SPECIFICATION

PRODUCT NO. : **TCXD062AWLGA-2**
VERSION : **Ver 1.1**
ISSUED DATE : **2021-8-3**

This module uses ROHS material

FOR CUSTOMER：

□：APPROVAL FOR SPECIFICATION
■：APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optronics ：

Presented by	Reviewed by	Organized by

Note:

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

1. Revision Recode

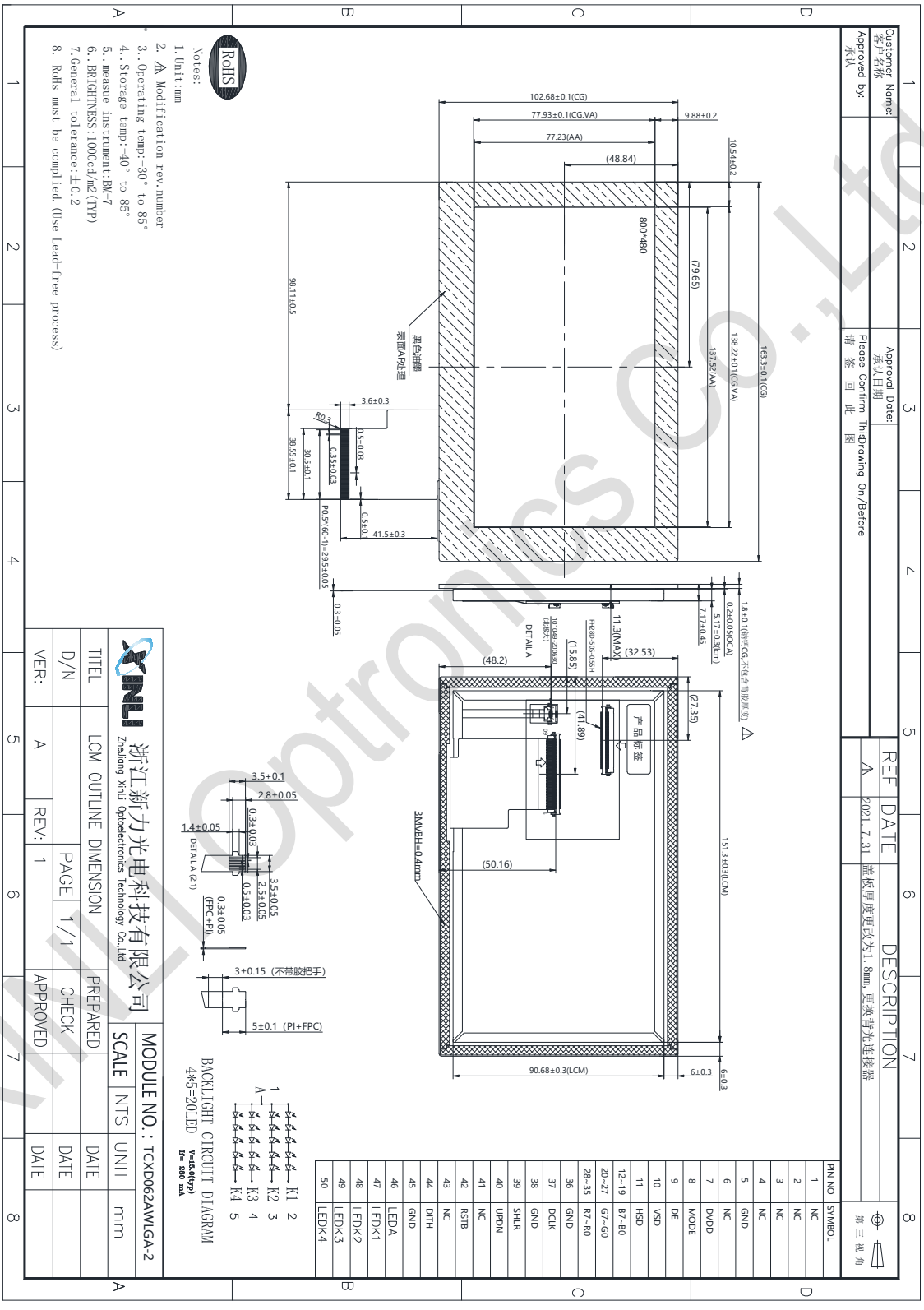
Revision	Description	Date
1.0	Initial Release	2021/7/10
1.1	Update structure	2021/08/03

2. General Description and Features

The 6.2 inch Module named TCXD062AWLGA-2 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC, FPC ,Touch panel and Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outline	163.3 x 102.68 x 7.17	mm
(2)	LCD Active area	137.52 x 77.232	mm
(3)	Dot Number	800 x 3(RGB) x 480	/
(4)	Dot size	0.1719 (H) x 0.1609(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	6	O'clock
(8)	Power Supply	3.3(TYP)	V
(9)	Interface	FPC 0. 5mm_Pitch 60pin	/
(10)	Interface type	RGB interface(24 Bit)	/
(11)	Module weight	TBD	g
(12)	Display mode	Normally white	/

3. Mechanical Dimension



4. Interface Pin Connection

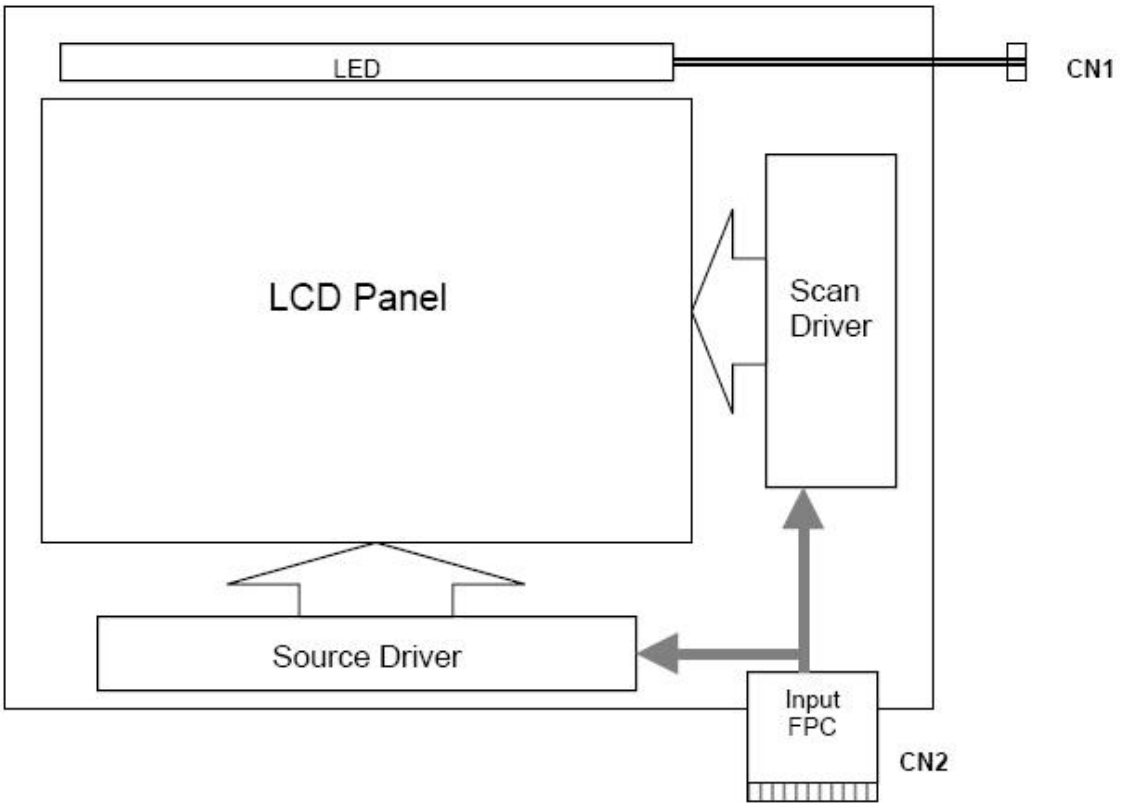
4.1 LCM Pin definition

FPC Connector is used for the module electronics interface. The recommended model is FH28D-50S-0.5SH manufactured by Hirose.

No.	Symbol	Description
1	NC	Not connect.
2	NC	Not connect.
3	NC	Not connect.
4	NC	Not connect.
5	GND	Digital ground
6	NC	Not connect.
7	VCC	Digital power
8	MODE	DE/SYNC mode selece.Normally pull high. H:DE mode L:HSD/VSD mode
9	DE	Data enable signal.
10	VSD	Vertical sync input.Negative polarity.
11	HSD	Horizontal sync input.Negative polarity.
12	B7	Data input(MSB)
13	B6	Data input
14	B5	Data input
15	B4	Data input
16	B3	Data input
17	B2	Data input
18	B1	Data input
19	B0	Data input(LSB)
20	G7	Data input(MSB)
21	G6	Data input
22	G5	Data input
23	G4	Data input
24	G3	Data input
25	G2	Data input
26	G1	Data input
27	G0	Data input(LSB)
28	R7	Data input(MSB)
29	R6	Data input

30	R5	Data input
31	R4	Data input
32	R3	Data input
33	R2	Data input
34	R1	Data input
35	R0	Data input(LSB)
36	GND	Digital ground
37	DCLK	Clock input.
38	GND	Digital ground
39	SHLR	Source right or left sequence control. SHLR=L,shift left:last data=S1←S2…S1200=first data SHLR=H,shift right: first data =S1→S2…S1200= last data
40	UPDN	Shift up or down control. UPDN=H,up shift:STDV(input)→G1~G480→STDV(output) UPDN=L,down shift:STDV(input) → G480~ G1 → STDV(output)
41	NC	Not connect.
42	RSTB	Global reset pin.Active low to enter reset state.Suggest to connecting with an RC reset circuit for stability.Normally pull high.
43	STBYB	Standby mode, normally pull high STBYB="1",normal operation STBYB="0",timming control , source driver will turn off ,all output are high-Z
44	DITH	Dithering setting DITH=H:6 bit resolution(last 2 bits of input data truncated) DITH=L: 8 bit resolution(default setting)
45	NC	Not connect.
46	LEDA	LED power supply(high voltage)
47	LEDK1	LED power supply(low voltage)
48	LEDK2	LED power supply(low voltage)
49	LEDK3	LED power supply(low voltage)
50	LEDK4	LED power supply(low voltage)

5. Block Diagram



6. Maximum Rating

Item	Symbol	Min.	Max.	Unit	Conditions
Power Supply Voltage	V_{CC}	-0.3	5	V	GND=0
	V_{GH}	0.3	40	V	GND=0
	V_{GL}	-20	0.3	V	GND=0
	AV_{DD}	0.5	15	V	GND=0
	V_{COM}	0	5	V	-
Logic Signal Input Level	V_I	-0.5	5	V	TTL signals

Note A. Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

B. Ta=25±2℃

Table 2 Reliability Absolute Rating

Item	Symbol	Min.	Max.	Unit	Conditions
Operating Temperature	TOP	-30	85	deg. C	-
Storage Temperature	TST	-40	85	deg. C	-

Note: There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

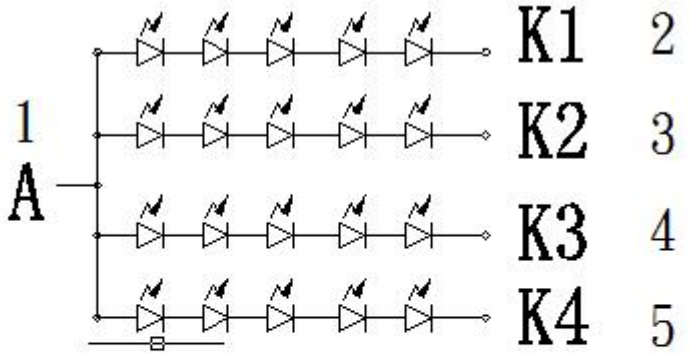
7. Electrical Characteristics

Typical operation conditions

Item	Symbol	Min.	Typ	Max.	Unit	Note
Supply Voltage	V CC	3.0	3.3	3.6	V	
Input signal voltage	V IH	0.7 VCC	-	VCC	V	
Input signal voltage	V IL	0	-	0.3VCC	V	

8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	14	15	16	V	IF=280mA
Number of LED	-	20			pcs	-
Power Consumption	PWF	-	4200	-	mW	-
LED life-span	-	-	(25000)	-	Hrs	-



BACKLIGHT CIRCUIT DIAGRAM

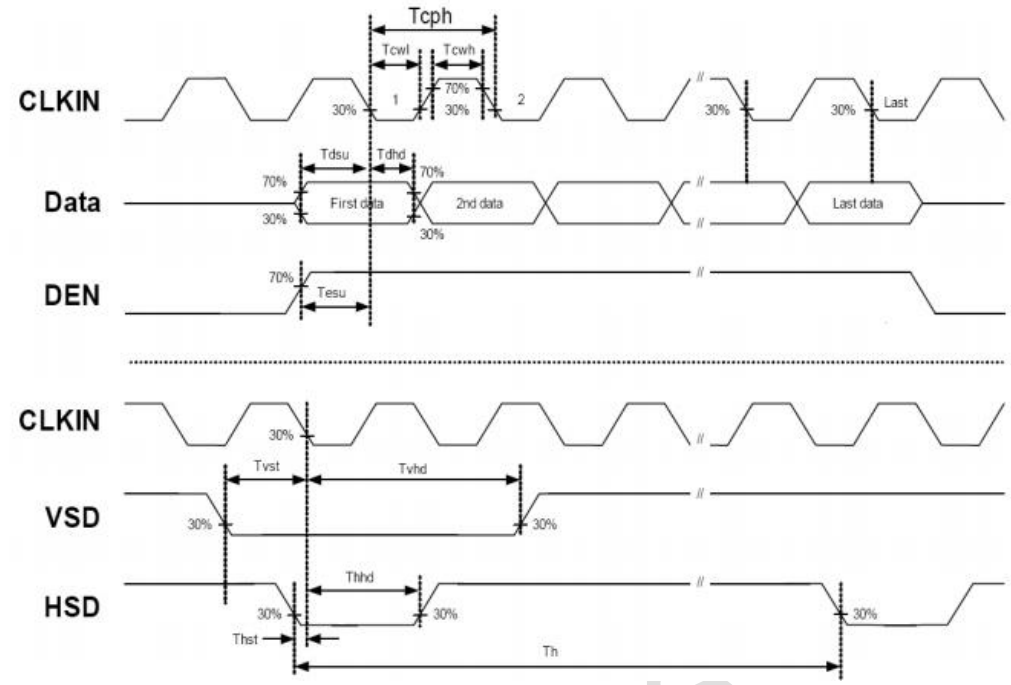
4*5=20LED V=15.0(typ)
If= 280 mA

9. Timing Characteristics

9.1.Timing Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	20	-	-	ns	-
DCLK frequency	fclk	-	30	40	MHZ	-
DCLK pulse duty	Tcwh	40	50	60	%	-
VSD setup time	Tvst	8	-	-	ns	-
VSD hold time	Tvhd	8	-	-	ns	-
HSD setup time	Thst	8	-	-	ns	-
HSD hold time	Thhd	8	-	-	ns	-
Data setup time	Tdsu	8	-	-	ns	-
Data hold time	Tdhd	8	-	-	ns	-
DE setup time	Tesu	8	-	-	ns	-
DE hold time	Tehd	8	-	-	ns	-
Horizontai dispiay area	Thd	-	800	-	Tcph	-
HSD period time	Th	908	928	1170	Tcph	-
HSD pulse width	Thpw	1	48	87	Tcph	Thpw+Thb=88Tcph is fixed
HSD back porch	Thb	-	40	-	Tcph	
HSD front porch	Thfp	20	40	282	Tcph	-
Vertical display area	Tvd	-	480	-	Th	-
VSD period time	Tv	517	598	712	Th	-
VSD pulse width	Tvpw	1	1	3	Th	Tvpw+Tvb=32H is fixed
VSD back porch	Tvb	-	31	-	Th	
VSD front porch	Tvfp	5	86	200	Th	-

9.2.Timing Diagram of Interface Signal



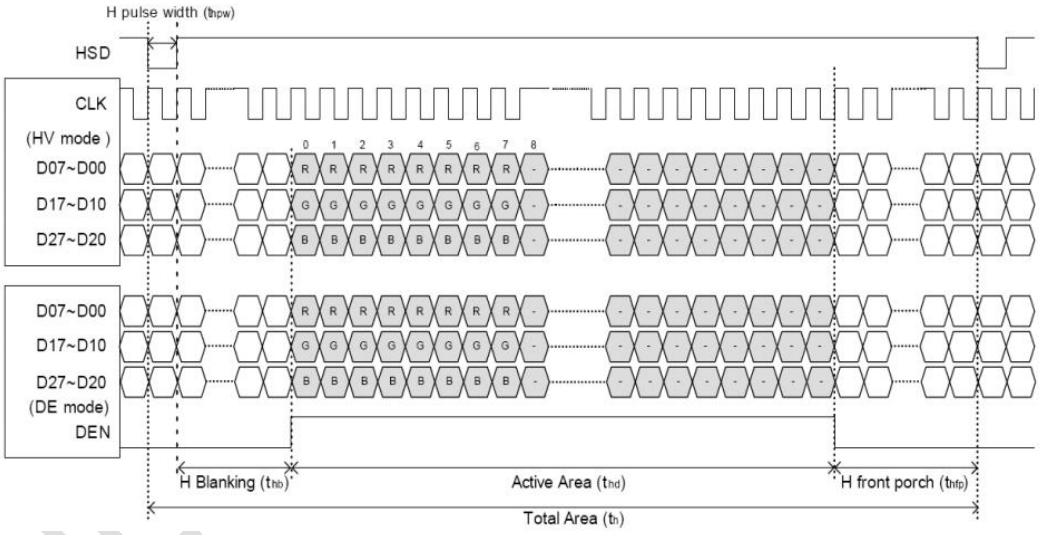
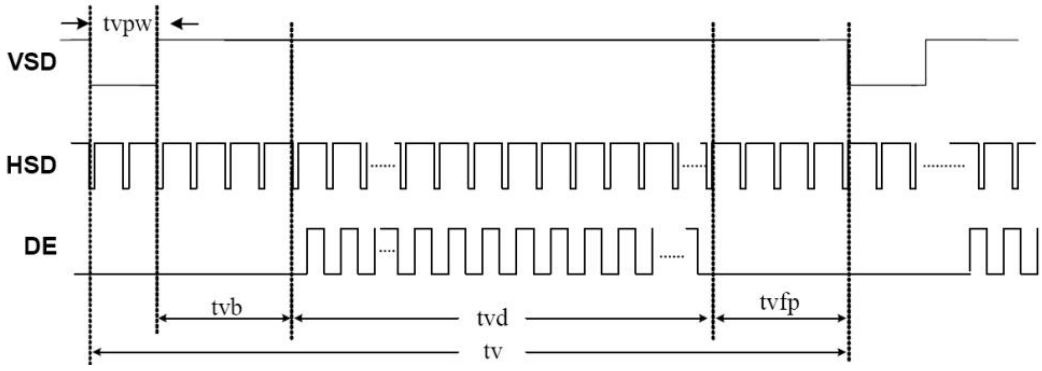


Figure 8 Vertical timing



Normal mode power **on/ off**

VDD power on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.

Figure 10 Power Sequence

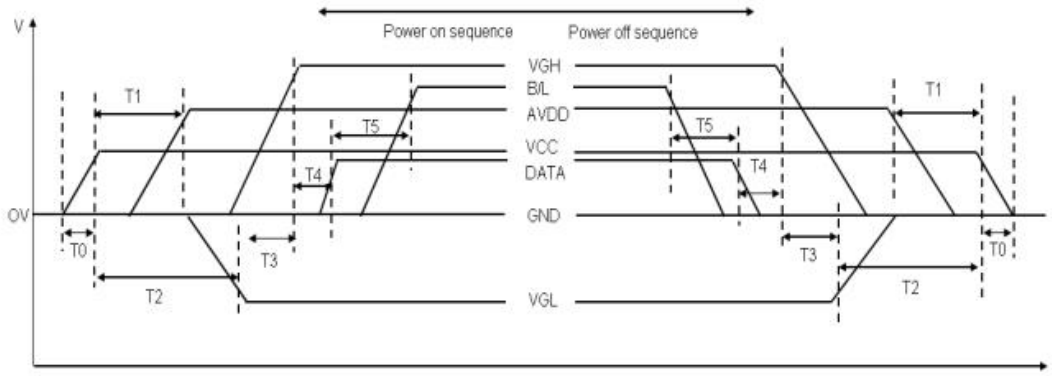


Table 10 Power Sequencing Requirements

Item	Min.	Typ.	Max.	Unit
T0	0.5	-	20	[ms]
T1	16	-	-	[ms]
T2	20	-	-	[ms]
T3	10	-	-	[ms]
T4	10	-	50	[ms]
T5	50	-	-	[ms]

Note:

A、Power On Sequence: VCC-> AVDD -> VGL -> VGH -> Data -> B/L

B、Power Off Sequence: B/L-> Data -> VGH -> VGL -> AVDD -> VCC

10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

Please consult our technical department for detail information.

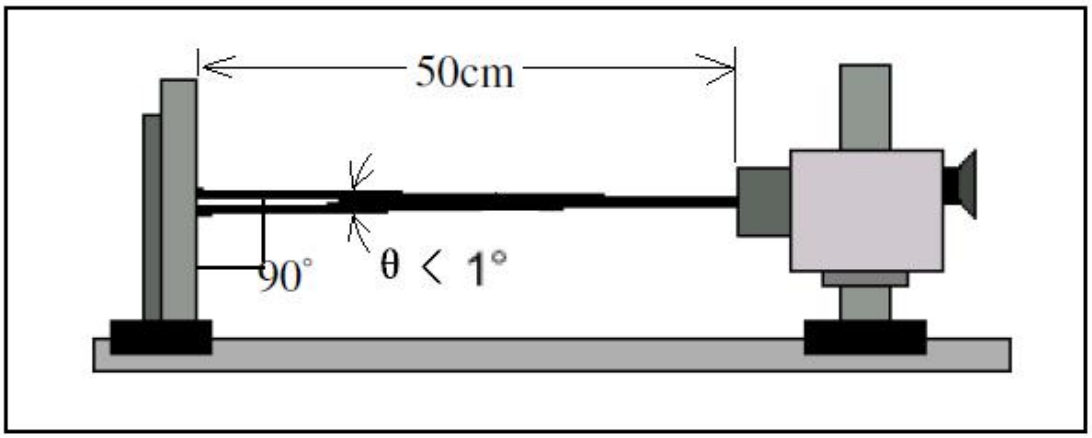
12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr	θ =0° ∅=0° Ta=25℃	-	14	-	ms	4
		Tf		-	26	-	ms	
Contrast ratio		Cr		480	600	-	-	3 ,5
Surface Luminance		Lv		800	1000	-	-	3 ,7
Viewing angle range		θ	∅ = 90°	65	(75)	-	deg	6
			∅ = 270°	65	(75)	-	deg	
			∅ = 0°	60	(70)	-	deg	
			∅ = 180°	60	(70)	-	deg	
Color filter chromaticity (x, y)	White	X	θ = ϕ = 0°	TBD	TBD	TBD		7
		Y		TBD	TBD	TBD		
	Red	X	θ = ϕ = 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Green	X	θ = ϕ = 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Blue	X	θ = ϕ = 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		

Note 1: Ambient temperature=25℃±2℃

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

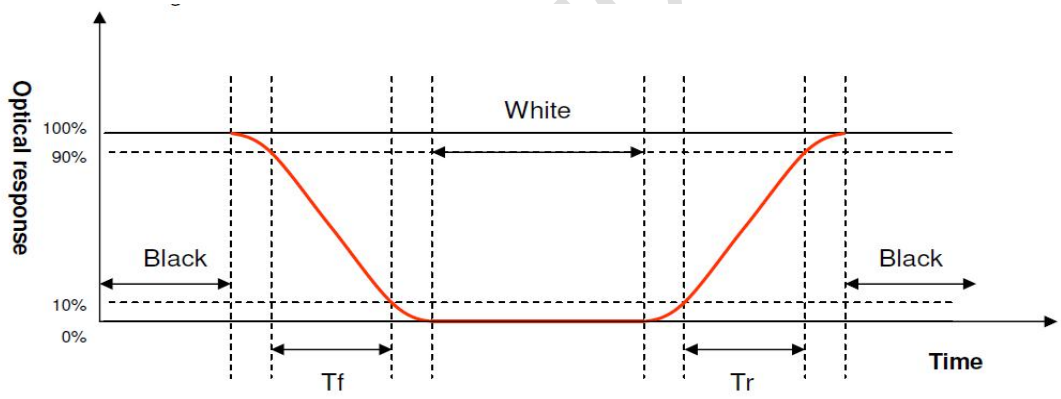
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



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.



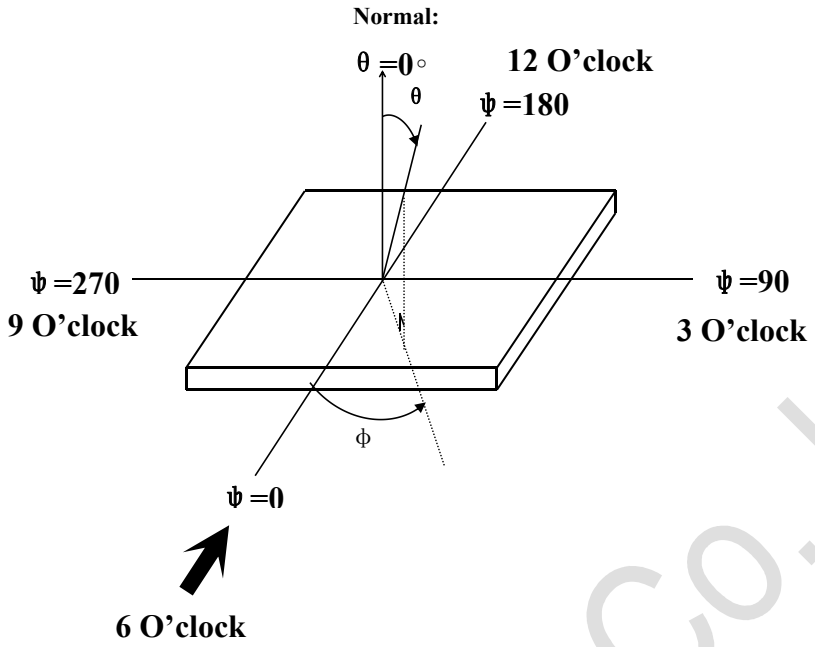
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

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

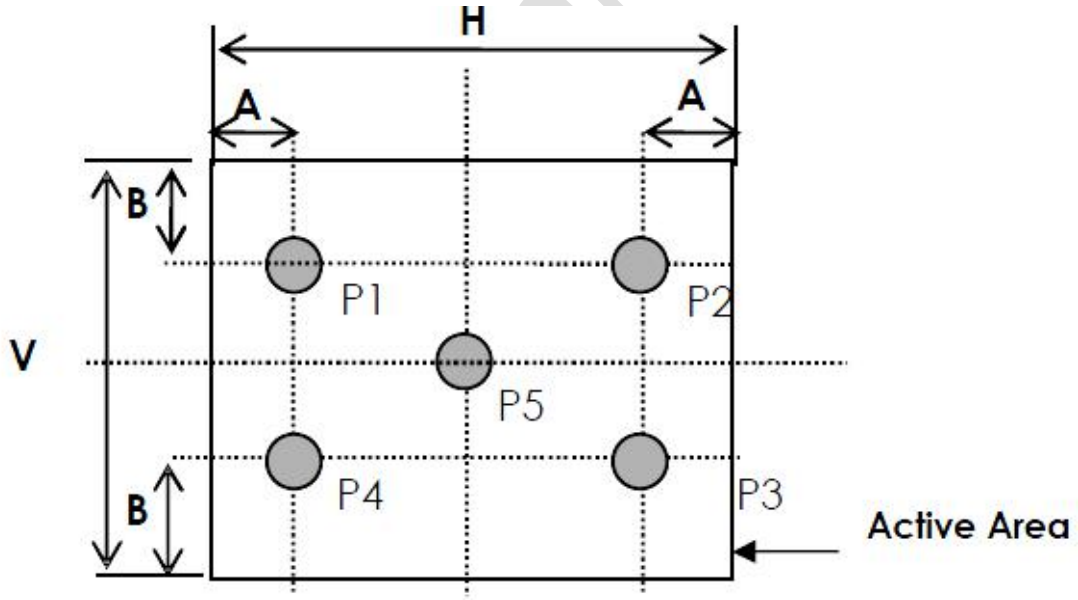
Note 6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. 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. Inspection Specification

TBD

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	85℃,500 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-40℃,500H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	85℃,500H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-30℃,500H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 500H
6	Temperature Cycle (Non operation)	Endurance test applying the low and high temperature cycle -30℃← →25℃ ← →85℃ 30min←→5min←→30min ◄——————————► one cycle	-30℃/85℃, 200 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