液 晶 模 组 规 格 书

LCM Specification

☑初定规格 Preliminary specification

☐正式规格 Official specifications

项目编号 Project No.	TFT-H070D12ZFIHX3N40
产品描述 Product Description	TFT LCD Module 1200 x 3RGB x 1920 Dots 7.0 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

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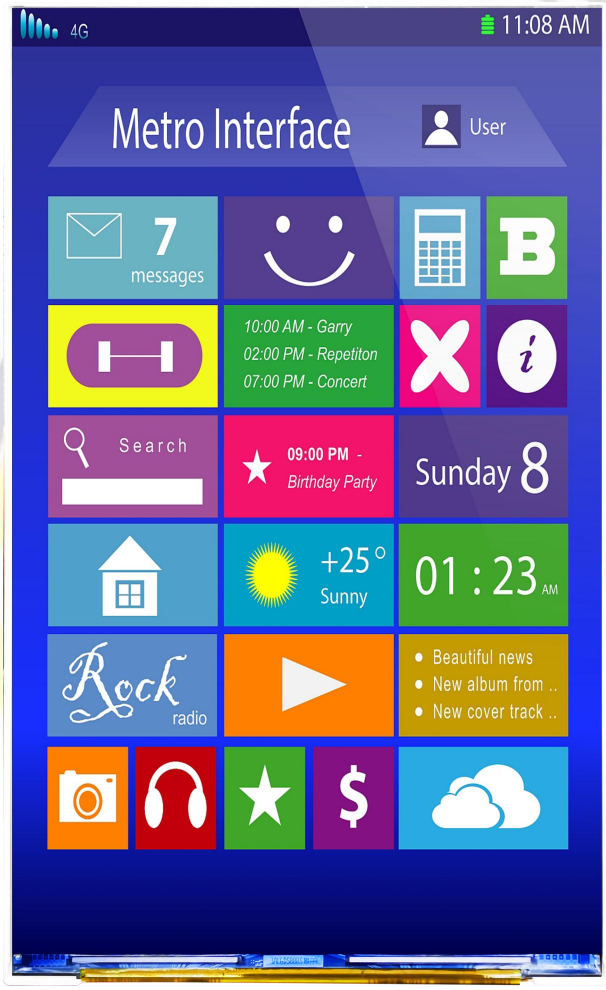
文档修订记录 Document revision history ：

版本 Version	日期 DATE	修改说明 Modify description	编制 PREPARED BY
0-0	2022-11-03	初次编制 First compilation.	YL



正面/FRONT

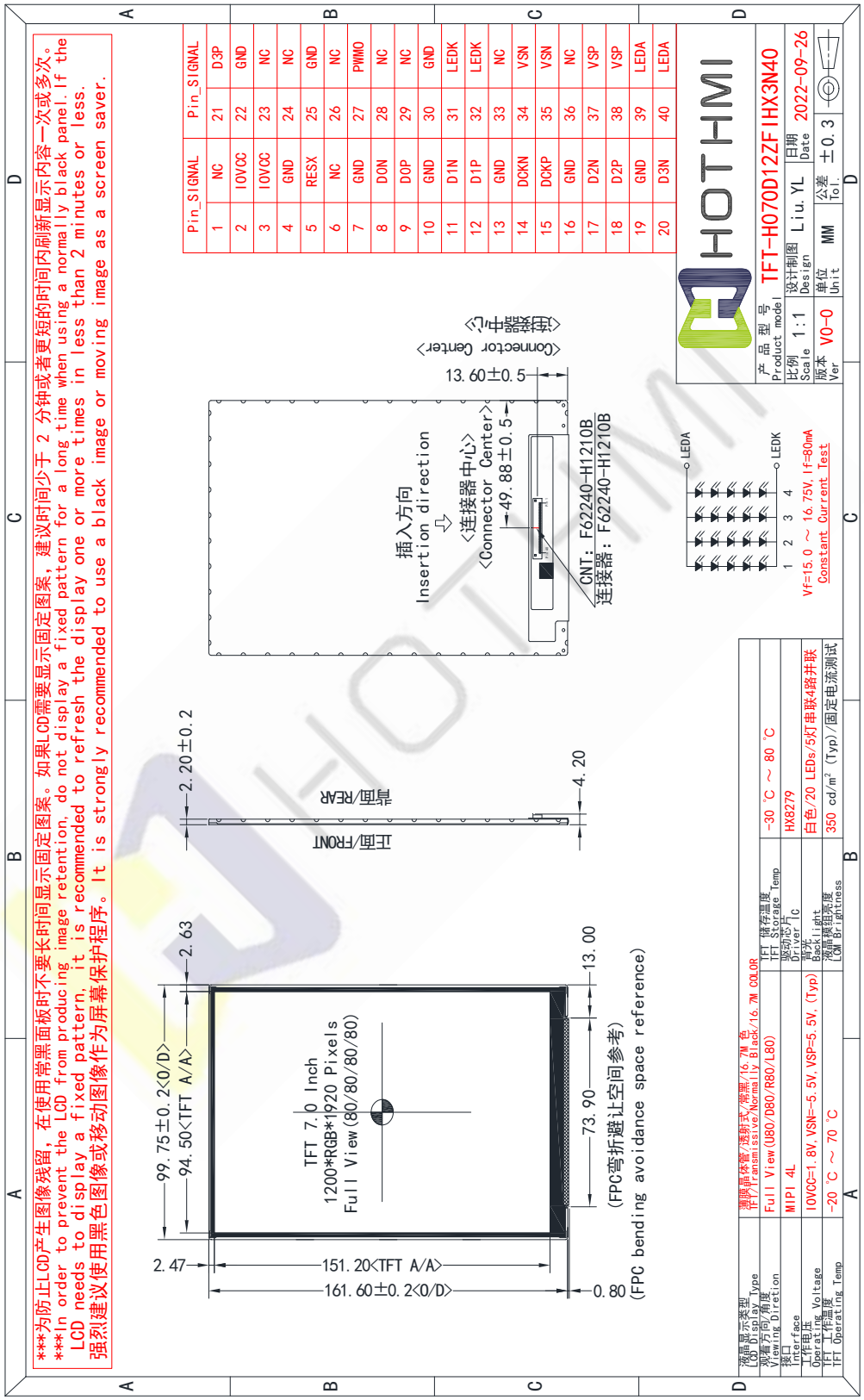
背面/REAR

一、基本特征 General Feature:

项目 Item	标准值 Standard Value			单位 Unit
显示尺寸 Display Size	7.0			英寸 Inch
分辨率 Number of Pixels	1200（H）*3(RGB)* 1920（V）			点 dots
显示区域 Active Area	94.50（H）* 151.20（V）			毫米 mm
外形尺寸 Outline Dimension	99.75(H) * 161.60(V) * 2.20(D)			毫米 mm
观看方向 Viewing Direction	全 视角 FULL O'clock			-
端口 Interface	MIPI 4L			-
驱动芯片 Driver IC	HX8279			-
驱动电压 Driver Condition	IOVCC=1.8V,VSN=-5.5V,VSP=5.5V(Typ)			伏 V
背光-1 Backlight-1	白色 LED/20 颗/5 颗串联 4 路并联 White LED/20 PCS/5 PCS serial 4 ways parallel			-
触摸屏 Touch Panel	☑不带触摸屏 Whitout TP	☐带电阻触摸屏 Whit RTP	☐带电容触摸屏 Whit 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 V
TFT 液晶工作温度 Operation Temperature	-20 ～ 70			摄氏度 ℃
TFT 液晶储存温度 Storage Temperature	-30 ～ 80			摄氏度 ℃

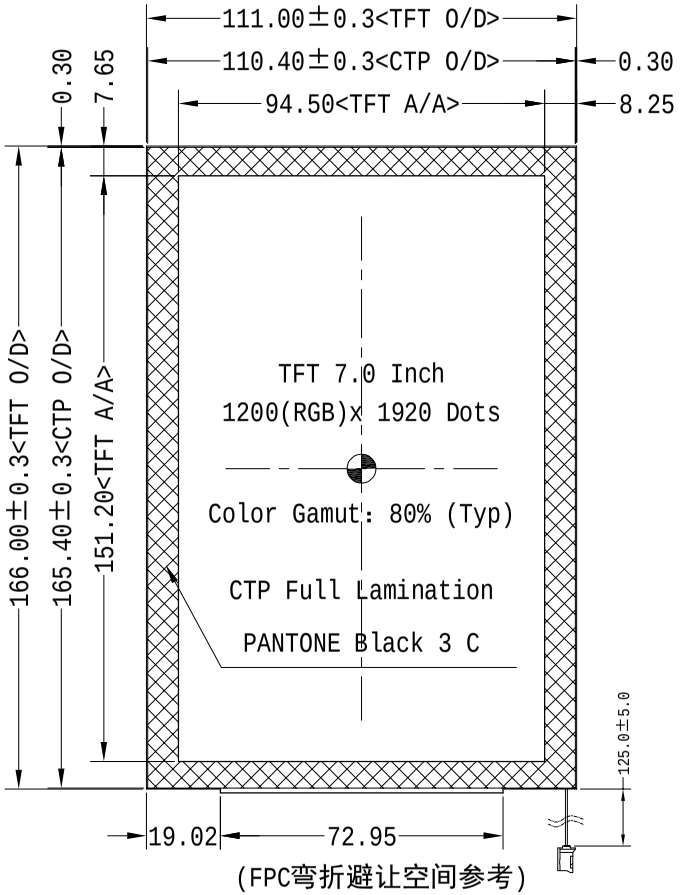
注释 Note:

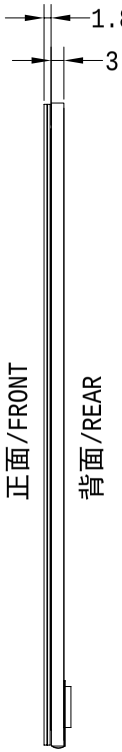
二、外形尺寸 Outline Dimensions

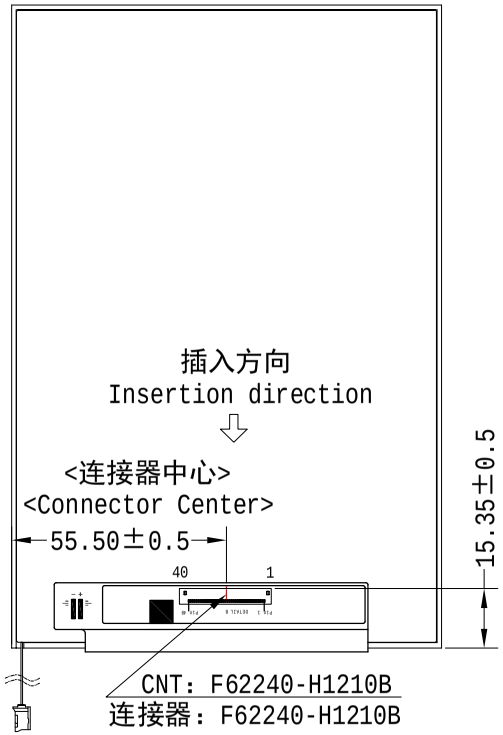


***为防止LCD产生图像残留，在使用常黑面板时不要长时间显示固定图案。如果LCD需要显示固定图案，建议时间少于 2 分钟或者更短的时间内刷新显示内容一次或多次。
***In order to prevent the LCD from producing image retention, do not display a fixed pattern for a long time when using a normally black panel.If the LCD needs to display a fixed pattern, it is recommended to refresh the display one or more times in less than 2 minutes or less.
强烈建议使用黑色图像或移动图像作为屏幕保护程序。It is strongly recommended to use a black image or moving image as a screen saver.

字体：黑体
bold (typeface)







Pin_SIGNAL		Pin_SIGNAL	
1	NC	21	D3P
2	IOVCC	22	GND
3	IOVCC	23	NC
4	GND	24	NC
5	RESX	25	GND
6	NC	26	NC
7	GND	27	PWMO
8	D0N	28	NC
9	D0P	29	NC
10	GND	30	GND
11	D1N	31	LEDK
12	D1P	32	LEDK
13	GND	33	NC
14	DCKN	34	VSN
15	DCKP	35	VSN
16	GND	36	NC
17	D2N	37	VSP
18	D2P	38	VSP
19	GND	39	LEDA
20	D3N	40	LEDA

说明：红线正极，黑线负极
Description: Red wire positive, black wire negative

液晶显示类型 LCD Display Type	薄膜晶体管/透射式/常黑/16.7M 色 TFT/Transmissive/Normally Black/16.7M COLOR		
观看方向/角度 Viewing Diretion	Full View(U80/D80/R80/L80)	TFT 储存温度 TFT Storage Temp	-30 ℃ ～ 80 ℃
接口 Interface	MIPI 4L	驱动芯片 Driver IC	HX8279
工作电压 Operating Voltage	IOVCC=1.8V,VSN=-5.5V,VSP=5.5V,(Typ)	背光驱动条件 Backlight Conditions	Vf=21.0 ～ 22.4V,If=400mA
TFT 工作温度 TFT Operating Temp	-20 ℃ ～ 70 ℃	液晶模组亮度 LCM Brightness	2000 cd/m² (Typ)/固定电流测试

HOTHMI

产品型号 Product model	TFT-H070D12ZFIHXTC40				
比例 Scale	1:1	设计制图 Design	Liu.YL	日期 Date	2024-05-08
版本 Ver	V0-1	单位 Unit	MM	公差 Tol.	±0.3

三、引脚说明 Pin Description

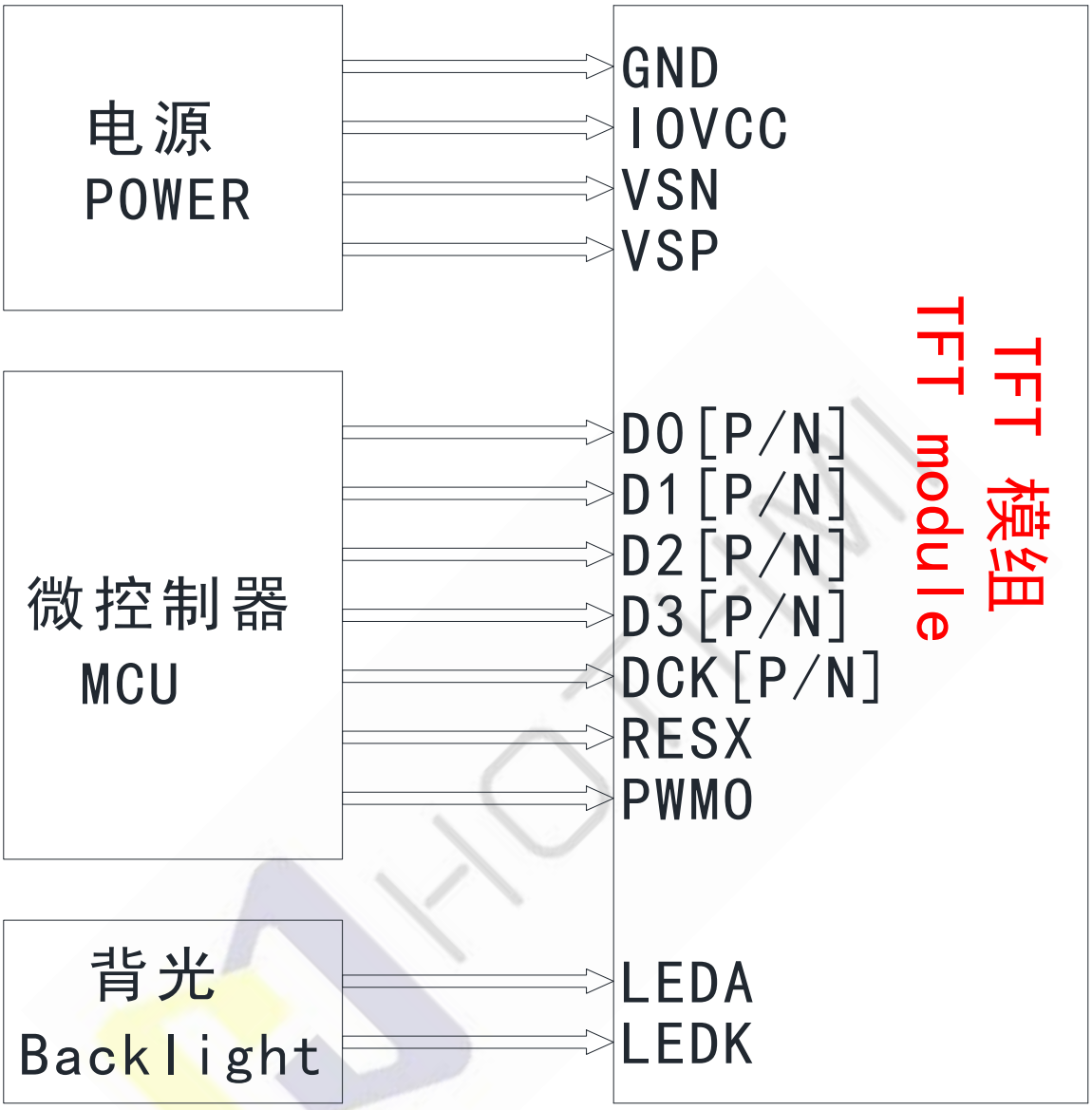
3.1 模组引脚说明 TFT Pin Description

引脚编号 Pin NO.	标号 Symbol	详细描述 Description
1	NC	不连接 Not connected
2 ～ 3	IOVCC	1.8V 电源 1.8V power supply
4	GND	地 Ground
5	RESX	重置引脚。 Reset pin.
6	NC	不连接 Not connected
7	GND	地 Ground
8	DON	MIPI负数据信号（-） MIPI Negative data signal (-)
9	DOP	MIPI正数据信号（+） MIPI Positive data signal (+)
10	GND	地 Ground
11	D1N	MIPI负数据信号（-） MIPI Negative data signal (-)
12	D1P	MIPI正数据信号（+） MIPI Positive data signal (+)
13	GND	地 Ground
14	DCKN	MIPI负时钟信号（-） MIPI Negative clock signal (-)
15	DCKP	MIPI正时钟信号（+） MIPI Positive clock signal (+)
16	GND	地 Ground
- 接下页 - - Continued on next page -		

注释 Note:

引脚编号 Pin NO.	标号 Symbol	详细描述 Description
17	D2N	MIPI负数据信号（-） MIPI Negative data signal (-)
18	D2P	MIPI正数据信号（+） MIPI Positive data signal (+)
19	GND	地 Ground
20	D3N	MIPI负数据信号（-） MIPI Negative data signal (-)
21	D3P	MIPI正数据信号（+） MIPI Positive data signal (+)
22	GND	地 Ground
23 ～ 24	NC	不连接 Not connected
25	GND	地 Ground
26	NC	不连接 Not connected
27	PWMO	LED驱动器的PWM控制信号 PWM control signal for LED driver
28 ～ 29	NC	不连接 Not connected
30	GND	地 Ground
31 ～ 32	LEDK	LED阴极 LED cathode
33	NC	不连接 Not connected
34 ～ 35	VSN	模拟电源负电压 Analog supply negative voltage
36	NC	不连接 Not connected
37 ～ 38	VSP	模拟电源正电压 Analog supply positive voltage
39 ～ 40	LEDA	LED阳极 LED anode
- 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	VCC	-	-0.3	-	2.1	伏 V
接口工作电压 IO Supply Voltage	IOVCC	-	-0.3	-	2.1	伏 V
输入电压范围 Input Voltage Range	VIN	-	-0.3	-	IOVCC +0.3	伏 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：1.7V ≦ IOVCC ≦ VCC ≦ 2.0V。

Insure the voltage levels of IOVCC, VCI, always matches the correct relation: 1.7V ≦ IOVCC ≦ VCC ≦ 2.0.

4. VIN 应小于或等于 2.0。 (VIN ≤ 2.0V)。

VIN should be less than or equal to 2.0V. (VIN ≦ 2.0V).

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
接口工作电压 IO Supply Voltage	IOVCC	-	1.7	1.8	2.0	伏 V
模拟电源负电压 VSN voltage	VSN	-	-5.0	-5.5	-6.0	伏 V
模拟电源正电压 VSP voltage	VSP	-	5.0	5.5	6.0	伏 V
待机电流 Standby Current	Isc	No Load@ FR=60Hz	-	-	-	微安 uA
工作电流 Operation Current	Ioc		-	-	-	毫安 mA

4-3 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	15.0	16.0	16.75	伏 V
工作电流 Forward current	IF		-	80	-	毫安 mA
亮度（带 LCD) Luminance(With LCD)	Lv	Without TP	-	350	-	坎德拉/平方米 cd/m^2
		With TP	-	-	-	
LED 寿命 LED life time	Hr	Ta=25±3 ℃	20,000	30,000	-	小时 Hour

注释 Note:

1. LED 寿命 (Hr) 定义为在 Ta=25±3 ℃,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 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

2. 以上结果是按 MTBF 計算方式预估判定的 LED 失效时间，实际测试 LED 在 Ta=25±3 ℃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 ℃, and the brightness decays by 8%.

五、液晶光学规格 TFT OPTICAL SPECIFICATION

5.1 概述 Overview

光学规格的测试应在暗室（环境亮度 1lux，温度=25 2℃）中使用亮度计系统（测角仪系统和TOPCON BM-5）设备进行测量，测试单元应位于大约 在 θ 和 Φ 等于 0 的视角下，距 LCD 表面 50cm 的距离。 显示面上测量点的中心应保持固定。 测量前背光应工作 30 分钟。

The test of Optical specifications shall be measured in a dark room (ambient luminance 1lux and temperature = 25 2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0 . The center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement.

5.2 光学规格 Optical Specifications

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	Θ左/L	CR>10	-	80	-	Deg.	Note 1
		Θ右/R		-	80	-	Deg.	
	垂直 Vertical	Θ上/U		-	80	-	Deg.	
		Θ下/D		-	80	-	Deg.	
对比度 Contrast ratio		CR	Θ = 0°	-	1200	-	-	Note2
色域 Color Gamut		CG	CIE1931	75	80	-	%	
白色色度 White Chromaticity		Wx	Θ = 0°	-0.03	0.285	+0.03	-	
		Wy			0.317		-	
色彩还原 Reproduction of color	红 Red	Rx			0.673		-	Note4 (Based on C Light)
		Ry			0.319		-	
	绿 Green	Gx			0.228		-	
		Gy			0.614		-	
	蓝 Blue	Bx			0.140		-	
		By			0.106		-	
响应时间（上升 + 下降） Response Time (Rising + Falling)		Tr+Tf	Θ = 0° Ta= 25℃	-	30	40	ms	Note5

注释 Note:

1. 视角是对比度大于10的角度。视角确定为相对于光轴的水平或3、9点钟方向和垂直或6、12点钟方向 垂直于 LCD 表面（见图 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 (see FIGURE 1).

2. 对比度测量应在 θ = 0 的视角和 LCD 表面的中心进行。 亮度测量时，视场中的所有像素首先设置为白色，然后设置为暗（黑色）状态。（参见图 1）亮度对比度（CR）是通过数学定义的。

Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGUR 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. 透射率是没有 APF 和没有 CG 的值。

Transmittance is the Value without APF and without CG.

4. 上表中规定的色度坐标应由所有像素首先测量的光谱数据计算为红色、绿色、蓝色和白色。 测量应在面板的中心进行。

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.

5. 电光响应时间测量应如图 2 所示，通过打开和关闭“数据”输入信号来进行。 亮度从10%变化到90%所需的时间是Tr，90%到10%是Tf。

The electro-optical response time measurements shall be made as FIGURE 2 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Tf.

Figure1 Measurement Set Up

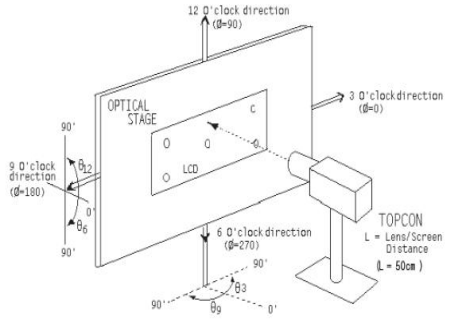


图 1

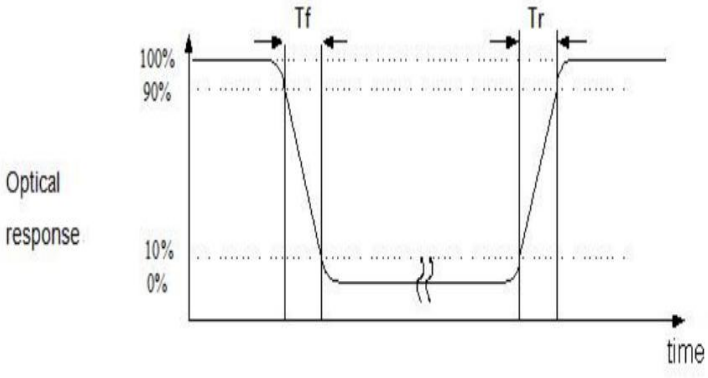
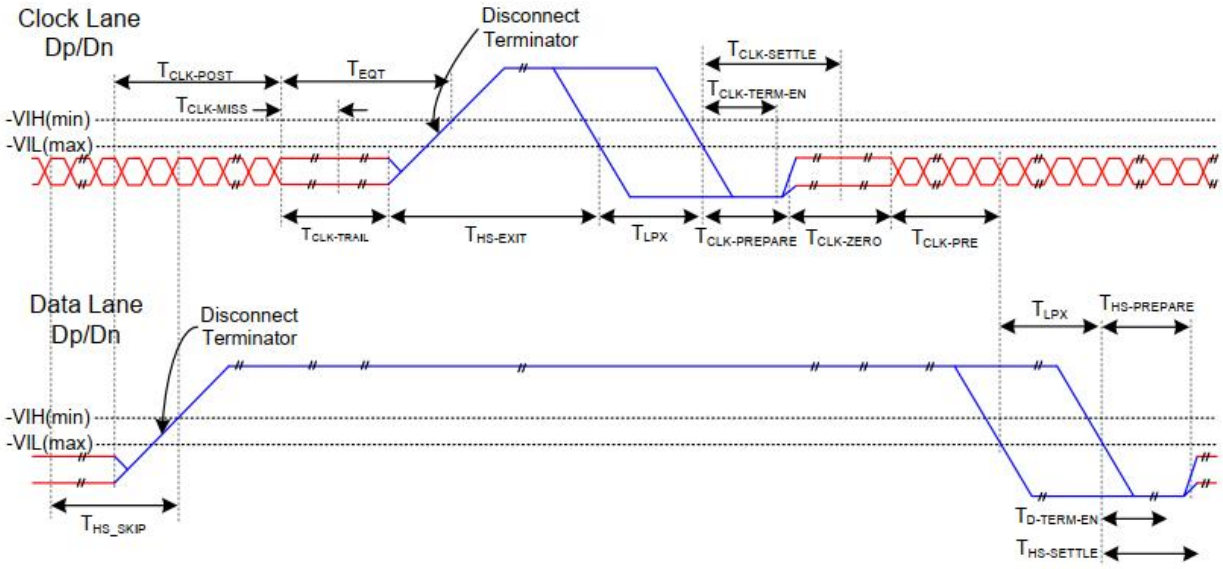


图 2

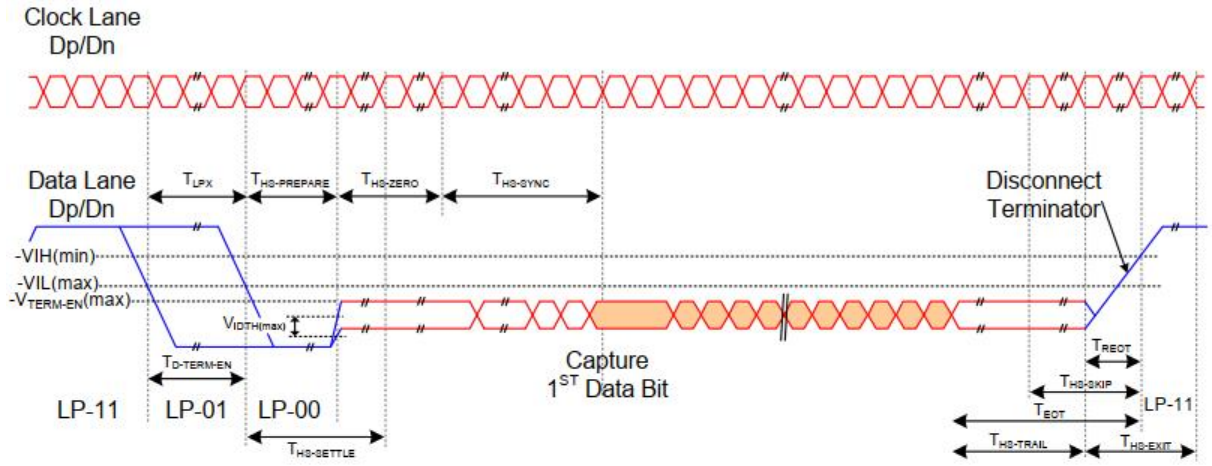
六、交流特性 AC characteristic

6.1.时序 Timing

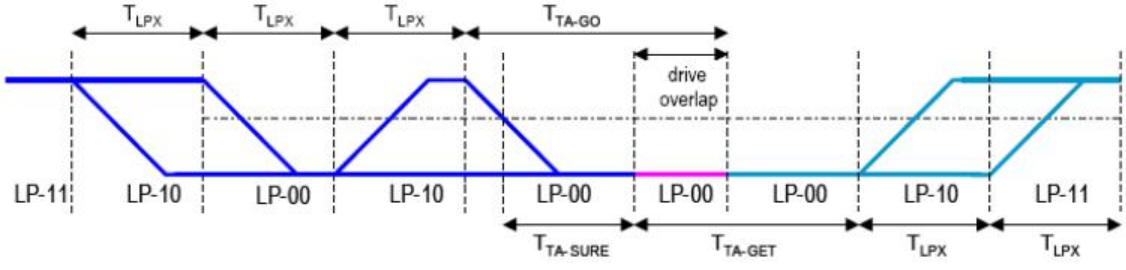
MIPI交流特性 MIPI AC characteristic



Switching the clock lane between clock transmission and low-power mode



Timing of high-speed data transmission in bursts



Turnaround Procedure

Parameter	Description	Spec.			Unit
		Min.	Typ.	Max.	
T_{REOT}	30%-85% rise time and fall time	-	-	35	ns
$T_{CLK-MISS}$	Timeout for receiver to detect absence of Clock transitions and disable the Clock Lane HS-RX.	-	-	60	ns
$T_{CLK-POST}$*1	Time that the transmitter continues to send HS clock after the last associated Data Lane has transitioned to LP Mode. Interval is defined as the period from the end of THS-TRAIL to the beginning of $T_{CLK-TRAIL}$.	60 ns + 52*UI **(For DCS)**	-	-	ns
$T_{CLK-PRE}$	Time that the HS clock shall be driven by the transmitter prior to any associated Data Lane beginning the transition from LP to HS mode.	8	-	-	ns
$T_{CLK-SETTLE}$	Time interval during which the HS receiver shall ignore any Clock Lane HS transitions, starting from the beginning of $T_{CLK-PRE}$.	95	-	300	ns
$T_{CLK-TERM-EN}$	Time for the Clock Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$	-	38	ns
$T_{HS-SETTLE}$	Time interval during which the HS receiver shall ignore any Data Lane HS transitions, starting from the beginning of $T_{HSPREPARE}$.	85 ns + 6*UI		145 ns + 10*UI	ns
T_{EOT}	Time from start of $T_{HS-TRAIL}$ or $T_{CLK-TRAIL}$ period to start of LP-11 state	-	-	105ns+48*UI	-
$T_{HS-EXIT}$ (1)	time to drive LP-11 after HS burst	100	-	-	ns
$T_{HS-PREPARE}$	Time to drive LP-00 to prepare for HS transmission	40ns + 4*UI	-	85ns+6*UI	ns
$T_{HS-PREPARE}$ + $T_{HS-ZERO}$	$T_{HS-PREPARE}$ + Time to drive HS-0 before the Sync sequence	145ns + 10*UI	-	-	ns
$T_{HS-SKIP}$	Time-out at RX to ignore transition period of EoT	40	-	55ns+4*UI	ns
$T_{HS-TRAIL}$	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60 + 4*UI	-	-	ns
T_{LPX}	Length of any Low-Power state period	50	-	-	ns
Ratio T_{LPX}	Ratio of $T_{LPX(MASTER)}/T_{LPS(SLAVE)}$ between Master and Slave side	2/3	-	3/2	-
T_{TA-GET}	Time to drive LP-00 by new TX		$5*T_{LPX}$		ns
T_{TA-GO}	Time to drive LP-00 after Turnaround Request		$4*T_{LPX}$		ns
$T_{TA-SURE}$	Time-out before new TX side starts driving T	T_{LPX}	-	$2*T_{LPX}$	ns

Note: (1) For image transmission:
$T_{CLK-POST}$ min value =164 when MIPI max frequency per lane = 0.53Gbps.
$T_{CLK-POST}$ min value =112 when MIPI max frequency per lane = 1Gbps

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 o C, 120hrs	
低温储存 Low Temperature Storage	Ta=-30 o C, 120hrs	
高温运行试验 High Temperature Operation	Ta=+70 o C, 120hrs	
低温运行试验 Low Temperature Operation	Ta=-20 o C, 120hrs	
高温高湿（运行测试） High Temperature and High Humidity (Operating)	Ta=+60 o C, 90%RH, 120hrs	

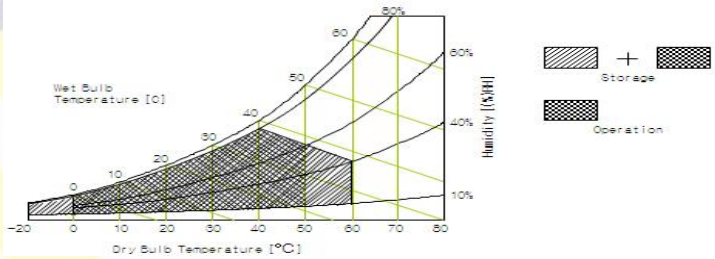
注释 Note:

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℃。并且没有冷凝水。

Temperature and relative humidity range are shown in the figure below.Wet bulb temperature should be 39 ℃ 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, abormal display etc).

4. 所有显示判断均在面板温度恢复到室温后进行

All judgments of display are performed after temp of panel returns to room temperature

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)	● Shock level:980m/s^2 ● Waveform:1/2 Sine wave,6msec ● ±X, ±Y ±Z,each axis 1 times
包装振动(非操作) Packing Vibration (Non-Operation)	● 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,330Ω, Contact±4KV,Air :±8KV.Note 1
	200pF,0Ω, ±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 HANDDLING & 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，工作室内湿度应保持在 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

9. LCD显示器初始化代码 LCD display initialization code

H_active	1200	H_total	1330	clk
H_plus_W	10	V_total	1969	H
H_Back_porch	70	Frame rate	60	Hz
H_Front_porch	50	PCLK	157.1262	MHz
V_active	1920	mipi mbps (888)	942.7572	mbps
V_plus_W	4			
V_Back_porch	20	H_frequncy	118.14	KHz
V_Front_porch	25	Line_time	8.464534	us
		frame_time	16.66667	ms

```
Void Panel_initial_code(void)
{
    //---------------------Reset sequence----------//
    LCD_RESET=1;
    Delayms(1); //Delay 1ms
    LCD_RESET=0;
    Delayms(10); //Delay 10ms
    LCD_RESET=1;
    Delayms(120);  //Delay 120ms
    //-----------------------------------------------------------------------//
Generic_Short_Write_1P(0xB0,0x05);
Generic_Short_Write_1P(0xB3,0x52);
Generic_Short_Write_1P(0xB8,0x7F);
Generic_Short_Write_1P(0xBC,0x20);
Generic_Short_Write_1P(0xD6,0x7F);

Generic_Short_Write_1P(0xB0,0x01);
Generic_Short_Write_1P(0xC0,0x0D);
Generic_Short_Write_1P(0xC1,0x0D);
Generic_Short_Write_1P(0xC2,0x06);
Generic_Short_Write_1P(0xC3,0x06);
Generic_Short_Write_1P(0xC4,0x08);
Generic_Short_Write_1P(0xC5,0x08);
Generic_Short_Write_1P(0xC6,0x0A);
Generic_Short_Write_1P(0xC7,0x0A);
Generic_Short_Write_1P(0xC8,0x0C);
```

```
Generic_Short_Write_1P(0xC9,0x0C);
Generic_Short_Write_1P(0xCA,0x00);
Generic_Short_Write_1P(0xCB,0x00);
Generic_Short_Write_1P(0xCC,0x0E);
Generic_Short_Write_1P(0xCD,0x0E);
Generic_Short_Write_1P(0xCE,0x01);
Generic_Short_Write_1P(0xCF,0x01);
Generic_Short_Write_1P(0xD0,0x04);
Generic_Short_Write_1P(0xD1,0x04);
Generic_Short_Write_1P(0xD2,0x00);
Generic_Short_Write_1P(0xD3,0x00);
Generic_Short_Write_1P(0xD4,0x0D);
Generic_Short_Write_1P(0xD5,0x0D);
Generic_Short_Write_1P(0xD6,0x05);
Generic_Short_Write_1P(0xD7,0x05);
Generic_Short_Write_1P(0xD8,0x07);
Generic_Short_Write_1P(0xD9,0x07);
Generic_Short_Write_1P(0xDA,0x09);
Generic_Short_Write_1P(0xDB,0x09);
Generic_Short_Write_1P(0xDC,0x0B);
Generic_Short_Write_1P(0xDD,0x0B);
Generic_Short_Write_1P(0xDE,0x00);
Generic_Short_Write_1P(0xDF,0x00);
Generic_Short_Write_1P(0xE0,0x0E);
Generic_Short_Write_1P(0xE1,0x0E);
Generic_Short_Write_1P(0xE2,0x01);
Generic_Short_Write_1P(0xE3,0x01);
Generic_Short_Write_1P(0xE4,0x03);
Generic_Short_Write_1P(0xE5,0x03);
Generic_Short_Write_1P(0xE6,0x00);
Generic_Short_Write_1P(0xE7,0x00);

Generic_Short_Write_1P(0xB0,0x03);
Generic_Short_Write_1P(0xBA,0xF0);
Generic_Short_Write_1P(0xC8,0x07);
Generic_Short_Write_1P(0xC9,0x03);
Generic_Short_Write_1P(0xCA,0x41);
Generic_Short_Write_1P(0xD2,0x01);
Generic_Short_Write_1P(0xD3,0x05);
Generic_Short_Write_1P(0xD4,0x05);
```

```
Generic_Short_Write_1P(0xD5,0x8A);
Generic_Short_Write_1P(0xE4,0xC0);
Generic_Short_Write_1P(0xE5,0x00);

Generic_Short_Write_1P(0xB0,0x00);
Generic_Short_Write_1P(0xBF,0x1F);
Generic_Short_Write_1P(0xC0,0x12);
Generic_Short_Write_1P(0xC2,0x1E);
Generic_Short_Write_1P(0xC4,0x1E);

Generic_Short_Write_1P(0xB0,0x06);
Generic_Short_Write_1P(0xB8,0xA5);
Generic_Short_Write_1P(0xC0,0xA5);
Generic_Short_Write_1P(0xBC,0x11);
Generic_Short_Write_1P(0xD5,0x48);
Generic_Short_Write_1P(0xB8,0x00);
Generic_Short_Write_1P(0xC0,0x00);

}


Void ST7789sPanelSleepInMode (void)
{
Generic_Short_Write_NP(0x10);
Delayms (120);
}

Void ST7789sPanelSleepOutMode (void)
{
Generic_Short_Write_NP(0x11);
Delayms (120);
}
```

- -END- -