深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

Model NO 型号	GMT154-07
Product Name 产品名称	1.54 TFT LCD Module
Version 版本号	V1
Date 日期	2022-04-29

☐**Preliminary Specification**（规范草案）

☑**Final Specification**（最终规格）

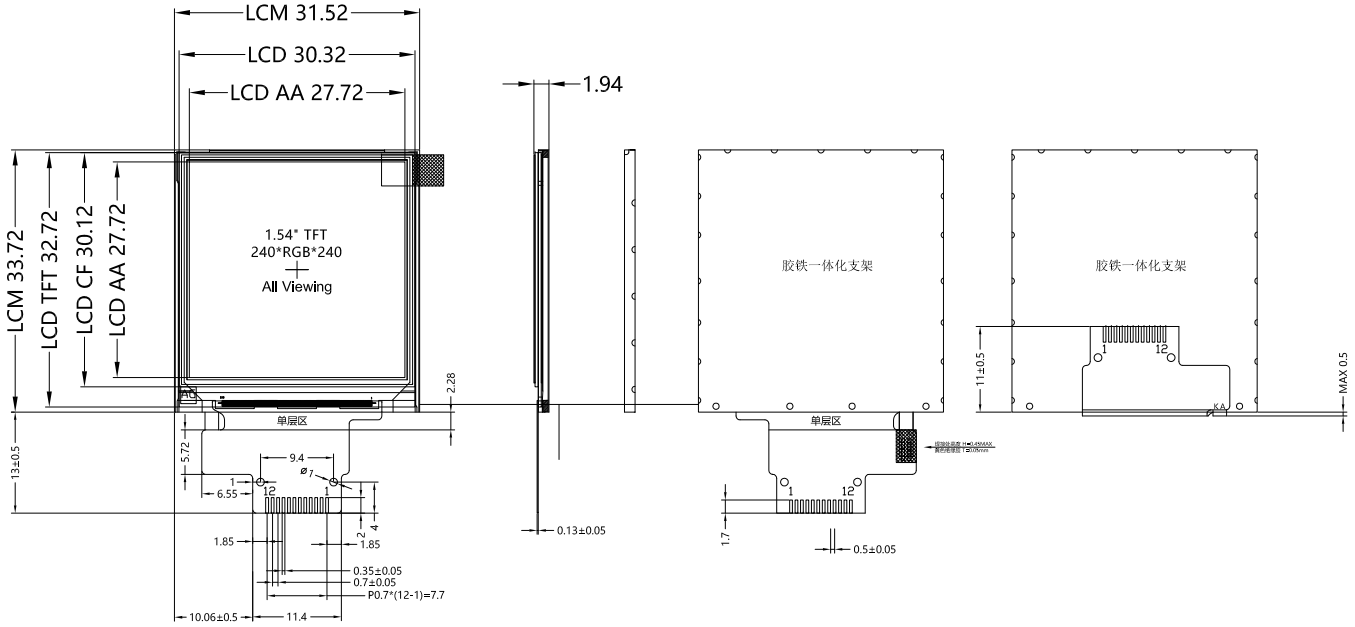
PREPARED 编辑	**CHECKED** 检查核对	**APPROVED** 审批人

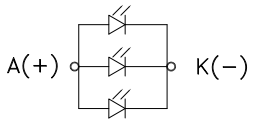
TABLE OF CONTENT

1. General Specifications（概况）

Item 项目	Specification 规格	Unit 单位
Display Mode 显示模式	Normally Black, Transmissive	/
Viewing Direction 视角方向	ALL	/
Colors 颜色	262K	/
Drive IC 驱动IC	ST7789	/
Interface Type 接口类型	4 Wire SPI	/
Dimensional Outline 模组尺寸	31.52(W) x 33.72(H) x 1.94(T)	mm
LCD Active Area LCD有效区域	27.72(W) x 27.72(H)	mm
Resolution 分辨率	240 RGB(H) x 240(V)	pixels
Pixel Pitch 像素间距	0.1155(W) x 0.1155(H)	mm

NO.	PIN NAME
1	GND
2	LEDK
3	LEDA
4	VCC
5	GND
6	GND
7	D/C
8	CS
9	SCL
10	SDA
11	RESET
12	GND





Display Type	TFT	LCM Luminance	300cd/m²TYP
	Normally Black	Backalight	White Color
Number of pixels	240RGB*240		IF=60mA,VF=3.2V
Viewing Direction	ALL	Operating temperature	-20℃+70℃
Color	262K	Storage temperature	-30℃+80℃
Drive IC	ST7789	RoHS	YES
Interface	4 wire SPI	Unspecified Tolerance	±0.1

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

LCM NO: GMT154-07 V1

UNITS:MM	SCALE: FIT		DESIGNED BY:	CHECKED BY:	APPROVED BY:
	SHEET: 1 OF 1		Percy		
	UNIT: MM	DATE	2022-04-10		

3. Maximum Ratings（极限参数）

Parameter 参数	Symbol 符号	Min 最小	Max 最大	Unit 单位
Logic Supply Voltage 逻辑电源电压	IOVCC	-0.3	4.6	**V**
Analog Supply Voltage 模拟电源电压	VCC	-0.3	4.6	**V**
Operating temperature 工作温度	Top	-20	70	℃
Storage temperature 储存温度	Tst	-30	80	℃
Humidity 湿度	RH	--	90%(Max60C)	RH

4. ELECTRICAL CHARACTERISTICS（电气特性）

Parameter 参数	Symbol 符号	Min 最小	Typ 典型	Max 最大	Unit 单位
Logic Supply Voltage 逻辑电源电压	IOVCC	1.65	1.8/2.8	3.3	V
Analog Supply Voltage 模拟电源电压	VCC	2.6	2.8	3.3	--
Input Current 输入电流	Idd	--	20	--	mA

5. BACKLIGHT CHARACTERISTICS（背光特性）

Item 项目	Symbol 符号	Min 最小	Typ 典型	Max 最大	Unit 单位	Condition 条件
Forward Voltage 正向电压	Vf	3.0	3.2	3.4	V	--
Forward Current 正向电流	If	--	60	--	mA	--
Operating Life Time 使用寿命	--	--	10000	--	Hrs	

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃
(LED 电源电压由 Ta=25℃时的 LED 数量定义)

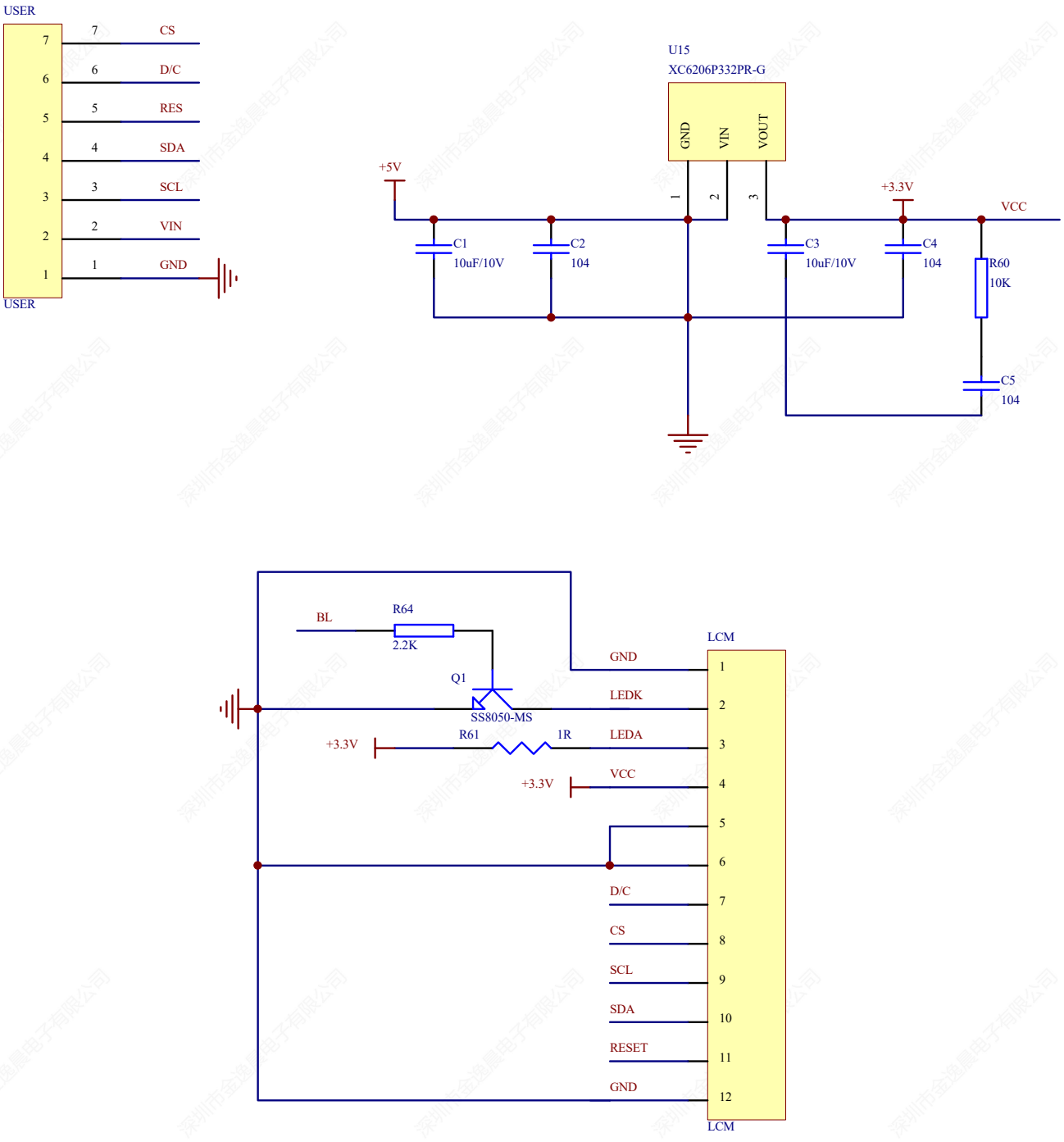
Note 2: Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.
(使用寿命意味着亮度降低到初始亮度的 50%。典型的使用寿命是估算数据。)

6. PIN DESCRIPTIONS（PIN 定义）

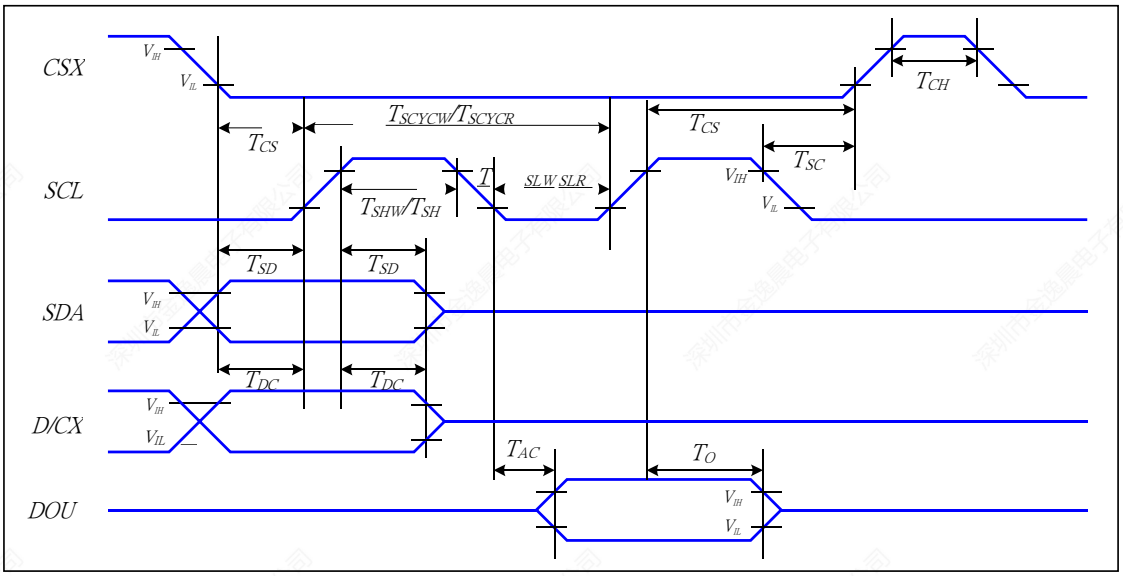
Pin.No 编号	Symbol 符号	Description 说明
1	GND	Ground （接地脚）
2	LEDK	Cathode of Backlight （背光负极供电脚）
3	LEDA	Anode of Backlight （背光正极供电脚）
4	VCC	Power supply for Analog（2.8V-3.3V） （系统电压）
5	GND	Ground （接地脚）
6	GND	Ground （接地脚）
7	D/C	Register select pin（指令/数据寄存器选择脚） D/C='1': Display data.（D/C='1':选择数据寄存器） D/C='0': Command data.（D/C='0':选择指令寄存器）
8	CS	Chip select pin("Low" enable) （屏驱动芯片片选脚，低电平有效）
9	SCL	Serial clock pin. (串口时钟线)
10	SDA	Serial data input / output. (串口数据线)
11	RESET	LCM Reset pin （屏复位脚）
12	GND	Ground （接地脚）

NOTE: The backlight LED can be powered separately or share a set of voltage supply with the VCC.
背光 LED 可以单独供电，也可以和 VCC 共用一组电压供电）

7. Schematic Diagram（原理图）



8. TIMING CHARACTERISTICS（时序特性）



VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25℃

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	TBD	-	ns	
	T_{CSH}	Chip select hold time (write)	TBD	-	ns	
	T_{CSS}	Chip select setup time (read)	TBD	-	ns	
	T_{SCC}	Chip select hold time (read)	TBD	-	ns	
	T_{CHW}	Chip select “H” pulse width	TBD	-	ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	TBD	-	ns	-write command & data ram
	T_{SHW}	SCL “H” pulse width (Write)	TBD	-	ns	
	T_{SLW}	SCL “L” pulse width (Write)	TBD	-	ns	
	T_{SCYCR}	Serial clock cycle (Read)	TBD	-	ns	-read command & data ram
	T_{SHR}	SCL “H” pulse width (Read)	TBD	-	ns	
	T_{SLR}	SCL “L” pulse width (Read)	TBD	-	ns	
D/CX	T_{DCS}	D/CX setup time	TBD	-	ns	
	T_{DCH}	D/CX hold time	TBD	-	ns	
SDA (DIN)	T_{SDS}	Data setup time	TBD	-	ns	
	T_{SDH}	Data hold time	TBD	-	ns	
DOUT	T_{ACC}	Access time	TBD	TBD	ns	For maximum CL=30pF For minimum CL=8pF
	T_{OH}	*Output disable time*	*TBD*	*TBD*	*ns*	

Note1 : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Note 2 : In the read sequence of Serial interface, the 500nsec delay time is needed between read command and first read clock.

9. OPTICAL CHARACTERISTICS（光学特性）

9.1 Optical Specifications（光学规格）

Parameter 参数		Symbol 符号	Condition 条件	Min. 最小	Typ. 典型	Max. 最大	Unit 单位	Remark 备注
Viewing Angle Range 视角范围	Horizontal 水平	Θ3	CR>10	75	80	-	Deg.	Note1
		Θ9		75	80	-	Deg.	
	Vertical 垂直	Θ12		75	80	-	Deg.	
		Θ6		75	80	-	Deg.	
Contrast ratio 对比度		CR	Θ = 0	700	900	-	-	Note2
Transmittance 透射率		Tr	-	4.6	5.4	-	%	Note3 POL HC +Clear
Color Gamut 色域		CG	-	45	50	-	%	CF@C-Light
Reproduction of color 色彩的再现	Red	Rx	Θ = 0	0.601	0.631	0.661	-	Note4 (CF@C Light Wi thout B- ITO)
		Ry		0.300	0.282	0.660	-	
	Green	Gx		0.252	0.282	0.312	-	
		Gy		0.514	0.544	0.574	-	
	Blue	Bx		0.108	0.138	0.168	-	
		By		0.125	0.155	0.185	-	
White Chromaticity 白色色度		Wx	Θ = 0	0.261	0.291	0.321	-	CF@C Light With out B-ITO
		Wy		0.304	0.334	0.364	-	
Response Time 响应时间		$T_r + T_f$	Ta= 25 C Θ = 0	-	30	35	ms	Note 5

Note:

1.Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.

视角是对比度大于 10 的角度。相对于垂直于 LCD 表面的光轴，确定水平或 3、9 点钟方向和垂直或 6、12 点钟方向的视角。

2. Contrast ratio is calculated by the following formula（对比度由以下公式计算）:

$$\text{对比度 Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state “白色”状态下的亮度}}{\text{Brightness on the "black" state “黑色”状态下的亮度}}$$

3. Transmittance is the Value with without APF and without CG.

透射率是不带 APF 和不带 CG 时的值。

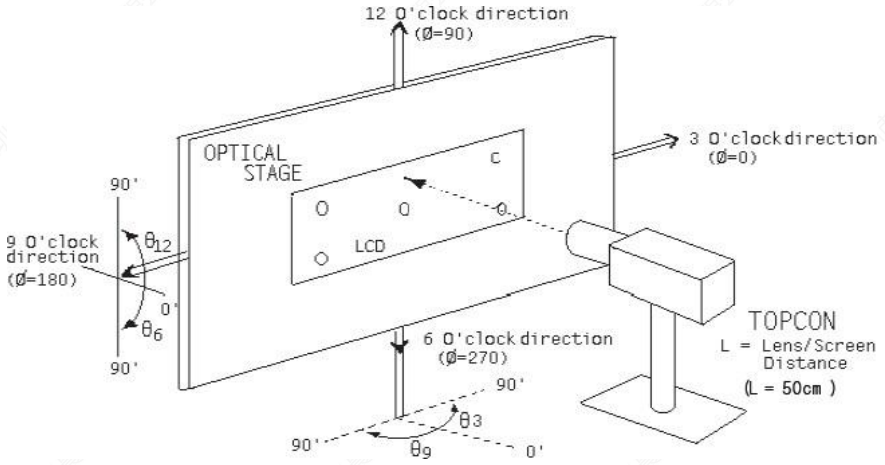
4. The color chromaticity coordinates specified in the above table shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

上表中规定的色度坐标应根据以红、绿、蓝、白为先的所有像素测量的光谱数据计算。应在面板中心进行测量。

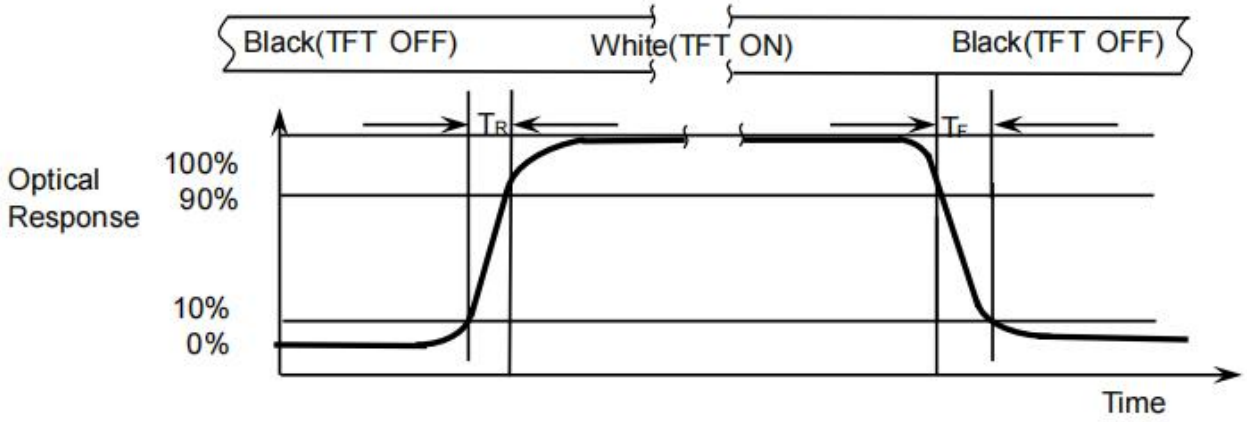
5. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Tf.

亮度从 10%改变到 90%所需的时间是 Tr，而 90%到 10%是 Tf。

<Measurement Set Up>



<Response Time Testing>



10 Reliability（可靠性）

10.1 MTBF(平均故障间隔时间)

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal.
LCD 模块的设计应满足正常情况下 50000 小时的最小 MTBF 值。

10.2 Test Condition(测试条件)

No	ITEM 测试项目	CONDITION 条件	CRITERION 标准
1	High Temperature Non-Operating Test 高温非操作试验	80℃*240Hrs	.No Defect Of Operational Function In Room Temperature Are Allowable (室温下不允许有操作功能缺陷) .IDD of LCM in Pre-and Post-Test Should Follow Specification (LCM 在测试前和测试后的 IDD 应遵循规范)
2	Low Temperature Non-Operating Test 低温非操作试验	-30℃*240Hrs	
3	High Temperature/Humidity Non Operating Test 高温/高湿非操作试验	60℃*90%RH*240Hrs	
4	High Temperature Operating Test 高温运行试验	70℃*240Hrs	
5	Low Temperature Operating Test 低温运行试验	-20℃*240Hrs	
6	Thermal Shock Test 热冲击试验	-20 ℃(30Min)<>70 ℃(30Min) *10CYCLES	

Notes:

1. Judgments should be made after exposure in room temperature for two hours.
   应在室温下暴露两小时后做出判断。
2. The distill water is used for the high temperature/humidity test.
   蒸馏水用于高温/湿度试验。
3. The sample above is individually for every reliability tests condition.
   上面的样本是针对每种可靠性测试条件单独提供的。

11. Precautions（注意事项）

11.1 Storage Conditions（储存条件）

(1) Store the panel or module in a dark place where the temperature is 23±5℃and the humidity is below 45±20%RH.(将面板或模块存放在温度为 23±5℃、湿度低于 45±20%RH 的黑暗处)

(2) Store in anti-static electricity container.(储存在防静电容器中)

(3) Store in clean environment, free from dust, active gas, and solvent.(储存在清洁的环境中，没有灰尘、活性气体和溶剂)

(4) Do not place the module near organics solvents or corrosive gases.(请勿将模块放置在有机溶剂或腐蚀性气体附近)

(5) Do not crush, shake, or jolt the module.(请勿挤压、摇晃或震动模块)

11.2 Handling Precautions(处理注意事项)

(1) Avoid static electricity, which can damage the CMOS LSI.（避免静电，因为静电会损坏 CMOS LSI）

(2) The polarizing plate of the display is very fragile, please handle if very carefully. (LCM 上的偏振片非常脆弱，请小心处理)

(3)Do not give external shock.(不要进行外部电击)

(4) Do not apply excessive force on the surface.(不要在表面上施加过大的力)

(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.(不要用干布擦拭偏振片，这样很容易划伤偏振片表面)

(6) Do not operate it above the absolute maximum rating. （请勿在极限参数以上操作）

(8)Do not remove the panel or frame from the module.（请勿从模块上拆下面板或框架）

Revision History（修订历史记录）

Version 版本号	Revise record 修订记录	Editor 编辑	Date 修订日期
V1	初始版本	张勇	2024-04-29