

# LCD Module SPECIFICATION

## 液晶显示模组规格书

Customer Name 客户名称	_____
Customer Model 客户机型	_____
Project Name 机种名	<u>T397B5-C24-02</u>
Date 日期	<u>2023.8.2</u>
Version 版本	<u>V.0</u> _____

☒ Preliminary Specification

☐ Final Specification

### Customer' s Acceptance 客户承认:

This module uses RoHS material. 模块使用环保材料.

Comment 承认意见	Approved by 承认人

华佳:

Written by 撰写		Checked by 审核	Approved by 批准
研发部	工程部	研发部	研发中心

Revision Record

修改记录

Rev No 版本号	Date 时间	Description 内容
V.0	2023.8.2	首次发行

## CONTENTS 目录

1. General Specifications 基本规格
2. Pin Assignments 接口定义描述
3. Electrical Specification 电气特性
  - 3.1 Absolute Maximum Ratings 极限参数
  - 3.2 Typical Operation Conditions 典型工作条件
  - 3.3 Backlight Circuit Characteristics 背光电气特性
  - 3.4 LCD Current Consumption 液晶面板功耗
4. Optical Specification 光学规格
  - 4.1 LCM Optical Characteristics 液晶模组光学特性
  - 4.2 Measurement system 测量系统
5. Mechanical Drawing 模组图
6. Reliability Test Items 可靠性测试项目
7. Packing and Storage Specification (Reference only)  
包装规格 (仅供参考)
8. Announcements 注意事项

## 1. General Specifications 基本规格

No.	Item 项目	Specification 规格	Unit 单位	Remark
1	LCD Size 液晶面板尺寸	3.97"	inch	-
2	Panel Type 面板类型	IPS	-	-
3	Resolution 分辨率	480RGBx800	Pixel	-
4	Display Mode 显示模式	Normally Black	-	-
5	Number of Colors 颜色数量	16.7M	-	-
6	Viewing Direction 使用视角	ALL	-	Note1
7	NTSC 色彩饱和度	69.5%	-	Typ.
8	Contrast Ratio 对比度	800	-	
9	Luminance 亮度	350	cd/m2	Typ.
10	Module Size 模组尺寸	55.44(H)x96.17(V)x2.3(D)	mm	Note1
11	Panel Active Area 可视区域	51.84x86.40	mm	Note1
12	Pixel Pitch 像素尺寸	0.108x0.108	mm	-
13	Pixel Arrangement 像素排列	RGB-stripe		-
14	Weight 重量		g	-
15	Driver IC 驱动芯片	ST7701S	-	-
16	Driver IC RAM Size 记忆体	RAM less	bit	-
17	Light Source 背光源	8 LED	-	-
18	Interface 接口方式	MIPI	-	-
19	Operating Temperature 工作温度	-20~+70	°C	-
20	Storage Temperature 存储温度	-30~+80	°C	-

Note 1: Please refer to the mechanical drawing; 注 1: 请参照模组图;

## 2. Pin Assignments 接口定义

Pin No. Pin 序号	Symbol 符号	Function 功能描述
1	D1N	MIPI DSI data lane1-
2	D1P	MIPI DSI data lane1+
3	GND	Ground
4	GND	Ground
5	D0N	MIPI DSI data lane0-
6	D0P	MIPI DSI data lane0+
7	GND	Ground
8	GND	Ground
9	CLKN	MIPI DSI clock lane-
10	CLKP	MIPI DSI clock lane+
11	GND	Ground
12	NC	
13	NC	
14	RESET	LCM reset signal
15	GND	Ground
16	GND	Ground
17	IOVCC 1.8-3.3V	Digit Power Supply for LCM
18	VCC2.8-3.3V	Digit Power Supply for LCM
19	CTP-SCL	
20	CTP-SDA	
21	CTP-INT	
22	LEDK	Backlight cathode
23	LEDA	Backlight anode
24	GND	Ground

### 3. Electrical Specification 电气特性

#### 3.1 Absolute Maximum Ratings 极限参数

Item 项目	Symbol	Value	Unit	Remark
Analog Power Supply Voltage 模拟供电电压	VCI	-0.3~+3.3	V	-
Digital Power Supply Voltage 数字电源电压	VDD	-0.3~+3.3	V	-
I/O Power Supply Voltage I/O端口供电电压	IOVCC	-0.3~3.3	V	-

#### 3.2 Typical Operation Conditions 典型工作条件

Item 项目	Symbol	Min.最小	Typ.典型	Max.最大	Unit
Analog Supply Voltage 模拟供电电压	VCI	2.7	2.8	3.3	V
Digital Supply Voltage 数字电源电压	VDD	2.7	2.8	3.3	V
I/O Supply Voltage 接口电压	IOVCC	1.65	1.8/2.8	3.3	V
Input High Voltage 输入高电平	V <sub>IH</sub>	0.8*IOVCC	-	IOVCC	V
Input Low Voltage 输入低电平	V <sub>IL</sub>	0	-	0.2*IOVCC	V
Output High Voltage 输出高电平	V <sub>OH</sub>	0.8*IOVCC	-	-	V
Output Low Voltage 输出低电平	V <sub>OL</sub>	-	-	0.2*IOVCC	V

### 3.3 Backlight Circuit Characteristics 背光功耗

Item	Symbol	Min.	Typ.	Max.	Unit
LED Current 背光电流	$I_B$	-	40	-	mA
LED Voltage 背光电压	$V_f$	-	12	-	V
Power Consumption 功耗	$P_{BL}$	-		-	mW

### 3.4 LCD Current Consumption 液晶面板功耗

Item	Symbol	Typ.	Max.	Unit
Full Mode 正常模式	VCI	-	-	mA
测试条件: VCI=2.8V, IOVCC=2.8V; Interface 驱动类型: 行翻转或者列翻转; TN Type=>All Black Pattern. TN型液晶面板=>黑色画面; IPS Type=>All White Pattern. IPS型液晶面板=>白色画面; Temperature: 25°C; 温度: 室温25摄氏度;				
Sleep Mode 休眠模式	VCI	-	-	uA
测试条件: VCI=2.8V, IOVCC=2.8V; DC/DC converter is enabled. Internal oscillator is started and panel scanning is started. 除IC内部晶振和面板扫描外, 其他功能都暂停工作; Temperature: 25°C; 温度: 室温25摄氏度;				

## 4. Optical Specification 光学参数

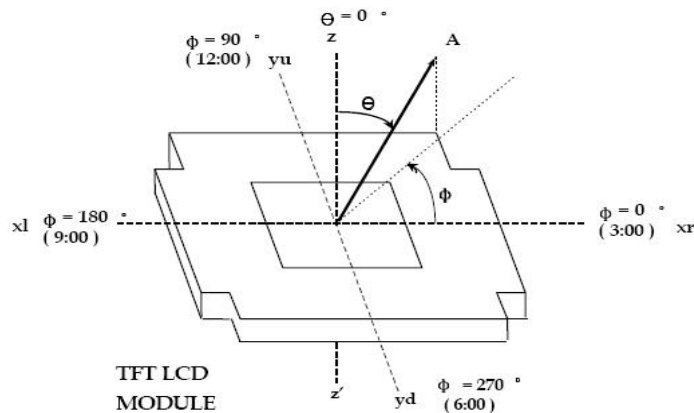
### 4.1 LCM Optical Characteristics 液晶模组光学特性

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle Range 视角	Left	$\theta_L$	$CR \geq 10$	-	85	-	degree
	Right	$\theta_R$		-	85	-	
	Top	$\theta_T$		-	85	-	
	Bottom	$\theta_B$		-	85	-	
Response Time 响应时间		$T_{on}+T_{off}$	$\theta=\phi=0^\circ$	-	35		ms
Contrast Ratio 对比度		CR	$\theta=\phi=0^\circ$	550	800	-	-
Luminance 亮度		L	$\theta=\phi=0^\circ$	-	350	-	cd/m <sup>2</sup>
Color Chromaticity (CIE1931) 色坐标	White	$W_x$	Normal $\theta=\phi=0^\circ$	0.277	0.292	0.307	-
		$W_y$		0.318	0.333	0.358	
	Red	$R_x$		0.648	0.663	0.678	
		$R_y$		0.310	0.325	0.340	
	Green	$G_x$		0.256	0.271	0.386	
		$G_y$		0.579	0.594	0.609	
	Blue	$B_x$		0.119	0.134	0.149	
		$B_y$		0.107	0.122	0.137	
Uniformity 均匀度		$U_L$	$\theta=\phi=0^\circ$	80	-	-	%
Flicker 闪烁		-	-	No Visible			-



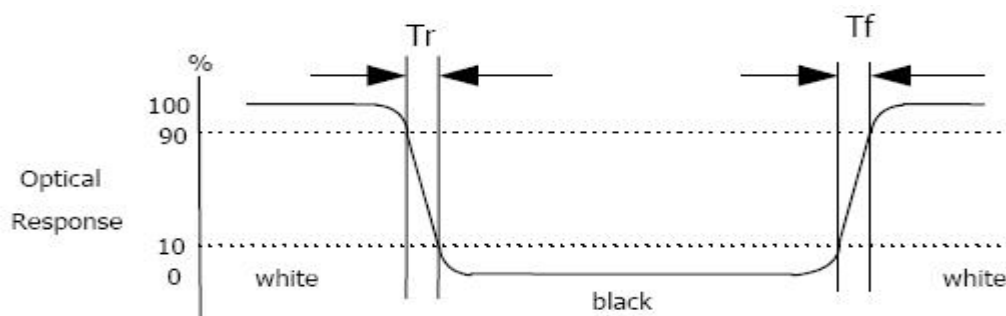
## 4.2 Measurement system 测量系统

### 4.2.1 LCM Viewing Angle



Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

### 4.2.2 Response time



Response time is the time required for the display to transition from white to black (Rising time,  $T_r$ ) and from black to white (Falling time,  $T_f$ ) for additional information.

### 4.2.3 Contrast Ratio (CR)

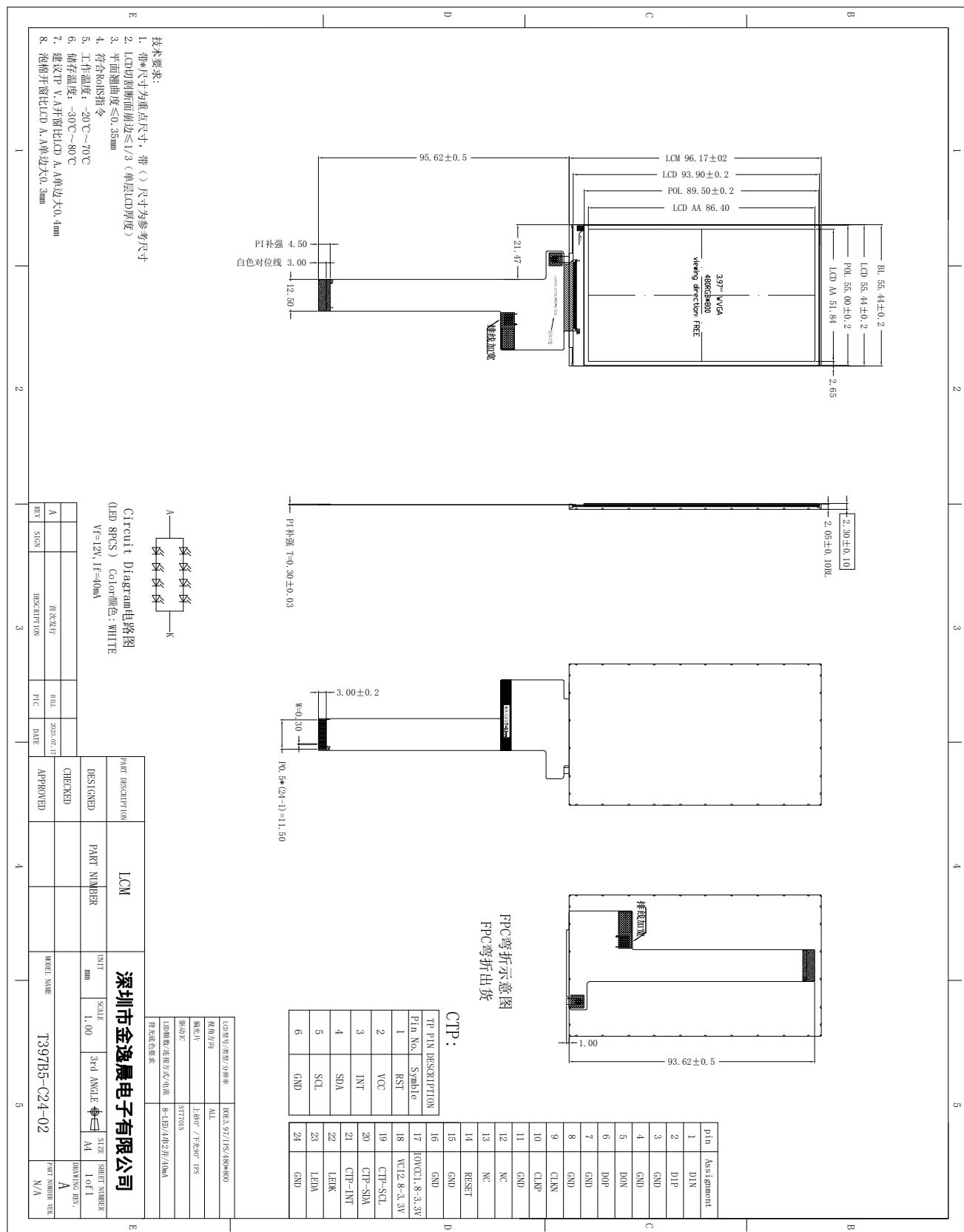
Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

### Surface Luminance with all black pixels

Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

## 5. Mechanical Drawing 模组图



## 6. Reliability Test Items 可靠性测试项目

Test Item 测试项目	Test Condition 测试条件	Test result determinant gist 实验结果判定
High temperature storage 高温存储	80±3°C, 24H;	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 试验结束后,已测试的LCD样品必须在室内正常温湿度环境下放置2~4个小时以上才能进行功能和外观检查,样品不允许有以下缺陷: 1.Air bubble in the LCD; 模块中有气泡; 2.Non-display; 不显示; 3.Glass crack; 玻璃破碎; 4. The electrical characteristics requirements shall be satisfied. 需要满足模块电气性能。
Low temperature storage 低温存储	-30±3°C, 24H;	
High temperature operation 高温运行测试	70±3°C, 24H;	
Low temperature operation 低温运行测试	-20±3°C, 24H;	
High temperature /humidity 高温高湿	60°C±3°C,90%±3%RH, 24H;	
Thermal Shock 冷热冲击	-30°C/0.5h~+80°C/0.5h for a total 24 cycles;	
Vibration Test 振动测试	Frequency 10Hz~55Hz~10Hz Amplitude: 1.5mm, X, Y, Z direction for total 1H; (Packing condition)	
ESD test 静电测试	±2KV, Human Body Mode, 150pF/330Ω; ±8KV, Air Mode, 150pF/330Ω;	

Remark: 注意:

1. The test samples should be applied to only one test item.

每个被测试的模块只能用于其中的一个测试项目。

2. Sample size for each test item is 2pcs.

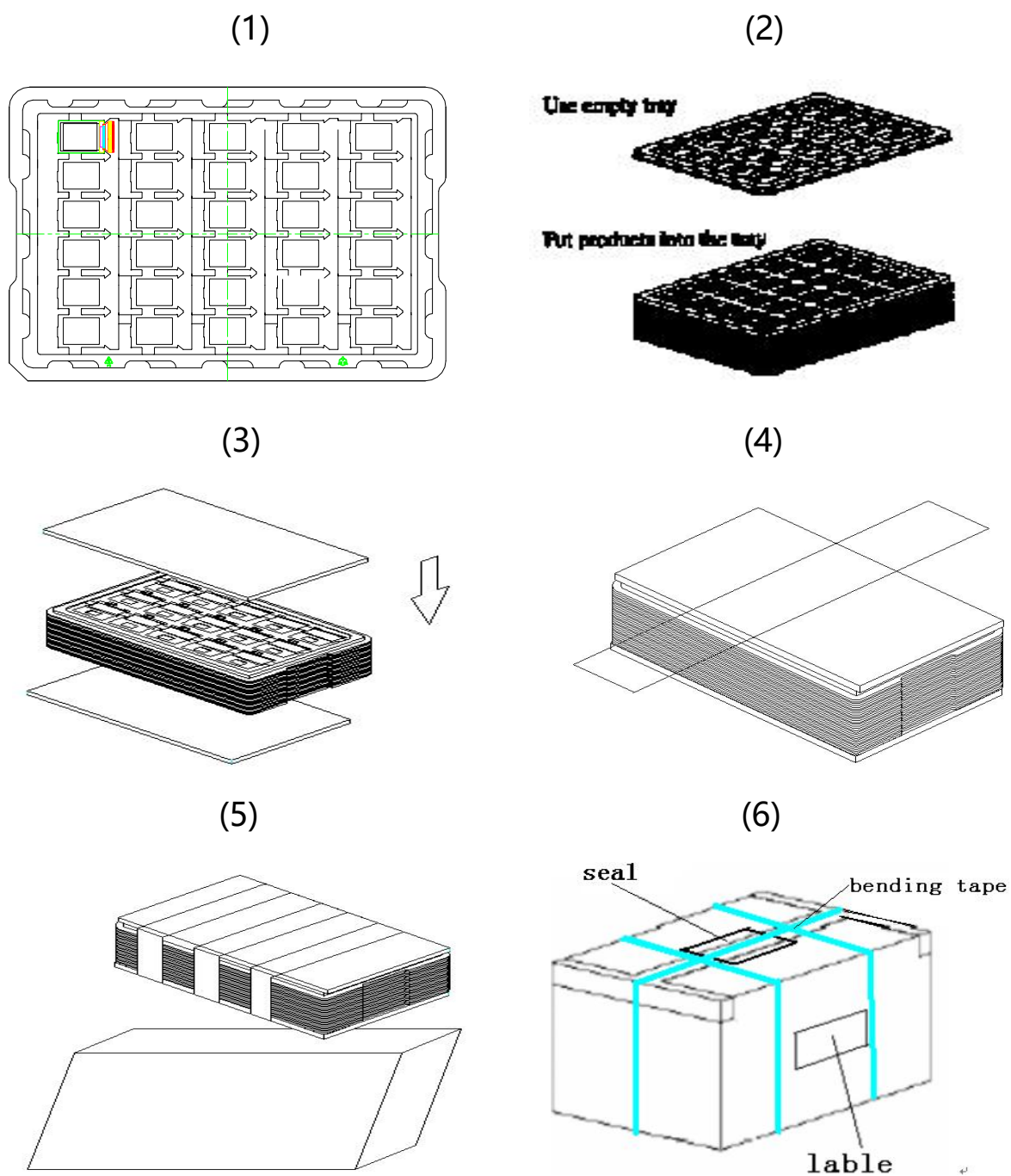
每个测试项目的样品数量为2片。

3. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic,  
Optical Characteristic.

故障判断标准:基本规格,电气特性,机械特性,光电特性。

## 7. Packing and Storage Specification(Reference Only)包装存储

### 7.1 Packing Method 包装方法



1. Put module into tray cavity. 把模块放进托盘.

2. Tray stacking. 托盘叠装.

3. Put 1 foam under the tray stack and 1 foam above. 在托盘上下放卡板.
4. Fix the cardboard to the tray stack with adhesive tape. 绑胶带.
5. Put the tray stack into carton. 把邦好的托盘放进纸箱.
6. Carton sealing with adhesive tape. 封纸箱.

## 7.2 Storage Method 存储方法

- 1.Store in an ambient temperature of  $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$ , and in a relative humidity of  $55\%\pm 15\%$ . Don't exceed 12 months and expose to sunlight or fluorescent light.

存储环境温度为  $23\pm 5^{\circ}\text{C}$ ，相对湿度为  $55\%\pm 15\%$ ，存储不能超过 12 个月，不要长时间暴晒。

2. Store in a clean environment, free from dust, active gas, and solvent.

存储在一个干净的环境，不受灰尘，活性气体和溶剂污染。

3. Store in antistatic container.

存储在防静电环境。

## 8. Announcements 注意事项

- 1.Do not attempt to disassemble or process the LCD module.

请勿拆卸液晶显示模块。

- 2.Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

不要在印制电路板上钻额外的孔，修改形状或更改印制线路板上元件的位置。

- 3.Except for soldering the interface, do not make any alterations or modifications with a soldering iron; Ensure welding temperature at  $320^{\circ}\text{C}$  to  $350^{\circ}\text{C}$ , the welding time

control within the 10 s, welding note don't stay too long in the same place to avoid scald FPC.

除焊接接口外，不要用烙铁做任何更改；焊接温度保证在 320°C-350°C，焊接时间控制在 10S 以内，焊接时注意不要在同一处停留时间太久以免烫伤 FPC。

4. Other matters in not clear before use, please contact our staff to guide.

其他事项在不清楚使用之前，请联系我司人员指导进行。

-END-