Reshine Display (HK) Technology Co., Limited

瑞翔顯示（香港）科技有限公司

PRODUCT SPECIFICATION

TFT-LCD MODULE

Model No： RXL040078-E

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

	Signature	Date
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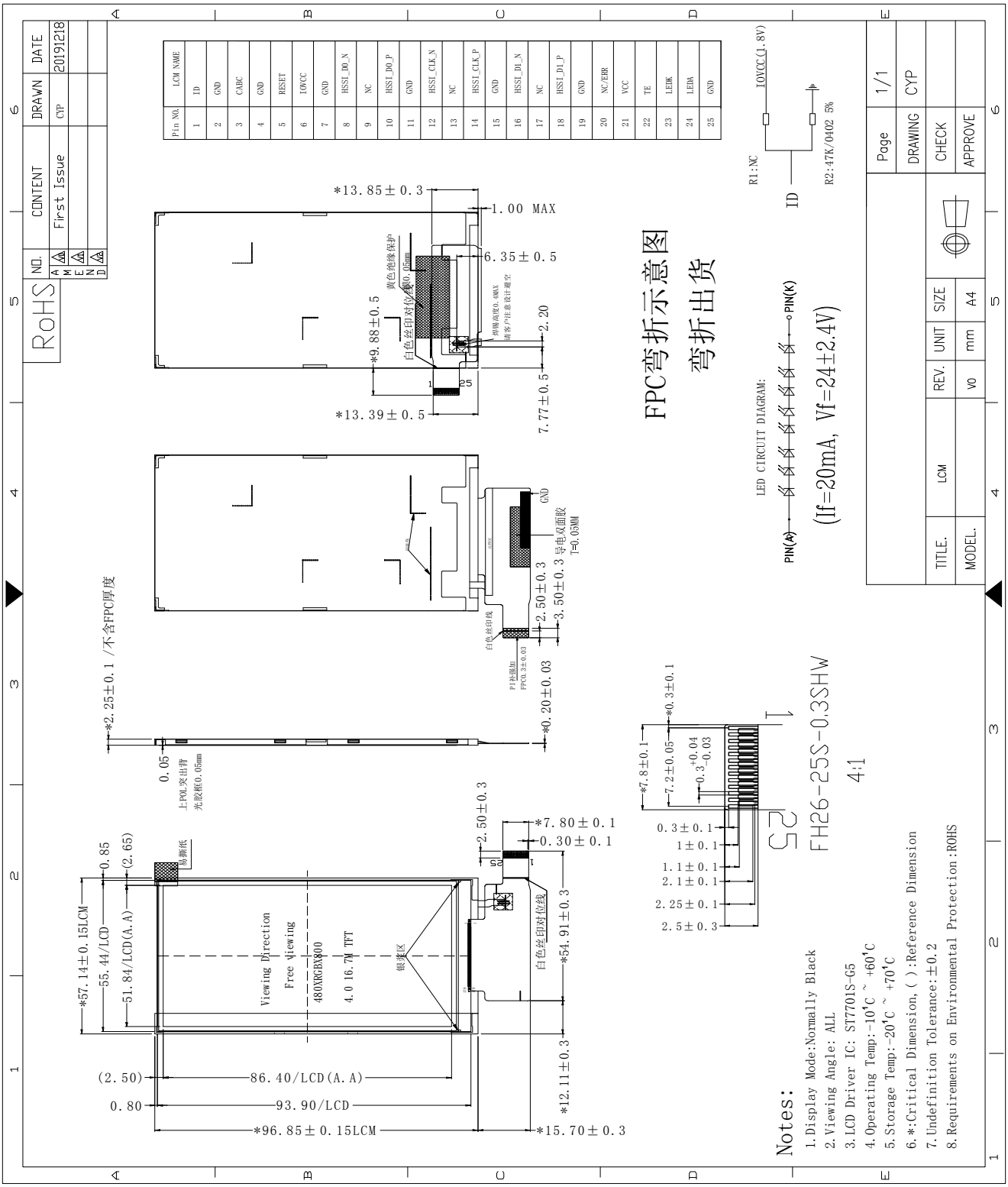
1. Document Revision History :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY
A	2020-01-04	First Release.	
B	2020-03-30	Update contact information	

2. General Description

No	Item	Specification	Remark
1	Screen Size	4.0 inch	
2	Display Mode	Normally Black	
3	Resolution	480 × RGB × 800	
4	Active Area	51.84*86.4	mm
5	Outline Dimension	57.14*96.85*2.25	mm
6	Viewing Direction	ALL	
7	Driver IC	ST7701S-G5	
8	Interface	MIPI	
9	Back Light	White Led*8	
10	Touch Panel	-	

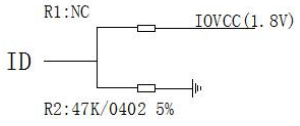
3. Outline Dimension



4. Interface Specification

Pin No	Symbol	Description	Note
1	ID	ID read PIN for ID circuit, Connection low level.	1
2	GND	Ground.	
3	CABC	PWM (Pulse Width Modulation) Signal Of LED Driving.	
4	GND	Ground.	
5	RESET	Reset Signal input pin.	
6	IOVCC	Power Supply For I/O.	
7	GND	Ground.	
8	HSSI_D0_N	Negative polarity of low voltage differential data 0 signal	
9	NC	No Connection.	
10	HSSI_D0_P	Positive polarity of low voltage differential data 0 signal	
11	GND	Ground.	
12	HSSI_CLK_N	Negative polarity of low voltage differential clock signal	
13	NC	No Connection.	
14	HSSI_CLK_P	Positive polarity of low voltage differential clock signal	
15	GND	Ground.	
16	HSSI_D1_N	Negative polarity of low voltage differential data 1 signal	
17	NC	No Connection.	
18	HSSI_D1_P	Positive polarity of low voltage differential data 1 signal	
19	GND	Ground.	
20	NC/ERR	No Connection.	
21	VCC	Power Supply For LCD.	
22	TE	Frame head pulse for tearing effect.	
23	LEDK	Power Supply For LED Backlight Cathode Input.	
24	LEDA	Power Supply For LED Backlight Anode Input.	
25	GND	Ground.	

Note1:



5.Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VCC)	VCC	-0.3	+4.6	V	1
Power supply voltage (IOVCC)	IOVCC	-0.3	+4.6	V	1

Note:

1.IOVCC,VCC, GND must be maintained.

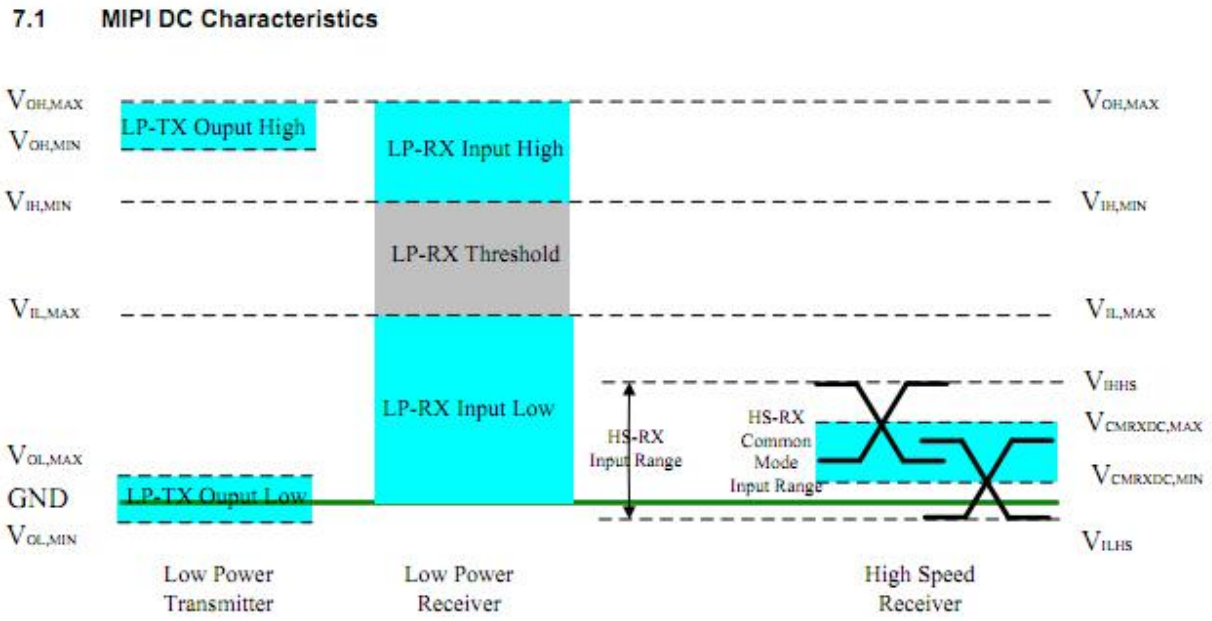
2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

6. Electrical Specifications

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCC -GND		2.5	2.8	3.6	V
Supply voltage (logic)	IOVCC-GND		1.65	1.8	3.3	V
Supply current (Logic & LCD)	ICC	-	-	-	-	mA
Supply voltage of white LED backlight	VLED	Forward current =20mA Number of LED =8	21.6	24	26.4	V

7.Timing Characteristics

7.1 MIPI Interface Characteristics (2-line mipi):



VDDI=1.8,VDD=2.8, AGND=DGND=0V, Ta=25 ℃

Parameter	Symbol	Specification			Unit
		MIN	TYP	MAX	
Operation Voltage for MIPI Receiver					
Low power mode operating voltage	V_{LPH}	1.1	1.2	1.3	V
MIPI Characteristics for High Speed Receiver					
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV
Single-ended input high voltage	V_{IHHS}	-	-	460	mV
Common-mode voltage	V_{CMRXDC}	70	-	330	mV
Differential input impedance	Z_{ID}	80	100	125	ohm
MIPI Characteristics for Low Power Mode					
Pad signal voltage range	V_I	-50	-	1350	mV
Logic 0 input threshold	V_{IL}	0-	-	550	mV
Logic 1 input threshold	V_{IH}	880	-	1350	mV
Output low level	V_{OL}	-50	-	50	mV
Output high level	V_{OH}	1.1	1.2	1.3	V

8.Power Supply Configuration

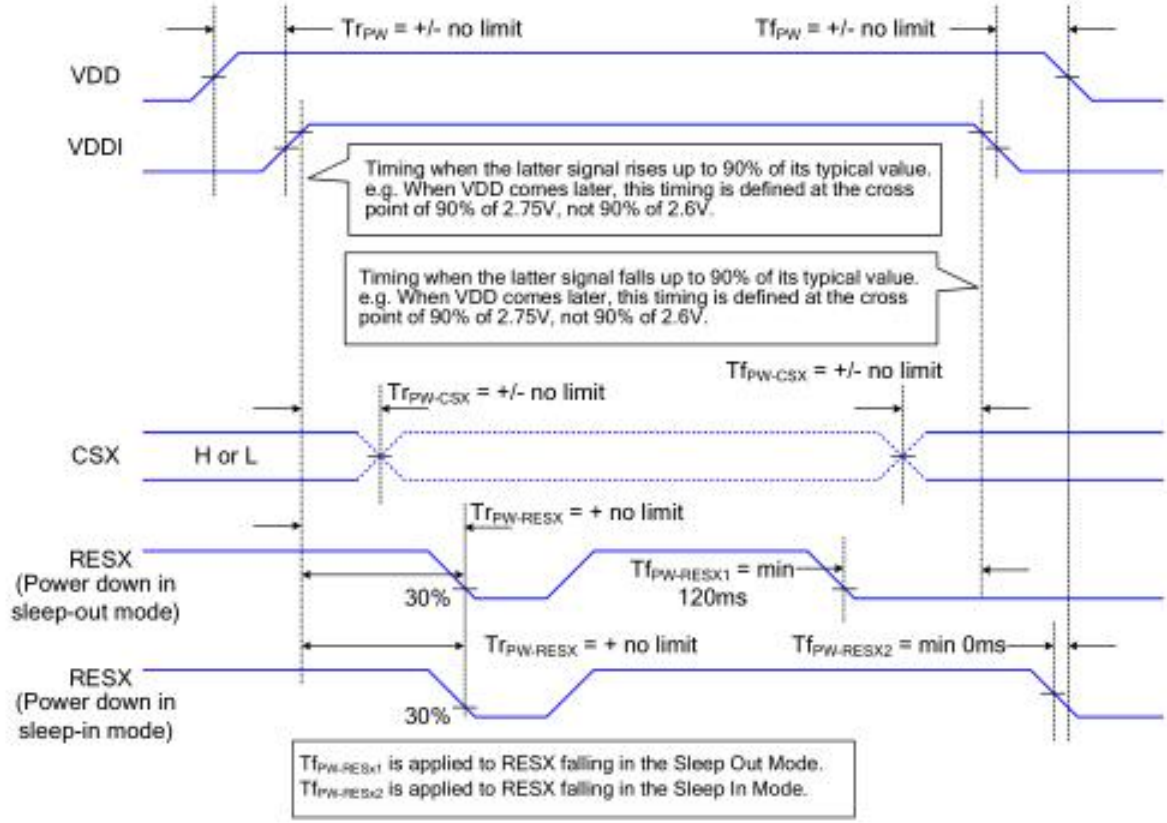
VDDI and VDDA can be applied or powered down in any order. During the Power Off sequence, if the LCD is in the Sleep Out mode, VDDA and VDDI must be powered down with minimum 120msec. If the LCD is in the Sleep In mode, VDDA and VDDI can be powered down with minimum 0msec after the RESX is released.

CSX can be applied at any timing or can be permanently grounded. RESX has high priority over CSX.

Notes:

1. There will be no damage to the ST7701S if the power sequences are not met.
2. There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
3. There will be no abnormal visible effects on the display between the end of Power On Sequence and before receiving the Sleep Out command, and also between receiving the Sleep In command and the Power Off Sequence.
4. If the RESX line is not steadily held by the host during the Power On Sequence as defined in Sections 9.1 and 9.2, then it will be necessary to apply the Hardware Reset (RESX) after the completion of the Host Power On Sequence to ensure correct operations. Otherwise, all the functions are not guaranteed.

The power on/off sequence is illustrated below



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	-	35	45	ms	1
Contrast ratio 对比度	Cr		720	900	-	-	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	-	250	-	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

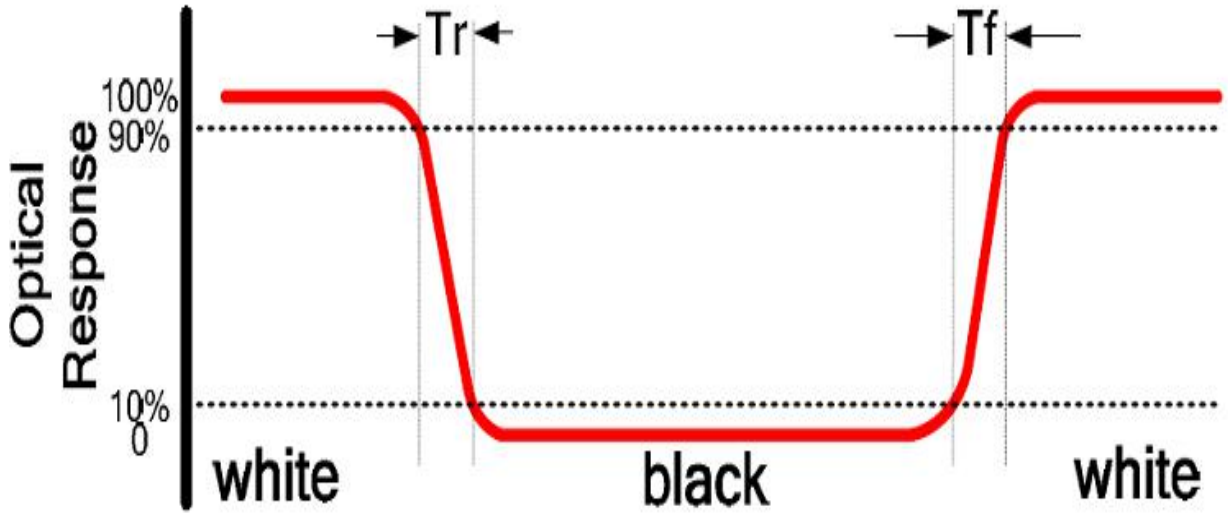


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)chromaticity.

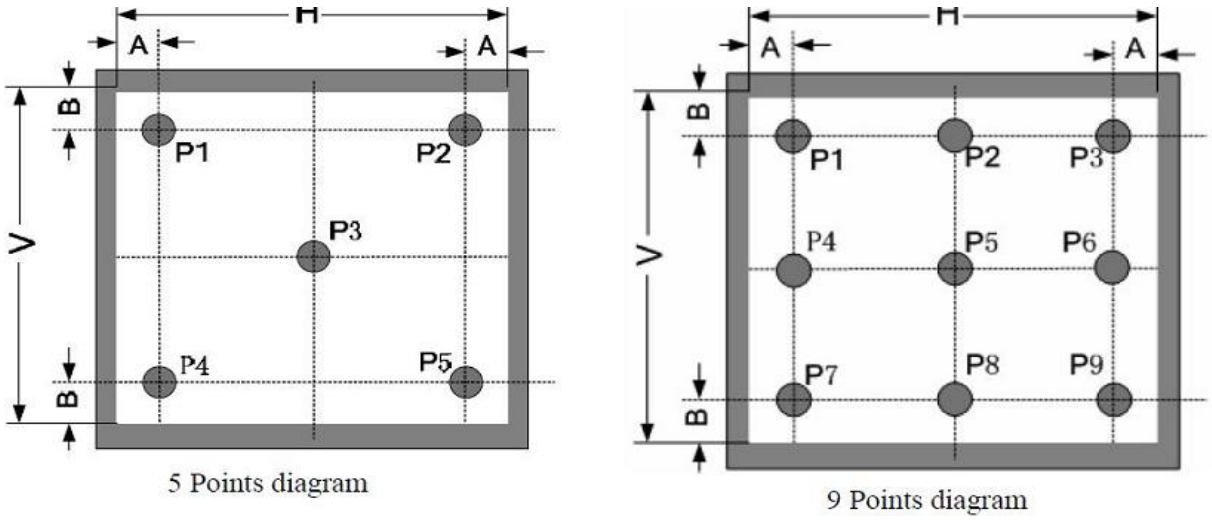
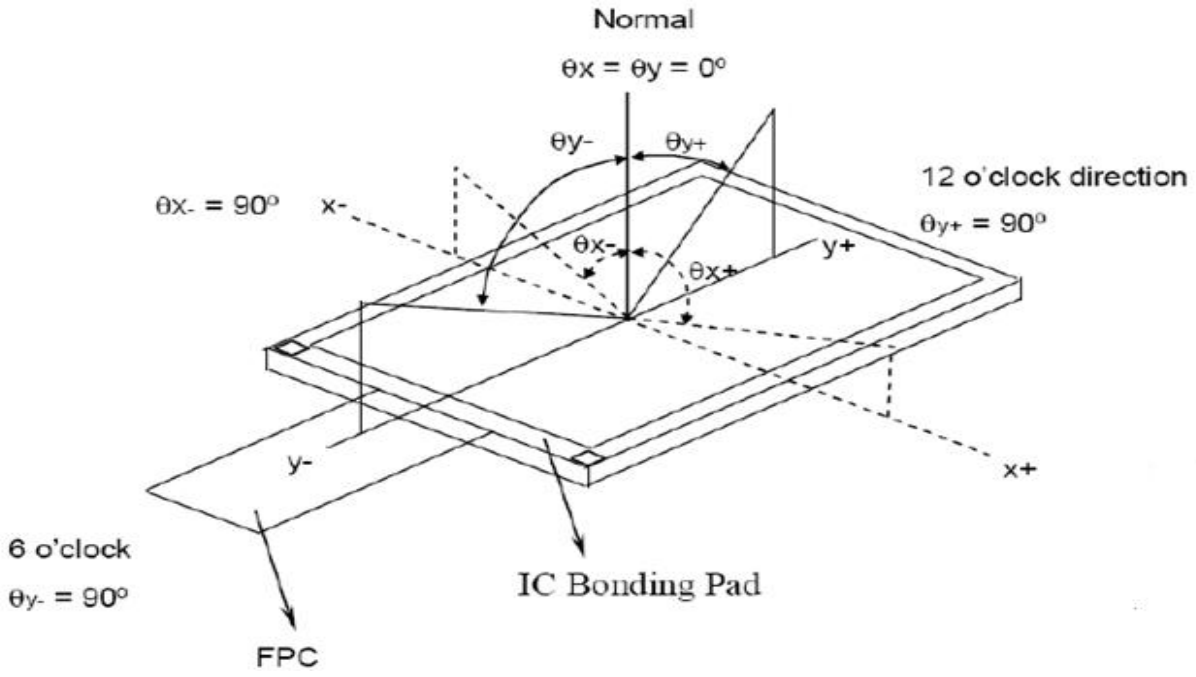


FIG3 The definition of viewing angle 视角定义



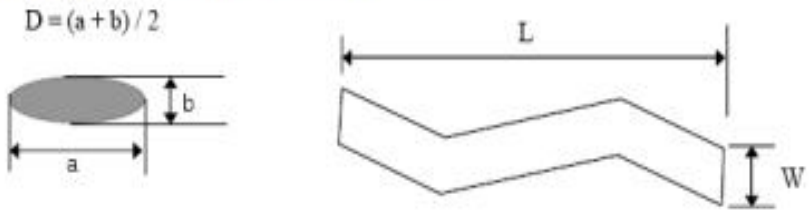
10. Inspection Specifications

10.1 **Appearance inspection**

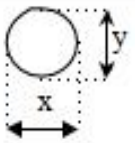
Item	Acceptable standards for defects	Defect level
Broken	Not allowed	critical defects
Cracks	Not allowed	critical defects
Insufficient UV glue entering	Not allowed	critical defects
Liquid crystal seal leakage	Not allowed	critical defects
Liquid crystal bubbles	Not allowed	critical defects
Surface scratch(mm)	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
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

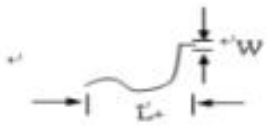
Remarks： 1)Surface scratches within 1.5mm of the glass edge are ignored;

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


<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	70 ℃, 48 hrs	Note1,Note2
Low Temperature Storage	-20 ℃, 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	60 ℃, 48 hrs	
Low temperature Operation	-10 ℃, 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.

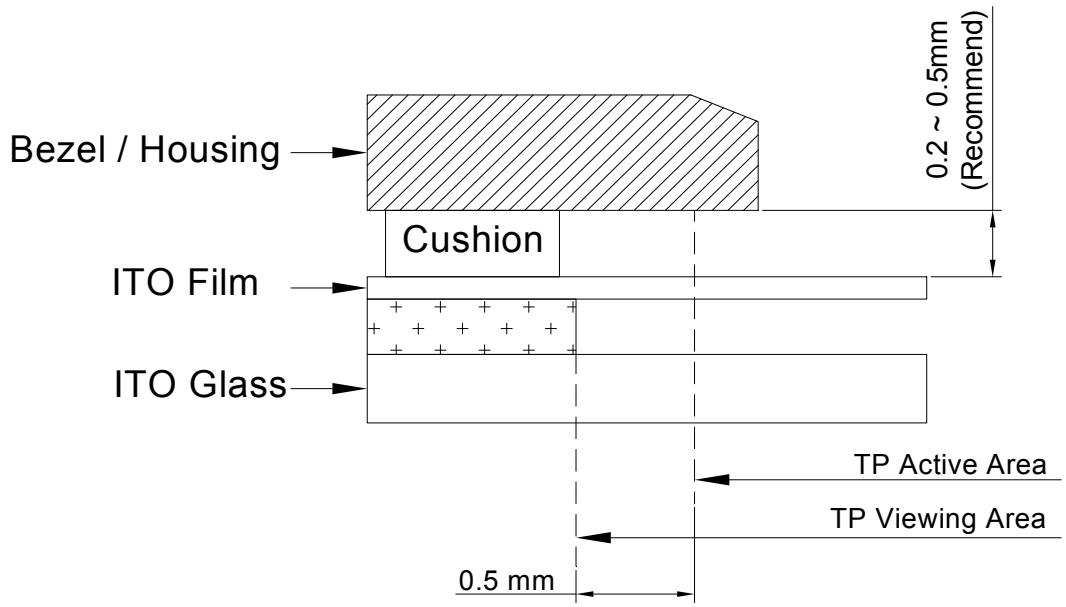
Touch Panel Mounting Notes

(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.