

LCD MODULE SPECIFICATION

Model:	UE070WS-RB40-L038B
Version:	V1.1
Date:	20191108

- ☒ **Preliminary Specification** 样品规格书
- ☐ **Final Specification** 量产规格书

Customer Confirmation 客户确认

Approved by	Notes

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VIEWE Confirmation 优奕确认

Prepared by	Reviewed by	Approved by

REVISION HISTORY

Revision 版本号	Date 日期	Contents of Revision Change 修改内容	Remark 备注
V1.0	2018.03.15	Preliminary release	
V1.1	2019.11.08	修正电压工作范围	

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB Vertical Stripe
- 2) Interface Mode: LVDS
- 3) Driver IC: HX8282
- 4) Operation Temperature: -10~50℃
- 5) Storage Temperature: -20~60℃
- 6) Backlight Type: White LED
- 7) Display mode: Normally Black,
- 8) Pixel Density: 170 PPI
- 9) LED life time: 30,000 Hours

1.2 Mechanical Specification

Item 项目	Specification 规格	Unit 单位	Remark 备注
Pixel Driving element	A-Si TFT	-	-
Screen Size	7.0IPS	Inch	Diagonal
Resolution	1024(W)*3(RGB)*600(H)	Dots	40PIN
Interface	LVDS	-	8BIT
Module Power Consumption	1.9	Watt	Typ.
Active Area	154.21(W)*85.92(H)	mm	-
Pixel pitch (W*H)	0.1506(W)*0.1432(H)	mm	-
Module Size (W*H*D)	164.86(W)*99.96(H)*3.5(D)	mm	-
Luminance	400	cd/m ²	Typ.
Viewing Direction	ALL	O'clock	-
Display Color	16.7M	Colors	-

2. ABSOLUTE MAXIMUM RATINGS

Item 项目	Symbol 符号	Min. 最小值	Max. 最大值	Unit 单位	Remark 备注
Power supply1 voltage	VDD	-0.5	3.96	V	Note1
Power supply2 voltage	AVDD	-0.5	13.8	V	Note1
Power supply3 voltage	VGH	-0.3	22	V	Note1
Power supply4 voltage	VGL	-8.8	0	V	Note1
Power supply5 voltage	VCOM	0	3.6	V	Note1
LED forward current	I _F	-0.001	30	mA	For each led,Note1
LED Reverse Voltage	V _R	-	5	V	For each led,Note1
Operating temperature	T _{op}	-10	50	°C	Note1,2
Storage temperature	T _{st}	-20	60	°C	Note1,2
Humidity	H _{st}	10	90	%RH	Note1,3

(Ta=+25°C,GND=0V)

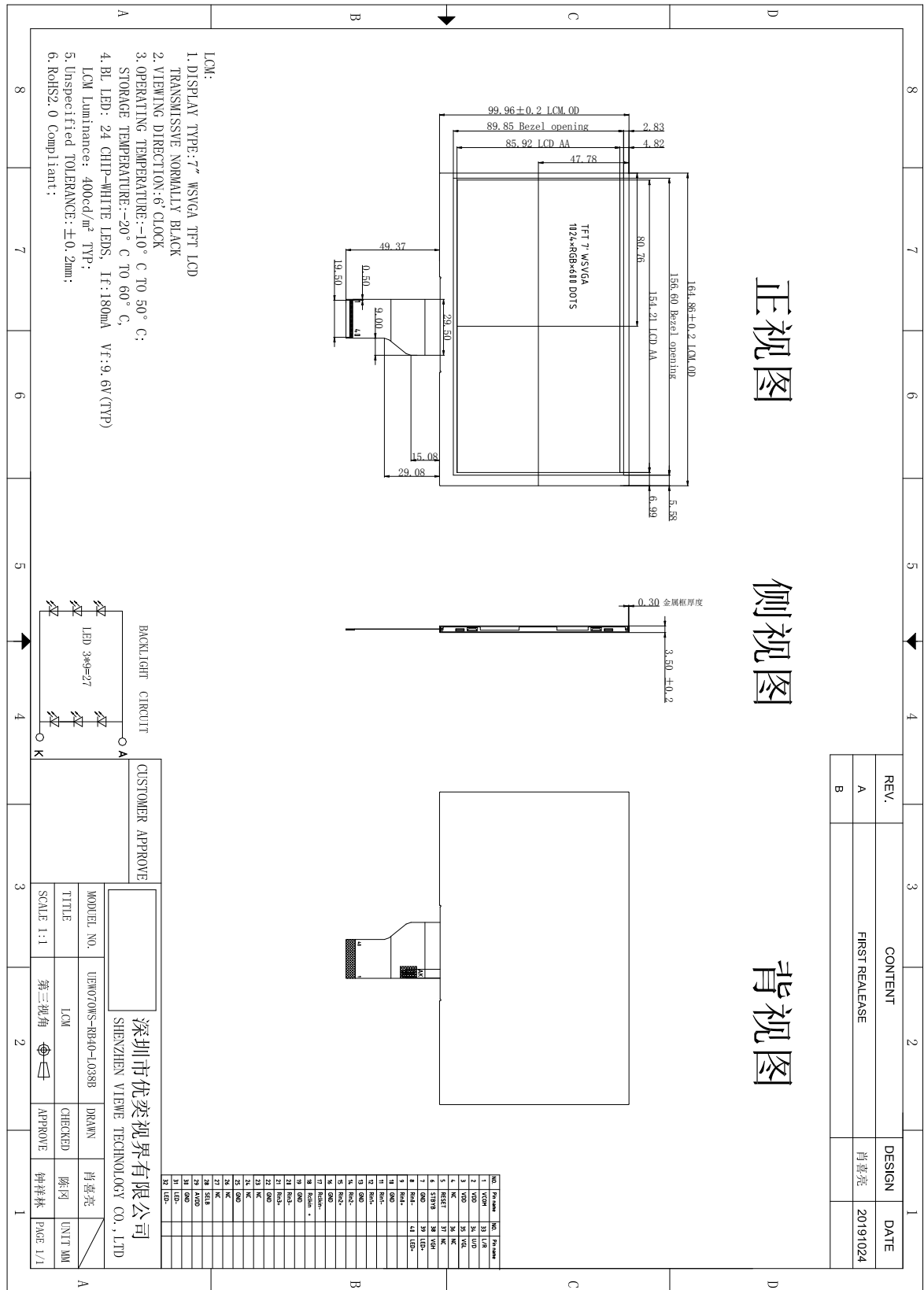
Note1:If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

Note2: In case of temperature below 0°C,the response time of liquid crystal (LC) becomes slower and the color of panel darker than normal one.

Note3: Temp. ≤ 60°C , 90% RH MAX.

Temp. >60°C , Absolute humidity shall be less than 90% RH.

3. MECHANICAL DRAWING



4. I/O CONNECTION & BLOCK DIAGRAM

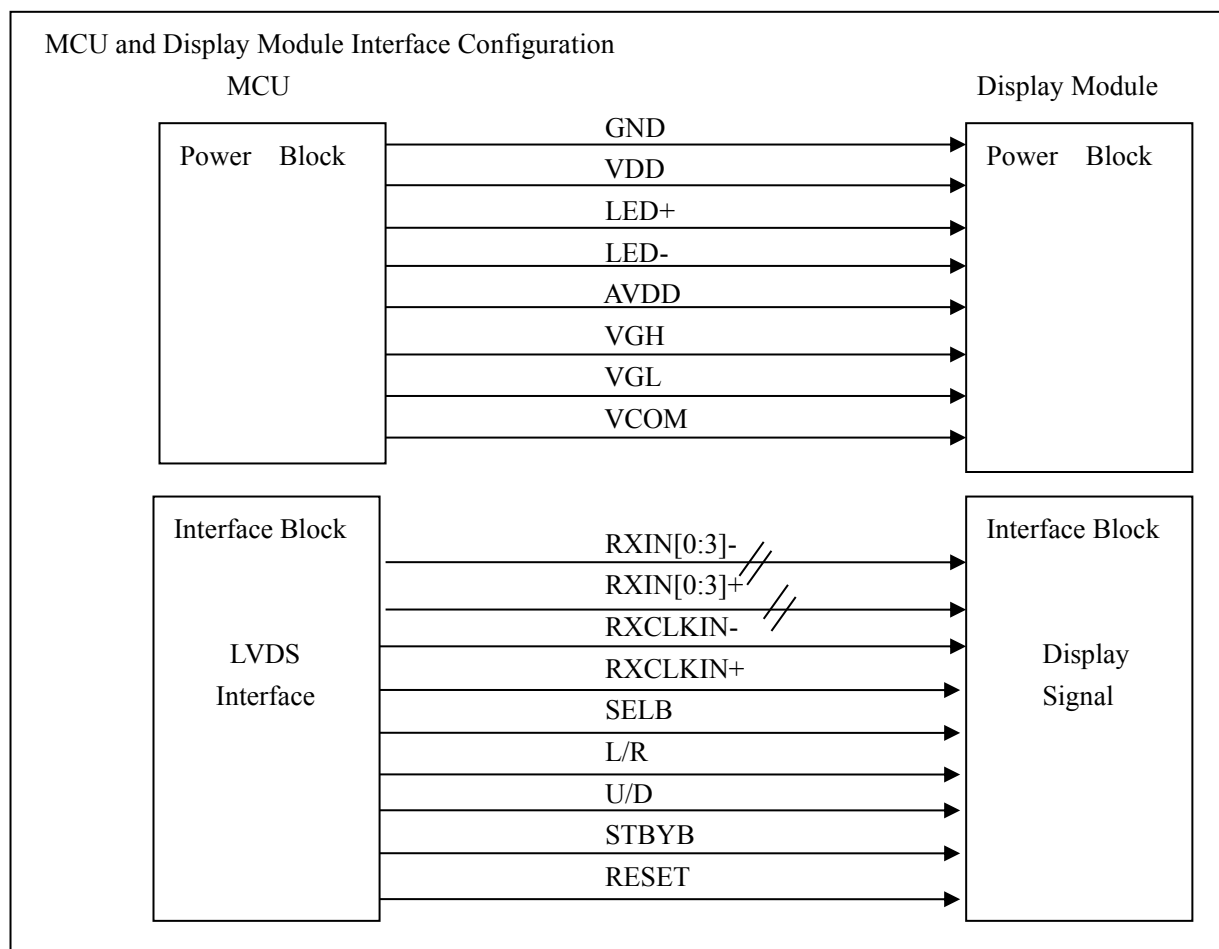
4.1 I/O Connection

Pin No. 序号	Symbol 符号	I/O	Description 描述
1	VCOM	P	LCD Common Voltage
2-3	VDD	P	Power supply for digital circuits and IO pads(3.3V)
4	NC	-	Dummy
5	RESET	I	Global reset pin,active is low
6	STBYB	I	Standby mode,Normally pulled high(3.3V)
7	GND	P	Power Ground
8	RXIN0-	I	LVDS differential data input
9	RXIN0+	I	LVDS differential data input
10	GND	P	Power Ground
11	RXIN1-	I	LVDS differential data input
12	RXIN1+	I	LVDS differential data input
13	GND	P	Power Ground
14	RXIN2-	I	LVDS differential data input
15	RXIN2+	I	LVDS differential data input
16	GND	P	Power Ground
17	RXCLKIN-	I	LVDS differential clock input
18	RXCLKIN+	I	LVDS differential clock input
19	GND	P	Power Ground
20	RXIN3-	I	LVDS differential data input
21	RXIN3+	I	LVDS differential data input
22	GND	P	Power Ground
23-24	NC	-	Dummy
25	GND	P	Power Ground
26-27	NC	-	Dummy
28	SELB	I	Data Input Format Selection,H:6bit,L:8bit
29	AVDD	P	Power for Analog Circuits
30	GND	P	Power Ground
31-32	LED-	P	Power for Back light Cathode
33	L/R	I	Horizontal inversion,L:shift left,H:shift right

34	U/D	I	Vertical inversion, L:shift down,H:shift up
35	VGL	P	TFT Gate Off Voltage
36-37	NC	-	Dummy
38	VGH	P	TFT Gate On Voltage
39-40	LED+	P	Power for Backlight Anode

I: Input; O: Output; P: Power

4.2 Block Diagram



5. ELECTRICAL CHARACTERISTICS

5.1 TFT-LCD Panel Driving Section

Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Power Supply1 Voltage	VDD	3.0	3.3	3.96	V	-
Power Supply2 Voltage	AVDD	8.2	9.6	13.8	V	-
Power Supply3 Voltage	VGH	16	18	22	V	-
Power Supply4 Voltage	VGL	-8.8	-6	-5.6	V	-
Power Supply5 Voltage	VCOM	2.5	3.2	3.6	V	Note3
Power Supply Current	I _{VDD}	-	60	-	mA	Note1
Logic Input High Voltage	V _{IH}	0.7VDD	-	VDD	V	-
Logic Input Low Voltage	V _{IL}	0	-	0.3VDD	V	-
Panel Power Consumption	P _{VDD}	-	0.198	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	1.9	-	Watt	Note1,2

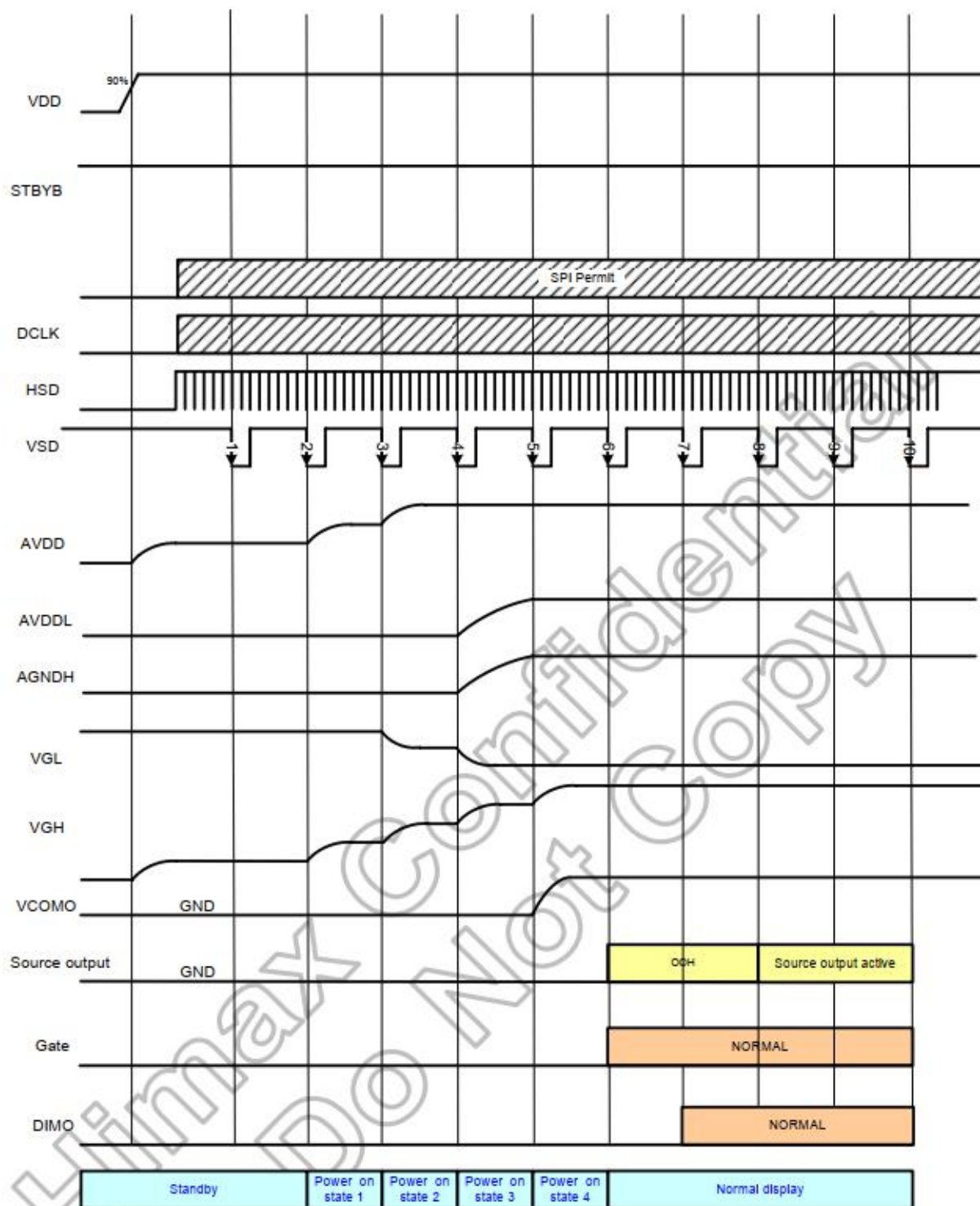
Note1: Measurement Conditions (Video Mode): Full Screen Red Pattern, VDD=3.3V, 60Hz Refresh.

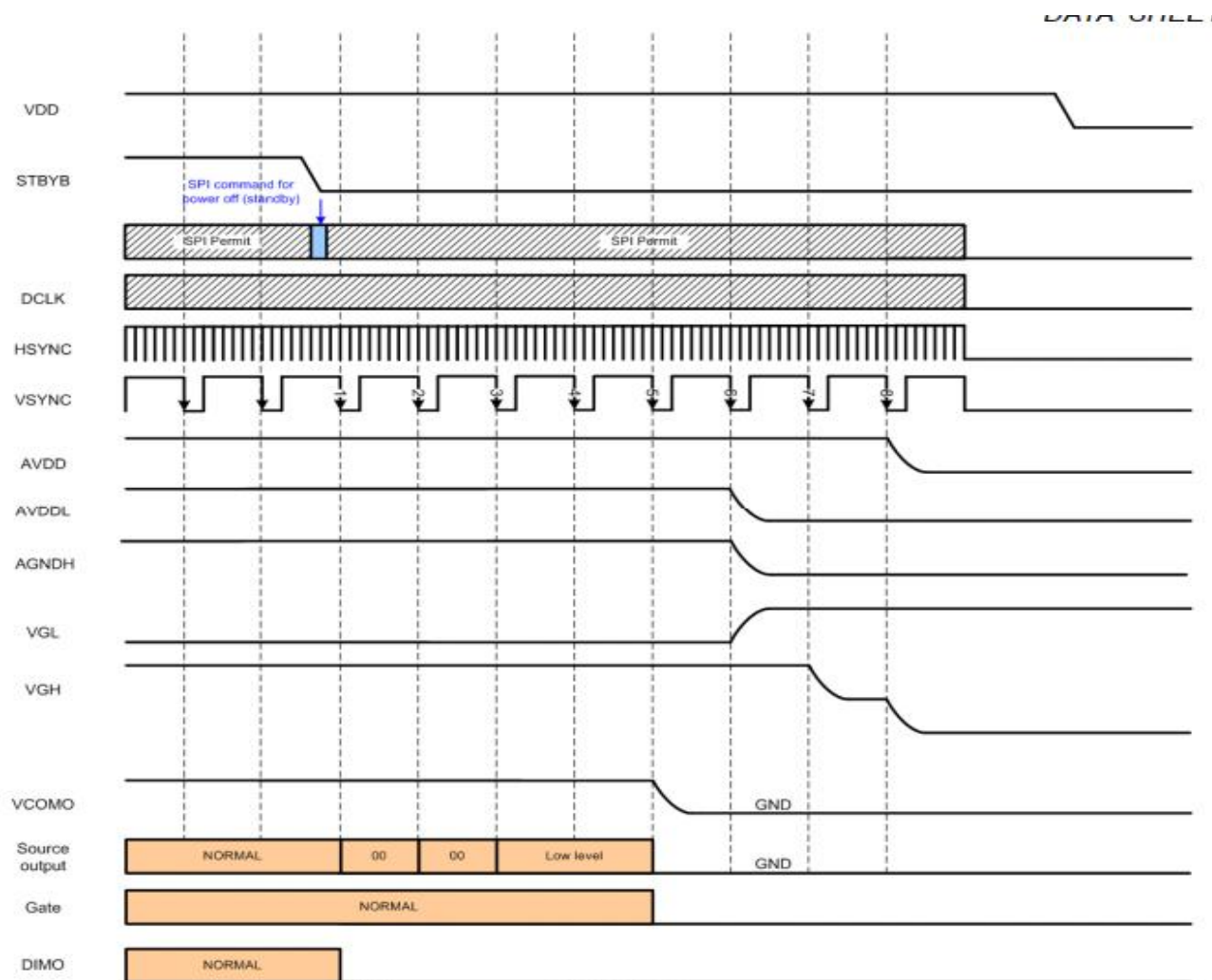
Note2: $P_{LCM} = P_{VDD} + P_{BL}$, About P_{BL} information, inference to 5.2 Back Light Driving Section.

Note3: VCOM values reference only, must be adjusted to optimize display quality

5.2 Back Light Driving Section

Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V _F	7	9.6	12	V	Note1
Forward Current	I _F	-	180	-	mA	Note1
Backlight Power consumption	P _{BL}	-	1.728	-	Watt	Note1
LED life time	-	30000	-	-	Hrs	Note2
LED Quantity		27			PCS	



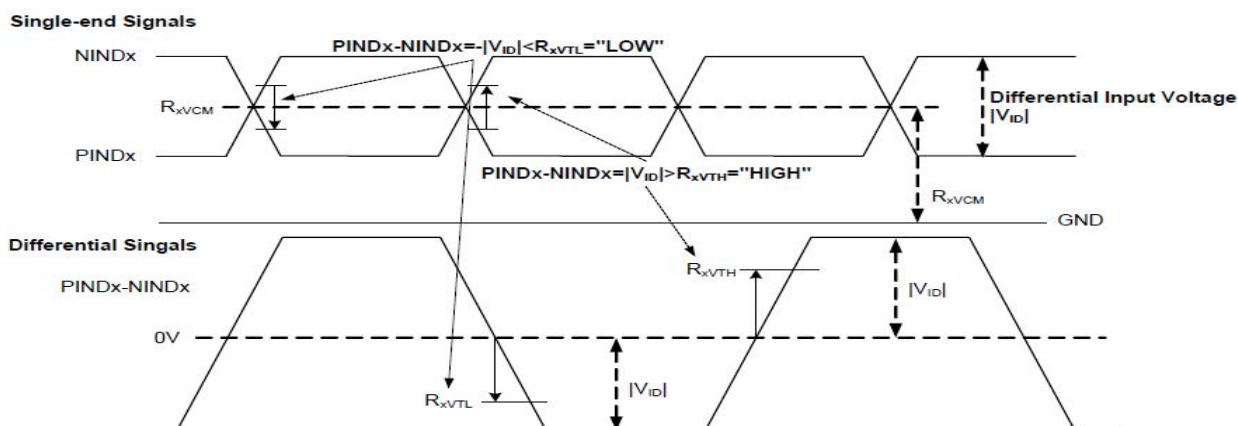


5.4 Timing Characteristics

5.4.1 LVDS DC Timing Characteristics

Parameter	Symbol	Min.	Spec. Typ.	Max.	Unit	Condition
Differential input high Threshold voltage	R_{XVTH}	-	-	+0.1	V	$R_{XVCM}=1.2V$
Differential input low threshold voltage	R_{XVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	$VDD-1.2+ V_{ID} /2$	V	-
Differential input common Mode voltage	R_{XVCM}	$ V_{ID} /2$	-	$VDD-1.2$	V	-
Differential input voltage	$ V_{ID} $	0.2	-	0.6	V	-
Differential input leakage Current	$R_{V_{XlIZ}}$	-10	-	+10	μA	-
LVDS Digital Operating Current	I_{ddlvds}	-	15	30	mA	$F_{clk}=65MHz, VDD=3.3V$
LVDS Digital Stand-by Current	I_{stlvds}	-	10	50	μA	Clock & all Functions are stopped

5.4.2 LVDS DC Timing Figure

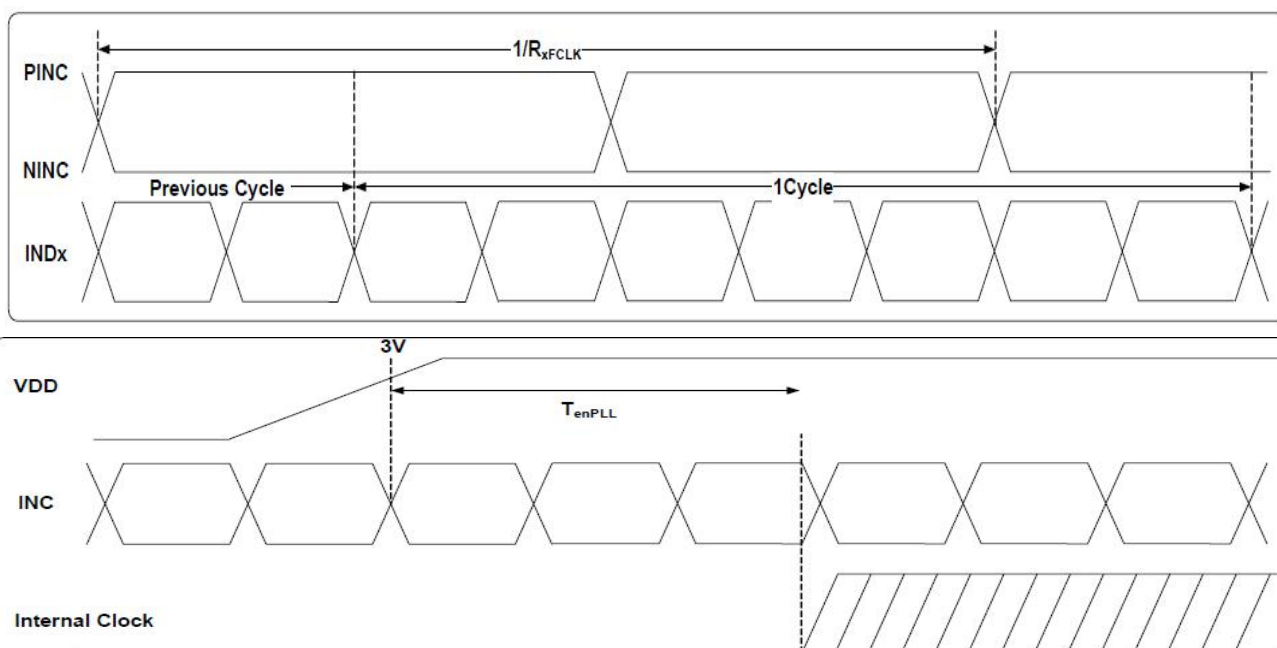


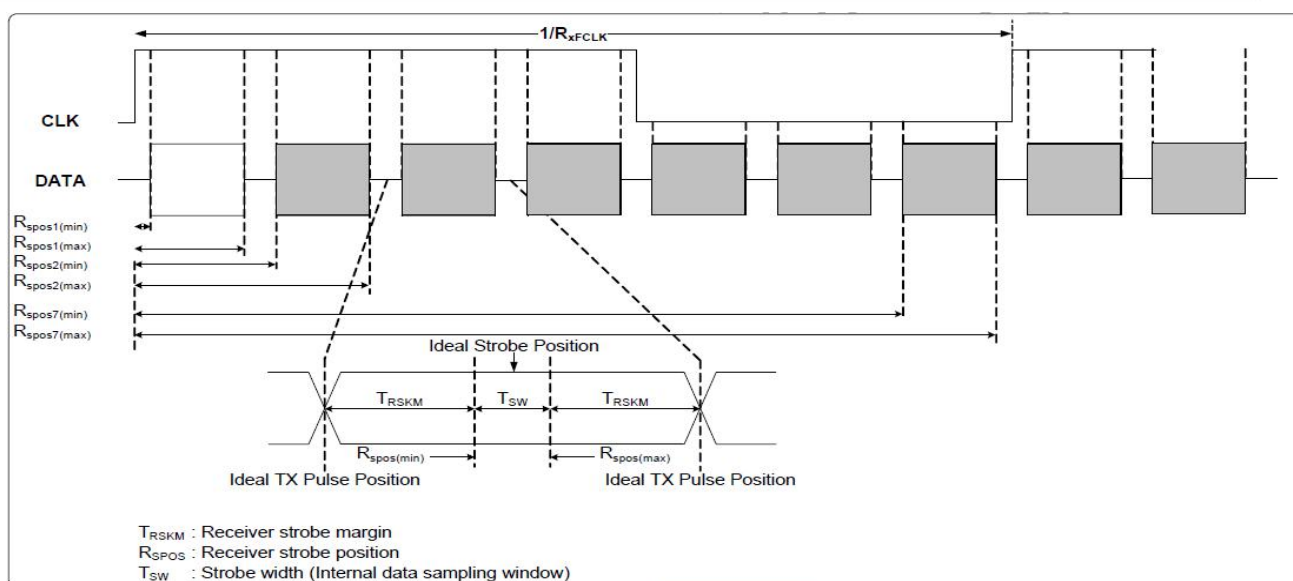
5.4.3 LVDS AC Timing Characteristics

($T_a = +25^\circ\text{C}$, $GND = 0V$)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	$RxFCLK$		20	-	71	MHz
Input data skew margin	$TRSKM$	$ V_{ID} = 400\text{mV}$ $R_{xVCM} = 1.2V$ $RxFCLK = 71\text{MHz}$	500			ps
Clock High Time	$TLVCH$			$4/(7 * RxFCLK)$		ns
Clock Low Time	$TLVCL$			$3/(7 * RxFCLK)$		ns
PLL wake-up-time	T_{enPLL}				150	us

5.4.4 LVDS AC Timing Figure





Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Modulation Frequency	SSC_{MF}	23	-	93	KHz	-
Modulation Rate	SSC_{MR}	-	-	± 3	%	LVDS clock = 71MHz center spread

5.4.5 Input Timing Parameters

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	1600	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		600		T_H
VSD Period	tvbp	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

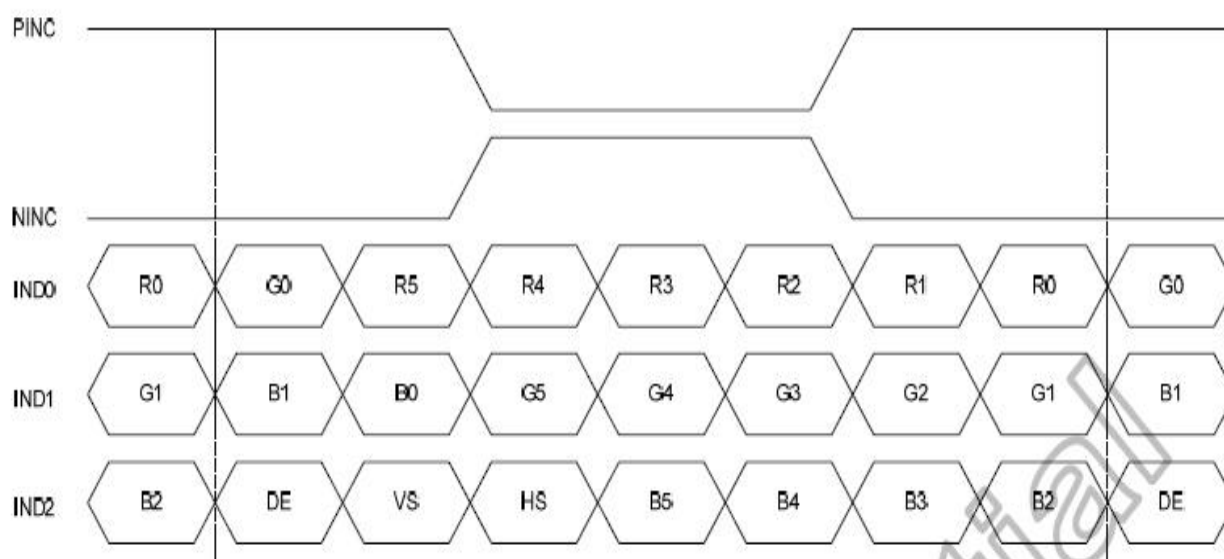
Table 10.5: HV mode horizontal timing (1024x600)

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

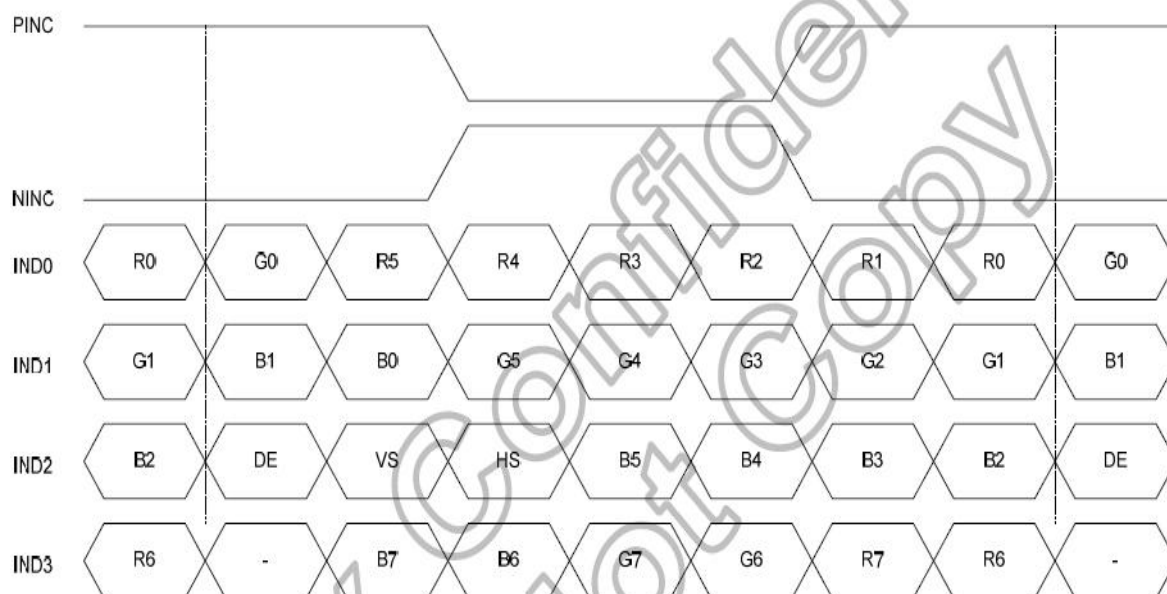
Table 10.6: HV Mode Vertical Timing (1024x600)

5.5 Timing Diagram



5.5.1 6-bit LVDS input data format

5.5.2 8-bit LVDS input data format



6. OPTICAL CHARACTERISTICS

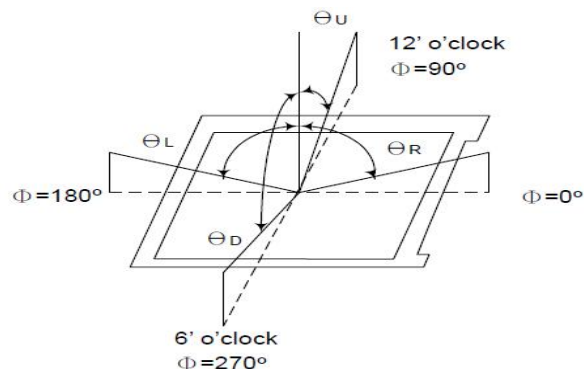
Parameter 参数	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Contrast Ratio	C/R	$\theta = 0^\circ$	600	800	-	-	Note(4)
NTSC Ratio	S	$\theta = 0^\circ$	45	50	-	%	Note(7)
Luminance	L	$\theta = 0^\circ$	-	400	-	cd/m ²	Note(5)
Luminance uniformity	U _W	$\theta = 0^\circ$	70	80	-	%	Note(3)
Response Time	T _R + T _F	25 °C	-	25	40	ms	Note(2)
Color Coordination	W _X	$\theta = 0^\circ$ (Center) Normal viewing angle B/L On	-0.03	0.290	+0.03	NTSC (x,y)	Note(6)
	W _Y			0.331			
	R _X			TBD			
	R _Y			TBD			
	G _X			TBD			
	G _Y			TBD			
	B _X			TBD			
	B _Y			TBD			
Viewing Angle	θ_L	C/R>10	80	85	-	Degree	Note(1)
	θ_R		80	85	-		
	θ_U		80	85	-		
	θ_D		80	85	-		

Test Conditions:

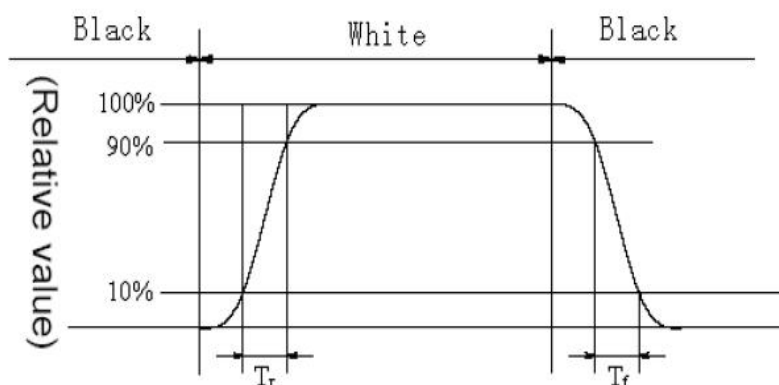
1. the ambient temperature is +25°C.

2. The test systems refer to Note 8.

Note1: Definition of Viewing Angle: The viewing angle range that the CR>10

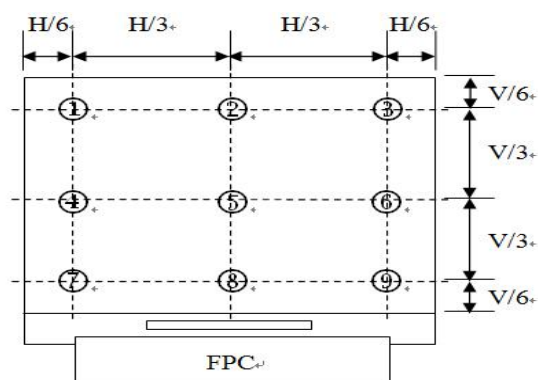


Note2: Definition of Response time: Sum of T_R and T_F



Note 3: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas, every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$



Note4: Definition of Contrast Ratio (CR): measured at the center point of panel

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

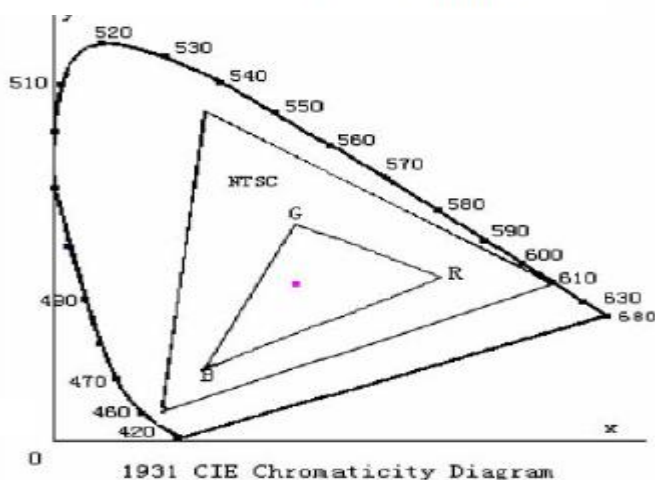
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1 point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

Color coordinates of white & red, green, blue measured at center point of LCD.

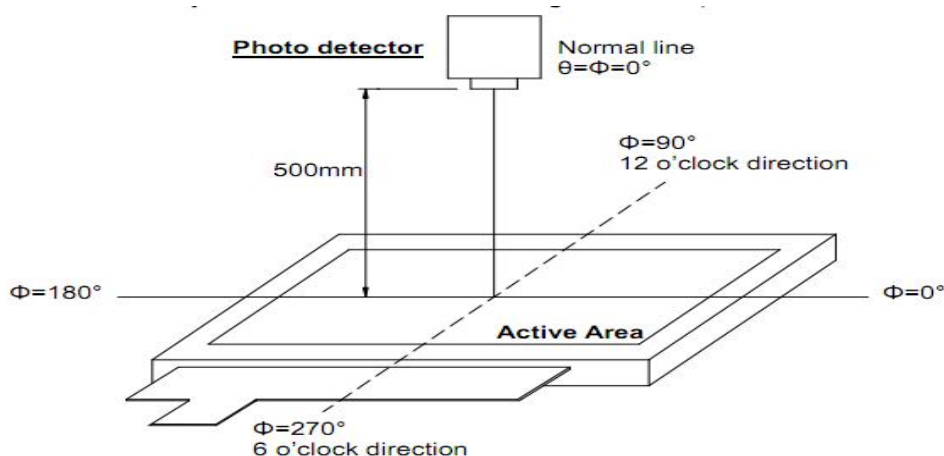
Note 7: Definition of NTSC ratio:

$$\text{NTSC ratio} = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}}$$



Note 8: 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. (Response time is measured by Photo detector TOPCON BM-7, Field of view: 1°/Height: 500mm.)



7. RELIABILITY

Item 项目	Test Condition 测试条件	Remark 备注
High Temperature Storage	Ta =+60°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta =-20°C /96Hours	Note1,2,3
High Temperature Operating	Ta =+50°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta =-10°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-20°C/30min ↔+60°C /30min for 30cycles,Transfer time less than 5min	Note2,3
Thermal humidity storage Test	60°C x 90%RH / 96Hours	Note2,3
Package Vibration Test	Frequency: 10Hz~55Hz,Amplitude:1.5mm, 1 hrs for each direction of X, Y, Z	Note2

Inspection after Test:

Note1:Ta is the ambient temperature of samples.

Note 2: 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 doesn't guarantee all the cosmetic specification.

Note 3: Before cosmetic and function tests , the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: 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. PACKAGE DRAWING

