

LCD MODULE
SPECIFICATION

Model:	UE070WS-RB31-L052B
Version:	V1.0
Date:	20201027

☒ 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	2020.04.25	Preliminary release	
V1.1	2020.09.18	变更标签纸内容	
V1.2	2020.10.27	变更 Source IC	

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB Vertical Stripe
- 2) Interface Mode: MIPI
- 3) Driver IC: EK79007AD3(Source) & EK73217BCGA(Gate)
- 4) Operation Temperature: -20~70℃
- 5) Storage Temperature: -30~80℃
- 6) Backlight Type: White LED
- 7) Display mode: Normally Black
- 8) Pixel Density: 169PPI
- 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	IPS TFT	-	
Screen Size	7.0	Inch	Diagonal
Resolution	1024(W)*3(RGB)*600(H)	Dots	
Interface	MIPI	-	4lane
Module Power Consumption	1.433	Watt	Typ.
Active Area	154.21(W)*85.92(H)	mm	
Pixel pitch (W*H)	0.143(W)*0.0502(H)	mm	
Module Size (W*H*D)	163.8(W)*97(H)*2.7(D)	mm	Tolerance: ±0.2
Luminance	400	cd/m ²	Typ.
Viewing Direction	All	O'clock	-
Display Color	16.7M	Colors	24bits

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	VDD1.8 V	-0.3	2	V	Note1
Power supply2 voltage	VDD3.3 V	-0.3	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)

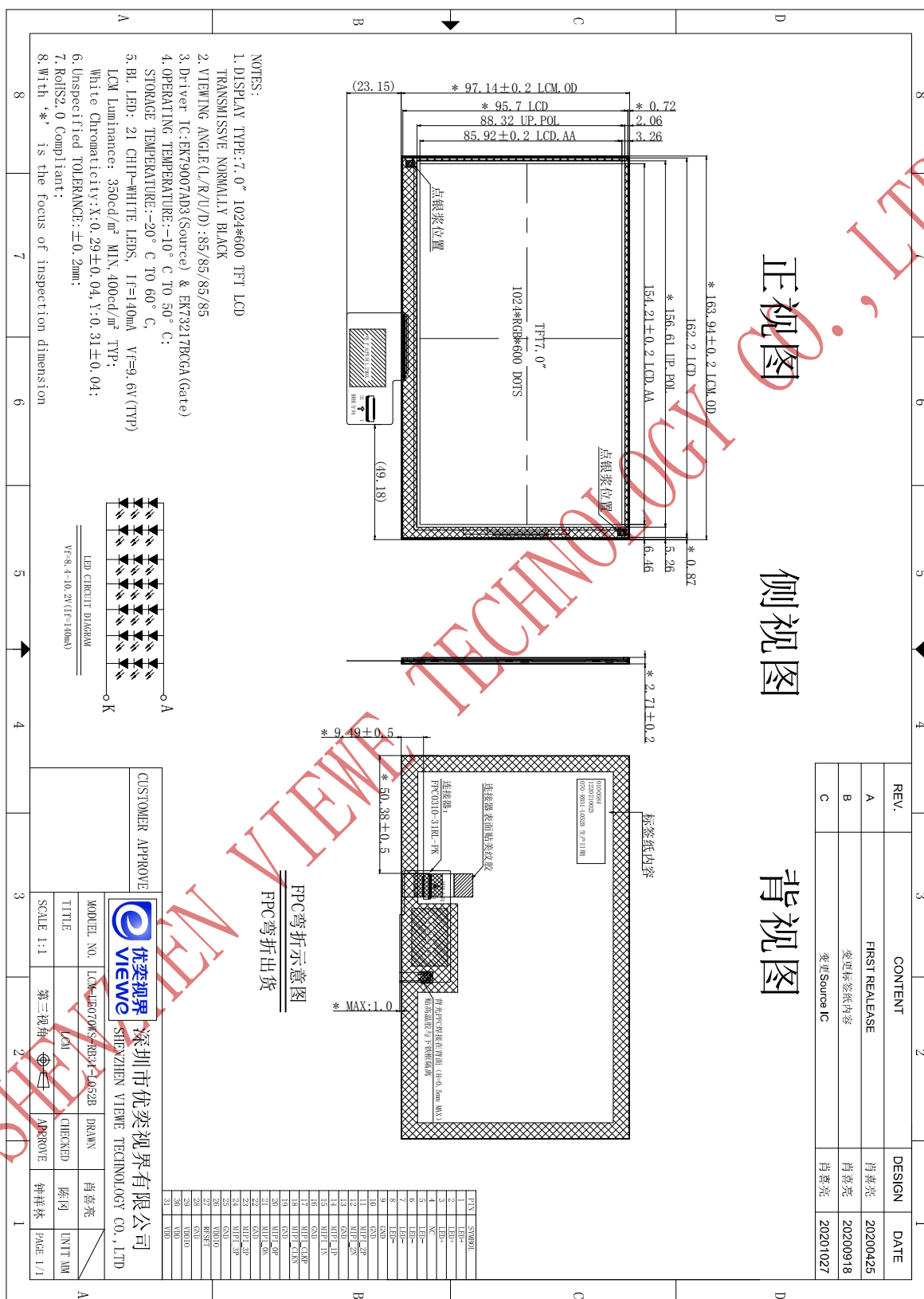
Note1:If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

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



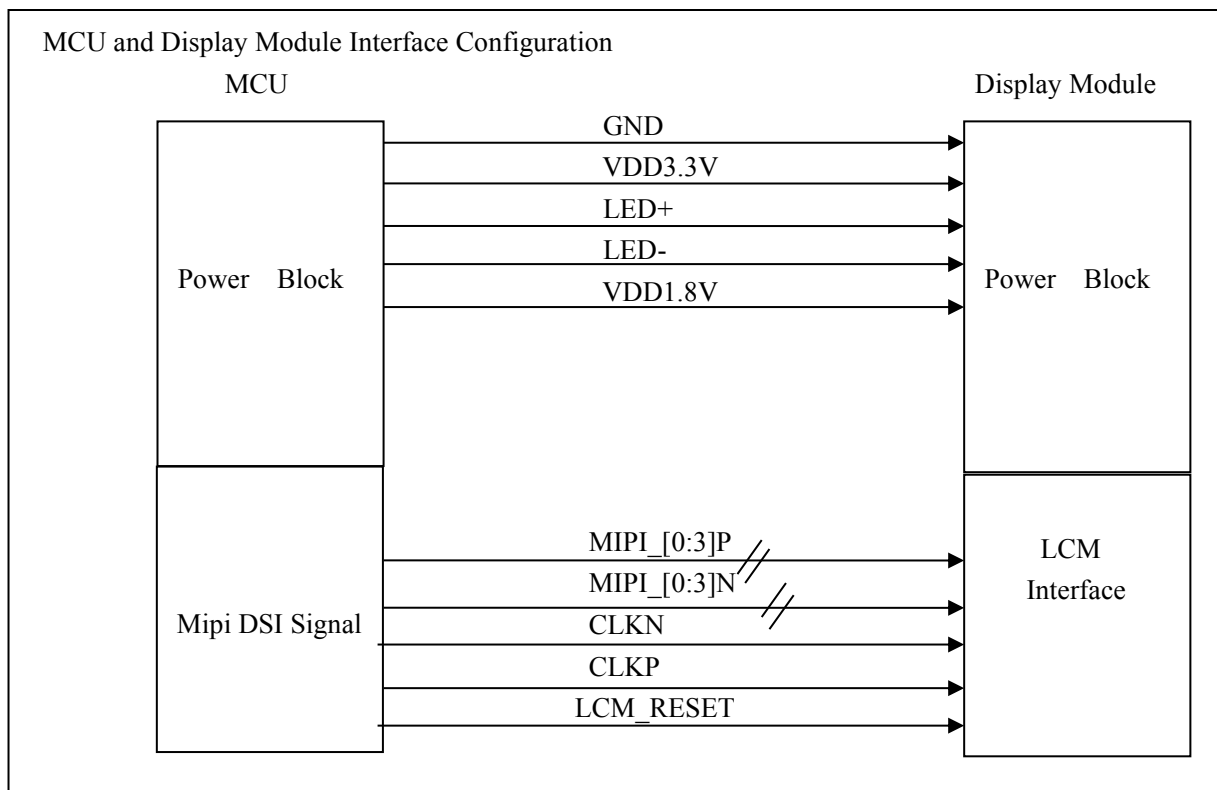
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

Pin No. 序号	Symbol 符号	I/O	Description 描述
1-3	LED+	P	Back light LED+
4	NC	-	
5-8	LED-	P	Back light LED-
9-10	GND	P	Ground
11	MIPI_2P	I	MIPI data input
12	MIPI_2N	I	MIPI data input
13	GND	P	Ground
14	MIPI_1P	I	MIPI data input
15	MIPI_1N	I	MIPI data input
16	GND	P	Ground
17	MIPI_CLK P	I	MIPI clock input
18	MIPI_CLK N	I	MIPI clock input
19	GND	P	Ground
20	MIPI_0P	I/O	MIPI data input
21	MIPI_0N	I/O	MIPI data input
22	GND	P	Ground
23	MIPI_3P	I	MIPI data input
24	MIPI_3N	I	MIPI data input
25	GND	P	Ground
26	VDD1.8V	P	VDD
27	RESET	I	Global reset pin
28	GND	P	Ground
29	VDD1.8V	P	VDD
30-31	VDD3.3V	P	Power supply for digital circuits

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	VDD3.3 V	-	3.3	-	V	-
Power Supply2 Voltage	VDD1.8 V	1.71	1.8	1.89	V	-
Power Supply Current	I _{VDD}	-	30	-	mA	Note1
Logic Input High Voltage	V _{IH}	0.7*V _{D1.8V}	-	VDD1.8V	V	-
Logic Input Low Voltage	V _{IL}	0	-	0.3*VDD1.8V	V	-
Panel Power Consumption	P _{VDD}	-	0.099	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	1.433	-	Watt	Note1,2

(Ta=+25°C, GND=0V)

Note1: Measurement Conditions (Video Mode): Full Screen Red Pattern, VDD=2.8V, 60Hz Refresh.

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

5.2 Back Light Driving Section

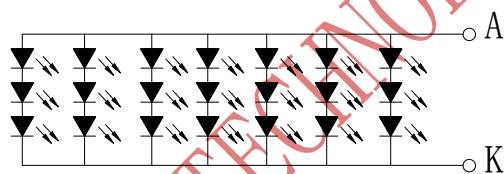
Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V_F	8.4	9.6	10.2	V	Note1
Forward Current	I_F	-	140	-	mA	Note1
Backlight Power consumption	P_{BL}	-	1.344	-	Watt	Note1
LED life time	-	30000	-	-	Hours	Note2
LED Quantity		21			PCS	

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

Note1: The LED driving condition is defined for each LED module (7 LED Serial, 2 LED Parallel)。

For each LED : $I_F = 20\text{mA}$, $V_F = 3.2V$ (Typ.), $T_a = 25^{\circ}\text{C}$ 。

Note2: The “LED life time” is defined as the module brightness decrease to 50% of original brightness at $I_{LED} = 20\text{mA}$ (Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.

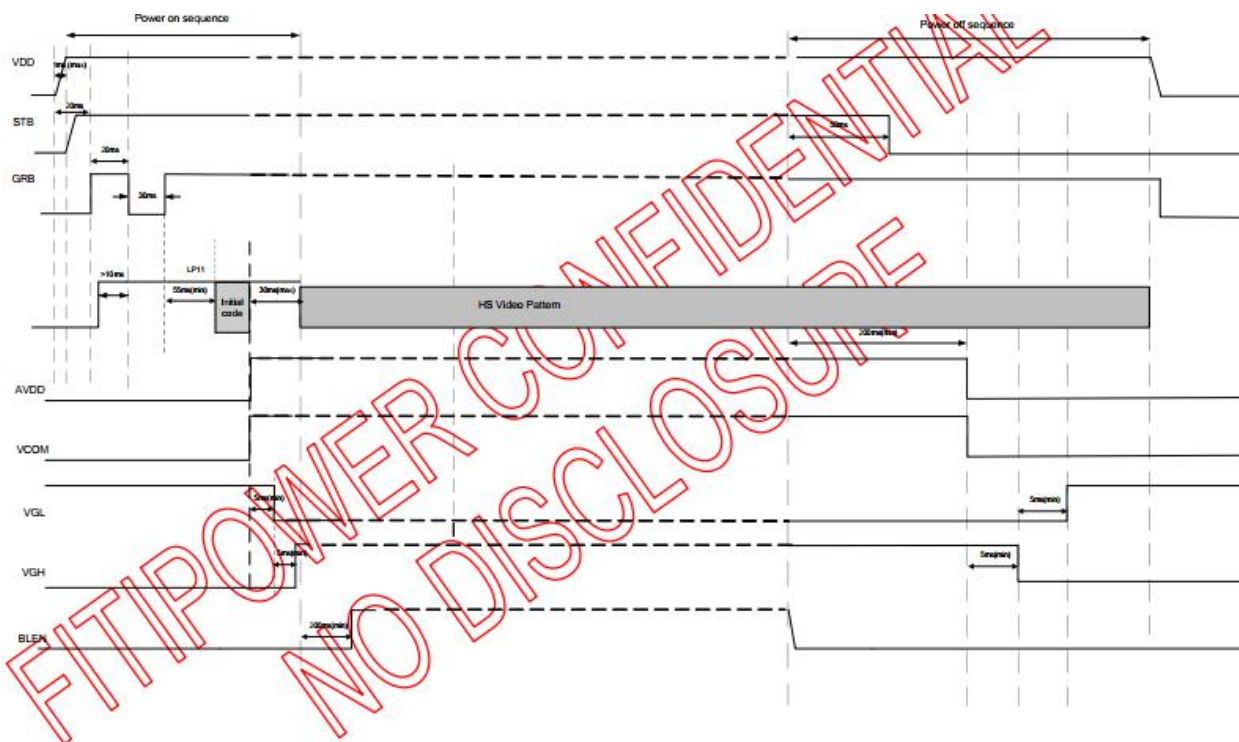


LED CIRCUIT DIAGRAM

$V_f = 8.4 - 10.2V$ ($I_f = 140\text{mA}$)

5.3 Power On/Off Sequence

5.3.1 Power On/Off Sequence

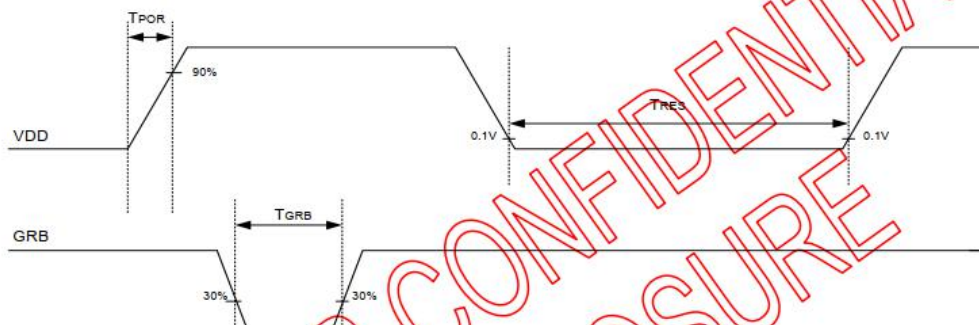


Note: CLK and Data Lanes should keep in LP11(stop state) before GRB.

5.4 Timing Characteristics

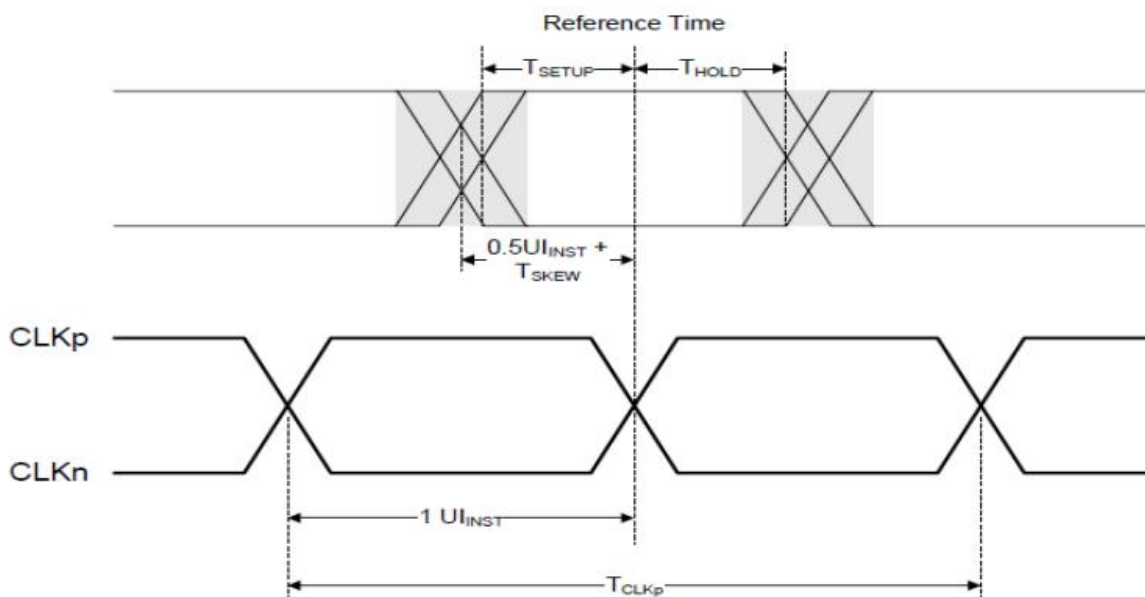
(Ta=+25°C, GND=0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
VDD power slew rate	T _{POR}	-	-	20	ms	From 0 to 90% VDD
GRB active pulse width	T _{GRB}	1	-	-	ms	VDD=VDD_IF=1.8V
VDD resettle time	T _{RES}	1	-	-	s	



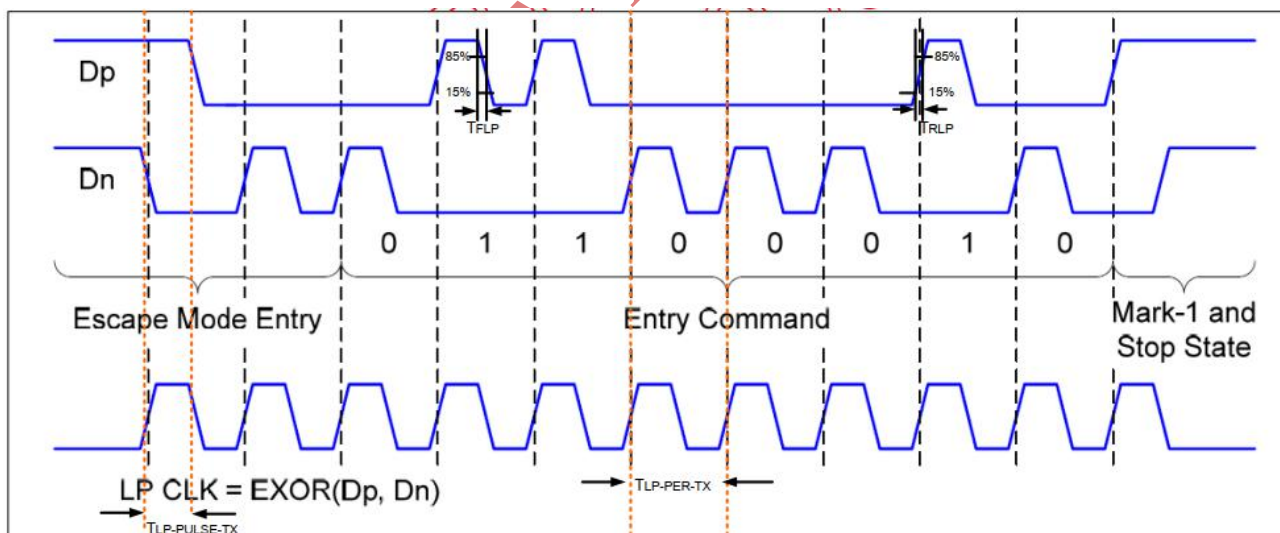
5.4.1 AC Characteristics

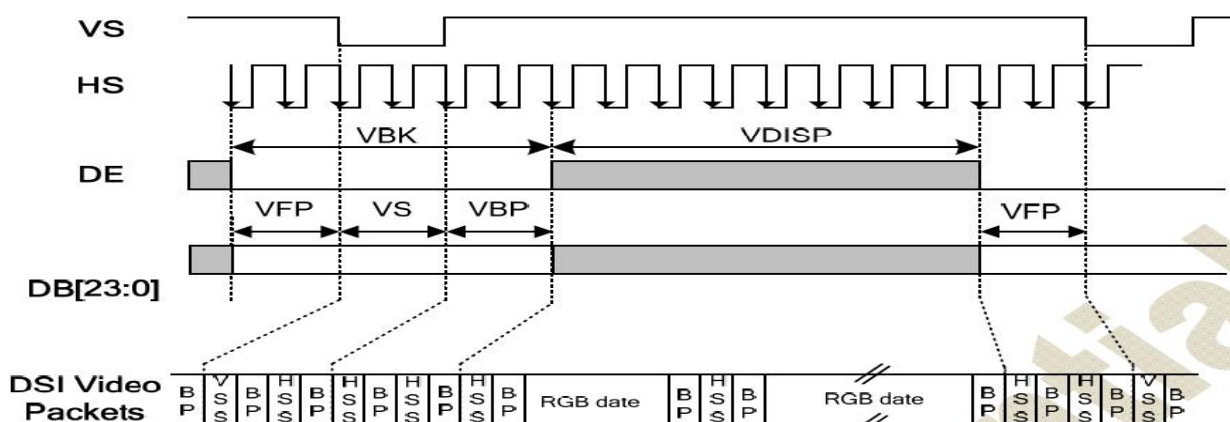
(Ta=+25°C, GND=0V)



5.5 Timing Diagram

5.5.1 LP Transmitter AC Specification





Parameter	Symbol	Value			Unit
		Min.	Typ.	MAX.	
Bit rate per lane	BRPHY	80	-	1000	Mbps
Active pixel per line	HACT	-	1024	-	Pixels
Horizontal back porch	tHBP	-	50	-	DCLK
Horizontal sync active	tHSA	-	20	-	DCLK
Horizontal front porch	tHFP	-	50	-	DCLK
Active pixel per frame	VACT	-	600	-	H
Vertical back porch	tVBP	-	23	-	H
Vertical sync active	tVSA	-	5	-	H
Vertical front porch	tVFP	-	12	-	H

6. OPTICAL CHARACTERISTICS

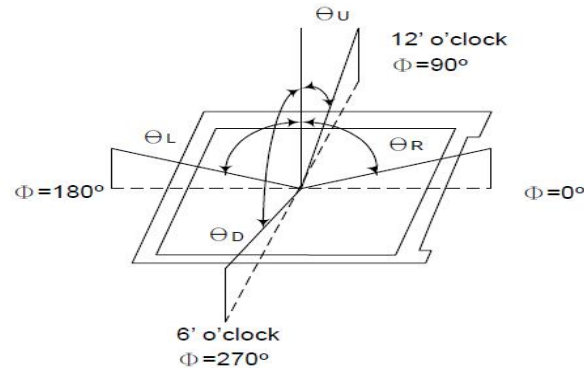
Parameter 参数	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Contrast Ratio	C/R	$\theta = 0^\circ$	800	1000	-	-	Note(4)
NTSC Ratio	S	$\theta = 0^\circ$	65	70	-	%	Note(7)
Luminance	L	$\theta = 0^\circ$	350	400	-	cd/m ²	Note(5)
Luminance uniformity	U _w	$\theta = 0^\circ$	-	50	-	%	Note(3)
Response Time	T _R + T _F	25 °C	-	30	40	ms	Note(2)
Color Coordination	W _X	$\theta = 0^\circ$ (Center) Normal viewing angle B/L On	-0.03	0.308	+0.03	NTSC (x,y)	Note(6)
	W _Y			0.306			
	R _X			0.599			
	R _Y			0.338			
	G _X			0.299			
	G _Y			0.550			
	B _X			0.139			
	B _Y			0.131			
Viewing Angle	θ_L	C/R>10	-	85	-	Degree	Note(1)
	θ_R		-	85	-		
	θ_U		-	85	-		
	θ_D		-	85	-		

Test Conditions:

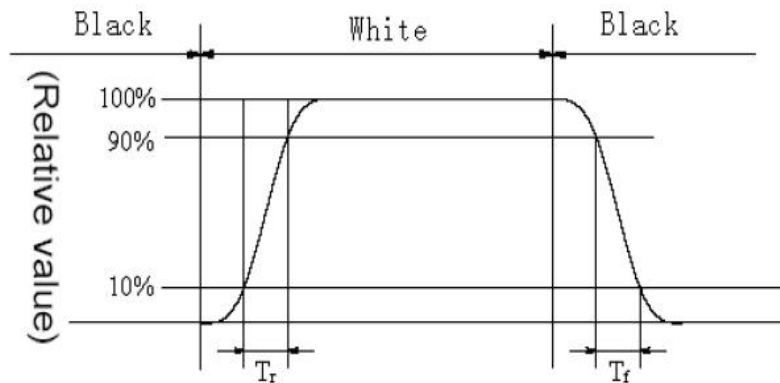
1. I_F=40mA (Backlight current), the ambient temperature is +25°C.

2. The test systems refer to Note 8.

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

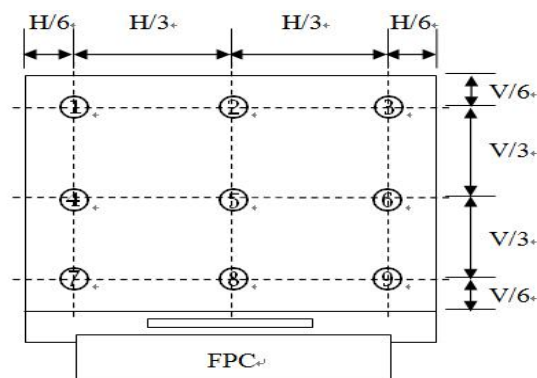


Note2: Definition of Response time: Sum of T_R and T_F



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

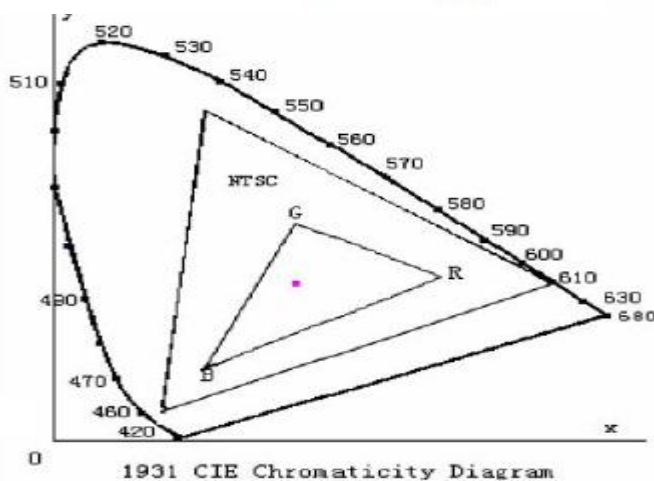
Luminance: Center Luminance of white is defined as luminance values of 1point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

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

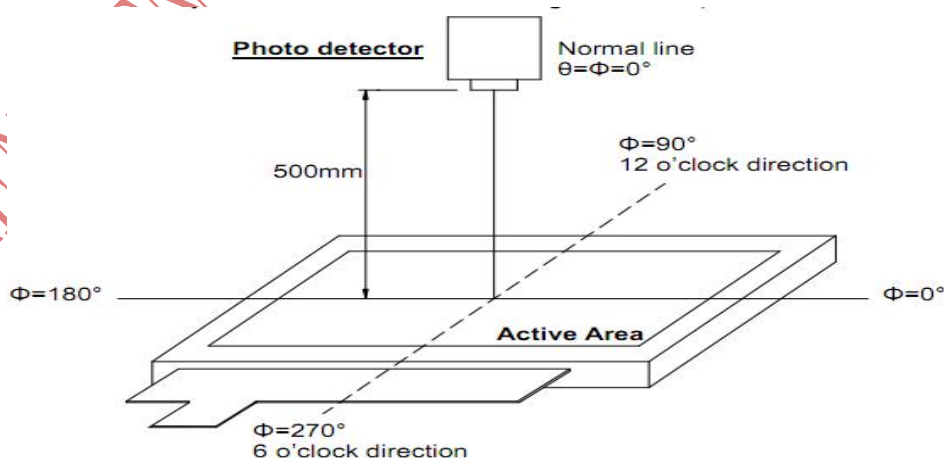
Note 7: Definition of NTSC ratio:

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



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
Packing shock test	Drop to the ground from 60cm height, 1 corner, 3 edges, 6 surfaces.	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.

8. PACKAGE DRAWIN

