KINGTECH Kingtech Group Co., Ltd. ---- *Lcd Touchscreen Expert*

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SPECIFICATION
FOR
LCD Module

PV05500TD29A-C

MODULE:	PV05500TD29A-C
CUSTOMER:	

Kingtech	**INITIAL**	**DATE**
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	**INITIAL**	**DATE**
APPROVED BY		

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TABLE OF CONTENTS

1.General Description
2. Electrical Characteristics
3. Pin Description
4. Electrical Characteristics
5. Optical Characteristics
6. Quality Specifications
7. Reliability
8. Handling Precaution

1. General Description

*** DESCRIPTION**

PV05500TD29A-C is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 5.5" TFT-LCD contains 720x 1280 pixels, and can display up to 16.7M colors.

*** Features**

-Low Input Voltage: VCC: 2.5~3.3V; IOVCC: 1.65~3.3V
-Display Colors of TFT LCD: 16.7M colors
- Interface:MIPI-4 Lanes
-Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	68.04(H) *120.96(V) (5.5 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	720(RGB) *1280	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.0945(H) *0.0945(V)	mm	-
Viewing angle	ALL	o'clock	-
Drive IC	HX8394-F210PD250	-	-
Display mode	Normally Black	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	76.5	-	mm	-
	Vertical(V)	-	149.5	-	mm	-
	Depth(D)	-	2.73	-	mm	-
Weight		-	TBD	-	g	-

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2. MECHANICAL SPECIFICATION

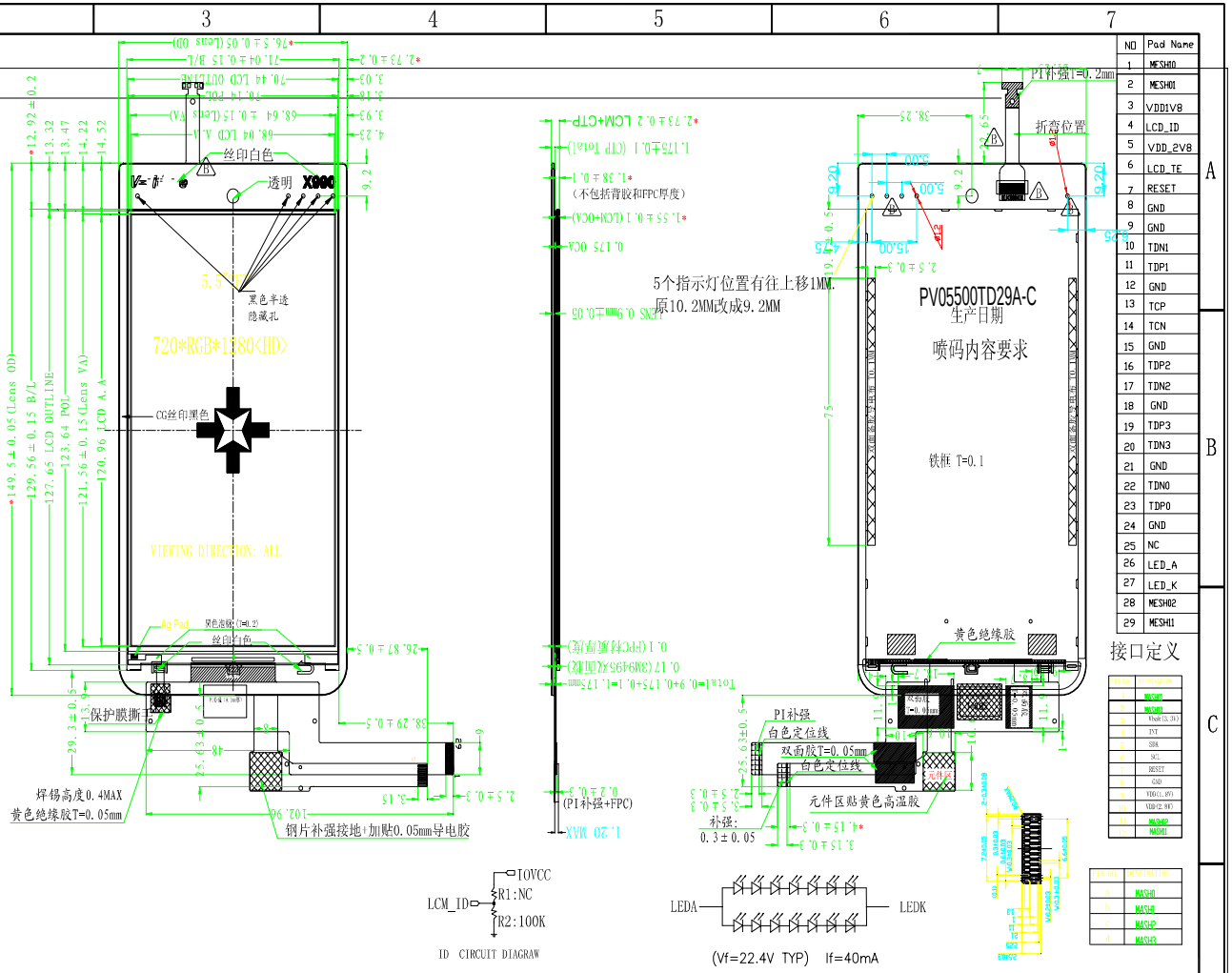
一.产品特征（Features）：

1.产品规格：
(Product specifications)：

显示类型(Display mode)：	TFT/NORMALLY BLACK
驱动芯片(Driver IC)：	HX8394F
人眼观察视角(Viewing Direction)：	ALL
接口类型(Interface Types)：	MIPI VIDEO MODE
背光类型(Backlight Types)：	12pcs,7串2并40mA(20mA/LED),电压为20.3V-23.8V
模组亮度(LCM Brightness)：	320 cd/m2 Min, 360 cd/m2 TPY(含CTP)
模组色坐标(LCM Color Coordinate)：	(X=0.29±0.03,Y=0.30±0.03)
模组均匀度(LCM Uniformity)	80% MIN
操作温度(Operating Temperature)：	-20° C ~ 70° C
储存温度(Storage Temperature)：	-30° C ~ 80° C
平面翘曲度(Plane Warping Degree)：	<=0.3MM

二.CTP技术要求(CTP Technical requirements)

1. 产品配置:G+F+F
2. IC 品牌型号：汇顶，GT5663;
3. CTP透过率：T > 85%
4. LENS 材质：钢化玻璃,产品符合RoHS标准;
5. Cover Glass表面处理
   抗指纹(AF Coating)：无
   表面硬度： ≥ 6H,
6. 翘曲度<= 0.3mm
7. 所有材料及制程需符合 Europe RoHS Specification;
8. 全贴合项目背面保护膜撕手设计要求与背保护膜设计为一体.
   撕手且飘出LENS外形.如图规范）.IR孔需单独加保护膜.
9. 工作温度：-20° ~ +70° C,存储温度：-30° ~ +80° C
10. 未注公差按 ±0.20mm管控；未注倒角按 C0.15±0.10mm管控
    带*为重点管控尺寸.



NO	Pad Name
1	MESH0
2	MESH1
3	VDD1V8
4	LCD_ID
5	VDD_2V8
6	LCD_TE
7	RESET
8	GND
9	GND
10	TDN1
11	TDP1
12	GND
13	TCP
14	TCN
15	GND
16	TDP2
17	TDN2
18	GND
19	TDP3
20	TDN3
21	GND
22	TDN0
23	TDP0
24	GND
25	NC
26	LED_A
27	LED_K
28	MESH2
29	MESH1

V4			
V3			
V2			
V1	A	更改五个指示灯孔大小与TP-FPC外形	2017.04.26
V0	A	初版(The first edition)	2016.01.11
版 本(Version)	符 号(SYMBOL)	变更记录(Change History)	日期(Date)

Kingtech Group Co., Ltd.

视 角 (View)	比例(Proportion)	1 : 1	设 计 (DESIGN)	审 核 (AUDITING)	批 准 (APPROVED)
单 位 (Unit)	M M	页 面 (Page)	1 / 1		
产品型号 (Product Type)	PV05500TD29A-C				

3. PIN DESCRIPTION

Pin NO.	Symbol	Level	Function
1	MESH10	/	/
2	MESH01	/	/
3	VDD1V8	H	Power supply
4	LCD_ID	H/L	READ ID
5	VDD_2V8	H	Power supply
6	LCD_TE	H/L	Tearing effect
7	RESET	H/L	Hardware reset pin
8	GND	L	Ground
9	GND	H/L	Hardware reset pin
10	TDN1	H/L	HSSI_D1- are differential data signal line.
11	TDP1	H/L	HSSI_D1+ are differential data signal line.
12	GND	L	Ground
13	TCP	H/L	HSSI_CLK+ are differential data signal line.
14	TCN	H/L	HSSI_CLK- are differential data signal line.
15	GND	L	Ground
16	TDP2	H/L	HSSI_D2+ are differential data signal line.
17	TDN2	H/L	HSSI_D2- are differential data signal line.
18	GND	L	Ground
19	TDP3	H/L	HSSI_D3+ are differential data signal line.
20	TDN3	H/L	HSSI_D3- are differential data signal line.
21	GND	L	Ground
22	TDN0	H/L	HSSI_D0- are differential data signal line.
23	TDP0	H/L	HSSI_D0+ are differential data signal line.
24	GND	L	Ground
25	NC	/	/
26	LED_A	H	Backlight+
27	LED_K	L	Backlight-
28	MESH02	/	/
29	MESH11	/	/

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	IOVCC	1.65	3.3	V	
Supply Voltage for analog circuit	VCC	2.5	3.3	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

Typical Operating Conditions (Ta=25℃)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Power Supply	VCC	2.4	-	3.3	V	
Power Supply	IOVCC	1.65	-	3.3	V	
Normal mode Current consumption	Icc		-	-	mA	V_{CC}=2.8V
TFT Gate ON Voltage	V_{GH}	11	-	20.5	V	
TFT Gate OFF Voltage	V_{GL}	-15.5	-	-7.0	V	

4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V_f	20.3	-	23.8	V	
Forward supply Current	I_f		40	-	mA	
LCM Luminance	L_V	–	360	–	cd/m2	I_B=40mA
Uniformity	/	80			%	-

4.3 TIMING CHARACTERISTICS

Timings for DSI video mode
Vertical timings

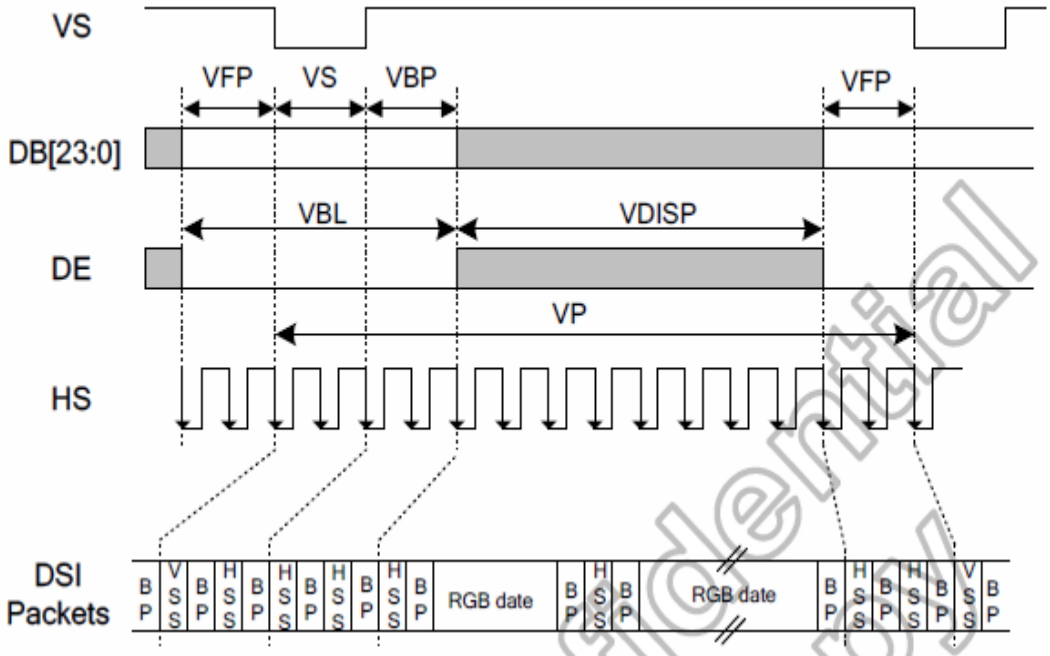


Figure 7.9: Vertical timings for DSI I/F

Resolution=720x1280(VSSA=0V, VDD1=1.8V, VDD2=2.8V, VDD3=2.8V, T_A=25°C)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Vertical cycle	VP	-	1286	-	-	Line
Vertical low pulse width	VS	-	2	-	Note(1)	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note(1)	Line
Vertical data start point	-	VS+VBP	4	-	Note(1)	Line
Vertical blanking period	VBL	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	1280	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note: (1) The VS/VBP/VFP pulse width are related to RD3h (Set GIP Option0). Please refer to the application note for VS/VBP/VFP setting.

Horizontal timings

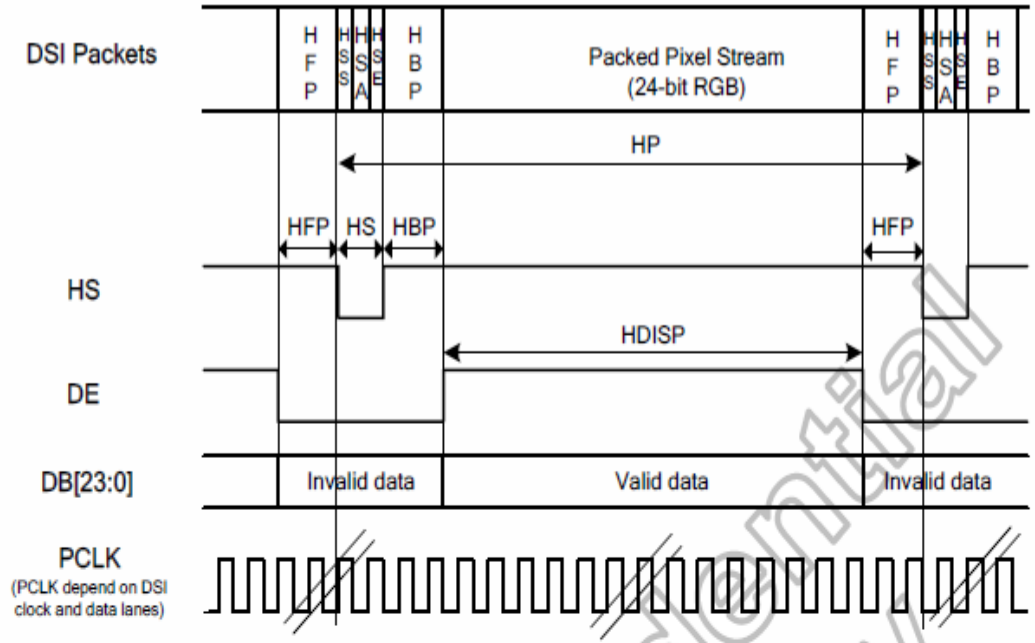


Figure 7.10: Horizontal timing for DSI video mode I/F

Resolution=720x1280 (VSSA=0V, VDD1=1.8V, VDD2=VDD3=VCC=2.8V, T_A=25°C)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Horizontal cycle	HP	-	762	-	-	DCK
HS low pulse width	HS	-	6	-	-	DCK
Horizontal back porch	HBP	-	24	-	-	DCK
Horizontal front porch	HFP	-	12	-	-	DCK
Horizontal data start point	-	HS+HBP	30	-	-	DCK
Horizontal blanking period	HBLK	HS+HBP+HFP	12	-	-	DCK
Horizontal active area	HDISP	-	-	720	-	DCK

Note: (1) HS > 0.2us (12-DCK @ 352.8Mbps /4-lane, Frame rate 60Hz, min DSI CLK rate)
(18-DCK @ 540Mbps /4-lane, Frame rate 60Hz, max DSI CLK rate)
(2) HBP > 0.4us (24-DCK @ 352.8Mbps /4-lane, Frame rate 60Hz, min DSI CLK rate)
(36-DCK @ 540Mbps /4-lane, Frame rate 60Hz, max DSI CLK rate)
(3) HFP > 0.2us (12-DCK @ 352.8Mbps /4-lane, Frame rate 60Hz, min DSI CLK rate)
(18-DCK @ 540Mbps /4-lane, Frame rate 60Hz, max DSI CLK rate)

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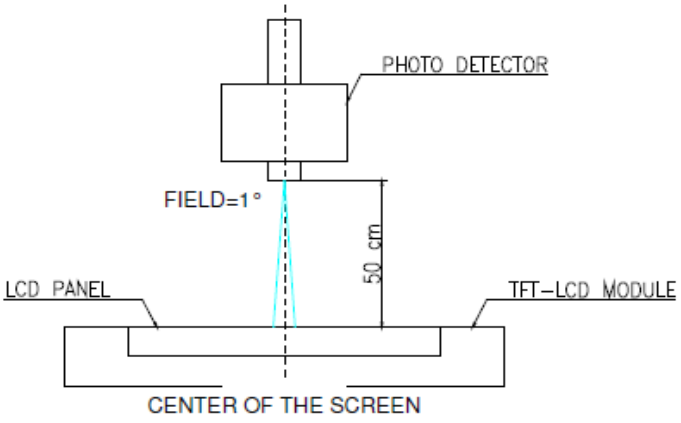
5. OPTICAL CHARACTERISTICS

All optical specification is measured under typical condition (Note 1, 2)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
TR			θ=0°	4.00	4.50	--	%	1. Panel with APCF (GVDD = 4.9V) 2. C-LIGHT 3. Note 7
NTSC		%	θ=0°	65	70	--		Note 7
Contrast Ratio		CR	θ=0°	800	1000	--		Note 4, 7
Viewing Angle	Top		CR≧10	70	80	--	deg.	Note 5, 7 θ =0, 90, 180, 270
	Bottom			70	80	--		
	Left			70	80	--		
	Right			70	80	--		
Response Time Rise + Fall		Tr + Tf	θ=0°	--	30	35	ms	Note 3
Chromaticity	White	X	θ=0°	(0.270)	(0.290)	(0.310)		Measured by 206C_2B source Note 7
		Y	θ=0°	(0.298)	(0.318)	(0.338)		
	Red	X	θ=0°	(0.629)	(0.649)	(0.669)		
		Y	θ=0°	(0.313)	(0.333)	(0.353)		
	Green	X	θ=0°	(0.270)	(0.290)	(0.310)		
		Y	θ=0°	(0.578)	(0.598)	(0.618)		
	Blue	X	θ=0°	(0.120)	(0.140)	(0.160)		
		Y	θ=0°	(0.052)	(0.072)	(0.092)		
Cross-talk Ratio		%		--	--	3	%	Note 8

Note 1: Measured under Ambient temperature =25℃, and LED lightbar current I_L = 20mA in the dark room.

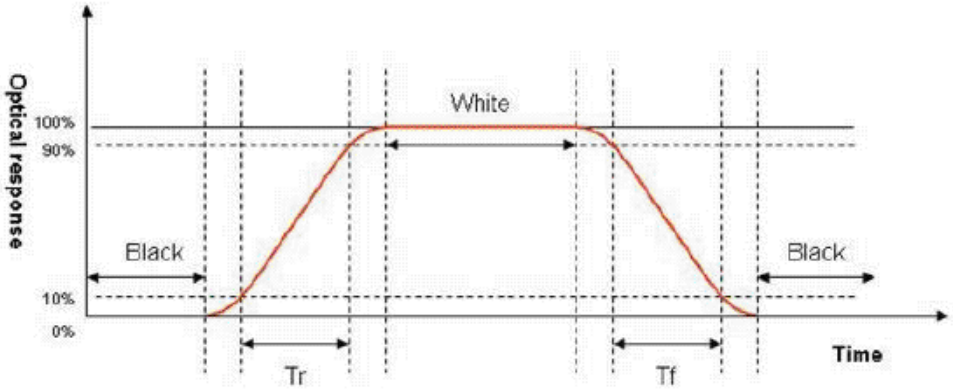
Note 2: To be measured on the center area of panel with a viewing cone of 1° by luminance meter, after 15 minutes operation.



Note 3: Definition of response time

The output signals of photo detector are measured when the input signals are changed from "black" to "white" (rising time) and from "white" to "black" (falling time), respectively.

The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.

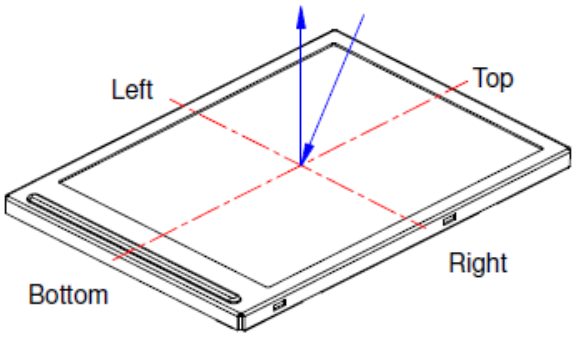


Note 4.Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" status}}{\text{Photo detector output when LCD is at "Black" status}}$$

Note 5. Definition of viewing angle, θ, Refer to figure as below.

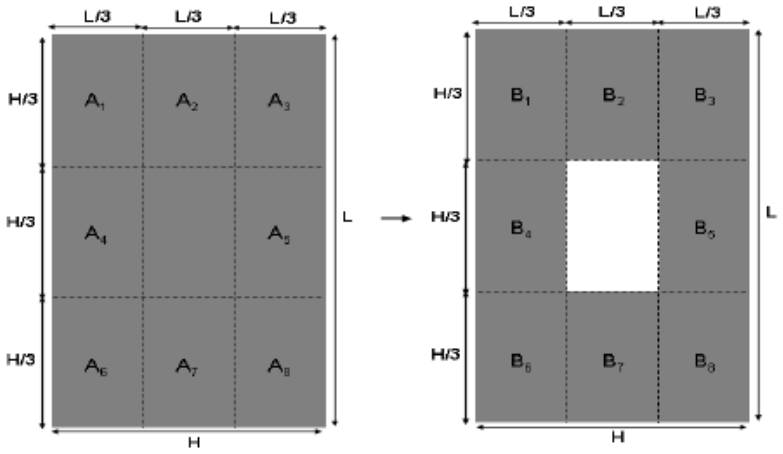


Note 6: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 7: The spec in table is for reference, different polarizer would make different performance for it.

Note 8: Cross-talk ratio is measuring by follow pattern and formula

The test pattern of cross-talk is 128L gary around one white block, size is defined as picture.

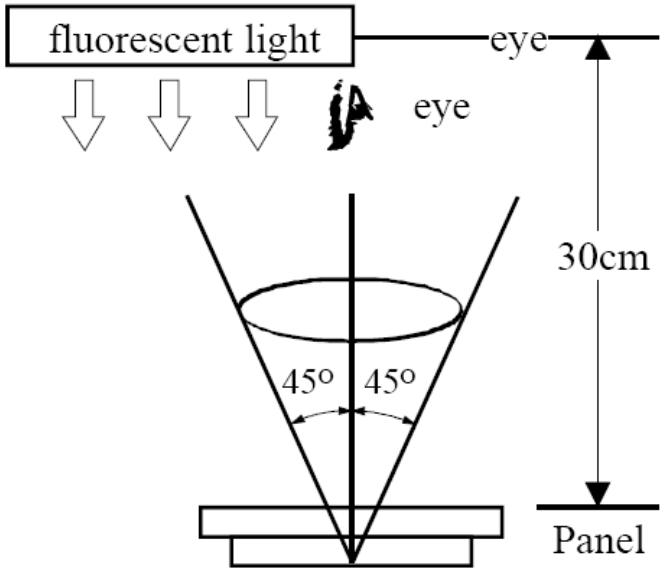


$$\text{Cross talk Ratio} = \max_{i=1 \text{ to } 8} \frac{|A_i - B_i \text{ (Photo detector output when LCD is at test pattern)}|}{A_i \text{ (Photo detector output when LCD is at 128L gray pattern)}}$$

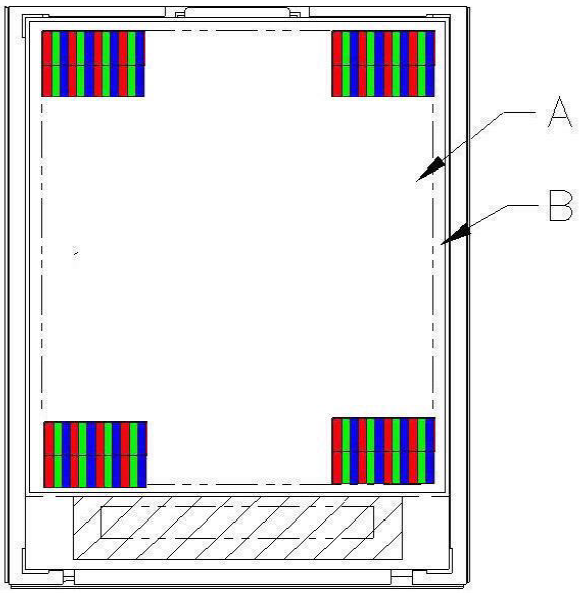
6. QUALITY SPECIFICATIONS

6.1 INSPECTION CONDITION

(1) Inspect under 300~500Lux fluorescent light, leaving 30~35cm between panels and eyes, and between panels and lights.
(2) Inspection condition is 23±5°C, 50±20%RH maximum.

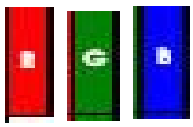
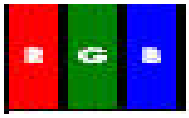


6.2 DEFINITION OF AREA



A Area : Viewing area.
B Area : Out of viewing.(outside viewing area)

6.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electrical Testing	**1-1 sub pixel classification** ● Sub Pixel: Number of sub pixel doesn't exceed one dot.	N≦2
		 **Sub Pixel (Dot)** **a> Dark dot ----one Allowed** **b> Bright dot ---- one Allowed**	
		● Pixel : Three dots link together doesn't exceed ones	N≦0
		 **Pixel**	
		1-2 Leakage to light ● Leakage to light be not allowed.	N=0
		1-3 Picture to shake ● Picture had shake, twinkle and noise etc. instable of defect that be not allowed.	N=0
		1-4 Function ● No display or No function. ● Source Line, Gate Line. ● Contrast Ratio ● Current consumption exceeds product specifications. ● Display malfunction.	N=0
2	Mechanical Dimension	2-1 Mechanical Dimension exceeds product specifications. 2-2 Out of frame and boss of plastic changed shape that be not allowed.	N=0

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection</td><td>

3-1 Blemish: Line shapes of defect

<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>---</td><td>W≦0.05</td><td>Ignore</td><td rowspan="3">5 m m</td></tr>
<tr><td>L≦3.0</td><td>0.05<W≦0.08</td><td>4</td></tr>
<tr><td>L≦3.0</td><td>0.08<W≦0.15</td><td>3</td></tr>
<tr><td>--</td><td>W＞0.15</td><td>Not allowed</td><td>---</td></tr>
</table>

L: length(mm)
W: width(mm)

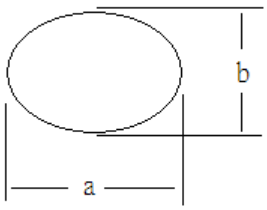
3-2 Blemish: dot shapes of defect.

<table>
<tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr>
<tr><td>Φ≦0.15</td><td>Ignore</td><td>---</td></tr>
<tr><td>0.15＜Φ≦0.20</td><td>3</td><td rowspan="2">5 m m</td></tr>
<tr><td>0.20＜Φ≦0.30</td><td>2</td></tr>
<tr><td>Φ＞0.30</td><td>1</td><td>---</td></tr>
</table>

3-3 Polarizer Bubble

<table>
<tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr>
<tr><td>Φ≦0.25</td><td>Ignore</td><td>---</td></tr>
<tr><td>0.25＜Φ≦0.35</td><td>3</td><td>15 m m</td></tr>
<tr><td>Φ＞0.35</td><td>1</td><td>---</td></tr>
</table>

Foreign Substances



Φ=(a+b)/2

</td><td></td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection</td><td>
3-4 Scratch
● Sensate scratch not allowed.
● Impassive scratch as below.
Unit:mm
<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>-----</td><td>W≦0.05</td><td>Ignore</td><td rowspan="3">5 m m</td></tr>
<tr><td>L≦3.0</td><td>0.05<W≦0.08</td><td>4</td></tr>
<tr><td>L≦3.0</td><td>0.08<W≦0.15</td><td>3</td></tr>
<tr><td>----</td><td>0.15＜W</td><td>Not allowed</td><td rowspan="2">---</td></tr>
<tr><td>L>3.0</td><td>----</td><td>Not allowed</td></tr>
</table>
</td><td></td></tr>
<tr><td>4</td><td>Package</td><td>4-1 Mixed product types
4-2 Shipping q’ty should be the same as “shipping notice form” q’ty.
4-3 Outer box can’t broken.</td><td>N=0</td></tr>
</table>

7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	70℃ for 96 hours
Low Temperature Operation	-20℃ for 96 hours
High Temperature Storage	80℃ for 96 hours
Low Temperature Storage	-30℃ for 96 hours
High Temperature Operation Humidity Operation	60℃, 90%RH for 72 hours
Thermal Shock	-10℃(30min) ~+25℃(5min)~ +60℃(30min) for 10 cycles
Vibration Test (No Operation)	Frequency: 10~55Hz Amplitude:1.0mm Sweep Time: 11min Test Period: 6 Cycles for each direction of X, Y, Z
Static electricity test	Touch 4KV,air touch 8KV

8. HANDLING PRECAUTION

8.1 SAFETY

(1) Do not swallow any liquid crystal, even if there is no proof that liquid stal is poisonous.
(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

(1) Store the panel or module in a dark place where the temperature is 23±5℃ and thehumidity is below 50±20%RH.
(2) Store in anti-static electricity container.
(3) Store in clean environment, free from dust, active gas, and solvent.
(4) Do not place the module near organics solvents or corrosive gases.
(5) Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

(1) Avoid static electricity which can damage the CMOS LSI.
(2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface.
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with acleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.

8.4 WARRANTY

1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
2) According to Kingtech TFT LCD quality standrad,Kingtech will rework or exchange for functional defect goods sine within one year。