

LCD MODULE
SPECIFICATION

Model:	UE060FH-RB40-L004B
Version:	V1.0
Date:	20191017

- ☐ 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	2019.10.17	Preliminary release	

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB_Stripe
- 2) Interface Mode: TDDI MIPI
- 3) Driver IC: TD4310
- 4) Operation Temperature: -20~70℃
- 5) Storage Temperature: -30~80℃
- 6) Backlight Type: White LED
- 7) Display mode: Normally Black,
- 8) Pixel Density: 403 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	IPS TFT	-	-
Screen Size	5.99	Inch	Diagonal
Resolution	1080(W)*3(RGB)*2160(H)	Dots	
Interface	MIPI	-	4lane
Module Power Consumption	0.2	Watt	Typ.
Active Area	68.04(W)*136.08(H)	mm	-
Pixel pitch (W*H)	0.021(W)*0.063(H)	mm	-
Module Size (W*H*D)	69.84(W)*142.53(H)*1.27(D)	mm	-
Luminance	480	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	VDDIO	-0.3	3.6	V	Note1
Power supply2 voltage	VSN	-0.3	-6.0	V	Note1
Power supply3 voltage	VSP	-0.3	6	V	
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}	-20	70	°C	Note1,2
Storage temperature	T _{st}	-30	80	°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.

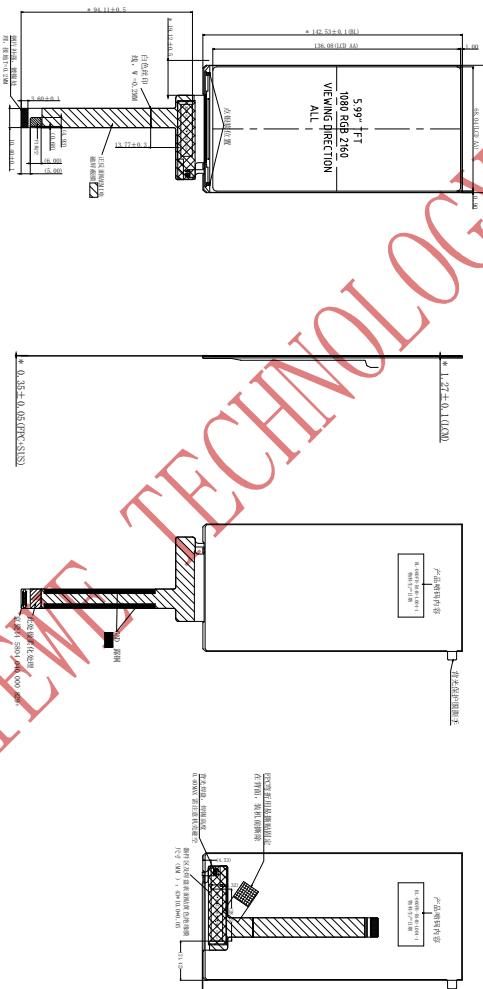
Note2: In case of temperature below 0°C,the response time of liquid crystal (LC) becomes slower and the color of panel darker than normal one.

Note3: Temp. ≤ 60°C , 90% RH MAX.

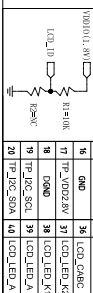
Temp. > 60°C , Absolute humidity shall be less than 90% RH .

FPC弯折示意图
FPC弯折出货

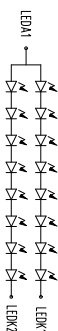
REV.	CONTENT	DESIGN	DATE
A	FIRST RELEASE	肖喜亮	20190527
B	修改LCD+IC品牌,調整LENS視窗	肖喜亮	20191017



接口定义:

[illegible]

- NOTES:
1. DISPLAY TYPE: 5.99" 1080*2160 TFT LCD
 2. TRANSMISSIVE, NORMALLY BLACK
 3. VIEWING DIRECTION: ALL
 4. TD01 IC: TP4310
 5. OPERATING TEMPERATURE: -20° C TO 70° C ;
STORAGE TEMPERATURE: -30° C TO 80° C ;
 6. BL LED: 16 CHIP-WHITE LEDS, IF:40mA VF:2.5~6V(TYP)
LCM Luminance: 410cd/㎡ MIN, 480cd/㎡ TYP;
White Chromaticity:X:0.3±0.04, Y:0.37±0.04;
Unspecified TOLERANCE: ±0.2mm;
 7. RoHS2.0 Compliant;
 8. With '*' is the focus of inspection dimension



CUSTOMER APPROVE		深圳市优奕视界有限公司 SHENZHEN VIEWE TECHNOLOGY CO., LTD			
MODEL NO.	UIC-0060PT-R10-1004B	DRAWN	肖煜亮		
TITLE	LOA	CHECKED	陈冈		
SCALE 1:1	第三视角	APPROVE	钟祥林		
			UNIT MM	PAGE 1 / 1	

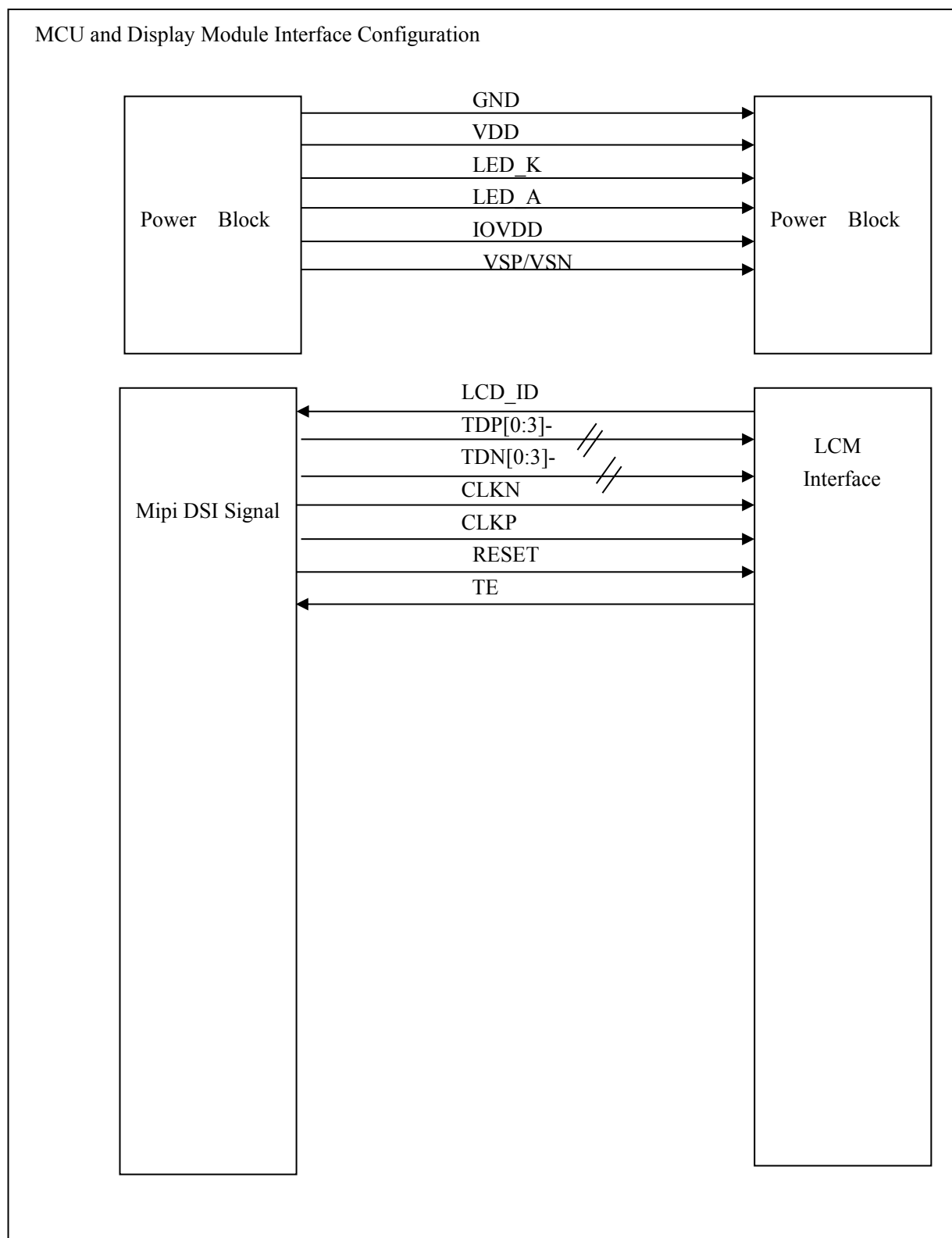
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

Pin	Symbol	I/O	Description
1	DSI-CLKN	I	differential data signals for MIPI interface
2	DSI-CLKP	I	differential data signals for MIPI interface
3	GND	P	Power Ground
4	DSI-D0N	I	differential data signals for MIPI interface
5	DSI-D0P	I	differential data signals for MIPI interface
6	GND	P	Power Ground
7	DSI-D1N	I	differential data signals for MIPI interface
8	DSI-D1P	I	differential data signals for MIPI interface
9	GND	P	Power Ground
10	DSI-D2N	I	differential data signals for MIPI interface
11	DSI-D2P	I	differential data signals for MIPI interface
12	GND	P	Power Ground
13	DSI-D3N	I	differential data signals for MIPI interface
14	DSI-D3P	I	differential data signals for MIPI interface
15	GND	P	Power Ground
16	GND	P	Power Ground
17	TP_VDD_2.8V	P	.Analog Power Supply for TP
18	GND	P	Power Ground
19	TP_SCL	I	I2C clock signals for TP
20	TP_SDA	I	I2C data signals for TP
21	TP_RST_N	I	The signal will reset the TP, Signal is active low
22	GND	P	Power Ground
23	TP_INT	O	Interrupt signals for TP
24	GND	P	Power Ground
25	GND	P	Power Ground
26	RST_N	I	Chip reset singal
27	GND	P	Power Ground
28	LCD_ID(1.8V)	I	LCM Hardware ID Selection,Default pull high
29	LCD_VDDIO	I	Power supply for digital circuits and IO pads(1.8V)
30	GND	P	Power Ground
31	LCD_VSN	P	Negative Voltage for source driver
32	LCD_VSP	P	Positive Voltage for source driver
33	GND	P	Power Ground
34	LCD_TE	O	Tearing effect output pin to synchronize MCU to frame
35	GND	P	Power Ground
36	LCD_CABC	O	ContentAdaptive Brightness Control
37	LED_K2	P	Power supply for LED cathode
38	LED_K1	P	Power supply for LED cathode
39	LED_A	P	Power supply for LED anode
40	LED_A	P	Power supply for LED 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	VDDIO	1.7	1.8	3.3	V	-
Power supply2 voltage	VSN	4.5	5	6	V	-
Power supply3 voltage	VSP	-6	-5	-4.5	V	-
Power Supply Current	I _{VDD}	-	30	-	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}	-	0.1	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	0.896	-	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_{B/L}, About P_{B/L} information, inference to 5.2 Back Light Driving Section.

5.2 Back Light Driving Section

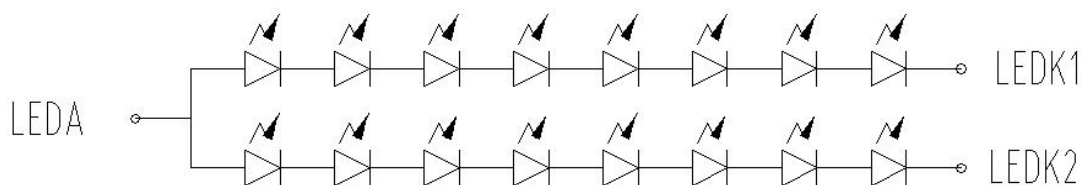
Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V _F	-	25.6	-	V	Note1
Forward Current	I _F	-	40	-	mA	Note1
Backlight Power consumption	P _{B/L}	-	1.024	-	Watt	Note1
LED life time	-	30000	-	-	Hours	Note2
LED Quantity			16		PCS	

(Ta=+25°C,GND=0V)

Note1: The LED driving condition is defined for each LED module (8 LED Serial, 2 LED Parallel)。

For each LED : I_F=20mA, V_F=3.2V(Typ.), Ta=25°C。

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



5.3 Power On/Off Sequence

5.3.1 Power On Sequence

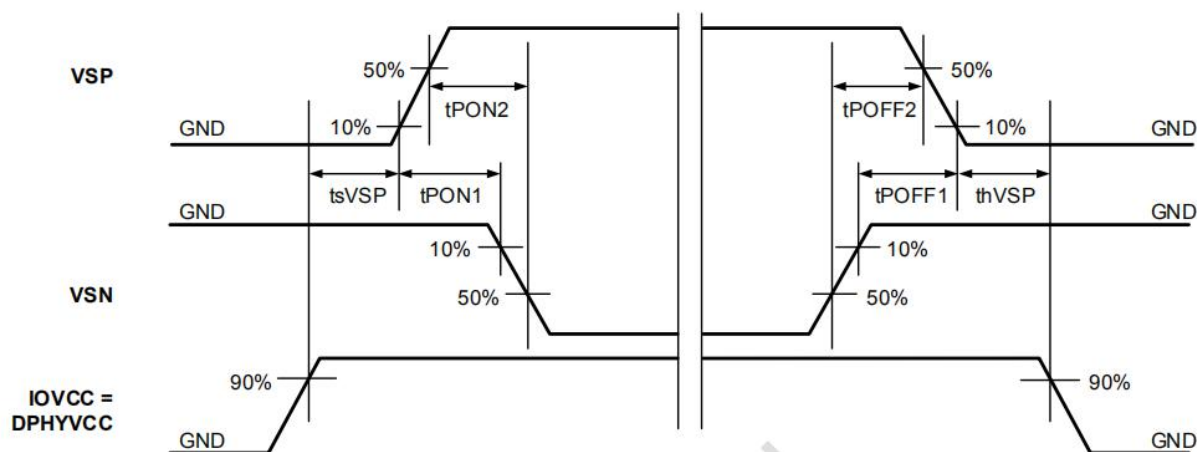
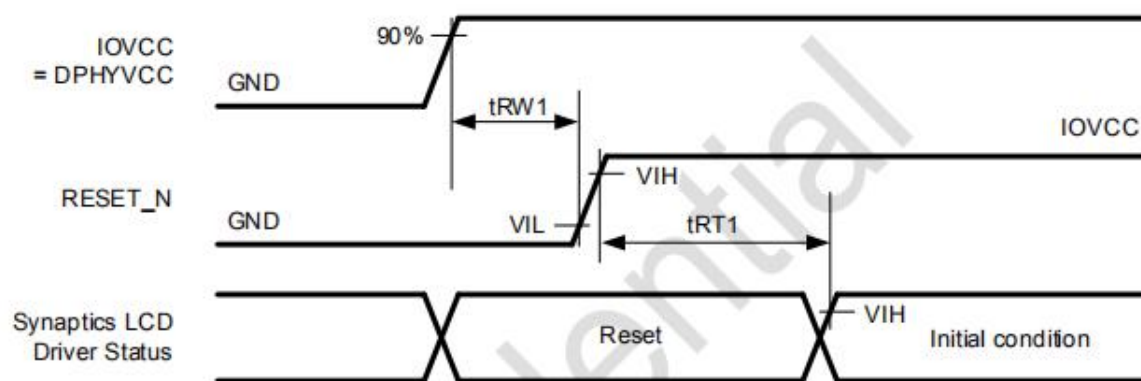


Figure 16. Power supply on/off timing

Table 25. Power supply specifications

Item	Symbol	Unit	Test Condition	Minimum	Maximum
VSP-VSN delay time (10% to 10%)	tPON1	μs	Power on	0	—
VSP-VSN delay time (50% to 50%)	tPON2	μs	Power on	0	—
System power on to VSP ON time	tsVSP	ms	Power on	1	—
VSN-VSP delay time (10% to 10%)	tPOFF1	μs	Power off	0	—
VSN-VSP delay time (50% to 50%)	tPOFF2	μs	Power off	0	—
VSP OFF to system power OFF time	thVSP	μs	Power off	0	—

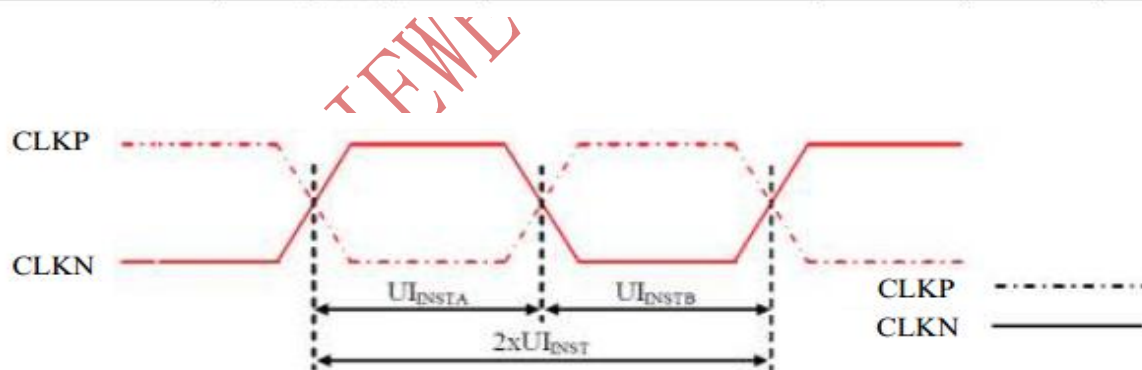
5.3.2 Reset timing at Power on



5.4 Timing Characteristics

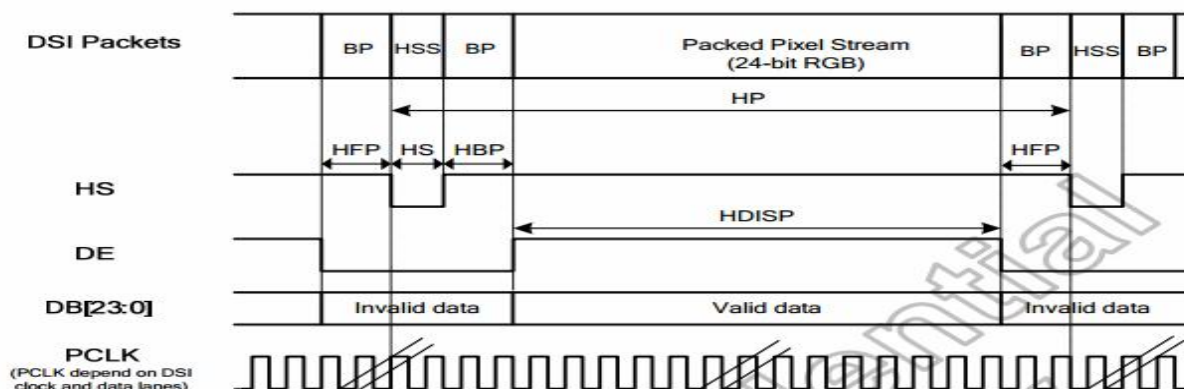
5.4.1 AC Characteristics

Signal	Symbol	Parameter	Min	Max	Unit
CLKP/N	$2 \times UI_{INST}$	Double UI instantaneous	Note 2	25	ns
CLKP/N	UI_{INSTA}, UI_{INSTB} (Note 1)	UI instantaneous Half	Note 2	12.5	ns

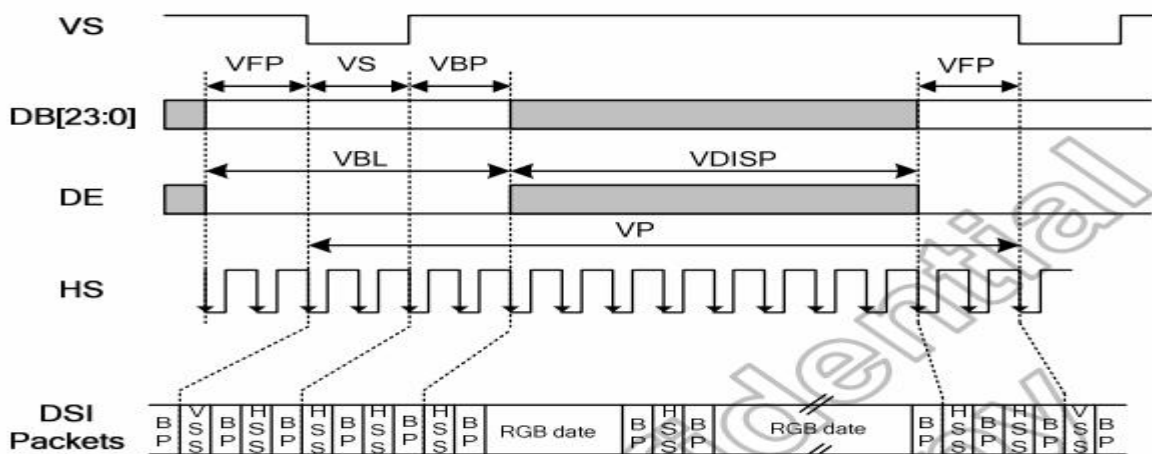


5.5 Timing Diagram

5.5.1 Horizontal Timings



5.5.2 Vertical Timings



5.5.3 Timing Parameters

Parameter	Symbol	Value			Unit
		Min.	Typ.	MAX.	
Bit rate per lane	BR _{PHY}	80	-	1000	Mbps
Active pixel per line	HACT	-	1080	-	Pixels
Horizontal back porch	t _{HBP}	-	26	-	DCLK
Horizontal sync active	t _{HSA}	-	2	-	DCLK
Horizontal front porch	t _{HFP}	-	130	-	DCLK
Active pixel per frame	VACT	-	2160	-	H
Vertical back porch	t _{VBP}	-	53	-	H
Vertical sync active	t _{VSA}	-	10	-	H
Vertical front porch	t _{VFP}	-	4	-	H

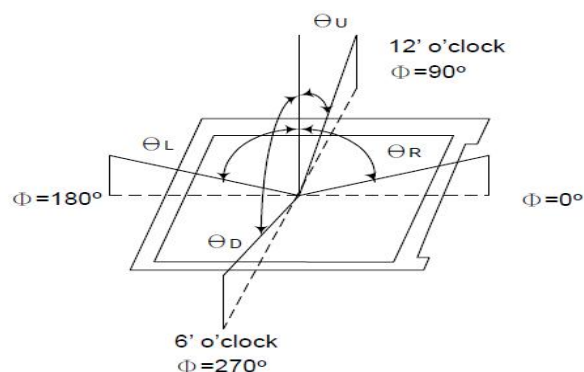
6. OPTICAL CHARACTERISTICS

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	$\theta = 0^\circ$	60	68	-	%	Note(7)
Luminance	L	$\theta = 0^\circ$	-	450	-	cd/m ²	Note(5)
Luminance uniformity	U _W	$\theta = 0^\circ$	-	80	-	%	Note(3)
Response Time	T _R + T _F	25 °C	-	30	35	ms	Note(2)
Color Coordination	W _X	$\theta = 0^\circ$ (Center) Normal viewing angle B/L On	-0.03	0.291	+0.03	NTSC (x,y)	Note(6)
	W _Y			0.317			
	R _X			0.671			
	R _Y			0.320			
	G _X			0.233			
	G _Y			0.600			
	B _X			0.140			
	B _Y			0.071			
Viewing Angle	θ_L	C/R>10	-	80	-	Degree	Note(1)
	θ_R		-	80	-		
	θ_U		-	80	-		
	θ_D		-	80	-		

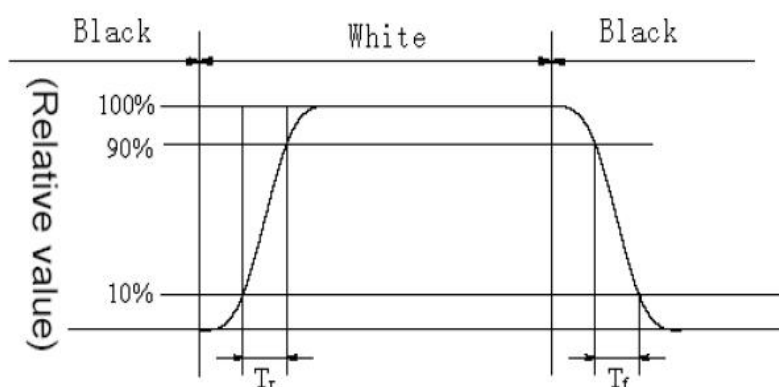
Test Conditions:

1. VDD=2.8V, 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

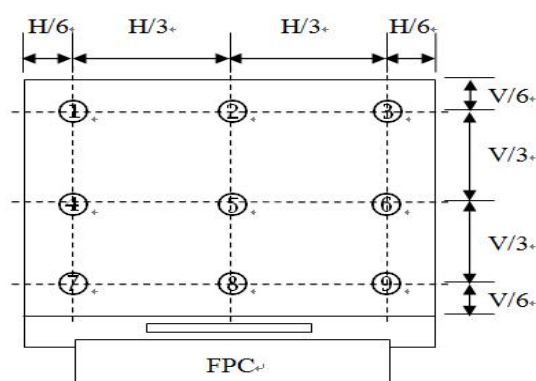


Note2: Definition of Response time: Sum of T_R and T_F



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

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

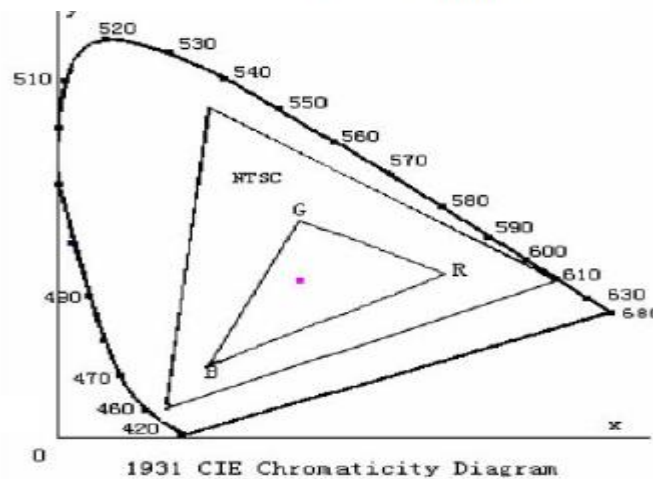
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1 point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

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

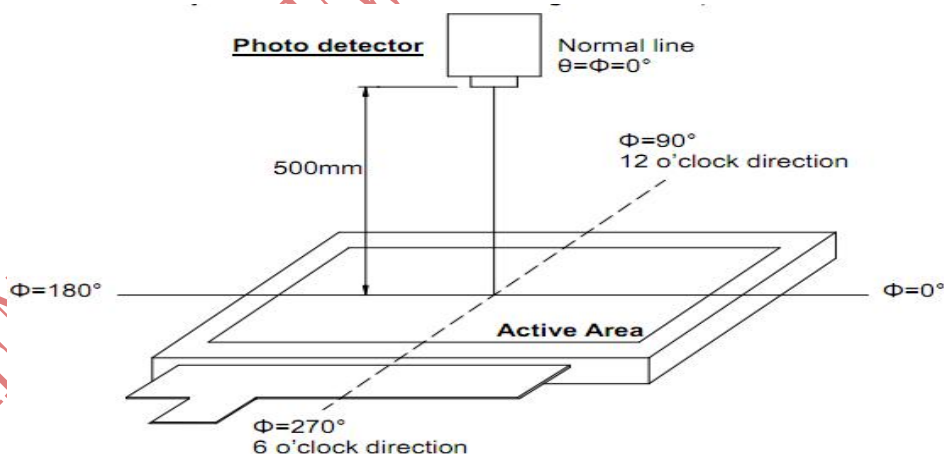
Note 7: Definition of NTSC ratio:

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



Note 8: Definition of 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 =+80°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 96Hours	Note1,2,3
High Temperature Operating	Ta =+70°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta =-20°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-20°C/30min ↔ +70°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 DRAWING

