

# ***TFT-Display Datenblatt***

Modell VM070WX3

## **Kurzdaten**

Hersteller	PrimeView
Diagonale	7" / 17,8cm
Format	16:9
Auflösung	800x480
Backlight	LED / 400cd/m <sup>2</sup>
Interface	TTL
Touchscreen	nein
Temperatur	-20...+70°C (Betrieb)

Version : 2.0



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TECHNICAL SPECIFICATION

MODEL NO : VM070WX3

The content of this information is subject to be changed without notice.  
Please contact PVI or its agent for further information.

Customer's Confirmation

Customer \_\_\_\_\_

Date \_\_\_\_\_

By \_\_\_\_\_

PVI's Confirmation

中山峰坤

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

吳昌霖

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

## Revision History

Rev.	Issued Date	Revised Contents																																																																																																																
0.1	Jul. 2, 2009	Preliminary																																																																																																																
0.2	Jul. 16, 2009	<p>Display resolution from 800*480 pixels to 800*479 pixels</p> <p>Surface treatment from AG type to HC type</p> <p>Add LED specification Add Typical application circuit Add Power consumption Add Optical specification</p> <p>Low temp. storage form -40°C to -30°C Low temp. operation form -30°C to -20°C</p> <p>Thermal cycling condition : Before : -30°C (30min) → +80°C (30min) , 200 Cycles After : -30°C (1hr) → +80°C (1hr) , 100 Cycles</p>																																																																																																																
1.0	Oct. 31, 2009	New																																																																																																																
2.0	Oct. 31, 2009	<p>Revise Power Consumption</p> <p>Before :</p> <p>8-3) Power Consumption</p> <p style="text-align: right;">GND = 0 V, Ta = 25°C</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Parameter</th> <th>Symbol</th> <th>Condition</th> <th>Typ.</th> <th>Max.</th> <th>Unit</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>Supply Current for Gate Driver (Hi level)</td> <td>I<sub>GH</sub></td> <td>V<sub>GH</sub>= 18.0V</td> <td>3.0</td> <td>9.0</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Gate Driver (Low level)</td> <td>I<sub>GL</sub></td> <td>V<sub>GL</sub>= -8.0V</td> <td>0.11</td> <td>0.33</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Source Driver (Digital)</td> <td>I<sub>DD</sub></td> <td>V<sub>CC</sub>= 3.3V</td> <td>4.2</td> <td>8.4</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Source Driver (Analog)</td> <td>AI<sub>DD</sub></td> <td>AV<sub>DD</sub>= 12.0V</td> <td>28.0</td> <td>56.0</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Gate Driver (Digital)</td> <td>I<sub>CC</sub></td> <td>V<sub>CC</sub>= 3.3V</td> <td>0.1</td> <td>0.3</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>LCD Panel Power Consumption(W/O B/L)</td> <td>-</td> <td>-</td> <td>0.40</td> <td>0.86</td> <td>W</td> <td>Note 8-4</td> </tr> <tr> <td>Total Power Consumption</td> <td>-</td> <td>-</td> <td>-</td> <td>3.28</td> <td>W</td> <td></td> </tr> </tbody> </table> <p>After :</p> <p>8-3) Power Consumption</p> <p style="text-align: right;">GND = 0 V, Ta = 25°C</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Parameter</th> <th>Symbol</th> <th>Condition</th> <th>Typ.</th> <th>Max.</th> <th>Unit</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>Supply Current for Gate Driver (Hi level)</td> <td>I<sub>GH</sub></td> <td>V<sub>GH</sub>= 18.0V</td> <td>0.11</td> <td>0.33</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Gate Driver (Low level)</td> <td>I<sub>GL</sub></td> <td>V<sub>GL</sub>= -8.0V</td> <td>1.8</td> <td>5.4</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Source Driver (Digital)</td> <td>I<sub>DD</sub></td> <td>V<sub>CC</sub>= 3.3V</td> <td>4.1</td> <td>8.2</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Source Driver (Analog)</td> <td>AI<sub>DD</sub></td> <td>AV<sub>DD</sub>= 12.0V</td> <td>23.8</td> <td>47.6</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>Supply Current for Gate Driver (Digital)</td> <td>I<sub>CC</sub></td> <td>V<sub>CC</sub>= 3.3V</td> <td>0.1</td> <td>0.3</td> <td>mA</td> <td>Note 8-5</td> </tr> <tr> <td>LCD Panel Power Consumption(W/O B/L)</td> <td>-</td> <td>-</td> <td>0.32</td> <td>0.65</td> <td>W</td> <td>Note 8-4</td> </tr> <tr> <td>Total Power Consumption</td> <td>-</td> <td>-</td> <td>-</td> <td>3.07</td> <td>W</td> <td></td> </tr> </tbody> </table>	Parameter	Symbol	Condition	Typ.	Max.	Unit	Remark	Supply Current for Gate Driver (Hi level)	I <sub>GH</sub>	V <sub>GH</sub> = 18.0V	3.0	9.0	mA	Note 8-5	Supply Current for Gate Driver (Low level)	I <sub>GL</sub>	V <sub>GL</sub> = -8.0V	0.11	0.33	mA	Note 8-5	Supply Current for Source Driver (Digital)	I <sub>DD</sub>	V <sub>CC</sub> = 3.3V	4.2	8.4	mA	Note 8-5	Supply Current for Source Driver (Analog)	AI <sub>DD</sub>	AV <sub>DD</sub> = 12.0V	28.0	56.0	mA	Note 8-5	Supply Current for Gate Driver (Digital)	I <sub>CC</sub>	V <sub>CC</sub> = 3.3V	0.1	0.3	mA	Note 8-5	LCD Panel Power Consumption(W/O B/L)	-	-	0.40	0.86	W	Note 8-4	Total Power Consumption	-	-	-	3.28	W		Parameter	Symbol	Condition	Typ.	Max.	Unit	Remark	Supply Current for Gate Driver (Hi level)	I <sub>GH</sub>	V <sub>GH</sub> = 18.0V	0.11	0.33	mA	Note 8-5	Supply Current for Gate Driver (Low level)	I <sub>GL</sub>	V <sub>GL</sub> = -8.0V	1.8	5.4	mA	Note 8-5	Supply Current for Source Driver (Digital)	I <sub>DD</sub>	V <sub>CC</sub> = 3.3V	4.1	8.2	mA	Note 8-5	Supply Current for Source Driver (Analog)	AI <sub>DD</sub>	AV <sub>DD</sub> = 12.0V	23.8	47.6	mA	Note 8-5	Supply Current for Gate Driver (Digital)	I <sub>CC</sub>	V <sub>CC</sub> = 3.3V	0.1	0.3	mA	Note 8-5	LCD Panel Power Consumption(W/O B/L)	-	-	0.32	0.65	W	Note 8-4	Total Power Consumption	-	-	-	3.07	W	
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# **TECHNICAL SPECIFICATION**

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## 1. Application

This data sheet applies to a color TFT LCD module, VM070WX3.

VM070WX3 module applies to OA product, portable DVD, 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.

If you use VM070WX3, Prime View advises your systems use PVI's timing controller IC (PVI-2003A) which will generate proper timing signals to control VM070WX3.

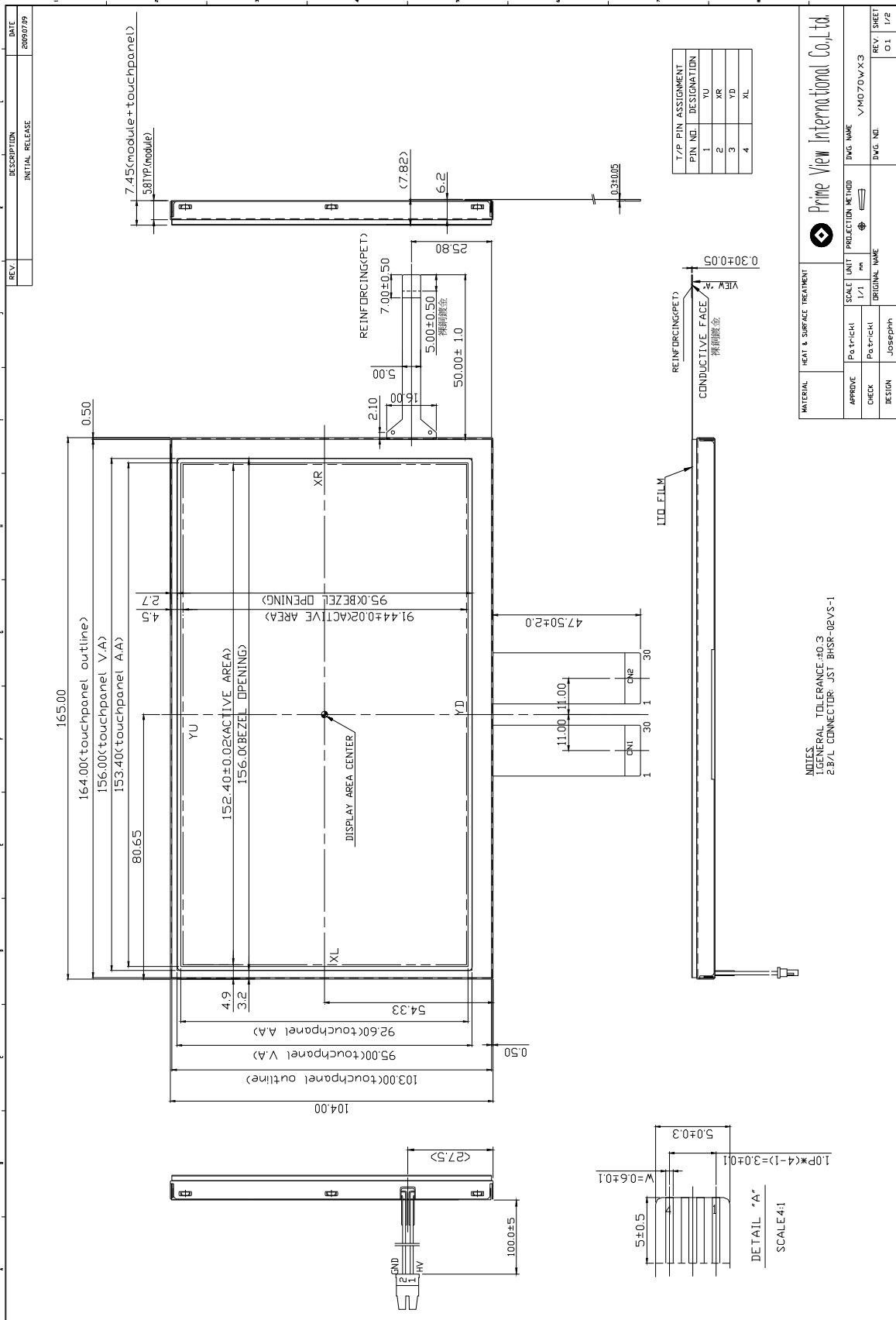
## 2. Features

- . Wide viewing angle
- . High contrast ratio
- . Fast response time
- . WVGA (800\*479 pixels) resolution
- . Amorphous silicon TFT LCD panel with back-light unit
- . Thin and light weight
- . TTL transmission interface
- . Module with resistive type touch panel

## 3. Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	7.0 (diagonal)	inch
Display Format	800 × (R,G,B) × 479	dot
Display Colors	262,144	
Active Area	152.40 (H)×91.44 (V)	mm
Pixel Pitch	0.1905(H)×0.1905(V)	mm
Pixel Configuration	RGB vertical stripe	
Outline Dimension	165.0 (W)×104.0 (H)×7.45 (typ.) (D) 165.0 (W)×104.0 (H)×7.82 (FPC side) (D)	mm
Weight	218±10	g
Back-light	LED	
Surface treatment of Touch Panel	Anti-glare,3H	
Display mode	Normally Black	

4. Mechanical Drawing of TFT-LCD Module





**5. Input / Output Terminals**

## 5-1) TFT-LCD Panel Driving

CN 1

Pin No.	Symbol	I/O	Function	Remark
1	DIO1	I/O	Horizontal Start Pulse Signal Input or Output	Note 5-5
2	VSS1	I	Ground	
3	VDD	I	Power Supply	
4	CLK	I	Horizontal Shift Clock	
5	VSS1	I	Ground	
6	R/L	I	Right / Left selection	Note 5-5
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	I/O	Horizontal Start Pulse Signal Input or Output	Note 5-5

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	Note 5-11
4	V3	I	Gamma Voltage 3	Note 5-11
5	V4	I	Gamma Voltage 4	Note 5-11
6	V5	I	Gamma Voltage 5	Note 5-11
7	V6	I	Gamma Voltage 6	Note 5-11
8	V7	I	Gamma Voltage 7	Note 5-11
9	VSS2	I	Ground	
10	V8	I	Gamma Voltage 8	Note 5-11
11	V9	I	Gamma Voltage 9	Note 5-11
12	V10	I	Gamma Voltage 10	Note 5-11
13	V11	I	Gamma Voltage 11	Note 5-11
14	V12	I	Gamma Voltage 12	Note 5-11
15	V13	I	Gamma Voltage 13	Note 5-11
16	V14	I	Gamma Voltage 14	Note 5-11
17	VSS2	I	Ground	
18	AVDD	I	Voltage for analog circuit	
19	VCOM	I	Common Voltage	
20	XON	I	NC	Note 5-10
21	OE	I	Output Enable	Note 5-4
22	U/D	I	Up / Down Selection	Note 5-3
23	CKV	I	Vertical Shift Clock	Note 5-9
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	VGH	I	Gate On Voltage	Note 5-2
27	GND	I	Ground	
28	VCC	I	Voltage for logic circuit	
29	GND	I	Ground	
30	VGL	I	Gate Off Voltage	Note 5-1

Note 5-1 : Gate off voltage,  $V_{GL(TYP.)} = -8.0V$

Note 5-2 : Gate on voltage,  $V_{GH(TYP.)} = 18.0V$

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 : When OE is connected to high “1”, the driver outputs are disabled (Gate output =  $V_{GL}$ ). Under this condition, the operation of registers will not be affected.

Note 5-5 : Select left or right shift

R/L	DIO1	DIO2	Shift
1	Input	Hi-Z	Left to right
0	Hi-Z	Input	Right to left

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 High)

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 : Gate driver shift clock

Note 5-10 : This pin is NC or must connect VDD

## 5-2) Backlight driving

Connector type : JST BHSR-02VS-1

Pin No	Symbol	Description	Remark
1	+	Input terminal (Positive electrode side)	Wire color : Red
2	-	Input terminal (Ground side)	Wire Color : Black



## 6. Touch Panel Characteristics

### 6-1) Pin assignment :

Pin	Symbol	Function	Remark
1	YU	Upper electrode Y(Upper side)	
2	XR	Lower electrode X(Right side)	
3	YD	Upper electrode Y(Down side)	
4	XL	Lower electrode X(Left side)	

### 6-2) Electrical Performance :

Parameters	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Terminal Resistance	X	300	720	950	$\Omega$	
	Y	180	300	570	$\Omega$	
Input Voltage	V <sub>T</sub>	-	5.0	7.0	V	
Linearity(X ,Y direction)	-	-	-	$\pm 1.5$	%	
Insulation Impedance	-	20	-	-	M $\Omega$	DC 25V
Response Time	-	-	-	20	ms	
Operation Force	-	-	-	80	g	Note 6-1

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

### 6-3) Durability Performance

#### 1. Hitting Durability :

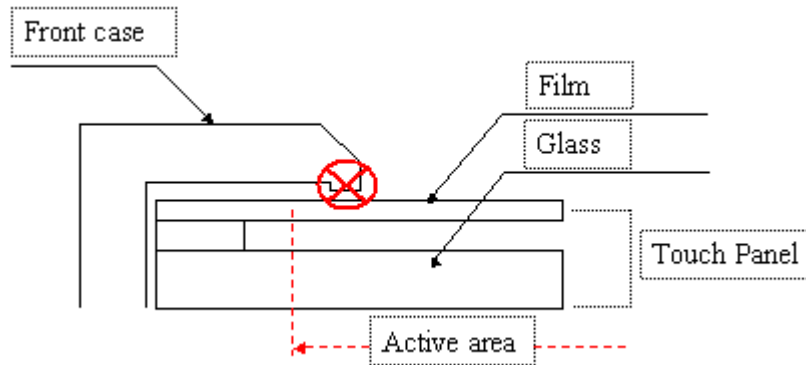
At least 1,000,000 times with R8.0mm silicon rubber, 250g , 3times/sec .

#### 2. Sliding Durability :

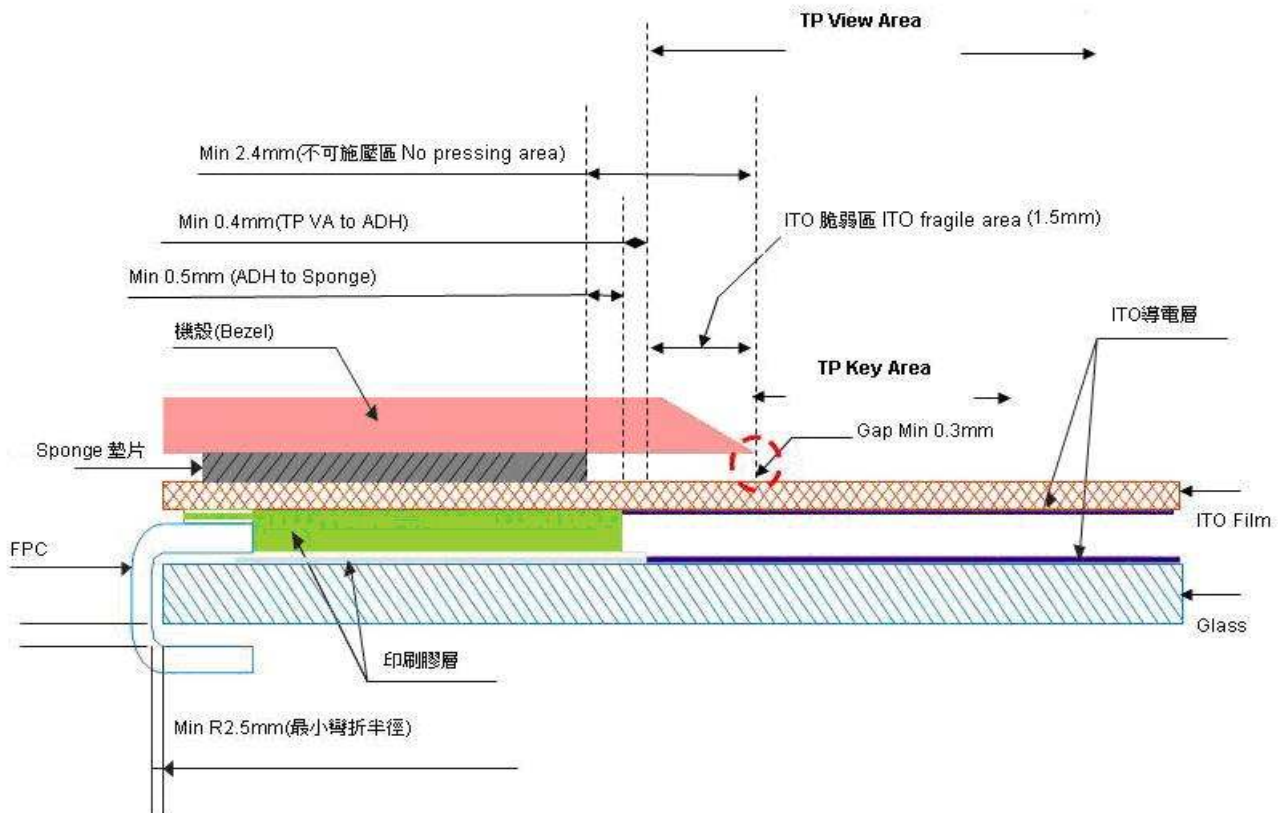
At least 100,000 times with R0.8mm polyacetal stylus , 250g , 60mm/sec.

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.



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

**7. Absolute Maximum Ratings**

V<sub>ss1</sub>=V<sub>ss2</sub>=GND=0V, Ta=25°C

Parameters	Symbol	MIN.	MAX.	Unit	Remark
Supply Voltage	V <sub>DD</sub>	-0.3	5.0	V	
	V <sub>CC</sub>			V	
	AV <sub>DD</sub>	-0.5	12.0	V	
	V <sub>GH</sub>	-0.3	40.0	V	
	V <sub>GH</sub> -V <sub>GL</sub>	-	40	V	
	V <sub>GL</sub>	-20	0.3	V	

**8. Electrical Characteristics**

8-1) Recommended Operating Conditions :

V<sub>ss1</sub>=V<sub>ss2</sub>=GND = 0V, Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage for Source Driver	V <sub>DD</sub>	-	3.3	-	V	
	AV <sub>DD</sub>	-	12.0	-	V	
Supply Voltage for Gate Driver	V <sub>GH</sub>	-	18.0	-	V	
	V <sub>GL</sub>	-	-8.0	-	V	
	V <sub>CC</sub>	-	3.3	-	V	
Digital Input Voltage	V <sub>IH</sub>	0.8V <sub>DD</sub>	-	V <sub>DD</sub>	V	
	V <sub>IL</sub>	0	-	0.2V <sub>DD</sub>	V	
V <sub>com</sub> Voltage	V <sub>com</sub>	-	4.3	-	V	

8-2) Recommended Driving Condition for LED :

Ta = 25°C

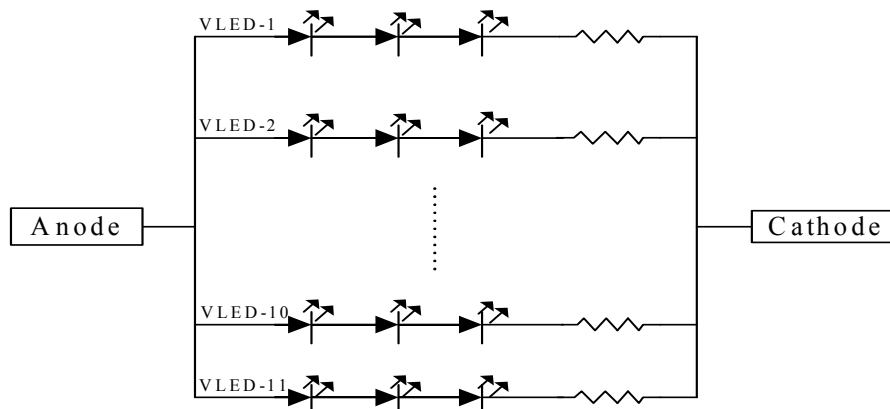
Parameter	Symbol	Min	TYP	MAX	Unit	Remark
Supply voltage of LED backlight	V <sub>LED</sub>	-	-	(11)	V	Note 8-1
Supply current of LED backlight	I <sub>LED</sub>	-	20	-	mA	Note 8-2
Backlight Power Consumption	P <sub>LED</sub>	-	-	2.42	W	Note 8-1 Note 8-3

Note 8-1 : I<sub>LED</sub> = 20mA(Constant Current).

Note 8-2 : The LED driving condition is defined for each LED module. (3 LED Serial)

Input current = 20mA \* 11 = 220mA

Note 8-3 : P<sub>LED</sub> = V<sub>LED-1</sub> \* I<sub>LED-1</sub> + V<sub>LED-2</sub> \* I<sub>LED-2</sub> ..... + V<sub>LED-10</sub> \* I<sub>LED-10</sub>+V<sub>LED-11</sub> \* I<sub>LED-11</sub>



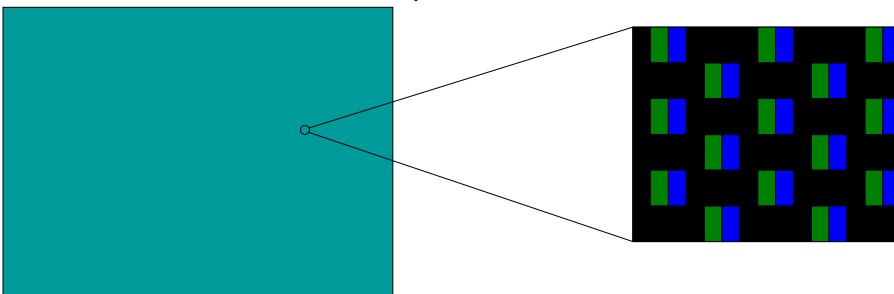
8-3) Power Consumption

GND = 0 V, Ta = 25°C

Parameter	Symbol	Condition	Typ.	Max.	Unit	Remark
Supply Current for Gate Driver (Hi level)	I <sub>GH</sub>	V <sub>GH</sub> = 18.0V	0.11	0.33	mA	Note 8-5
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Supply Current for Gate Driver (Digital)	I <sub>CC</sub>	V <sub>CC</sub> = 3.3V	0.1	0.3	mA	Note 8-5
LCD Panel Power Consumption(W/O B/L)	-	-	0.32	0.65	W	Note 8-4
Total Power Consumption	-	-	-	3.07	W	

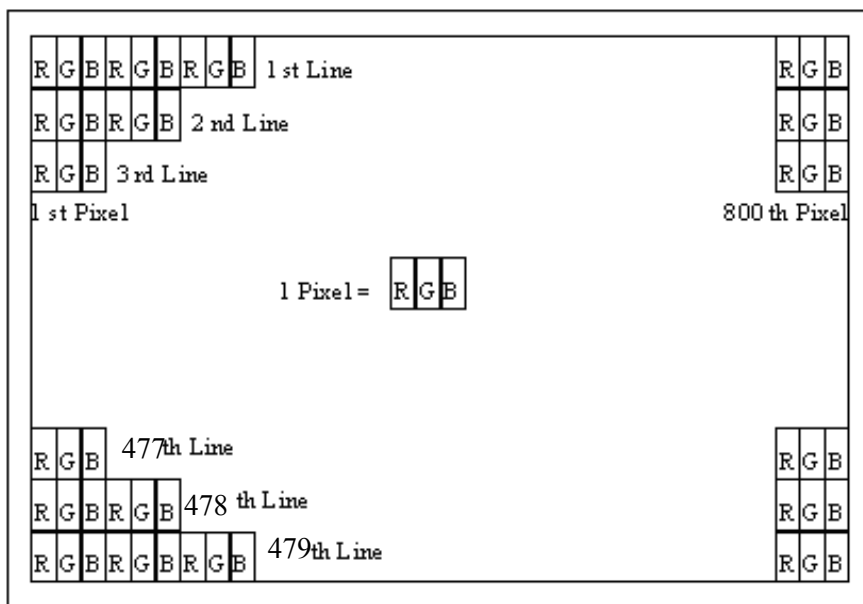
Note 8-4 : The power consumption for back light is not included.

Note 8-5 : Test Pattern for dissipative current.



9. Pixel Arrangement

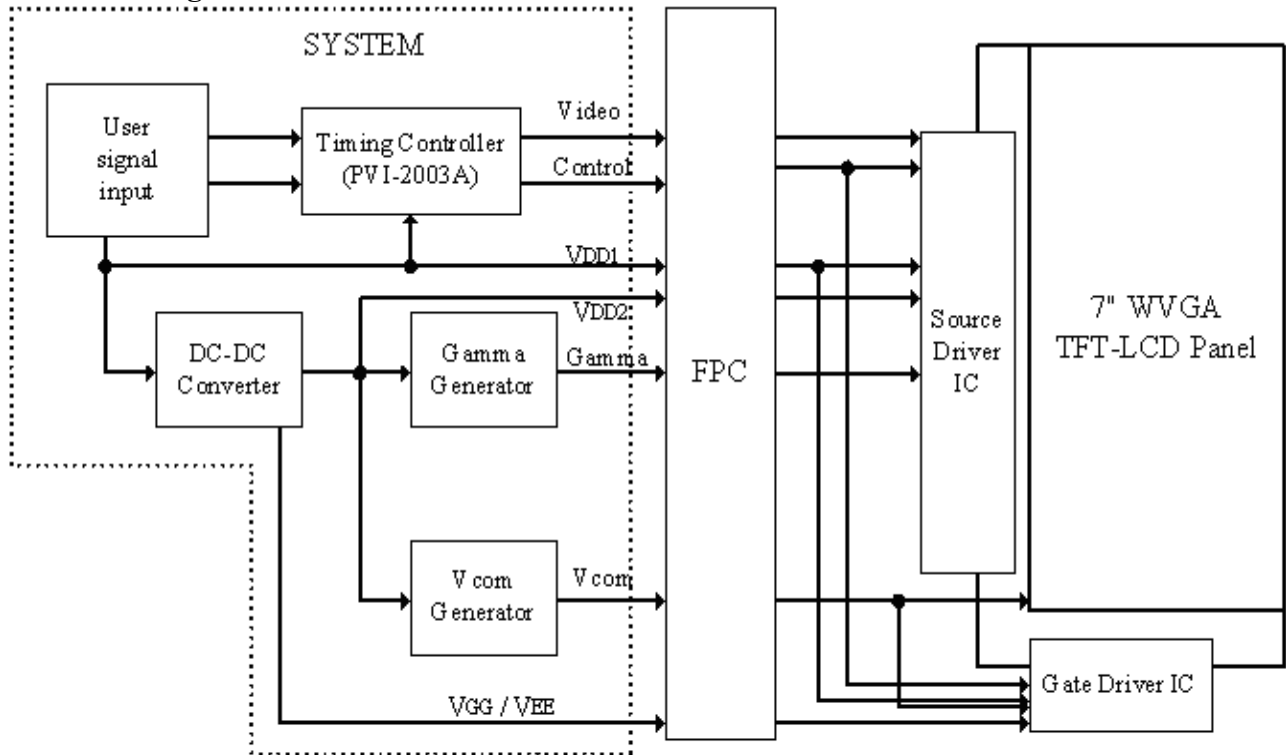
The LCD module pixel arrangement is the stripe.



## 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	

**11. Block Diagram**



If you use **VM070WX3** , you can apply PVI-2003A(Timing controller) which will generate timing signals to support **VM070WX3** .

## 12. Interface Timing

### 12-1) Timing Parameters

AC Electrical Characteristics ( $V_{CC}=V_{DD}=3.3V$ ,  $V_{DD2}=12.0V$ ,  $GND=V_{SS1}=V_{SS2}=0V$ ,  $T_a=25^{\circ}C$ )

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 <sub>OE</sub> V	1	-	-	μs
CKV Pulse Width	T <sub>CKV</sub>	500	-	-	ns
STV Set-up Time	T <sub>SUV</sub>	400	-	-	ns
STV Hold Time	T <sub>HDV</sub>	400	-	-	ns
Horizontal Display Period	T <sub>HDP</sub>	-	800	-	Tcw
Horizontal Period Timing Range	T <sub>HP</sub>	-	1056	-	Tcw
Horizontal Lines Per Field	T <sub>V</sub>	484	508	620	T <sub>HP</sub>
Vertical Display Timing Range	T <sub>DV</sub>	-	480	-	T <sub>HP</sub>

12-2) Timing Diagram

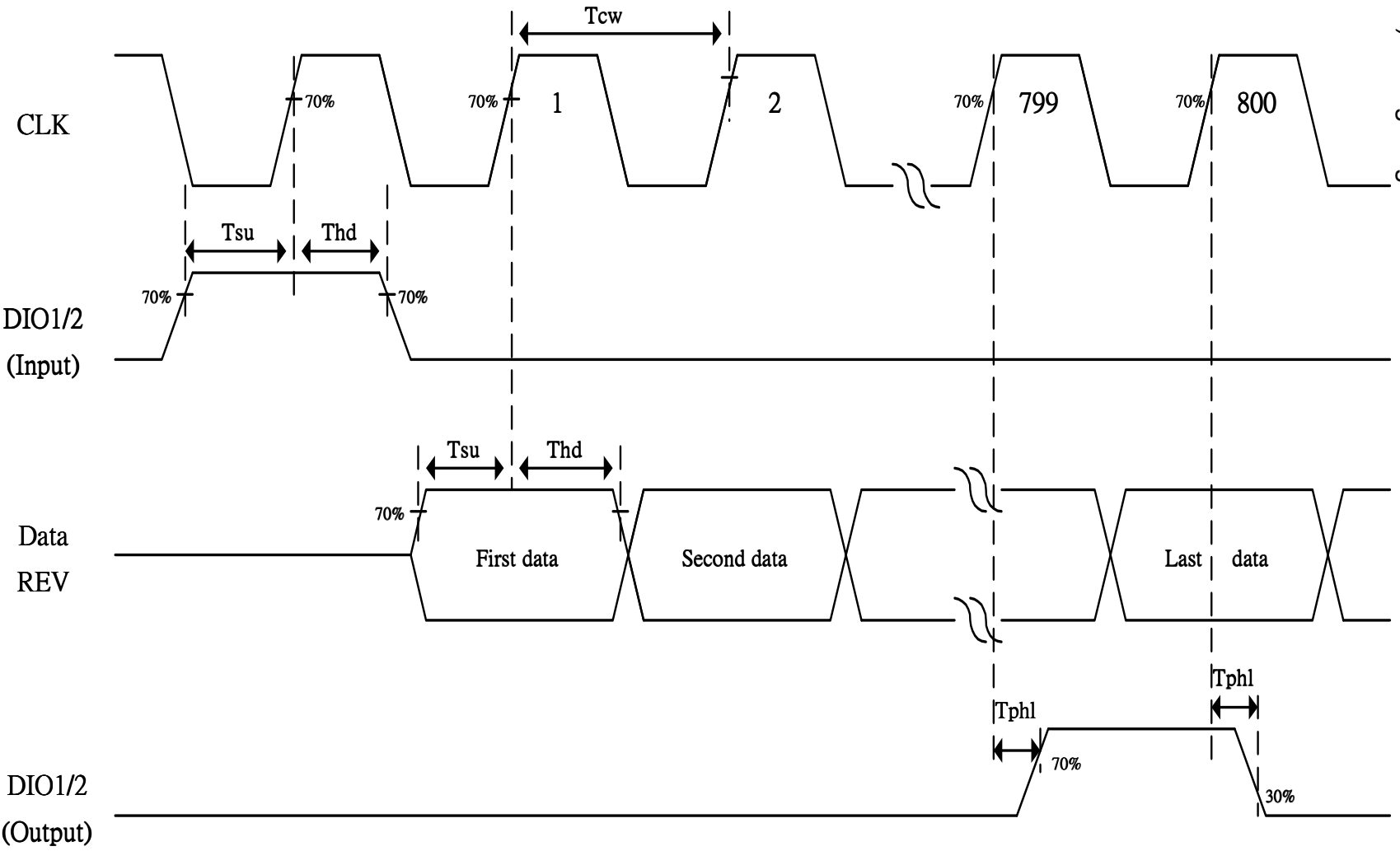


Fig. 11-1 Horizontal timing (1)

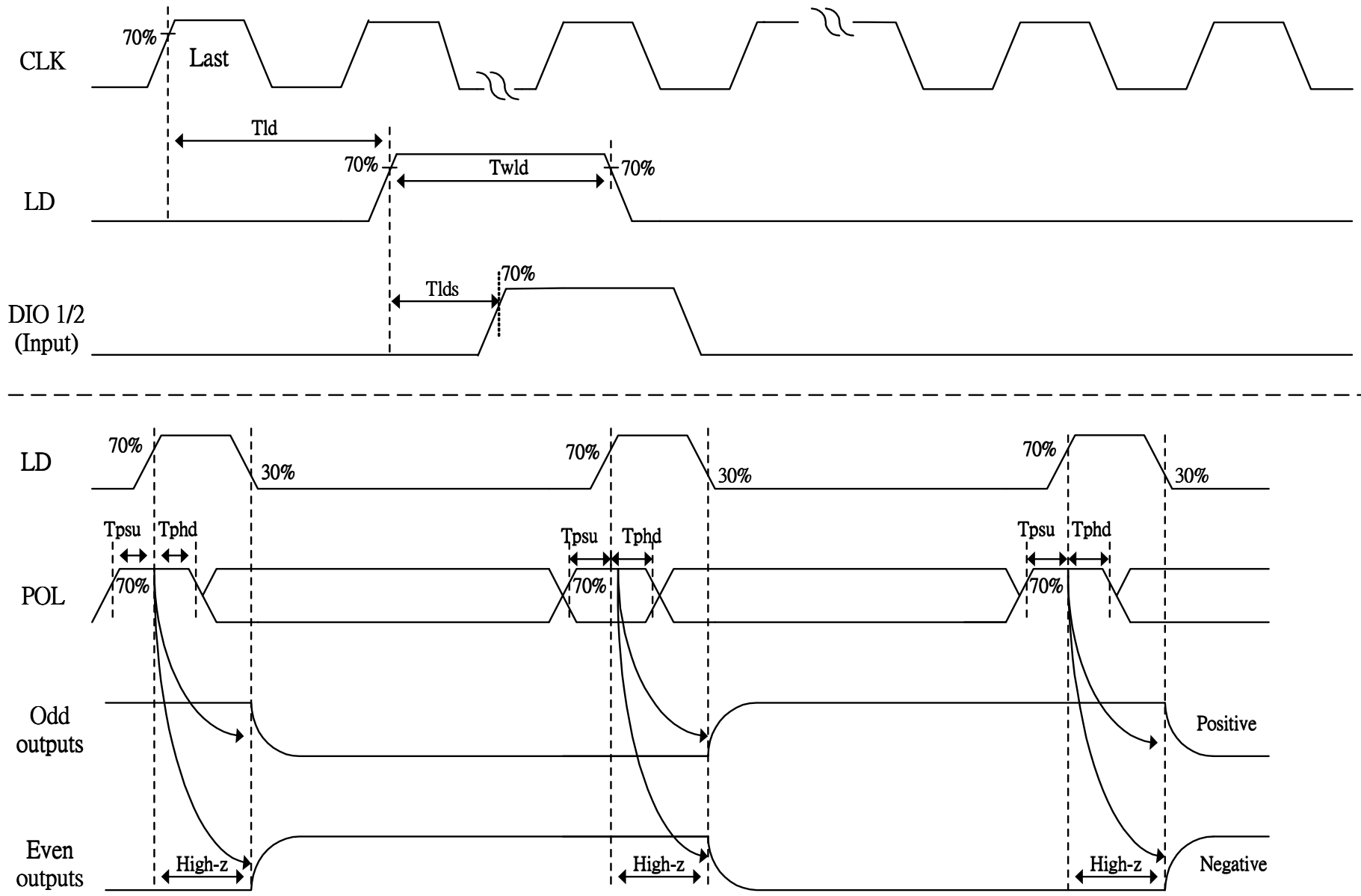


Fig. 11-2 Horizontal timing(2)

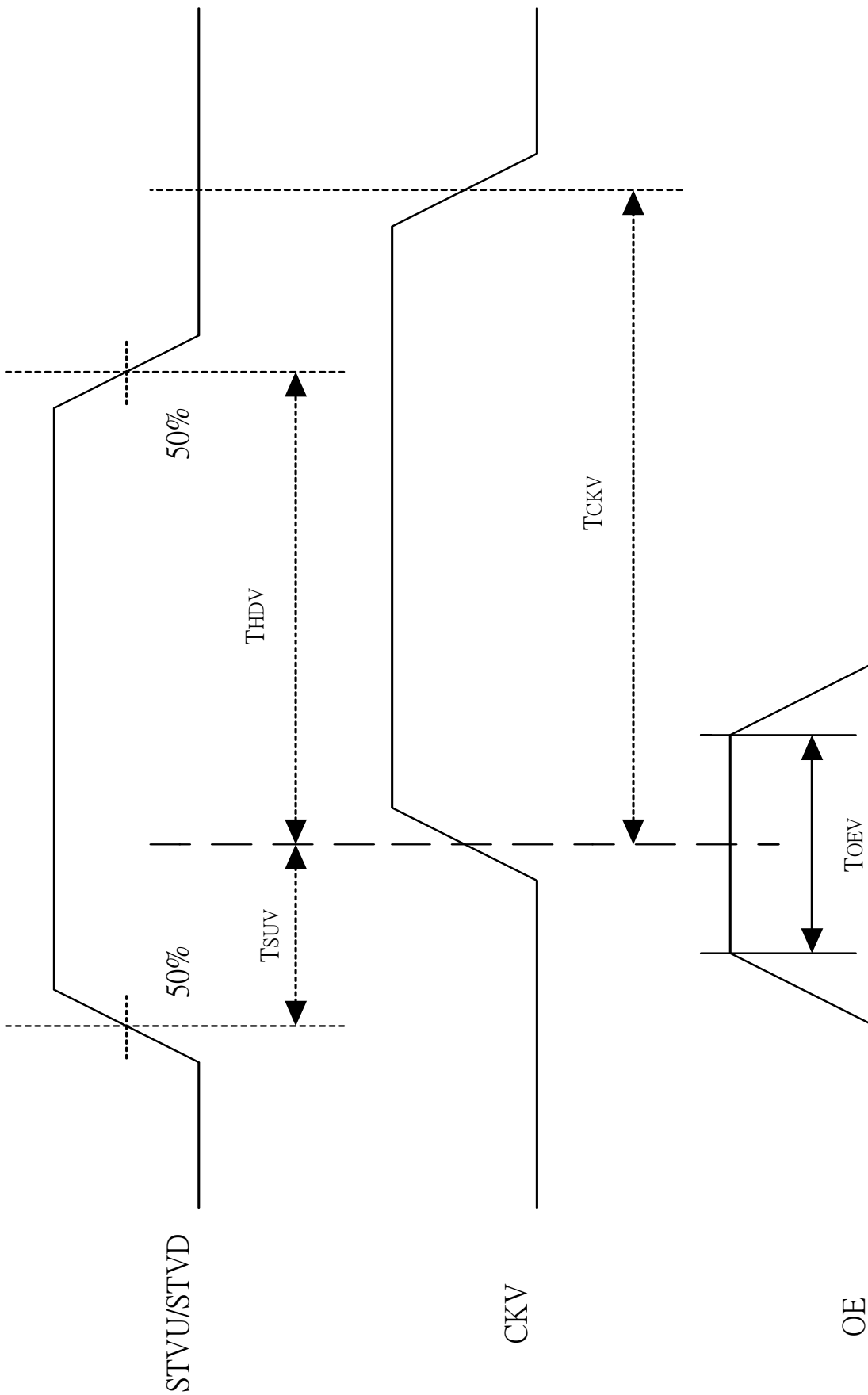


Fig. 11-3 Vertical shift clock timing

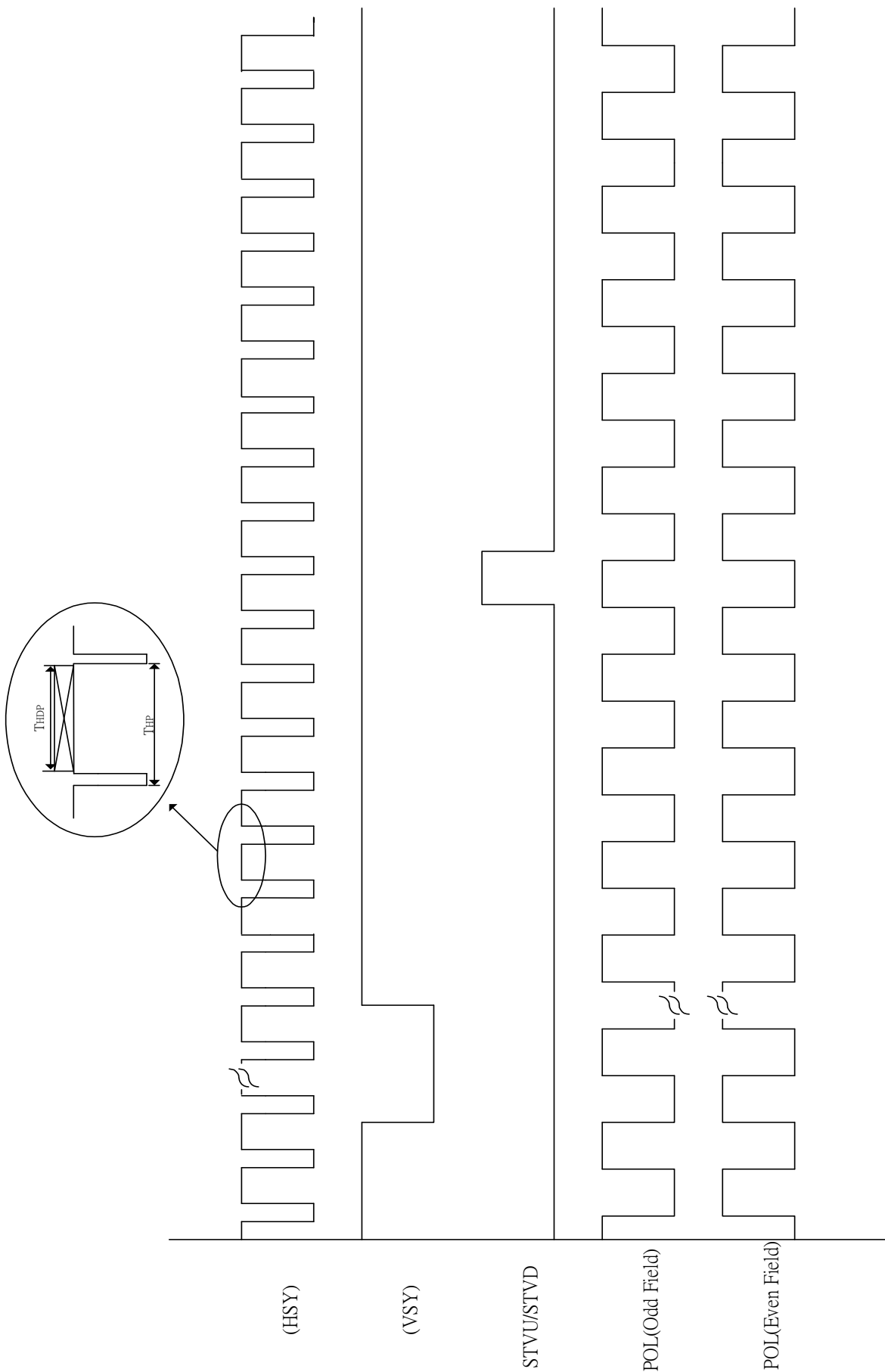
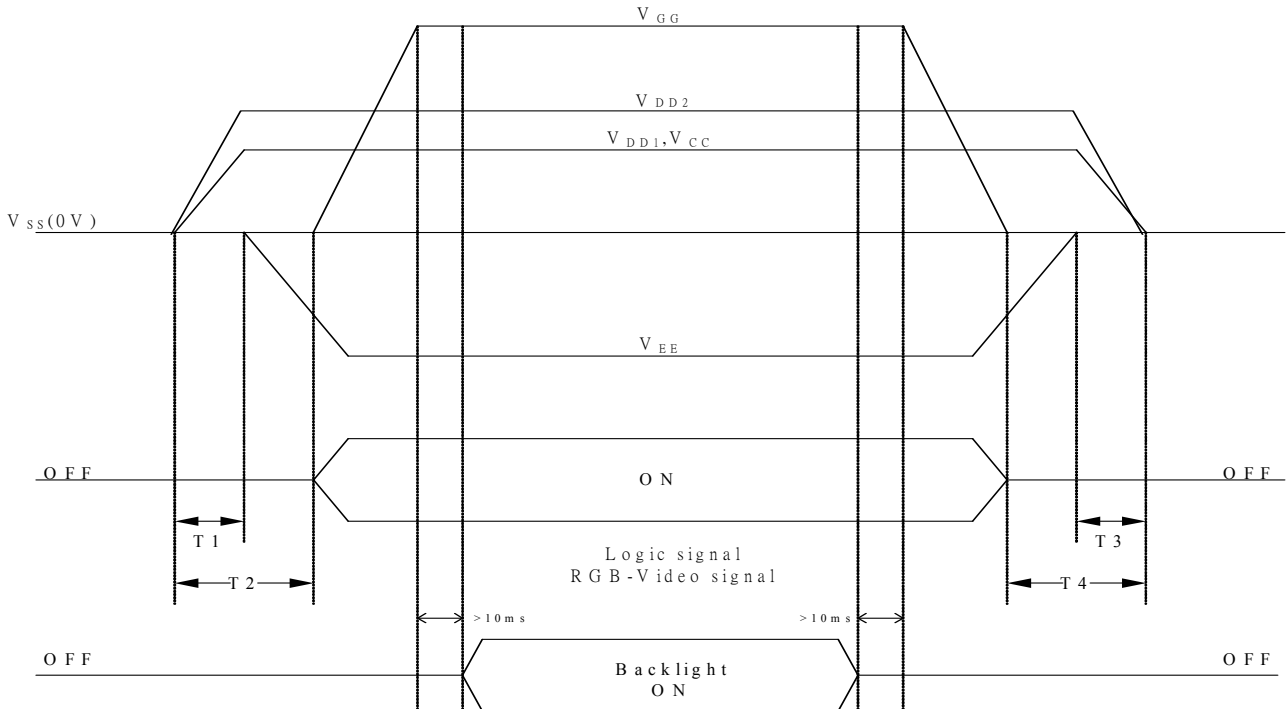


Fig. 11-4 Vertical timing

**13. Power on Sequence**



1.  $10\text{ms} \leq T1 < T2$
2.  $0\text{ms} < T3 \leq T4 \leq 10\text{ms}$

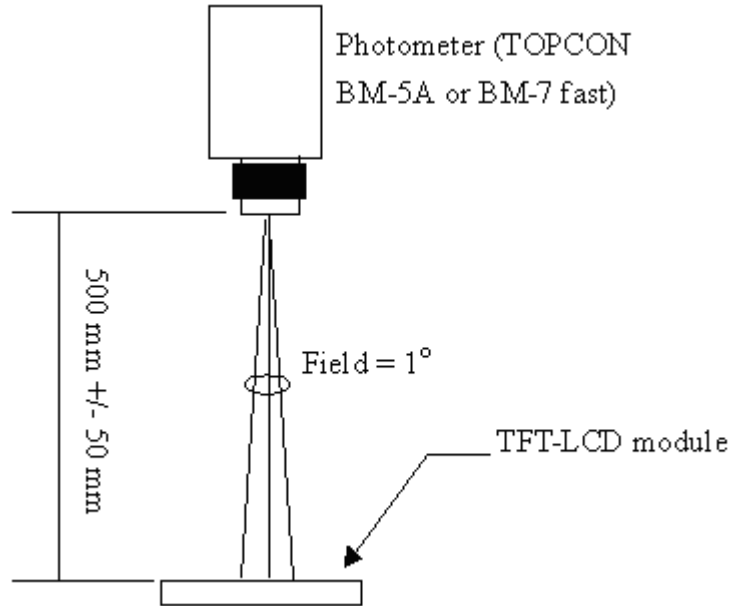
**14. Optical Characteristics**

**14-1) Specification :**

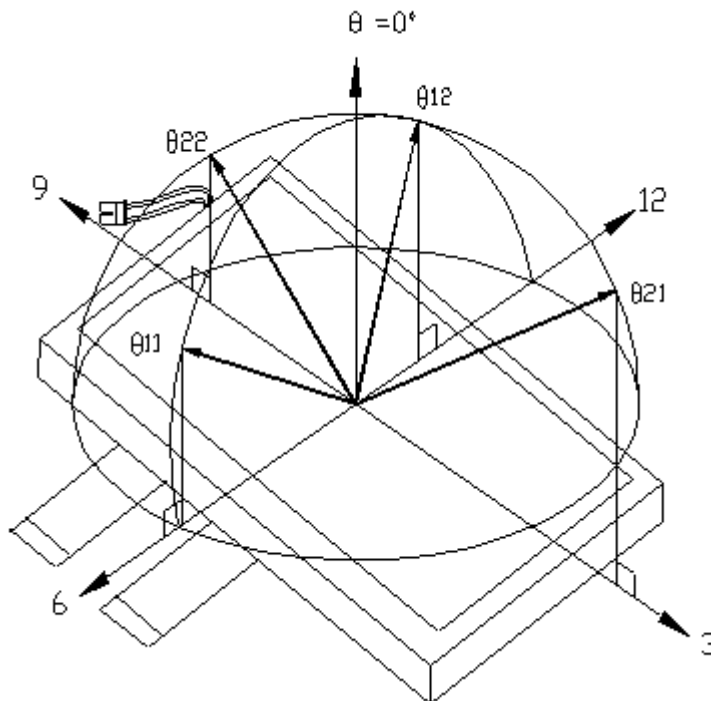
Ta=25°C

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	$\theta_{21} \cdot \theta_{22}$	$CR \geq 10$	70	75		deg	Note 14-1
	Vertical	$\theta_{11} \cdot \theta_{12}$		80	85	-	deg	
Contrast Ratio		CR	$\theta = 0^\circ$	200	400	-	-	Note 14-2
Response time	Rise	T <sub>on</sub>	$\theta = 0^\circ$	-	15	30	ms	Note 14-3
	Fall	T <sub>off</sub>		-	10	20	ms	
Brightness		L	$\theta = 0^\circ$	350	400		cd/m <sup>2</sup>	
Luminance Uniformity		U		70	75	-	%	Note 14-4
White Chromaticity		x		0.27	0.31	0.35	-	
		y		0.30	0.34	0.38	-	
Cross Talk			$\theta = 0^\circ$	-	-	3.5	%	Note 14-5
LED Life Time				20000	-	-	hrs	Note 14-6

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.

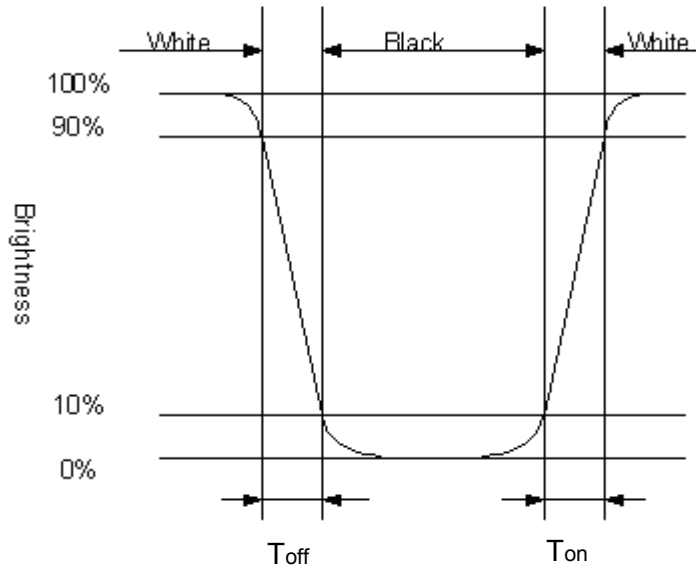


Note 14-1 : The definitions of viewing angles are as follow



Note 14-2 : The definition of contrast ratio  $CR = \frac{\text{Luminance at White Pattern}}{\text{Luminance at Black Pattern}}$

Note 14-3 : Definition of Response Time  $T_{on}$  and  $T_{off}$



Note 14-4 : The uniformity of LCD is defined as

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

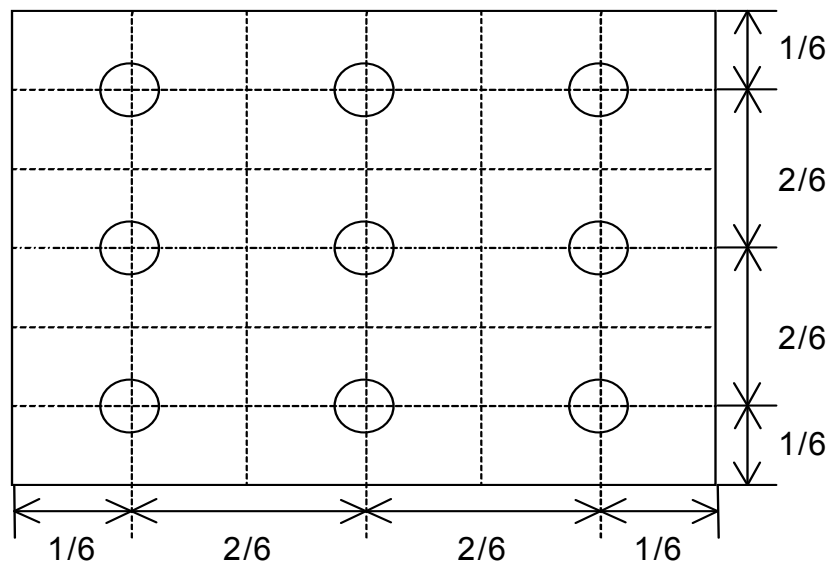
Luminance meter : BM-5A or BM-7 fast(TOPCON)

Measurement distance : 500 mm +/- 50 mm

Ambient illumination < 1 Lux

Measuring direction : Perpendicular to the surface of module

The test pattern is white.



Note 14-5 : Cross Talk (CTK) =  $\frac{|YA-YB|}{YA} \times 100\%$

YA : Brightness of Pattern A

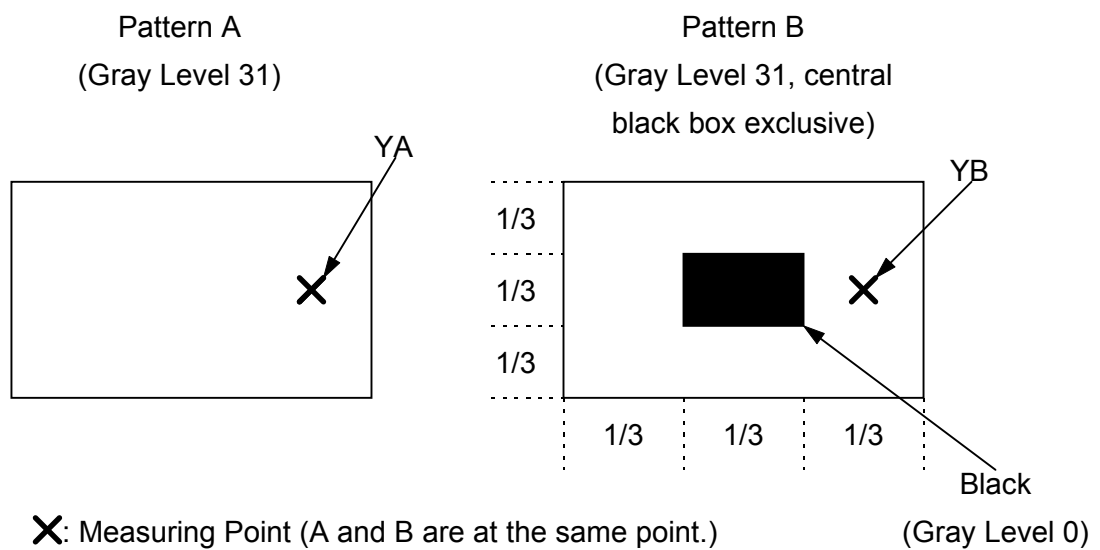
YB : Brightness of Pattern B

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



Note 14-6 : The “LED Life time “ is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C and  $I_{LED} = 220mA$ .

**15. Handling Cautions**

## 15-1) 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.
- d) Please following the tear off direction as figure 15-1 to remove the protective film as slowly as possible, so that electrostatic charge can be minimized.

## 15-2) 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.

## 15-3) 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.

## 15-4) 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.

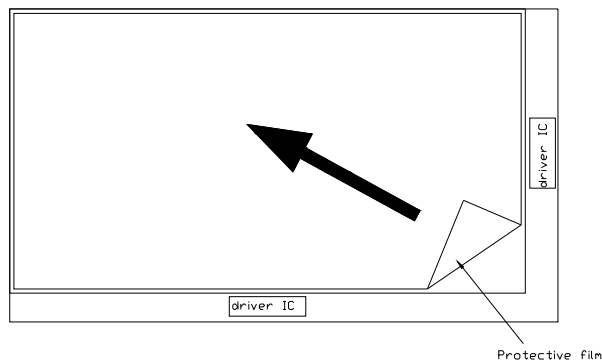


Figure 15-1 the way to peel off protective film

**16. Reliability Test**

No	Test Item	Test Condition	Remark
1	High Temperature Storage Test	Ta = +80°C, 240 hrs	
2	Low Temperature Storage Test	Ta = -30°C, 240 hrs	
3	High Temperature Operation Test	Ta = +70°C, 240 hrs	
4	Low Temperature Operation Test	Ta = -20°C, 240 hrs	
5	High Temperature & High Humidity Operation Test	Ta = +60°C, 90%RH, 240 hrs (No Condensation)	
6	Thermal Cycling Test (non-operating)	-30°C → +80°C , 100 Cycles 1hr 1hr	
7	Vibration Test (non-operating)	Frequency : 10 ~ 55 Hz, 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	
10	Hitting Durability Test (Touch panel)	1,000,000 times, with R 8.0 mm silicon rubber, 250g, 3times/sec	
11	Sliding Durability Test (Touch panel)	1,00,000 times, with R 0.8 mm polyacetal stylus, 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.

**17. Packing Diagram**

REV.	DESCRIPTION	Design	DATE
	INITIAL RELEASE	Tzung Yu	2005.09.29
△	變更防靜電袋料號(50-0500181->50-0500182)	Joseph	2009.08.11
△	變更Carton料號(50-010111->50-0100113)	Joseph	2009.12.17

**NOTE:**  
 1.Q'TY: 40 pcs panel/carton.  
 2.Dimension: 530\*295\*230mm  
 3.Weight: 10.6 Kg

ITEM	PART NO.	DESCRIPTION	QTY	REMARK
△ 4	50-0100113	CARTON	1	
△ 3	50-0500182	防靜電袋	40	抗靜電
2		VM070WX3	40	
1	50-0300862	瓦楞隔板緩衝材	1	上蓋+底層

MTL.SPEC.		UNSPECIFIED TOL'S		REMARK	
		ANGLE			
		ROUGHNESS			
APPROVE	Patrick lin	09.12.17	SCALE	UNIT	SHEET
CHECK	Patrick lin	09.12.17			1 OF 1
DRAWN	Joseph	09.12.17	MTL.NO.		DWG FILE:
					RV. 01

**元太科技工業股份有限公司**  
**Prime View International Co., Ltd.**

DWG TITLE: **7" WVGA Packing**