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： RXL035093-C

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

	Signature	Date
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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	Reliability Test Items
11	Precautions

1. Document Revision History :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY
A	2018-07-28	First Release.	

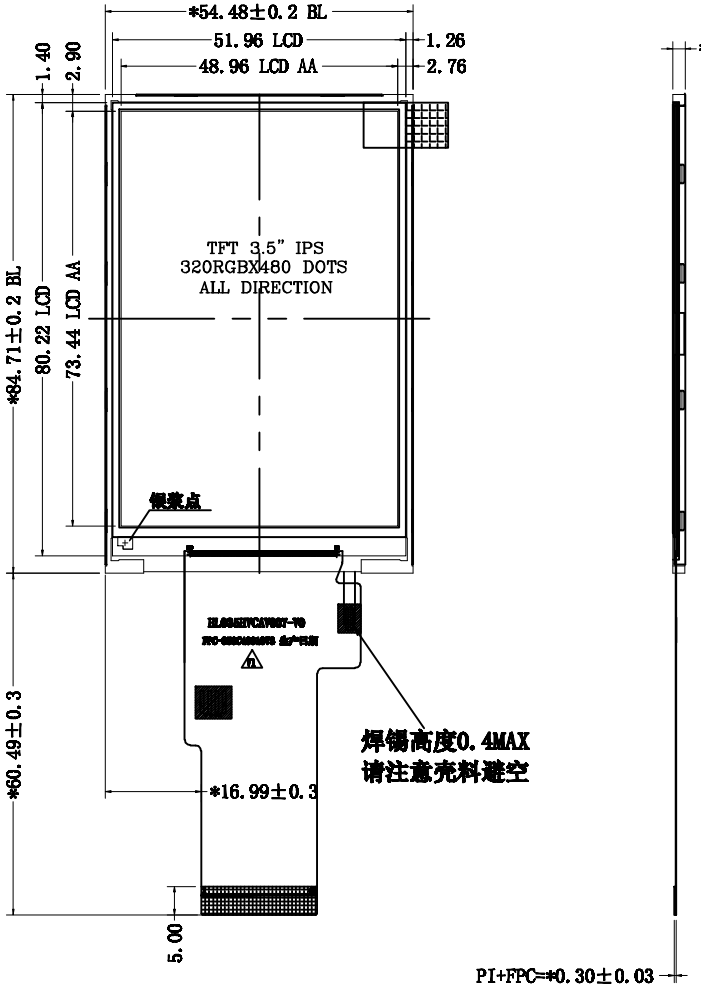
2. General Description

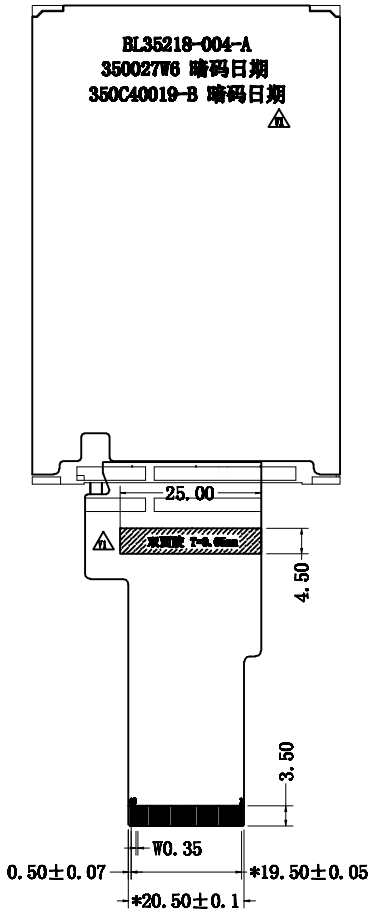
No	Item	Specification	Remark
1	Screen Size	3.5 inch	
2	Display Mode	Normally Black	
3	Resolution	320 × RGB × 480	pixel
4	Active Area	48.96*73.44	mm
5	Outline Dimension	54.48*84.71*2.18	mm
6	Viewing Direction	ALL	
7	Driver IC	ILI9488	
8	Interface	MCU	
9	Back Light	White Led*6	
10	Touch Panel	-	

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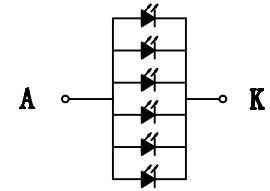
RoHS

NO.	CONTENT	DRAWN	DATE
A	First Issue	W J	2017.07.13
B	FPC上加强筋厚度0.15改0.20mm，修改背光	W J	2018.08.31
C			
D			





1	NC
2	NC(CS_ID)
3	GND
4	VCC
5	IOVCC
6	/CS
7	RS
8	WR
9	RD
10	/RESET
11	D0
12	D1
13	D2
14	D3
15	D4
16	D5
17	D6
18	D7
19	D8
20	D9
21	D10
22	D11
23	D12
24	D13
25	D14
26	D15
27	GND
28	XL
29	YD
30	XR
31	YU
32	LEDK1
33	LEDK2
34	LEDK3
35	LEDK4
36	LEDK5
37	LEDK6
38	LPTE
39	LEDA
40	NC



展开出货
（双面胶离型纸不用撕掉）

IF=120MA, VF=3.0±0.3V
Luminance:360cd/㎡ TYP

Notes:

1. Display Mode:Normally Black
2. Viewing Angle: ALL
3. LCD Driver IC: ILI9488
4. Operating Temp:-10°C ~ +60°C
5. Storage Temp:-20°C ~ +70°C
6. *:Critical Dimension, ( ):Reference Dimension
7. Undefinition Tolerance:±0.2
8. Requirements on Environmental Protection:ROHS

RX	Reshine Display (HK) Technology Co., Limited					Page 1/1
						DRAWING W J
TITLE.	LCM	REV.	UNIT	SIZE		CHECK
MODEL.	RXL035093-C	V0	mm	A4		APPROVE

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4. Interface Specification

Pin No	Symbol	Description	Note
1	NC	No Connection.	
2	NC(LCD_ID)	No Connection.	
3	GND	Ground.	
4	VCC	Power Supply For LCD.	
5	IOVCC	Power Supply For I/O.	
6	/CS	Chip selection signal pin.	
7	RS	Data / Command Selection pin.	
8	WR	Write strobe signal.	
9	RD	Read strobe signal.	
10	/RESET	Reset Signal input pin.	
11-26	D0-D15	MCU parallel interface data bus.	
27	GND	Ground.	
28	XL/NC	Touch panel left side	
29	YD/NC	Touch panel down side	
30	XR/NC	Touch panel right side	
31	YU/NC	Touch panel up side	
32-37	LEDK1-K6	Power Supply For LED Backlight Cathode Input.	
38	LPTE	Frame head pulse for tearing effect.	
39	LEDA	Power Supply For LED Backlight Anode Input.	
40	NC	No Connection.	

5.Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VCC)	VCC	-0.3	+3.3	V	1
Power supply voltage (IOVCC)	IOVCC	-0.3	+3.3	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.

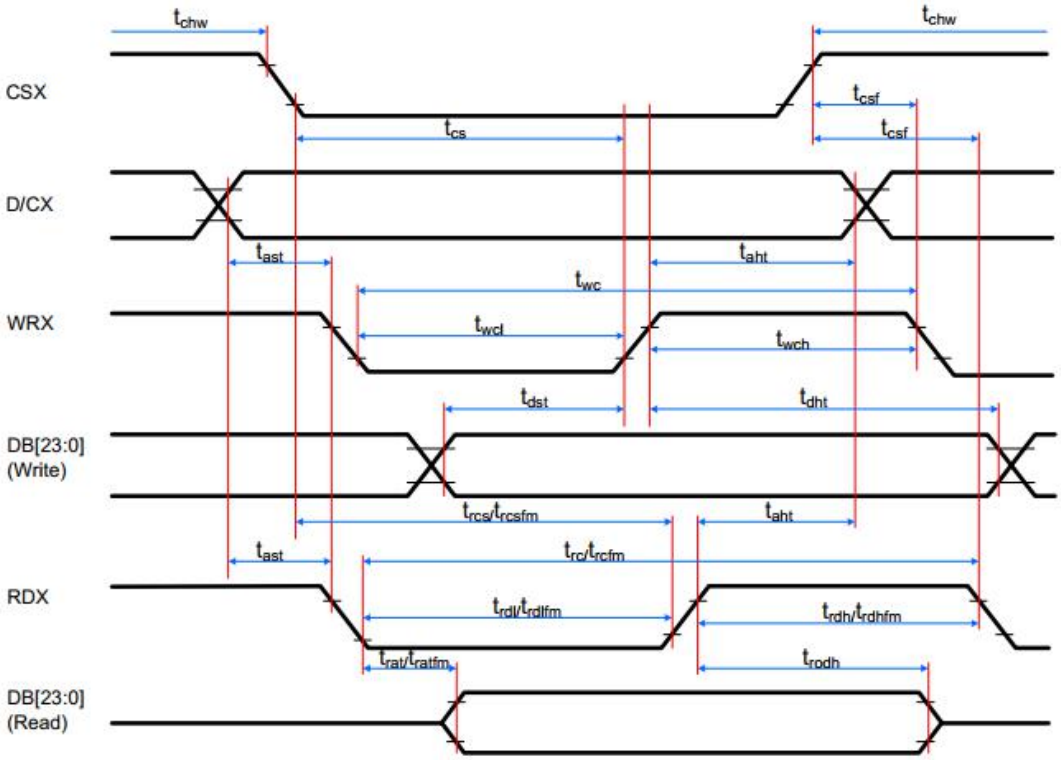
6. Electrical Specifications

At Ta = 25 ℃, VCC = 2.5V to 3.3V, IOVCC= 1.65V to 3.3V GND=0V.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCC-GND		2.5	2.8	3.3	V
Supply voltage (logic)	IOVCC-GND		1.65	1.8	3.3	V
Supply current (Logic & LCD)	ICC	VCC=2.8V	-	-	TBD	mA
Supply voltage of white LED backlight	VLED	Forward current =120mA Number of LED = 6	2.7	3.0	3.3	V

7.Timing Characteristics

7.1 MCU INTERFACE TIMING

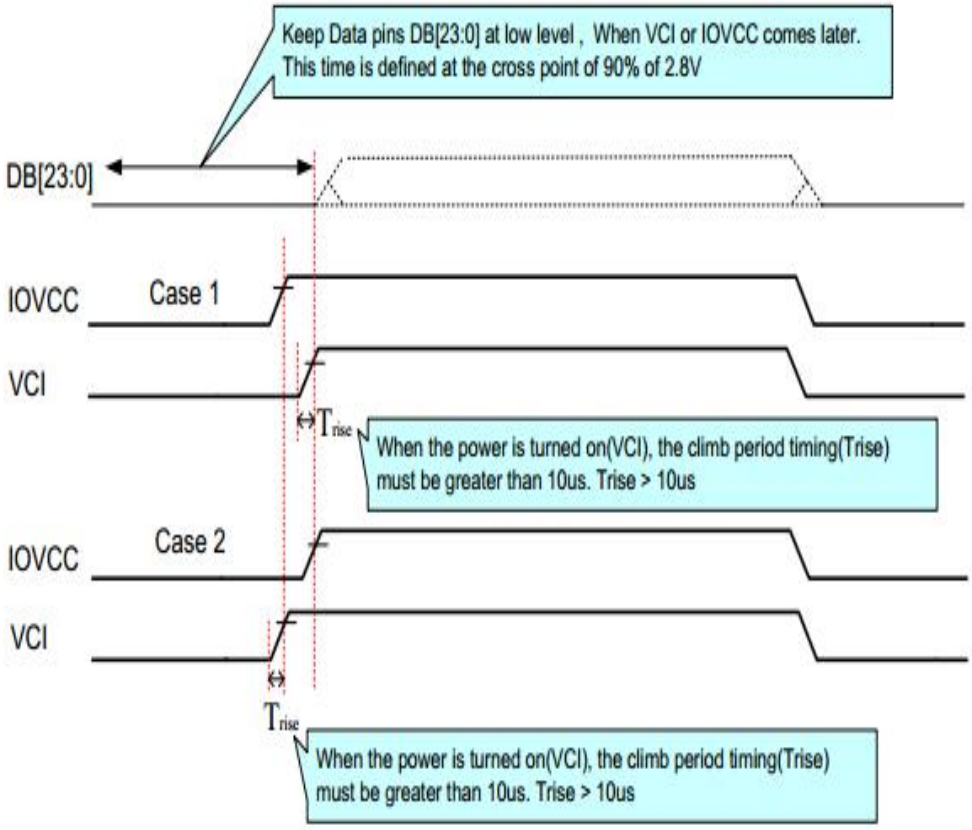


Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	-
	that	Address hold time (Write/Read)	0	-	ns	-
CSX	tchw	CSX "H" pulse width	0	-	ns	-
	tcs	Chip Select setup time (Write)	15	-	ns	-
	trcs	Chip Select setup time (Read ID)	45	-	ns	-
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	-
	tcsf	Chip Select Wait time (Write/Read)	0	-	ns	-
WRX	twc	Write cycle	40	-	ns	-
	twrh	Write Control pulse H duration	15	-	ns	-
	twrl	Write Control pulse L duration	15	-	ns	-
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	When read from Frame Memory
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	When read ID data
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
DB [23:0], DB [17:0], DB [15:0], DB [8:0], DB [7:0]	tdst	Write data setup time	10	-	ns	For maximum, CL=30pF For minimum, CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

8.Power Supply Configuration

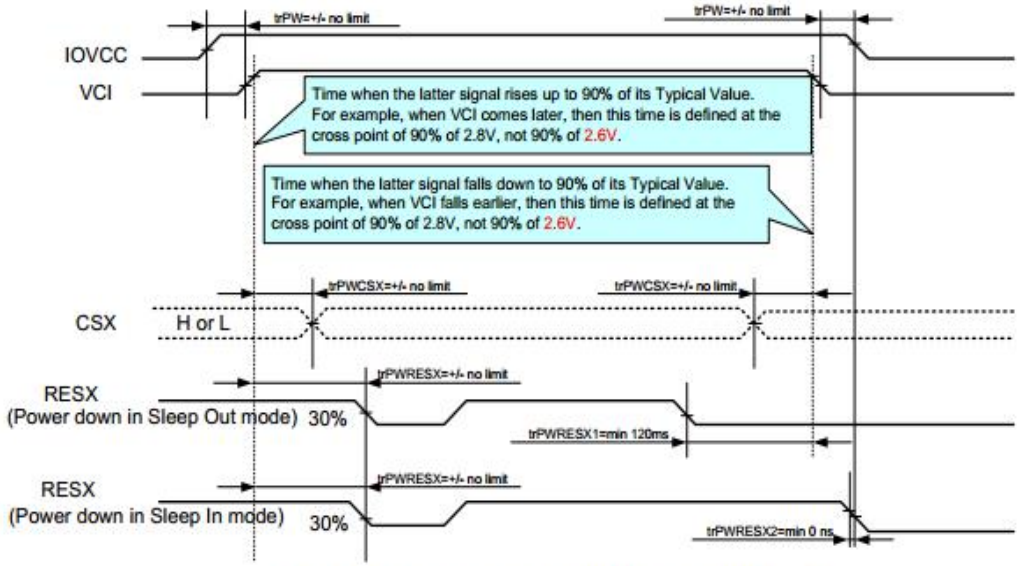
Notes:

1. There will be no damage to the ILI9488 if the power sequences are not met.
2. There will be no abnormal visible effects on the display panel during the Power On/Off Sequence.
3. There will be no abnormal visible effects on the display between the end of the 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 11.1 and 11.2, 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.
5. When the power is turned on, the climb period timing(T_{rise}) must be greater than 10us.
6. Keep data pins DB[23:0] at low level, when VCI or IOVCC comes later



8.1 Case 1 – RESX Line is Held High or Unstable by Host at Power ON

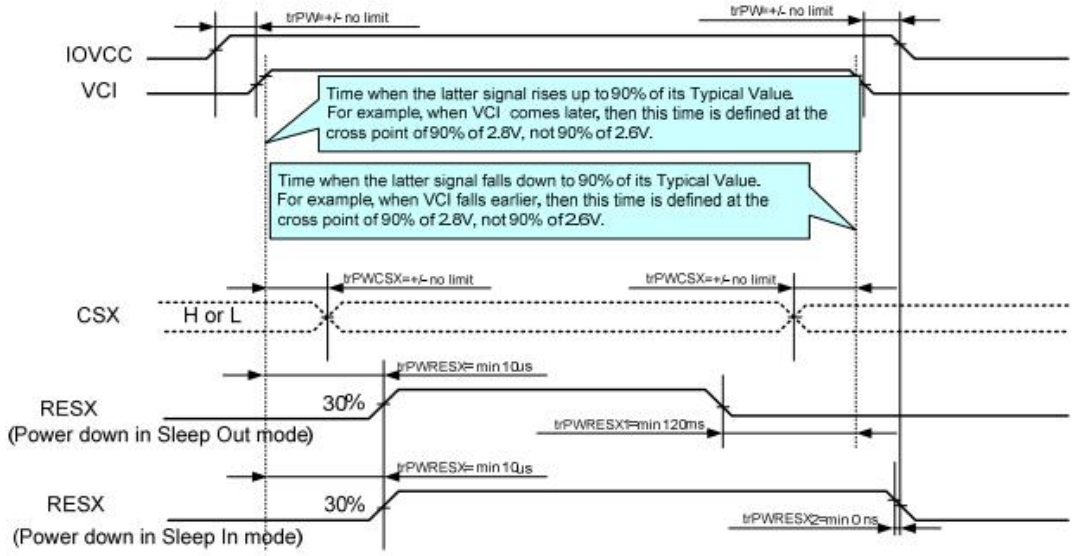
If the RESX line is held High or unstable by the host during Power On, then Hardware Reset must be applied after both VCI and IOVCC have been applied. Otherwise, the correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



trPWRESX1 is applied to RESX falling in the Sleep Out Mode
trPWRESX2 is applied to RESX falling in the Sleep In Mode

8.2 Case 2 – RESX Line is Held Low by Host at Power ON

If the RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for a minimum of 10µsec after both VCI and IOVCC have been applied.



trPWRESX1 is applied to RESX falling in the Sleep Out Mode
trPWRESX2 is applied to RESX falling in the Sleep In Mode

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	-	ms	1
Contrast ratio 对比度	Cr		-	700	-	-	2
Color gamut 饱和度	S(%)		-	-	-	%	-
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	-	370	-	Cd/m^2	5
CIE (X,Y) Chromaticity 色度坐标	White(X)		0.26	0.29	0.32	-	6
	White(Y)		0.29	0.32	0.35	-	

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,.....)

Note6.CIE(X,Y)chromaticity is the Center point value.For more information see FIG2.

Note7.For Viewing angle and response time testing,the testing date is base on Autronic-Melchers's ConScope.Series instruments.For contrast ratio,Surface Luminance,Luminance uniformity and CIE,the testing date is base on CS-2000 photo detector.

Note8.For TN type TFT transmissive module,Gray scale reverse occurs in the direction of panel viewing angle

FIG1. The definition of Response time

响应时间定义

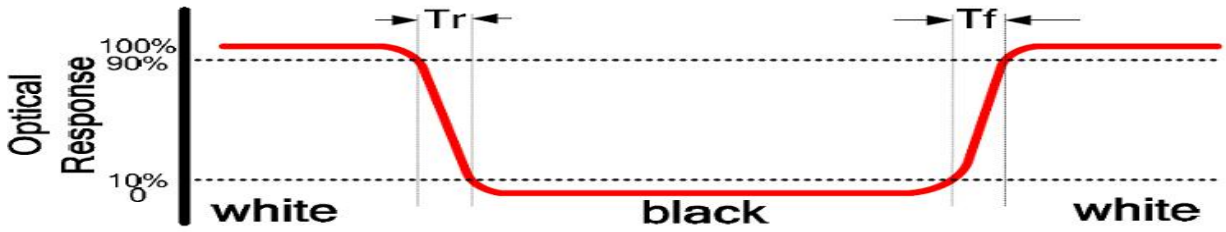


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)chromaticity.

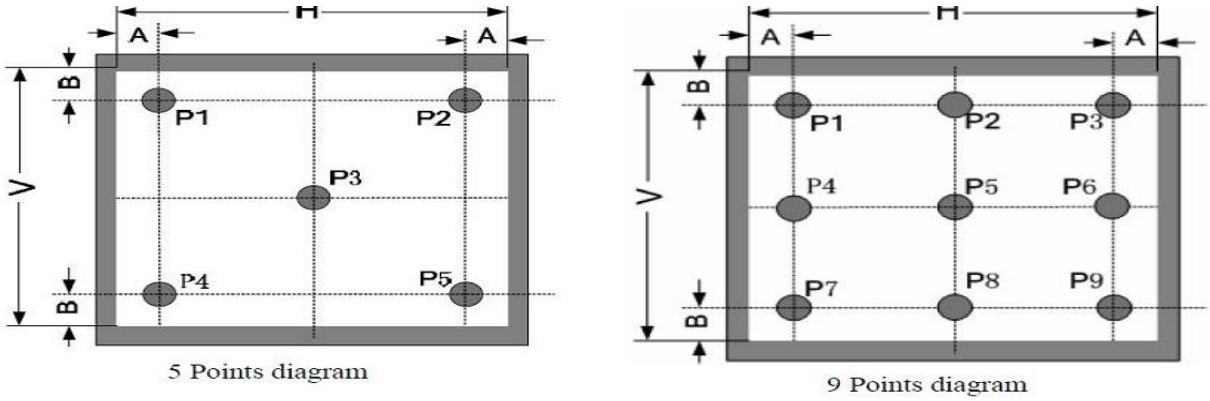
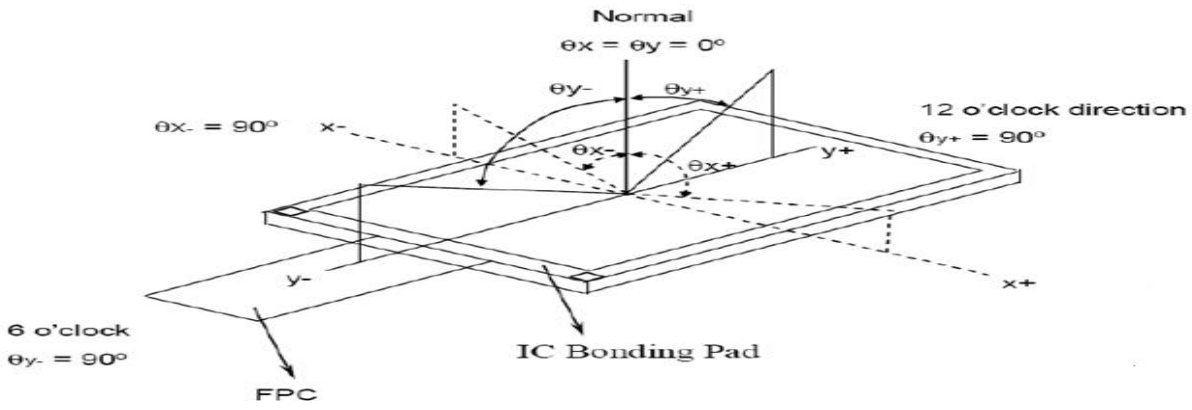


FIG3 The definition of viewing angle 视角定义



10.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.

11.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.

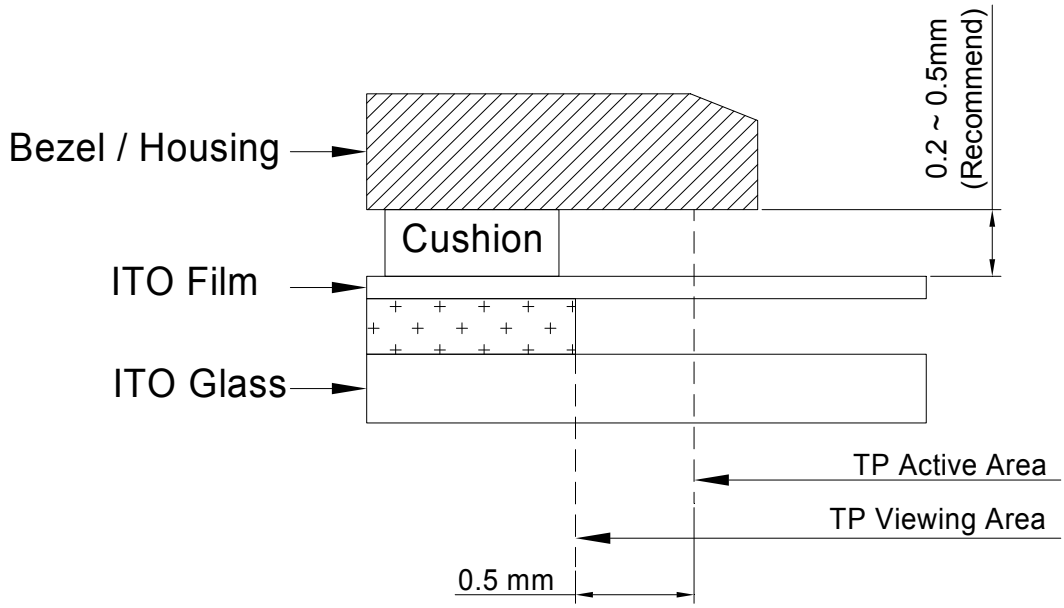
Touch Panel Mounting Notes

(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.