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MODEL NO : ET101WS01-T

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2022-08-05

□**Preliminary Specification**

■**Final Product Specification**

Customer :_____

Approved by	Notes

Youri Confirmation

Prepared by	Reviewed by	Approved by
John	Johnny	Wang

1. Introduction

1.1 Scope of application

LCD specification: Dots 1024xRGBx600.
All material & processing of the LCD module should be Lead Free.

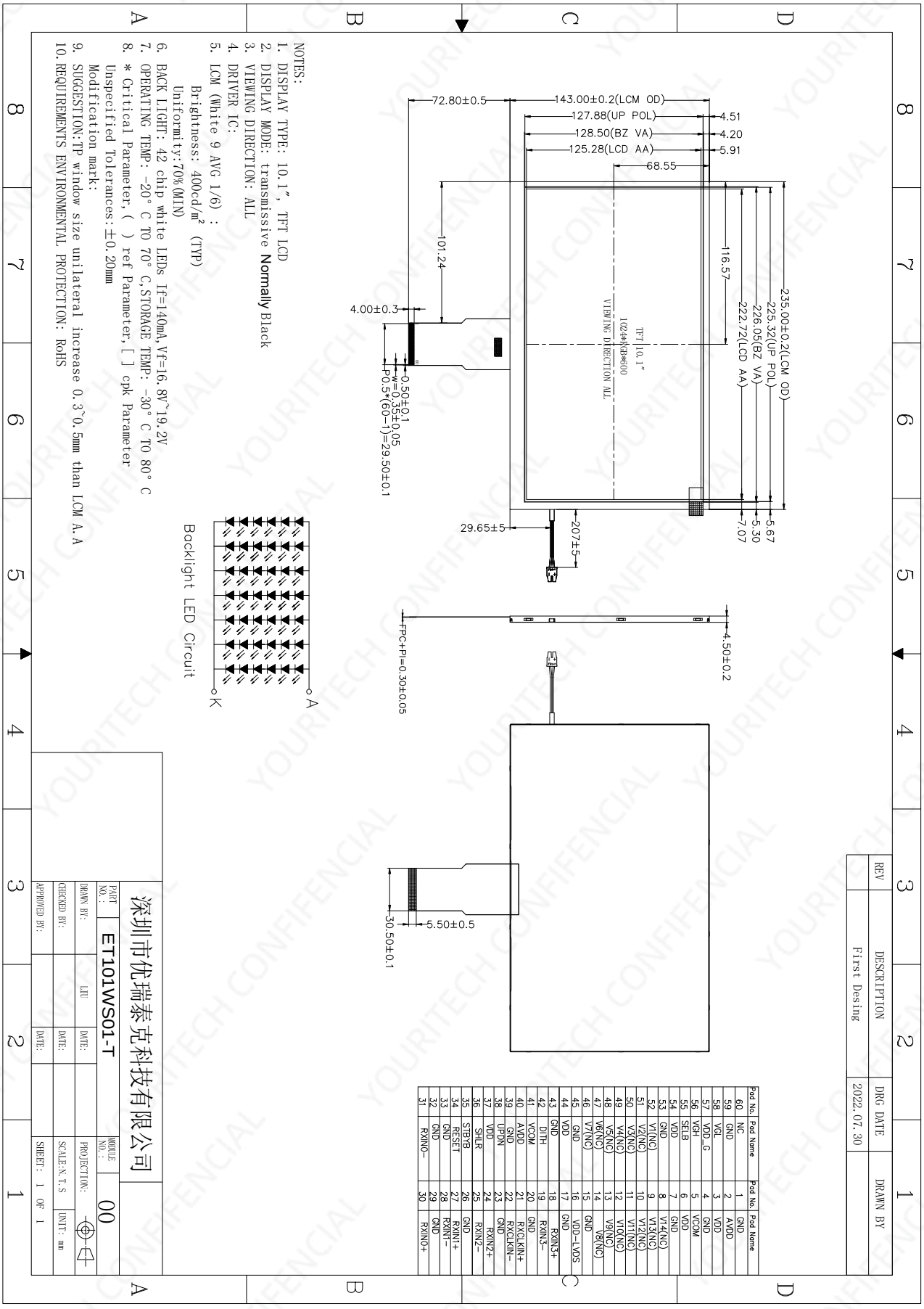
1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;
IPS Type LCD
1024dot-segment and 600 dot-common outputs;
16.7M Color can be selected by software;
White LED back light;
6bit/8bit LVDS

1.3 Applications:

2. LCM General specification

ITEM	Sandard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	1024*3RGB(H)X600(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch	0.2175(H) ×0.2088 (V)	mm
Active area	222.72(H) x 125.28(V)	mm
Viewing direction	ALL O'CLOCK	-
TFT Driver IC	TBD	
TFT interface	6bit/8bit LVDS	-
Approx. Weight	TBD	g
LCM Size(H*V*T)	235.00(H) x 143.00(V) x4.50(T)	mm
Touch structure	--	
Touch Driver IC	--	-
Touch Interface	--	



NOTES:
1. DISPLAY TYPE: 10.1", TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL
4. DRIVER IC:
5. LCM (White 9 AVG 1/6) :
   Brightness: 400cd/m² (TYP)
   Uniformity:70%(MIN)
6. BACK LIGHT: 42 chip white LEDs If=140mA, Vf=16.8V~19.2V
7. OPERATING TEMP: -20° C TO 70° C,STORAGE TEMP: -30° C TO 80° C
8. * Critical Parameter,( ) ref Parameter,[ ] cpk Parameter
   Unspecified Tolerances:±0.20mm
   Modification mark:
9. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS

Pad No.	Pad Name	Pad No.	Pad Name
60	NC	1	GND
59	GND	2	AVDD
58	VGL	3	VDD
57	VDD_G	4	GND
56	VGH	5	VCOM
55	SELB	6	VDD
54	VDD	7	GND
53	GND	8	V14(NC)
52	V1(NC)	9	V13(NC)
51	V2(NC)	10	V12(NC)
50	V3(NC)	11	V11(NC)
49	V4(NC)	12	V10(NC)
48	V5(NC)	13	V9(NC)
47	V6(NC)	14	V8(NC)
46	V7(NC)	15	GND
45	GND	16	VDD-LVDS
44	VDD	17	GND
43	GND	18	RXIN3+
42	DITH	19	RXIN3-
41	VCOM	20	GND
40	AVDD	21	RXCLKIN+
39	GND	22	RXCLKIN-
38	UPDN	23	GND
37	VDD	24	RXIN2+
36	SHLR	25	RXIN2-
35	STBYB	26	GND
34	RESET	27	RXIN1+
33	GND	28	RXIN1-
32	GND	29	GND
31	RXIN0-	30	RXIN0+

REV	DESCRIPTION	DRG DATE	DRAWN BY
	First Desing	2022.07.30	

深圳市优瑞泰克科技有限公司

PART NO.:	ET101WS01-T	MODULE NO.:	00
DRAWN BY:	LIU	DATE:	PROJECTION:
CHECKED BY:		DATE:	SCALE:N.T.S
APPROVED BY:		DATE:	UNIT: mm
			SHEET: 1 OF 1

3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T_{OPR}	-20	+70	°C
LCM Storage Temperature	T_{STG}	-30	+80	°C
Humidity	RH	-	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
TFT OperationFrame rate	Hz	--	60	--	Hz	
Supply Voltage for(DC/DC)	VDD	3.0	3.3	3.6	V	
TFT Gate ON Voltage	VGH	--	18	--	V	Note 2
TFT Gate OFF Voltage	VGL	--	-6	--	V	Note 2
TFT Common Voltage	Vcom	--	4.0	--	V	Note 1
AVDD	Avdd	--	9.6	--	V	Note 3

Note 1: VCOM value should be adjusted by different condition to optimize Flicker Value.

Note 2: VGH and VGL are the operating voltages of TFT gate.

Note 3: Adjust the contrast, make the color bigger and darker, and make the color smaller and lighter.

4.2 Back-Light Unit Characeristics

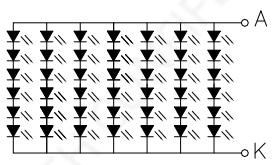
The back-light system is an edge-lighting type with white 42 LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V_F	16.8	--	19.2	V	-
Forward current	I_F	--	140	-	mA	-
Luminance(With LCD)	Lv		400	--	cd/m^2	-
LED life time	N/A	--	30000	--	Hr	Note 1

Note:

(1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

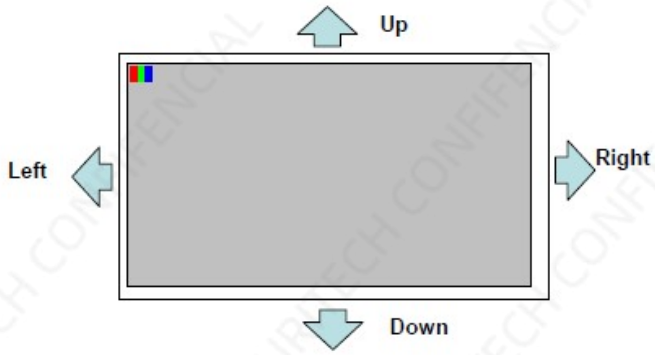
Pin NO.	Symbol	Description	Note
1	AGND	Analog ground	
2	AVDD	Analog power	
3	DVDD	Digital power	
4	GND	Digital ground	
5	VCOM	Common voltage	
6	DVDD	Digital power	
7	GND	Digital ground	
8	V14	Gamma correction voltage reference /NC	
9	V13	Gamma correction voltage reference /NC	
10	V12	Gamma correction voltage reference /NC	
11	V11	Gamma correction voltage reference /NC	
12	V10	Gamma correction voltage reference /NC	
13	V9	Gamma correction voltage reference /NC	
14	V8	Gamma correction voltage reference /NC	
15	GND	Digital ground	
16	DVDD_LVDS	LVDS power	
17	GND	Digital ground	
18	PIND3	Positive LVDS differential data input	
19	NIND3	Negative LVDS differential data input	
20	GND	Digital ground	
21	PINC	Positive LVDS differential clock input	
22	NINC	Negative LVDS differential clock input	
23	GND	Digital ground	
24	PIND2	Positive LVDS differential data input	
25	NIND2	Negative LVDS differential data input	
26	GND	Digital ground	
27	PIND1	Positive LVDS differential data input	
28	NIND1	Negative LVDS differential data input	
29	GND	Digital ground	
30	PIND0	Positive LVDS differential data input	
31	NIND0	Negative LVDS differential data input	
32	GND	Digital ground	
33	GND_LVDS	LVDS ground	
34	GRB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ，C=0.1μF)	
35	STBYB	Standby mode, normally pull high STBYB=" 1" , normal operation STBYB=" 0" ,timing control, source driver will turn off, all output are high-Z	
36	SHLR	Left or right display control	Note 1
37	DVDD	Digital power	
38	UPDN	Up / down display control	Note 1
39	AGND	Analog ground	
40	AVDD	Analog power	
41	VCOM	Common voltage	

42	DITH	Dithering function enable control. Normally pull low DITHER = "1", Enable internal dithering function DITHER = "0", Disable internal dithering function	
43	GND	Digital ground	
44	DVDD	Digital Power	
45	GND	Digital ground	
46	V7	Gamma correction voltage reference /NC	
47	V6	Gamma correction voltage reference /NC	
48	V5	Gamma correction voltage reference /NC	
49	V4	Gamma correction voltage reference /NC	
50	V3	Gamma correction voltage reference /NC	
51	V2	Gamma correction voltage reference /NC	
52	V1	Gamma correction voltage reference /NC	
53	GND	Digital ground	
54	DVDD	Digital power	
55	SELB	6bit/8bit mode select, SELB = "0", LVDS input data is 8bits SELB = "1", LVDS input data is 6bits	Note 2
56	VGH	Positive power for TFT	
57	DVDD	Digital power for Gate IC	
58	VGL	Negative power for TFT	
59	GND	Digital ground for Gate IC	
60	NC	Not connect	

V1~V14: Refer to the voltage value on page 6

Remarks：Mating connector：089K60-000100-G2-R (STARCONN)
Note 1: UPDN and SHLR control function

UPDN	SHLR	FUNCTION
0	1	Normal display
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right Inverse Up and Down



Note 2: if LVDS input data is 6bits, SELB must be set to High
if LVDS input data is 8bits, SELB must be set to Low

DITH and SELB control function

DITH	SELB	FUNCTION
0	1	Colors (262K)
0	0	Colors (262K)
1	1	Colors (262K)
1	0	Colors (16.2M)

6. Timing Characteristics

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/off control

HX8282-A01 has a power on/off sequence control function. In order to prevent IC from power on reset fail, the rising time (T_{POR}) of the digital power supply VDD should be maintained within the given specifications. Please refer to "AC Characteristics" for more detail on timing.

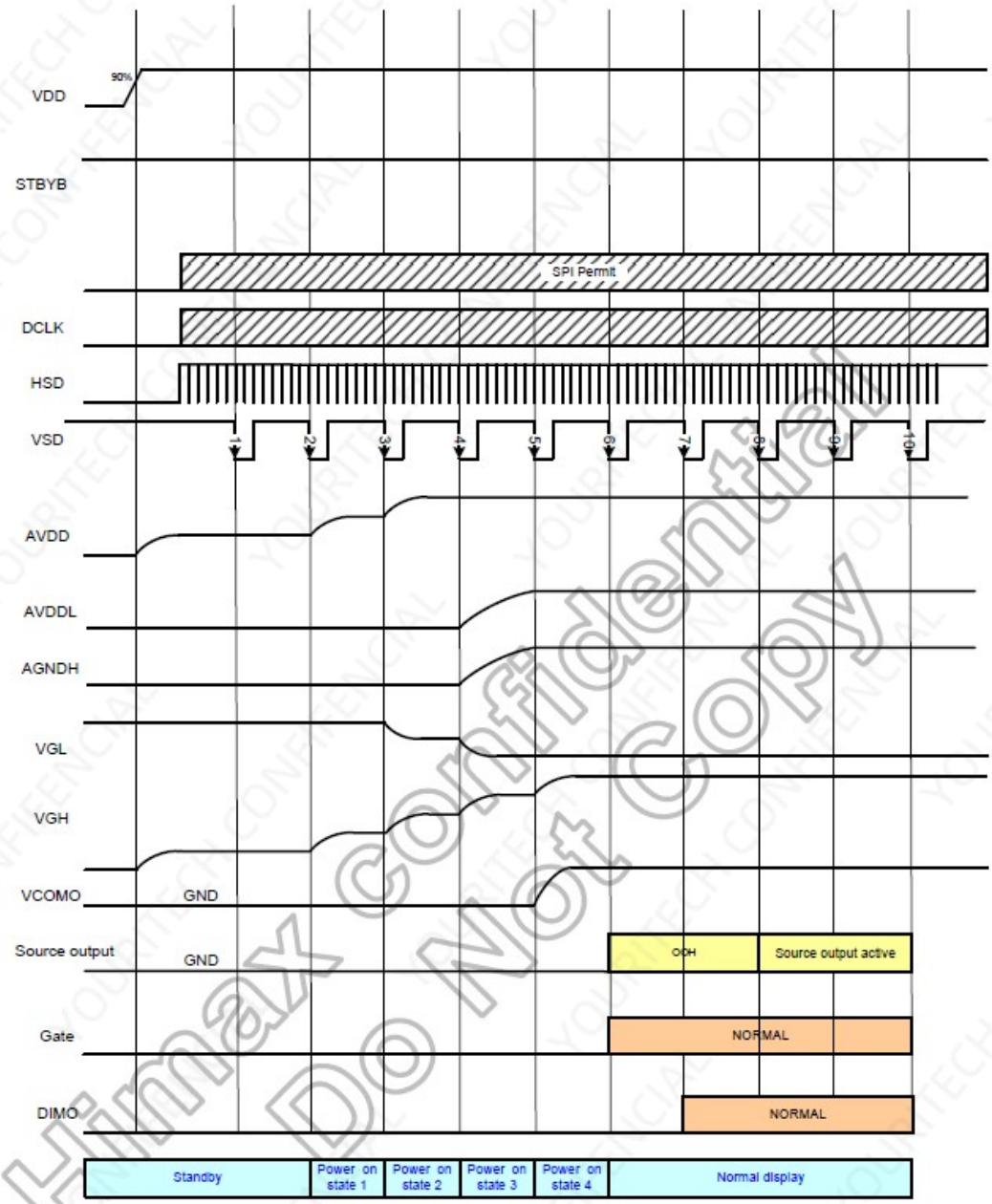
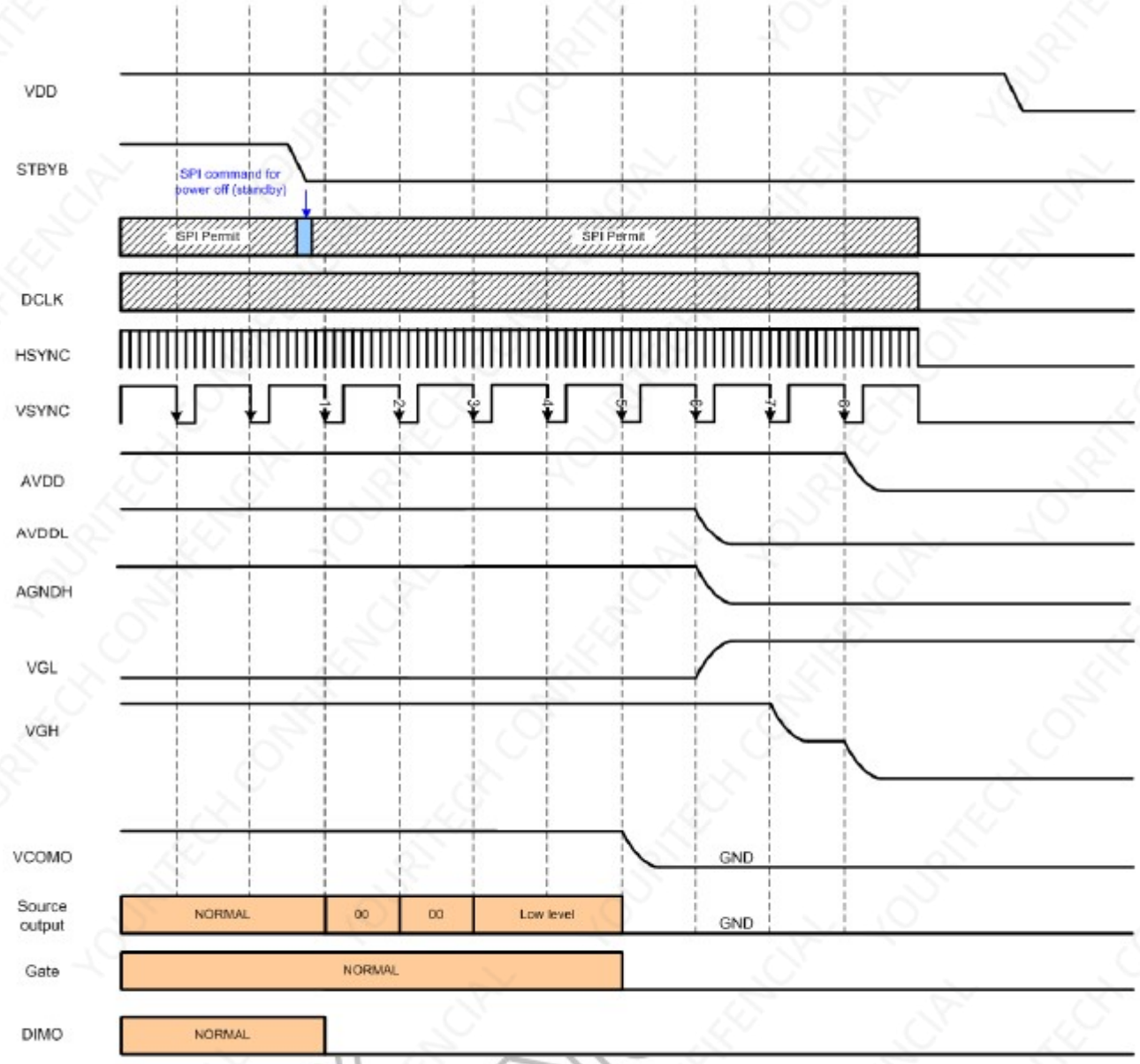


Figure 8.1: Power on timing sequence

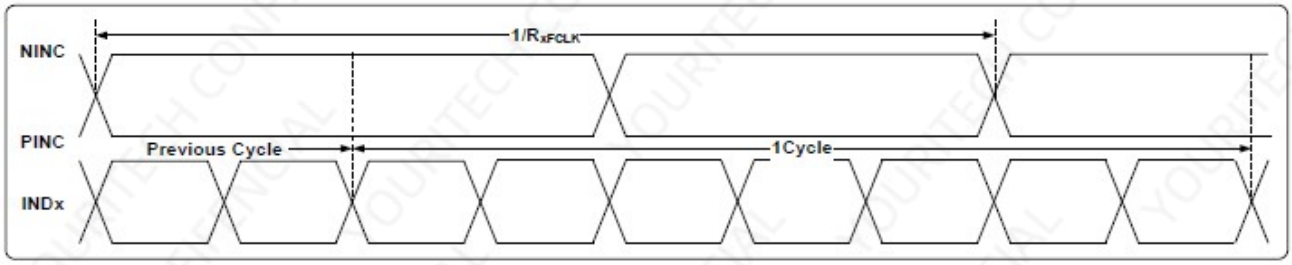


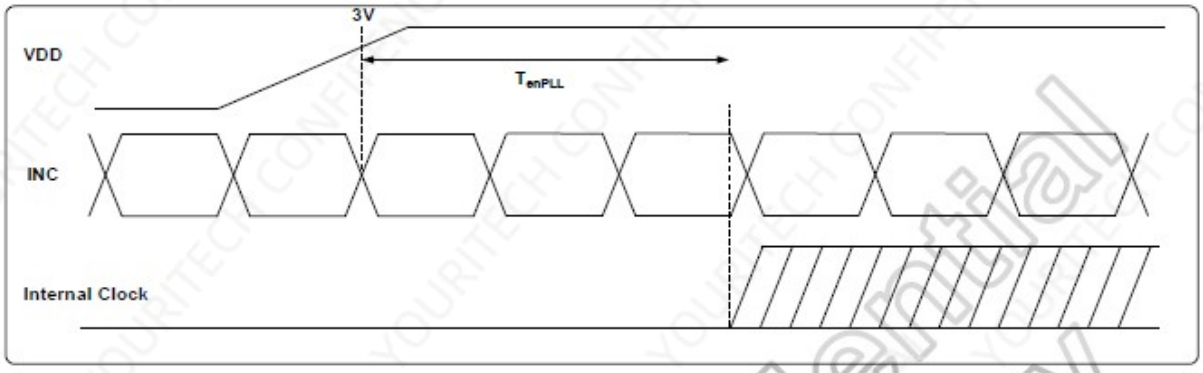
Note: (1) Low level=3FH, when NBW=L. **(Normally white)**
(2) Low level=00H, when NBW=H. **(Normally black)**

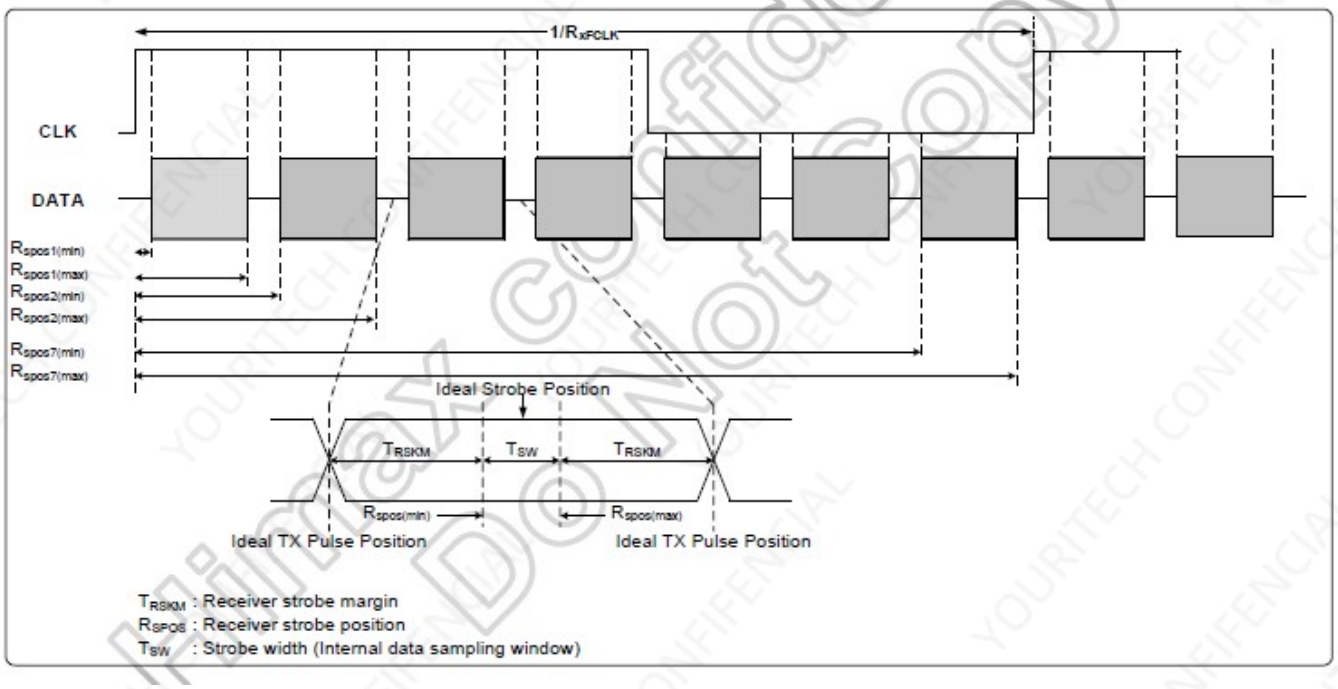
Figure 8.2: Power off timing sequence

LVDS mode AC electrical characteristics

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Clock frequency	R_{XFCLK}	-	20	-	71	MHz
Input data skew margin	T_{RSKM}	$\|V_{ID}\|$=400mV R_{XVCM}=1.2V R_{XFCLK}=71MHz	500	-	-	pS
Clock high time	T_{LVCH}	-	-	$4/(7xR_{XFCLK})$	-	ns
Clock low time	T_{LVCL}	-	-	$3/(7xR_{XFCLK})$	-	ns
PLL wake-up time	T_{enPLL}	-	-	-	150	μs







LVDS mode data input format

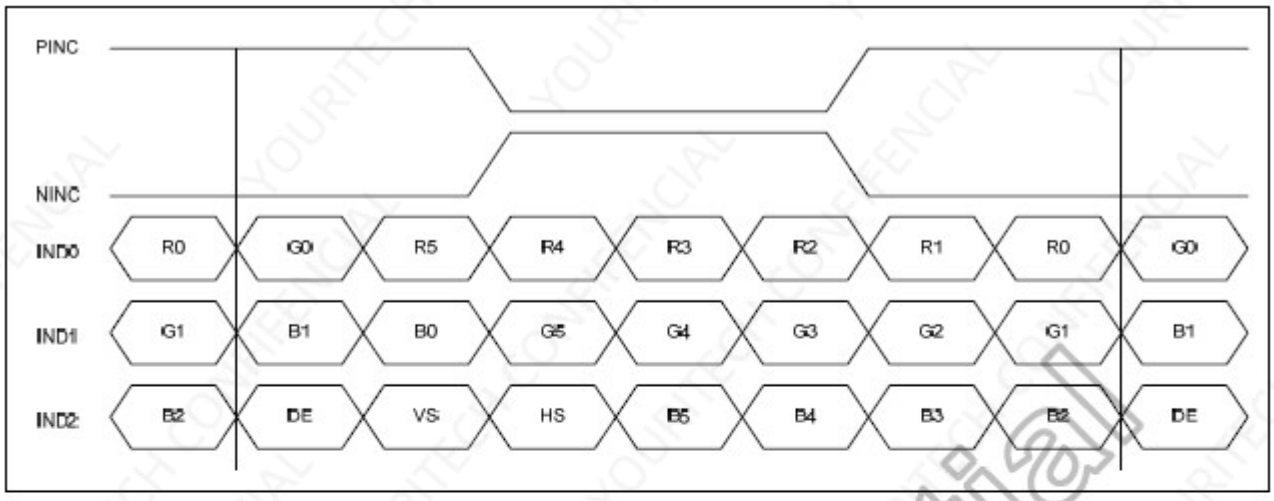


Figure 10.4: 6-bit LVDS input

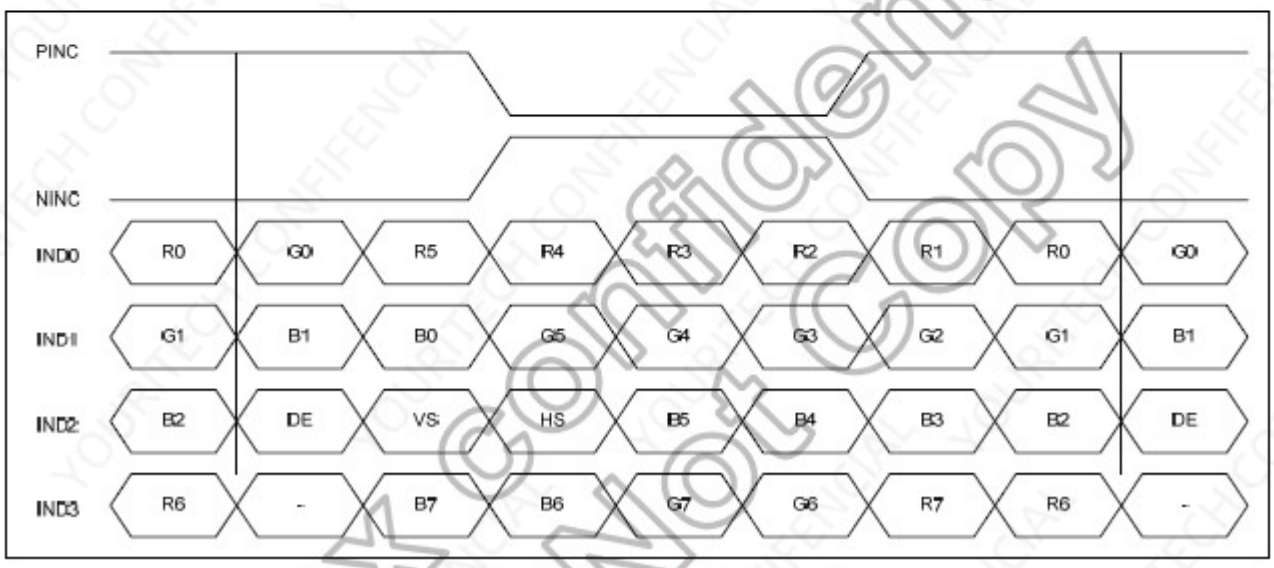


Figure 10.5: 8-bit LVDS input

Resolution：1024 x 600

DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	40.8	51.2	67.2	MHz
Horizontal display area	thd		1024		DCLK
HSD period	th	1114	1344	1400	DCLK
HSD blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		T_H
VSD period	tv	610	635	800	T_H
VSD blanking	tvbp+tvfp	10	35	200	T_H

Table 10.4: DE mode (1024x600)

HV mode

- **Horizontal timing**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	44.9	51.2	63	MHz
Horizontal display area	thd		1024		DCLK
HSD period	th	1200	1344	1400	DCLK
HSD pulse Width	thpw	1	-	140	DCLK
HSD back porch	thbp		160		DCLK
HSD front porch	thfp	16	160	216	DCLK

Table 10.5: HV mode horizontal timing (1024x600)

- **Vertical timing**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		T_H
VSD period	tv	624	635	750	T_H
VSD pulse width	tvpw	1	-	20	T_H
VSD back porch	tvbp		23		T_H
VSD front porch	tvfp	1	12	127	T_H

Table 10.6: HV mode vertical timing (1024x600)

7.Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	85	-	Deg.	WV-Pol Note 1
		Θ_9		-	85	-	Deg.	
	Vertical	Θ_{12}		-	85	-	Deg.	
		Θ_6		-	85	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0°	-	800	-		Note 2
Cell Transmittance		Tr		4.8	5.8	-	%	Base on C Light Note 3
White Chromaticity		x_w		TYP. - 0.03	0.307	TYP. + 0.03		Note 4 Base on C Light
		y_w			0.338			
Reproduction of color (C light)	Red	R_x			0.605			
		R_y			0.336			
	Green	G_x			0.297			
		G_y			0.552			
	Blue	B_x			0.139			
		B_y			0.132			
Color Gamut (C light)				-	50	-	%	
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	30	40	ms	Note 5

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 5).

2. Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 5) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value with Polarizer.

4. The color chromaticity coordinates specified in Table 6 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Calculation is based on C light.

5. The electro-optical response time measurements shall be made as FIGURE 6 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

Figure 4. The Definition of Vth & Vsat

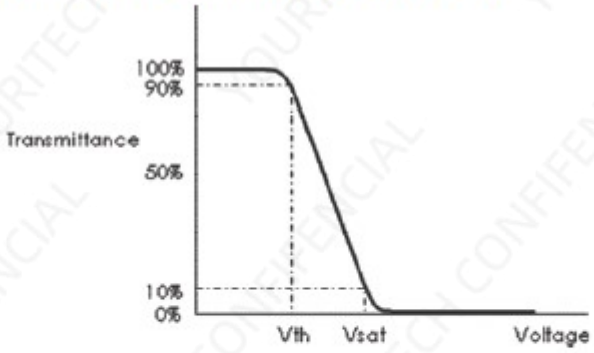


Figure 5. Measurement Set Up

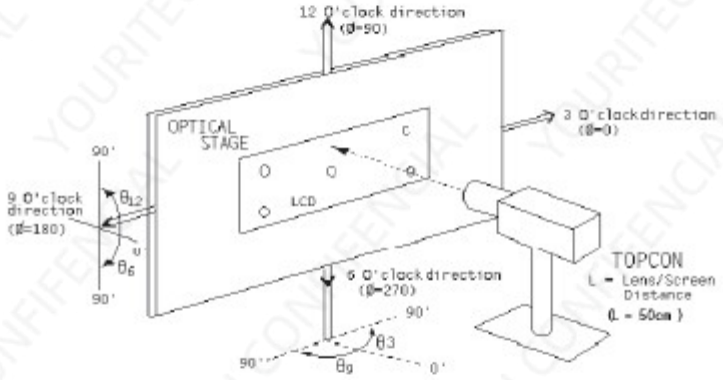
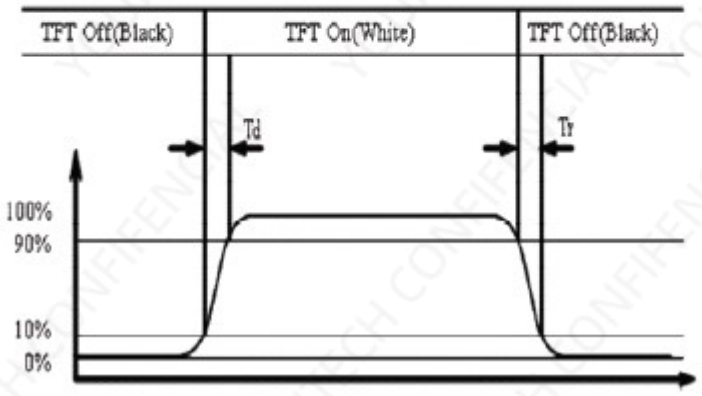


Figure 6. Response Time Testing



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°C / 96H	1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed. 2. No low temperature bubbles,end seal loose andfall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Tempe. Operating	+70°C / 96H	
4	Low Tempe. Operating	-20°C / 96H	
5	High Temperature /Humidity storage	50°C x 90%RH /96H	
6	Thermal and cold shock	Static state，-20℃（30min）~70℃（30min），50 cycles	

9. Packing Method----TBD

- END -