深圳显旸光电科技有限公司
Shenzhen Xianyang Optoelectronic Technology Co., Ltd

PRODUCTION SPECIFICATION OF LCD MODULE

MODULE NO.：XY101HWX8785ANT

Customer Name:			
Customer Part Number:			
Approved By:		**Date:**	

Prepared By	Checked By	Approved By
Ray	Jessica	Jack

Table of Contents

Revision History

Rev	Issued Date	Description	Page	Editor
1.0	Mar. 06, 2024	First release	All	

1 General Specifications

Feature		Specifications
Display Spec.	LCD type	10.1 inch
	Resolution (H*V)	1280(RGB)×800
	Technology Type	a-Si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Viewing Direction	ALL
	Gray Scale Inversion Direction	ALL
Mechanical Characteristics	OutlineDimensions (W x H x T) (mm)	229.46* 149.1*4.5
	Active Area(mm)	216.96* 135.6
	With /Without Touch screen	Without
	Match Connector Type	0.5 Pitch 40 Pin
	Backlight Type	White LED
	Weight (g)	TBD
Electrical Characteristics	Interface	LVDS
	Number of color	16.7M
	Driver IC	-

2 Pin Assignment

No.	Symbol	Description	Note
1	VCOM(-0.65V)	Common voltage	
2-3	VDD（3.3V）	Power Supply	
4	NC	No connection	
5	RESET	Reset Pin for LCM	
6	STBYB	Standby mode, normally pull high STBYB=" 1", normal operation STBYB="0", source driver will turn off, all output are high-Z	
7	GND	Ground	
8	RXIN0-	- LVDS differential data input	
9	RXIN0+	+ LVDS differential data input	
10	GND	Ground	
11	RXIN1-	- LVDS differential data input	
12	RXIN1+	+ LVDS differential data input	
13	GND	Ground	
14	RXIN2-	- LVDS differential data input	
15	RXIN2+	+ LVDS differential data input	
16	GND	Ground	
17	RXYLK-	- LVDS differential clock input	
18	RXYLK+	+ LVDS differential clock input	
19	GND	Ground	
20	RXIN3-	- LVDS differential data input	
21	RXIN3+	+ LVDS differential data input	
22	GND	Ground	
23-24	NC	No connection	
25	GND	Ground	
26	NC	No connection	
27	LVBIT	6bit/8bit mode select	Note 1
28	NC	No connection	
29	VSP(5.5V)	Input voltage from the set-up circuit (5.5V).	
30	NC	No connection	
31-32	LEDK	Power for LED backlight (Cathode)	
33	NC	No connection	
34	VSN(-5.5V)	Input voltage from the set-up circuit (-5.5V).	
35	NC	No connection	
36	VGL(-10V)	Gate OFF Voltage	
37	NC	No connection	
38	VGH(18V)	Gate ON Voltage	
39-40	LEDA	Power for LED backlight (Anode)	

3 Absolute Maximum Ratings

GND=0V, Ta= 25℃

Item	Symbol	Value	Unit
Power supply voltage for logic	V_{DD}	2.3~3.6	V
Operating temperature	Topr	-20 to 70	° C
Storage temperature	Tstg	-30 to 80	° C

4 Electrical Characteristics

4.1 DC Characteristics

(Note 1)

Item	Symbol	Min	Type	Max	Unit	Test condition
Power voltage	VDD	2.3	2.8	3.6	V	**(Note 2)**
	AVDD	8.0	8.2	8.4	V	
	VGH	17.5	18	18.5	V	
	VGL	-10	-10.5	-11.5	V	
Input logic high voltage	VIH	0.8DVDD	-	DVDD	V	
Input logic low voltage	VIL	0		0.2DVDD	V	
Input signal voltage	VCOM	- 1.5	-0.65	-0.5	V	

Note 1: Be sure to apply VDD and V_{GL} to the LCD first, and then apply V_{GH}

Note 2: VDD setting should match the signals output voltage (refer to Note 3) of customer's system board

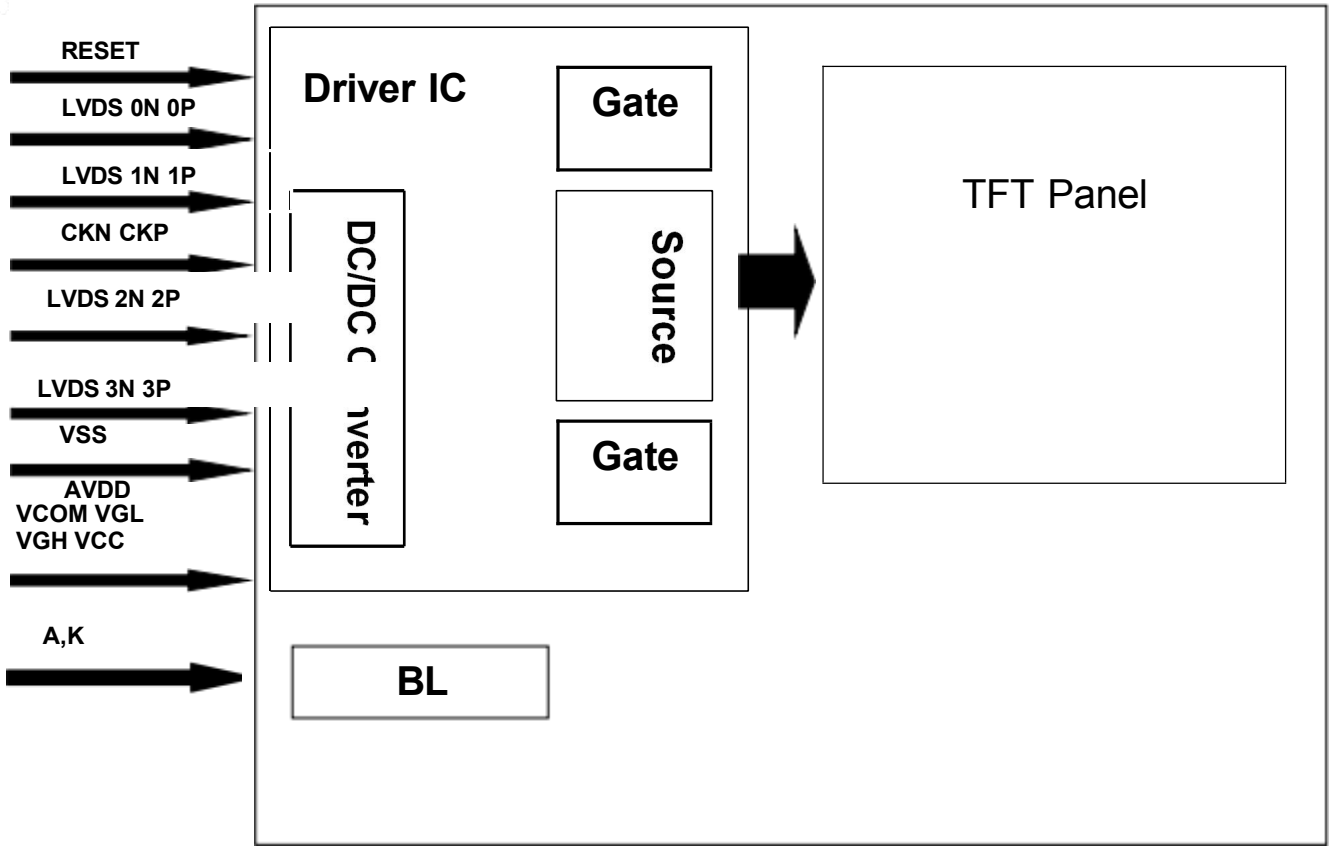
4.2

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	--	260	-	mA	
Forward Voltage	V_F	-	9.6	-	V	
Connection mode	P	--	7S6P	--		
LED number	/		42		pcs	
LED life time		50000			hours	

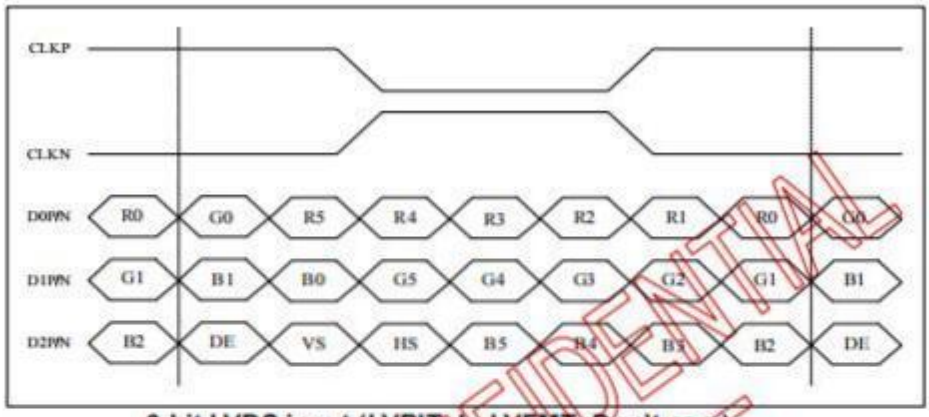
Note1: Optical performance should be evaluated at Ta=25℃ only .If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

4.3 Block Diagram

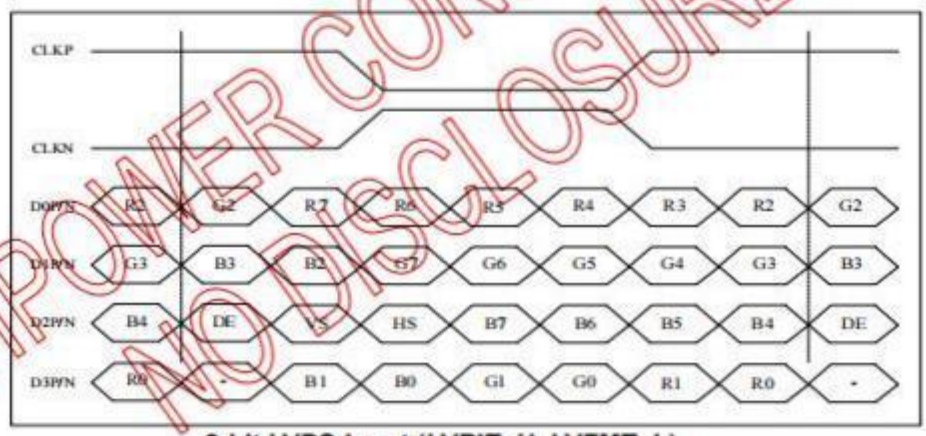


5 INTERFACE TIMING

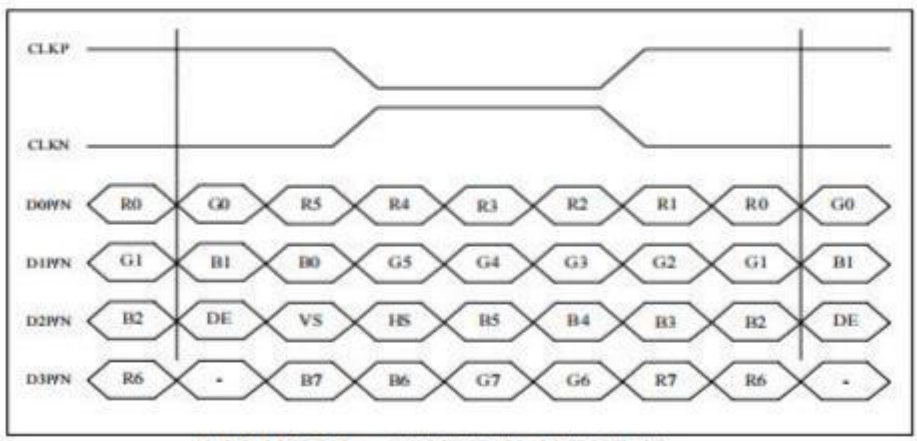
5.1 Data input format for LVDS



6-bit LVDS input (LVBIT=L, LVFMT=Don't care)



8-bit LVDS input (LVBIT=H, LVFMT=L)



8-bit LVDS input(LVBIT=H, LVFMT=H)

5.2 Timing Table

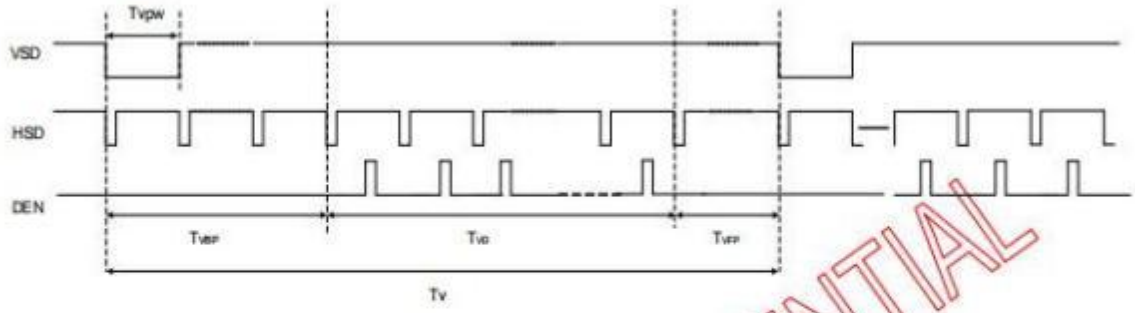
For 1280RGBx800

Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)		F_{DCLK}	66.3	72.4	78.9	MHz
HSYNC period time		T_H	1380	1440	1500	DCLK
Horizontal display area		T_{HD}		1280		DCLK
HSYNC pulse width	Min.	T_{HPW}		2		
	Typ.			-		
	Max.			40		
HSYNC back porch(with pulse width)		T_{HBP}	88	88	88	DCLK
HSYNC front porch		T_{HFP}	12	72	132	DCLK
VSYNC period time		T_V	824	838	872	H
Vertical display area		T_{VD}		800		H
VSYNC pulse width	Min.	T_{VPW}		2		H
	Typ.			-		
	Max.			20		
VSYNC back porch(with pulse width)		T_{VBP}	23	23	23	H
VSYNC front porch		T_{VFP}	1	15	49	H

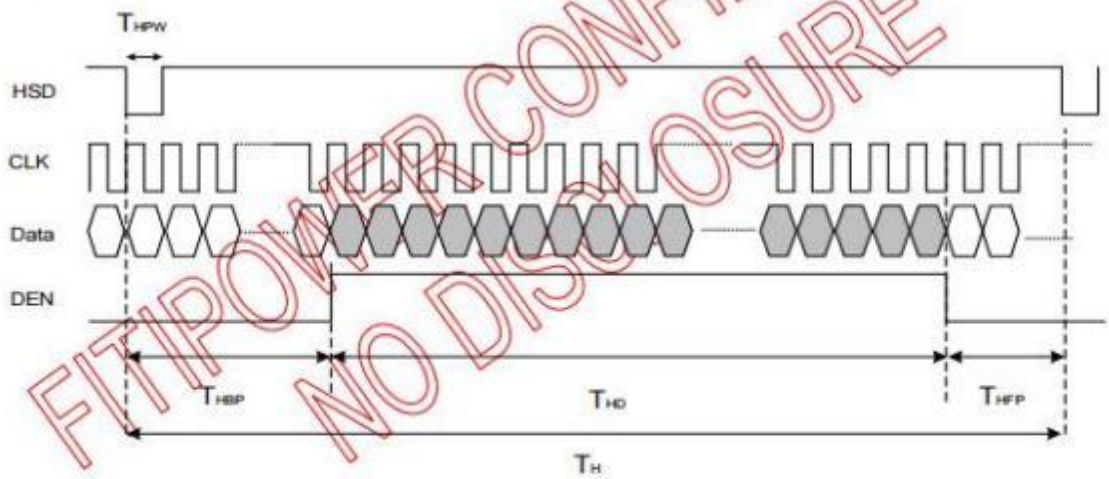
For 1280RGBx800 DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)	F_{DCLK}	69.7	75	80.9	MHz
Horizontal display area	T_{HD}		1280		DCLK
HSYNC period time	T_H	1380	1440	1500	DCLK
HSYNC blanking	$T_{HBP}+T_{HFP}$	100	160	220	DCLK
Vertical display area	T_{VD}		800		H
VSYNC period time	T_V	842	838	872	H
VSYNC blanking	$T_{VBP}+T_{VFP}$	24	38	72	H

Vertical timing



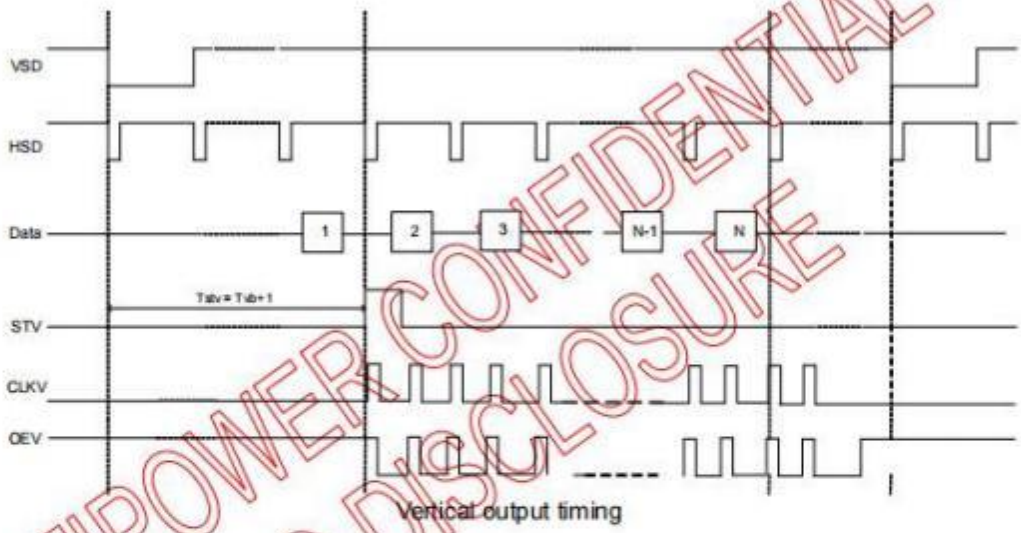
Horizontal timing



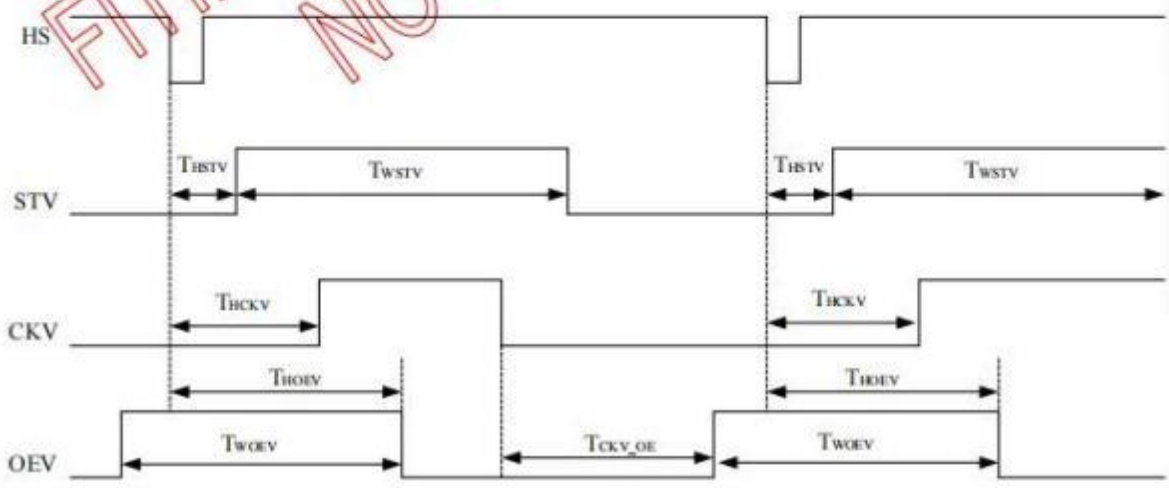
Gate Output Timing Table

(VDD=2.3 to 3.6V, VSS=VSSA=VSS_IF=0V, TA=-20 to +85℃)

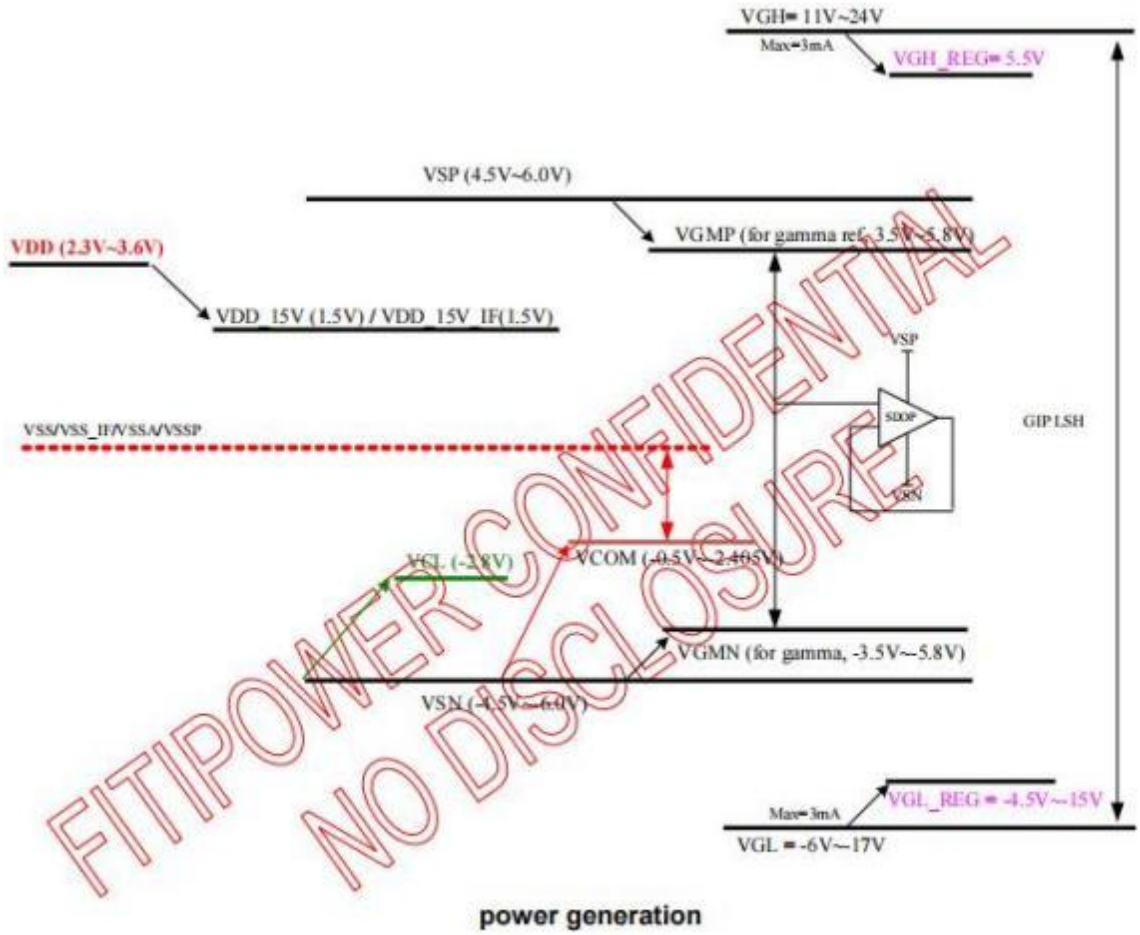
Parameter	Symbol	Min.	Typ.	Max.	Unit
STV Pulse Width	T_{WSTV}	-	1	-	H
Time from HSD to STV	T_{HSTV}	-	2	-	DCLK
Time from HSD to CKV	T_{HCKV}	-	25	-	DCLK
Time from HSD to OEV	T_{HOEV}	-	35	-	DCLK
Time from CKV to OEV	T_{CKV_OE}	-	168	-	DCLK
OEV Pulse Width	T_{WOEV}	-	188	-	DCLK



Vertical output timing

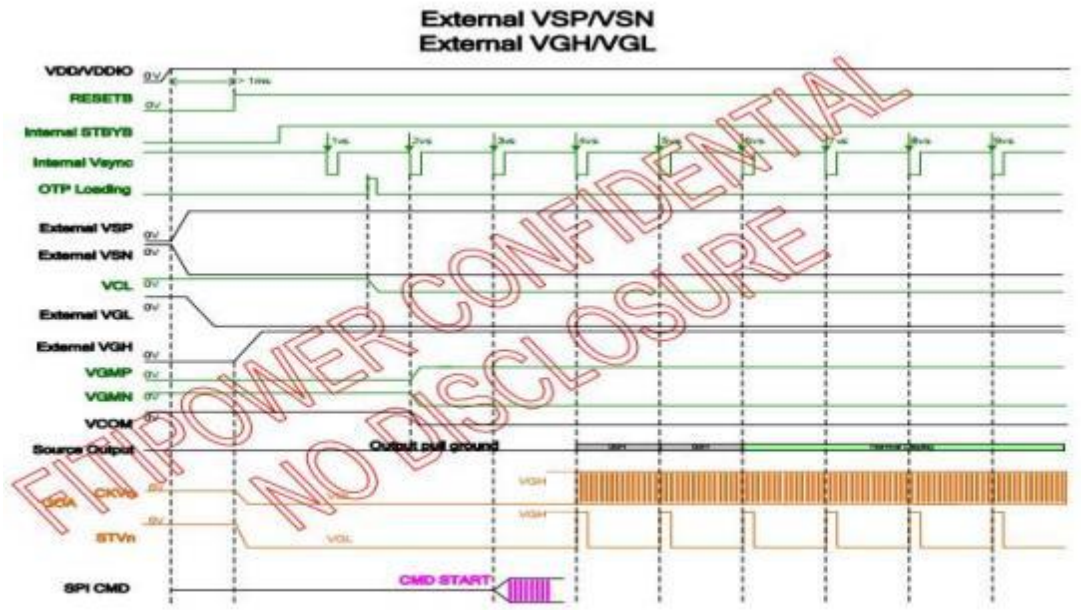


Gate output timing

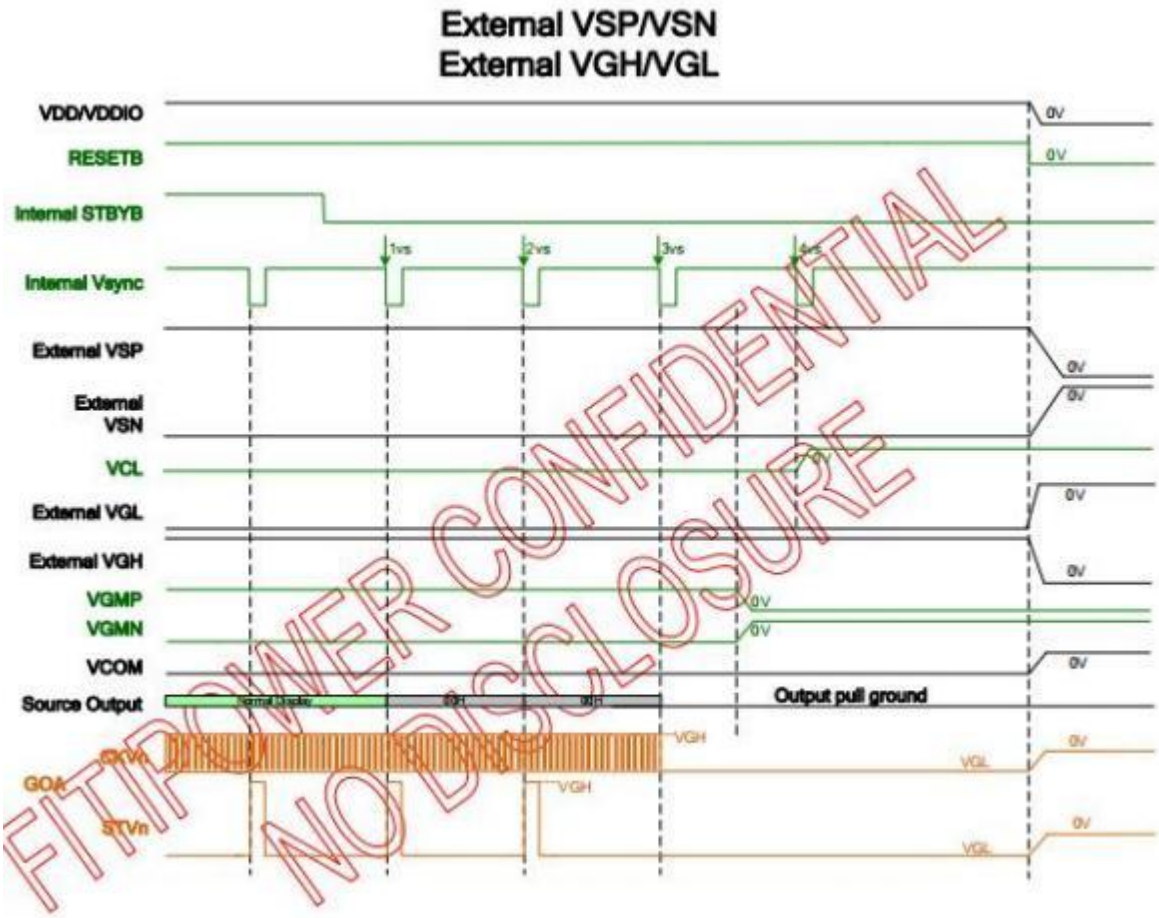


power generation

Power on sequence



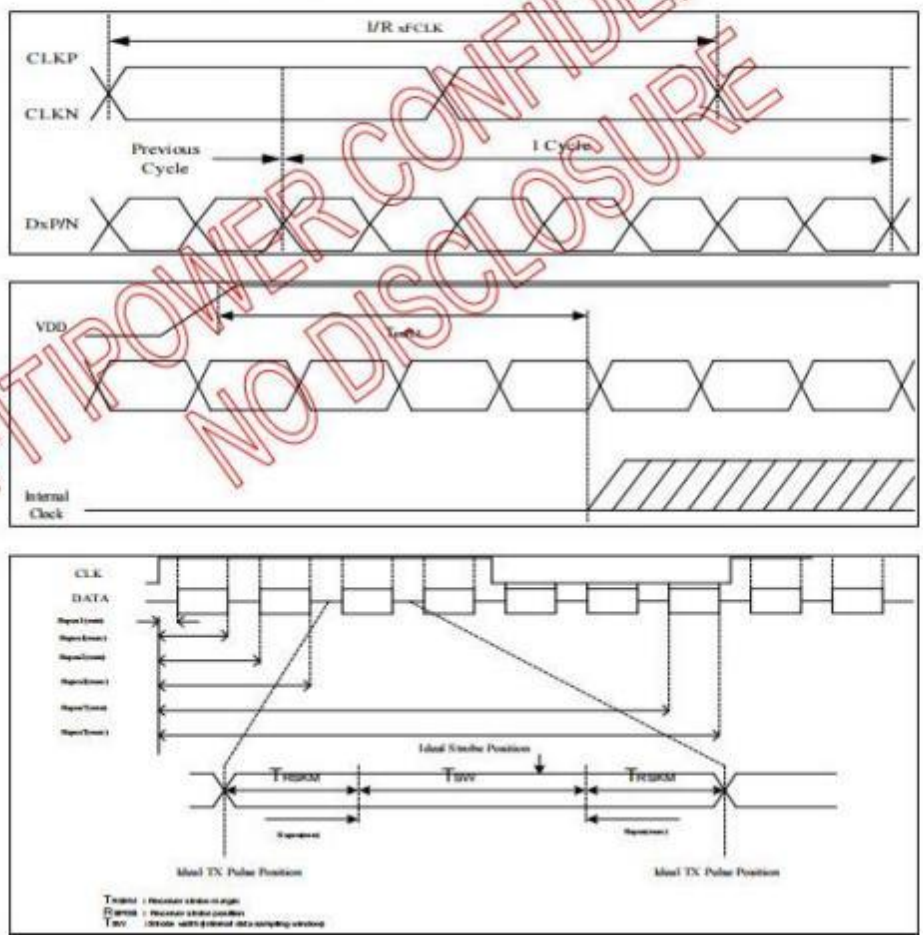
Power off sequence



LVDS mode AC electrical characteristics

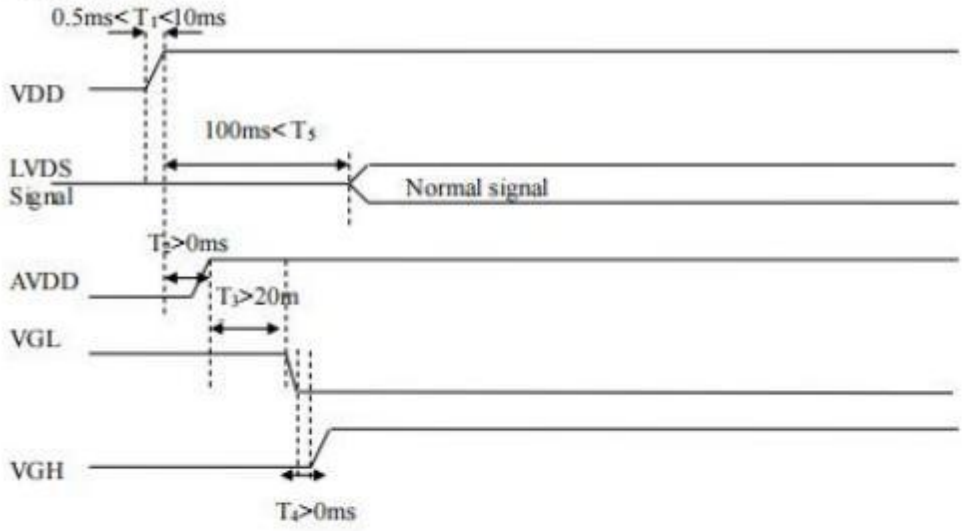
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	500	-	-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	

Table 13.1: LVDS mode AC electrical characteristics

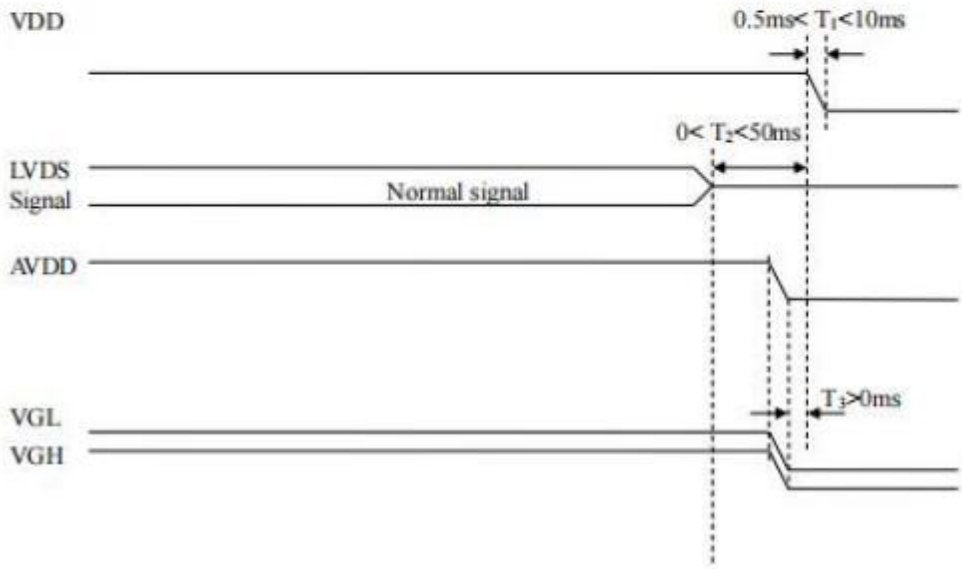


5.2 Power ON/OFF Timing

a. Power on:



b. Power off:



Note：VGH 電壓先于 VGL 下電或同時下電。

6 Optical Characteristics

Ta=25℃

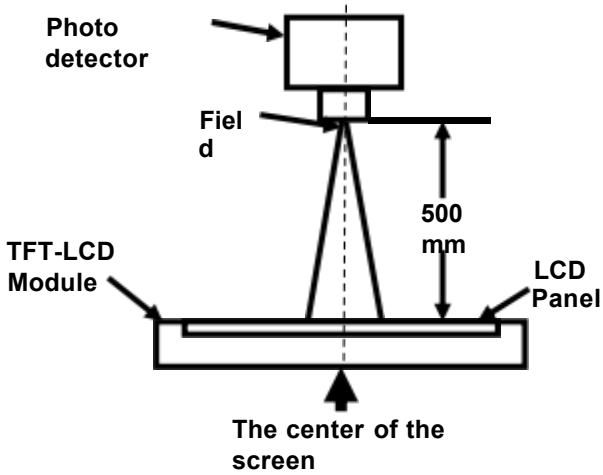
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	CR≧10	70	80	-	Degree	Note 2
	θB		70	80	-		
	θL		70	80	-		
	θR		70	80	-		
Contrast Ratio	CR	θ=0°	800	1000	-	-	Note1 Note3
Response Time	T_{ON}	25℃	-	25	35	ms	Note1 Note4
	T_{OFF}						
Uniformity	U	-	80	85	-	%	Note1 Note6
NTSC	-	-	-	50	-	%	Note 5
Luminance	L		-	600	-	cd/m^2	Note1 Note7

Test Conditions:

1. V_F=21V, I_F=360mA, the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

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

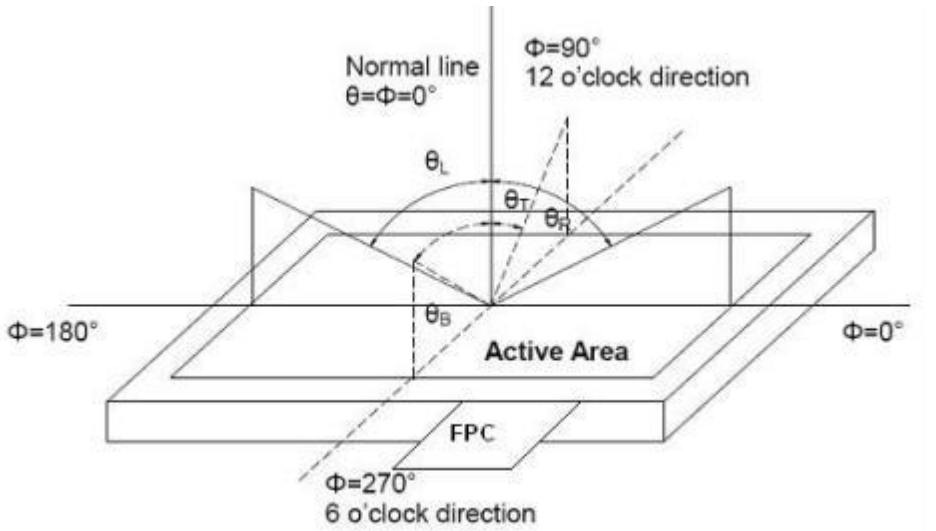


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

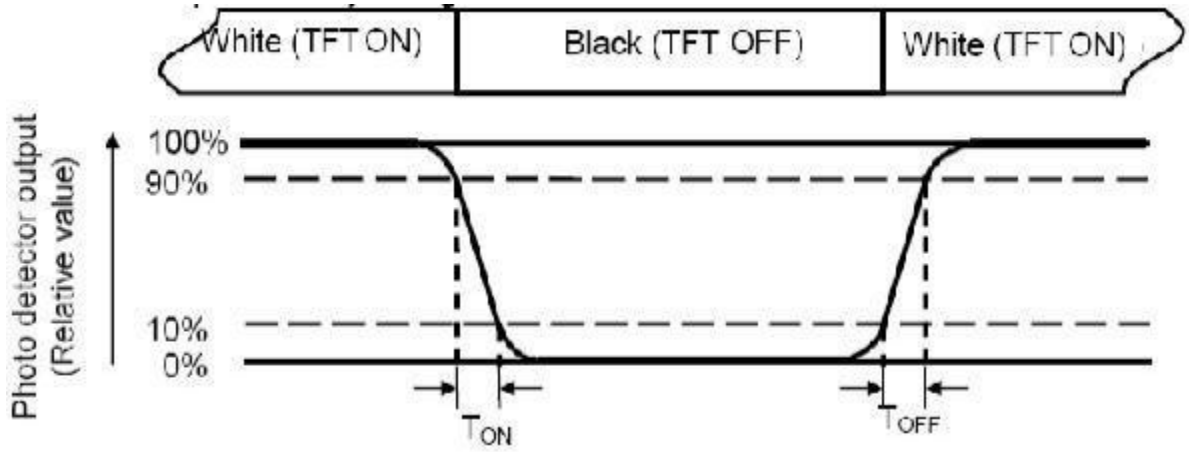
"White state ":The state is that the LCD should be driven by Vwhite.

"Black state": The state is that the LCD should be driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: 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%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). 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

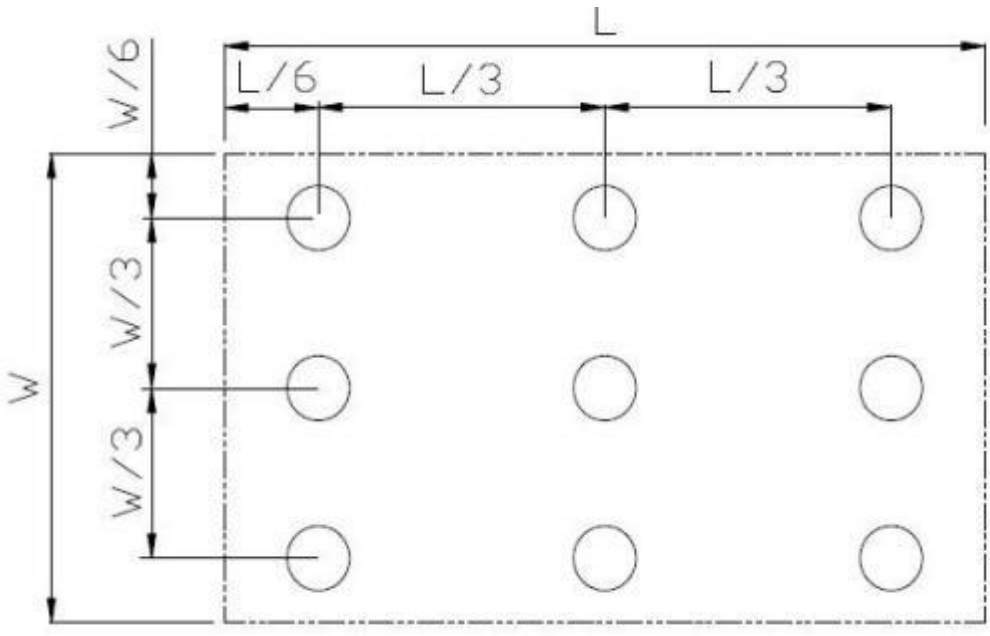


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

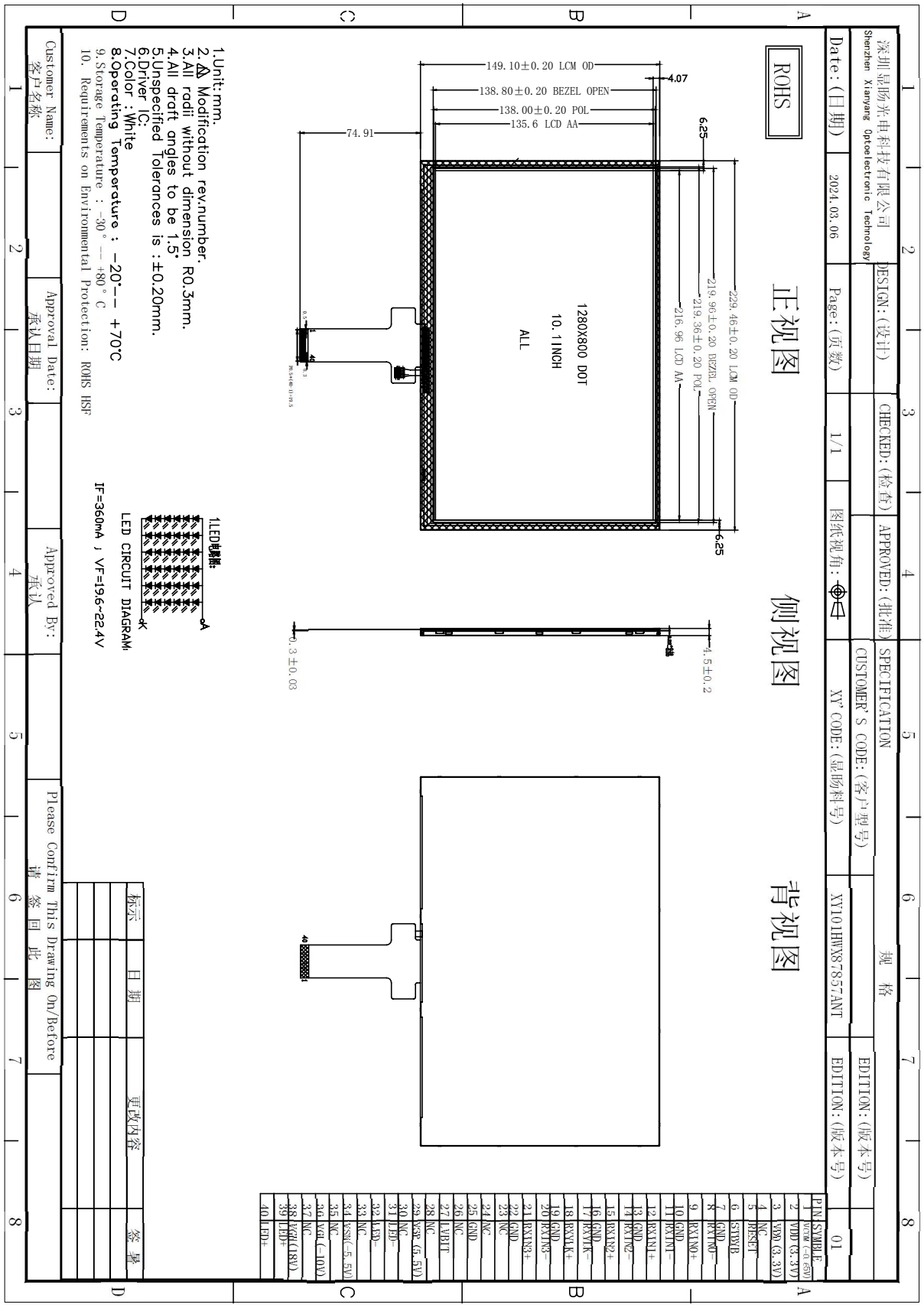
7 Environmental / Reliability Test

Item	Condition	Time (hrs)	Assessment
High temp. Storage	80。C	120	No abnormalities in functions and appearance
High temp. Operating	70。C	120	
Low temp. Storage	-30。C	120	
Low temp. Operating	-20。C	120	
Humidity	40。C/ 90%RH	120	
Thermal Shock(Non-operation)	-20。C ← 25。C →70。C (0.5 hour ← 5 min → 0.5 hour)	10cycles	

Remark:

1. The test samples should be applied to only one test item.
2. Sample size for each test item is 1~10pcs.
3. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

8 Mechanical Drawing



9 Precautions For Use of LCD Modules

9.1 Handling Precautions

9.1.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.1.3 Do not apply eXYessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

9.1.1.6 Do not attempt to disassemble the LCD Module.

9.1.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.1.9 Be sure to ground the body when handling the LCD Modules.

9.1.1.10 Tools required for assembly, such as soldering irons, must be properly ground.

9.1.1.11 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.1.12 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

9.1.1.13 Storage precautions

9.1.1.14 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.1.1.15 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

9.1.1.16 The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.2 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid eXYessive press, water, damp and sunshine.