

PRODUCT : TFT TOUCH MODULE

MODULE NO. : WKS50WV012-WCT

SUPPLIER: WKS Technology Co.,LTD

DATE: Jul 15, 2019

SPECIFICATION

Revision: 0.0

WKS50WV012-WCT

This module uses ROHS material

This specification may change without prior notice in order to improve performance or quality. Please contact WKS R&D department for updated specification and product status before design for this product or release of this order.

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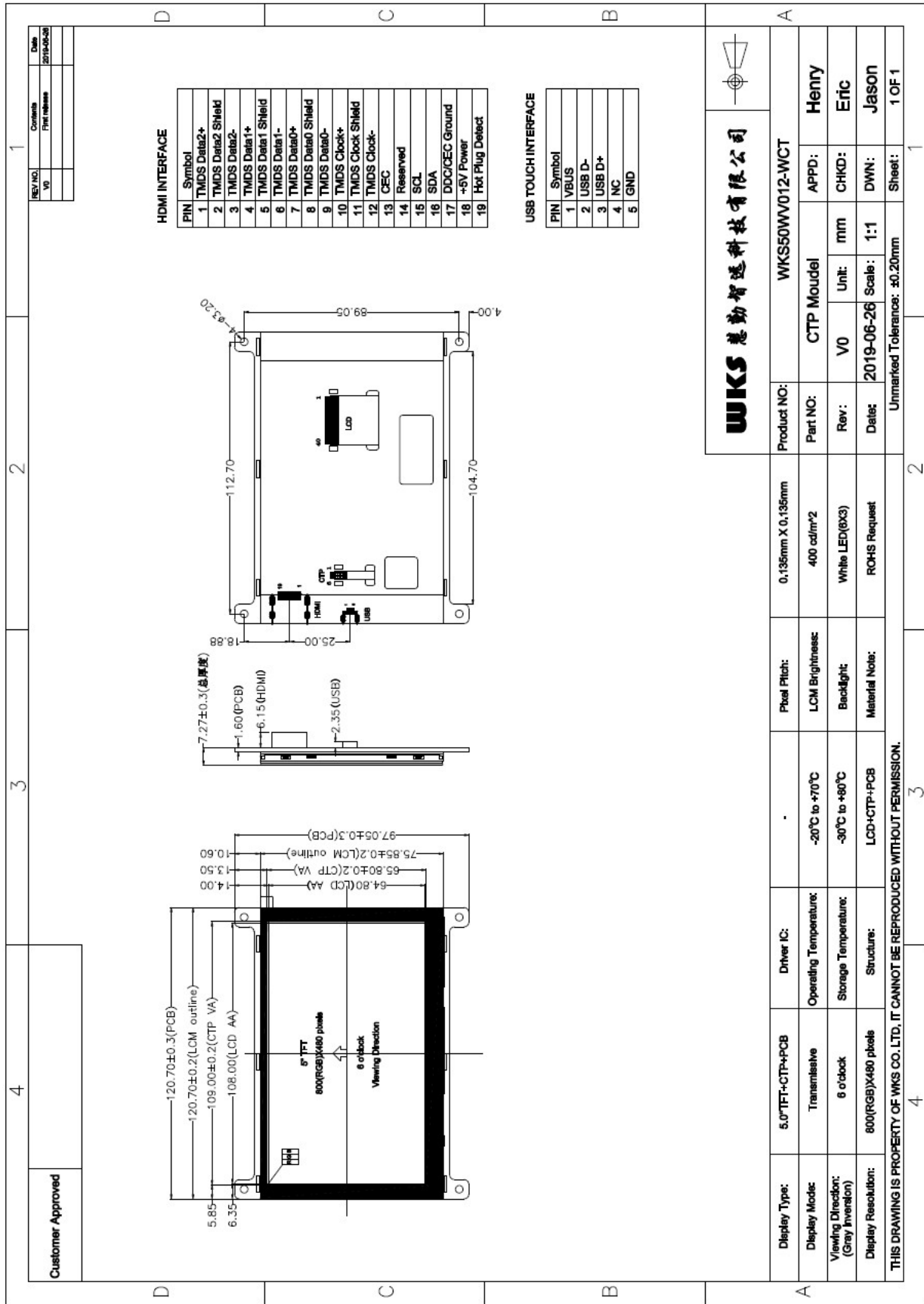
CONTENTS

- 1、 GENERAL INFORMATION**
- 2、 EXTERNAL DIMENSIONS**
- 3、 ABSOLUTE MAXIMUM RATINGS**
- 4、 ELECTRICAL CHARACTERISTICS**
- 5、 CTP CHARACTERISTICS**
- 6、 ELECTRO-OPTICAL CHARACTERISTICS**
- 7、 INTERFACE DESCRIPTION**
- 8、 INPUT TIMING**
- 9、 RELIABILITY TEST CONDITIONS**
- 10、 INSPECTION CRITERION**
- 11、 PRODUCT PHOTOS**

1、GENERAL INFORMATION

| <i>Item of general information</i> | <i>Contents</i> | | <i>Unit</i> |
|--------------------------------------|--|-----------------------|----------------|
| <i>LCD Display Size (Diagonal)</i> | 5.0 | | <i>inch</i> |
| <i>Module Structure</i> | <i>LCD Display + CTP Touch + PCB</i> | | - |
| <i>LCD Display Type</i> | <i>TFT/TRANSMISSIVE</i> | | - |
| <i>LCD Display Mode</i> | <i>Normally White</i> | | - |
| <i>Recommended Viewing Direction</i> | 12 | | <i>o'clock</i> |
| <i>Gray inversion Direction</i> | 6 | | <i>o'clock</i> |
| <i>Module size (W×H×T)</i> | 120.70×97.05×7.27 | | <i>mm</i> |
| <i>Active area (W×H)</i> | 108.00×64.80 | | <i>mm</i> |
| <i>Number of pixels (Resolution)</i> | 800RGB×480 | | <i>pixel</i> |
| <i>Pixel pitch (W×H)</i> | 0.135×0.135 | | <i>mm</i> |
| <i>Color Pixel Arrangement</i> | <i>RGB Stripe</i> | | - |
| <i>Module Interface Type</i> | <i>LCD Display</i> | <i>HDMI interface</i> | - |
| | <i>CTP Touch</i> | <i>USB interface</i> | - |
| <i>System Support</i> | <i>Win7/Win8/Win10(Plug and play)</i> | | - |
| | <i>Android/Linux (need to be configured first)</i> | | - |
| <i>Power Supply</i> | <i>USB (5.0V)</i> | | - |
| <i>Module Power consumption</i> | 460(Max) | | <i>mA</i> |
| <i>Color Numbers</i> | 16.7M | | - |
| <i>Backlight Type</i> | <i>White LED</i> | | - |

2、EXTERNAL DIMENSIONS



3、ABSOLUTE MAXIMUM RATINGS

| <i>Parameter of absolute maximum ratings</i> | <i>Symbol</i> | <i>Min</i> | <i>Max</i> | <i>Unit</i> |
|--|---------------|------------|---------------|-------------|
| <i>Operating temperature</i> | <i>Top</i> | -20 | 70 | °C |
| <i>Storage temperature</i> | <i>Tst</i> | -30 | 80 | °C |
| <i>Humidity</i> | <i>RH</i> | - | 90%(Max 60°C) | <i>RH</i> |

Note: Absolute maximum ratings means the product can withstand short-term, not more than 120 hours. If the product is a long time to withstand these conditions, the life time would be shorter.

4、ELECTRICAL CHARACTERISTICS(DC CHARACTERISTICS)

| <i>Parameter of DC characteristics</i> | <i>Symbol</i> | <i>Min.</i> | <i>Typ.</i> | <i>Max.</i> | <i>Unit</i> |
|--|---------------|-------------|-------------|-------------|-------------|
| <i>PCB operating voltage</i> | <i>VUSB</i> | - | 5.0 | - | <i>V</i> |
| <i>LCD I/O operating voltage</i> | <i>VDD</i> | 3.0 | 3.3 | 3.6 | <i>V</i> |
| <i>Input voltage 'H' level</i> | <i>VIH</i> | 0.7*VDD | - | VDD | <i>V</i> |
| <i>Input voltage 'L' level</i> | <i>VIL</i> | VSS | - | 0.3*VDD | <i>V</i> |
| <i>Output voltage 'H' level</i> | <i>VOH</i> | VDD-0.4 | - | VDD | <i>V</i> |
| <i>Output voltage 'L' level</i> | <i>VOL</i> | VSS | - | VSS+0.4 | <i>V</i> |

5、CTP CHARACTERISTICS

| <i>Item of CTP characteristics</i> | <i>Specification</i> | <i>Unit</i> | <i>Remark</i> |
|------------------------------------|-----------------------------------|--------------|---------------|
| <i>Panel Type</i> | <i>Glass Cover + Glass Sensor</i> | - | - |
| <i>Resolution</i> | <i>800 × 480</i> | <i>pixel</i> | - |
| <i>Surface Hardness</i> | <i>≥6H</i> | - | - |
| <i>Transparency</i> | <i>>82%</i> | - | - |
| <i>Driver IC</i> | - | - | - |
| <i>Interface Type</i> | <i>USB</i> | - | - |
| <i>Support Points</i> | <i>5</i> | - | - |
| <i>Sampling Rate</i> | <i>20~100</i> | <i>Hz</i> | - |
| <i>Supply voltage</i> | <i>3.3</i> | <i>V</i> | - |

6、ELECTRO-OPTICAL CHARACTERISTICS

| Item of electro-optical characteristics | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark | Note |
|---|------------------------------|----------------|--|------|-------|------|-------------------|--------|------|
| Response time | | $Tr+Tf$ | $\theta=0$ $\phi=0$ $Ta=25^{\circ}C$ | - | 20 | - | ms | FIG 1. | 4 |
| Contrast Ratio | | CR | | - | 350 | - | - | FIG 2. | 1 |
| Luminance uniformity | | $\delta WHITE$ | | - | 80 | - | % | FIG 2. | 3 |
| Surface Luminance | | Lv | | - | 400 | - | cd/m ² | FIG 2. | 2 |
| CIE (x, y) chromaticity | White | White x | $\theta=0$ $\phi=0$ $Ta=25^{\circ}C$ | - | 0.317 | - | - | FIG 2. | 5 |
| | | White y | | - | 0.324 | - | | | |
| | Red | Red x | | - | 0.633 | - | | | |
| | | Red y | | - | 0.341 | - | | | |
| | Green | Green x | | - | 0.324 | - | | | |
| | | Green y | | - | 0.551 | - | | | |
| | Blue | Blue x | | - | 0.153 | - | | | |
| | | Blue y | | - | 0.143 | - | | | |
| Viewing angle range | $\phi=90(12\text{ o'clock})$ | | CR ≥ 10 | - | 50 | - | deg | FIG 3. | 6 |
| | $\phi=270(6\text{ o'clock})$ | | | - | 60 | - | deg | | |
| | $\phi=0(3\text{ o'clock})$ | | | - | 65 | - | deg | | |
| | $\phi=180(9\text{ o'clock})$ | | | - | 65 | - | deg | | |
| NTSC ratio | | - | - | - | 50 | - | % | - | - |

Note 1. Contrast Ratio(CR) is defined mathematically by the following formula. For more information see FIG 2.:

$$\text{Contrast Ratio(CR)} = \frac{\text{Average Surface Luminance with all white pixels(P1,P2,P3,P4,P5,P6,P7,P8,P9)}}{\text{Average Surface Luminance with all black pixels(P1,P2,P3,P4,P5,P6,P7,P8,P9)}}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see FIG 2.

Lv =Average Surface Luminance with all white pixels (P1,P2,P3,P4,P5,P6,P7,P8,P9)

Note 3. The uniformity in surface luminance ($\delta WHITE$) is determined by measuring

luminance at each test position 1 through 9, and then dividing the maximum luminance of 9 points luminance by minimum luminance of 9 points luminance. For more information see FIG 2.

$$\delta_{\text{WHITE}} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5, P6, P7, P8, P9)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5, P6, P7, P8, P9)}}$$

Note 4. Response time is the time required for the display to transition from White to black (Rise Time, T_r) and from black to white (Decay Time, T_f). For additional information see FIG 1.

Note 5. CIE (x, y) chromaticity, The x, y value is determined by screen active area position 5. For more information see FIG 2.

Note 6. Viewing angle is the angle at which the contrast ratio is greater than a specific value. For TFT module, the specific value of contrast ratio is 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 3.

Note 7. For Viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope. Series Instruments. For contrast ratio, Surface Luminance, Luminance uniformity and CIE, the testing data is base on BM-7 photo detector.

Note 8. For TN type TFT transmissive module, Gray scale reverse occurs in the direction of panel viewing angle.

FIG.1. The definition of Response Time

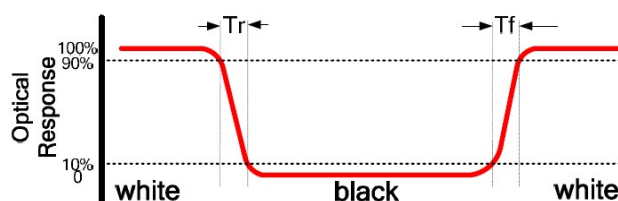


FIG.2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity,

CIE (x , y) chromaticity

A : H/6 ;

B : V/6 ;

H,V : Active Area(AA) size

Measurement instrument: BM-7; Light spot size=5mm, 350mm distance from the LCD surface to detector lens.

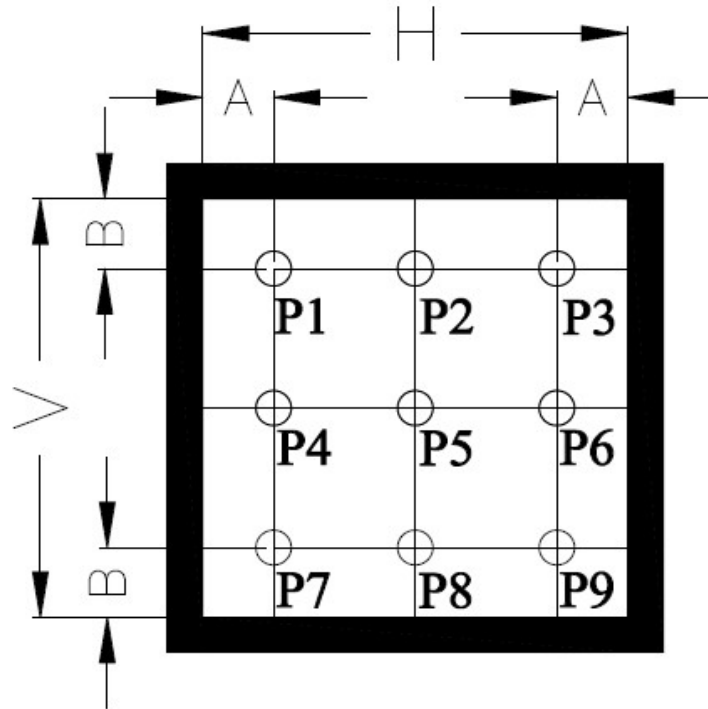
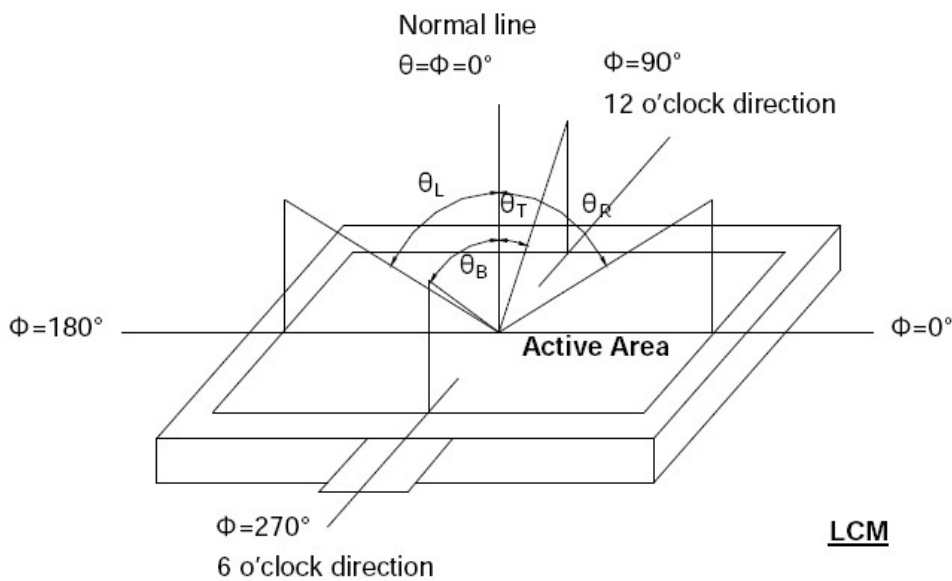


FIG.3. The definition of viewing angle



7、INTERFACE DESCRIPTION

A、HDMI Interface Description

| NO. | Symbol | DESCRIPTION |
|-----|-------------------|---|
| 1 | TMDS Data2+ | Positive side of channel 2 TMDS low-voltage signal differential input pair |
| 2 | TMDS Data2 Shield | Ground |
| 3 | TMDS Data2- | Negative side of channel 2 TMDS low-voltage signal differential input pair |
| 4 | TMDS Data1+ | Positive side of channel 1 TMDS low-voltage signal differential input pair |
| 5 | TMDS Data1 Shield | Ground |
| 6 | TMDS Data1- | Negative side of channel 1 TMDS low-voltage signal differential input pair |
| 7 | TMDS Data0+ | Positive side of channel 0 TMDS low-voltage signal differential input pair |
| 8 | TMDS Data0 Shield | Ground |
| 9 | TMDS Data0- | Negative side of channel 0 TMDS low-voltage signal differential input pair |
| 10 | TMDS Clock+ | Positive side of reference clock. TMDS low-voltage signal differential input pair |
| 11 | TMDS Clock Shield | Ground |
| 12 | TMDS Clock- | Negative side of reference clock. TMDS low-voltage signal differential input pair |
| 13 | CEC | No Connection |
| 14 | Reserved(N.C.) | No Connection |
| 15 | SCL | DDC SCL |
| 16 | SDA | DDC SDA |
| 17 | DDC/CEC Ground | Ground |
| 18 | +5V Power | +5V Power |
| 19 | Hot Plug Detect | Hot Plug Detect |

B、USB Interface Description

| NO. | Symbol | DESCRIPTION |
|-----|--------|---------------|
| 1 | VUSB | USB Power |
| 2 | D- | USB Data- |
| 3 | D+ | USB Data+ |
| 4 | NC | No connection |
| 5 | GND | Power Ground |

Application Note: Please connect the USB first, and then connect the HDMI interface.

8、LCD TIMING

Parallel RGB input Timing table

| Parameter | Symbol | Value | | | Unit |
|---------------------------------|--------|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| DCLK frequency@ Frame rate=60Hz | DCLK | - | 30 | 50 | MHz |
| Horizontal display area | thd | 800 | | | DCLK |
| 1 Horizontal Line | th | - | 928 | - | DCLK |
| HSYNC pulse width | thpw | 1 | 48 | - | DCLK |
| HSYNC Back Porch(Blanking) | thb | - | 88 | - | DCLK |
| HSYNC Front Porch | thfp | - | 40 | - | DCLK |
| Vertical display area | tvd | 480 | | | H |
| VSYNC period time | tv | - | 525 | - | H |
| VSYNC pulse width | tvpw | - | 3 | - | H |
| VSYNC Back Porch(Blanking) | tvb | - | 32 | - | H |
| VSYNC Front Porch | tvfp | - | 13 | - | H |

9、RELIABILITY TEST CONDITIONS

| No. | Test Item | Test Condition |
|-----|----------------------------|---|
| 1 | High Temperature Storage | 80°C/120 hours |
| 2 | Low Temperature Storage | -30°C/120 hours |
| 3 | High Temperature Operating | 70°C/120 hours |
| 4 | Low Temperature Operating | -20°C/120 hours |
| 5 | Temperature Cycle Storage | -20°C(30min.)~25(5min.)~70°C(30min.)×10cycles |

A、Inspection after test:

Inspection after 2~4 hours storage at room temperature, the sample shall be free from defects:

- Air bubble in the LCD;
- Sealleak;
- Non-display;
- Missing segments;
- Glass crack;
- Current is twice higher than initial value.

B、Remark:

- The test samples should be applied to only one test item.
- Sample size for each test item is 5~10pcs.
- Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

10、INSPECTION CRITERION

This specification is made to be used as the standard of acceptance/rejection criteria for TFT-LCD/IPS TFT-LCD module product, and this specification is applicable only in the case that the size of module equal to or exceed than 3.5 inch.

10.1 Sample plan

Sampling plan according to GB/T2828.1-2003/ISO 2859-1: 1999 and ANSI/ASQC

Z1.4-1993,normal level 2 and based on:

Major defect: AQL 0.65

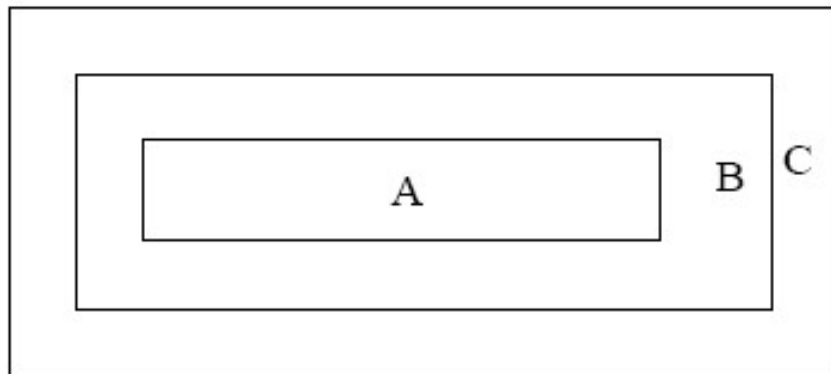
Minor defect: AQL 1.5

10.2 Inspection condition

Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45° against perpendicular line. (Normal temperature 20~25 °C and normal humidity 60 ±15%RH)

10.3 Definition of Inspection Item.

A、Definition of inspection zone in LCD.



Zone A: character/Digit area

Zone B: viewing area except Zone A (Zone A + Zone B=minimum Viewing area)

Zone C: Outside viewing area (invisible area after assembly in customer's product)

Fig.1 Inspection zones in an LCD

Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

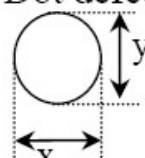
B、 Definition of some visual defect

| | |
|-------------------|--|
| <i>Bright dot</i> | <i>Because of losing all or part function, bad pixel dots appear bright and the size is more than 50% of one dot in which LCD panel is displaying under black pattern.</i> |
| <i>Dark dot</i> | <i>Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture, or pure whiter picture.</i> |

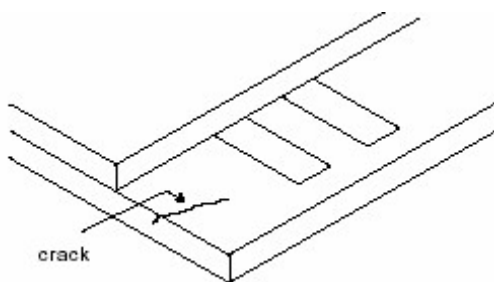
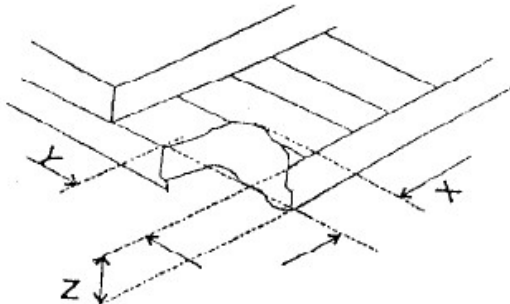
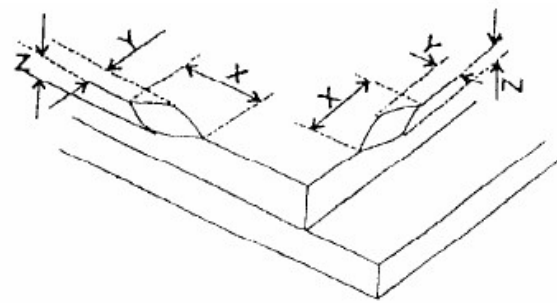
10.4 Major Defect

| <i>Item No.</i> | <i>Items to be inspected</i> | <i>Inspection standard</i> | <i>Classification of defects</i> |
|-----------------|------------------------------|--|----------------------------------|
| <i>1</i> | <i>Functional defects</i> | <i>1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Excess power consumption 6) Backlight no lighting, flickering and abnormal lighting</i> | <i>major</i> |
| <i>2</i> | <i>Missing</i> | <i>Missing component</i> | |
| <i>3</i> | <i>Outline dimension</i> | <i>Overall outline dimension beyond the drawing is not allowed</i> | |

10.5 Minor Defect

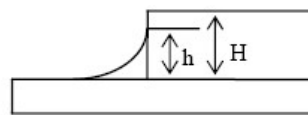
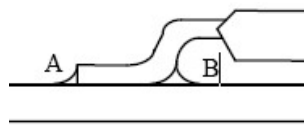
| Item No. | Items to be inspected | Inspection standard | | | | | Classification of defects |
|--|--|-----------------------|---------------------|-----------------|------------|------------|---------------------------|
| 1 | Bright dot /dark dot defect | Zone | | Acceptable Qty | | | C |
| | | | | A+B | | | |
| | | | | 3.5" ~ 7" | 7~10.1" | >10.1" | |
| | | Bright pixel dot | | 1 | 2 | 3 | Acceptable |
| | | Dark pixel dot | | 4 | 4 | 4 | |
| | | 2bright dots adjacent | | 0 | 0 | 0 | |
| | | 2dark dots adjacent | | 0 | 0 | 0 | |
| Total bright and dark dots | | 5 | 6 | 7 | | | |
| <p>Note: Minimum distance between defective dots is more than 5mm; Pixel dots' function is normal, but bright dots caused by foreign material and other reasons are judged by the dot defect of 5.2.</p> | | | | | | | |
| 2 | <p>Dot defect</p>  <p>$\Phi = (x+y) / 2$</p> | Zone | | Acceptable Qty | | | C |
| | | | | A+B | | | |
| | | | | 3.5" ~7" | 7~10.1" | >10.1" | |
| | | Size(mm) | | $\Phi \leq 0.2$ | Acceptable | Acceptable | Acceptable |
| | | $0.2 < \Phi \leq 0.5$ | 4 | 5 | 6 | | |
| | | $\Phi > 0.5$ | 0 | 0 | 0 | | |
| <p>Note:</p> <ol style="list-style-type: none"> 1. Minimum distance between defective dots is more than 5 mm; 2. The quantity of defect is zero in operating condition. | | | | | | | |
| 3 | Linear defect | Zone | | Acceptable Qty | | | C |
| | | | | A+B | | | |
| | | Length | Width | 3.5" ~7" | 7~10.1" | >10.1" | Acceptable |
| | | Ignore | $W \leq 0.05$ | Acceptable | Acceptable | Acceptable | |
| | | $L \leq 5.0$ | $0.05 < W \leq 0.1$ | 4 | 5 | 6 | |
| $L > 5.0$ | $W > 0.1$ | 0 | 0 | 0 | | | |
| <p>Note:</p> | | | | | | | |

| 4 | Polarizer defect | <p>5.4.1 Polarizer Position</p> <p>(i) Shifting in position should not exceed the glass outline dimension.</p> <p>(ii) Incomplete covering of the viewing area due to shifting is not allowed.</p> <p>5.4.2 Dirt on polarizer</p> <p>Dirt which can be wiped easily should be acceptable.</p> <p>5.4.3 Polarizer Dent & Air bubble</p> <table border="1"> <thead> <tr> <th colspan="2">Zone</th> <th colspan="3">Acceptable Qty</th> <th rowspan="2">C</th> </tr> <tr> <th colspan="2">Size(mm)</th> <th colspan="3">A+B</th> </tr> <tr> <th></th> <th></th> <th>3.5"~7"</th> <th>7~10.1"</th> <th>>10.1"</th> <th></th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td></td> <td>Acceptable</td> <td>Acceptable</td> <td>Acceptable</td> <td rowspan="3">Acceptable</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.5$</td> <td></td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>$\Phi > 0.5$</td> <td></td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>5.4.4 Polarizer scratch</p> <p>(i) If the polarizer scratch can be seen after cover assembling or in the operating condition, judge by the linear defect of 5.3.</p> <p>(ii) If the polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following:</p> <table border="1"> <thead> <tr> <th colspan="2">Zone</th> <th colspan="3">Acceptable Qty</th> <th rowspan="2">C</th> </tr> <tr> <th colspan="2">Size (mm)</th> <th colspan="3">A+B</th> </tr> <tr> <th>Length</th> <th>Width</th> <th>3.5"~7"</th> <th>7~10.1"</th> <th>>10.1"</th> <th></th> </tr> </thead> <tbody> <tr> <td>Ignore</td> <td>$W \leq 0.05$</td> <td>Acceptable</td> <td>Acceptable</td> <td>Acceptable</td> <td rowspan="3">Acceptable</td> </tr> <tr> <td>$1.0 < L \leq 5.0$</td> <td>$0.05 < W \leq 0.20$</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>$L > 5.0$</td> <td>$W > 0.2$</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> | Zone | | Acceptable Qty | | | C | Size(mm) | | A+B | | | | | 3.5"~7" | 7~10.1" | >10.1" | | $\Phi \leq 0.2$ | | Acceptable | Acceptable | Acceptable | Acceptable | $0.2 < \Phi \leq 0.5$ | | 4 | 5 | 6 | $\Phi > 0.5$ | | 0 | 0 | 0 | Zone | | Acceptable Qty | | | C | Size (mm) | | A+B | | | Length | Width | 3.5"~7" | 7~10.1" | >10.1" | | Ignore | $W \leq 0.05$ | Acceptable | Acceptable | Acceptable | Acceptable | $1.0 < L \leq 5.0$ | $0.05 < W \leq 0.20$ | 4 | 5 | 6 | $L > 5.0$ | $W > 0.2$ | 0 | 0 | 0 | Minor |
|-----------------------|------------------------|---|------------|----------------|----------------|--------|---|---|----------|--|-----|--|--|--|--|---------|---------|--------|--|-----------------|--|------------|------------|------------|------------|-----------------------|--|---|---|---|--------------|--|---|---|---|------|--|----------------|--|--|---|-----------|--|-----|--|--|--------|-------|---------|---------|--------|--|--------|---------------|------------|------------|------------|------------|--------------------|----------------------|---|---|---|-----------|-----------|---|---|---|-------|
| | | Zone | | Acceptable Qty | | | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Size(mm) | | A+B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 3.5"~7" | 7~10.1" | >10.1" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi \leq 0.2$ | | Acceptable | Acceptable | Acceptable | Acceptable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.2 < \Phi \leq 0.5$ | | 4 | 5 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi > 0.5$ | | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zone | | Acceptable Qty | | | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Size (mm) | | A+B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Length | Width | 3.5"~7" | 7~10.1" | >10.1" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ignore | $W \leq 0.05$ | Acceptable | Acceptable | Acceptable | Acceptable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $1.0 < L \leq 5.0$ | $0.05 < W \leq 0.20$ | 4 | 5 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $L > 5.0$ | $W > 0.2$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | MURA | Using 3% ND filter, it's NG if it can be seen in R,G,B picture. | Minor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | White/Black dot (MURA) | Visible under: ND3%; $D \leq 0.15mm$, Acceptable; $0.15mm < D \leq 0.5mm$, $N \leq 4$; $D > 0.5mm$, Not allowable. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 6 | Glass defect | <p>(i) Crack Cracks are not allowed.</p>  | Minor | | | | | | | | |
|---|--------------|---|------------|------------|------------|------------|--------------------------------------|------------|--------------------------------------|------------|-------|
| | | <p>(ii) TFT chips on corner</p>  <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">X</th> <th style="width: 25%;">Y</th> <th style="width: 25%;">Z</th> <th style="width: 25%;">Acceptable</th> </tr> </thead> <tbody> <tr> <td>≤ 3.0</td> <td>≤ 3.0</td> <td>Not more than the thickness of glass</td> <td>$N \leq 3$</td> </tr> </tbody> </table> <p>Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.</p> | X | Y | Z | Acceptable | ≤ 3.0 | ≤ 3.0 | Not more than the thickness of glass | $N \leq 3$ | Minor |
| | | X | Y | Z | Acceptable | | | | | | |
| ≤ 3.0 | ≤ 3.0 | Not more than the thickness of glass | $N \leq 3$ | | | | | | | | |
| <p>(iii) Usual surface crack</p>  <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">X</th> <th style="width: 25%;">Y</th> <th style="width: 25%;">Z</th> <th style="width: 25%;">Acceptable</th> </tr> </thead> <tbody> <tr> <td>≤ 1.5</td> <td>≤ 1.5</td> <td>Not more than the thickness of glass</td> <td>$N \leq 4$</td> </tr> </tbody> </table> <p>It is only applicable to the upper glass of LCD.</p> | X | Y | Z | Acceptable | ≤ 1.5 | ≤ 1.5 | Not more than the thickness of glass | $N \leq 4$ | Minor | | |
| X | Y | Z | Acceptable | | | | | | | | |
| ≤ 1.5 | ≤ 1.5 | Not more than the thickness of glass | $N \leq 4$ | | | | | | | | |

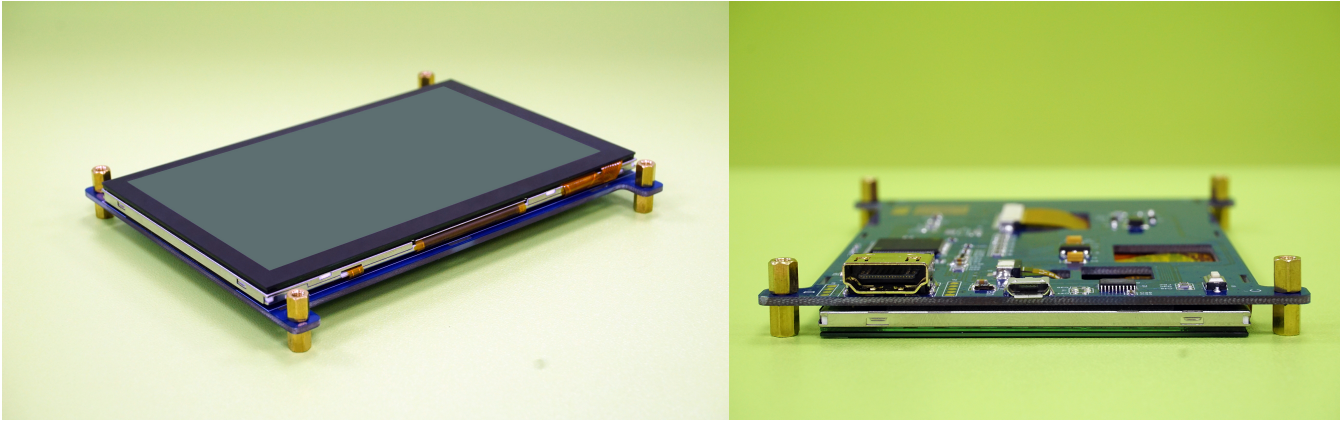
10.6 Module Cosmetic Criteria

| Item No. | Items to be inspected | Inspection Standard | Classification of defects |
|------------------------------|--|--|---------------------------|
| 1 | Difference in Spec. | Not allowable | Major |
| 2 | Pattern peeling | No substrate pattern peeling and floating | Major |
| 3 | Soldering defects | No soldering missing | Major |
| | | No soldering bridge | Major |
| | | No cold soldering | Minor |
| 4 | Resist flaw on PCB | Visible copper foil ($\Phi 0.5$ mm or more) on substrate pattern is not allowed | Minor |
| 5 | FPC gold finger | No dirt, breaking, oxidation lead to black | Major |
| 6 | Backlight plastic frame | No deformation, crack, breaking, backlight positioning column breaking, obvious nick. | Minor |
| 7 | Marking printing effect | No dark marking, incomplete, deformation lead to unable to judge | Minor |
| 8 | Accretion of metallic Foreign matter | No accretion of metallic foreign matter (Not exceed $\Phi 0.2$ mm) | Minor |
| 9 | Stain | No stain to spoil cosmetic badly | Minor |
| 10 | Plate discoloring | No plate fading, rusting and discoloring | Minor |
| 11 | 1. Lead parts | a. Soldering side of PCB Solder to form a 'Filet' all around the lead. Solder should not hide the lead form perfectly. | Minor |
| | | b. Components side(In case of 'Through Hole PCB') Solder to reach the Components side of PCB. | Minor |
| | 2. Flat packages | Either 'Toe'(A) or 'Seal'(B)of the lead to be covered by "Filet". Lead form to be assume over Solder. | Minor |
| | 3. Chips | $(3/2) H \geq h \geq (1/2) H$ | Minor |
| 4. Solder ball/Solder splash | a. The spacing between solder ball and the conductor or solder pad $h \geq 0.13$ mm. The diameter of solder ball $d \leq 0.15$ mm. | Minor | |
| | b. The quantity of solder balls or solder splashes isn't beyond 5 in 600 mm ² . | Minor | |
| | c. Solder balls/Solder splashes do not violate minimum electrical clearance. | Major | |



11、PRODUCT PHOTOS

PRODUCT



APPLICATION CASE

Driven by Raspberry Pi (linux) & win7/win8/win10 systems

