**Version : 2.0**

# TECHNICAL SPECIFICATION

# MODEL NO : PM090WY2

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☐Customer's Confirmation

Customer _____

Date _____

By _____

☐E Ink's Confirmation

Confirmed By Frank, Shin

Prepared By

# Revision History

| Rev. | Eng. | Revised | Contents |
|---|---|---|---|
| 1.0 | Tim Jen | Apr. 22, 2010 | New |
| 2.0 | | August.17.2011 | Update to E Ink logo |

# TECHNICAL SPECIFICATION

## CONTENTS

## 1. Application

This data sheet applies to a color TFT LCD module, PM090WY2.

If you use in severe reliability environment, please don't extend over PVI's reliability test conditions.

If you use PM090WY2, Prime View advises to use PVI's timing controller IC (PVI-2003A) on your system which will generate proper timing signals to control PM090WY2.

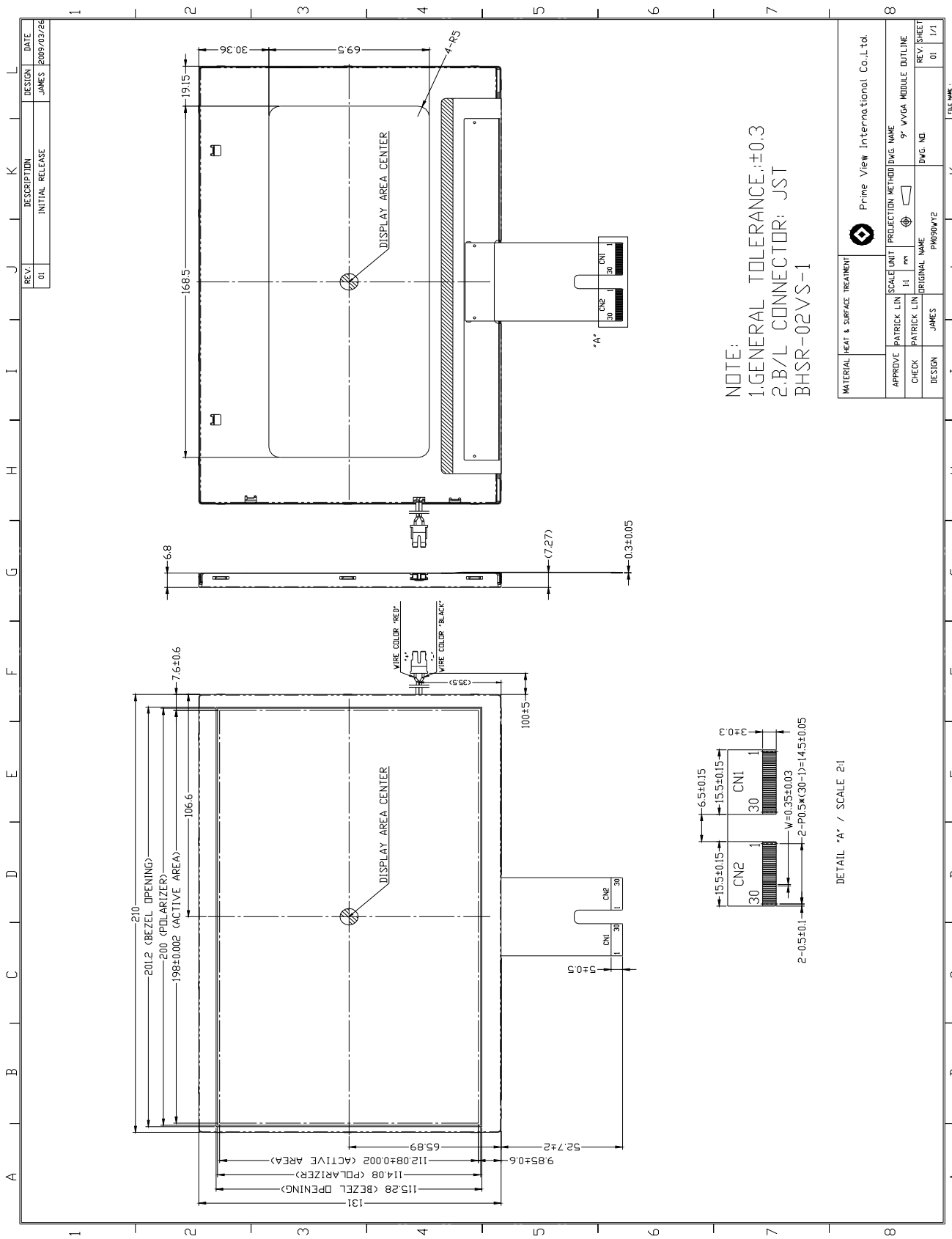
## 2. Features

. Pixel in stripe configuration
. Display Colors：262K colors
. Optimum Viewing Direction：6 o'clock
. WVGA (800 × 480 pixels) resolution

## 3. Mechanical Specifications

| Parameter | Specifications | Unit |
|---|---|---|
| Screen Size | 9" (Diagonal) | inch |
| Display Format | 800×(R, G, B)×480 | dot |
| Display Colors | 262K | |
| Active Area | 198 (H)×112.08(V) | mm |
| Pixel Pitch | 0.2475(H)×0.2335(V) | mm |
| Pixel Configuration | Stripe | |
| Outline Dimension | 210(W)×131(H)×6.8 (typ.) (D)<br>210(W)×131(H)×7.27 (FPC side) (D) | mm |
| Weight | 268±15 | g |
| Back-light | 42-LED | |
| Surface treatment | AG + WV | |
| Display mode | Normally white | |
| Gray scale inversion direction | 6 o'clock | Note 13-1 |

## 4. Mechanical Drawing of TFT-LCD Module



5. Input / Output Terminals

5-1) TFT-LCD Panel Driving

CN1

| Pin No. | Symbol | I/O | Function | Remark |
|---|---|---|---|---|
| 1 | DIO1 | I | Horizontal Start Pulse Signal Input | |
| 2 | VSS1 | I | Ground | |
| 3 | VDD1 | I | Power Supply | Note 5 - 10 |
| 4 | CLK | I | Horizontal Shift Clock | Note 5 - 4 |
| 5 | VSS1 | I | Ground | |
| 6 | NC | - | NC | |
| 7 | R0 | I | Red Data (LSB) | |
| 8 | R1 | I | Red Data | |
| 9 | R2 | I | Red Data | |
| 10 | R3 | I | Red Data | |
| 11 | R4 | I | Red Data | |
| 12 | R5 | I | Red Data (MSB) | |
| 13 | VSS1 | I | Ground | |
| 14 | G0 | I | Green Data (LSB) | |
| 15 | G1 | I | Green Data | |
| 16 | G2 | I | Green Data | |
| 17 | G3 | I | Green Data | |
| 18 | G4 | I | Green Data | |
| 19 | G5 | I | Green Data (MSB) | |
| 20 | VSS1 | I | Ground | |
| 21 | B0 | I | Blue Data (LSB) | |
| 22 | B1 | I | Blue Data | |
| 23 | B2 | I | Blue Data | |
| 24 | B3 | I | Blue Data | |
| 25 | B4 | I | Blue Data | |
| 26 | B5 | I | Blue Data (MSB) | |
| 27 | LD | I | Load output signal | Note 5 - 6 |
| 28 | REV | I | Data invert control | Note 5 - 7 |
| 29 | POL | I | Polarity selection | Note 5 - 8 |
| 30 | DIO2 | O | Horizontal Start Pulse Signal Output | |

CN2

| Pin No. | Symbol | I/O | Function | Remark |
|---|---|---|---|---|
| 1 | VSS2 | I | Ground | |
| 2 | V1 | I | Gamma Voltage 1 | Note 5 - 11 |
| 3 | V2 | I | Gamma Voltage 2 | |
| 4 | V3 | I | Gamma Voltage 3 | |
| 5 | V4 | I | Gamma Voltage 4 | |
| 6 | V5 | I | Gamma Voltage 5 | |
| 7 | V6 | I | Gamma Voltage 6 | |
| 8 | V7 | I | Gamma Voltage 7 | |
| 9 | VSS2 | I | Ground | |
| 10 | V8 | I | Gamma Voltage 8 | Note 5 - 11 |
| 11 | V9 | I | Gamma Voltage 9 | |
| 12 | V10 | I | Gamma Voltage 10 | |
| 13 | V11 | I | Gamma Voltage 11 | |
| 14 | V12 | I | Gamma Voltage 12 | |
| 15 | V13 | I | Gamma Voltage 13 | |
| 16 | V14 | I | Gamma Voltage 14 | |
| 17 | VSS2 | I | Ground | |
| 18 | VDD2 | I | Voltage for analog circuit | Note 5 - 11 |
| 19 | VCOM | I | Common Voltage | |
| 20 | NC | - | NC | |
| 21 | OE | I | Output Enable | Note 5 - 5 |
| 22 | U/D | I | Up / Down Selection | Note 5 - 3 |
| 23 | CKV | I | Vertical Shift Clock | Note 5 - 6 |
| 24 | STVU | I/O | Vertical Shift Pulse Signal Input or Output | Note 5 - 3 |
| 25 | STVD | I/O | Vertical Shift Pulse Signal Input or Output | Note 5 - 3 |
| 26 | VGG | I | Gate On Voltage | Note 5 - 2 |
| 27 | GND | I | Ground | |
| 28 | VCC | I | Voltage for logic circuit | Note 5 - 9 |
| 29 | GND | I | Ground | |
| 30 | VEE | I | Gate Off Voltage | Note 5 - 1 |

Note 5 - 1：Gate off voltage, $VEE_{(TYP.)}$ = -6.3 V

Note 5 - 2：Gate on voltage, $VGG_{(TYP.)}$ = +18.6 V

Note 5 - 3：Select up or down shift

| U/D | STVU | STVD | Shift |
|---|---|---|---|
| 1 | Hi-Z | Input | Down to Up |
| 0 | Input | Hi-Z | Up to Down |

Note 5 - 4：Gate driver shift clock

Note 5 - 5：When OE is connected to high “1”, the driver outputs are disabled (Gate output = VEE). Under this condition, the operation of registers will not be affected.

Note 5 - 6：Latch the polarity of outputs and switch the new data to outputs. At the rising edge (LD), latch the “POL” signal to control the polarity of the outputs.

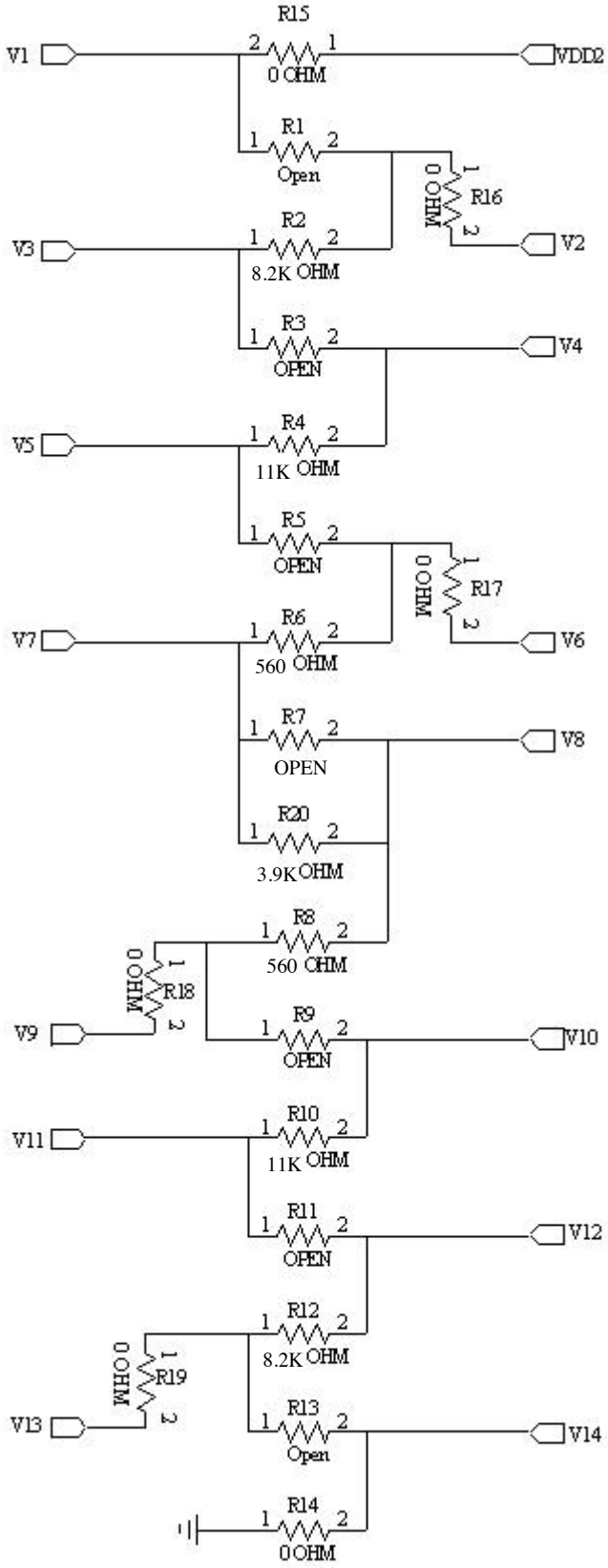
Note 5 - 7：Control whether the Data R0~G5 are inverted or not. (PVI suggests connecting to GND)
When “REV=1”, these data will be inverted.
EX: “00”→”3F”, “07”→”38”, “15”→”2A”

Note 5 - 8：Polarity selector for dot-inversion control. Available at the rising edge of LD.
When POL=1: Even outputs range from V1~V7, and Odd outputs range from V8~V14;
When POL=0: Even outputs range from V8~V14, and Odd outputs range from V1~V7.

Note 5 - 9：$VCC_{(TYP.)}$ = 3.3 V

Note 5 - 10：$VDD1_{(TYP.)}$ = 3.3 V

Note 5 - 11：Typical Application Circuit (When VDD2 $_{(TYP.)}$ = +9.9 V)



5-2) Backlight driving

Connector type: JST BHSR-02VS-1

| PIN NO. | Symbol | Description | Remark |
|---|---|---|---|
| 1 | + | Input terminal (Anode) | Red |
| 2 | - | Input terminal (Cathode) | Black |

6. Absolute Maximum Ratings:

Vss1=Vss2=GND=0V, Ta=25℃

| Parameters | Symbol | MIN. | MAX. | Unit | Remark |
|---|---|---|---|---|---|
| Supply Voltage | VDD1 | -0.5 | 5.0 | V | |
| | VDD2 | -0.5 | 13.5 | V | |
| | VCC | -0.3 | 6.0 | V | |
| | VGG | -0.3 | 40 | V | |
| | VEE | -20 | 0.3 | V | |
| | VGG-VEE | -0.3 | 40 | V | |
| Operating Temperature | Top | -30 | +85 | ℃ | |
| Storage Temperature | Tst | -40 | +95 | ℃ | |

7. Electrical Characteristics

7-1) Recommended Operating Conditions

Vss1=Vss2=GND=0V, Ta=25℃

| Item | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply Voltage for Source Driver | VDD1 | 3 | 3.3 | 3.6 | V | |
| | VDD2 | 8.9 | 9.9 | 10.9 | V | |
| Supply Voltage for Gate Driver | VCC | 3 | 3.3 | 3.6 | V | |
| | VGG | 16.6 | 18.6 | 20.6 | V | |
| | VEE | -7.3 | -6.3 | -5.3 | V | |
| $V_{COM}$ Voltage | VCOM | - | 4.1 | - | V | |
| Digital Input Voltage | VIH | 0.7VDD1 | - | VDD1 | V | |
| | VIL | 0 | - | 0.3VDD1 | V | |

7-2) Recommended driving condition for LED back light

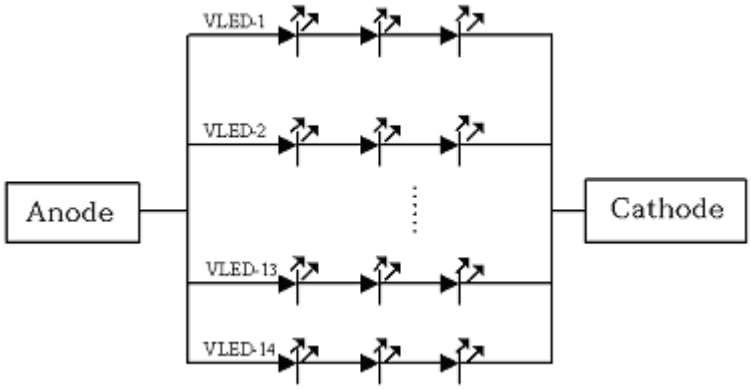
Ta=25℃

| Parameter | Symbol | Min | TYP | MAX | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply voltage of LED backlight | $V_{LED}$ | - | - | (10.5) | V | Note 7 - 1 |
| Supply current of LED backlight | $I_{LED}$ | - | 15 | - | mA | Note 7 - 2 |
| Backlight Power Consumption | $P_{LED}$ | - | - | 2.21 | W | Note 7 - 1/ Note 7 - 3 |

Note 7 - 1: $I_{LED}$= 15mA, constant current

Note 7 - 2: The LED driving condition is defined for each LED module. (3 LED Serial)
Input current = 15mA * 14 = 210mA

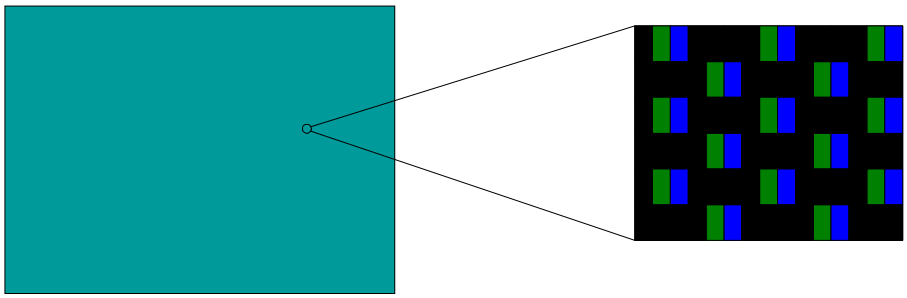
Note 7 - 3: $P_{LED} = V_{LED-1} * I_{LED-1} + V_{LED-2} * I_{LED-2} \ldots + V_{LED-13} * I_{LED-13} + V_{LED-14} * I_{LED-14}$



7-3) Power Consumption

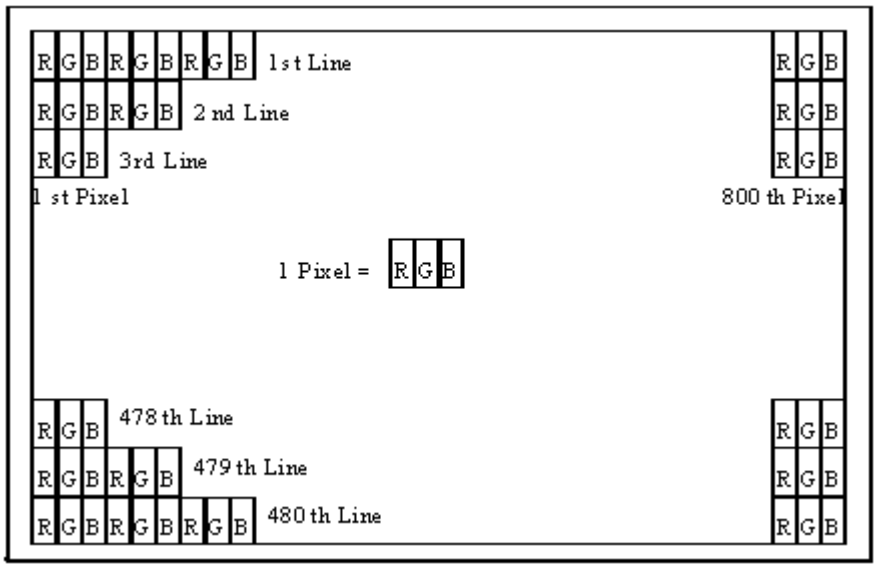
| Parameter | Symbol | Condition | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply Current for Gate Driver (Hi level) | IGG | VGG= 18.6 V | 0.2 | 0.6 | mA | Note 7 - 5 |
| Supply Current for Gate Driver (Low level) | IEE | VEE= -6.3 V | 0.2 | 0.6 | mA | Note 7 - 5 |
| Supply Current for Gate Driver (Digital) | ICC | VCC= +3.3V | 0.1 | 0.3 | mA | Note 7 - 5 |
| Supply Current for Source Driver (Digital) | IDD1 | VDD1= +3.3V | 5.0 | 10.0 | mA | Note 7 - 5 |
| Supply Current for Source Driver (Analog) | IDD2 | VDD2= 9.9 V | 23.1 | 46.2 | mA | Note 7 - 5 |
| LCD Panel Power Consumption | - | - | 253.2 | 504.5 | mW | Note 7 - 4 |

Note 7 - 4: The power consumption for back light is not included.
Note 7 - 5: Test Pattern for dissipative current.



8. Pixel Arrangement

The LCD module pixel arrangement is the stripe.

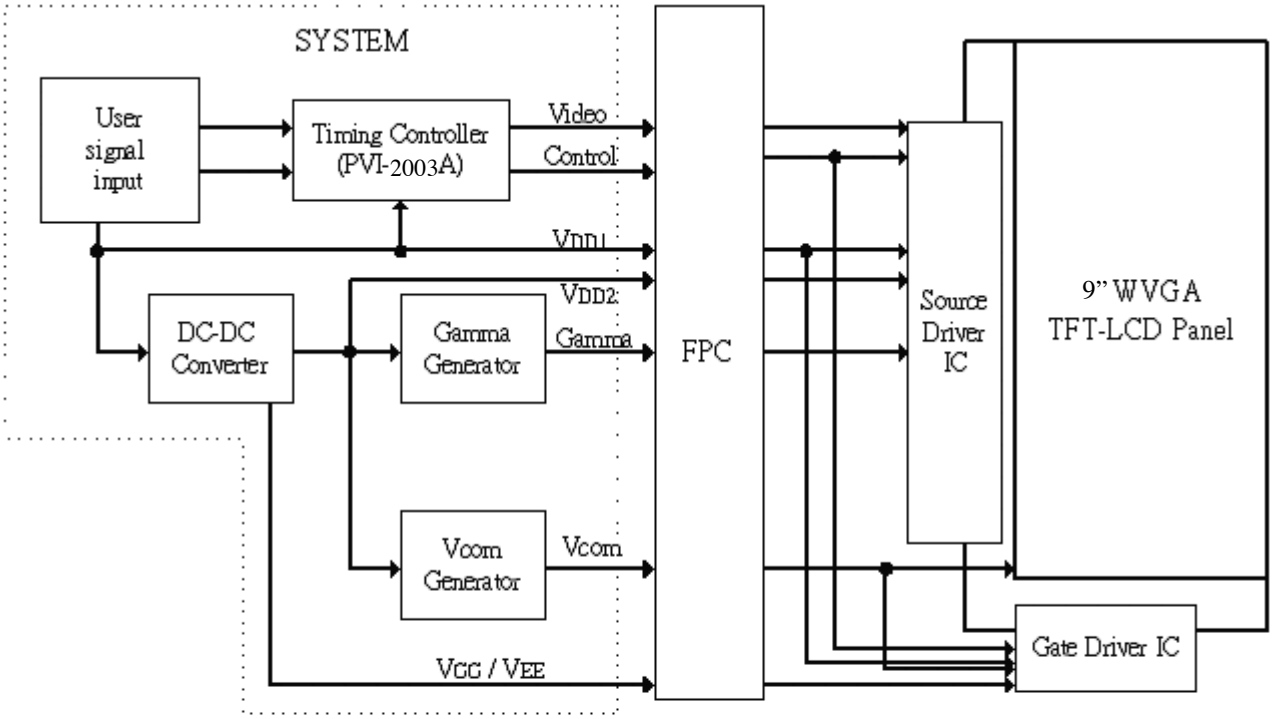


## 9. Display Color and Gray Scale Reference

| 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 | 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 |

## 10. Block Diagram

### 10-1) TFT-module Block Diagram




If you use PM090WY2 , you can apply PVI-2003A (Timing controller) which will gernerate timing signals to support PM090WY2 .

## 11. Interface Timing

### 11-1) Timing Parameters

AC Electrical Characteristics ($V_{CC}$=$V_{DD1}$=3.3V, $V_{DD2}$= 9.9 V, GND= 0V, Ta=25℃)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| CLK Frequency | Fclk | - | 32 | 40 | MHz |
| CLK Pulse Width | Tcw | 25 | - | - | ns |
| Data Set-up Time | Tsu | 4 | - | - | ns |
| Data Hold Time | Thd | 2 | - | - | ns |
| Propagation Delay of DIO2/1 | Tphl | 6 | 10 | 15 | ns |
| Time That The Last Data to LD | Tld | 1 | - | - | Tcw |
| Pulse width of LD | Twld | 2 | - | - | Tcw |
| Time That LD to DIO1/2 | Tlds | 5 | - | - | Tcw |
| POL Set-up Time | Tpsu | 6 | - | - | ns |
| POL Hold Time | Tphd | 6 | - | - | ns |
| OE Pulse Width | $T_{OEV}$ | 1 | - | - | μs |
| CKV Pulse Width | $T_{CKV}$ | 500 | - | - | ns |
| STV Set-up Time | $T_{SUV}$ | 400 | - | - | ns |
| STV Hold Time | $T_{HDV}$ | 400 | - | - | ns |
| Horizontal Display Period | $T_{HDP}$ | - | 800 | - | Tcw |
| Horizontal Period Timing Range | $T_{HP}$ | - | 1056 | - | Tcw |
| Horizontal Lines Per Field | $T_V$ | 484 | 508 | 620 | $T_{HP}$ |
| Vertical Display Timing Range | $T_{DV}$ | - | 480 | - | $T_{HP}$ |

11-2) Timing Diagram

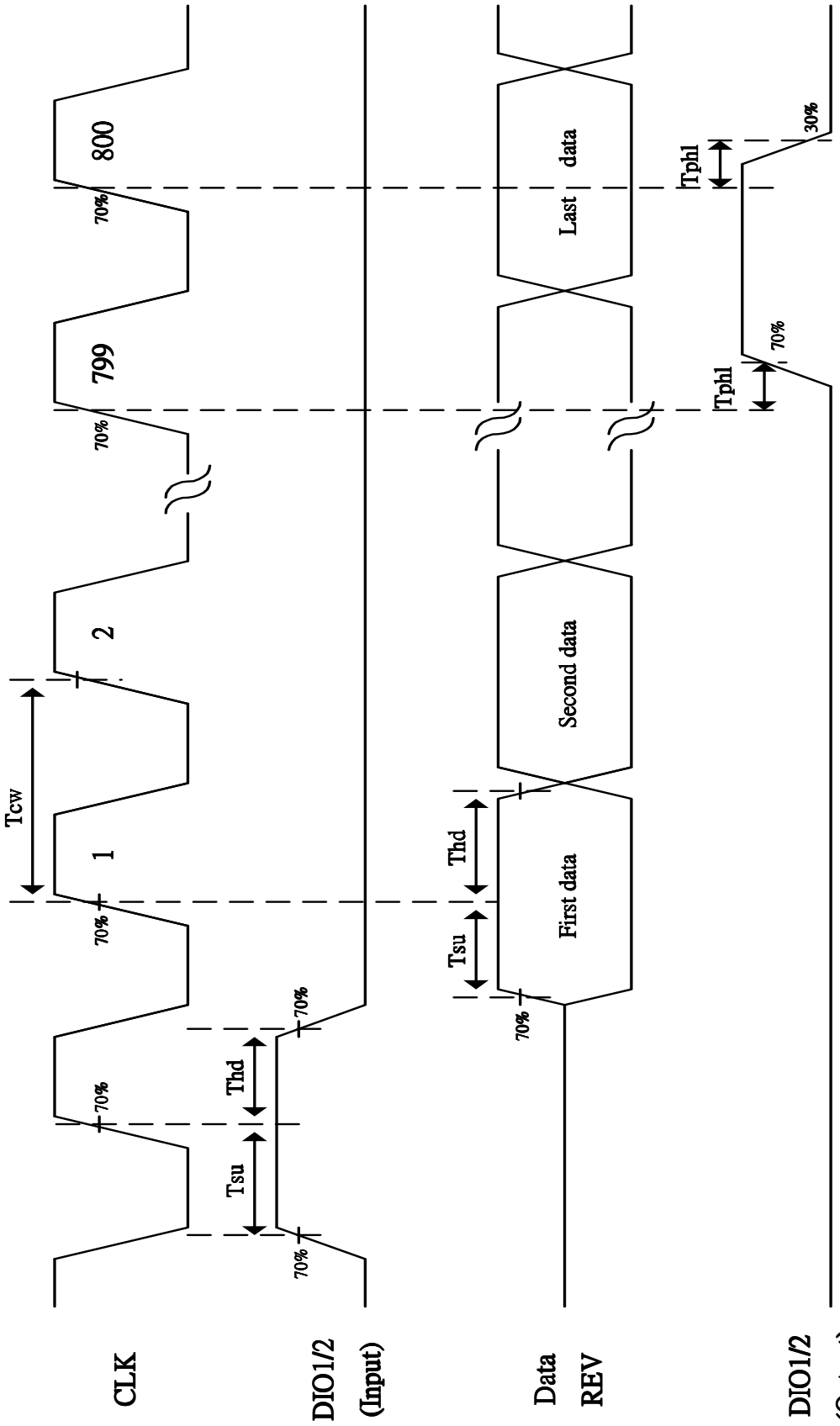



Fig. 11-1 Horizontal timing (1)

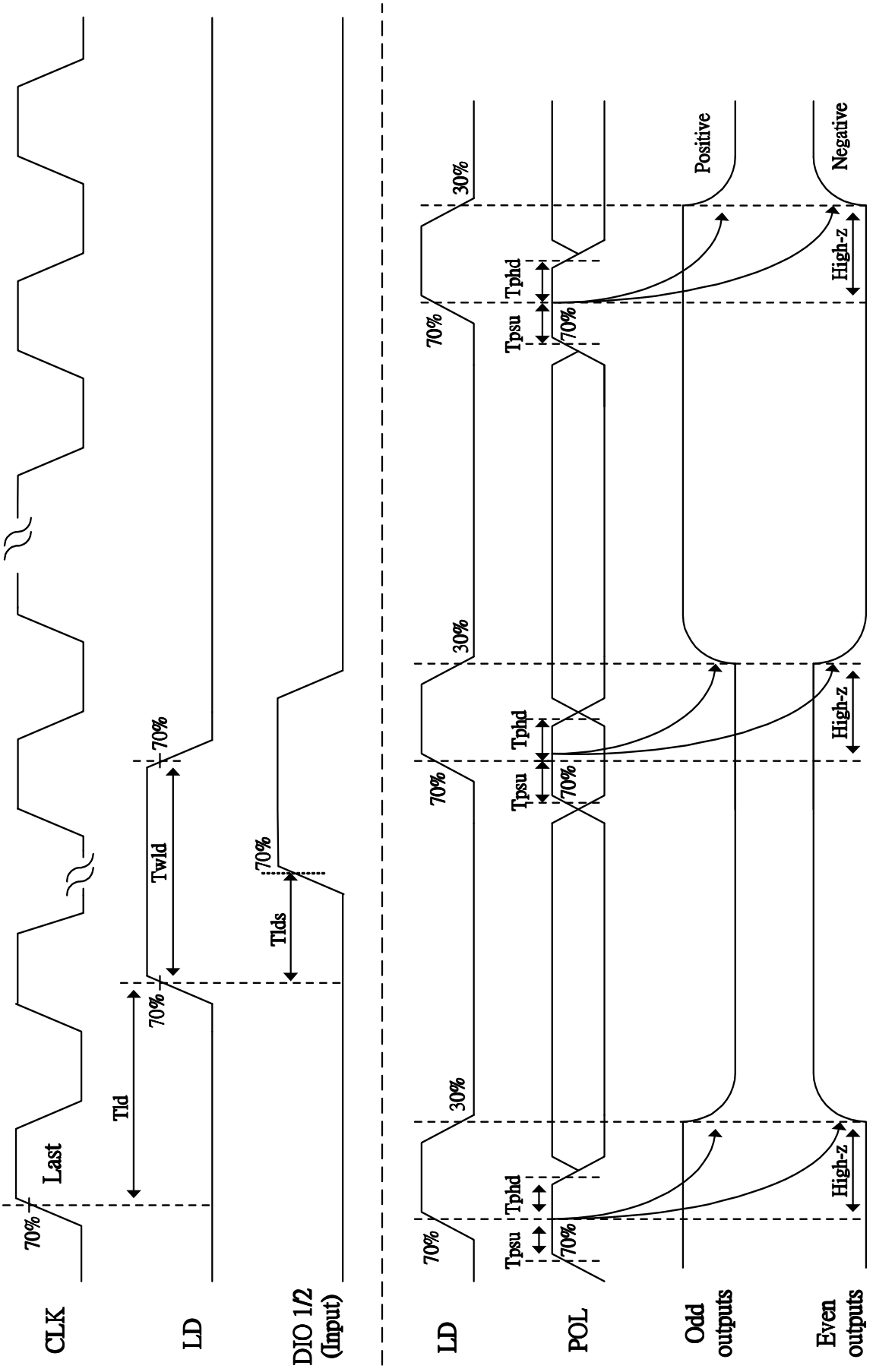



Fig. 11-2 Horizontal timing(2)

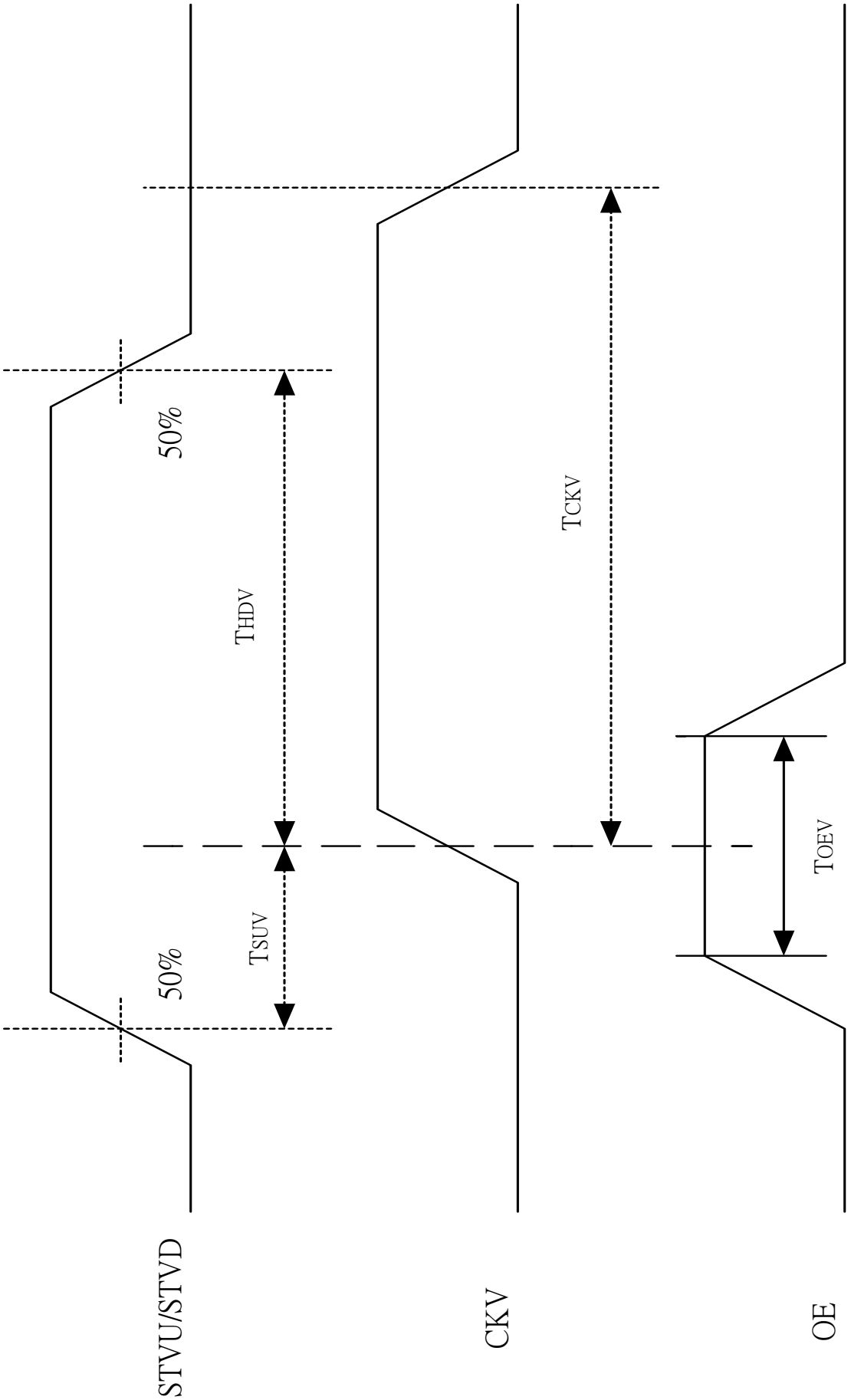



Fig. 11-3 Vertical shift clock timing

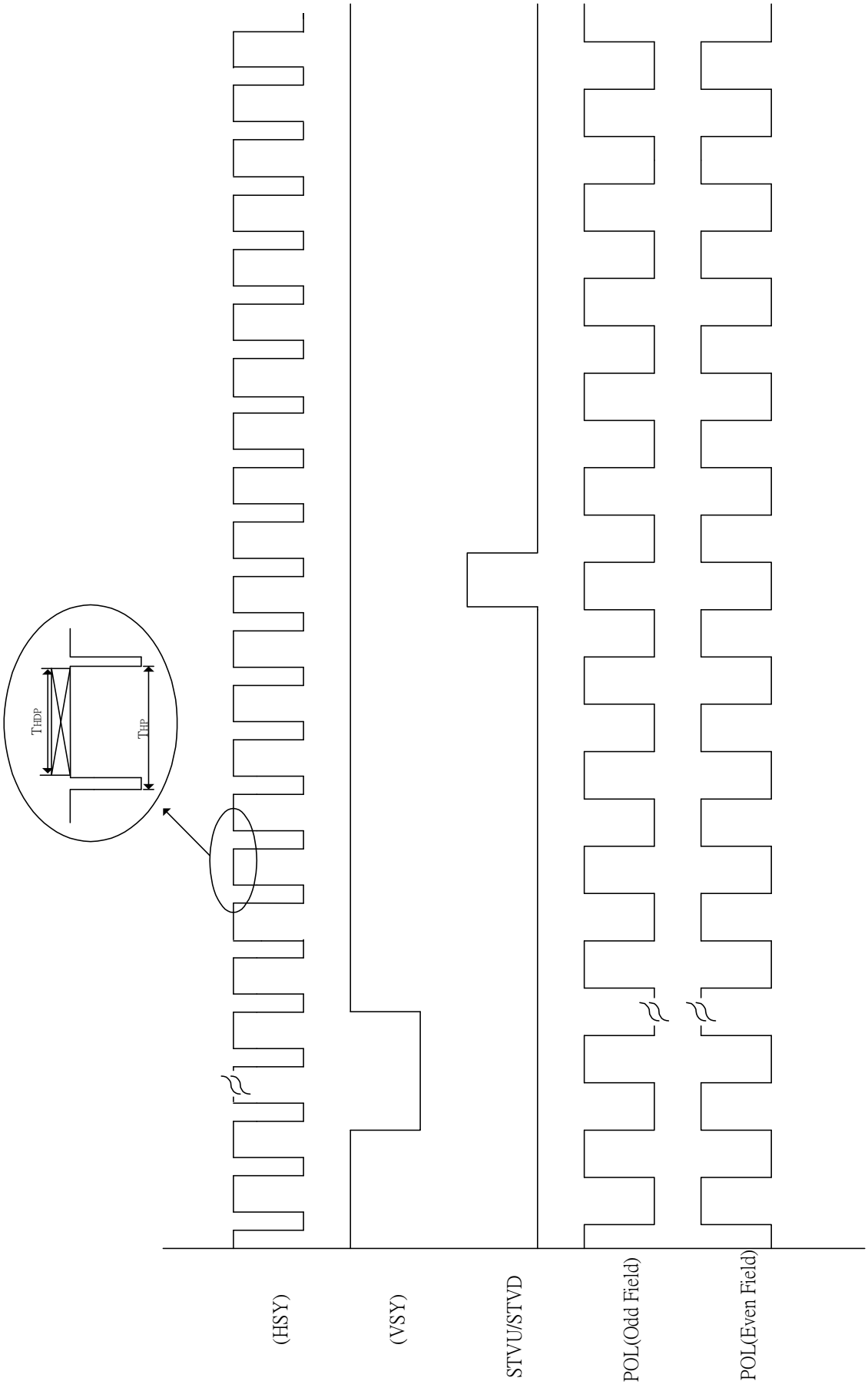



Fig. 11-4 Vertical timing

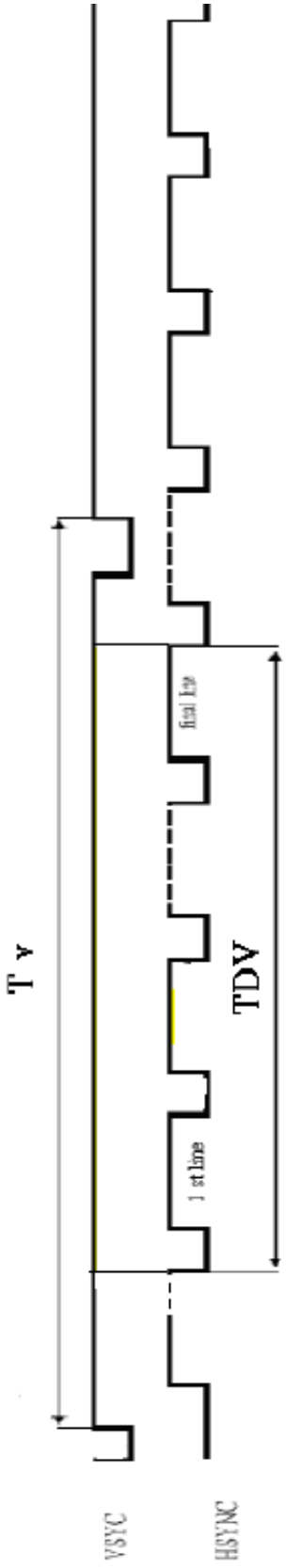
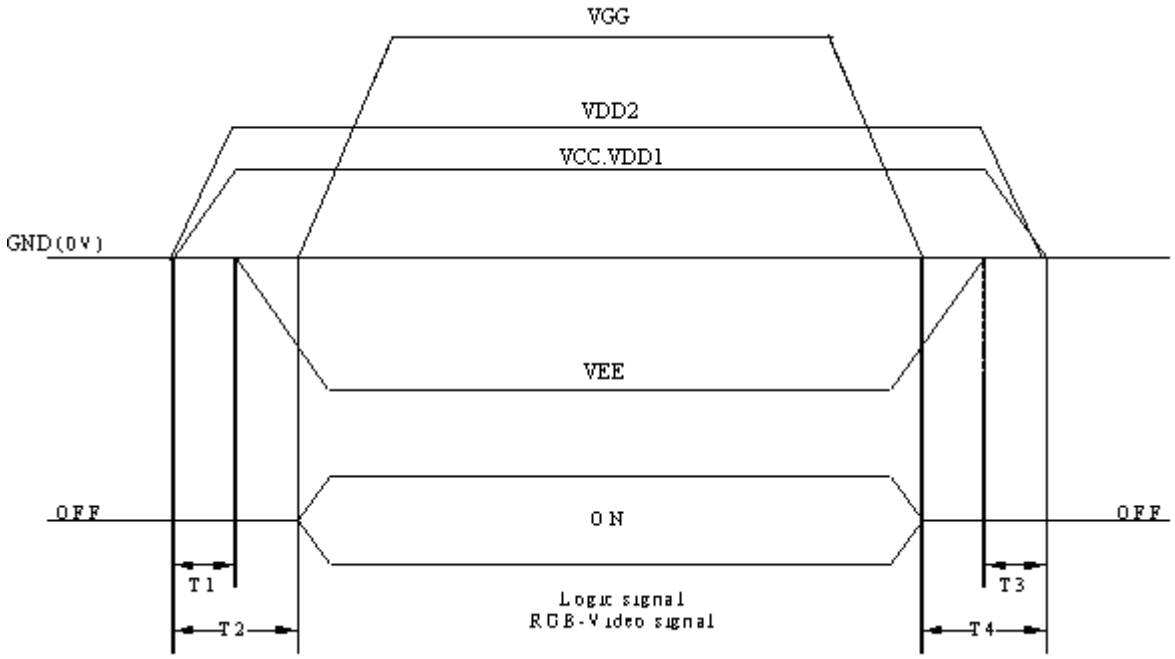



Fig 11-5 VSYC,HSYNC relationship

## 12. Power On Sequence




1. 10ms≦T1＜T2
2. 0ms＜T3≦T4≦10ms

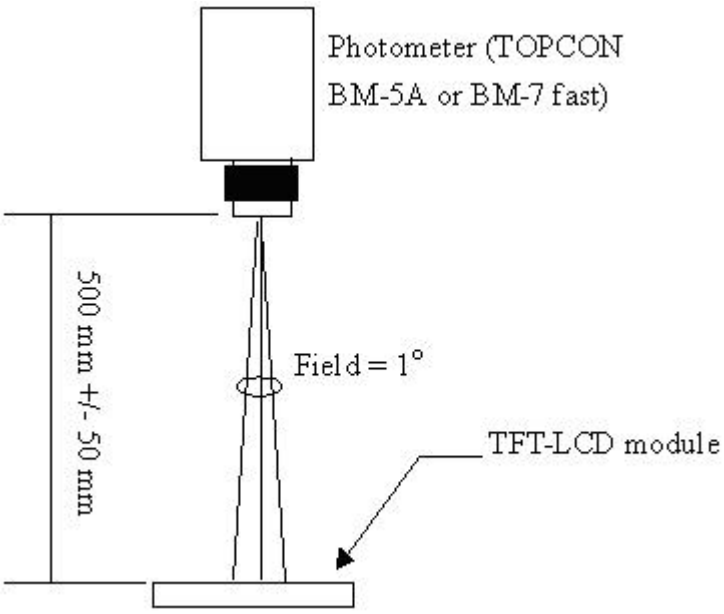
## 13. Optical Characteristics

### 13-1) Specification:

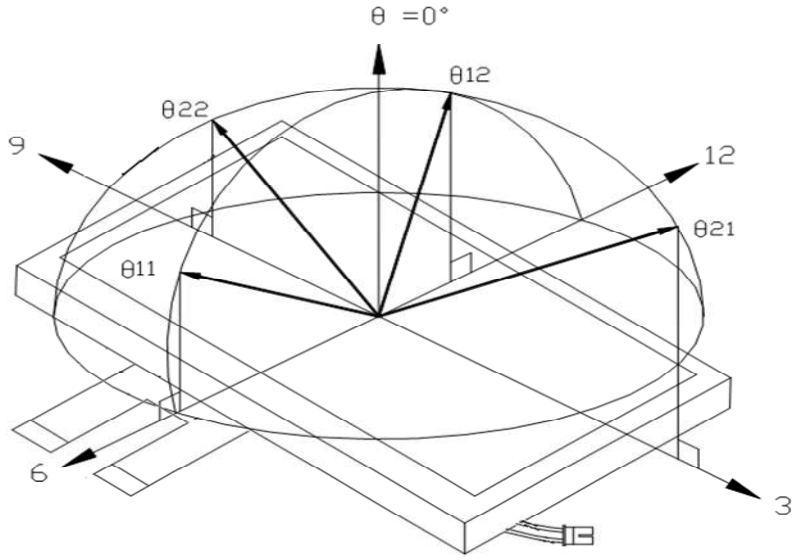
Ta=25℃

| Parameter | | Symbol | Condition | MIN. | TYP. | MAX. | Unit | Remarks |
|---|---|---|---|---|---|---|---|---|
| Viewing Angle | Horizontal | θ22.21 | CR≧10 | 65 | 70 | - | deg | Note 13-1 |
| | Vertical | θ12 | | 45 | 50 | - | deg | |
| | | θ11 | | 45 | 50 | - | deg | |
| Contrast Ratio | | CR | At Optimized Viewing Angle | 600 | 750 | - | - | Note 13-2 |
| Response time | Rise | Tr | θ=0°/φ=0 | - | 5 | 10 | ms | Note 13-3 |
| | Fall | Tf | | - | 20 | 40 | ms | |
| Brightness | | L | θ=0°/φ=0 | 400 | 500 | - | cd/㎡ | |
| LED Life Time | | | +25℃ | 20000 | -- | - | hrs | Note 13-4 |
| Luminance Uniformity | | U | - | 75 | 80 | - | % | Note 13-5 |
| White Chromaticity | | x | - | 0.255 | 0.295 | 0.335 | - | |
| | | y | - | 0.280 | 0.320 | 0.360 | - | |
| Cross Talk | | CTK | θ=0°/φ=0 | - | - | 3.5 | % | Note 13-6 |

All the optical measurement shall be executed 30 minutes after backlight being turn-on. 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.

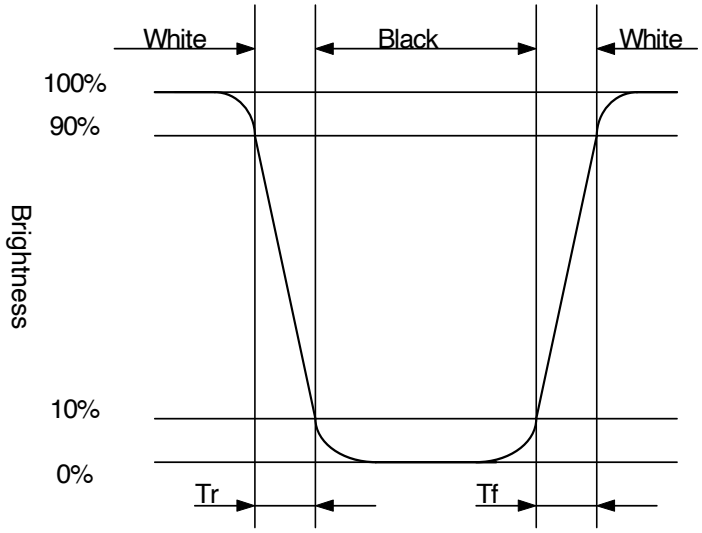


Note 13-1: The definitions of viewing angles are as follow




Note 1 3-2 : CR = $\frac{\text{Luminance when Testing point is White}}{\text{Luminance when Testing point is Black}}$

Note 13-3: Definition of Response Time Tr and Tf

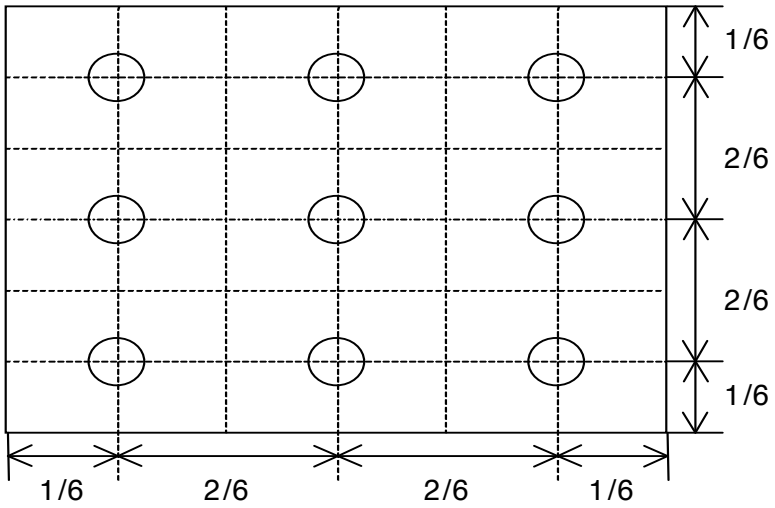



Note 13-4: The “LED Life time “is defined as the module brightness decrease to 50% original Brightness that the ambient temperature is 25℃ and $I_{LED}$ =210mA

Note 13-5: 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.

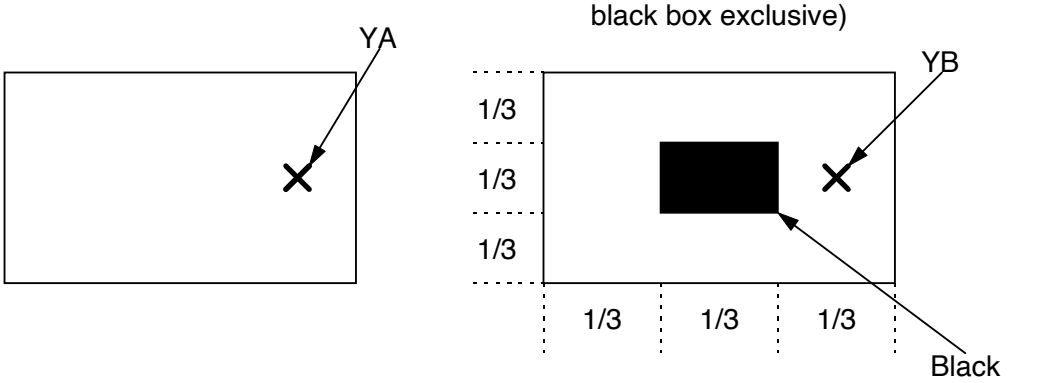



Note 13-6: Cross Talk (CTK) = $\frac{|YA-YB|}{YA} \times 100\%$

YA: Brightness of Pattern A
YB: Brightness of Pattern B
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

Pattern A
(Gray Level 31)

Pattern B
(Gray Level 31, central
black box exclusive)




✕: Measuring Point (A and B are at the same point.)

(Gray Level 0)

# 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 dirt's.
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) 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.

## 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.

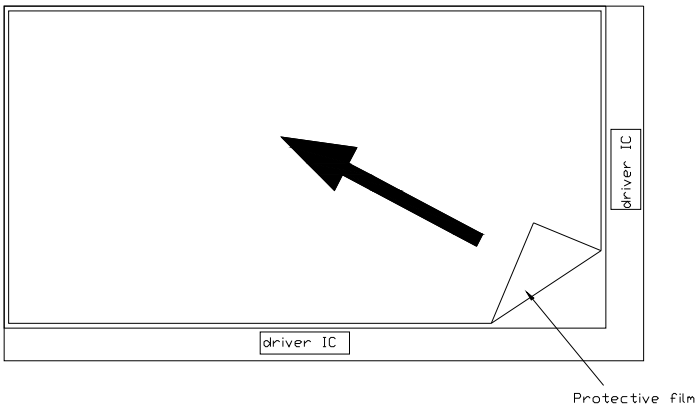



Figure 14-1 the way to peel off protective film

15. Reliability Test

| No | Test Item | Test Condition |
|---|---|---|
| 1 | High Temperature Storage Test | Ta = +95℃, 240 hrs |
| 2 | Low Temperature Storage Test | Ta = -40℃, 240 hrs |
| 3 | High Temperature Operation Test | Ta = +85℃, 240 hrs |
| 4 | Low Temperature Operation Test | Ta = -30℃, 240 hrs |
| 5 | High Temperature & High Humidity Operation Test | Ta =+60℃, 90%RH, 240 hrs (No Condensation) |
| 6 | Thermal Shock Test (non-operating) | -30℃→+80℃, 200 Cycles 30min 30min |
| 7 | Vibration Test (non-operating) | Frequency : 10 ~ 55 $H_Z$ Amplitude : 1 mm Sweep time : 11 min Test Period : 6 Cycles for each direction of X, Y, Z |
| 8 | Shock Test (non-operating) | 100G , 6ms Direction : ±X , ±Y , ±Z Cycle : 3 times |
| 9 | Electrostatic Discharge Test (non-operating) | 200pF, 0Ω ±200V 1 time/each terminal |

Ta: ambient temperature

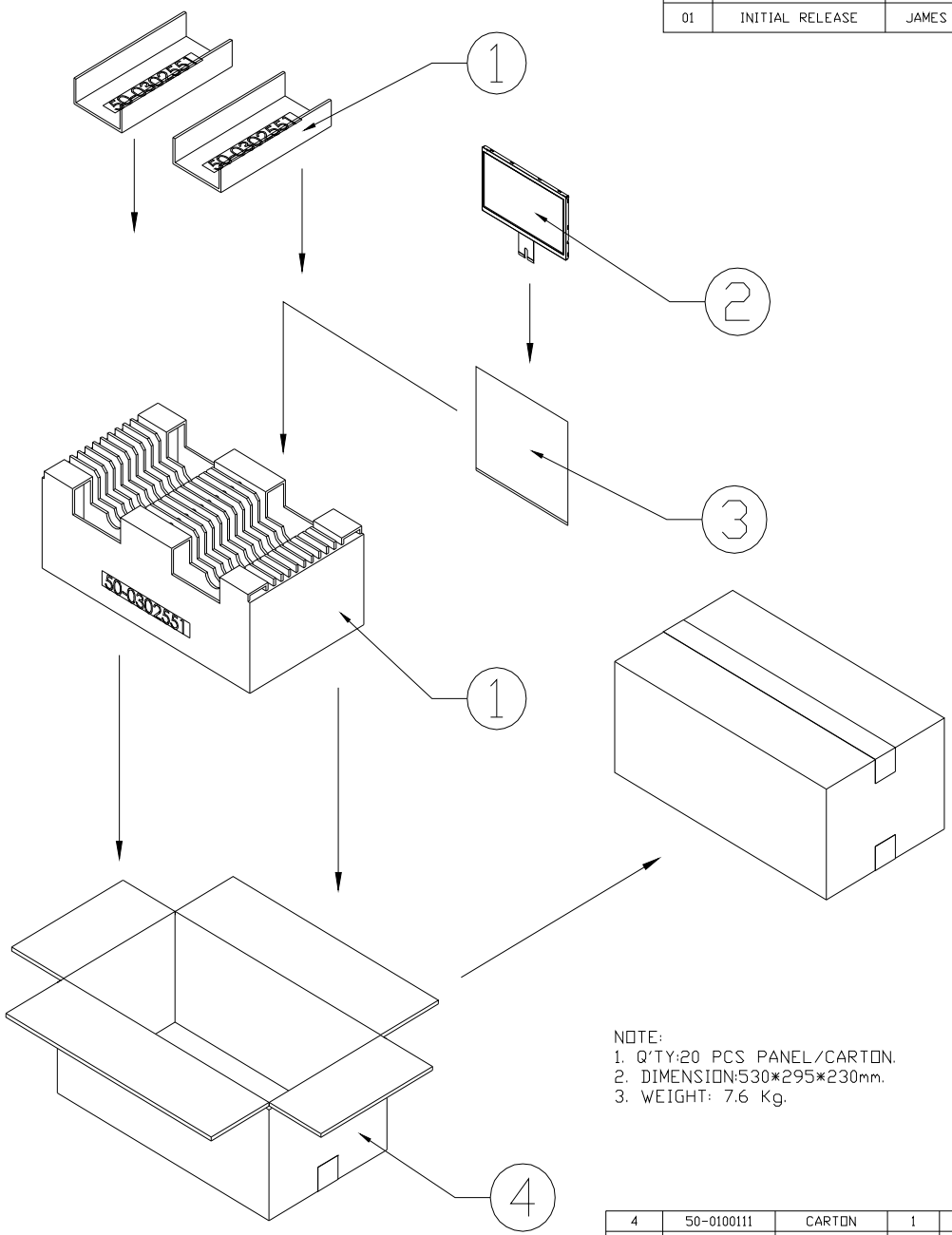
Note : The protective film must be removed before temperature test.

[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.

## 16. Packing Diagram

| REV. | DESCRIPTION | DESIGN | DATE |
|---|---|---|---|
| 01 | INITIAL RELEASE | JAMES | 2009/10/15 |




NOTE:
1. Q'TY:20 PCS PANEL/CARTON.
2. DIMENSION:530*295*230mm.
3. WEIGHT: 7.6 Kg.

| ITEM | PART NO. | DESCRIPTION | QTY | REMARK |
|---|---|---|---|---|
| 4 | 50-0100111 | CARTON | 1 | |
| 3 | 50-0510441 | 防靜電袋 PINK | 20 | 抗靜電 |
| 2 | PM090WY2 | 9"WVGA Module | 20 | |
| 1 | 50-0302551 | 瓦楞隔板緩衝材 | 1 | 上蓋+底座 |

| | | |
|---|---|---|
| MTL.SPEC. | UNSPECIFIED TOL.<br>ANGLE<br>ROUGHNESS | REMARK |

元太科技股份有限公司
Prime View Internation Co.,ltd.

| | | | | | |
|---|---|---|---|---|---|
| APPROVE | PATRICK LIN | SCALE | UNIT | SHEET 1 OF 1 | DWG.TITLE 9" WVGA Module Packing Draw |
| CHECK | PATRICK LIN | | | | |
| DESIGN | JAMES | MTL.NO. PM090WY2 | | DWG.NO. | REV. 01 / A4 SIZE |