

PRODUCT SPECIFICATION

PRODUCT 产品规格: 7.0 TFT

MODEL NO. 模组型号: UE070WS-SC50-L002

CUSTOMER 客户: _____

SPECIFICATION

FOR

UE070WS-SC50-L002 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: _____

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☒ Preliminary Specification 样品规格书☐ Final Specification 量产规格书

Design 制作: _____ Check 检查: _____ Approval 审核: _____

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Revision History

Version NO.	DATE	Description	Remak
V1.0	2017.8.3	Original	

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1. GENERAL INFORMATION

1.1 features

- 1) Display Format: 7.0 WSGA Vertical Stripe (1024*600)
- 2) Interface : RGB 24bits
- 3) Driver IC : EK79001ECGA
- 4) Touch IC : -/
- 5) Operation Temperature : -20~70℃
- 6) Storage Temperature : -30~80℃
- 7) Backlight Type: White LED
- 8) Display mode: Normally white
- 9) CTP cover lens: -/
- 10)CTP surface hardness : -/

1.2 mechanical specification

Item of	Contents	Unit
LCD Type	TFT/TRANSMISSIVE	/
Panel Size	7.0	inch
Pixel arrangement	1024*3 (RGB) *600	Dots
Active Area	154.2114 (H) *85.92 (V)	Mm
Pixel pitch (W*H)	0.1506 (V) *0.1432 (V)	um
Module area (W*H*T)	164 (H) *97 (V) *2.6 (T)	Mm
Recommended Viewing Direction	6	0' clock
Luminance	-/	cd/m2
Weight	TBD	g

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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	DVDD	-0.5	5.0	V
Power supply voltage2	AVDD	-0.5	15	V
Power supply voltage3	VGH	-0.5	22	V
Power supply voltage4	VGL	-13	0	V
Power supply voltage5	VCOM	0	4.8	V
Backlight forward current	I _{LED}	-0.001	30	mA(For each led)
Reverse Voltage	V _R		5	V
Operating temperature	T _{op}	-20	70	°C
Storage temperature	T _{st}	-30	80	°C
Humidity	RH	-	90%(Max)/60°C	RH



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4. I/O CONNECTION & BLOCK DIAGRAM

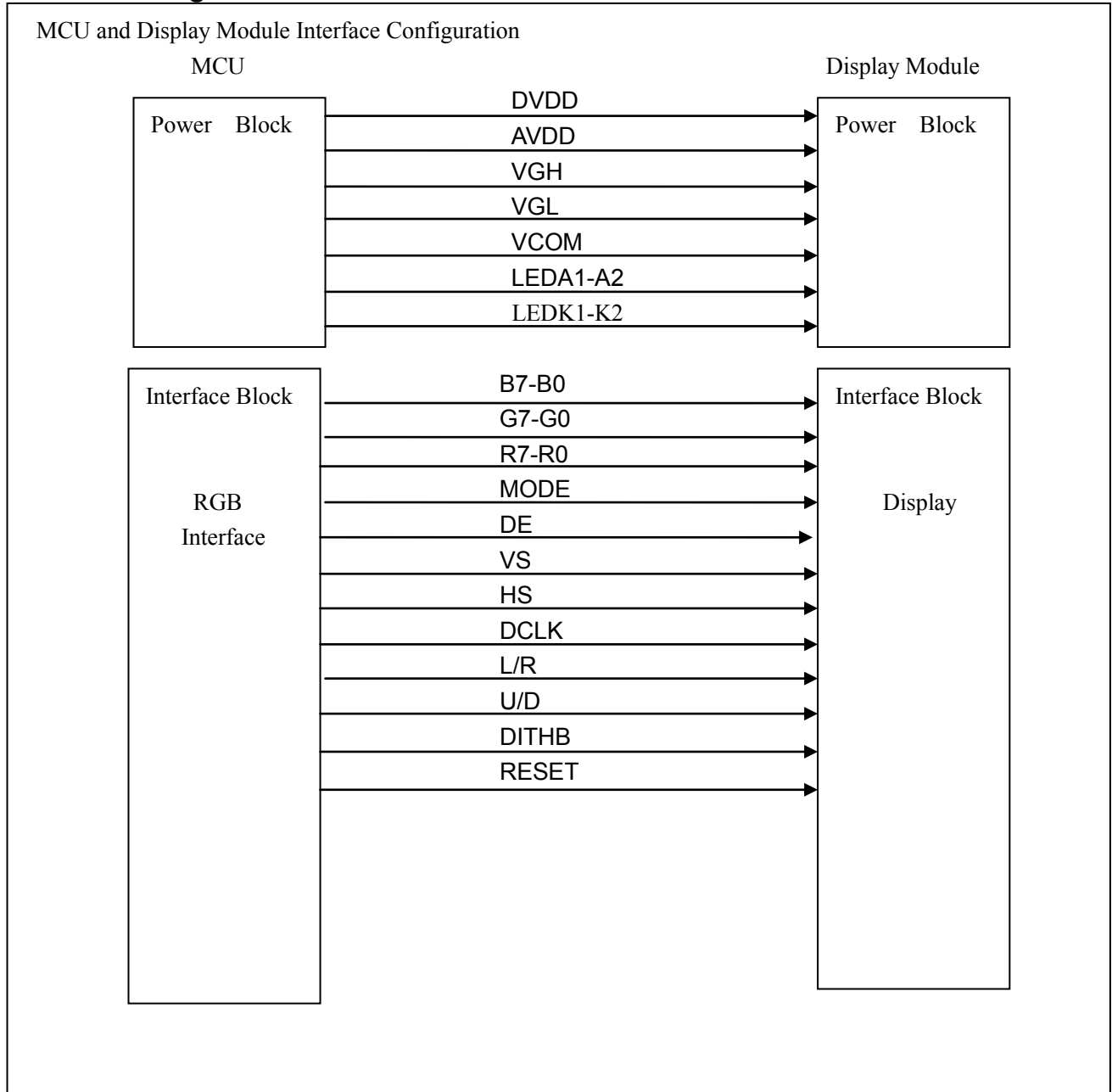
4.1 I/O connection

LCM Pin	Symbol	I/O	Description
1-2	LEDA	P	Power supply for LED+
3-4	LEDK	P	Power supply for LED-
5	GND	P	Power Ground
6	VCOM	P	For external VCOM DC input
7	DVDD	P	Power Supply(3.3V typ.)
8	MODE	I	DE/SYNC MODE Select
9	DE	I	Data enable signal for DPI (RGB) interface operation
10	VSYNC	I	Frame synchronizing signal for DPI (RGB) interface operation
11	HSYNC	I	Line synchronizing signal for DPI (RGB) interface operation
12-19	B7-B0	I	Blue data input.
20-27	G7-G0	I	Green data input.
28-35	R7-R0	I	Red data input.
36	GND	P	Power Ground
37	DCLK	I	Dot clock signal for DPI (RGB) interface operation.
38	GND	P	Power Ground
39	L/R	I	L/R=" 1" : Shift left to right , L/R=" 0" : Shift right to left
40	U/D	I	U/D=" 1" : Shift bottom to top, U/D=" 0" : Shift top to bottom
41-	VGH	P	Positive Power for TFT
42	VGL	P	Negative Power for TFT
43	AVDD	P	Analog Power
44	RESET	I	Global reset pin
45	NC	-	No Connection
46	VCOM	P	For external VCOM DC input
47	DITHER	I	Dithering function
48	GND	P	Power Ground
49-50	NC	-	No Connection

I: Input; O: Output; P: Power

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4.2 block diagram



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5. ELECTRICAL CHARACTERISTICS
5.1 Typical Operation Conditions

Item	Symbol	Values			Unit	Remarks
		Min.	Typ.	Max.		
Power Voltage Supply1	DVDD	3.0	3.3	3.6	V	-
Power Voltage Supply2	AVDD	0.5	9.6	15	V	
Power Voltage Supply3	VGH	-0.5	18	22	V	
Power Voltage Supply4	VGL	-13	-6	0	V	
Power Voltage Supply5	VCOM	0	3.2	4.8	V	
Backlight Forward Voltage	Vf		9.6	-	V	-
LED Forward Current	If	-	160	-	MA	Note

Note: The "LED life time" is defined as the module brightness decrease to 50% of original brightness at $I_L=20\text{Ma}$ (for each led). The LED life time could be decreased if operating I_L is larger than 20mA

BACKLIGHT CIRCUIT


背光电路图

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5.2 DC ELECTRICAL CHARACTERISTICS

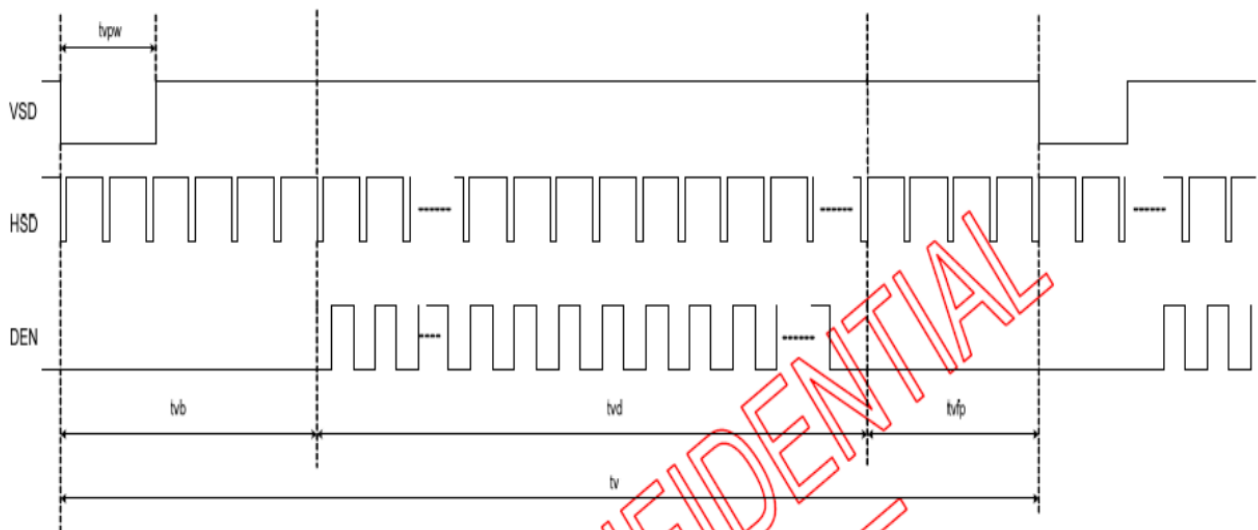
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Low level input voltage	Vil	For the digital circuit	0	-	0.3×VDD	V
High level input voltage	Vih	For the digital circuit	0.7×VDD	-	VDD	V
Input leakage current	Ii	For the digital circuit	-	-	±1	μA
High level output voltage	Voh	Ioh= -400 μA	VDD-0.4	-	-	V
Low level output voltage	Vol	Iol= +400 μA	-	-	GND+0.4	V
Pull low/high resistor	Ri	For the digital input pin @ VDD=3.3V	200K	250K	300K	ohm
Digital Operation current	Idd	Fclk=65 MHz, FLD=50KHz, VDD=3.3V	-	15	25	mA
Digital Stand-by current	Ist1	Clock and all functions are stopped	-	10	50	μA
Analog Operating Current	Idda	No load, Fclk=65MHz, FLD=50KHz @ AVDD=10V, V1=8V, V14=0.4V	-	10	12	mA
Analog Stand-by current	Ist2	No load, Clock and all functions are Stopped	-	10	50	μA
Input level of V1 ~ V7	Vref1	Gamma correction voltage input	0.4*AVDD	-	AVDD-0.1	V
Input level of V8 ~ V14	Vref2	Gamma correction voltage input	0.1	-	0.6*AVDD	V
Output Voltage deviation	Vod1	Vo = AVSS+0.1V ~ AVSS+0.5V and Vo = AVDD-0.5V ~ AVDD-0.1V	-	±20	±35	mV
Output Voltage deviation	Vod2	Vo = AVSS+0.5V ~ AVDD-0.5V	-	±15	±20	mV
Output Voltage Offset between Chips	Voc	Vo = AVSS+0.5V ~ AVDD-0.5V	-	-	±20	mV
Dynamic Range of Output	Vdr	SO1 ~ SO1536	0.1	-	AVDD-0.1	V
Sinking Current of Outputs	IOLy	SO1 ~ SO1536; Vo=0.1V v.s 1.0V, AVDD=13.5V	80	-	-	uA
Driving Current of Outputs	IOHy	SO1 ~ SO1536; Vo=13.4V v.s 12.5V, AVDD=13.5V	80	-	-	uA
Resistance of Gamma Table	Rg	Rn: Internal gamma resistor	0.7*Rn	1.0*Rn	1.3*Rn	ohm

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5.3 AC ELECTRICAL CHARACTERISTICS

(TA = -20 to 85°C, VDD = 2.3 to 3.6V, AVDD = 8 to 13.5V, GND = AGND = 0V)

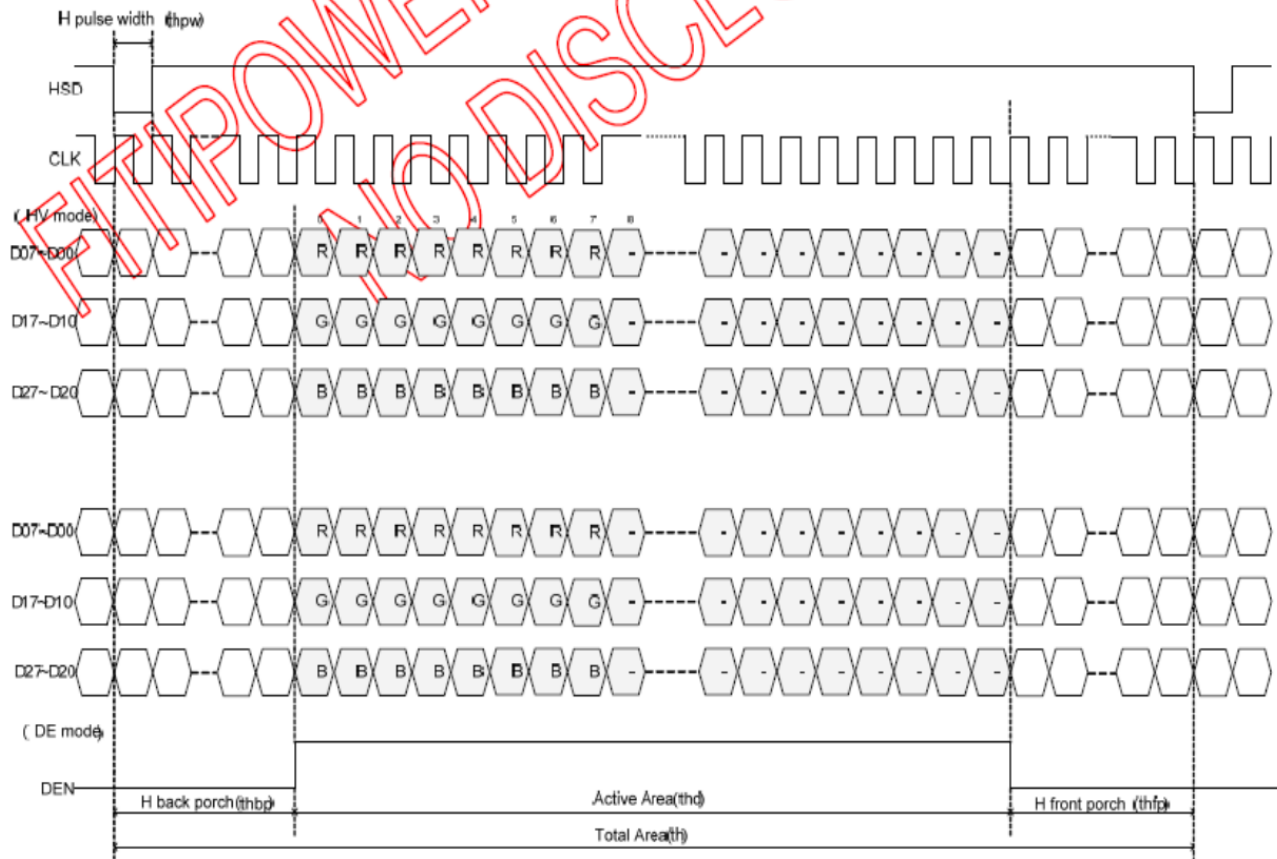
TTL mode

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
VDD Power On Slew rate	TPOR	From 0V to 90% VDD	1	-	20	ms
RST pulse width	TRST	DCLK = 65MHz	50	-	-	us
DCLK cycle time	Tcph	-	14	-	-	ns
DCLK pulse duty	Tcwh	-	40	50	60	%
VSD setup time	Tvst	-	5	-	-	ns
VSD hold time	Tvhd	-	5	-	-	ns
HSD setup time	Thst	-	5	-	-	ns
HSD hold time	Thhd	-	5	-	-	ns
Data set-up time	Tdsu	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	Tdhd	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
DE setup time	Tesu	-	5	-	-	ns
DE hold time	Tehd	-	5	-	-	ns
Output stable time	Tsst	10% to 90% target voltage, CL=90pF, R=10K ohm(Cascade)	-	-	6	us
		Dual gate			3	

5.4 Data input format
Vertical input timing


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Horizontal input timing



Horizontal input timing

DE mode

DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd	1024			DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	600			H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

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HV mode(1)
HV mode
Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		—			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

HV mode(2)
Vertical input timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	600			H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

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6. ELECTRO-OPTICAL CHARACTERISTICS

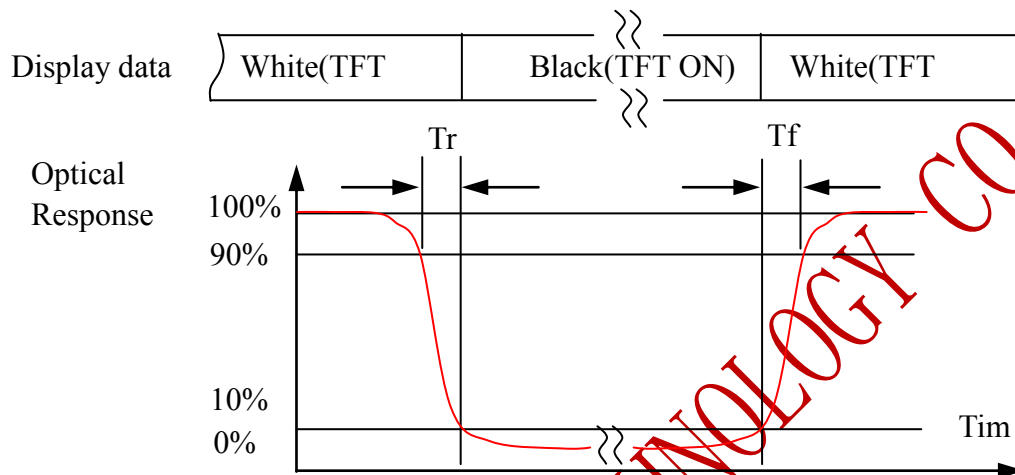
Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center point)		C/R	-	600	800	-	-	BM-7 Note(1)
Luminance uniformity		U_W	$\theta = 0$. Normal viewing angle B/L On Note(1)	70	-	-	%	BM-7 Note(2)
Response Time		$Tr + Tf$		-	25	40	ms	BM-5AS Note(3)
Color Chromaticity (CIE 1931)	White	W_X			TDB			BM-7 Note(4)
		W_Y			TDB			
	Red	R_X			TDB			
		R_Y			TDB			
	Green	G_X		-	TDB	-		
		G_Y			TDB			
	Blue	B_X			TDB			
		B_Y			TDB			
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	-		

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Note1 Definition of Contrast Ratio (CR):

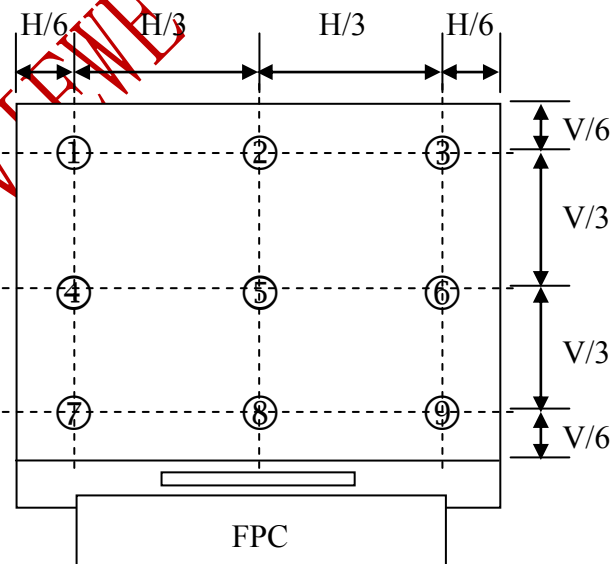
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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.



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

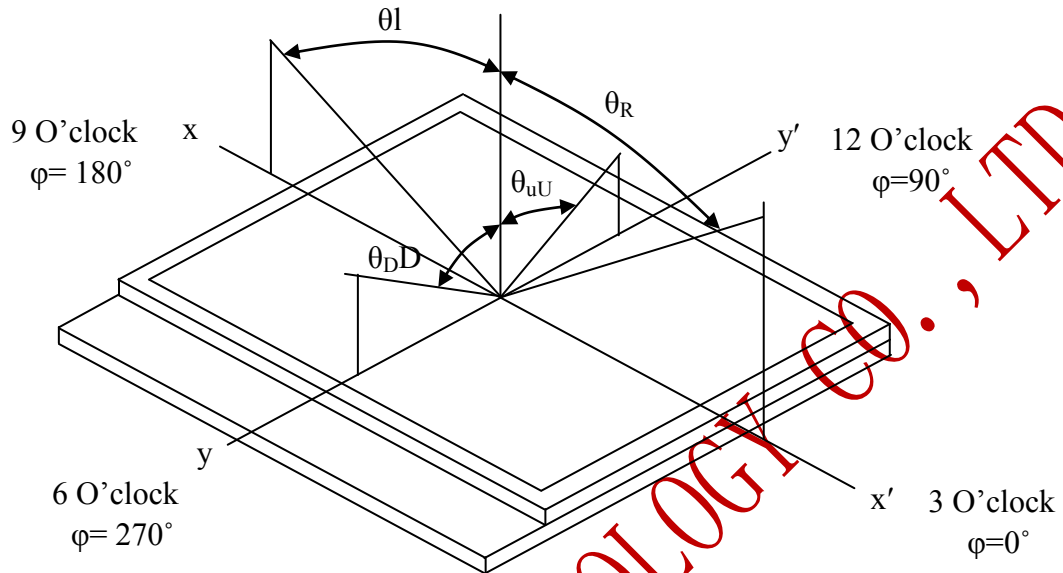
Note 3: Definition of Response time: Sum of Tr and Tf



The spot locations for luminance measurement

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

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Note 5: Definition of Color Chromaticity (CIE 1931)

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

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7. RELIABILITY TEST CONDITIONS

No 序号	Test Item	Test Condition
1	High Temperature Storage	+80°C / 24Hours
2	Low Temperature Storage	-30°C / 24Hours
3	High Temperature Operating	+70°C / 24Hours
4	Low Temperature Operating	-20°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	-/-

Inspection after test判断标准

1. 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。
2. Sample size for each test item is 5~10pcs. 每个测试项目的样品数量为5~10片。
3. 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。
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. 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。
5. 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。
6. 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

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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 $50 \sim 100 \Omega$.

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.

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8.4 Packaging

1. Do not leave the product in a place of high humidity for a long period. For storage 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 isopropyl alcohol. 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 from 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

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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.

SHENZHEN VIEWE TECHNOLOGY CO., LTD

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:

