



**SPECIFICATION
FOR
LCD Module
PV012306T0260H-CO**

MODULE:	PV012306T0260H-CO
CUSTOMER:	
LCD:	
IC:	

	INITIAL	DATE
PREPARED BY	杨荣武	2023.2.21
CHECKED BY	陈志文	2023.2.21
APPROVED BY	罗教平	2023.2.21

CUSTOMER	INITIAL	DATE
APPROVED BY		



REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2023.2.21	-	First Issued.	



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1. General Description

* **DESCRIPTION**

PV012306T0260H-CO 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 12.3" TFT-LCD contains 1920*720 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: LVDS

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	292.03(H) *109.51(V) (12.3 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1920(RGB) *720	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1521(H) *0.1521(V)	mm	-
Viewing angle	ALL	o'clock	-
Drive IC	RM5366B	-	-
Display mode	Transmissive/ Normally White	-	-
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	312.3	-	mm	±0.15
	Vertical(V)	-	139.70	-	mm	±0.15
	Depth(D)	-	4.23	-	mm	±0.3
Weight		-	TBD	-	g	-

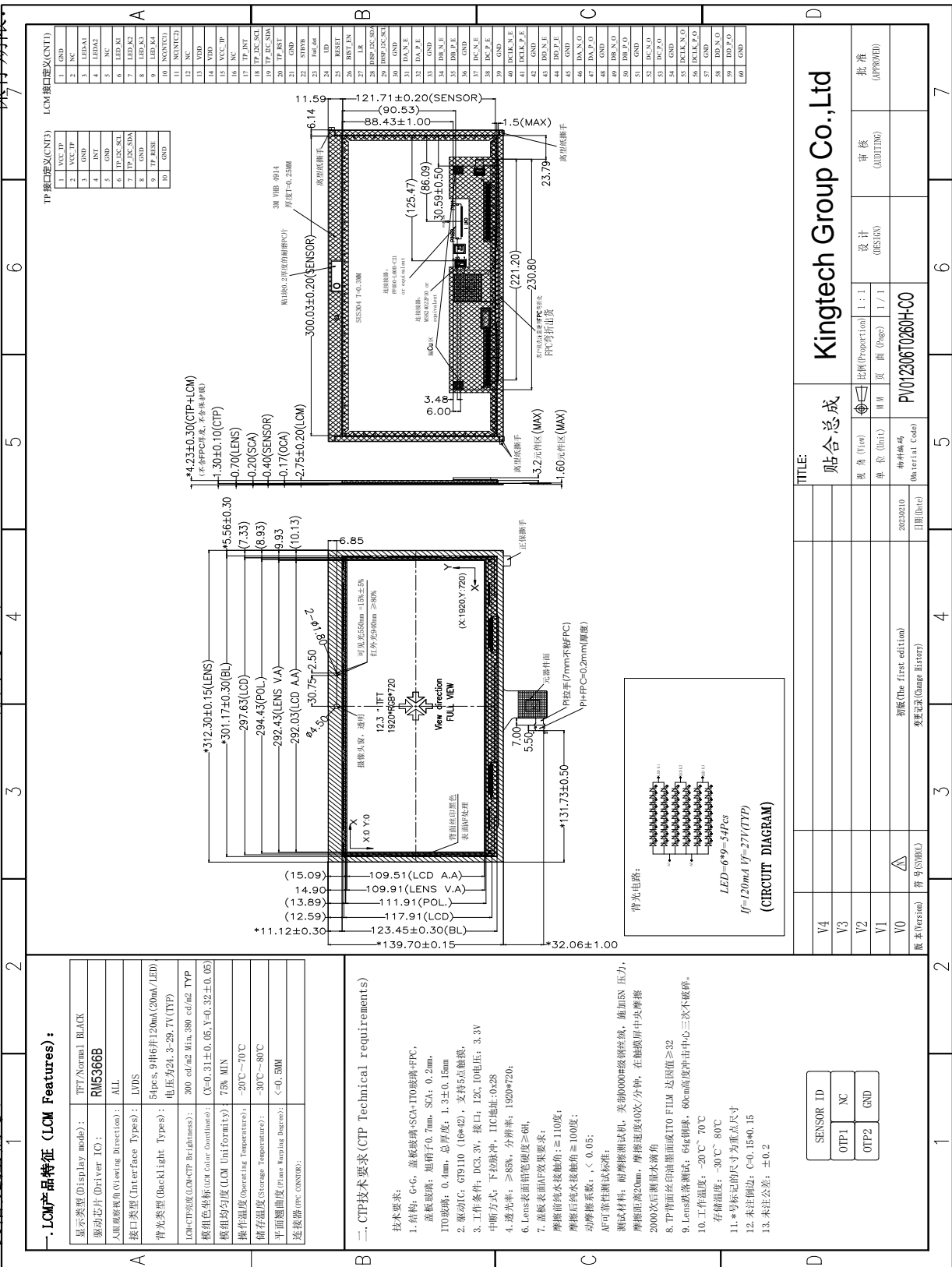


2. Mechanical Specification

保存期限:

版本号: A/1

表格受控编号:





3. PIN DESCRIPTION

Terminal	Symbol	Functions
Pin No.	Symbol	Description
1	GND	GROUND
2	NC	NC
3	LED_A1	LED Anode1
4	LED_A2	LED Anode2
5	NC	NC
6	LED_K1	LED Cathode 1
7	LED_K2	LED Cathode 2
8	LED_K3	LED Cathode 3
9	LED_K4	LED Cathode 4
10	NC(NTC1)	NC(NTC1)
11	NC(NTC2)	NC(NTC2)
12	NC	Reserved for BOE use only
13	VDD	LCD Power Supply, Min. 3.0V/Typ. 3.3V/Max. 3.6V
14	VDD	LCD Power Supply, Min. 3.0V/Typ. 3.3V/Max. 3.6V
15	VCC_TP	Power Supply For Touch
16	NC	NC
17	TP_INT	Interrupt Signal for Touch
18	TP_I2C_SCL	Touch I2C CLOCK
19	TP_I2C_SDA	Touch I2C DATA
20	TP_RST	TP External reset single
21	GND	GROUND
22	STBYB	Standby mode , Default H
23	Fail_det	Fail detect function output pin , Default H
24	UD	UP= H(Default), U2D sequence UP= L, D2U sequence
25	RESET	LCD reset , Default H
26	BIST_EN	Enable BIST function, GND for Normal , Default L
27	LR	LR= 0, shift left LR= 1(Default), shift right
28	DISP_I2C_SDA	Display I2C DATA
29	DISP_I2C_SCL	Display I2C CLOCK
30	GND	GROUND
31	DA_N_E	Negative Transmission data of Pixel 0 (EVEN)
32	DA_P_E	Positive Transmission data of Pixel 0 (EVEN)



33	GND	GROUND
34	DB_N_E	Negative Transmission data of Pixel 1 (EVEN)
35	DB_P_E	Positive Transmission data of Pixel 1 (EVEN)
36	GND	GROUND
37	DC_N_E	Negative Transmission data of Pixel 2 (EVEN)
38	DC_P_E	Positive Transmission data of Pixel 2 (EVEN)
39	GND	GROUND
40	DCLK_N_E	Negative Transmission Clock (EVEN)
41	DCLK_P_E	Positive Transmission Clock (EVEN)
42	GND	GROUND
43	DD_N_E	Negative Transmission data of Pixel 3 (EVEN)
44	DD_P_E	Positive Transmission data of Pixel 3 (EVEN)
45	GND	GROUND
46	DA_N_O	Negative Transmission data of Pixel 0 (ODD)
47	DA_P_O	Positive Transmission data of Pixel 0 (ODD)
48	GND	GROUND
49	DB_N_O	Negative Transmission data of Pixel 1 (ODD)
50	DB_P_O	Positive Transmission data of Pixel 1 (ODD)
51	GND	GROUND
52	DC_N_O	Negative Transmission data of Pixel 2 (ODD)
53	DC_P_O	Positive Transmission data of Pixel 2 (ODD)
54	GND	GROUND
55	DCLK_N_O	Negative Transmission Clock (ODD)
56	DCLK_P_O	Positive Transmission Clock (ODD)
57	GND	GROUND
58	DD_N_O	Negative Transmission data of Pixel 3 (ODD)
59	DD_P_O	Positive Transmission data of Pixel 3 (ODD)
60	GND	GROUND



4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	VDD	3.0	3.6	V	
Supply Voltage for analog circuit	AVDD	-	-	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	3	3.3	3.6	V	
Analog Supply Voltage	AVDD	-	-	-	V	
Common Voltage	VCOM	-	-	-	V	
TFT Gate ON Voltage	VGH	-	-	-	V	
TFT Gate OFF Voltage	VGL	-	-	-	V	

4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V _f	24.3	-	29.7	V	
Forward supply Current	I _f	-	120	-	mA	
LCM Luminance	L _v	300	380	-	cd/m ²	I _B =120mA
Uniformity	/	75			%	-



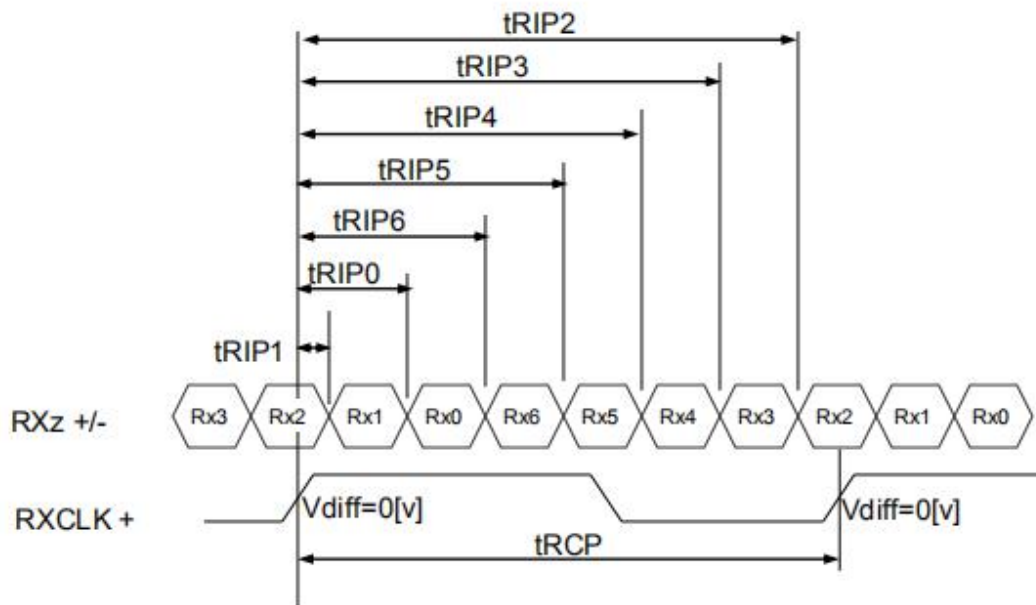
4.3 TIMING CHARACTERISTICS
LVDS INTERFACE AC CHARACTERISTICS

4.5 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 8.

<Table 8. LVDS Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCP	10	T	40	nsec	
Receiver Data Input Margin	tRMG	TBD	-	TBD	nsec	fCLKIN=MHz
		TBD	-	TBD	nsec	fCLKIN=MHz
Input Data 0	tRIP1	- tRMG	0.0	tRMG	Clock	
Input Data 1	tRIP0	T/7- tRMG	T/7	T/7+ tRMG	Clock	
Input Data 2	tRIP6	2 T/7- tRMG	2T/7	2T/7+ tRMG	Clock	
Input Data 3	tRIP5	3T/7- tRMG	3T/7	3T/7+ tRMG	Clock	
Input Data 4	tRIP4	4T/7- tRMG	4T/7	4T/7+ tRMG	Clock	
Input Data 5	tRIP3	5T/7- tRMG	5T/7	5T/7+ tRMG	Clock	
Input Data 6	tRIP2	6T/7- tRMG	6T/7	6T/7+ tRMG	Clock	



* Vdiff = (RXz+)-(RXz-),..... ,(RXCLK+)-(RXCLK-)

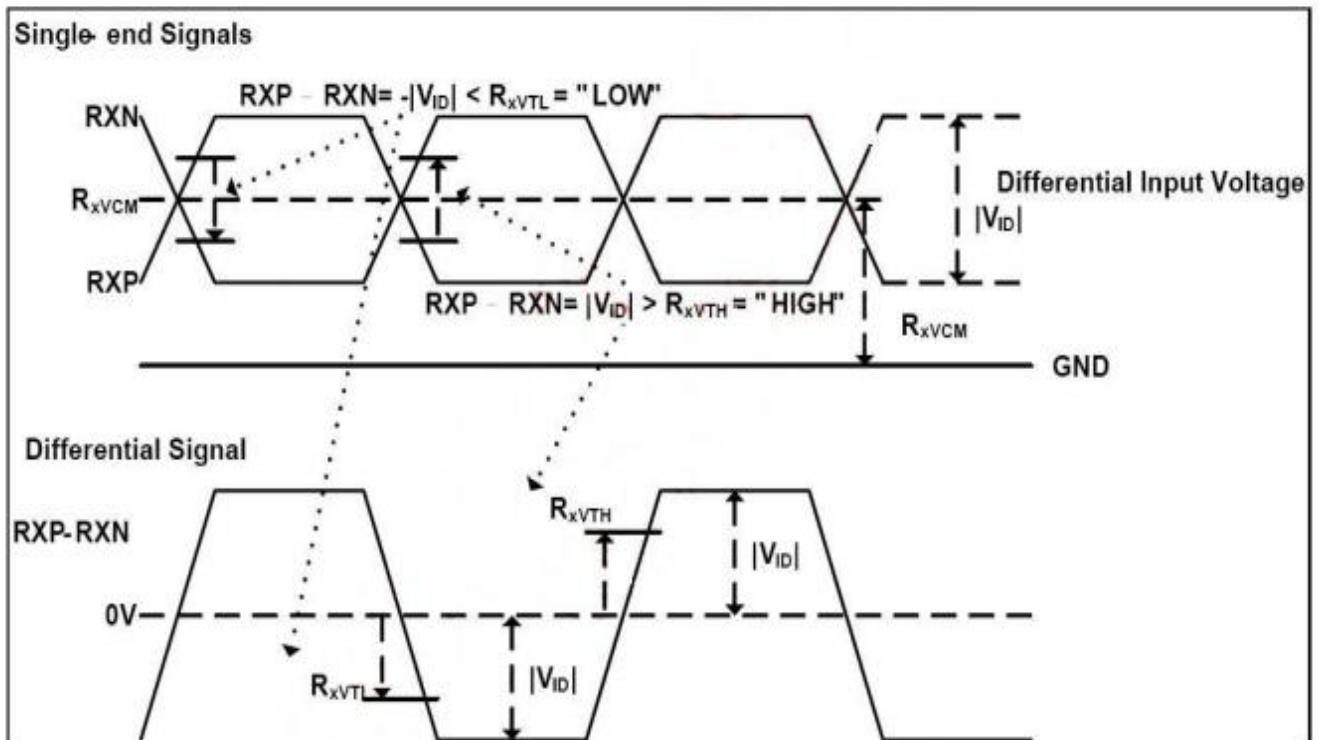


4.6 DC Specification

- LVDS Receiver Differential Input (DC Characteristics)

< Table 9-1. LVDS Rx DC Characteristics >

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Differential Input High Threshold Voltage	V_{TH}	-	-	+100	mV	VCM=1.2V
Differential Input Low Threshold Voltage	V_{TL}	-100	-	-	mV	
Differential Input Common Mode Voltage	VCM	0.7	1.2	1.6	V	
Differential Input Voltage	$ V_{ID} $	100	-	600	mV	



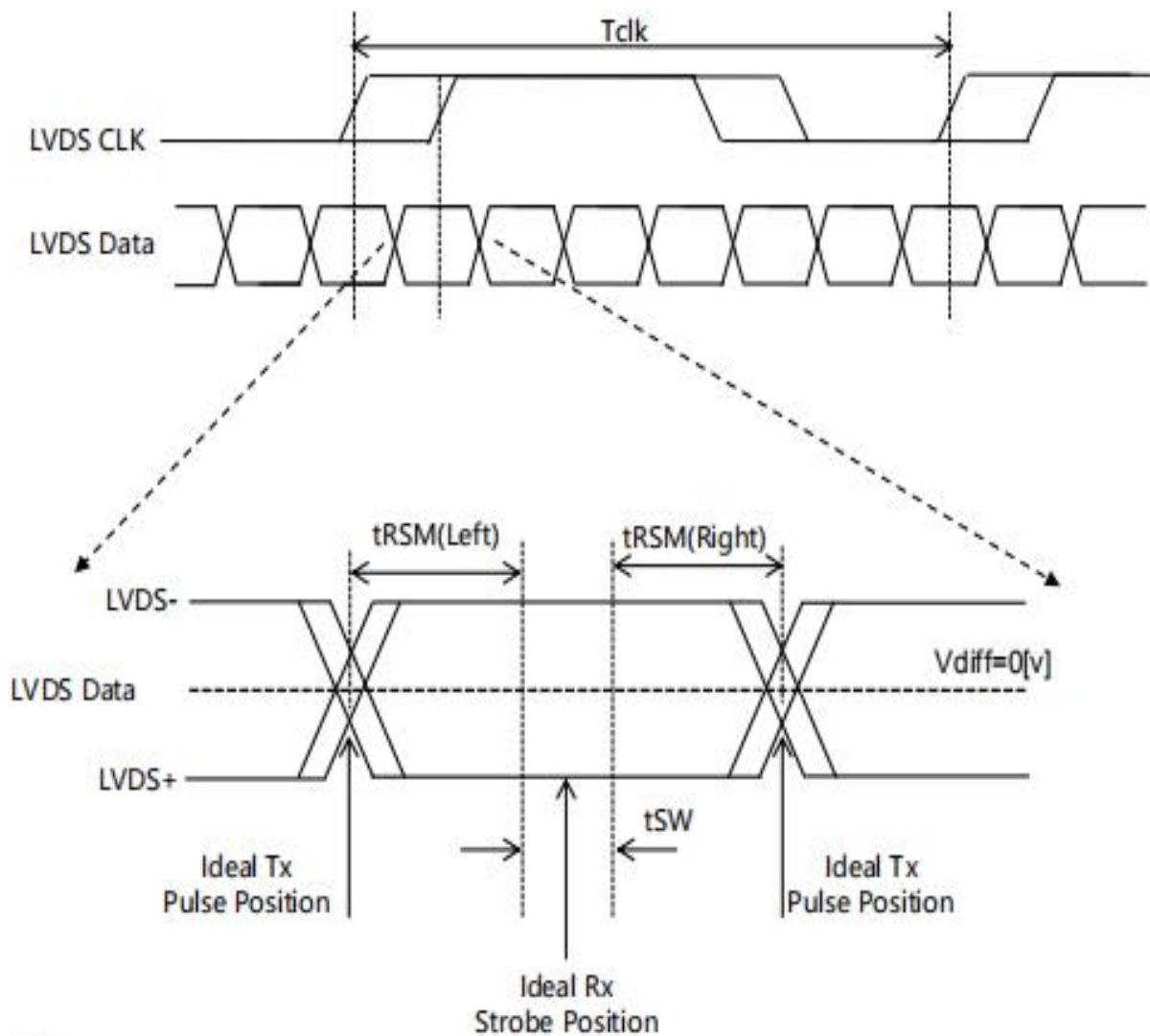


4.7 AC Specification

- LVDS Receiver Differential Input (AC Characteristics)

< Table 9-2. LVDS Rx AC Characteristics >

Parameter	Symbol	Min	Typ	Max	Unit	Notes
LVDS Strobe Width	t_{SW}	TBD	-	-	ps	V _{cm} =1.2V VID = 400mV @65MHz
LVDS Receiver Skew Margin	t_{RSM}	TBD	-	-	ps	



Note:

RSM: Receiver Skew Margin

SW: Strobe Width (Setup and Hold time; TCON Internal data sampling window)



5. OPTICAL CHARACTERISTICS

(LCD MONOMER PARAMETERS)

7.1 Overview

The test of view angle range shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25\pm 2^\circ\text{C}$) with the equipment of Luminance meter system (TOPCON CS2000/CA310) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and ϕ equal to 0° . We refer to $\theta=0$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta=90$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta=180$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta=270$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or ϕ , the center of the measuring spot on the Display surface shall stay fixed. The luminance, color and uniformity (etc) should be tested by CS2000/CA310. The backlight should be operating for 10 minutes prior to measurement. VDD shall be $3.3 \pm 0.3\text{V}$ at 25°C . Optimum viewing angle direction is 6 o'clock

<Table 9. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	θ_3	CR > 10	80	89	-	Deg.	Note 1
		θ_9		80	89	-	Deg.	
	Vertical	θ_{12}		80	89	-	Deg.	
		θ_6		80	89	-	Deg.	
Luminance Contrast ratio		CR	$\theta = 0^\circ$	900	1200	-		Note 2
Brightness Center		Lv	$\theta = 0^\circ$	320	400	-	cd/m ²	Note 3
White Luminance uniformity (9点)		ΔY		75	-	-	%	Note 4
Color Gamut	NTSC	CIE1931	$\theta = 0^\circ$	67	72	-	%	Note 7
Reproduction of color	White	Wx	$\theta = 0^\circ$ (center)	TYP. - 0.03	0.313	TYP. + 0.03		Note 5
		Wy			0.329			
	Red	Rx			0.641			
		Ry			0.342			
	Green	Gx			0.316			
		Gy			0.619			
	Blue	Bx			0.150			
		By			0.061			
Response Time		Tr+Td	Ta = 25° C $\theta = 0^\circ$	-	30	35	ms	Note 6
Gamma Scale				2.0	2.2	2.4		



- Notes :
1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see [FIGURE 1](#)).
 2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (see [FIGURE 2](#)) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Luminance of white is defined as luminance values of center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in [FIGURE 2](#) for a total of the measurements per display. The luminance is measured by CS2000/CA310 when the LED current is set at 60mA.
4. The White luminance uniformity on LCD surface is then expressed as : $\Delta Y = \text{Minimum Luminance of 9 points} / \text{Maximum Luminance of 9 points}$ (See [FIGURE 3](#)).
5. The color chromaticity coordinates specified in Table 5. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
6. The electro-optical response time measurements shall be made as [FIGURE 4](#) by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_d .

7. Definition of Color of CIE Coordinate and NTSC Ratio

8. Definition of gray inversion angle (see [FIGURE 5](#)).



7.2 Optical measurements

Figure 1: The definition of Viewing Angle

Refer to the graph below marked by θ and ϕ .

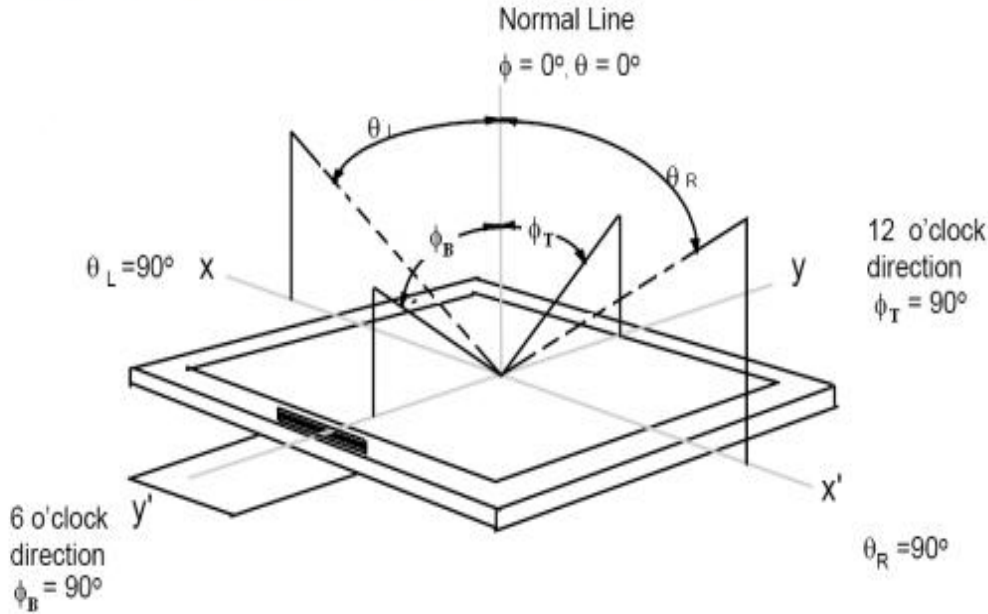
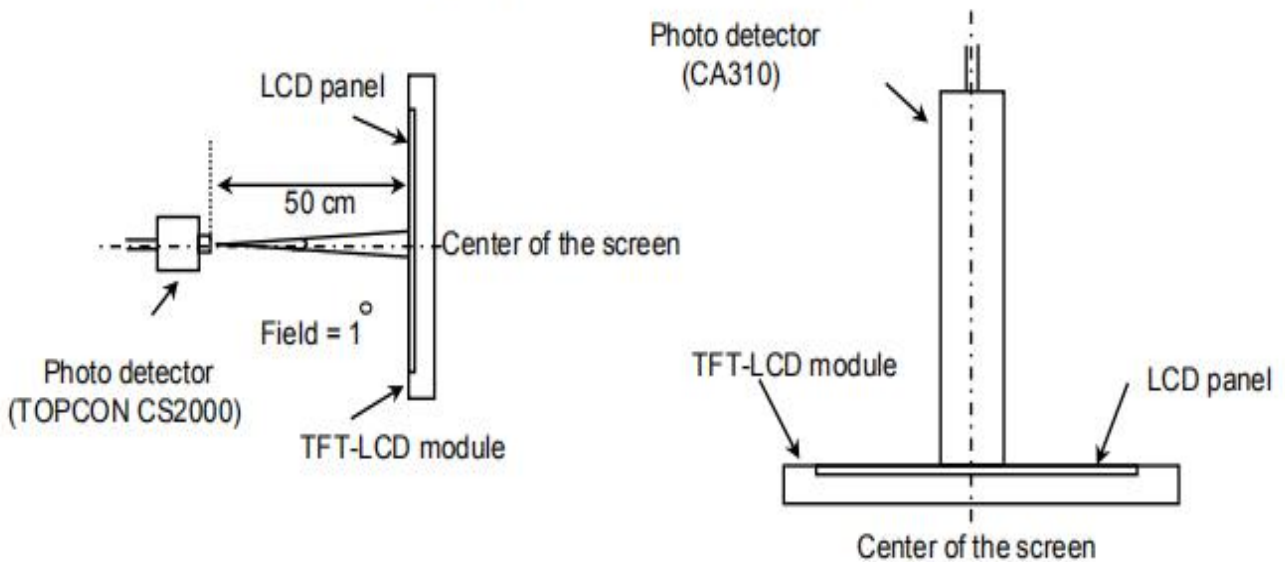


Figure 2. Measurement Set Up



View angel range, uniformity, etc. measurement setup

Flicker, measurement setup



6. QUALITY SPECIFICATIONS

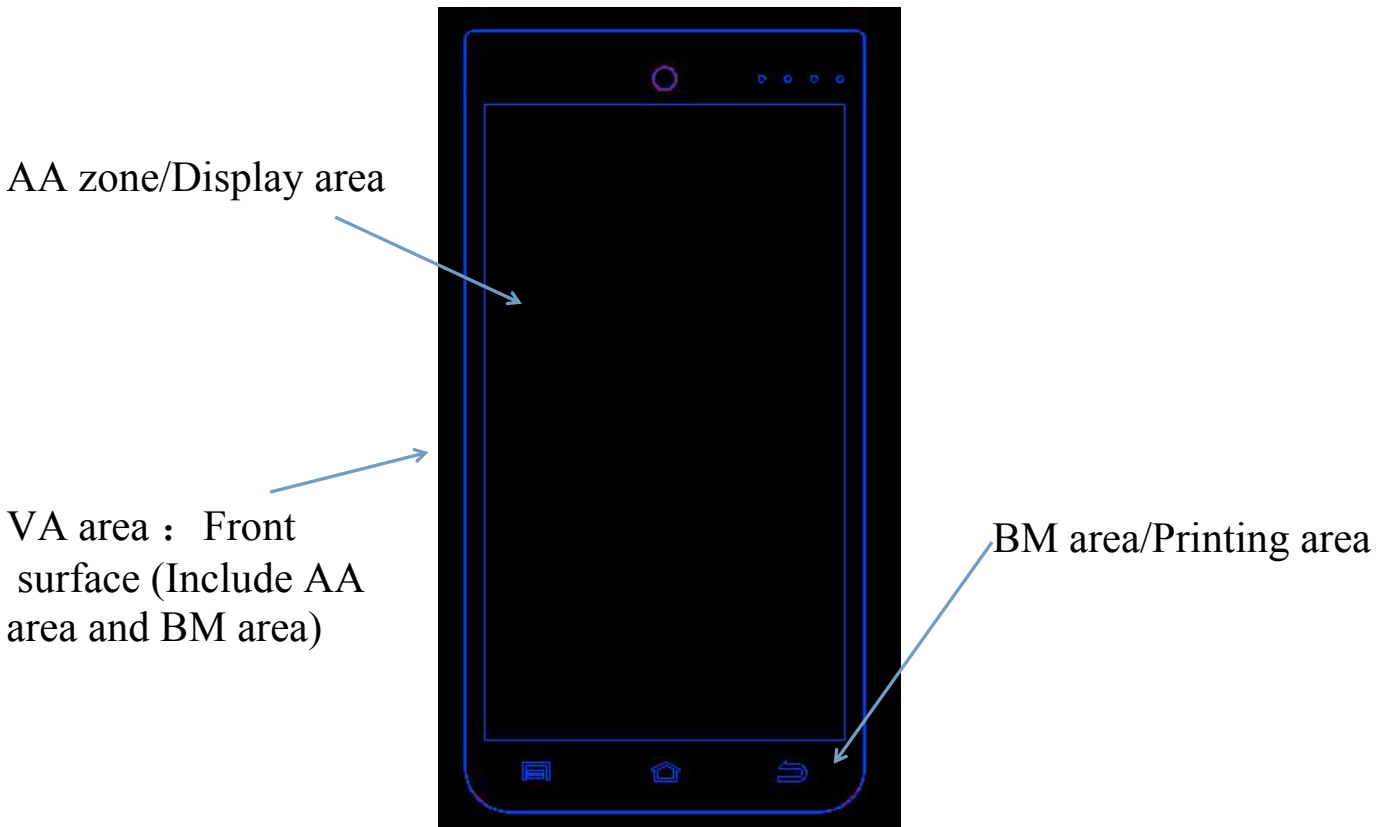
1. Inspection condition

6.1.1:Cosmetic inspection: viewing distance is about 30cm with bare eyes, and under an environment of 20~40W light intensity (800~1200LUX) , 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

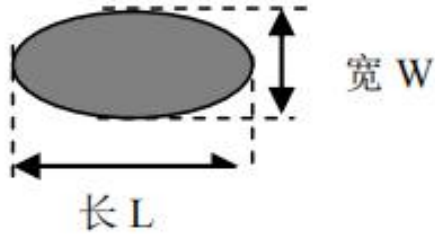
BM zone: Printing area

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

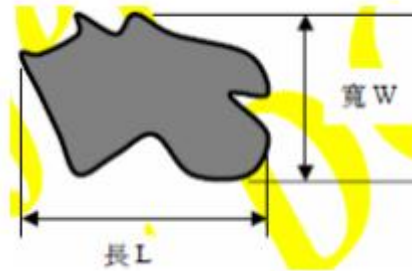


3. Defect definition

3.1 Circular defect



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

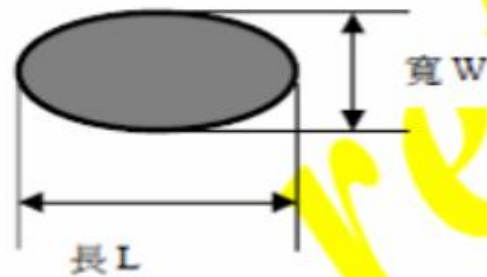
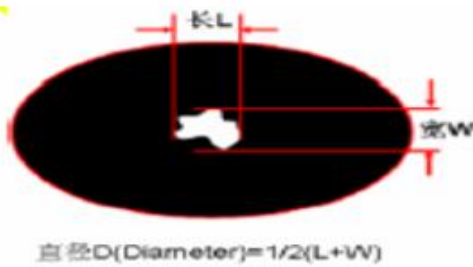


Diameter $\Phi = 1/2(L+W)$

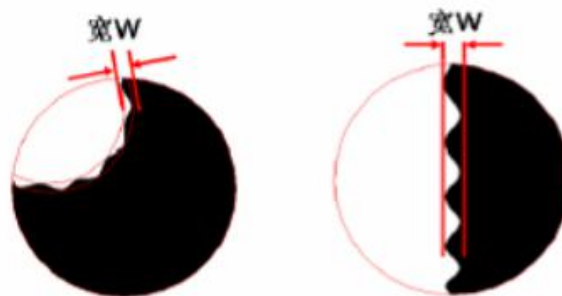
3.2 Linear defect



3.3 Pin hole





3.4 Zigzag





4. Inspection standards

4.1 Major defect

-Item -No	Items to be inspected	Inspection Standard	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.	
4.1.5	Sub Pixel classification	<ul style="list-style-type: none"> ● Sub Pixel: Number of sub pixel doesn't exceed two dot. <div style="text-align: center;">  <p>Sub Pixel (Dot)</p> </div> <ul style="list-style-type: none"> a> Dark dot ----two Allowed b> Bright dot ---- two Allowed ● Pixel : Three dots link together doesn't exceed twos <div style="text-align: center;">  <p>Pixel</p> </div> 	N ≦ 2



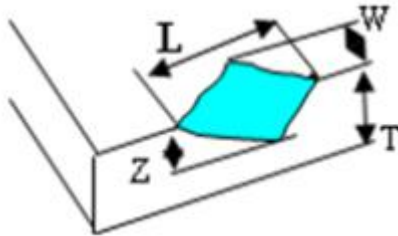
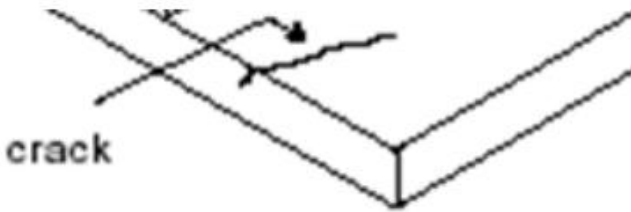
4.2 Cosmetic defect

Item No	Items to be inspected	Inspection Standard		Classification of defects
4.2.1	Dot defect	Zone Size(mm)	VA area	Minor
			Acceptable Qty	
		$\Phi \leq 0.1$	Ignore	
		$0.10 < \Phi \leq 0.25$	3	
		$0.25 < \Phi \leq 0.30$	2	
		$0.30 < \Phi$	0	
4.2.2	Dim Spots: Circle shaped and dim edged defects	Zone Size(mm)	VA area	Minor
			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 Size(mm)	VA area	Minor
			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	<table border="1"> <thead> <tr> <th colspan="2">Zone</th> <th>VA area</th> </tr> <tr> <th>L (Length)</th> <th>W (Width)</th> <th>Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td>Ignore</td> <td>$W \leq 0.03$</td> <td>Ignore</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>3</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.05 < W \leq 0.07$</td> <td>1</td> </tr> <tr> <td>/</td> <td>$0.07 < W$</td> <td>Define as spot defect</td> </tr> </tbody> </table>	Zone		VA area	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	Minor
Zone		VA area																			
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> <table border="1"> <thead> <tr> <th colspan="2">Size (mm)</th> <th>VA area</th> </tr> <tr> <th>L (Length)</th> <th>Acceptable Qty</th> <th>Acceptable Qty</th> </tr> </thead> <tbody> <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	Minor
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="491 309 852 383">Zone</th> <th data-bbox="853 309 1217 383">VA area</th> </tr> <tr> <th data-bbox="491 385 852 439">Size(mm)</th> <th data-bbox="853 385 1217 439">Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td data-bbox="491 441 852 495">$\Phi \leq 0.15$</td> <td data-bbox="853 441 1217 495">Ignore</td> </tr> <tr> <td data-bbox="491 497 852 551">$0.15 < \Phi \leq 0.25$</td> <td data-bbox="853 497 1217 551">2</td> </tr> <tr> <td data-bbox="491 553 852 607">$0.25 < \Phi$</td> <td data-bbox="853 553 1217 607">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 data-bbox="491 680 906 719">4.2.7a Chip on corner or surface</p>  <table border="1" data-bbox="491 1041 1209 1198"> <thead> <tr> <th data-bbox="491 1041 730 1117">L(length)</th> <th data-bbox="732 1041 971 1117">W(width)</th> <th data-bbox="973 1041 1209 1117">Z(thickness)</th> </tr> </thead> <tbody> <tr> <td data-bbox="491 1117 730 1198">$L \leq 0.30$</td> <td data-bbox="732 1117 971 1198">$W \leq 0.20$</td> <td data-bbox="973 1117 1209 1198">T/2</td> </tr> </tbody> </table> <p data-bbox="491 1274 1136 1355">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 1451 1011 1525">4.2.7b Cracks 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)	 <p>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.</p>	Minor
	Surface dirty	<p>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. 保护膜的质量保证期为三个月，在保证期内因保护膜问题引起的脏污判定为不良。</p>	
	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	Inspection after test
High Temperature Operation	70°C for 96 hours	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 试验结束后, 已测试的 LCD 样品必须在室内正常温湿度环境下放置 2~4 个小时以上才能进行功能和外观检查, 样品不允许有以下缺陷: 1. 无功能不良, 例: 缺划, 显异, 严重爆灯等 2. 外观无偏光片气泡, OCA 气泡等不良: 2. The test samples should be applied to only one test item. 每个被测试的模块只能用于其中的一个测试项目。
Low Temperature Operation	-20°C for 96 hours	
High Temperature Storage	80°C for 96 hours	
Low Temperature Storage	-30°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	
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 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) From the KINGTECH shipping date, customers need to be up and running within 6 months. 从KINGTECH发货之日起，客户需要6个月内上线并且使用。
- 2) According to KINGTECH TFT LCD quality standard, KINGTECH will rework or exchange for functional defect goods since within one year. 依据KINGTECH TFT LCD质量标准，KINGTECH将在一年内保修或置换功能缺陷产品。
- 3) strictly prohibit the display in the whole machine for a long time point a fixed screen (display by the LCD residual shadow determination criteria); suggest that the entire machine more than 2 minutes without the use of LCM automatically into hibernation, more than 30 minutes without the use of the system to force LCM into hibernation. 严禁显示屏在整机长期点一个固定画面（显示屏依LCD残影判定标准）；建议整机超过2分钟不使用LCM自动进入休眠，超过30分钟不使用系统强制LCM进入休眠状态。
- 4) Display is strictly prohibited to work continuously for more than 8 hours on the whole



machine. 严禁显示屏在整机连续工作8小时以上。

- 5) Please take the module under static protection. 请在有静电防护情况下，拿取模组。
- 6) LCM in special scenarios (such as high concentration of chemicals, strong magnetic field, extreme cold, and other use scenarios) use in advance to contact us to confirm. LCM在特殊场景（比如高浓度化学品，强磁场，极寒等使用场景）使用时提前联系我们确认。

9. PACKAGE DRAWING

TBD