



RVT50HQLFWCA0

## HB, IPS LVDS 5.0" LCD TFT DATASHEET

Rev.1.0

2022-11-23

| ITEM                           | CONTENTS                              | UNIT              |
|--------------------------------|---------------------------------------|-------------------|
| LCD Type                       | TFT/Transmissive/Normally black/IPS   | /                 |
| Size                           | 5.0                                   | Inch              |
| Viewing Direction              | Free                                  | /                 |
| Outside Dimensions (W x H x D) | 137.50 x 76.60 x 5.93                 | mm                |
| Active Area (W x H)            | 108.00 x 64.80                        | mm                |
| Pixel Pitch (W x H)            | 0.135 x 0.135                         | mm                |
| Resolution                     | 800 x 480 (RGB)                       | /                 |
| Brightness                     | 800                                   | cd/m <sup>2</sup> |
| LCD Interface Type             | LVDS (6/8-bit)                        | /                 |
| Color Depth                    | 16.7 M                                | /                 |
| Pixel Arrangement              | RGB Vertical Stripe                   | /                 |
| LCD Driver                     | ST7262-G4                             | /                 |
| With/Without Touch             | With Projected Capacitive Touch Panel | /                 |
| CTP Driver                     | ILI2132A                              | /                 |
| Touch Interface                | USB /I2C/ Optional UART               | /                 |
| LCD Input Voltage              | 3.3                                   | V                 |
| Weight                         | TBD                                   | g                 |

**Note 1.** RoHS3 compliant**Note 2.** LCM weight tolerance:  $\pm 5\%$ .



## 1. REVISION RECORD

| REV NO. | REV DATE   | CONTENTS        | REMARKS |
|---------|------------|-----------------|---------|
| 1.0     | 2022-11-23 | Initial Release |         |



## 2. CONTENTS

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### 3. MODULE CLASSIFICATION INFORMATION

| RV | T  | 50 | H  | Q  | L  | F  | W  | C  | A0  |
|----|----|----|----|----|----|----|----|----|-----|
| 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     | 50 – 5.0"                       |
| 4.  | MODEL SERIAL NO. | H – High Brightness, IPS        |
| 5.  | RESOLUTION       | Q – 800 x 480 px                |
| 6.  | INTERFACE        | L – TFT LCD, LVDS               |
| 7.  | FRAME            | F – With Mounting Metal Frame   |
| 8.  | BACKLIGHT TYPE   | W – LED White                   |
| 9.  | TOUCH PANEL      | C – With Capacitive Touch Panel |
| 10. | VERSION          | A0 – aTouch                     |

## 4. ASSEMBLY GUIDE

### 4.1 Mounting frame

For dimensions 3.5", 4.3", 5.0", 7.0" and 10.1", the product with mounting frame version is available. Thanks to the four catches attached to the side, frame provides strong assembly to the surface by mounting element (like the screw, see Figure 1). The frames are specially designed to fit Riverdi products perfectly. The diameter of the mounting hole is 3.5mm.

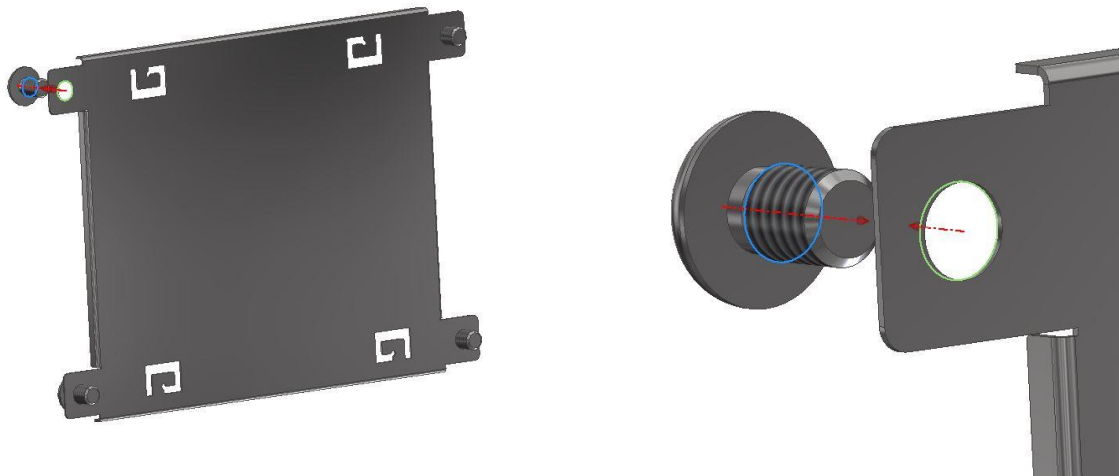
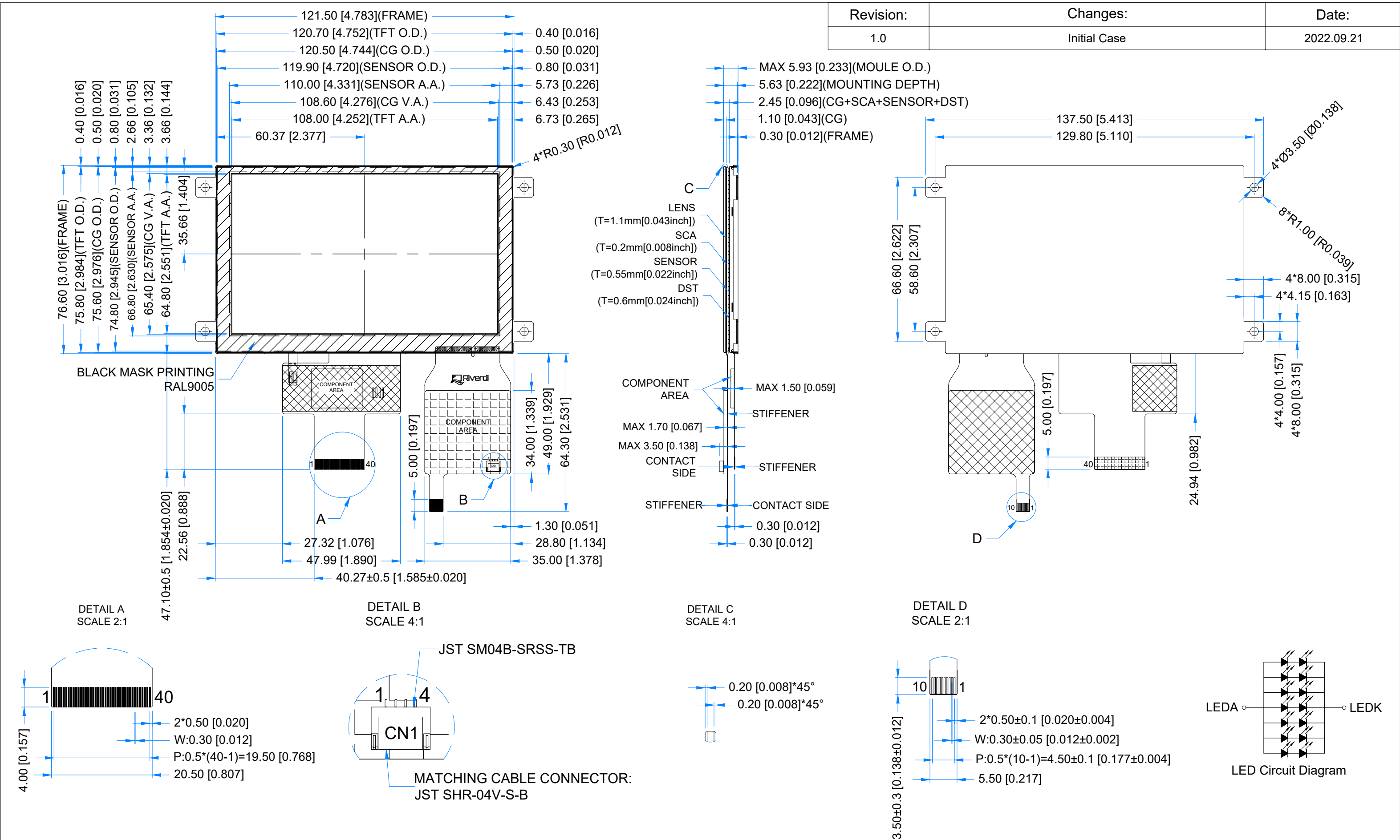


Figure 1. Mounting frame



## 6. ABSOLUTE MAXIMUM RATINGS

| PARAMETER                     | SYMBOL    | MIN  | MAX | UNIT |
|-------------------------------|-----------|------|-----|------|
| Operating Ambient temperature | $T_{OP}$  | -20  | 70  | °C   |
| Storage Temperature           | $T_{ST}$  | -30  | 80  | °C   |
| Operating Ambient Humidity    | $H_{OP}$  | 10   | 90  | % RH |
| Power for Circuit Driving     | $V_{DD}$  | -0.3 | 5   | V    |
| Backlight Forward Current     | $I_{LED}$ | -    | 25  | mA   |

**Note.** The above are maximum values. If exceeded, they may cause permanent damage to the unit.

## 7. ELECTRICAL CHARACTERISTICS

| PARAMETER                       | SYMBOL       | MIN      | TYP            | MAX | UNIT |
|---------------------------------|--------------|----------|----------------|-----|------|
| Power Supply for analog circuit | $V_{DD}$     | 3.0      | 3.3            | 3.6 | V    |
| Logic Input Voltage             | Low Voltage  | $V_{IL}$ | 0              | -   |      |
|                                 | High Voltage | $V_{IH}$ | $0.7V_{DD}$    | -   |      |
| Logic Output Voltage            | Low Voltage  | $V_{OL}$ | -              | -   |      |
|                                 | High Voltage | $V_{OH}$ | $V_{DD} - 0.4$ | -   | mA   |
| Power Consumption               | Black Mode   | $P_b$    | 80             | 100 |      |
|                                 | Standby Mode | $P_w$    | 40             | 50  | μA   |

## 8. BACKLIGHT ELECTRICAL CHARACTERISTICS

| PARAMETER                   | SYMBOL   | MIN  | TYP    | MAX  | UNIT  | NOTE       |
|-----------------------------|----------|------|--------|------|-------|------------|
| Backlight Driving Voltage   | $V_F$    | 11.2 | 12.0   | 12.8 | V     | Notes 1, 2 |
| Backlight Driving Current   | $I_F$    | -    | 140    | -    | mA    |            |
| Backlight Power Consumption | $W_{BL}$ | -    | 1680   | -    | mW    |            |
| Backlight Lifetime          | -        | -    | 50,000 | -    | hours | Note 3     |

**Note 1.** Unless specified, the ambient temperature  $T_a = 25^\circ\text{C}$

**Note 2.** The recommended operating conditions refer to a range in which operation of this product is guaranteed. The operation cannot be guaranteed if the absolute maximum values exceed.

**Note 3.** If LED is driven by high current, high ambient temperature and humidity condition, the lifetime of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating lifetime is estimated data.

## 9. ELECTRO-OPTICAL CHARACTERISTICS

| ITEM                    | SYMBOL         | CONDITION                                                    | MIN   | TYP   | MAX   | UNIT              | RMK    | NOTE |
|-------------------------|----------------|--------------------------------------------------------------|-------|-------|-------|-------------------|--------|------|
| Response Time           | Tr+Tf          | $\theta=0^\circ$<br>$\phi=0^\circ$<br>$T_a=25^\circ\text{C}$ | -     | 30    | 40    | ms                | FIG 2. | 4, 7 |
| Contrast Ratio          | Cr             |                                                              | 800   | 1000  | -     | ---               | FIG 3. | 1, 7 |
| Luminance Uniformity    | $\delta$ WHITE |                                                              | 75    | 80    | -     | %                 |        | 3, 7 |
| Surface Luminance       | Lv             |                                                              | -     | 800   | -     | cd/m <sup>2</sup> |        | 2, 7 |
| Viewing Angle Range     | $\theta$       | $\phi = 90^\circ$                                            | -     | 80    | -     | deg               | FIG 4. | 6    |
|                         |                | $\phi = 270^\circ$                                           | -     | 80    | -     | deg               |        |      |
|                         |                | $\phi = 0^\circ$                                             | -     | 80    | -     | deg               |        |      |
|                         |                | $\phi = 180^\circ$                                           | -     | 80    | -     | deg               |        |      |
| CIE (x, y) Chromaticity | Rx             | $\theta=0^\circ$<br>$\phi=0^\circ$<br>$T_a=25^\circ\text{C}$ | 0.575 | 0.615 | 0.655 | -                 | FIG 3. | 5, 7 |
|                         | Ry             |                                                              | 0.296 | 0.336 | 0.376 | -                 |        |      |
|                         | Gx             |                                                              | 0.352 | 0.392 | 0.432 | -                 |        |      |
|                         | Gy             |                                                              | 0.512 | 0.552 | 0.592 | -                 |        |      |
|                         | Bx             |                                                              | 0.100 | 0.140 | 0.180 | -                 |        |      |
|                         | By             |                                                              | 0.085 | 0.125 | 0.165 | -                 |        |      |
|                         | Wx             |                                                              | 0.274 | 0.316 | 0.358 | -                 |        |      |
|                         | Wy             |                                                              | 0.294 | 0.336 | 0.378 | -                 |        |      |

**Note 1.** Contrast Ratio (CR) is defined mathematically as below, for more information see Figure 3.

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

**Note 2.** Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see Figure 3.

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

**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 3.

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

**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 2. The test equipment is BM-7A.

**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.** For TFT module, viewing angle is the angle at which the contrast ratio is greater 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 4.



**Note 7.** Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80). For response time testing, the testing data is based on BM-7A. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, Chromaticity the test data is based on SR-3A.

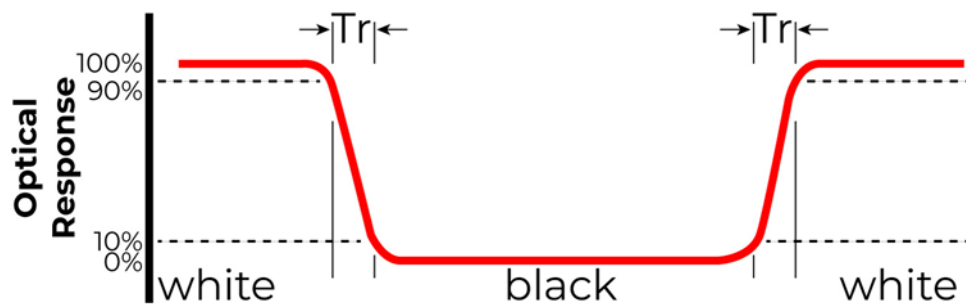


Figure 2. The definition of response time

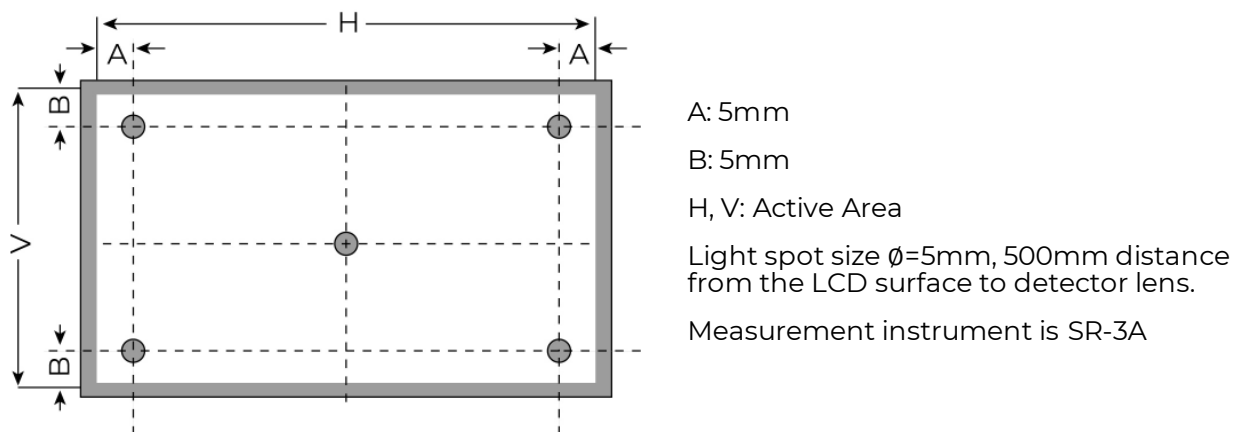


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

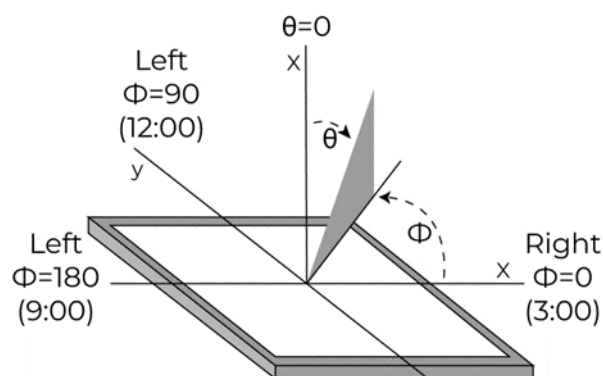
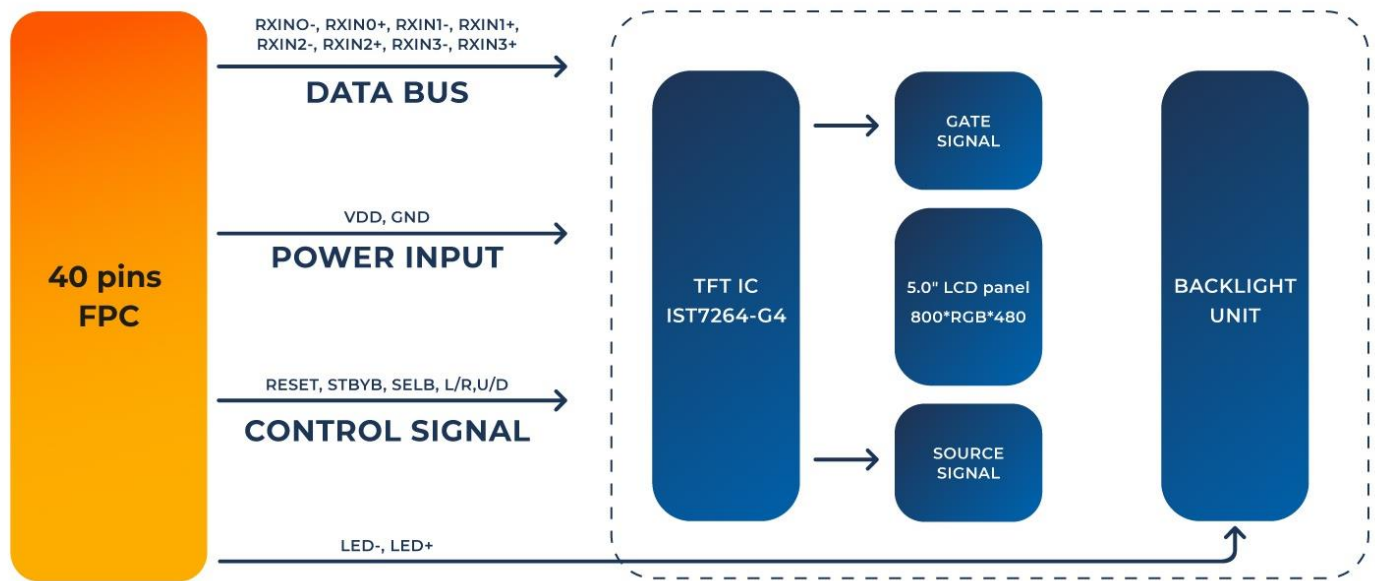


Figure 4. The definition of viewing angle

## 10. BLOCK DIAGRAM



## 11. INTERFACES DESCRIPTION

### 11.1 TFT assignment

Matched Riverdi ZIF connector: ZIF0540UH

| PIN    | SYMBOL   | I/O | DESCRIPTION                                                                                 | NOTE |
|--------|----------|-----|---------------------------------------------------------------------------------------------|------|
| 1      | NC       | -   | No connection                                                                               |      |
| 2, 3   | VDD      | P   | Power voltage for digital circuit                                                           |      |
| 4      | NC       | -   | No connection                                                                               |      |
| 5      | RESET    | I   | Global reset pin                                                                            |      |
| 6      | STBYB    | I   | Standby mode setting normally pulled high.<br>STBYB=0: Standby mode<br>STBYB=1: Normal mode |      |
| 7      | GND      | P   | Ground                                                                                      |      |
| 8      | RXINO-   | I   | -LVDS differential data input                                                               |      |
| 9      | RXINO+   | I   | +LVDS differential data input                                                               |      |
| 10     | GND      | P   | Ground                                                                                      |      |
| 11     | RXIN1-   | I   | -LVDS differential data input                                                               |      |
| 12     | RXIN1+   | I   | +LVDS differential data input                                                               |      |
| 13     | GND      | P   | Ground                                                                                      |      |
| 14     | RXIN2-   | I   | -LVDS differential data input                                                               |      |
| 15     | RXIN2+   | I   | +LVDS differential data input                                                               |      |
| 16     | GND      | P   | Ground                                                                                      |      |
| 17     | RXCLKIN- | I   | -LVDS differential clock input                                                              |      |
| 18     | RXCLKIN+ | I   | +LVDS differential clock input                                                              |      |
| 19     | GND      | P   | Ground                                                                                      |      |
| 20     | RXIN3-   | I   | -LVDS differential data input                                                               |      |
| 21     | RXIN3+   | I   | +LVDS differential data input                                                               |      |
| 22     | GND      | P   | Ground                                                                                      |      |
| 23, 24 | NC       | -   | No connection                                                                               |      |

|        |      |   |                                                                                                                     |        |
|--------|------|---|---------------------------------------------------------------------------------------------------------------------|--------|
| 25     | GND  | P | Ground                                                                                                              |        |
| 26, 27 | NC   | - | No connection                                                                                                       |        |
| 28     | SELB | I | 6-bit /8-bit mode select.<br>Set 'LOW' for 6-bit data input mode,<br>Set 'HIGH' for 8-bit data input mode (Default) |        |
| 29     | NC   | - | No connection                                                                                                       |        |
| 30     | GND  | P | Ground                                                                                                              |        |
| 31, 32 | LED- | P | Backlight LED Cathode                                                                                               |        |
| 33     | L/R  | I | Horizontal inversion                                                                                                | Note 1 |
| 34     | U/D  | I | Vertical inversion                                                                                                  |        |
| 35-38  | NC   | - | No connection                                                                                                       |        |
| 39, 40 | LED+ | P | Backlight LED Anode                                                                                                 |        |

**Note 1.** U/D L/R Function Description

| SCAN CONTROL INPUT |             | SCANNING DIRECTION                  |
|--------------------|-------------|-------------------------------------|
| U/D                | L/R         |                                     |
| H (default)        | H (default) | From up to down, from left to right |
| H                  | L           | From up to down, from right to left |
| L                  | H           | From down to up, from left to right |
| L                  | L           | From down to up, from right to left |

## 11.2 Touch panel assignment

Matched Riverdi ZIF connector: ZIF0510DH-CF25

| PIN NO. | SYMBOL  | DESCRIPTION                                | NOTE   |
|---------|---------|--------------------------------------------|--------|
| 1       | USB_GND | USB_Ground                                 |        |
| 2       | USB_VDD | USB Power for CTP, 5.0V                    | Note 1 |
| 3       | USB_D-  | USB _Data Signal -                         |        |
| 4       | USB_D+  | USB _Data Signal +                         |        |
| 5       | I2C_GND | I2C _Ground                                |        |
| 6       | I2C_VDD | I2C _Power for CTP, 3.3 V                  | Note 1 |
| 7       | I2C_RST | I2C _Reset Pin, Active low                 |        |
| 8       | I2C_SCL | I2C _Clock Input                           | Note 2 |
| 9       | I2C_INT | I2C _Interrupt Signal from CTP, Active low |        |
| 10      | I2C_SDA | I2C _Data Signal                           |        |

**Note 1.** Please do not supply power to both USB\_VDD and I2C\_VDD at the same time, Otherwise, there is a risk that the LDO on the PCAP FPC will be destroyed.

**Note 2.** External pull-up resistors are required.

## 11.3 CON1 assignment

Matched PCAP USB programing cable accessory: RVA-PCAP-USB-CABLE.

| PIN NO. | SYMBOL  | DESCRIPTION                | NOTE   |
|---------|---------|----------------------------|--------|
| 1       | USB_VDD | USB_Power for CTP, DC 5.0V | Note 1 |
| 2       | USB_D-  | USB _Data Signal -         |        |
| 3       | USB_D+  | USB _Data Signal +         |        |
| 4       | USB_GND | USB_Ground                 |        |

**Note 1.** If USD\_VDD of CON1 is powered, please make sure to disconnect the PCAP FPC from the PCAP ZIF connector on your application.

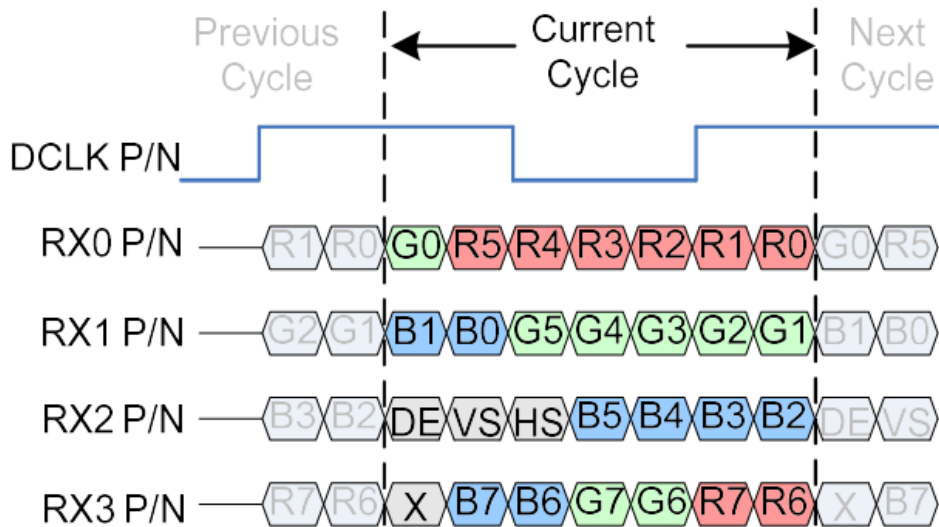
Otherwise, there is a risk that the LDO on the PCAP FPC will be destroyed.

## 12. TIMING CHARACTERISTICS

### 12.1 System bus timing for LVDS interface

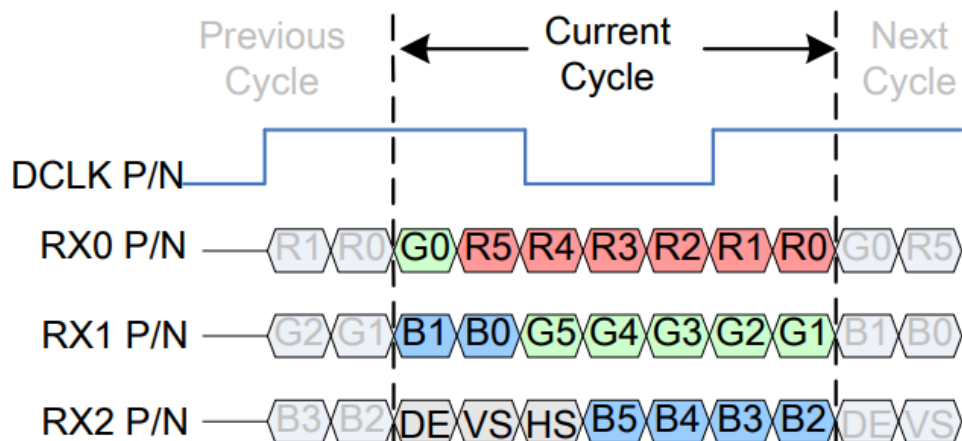
#### 12.1.1 4Lane VESA Data Format Color Bit Map

8-bit LVDS input mode, SELB='H'

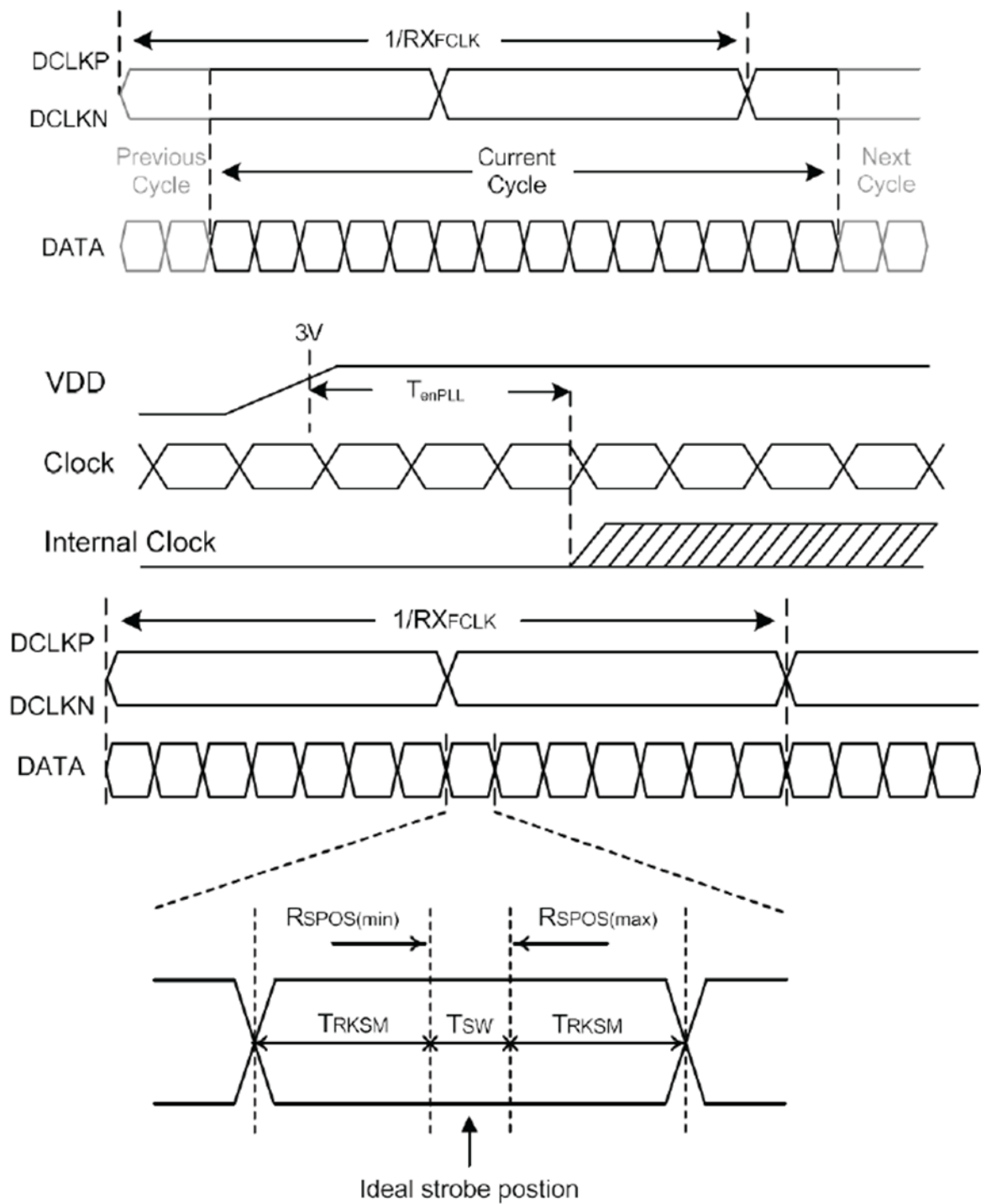


#### 12.1.2 3Lane VESA Data Format Color Bit Map

6-bit LVDS input mode, SELB='L'



### 12.1.3 LVDS Input Timing



$R_{KSM}$ : Receiver strobe margin

$RS_{POS}$ : Receiver strobe position

$T_{SW}$ : Strobe width (internal DATA sampling window)

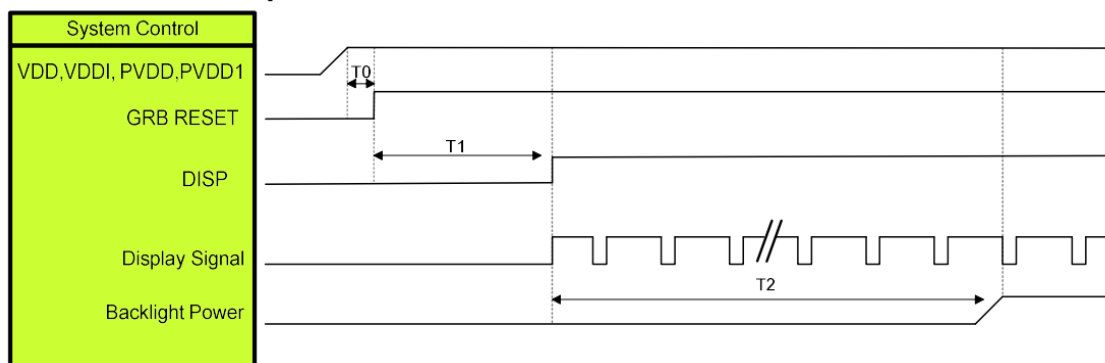
| PARAMETER                                                      | SYMBOL      | MIN                      | TYP | MAX     | UNIT    |
|----------------------------------------------------------------|-------------|--------------------------|-----|---------|---------|
| Clock Frequency                                                | $RX_{FCLK}$ | 23                       | 25  | 27      | MHz     |
| Input Data Skew Margin                                         | $T_{RKSM}$  | 400                      | -   | -       | ps      |
| Clock High Time                                                | $T_{LVGH}$  | $4/(7 \times RX_{fclk})$ |     |         | ns      |
| Clock Low Time                                                 | $T_{LVGL}$  | $3/(7 \times RX_{fclk})$ |     |         | ns      |
| PLL Wake-up Time                                               | $T_{enPLL}$ | -                        | -   | 150     | $\mu s$ |
| LVDS Spread Spectrum Clocking (SSC) Tolerance of LVDS Receiver |             |                          |     |         |         |
| Modulation Frequency                                           | $SSC_{MF}$  | -                        | -   | 100     | KHz     |
| Modulation Rate                                                | $SSC_{MR}$  | -                        | -   | $\pm 3$ | %       |

## 12.2 Timing Table

| PARAMETER      |                               | SYMBOL | MIN | TYP | MAX | UNIT  |
|----------------|-------------------------------|--------|-----|-----|-----|-------|
| DCLK Frequency |                               | Fclk   | 23  | 25  | 27  | MHz   |
| HSYNC          | Period Time                   | Th     | -   | 816 | 896 | DCLK  |
|                | Display Period                | Thdisp | 800 |     |     |       |
|                | H <sub>sync</sub> Back Porch  | Thbp   | -   | 8   | 48  |       |
|                | H <sub>sync</sub> Front Porch | Thfp   | -   | 8   | 48  |       |
|                | H <sub>sync</sub> Pulse Width | Thw    | -   | 4   | 8   |       |
| VSYNC          | Period Time                   | Tv     | -   | 496 | 504 | HSYNC |
|                | Display Period                | Tvdisp | 480 |     |     |       |
|                | V <sub>sync</sub> Back Porch  | Tvbp   | -   | 8   | 12  |       |
|                | V <sub>sync</sub> Front Porch | Tvfp   | -   | 8   | 12  |       |
|                | V <sub>sync</sub> Pulse Width | Tvw    | -   | 4   | 8   |       |

## 12.3 Power ON/OFF sequence

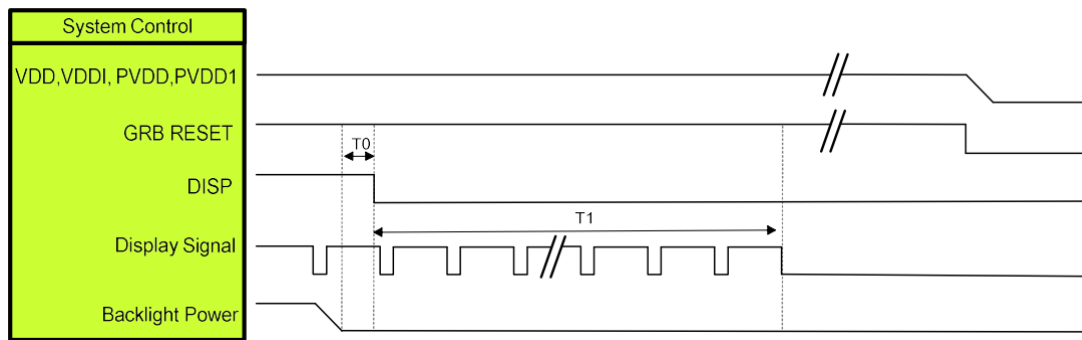
### 12.3.1 Power On sequence



| SYMBOL | DESCRIPTION                                 | MIN. TIME | UNIT |
|--------|---------------------------------------------|-----------|------|
| T0     | System power stability to GRB RESET signal  | 0         | ms   |
| T1     | GRB RESET=" High" to DISP=" High"           | 10        |      |
| T2     | Display Signal output to Backlight Power on | 250       |      |

**Note.** LVDS interface Display signal: DCLK P/N; RX [3:0] P/N.

### 12.3.2 Power Off sequence



| SYMBOL | DESCRIPTION                                          | MIN. TIME | UNIT |
|--------|------------------------------------------------------|-----------|------|
| T0     | Backlight Power off to DISP="Low"                    | 5         | ms   |
| T1     | DISP="Low" to IC internal voltage discharge complete | 100       |      |

**Note.** LVDS interface Display signal: DCLK P/N; RX [3:0] P/N.

## 13. CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

### 13.1 Mechanical characteristics

| DESCRIPTION              | SPECIFICATION        | REMARK |
|--------------------------|----------------------|--------|
| Touch Panel Size         | 5.0 inch             | aTouch |
| Outline Dimension of CTP | 120.50 mm x 75.60 mm |        |
| Product Thickness        | 2.45 mm              |        |
| Glass Thickness          | 1.1 mm               |        |
| CTP View Area            | 108.60 mm x 65.40 mm |        |
| Sensor Active Area       | 110.00 mm x 66.80 mm |        |
| Structure type           | Glass + Glass        |        |
| Surface Hardness         | 7H                   |        |

### 13.2 Electrical characteristics

| DESCRIPTION             | SPECIFICATION |           |
|-------------------------|---------------|-----------|
| Power Consumption (IDD) | Active Mode   | 90 mA     |
|                         | Sleep Mode    | 10 mA     |
| Linearity               |               | +/- 1.5mm |
| Controller              |               | ILI2132A  |
| Resolution              |               | 800 x 480 |

## 14. INSPECTION

Standard acceptance/rejection criteria for TFT module

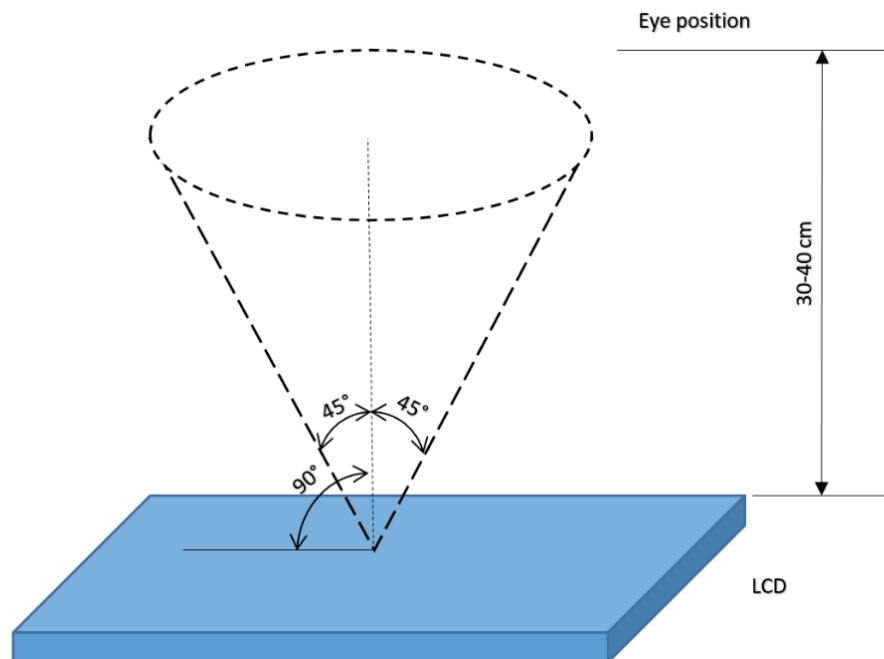
### 14.1 Inspection condition

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)

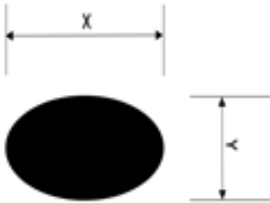
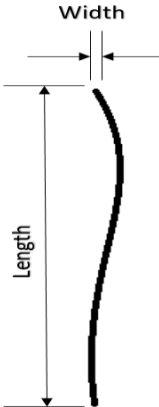
Viewing distance:  $35 \pm 5\text{cm}$  between inspector bare eye and LCD.

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





## 14.2 Inspection standard

| ITEM                                                                               | CRITERION                                                                                                              |                      |                 |               |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|---------------|
| Black spots,<br>white spots,<br>light leakage,<br>Foreign Particle<br>(round Type) | <br>D=(x+y)/2<br>Spots density: 10 mm | 3.5" ≤ Size ≤ 5"     |                 |               |
|                                                                                    |                                                                                                                        | Average Diameter     | Qualified Qty   |               |
|                                                                                    |                                                                                                                        | D ≤ 0.15 mm          | Ignored         |               |
|                                                                                    |                                                                                                                        | 0.15 mm < D ≤ 0.3 mm | N≤3             |               |
|                                                                                    |                                                                                                                        | 0.3mm < D            | Not allowed     |               |
| LCD black spots,<br>white spots,<br>light leakage<br>(line Type)                   | <br>Spots density: 10 mm             | 3.5" ≤ Size ≤ 5"     |                 |               |
|                                                                                    |                                                                                                                        | Length               | Width           | Qualified Qty |
|                                                                                    |                                                                                                                        | -                    | W ≤ 0.03        | Ignored       |
|                                                                                    |                                                                                                                        | L ≤ 3.0              | 0.03 < W ≤ 0.05 | 2             |
|                                                                                    |                                                                                                                        | L ≤ 3.0              | 0.05 < W ≤ 0.1  | 1             |
|                                                                                    |                                                                                                                        | 3.0 < L              | 0.1 < W         | Not allowed   |
| Bright/Dark<br>Dots                                                                | 3.5" ≤ Size ≤ 5"                                                                                                       |                      |                 |               |
|                                                                                    | Item                                                                                                                   |                      | Qualified Qty   |               |
|                                                                                    | Bright dots                                                                                                            |                      | N ≤ 1           |               |
|                                                                                    | Dark dots                                                                                                              |                      | N ≤ 2           |               |
|                                                                                    | Total Bright and Dark Dots                                                                                             |                      | N ≤ 3           |               |
| Clear spots                                                                        | Size ≤ 5"                                                                                                              |                      |                 |               |
|                                                                                    | Average Diameter                                                                                                       |                      | Qualified Qty   |               |
|                                                                                    | D < 0.2 mm                                                                                                             |                      | Ignored         |               |
|                                                                                    | 0.2 mm < D < 0.3 mm                                                                                                    |                      | 3               |               |
|                                                                                    | 0.3 mm < D < 0.5 mm                                                                                                    |                      | 2               |               |
|                                                                                    | 0.5 mm < D                                                                                                             |                      | 0               |               |
|                                                                                    | Spots density: 10 mm                                                                                                   |                      |                 |               |
| Polarizer<br>bubbles                                                               | 3.5" ≤ Size ≤ 5"                                                                                                       |                      |                 |               |
|                                                                                    | Average Diameter                                                                                                       |                      | Qualified Qty   |               |
|                                                                                    | D ≤ 0.2 mm                                                                                                             |                      | Ignored         |               |
|                                                                                    | 0.2 mm < D ≤ 0.3 mm                                                                                                    |                      | 2               |               |
|                                                                                    | 0.2 mm < D ≤ 0.5 mm                                                                                                    |                      | 1               |               |
|                                                                                    | 0.5 mm < D                                                                                                             |                      | 0               |               |
|                                                                                    | Total Q'ty                                                                                                             |                      | 3               |               |
|                                                                                    | Size ≤ 5"                                                                                                              |                      |                 |               |

|                                |                     |                 |               |
|--------------------------------|---------------------|-----------------|---------------|
| Touch panel spots              | Average Diameter    |                 | Qualified Qty |
|                                | D < 0.2 mm          |                 | Ignored       |
|                                | 0.2 mm < D < 0.4 mm |                 | 5             |
|                                | 0.4 mm < D < 0.5 mm |                 | 2             |
|                                | 0.5 mm < D          |                 | 0             |
| Touch panel white line scratch | Size ≤ 5"           |                 |               |
|                                | Length              | Width           | Qualified Qty |
|                                | -                   | W < 0.02        | Ignored       |
|                                | L < 3.0             | 0.02 < W < 0.05 | 2             |
|                                | L < 5.0             | 0.05 < W < 0.08 | 2             |
|                                | -                   | 0.08 < W        | 0             |

## 15. 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                                                                                       |        |
| 9   | Electrostatic Discharge             | ±2KV, Human Body Mode, 100pF/1500Ω                                                                                                   |        |

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

**Note 2.** The device is kept at room temperature for 2 hours prior to starting the test.



## 16.LEGAL INFORMATION

CE marking is usually obligatory only for a complete end product. Riverdi display modules are semi-finished goods which are used as inputs to become part of the finished products.

Therefore, Riverdi display modules are not CE marked.

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.

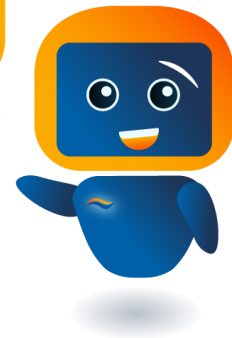
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