TIANMA
Microelectronics Co.,LTD

# SPECIFICATION FOR
# CTP MODULE

| | |
|---|---|
| MODEL NO: | TP035KCZS01 |
| CUSTOMER: | - |
| CUSTOMER P/N. | - |
| VERSION | V1.0 |
| CUSTOMER APPROVED | |



□ Preliminary Specification

■ Final Specification

| PREPARED | CHECKED | VERIFIED BY QA DEPT | VERIFIED BY R&D DEPT |
|---|---|---|---|
| | | | |

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# REVISION RECORD

| Date | Rev.No. | Page | Revision Items | Prepared |
|---|---|---|---|---|
| **2013.3.30** | **V1.0** | | **The first preliminary release.** | **ZhanXing_Tan** |

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# 1. General Specifications

The projected capacitive touch technology applied to this product is an ITO-based touch technology. It consists of one glass substrate layers with ITO coating patterned into a grid of rows/columns and cover lens that are laminated together. During a touch, the capacitance of the finger changes the capacitive coupling between the grid elements on the location of the touch. This location is calculated from the change in electrical characteristics of the sensor grid. Mathematical processing, programmed in the Touch Controller chip, is used to recognize this distortion. Capacitive sensors can be touched with a bare finger or a conductive device being held by a bare hand. They are not affected by outside elements and have high clarity.

The purpose of this specification is to define the general provisions and quality requirements that apply to the supply of capacitive touch sensor or capacitive touch panel (CTP) module manufactured by TIANMA. This document, together with the Module Drawing, is the highest-level specification for this product. It describes the product and contains specifications.

## 1.1 General overview

| Features | Details | Unit | Note |
|---|---|---|---|
| Operation Technology | Projected capacitive | -- | 1 |
| Product type | Capacitive touch lens | -- | -- |
| Product structure | Glass Lens/Glass Sensor | -- | 2 |
| Input Method | Bare finger or a conductive device being held | -- | -- |
| Number of simultaneous touches | 5 points multi-touch | -- | -- |
| Minimum Touch Area | Φ6 | mm | -- |
| Connection Type | FPC connector(0.5mm Pitch) | -- | 2 |
| FG Weight | TBD | g | -- |

Note 1: Mutual mode.
Note 2: RoHS compatible.

# 2. Outline Drawing

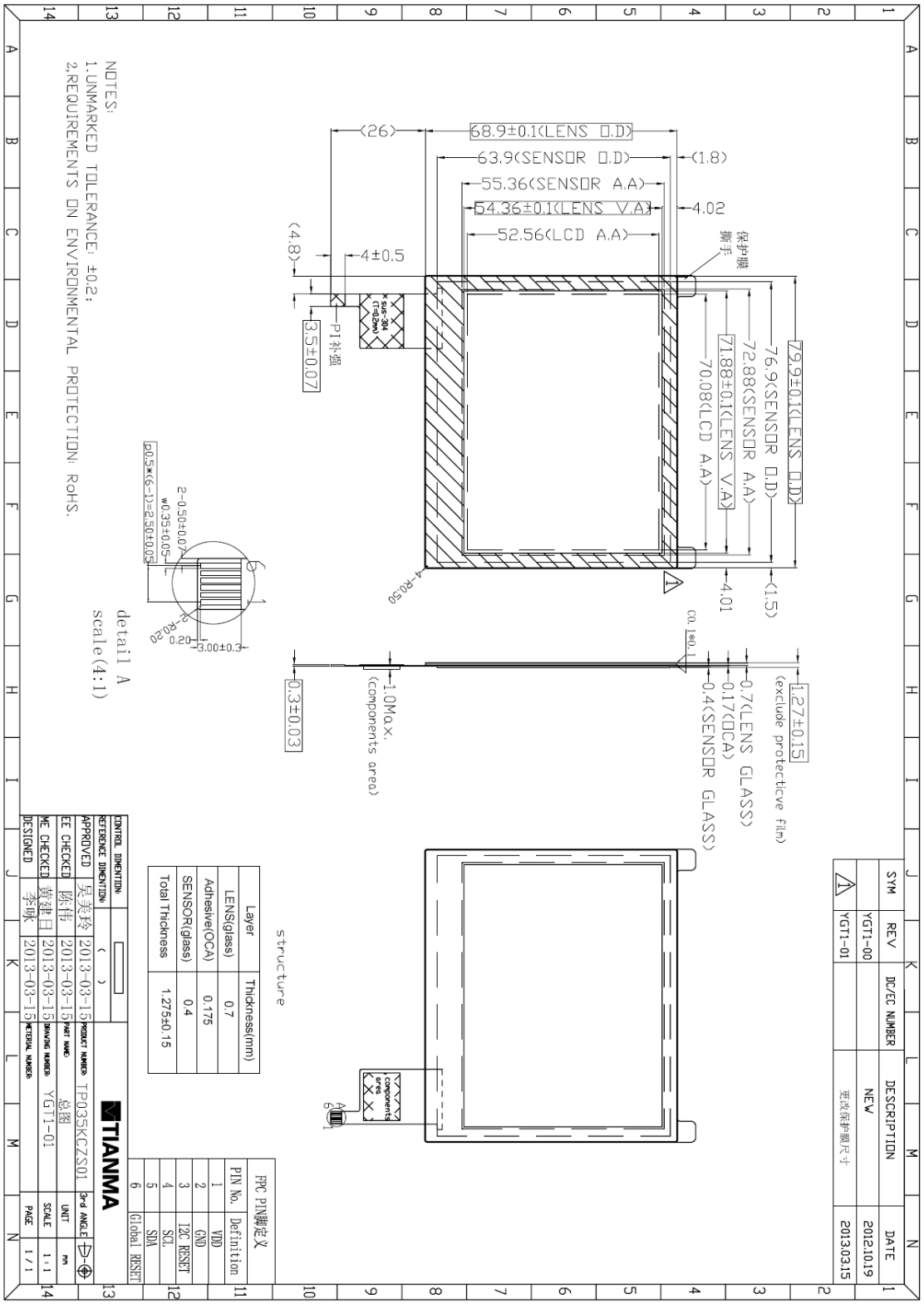



**Fig1. Outline drawing**

# 3. Circuit Block Diagram

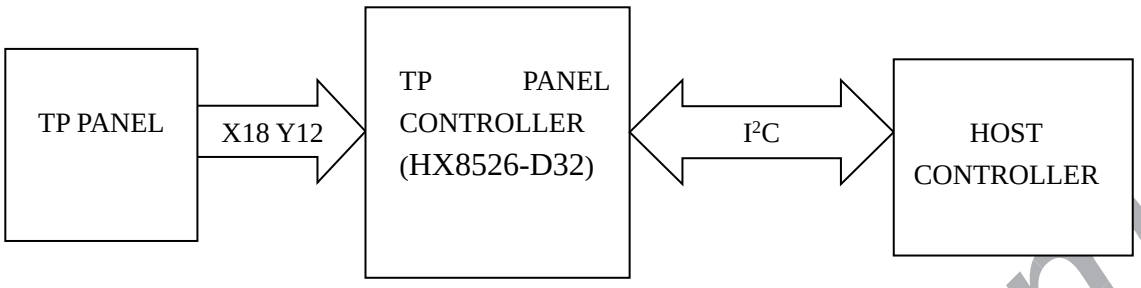



**Fig2. System Block Diagram**

# 4. Production Description

## 4.1 General description

| Item | Contents | Unit | Note |
|---|---|---|---|
| Product size | 3.5 | inch | |
| TP outline | 79.9 (W)×68.9(H) | mm | |
| TP active area | 72.88(W)×55.36(H) | mm | |
| Resolution | 320**RGB*240 | | |
| Control IC | HX8526-D32 | | |
| Interface | I²C | | |
| Surface Hardness | 6 | H | |
| Transmission | 88 | % | TYPE |

## 4.2 Structure description

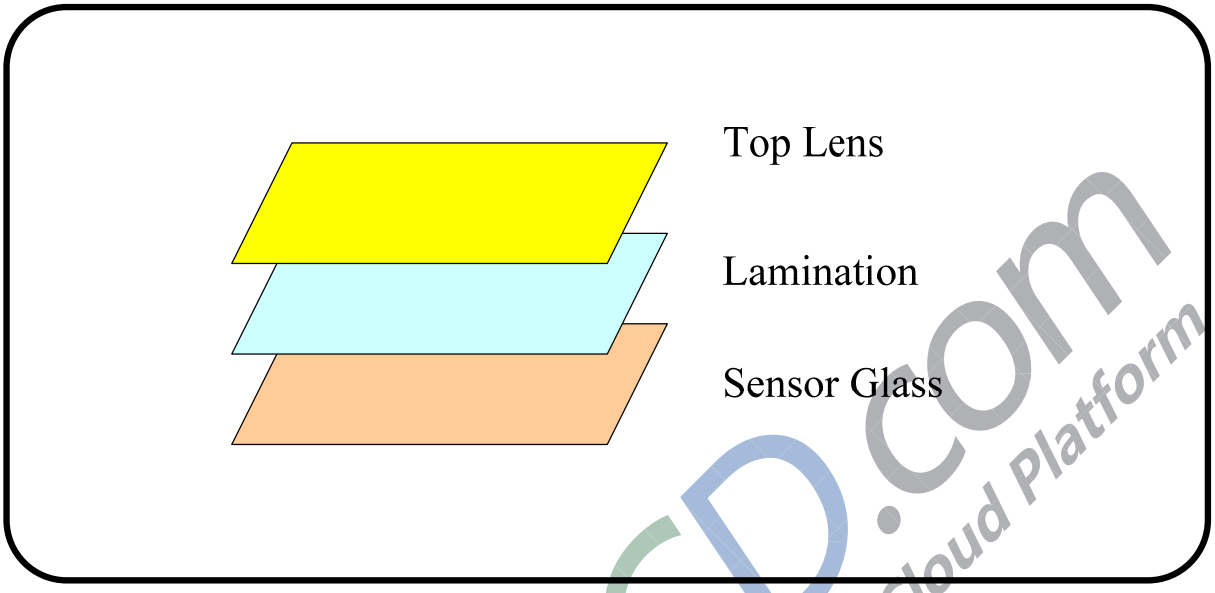



**Fig3. Structure of touch lens**

## 4.3 Hardware interface block diagram

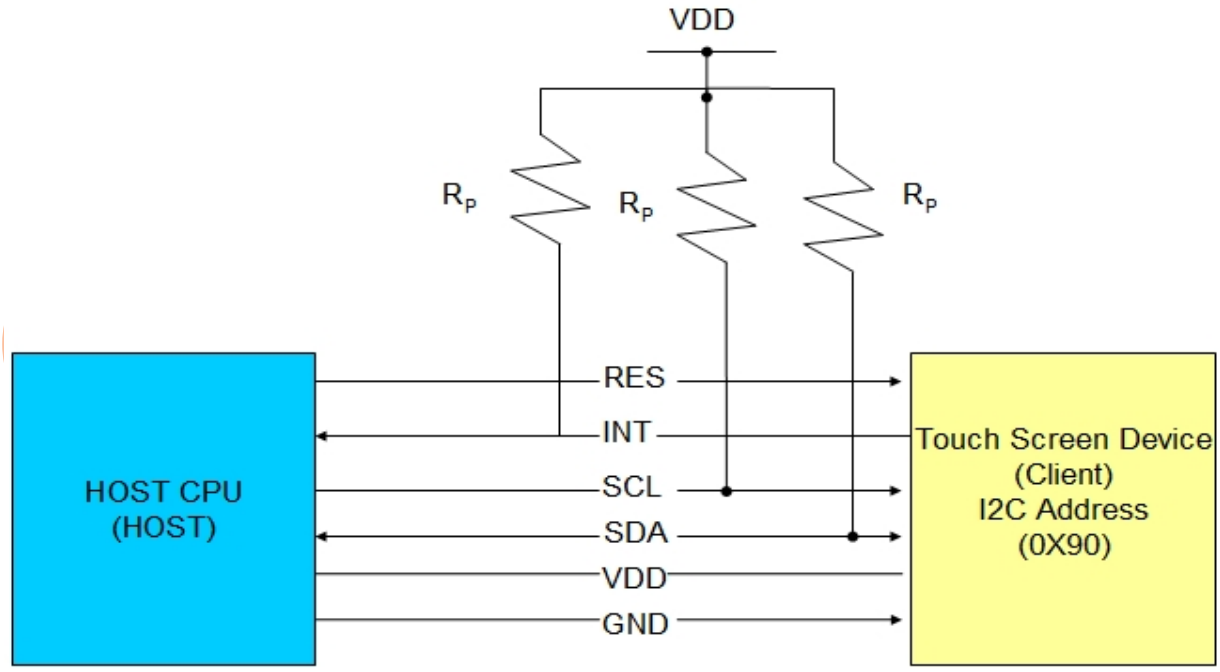



**Fig 4 .Reference environment configuration**

Note：We recommend using 4.7K I2C pull-up resistors, when customers use can make changes based on specific application.

## 4.4 Product specification

($T_A$= 25℃,VDD=3.3V)

| Item | Min | Typ | Max | Unit | Note |
|---|---|---|---|---|---|
| power supply voltage | 2.7 | -- | 3.5 | V | |
| Power supply current | | TBD | | mA | |

Note1: All current measurement is average current.

# 5. FPC interface pin and Interface Timing Chart

## 5.1 The FPC Connection of CTP

| Pin No. | Symbol | I/O | Description | Remark |
|---|---|---|---|---|
| 1 | VDD | P | CTP power supply | 1 |
| 2 | GND | P | GND | |
| 3 | IIC RESET | O | Interrupt line,active low | 1 |
| 4 | SCL | I | I2C clock input | 1 |
| 5 | SDA | I/O | I2C data input and output | 1 |
| 6 | Global RESET | I | Reset pin,active low | 1 |

Note
1. Please contacts to product supplier for detail define information.

## 5.2 Interface Timing Chart

Note: Please refer to HX8526-D32 data sheet for more details.

HX8526-D32 supports the I2C interfaces, which can be used by a host processor or other devices. The I2C is always configured in the Slave mode. The data transfer format is shown in Fig 5.

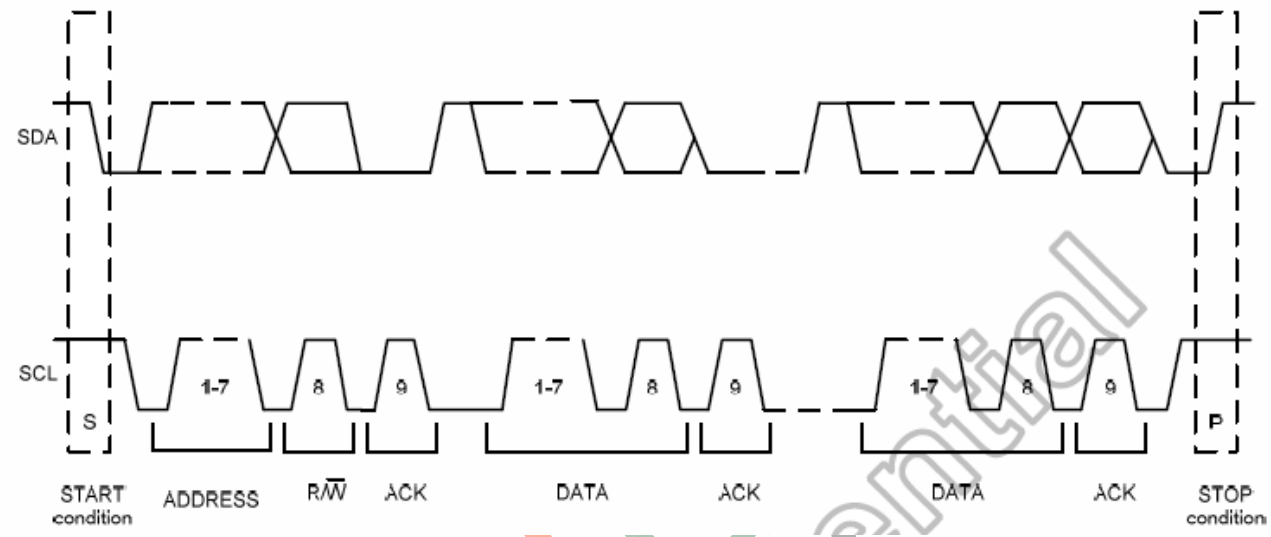



**Fig 5 . I2C serial data transfer format**

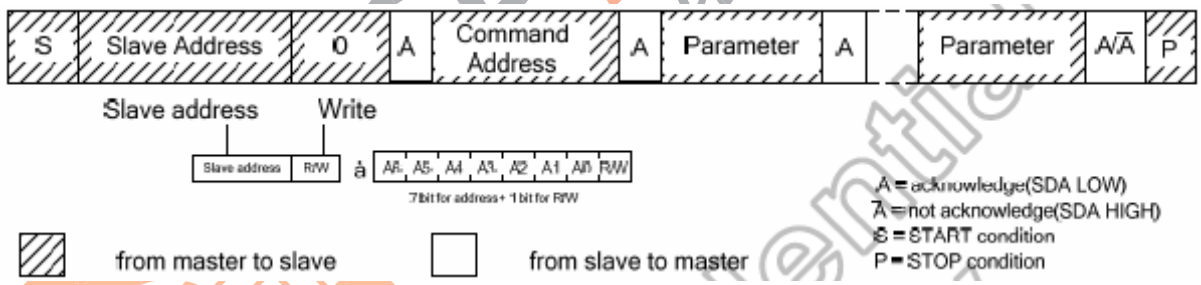



**Fig 6 . Data format of writing mode**


**Fig 7. Data format of reading mode**

COMMAND LIST(HX8526-D32)

Standard command

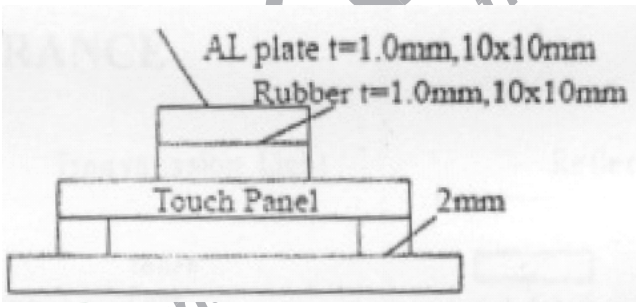
| (Hex) | Operation Code | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | No operation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| 80 | Sleep IN | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| 81 | Sleep Out | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | - |
| 82 | Sense Off | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | - |
| 83 | Sense On | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | - |
| 85 | Read Event | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | - |
| | 1st parameter | B31 | B30 | B29 | B28 | B27 | B26 | B25 | B24 | - |
| | 2nd parameter | B23 | B22 | B21 | B20 | B19 | B18 | B17 | B16 | - |
| | 3rd parameter | B15 | B14 | B13 | B12 | B11 | B10 | B9 | B8 | - |
| | 4th parameter | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 | - |
| 86 | Read All Events | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | - |
| | 1st parameter | B31 | B30 | B29 | B28 | B27 | B26 | B25 | B24 | - |
| | 2nd parameter | B23 | B22 | B21 | B20 | B19 | B18 | B17 | B16 | - |
| | 3rd parameter | B15 | B14 | B13 | B12 | B11 | B10 | B9 | B8 | - |
| | 4th parameter | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 | - |
| | 5th parameter | E3 | E2 | E1 | E0 | F1 | P2 | P1 | P0 | - |
| | 6th parameter | B23 | B22 | B21 | B20 | B19 | B18 | B17 | B16 | - |
| | : | : | : | : | : | : | : | : | : | - |
| | (n+1)th parameter | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 | - |
| 87 | Read Latest Event | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | - |
| | 1st parameter | B31 | B30 | B29 | B28 | B27 | B26 | B25 | B24 | - |
| | 2nd parameter | B23 | B22 | B21 | B20 | B19 | B18 | B17 | B16 | - |
| | 3rd parameter | B15 | B14 | B13 | B12 | B11 | B10 | B9 | B8 | - |
| | 4th parameter | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 | - |
| 88 | Clear Stack | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | - |

User define command list table

| CMD (Hex) | Operation Code | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 31h | Device ID | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | Response Device ID Code |
| | 1st parameter | 85 | | | | | | | | - |
| | 2nd parameter | 26 | | | | | | | | - |
| | 3rd parameter | 00 | | | | | | | | - |
| 32h | Version ID | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | Read Firmware version |
| | 1st parameter | SF_Version[7:0] | | | | F_Version[7:0] | | | | - |
| 42h | SETFLASHTEST | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | - |
| | 1st parameter | - | - | - | - | - | - | RELOAD_DISABLE(0) | FLASCHTEST(0) | - |
| 43h | SETFLASHEN | 1 | | | | | | | | 0 |
| | 1st parameter | - | - | - | - | TRIM_AUTO | MASS_E_EN(0) | TRIM_W_EN(0) | FLASCHEN(0) | - |
| | 2nd parameter | MERASE(0) | SERASE(0) | PERASE(0) | PROG(0) | WRONLY(0) | ALE(0) | SAVEN(0) | OE(0) | - |
| | 3rd parameter | - | - | TM[3:0](0000) | | | | POR(0) | INF(0) | - |
| 44h | SETFLASHADDR | 1 | | | | | | | | 0 |
| | 1st parameter | A[6:0](7'b0000000) | | | | | | | | - |
| | 2nd parameter | A[11:7](5'b00000) | | | | | | | | - |
| 45h | SETFLASHDATA | A[13:12](2'b00) | | | | | | | | - |
| | 1st parameter | - | | | | | | | | 0 |
| 46h | FLASHR | DI[7:0](00000000) | | | | | | | | - |
| 47h | FLASHPWSTART | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | FLASHR |
| 48h | FLASHPW | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | FLASHPWSTART |
| 49h | FLASHPWEND | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | FLASHPW |
| 4Ah | FLASHBPWSTART | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | FLASHPWEND |
| 4Bh | FLASHBPW | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | FLASHBPWSTART |
| 4Ch | FLASHBPWEND | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | FLASHBPW |
| 4Dh | FLASHPE | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | FLASHBPWEND |
| 4Eh | FLASHSE | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | FLASHPE |
| 4Fh | FLASHME | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | FLASHSE |

# 6. Reliability

## 6.1 Mechanical test

| No. | Item | Requirement | Verification method |
|---|---|---|---|
| 1 | Impact Resistance test | No crack after test. | Use the 9mm diameter steel ball is dropped on the Glass surface from 30cm height at 1time(Glass side) |
| 2 | Static Load Resistance Test | No crack after test. | After 4.5Kg load for 1min is applied to the center area (1.0cm2) of the Touch panel, the requirements in optical characteristic and electrical characteristics shall be satisfied.<br>  |
| 3 | Surface hardness | 6H | JIS-K5600 |

## 6.2 Electrical test

| No. | Item | Specification | Remark |
|---|---|---|---|
| 1 | Function test | No open and No short for ALL X/Y sensors<br>Linearity is OK | Test condition (Ta=25℃,VDD=2.8V) |

## 6.3 Optical test

(Ta = 25 °C)

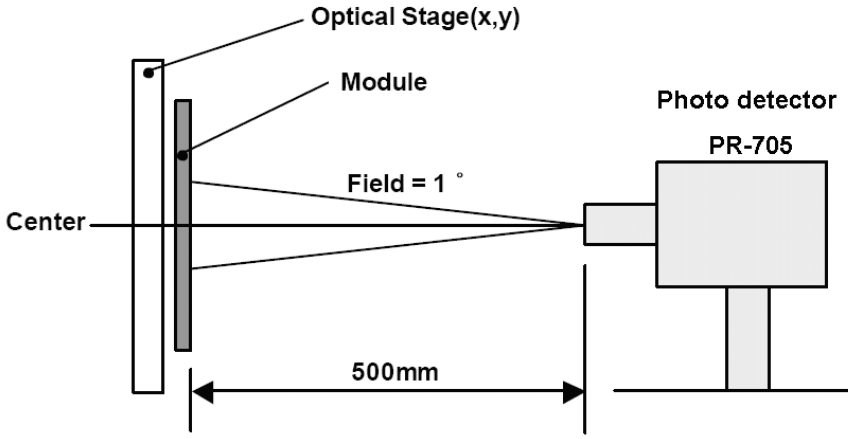
| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Transmission | % | 550nm | 86 | 88 | 90 | % | Note 1 |

Note1: Measuring equipments: DMS-501, PR-705. @550nm

Measuring condition:

- After stabilizing and leaving the panel alone at a given temperature for 30 min, the measurement should be executed,

- Measuring surroundings: a stable, windless and dark room,
- Measuring temperature: Ta=25°C,
- 30 min after lighting the back-light.

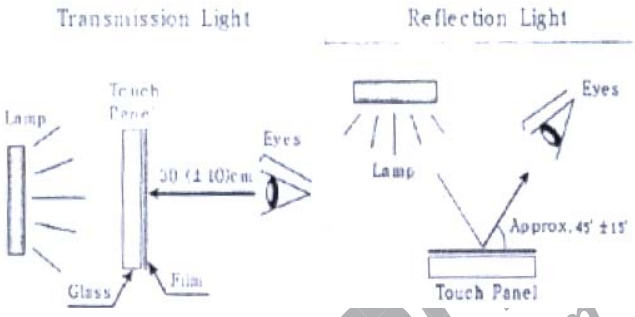



## 6.3 Environmental / Reliability Tests

| No | Test Item | Test condition | Criterion |
|---|---|---|---|
| 1 | High Temperature Storage | +60℃±2℃ 120H<br>Power off | After testing, cosmetic and electrical defects should not happen. |
| 2 | Low Temperature Storage | -20℃±2℃ 120H<br>Power off | |
| 3 | High Temperature Operation | TBD | |
| 4 | Low Temperature Operation | TBD | |
| 5 | High Temperature & Humidity Operation | TBD | |

# 7. Specification of Quality Assurance

1. Inspection condition
   a. Inspection condition:
      1. Illuminace:1000~3500 lux
      2. Black background
   b. Metod:
      1. Avoid light to irradiate eyes.
      2. Distance between eyes and panel is 30±10cm.




## 2. Foreign object

A Criteria

| Number | Inspection items | Judgment standard(Unit: mm) | | |
|---|---|---|---|---|
| 1 | Circular Defects(Dot、Impurity、Dust、Bubble) | Defect Size | Judgment (A Area) | Judgment (B Area) |
| | | D≤0.10 | Neglected(distance≥10) | Neglected |
| | | 0.10<D≤0.15 | N≤2, (distance≥10) | |
| | | D>0.15 | NG | |
| | | Notes: 1、The foreign meterial which can be removed is ignored.<br>2、The foreign meterial of B area should not affect to assembly, functionality or final look of the product. | | |
| 2 | Linear Defects(Scratch Line\Foreign | width/length | Judgment | |
| | | W≤0.05, L≤3.0 | Neglected(distance≥10) | |
| | | 0.05<W≤0.1, L≤3.0 | N≤2, (distance≥10) | |
| | | W>0.1, L>3.0 | NG | |

<table>
<tr><td></td><td>material )</td><td colspan="3">Notes: The foreign meterial which can be removed is ignored.</td></tr>
<tr><td rowspan="5">3</td><td rowspan="5">Dent</td><td>Defect Size</td><td>Judgment (A Area)</td><td>Judgment (B Area)</td></tr>
<tr><td>D≤0.15</td><td>Neglected(distance≥10)</td><td rowspan="3">Neglected</td></tr>
<tr><td>0.15≤D≤0.3</td><td>N≤3, (distance≥10)</td></tr>
<tr><td>D>0.3</td><td>NG</td></tr>
<tr><td colspan="3">Notes: 1、The foreign meterial which can be removed is ignored.<br>2、The foreign meterial of B area should not affect to assembly, functionality or final look of the product.</td></tr>
<tr><td>4</td><td>Dirt/Fingerprint/ Smokes/Snake/Rain bow effect</td><td colspan="3">A area: NG;<br>B area: OK (Not affect to assembly, functionality or final look of the product.)</td></tr>
<tr><td>5</td><td>Printing color</td><td colspan="3">The printing color is the same to the drawing(or client sample).</td></tr>
<tr><td>6</td><td>Color diffence</td><td colspan="3">1、Accept the same series ink color not inform and printing shift.<br>2、Color difference of IR hole, light sensor hole is not inspected.<br>3、If there is customer's inspection criteria or sample, determining by customer's inspection criteria or sample.</td></tr>
<tr><td>7</td><td>Transmittance-rate ( IR hole\light sensor hole)</td><td colspan="3">Meet drawing.</td></tr>
<tr><td>8</td><td>Printing pin hole</td><td colspan="3">Not allowed</td></tr>
<tr><td>9</td><td>Character/LOGO</td><td colspan="3">Character/LOGO printing can not be distortion, breakage, wash out, shift, etc.</td></tr>
<tr><td>10</td><td>Breakage on edge or corner</td><td colspan="3">A area(front side): not allowed.<br>B area(back side): X≤0.2, Y≤0.2, Z≤1/5T;<br>N≤2, (distance≥20), Neglected</td></tr>
<tr><td>11</td><td>Crack</td><td colspan="3">NG</td></tr>
</table>

| | | |
|---|---|---|
| 12 | Edges roughness、Zigzag | 1、The edge of touch window:<br>W≤0.2, OK; W>0.2, NG。<br>2、The edge of CTP outline:<br>W≤0.3, OK; W>0.3, NG。 |
| 13 | Foreign material of printing area | (1).The view area+ 0～2.0mm: the criteria is same to Circular Defects;<br>(2). The view area+ 2.0 ～ 5.0mm : D≤0.3 , Neglected(distance≥5.0)<br>(3).The other areas:D≤0.5, Neglected(distance≥5.0) |
| 14 | LED hole、IR hole、sensor hole | Sensor hole、LED hole: D≤0.1mm, allowed N≤1;<br>D>0.1mm, not allowed;<br>IR hole: D≤0.1mm, neglected; D>0.1mm, not allowed。 |
| 15 | COVER/SENSOR cutting section failure | Crack is not allowed. |
| 16 | Dirt | 1、The dirt which can be removed is ignored.<br>2、The dirt which can not be removed is not alowed. |

B Criteria

<table>
<tr><td>Number</td><td>Inspection items</td><td colspan="3">Judgment standard(Unit: mm)</td></tr>
<tr><td rowspan="5">1</td><td rowspan="5">Circular Defects(Dot、Impurity、Dust、Bubble)</td><td>Defect Size</td><td>Judgment (A Area)</td><td>Judgment (B Area)</td></tr>
<tr><td>D≤0.15</td><td>Neglected(distance≥10)</td><td rowspan="3">Neglected</td></tr>
<tr><td>0.15<D≤0.2</td><td>N≤2, (distance≥10)</td></tr>
<tr><td>D>0.2</td><td>NG</td></tr>
<tr><td colspan="3">Notes: 1、The foreign meterial which can be removed is ignored.<br>2、The foreign meterial of B area should not affect to assembly, functionality or final look of the product.</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3"></td></tr>
<tr><td rowspan="5">2</td><td rowspan="5">Linear Defects(Scratch Line\Foreign material )</td><td colspan="2">width/length</td><td>Judgment</td></tr>
<tr><td colspan="2">W≤0.05, L≤3.5</td><td>Neglected(distance≥5)</td></tr>
<tr><td colspan="2">0.05<W≤0.1, L≤3.5</td><td>N≤3, (distance≥10)</td></tr>
<tr><td colspan="2">W>0.1, L>3.5</td><td>NG</td></tr>
<tr><td colspan="3">Notes: The foreign meterial which can be removed is ignored.</td></tr>
<tr><td rowspan="5">3</td><td rowspan="5">Dent</td><td>Defect Size</td><td>Judgment (A Area)</td><td>Judgment (B Area)</td></tr>
<tr><td>D≤0.15</td><td>Neglected(distance≥10)</td><td rowspan="3">Neglected</td></tr>
<tr><td>0.15≤D≤0.3</td><td>N≤3, (distance≥10)</td></tr>
<tr><td>D>0.3</td><td>NG</td></tr>
<tr><td colspan="3">Notes: 1、The foreign meterial which can be removed is ignored.<br>2、The foreign meterial of B area should not affect to assembly, functionality or final look of the product.</td></tr>
<tr><td>4</td><td>Dirt/Fingerprint/ Smokes/Snake/Rain bow effect</td><td colspan="3">A area: NG;<br>B area: OK (Not affect to assembly, functionality or final look of the product.)</td></tr>
<tr><td>5</td><td>Printing color</td><td colspan="3">The printing color is the same to the drawing(or client sample).</td></tr>
<tr><td>6</td><td>Color diffence</td><td colspan="3">4、Accept the same series ink color not inform and printing shift.<br>5、Color difference of IR hole, light sensor hole is not inspected.<br>6、If there is customer's inspection criteria or sample, determining by customer's inspection criteria or sample.</td></tr>
<tr><td>7</td><td>Transmittance-rate ( IR hole\light sensor hole)</td><td colspan="3">Meet drawing.</td></tr>
<tr><td>8</td><td>Printing pin hole</td><td colspan="3">Not allowed</td></tr>
</table>

| | | |
|---|---|---|
| 9 | Character/LOGO | Character/LOGO printing can not be distortion, breakage, wash out, shift, etc. |
| 10 | Breakage on edge or corner | A area(front side): not allowed.<br>B area(back side): X≤0.2, Y≤0.2, Z≤1/5T;<br>N≤2, (distance≥20), Neglected |
| 11 | Crack | NG |
| 12 | Edges roughness、Zigzag | 1、The edge of touch window:<br>W≤0.2, OK; W>0.2, NG。<br>2、The edge of CTP outline:<br>W≤0.3, OK; W>0.3, NG。 |
| 13 | Foreign material of printing area | (1).The view area+ 0～2.0mm: the criteria is same to Circular Defects;<br>(2). The view area+ 2.0 ～ 5.0mm: D≤0.3 , Neglected(distance≥5.0)<br>(3).The other areas:D≤0.5, Neglected(distance≥5.0) |
| 14 | LED hole、IR hole、sensor hole | Sensor hole、LED hole: D≤0.1mm, allowed N≤1; D>0.1mm, not allowed;<br>IR hole: D≤0.1mm, neglected; D>0.1mm, not allowed。 |
| 15 | COVER/SENSOR cutting section failure | Crack is not allowed. |
| 16 | Dirt | 3、The dirt which can be removed is ignored.<br>4、The dirt which can not be removed is not alowed. |

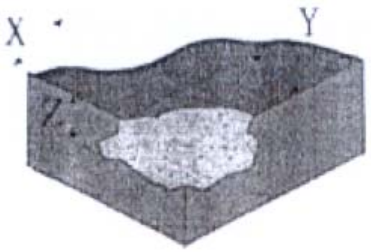
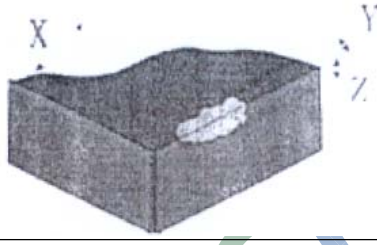
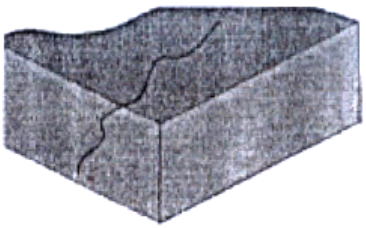
C Criteria

| Number | Inspection items | Judgment standard(Unit: mm) | | |
|---|---|---|---|---|
| 1 | Circular Defects(Dot、Impurity、Dust、Bubble) | Defect Size | Judgment (A Area) | Judgment (B Area) |
| | | D≤0.20 | Neglected(distance≥10) | Neglected |
| | | 0.20≤D≤0.3 | N≤5, (distance≥10) | |
| | | D>0.3 | NG | |
| | | Notes: 1、The foreign meterial which can be removed is ignored.<br>2、The foreign meterial of B area should | | |

<table>
<tr><td></td><td></td><td colspan="3">not affect to assembly, functionality or final look of the product.</td></tr>
<tr><td rowspan="5">2</td><td rowspan="5">Linear Defects(Scratch Line\Foreign material )</td><td colspan="2">width/length</td><td>Judgment</td></tr>
<tr><td colspan="2">W≤0.10, L≤3.0</td><td>Neglected(distance≥10)</td></tr>
<tr><td colspan="2">0.10<W≤0.20, L≤3.0</td><td>N≤3, (distance≥10)</td></tr>
<tr><td colspan="2">W>0.2, L>3.0</td><td>NG</td></tr>
<tr><td colspan="3">Notes: The foreign meterial which can be removed is ignored.</td></tr>
<tr><td rowspan="5">3</td><td rowspan="5">Dent</td><td>Defect Size</td><td>Judgment (A Area)</td><td>Judgment (B Area)</td></tr>
<tr><td>D≤0.15</td><td>Neglected(distance≥10)</td><td rowspan="3">Neglected</td></tr>
<tr><td>0.15≤D≤0.3</td><td>N≤3, (distance≥10)</td></tr>
<tr><td>D>0.3</td><td>NG</td></tr>
<tr><td colspan="3">Notes: 1、The foreign meterial which can be removed is ignored.<br>2、The foreign meterial of B area should not affect to assembly, functionality or final look of the product.</td></tr>
<tr><td>4</td><td>Dirt/Fingerprint/ Smokes/Snake/Rain bow effect</td><td colspan="3">A area: NG;<br>B area: OK (Not affect to assembly, functionality or final look of the product.)</td></tr>
<tr><td>5</td><td>Printing color</td><td colspan="3">The printing color is the same to the drawing(or client sample).</td></tr>
<tr><td>6</td><td>Color diffence</td><td colspan="3">7、Accept the same series ink color not inform and printing shift.<br>8、Color difference of IR hole, light sensor hole is not inspected.<br>9、If there is customer's inspection criteria or</td></tr>
</table>

| | | |
|---|---|---|
| | | sample, determining by customer's inspection criteria or sample. |
| 7 | Transmittance-rate ( IR hole\light sensor hole) | Meet drawing. |
| 8 | Printing pin hole | Not allowed |
| 9 | Character/LOGO | Character/LOGO printing can not be distortion, breakage, wash out, shift, etc. |
| 10 | Breakage on edge or corner | A area(front side): not allowed.<br>B area(back side): X≤0.2, Y≤0.2, Z≤1/5T;<br>N≤2, (distance≥20), Neglected |
| 11 | Crack | NG |
| 12 | Edges roughness、Zigzag | 1、The edge of touch window:<br>W≤0.2, OK; W>0.2, NG。<br>2、The edge of CTP outline:<br>W≤0.3, OK; W>0.3, NG。 |
| 13 | Foreign material of printing area | (1). The view area+ 0～2.0mm: the criteria is same to Circular Defects;<br>(2). The view area+ 2.0 ～ 5.0mm : D≤0.3 , Neglected(distance≥5.0)<br>(3). The other areas:D≤0.5, Neglected(distance≥5.0) |
| 14 | LED hole、IR hole、sensor hole | Sensor hole、LED hole: D≤0.1mm, allowed N≤1;<br>D>0.1mm, not allowed;<br>IR hole: D≤0.1mm, neglected; D>0.1mm, not allowed。 |
| 15 | COVER/SENSOR cutting section failure | Crack is not allowed. |
| 16 | Dirt | 5、The dirt which can be removed is ignored.<br>6、The dirt which can not be removed is not alowed. |

## 3. Glass Appearance

| No. | Item | Definition | Specification |
|---|---|---|---|
| 1 | Corner chip |  | X≤3.0mm,Y≤3.0mm<br>Z≤t<br>T=thickness of Glass; |
| 2 | Edge chip |  | X≤3.0mm,Y≤3.0mm<br>Z≤t<br>X≤5.0mm,Y≤1.0mm<br>Z≤t<br>T=thickness of Glass; |
| 3 | Crack |  | Not allowed |

# 8. Package Method