



RVT70HSTNWN00

## IPS RGB 7.0" LCD TFT DATASHEET

Rev.1.2

2021-07-29

| ITEM                           | CONTENTS                            | UNIT              |
|--------------------------------|-------------------------------------|-------------------|
| LCD Type                       | TFT/Transmissive/Normally black/IPS | /                 |
| Size                           | 7.0                                 | Inch              |
| Viewing Direction              | Free                                | /                 |
| Outside Dimensions (W x H x D) | 164.90 x 100.00 x 5.70              | mm                |
| Active Area (W x H)            | 154.21 x 85.92                      | mm                |
| Pixel Pitch (W x H)            | 0.1506 x 0.1432                     | mm                |
| Resolution                     | 1024 (RGB) x 600                    | /                 |
| Brightness                     | 1000                                | cd/m <sup>2</sup> |
| LCD Interface Type             | RGB                                 | /                 |
| Color Depth                    | 16.7 M                              | /                 |
| Pixel Arrangement              | RGB Vertical Stripe                 | /                 |
| With/Without Touch             | Without Touch Panel                 | /                 |
| Weight                         | 131                                 | g                 |

**Note 1:** RoHS3 compliant

**Note 2:** LCM weight tolerance:  $\pm 5\%$ .



## 1. REVISION RECORD

| REV NO. | REV DATE   | CONTENTS                   | REMARKS |
|---------|------------|----------------------------|---------|
| 1.0     | 2020-08-05 | Initial Release            |         |
| 1.1     | 2021-04-20 | Add" inch" unit on drawing |         |
| 1.2     | 2021-07-29 | Updating new template      |         |



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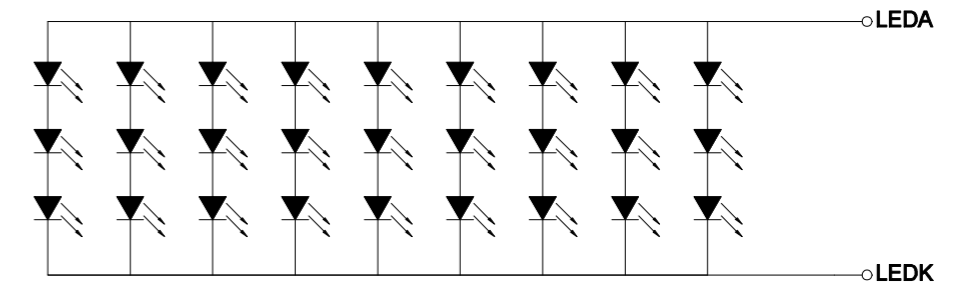
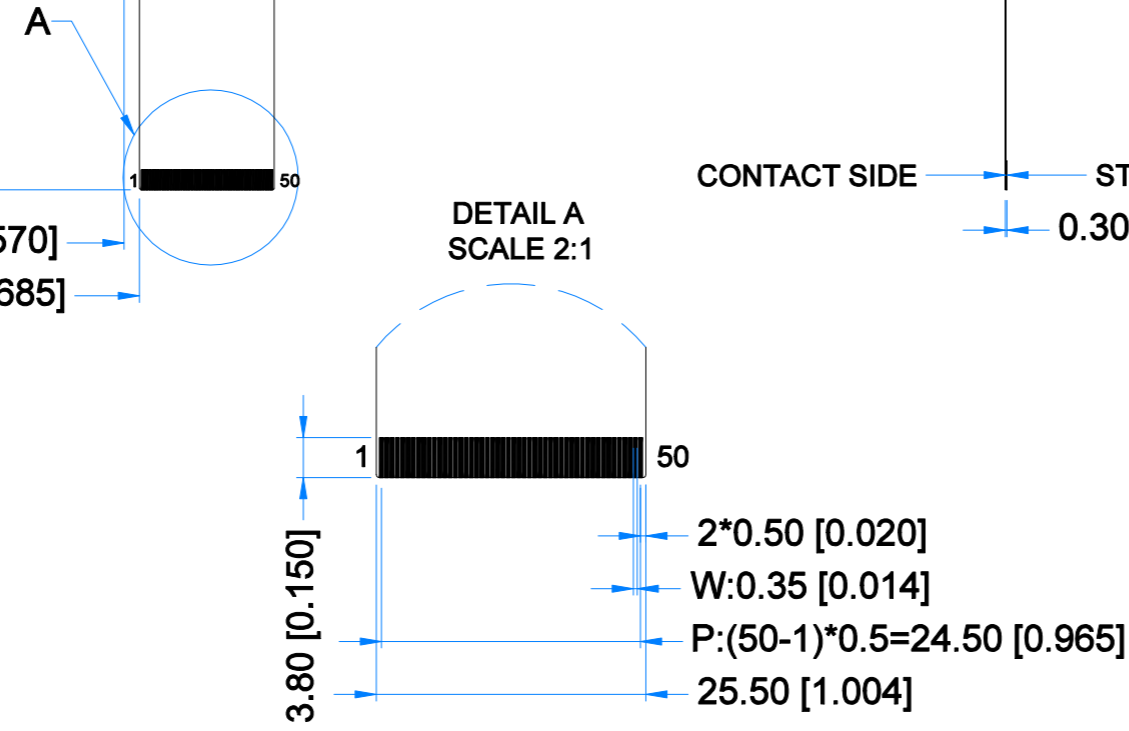
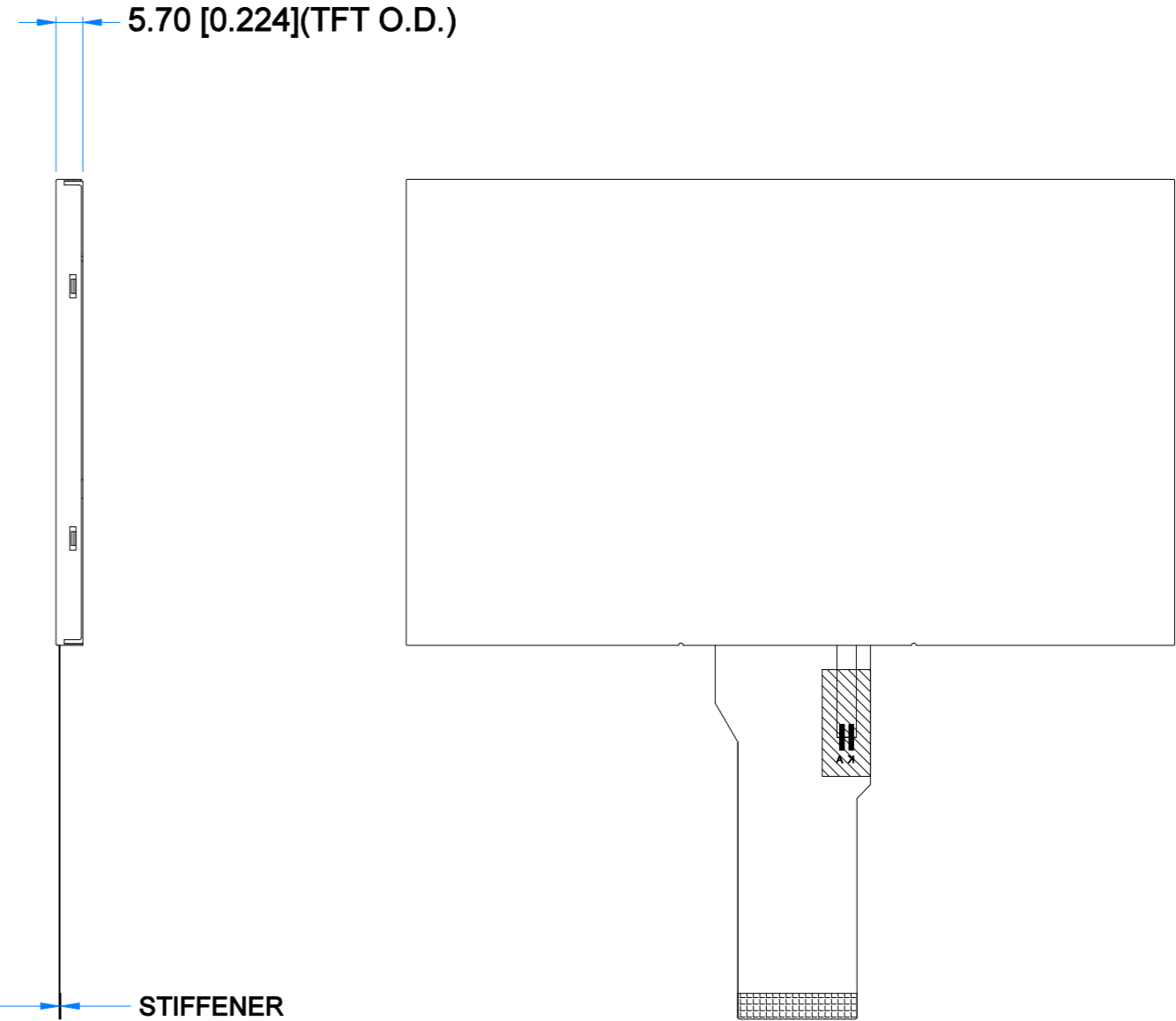
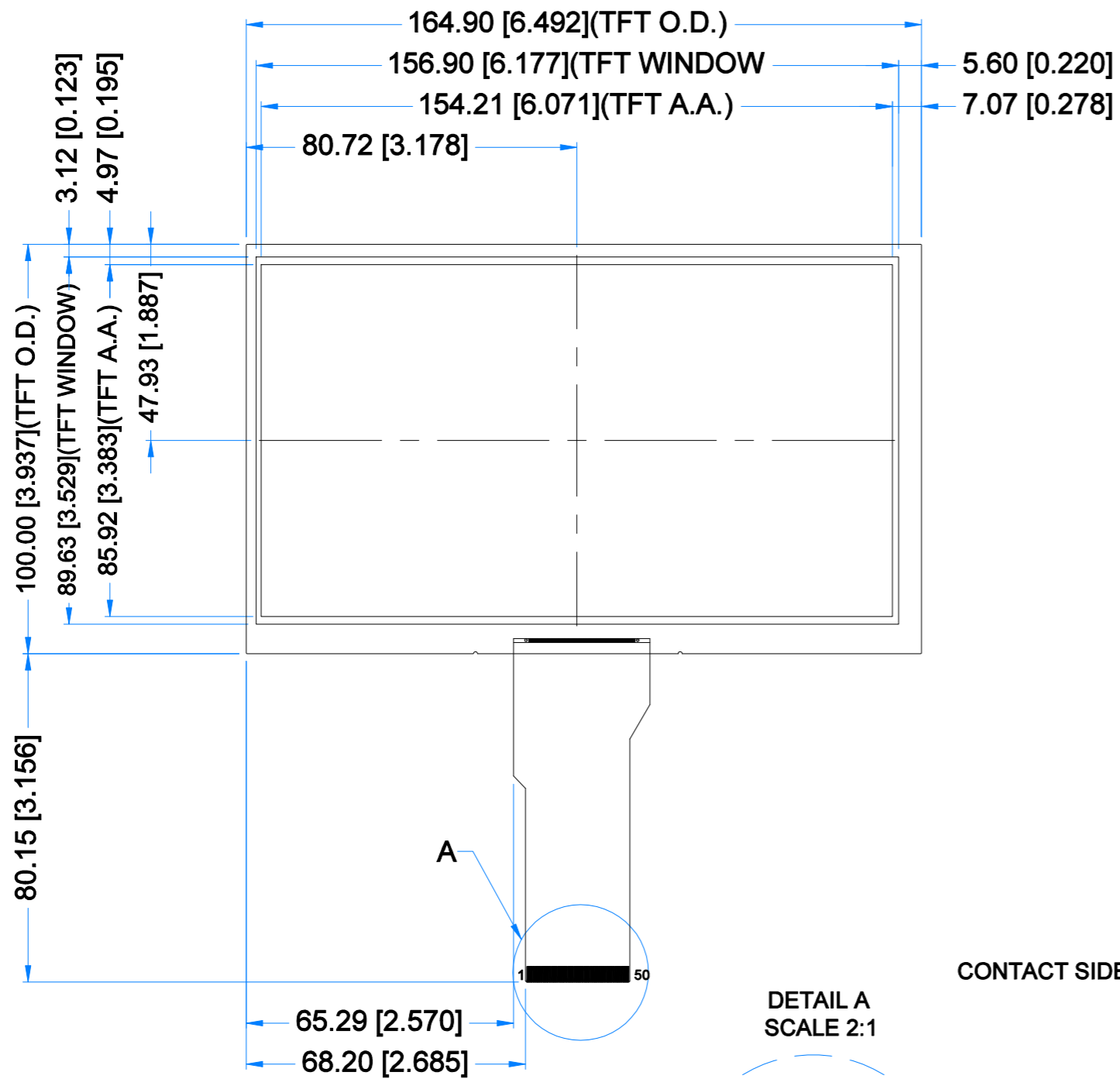


### 3. MODULE CLASSIFICATION INFORMATION

| RV | T  | 70 | H  | S  | T  | N  | W  | N  | 00  |
|----|----|----|----|----|----|----|----|----|-----|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |

| NO. | PARAMETER        | SYMBOL                           |
|-----|------------------|----------------------------------|
| 1.  | BRAND            | RV – Riverdi                     |
| 2.  | PRODUCT TYPE     | T – TFT Standard                 |
| 3.  | DISPLAY SIZE     | 70 – 7.0”                        |
| 4.  | MODEL SERIAL NO. | H – High Brightness, IPS         |
| 5.  | RESOLUTION       | S – 1024 x 600 px                |
| 6.  | INTERFACE        | T – TFT LCD, RGB                 |
| 7.  | FRAME            | N – Without Mounting Metal Frame |
| 8.  | BACKLIGHT TYPE   | W – LED White                    |
| 9.  | TOUCH PANEL      | N – Without Touch Panel          |
| 10. | VERSION          | 00 – (00-99)                     |

| Revision: | Changes:           | Date:      |
|-----------|--------------------|------------|
| 1.0       | Initial Case       | 2020.07.03 |
| 1.1       | Dimension Overhaul | 2021.04.19 |



LED Diagram Circuit

**TFT NOTES:**  
 1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS  
 2. RESOLUTION: 1024x600  
 3. VIEWING ANGLE: FREE  
 4. INTERFACE: RGB  
 5. DRIVER IC: EK79001HK+EK73215BCGA  
 6. LOGIC VOLTAGE: 3.3V  
 7. SURFACE LUMINANCE: 1000cd/m<sup>2</sup>  
 8. BACKLIGHT: 27PCS LED WHITE, V<sub>F</sub>=9.6V, I<sub>F</sub>=270mA

**GENERAL NOTES:**  
 1. OPERATING TEMPERATURE: -20°C ~ 70°C  
 2. STORAGE TEMPERATURE: -30°C ~ 80°C  
 3. WITHOUT INDIVIDUAL TOLERANCE: ±0.2mm  
 4. RoHS3 COMPLIANT

|                     |            |        |  |
|---------------------|------------|--------|--|
| PN: RVT70HSTNWN00   |            |        |  |
| SN:                 |            |        |  |
| DRAWN: M.Natywa     | 2021.04.19 | 1:1.43 |  |
| CHECKED: K.Brodacka | 2021.07.14 | [mm]   |  |
| APPR:               |            | ISO A3 |  |



## 5. ABSOLUTE MAXIMUM RATINGS

| PARAMETER                       | SYMBOL          | MIN   | MAX   | UNIT |
|---------------------------------|-----------------|-------|-------|------|
| Power for Circuit Driving       | VDD             | -0.3  | 3.96  | V    |
|                                 | AVDD            | -0.5  | 14.85 |      |
|                                 | VGH             | -0.3  | 40    |      |
|                                 | VGL             | -20.0 | 0.3   |      |
| Operating Temperature           | T <sub>OP</sub> | -20   | 70    | °C   |
| Storage Temperature             | T <sub>ST</sub> | -30   | 80    | °C   |
| Operating Humidity (@ 25 ± 5°C) | RH              | 10%   | -     | RH   |
| Storage Humidity (@ 25 ± 5°C)   | RH              | 10%   | -     | RH   |

**Note.** The following are maximum values. If exceeded, it may cause operation or damage to the unit.

## 6. ELECTRICAL CHARACTERISTICS

| PARAMETER                 | SYMBOL          | MIN     | TYP  | MAX    | UNIT | NOTE        |
|---------------------------|-----------------|---------|------|--------|------|-------------|
| Supply Voltage for Module | DVDD            | 3.0     | 3.3  | 3.6    | V    |             |
|                           | VGH             | 17      | 18   | 19     |      |             |
|                           | VGL             | -6.6    | -6.0 | -5.4   |      |             |
|                           | AVDD            | 9.4     | 9.6  | 9.8    |      |             |
|                           | VCOM            | 3.6     | 3.8  | 4.0    |      |             |
| Current of Power Supply   | IDD             | -       | 30   | 45     | mA   | DVDD = 3.3V |
|                           | IADD            | -       | 35   | 45     | mA   | AVDD = 9.6V |
|                           | IGH             | -       | 0.5  | 1      | uA   | VGH = 18V   |
|                           | IGL             | -       | 0.5  | 1      | mA   | VGL = -6V   |
| Input Voltage ' H ' level | V <sub>IH</sub> | 0.7DVDD | -    | DVDD   | V    | Note 1      |
| Input Voltage ' L ' level | V <sub>IL</sub> | 0       | -    | 0.3VDD | V    | Note 1      |

**Note 1.** STHL, STHR, OEH, L/R, CPH1÷CPH3, STVD, STVU, OEV, CKV, U/D.

## 7. BACKLIGHT ELECTRICAL CHARACTERISTICS

| PARAMETER                   | SYMBOL          | MIN | TYP    | MAX  | UNIT  | NOTE   |
|-----------------------------|-----------------|-----|--------|------|-------|--------|
| Backlight Driving Voltage   | V <sub>F</sub>  | 9.0 | 9.6    | 10.2 | V     |        |
| Backlight Driving Current   | I <sub>F</sub>  | -   | 270    | -    | mA    |        |
| Backlight Power Consumption | W <sub>BL</sub> | -   | 2592   | -    | mW    |        |
| LED Lifetime                | -               | -   | 50,000 | -    | hours | Note 1 |

**Note 1.** If LED is driven by high current, the lifetime of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating lifetime is estimated data.

## 8. POWER CONSUMPTION

| PARAMETER               | SYMBOL | CONDITION  | MIN | TYP | MAX | UNIT | NOTE   |
|-------------------------|--------|------------|-----|-----|-----|------|--------|
| Gate on Power Current   | IVGH   | VGH=18V    | -   | 0.5 | 1   | mA   | Note 1 |
| Gate off Power Current  | IVGL   | VGL=6V     | -   | 0.5 | 1   |      |        |
| Digital Power Current   | IDVDD  | DVDD=3.3V  | -   | 30  | 45  |      |        |
| Analog Power Current    | IAVDD  | AVDD=9.6 V | -   | 35  | 45  |      |        |
| Total Power Consumption | PC     |            | -   | 447 | 604 | mW   |        |

**Note.** Typ. Specification: Gray-level test pattern; Max Specification: Black test pattern



256 gray patten



black pattern



## 9. ELECTRO-OPTICAL CHARACTERISTICS

| ITEM                       | SYMBOL            | CONDITION                                             | MIN   | TYP   | MAX   | UNIT              | RMK    | NOTE |
|----------------------------|-------------------|-------------------------------------------------------|-------|-------|-------|-------------------|--------|------|
| Response Time              | Tr+Tf             | $\theta=0^\circ$<br>$\varnothing=0^\circ$<br>Ta=25 °C | -     | 35    | -     | ms                | FIG 1. | 4    |
| Contrast Ratio             | Cr                |                                                       | -     | 800   | -     | ---               | FIG 2. | 1    |
| Luminance Uniformity       | $\delta$<br>WHITE |                                                       | -     | 75    | -     | %                 | FIG 2. | 3    |
| Surface Luminance          | Lv                |                                                       | 800   | 1000  | -     | cd/m <sup>2</sup> | FIG 2. | 2    |
| Viewing Angle Range        | $\theta$          | $\varnothing = 90^\circ$                              | -     | 85    | -     | deg               | FIG 3. | 6    |
|                            |                   | $\varnothing = 270^\circ$                             | -     | 85    | -     | deg               | FIG 3. |      |
|                            |                   | $\varnothing = 0^\circ$                               | -     | 85    | -     | deg               | FIG 3. |      |
|                            |                   | $\varnothing = 180^\circ$                             | -     | 85    | -     | deg               | FIG 3. |      |
| CIE (x, y)<br>Chromaticity | Rx                | $\theta=0^\circ$<br>$\varnothing=0^\circ$<br>Ta=25 °C | 0.578 | 0.618 | 0.658 | -                 | FIG 2. | 5    |
|                            | Ry                |                                                       | 0.489 | 0.329 | 0.369 | -                 |        |      |
|                            | Gx                |                                                       | 0.376 | 0.416 | 0.456 | -                 |        |      |
|                            | Gy                |                                                       | 0.493 | 0.533 | 0.573 | -                 |        |      |
|                            | Bx                |                                                       | 0.071 | 0.111 | 0.151 | -                 |        |      |
|                            | By                |                                                       | 0.108 | 0.148 | 0.188 | -                 |        |      |
|                            | Wx                |                                                       | 0.270 | 0.310 | 0.350 | -                 |        |      |
|                            | Wy                |                                                       | 0.290 | 0.330 | 0.370 | -                 |        |      |

**Note 1.** Contrast Ratio (CR) is defined mathematically as below, for more information see Figure 2.

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

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

Figure 2.

$$L_v = \text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}$$

**Note 3.** The uniformity in surface luminance  $\delta$  WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the minimum luminance of 5 points luminance by maximum luminance of 5 points luminance. For more information see

Figure 2.

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

**Note 4.** Response time is the time required for the display to transition from white to black (Rise Time, Tr) and from black to white (Decay Time, Tf). For additional information see Figure 1. The test equipment is Autronic-Melchers's ConoScope series.

**Note 5.** CIE (x, y) chromaticity, the x, y value is determined by measuring luminance at each test position 1 through 5, and then make average value.





**Note 6.** Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the contrast ratio is greater than 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 LCD surface. For more information see Figure 3.

**Note 7.** For viewing angle and response time testing, the testing data is based on Autronic-Melchers's ConoScope series. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, CIE the test data is based on TOPCON's BM-5 photo detector.

Figure 1. The definition of response time

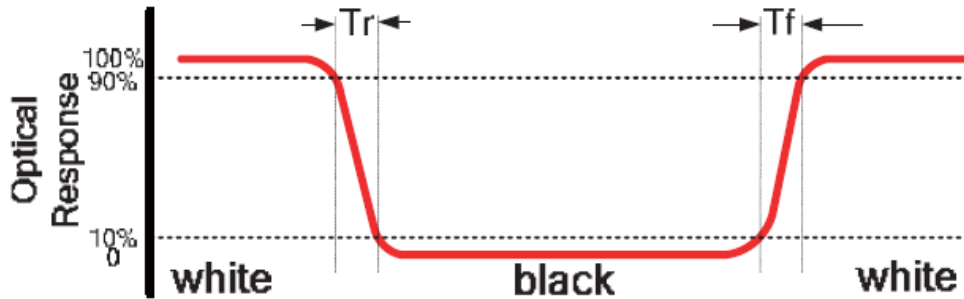
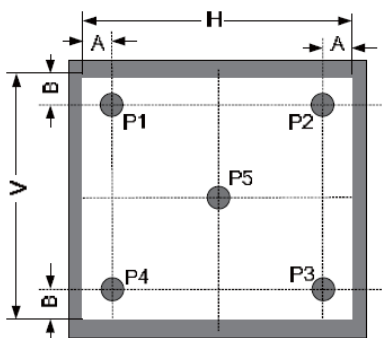
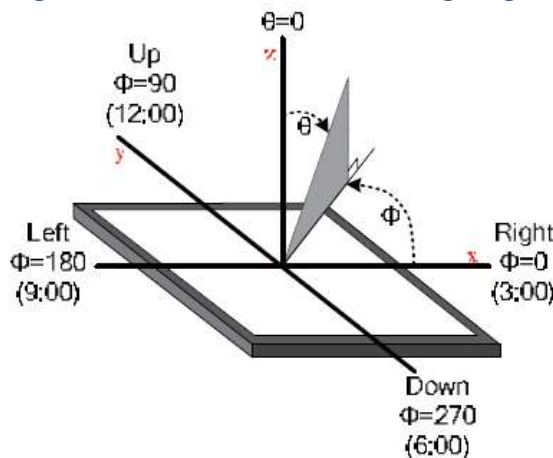


Figure 2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity



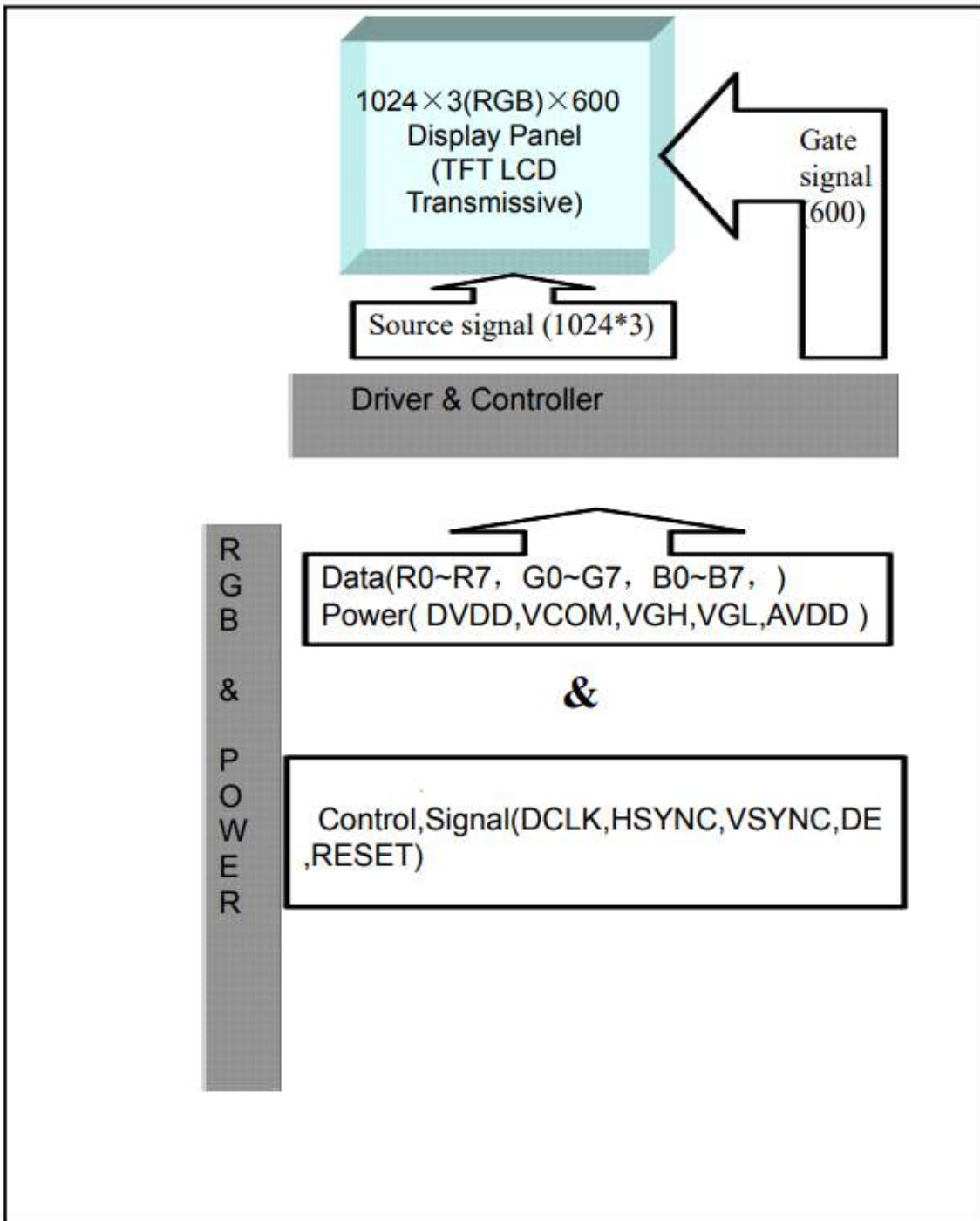
A: 5mm  
 B: 5mm  
 H, V: Active Area  
 Light spot size  $\phi=5\text{mm}$ , 500mm distance from the LCD surface to detector lens.  
 Measurement instrument is TOPCON'S luminance meter BM-5

Figure 3. The definition of viewing angle





10. BLOCK DIAGRAM





## 11. INTERFACES DESCRIPTION

### 11.1 TFT assignment

| PIN NO. | SYMBOL | I/O | DESCRIPTION                       | NOTES    |
|---------|--------|-----|-----------------------------------|----------|
| 1       | VLED+  | P   | Power for LED Backlight (Anode)   |          |
| 2       | VLED+  | P   | Power for LED Backlight (Anode)   |          |
| 3       | VLED-  | P   | Power for LED Backlight (Cathode) |          |
| 4       | VLED-  | P   | Power for LED Backlight (Cathode) |          |
| 5       | GND    | P   | Ground                            |          |
| 6       | VCOM   | I   | Common Voltage                    |          |
| 7       | DVDD   | P   | Power for Digital Circuit         |          |
| 8       | MODE   | I   | DE/SYNC mode select               | Note 1   |
| 9       | DE     | I   | Data Input Enable                 |          |
| 10      | VS     | I   | Vertical Sync Input               |          |
| 11      | HS     | I   | Horizontal Sync Input             |          |
| 12      | B7     | I   | Blue Data (MSB)                   |          |
| 13      | B6     | I   | Blue Data                         |          |
| 14      | B5     | I   | Blue Data                         |          |
| 15      | B4     | I   | Blue Data                         |          |
| 16      | B3     | I   | Blue Data                         |          |
| 17      | B2     | I   | Blue Data                         |          |
| 18      | B1     | I   | Blue Data                         | Note 2   |
| 19      | B0     | I   | Blue Data (LSB)                   | Note 2   |
| 20      | G7     | I   | Green Data (MSB)                  |          |
| 21      | G6     | I   | Green Data                        |          |
| 22      | G5     | I   | Green Data                        |          |
| 23      | G4     | I   | Green Data                        |          |
| 24      | G3     | I   | Green Data                        |          |
| 25      | G2     | I   | Green Data                        |          |
| 26      | G1     | I   | Green Data                        | Note 2   |
| 27      | G0     | I   | Green Data (LSB)                  | Note 2   |
| 28      | R7     | I   | Red Data (MSB)                    |          |
| 29      | R6     | I   | Red Data                          |          |
| 30      | R5     | I   | Red Data                          |          |
| 31      | R4     | I   | Red Data                          |          |
| 32      | R3     | I   | Red Data                          |          |
| 33      | R2     | I   | Red Data                          |          |
| 34      | R1     | I   | Red Data                          | Note 2   |
| 35      | R0     | I   | Red Data(LSB)                     | Note 2   |
| 36      | GND    | P   | Ground                            |          |
| 37      | DCLK   | P   | Sample Clock                      |          |
| 38      | GND    | P   | Ground                            |          |
| 39      | L/R    | I   | Left/Right Selection              | Note 4,5 |
| 40      | U/D    | I   | Up/Down Selection                 | Note 4,5 |
| 41      | VGH    | P   | Gate ON Voltage                   |          |
| 42      | VGL    | P   | Gate OFF Voltage                  |          |



|    |        |   |                          |        |
|----|--------|---|--------------------------|--------|
| 43 | AVDD   | P | Power for Analog Circuit |        |
| 44 | RESET  | I | Global Reset Pin         | Note 6 |
| 45 | NC     | - | No Connection            |        |
| 46 | VCOM   | I | Common Voltage           |        |
| 47 | DITHUB | I | Dithering Function       | Note 7 |
| 48 | GND    | I | Ground                   |        |
| 49 | NC     | - | No Connection            |        |
| 50 | NC     | - | No Connection            |        |

I: input, O: output, P: Power

**Note 1.** DE/SYNC mode select. Normally pull high.

H:DE Mode. L: HS/VS mode.

When select DE mode, MODE="1", VS and HS must pull high.

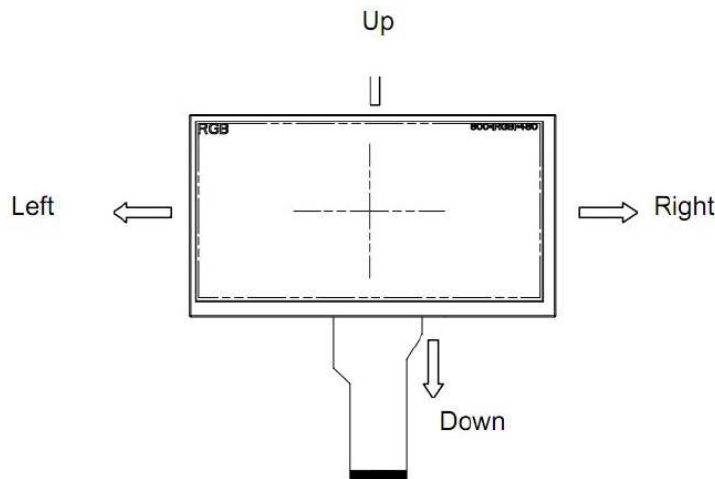
**Note 2.** When input 18 bits RGB data, the two low bits of R, G and B data must be grounded.

**Note 3.** Data shall be latched at the falling edge of DCLK.

**Note 4.** Selection of scanning mode:

| SETTING OF SCAN CONTROL INPUT |      | SCANNING DIRECTION        |
|-------------------------------|------|---------------------------|
| U/D                           | L/R  |                           |
| GND                           | DVDD | Up to down, left to right |
| DVDD                          | GND  | Down to up, right to left |
| GND                           | GND  | Up to down, right to left |
| DVDD                          | DVDD | Down to up, left to right |

**Note 5.** Definition of scanning direction, refer to the figure as below:



**Note 6.** Global reset pin. Active low to enter reset state, suggest to connect with an RC reset circuit for stability. Normally pull high.

**Note 7.** Dithering function enable control, normally pull high.

When DITHUB="1", Disable internal dithering function.

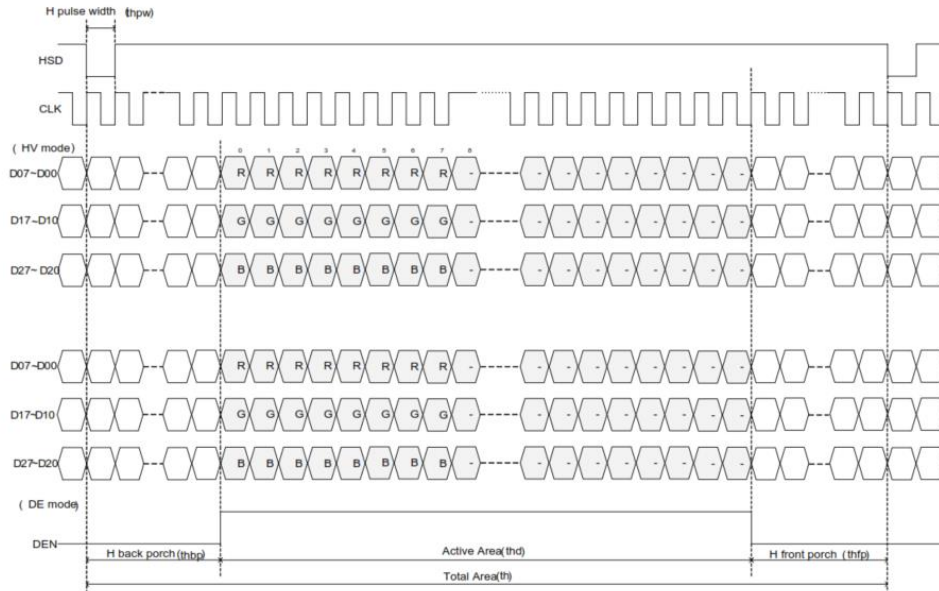
When DITHUB="0", Enable internal dithering function.



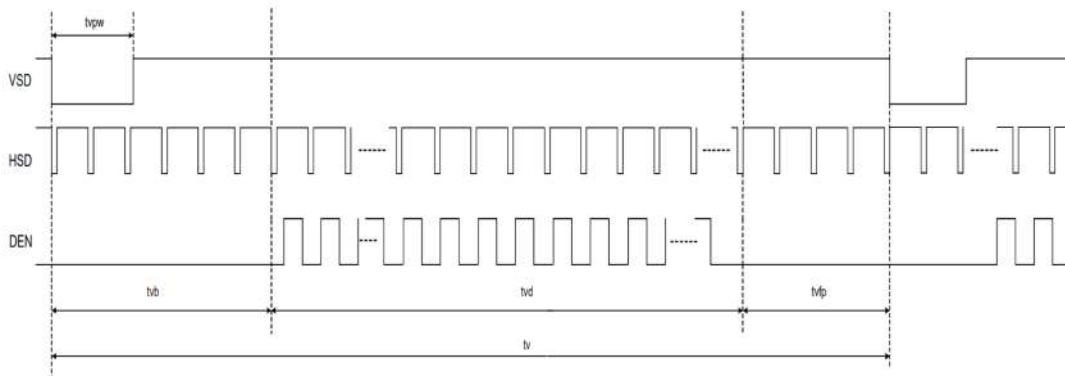
## 12. TIMING CHARACTERISTICS

**Note:** DE/SYNC mode select. Normally pull high. H:DE Mode. L: HS/VB mode.  
When select DE mode, MODE="1", VS and HS must pull high.

### 12.1 Horizontal input timing



### 12.2 Vertical input timing





## 12.3 Parallel RGB timing characteristic

### 12.3.1 DE MODE

| PARAMETER                        | SYMBOL   | VALUE |      |      | UNIT |
|----------------------------------|----------|-------|------|------|------|
|                                  |          | MIN.  | TYP. | MAX. |      |
| DCLK frequency (Frame rate 60Hz) | fclk     | 40.8  | 51.2 | 67.2 | MHz  |
| Horizontal display area          | thd      | 1024  |      |      | DCLK |
| HSYNC period time                | th       | 1114  | 1344 | 1400 |      |
| HSYNC blanking                   | thb+thfp | 90    | 320  | 376  |      |
| Vertical display area            | tvd      | 600   |      |      | H    |
| VSYNC period time                | tv       | 610   | 635  | 800  |      |
| VSYNC blanking                   | tvb+tvfp | 10    | 85   | 200  |      |

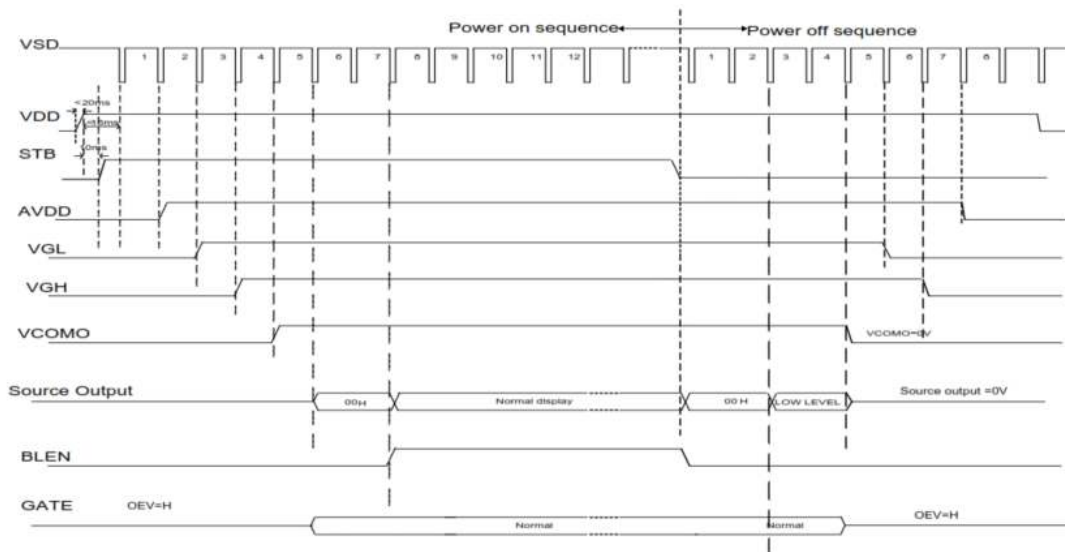
### 12.3.2 HV MODE – Horizontal input timing

| PARAMETER                        | SYMBOL | VALUE |      |      | UNIT |
|----------------------------------|--------|-------|------|------|------|
|                                  |        | MIN.  | TYP. | MAX. |      |
| Horizontal display area          | thd    | 1024  |      |      | DCLK |
| DCLK frequency (frame rate 60Hz) | fclk   | 44.9  | 51.2 | 63   | MHz  |
| 1 Horizontal Line                | th     | 1200  | 1344 | 1400 | DCLK |
| HSYNC pulse width                | thpw   | 1     | -    | 140  |      |
| HSYNC back porch                 | thbp   | 160   | 160  | 160  |      |
| HSYNC front porch                | thfp   | 16    | 160  | 216  |      |

### 12.3.3 HV MODE – Vertical input timing

| PARAMETER             | SYMBOL | VALUE |      |      | UNIT |
|-----------------------|--------|-------|------|------|------|
|                       |        | MIN.  | TYP. | MAX. |      |
| Vertical display area | tvd    | 600   |      |      | H    |
| VSYNC period time     | tv     | 624   | 635  | 750  |      |
| VSYNC pulse width     | tvpw   | 1     | -    | 20   |      |
| VSYNC back porch      | tvb    | 23    | 23   | 23   |      |
| VSYNC front porch     | tvfp   | 1     | 12   | 127  |      |

### 12.3.4 Power On/Off sequence



## 13. INSPECTION

Standard acceptance/rejection criteria for TFT module

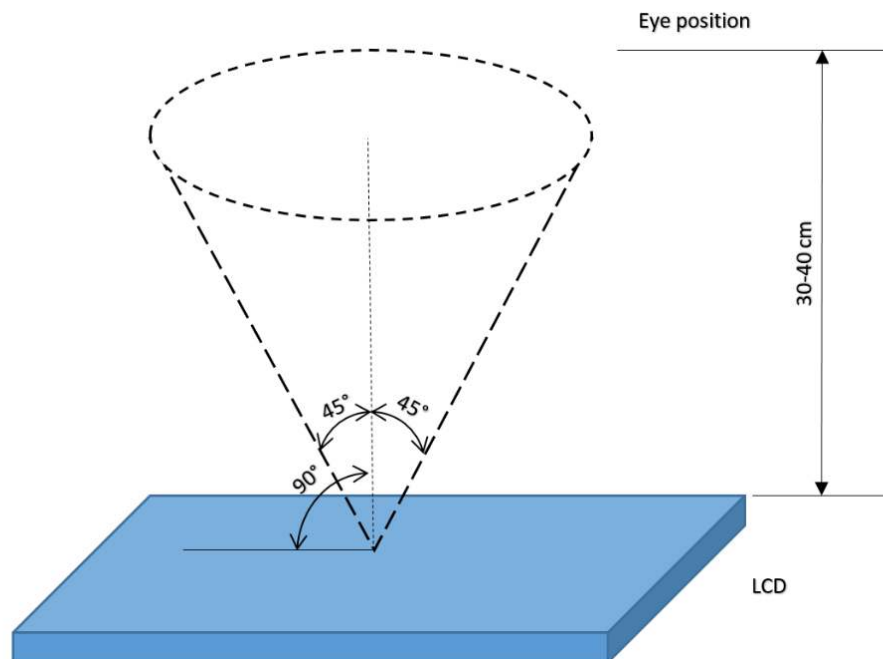
### 13.1 Inspection condition

Ambient conditions:

- Temperature:  $25 \pm 2^\circ\text{C}$
- Humidity:  $(60 \pm 10) \% \text{RH}$
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

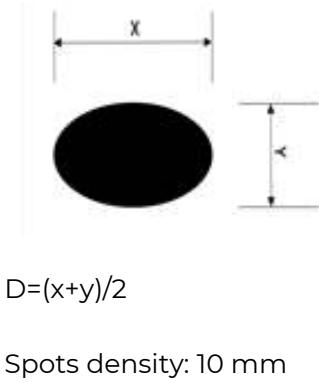
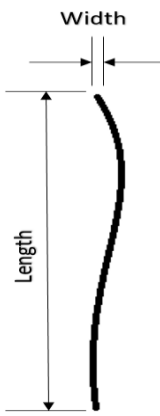
Viewing distance:  $35 \pm 5 \text{cm}$  between inspector bare eye and LCD.

Viewing Angle: U/D:  $45^\circ/45^\circ$ , L/R:  $45^\circ/45^\circ$





13.2 Inspection standard

| ITEM                                                                   |                                                                                                                                          | CRITERION                                |                     |               |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------|---------------|
| Black spots, white spots, light leakage, Foreign Particle (round Type) |  <p><math>D=(x+y)/2</math><br/>Spots density: 10 mm</p> | Size =7"                                 |                     |               |
|                                                                        |                                                                                                                                          | Average Diameter                         | Qualified Qty       |               |
|                                                                        |                                                                                                                                          | $D \leq 0.2 \text{ mm}$                  | Ignored             |               |
|                                                                        |                                                                                                                                          | $0.2 \text{ mm} < D \leq 0.3 \text{ mm}$ | N≤3                 |               |
|                                                                        |                                                                                                                                          | $0.5\text{mm} < D$                       | Not allowed         |               |
| LCD black spots, white spots, light leakage (line Type)                |  <p>Spots density: 10 mm</p>                           | Size = 7"                                |                     |               |
|                                                                        |                                                                                                                                          | Length                                   | Width               | Qualified Qty |
|                                                                        |                                                                                                                                          | -                                        | $W \leq 0.05$       | Ignored       |
|                                                                        |                                                                                                                                          | $L \leq 5.0$                             | $0.05 < W \leq 0.1$ | N≤3           |
|                                                                        |                                                                                                                                          | $5.0 < L$                                | $0.1 < W$           | Not allowed   |
| Bright/Dark Dots                                                       | Size = 7                                                                                                                                 |                                          |                     |               |
|                                                                        | Item                                                                                                                                     | Qualified Qty                            |                     |               |
|                                                                        | Bright dots                                                                                                                              | N ≤ 2                                    |                     |               |
|                                                                        | Dark dots                                                                                                                                | N ≤ 3                                    |                     |               |
|                                                                        | Total Bright and Dark Dots                                                                                                               | N ≤ 4                                    |                     |               |
| Clear spots                                                            | Size ≥ 5"                                                                                                                                |                                          |                     |               |
|                                                                        | Average Diameter                                                                                                                         | Qualified Qty                            |                     |               |
|                                                                        | $D < 0.2 \text{ mm}$                                                                                                                     | Ignored                                  |                     |               |
|                                                                        | $0.2 \text{ mm} < D < 0.3 \text{ mm}$                                                                                                    | 4                                        |                     |               |
|                                                                        | $0.3 \text{ mm} < D < 0.5 \text{ mm}$                                                                                                    | 2                                        |                     |               |
|                                                                        | $0.5 \text{ mm} < D$                                                                                                                     | 0                                        |                     |               |
|                                                                        | Spots density: 10 mm                                                                                                                     |                                          |                     |               |
| Polarizer bubbles                                                      | Size ≥ 5"                                                                                                                                |                                          |                     |               |
|                                                                        | Average Diameter                                                                                                                         | Qualified Qty                            |                     |               |
|                                                                        | $D < 0.2 \text{ mm}$                                                                                                                     | Ignored                                  |                     |               |
|                                                                        | $0.2 \text{ mm} < D < 0.5 \text{ mm}$                                                                                                    | 2                                        |                     |               |
|                                                                        | $0.5 \text{ mm} < D$                                                                                                                     | 1                                        |                     |               |





## 14. RELIABILITY TEST

| NO. | TEST ITEM                           | TEST CONDITION                                                                                                                       | NOTE   |
|-----|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1   | High Temperature Storage            | 80°C/120 hours                                                                                                                       | Note 1 |
| 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   | High Temperature and High Humidity  | Humidity 40°C, 90%RH, 120Hrs                                                                                                         |        |
| 6   | Thermal Cycling Test (No operation) | -20°C for 30min, 70°C for 30 min.<br>100 cycles. Then test at room temperature after 1 hour                                          | Note 2 |
| 7   | Vibration Test                      | Frequency: 10 ÷ 55 Hz.<br>Stroke: 1.5 mm.<br>Sweep: 10Hz ÷ 55Hz ÷ 10 Hz.<br>2 hours for each direction of X, Y, Z<br>(Total 6 hours) |        |
| 8   | Package Drop Test                   | Height: 60 cm<br>1 corner, 3 edges, 6 surfaces                                                                                       |        |

**Note 1.** Sample quantity for each test item is 5 ÷ 10 pcs.

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



## 15. LEGAL INFORMATION

Riverdi grants the guarantee for the proper operation of the goods for a period of 12 months from the date of possession of the goods. If in a consequence of this guaranteed execution the customer has received the defects-free item as replacement for the defective item, the effectiveness period of this guarantee shall start anew from the moment the customer receives the defects-free item.

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