

**PRODUCT SPECIFICATION****TFT-LCD MODULE****Module No: 312249-01**☒ Preliminary Specification☐ Approval Specification

Designed by	Checked by	Approved by

Final Approval by Customer

Approved by	Comment

For more information, contact us:

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※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

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Revision History

Version	Contents	Date	Note
V0	Original	2021.11.26	
V1	Change CTP golden finger direction	2021.12.14	

1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by Technology CO., LTD.

LCD specification: Dots 320xRGBx480

As to basic specification of the driver IC, refer to the IC (ILITEK:ILI9488) specification and data book.

All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL+CTP;

ALL O'CLOCK Type LCD

320 dot-segment and 480 dot-common outputs;

262K Color can be selected by software;

White LED back light;

3/4line SPI or 8/16bit MCU Interface

1.3 Applications:

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	320*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.153(H) x 0.153(V)	mm
Active area	48.96(H) x 73.44(V)	mm
Viewing direction	ALL O'CLOCK	-
TFT Driver IC	ILI9488	
TFT interface	SPI/MCU Interface	-
LCM+CTP Size(W*H*T)	70.80(W) ×102.80(H) ×6.20(T)	mm
Approx. Weight	TBD	g
Touch structure	G+G	
Touch Driver IC	HY4633-N048	-
Touch Interface		

1	2
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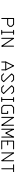
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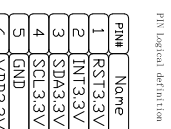
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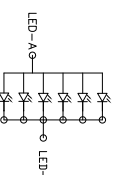


Pin#	Name
1	RST3.3V
2	INT3.3V
3	SDA3.3V
4	SCL3.3V
5	GND
6	VDD3.3V



5	GND
4	VDDIO

- CIRCUIT DIAGRAM**
-



LEADTEK COMPANY LIMITED

- | | | |
|-----|------------------------------------|-----------------|
| 3 | | |
| 2 | | |
| 1 | Change CTP golden finger direction | 2021.12.14 Jack |
| 0 | NEW DRAWING | 2021.11.26 Ian |
| REV | DESCRIPTION | DATE NAME |

CALE: 1/1	UNIT: mm	PAGE: 1/1		Approve	Check
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Draw

2W

3. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-20	+60	°C
LCM Storage Temperature	T _{STG}	-30	+70	°C
Humidity	RH	-	90	%

4. Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for I/O	VDDIO	1.65	1.8	3.3	V
Supply Voltage for(DC/DC)	VDD	2.7	2.8	3.3	V
Supply Voltage for(DC/DC)	AVDD				V
Supply Voltage for(DC/DC)	AVEE				V

4.2 Back-Light Unit Characteristics

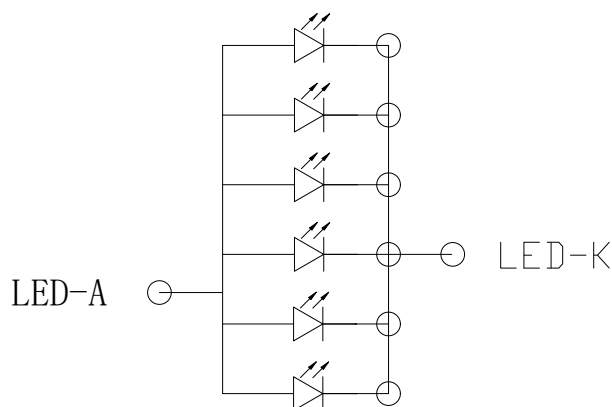
The back-light system is an edge-lighting type with 6 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	2.8	-	3.2	V	-
Forward current	I _F	--	120	-	mA	-
Luminance(With LCD)	L _v		340	--	cd/m ²	-
LED life time	N/A	----	30,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

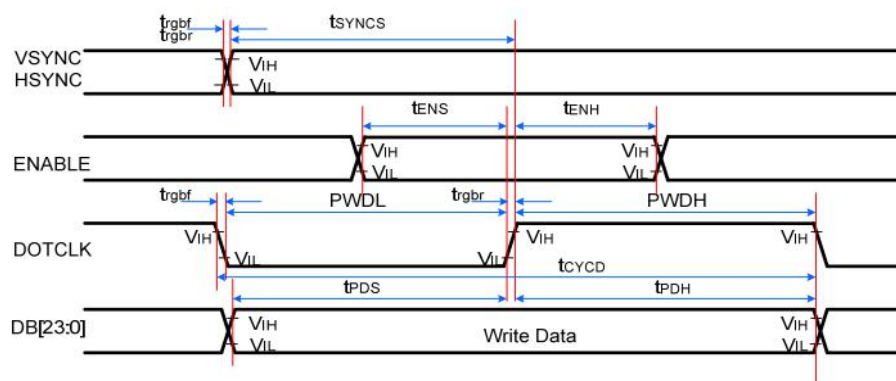
Pin No.	Symbol	Functional				Notes																				
1	XL	Touch panel pin																								
2	YU	Touch panel pin																								
3	XR	Touch panel pin																								
4	YD	Touch panel pin																								
5	GND	Power Ground																								
6	IOVCC	I/O Voltage (IOVCC to DGND): 1.65V ~ 3.3V																								
7	VCI	Power supply : 2.7V ~ 3.3V																								
8	TE	Tearing effect output pin to synchronies MCU to frame rate.																								
9	CS	Chip select signal input pin																								
10	RS	Register select signal.																								
11	WR/SCL	Write strobe signal/ pin as Serial Clock when operates in the serial																								
12	RD	Read data at the rising edge.																								
13	SDA	serial data input/output bi-direction pin																								
14	SDO	Serial data output																								
15	RESET	Reset signal input terminal. Active at ‘L’.																								
16	GND	Power Ground																								
17-32	DB0~DB15	Data bus																								
33	LEDA	Power supply for backlight anode input terminal.																								
34~36	LEDK	Power supply for backlight cathode input terminal.																								
37	GND	Power Ground																								
38	IM0	<table><tr><td>IM0</td><td>IM1</td><td>IM2</td><td>Interface</td></tr><tr><td>1</td><td>0</td><td>1</td><td>3 wire 9–bit date serialinterafce</td></tr><tr><td>1</td><td>1</td><td>1</td><td>4 wire 8–bit date serialinterafce</td></tr><tr><td>0</td><td>1</td><td>0</td><td>80 MCU 16–bit businterface</td></tr><tr><td>1</td><td>1</td><td>0</td><td>80 MCU 8–bit businterface</td></tr></table>				IM0	IM1	IM2	Interface	1	0	1	3 wire 9–bit date serialinterafce	1	1	1	4 wire 8–bit date serialinterafce	0	1	0	80 MCU 16–bit businterface	1	1	0	80 MCU 8–bit businterface	See ili9488 data sheet for details
IM0	IM1					IM2	Interface																			
1	0					1	3 wire 9–bit date serialinterafce																			
1	1					1	4 wire 8–bit date serialinterafce																			
0	1	0	80 MCU 16–bit businterface																							
1	1	0	80 MCU 8–bit businterface																							
39	IM1																									
40	IM2																									

5.1 TP INTERFACE SIGNAL

Pin No	Symbol	Functional
1	RST 3.3V	Reset signal (Low: Active).
2	INT 3.3V	INT pin for CTP
3	SDA 3.3V	SDA pin for CTP
4	SCL 3.3V	SCL pin for CTP
5	GND	GND pin for CTP
6	VDD3.3V	Power supply for CTP.

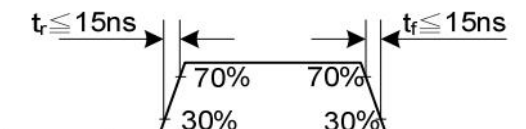
6. Timing Characteristics

DPI (Display Parallel 8-/9-16-/18-/24-bit interface) Timing Characteristics:



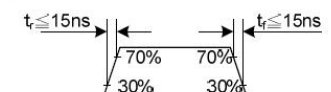
Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC/HSYNC	t_{SYNCS}	VSYNC/HSYNC setup time	15	-	ns	16-/18-/24-bit bus RGB interface mode
	t_{SYNCH}	VSYNC/HSYNC hold time	15	-	ns	
ENABLE	t_{ENS}	ENABLE setup time	15	-	ns	
	t_{ENH}	ENABLE hold time	15	-	ns	
DB [23:0]	t_{POS}	Data setup time	15	-	ns	
	t_{PDH}	Data hold time	15	-	ns	
DOTCLK	PWDH	DOTCLK high-level period	20	-	ns	
	PWDL	DOTCLK low-level period	20	-	ns	
	t_{CYCD}	DOTCLK cycle time	50	-	ns	
	t_{rgr}, t_{grbr}	DOTCLK, HSYNC, VSYNC rise/fall time	-	15	ns	

Note: $T_a = -30$ to 70 °C, $IOVCC = 1.65V$ to $3.3V$, $VCI = 2.5V$ to $3.3V$, $AGND = DGND = 0V$

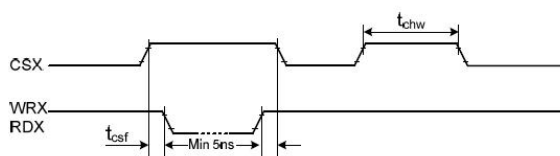


Notes:

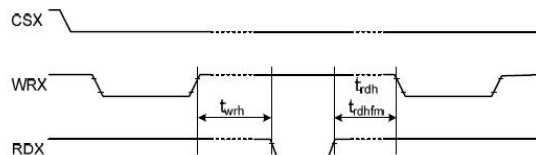
- $T_a = -30$ to 70 °C, $IOVCC = 1.65V$ to $3.3V$, $VCI = 2.5V$ to $3.3V$, $AGND = DGND = 0V$
- Logic high and low levels are specified as 30% and 70% of $IOVCC$ for input signals.
- Input signal rising time and falling time:



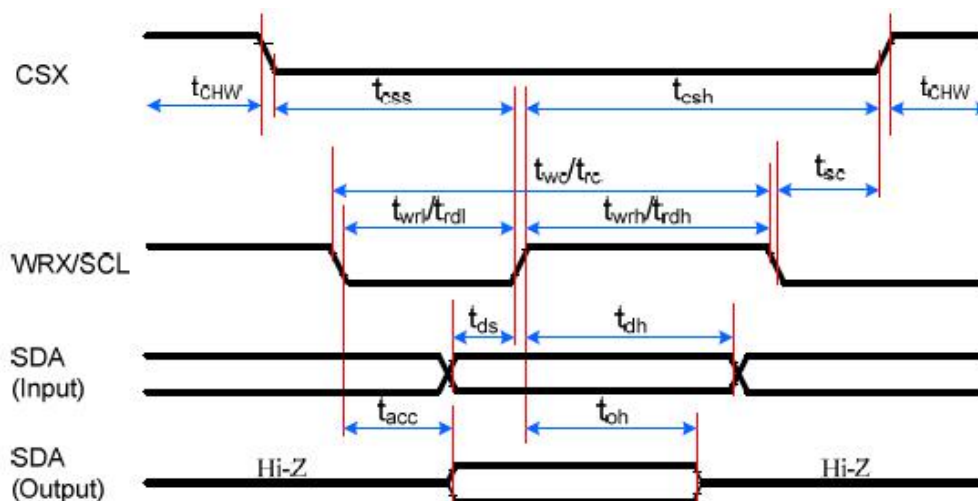
4. The CSX timing:



5. The Write to Read or the Read to Write timing:

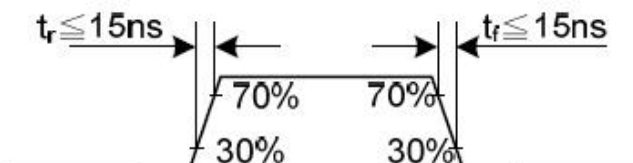


(3-Line SPI System) Timing Characteristics:

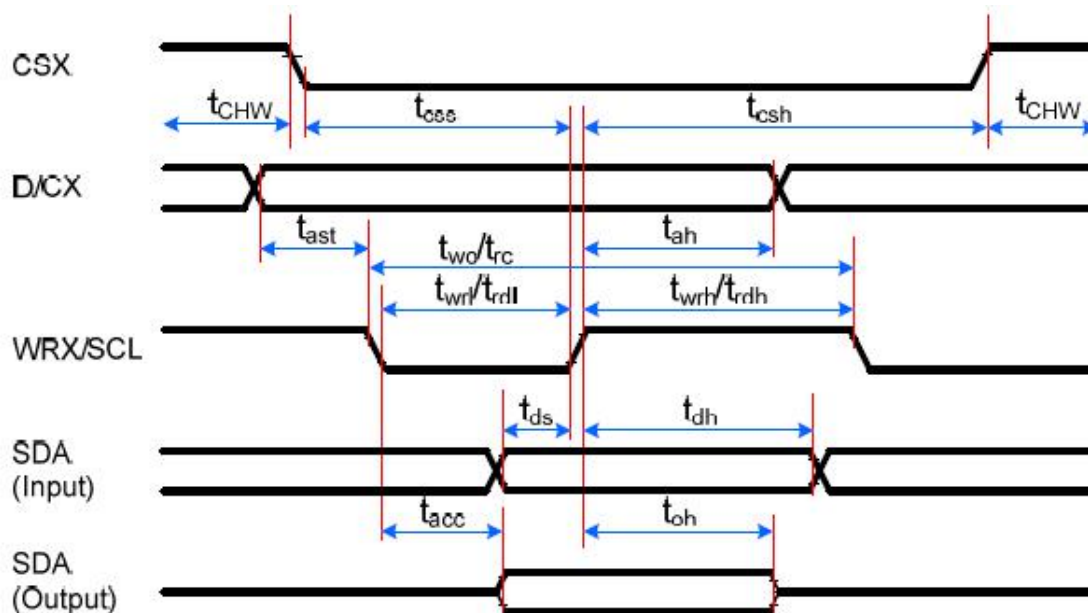


Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tsc	SCL-CSX	15	-	ns	
	tchwh	CSX H Pulse Width	40	-	ns	
	tcss	Chip select time (Write)	60	-	ns	
	tcsh	Chip select hold time (Read)	65	-	ns	
SCL	twc	Serial Clock Cycle (Write)	66	-	ns	
	twrh	SCL H Pulse Width (Write)	15	-	ns	
	twrl	SCL L Pulse Width (Write)	15	-	ns	
	trc	Serial Clock Cycle (Read)	150	-	ns	
	trdh	SCL H Pulse Width (Read)	60	-	ns	
	trdl	SCL L Pulse Width (Read)	60	-	ns	
SDA/SDI (Input)	tds	Data setup time (Write)	10	-	ns	
	tdh	Data hold time (Write)	10	-	ns	
SDA/SDO (Output)	tacc	Access time (Read)	10	50	ns	For maximum CL=30pF
	toh	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Note: Ta = -30 to 70 °C, IOVCC = 1.65V to 3.6V, VCI = 2.5V to 3.6V, AGND = DGND = 0V, T = 10+/-0.5ns



(4-Line SPI System) Timing Characteristics:



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	15	-	ns	
	t_{csh}	Chip select hold time (Read)	15	-	ns	
	t_{CHW}	CS H pulse width	40	-	ns	
SCL	t_{wc}	Serial clock cycle (Write)	50	-	ns	
	t_{wrh}	SCL H pulse width (Write)	10	-	ns	
	t_{wrl}	SCL L pulse width (Write)	10	-	ns	
	t_{rc}	Serial clock cycle (Read)	150	-	ns	
	t_{rdh}	SCL H pulse width (Read)	60	-	ns	
	t_{rdl}	SCL L pulse width (Read)	60	-	ns	
D/CX	t_{as}	D/CX setup time	10	-	ns	
	t_{ah}	D/CX hold time (Write/Read)	10	-	ns	
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	10	-	ns	
	t_{dh}	Data hold time (Write)	10	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	10	50	ns	For maximum $C_L=30pF$
	t_{od}	Output disable time (Read)	15	50	ns	For minimum $C_L=8pF$

Notes:

1. $T_a = -30$ to $70\text{ }^{\circ}\text{C}$, $IOVCC = 1.65\text{V}$ to 3.3V , $V_{CI} = 2.5\text{V}$ to 3.3V , $AGND = DGND = 0\text{V}$, $T = 10\pm 0.5\text{ns}$.
2. Does not include signal rising and falling times.

Reset Description:

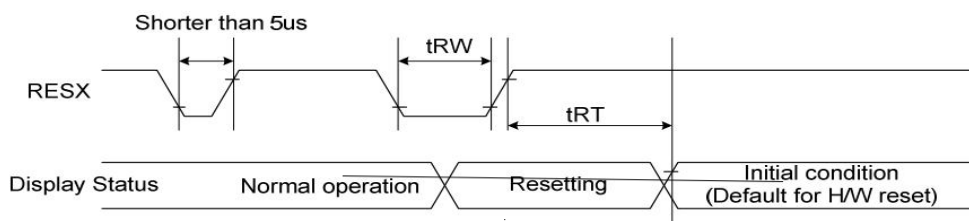


Table 39: Reset Timing

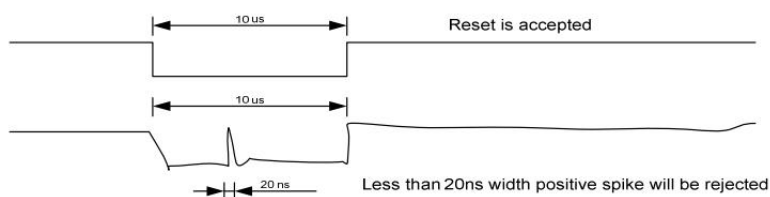
Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5) 120 (note 1,6,7)	mS

Notes:

- The reset cancel also includes the required time for loading ID bytes, VCOM setting and other settings from the EEPROM to registers. After a rising edge of RESX, this loading is done within 5 ms after the H/W reset cancel (tRT).
- According to the Table 40, a spike due to an electrostatic discharge on the RESX line does not cause irregular system reset.

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

- During the Reset period, the display will be blanked (When Reset starts in the Sleep Out mode, the display will enter the blanking sequence in at least 120 ms. The display remains the blank state in the Sleep In mode.) and then return to the default condition for the Hardware Reset.
- Spike Rejection can also be applied during a valid reset pulse, as shown below:



Positive Noise Pulse during Reset Low

- When Reset is applied during the Sleep In Mode.
- When Reset is applied during the Sleep Out Mode.
- It is necessary to wait 5msec after releasing RESX before sending commands. The Sleep Out command also cannot be sent in 120msec.

7. Optical Characteristics

Optical Specification

Item	Symbol	Condition	Specification			Unit	Remark
			Min.	Typ.	Max.		
Response time	Tr+Tf	$\theta = 0^\circ$	-	30	40	ms	Note 4
Contrast ratio	CR	$\theta = 0^\circ$		1000	-		Note 2,5
Viewing angle	Top	$CR \geq 10$	70	80	-	deg.	Note 2,5,6
	Bottom	$CR \geq 10$	70	80	-		
	Left	$CR \geq 10$	70	80	-		
	Right	$CR \geq 10$	70	80	-		
Color chromaticity (CF only, light source is C light, CIE 1931)	Rx	$\theta = 0^\circ$	-0.03	0.655	+0.03		Note 3
	Ry			0.317			
	Gx			0.260			
	Gy			0.571			
	Bx			0.144			
	By			0.074			
Color chromaticity (CF only, light source is C light, CIE 1931)	Wx	$\theta = 0^\circ$		0.304			Only for reference
	Wy	$\theta = 0^\circ$		0.327			
NTSC(CF only, light source is C light, CIE 1931)	%	CIE1931	60	70	-	%	Note 3
Transmittance (w/o APCF / w/i CTC Gal SK2 BL)	Trans		3.74	4.4		%	Note 9

Note 1: Ambient temperature = 25°C.

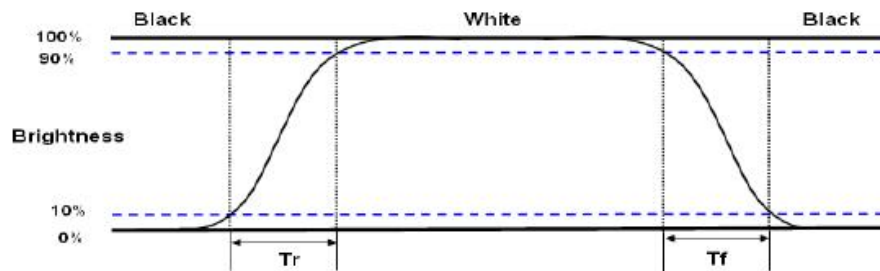
Note 2: To be measured with a viewing cone of 2° by Topcon luminance meter SR3.

Note 3: Definition of color chromaticity (CIE 1931) Color coordinates measured at center point of LCD.

Note 4: Transmittance of Specification is cell with CTC's polarizer and BL.

Note 5: Definition of response time:

The output signals of TRD-100 are measured when the input signals are changed to "White" (rising time) and from "White" to "Black" (falling time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.

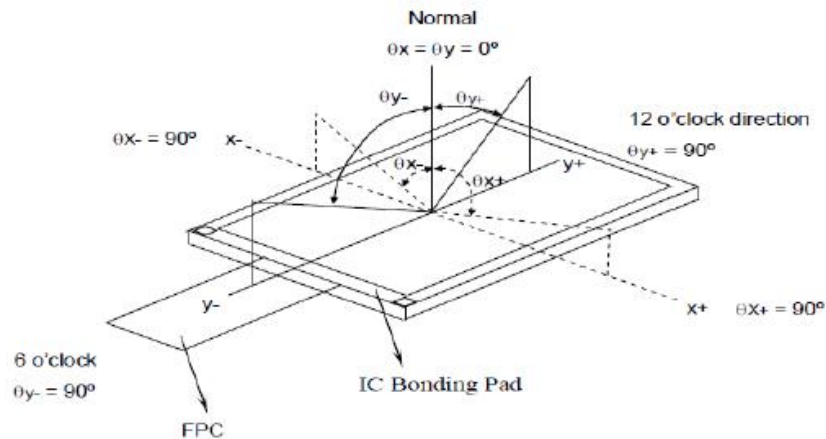


Note 6: Definition of contrast ratio:

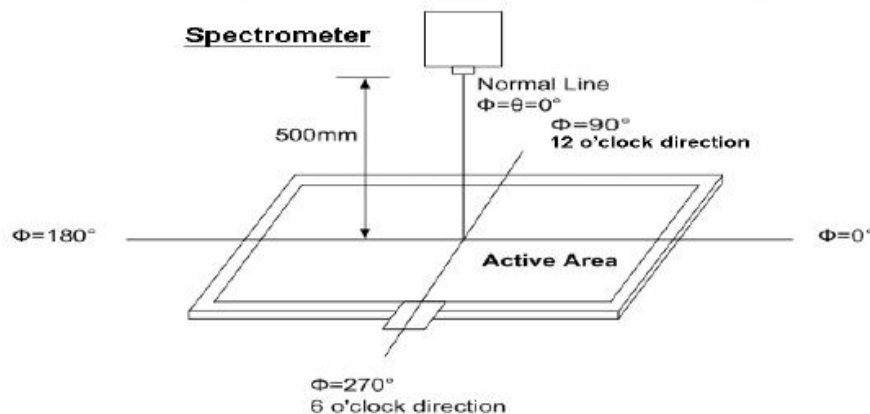
Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

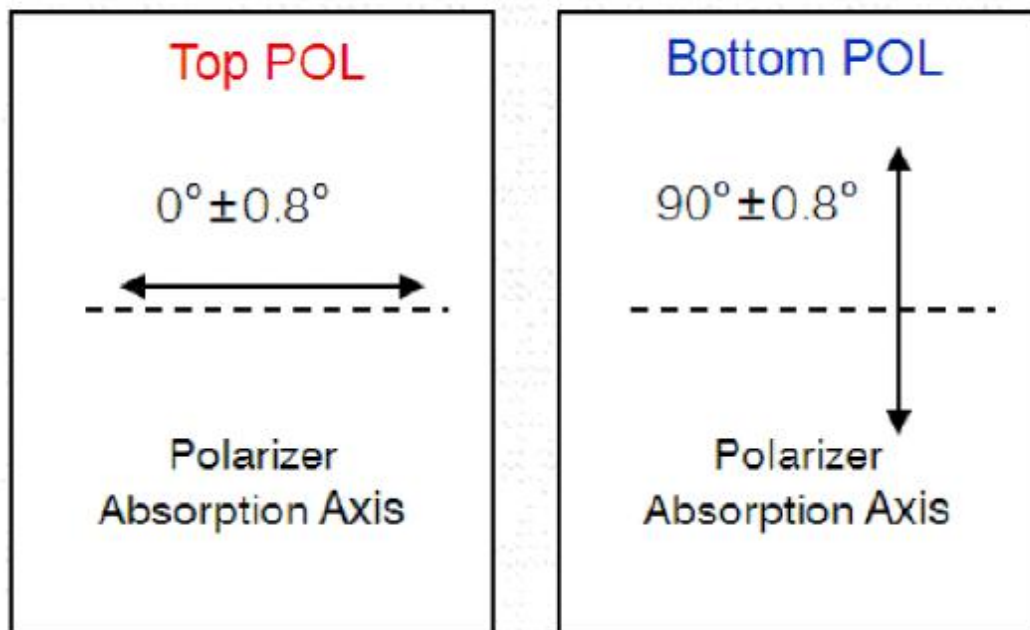
Note 7: Definition of viewing angle



Note 8: Definition of optical measurement system. The optical characteristics should be measured in dark room. The optical properties are measured at the center point of the LCD screen, (Response time is measured by Photo detector TRD_100, other items are measured by SR3.



Note 9: The absorption axis direction of polarizer refer to figure as bellow :



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+70°C / 96H	1. Functional test is OK. Missing Segment, short, unclear segment non-display, display abnormally and liquid crystal leakage are un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Temperature Operating	+60°C / 96H	
4	Low Temperature Operating	-20°C / 96H	
5	High Temperature / Humidity storage	50°C x 90%RH / 96H	
6	Thermal and cold shock	Static state, -20°C (30min) ~70°C (30min), 50 cycles	

9. Packing Method----TBD

深圳市丽台电子有限公司

Quality inspection standards

品质允收标准

MODEL No. / 产品型号: Applies 0.95~5.0 TFT-LCD PanelUPDATED DATE / 生效日期: 2022-05-20VERSION / 版本: A0

Customer Signature/客户签字: _____

RECORD OF REVISION/修订履历:

Version 版本	Revision Record 修订内容	Compile 修订者	Date of Revision 修订日期
V0	首发/Starting	Green	2022.05.20

1.Scope 1适用范围

This document shall be applied to 0.95~5.0 TFT-LCD Panel.

本文件适用于0.95~5.0 TFT-LCD Panel.

2.Inspection and Environment onditions/检查条件与环境

2.1 Inspection Conditions 检查条件:

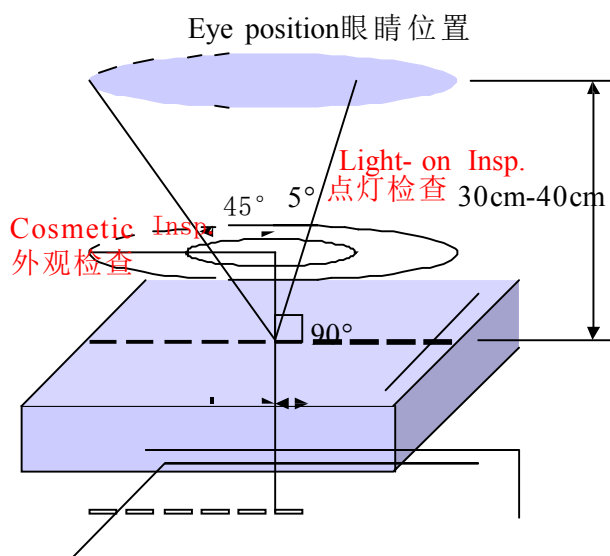
(1) Inspection Distance检测距离: 35 cm $\pm$ 5cm

(2) Each picture /每个画面: 2~3 secs/秒, Cosmetic Insp./外观10~12 secs/秒

(3) View Angle观看角度:

Light-on Inspection Angle点灯检验角度 : $\pm 45^\circ$

Cosmetic Inspection Angle外观检验角度 : $\pm 45^\circ$



(Perpendicular to LCD panel surface垂直于液晶显示表面)

2.2 Environment Conditions环境条件:

Ambient Temperature 温度		25°C $\pm$ 5°C
Ambient Humidity 湿度		55 $\pm$ 5%RH
Ambient Illumination 亮度	Cosmetic Inspection 外观检验	800-1000 Lux
	Functional Inspection 点灯检验	200~300Lux

2.3 Sampling Conditions 抽样条件:

(1) Lot Size : Quantity of shipment lot per model/.

批量: 单次运送单一机型数量

- (2) Sampling Method :
抽样方法:

Sampling Plan 抽样计划		GB2828/2003
		Normal Inspection, Single Sampling 正常检验、单次抽样
		General II Inspection 普通二级
AQL	Major Defect 主要缺点	0.25
	Minor Defect 次要缺点	0.65

- (3) The classification of Major(MA) and Minor(MI) defects is shown as 3. Inspection Criteria.

主缺(MA)及次缺(MI)定义于”3.检查标准”

3.Terms and Definitions/术语和定义

3.1 Classification of defects缺陷的分类:

Major defects: A major defect is a defect that is likely to result in failure, or to reduce materially the usability of the product for its intended purpose.

主要缺陷：会导致产品功能失效或减少产品可用性的缺陷。

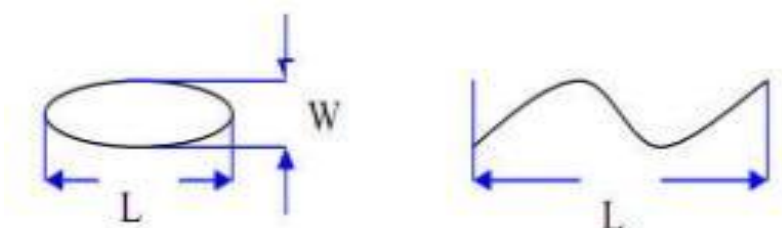
Minor defects: A minor defect either is a defect that is not likely to reduce materially the usability of the product for its intended purpose, or is a departure from an established having little bearing on the effective use or operation of the product.

次要缺陷：不会导致产品功能失效，不会减少产品的有效使用和操作。

- 3.2 Extraneous substances that can be wiped out ,like Finger point,Particles are not considered as a defect . 可以被擦拭干净的表面物质不视为缺陷 (如手指印，尘粒)。

- 3.3 Defects on the Black Matraix(outside of Active Area) are not considered as a defect . BM 区域 (AA 区以外) 的缺陷不视为缺陷。

- 3.4 Size of circular defect,is defined by diameter”D” 。 The defect average diameter $D=1/2(W+L)$ 圆形缺陷的大小是由直径 D 定义的。缺陷的平均直径 $D=1/2(W+L)$



3.5 When defect size $L \geq 2W$, the defect count as liner type defect. Size of linear defect is defined by length(L) and the maximum width(W).

当缺陷尺寸 $L \geq 2W$ 时，被视为线状缺陷。线状缺陷是由长度 (L) 和最大宽度 (W) 定义的。3.6 Mura criteria :judged by ND filter 6%, and can't be seen under at ND filter 6% .

3.6 MURA 判断标准：使用 ND6% 判定，且透过 ND6%，遮住不可见。

3.7 Dot defect is defined as the defective area of the dot is larger than 50% of the dot area and is visible through 6% ND filter

DOT 定义为点缺陷面积大于 50% DOT 面积, 且透过 ND6% 遮住是可见的。

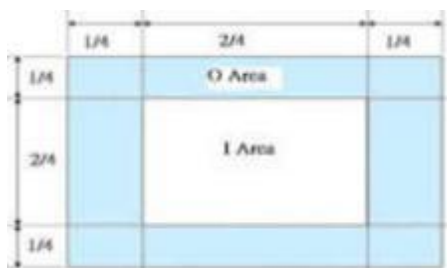
The drawing of 1/2 area sub-pixel definition: The 1/2 area sub-pixel can be defined as below one or more of specific shapes

1/2 面积的子像素定义绘图：1 / 2 面积的子像素可以定义为如下一个或多个特定形状图：



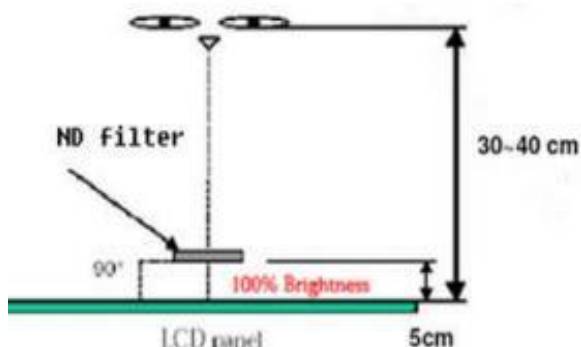
3.8 A dot defect that is smaller than the defined dot defect will be treated as small bright dot. 细碎亮点：小于“DOT 定义”的点缺陷视为细碎亮点。

I 区与 O 区比例：1：2：1



3.9 Inspection method of ND Filter - holding ND filter in front of the panel around 5cm and examine the panel from 35±5 cm in the front view for 2~3 second.

ND 卡的检查方法：在面板上方大约 5CM 处握住 ND 卡，眼睛距离面板 30-40CM，通过 2~3 秒观察。



4. Inspection Criteria 检验标准

4.1 Appearance Inspection specification 外观检查规格:

Judge area 区域	Judge item 项目	Specification inspection 检查规格	Judge criterion	
			Major	Minor
Silicone 硅胶	Silicone spread 硅胶涂布	The height can't over C/F , color filter , or gommu 高度不能过超 C/F		MI
	Silicone residue 硅胶残余	Can't cover polarizer, FPC ...etc. 不能覆盖 POL, FPC 等		MI
LCD 玻璃	Wire(on Array) 线路	No damage 不能损伤	MA	
	Edge 边缘	No extended crack 不可有延伸性裂纹	MA	
PCBA Connector FPC/FFC	Appearance 外观	Scratch or damage result in copper expose is not allowed 划伤或损伤不允许导致出现露铜		MI
	Component 零件	No damage 不能损伤	MA	
	Connection status 连接状况	Need correct connection 需要正确连接	MA	
	Broken 破裂	Not allowable 不允许	MA	
	Folding sign 对位记号折叠	Not allowable 不允许	MA	
POL 偏光片	Scratch on the polarizer 偏光片划伤	1. $W \leq 0.05\text{mm}$; $L \leq 5\text{mm}$, Ignore (忽略)		MI
		2. $0.05\text{mm} < W \leq 0.10\text{mm}$; $L \leq 5\text{mm}$; $N \leq 3$; $DS \geq 10\text{mm}$		
		3. $10\text{mm} < W$; $5\text{mm} < L$, Not allowable不允许		

Judge area 区域	Judge item 项目	Specification inspection 检查规格	Judge criterion	
			Major	Minor
POL 偏光片	Dent on the polarizer 偏光片凹痕	1.D<0.15mm, Ignore (忽略)		MI
		2.0.15mm<D≤0.30mm; N≤3; DS≥10mm		
		3.0.30mm<D, Not allowable不允许		
	POL Linear bubble 线状气泡	1.W≤0.05mm; L≤5mm, Ignore (忽略)		MI
		2.0.05mm<W≤0.10mm; L≤5mm; N≤3; DS≥10mm		
		3.0.10mm<W; 5mm<L, Not allowable不允许		
	POL dot bubble 点状气泡	1.D<0.15mm, Ignore (忽略)		MI
		2.0.15mm<D≤0.30mm; N≤3; DS≥10mm		
		3.0.30mm<D, Not allowable不允许		
	POL edge bubble 片边缘气泡	1. The display area is 1/2BM outside, Not allowable 显示区往外 1/2BM 区域内, 不允许		MI
		2. The display area is outside the outer 1/2BM area, Not allowable 显示区往外1/2BM区域以外, 不管控		

Judge area 区域	Judge item 项目	Specification inspection 检查规格	Judge criterion	
			Major	Minor
TP&CG	Foreign Material in spot shape 点状异物	1.D≤0.15mm; Ignored (忽略) 2.0.15mm<D≤0.30mm; N≤3; DS≥10mm 3.D>0.30mm; Not allowable不允许		MI
	Fisheye/bubbles 鱼眼/气泡	1.D≤0.15mm; Ignored (忽略) 2.0.15mm<D≤0.30mm; N≤3; DS≥10mm 3.D>0.30mm; Not allowable不允许		MI
	Scratches on the surface 表面划伤	1.W≤0.05mm; Ignored (忽略) 2.0.05mm<W≤0.10mm, L≤5mm; N≤3; DS≥10mm 3.W>0.10mm, L>5mm; Not allowable不允许		MI
	Collapse corner、Crash edge 崩角、崩边	Product front:/产品正面: collapse corners, collapsed edges are not allowed 崩角、崩边不允许; Product back/产品背面: X≤0.5, Y≤0.5, Z≤1/2T; N≤2; DS≥10mm	MA	
	Printed fonts/LOGO 丝印/LOGO	Printed fonts/LOGO clarity、complete、content right 字体/LOGO丝印清晰、完整、内容正确		MI
	Broken 破损	Not allowable不允许	MA	
	Dirty surfaces 表面脏污	Dirt cannot be wiped, Not allowable 不可擦拭的脏污, 不允许		MI
	IR hole IR孔	Black spots/黑点: W≤0.15mm, N≤2, Not visible against a black background/黑色背景下不可见		MI
		IR hole Scratches: 1.W<0.03mm, Ignored (忽略) (Dense points Not allowable 不允许密集); 2.0.03mm<W≤0.08mm; L≤2mm; N≤2; 3.W>0.08mm, L>2mm, Not allowable 不允许		MI

4.2 Electrical Inspection specification 电性检查规格:

Item 项目	Judgment Criteria 判定标准	Judge criterion	
		Major	Minor
LCD Bright /Dark dot 玻璃亮点/暗点	1.D $\leq$ 0.15mm, Ignored (忽略), Not dense (不可密集) 2.0.15mm<D $\leq$ 0.30mm; N $\leq$ 3; DS $\geq$ 10mm 3.D>0.30mm, Not allowed/不允许		MI
Mura	Invisible through 6% ND filter, 200~300Lux 透过ND6% 遮住, 目测不可见即为OK, 200~300Lux		MI
Small bright dot 细碎亮点	Not allowed if it can be observed through ND Filter6% 透过ND6%目测看得见, 不允许		MI
ZBD Rate 玻璃亮点比率	90:10		MI
Light Leakage 漏光	Invisible through 6% ND filter, OK 透过ND6%遮住目测不可见即为OK If necessary,set up set up Limit Sample. 如果有必要,可制订限度样品		MI
Bubble in Cell (LC Bubble/Actice Area) CELL气泡 (AA区LCD气泡)	Eyes should not find it . 目视观察不可见, 视为 OK	MA	

Item 项目	Judgment Criteria 判定标准	Judge criterion	
		Major	Minor
Foreign Material in spot shape 点状异物	1. $D \leq 0.15\text{mm}$, Ignored (忽略) 2. $0.15\text{mm} < D \leq 0.30\text{mm}$; $N \leq 3$; $DS \geq 10\text{mm}$ 3. $D > 0.30\text{mm}$, Not allowable/不允许		MI
Foreign Material in line or spiral shape 线状异物	1. $W \leq 0.05\text{mm}$, Ignored (忽略) 2. $L \leq 5\text{mm}$; $0.05\text{mm} < W \leq 0.10\text{mm}$; $N \leq 3$ 3. $W > 0.10\text{mm}$; $L > 5\text{mm}$, Not allowable/不允许		MI
White dot in back-light 白点	1. $D \leq 0.15\text{mm}$, Ignored (忽略) 2. $0.15\text{mm} < D \leq 0.30\text{mm}$; $N \leq 3$; $DS \geq 10\text{mm}$ 3. $D > 0.30\text{mm}$, Not allowed/不允许		MI
TP no touch 无触摸	Not allowable 不允许	MA	
Abnormal Disply 显示异常	Not Allowed 不允许	MA	
NO display 无显示	Not Allowed 不允许	MA	
Line Defect 缺线	Not Allowed 不允许	MA	
Angle of view error 视角错误	Not Allowed 不允许	MA	
Tect crostalk 不消失的残影	Not Allowed 不允许	MA	