US Micro Products
ENGINEERED DISPLAY SOLUTIONS

TFT SPECIFICATION

Part Number	USMP-LPS-T101-128080MFD-A0
Size	10.1"
Resolution	1280 x 800
Brightness	1000 cd/m²
Contrast	1000:1
Viewing Angle	80/80/80/80
Operating Temp.	-30 ~ 85°C

FOR ADDITIONAL INFORMATION
PLEASE CONTACT:
engineering@usmicroproducts.com

Issue Date	Approved by (customer use)	Checked by	Prepared by

. Revision Record

Date	Rev.No.	Page	Revision Items	Prepared
2023.07.31	Y0	ALL	The first release	Zhao
2023.08.03	Y1	P16	Change test condition	Zhao
2023.08.08	Y2	P5	Change drawing	Zhao
2023.10.27	Y3	P1,P12, P17~P18	Update product weight Update product color coordinates Update packaging drawings	Zhao

Table of Contents

1. General Specifications

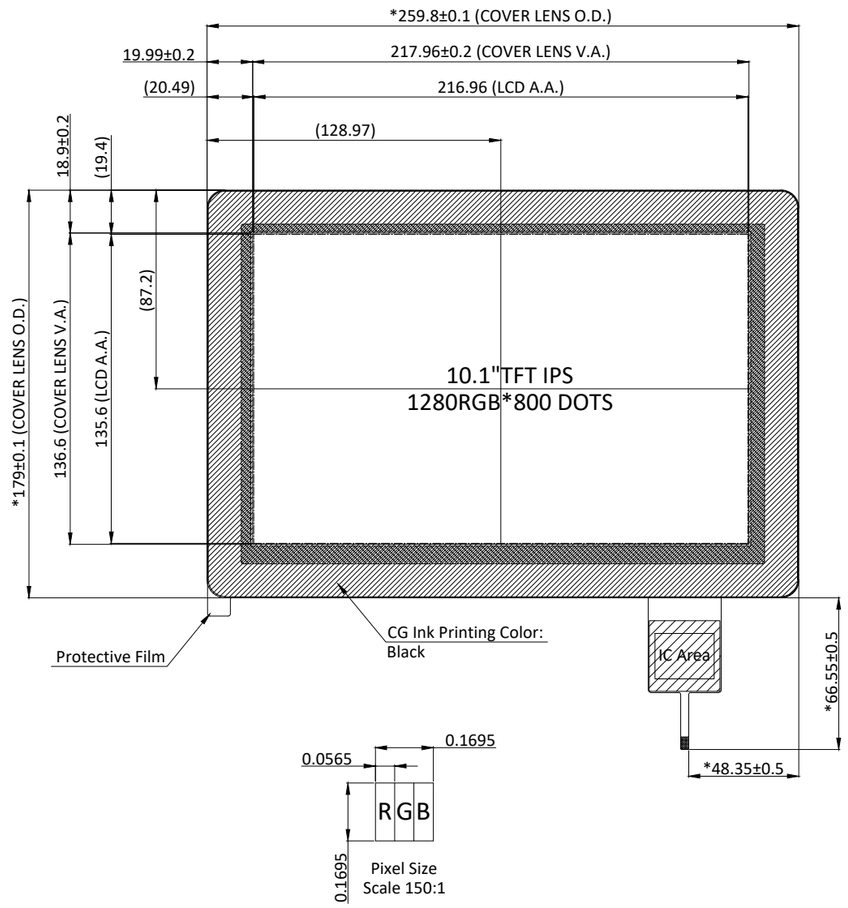
USMP-LPS-T101-128080MFD-A0 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC,CTP, a back light unit. The 10.1″ display area contains 1280(RGB) x800 pixels and can display up to 16.7M colors. This product accords with ROHS environmental criterion.

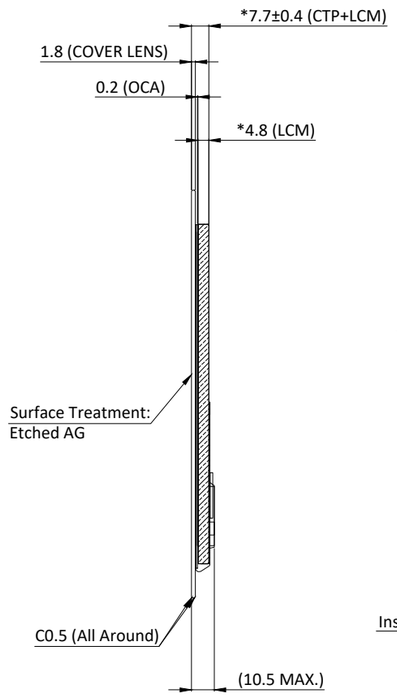
Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M	-	1
Viewing Direction	ALL	O'Clock	2
Operating temperature	-30℃~85℃	℃	
Storage temperature	-30℃~85℃	℃	
Module size	259.8*179*7.7	mm	3
Active Area(W×H)	216.96*135.6	mm	
Number of Dots	1280×RGB×800	dots	
Backlight	32-LEDs (white)	pcs	
Brightness	1000	cd/m^2	TYP
Data Transfer	MIPI	-	
Weight	516	g	4

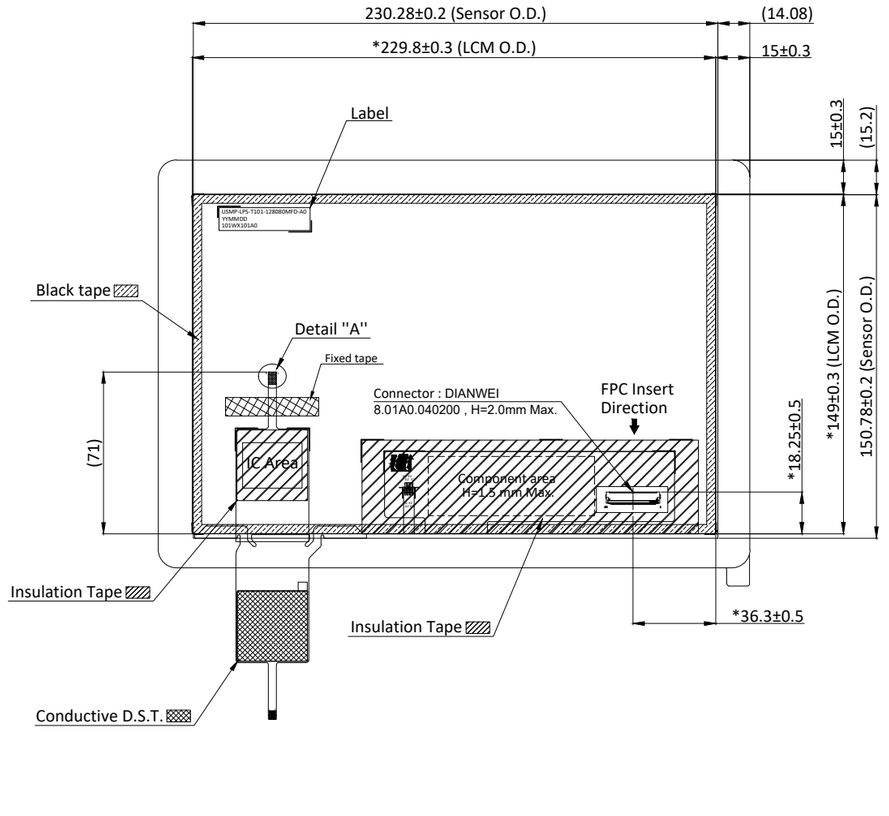
Note 1: Color tune is slightly changed by temperature and driving voltage.
Note 2: IC& FPC on the bottom side(follow LCD viewing direction).
Note 3: Without FPC and Solder.
Note 4: LCM weight tolerance:±5%.

All MATERIALS MUST COMPLY WITH RoHS DIRECTIVE

FORMAL DRAWING

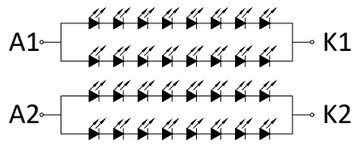




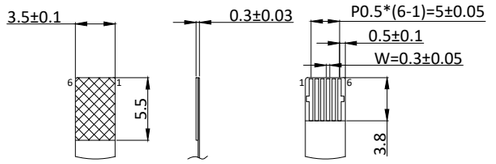


LCM PIN DEFINE

PIN	SYMBOL
1	NC
2	VDD
3	VDD
4	NC
5	NC
6	NC
7	NC
8	MIPI_3N
9	MIPI_3P
10	GND
11	MIPI_0N
12	MIPI_0P
13	GND
14	MIPI_CLKN
15	MIPI_CLKP
16	GND
17	MIPI_1N
18	MIPI_1P
19	GND
20	MIPI_2N
21	MIPI_2P
22	GND
23	GND
24	GND
25	GND
26	NC
27	LED_PWM
28	LED_EN
29	NC
30	NC
31	VLED (12V)
32	VLED (12V)
33	VLED (12V)
34	NC
35	BIST
36	NC
37	NC
38	NC
39	NC
40	NC



LED CIRCUIT DIAGRAM:



Detail "A"
Scale 5:1

CTP PIN DEFINE

1	VDD
2	RESET
3	INT
4	SDA
5	SCL
6	GND

NOTES:

1. LCD/CTP Driver IC : EK79202D/mXT1066
2. CTP+LCM Brightness : 800 cd/m2(min.) , 1000 cd/m2(typ.).
3. Chromaticity Coordinate : x : 0.31±0.05 , y : 0.32±0.05.
4. B/L LED : 8 chip-white LEDs Series*4 , IF = 240mA , VF = 21.6~26.4V.
5. Cover Lens Surface Treatment : Etched AG.
5. Cover Lens Surface Hardness : ≥7H.
6. Dimensions in Brackets''( )'' are for Reference Only.
7. Dimensions in Brackets '' * '' are Critical Dimension.
8. Tolerance not Specified: ±0.5mm.

DISPLAY TYPE	10.1 inch-TFT , Normally Black
DISPLAY MODE	Transmissive
DISPLAY RESOLUTION	1280RGBX800
VIEWING DIRECTION	All Direction
OPERATING TEMP.	-30°C ~ +85°C
STORAGE TEMP.	-30°C ~ +85°C
INTERFACE	LCM : MIPI / CTP : I2C

VERSION	RECORD	DATE
A0	New Release	08-07-23

SCALE	1:1
UNIT	mm
DRAWN BY	
CHECKED BY	Chris Ho
APPROVED BY	
DATE	01-30-24

US Micro Products
ENGINEERED DISPLAY SOLUTIONS

MODULE NO.
USMP-LPS-T101-128080MFD-A0

DRAWING NAME
10.1'' CTP+LCM Outline

SHEET	1 of 1	REV.	A0

3. Interface signals

Pin No.	Symbol	Function	Remark
1	NC	No Connection.	
2~3	VDD(3.3V)	Power Supply(3.3V type).	
4~7	NC	No Connection.	
8	MIPI_3N	Negative MIPI differential data input.	
9	MIPI_3P	Pegative MIPI differential data input.	
10	GND	System ground.	
11	MIPI_0N	Negative MIPI differential data input.	
12	MIPI_0P	Pegative MIPI differential data input.	
13	GND	System ground.	
14	MIPI_CLKN	Negative MIPI differential clock input.	
15	MIPI_CLKP	Pegative MIPI differential clock input.	
16	GND	System ground.	
17	MIPI_1N	Negative MIPI differential data input.	
18	MIPI_1P	Pegative MIPI differential data input.	
19	GND	System ground.	
20	MIPI_2N	Negative MIPI differential data input.	
21	MIPI_2P	Pegative MIPI differential data input.	
22	GND	System ground.	
23~25	VLSS	No Connection	
26	NC	No Connection	
27	LED_PWM	PWM control signal for brightness of the LED backlight	
28	LED_EN	LEDON signal on/off control. Normally pull high. LED_ON=”L”, Disable LEDON signal LED_ON=”H”, Enable LEDON signal(Default)	
29~30	NC	No Connection	
31~33	VLED(12V)	Backlight power supply.	
34	NC	No Connection	
35	BIST	BIST mode select	
36~40	NC	No Connection	

4. Absolute Maximum Ratings(Ta=25℃)

4.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VDD	Ta=25℃	-3.0	-	3.6	V	
BL Power supply	LED_PWM	Ta=25℃	-0.3	-	27	V	
BL Power supply	LED_EN	GND = 0V	-0.3	-	27	V	
BL Power supply	LED_Pow	GND = 0V	-0.3	-	27	V	

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V_{CC} >V_{SS} must be maintained.
3. Please be sure users are grounded when handing LCD Module

4.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	85℃	-30℃	85℃	1,2

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.

   The phenomenon is reversible.

5. Electrical Specifications and Timing Chart

5.1 Electrical characteristics(Vss=0V ,Ta=25℃)

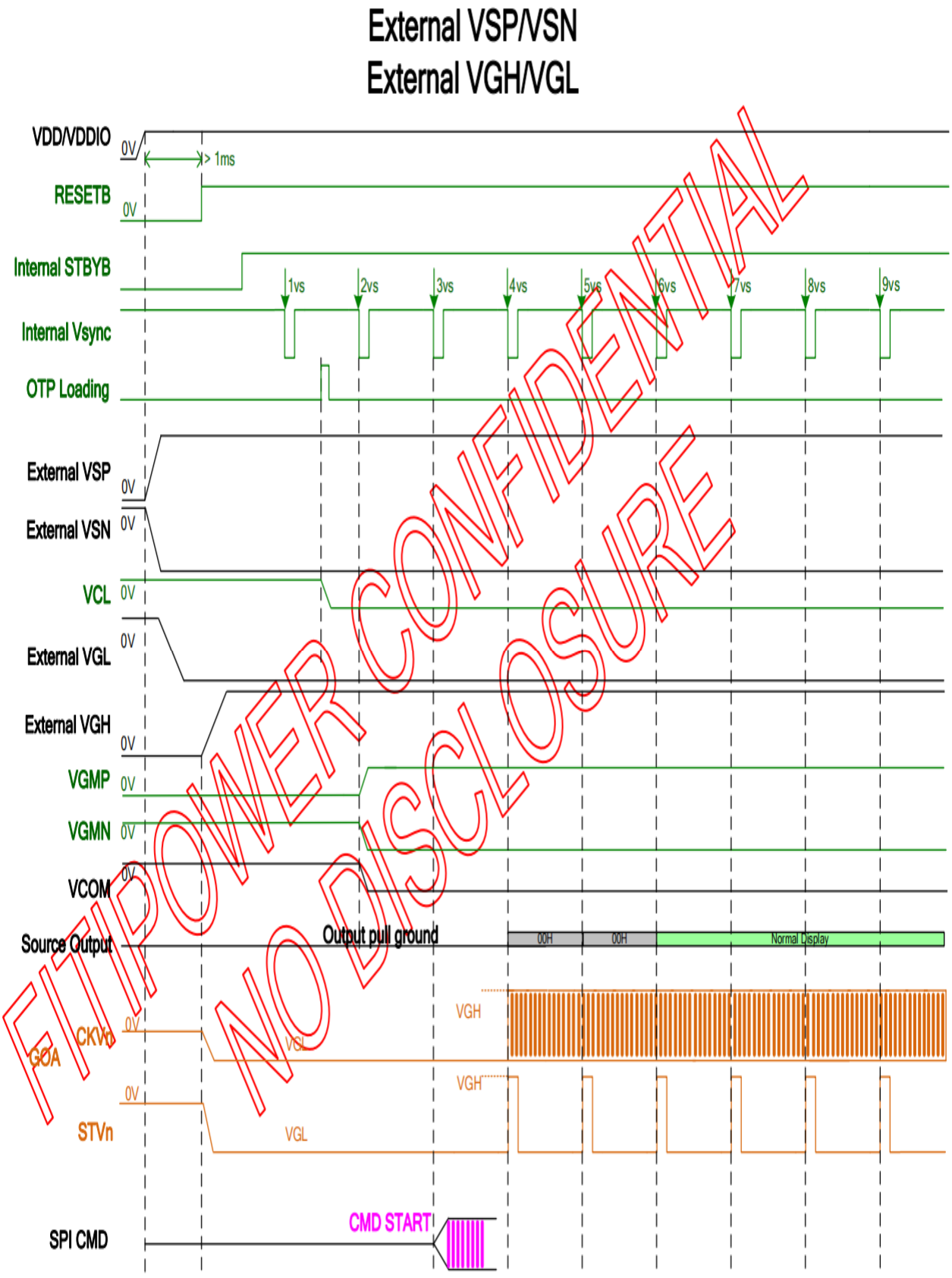
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VDD	Ta=25℃	3.0	3.3	3.6	V	
BL Power supply	LED_Power	Ta=25℃	5.0	-	24	V	
Logic Low Threshold (EN,PWM)	VIL	Ta=25℃ LED_Power =4.2V to 24V	-	-	0.8	V	
Logic High Threshold (EN,PWM)	VIH		1.9	-	-	V	

Note:

1:When an optimum contrast is obtained in transmissive mode.

2: Tested in 1×1 chessboard pattern.

5.2 Power On/Off Sequence



5.2.1 MIPI Interface DC Characteristic

(Test condition: VDD=VDDIO=VDDIF=2.3~3.6V, TA=-20℃~+85℃,VSS=VSSA=0V)

Parameter		Symbol	Spec.			Unit	Note
			Min.	Typ.	Max.		
VDDIO Input high level voltage		VIH	0.8 x VDDIO		VDDIO	V	
VDDIO input low level voltage		VIL	VSS		0.2 x VDDIO	V	
Input Leakage Current		Ileak	(-1)		(+1)	μA	
VGH_REG output voltage		VGH_REG	9	16	22	V	
VGL_REG output voltage		VGL_REG	-15	-10	-4.5		
VGMP output voltage		VGMP	3.5	4.24	5.8	V	
VGMN output voltage		VGMN	-5.8	-4.64	-3.5	V	
VGL output voltage		VGL	-17	-12	-6	V	
VGH output voltage		VGH	11	18	24	V	
VCL output voltage		VCL	-3	-2.8	-2.1	V	
VCOM output voltage		VCOM	-2.405	-1.5	-0.5	V	
Input terminal resistance		ZID		100		ohm	
Source output level deviation	Graycode = 0 ~ 14 Graycode = 241 ~ 255			TBD		mV	
	Graycode = 15 ~ 31 Graycode = 208 ~ 240			TBD		mV	
	Graycode = 32 ~ 207			TBD		mV	
Source output offset deviation	Graycode = 0 ~ 14 Graycode = 241 ~ 255	-		TBD		mV	
	Graycode = 15 ~ 31 Graycode = 208 ~ 240	-		TBD		mV	
	Graycode = 32 ~ 207	-		TBD		mV	
Current consumption	Analog Operating	IAOP		TBD		mA	
	Analog Stand-by	IAST		TBD		mA	
Rush current		Ivddpeak		TBD		mA	

5.3 LED backlight specification(VSS=0V ,Ta=25℃)

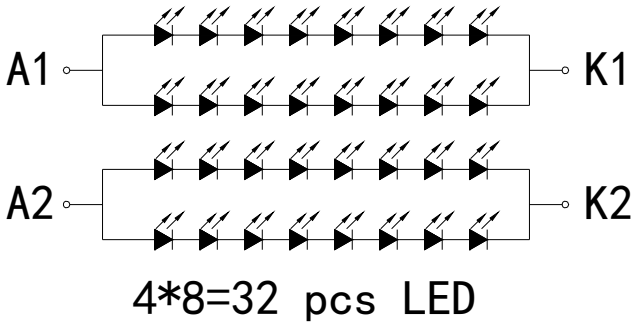
Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	V_f	-	21.6	-	26.4	V	1
Supply current	I_f	-	-	240	-	mA	2
Number of LED	-	8Sx4P	-	32	-	Piece	
LED life time	-	-	50000	-	-	Hr	

Note:

1: $V_{LED}=V_{LED}(+)-V_{LED}(-)$.

2:The current of LED is 60mA.
A LED drive in constant current mode is recommended.

5.3.1 Backlight circuit diagram



6. Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0°	800	1000	-	cd/m^2	1
Uniformity	⊿Bp		Φ=0°	75	80	-	%	1,2
Viewing Angle	3:00		Cr›10	-	80	-	Deg	3
	6:00			-	80	-		
	9:00			-	80	-		
	12:00			-	80	-		
Contrast Ratio	Cr		θ=0° Φ=0°	800	1000	-	-	4
Response Time	T_{r+} T_f			-	25	35	ms	5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	-0.05	0.31	+0.05	-	1,6
		y			0.32		-	
	R	x			0.57		-	
		y			0.37		-	
	G	x			0.32		-	
		y			0.61		-	
	B	x			0.15		-	
		y			0.12		-	
Color Gamut				45	50	-	%	

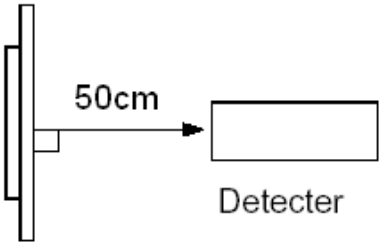
Note：The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7.

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25℃.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.

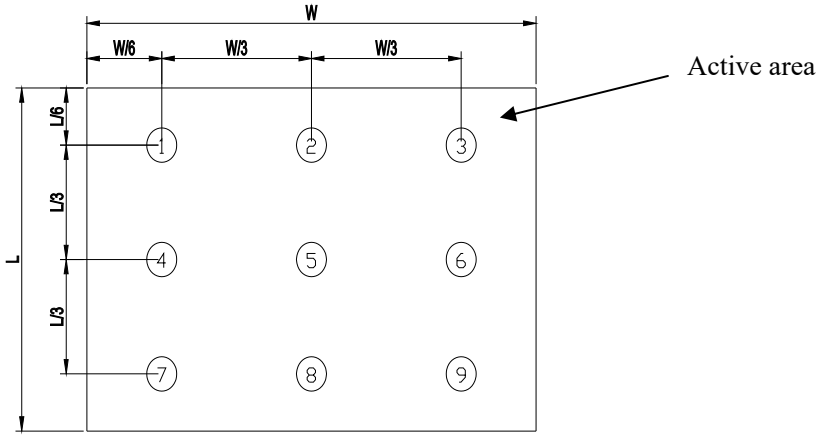


Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)

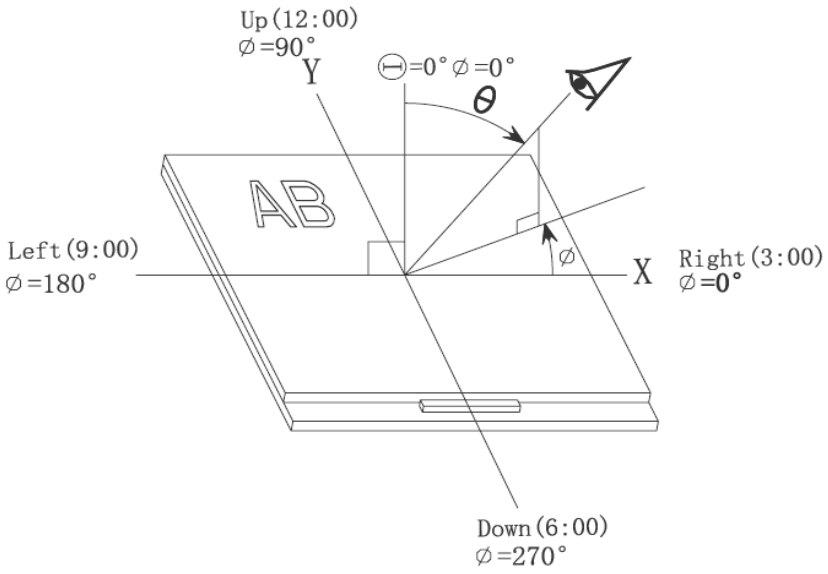
Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.

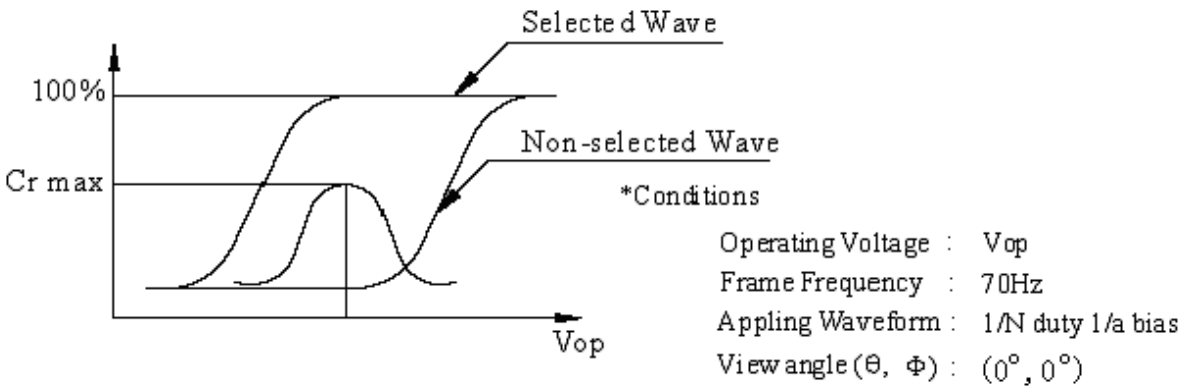


Note 3: The definition of viewing angle:

Refer to the graph below marked by *θ* and *Φ*



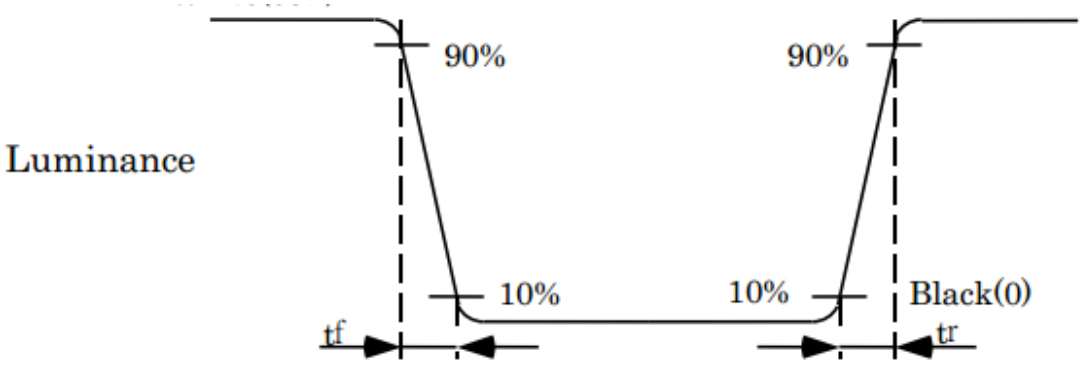
Note 4: Definition of contrast ratio



$$Contrast\ ratio(Cr) = \frac{Brightness\ of\ selected\ dots}{Brightness\ of\ non-selected\ dots}$$

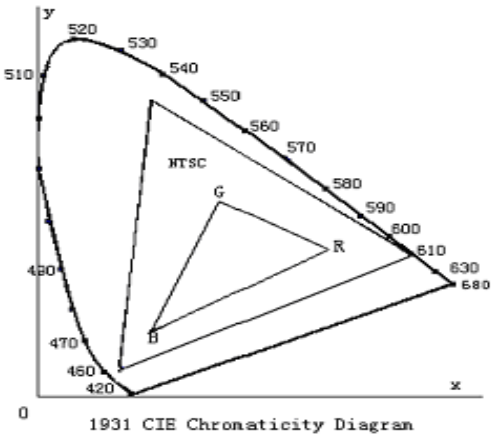
Note 5: Definition of Response time.

The output signals of photo detector are measured when the input signals are changed from"black" to "white"(Tf) and from "white" to "black"(Tr), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

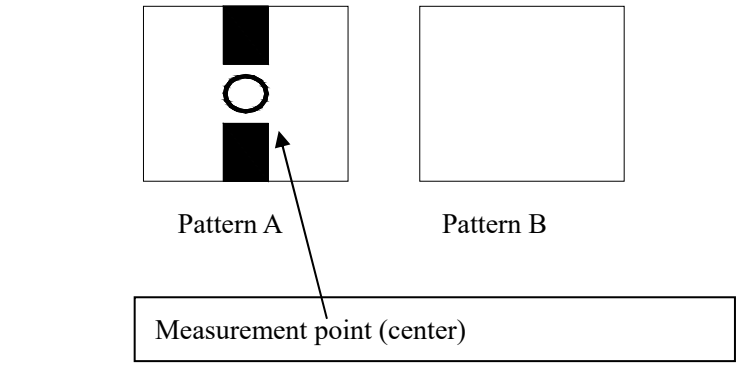


Color gamut:

$$\mathbf{S = \frac{area\ of\ RGB\ triangle}{area\ of\ NTSC\ triangle} \times 100\%}$$

Note 7: Definition of cross talk.

Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness*100



Electric volume value=3F+/-3Hex

7. CTP Specifications

No.	ITEM	Description
1	CTP OD	259.8*179*2.7
2	CTP VA	217.96*136.6
3	CTP Type	G+G
4	TP Controller	mXT1066T2
5	Interface	I2C
6	Input Mode	Multi-Touch
7	Surface hardness	＞7H
8	CTP Transmittance	≥85%
9	surface treatment	Etched-AG（BLACK ANTI-UV INK PRINTED）

8. Reliability Test Items and Criteria

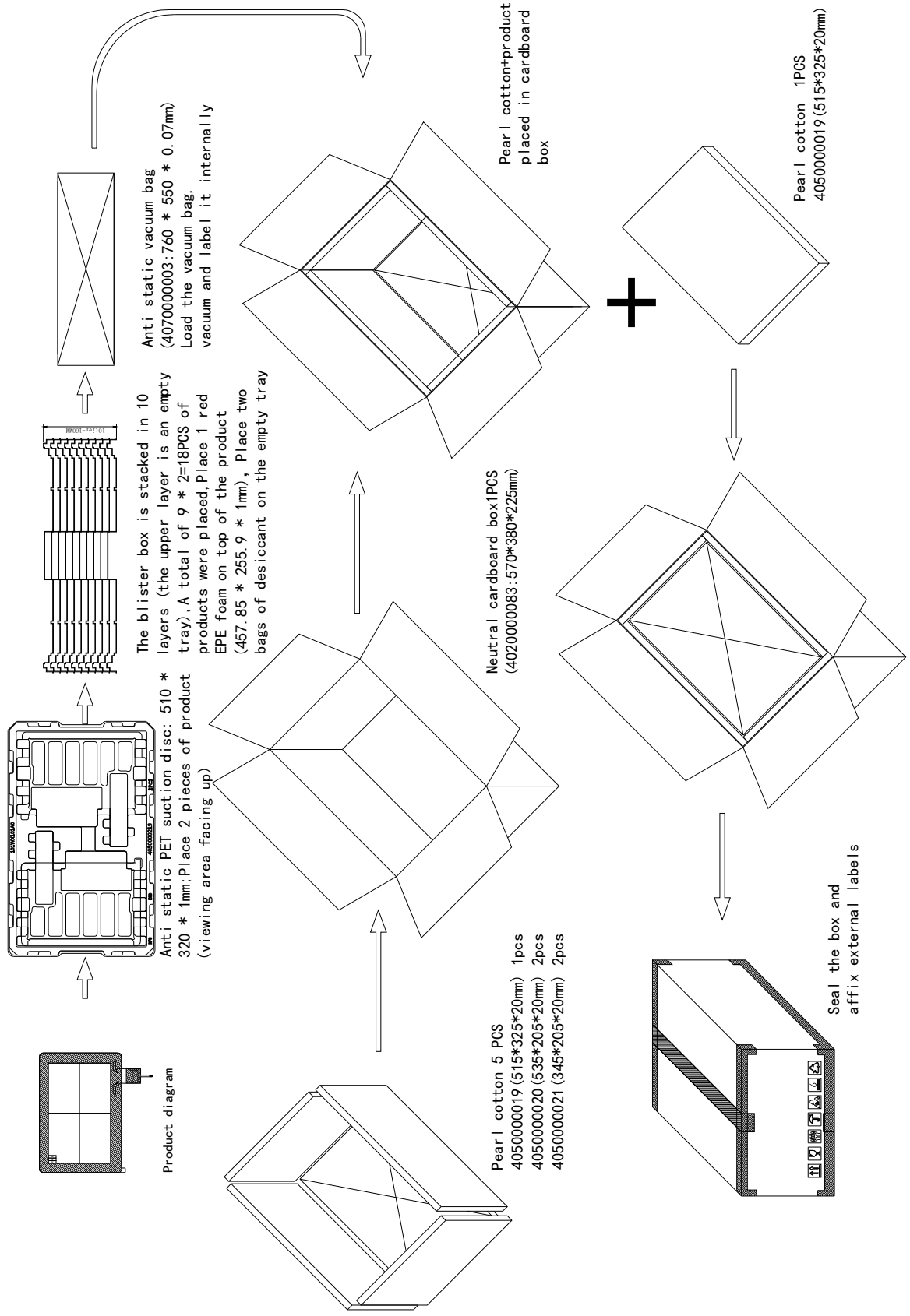
<table>
<tr><th>No</th><th>Test Item</th><th>Test condition</th><th>Criterion</th></tr>
<tr><td>1</td><td>High Temperature Storage</td><td>85℃ 240H
Restore 2H at 25℃
Power off</td><td rowspan="6">1. After testing, cosmetic and electrical defects should not happen.
2. Total current consumption should not be more than twice of initial value.</td></tr>
<tr><td>2</td><td>Low Temperature Storage</td><td>-30℃ 240H
Restore 2H at 25℃
Power off</td></tr>
<tr><td>3</td><td>High Temperature Operation</td><td>85℃ 240H
Restore 2H at 25℃
Power on</td></tr>
<tr><td>4</td><td>Low Temperature Operation</td><td>-30℃ 240H
Restore 2H at 25℃
Power on</td></tr>
<tr><td>5</td><td>High Temperature/Humidity Operation</td><td>60℃ 90%RH 240H
Power on</td></tr>
<tr><td>6</td><td>Temperature Cycle</td><td>-30℃←----------→85℃
30min 5min 30min
after 50 cycle, Restore 2H at 25℃
Power off</td></tr>
<tr><td>7</td><td>Vibration Test (FCL packing)</td><td>Frequency range:10~55Hz
Stroke:1.5mm
Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)</td><td rowspan="3">Not allowed cosmetic and electrical defects.</td></tr>
<tr><td>8</td><td>DroppingTest (FCL packing)</td><td><table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>Drop Direction :※1 corner / 3 edges / 6 sides each 1time</td></tr>
<tr><td>9</td><td>Shock Test</td><td>100G 6ms,±X, ±Y, ±Z 3 times for each direction</td></tr>
<tr><td>10</td><td>ESD Test</td><td>Air discharge:±8KV,(150PF,330Ω)
Contact discharge:±4KV(150PF,330Ω)</td><td></td></tr>
</table>

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

9. Packing Drawing



Inspection OK Full box product, 18PCS/box
Plastic pallet 1200*1000mm
Place 5 boxes of products on each layer of the pallet
Each upper layer alternates 5 boxes of product with the lower layer
Place a total of 6 layers and 30 boxes of products, 30 * 18=540PCS/pallet
strap
protective angle
stretch film
Place 4 protective corners on the top and fix them with a well shaped pattern using packaging tape
Place 4 corner protectors on the four side edges and seal the cardboard box from bottom to top using stretch film

10. Inspection Standard

10.1 定义 Definition

10.1.1 AQL 定义 AQL definition

1）抽样计划 Sampling plan

外观、功能依照 MIL-STD - 105E 标准，II 检验水平执行抽检；Appearance, function in accordance with MIL-STD-105E standards, II Test level to perform sampling;

2）接收质量限（AQL）Receive quality limit (AQL)

重要缺陷:C=0 主缺缺陷:0.4 次缺缺陷:1.0 Critical defect: c=0 Main defect: 0.4 Minor defect: 1.0

客户有特殊要求则依客户要求定之。

Customers have special requirements according to customer requirements.

10.1.2 缺陷定义：Defect definition:

致命缺陷（CR）：影响显示的功能，例如短路、断路、漏液等；Critical defect (CR): Affect the display function, such as short circuit, circuit breaker, leaking fluid, etc.

主缺陷（MA）：影响显示的功能，例如缺划、大电流、视角错、显示不清等；严重外观缺陷，产品尺寸不符等；Main defect (MA): Affect the display of functions, such as missing strokes, large current, perspective error, display is not clear, serious appearance defects, product size discrepancy;

次缺陷（MI）：不影响产品功能，但对产品外观有影响，例如：反黑/反白点、偏光片缺陷、污点；Minor defect (MI): does not affect the product function, but the appearance of the product has an impact, such as: Anti-black/anti-white, polarizer defects, stains;

10.2 检验要求 Inspection requirements

10.2.1 检验条件：Test conditions:

1）温度、湿度：Temperature, Humidity:

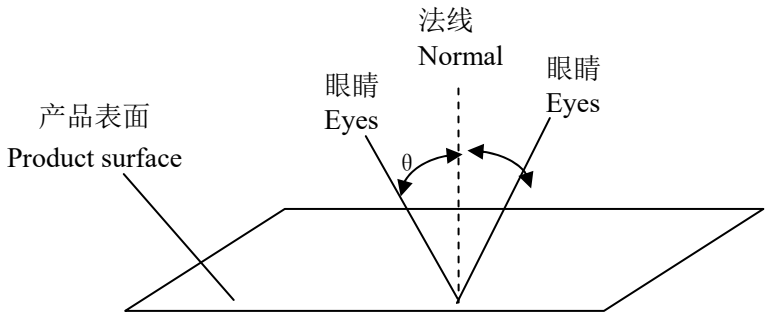
温度，15℃~30℃；湿度，50%±25%。 temperature, 15℃~30℃, humidity, 50%±25%.

2）距离：Distance

人眼与被测物表面的距离为 300±50mm。The distance between the human eye and the surface of the measured object is 300±50mm.

3）位置：Location

产品检视面与法线上下左右各转动 45 度。Product view and normal up and down 45 degrees each rotation.



4）.环境照度： Ambient illuminance:

外观检验：40W 冷白荧光灯（光源在检测物正上方），光照强度为 800±200Lux ；Appearance

inspection: 40W Cold white fluorescent lamp (light source is above the detection material), the illumination intensity is 800±200Lux;

电性测试：环境照度为 100±50Lux Electrical test: environmental illumination is 100±50Lux

5）.检视时间 View time

外观表面标准检视时间为 8±2S，在 10S 内缺陷仍不可见视为合格品。The appearance surface Standard view time is 8±2s. Defects in 10S are still not visible as a qualified product.

6）.其它要求 Other requirements

a.检验员必须带手指套及防静电手环并测试合格。a. The inspectors must wear a finger sleeve and a anti-static hand ring and pass the test.

b.测试检验平台必须要有防静电措施并测试合格。b. Test testing platform must have anti-static measures and test qualified.

10.2.2 检验标准（以下涉及尺寸标准的单位非特殊说明均为 mm）

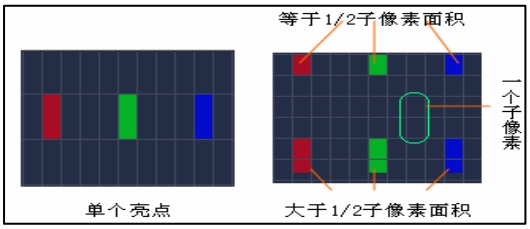
Inspection standards (the following size standard units are not special instructions are mm)

1）点缺陷定义 Dot defect definition

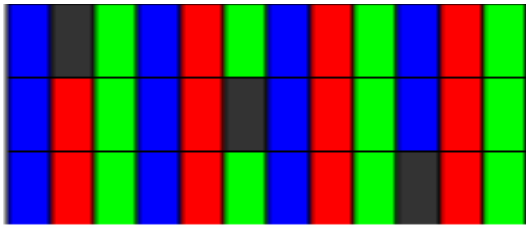
像素亮点：由于 TFT 失效造成一个子像素一直发光，成为像素亮点，如图（3）Pixel

Highlights: Due to the TFT failure of a sub-pixel has been glowing, pixel highlights, as shown (3)

像素暗点：由于 TFT 失效造成一个子像素 一直不发光，成为像素暗点，如图（4）Pixel Dark dot: because the TFT failure caused a sub-pixel has not been glowing, become pixel Dark dot, as shown (4)



图（3）Figure



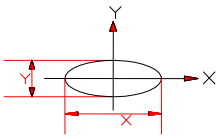
图（4）Figure

杂质点：除像素点以外的其它模糊点，污点，色点，其形状定义：X/Y<2.5，如图（5）

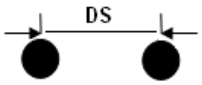
Impurity points: Other than pixel points, stains, color points, their shape definition: x/y<2.5, as shown (5)

点直径(d)计算：d=(X+Y)/2 Point diameter (d) Calculation: d= (x+y)/2

点间距 DS 的计算：如图（6）Calculation of point spacing DS: Figure (6)



图（5）Figure



图（6）Figure

2) 点缺陷检验标准（点/线状判定 ： 点/线状不良大小依据菲林卡搭配目镜比对判定是否合格）

Dot Defect Inspection Standard (dot/Line decision: Dot/Line bad size according to the film with the eyepiece match to determine whether the qualified)

通电点亮测试 Power-on test	LCM 判定标准 LCM judgment criteria		判定方法 Determination method	缺陷区分 Defect level
	规格 Specifications 单位：mm	数量 Number		
点状缺陷（像素点/异物/凹凸点/杂质点等） Pixel points/particles	D ≤ 0.15	不计 Negligible	目视、菲林卡、目镜、滤光片 Visual, Film ruler, eyepiece,filter	次缺 minor defect
	0.15＜D ≤ 0.30	3		
	D＞0.30	0		
	两连点 Two joined dots 密集点 intensive dots	0		
	Total Defect N≤3，DS＞20mm.			
LCD 满天星 LCD Full of stars	D≤0.10 以 ND5%滤光片遮盖判定，不可见 OK. D ≤ 0.10, judged by ND5% filter coverage, invisible OK			

备注：针对模糊点状，线状及斑块状不良的判定，根据实际情况以 5%ND 片滤光判定。

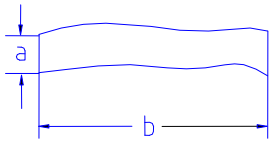
Note: for the judgment of fuzzy spot-like, linear and blocky, 5%ND filter is used to judge according to the actual situation.

3) 线缺陷检验标准（点/线状判定 ： 点/线状不良大小依据菲林卡搭配目镜比对判定是否合格）

Line Defect Inspection Standard (dot/Line decision: Dot/Line bad size according to the film card and the eyepiece match to determine whether the qualified)

1>线缺陷定义,如图(7) b/a≥2.5。

Line defect definitions, as shown (7)b/a≥2.5.



图（7）

2>线缺陷检验标准 Inspection standard for line defects

LCD 线状缺陷/划痕等 LCD Linear defect/scratches	规格 Specifications 单位：mm	数量 Number	判定方法 Determination method	缺陷区分 Defect level
	W≤0.03	不计 ignore	目视、菲林卡、目镜 Visual, Film ruler, eyepiece	次缺 minor defect
	L≤5.0，0.03＜W≤0.08	3		
	L>5.0 or W>0.08	0		
	Total	3		

备注:LCD线状杂质，包括屏幕盒内毛线、纤维、贴片杂质，偏光片表面划伤，LCD划伤等.

Note: LCD linear impurities, including impurities such as yarn, fibers, and patches inside the screen box, scratches on the polarizer surface, LCD scratches, etc

10.3 POL 不良检验标准 POL defect inspection standard

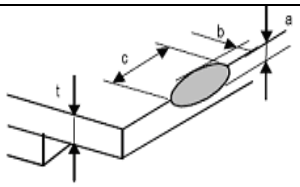
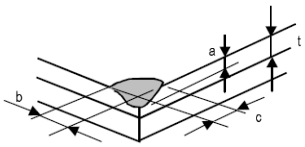
不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria	判定方法 Determination method	缺陷区分 Defect differentiation
边缘气泡 Edge Bubbles	偏光片边缘气泡 Edge Bubbles	W≤0.15，L≤10，N≤2； W>0.15，L>10，不允许 Not allowed	目视、菲林卡 Visual, Film ruler	次缺 Minor defect
POL 异物/气泡 POL Foreign objects/bubbles	异物，异物气泡或空气泡 Foreign objects，Foreign object within the bubbles or air bubbles	空气泡 Air bubbles：不允许 Not allowed 异物/气泡 Foreign body bubbles： D≤0.2mm，N≤3； D>0.2mm，不允许 Not allowed 密集点 Dense point，不允许 Not allowed	目视、菲林卡 Visual, Film ruler	
贴附偏移 Deviation of POL lamination	偏光片相对于玻璃的位置偏移 Position deviation of polarizer relative to glass	参照图纸贴附精度尺寸 Refer to the size remarked in the drawing	目视、卡尺 Visual, aliper	
片损伤 POL Damage	刮伤,压伤,凹痕 Scratches, bruises, dents.	按照点、线缺陷判断 According to the point, line flaw judgment	目视 Visual	
电测发白 Black picture not black enough	偏光片裁切角度异常 Abnormal angle of polarizer caused by cutting	不允许 Not allowed	目视 Visual	
保护膜不良 Protective film defect	破损，翻卷，明显脏污 Broken, rolled, obviously dirty	不允许 Not allowed	目视 Visual	
易撕贴不良 Pull-tag defect	1.贴附位置与工程图不符； 1.The attached position is not in conformity with the engineering drawing; 2.不易揭起保护膜 2.Not easy to uncover protective film	1.参照图纸； 1.Refer to drawings; 2.以揭起一个角效果判定。 2. To uncover a corner effect.	目视 Visual	
片白边 White Edge	偏光片边缘白边 Polarizing Edge white line	不允许 Not allowed	目视 Visual	
偏光片脏污 Stains on POL	手指印、片表面脏印,不可清除的脏污 Finger printing，dirty printing on the surface of the polarize,Un-removable stains	不允许 Not allowed	目视 Visual	
材料用错 Wrong material	颜色不符，砂型不符 Color mismatch, surface treatment mismatch..	不允许 Not allowed	目视 Visual	重缺 Critical defect

10.4 功能类不良 Functional defect

不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria	判定方法 Determination method	缺陷区分 Defect differentiation
无显 No Display	不能显示画面 cannot display any image	不允许 Not allowed	目视、测试架 Visual and Test jig	重缺 Critical defect
显异 Abnormal display	与正常显示画面内容或颜色有明显差异 There is a significant difference between the content and color of the normal display screen	不允许 Not allowed	目视、测试架 Visual and Test jig	重缺 Critical defect
缺画 Pixel missing	以像素为单位的水平,垂直或交叉不显示 Horizontal in pixels, vertical or cross not displayed	不允许 Not allowed	目视、测试架 Visual and Test jig	重缺 Critical defect
屏闪 Flicker	全显示画面出现规律性的闪动 Full display screen with regular flashing	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	目视、测试架 Visual and Test jig	主缺 Minor defect
边缘漏光 Light leakage	LCD 显示区边缘局部偏亮 LCD display Area Edge partially bright	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	目视、测试架 Visual and Test jig	次缺 Minor defect
显示不均 Uneven display	局部位置对比度出现显示深/浅不一致的现象 Local position contrast appears to show deep/shallow inconsistencies	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	目视、测试架 Visual and Test jig	次缺 Minor defect

显淡/显浓 Too Light/Heavy	画面显示颜色较正常过深或过浅 Screen display color more than normal too deep or too shallow	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	目视、测试架 Visual and Test jig	次缺 Minor defect
水波纹 Water Ripple	灰阶画面或特定图形画面可见的局部波纹状抖动. A local ripple jitter that is visible in a gray-scale screen or a specific graphic image.	不允许 Not allowed	目视、测试架 Visual and Test jig	次缺 Minor defect
LCD Mura	黑色画面发白、发蓝、黄彩斑等 Black screen white, blue, color spots, etc.	使用 ND 5%进行判定 Use ND 5% to determine	目视、ND 5%滤光片 Visual, ND 5% filters	次缺 Minor defect
画面不动 The picture does not move	驱动时画面无法切换 The screen cannot be switched while driving	不允许 Not allowed	目视、测试架 Visual and Test jig	重缺 Critical defect
串扰 Crosstalk	视窗画面出现的水平或垂直颜色交叉混色现象 Horizontal or vertical color cross blending phenomenon in window screen	不允许 Not allowed	目视、测试架 Visual and Test jig	次缺 Minor defect

10.5 外观类不良 Appearance defects

不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria	判定方法 Determination method	缺陷区分 Defect differentiation
崩边 Edge chip		a≤1/2t,b<1.5mm,c<1.5mm（t 表示单层玻璃的整体厚度），判定 OK。 a≤1/2t，b<1.5mm，c<1.5mm (t represents the overall thickness of single-layer glass)， judged OK.	目视、菲林卡 Visual, Film ruler	次缺 Minor defect
崩角 Corner chip		a≤1/2t,b<1.5mm,c<1.5mm，同时不允许进入框胶（T 表示单层玻璃的整体厚度），判 OK。 a≤1/2t,b<1.5mm,c<1.5mm，and chipping within housing is not allowed. (t represents the overall thickness of single-layer glass)， judged OK。	目视、菲林卡 Visual, Film ruler	次缺 Minor defect
延伸性裂痕 Extension cracks		不允许 Not allowed	目视 Visual	主缺 Major defect
LCD 破裂 LCD rupture	/	不允许 Not allowed	目视 Visual	主缺 Major defect
LCD 划伤 LCD Scratch	LCD 表面划伤 LCD surface is scratched	1.无感划伤偏光片可盖住 OK； 2.有感刮伤，不允许。 1.Senseless scratch polarizer can cover OK； 2.Tangible scratch : not allowed。	目视 Visual	主缺 Major defect
银浆不良 Silver slurry defect	银浆偏移，无传导 Silver slurry offset, no conduction	不允许 Not allowed	目视 Visual	主缺 Major defect
切割不良 Cutting defect	切割偏移，锯齿，凸边，毛边等 Cutting offset, saw-tooth, Convex side,burrs, etc.	不允许 Not allowed	目视 Visual	主缺 Major defect
LCD 漏液 LCD leakage	因框胶开裂，密封不严或封口未封住，导致液晶漏出。 Because the frame gum crack, seal is not strict or seal not sealed, cause liquid crystal leakage.	不允许 Not allowed	目视 Visual	重缺 Critical defect
液晶气泡 Liquid crystal bubble	因液晶注入量不足产生的空气泡或真空泡 Air bubble or vacuum bubble due to insufficient liquid crystal injection	不允许 Not allowed	目视 Visual	主缺 Major defect
IC 破 IC Broken	/	不允许 Not allowed	目视 Visual	重缺 Critical defect

ACF 偏位 ACF Deviation	/	ACF 需超出 IC 边缘，否则判 NG ACF must exceed IC edge, or it will be judged NG	目视 Visual	次缺 Minor defect
点胶不良 Glue dispensing defect	胶表面有凸起，针孔或气泡 The surface of the gum is raised,pinhole or bubble	不允许 Not allowed	目视 Visual	次缺 Minor defect
少胶 Too little glue	保护胶未完全覆盖 TFT 测线路 The protective adhesive is not fully covered by the TFT measuring line	不允许 Not allowed	目视 Visual	次缺 Minor defect
多胶 Too much Glue	保护胶过多流到 FPC 或上玻璃 Excessive flow of protective glue to FPC or glazing	不允许 Not allowed	目视 Visual	次缺 Minor defect

10.6 FPC 类不良 FPC defects

不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria	判定方法 Determination method	缺陷区分 Defect differentiation
尺寸超标 Dimension out of spec	外观尺寸超出图纸要求 Exterior dimensions exceeding drawing requirements	不允许 Not allowed	目视、游标卡尺 Visual and Vernier caliper	主缺 Main defect
FPC 划伤 FPC Scratch	FPC 表面划伤 Scratch on FPC surface	露铜不允许 Copper Dew is not allowed	目视 Visual	次缺 Minor defect
FPC 折痕 FPC crease	FPC 上出现的死折、引线断裂 Breakage and lead fracture appearing on FPC	死折不允许，功能缺陷不允许 Dead folding not allowed, functional defects not allowed	目视 Visual	主缺 Main defect
FPC 赃污 FPC Dirt	FPC 表面脏污 FPC surface Dirty	金手指位置不允许，其他位置脏污可擦除可接受判 OK PIN pad position not allowed, other locations dirty can be erased acceptable OK	目视 Visual	次缺 Minor defect
金手指氧化 Gold finger oxidation	FPC 金手指氧化 FPC PIN pad oxidation	不允许 Not allowed	目视 Visual	主缺 Main defect
金手指破损 Damaged golden finger	金手指破损、折断 Damaged or broken golden finger	不允许 Not allowed	目视 Visual	主缺 Main defect
补强板不良 Stiffener defect	补强板开裂，脱落 Reinforcement plate cracking,shedding	不允许 Not allowed	目视 Visual	主缺 Main defect
FPC 少器件 FPC component missing	FPC 上少器件 FPC component missing	不允许 Not allowed	目视 Visual	主缺 Main defect
FPC 分层 FPC layering	FPC 分层、起泡 FPC layering, foaming	不允许 Not allowed	目视 Visual	主缺 Main defect
FPC 损坏 FPC damage	FPC 损坏 FPC damage	不允许 Not allowed	目视 Visual	主缺 Main defect
焊接不良 Poor soldering	虚焊、假焊、少焊锡、连锡，FPC 上连接器焊接后 PIN 脚上沾锡,连锡. Virtual welding, false welding, insufficient solder, solder bridge, FPC on the connector after welding pin foot dip tin, even tin.	不允许 Not allowed	目视、烙铁台 Visual, soldering iron table	主缺 Main defect
FPC 左右 PIN 角均匀性 FPC left and right pin angle uniformity	FPC 第一根 PIN 角外露加强板边缘与最后一根 PIN 角外露加强板边沿需均匀符合设计图纸要求，否则不合格 FPC the first pin angle exposed strengthening plate edge and the last pin angle exposed strengthening plate edge should be uniform to meet the design requirements, or unqualified.	根据图纸要求 According to the drawing requirements	目视、游标卡尺、图纸 Visual, Vernier caliper, drawing	次缺 Minor defect

器件偏位 Component deviation	FPC 上器件偏位 Component deviations on FPC	横向小于焊盘宽度的 20%，纵向小于器件焊端纵向宽度的 30%。 The transverse is less than 20% of the width of the pad, the longitudinal is less than 30% of the longitudinal width of the device solder end.	目视 Visual	次缺 Minor defect
喷码不良 Poor ink Jet printing	无喷码、喷码模糊、与图纸/样品不符 No spray code, code blur, and drawings/samples do not match	不允许 Not allowed	目视 Visual	次缺 Minor defect
丝印不良 Poor screen printing	无丝印、丝印模糊，与图纸/样品不符 No screen printing, screen printing blurred, and the drawings/samples do not match	不允许 Not allowed	目视 Visual	次缺 Minor defect

10.7 B/L 类不良 B/L defects

不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria	判定方法 Determination method	缺陷区分 Defect differentiation
铁框生锈/掉漆 Rust/paint peeling on the iron frame	铁框生锈/掉漆 Rust/paint peeling on the iron frame	不允许 Not allowed	目视 Visual	次缺 Minor defect
灯不亮 The light is not bright	灯不亮，B/L 点亮灯不稳定时亮时暗 The light is not bright，B/L light is dark when light is unstable	不允许 Not allowed	目视 Visual	重缺 Critical defect
焊盘脱落 Solder pad detachment	B/L 排线焊盘完全脱落或脱落面积大于焊盘 1/3 B/L line pad completely off or off area greater than pad 1/3	不允许 Not allowed	目视 Visual	主缺 Main defect
铁框变形 Iron frame deformation	铁框变形 Iron frame deformation	不允许 Not allowed	目视 Visual	次缺 Minor defect
铁框划伤 Scratches on the iron frame	铁框表面划伤 Scratch on the surface of the iron frame	有感划伤不允许 Sensory scratches are not allowed	目视 Visual	次缺 Minor defect
铁框毛刺、披锋 Iron frame burrs and sharp edges	铁框四周出现毛刺、披锋 There are burrs on the edge of bezel.	不允许 Not allowed	目视 Visual	次缺 Minor defect
背光不均 Backlight uneven	背光显示出现亮斑、暗场、灯影等背光不均现象 Backlight display of bright spots, dark, shadow, etc.	不允许 Not allowed	目视、点灯治具 Visual and lighting Fixtures	主缺 Main defect
色坐标偏 Color coordinate out of spec	全白画面下,不同的屏幕之间颜色有差异 All white screen, different colors differ between the screens	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	BM-7 判定 Bm-7 judgment	次缺 Minor defect
灯颜色不均 Light color Uneven	同一屏幕在全白画面下，屏幕局部出现颜色不均 The same screen in the full white screen, the local appearance of color uneven	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	目视 Visual	主缺 Main defect
背光脏污 Backlight Dirt	背光显示像素亮点、杂质点、色点等 Backlight display pixel highlights, impurity points, color points, etc.	按照点、线缺陷控制 According to point and line defect control	目视 Visual	次缺 Minor defect
尺寸不符 Dimension out of spec	超出图纸规格 Beyond the specifications of the drawings	不允许 Not allowed	游标卡尺/二次元 Vernier caliper /CMM	主缺 Main defect
背光变形 Backlight deformation	背光翘曲、变形 Backlight warping, deformation	不允许 Not allowed	目视 Visual	次缺 Minor defect
亮度偏差 Brightness deviation	背光亮度偏暗/亮 Backlight brightness is darker/brighter	不允许,特殊情况下参照样品 Not allowed. In special cases, refer to the sample	BM-7 测试 Bm-7 judgment	主缺 Main defect

铁框卡扣不良 Iron Frame Card Buckle Bad	1.下铁凸包未卡入上铁卡口内导致松脱； 2.上下铁间隙过大 1. The lower iron convex package is not stuck into the upper iron card mouth, resulting in loosening; 2. The upper and lower iron clearance is too big	不允许 Not allowed	目视 Visual	次缺 Minor defect
铁框花纹不一致 Inconsistent pattern of the iron frame	上下铁框花纹大小（尺寸）不一致。 The pattern size of the upper and lower iron frames is inconsistent.	同批一致，不同批次花纹接近。 The same batch is consistent, and the patterns of different batches are similar.	目视 Visual	次缺 Minor defect
喷码不良 Poor ink jet printing	无喷码、喷码模糊、与图纸/样品不符。 No spray code, code blur, and drawings/samples do not match.	不允许 Not allowed	目视 Visual	次缺 Minor defect
背光灯眼、漏光 Backlight Light bean, light leakage	亮眼、漏光（边框漏光），进入 LCD 的 VA 区。 Bright Eye, leaky (Border leaky)， Enter the LCD of VA area.	不允许 Not allowed	目视 Visual	次缺 Minor defect
丝印不良 Poor screen printing	无丝印、丝印模糊，与图纸/样品不符 No screen printing, screen printing blurred, and the drawings/samples do not match	不允许 Not allowed	目视 Visual	次缺 Minor defect

10.8 TP 类不良 TP defects

不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria		判定方法 Determination method	缺陷区分 Defect differentiation
TP 异物、黑白点 TP foreign objects, black and white dots	TP表面异物、刺伤、贴合/组装异物、杂质等均属之； TP surface foreign objects, punctures, adhesion/assembly foreign objects, impurities, etc. all belong to this category;	贴合/组装黑点等 Fit/assemble black dots, etc	参照点规格判定 According to the point flaw judgment	目视、菲林卡 Visual, Philip Card	次缺 minor defect
		贴合/组装白点等 Fit/assemble white dots, etc	D ≤ 0.20，N≤3； D>0.20，N≤0 DS＞20mm		
			TLCM Total Defect N≤3		
		密集点 Dense dots	不允许 Not allowed		
TP 刮伤 TP Scratch	1、TP表面划伤、组装异物、线性异物； 2、两线之间的距离需≥20mm； 1、TP surface scratching, assembling foreign bodies, linear foreign bodies。 2、The distance between the two lines need ≥20mm；	参照线缺陷规格判定 According to the line flaw judgment		目视、菲林卡 Visual, Philip Card	次缺 minor defect
牛顿环 Newton's rings		TP 有规则牛顿环、大于触摸屏面积的1/6且点灯影响文字及直线失真，不可有； A regular Newton’s ring, bigger than 1/6 of the area of the touch screen and deformation of the text and line distortion is not allowed.		目视 Visual	次缺 minor defect
无动作 No action	TP测试时点不动、无动作； TP test does not move, no action；	不允许 Not allowed		目视、测试架 Visual, Test Stand	主缺 major defect

TP 断线 Sliding trace broken	TP测试时画线有断线情况 The line is disconnected when TP test;	不允许 Not allowed	目视、测试架 Visual,Test Stand	主缺 major defect
TP 飘移 TP Drift	TP画线位置飘移≤1.5%; TP draw line position drift ≤1.5%	允许 Allowed	目视、测试架 Visual,Test Stand	主缺 major defect
TP 贴歪 Deviation of TP lamination	TP四周不可超出铁框边缘; The surrounding area of TP should not exceed the edge of the iron frame	以铁框框面直视不可超出铁框边缘，直视可见TP边，不允许; TP exceed the edge of bezel:not allowed	目视 Visual	主缺 Major defect
TP油墨漏光/白边 Ink leakage /white edge on TP		边缘宽度漏光/白边≤0.2mm，只允许单边漏光/白边，条数≤1条 Edge width light leakage/white edge ≤0.2mm. Only one side light leakage/white edge is allowed. The number of light leakage/white edge is ≤1	目视、菲林卡 Visual, film ruler	次缺 minor defect
TP 气泡 Bubbles of TP	/	VA:D≤0.2 N≤2；D>0.2 不允许Not allowed AA:不允许Not allowed	目视、菲林卡 Visual, film ruler	次缺 minor defect
TP 披锋、毛刺 Burrs on TP	/	影响外形尺寸及组装,不允许 Affects the outline dimensions and assembly, not allowed	游标卡尺 Vernier caliper	次缺 minor defect

10.9 包装类不良 Packaging defects

不良项目 Defect item	现象描述 Description of the phenomenon	判定标准 Judging criteria	判定方法 Determination method	缺陷区分 Defect differentiation
物料错误 Incorrect material	错料，混料 Wrong material, mixture	不允许 Not allowed	目视 Visual	主缺 Major defect
产品的包装 Packing of product	与该型号的对应的指导书不符 Inconsistent with the corresponding instruction for this model	不允许 Not allowed	目视 Visual	主缺 Major defect
标签打印不良 Poor label printing	与成品喷码要求不符 Not in conformity with the finished code requirements	不允许 Not allowed	目视 Visual	主缺 Major defect
数量不符 Quantity mismatch	与包装 BOM 不符（多数/少数）或与外包装标注的数量不一致 Inconsistent with the packing BOM (majority/minority) or with the number of external packaging	不允许 Not allowed	目视 Visual	主缺 Major defect
包装箱 Box	包装箱变质，破损，打包不牢固 （未按客户要求）The packing box is spoiled, damaged, and the packing is not strong (not according to customer's requirement)	不允许 Not allowed	目视 Visual	主缺 Major defect

10.10 产品保质期 The shelf life of the product

产品保质期为 12 个月，从交货日期起。

The shelf life of the product is 12 months from the date of delivery.

11. Precautions for Use of LCD Modules

11.1 Handling Precautions

11.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

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

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

11.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol

— Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

— Water

— Ketone

— Aromatic solvents

11.1.6 Do not attempt to disassemble the LCD Module.

11.1.7 If the logic circuit power is off, do not apply the input signals.

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

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

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

11.2 Storage precautions

11.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃

Relatively humidity: ≤80%

11.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

11.3 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.