宇华国际科技有限公司
YuHua INT,L Technology Co., LIMITED

Tel: 0755-21010980 Web: www.yhwdislay.com

SPECIFICATION FOR LCD MODULE

Customer : _____

Product Model: YH101MH4002

Sample code: _____

Designed by	Checked by	Approved by

Final Approval by Customer

☐ **LCM Machinery OK** Checked By _____ ☐ **LCM Display OK** Checked By _____	☐ **LCM OK** ☐ **NG，Problem survey:** Approved By _____

※The specification of “TBD” should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

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Record of Revision

Version	Revise Date	Page	Content
Pre-Spec.01	2013/03/30		Initial Release
Pre-Spec.01	2017/09/30		变更产品型号
Fin-Spec.13	2022/01/26	7	3.4 Power Sequence
		8-10	3.5 LVDS Signal Timing Characteristics
		16	7. Mechanical Drawing
	2022/02/25	5-6	3. Operation Specifications

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	10.1 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1280 × 3(RGB) × 800	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.0565(W) × 0.1695(H) mm	
6	Active area	216.96(W) × 135.60(H) mm	
7	Module size	229.46(W) ×149.1(H) ×2.50(D) mm	Note 1
8	Surface treatment	HC	
9	Color arrangement	RGB-stripe	
10	Interface	Digital LVDS	
11	Backlight power consumption	2.57 W	
12	Panel power consumption	1W	Note 2
13	IC	EK79202	

Note 1: Refer to Mechanical Drawing.
Note 2: Including T-con Board power consumption

2. Pin Assignment

A 40pin connector is used for the module electronics interface. The recommended model is F62240-H1210A manufactured by Vigorconn.

Pin No.	Symbol	I/O	Function	Remark
1	NC		No connection	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC	---	SPI-CS FOR INX Test	
5	NC	---	SPI-SDA FOR INX Test	
6	NC	---	SPI-SCK FOR INX Test	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5, G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1~G5, B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6, R7, G6, G7, B6, B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	

27	NC	---	No connection	
28	NC	---	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	---	No connection	
34	NC	---	No connection	
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	NC	---	No connection	
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	VDD	2.2	2.8	V	
	AVDD	7.9	8.5	V	
	V_{GH}	13	17	V	
	V_{GL}	-11	-15	V	
	V_{GH}-V_{GL}	24	32	V	
Operation Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.1.1. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V_L	8.7	9.3	9.9	V	Note 1
Current for LED backlight	I_L	-	260	-	mA	
LED life time	-	15000	20,000	-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L =260mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =260mA. The LED lifetime could be decreased if operating I_L is lager than 260mA.

3.2. Typical Operation Conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDD	2.3	2.5	2.7	V	Note 2
	AVDD	8.0	8.2	8.4	V	
	V_{GH}	14.5	15	15.5	V	
	V_{GL}	-13.5	-13	-12.5	V	
Input logic high voltage	V_{IH}	0.8 VDD	-	VDD	V	
Input logic low voltage	V_{IL}	0	-	0.2 DV_{DD}	V	

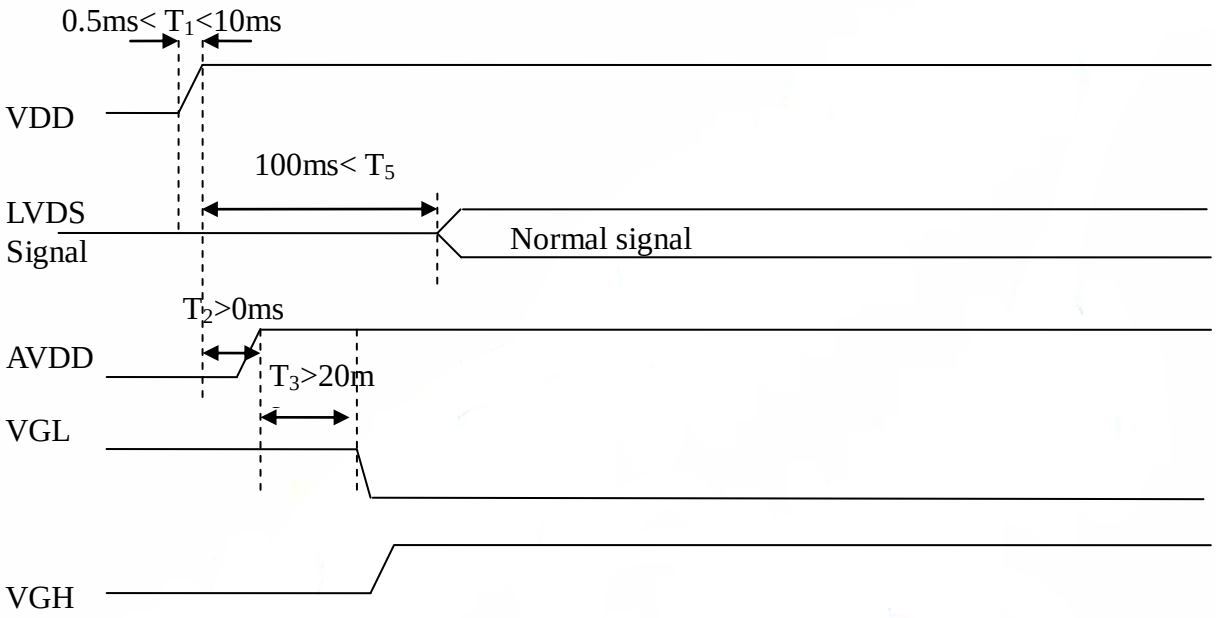
Note 1: Be sure to apply VDD and V_{GL} to the LCD first, and then apply V_{GH}
Note 2: VDD setting should match the signals output voltage (refer to Note 3) of customer's system board.

3.3. Current Consumption

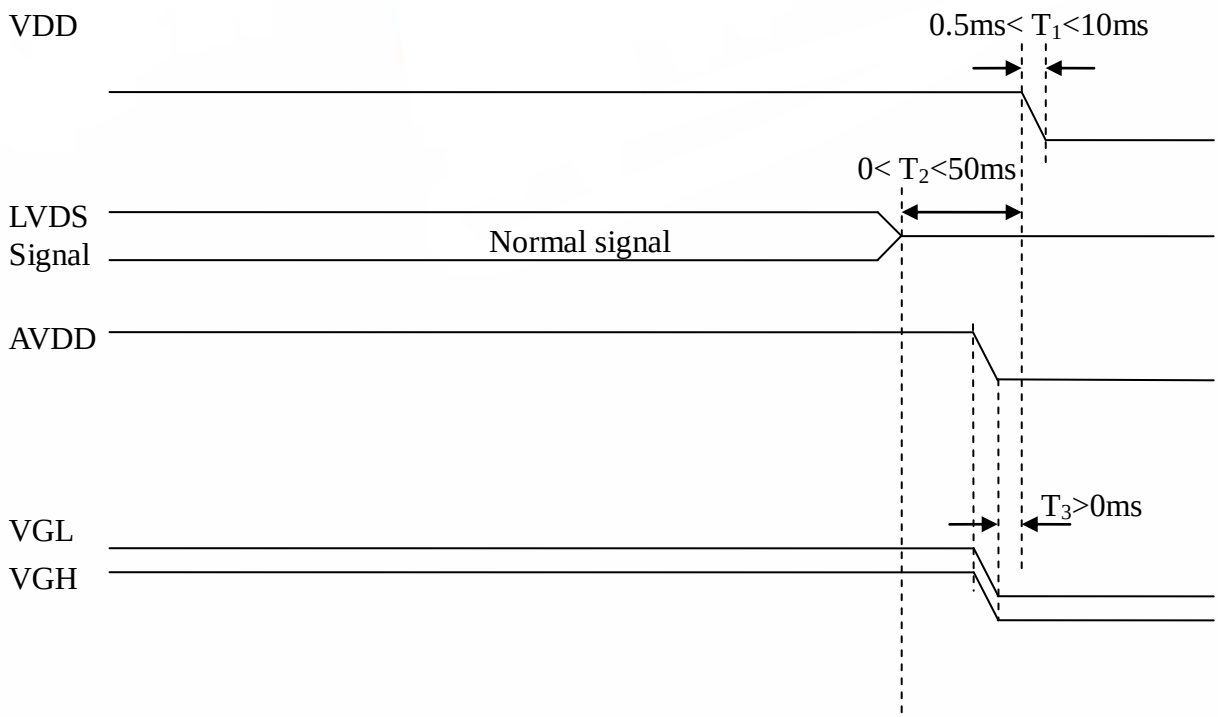
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	TBD	1.7	TBD	uA	V_{GH} =15V
	I_{GL}	TBD	1.6	TBD	uA	V_{GL} = -13V
	IV_{DD}	TBD	31	TBD	mA	V_{DD} =2.5V
	IAV_{DD}	TBD	21	TBD	mA	AV_{DD} =8.2V

3.4. Power Sequence

a. Power on:



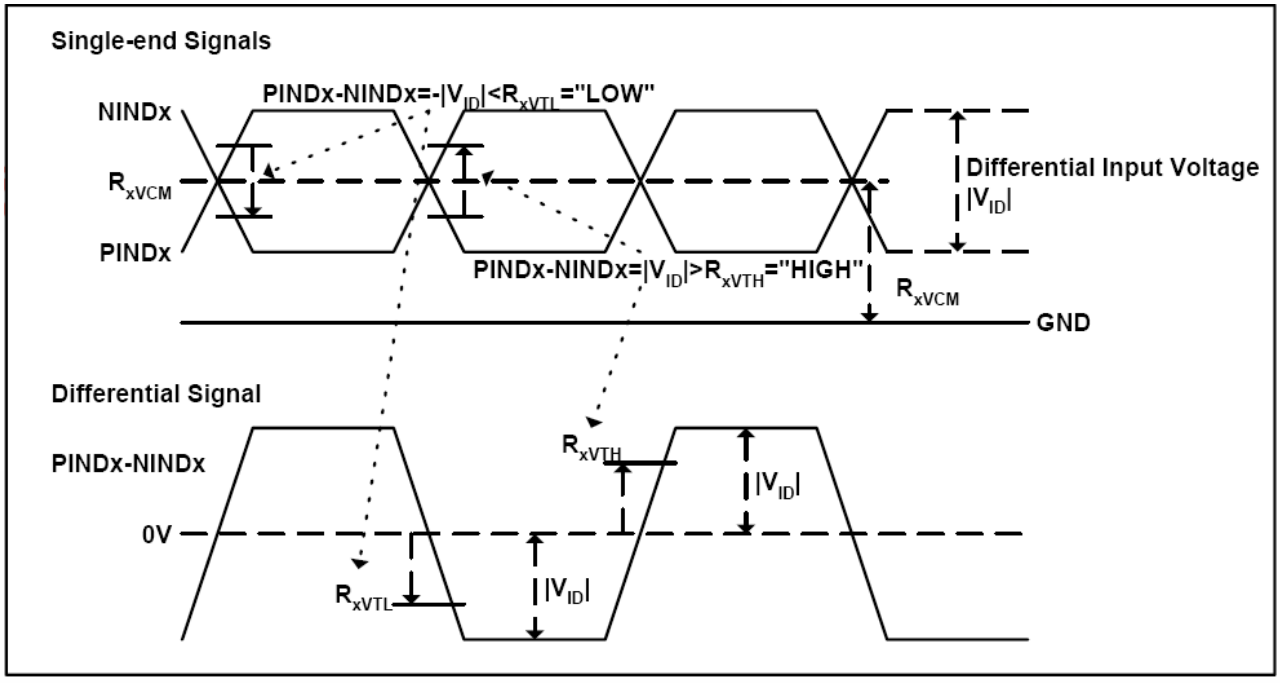
b. Power off:



3.5. LVDS Signal Timing Characteristics

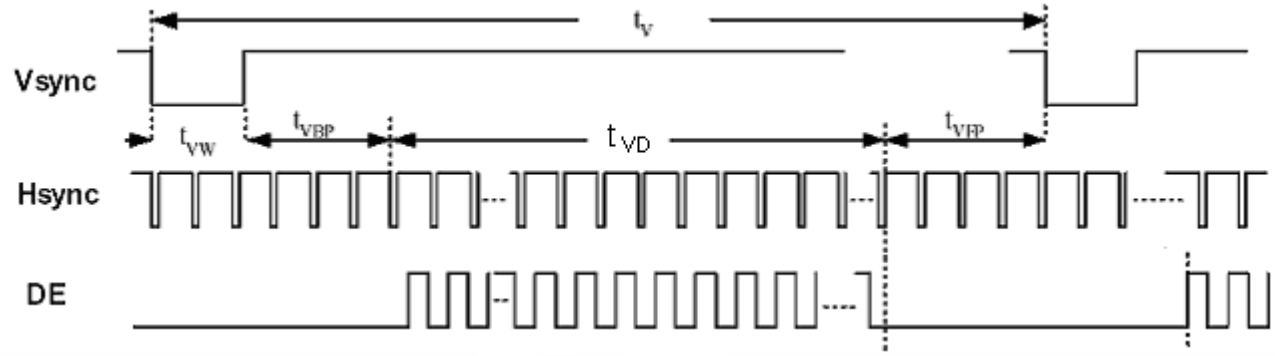
3.5.1. AC Electrical Characteristics

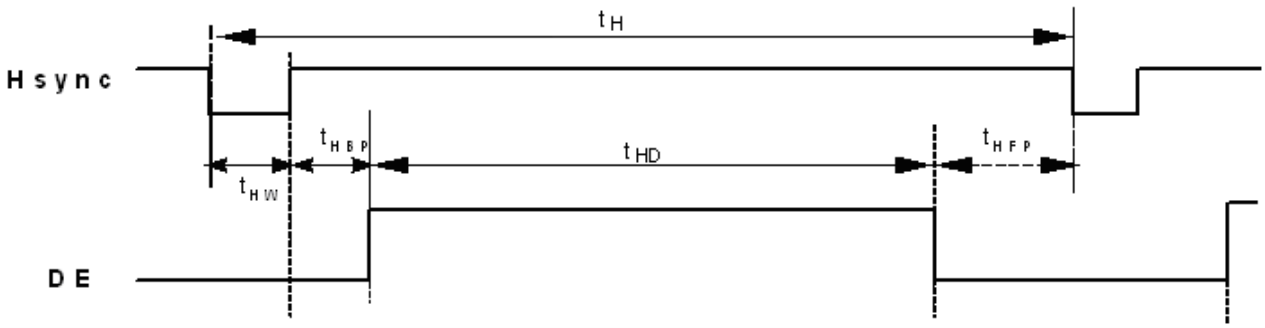
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LVDS Differential input high Threshold voltage	R_{xVTH}	-	-	+100	mV	R_{XVCM}=1.2V
LVDS Differential input low Threshold voltage	R_{xVTL}	-100	-	-	mV	
LVDS Differential input common mode voltage	R_{xVCM}	0.7	-	1.6	V	
LVDS Differential voltage	$\|V_{ID}\|$	200	-	600	mV	



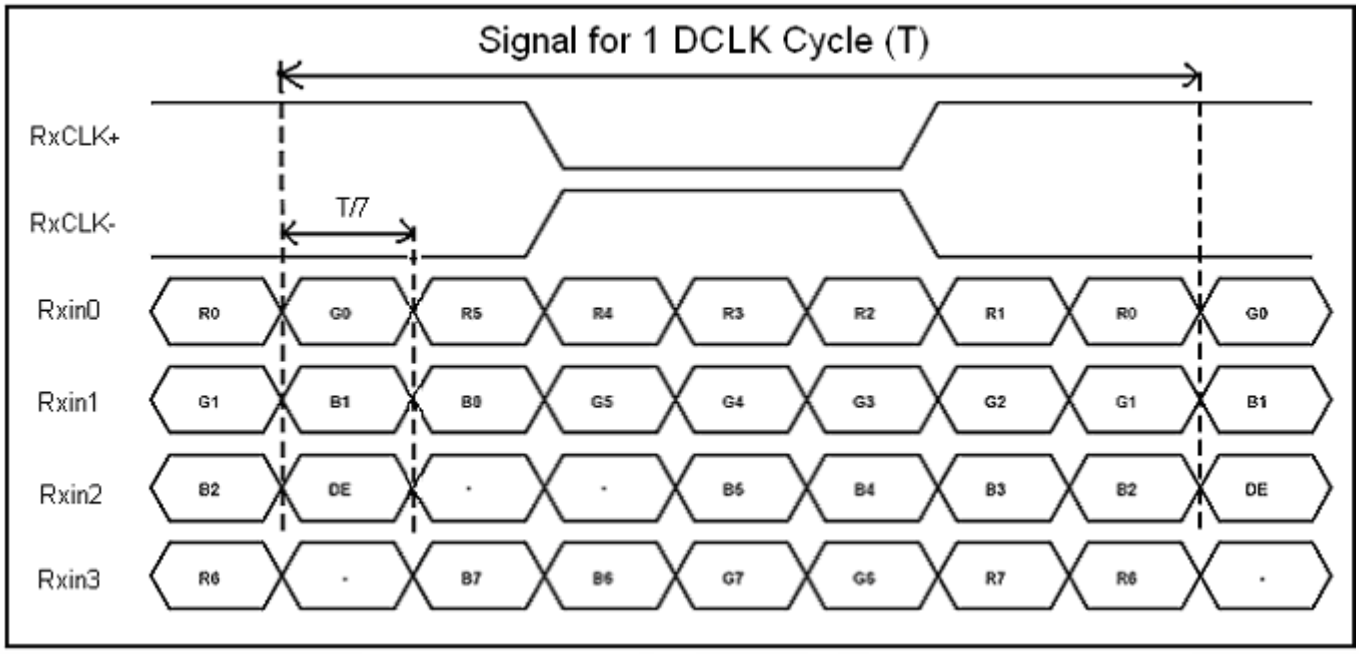
3.5.2. Timing Table

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	1/Tc	66.3	72.4	78.9	MHz	Frame rate =60Hz
Horizontal display area	tHD		1280			
HS period time	tH	1380	1440	1500	Tc	
HS Width +Back Porch +Front Porch	tHW+ tHBP +tHFP	102	180	260	Tc	
Vertical display area	tVD		800			
VS period time	tv	824	838	872	tH	
VS Width +Back Porch +Front Porch	tVW+ tVBP +tVFP	15	23	33	tH	





3.5.3. LVDS Data Input Format



4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	75	85	-	degree	Note 1
	θ_R	Φ=0°(3 o'clock)	75	85	-		
	θ_T	Φ=90°(12 o'clock)	75	85	-		
	θ_B	Φ=270°(6 o'clock)	75	85	-		
Response time	T_{ON}	Normal θ=Φ=0°	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		600	800	-	-	Note 4
Color chromaticity	W_X		0.27	0.31	0.35	-	Note 2 Note 5 Note 6
	W_Y		0.28	0.32	0.36	-	
Luminance	L		300	350	-	cd/m2	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 7

Test Conditions:

1. V_{DD}=2.5V, I_L=260mA (Backlight current), the ambient temperature is 25℃..
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

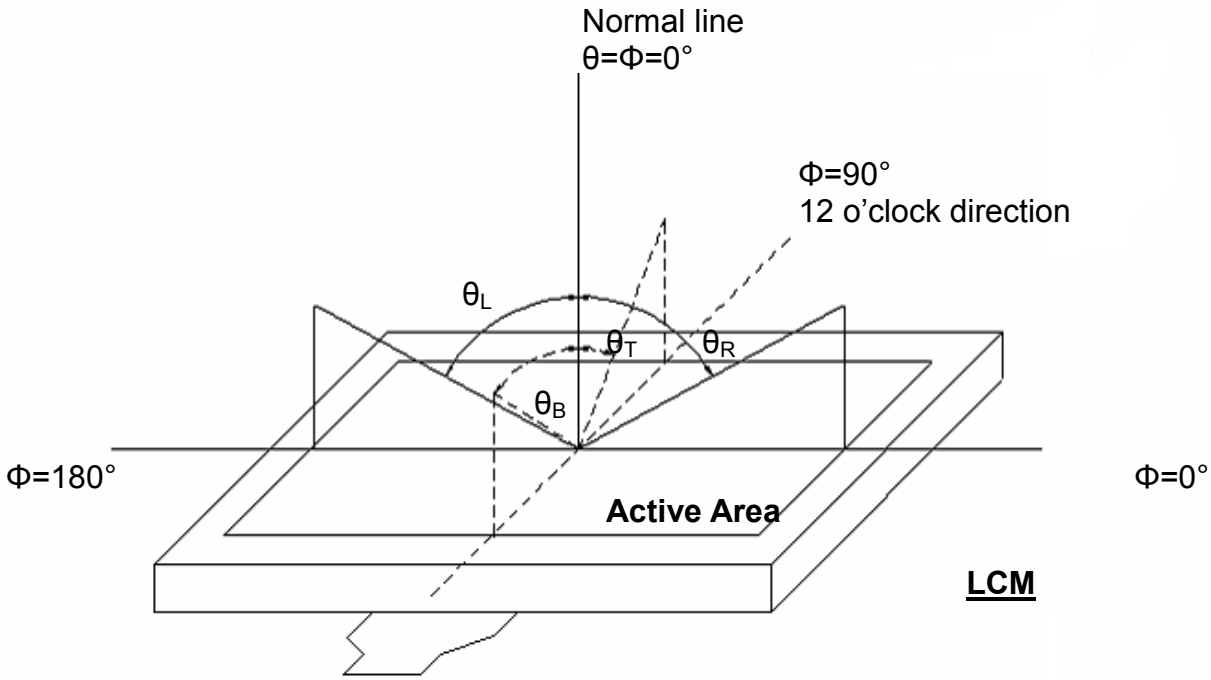


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.)

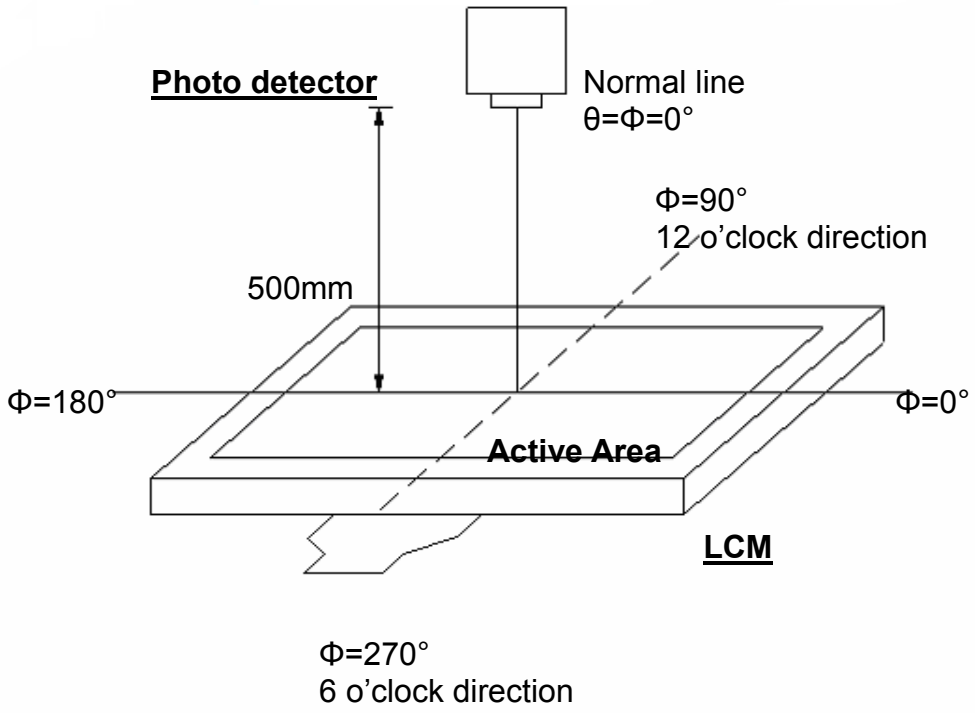


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

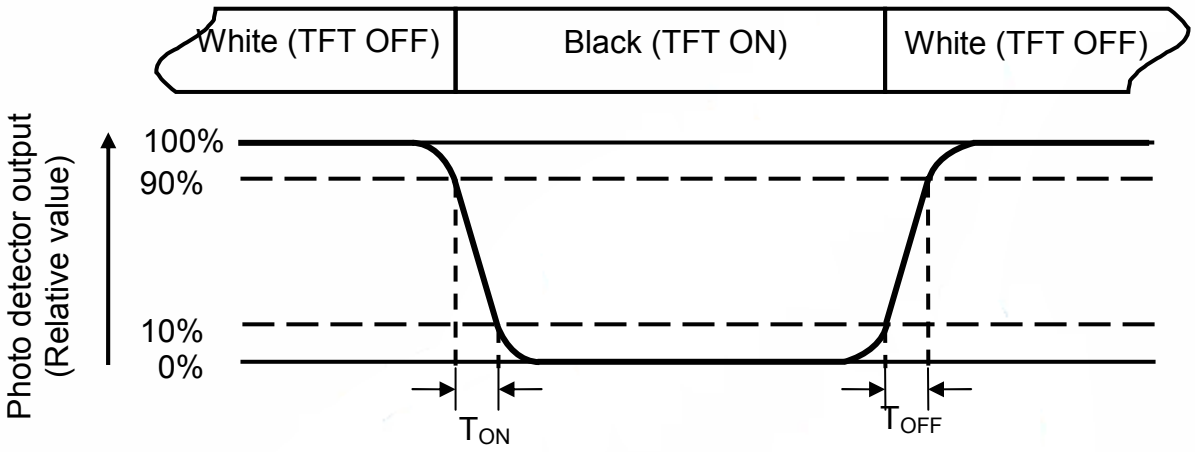


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)

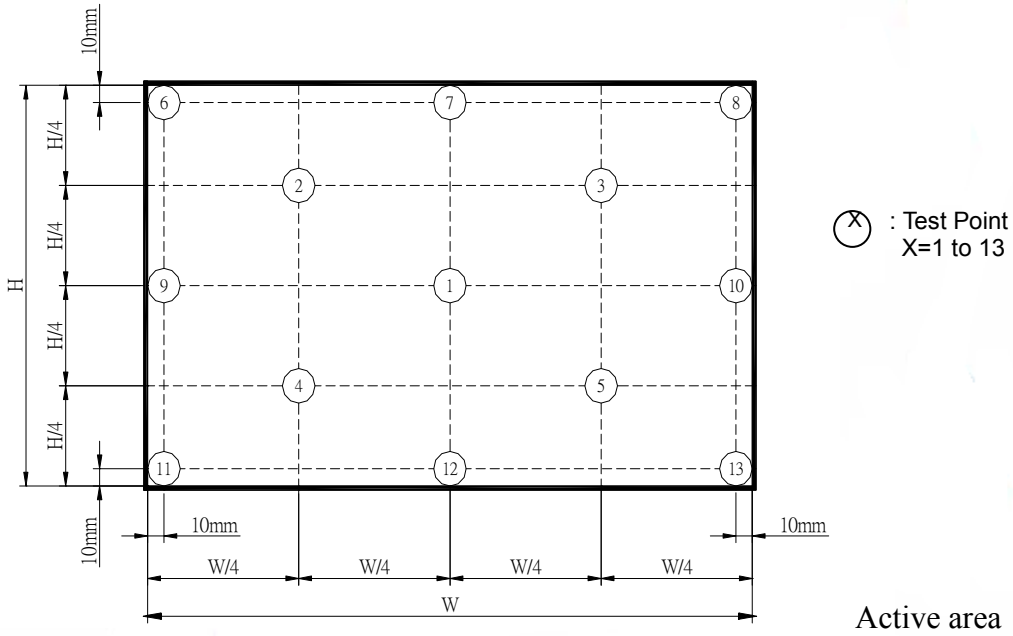
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=260mA .

Note 7: Definition of Luminance Uniformity

Measure the luminance of gray level 63 at 9 points

δW_{9p} = {Minimum [L (1)+ L (6)+ L (7)+ L (8)+ L (9)+ L (10)+ L (11) +L (12) +L (13)] / Maximum [L (1)+ L (6)+ L (7)+ L (8)+ L (9)+ L (10)+ L (11) +L (12) +L (13)]}*100%



5. Reliability Test Items

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80℃ 120hrs	Note 1，Note 4
Low Temperature Storage	Ta = -30℃ 120hrs	Note 1，Note 4
High Temperature Operation	Ts = 70℃ 120hrs	Note 2，Note 4
Low Temperature Operation	Ta = -20℃ 120hrs	Note 1，Note 4
Operate at High Temperature and Humidity	+40℃, 90%RH 120hrs	Note 4
Thermal Shock	-20℃/30 min ~ +60℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : ISTA-3A 1Hz~200Hz,Grms=0.53 Half hours for direction of Z.	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: 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 don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

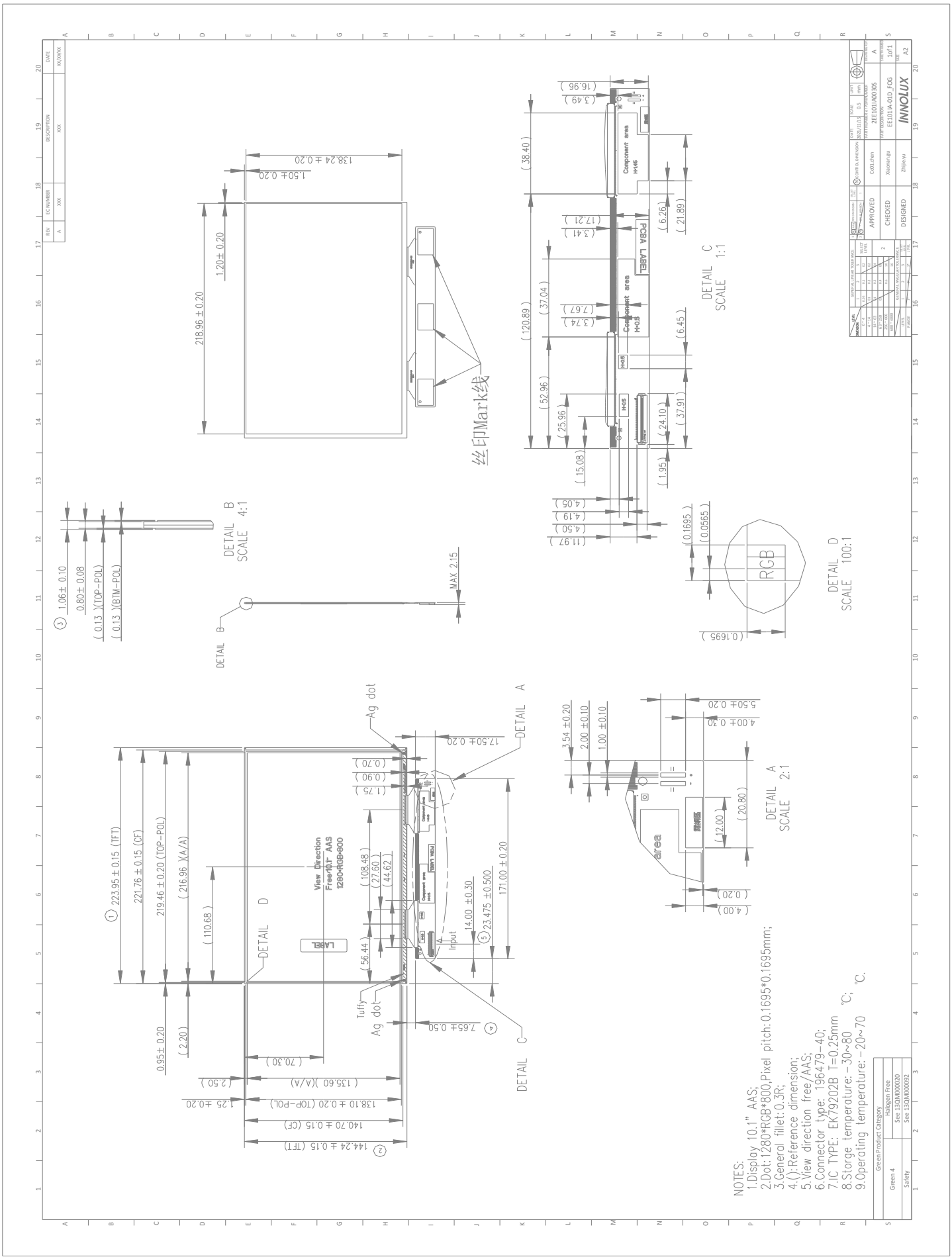
6.4. Storage

1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

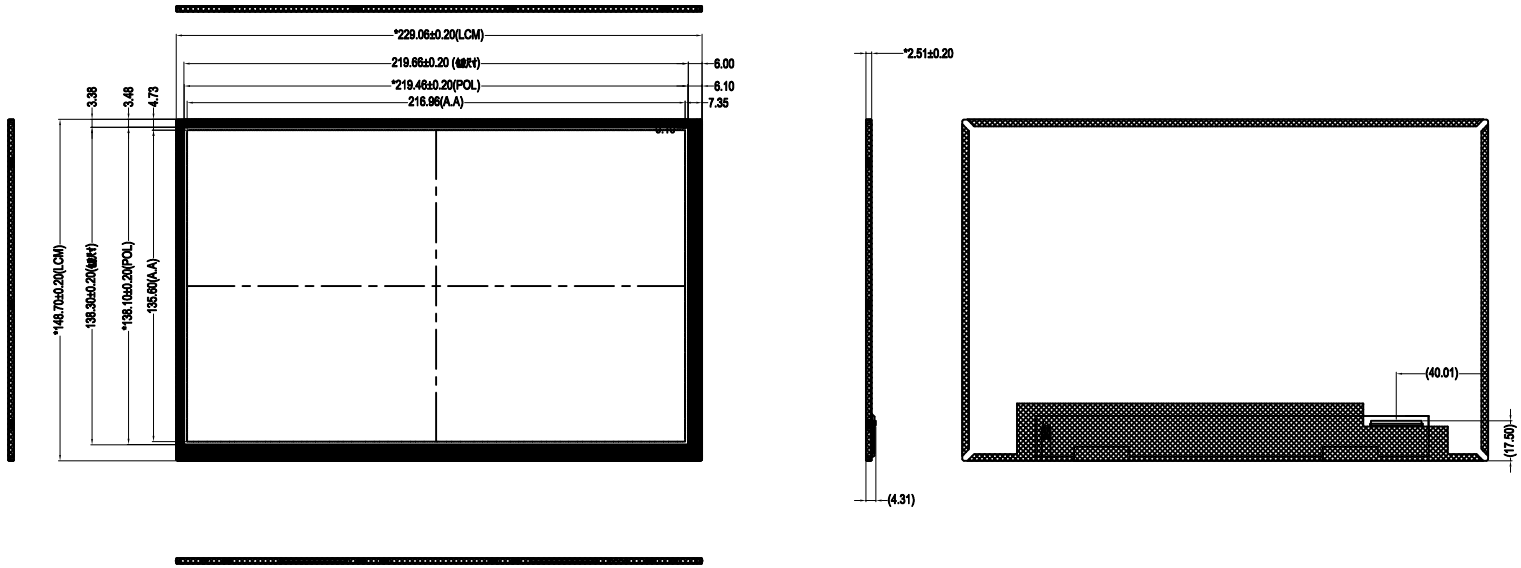
Mechanical Drawing

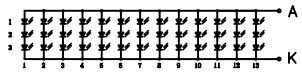


Customer Name: 客户名称：	宇华微	Customer's Code: 客户料号：		Edition: 版本号	A0	第三视角
Approved by: 承认：		Model NO.: 公司料号：	YH101MH4002	Edition: 版本号	A0	
Approval Date: 承认日期		Please Confirm This Drawing On/Before 请 签 回 此 图				

深圳市宇华微科技有限公司

REV.	DATE	MODIFICATION





CIRCUIT DIAGRAM

RoHS

Notes:

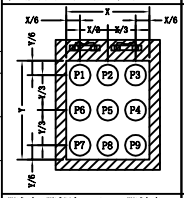
1. Unit:mm
2. Do not scale drawing.
3. ⚠ Modification rev.number
4. Mark mold cavity indentification in recess approximately where indicated.
5. "*" For important dimension; ( ) for reference dimention
6. RoHs must be complied.(Use Lead-free process)
7. 平整度控制到0.4MAX

FOG透过率：

Item(项目)		Symbol	min.	typ.	max.	Unit	Condition
Main screen 主屏 (BL)	Luminance(亮度)	Lv				cd/m²	(BM-7测试值)
	Uniformity(均匀性)	Avg				%	
	Colour Coordinate (色坐标)	X	0.270		0.320		(照计度测试值) Lv=xxxx mcd
		Y	0.260		0.320		
Main screen 主屏 (LCM)	Luminance(亮度)	Lv	300	350		cd/m²	If= 260 mA (定电流测试) 样品亮度根据实际做出来样品亮度定
	Uniformity(均匀性)	Avg	75			%	
	Colour Coordinate (色坐标)	X	0.270		0.330		
		Y	0.300		0.360		
Forward Voltage(正向电压)		Vf	8.4	9.6	10.5	V	

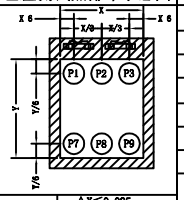
∘Operating Temperature:-20~+70° C (工作温度) ∘Storage Temperature:-30~+80° C (储存温度)

亮度测试点分布示意图



测试9点，测试距离：50±5cm，测试角度：1°
均匀性-最小/最大亮度*100%，测试仪器：BM-7

色差测试点排布示意图



色差标准 △X≤0.025 △Y≤0.025

TOLERANCES(公差)	
FIELD	TOLERANCES
L≤60	±0.15
60<L≤120	±0.2
120<L≤200	±0.25
200<L≤400	±0.3

成品平面弧度公差	
边长度L	对应公差范围
L≤35	≤0.1mm
35<L≤120	≤L*0.35%mm
120<L≤400	≤0.6mm
角度公差	±1°

序号	材料	材料名称	数量	原厂供应商	工艺	厚度
1.	胶框		1			
2.	导光板		1			
3.	反射片		1			
4.	下扩散		1			
5.	下BEF		1			
6.	上BEF		1			
7.	FPC双面胶		1			
8.	双面胶		1			
9.	FPC		1			
10.	LED		39			
11.	下铁框		1			
12.						
12.						
12.						

背光成品图	Design by: (设计)	贺顺超	Check by: (审查)		Approval By: (核准)	Date: (日期)	Page: (页数) 1/1