ATouch Technologies Co., Ltd.

Specification of

4 Wire Analog Resistive Touch Panel

Release : Apr.9, 2007
Rev. C

A. Application

This specification applies to the **4 Wire Analog Resistive Touch Panel**.

B. Environmental Conditions

1. **Operating Temperature Range**
   -30°C ~ 80°C

2. **Operating Humidity Range**
   5% ~ 96% RH (no dew falls)

3. **Storage Temperature Range**
   -30°C ~ 80°C

4. **Storage Humidity Range**
   5% ~ 96% RH (no dew falls)

5. **Water Spray**
   Not damaged by running water applied to the active area.

6. **Chemical Resistance**
   The touch panel active area of the touchscreen is resistant to the following chemicals when exposed for a period of one hour at a temperature of 21°C:
   - Acetone
   - Ammonia-based glass cleaners
   - Common foods and beverages
   - Hexane
   - Isopropyl alcohol
   - Methylene chloride
   - Methyl ethyl ketone
   - Mineral spirits
   - Turpentine

C. Electrical Characteristics

1. **Supply Voltage**
   +5VDC, nominal

2. **Lead to Lead Resistance**
   200Ω ~ 500Ω (between X1 – X2)
   200Ω ~ 500Ω (between Y1 – Y2)

3. **Contact Bounce**
   Less than 10 ms (input by finger).

4. **Insulation Resistance**
   More than 20M ohms at DC 25V.

D. Mechanical Characteristics

1. **Activation force**
   Less than 40gr.
   Using by the silicone finger, hardness = 60°of diameter 16mm.

2. **Input Methods**
   Finger, glove hand, pen or stylus.

3. **Surface Hardness**
   Meets pencil hardness 3H (per ASTM D3363).

4. **Position Accuracy (Linearity)**
   Less than 1.5%.

5. **Resolution**
   Based on controller resolution of 4096 x 4096.

E. Reliability

The following characteristics are generated by evaluating test samples after 2 hours leaving in the room condition when each of the reliability tests finishes.

Test Item	Result	Remark
Storage Temperature-high	80°C for 240hours	At ambient humidity
Storage Temperature-low	-30°C for 240hours	
Thermal Shock	-20°C (1hr.)~ 70°C (1hr.) 10cycles	
High Temp./Humidity Test	60°C/90%RH : 240hours	
Operating Life 1 : Hitting Key Test (*1)	250g , 2 activations / sec. More than 3,000,000 times	By using Silicone finger (*2)
Operating Life 2 : Writing Test (*1)	250g , 4.5mm / sec. More than 200,000 times	By using polyester finger (*3)

*1 Without supplying Volts.

*2 Positions of hitting key are between the dots by Silicon finger (hardness 60° silicon rubber) of diameter 16mm.

*3 Writing test is made by polyester stylus pen with tip radius.

F. Optical Performance

Light Transmission 75~ 85% (typical value) (per ASTM D1003)

G. Cosmetic Performance

G.1 Surface Quality

Surface quality criteria recognize cosmetic irregularities appearing on or between the glass and plastic surfaces of the touchscreen. Cosmetic irregularities are normally classified into two parts, circular criteria and linear criteria.

G.1.1 Circular Criteria

Circular criteria recognize surface irregularities that are circular in nature, including dirt, hard coat flaws , particles, glass bubbles, etc.

Circular defect size will be measured across its diameter. Irregularly shaped circular defect diameters will be designated by the smallest diameter into which the defects could be completely covered, i.e. the length at the widest point of the defect.

Area	Diameter of Circular Defect	Comment	Accept or Fail
Active Area	D＞0.51 (0.02”)		Fail
	0.51 (0.02”)≧D≧0.38 (0.015”)	No more than two defects contained within 50.8 (2”) ∅	Accept
	The sum of the diameters of all circular defects ≦1.27 (0.05”)	Within 50.8 (2”) ∅	Accept
	Black-colored specks or dirt, D ≦0.13 (0.005”)		Accept
View Area	D＞1.02 (0.04”)		Fail
Outside View Area	D＞1.91 (0.075”)		Fail

Unit : mm

G.1.2 Linear Criteria

Linear criteria recognize surface irregularities that are linear in nature. Linear defect size will be measured across the width of the defect at its widest point.

Linear defects smaller than 0.025 mm (0.001”) will not be considered in the evaluation of surface quality.

Area	Width Range	Maximum Length	Minimum Separation	Comment	Accept or Fail
Active Area	W＞0.102 (0.004”)				Fail
	0.076 (0.003”) ~ 0.102 (0.004”)	12.7 (0.500”)		A single defect	Accept
	1. The combined length of multiple linear defects within a 50.8 mm (2”) diameter area shall not exceed the criteria listed below. 2. The distance between two linear defects shall not be less than the separation defined below. 3. When two linear defects are in different width ranges, the largest width range shall be used to decide minimum separation.				
	0.079 (0.0031”) ~ 0.102 (0.0040”)	12.7 (0.500”)	6.35 (0.250”)	Within 50.8 (2”) ∅	Accept
	0.053 (0.0021”) ~ 0.076 (0.0030”)	25.4 (1.000”)	3.81 (0.150”)	Within 50.8 (2”) ∅	Accept
	0.025 (0.0010”) ~ 0.051 (0.0020”)	38.1 (1.500”)	1.27 (0.050”)	Within 50.8 (2”) ∅	Accept
	W≦0.025 (0.0010”)				Accept
Outside Active Area	W＞0.305 (0.012”)				Fail

Unit : mm

G.2 Coversheet Fit Criteria

Coversheet fit criteria relate to the degree of tightness of the coversheet to the touchscreen glass.

G.2.1 Proper Fit

Definition:

- Proper fit is characterized by a tight fitting coversheet.

Method:

- Put a plastic straight edge diagonally across the entire coversheet surface.
- Apply pressure in one corner in the area over the adhesive.

Criteria of determination:

- If the straight edge rests on the opposite corner, this is an acceptable fit (Figure 1).
- If the coversheet in the active area not to touch the straight edge when the straight edge is extended across the sensor on top of the adhesive, this is an acceptable fit (Figure 2).

Figure 1. Proper Coversheet Fit

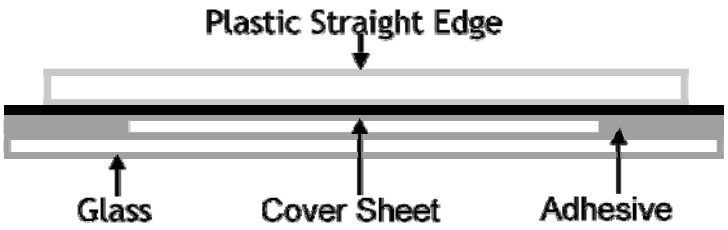
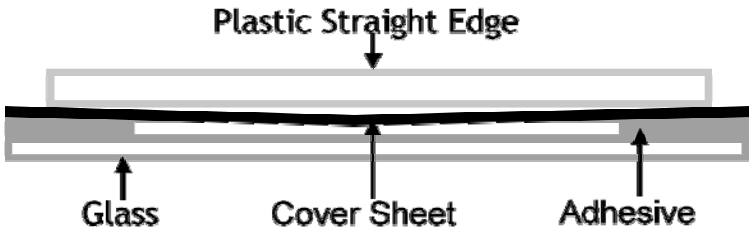


Figure 2. Proper Coversheet Fit



G.2.2 Ripple Criteria

Definition:

- Ripple criteria are characterized by a wave or ridge in the coversheet which usually stretches from a high point on the screen, for example the cable contact area.

Method :

- Place a plastic straight edge diagonally across the entire coversheet surface.
- Apply pressure in one corner in the area over the adhesive.

Criteria of determination:

- If the straight edge rests on the opposite corner, this is an acceptable fit.
- If the coversheet drops below the straight edge and then rises and falls three times, the touchscreen should fail for improper fit (Figure 3).

Figure 3. Improper Coversheet Fit—Ripple