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# Datasheet

## Disea

**ZW-T062HWH-02**

DE-05-012



# PRODUCT SPECIFICATIONS

For Customer: \_\_\_\_\_

: APPROVAL FOR SPECIFICATION

Customer Model No. \_\_\_\_\_

: APPROVAL FOR SAMPLE

Module No.: ZW-T062HWH-02

Date : 2015-08-27

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|     |  |      |

**For Customer's Acceptance:**

| Approved By | Comment |
|-------------|---------|
|             |         |

| PREPARED | CHECKED | VERIFIED BY QA DEPT | VERIFIED BY R&D DEPT |
|----------|---------|---------------------|----------------------|
| GZH      | JOHN    |                     | Dmjiaing             |

**2. Revision Record**

| Date       | Rev.No. | Page | Revision Items    | Prepared |
|------------|---------|------|-------------------|----------|
| 2015-08-27 | V0      |      | The first release | ZHP      |
|            |         |      |                   |          |

### 3. General Specifications

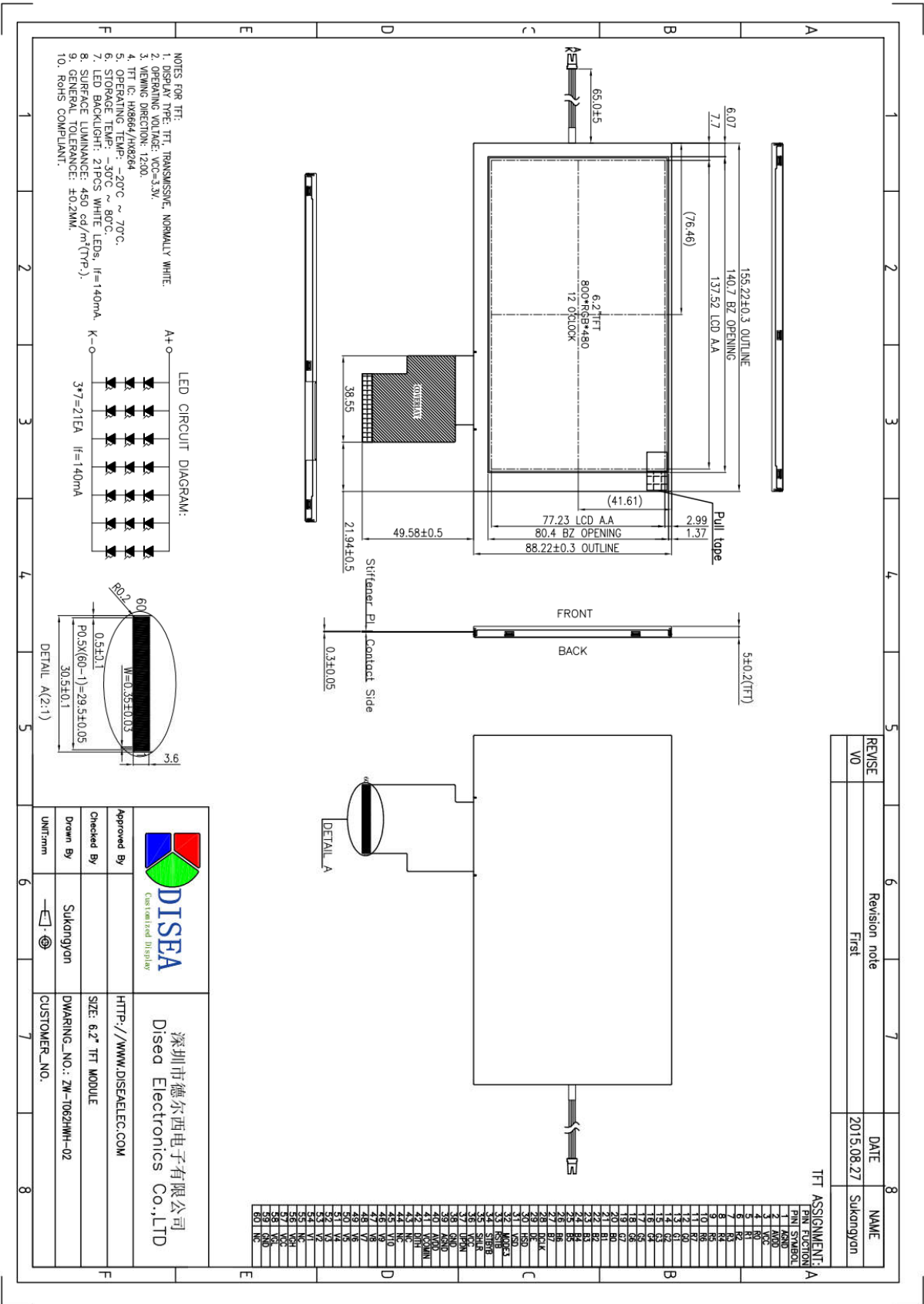
ZW-T062HWH-02 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a backlight unit. The 6.2" display area contains 800X480 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

| Item                  | Contents                        | Unit    | Note |
|-----------------------|---------------------------------|---------|------|
| LCD Type              | TFT/Transmissive/Normally white | -       |      |
| Display color         | 16.7M                           |         |      |
| Viewing Direction     | 12:00                           | O'Clock |      |
| Operating temperature | -20~+70                         | ℃       |      |
| Storage temperature   | -30~+80                         | ℃       |      |
| Module size           | 155.22x88.22x5.0                | mm      |      |
| Active Area(W×H)      | 137.52X77.23                    | mm      |      |
| Number of Dots        | 800x480                         | dots    |      |
| Controller            | GATE: HX8664<br>SOURCE :HX8264  | -       |      |
| Power Supply Voltage  | 3.3                             | V       |      |
| Backlight             | 21pcs-LEDs (white)              | pcs     |      |
| Weight                | ---                             | g       |      |
| Interface             | 24-BIT RGB                      | -       |      |

Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: Without FPC and Solder.

## 4.Outline Drawing



| REVISE | Revision note | DATE       | NAME      |
|--------|---------------|------------|-----------|
| V0     | First         | 2015.08.27 | Sukangyon |

|             |           |  |  |
|-------------|-----------|--|--|
|             |           | 深圳市德西电子有限公司<br>Disea Electronics Co.,LTD |  |
| Approved By |           | HTTP://WWW.DISEAELEC.COM                 |  |
| Checked By  |           | SIZE: 6.2" TFT MODULE                    |  |
| Drawn By    | Sukangyon | DWARKING_NO.: ZW-1062HW-02               |  |
| Unit/Tram   |           | CUSTOMER_NO.                             |  |

## 5. Absolute Maximum Ratings(Ta=25°C)

### 5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25°C)

| Item                 | Symbol                           | Min.                | Max. | Unit | Note |
|----------------------|----------------------------------|---------------------|------|------|------|
| Power Supply Voltage | V <sub>DD</sub>                  | -0.5                | 5.0  | V    | 1, 2 |
|                      | AV <sub>DD</sub>                 | -0.5                | 15.0 | V    |      |
|                      | V <sub>GH</sub>                  | -0.3                | 42.0 | V    |      |
|                      | V <sub>GL</sub>                  | VG <sub>H</sub> -42 | 0.3  | V    |      |
|                      | V <sub>GH</sub> -V <sub>GL</sub> | -                   | 40.0 | V    |      |

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V<sub>CC</sub> > V<sub>SS</sub> must be maintained.

### 5.2 Typical operation conditions

| Item                     | Symbol | Values  |      |      | Unit | Remark |
|--------------------------|--------|---------|------|------|------|--------|
|                          |        | Min.    | Typ. | Max. |      |        |
| Power voltage            | VDD    | 3.0     | 3.3  | 3.6  | V    |        |
|                          | AVDD   | 9.9     | 10   | 10.1 | V    |        |
|                          | VGH    | 12      | 15   | 23   | V    |        |
|                          | VGL    | -12     | -7.0 | -5   | V    |        |
| Input signal voltage     | VCOM   | -       | 3.4  | -    | V    |        |
| Input logic high voltage | VIH    | 0.7 VDD | -    | VDD  | V    |        |

## 5.3 Environmental Absolute Maximum Ratings.

| Item                | Storage |      | Operating |      | Note |
|---------------------|---------|------|-----------|------|------|
|                     | MIN.    | MAX. | MIN.      | MAX. |      |
| Ambient Temperature | -30°C   | 80°C | -20°C     | 70°C | 1,2  |
| Humidity            | -       | -    | -         | -    | 3    |

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.

The phenomenon is reversible.

3.  $T_a \leq 40^\circ\text{C}$ : 90%RH MAX.

$T_a > 40^\circ\text{C}$ : Absolute humidity must be lower than the humidity of 90%RH at  $40^\circ\text{C}$ .

## 6. Electrical Specifications

### 6.1 Electrical characteristics ( $V_{SS}=0V$ , $T_a=25^\circ\text{C}$ )

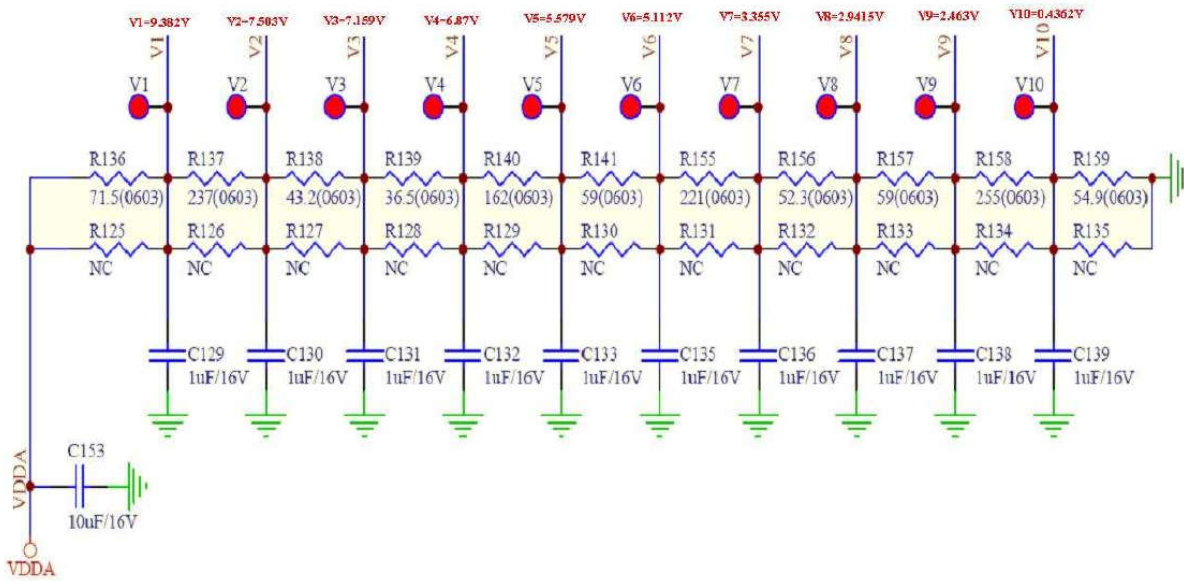
| Parameter           | Symbol    | Condition              | Min           | Typ         | Max | Unit        | Note |
|---------------------|-----------|------------------------|---------------|-------------|-----|-------------|------|
| Power supply        | VDD       | $T_a=25^\circ\text{C}$ | 3.0           | 3.3         | 3.6 | V           |      |
| Input voltage       | 'H'       | $V_{IH}$               | $V_{DD}=3.3V$ | $0.8V_{DD}$ | -   | $V_{DD}$    | V    |
|                     | 'L'       | $V_{IL}$               | $V_{DD}=3.3V$ | 0           | -   | $0.2V_{DD}$ | V    |
| Current Consumption | $I_{CC1}$ | Normal mode            | -             | 20          | 30  | mA          | 1    |
|                     | $I_{CC2}$ | Sleep mode             | -             | 0.05        | 0.1 | mA          | 1    |
| Clock Frequency     | $f_{CLK}$ | -                      | -             | 30          | 50  | MHz         |      |

Note:

- 1: Tested in  $1 \times 1$  chessboard pattern.

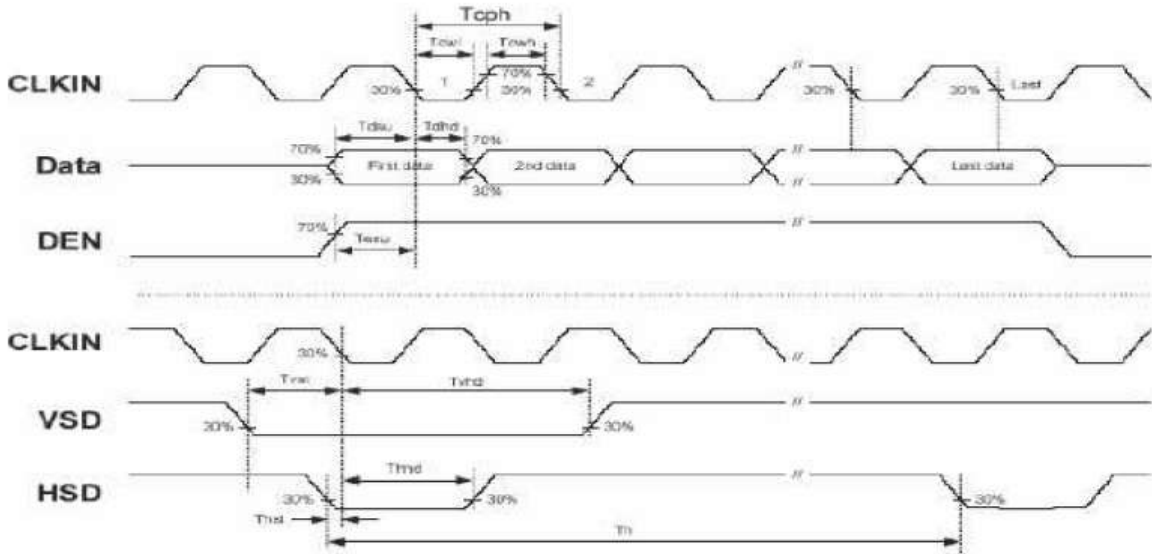


## 6.2 Gamma Correction Reference Voltage Setting



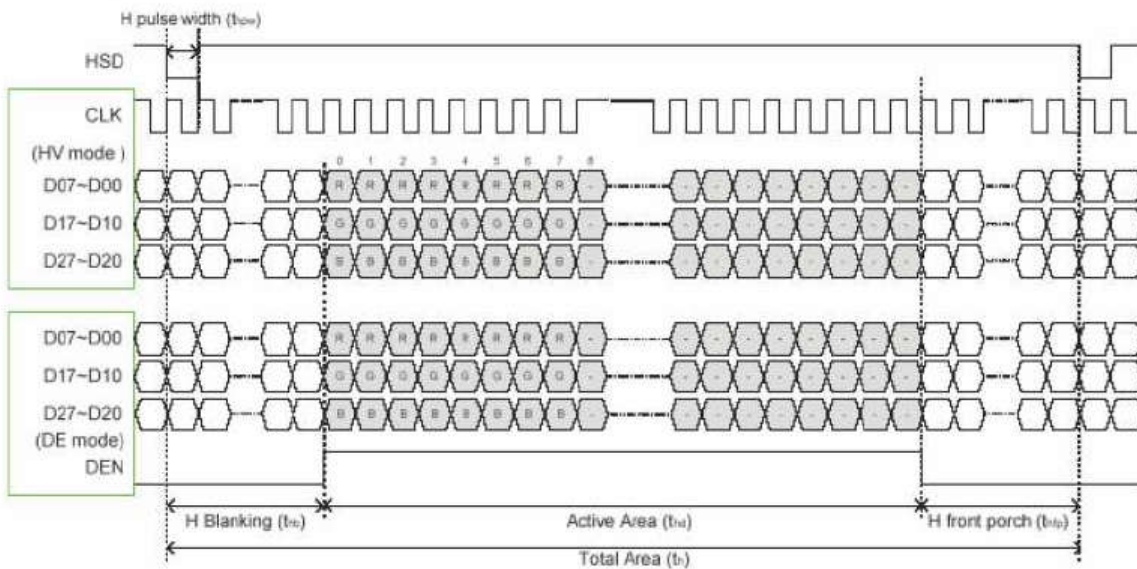
## 6.3 Timing Chart

| Item                    | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------|--------|------|------|------|------|------|
| DCLK cycle time         | Tcph   | 25   |      |      | ns   |      |
| DCLK frequency          | fclk   |      | 30   | 40   | MHz  |      |
| DCLK pulse duty         | Tcwh   | 40   | 50   | 60   | %    |      |
| VSD setup time          | Tvst   | 8    |      |      | ns   |      |
| VSD hold time           | Tvhhd  | 8    |      |      | ns   |      |
| HSD setup time          | Thst   | 8    |      |      | ns   |      |
| HSD hold time           | Thhd   | 8    |      |      | ns   |      |
| Data setup time         | Tdsu   | 8    |      |      | ns   |      |
| Data hold time          | Tdhd   | 8    |      |      | ns   |      |
| DE setup time           | Tesu   | 8    |      |      | ns   |      |
| DE hold time            | Tehd   | 8    |      |      | ns   |      |
| Horizontal display area | thd    |      | 800  |      | Tcph |      |
| HSD period time         | th     |      | 928  |      | Tcph |      |
| HSD pulse width         | thpw   | 1    | 48   |      | Tcph |      |
| HSD back porch          | thb    |      | 88   |      | Tcph |      |
| HSD front porch         | thfp   |      | 40   |      | Tcph |      |
| Vertical display area   | tvhd   |      | 480  |      | th   |      |
| VSD period time         | tv     |      | 525  |      | th   |      |
| VSD pulse width         | tvpw   |      | 3    |      | th   |      |
| VSD back porch          | tvb    |      | 32   |      | th   |      |
| VSD front porch         | tvfp   |      | 13   |      | th   |      |

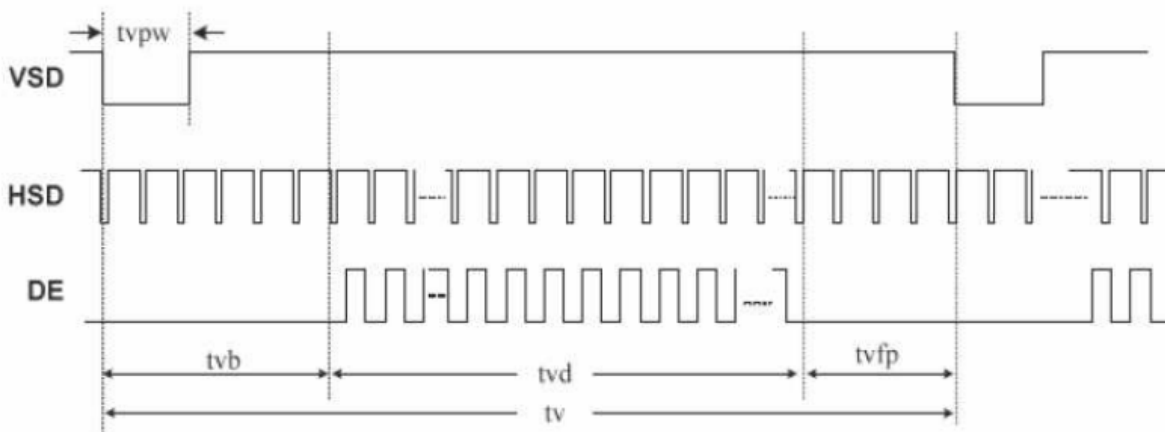


Sampling clock timing

### Horizontal input timing

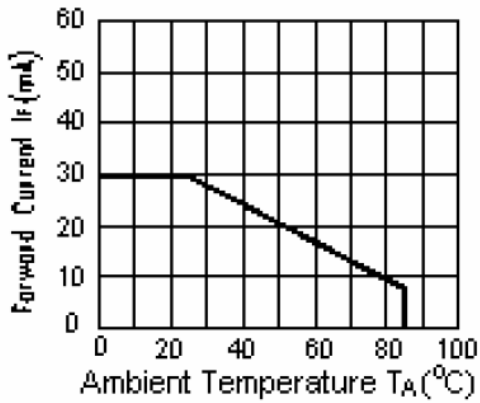


### Vertical input timing



## 6.4 LED backlight specification(VSS=0V ,Ta=25°C)

| Item              | Symbol      | Condition | Min   | Typ   | Max  | Unit  | Note |
|-------------------|-------------|-----------|-------|-------|------|-------|------|
| Supply voltage    | Vf          | If=20X7mA | 8.0   | 9.0   | 10.5 | V     |      |
| Uniformity        | $\Delta Bp$ | If=20X7mA | 75    |       |      | %     |      |
| Luminance for LCD | Lv          | If=20X7mA | 350   | 450   |      | Cd/m2 |      |
| Life Time         | T           | If=20X7mA | 20000 | 30000 |      | Hours |      |



## 6.5 Interface signals

| Pin No. | Symbol | I/O | Function  |
|---------|--------|-----|---|
| 1       | AGND   | P   | Ground.   |
| 2       | AVDD   | P   | Power for Analog Circuit  |
| 3       | VCC    | P   | Power for Digital Circuit   |
| 4-11    | R0-R7  | I   | Red data input  |
| 12-19   | G0-G7  | I   | Green data input  |
| 20-27   | B0-B7  | I   | Blue data input   |
| 28      | DCLK   | I   | Clock input   |
| 29      | DE     | I   | Data Enable   |
| 30      | HSD    | I   | Hsync signal input  |
| 31      | VSD    | I   | Vsync signal input  |
| 32      | MODE3  | I   | DE/SYNC mode select .normally pull high H:DE mode.L:HSD/VSD mode  |
| 33      | RSTB   | I   | Reset   |
| 34      | STBYB  | I   | Standby Mode Select;H:normal operation, L:standby mode  |
| 35      | SHLR   | I   | Source right or left sequence control.SHLR="L",shift left:last data=S1<-S2...S1200=first data SHLR="H",shift right:first data=S1->SS2...S1200=last data |
| 36      | VCC    | P   | Power for Digital Circuit   |
| 37      | UPDN   | I   | gate up or down scan control. UPDN="L" , DOWN shift : G1->G2...->G480 ; UPDN="H", up shift: G1<-G2...<-G480   |
| 38-39   | GND    | P   | Power ground  |
| 40      | AVDD   | P   | Power for Analog Circuit  |
| 41      | VCOMIN | I   | VCOM input  |
| 42      | DITH   | I   | Dithering Setting.<br>H:6bit Resolution,L:8bit Resolution   |
| 43-44   | NC     | -   | No connection   |
| 45-54   | V10-V1 | I   | Gamma Voltage 10-1  |
| 55      | NC     | -   | No connection   |
| 56      | VGH    | I   | Positive power for scan driver  |
| 57      | VCC    | P   | Power for Digital Circuit   |
| 58      | VGL    | I   | Negative power for scan driver  |
| 59      | GND    | P   | Power ground  |
| 60      | NC     | -   | No connection   |

## 7. Optical Characteristics

| Item                    | Symbol         | Condition                          | Min.  | Typ. | Max.  | Unit              | Note |
|-------------------------|----------------|------------------------------------|-------|------|-------|-------------------|------|
| Brightness              | Bp             | $\theta=0^\circ$                   | 350   | 450  | -     | Cd/m <sup>2</sup> | 1    |
| Uniformity              | $\Delta Bp$    | $\Phi=0^\circ$                     | 75    | -    | -     | %                 | 1,2  |
| Viewing Angle           | 3:00           | Cr $\geq$ 10                       | 55    | 65   | -     | Deg               | 3    |
|                         | 6:00           |                                    | 45    | 55   | -     |                   |      |
|                         | 9:00           |                                    | 55    | 65   | -     |                   |      |
|                         | 12:00          |                                    | 55    | 65   | -     |                   |      |
| Contrast Ratio          | Cr             | $\theta=0^\circ$<br>$\Phi=0^\circ$ | 300   | 500  | -     | -                 | 4    |
| Response Time           | T <sub>r</sub> |                                    | -     | 10   | -     | ms                | 5    |
|                         | T <sub>f</sub> |                                    | -     | 10   | -     | ms                |      |
| Color of CIE Coordinate | W              | x                                  | -0.05 | 0.28 | +0.05 | -                 | 1,6  |
|                         |                | y                                  |       | 0.33 |       | -                 |      |
|                         | R              | x                                  |       | 0.51 |       | -                 |      |
|                         |                | y                                  |       | 0.34 |       | -                 |      |
|                         | G              | x                                  |       | 0.31 |       | -                 |      |
|                         |                | y                                  |       | 0.56 |       | -                 |      |
|                         | B              | x                                  |       | 0.15 |       | -                 |      |
|                         |                | y                                  |       | 0.14 |       | -                 |      |
| NTSC Ratio              | S              |                                    | 50    | 60   | -     | %                 |      |

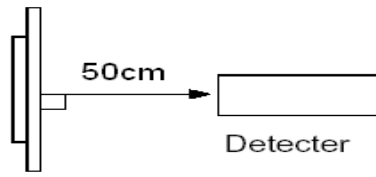
Note: The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 ( $\Phi$ 5mm)

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: T<sub>a</sub>=25 °C.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.

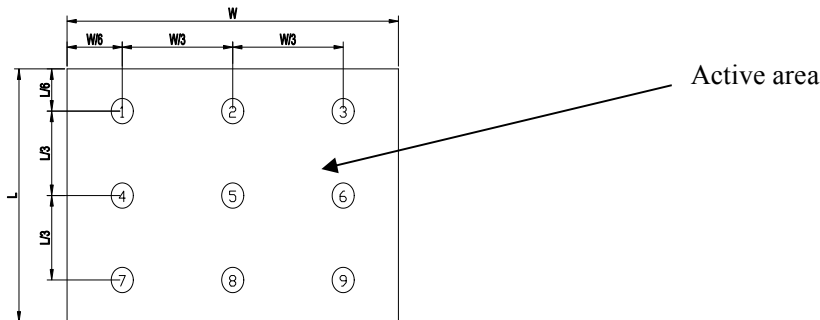


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

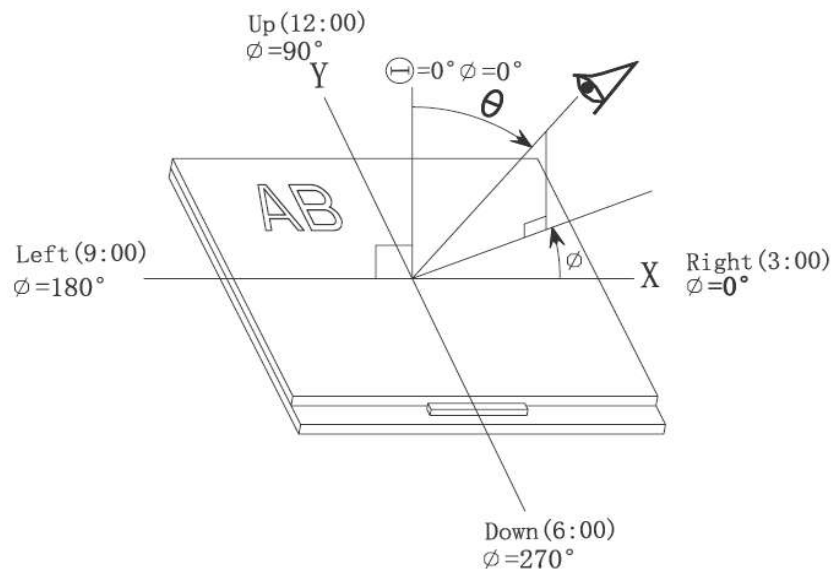
$Bp (\text{Max.})$  = Maximum brightness in 9 measured spots

$Bp (\text{Min.})$  = Minimum brightness in 9 measured spots.

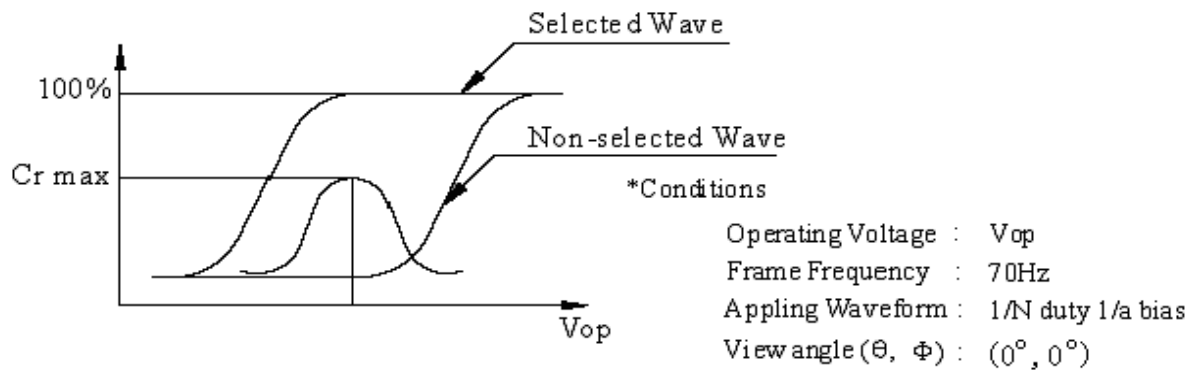


Note 3: The definition of viewing angle:

Refer to the graph below marked by  $\vartheta$  and  $\phi$



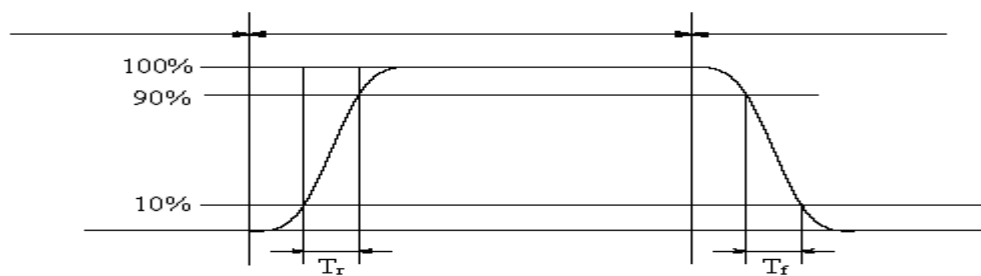
Note 4: Definition of contrast ratio.( Test LCD using DMS501)



$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

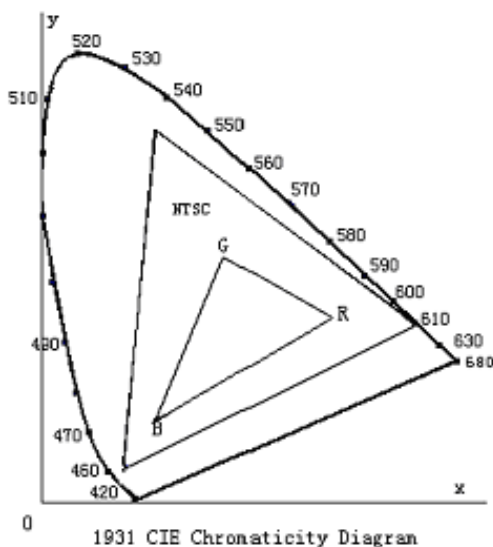
Note 5: Definition of Response time. (Test LCD using DMS501):

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

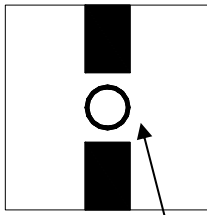


Color gamut:

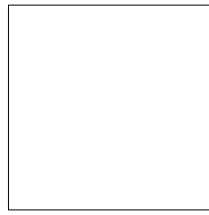
$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.

$$\text{Cross talk ratio}(\%) = \frac{|\text{pattern A Brightness} - \text{pattern B Brightness}|}{\text{pattern A Brightness}} \times 100$$



Pattern A



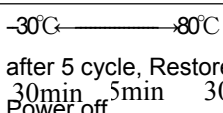
Pattern B

Measurement point(center)

*Electric volume value=3F+/-3Hex*



## 8. Reliability Test Items and Criteria

| No | Test Item                         | Test condition  | Criterion                            |
|----|-----------------------------------|---|--------------------------------------|
| 1  | High Temperature Storage          | 80°C±2°C 96H<br>Restore 2H at 25°C<br>Power off   | Note 1<br>Note 2<br>Note 3<br>Note 4 |
| 2  | Low Temperature Storage           | -30°C±2°C 96H<br>Restore 2H at 25°C<br>Power off  |                                      |
| 3  | High Temperature Operation        | 80°C±2°C 96H<br>Restore 2H at 25°C<br>Power on  |                                      |
| 4  | Low Temperature Operation         | -30°C±2°C 96H<br>Restore 4H at 25°C<br>Power on   |                                      |
| 5  | High Temperature/Humidity Storage | 60°C±2°C 90%RH 96H<br>Power off   |                                      |
| 6  | Temperature Cycle                 | <br>after 5 cycle, Restore 2H at 25°C<br>Power off |                                      |
| 7  | Vibration Test                    | 10Hz~150Hz, 100m/s <sup>2</sup> , 120min  |                                      |

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

| ITEM       | Inspection        |
|------------|-------------------|
| Contrast   | CR>50%            |
| IDD        | IDD<200%          |
| Brightness | Brightness>60%    |
| Color Tone | Color Tone+/-0,05 |

Note 1:  $T_a$  is the ambient temperature of samples.

Note 2:  $T_s$  is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may after the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

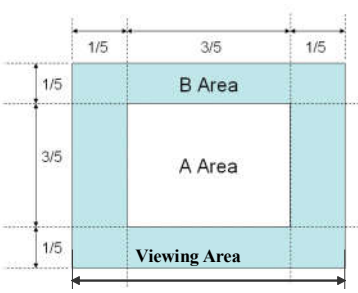
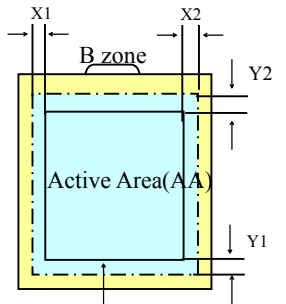
## 9 Quality level

### 9.1 Classification of defects

**Major defects (MA):** A major defect refers to a defect that may substantially degrade usability for product applications, including all functional defects (such as no display, abnormal display, open or missing segment, short circuit, missing component), outline dimension beyond the drawing, progressive defects and those affecting reliability.

**Minor defects (MI):** A minor defect refers to a defect which is not considered to be able to substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation, such as black spot, white spot, bright spot, pinhole, black line, white line, contrast variation, glass defect, polarizer defect, etc.

### 9.2 Definition of inspection range

|  |  |
|--|--|
| <p>For dot defect of TFT LCD which is not smaller than 3 inches, dividing three areas to make a judgment (according to figure 1).</p> <p>A area : center of viewing area<br/>         B area : periphery of viewing area<br/>         C area : Outside viewing area</p> <p>For other defects, dividing two areas to make a judgment (according figure 2).</p> <p>A zone : Inside Viewing area<br/>         B zone : Outside Viewing area</p> <p>X1(A.A~V.A): 2mm    X2(A.A~V.A): 2mm<br/>         Y1(A.A~V.A): 2mm    Y2(A.A~V.A): 2mm</p> |  <p>Figure 1</p>  <p>Figure 2</p> |
|--|--|

### 9.3 Inspection items and general notes

|                  |   |   |
|------------------|---|---|
| General notes    | <p>Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and our company.</p> <p>Viewing area should be the area which our company guarantees.</p> <p>Limit sample should be prior to this Inspection standard.</p> <p>Viewing judgment should be under static pattern.</p> <p>Inspection conditions</p> <p>Inspection distance: 250 mm (from the sample)      Temperature : 25±5 °C</p> <p>Inspection angle : 45 degrees in 6 o'clock direction (all defects in viewing area should be inspected from this direction)</p> |   |
| Inspection items | Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble  | The color of a small area is different from the remainder. The phenomenon doesn't change with voltage |
|                  | Contrast variation  | The color of a small area is different from the remainder. The phenomenon changes with voltage        |
|                  | Polarizer defect  | Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass                           |
|                  | Dot defect (TFT LCD)  | The pixel appears bright or dark abnormally when display  |

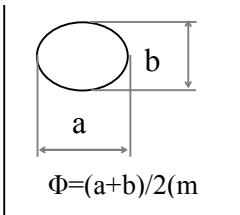
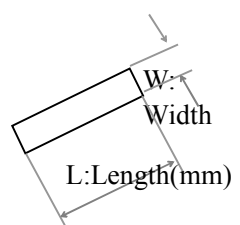
|  |                   |   |
|--|-------------------|---|
|  | Functional defect | No display, Abnormal display, Open or missing segment, Short circuit, False viewing direction |
|  | Glass defect      | Glass crack, Shaved corner of glass, Surplus glass  |
|  | PCB defect        | Components assembly defect  |

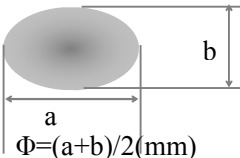
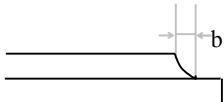
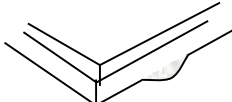
## 9.4 Outgoing Inspection level

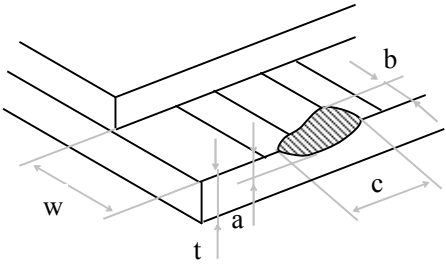
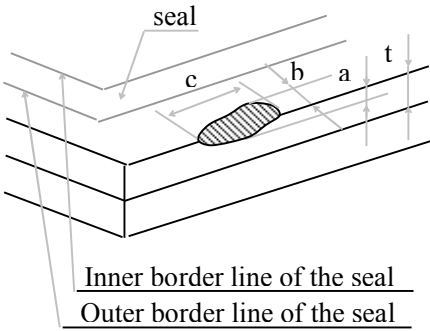
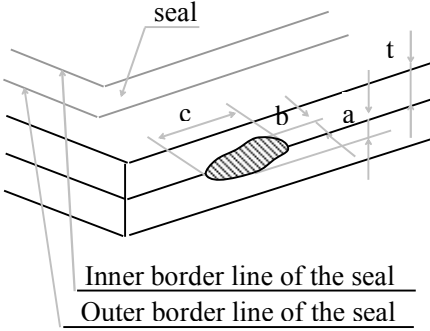
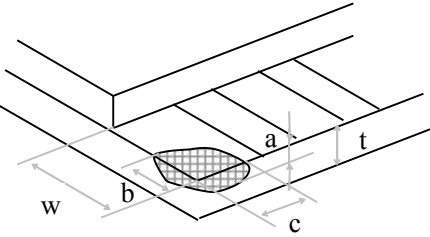
| Outgoing Inspection standard | Inspection conditions | Inspection |      |      |    |      |
|------------------------------|-----------------------|------------|------|------|----|------|
|                              |                       | Min.       | Max. | Unit | IL | AQL  |
| Major Defects                | See 9.3 general notes | See 9.5    |      |      | II | 0.65 |
| Minor Defects                | See 9.3 general notes | See 9.5    |      |      | II | 0.65 |

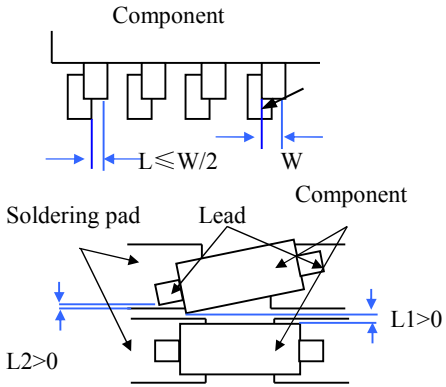
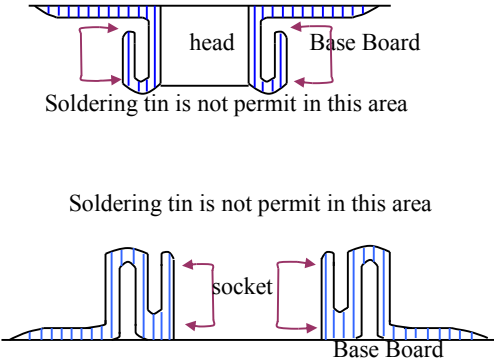
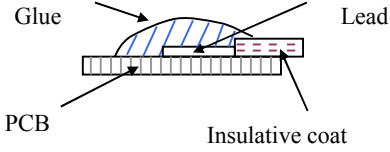
Note: Sampling standard conforms to GB2828

## 9.5 Inspection Items and Criteria

| Inspection items |  |   | Judgment standard          |                                      |                   |        |           |  |
|------------------|--|---|----------------------------|--------------------------------------|-------------------|--------|-----------|--|
|                  |  |   | Category                   |                                      | Acceptable number |        |           |  |
|                  |  |   |                            |                                      | A zone            | B zone |           |  |
| 1                | Black spot, White spot, Pinhole, Foreign Particle, Particle in or on glass, Scratch on glass |  | A                          | $\Phi \leq 0.10$                     | Neglected         |        |           |  |
|                  |  |   | B                          | $0.10 < \Phi \leq 0.2$               | 1                 |        |           |  |
|                  |  |   | C                          | $0.2 < \Phi$                         | 0                 |        |           |  |
|                  |  |   | D                          | -                                    | -                 |        |           |  |
|                  |  |   | Total defective point(B,C) |                                      | 1                 |        | Neglected |  |
| 2                | Black line, White line, and Particle Between Polarizer and glass, Scratch on glass           |  | A                          | $W \leq 0.02$                        | Neglected         |        |           |  |
|                  |  |   | B                          | $0.02 < W \leq 0.03$<br>$L \leq 1.0$ | 1                 |        |           |  |
|                  |  |   | C                          | $0.03 < W \leq 0.05$<br>$L > 1.0$    | 0                 |        |           |  |
|                  |  |   | D                          | $0.05 < W, 1.0 < L$                  | 0                 |        |           |  |
|                  |  |   | Total defective point(B,C) |                                      | 1                 |        | Neglected |  |
| 3                | Bright spot  | any size  |                            | none                                 | none              |        |           |  |
| 4                | Contrast   | A   | $\Phi < 0.2$               | Neglected                            | Neglecte          |        |           |  |

|    |  |  |  |                       |           |           |
|----|--|--|--|-----------------------|-----------|-----------|
|    | variation                                  |                                 | B  | $0.2 < \Phi \leq 0.3$ | 2         | d         |
|    |  |  | C  | $0.3 < \Phi \leq 0.4$ | 1         |           |
|    |  |  | D  | $0.4 < \Phi$          | 0         |           |
|    |  |  | Total defective point(B,C)                             |                       |           | 3         |
| 5  | Bubble inside cell                         |  | any size   |                       | none      | none      |
| 6  | Polarizer defect<br>(if Polarizer is used) | Scratch ,damage on polarizer, Particle on polarizer or between polarizer and glass.                              | Refer to item 1 and item 2.                            |                       |           |           |
|    |  | Bubble, dent and convex  | A  | $\Phi \leq 0.1$       | Neglected | Neglected |
|    |  |  | B  | $0.1 < \Phi \leq 0.2$ | 1         |           |
|    | C  | $0.2 < \Phi$   | 0  |                       |           |           |
| 7  | Surplus glass                              | Stage surplus glass<br>        | $B \leq 0.3\text{mm}$                                  |                       |           |           |
|    |  | Surrounding surplus glass<br> | Should not influence outline dimension and assembling. |                       |           |           |
| 8  | Open segment or open common                | Not permitted  |  |                       |           |           |
| 9  | Short circuit                              | Not permitted  |  |                       |           |           |
| 10 | False viewing direction                    | Not permitted  |  |                       |           |           |
| 11 | Contrast ratio uneven                      | According to the limit specimen  |  |                       |           |           |
| 12 | Crosstalk                                  | According to the limit specimen  |  |                       |           |           |
| 13 | Black /White spot(display)                 | Refer to item 1  |  |                       |           |           |
| 14 | Black /White line(display)                 | Refer to item 2  |  |                       |           |           |

| Inspection items |                    | Judgment standard   |   |  |                       |   |
|------------------|--------------------|---|---|--|-----------------------|---|
|                  |                    | Category(application: B zone)   |   | Acceptable number                          |                       |   |
| 15               | Glass defect crack | i ) The front of lead terminals<br><br>          | A | $a \leq t, b \leq 1/5W, c \leq 3\text{mm}$ | Max.3 defects allowed |   |
|                  |                    | ii ) Surrounding crack-non-contact side<br><br> | B |  |                       | Crack at two sides of lead terminals should not cover patterns and alignment mark |
|                  |                    | iii ) Surrounding crack- contact side<br><br>  | B |  |                       | $b < \text{Inner borderline of the seal}$   |
|                  |                    | iv ) Corner<br><br>                            | A | $a \leq t, b \leq 3.0, c \leq 3.0$         |                       | B   |

| Inspection items |            | Judgment standard   |
|------------------|------------|---|
|                  |            | Category(application: B zone)   |
| 16               | PCB defect | <p>Component soldering:<br/>           No cold soldering、short、open circuit、burr、tin ball<br/>           The flat encapsulation component position deviation must be less than 1/3 width of the pin (Pic.1);<br/>           the sheet component deviation:<br/>           Pin deviates from the pad and contact with the near components is not permitted (Pic.2)</p> |
|                  |            |   |
|                  |            | <p>lead defect:<br/>           The lead lack must be less than 1/3 of its width;<br/>           The lead burr must be less than 1/3 of the seam;<br/>           Impurities connect with the near leads is not permitted</p>   |
|                  |            | <p>Connector soldering:<br/>           Soldering tin is at contact position of the plug and socket is not permitted<br/>           No foundation is scald<br/>           Serious cave distortion on plug and socket contact pin is not permitted</p>  |
|                  |            |   |
|                  |            | <p>Glue on root of the speaker receiver and motor lead:<br/>           The insulative coat of the lead must join into the PCB; the protected glue must envelop to the insulative coat.</p>  |
|                  |            |   |

## **10. Precautions for Use of LCD Modules**

### **10.1 Handling Precautions**

10.1.1 *The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.*

10.1.2 *If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.*

10.1.3 *Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.*

10.1.4 *The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.*

10.1.5 *If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:*

— Isopropyl alcohol                      — Ethyl alcohol

*Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:*

— Water                                      — Ketone                                      — Aromatic solvents

10.1.6 *Do not attempt to disassemble the LCD Module.*

10.1.7 *If the logic circuit power is off, do not apply the input signals.*

10.1.8 *To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.*

*a. Be sure to ground the body when handling the LCD Modules.*

*b. Tools required for assembly, such as soldering irons, must be properly ground.*

*c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.*

*d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.*

## **10.2 Storage precautions**

10.2.1 *When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.*

10.2.2 *The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:*

*Temperature :        0 °C ~ 40 °C*

*Relatively humidity: ≤80%*

10.2.3 *The LCD modules should be stored in the room without acid, alkali and harmful gas.*

**10.3 *The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.***

**END**



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