Shenzhen Leadtek Electronics Co.,Ltd

PRODUCT SPECIFICATION

TFT-LCD MODULE

Module No：LTK035P4046TX-09QC-V1

☑ Preliminary Specification

☐ Approval Specification

Designed by	Checked by	Approved by
jona	tom	lan

Final Approval by Customer

Approved by	Comment
	Distributed by: TEXIM EUROPE www.texim-europe.com

※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.

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 Leadtek 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:

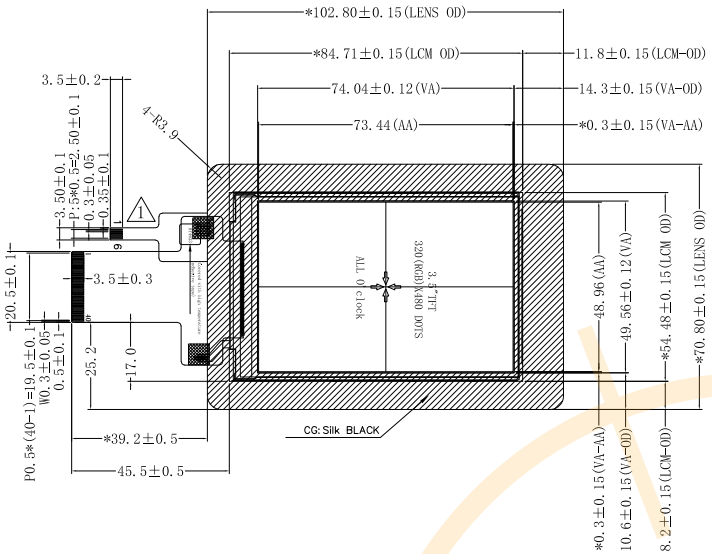
Structure: TFT PANNEL+IC +FPC+BL+CTP;
ALL O'CLOCK Type LCD
320 dot-segment and 480 dot-common outputs;
262K Color can be selected by software;
White LED back light;
3/4line SPI or 8/16bit MCU Interface

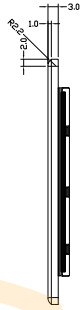
1.3 Applications:

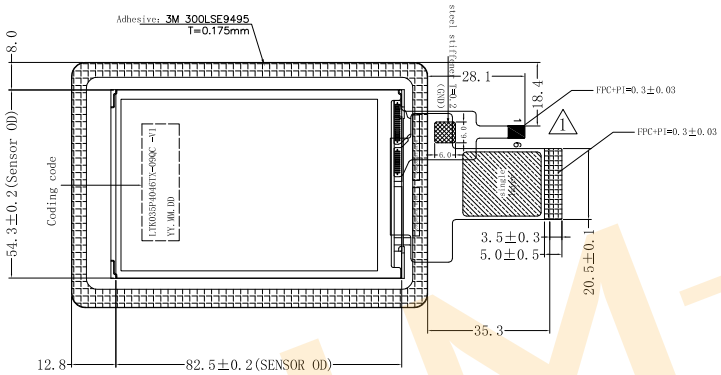
2. LCM General specification

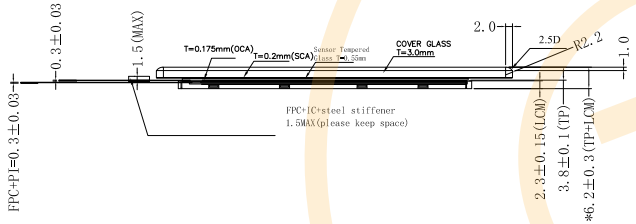
ITEM	Sandard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	320*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.153(H) x 0.153(V)	mm
Active area	48.96(H) x 73.44(V)	mm
Viewing direction	ALL O'CLOCK	-
TFT Driver IC	ILI9488	
TFT interface	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		

Front View









PIN ASSIGNMENT

1	XL
2	YU
3	XR
4	YD
5	GND
6	IOVCC(1.8/2.8V)
7	VCI(2.8V)
8	FMARK
9	CS/SPI CS
10	RS
11	WR/SPI SCL/SCK
12	RD
13	SPI SDI/SDA
14	SPI SDO
15	RESET
16	GND
17	DB0
18	DB1
19	DB2
20	DB3
21	DB4
22	DB5
23	DB6
24	DB7
25	DB8
26	DB9
27	DB10
28	DB11
29	DB12
30	DB13
31	DB14
32	DB15
33	A
34	K
35	K
36	K
37	GND
38	IM0
39	IM1
40	IM2

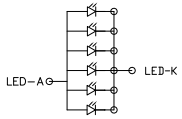
PIN Logical definition

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

NOTES:
1. DISPLAY TYPE: 3.5", 320*480 TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL
4. DRIVER IC:ILI9488
5. LCM (White 9 AVG 1/9) :
   Brightness: 400 cd/m² (TYP) ,LCM+CTP:340 cd/m² (TYP)
   Uniformity:80%(MIN)
6. BACK LIGHT: 6 chip white LEDs If=120mA,Vf=2.8V-3.2V
7. OPERATING TEMP: -20° C TO 60° C,STORAGE TEMP: -30° C TO 70° C
8. * Critical Parameter,( ) ref Parameter,[ ] cpk Parameter
   Unspecified Tolerances:±0.20mm
   Modification mark:
9. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS

NOTES:
1. structure:G+G
2. working voltage : 3.3 V
3. OPERATING TEMP: -20℃~+60℃
4. STORAGE TEMP: -30℃~+70℃
5. Transmittance≥80%
6. surface hardness ≥6H
7. surface hardness: ±0.2mm
8. IC(HY4633-N048)

CIRCUIT DIAGRAM



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

LEADTEK DISPLAY

LEADTEK COMPANY LIMITED

SCALE:1/1	UNIT:mm	PAGE:1/1		Approve	Check	Drawn
Part No:	LTK035P4046TX-09QC		VER:V1	Ian	Jona	Jack
Customer No:						

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 Characeristics

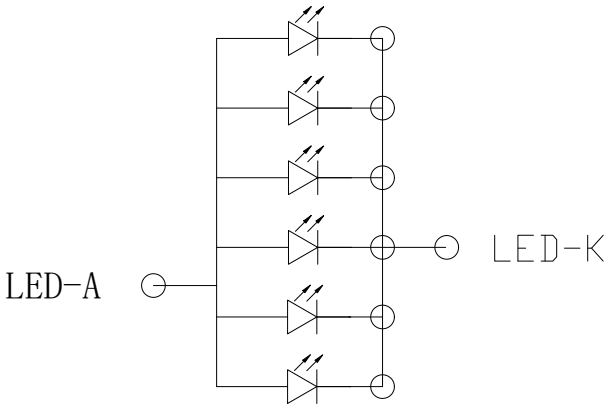
The back-light system is an edge-lighting type with 6 white LEDs. The characteristics of the back-light are shown in the following tables.

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)	Lv		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

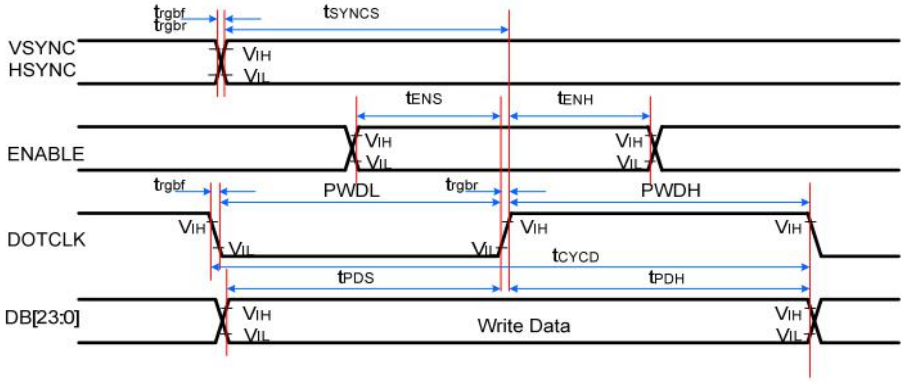
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Functional</th><th>Notes</th></tr>
<tr><td>1</td><td>XL</td><td>Touch panel pin</td><td></td></tr>
<tr><td>2</td><td>YU</td><td>Touch panel pin</td><td></td></tr>
<tr><td>3</td><td>XR</td><td>Touch panel pin</td><td></td></tr>
<tr><td>4</td><td>YD</td><td>Touch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

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.

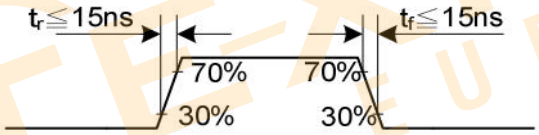
6. Timing Characteristics

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



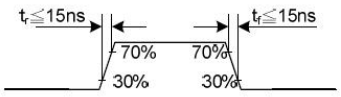
Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC/ HSYNC	t_{SYNCS}	VSYNC/HSYNC setup time	15	-	ns	16-/18-/24-bit bus RGB interface mode
	t_{SYNCH}	VSYNC/HSYNC hold time	15	-	ns	
ENABLE	t_{ENS}	ENABLE setup time	15	-	ns	
	t_{ENH}	ENABLE hold time	15	-	ns	
DB [23:0]	t_{POS}	Data setup time	15	-	ns	
	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_{rgbr} , t_{rgbf}	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	

Note: Ta = -30 to 70 ℃, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V

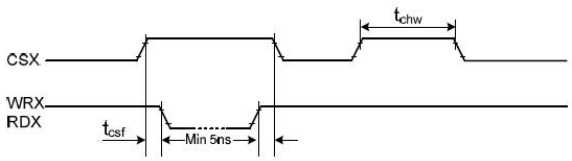


Notes:

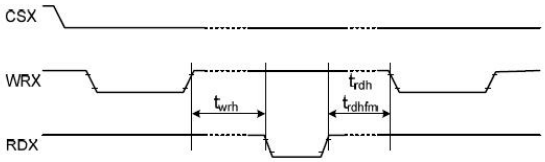
1. Ta = -30 to 70 ℃, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V
2. Logic high and low levels are specified as 30% and 70% of IOVCC for input signals.
3. Input signal rising time and falling time:



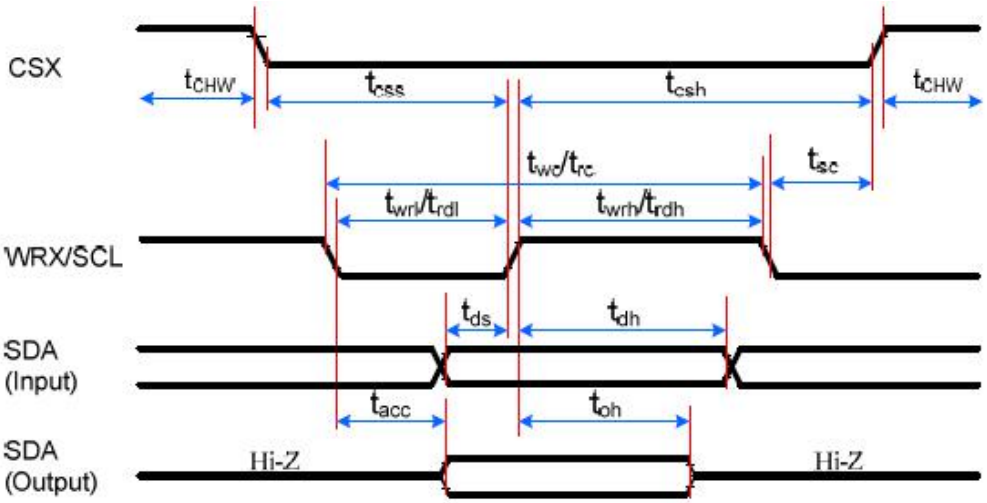
4. The CSX timing:



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

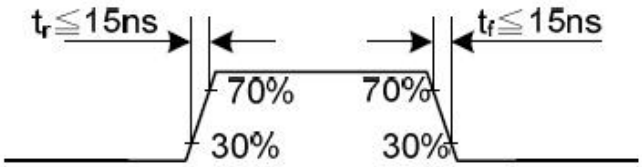


(3-Line SPI System) Timing Characteristics:

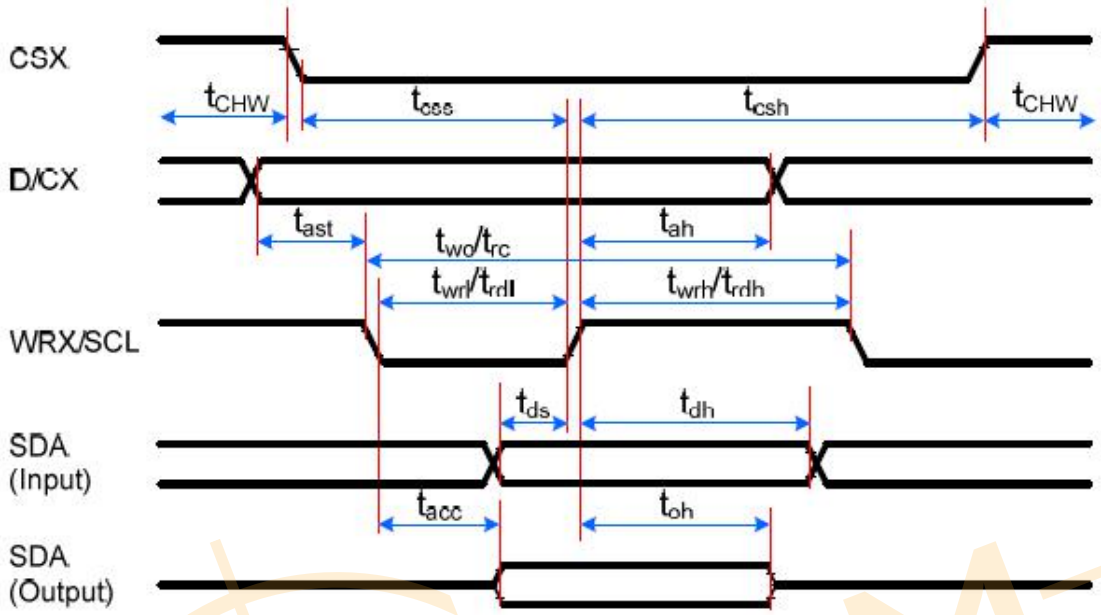


Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tsc	SCL-CSX	15	-	ns	
	tchw	CSX H Pulse Width	40	-	ns	
	tcss	Chip select time (Write)	60	-	ns	
	tcsh	Chip select hold time (Read)	65	-	ns	
SCL	twc	Serial Clock Cycle (Write)	66	-	ns	
	twrh	SCL H Pulse Width (Write)	15	-	ns	
	twrl	SCL L Pulse Width (Write)	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 ℃, 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	tcss	Chip select time (Write)	15	-	ns	
	tcsh	Chip select hold time (Read)	15	-	ns	
	tCHW	CS H pulse width	40	-	ns	
SCL	twc	Serial clock cycle (Write)	50	-	ns	
	twrh	SCL H pulse width (Write)	10	-	ns	
	twrl	SCL L pulse width (Write)	10	-	ns	
	trc	Serial clock cycle (Read)	150	-	ns	
	trdh	SCL H pulse width (Read)	60	-	ns	
	trdl	SCL L pulse width (Read)	60	-	ns	
D/CX	tas	D/CX setup time	10	-	ns	
	tah	D/CX hold time (Write/Read)	10	-	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
	tod	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Notes:

1. Ta = -30 to 70 ℃, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V, T = 10+/-0.5ns.
2. Does not include signal rising and falling times.

Reset Description:

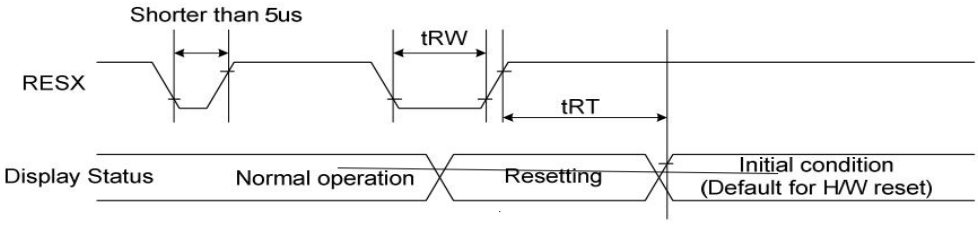


Table 39: Reset Timing

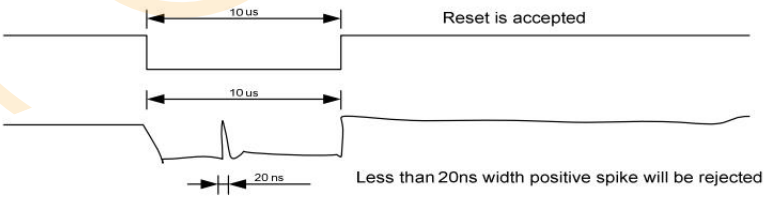
Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

Notes:

1. 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).
2. 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

3. 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.
4. Spike Rejection can also be applied during a valid reset pulse, as shown below:



Positive Noise Pulse during Reset Low

5. When Reset is applied during the Sleep In Mode.
6. When Reset is applied during the Sleep Out Mode.
7. 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	θ= 0°	-	30	40	ms	Note 4
Contrast ratio	CR	θ= 0°		1000	-		Note 2,5
Viewing angle	Top	CR≧10	70	80	-	deg.	Note 2,5,6
	Bottom	CR≧10	70	80	-		
	Left	CR≧10	70	80	-		
	Right	CR≧10	70	80	-		
Color chromaticity (CF only, light source is C light, CIE 1931)	Rx	θ= 0°	-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	θ= 0°		0.304			Only for reference
	Wy	θ= 0°		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.

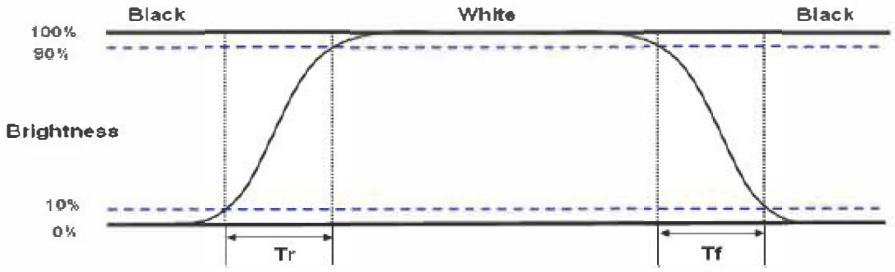
Note 2: To be measured with a viewing cone of 2°by Topcon luminance meter SR3.

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.

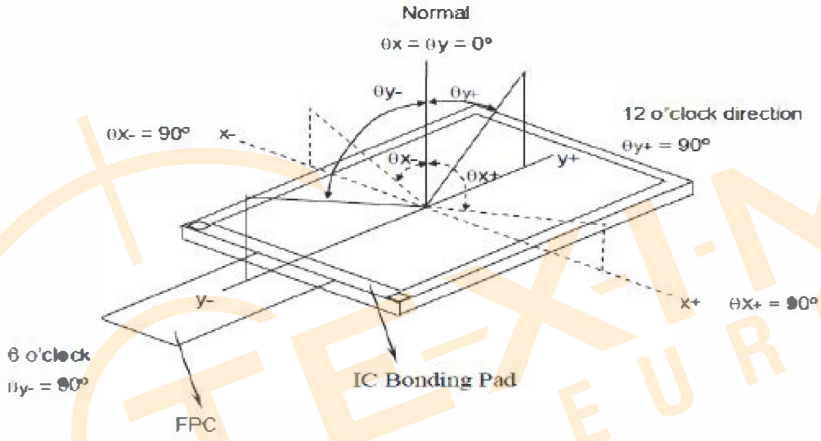


Note 6: Definition of contrast ratio:

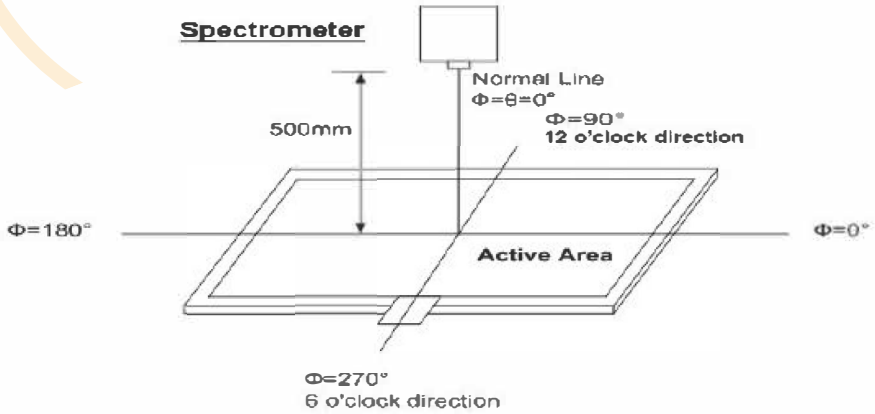
Contrast ratio is calculated by the following formula.

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

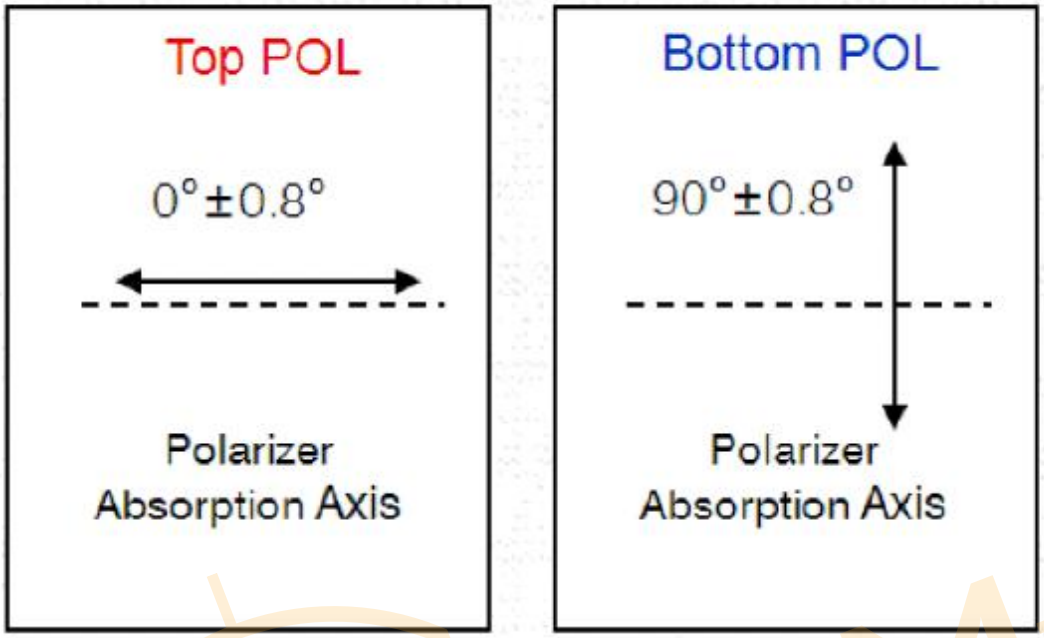
Note 7: Definition of viewing angle



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 isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed. 2. No low temperature bubbles,end seal loose andfall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Tempe. Operating	+60°C / 96H	
4	Low Tempe. Operating	-20°C / 96H	
5	High Temperature /Humidity storage	50°C x 90%RH /96H	
6	Thermal and cold shock	Static state，-20℃（30min）~70℃（30min），50 cycles	

9. Packing Method----TBD

LEADTEK DISPLAY

深圳市丽台电子有限公司

Shenzhen Leadtek Electronics Co.,Ltd

Quality inspection standards

品质允收标准

MODEL No. / 产品型号： **Applies 0.95~5.0 TFT-LCD Panel**
UPDATED DATE / 生效日期： **2022-05-20**
VERSION / 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:

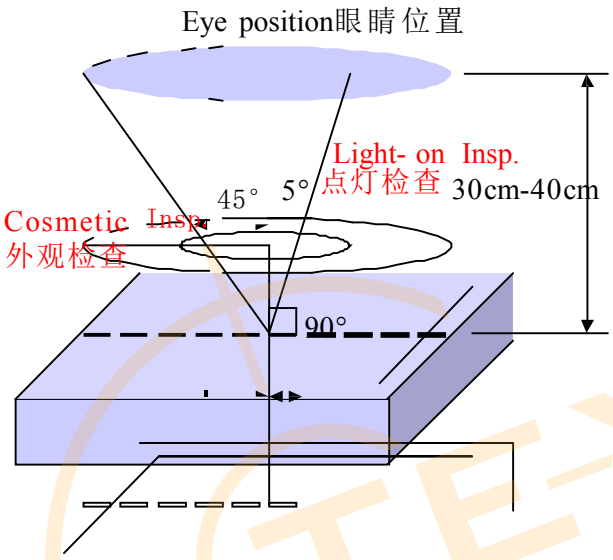
(1) Inspection Distance检测距离: 35 cm±5cm

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

(3) View Angle观看角度:

Light-on Inspection Angle点灯检验角度 ： ±45°

Cosmetic Inspection Angle外观检验角度 ： ±45°



(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℃±5℃
Ambient Humidity 湿度		55±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
		Geneal 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。

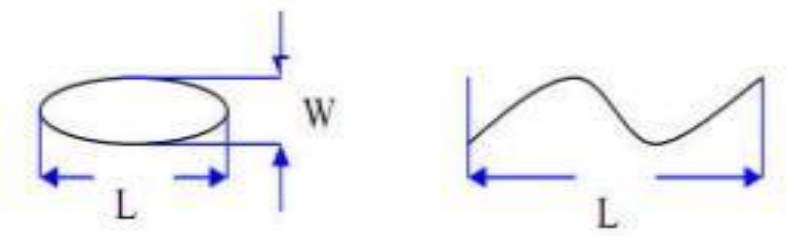
Minor defects: A minor defect either is a defect that is not likely to reduce materially the usability of the product for its intended purpose, or is a departure from an established having little bearing on the effective use or operation of the product.

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 cnsidered 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 ofActive 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≥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≥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 3.6 Mura criteria :judged by ND filter6%,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 defind as the defective area of the dot is larger than 50% of the dot area and is visible through 6% ND filter

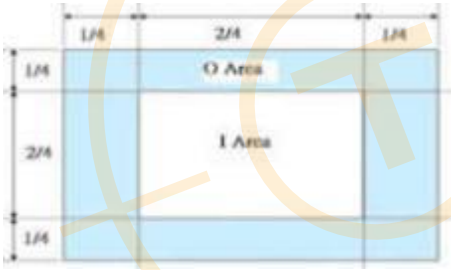
DOT 定义为点缺陷面积大于 50% DOT 面积, 且透过 ND6%遮住是可见的.

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：

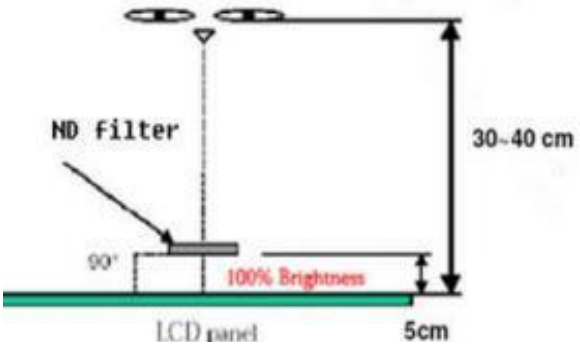
3.8 A dot defect that is smaller than the defined dot defect will be treated as small bright dot. 细碎亮点：小于"DOT 定义"的点缺陷视为细碎亮点。

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 gomu 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	Scract on the polarizer 偏光片划伤	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		

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 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		MI

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≦0. 15mm， Ignored（忽略），Not dense（不可密集） 2.0.15mm<D≦0.30mm ； N≦3 ； DS≥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≦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
Foreign Material in line or spiral shape 线状异物	1.W≦0.05mm ， Ignored（忽略） 2. L≤5mm ； 0.05mm<W≦0.10mm ； N≦3 3.W＞0.10mm ； L＞5mm ， Not allowable/不允许		MI
White dot in back-light 白点	1.D≦0. 15mm，Ignored（忽略） 2.0.15mm<D≦0.30mm ； N≦3 ； DS≥10mm 3.D＞0.30mm ， 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	

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