

## Analog 4-wire PET-On-Glass Touch Screen Specification

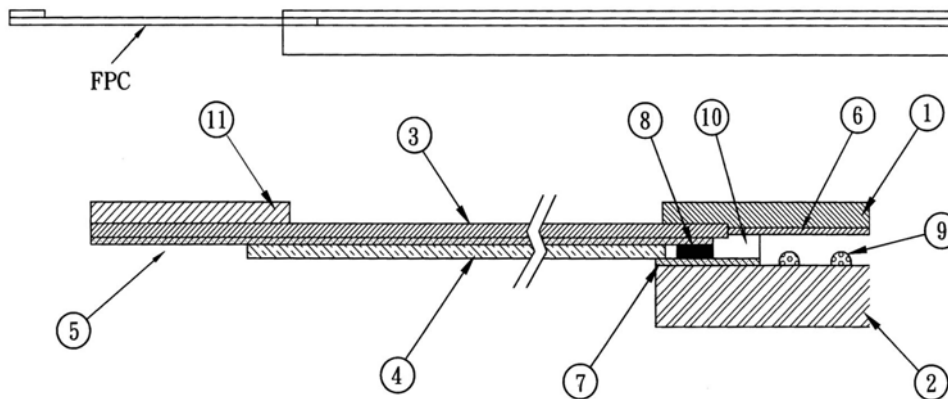
### 1. Mechanical Dimensions and Construction

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

1.2 Construction :

Item	Description	Material	Remarks
1	ITO PET (Top layer)	0.175mm ITO PET Film	Clear coating Surface hardness: 3H Resistance:300~600Ω/□
2	ITO Patterned Glass (Bottom layer)	1.1mm ITO Glass	Resistance:300~600Ω/□
3	Tail Base	Kapton	Separated Tail
4	Tail Coverlay	Kapton	
5	Conductor	Copper	
6	Top layer circuit	Silver ink	
7	Bottom layer circuit	Silver ink	
8	Layer to layer contacted	Silver ink	
9	Dot spacer	UV Cure ink	
10	Isolation Layer	Isolation Adhesive	
11	Stiffener	PET Film	

Touch screen side view:



*Changes that contribute to technical improvement are subject to alternations*

				2002	Datum	Name	<b>TOUCHSCREEN</b> <b>3,85", 4-Wire</b>  SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured bei Apex Material Technology Corp.
				Bearb.	24.10.	Maurer	
				Gepr.	24.10.	Maurer	
				Vert.			
				EDV-Datasheet			
				don't change manually			
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### 1.3 Input Method and Activation Force

Input Method	Average Activation Force
1.6mm dia. Delrin stylus	10~70 grams
16mm dia. Silicon "finger"	10~ 80 grams

## 2. Typical Optical Characteristics

- 2.1 Visible Light Transmission: >80%
- 2.2 Haze: < 3%(JIS K-7105)


## 3. Electrical Specifications

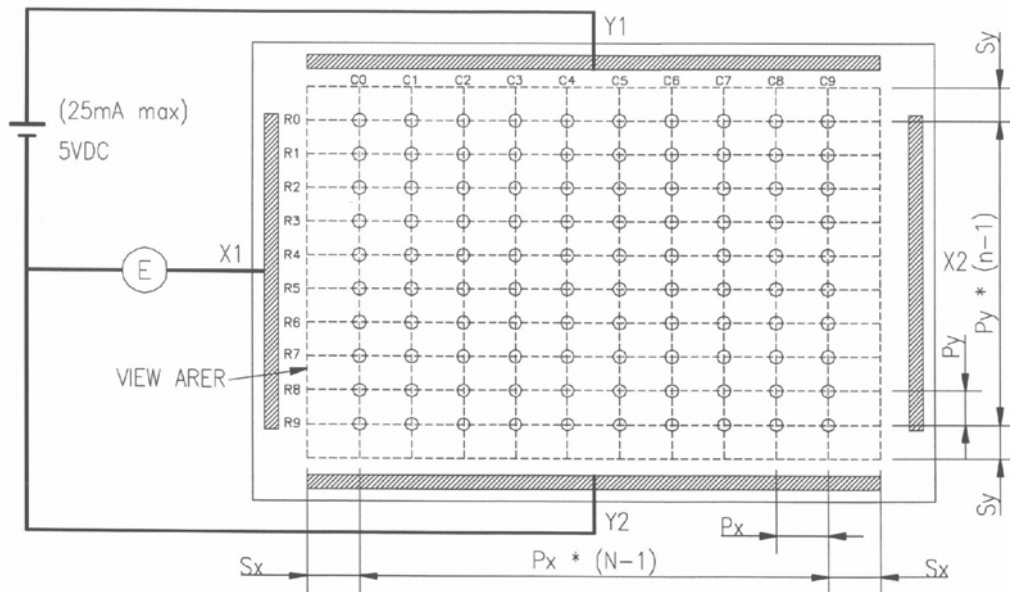
- 3.1 Operating Voltage: 5.5V or less
- 3.2 Contact current: 20mA (maximum)
- 3.3 Circuit close resistance: X : 200~650Ω Y : 400~1000Ω
- 3.4 Circuit open resistance: > 10MΩ at 25VDC
- 3.5 Contact bounce: < 10ms
- 3.6 Linear Test : <1.5 %
- 3.7 Capacitance:100nF(maximum)

## 4. Linearity

- 4.1 Linear Test Specification  
Direction X: <1.5 %  
Direction Y: <1.5 %
- 4.2 Line Test Circuit for Y Coordinate  
Add 5V between Y1 and Y2 touch the point C0R0 to C9R9 separately, and measure the voltage from X1 as the following drawing.

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- 4.3 Calculate Linearity : For the First Row0  
 $R0_{avg} = (VC0 + VC1 + VC2 + \dots + VC9) \div 10$   
 $R0_{max}$  = The maximum voltage in Row 0  
 $R0_{min}$  = The minimum voltage in Row 0  
 $R0 \text{ linear1} = |R0 \text{ max} - R0 \text{ avg.}| \div R0 \text{ avg.} * 100\%$   
 $R0 \text{ linear2} = |R0 \text{ min} - R0 \text{ avg.}| \div R0 \text{ avg.} * 100\%$   
 $R0 \text{ linear} = \max(R0 \text{ linear1}, R0 \text{ linear2})$

- 4.4 For X Coordinate Test  
 Add 5 voltage between X1 and X2 touch the point C0R0 to C9R9 separately and measure the voltage from Y1 as the above drawing

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- 4.5 Calculate Linearity : For the First Column0  
 $C0_{avg} = (VR0 + VR1 + VR2 + \dots + VR9) \div 10$   
 $C0_{max}$  = The maximum voltage in Column 0  
 $C0_{min}$  = The minimum voltage in Column 0  
 $C0 \text{ linear1} = |C0 \text{ max} - C0 \text{ avg.}| \div C0 \text{ avg.} * 100\%$   
 $C0 \text{ linear2} = |C0 \text{ min} - C0 \text{ avg.}| \div C0 \text{ avg.} * 100\%$   
 $C0 \text{ linear} = \max(C0 \text{ linear1}, C0 \text{ linear2})$


**5. Environment Specification**

- 5.1 Operating Temperature - 10° C ~ + 60° C Humidity less than 90% RH  
 5.2 Storage Temperature - 20° C ~ + 80° C at Ambient Humidity

**6. Reliability Test**

- 6.1 Exposure to high temperature  
 Touch panel is put into a test machine at the condition of 80° for 120 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
- 6.2 Exposure to low temperature  
 Touch panel is put into a test machine at the condition of -20° for 120 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 60°, 90%RH for 120 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 -20° for 30 minutes, and then 80° 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

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- 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, hitting rate is by 250g at 2 times per second. 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

7.2 Stylus writing

Touch panel is drawn by R0.8 Derlin stylus pen, at 250g forces, repeat one inch by 100K times. 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

**8. Optical Performance**

8.1 Optical inspection method and optical defect standards refer to document. A001-1 □  
Touch Screen Optical Quality Standard.□

8.2 Outside to Viewing Area: any optical defected in this area need to be ignored if no effected to touch screen function.

8.3 Silver Bus Pattern defect : Voids in traces to be less than 50% of the trace width.

8.3.1 Silver Bus Pattern gap: >0.1mm

8.3.2 Silver Bus and Active area gap: No silver ink may project beyond the viewing area.

8.4 Glass defects such as edge chips and scratches refer to A001-1.□Touch Screen Optical Quality Standard.□


8.5 Others

8.5.1 Folding line should be avoided on the pressure sensitive adhesive.

8.5.2 Refer to document A001-1 Touch Screen Optical Quality Standard.

8.5.3 Always store the touch screen in its original shipping container under normal conditions  
(20~25°C, 65% RH)

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