

 深圳市福瑞达显示技术有限公司 SHENZHEN FRIDA LCD CO.,LTD	Doc.No.: FRD700B50063-A-CTK	
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PRODUCT SPECIFICATION

TFT-LCD MODULE

Model No: FRD700B50063-A-CTK

For Customer's Acceptance	
Approved by	Comment

	Signature	Date
Prepared by		2022.09.08
Checked by		2022.09.08
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2. General Description

No	Item	Specification	Remark
1	Screen Size	7.0 inch	
2	Display Mode	Normally White	TN
3	Resolution	800× RGB ×480	
4	Active Area	154.08*85.92	mm
5	Outline Dimension	164.9*100*5.06	mm
6	Viewing Direction	6 O'CLOCK	
7	Driver IC	HX8264-D05DPD400-A+HX8664-B00H(B)PD400	
8	Interface	RGB	
9	Back Light	White Led*27	
10	Touch Panel	CTP	

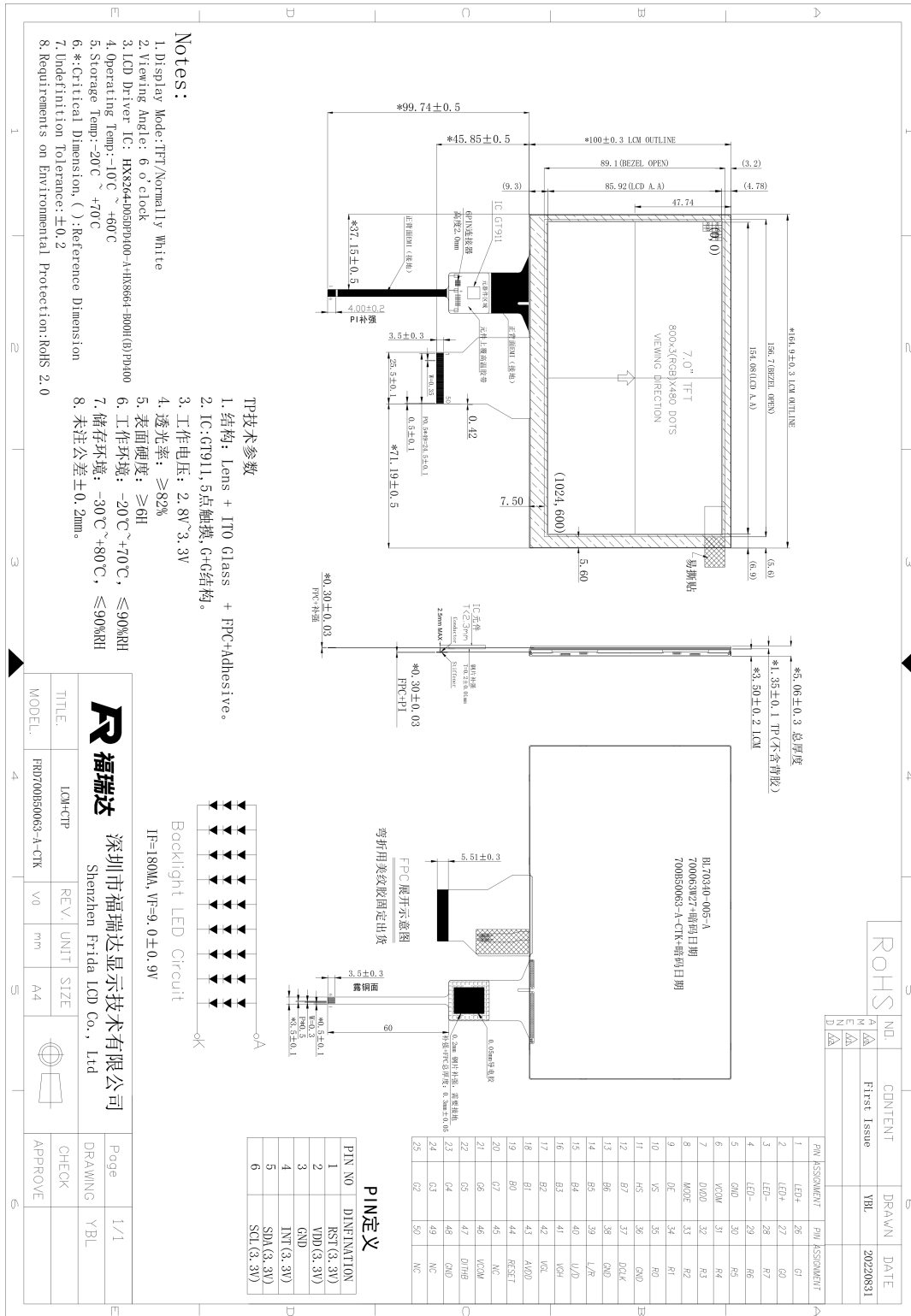


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3. LCM Outline Dimension



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4. Interface Specification

Pin No	Symbol	Description	Note
1-2	LED+	Power Supply For LED Backlight Anode Input.	
3-4	LED-	Power Supply For LED Backlight Cathode Input.	
5	GND	Ground.	
6	VCOM	Power supply for Common voltage.	
7	DVDD	Power Supply For LCD.	
8	MODE	DE/SYNC mode select	
9	DE	Data enable signal for RGB interface operation.	
10	VS	Frame synchronizing signal for RGB interface operation.	
11	HS	Line synchronizing signal for RGB interface operation.	
12-19	B7-B0	Blue data (B7-MSB ;B0-LSB).	
20-27	G7-G0	Green data (G7-MSB; G0-LSB).	
28-35	R7-R0	Red data(R7-MSB ;R0-LSB).	
36	GND	Ground.	
37	DCLK	Dot clock signal for RGB interface operation.	
38	GND	Ground.	
39	L/R	Source right or left sequence control.	
40	U/D	Gate up or down scan control.	
41	VGH	Power supply for Gate on voltage.	
42	VGL	Power supply for Get off voltage.	
43	AVDD	Power supply. (Typ=+xxV.)	
44	RESET	Reset signal input Pin.Please make sure its same as the logical voltage when its "High".	
45	NC	Non connection.	
46	VCOM	Power supply for the Common electrode.	
47	DITHB	Dithering function enable control.	
48	GND	Ground.	
49-50	NC	Non connection.	

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4.2 CTP Interface Specification

Pin No	Symbol	Description	Note
1	RST(3.3V)	Reset Signal input pin.	
2	VDD(3.3V)	Power Supply For CTP.	
3	GND	Ground.	
4	INT(3.3V)	CTP interrupt request.	
5	SDA(3.3V)	Serial data input/output pin.	
6	SCL(3.3V)	Serial clock signal pin.	

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5. Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (DVDD)	DVDD	-0.5	+5.0	V	1
Power supply voltage (AVDD)	AVDD	-0.5	+15.0	V	1
Power supply voltage	VGH	-0.3	42.0	V	1
Power supply voltage	VGL	-20.0	0.3	V	1

Note:

- 1.AVDD,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
Supply voltage ((logic)	DVDD-GND		2.7	3.3	3.6	V
Supply voltage analog)	AVDD-GND		10.2	10.4	10.6	V
TFT gate on voltage	VGH-GND		15.3	16.0	16.7	V
TFT gate off voltage	VGL-GND		-7.7	-7.0	-6.3	V
TFT common electrode voltage	VCOM(DC)		4.2	4.4	4.6	V
Supply voltage of white LED backlight	VLED	Forward current =180mA Number of LED = 27	8.1	9	9.9	V

Figure 10. 3 Output Load Condition

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Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd		800		DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	889	928	1143	DCLK
HS pulse width	thpw	1	48	255	DCLK
HS Back Porch (Blanking)	thb		88		DCLK
HS Front Porch	thfp	1	40	255	DCLK
DE mode Blanking	th-thd	85	128	512	DCLK

Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		480		T _H
VS period time	tv	513	525	767	T _H
VS pulse width	tpw	3	3	255	T _H
VS Back Porch (Blanking)	tvb		32		T _H
VS Front Porch	tvfp	1	13	255	T _H
DE mode Blanking	tv-tvd	4	45	255	T _H

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8.Power Supply Configuration

Power on/off sequence

HX8264-D has a power on/off sequence control function. In order to prevent IC from power on reset fail, the rising time (T_{POR}) of the digital power supply VDD should be maintained within the given specifications. Please refer to "AC Characteristics" for more detail on timing.

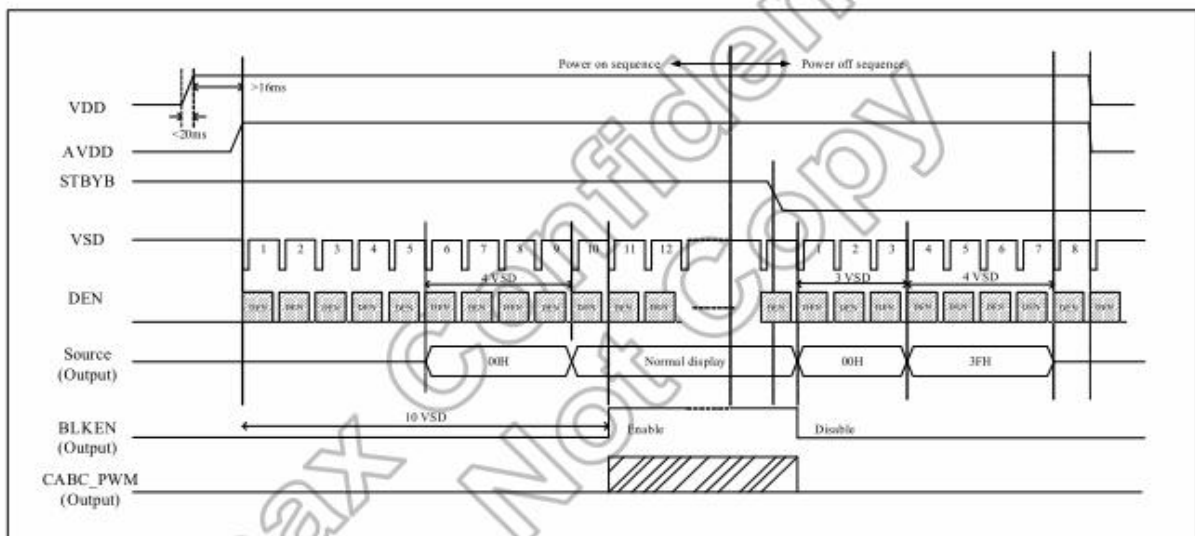


Figure 7.1 Power on/off Timing Sequence

9.2 Enter and exit standby mode sequence

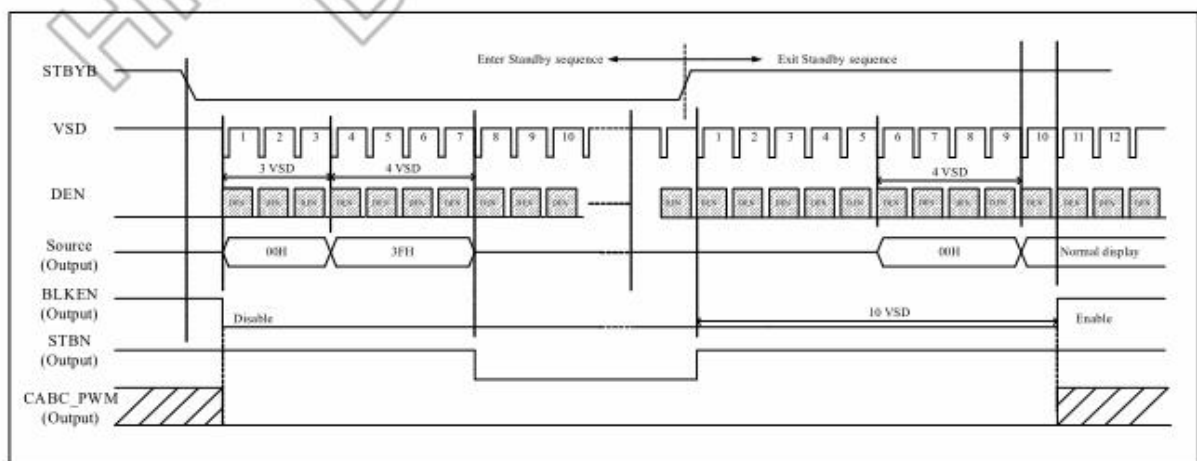


Figure 7.2 Enter and Exit Standby Mode Sequence

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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	$\Theta_x=0^\circ$ $\Theta_y=0^\circ$ Ta=25°C	-	25	50	ms	1
Contrast ratio 对比度	Cr		-	500	-	-	2
Color gamut 饱和度	S(%)		-	50	-	%	-
Luminance uniformity 均匀度	δ WHITE		80	-	-	%	3
Viewing angle range 视角范围	Θ_{x+}	CR ≥ 10 Ta=25°C	-	70	-	deg	4
	Θ_{x-}		-	70	-	deg	
	Θ_{y+}		-	60	-	deg	
	Θ_{y-}		-	70	-	deg	
LCM Luminance LCM 亮度	Lv	$\Theta_x=0^\circ$ $\Theta_y=0^\circ$ Ta=25°C	-	300	-	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 each 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

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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

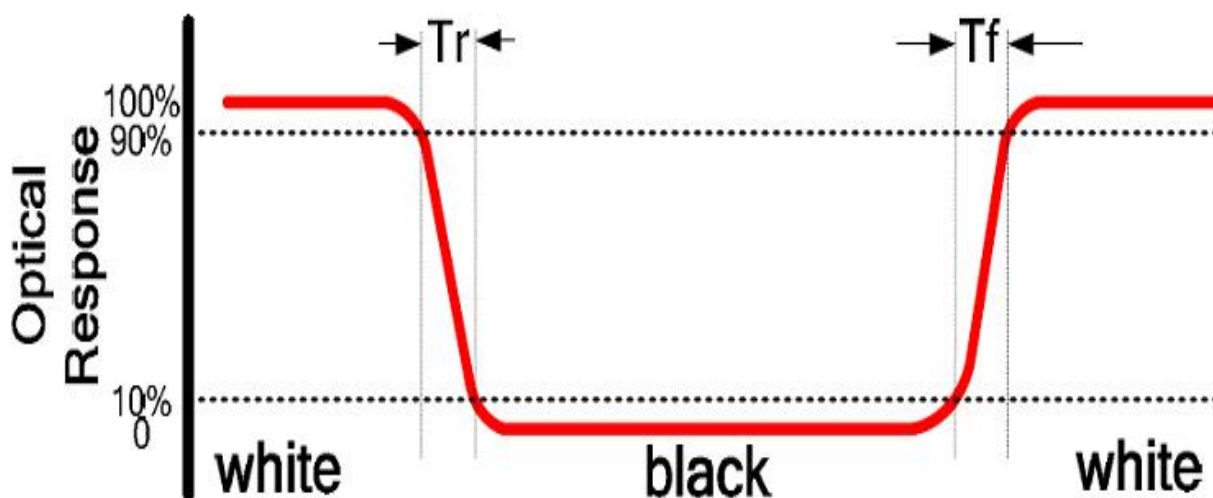


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance

uniformity,CIE(X,Y)chromaticity.

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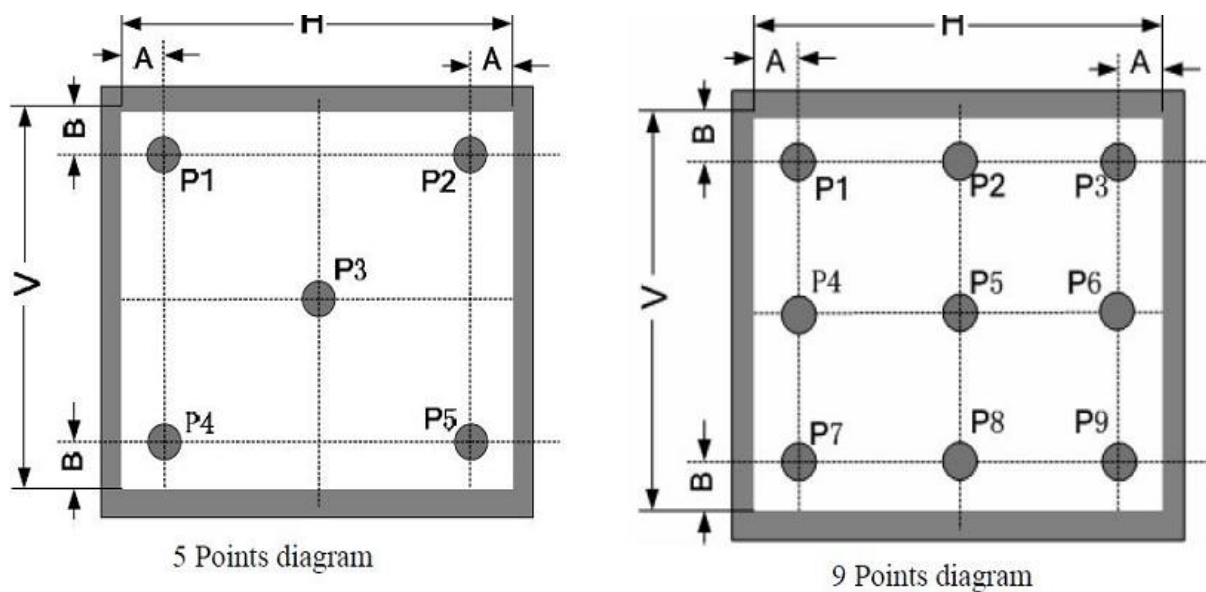
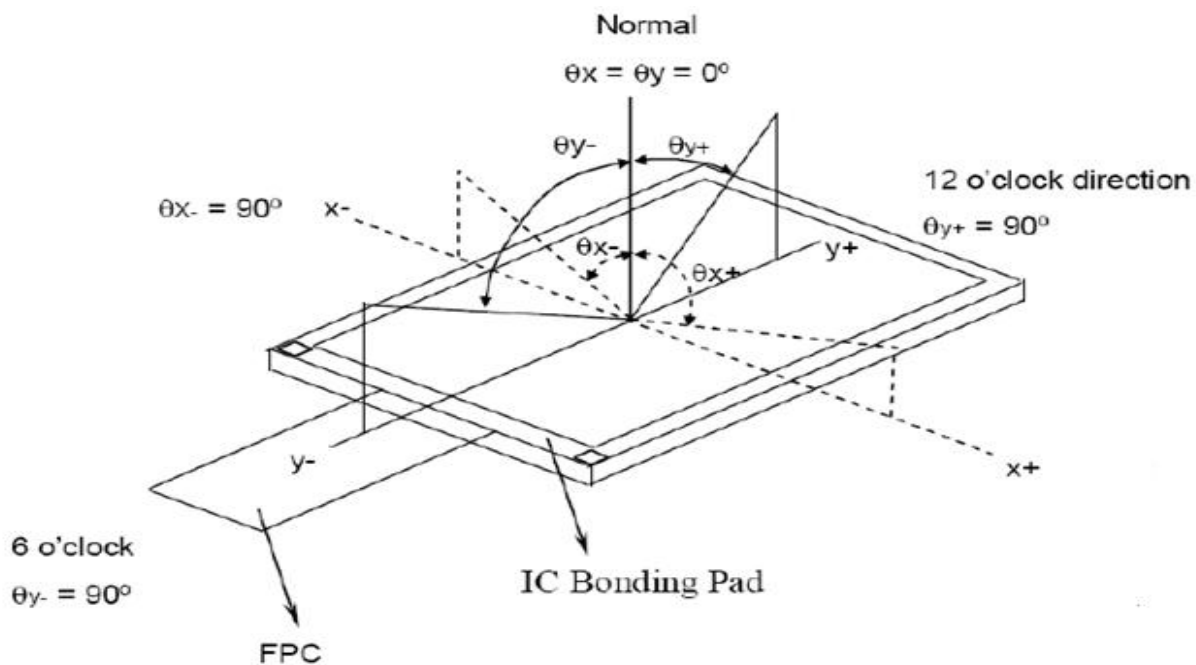


FIG3 The definition of viewing angle 视角定义



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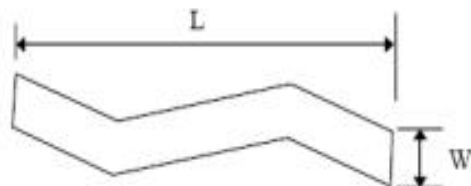
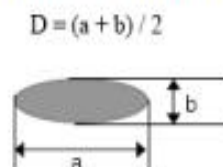
10. Inspection Specifications

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)	$W \leq 0.02$, ignored	minor defects
	$0.02 < W \leq 0.04$ $L \leq 4$, $N \leq 2$	
	$0.03 < W \leq 0.05$ $L \leq 3$, $N \leq 1$	
	$0.05 < W$ Not allowed	
Black/white spot(mm)	$D \leq 0.15$, ignored; $0.15 < D \leq 0.25$, $N \leq 4$	minor defects
	$0.25 < D \leq 0.30$, $N \leq 2$; $0.3 < D$, 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;

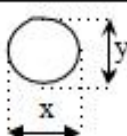
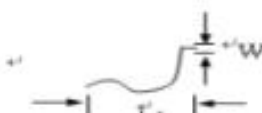


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10.2 Functional test criteria

Item	Judgment	Level																		
Display status	No Display、Incomplete image、line defect、wrong viewing angle、flickering、abnormal image、are not allowed	major defects																		
	Display color, judged by approved samples, Or by limited samples	minor defects																		
	MURA or the phenomenon that is unable to describe in words, judged by ND 5% or limited samples	minor defects																		
Spot(bright/dark)defect	Definition of spot defect: $\Phi=(x+y)/2$ 	minor defects																		
	<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>$\Phi\leq0.15$</td><td>ignored</td><td rowspan="4">ignored</td></tr><tr><td>$0.15<\Phi\leq0.25$</td><td>$N\leq2$ (gap≥5)</td></tr><tr><td>$0.25<\Phi\leq0.30$</td><td>1</td></tr><tr><td>$0.30<\Phi$</td><td>Not allowed</td></tr></table>		Size(mm)	acceptable qty		Active area	View area	$\Phi\leq0.15$	ignored	ignored	$0.15<\Phi\leq0.25$	$N\leq2$ (gap ≥5)	$0.25<\Phi\leq0.30$	1	$0.30<\Phi$	Not allowed				
Size(mm)	acceptable qty																			
	Active area		View area																	
$\Phi\leq0.15$	ignored		ignored																	
$0.15<\Phi\leq0.25$	$N\leq2$ (gap ≥5)																			
$0.25<\Phi\leq0.30$	1																			
$0.30<\Phi$	Not allowed																			
Black/white line	Definition of line defect: L: length, W: width 	minor defects																		
	<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>$W\leq0.03$</td><td>ignored</td><td>ignored</td><td rowspan="3">ignored</td></tr><tr><td>$0.03<W\leq0.05$</td><td>$L\leq3.0$</td><td>2</td></tr><tr><td>$W>0.05$</td><td>-</td><td>Not allowed</td></tr></table>		Size(mm)		Acceptable qty		W(width)	L(length)	Active area	View area	$W\leq0.03$	ignored	ignored	ignored	$0.03<W\leq0.05$	$L\leq3.0$	2	$W>0.05$	-	Not allowed
	Size(mm)		Acceptable qty																	
	W(width)		L(length)	Active area	View area															
	$W\leq0.03$		ignored	ignored	ignored															
	$0.03<W\leq0.05$		$L\leq3.0$	2																
$W>0.05$	-	Not allowed																		

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11. Reliability Test Items

Item	Test Condition	Criterion
High Temperature Storage	70 °C, 48 hrs	Note1, Note2
Low Temperature Storage	-20 °C, 48 hrs	
High Temp. & High Humidity Storage	40 °C, 80% RH, 48hrs	
Thermal Shock (Static)	-20°C, 30 min / 70°C, 30 min, 20 cycles	
High Temperature Operation	60 °C, 48 hrs	
Low temperature Operation	-10 °C, 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

- Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.
- Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.
- Do not put heavy or hard material on the display surface, and do not stack LCD modules.
- If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

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- (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

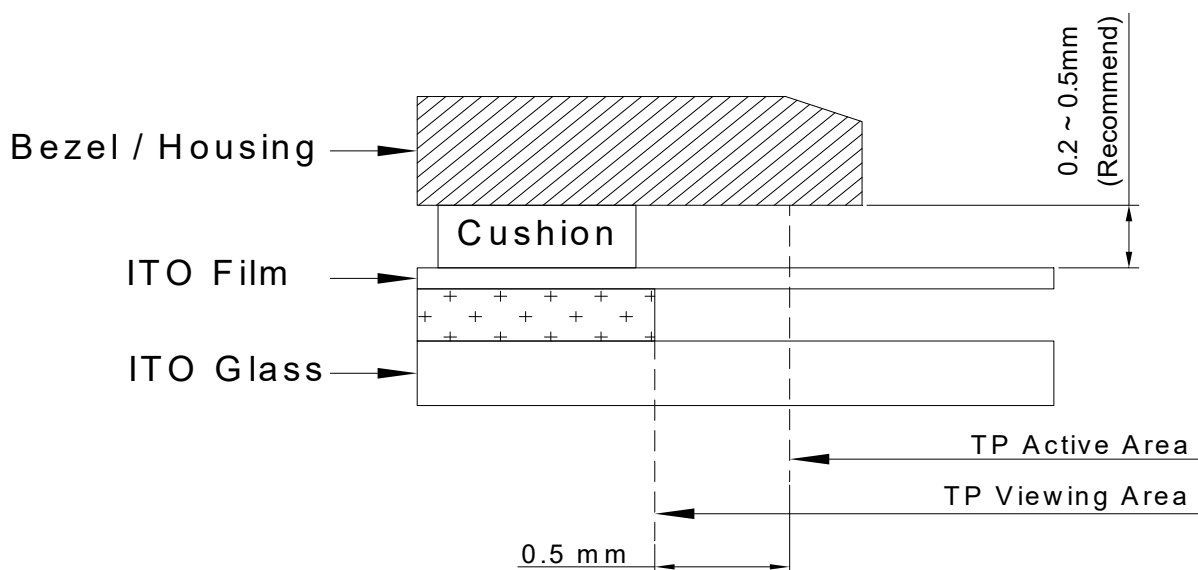
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liquid is accumulated near the air vent.

- (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.