

SPECIFICATION

PRODUCT NO. : TCXD070AWLMT-209-ARE

VERSION : Ver 1.6

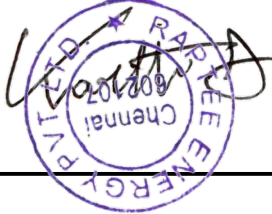
ISSUED DATE : 2024-2-27

This module uses ROHS material

FOR CUSTOMER: Amax Technologies

: APPROVAL FOR SPECIFICATION

: APPROVAL FOR SAMPLE

DATE	APPROVED BY
10/APR/2024	

Xinli Optoelectronics :

Presented by	Reviewed by	Organized by
		

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1. Revision Recode

Revision	Description	Date
1.0	Initial Release	2022/7/14
1.1	Change module brightness	2022/7/19
1.2	The cover surface is coated with AG and anti-UV ink	2023/8/21
1.3	Modify cover plate dimensions	2023/9/23
	Add positioning column to lower iron frame	
	Name the upgrade	
1.4	Modify the cover thickness	2023/10/08
	Increase the size of the control	
1.5	Positioning column profile optimization	2023/10/20
	Optimized cover-to-edge dimensions	
1.6	Drawings are updated	2024/2/27

2. General Description and Features

2.1 LCM

The 7.0 inch Module named TCXD070AWLMT-209-ARE is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC ,one FPC, one Touch Panel and one Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outsize	165(H)*100(V)*5.7(T)	mm
(2)	LCD Active area	154.08(H)*85.92(V)	mm
(3)	Dot Number	800*3(RGB)*480	/
(4)	Dot size	0.0642(H)*0.1790(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16M	/
(7)	Viewing direction	6 (Gray inversion)	O'clock
(8)	Backlight Type	24-chip	/
(9)	Power Supply	3.3(TYP)	V
(10)	Interface type	RGB interface	/
(11)	Module weight	TBD	G
(12)	With /Without TSP	With CTP	/

2.2 CTP

NO	Item	Contents	Unit
(1)	Outline Dimension	201.52(H)*116.02(V)*3.9(T)	mm
(2)	Active Area	156.08(H)*87.92(V)	mm
(3)	Viewing Area	155.08(H)*86.92(V)	mm
(4)	Interface Type	IIC	/
(5)	Structure Type	G+G	/
(6)	IC Type	ILI2130	/
(7)	IC Working Voltage	2.8-3.3	V
(8)	Transparency	≥86%	/
(9)	Reflectivity	≤14%	/
(10)	Haze	≤5%	/
(11)	Hardness	7H	/

3.Mechanical Dimension

A	B	C	D	E	F	G	H	I	J																																																																																	
第三视角		车载产品				优化盖板到边尺寸																																																																																				
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4.Interface Pin Connection

4.1 LCD Interface.

FPC Connector is used for the module electronics interface. The recommended model is FH28-40S-0.5SH manufactured by Hirose.

NO	Symbol	Level	Description
1	NC	-	Not connect.
2	NC	-	Not connect.
3	GND	P	Ground.
4	VDD	P	Power supply for digital circuits.
5	R0	I	Red Data input.
6	R1	I	
7	R2	I	
8	R3	I	
9	R4	I	
10	R5	I	
11	R6	I	
12	R7	I	
13	G0	I	Green Data input.
14	G1	I	
15	G2	I	
16	G3	I	
17	G4	I	
18	G5	I	
19	G6	I	
20	G7	I	
21	B0	I	Blue Data input.
22	B1	I	
23	B2	I	
24	B3	I	
25	B4	I	
26	B5	I	
27	B6	I	
28	B7	I	

29	GND	P	Ground.
30	DCLK	I	Clock for input data.
31	DISP	I	Standby mode control. (Normally pull high) DISP="L", enter standby mode for power saving. Timing controller and source driver will turn off, all outputs are Hi-Z. DISP="H", normal operation
32	HSYNC	I	Horizontal sync input in digital parallel RGB. Negative polarity.
33	VSYNC	I	Vertical sync input in digital parallel RGB. Negative polarity.
34	DEN	I	Input data enable control. When DE mode, active High to enable data input.(Normally pull low)
35	NC	-	Not connect.
36	GND	P	Ground.
37	NC	-	Not connect.
38	NC	-	Not connect.
39	NC	-	Not connect.
40	NC	-	Not connect.

4.2 Backlight Interface.

FPC Connector is used for the CTP interface. The recommended model is FH28-10S-0.5SH manufactured by Hirose.

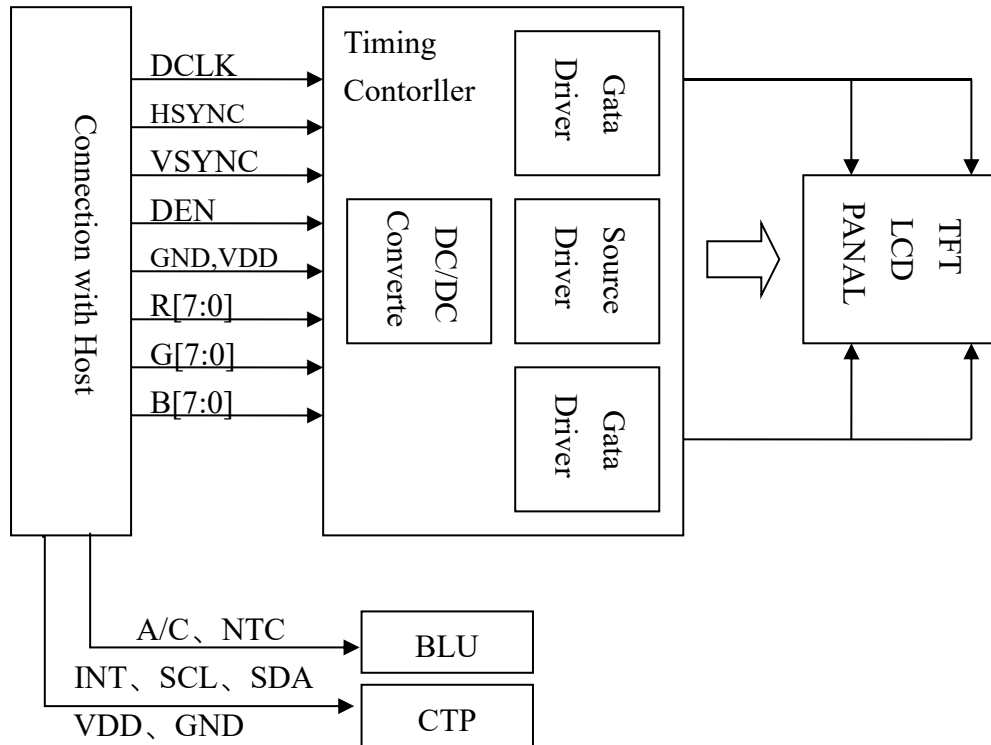
NO	Symbol	Description
1	NC	Not connect.
2	A1	LED Anode.
3	C1	LED Cathode.
4	NC	Not connect.
5	THER+	Thermistor+.
6	THER-	Thermistor-.
7	NC	Not connect.
8	C2	LED Cathode.
9	A2	LED Anode.
10	NC	Not connect.

4.3 CTP Interface.

FPC Connector is used for the CTP interface. The recommended model is FH12-6S-1SH manufactured by Hirose.

NO	Symbol	Level	Description
1	RST	I/O	System reset signal input.
2	VCC	P	Power Voltage for CTP.
3	GND	P	Ground.
4	INT	I/O	Indicate coordinate ready.
5	SDA	I/O	I2C:serial data.
6	SCL	I/O	I2C:serial clock.

5. Block Diagram



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature(Humidity)	Top	-30 to 70	°C
Storage temperature(Humidity)	Tst	-40 to 85	°C
power Voltage	VDD	-0.5 ~ 5.0	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

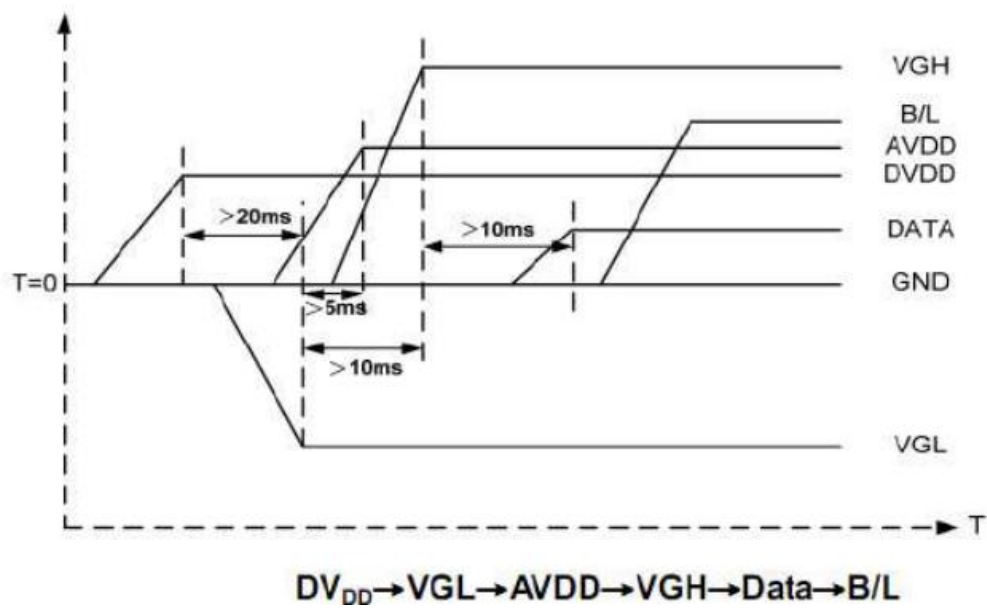
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Voltage	VDD	-	3.0	3.3	3.6	V
Logic input signal Voltage	H level	-	0.7*VDD	-	VDD	V
	L level		GND	-	0.3*VDD	V

8. Backlight Characteristics

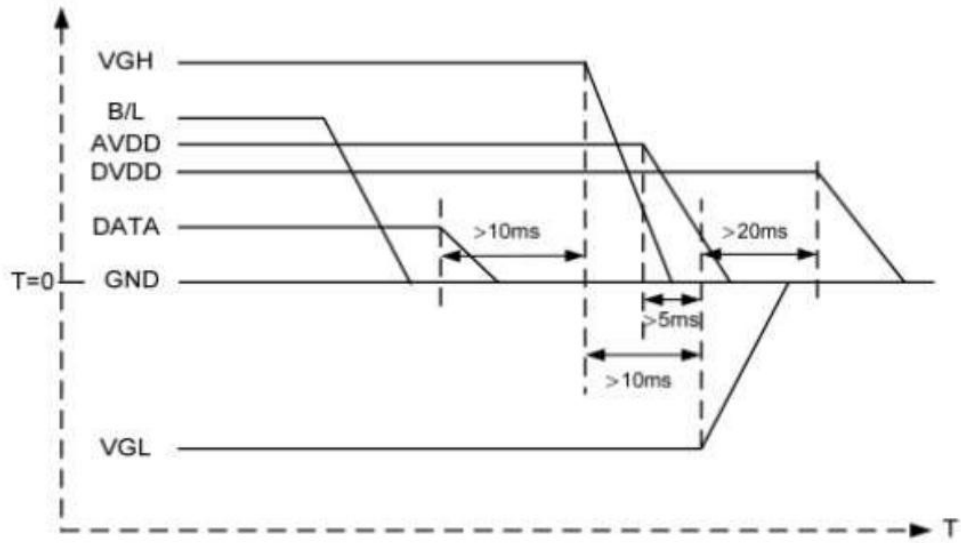
Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	16.2	18	19.8	V	IF=200mA
Number of LED	-	24			pcs	-
Power Consumption	PWF	3240	3600	3960	mW	-
LED life-span	-	-	(30000)	-	Hrs	-

9. Electrical Characteristics

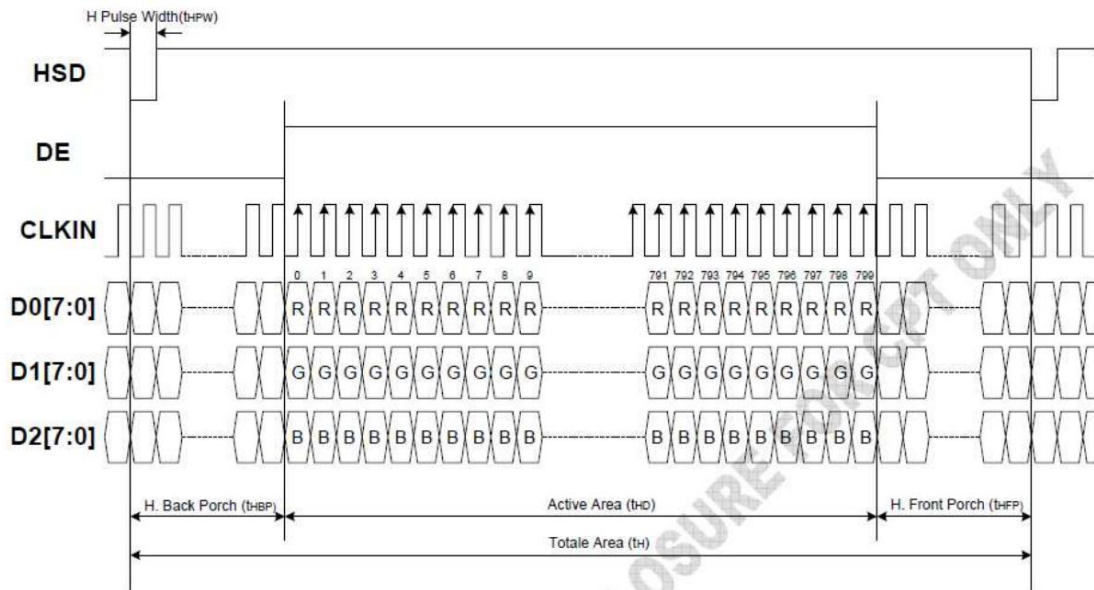
a. Power on:



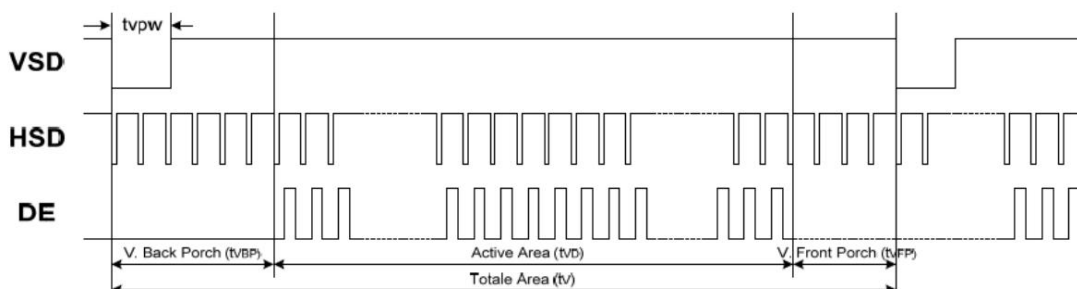
b. Power off:



B/L → Data → VGH → AVDD → VGL → DV_{DD}



Horizontal Input Timing						
Parameter	Symbol	Value			Unit	
		Min.	Typ.	Max.		
Horizontal display area	t_{HD}	--	800	--	CLKIN	
CLKIN frequency	f_{CLK}	--	33.3	50	MHz	
1 Horizontal line period	t_H	862	1056	1200	CLKIN	
HSD pulse width	t_{HPW}	Min.	--	1	CLKIN	
		Typ.	--	--	CLKIN	
		Max.	--	40	CLKIN	
HSD back porch	SYNC	t_{HBP}	46	46	46	CLKIN
HSD front porch	SYNC	t_{HFP}	16	210	354	CLKIN



Vertical Input Timing						
Parameter	Symbol	Value			Unit	
		Min.	Typ.	Max.		
Vertical display area	t_{VD}	--	480	--	HSD	
VSD period time	t_V	510	525	650	HSD	
VSD pulse width	t_{VPW}	1	--	20	HSD	
VSD back porch	t_{VBP}	23	23	23	HSD	
VSD front porch	t_{VFP}	7	22	147	HSD	

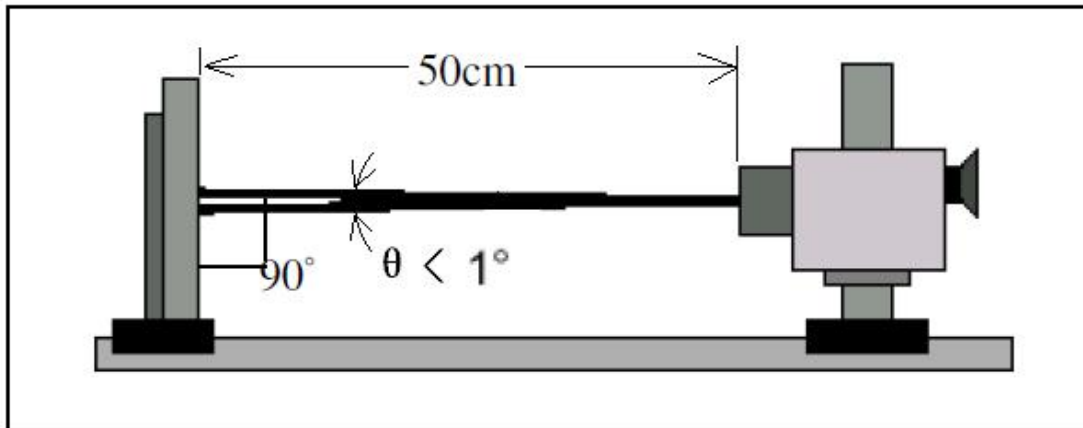
10. Electro-Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	Note	
Response time	Tr+Tf	$\theta = 0^\circ$	-	25	50	ms	4	
Uniformity (Five point)	δ WHITE	$\varnothing = 0^\circ$ $T_a = 25^\circ\text{C}$	-	75	-	%	7	
Contrast ratio	Cr		500	800	-	-	3,5	
Surface Luminance	Lv		-	800	-	-	3,7	
Viewing angle range	θ	$\varnothing = 90^\circ$	60	70	-	deg	6	
		$\varnothing = 270^\circ$	60	70	-	deg		
		$\varnothing = 0^\circ$	60	70	-	deg		
		$\varnothing = 180^\circ$	50	60	-	deg		
Color filter chromaticity (x, y)	White	X	$\theta = \phi =$	TBD	TBD	TBD	-	7
		Y	0°	TBD	TBD	TBD		
	Red	X	$\theta = \phi =$	TBD	TBD	TBD		
		Y	0°	TBD	TBD	TBD		
	Green	X	$\theta = \phi =$	TBD	TBD	TBD		
		Y	0°	TBD	TBD	TBD		
Blue	X	$\theta = \phi =$	TBD	TBD	TBD			
	Y	0°	TBD	TBD	TBD			

Note 1: Ambient temperature=25°C±2°C

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

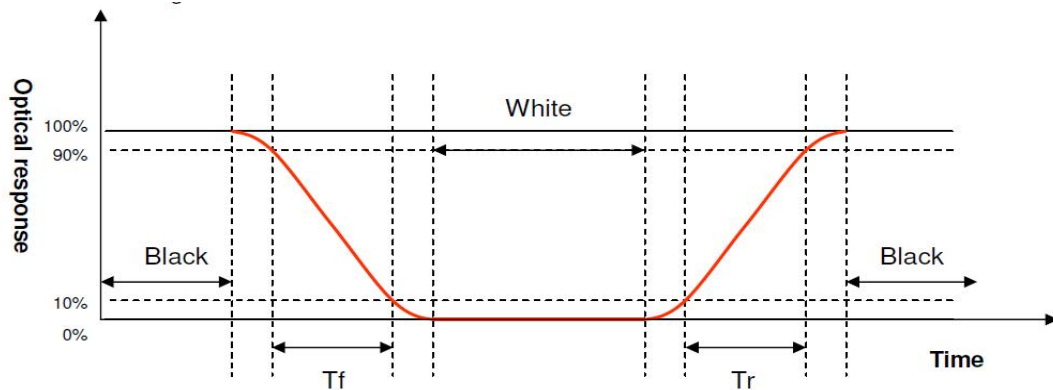
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



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:

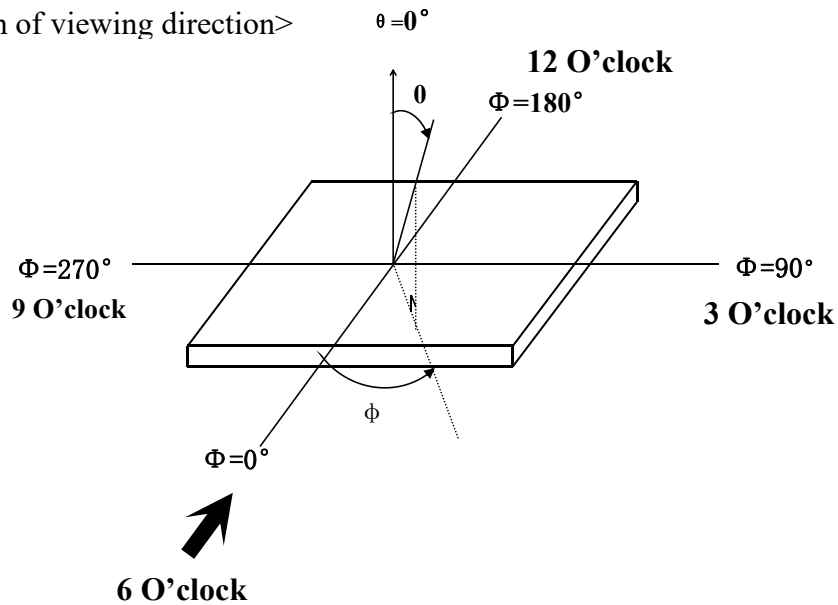
Contrast ratio is calculated with the following formula:

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

Note 6. Definition of viewing angle

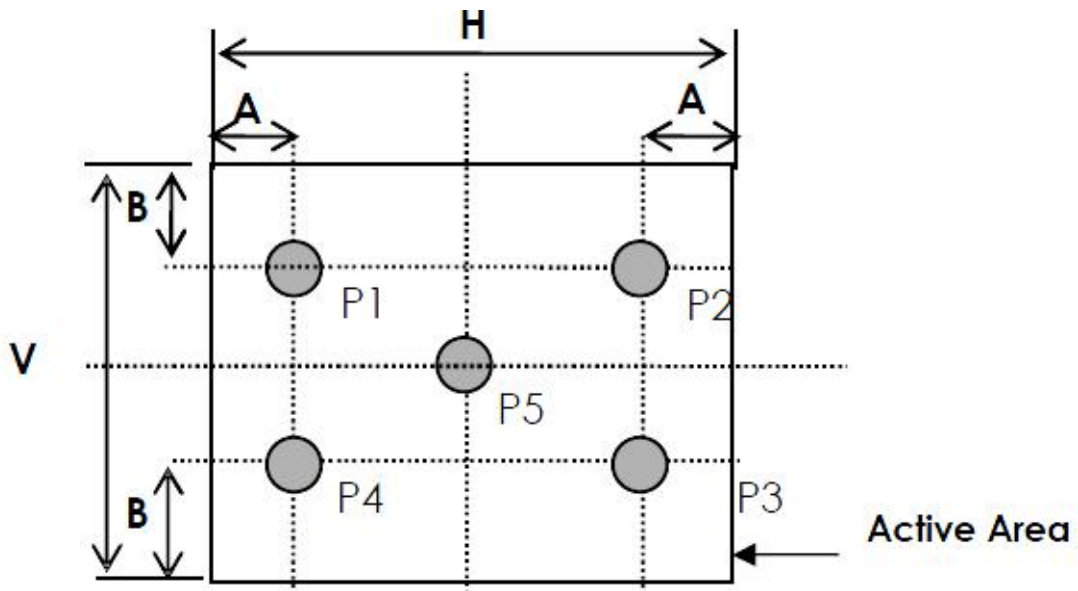
Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

<Definition of viewing direction>



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



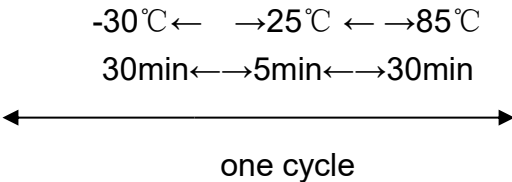
A : 5 mm B : 5 mm H,V : Active Area

Light spot size $\Phi=7\text{mm}$, 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 all white pixels (P5)

11. Reliability Test

			°C,
			°C,
			°C,
			°C,
			°C, %
		<p style="text-align: center;"> -30°C ← → 25°C ← → 85°C 30min ← → 5min ← → 30min  ←—————→ one cycle </p>	°C °C,

12. Precautions for Operation and Storage

1. Precautions for Operation

2. Precautions for Storage

°C

°C

°C

3. Warranty period

13. Package Specification

