

LCD MODULE
SPECIFICATION

Model:	UE035QV-AH54-L015
Version:	V1.1
Date:	2018-06-08

☒ **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	2018.5.30	Preliminary release	All
V1.1	2018.6.8	Change Operation Temperature	Page6

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB Vertical Stripe
- 2) Interface Mode: 54PIN RGB 24bits
- 3) Driver IC: -
- 4) Operation Temperature: -20~70°C
- 5) Storage Temperature: -30~80°C
- 6) Backlight Type: White LED
- 7) Display mode: Normally black, Transmissive
- 8) Pixel Density: 114 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	3.5	Inch	Diagonal
Resolution	320(W)*3(RGB)*240(H)	Dots	
Interface	RGB 24bits	-	54PIN
Module Power Consumption	-	Watt	Typ.
Active Area	70.08(W)*52.56(H)	mm	
Pixel pitch (W*H)	0.219(W)*0.219(H)	mm	
Module Size (W*H*D)	76.84(W)*63.84(H)*3.32(D)	mm	Tolerance: ±0.2
Luminance	800	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	VDD	-0.3	4	V	Note1
Power supply2 voltage	VCCIO	-0.3	4	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}	-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,DGND=AVSS=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

[illegible]

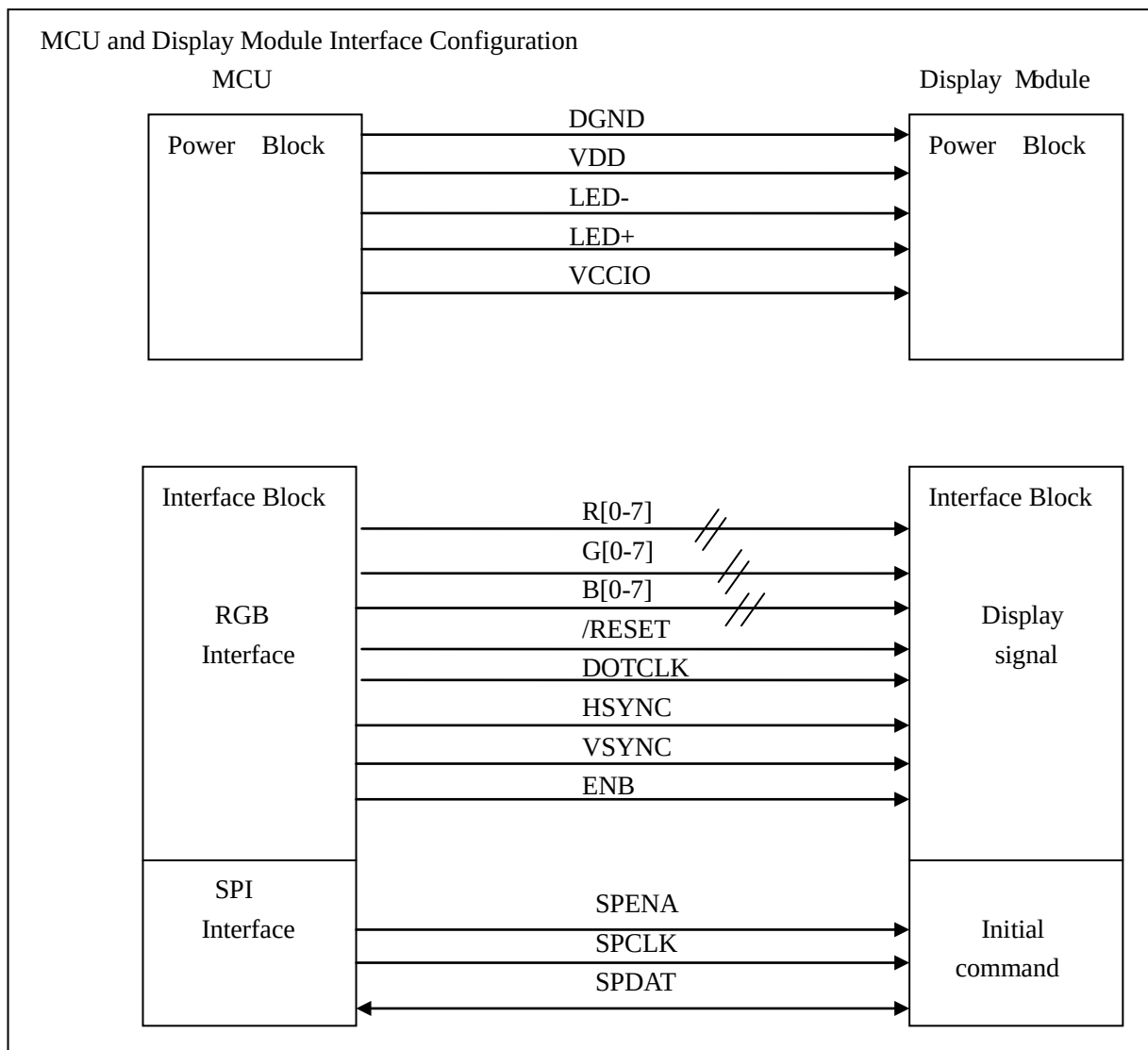
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

Pin No. 序号	Symbol 符号	I/O	Description 描述
1-2	LEDK	P	Power supply for backlight cathode
3-4	LEDA	P	Power supply for backlight anode
5-7	NC	-	Dummy
8	/RESET	I	Global reset pin. When /RESET is “L”, internal initialization procedure is executed
9	SPENA	I	Serial communication chip selection
10	SPCLK	I	Serial communication clock input
11	SPDAT	I/O	Serial communication data input and output
12-19	B0-B7	I	Blue data input
20-27	G0-G7	I	Green data input
28-35	R0-R7	I	Red data input
36	HSYNC	I	Horizontal sync signal, default is negative polarity
37	VSYNC	I	Vertical sync signal, default is negative polarity
38	DOTCLK	I	Pixel clock input pin, default is positive polarity
39-40	NC	-	Dummy
41	VCCIO	P	Power supply for digital I/O pins.
42	VDD	P	Power supply for analog circuit.
43-51	NC	-	Dummy
52	ENB	I	Data input enable. Display access is enabled when DE is “H”
53	DGND	P	Power Ground
54	AVSS	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	VDD	3.0	3.3	3.6	V	-
Power Supply2 Voltage	VCCIO	3.0	3.3	3.6	V	-
Power Supply Current	I _{VDD}	-	-	-	mA	Note1
Logic Input High Voltage	V _{IH}	0.7VCCIO	-	VCCIO	V	-
Logic Input Low Voltage	V _{IL}	0	-	0.3VCCIO	V	-
Panel Power Consumption	P _{VDD}	-	-	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	-	-	Watt	Note1,2

(Ta=+25°C, DGND=AVSS=0V)

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

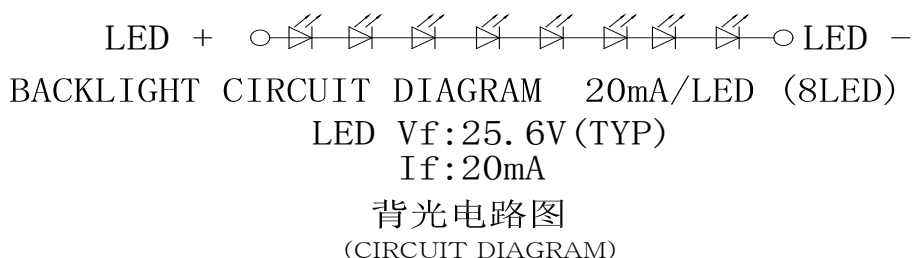
Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V _F	-	25.6	-	V	Note1
Forward Current	I _F	-	20	-	mA	Note1
Backlight Power consumption	P _{B/L}	-	0.51	-	Watt	Note1
LED life time	-	30000	-	-	Hrs	Note2
LED Quantity		8			PCS	

(Ta=+25°C, DGND=AVSS=0V)

Note1: The LED driving condition is defined for each LED module (8LED Serial, 1 LED Parallel).

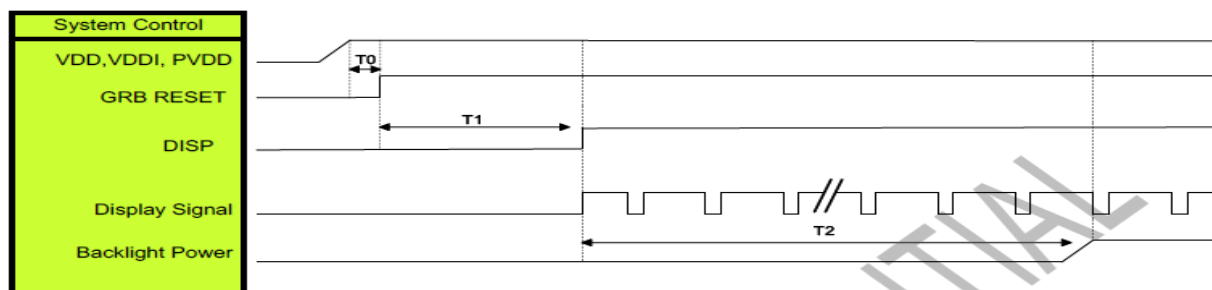
For each LED : I_F=20mA, V_F=3.2V(Typ.)/3.4V(Max.), Ta=25°C。

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

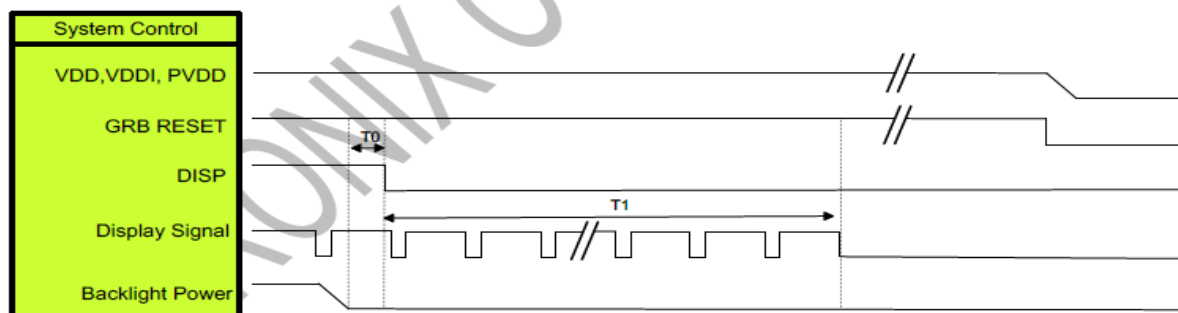
5.3.1 Power on sequence



Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note: Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

5.3.2 Power off sequence

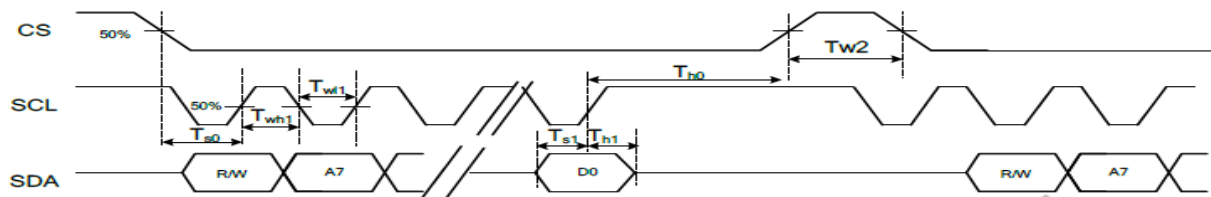


Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms

Note: Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

5.4 Timing Characteristics

5.4.1 Timing for 3-Wire SPI Interface



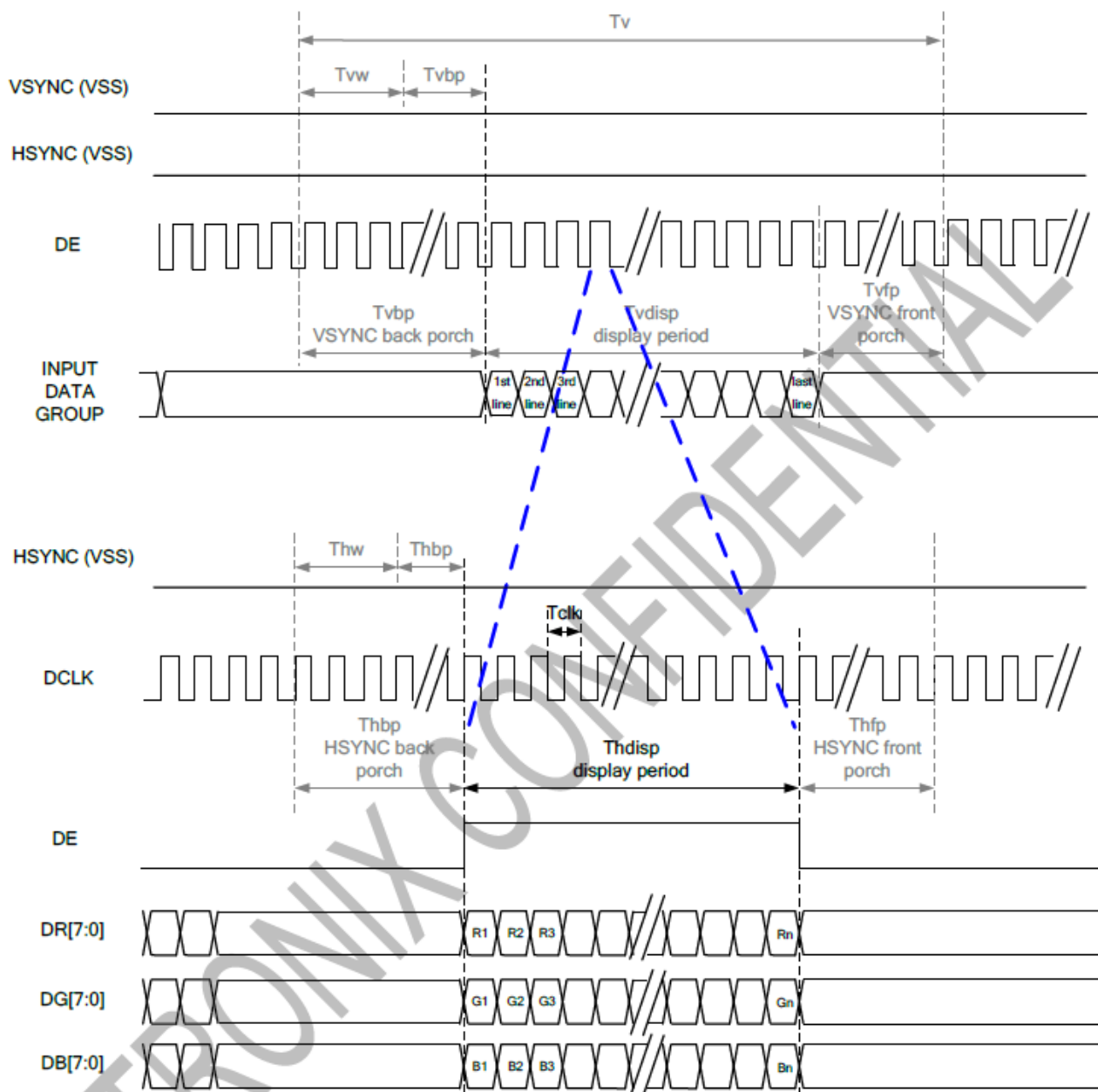
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CS Input Setup Time	Ts0	50	-	-	ns	
Serial Data Input Setup Time	Ts1	50	-	-	ns	
CS Input Hold Time	Th0	50	-	-	ns	
Serial Data Input Hold Time	Th1	50	-	-	ns	
SCL Write Pulse High Width	Twh1	50	-	-	ns	
SCL Write Pulse Low Width	Twl1	50	-	-	ns	
SCL Read Pulse High Width	Trh1	300			ns	
SCL Read Pulse Low Width	Trl1	300			ns	
CS Pulse High Width	Tw2	400	-	-	ns	

(Ta=+25°C, DGND=AVSS=0V)

5.4.2 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing Table						
Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK Frequency	Fclk	5	6	8	MHz	
DCLK Period	Tclk	125	167	200	ns	
HSYNC	Period Time	Th	325	371	438	DCLK
	Display Period	Thdisp		320		DCLK
	Back Porch	Thbp	3	43	43	DCLK SYNC mode back porch control by H_BLANKING[7:0] setting Thbp= H_BLANKING[7:0]
	Front Porch	Thfp	2	8	75	DCLK
	Pulse Width	Thw	2	4	43	DCLK
VSYNC	Period Time	Tv	244	260	289	HSYNC
	Display Period	Tvdisp		240		HSYNC
	Back Porch	Tvbp	2	12	12	HSYNC SYNC mode back porch control by V_BLANKING[7:0] setting Tvbp= V_BLANKING[7:0]
	Front Porch	Tvfp	2	8	37	HSYNC
	Pulse Width	Tvw	2	4	12	HSYNC

5.5 Timing Diagram



6. OPTICAL CHARACTERISTICS

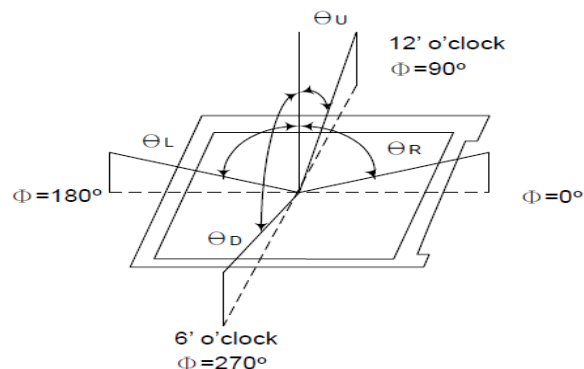
Parameter 参数	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Contrast Ratio	C/R	$\theta = 0^\circ$	640	800	-	-	Note(4)
NTSC Ratio	S	$\theta = 0^\circ$	55	60	-	%	Note(7)
Luminance	L	$\theta = 0^\circ$	-	800	-	cd/m ²	Note(5)
Luminance uniformity	U _w	$\theta = 0^\circ$	70	80	-	%	Note(3)
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	-0.02	0.317	+0.02	NTSC (x,y)	Note(6)
	W _Y			0.339			
	R _X			0.646			
	R _Y			0.332			
	G _X			0.323			
	G _Y			0.567			
	B _X			0.134			
	B _Y			0.121			
Viewing Angle	θ_L	C/R>10	70	80	-	Degree	Note(1)
	θ_R		70	80	-		
	θ_U		70	80	-		
	θ_D		70	80	-		

Test Conditions:

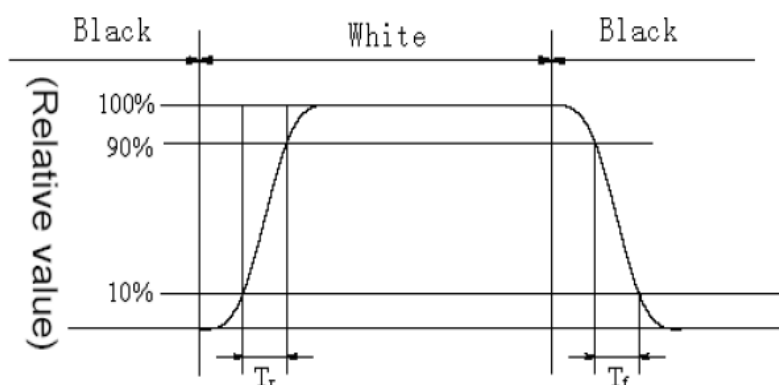
1. VDD=3.3V, I_F=20mA (Backlight current), the ambient temperature is +25°C.

2. The test systems refer to Note 8.

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

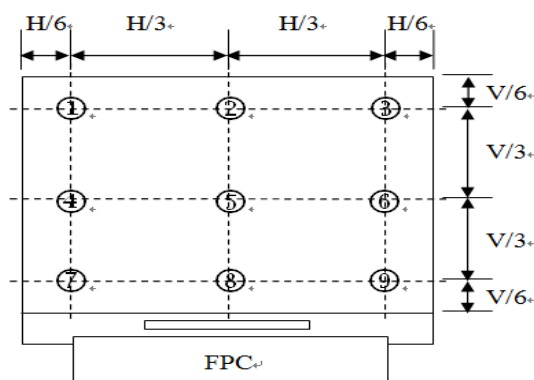


Note2: Definition of Response time: Sum of T_R and T_F



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

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

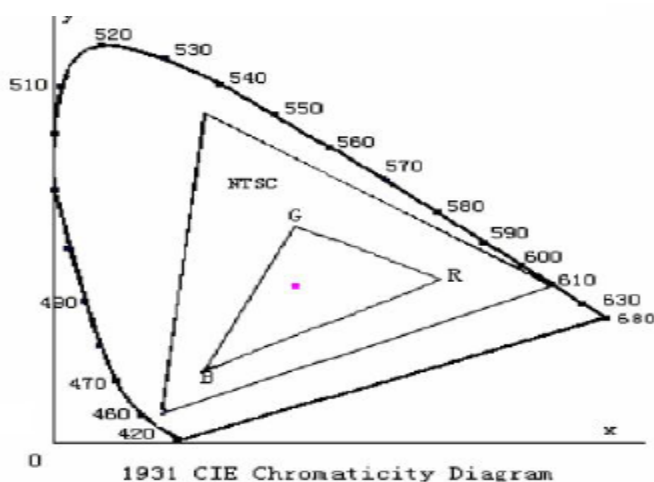
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

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

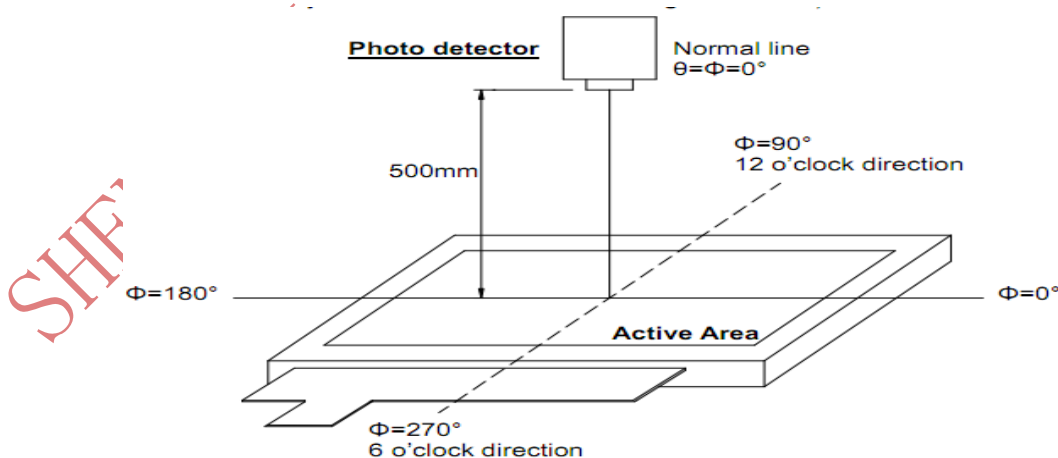
Note 7: Definition of NTSC ratio:

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



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 =+80°C / 240Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 240Hours	Note1,2,3
High Temperature Operating	Ta =+70°C / 240Hours	Note1,2,3
Low Temperature Operating	Ta =-20°C / 240Hours	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 / 240Hours	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
ESD	C=150PF, R=330 Ohm Air: ±8kv, 5times(Center) Contact: ±4kv, 5times(Center)	Note4

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

14. PACKING SPECIFICATIONS 14.1 INNER BOX SPECIFICATIONS

