KINGTECH Kingtech Group Co., Ltd. ---- Lcd Touchscreen Expert
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SPECIFICATION
FOR
LCD Module
PV08004TD31C-C

KINGTECH	INITIAL	DATE
PREPARED BY		20190823
CHECKED BY		20190823
APPROVED BY		20190823

CUSTOMER	INITIAL	DATE
APPROVED BY		

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REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	20190823	-	First Issued.	XIAO

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1. General Description

* DESCRIPTION

PV08004TD31C-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 8.0" TFT-LCD contains 1200*1920 pixels, and can display up to 16.7M colors.

* Features

-Low Input Voltage: VDD: 3.3V
-Display Colors of TFT LCD: 16.7M colors
-CPU Interface: MIPI-4 Lanes

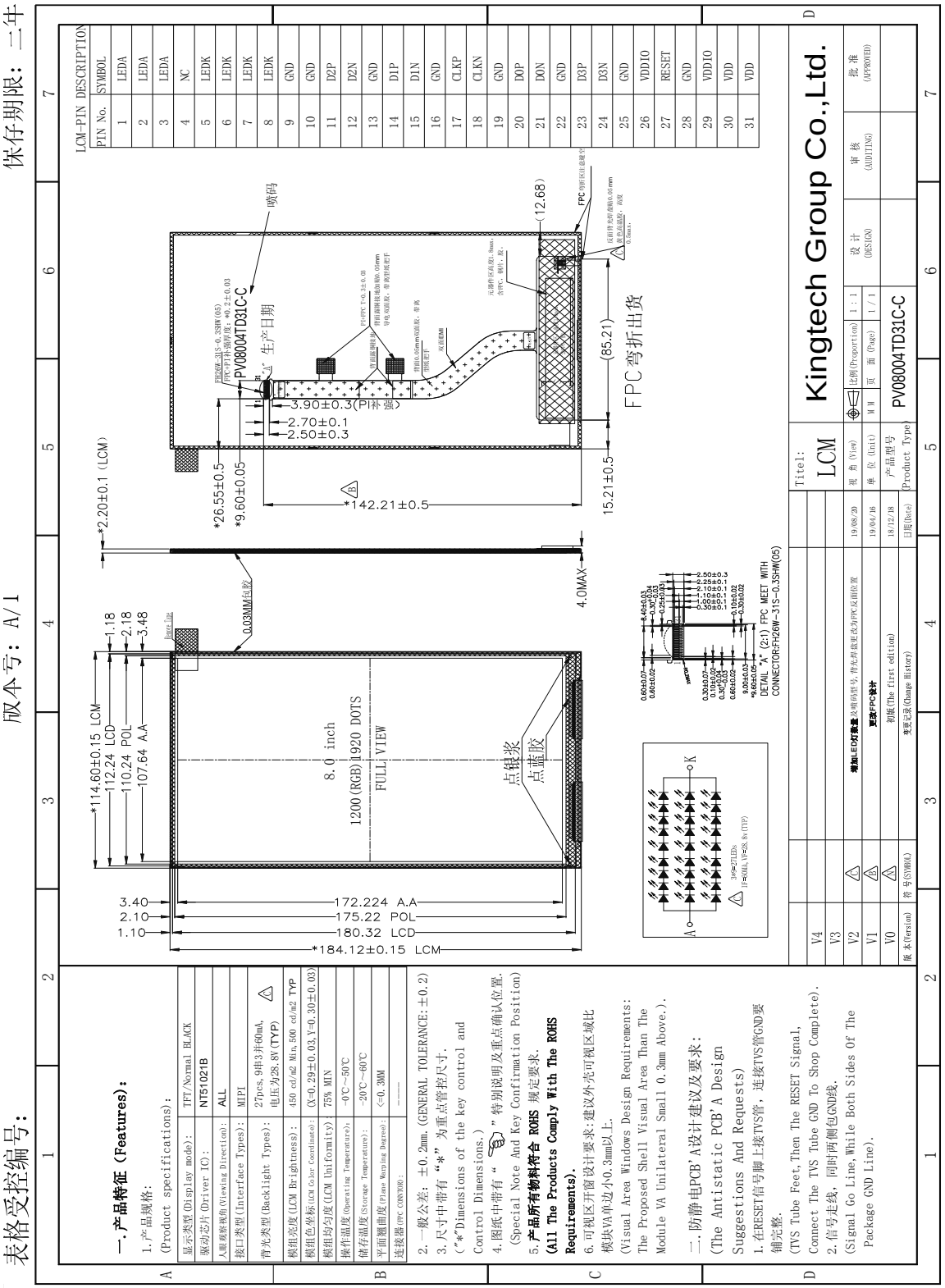
General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	107.64(H) *172.224(V) (8.0 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1200(RGB) *1920	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.0897(H) *0.0897(V)	mm	-
Viewing angle	ALL	o'clock	-
Drive IC	NT51021B	-	-
Display mode	Normally BLACK	-	-
Operating temperature	-0～+50	℃	-
Storage temperature	-20～+60	℃	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	128.84	-	mm	±0.15
	Vertical(V)	-	205.93	-	mm	±0.15
	Depth(D)	-	3.50		mm	±0.25
Weight		-	TBD	-	g	-

2. Mechanical Specification

LCM



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LCM+CTP

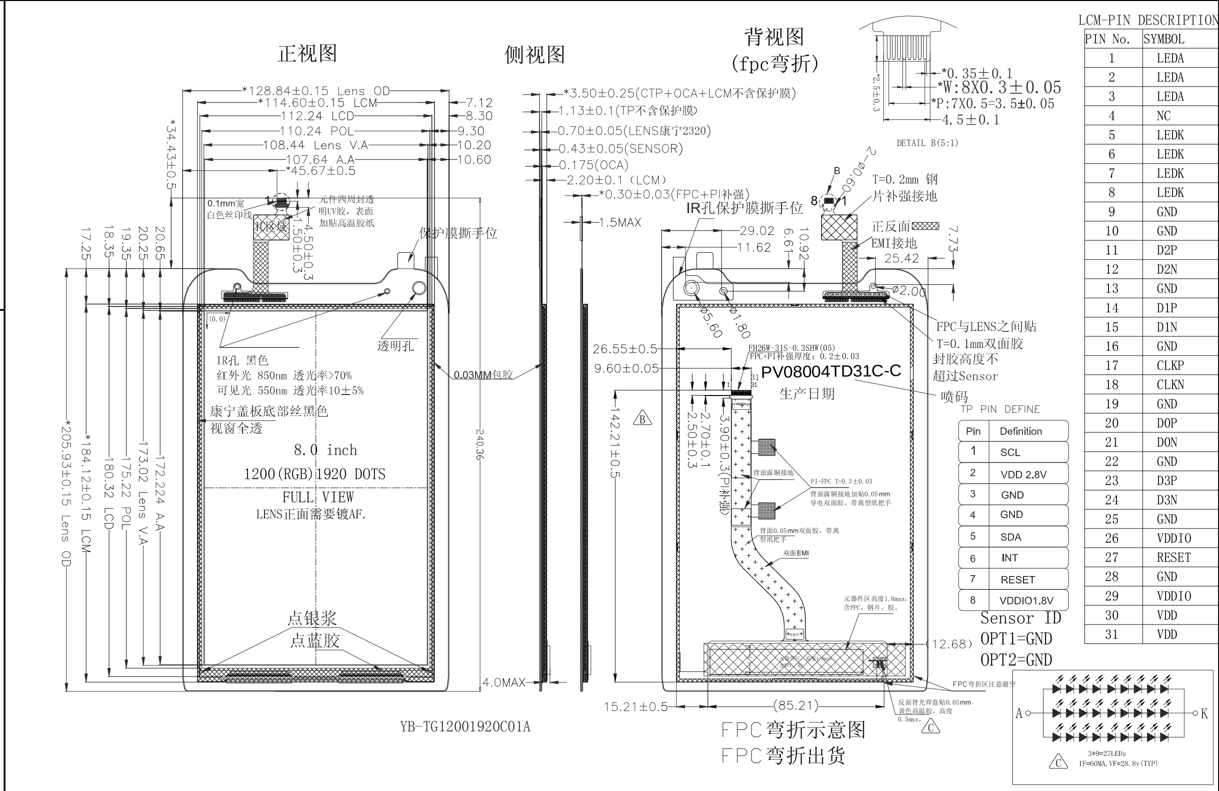
表格受控编号： 版本号：A/1 保存期限：三年

一.LCM产品特征（LCM Features）：

显示类型(Display mode)：	TFT/Normal BLACK
驱动芯片(Driver IC)：	NT51021B
人眼观察视角(Viewing Direction)：	ALL
接口类型(Interface Types)：	MIPI
背光类型(Backlight Types)：	27pcs,9串3并60mA, 电压为28.8V(TYP)
LCM+CTP亮度(LCM+CTP Brightness)：	400 cd/m2 Min,450 cd/m2 TYP
模组色坐标(LCM Color Coordinate)：	(X=0.29±0.05,Y=0.30±0.05)
模组均匀度(LCM Uniformity)：	75% MIN
操作温度(Operating Temperature)：	-0℃~50℃
储存温度(Storage Temperature)：	-20℃~60℃
平面翘曲度(Plane Warping Degree)：	<=0.3MM
连接器(FPC CONNTOR)：	----

二.CTP技术要求(CTP Technical requirements)

TP NOTES:
1.结构：GFF, 0.7mm glass lens +0.425mm sensor =1.13mm (sensor=0.125 TOP OCA +0.125 TOP FILM +0.05 BOTTOM OCA +0.125 BOTTOM FILM)
2.IC：GT928(26TX*16RX)
3.FPC表面处理：双面铺电磁膜（EMI）
4.Lens玻璃材质：康宁2320
5.Lens强化要求：应力值CS≥750MPa,强化深度DOL≥40UM
6.Lens玻璃表面处理：防指纹处理(AF),摩擦前 水滴角>106°
7.TP透过率：86%（min）
8.Lens表面铅笔硬度≥7H(750gf)
9.Lens跌落测试：67g钢球，35cm高度冲击四角（四角以VA区为基准单边内缩5mm处）及中心五点各一次，需满足不破碎。
10.工作温度：-20℃~ 70℃，存储温度：-30℃~ 80℃
11.*号标记的尺寸为重点尺寸
12.未注倒边：C=0.15*0.15
13.未注公差：±0.2
14.所有材料及制程需符合 Europe RoHS Specification;
15.FPC弯折技术要求：要求FPC180° 来回对折15次无分层，断线，裂痕等现象，重点验证区域；
16.支持直径5mm的被动笔



LCM-PIN DESCRIPTION	
PIN No.	SYMBOL
1	LEDA
2	LEDA
3	LEDA
4	NC
5	LEDK
6	LEDK
7	LEDK
8	LEDK
9	GND
10	GND
11	D2P
12	D2N
13	GND
14	D1P
15	D1N
16	GND
17	CLKP
18	CLKN
19	GND
20	D0P
21	D0N
22	GND
23	D3P
24	D3N
25	GND
26	VDDIO
27	RESET
28	GND
29	VDDIO
30	VDD
31	VDD

Pin	Definition
1	SCL
2	VDD 2.8V
3	GND
4	GND
5	SDA
6	INT
7	RESET
8	VDDIO1.8V

版本(Version)	符号(SYMBOL)	变更记录(Change History)	日期(Date)
V4			
V3			
V2	C	增加LED灯数量及喷码型号，背光焊盘更改为FPC反面位置	19/08/20
V1	B	更改FPC设计	19/04/16
V0	A	初版(The first edition)	18/12/18

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视角(View)		比例(Proportion)	1:1	设计(DESIGN)	审核(AUDITING)
单位(Unit)	MM	页面(Page)	1/1		
物料编码(Material Code)	PV08004TD31C-C				

批准(APPROVED)

3. PIN DESCRIPTION

Pin NO.	Symbol	Function
1~3	VLED+	Backlight+
4	NC	Not Connect
5~8	VLED-	Backlight-
9~10	GND	Ground
11	D2+	DSI_D2+ are differential data signal line
12	D2-	DSI_D2- are differential data signal line
13	GND	Ground
14	D1+	DSI_D1+ are differential data signal line
15	D1-	DSI_D1- are differential data signal line
16	GND	Ground
17	CLK+	DSI_DCLK+are differential data signal line
18	CLK-	DSI_DCLK- are differential data signal line
19	GND	Ground
20	D0+	DSI_D0+ are differential data signal line
21	D0-	DSI_D0- are differential data signal line
22	GND	Ground
23	D3+	DSI_D3+ are differential data signal line
24	D3-	DSI_D3- are differential data signal line
25	GND	Ground
26	VDDI	A supply voltage
27	RESET	Hardware reset pin
28	GND	Ground
29	VDDIO	A supply voltage
30	VDD	A supply voltage
31	VDD	A supply voltage

TP PIN

Pin NO.	Symbol	Remark
1	SCL	Serial clock input pin
2	VDD2.8V	Power supply
3-4	GND	Ground
5	SDA	Serial data input pin
6	INT	Interrupt pin
7	RST	Reset pin
8	VDDIO1.8V	Power supply

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	VDD	-0.3	5.5	V	
Supply Voltage for analog circuit	AVDD	-0.3	11	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

Typical Operating Conditions (Ta=25℃)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Digital Supply Voltage	VDD	2.7	3.3	3.6	V	
Analog Supply Voltage	AVDD	7	-	10	V	
TFT Gate ON Voltage	VGH	-	17	-	V	
TFT Gate OFF Voltage	VGL	-	-8	-	V	

4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V_f	-	28.8	-	V	
Forward supply Current	I_f	-	60	-	mA	
LCM Luminance	L_V	400	450	–	cd/m2	I_B=60mA
Uniformity	/	75			%	-

4.3 TIMING CHARACTERISTICS

(VCC=VCC_IF=1.55V to 1.65V, VDD= 2.7V to 3.6V, AVDD= 7V to 10V, GND=AGND= 0V, TA= -20 to +85°C)

Parameter	Symbol	Min	Typ	Max	Units
15%-85% rise time and fall time	T_{RLP} / T_{FLP}	-	-	25	ns
Pulse width of the LP exclusive-OR clock	$T_{LP-PULSE-TX}$	50	-	-	ns
Period of the LP exclusive-OR clock	$T_{LP-PER-TX}$	100	-	-	ns

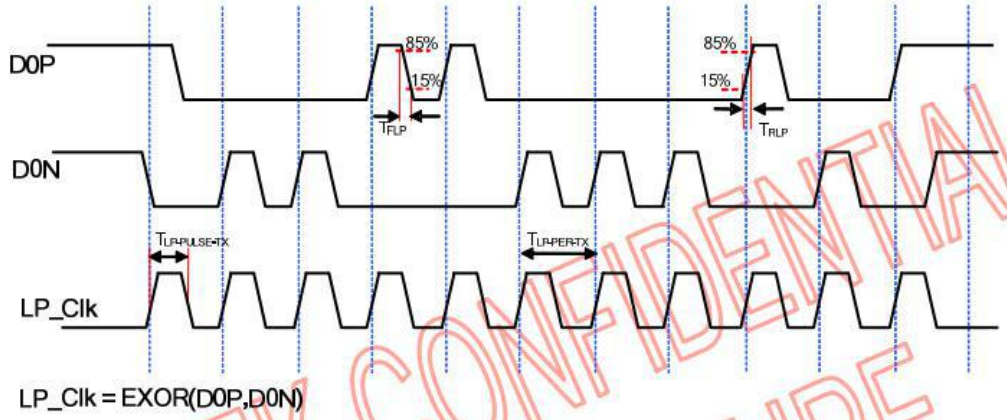


Figure 25. LP Transmitter Timing Definitions

(VCC=VCC_IF=1.55V to 1.65V, VDD= 2.7V to 3.6V, AVDD= 7V to 10V, GND=AGND= 0V, TA= -20 to +85°C)

Parameter	Symbol	Min	Typ	Max	Units
UI instantaneous	UI_{INST}	1.0	-	12.5	ns
Data to Clock Setup Time	T_{SETUP}	0.25	-	-	UI_{INST}
Data to Clock Hold Time	T_{HOLD}	0.25	-	-	UI_{INST}

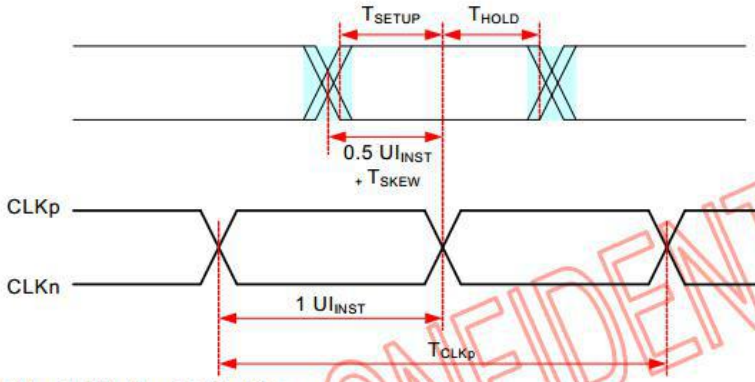


Figure 26. Data to Clock Timing Definitions

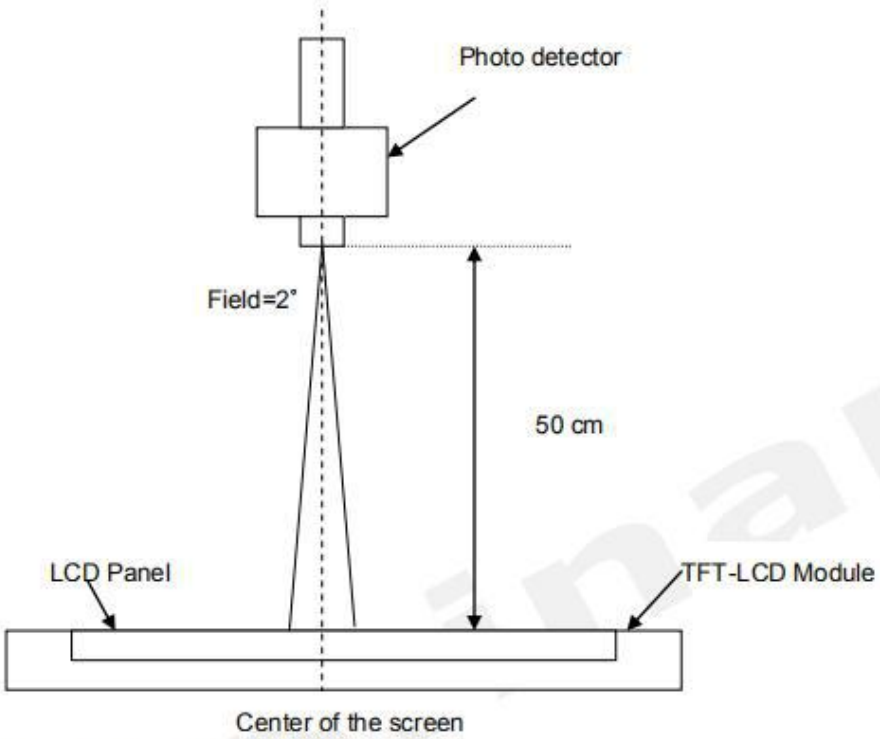
5. OPTICAL CHARACTERISTICS

(LCD MONOMER PARAMETERS)

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Viewing Angle		θ_R θ_L	Horizontal (Right) CR = 10 (Left)	80 80	85 85	- -	degree	1, 6
		ψ_H ψ_L	Vertical (Upper) CR = 10 (Lower)	80 80	85 85	- -		
Contrast Ratio		CR		800	1000	-		1, 3
Cross talk		%		-	-	4		1, 4
Response Time		T_{RT}	Rising + Falling	-	27	35	msec	5
Color / Chromaticity Coodinates	Red	Rx	CIE 1931	0.600	0.630	0.660		
		Ry		0.316	0.346	0.376		
	Green	Gx		0.253	0.283	0.313		
		Gy		0.551	0.581	0.611		
	Blue	Bx		0.101	0.131	0.161		
		By		0.131	0.161	0.191		
	White	Wx		0.290	0.320	0.350		
		Wy		0.338	0.368	0.398		
NTSC		%	-	-	57.3	-		
Transmittance		%		3.95	4.49	NA		

Note 1: Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room, and it should be measured in the center of screen.



Note 2： Definition of Average Luminance of White (Y_L):

Measure the luminance of gray level 63 at 5 points，Y_L = [L (1)+ L (2)+ L (3)+ L (4)+ L (5)] / 5

L (x) is corresponding to the luminance of the point X at Figure in Note (1).

Note 3： Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the “White” state}}{\text{Brightness on the “Black” state}}$$

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Note 4 : Definition of Cross Talk (CT)

$CT = |Y_B - Y_A| / Y_A \times 100\ (\%)$

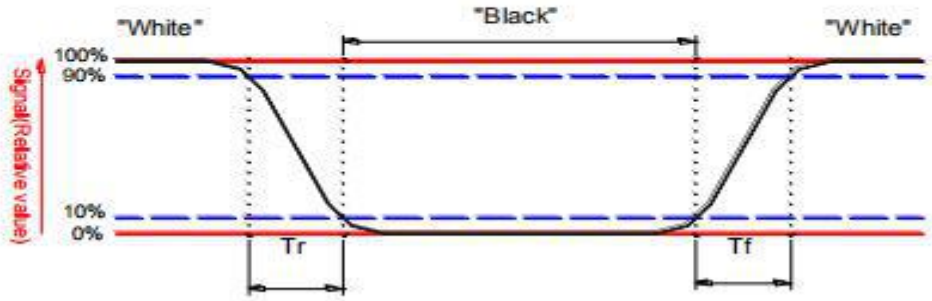
Where

Y_A = Luminance of measured location without gray level 0 pattern (cd/m2)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m2)

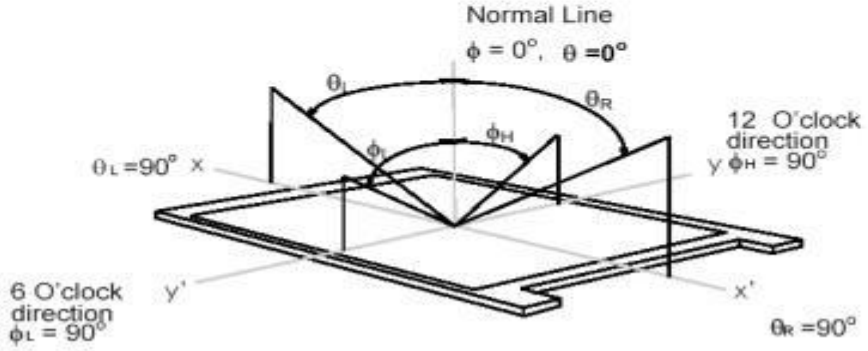
Note 5: Definition of response time:

The output signals of BM-7 or equivalent are measured when the input signals are changed from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note 6. Definition of viewing angle

Viewing angle is the measurement of contrast ratio ≧10, at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 90° (θ) horizontal left and right and 90° (Φ) vertical, high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated about its center to develop the desired measurement viewing angle.



6. QUALITY SPECIFICATIONS

1. Inspection condition

1.1:Cosmetic inspection: viewing distance is about 30cm with bare eyes, and under an environment of 20~40W light intensity （600~1200LUX）, all directions for inspecting the sample should be within 45° against perpendicular line.

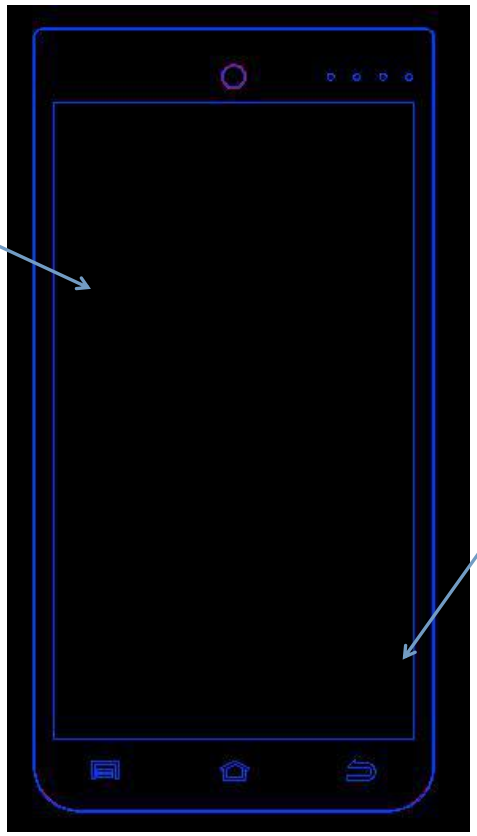
6.1.2:Function inspection: viewing distance is about 30cm with bare eyes, and under an environment of 300LUX light intensity, all directions for inspecting the sample should be within 45° against perpendicular line.

2. Definition of Inspection Item.

2.1 Definition of Inspection zone in I-touch module.

AA zone/Display area

VA area： Front surface (Include AA area and BM area)



BM area/Printing area

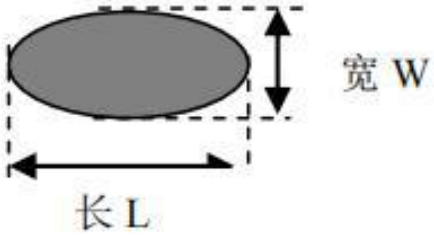
AA zone：Character/Display area

BM zone：Printing area

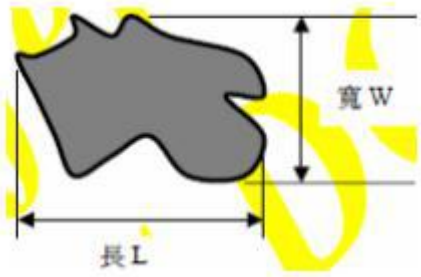
VA zone：Viewing area（AA area + BM area = viewing area ）

3. Defect definition

3.1 Circular defect

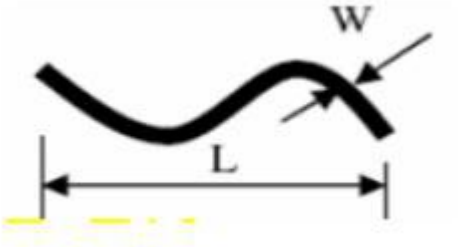


Diameter Φ=1/2(L+W)

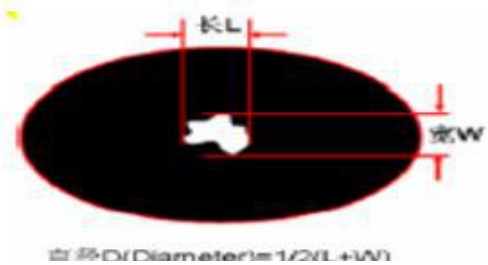


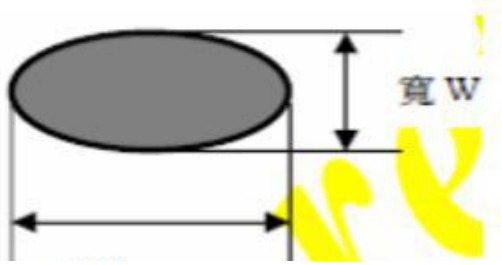
Diameter Φ=1/2(L+W)

3.2 Linear defect

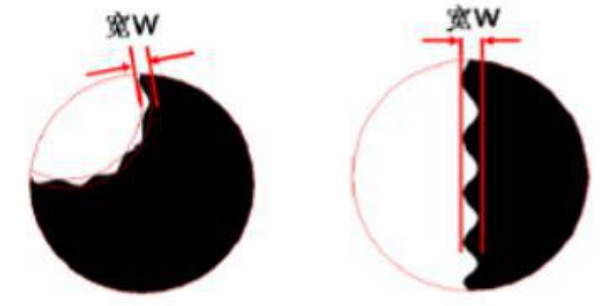


3.3 Pin hole





3.4 Zigzag



4. Inspection standards

4.1 Major defect

-Item -No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical，horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting. 6) Touch panel abnormal.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	
4.1.4	LCD Mura	LCD Mura according to ND 5% keep out to determine, if keep out distance at 30cm be seen by eyes is NG, otherwise will be ok if invisible.	

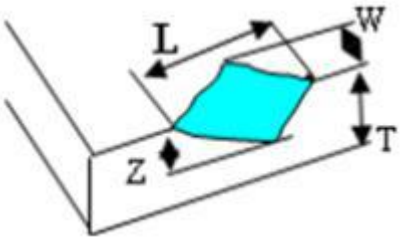
4.2 Cosmetic defect

Item No	Items to be inspected	Inspection Standard	Classification of defects

<table>
<tr><td>4.2.1</td><td>Dot defect</td><td><table><tr><td>Zone
Size(mm)</td><td>VA area
Acceptable Qty</td></tr><tr><td>Φ≤0.1</td><td>Ignore</td></tr><tr><td>0.10＜Φ≤0.25</td><td>3</td></tr><tr><td>0.25＜Φ≤0.30</td><td>1</td></tr><tr><td>0.30＜Φ</td><td>0</td></tr></table></td><td>Minor</td></tr>
<tr><td>4.2.2</td><td>Dim Spots: Circle shaped and dim edged defects</td><td><table><tr><td>Zone
Size(mm)</td><td>VA area
Acceptable Qty</td></tr><tr><td>Φ≤0.20</td><td>Ignore</td></tr><tr><td>0.20＜Φ≤0.40</td><td>3</td></tr><tr><td>0.40＜Φ≤0.60</td><td>2</td></tr><tr><td>0.60＜Φ</td><td>0</td></tr></table></td><td>Minor</td></tr>
<tr><td>Item No</td><td>Items to be inspected</td><td>Inspection Standard</td><td>Classification of defects</td></tr>
</table>

<table>
<tr>
<td>4.2.3</td>
<td>Dent Spot
Fish eye</td>
<td>
<table>
<tr><td>Zone
Size(mm)</td><td>VA area
Acceptable Qty</td></tr>
<tr><td>Φ≤0.10</td><td>Ignore</td></tr>
<tr><td>0.10＜Φ≤0.20</td><td>3</td></tr>
<tr><td>0.20＜Φ≤0.30</td><td>2</td></tr>
<tr><td>0.30＜Φ</td><td>0</td></tr>
</table>
</td>
<td>Minor</td>
</tr>
<tr>
<td>4.2.4</td>
<td>Line defect</td>
<td>
<table>
<tr><td colspan="2">Zone
Size(mm)</td><td>VA area</td></tr>
<tr><td>L
(Length)</td><td>W
(Width)</td><td>Acceptable Qty</td></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td>Ignore</td></tr>
<tr><td>L≤5.0</td><td>0.03＜W≤0.05</td><td>3</td></tr>
<tr><td>L≤3.0</td><td>0.05＜W≤0.07</td><td>1</td></tr>
<tr><td>/</td><td>0.07＜W</td><td>Define as spot defect</td></tr>
</table>
</td>
<td>Minor</td>
</tr>
</table>

<table>
<tr>
<td>4.2.5</td>
<td>Scratch</td>
<td>If the scratch can be seen after mobile phone cover assembling or in the operating condition, judged as the line defect of 4.2.4.
If the scratch can be seen only in non-operating condition or some special angle, judged as the following table.
<table>
<tr><th colspan="2">Size (mm)</th><th>VA area</th></tr>
<tr><td>L
(Length)</td><td>Acceptable
Qty</td><td>Acceptable
Qty</td></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td>Ignore</td></tr>
<tr><td>5.0＜L≤10.0</td><td>0.03＜W≤0.05</td><td>2</td></tr>
<tr><td>L≤5.0</td><td>0.05＜W≤0.08</td><td>1</td></tr>
<tr><td>/</td><td>W＞0.08</td><td>0</td></tr>
</table>
</td>
<td>Minor</td>
</tr>
</table>

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defect</th></tr>
<tr><td>4.2.6</td><td>Bubble</td><td>
<table>
<tr><td>Zone
Size(mm)</td><td>VA area
Acceptable Qty</td></tr>
<tr><td>Φ≤0.15</td><td>Ignore</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td>2</td></tr>
<tr><td>0.25＜Φ</td><td>0</td></tr>
</table>
</td><td rowspan="3">Minor</td></tr>
<tr><td rowspan="2">4.2.7</td><td rowspan="2">Glass defect</td><td>4.2.7a Chip on corner or surface
 

<table>
<tr><td>L(length)</td><td>W(width)</td><td>Z(thickness）</td></tr>
<tr><td>L≤0.30</td><td>W≤0.20</td><td>T/2</td></tr>
</table>
Notes: T=Lens thickness，Φ≤0.10 ignore
Acceptable Qty：Single edge N≤2，Total N≤4</td></tr>
<tr><td>4.2.7b Cracks
Cracks tend to break are not allowed.
 
</td></tr>
</table>

Item No	Items to be inspected	Inspection Standard	Classification of defect
4.2.8	Parts alignment	1) Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern. 2) Not allow chip or solder component is off center more than 50% of the pad outline.	Minor
4.2.9 view area/ printing area of front surface and view area of rear surface	LOGO Pattern	 **Dot: according to Dot spec.** **Thickness odds:** $\frac{\lvert \text{Spec pattern width} - \text{Print pattern width} \rvert \times 100\%}{\text{Spec pattern width}} \leqslant 30\%$ **Drawing slant:** Print pattern length≤10mm, slant angle ≤3°；10mm＜Print pattern length≤20mm, slant angle ≤1.5°  **Pattern serration:** H≤0.05 mm **Pattern leak print/ error/overprint:** not allowed **Pattern break line:** width ≤0.10 mm **Logo pattern color windage / color thin:** Follow the limit samples.	Minor

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.2.10 view area/printing area of front surface and view area of rear surface	IR hole(A)/ Light sensor hole(B)/ LED hole(C)	 1. A.B.C hole must be according the transmittancy 2. Light leakage on A.B.C hole or follow the limited sample. 3. A.B.C hole (LED) hole only judge by black background， no need to check in the lamb condition.	Minor
	Surface dirty	1. Dirty can not be cleaned follow the dot spec. 2. Accept while the dirty can be cleaned. 3. The quality guarantee period of protective film is 3months, during the period, the spot or contamination is not allowed.	
	Printing area Light leakage	Follow the dot defect spec， MAX，Severity －see light leakage limit sample	
	Ink overflow	Visual inspection 30cm not allowed	
	Color discordant	Obvious color difference in the BM area is not allowed	
	Icon scratch of printing logo area	Icon printing logo area is not allow penetrability scratch	

7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	50℃ for 96 hours
Low Temperature Operation	0℃ for 96 hours
High Temperature Storage	60℃ for 96 hours
Low Temperature Storage	-20℃ 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

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。

9. PACKAGE DRAWING

TBD