



**SPECIFICATION  
FOR  
LCD Module  
PV08004TD31C-C**

<b>KINGTECH</b>	<b>INITIAL</b>	<b>DATE</b>
<b>PREPARED BY</b>		<b>20190823</b>
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<b>CUSTOMER</b>	<b>INITIAL</b>	<b>DATE</b>
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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	°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	-



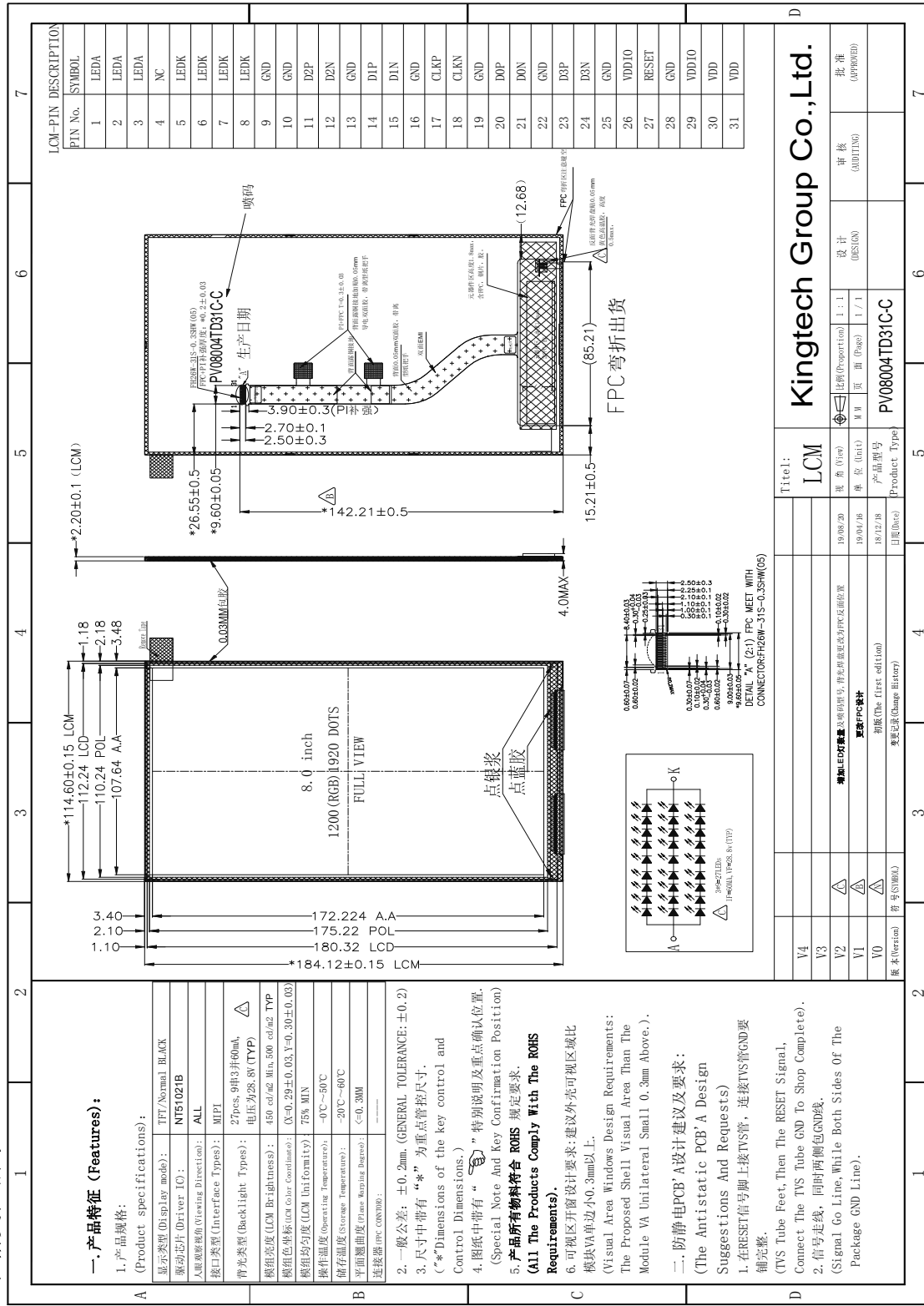
## 2. Mechanical Specification

LCM

表格受控编号: \_\_\_\_\_

版本号: A/1

保质期: 二年



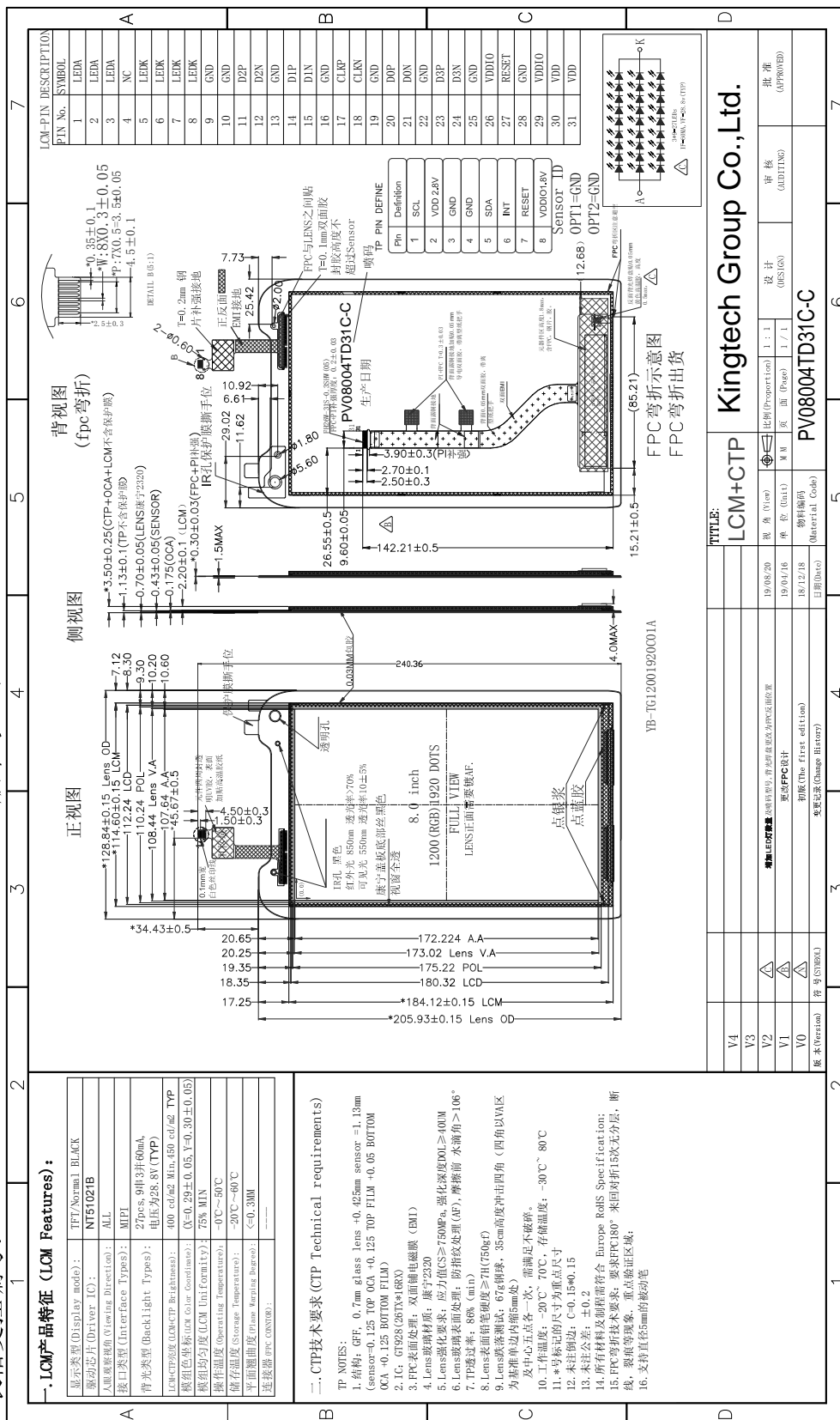


## LCM+CTP

保存期限: 三年

版本号: A/1

表格受控编号:





### 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 <sub>f</sub>	-	28.8	-	V	
Forward supply Current	I <sub>f</sub>	-	60	-	mA	
LCM Luminance	L <sub>v</sub>	400	450	-	cd/m <sup>2</sup>	I <sub>B</sub> =60mA
Uniformity	/	75			%	-

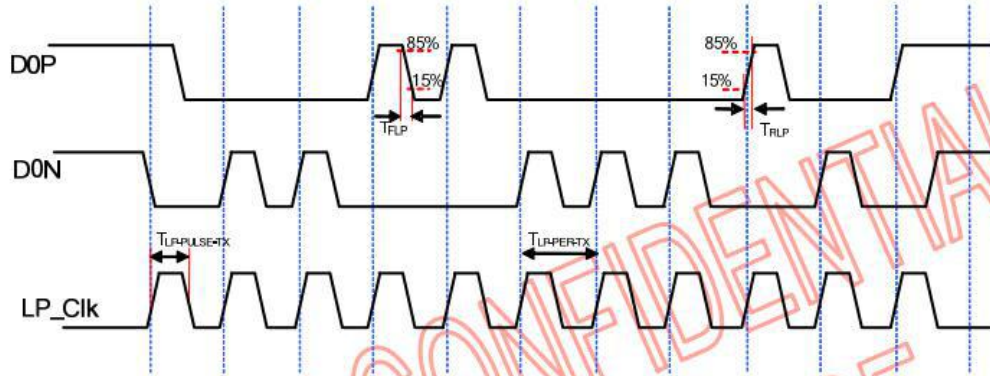




### 4.3 TIMING CHARACTERISTICS

(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

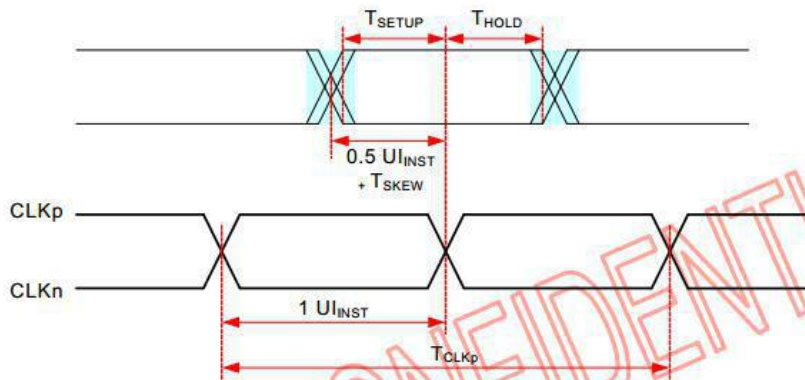


$LP\_Clk = EXOR(D0P, D0N)$

**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**



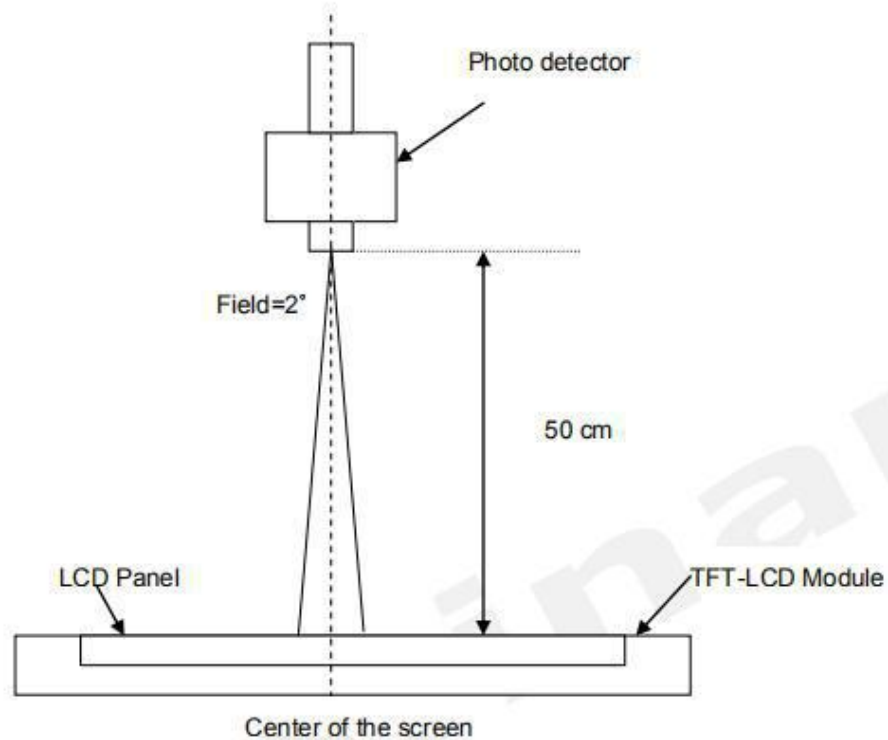
## 5. OPTICAL CHARACTERISTICS

### (LCD MONOMER PARAMETERS)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Viewing Angle	$\theta_R$	Horizontal (Right) CR = 10 (Left)	80	85	-	degree	1, 6
	$\theta_L$		80	85	-		
	$\psi_H$	Vertical (Upper) CR = 10 (Lower)	80	85	-		
	$\psi_L$		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

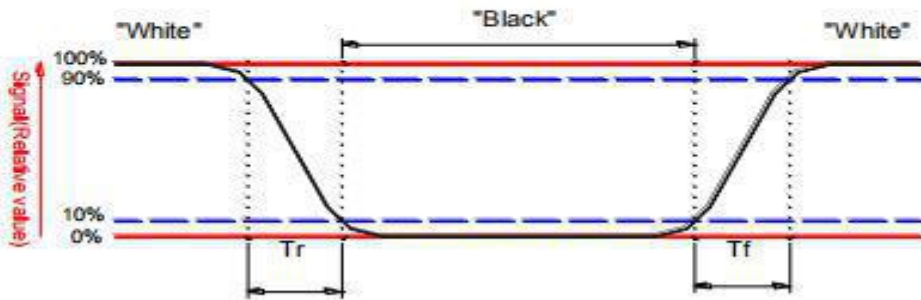
$Y_A$  = Luminance of measured location without gray level 0 pattern (cd/m<sup>2</sup>)

$Y_B$  = Luminance of measured location with gray level 0 pattern (cd/m<sup>2</sup>)



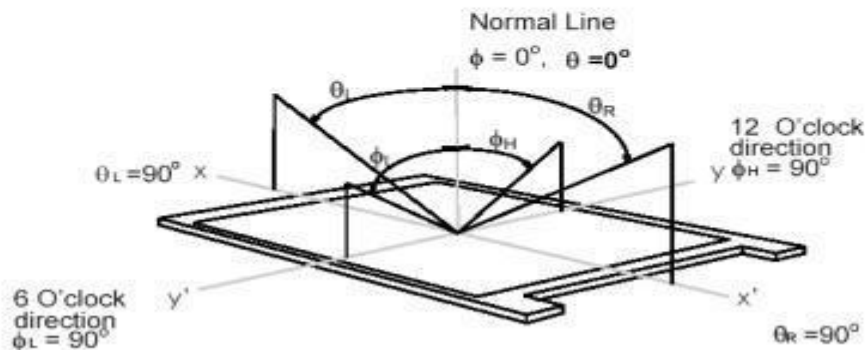
**Note 5: Definition of response time:**

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  $\geq 10$ , 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° ( $\theta$ ) horizontal left and right and 90° ( $\Phi$ ) 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

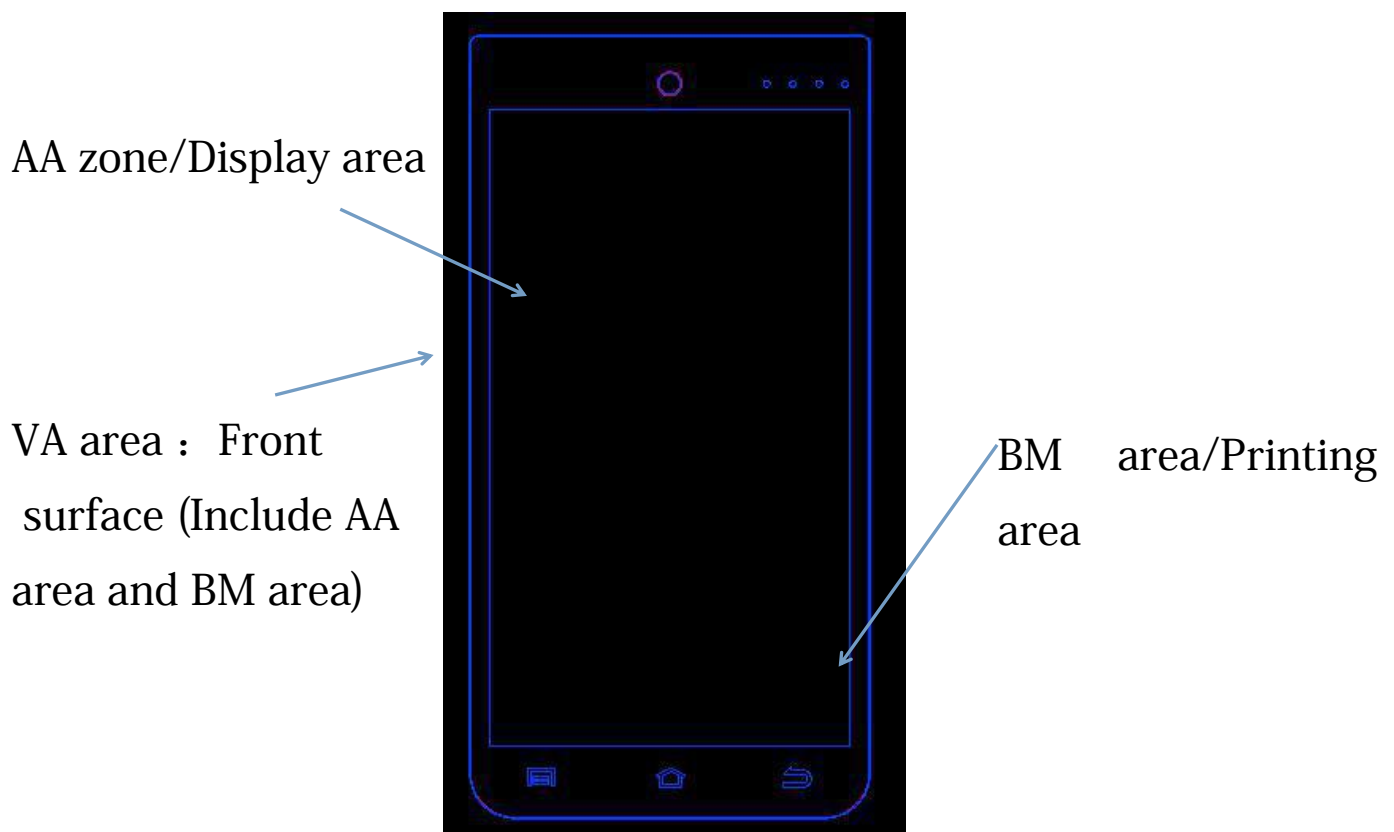
### 1. Inspection condition

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

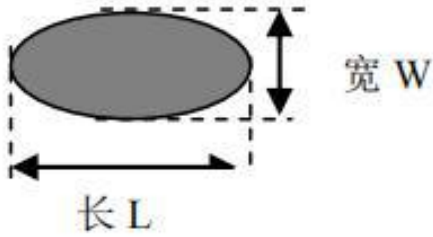
BM zone: Printing area

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

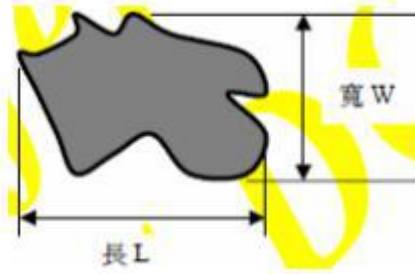


### 3. Defect definition

#### 3.1 Circular defect

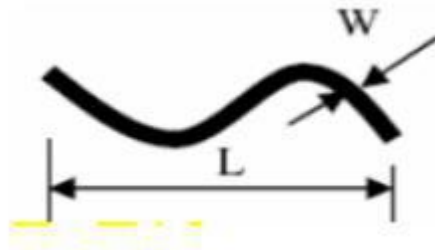


Diameter  $\Phi = 1/2(L+W)$

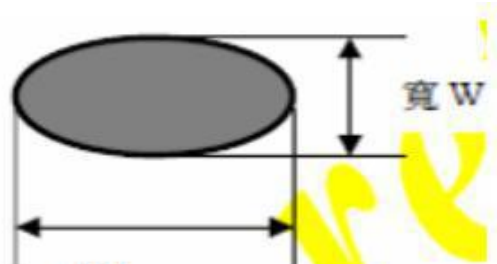
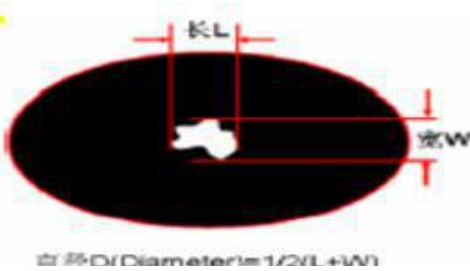


Diameter  $\Phi = 1/2(L+W)$

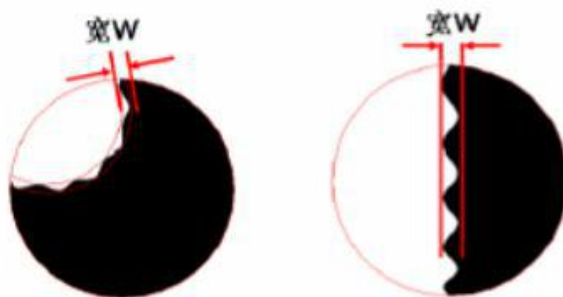
#### 3.2 Linear defect



#### 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



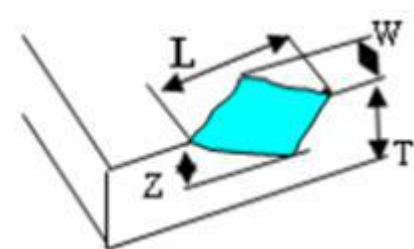



4.2.3	Dent Spot Fish eye	Zone		VA area		Minor	
		Size(mm)		Acceptable Qty			
		$\Phi \leq 0.10$		Ignore			
		$0.10 < \Phi \leq 0.20$		3			
		$0.20 < \Phi \leq 0.30$		2			
		$0.30 < \Phi$		0			
4.2.4	Line defect	Zone			VA area		Minor
		Size(mm)			Acceptable Qty		
		L ( Length )	W ( Width )		Acceptable 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><math>W \leq 0.03</math></td> <td>Ignore</td> </tr> <tr> <td><math>5.0 &lt; L \leq 10.0</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td>2</td> </tr> <tr> <td><math>L \leq 5.0</math></td> <td><math>0.05 &lt; W \leq 0.08</math></td> <td>1</td> </tr> <tr> <td>/</td> <td><math>W &gt; 0.08</math></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="478 448 845 526">Zone</th> <th data-bbox="845 448 1228 526">VA area</th> </tr> <tr> <th data-bbox="478 526 845 616">Size(mm)</th> <th data-bbox="845 526 1228 616">Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td data-bbox="478 616 845 683"><math>\Phi \leq 0.15</math></td> <td data-bbox="845 616 1228 683">Ignore</td> </tr> <tr> <td data-bbox="478 683 845 739"><math>0.15 &lt; \Phi \leq 0.25</math></td> <td data-bbox="845 683 1228 739">2</td> </tr> <tr> <td data-bbox="478 739 845 801"><math>0.25 &lt; \Phi</math></td> <td data-bbox="845 739 1228 801">0</td> </tr> </tbody> </table>	Zone	VA area	Size(mm)	Acceptable Qty	$\Phi \leq 0.15$	Ignore	$0.15 < \Phi \leq 0.25$	2	$0.25 < \Phi$	0	
Zone	VA area												
Size(mm)	Acceptable Qty												
$\Phi \leq 0.15$	Ignore												
$0.15 < \Phi \leq 0.25$	2												
$0.25 < \Phi$	0												
4.2.7	Glass defect	<p>4.2.7a Chip on corner or surface</p>  <table border="1"> <thead> <tr> <th data-bbox="478 1254 718 1332">L(length)</th> <th data-bbox="718 1254 957 1332">W(width)</th> <th data-bbox="957 1254 1228 1332">Z(thickness)</th> </tr> </thead> <tbody> <tr> <td data-bbox="478 1332 718 1411"><math>L \leq 0.30</math></td> <td data-bbox="718 1332 957 1411"><math>W \leq 0.20</math></td> <td data-bbox="957 1332 1228 1411">T/2</td> </tr> </tbody> </table> <p>Notes: T=Lens thickness, <math>\Phi \leq 0.10</math> ignore                      Acceptable Qty: Single edge <math>N \leq 2</math>, Total <math>N \leq 4</math></p> <p>4.2.7b Cracks</p> <p>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><b>Dot: according to Dot spec.</b>  <b>Thickness odds:</b></p> $\frac{ \text{Spec pattern width} - \text{Print pattern width}  \times 100\%}{\text{Spec pattern width}} \leq 30\%$ <p><b>Drawing slant:</b></p> <p>Print pattern length <math>\leq 10\text{mm}</math>, slant angle <math>\leq 3^\circ</math> ;  <math>10\text{mm} &lt; \text{Print pattern length} \leq 20\text{mm}</math>, slant angle <math>\leq 1.5^\circ</math></p>  <p><b>Pattern serration:</b> <math>H \leq 0.05 \text{ mm}</math></p> <p><b>Pattern leak print/ error/overprint:</b> not allowed</p> <p><b>Pattern break line:</b> width <math>\leq 0.10 \text{ mm}</math></p> <p><b>Logo pattern color windage / color thin:</b> 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"> <li>1. A.B.C hole must be according the transmittancy</li> <li>2. Light leakage on A.B.C hole or follow the limited sample.</li> <li>3. A.B.C hole (LED) hole only judge by black background , no need to check in the lamb condition.</li> </ol>	Minor
	Surface dirty	<ol style="list-style-type: none"> <li>1. Dirty can not be cleaned follow the dot spec.</li> <li>2. Accept while the dirty can be cleaned.</li> <li>3. The quality guarantee period of protective film is 3months, during the period, the spot or contamination is not allowed.</li> </ol>	
	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