PRIME VIEW

PD057VUB

*Version : 2.0*

# TECHNICAL SPECIFICATION

# MODEL NO. : PD057VUB

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Please contact PVI or its agent for further information.

☐Customer' s Confirmation

Customer _____

Date _____

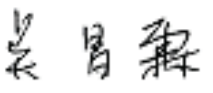
By _____

☐PVI' s Confirmation

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Confirmed By _____



Prepared By _____

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# Revision History

<table>
<tr><th>Rev.</th><th>Issued Date</th><th>Eng.</th><th>Revised Contents</th></tr>
<tr><td>0.1</td><td>Jul. 08, 2008</td><td>吳昌霖</td><td>Preliminary</td></tr>
<tr><td>0.2</td><td>Sep. 09, 2008</td><td>吳昌霖</td><td>Add Mechanical Drawing</td></tr>
<tr><td>0.3</td><td>Oct. 31, 2008</td><td>吳昌霖</td><td>Add weight = 244±10g<br><br>Modify 4. mechanical drawing<br><br>Add LED voltage(max.) = 24.5V<br>Add LED power consumption(max.) = 1470mW<br>Add total power consumption(max.) = 1.72W</td></tr>
<tr><td>1.0</td><td>Nov. 18, 2008</td><td>吳昌霖</td><td>New</td></tr>
<tr><td>2.0</td><td>Jun 23, 2010</td><td>吳昌霖</td><td>Modify 6-2) Electrical Performance<br>Before：
<table>
<tr><th>Parameters</th><th>Symbol</th><th>MIN.</th><th>Typ.</th><th>MAX.</th><th>Unit</th><th>Remark</th></tr>
<tr><td rowspan="2">Terminal Resistance</td><td>X</td><td>400</td><td>550</td><td>810</td><td>Ω</td><td></td></tr>
<tr><td>Y</td><td>230</td><td>320</td><td>640</td><td>Ω</td><td></td></tr>
</table>
After：
<table>
<tr><th>Parameters</th><th>Symbol</th><th>Specification</th><th>Unit</th><th>Remark</th></tr>
<tr><td rowspan="2">Circuit Resistance</td><td>X</td><td>420 ~ 870</td><td>Ω</td><td>At connector</td></tr>
<tr><td>Y</td><td>310 ~ 700</td><td>Ω</td><td>At connector</td></tr>
</table></td></tr>
</table>

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# TECHNICAL SPECIFICATION

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## 1. Application

This data sheet applies to a color TFT LCD module, PD057VUB.
PD057VUB 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

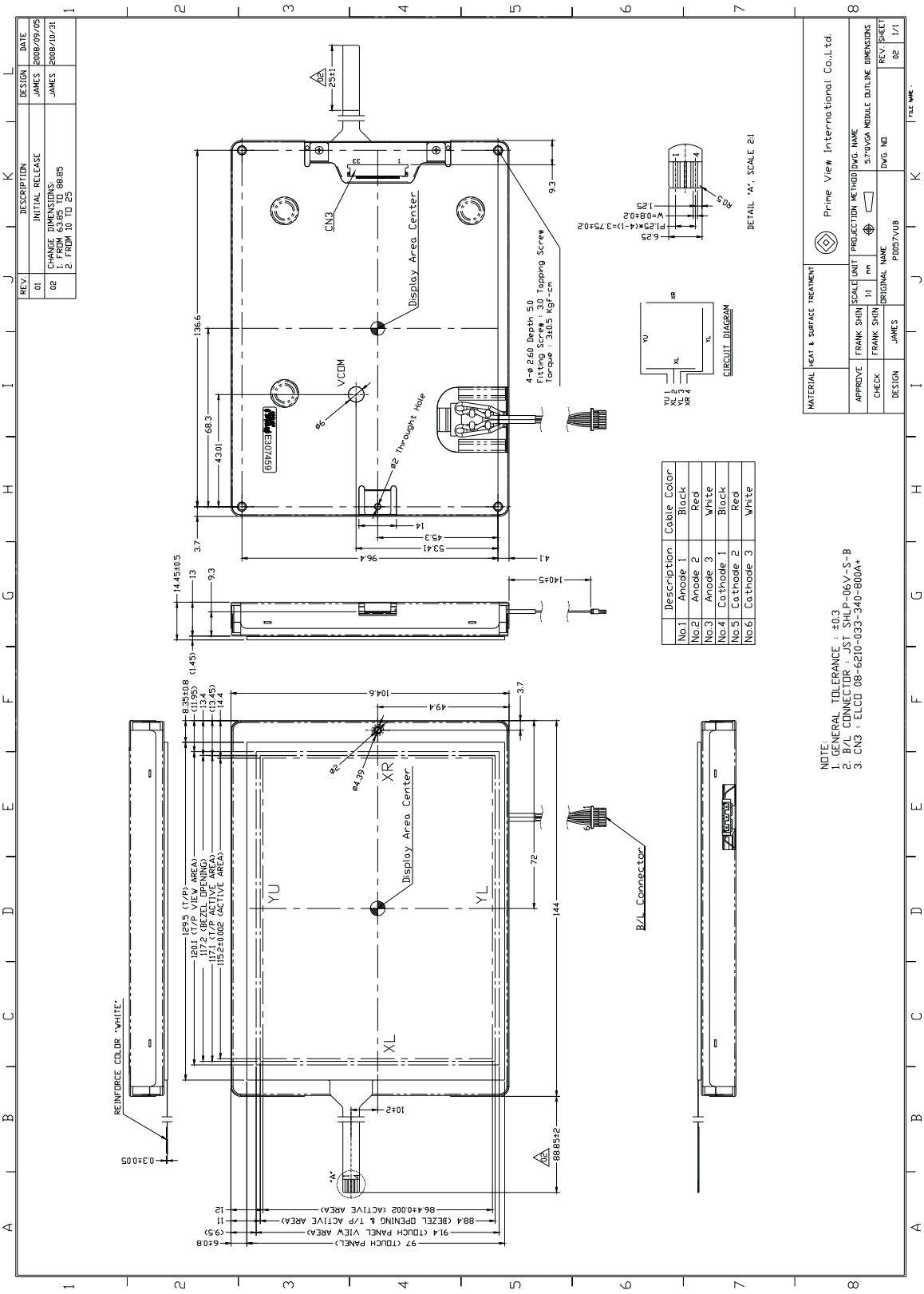
. QVGA (320*240 pixels) resolution
. Module with resistive type touch panel
. Amorphous silicon TFT LCD panel with LED
. Pixel in stripe configuration
. Thin and light weight
. Display Colors：262,144 colors
. TTL interface

## 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)×14.45 (D) (typ.) | mm |
| Weight | 244±10 | g |
| Back-light | 21-LED | |
| Surface treatment | Anti-glare + EWV | |
| Display mode | Normally white | |
| Surface treatment of Touch Panel | 3H | |
| Gray scale inversion direction | 6 o`clock<br>[ ref to Note 13-1 ] | |

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## 4.Mechanical Drawing of TFT-LCD Module




| No. | Description | Cable Color |
|---|---|---|
| No.1 | Anode 1 | Black |
| No.2 | Anode 2 | Red |
| No.3 | Anode 3 | White |
| No.4 | Cathode 1 | Black |
| No.5 | Cathode 2 | Red |
| No.6 | Cathode 3 | White |

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## 5.Input / Output Terminals

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

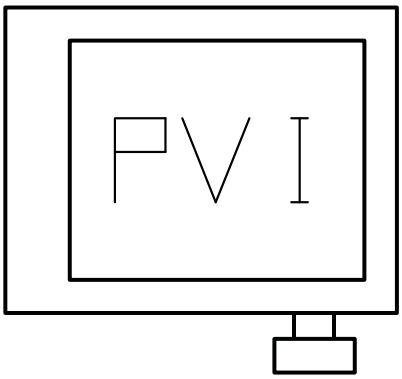
Connector type: ELCO 08-6210-033-340-800A+, PIN No 33 pins

| 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 | $V_{CC}$ | - | +3.3V power supply | |
| 29 | $V_{CC}$ | - | +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 | Note11-2 |
| 33 | GND | - | GND | |

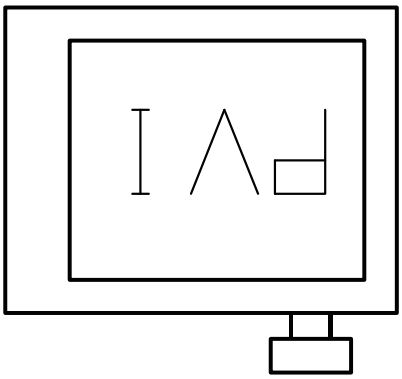
Note5-1：The horizontal display start timing is settled in accordance with rising of ENAB signal. In case ENAB is fixed ”Low”,the horizontal start timing is determined as described in 10-2. Don`t keep ENAB”High” during operation.

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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：MOLEX 51021-0400

| Pin No | Symbol | Description | Remark |
|---|---|---|---|
| 1 | + | Input terminal (Anode) | Wire Color：Black |
| 2 | - | Input terminal (Cathode)) | Wire Color：Red |
| 3 | + | Input terminal (Anode) | Wire Color：White |
| 4 | - | Input terminal (Cathode)) | Wire Color：Black |
| 5 | + | Input terminal (Anode) | Wire Color：Red |
| 6 | - | Input terminal (Cathode)) | Wire Color：White |

## 6.Touch Panel Characteristics

**6-1) Pin assignment：**

| Pin No. | Designation | Remark |
|---|---|---|
| 1 | YU (Bottom) | |
| 2 | XL (Top) | |
| 3 | YL (Bottom) | |
| 4 | XR (Top) | |

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### 6-2) Electrical Performance：

| Parameters | Symbol | Specification | | | Unit | Remark |
|---|---|---|---|---|---|---|
| Circuit Resistance | X | 420 ~ 870 | | | Ω | At connector |
| | Y | 310 ~ 700 | | | Ω | At connector |
| Input Voltage | VT | - | 5 | 7 | V | |
| Linearity (X ,Y direction) | | - | - | ±1.5 | % | |
| Insulation Impedance | | 20 | - | - | MΩ | DC 25V |
| Response Time | | - | - | 15 | ms | |
| Operation Force | | - | - | 50 | g | Note 6-1 |

Note 6-1：Input through R0.8mm stylus or R8.0mm finger.

### 6-3) Durability Performance

1. Hitting Durability:

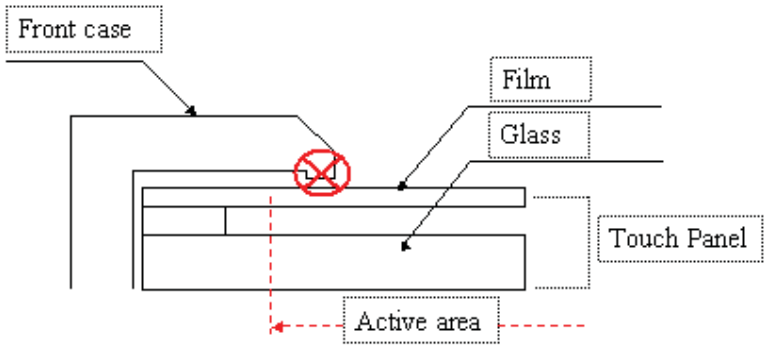
   At least 1,000,000 times with R8.0mm silicon rubber, 250g, 3 times/sec.

2. Sliding Durability:

   At least 1,00,000 times with R0.8mm polyacetal stylus, 250g, 60 mm/sec.

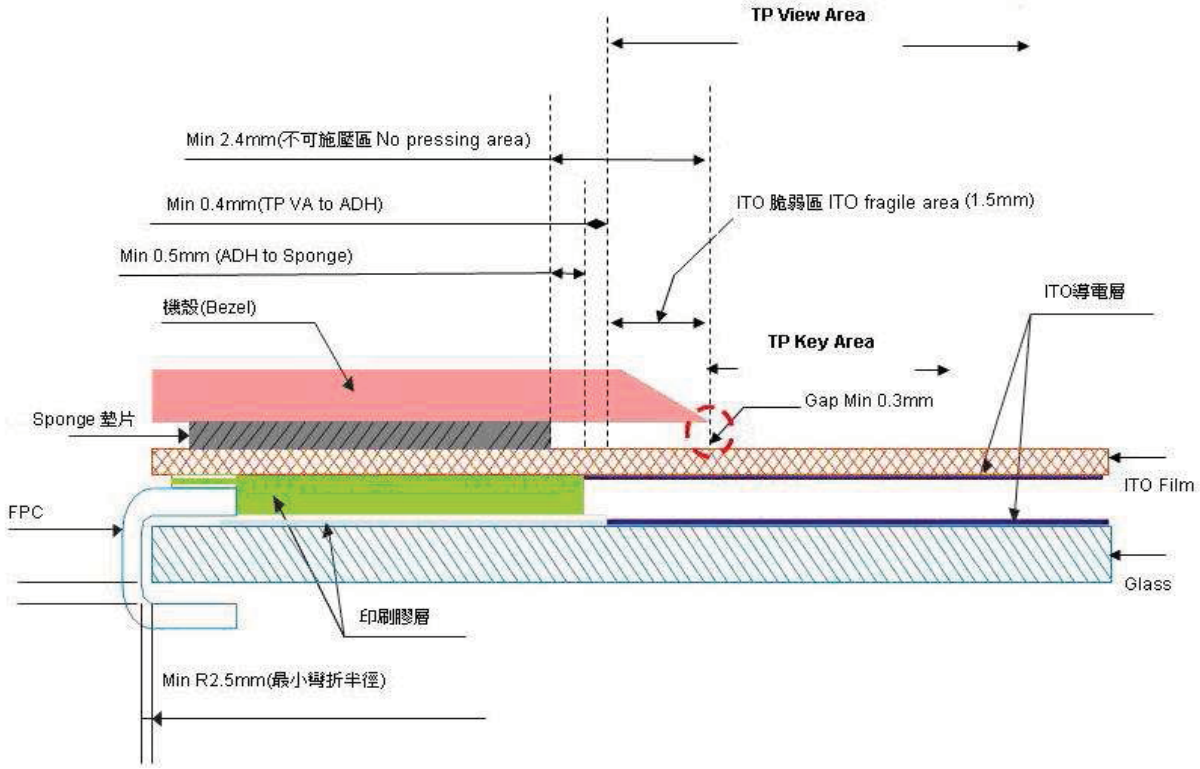
### 6-4) Integration Design Guide

Avoid the design that Front-case overlap and press on the active area of the touch-panel.
Give enough gap (over 0.5mm at compressed) between the front case and touch-panel to protect wrong operating.




Use a buffer material (Gasket) between the touch-panel and front-case to protect damage and wrong operating.
Avoid the design that buffer material overlap and press on the inside of touch-panel viewing area.

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Note 6-2：We strongly suggest to follow above design guide to avoid the linear defect happened on the touch panel.

## 7.Absolute Maximum Ratings:

GND=0V, Ta=25℃

| Parameters | Symbol | Condition | MAX. | Unit | Remark |
|---|---|---|---|---|---|
| Input Voltage | $V_I$ | Ta=25℃ | -0.3~+4 | V | Note7-1 |
| +3.3V supply voltage | $V_{CC}$ | Ta=25℃ | 0~+3.6 | V | |

Note7-1:CK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,ENAB,R/L,U/D,V/Q

## 8.Electrical Characteristics

### 8-1) Recommended Operating Conditions:

GND=0V, Ta=25℃

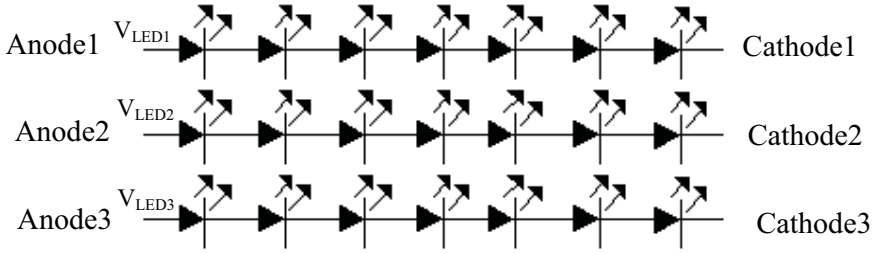
| Item | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| +3.3V Supply Voltage | $V_{CC}$ | +3.0 | +3.3 | +3.6 | V | |
| Permissive input ripple voltage | $V_{RF}$ | - | - | 100 | mVp-p | $V_{CC}$=3.3V |
| Input voltage (Low) | $V_{IL}$ | 0 | - | 0.3 $V_{CC}$ | V | |
| Input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

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### 8-2) Recommended Driving Condition for LED Back Light

Ta=25℃

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| LED voltage | $V_{LED}$ | - | - | (24.5) | V | $I_L$=20mA |
| LED current | $I_{LED}$ | - | 20 | - | mA | Note 8-1 |
| Back Light Power Consumption | $P_{LED}$ | - | - | 1470 | mW | Note 8-2 |



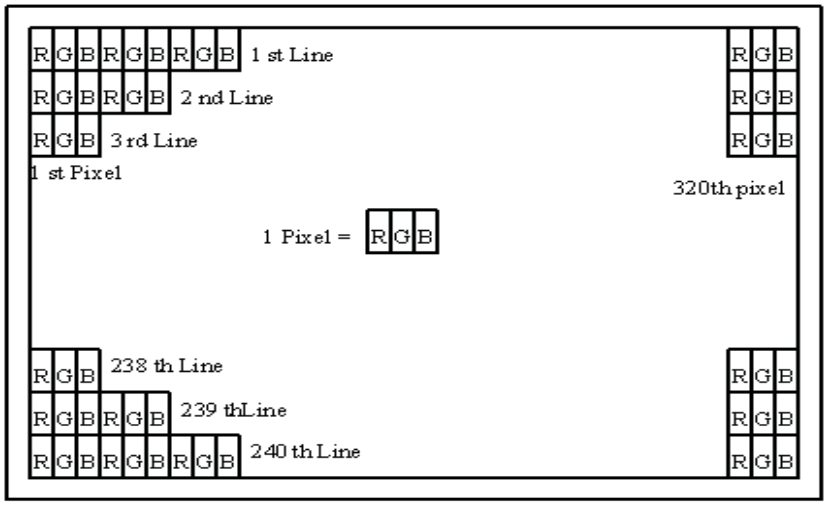

### 8-3) Power Consumption

| Parameters | Symbol | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|
| +3.3V Current Dissipation | $I_{CC}$ | 67 | 75 | mA | |
| LCD Panel Power Consumption | - | 0.22 | 0.25 | W | Note 8-3 |
| Total Power Consumption | - | - | 1.72 | W | |

Note 8-3: The power consumption for back light is not included.

## 9. Pixel Arrangement

The LCD module pixel arrangement is stripe configuration.




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## 10. 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 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green (02) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 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 | 0 | 1 | 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 |

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## 11. Interface Timing

### 11-1) Timing Parameters

AC Electrical Characteristics ($V_{CC}$ =+3.3V,GND=0V,Ta=25℃)

| 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 |

Note11-1：In case of lower frequency, the deterioration of the display quality, flicker etc., may occur.

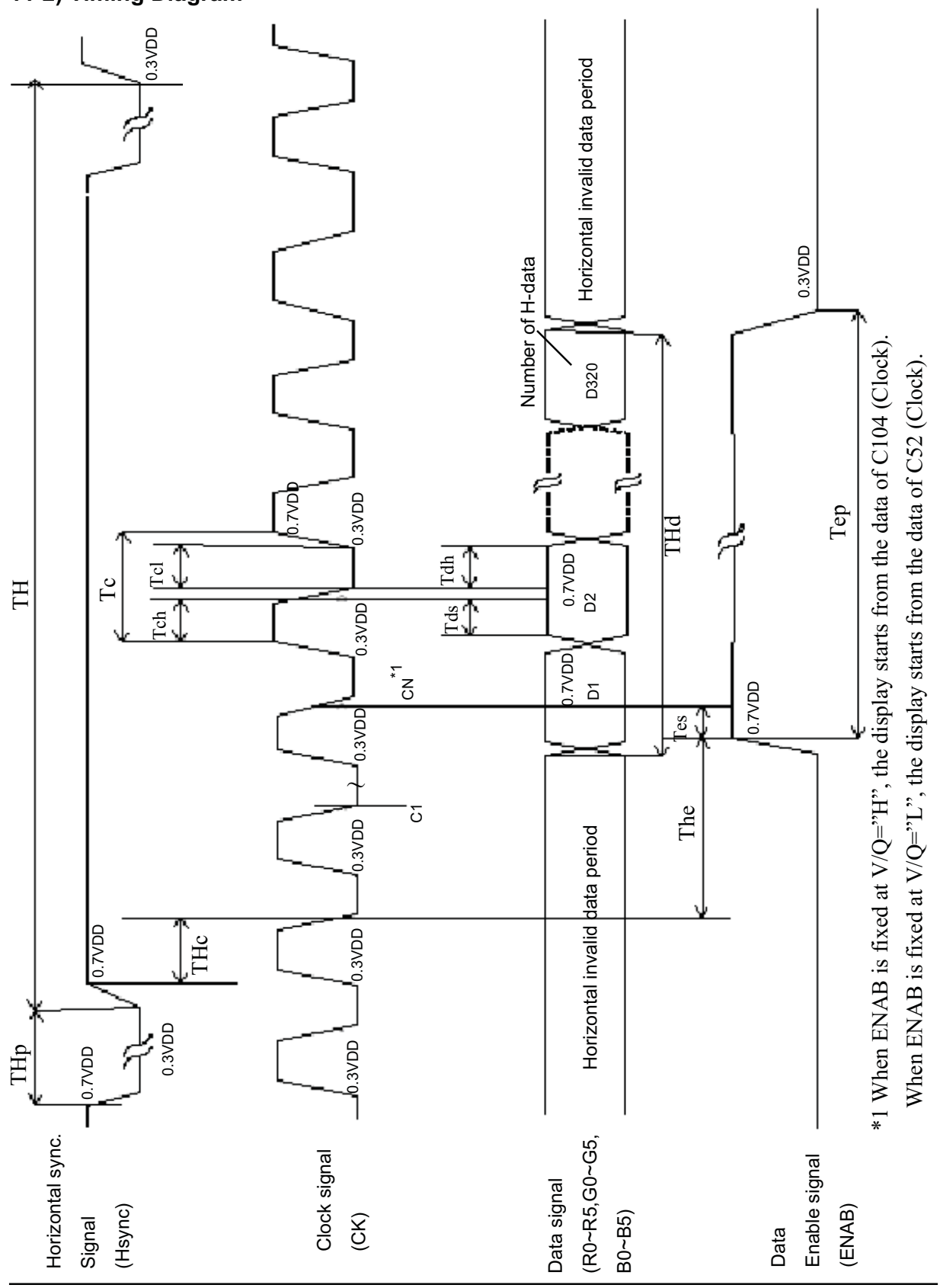
| Parameter | | symbol | Min. | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Enable signal | Set up time | Tes | 5 | - | Tc-10 | ns | |
| | Pulse width | Tep | 2 | 320 | TH-10 | clock | |
| Hsync-Enable signal phase difference | | The | 44 | - | TH-664 | clock | V/Q=H |
| | | | 2 |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

Note11-2：
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).

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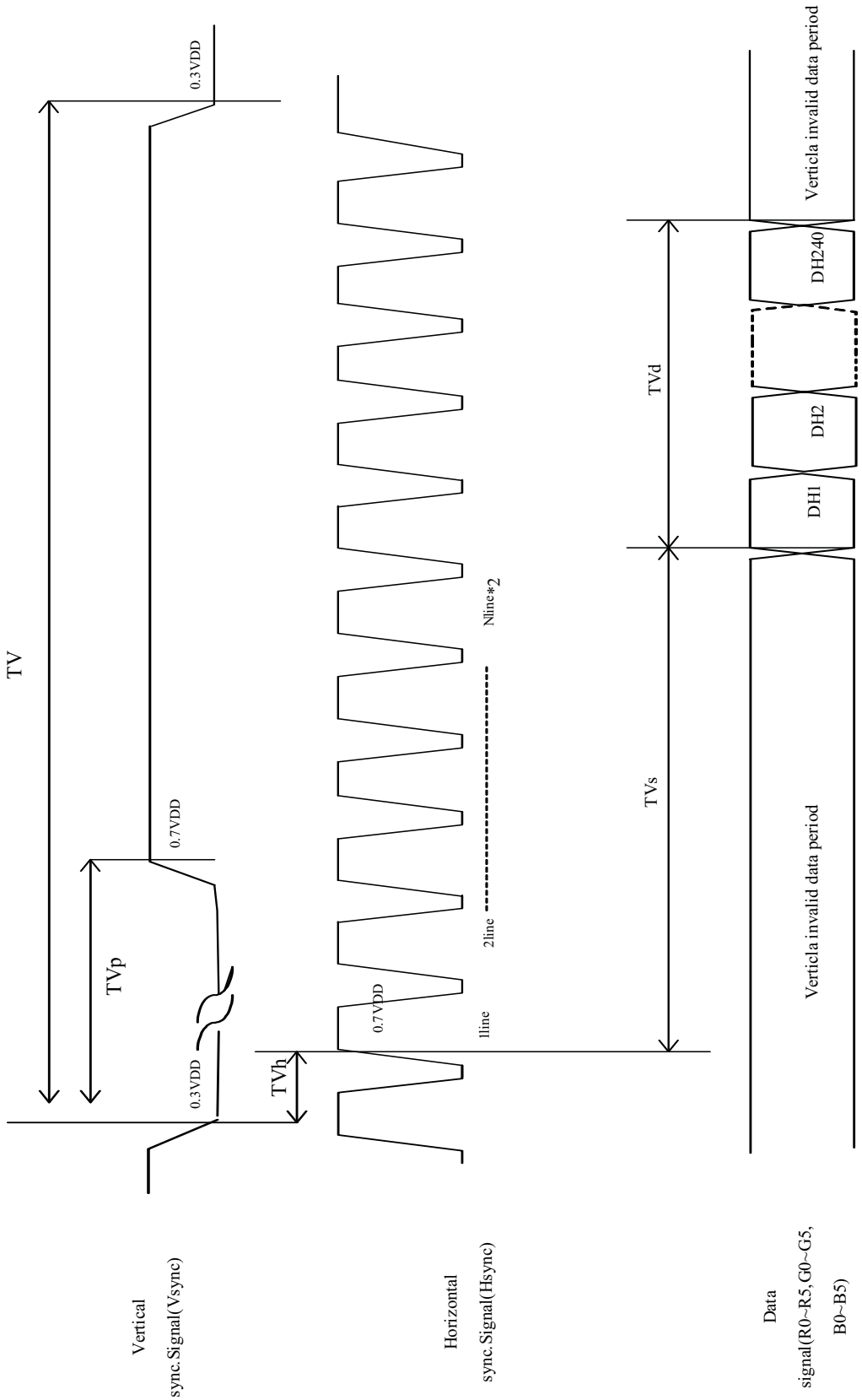
P-511-541(V:2)

## 11-2) Timing Diagram




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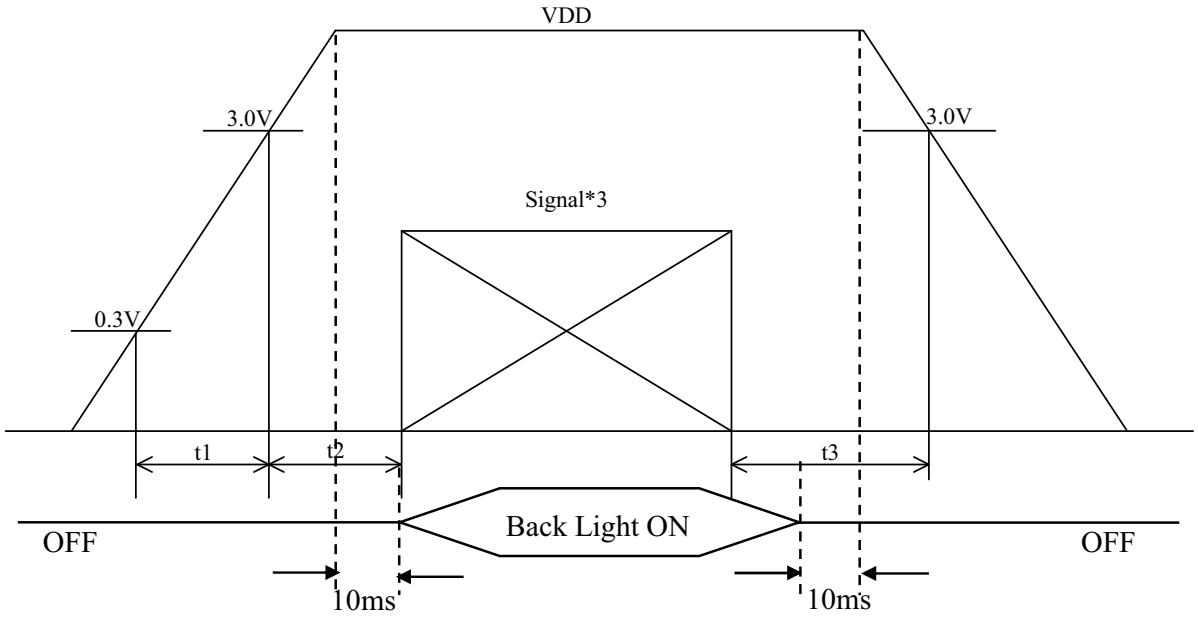
P-511-541(V:2)




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

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## 12. Power On Sequence




1. 0＜t1≦20ms
2. 0＜t2≦50ms
3. 0＜t3≦1s

## 13. Optical Characteristics

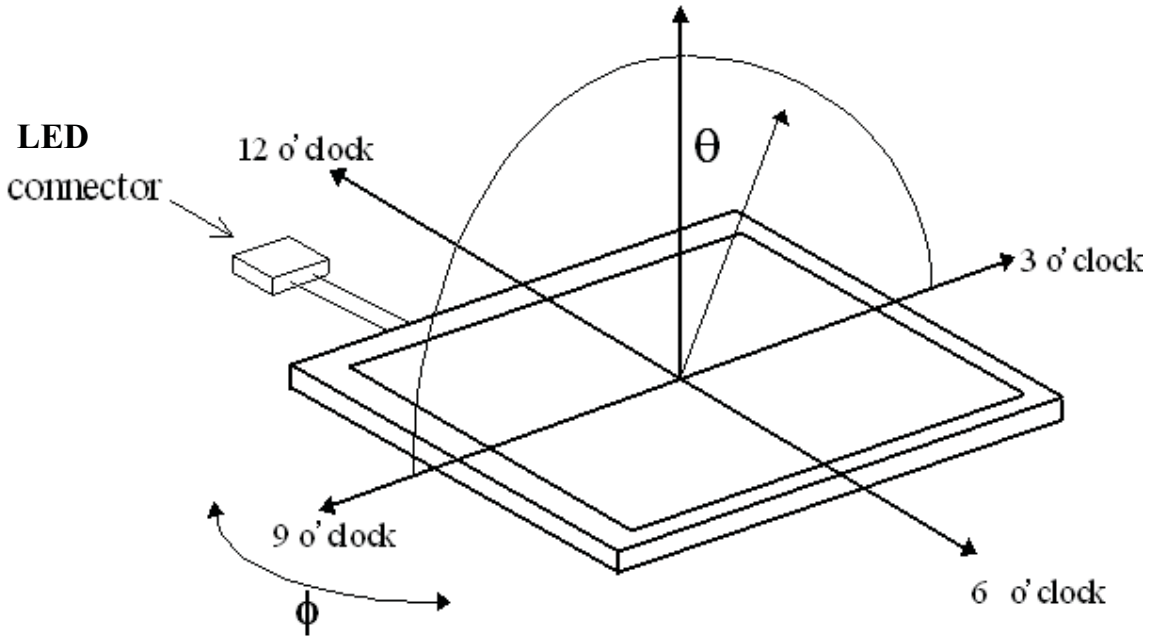
### 13-1) Specification:

Ta=25℃

| Parameter | | Symbol | Condition | MIN. | TYP. | MAX. | Unit | Remarks |
|---|---|---|---|---|---|---|---|---|
| Viewing Angle | Horizontal | $\theta$ | CR≧10 | 70 | 75 | - | deg | Note 13-1 |
| | Vertical | $\theta$ (to 6 o'clock) | | 65 | 70 | - | deg | |
| | | $\theta$ (to 12 o'clock) | | 45 | 50 | - | deg | |
| Contrast Ratio | | CR | At optimized viewing angle | 300 | 600 | - | - | Note 13-2 |
| Response time | Rise | Tr | $\theta$ =0° | - | 15 | 30 | ms | Note 13-3 |
| | Fall | Tf | | - | 25 | 50 | ms | |
| Brightness | | - | $\theta$ =0°/ $\varphi$ =0 | 350 | 400 | - | cd/㎡ | Note 13-5 |
| Luminance Uniformity | | U% | | 70 | 75 | - | % | Note 13-6 |
| White Chromaticity | | x | | 0.27 | 0.31 | 0.35 | - | |
| | | y | | 0.30 | 0.34 | 0.38 | - | |
| LED Life Time | | - | | - | 30000 | - | hrs | Note 13-4 |

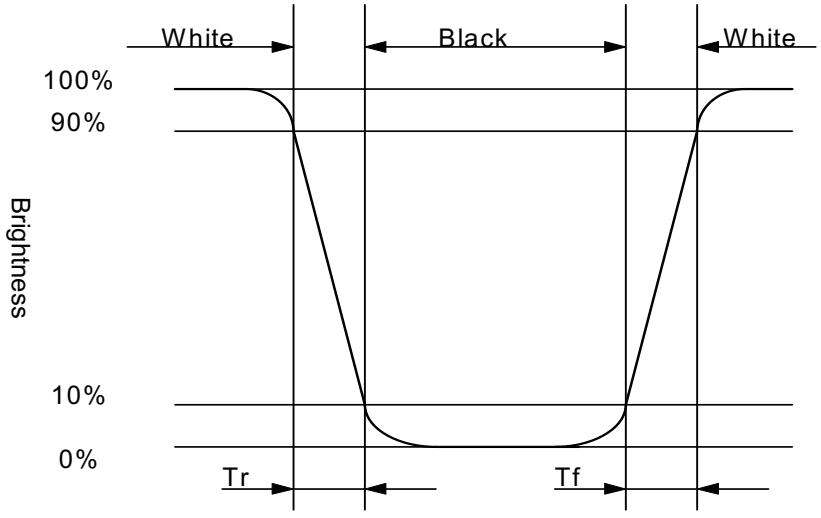
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Note 13-1：The definitions of viewing angles are as follow




Note 13-2：The definition of contrast ratio $CR = \frac{\text{Luminance at White Pattern}}{\text{Luminance at Black Pattern}}$

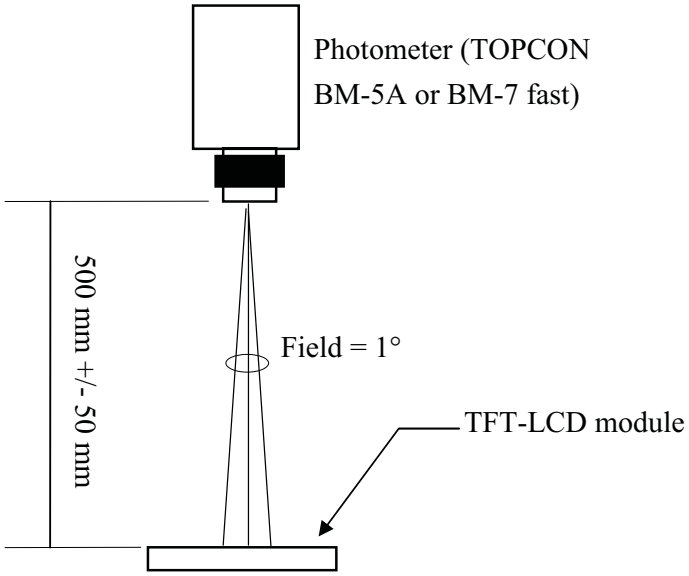
Note 13-3：Definition of Response Time $T_r$ and $T_f$:




Note 13-4：The “LED Life time “ is defined as the module brightness decrease to 50% original Brightness that the ambient temperature is 25℃ and $I_{LED}$ = 20 mA.

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Note 13-5：All optical measurements shall be performed after backlight being turned-on for 30 mins. 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.




Optical characteristics measuring configuration

Note 13-6：The uniformity of LCD is defined as

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

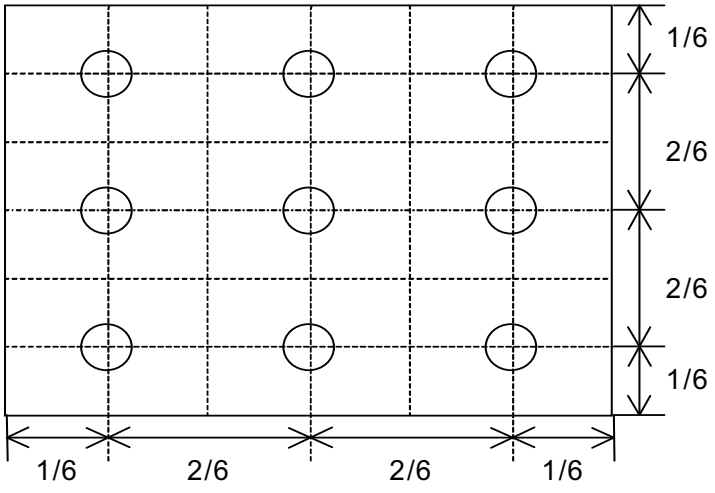
Luminance meter: BM-5A or BM-7 fast (TOPCON)

Measurement distance: 500 mm +/- 50 mm

Ambient illumination: < 1 Lux

Measuring direction: Perpendicular to the surface of module

The test pattern is white




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## 14. Handling Cautions

### 14-1) Mounting of module

a) Please power off the module when you connect the input/output connector.
b) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
c) Protective film (Laminator) is applied on surface to protect it against scratches and dirts.
d) Please following the tear off direction as figure 14-1 to remove the protective film as slowly as possible, so that electrostatic charge can be minimized.

### 14-2) 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.

### 14-3) 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.

### 14-4) Others

a) Don`t 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.

### 14-5) Polarizer mark

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

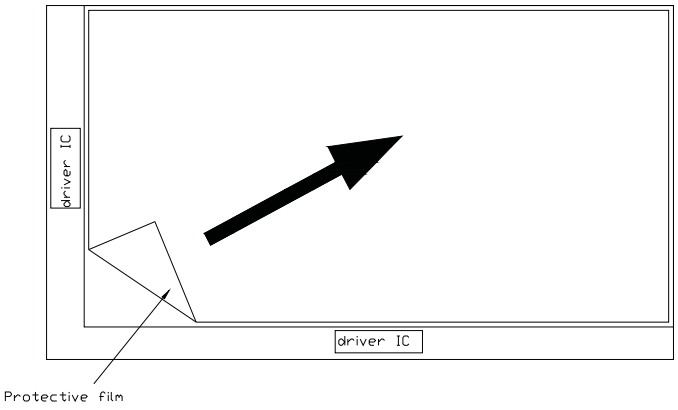



Figure 14-1 the way to peel off protective film

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## 15. Reliability Test

| No | Test Item | Test Condition | Remark |
|---|---|---|---|
| 1 | High Temperature Storage Test | Ta = +85℃, 240 hrs | |
| 2 | Low Temperature Storage Test | Ta = -40℃, 240 hrs | |
| 3 | High Temperature Operation Test | Ta = +80℃, 240 hrs | |
| 4 | Low Temperature Operation Test | Ta = -30℃, 240 hrs | |
| 5 | High Temperature & High Humidity Operation Test | Ta = +60℃, 90%RH, 240 hrs<br>(No Condensation) | |
| 6 | Thermal Cycling Test<br>(non-operating) | -20℃→+70℃, 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 | |
| 10 | Hitting Durability Test<br>(Touch panel) | 1,000,000 times, with R 8.0 mm silicon rubber,<br>250g, 3times/sec | |
| 11 | Sliding Durability Test<br>(Touch panel) | 1,00,000 times, with R 0.8 mm polyacetal stylus,<br>250g, 60mm/sec | |

Ta: ambient temperature

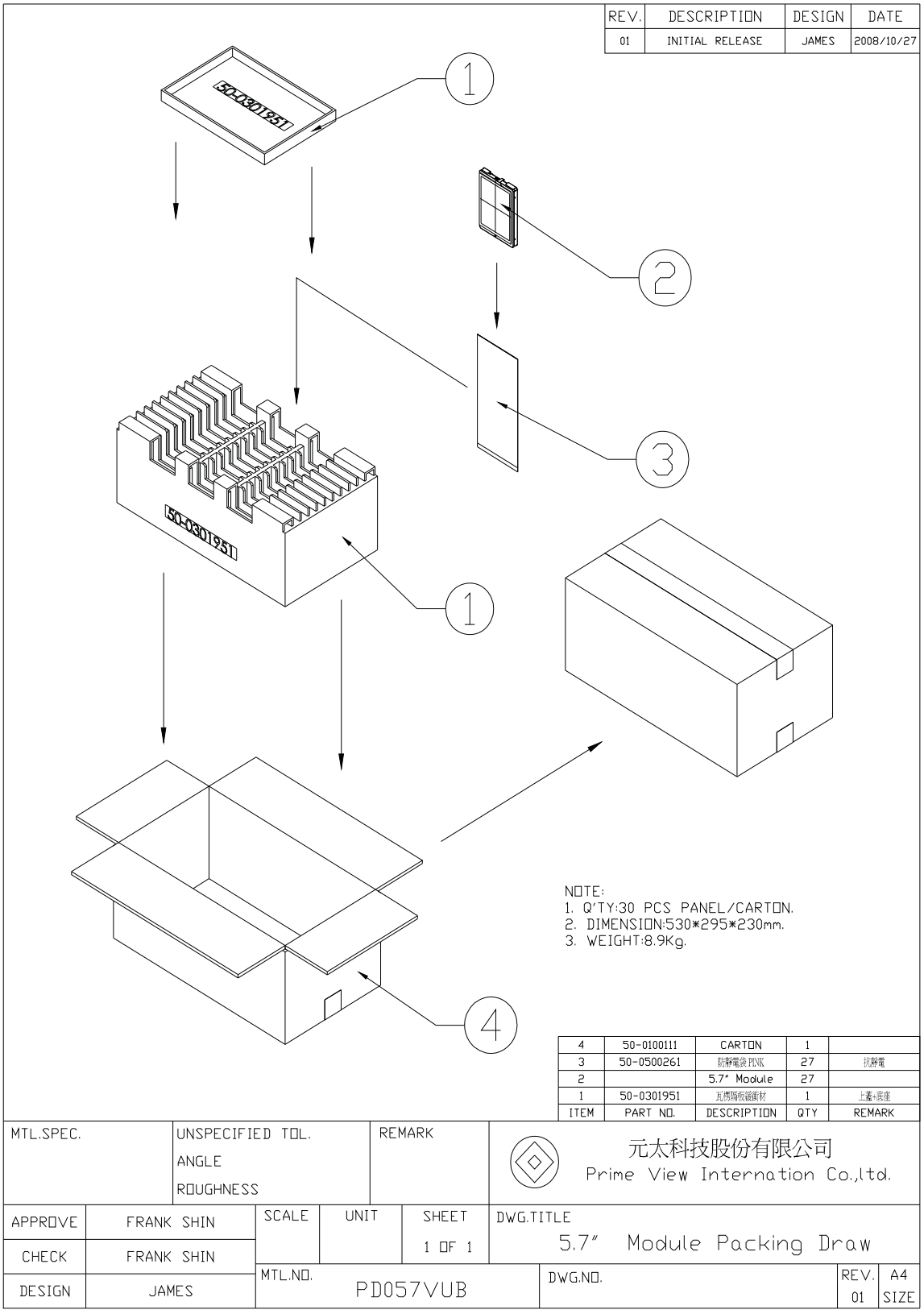
Note: The protective film must be removed before temperature test

[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.

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## 16. Packing Diagram




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