

SPECIFICATION

PRODUCT NO. : TCXD070IBLMT-820

VERSION : Ver 1.1

ISSUED DATE : 2022-03-10

This module uses ROHS material

FOR CUSTOMER: _____

: APPROVAL FOR SPECIFICATION

: APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optoelectronics :

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2. General Description and Features

The 7.0 inch Module named TCXD070IBLMT-820 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, one Driver IC, one FPC and one Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outsize	191.50 x 137.00 x 10.85(含 CTP)	mm
(2)	LCD Active area	154.21 x 85.92	mm
(3)	Dot Number	1024 x 3(RGB) x 600	/
(4)	Dot size	0.1506(W)x 0.1432(H)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	ALL	O'clock
(8)	Backlight Type	30-chip LED	/
(9)	Power Supply	3.3 (TYP)	V
(10)	Interface	FPC 0.5mm_Pitch 50 pin	/
(11)	Interface type	LVDS	/
(12)	Surface Treatment	Anti-glare	/
(13)	Module weight	TBD	g

4. Interface Pin Connection

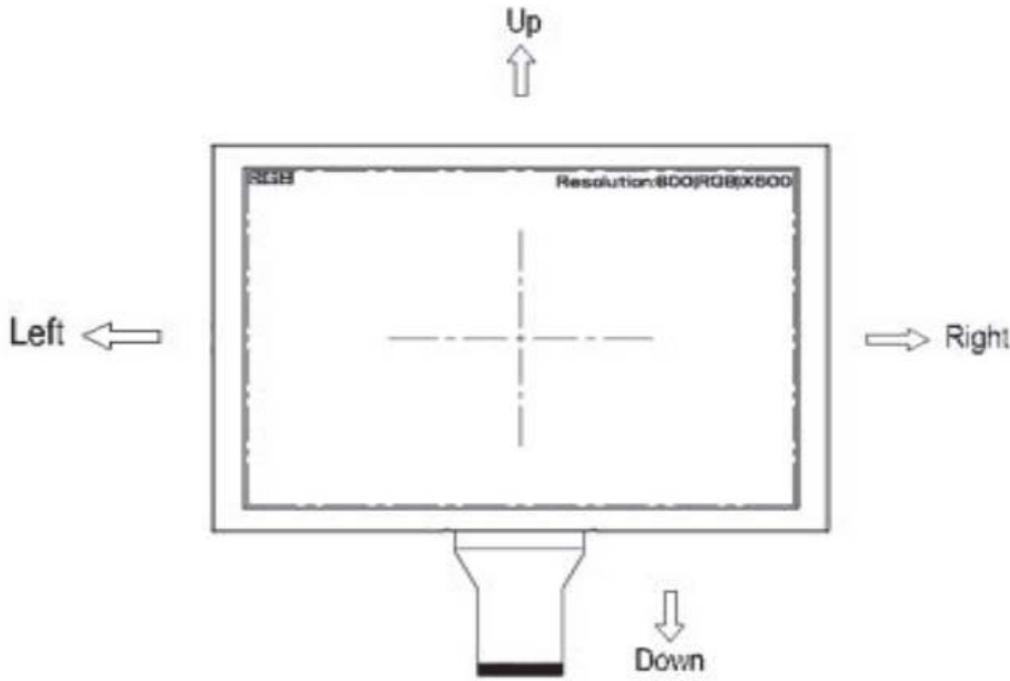
N O	Symbol	Level	Description
1	NC	-	Not connect
2	VDD	P	Power supply
3	VDD	P	Power supply
4	NC	-	Not connect
5	RESET	I	Global reset pin. Active Low.
6	STBYB	I	Standby mode control. Active Low.
7	GND	p	Power ground
8	RxIN0-	I	Negative LVDS differential data input
9	RxIN0+	I	Positive LVDS differential data input
10	GND	p	Power ground
11	RxIN1-	I	Negative LVDS differential data input
12	RxIN1+	I	Positive LVDS differential data input
13	GND	p	Power ground
14	RxIN2-	I	Negative LVDS differential data input
15	RxIN2+	I	Positive LVDS differential data input
16	GND	p	Power ground
17	RXCLKIN-	I	- LVDS differential clock input
18	RXCLKIN+	I	+ LVDS differential clock input
19	GND	p	Power ground
20	RxIN3-	I	Negative LVDS differential data input
21	RxIN3+	I	Positive LVDS differential data input
22	GND	p	Power ground
23	NC	-	Not connect
24	NC	-	Not connect
25	GND	p	Power ground
26	NC	-	Not connect
27	NC	-	Not connect
28	SELB	I	6bit/8bit mode selection. If LVDS input data is 6 bits, SELB must be set to High; If LVDS input data is 8 bits, SELB must be set to Low.
29	NC	-	Not connect

30	GND	p	Power ground
31	LEDK	P	Backlight ground
32	LEDK	P	Backlight ground
33	LR	I	Source Right or Left sequence control. Normally pull high. See note 1 and 2
34	UD	I	Gate Up or Down scan control. Normally pull low. See note 1 and 2
35	ID1	O	LCD_ID. Resistor 1K Ohm to GND.
36	NC	-	Not connect
37	NC	-	Not connect
38	NC	-	Not connect
39	LEDA	p	Backlight anode
40	LEDA	p	Backlight anode

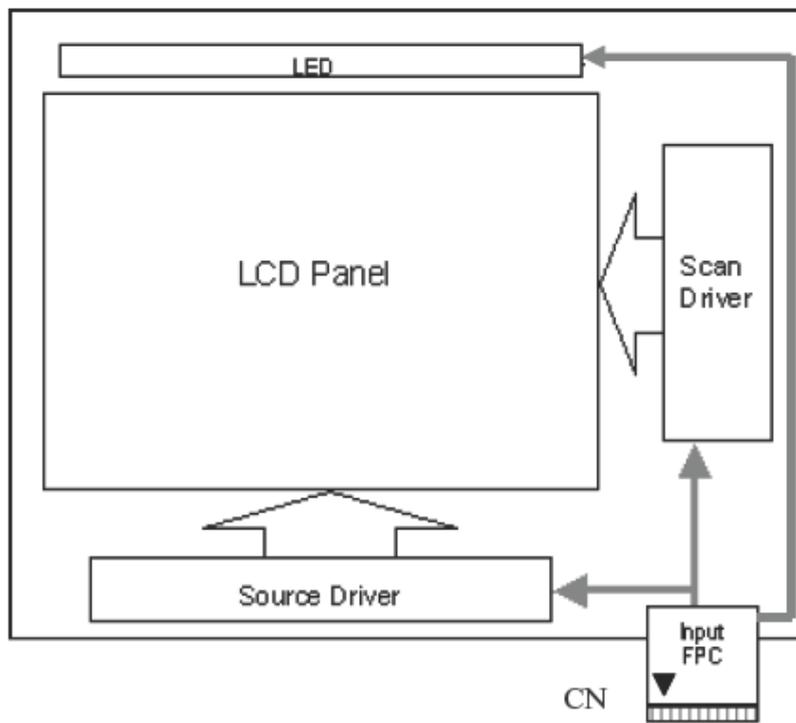
Note 1: Selection of scanning mod

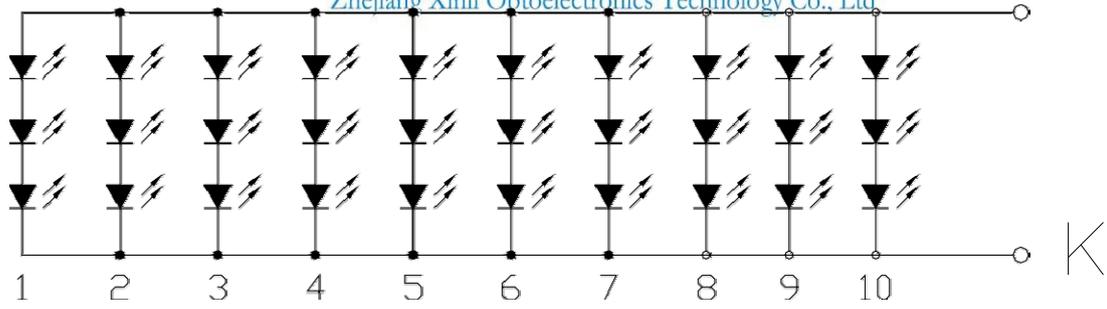
Setting of scan control input		Scanning direction
UD	LR	
GND	VDD	UP to down , left to right
VDD	GND	Down to up , right to left
GND	GND	UP to down , right to left
VDD	VDD	Down to up , left to right

Note 2: Definition of scanning direction.Refer to the figure as below:



5. Block Diagram





LED Circuitry

6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	°C
Storage temperature	Tst	-30 to 80	°C
Power Voltage1	VDD	-0.5~3.96	V
Power Voltage2	AVDD	-0.5~14.85	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

Item	Symbol	Min.	Typ.	Max.	Unit	
Power Voltage1	VDD	3.0	3.3	3.6	V	
Power Voltage2	AVDD	8.9	9.0	9.1	V	
TFT Gate ON voltage	VGH	17	18	19	V	
TFT Gate OFF voltage	VGL	-6.5	-6.0	-5.5	V	
TFT Common voltage	VCOM	3.0	3.15	3.3	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}	VDD-0.4	-	-	V
	L level	V _{OL}	-	-	GND+0.4	V

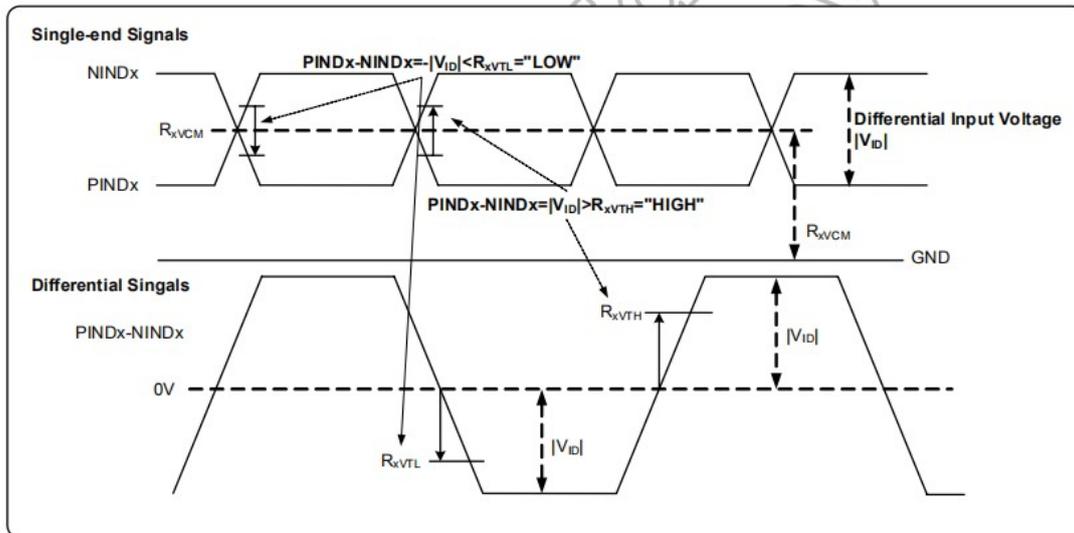
8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	V _f	8.4	9.6	10.8	V	If=350mA
Number of LED	-	30			pcs	
Power Consumption	PWF	-	3360	-	mW	-
LED life-span	-	-	50000	-	Hrs	-

9. Timing Characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
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	$R_{V_{XIZ}}$	-10	-	+10	μA	-
LVDS Digital Operating Current	Iddlvs	-	15	30	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvs	-	10	50	μA	Clock & all Functions are stopped

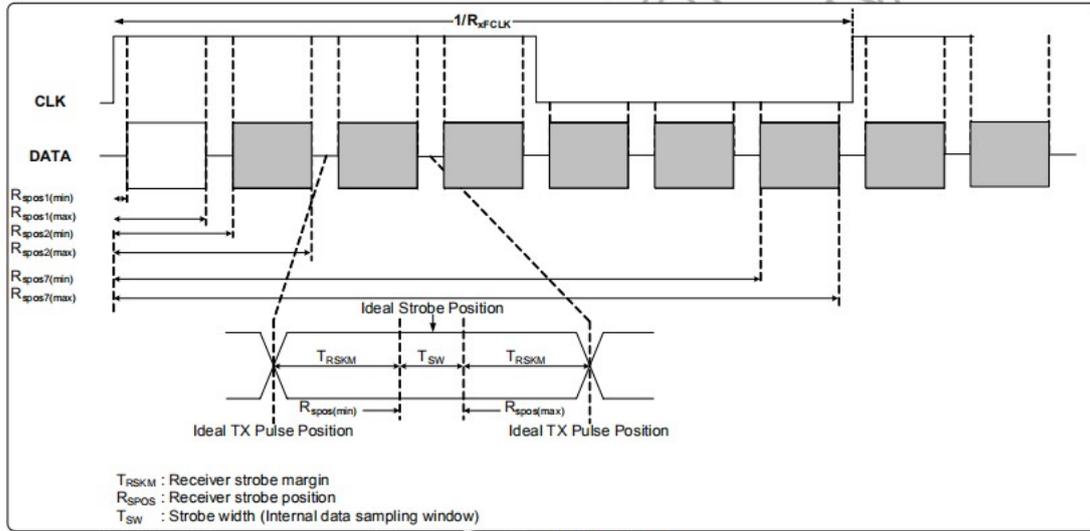
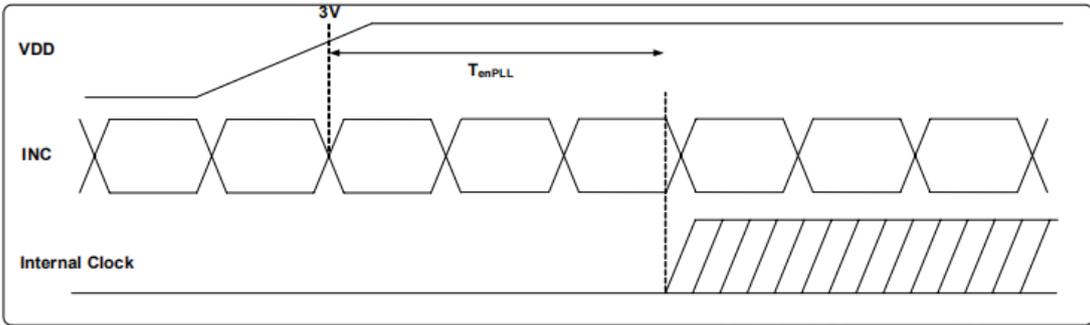
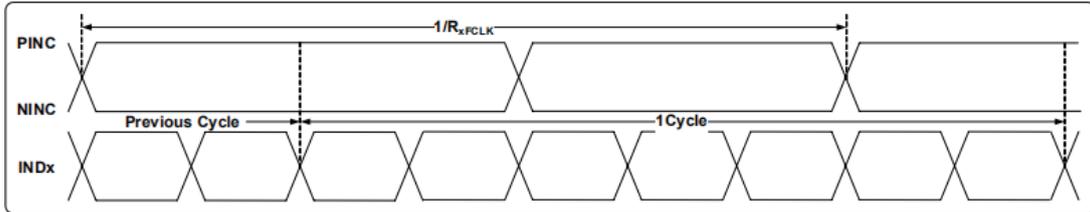
LVDS mode DC electrical characteristics



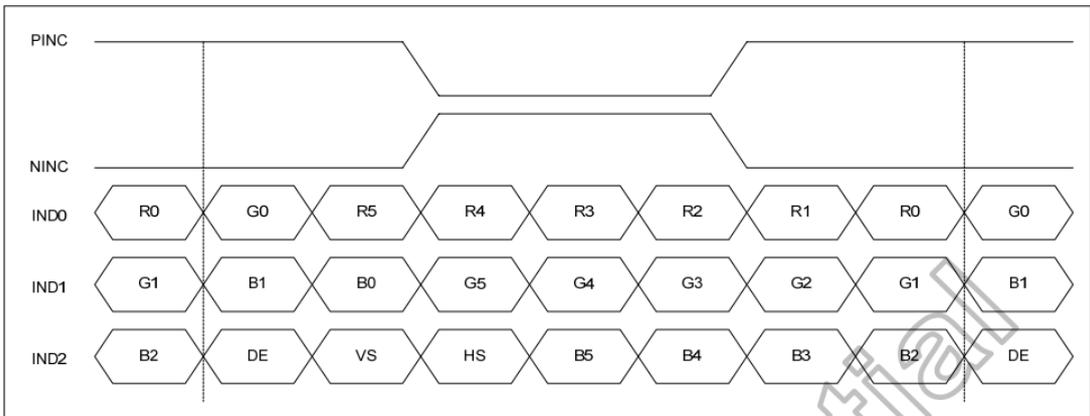
Single-end signals

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	$ V_{ID} =400mV$ $R_{XVCM}=1.2V$ $R_{XFCLK}=71MHz$
Clock high time	T_{LVCH}	-	$4/(7 * R_{XFCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7 * R_{XFCLK})$	-	ns	-
PLL wake-up time	T_{emPLL}	-	-	150	μs	-

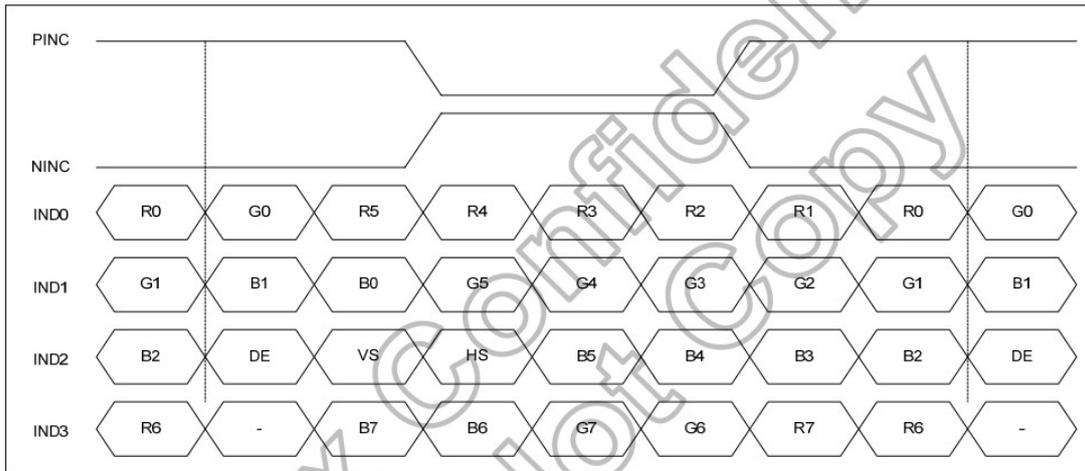
LVDS mode AC electrical characteristics



LVDS figure



6-bit LVDS input



8-bit LVDS Input

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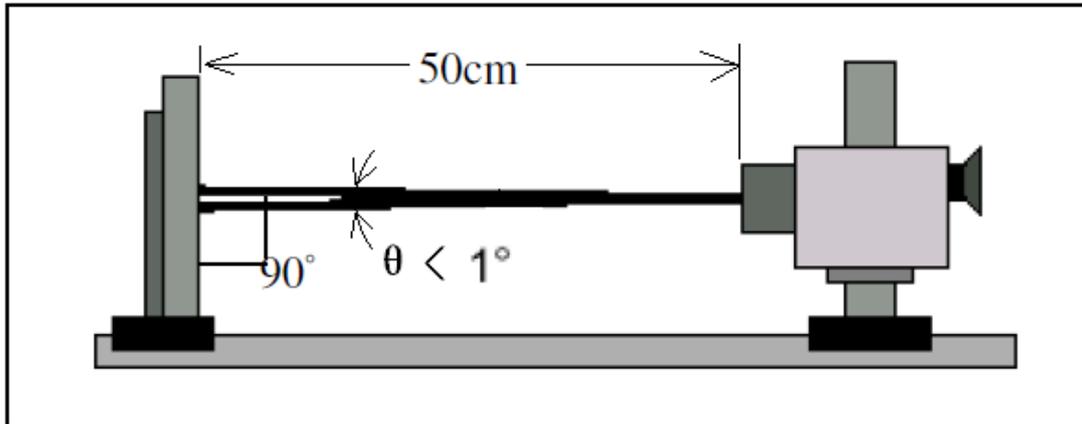
10. Electro-Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Transmission	T		-	3.93	-	%	
Response time	Tr	$\theta = 0^\circ$	-	4	-	ms	4
	Tf	$\phi = 0^\circ$	-	12	-	ms	
Uniformity (Five point)	δ	Ta=25°C	75	-	-	%	7
	WHITE						
Contrast ratio	Cr		600	800	-	-	3,5
Surface Luminance (Center point)	Lv		800	1000	-	-	3,7
Viewing angle range	θ	$\phi = 90^\circ$	80	85	-	deg	6
		$\phi = 270^\circ$	80	85	-	deg	
		$\phi = 0^\circ$	80	85	-	deg	
		$\phi = 180^\circ$	80	85	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD	7
		Y		TBD	TBD	TBD	
	Red	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD	
		Y		TBD	TBD	TBD	
	Green	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD	
		Y		TBD	TBD	TBD	
	Blue	X	$\theta = \phi = 0^\circ$	TBD	TBD	TBD	
		Y		TBD	TBD	TBD	

Note 1: Ambient temperature=25°C±2°C

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

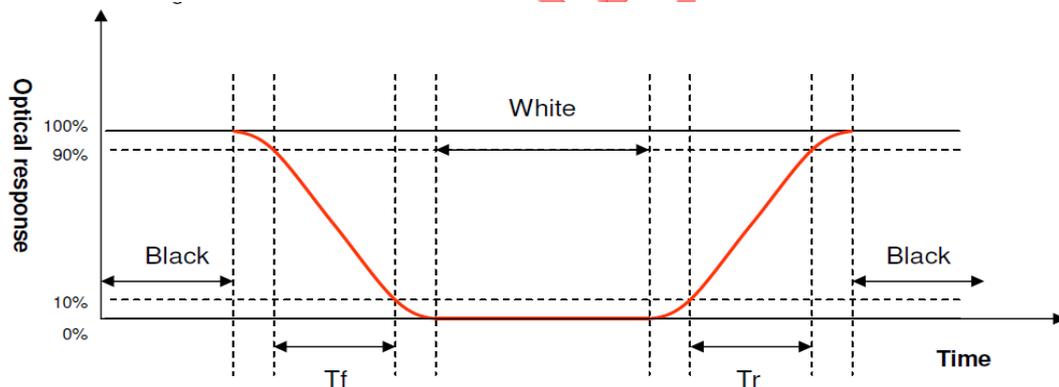
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



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.



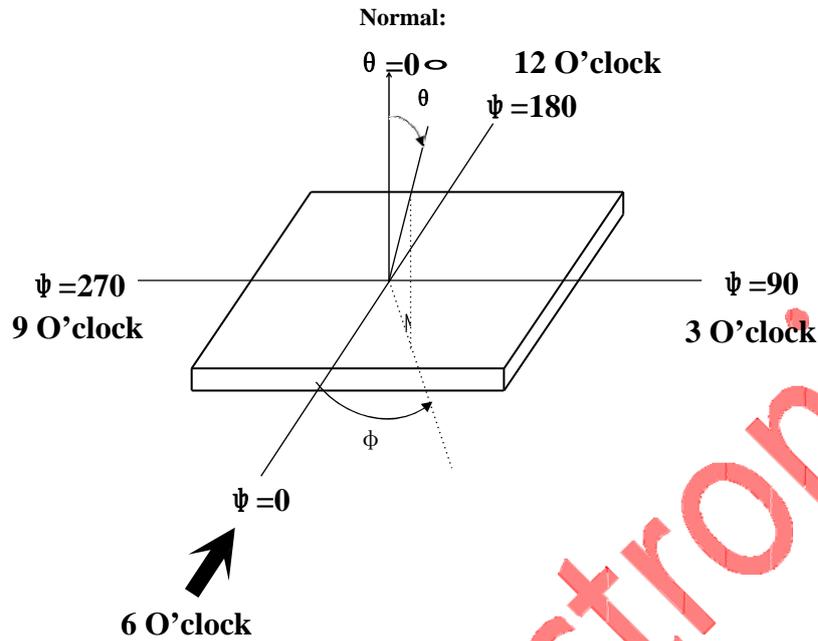
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

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

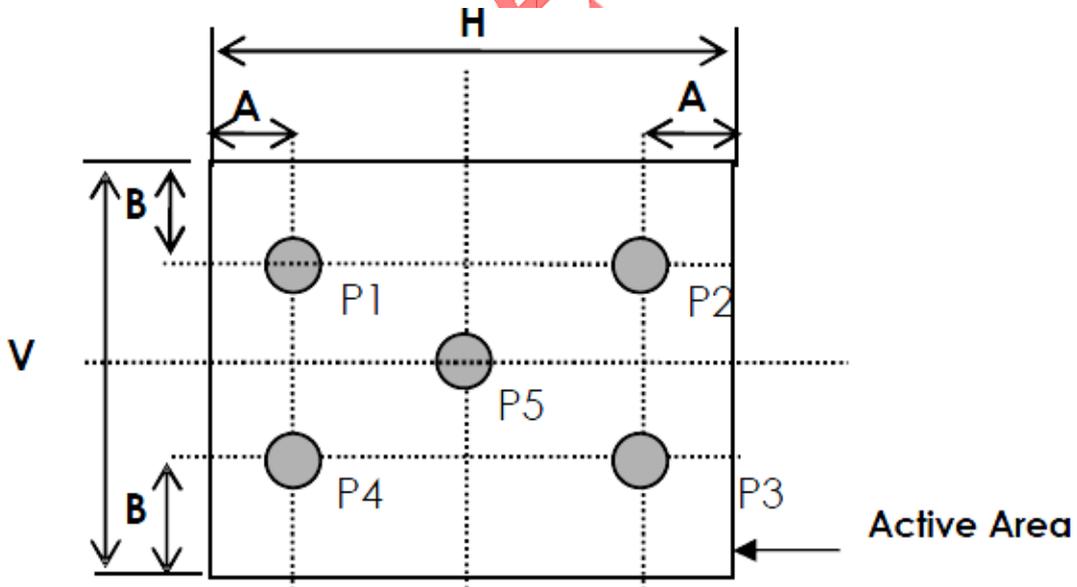
Note 6. Definition of viewing angle

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

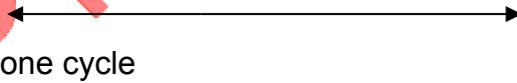
Light spot size $\varnothing=7\text{mm}$, 500mm distance from the LCD surface to detector lens
measurement instrument is TOPCON's luminance meter BM-7A

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

L_v = Surface Luminance with P5

11. 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.

NO.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80°C, 240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30°C, 240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70°C, 240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20°C, 240H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60°C, 90% RH, 240H
6	Temperature Cycle (Non operation)	Endurance test applying the low and high temperature cycle $-20^{\circ}\text{C} \leftarrow \rightarrow 25^{\circ}\text{C} \leftarrow \rightarrow 70^{\circ}\text{C}$ $30\text{min} \leftarrow \rightarrow 5\text{min} \leftarrow \rightarrow 30\text{min}$  one cycle	-20°C/70°C, 10 cycles
7	Vibration	Sine Wave 1.5G, 5~500Hz, XYZ 30min/each direction	30min/each direction

12. 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 handling 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 at between 10°C and 35 °C and at normal humidity. Avoid high temperature, high humidity or temperature below 0°C.
- (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.

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13. Package Specification

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