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Optical Bonding

In-house Manufacturing

Cover glass

System solutions

OEM Solutions

Custom Display

Production Custom designs Installation

Mechanical design



PRODUCT 产品规格: 10.1" TFT**MODEL NO. 模组型号:** ET101WU01-V**CUSTOMER 客户:** _____

SPECIFICATION

FOR

ET101WU01-V

产品规格书

版本: **V 1.0****Customer Confirmation column** 客户确认栏**Approved by 核准:** _____ **Dept.部门:** _____ **Data 日期:** _____

Please return one of the copies of the specification with your signature to us
请贵司在收到规格书的两周内, 将签好字的规格书原件或者复印件寄回.如果没有返回,
within two weeks after you receive this document.If it is not returned,we will
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assume that you agree to the entire contents of this specification document.

☒ **Preliminary Specification** 样品规格书☐ **Final Specification** 量产规格书**Design 制作:** _____ **Check 检查:** _____ **Approval 审核:** _____

Revision History

Version NO.	DATE	Description	Remak
V1.0	2016.12.10	Original	

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1. GENERAL INFORMATION

1.1 features

- 1) Display Format: 10.1" WUXGA Vertical Stripe (1920*1200)
- 2) Interface : MIPI 4Lane
- 3) Driver IC :-/
- 4) Touch IC : -/
- 5) Operation Temperature : -0~50℃
- 6) Storage Temperature : -20~60℃
- 7) Backlight Type: White LED
- 8) Display mode: Normally Black
- 9) CTP cover lens: -/
- 10)CTP surface hardness : -/
- 11) LED life time: -/

1.2 mechanical specification

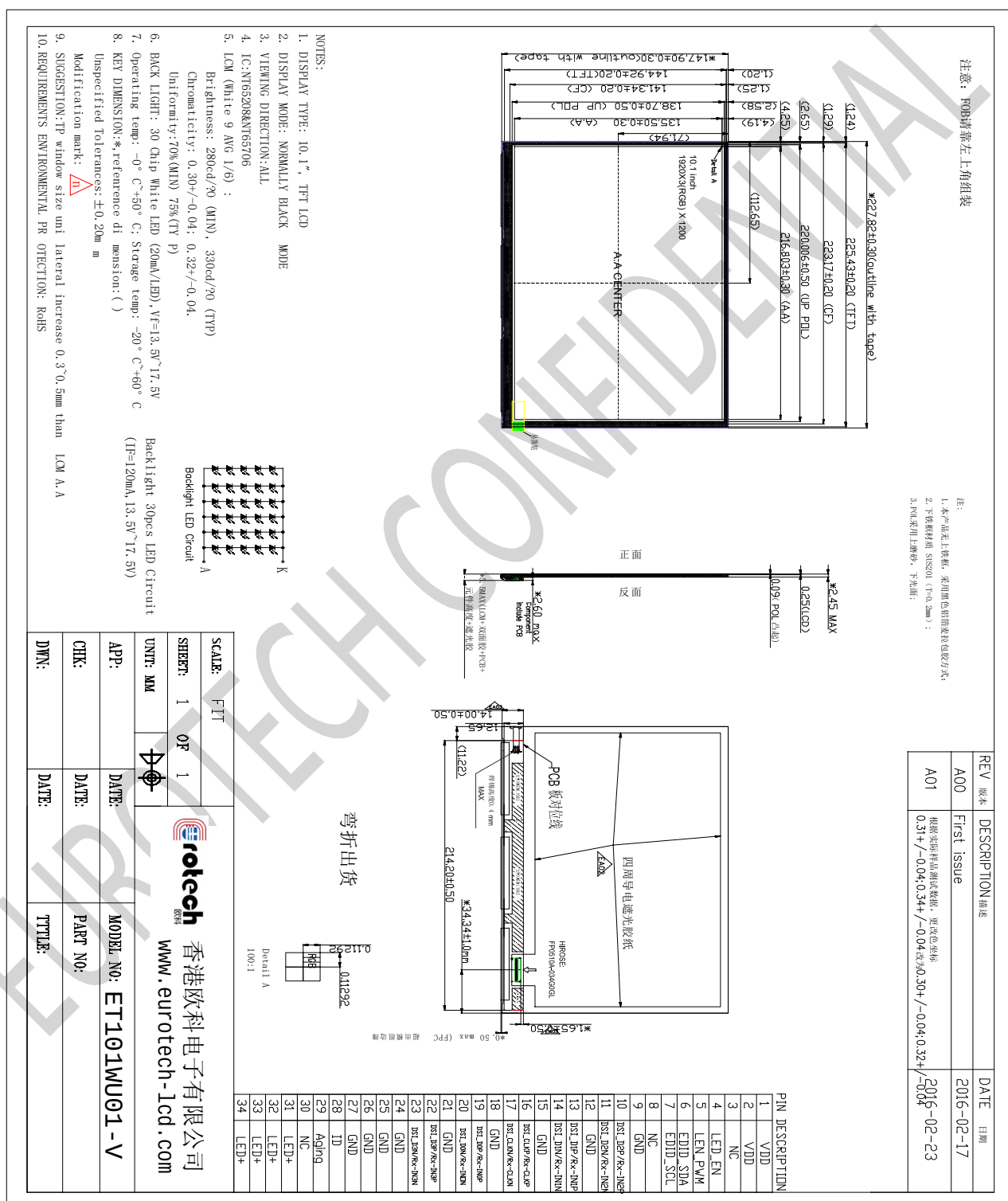
Item of	Contents	Unit
LCD Type	TFT/TRANSMISSIVE	/
Panel Size	10.1	inch
Pixel arrangement	1920*3(RGB)*1200	Dots
Active Area	216.806(H)*135.5(V)	Mm
Pixel pitch (W*H)	0.11292 (H) *0.11292(V)	um
Module area (W*H*T)	227.72(H)*147.8(V)*2.45(T)	Mm
Recommended Viewing Direction	ALL	O'clock
Luminance	330	cd/m2
Weight	TBD	g

2. ABSOLUTE MAXIMUM RATINGS

(GND=AGND=0V)

Parameter of absolute maximum ratings 参数	Symbol 符号	Min 最小值	Max 最大值	Unit 单位
Power supply voltage1	VDD	-0.5	5	V
Input Signal Voltage	VI	-0.3	VDD	V
Backlight forward current	I _{LED}	-0.001	30	mA(For each led)
Reverse Voltage	VR	-	5	V
Operating temperature	Top	-0	50	°C
Storage temperature	Tst	-20	60	°C
Humidity	RH	-	90%(Max)/60°C	RH

3.DIAGRAM FOR LCM



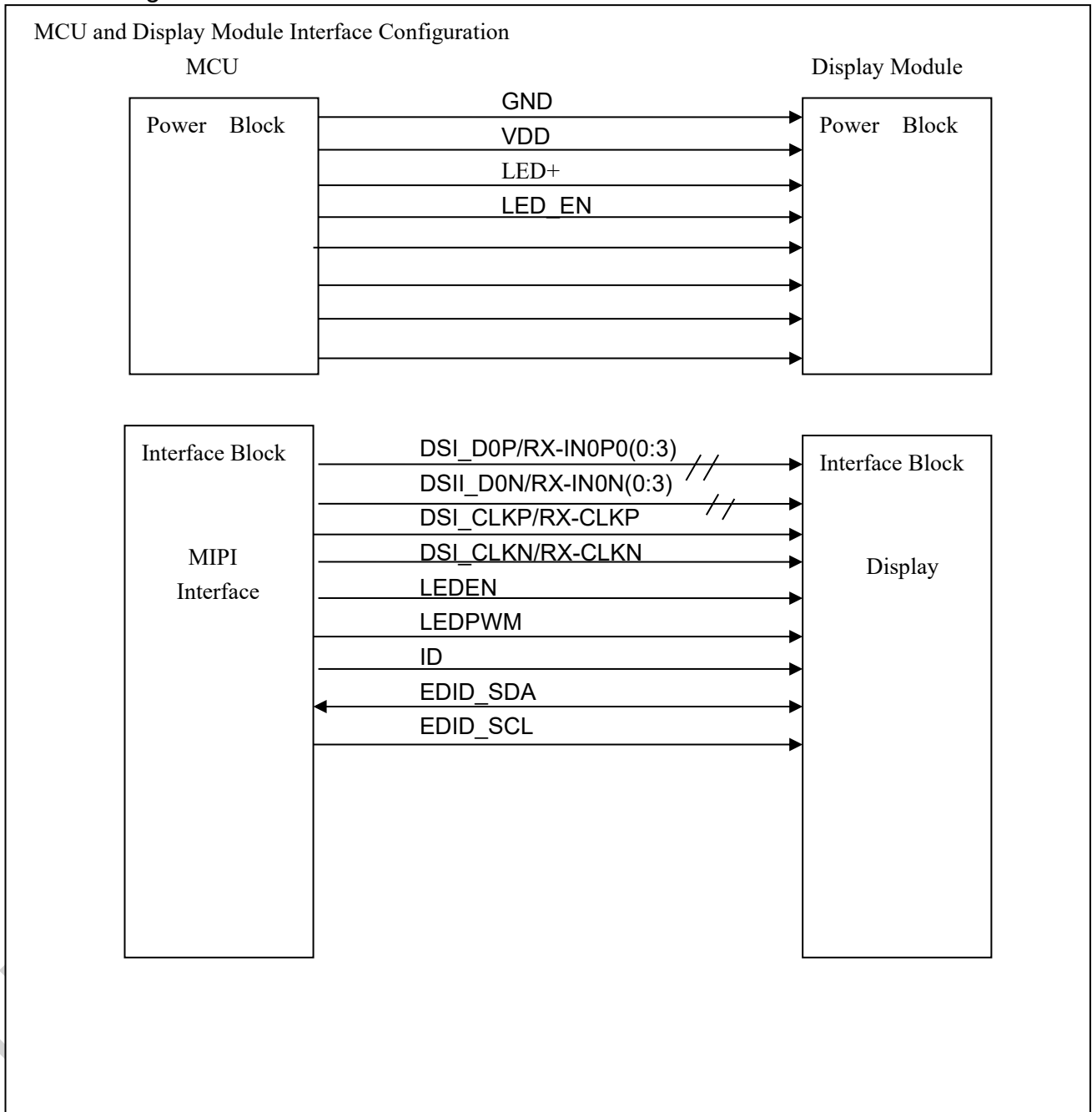
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O connection

LCM	Symbol	I/O	Description
1-2	VDD	P	Power supply for digital circuits +1.8V input
3	NC	-	NO connection
4	LED_EN	I	LED driver enable input (1.9-5V)
5	LED_PWM	I	Backlight LED driver PWM input (H=2.5V)
6	EDID_SDA	I	EDID Data input (VIH=1.8V)
7	EDID_SCL	I	EDID Clock input (VIH=1.8V)
8	NC	-	NO connection
9	GND	P	Power Ground
10	DSI_D2P/RX-IN2P	I	MIPI data pair 2 positive signal
11	DSI_D2P/RX-IN2N	I	MIPI data pair 2 negative signal
12	GND	P	Power Ground
13	DSI_D2P/RX-IN1P	I	MIPI data pair 1 positive signal
14	DSI_D2P/RX-IN1N	I	MIPI data pair 1 negative signal
15	GND	P	Power Ground
16	DSI_CLKP/RX-CLKP	I	MIPI Clock positive signal
17	DSI_CLKP/RX-CLKN	I	MIPI Clock negative signal
18	GND	P	Power Ground
19	DSI_D2P/RX-IN0P	I	MIPI data pair 0 positive signal
20	DSI_D2P/RX-IN0N	I	MIPI data pair 0 negative signal
21	GND	P	Power Ground
22	DSI_D2P/RX-IN3P	I	MIPI data pair 3 positive signal
23	DSI_D2P/RX-IN3N	I	MIPI data pair 3 negative signal
24-27	GND	P	Power Ground
28	ID	I	No connection
29	Aging	-	Aging Mode Power Supply (H=2.5V)
30	NC	-	NO connection
31-34	LED+	P	LED+ Anode

I: Input; O: Output; P: Power

4.2 block diagram

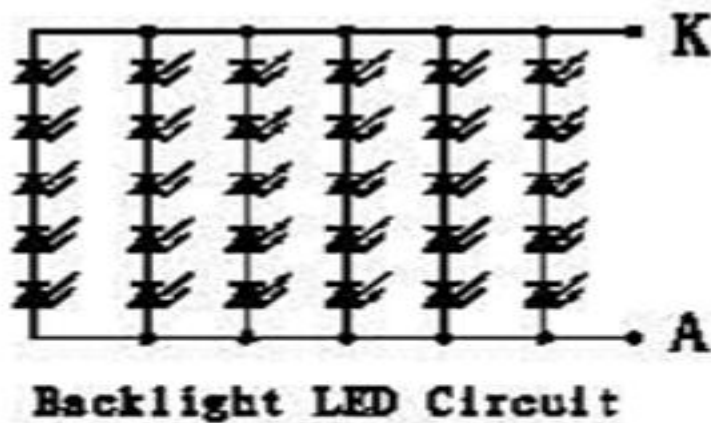


5. ELECTRICAL CHARACTERISTICS

5.1 Typical Operation Conditions

Item	Symbol	Values			Unit	Remarks
		Min.	Typ.	Max.		
Power Voltage Supply1	VDD	3.0	3.3	3.6	V	-
Backlight Forward Voltage	Vf	-	16	-	V	-
LED Forward Current	If	-	120	-	MA	Note

Note:The "LED life time" is defined as the module brightness decrease to 50% of original brightness at $I_L=22.5\text{Ma}$ (for each led). The LED life time could be decreased if operating I_L is larger than 22.5mA



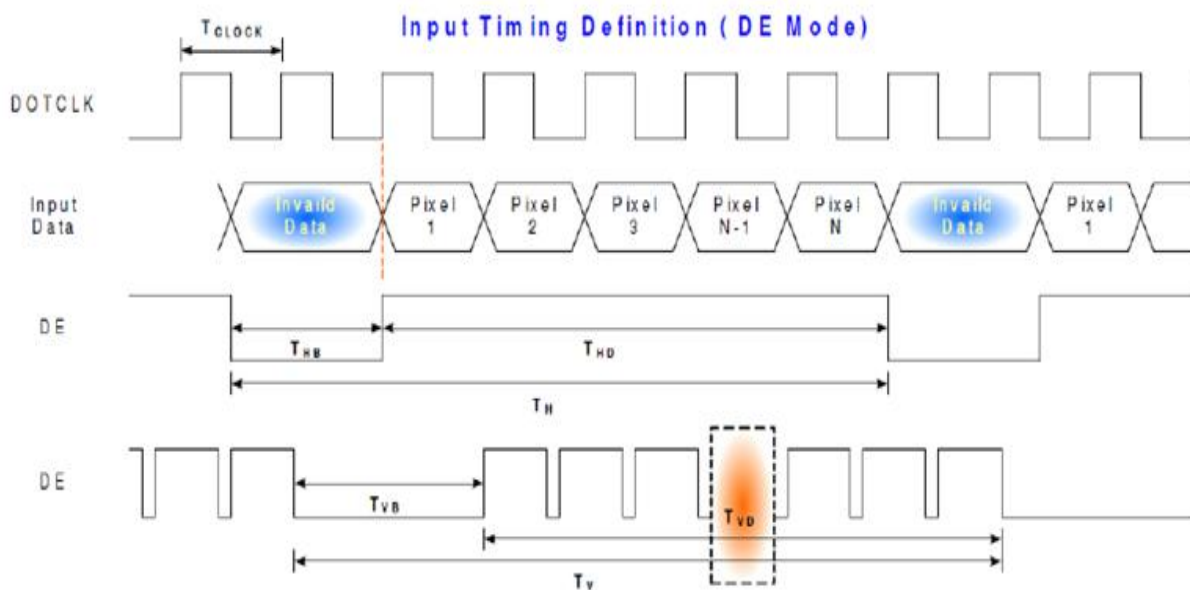
Backlight 30pcs LED Circuit
(IF=120mA, 13.5V~17.5V)

背光电路图

5.2 MIPI AC CHARACTERISTICS

Basically, interface timings should match the 1920x1200 /60Hz manufacturing guide line timing. Note: DE mode only.

Parameter		Symbol	Values			Unit
			Min.	Typ.	Max.	
Frame Rate		-	-	60	-	Hz
Clock frequency		1/T _{clock}	155.43	157.08	158.73	MHz
Vertical Section	Period	T _V	1206	1212	1218	T _{line}
	Active	T _{VD}	1200			
	Blanking	T _{VB}	6	12	18	
Horizontal Section	Period	T _H	2148	2160	2172	T _{clock}
	Active	T _{HD}	1920			
	Blanking	T _{HB}	228	240	252	



Timing diagram

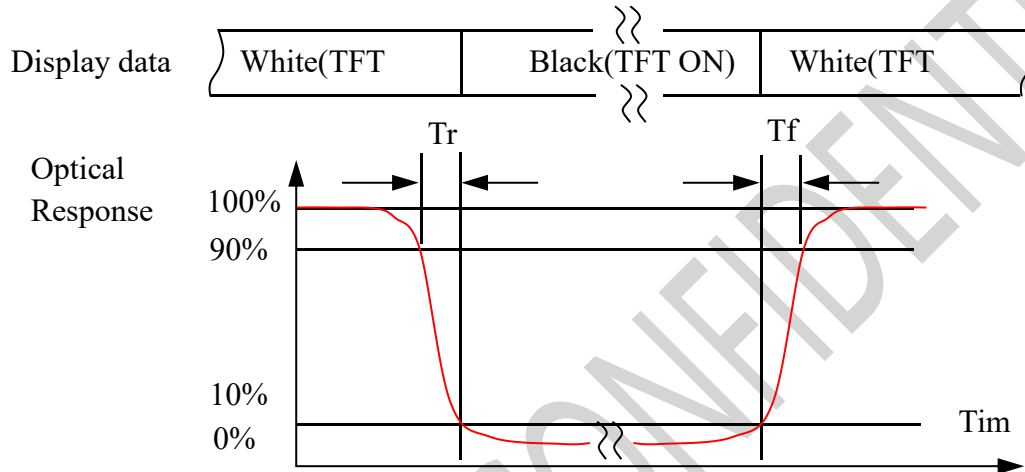
6. ELECTRO-OPTICAL CHARACTERISTICS

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center point)		C/R	-	600	800	-	-	BM-7 Note(1)
Luminance uniformity		U_w	$\theta = 0^\circ$ Normal viewing angle B/L On Note(1)	70	75	-	%	BM-7 Note(2)
Response Time		$T_r + T_f$		-	35	45	ms	BM-5AS Note(3)
Color Chromaticity (CIE 1931)	White	W_x			0.315		参考 值	BM-7 Note(4)
		W_y			0.335			
	Red	R_x			0.637			
		R_y			0.337			
	Green	G_x		-0.02	0.295	+0.02		
		G_y			0.585			
	Blue	B_x			0.137			
		B_y			0.145			
Viewing Angle	Hor.	$\phi 3R$	$C/R \geq 10$		85	-	Deg	EZ Contrast Note(5)
		$\phi 9L$			85	-		
	Ver.	$\phi 12U$			85	-		
		$\phi 6D$		-	85	-		

Note1 Definition of Contrast Ratio (CR):

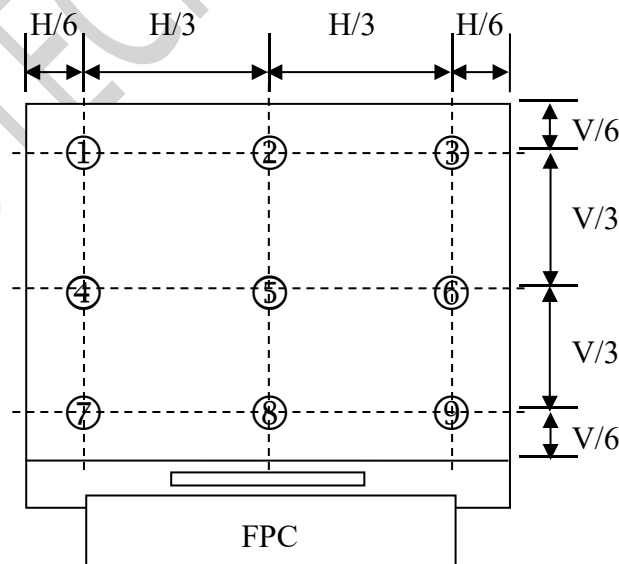
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note2: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas (Shown in below), every measuring point is placed at the center of each measuring area.



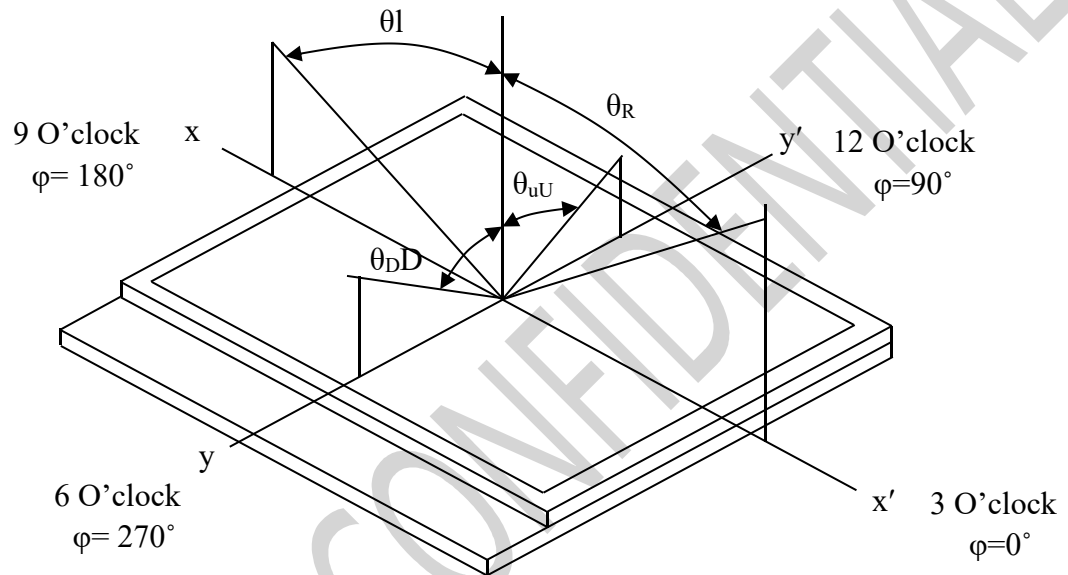
$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$

Note 3:Definition of Response time: Sum of Tr and Tf



The spot locations for luminance measurement

Note4.Definition of Viewing Angle: The viewing angle range that the $CR \geq 10$



Note 5: Definition of Color Chromaticity (CIE 1931)

Color coordinate of white & red, green, blue at center point.

7. RELIABILITY TEST CONDITIONS

No 序号	Test Item	Test Condition
1	High Temperature Storage	+60°C / 24Hours
2	Low Temperature Storage	-20°C / 24Hours
3	High Temperature Operating	+50°C / 24Hours
4	Low Temperature Operating	-0°C / 24Hours
5	Temperature Cycle	0±2°C↔25°C↔+50±2°C x 10cycles (30min) (5min) (30min)
6	Damp Proof Test	60°C x 90%RH / 24H
7	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude:1.5mm, 2 hours for each direction of X, Y, Z
8	Dropping test	Drop to the ground from 1m height, 1 corner, 3 edges, 6 surfaces.
9	ESD test	Contact: ±4KV Air: ±8KV 150PF/330Ω,5Points/panel,5times

Inspection after test判断标准

- The test samples should be applied to only one test item. 每个被测试的模块只能用于其中的一个测试项目。
- Sample size for each test item is 5~10pcs. 每个测试项目的样品数量为5~10 片。
- For Damp Proof Test, Pure water(Resistance>10MΩ) should be used. 对于防潮试验，试验箱的用水必须是电阻大于10M 欧姆的纯水。
- 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. 如果由静电引起产品故障,当放置一段时间后能够恢复正常，则不视为产品缺陷。
- EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has. 带EL片的可靠性测试在高温高湿条件下,荧光粉会发生自然化学反应而产生黑点或瑕疵,因此不在高温高湿条件测试范围内。
- Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic. 故障判断标准:基本规格,电气特性,机械特性,光电特性

8. Handling Precautions

8.1 Static charge

Since this LCD module contains CMOS LSIs that are sensitive to static charge, care must be taken when handling it.

8.2 Power on sequence

- 1.Input signals should not be applied to the LCD module before the logic system voltage has reached the specified voltage. If the above sequence is not kept the LCD module might be permanently damaged.
- 2.When connecting the power supply, connect the LCD bias voltage after connecting the logic system voltage.
- 3.When disconnecting the power supply, disconnect the logic system voltage after the LCD bias voltage.
4. It is recommended to connect a serial resistor or fuse to the LCD bias power supply of the system, as a current limiter. The value of the resistor depends on the kind of LCD used, but is typically 50 ~ 100 Ω .

8.3 Operation

- 1.It is essential to drive the LCD within the specified voltage limits, since a higher driving voltage than allowed causes a shorter LCD lifetime. Under these circumstances, electrochemical reactions will result in undesirable deterioration of the LCD.
- 2.The response time of the LCD fluid is considerably longer at low temperatures than in the normal operating temperature range. On the other hand, the LCD will show a dark blue color at high temperatures. Those phenomena do not indicate a malfunction or defect of the LCD. Back at normal temperatures, the LCD will return to its original behavior.
- 3.If the display area is pressed hard during operation, some abnormal display patterns might appear. However, the display will resume normal operation after turning the module off and on.
- 4.Moisture on the terminals could cause an electrochemical reaction resulting in an open terminal connection. If the environmental temperature is higher than 40°C, it is required that the relative humidity is 50% or less.

8.4 Packaging

- 1.Do not leave the product in a place of high humidity for a long period. For st in a location where the

temperature is 35°C or higher, special care to protect the product from high humidity is required. A combination of high temperature and high humidity may cause polarization degradation and damage as well. Please keep the temperature and humidity within the specified range for storing.

2.Since LCD panels tend to be easily damaged, they should be handled with full care. Avoid any contact with materials that have a hardness of more than 2H.

3.Adhesives used for adhering upper/lower polarizers and aluminum plates are made of organic substances that will deteriorate by chemical reactions with for example chemicals such as acetone, toluene, ethanol, and isopropylalcohol. Please prevent the use of these chemicals and contact us when it is necessary for you to use other chemicals.

4.Immediately wipe off saliva or water drops from the display area with an absorbent cotton cloth, without scrubbing it. If adhered for a long period, such particles might cause deformation or faded color.

5.Moisture deposited on the display surface and contact terminals due to low temperatures will be a cause for polarizer damage, stains, and dirt. Before use, such panels should be slowly warmed up to a temperature that is higher than room temperature..

6.Touching the display area and contact terminals with bare hands is harmful to polarizer and may lead to poor insulation at the terminals.

7.The glass is fragile and can be cracked or chipped easily by handling, in particular on near its edge. Please prevent sudden shocks or exposing the glass to other sorts of stress.

8.5 Long-term storage

For long-term storage the following methods are highly recommended:

- 1.Store the product in a polyethylene bag with a sealed opening to prevent fresh air entering from the outside. Placing it with a desiccant is not necessary.
- 3.Store the product in a dark place, with the temperature in the range from 0 °C to 35 °C
- 4.Keep the sensitive polarizer surface of the LCD panels clear of any contact. We recommend using the container that was used by FRD DISPLAY to deliver the products.

8.6 Cleaning of the product

To clean the product make sure to use absorbent cotton cloth or other soft material like chamois. Make sure to rub it gently, and do not use chemicals when cleaning.

9.PACKAGE DRAWING

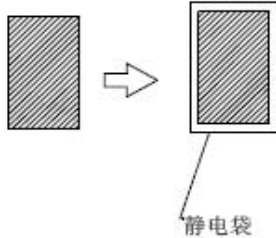
LCM产品(刀卡类)包装流程图

1.0 包装材料清单:

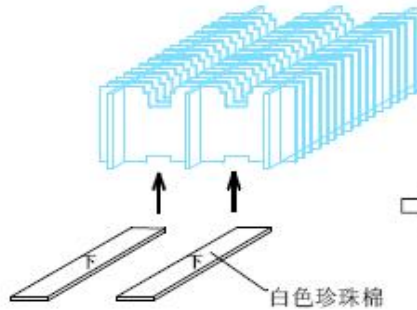
见受控BOM

2.0 包装方法说明:

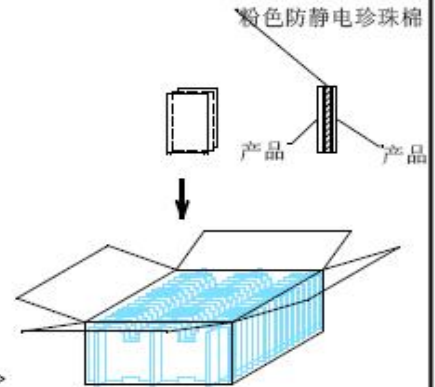
LCM产品



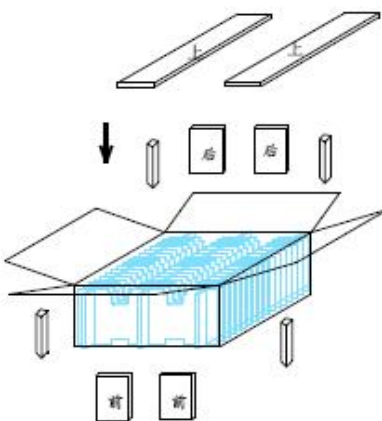
第一步:
LCM产品装入静电袋



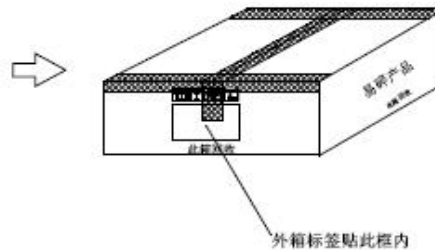
第二步:
把长卡, 短卡组成卡阵 (短卡朝向一致)
形状和数量按照 BOM 实际物料
卡阵底部放对应的白色珍珠棉后装箱



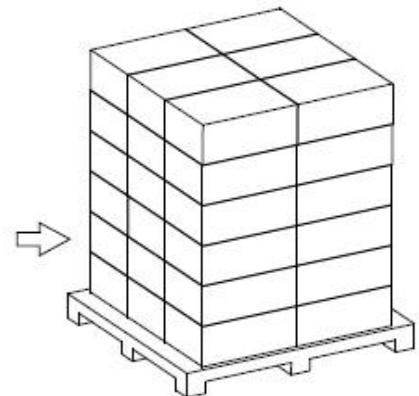
第三步:
放产品, 每个卡槽内放两片产品;
2PCS 产品显示面相对,
中间加粉色珍珠棉一起放入卡槽内。



第四步:
装箱后, 按照BOM实际物料在纸箱内
侧与卡阵避空位置放白色泡棉;



第五步:
最后胶带封箱, 贴外箱标签



第六步:
将每箱整齐摆放在栈板上并包裹
最高可堆叠6层