Reshine Display (HK) Technology Co., Limited

PRODUCT SPECIFICATION
TFT-LCD MODULE

Model No RXL050025-B

For Customer's Acceptance	
Approved by	**Comment**

	Signature	Date
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Checked by	Hu shizheng	2019.11.29
Approved by	Hu shizheng	2019.11.29

Contents

No.	ITEM
1	Document Revision History
2	General Description
3	Outline Dimension
4	Interface Specification
5	Absolute Maximum Ratings
6	Electrical Specifications
7	Timing Characteristics
8	Power Supply Configuration
9	Optical Specification
10	Inspection Specifications
11	Reliability Test Items
12	Precautions

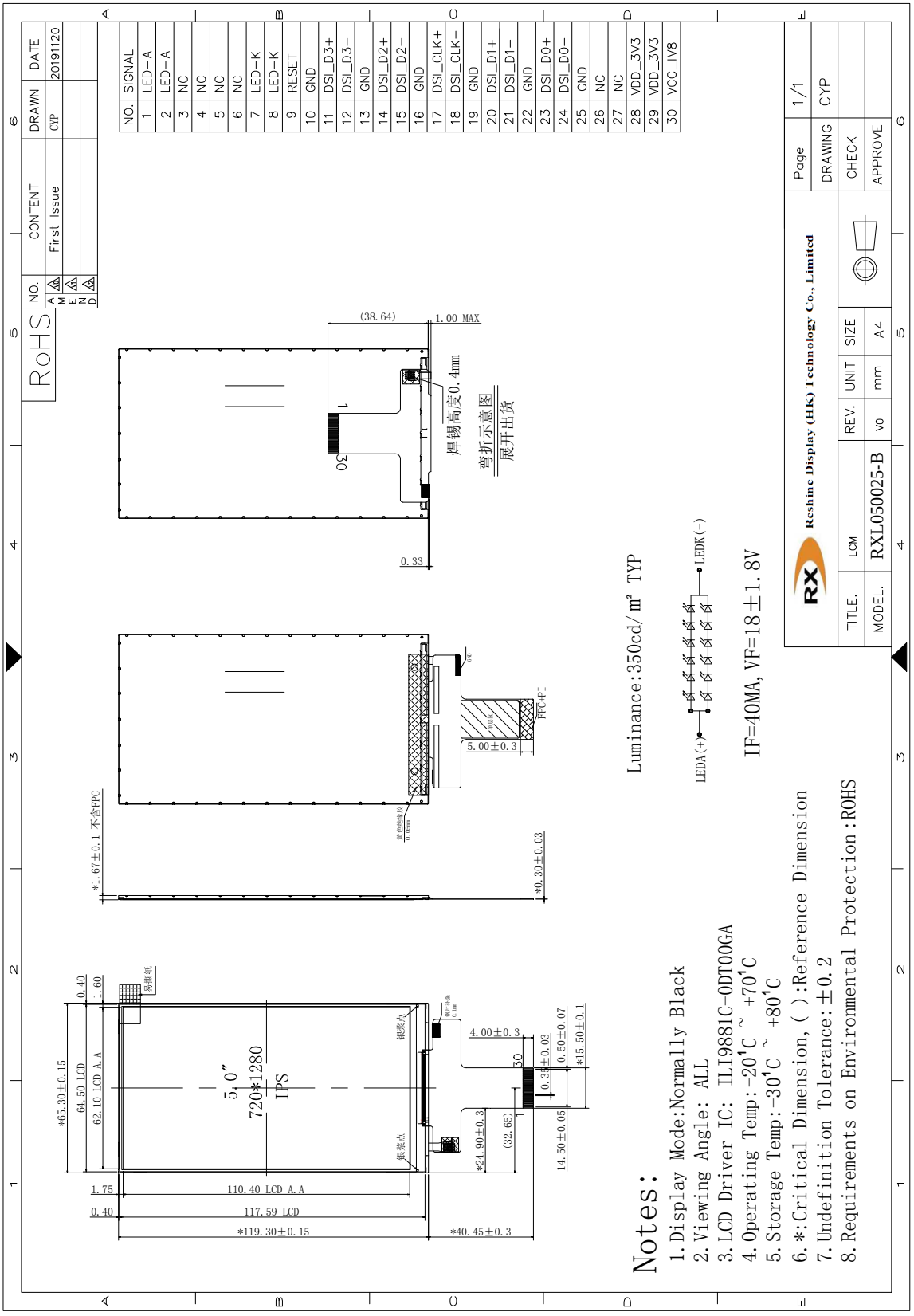
1. Document Revision History :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY
A	2019-11-29	First Release.	

2. General Description

No	Item	Specification	Remark
1	Screen Size	5.0 inch	
2	Display Mode	Normally Black	
3	Resolution	720 × RGB × 1280	
4	Active Area	62.1*110.4	mm
5	Outline Dimension	65.3*119.3*1.67	mm
6	Viewing Direction	ALL	
7	Driver IC	ILI9881C-0DT00GA	
8	Interface	MIPI	
9	Back Light	White Led*12	
10	Touch Panel	-	

3. Outline Dimension



4. Interface Specification

Pin No	Symbol	Description	Note
1-2	LED-A	Power Supply For LED Backlight Anode Input.	
3-6	NC	No Connection.	
7-8	LED-K	Power Supply For LED Backlight Cathode Input.	
9	RESET	Reset Signal input pin.	
10	GND	Ground.	
11	DSI_D3+	Positive polarity of low voltage differential data 3 signal	
12	DSI_D3-	Negative polarity of low voltage differential data 3 signal	
13	GND	Ground.	
14	DSI_D2+	Positive polarity of low voltage differential data 2 signal	
15	DSI_D2-	Negative polarity of low voltage differential data 2 signal	
16	GND	Ground.	
17	DSI_CLK+	Positive polarity of low voltage differential clock signal	
18	DSI_CLK-	Negative polarity of low voltage differential clock signal	
19	GND	Ground.	
20	DSI_D1+	Positive polarity of low voltage differential data 1 signal	
21	DSI_D1-	Negative polarity of low voltage differential data 1 signal	
22	GND	Ground.	
23	DSI_D0+	Positive polarity of low voltage differential data 0 signal	
24	DSI_D0-	Negative polarity of low voltage differential data 0 signal	
25	GND	Ground.	
26-27	NC	No Connection.	
28-29	VDD_3V3	Power Supply For LCD.	
30	VDD_1V8	Power Supply For I/O.	

5.Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VDD_3V3)	VDD_3V3	-0.3	+7.0	V	1
Power supply voltage (VDD_1V8)	VDD_1V8	-0.3	+3.8	V	1

Note:

1.VDD_1V8,VDD_3V3, GND must be maintained.

2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

6. Electrical Specifications

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VDD_3V3-GND		2.5	2.8	6.6	V
Supply voltage (logic)	VDD_1V8-GND		1.65	2.8	3.6	V
Supply voltage of white LED backlight	VLED	Forward current =40mA Number of LED = 12	16.2	18	19.8	V

7.Timing Characteristics

DSI Timing Characteristics

High Speed Mode – Clock Channel Timing

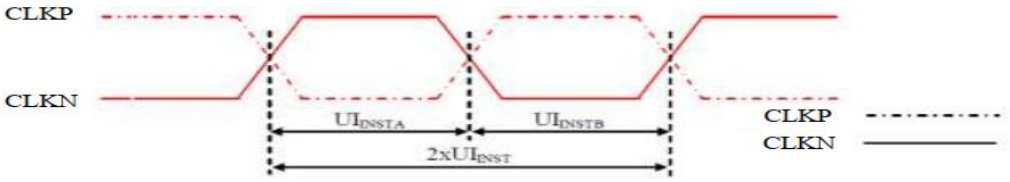


Figure 116: DSI Clock Channel Timing

Table 38: DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Max	Unit
CLKP/N	$2xUI_{INST}$	Double UI instantaneous	*Note 2*	25	ns
CLKP/N	UI_{INSTA},UI_{INSTB} (Note 1)	UI instantaneous Half	*Note 2*	12.5	ns

Notes:

1. UI = UIINSTA = UIINSTB

2. Define the minimum value, see Table 39.

Table 39: Limited Clock Channel Speed

Data type	Two Lanes speed	Three Lanes speed	Four Lanes speed
Data Type = 00 1110 (0Eh), RGB 565, 16 UI per Pixel	566 Mbps	466 Mbps	366 Mbps
Data Type = 01 1110 (1Eh), RGB 666, 18 UI per Pixel	637 Mbps	525 Mbps	412 Mbps
Data Type = 10 1110 (2Eh), RGB 666 Loosely, 24 UI per Pixel	850 Mbps	700 Mbps	550 Mbps
Data Type = 11 1110 (3Eh), RGB 888, 24 UI per Pixel	850 Mbps	700 Mbps	550 Mbps

High Speed Mode – Data Clock Channel Timing

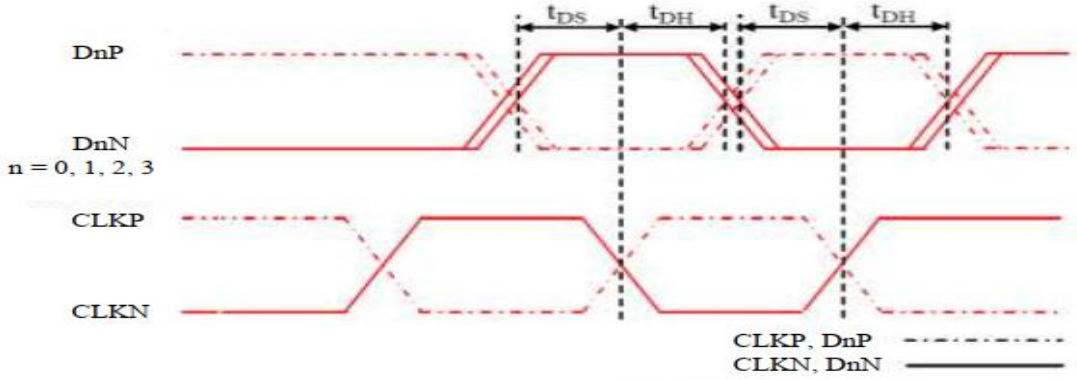


Figure 117: DSI Data to Clock Channel Timings

Table 40: DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max
DnP/N , n=0 and 1	t_{DS}	Data to Clock Setup time	0.15xUI	-
	t_{DH}	Clock to Data Hold Time	0.15xUI	-

High Speed Mode – Rising and Falling Timings

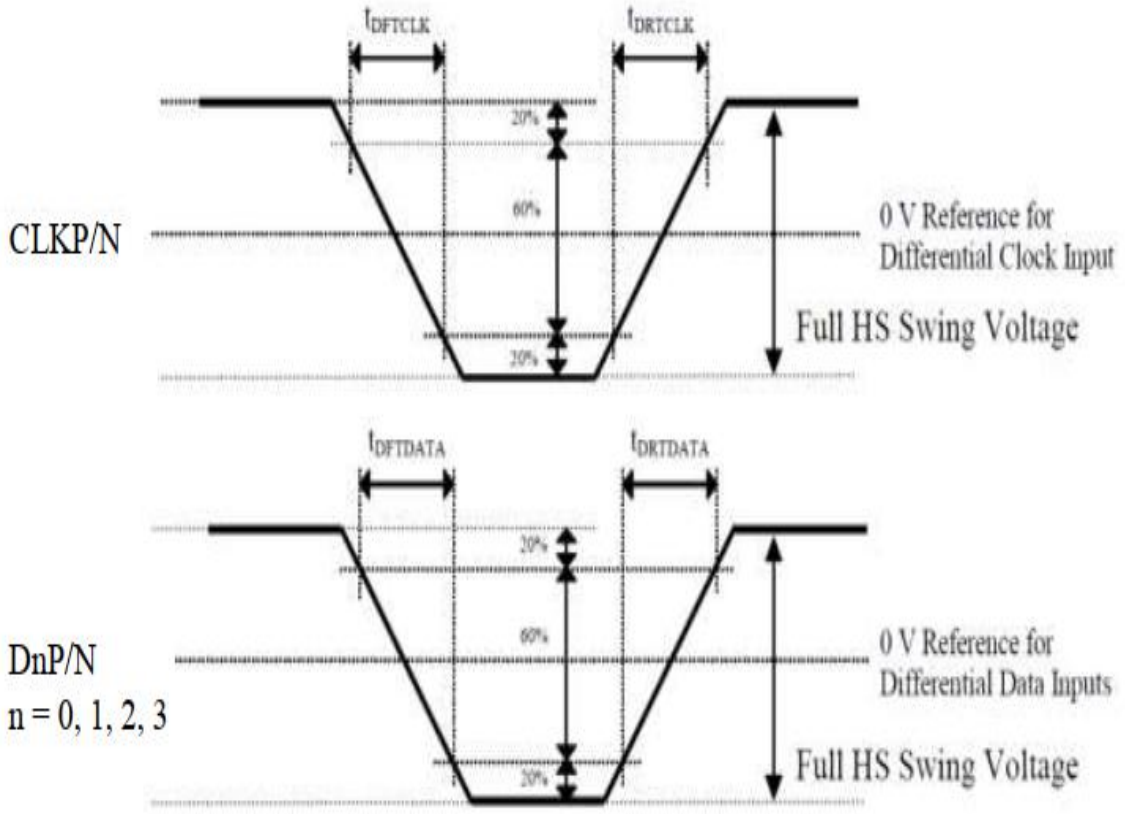


Figure 118: Rising and Falling Timings on Clock and Data Channels

Table 41: Rise and Fall Timings on Clock and Data Channels

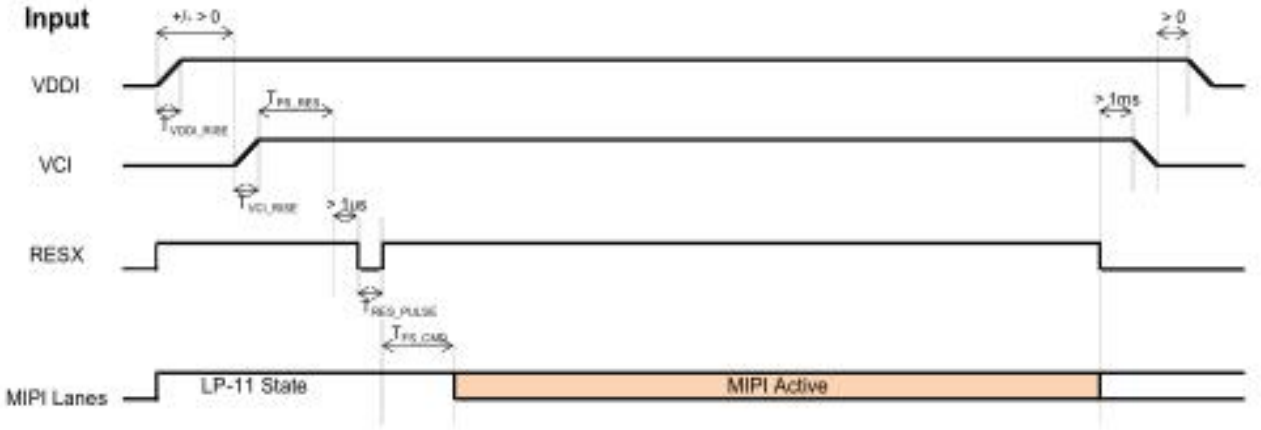
Parameter	Symbol	Condition	Specification		
			Min	Typ	Max
Differential Rise Time for Clock	t_{DRTCLK}	CLKP/N	150 ps	-	0.3UI (Note)
Differential Rise Time for Data	$t_{DRTDATA}$	DnP/N n=0 and 1	150 ps	-	0.3UI (Note)
Differential Fall Time for Clock	t_{DFTCLK}	CLKP/N	150 ps	-	0.3UI (Note)
Differential Fall Time for Data	$t_{DFTDATA}$	DnP/N n=0 and 1	150 ps	-	0.3UI (Note)

Note: *The display module has to meet timing requirements, which are defined for the transmitter (MCU) on MIPI D-Phy standard.*

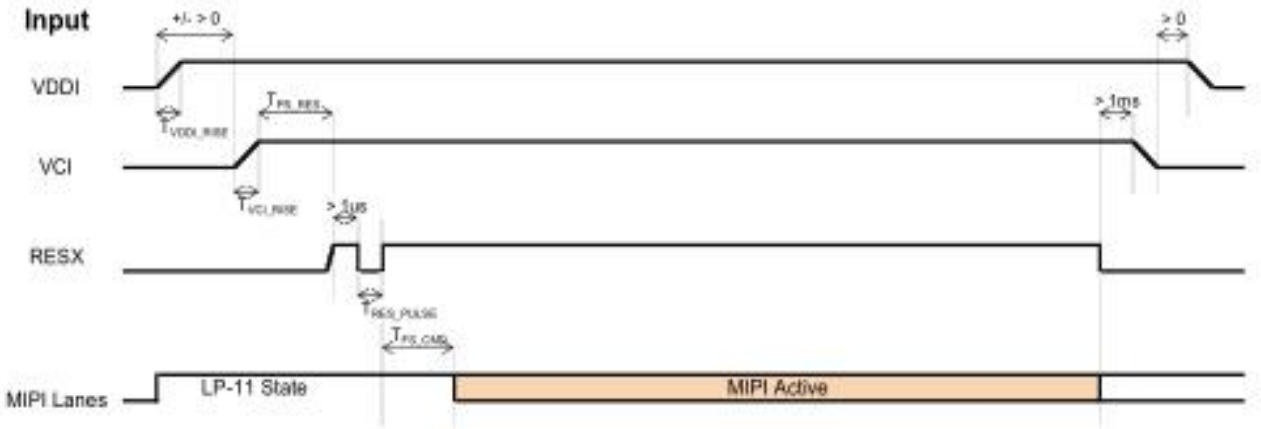
8. Power Supply Configuration

Power on/off Sequence

Case A:



Case B:



Symbol	Characteristics	Min.	Typ.	Max.	Units
T_{VDDI_RISE}	VDDI Rise time	20	-	-	us
T_{VCI_RISE}	Case A: VCI Rise time	200	-	-	us
	Case B: VCI Rise time	40			
T_{PS_RES}	VDDI/VCI on to Reset high	5	-	-	ms
T_{RES_PULSE}	Reset low pulse time	10	-	-	us
T_{FS_CMD}	Reset to first command	10	-	-	ms

Figure 105: Power on/off sequence with Power Mode 3

9.Optical Specification

Item 项目	Symbol 符号	Condition 条件	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	Note 备注
Response time 响应时间	Tr+Tf	Θ=0° Ø=0° Ta=25˚C	-	30	40	ms	1
Contrast ratio 对比度	Cr		640	800	-	-	2
Color gamut 饱和度	S(%)		-	70	-	%	-
Luminance uniformity 均匀度	δWHITE		80	-	-	%	3
Viewing angle range 视角范围	Θx+	CR≧10 Ta=25˚C	-	80	-	deg	4
	Θx-		-	80	-	deg	
	Θy+		-	80	-	deg	
	Θy-		-	80	-	deg	
LCM Luminance LCM 亮度	Lv	Θ=0° Ø=0° Ta=25˚C	-	350	-	Cd/m²	5

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...

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

Note3.The uniformity in surface luminance(WHITE) is determined by measuring luminance at eath 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,.....)

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 is2.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

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,.....)

FIG1. The definition of Response time

响应时间定义

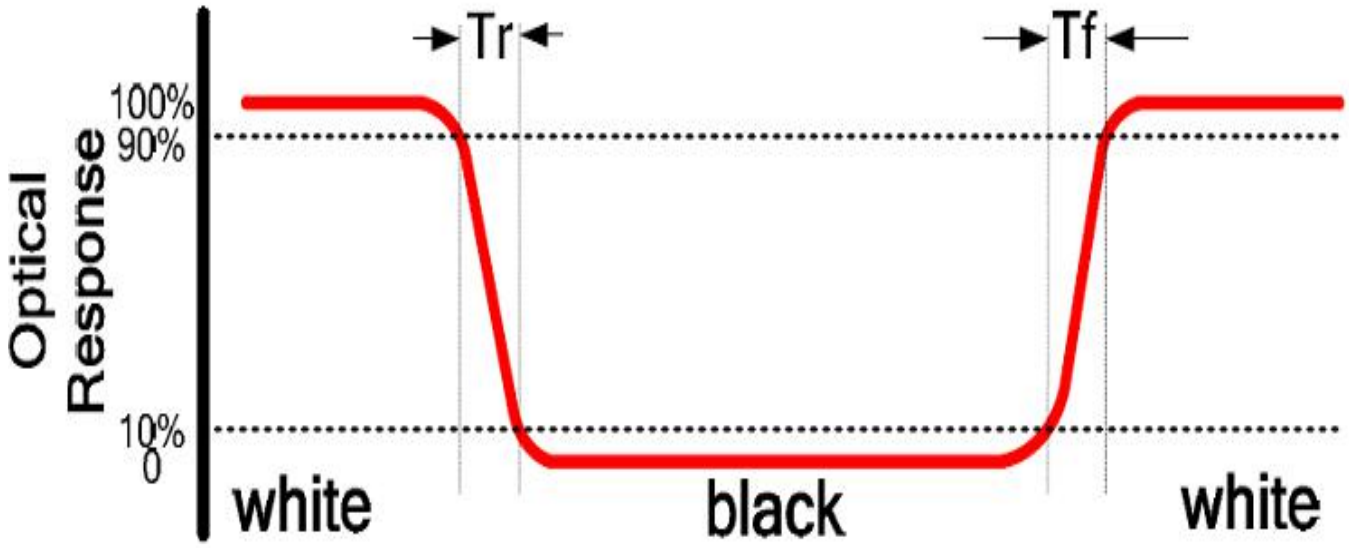


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)chromaticity.

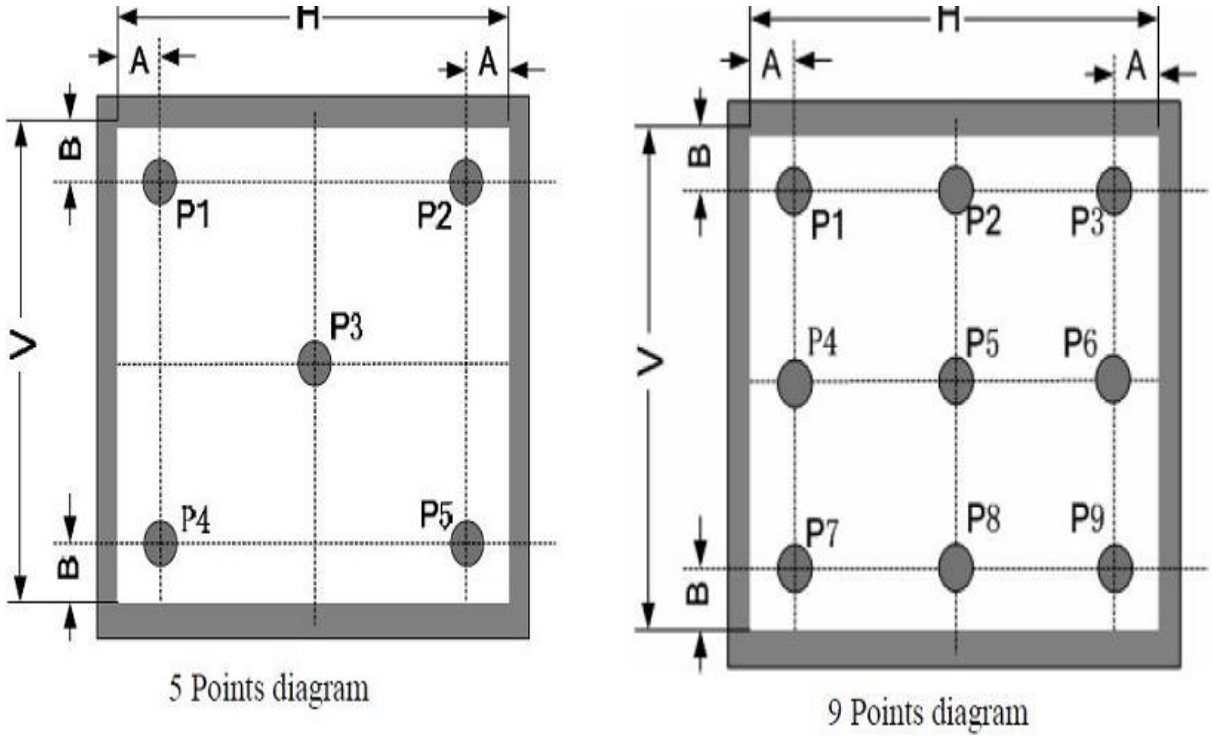
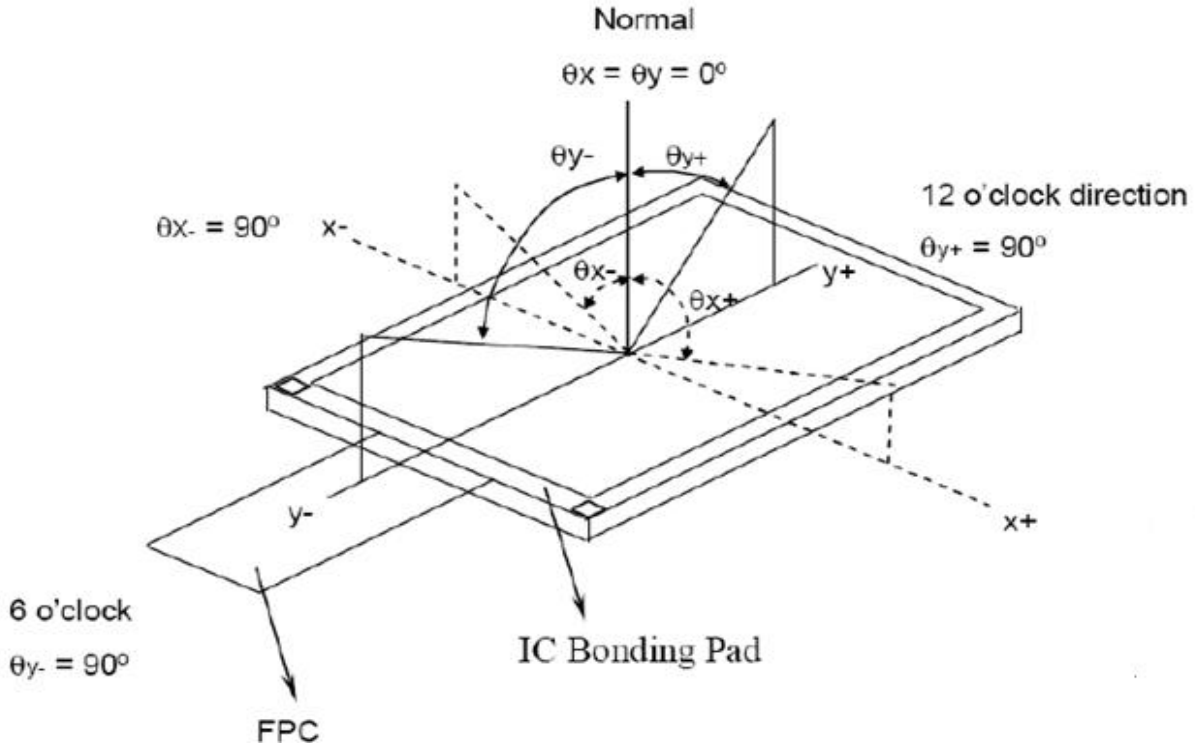


FIG3 The definition of viewing angle 视角定义



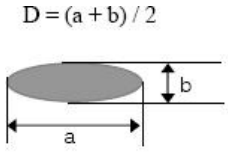
10. Inspection items and standards

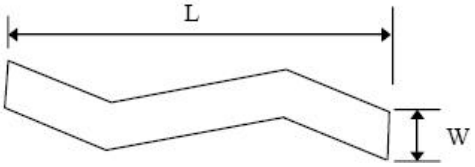
10.1 **Appearance inspection**

Item	Acceptable standards for defects	Defect level
Broken	Not allowed	critical defects
Cracks	Not allowed	critical defects
Insufficient UV glue entering	Not allowed	critical defects
Liquid crystal seal leakage	Not allowed	critical defects
Liquid crystal bubbles	Not allowed	critical defects
Surface scratch(mm)	W ≤0.02,ignored	minor defects
	0.02＜ W ≤0.03 L ≤ 2, N ≤ 2	
	0.03＜ W ≤0.05 L ≤ 1, N ≤ 1	
	0.05＜ W Not allowed	
Black/white spot(mm)	D≤ 0.1, ignored； 0.1＜D≤ 0.15, N ≤ 4	minor defects
	0.15＜D≤ 0.2, N ≤ 2； 0.2＜ D,Not allowed	
The seal pollution	Not allowed	minor defects
Liquid crystal residues	Not allowed	minor defects
1 Surface stains	Stains that cannot be cleaned or erased are not allowed	minor defects
size	Refer to the product specification corresponding to each product, overall size(including length,Width, thickness) or partial size exceeding the drawing size is not allowed	major defects

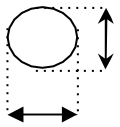
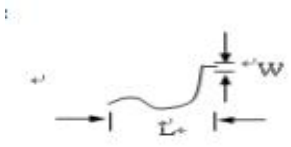
Remarks：1)Surface scratches within 1.5mm of the glass edge are ignored；

2) D = diameter, L = length, W = width, N = qty；





10.2 Functional test criteria

<table>
<tr><th>Item</th><th>Judgment</th><th>Level</th></tr>
<tr><td rowspan="3">Display status</td><td>No Display、Incomplete image、line defect、wrong viewing angle、flickering、abnormal image，are not allowed.</td><td>major defects</td></tr>
<tr><td>Display color, judged by approved samples, Or by limited samples</td><td>minor defects</td></tr>
<tr><td>MURA or the phenomenon that is unable to describe in words, judged by ND 5% or limited samples</td><td>minor defects</td></tr>
<tr><td>Spot(bright/dark)defect</td><td>Definition of spot defect：
Φ=（x+y）/2
y
x
<table>
<tr><th rowspan="2">Size(mm)</th><th colspan="2">acceptable qty</th></tr>
<tr><th>Active area</th><th>View area</th></tr>
<tr><td>Φ≤0.1</td><td>ignored</td><td rowspan="4">ignored</td></tr>
<tr><td>0.1＜Φ≤0.15</td><td>2（gap≥5）</td></tr>
<tr><td>0.15＜Φ≤0.2</td><td>1</td></tr>
<tr><td>0.2＜Φ</td><td>Not allowed</td></tr>
</table></td><td>minor defects</td></tr>
<tr><td>Black/white line</td><td>Definition of line defect:
L: length, W: width

<table>
<tr><th colspan="2">Size(mm)</th><th colspan="2">Acceptable qty</th></tr>
<tr><th>W(width)</th><th>L(length)</th><th>Active area</th><th>View area</th></tr>
<tr><td>W≤0.03</td><td>ignored</td><td>ignored</td><td rowspan="3">ignored</td></tr>
<tr><td>0.03＜W≤0.05</td><td>L≤2.0</td><td>3</td></tr>
<tr><td>W>0.05</td><td>-</td><td>Not allowed</td></tr>
</table></td><td>minor defects</td></tr>
</table>

11.Reliability Test Items

Item	Test Condition	Criterion
High Temperature Storage	80 ℃, 48 hrs	Note1,Note2
Low Temperature Storage	-30 ℃, 48 hrs	
High Temp. & High Humidity Storage	40 ℃, 80％ RH, 48hrs	
Thermal Shock (Static)	-20℃, 30 min /70℃, 30 min, 20 cycles	
High Temperature Operation	70 ℃, 48 hrs	
Low temperature Operation	-20 ℃, 48 hrs	

Note1:Evaluation should be tested after storage at room temperature for two hours.
Note2:
Pass: Normal display image no line defect.
Fail: No display image, or line defects.
Partial transformation of the module parts should be ignored.

12.Precautions

Please pay attentions to the followings as using the LCD module.

Handling

(a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.

(b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.

(c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.

(d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

(e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean the display surface. It might damage the touch panel surface permanently. The recommended solvents are water and Isopropyl alcohol.

(f) Wipe off water droplets or oil immediately.

(g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.

(h) Do not touch the output pins directly with bare hands.

(i) Do not disassemble the LCD module.

(j) Do not lift the FPC of Touch Panel.

Storage

(a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.

(b) Do not expose the LCD modules to sunlight directly.

(c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.

(d) Avoid condensation of water. It may cause improper operation.

(e) Please stack only up to the number stated on carton box for storage and transportation. Excessive weight will cause deformation and damage of carton box.

Operation

(a) When mounting or dismounting the LCD modules, turn the power off.

(b) Protect the LCD modules from electric shock.

(c) The Driver IC control algorithms stated above should always obeyed to avoid damaging the LSI and electronic circuit.

(d) Be careful to avoid mixing up the polarity of power supply for backlight.

(e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cause non-recoverable damage of electronic components or, nevertheless, burning.

(f) When a static image is displayed for a long time, remnant image is likely to occur.

(g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

(h) Most of the touch screens have air vent to equalize the inside air pressure to the outside one. The air vent must be open and liquid contact must be avoided as the liquid may be absorbed if the liquid is accumulated near the air vent.

(i) For the fragility of ITO film, it should avoid to use too tapering pen as the input material.

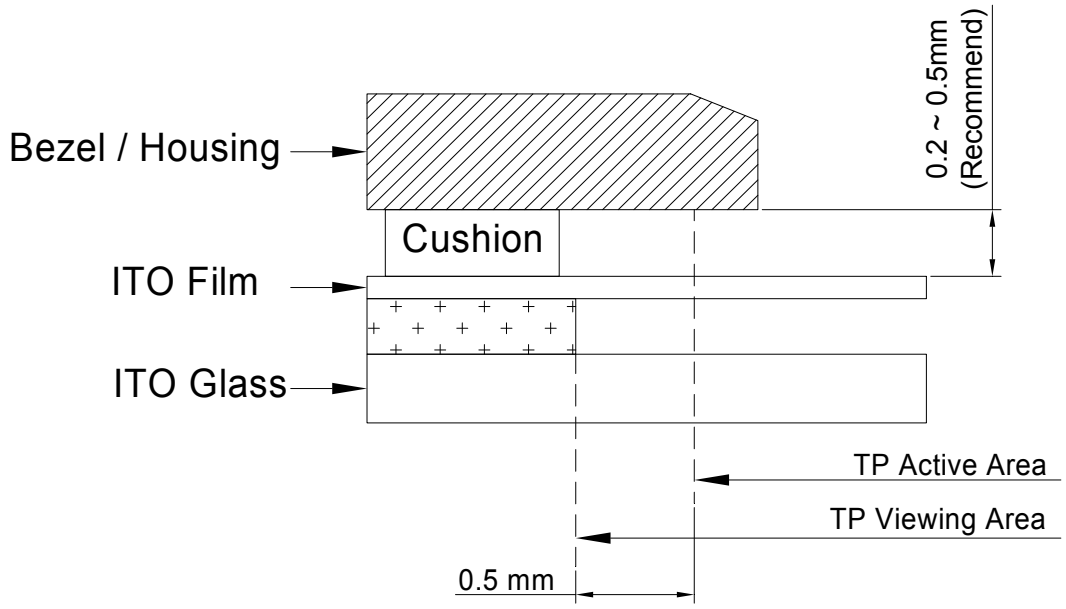
Touch Panel Mounting Notes

(a) If a cushion is used between bezel/housing and film must be choose as free as enough to absorb the expansion and contraction to avoid the distortion of film.

(b) The cushion must be placed out of the Viewing Area.

(c) Bezel/Housing edge must be posited between Key Area and Viewing Area. The edge enters the Key Area may cause unexpected input if the gap is too narrow or foreign particles like dusts exist between Bezel/Housing and ITO film.

(d) Mounting example:



The corner part has conductivity. Do not touch any metal part after mounting.

Others

a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.

b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.

c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized.