PRODUCT SPECIFICATION

■ Tentative Specification
□ Preliminary Specification
□ Approval Specification

MODELNAME:YH104AT9001

Version:RN01

Customer: Common

APPROVED BY **SIGNATURE**

Name / Title
Note

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By

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1. General Description

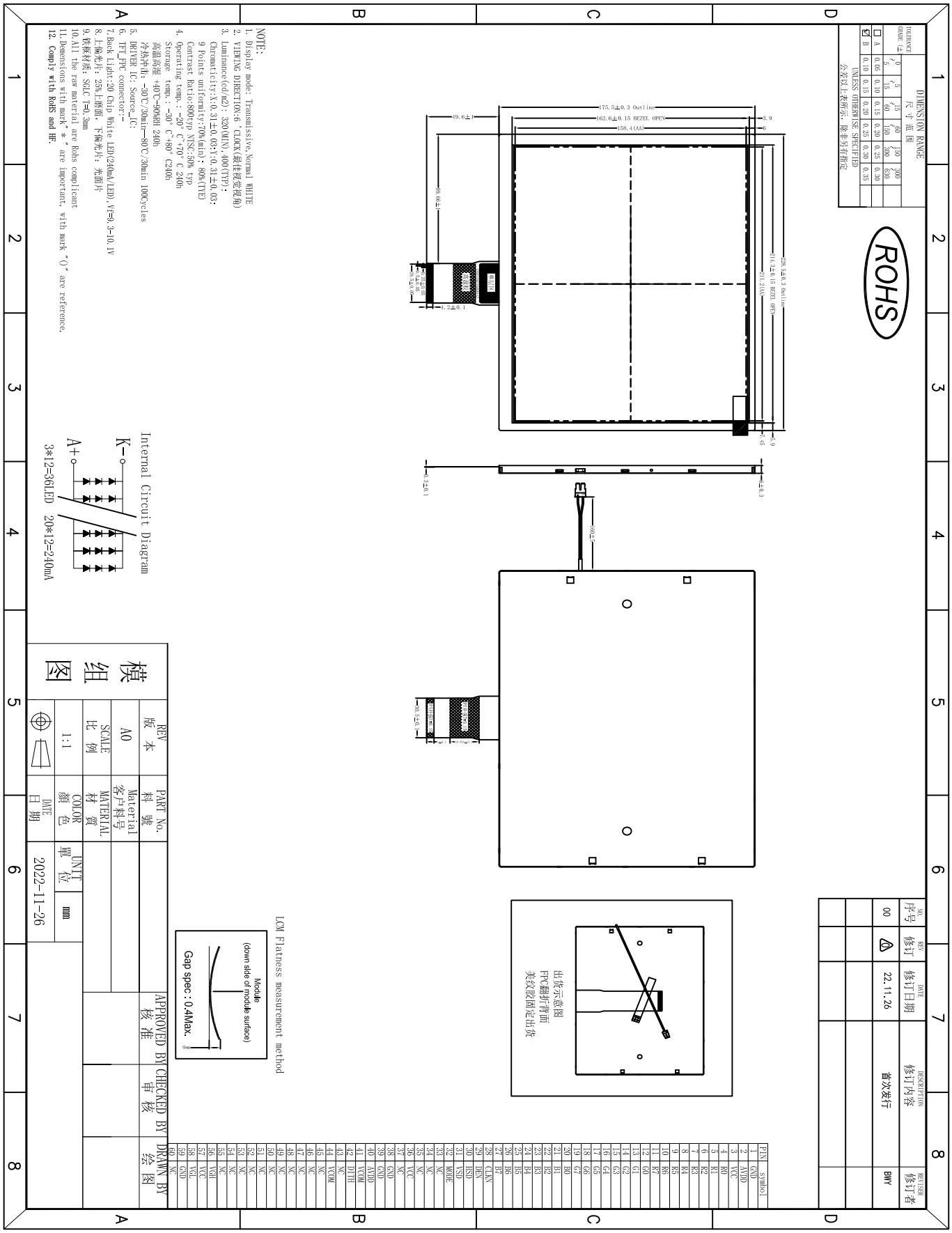
1.1 Description

YH104AT9001 is a color active matrix thin film transistor (TFT) TN liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC ,BL;

1.2 Features:

No.	Item	Specification	Unit
1	Panel Size	10.4”	inch
2	Number of Pixels	800×RGB (3) ×600	pixels
3	Active Area	211.2(H) × 158.4(V)	mm
4	Pixel Pitch	0.264(H)×RGB×0.264(V)	um
5	Outline Dimension	228.5(W)×175.5(H)×6.0(T)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally White	-
8	Viewing Direction	6 o’clock	-
9	Pixel Arrangement	RGB vertical stripe	-
10	Border(L/R/U/D)	6.5/2.5/2.5/8	mm
11	Contrast Ratio	800(TYP.)	
12	Surface Treatment	Anti-glare	-
13	Interface	RGB	-
14	Transmittance	Typ.5.8%,Min.5.3%	-
15	Operation Temperature	-20~70	℃
16	Storage Temperature	-30~80	℃
17	Driver IC		
18	Response Time	Typ.25,Max.35	MS

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

FH19SC-60S-0.5SH (05)

Pin	Symbol	I/O	Function	**Remark**
1	GND	G	Power Ground	
2	AVDD	P	Analog input voltage	
3	VCC	P	Digital input voltage	
4	R0	I	Red data input (LSB)	
5	R1	I	Red data input	
6	R2	I	Red data input	
7	R3	I	Red data input	
8	R4	I	Red data input	
9	R5	I	Red data input	
10	R6	I	Red data input	
11	R7	I	Red data input (MSB)	
12	G0	I	Green data input (LSB)	
13	G1	I	Green data input	
14	G2	I	Green data input	
15	G3	I	Green data input	
16	G4	I	Green data input	
17	G5	I	Green data input	
18	G6	I	Green data input	
19	G7	I	Green data input (MSB)	
20	B0	I	Blue data input (LSB)	
21	B1	I	Blue data input	
22	B2	I	Blue data input	
23	B3	I	Blue data input	
24	B4	I	Blue data input	
25	B5	I	Blue data input	
26	B6	I	Blue data input	
27	B7	I	Blue data input (MSB)	
28	CLKIN	I	Dot clock input	
29	DEN	I	Data enable signal	
30	HSD	I	HSYNC signal	
31	VSD	I	VSYNC signal	

32	MODE	I	H: DE mode (Default) L: SYNC mode	
33	NC	I	No connect (please leave it open)	
34	NC	I	No connect (please leave it open)	
35	NC	-	No connect (please leave it open)	
36	VCC	P	Digital input voltage	
37	NC	-	No connect (please leave it open)	
38	GND	G	Power Ground	
39	GND	G	Power Ground	
40	AVDD	P	Analog input voltage	
41	VCOM	P	VCOM DC input	
42	DITH	I	Dithering function setting H: Disable dithering function L: Enable dithering function	
43	NC	-	No connect (please leave it open)	
44	VCOM out	O	connect a capacitor	
45	NC		No connect (please leave it open)	
46	NC		No connect (please leave it open)	
47	NC		No connect (please leave it open)	
48	NC		No connect (please leave it open)	
49	NC		No connect (please leave it open)	
50	NC		No connect (please leave it open)	
51	NC		No connect (please leave it open)	
52	NC		No connect (please leave it open)	
53	NC		No connect (please leave it open)	
54	NC		No connect (please leave it open)	
55	NC	-	No connect (please leave it open)	
56	VGH	P	TFT turn on voltage	
57	VCC	P	Digital input voltage	
58	VGL	P	TFT turn off voltage	
59	GND	G	Power Ground	
60	NC	-	No connect (please leave it open)	

I：input , O：output , P：Power

【Note】

*1)： When L/R="0" , set right to left scan dirction
When L/R="1" , set left to right scan dirction
When U/D="0" , set top to bottom scan dirction
When U/D="1" , set bottom to top scan dirction

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Ta = 25℃±2

Item	Symbol	Min.	Max.	Unit	Conditions
Digital Supply Voltage	VDD	-0.5	3.66	V	
TFT Gate on voltage	VGH	-0.3	40	V	
TFT Gate off voltage	VGL	VGH-42	0.3	V	
Analog power supply voltage	AVDD	-0.5	13.85	V	

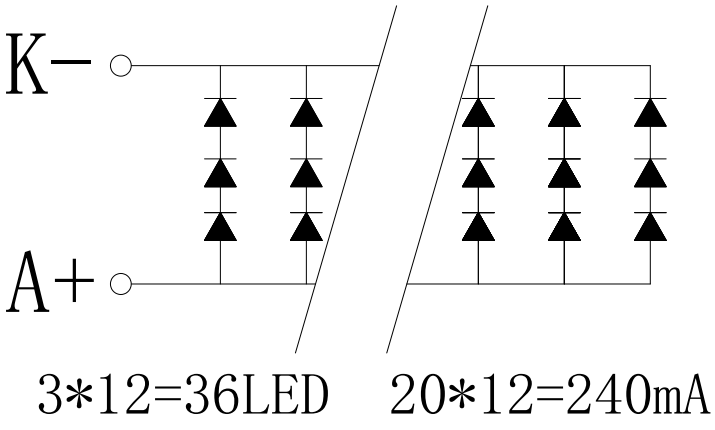
4.2 TFT LCD MODULE

4.2.1 Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Digital Supply Voltage	VDD	3.2	3.3	3.8	V	
TFT Gate on voltage	VGH	--	19.3	--	V	
TFT Gate off voltage	VGL		-6.8		V	
TFT Common electrode voltage	VCOM		-3.8		V	
Analog power supply voltage	AVDD		10		V	

4.2.2 BL

20 Chip White LED(240mA/LED),Vf=9.3-10.1V



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

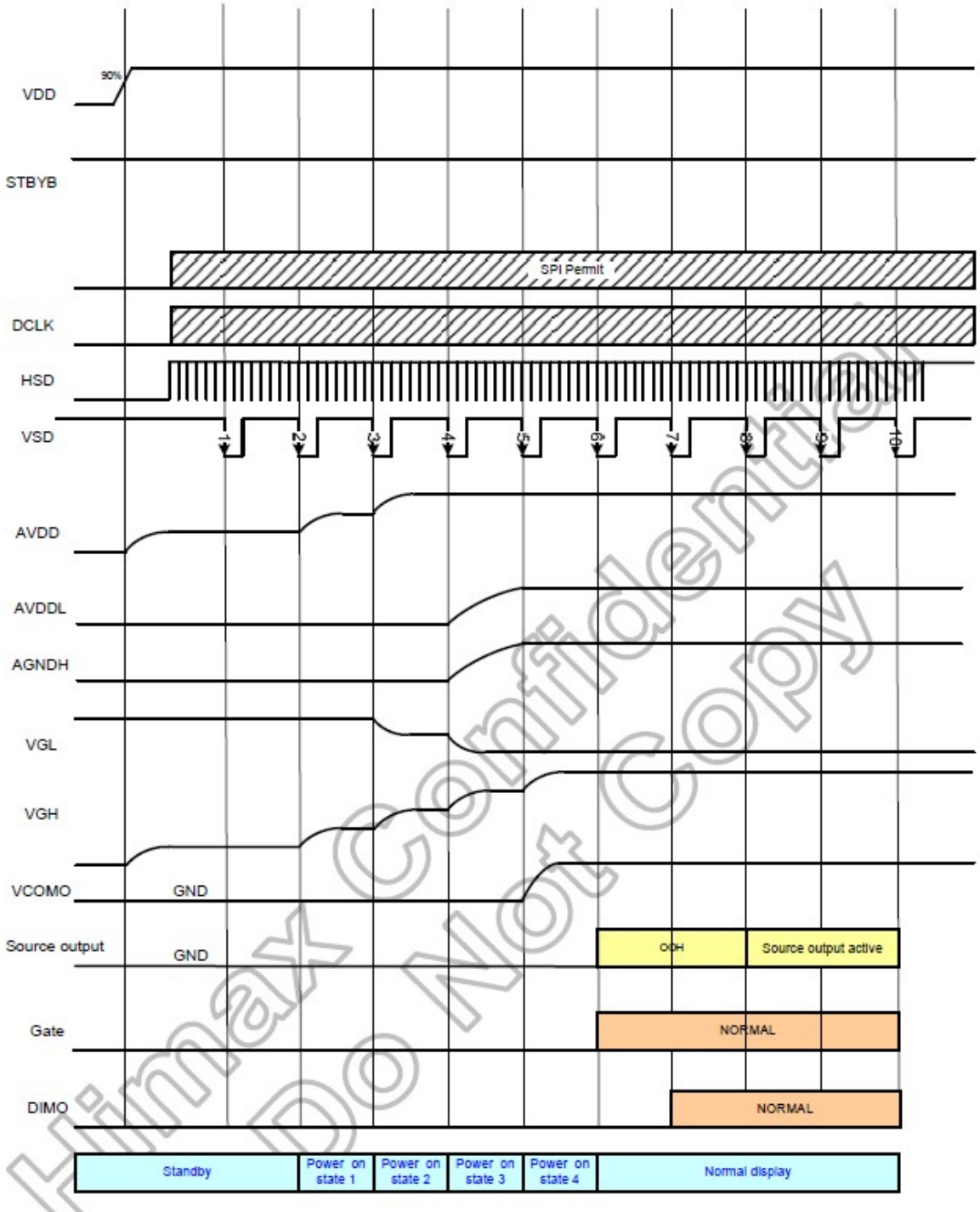


Figure 8.1: Power on timing sequence

Power on timing sequence

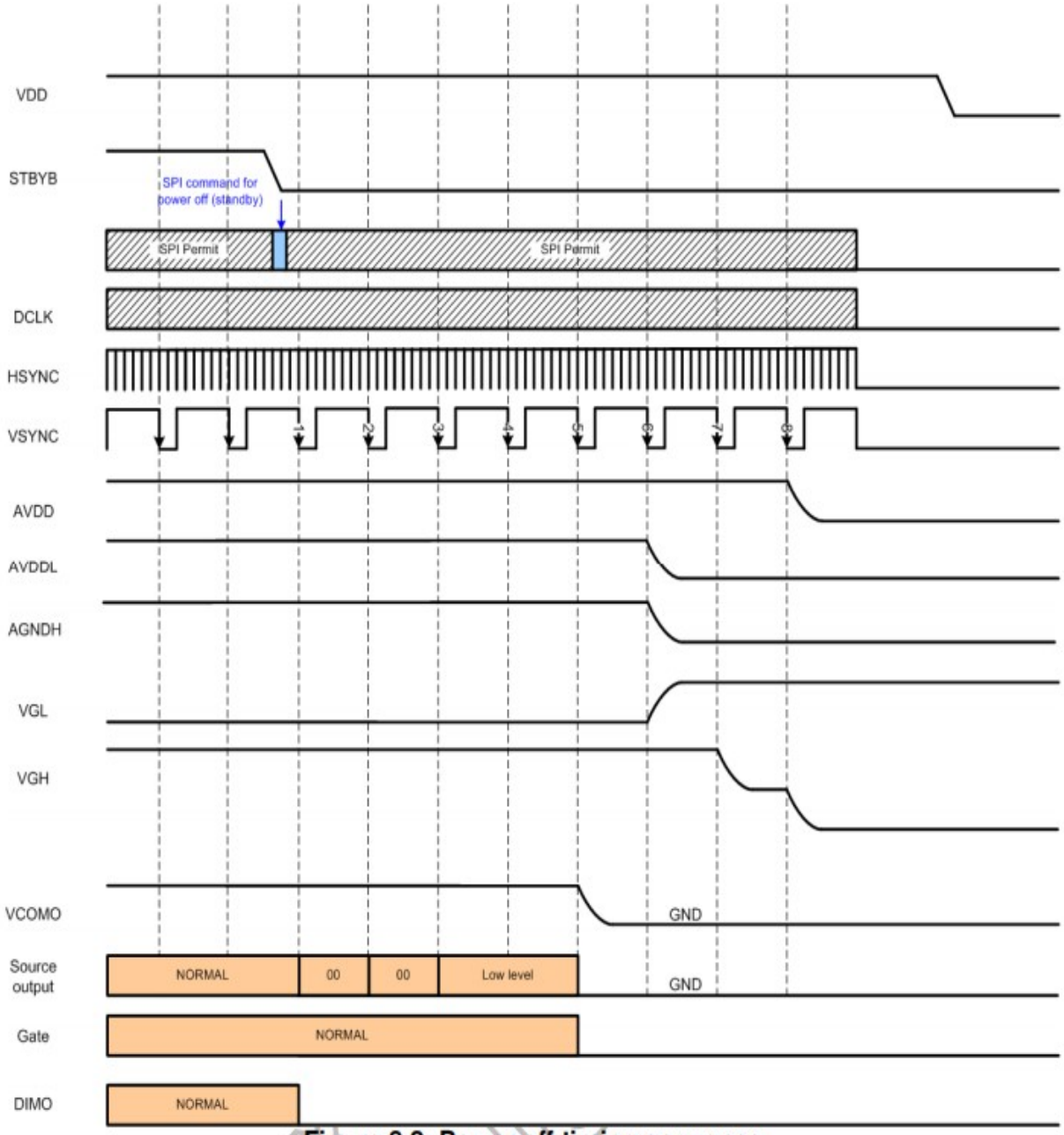


Figure 8.2: Power off timing sequence

Note: Low level=3FH, when NBW=L (Normally white)
Low level=00H, when NBW=H (Normally black)

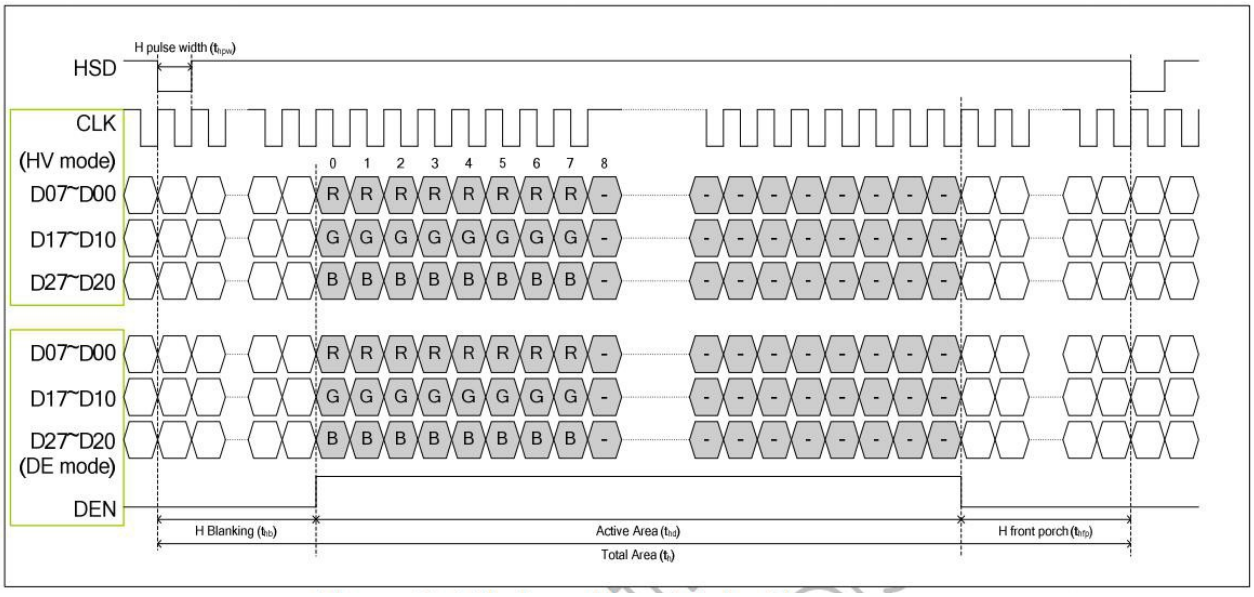
Power off timing sequence

5. INPUT SIGNAL TIMING

DATA INPUT FORMAT

5.1.1 RGB mode data input format

Horizontal timing:



- **DE mode**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	32.6	39.6	62.4	MHz
Horizontal Display Area	thd		800		DCLK
HSD Period	th	890	1000	1300	DCLK
HSD Blanking	thb+ thfp	90	200	500	DCLK
Vertical Display Area	tvd		600		T_H
VSD Period	tv	610	660	800	T_H
VSD Blanking	tvbp+ tvfp	10	60	200	T_H

Table 10.10: DE mode (800x600)

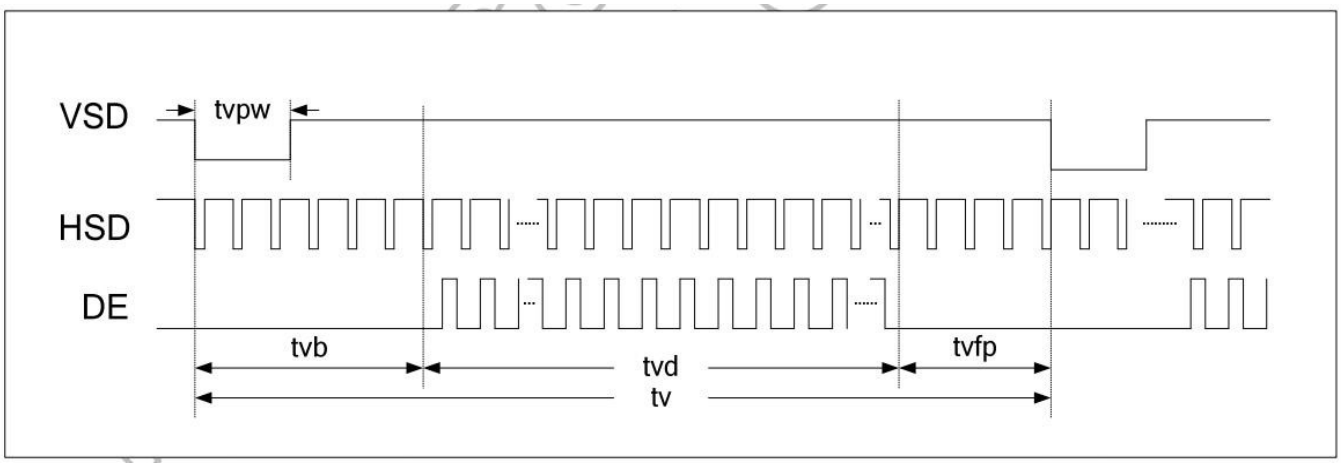
- **HV mode**

Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	34.5	39.6	50.4	MHz
Horizontal Display Area	thd		800		DCLK
HSD Period	th	900	1000	1200	DCLK
HSD Pulse Width	thpw	1	-	40	DCLK
HSD Back Porch	thbp		88		DCLK
HSD Front Porch	thfp	12	112	312	DCLK

Table 10.11: HV mode horizontal timing (800x600)

Vertical timing:

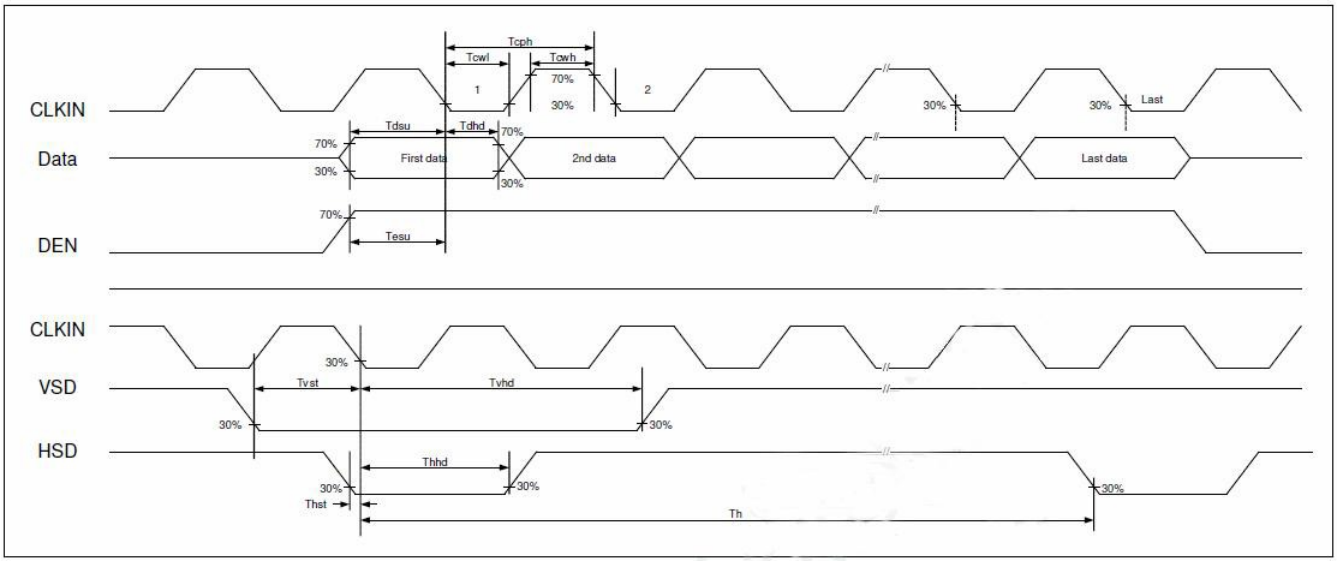


Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		T_H
VSD Period	tv	640	660	700	T_H
VSD Pulse Width	tvpw	1	-	20	T_H
VSD Back Porch	tvbp		39		T_H
VSD Front Porch	tvfp	1	21	61	T_H

Table 10.12: HV mode vertical timing (800x600)

5.2 TIMING DIAGRAM

5.2.1 Input Clock and Data Timing Diagram



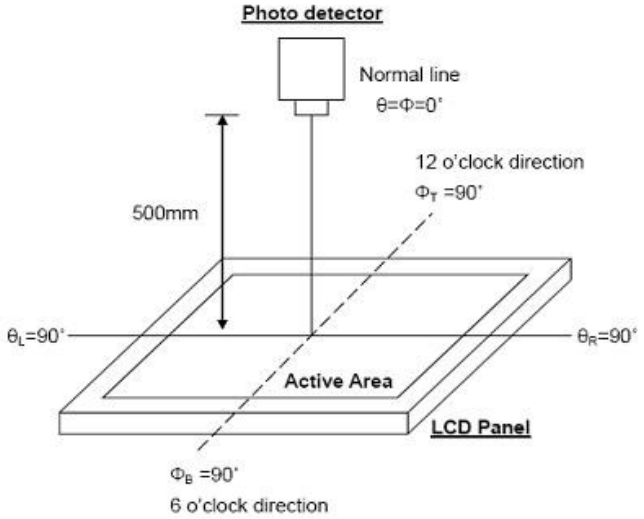
6. OPTICAL CHARACTERISTICS

Ta=25℃±2

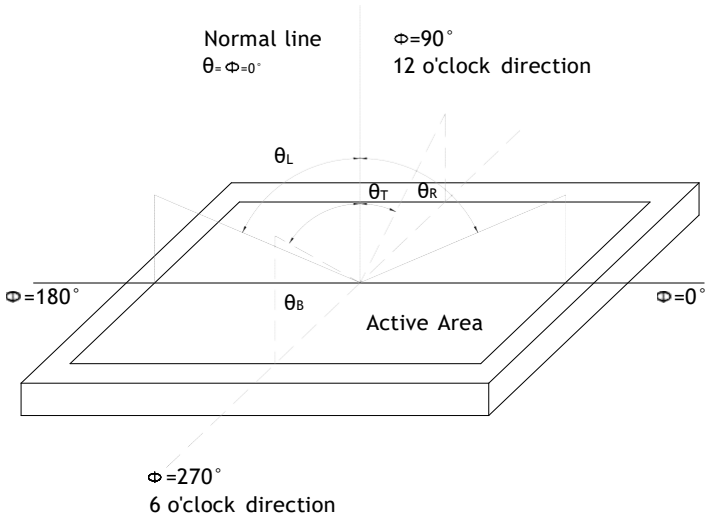
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	Θ = 0°	600	800	-		Note1 Note4
Transmittance		Tr		5.3	5.8	-	%	Note1 Note6 Note7
Luminance Uniformity		IV-M		70	80	-	%	
Response Time	Rising	T_R	Ta= 25℃ Θ = 0°	-	5	10	ms	Note1 Note3
	Falling	T_F		-	20	25		
Viewing Angle range	Left	Θ	CR > 10	60	80	-	degree	Note2
	Right	Θ		60	80	-	degree	
	Up	Φ		50	80	-	degree	
Luminance				320	400	-	Cd/m^2	

	Down	Φ		60	80	-	degree	
Color Chromaticity (CIE1931)	White	x		0.27	0.30	0.33		Note1 Note5 Note7
		y		0.27	0.30	0.33		
	Red	x			0.616			
		y			0.284			
	Green	x			0.284			
		y			0.538			
	Blue	x			0.148			
		y			0.141			
NTSC				45	60		%	

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 (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

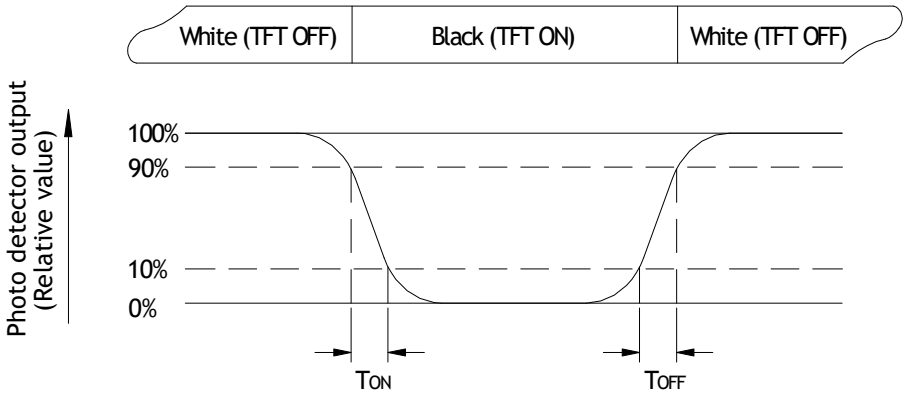


Fig. 6-3 Definition of response time

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.

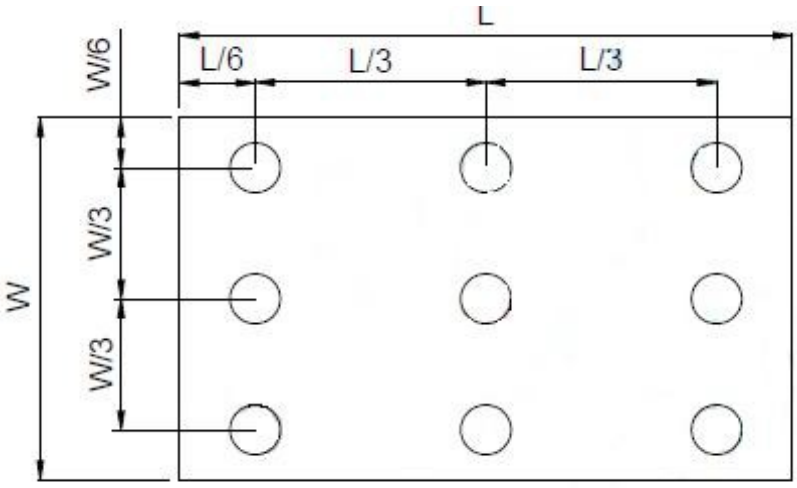
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=350mA

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) = Lmin/ Lmax

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.

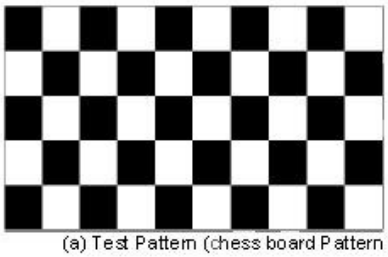
7. Quality Assurance System

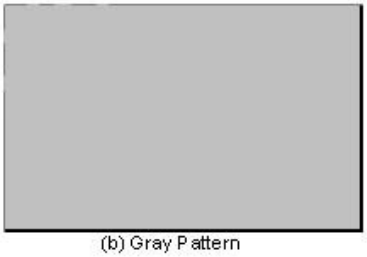
7.1 Temperature and Humidity

Test Item	Test Condition	Remark
HighTemperatureStorage	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℃; 240hrs	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=60℃，90%RH， 72Hrs(no condensation)	IEC60068-2-78：2001 GB/T2423.3-2006
Thermal Shock	-20℃(0.5h) ~ 70℃(0.5h) / 10cycles	Start with cold temperature， End with high temperature， IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃ ; 2hrs	Note1

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

Operation with test pattern sustained for 2hrs,then change to gray pattern immediately.after 5 mins,the mura 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/s2,6ms, ±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. PRECAUTION RELATING PRODUCT HANDLING

8.1 SAFETY

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal ispoisonous.
(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±5° C andthe humidity is below 50±20%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 verycarefully.
(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 theSurface of plate.
(6) Do not use ketonics 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 longtime, staining and discoloration may occur.
(11) f the liquid crystal material leaks from the panel,it should be kept away from theeyes or mouth.In case of contact with hands,legs or clothes, it must be washedaway 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 ,ZY does not warrant the LCM.
(3) All process and material comply ROHS.

9. PACKAGE DRAWING