CERT. No. QAC0946535 (ISO9001)

CERT. No. HKG002005 (ISO14001)

Product Specifications

Customer: _____

Model Name: H070BWS40E3010

Date: _____

Version: _____

■ **Preliminary Specification**

□ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

Contents

1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2017/7/10	First Release.	

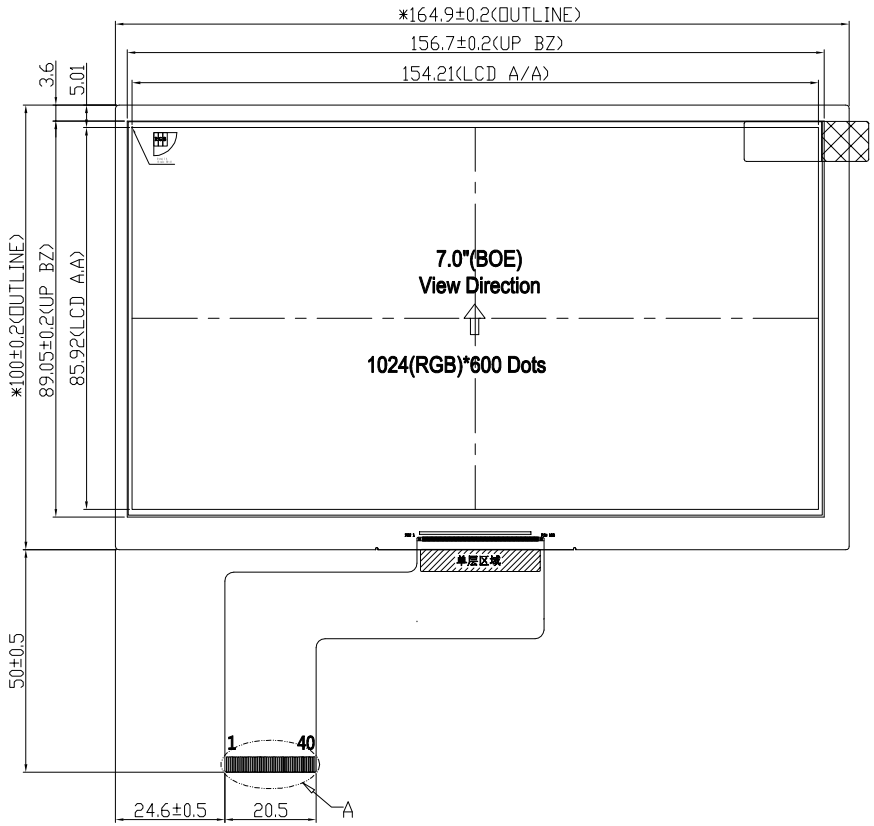
2 . General Specifications

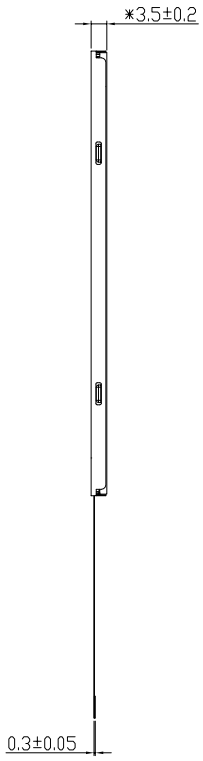
H070BWS40E3010 is a color active matrix thin film transistor(TFT) liquid crystal display (LCD) that use's amorphous silicon TFT as a switching device. This module is composed of a TFT LCD panel, driver ICs, FPC and a backlight unit.

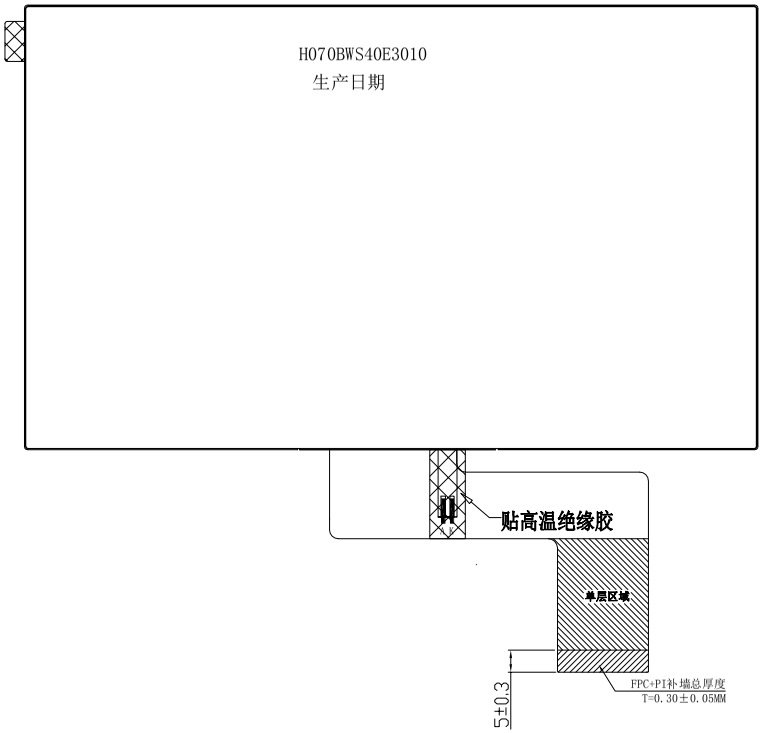
No.	Item	Specification	Unit
1	Panel Size	7"	inch
2	Number of Pixels	1024 (H) × 3(RGB) ×600 (V)	pixels
3	Active Area	154.2144(H)×85.92(V)	mm
4	Pixel Pitch	0.0502 (H)×0.1432 (V)	mm
5	OutlineDimension	164. 9(H) x 100(V) x 3.5(T)	mm
6	Pixel arrangement	RGB vertical stripe	-
7	Display Mode	Normally White	-
8	Viewing Direction	6 o'clock	-
9	Display Color	16.7M	-
10	Luminance(cd/m2)	250(TYP.)	nit
11	Contrast Ratio	800(TYP.)	-
12	Surface Treatment	Anti-Glare	-
13	Interface	MIPI	-
14	Backlight	White LED	-
15	OperationTemperature	-20~70	℃
16	StorageTemperature	-30~80	℃

3. MECHANICAL SPECIFICATION

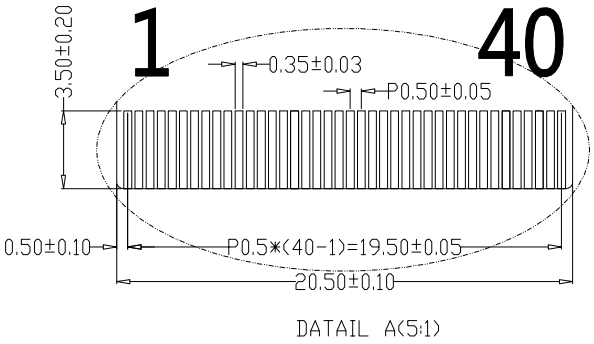
REV.	DATE	MODIFICATION
1.0	2021.09.29	First issue







PIN	SYMBLE
1	GND
2	MIPI-TD
3	MIPI-TD
4	GND
5	MIPI-TD
6	MIPI-TD
7	GND
8	MIPI-TC
9	MIPI-TC
10	GND
11	MIPI-TD
12	MIPI-TD
13	GND
14	MIPI-TD
15	MIPI-TD
16	GND
17	GND
18	VDD
19	VDD
20	REFCLK(
21	SAD(NC)
22	SCL(NC)
23	IRQ(NC)
24	LRSTB
25	STBYB
26	AVDD
27	GND
28	LED-
29	LED-
30	GND
31	VGL
32	GND
33	GND
34	VGH
35	LED+
36	LED+
37	GND
38	3.3V(NC
39	3.3V(NC
40	VCOM



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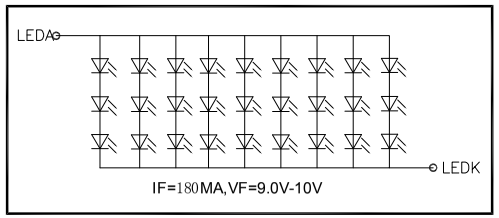
NOTES:
1. DISPLAY TYPE: 7.0 INCH TFT /BLACK
2. BACKLIGHT: 27 CHIP WHITE LED
3. OPERATING TEMP: -10°C~+50°C
4. STORAGE TEMP: -20°c~+60°c
5. RESOLUTION: 1024RGBx600
6.Luminous instensity(9 AVG): Module: 300cd/m(TYP.)
7.Uniformity:75%(Min)
8. "( )"reference dimension. " * "critical dimension
9. RoHS Compliant



INTERFACE	RGB Interface	深圳市勋瑞光电科技有限公司 Xunrui Shenzhen Optoelectronics Technology Co., Ltd.	
	FPC Connector	MODEL NAME	PART NO. H070BWS40E3010
VIEWING DIRECTION	12 O'clock	DWN	REV. 1.0 / SHEET OF 1/1
		CHKD	TOLERANCE UNLESS SPECIFIED ±0.3
Gray Scale DIRECTION	6 O'clock	PROJECTION 3RD ANGLE	UNIT mm / SCALE

4. PIN DESCRIPTION

Pin No.	Symbol	Type	Function
1	GND	p	Ground
2	MIPI_TDP0	I	Positive MIPI differential data inputs
3	MIPI_TDN0	I	Negative MIPI differential data inputs
4	GND	p	Ground
5	MIPI_TDP1	I	Positive MIPI differential data inputs
6	MIPI_TDN1	I	Negative MIPI differential data inputs
7	GND	p	Ground
8	MIPI_TCP	I	Positive MIPI differential clock inputs
9	MIPI_TCN	I	Negative MIPI differential clock inputs
10	GND	p	Ground
11	MIPI_TDP2	I	Positive MIPI differential data inputs
12	MIPI_TDN2	I	Negative MIPI differential data inputs
13	GND	p	Ground
14	MIPI_TDP3	I	Positive MIPI differential data inputs
15	MIPI_TDN3	I	Negative MIPI differential data inputs
16-17	GND	p	Ground
18-19	VDD	P	(1.8V)Digitalpower
20	REFCLK(NC)	I	NC
21	SDA(NC)	I	NC
22	SCL(NC)	I	NC
23	IRQ(NC)	I	NC
24	LRSTB	I	Global reset pin. Active low to enter reset state.
25	STBYB	I	Standby mode, normally pull high STBYB=”1”, normal operation STBYB=”0”,timing control, source driver will turn off, all output are high-Z
26	AVDD	P	(AVDD) Power for Analog Circuit
27	GND	p	Ground
28-29	LED-	P	LEDCathode
30	GND	p	Ground
31	VGL	P	Negative power for TFT
32-33	GND	p	Ground
34	VGH	P	Positive power for TFT
35-36	LED+	P	LEDAnode
37	GND	p	Ground
38-39	3.3V(NC)	P	(3.3V)Digitalpower
30	VCOM	P	Common voltage

I：input , O：output , P：Power

【Note】 *1)：When SHLR ="0" , set right to left scan dirction
When SHLR ="1" , set left to right scan dirction
When UPDN ="0" , set top to bottom scan dirction

5. ELECTRICAL CHARACTERISTICS

5.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Digital Supply Voltage	VDD	- 0.3	2.0	V	
Analog Supply Voltage	AVDD	-0.5	15	V	
Gate On Voltage	VGH	-0.3	40	V	
Gate Off Voltage	VGL	-20	0.3	V	
Gate On-Gate Off Voltage	VGH-VGL	12	40	V	

5.2 TFT LCD MODULE

5.2.1 Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Digital Supply Voltage	VDD	1.71	1.8	1.89	V	
TFT Gate on voltage	VGH	16	18	20	V	
TFT Gate off voltage	VGL	-7	-6	-5	V	
TFT Common electrode voltage	VCOM	3.6	3.7	4.0	V	
Analog power supply voltage	AVDD	8.0	9.6	13.5	V	

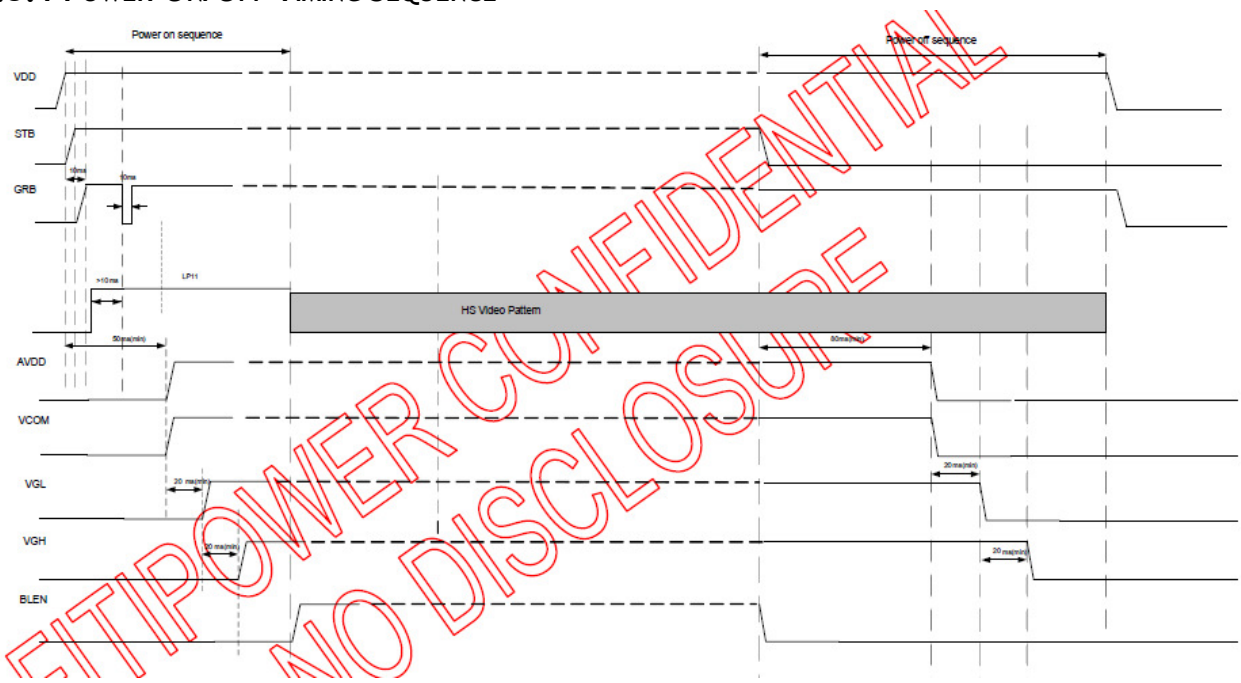
5.2.2 Current Consumption

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Gate on power Current	IVGH	VGH =18 V	-	0.5	1	mA	Note2
Gate off power current	IVGL	VGL= -6V	-	1	2	mA	Note2
Digital power current	IVDD	VDD = 1.8V	-	30	45	mA	Note2
Analog power current	IAVDD	AVDD =9.6V	-	35	45	mA	Note2

5.3 POWER ON/OFF SEQUENCE

In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within the given specifications. Refer to “ AC Characteristics” for more detail on timing.

5.3.1 POWER-ON/OFF TIMING SEQUENCE



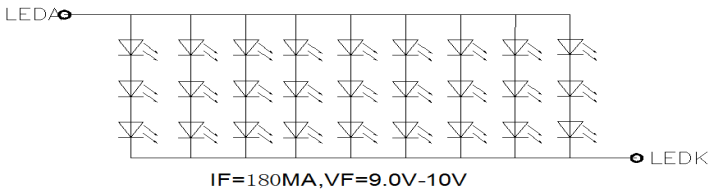
Enter and Exit Standby Mode timing chart

5.4 BACK LIGHT UNIT

Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	ILED	-	180	-	mA	27LEDS
Forward voltage	VF	9.0	9.6	10	V	IF=180mA 27LEDS
Reverse current	IR			50	μA	VR=5V,1LED
Power dissipation	Pd	-			mW	27LEDS
Peak forward current	IFP	100			mA	1LED
Reverse Voltage	VR	5			V	1LED

5.4.1Internal Circuit Diagram



6.INPUT SIGNAL TIMING AND INITION CODE

6.1 DE MODE FOR 1024RGB*600

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		600		T_H
VSD Period	tv	610	635	800	T_H
VSD Blanking	tvbp+ tvfp	10	35	200	T_H

6.2 Inition code for LCM

5.2.1 **MIPI-4LINE** command:

MIPI CLK Speed:340Mbps(170MHZ)
H blank porch:160
H front porch:160
H pulse width:10
V blank porch:23
V front porch:12
V pulse width:1

MIPI command:
regw(0x01);//Reset
Delay 30ms
regw(0x80,0x8B);
regw(0x81,0xFF);
regw(0x82,0xAF);
regw(0x83,0xDF);
regw(0x84,0x97);
regw(0x85,0x9C);
regw(0x86,0xB9);

7.OPTICAL CHARACTERISTICS

Ta = 25 ± 2℃

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response time		Tr Tf	θ=φ= 0°	-	25	40	ms	Note3
Contrast ratio		CR	θ=φ= 0°	600	800	-	-	Note4
Color Chromaticity	White	x	Θ=0 Normal viewing angle	0.238	0.268	0.298		Note2 Note5
		y		0.270	0.300	0.330		
	Red	x		0.533	0.563	0.593		
		y		0.285	0.315	0.345		
	Green	x		0.287	0.317	0.347		
		y		0.587	0.617	0.647		
	Blue	x		0.111	0.141	0.171		
		y		0.082	0.112	0.142		
Luminance		L		250	300	-	cd/m2	Note2 Note6
Luminance uniformity		YU		70	75	-	%	
Viewing Angle	Ver.	θU	CR≧10	-	60	-		Note1
		θD		-	70	-		
	Hor.	φL		-	80	-		
		φR		-	80	-		
NTSC				45	50	-	%	

Note1:Definition of viewing angle range

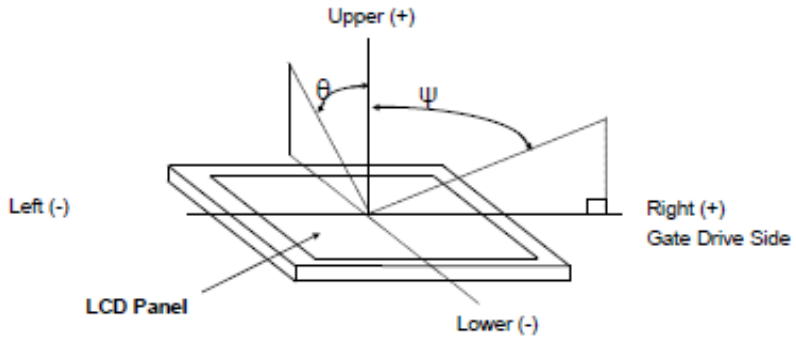


Fig. 6-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm , other items are measured by Photo detector TOPCON BM-7 Field of view: 1° /Height: 500mm.)

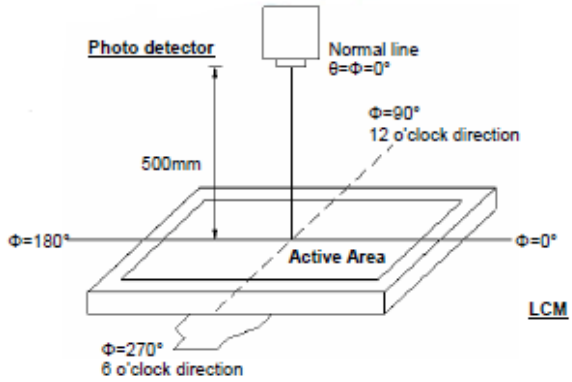


Fig. 6-2 Optical measurement system setup

Note3:Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

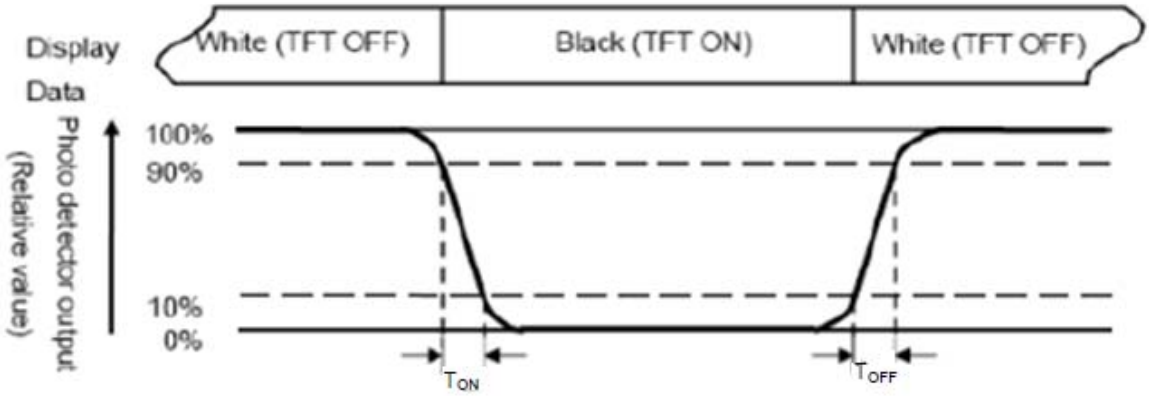


Fig. 6-3 Definition of response time

Note4:Definition of contrast ratio:

Note5: Definition of color chromaticity

Color coordinates measured at center point of LCD.

Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=140mA.

8 . Environmental / Reliability Tests

8.1 Temperature and Humidity

Test Item	Test Condition	Remark
HighTemperatureStorage	Ta=80℃;	72hrs
Low Temperature Storage	Ta=-30℃;	72hrs
High Temperature Operation	Ta=70℃;	72hrs
Low Temperature Operation	Ta=-20℃;	72hrs
High Temperature High Humidity Operation	Ta=60℃，90%RH，	72Hrs(no condensation)
Thermal Shock	-20℃(0.5h) ~ 70℃(0.5h) / 10cycles	Start with cold temperature ， End with high temperature.

8.2 Vibration shock

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s2,6ms, ±x,y,z 3times for direction	IEC60068-2-27：1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32：1990 GB/T2423.8-1995

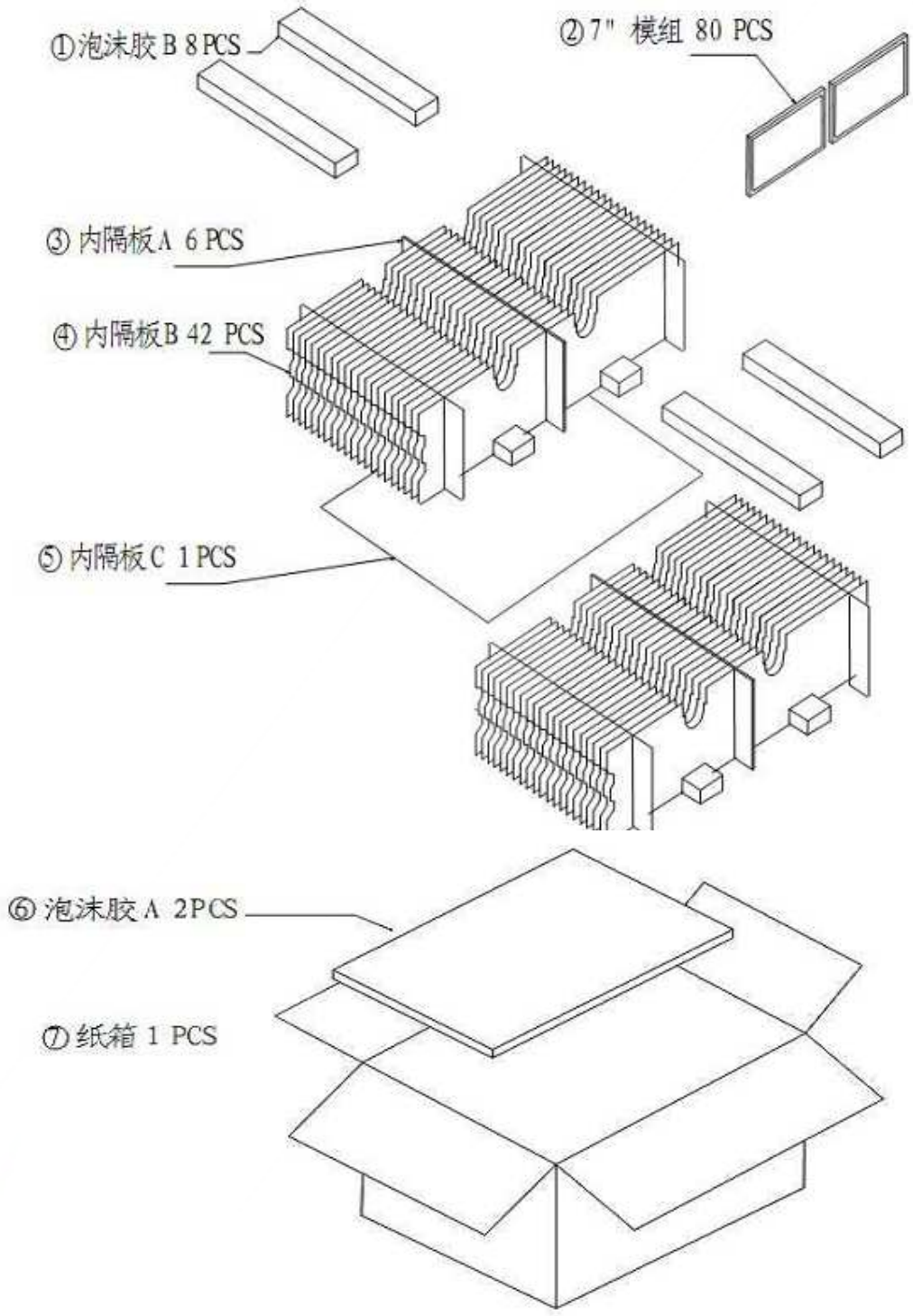
8.3ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF，330Ω， Contact:±4KV,Air:±8KV	1	IEC61000-4-2：2001 GB/T17626.2-2006
	200pF，0Ω，±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

9.Packing


①泡沫胶 B 8 PCS
②7" 模组 80 PCS
③ 内隔板A 6 PCS
④ 内隔板B 42 PCS
⑤ 内隔板C 1 PCS
⑥ 泡沫胶 A 2PCS
⑦ 纸箱 1 PCS

10. Precautions for Use of LCD modules

10.1 *HANDING PRECAUTIONS*

(1) The display panel is made of glass. Do not subject it to a mechanical shock or impact by dropping it.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

(5) If the display surface becomes contaminated,breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten a cloth with one of the following solvents:

- *Isopropyl alcohol*
- *Ethyl alcohol*

(6) Solvents other than those above mentioned may damage the polarizer.

Especially, do not use the following:

- *Water*
- *Ketone*
- *Aromatic solvents*

(7) Extra care to minimize corrosion of the electrode. Water droplets, moisture condensation or a current flow in a high-humidity environment accelerates corrosion of the electrode.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD Module, make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD Module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- *Be sure to ground the body when handling he LCD Module.*

-To reduce the amount of static electricity generated, do not conduct assembling and other

-The LCD Module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

10.2 *STORAGE PRECAUTIONS*

When storing The LCD Module, avoid exposure to direct sunlight of fluorescent lamps. Keep the modules in bags (avoid high temperature/ high humidity and low temperatures below 0℃). Whenever possible, the LCD Module should be stored in the same conditions in which they were shipped from our company.

10.3 *OTHERS*

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD Module have been operating for a long time showing the same display patterns the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be recovered by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD Module resulting from destruction caused by static electricity etc. exercise care to avoid holding the following sections when handling the modules.

- *Exposed area of the printed circuit board.*
- *Terminal electrode sections.*