

LCD MODULE SPECIFICATION

Model:	UE025WV-RB12-L001
Version:	V1.0
Date:	20180223

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	20180223	Preliminary release	

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB_Stripe
- 2) Interface Mode: 12PIN 4 wire SPI 8bit
- 3) Driver IC: HX8379-C
- 4) Operation Temperature: -10~60℃
- 5) Storage Temperature: -20~70℃
- 6) Backlight Type: White LED
- 7) Display mode: Normally Black,
- 8) Pixel Density: 274 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	2.47	Inch	Diagonal
Resolution	480(W)*RGB*480(H)	Dots	-
Interface	MIPI	-	2 Lanes
Module Power Consumption	0.41	Watt	Typ.
Active Area	62.64(W)*62.64(H)	mm	-
Pixel pitch (W*H)	130.5(W)*130.5(H)	um	-
Module Size (W*H*D)	69.19(W)*71.74(H)*1.41(D)	mm	-
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	VCI	-0.3	3.6	V	Note1
Power supply2 voltage	IOVCC	-0.3	3.6	V	
LED forward current	I _F	-0.001	20	mA	For each led,Note1
LED Reverse Voltage	V _R	-	5	V	For each led,Note1
Operating temperature	T _{op}	-10	60	°C	Note1,2
Storage temperature	T _{st}	-20	70	°C	Note1,2
Humidity	H _{st}	60	90	%RH	Note1,3

(Ta=+25°C,GND=0V)

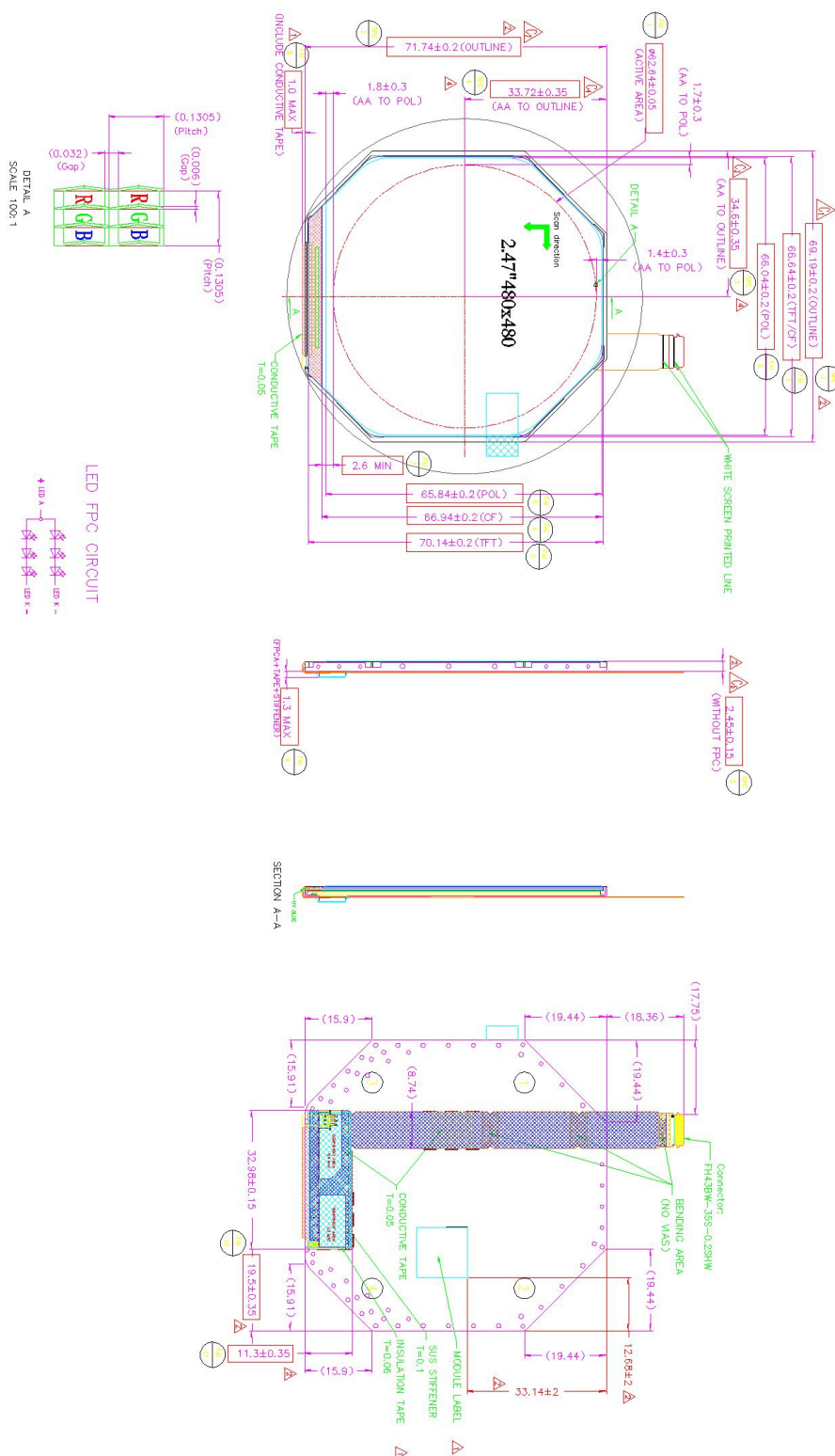
Note1:If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

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 .

LCM Outline Dimension(unit:mm)

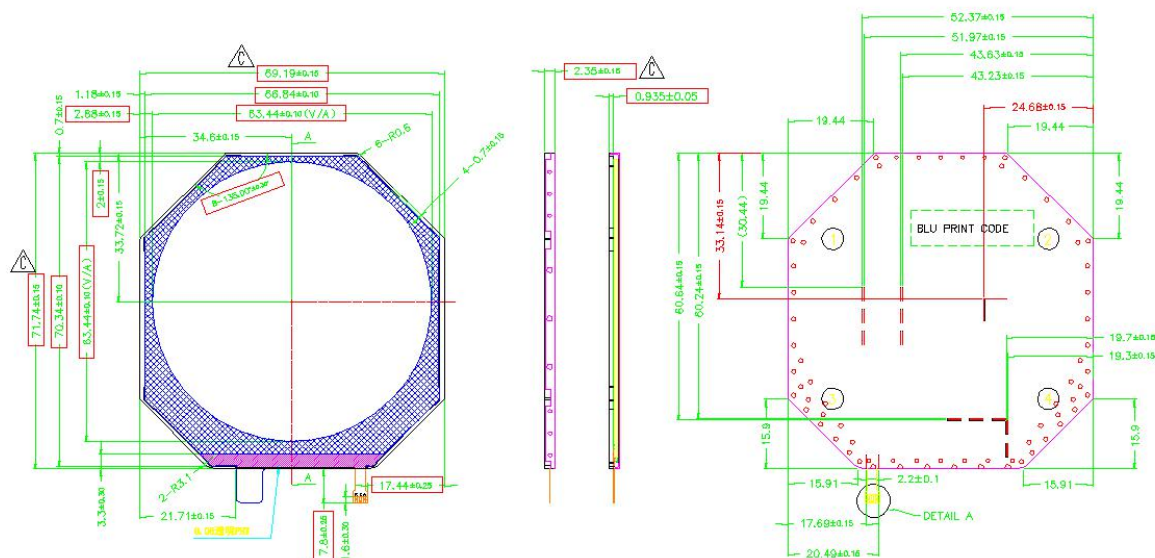


BLU Outline Dimension(unit:mm)

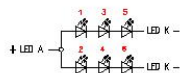
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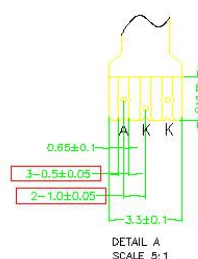
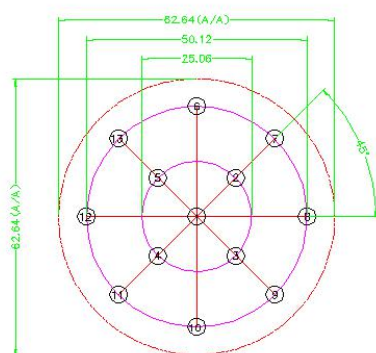
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LED FPC CIRCUIT



CONFIDENTIAL



13 点均一性管控测试点

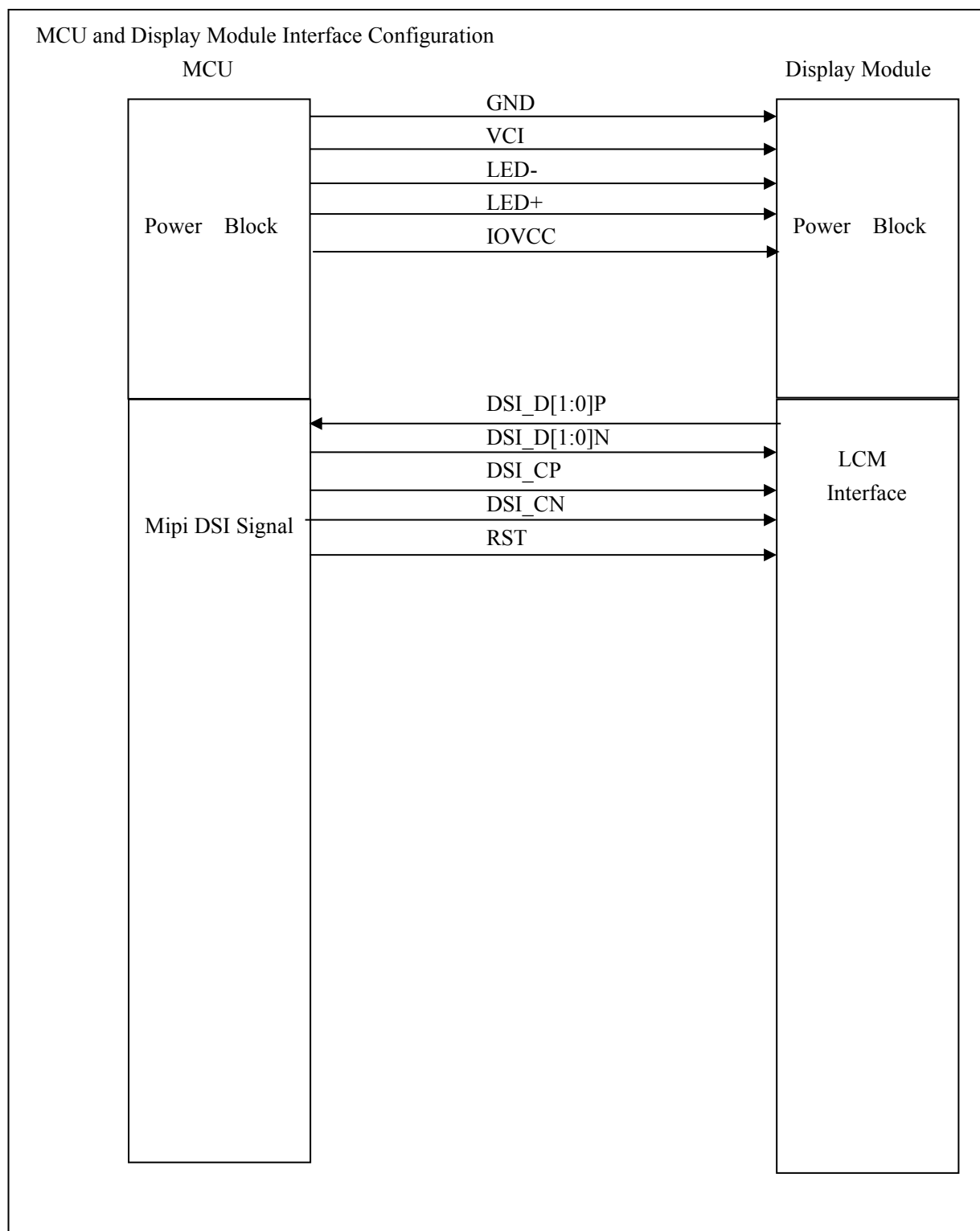
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

Pin No. 序号	Symbol 符号	I/O	Description 描述
1	GND	P	Power Ground
2	DSI_D1P	I	MIPI-DSI data lane 1 positive-end input pin
3	NC	-	No connected
4	DSI_D1N	I	MIPI-DSI data lane 1 negative-end input pin
5-7	GND	P	Power Ground
8	DSI_CP	I	MIPI-DSI clock lane positive-end input pin
9	NC	-	No connected
10	DSI_CN	I	MIPI-DSI clock lane negative-end input pin
11-13	GND	P	Power Ground
14	DSI_D0P	I/O	MIPI-DSI data lane 0 positive-end input pin
15	NC	-	No connected
16	DSI_D0N	I/O	MIPI-DSI data lane 0 negative-end input pin
17-18	GND	P	Power Ground
19	ID0	O	LCD ID0
20	ID1	O	LCD ID1
21	RST	I	The signal will reset the LCM, Signal is active low.
22	NC	-	No connected
23	THERM	O	Thermistor Readout
24	IOVCC	P	Power supply to interface pins(1.8V)
25	GND	P	Power Ground
26-27	VCI	P	Power supply for analog circuits
28	GND	P	Power Ground
29	LED1-	P	Power supply for backlight cathode
30	LED2-	P	Power supply for backlight cathode
31	NC	-	No connected
32-33	LED+	P	Power supply for backlight anode
34	NC	-	No connected
35	GND	P	Power Ground

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	VCI	2.5	2.8	3.6	V	-
Power Supply2 Voltage	IOVCC	1.65	1.8	3.3	V	-
Power Supply Current	I _{VDD}	-		8	mA	Note1
Logic Input High Voltage	V _{IH}	0.7*IOVC C	-	IOVCC	V	-
Logic Input Low Voltage	V _{IL}	0	-	0.3*VDD	V	-
Panel Power Consumption	P _{VCC}	-	0.08	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	0.404	-	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	-	9	-	V	Note1
Forward Current	I _F	-	36	-	mA	Note1
Backlight Power consumption	P _{BL}	-	0.33	-	Watt	Note1
LED life time	-	30000	-	-	Hours	Note2
LED Quantity			6		PCS	

(Ta=+25°C,GND=0V)

Note1: The LED driving condition is defined for each LED module (2 LED Serial, 3 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

VDD1, VDD2 and VDD3 can be applied in any order. VDD1, VDD2 and VDD3 can be powered down in any order. During power off, if LCD is in the Sleep Out mode, VDD1 and VDD2 must be powered down minimum 120msec after RESX has been released. During power off, if LCD is in the Sleep In mode, VDD1, VDD2 and VDD3 can be powered down minimum 0msec after RESX has been released. CSX can be applied at any timing or can be permanently grounded. RESX has priority over CSX. There will be no damage to the display module if the power sequences are not met. There will be no abnormal visible effects on the display panel during the Power On/Off Sequences. There will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence. If RESX line is not held stable by host during Power On Sequence as defined in Sections 5.11.1 and 5.11.2, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed. The power on/off sequence is illustrated below.

RESX line is held high or unstable by host at power on

If RESX line is held high or unstable by the host during power on, then a Hardware Reset must be applied after both VDD1, VDD2 and VDD3 have been applied- otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.

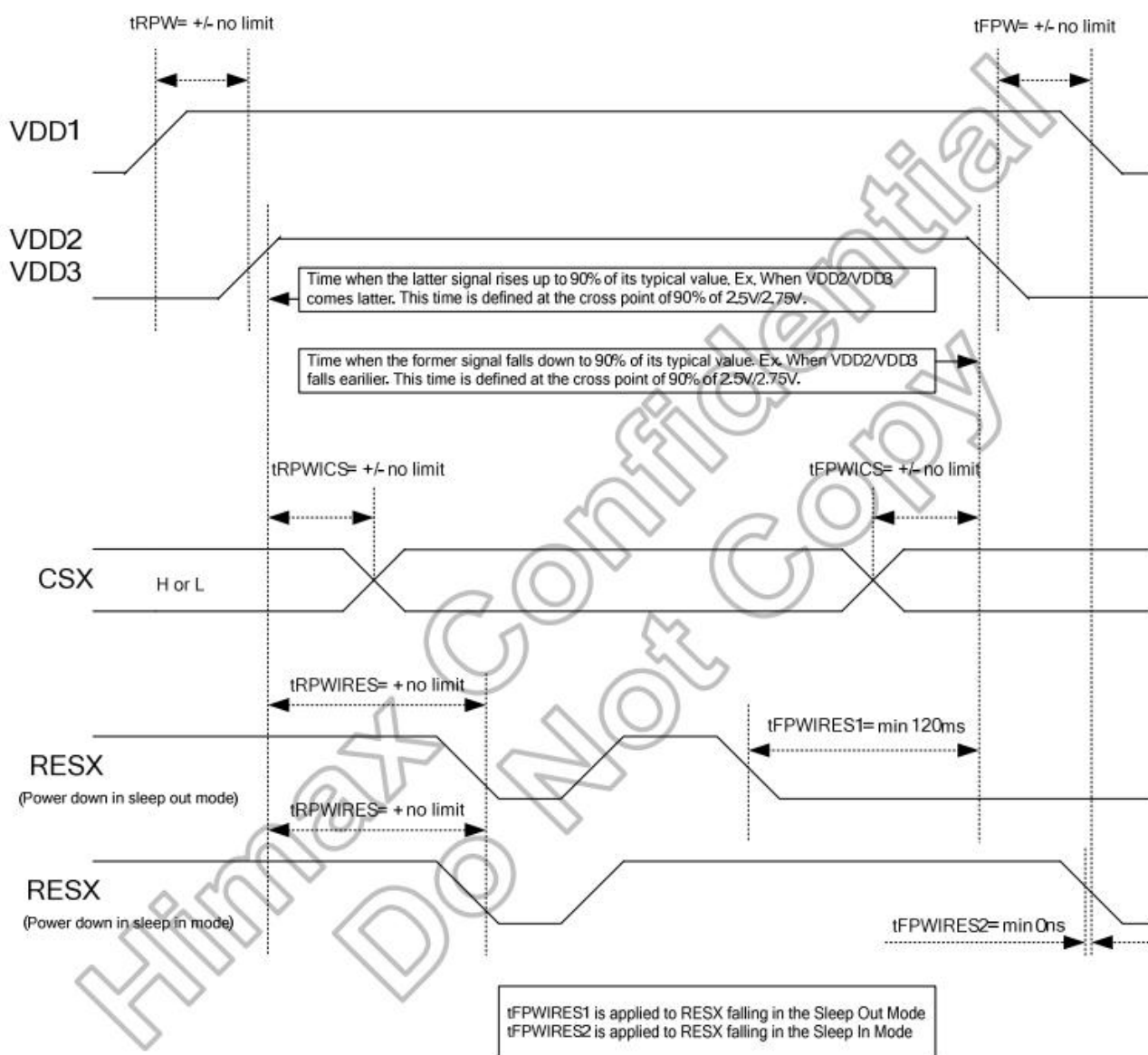


Figure 5.22: Case 1: RESX line is held high or unstable by host at power on

RESX line is held low by host at power on

If RESX line is held low (and stable) by the host during power on, then the RESX must be held low for minimum 10μsec after both VDD1, VDD2 and VDD3 have been applied.

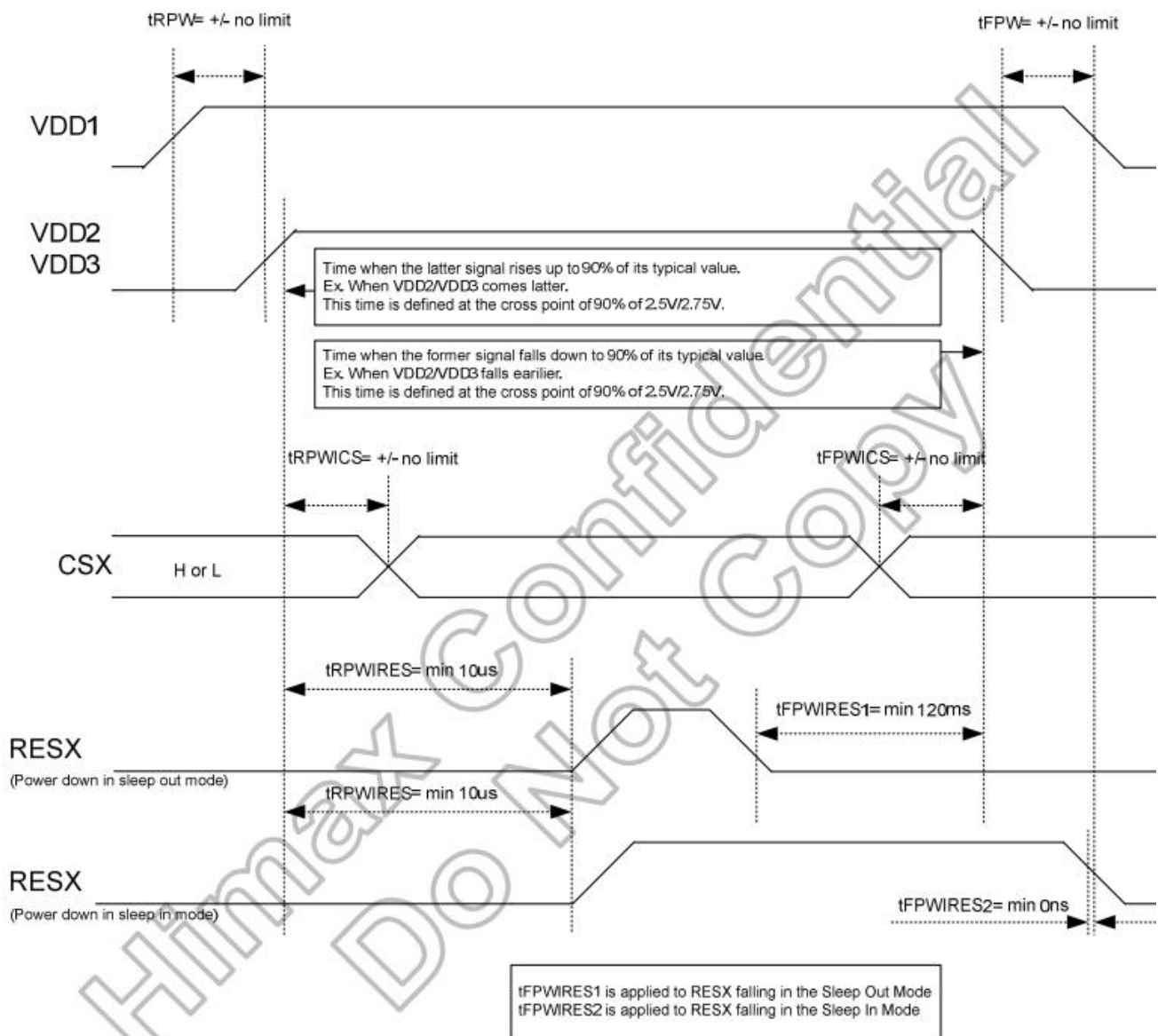


Figure 5.23: Case 2: RESX line is held low by host at power on

Uncontrolled power off

The uncontrolled power off means a situation when e.g. there is removed a battery without the controlled power off sequence. There will not be any damages for the display module or the display module will not cause any damages for the host or lines of the interface. At an uncontrolled power off the display will go blank and there will not be any visible effects within 1 second on the display (blank display) and remains blank until "Power On Sequence" powers it up.

5.4 Timing Characteristics

MIPI Characteristics

MODE	VSYNC_Width	VSYNC_BP	VSYNC_FP	HSYNC_Width	HSYNC_BP	HSYNC_FP
Event /Burst/Pulse	4-Hsync	8-Hsync	5-Hsync	(HS=100,HBP=100) HS+HBP>1.2us		(HFP=180) HFP> 1us

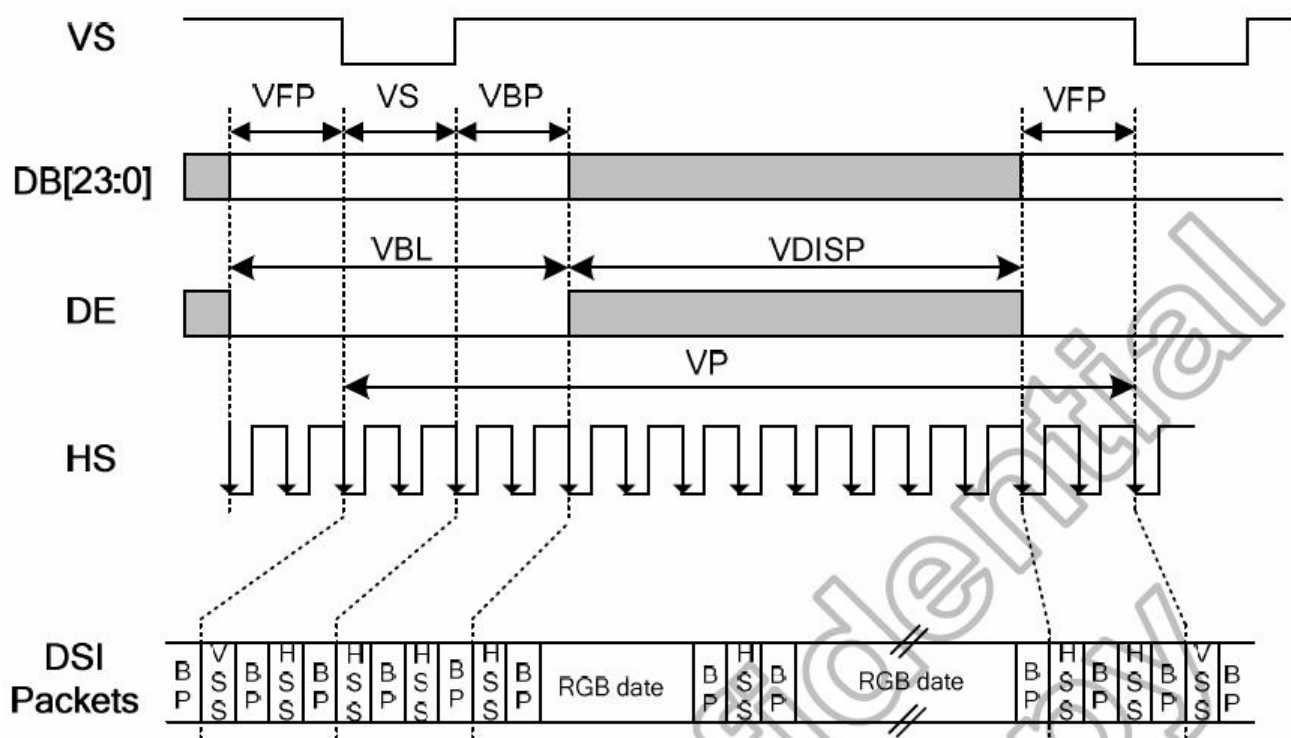
5.4.1 DC Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI Characteristics for High Speed Receiver					
Single-ended input low voltage	VILHS	-40	-	-	mV
Single-ended input high voltage	VIHHS	-	-	460	mV
Differential input impedance	ZID	80	100	125	ohm
HS transmit differential voltage	VOD	140	200	270	mV
MIPI Characteristics for Low Power Mode					
Pad signal voltage range	VI	-50	-	1350	mV
Ground shift	VGND SH	-50	-	50	mV
Logic 0 input threshold	VIL	-	-	550	mV
Logic 1 input threshold	VIH	880	-	-	mV
Input hysteresis	VHYST	25	-	-	mV
Output low level	VOL	-50	-	50	mV
Output high level	VOH	1.1	1.2	1.3	V

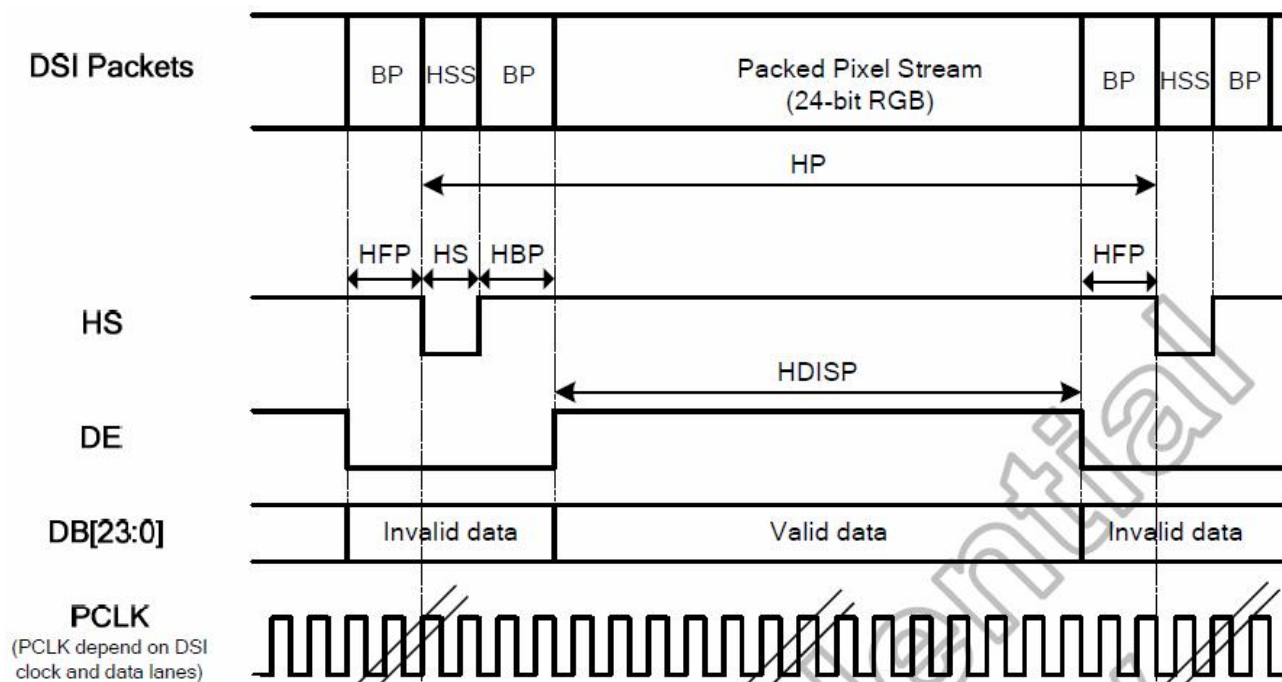
5.5 Timing Diagram

Parameter	Symbol	Min	Typ	Max
MIPI Data Frequency	Mbps	-	-	550/lane for 2-lane
Hsync period time	us	2.2	-	-
Hsync pulse width	us	0.2	-	-
Hsync back porch	us	1	-	-
Hsync front porch	us	1	-	-
Vsync period time	line	6	-	-
Vsync pulse width	line	2	-	255
Vsync back porch	line	2	-	255
Vsync front porch	line	2	-	-
Data to CLK Setup Time	UIINST	0.15	-	-
Data to CLK Hold Time	UIINST	0.15	-	-
Data CLK cycle time	ns	1.82	-	12.5

Vertical timings



Horizontal timings



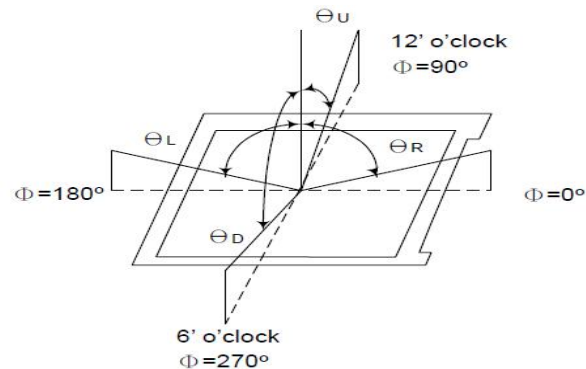
6. OPTICAL CHARACTERISTICS

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	$\theta = 0^\circ$	70	-	-	%	Note(3)
Response Time	T _R + T _F	25 °C	-	-	35	ms	Note(2)
Color Coordination	W _X	$\theta = 0^\circ$ (Center) Normal viewing angle B/L On	-0.03	0.313	+0.03	NTSC (x,y)	Note(6)
	W _Y			0.329			
	R _X			0.637			
	R _Y			0.328			
	G _X			0.337			
	G _Y			0.622			
	B _X			0.155			
	B _Y			0.055			
Viewing Angle	θ_L	C/R>10	70	85	-	Degree	Note(1)
	θ_R		70	85	-		
	θ_U		70	85	-		
	θ_D		70	85	-		

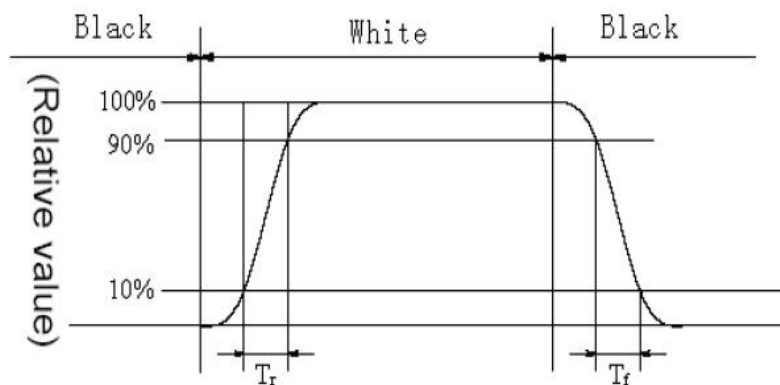
Test Conditions:

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

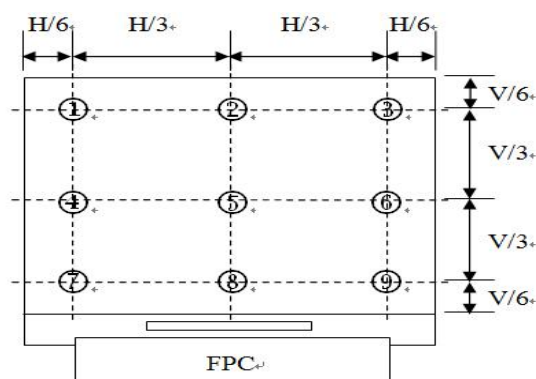


Note2: Definition of Response time: Sum of T_R and T_F



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

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

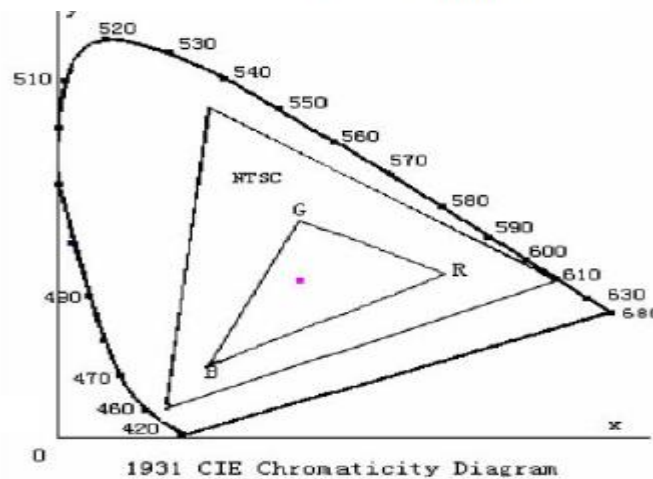
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1 point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

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

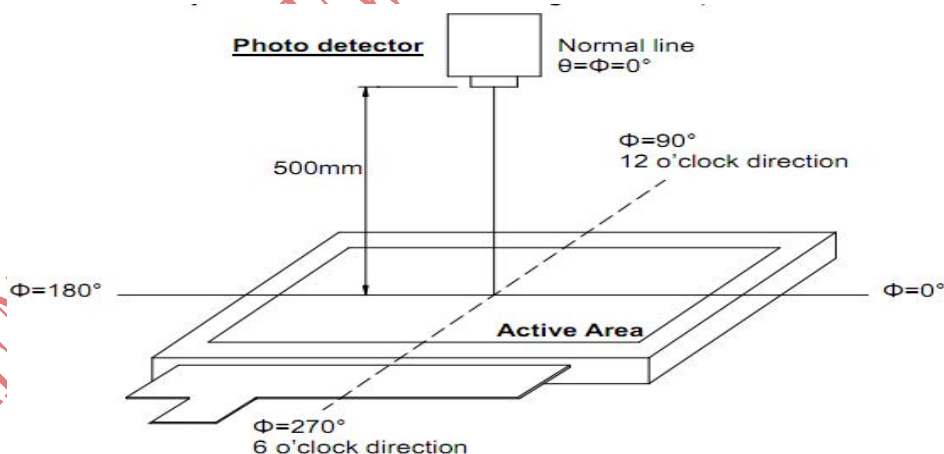
Note 7: Definition of NTSC ratio:

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



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 =+70°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 96Hours	Note1,2,3
High Temperature Operating	Ta =+60°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta =-10°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-30°C/30min ↔ +80°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
Storage ESD	Contact ±4KV, Air ±8KV 100pF, 1500 Ω, 每点 10 次 IC 表面 (左中右) ±2KV	
Operating ESD	Contact ±4KV 100pF, 1500 Ω, 每点 10 次 IC 表面 (左中右) ±2KV	
Vibration	3.5 Grms random vibration, 5 to 500 Hz, 15 min / axis	

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

TBD

14. PACKING SPECIFICATIONS 14.1 INNER BOX SPECIFICATIONS

