



SPECIFICATION

FOR

TFT LCD MODULE

CUSTOMER : _____

CUSTOMER MODULE : _____

HG MODEL : HG050VG003

☐ Preliminary Specification

☒ Final Specification

Customer Confirmation column:

Approved by : _____ Dept. : _____ Data : _____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Designed by	Checked by	Approved by

REVISION RECORD

修改记录

[illegible]



CONTENTS

目录

1.GENERAL INFORMATION -- -- -- -- --	- 4
基本描述	
2 .MODULE OUTLINE DRAWING-- -- -- -- --	5
产品外形图	
3.INTERFACE DESCRIPTION -- -- -- -- --	-- 6
接口定义	
4.ABSOLUTE MAXIMUM RATINGS-- -- -- -- --	-- 8
极限参数 (IC)	
5.ELECTRICAL CHARACTERISTICS--- -- -- -- --	-- 8
模块电气特性	
6.BACKLIGHT CHARACTERISTICS-- -- -- -- --	--9
背光电气特性	
7.OPTICAL CHARACTERISTICS-- -- -- -- --	--9
光学特性	
8.Recommended Operating Sequence -- -- -- -- --	--12
推荐上/下电工作流程	
9.RESET INPUT TIMING -- -- -- -- --	13
复位时序	
10.INSPECTION SPECIFICATIONS -- -- -- -- --	--14
品质检验标准	
11.RELIABILITY TEST CONDITIONS -- -- -- -- --	--16
可靠性测试条件	
12.PRECAUTIONS FOR USING LCD MODULES- -- -- -- --	17
模组使用注意事项	
13.PACKING SPCIFICATION -- -- -- -- --	-19
包装规格	



1. GENERAL INFORMATION

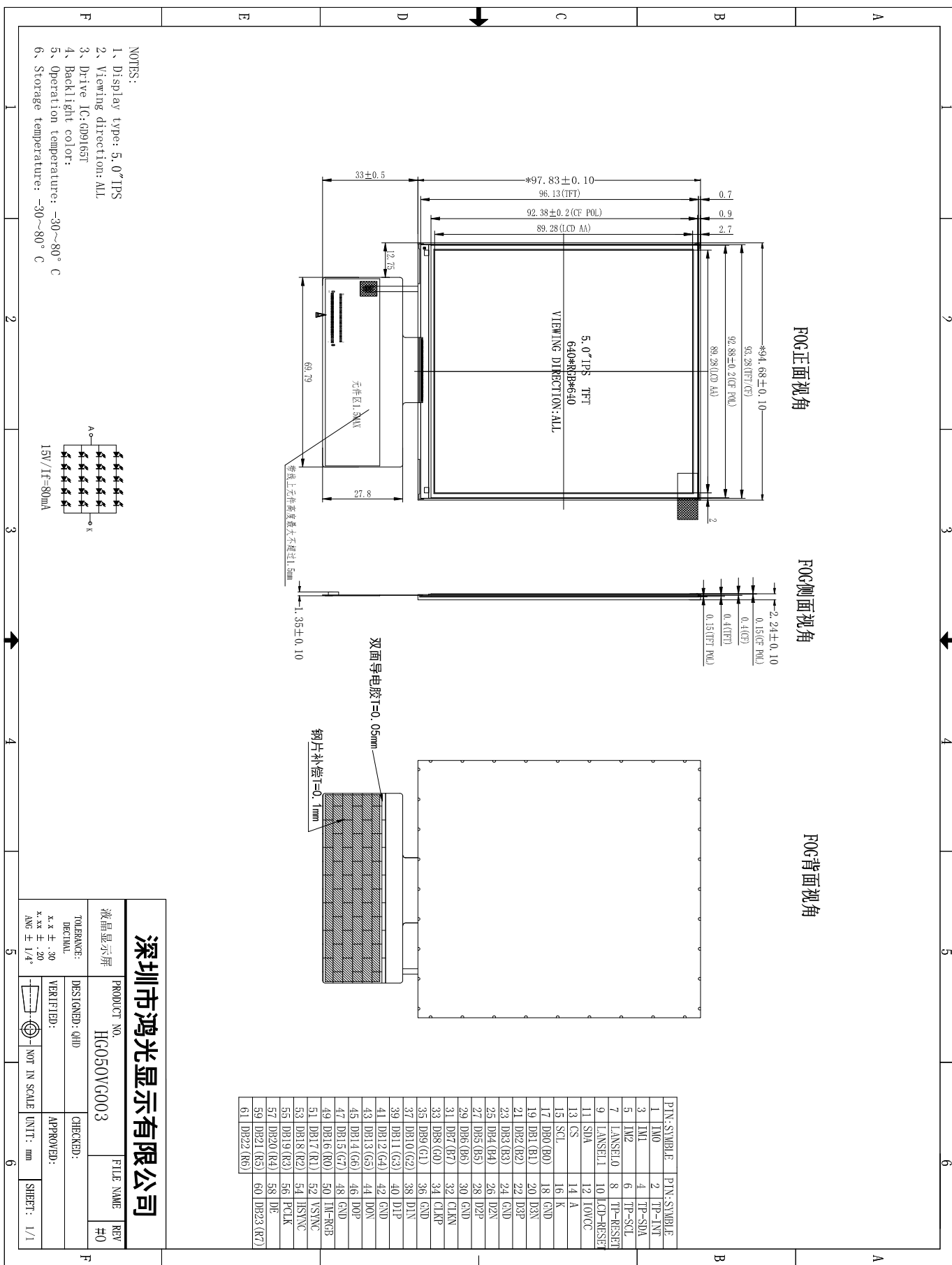
基本描述

- 1)Structure:TFT PANNEL+IC+FPC+BL
- 2)IPS Type LCD 640 dot-segment and 640 dot-common outputs
- 3)White LED back light
- 4)MIPI/RGB interface
- 5)Operation Temperature:-30~80℃
- 6)Storage Temperature:-30~80℃
- 7)CTPcoverlens : -/
- 8)CTPstructure : -/

1.2 General specification

Item of	Contents	Unit
Panel Size	5.0	inch
LCD Type	TRANSMISSIVE	/
Display mode	Normally Black	/
Pixel arrangement	640 (RGB)*640	Dots
Pixel pitch (W*H)	0.021x 0.063	Mm ²
Active Area	89.28 (H) x 89.28 (V)	Mm
Module area (W*H*T)	94.68 (H) *97.83 (V) *2.24 (T)	Mm
Recommended Viewing Direction	ALL	0' clock
Interface	MIPI/RGB	/
Luminance for LCM	400	cd/m2
Color gamut	70	%
Weight	TBD	g

2. MODULE OUTLINE DRAWING 产品外形图





3. INTERFACE DESCRIPTION

LCD 接口定义

Pin No 接口序号	Symbol 符号	Description 描述															
1	IM0	IM_RGB=1 ,IM0-IM1-IM2=1, Parallel RGB(video)+ SPI_3-wire 9bit serial IM_RGB=0 ,IM0-IM1-IM2=0, MIPI															
2	TP-INT	TP-INT I2C															
3	IM1	IM_RGB=1 ,IM0-IM1-IM2=1, Parallel RGB(video)+ SPI_3-wire 9bit serial IM_RGB=0 ,IM0-IM1-IM2=0, MIPI															
4	TP-SDA	TP-SDA I2C															
5	IM2	IM_RGB=1 ,IM0-IM1-IM2=1, Parallel RGB(video)+ SPI_3-wire 9bit serial IM_RGB=0 ,IM0-IM1-IM2=0, MIPI															
6	TP-SCL	TP-SCL I2C															
7	LANSEL0	Select number for MIPI DSI/LVDS data lane. <table border="1"> <thead> <tr> <th>LANSEL[1:0]</th><th>MIPI DSI</th><th>LVDS</th></tr> </thead> <tbody> <tr> <td>00</td><td>Reserved</td><td>6 bit</td></tr> <tr> <td>01</td><td>2 Lanes</td><td>8 bit</td></tr> <tr> <td>10</td><td>3 Lanes</td><td>6 bit</td></tr> <tr> <td>11</td><td>4 Lanes</td><td>8 bit</td></tr> </tbody> </table>	LANSEL[1:0]	MIPI DSI	LVDS	00	Reserved	6 bit	01	2 Lanes	8 bit	10	3 Lanes	6 bit	11	4 Lanes	8 bit
LANSEL[1:0]	MIPI DSI	LVDS															
00	Reserved	6 bit															
01	2 Lanes	8 bit															
10	3 Lanes	6 bit															
11	4 Lanes	8 bit															
8	TP-RESET	TP-RESET I2C															
9	LANSEL1	Select number for MIPI DSI/LVDS data lane. <table border="1"> <thead> <tr> <th>LANSEL[1:0]</th><th>MIPI DSI</th><th>LVDS</th></tr> </thead> <tbody> <tr> <td>00</td><td>Reserved</td><td>6 bit</td></tr> <tr> <td>01</td><td>2 Lanes</td><td>8 bit</td></tr> <tr> <td>10</td><td>3 Lanes</td><td>6 bit</td></tr> <tr> <td>11</td><td>4 Lanes</td><td>8 bit</td></tr> </tbody> </table>	LANSEL[1:0]	MIPI DSI	LVDS	00	Reserved	6 bit	01	2 Lanes	8 bit	10	3 Lanes	6 bit	11	4 Lanes	8 bit
LANSEL[1:0]	MIPI DSI	LVDS															
00	Reserved	6 bit															
01	2 Lanes	8 bit															
10	3 Lanes	6 bit															
11	4 Lanes	8 bit															
10	LCD-RESET	LCD-RESET															
11	SDA	SPI 9 input/output data pin (For RGBmode)															
12	IOVCC	3.3 V Power Supply															
13	CS	SPI 9 Chip select pin (For RGB mode)															
14	LEDA	LEDA															
15	SCL	SPI 9 CLOCK pin (For RGB mode)															
16	LEDA	LEDK															
17	DB0(B0)	Blue data signal(B0 LSB)															
18	GND	GROUND															



19	DB1(B1)	Blue data signal(B1)
20	D3N	MIPI D3N
21	DB2(B2)	Blue data signal(B2)
22	D3P	MIPI D3P
23	DB3(B3)	Blue data signal(B3)
24	GND	GROUND
25	DB4(B4)	Blue data signal(B4)
26	D2N	MIPI D2N
27	DB5(B5)	Blue data signal(B5)
28	D2P	MIPI D2P
29	DB6(B6)	Blue data signal(B6)
30	GND	GROUND
31	DB7(B7)	Blue data signal(B7)
32	CLKN	MIPI CLKN clock
33	DB8(G0)	Green data signal(G0 LSB)
34	CLKP	MIPI CLKP clock
35	DB9(G1)	Green data signal(G1)
36	GND	GROUND
37	DB10(G2)	Green data signal(G2)
38	D1N	MIPI D1N
39	DB11(G3)	Green data signal(G3)
40	D1P	MIPI D1P
41	DB12(G4)	Green data signal(G4)
42	GND	GROUND
43	DB13(G5)	Green data signal(G5)
44	D0N	MIPI D0N
45	DB14(G6)	Green data signal(G6)
46	D0P	MIPI D0P
47	DB15(G7)	Green data signal(G7)
48	GND	GROUND
49	DB16(R0)	Red data signal(R0 LSB)
50	IM-RGB	IM_RGB=1 ,IM0-IM1-IM2=1, Parallel RGB(video)+ SPI_3-wire 9bit serial IM_RGB=0 ,IM0-IM1-IM2=0, MIPI
51	DB17(R1)	Red data signal(R1)
52	VSYNC	RGB interface VSYNC input.
53	DB18(R2)	Red data signal(R2)
54	HSYNC	RGB interface HSYNC input.
55	DB19(R3)	Red data signal(R3)
56	PCLK	RGB interface pixel clock input.
57	DB20(R4)	Red data signal(R4)
58	DE	RGB interface data enable input.
59	DB21(R5)	Red data signal(R5)
60	DB23(R7)	Red data signal(R7)
61	DB21(R6)	Red data signal(R6)



4. ABSOLUTE MAXIMUM RATINGS

极限参数(IC)

Parameter 参数	Symbol 符号	Min 最小值	Max 最大值	Unit 单位
Supply voltage for logic 逻辑电压 I/O	IOVCC	-0.3	+3.6	V
Power Supply voltage 供电电压	VCC	-0.3	+3.6	V
Input voltage for analog circuit 输入模拟电压	VSP	-0.3	+6.5	V
	VSN	-6.5	0	V
Operating temperature 操作温度	TOP	-30	80	°C
Storage temperature 存储温度	TST	--30	80	°C
Humidity 湿度	RH	-	90%(55°C)	RH

5. ELECTRICAL CHARACTERISTICS

模块电气特性

Parameter 参数	Symbol 符号	Min 最小指	Typ 典型值	Max 最大值	Unit 单位
Analog operating voltage 模拟电压	VSP	4.5	5.5	6.5	V
	VSN	-6.5	-5.5	-4.5	V
Logic operating voltage 逻辑电压	IOVCC	2.8	3.3	3.6	V
Power Supply voltage 供电电压	VCC	2.8	3.3	3.6	V
Input voltage “H”level 输入高电平	V _{IH}	0.7 IOVCC	-	IOVCC	V
Input voltage “L”level 输入低电平	V _{IL}	GND	-	0.3 IOVCC	V
Output voltage “H”level 输出高电平	V _{OH}	0.8IOVCC	-	IOVCC	V
Output voltage “L”level 输出低电平	V _{OL}	GND	-	0.2 IOVCC	V

6. BACKLIGHT CHARACTERISTICS

背光电气特性

Item 项目	Symbol 符号	Min 最小值	Typ 中间值	Max 最大值	Unit 单位	Condition 条件
Forward voltage 正向电压	Vf	14.5	15	16.5	V (伏)	If=80MA Ta=25℃
Number of LED LED 灯数	-	20			Piece (颗)	-
Connection mode 连接类型	S/P	/			-	-

7. OPTICAL CHAYACTERISTICS

光学特性

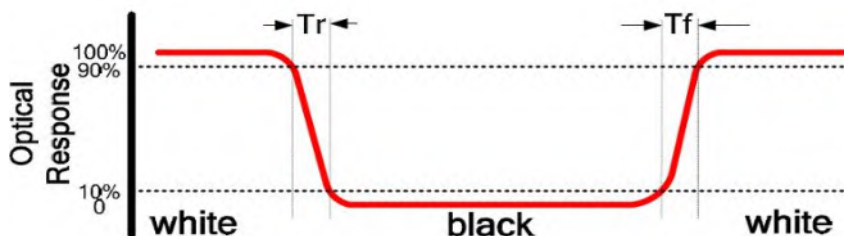
Item 项目	Symbol 符号	Condition 条件	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	Remark 注释	Note 备注
Response time 响应时间	Tr+Tf	$\Theta=0^{\circ}$ $\varnothing=0^{\circ}$ Ta=25℃	-	30	35	ms	FIG1	1
Contrast ratio 对比度	Cr		1000	1400	-	-	FIG2	2
Color gamut 色域	S(%)		65	70	-	%	-	-
Luminance uniformity 均匀度	δ WHITE		-	80	-	%	FIG2	3
Viewing angle range 视角范围	Θ_{x+}	CR ≥ 10 Ta=25℃	70	80	-	deg	FIG3	4
	Θ_{x-}		70	80	-	deg	FIG3	
	Θ_{y+}		70	80	-	deg	FIG3	
	Θ_{y-}		70	80	-	deg	FIG3	
LCM Luminanc LCM 单体亮度	Lv	$\Theta=0^{\circ}$ $\varnothing=0^{\circ}$ Ta=25℃	-	400	-	Cd/m ₂	FIG2	5
CIE (X,Y) Chromaticity 色度坐标	White(X)		-0.03	0.287	+0.03	-	FIG2	6
	White(Y)		-0.03	0.312	+0.03	-		

Note1.Response time is the time required for the display to transition from White to black(Rise Time,Tr)and from black to white(Decay Time,Tf).For additional information see FIG1...

备注 1. 响应时间是 Tr(上升时间) 与 Tf(下降时间) 的和, Tr 指显示黑色画面转为显示白色画面需要时间, Tf 指显示白色画面转为显示黑色画面需要时间, 详见 FIG1.。

FIG1. The definition of Response time

响应时间定义



Note2.contrast Ratio(CR) is defined mathematically by the following formula ,For more information see FIG2.

Contrast Ratio(CR)=Average Surface Luminance with all white pixels/ Average Surface Luminance with all black pixels

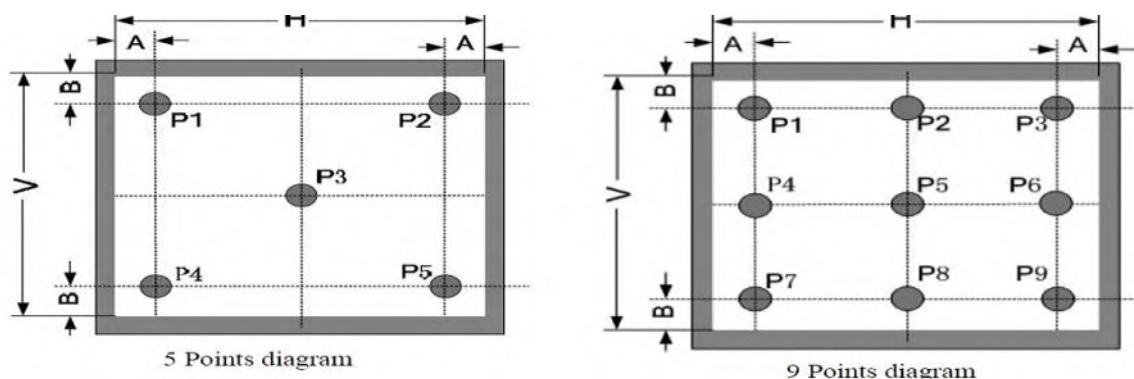
备注 2. 对比度是由以下公式计算所得。详见 FIG2.

对比度=显示白色画面时平均表面亮度 (P1, P2, ………)/显示黑色画面时平均表面亮度 (P1, P2, ………)

FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)

chromaticity.

对比度，表面亮度，均匀度，CIE 坐标测试方法



Note3.The uniformity in surface luminance(WHITE) is determined by measuring luminance at each test position,and then dividing the maximum luminance of all white pixels by minimum luminance of all white pixels,For more information seeFIG2.

WHITE=Minimum Surface Luminance with all white pixels(P1,P2,………)/Maximum Surface Luminance with all white pixels(P1,P2,………)

备注 3. 均匀度是在显示白色画面时，测试 P1 到 P9 的亮度，然后再用 9 个点亮度的最小值除以最大值。详见 FIG2. 。

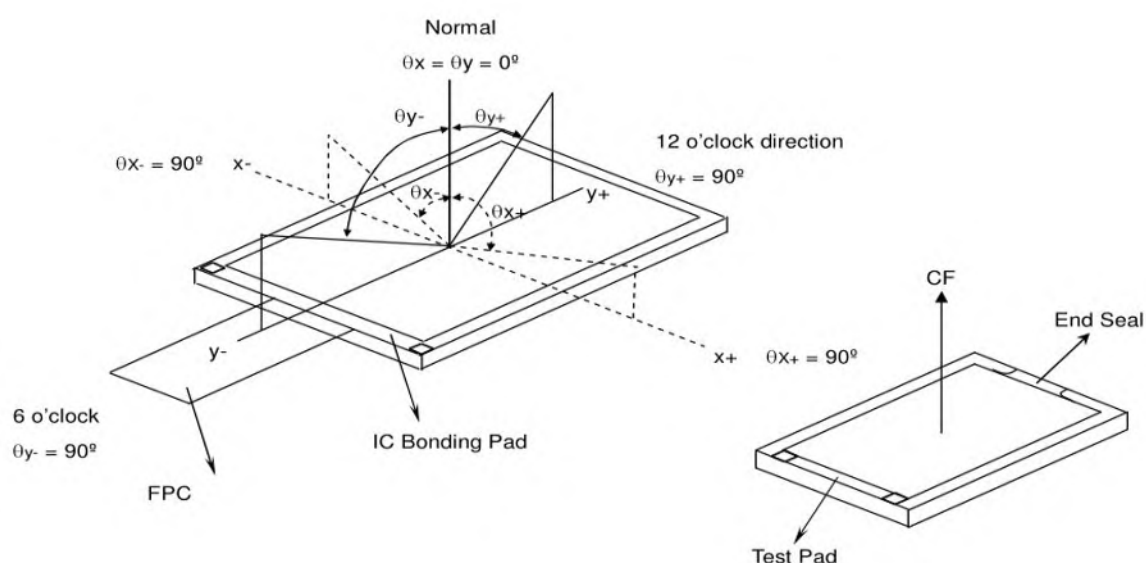
均匀度=白色画面下表面亮度最小值 (P1, P2, ………)/白色画面下表面亮度最大值 (P1, P2, ………)

Note4.Viewing angle is the angel at which contrast ratio is greater than a specific value.For TET module,the specific value of contrast ratio is 10.For monochrome and color stn module,the specific

value of contrast ratio is 2. 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. For more information see FIG3

备注 4. 视角指对比度大于等于一个特定值时的可视范围，对 TFT 屏，对比特定值为 10，对黑白屏 CSTN 屏，对比度特定值为 2，视角由横轴（X 轴），竖轴（Y 轴）同 Z 轴（垂直与 LCD 表面）之间的夹角来定义，详见 FIG3.。

FIG3 The definition of viewing angle 视角定义



Note5. Surface luminance is the LCD surface luminance with all white pixels, For more information see FIG2.

LV=Average Surface Luminance with all white pixels(P1,P2,.....)

备注 5. 表面亮度是在显示白色画面时，测试的亮度值，详见 FIG2.

Lv=平均的表面亮度（P1，P2，……）

Note6. CIE(X,Y)chromaticity is the Center point value. For more information see FIG2.

备注 6. 选择中心点，分别测试 X，Y 值，详见 FIG2.。

Note7. For Viewing angle and response time testing, the testing date is base on Autronic-Melchers' s ConScope. Series instruments. For contrast ratio, Surface Luminance, Luminance uniformity and CIE, the testing date is base on CS-2000(BM-7/CA310) photo detector.

备注 7. 视角和响应时间，测试数据基于 Autronic Melchers' s Conoscope 系列测试仪器，而对比度，表面亮度，均匀度 CIE 坐标，测试数据基于 CS-2000(BM-7/CA310)光学测试仪。

Note8. For TN type TFT transmissive module, Gray scale reverse occurs in the direction of panel viewing angle

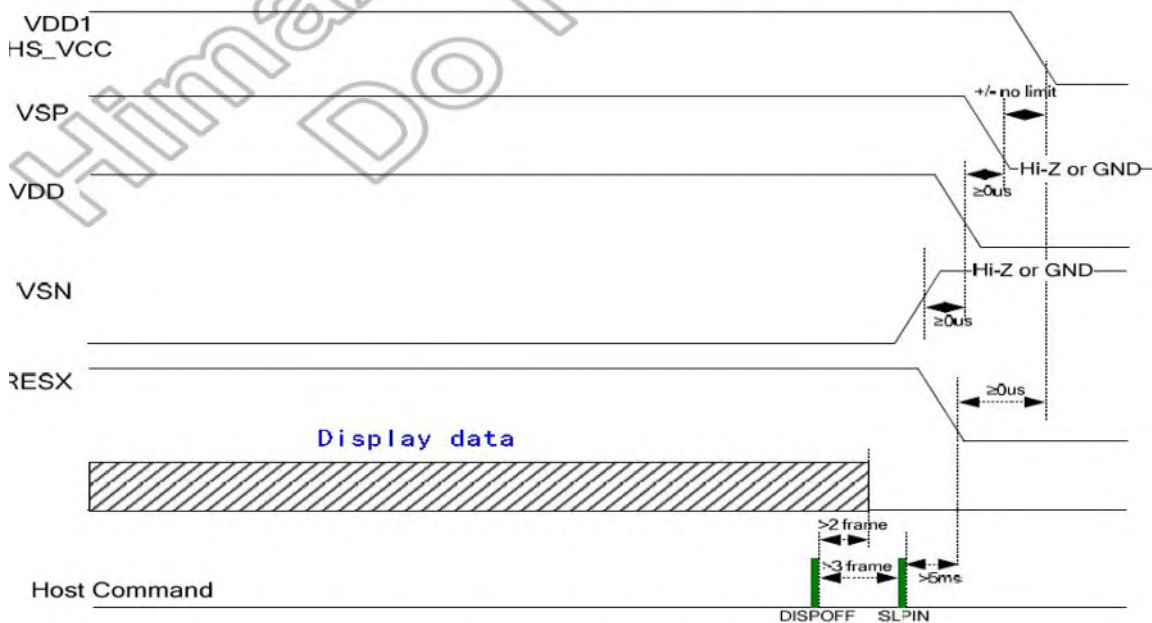
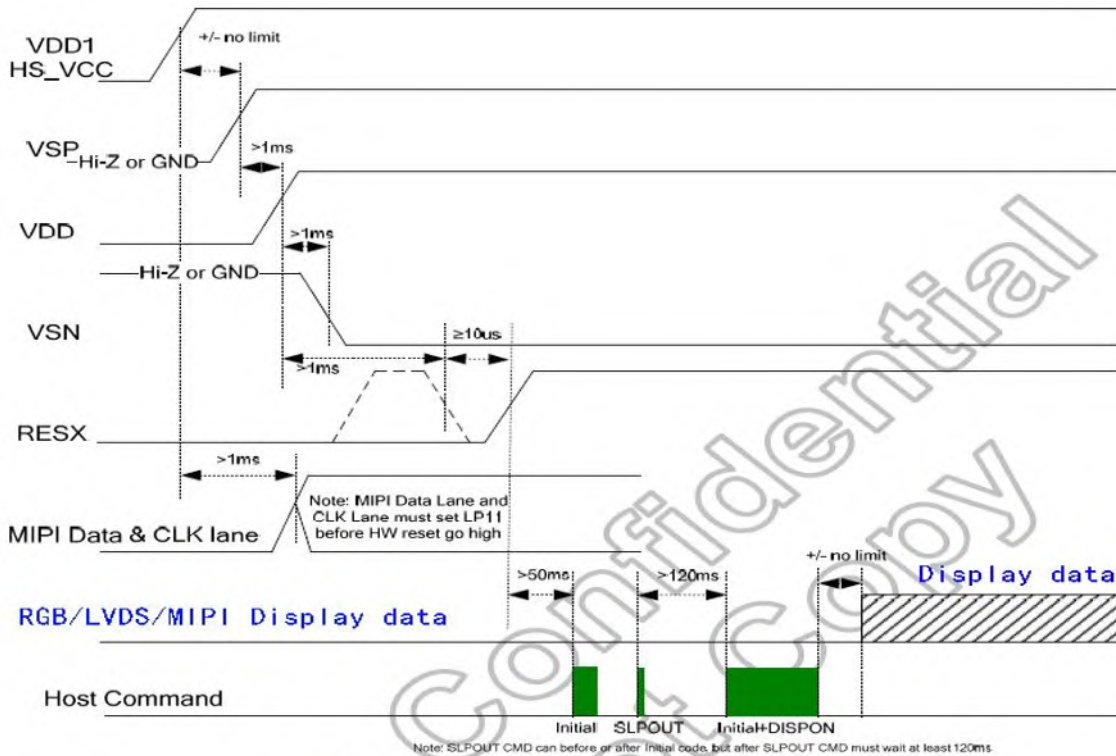
备注 8. TN 型 TFT 全透产品，在视角方向会发生灰度反转。



8.Recommended Operating Sequence

推荐上/下电工作流程

8.1 Power on/off sequence with 2- power



NOTE: This section is only for reference,Details please refer to the IC specification.

备注：本节仅供参考,详细信息请参阅 IC 规格书。



9. RESET INPUT TIMING

复位时序

8.3.5 Reset input timing

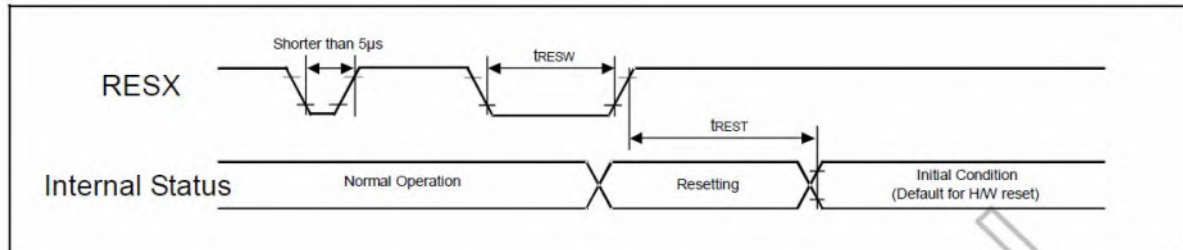


Figure 8.10: Reset input timing

Symbol	Parameter	Related pins	Spec.			Unit	Note
			Min.	Typ.	Max.		
t _{RESW}	Reset low pulse width ⁽¹⁾	RESX	10	-	-	µs	-
t _{REST}	Reset complete time ⁽²⁾	-	-	-	50	ms	HX8399-A reset execute period when reset is applied during Sleep In mode
		-	-	-	120	ms	HX8399-A reset execute period when reset is applied during Sleep Out mode

Note: (1) Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 5 µs	Reset Rejected
Longer than 10 µs	Reset
Between 5 µs and 10 µs	Reset Start

- (2) During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then returns to Default condition for H/W reset.
- (3) During Reset Complete Time, OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (t_{REST}) within 5ms after a rising edge of RESX.
- (4) Spike Rejection also applies during a valid reset pulse as shown below:

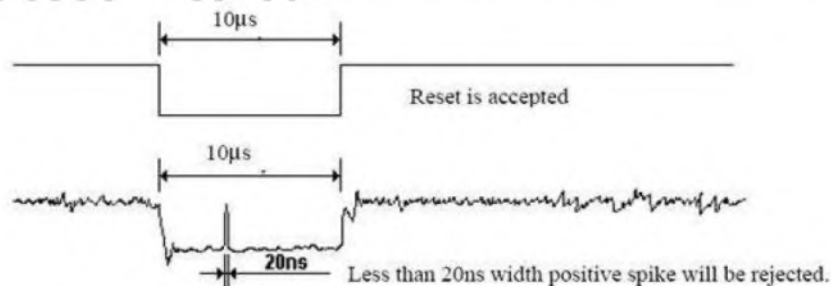


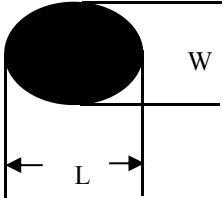
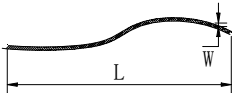
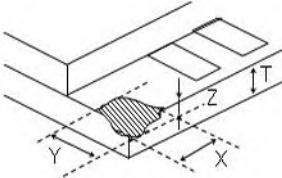
Table 8.16: Reset timing

NOTE: This section is only for reference,Details please refer to the IC specification.

备注：本节仅供参考, 详细信息请参阅 IC 规格

10. INSPECTION SPECIFICATIONS

品质检验标准

不良项目	判定标准				缺点类别	
点状缺陷	 D= (L+W) / 2 单位: mm 点不良间距需 ≥ 30mm	尺寸		允许个数	轻缺	
		D ≤ 0.10		忽略不计		
		0.10 < D ≤ 0.15		2 密集不可		
		0.15 < D ≤ 0.2		1		
		D > 0.2		0		
亮点	1. 单一点: 单个 Pixel 2. 连续点: 相连 2 个 Pixel 3. 亮点及暗点总个数不可超过 2 个	单一点		2	轻缺	
暗点		2 连续亮点		1		
		坏点		2		
		2 连续暗点		1		
Mura	斑点、不均	参照 LCD 原厂判定标准, 用 ND:5%			轻缺	
电测 线状缺陷		尺寸		允许个数	轻缺	
		W ≤ 0.03		忽略不计		
		L ≤ 5.0, 0.03 < W ≤ 0.05		1		
		W > 0.05		依点状缺陷判定		
外观 线状缺陷	L: 长度 W: 宽度 线不良间距需 ≥ 10.0mm	尺寸		允许个数		
		W ≤ 0.03		忽略不计		
		L ≤ 10.0, 0.03 < W ≤ 0.05		2 个		
		W > 0.05		依点状缺陷判定		
LCD 角破损 (端子位)		长度 X	宽度 Y	高度 Z	允许数	轻缺
		X ≤ 2.0	Y ≤ 2.0	Z ≤ T	2	
		2.0 < X ≤ 3.0	2.0 < Y ≤ 3.0	Z ≤ T	1	
		X > 3	Y > 3	Z ≤ T	0	



LCD 边破损 (端子位)			1. 长度 $X \leq 5.0$ 宽度 $Y \leq 1.0$ 2. 崩裂位置不可伤及 IT0 线路、不可影响 bonding			轻缺
LCD 角破损 (非端子部)	 崩裂位置不可伤及线路	长度 X	宽度 Y	高度 Z	允许数	轻缺
		$X \leq 2.0$	$Y \leq 2.0$	不计	2	
		$2.0 < X \leq 3.0$	$2.0 < Y \leq 3.0$	不计	1	
		$X > 3$	$Y > 3$		0	
LCD 边破损 (非端子部)	 崩裂位置不可伤及线路	长度 X	宽度 Y	高度 Z	允许数	轻缺
		$X \leq 7.0$	$Y \leq 0.5$	$Z \leq T/2$	2	
		$X \leq 7.0$	$0.5 < Y \leq 0.8$	$Z \leq T$	1	
		$X > 7.0$	$Y > 0.8$		0	
玻璃突出			1. Y、Y1、Z 均 ≤ 0.2 且 $Y+Y1 \leq 0.2$ 时 X 长度不计 2. Y、Y1、Z > 0.2 或 $Y+Y1 > 0.2$ 时，不允许			轻缺
LCD 裂纹			1: 内裂发生不可。 2: 外裂修正以玻璃破损规格判定, 但不能有可清除的玻璃屑附着。			重缺
外观检查	CF 偏光片保护膜上划线不可有、气泡不可有、盖章不可有（依客户特殊要求）					轻缺

Note; The rest of the test items according to our standards

注：其余测试项按我司标准执行



11. RELIABILITY TEST CONDITIONS

可靠性测试条件

NO. 序号	Test Item 实验项目	Test Condition 实验条件	Inspection after test 实验后检查
1	High Temperature Storage 高温存储测试	80℃±2℃/48 hours	Inspection after 2~4 hours storage at room temperature ,the sample shall be free from defects:实验结束后，已测试的 LCD 样品必须在室内正常温湿度环境下放置，2~4 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.Sealleak;封口松脱 3.Non-display;不显示 4.missing segments;漏笔 5.Glass crack;玻璃破碎 6.Current IDD is twice higher than initial value. 电流 IDD 大于初始值的两倍。
2	Low Temperature Storage 低温存储测试	-30℃±2℃/48 hours	
3	High Temperature Operating 高温操作测试	80℃±2℃48 hours	
4	Low Temperature Operating 低温操作测试	-30℃±2℃/48 hours	
5	Temperature Cycle 冷热循环存储	-30℃±2℃~80℃±2℃* 10 次 cycles (30min.) ~ (30min.)	
6	Damp Proof Test 防潮测试	55℃±5℃*90%RH/48 hours	
7	ESD Test 抗静电性测试	测试前对样品进行外观和功能测试，采用空气放电，对 TP 进行单次放电，9 个点每一点放电一次，每次间隔≥5s, 9 个点为一个循环。放点电压：±8KV，每一个循环放电后进行检查，如果合格就进行下一循环测试，如果不合格，试验停止，并进行问题判定	试验样品电气功能正常



12. PRECAUTIONS FOR USING LCD MODULES

模组使用注意事项

1. Handling precautions 使用注意事项

1.1 The display panel is made of glass and polarizer. As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

显示屏由玻璃和偏光片组成，由于玻璃是脆的，使用过程中要特别注意边缘区，请防止跌落或震动，不能机械碰撞。

1.2 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands, This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer)

请勿施加过大的压力与显示屏或连接部位，否则会引起色调变化，不要用手接触显示屏，这将弄脏显示区和降低端子之间的绝缘能力，（一些外观是由偏光片决定的）

1.3 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc). Do not put or attach anything on The display area to avoid leaving marks on it. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in container before coming in to contact with room temperature air.

覆盖液晶显示模块显示平面的偏光片是软性且易被擦伤，请小心轻拿，请勿用任何硬度大于 HB 铅笔芯的物品（玻璃，镊子等）接触、撞压或摩擦裸露偏光片，不要放置或粘附物体在显示区域上以免留下痕迹，冷凝在表面和端子将会损坏或弄脏偏光片，产品在低温下测试之后，与室温空气接触之前必须在容器内升温。

1.4 Tools required for assembling, such as soldering irons, must be properly grounded. Make certain the AC power source for the soldering iron does not leak. When using an electric

screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

使用工具如电烙铁，要可靠接地，并确保烙铁使用交流电，不要漏电，用电批固定模块时，电批应接地，尽可能降低电动换向器火花产生的电磁波。

2. Handling precaution for LCM 模块操作规范

2.1 LCM is easy to be damaged. Please note below and be careful for handling.

液晶显示模块很容易被损坏，请注意以下并小心操作

2.2 Correct handling; 正确操作

Please handle with anti-static gloves around LCM edges.

请戴防静电手套，并拿模块边缘。

2.3 Incorrect handing 错误操作

Please don't stack LCM 不要把模块叠在一起

Please don't operate with sharp stick such as pens 请不要用尖锐的物体来操作，例如用笔尖

2.4 Input logic voltage before apply analog high voltage such as LCD driving voltage when power on.Remove analog high voltage before logic when power off the module.Input each signal after the positive/negative voltage becomes stable.

开机时，先开逻辑电压，再接通模拟电压，如显示屏驱动电压。关机时，先断开模拟电压，再关逻辑电压，正负电源都稳定后再送控制信号。

2.5 If the LCD modules have been operating for a long time showing the same display patters,the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear.A normal operating status can be regained by suspending use for some time.It should be noted that this phenomenon does not adversely affect performance reliability.如果液晶显示模块长时间工作于同一个显示图案，换屏时会出现鬼影，也会出现轻微的对比度不均，停止使用一段时间后可恢复到正常状态，此现象不会严重影响性能可靠性。

2.6 Please keep the temperature within the specified range for use and storage.Polarization degradation,bubble generation or polarizer peel-off may occur with high temperature and high humidity.

模块在操作和存储规范范围内使用，高温高湿可能会引起偏振退化，气泡，偏光片脱落等问题。

3. Storage Precautions 存储注意事项

3.1 When storing the LCD modules,the following precaution are necessary.

液晶显示模块的存储依照以下几点：

3.2 Store them in sealed polyethylene bag.If properly sealed,there is no need for the desiccant 使用聚乙烯密袋封，如果密封得当，不需要干燥剂。

3.3 Store them in a dark place.Do not expose to sunlight or fluorescent light,keep the temperature between0~35℃,and keep the relative humidity between40%RH and 40%RH.

避光保存，避免直接暴晒在太阳光或黄光灯下，保持温度在 0~35℃之间，保持相对湿度在 40% RH 和 60%RH 之间。

3.4 The polarizer surface should not come in contact with any other objects(We advise you store them in the anti-static electricity container in which they were shipped)

偏光片表面避免接触其他物质（建议存放在货运防静电包装中

4 Transportation Precautions 运输注意事项

4.1 During shipment,pleas handle with care.The packaging bag can not be broken,step on trap.Packing Carton layer height can not be over two meters .

装运过程要轻拿轻放，不能出现包装袋破损，塌陷，卡通箱叠层高度不能超过两米。

4.2 The transportation process should pay attention to the waterproof and moisture-proof measures.Product can not be watering.Ethylene sealed bags can not be unsealed.

运输过程要注意有防水和防潮措施，产品不能淋水，产品乙烯密封袋不可拆封。



13. PACKING SPECIFICATION

包装规格

