



TK4324-V1

Product

4.3" Standard Touch Screen
Surface Capacitive sensor
With 24 independent touch buttons
I²C interface



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1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
01	2011.09.03	First Release.	XH Dai	



2. General Description

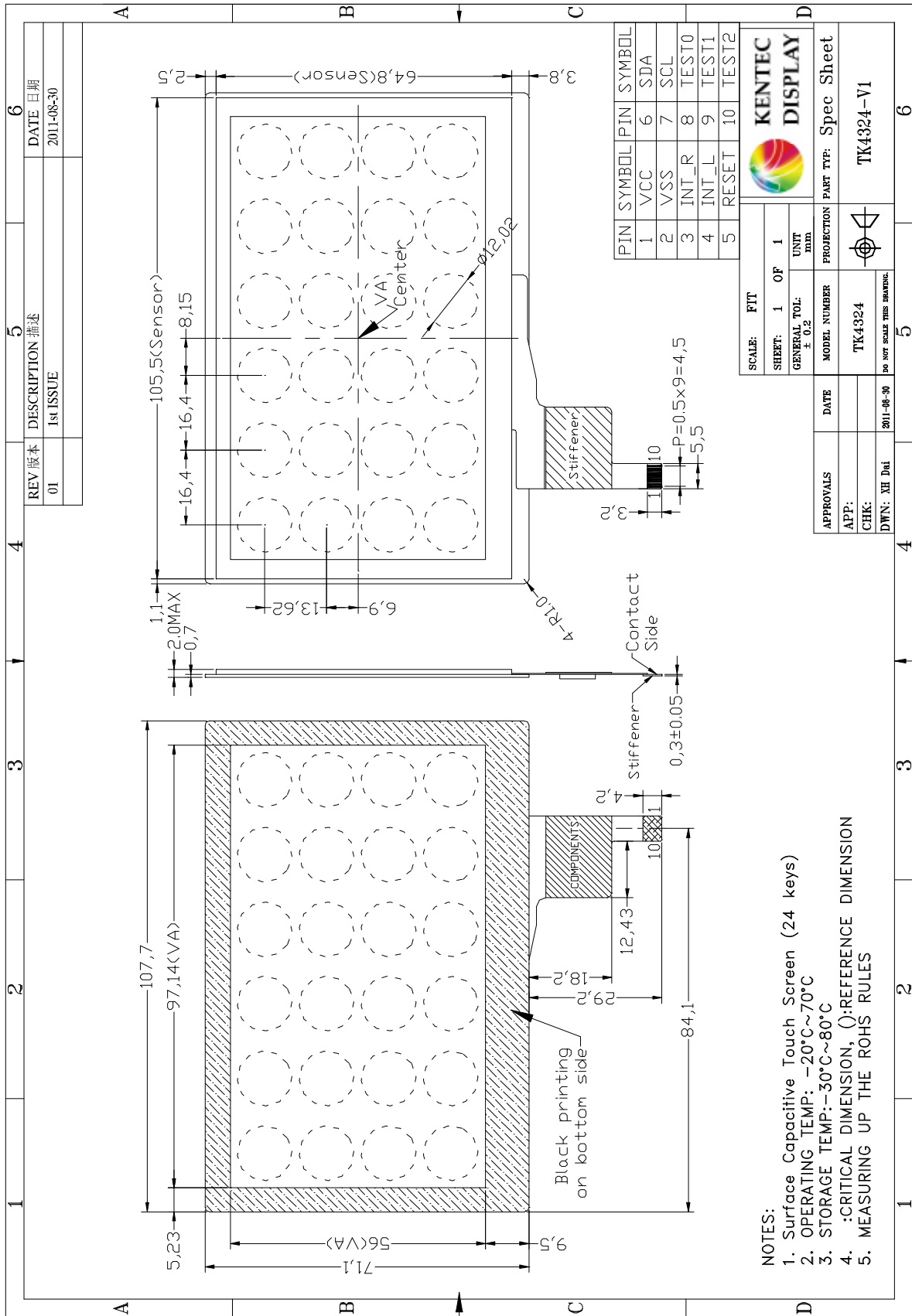
- 4.3”(diagonal), 24 touch buttons, surface capacitive touch screen.
- Glass-Glass structure.
- Interface: I²C Slave.
- Logic voltage: 3.3V (typ.).

3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	107.7(W) x 71.1(H) x 2.0(T) (Exclude FPC cables)	mm
TP view area	97.14(W) x 56.0(H)	mm
Cover lens thickness	0.7	mm
Capacitive sensor thickness	1.1	mm
Input force	<10	grams
Surface hardness	>6	H
Weight	TBD	grams



- NOTES:
1. Surface Capacitive Touch Screen (24 keys)
 2. OPERATING TEMP: -20°C~70°C
 3. STORAGE TEMP: -30°C~80°C
 4. :CRITICAL DIMENSION, ():REFERENCE DIMENSION
 5. MEASURING UP THE ROHS RULES

Figure 1: Outline Drawing



4. Block diagram and Interface signals

Table 2: Pin assignment

Pin No.	Symbol	Description
1	VCC	Power supply (VCC = 3.3V).
2	VSS	Ground (0V)
3	INT_R	Capacitive sensor interrupt signal output for right half screen.
4	INT_L	Capacitive sensor interrupt signal output for left half screen.
5	RESET	Chip reset input, active low.
6	SDA	I ² C data line.
7	SCL	I ² C clock line.
8	TEST0	TEST pin (for factory use only), left it open.
9	TEST1	
10	TEST2	

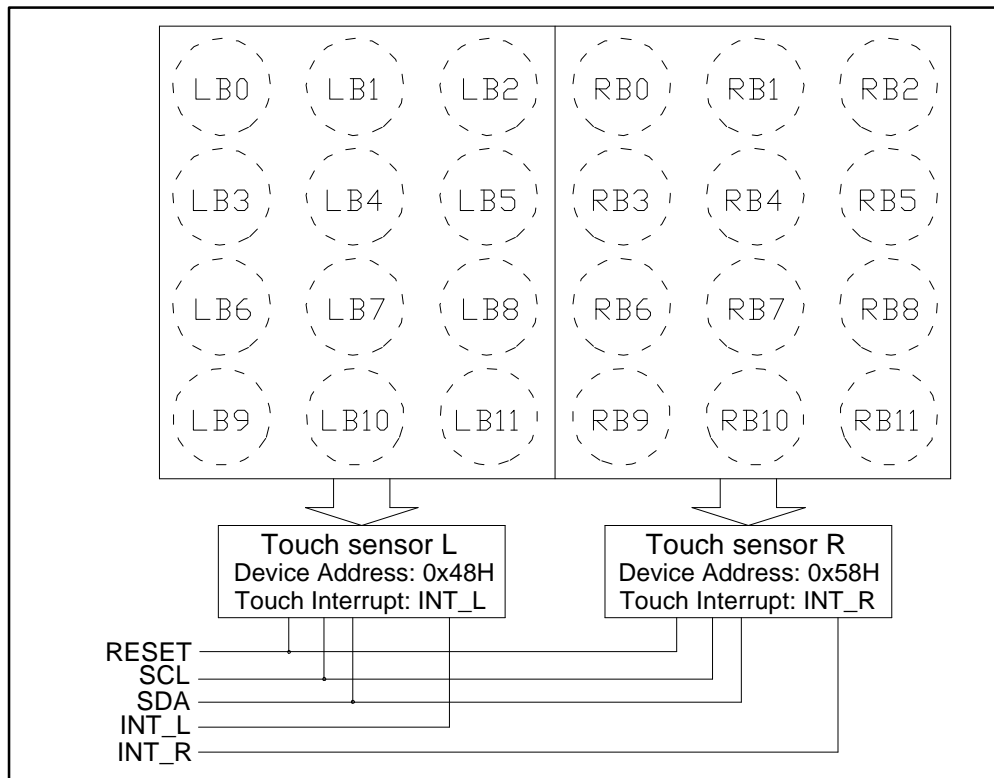


Figure 2: Block Diagram and Button Mapping



5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings

Table 3: Electrical Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply voltage	VCC	-0.3	4.1	V	1
Input voltage	VI	-0.3	VCC+0.3	V	

Note:

- 1.VCC, GND must be maintained.
- 2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

Typical Electrical Characteristics

At Ta = 25 °C, VCC= 3.3V, GND=0V.

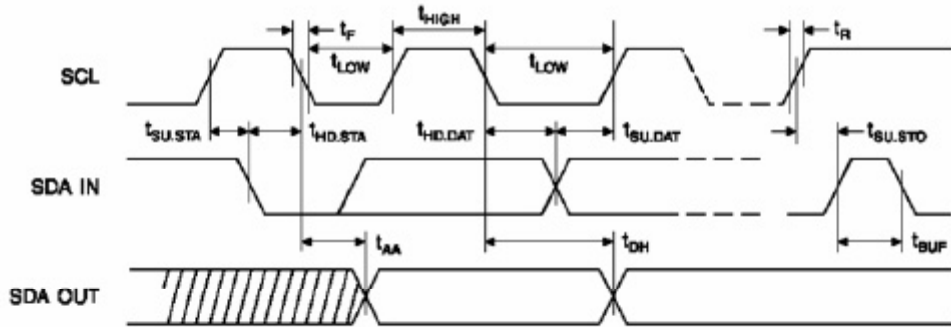
Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (logic)	VCC-GND		2.8	3.3	3.6	V
Input signal voltage	VIH		0.8VCC	-	VCC	V
	VIL		0	-	0.2VCC	V
Supply current (Logic & LCD)	ICC	VDD=3.3V	-	320	420	uA

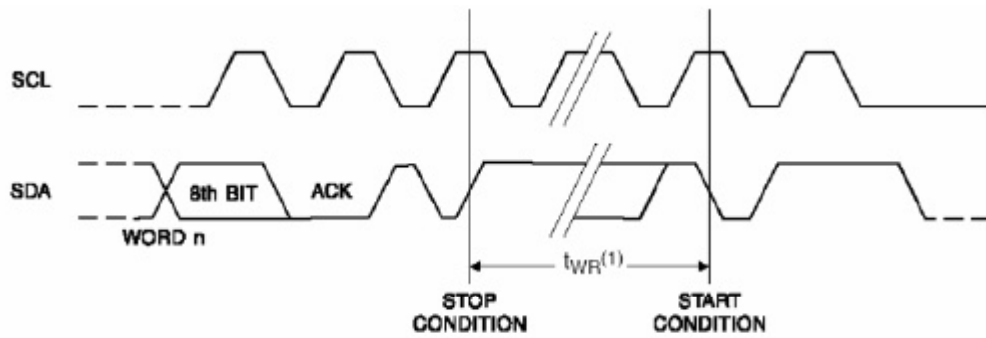


7. I²C communication instruction

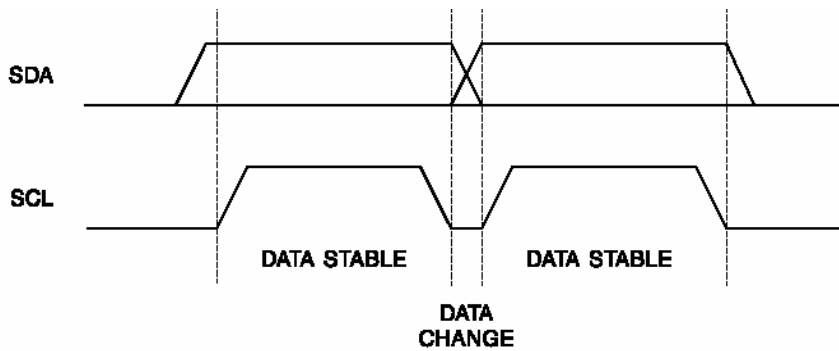
7.1 Bus Timing



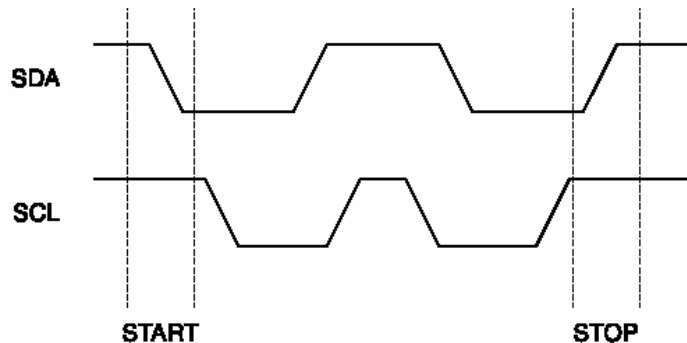
7.2 Write Cycle Timing



7.3 Data Validity

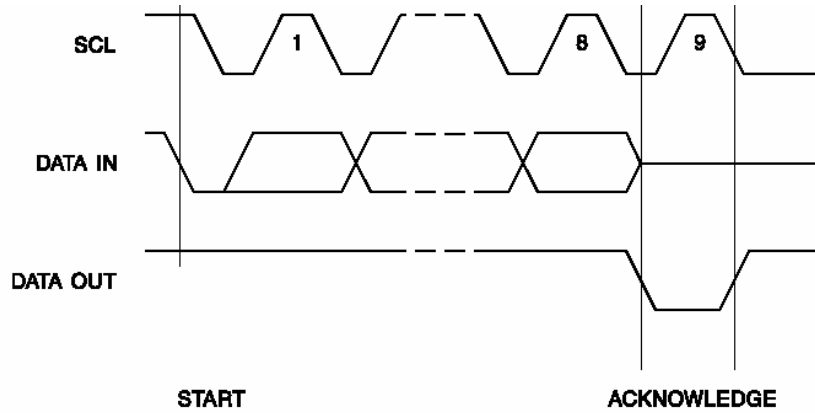


7.4 Start / Stop Definition

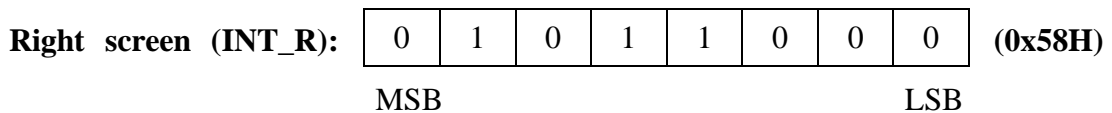
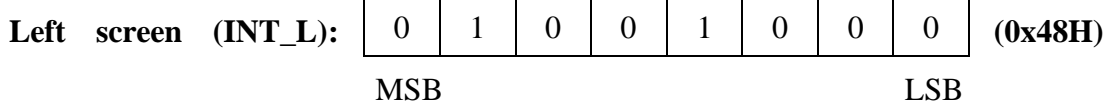




7.5 Output Acknowledge

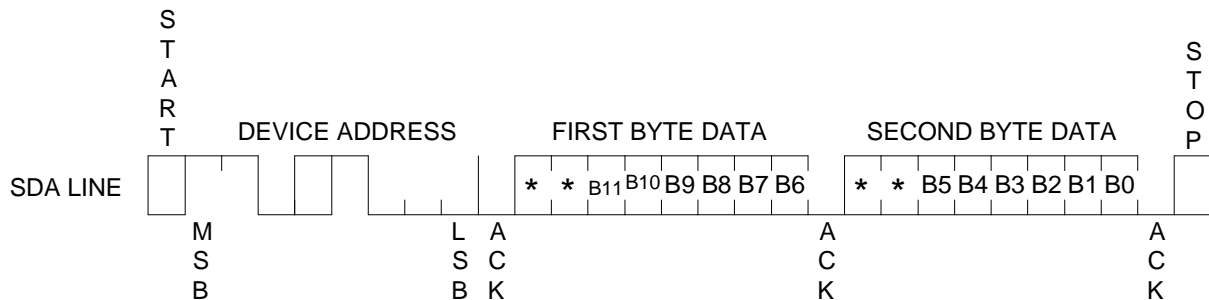


7.6 Device Address



7.7 Data Read

The touch controller require a 7-bit slave address following a start condition to enable the chip for read the touch button status. The left 12-keys touch controller slave address is 0x48 and the right 12-keys touch controller slave address is 0x58. 2 byte (8-bit) touch status data can be read out following the device address and acknowledgment.





8. Reliability Test Item

Test Item	Test Condition	Test result determinant gist
High temperature storage	70±3 ; 240Hrs	the inspection of appearance and function character.
Low temperature storage	-20±3 ; 240Hrs	
High temperature /humidity storage	60 ±3 ,90%±3%RH; 240Hrs, Normalized for 2 Hrs	
High temperature operation	55±3 ; 24Hrs	no objection of the function character; no fatal objection of the appearance.
Low temperature operation	-10±3 ; 24Hrs	
High temperature /humidity operation	40 ±3 ,90%±3%RH;96H	
	50 ±3 ,90%±3%RH;96H	
Temperature Shock	-20±3 , 30min ? 70±3 , 30min; 10cycle, Normalized for 2 Hrs	inspect the objections appearance、 function & the whole structure

9. Suggestions for using touch screen

9.1 Handling of touch screen

- 9.1.1. Use clean sacks or glove to prevent fingerprints and/or stains left on the panel. Extra attention and carefulness should be taken while handling the glass edge.
- 9.1.2. Avoid touching the viewing area before installation integration.
- 9.1.3 Holding the panel instead of handling the tail at all time.

9.2 Storage

- 9.2.1. Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%.
Don't expose to sunlight or fluorescent light.
- 9.2.2. Storage in a clean environment, free from dust, active gas, and solvent.
- 9.2.3. Store in antistatic container.

9.3 Storage

- 9.3.1. Use neutral detergent or isopropyl alcohol on a clean soft cloth to clean the panel surface.
- 9.3.2 Prevent using any kind of chemical solvent, acidic or alkali solution.

9.4 Installing

- 9.4.1. Excessive force or strain to the panel or tall is prohibited.
- 9.4.2. Retain at least 0.3mm clearance between panel and display module.
- 9.4.3. Gasket or cushion pads around the edge of the panel may segregate water and/or dust contamination.

9.5 Operating

- 9.5.1. Touch the panel with your finger or stylus only to assure normal operation. Any sharp edged or hard objects are prohibited.



9.5.2. Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunction of the panel.

9.6 Others

9.6.1. Keep the panel surface clean. Prevent any kind of adhesive applied on the surface.

9.6.2. Avoid high voltage and / or static charge.

10. Inspection Standard

10.1 Sample plan and Inspection condition

10.1.1 Sample plan

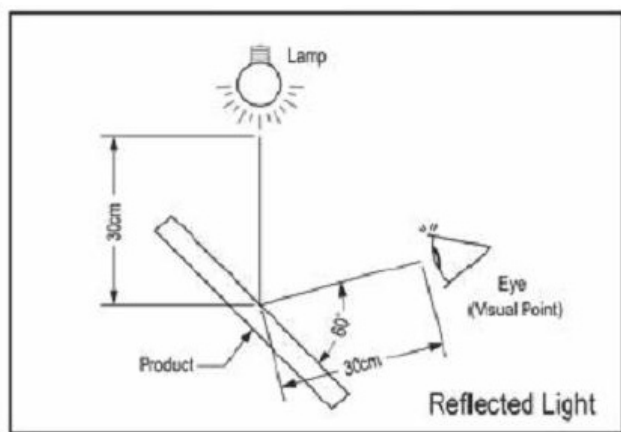
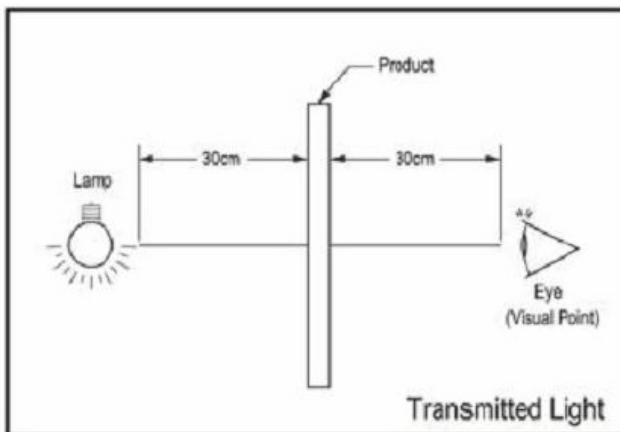
Sampling plan according to MIL-STD-105E , normal level 2 and based on:

Major defect: AQL 0.65;

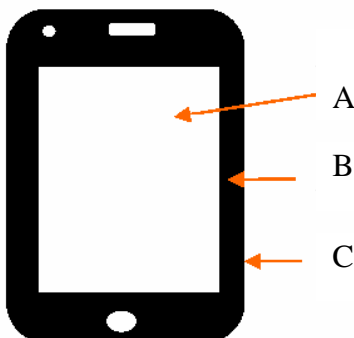
Minor defect: AQL 1.5.

10.1.2 Inspection condition

- Environment : 22 ± 3 , inspection distance : 30 ± 10 cm.
- Angle of Vision : $30 \sim 90$
- Lighting illumination : 17W fluorescent luminant lamp is used for appearance inspection. Detail of settings is shown in below diagrammatic.
- Minor impurities outside viewing area are acceptable unless their existence affect electrical functions.



10.2 Definition of inspection zone



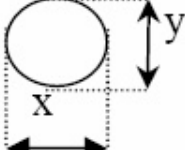
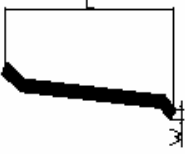
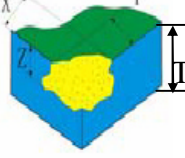
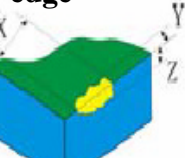
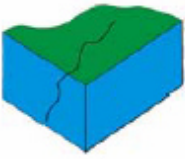

Zone A: Viewing area;

Zone B: Outside of viewing area;



Zone C: Edge of touch screen;



10.3 Inspection standards table:

Item No	Defect type	Inspection Standard	Classification of defects																		
10.3.1.1	Spots defect 	Black and white spot, Pinhole, Foreign threadiness , For dark/white spot, size F is defined as $F = (x + y) / 2$	Minor																		
		<table border="1"> <thead> <tr> <th>Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>Size(mm)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>F = 0.15</td> <td>0</td> <td>= 2</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>0.15 < F = 0.20</td> <td>0</td> <td>= 1</td> </tr> <tr> <td>0.20 < F = 0.30</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Zone	Acceptable Qty			Size(mm)	A	B	C	F = 0.15	0	= 2	Ignore	0.15 < F = 0.20	0	= 1	0.20 < F = 0.30	0	0	Minor
		Zone	Acceptable Qty																		
		Size(mm)	A	B	C																
F = 0.15	0	= 2	Ignore																		
0.15 < F = 0.20	0	= 1																			
0.20 < F = 0.30	0	0																			
10.3.1.2	Line defect 	Black and white line, Foreign shaped	Minor																		
		<table border="1"> <thead> <tr> <th>Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>Size(mm)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>W = 0.05, L = 3.0</td> <td>0</td> <td>1</td> <td rowspan="2">Ignore</td> </tr> <tr> <td>W = 0.05, L = 2.0</td> <td>0</td> <td>2</td> </tr> </tbody> </table>		Zone	Acceptable Qty			Size(mm)	A	B	C	W = 0.05, L = 3.0	0	1	Ignore	W = 0.05, L = 2.0	0	2			
		Zone		Acceptable Qty																	
		Size(mm)		A	B	C															
W = 0.05, L = 3.0	0	1	Ignore																		
W = 0.05, L = 2.0	0	2																			
10.3.1.3	ITO Glass corner 	ITO glass corner broken :	Minor																		
		<table border="1"> <thead> <tr> <th>Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>Size(mm)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>X=3.0, Y=3.0, Z<T</td> <td>0</td> <td>2</td> <td>Ignore</td> </tr> </tbody> </table>		Zone	Acceptable Qty			Size(mm)	A	B	C	X=3.0, Y=3.0, Z<T	0	2	Ignore						
		Zone		Acceptable Qty																	
Size(mm)	A	B	C																		
X=3.0, Y=3.0, Z<T	0	2	Ignore																		
10.3.1.4	ITO Glass edge 	ITO Glass edge broken :	Minor																		
		<table border="1"> <thead> <tr> <th>Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>Size(mm)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>X=3.0, Y=2.0, Z<T</td> <td>0</td> <td>2</td> <td>Ignore</td> </tr> </tbody> </table>		Zone	Acceptable Qty			Size(mm)	A	B	C	X=3.0, Y=2.0, Z<T	0	2	Ignore						
		Zone		Acceptable Qty																	
Size(mm)	A	B	C																		
X=3.0, Y=2.0, Z<T	0	2	Ignore																		
10.3.1.5	Glass flaw 	Glass flaw :	Minor																		
		<table border="1"> <thead> <tr> <th>Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>Size(mm)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>		Zone	Acceptable Qty			Size(mm)	A	B	C	-	0	0	0						
		Zone		Acceptable Qty																	
Size(mm)	A	B	C																		
-	0	0	0																		
10.3.1.6	Scratch 	Glass flaw :	Minor																		
		<table border="1"> <thead> <tr> <th>Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>Size(mm)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>W < 0.05, L = 3.0</td> <td>0</td> <td>1</td> <td>Ignore</td> </tr> <tr> <td>W < 0.05, L = 2.0</td> <td>0</td> <td>2</td> <td>Ignore</td> </tr> </tbody> </table>		Zone	Acceptable Qty			Size(mm)	A	B	C	W < 0.05, L = 3.0	0	1	Ignore	W < 0.05, L = 2.0	0	2	Ignore		
		Zone		Acceptable Qty																	
		Size(mm)		A	B	C															
W < 0.05, L = 3.0	0	1	Ignore																		
W < 0.05, L = 2.0	0	2	Ignore																		



10.3.1.6	Newton ring (Regular) 	Newton ring size < (screen size / 6) And no character affected and line	Minor
10.3.1.7	Newton ring (Irregular) 	Newton ring size < (screen size / 6) And no character affected and line	Minor
10.4.2.4	Spray	No spray in A area.	Minor

- END -