



SPECIFICATION

客户名称 (Customer):

型号规格 (Mode Name): PV09704TX30D

制作日期 (Date):

版本 (Version) : V1

For Customer' s Acceptance (客户规格书确认签名)

Approved by (核准人签名)	Comment (意见)

Approved by (核准人)	Reviewed by (审核人)	Prepared by (制作人)
Date (日期) :	Date (日期) :	Date (日期) :



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1. General Specifications

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No.	Item	Specification	Remark
1	LCD size(液晶尺寸)	9.7 inch(Diagonal)	
2	Driver element (驱动元素)	a-Si TFT active matrix	
3	Resolution (分辨率)	1024 (RGB) × 768	
4	Display mode (显示模式)	Normally Black Transmissive (IPS)	
5	Dot pitch (像素尺寸)	0.192(W) × 0.192(H) mm	
6	Active area (AA 区)	196.608(W) × 147.456(H) mm	
7	Module size (模组外围尺寸)	210.10(W) × 164.25(H) × 4.8(D) mm	Note 1
8	Surface treatment (表面外观)	Anti-Glare	
9	Color arrangement (颜色排列)	RGB-stripe	
10	Interface (界面)	LVDS	
11	View Direction	ALL	

Note 1: Refer to Mechanical Drawing. (参考平面机械图)



2. Pin Assignment

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TFT LCD Panel Driving Section

FPC Connector is used for the module electronics interface.

NO	Symbol	I/O	Function	Note
1	GND	P	Power ground	
2	VDD	P	Digital Power	
3	VDD	P	Digital Power	
4	NC	I	Not connect	
5	NC	I	Not connect	
6	NC	I	Not connect	
7	NC	I	Not connect	
8	LVDS_0N	I	LVDS data lane0 input	
9	LVDS_0P	I	LVDS data lane0 input	
10	GND	P	Power ground	
11	LVDS_1N	I	LVDS data lane1 input	
12	LVDS_1P	I	LVDS data lane1 input	
13	GND	P	Power ground	
14	LVDS_2N	I	LVDS data lane2 input	
15	LVDS_2P	I	LVDS data lane2 input	
16	GND	P	Power ground	
17	LVDS_CLKN	I	LVDS CLK input	
18	LVDS_CLKP	I	LVDS CLK input	
19	GND	P	Power ground	
20	NC	I	Not connect	
21	LED+	P	LED Anode	
22	LED+	P	LED Anode	



23	NC	I	Not connect	
24	LED-	P	LED Cathode	
25	LED-	P	LED Cathode	
26	LED-	P	LED Cathode	
27	LED-	P	LED Cathode	
28	LED-	P	LED Cathode	
29	LED-	P	LED Cathode	
30	NC	I	Not connect	

I: input, O: output, P: Power

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3. Operation Specifications

3.11 Typical Operation Conditions

Note1

Item	symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV _{DD}	3.0	3.3	3.6	V	Note 2
	AV _{DD}	-	8.42	-	V	
	V _{GH}	17	18	19	V	
	V _{GL}	-8.5	-7.5	-6.5	V	
Input signal voltage	V _{COM}	2.45	3.45	4.45	V	
Operation Temperature	Top	0	50	°C		
Storage Temperature	Tst	-20	60	°C		

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme

Note2 : Liquid Crystal driving voltage

Due to the characteristics of LC Material, this voltage varies with environmental temperature.

Note3: Please make sure to keep the temperature of LCD panel is less than 60°C

Note4 : No condensation



3.12 Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V _L	17.4	19.2	21.0	V	Note 1
Current for LED backlight	I _L		160		mA	
LED life time	-	25,000	-	-	Hr	Note 2

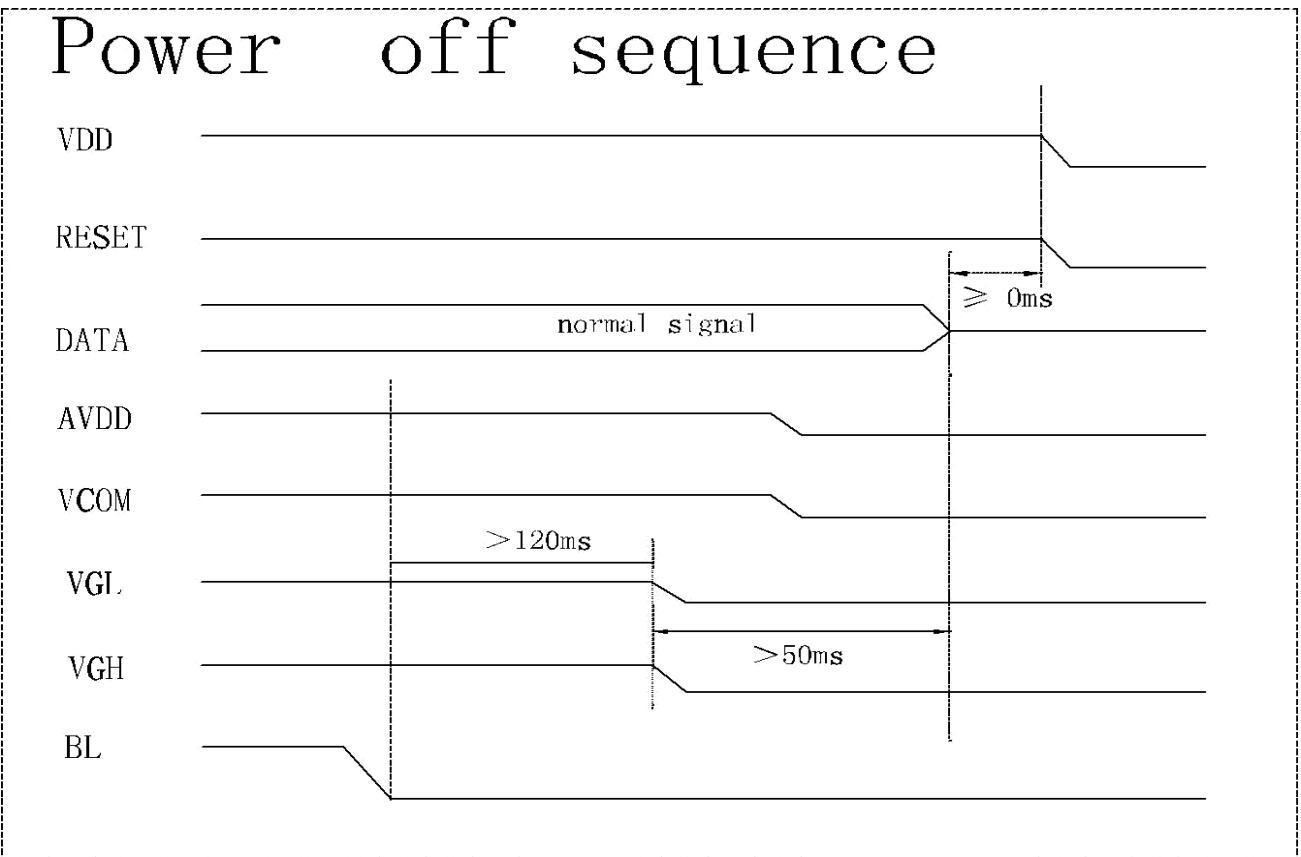
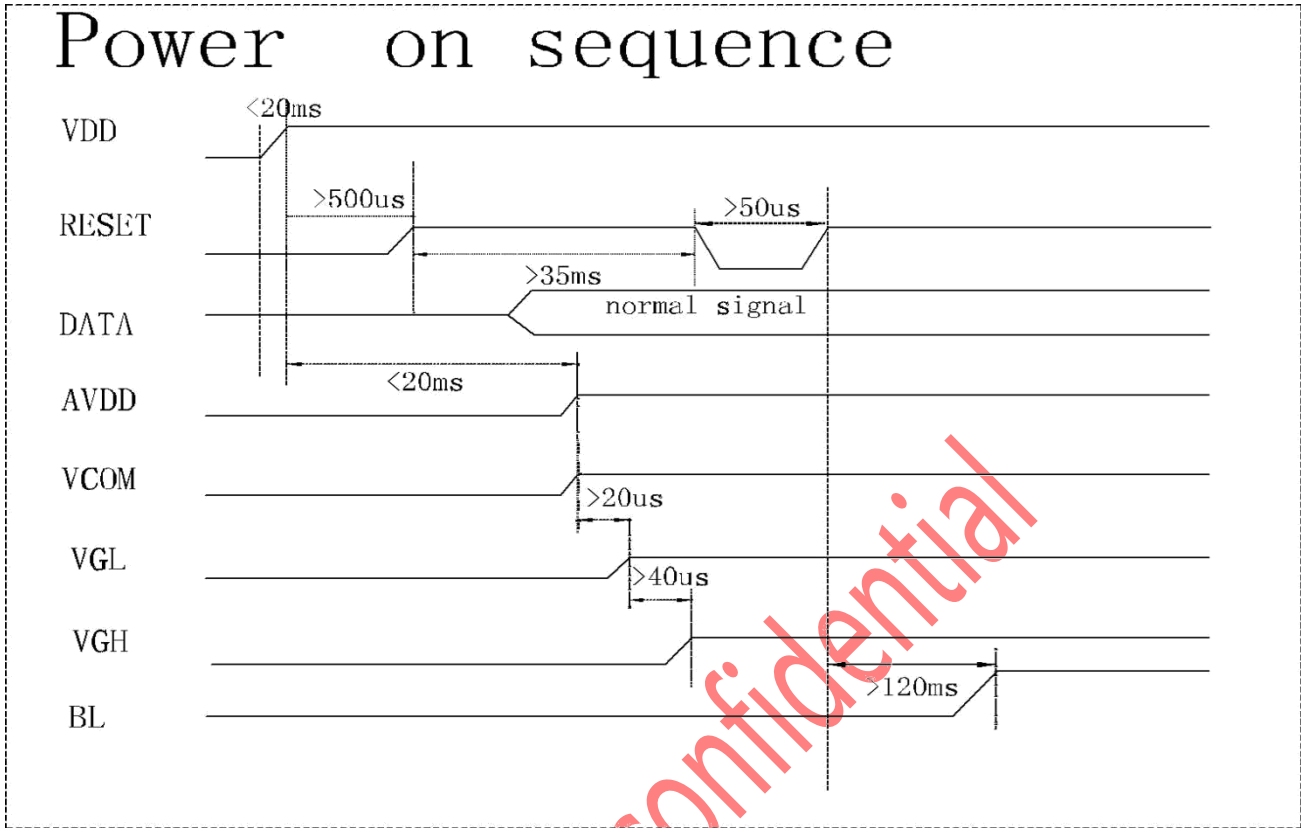
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I_LB =160mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C and I_L =160mA. The LED lifetime could be decreased if operating I_L is larger than 160mA.

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3.2. Power Sequence





3.3.3. Timing table

DE mode

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	Thd		1024	-	DCLK	
DCLK Frequency	fclk	52	65	71	MHZ	
HSYNC period time	th	1114	1344	1400	DCLK	
HSYNC Blanking	thb	90	320	376	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd		768	-	TH	
VSYNC period time	tv	778	806	845	TH	
VSYNC Blanking	tvb	10	38	77	TH	

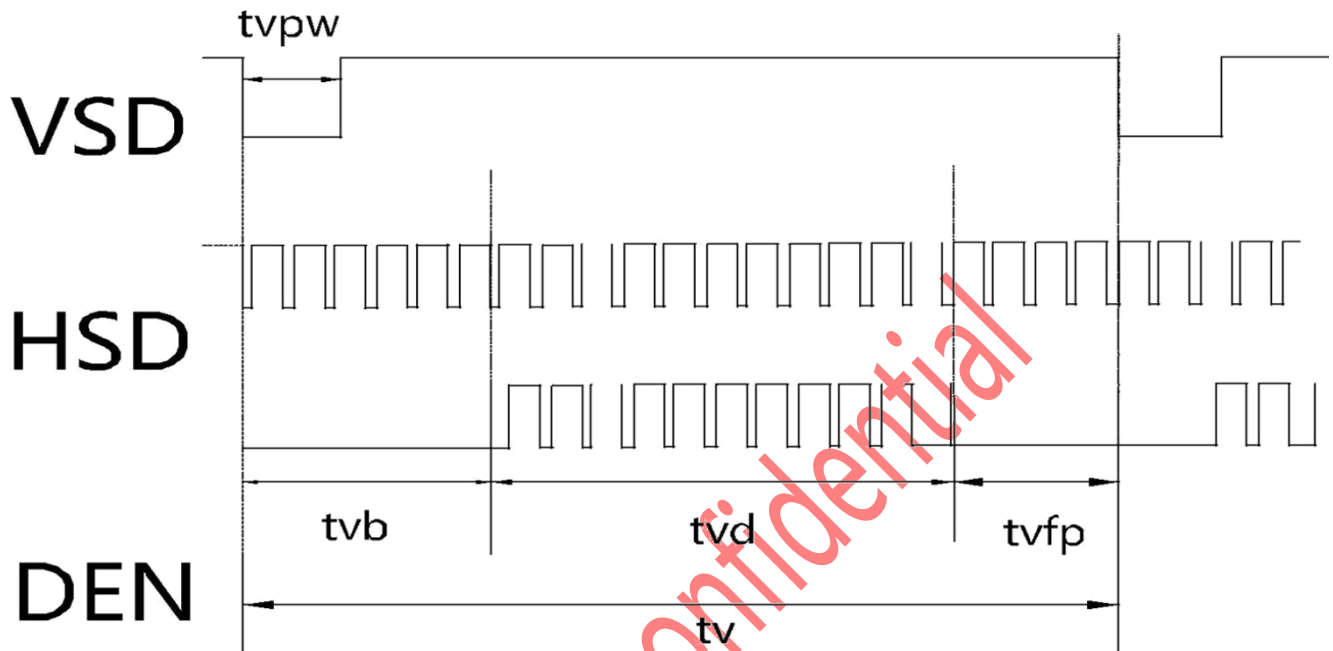
HV mode (1) (2)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	Thd		1024	-	DCLK	
DCLK Frequency	fclk	57	65	70.5	MHZ	
Horizontal line	th	1200	1344	1400	DCLK	
HSYNC pulse width	thpw	1		140	DCLK	
HSYNC back porch	thbp	160	160	160	DCLK	
HSYNC front porch	thfp	16	160	216	DCLK	
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd		768	-	H	
VSYNC period time	tv	792	806	840	H	
VSYNC pulse width	tvpw	1		20	H	
VSYNC back porch	tvb	23		160	H	
VSYNC front porch	tvfp	1	15	49	H	

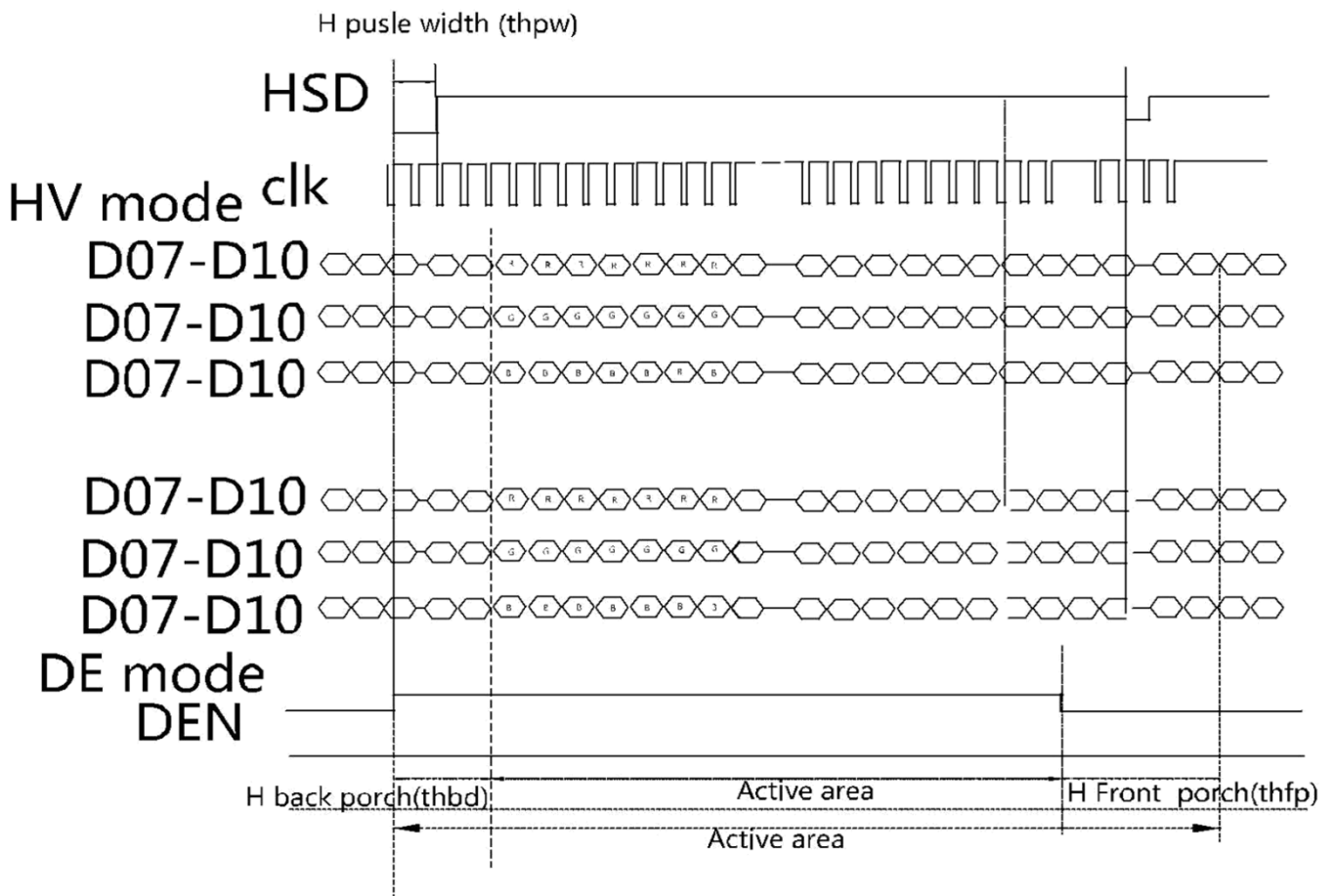


Timing sequence

Vertical input timing



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4. Optical Specifications

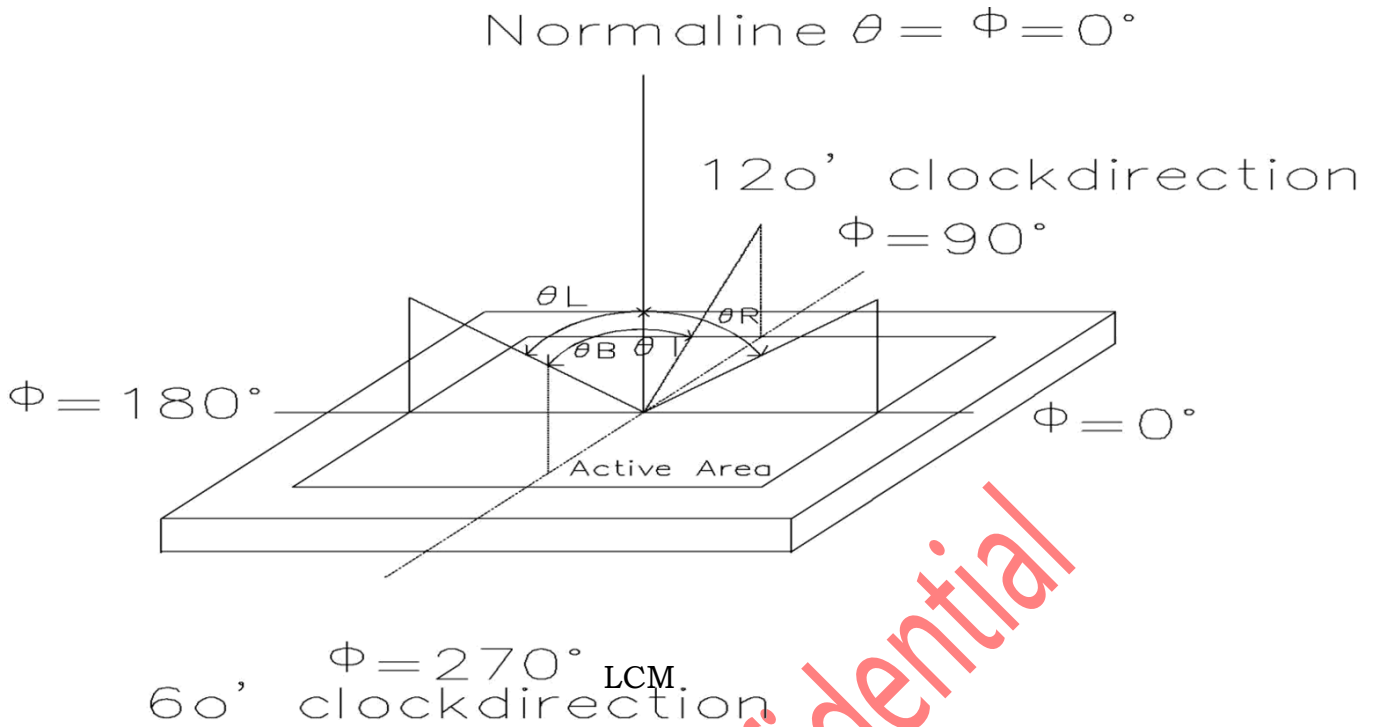
Item	Symbol	condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR ≥ 10)	θ_L	$\Phi=180^\circ$ (9 o' clock)		89		degree	Note1
	θ_R	$\Phi=0^\circ$ (3 o' clock)		89			
	θ_T	$\Phi=90^\circ$ (12 o' clock)		89			
	θ_B	$\Phi=270^\circ$ (6 o' clock)		89			
Response time	Ton	Viewing normal angle $\theta_X = \theta_Y = 0^\circ$ Color Filter Only, Base on C Light		20		msec	Note 3
Contrast ratio	+TOFF						
	CR		400	900	-	-	Note 4
Color chromaticity	Rx			0.616 ± 0.02		-	Note 1 Note2 Note 5 Note 6
	Ry			$(0.329) \pm 0.02$			
	Gx			$(0.285) \pm 0.02$			
	Gy			$(0.545) \pm 0.02$			
	Bx			$(0.139) \pm 0.02$			
	By			$(0.156) \pm 0.02$			
	Wx			$(0.296) \pm 0.02$			
	Wy			$(0.336) \pm 0.02$			
Luminance	L		-	500	-	cd/m ²	Note6
Luminance uniformity	Yu		75	80	-	%	Note7

Test Conditions:

1. $DV_{DD}=3.3V$, $I_L=160mA$ (Backlight current), the ambient temperature is 25°C.
2. The test systems refer to Note 2.



Note 1: Definition of viewing angle range



Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

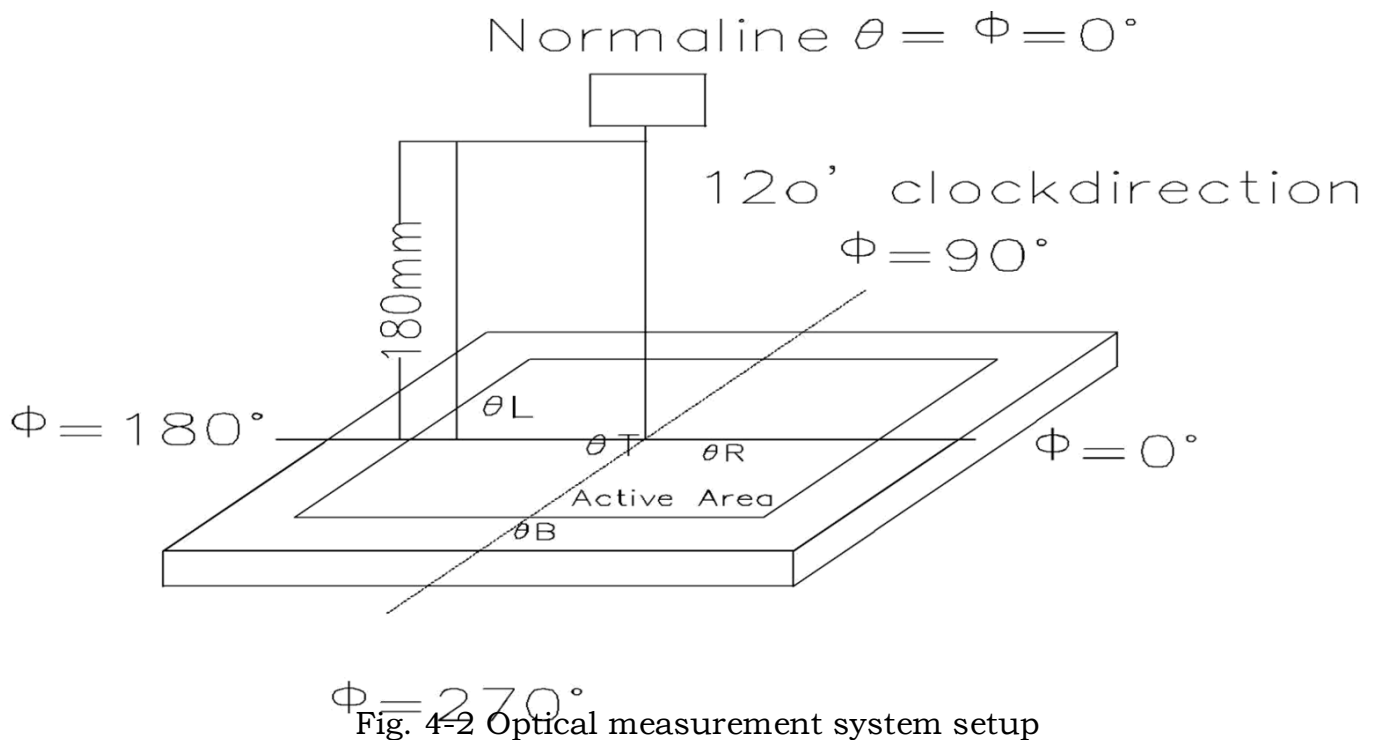


Fig. 4-2 Optical measurement system setup



Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

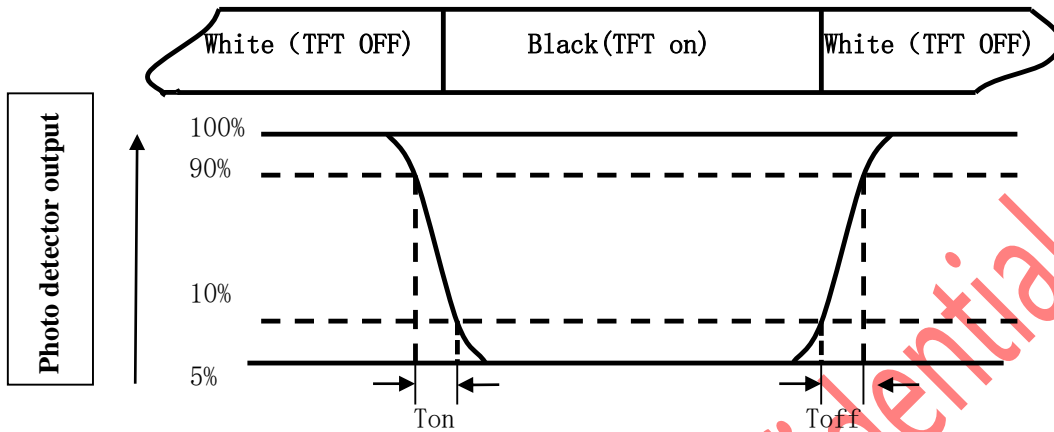


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note5: Definition of color chromaticity

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=160\text{mA}$.



Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).
 Every measuring point is placed at the center of each measuring area

$$\text{Luminance Uniformity (Yu)} = \frac{B_{\min}}{B_{\max}}$$

B_{\max}

L-----Active area length W----- Active area width

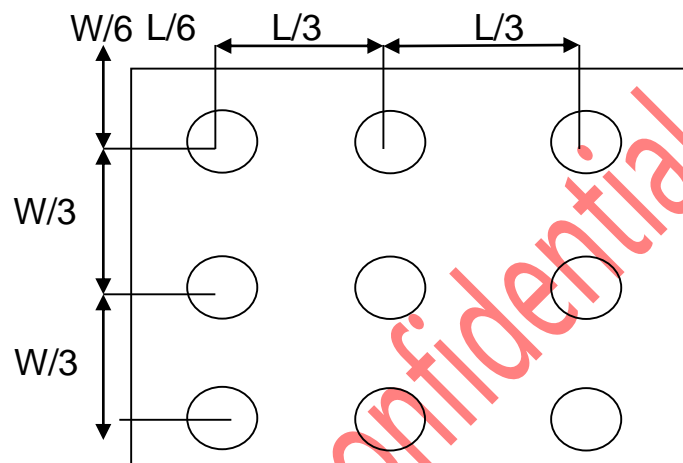


Fig. 4-4 Definition of measuring points



5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta = 60°C 240hrs	Note 1 , Note 4
Low Temperature Storage	Ta = -20°C 240hrs	Note 1 , Note 4
High Temperature Operation	Ts = 50°C 240hrs	Note 2 , Note 4
Low Temperature Operation	Ta = 0°C 240hrs	Note 1 , Note 4
Operate at High Temperature and Humidity	+40°C, 90%RH 240hrs	Note 4
Thermal Shock(No Operation)	-20°C/30 min ~ +60°C/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.

Note 2: Ts is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature



6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

6.4. Storage

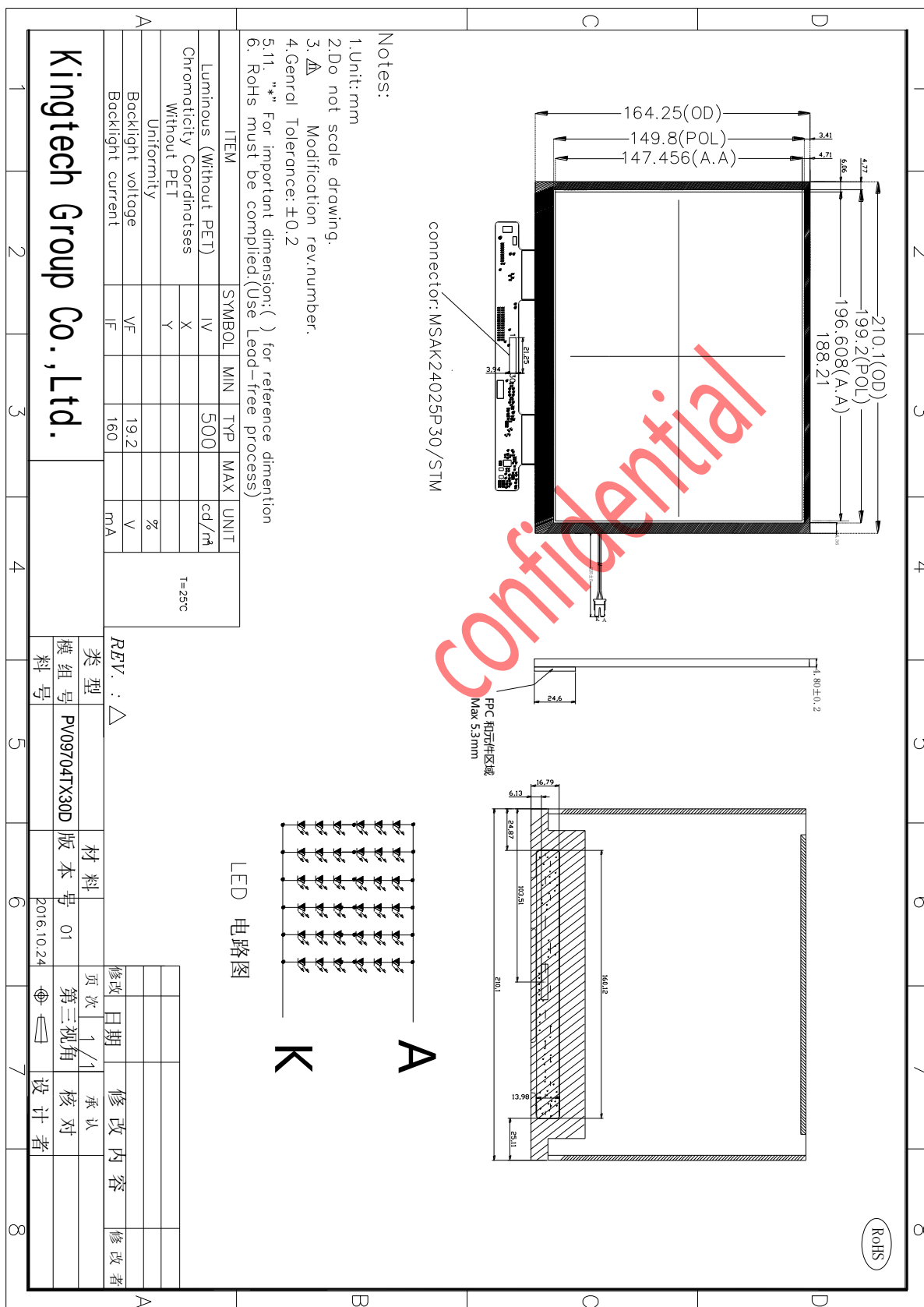
1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft cloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer



7.0 Mechanical Drawing





8.0 Packing form

模组 40Pcs

