

SPECIFICATION
FOR
LCM+CTP Module

MODULE No:	KD101UXFLD009-C015B
CUSTOMER:	

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

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	常备库存 Stock For Sale	长期供货 Long Time supply	支持小量 NO MOQ	品种齐全 In Full Range

1. Basic Specifications

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, capacitance touch panel, back-light unit. The resolution of a 10.1" TFT-LCD contains 1920*1200 pixels, and can display up to 16.7M colors.

1.1 TFT Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	217.44(H)*135.9(V) (10.1 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	1920(RGB)*1200	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.113(H)*0.113(V)	mm	
Viewing angle	Free	o'clock	
Controller IC	4*HX8255+2*HX8678	-	
LCM Interface	2 Part LVDS	-	
Display mode	Transmissive /Normally Black	-	
Operating temperature	-30~+80	°C	
Storage temperature	-30~+80	°C	
Module bonding technology	Foam adhesive bonding	-	

1.2 CTP Features

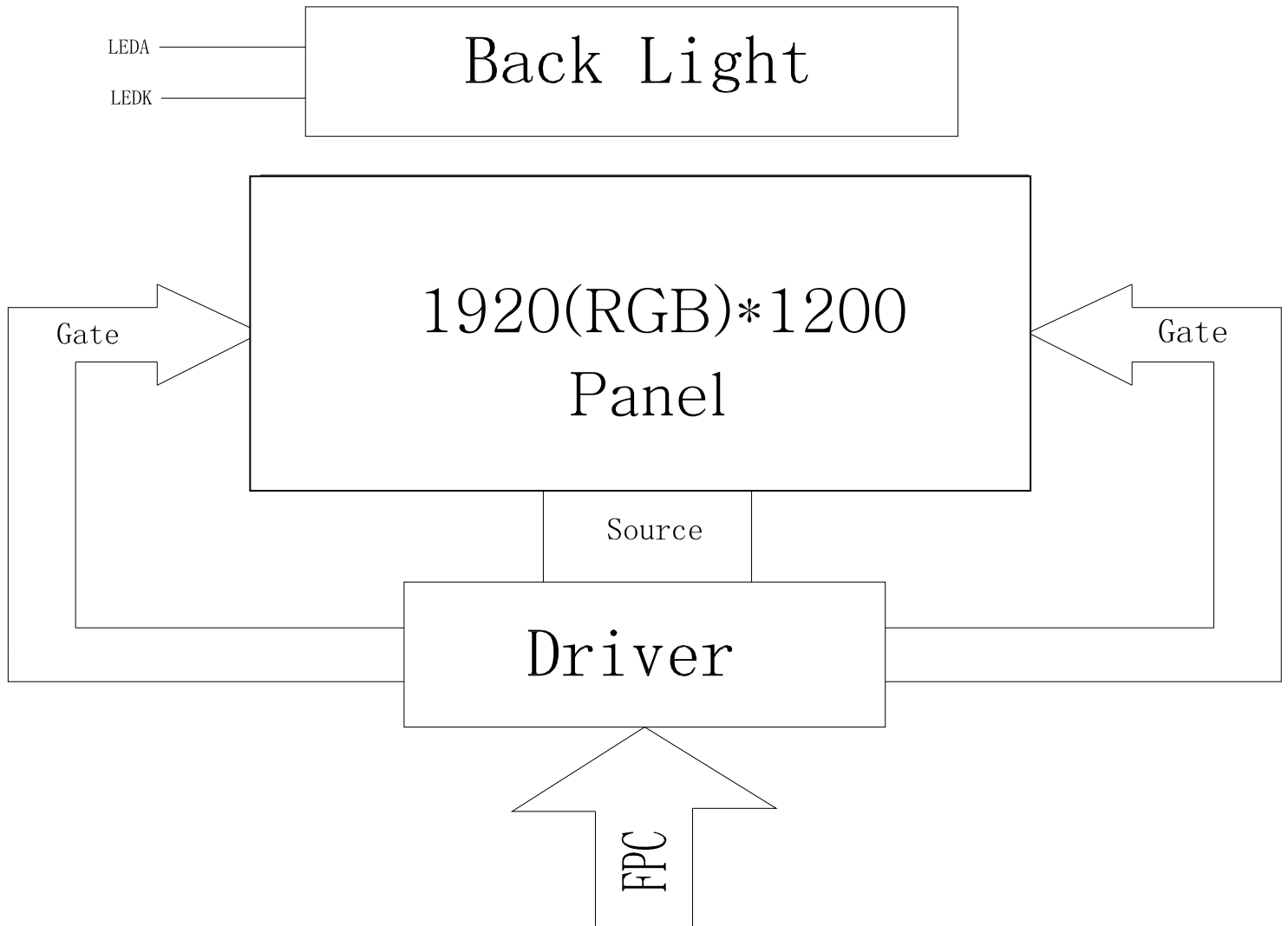
General Information Items	Specification	Unit	Note
	Main Panel		
Resolution	1920(H)*1200(V)	-	
Structure	G+G	-	
Controller IC	ILI2511	-	
Interface	I2C&USB	-	
Touch mode	Five points and Gestures	-	-

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1.3 Mechanical Information

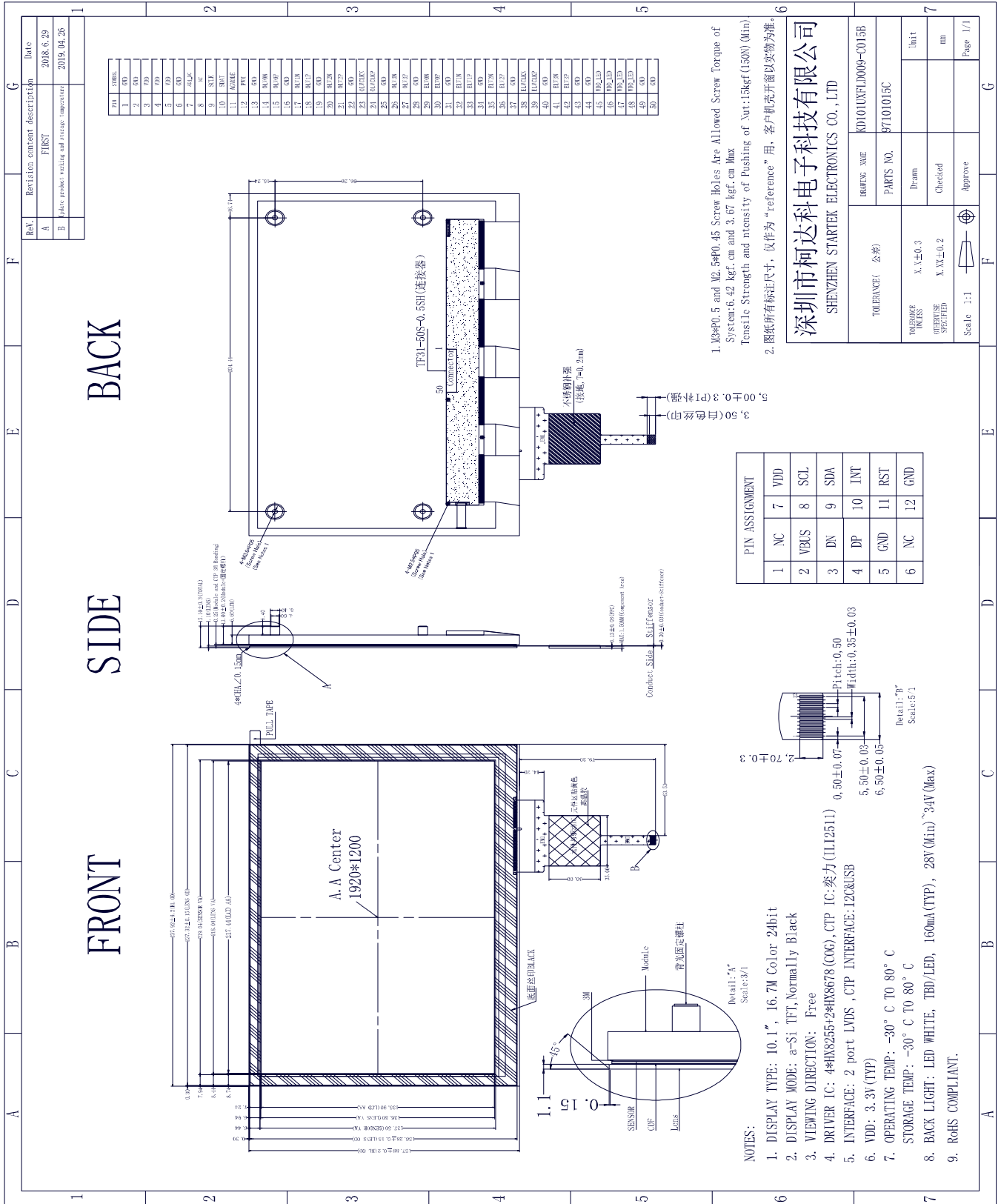
Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	237.92	-	mm	
	Vertical(V)	-	157.88	-	mm	
	Depth(D)	-	15.1	-	mm	Contains the bracket
Weight		-	TBD	-	g	

2. Block Diagram



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3. Outline dimension



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4. Input terminal Pin Assignment

4.1 TFT PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground	P
2	GND	Ground	P
3	VDD	Supply voltage (3.3V).	P
4	VDD	Supply voltage (3.3V).	I/O
5	VDD	Supply voltage (3.3V).	I/O
6	GND	Ground	P
7	ADJ_DC	B/L channel current control Connect to GND for normal operation	I/O
8	NC	No connection	-
9	SCLK	Serial clock input for EEPROM	I
10	SDAT	Serial data input for EEPROM	I
11	AGMODE	Aging pattern selection connect to GND for normal operation	I
12	PWM	B/L control input connect to VDD for normal operation	I
13	GND	Ground	P
14	OLV0N	Odd pixel LVDS data pair 0N	I
15	OLV0P	Odd pixel LVDS data pair 0P	I
16	GND	Ground	P
17	OLV1N	Odd pixel LVDS data pair 1N	I
18	OLV1P	Odd pixel LVDS data pair 1P	I
19	GND	Ground	P
20	OLV2N	Odd pixel LVDS data pair 2N	I
21	OLV2P	Odd pixel LVDS data pair 2P	I
22	GND	Ground	P
23	OLVCLKN	Odd pixel LVDS clock pair N	I
24	OLVCLKP	Odd pixel LVDS clock pair P	I
25	GND	Ground	P
26	OLV3N	Odd pixel LVDS data pair 3N	I
27	OLV3P	Odd pixel LVDS data pair 3P	I
28	GND	Ground	P
29	ELV0N	Even pixel LVDS data pair 0N	I
30	ELV0P	Even pixel LVDS data pair 0P	I

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31	GND	Ground	P
32	ELV1N	Even pixel LVDS data pair 1N	I
33	ELV1P	Even pixel LVDS data pair 1P	I
34	GND	Ground	P
35	ELV2N	Even pixel LVDS data pair 2N	I
36	ELV2P	Even pixel LVDS data pair 2P	I
37	GND	Ground	P
38	ELVCLKN	Even pixel LVDS clock pair N	I
39	ELVCLKP	Even pixel LVDS clock pair P	I
40	GND	Ground	P
41	ELV3N	Even pixel LVDS data pair 3N	I
42	ELV3P	Even pixel LVDS data pair 3P	I
43	GND	Ground	P
44	GND	Ground	P
45	VDD_LED	Power Supply for LED	P
46	VDD_LED	Power Supply for LED	P
47	VDD_LED	Power Supply for LED	P
48	VDD_LED	Power Supply for LED	P
49	GND	Ground	P
50	GND	Ground	P

4.2 CTP PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	NC	No Connection	-
2	VBUS	VBUS sensor input, The pin should be connected to USB 4.5~5.5V power supply. This pin must be floating or connected to VDD3 when USB Power is not adopted. A 1 μ F ceramic capacitor to ground is required.	P
3	DN	USB D-	I/O
4	DP	USB D+	I/O
5	GND	Ground	P
6	NC	No Connection	-
7	VDD	Supply voltage	P
8	SCL	I2C clock input	I
9	SDA	I2C data input and output	I/O
10	INT	External interrupt to the host	I
11	RST	External Reset, Low is active	I
12	GND	Ground	P

5. LCD Optical Characteristics

5.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio	CR	$\Theta=0$		TBD	--		
Response time	Rising	T_{R+T_F}	--	TBD	--	msec	
	Falling						
Luminance Uniformity	White		70	--	--	%	
	Black		40				
Color Filter Chromacity	White	W_X	0.275	0.315	0.355		
		W_Y	0.309	0.349	0.389		
	Red	R_X	0.532	0.572	0.612		
		R_Y	0.291	0.331	0.371		
	Green	G_X	0.261	0.301	0.341		
		G_Y	0.595	0.635	0.675		
	Blue	B_X	0.113	0.153	0.193		
		B_Y	0.075	0.115	0.155		
Viewing angle	Hor.	Θ_L	CR>10	--	85	--	
		Θ_R		--	85	--	
	Ver.	Θ_U		--	85	--	
		Θ_D		--	85	--	
Option View Direction	Free						

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6. Electrical Characteristics

6.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	VDD	-0.3	3.9	V	Note1
Operating temperature	T _{OP}	-30	+80	°C	
Storage temperature	T _{ST}	-30	+80	°C	

NOTE1: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

6.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.2	3.3	3.4	V	
Normal mode Current	IDD	--	TBD	--	mA	
Level input voltage	V _{IH}	0.8*VDD	--	VDD	V	
	V _{IL}	GND-0.3	--	0.2*VDD	V	
Level output voltage	V _{OH}	VDD-0.4	--	VDD	V	
	V _{OL}	GND	--	GND+0.4	V	

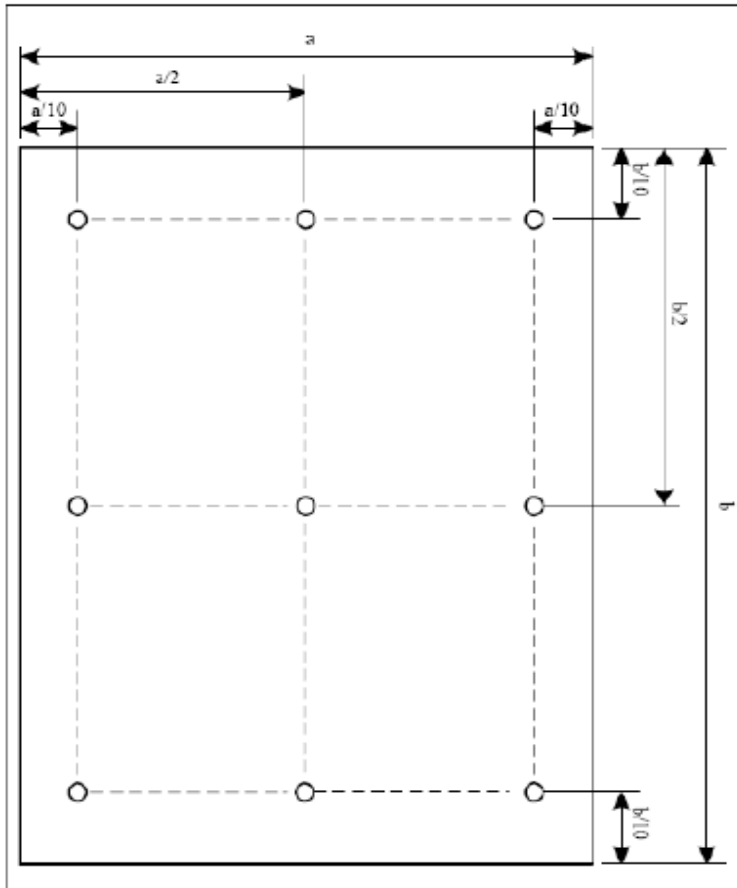
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6.3 LED Backlight Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F		160	--	mA	
Forward Voltage	V_F	--	28	--	V	
LCM Luminance	LV	--	350	--	cd/m ²	
LED life time	Hr	--	50000	--	Hour	
Uniformity	Avg	80	--	--	%	

Notes:LED Driver IC TBD.

Note (3) Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

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$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

7. TFT AC Characteristics
TBD

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8. CTP Specification

8.1 Electrical Characteristics

8.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
I2C Power Supply Voltage	VDD	-0.3	3.6	V	
USB Power Supply Voltage	VBUS	-0.3	6.0	V	
Operating temperature	T _{OP}	-30	+80	°C	
Storage temperature	T _{ST}	-30	+80	°C	

8.1.2 I2C DC Electrical Characteristics (Ta=25°C)

(Ambient temperature:25°C, VDD=2.8V, VDDIO=1.8V or VDDIO=VDD)

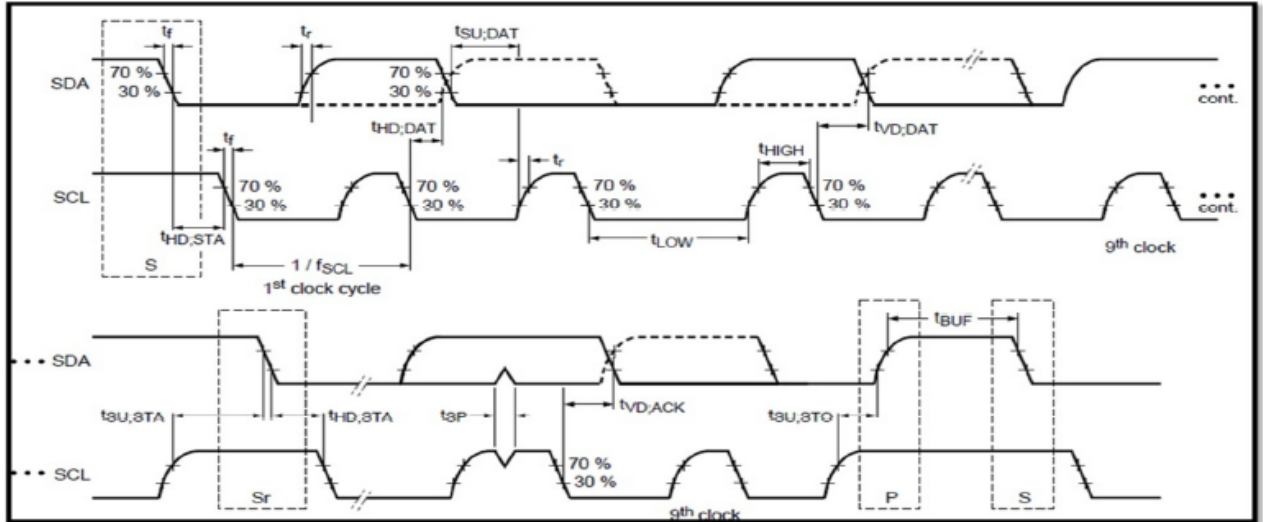
Item	Min.	Typ.	Max.	Unit	Note
I2C Power Supply Voltage	3.0	3.3	3.6	V	
USB Power Supply Voltage	4.4	5	5.5		
Normal mode operating current	--	100		mA	
Digital Input low voltage/VIL	0	--	0.3*VDDIO	V	
Digital Input high voltage/VIH	0.6*VDDIO	--	VDDIO+0.5	V	
Digital Output low voltage/VOL	0.7*VDDIO	--	--	V	
Digital Output high voltage/VOH	--	--	0.3*VDDIO	V	

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8.1.3 USB DC Electrical Characteristics

Item	Symbol	Min	Typ.	Max	Unit	Condition
Input Low	V_{IL}			0.8	V	
Input High (driven)	V_{IH}	2.0			V	
Differential input sensitivity	V_{DI}	0.2			V	(D+) – (D-)
Differential common-mode range	V_{CM}	0.8		2.5	V	Includes V_{DI} range
Single-ended receiver threshold	V_{SE}	0.8		2.0	V	
Receiver hysteresis	V_{RH}		200		mV	
Output low (driven)	V_{OL}	0		0.3	V	
Output high (driven)	V_{OH}	2.8		3.6	V	
Output signal cross voltage	V_{CRS}	1.3		2.0	V	
Pull-up resistor	R_{PU}	1.425		1.575	$k\Omega$	
Pull-down resistor	R_{PD}	14.25		15.75	$k\Omega$	
Termination Voltage for upstream port pull up (RPU)	V_{TRM}	3.0		3.6	V	

8.2 I2C AC Characteristics



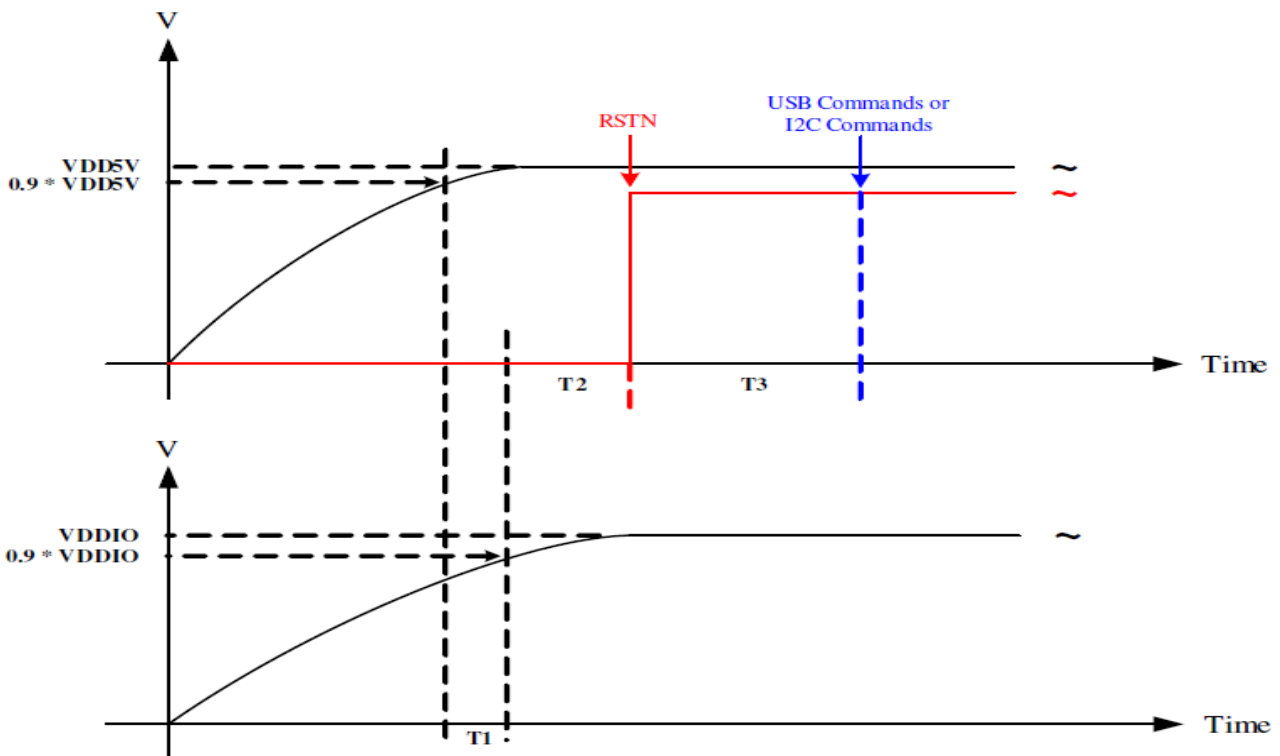
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Parameter	Symbol	Standard-mode		Fast-mode		Unit
		Min	Max	Min	Max	
SCL clock frequency	f_{SCL}	0	100	0	400	kHz
Hold time START condition	$t_{HD;STA}$	4.0	-	0.6	-	us
LOW period of the SCL clock	t_{Low}	4.7	-	1.3	-	us
HIGH period of the SCL clock	t_{High}	4.0	-	0.6	-	us
Set-up time for a repeated START condition	$t_{SU;STA}$	4.7	-	0.6	-	us
Data hold time	$t_{HD;DAT}$	300	-	300	-	ns
Data set-up time	$t_{SU;DAT}$	250	-	100	-	ns
Rise time of both SDA and SCL signals (30% to 70%)	t_r	-	1000	20	300	ns
Fall time of both SDA and SCL signals (70% to 30%)	t_f	-	300	20	300	ns
Set-up time for STOP condition	$t_{SU;STO}$	4.0	-	0.6	-	us
Bus free time between a STOP and START condition	t_{BUF}	4.7	-	1.3	-	us
Capacitive load for each bus line	C_b	-	400	-	400	pF
Noise margin at the LOW level for each connected device	V_{nL}	$0.1V_{DD}$	-	$0.1V_{DD}$	-	V
Noise margin at the HIGH level for each connected device	V_{nH}	$0.2V_{DD}$	-	$0.2V_{DD}$	-	V

8.3 Power Sequence

8.3.1 Power-on Sequence

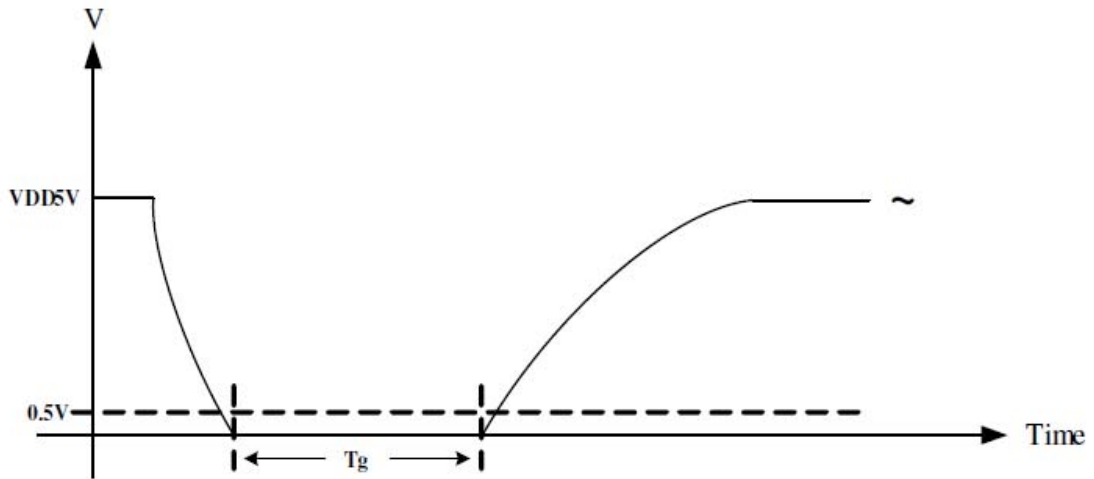
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1. T1: the time difference between $0.9 * VDD5V$ and $0.9 * VDDIO$. T1 must be ≥ 0 sec.
2. T2: the time difference between $0.9 * VDDIO$ and RSTN. T2 must be ≥ 200 us.
3. T3: the time difference between RSTN and Commands.
 - T3 in case of USB must be ≥ 20 ms.
 - T3 in case of I2C must be ≥ 300 ms.

. 8.3.2 Power-off to Power-on Sequence

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T_g : the time difference between power-off and power-on. T_g must be $> 10\mu s$.

Note. During the power off time, the VDD5V must be lower than 0.5V that make sure the touch controller have been correctly reset.

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9. LCD Module Out-Going Quality Level

9.1 VISUAL & FUNCTION INSPECTION STANDARD

9.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

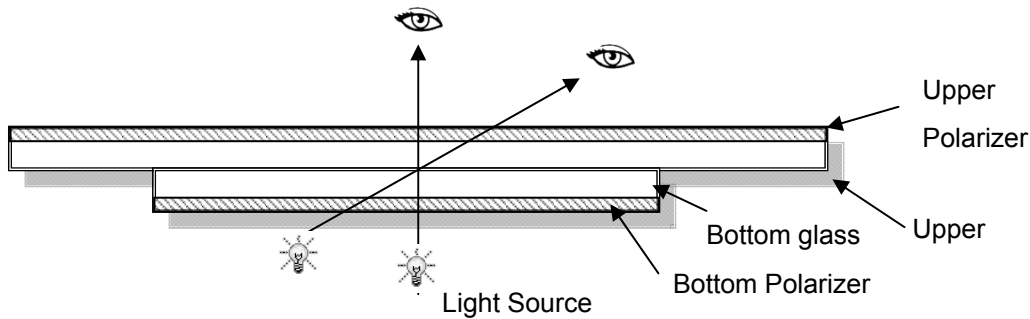
Temperature : $25\pm 5^{\circ}\text{C}$

Humidity : $65\%\pm 10\%RH$

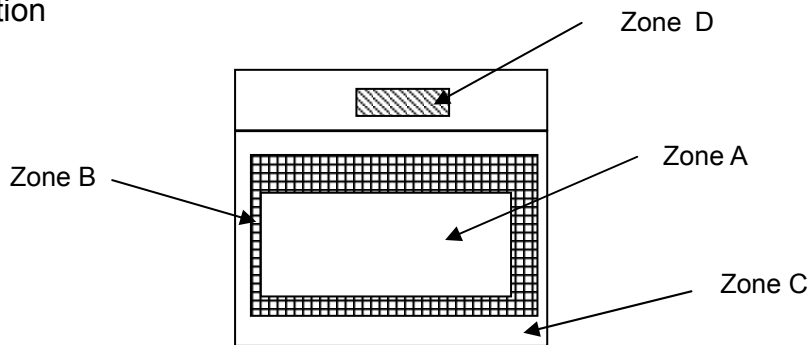
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



9.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C Cover (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note: As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer

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9.1.3 Sampling Plan

According to GB/T 2828.1-2003 ; , normal inspection, Class II

AQL:

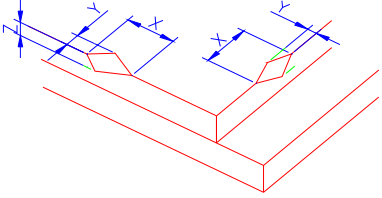
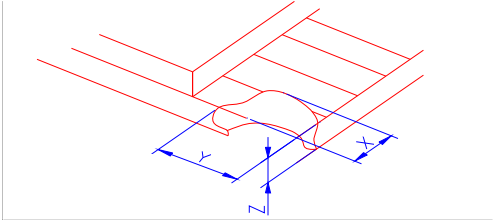
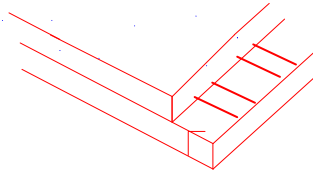
Major defect	Minor defect
0.65	1.5

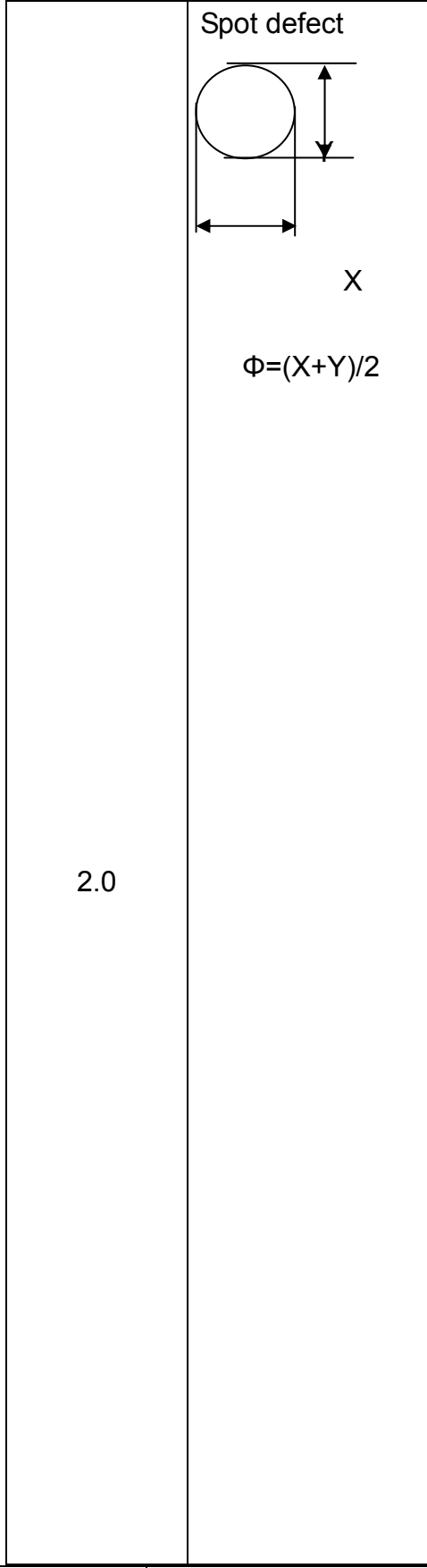
LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot Line defect	Light dot , Dim spot , Polarizer Bubble ; Polarizer accidented spot.	
6	Soldering appearance	Good soldering , Peeling off is not allowed.	
7	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

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9.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 <table border="1" data-bbox="756 667 1453 815"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td><Inner border line of the seal</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
X	Y	Z						
≤3.0mm	<Inner border line of the seal	≤T						
	(2)LCD corner broken	 <table border="1" data-bbox="815 1122 1394 1223"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td>≤L</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	≤L	≤T
X	Y	Z						
≤3.0mm	≤L	≤T						
	(3) LCD crack	 <p style="text-align: center;">Crack Not allowed</p>						



① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.10$	Ignore		
$0.10 < \Phi \leq 0.25$	4(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.35$	3		
$\Phi > 0.4$	0		

② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.1$	Ignore		
$0.10 < \Phi \leq 0.25$	4(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.35$	3		
$\Phi > 0.4$	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.3 < \Phi \leq 0.5$	3(distance $\geq 10\text{mm}$)		
$\Phi > 0.5$	1		

④ Pixel bad points (light dot, Dim dot, color dot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore		
$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.4$	1		

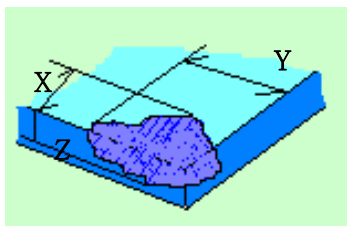
⑤ Polarizer Bubble

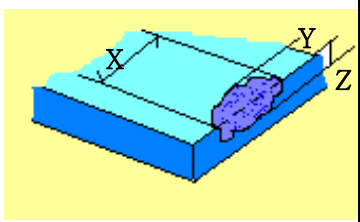
Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.3 < \Phi \leq 0.4$	4(distance $\geq 10\text{ m}$)		
$0.4 < \Phi \leq 0.5$	3		
$\Phi > 0.5$	1		

2.0

3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Width(mm)	Length(m)	Acceptable Qty		
				A	B	C
		$\Phi \leq 0.05$	Ignore	Ignore		
		$0.05 < W \leq 0.06$	$L \leq 4.0$	N \leq 3		
		$0.07 < W \leq 0.08$	$L \leq 3.0$	N \leq 2		
	$0.08 < W$	Define as spot defect				
4.0	Electronic Components SMT	Not allow missing parts, solderless connection, cold solder joint, mismatch, The positive and negative polarity opposite				
5.0	Display color & Brightness	<p>1. Color: Measuring the color coordinates, The measurement standard according to the datasheet or samples.</p> <p>2. Brightness: Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.</p>				
6.0	LCD Mura	By 5% ND filter invisible.				

7.0	CTP Related	CTP Cover sensor accidented black/white spot	Size Φ (mm)	Acceptable Qty		
				A	B	C
			$\Phi \leq 0.1$	Ignore		
			$0.15 < \Phi \leq 0.25$	4 (distance \geq 10mm)		
			$0.25 < \Phi \leq 0.35$	3		
	$\Phi > 0.4$	1				

		CTP Cover scratch	<table border="1"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Ignore(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.05$</td> <td>Ignore</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.05 < W \leq 0.06$</td> <td>$L \leq 4.0$</td> <td colspan="3">$N \leq 3$</td> </tr> <tr> <td>$0.07 < W \leq 0.08$</td> <td>$L \leq 3.0$</td> <td colspan="3">$N \leq 2$</td> </tr> <tr> <td>$0.08 < W$</td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Ignore(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore			$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$			$0.07 < W \leq 0.08$	$L \leq 3.0$	$N \leq 2$			$0.08 < W$	Define as spot defect			
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		Assembly deflection	beyond the edge of backlight ≤ 0.2 mm																												
		TP cover broken X : length Y : width Z : height	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$X \leq 0.5$mm</td> <td>$Y \leq 0.5$mm</td> <td>$Z < \text{cover thickness}$ s</td> </tr> </tbody> </table> <p>Circuitry broken is not allowed.</p> 	X	Y	Z	$X \leq 0.5$ mm	$Y \leq 0.5$ mm	$Z < \text{cover thickness}$ s																						
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Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

10. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	80°C,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-30°C, 96HR	
High Temperature Storage	80°C, 96HR	
Low Temperature Storage	-30°C, 96HR	
High Temperature & High Humidity Operating	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30°C,30 min ↔ 80°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

Remark:

- The test samples should be applied to only one test item.
- Sample size for each test item is 5~10pcs.
- For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.
- In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

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11. Cautions and Handling Precautions

11.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

11.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

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12. Packing

----TBD-----

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