

**FORENEX**

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**SPECIFICATION**

|                    |                           |
|--------------------|---------------------------|
| <b>CUSTOMER :</b>  |                           |
| <b>MODULE NO.:</b> | <b>TS104-SJAWI01-PCT+</b> |

**I2C interface/ white print cover Len**

|                                  |                    |
|----------------------------------|--------------------|
| <b>APPROVED BY:</b>              | <b>PCBVERSION:</b> |
| <b>( FOR CUSTOMER USE ONLY )</b> | <b>DATA:</b>       |

| <b>SALES BY</b> | <b>APPROVED BY</b> | <b>CHECKED BY</b> | <b>PREPARED BY</b> |
|-----------------|--------------------|-------------------|--------------------|
|                 |                    |                   |                    |
| <b>ISSUED</b>   |                    |                   |                    |
| <b>DATE:</b>    |                    |                   |                    |

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MODLE NO :

**RECORDS OF REVISION**

**DOC. FIRST ISSUE**

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|---------|------------|---------------------|-------------|
|         | 2013/05/31 |                     | First Issue |



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### 3. Interface

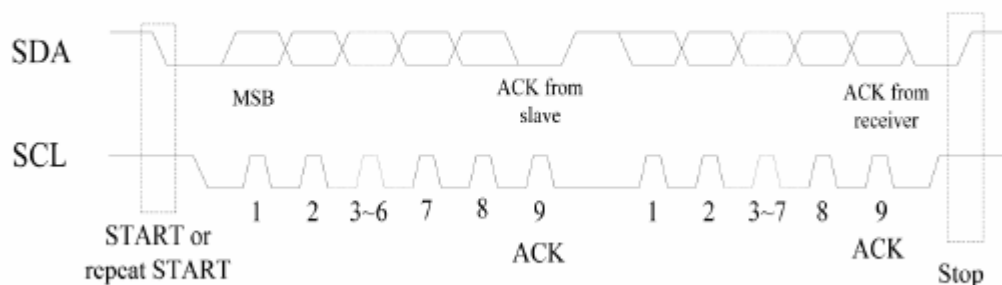
#### 3.1 Pin Define

| Pin No. | Symbol | Description       | Remark |
|---------|--------|-------------------|--------|
| 1       | SDA    | No connection     | Note1  |
| 2       | SCL    | No connection     |        |
| 3       | RESET  | Differential "1"  |        |
| 4       | INT    | Differential "0"  |        |
| 5       | VCC    | Power supply 3.3V |        |
| 6       | GND    | Power ground      |        |

Note1: This is a very low-power mode because all circuit clocks and all peripherals are stopped. Only some service blocks remain active.

#### 3.2 I2C Interface

##### 3.2.1 I2C Serial Data Transfer Format

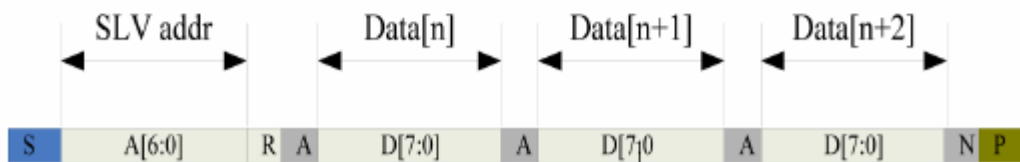




### 3.2.2 I2C master write, slave read



### 3.2.3 I2C master read, slave write



### 3.2.4 Mnemonics Description

| Mnemonics | Description  |
|-----------|--|
| S         | I2C Start or I2C Restart   |
| A[6:0]    | Slave address<br>A[6:4]: 3'b011<br>A[3:0]: data bits are identical to those of I2CCON[7:4] register.   |
| W         | 1'b0: Write  |
| R         | 1'b1: Read   |
| A(N)      | ACK(NACK)  |
| P         | STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet) |

**3.2.5 I2C Timing Characteristics**

| No | Parameter  | Unit | Min. | Max. | Remark |
|----|--|------|------|------|--------|
| 1  | SCL frequency                                    | KHz  | 0    | 400  |        |
| 2  | Bus free time between a STOP and START condition | us   | 4.7  | /    |        |
| 3  | Hold time (repeated) START condition             | us   | 4.0  | /    |        |
| 4  | Data setup time                                  | Ns   | 250  | /    |        |
| 5  | Setup time for a repeated START condition        | us   | 4.7  | /    |        |
| 6  | Setup Time for STOP condition                    | us   | 4.0  | /    |        |



## 4. Characteristics

### 4.1 Environmental characteristics

| No | Specification         | Value  | Remark          |
|----|-----------------------|--|-----------------|
| 1  | Operating Temperature | -10°C ~+60°C   | No condensation |
| 2  | Operating Humidity    | -10°C to 50°C Less than 90%RH<br>Exceeding 60°C Less than 133.8g/m <sup>3</sup>  |                 |
| 3  | Storage Temperature   | -20°C~+70°C  |                 |
| 4  | Storage Humidity      | -20°C to 60°C Less than 95%RH<br>Exceeding 60°C Less than 142.9g/m <sup>3</sup>  |                 |
| 5  | Chemical Resistance   | Toluene, Trichloroethylene, Acetone, Alcohol, Gasoline, Machine Oil, Ammonia, Glass Cleaner, Mayonnaise, Ketchup, Wine, Salad Oil, Vinegar, Lipstick, etc. |                 |

### 4.2 Mechanical characteristics

| No | Item                   | Specification       | Remark                |
|----|------------------------|---------------------|-----------------------|
| 1  | Surface Hardness       | Over 6H             | JIS K5400             |
| 2  | Operating Life         | 50,000,000 times    | Finger input          |
| 3  | FPC Peeling Strength   | 500 g               | Peeling upward by 90° |
| 4  | FPC Bending Strength   | Bending 3 times     | R 1.0mm, 90°          |
| 5  | Light Transmittance    | 90%                 | Full wavelength       |
| 6  | Electrode Matrix Pitch | Approximately 5~7mm |                       |





### 4.3 Electrical characteristics

| No | Item   | Symbol           | Unit | Min. | Typ.    | Max. | Remark                            |
|----|--|------------------|------|------|---------|------|-----------------------------------|
| 1  | Power supply voltage                           | VDD              | V    | 2.7  | 2.8~3.6 | 3.7  | Note1                             |
| 2  | Current consumption<br>(Normal operation mode) | I <sub>OPR</sub> | mA   |      | 6       |      | VDD=2.8V<br>Ta=25°C<br>MCLK=24MHz |
| 3  | Current consumption<br>(Monitor mode)          | I <sub>MON</sub> | mA   |      | 4       |      | VDD=2.8V<br>Ta=25°C<br>MCLK=24MHz |
| 4  | Current consumption<br>(Sleep mode)            | I <sub>SLP</sub> | mA   |      | 0.03    |      | VDD=2.8V<br>Ta=25°C<br>MCLK=24MHz |

Note1: If used beyond the absolute maximum ratings, Controller may be permanently damaged. It is strongly recommended that the device be used within the electrical characteristics in normal operations. If exposed to the condition not within the electrical characteristics, it may affect the reliability of the device.



## 5. Test Conditions

### 5.1 Mechanical Test

#### 5.1.1 Operating Life test

Condition: Testing rod: Refer to Figure 1

Load: 3N

Cycle: 2 hits/sec

Silicon Rubber  
(Hardness: 60°)  
Tip: R = 4.0



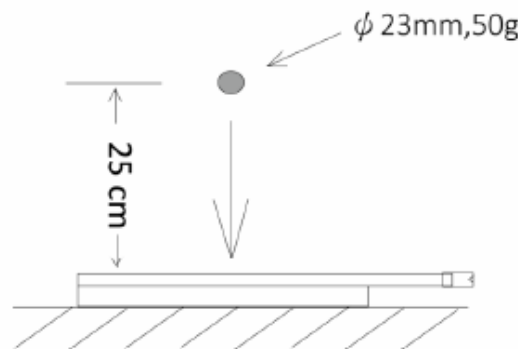
Figure 1. Testing rod 1

Judgment: Must operate properly after the test

#### 5.1.2 Impact Test

Steel ball 50g, diameter 23mm, height 25cm.

One time impact at center area, no damage.



### 5.2 Environmental Test

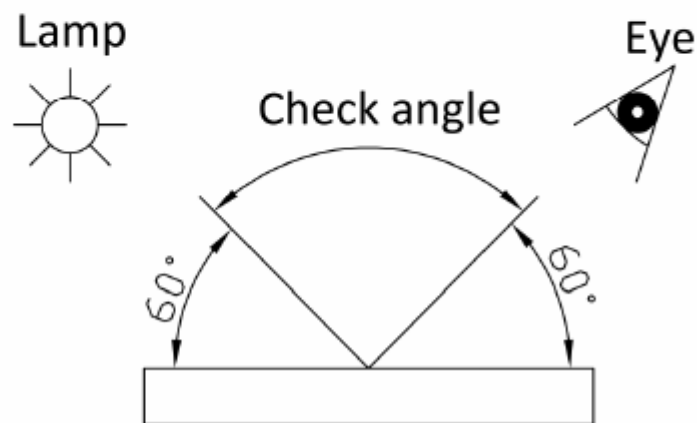
| No | Item                                   | Specification   | Remark           |
|----|--|---|------------------|
| 1  | High temperature storage               | 70°C, 240 hr<br>(Confirm after 4hr room temp.)                            | No condensation. |
| 2  | Low temperature storage                | -20°C, 240 hr<br>(Confirm after 4hr room temp.)                           |                  |
| 3  | High temperature high humidity storage | 40°C, 80%RH, 240 hr<br>(Confirm after 24hr room temp.)                    |                  |
| 4  | Thermal Cycling                        | -20°C ~+70°C (30min each),<br>10cycles<br>(Confirm after 24hr room temp.) |                  |



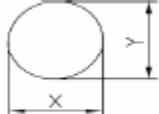

## 6. Appearance

### 6.1 Inspection Method

- (A) The lightness of place: 500~800 LUX
- (B) The distance of eyeshot: 30 CM
- (C) The angle of eyeshot: >60°
- (D) Inspection time: 10 sec



### 6.2 Inspection Standard

| No | Item                    | Specification                      | Allowance | Remark   |
|----|-------------------------|------------------------------------|-----------|--|
| 1  | Granular foreign object | $D > 0.5\text{mm}$                 | 0         | <br>$(X+Y)/2 = D$ |
|    |                         | $0.3 < D \leq 0.5$                 | 5         |  |
|    |                         | $D \leq 0.3\text{mm}$              | Ignore    |  |
| 2  | Linear foreign matter   | $W > 0.1\text{mm}, L > 5\text{mm}$ | 0         | $W = \text{Width}$<br>$L = \text{Length}$  |
|    |                         | $0.05 < W \leq 0.1, L \leq 5$      | 5         |  |
|    |                         | $W < 0.05\text{mm}$                | Ignore    |  |
| 3  | Scratch                 | $W > 0.1$                          | 0         |  |
|    |                         | $0.05 < W \leq 0.1, L \leq 5$      | 5         |  |
|    |                         | $W \leq 0.05$                      | Ignore    |  |
| 4  | Bubble                  | $D > 0.5$                          | 0         | <br>$(X+Y)/2 = D$ |
|    |                         | $0.3 < D \leq 0.5$                 | 5         |  |
|    |                         | $D \leq 0.3$                       | Ignore    |  |



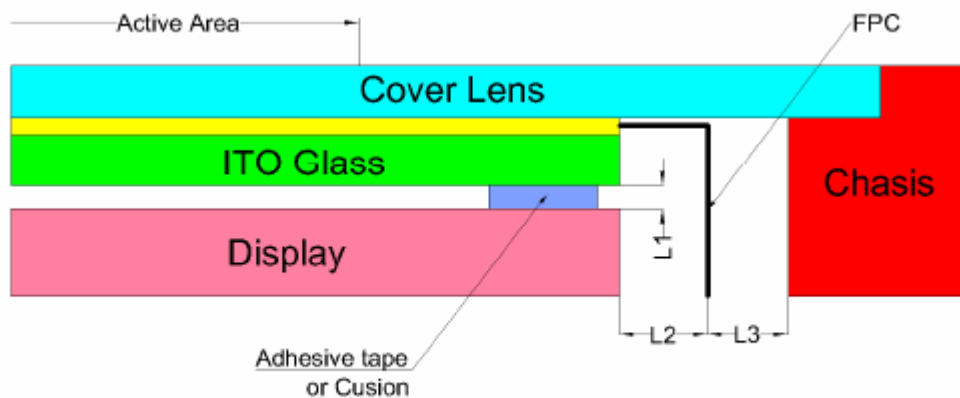
**6.3 Glass Flaw**

| No | Item                 | Diagram | Allowance  | Remark |
|----|----------------------|---------|--|--------|
| 1  | Corner Fragment      |         | $X \leq 3.0\text{mm}$<br>$Y \leq 3.0\text{mm}$<br>$Z \leq T$ |        |
| 2  | Edge Fragment        |         | $X \leq 3.0\text{mm}$<br>$Y \leq 3.0\text{mm}$<br>$Z \leq T$ |        |
| 3  | Progressive Fragment |         | Not Allowed  |        |



## 7. Mounting Condition

If the Flat Surface Design is preferred, please consult with us before proceeding. Thickness of cover glass and capacitance couplings at the periphery of the Touch panel must be considered for each individual case.



L1=0.5~1mm, Gap between Touch panel and LCD panel.  
L3=1mm, Gap between FPC and LCD panel.  
L5=1mm, Gap between FPC and Chasis.

Diagram 1. Suggested Mounting Condition



## 8. Precautions

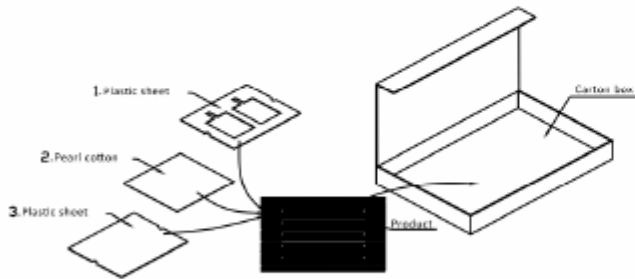
1. Since Touch Panel is consisted of glass, please be careful your hands to be injured during handling. You must wear gloves during handling.
2. Do not strike touch panel.
3. Do not lift touch panel by cable (FPC).
4. Please use dry cloth or soft cloth with neutral detergent (after wring dry) or one with ethanol at cleaning. Do not use any organic solvent, acid or alkali solution.
5. Do not stack the touch panels together. Do not put heavy objects on touch panels.
6. Do not bend the cable (FPC) of touch panel to prevent the circuit broken.



## 9. Packing

Packing of batch outgoing goods is carton with plastic board in it.

### Inside Packing Material



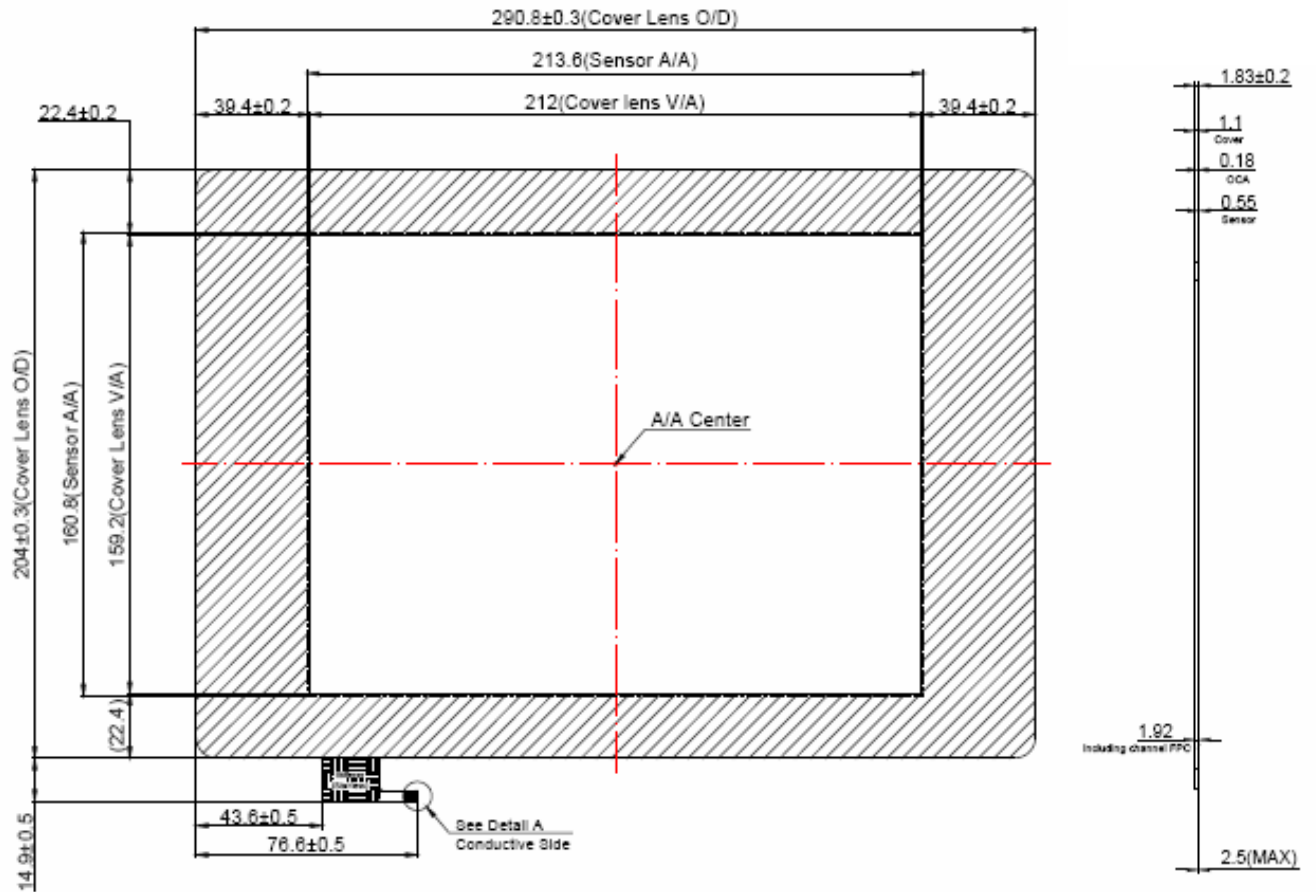
### Outside Packing Material

### Outside Packing Material





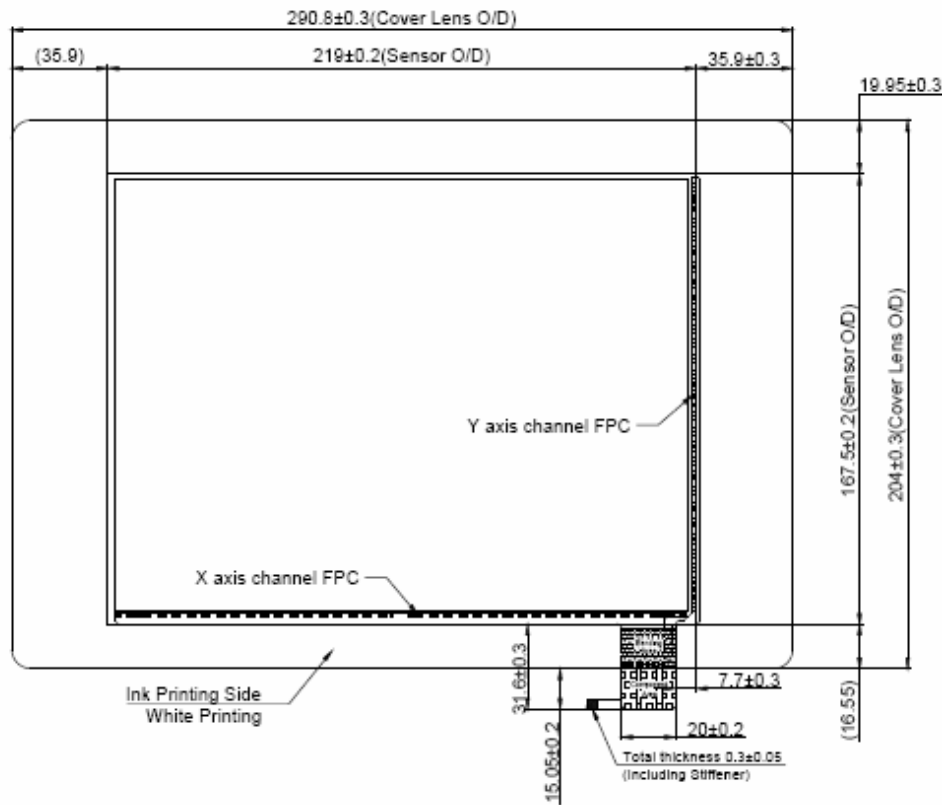
## TOP VIEW





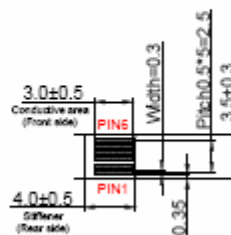


## BACK VIEW



### Detail A, 5:1

| I2C PIN ASSIGNMENT |       |
|--------------------|-------|
| PIN1               | SDA   |
| PIN2               | SCL   |
| PIN3               | RESET |
| PIN4               | INT   |
| PIN5               | VCC   |
| PIN6               | GND   |



#### Note:

1. Operating Temperature:  $-10 \sim 60$
2. Storage Temperature:  $-20 \sim 70$
3. Transmission:  $> 85\%$
4. Surface hardness:  $\geq 7H$
5. Control IC: FT 5606