



RVT70HSHNWCA0

IPS 7.0" HDMI LCD TFT Datasheet

Rev.1.1

2021-04-16

| ITEM | CONTENTS | UNIT |
|---------------------------------|--|-------------------|
| LCD Type | TFT/Transmissive/Normally Black/IPS | / |
| Size | 7.0 | Inch |
| Viewing Direction | Free | / |
| Outside Dimensions (W × H × D) | 164.90 x 100.00 x 24.85 | mm ³ |
| Active Area (W × H) | 154.21 × 85.92 | mm ² |
| Pixel Pitch (W × H) | 0.1506 × 0.1432 | mm ² |
| Resolution | 1024 (RGB) × 600 | / |
| Brightness | 800 | cd/m ² |
| Color Depth | 16.7 M | / |
| Pixel Arrangement | RGB Vertical Stripe | / |
| Controller IC of Main Board | RTD2662 | / |
| Video interface | HDMI | / |
| Touch panel interface | USB-C | / |
| Power Supply | Power Jack(7.0V - 30.0V); USB-C | V |
| With/Without Touch | With projective capacitive touch panel | / |
| Touch controller | ILI2132A | / |
| Weight | 238 | g |

Note 1: RoHS3 compliant

Note 2: LCM weight tolerance: ± 5%.

REVISION RECORD

| REVNO. | REVDATE | CONTENTS | REMARKS |
|--------|------------|-----------------------|---------|
| 1.0 | 2021-03-10 | Initial Release | |
| 1.1 | 2021-04-16 | Update the HDMI photo | |

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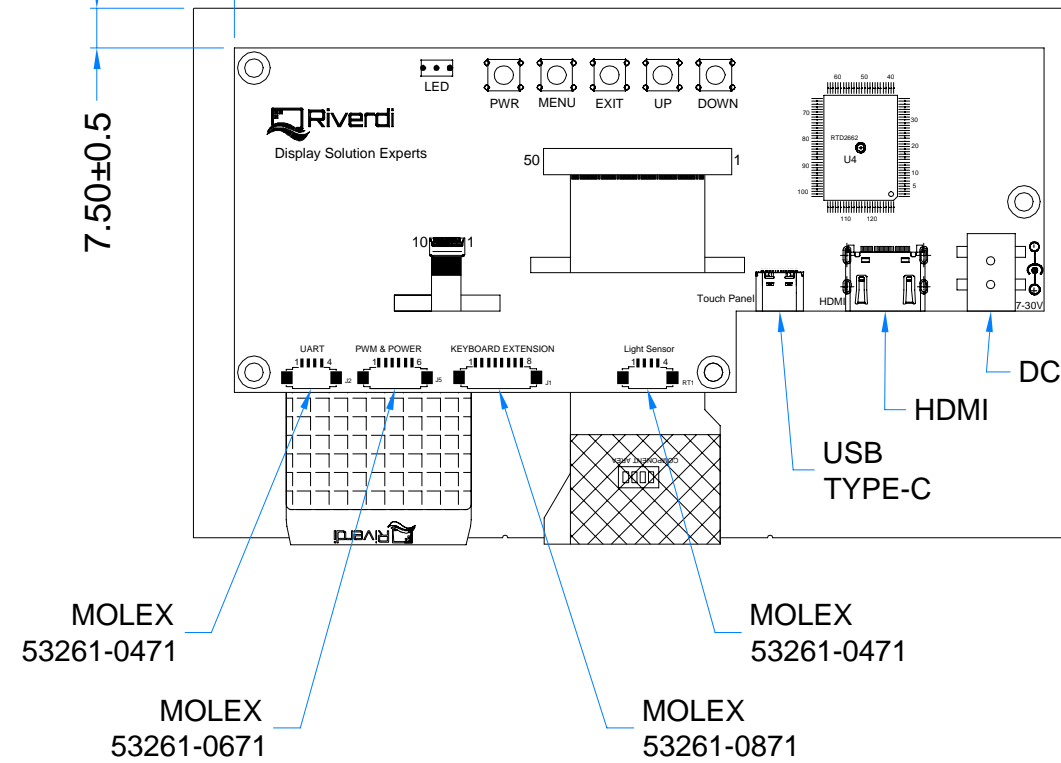
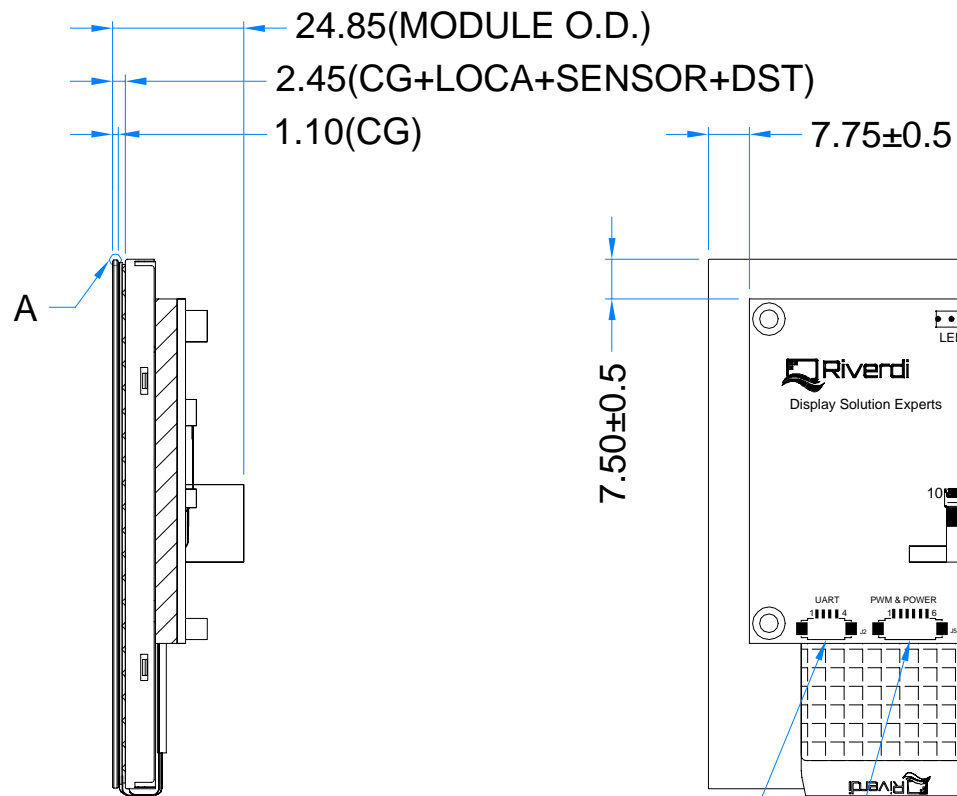
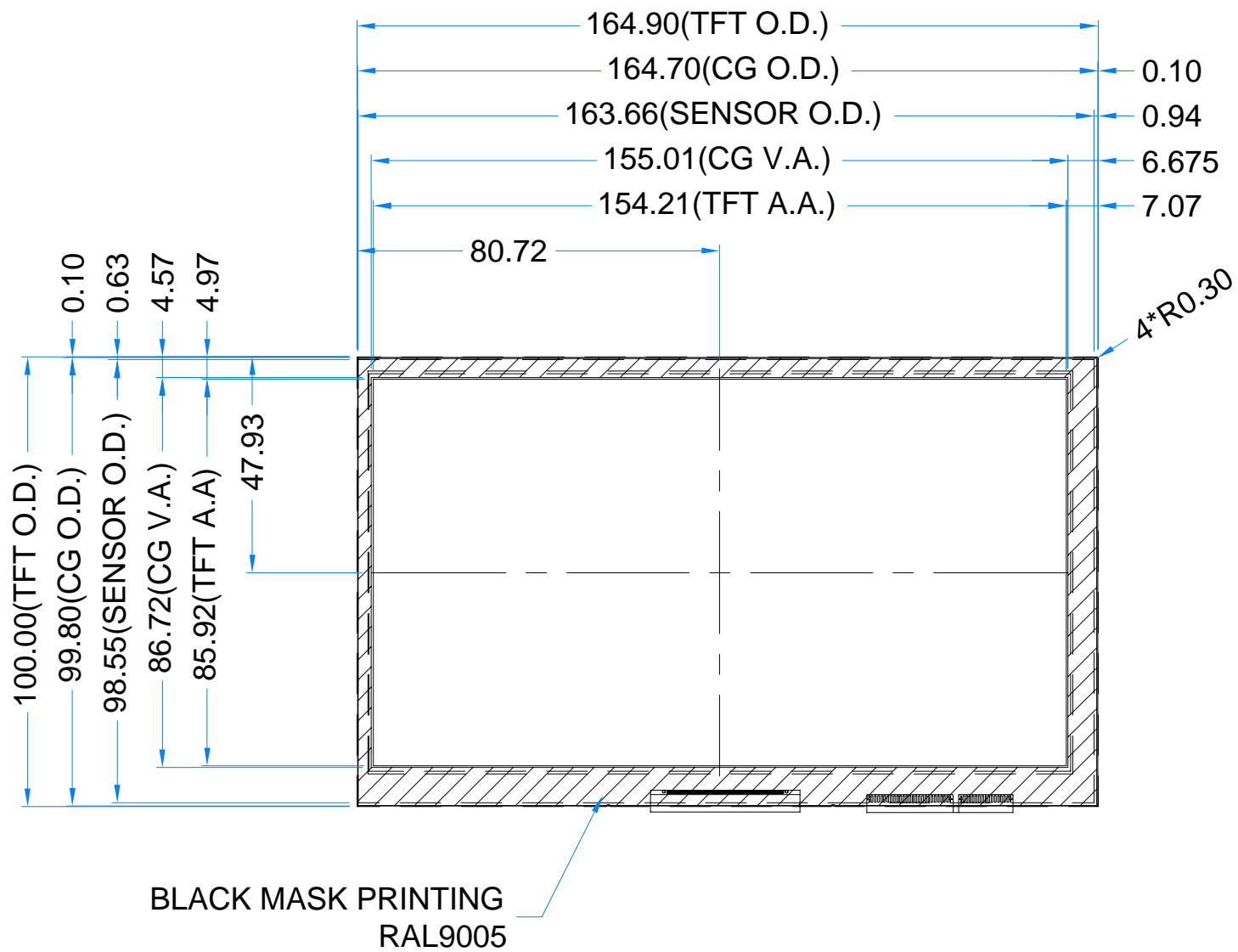
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1 MODULE CLASSIFICATION INFORMATION

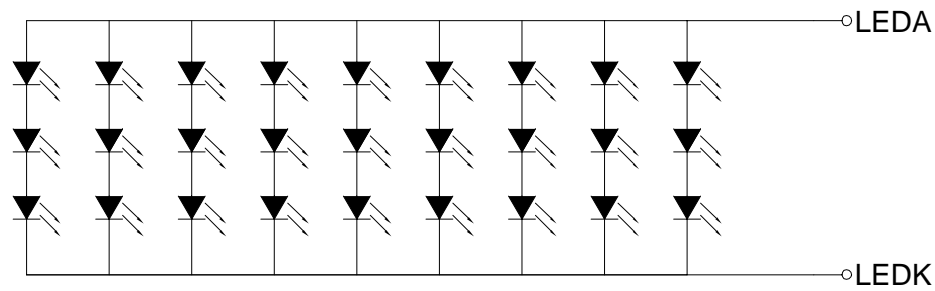
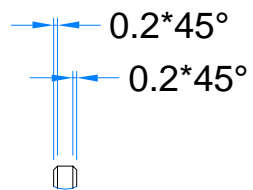
| RV | T | 70 | H | S | H | N | W | C | A0 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |

| | | |
|------------|-------------------------|---------------------------------|
| 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 | H– HDMI |
| 7. | FRAME | N – No Frame |
| 8. | BACKLIGHT TYPE | W – LED White |
| 9. | TOUCH PANEL | C – With Touch Panel |
| 10. | VERSION | A0 –aTouch |

| | | |
|-----------|--------------|------------|
| Revision: | Changes: | Date: |
| 1.0 | Initial Case | 2021.03.08 |



DETAIL A
SCALE 4:1



LED Diagram Circuit

LCM NOTES:

1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
2. RESOLUTION: 1024x600
3. VIEWING ANGLE: FREE
4. MODULE SURFACE LUMINANCE: MAX. 800 cd/m²
5. CONTROLLER IC OF MAIN BOARD: RTD2662
6. VIDEO INTERFACE: HDMI
7. POWER SUPPLY: POWER JACK (7.0-30.0V); USB-C.

TP NOTES:

1. TP STRUCTURE: G+G
2. CG THICKNESS: 1.10 mm
3. DRIVER IC: ILI2132A
4. TOUCH PANEL INTERFACE: USB-C

GENERAL NOTES:

1. OPERATING TEMPERATURE: -20°C ~ 70°C
2. STORAGE TEMPERATURE: -30°C ~ 80°C
3. WITHOUT INDIVIDUAL TOLERANCE: ±0.3mm
4. RoHS3 COMPLIANT

PN: RVT70HSHNWCA0

SN:

DRAWN: M.Natywa

2021.03.08

1:1.43

CHECKED: Carol Gao

2021.03.08

[mm]

APPR:

ISO A3

P. 1 of 1



3 ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|-----------------|-----|-----|------|--------|
| Supply Voltage for Module | VDD | 7 | 30 | V | Note 1 |
| Operating Temperature | T _{OP} | -20 | 70 | °C | |
| Storage Temperature | T _{ST} | -30 | 80 | °C | |
| Storage Humidity (@ 25 ± 5°C) | H _{ST} | 10 | 90 | % RH | |
| Operating Ambient Humidity (@ 25 ± 5°C) | H _{OP} | 10 | 90 | % RH | |

Note 1. Exceeding the maximum values may cause improper operation or permanent damage to the unit.

4 ELECTRICAL CHARACTERISTICS

Standard: All the inputs to the HDMI boards operate in 3.3V standard, unless otherwise stated.

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | NOTE |
|---------------------------|------------------------|-----|------|------|------|-----------------|
| Supply Voltage for Module | VDD | 7.0 | 12.0 | 30.0 | V | From Power Jack |
| Current drawn from VDD | I _{VDD=7.0V} | 295 | 500 | 755 | mA | Note 1 |
| Current drawn from VDD | I _{VDD=12.0V} | 175 | 300 | 430 | mA | |
| Current drawn from VDD | I _{VDD=24.0V} | 95 | 155 | 220 | mA | |
| Current drawn from VDD | I _{VDD=30.0V} | 80 | 125 | 180 | mA | |
| Current drawn from USB-C | I _{USB-C} | 355 | 620 | 925 | mA | Note 1, Note 2 |

Note 1. Min. current was measured with BL brightness set to 0%,
Typ. current was measured with BL brightness set to 50%,
Max. current was measured with BL brightness set to 100%.

Note 2. USB-C interface can be used as a sole power supply for all modules with or without touch panels. If DC1 power jack is used, the power from the USB-C connector is not drawn, as the onboard MOSFET key cuts it off.

5 BACKLIGHT DRIVING CONDITIONS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | NOTE |
|-----------------------------|-----------------|-----|--------|------|-------|----------------|
| Backlight Power Consumption | W _{BL} | - | - | 2595 | mW | 100% backlight |
| Life Time | - | - | 50,000 | - | hours | Note 1 |

Note 1. Operating life means the period of time in which the LED brightness goes down to 50% of the initial brightness. Typical operating life time is the estimated parameter.

6 ELECTRO-OPTICAL CHARACTERISTICS

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 °C. The values specified are at an approximate distance 500mm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

| ITEM | | SYMBOL | CONDITION | MIN | TYP | MAX | UNIT | REMARK | NOTE |
|----------------------------|-------|-------------------|--|-------|-------|-------|-------------------|--------|------|
| Response Time | | Tr+Tf | $\theta=0^\circ$ $\Phi=0^\circ$ Ta=25 °C | - | 35 | - | ms | FIG 1. | 4 |
| Contrast Ratio | | Cr | | - | 800 | - | --- | FIG 2. | 1 |
| Luminance Uniformity | | δ WHITE | | - | 75 | - | % | FIG 2. | 3 |
| Surface Luminance | | Lv | | - | 800 | | cd/m ² | FIG 2. | 2 |
| Viewing Angle Range | | θ | $\Phi = 90^\circ$ | - | 85 | - | deg | FIG 3. | 6 |
| | | | $\Phi = 270^\circ$ | - | 85 | - | deg | FIG 3. | |
| | | | $\Phi = 0^\circ$ | - | 85 | - | deg | FIG 3. | |
| | | | $\Phi = 180^\circ$ | - | 85 | - | deg | FIG 3. | |
| CIE (x, y) Chromaticity | Red | x | $\theta=0^\circ$ $\Phi=0^\circ$ Ta=25 °C | 0.578 | 0.618 | 0.658 | FIG 2. | | 5 |
| | | y | | 0.489 | 0.329 | 0.369 | | | |
| | Green | x | | 0.376 | 0.416 | 0.456 | | | |
| | | y | | 0.493 | 0.533 | 0.573 | | | |
| | Blue | x | | 0.071 | 0.111 | 0.151 | | | |
| | | y | | 0.108 | 0.148 | 0.188 | | | |
| | White | x | | 0.270 | 0.310 | 0.350 | | | |
| | | y | | 0.290 | 0.330 | 0.370 | | | |

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

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

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

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

Note 3. The uniformity in surface luminance δ 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 Figure2. 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 calculate the 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 (x, y) chromaticity the test data is based on TOPCON's BM-5 photo detector.

Figure 1. The definition of response time

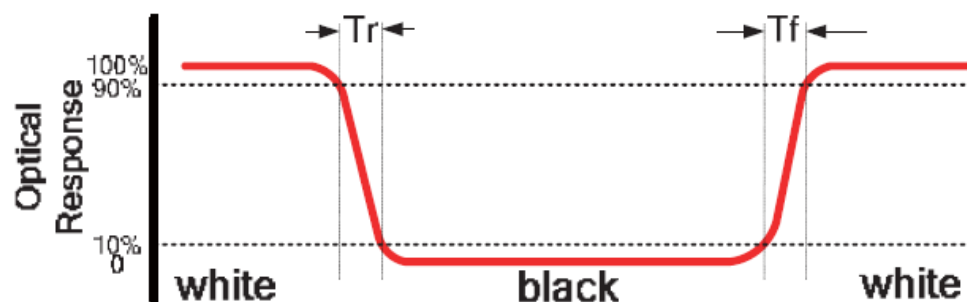


Figure 2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

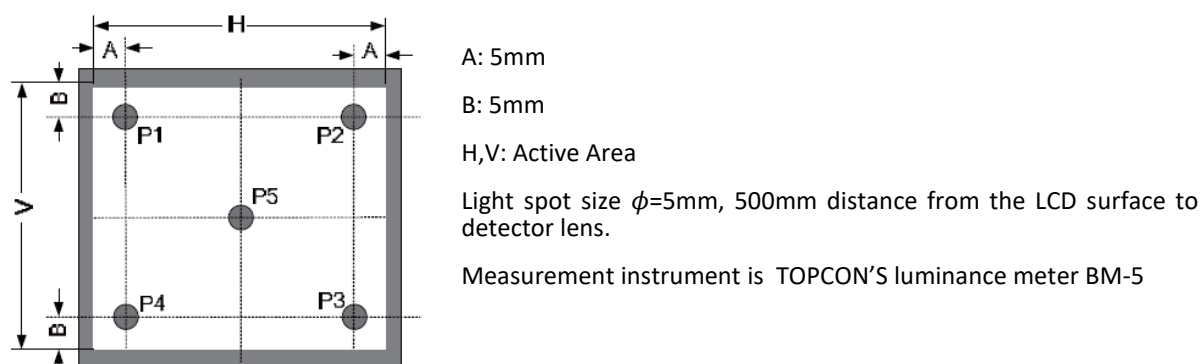
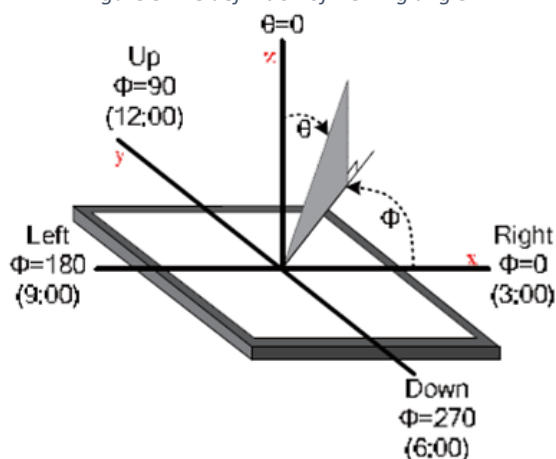


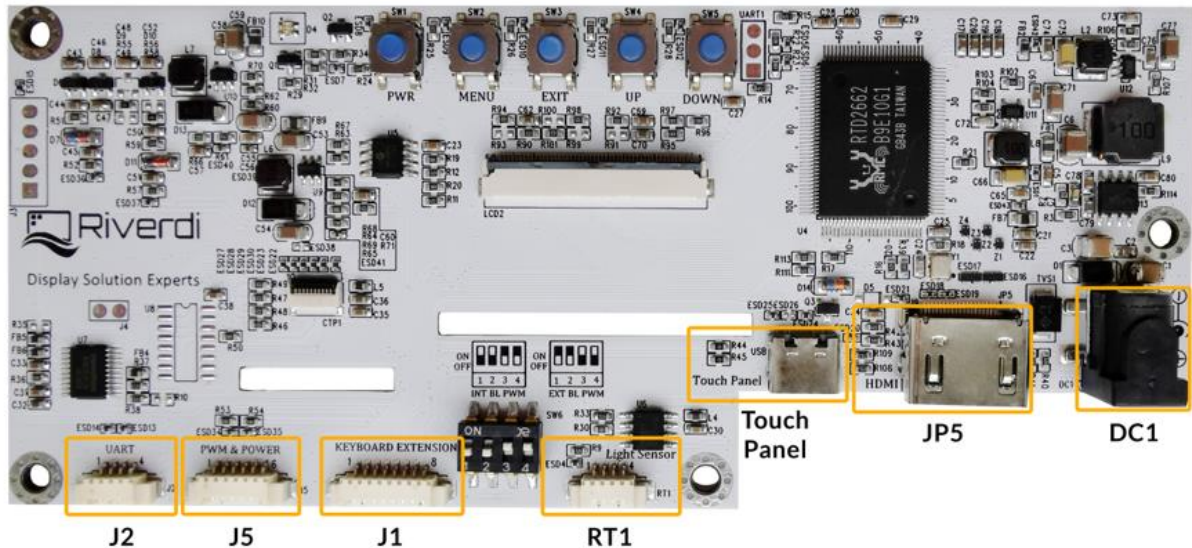
Figure 3. The definition of viewing angle



7 INTERFACE DESCRIPTION

7.1 PCB OVERVIEW

Picture below shows the connectors exact placement and their descriptions. The descriptions were extended for legibility reasons (table references).



| NAME | CONNECTOR | DESCRIPTION | NOTE |
|-------------|-----------------------------|--|----------------|
| DC1 | Power Jack | DC jack, (5.5 mm OD; 2.1mm ID) This is the connector to power on the TFT module. It allows DC for voltage range from 7.0V to 30.0V | |
| JP5 | HDMI Connector | This is the connector to which you can connect the HDMI signal source to the module. | |
| Touch Panel | USB-C | Touch panel interface and touch panel power supply. Only for versions with touch panel. It can be used as the power supply when the DC jack is not applied. | |
| RT1 | Light sensor connector | Molex 53261-0471; Horizontal, 1.25mm; 4 pins. To connect external light sensor. | Note 1. |
| J1 | External keyboard connector | Molex 53261-0871; Horizontal, 1.25mm; 8 pins. The connector is reserved for external keyboard. Performs the same functions: PWR, MENU, EXIT, UP, DOWN as the pushbuttons on PCB. | Note 1. |
| J5 | Backlight PWM & Power | Molex 53261-0671; Horizontal, 1.25mm; 6 pins. The unit realizes the function of digital dimming. This connector enables to control backlight PWM internally or externally. | Note 2. |
| J2 | UART | Molex 53261-0471; Horizontal, 1.25mm; 4 pins. It supports asynchronous serial communication UART port. | Note 3. |

Note 1. Light sensor and external keyboard are optional, not included in the standard completion.

Note 2. 4 position-DIP onboard switch **SW6** is used to choose the power to backlight. The settings are:

- INTERNAL BL PWM: Set 1&2 to OFF, and 3&4 to ON,
- EXTERNAL BL PWM: Set 1&2 to ON, and 3&4 to OFF.

Note 3. UART functionality is under development process and will be documented in next version of this datasheet.

7.2 Power connector -DC1

| PIN NO. | SYMBOL | DESCRIPTION |
|---------|--------|-----------------|
| 1 | VDD | Power supply DC |
| 2 | GND | GND |

7.3 HDMI connector-JP5

| PIN NO. | SYMBOL | DESCRIPTION |
|---------|--------------------|---------------------------------|
| 1 | TMDS Data 2+ | TMDS differential signal 2+ |
| 2 | TMDS Data2 Shield | Data2 shielding ground |
| 3 | TMDS Data 2- | TMDS differential signal 2- |
| 4 | TMDS Data 1+ | TMDS differential signal 1+ |
| 5 | TMDS Data1 Shield | Data1 shielding ground |
| 6 | TMDS Data 1- | TMDS differential signal 1- |
| 7 | TMDS Data 0+ | TMDS differential signal 0+ |
| 8 | TMDS Data 0 Shield | Data0 shielding ground |
| 9 | TMDS Data 0- | TMDS differential signal 0- |
| 10 | TMDS Data Clock+ | TMDS differential signal Clock+ |
| 11 | TMDS Data Shield | Clock shielding ground |
| 12 | TMDS Data Clock- | TMDS differential signal Clock- |
| 13 | CEC | Electronic protocol CEC |
| 14 | NC | No Connection |
| 15 | SCL | I ² C clock Line |
| 16 | SDA | I ² C data Line |
| 17 | DDC/CEC GND | Data display channel |
| 18 | +5V | HDMI 5V |
| 19 | Hot Plug Detect | Hot plug Detect |

7.4 Touch Panel connector- USB-C standard

| PIN NO. | SYMBOL | DESCRIPTION (Note 1) |
|---------|---------|---|
| A1 | USB_GND | USB_Ground |
| B12 | USB_GND | USB_Ground |
| A4 | V_BUS | V_Bus Power; 5V |
| B9 | V_BUS | V_Bus Power; 5V |
| A5 | CC1 | Configuration channel |
| A6 | DP1 | USB differential pair, position 1, positive |
| A7 | DN1 | USB differential pair, position 1, negative |
| A8 | SBU1 | Sideband use |
| B5 | CC2 | Configuration channel |
| B6 | DP2 | USB differential pair, position 2, positive |
| B7 | DN2 | USB differential pair, position 2, negative |
| B8 | SBU2 | Configuration channel |
| A9 | V_BUS | V_Bus Power; 5V |
| B4 | V_BUS | V_Bus Power; 5V |
| A12 | USB_GND | USB_Ground |
| B1 | USB_GND | USB_Ground |

Note 1: All the signals in Touch Panel connector are in accordance with USB-C standard.

7.5 Light sensor connector-RT1

| PIN NO. | SYMBOL | DESCRIPTION |
|---------|------------------|--|
| 1 | GND | Ground |
| 2 | ADC_IN | ADC Input from Light sensor (max 3.3 V, TBD) |
| 3 | NC | No connection |
| 4 | Light sensor VDD | Light sensor VDD, max. 3.3 V |

7.6 External Keyboard connector-J1

| PIN NO. | SYMBOL | DESCRIPTION |
|---------|--------------|----------------------------|
| 1 | Down | Page down |
| 2 | Up | Page up |
| 3 | Exit | Exit |
| 4 | Menu | Menu |
| 5 | PWR | Power on/off |
| 6 | LED_EN | LED Enable. Active H, 3.3V |
| 7 | Keyboard VDD | Keyboard VDD, max. 3.3 V |
| 8 | GND | Ground |

7.7 Backlight PWM &Power-J5

| PIN NO. | SYMBOL | DESCRIPTION (Note 1.) |
|---------|--------|-----------------------------|
| 1 | GND | Ground |
| 2 | GND | Ground |
| 3 | EN | Backlight enable, active H |
| 4 | PWM | PWM input (frequency - TBD) |
| 5 | VDD | Power supply (max. 30.0 V) |
| 6 | VDD | Power supply (max. 30.0 V) |

Note 1. 4 position-DIP onboard switch **SW6** is used to choose the power source to backlight. The settings are:

- INTERNAL BL PWM: Set 1&2 to OFF, and 3&4 to ON,
- EXTERNAL BL PWM: Set 1&2 to ON, and 3&4 to OFF.

7.8 UART connector-J2

| PIN NO. | SYMBOL | DESCRIPTION (Note 1.) |
|---------|--------|-----------------------|
| 1 | GND | Ground |
| 2 | RXD | Receive Data |
| 3 | TXD | Transmit Data |
| 4 | VDD | UART VDD 3.3V |

Note 1. UART functionality is under development process and will be documented in next version of this datasheet.

8 DISPLAY SPECIFICATION

8.1 TFT resolution

The supported resolution of the display in this module is 1024*600.

8.2 Full TFT specification

For detailed information on the display used, please refer to datasheet of display RVT70HSTNWCA0.

9 CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

9.1 Mechanical characteristics

| DESCRIPTION | SPECIFICATION | REMARK |
|--------------------------|-----------------------|--------|
| Touch Panel Size | 7.0 inch | aTouch |
| Outline Dimension of CTP | 164.90 mm x 100.00 mm | aTouch |
| Product Thickness | 2.45 mm | aTouch |
| Glass Thickness | 1.1 mm | aTouch |
| CTP View Area | 115.08 mm x 87.42 mm | aTouch |
| Sensor Active Area | 156.68 mm x 88.52 mm | aTouch |
| Structure type | Glass + Glass | aTouch |
| Surface Hardness | 7H | aTouch |

9.2 Electrical characteristics

| DESCRIPTION | SPECIFICATION | NOTE |
|-------------------------|---------------|-------|
| Power Consumption (IDD) | Active Mode | 96 mA |
| | Sleep Mode | 10 mA |
| Linearity | +/- 1.5 mm | |
| Controller | ILI2132A | |
| Resolution | 1024 x 600 | |

Note 1. These 2 values will be verified on the real samples.

10 INSPECTION

Standard acceptance/rejection criteria for TFT module.

10.1 Inspection condition

Ambient conditions:

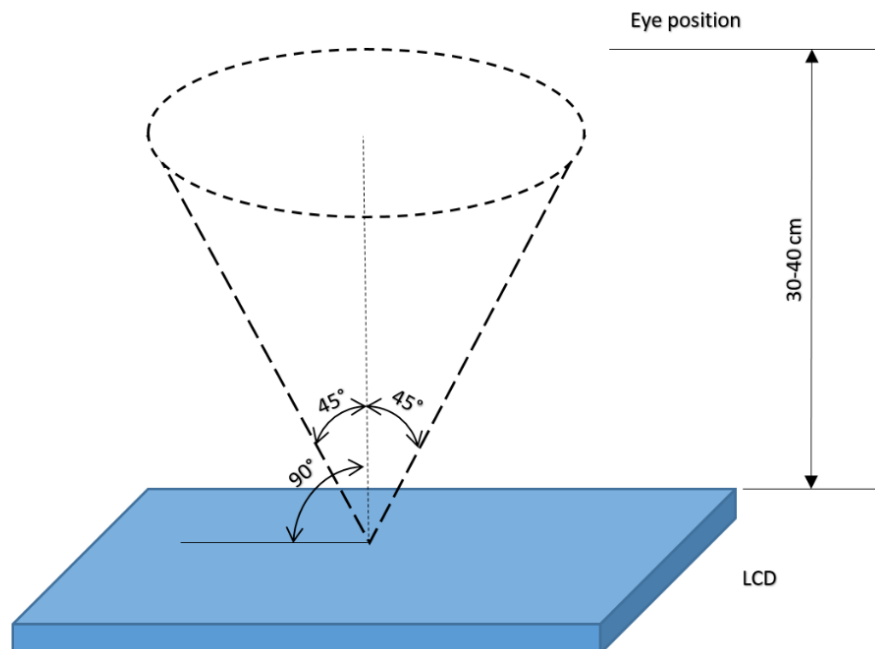
- Temperature: 25 ± 2 °C
- Humidity: (60 ± 10) %RH
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

Viewing distance:

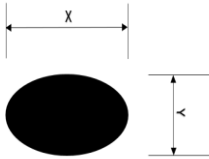
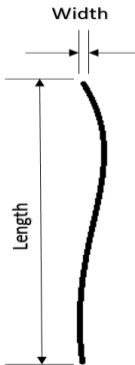
35 ± 5 cm between inspector bare eye and LCD.

Viewing Angle:

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



10.2 Inspection standard

| Item | Criterion | | | | | | | | | | | | | | | |
|--|---|---------------|--|------------------|---------------|-------------------------|---------------|--|---------------|----------------------------|--------------|---------------------|---|-----------|------------|-------------|
| Black spots, white spots, light leakage, Foreign Particle (round Type) | <div><div>$D = \frac{(x + y)}{2}$</div><div><table><tr><th colspan="2">Size = 7"</th></tr><tr><th>Average Diameter</th><th>Qualified Qty</th></tr><tr><td>$D \leq 0.2 \text{ mm}$</td><td>Ignored</td></tr><tr><td>$0.2 \text{ mm} < D \leq 0.3 \text{ mm}$</td><td>$N \leq 3$</td></tr><tr><td>$0.5\text{mm} < D$</td><td>Not allowed</td></tr></table></div></div> <p>*Spots density: 10 mm</p> | Size = 7" | | Average Diameter | Qualified Qty | $D \leq 0.2 \text{ mm}$ | Ignored | $0.2 \text{ mm} < D \leq 0.3 \text{ mm}$ | $N \leq 3$ | $0.5\text{mm} < D$ | Not allowed | | | | | |
| Size = 7" | | | | | | | | | | | | | | | | |
| Average Diameter | Qualified Qty | | | | | | | | | | | | | | | |
| $D \leq 0.2 \text{ mm}$ | Ignored | | | | | | | | | | | | | | | |
| $0.2 \text{ mm} < D \leq 0.3 \text{ mm}$ | $N \leq 3$ | | | | | | | | | | | | | | | |
| $0.5\text{mm} < D$ | Not allowed | | | | | | | | | | | | | | | |
| LCD black spots, white spots, light leakage (line Type) | <div><div></div><div><table><tr><th colspan="3">Size = 7"</th></tr><tr><th>Length</th><th>Width</th><th>Qualified Qty</th></tr><tr><td>-</td><td>$W \leq 0.05$</td><td>Ignored</td></tr><tr><td>$L \leq 5.0$</td><td>$0.05 < W \leq 0.1$</td><td>3</td></tr><tr><td>$5.0 < L$</td><td>$0.10 < W$</td><td>Not allowed</td></tr></table></div></div> <p>*Spots density: 10 mm</p> | Size = 7" | | | Length | Width | Qualified Qty | - | $W \leq 0.05$ | Ignored | $L \leq 5.0$ | $0.05 < W \leq 0.1$ | 3 | $5.0 < L$ | $0.10 < W$ | Not allowed |
| Size = 7" | | | | | | | | | | | | | | | | |
| Length | Width | Qualified Qty | | | | | | | | | | | | | | |
| - | $W \leq 0.05$ | Ignored | | | | | | | | | | | | | | |
| $L \leq 5.0$ | $0.05 < W \leq 0.1$ | 3 | | | | | | | | | | | | | | |
| $5.0 < L$ | $0.10 < W$ | Not allowed | | | | | | | | | | | | | | |
| Bright/Dark Dots | <table><tr><th colspan="2">Size = 7"</th></tr><tr><th>Item</th><th>Qualified Qty</th></tr><tr><td>Bright Dots</td><td>$N \leq 2$</td></tr><tr><td>Dark Dots</td><td>$N \leq 3$</td></tr><tr><td>Total Bright and Dark Dots</td><td>$N \leq 4$</td></tr></table> | Size = 7" | | Item | Qualified Qty | Bright Dots | $N \leq 2$ | Dark Dots | $N \leq 3$ | Total Bright and Dark Dots | $N \leq 4$ | | | | | |
| Size = 7" | | | | | | | | | | | | | | | | |
| Item | Qualified Qty | | | | | | | | | | | | | | | |
| Bright Dots | $N \leq 2$ | | | | | | | | | | | | | | | |
| Dark Dots | $N \leq 3$ | | | | | | | | | | | | | | | |
| Total Bright and Dark Dots | $N \leq 4$ | | | | | | | | | | | | | | | |

| Item | Criterion | | | | | | | | | | | | | | | | | | |
|--------------------------------|--|-----------------|---------------|--|------------------|-------|---------------|-------------|----------|---------|----------------------|-----------------|---|---------------------|----------|---|------------|--|---|
| Clear spots | <table><tr><th colspan="3">Size >= 5"</th></tr><tr><td colspan="2">Average Diameter</td><td>Qualified Qty</td></tr><tr><td colspan="2">D < 0.2 mm</td><td>Ignored</td></tr><tr><td colspan="2">0.2 mm < D < 0.3 mm</td><td>4</td></tr><tr><td colspan="2">0.3 mm < D < 0.5 mm</td><td>2</td></tr><tr><td colspan="2">0.5 mm < D</td><td>0</td></tr></table> | Size >= 5" | | | Average Diameter | | Qualified Qty | D < 0.2 mm | | Ignored | 0.2 mm < D < 0.3 mm | | 4 | 0.3 mm < D < 0.5 mm | | 2 | 0.5 mm < D | | 0 |
| | Size >= 5" | | | | | | | | | | | | | | | | | | |
| | Average Diameter | | Qualified Qty | | | | | | | | | | | | | | | | |
| | D < 0.2 mm | | Ignored | | | | | | | | | | | | | | | | |
| | 0.2 mm < D < 0.3 mm | | 4 | | | | | | | | | | | | | | | | |
| | 0.3 mm < D < 0.5 mm | | 2 | | | | | | | | | | | | | | | | |
| | 0.5 mm < D | | 0 | | | | | | | | | | | | | | | | |
| *Spots density: 10 mm | | | | | | | | | | | | | | | | | | | |
| Polarizer bubbles | <table><tr><th colspan="3">Size = 7.0"</th></tr><tr><td colspan="2">Average Diameter</td><td>Qualified Qty</td></tr><tr><td colspan="2">D ≤ 0.2 mm</td><td>Ignored</td></tr><tr><td colspan="2">0.2 mm < D ≤ 0.5 mm</td><td>2</td></tr><tr><td colspan="2">0.5 mm < D</td><td>1</td></tr></table> | Size = 7.0" | | | Average Diameter | | Qualified Qty | D ≤ 0.2 mm | | Ignored | 0.2 mm < D ≤ 0.5 mm | | 2 | 0.5 mm < D | | 1 | | | |
| | Size = 7.0" | | | | | | | | | | | | | | | | | | |
| | Average Diameter | | Qualified Qty | | | | | | | | | | | | | | | | |
| | D ≤ 0.2 mm | | Ignored | | | | | | | | | | | | | | | | |
| | 0.2 mm < D ≤ 0.5 mm | | 2 | | | | | | | | | | | | | | | | |
| 0.5 mm < D | | 1 | | | | | | | | | | | | | | | | | |
| Touch panel spots | <table><tr><th colspan="3">Size >= 5"</th></tr><tr><td colspan="2">Average Diameter</td><td>Qualified Qty</td></tr><tr><td colspan="2">D < 0.25 mm</td><td>Ignored</td></tr><tr><td colspan="2">0.25 mm < D < 0.5 mm</td><td>4</td></tr><tr><td colspan="2">0.5 mm < D</td><td>0</td></tr></table> | Size >= 5" | | | Average Diameter | | Qualified Qty | D < 0.25 mm | | Ignored | 0.25 mm < D < 0.5 mm | | 4 | 0.5 mm < D | | 0 | | | |
| | Size >= 5" | | | | | | | | | | | | | | | | | | |
| | Average Diameter | | Qualified Qty | | | | | | | | | | | | | | | | |
| | D < 0.25 mm | | Ignored | | | | | | | | | | | | | | | | |
| | 0.25 mm < D < 0.5 mm | | 4 | | | | | | | | | | | | | | | | |
| 0.5 mm < D | | 0 | | | | | | | | | | | | | | | | | |
| Touch panel White line Scratch | <table><tr><th colspan="3">Size >= 5"</th></tr><tr><td>Length</td><td>Width</td><td>Qualified Qty</td></tr><tr><td>-</td><td>W < 0.03</td><td>Ignored</td></tr><tr><td>L < 5.0</td><td>0.03 < W < 0.05</td><td>2</td></tr><tr><td>-</td><td>0.05 < W</td><td>0</td></tr></table> | Size >= 5" | | | Length | Width | Qualified Qty | - | W < 0.03 | Ignored | L < 5.0 | 0.03 < W < 0.05 | 2 | - | 0.05 < W | 0 | | | |
| | Size >= 5" | | | | | | | | | | | | | | | | | | |
| | Length | Width | Qualified Qty | | | | | | | | | | | | | | | | |
| | - | W < 0.03 | Ignored | | | | | | | | | | | | | | | | |
| | L < 5.0 | 0.03 < W < 0.05 | 2 | | | | | | | | | | | | | | | | |
| - | 0.05 < W | 0 | | | | | | | | | | | | | | | | | |

11 RELIABILITY TEST

| NO. | TEST ITEM | TEST CONDITION | REMARK |
|-----|-------------------------------------|---|--------|
| 1 | High Temperature Storage | 80 °C / 120 hours | Note 1 |
| 2 | Low Temperature Storage | -30 °C / 120 hours | Note 1 |
| 3 | High Temperature Operating | 70 °C / 120 hours | Note 1 |
| 4 | Low Temperature Operating | -20 °C / 120 hours | Note 1 |
| 5 | High Temperature & High Humidity | Humidity 40 °C, 90 %RH, 120 hours | Note 1 |
| 6 | Thermal Cycling Test (No operation) | -20 °C for 30 min, 70 °C for 30 min. 100 cycles. Then test at room temperature after 1 hour | Note 2 |
| 7 | Damp Proof Test | 40 °C, 90 %RH/120 hours | |
| 8 | Vibration Test | Frequency: 10 ÷ 55 Hz; Stroke: 1.5 mm; Sweep: 10 Hz ÷ 55 Hz ÷ 10 Hz; 2 hours for each direction of X, Y, Z (6 hours for total) | |
| 9 | Package Drop Test | Height: 60 cm 1 corner, 3 edges, 6 surfaces | |
| 10 | ESD Test | Air: ±2 kV, human body mode, 100 pF /1500 Ω | |

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

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

12 LEGAL INFORMATION

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