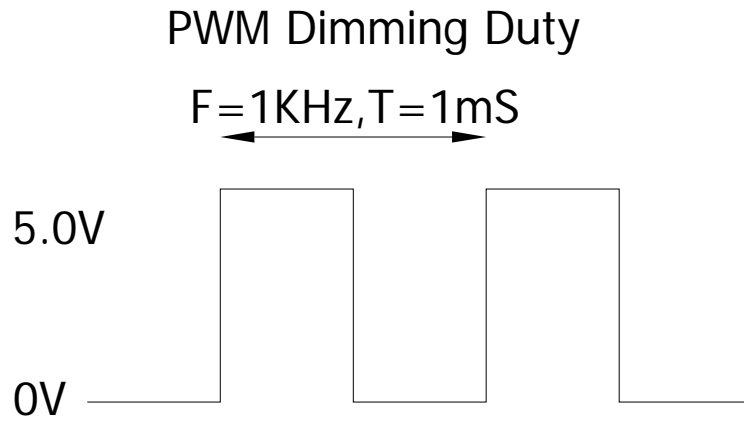
Note3 : A higher LED power supply voltage will result in better power efficiency. Keep the VLED between 12V and 12.3V is strongly recommended.

Note4: When the ADJ pin voltage rises from 0.7VDC to 1.4VDC,the LED current will change from 0% to 100% of the maximum LED current.

#### Analog Dimming Voltage



Note5: ADJ signal  $V_{P-P}=1.4\sim 5.0V$ , operation frequency : 100Hz~1kHz



### 7.3 CTP ELECTRICAL CHARACTERISTICS

| ITEM                  | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMARK |
|-----------------------|--------|------|------|------|------|--------|
| Power Voltage For CTP | VCC 5V | 4.4  | -    | 5.25 | V    |        |

## 8. OPTICAL CHARACTERISTICS

Ta=25°C

| ITEM                 | SYMBOL | CONDITIONS  | MIN. | TYP. | MAX. | UNIT              | REMARK |
|----------------------|--------|---|------|------|------|-------------------|--------|
| Contrast Ratio       | CR     | Viewing Normal Angle<br>$\Theta_x=\Theta_y=0^\circ$ | 400  | 500  | -    | -                 | Note 1 |
| Response Time        | TR+TF  |   | -    | 25   | 50   | ms                | Note 2 |
| Chromaticity         | White  |   | x    | 0.24 | 0.29 | 0.34              | -      |
|                      |        | y   | 0.29 | 0.34 | 0.39 | -                 |        |
| Viewing Angle        | Hor.   | $\theta_{x+}$                                       | 65   | 75   | -    | Deg.              | Note 3 |
|                      |        | $\theta_{x-}$                                       | 65   | 75   | -    |                   |        |
|                      | Ver.   | $\theta_{y+}$                                       | 60   | 70   | -    |                   |        |
|                      |        | $\theta_{y-}$                                       | 65   | 75   | -    |                   |        |
| Luminance            | L      | PWM=100%  | 400  | 500  | -    | cd/m <sup>2</sup> | Center |
| Luminance Uniformity | YU     | PWM=100%  | 70   | -    | -    | %                 | Note 5 |

Note 1 : Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63}/L_0$$

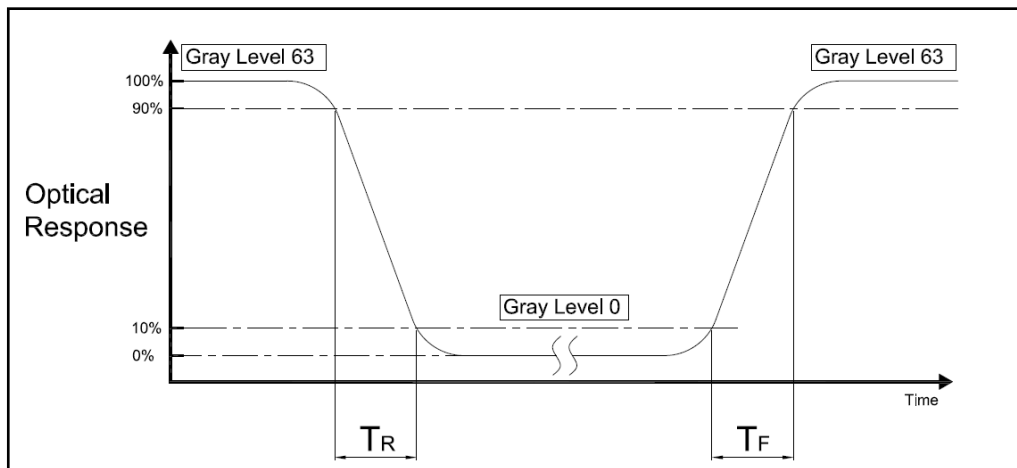
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

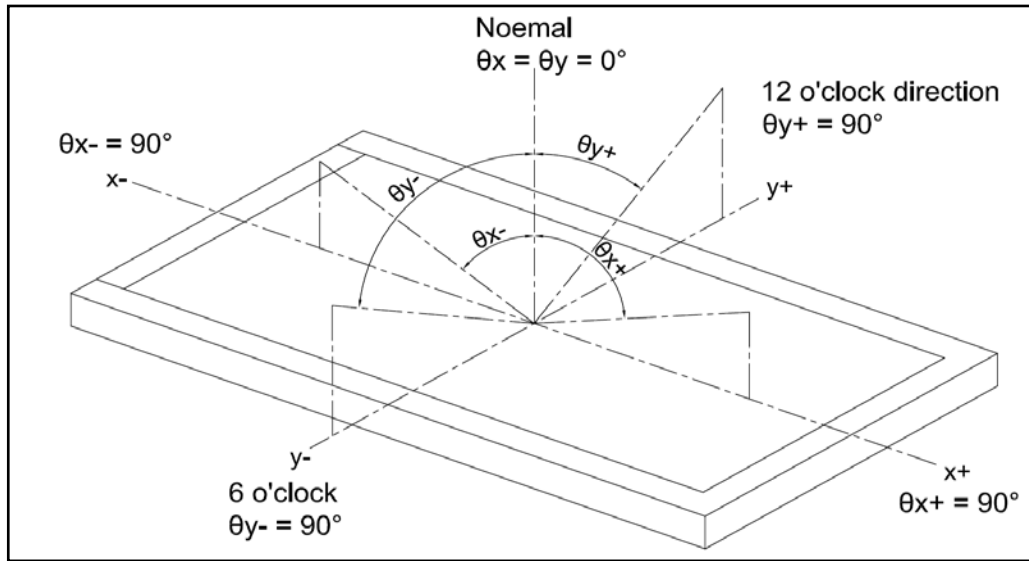
$$CR = CR(5)$$

CR(X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5

Note 2 : Definition of Response Time (TR,TF)

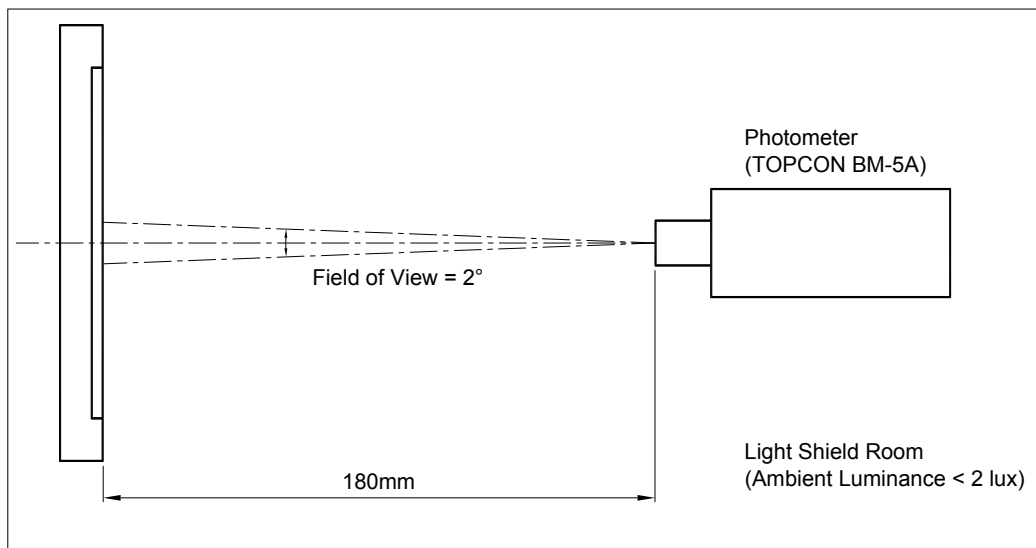


Note 3 : Definition of Viewing Angle

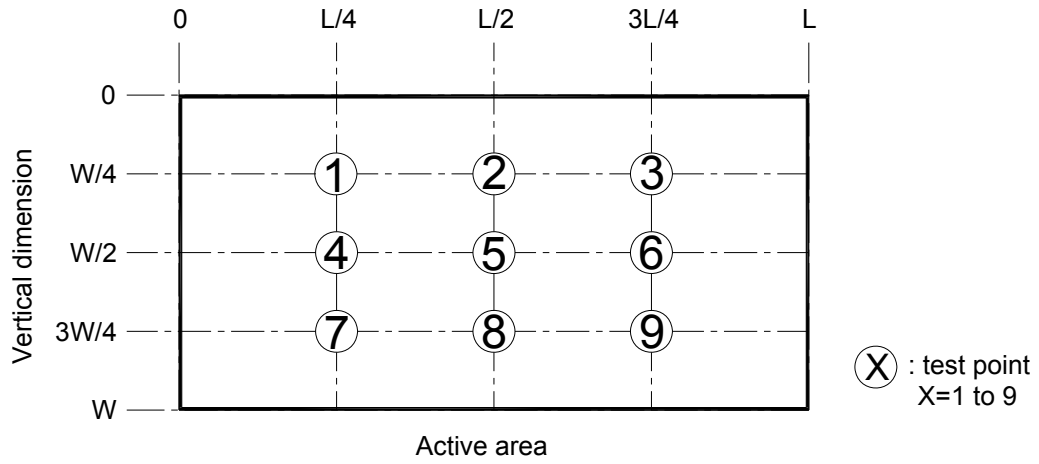


Note 4 : Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note 5 :

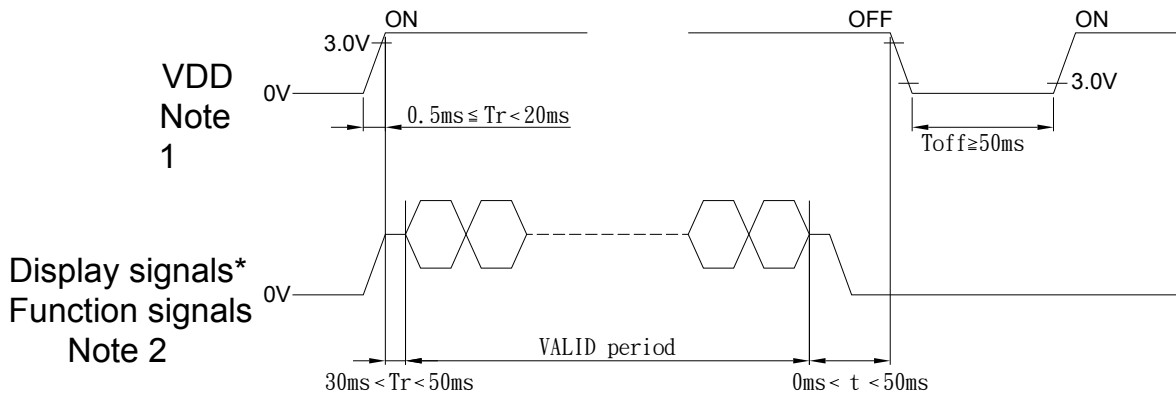


$$\left[ 1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right] \times 100\% = YU$$

## 9. TIMING SPECIFICATIONS

### 9.1 LCM POWER SUPPLY VOLTAGE SEQUENCE

#### 9.1.1 LCD panel signal processing board

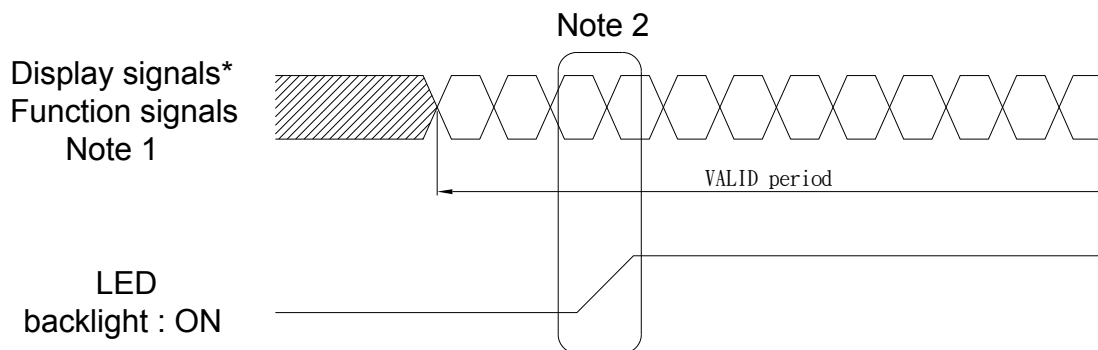


\*These signals should be measured at the terminal of 100Ω resistance

Note1: If there is a voltage variation (voltage drop) at the rising edge of VDD below 3.0V, there is a possibility that a product does not work due to a protection circuit.

Note2: Display signals (RxIN0+/-, RxIN1+/-, RxIN2+/-, and RxCLK+/-), except the VALID period (See above sequence diagram), in order to avoid the circuitry damage. If some of display and function signals of this product are cut while this product is working, even if the signal input to it once again, it might not work normally. If a customer stops the display and function signals, VDD also must be shut down.

#### 9.1.2 LCD driver board



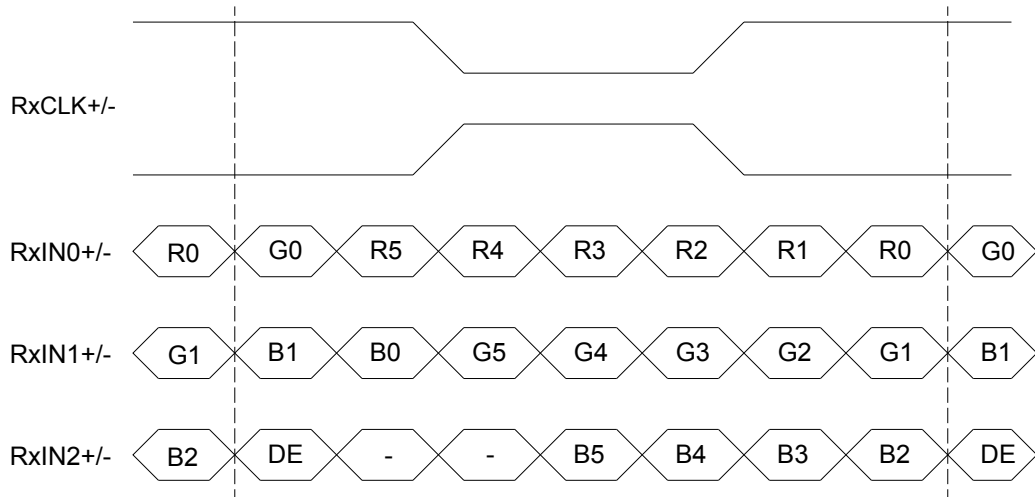
Note1: These are the display and function signals for LCD panel signal processing board.

Note2: The backlight should be turned on within the valid period of display and function signals, in order to avoid unstable data display.



## 9.2 LCM INTERFACE TIMING

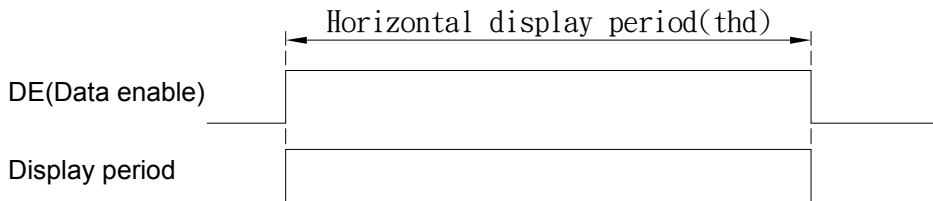
### 9.2.1 INPUT DATA SIGNAL



### 9.2.2 OUTLINE OF INPUT SIGNAL TIMINGS

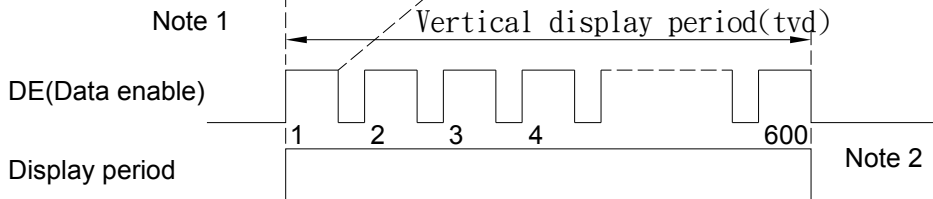
- Horizontal signal

Note 1



- Vertical signal

Note 1



Note 1: This diagram indicates virtual signal for set up to timing.

Note 2: See "9.2.4 INPUT SIGNAL TIMING CHART" for the pulse number.

9.2.3 TIMING CHARACTERISTICS

| ITEM |                      | SYMBOL               | MIN. | TYP.  | MAX.   | UNIT  | REMARKS        |               |
|------|----------------------|----------------------|------|-------|--------|-------|----------------|---------------|
| CLK  | Frequency            | 1/tc                 | 40.8 | 51.2  | 67.2   | MHz   | 19.53ns (typ.) |               |
|      | Duty                 | -                    | -    |       |        | -     | -              |               |
|      | Rise time, Fall time | -                    | -    |       |        | ns    | -              |               |
| DATA | CLK-DATA             | Setup time           | -    |       |        | ns    | -              |               |
|      |                      | Hold time            | -    |       |        | ns    |                |               |
|      | Rise time, Fall time | -                    | -    |       |        | ns    |                |               |
| DE   | Horizontal           | Cycle                | th   | 20.83 | 26.24  | 27.3  | μs             | 38.1Hz (typ.) |
|      |                      | Display period       | thd  | 1024  |        |       | CLK            |               |
|      | Vertical (One frame) | Cycle                | tv   | 12.7  | 16.666 | 20.92 | ms             | 60.0Hz (typ.) |
|      |                      | Display period       | tvd  | 600   |        |       | H              |               |
|      | CLK-DE               | Setup time           | -    | -     |        |       | ns             | -             |
|      |                      | Hold time            | -    | -     |        |       | ns             |               |
|      |                      | Rise time, Fall time | -    | -     |        |       | ns             |               |

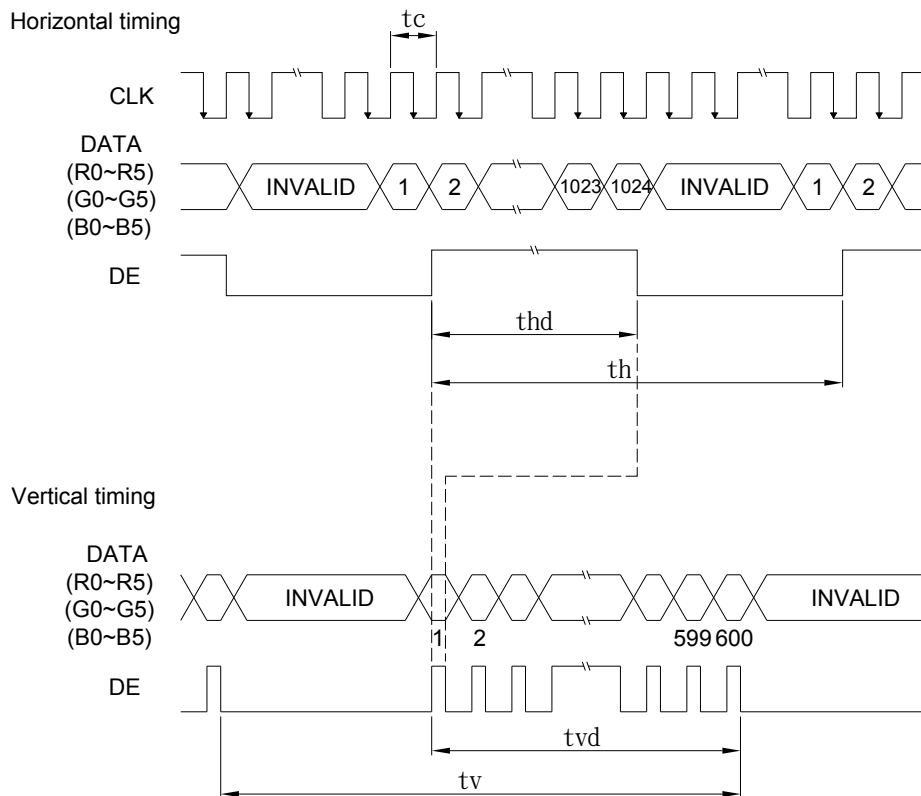
Note1: Definition of parameters is as follows.

tc=1CLK, th=1H

Note2: See the data sheet of LVDS transmitter.

Note3: Vertical cycle(tv) should be specified in integral multiple of Horizontal cycle(th).

9.2.4 INPUT SIGNAL TIMING CHART



## 10 RELIABILITY TEST

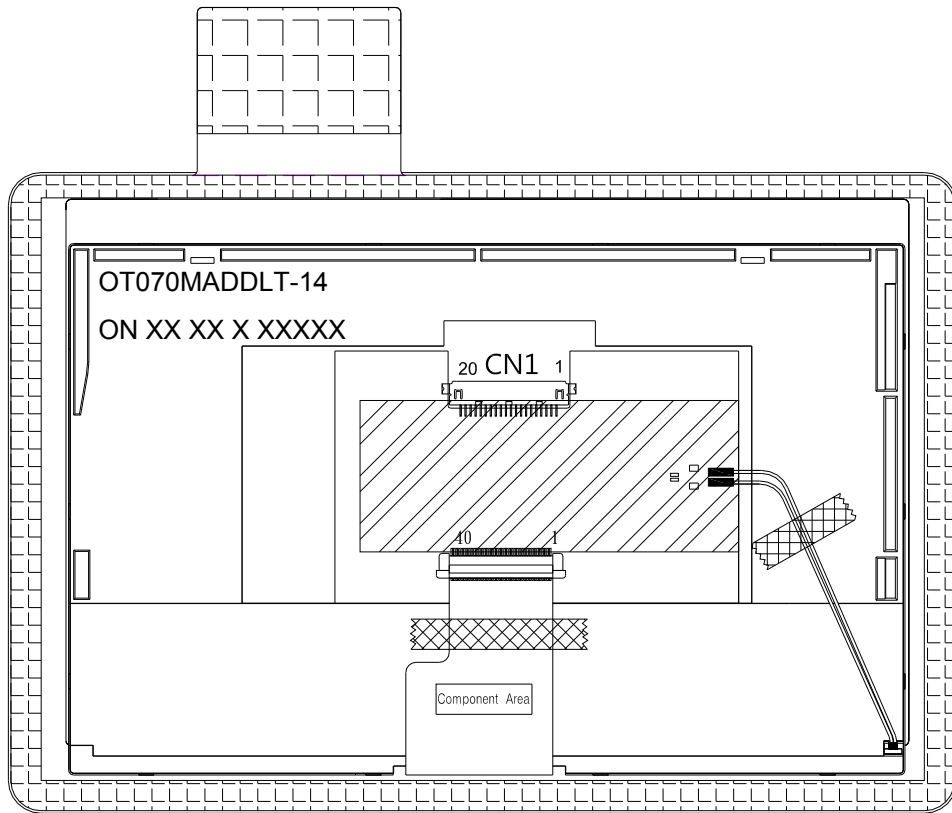
| ENVIRONMENTAL TEST |                                   |               |                    |        |
|--------------------|-----------------------------------|---------------|--------------------|--------|
| NO.                | ITEM                              | CONDITIONS    | TIME PERIOD        | REMARK |
| 1                  | High Temperature Storage          | 70°C          | 120HRS             |        |
| 2                  | Low Temperature Storage           | -30°C         | 120HRS             |        |
| 3                  | High Temperature Operation        | 60°C          | 120HRS             |        |
| 4                  | Low Temperature Operation         | -20°C         | 120HRS             |        |
| 5                  | Temperature Cycle                 | -20°C~60°C    | 0.5HRS/<br>50CYCLE |        |
| 6                  | High Temperature Humidity Storage | 40°C<br>90%RH | 120HRS             |        |

NOTE 1 : a. The module should work properly.  
 b. Before and after function test, The difference of consumptive current. Should be within 10%.

NOTE 2 : a. The module should work properly.  
 b. The module won't be deformative, Color changeable or broken.  
 c. The modules can't be apart.

NOTE 3 : a. Before cosmetic and function test, The product must have enough recovery time, At least 2 hours at room temperature.

### 11.MODEL NUMBER SYSTEM



(a) MODEL NAME : OT070MADDLT-14

(b) LOT NO : ON XX XX X XXXXX

| CODE         | MEANING       | DESCRIPTION                              |
|--------------|---------------|--|
| <u>XX</u>    | Year          | 2014=14, 2015=15, ....                   |
| <u>XX</u>    | Month         | 01,02,03,04,05,06,07,08,09,10,11,12      |
| <u>X</u>     | Week          | 1,2,3,4,5,6                              |
| <u>XXXXX</u> | Serial number | A0000.A0001.A0002..<br>Z0000.Z0001.Z0002 |

## 12. LCM INSPECTION STANDARD

Inspection specifications refer ONation Corporation LCM INSPECTION STANDARD Document.

Document Number : QT3-QC-A-I004

## 13 PACKAGE INFORMATION

| LCM Model      | LCM Qty.<br>in the box | Inner Box Size<br>(mm) | Weight | REMARK |
|----------------|------------------------|------------------------|--------|--------|
| OT070MADDLT-14 | TBD                    | TBD                    | TBD    |        |

## 14.PRECAUTIONS FOR USE

### 14.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

### 14.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is  $23\pm 5^{\circ}\text{C}$  and the humidity is below  $50\pm 20\%\text{RH}$ .
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

### 14.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately . If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

### 14.4 WARRANTY

- (1) Acceptance inspection period  
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period  
The period is within 12 months since the date of shipping out under normal using and storage conditions.