SPECIFICATION

PRODUCT NO. : XT35362A
VERSION : Ver 1.0
ISSUED DATE : 2014-7-15

This module uses ROHS material

FOR CUSTOMER：

□：APPROVAL FOR SPECIFICATION
■：APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optoelectronics ：

Presented by	Reviewed by	Organized by

Note:

1.Xinli Optoelectronics reserves the right to make changes without further notice to any products herein to improve reliability, function or design.

1. Revision Recode

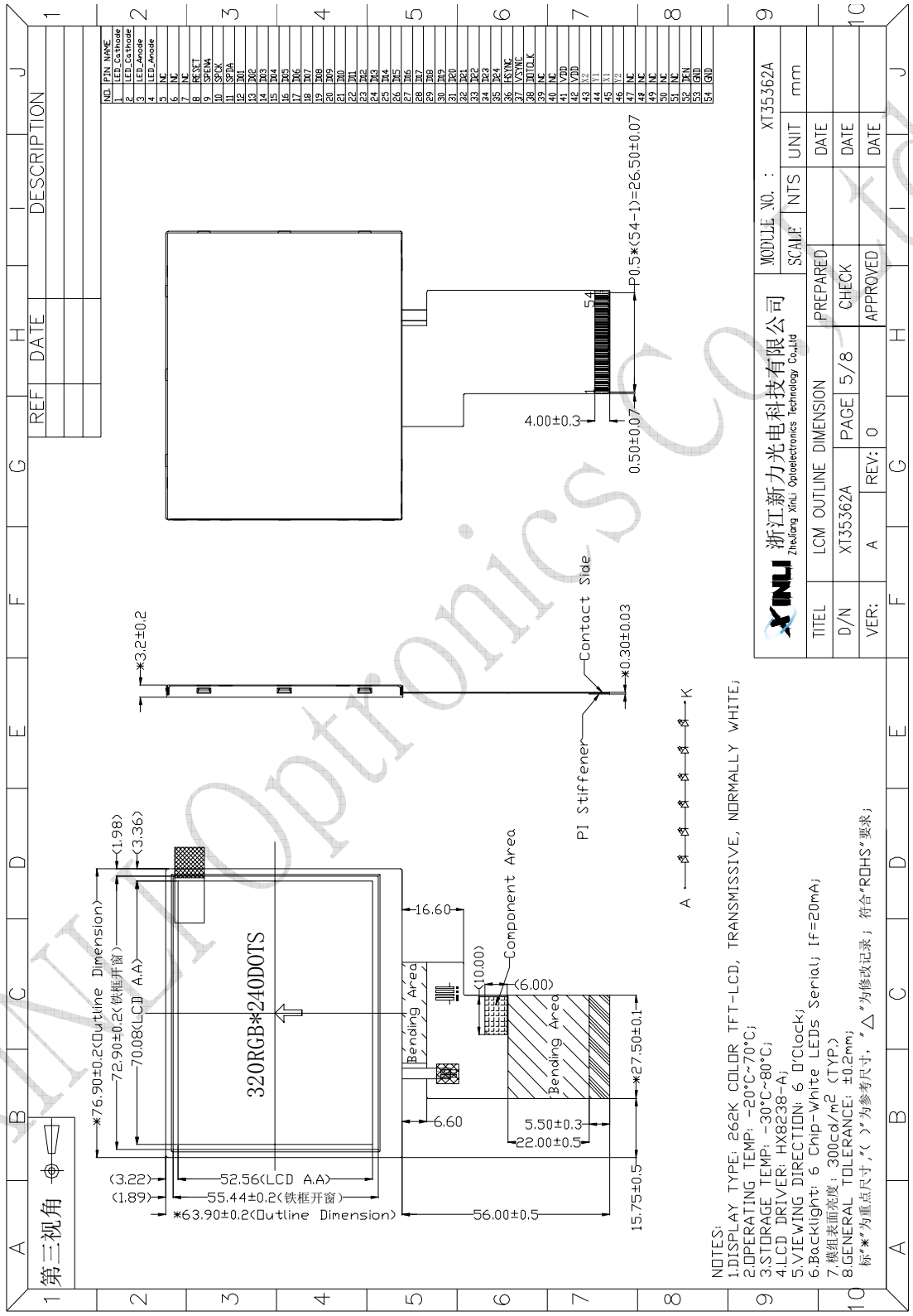
Revision	Description	Date
1.0	Initial Release	2014/7/15

2. General Description and Features

The 3.5 inch Module named XT35362A is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC, FPC and Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outsize	76.90*63.90*3.20	mm
(2)	LCD Active area	70.08* 52.56	mm
(3)	Dot Number	320(RGB)*240	dot
(4)	Dot size	0.219*0.219	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	262K	/
(7)	Viewing direction	6	O'Clock
(8)	Backlight Type	LED	/
(9)	Power Supply	3.3(typ)	V
(10)	Drive IC	HX8238-D	/
(11)	Interface	FPC 0.5mm_Pitch 45 pin	/
	Interface type	SPI+RGB Interface	/

3. Mechanical Dimensio

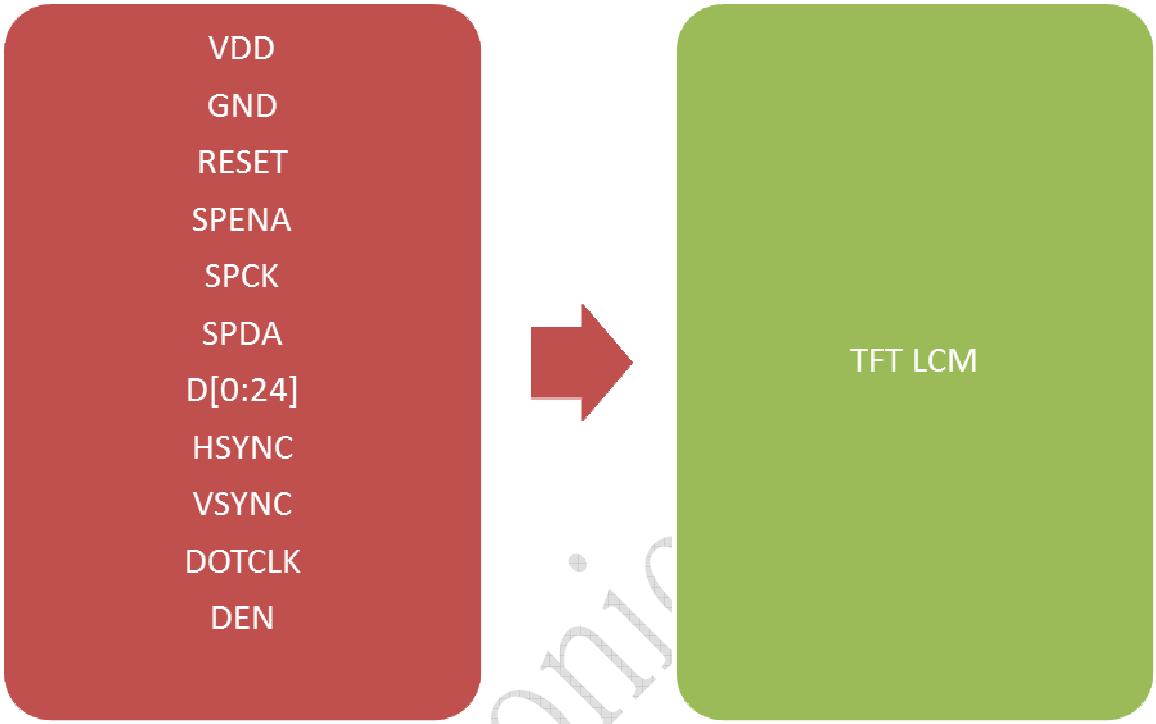


4. Interface Pin Connection

NO	Symbol	Level	Description
1	LED_Cathode	H/L	Backlight-
2	LED_Cathode	H/L	Backlight-
3	LED_Anode	H/L	Backlight+
4	LED_Anode	H/L	Backlight+
5	NC	-	Not connect
6	NC	-	
7	NC	-	
8	RESET	H/L	System reset pin. Internal pull high.
9	SPENA	H/L	Chip select pin of serial interface. Internal pull high.
10	SPCLK	H/L	Clock pin of serial interface. Internal pull high.
11	SPDA	H/L	Data input pin in serial mode. Internal pull high.
12	D01	H/L	24 bit Data bus
13	D02	H/L	
14	D03	H/L	
15	D04	H/L	
16	D05	H/L	
17	D06	H/L	
18	D07	H/L	
19	D08	H/L	
20	D09	H/L	
21	D10	H/L	
22	D11	H/L	
23	D12	H/L	
24	D13	H/L	
25	D14	H/L	
26	D15	H/L	
27	D16	H/L	
28	D17	H/L	
29	D18	H/L	

30	D19	H/L	
31	D20	H/L	
32	D21	H/L	
33	D22	H/L	
34	D23	H/L	
35	D24	H/L	
36	HSYNC	H/L	Line synchronization signal. Internal pull high.
37	VSYNC	H/L	Frame synchronization signal. Internal pull high.
38	DOTCLK	H/L	Dot-clock signal and oscillator source. A non-stop external clock must be provided to that pin even at front or black porch non-display period.
39	NC	-	Not connect.
40	NC	-	
414	VDD	P	power supply
42	VDD	P	
43	X2	-	Touch panel pin. If not used, Please not connect.
44	Y1	-	
45	X1	-	
46	Y2	-	
47	NC	-	Not connect.
48	NC	H/L	
49	NC	H/L	
50	NC	H/L	
51	NC	-	
52	DE	H/L	Display enable pin from controller. Internal pull high.
53	GND	P	Power ground.
54	GND	P	Power ground.

5. Block Diagram



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	℃
Storage temperature	Tst	-30 to 80	℃
Power Supply Voltage	VDD	-0.3~4.0	V

NOTE:

If the module was used these absolute maximum ratings as above, it may be damaged permanently. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability. VDD>GND must be maintained.

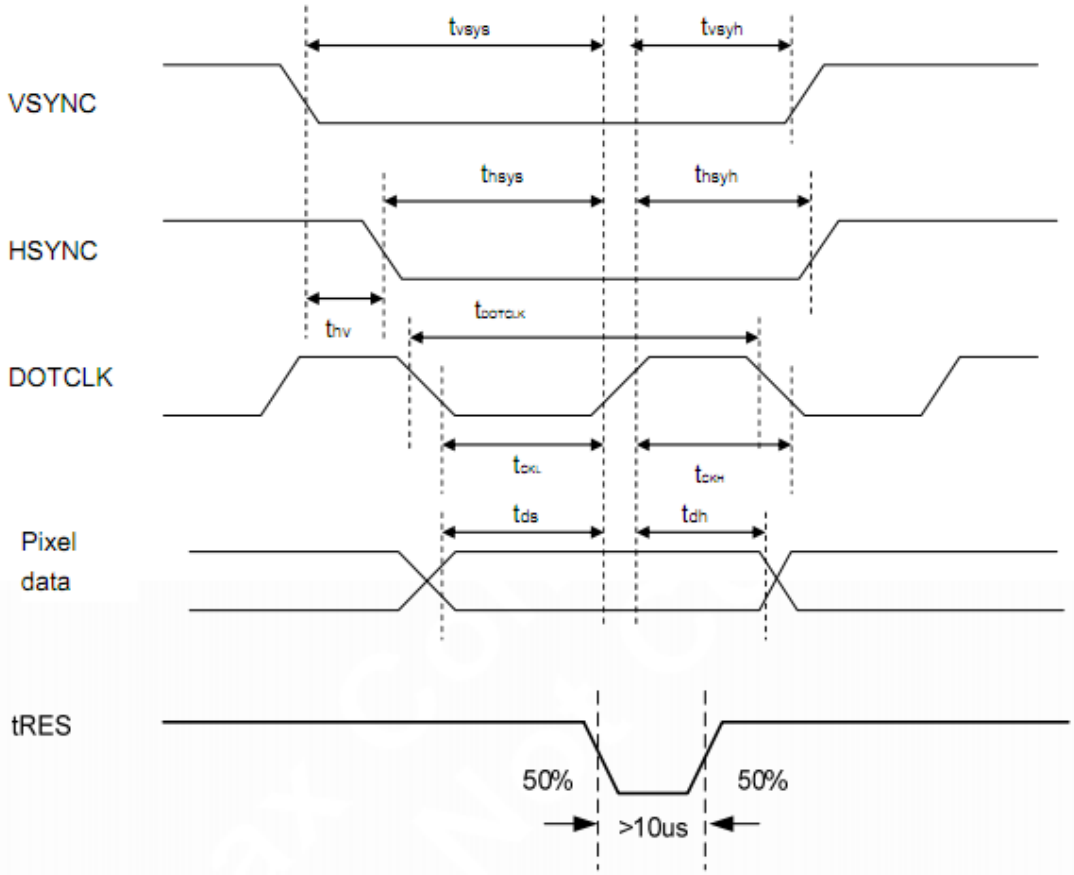
7. Electrical Characteristics

8. Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage		VDD		3.0	3.3	3.6	V
Logic input signal Voltage	H level	V_{IH}		0.7*VDD	-	VDD	V
	L level	V_{IL}		0	-	0.3*VDD	V
Logic output signal Voltage	H level	V_{OH}	Iout=100uA	0.8*VDD	-	VDD	V
	L level	V_{OL}	Iout=100uA	0	-	0.2*VDD	V

8. Backlight Characteristics

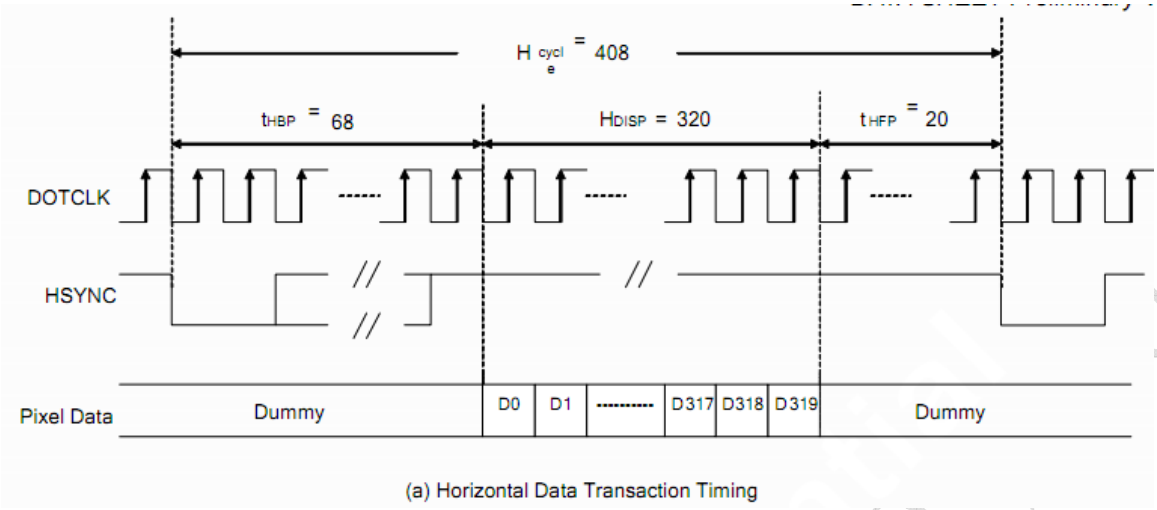
Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	-	19.8	-	V	IF=20mA
Number of LED	-	6			pcs	-
Power Consumption	PWF	-	396	-	mW	-
LED life-span	-	-	(20000)	-	Hrs	-

9. Timing Characteristics

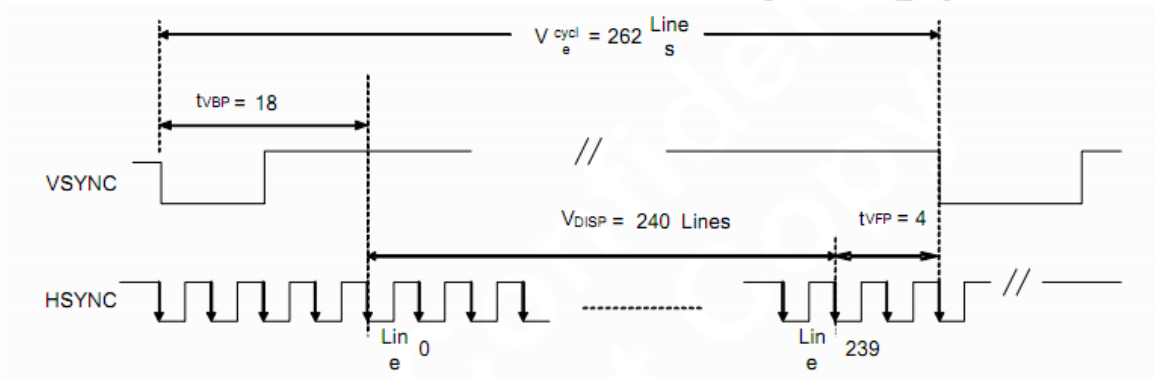


Characteristics	Symbol	Min.		Typ.		Max.		Unit
		24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency	fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period	tDOTCLK	100	33.3	154	51.3	-	-	ns
Vertical Sync Setup Time	tvsys	20	10	-	-	-	-	ns
Vertical Sync Hold Time	tvsyh	20	10	-	-	-	-	ns
Horizontal Sync Setup Time	thsys	20	10	-	-	-	-	ns
Horizontal Sync Hold Time	thsyh	20	10	-	-	-	-	ns
Phase difference of Sync Signal Falling Edge	thv	1		-		240		tDOTCLK
DOTCLK Low Period	tCKL	50	15	-	-	-	-	ns
DOTCLK High Period	tCKH	50	15	-	-	-	-	ns
Data Setup Time	tds	12	10	-	-	-	-	ns
Data hold Time	tdh	12	10	-	-	-	-	ns
Reset pulse width	tRES	10		-		-		µs

Note: External clock source must be provided to DOTCLK pin of HX8238-D. The driver will not operate if absent of the clocking signal.



(a) Horizontal Data Transaction Timing



(b) Vertical Data Transaction Timing

Characteristics		Symbol	Min.		Typ.		Max.		Unit
			24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency		fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period		tDOTCLK	100	33.3	154	51.3	-	-	ns
Horizontal Frequency (Line)		fH	-		14.9		22.35		KHz
Vertical Frequency (Refresh)		fV	-		60		90		Hz
Horizontal Back Porch		tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Front Porch		tHFP	-	-	20	60	-	-	tDOTCLK
Horizontal Data Start Point		tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Blanking Period		tHBP + tHFP	-	-	88	264	-	-	tDOTCLK
Horizontal Display Area		HDISP	-	-	320	960	-	-	tDOTCLK
Horizontal Cycle		Hcycle	-	-	408	1224	450	1350	tDOTCLK
Vertical Back Porch		tVBP	-		18		-		Lines
Vertical Front Porch		tVFP	-		4		-		Lines
Vertical Data Start Point		tVBP	-		18		-		Lines
Vertical Blanking Period		tVBP + tVFP	-		22		-		Lines
Vertical Display Area	NTSC	VDISP	-		240		-		Lines
	PAL				280(PALM=0)				
	PAL				288(PALM=1)				
Vertical Cycle	NTSC	Vcycle	-		262		350		Lines
	PAL				313				

10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

Please consult our technical department for detail information.

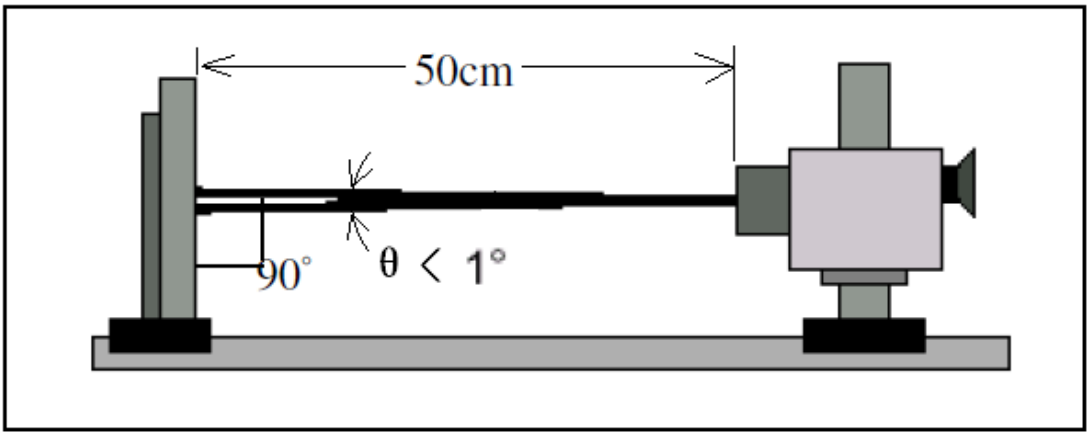
12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr	θ =0° ∅=0° Ta=25℃	-	15	-	ms	4
		Tf		-	35	-	ms	
Contrast ratio		Cr		-	300	-	-	3 ,5
Surface Luminance		Lv		-	300	-	-	3 ,7
Viewing angle range		θ	∅ = 90°	-	45	-	deg	6
			∅ = 270°	-	45	-	deg	
			∅ = 0°	-	35	-	deg	
			∅ = 180°	-	15	-	deg	
Color filter chromaticity (x, y)	White	X	θ = ϕ = 0°	0.225	0.230	0.235		7
		Y		0.365	0.370	0.375		

Note 1: Ambient temperature=25℃±2℃

Note 2: To be measured in the dark room with backlight unit.

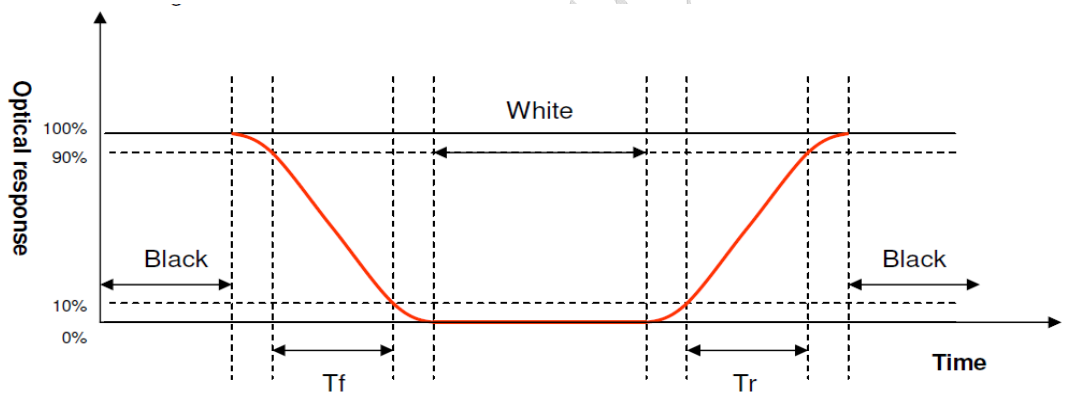
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white" (rising time) and from "white" to "black" (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.

Refer to figure as below.



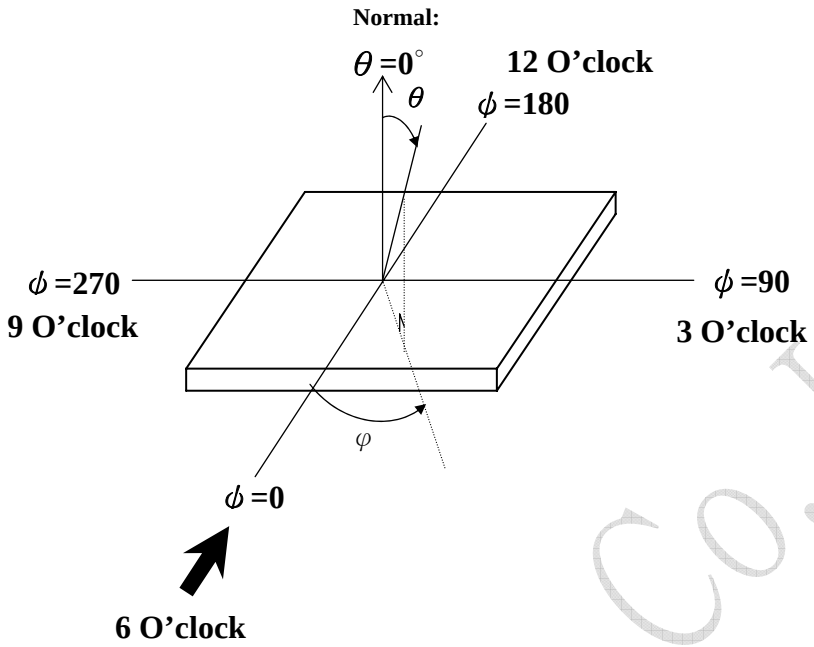
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

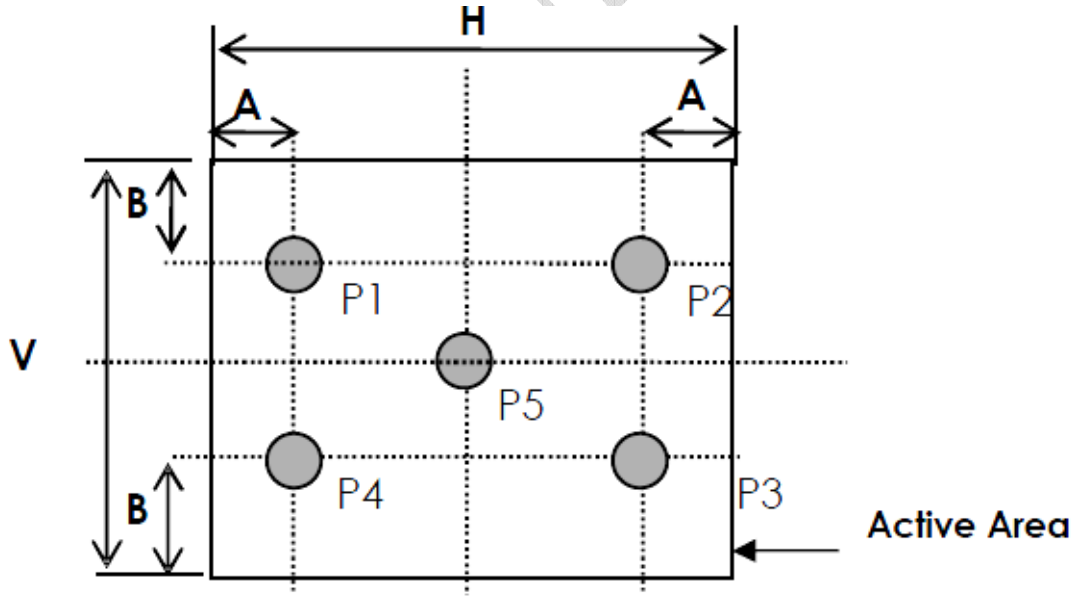
Note 6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. 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.



Note 7. Surface luminance is the LCD surface from the surface with all pixels displaying white. Refer to figure as below.

Measuring method for Contrast ratio, surface luminance, Luminance uniformity， CIE (x, y) chromaticity



A : 5 mm B : 5 mm H,V : Active Area

Light spot size Æ=7mm, 500mm distance from the LCD surface to detector lens

measurement instrument is TOPCON's luminance meter BM-7A

Uniformity definition= [min of 5point/max of 5points]x100%

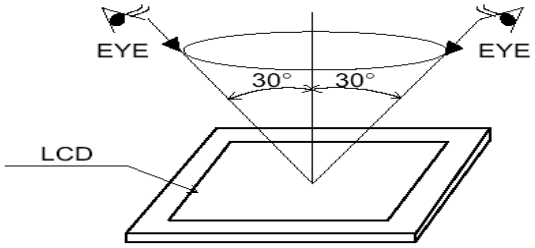
Lv = Average Surface Luminance with all white pixels (P_1, P_2, P_3, P_4, P_5)

13. Quality Assurance

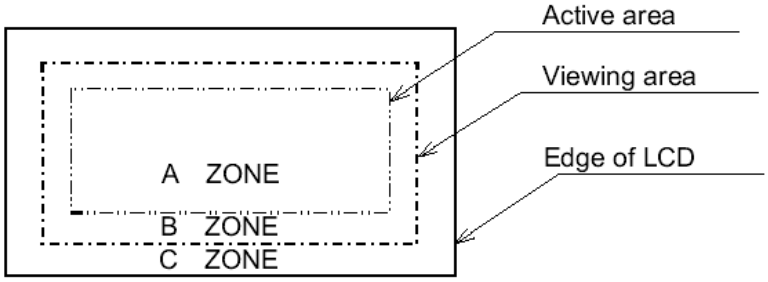
The customer should check and accept the products of XINLI within one month after reception. This standard for Quality Assurance should affirm the quality of LCD products to supply to purchaser by XINLI Company Limited.

1. Appearance Inspection

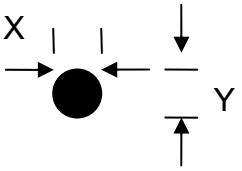
Appearance inspection should be done under the following condition.
(1) In the dark room.
(2) The distance from eyes to LCD must be 30 cm.
(3) Viewing direction must be within 30 degrees to vertical line of LCD center.



2. Definition of A zone, B zone and C zone



3. Appearance Criterion

<table>
<tr><th>Item</th><th>Criterion</th><th>Note</th></tr>
<tr><td>LCD black spots, white spots, color spots, contaminatio n, scratches (display/no n-display)</td><td>1 Round type: As following drawing
φ=(x+y)/2
 
<table>
<tr><td rowspan="2">Size</td><td colspan="2">Acceptable QTY</td><td rowspan="2">Remark</td></tr>
<tr><td>A.A</td><td>V.A</td></tr>
</table></td><td></td></tr>
</table>

	φ≦0.20	Ignore	Ignore	No more than two spots within 5mm	
	0.20<φ≦0.25	2	3		
	0.25 ≦φ≦0.30	1	2		
	0.30<φ	0	0		
	Total	3	5		

2 Line Type: (As following drawing)

Length	Width	Acceptable QTY		Remark
		A.A	V.A	
---	W≦0.03	Ignore	Ignore	
L≦2.5	0.03< W≦0.05	2	3	No more than two lines within 5mm
L≦1.5	0.05< W≦0.08			
---	0.08< W	0	0	

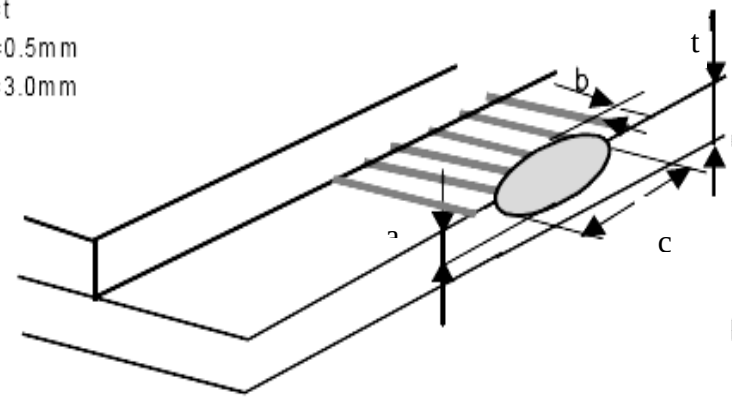
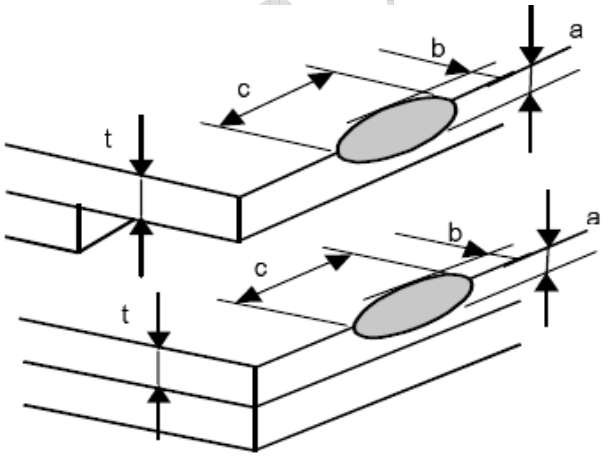
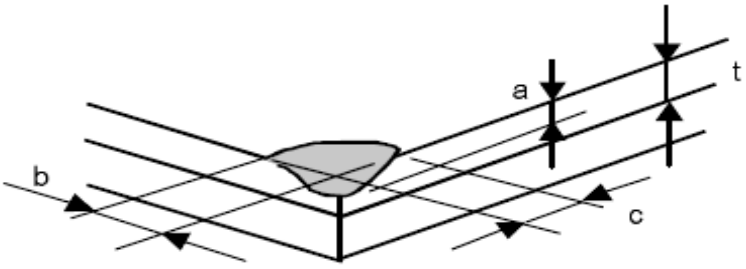
Polarizer bubbles

If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.

Size	Acceptable QTY	
	A.A	V.A
φ≦0.30	Ignore	Ignore
0.30<φ≦0.60	2	3
	0	0

Chipped

Symbols:

glass	a: Chip length b: Chip width c: Chip thickness t: Glass thickness 1 ITO electrode a<=t b<=0.5mm c<=3.0mm  2 General ,corner portion a<= t b<=1.0mm  *Effective width of seal area shall be more than 0.3mm. 	
Cracked glass	The LCD with extensive crack is not acceptable.	
Backlight	1 Illumination source flickers when lit.	

elements	2 Spots or scratches that appear when lit must be judged using LCD spot, lines and contamination standards. 3 Backlight doesn't light or color is wrong	
Soldering	1 No unmelted solder paste may be present on the PCB. 2 No cold solder joints, missing solder connections, oxidation or icicle. 3 No residue or solder balls on PCB. 4 No short circuits in components on PCB.	
General appearance	1 No oxidation, contamination, curves or, bends on interface pin (OLB) of TCP. 2 No cracks on interface pin(OLB) of TCP 3 NO contamination, solder residue or solder balls on product. 4 The IC on the TCP may not be damaged, circuits. 5 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color. 6 Sealant on top of the ITO circuit has not hardened 7 Pin type must match type in specification sheet. 8 LCD pin loose or missing pins. 9 Product packaging must the same as specified on packaging specification sheet. 10 Product dimension and structure must conform to product specification sheet.	

14. Reliability Test

This standard reliability test is done only for the first lot of MP products. Custom er and supplier must hold a discussion if other reliability test is requested by customer.

NO.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80℃,240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,240H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	70℃,80% RH, 240H
7	Temperature Cycle (Non operation)	Endurance test applying the low and high temperature cycle -20℃← →25℃ ← →60℃ 30min←→5min←→30min one cycle	-20℃/70℃, 10 cycles

15. Precautions for Operation and Storage

1. Precautions for Operation

(1)Since LCD panel made of glass,in order to prevent from glass broken or color tone change,please do not apply any mechanical shock or impact or excessive force to it when installing the LCD module.

(2)If LCD panel is broken and liquid crystal substance leaks out and contact your skin or clothes,please immediately wash it off by using soap and water.

(3)The polarizer on the LCD surface is soft and easily scratched.Please be careful when handling.

(4)If LCD surface becomes contaminated,please wipe it off gently by using mois

ten soft cloth with normal hexane,do not use acetone,ketone,ethanol, alcohol or water.If there is saliva or water on the LCD surface,please wipe it off immediate ly.

(5)When handing LCD module,please be sure that the body and the tools are properly grounded.And do not touch I/F pins with bare hands or contaminate I/F pins.

(6)Do not attempt to disassemble or process the LCD module.

(7)LCD module should be used under recommended operating conditions shown in chapter 6 and 7.

(8)Response time will be extremely slower at lower temperature than at specified temperature and LCD will show different color when at higher temperature.The phenomenon will disappear when returning to specified condition.

(9)Foggy dew,moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage,the deteriorated display quality and electrochemical reaction then leads to the shorter life time and permanent damage to the module probably.Please pay attention to the enviro nmental temperature and humidity.

2. Precautions for Storage

(1)Please store LCD module in a dark place,avoid exposure to sunlight,the light of fluorescent lamp or any ultraviolet ray.

(2)Keep the environment temperature at between 10℃and 35 ℃ and at normal humidity.Avoid high temperature,high humidity or temperature below 0℃.

(3)That keeps the LCD modules stored in the container shipped from supplier be fore using them is recommended.

(4)Do not leave any article on the LCD module surface for an extended period of time.

3. Warranty period

Warrants for a period of 12 Months from the shipping date when stored or used under normal condition.

16. Package Specification

TBD