

# **ANALOG TOUCH PANEL summary**



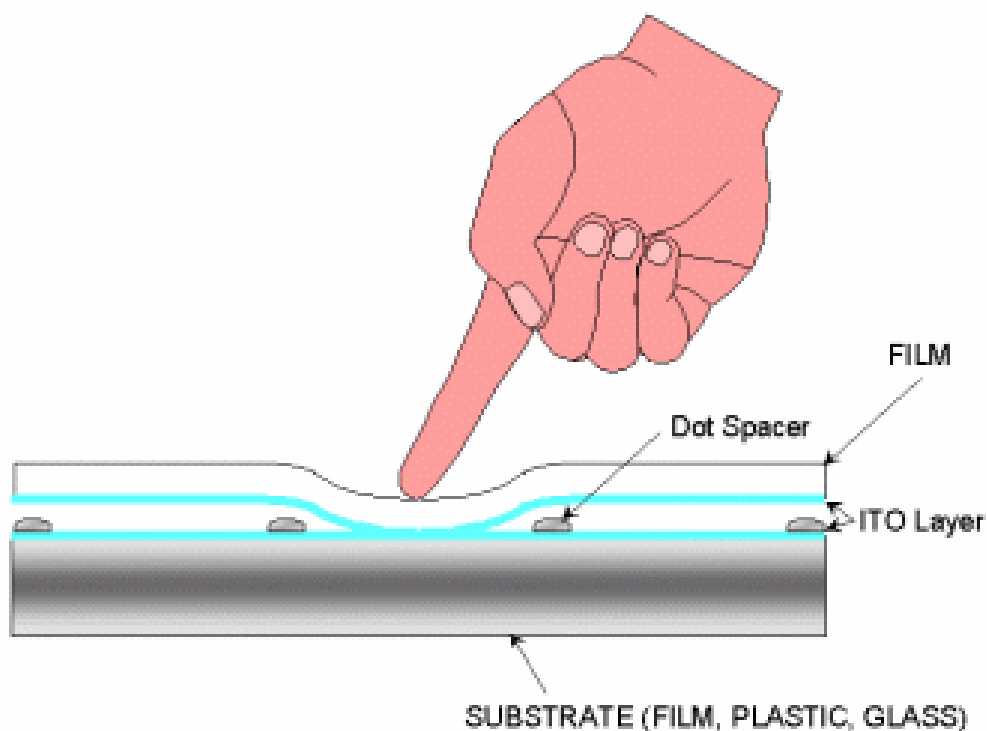
## Resistive Overlay TYPE

Touch screen 에는 그 작동 방식에 따라 저항막방식, 정전용량방식, 4 선방식, 5 선방식, 초음파방식, 광(적외선)방식등으로 나뉘어진다. 대표적인 방식 및 방법에 대해서 이하에 설명한다.

저항막 방식은 투명전극(ITO Metal Layer)층이 코팅 되어있는 두 장의 기판을 Dot Spacer 를 사이에 두고 투명 전극 층이 서로 마주보도록 합착시키는 구조로 이루어져 있다.

동작 원리로는, 한쪽의 투명 전극 상에 위치 검출을 위한 전기 신호가 인가되고 아래 그림과 같이 손가락 또는 펜에 의해 상부 기판의 투명 전극층이 하부 기판의 투명 전극층과 접촉되었을 때, 반대쪽 투명 전극상에서 그 전기적 신호를 검출한다.

이 때 검출된 전기적 신호의 크기를 이용하여 위치를 결정하게 된다.



## 4-WIRE TYPE

4선 저항막 방식 패널은 스크린 인쇄 기법을 이용하여 아래 그림과 같이 상하 투명 전극의 모서리 위에 Silver를 프린트하여 전극을 완성한다.

Silver 패턴은 한 기판상에서는 평행하게 정렬시키고, 상하 기판상에서는 수직인 방향으로 인쇄되는 구조로 되어 있다.

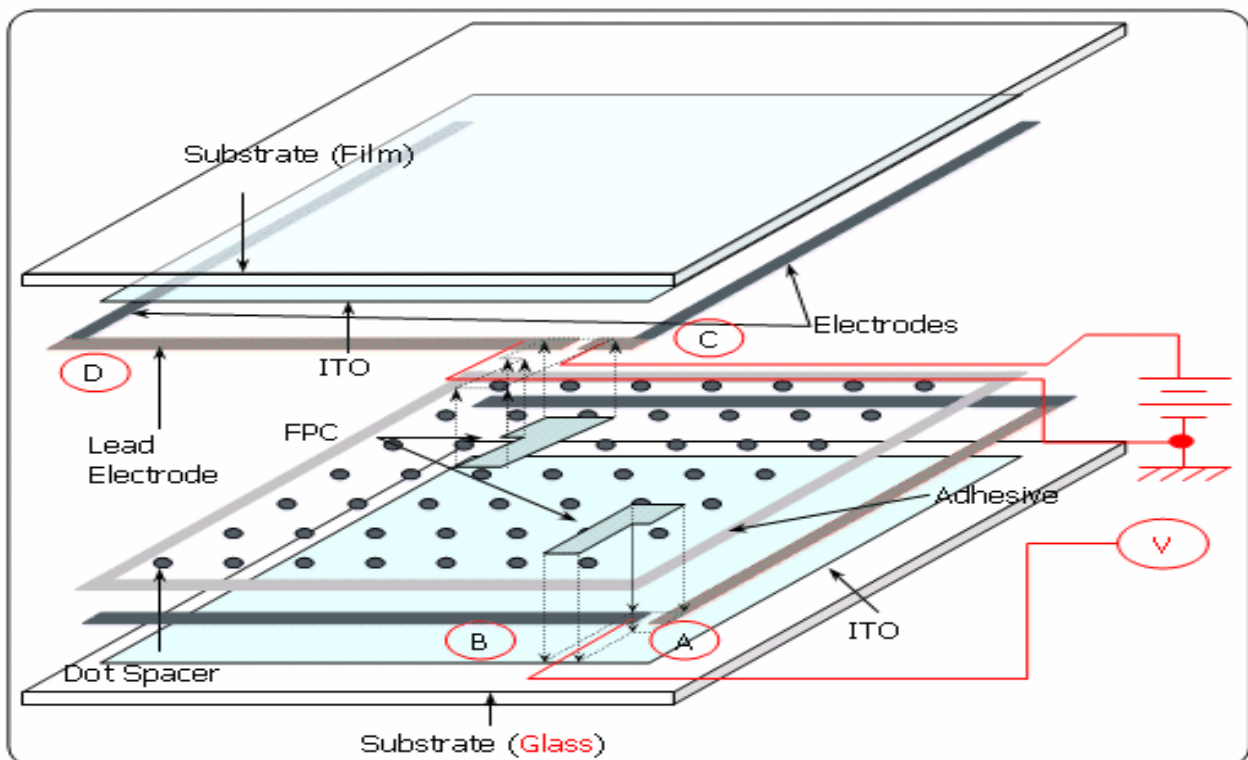
Dot Spacer는 상하 기판 사이의 전기적 절연을 위하여 설치한다.

X, Y축 위치 검출은 다음과 같은 방법에 의해 결정된다.

먼저 X축 위치 검출은, 그림과 같이 하부 기판의 Silver전극에 전기적 신호를 인가하고 펜 또는 손가락에 의해 상하 투명전극이 접촉되었을 때, 상부 기판의 투명전극에서 접촉된 하부 기판의 전기적 신호를 검출한다.

Y축 위치 검출은 반대로 상부 기판의 Silver전극에 전기적 신호를 인가하고 하부기판의 투명전극에서 상부 기판의 전기 신호를 감지함으로써 결정할 수가 있다.

위와 같이 검출된 아날로그 신호는 디지털화 처리를 거쳐 시스템 본체에 전달되고, 시스템 본체에서 계산을 통하여 화면상에 위치를 표시하게 된다.



# **ANALOG TOUCH PANEL Description**



## **1. Range of Application**

This specification is applied to A-touch Product No. **A070-26B**.

## **2. Warranty**

Touch Panel products manufactured to this specification shall be warranted for a minimum period of 12 months from the date of shipping from A-touch when stored or used as specified under normal conditions within the contents of these sheets.

## **3. Shape**

Shape, structure and Dimension are referred to the proper Drawing No. **A070-26B -00**.

## **4. Rating**

### **4.1 Maximum voltage and current**

Less than DC 7V, 1mA at the contact point of top layer and bottom layer

### **4.2 Operation temperature & Humidity**

Temperature : From -20℃ to +60℃ (No Condensation)

Humidity : Less than 90% RH (No Condensation)

### **4.3 Storage temperature & Humidity**

Temperature : From -30℃ to +70℃ (No Condensation)

Humidity : Less than 90% RH (No Condensation)

## **5. Electrical**

### **5.1 Terminal resistance unit of measurement**

Between X1 and X2 : **100 ~ 1200 Ω**

Between Y1 and Y2 : **100 ~ 1200 Ω**

### **5.2 Linearity**

X axis : ±1.5% or less

Y axis : ±1.5% or less

\* Measurement as per attached Appendix 1.

### **5.3 Insulation resistance**

Minimum 10MΩ at DC 25V

### **5.4 Chattering time**

10msec or less at 100kΩ pull-up

## **6. Mechanical performance**

### **6.1 Input method**

R0.8 stylus pen or finger

## 6.2 Activation force

Input with stylus : **110g** or less (R0.8 Polyacetal stylus)

Input with finger : **110g** or less (R8.0 Hs40 Silicon rubber)

## 6.3 Transparency(JIS-K7105)

**80%** (Typical)

(Measuring equipment : NIPPON DENSYOKU Haze-meter)

## 6.4 Surface hardness

Pencil hardness **3H** or more according to JIS-K5400.

# 7. Reliability

※ The measurement must satisfy the following:

▶ Resistance between terminals : According to Section 5.1

▶ Linearity : According to Section 5.2

▶ Insulation Resistance : According to Section 5.3

※ Except for appearance issues. Only functional performance.

## 7.1 Exposure to high Temperature

Put it in a vessel at the condition of 80℃ for 240 hours, and then leave it at room temperature for 24 hours or more.

## 7.2 Exposure to Low Temperature

Put it in a vessel at the condition of -40℃ for 240 hours, and then leave it at room temperature for 24 hours or more.

## 7.3 Exposure to constant high temperature and high humidity

Put it in a vessel at the condition of 60℃, 90%RH for 240 hours, and then leave it at room temperature for 24 hours or more.

## 7.4 Repetition of High and Low Temperature

Put it in a vessel at the condition of -40℃ for 30 minutes and then 80℃ for 30 minutes. This Process is repeated 10 cycles.

Then it is left at room temperature for 24 hours or more.

## 8. Durability

※ The measurement must satisfy the following:

- ▶ Resistance between terminals : According to Section 5.1
- ▶ Linearity : According to Section 5.2
- ▶ Insulation Resistance : According to Section 5.3
- ▶ Activation force : According to Section 6.2

※ Except for appearance issues. Only functional performance.

### 8.1 Writing friction

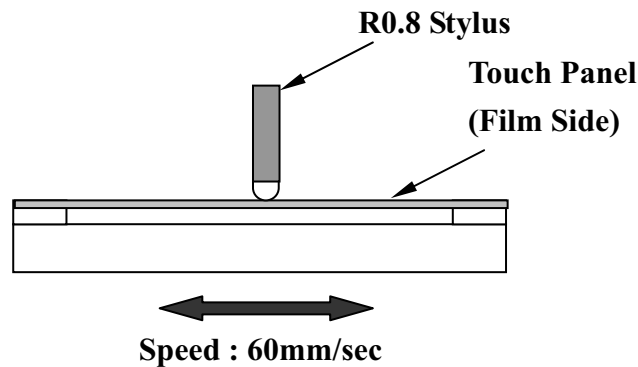
Write **100,000** capital or small alphabetical characters with a stylus in an area 20mm ×20mm.

Stylus is used as below on the following conditions:

Pen: 0.8R Polyacetal stylus      Loads : 250gf

Speed: 60mm/sec

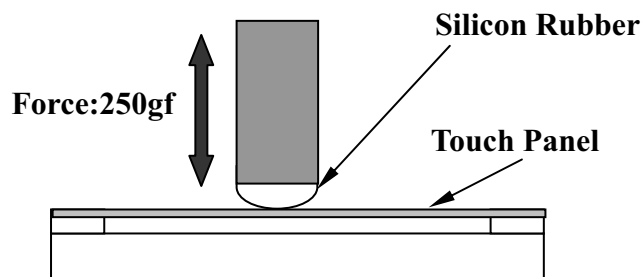
Measurement position: Center of Touch Panel



### 8.2 Finger touches

Punching **1,000,000** times with a silicon rubber R8.0, hardness of 60°.

Force : 250g, Speed : 2 times per second



### 8.3 Flexible tail peeling strength

400g/cm or more

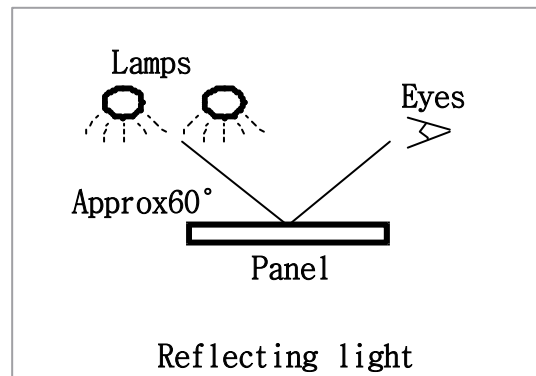
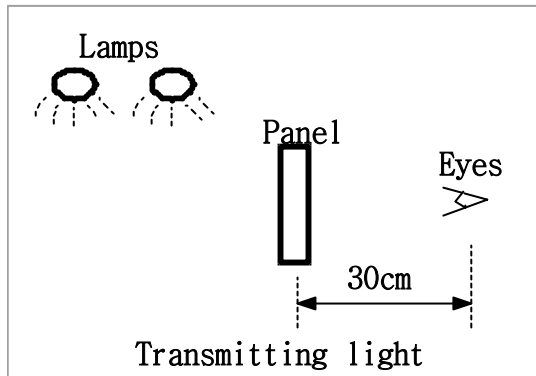
(peeling upward by 90° deg. in the direction of X, speed: 50mm/min)

## 9. Cosmetic inspection criterion

The followings are applied to the viewing area only. Those in the non-viewing area are ignored as long as the electrical performance of the touch panel is normal. W=Width, L=Length, T=Thickness. Contamination that can be cleaned using a soft cloth with ethyl alcohol does not apply to these inspection criterion. But if an object is in the viewing area after rubbed by the soft cloth to a direction 3 times longer, it is considered a linear foreign object.

### ► Inspection condition

The inspection shall be performed by using two 14W fluorescent lamps.  
The panel shall be placed at 30cm away from eyes as shown below.



### 9.1 Granular foreign object

CRITERION	DECISION
$D \leq 0.20\text{mm}$	The object is ignored.
$0.20\text{mm} < D \leq 0.30\text{mm}$	$N \leq 3$ , it is ignored.
$0.30\text{mm} < D$	The T/P is regarded as defective.

A diagram of an oval-shaped granular foreign object. The horizontal major axis is labeled 'X' and the vertical major axis is labeled 'Y'. To the right of the diagram, the text reads: **D = Major axis in X, Y**

### 9.2 Liner foreign object

CRITERION	DECISION
$W \leq 0.05\text{mm} \text{ \& } L \leq 3\text{mm}$	The object is ignored.
$0.05\text{mm} < W, \text{ \& } L > 3\text{mm}$	The T/P is regarded as defective.



### 9.3 Scratch

CRITERION	DECISION
$W \leq 0.05\text{mm} \text{ \& } L \leq 3\text{mm}$	The object is ignored.
$0.05\text{mm} < W, \quad L > 3\text{mm}$	The T/P is regarded as defective.

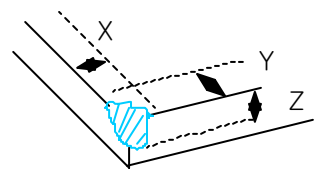
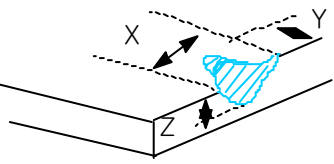
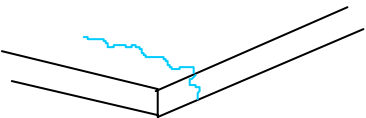
### 9.4 PET Bubbles

CRITERION	DECISION
$D \leq 0.3\text{mm}$	The object is ignored.
$0.3\text{mm} < D$	The T/P is regarded as defective.

### 9.5 Dent

CRITERION	DECISION
$D \leq 0.2\text{mm}$	The object is ignored.
$0.2\text{mm} < D$	The T/P is regarded as defective.

### 9.6 Glass breakage

CRITERION	DECISION	
Corner breakage		$X \leq 2.0\text{mm}$ and $Y \leq 2.0\text{mm}$ and $Z \leq T$ It is ignored
Side breakage		$X \leq 2.0\text{mm}$ and $Y \leq 2.0\text{mm}$ and $Z \leq T$ It is ignored
Progressive		It is regarded as defective.

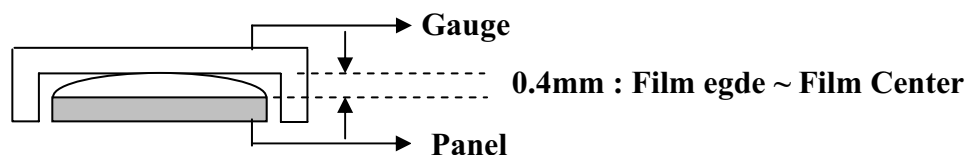
### 9.6 Newton's Ring

Subject to limited sample agreed between buyer and manufacturer.

CRITERION	DECISION	DEMARK
Newton's ring	The T/P is regarded as defective.	Incoming inspection

### 9.7 Bagginess

Check bagginess with 0.4mm gauge.



## **10. Inspection**

### **10.1 Resistance between terminals**

**Criterion : According to section 5.1.**

**All the Touch Panels are inspected.**

### **10.2 Linearity**

**Criterion : According to section 5.2.**

**All the Touch Panels are inspected.**

### **10.3 Insulation resistance**

**Criterion : According to section 5.3.**

**All the Touch Panels are inspected.**

### **10.4 Appearance**

**Criterion : According to section 9.**

**All the Touch Panels are inspected.**

## 11. Handling Remarks

### 11-1. Storage

- ▶ Store touch panels in boxes at storage temperature.
- ▶ Please do not expose touch panels to a direct ray of the sun.
- ▶ Do not give shock and vibration to the touch panels.

### 11-2. Unpacking

- ▶ Open the box after checking the up/down indicator.
- ▶ Please do not touch where FPC tails in order to avoid disconnection.

### 11-3. Handling

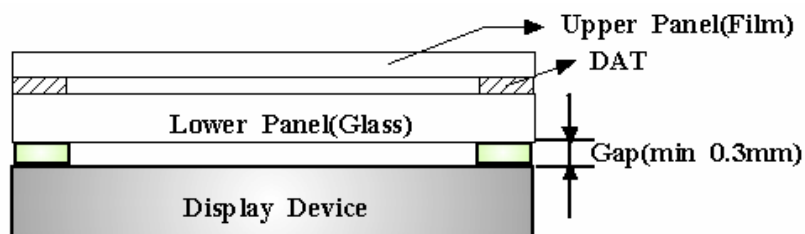
- ▶ Use gloves and masks when handing touch panels.
- ▶ Please do not hole FPC tails on handling touch panels .
- ▶ Hold touch panels around outside of viewing area.
- ▶ Please do not pile touch panels onto other touch panels.
- ▶ Please do not put heavy objects on touch panels.
- ▶ Clean off touch panels with soft clothes with alcohol when surface is dirty.
- ▶ Please do not use organic solvents except alcohol.

### 11-4. Assembly

- ▶ Please design housing which minimizes stress onto touch panels.
- ▶ Please pay attention not to harm touch panels with your tools which may be used for assembling.
- ▶ Please pay attention not to create any stress to the heat-sealed tails.

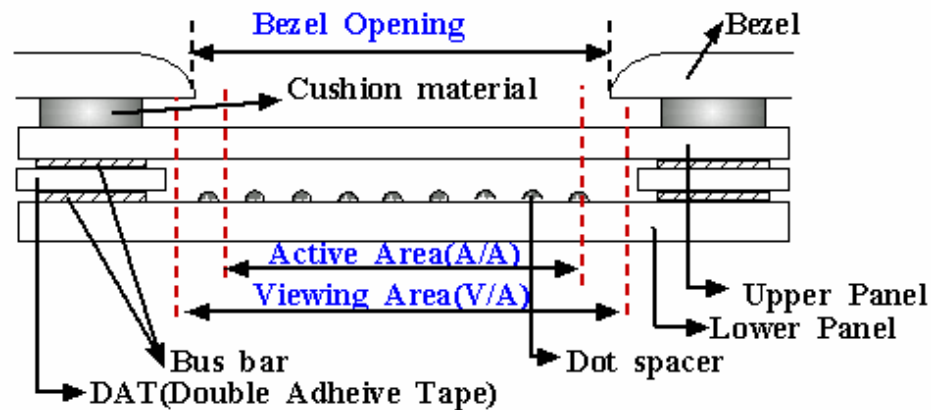
### 11-5. Housing design

- ▶ Keep the gap(over 0.3mm) between the touch panel and flat-panel display to protect a display device.



- ▶ Keep the gap(over 0.3mm) between the bezel edge and touch panel surface.  
The reason is to prevent the bezel edge from contacting touch panel surface which may cause a short with the bottom layer.

- We recommend the use of a cushion material between the touch panel and the bezel.



- The cushion material should be limited only on the busbar area. If it is out of the busbar area, a short may occur.

#### 11-6. Operation

- Please do not operate touch panels by applying excessive force.
- Please do not use a sharp things except finger or R0.8 polyacetal
- We recommend calibration after long term use tip pen for input.

#### 12. Others

##### 12.1 This specification shall guarantee the quality of the product.

When using the products, be sure to check and evaluate after installing on your equipment.

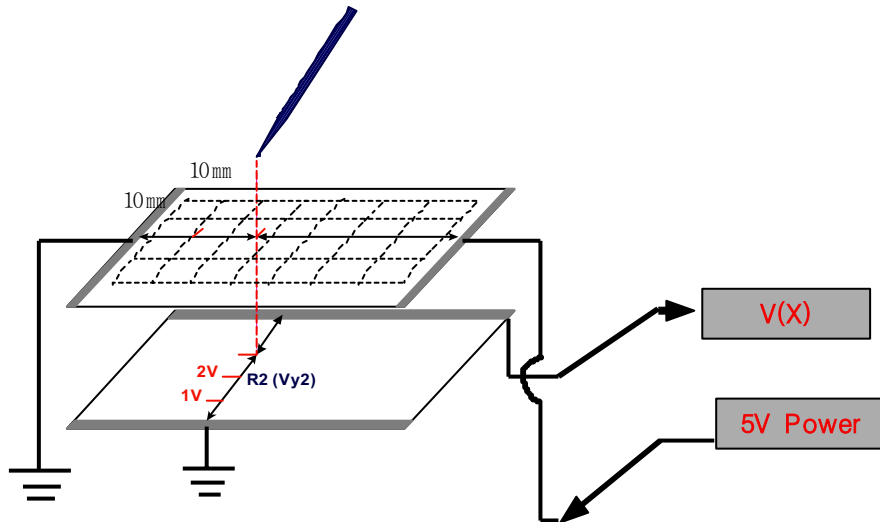
##### 12.2 After evaluation, please return approval sheet or our specification submitted, with approval stamp on it.

##### 12.3 Any changes of the approved specification are subject to agreement prior to the actual changes.

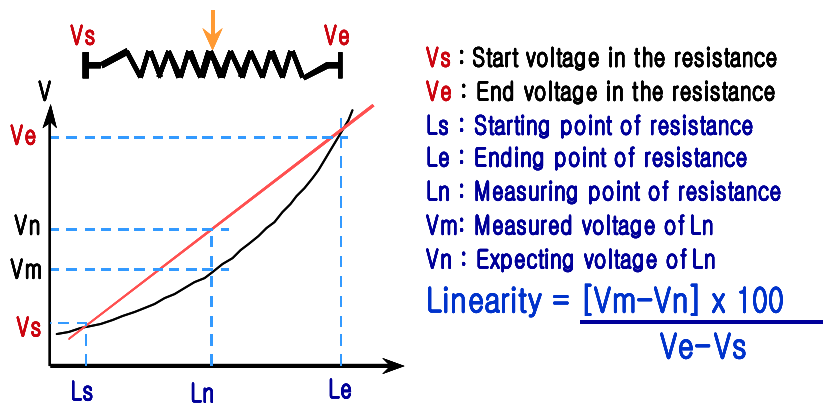
## Appendix 1 ; Linearity

Voltage (DC 5volt) is applied to the top electrode.

Output Voltage  $V(X)$  on the bottom electrode is measured at every crossing point.



Linearity is measured by ;

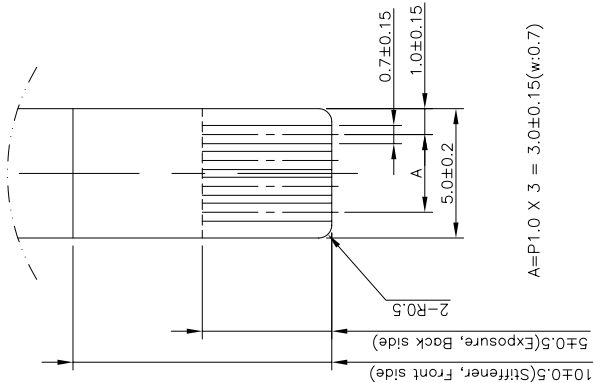


For the Y axis direction, exchange the voltage input direction, and measure the voltage in the same way.

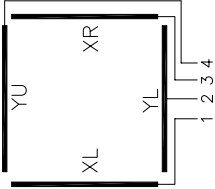
REMARK

- 1. Film Type : Non-Glare Type
- 2. Glass THK : 0.7mm
- 3. Total THK : 0.95 ±0.15
- 4. Linearity : ±1.5% or less
- 5. Transmittance : 80%(Typical)
- 6. Resistance : 100 < Film(TOP) < 1200ohm  
100 < Glass(BOTTOM) < 1200ohm
- 7. Connector : FPC

Detail AA (Scale=5/1)

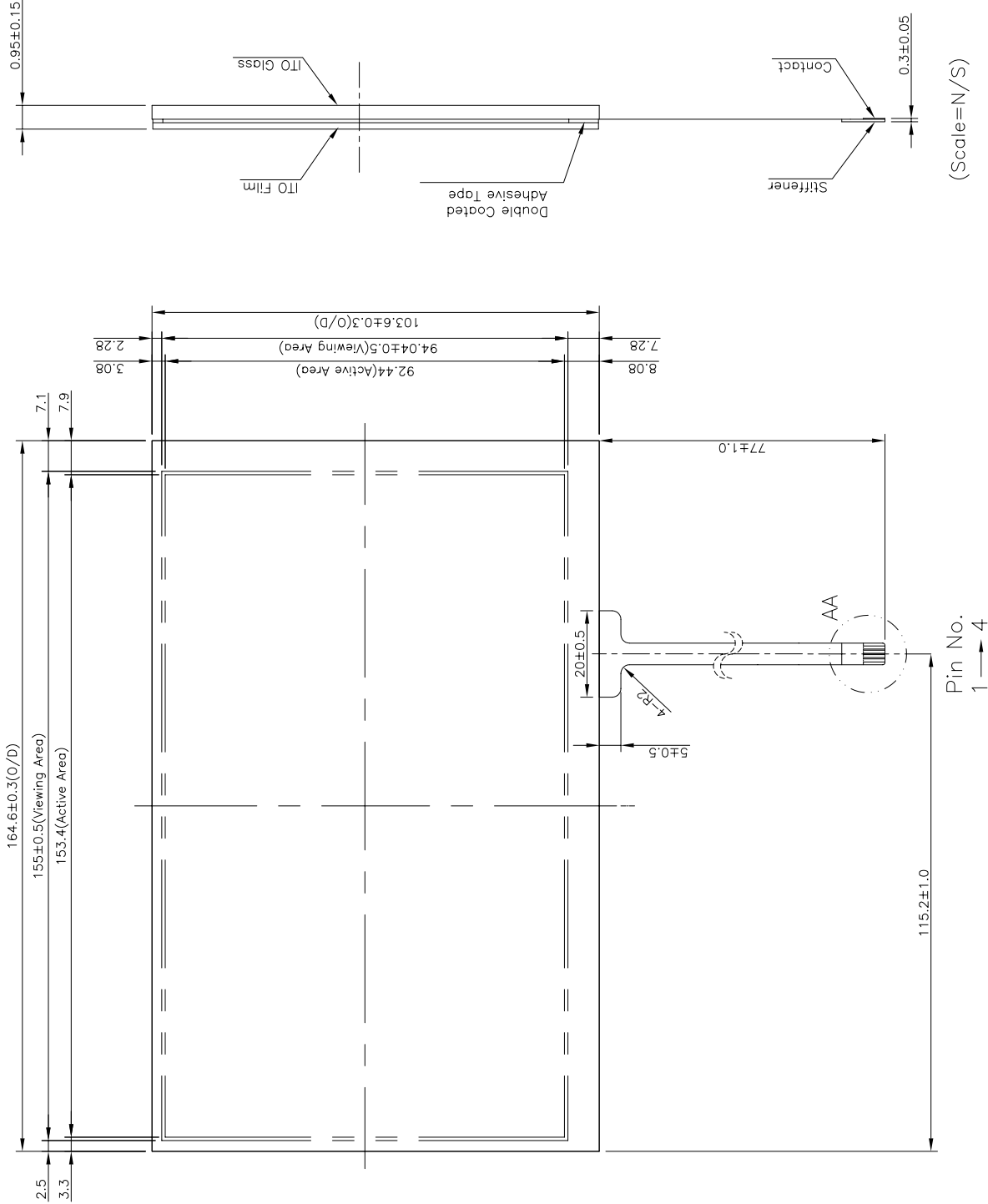


Circuit Diagram



Signal Assignment

Pin No.	Signal
1	XL
2	YL
3	XR
4	YU



(Scale=N/S)

DESIG.	G. L. LEE	DARW. NO.	A070-26B-00
CHEKD.	S. H. LEE		
APPRD.		MODEL	A070-26B
DATE	2006.11.22		
DIM	SIZE	STD.TOL	SCALE
MM	A3	±0.3	1 : 1



REVISION DESCRIPTIONS

REV. DATE