ORIENT DISPLAY

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# SPECIFICATION
# FOR
# LCD MODULE

## MODULE NO: AFD1024768A1L-10.4N6WTM-R
## VERSION NO.: V1.0

Customer's Approval:

| | |
|---|---|
| | |

| | SIGNATURE | DATE |
|---|---|---|
| PREPARED BY | | |
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## RECORD OF REVISION

| Version | Revised Date | Page | Content |
|---|---|---|---|
| V1.0 | 2013/11/29 | -- | First Issued |
| | | | |
| | | | |
| | | | |
| | | | |

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## 1. GENERAL DESCRIPTION

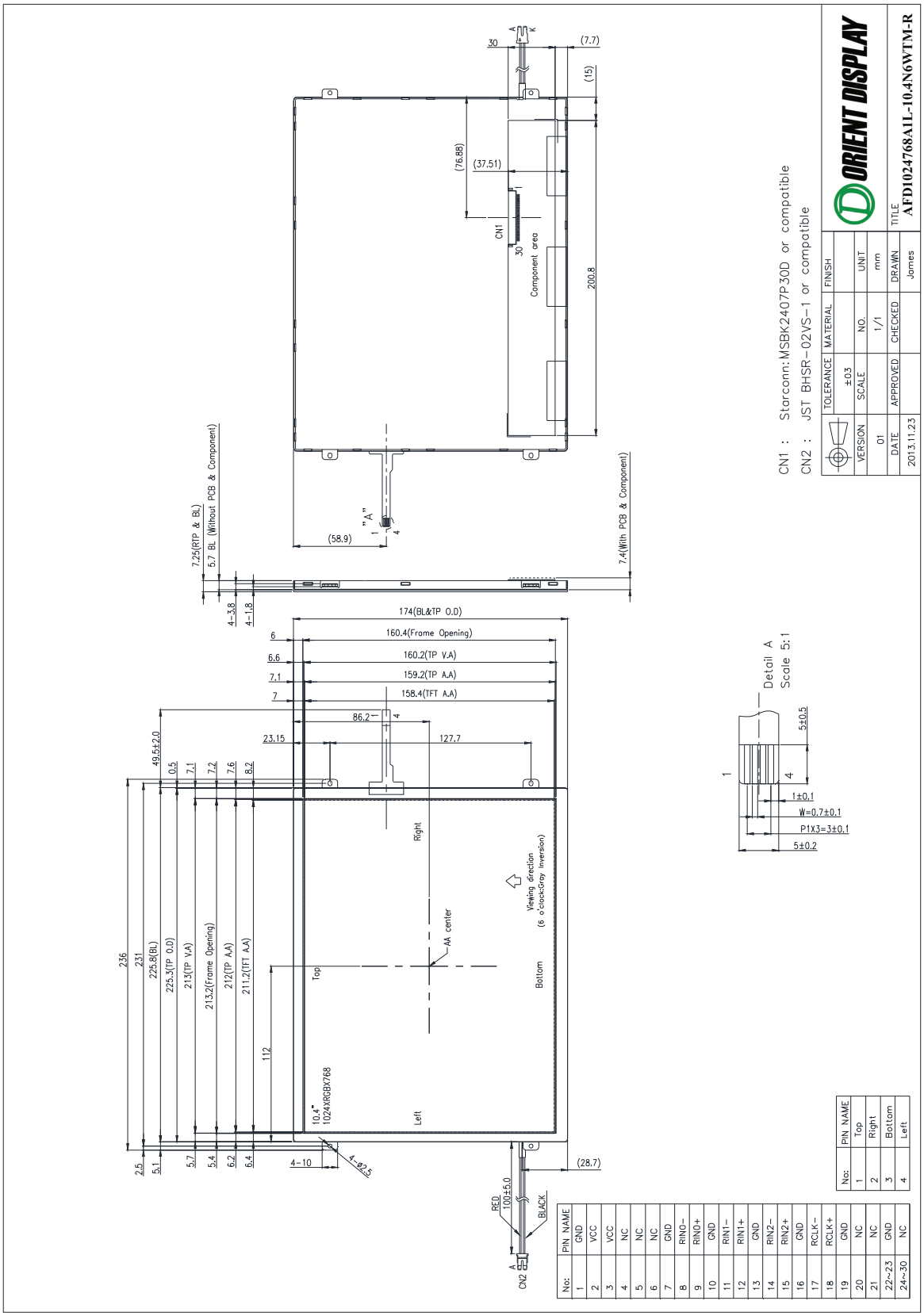
### 1.1 Description

The specifications is model AFD1024768A1L-10.4N6WTM-R is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit, a back light system and touch panel. This TFT LCD has a 10.4 (4:3) inch diagonally measured active display area with XGA (1024 horizontal by 768 vertical pixels) resolution.

### 1.2 Features:

| No. | Item | Specification | Unit |
|---|---|---|---|
| 1 | Panel Size | 10.4” | Inch |
| 2 | Number of Pixels | 1024 (W) x RGB x 768 (H) | Pixels |
| 3 | Active Area | 211.2 (W) × 158.4 (H) | mm |
| 4 | Pixel Pitch | 0.20625 (W) x 0.20625 (H) | mm |
| 5 | Outline Dimension | 236 (W) × 174 (H) × 7.25 (T) | mm |
| 6 | Number of Colors | 262K | - - |
| 7 | Display Mode | TN / Normally White / Transmissive | - - |
| 8 | View Direction | 6 o’clock(Gray Inversion) | |
| 9 | Display Format | RGB vertical stripe | - - |
| 10 | Surface Treatment | Anti-Glare,3H | - - |
| 11 | Contrast Ratio | 500 (Typ.) | - - |
| 12 | Luminance (cd/m^2) | 320 (Typ.) | cd/m2 |
| 13 | Interface | LVDS 6 bit Interface | - - |
| 14 | Backlight | White LED | - - |
| 15 | Driver IC | -- | - - |
| 16 | Operation Temperature | -20 ~ 70 | °C |
| 17 | Storage Temperature | -30 ~ 80 | °C |
| 18 | Weight | (TBD) | g |

## 2. MECHANICAL SPECIFICATION

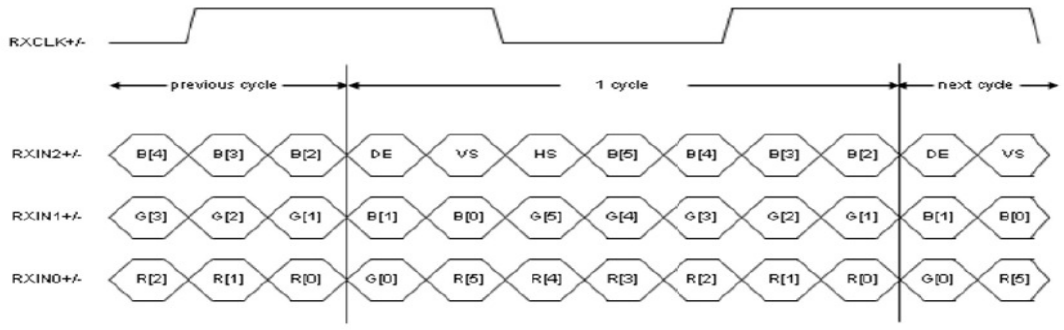


## 3. PIN DESCRIPTION

### 3.1 TFT LCD Module

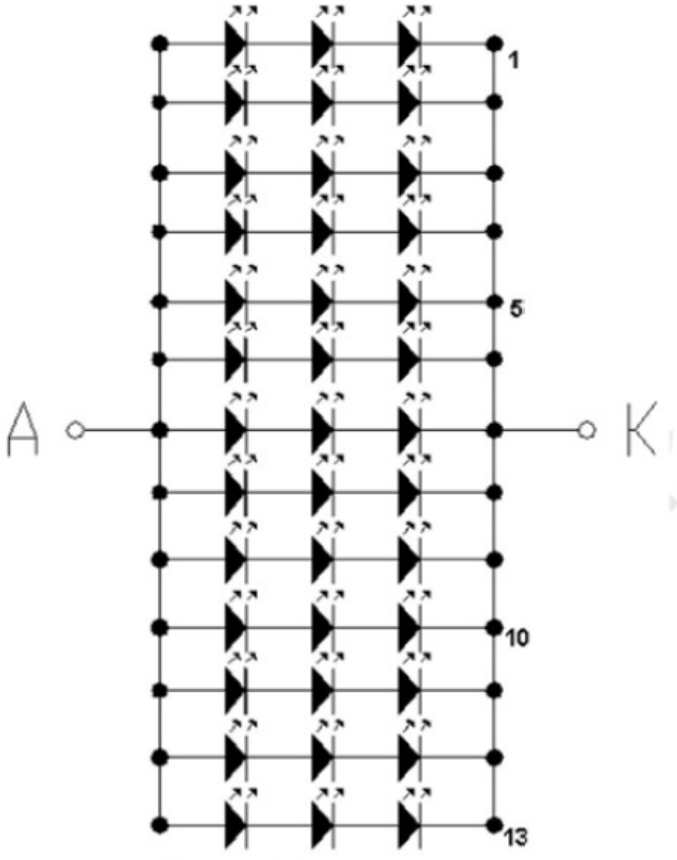
| Pin No. | Symbol | I/O | Function | Remark |
|---|---|---|---|---|
| 1 | GND | P | Ground | |
| 2 | VCC | P | Power Supply +3.3V | |
| 3 | VCC | P | Power Supply +3.3V | |
| 4 | NC | - | NO Connect | |
| 5 | NC | - | NO Connect | |
| 6 | NC | - | NO Connect | |
| 7 | GND | P | Ground | |
| 8 | RXIN0- | I | Negative LVDS differential data input | |
| 9 | RXIN0+ | I | Positive LVDS differential data input | |
| 10 | GND | P | Ground | |
| 11 | RXIN1- | I | Negative LVDS differential data input | |
| 12 | RXIN1+ | I | Positive LVDS differential data input | |
| 13 | GND | P | Ground | |
| 14 | RXIN2- | I | Negative LVDS differential data input | |
| 15 | RXIN2+ | I | Positive LVDS differential data input | |
| 16 | GND | P | Ground | |
| 17 | RXCLK- | I | Negative LVDS differential clock input | |
| 18 | RXCLK+ | I | Positive LVDS differential clock input | |
| 19 | GND | P | Ground | |
| 20 | NC | - | NO Connect | |
| 21 | NC | - | NO Connect | |
| 22 | GND | P | Ground | |
| 23 | GND | P | Ground | |
| 24~30 | NC | - | NO Connect | |

NOTE1: NC Pin must be floating



### 3.2 Backlight Unit

| Pin No. | Symbol | Function | Remark |
|---|---|---|---|
| 1 | LEDA | Power Supply for LED backlight | RED |
| 2 | LEDK | GND for LED backlight | BLACK |



## 4. ABSOLUTE MAXIMUM RATINGS

### 4.1 Electrical Absolute Rating

#### 4.1.1 TFT LCD Module

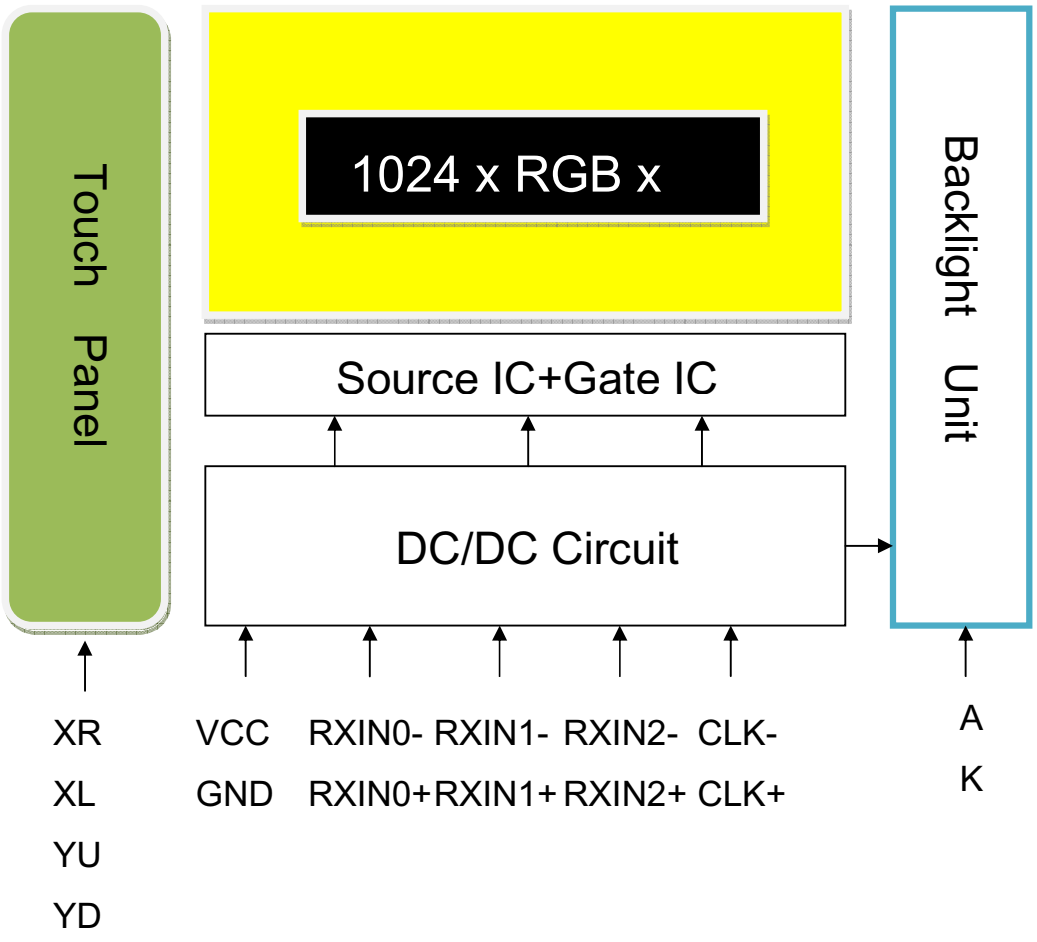
| Item | Symbol | Values | | Unit | Note |
|---|---|---|---|---|---|
| | | Min | Max. | | |
| Power supply voltage | VCC | -0.3 | 4.0 | V | |

#### 4.1.2 Environment Absolute Rating

| Item | Symbol | Values | | | Unit | Note |
|---|---|---|---|---|---|---|
| | | Min | Typ | Max. | | |
| Operating Temperature | Topa | -20 | | 70 | °C | Ambient temperature |
| Storage Temperature | Tstg | -30 | | 80 | °C | |

## 5. BLOCK DIAGRAM

### 5.1 TFT LCD Module



## 6. Relationship Between Displayed Color and Input

### 6.1 6 bit

| | Color & Gray Scale | Data Signal | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Color | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Red | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(1) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(2) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Red(31) | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Red(62) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(63) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Green(31) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Green(62) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(63) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blue | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Blue(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Blue(31) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Blue(62) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| | Blue(63) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

0 : Low level voltage, 1 :High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. With the combination of total 18 bit data signals, the 262K-color display can be achieved on the screen.

## 7. ELECTRICAL CHARACTERISTICS

### 7.1 TFT LCD Module

| Item | | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Power supply | | VCC | 3.0 | 3.3 | 3.6 | V | |
| Differential Input Voltage | | \|VID\| | 250 | 350 | 450 | mV | |
| Common Mode Voltage | | VCM | 1.08 | 1.2 | 1.32 | V | |
| Input Voltage for logic | Differential Input High Threshold | VTH | | | +100 | mV | |
| | Differential Input Low Threshold | VTL | -100 | | | mV | |
| Power Supply current | | ICC | - | 450 | 500 | mA | Note 1 |

Note 1: frame =60Hz , Ta=25°C , Display pattern : Black pattern

### 7.2 Backlight Unit

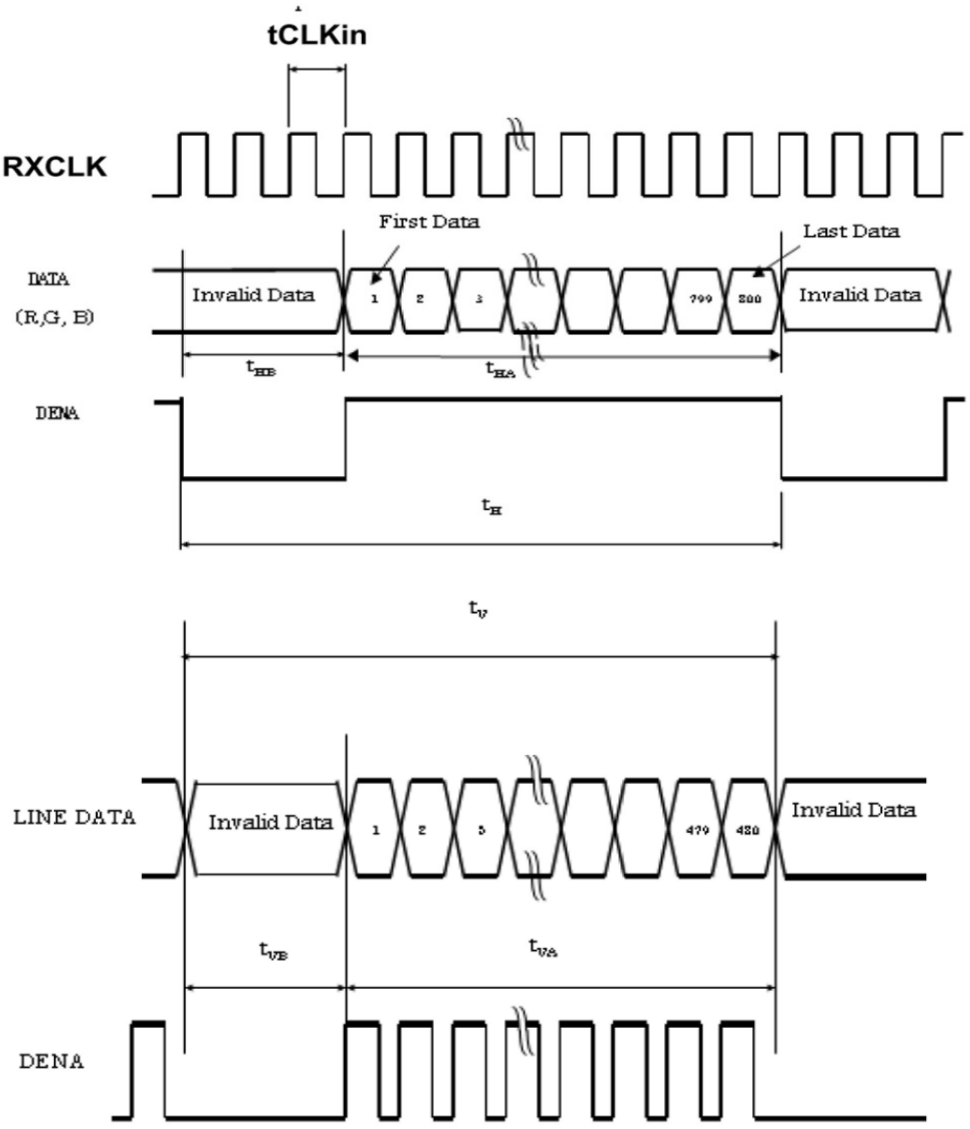
| Item | Symbol | Value | | | Unit | Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| LED Voltage | VL | (8.85) | (9.5) | (10.65) | V | |
| LED Current | IF | - | 260 | - | mA | 3S13P |
| Power Consumption | PBL | - | 2.496 | - | W | |
| LED Life Time (25℃) | - | (30000) | - | - | hr | (1) |

Note (1): The "LED life time" is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25℃ 60% RH.

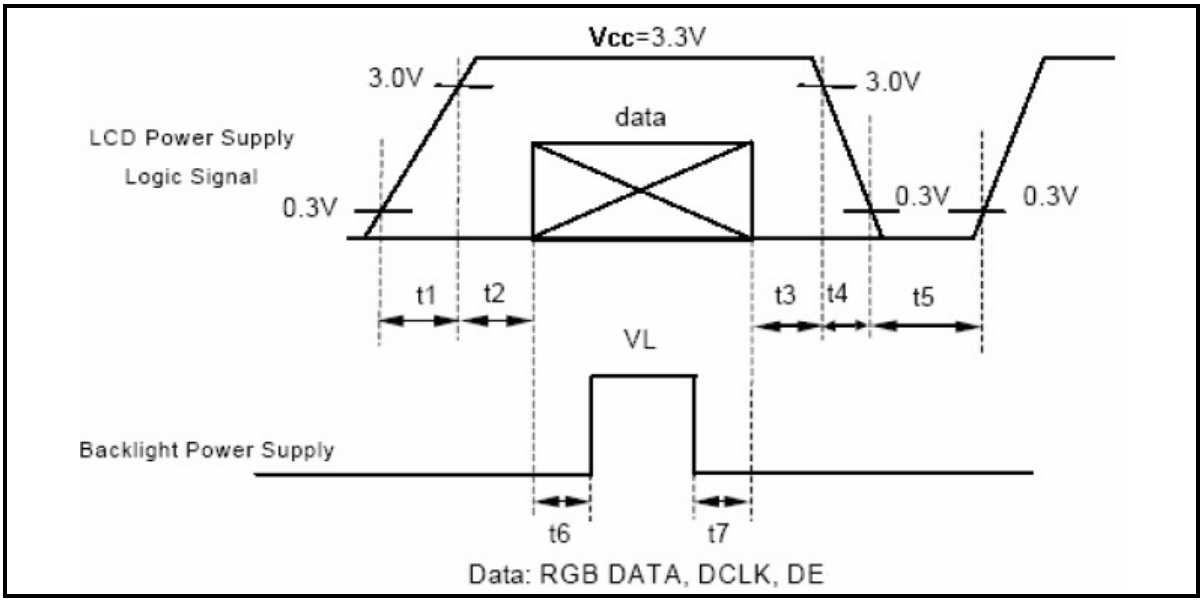
## 7.3 INTERFACE SPECIFICATIONS

### 7.3.1 DE Mode Input Timing Table

| Signal | Parameter | Symbol | Min. | Typ. | Max. | Unit. | Remark |
|---|---|---|---|---|---|---|---|
| DCLK | CLK frequency | fCLKin | 51 | 65 | 71 | MHz | |
| HSYNC | Horizontal Line | tH | 1160 | 1344 | 1350 | tCLK | |
| | HS Display Area | tHA | - | 1024 | - | tCLK | |
| | HS Blanking | tHB | 136 | 320 | 376 | tCLK | |
| VSYNC | Frame | fV | 55 | 60 | 65 | Hz | |
| | VS Period Time | tv | 790 | 806 | 810 | tH | |
| | VS Display Area | tVA | - | 768 | - | tH | |
| | VS Blanking | tVB | 22 | 38 | 42 | tH | |



## 7.4 Power On / Off Sequence




t1 ≤10ms : 1 sec≤ t5

50ms≤ t2 : 200ms ≤t6

0<t3 ≤50ms: 200ms≤ t7

0<t4 ≤10ms

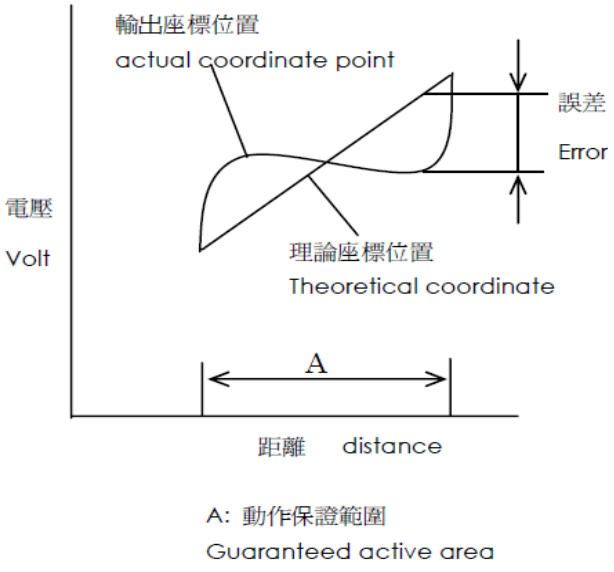
## 8. TOUCH SCREEN PANEL SPECIFICATION

### 8.1 Main Feature

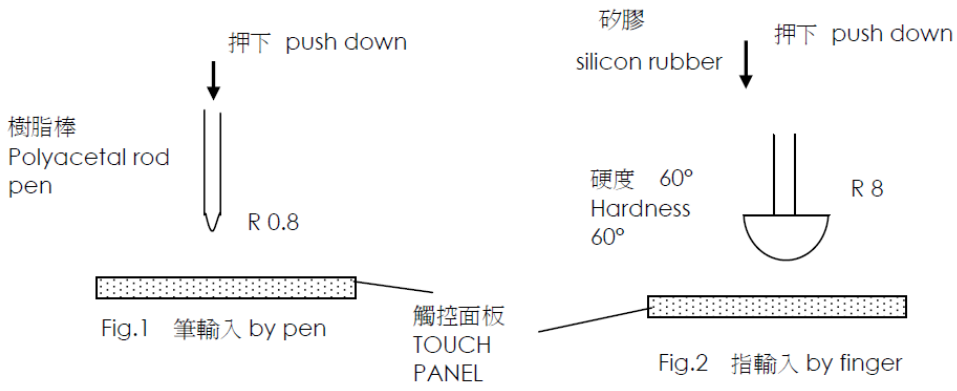
| Item | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|
| Linearity | -2.0 | - | +2.0 | % | Initial data |
| | -3.5 | - | +3.5 | % | After environmental &life test, Refer Note2 |
| Terminal resistance | 200 | - | 1000 | Ω | X |
| | 100 | - | 800 | Ω | Y |
| Insulation resistance | 20 | - | - | MΩ | DC 25V |
| Voltage | | - | 7.0 | V | DC |
| Response time | - | - | 10 | ms | |
| Haze | 4 | 8 | 12 | % | JIS K-7105 |
| FPC peeling strength | 5 | - | - | N | Peeling upward by 90° |
| Minimum Input force | - | - | 80 | gf | Test Area is 3mm inside of active area, but not on Dot-Spacer. Refer Note1 |
| Notes life | 100000 | | | words | Refer Note3 |
| Input life | 1000000 | | | times | Refer Note3 |

Note1: Measurement condition of minimum input force Resistance between X & Y axis must be equal or lower than 2kΩ (Ron ≤ 2kΩ)

Note2: Measurement condition of Linearity
Difference between actual voltage & Theoretical voltage is an error at any points
Linearity is the value max. error voltage divided by voltage difference on active area inside 1mm.



Note3:



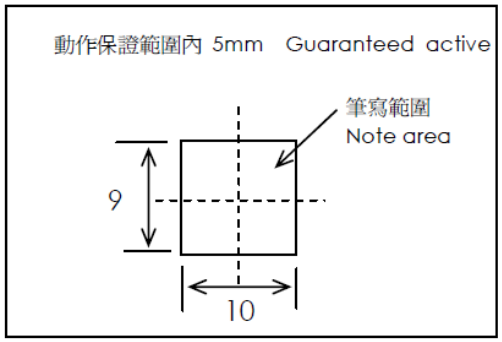

Notes area for pen notes life test is 10×9mm. Size of word is 7.5×6.75mm. Word is any A.B.C….. word. Center of each word is changed at random on active area inside 5mm.

Sharp of pen end : R 0.8 (Refer Fig.1)

Materials of pen : Polyacetal

Load : 250g

Speed : 60mm/s




Input life test condition( by finger )

By silicone rubber tapping at same point.

Sharp of rubber end : R8 Hardness 60°(Refer fig.2)

Load : 200g

Frequency : 5Hz

## 8.2 Pin Assignments and Definitions

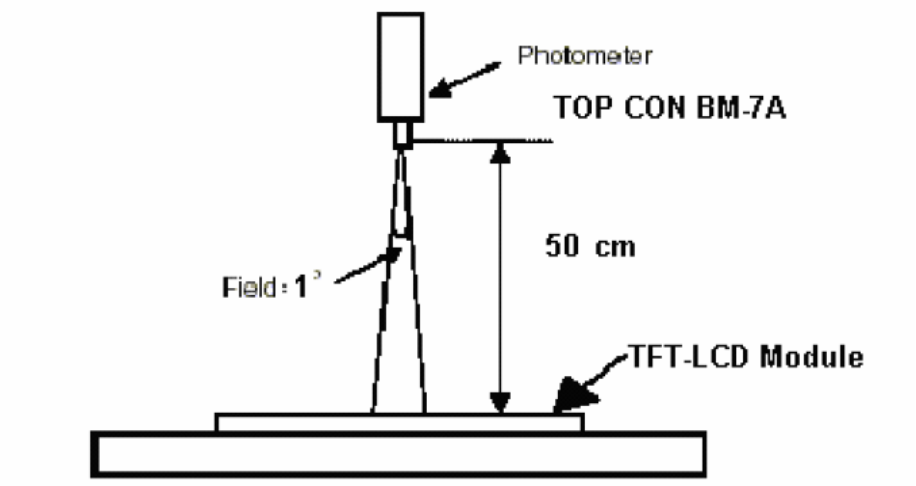
| Item | Name | I/O | Unit |
|---|---|---|---|
| 1 | YU | O | Touch Panel Up |
| 2 | XR | O | Touch Panel Right |
| 3 | YD | O | Touch Panel Down |
| 4 | XL | O | Touch Panel Left |

## 9. OPTICAL CHARACTERISTICS

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Brightness | | -- | Note1, Note 3, ( $\theta = 0^\circ$, Normal Viewing Angle) | 250 | 320 | -- | cd/m2 |
| Uniformity | | B-uni | | 70 | 80 | - | % |
| Contrast Ratio | | CR | | 400 | 500 | -- | -- |
| Response Time | | Tr | | -- | 10 | 10 | ms |
| | | Tf | | -- | 15 | 20 | ms |
| Color Chromaticity | White | Wx | | 0.260 | 0.310 | 0.360 | -- |
| | | Wy | | 0.290 | 0.340 | 0.390 | -- |
| View angle | Horizontal | $\theta$ x+ | Center CR≥10 | 60 | 70 | -- | |
| | | $\theta$ x- | | 60 | 70 | -- | |
| | Vertical | $\theta$ Y+ | | 45 | 55 | -- | |
| | | $\theta$ Y- | | 55 | 65 | -- | |
| Image sticking | | tis | 2 hours | -- | -- | 2 | Sec |

Note：The following optical specifications shall be measured in a darkroom or equivalent state(ambient luminance ≤1 lux, and at room temperature). The operation temperature is 25°C±2°C. The measurement method is shown in Note1.

Note1: The method of optical measurement:

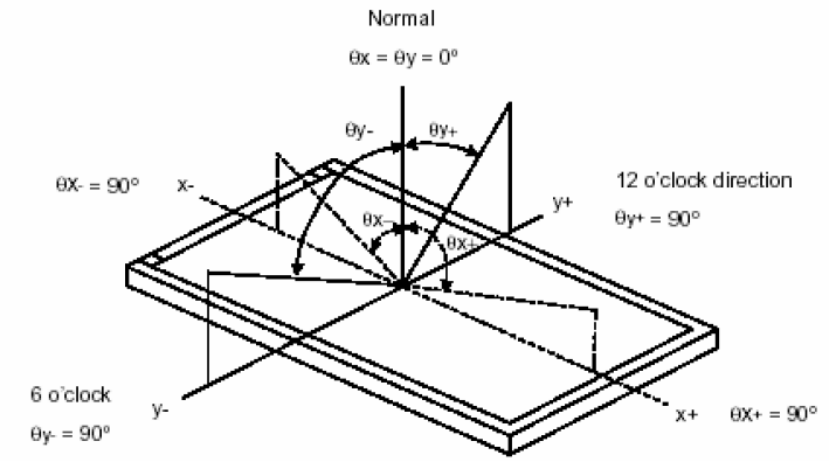



Note2: Measured at the center area of the panel and at the viewing angle of the $\theta$ x= $\theta$ y =0°

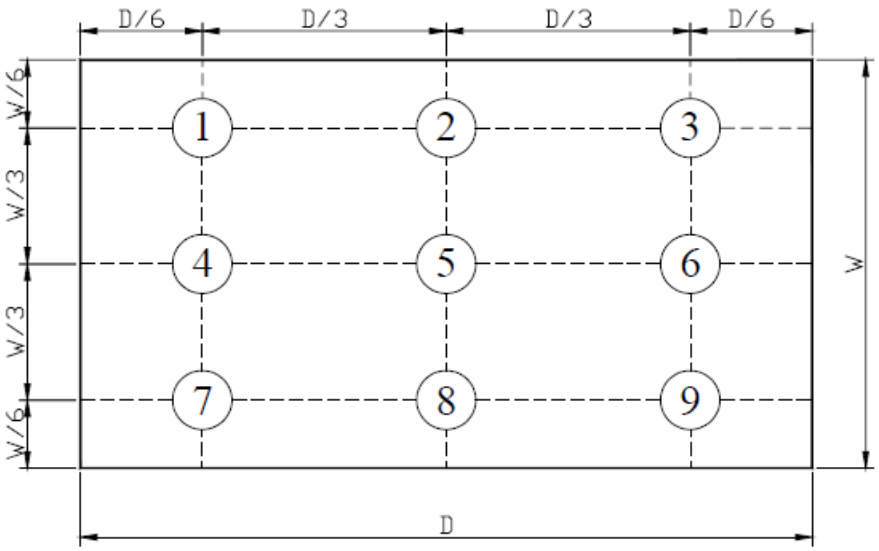
Note3: Definition of Contrast Ratio (CR):

CR = Luminance with all pixels in white state ÷ Luminance with all pixels in Black state

Note4: Definition of Viewing Angle:

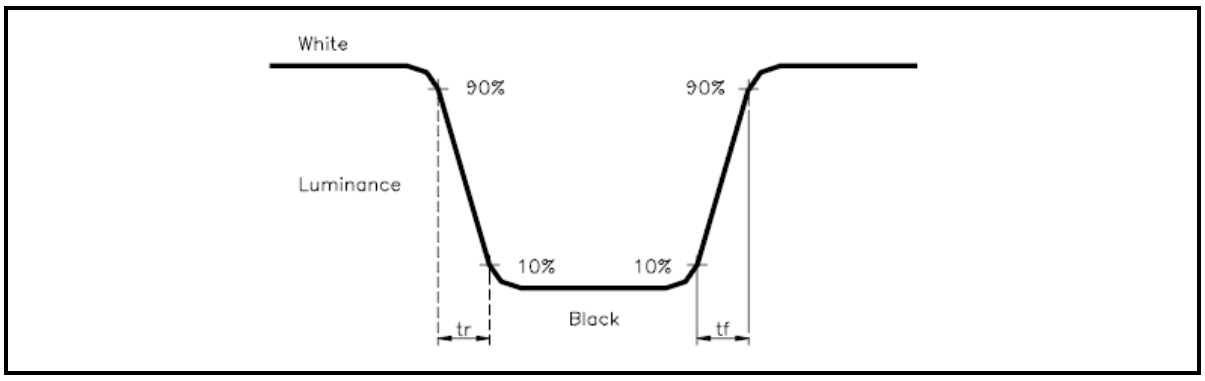



Note 5: Definition of Brightness Uniformity (B-uni):



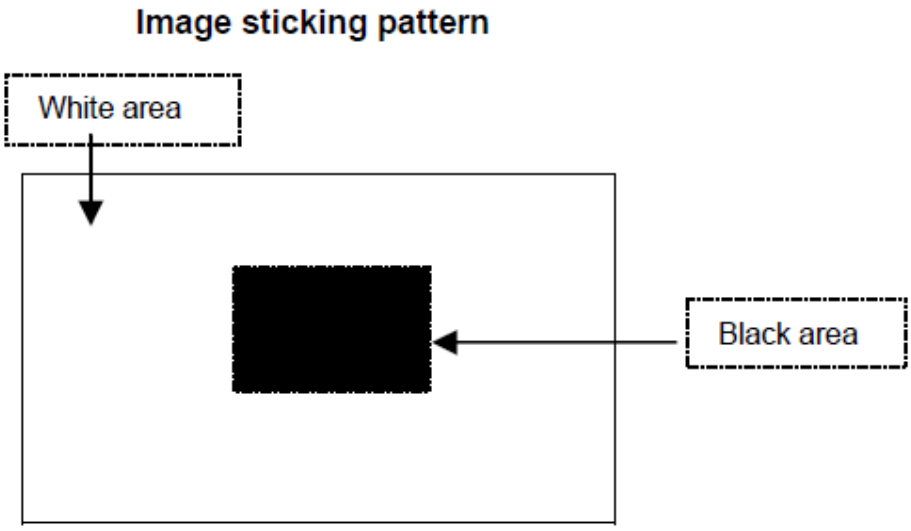

B-uni ＝(Minimum luminance of 9 points÷Maximum luminance of 9points)X100%

Note 6: Definition of Response Time:
The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure




Note 7: Definition of Chromaticity:
The color coordinates (Wx,Wy),(Rx,Ry),(Gx,Gy),and (Bx,By) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (tis):
Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 ˚C



## 10. RELIABILITY

### 10.1 Test Condition

**10.1.1** Temperature and Humidity(Ambient Temperature)

Temperature : 25 ± 5°C

Humidity : 65 ± 5%

**10.1.2** Operation

Unless specified otherwise, test will be conducted under function state.

**10.1.3** Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

**10.1.4** Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

### 10.2 TESTS

| No. | ITEM | CONDITION CRITERION |
|---|---|---|
| 1 | High Temperature Storage | 80°C, 120 hrs |
| 2 | Low Temperature Storage | -30°C, 120 hrs |
| 3 | High Temperature Operating | 70°C, 120 hrs |
| 4 | Low Temperature Operating | -20°C, 120 hrs |
| 5 | High Temperature/Humidity Non-Operating | 50°C, 90%RH, 120 hrs |
| 6 | Temperature Shock Non-Operating | -30°C ←→ 80°C<br>(0.5hr each), 25 cycles |
| 7 | Vibration Test Non-Operating | Frequency:0 ~ 55 Hz Amplitude:1.5 mm<br>Sweep Time:11min<br>Test Period:6 Cycles for each Direction of X,Y,Z |
| 8 | Electro-static Discharge Non-Operating | 150pF,330Ω<br>Air:± 12KV;Contact: ±6KV<br>10 times/point;4 points/panel face |

Note1: The test sample have recovery time for 24 hours at room temperature before the function check. In the standard conditions, there is no any touch panel function NG issue occurred.

### 10.3 JUDGMENT STANDARD

The judgment of the above test should be made as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

## 10.4 INCOMING INSPECTION STANDARDS

<table>
<tr><th>No.</th><th>Parameter</th><th>Criteria</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Operating</td><td>Display function: No Display malfunction (Major)<br>Contrast ratio (Black, White):<br>Does not meet specified range in the spec. (Major) (Note:3)<br>Line Defect: No obvious Vertical and Horizontal line defect in bright, dark and colored. (Major) (Note:1)<br>Point Defect : Active area ≤ 5 dots (Minor) (Note:1)
<table>
<tr><th rowspan="2">Item</th><th>Acceptable number</th><th rowspan="2">Total</th></tr>
<tr><th>Active Area</th></tr>
<tr><td>Bright</td><td>2</td><td rowspan="2">5</td></tr>
<tr><td>Dark</td><td>4</td></tr>
</table>
Non-uniformity: Visible through 5%ND filter. (Minor)<br>Foreign material in Black or White spots shape (W>1/4L)
<table>
<tr><th>Zone / Dimension</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr>
<tr><td>D> 0.5</td><td>0</td><td rowspan="3">Minor</td><td rowspan="3">1.5</td></tr>
<tr><td>0.3 < D ≤ 0.5</td><td>5</td></tr>
<tr><td>D ≤ 0.3</td><td>*</td></tr>
</table>
D = (Long + Short) / 2 ＊ : Disregard<br>Foreign Material in Line or spiral shape (W≤1/4L) (Note: 4)
<table>
<tr><th>L (mm) / Zone W(mm)</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr>
<tr><td>L >5</td><td>W>0.1</td><td>0</td><td rowspan="3">Minor</td><td rowspan="3">1.5</td></tr>
<tr><td>0.5 < L ≤ 5</td><td>0.03 < W≤0.1</td><td>5</td></tr>
<tr><td>L ≤0.5</td><td>W≤0.03</td><td>*</td></tr>
</table>
L : Length W : Width ＊ : Disregard</td></tr>
<tr><td>2</td><td>External Inspection (non-operating)</td><td>Dimension: Outline (Major)<br>Bezel appearance: uneven (Minor)<br>Scratch on the polarize: (Note:2)
<table>
<tr><th>L (mm) / Zone W(mm)</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr>
<tr><td>--</td><td>W>0.1</td><td>0</td><td rowspan="2">Minor</td><td rowspan="2">1.5</td></tr>
<tr><td>L ≤ 3</td><td>W≤0.1</td><td>3</td></tr>
</table>
L : Length W : Width ＊ : Disregard<br>Dent or bubble on the polarize (Note:2)
<table>
<tr><th>Zone / Dimension</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr>
<tr><td>D≤0.3</td><td>*</td><td rowspan="2">Minor</td><td rowspan="2">1.5</td></tr>
<tr><td>D≤0.5</td><td>3</td></tr>
</table>
D = (Long + Short) / 2 ＊ : Disregard</td></tr>
</table>

| | | | |
|---|---|---|---|
| Class of defects | **Major** | AQL 0.65% | **Definition**<br>It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function. |
| | **Minor** | AQL 1.5% | It is a defect that will not result in functioning problem with deviation classified. |

Note1:

(a)Bright point defect is defined as point defect of R,G,B with area >1/2 pixel respectively

(b)Dark point defect is defined as visible in full white pattern.

(c)Definition of distribution of point defect is as follows:

-minimum separation between dark point defects should be larger than 5mm.

-minimum separation between bright point defects should be larger than 5mm.

(d)Definition of joined bright point defect and joined dark point defect are as follows:

-Two or more joined bright point defects must be nil.

-Three joined dark point defects must be nil.

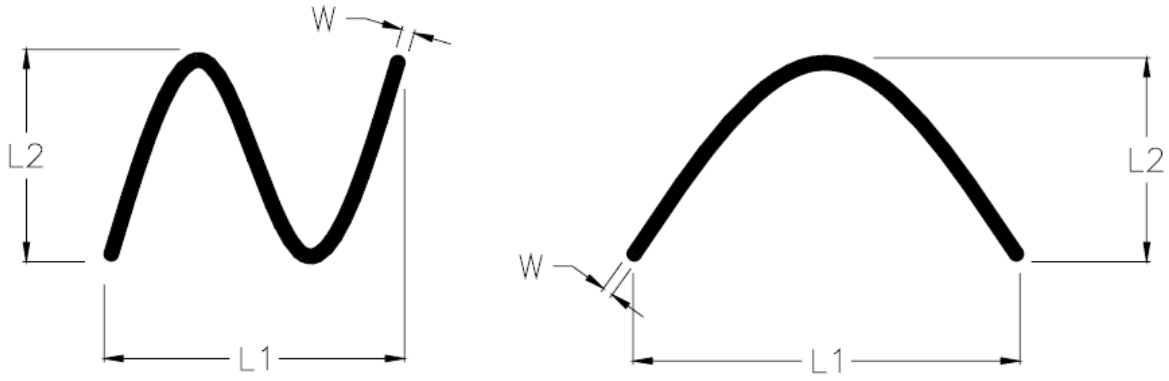
-Coupling of one dark and one bright point in junction is counted as one dark and bright spot with 1 pair maximum.

-Two Joined dark point is counted as two dark points with 2 pair maximum.

Note2: The external inspection should be conducted at the distance 30± 5cm between the eyes of inspector and the panel.

Note3: Luminance measurement for contrast ratio is at the distance 50± 5cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note4: W-Width in mm , L-length of Max.(L1,L2) in mm.



### 10.5 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: MIL-STD-105E

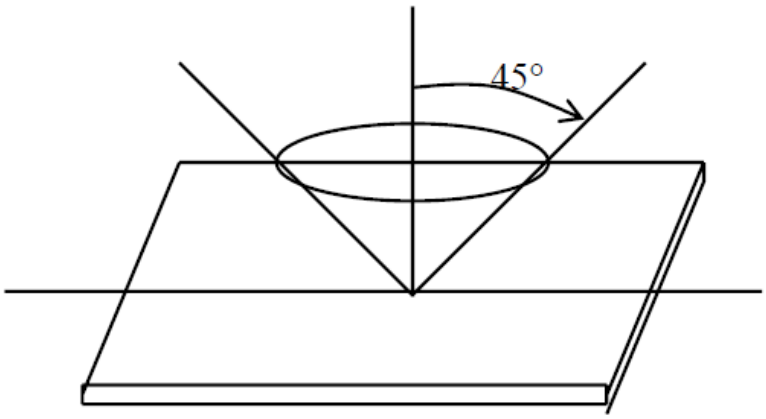
Inspection level: Level II

### 10.6 Inspection conditions

The LCD shall be inspected under 40W white fluorescent light.

$\theta \leq 45^{\circ}$ inspection under non-operating condition.

$\theta \leq 5^{\circ}$ inspection under operating condition



## 11. PRECAUTION RELATING PRODUCT HANDLING

### 11.1 SAFETY

11.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.

11.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

### 11.2 HANDLING

11.2.1 Avoid any strong mechanical shock which can break the glass.

11.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.

11.2.3 Do not remove the panel or frame from the module.

11.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully, Do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)

11.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

11.2.6 Do not touch the display area with bare hands , this will stain the display area.

11.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

11.2.8 To control temperature and time of soldering is 280 ± 10°C and 3-5 sec.

11.2.9 To avoid liquid (include organic solvent) stained on LCM.

### 11.3 STORAGE

11.3.1 Store the panel or module in a dark place where the temperature is 25°C ± 5°C and the humidity is below 65% RH.

11.3.2 Do not place the module near organics solvents or corrosive gases.

11.3.3 Do not crush, shake, or jolt the module.