PRODUCT SPECIFICATION

TFT-LCD MODULE

Model No：FRD500H40119-A-CTK

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

	Signature	Date
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Checked by	黄思琦	**2023.05.24**
Approved by	汪 进	**2023.05.24**

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Contents

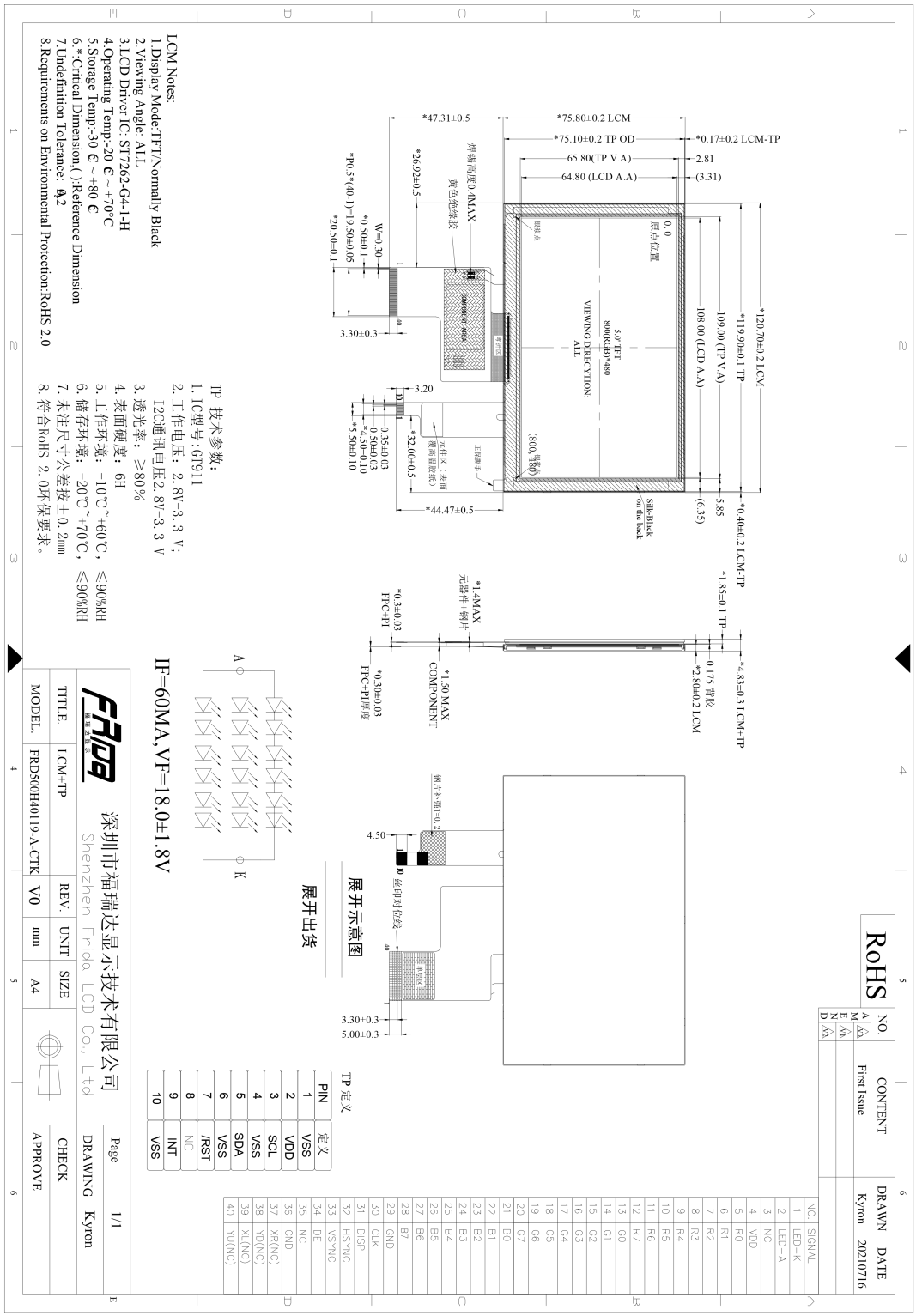
1. Document Revision History :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY
A	2023-05-24	First Release.	

2. General Description

No	Item	Specification	Remark
1	Screen Size	5.0 inch	
2	Display Mode	Normally Black	
3	Resolution	800 × RGB × 480	
4	Active Area	108.0*64.8	mm
5	Outline Dimension	120.7*75.8*4.83	mm
6	Viewing Direction	ALL	
7	Driver IC	ST7262-G4-1-H	
8	Interface	RGB	
9	Back Light	White Led*18	
10	Touch Panel	With CTP	

3. Outline Dimension



4. Interface Specification

4.1 LCM Interface Specification

Pin No	Symbol	Description	Note
1	LED-K	Power Supply For LED Backlight Cathode Input.	
2	LED-A	Power Supply For LED Backlight Anode Input.	
3	NC	No Connection.	
4	VDD	Power Supply For LCD.	
5-12	R0-R7	Red data (R0-LSB;R7-MSB)	
13-20	G0-G7	Green data (G0-LSB; G7-MSB)	
21-28	B0-B7	Blue data (B0-LSB;B7-MSB)	
29	GND	Ground.	
30	CLK	Dot clock signal for RGB interface operation.	
31	DISP	DISP sets the display mode.	Note1
32	HSYNC	Line synchronous signal for RGB interface operation.	
33	VSYNC	Frame synchronous signal for RGB interface operation.	
34	DE	Data enable signal for RGB interface operation.	
35	NC	No Connection.	
36	GND	Ground.	
37	XR	Touch panel right side	
38	YD	Touch panel down side	
39	XL	Touch panel left side	
40	YU	Touch panel up side	

4.2 CTP Interface Specification

Pin No	Symbol	Description	Note
1	VSS	Ground.	
2	VDD	Power Supply for CTP.	
3	SCL	Serial clock signal pin for CTP.	
4	VSS	Ground.	
5	SDA	Serial data input/output pin for CTP.	
6	VSS	Ground.	

7	RST	Reset Signal input pin for CTP.	
8	NC	No Connection.	
9	INT	CTP interrupt request.	
10	VSS	Ground.	

Note1：

DISP	Function Description
L	Standby mode
H	Normal display mode

5.Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VDD)	VDD	-0.3	+4.0	V	1

Note:

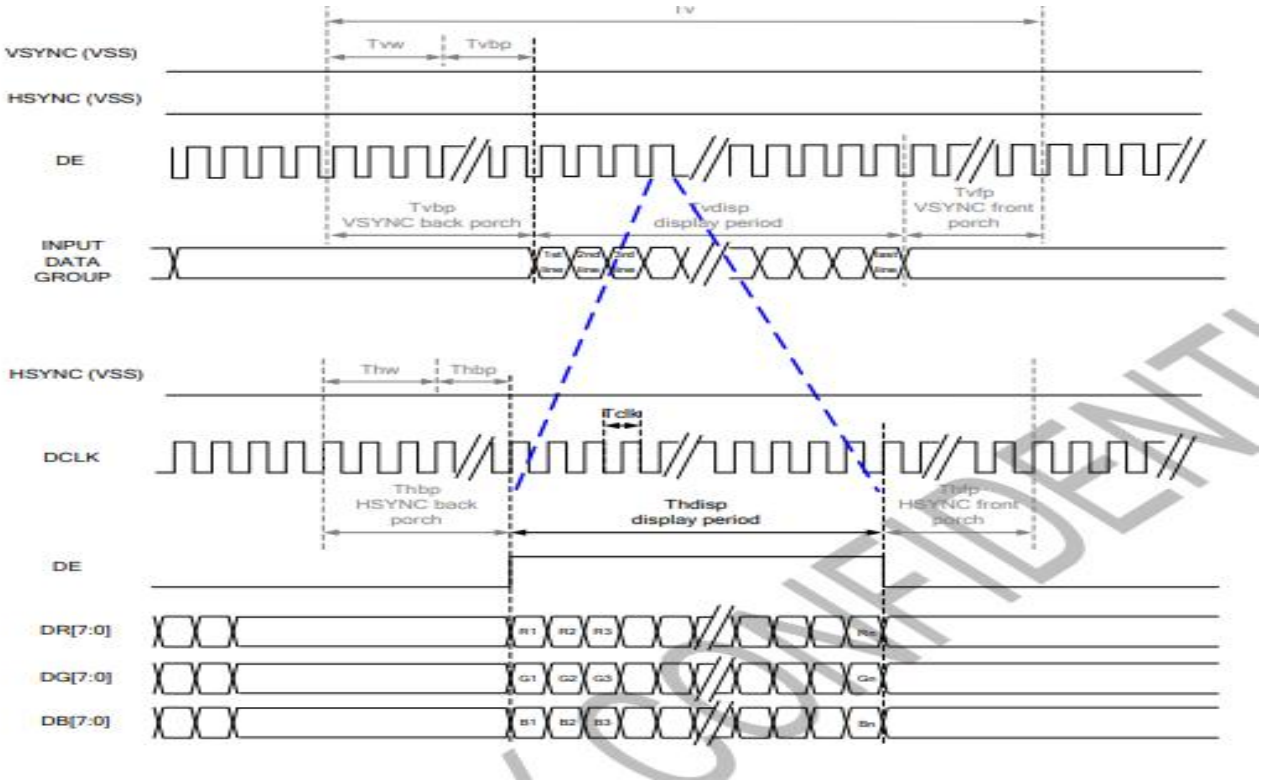
1.VDD,GND must be maintained.

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
Power supply voltage(Analog)	VDD-GND		3.1	3.3	3.6	V
Supply voltage of white LED backlight	VLED	Forward current =60mA Number of LED = 18	16.2	18.0	19.8	V

7. Timing Characteristics



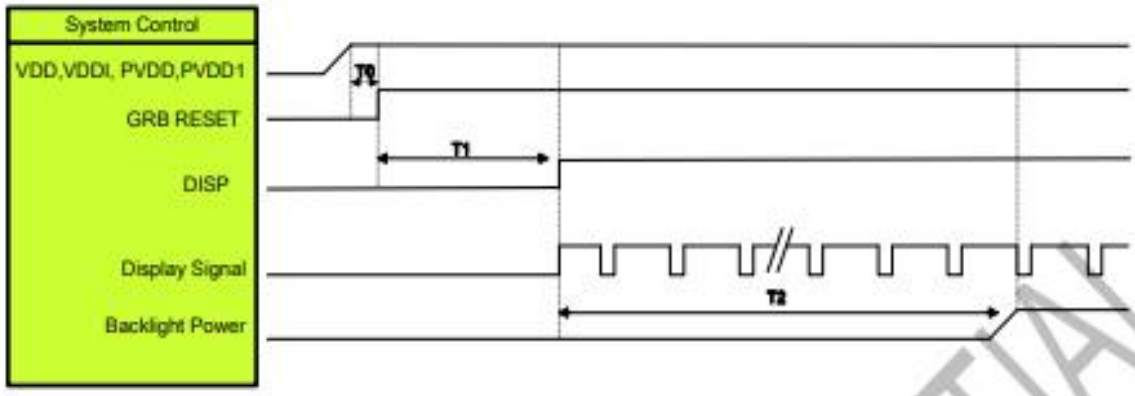
7.3.4 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=PVDD1=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	488	496	504	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	4	8	12	HSYNC	
	Front Porch	Tvfp	4	8	12	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

8. Power Supply Configuration

11.1 Power On Sequence

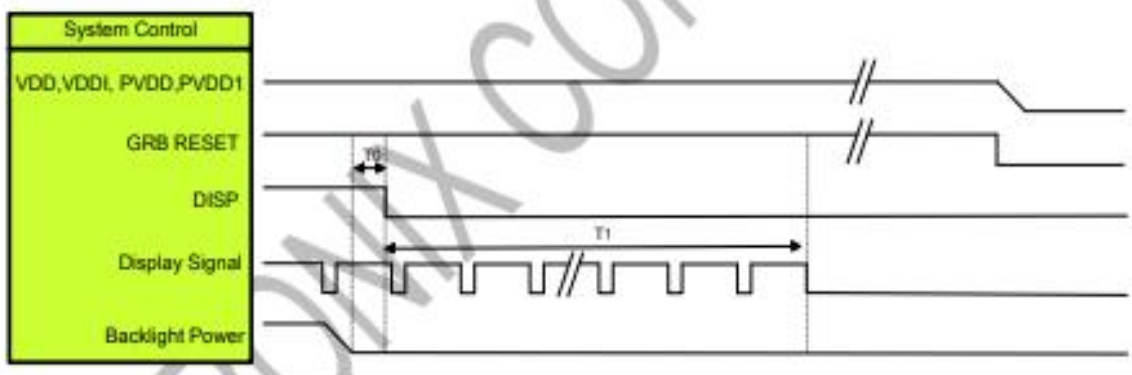


Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

11.2 Power Off Sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	100	ms

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		800	1000	-	-	2
Color gamut 饱和度	S(%)		45	50	-	%	-
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	-	500	-	Cd/m^2	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

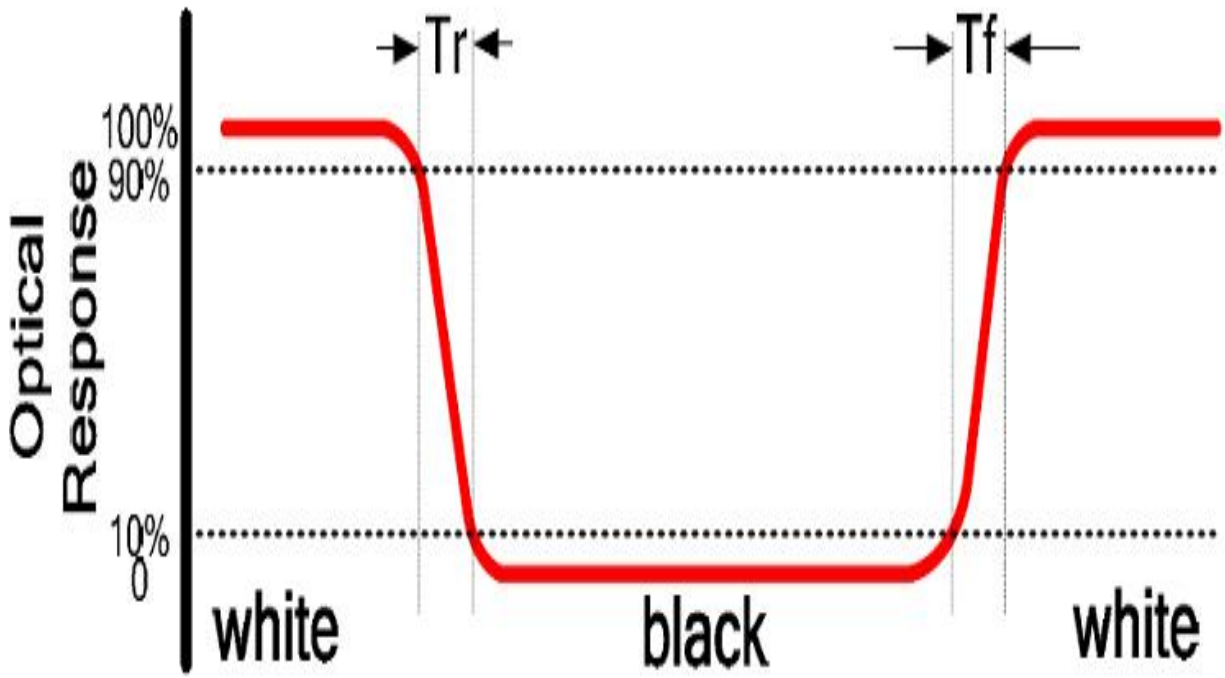


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)chromaticity.

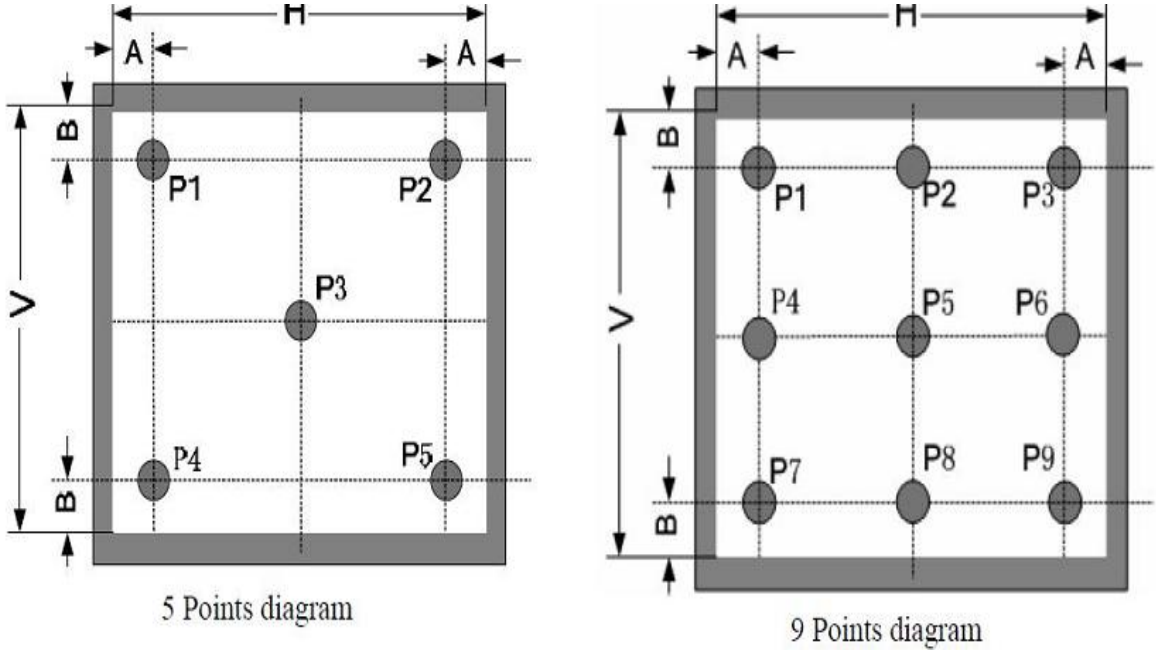
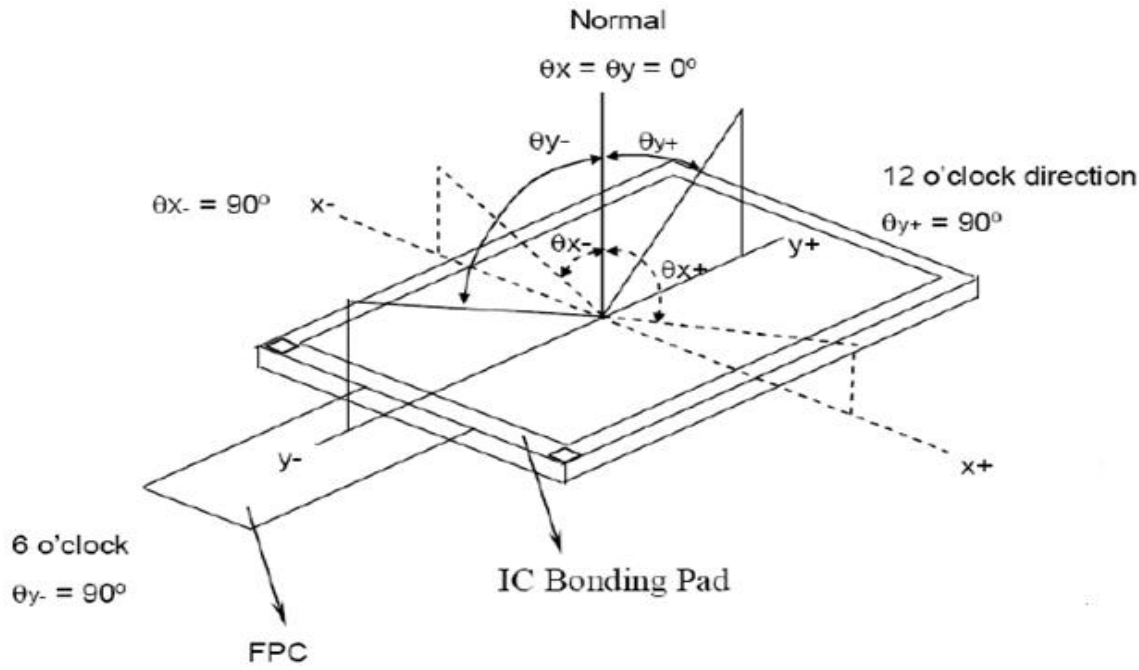


FIG3 The definition of viewing angle 视角定义



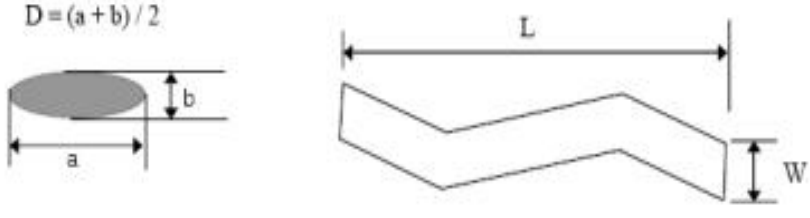
10. Inspection Specifications

10.1 **Appearance inspection**

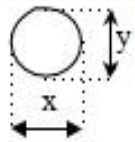
Item	Acceptable standards for defects	Defect level
Broken	Not allowed	critical defects
Cracks	Not allowed	critical defects
Insufficient UV glue entering	Not allowed	critical defects
Liquid crystal seal leakage	Not allowed	critical defects
Liquid crystal bubbles	Not allowed	critical defects
Surface scratch(mm)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

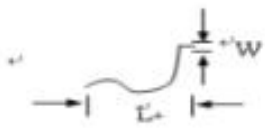
Remarks： 1)Surface scratches within 1.5mm of the glass edge are ignored;

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	80 ℃, 48 hrs	Note1,Note2
Low Temperature Storage	-30 ℃, 48 hrs	
High Temp. & High Humidity Storage	40 ℃, 80％ RH, 48hrs	
Thermal Shock (Static)	-30℃, 30 min /80℃, 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.

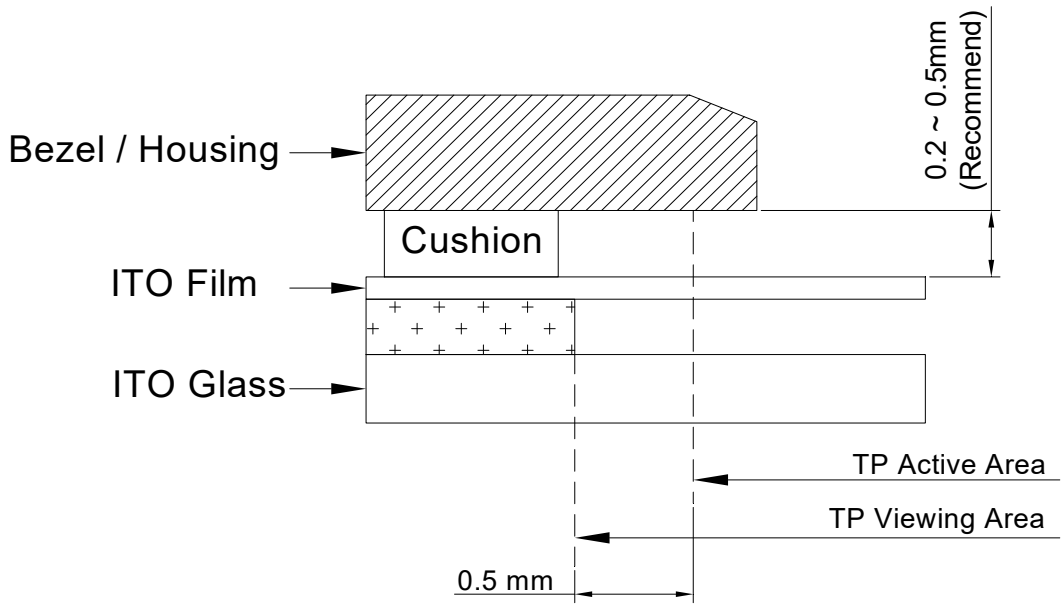
Touch Panel Mounting Notes

(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.