

LCD MODULE
SPECIFICATION

Model:	UE101WU-AN40-L018-C
Version:	V1.0
Date:	20190119

☒ 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	2019.01.19	Preliminary release	

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB Vertical Stripe
- 2) Interface Mode: MIPI
- 3) Driver IC: S:NT51021B
- 4) Operation Temperature: 0~50℃
- 5) Storage Temperature: -20~60℃
- 6) Backlight Type: White LED
- 7) Display mode: Normally Black,
- 8) Pixel Density: 224 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	10.1.	Inch	Diagonal
Resolution	1200(W)*3(RGB)*1920(H)	Dots	-
Interface	MIPI	-	4lane
Module Power Consumption	3.0	Watt	Typ.
Active Area	216.58(W)*135.36(H)	mm	-
Pixel pitch (W*H)	0.1128(W)*0.0.1128(H)	mm	-
Module Size (W*H*D)	142.80(W)*228.20(H)*2.25(D)	mm	-
Luminance	500	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	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}	0	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 .

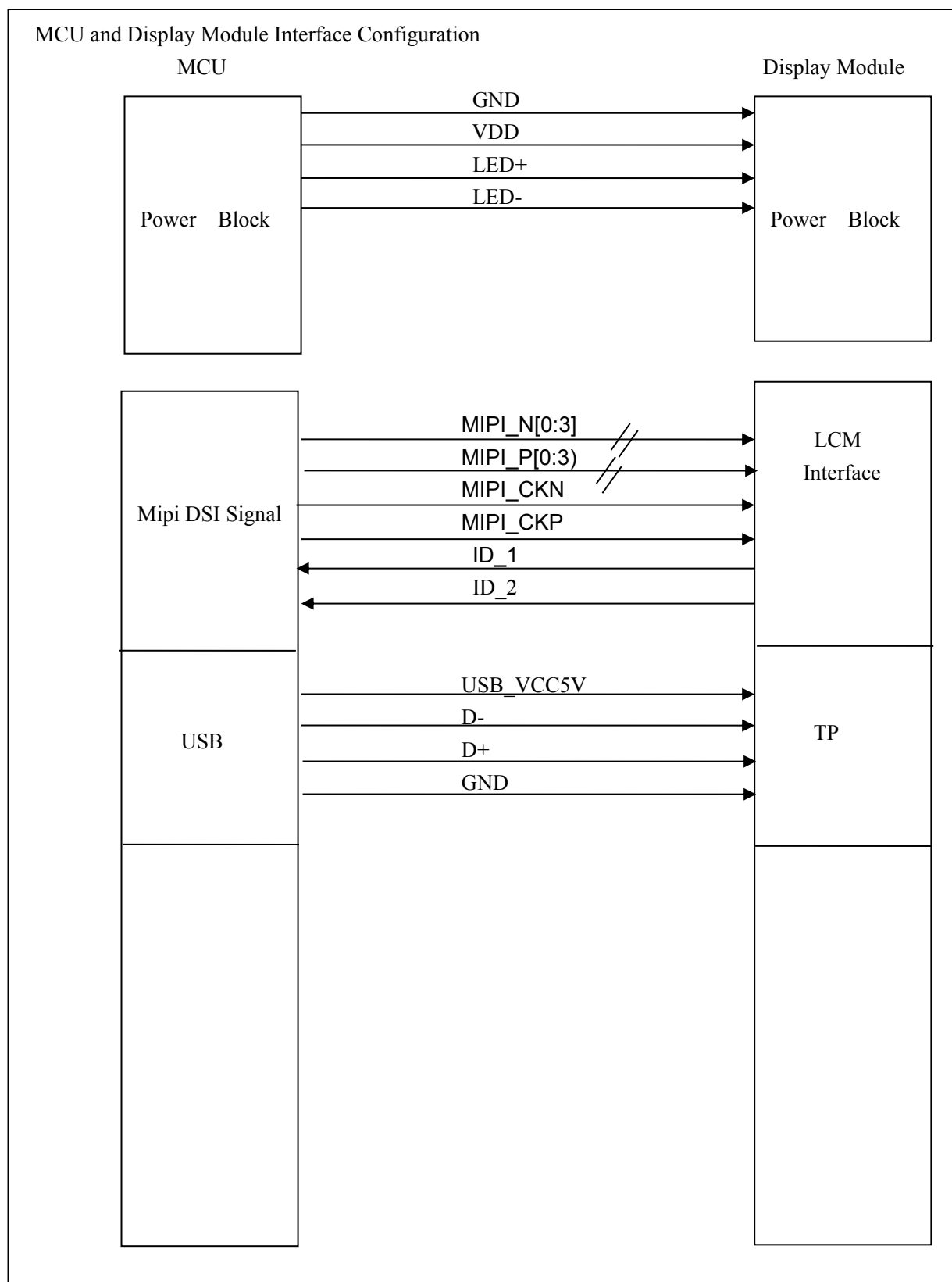
4. I/O CONNECTION & BLOCK DIAGRA

4.1 I/O Connection

LCM	Symbol	I/O	Description
1	NC	-	NO connection
2-3	VDD	P	Power supply for digital circuits 3.3V input
4-5	NC	-	NO connection
6	ID_2	O	ID=0V
7	GND	P	Power Ground
8	MIPI-0N	I/O	MIPI data pair 0 negative signal
9	MIPI-0P	I/O	MIPI data pair 0 positive signal
10	GND	P	Power Ground
11	MIPI-1N	I	MIPI data pair 1 negative signal
12	MIPI-1P	I	MIPI data pair 1 positive signal
13	GND	P	Power Ground
14	MIPI-CKN	I	MIPI Clock negative signal
15	MIPI-CKP	I	MIPI Clock positive signal
16	GND	P	Power Ground
17	MIPI-2N	I	MIPI data pair 2 negative signal
18	MIPI-2P	I	MIPI data pair 2 positive signal
19	GND	P	Power Ground
20	MIPI-3N	I	MIPI data pair 3 negative signal
21	MIPI-3P	I	MIPI data pair 3 positive signal
22	GND	P	Power Ground
23-24	NC	-	NO connection
25	GND	P	Power Ground
26	SDA	-	No connection
27	PWMO	O	CABC controller signal output for backlight
28	ID_1	O	ID=1.8V
29	NC	-	NO connection
30	GND	P	Power Ground
31-32	LED-	P	LED Cathode
33	SCL	-	No connection
34	WPN	-	No connection
35	NC	-	NO connection
36	MTP		NO connection
37-38	NC	-	NO connection
39-40	LED+	P	LED+ Anode

I: Input; O: Output; P: Powe

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 Supply Current	I _{VDD}	-	TBD	-	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}	-	30	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	3.0	-	Watt	Note1,2

(Ta=+25°C,GND=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.

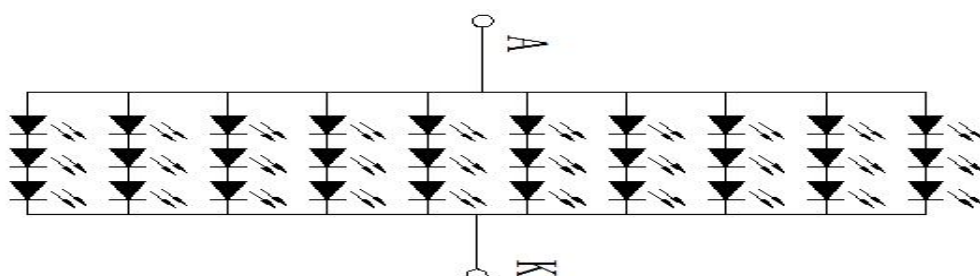
5.2 Back Light Driving Section

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	15	17	18.5	V	Note1
Forward Current	I _F	-	170	-	mA	Note1
Backlight Power consumption	P _{B/L}	-	2.9	-	Watt	Note1
LED life time	-	30000	-	-	Hours	Note2
LED Quantity	-	33			PCS	

Note1: The LED driving condition is defined for each LED module (3LED Serial, 10LED Parallel)。

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

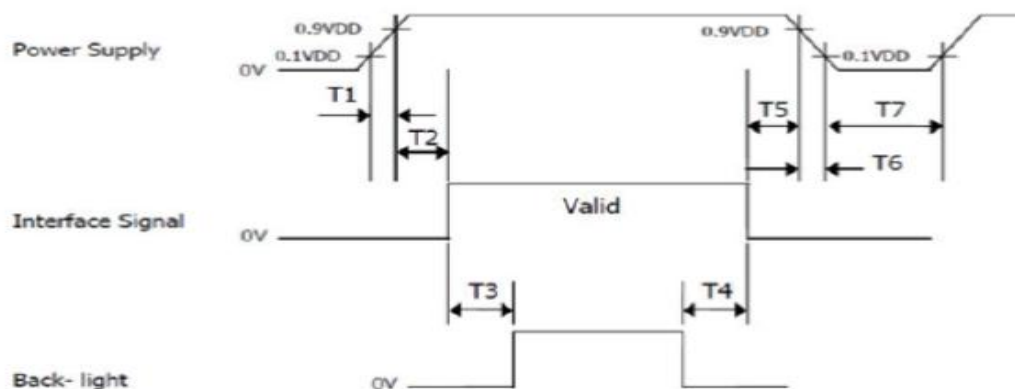
Note2:The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_{LED}=20mA(Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.



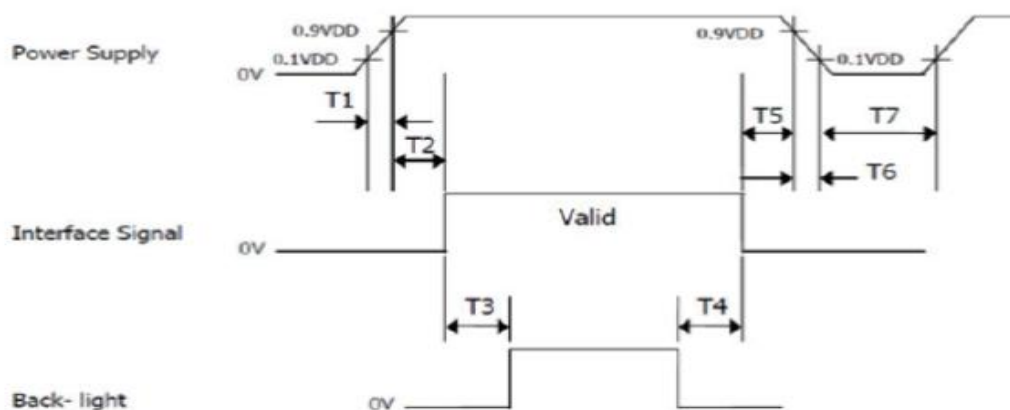
30 CHIP WHITE LEDs
V_f=15V~18.5V, I_f=170mA

5.3 Power On/Off Sequence

5.3.1 Power On Sequence



5.3.2 Power Off Sequence



Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	0.5	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms

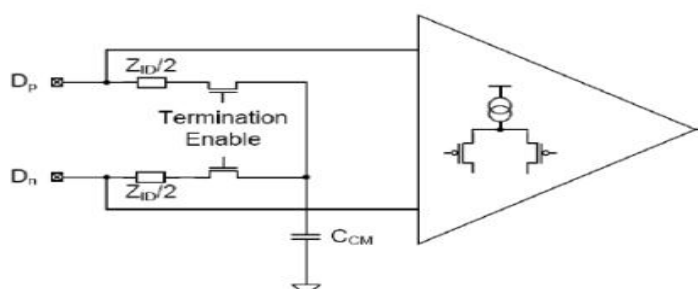
5.4 Timing Characteristics

5.4.1 AC Characteristics

MIPI Receiver Differential Input (AC Characteristics)						
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta V_{CMRX(HF)}$	Common-mode interference beyond 450MHz		-	-	100	mV
$\Delta V_{CMRX(LF)}$	Common-mode interference 50MHz ~ 450MHz		-50	-	50	mV
C_{CM}	Common-mode termination		-	-	60	pF
UI_{INST}	UI instantaneous		1		12.5	ns

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

HS RX Scheme

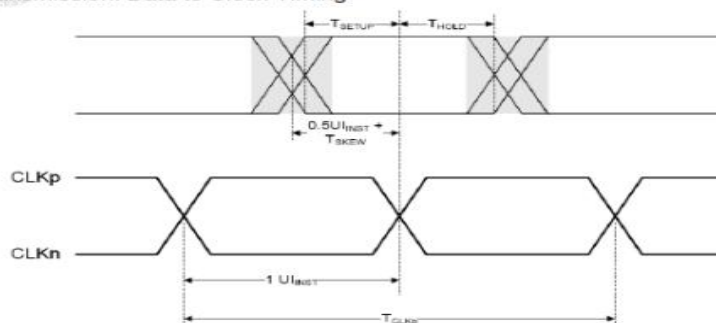


Symbol	Parameter	Min	Typ	Max	Unit	Notes
$T_{SKEW(TXI)}$	Data to Clock Skew (measured at transmitter)	-0.15		0.15	UI_{INST}	1
$T_{SETUP(RXI)}$	Data to Clock Setup Time (receiver)	0.25			UI_{INST}	2
$T_{HOLD(RXI)}$	Data to Clock Hold Time (receiver)	0.25			UI_{INST}	2

Note:

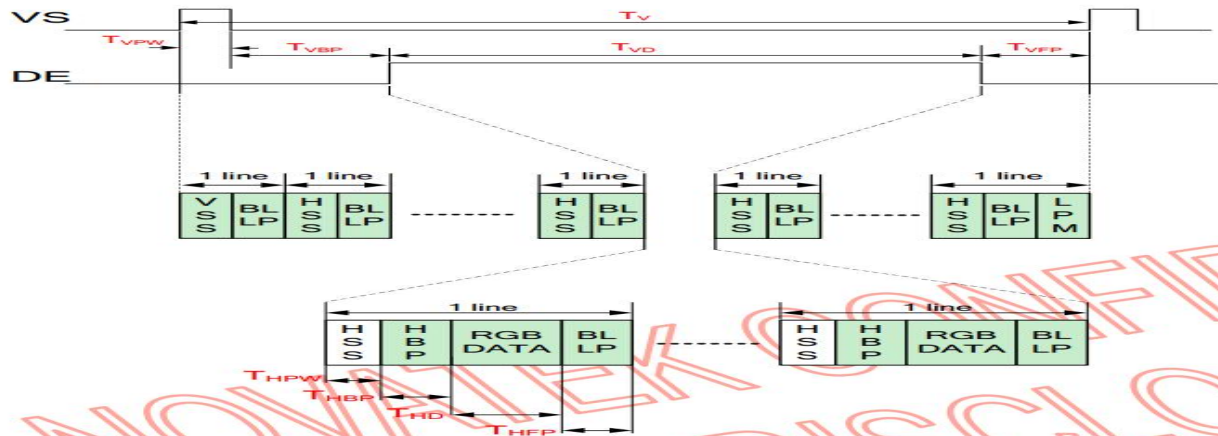
1. Total silicon and package delay budget of $0.25 \cdot UI_{INST}$
2. Total setup and hold window for receiver of $0.5 \cdot UI_{INST}$

High Speed Data Transmission: Data to Clock Timing

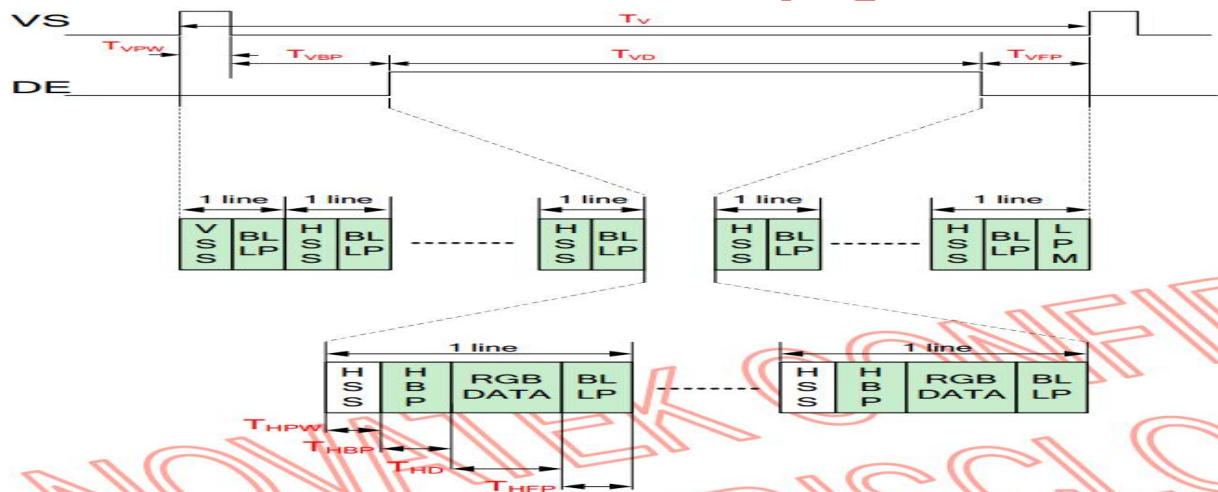


5.5 Timing Diagram

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	BRPHY	80	-	1000	Mbps
Active pixel per line	HACT	-	1200	-	Pixels
Horizontal back porch	tHBP	-	60	-	DCLK
Horizontal sync active	tHSA	-	1	-	DCLK
Horizontal front porch	tHFP	-	80	-	DCLK
Active pixel per frame	VACT	-	1920	-	H
Vertical back porch	tVBP	-	25	-	H
Vertical sync active	tVSA	-	1	-	H
Vertical front porch	tVFP	-	35	-	H

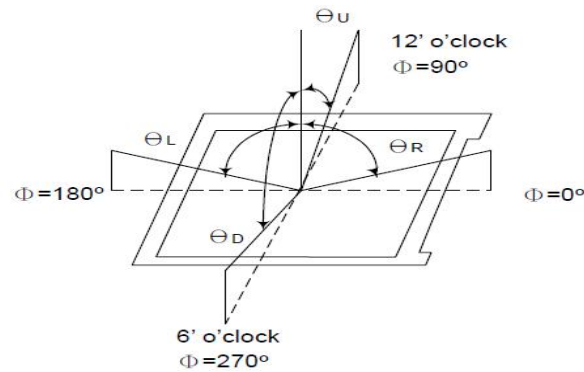
6. OPTICAL CHARACTERISTICS

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	-	-	%	Note(7)
Luminance	L	$\theta = 0^\circ$	-	500	-	cd/m ²	Note(5)
Luminance uniformity	U _W	$\theta = 0^\circ$	70	75	-	%	Note(3)
Response Time	T _R + T _F	25 °C	-	25	50	ms	Note(2)
Color Coordination	W _X	$\theta = 0^\circ$ (Center) Normal viewing angle B/L On	-0.03	0.300	+0.03	NTSC (x,y)	Note(6)
	W _Y			0.330			
	R _X			0.627			
	R _Y			0.338			
	G _X			0.307			
	G _Y			0.540			
	B _X			0.140			
	B _Y			0.093			
Viewing Angle	θ_L	C/R>10	-	85	-	Degree	Note(1)
	θ_R		-	85	-		
	θ_U		-	85	-		
	θ_D		-	85	-		

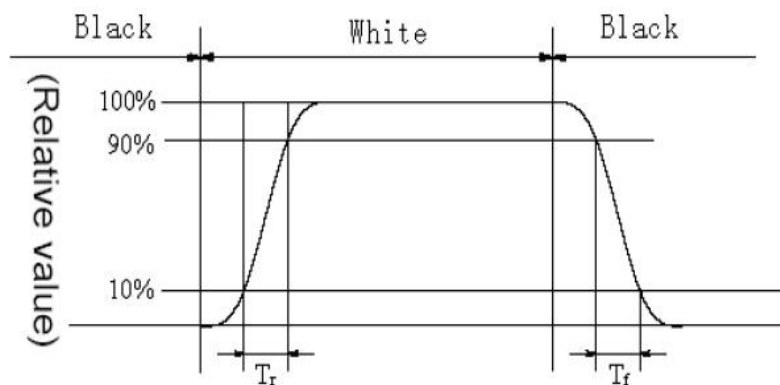
Test Conditions:

1. VDD=3.3V, I_F=80mA (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

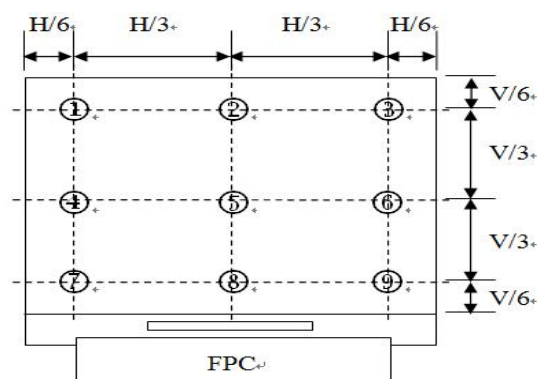


Note2: Definition of Response time: Sum of T_R and T_F



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

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

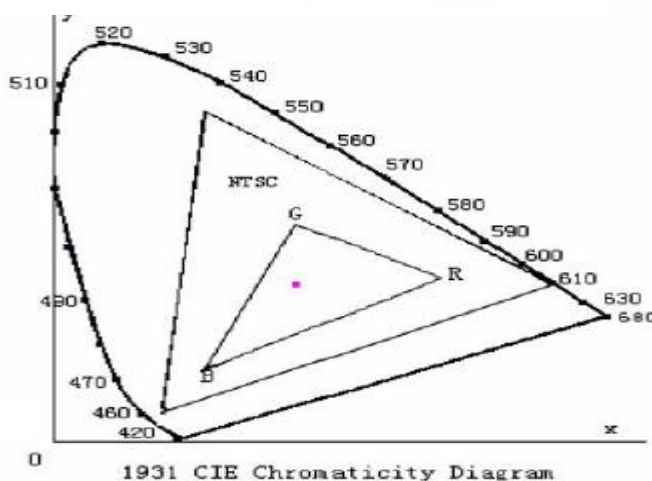
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1 point average across the LCD surface.

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:

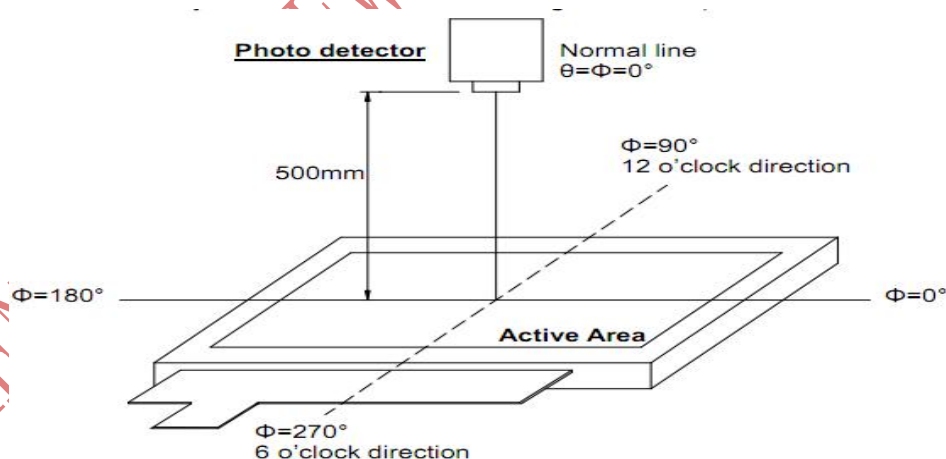
$$\text{NTSC ratio} = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}}$$



Note 8: Definition of measurement system.

optical

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 =0°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 DRAWING

LCM产品(刀卡类)包装流程图

1. 0包装材料清单:

见受控BOM

2. 0包装方法说明:

