

**Version : 1.0**

**TECHNICAL SPECIFICATION**

**MODEL NO. : PD057VU5**

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Customer \_\_\_\_\_

Date \_\_\_\_\_

By \_\_\_\_\_



Confirmed By \_\_\_\_\_



Prepared By \_\_\_\_\_

# TECHNICAL SPECIFICATION

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## 1. Application

This data sheet applies to a color TFT LCD module, PD057VU5.

PD057VU5 module applies to OA product, car TV (must use Analog to Digital driving board), which requires high quality flat panel display. If you must use in severe reliability environment, please don't extend over PVI's reliability test conditions.

## 2. Features

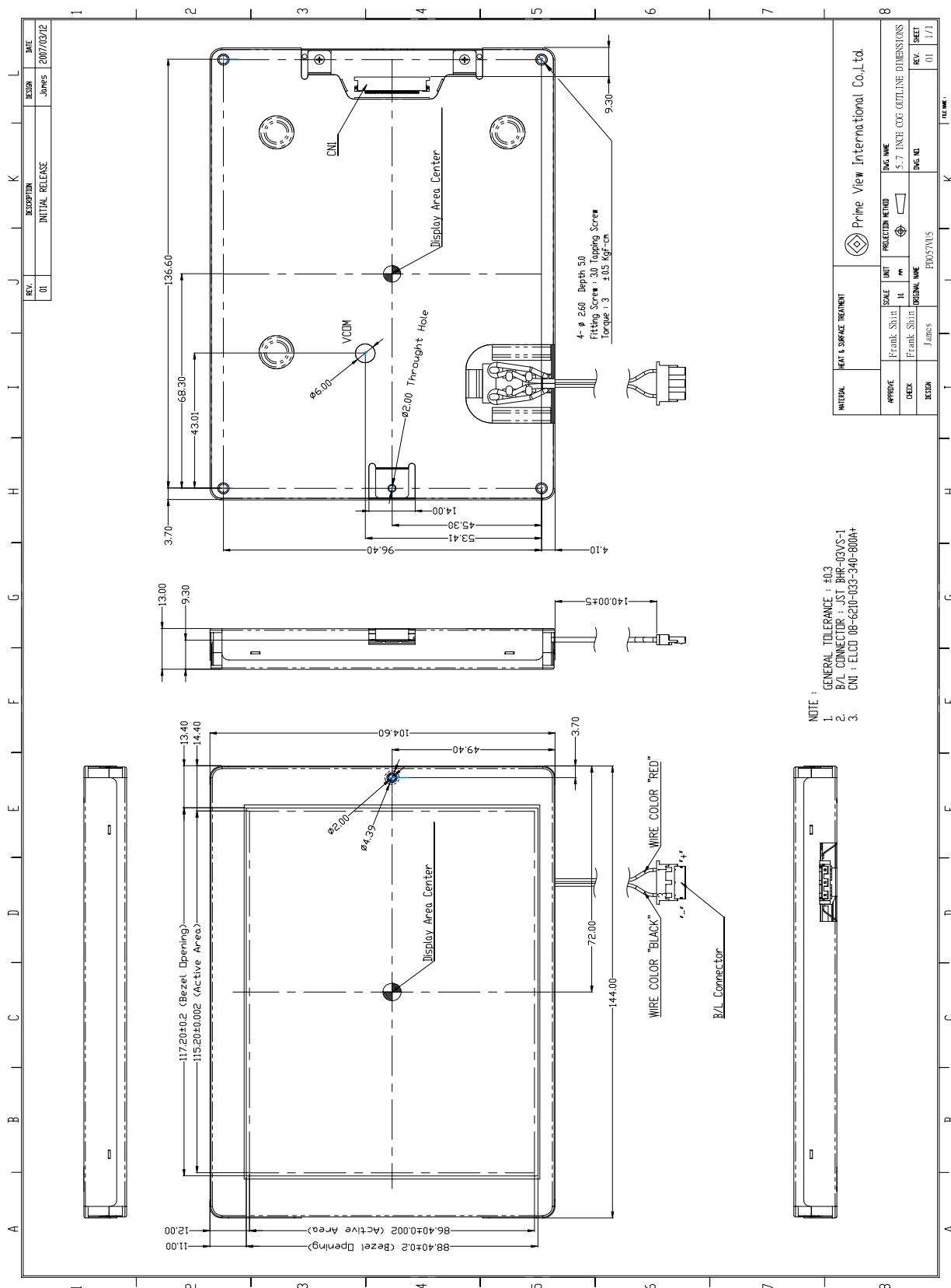
- . QVGA (320\*240 pixels) resolution
- . Amorphous silicon TFT LCD panel with LED
- . Pixel in stripe configuration
- . Thin and light weight
- . Display Colors : 262,144 colors
- . TTL interface

## 3. Mechanical Specifications

| Parameter                      | Specifications                   | Unit |
|--------------------------------|----------------------------------|------|
| Screen Size                    | 5.7 (diagonal)                   | inch |
| Display Format                 | 320×(R,G,B)×240                  | dot  |
| Display Colors                 | 262,144                          |      |
| Active Area                    | 115.20 (H)×86.4 (V)              | mm   |
| Pixel Pitch                    | 0.36(H)×0.36(V)                  | mm   |
| Pixel Configuration            | Stripe                           |      |
| Outline Dimension              | 144(W)×104.6 (H)×13.0 (D) (typ.) | mm   |
| Weight                         | 206±10                           | g    |
| Back-light                     | LED                              |      |
| Surface treatment              | Anti-glare + SWV                 |      |
| Display mode                   | Normally white                   |      |
| Gray scale inversion direction | 6 o'clock                        |      |

#### 4.Mechanical Drawing of TFT-LCD Module

### Outline Drawing : Front View (unit : mm)



## 5.Input / Output Terminals

### 5-1) TFT-LCD Panel Driving

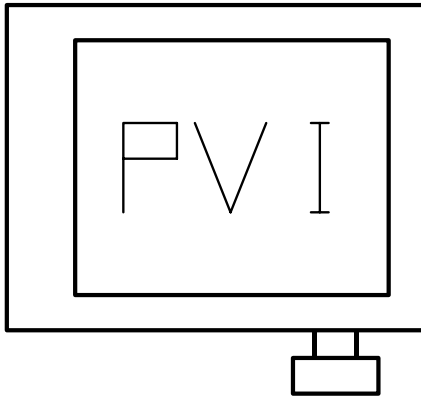
Connector type: ELCO 08-6210-033-340-800A+, PIN No 33 pins, pitch=0.5mm

| Pin No | Symbol          | I/O | Description   | Remark   |
|--------|-----------------|-----|---|----------|
| 1      | GND             | -   | GND   |          |
| 2      | CK              | I   | Clock signal for sampling each data signal  |          |
| 3      | Hsync           | I   | Horizontal synchronous signal(neqative)   |          |
| 4      | Vsync           | I   | Vertical synchronous signal(neqative)   |          |
| 5      | GND             | -   | GND   |          |
| 6      | R0              |     | RED data signal(LSB)  |          |
| 7      | R1              | I   | RED data signal   |          |
| 8      | R2              | I   | RED data signal   |          |
| 9      | R3              | I   | RED data signal   |          |
| 10     | R4              | I   | RED data signal   |          |
| 11     | R5              | I   | RED data signal(MSB)  |          |
| 12     | GND             | -   | GND   |          |
| 13     | G0              | I   | GREEN data signal(LSB)  |          |
| 14     | G1              | I   | GREEN data signal   |          |
| 15     | G2              | I   | GREEN data signal   |          |
| 16     | G3              | I   | GREEN data signal   |          |
| 17     | G4              | I   | GREEN data signal   |          |
| 18     | G5              | I   | GREEN data signal(MSB)  |          |
| 19     | GND             | -   | GND   |          |
| 20     | B0              | I   | Blue data signal(LSB)   |          |
| 21     | B1              | I   | Blue data signal  |          |
| 22     | B2              | I   | Blue data signal  |          |
| 23     | B3              | I   | Blue data signal  |          |
| 24     | B4              | I   | Blue data signal  |          |
| 25     | B5              | I   | Blue data signal(MSB)   |          |
| 26     | GND             | -   | GND   |          |
| 27     | ENAB            | I   | Signal to settle the horizontal display position(positive)                        | Note5-1  |
| 28     | V <sub>CC</sub> | -   | +3.3V power supply  |          |
| 29     | V <sub>CC</sub> | -   | +3.3V power supply  |          |
| 30     | R/L             | I   | Horizontal display mode select signal<br>L : Normal ,H : Left /Right reverse mode | Note5-2  |
| 31     | U/D             | I   | Vertical display mode select signal<br>H : Normal ,L :Up/Down reverse mode        | Note5-3  |
| 32     | V/Q             | I   | VGA / QVGA mode select signal   | Note10-2 |
| 33     | GND             | -   | GND   |          |

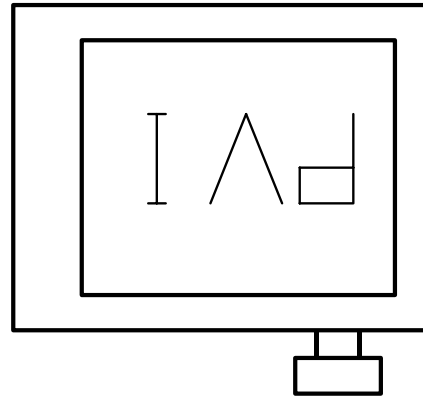
Note5-1 : The horizontal display start timing is settled in accordance with rising of ENAB signal.

In case ENAB is fixed "Low",the horizontal start timing is determined as described in 10-2. Don't keep ENAB"High" during operation.

Note 5-2 , 5-3 : The definitions of U/D & R/L



R/L(PIN 30)= Low, U/D(PIN 31)= High



R/L(PIN 30)= High , U/D(PIN 31)= Low

## 5-2) LED Backlight driving

Connector type: JST BHR-03VS-1, PIN No 2 pins, pitch=3.5mm

| Pin No | Symbol     | Description                               | Remark |
|--------|------------|---|--------|
| 1      | $V_{High}$ | Power supply for lamp (High voltage side) | Red    |
| -      | NC         | This is electrically opened               | -      |
| 3      | $V_{Low}$  | Power supply for lamp (Low voltage side)  | Black  |

Note 5-4: Low voltage side of backlight inverter connects with ground of inverter circuits.

## 6.Absolute Maximum Ratings:

GND=0V, Ta=25°C

| Parameters           | Symbol   | Condition | MAX.    | Unit | Remark  |
|----------------------|----------|-----------|---------|------|---------|
| Input Voltage        | $V_I$    | Ta=25°C   | -0.3~+4 | V    | Note6-1 |
| +3.3V supply voltage | $V_{CC}$ | Ta=25°C   | 0~+3.6  | V    |         |

Note6-1:CK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,ENAB,R/L,U/D,V/Q

## 7.Electrical Characteristics

### 7-1) Recommended Operating Conditions:

GND=0V, Ta=25°C

| Item                            | Symbol   | Min.         | Typ. | Max.         | Unit  | Remark        |
|---------------------------------|----------|--------------|------|--------------|-------|---------------|
| +3.3V Supply Voltage            | $V_{CC}$ | +3.0         | +3.3 | +3.6         | V     |               |
| Permissive input ripple voltage | $V_{RF}$ | -            | -    | 100          | mVp-p | $V_{CC}=3.3V$ |
| Input voltage(Low)              | $V_{IL}$ | 0            | -    | 0.3 $V_{CC}$ | V     |               |
| Input voltage(High)             | $V_{IH}$ | 0.7 $V_{CC}$ | -    | $V_{CC}$     | V     |               |

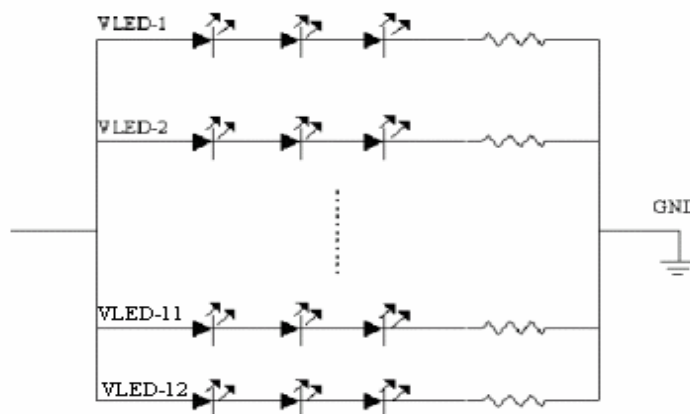
## 7-2) Recommended Driving Condition for LED Back Light

 $T_a=25^{\circ}\text{C}$ 

| Parameter                    | Symbol           | Min. | Typ. | Max. | Unit | Remark              |
|------------------------------|------------------|------|------|------|------|---------------------|
| LED voltage                  | $V_{\text{LED}}$ | -    | 11.0 | 11.5 | V    | $I_L = 20\text{mA}$ |
| LED current                  | $I_{\text{LED}}$ | -    | 20   | -    | mA   | Note 7-1            |
| Back Light Power Consumption | $P_{\text{LED}}$ | -    | 2640 | 2760 | mW   | Note 7-2            |

Note 7-1 : The LED driving condition is defined for each LED module. (3 LED Serial)

Note 7-2 :  $P_{\text{LED}} = V_{\text{LED-1}} * I_{\text{LED-1}} + V_{\text{LED-2}} * I_{\text{LED-2}} + \dots + V_{\text{LED-11}} * I_{\text{LED-11}} + V_{\text{LED-12}} * I_{\text{LED-12}}$



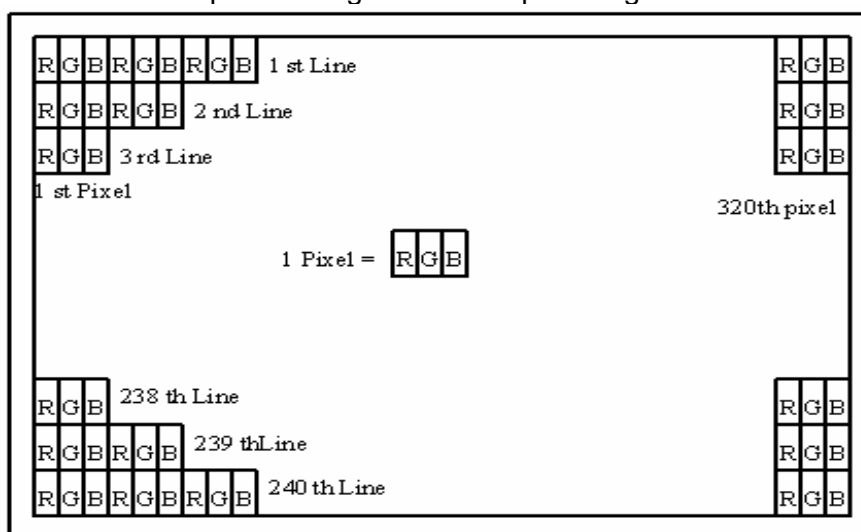
## 7-3) Power Consumption

| Parameters                  | Symbol          | Typ. | Max. | Unit | Remark |
|-----------------------------|-----------------|------|------|------|--------|
| +3.3V Current Dissipation   | $I_{\text{CC}}$ | 67   | 75   | mA   |        |
| LCD Panel Power Consumption | -               | 0.22 | 0.25 | W    |        |
| Total Power Consumption     | -               | 2.86 | 3.01 | W    |        |

Note 7-3: The power consumption for back light is not included.

## 8. Pixel Arrangement

The LCD module pixel arrangement is stripe configuration.



**9. Display Color and Gray Scale Reference**

| Color        |            | Input Color Data |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|--------------|------------|------------------|----|----|----|----|----|-------|----|----|----|----|----|------|----|----|----|----|----|
|              |            | Red              |    |    |    |    |    | Green |    |    |    |    |    | Blue |    |    |    |    |    |
|              |            | R5               | R4 | R3 | R2 | R1 | R0 | G5    | G4 | G3 | G2 | G1 | G0 | B5   | B4 | B3 | B2 | B1 | B0 |
| Basic Colors | Black      | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Red (63)   | 1                | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Green (63) | 0                | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Blue (63)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  |
|              | Cyan       | 0                | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  |
|              | 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  |
| Red          | Red (00)   | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Red (01)   | 0                | 0  | 0  | 0  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Red (02)   | 0                | 0  | 0  | 0  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Darker     |                  |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|              | ↓          | ↓                | ↓  | ↓  | ↓  | ↓  | ↓  | ↓     | ↓  | ↓  | ↓  | ↓  | ↓  | ↓    | ↓  | ↓  | ↓  | ↓  | ↓  |
|              | Brighter   |                  |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|              | Red (61)   | 1                | 1  | 1  | 1  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Red (62)   | 1                | 1  | 1  | 1  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Red (63)   | 1                | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
| Green        | Green (00) | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Green (01) | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Green (02) | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 1  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Darker     |                  |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|              | ↓          | ↓                | ↓  | ↓  | ↓  | ↓  | ↓  | ↓     | ↓  | ↓  | ↓  | ↓  | ↓  | ↓    | ↓  | ↓  | ↓  | ↓  | ↓  |
|              | Brighter   |                  |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|              | Green (61) | 0                | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Green (62) | 0                | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Green (63) | 0                | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
| Blue         | Blue (00)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|              | Blue (01)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 1  |
|              | Blue (02)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 1  | 0  | 0  |
|              | Darker     |                  |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|              | ↓          | ↓                | ↓  | ↓  | ↓  | ↓  | ↓  | ↓     | ↓  | ↓  | ↓  | ↓  | ↓  | ↓    | ↓  | ↓  | ↓  | ↓  | ↓  |
|              | Brighter   |                  |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|              | Blue (61)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 0  | 1  |
|              | Blue (62)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 0  |
|              | Blue (63)  | 0                | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  |



## 10. Interface Timing

### 10-1) Timing Parameters

AC Electrical Characteristics ( $V_{CC} = +3.3V, GND = 0V, T_a = 25^{\circ}C$ )

| Characteristics                      |             | Symbol | Min. | Typ.  | Max.   | Unit  | Remark |
|--------------------------------------|-------------|--------|------|-------|--------|-------|--------|
| Clock                                | Frequency   | 1/Tc   | -    | 25.18 | 28.33  | MHz   | V/Q=H  |
|                                      |             |        | -    | 6.3   | 7.0    | MHz   | V/Q=L  |
|                                      | Duty ratio  | Tch/Tc | 40   | 50    | 60     | %     | V/Q=L  |
| Data                                 | Set up time | Tds    | 5    | -     | -      | ns    |        |
|                                      | Hold time   | Tdh    | 10   | -     | -      |       |        |
| Horizontal sync. signal              | Cycle       | TH     | 30.0 | 31.8  | -      | us    | V/Q=H  |
|                                      |             |        | 700  | 800   | 900    | clock |        |
|                                      |             | TH     | 50.0 | 63.6  | -      | us    | V/Q=L  |
|                                      |             |        | 360  | 400   | 450    | clock |        |
|                                      | Pulse width | THp    | 2    | 96    | 200    | clock |        |
| Vertical sync. signal                | Cycle       | TV     | 515  | 525   | 560    | line  | V/Q=H  |
|                                      |             | TV     | 251  | 262   | 280    |       | V/Q=L  |
|                                      | Pulse width | TVp    | 2    | -     | 34     | line  |        |
| Horizontal display period            |             | THd    | 320  |       |        | Clock |        |
| Hsync.-Clock phase difference        |             | THc    | 10   | -     | Tc-10  | ns    |        |
| Hsync.-Vsync. phase difference       |             | TVh    | 0    | -     | TH-THp | ns    |        |
| Vertical sync. signal start position |             | TVs    | 34   |       |        | line  | V/Q=H  |
|                                      |             |        | 7    |       |        |       | V/Q=L  |

Note10-1 : In case of lower frequency, the deterioration of the display quality, flicker etc., may occur.

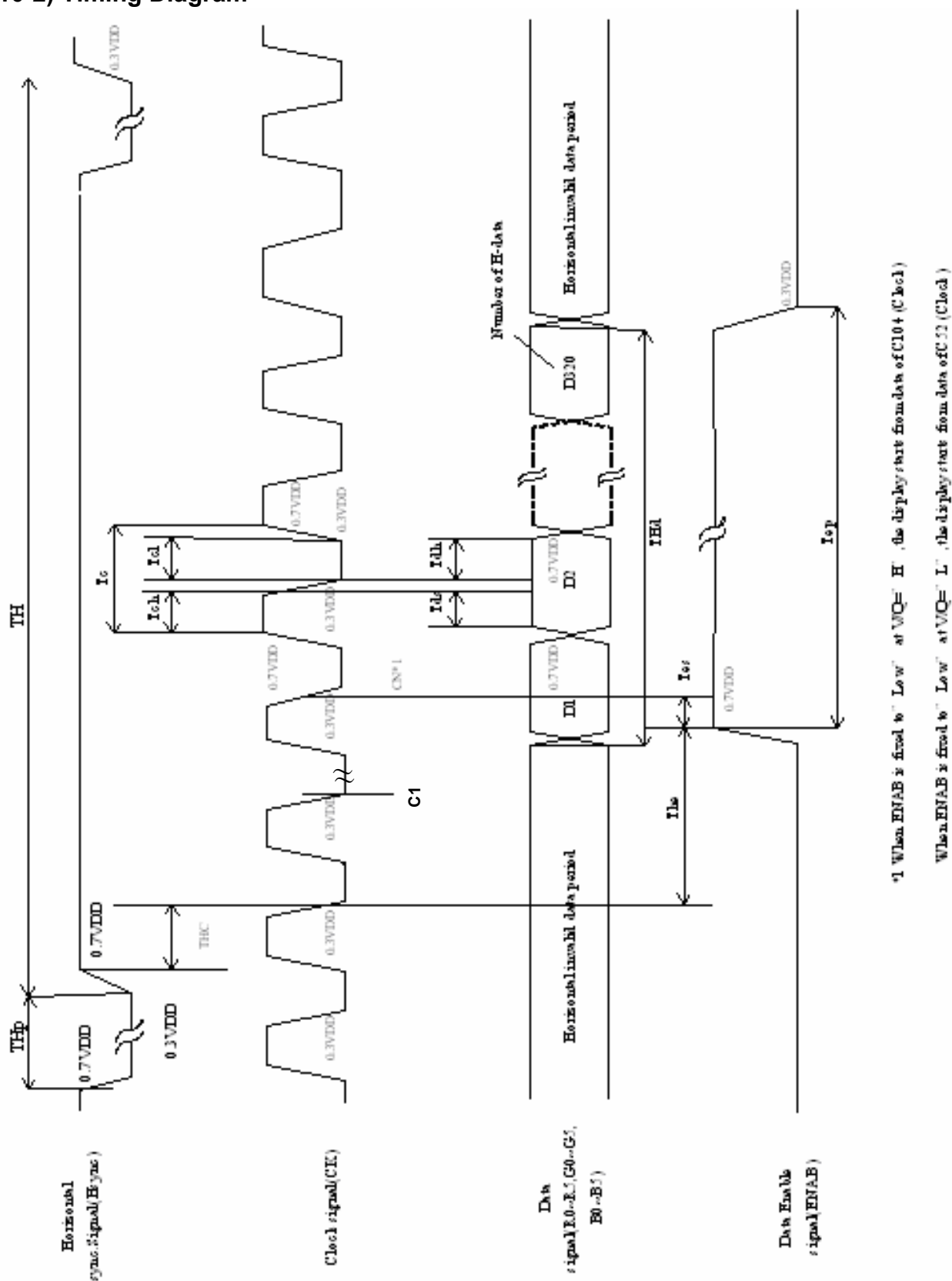
| Parameter                            |             | symbol | Min. | Typ | Max    | Unit  | Remark |
|--------------------------------------|-------------|--------|------|-----|--------|-------|--------|
| Enable signal                        | Set up time | Tes    | 5    | -   | Tc-10  | ns    |        |
|                                      | Pulse width | Tep    | 2    | 320 | TH-10  | clock |        |
| Hsync-Enable signal phase difference |             | The    | 44   | -   | TH-664 | clock | V/Q=H  |
|                                      |             |        | 2    | -   | TH-340 |       | V/Q=L  |

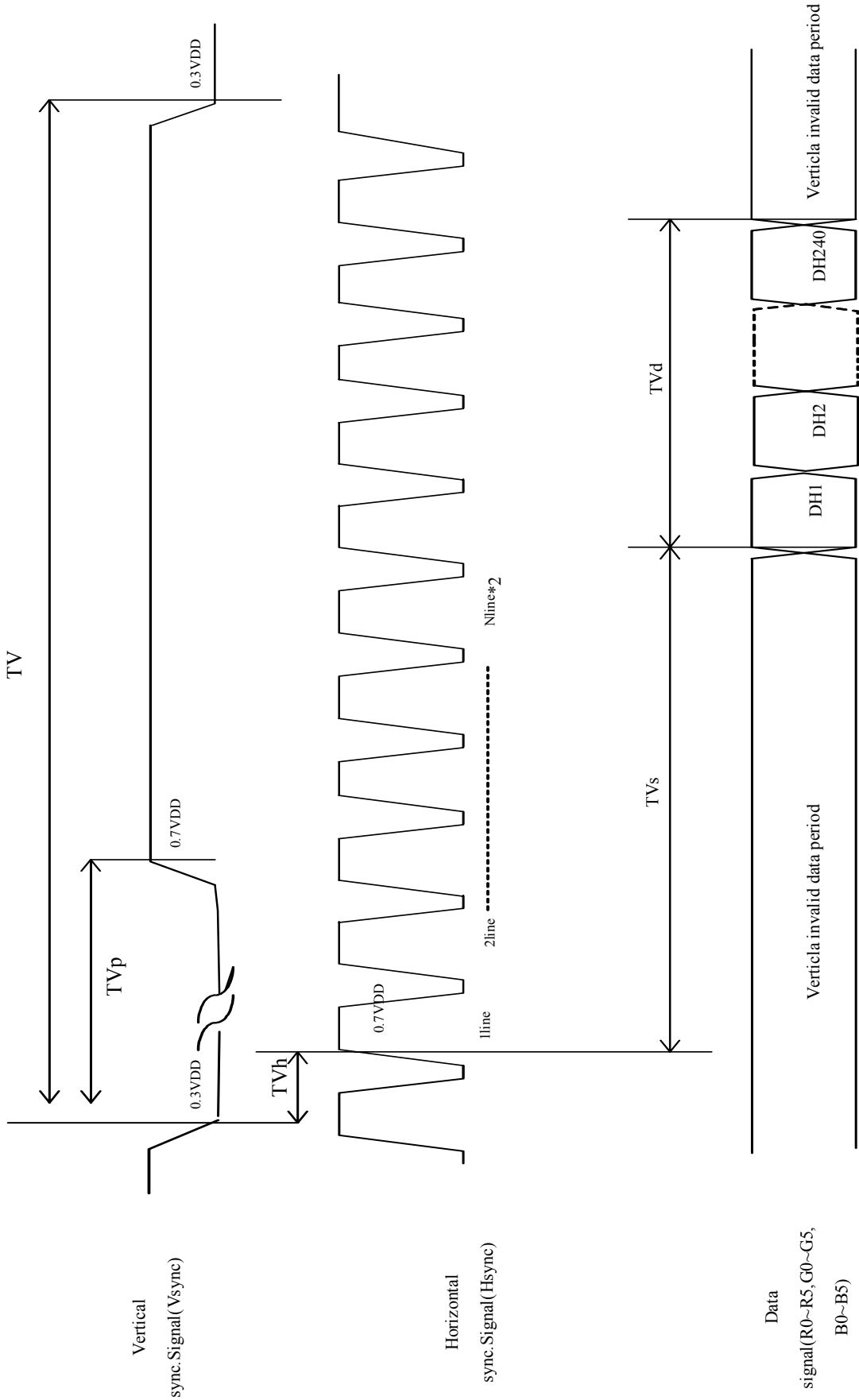
Note10-2 :

When ENAB is fixed at "V/Q=Low", the display starts from the data of C52 (clock).

When ENAB is fixed at "V/Q=High", the display starts from the data of C104 (clock).

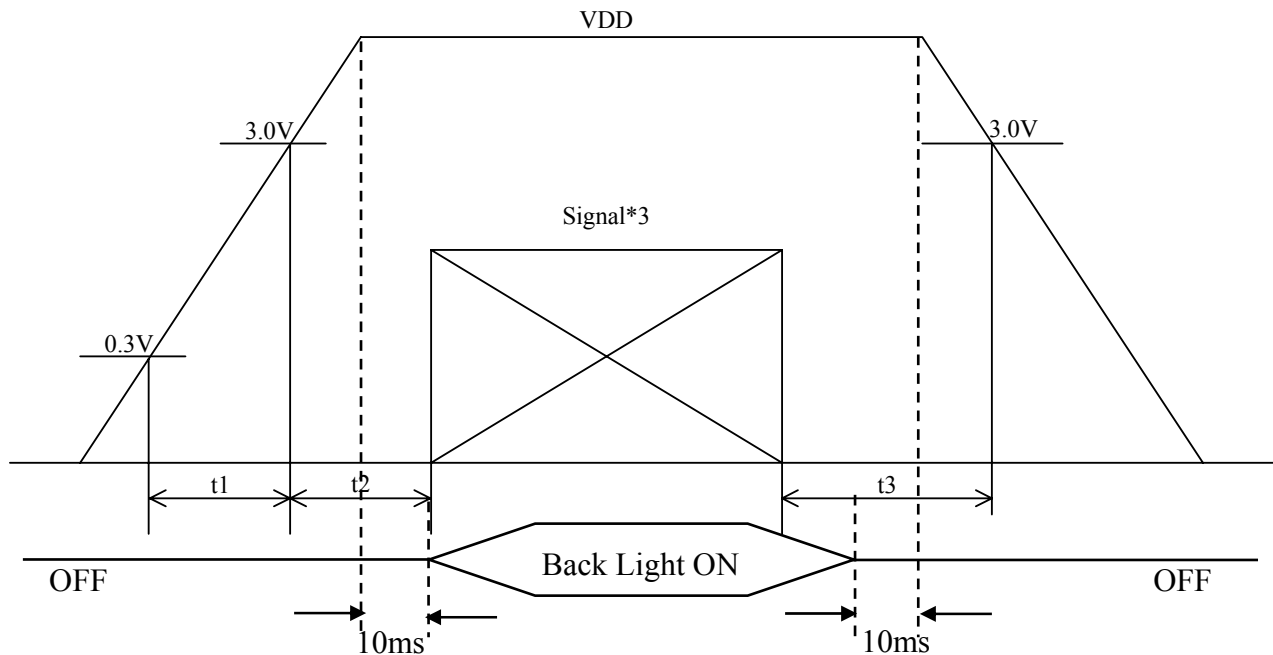
### 10-2) Timing Diagram





\*2 The vertical display position (TVs) is fixed at 34th line (V/Q=H) and 7th line (V/Q=L).

## 11. Power On Sequence



1.  $0 < t_1 \leq 20\text{ms}$
2.  $0 < t_2 \leq 50\text{ms}$
3.  $0 < t_3 \leq 1\text{s}$

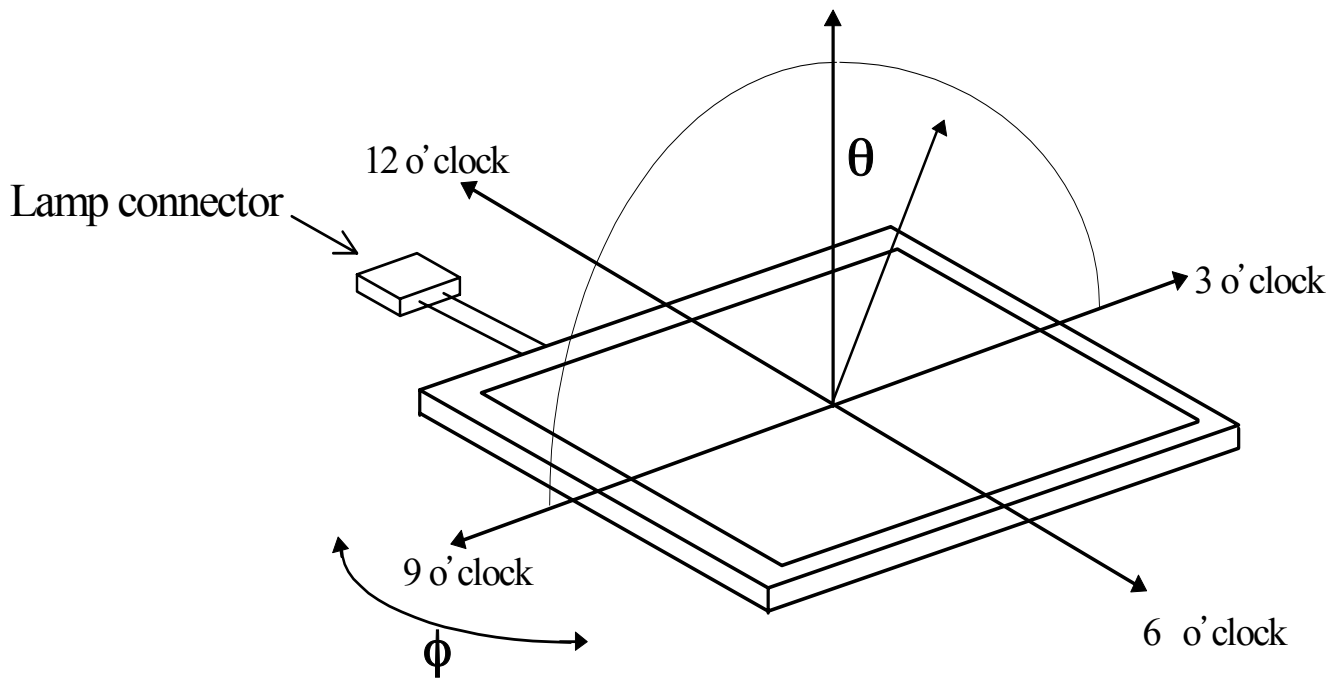
## 12. Optical Characteristics

### 12-1) Specification:

$T_a = 25^\circ\text{C}$

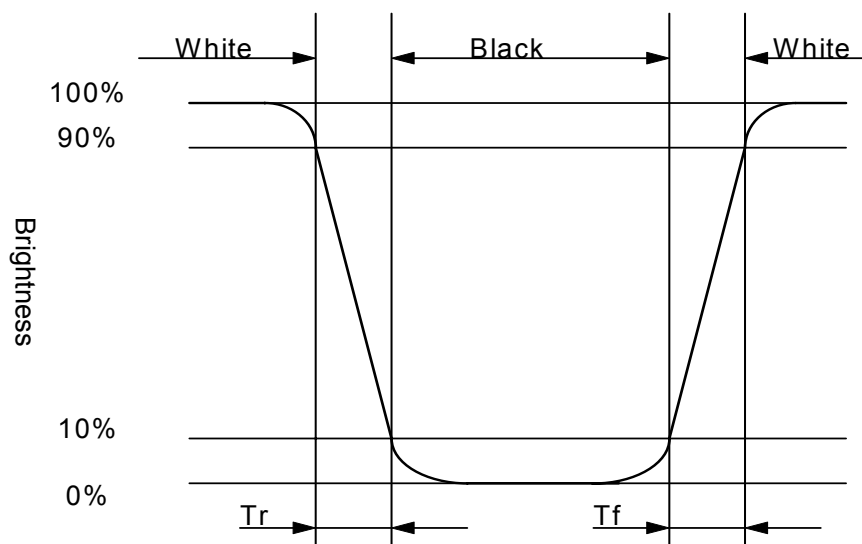
| Parameter            |            | Symbol                   | Condition                        | MIN.  | TYP. | MAX. | Unit              | Remarks   |
|----------------------|------------|--------------------------|----------------------------------|-------|------|------|-------------------|-----------|
| Viewing Angle        | Horizontal | $\theta$                 | $CR \geq 10$                     | 55    | 60   | -    | deg               | Note 12-1 |
|                      | Vertical   | $\theta$ (to 6 o'clock)  |                                  | 45    | 50   | -    | deg               |           |
|                      |            | $\theta$ (to 12 o'clock) |                                  | 35    | 40   | -    | deg               |           |
| Contrast Ratio       |            | CR                       | At optimized viewing angle       | 300   | 600  | -    | -                 | Note 12-2 |
| Response time        | Rise       | Tr                       | $\theta = 0^\circ$               | -     | 15   | 30   | ms                | Note 12-3 |
|                      | Fall       | Tf                       |                                  | -     | 25   | 50   | ms                |           |
| Brightness           |            | -                        | $\theta = 0^\circ / \varphi = 0$ | 600   | 700  | -    | cd/m <sup>2</sup> | Note 12-4 |
| Luminance Uniformity |            | U%                       |                                  | 80    | 85   | -    | %                 | Note 12-5 |
| White Chromaticity   |            | x                        |                                  | 0.28  | 0.31 | 0.34 | -                 |           |
|                      |            | y                        |                                  | 0.31  | 0.34 | 0.37 | -                 |           |
| LED Life Time        |            | -                        |                                  | 20000 | -    | -    | hr                |           |

Note 12-1: The definitions of viewing angles are as follow

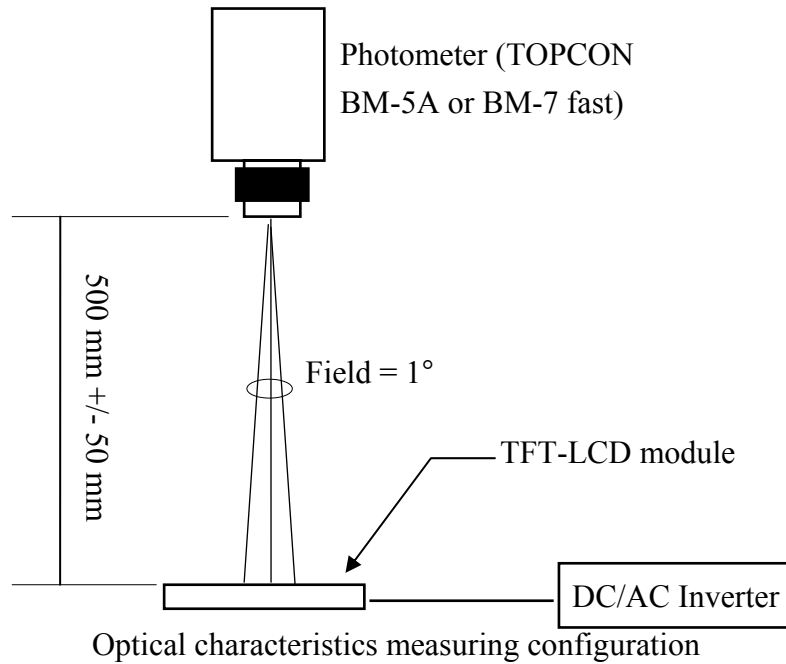


Note 12-2: The definition of contrast ratio  $CR = \frac{\text{Luminance at gray level 63}}{\text{Luminance at gray level 0}}$

Note 12-3: Definition of Response Time  $T_r$  and  $T_f$ :



Note 12-4: The optical characteristics shall be measured in dark room (ambient illumination on panel surface less than 1 Lux). The measuring configuration shows as following figure.



Note 12-5: The uniformity of LCD is defined as

$$U = \frac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$$

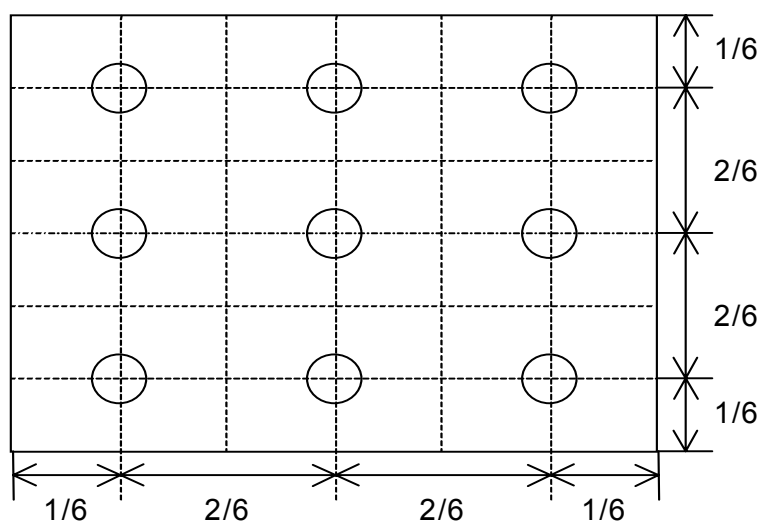
Luminance meter: BM-5A or BM-7 fast (TOPCON)

Measurement distance: 500 mm +/- 50 mm

Ambient illumination: < 1 Lux

Measuring direction: Perpendicular to the surface of module

The test pattern is white (Gray Level 63).



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**13. Handling Cautions****13-1) Mounting of module**

- a) Please power off the module when you connect the input/output connector.
- b) Please connect the ground pattern of the inverter circuit surely. If the connection is not perfect, some following problems may happen possibly.
  - 1. The noise from the backlight unit will increase.
  - 2. The output from inverter circuit will be unstable.
  - 3. In some cases a part of module will heat.
- c) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
- d) Protective film (Laminator) is applied on surface to protect it against scratches and dirt. It is recommended to peel off the laminator before use and taking care of static electricity.

**13-2) Precautions in mounting**

- a) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth.
- b) Wipe off water drops or finger grease immediately. Long contact with water may cause discoloration or spots.
- c) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Please handle with care.
- d) Since CMOS LSI is used in the module. So take care of static electricity and earth yourself when handling.

**13-3) Adjusting module**

- a) Adjusting volumes on the rear face of the module have been set optimally before shipment.
- b) Therefore, do not change any adjusted values. If adjusted values are changed, the specifications described may not be satisfied.

**13-4) Others**

- a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours.
- b) Store the module at a room temperature place.
- c) The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around.
- d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel. Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet. Wash it out immediately with soap.
- e) Observe all other precautionary requirements in handling general electronic components.
- f) Please adjust the voltage of common electrode as material of attachment by 1 module.

**13-5) Polarizer mark**

The polarizer mark is to describe the direction of wide view angle film how to match up with the rubbing direction.

#### 14. Reliability Test

| No | Test Item                                       | Test Condition   | Remark |
|----|---|--|--------|
| 1  | High Temperature Storage Test                   | Ta = +85°C, 240 hrs  |        |
| 2  | Low Temperature Storage Test                    | Ta = -40°C, 240 hrs  |        |
| 3  | High Temperature Operation Test                 | Ta = +80°C, 240 hrs  |        |
| 4  | Low Temperature Operation Test                  | Ta = -30°C, 240 hrs  |        |
| 5  | High Temperature & High Humidity Operation Test | Ta = +60°C, 90%RH, 240 hrs<br>(No Condensation)  |        |
| 6  | Thermal Cycling Test<br>(non-operating)         | -20°C → +70°C, 200 Cycles<br>30 min 30 min   |        |
| 7  | Vibration Test<br>(non-operating)               | Frequency: 10 ~ 57 HZ /Vibration<br>Width:0.075 mm<br>58-500 Hz / Gravity: 9.8m/s2<br>Sweep time: 11 minutes<br>Test period: 3 hrs for each direction of X, Y, Z |        |
| 8  | Shock Test<br>(non-operating)                   | Gravity: 490m/s2 * 6ms<br>Direction: ±X, ±Y, ±Z<br>3 times for each direction  |        |
| 9  | Electrostatic Discharge Test<br>(non-operating) | Machine Mode = ±200V<br>C = 200pF, R = 0Ω<br>1 times discharge for each pad  |        |

Ta: ambient temperature

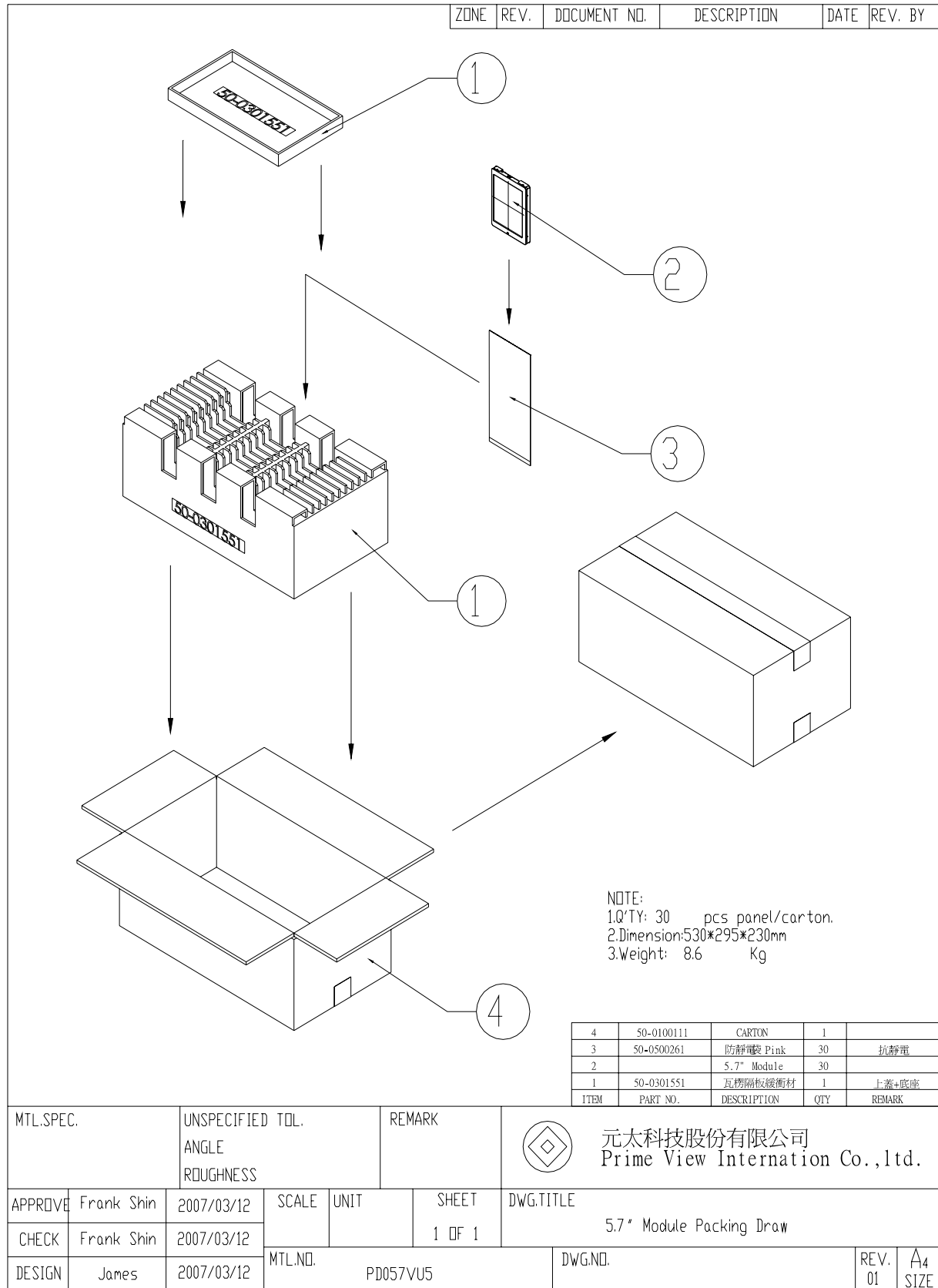
Note: The protective film must be removed before temperature test

[Criteria]

In the standard conditions, there is not display function NG issue occurred.  
(Including : line defect, no image) All the cosmetic specification is judged before the reliability stress.



## 15. Packing Diagram



## Revision History

| Rev. | Issued Date  | Eng. | Revised | Contents |
|------|--------------|------|---------|----------|
| 1.0  | Mar.12, 2007 | 吳昌霖  | New     |          |