SPECIFICATION

PRODUCT NO. : **TCXT70011A**
VERSION : **Ver 1.1**
ISSUED DATE : **2019-9-28**

This module uses ROHS material

FOR CUSTOMER: _____

□: APPROVAL FOR SPECIFICATION
■: APPROVAL FOR SAMPLE

DATE	APPROVED BY

Xinli Optronics :

Presented by	Reviewed by	Organized by
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Note:

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1. Revision Recode

Revision	Description	Date
1.0	Initial Release	2019/2/21
1.1	Change the Chinese to English on Drawing（Page3)	2019/9/28

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2. General Description and Features

The 7.0 inch Module named TCXT70011A 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	164.9 x 100 x 5.7	mm
(2)	LCD Active area	154.08 x 85.92	mm
(3)	Dot Number	800 x 3(RGB) x 480	/
(4)	Dot size	0.0642(H) x 0.1790(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16M	/
(7)	Viewing direction	6:00(gray inversion)	O'clock
(8)	Backlight Type	21-chip	/
(9)	Power Supply	3.3(TYP)	V
(10)	Interface	FPC 0. 5mm_Pitch 50pin	/
(11)	Interface type	RGB interface(24 Bit)	/
(12)	Module weight	TBD	g

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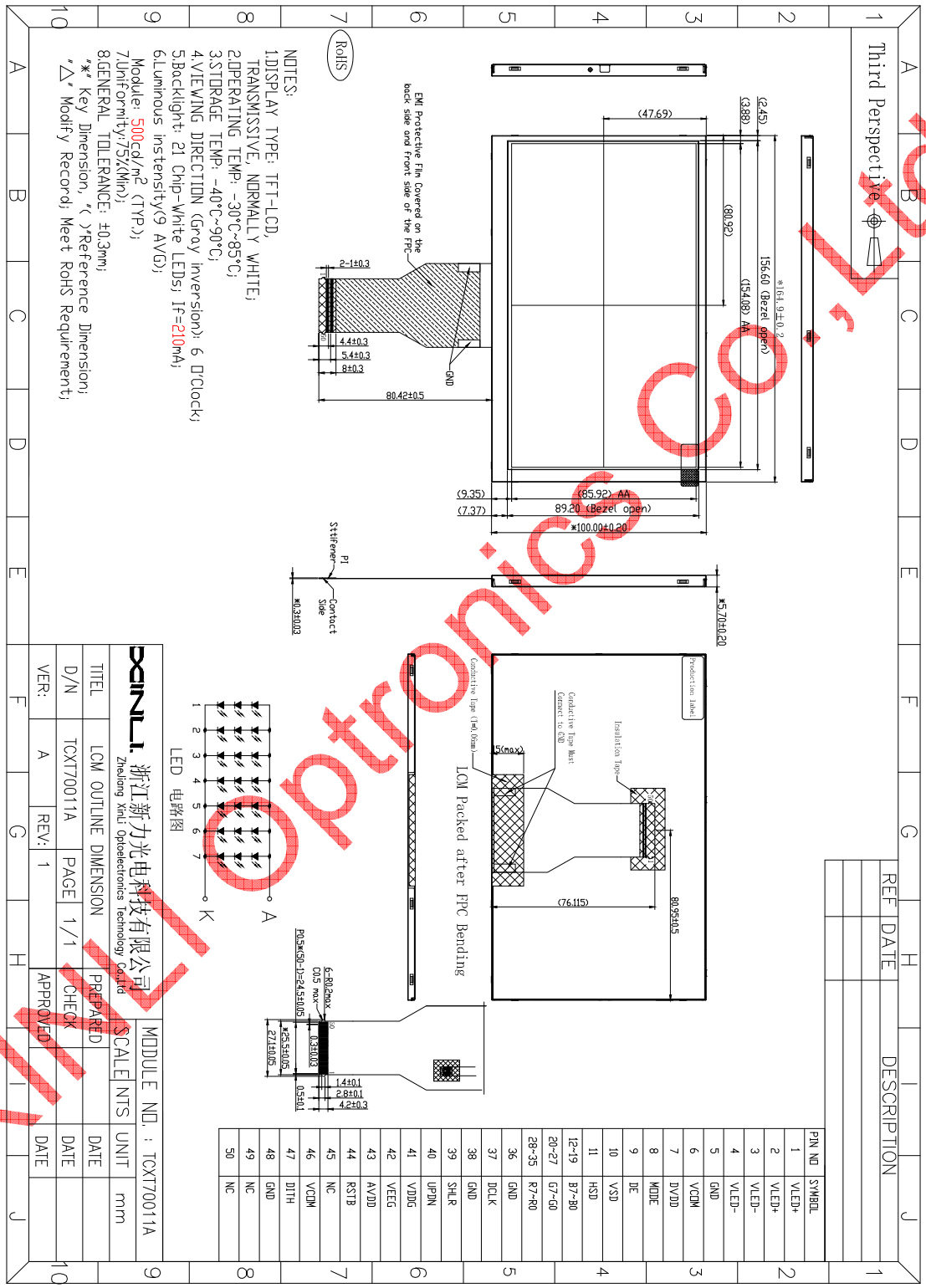
3. Mechanical Dimension



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4. Interface Pin Connection

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

NO	Symbol	Level	Description
1	VLED+	P	Backlight+
2	VLED+	P	Backlight+
3	VLED-	P	Backlight-
4	VLED-	P	Backlight-
5	GND	P	Ground
6	VCOM	P	The power supply for common voltage in TFT driving.
7	DVDD	P	Power supply for digital circuits.
8	MODE	I	DE / SYNC mode select. (Normally pull high) MODE="L", for entering SYNC mode. MODE="H", for entering DE mode.
9	DE	I	Input data enable control. When DE mode, active High to enable data input.(Normally pull low)
10	VSD	I	Vertical sync input in digital parallel RGB. Negative polarity.
11	HSD	I	Horizontal sync input in digital parallel RGB. Negative polarity.
12	B7	I	Blue Data Input
13	B6	I	
14	B5	I	
15	B4	I	
16	B3	I	
17	B2	I	
18	B1	I	
19	B0	I	
20	G7	I	Green Data Input
21	G6	I	
22	G5	I	
23	G4	I	
24	G3	I	
25	G2	I	

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26	G1	I	
27	G0	I	
28	R7	I	Red Data input
29	R6	I	
30	R5	I	
31	R4	I	
32	R3	I	
33	R2	I	
34	R1	I	
35	R0	I	
36	GND	P	Ground
37	DCLK	I	Clock for input data.
38	GND	P	Ground
39	L/R	I	Left/right selection
40	U/D	I	Up/down selection.
41	VGH	P	Power supply for Gate on output
42	VGL	P	Power supply for Gate off output
43	AVDD	P	Power supply for Analog circuits.
44	RSTB	I	Hardware global reset. Low active. (Normally pull high)
45	NC	-	Not connect.
46	VCOM	P	The power supply for common voltage in TFT driving.
47	DITH	I	Dithering function enable control. (Normally pull high) DITHB="L", to enable internal dithering function. DITHB="H", to disable internal dithering function.
48	GND	P	Ground
49	NC	-	Not connect.
50	NC	-	Not connect.

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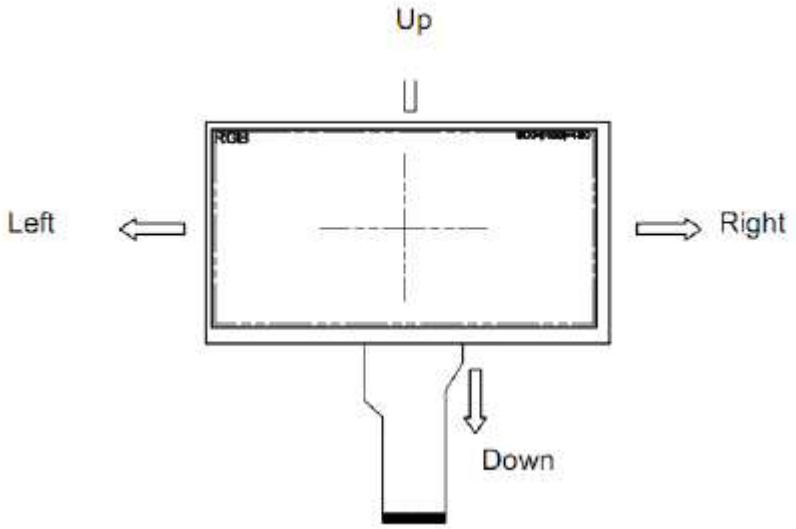
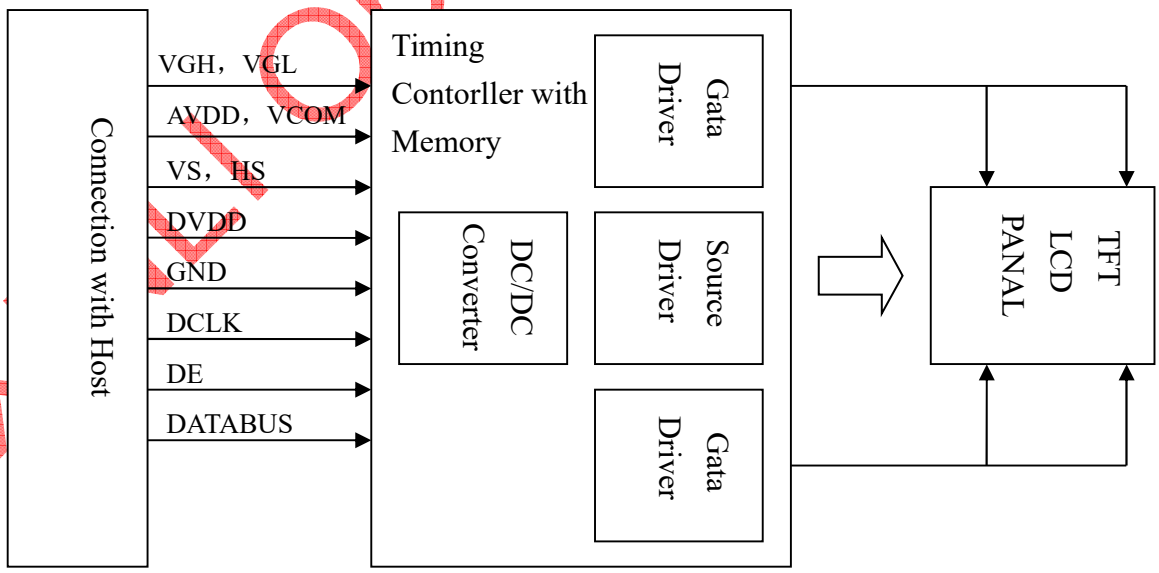
Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV_{DD}	Up to down, left to right
DV_{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV_{DD}	DV_{DD}	Down to up, left to right



5. Block Diagram



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6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-30 to 85	℃
Storage temperature	Tst	-40 to 90	℃
Power Voltage	DVDD	-0.5~5.0	V
	AVDD	-0.5~13.5	V
	VGH	-0.3~40	V
	VGL	-20.0~0.3	V
	VGH-VGL	≤40.0	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	Min.	Typ.	Max.	Unit
Power Voltage		DVDD	3.0	3.3	3.6	V
		AVDD	10.35	10.4	10.45	V
		VGH	14.5	15	15.5	V
		VGL	-10.5	-10	-9.5	V
		VCOM	3.54	4.04	4.54	V
Logic input signal Voltage	H level	V_{IH}	0.7*DVDD	-	DVDD	V
	L level	V_{IL}	0	-	0.3*DVDD	V

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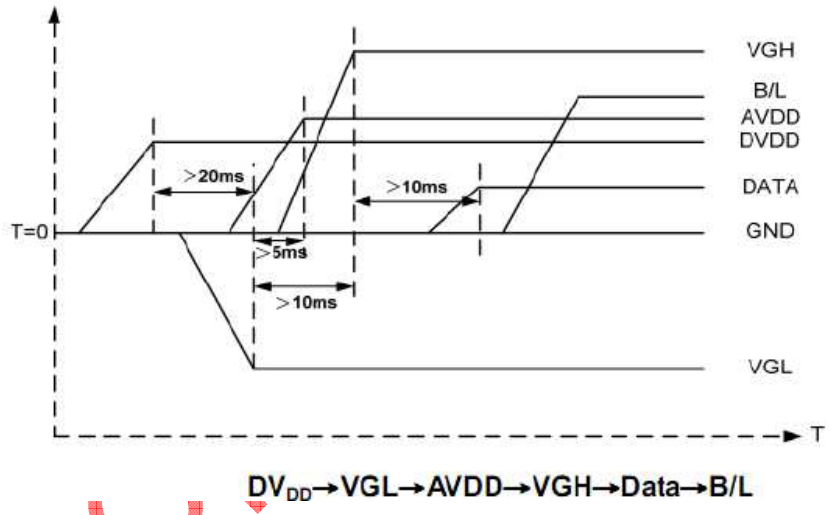
8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	8.4	9.6	10.5	V	IF=210mA
Number of LED	-	21			pcs	-
Power Consumption	PWF	-	2016	-	mW	-
LED life-span	-	30000	-	-	Hrs	-

9. Timing Characteristics

a. Power on:



DV_{DD}→VGL→AVDD→VGH→Data→B/L

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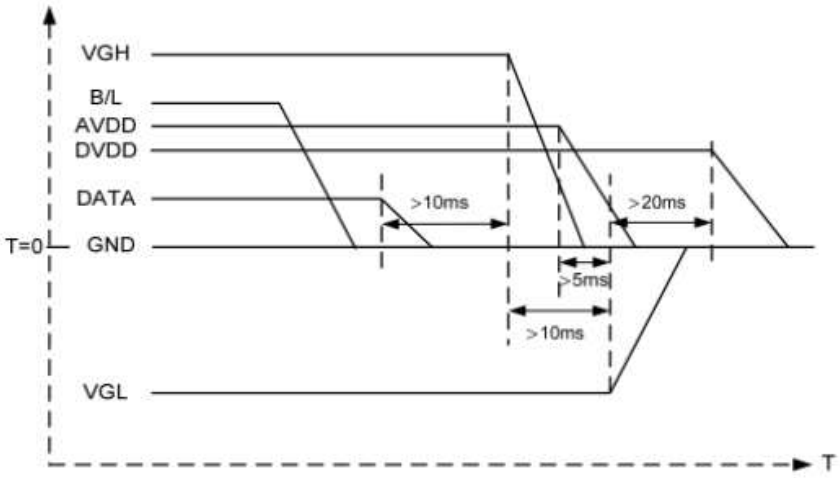
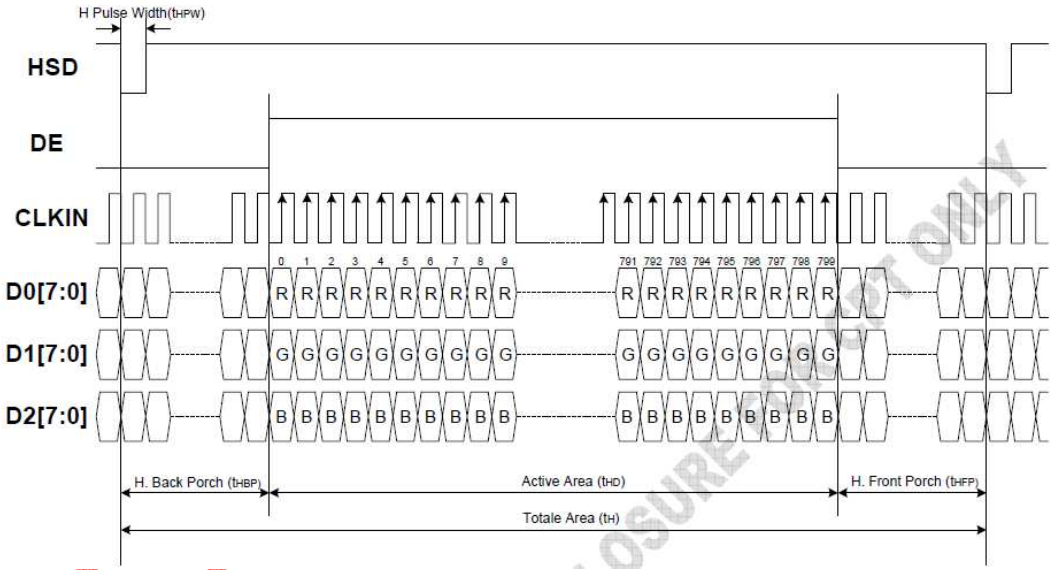
b. Power off:



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	Min.	t_{HPW}	--	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

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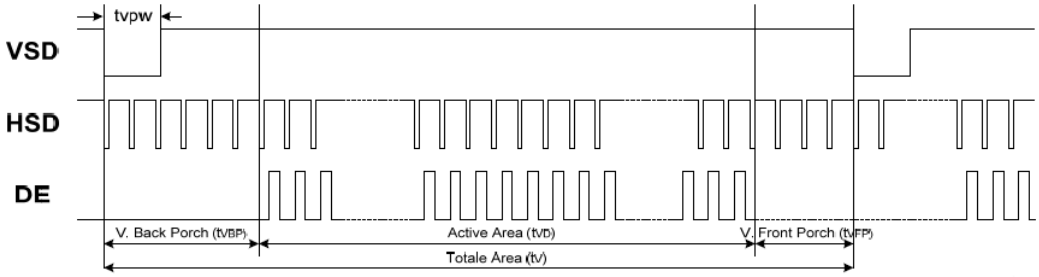

Vertical Input Timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	t_{VD}	--	480	--	HSD
VSD period time	t_V	510	525	650	HSD
VSD pulse width	t_{VPW}	1	--	20	HSD
VSD back porch	t_{VBP}	23	23	23	HSD
VSD front porch	t_{VFP}	7	22	147	HSD

10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

Please consult our technical department for detail information.

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12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Transmission (with pol)		T		4.42	5.02	-	%	
Response time		Tr	θ =0° ∅=0° Ta=25℃	-	10	-	ms	4
		Tf		-	15	-	ms	
Uniformity （Five point）		δ WHITE		-	75	-	%	7
Contrast ratio		Cr		500	800	-	-	3 ,5
Surface Luminance		Lv		-	500	-	-	3 ,7
Viewing angle range		θ	∅ = 90°	60	70	-	deg	6
			∅ = 270°	60	70	-	deg	
			∅ = 0°	60	70	-	deg	
			∅ = 180°	50	60	-	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).

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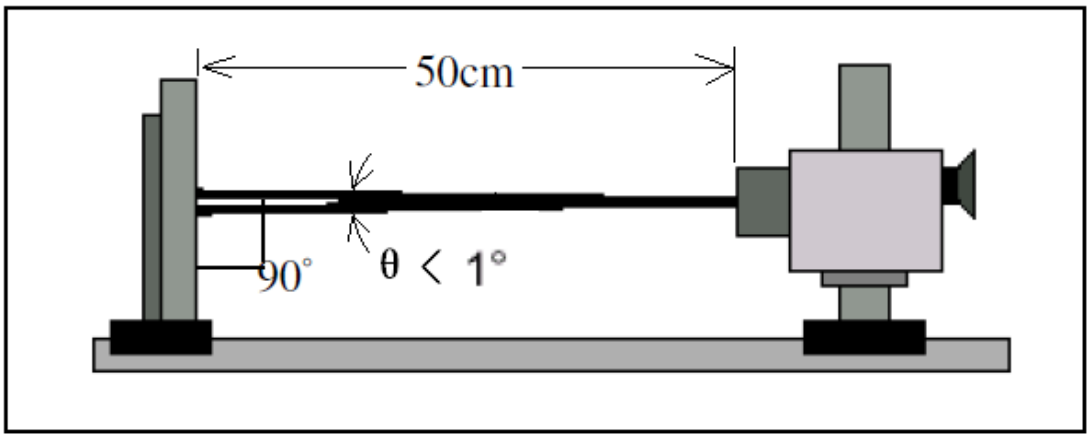
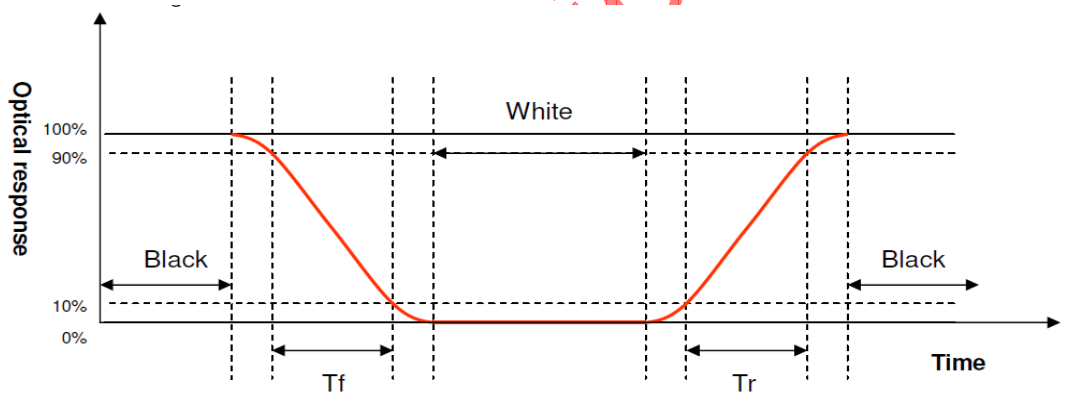


Note 4: Definition of response time:

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.

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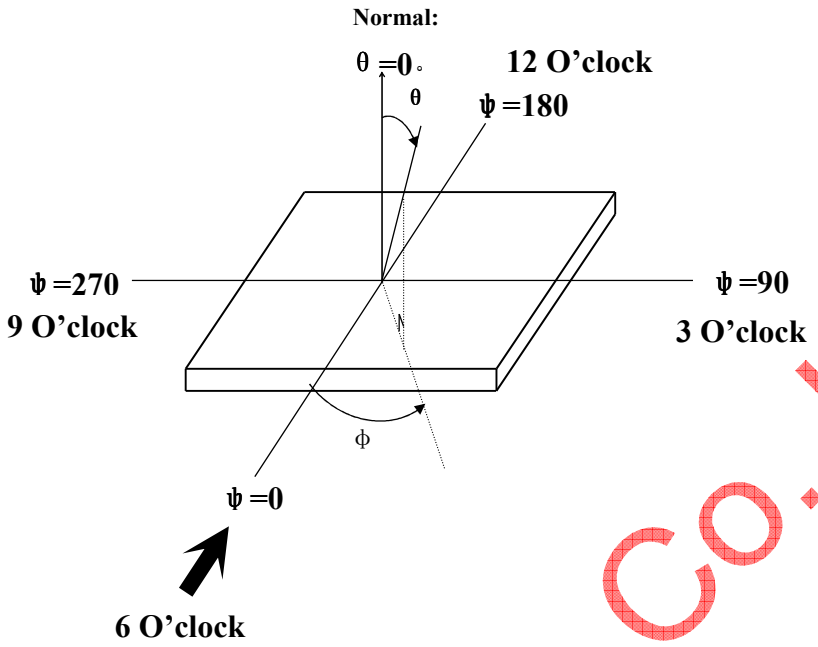
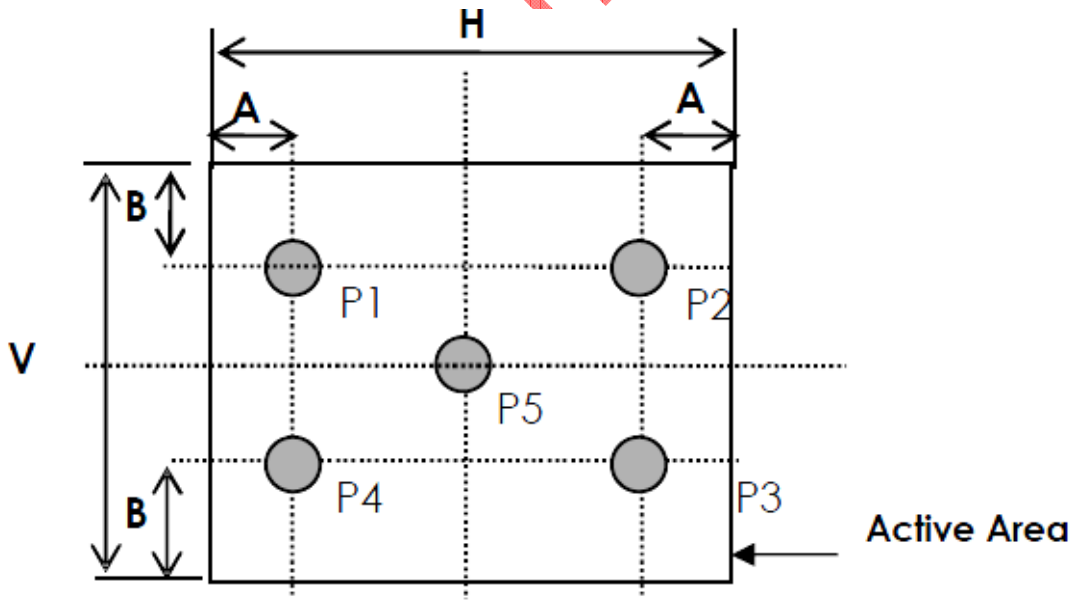


Note 7. Surface luminance is the LCD surface from the surface with all pixels displaying white. Refer to figure as below.

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)

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13. 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	90℃,240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-40℃,240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	85℃,240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-30℃,240H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 240H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle -30℃← →20℃ ← →85℃ 30min←→5min←→30min one cycle	-30℃/85℃, 100 cycles

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 mois

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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.

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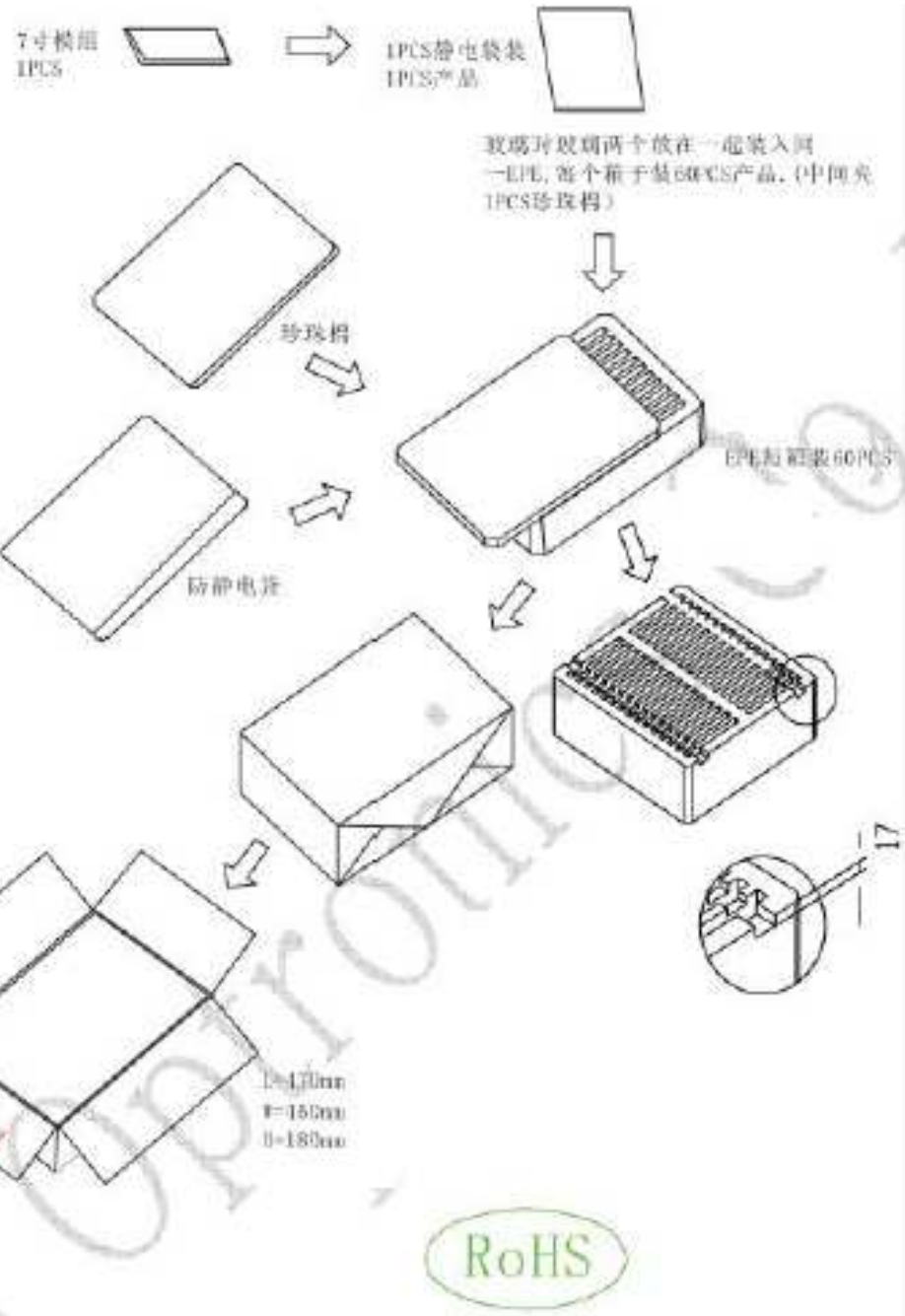
15. Package Specification



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