

# ASI-T-6508032A4K6/Z

| ITEM                           | CONTENTS                                 |  |  |  |  |
|--------------------------------|------------------------------------------|--|--|--|--|
| Module Size                    | 171.00 (W) * 78.50 (H) * 5.43(T) mm      |  |  |  |  |
| Module Size (with FPC)         | 171.00 (W) * 157.17 (H) * 5.43(T) mm     |  |  |  |  |
| Display Size (Diagonal)        | 6.5 inch                                 |  |  |  |  |
| Display Format                 | 800(RGB)* 320 Pixels                     |  |  |  |  |
| Active Area                    | 153.84 (W) * 57.088 (H) mm               |  |  |  |  |
| View Area                      | 154.64 (W) * 57.89 (H) mm                |  |  |  |  |
| Pixel Pitch                    | 0.1923 * 0.1784 mm                       |  |  |  |  |
| LCD Type                       | TFT (16.7M)/ Transmissive / Normal White |  |  |  |  |
| View Angle<br>(Gray Inversion) | 6 O'clock                                |  |  |  |  |
| The Best Viewing Direction     | 12 O'clock                               |  |  |  |  |
| Controller IC                  | EK9716BD +EK73002AB or Compatible        |  |  |  |  |
| CTP IC                         | ILI2117A                                 |  |  |  |  |
| Weight                         | TBD                                      |  |  |  |  |



# Sample DOC. **CHANGED BY** DATE DESCRIPTION Version Version A0 00 2022-08-31 SPEC ONLY ZCF First issue



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| Weight                         | TBD                                      |  |  |  |  |







# **5. Electrical Characteristics**

# 5-1 Absolute Maximum Ratings

# 5-1-1 Absolute Maximum Ratings (TFT)

# (Ta=25°C VSS=0V)

| I4 a un               | Creek al | Min    | Trues | Mari | I Luit | Damasla       |
|-----------------------|----------|--------|-------|------|--------|---------------|
| Item                  | Symbol   | IVIIn. | 1 ype | Max. | Unit   | Remark        |
|                       | DVDD     | -0.3   |       | 5.0  | Volt   |               |
|                       | VDDA     | -0.5   | -     | 13.5 | Volt   |               |
| Power Supply voltage  | VGH      | -0.3   |       | 42   | Volt   |               |
|                       | VGL      | VGG-42 |       | -0.3 | Volt   |               |
|                       | VGH-VGL  | -0.3   | -     | 40   | Volt   | DVDD<br>=3.3V |
| Operating Temperature | Topr     | -20    | -     | +70  | °C     |               |
| Storage Temperature   | Tstg     | -30    | -     | +80  | °C     |               |

# 5-1-2 Absolute Maximum Ratings (CTP)

| Item                        | Symbol               | Min | Тур | Max | Unit |
|-----------------------------|----------------------|-----|-----|-----|------|
| System power supply voltage | VDD                  |     |     | 3.6 | V    |
| High voltage power supply   | V <sub>PVDD_CP</sub> |     | 3.6 | 3.7 | V    |
| Analog input voltage        | VINANA               |     |     | VDD | V    |
| Digital input voltage       | VINDIG               |     |     | 5   | V    |
| Storage temperature         | T <sub>STG</sub>     | -40 |     | 150 | °C   |

Notes: Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and does not imply functional operation of the device. Exposure to absolute maximum ratings for extended periods may affect device reliability.



# **5-2 Operating Conditions**

# 5-2-1 Operating Conditions (TFT)

| 5-2-1 Operating Conditions (TFT) ( |          |           |         |      |         |      |  |  |
|------------------------------------|----------|-----------|---------|------|---------|------|--|--|
| Item                               | Symbol   | Condition | Min.    | Тур. | Max.    | Unit |  |  |
|                                    | VDD      | -         | 3.1     | 3.3  | 3.5     | Volt |  |  |
|                                    | AVDD     | -         | 10.1    | 10.3 | 10.5    | Volt |  |  |
| Power Supply voltage               | VCOM     | -         | 3.2     | 3.38 | 3.5     | Volt |  |  |
|                                    | VGH      |           | 17.8    | 18.0 | 18.2    | Volt |  |  |
|                                    | VGL      | -         | -7.8    | -8.0 | -8.2    | Volt |  |  |
|                                    | VIH      | -         | 0.7*VDD | -    | VDD     | Volt |  |  |
| Level Input Voltage                | VIL      | -         | GND     | -    | 0.3*VDD | Volt |  |  |
| Digital signal)                    | VOH      | -         | VDD-0.4 | -    | VDD     | Volt |  |  |
|                                    | VOL      | -         | GND     | -    | GND+0.4 | Volt |  |  |
| Power Supply Current<br>For LCM    | DVDD_IDD | DVDD=3.3V | -       | 10   | 15      | mA   |  |  |

# 5-2-2 Operating Conditions (CTP)

# Table 5-2: Power Supply

| Item                          | Symbol         | Min | Тур. | Max | Unit |
|-------------------------------|----------------|-----|------|-----|------|
| System power supply voltage   | VDD            | 2.8 | 3.3  | 3.6 | V    |
| Ambient operating temperature | T <sub>A</sub> | -40 | Y    | 85  | °C   |
| Junction Temperature          | TJ             |     |      | 125 | °C   |

## Table 5-3: DC Characteristics (T<sub>opr</sub> = 25°C)

| Item                   | Symbol                           | Min | Тур.      | Max | Unit |
|------------------------|----------------------------------|-----|-----------|-----|------|
| Input Voltage, High 1  | (V <sub>IH1</sub> ) <sup>1</sup> | 1   |           |     | V    |
| Input Voltage, High 2  | (V <sub>IH2</sub> ) <sup>2</sup> | 1.3 |           |     | V    |
| Input Voltage, Low     | (V <sub>IL</sub> )               |     |           | 0.5 | V    |
| Output Voltage, High 1 | (V <sub>он</sub> ) <sup>3</sup>  |     | See Note3 |     | V    |
| Output Voltage, Low    | (V <sub>OL</sub> )               |     |           | 0.1 | V    |

Specifications are subjected to change without notice.

Notes:

1. V IH1 includes pins CHIP\_EN, SDA, SCL, INT

2. V IH2 includes pin EXT\_CLK

3. V<sub>OH</sub> is for INT output voltage level which is programmable by registers. Typical values are 1.2V/1.5V/1.8V/V<sub>VDD</sub>.



# 5-3 AC Characteristics 5-3-1 AC Characteristics (TFT)

# **DE MODE (MODE=H)**



# SYNC MODE(MODE=L)



# Vertical Timing Diagram SYNC (Dual Gate)





# Vertical Timing Diagram DE (Dual Gate)



# Gate output Timing Diagram (Dual Gate)



# AC Electrical Characteristics (VDD =3.0~3.6V, VDDA=6.5~13.5V, AGND=DGND=0V, TA= -20~85≥)

| Parameter                 | Symbol |      | Value | Unit | Note       |             |
|---------------------------|--------|------|-------|------|------------|-------------|
| Horizontal display area   | thd    |      | 800   |      |            |             |
|                           | folk   | Min. | Тур.  | Max  |            | 2           |
| DOLK frequency            | ICIK   | 20   | 33.3  | 50   | MHz        | $\wedge$    |
| 1 Horizontal Line         | th     | 908  | 928   | 1088 |            | thb+thpw=88 |
| HSD pulse width           | thpw   | 1    | 48    | 87   | DCI K      | DOKRIS      |
| HSD Back Porch (Blanking) | thb    | 87   | 40    | 1    | (          | Tixed 1/    |
| HSD Front Porch           | thfp   | 20   | 40    | 200  | $\bigcirc$ | UNU NES     |

# Horizontal input timing

| Parameter                 | Symbol | Min. | Тур. | Max.  | Unit      | Note    |
|---------------------------|--------|------|------|-------|-----------|---------|
| Vertical display area     | tvd    |      | 480  | 6     | A         |         |
| VSD period time           | tv     | 517  | 525  | 718   |           |         |
| VSD pulse width           | tvpw   | 1    |      | 1 8 1 | INH I     | s fixed |
| VSD Back Porch (Blanking) | tvb    | 31   | 31   | 29    | V HAV     |         |
| VSD Front Porch           | tvfp   | 5    | 1 13 | 1200  | ( \\H) \V |         |





Figure 5-1: The timing of I<sup>2</sup>C Interface

| Cumhal              | Devenueter                                                                                        |                   | 100KHz           | 1    | 400KHz      |                  |      |  |
|---------------------|---------------------------------------------------------------------------------------------------|-------------------|------------------|------|-------------|------------------|------|--|
| Symbol              | Parameter                                                                                         | Min               | Max              | Unit | Min         | Max              | Unit |  |
| f <sub>SCL</sub>    | SCL clock frequency                                                                               | 0                 | 100              | kHz  | 0           | 400              | KHz  |  |
| t <sub>hd;sta</sub> | Hold time (repeated) START condition.<br>After this period, the first clock pulse is<br>generated | 4.0               | -                | μs   | 0.6         | -                | μs   |  |
| t <sub>LOW</sub>    | LOW period of the SCL clock                                                                       | 4.7               | H                | μs   | 1.3         | -                | μs   |  |
| t <sub>HIGH</sub>   | HIGH period of the SCL clock                                                                      | 4.0               | 8 <del></del> 8  | μs   | 0.6         | -                | μs   |  |
| t <sub>su;sta</sub> | Set-up time for a repeated START condition                                                        | 4.7               | -                | μs   | 0.6         | -                | μs   |  |
| t <sub>HD;DAT</sub> | Data hold time                                                                                    | 0                 | 3.45             | μs   | 0           | 0.9              | μs   |  |
| t <sub>SU;DAT</sub> | Data set-up time                                                                                  | 250               | 2.<br>2.         | ns   | 100         |                  | ns   |  |
| t <sub>r</sub>      | Rise time of both SDA and SCL signals                                                             | -                 | 1000             | ns   | 1211        | 300              | ns   |  |
| t <sub>f</sub>      | Fall time of both SDA and SCL signals                                                             | ( <del>)</del> 4) | 300              | ns   | <del></del> | 300              | ns   |  |
| t <sub>su;sto</sub> | Set-up time for STOP condition                                                                    | 4.0               | 2 <del>-</del> 1 | μs   | 0.6         | 9 <del></del> -5 | μs   |  |
| t <sub>BUF</sub>    | Bus free time between a STOP and START condition                                                  | 4.7               | 87 <u>-</u>      | μs   | 1.3         |                  | μs   |  |

## Table 5-5: Characteristics of the SDA and SCL bus lines



| Item             |        | Szerek al    | Conditions                        | Specifications |         |     | TI:4 | Nata   |
|------------------|--------|--------------|-----------------------------------|----------------|---------|-----|------|--------|
|                  |        | Symbol       | Conditions                        | Min            | Тур     | Max | Unit | Inote  |
| Transmit         | ttance | T(%)         | -                                 | 5.2            | 5.7     | -   | -    | -      |
| Contrast Ratio   |        | CR           | θ=0<br>Normal<br>Viewing<br>angle | 350            | 500     | -   |      | (1)(2) |
| Response         | e time | TR+TF        | -                                 | -              | 25      | -   | ms   | (1)(3) |
|                  | Hor    | $\Theta x^+$ |                                   | 60             | 70      | -   |      |        |
| Viewing<br>angle | 1101.  | Θx-          | CD > 10                           | 60             | 70      | -   | deg. |        |
|                  | Var    | Θy+          | CK <u></u> ≥10                    | 40             | 40 50 - | -   |      | -      |
|                  | ver.   | Θy-          |                                   | 50             | 60      | -   |      |        |

Measuring Condition

- 1. Measuring surrounding: dark room
- 2. Ambient temperature: 25±2°C
- 3. 30 min. Warm-up time.

# Color of CIE Coordinate:

| Item           |         | Symbol | Condition                                   | Min.   | Тур.   | Max.   |
|----------------|---------|--------|---------------------------------------------|--------|--------|--------|
|                | Dad     | х      | θ = φ = 0°<br>LED Backlight<br>Color Degree | 0.5070 | 0.5570 | 0.6070 |
|                | Rea     | у      |                                             | 0.2702 | 0.3202 | 0.3702 |
|                | Green   | х      |                                             | 0.3085 | 0.3585 | 0.4085 |
| Chromaticity   |         | у      |                                             | 0.5316 | 0.5816 | 0.6316 |
| (Transmissive) | Blue    | х      |                                             | 0.1018 | 0.1518 | 0.2018 |
| (Transmissive) |         | у      |                                             | 0.0576 | 0.1076 | 0.1576 |
|                | XX71 ·4 | x      |                                             | 0.2412 | 0.2912 | 0.3412 |
|                | White   | у      |                                             | 0.2646 | 0.3146 | 0.3646 |

Time



10% 0





# ASI-T-6508032A4K6/Z

# **<u>7. Interface Pin Assignment</u>** 7-1 LCM FPC Interface

| No.   | Symbol | Function                                                                                                                                                        |
|-------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1~2   | VLED+  | Power for LED backlight (Anode)                                                                                                                                 |
| 3~4   | VLED-  | Power for LED backlight (Cathode)                                                                                                                               |
| 5     | GND    | Power ground                                                                                                                                                    |
| 6     | VCOM   | Common voltage input.                                                                                                                                           |
| 7     | DVDD   | Power supply.                                                                                                                                                   |
| 8     | MODE   | DE/SYNC mode select. Normally pull high<br>H:DE mode. L:HSD/VSD mode                                                                                            |
| 9     | DE     | Data Enable signal                                                                                                                                              |
| 10    | VS     | Vertical sync input. Negative polarity                                                                                                                          |
| 11    | HS     | Horizontal sync input. Negative polarity                                                                                                                        |
| 12~19 | B7~B0  | Blue Data Input                                                                                                                                                 |
| 20~27 | G7~G0  | Green Data Input                                                                                                                                                |
| 28~35 | R7~R0  | Red Data Input                                                                                                                                                  |
| 36    | GND    | Power ground                                                                                                                                                    |
| 37    | DCLK   | Data clock Input                                                                                                                                                |
| 38    | GND    | Power ground                                                                                                                                                    |
| 39    | L/R    | Left or Right Display Control                                                                                                                                   |
| 40    | U/D    | Up / Down Display Control                                                                                                                                       |
| 41    | VGH    | Positive Power for TFT.                                                                                                                                         |
| 42    | VGL    | Negative Power for TFT.                                                                                                                                         |
| 43    | AVDD   | Analog Power input.                                                                                                                                             |
| 44    | RESET  | Global reset pin. Active Low to enter Reset State. (Normally pull high.)<br>Suggest to connecting with an RC reset circuit for stability.                       |
| 45    | NC     | No connection                                                                                                                                                   |
| 46    | VCOM   | Common voltage input.                                                                                                                                           |
| 47    | DITHB  | Dithering function enable control. (Normally pull high )<br>DITHB = "1", Disable internal dithering function<br>DITHB = "0", Enable internal dithering function |
| 48    | GND    | Power ground                                                                                                                                                    |
| 49    | NC     | No connection                                                                                                                                                   |
| 50    | NC     | No connection                                                                                                                                                   |



# RLL SHORE INDUSTRIES 7-2 CTP FPC Interface

| No. | Symbol    | Function                     | Remark |
|-----|-----------|------------------------------|--------|
| 1   | GND       | Touch panel Ground           |        |
| 2   | VDD(3.3V) | Touch panel power supply     |        |
| 3   | INT       | Touch panel interrupt output |        |
| 4   | SCL       | Touch panel I2C clock        |        |
| 5   | SDA       | Touch panel I2C data         |        |
| 6   | RESET     | Touch panel reset            |        |







- 1. Standard Lamp Styles (Edge Lighting Type): The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:
- 2. The Main Advantages of the LED Backlight are as following:
- 2.1 The brightness of the backlight can simply be adjusted. By a resistor or a potentiometer.

| 3  | Data | About | LED | Back | light  |
|----|------|-------|-----|------|--------|
| 5. | Data | Abbut | LLD | Dack | ingin. |

(Ta=25°)

| PARAMETER                         | Sym.  | Min.  | Тур. | Max. | Unit  | Test<br>Condition | Note |
|-----------------------------------|-------|-------|------|------|-------|-------------------|------|
| Supply Current                    | Ι     | -     | 140  | -    | mA    | V=9.6V            |      |
| Supply Voltage                    | V     | 8.7   | 9.6  | 10.2 | V     |                   |      |
| Luminous Intensity for<br>LCM+CTP | IV    | 340   | 420  | -    | Cd/m2 | If=140mA          | 2    |
| Uniformity for CTP+LCM            | -     | 70    | -    | -    | %     |                   | 3    |
| Life Time                         | -     | 20000 |      | -    | Hr.   |                   | 4    |
| Color                             | White |       |      |      |       |                   |      |

# NOTE:

- 1. Backlight Only
- 2. Average Luminous Intensity of P1-P9
- 3. Uniformity = Min/Max \* 100%
- 4. LED life time defined as follow: the final brightness is at 50% of original brightness

# Measured Method: (X\*Y: Light Area)

#### **Internal Circuit Diagram**





Using aperture of 1°, distance 50cm.

# **10. Standard Specification for Reliability** 10–1. Standard Specifications for Reliability

| No | Item                        | Description                                                                                                                                                                                                                                  |
|----|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01 | High temperature operation  | The sample should be allowed to stand at $70^{\circ}$ C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.                                                      |
| 02 | Low temperature operation   | The sample should be allowed to stand at $-20^{\circ}$ C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.                                                     |
| 03 | High temperature<br>storage | The sample should be allowed to stand at $80^{\circ}$ C for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.                                                     |
| 04 | Low temperature<br>storage  | The sample should be allowed to stand at $-30^{\circ}$ C for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.                                                        |
| 05 | Moisture storage            | The sample should be allowed to stand at $60^{\circ}$ C,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.                                                                 |
| 06 | Thermal shock<br>storage    | The sample should be allowed to stand the following 10 cycles :<br>-30 °C for 30 minutes $\rightarrow$ normal temperature for 5 minutes $\rightarrow$<br>+80 °C for 30 minutes $\rightarrow$ normal temperature for 5 minutes, as one cycle. |
| 07 | Packing vibration           | Frequency range : 10Hz ~ 55Hz<br>Amplitude of vibration : 1.5mm<br>X,Y,Z 2 hours for each direction.                                                                                                                                         |
| 08 | Packing drop test           | According to ISTA 1A 2001.                                                                                                                                                                                                                   |
| 09 | Electrical Static           | Air: ±6KV 150pF/330Ω 5 times                                                                                                                                                                                                                 |
|    | Discharge                   | Contact: ±4KV 150pF/330Ω 5 time                                                                                                                                                                                                              |

\*Sample size for each test item is 3~5pcs



# 10 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 10-1, Standard specifications for Reliability have been executed in order to ensure stability.

| No | Item                   | Test Model             | In section Criteria                                                                                                |
|----|------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------|
| 01 | Current<br>Consumption | Refer To Specification | The current consumption should conform to the product specification.                                               |
| 02 | Contrast               | Refer To Specification | After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests. |
| 03 | Appearance             | Visual inspection      | Defect free.                                                                                                       |

### 10 - 3. MTBF

| MTBF | Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature $(25\pm5^{\circ}C)$ , normal humidity $(50\pm10\%$ RH), and in area not exposed to direct sun light. |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



# **<u>11. Specification of Quality Assurance</u>**

11-1. Purpose

This standard for Quality Assurance should affirm the quality of LCD module products to supply to purchaser by All Shore Industries (Supplier).

11-2. Standard for Quality Test

a. Inspection:

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

- c. Test of Appearance Characteristics:
  - According to the individual specification to test the product.
- d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

- (i) Test method: According to ISO2859-1.General Inspection Level II take a single time.
- (ii) The defects classify of AQL as following:

Major defect: AQL = 0.65Minor defect: AQL = 2.5

- Total defects: AQL = 2.5
- 11-3. Non- conforming Analysis & Deal With Manners
  - a. Non- conforming Analysis:
    - (i) Purchaser should supply the detail data of non- conforming sample and the non-conforming.
    - (ii) After accepting the detail data from purchaser, the analysis of non- conforming should be finished in two weeks.
  - (iii) If supplier can not finish analysis on time, must announce purchaser before 3 days.
  - b. Disposition of non- conforming:
    - (i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.
    - (ii) Both supplier and customer should analyze the reason and discuss the disposition of non- conforming when the reason of nonconforming is not sure.

# 11-4. Agreement items

Both sides should discuss together when the following problems happen.

- a. There is any problem of standard of quality assurance, and both sides should think that must be modified.
- b. There is any argument item which does not record in the standard of quality assurance.
- c. Any other special problem.





11-5. Standard of The Product Appearance Test

a. Manner of appearance test:

(i) The test must be under 20W  $\times$  2 or 40W fluorescent light, and the distance of view must be at 30±5cm.

(ii) When test the model of transmissive product must add the reflective plate.

(iii)The test direction is base on around  $10^{\circ}$  of vertical line.

(iiii)Temperature: 25±5℃ Humidity: 60±10%RH



(iv) Definition of area:



- A. Area: Viewing area.
- B. Area: Out of viewing area.
  - (Outside viewing area)

b. Basic principle:

- (i) It will accord to the AQL when the standard can not be described.
- (ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
- (iii) Must add new item on time when it is necessary.
- c. Standard of inspection: (Unit: mm)



11-6. Inspection specification Defect out of viewing area can be neglected.

| ltem                                                            | Spe                                                                                                                                                                                                                                                                                                                                                                                                                                          | cification                                          | Unit : mm | AQL |  |  |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------|-----|--|--|
| Electrical Testing                                              | <ul> <li>1.1 Open</li> <li>1.2 Short</li> <li>1.3 T/P failure</li> <li>1.4 Missing vertical, horizontal segment, segment contrast defect.</li> <li>1.5 Missing character, dot or icon.</li> <li>1.6 Display malfunction.</li> <li>1.7 No function or no display.</li> <li>1.8 Current consumption exceeds product specifications.</li> <li>1.9 LCD viewing angle defect.</li> <li>1.10 Mixed product types.</li> <li>1.11 Flicker</li> </ul> |                                                     |           |     |  |  |
|                                                                 | D                                                                                                                                                                                                                                                                                                                                                                                                                                            | Acceptable numbers                                  |           |     |  |  |
|                                                                 | ≤0.25                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>ignored</b> (No more than five spots within 5mm) | <b>y</b>  |     |  |  |
| explosion-proof<br>film                                         | 0.25 <d≤0.5< td=""><td>3</td><td>X</td><td></td></d≤0.5<>                                                                                                                                                                                                                                                                                                                                                                                    | 3                                                   | X         |     |  |  |
| bubble/Concave                                                  | 0.5 <d≤0.8< td=""><td>2</td><td>D=(x+y)/2</td><td></td></d≤0.8<>                                                                                                                                                                                                                                                                                                                                                                             | 2                                                   | D=(x+y)/2 |     |  |  |
| and convex                                                      | 0.8 <d≤1.5< td=""><td>1</td><td>4</td><td>о г</td></d≤1.5<>                                                                                                                                                                                                                                                                                                                                                                                  | 1                                                   | 4         | о г |  |  |
| / Contamination                                                 | D>1.5                                                                                                                                                                                                                                                                                                                                                                                                                                        | NG                                                  |           | 2.5 |  |  |
|                                                                 | <ol> <li>Product's front side checked according to this specification, back side<br/>ignored, but light leakage is not allowed.</li> <li>Printing ink peel off is not allowed.</li> <li>The particle will be ignored when it is removable by cleaning</li> </ol>                                                                                                                                                                             |                                                     |           |     |  |  |
|                                                                 | * Densely spaced:                                                                                                                                                                                                                                                                                                                                                                                                                            | No more than two spots withi                        | n 10mm    |     |  |  |
|                                                                 | D                                                                                                                                                                                                                                                                                                                                                                                                                                            | Acceptable numbers                                  |           |     |  |  |
|                                                                 | ≪0. 15                                                                                                                                                                                                                                                                                                                                                                                                                                       | ignored (No more than five spots within 5mm)        | У         |     |  |  |
| Black spots /                                                   | 0.15 <d≤0.3< td=""><td>3</td><td>≺ X</td><td></td></d≤0.3<>                                                                                                                                                                                                                                                                                                                                                                                  | 3                                                   | ≺ X       |     |  |  |
| White spots                                                     | 0.3 <d≤0.5< td=""><td>2</td><td>D=(x+y)/2</td><td></td></d≤0.5<>                                                                                                                                                                                                                                                                                                                                                                             | 2                                                   | D=(x+y)/2 |     |  |  |
| /Bright spots/<br>Color spots<br>/polluted inside/<br>punctured | D>0. 5                                                                                                                                                                                                                                                                                                                                                                                                                                       | NG                                                  |           | 2.5 |  |  |
|                                                                 | <ol> <li>Product's front side checked according to this specification, back side ignored, but light leakage is not allowed.</li> <li>Printing ink peel off is not allowed.</li> <li>The particle will be ignored when it is removable by cleaning</li> <li>* Densely spaced: No more than two spots within 10mm</li> </ol>                                                                                                                   |                                                     |           |     |  |  |
|                                                                 | <ul><li>3. The particle will be ignored when it is removable by cleaning</li><li>* Densely spaced: No more than two spots within 10mm</li></ul>                                                                                                                                                                                                                                                                                              |                                                     |           |     |  |  |



|                     |                                                                                                            |               |                             | 1            |                           |            |
|---------------------|------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------|---------------------------|------------|
|                     | W                                                                                                          | L             | Acceptable numbers          |              |                           |            |
|                     |                                                                                                            |               | ignored (No more            |              | W                         |            |
|                     | $\leq 0.05$                                                                                                | $\leq 6$      | than five lines within      |              |                           |            |
| Linear Object:      |                                                                                                            |               | 5mm)                        | , í          |                           |            |
| Fiber, scurf,       | 0.05 <w<0.25< td=""><td><math>\leq 6</math></td><td>2</td><td>   </td><td><u> </u></td><td></td></w<0.25<> | $\leq 6$      | 2                           |              | <u> </u>                  |            |
| scratches and other | W> 0.25                                                                                                    |               | NG                          | '            | L                         | <u>о Б</u> |
| affecting function) |                                                                                                            |               |                             |              |                           | 2.5        |
| arreeting function) | The reverse side s                                                                                         | cratches      | not affect to the electror  | ic circuit   | cannot find the           |            |
|                     | scratches from the                                                                                         | e front si    | de is acceptable            | ne encun,    | cannot nind the           |            |
|                     |                                                                                                            |               | 1                           |              |                           |            |
|                     | * Densely spaced:                                                                                          | No mor        | e than two lines within 1   | 0mm          |                           |            |
|                     |                                                                                                            |               |                             |              |                           |            |
|                     |                                                                                                            |               |                             |              | ŧ                         |            |
| Glass edge          | Edge breakag                                                                                               | ge can't a    | affect visual effection (ed | ge           | ××××                      |            |
| chipping, edge      | have no visua                                                                                              | al dama       | annage to circuit, over     |              | SOL                       | 0 5        |
| breakage            | cone                                                                                                       | ditions       | Acceptable nur              | nbers        |                           | 2.5        |
| U U                 | V<1.5mm                                                                                                    | V<7mm         | .7<⊤ /                      |              |                           |            |
|                     | ∧≈1.5mm,                                                                                                   | 1 <21111      | 1,2 < 1 4                   |              | TYZZ                      |            |
|                     | Visual broken                                                                                              | is NG         | and there is no note        | ntial fau    | 11+                       |            |
|                     | visuai bioken                                                                                              | 15 110,       |                             |              | 11.0.                     |            |
| Glass broken        |                                                                                                            | $\searrow$    |                             |              |                           | 0.65       |
|                     |                                                                                                            | $\rightarrow$ |                             |              |                           |            |
| 1. V/A printed      |                                                                                                            |               |                             |              |                           |            |
| edges sawtooth      | Some contentiou                                                                                            | s defect      | judged according to samp    | oles         |                           |            |
| according to        | Product                                                                                                    | G 1''         |                             |              | -+ 1+-                    |            |
| this standard       | type                                                                                                       | Conditi       | ons                         |              | 2 w                       |            |
| 2. LOGO's           |                                                                                                            | 1、wid         | th below 0.2 inch (inclue   | ded)         | $\langle \lambda \rangle$ | 2.5        |
| sawtooth            | Same size                                                                                                  | ignored       | , above 0.2 NG              |              | ( 🖓 )                     |            |
|                     |                                                                                                            | 2、Len         | gth not accounted           |              | $\langle \rangle \rangle$ |            |
|                     |                                                                                                            |               |                             |              |                           |            |
|                     |                                                                                                            |               |                             |              |                           |            |
| Sanaifia dimanaian  |                                                                                                            |               |                             |              |                           |            |
| specific dimension  | In accordance wi                                                                                           | ith produ     | ct outline drawing or spe   | cification ( | (kev dimension)           |            |
|                     | or engineering sa                                                                                          | mple.         |                             |              | ()                        | 2.5        |
|                     |                                                                                                            |               |                             |              |                           |            |
| Glue                | 1 Glue overflow                                                                                            | exceed 0      | 2mm to the black frame      | is not allo  | ved                       |            |
| overflow/Frame      |                                                                                                            | LALLUU U      |                             | 13 1101 4110 | weu.                      |            |
|                     |                                                                                                            |               |                             |              |                           | <u>Э</u> Е |
|                     |                                                                                                            |               |                             |              |                           | 2.5        |
|                     |                                                                                                            |               |                             |              |                           |            |
|                     |                                                                                                            |               |                             |              |                           |            |



| FPC | Bonding<br>bubble/<br>Misalignm<br>ent | FPC golden finger hot pressure's bubble or impurity diameter shall be below $1/2$ of the pressed area, pressed deviation shall not exceed $1/2$ of the silver line width, and 40X microscope cannot have obvious cracks. | 0.65 |
|-----|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|     | Folded<br>mark<br>(minor               | Linearity irreversibility folded mark and acute angle folded mark is NG.                                                                                                                                                 | 2.5  |
|     | fault)<br>FMI FII M                    | Surface broken scratched $\leq 0.3$ mm                                                                                                                                                                                   |      |
|     | (minor                                 | Surface broken below 5mm can be modified by print ink, after modified, the                                                                                                                                               | 2.5  |
|     | fault)                                 | result shall be achieved to EMI                                                                                                                                                                                          |      |



# **12. Handling Precaution**

# 12.1 Warranty

This product has been manufactured to specifications as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we will not take responsibility if the product is used in medical devices, nuclear power control equipment, aerospace equipment, fire and security systems, or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

- 1. We cannot accept responsibility for any defect arise after additional process of the product (including disassembly and reassembly), after product delivery.
- 2. We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.
- 3. We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product has passed your company's acceptance inspection procedures.
- 4. We cannot accept responsibility for industrial property, which may arise through the use of your product, with exception to those issues relating directly to the structure or method of manufacturing of our product 3months from All Shore production.
- 5. The liability of ASI is limited to repair or replacement on the terms set forth below. ASI will not be responsible for any subsequent or consequential events or injury or damage to any personnel or user including third party personnel and/or user. Unless otherwise agreed in writing between ASI and the customer, ASI will only replace or repair any of its CTP which is found defective electrically or visually when inspected in accordance with ASI GENERAL CTP INSPECTION STANDARD.

# 12.2. Precautions in Use of CTP Module

# 12.2-1. Handling of CTP Module

12.2-1-1 Please operate the capacitive touch panel by touch the panel surface with finger or electric pen

12.2-1-2 Store the products at the temperature and humidity mentioned in the specification in a good package do not expose the products under direct sunlight.

12.2-1-3 Do not hit the capacitive touch panel in strong force , or drop it down, it is made of glass and friable.

12.2-1-4 Put on finger coats glovers or mask to protect the products from fingerprint of stain. Do not upload/unload the touch panel by holding the FPC cable. Do not bend the FPC cableoften or pull it hard when installing, as FPC cable is soft and connected to touch panel body.

12.2-1-5 Pay attention to the prevention from high voltage and static electricity.

# 12.2-2 Storage

- 12.2-2-1 Store in ambient temperature of 25±10°C, and relative humidity of 50±10%RH. Do not expose to sunlight or fluorescent light.
- 12.2-2-2 Storage in a clean environment, free from dust, active gas, and solvent.
- 12.2-2-3 Store in anti-static electricity container.
- 12.2-2-4 Store without any physical load.

12.2-2-5 Appearance,3months;Function,1year;within the validity, failed CTP can be replaced 1 to 1

# 12.3 Guarantee

Our products meet requirements of the environment. All Shore ROHS requirement is based on European Union Directive 2011/65/EU (ROHS) Requirements and Update.