

LCD MODULE SPECIFICATION

Model:	UEOL060FH-RB39-A001A
Version:	V1.0
Date:	2023.03.20

Customer Confirmation 客户确认

Approved by	Notes

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VIEWE Confirmation 优奕确认

Prepared by	Reviewed by	Approved by

REVISION HISTORY 修改履历

Revision 版本号	Date 日期	Contents of Revision Change 修改内容	Remark 备注
V1.0	2023.03.20	Preliminary release	

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1. GENERAL INFORMATION 一般信息

Item 项目	Specification 规格	Unit 单位	Remark 备注
Display Type	AMOLED	-	-
Screen Size 屏幕尺寸	6.01	Inch	Diagonal
Resolution 分辨率	1080(W)*3(RGB)*2160(H)	Dots	-
Module Power Consumption 模块功率	TBD	Watt	
Active Area 显示区尺寸	68.256(W)×136.512 (H)	mm	-
Module Size (W*H*D) 模组外形尺寸	70.066(W)x142.297(H)x0.773(D)	mm	
Technology Type 技术类型	LTPS	-	
Display Color 显示颜色	16.7M	Colors	24bits
Driver IC 控制IC	CH13721C	-	
TP IC 触摸IC	CST148	-	
Interface Mode 接口类型	39PIN MIPI 4 LANE	-	
Display mode 显示模式	Normally Black	-	
Luminance 亮度	360	cd/m ²	Typ.
Viewing Direction 视角	ALL	O'clock	-
Surface Treatment 表面处理	Hard Coating	-	
NTSC 色域	100%	-	Typ.

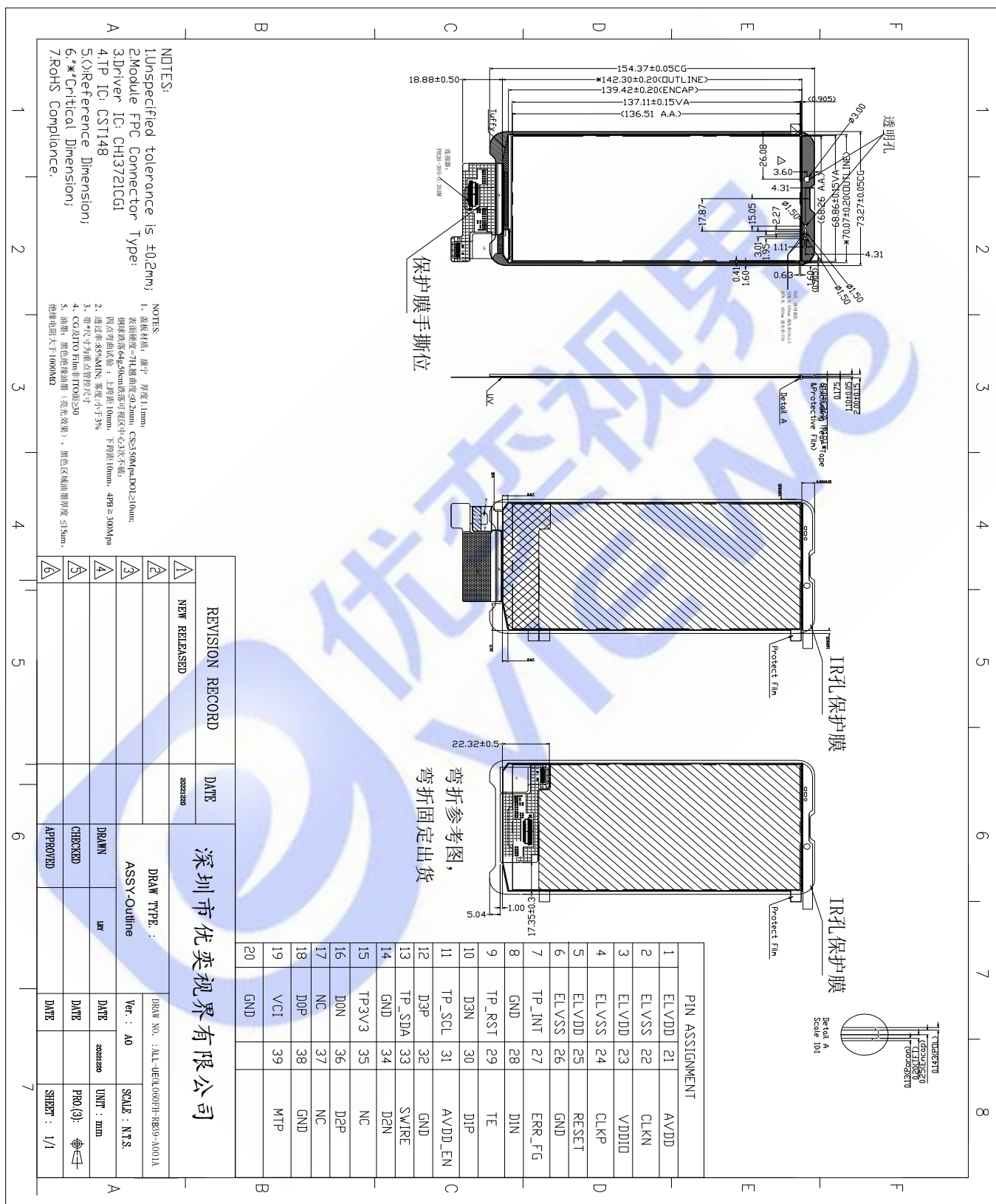
2. ABSOLUTE MAXIMUM RATINGS 绝对最大额定值

Item 项目	Symbol 符号	Min. 最小值	Max. 最大值	Unit 单位	Remark 备注
Analog Power supply	VCI	-0.3	5.5	V	
Logic Power supply	VDDIO	-0.3	5.5	V	
Positive Power Input	ELVDD	-0.3	+6.6	V	
Negative Power Input	ELVSS	-6.6	+0.3	V	
Analog Power supply	AVDD	4.5	6.5	V	

(Ta=+25°C, GND=0V)

Note: Functional operation should satisfy the limits in the Electrical Characteristics tables or Pin Description section. If the module exceeds the absolute maximum ratings, permanent damage may occur. Besides, if the module is operated with the absolute maximum ratings for along time, the reliability may also drop.

3. MECHANICAL DRAWING 结构图纸



4. I/O CONNECTION 输入/输出连接定义

Pin No. 序号	Symbol 符号	I/O	Description 描述
1、3、5	ELVDD	P	Positive Power supply for EL
2、4、6	ELVSS	P	Negative Power supply for EL
7	TP_INT	I/O	INT Pin for TP
8	GND	GND	GND
9	TP_RST	I	Reset Pin for TP
10	D3N	I/O	MIPI-DSI data differential signal pins.
11	TP_SCL	I/O	SCL pin for TP
12	D3P	I/O	MIPI-DSI data differential signal pins.
13	TP_SDA	I/O	SDA pin for TP
14	GND	GND	GND
15	TP_3.3V	P	Analog Power for TP
16	D0N	I/O	MIPI-DSI data differential signal pins.
17	NC	-	No connect
18	D0P	I/O	MIPI-DSI data differential signal pins.
19	VCI	P	Power Supply for analog Circuit
20	GND	GND	GND
21	AVDD	P	External Power input for AVDD
22	DKN	I/O	MIPI-DSI data differential signal pins.
23	VDDIO	P	Power Supply for display logic circuit
24	DKP	I/O	MIPI-DSI data differential signal pins.
25	RESX	I	The external reset input for Display
26	GND	GND	GND
27	ERR_FG	O	Error status of MIPI' s HSDT
28	D1N	I/O	MIPI-DSI data differential signal pins.
29	TE	O	Tearing effect pin
30	D1P	I/O	MIPI-DSI data differential signal pins.
31	AVDD_EN	O	DC/DC Power EnablePin
32	GND	GND	GND
33	SWIRE	O	DC/DC Power IC S-WireCTRLPin
34	D2N	I/O	MIPI-DSI data differential signal pins.
35	NC	-	No connect
36	D2P	I/O	MIPI-DSI data differential signal pins.
37	NC	-	No connect
38	GND	GND	GND
39	MTP	P	Power supply for MTP Programming or Erase. If it is not used, please let it open

Note: I=Input; O=Output; P=Power; I/O=Input / Output

5. ELECTRICAL CHARACTERISTICS 电气特性

5.1 AMOLED Panel Driving Section AMOLED 面板驱动部分

Item		Symbol	MIN	TYP	MAX	Unit
Logic Powersupply		VDDIO	1.65	1.80	3.3	V
Analog Powersupply		VCI	2.75	3	3.30	V
ELVDD Supply Voltage		ELVDD	4.3	4.4	4.5	V
ELVSS Supply Voltage		ELVSS	-2.7	-2.6	-2.5	V
Interface operating voltage		AVDD	6.3	6.4	6.5	
Input Signal Voltage	High Level	VIH	0.80*VDDIO	-	VDDIO	V
	Low Level	VIL	0.00	-	0.20*VDDIO	V
Output Signal Voltage	High Level	VOH	0.80*VDDIO	-	VDDIO	V
	Low Level	VOL	0.00	-	0.20*VDDIO	V
Normal		I _{ELVDD}	-	-	147	mA
		I _{ELVSS}	-	-	114	mA
		I _{VCI}	-	-	3	mA
		I _{VDDIO}	-	-	27	mA
		I _{avdd}	-	-	12	mA
Stand-by		I _{VCI}	-	-	TBD	uA
		I _{VDDIO}	-	-	TBD	uA

Ta= 25 °C

Note1: The input digital voltage is the I/O reference voltage.

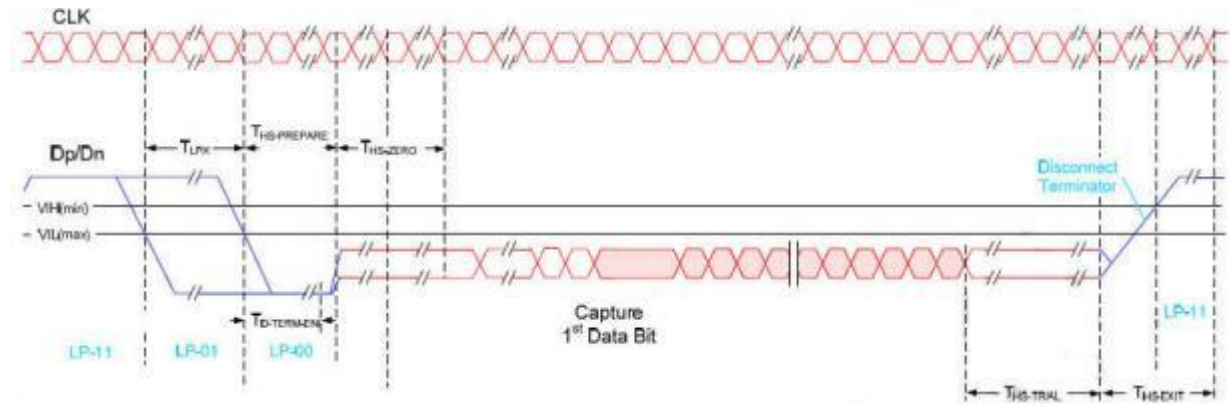
Note2: VDDIO usually ranges from 1.65V to 3.3 V. If VDDIO is changed, the remaining voltage needs to be changed to the same voltage as VDDIO.

Note3: Under full white pattern, Video Mode 60.5Hz.

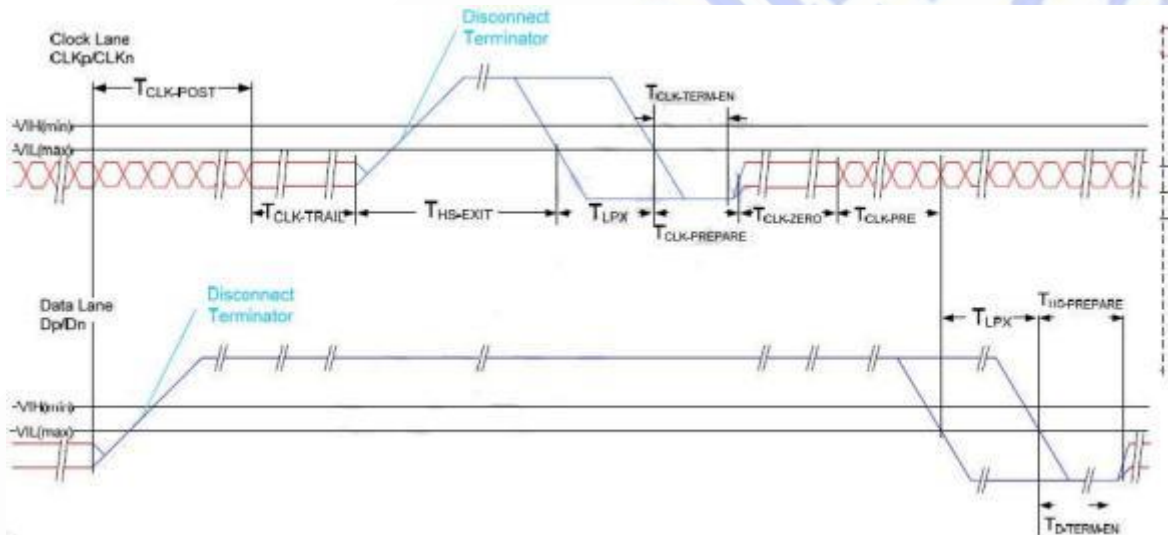
Note4: 60Hz command mode at 896 Mbps

5.2 AC Characteristics 交流特性

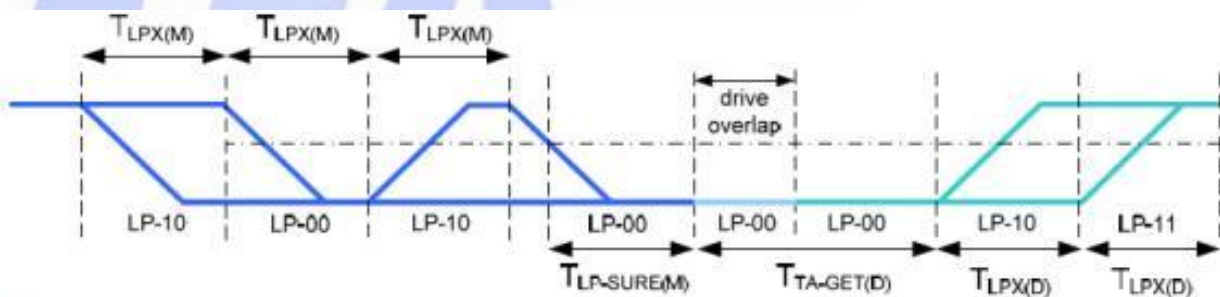
5.2.1 MIPI Interface Characteristics



HS Data Transmission Burst

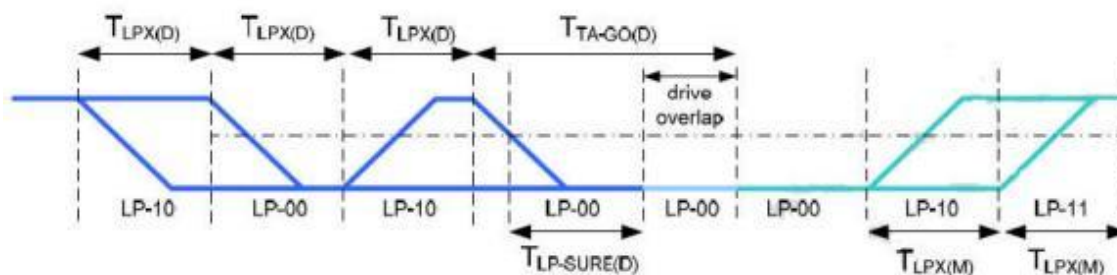


HS clock transmission



Turn around Procedure

Bus turn around (BAT)from MPU to display module timing



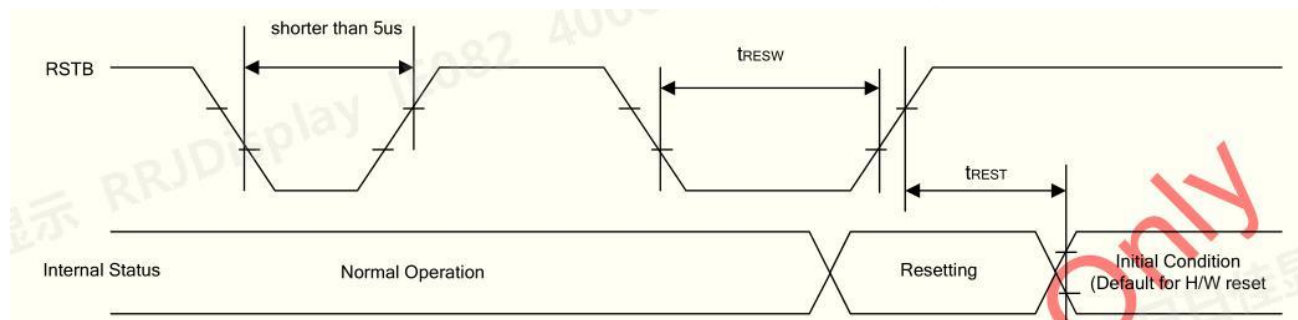
5.2.2 Timing Characteristics 时序特征 (Ta=+25°C,GND=0V)

Parameter	Description	Min	Typ	Max	Unit
$T_{CLK-POST}$	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 $T_{HS-TRAIL}$ to the beginning of $T_{CLK-TRAIL}$.	$60ns + 52 \cdot UI$			ns
$T_{CLK-TRAIL}$	Time that the transmitter drives the HS-0 state after the last payload clock bit of a HS transmission burst.	60			ns
$T_{HS-EXIT}$	Time that the transmitter drives LP-11 following a HS burst.	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
$T_{CLK-PREPARE}$	Time that the transmitter drives the Clock Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission.	38		95	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			UI
$T_{CLK-PREPARE} + T_{CLK-ZERO}$	$T_{CLK-PREPARE}$ + time that the transmitter drives the HS-0 state prior to starting the Clock.	300			ns
$T_{D-TERM-EN}$	Time for the Data Lane receiver to enable the HS line termination, starting from the time point when Dn crosses V_{IL_MAX} .	Time for Dn to reach $V_{TERM-EN}$		$35 ns + 4 \cdot UI$	
$T_{HS-PREPARE}$	Time that the transmitter drives the Data Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission	$40ns + 4 \cdot UI$		$85 ns + 6 \cdot UI$	ns
$T_{HS-PREPARE} + T_{HS-ZERO}$	$T_{HS-PREPARE}$ + time that the transmitter drives the HS-0 state prior to transmitting the Sync sequence.	$145ns + 10 \cdot UI$			ns
$T_{HS-TRAIL}$	Time that the transmitter drives the flipped differential state after last payload data bit of a HS transmission burst	$60ns + 4 \cdot UI$			ns

Parameter	Description	Min	Typ	Max	Unit	Notes
$T_{LPX(M)}$	Transmitted length of any Low-Power state period of MCU to display module	50		150	ns	1,2
$T_{TA-SURE(M)}$	Time that the display module waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	$T_{LPX(M)}$		$2 \cdot T_{LPX(M)}$	ns	2
$T_{LPX(D)}$	Transmitted length of any Low-Power state period of display module to MCU	50		150	ns	1,2
$T_{TA-GET(D)}$	Time that the display module drives the Bridge state (LP-00) after accepting control during a Link Turnaround.		$5 \cdot T_{LPX(D)}$		ns	2
$T_{TA-GO(D)}$	Time that the display module drives the Bridge state (LP-00) before releasing control during a Link Turnaround.		$4 \cdot T_{LPX(D)}$		ns	2
$T_{TA-SURE(D)}$	Time that the MPU waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	$T_{LPX(D)}$		$2 \cdot T_{LPX(D)}$	ns	2

5.2.3 Display RESET Timing Characteristics 重置时序特征

VDDIO=1.65 to 3.3V, VDD=2.7 to 3.6V, AGND=DGND=0V, Ta=-40 to 85°C



Reset input timing

Signal	Symbol	Parameter	Min.	Typ.	Max.	Unit	Description
RSTB	tRESW	Reset "L" pulse width (Note 1)	10	-	-	μs	-
	tREST	Reset complete time (Note 2)	-	-	5	ms	When reset applied during Sleep In Mode
			-	-	120	ms	When reset applied during Sleep Out Mode

Timing Parameters

Note1.Spike caused by an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

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

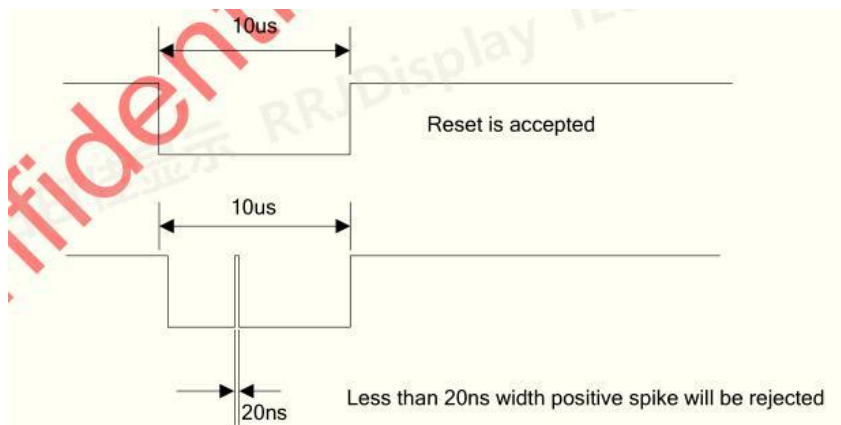
Note 2: During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In–mode)

and then return to Default condition for H/W Reset.

Note 3: During Reset Complete Time, values in OTP memory 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 RSTB.

Note 4: Spike Rejection also applies during a valid Reset pulse as shown below:



Note5. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command can not be sent for 120msec.

5.2.4 TE Timing Characteristics

Model1 , TheTearingEffectOutputlineconsistsofV- Blankinginformationonly.



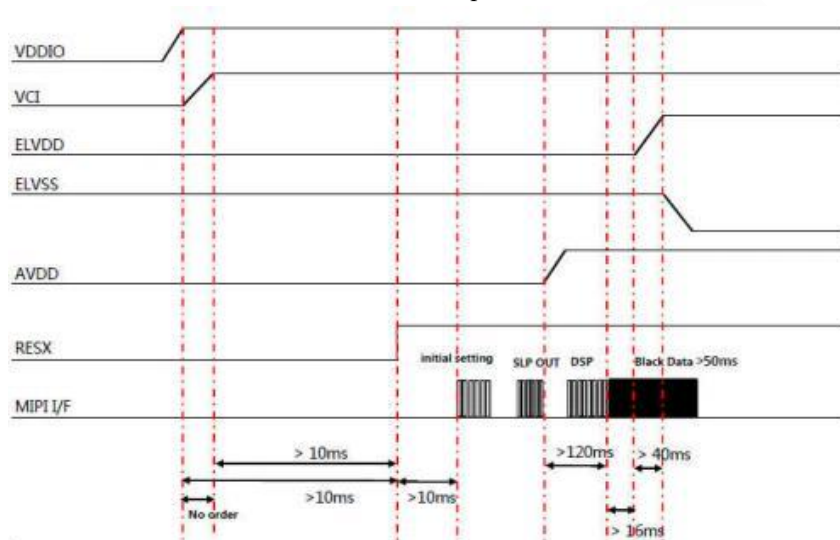
Tvdh = The display is not updated from the frame memory.

Tvdl= The display is updated from the frame memory.

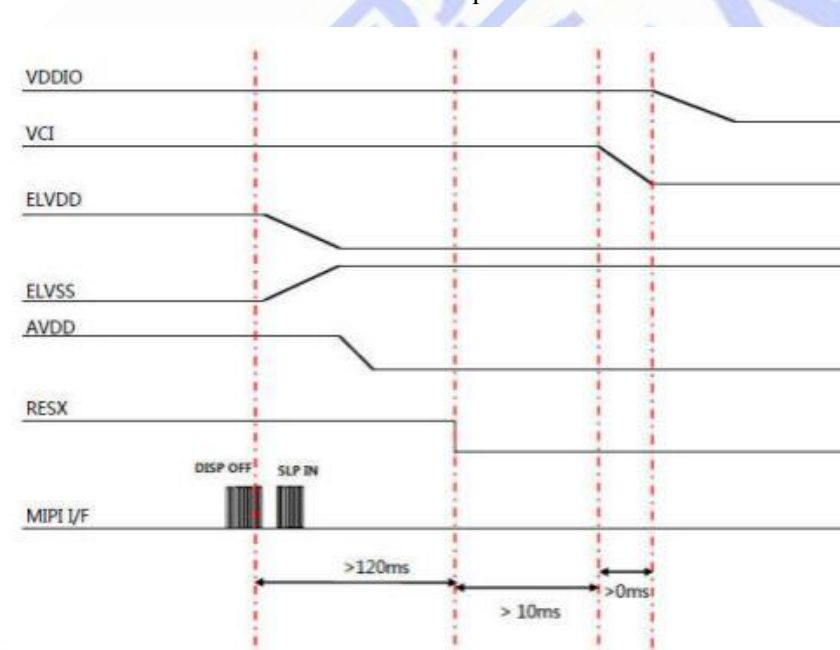
5.3 Recommended Operating Sequence 推荐操作时序

5.3.1 Display Power on / off Sequence

Power On Sequence



Power Off Sequence



5.3.2 Brightness contro

Use “ command 5 1 0 0 h, data xxh ” to adjust the Manual Brightness value of the display:

In principle relation ship is that 0 0 h value means the lowest brightness and FFh value means the highest brightness.

Inst/Para	R/W	Address		Date Type	Description
		MIPI	Other		
BRTCTRL	W	51h	5100h	Hex	Value form 0~255(FF)

6. OPTICAL CHARACTERISTICS 光学特性

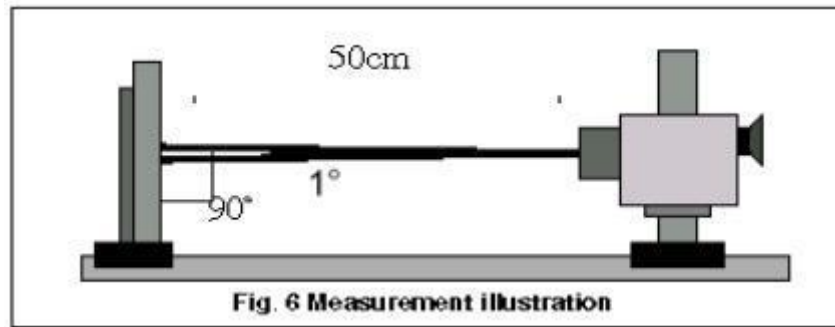
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
ViewAngle	θT	CR≥10	80	-		Degree	Note2 TestEquipment: CS2000A
	θB		80	-			
	θL		80	-			
	θR		80	-			
Contrast Ratio	CR	θ=0°	100000				Note1 Note3 Test Equipment: CS2000A
ResponseTime	T _{ON}	25 C			1	ms	Note1 Note4 TestEquipment: AdmesyMSE
	T _{OFF}						
Chromaticity	White	x	(0.280)	(0.305)	(0.320)		Test Equipment: CS2000A Note: Chromaticitycan be modified accordingtocustomer demand
		y	(0.295)	(0.315)	(0.335)		
	Red	x	(0.625)	(0.655)	(0.685)		
		y	(0.315)	(0.345)	(0.375)		
	Green	x	(0.210)	(0.250)	(0.290)		
		y	(0.670)	(0.710)	(0.750)		
	Blue	x	(0.105)	(0.135)	(0.165)		
		y	(0.030)	(0.060)	(0.090)		
Uniformity	U		75			%	Note1 Note6 Test Equipment: CS2000A
NTSC			90	100		%	Note5
Luminance	L	Normal	320	360		Cd/m ²	Note1 Note7 Test Equipment: CS2000A
Cross-talk					1.5	%	Note8 Test Equipment: CS2000A
Gamma			2.0	2.2	2.4		Gamma=2.2±0.2 TestEquipment: CS2000A

Test Conditions:

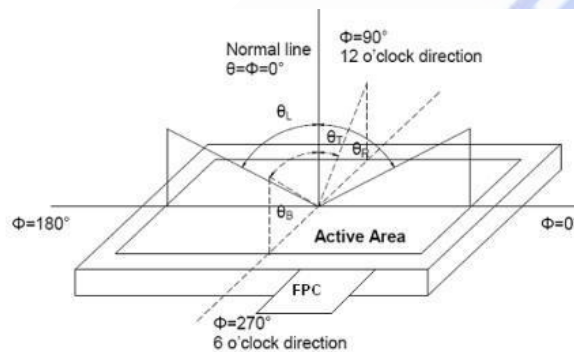
The ambient temperature is 25 C.

1. The test systems refer to Note1 and Note2.

Note1: Definition of optical measurement system. The optical characteristics should be measured in darkroom. The optical properties are measured at the center point of the AMOLED screen. All input terminals AMOLED panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.



Note 3: Definition of contrast ratio 对比度的定义

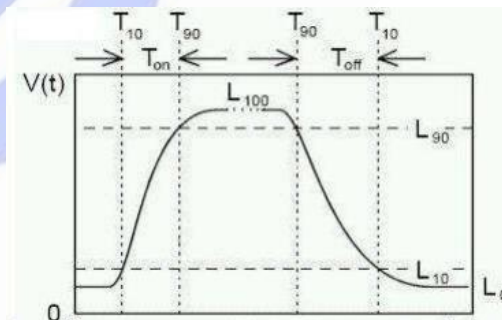
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "white" stat}}{\text{Luminance measured when LCD is on the "Black" stat}}$$

“White state” : A state where the AMOLED should be driven by V_{white} .

“Black state” : A state where the AMOLED should be driven by V_{black} .

Note4: Definition of response time

The response time is defined as the AMOLED optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changing from 10% to 90%. And fall time (T_{OFF}) is the time between photo detector output intensity changing from 90% to 10%.



Note 5: Note 5: Definition of color chromaticity (CIE1931)

Color coordinates are measured at the center point of AMOLED.

Note 6: Definition of luminance uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2).

Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = L_{min} / L_{max}

L-----Active area length

W----- Active area width

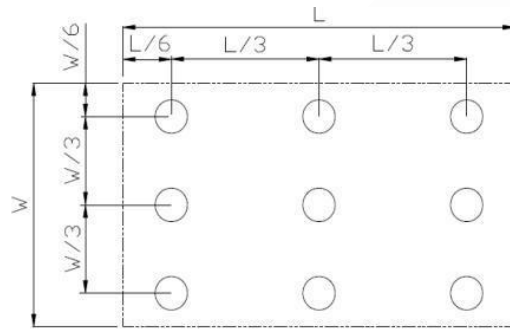


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

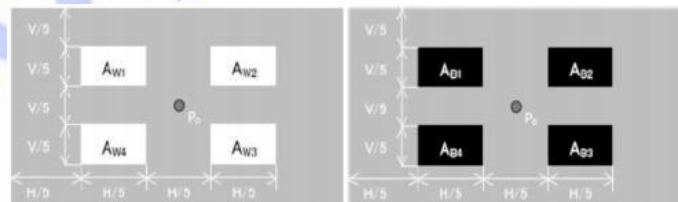
Note 7: Definition of luminance:

Measure the luminance of white state at the center point.

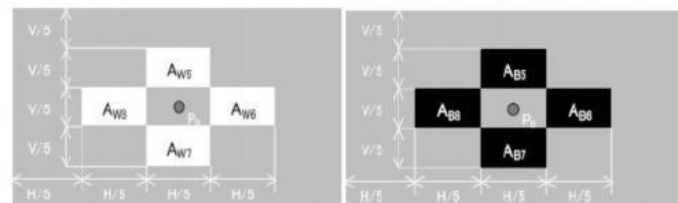
Note 8: Cross Talk

A. Measure luminance at the position, P0.

B. Calculate crosstalk as below equation.



(a) L_{W_OFF} , L_{B_OFF} measuring pattern



(b) L_{W_ON} , L_{B_ON} measuring pattern

$$L_{W\_OFF} = \frac{L_{W1} + L_{W2} + L_{W3} + L_{W4}}{4}$$

$$L_{B\_OFF} = \frac{L_{B1} + L_{B2} + L_{B3} + L_{B4}}{4}$$

$$\text{crosstalk} = \frac{|L_{W\_ON} - L_{W\_OFF}|}{L_{W\_OFF}} \times 100\% \quad (i=5 \text{ to } 8)$$

$$\text{crosstalk} = \frac{|L_{B\_ON} - L_{B\_OFF}|}{L_{B\_OFF}} \times 100\% \quad (i=5 \text{ to } 8)$$

7. RELIABILITY 可靠性实验规范

Item 项目	Test Condition 测试条件	Remark 备注
High Temperature Storage 高温存储	Ta =+80°C / 120Hours	Note1,2,3
Low Temperature Storage 低温存储	Ta =-30°C / 120Hours	Note1,2,3
High Temperature Operating 高温工作	Ta =+70°C / 120Hours	Note1,2,3
Low Temperature Operating 低温工作	Ta =-20°C / 120Hours	Note1,2,3
Temperature Cycle storage Test 冷热冲击	-30°C/30min Δ+70°C /30min for 30cycles, Transfer time less than 10min	Note2,3
Thermal humidity storage Test 高温高湿存储	60°C x 90%RH / 120Hours	Note2,3
Electro Static Discharge (Operation) 静电放电（工作）	C=150pF, R=330Ω , 5points/panel Air: ±8KV, 5times; Contact: ± 4 KV, 5 times; (Environment: 15°C~35°C, 30%~60%, 8.6Kpa~10.6Kpa) .	IEC61000-4-2 GB/T17626.2
Package Vibration Test 包装震动	Frequency: 10Hz~55Hz, Amplitude: 1.5mm, 1 hrs for each direction of X, Y, Z	Note2
Packing shock test 包装跌落	Drop to the ground from 60cm height, 1 corner, 3 edges, 6 surfaces.	Note2

Inspection after Test 试验后检查:

Note1: Ta is the ambient temperature of samples.

注1: Ta是样品的环境温度。

Note 2: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

注2: 在标准条件下, 不存在可能影响显示功能的实际问题。可靠性测试后, 产品仅保证运行工作, 但不保证产品的所有规格。

Note 3: Before cosmetic and function tests, the product must have enough recovery time, at least 2 hours at room temperature.

注3: 在进行外观和功能测试之前, 产品必须有足够的恢复时间, 在室温下至少2小时。

Note 4: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

注4: 如果ESD损坏导致故障缺陷, 如果重置后恢复正常状态, 则判定为良好零件。

8. Specification of Quality Assurance 质量保证规范:

8-1. Purpose 目的

This standard for Quality Assurance should affirm the quality of Display module products to supply to purchaser by VIEWE.

本质量保证标准应确认 VIEWE 向买方供应的显示模块产品的质量。

8-2. Standard for Quality Test 质量检验标准

a. Inspection 检查:

Before delivering, the supplier should take the following tests, and affirm the quality of product.
在交货前, 供应商应进行下列试验, 并确认产品质量。

b. Electro-Optical Characteristics 光电特性:

According to the individual specification to test the product. 根据个别规格对产品进行测试。

c. Test of Appearance Characteristics 外观特性试验:

According to the individual specification to test the product. 根据个别规格对产品进行测试。

d. Test of Reliability Characteristics 可靠性特性试验:

According to the definition of reliability on the specification for testing products.
根据测试产品规范中可靠性的定义。

e. Delivery Test 出厂试验:

Before delivering, the supplier should take the delivery test. 交货前, 供货商应进行出厂试验。

(i) Test method: According to ISO2859-1. General Inspection Level II take a single time.

(i) 试验方法: 按 ISO2859-1。一般检验二级一次

(ii) The defects classify of AQL as following AQL 的缺陷分类如下:

Major defect 重大缺陷: AQL = 0.65

Minor defect 轻微缺陷: AQL = 2.5

Total defects 全部缺陷: AQL = 2.5

8-3. Non-conforming Analysis & Deal With Manners 不合格分析及处理方式

a. Non-conforming Analysis 不合格分析:

(i) Purchaser should supply the detail data of non-conforming sample and the non-conforming.

(i) 买方应提供不合格样品和不合格品的详细资料。

(ii) After accepting the detail data from purchaser, the analysis of non-conforming should be finished in two weeks.

(ii) 接受买方的详细资料后, 不合格分析应在两周内完成。

(iii) If supplier can not finish analysis on time, must announce purchaser before 3 days.

(iii) 如果供应商不能按时完成分析, 必须在 3 天前通知买方。

b. Disposition of non-conforming 不合格品的处置:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(i) 如果在装配过程中发现供应商的任何产品缺陷, 供应商必须在确认后对每一个缺陷更换好的产品。

(ii) Both supplier and customer should analyze the reason and discuss the disposition of non-conforming when the reason of nonconforming is not sure.

(ii) 当不合格原因不确定时, 供需双方应分析原因并讨论不合格的处理。

8-4. Agreement items 协议项目

Both sides should discuss together when the following problems happen.

出现下列问题时，双方应共同讨论。

- a. There is any problem of standard of quality assurance, and both sides should think that must be modified.

质量保证标准有问题，双方都认为必须修改

- b. There is any argument item which does not record in the standard of quality assurance.

有不在质量保证标准中记录的论证项目。

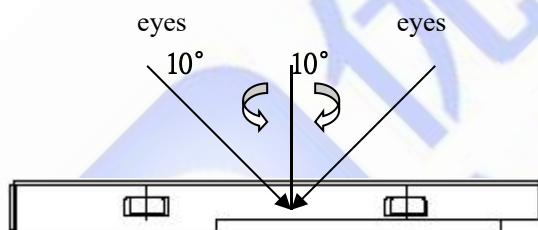
- c. Any other special problem.

其他特殊问题。

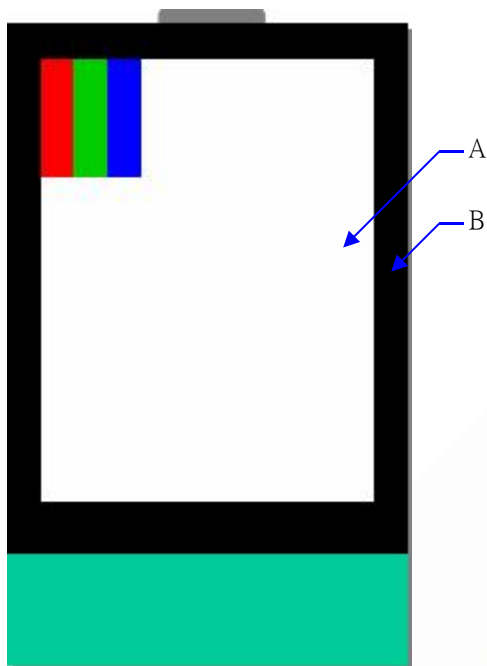
8-5. Standard of The Product Appearance Test 产品外观检验标准

a. Manner of appearance test 外观试验方式:

- (1) Ambient temperature: 20-26℃
- (2) Humidity: 55 ± 10%RH
- (3) Ambient light intensity of visual inspection: 800 ~ 1200 lux
- (4) Ambient light intensity of function inspection: ≤200lux
- (5) Viewing Distance: 30 ± 5cm
- (6) Viewing angle (tolerance): ±30°
- (7) Inspection time: 10 ± 2 sec



(iv) Definition of area 区域定义:



A. Area: Viewing area. 区域: 观察区域

B. Area: Out of viewing area. 区域: 不在视野范围内。

(Outside viewing area) (外部观察区域)

b. Basic principle: 基本原则:

(i) It will accord to the AQL when the standard can not be described.

(i) 当标准无法描述时, 将符合 AQL.

(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

(ii) 当发生任何争议时, 供应商和客户必须讨论最低可接受质量水平的样品.

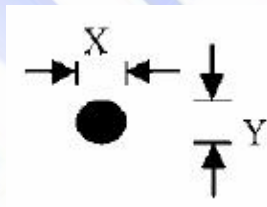
(iii) Must add new item on time when it is necessary.

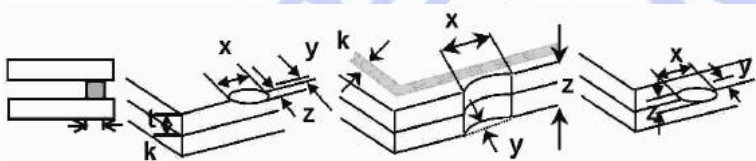
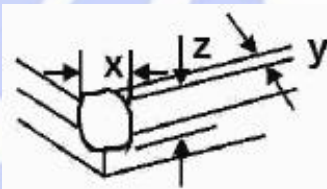
(iii) 必要时必须按时添加新项目.

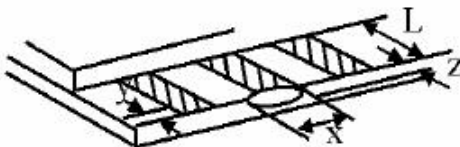
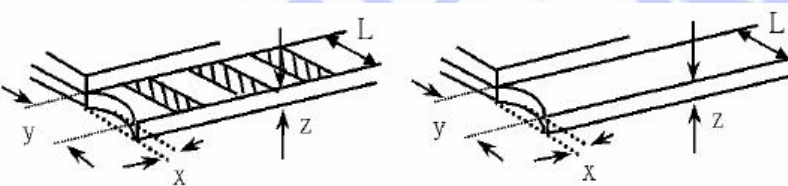
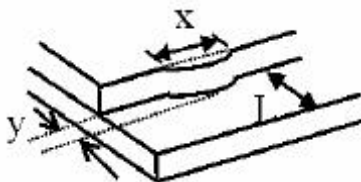
c. Standard of inspection 检验标准: (Unit: mm)

8-6. Inspection specification 检验规范

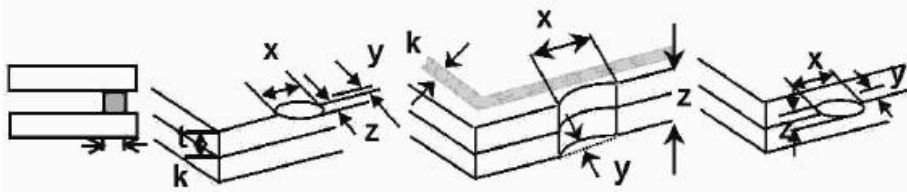
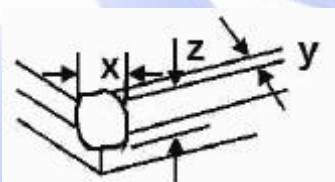
Defect out of viewing area can be neglected 可视区域以外的缺陷可以忽略。

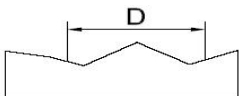
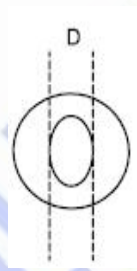
NO	Item	Criterion	AQL																										
01	Electrical Testing 电气试验	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.1 缺少垂直、水平段、段对比度缺陷。 1.2 Missing character, dot or icon. 1.2 缺少字符、圆点或图标。 1.3 Display malfunction. 1.3 显示故障 1.4 No function or no display. 1.4 无功能或无显示。 1.5 Current consumption exceeds product specifications. 1.5 电流消耗超过产品规格 1.6 LCD viewing angle defect. 1.6 液晶显示器视角缺陷。 1.7 Mixed product types. 1.7 不同产品混料。 1.8 Flicker 1.8 闪烁	0.65																										
02	Black or White spots or Bright spots or Color spots on LCD (Display only) LCD 上的黑点或白点或亮点或色斑（仅显示）	2.1 White and black or color spots on display $\leq 0.25\text{mm}$, no more than Five spots. 2.1 显示器上的黑白或色斑 ≤ 0.25 毫米，不超过 5 个。 2.2 Densely spaced: No more than three spots within 3mm. 2.2 密集间距：3mm 内不超过三处。	2.5																										
03	LCD and Touch Panel black spots, white spots, contamination (non – display) LCD 和触摸屏黑点，白点，脏污（非显示区）	3.1 Round type: As following drawing 圆形：如下图所示 $\Phi = (X+Y) / 2$ <table><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>$\Phi \leq 0.10$</td><td>Accept no dense</td></tr><tr><td>$0.10 < \Phi \leq 0.20$</td><td>3</td></tr><tr><td>$0.20 < \Phi \leq 0.25$</td><td>2</td></tr><tr><td>$0.25 < \Phi \leq 0.30$</td><td>1</td></tr><tr><td>$0.30 < \Phi$</td><td>0</td></tr></table> * Densely spaced: No more than two spots within 3mm. 密集间距：3mm 内不超过 2 处。 3.2 Line type: (As following drawing) 线型：（如下图所示） <table><tr><th>Length(mm)</th><th>Width(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>---</td><td>$W \leq 0.02$</td><td>Accept no dense</td></tr><tr><td>$L \leq 3.0$</td><td>$0.02 < W \leq 0.05$</td><td rowspan="2">2</td></tr><tr><td>$L \leq 2.5$</td><td>$0.03 < W \leq 0.15$</td></tr><tr><td>---</td><td>$0.15 < W$</td><td>Rejection</td></tr></table> * Densely spaced: No more than two lines within 3mm. *密集间距：3mm 以内不超过两行。	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	3	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.02$	Accept no dense	$L \leq 3.0$	$0.02 < W \leq 0.05$	2	$L \leq 2.5$	$0.03 < W \leq 0.15$	---	$0.15 < W$	Rejection	2.5
Size(mm)	Acceptable Q'ty																												
$\Phi \leq 0.10$	Accept no dense																												
$0.10 < \Phi \leq 0.20$	3																												
$0.20 < \Phi \leq 0.25$	2																												
$0.25 < \Phi \leq 0.30$	1																												
$0.30 < \Phi$	0																												
Length(mm)	Width(mm)	Acceptable Q'ty																											
---	$W \leq 0.02$	Accept no dense																											
$L \leq 3.0$	$0.02 < W \leq 0.05$	2																											
$L \leq 2.5$	$0.03 < W \leq 0.15$																												
---	$0.15 < W$	Rejection																											

NO	Item	Criterion	AQL																		
04	Polarizer bubbles 偏光片气泡	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction 如果气泡可见，用黑点判断规格，不容易找到，必须登记指定方向 <table><tr><th>Size Φ(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>Φ ≤ 0.20</td><td>Accept no dense</td></tr><tr><td>0.20 < Φ ≤ 0.50</td><td>3</td></tr><tr><td>0.50 < Φ ≤ 1.00</td><td>2</td></tr><tr><td>1.00 < Φ</td><td>0</td></tr><tr><td>Total Q'ty</td><td>3</td></tr></table>	Size Φ(mm)	Acceptable Q'ty	Φ ≤ 0.20	Accept no dense	0.20 < Φ ≤ 0.50	3	0.50 < Φ ≤ 1.00	2	1.00 < Φ	0	Total Q'ty	3	2.5						
Size Φ(mm)	Acceptable Q'ty																				
Φ ≤ 0.20	Accept no dense																				
0.20 < Φ ≤ 0.50	3																				
0.50 < Φ ≤ 1.00	2																				
1.00 < Φ	0																				
Total Q'ty	3																				
05	Scratches 划痕	Follow NO.3 -2 Line Type. 遵循 3.2 号线类型.																			
06	Chipped glass 玻璃破损	Symbols 符号: x: Chip length 缺损长度 y: Chip width 缺损宽度 z: Chip thickness 缺损厚度 k: Seal width 封口宽度 t: Glass thickness 玻璃厚度 a: LCD side length 玻璃边长 L: Electrode pad length 电极长度 6.1 General glass chip 普通玻璃破损: 6.1.1 Chip on panel surface and crack between panels : 面板表面的缺损和面板之间的裂缝:  <table><tr><th>z: Chip thickness</th><th>y: Chip width</th><th>x: Chip length</th></tr><tr><td>$Z \leq 1/2t$</td><td>Not over viewing are</td><td>$x \leq 1/8a$</td></tr><tr><td>$1/2t < z \leq 2t$</td><td>Not exceed 1/3k</td><td>$x \leq 1/8a$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 如果有 2 个或更多缺损，x 是每个缺损的总长度 6.1.2 Corner crack 角破损:  <table><tr><th>z: Chip thickness</th><th>y: Chip width</th><th>x: Chip length</th></tr><tr><td>$Z \leq 1/2t$</td><td>Not over viewing area</td><td>$x \leq 1/8a$</td></tr><tr><td>$1/2t < z \leq 2t$</td><td>Not exceed1/3k</td><td>$x \leq 1/8a$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 如果有 2 个或更多缺损，x 是每个缺损的总长度	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing are	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed1/3k	$x \leq 1/8a$	2.5
z: Chip thickness	y: Chip width	x: Chip length																			
$Z \leq 1/2t$	Not over viewing are	$x \leq 1/8a$																			
$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$																			
z: Chip thickness	y: Chip width	x: Chip length																			
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$																			
$1/2t < z \leq 2t$	Not exceed1/3k	$x \leq 1/8a$																			

NO	Item	Criterion	AQL																
07	Glass crack 玻璃裂纹	Symbols 符号: x: Chip length 缺损长度 y: Chip width 缺损宽度 z: Chip thickness 缺损厚度 k: Seal width 封口宽度 t: Glass thickness 玻璃厚度 a: LCD side length 玻璃边长 L: Electrode pad length 电极长度 7.2 Protrusion over terminal 下玻璃突出部分: 7.2.1 Chip on electrode pad 电极处破损:  <table><tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr><tr><td>$y \leq 0.5\text{mm}$</td><td>$x \leq 1/8a$</td><td>$0 < z \leq t$</td></tr></table> 7.2.2 Non-conductive portion 非导电部分:  <table><tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr><tr><td>$y \leq L$</td><td>$x \leq 1/8a$</td><td>$0 < z \leq t$</td></tr></table> ⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. 如果有缺口区域接触到 ITO 端子, 则必须保留超过 2/3 的 ITO, 并根据电极端子规范进行检查. ⊙ If the product will be heat sealed by the customer, the alignment mark must not be damaged. 如果产品将由客户热压, 则对准标记不得损坏. 7.2.3 Substrate protuberance and internal crack 基体突起和内部裂纹  <table><tr><td>y: width</td><td>x: length</td></tr><tr><td>$y \leq 1/3L$</td><td>$X \leq a$</td></tr></table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$X \leq a$	2.5
		y: Chip width	x: Chip length	z: Chip thickness															
		$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$															
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$X \leq a$																		

NO	Item	Criterion	AQL
08	Cracked glass 玻璃破碎	The LCD with extensive crack is not acceptable. 不接受有大裂纹的液晶显示器。	2.5
09	Backlight elements 背光元件	9.1 Illumination source flickers when lit. 光源点亮时闪烁。 9.2 Spots or scratches that appear when lit must be judged. 必须判断照明时出现的斑点或划痕。 Using LCD spot, lines and contamination standards. 采用液晶点、线和污染标准。 9.3 Backlight doesn't light or color is wrong. 背光不亮或颜色不对。	2.5 2.5 0.65
10	Bezel 铁框	Bezel must comply with product specifications. 铁框必须符合产品规范。	2.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.1 COB 密封不得有大于 0.2 毫米的针孔或污染。 11.2 COB seal surface may not have pinholes through to the IC. 11.2 COB 密封表面可能没有针孔穿过 IC。 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.3 COB 的高度不应超过装配图所示的高度。 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.4 印刷电路板密封区域外的密封剂不得超过 2 毫米。不应该超过三个地方。 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.5 印刷电路板上的零件必须与生产特性图上的零件相同，不得有错误零件、丢失零件或多余零件。 11.6 The jumper on the PCB should conform to the product characteristic chart. 11.6 PCB 上的跳线应符合产品特性图。	2.5 2.5 2.5 2.5 0.65 0.65
12	FPC	12.1 FPC terminal damage $\leq 1/2$ FPC terminal width and can not affect the function, we judge accept. FPC 端子损坏 $\leq 1/2$ FPC 端子宽度且不影响功能，我们判断接受。 12.2 FPC alignment hole damage $\leq 1/2$ alignment area and can not affect the function, we judge accept. FPC 对准孔损坏 $\leq 1/2$ 对准面积且不能影响功能，我们判断接受。	2.5 2.5
13	Soldering 焊接	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.1 无虚焊、漏焊、氧化或凸柱。 13.2 No short circuits in components on PCB or FPC. 13.2 PCB 或 FPC 上的组件无短路。	2.5 0.65

NO	Item	Criterion	AQL												
14	Touch Panel Chipped glass 触摸盖板玻璃缺损	Symbols 符号: x: Chip length 缺损长度 y: Chip width 缺损宽度 z: Chip thickness 缺损厚度 k: Seal width 封口宽度 t: Glass thickness 玻璃厚度 a: LCD side length 玻璃边长 L: Electrode pad length 电极长度 14.1 General glass chip 普通玻璃缺损: 14.1.1 Chip on panel surface and crack between panels: 玻璃表面缺损和玻璃直接的裂缝  <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>$Z \leq t$</td><td>$\leq 1/2 k$ and not over viewing area</td><td>$x \leq 1/8a$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 如果有 2 个或更多缺损, x 是每个缺损的总长度 14.1.2 Corner crack:  <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>$z \leq t$</td><td>$\leq 1/2 k$ and not over viewing area</td><td>$x \leq 1/8a$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 如果有 2 个或更多缺损, x 是每个缺损的总长度	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	2.5
z: Chip thickness	y: Chip width	x: Chip length													
$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													
z: Chip thickness	y: Chip width	x: Chip length													
$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													

NO	Item	Criterion	AQL										
15	Touch Panel(Fish eye、dent and bubble on film) 触摸屏（鱼眼、凹痕和薄膜上的气泡）	<table><tr><th>SIZE(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>$\Phi \leq 0.2$</td><td>Accept no dese</td></tr><tr><td>$0.2 < D \leq 0.4$</td><td>5</td></tr><tr><td>$0.4 < D \leq 0.5$</td><td>2</td></tr><tr><td>$0.5 < D$</td><td>0</td></tr></table>  	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dese	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	2.5
SIZE(mm)	Acceptable Q'ty												
$\Phi \leq 0.2$	Accept no dese												
$0.2 < D \leq 0.4$	5												
$0.4 < D \leq 0.5$	2												
$0.5 < D$	0												
16	Touch Panel Newton ring 触摸屏牛顿环	Newton ring dimension $\cong 1/2$ touch panel area and not affect font and line distortion ($\cong 2.5\%$), it is acceptable. 牛顿环尺寸 $\leq$ 触摸屏面积的 1/2，且不影响字体和线条失真（ $\leq 2.5\%$ ），是可以接受的。	2.5										
17	Touch Panel Linearity 触摸屏线性	Less than 2.5% is acceptable. 低于 2.5%是可以接受的。	2.5										
18	LCD Ripple LCD 水波纹	Touch the touch panel, can not see the LCD ripple. 触摸触摸屏，看不到液晶波纹。 Pen: R 1.0mm silicon rubber 笔：R 1.0mm 硅橡胶。 Operation Force: 80g 操作力：80g	2.5										
19	General appearance 整体外观	19.1 Pin type must match type in specification sheet. 19.1 引脚类型必须与规格表中的类型相匹配。 19.2 LCD pin loose or missing pins. 19.2 LCD 引脚松动或缺失。 19.3 Product packaging must the same as specified on packaging specification sheet. 19.3 产品包装必须与包装规格表上的规定相同。 19.4 Product dimension and structure must conform to product specification sheet. 19.4 产品尺寸和结构必须符合产品规格书。	0.65 0.65 0.65 0.65										

9. Handling Precaution 操作注意事项:

9-1 Handling of LCM 液晶显示屏的组装

- Don't give external shock. 不要受到外来冲击。
- Don't apply excessive force on the surface. 不要在表面施加过大的力。
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
液晶显示器中的液体是有害物质。不得舔舐和吞咽。当液体附着在手、皮肤、布等上时，立即彻底清洗。
- Don't operate it above the absolute maximum rating.
不要超过绝对最大额定值
- Don't disassemble the LCM. 不要拆解LCM
- The operators should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
操作员在接触模块时应接地。切勿用人体任何部位接触LSI焊盘、PCB上的铜引线 and 接口端子等任何导电部件。
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
模块应放在防静电袋或其他防静电容器中储存。
- The module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.
该模块表面有保护膜以保护显示表面。剥离此保护膜时要小心，因为可能会产生静电。

9-2 Storage 存储

- Store in an ambient temperature of $25\pm 10^{\circ}\text{C}$, and in a relative humidity of $50\pm 10\%\text{RH}$. Don't expose to sunlight or fluorescent light.
储存在 $25\pm 10^{\circ}\text{C}$ 的环境温度和 $50\pm 10\%$ 相对湿度下。不要暴露在阳光或荧光灯下。
- Storage in a clean environment, free from dust, active gas, and solvent.
储存在清洁的环境中，无灰尘、活性气体和溶剂。
- Store in anti-static electricity container. 存放在防静电容器中。
- Store without any physical load. 无任何物理负载储存。

9-3 Soldering 焊接

- Use only soldering irons with proper grounding and no leakage.
只能使用接地正确、无泄漏的烙铁。
- Iron: No higher than $280\pm 10^{\circ}\text{C}$ and less than 3 sec during Hand soldering.
烙铁：手工焊接时温度不高于 $280\pm 10^{\circ}\text{C}$ ，时间不超过3秒。
- Rewiring: no more than 2 times. 重新焊接：不超过2次

10. PACKAGE DRAWING

