SPECIFICATION

PRODUCT NO. : **TCXD097IBLON-2**
VERSION : **Ver 1.2**
ISSUED DATE : **2021-3-11**

This module uses ROHS material

FOR CUSTOMER：_____
□：APPROVAL FOR SPECIFICATION
■：APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optronics ：

Presented by	Reviewed by	Organized by
朱王煒	趙春曉	王俊傑

Note:

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

2.All rights are reserved. No one is permitted to reproduce or duplicate the whole or part of this document without Xinli Optronics permission.

1. Revision Recode

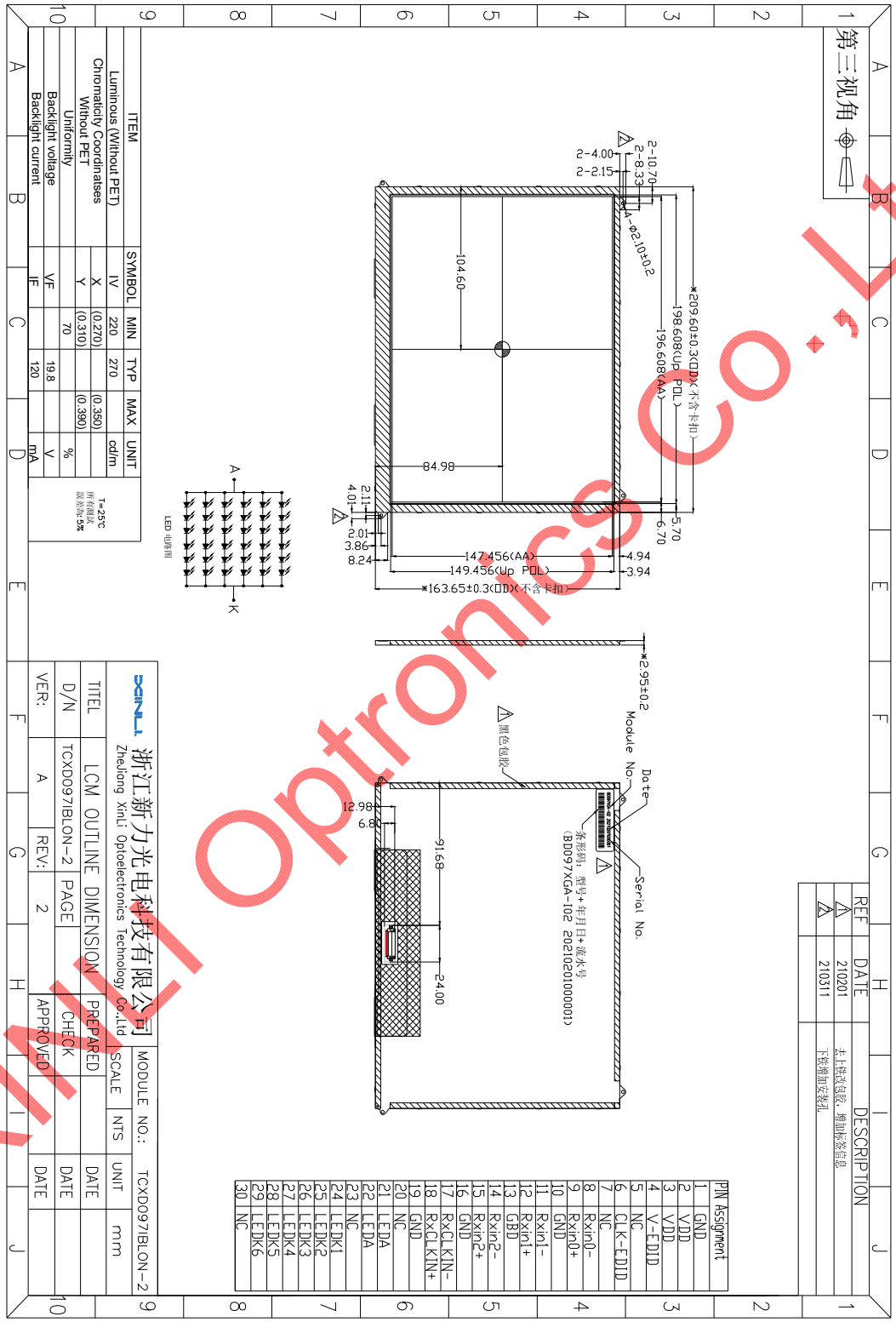
Revision	Description	Date
1.0	Initial Release	2021/1/18
1.1	Update the Module Outline, drawing and Color filter Chromaticity(Page 3,4,10)	2021/2/1
1.2	Update the Drawing	2021/3/11

2. General Description and Features

The 9.7 inch Module named TCXD097IBLON-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 Outline	209.6 x 163.65 x2.95	mm
(2)	LCD Active area	196.608 x 147.456	mm
(3)	Dot Number	1024 x 3(RGB) x 768	/
(4)	Pixel size	0.192(H) x 0.192(V)	mm
(5)	LCD type	Normally black, TFT Transmissive	/
(6)	Display Color	262K	/
(7)	Viewing direction	ALL	O'clock
(8)	Backlight Type	36-chip	/
(9)	Power Supply	3.3(TYP)	V
(10)	Interface	Connector	/
(11)	Interface type	LVDS	/
(12)	Module weight	TBD	g

3. Mechanical Dimension



4. Interface Pin Connection

NO	Symbol	Level	Description
1	GND	P	Ground
2	VDD	P	3.3V Power
3	VDD	P	3.3V Power
4	V_EDID	p	3.3V Power for EDID
5	NC	-	Not connect.
6	CLK_EDID	I/O	EDID Clock input
7	NC	-	Not connect.
8	RXIN0-	I/O	-LVDS differential data input
9	RXIN0+	I/O	+LVDS differential data input
10	GND	P	Ground
11	RXIN1-	I/O	-LVDS differential data input
12	RXIN1+	I/O	+LVDS differential data input
13	GND	P	Ground
14	RXIN2-	I/O	-LVDS differential data input
15	RXIN2+	I/O	+LVDS differential data input
16	GND	P	Ground
17	RXCLKIN-	I/O	-LVDS differential clock input
18	RXCLKIN+	I/O	+LVDS differential clock input
19	GND	P	Ground
20	NC	-	Not connect.
21	LEDA	P	LED Anode (Positive)
22	LEDA	P	LED Anode (Positive)
23	NC	-	Not connect.
24	LEDK1	P	LED Cathode (Negative)
25	LEDK2	P	LED Cathode (Negative)
26	LEDK3	P	LED Cathode (Negative)
27	LEDK4	P	LED Cathode (Negative)
28	LEDK5	P	LED Cathode (Negative)
29	LEDK6	P	LED Cathode (Negative)
30	NC	-	Not connect.

5. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	0 to 50	℃
Storage temperature	Tst	-20 to 60	℃
Power Voltage	VDD	-0.5~3.96	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.

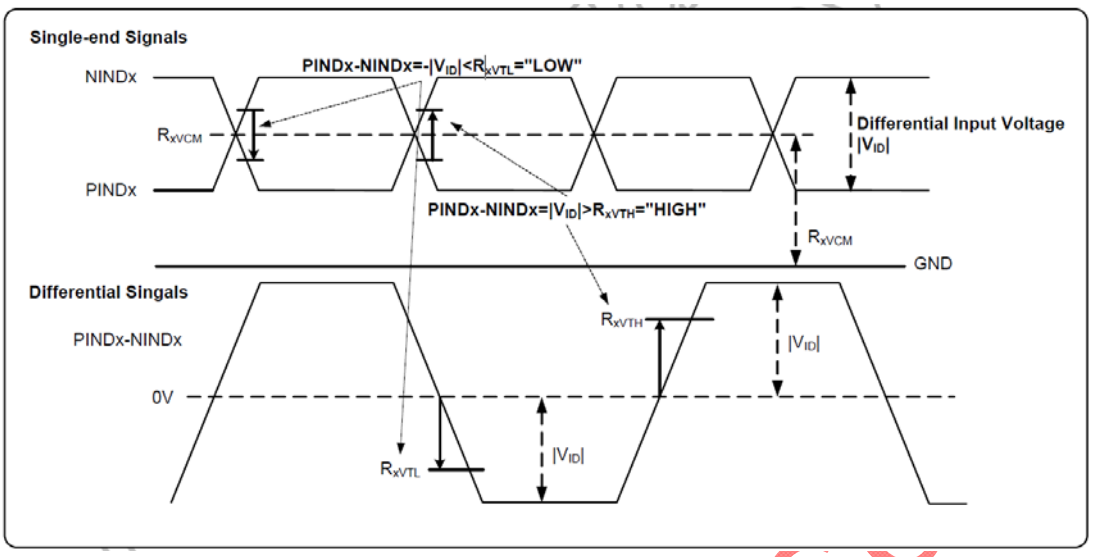
6. Electrical Characteristics

6.1 TTL DC electrical characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Power Voltage	VDD	3.0	3.3	3.6	V

6.2 LVDS DC electrical characteristics

Parameter	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit	Condition
Differential input high Threshold voltage	R_{XVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	VDD-1.2+ $\|V_{ID}\|/2$	V	-
Differential input common Mode voltage	R_{XVCM}	$\|V_{ID}\|/2$	-	VDD-1.2	V	-
Differential input voltage	$\| V_{ID} \|$	0.2	-	0.6	V	-
Differential input leakage Current	RV_{Xliz}	-10	-	+10	μA	-
LVDS Digital Operating Current	Iddlvds	-	15	30	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	-	10	50	μA	Clock & all Functions are stopped



7. Backlight Characteristics

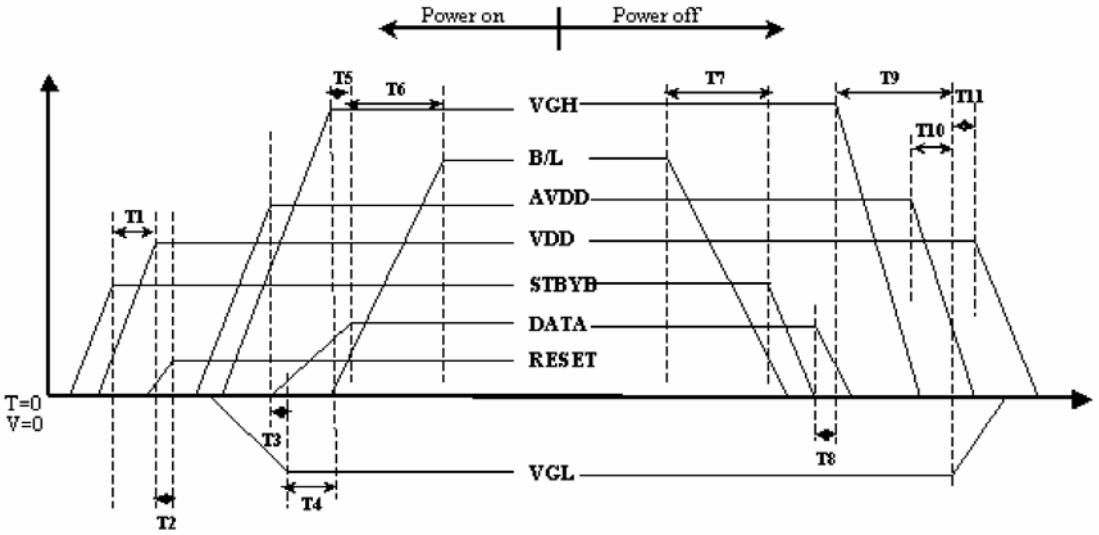
Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	-	19.8	-	V	Note 1
Number of LED	-		36		pcs	-
Power Consumption	PWF	-	2376	-	mW	-
LED life-span	-	-	(20000)	-	Hrs	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IF =120 mA

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL = 120 mA. The LED lifetime could be decreased if operating IL is larger than 120mA.

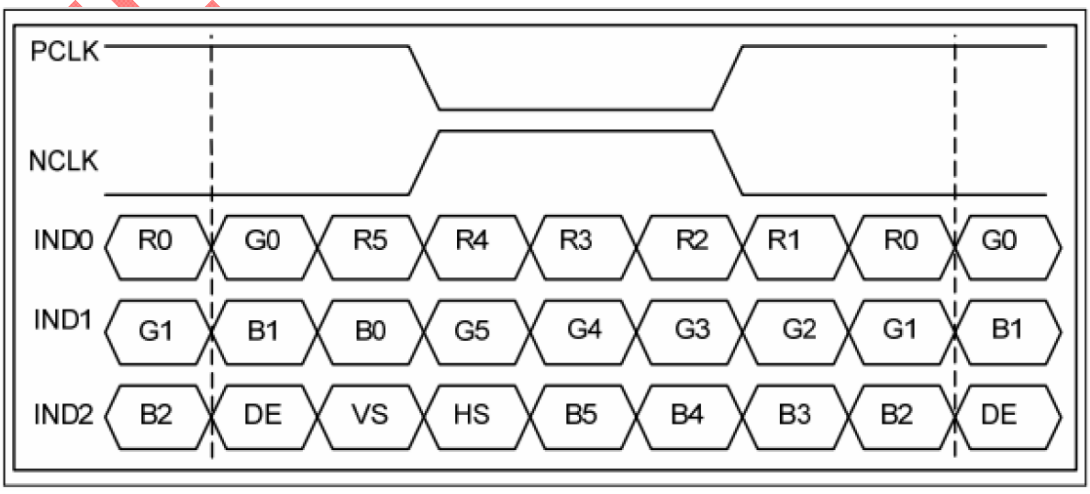
8. Timing Characteristics

8.1 Power On/Off Sequence



Item	Min.	Typ.	Max.	Unit
T1	0	--	--	ms
T2	50	--	--	ms
T3	5	--	--	ms
T4	10	--	--	ms
T5	20	--	--	ms
T6	50	--	--	ms
T7	20	--	--	ms
T8	10	--	--	ms
T9	20	--	--	ms
T10	10	--	--	ms
T11	20	--	--	ms

8.2 6 Bit LVDS input



8.3 Parallel RGB input timing table

DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	52	65	71	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		768		T_H
VSD Period	tv	778	806	845	T_H
VSD Blanking	tvbp+ tvfp	10	38	77	T_H

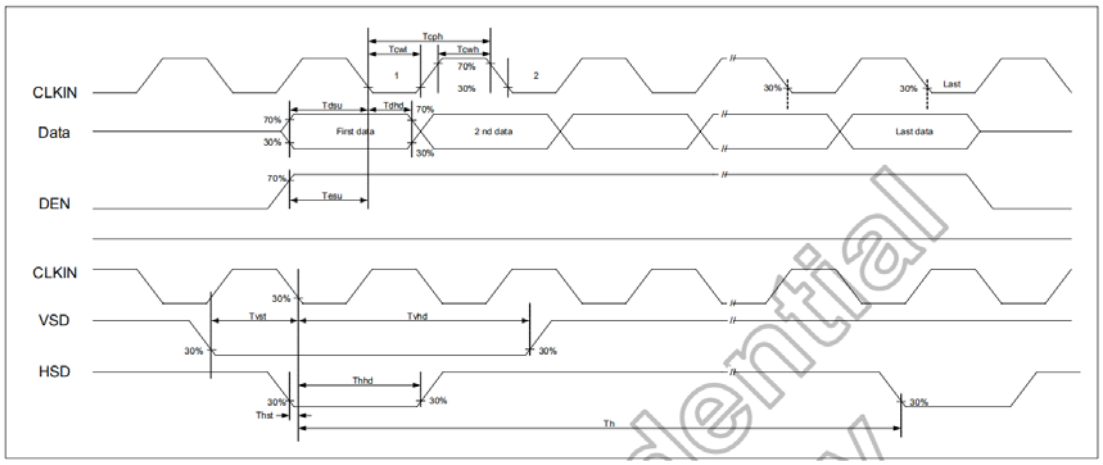
HV mode

Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	57	65	70.5	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp		160		DCLK
HSD Front Porch	thfp	16	160	216	DCLK

Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		768		T_H
VSD Period	tv	792	806	840	T_H
VSD Pulse Width	tvpw	1	-	20	T_H
VSD Back Porch	tvbp		23		T_H
VSD Front Porch	tvfp	1	15	49	T_H



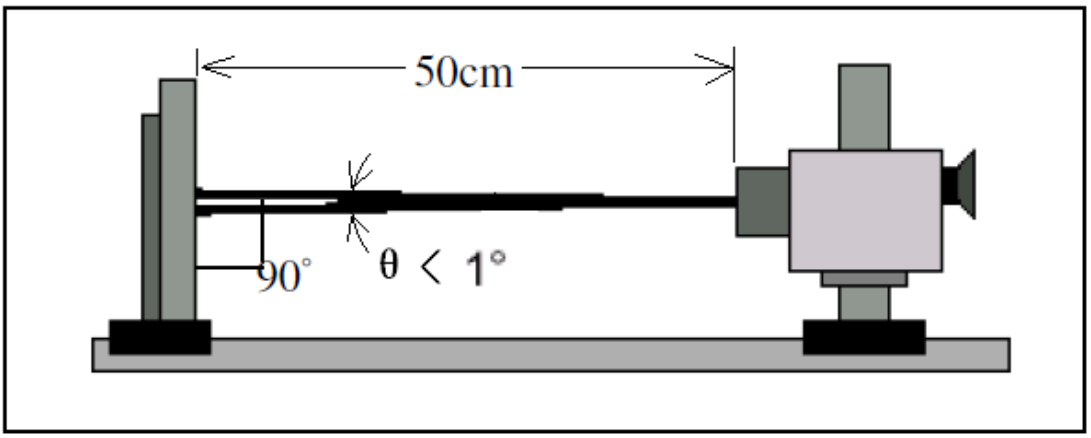
9. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Transmission (with pol)		T		5.2	5.42	-	%	
Response time		Tr+Tf	θ =0° ∅=0° Ta=25℃	-	20	-	ms	4
Uniformity （Five point）		δ WHITE		70	-	-	%	7
Contrast ratio		Cr		-	900	-	-	3 ,5
Surface Luminance		Lv		220	270	-	-	3 ,7
Viewing angle range		θ	∅ = 90°	-	89	-	deg	6
			∅ = 270°	-	89	-	deg	
			∅ = 0°	-	89	-	deg	
			∅ = 180°	-	89	-	deg	
Color filter chromaticity (x, y)	White	X	θ = ϕ = 0°	0.270	0.310	0.350		7
		Y		0.310	0.350	0.390		
	Red	X	θ = ϕ = 0°	0.560	0.600	0.640		
		Y		0.320	0.360	0.400		
	Green	X	θ = ϕ = 0°	0.302	0.342	0.382		
		Y		0.560	0.600	0.640		
	Blue	X	θ = ϕ = 0°	0.110	0.150	0.190		
		Y		0.085	0.125	0.165		

Note 1: Ambient temperature=25℃±2℃

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

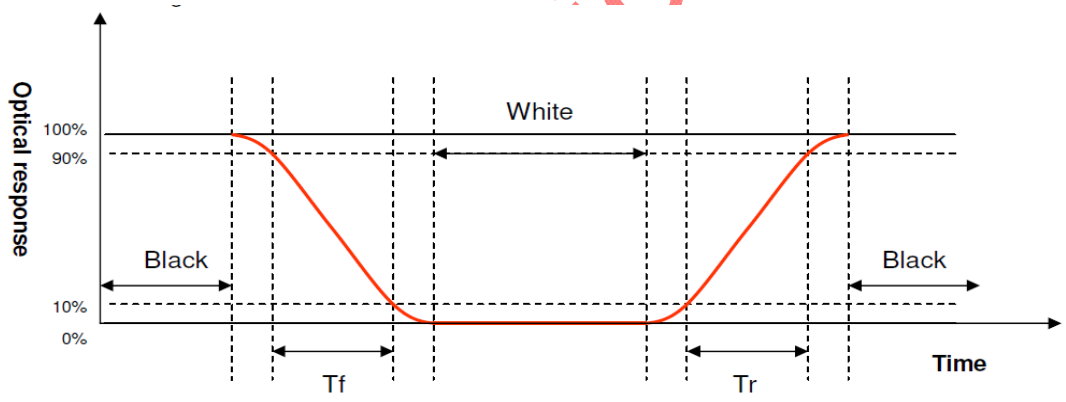
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



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.



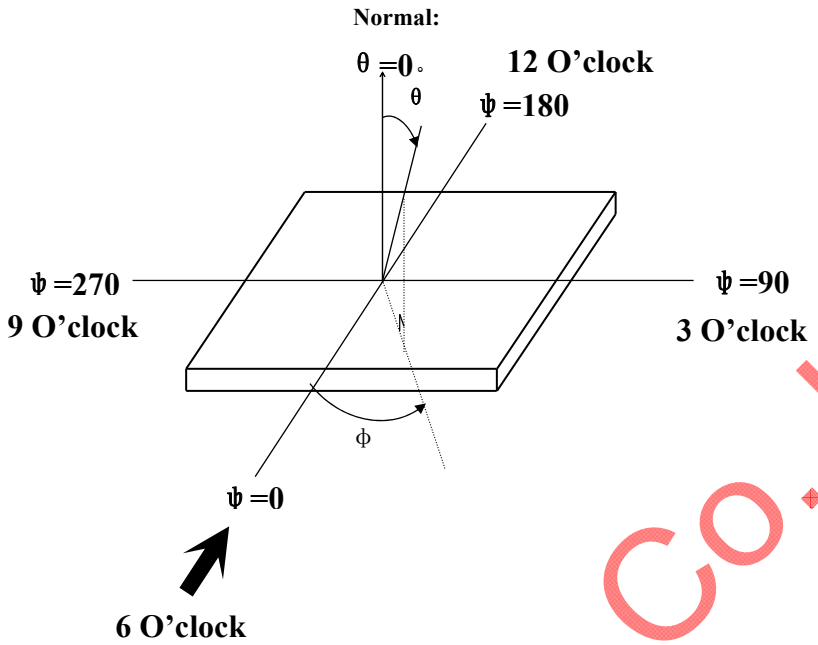
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

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

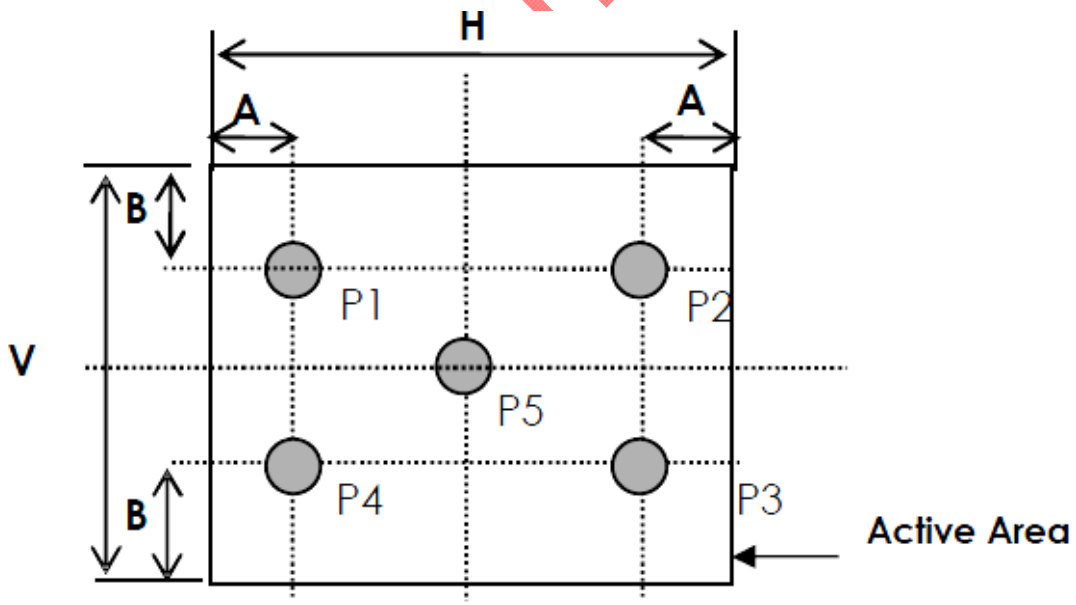
Note 6. Definition of viewing angle

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 =Surface Luminance with all white pixels (P_5)

10. 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	Test Condition	Remarks
1	High temperature storage	60℃，240H	IEC60068-2-1:2007,GB2423.2-2008
2	Low temperature storage	-20℃，240H	IEC60068-2-1:2007 GB2423.1-2008
3	Hight temperature operation	50℃，240H	IEC60068-2-1:2007 GB2423.2-2008
4	Low temperature operation	0℃，240H	IEC60068-2-1:2007 GB2423.1-2008
5	Temperature Cycle (Non-operation)	-20℃-25℃-60℃ 30min-5min-30min 10 cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002

11. 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.

12. Package Specification