SPECIFICATION

PRODUCT NO. : **TCXD010MBLON-2**
VERSION : **Ver 1.8**
ISSUED DATE : **2021-5-10**

This module uses ROHS material

FOR CUSTOMER：

□：APPROVAL FOR SPECIFICATION
■：APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optoelectronics ：

Presented by	Reviewed by	Organized by
黄文博	赵春曉	王俊傑

Note:

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

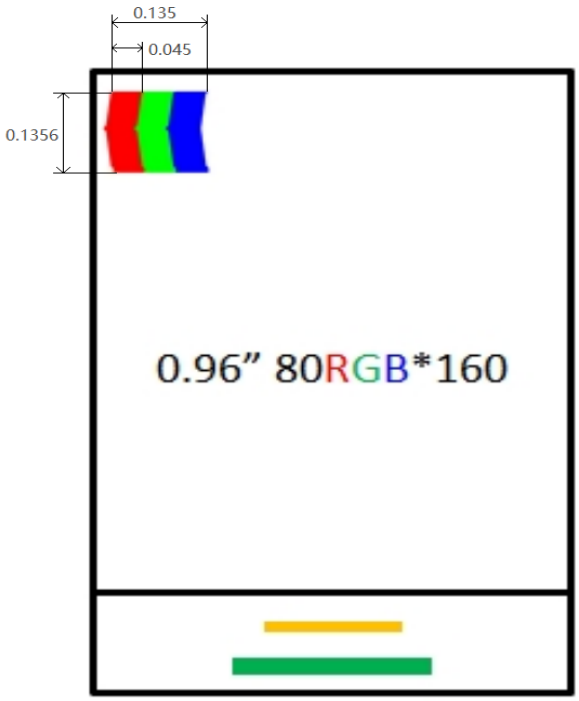
1. Revision Recode

Revision	Description	Date
1.0	Initial Release	2020/6/30
1.1	Add the LED's Types of information (page 8)	2020/7/1
1.2	Add the Drawing of BLG (page 5)	2020/9/7
1.3	Update the Mechanical Dimension(page 4) Add Package Specification(Page 16)	2020/10/20
1.4	Add the Standby Current(page 8) Update the Cosmetic Defect standard(Page 13)	2020/10/28
1.5	Update the Standby Current(page 8) Add note of the Color filter chromaticity(page 9)	2021/1/25
1.6	Update the Standby Current When VCC=3.3V (page 8)	2021/2/3
1.7	Add the drawing of the pixel's arrangement and size	2021/4/23
1.8	Add the Quality Assurance Scope, Sampling Plan, Acceptable Quality Level	2021/5/10

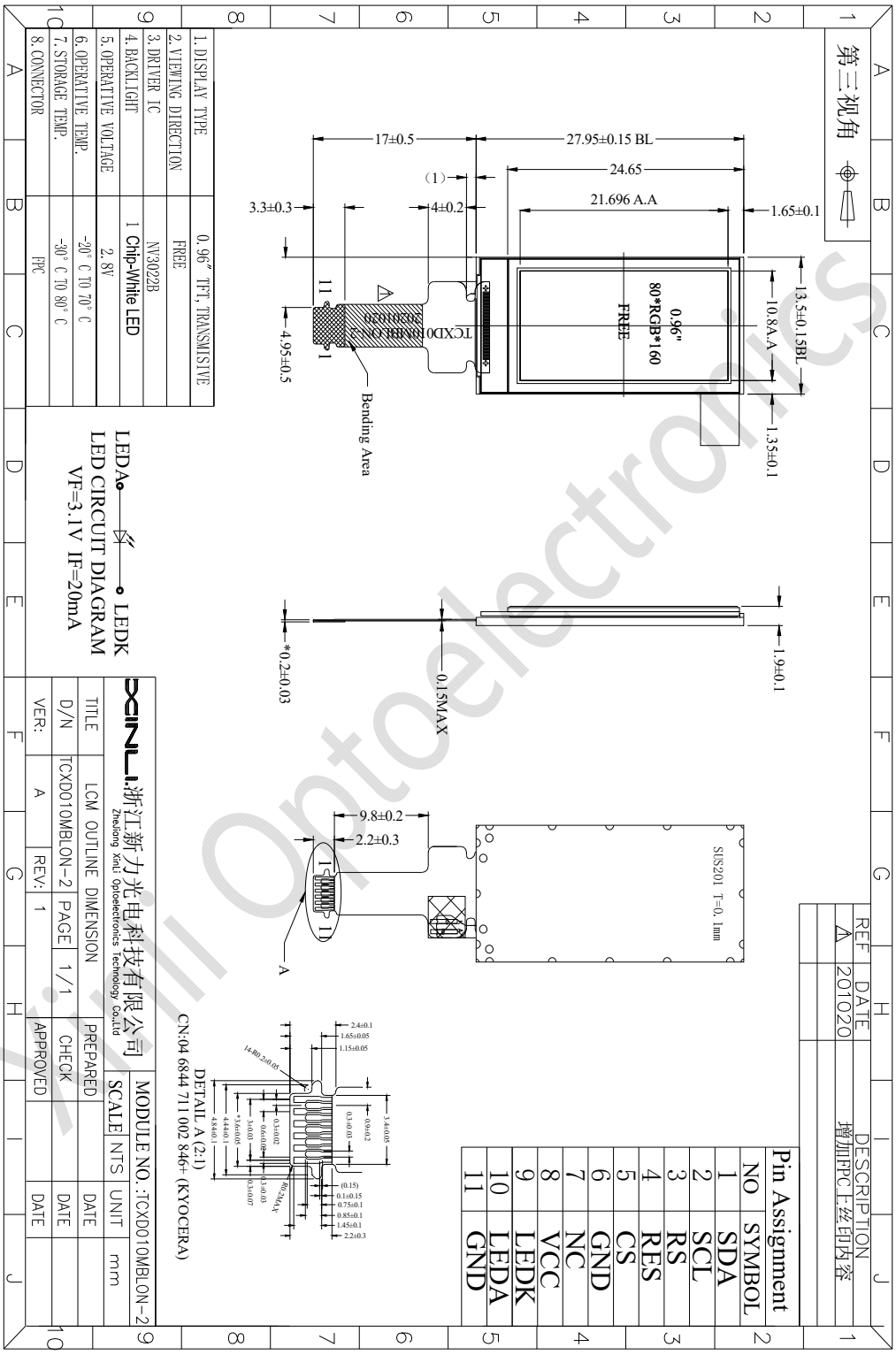
2. General Description and Features

The 0.96 inch Module named TCXD010MBLON-2 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	13.5*27.95*1.9	mm
(2)	LCD Active area	10.8*21.696	mm
(3)	Dot Number	80*3(RGB)*160	/
(4)	Pixel size	0.135*0.1356	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	262K	/
(7)	Viewing direction	Free	O'clock
(8)	Backlight Type	1-chip LED	/
(9)	Power Supply	2.8（TYP)	V
(10)	IC	NV3022B	/
(11)	Interface	FPC 0.3mm_Pitch 11 pin	/
(12)	Interface type	SPI interface	/
(13)	Module weight	TBD	g



3. Mechanical Dimension



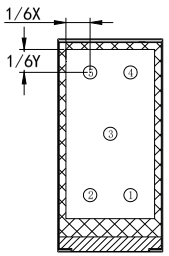
第三视角

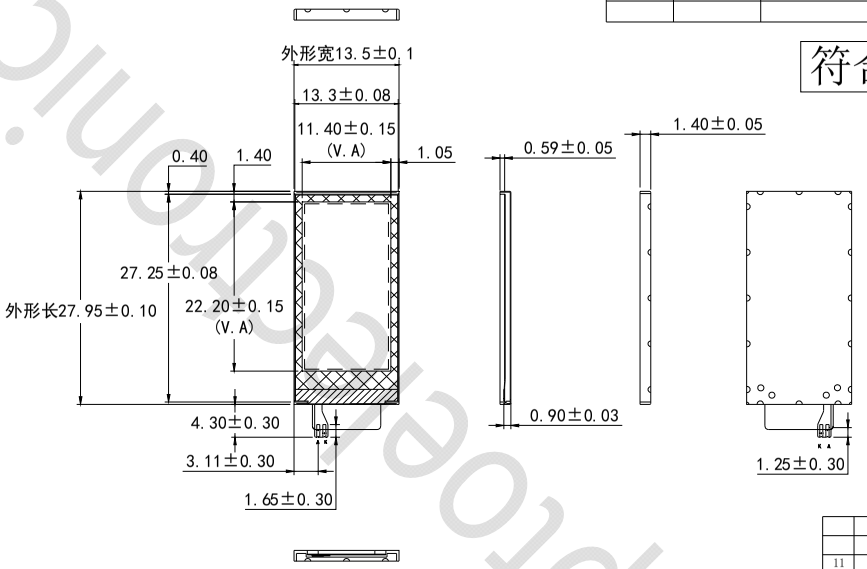
REF	DATE	DESCRIPTION

符合ROHS要求

平面翘曲度公差	
边长度L	对应公差范围
L≤20mm	≤0.1mm
20<L≤100mm	≤L*0.5%mm
L>100mm	≤0.5mm

Test Point测试点
(测试角度 0.2°)



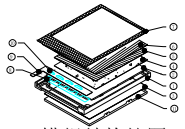


线路简图

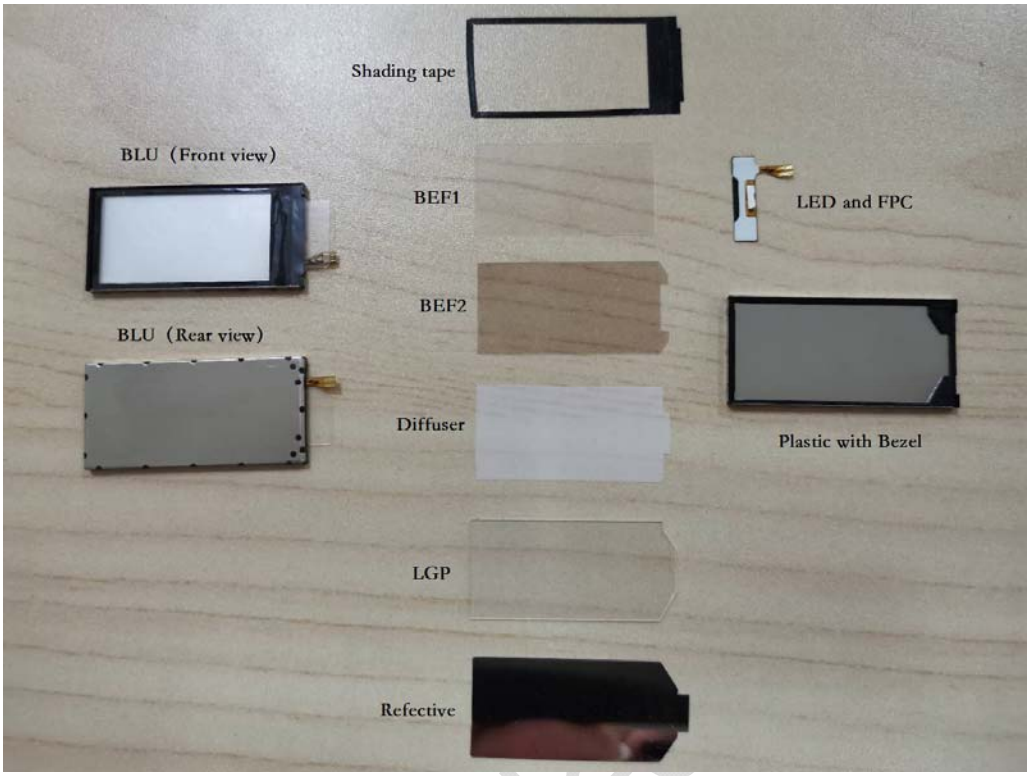
NO.	TITLE	QUANTITY
11	Breze Frame	
10	LED	
9	FPC	
8	Double Side Tape	
7	Shielding Tape	
6	Upper BEF	
5	Bottom BEF	
4	Lower Diffuser	
3	Reflector	
2	Ligheguide	
1	Housing	

Notes:
1. Unit:mm
2. ⚠ Modification rev.number
3.Unmarked radii:R0.3;unmarked toleracce:±0.15
4. draft angle 1.5°
5. Mark mold cavity indentification in recess approximately where indicated
6. ( ) reference dimension; ▭ area critical dimension; ⬭ area CPK ≥1.33
7. ELECTRICAL-OPTICAL CHARACTERISTICS (Ambient temperature Ta=25° C)

Item		Symbol	Min.	Typ.	Max.	Unit	Condition
Main screen	Luminance	Lv				cd/m²	If= 18-23 mA 限电压 (3.0-3.1)
	Uniformity	Avg				%	
	Colour Coordinate (Center point)	X					
		Y					
Forward Voltage		Vf				V	
Operating Temperature		T_{OPR}	-30	—	70	°C	
Storage Temperature		T_{STG}	-40	—	80	°C	
Soldering Temperature		T_{sd}		260		°C	10sec(Reflow)


模组结构简图

XINLI 浙江新力光电科技有限公司 ZheJiang XinLi Optoelectronics Technology Co.,Ltd				MODULE NO. : TCXD010MBLON-2	
				SCALE NTS	UNIT mm
TITLE	BLG OUTLINE DIMENSION			PREPARED	DATE
D/N	BLG-TCXD010-2-V0	PAGE	1/1	CHECK	DATE
VER:	A	REV:	0	APPROVED	DATE

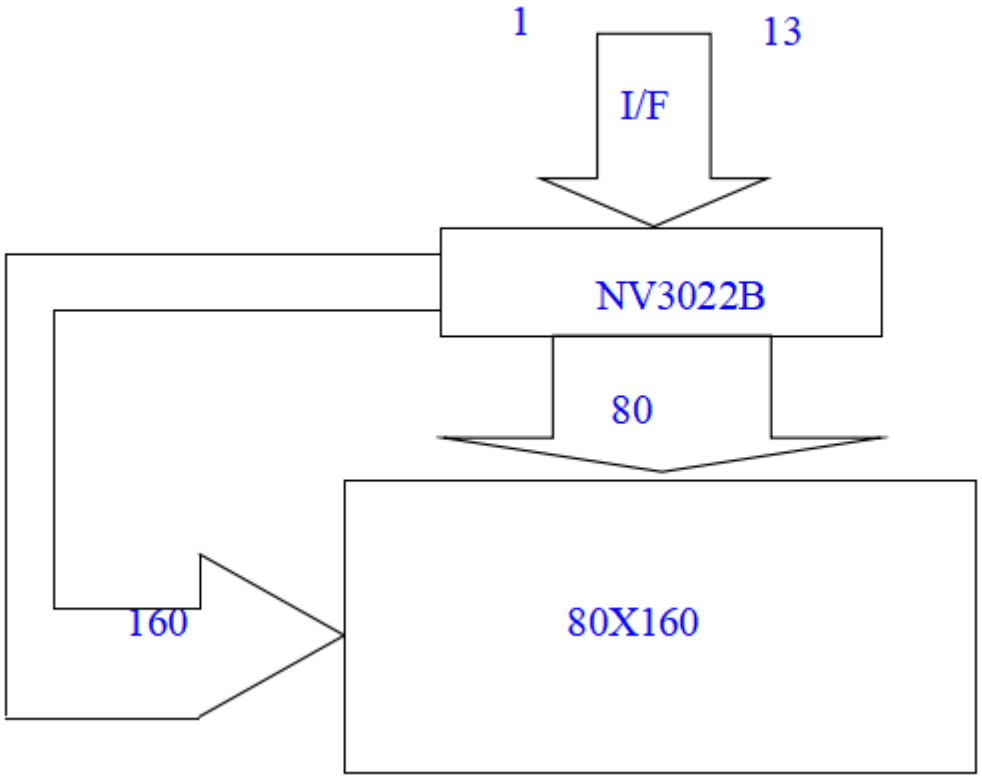


4. Interface Pin Connection

LCM interface Pin

NO	Symbol	Level	Description
1	SDA	I	SPI interface input/output pin. -The data is latched on the rising edge of the SCL signal.
2	SCL	I	This pin is used to be serial interface clock.
3	RS	I	4-line system (D/CX): Serves as command or parameter select.
4	RES	I	This signal will reset the device and it must be applied to properly initialize the chip.
5	CS	I	Chip select signal input (low active)
6	GND	p	Ground
7	NC	-	Not Connect
8	VCC	P	Power supply(2.8V)
9	LEDK	P	Back light power supply negative
10	LEDA	P	Back light power supply positive
11	GND	p	Ground

5. Block Diagram



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	℃
Storage temperature	Tst	-30 to 80	℃
Humidity	RH	90%(Max60C)	RH
Analog power supply	VCC	-0.3 ~ 4.6	V
Supply voltage (Logic)	IOVCC	-0.3 ~ 4.6	V

7. Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Analog power supply	VCC	-	2.6	2.8	3.3	V
Interface operation voltage	IOVCC	-	1.65	1.8/2.8	3.3	V
Input current	IDD	-	-	12	-	mA
Standby Current (Use Xinli's SW)	I	VCC 2.8V	-	-	30	uA
		VCC 3.3V	-	-	50	uA

8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	-	3.1	-	V	IF=20mA
Luminance	Lv	-	500	-	cd/m2	
Number of LED	-		1		pcs	-
Operating Life Time	-	-	20000	-	Hrs	
LED TYPE	LC-S04-WB-B42E(谷麦)					

Note 1: The LED Supply voltage is defined by the number of LED at Ta=25℃.
Note 2: Operating life means brightness goes down to 50% initial brightness. Typical operating life tine is estimated data.

9. Timing Characteristics

Please consult our technical department for detail information.

10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

Please consult our technical department for detail information.

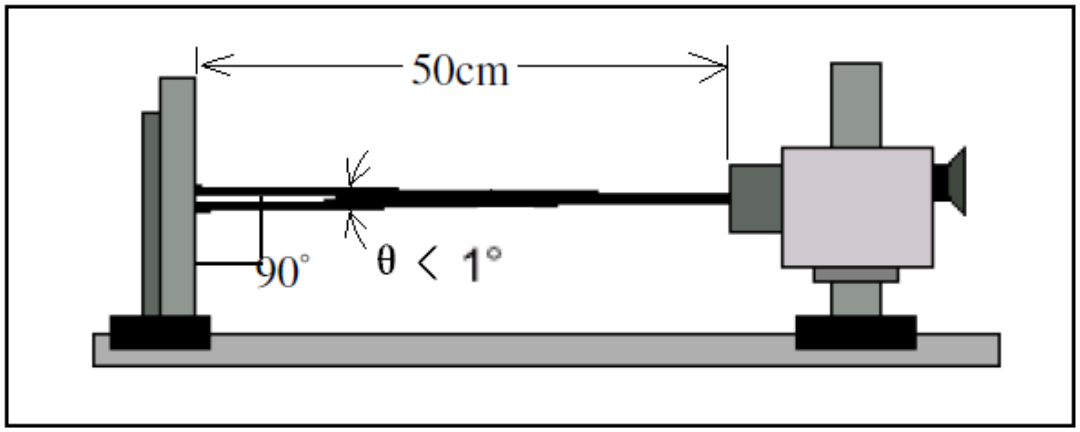
12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr+Tf	θ =0° ∅=0° Ta=25℃	-	30	40	ms	4
Uniformity （Five point）		δ WHITE		-	80	-	%	7
Contrast ratio		Cr		700	800	-	-	3 ,5
Surface Luminance		Lv		-	500	-	-	3 ,7
Viewing angle range		θ	∅ = 90°	80	85	-	deg	6
			∅ = 270°	80	85	-	deg	
			∅ = 0°	80	85	-	deg	
			∅ = 180°	80	85	-	deg	
Color filter chromaticity (x, y)	White	X	θ = ϕ = 0°	-	-	-		7 CF Glass
		Y		-	-	-		
	Red	X		0.640	0.655	0.670		
		Y		0.303	0.318	0.333		
	Green	X		0.273	0.288	0.303		
		Y		0.530	0.545	0.560		
	Blue	X		0.123	0.138	0.153		
		Y		0.106	0.121	0.136		

Note 1: Ambient temperature=25℃±2℃

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

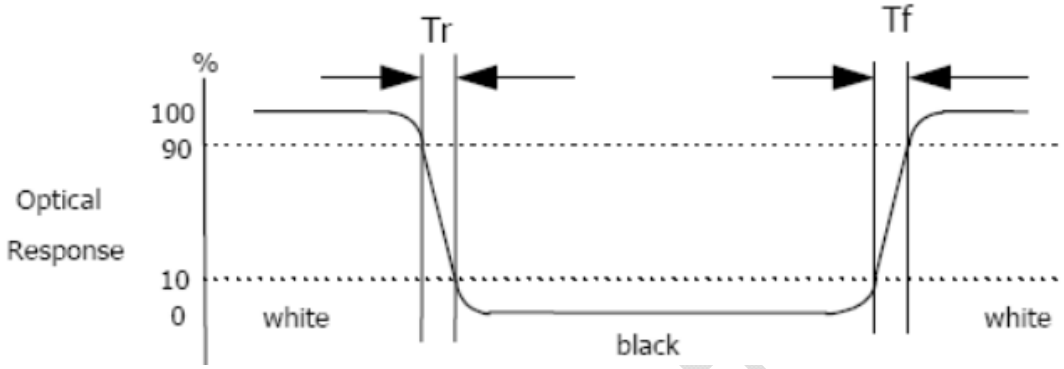
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



Note 4: Definition of response time:

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

Refer to figure as below.



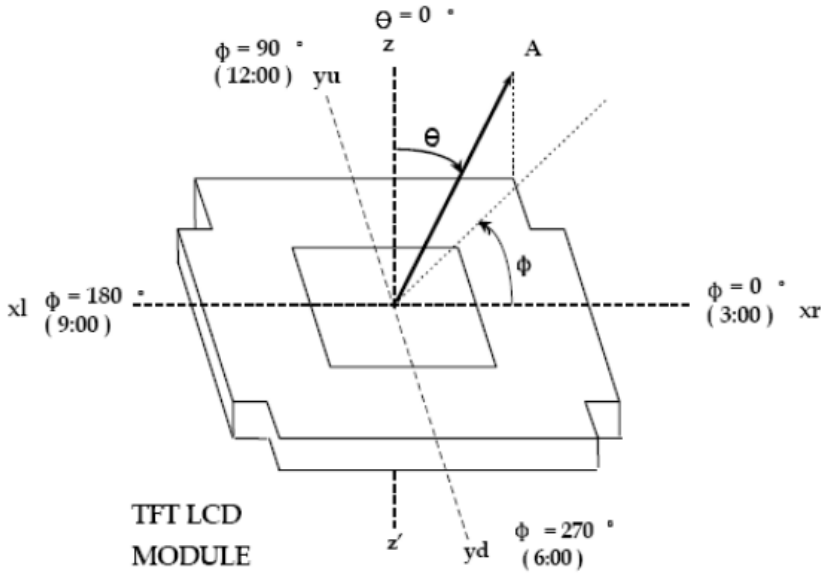
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

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

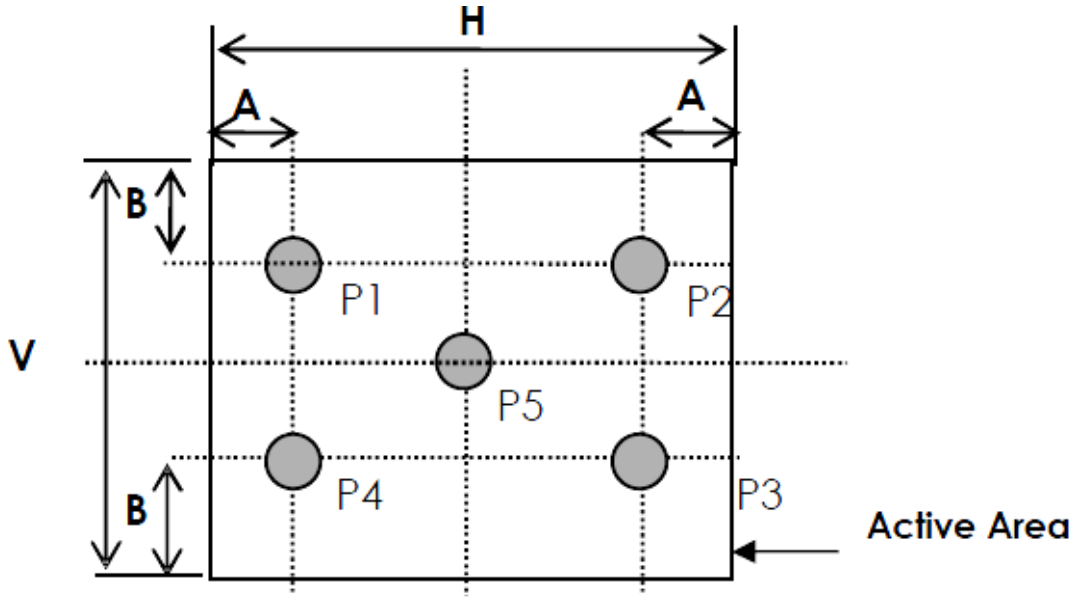
Note 6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10 for TFT module. 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 = Surface Luminance with all white pixels (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. Scope

Display Quality Evaluation

Mechanics Specification

2. Sampling Plan

MIL-STD-105E

Unless there is other agreement, the sampling plan for incoming inspection shall follow MIL-STD-105E.

Lot size: Quantity per shipment as one lot (different model as different lot).

Sampling type: Normal inspection, single sampling.

Sampling level: Level II.

3. Acceptable Quality Level

Item	Major	Minor
Appearance	1.5%	2.5%
Electrical	1.0%	1.5%

Classification of defects:

(1) Major defect: Any defect may result in functional failure, or reduce the usability of product for its purpose. For example: Electrical failure, deformation and etc.

(2) Minor defect: The criteria on major or minor judgment will be according with the classification of defects.

4. Panel Inspection Condition

（1）The environmental conditions for inspection shall be as follows:

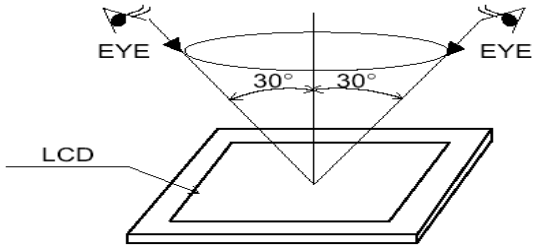
Room temperature: 20±3℃

Humidity: 65±20%RH

（2）Ambient illumination condition need 750lux for visual cosmetic inspection (300lux for Electrical characteristic functional inspection.)

（3）The distance from eyes to LCD must be 30cm.

（4）Viewing direction must be within 30 degrees to vertical line of LCD center.



5. Major defect

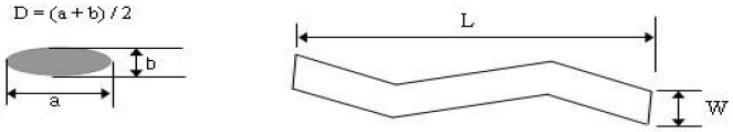
No.	Item	Inspection Standard	Classification of defects
1	All functional defects	1) No display 2) Display abnormally 3) Open or missing segment 4) Short circuit 5) Excess power consumption 6) Backlight no lighting, flickering and abnormal lighting	Major
2	Missing	Missing component	Major
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	Major

6. Cosmetic defect in the Active Area

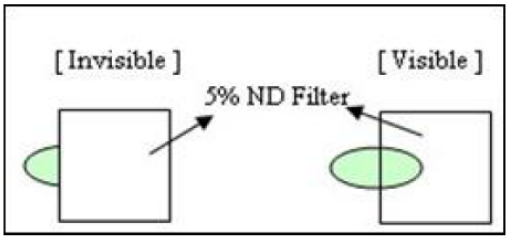
No.	Item	Inspection Standard	Classification of defects
1	(spot defect) Bright Dot/ Dark Dot/ Foreign Material/ Spot/Dent /Bubble On the polarizer	Size Φ (mm) / Acceptable Quantity Φ≦0.15 / Ignore 0.15<Φ≦0.2 / 2 0.2<Φ / 0	Minor

<table>
<tr>
<td>2</td>
<td>(line defect) Foreign Material /Scratch /Bubble On the polarizer</td>
<td>Define: 
<table>
<tr><td>Width</td><td>Length(mm);Acceptable Qty</td></tr>
<tr><td>W≦0.03</td><td>Ignore</td></tr>
<tr><td>0.03<W≦0.05</td><td>L≦2.0; N≦2</td></tr>
<tr><td>0.05<W or L＞3.0</td><td>Define as spot defect</td></tr>
</table>
</td>
<td>Minor</td>
</tr>
<tr>
<td>3</td>
<td>Mura</td>
<td>Follow Limit sample if necessary by 5%ND filter</td>
<td>Minor</td>
</tr>
</table>

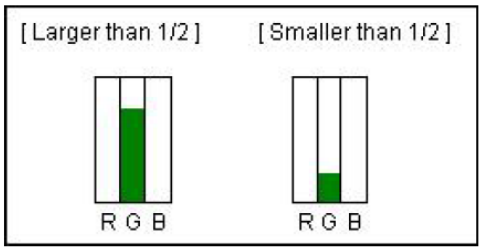
※Note1） D = Diameter, L = Length, W = Width, N = Number



※Note2) For pixel defect, dot means a sub-pixel. Dot defects should be larger than half size of a Sub -pixel. Dot which is invisible through 5% ND filter or smaller than 1/2 of sub-pixel size will not counted as "1 dot" defect.



"No dot defect" (=ignored)　　"1 dot defect" (=counted)



"1 dot defect" (=counted)　　"No dot defect" (=ignored)

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℃,96 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,96H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,96H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,96H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 96H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle -30℃← →25℃ ← →80℃ 30min←→5min←→30min one cycle	-30℃/80℃, 10 cycles
7	Vibration Test	10Hz~150Hz,100m/s2	120min
8	Shock Test	Half-sine wave	300m/s2, 11ms
9	Drop Test (Package state)	Concrete floor, 1 corner, 3 edges, 6 sides each time	600mm

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℃.

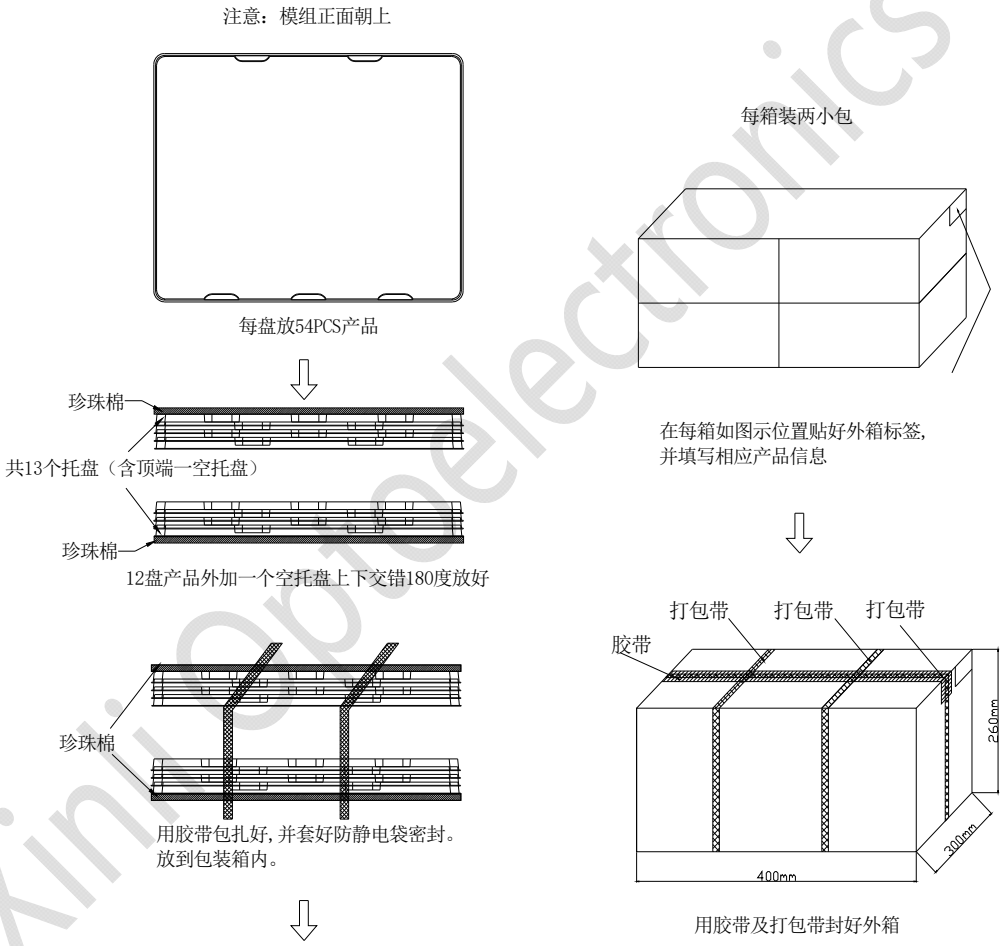
(3)That keeps the LCD modules stored in the container shipped from supplier be fore using them is recommended.

(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



说明：1. 每包648pcs产品，12+1层托盘；
2. 每箱装2小包，1296pcs产品；
3. 非中性包装；