

Apex Material Technology Corp.
創為精密材料股份有限公司

AMT PRODUCT STANDARD

Doc No:	AS-09537-000-8	Doc Rev: 8.0
Title:	SPECIFICATIONS OF ANALOG RESISTIVE TOUCH SCREEN	Released: Aug. 19, 2011
	Model Name: 09537-00 Rev.0 Size: 10.45"	Page. 1 of 7

Analog Touch Screen Specification

Manufacturer: Apex Material Technology Corp.

Model Name: 09537-00 Rev.0

1. Mechanical Dimensions and Construction

1.1 General: Analog Resistive touch screen is laminated by ITO film to ITO glass.

1.2 Mechanical Performance:

1.2.1 Surface hardness: 3H

1.2.2 ITO Glass Thickness: 1.8mm

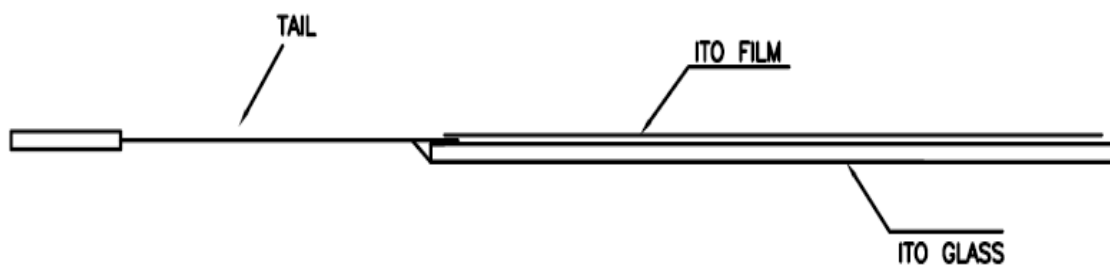
1.2.3 Tail Type: FPC

1.2.4 Surface Finish Type: Anti-glare

1.3 Input Method and Activation Force

Input Method	Average Activation Force
1.6mm dia. Delrin stylus	0.10~0.70N
16mm dia. Silicon "finger"	0.10~0.80N

Touch screen side view:



Remarks: This Model is with Anti-Newton Ring design.

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2. Typical Optical Characteristics

- 2.1 Visible Light Transmission: $81 \pm 3\%$
- 2.2 Haze: $9.5 \pm 4\%$

3. Electrical Specifications

- 3.1 Operating Voltage: 5.5V or less
- 3.2 Contact current: 20mA (maximum)
- 3.3 Circuit close resistance: X :300~950 Ω
Y :200~700 Ω
- 3.4 Circuit open resistance: > 10M Ω at 25VDC
- 3.5 Contact bounce: < 10ms
- 3.6 Linear Test : <1.5 %
- 3.7 Capacitance:100nF(maximum)
- 3.8 Electrostatic Discharge Protection : (per EN 61000-4-2)

The touch screen withstands of 15KV air discharge and 8KV contact discharge.

4. Linearity

4.1 Linear Test Specification

- Direction X: <1.5 %
- Direction Y: <1.5 %

4.2 Linearity Test

Apply voltage (DC5V) to upper (or lower) electrodes, output voltage Vx (see Fig.4-1) or Vy (see Fig.4-2) on the other electrodes is measured at every regular intervals.

Linearity is the value of max. error voltage (see Fig. 4-3).

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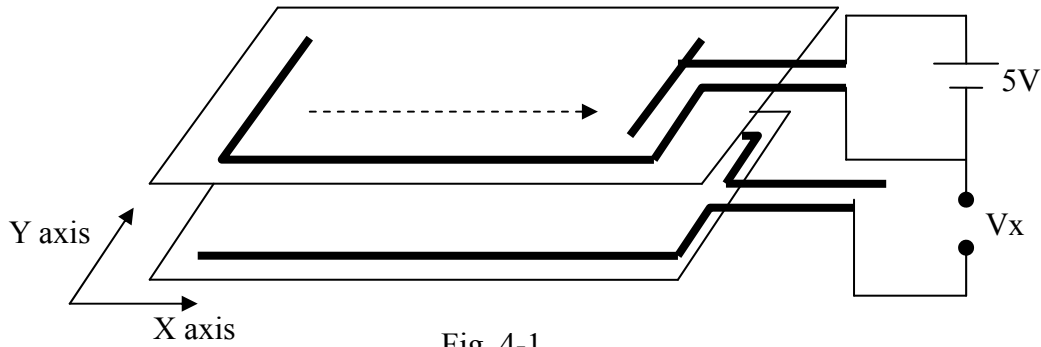


Fig. 4-1

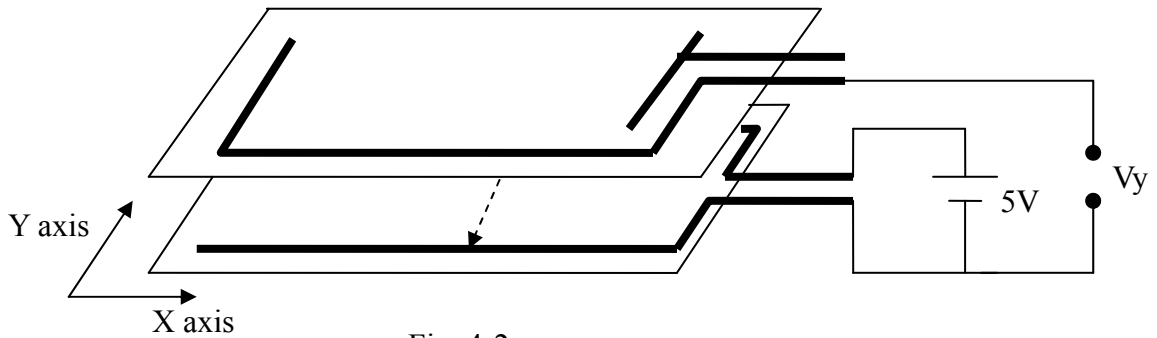
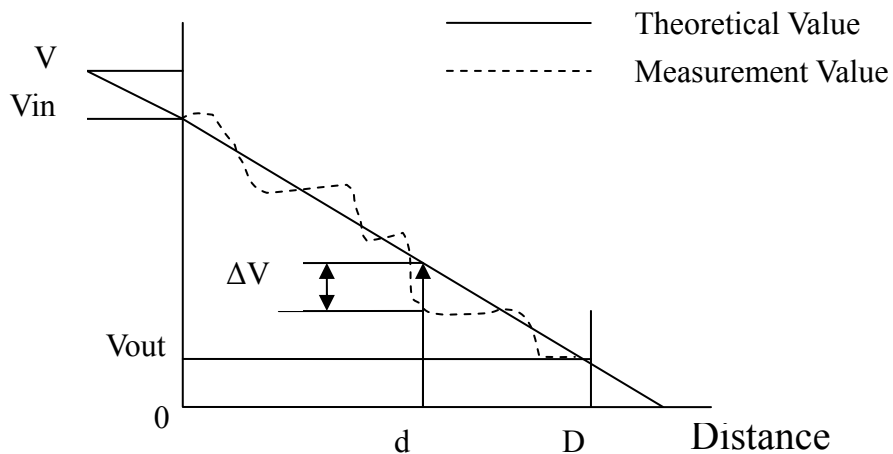


Fig. 4-2



$$\text{Error voltage} = \frac{|\Delta V|}{(V_{in} - V_{out})}$$

$$\text{Max. error voltage} = \frac{|\Delta V_{max}|}{(V_{in} - V_{out})}$$

Fig. 4-3

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5. Environmental Specifications

5.1 Operating Temperature: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$

5.2 Storage Temperature: $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$

5.3 Humidity: if temp. $\geq 20^{\circ}\text{C}$, see Fig.5 below
if temp. $< 20^{\circ}\text{C}$, humidity less than 90% RH
No dew condensation

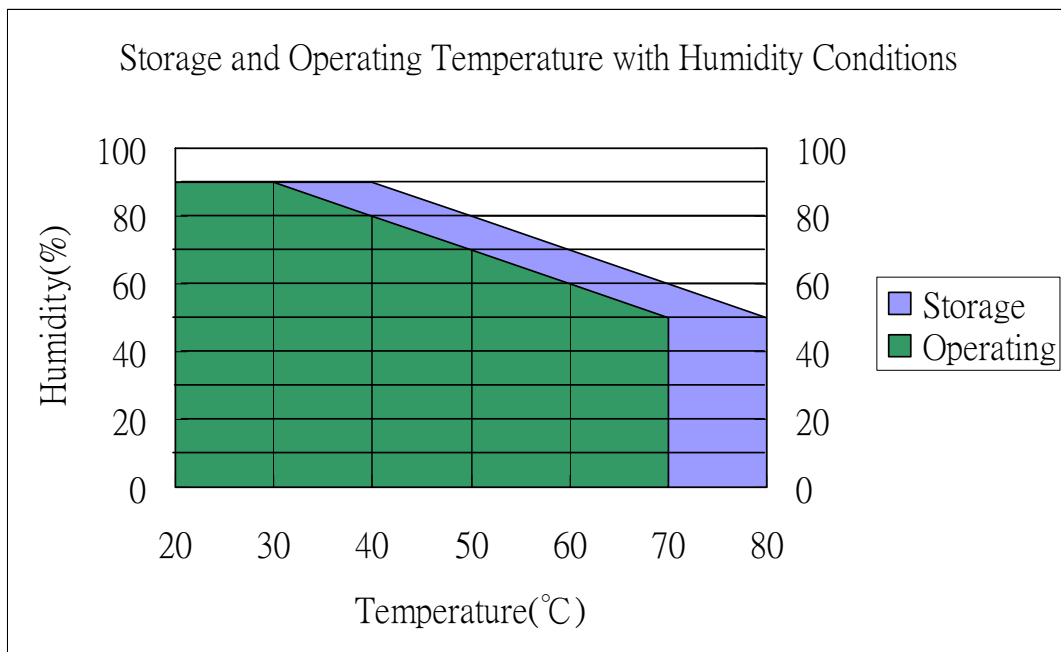


Fig.5 Storage and Operating Temperature with Humidity Conditions

6. Reliability Test

6.1 Exposure to high temperature

Touch panel is put into a test machine at the condition of 80°C for 288 hours. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

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6.2 Exposure to low temperature

Touch panel is put into a test machine at the condition of -40°C for 288 hours. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

6.3 Exposure to constant temperature and humidity

Touch panel is put into a test machine at the condition of 50°C, 80%RH for 288 hours. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

6.4 Thermal Shock

Touch panel is put into a test machine at the condition of -40°C for 30 minutes, and then 80°C for 30 minutes. The process is repeated by 10 cycles. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

7. Durability test:

7.1 Finger touches

Touch panel is hit 10 millions times with a silicone rubber of R8 finger(see Fig.7-1), hitting rate is by 250g at 2 times per second. The measurement must satisfy the following:

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- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

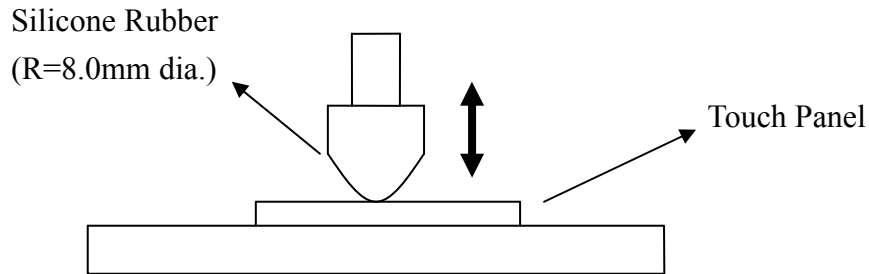


Fig. 7-1

7.2 Stylus writing

Touch panel is drawn by R0.8 Delrin stylus pen, at 250g forces, repeat one inch by 200K times (see Fig.7-2). The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

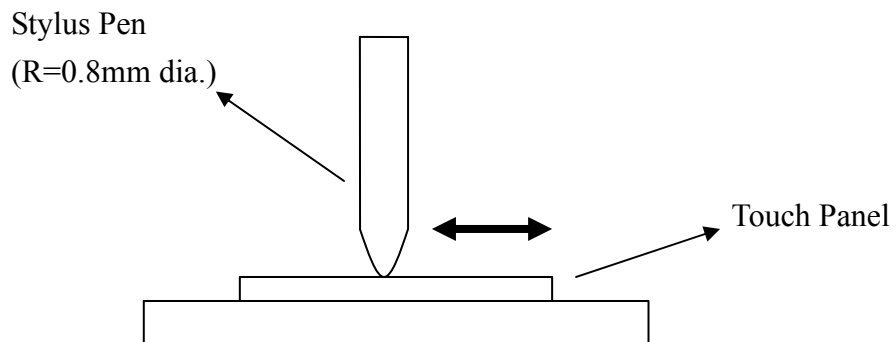


Fig. 7-2

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8. Optical Performance

- 8.1 Optical inspection method and optical defect standards refer to AMT document A001 updated version ; “Touch Screen Optical Quality Standard.”
- 8.2 Outside to Viewing Area: any optical defects in this area need to be ignored if no touch screen function is affected.

9. Others

- 9.1 Always store the touch screen in its original shipping container under normal conditions (Temperature 20~25°C ; Humidity \leq 65%RH).
- 9.2 This Model is RoHS compliant.