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CERT. No.: 282Q19070712006



CERT. No.: 282E19070712007

Product Specification

Model: TTX070HHT-01

7.0" TFT Display Module (800*480)

This module uses RoHS material

Tailor Pixels Technology Co., Ltd.

www.tailorpixels.com

tailor@tailorpixels.com

Ph: 86-755-8821 2653

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2021/11/1	First Release.	

1. GENERAL DESCRIPTION

1.1 DESCRIPTION

TTX070HHT-01 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC and Backlight.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	7"	inch
2	Number of Pixels	800×RGB (3) ×480	pixels
3	Active Area	152.40(H)×91.44(V)	mm
4	Pixel Pitch	0.1905(H)×0.1905(V)	mm
5	Outline Dimension	170.0 (W)×106.30(H)×6.6(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally Black	-
8	Viewing Direction	ALL	-
9	Display Format	RGB vertical stripe	-
10	Luminance (cd/m ²)	650(min.)	nit
11	Contrast Ratio	900(TYP.)	
12	Surface Treatment	Anti-Glare	-
13	Interface	LVDS	-
14	Backlight	White LED	-
15	Operation Temperature	-30~85	°C
16	Storage Temperature	-40~90	°C

2.Mechanical Drawing

[illegible]

3. PIN DESCRIPTION

FI-X30SSLA-HF(JAE)

Pin No.	Symbol	Type	Function
1	VLED+	P(BL)	LED Anode(12V)
2	VLED+	P(BL)	LED Anode(12V)
3	VLED+	P(BL)	LED Anode(12V)
4	NC	-	Not connect
5	GND	P	Ground
6	LED-EN	I	Enable input for the device as well as supply input (VDDIO) for digital pins
7	PWM	I	PWM dimming input.
8	TP	I	Not connect
9	TP	I	Not connect
10	GND	P	Ground
11	PIND3	I	Positive LVDS differential data inputs
12	NIND3	I	Negative LVDS differential data inputs
13	GND	P	Ground
14	CLKP	I	Positive LVDS differential clock inputs
15	CLKN	I	Negative LVDS differential clock inputs
16	GND	P	Ground
17	PIND2	I	Positive LVDS differential data inputs
18	NIND2	I	Negative LVDS differential data inputs
19	GND	P	Ground
20	PIND1	I	Positive LVDS differential data inputs
21	NIND1	I	Negative LVDS differential data inputs
22	GND	P	Ground
23	PIND0	I	Positive LVDS differential data inputs
24	NIND0	I	Negative LVDS differential data inputs
25	GND	P	Ground
26	SHL1	I	Horizontal inversion
27	GND	P	Ground
28	GND	P	Ground
29-30	VDD(3.3)	P	Digital power

I : input , O : output , P : Power

【Note】

*1) : When SHL1="0" , set right to left scan dirction When SHL1="1" , set left to right scan dirction
When UPDN="0" , set top to bottom scan dirction When UPDN="1" , set bottom to top scan dirction

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

(GND=GND_IF=GNDP=GND A=0V, T_J = 25°C)

Parameter		Min.	Max.	Unit
Digital supply voltage, VDD Logic input voltage, VDD		-0.5	5	V
Interface supply voltage, VDD_IF		-0.5	5	V
Internal PFM supply voltage, VDDP		-0.5	5	V
Analog supply voltage, VDDA		-0.5	15	V
Operating Temperature	T _{OP}	-30	85	°C
Storage Temperature	T _{ST}	-40	90	°C

4.2 TFT LCD MODULE

4.2.1 Operating Conditions

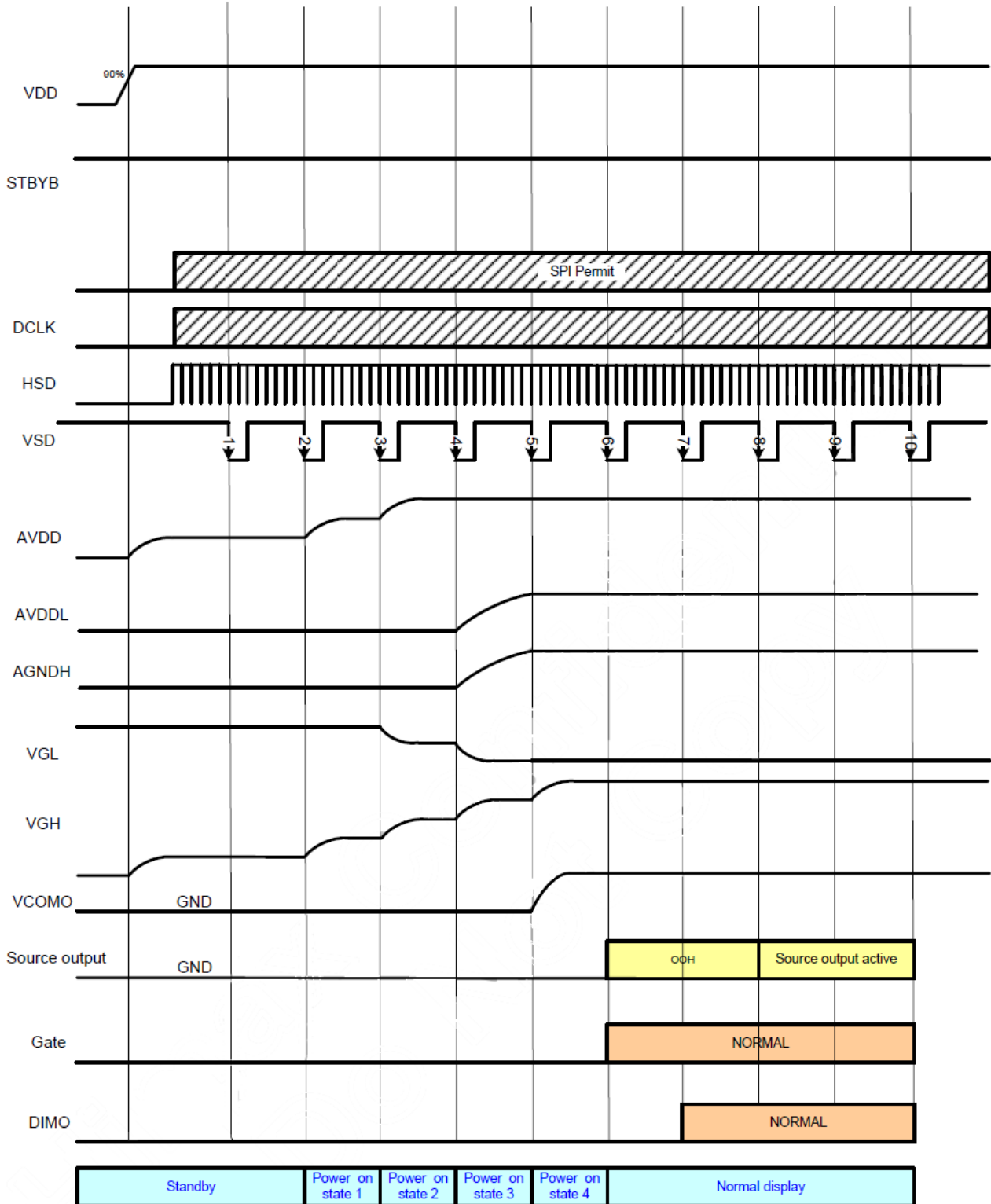
Parameter	Symbol	Min.	Typ.	Max.	Unit
Digital supply voltage	V _{VDD}	2.7	3.3	3.6	V
Interface supply voltage	V _{VDDIF}	2.7	3.3	3.6	V
Internal PFM supply voltage	V _{VDDP}	2.7	3.3	3.6	V
Analog supply voltage	V _{VDDA}	8	-	13.5	V

4.3 POWER ON/OFF SEQUENCE

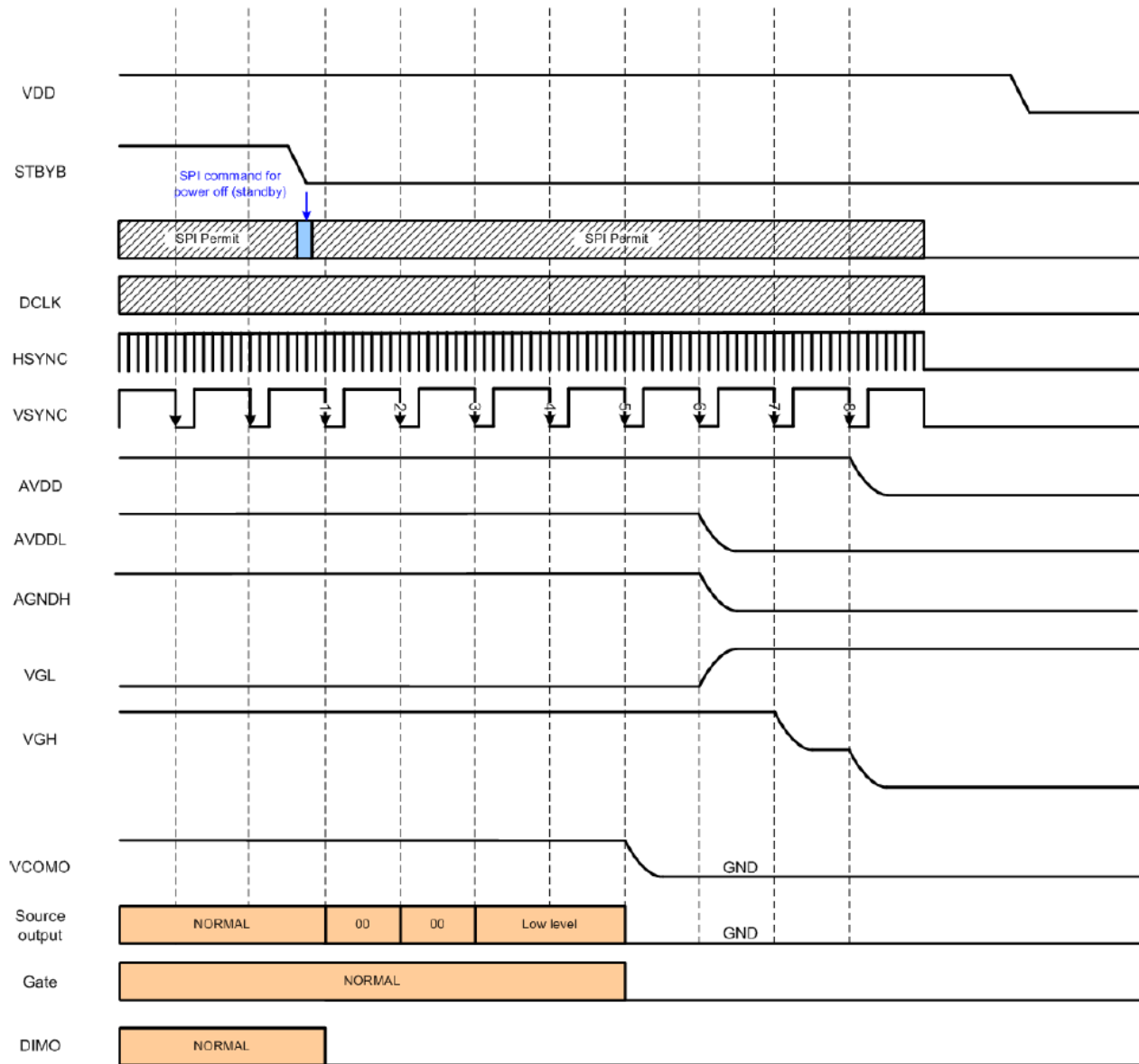
To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power on: VDD, GND → AVDD, AGND → V1 to V14

Power off: V1 to V14 → AVDD, AGND → VDD, GND



Power on timing sequence



Power off timing sequence

Note: Low level=3FH, when NBW=L (Normally white)

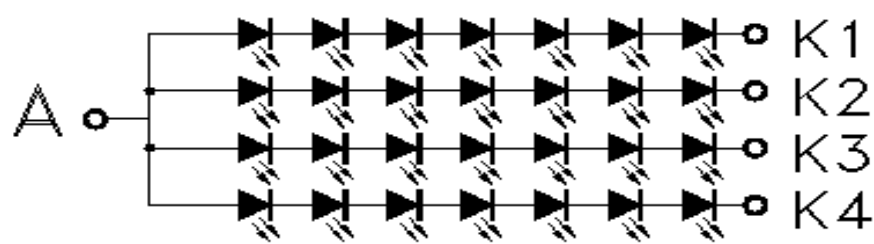
Low level=00H, when NBW=H (Normally black)

4.4 BACK LIGHT UNIT

Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I _{LED}	-	160	-	mA	28LEDS
Forward voltage	V _F	19.6	21	22.4	V	I _F =160mA 28LEDS
Reverse current	I _R	-	-	50	μA	V _R =3V,1LED
Power dissipation	P _d	1680			mW	28LEDS
Peak forward current	I _{FP}	20			mA	1LED
Reverse Voltage	V _R	3			V	1LED

4.4.1Internal Circuit Diagram



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BACKLIGHT CIRCUIT DIAGRAM:

I_f=160mA , V_F=21V (TYP)

5.INPUT SIGNAL TIMING

5.1AC ELECTRICAL CHARACTERISTICS

5.1. 1. LVDS mode AC electrical characteristics

(VDD IF=VDD= 2.7V to 3.6V, VDDA= 8V to 13.5V, GND IF=GND=GND A= 0V, Ta=25°C±2,

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	F_{LVCLK}	20	-	65	MHz	Refer to input timing table for each display resolution.
Clock Period	T_{LVCLK}	50	-	15.38	nsec	
Clock high time	T_{LVCH}	-	$4/(7 \cdot R_{XFCLK})$	-	ns	
Clock low time	T_{LVCL}	-	$3/(7 \cdot R_{XFCLK})$	-	ns	
Input data skew margin	T_{RSKM}	-	-	0.2	UI	$ V_{ID} = 200\text{mV}$, $R_{XVCM} = 1.2\text{V}$
Strobe width	T_{SW}	0.6	-	-	UI	$F_{LVCLK} = 65\text{MHz}$
1 data bit time	UI	-	1/7	-	T_{LVCLK}	
Position 1	T_{POS1}	-0.2	0	0.2	UI	
Position 0	T_{POS0}	0.8	1	1.2	UI	
Position 6	T_{POS6}	1.8	2	2.2	UI	
Position 5	T_{POS5}	2.8	3	3.2	UI	
Position 4	T_{POS4}	3.8	4	4.2	UI	
Position 3	T_{POS3}	4.8	5	5.2	UI	
Position 2	T_{POS2}	5.8	6	6.2	UI	
PLL wake-up time	T_{enPLL}	-	-	150	us	
SSC Modulation Frequency	SSC_{MF}	23	-	93	KHz	
SSC Modulation Rate	SSC_{MR}	-3	-	+3	%	$F_{LVCLK} = 60\text{MHz}$, Center spread

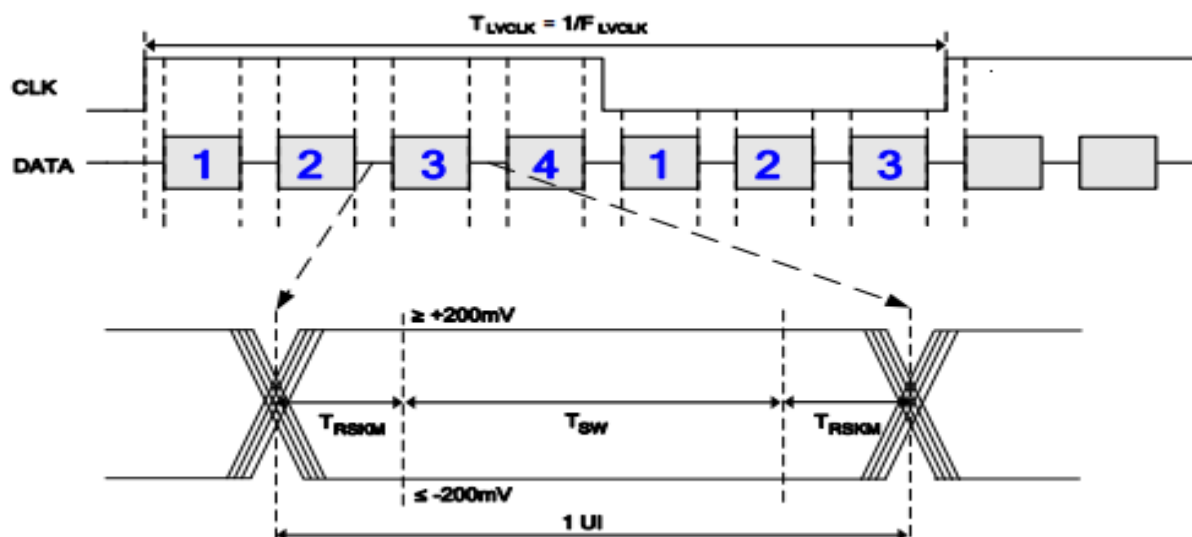


Figure 50. LVDS Data Skew

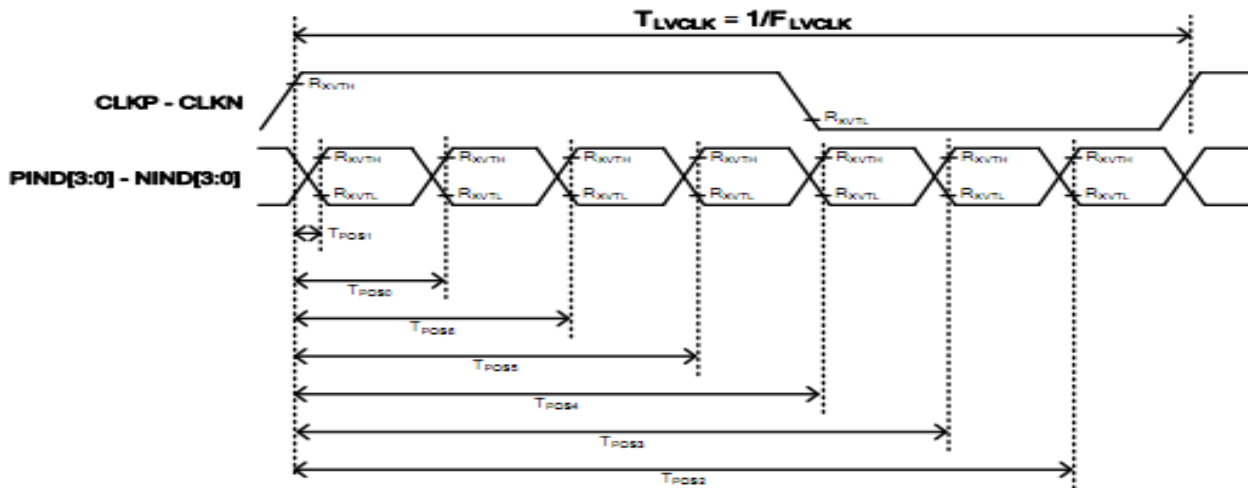


Figure 51. LVDS input timing

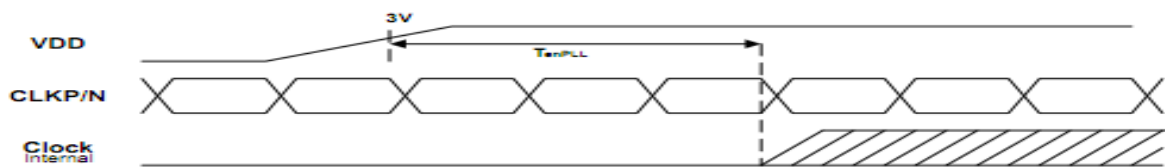


Figure 52. Relationship between VDD, LVDS clock, and internal clock

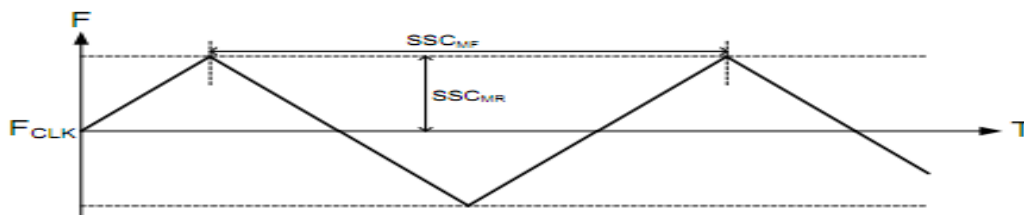


Figure 53. Frequency Modulation

5.1.2 LVDS Input Timing

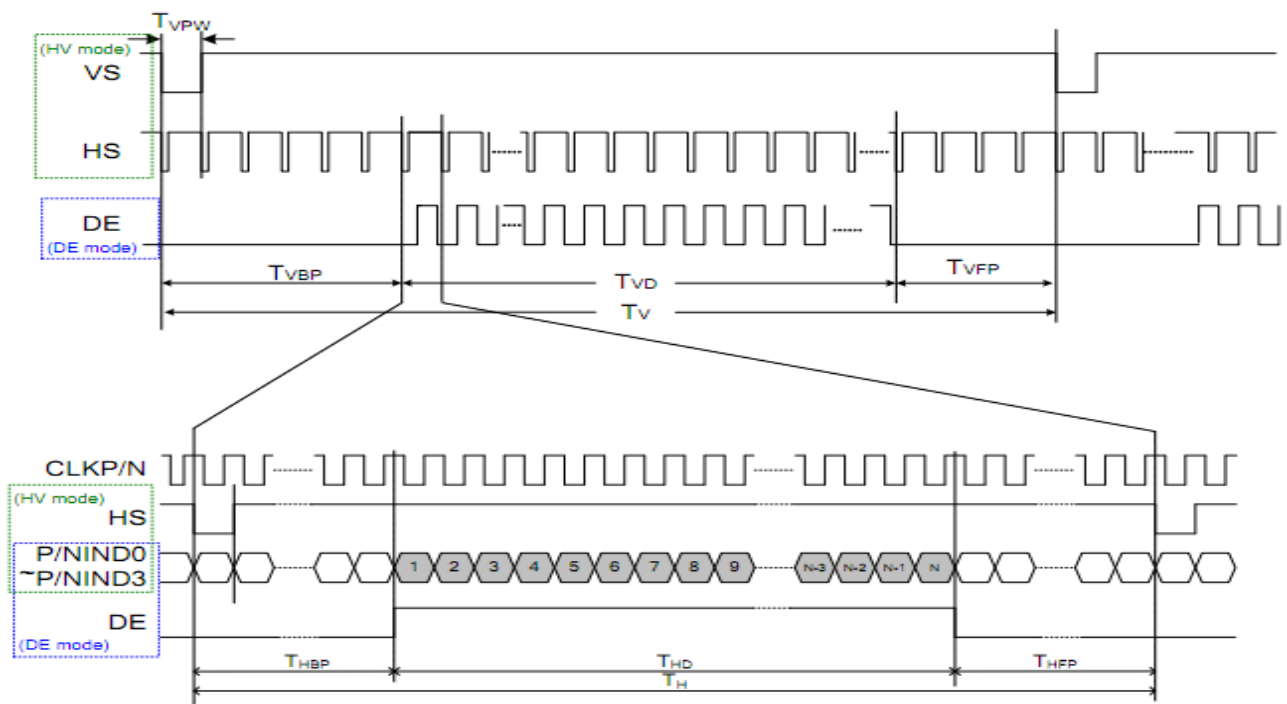


Figure 42. LVDS Input Timing

Note:
 $T_V = T_{VBP} + T_{VD} + T_{VFP}$
 $T_H = T_{HBP} + T_{HD} + T_{HFP}$

5.1.3 For 800x480 panel

Table 17. HV mode for 800x480

Parameter	Symbol	Min.	Typ.	Max.	Unit
CLK frequency	F_{CLK}	25.2	25.4	35.7	MHz
Horizontal display area	T_{HD}	800			CLK
HS period time	T_H	860	864	974	CLK
HS pulse width	T_{HPW}	1	2	40	CLK
HS back porch	T_{HBP}	32			CLK
HS front porch	T_{HFP}	28	32	142	CLK
Vertical display area	T_{VD}	480			H
VS period time	T_V	488	490	611	H
VS pulse width	T_{VPW}	1	2	20	H
VS back porch	T_{VBP}	5			H
VS front porch	T_{VFP}	3	5	126	H

Table 18. DE mode for 800x480

Parameter	Symbol	Min.	Typ.	Max.	Unit
CLK frequency	F_{CLK}	25.2	25.4	35.7	MHz
Horizontal display area	T_{HD}	800			CLK
HS period time	T_H	860	864	974	CLK
HS blanking	$T_{HFP} + T_{HBP}$	60	64	174	CLK
Vertical display area	T_{VD}	480			H
VS period time	T_V	488	490	611	H
VS blanking	$T_{VBP} + T_{VFP}$	8	10	131	H

5.2 DATA INPUT FORMAT

LVDS mode data input format

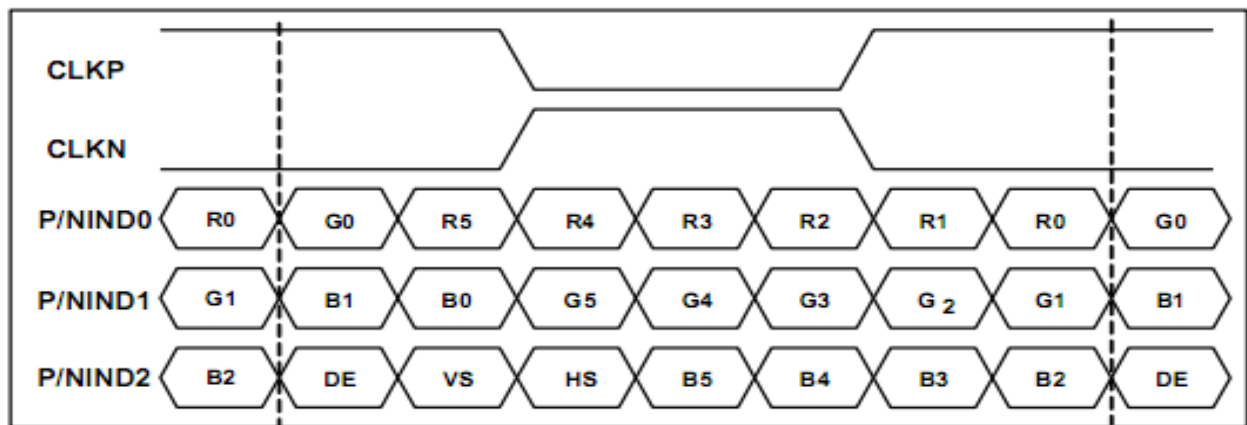


Figure 39. 6-bit LVDS Input (LVBIT=L, LVFMT=H only)

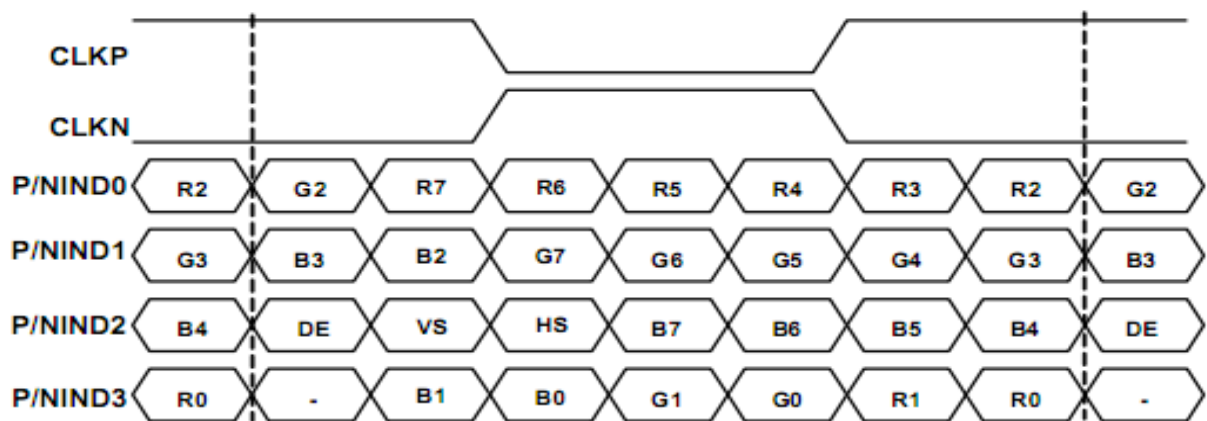


Figure 40. 8-bit LVDS Input (LVBIT=H, LVFMT=L)

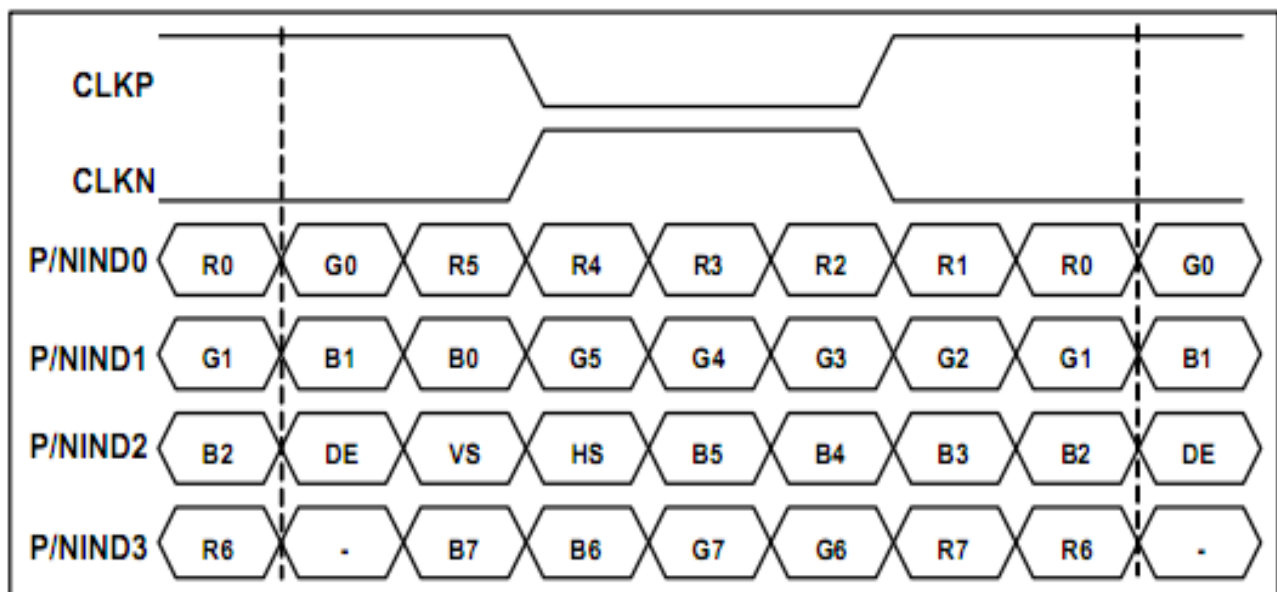
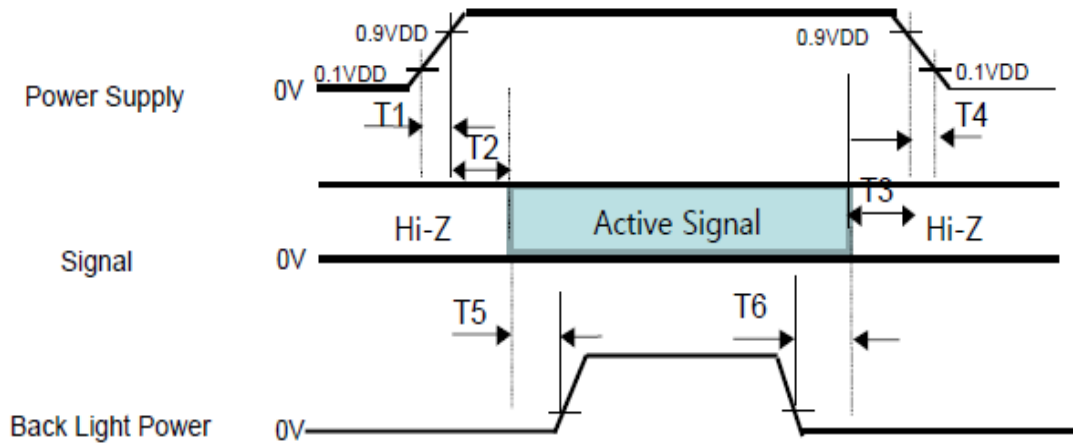


Figure 41. 8-bit LVDS Input (LVBIT=H, LVFMT=H)

5.3 POWER SEQUENCE



- $0.5\text{ms} \leq T1 \leq 10\text{ ms}$
- $10\text{ ms} \leq T2$
- $10\text{ ms} \leq T3$
- $0\text{ ms} \leq T4 \leq 10\text{ms}$
- $100\text{ms} \leq T5$
- $100\text{ ms} \leq T6$

Notes:

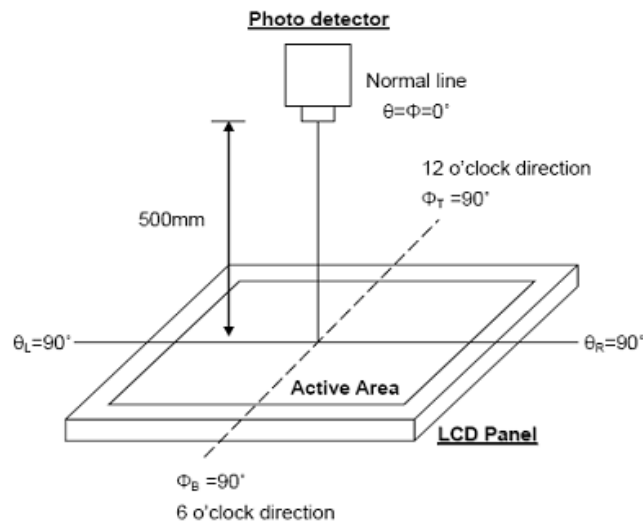
1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

6. OPTICAL CHARACTERISTICS

 $T_a = 25^{\circ}\text{C} \pm 2$

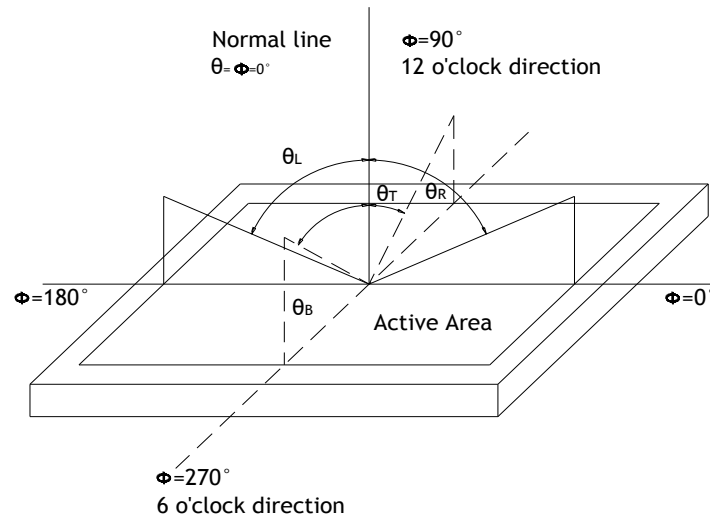
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\Theta = 0^{\circ}$	-	900	-		Note1 Note4
Luminance		YL		650	-	-	cd/m2	Note1 Note6 Note7
Luminance Uniformity		IV-M		80	85		%	
Response Time (Rising + Falling)		T _{RT}	Ta= 25°C $\Theta = 0^{\circ}$	-	30	50	ms	Note1 Note3
Viewing Angle range	Left	Θ	CR > 10	-	85	-	degree	Note2
	Right	Θ		-	85	-	degree	
	Up	Φ		-	85	-	degree	
	Down	Φ		-	85	-	degree	
Color Chromaticity (CIE1931)	White	x		0.253	0.303	0.350		Note1 Note5 Note7
		y		0.270	0.320	0.370		
	Red	x		0.604	0.654	0.704		
		y		0.269	0.319	0.367		
	Green	x		0.206	0.259	0.309		
		y		0.524	0.573	0.625		
	Blue	x		0.090	0.142	0.190		
		y		0.034	0.084	0.134		
NTSC				-	70	-	%	

Note1: Definition of optical measurement system



Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note3: 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%.

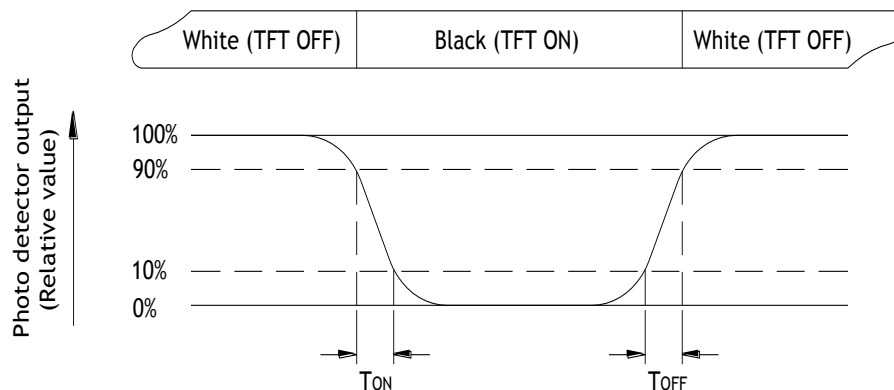


Fig. 6-3 Definition of response time

Note4: Definition of contrast ratio

$$\text{Contrast ratio(CR)} = \frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

“White state “: The state is that the LCD should drive by Vwhite.

“Black state”: The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

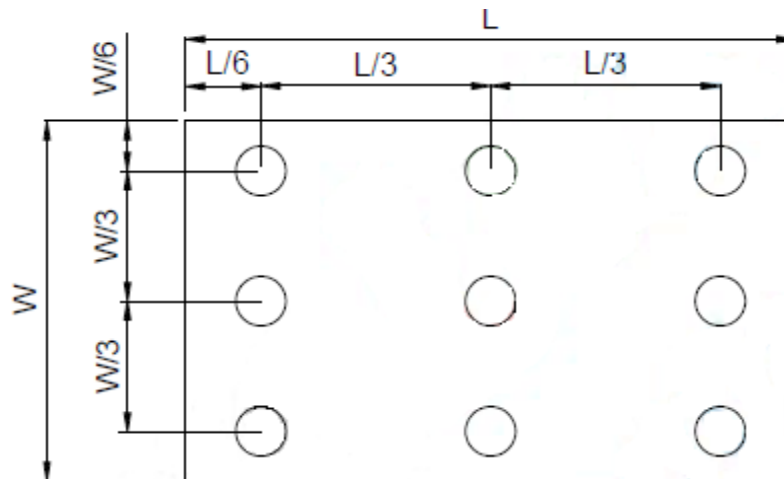
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=207mA.

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = $L_{\min} / L_{\max}$

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



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

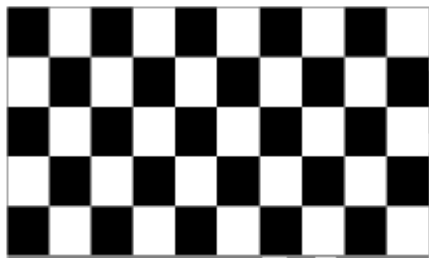
7.RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=80℃; 240hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-30℃; 240hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=70℃; 240 Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=-20℃; 240hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=70℃ , 90%RH , 48Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-20℃ (0.5h) ~ 70℃ (0.5h) / 10 cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃ ; 4hrs	Note1

Note1:Condition of image sticking test :25℃±2℃

Operation with test pattern sustained for 2hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

7.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s ² ,6ms, ±x,y,z 3times for direction	IEC60068-2-27 : 1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32 : 1990 GB/T2423.8-1995

7.3ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF , 330Ω , Contact:±4KV,Air:±8KV	1	IEC61000-4-2 : 2001 GB/T17626.2-2006
	200pF , 0Ω , ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

8. GENERAL PRECAUTION

8.1 SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
2. If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
3. If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $50\pm20\%\text{RH}$.
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketone solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly. Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

8.4 WARRANTY

- (1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- (2) Do not repaired or modified the LCM. It may cause function to lose efficacy, XianChuang does not warrant the LCM.
- (3) All process and material comply ROHS.

9. PACKAGE DRAWING

