

液晶模组说明书

LCD Module Instructions

初定规格 Preliminary specification

正式规格 Official specifications

项目编号 Project No.	TFT-H050A18SVRJDNN40
产品描述 Product Description	TFT LCD Module 800 (RGB) x 480 Dots 5.0 Inch TFT LCD

客户确认签章:

Signature by customer:

小批量试产 Trial Production 大批量生产 Mass Production

请返回一份带有您的签名和评论的确认副本

Please return one copy confirmation with signature and your comments

HotDisplay Technology Co., Ltd

鑫洪泰科技（广东）有限公司

深圳市鑫洪泰电子科技有限公司

广东省东莞市凤岗镇东深公路凤岗段 208 号天安数码城 N3 栋 3 楼

免责声明

HotDisplay, HOTLCD 和 HOTHMI 是深圳市鑫洪泰电子科技有限公司的商标, HOTHMI 拥有多项专利、商标、商业机密和其它知识产权。

HOTHMI 对公司产品提供可靠性数据(包括数据表)、设计资料(包括参考设计)、应用 或其它设计建议、技术支持和其它资源, 但不就本司任何产品用于任何特定目的做出担保。HOTHMI 不承担任何因产品的使用产生责任, 包括使用方须遵守的法律法规和安全使用标准。

对于在规格书中提到的产品参数, 在不同的应用条件下实际性能可能会产生变化。任何参数的配置和使用必须经由客户的技术支持进行验证, 对本文档所涉及的内容进行变更, 恕不另行通知。

HOTHMI 对您的使用授权仅限于产品的应用, 除此之外不得复制或展示所述资源, HOTHMI 也不提供任何人或第三方机构的知识产权授权许可。如因使用所述资源而产生任何索赔、赔偿、成本、债务及任何损失, HOTHMI 对此概不负责, 并且您须赔偿由此对 HOTHMI 造成的损害。

HOTHMI 所提供产品均受 HOTHMI 的销售条款以及 www.hotlcd.com 上或随附 HOTHMI 产品提供的其他可适用条款的约束。HOTHMI 提供所述资源并不扩展或以其他方式更改 HOTHMI 针对 HOTHMI 产品所发布的可适用的担保范围或担保免责声明。

HOTHMI 反对并拒绝您可能提出的任何其他或不同的条款。

Disclaimers

HotDisplay, HOTLCD and HOTHMI are trademarks of Shenzhen Xinhongtai Electronic Technology Co., Ltd. and HOTHMI owns several patents, trademarks, trade secrets and other intellectual property rights.

HOTHMI provides reliability data (including data sheets), design information (including reference designs), application or other design advice, technical support and other resources for the Company's products, but does not warrant the use of any of its products for any particular purpose. HOTHMI assumes no liability arising from the use of its products, including compliance by the user with laws, regulations and standards for safe use.

For the product parameters mentioned in the specification, the actual performance may vary under different application conditions. The configuration and use of any parameter must be verified by the customer's technical support. The content of this document is subject to change without notice.

HOTHMI's license to use you is limited to the application of the product and no other reproduction or display of said resources is permitted, nor does HOTHMI provide a license to the intellectual property of any person or third party organization. HOTHMI shall not be liable for any claims, damages, costs, liabilities and any losses arising out of the use of said resources and you shall indemnify HOTHMI for any damage caused thereby.

HOTHMI offers its products subject to HOTHMI's Terms of Sale and other applicable terms provided on or with HOTHMI products at www.hotlcd.com. HOTHMI provides the resources described and does not extend or otherwise modify the scope of applicable warranties or warranty disclaimers issued by HOTHMI with respect to HOTHMI products.

HOTHMI objects to and rejects any other or different terms that you may offer.



正面/FRONT



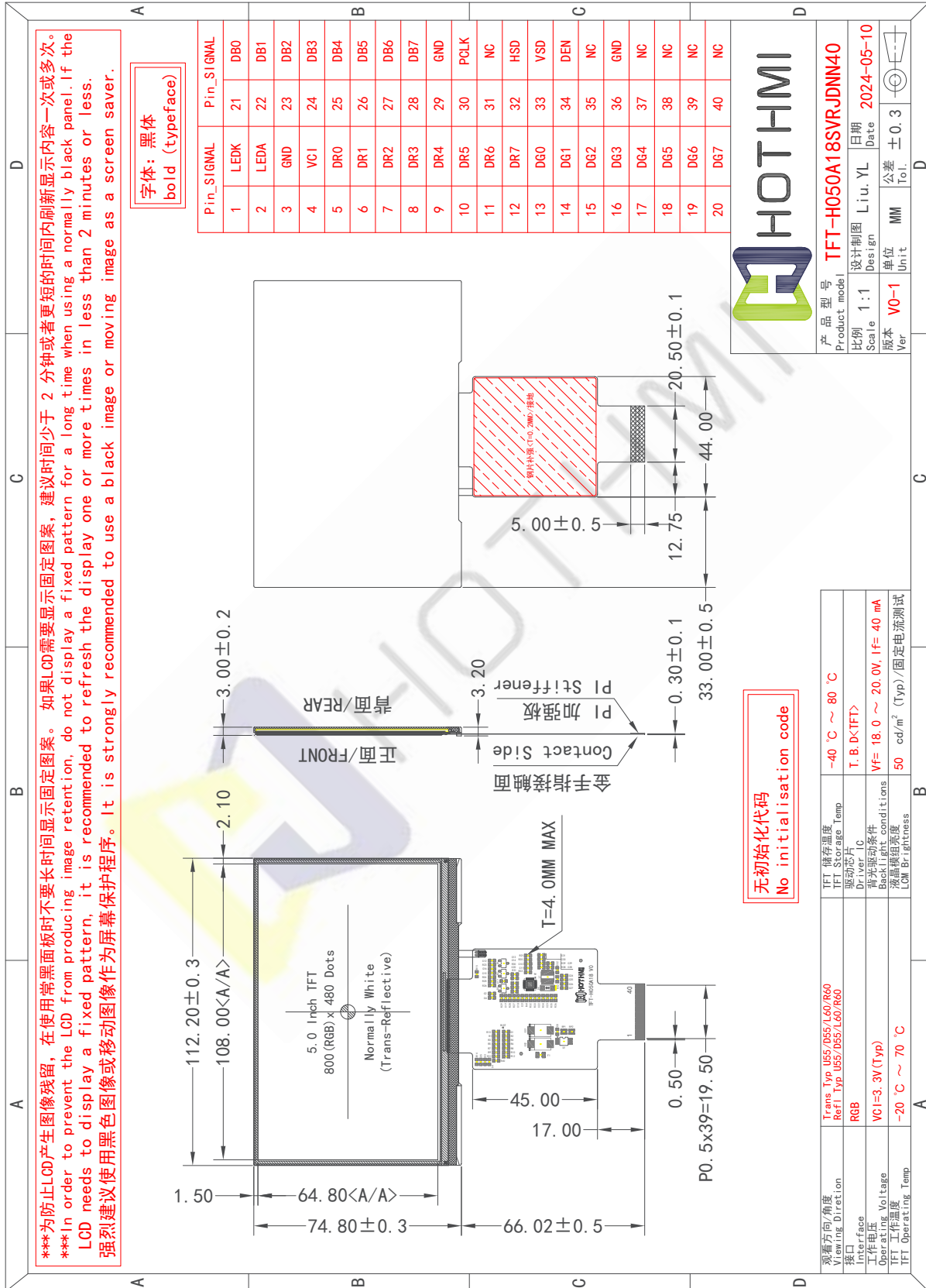
背面/REAR

一、基本特征 General Feature:

项目 Item	标准值 Standard Value			单位 Unit
显示尺寸 Display Size	5.0			英寸 Inch
分辨率 Number of Pixels	800 (RGB) (H) x 480 (V)			点 dots
显示区域 Active Area	108.00 (H) * 64.80 (V)			毫米 mm
外形尺寸 Outline Dimension	112.20 (H) * 74.80 (V) * 3.00 (D) <TFT>			毫米 mm
观看方向 Viewing Direction	Trans Typ U55/D55/L60/R60 RefI Typ U55/D55/L60/R60			-
端口 Interface	TTL 24-bit parallel RGB interface			-
驱动芯片 Driver IC	- - -			-
驱动电压 Driver Condition	VCI=3.0 ~ 3.3V(Typ)			伏特 V
背光驱动条件 Backlight conditions	电压= 18.0 ~ 20.0V/电流= 40 mA (恒流) Vf= 18.0 ~ 20.0V, If= 40 mA(constant current)			-
触摸屏 Touch Panel	<input checked="" type="checkbox"/> 不带触摸屏 Whitout TP	<input type="checkbox"/> 带电阻触摸屏 With RTP	<input type="checkbox"/> 带电容触摸屏 With CTP	-
电容触摸屏驱动芯片 CTP Driver IC	-			-
电容触摸屏驱动电压 CTP Driver Condition	-			伏特 V
TFT 液晶工作温度 TFT Operation Temp	-20 ~ +70			摄氏度 ℃
TFT 液晶储存温度 TFT Storage Temp	-40 ~ +80			摄氏度 ℃

注释 Note:

二、外形尺寸 Outline Dimensions



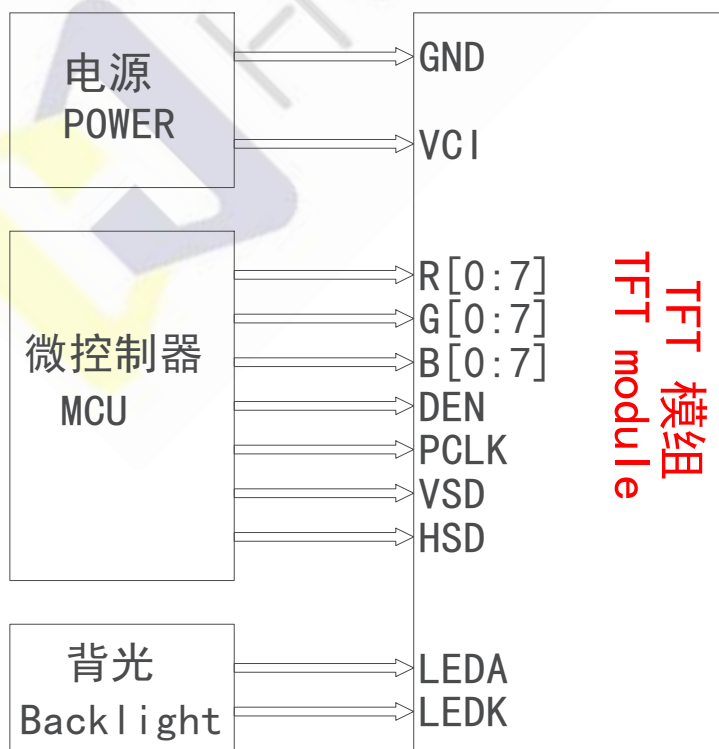
三、引脚说明 Pin Description

3.1 模组引脚说明 TFT Pin Description

引脚编号 Pin NO.	标号 Symbol	详细描述 Description
1	LEDK	LED阴极 LED cathode
2	LEDA	LED阳极 LED anode
3	GND	电源地 Power supply ground
4	VCI	电源 Power supply
5~12	DR0~7	红色数据总线。请将不使用的引脚固定在GND。 Red data bus. Please fix the unused pin's to GND.
13~20	DG0~7	绿色数据总线。请将不使用的引脚固定在GND。 Green data bus. Please fix the unused pin's to GND.
21~28	DB0~7	蓝色数据总线。请将不使用的引脚固定在GND。 Blue data bus. Please fix the unused pin's to GND.
29	GND	电源地 Power supply ground
30	PCLK	像素时钟输入引脚 Pixel clock input pin
31	NC	不连接 Not connected
32	HSD	水平同步信号，默认为负极性。 Horizontal sync signal, default is negative polarity.
33	VSD	垂直同步信号，默认为负极性。 Vertical sync signal, default is negative polarity.
34	DEN	数据输入启用。当DE为 "H" 时，显示访问被启用。 Data input enable. Display access is enabled when DE is "H".
35	NC	不连接 Not connected
- 接下页 - - Continued on next page -		

引脚编号 Pin NO.	标号 Symbol	详细描述 Description
36	GND	电源地 Power supply ground
37	NC	不连接 Not connected
38	NC	不连接 Not connected
39	NC	不连接 Not connected
40	NC	不连接 Not connected
- 结束 - - END -		

3.2 接线说明 Wiring instructions



四、电气特性 Electrical Characteristics

4-1 TFT 模组工作条件 TFT LCD Module Operating Conditions

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Unit
数字电源 Digital Power	VCI	-	-0.3	-	4.0	伏特 V
接口工作电压 IO Supply Voltage	IOVCC	-	-0.3	-	4.0	伏特 V
输入电压范围 Input Voltage Range	VIN	-	-0.3	-	IOVCC +0.3	伏特 V

注释 Note:

1. 超过上面列出的极限值可能会导致驱动 IC 永久损坏。这些值仅用于测试。IC 应在芯片特性条件下正常运行。如果不满足这些条件，IC 操作可能会出错，可靠性可能会下降。

That the exceeds the Limiting Value listed above it may cause the driver IC permanent damage. These values are for test only. IC should be operated under the Chip Characteristic conditions for normal operation. If these conditions are not met, IC operation may be error and the reliability may be deteriorated.

2. 参数在工作温度范围内有效，除非另有说明。除非另有说明，所有电压均相对于 GND。

Parameters are valid over operating temperature range unless otherwise specified. All voltages are with respect to GND unless otherwise noted.

3. 确保 IOVCC、VCI 的电压电平始终符合正确的关系： $3.0V \leq IOVCC \leq VCC \leq 3.6V$ 。

Insure the voltage levels of IOVCC, VCI, always matches the correct relation:
 $3.0V \leq IOVCC \leq VCC \leq 3.6V$.

4. VIN 应小于或等于 3.6V。 ($VIN \leq 3.6V$)。

VIN should be less than or equal to 3.6V. ($VIN \leq 3.6V$).

5. 面板显示质量取决于面板负载，在低温/高温下可能有不同的性能。

Panel display quality depends on panel loading, and it may have the different performance at low/high temperature.

4-2 TFT 面板工作条件 TFT Panel Operating Conditions

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Unit
数字电源 Digital Power	VCI	-	3.0	3.3	3.6	伏特 V
接口工作电压 IO Supply Voltage	IOVCC	-	3.0	3.3	3.6	伏特 V
输入电压范围 Input Voltage Range	VIN	-	3.0	3.3	3.6	伏特 V
待机电流 Standby Current	I _{sc}	No Load@ FR=60Hz	-	-	-	微安 uA
工作电流 Operation Current	I _{oc}		-	-	-	毫安 mA

4-3 电容触摸屏工作条件 CTP Operating Conditions

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Unit
表面硬度 Surface hardness	-	铅笔 Pencil	-	6H	-	硬度 Hard
透光率 Transmittance	-	-	80	-	-	百分比 %
数字电源 Digital Power	VDD	-	2.8	3.30	3.60	伏特 V
I/O 电源 I/O Power	IOVDD	-	2.8	3.30	3.60	伏特 V
工作温度 Operation Temperature	-	20%-90%RH;	-20	-	+70	摄氏度 ℃
储存温度 Storage Temperature	-		-30	-	+80	摄氏度 ℃

4-4 背光工作条件 LED back light specification

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Unit
工作电压 Forward voltage	VF	If=3.2V/20mA /1-chip	18.0	19.0	20.0	伏特 V
工作电流 Forward current	IF		-	40	-	毫安 mA
亮度 (带 LCD) Luminance (With LCD)	Lv	不带触摸 Without TP	40	50	-	坎德拉/平方米 cd/m ²
		带触摸 With TP	-	-	-	
LED 寿命 LED life time	Hr	Ta=25±3 °C	20,000	30,000	-	小时 Hour

注释 Note:

1. LED 寿命 (Hr) 定义为在 Ta=25±3 °C, 上表所示的典型电压电流值条件下持续工作直至亮度低于 50% 的时间。

LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

2. 以上结果是按 MTBF 计算方式预估判定的 LED 失效时间, 实际测试 LED 在 Ta=25±3 °C 点亮 5000H, 亮度衰减 8%.

The above results are estimated and judged by the MTBF calculation method of the LED failure time. The actual test LED is lit for 5000H at Ta=25±3 °C, and the brightness decays by 8%.

五、液晶光学规格 TFT OPTICAL SPECIFICATION

5.1 光学规格(反射式)Optical Specifications(Reflective)

参数 Parameter		标号 Symbol	条件 Condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit	备注 Remark
视角范围 Viewing Angle Range	水平 Horizontal	⊕左/L	CR>2	-	60	-	Deg.	
	垂直 Vertical	⊕右/R		-	60	-	Deg.	
		⊕上/U		-	55	-	Deg.	
	⊕下/D	-		55	-	Deg.		
对比度 Contrast ratio		CR	⊕ = 0°	-	15	-	-	
色域 Color Gamut		CG	-	-	-	-	%	
白色色度 White Chromaticity		Wx	⊕ = 0°	-0.03	0.310	+0.03	-	
		Wy			0.374		-	
响应时间(上升 + 下降) Response Time (Rising + Falling)		Tr+Tf	⊕ = 0° Ta= 25°C	-	7	-	ms	

5.2 光学规格(半透式)Optical Specifications(Transmittance)

参数 Parameter		标号 Symbol	条件 Condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit	备注 Remark
视角范围 Viewing Angle Range	水平 Horizontal	⊕左/L	CR>2	-	60	-	Deg.	
	垂直 Vertical	⊕右/R		-	60	-	Deg.	
		⊕上/U		-	55	-	Deg.	
	⊕下/D	-		55	-	Deg.		
对比度 Contrast ratio		CR	⊕ = 0°	-	15	-	-	
色域 Color Gamut		CG	-	-	13	-	%	
白色色度 White Chromaticity		Wx	⊕ = 0°	-0.03	0.282	+0.03	-	
		Wy			0.332		-	
响应时间(上升 + 下降) Response Time (Rising + Falling)		Tr+Tf	⊕ = 0° Ta= 25°C	-	7	-	ms	

注释 Note:

1. 测量条件

- 1) 测量环境: 暗室
- 2) 环境温度: 25±2oC
- 3) 15 分钟预热时间。。

Measuring Condition

- Measuring surrounding: dark room
- Ambient temperature: 25±2oC

■ 15min. warm-up time..

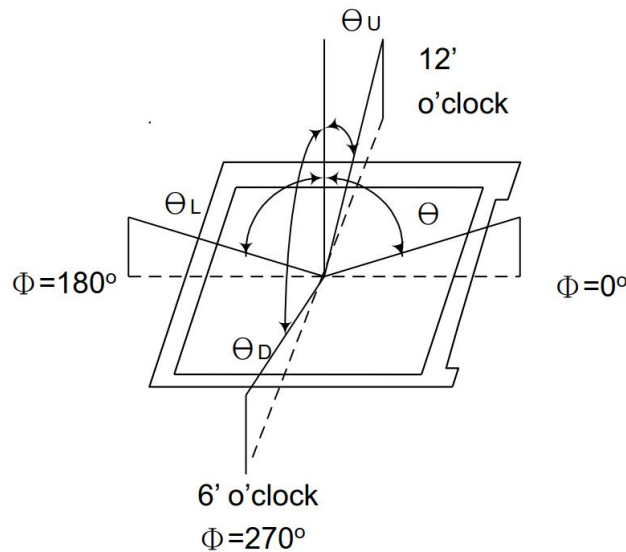
2. 测量设备。

■ AUTRONIC-MELCHERS GmbH 的显示测量系统，用于全面显示表征的电动角度计系统 Measuring Equipmenty.

■ Display Measurement System of AUTRONIC-MELCHERS GmbH, motorized goniometer system for comprehensive display characterization

注 (1) 视角的定义：

Note (1) Definition of Viewing Angle:



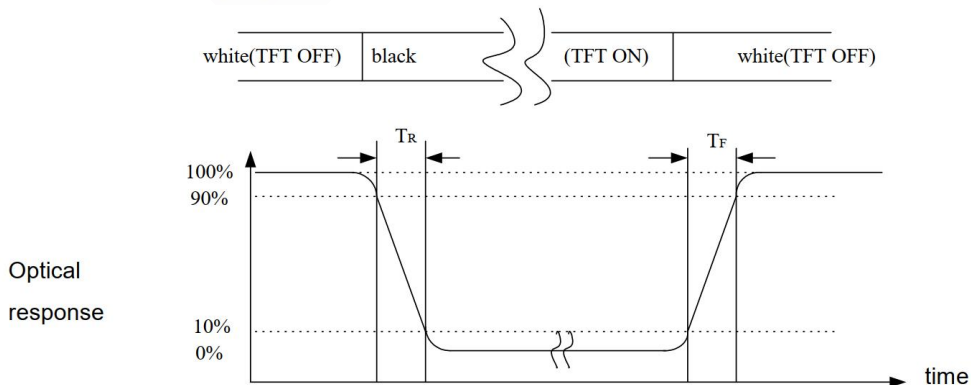
注 (2) 对比度 (CR) 的定义 (在面板中心点测量) :

Note (2) Definition of Contrast Ratio (CR) (measured at the center point of panel):

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

注 (3) 响应时间的定义：TR 和 TF 的总和：

Note (3) Definition of Response Time : Sum of TR and TF:

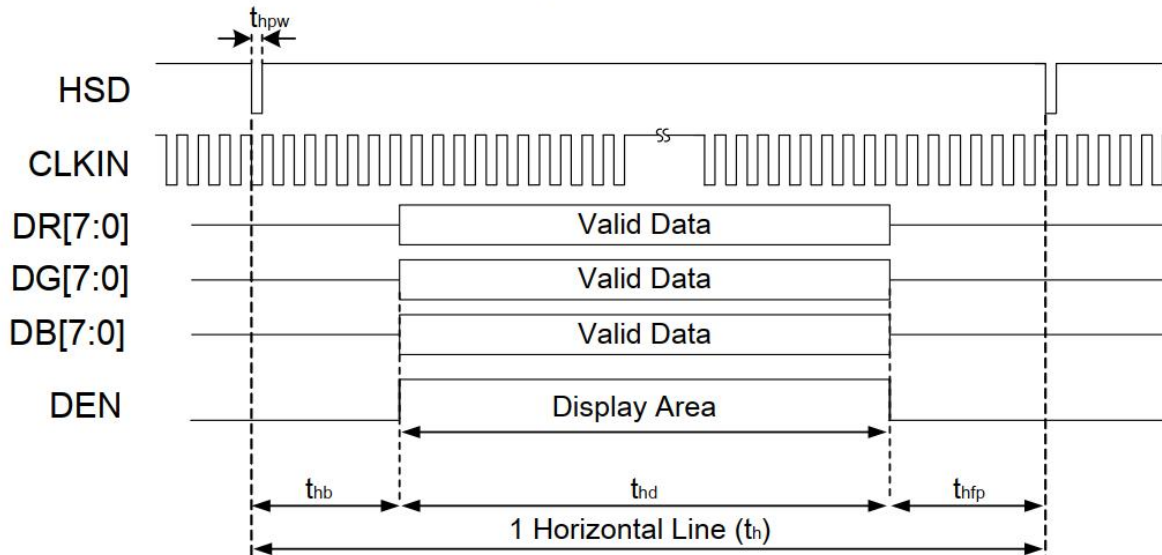


六、交流特性 AC characteristic

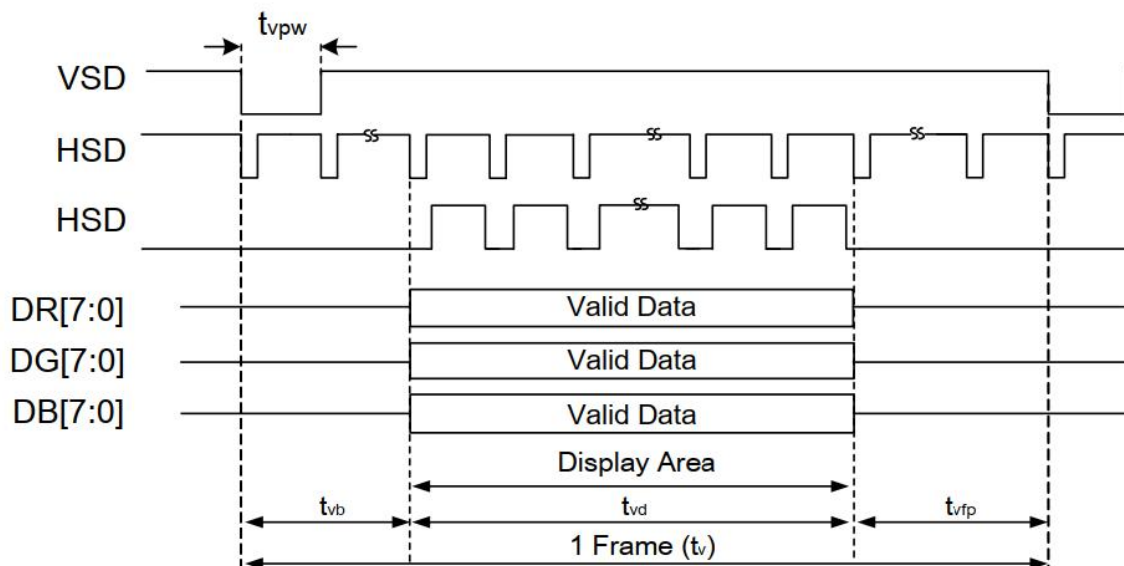
6.1. 24 位并行 RGB 数据输入格式

24-bit parallel RGB data input format

● Horizontal timing



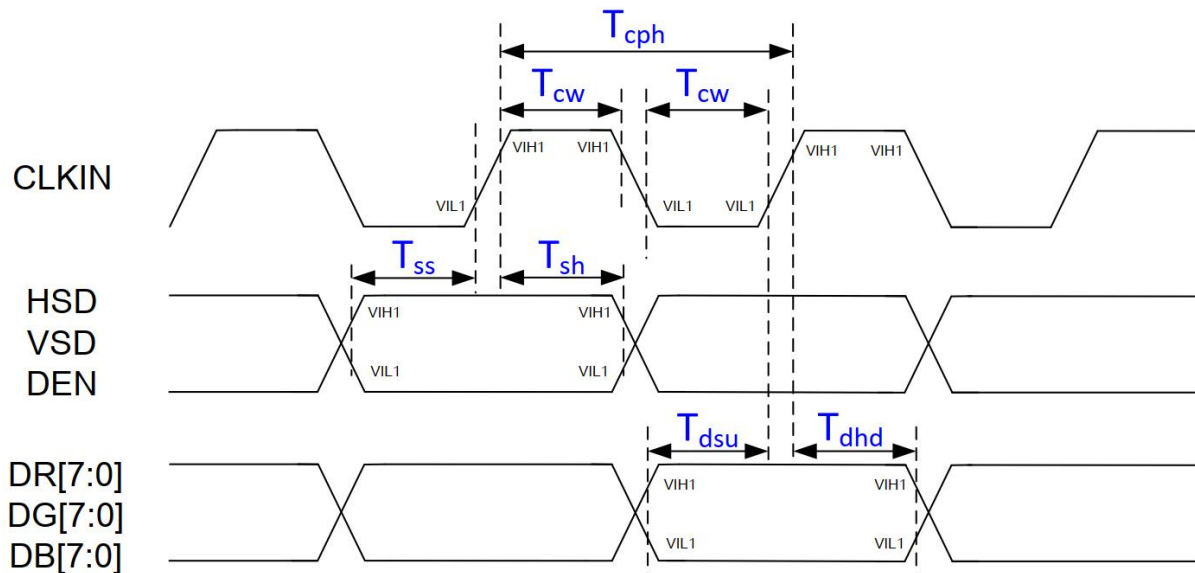
● Vertical timing



6.2. TTL 时序特性 TTL timing characteristic

24-bit parallel RGB Input Timing	Symbol	1024RGBx768			1024RGBx600			800RGBx600			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
DCLK Frequency	-	52.7	65	71	41.4	51.2	67.2	33.1	39.6	62.4	MHZ
Horizontal Total	tht	1114	1344	1400	1114	1344	1400	890	1000	1300	DCLK
Hsync Pulse width	ths	1	24	HBP-1	1	24	HBP-1	1	24	HBP-1	DCLK
Horizontal Back Porch	thb	60	160	160	60	160	160	60	160	250	DCLK
Horizontal Valid Data	thd	1024			1024			800			DCLK
Horizontal Front Porch	thfp	30	160	216	30	160	216	30	40	250	DCLK
Vertical Total	vt	788	806	845	620	635	800	620	660	800	THT
Vsync Pulse Width	tv	1	2	VBP-1	1	2	VBP-1	1	2	VBP-1	THT
Vertical Back Porch	tvb	8	23	33	8	23	100	8	23	100	THT
Vertical Valid Data	tvd	768			600			600			THT
Vertical Front Porch	tvfp	12	15	44	12	12	100	12	37	100	THT

6.3. TTL 交流电气特性 TTL AC electrical characteristic



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLKIN period	T_{cph}	14	-	-	ns
CLKIN duty ratio	T_{cw}	40	50	60	%
Data setup time	T_{dsu}	5	-	-	ns
Data hold time	T_{dhd}	5	-	-	ns
VSD setup time	T_{ss}	5	-	-	ns
VSD hold time	T_{sh}	5	-	-	ns
HSD setup time	T_{ss}	5	-	-	ns
HSD hold time	T_{sh}	5	-	-	ns
DEN setup time	T_{ss}	5	-	-	ns
DEN hold time	T_{sh}	5	-	-	ns

七、可靠性测试 RELIABILITY TEST

7-1 温度和湿度 Temperature and Humidity

测试项目 TEST ITEMS	条件 CONDITIONS	注释 NOTE
高温储存 High Temperature Storage	Ta=+80 °C, 120hrs	
低温储存 Low Temperature Storage	Ta=-40 °C, 120hrs	
高温运行试验 High Temperature Operation	Ta=+70 °C, 120hrs	
低温运行试验 Low Temperature Operation	Ta=-20 °C, 120hrs	
高温高湿（运行测试） High Temperature and High Humidity (Operating)	Ta=+60 °C, 90%RH, 120hrs	

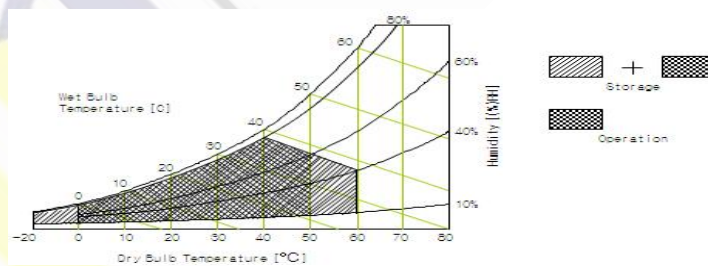
注释 Note:

1. 液晶驱动电压。由于液晶材料的特性，该电压随环境温度而变化。

Liquid Crystal driving voltage. Due to the characteristics of LC Material, this voltage varies with environmental temperature.

2. 温度和相对湿度范围如下图所示。湿球温度最高应为39°C。并且没有冷凝水。

Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be 39 °C max. and no condensation of water.



3. 产品经可靠性测试后，仅保证功能正常，无任何致命缺陷（不显示、线路缺陷、显示异常等）。

After the reliability test, the product only guarantee function normally without any fatal defect (non-display, line defect, abnormal display etc).

4. 所有显示判断均在面板温度恢复到室温2小时后进行

All display judgments are made after the panel temperature returns to room temperature for 2 hours

5. Ta: 环境温度

Ta: Ambient temperature

7-2 冲击和振动 Shock and Vibration

测试项目 TEST ITEMS	条件 CONDITIONS
包装冲击(非操作) Packing Shock (Non-Operation)	<ul style="list-style-type: none"> ● Shock level:980m/s² ● Waveform:1/2 Sine wave,6msec ● ±X, ±Y ±Z, each axis 1 times
包装振动(非操作) Packing Vibration (Non-Operation)	<ul style="list-style-type: none"> ● Frequency range:8-33.3HZ ● Stoke:1.0mm ● Sweep: 10Hz-50Hz ● x, y, z 2 hours for each direction

7-3 静电放电测试 Electrostatic Discharge

测试项目 TEST ITEMS	条件 CONDITIONS
ESD (Non-operation)	150pF, 330 Ω, Contact ±4KV, Air : ±8KV. Note 1
	200pF, 0 Ω, ±200V Contact test. Note 2

测量点 Measure Point:

1. LCD玻璃和金属边框
LCD glass and metal bezel
2. 连接器引脚
IF connector pins

八、处理和注意事项 HANDLING & CAUTIONS

8-1 操作注意事项 Caution For Operation

◆由于液晶模组是玻璃材质，请勿对其施加强烈的机械冲击或静载荷。请小心搬运，因为冲击、振动和粗心的搬运可能会严重影响产品。如果从高处坠落或受到强烈冲击，玻璃可能碎了。

Since the LCM is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass maybe broken.

◆在规定的电压限制内驱动 LCM 是必不可少的，因为高于限制的电压会导致 LCM 的寿命缩短。由直流引起的电化学反应会导致 LCM 出现不良劣化，因此应避免使用直流驱动。

It is indispensable to drive the LCM within the specified voltage limit since the higher voltage than the limit causes LCM's life shorter. An electro-chemical reaction due to DC causes undesirable deterioration of the LCM so that the use of DC drive should avoid.

◆请勿在电源开启时将 LCM 连接到系统或从系统断开连接。

Do not connect or disconnect the LCM to or from the system when power is on.

◆切勿在高温高湿的异常条件下使用 LCM。

Never use the LCM under abnormal conditions of high temperature and high humidity.

◆当暴露于剧烈的温度波动（热到冷或冷到热）时，LCM可能会受到影响；具体来说，从冷到热的剧烈温度波动会在 LCM 表面产生露水，这可能会影响 LCM 上偏振片的运行。

When expose to drastic fluctuation of temperature (hot to cold or cold to hot), the LCM may be affected; specifically, drastic temperature fluctuation from cold to hot, produces dew on the LCM's surface which may affect the operation of the polarizer on the LCM.

◆在低于工作温度范围的温度下，响应时间将极度延迟，另一方面，在高于其工作范围的温度下，LCM 可能会变黑。然而，这些现象并不意味着 LCM 出现故障或故障。一旦温度恢复到正常运行的推荐温度范围，LCM 将恢复正常运行。

Response time will be extremely delay at lower temperature than the operating temperature range and on the other hand LCM may turn black at temperature above its operational range. However those phenomenon do not mean malfunction or out of order with the LCM. The LCM will revert to normal operation once the temperature returns to the recommended temperature range for normal operation.

◆为防止LCD产生图像残留，在使用常黑面板时不要长时间显示固定图案。如果LCD需要显示固定图案，建议时间少于 2 分钟或者更短的时间内刷新显示内容一次或多次。强烈建议使用黑色图像或移动图像作为屏幕保护程序。

In order to prevent the LCD from producing image retention, do not display a fixed pattern for a long time when using a normally black panel. If the LCD needs to display a fixed pattern, it is recommended to refresh the display one or more times in less

than 2 minutes or less. It is strongly recommended to use a black image or moving image as a screen saver.

◆强烈的光照会导致 LCD 偏光片和彩色滤光片退化。不准在强光或高温高湿下长期存放或直接运行。

Strong sunlight can cause LCD polarizers and color filters to degrade. Long-term storage or direct operation under strong light or high temperature and humidity is not allowed.

8-2 防静电措施 Caution Against Static Charge

◆LCM 使用 C-MOS LSI 驱动器，因此建议客户将任何未使用的输入端连接到 Vdd 或 Vss，上电前不要输入任何信号，并将您的身体、工作/装配区、装配设备接地 防止静电。

The LCM use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipments to protect against static electricity.

◆缓慢去除保护膜，保持去除方向与面板表面不垂直约 30 度，如有可能，在离子风机等 ESD 控制装置下，工作室湿度应保持在 50%RH 以上，以减少静电风险

Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, if possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.

◆避免使用合成纤维制成的工作服。我们推荐棉质衣服或其他经过导电处理的纤维。

Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.

◆在处理 LCM 时，请戴上不带电材料的手套。对地导电手腕和对地导电鞋是必需的

In handling the LCM, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary

九、初始化代码 Initialization code

```

Void Panel_Initial_code(void)
{
//TFT分辨率(Resulation ): 800  x  480
//测试接口: RGB
//Power:VCI=3.3

#define HSPW    24
#define HBPD    64
#define HFPD    112
#define Horizontal  800

#define VSPW    2
#define VBPD    37
#define VFPD    21
#define Vertical  480
//PCLK=32MHz

//=====上电复位操作=====//
LCD_RESET=1;
Delays(1);          //Delay 1ms
LCD_RESET=0;
Delays(10);         //Delay 10ms
LCD_RESET=1;
Delays(120);        //Delay 120ms
//=====//

//不需要初始化代码 No initialisation code required

)

```

文档修订记录 Document revision history :

版本 Version	日期 DATE	修改说明 Modify description	编著 Editorial
0-0	2024-05-10	初次编制 First compilation.	YL

-- 结束 --

-- END --