



深圳威耀光电有限公司

SHENZHEN WEIYAO PHOTOELECTRIC CO., LTD

## 7.0 寸 LED 模组规格书

### SPECIFICATION

<b>承 认 印</b> Approved by	
审核:	确认:
客户确认结果:	

**Customer**

客 户: \_\_\_\_\_

**Product**

品 名: \_\_\_\_\_ 7.0 寸 LED 模组 (7D CPT IPS)

**Part NO.**

产品料号: \_\_\_\_\_ **WY070ML006CP24B**

**DATE**

日 期: \_\_\_\_\_ 2014/10/06

Approved 核 准	Checked 审 核	Prepared 制 作

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## 1.0 General Description

### 1.1 Introduction

WY070ML006CP24B is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel and a driving circuit. This TFT LCD has a 7.0 (16:9) inch diagonally measured active display area with (1024 horizontal by 600 vertical pixel) resolution.

### 1.2. Features

7 (16:9 diagonal) inch configuration  
Compatible with NTSC & PAL system  
Image Reversion: UP/DOWN and LEFT/RIGHT  
ROHS design

### 1.3. General information

Item	Specification	Unit
Outline Dimension	163.9(H) x 97.1 (V) x 2.6(D)	mm
Display area	154.22 (H) x 85.92 (V)	mm
Number of Pixel	1024 (H) x 3(RGB)x 600 (V)	pixels
Pixel pitch	0.1506 (H) x 3(RGB)x 0.1432 (V)s	mm
Pixel arrangement	RGB Vertical stripe	
Display mode	Normally Black, FFS	
Color Filter Array	RGB vertical stripes	
Backlight	White LED	
Weight	TBD	g
Interface	MIPI	



## 2.0 Absolute Maximum Ratings

### 2.1 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	0	50	°C	
Storage Temperature	Tstg	-10	60	°C	

### 2.2 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	160	–	mA	–	–
LED Voltage	VF	9	9.9	10.5	V	–	–
Life Time		–	20000	–	Hr.	I ≦ 160mA	–
Color	White						

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2) Ta=25±2°C

(3) Test condition: LED Current 160mA



### 3.0 Optical Characteristics

#### 3.1 Optical specification

Ta = 25°C, VCC=3.3V

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE	
Constrast Ratio	CR	Point-5	640	800		--	1, 2, 3	
Luminance(CEN)	Lw	Point-5	200	250		cd/m <sup>2</sup>	1, 3	
Luminance Uniformity	ΔL		70	75		%	1, 3	
Response Time (White - Black)	Tr +Tf	Point-5	-	20	40	ms	1, 3, 5	
NTSC		-	45	50	-	%	1, 3	
Viewing Angle	Left	Deg.	CR ≥ 10 Point-5	80	--	°	1, 4	
	Right	Deg.		80			1, 4	
	Upper	Deg.		80	--	°	1, 4	
	Lower	Deg.		80			1, 4	
Color Coordinate	White	Wx Wy	Point-5	0.273 0.289	0.313 0.329	0.353 0.369	--	1, 3
	Red	Rx Ry		-				
	Green	Gx Gy		-				
	Blue	Bx By		-				

#### 3.2 Measuring Condition

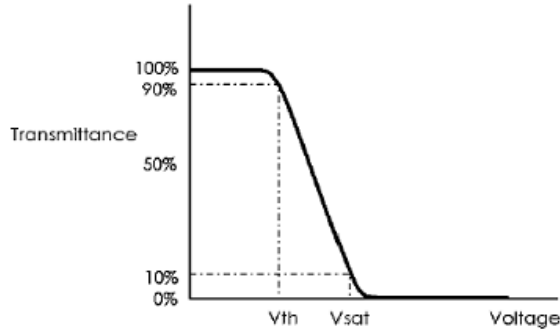
- Measuring surrounding : dark room
- Ambient temperature : 25±2°C
- 30min. warm-up time.

#### 3.3 Measuring Equipment

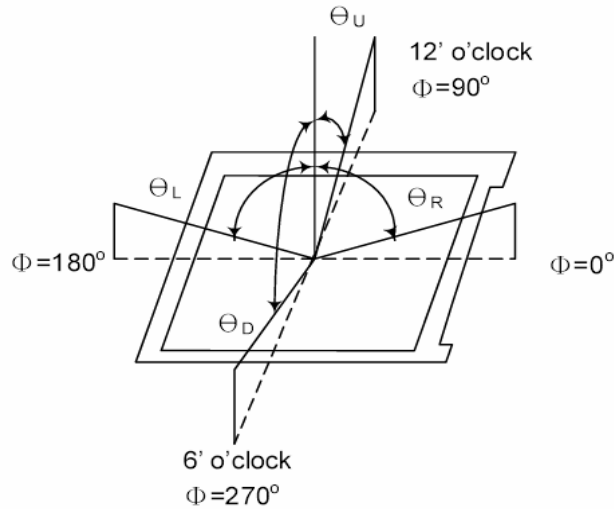
- TOPCON BM-7
- Measuring spot size : field 2°



**Note (1)** Definition of  $V_{sat}$  and  $V_{th}$  (at 20°C)



**Note (2)** Definition of Viewing Angle :

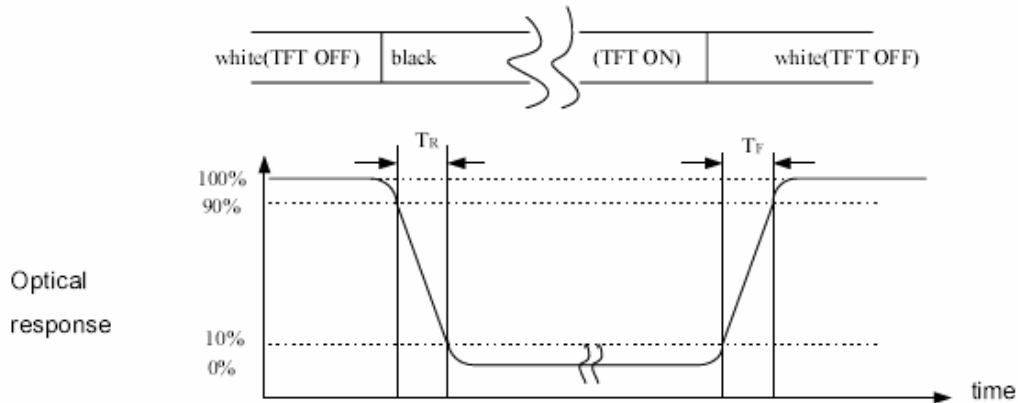


**Note (3)** Definition of Contrast Ratio(CR) :

measured at the center point of panel

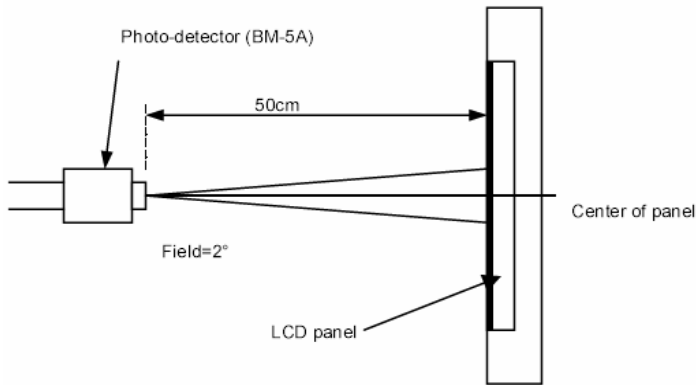
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

**Note (4)** Definition of Response Time : Sum of  $T_R$  and  $T_F$

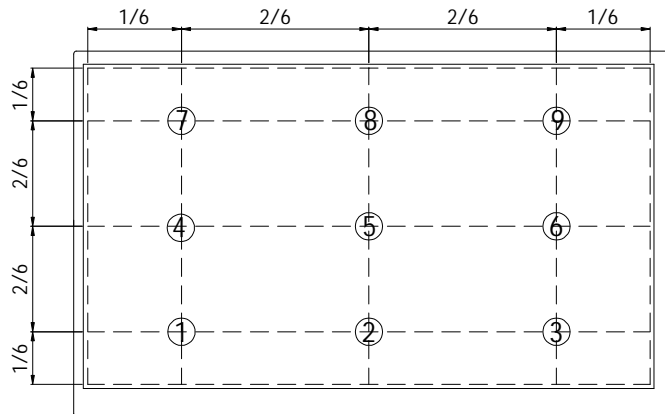




**Note (5)** Definition of optical measurement setup



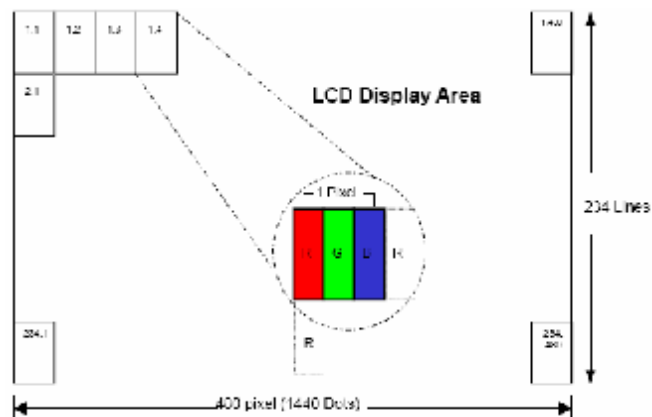
**Note (6)** Definition of brightness uniformity



**Note (7)** Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.)

## 4.0 Block Diagram

### 4.1 TFT-LCD Module







## 5.0 Interface Pin Connection

PIN NO	SYMBOL	DESCRIPTION
1	LED+	Power for LED backlight (Anode)
2	LED+	Power for LED backlight (Anode)
3	VGH	Positive power for TFT
4	VGL	Negative power for TFT
5	UPND	Vertical inversion
6	SHLR	Horizontal inversion
7	LED-	Power for LED backlight (Cathode)
8	LED-	Power for LED backlight (Cathode)
9	AVDD	
10	GND	Digital ground
11	MIPI-TDP3	HSSI_D3_P/N are differential small amplitude signals.
12	MIPI-TDN3	
13	GND	Digital ground
14	MIPI-TDP2	HSSI_D2_P/N are differential small amplitude signals.
15	MIPI-TDN2	
16	GND	Digital ground
17	NIPI-TDP	HSSI_CLK_P/N are differential small amplitude signals
18	MIPI-TDN	
19	GND	Digital ground
20	MIPI-TDP1	HSSI_D1_P/N are differential small amplitude signals.
21	MIPI-TDN1	
22	GND	Digital ground
23	MIPI-TDP0	HSSI_D0_P/N are differential small amplitude signals.
24	MIPI-TDN0	
25	GND	Digital ground
26	STBY	Standby mode, normally pull high STBYB="1", normal operation STBYB="0", timing control, source driver will turn off, all output are high-Z
27	RESET	Global reset pin.
28	VDD(1.8V)	Digital power 1.8V
29	VDD(1.8V)	Digital power 1.8V
30	VCOM	Common Voltage



## 6. Electrical Characteristics

### 6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Supply Voltage</b>	DVDD	1.71	1.8	2.5	V	
	VGH	17	18	19	V	
	VGL	-6.6	-6	-5.4	V	
	AVDD	9.4	9.6	9.8	V	
	VCOM	3.6	3.8	4.1		
<b>Video signal amplitude (VR, VG, VB)</b>	VIA	-	-	AVDD - 0.4	V	
	VIAC	-	-	-	V	AC component,
	VIDC	-	AVDD/2	-	V	DC component
<b>VCOM</b>	VCAC		-	-	VP-P	AC component
	VCDC	-	-	-	V	DC component, (1)
<b>Input signal voltage</b>	VIH	0.7DVDD	-	DVDD	V	(2)
	VIL	0	-	0.3DVDD	V	(2)
<b>Current of power supply</b>	IDD	-	-		mA	DVDD=1.8V
	IADD	-	-		mA	AVDD=9.6V
	IGH	-	-		uA	VGH=18V
	IGL	-	-		mA	VGL=-5.4V

Note (1): The brightness of LCD panel could be changed by adjusting the AC component of VCOM.

Note (2): STHL, STHR, OEH, L/R, CPH1~CPH3, STVD, STVU, OEV, CKV, U/D



## 6.2 TFT-LCD Current Consum

ITEM	SYMBOL	CONDITION	MIN	TYPE	MAX	UNIT	NOTE
Gate on power current	IVGH	VGH = 18V	--	0.5	1	mA	Note1
Gate off power current	IVGL	VGL = -6V	--	0.5	1	mA	Note1
Digital power current	IDVDD	DVDD = 3.3V	--	30	45	mA	Note1
Analog power current	IAVDD	AVDD = 9.6V	--	35	45	mA	Note1
Total Power Consumption	PC		--	447	604	mW	Note1

Note1: Typ. specification : Gray-level test Pattern

Max. specification : Black test Pattern



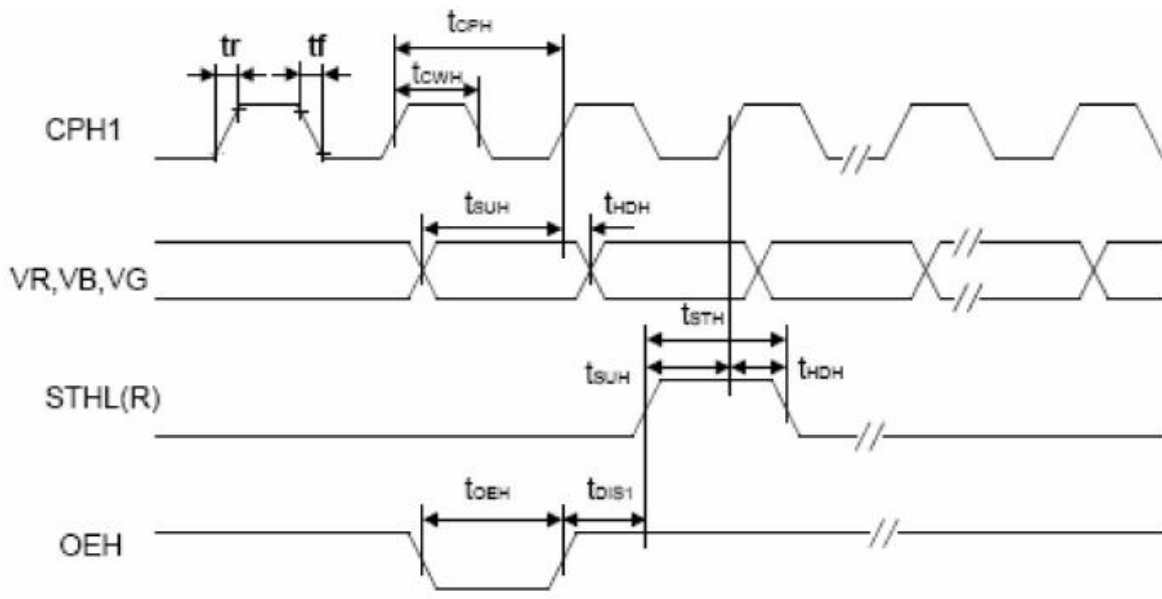
256 gray pattern



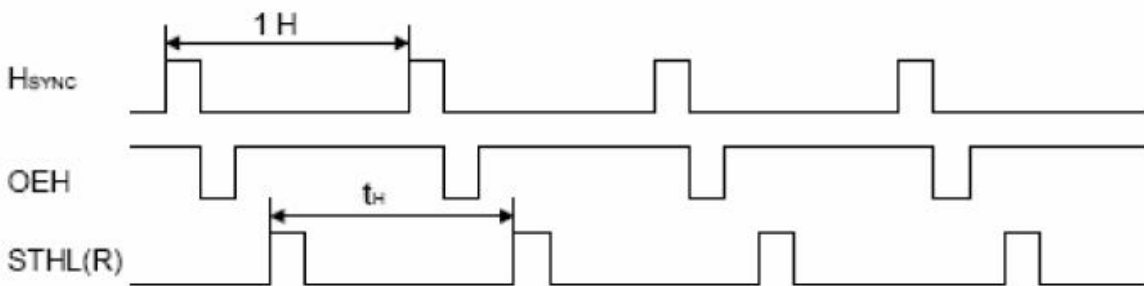
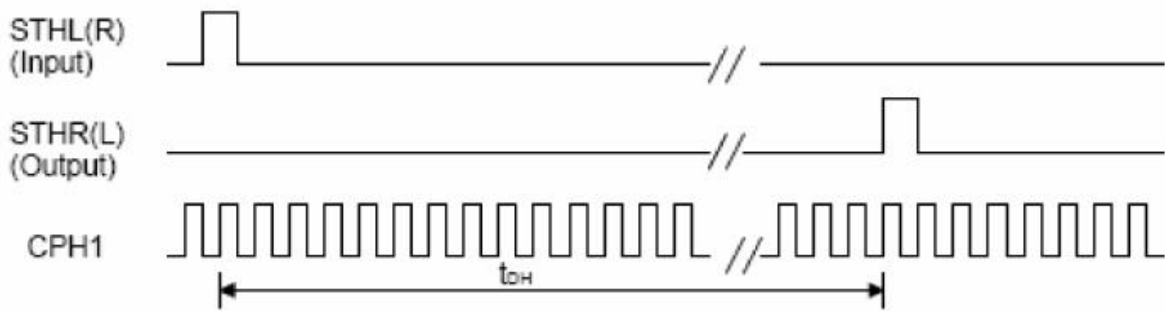
Black Pattern



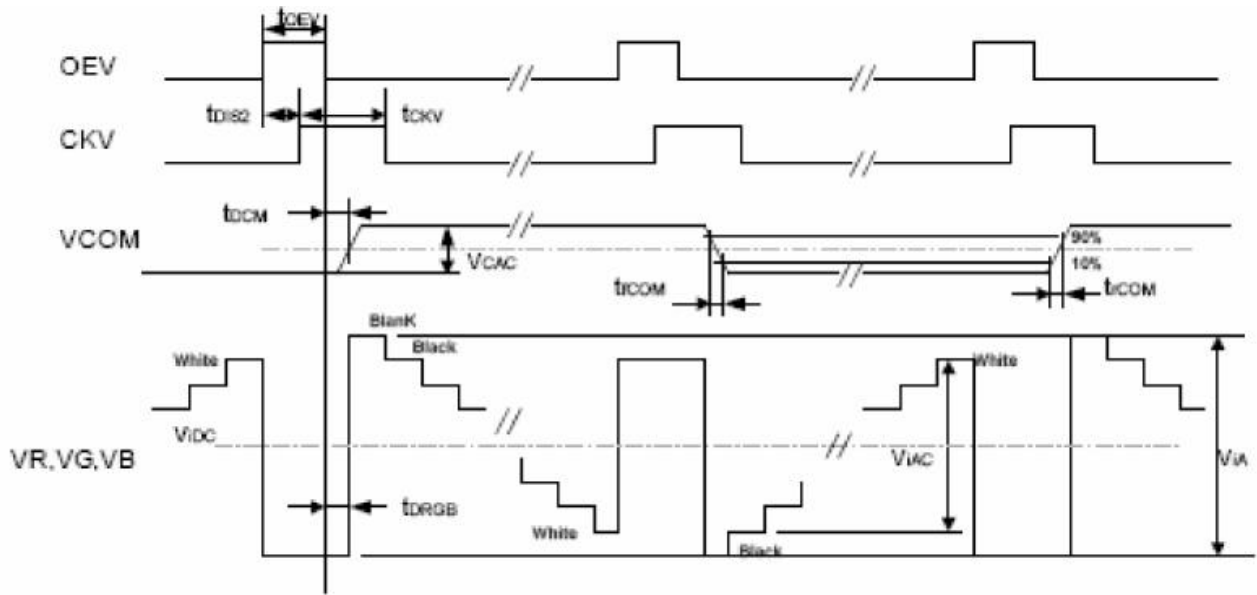
### 6.3 Timing Diagram of Interface Signal



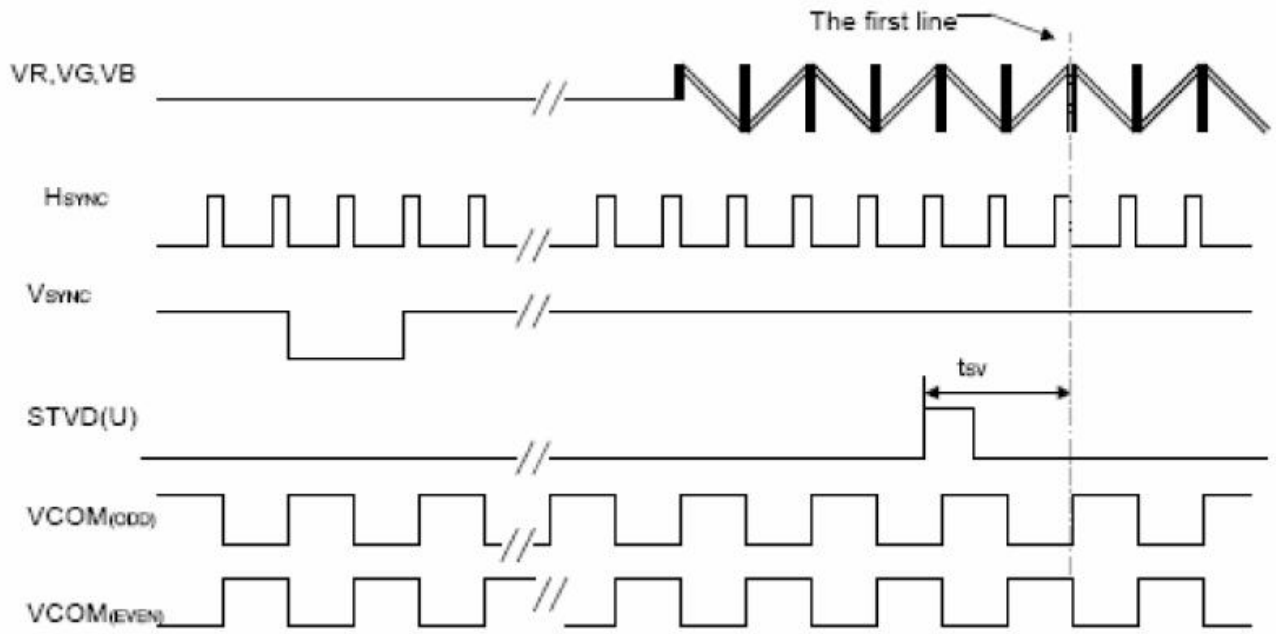
Sampling clock timing



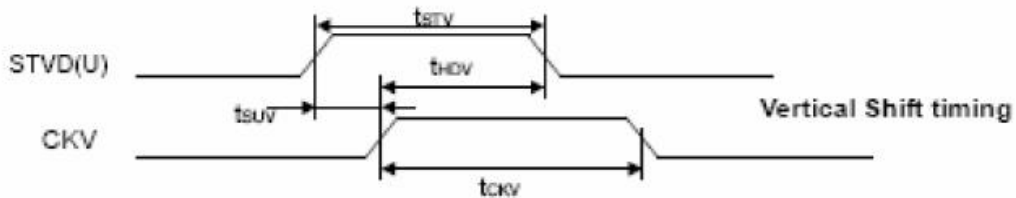
Horizontal display timing range



Detail Horizontal timing



Vertical timing



Vertical Shift timing



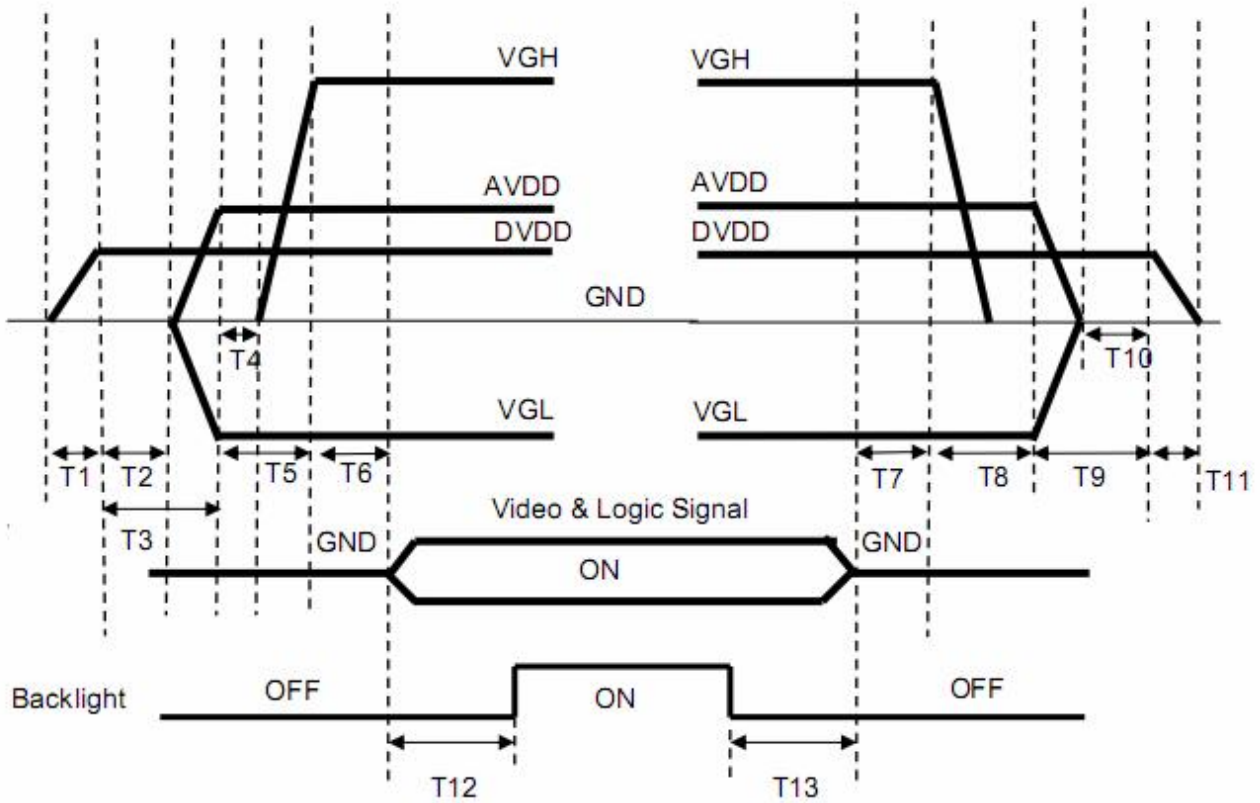
	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
<b>DE MODE</b>	Dot Clock	1/tCLK	45	51.2	57	MHz	
	DCLK pulse duty	Tcwh	40	50	60	%	
	Horizontal total Time	tH	1324	1344	1364	tCLK	
	Horizontal effective Time	tHA	1024			tCLK	
	Horizontal Blank Time	tHB	300	320	340	tCLK	
	Vertical total Time	tV	625	635	645	tH	
	Vertical effective Time	tVA	600			tH	
	Vertical Blank Time	tVB	25	35	45	tH	
<b>SYNC MODE</b>	Horizontal total Time	TH	1324	1344	1364	tCLK	
	Horizontal Pulse Width	Thpw		20	-	tCLK	thb + thpw =160DCLK is fixed
	Horizontal Back Porch	Thb		140	-	tCLK	
	Horizontal Front Porch	Thfp	140	160	180	tCLK	
	Horizontal effective Time	THA	1024			tCLK	
	Vertical total Time	TV	625	635	645	tH	
	Vertical Pulse Width	Tvpw		3	-	th	tvpw + tvb =23th is fixed
	Vertical Back Porch	Tvb	-	20	-	th	
	Vertical Front Porch	Tvfp	2	12	22	th	
Vertical Valid	Tvd	600			th		



### 6.4 Power Sequence

Power On : DVDD→AVDD/VGL →VGH →Video & Logic Signal→Backlight

Power Off : Backlight→Video & Logic Signal→ VGH→AVDD/VGL→DVDD



$0 < T1 \leq 10\text{ms}$   
 $T2 > 0\text{ms}$   
 $T3 > 20\text{ms}$   
 $T4 > 0\text{ms}$   
 $T5 > 10\text{ms}$   
 $0 < T6 \leq 10\text{ms}$   
 $T12 \geq 200\text{ms}$

$T7 > 0\text{ms}$   
 $T8 > 0\text{ms}$   
 $T9 > 0\text{ms}$   
 $T10 > 0\text{ms}$   
 $0 < T11 \leq 10\text{ms}$   
 $T13 \geq 200\text{ms}$



### 7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=+60℃,24hrs	
2	Low Temperature Storage	Ta=-10℃,24hrs	
3	High Temperature Operation	Ta=+50℃,24hrs	
4	Low Temperature Operation	Ta=0℃,24hrs	
5	High Temperature and High Humidity (operation)	Ta=+40℃,90%RH,24hrs	
6	Thermal Cycling Test (non operation)	-20℃(0.5hr)→+70℃(0.5hr),200cycles	
7	Vibration	1.Random:1.04G,10-500HZ,X,Y,Zdirection 30min/each direction 2.Sweep sine:1.5G, 5~500Hz, X/Y/Z,30min/each direction	
8	Shock	100G,6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
9	Vibration (with carton)	Random:1.04Grms, 10~500Hz, X/Y/Z 45min/each direction Fixed:5Hz, 1.5Grms, X/Y/Z 45min/each direction	
10	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202
11	Electrostatic Discharge	±200V,200PF,0Ω1 time/each terminal	

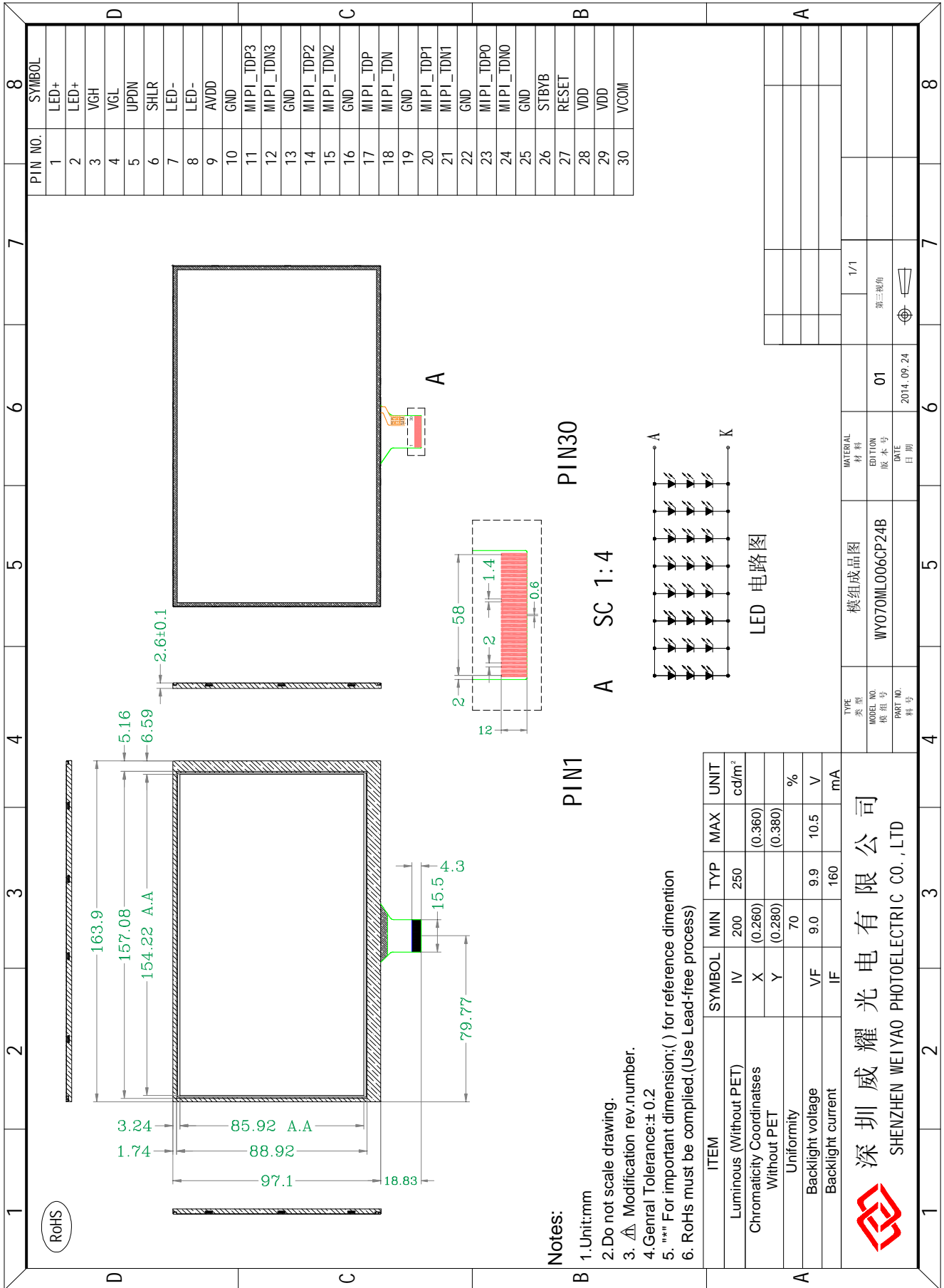
Note: All tests above are practiced at module type.

There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.





### 8.0 Outline dimension



PIN NO.	SYMBOL
1	LED+
2	LED+
3	VGH
4	VGL
5	UPDN
6	SHLR
7	LED-
8	LED-
9	AVDD
10	GND
11	MIPI_TDP3
12	MIPI_TDN3
13	GND
14	MIPI_TDP2
15	MIPI_TDN2
16	GND
17	MIPI_TDP
18	MIPI_TDN
19	GND
20	MIPI_TDP1
21	MIPI_TDN1
22	GND
23	MIPI_TDP0
24	MIPI_TDN0
25	GND
26	STBYB
27	RESET
28	VDD
29	VDD
30	VCOM

**Notes:**  
 1. Unit:mm  
 2. Do not scale drawing.  
 3.  $\Delta$  Modification rev.number.  
 4. General Tolerance:±0.2  
 5. \*mm For important dimension;() for reference dimension  
 6. RoHs must be complied.(Use Lead-free process)

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Luminous (Without PET)	IV	200	250		cd/m <sup>2</sup>
Chromaticity Coordinates Without PET	X	(0.260)		(0.360)	
	Y	(0.280)		(0.380)	
Uniformity		70			%
Backlight voltage	VF	9.0	9.9	10.5	V
Backlight current	IF		160		mA

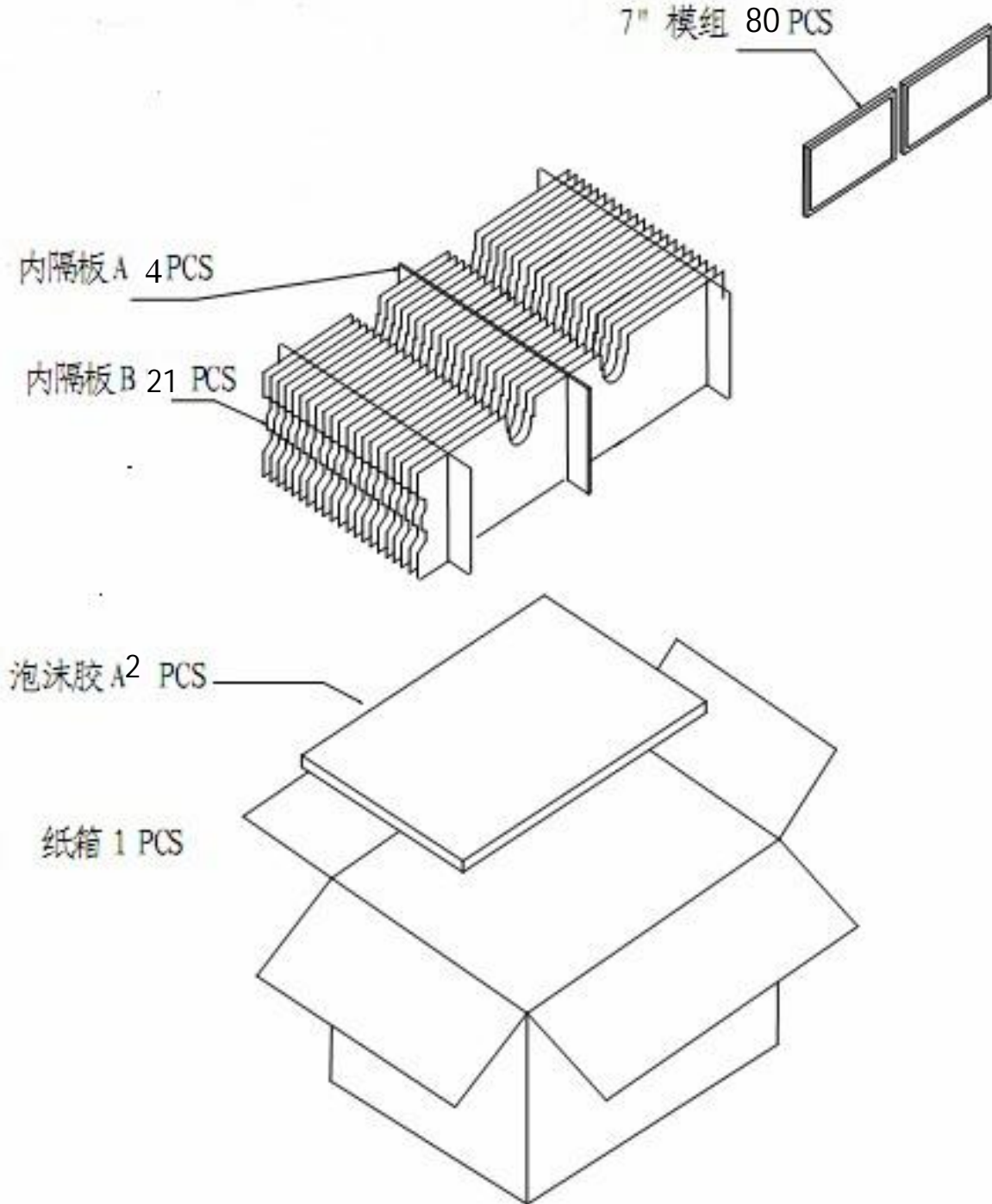
**深圳威耀光电有限公司**  
 SHENZHEN WEIYAO PHOTOELECTRIC CO.,LTD

TYPE 类型	模组成品图	MATERIAL 材料	1/1
MODEL NO. 模组号	WY070ML006CP24B	EDITION 版本号	01
PART NO. 料号		DATE 日期	2014.09.24



## 9.0 Packing form

### 9.1 Packing form 1





## 10.0 General Precaution

### 10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

### 10.2 Assembly Precaution

10.2.1 Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.

10.2.2 Please design display housing in accordance with the following guide lines.

10.2.2.1 Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.

10.2.2.2 Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. The clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.

10.2.3 Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)

10.2.4 Please do not press any parts on the rear side such as source IC, gate IC, and FPC during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.

10.2.5 Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.

10.2.6 Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.

10.2.7 Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

### 10.3 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

### 10.4 Breakage of LCD Panel

10.4.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

10.4.2 If liquid crystal contacts mouth or eyes, rinse out with water immediately.

10.4.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

10.4.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.



## 10.5 Absolute Maximum Ratings and Power Protection Circuit

10.5.1 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

10.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

10.5.3 It's recommended employing protection circuit for power supply.

### 10.6 Operation

10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

10.6.2 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

10.6.3 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

10.6.4 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene or other adequate solvent.

## 10.7 Static Electricity

10.7.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

10.7.2 Because LCD module uses CMOS-IC on TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.

10.7.3 Persons who handle the module should be grounded through adequate methods.

## 10.8 Disposal

When disposing LCD module, obey the local environmental regulations.

## 10.9 OTHERS

10.9.1 A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior.

Please do not expose LCD module direct sunlight land strong UV rays.

10.9.2 Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.

10.9.3 For the packaging box, please pay attention to the followings:

10.9.3.1 Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.

10.9.3.2 Please do not pile them up more than 6 boxes. (They are not designed so.) And please do not turn over.

10.9.3.3 Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

10.9.3.4 Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)