SPECIFICATION

PRODUCT NO. : **TCXD068IBLON-13**
VERSION : **Ver 1.0**
ISSUED DATE : **2021-03-30**

This module uses ROHS material

FOR CUSTOMER：＿＿＿＿＿＿＿＿＿＿＿

□：**APPROVAL FOR SPECIFICATION**
■：**APPROVAL FOR SAMPLE**

DATE	APPROVED BY

Xinli Optoelectronics ：

Presented by	Reviewed by	Organized by
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1. Record of Revision

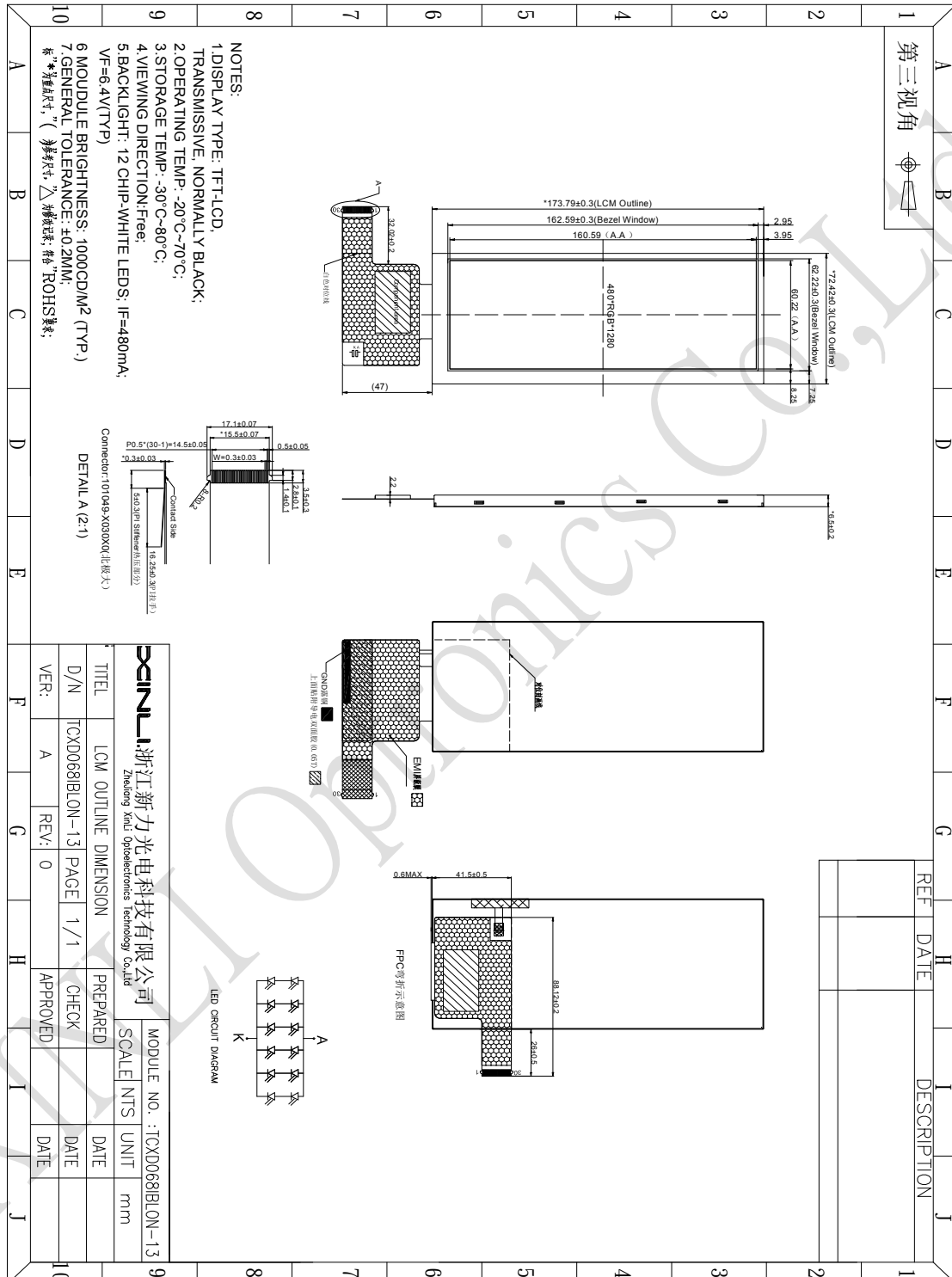| Revision	Description	Date
1.0	Initial Release	2021/03/30

2. General Description and Features

The 6.8 inch Module named TCXD068IBLON-13 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. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outline	72.42(H)*173.79(V)*6.5(T)	mm
(2)	LCD Active area	60.22(H)*160.59(V)	mm
(3)	Dot Number	480*3(RGB)*1280	/
(4)	Dot size	41.82*125.46	um
(5)	LCD type	Normally Black,Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	ALL	O'clock
(8)	Drive IC	HX8394-F	
(9)	Power Supply	3.3（TYP）	V
(10)	Interface	FPC 0. 5mm_Pitch 30 pin	/
(11)	Interface type	MIPI interface	/
(12)	Module weight	TBD	g

3. Mechanical Dimension

NOTES:
1. DISPLAY TYPE: TFT-LCD, TRANSMISSIVE, NORMALLY BLACK;
2. OPERATING TEMP: -20℃~70℃;
3. STORAGE TEMP: -30℃~80℃;
4. VIEWING DIRECTION:Free;
5. BACKLIGHT: 12 CHIP-WHITE LEDS; IF=480mA; VF=6.4V(TYP);
6. MOUDULE BRIGHTNESS: 1000CD/M² (TYP.)
7. GENERAL TOLERANCE: ±0.2MM;

TITEL: LCM OUTLINE DIMENSION
D/N: TCXD068IBLON-13 PAGE: 1/1
VER: A REV: 0
MODULE NO.: TCXD068IBLON-13
SCALE: NTS UNIT: mm

浙江新力光电科技有限公司
Zhejiang XinLi Optoelectronics Technology Co.,Ltd

4. Interface Pin Connection

LCM interface Pin

NO	Symbol	Level	Description
1	GND	P	Power ground
2	VCI	P	Power voltage
3	VCI	P	Power voltage
4	VCI	P	Power voltage
5	GND	P	Power ground
6	RESET	I	Reset pin
7	TE	P	Tearing effect output signal
8	GND	P	Power ground
9	GND	P	Power ground
10	D3N	I	MIPI data input
11	D3P	I	MIPI data input
12	GND	P	Power ground
13	D2N	I	MIPI data input
14	D2P	I	MIPI data input
15	GND	P	Power ground
16	CLKN	I	MIPI clock input
17	CLKP	I	MIPI clock input
18	GND	P	Power ground
19	D1N	I	MIPI data input
20	D1P	I	MIPI data input
21	GND	P	Power ground
22	D0N	I	MIPI data input
23	D0P	I	MIPI data input
24	GND	P	Power ground
25	NC	-	Not connect
26	NC	-	Not connect
27	LEDK	P	Backlight Ground
28	LEDK	P	Backlight Ground
29	LEDA	P	Backlight Anode
30	LEDA	P	Backlight Anode

5. Block Diagram
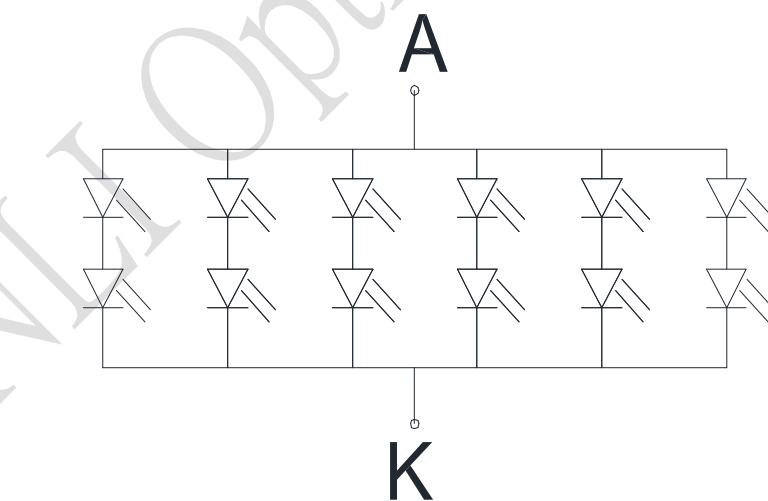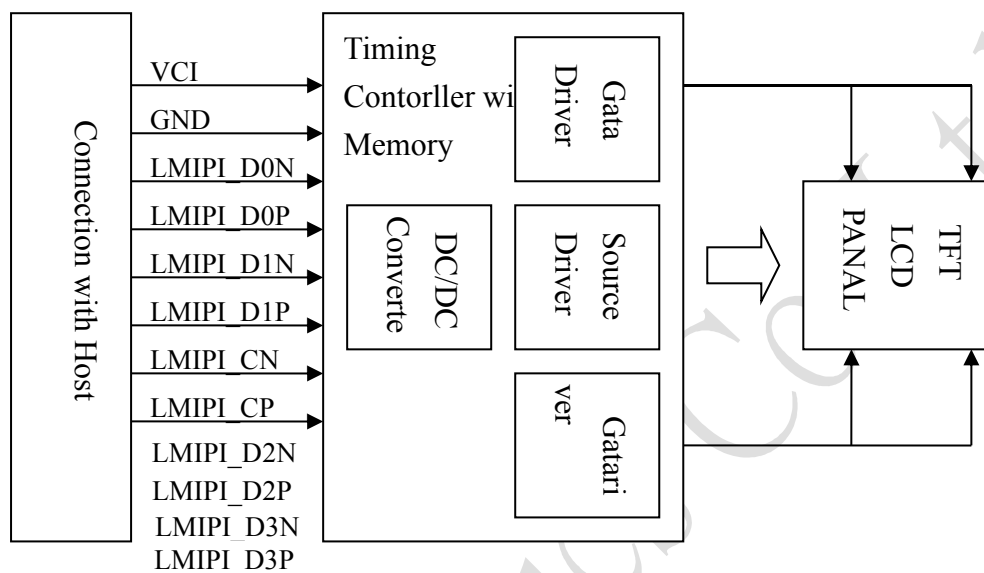
6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	℃
Storage temperature	Tst	-30 to 80	℃
Booster power supply	VCI	-0.3~ 3.6	V

7. Electrical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage		VCI	-	1.65	3.3	3.6	V
Logic input signal Voltage	H level	V_{IH1}	-	0.8*VCI	-	VCI	V
	L level	V_{IL1}		0	-	0.2*VCI	V

8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	5.4	6.4	6.8	V	IF=480mA
Luminance(module)	Lv	-	1000	-	cd/m2	
Number of LED	-		12		pcs	

9. Timing Characteristics

9.1 Low-power receiver

The low power receiver is an un-terminated, single-ended receiver circuit. The LP receiver is used to detect the Low-Power state on each pin. For high robustness, the LP receiver shall filter out noise pulses and RF interference. It is recommended the implementer optimize the LP receiver design for low power. The LP receiver shall reject any input glitch when the glitch is smaller than eSpike. The filter shall allow pulses wider than TMIN to propagate through the LP receiver. The related diagram shows as Figure 7.5 Input Glitch Rejection of Low-Power Receivers. Besides, under tables list DC and AC characteristic for LP-RX.
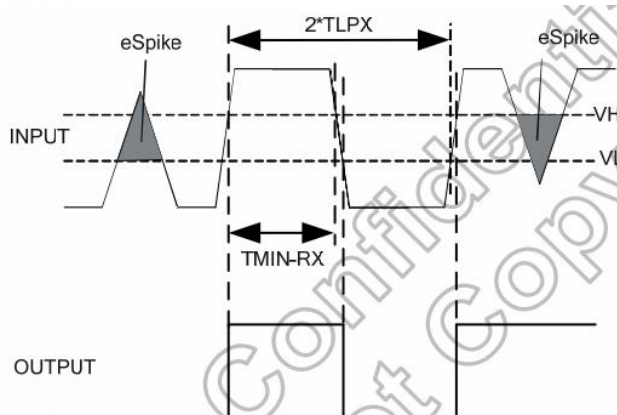
Input glitch rejections os low-power receivers

Parameter	Description	Spec.			Unit
		Min.	Typ.	Max.	
V_{IL}	Logic 0 input threshold	-	-	550	mV
V_{IH}	Logic 1 input threshold	880	-	-	mV

LP receiver DC specifications

Parameter	Description	Spec.			Unit
		Min.	Typ.	Max.	
e_{SPIKE}	Input pulse rejection[1], [2], [3]	-	-	300	V.ps
T_{MIN-RX}	Minimum pulse width response[4]	20	-	-	ns
V_{INT}	Peak-to-peak interference voltage	-	-	200	mV
f_{INT}	Interference frequency	450	-	-	MHz

Note: (1) Time-voltage integration of a spike above VIL when being in LP-0 state or below VIH when being in LP-1 state
(2) An impulse less than this will not change the receiver state.
(3) In addition to the required glitch rejection, implementers shall ensure rejection of known RF-interferers.
(4) An input pulse greater than this shall toggle the output.

LP receiver AC specifications

9.2 High-power receiver

The HS receiver is a differential line receiver. It contains a switch-able parallel input termination, Z_{ID}, between the positive input pin Dp and the negative input pin Dn. Under Tables list DC and AC characteristic for HS-RX.
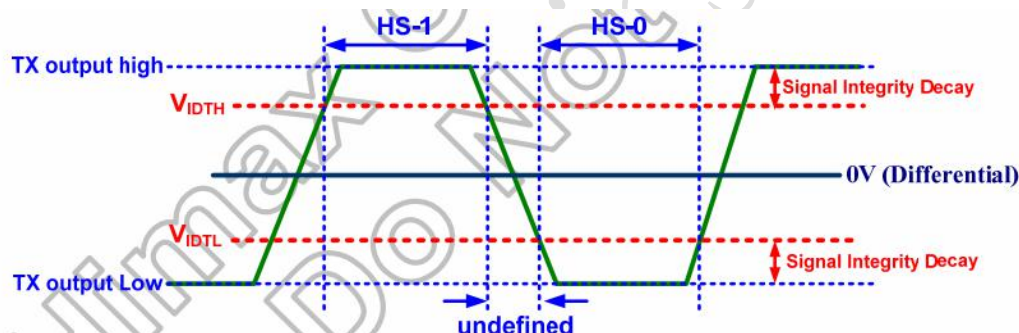
Parameter	Description	Spec.			Unit
		Min.	Typ.	Max.	
V_{IDTH}	Differential input high threshold[1]	-	-	70	mV
V_{IDTL}	Differential input low threshold[1]	-70	-	-	mV
V_{ILHS}	Single-ended input low voltage[2]	-40	-	-	mV
V_{IHHS}	Single-ended input high voltage[2]	-	-	460	mV
V_{CMRXDC}	Common-mode voltage HS receive mode[2],[3]	70	-	330	mV
Z_{ID}	Differential input impedance	80	100	125	Ω

Note: (1) +/-70mV only for reference, related to power and ground noise on system environment, this spec need to check on panel performance to fine tune.
(2) Excluding possible additional RF interference of 100mV peak sine wave beyond 450MHz.
(3) This table value includes a ground difference of 50mV between the transmitter and the receiver, the static common-mode level tolerance and variations below 450MHz

HS receiver DC specifications

Differential HS signals for HS receiver

Parameter	Description	Spec.			Unit
		Min.	Typ.	Max.	
$\Delta V_{CMRX(HF)}$	Common mode interference beyond 450 MHz[1]	-	-	100	mV_{PP}
C_{CM}	Common mode termination[2]	-	-	60	pF

Note: (1) $\Delta V_{CMRX(HF)}$ is the peak amplitude of a sine wave superimposed on the receiver inputs.
(2) For higher bit rates a 14pF capacitor will be needed to meet the common-mode return loss specification.
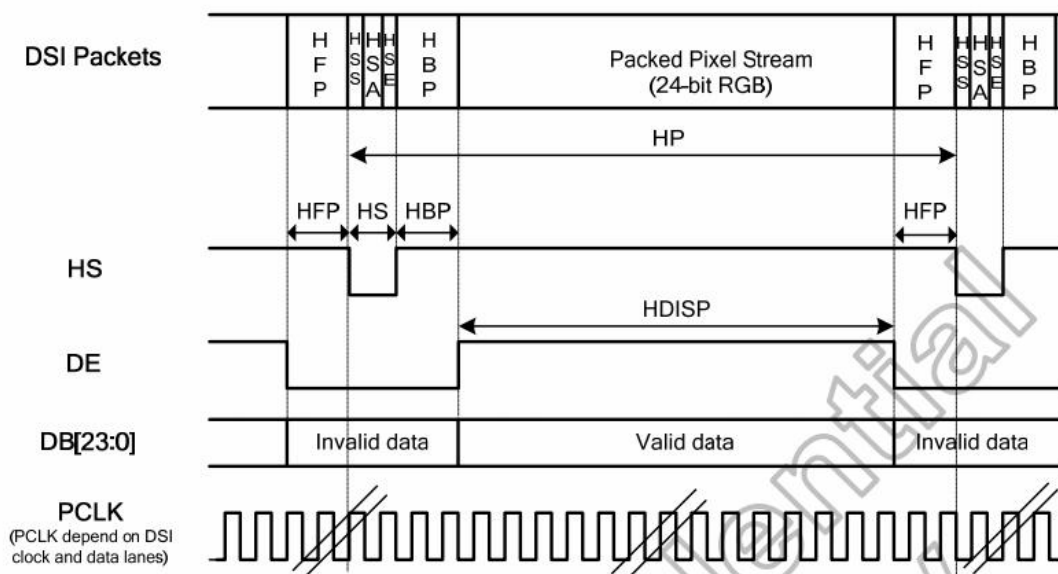
HS receiver AC specifications

9.3 Vertical timings
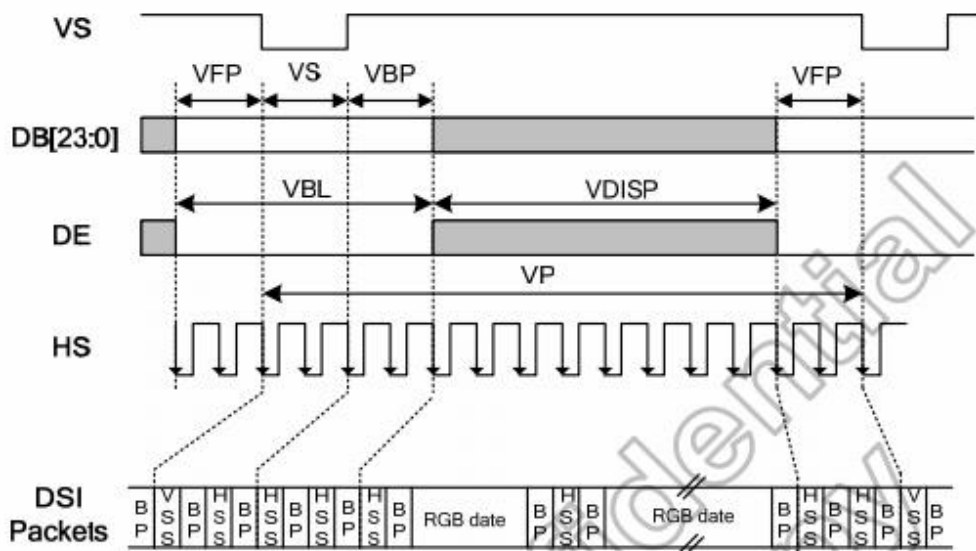
Resolution=720x1280 (VSSA=0V, VDD1=1.8V, VDD2=2.8V, VDD3=2.8V, T$_A$=25°C)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Vertical cycle	VP	-	1286	-	-	Line
Vertical low pulse width	VS	-	2	-	Note[1]	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note[1]	Line
Vertical data start point	-	VS+VBP	4	-	Note[1]	Line
Vertical blanking period	VBL	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	1280	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note: (1) The VS/VBP/VFP pulse width are related to RD3h (Set GIP Option0). Please refer to the application note for VS/VBP/VFP setting.

9.4 Horizontal timings

Resolution=720x1280 (VSSA=0V, VDD1=1.8V, VDD2=VDD3=VCC=2.8V, T_A=25°C)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Horizontal cycle	HP	-	762	-	-	DCK
HS low pulse width	HS	-	12	-	-	DCK
Horizontal back porch	HBP	-	24	-	-	DCK
Horizontal front porch	HFP	-	12	-	-	DCK
Horizontal data start point	-	HS+HBP	36	-	-	DCK
Horizontal blanking period	HBLK	HS+HBP+HFP	12	-	-	DCK
Horizontal active area	HDISP	-	-	720	-	DCK

Note: (1) HS > 0.2µs **(12-DCK @ 352.8Mbps /4-lane, Frame rate 60Hz, min DSI CLK rate)**
(18-DCK @ 540Mbps /4-lane, Frame rate 60Hz, max DSI CLK rate)
(2) HBP > 0.4µs **(24-DCK @ 352.8Mbps /4-lane, Frame rate 60Hz, min DSI CLK rate)**
(36-DCK @ 540Mbps /4-lane, Frame rate 60Hz, max DSI CLK rate)
(3) HFP > 0.2µs **(12-DCK @ 352.8Mbps /4-lane, Frame rate 60Hz, min DSI CLK rate)**
(18-DCK @ 540Mbps /4-lane, Frame rate 60Hz, max DSI CLK rate)

Table 7.14: Horizontal timings for DSI video mode I/F

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°	-	25	35	ms	4
Uniformity （Five point）		δ WHITE	$\varnothing$=0° Ta=25℃	70	80	-	%	7
Contrast ratio		Cr		1000	(1500)	-	-	3 ,5
Surface Luminance		Lv		-	1000	-	-	3 ,7
Viewing angle range		θ	$\varnothing$ = 90°	70	80	-	deg	6
			$\varnothing$ = 270°	70	80	-	deg	
			$\varnothing$ = 0°	70	80	-	deg	
			$\varnothing$ = 180°	70	80	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi = 0°$	-0.025	TBD	+0.025		7
		Y			TBD			
	Red	X			TBD			
		Y			TBD			
	Green	X			TBD			
		Y			TBD			
	Blue	X			TBD			
		Y			TBD			

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).
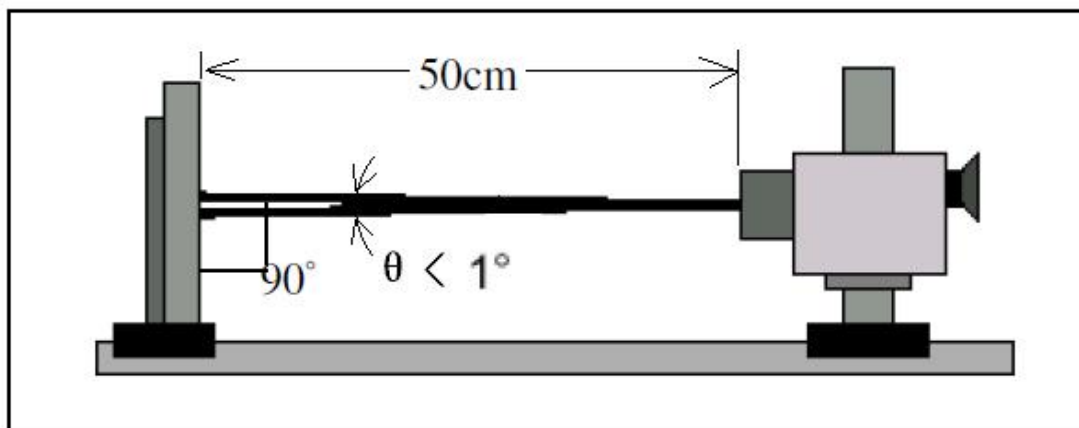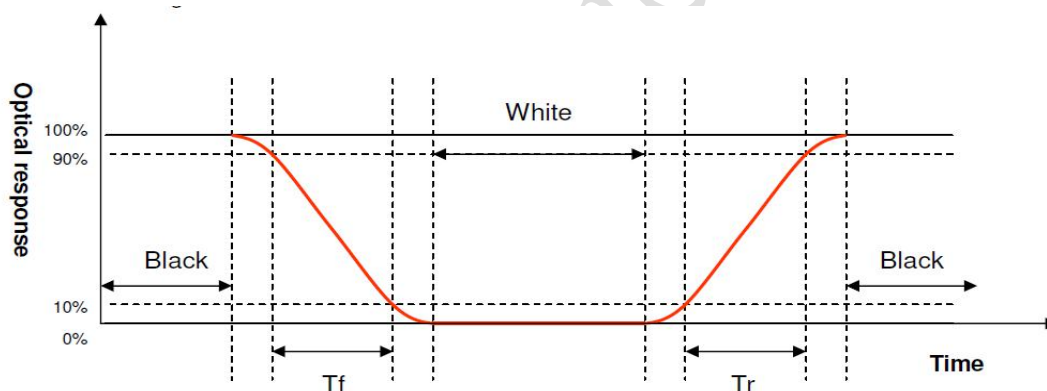
Note 4: Definition of response time:

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.
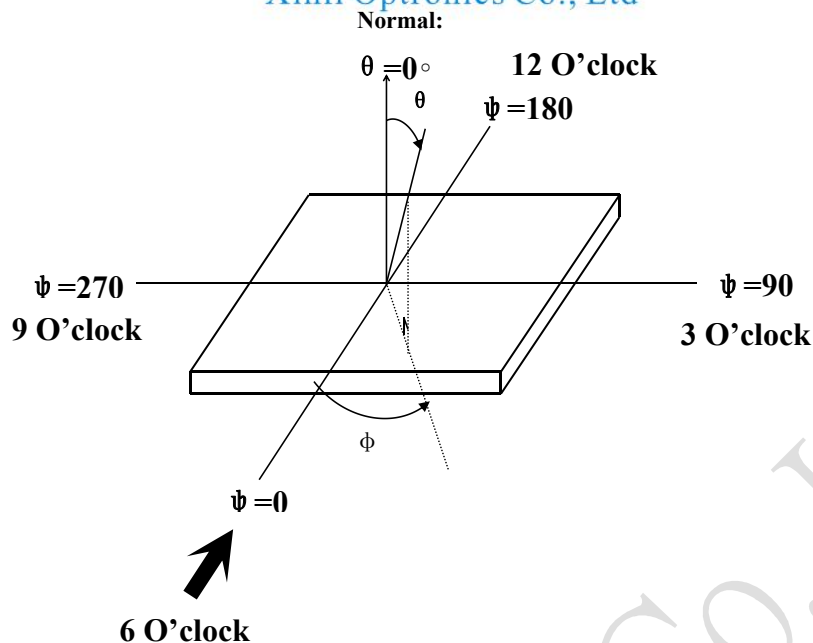
Refer to figure as below.

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 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.

Normal:

$\theta =0°$ **12 O'clock**

θ

$\psi =180$

$\psi =270$

9 O'clock

$\psi =90$

3 O'clock

ϕ

$\psi =0$

6 O'clock

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

H

A

A

B

P1

P2

V

P5

B

P4

P3
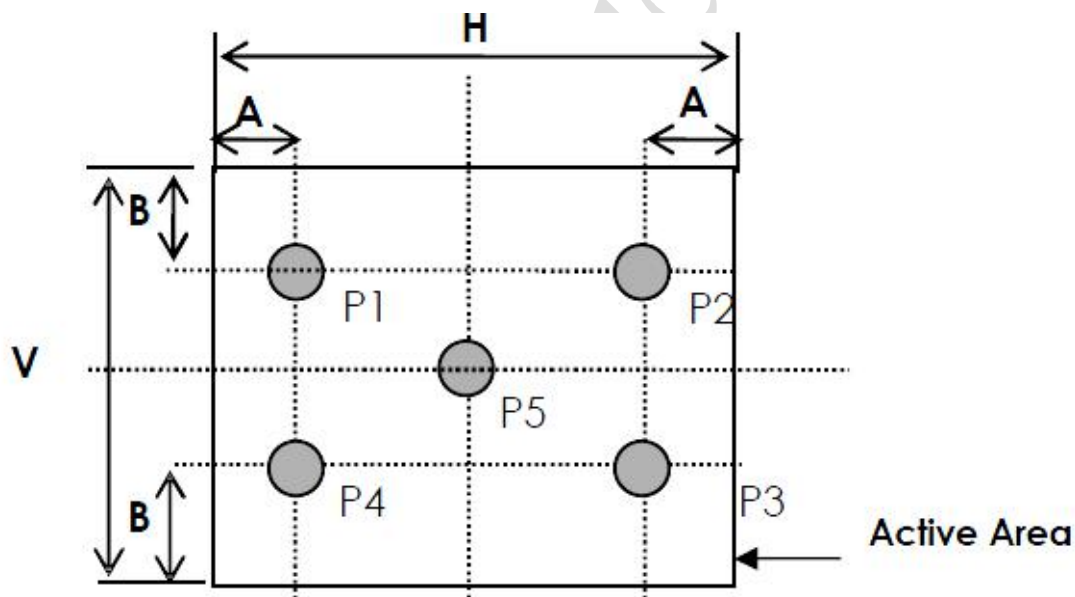
Active Area

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 (P5)

13．Reliability Test

This standard reliability test is done only for the first lot of MP products.

Customer and supplier must hold a discussion if other reliability test is requested

by customer.

If there is any abnormality, the normal temperature and humidity recovery 2 hours after

the display is OK, the result is judged as OK.

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 operation	Endurance test applying the high temperature and high humidity storage for a long time	50℃,90% RH, 96H
6	Temperature Cycle (Non operation)	Endurance test applying the low and high temperature cycle -20℃← →70℃ 60min← →60min ←————————→ 20 cycle	-20℃/70℃, 20 cycles
7	ESD Test	To check the product operating capability after electrostatic environment.	Air: ± 4KV 150pF/330 Ω 5 times Contact: ± 2KV 150pF/330 Ω 5 times
8	Packing vibration	Frequency range: 10Hz~50Hz Acceleration of gravity:5G X,Y,Z 30 min for each direction	
9	Drop Test	Height 80 cm, 1 comer, 3 edges, 6 surfaces	

14. 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 moisten 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 immediately.

(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 environmental 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 between 10°C and 35°C, and humidity below 85%RH. Please maintain within 72 hours of accumulated length of storage time, with conditions of 60°C and room humidity of 90%RH.

(3)That keeps the LCD modules stored in the container shipped from supplier before 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.

15.Package Specification

TBD.