



**SPECIFICATION
FOR
LCD Module
PV08004TD31C-C**

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

CUSTOMER	INITIAL	DATE
APPROVED BY		



REVISION STATUS

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



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
9. Package Drawing



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	°C	-
Storage temperature	-20~+60	°C	-

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	-



LCM+CTP

保存期限: 三年

版本号: A/1

表格受控编号:

<p>一. LCM产品特征 (LCM Features):</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>显示类型 (Display mode):</td><td>TFT/Normal BLACK</td></tr> <tr><td>驱动芯片 (Driver IC):</td><td>NT51021B</td></tr> <tr><td>人眼观察角 (Viewing Direction):</td><td>ALL</td></tr> <tr><td>接口类型 (Interface Types):</td><td>MPI</td></tr> <tr><td>背光类型 (Backlight Types):</td><td>2Tpes, 9H3并60mA, 电压为28.8V (TYP)</td></tr> <tr><td>背光亮度 (LCD/CTP Brightness):</td><td>400 cd/m2 Min, 450 cd/m2 TYP</td></tr> <tr><td>LCM/CTP模组 (LCM/CTP Module):</td><td>0.29±0.05, Y=0.30±0.05</td></tr> <tr><td>模组颜色 (Color Contrast):</td><td>75% MIN</td></tr> <tr><td>操作温度 (Operating Temperature):</td><td>-0°C~50°C</td></tr> <tr><td>储存温度 (Storage Temperature):</td><td>-20°C~60°C</td></tr> <tr><td>平面弯曲度 (Plane Warpage Degree):</td><td><0.3MM</td></tr> <tr><td>连接器 (Connector):</td><td>FPC CONN09</td></tr> </table>	显示类型 (Display mode):	TFT/Normal BLACK	驱动芯片 (Driver IC):	NT51021B	人眼观察角 (Viewing Direction):	ALL	接口类型 (Interface Types):	MPI	背光类型 (Backlight Types):	2Tpes, 9H3并60mA, 电压为28.8V (TYP)	背光亮度 (LCD/CTP Brightness):	400 cd/m2 Min, 450 cd/m2 TYP	LCM/CTP模组 (LCM/CTP Module):	0.29±0.05, Y=0.30±0.05	模组颜色 (Color Contrast):	75% MIN	操作温度 (Operating Temperature):	-0°C~50°C	储存温度 (Storage Temperature):	-20°C~60°C	平面弯曲度 (Plane Warpage Degree):	<0.3MM	连接器 (Connector):	FPC CONN09	<p>二. CTP技术要求 (CTP Technical requirements)</p> <p>TP NOTES:</p> <ol style="list-style-type: none"> 结构: GPF, 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) IC: G1928 (8BY)*18XX FPC表面处理: 双面电镀锌 (EMI) Lens玻璃材质: 康宁2920 Lens强化要求: 应力值CS>750MPa, 强化深度DOL≥40UM Lens玻璃表面处理: 防指纹处理 (AF), 摩擦前 水滴角 >100° TP透过率: 86% (min) Lens表面铅笔硬度: 2H (50gf) Lens表面铅笔硬度: 6H (50gf), 35cm高度冲击四角 (四角以VA区及中心五点各一次, 需满足不破裂) *号标注的尺寸为重点尺寸 未注公差: ±0.2 所有材料规格均需符合 Europe RoHS Specifications; FPC弯折技术要求: 要求FPC180°来回折5次无分层, 断裂, 裂痕等现象, 重点验证区域; 支持直径5mm的震动笔 	<p>正视图</p> <p>透明孔 点银浆 点蓝胶 1200 (RGB) 1920 DOTS 8.0 inch FULL VIEW LENS正面需要做AF.</p>	<p>侧视图</p> <p>IR孔保护胶断手位 IR孔保护胶断手位 1.5MAX 0.03MM MIN 240.36 4.0MAX</p>	<p>背视图</p> <p>(fpc弯折) 3.50±0.25 (CTP+OCA+LCM不穿保护膜) 1.13±0.1 (TP不穿保护膜) 0.70±0.05 (LENS表面打点) 0.43±0.05 (SENSOR) 0.175 (OCA) 2.20±0.1 (LCM) 0.30±0.03 (FPC+P焊脚)</p>	<p>FPC弯折示意图</p> <p>FPC弯折示意图 FPC弯折出货</p>	<p>LCM+PIN DESCRIPTION</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th>PIN No.</th><th>SYMBOL</th></tr> <tr><td>1</td><td>LEDA</td></tr> <tr><td>2</td><td>LEDA</td></tr> <tr><td>3</td><td>LEDA</td></tr> <tr><td>4</td><td>NC</td></tr> <tr><td>5</td><td>LEIK</td></tr> <tr><td>6</td><td>LEIK</td></tr> <tr><td>7</td><td>LEIK</td></tr> <tr><td>8</td><td>LEIK</td></tr> <tr><td>9</td><td>GND</td></tr> <tr><td>10</td><td>GND</td></tr> <tr><td>11</td><td>D2P</td></tr> <tr><td>12</td><td>D2P</td></tr> <tr><td>13</td><td>GND</td></tr> <tr><td>14</td><td>DIP</td></tr> <tr><td>15</td><td>DIN</td></tr> <tr><td>16</td><td>GND</td></tr> <tr><td>17</td><td>CLRP</td></tr> <tr><td>18</td><td>CLRP</td></tr> <tr><td>19</td><td>GND</td></tr> <tr><td>20</td><td>DOP</td></tr> <tr><td>21</td><td>DOON</td></tr> <tr><td>22</td><td>GND</td></tr> <tr><td>23</td><td>DSP</td></tr> <tr><td>24</td><td>DSN</td></tr> <tr><td>25</td><td>GND</td></tr> <tr><td>26</td><td>VDDIO</td></tr> <tr><td>27</td><td>RESET</td></tr> <tr><td>28</td><td>GND</td></tr> <tr><td>29</td><td>VDDIO+VB</td></tr> <tr><td>30</td><td>VDD</td></tr> <tr><td>31</td><td>VDD</td></tr> </table>	PIN No.	SYMBOL	1	LEDA	2	LEDA	3	LEDA	4	NC	5	LEIK	6	LEIK	7	LEIK	8	LEIK	9	GND	10	GND	11	D2P	12	D2P	13	GND	14	DIP	15	DIN	16	GND	17	CLRP	18	CLRP	19	GND	20	DOP	21	DOON	22	GND	23	DSP	24	DSN	25	GND	26	VDDIO	27	RESET	28	GND	29	VDDIO+VB	30	VDD	31	VDD
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<p>V4</p>	<p>V3</p>	<p>V2</p>	<p>V1</p>	<p>V0</p>	<p>版本号 (Version)</p>	<p>日期 (Date)</p>	<p>物料编码 (Material Code)</p>	<p>页 数 (Page)</p>	<p>比例 (Proportion)</p>	<p>设计 (DESIGN)</p>	<p>审核 (AUDITING)</p>	<p>批准 (APPROVED)</p>																																																																																		
<p>TITLE: LCM+CTP Kingtech Group Co., Ltd.</p>										<p>PV08004TD31C-C</p>																																																																																				



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°C)

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)

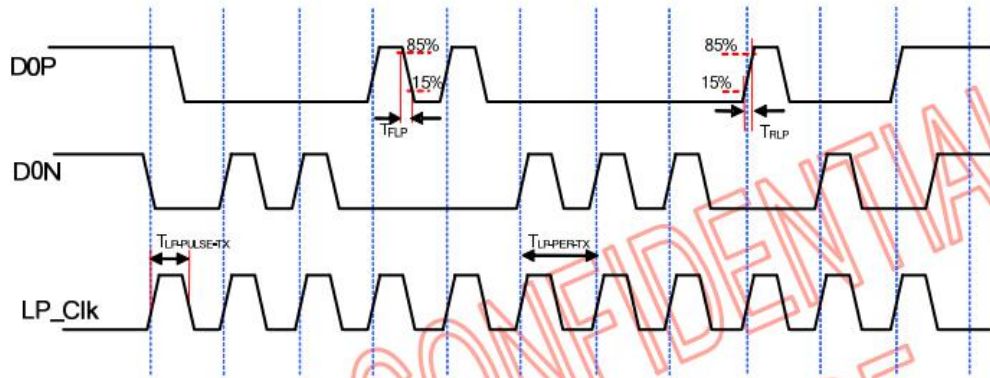
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V _f	-	28.8	-	V	
Forward supply Current	I _f	-	60	-	mA	
LCM Luminance	L _v	400	450	-	cd/m ²	I _B =60mA
Uniformity	/	75			%	-



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



$LP_Clk = EXOR(D0P, D0N)$

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}

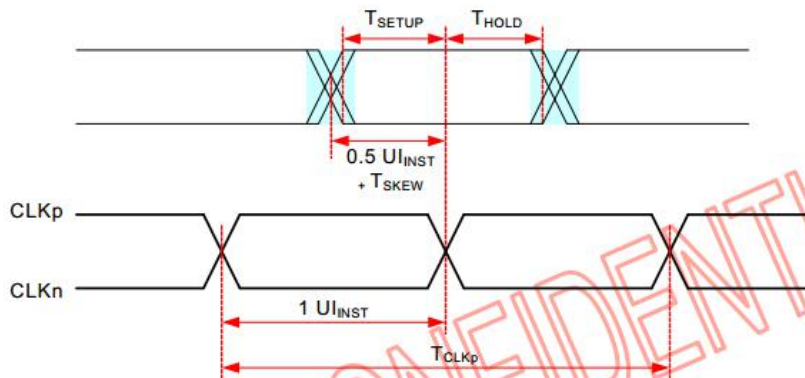


Figure 26. Data to Clock Timing Definitions



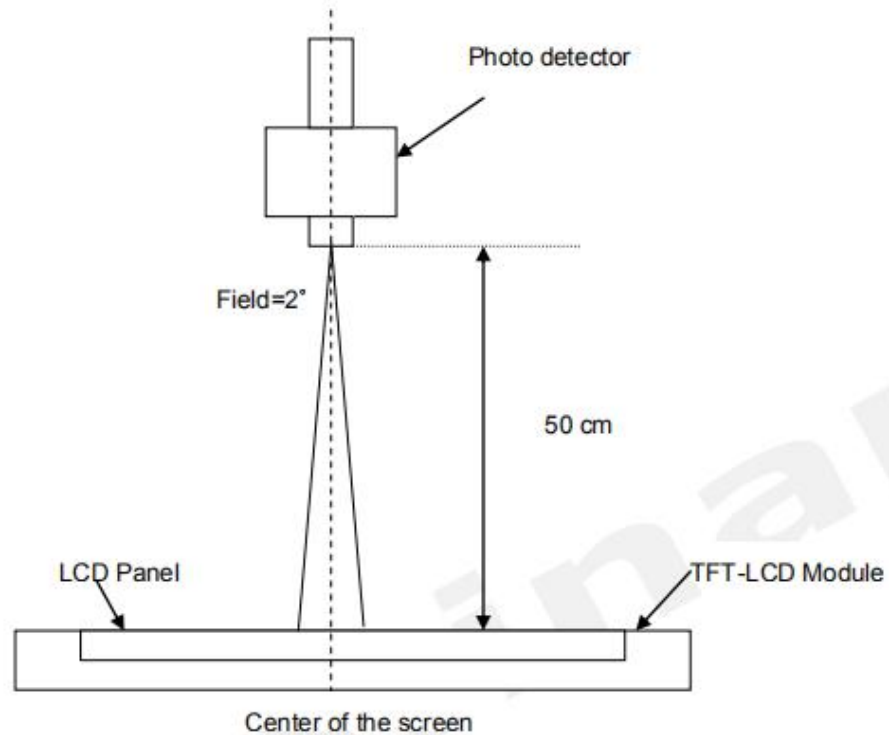
5. OPTICAL CHARACTERISTICS

(LCD MONOMER PARAMETERS)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Viewing Angle	θ_R	Horizontal (Right) CR = 10 (Left)	80	85	-	degree	1, 6
	θ_L		80	85	-		
	ψ_H	Vertical (Upper) CR = 10 (Lower)	80	85	-		
	ψ_L		80	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 Coordinates	Red	Rx	0.600	0.630	0.660	CIE 1931	
		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.

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



Note 4 : Definition of Cross Talk (CT)

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

Where

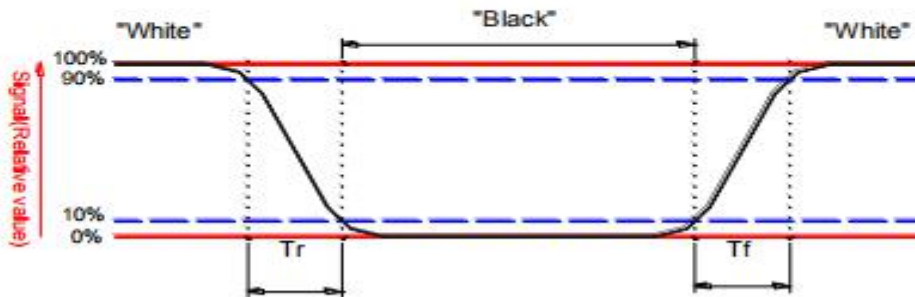
Y_A = Luminance of measured location without gray level 0 pattern (cd/m²)

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



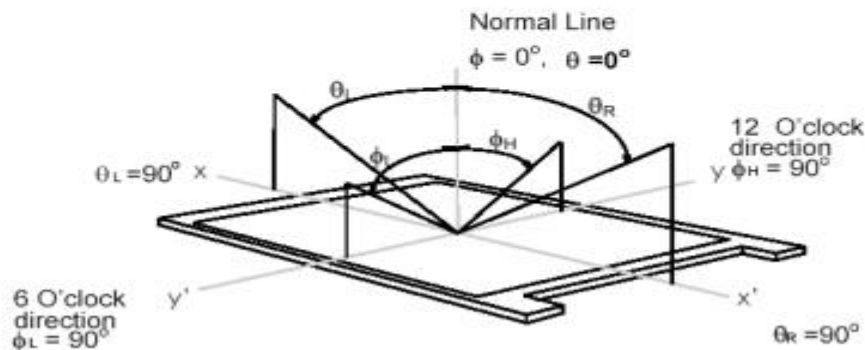
Note 5: Definition of response time:

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

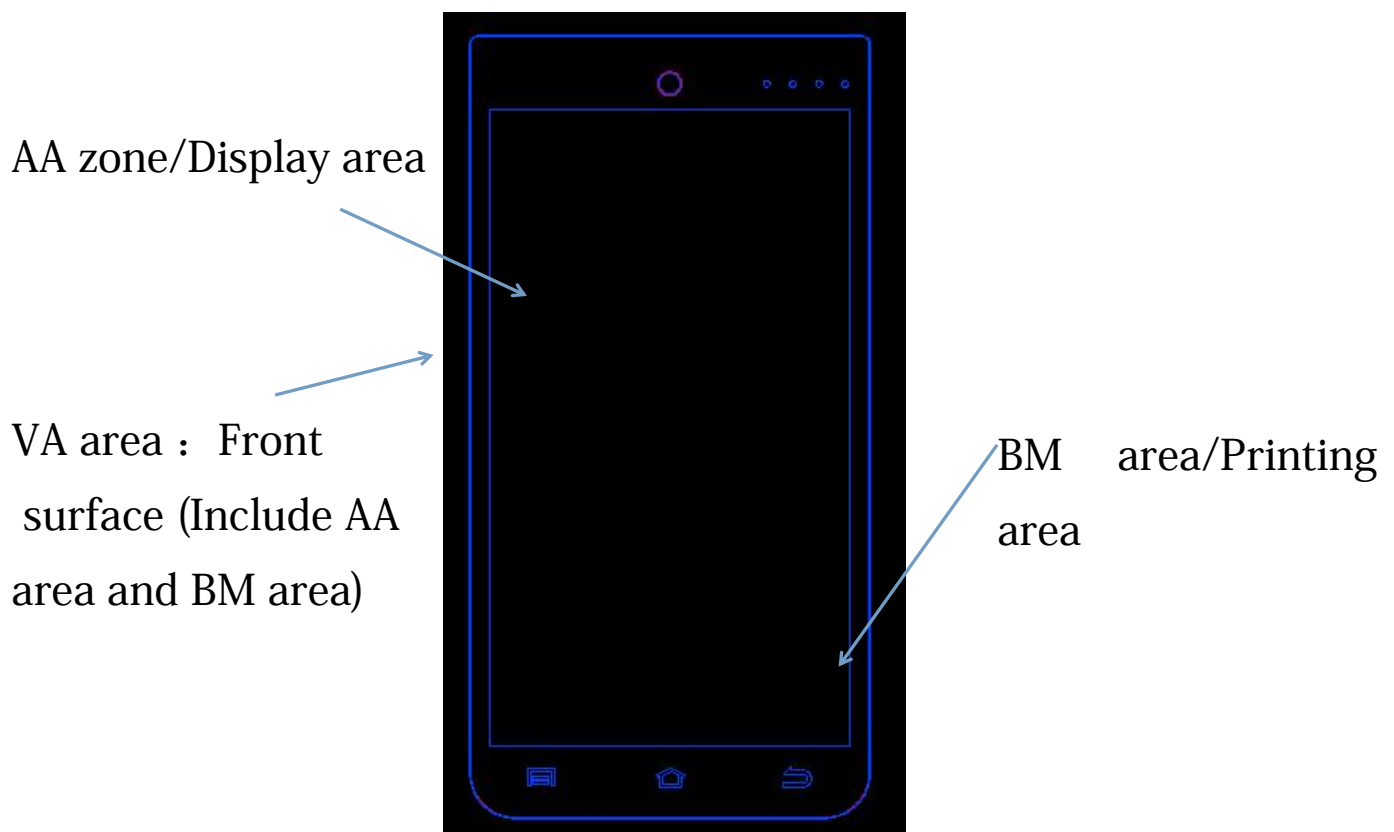
1. Inspection condition

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: Character/Display area

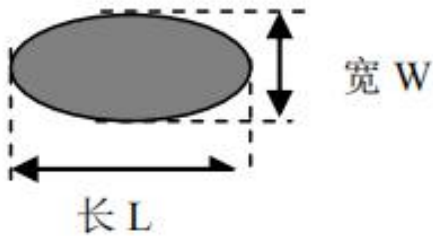
BM zone: Printing area

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

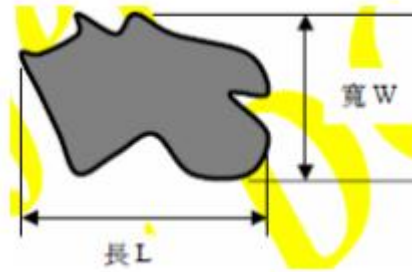


3. Defect definition

3.1 Circular defect

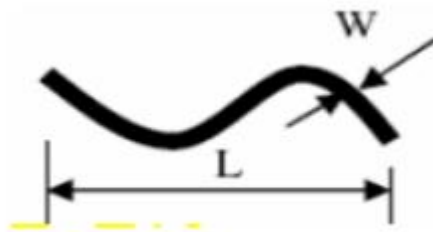


Diameter $\Phi = 1/2(L+W)$

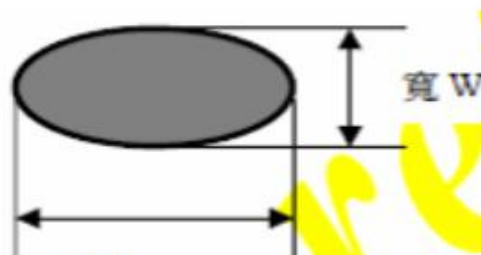
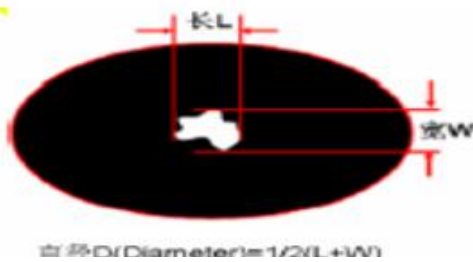


Diameter $\Phi = 1/2(L+W)$

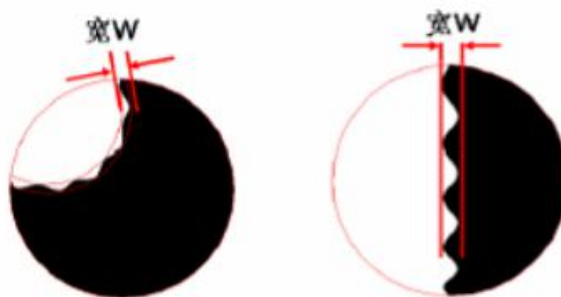
3.2 Linear defect



3.3 Pin hole



3.4 Zigzag





4. Inspection standards

4.1 Major defect

-Item -No	Items to be inspected	Inspection Standard	Classificatio n 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	Classificatio n of defects



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

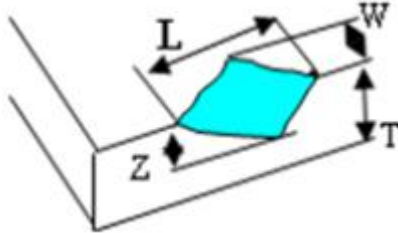



4.2.3	Dent Spot Fish eye	Zone		VA area	Minor
		Size(mm)		Acceptable Qty	
		$\Phi \leq 0.10$		Ignore	
		$0.10 < \Phi \leq 0.20$		3	
		$0.20 < \Phi \leq 0.30$		2	
		$0.30 < \Phi$		0	
4.2.4	Line defect	Zone		VA area	Minor
		Size(mm)		Acceptable Qty	
		L (Length)	W (Width)	Acceptable Qty	
		Ignore	$W \leq 0.03$	Ignore	
		$L \leq 5.0$	$0.03 < W \leq 0.05$	3	
		$L \leq 3.0$	$0.05 < W \leq 0.07$	1	
/	$0.07 < W$	Define as spot defect			





4.2.5	Scratch	<p>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.</p> <p>If the scratch can be seen only in non-operating condition or some special angle, judged as the following table.</p>		Minor																		
		<table border="1"> <thead> <tr> <th colspan="2">Size (mm)</th> <th>VA area</th> </tr> </thead> <tbody> <tr> <td>L (Length)</td> <td>Acceptable Qty</td> <td>Acceptable Qty</td> </tr> <tr> <td>Ignore</td> <td>$W \leq 0.03$</td> <td>Ignore</td> </tr> <tr> <td>$5.0 < L \leq 10.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>2</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.08$</td> <td>1</td> </tr> <tr> <td>/</td> <td>$W > 0.08$</td> <td>0</td> </tr> </tbody> </table>			Size (mm)		VA area	L (Length)	Acceptable Qty	Acceptable Qty	Ignore	$W \leq 0.03$	Ignore	$5.0 < L \leq 10.0$	$0.03 < W \leq 0.05$	2	$L \leq 5.0$	$0.05 < W \leq 0.08$	1	/	$W > 0.08$	0
		Size (mm)			VA area																	
		L (Length)	Acceptable Qty		Acceptable Qty																	
		Ignore	$W \leq 0.03$		Ignore																	
		$5.0 < L \leq 10.0$	$0.03 < W \leq 0.05$		2																	
		$L \leq 5.0$	$0.05 < W \leq 0.08$		1																	
		/	$W > 0.08$		0																	




Item No	Items to be inspected	Inspection Standard	Classification of defect															
4.2.6	Bubble	<table border="1"> <thead> <tr> <th data-bbox="491 454 852 622">Zone Size(mm)</th> <th colspan="2" data-bbox="855 454 1212 524">VA area</th> </tr> <tr> <td data-bbox="491 627 852 683">$\Phi \leq 0.15$</td> <td colspan="2" data-bbox="855 528 1212 622">Acceptable Qty</td> </tr> <tr> <td data-bbox="491 687 852 743">$0.15 < \Phi \leq 0.25$</td> <td colspan="2" data-bbox="855 627 1212 683">Ignore</td> </tr> <tr> <td data-bbox="491 748 852 801">$0.25 < \Phi$</td> <td colspan="2" data-bbox="855 687 1212 743">2</td> </tr> <tr> <td></td> <td colspan="2" data-bbox="855 748 1212 801">0</td> </tr> </thead> </table>	Zone Size(mm)	VA area		$\Phi \leq 0.15$	Acceptable Qty		$0.15 < \Phi \leq 0.25$	Ignore		$0.25 < \Phi$	2			0		
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	0																	
4.2.7	Glass defect	<p data-bbox="491 853 963 891">4.2.7a Chip on corner or surface</p>  <table border="1" data-bbox="491 1256 1209 1413"> <thead> <tr> <th data-bbox="491 1256 730 1335">L(length)</th> <th data-bbox="734 1256 970 1335">W(width)</th> <th data-bbox="973 1256 1209 1335">Z(thickness)</th> </tr> </thead> <tbody> <tr> <td data-bbox="491 1339 730 1413">$L \leq 0.30$</td> <td data-bbox="734 1339 970 1413">$W \leq 0.20$</td> <td data-bbox="973 1339 1209 1413">T/2</td> </tr> </tbody> </table> <p data-bbox="491 1503 1185 1597">Notes: T=Lens thickness, $\Phi \leq 0.10$ ignore Acceptable Qty: Single edge $N \leq 2$, Total $N \leq 4$</p> <p data-bbox="491 1686 692 1724">4.2.7b Cracks</p> <p data-bbox="533 1742 1078 1780">Cracks tend to break are not allowed.</p> 	L(length)	W(width)	Z(thickness)	$L \leq 0.30$	$W \leq 0.20$	T/2	Minor									
L(length)	W(width)	Z(thickness)																
$L \leq 0.30$	$W \leq 0.20$	T/2																



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	 <p>Dot: according to Dot spec. Thickness odds:</p> $\frac{ \text{Spec pattern width} - \text{Print pattern width} \times 100\%}{\text{Spec pattern width}} \leq 30\%$ <p>Drawing slant:</p> <p>Print pattern length $\leq 10\text{mm}$, slant angle $\leq 3^\circ$; $10\text{mm} < \text{Print pattern length} \leq 20\text{mm}$, slant angle $\leq 1.5^\circ$</p>  <p>Pattern serration: $H \leq 0.05 \text{ mm}$</p> <p>Pattern leak print/ error/overprint: not allowed</p> <p>Pattern break line: width $\leq 0.10 \text{ mm}$</p> <p>Logo pattern color windage / color thin: Follow the limit samples.</p>	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)	 <ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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°C for 96 hours
Low Temperature Operation	0°C for 96 hours
High Temperature Storage	60°C for 96 hours
Low Temperature Storage	-20°C for 96 hours
High Temperature Operation Humidity Operation	60°C, 90%RH for 72 hours
Thermal Shock	-10°C (30min) ~+25°C (5min)~ +60°C (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 crystal 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 $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (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 ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning 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 standard, Kingtech will rework or exchange for functional defect goods since within one year.



9. PACKAGE DRAWING

TBD