

# TFT-DISPLAY DATASHEET

ONation  
Model:OT070PGDDL-02

## BRIEF SPEC.:

|                       |   |
|-----------------------|---|
| Main Feature          | LandscapeType<br>Transmissive<br>Touch Screen |
| Active Screen Area    | 154.08 x 85.92 (mm)                           |
| Diagonal   Format     | 7 "   15:9                                    |
| Resolution            | 800 X 480                                     |
| Colors                | (6 Bit)                                       |
| Backlight             | LED   |
| Brightness            | 280 cd/m <sup>2</sup>                         |
| LED Life Time         | 20K (h)                                       |
| Interface             | LVDS  |
| Viewing Angle         | 70/70 L/R 50/70 up/down                       |
| Touchscreen           | yes   |
| Power Supply          | 3.3 V (Typ.)                                  |
| Module Outline        | 164.9 x 100.0 x 10.6 (mm)                     |
| Operation Temperature | -10... +70 °C                                 |
| Storage Temperature   | -30... +80 °C                                 |
| Surface Treatment     | Anti-glare                                    |



# ONation Corporation

## TFT COLOR LCD MODULE

**MODEL: OT070PGDDLT-02**  
(Complied with RoHS)

**WVGA**  
**LVDS interface**

**Version: P0.2**

|                            |
|----------------------------|
| <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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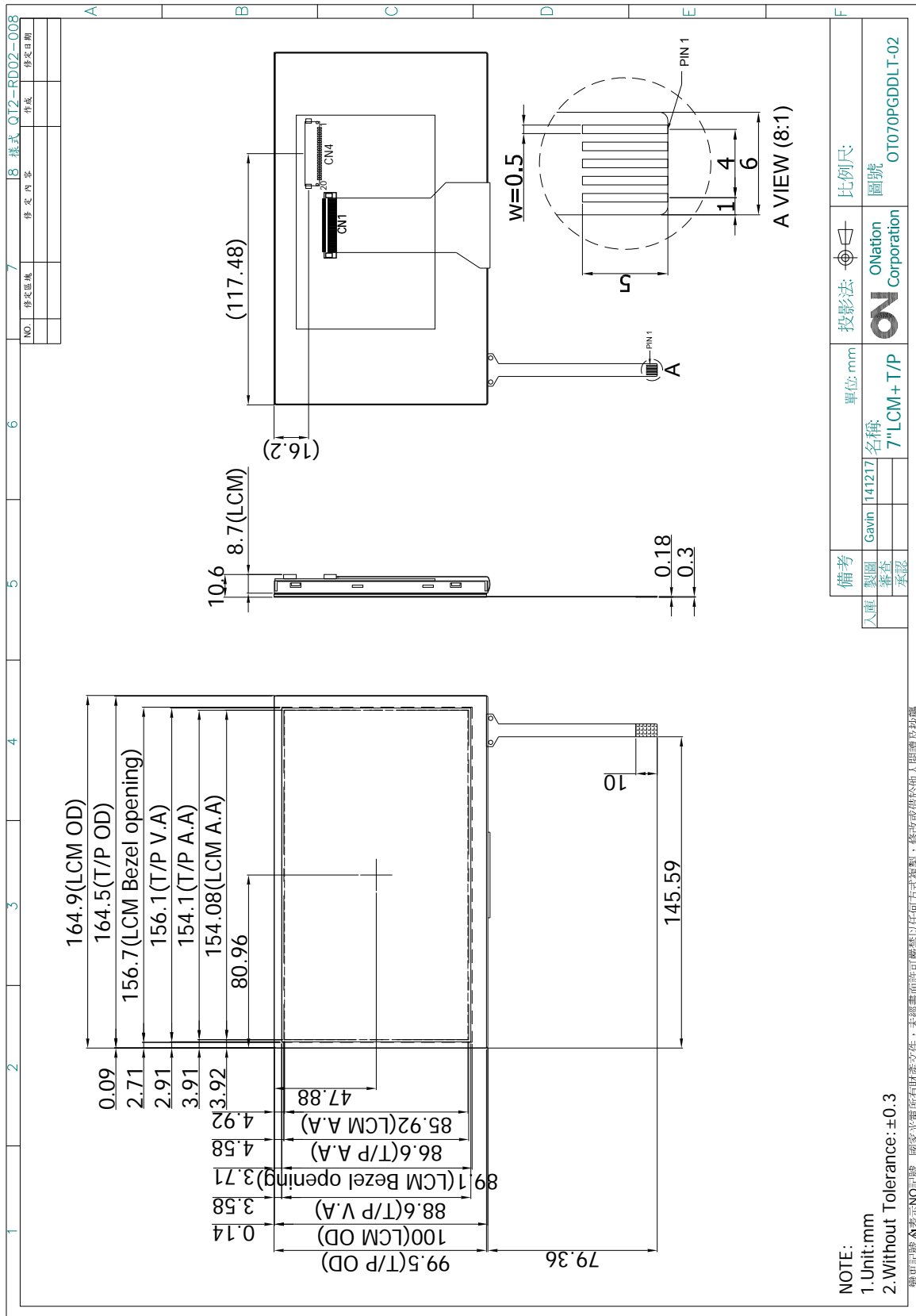
0. RECORD OF REVISION

| REV | DATE       | PAGE                     | SUMMARY   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|-----|------------|--------------------------|---|---------|--------------------------|----------|---|----|-------------------------|---|----|--------------------------|---|----|--------------------|---|----|--------------------------|---|----|--------------------------|
| 0.1 | 2014.12.19 | ALL                      | Preliminary specification was first issued.   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
| 0.2 | 2105.03.17 | 3                        | Modify.2 T/P PANEL DRIVING SECTION  |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | <table border="1"> <thead> <tr> <th>PIN NO.</th> <th>SIGNAL</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>LT</td> <td>Touch panel(Lower Left)</td> </tr> <tr> <td>2</td> <td>RT</td> <td>Touch panel(Upper Left)</td> </tr> <tr> <td>3</td> <td>SG</td> <td>Touch panel(Sense)</td> </tr> <tr> <td>4</td> <td>LL</td> <td>Touch panel(Upper Right)</td> </tr> <tr> <td>5</td> <td>RL</td> <td>Touch panel(Lower Right)</td> </tr> </tbody> </table> | PIN NO. | SIGNAL                   | FUNCTION | 1 | LT | Touch panel(Lower Left) | 2 | RT | Touch panel(Upper Left)  | 3 | SG | Touch panel(Sense) | 4 | LL | Touch panel(Upper Right) | 5 | RL | Touch panel(Lower Right) |
|     |            |                          | PIN NO.   | SIGNAL  | FUNCTION                 |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | 1   | LT      | Touch panel(Lower Left)  |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | 2   | RT      | Touch panel(Upper Left)  |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | 3   | SG      | Touch panel(Sense)       |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | 4   | LL      | Touch panel(Upper Right) |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | 5   | RL      | Touch panel(Lower Right) |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | ↓   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
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|     |            |                          | PIN NO.   | SIGNAL  | FUNCTION                 |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          | 1   | LT      | Touch panel(Upper Left)  |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
| 2   | RT         | Touch panel(Upper Right) |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
| 3   | SG         | Touch panel(Sense)       |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
| 4   | LL         | Touch panel(Lower Left)  |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
| 5   | RL         | Touch panel(Lower Right) |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |
|     |            |                          |   |         |                          |          |   |    |                         |   |    |                          |   |    |                    |   |    |                          |   |    |                          |

## 2.MECHANICAL SPECIFICATIONS

|      |                                |  |
|------|--------------------------------|--|
| (1)  | Number Of Dots (Dots)          | 800(R.G.B) X 480   |
| (2)  | Module Size(mm)                | 164.9(H) X 100.0(V) X106(D)  |
| (3)  | Active Area(mm)                | 154.08(H) X 85.92(V)   |
| (4)  | Pixel Pitch(mm)                | 0.1926 (H) X 0.1790(V)   |
| (5)  | LCD / Polarizer Model          | TFT , Transmissive, Normally/White, Anti-Glare   |
| (6)  | Backlight Color                | White, LED   |
| (7)  | Viewing Direction              | 12O'clock<br>Horizontal : Right side 70°(typ.), Left side 70°(typ.)<br>Vertical : Up side 50°(typ.), Down side 70°(typ.) |
| (8)  | Gray Scale Inversion Direction | 6O'clock   |
| (9)  | Electrical Interface           | LVDS Interface   |
| (10) | Color Configuration            | R.G.B Stripe,16.7M Color   |
| (11) | Module Weight(g)               | TBD±5%   |

### 3. OUTLINE DIMENSIONS



## 4. INTERFACE PIN CONNECTION

### 4.1 LCM PANEL DRIVING SECTION

CN4 Connector : STM MS240420G or Equivalent

| PIN NO. | SIGNAL   | FUNCTION  | REMARK |
|---------|----------|---|--------|
| 1       | VDD      | Digital Power   |        |
| 2       | VDD      | Digital Power   |        |
| 3       | U/D      | Vertical Display Mode Select Signal Up/Down Scan Control Input      | Note1  |
| 4       | L/R      | Horizontal Display Mode Select Signal Left/Right Scan Control Input | Note1  |
| 5       | RxIN0-   | Differential Clock Input,CH0(Negative)                              |        |
| 6       | RxIN0+   | Differential Clock Input,CH0(Positive)                              |        |
| 7       | GND      | Ground  |        |
| 8       | RxIN1-   | Differential Clock Input,CH1(Negative)                              |        |
| 9       | RxIN1+   | Differential Clock Input,CH1(Positive)                              |        |
| 10      | GND      | Ground  |        |
| 11      | RxIN2-   | Differential Clock Input,CH2(Negative)                              |        |
| 12      | RxIN2+   | Differential Clock Input,CH2(Positive)                              |        |
| 13      | GND      | Ground  |        |
| 14      | RxCLKIN- | Differential Clock Input (Negative)                                 |        |
| 15      | RxCLKIN+ | Differential Clock Input (Positive)                                 |        |
| 16      | GND      | Ground  |        |
| 17      | VLED     | Power Supply for LED Driver Circuit(5V)                             |        |
| 18      | VLED     | Power Supply for LED Driver Circuit(5V)                             |        |
| 19      | GND      | Ground  |        |
| 20      | ADJ      | Adjust The Back Light Brightness                                    |        |

Note 1: L/R&U/D scan direction setting:

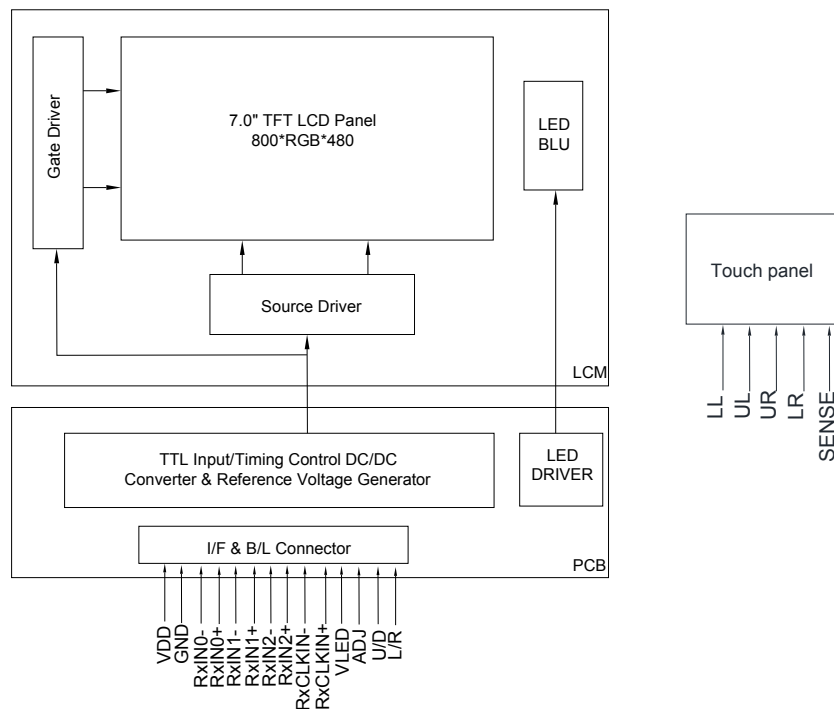
| Scan Control |      | Scan Direction            |
|--------------|------|---------------------------|
| L/R          | U/D  |                           |
| High         | Low  | Left to right, up to down |
| High         | High | Left to right, down to up |
| Low          | High | Right to Left, down to up |
| Low          | Low  | Right to Left, up to down |

### 4.2 T/P PANEL DRIVING SECTION

FPC PITCH=1.0mm,5PIN

| PIN NO. | SIGNAL | FUNCTION                 |
|---------|--------|--------------------------|
| 1       | LT     | Touch panel(Upper Left)  |
| 2       | RT     | Touch panel(Upper Right) |
| 3       | SG     | Touch panel(Sense)       |
| 4       | LL     | Touch panel(Lower Left)  |
| 5       | RL     | Touch panel(Lower Right) |

## 5. BLOCK DIAGRAM



## 6. ABSOLUTE MAXIMUM RATINGS

### 6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

| ITEM           | SYMBOL | MIN. | MAX. | UNIT | REMARK |
|----------------|--------|------|------|------|--------|
| Supply Voltage | VDD    | -0.3 | 5.0  | V    |        |
|                | VLED   | -0.3 | 40   | 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) | -10       | 70   | -30     | 80   | 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 :  $T_a \leq 60^\circ\text{C}$  : 90%RH max , without condensation.

$T_a > 60^\circ\text{C}$  : Absolute humidity shall be less than the value of 90%RH at  $60^\circ\text{C}$  without condensation



## 7. ELECTRICAL CHARACTERISTICS

### 7.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

| ITEM                  | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMARK |
|-----------------------|--------|------|------|------|------|--------|
| Power Voltage For LCD | VDD    | 3.0  | 3.3  | 3.6  | V    |        |
|                       | IDD    | -    | 100  | 130  | mA   | Note1  |

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

### 7.2 BACKLIGHT UNITS

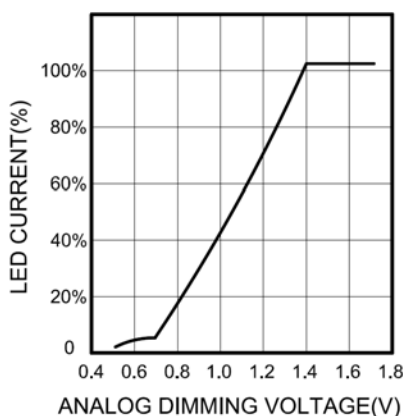
Ta=25°C

| ITEM                             | SYMBOL | MIN.  | TYP. | MAX. | UNIT | REMARK |
|----------------------------------|--------|-------|------|------|------|--------|
| LED Driving Voltage              | VLED   | -     | 5    | 12   | V    | Note 1 |
| LED Driving Current              | ILED   | -     | 420  | 470  | mA   |        |
| ADJ Input Analog Dimming Voltage | -      | 0.7   | -    | 1.4  | VDC  | Note 3 |
| ADJ Input PWM Dimming Voltage    | -      | 1.4   | -    | 5.0  | Vp-p | Note 4 |
| ADJ Frequency                    | -      | 100   | -    | 1000 | Hz   |        |
| LED Life Time                    | -      | 20000 | -    | -    | Hrs  | Note 2 |

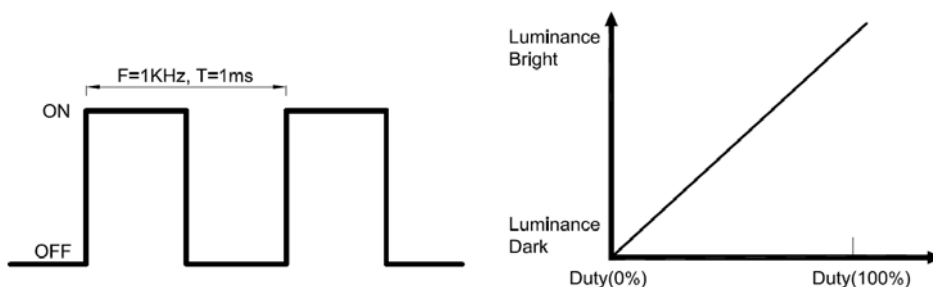
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and IL=180mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL=180mA. The LED lifetime could be decreased if operating IL is larger than 180mA.

Note 3: 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:



Note 4: ADJ signal Vp-p =1.4~5.0V, operation frequency: 100Hz ~ 1 kHz  
PWM DIMMING DUTY



### 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   | 0.260 | 0.310 | 0.360 | -                 | Note 4 |
|                      |        | y   | 0.280 | 0.330 | 0.380 | -                 |        |
| Viewing Angle        | Hor.   | $\theta_{x+}$                                       | 60    | 70    | -     | Deg.              | Note 3 |
|                      |        | $\theta_{x-}$                                       | 60    | 70    | -     |                   |        |
|                      | Ver.   | $\theta_{y+}$                                       | 40    | 50    | -     |                   |        |
|                      |        | $\theta_{y-}$                                       | 60    | 70    | -     |                   |        |
| Luminance            | L      | PWM=100%  | (220) | (280) | -     | cd/m <sup>2</sup> | Note 5 |
| Luminance Uniformity | YU     |   | 70    | 75    | -     | %                 |        |

Note 1 : Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

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

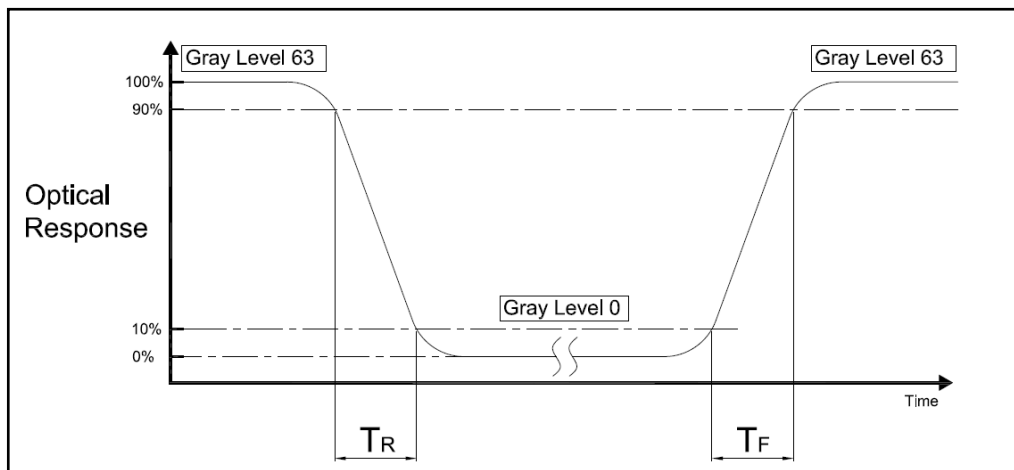
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

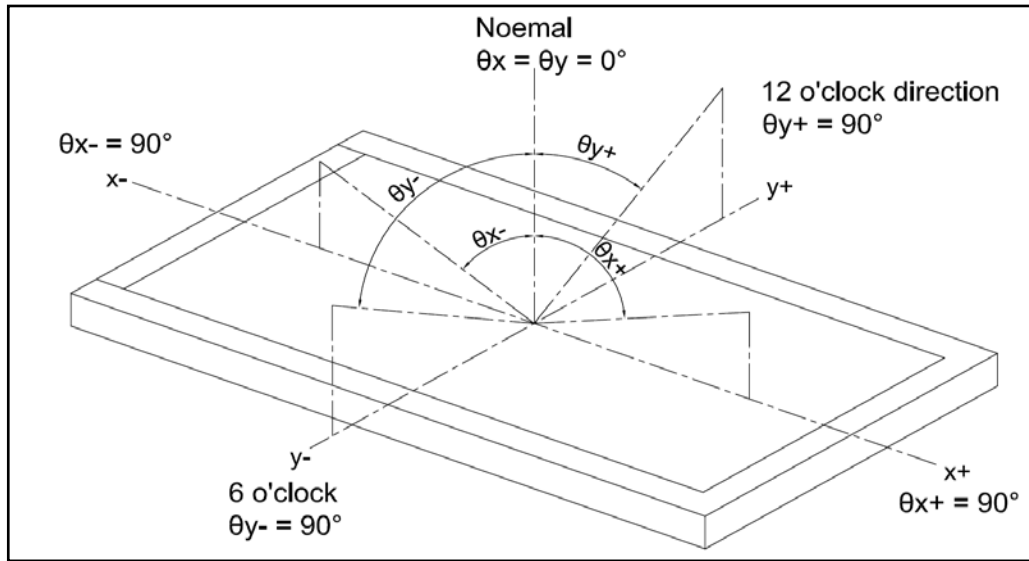
$$CR = CR(5)$$

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)

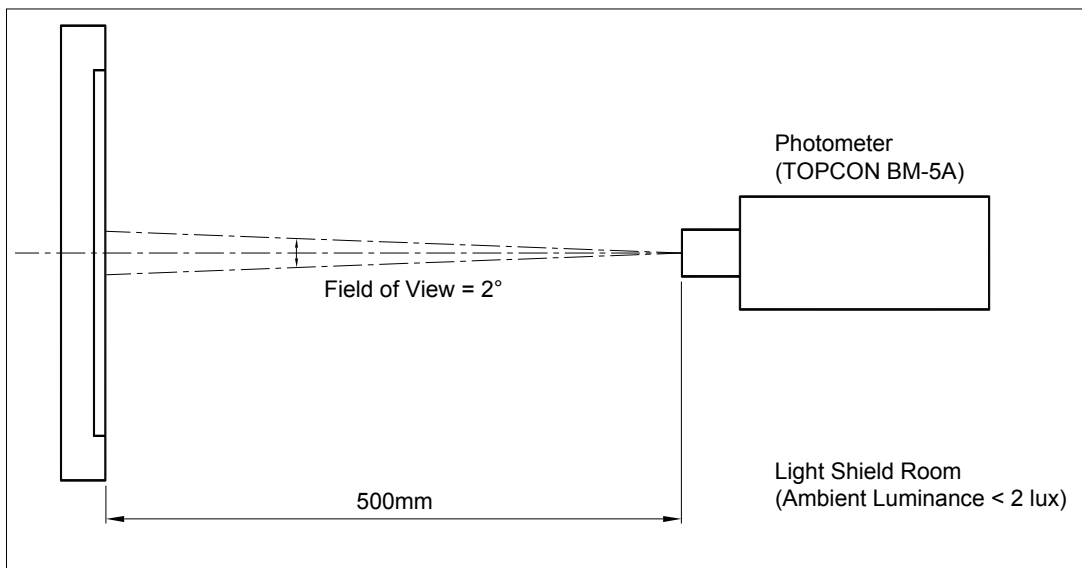


Note 3 : Definition of Viewing Angle

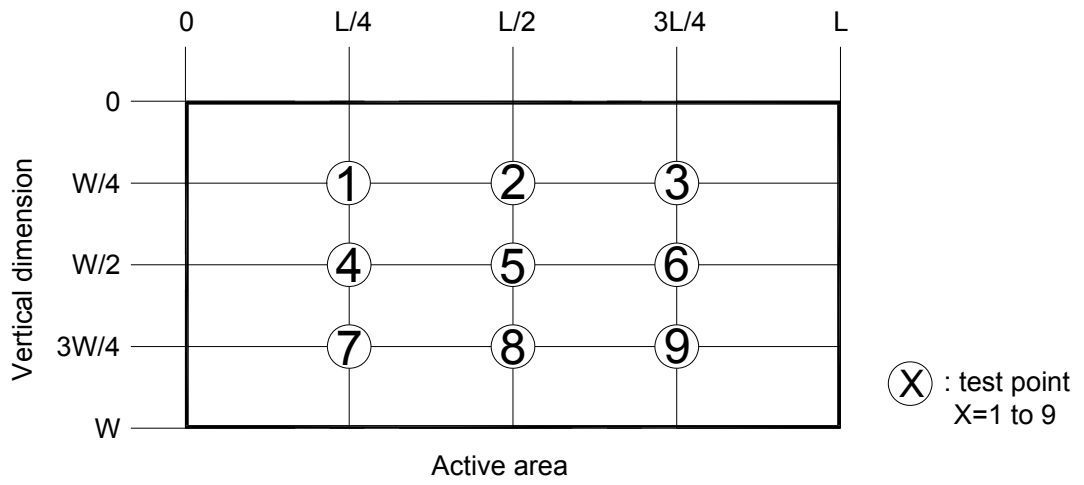


Note 4 : Measurement Set-Up:

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 :



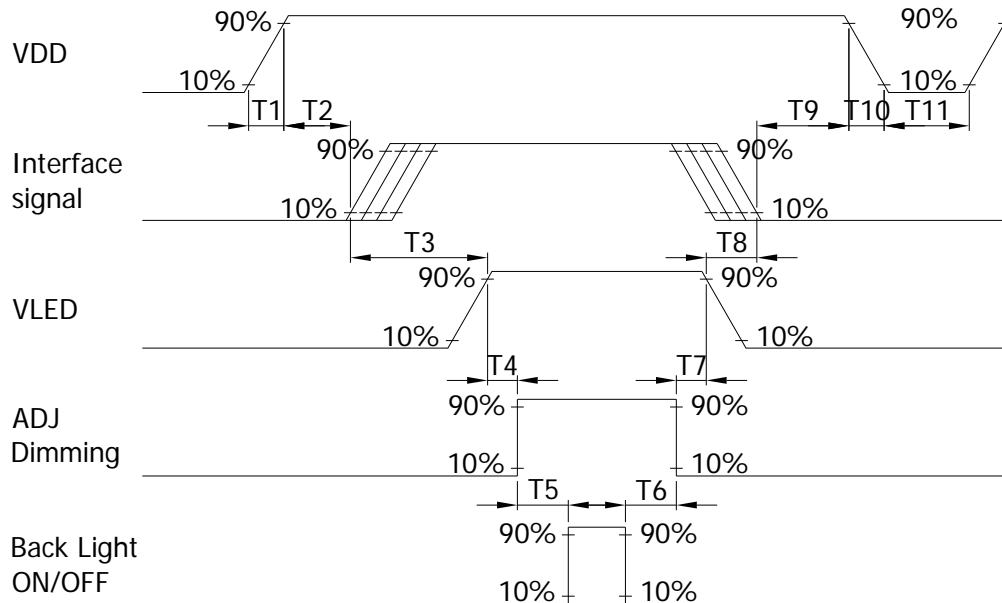
$$\left( 1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right) \times 100\% \geq 70\%$$

## 9. TOUCH PANEL SPECIFICATIONS

| ITEM                 | SPECIFICATIONS                   | REMARK |
|----------------------|----------------------------------|--------|
| Working Voltage      | DC 5V Max.                       |        |
| Resistance           | X axis:20 $\Omega$ ~500 $\Omega$ |        |
| Resistance           | Y axis:20 $\Omega$ ~500 $\Omega$ |        |
| Linearity            | X $\leq$ 1.5%, Y $\leq$ 2%       |        |
| Response             | $\leq$ 15ms                      |        |
| Operation force      | 20~150g                          |        |
| Insulation Impedance | 25V(DC) $\geq$ 20M $\Omega$      |        |

## 10. TIMING SPECIFICATIONS

### 10.1 POWER SIGNAL SEQUENCE

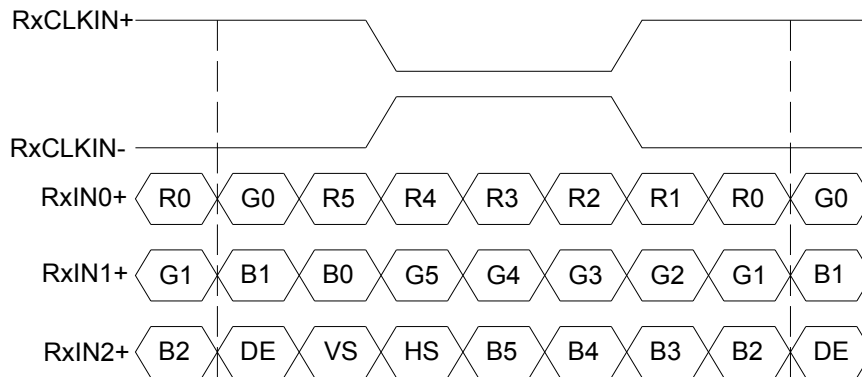


### 10.2 POWER ON/OFF SEQUENCE TIMING

| ITEM | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMARK |
|------|--------|------|------|------|------|--------|
| T1   | -      | 0.5  | -    | 10   | ms   |        |
| T2   | -      | 0    | -    | 50   | ms   |        |
| T3   | -      | 200  | -    | -    | ms   |        |
| T4   | -      | 10   | -    | -    | ms   |        |
| T5   | -      | 10   | -    | -    | ms   |        |
| T6   | -      | 0    | -    | -    | ms   |        |
| T7   | -      | 10   | -    | -    | ms   |        |
| T8   | -      | 100  | -    | -    | ms   |        |
| T9   | -      | 0    | 16   | 50   | ms   |        |
| T10  | -      | -    | -    | 10   | ms   |        |
| T11  | -      | 1000 | -    | -    | ms   |        |

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

### 10.3 THE INPUT DATA FORMAT

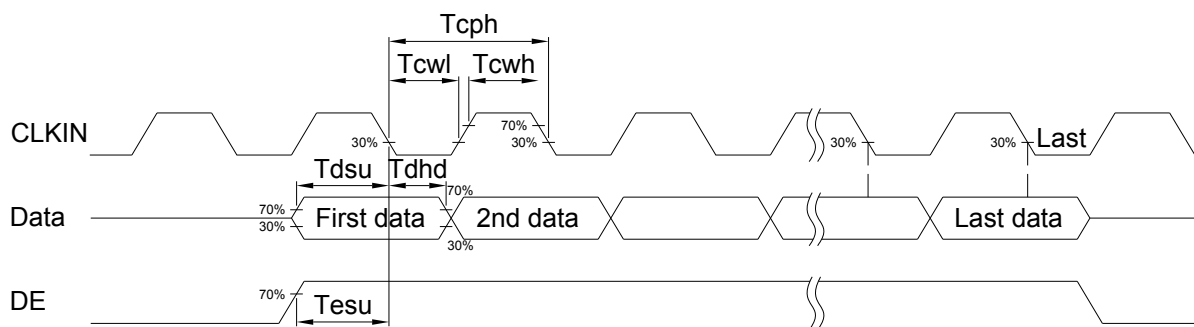


### 10.4 AC TIMING CHARACTERISTICS

| ITEM        |                | SYMBOL | MIN.  | TYP.  | MAX. | UNIT | REMARK |
|-------------|----------------|--------|-------|-------|------|------|--------|
| Clock       | Frequency      | 1/Tc   | 31.95 | 33.26 | 34.6 | MHz  | Note1  |
|             | Clk Pulse Duty | Tcwh   | 40    | 50    | 60   | %    | Note1  |
|             | Clk Cycle Time | Tcph   | 25    | -     | -    | ns   | Note1  |
| Data        | Setup Time     | Tdsu   | 5     | -     | -    | ns   | Note1  |
|             | Hold Time      | Tdhd   | 5     | -     | -    | ns   | Note1  |
| ENAB Signal | Setup Time     | Tesu   | 5     | -     | -    | ns   | Note1  |
|             | Hold Time      | Tehd   | 5     | -     | -    | ns   | Note1  |

Note1: Frame rate is 60Hz at 3.3V VDD

### 10.5 CLOCK AND DATA TIMING DIAGRAM



## 11. RELIABILITY TEST

| ENVIRONMENTAL TEST |                                   |               |                  |        |
|--------------------|-----------------------------------|---------------|------------------|--------|
| NO.                | ITEM                              | CONDITIONS    | TIME PERIOD      | REMARK |
| 1                  | High Temperature Storage          | 70°C          | 240HRS           |        |
| 2                  | Low Temperature Storage           | -30°C         | 240HRS           |        |
| 3                  | High Temperature Operation        | 60°C          | 240HRS           |        |
| 4                  | Low Temperature Operation         | -10°C         | 240HRS           |        |
| 5                  | Temperature Cycle                 | -30°C~70°C    | 1HRS/<br>10CYCLE |        |
| 6                  | High Temperature Humidity Storage | 60°C<br>90%RH | 240HRS           |        |

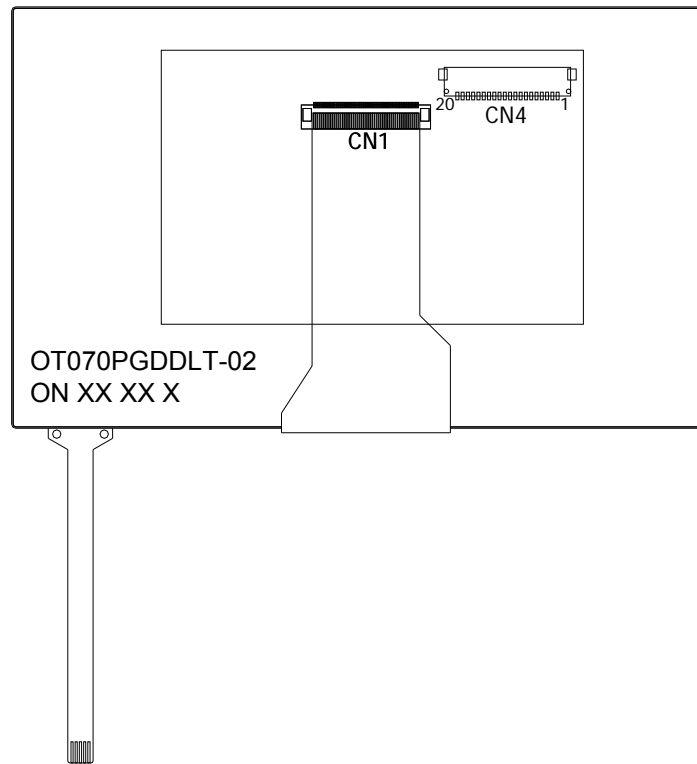
NOTE 1 : a. The module should work properly.  
 b. Before and after function test, The difference of consumptive current. Should be within 10%.

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.



## 12.MODEL NUMBER SYSTEM



(a) MODEL NAME : OT070PGDDLTL-02

(b) LOT NO : ON XX XX X

| 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                         |

### 13. LCM INSPECTION STANDARD

Inspection specifications refer ONation Corporation LCM INSPECTION STANDARD Document.  
Document Number :QT3-QC-A-I002

### 14 PACKAGE INFORMATION

| LCM MODEL       | LCM QTY.<br>IN THE BOX | INNER BOX<br>SIZE (mm) | WEIGHT | REMARK |
|-----------------|------------------------|------------------------|--------|--------|
| OT070PGDDLTL-02 | TBD                    | TBD                    | TBD    |        |

## 15. PRECAUTIONS FOR USE

### 15.1 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.

### 15.2 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.

### 15.3 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.

### 15.4 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.