



RVT101HVLFWCA0

HB,IPS LVDS 10.1" LCD TFT DATASHEET

Rev.1.2

2023-01-19

| ITEM | CONTENTS | UNIT |
|--------------------------------|---------------------------------------|-------------------|
| LCD Type | TFT/Transmissive/Normally Black/IPS | / |
| Size | 10.1 | Inch |
| Viewing Direction | Free | / |
| Outside Dimensions (W x H x D) | 246.66 x 151.30 x 9.85 | mm |
| Active Area (W x H) | 216.96 x 135.60 | mm |
| Pixel Pitch (W x H) | 0.1695 x 0.1695 | mm |
| Resolution | 1280 x 800 (RGB) | / |
| Brightness | 800 | cd/m ² |
| Color Depth | 16.7 M | / |
| Pixel Arrangement | RGB Vertical Stripe | / |
| LCD Driver | EK79202B | / |
| Interface | LVDS | / |
| With/Without Touch | With Projected Capacitive Touch Panel | / |
| CTP Driver | ILI2132A | / |
| Weight | 650 | g |

Note 1. RoHS3 compliant

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



1. REVISION RECORD

| REV NO. | REV DATE | CONTENTS | REMARKS | | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------------|---|-------------------|-----------------------|---|----|----|-----------------|-----------------|---|---|----|-------------------|-----------------------|---|-----|-----|-----------------|-----------------|---|----|-----|--|
| 1.0 | 2021-07-22 | Initial Release | | | | | | | | | | | | | | | | | | | | | |
| 1.1 | 2021-09-09 | Correcting the Operating/standby current From: <table border="1" style="margin-left: 20px;"> <tr> <td>Operating Current</td> <td>I_{VDD=3.3V}</td> <td>-</td> <td>15</td> <td>20</td> </tr> <tr> <td>Standby Current</td> <td>I_{ST}</td> <td>-</td> <td>-</td> <td>25</td> </tr> </table> To: <table border="1" style="margin-left: 20px;"> <tr> <td>Operating Current</td> <td>I_{VDD=3.3V}</td> <td>-</td> <td>280</td> <td>420</td> </tr> <tr> <td>Standby Current</td> <td>I_{ST}</td> <td>-</td> <td>15</td> <td>2.0</td> </tr> </table> | Operating Current | I _{VDD=3.3V} | - | 15 | 20 | Standby Current | I _{ST} | - | - | 25 | Operating Current | I _{VDD=3.3V} | - | 280 | 420 | Standby Current | I _{ST} | - | 15 | 2.0 | |
| Operating Current | I _{VDD=3.3V} | - | 15 | 20 | | | | | | | | | | | | | | | | | | | |
| Standby Current | I _{ST} | - | - | 25 | | | | | | | | | | | | | | | | | | | |
| Operating Current | I _{VDD=3.3V} | - | 280 | 420 | | | | | | | | | | | | | | | | | | | |
| Standby Current | I _{ST} | - | 15 | 2.0 | | | | | | | | | | | | | | | | | | | |
| 1.2 | 2023-01-19 | Modify DE signal: Active High | | | | | | | | | | | | | | | | | | | | | |



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3. MODULE CLASSIFICATION INFORMATION

| RV | T | 101 | H | V | L | F | W | C | A0 |
|----|----|-----|----|----|----|----|----|----|-----|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |

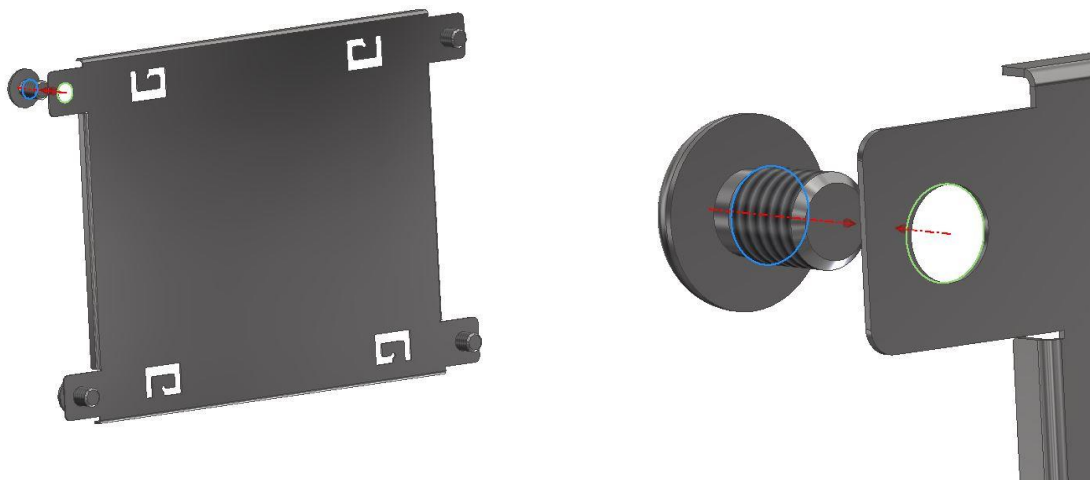
| NO. | PARAMETER | SYMBOL |
|-----|------------------|---------------------------------|
| 1. | BRAND | RV – Riverdi |
| 2. | PRODUCT TYPE | T – TFT Standard |
| 3. | DISPLAY SIZE | 101 – 10.1" |
| 4. | MODEL SERIAL NO. | H – High Brightness, IPS |
| 5. | RESOLUTION | V – 1280 x 800 px |
| 6. | INTERFACE | 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

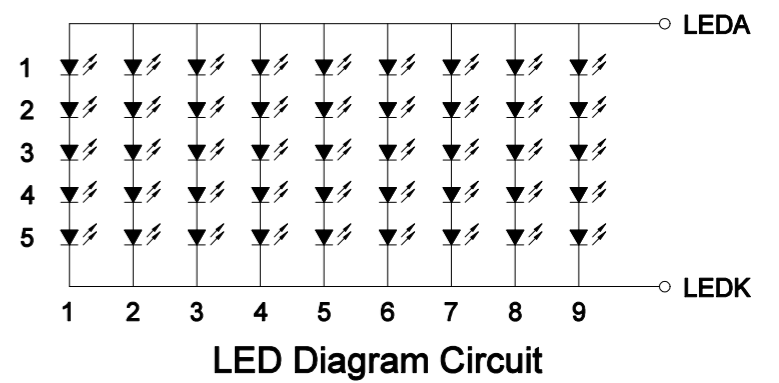
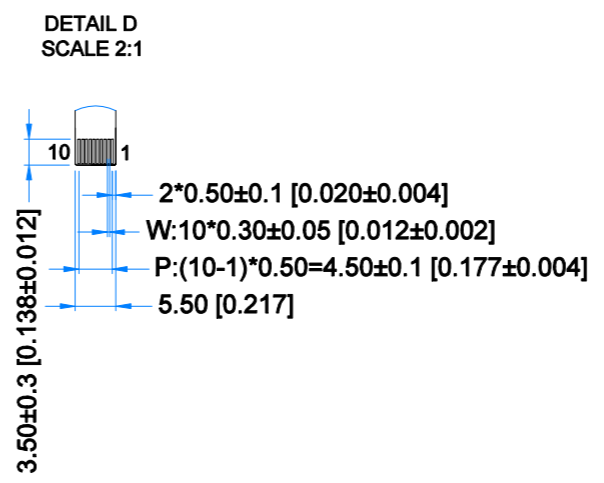
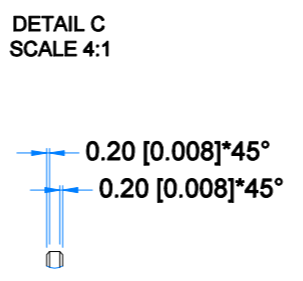
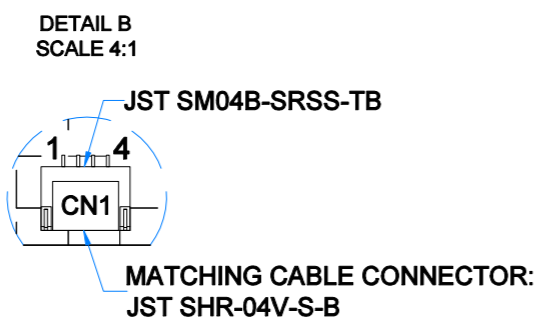
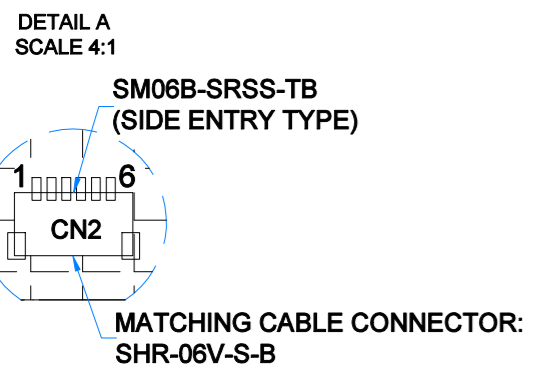
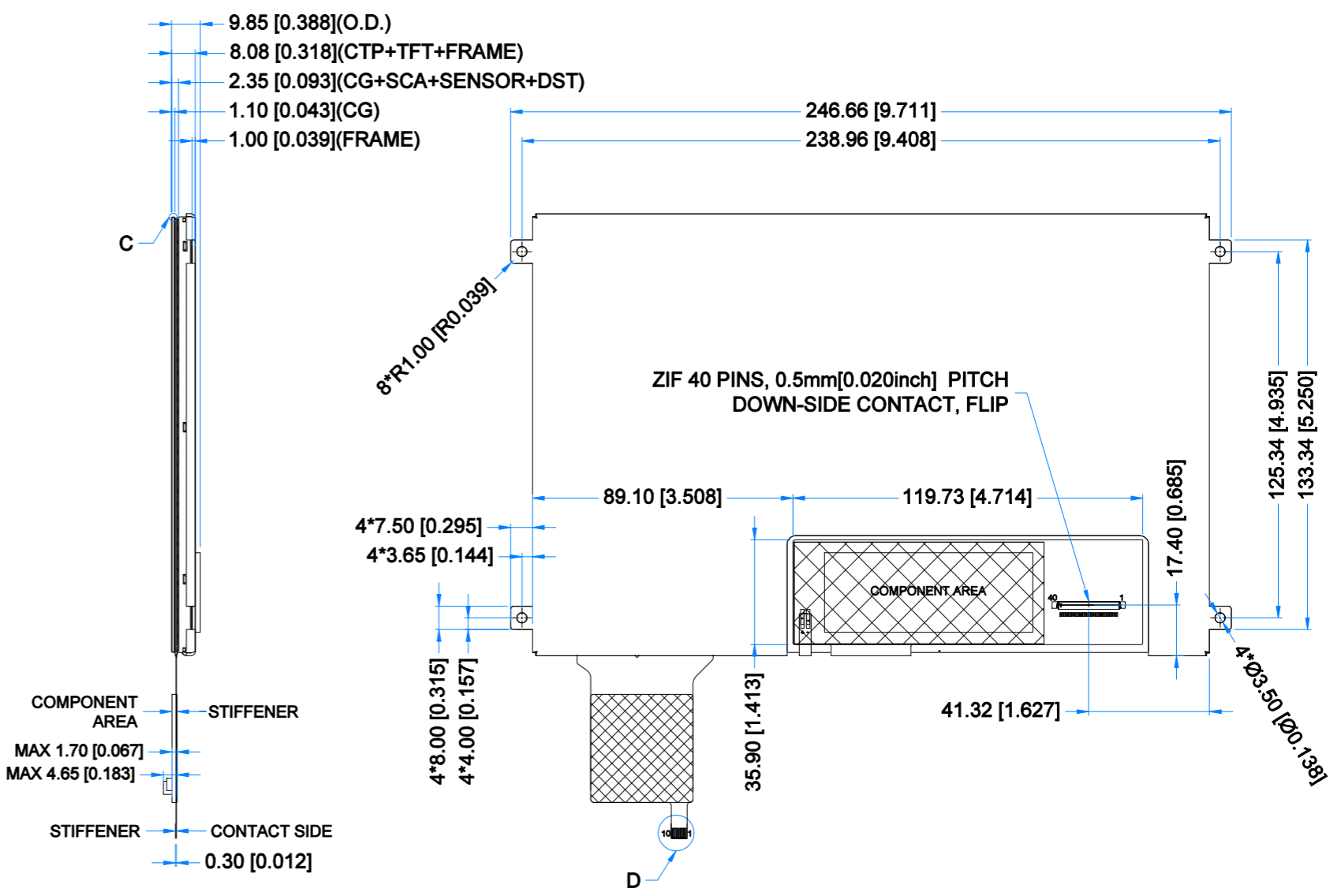
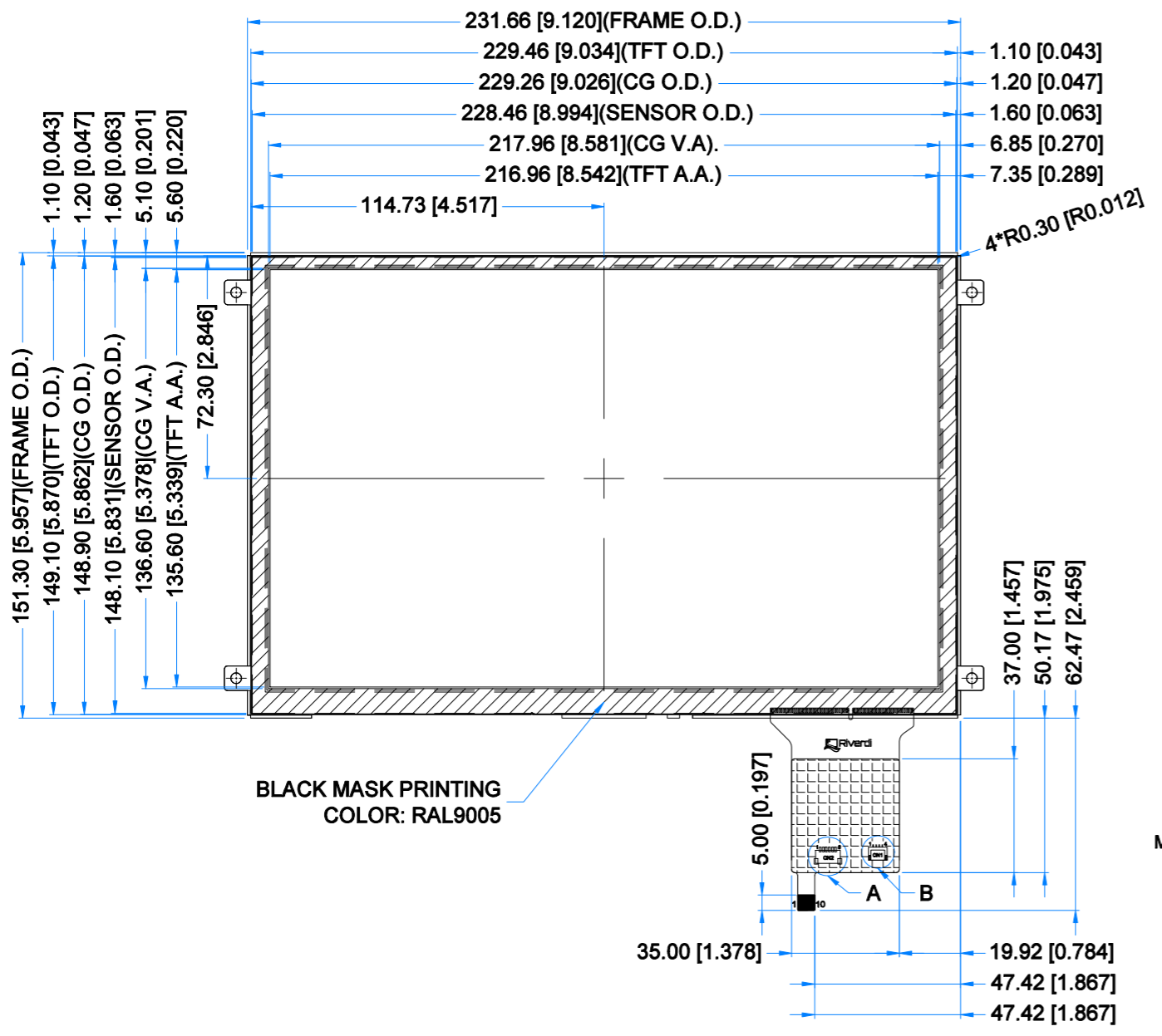
4.1 Mounting frame

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



| | | |
|-----------|--------------|------------|
| Revision: | Changes: | Date: |
| 1.0 | Initial Case | 2021.07.08 |



TFT NOTES:

- LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
- RESOLUTION: 1280x800
- VIEWING ANGLE: FREE
- DRIVING VOLTAGE: 3.3V
- BACKLIGHT: 45 LEDs, $V_f=16.0V(TYP.)$, $I_f=360mA$
- ZERO BAD PIXEL

TP NOTES:

- TP STRUCTURE: G+G
- CG THICKNESS: 1.10mm
- SURFACE HARDNESS: 7H
- DRIVER IC: ILI2132A
- INTERFACE: USB; I2C; OPTIONAL UART
- OPERATING VOLTAGE: 3.3V(CTP I2C); 5.0V(CTP USB);

GENERAL NOTES:

- MODULE SURFACE LUMINANCE: 800 cd/m²
- OPERATING TEMPERATURE: -20°C ~ 70°C
- STORAGE TEMPERATURE: -30°C ~ 80°C
- WITHOUT INDIVIDUAL TOLERANCE: ±0.3mm [0.012inch]
- RoHS COMPLIANT

| |
|---------------------|
| PN: RVT101HVLFWCA0 |
| SN: |
| DRAWN: M.Natywa |
| CHECKED: K.Brodacka |
| APPR: |



| | | |
|------------|-----------|--|
| 2021.07.08 | 1:2.04 | |
| 2021.07.14 | [mm] | |
| ISO A3 | P. 1 of 1 | |



6. ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT |
|---------------------------|-----------------|------|-----|------|
| Supply Voltage for Module | VDD | -0.3 | 3.9 | V |
| Operating Temperature | T _{OP} | -20 | 70 | °C |
| Storage Temperature | T _{ST} | -30 | 80 | |

Note1. The absolute maximum rating values must not be exceeded at any times. The module MUST NOT be used when any of the absolute maximum ratings is exceeded.

The characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

7. ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|-------------------|-----------------------|-----|-----|-----|------|
| Supply Voltage | V _{DD} | 2.6 | 3.3 | 3.6 | V |
| Operating Current | I _{VDD=3.3V} | - | 280 | 420 | mA |
| Standby Current | I _{ST} | - | 1.5 | 2.0 | mA |

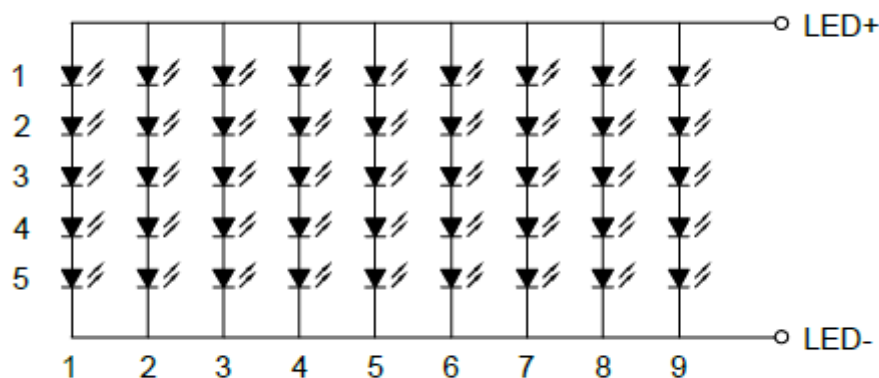
8. BACKLIGHT ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | NOTE |
|-----------------------------|-----------------|------|--------|------|-------|--------|
| Backlight Driving Voltage | V _F | 15.0 | 16.0 | 17.0 | V | |
| Backlight Driving Current | I _F | 315 | 360 | 405 | mA | Note 1 |
| Backlight Power Consumption | W _{BL} | - | 5760 | - | mW | |
| LED Lifetime | - | - | 50,000 | - | hours | |

Note 1. Each LED: I_F =40 mA, V_F=3.2 ±0.2V.

Note 2. Optical performance should be evaluated at T_a=25 °C only.

Note 3. Operating life means the period in which the LED brightness goes down to 50% of the initial brightness. Typical operating lifetime is the estimated parameter.



LED Diagram Circuit

9. ELECTRO-OPTICAL CHARACTERISTICS

| ITEM | SYMBOL | CONDITION | MIN | TYP | MAX | UNIT | RMK | NOTE |
|-------------------------|----------------|---|------|------|------|-------------------|--------|------|
| Response Time | Tr+Tf | $\theta=0^\circ$ $\varnothing=0^\circ$ Ta=25 °C | - | 25 | 35 | ms | FIG 2. | 4 |
| Contrast Ratio | Cr | | 800 | 1000 | - | --- | FIG 3 | 1 |
| Luminance Uniformity | δ WHITE | | - | 75 | - | % | | 3 |
| Surface Luminance | Lv | | - | 800 | - | cd/m ² | | 2 |
| Viewing Angle Range | θ | $\varnothing = 90^\circ$ | 75 | 85 | - | deg | FIG 4. | 6 |
| | | $\varnothing = 270^\circ$ | 75 | 85 | - | deg | | |
| | | $\varnothing = 0^\circ$ | 75 | 85 | - | deg | | |
| | | $\varnothing = 180^\circ$ | 75 | 85 | - | deg | | |
| CIE (x, y) Chromaticity | Rx | $\theta=0^\circ$ $\varnothing=0^\circ$ Ta=25 °C | 0.22 | 0.26 | 0.30 | - | FIG 3. | 5 |
| | Ry | | 0.20 | 0.24 | 0.28 | - | | |
| | Gx | | 0.34 | 0.38 | 0.42 | - | | |
| | Gy | | 0.50 | 0.54 | 0.58 | - | | |
| | Bx | | 0.10 | 0.14 | 0.18 | - | | |
| | By | | 0.09 | 0.13 | 0.17 | - | | |
| | Wx | | 0.28 | 0.32 | 0.36 | - | | |
| | Wy | | 0.29 | 0.33 | 0.37 | - | | |

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 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 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 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 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

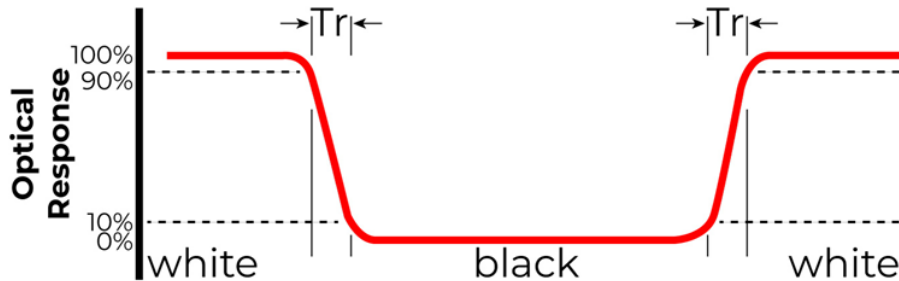


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

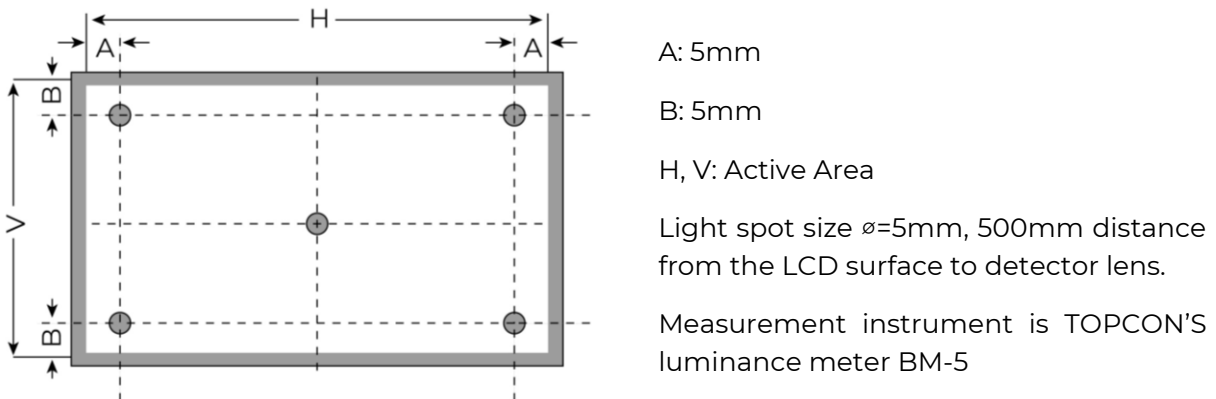
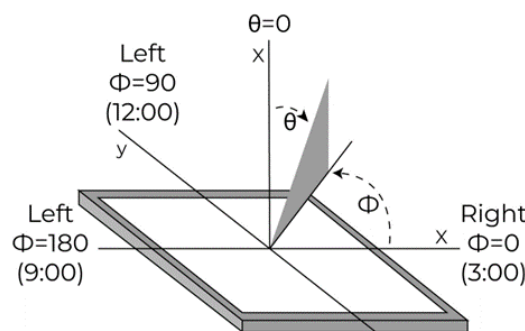


Figure 4. The definition of viewing angle





10. INTERFACES DESCRIPTION

10.1 TFT assignment

Matched Riverdi ZIF connector: ZIF0540DH-CF25

| PIN NO. | SYMBOL | I/O | DESCRIPTION |
|---------|-----------------|-----|-------------------------------|
| 1 | NC | - | No Connection |
| 2 | V _{DD} | P | Power Supply, 3.3V |
| 3 | V _{DD} | P | Power Supply, 3.3V |
| 4-6 | NC | - | No Connection |
| 7 | GND | P | Ground |
| 8 | Rxin0- | I | -LVDS Differential Data Input |
| 9 | Rxin0+ | 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 | RxCLK- | I | -LVDS Differential Data Input |
| 18 | RxCLK+ | I | +LVDS Differential Data Input |
| 19 | GND | P | Ground |
| 20 | Rxin3- | I | -LVDS Differential Data Input |
| 21 | Rxin3+ | I | +LVDS Differential Data Input |
| 22 | GND | P | Ground |
| 23 | NC | - | No Connection |
| 24 | NC | - | No Connection |
| 25 | GND | P | Ground |
| 26-29 | NC | - | No Connection |
| 30 | GND | P | Ground |
| 31 | LED- | P | LED Cathode |
| 32 | LED- | P | LED Cathode |
| 33 | NC | - | No Connection |
| 34 | NC | - | No Connection |
| 35 | NC | - | No Connection |
| 36 | NC | - | No Connection |
| 37 | NC | - | No Connection |
| 38 | NC | - | No Connection |
| 39 | LED+ | P | LED Anode |
| 40 | LED+ | P | LED Anode |

Note 1. I: input, P: Power



10.2 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 | Note 2 |
| 8 | I2C_SCL | I2C _Clock Input | |
| 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.

10.3 CON1 assignment

Matched PCAP USB programming 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.

10.4 CON2 assignment

| PIN NO. | SYMBOL | DESCRIPTION | |
|---------|---------|--|--------|
| 1 | I2C_GND | I2C _Ground | |
| 2 | I2C_VDD | I2C _Power for CTP, 3.3 V | |
| 3 | I2C_RST | I2C _Reset Pin, Active low | Note 1 |
| 4 | I2C_SCL | I2C _Clock Input | |
| 5 | I2C_INT | I2C _Interrupt Signal from CTP, Active low | |
| 6 | I2C_SDA | I2C _Data Signal | |

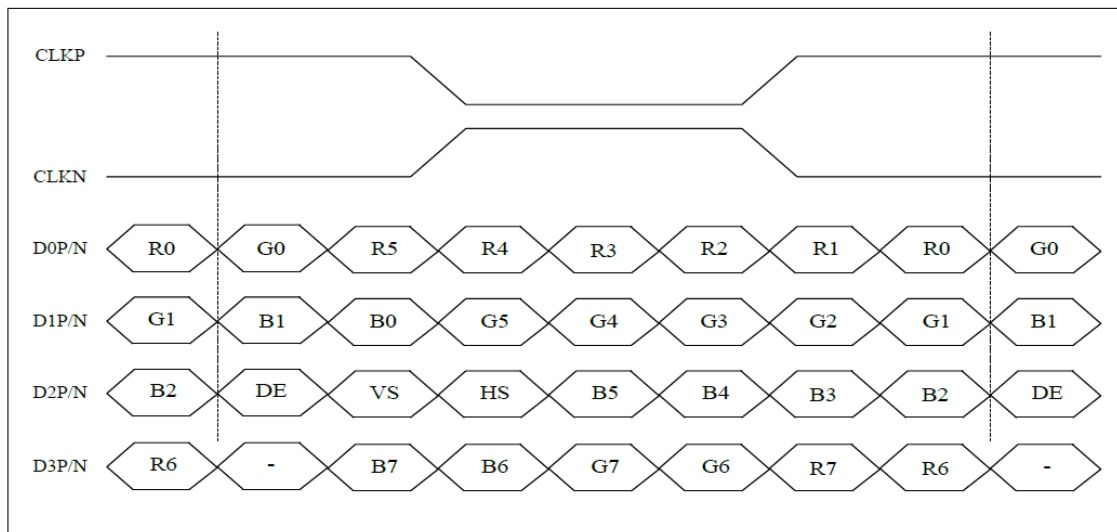
Note 1. External pull-up resistors are required.



11. TIMING CHARACTERISTICS

11.1 LVDS interface characteristic

VESA Format: 8-bit LVDS input, (LVBIT=H, LVFMT=H)



Note 1. Control signals : DE: Active High VS HS: Active Low

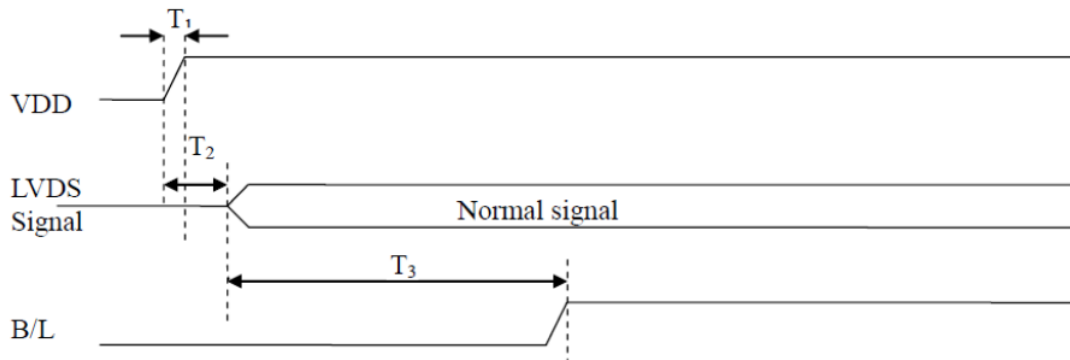
11.2 Timing table

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|-------------------------------------|-----------|------|------|------|------|
| Clock Frequency (Rate=60Hz (LVDS)) | FDCLK | 66.3 | 72.4 | 78.9 | MHz |
| HSYNC Period Time | T_H | 1380 | 1440 | 1500 | DCLK |
| Horizontal Display area | T_{HD} | 1280 | | | DCLK |
| Hsync pulse Width | T_{HPW} | 1 | - | 40 | Tc |
| Hsync Back Porch (With pulse width) | T_{HBP} | 88 | 88 | 88 | DCLK |
| Hsync Front Porch | T_{HFP} | 12 | 72 | 132 | DCLK |
| VSYNC Period Time | T_V | 824 | 838 | 872 | H |
| Vertical Display area | T_{VD} | 800 | | | |
| Vsync pulse Width | T_{VW} | 1 | - | 20 | |
| Vsync Back Porch (With pulse width) | T_{VBP} | 23 | 23 | 23 | |
| Vsync Front Porch | T_{VFP} | 1 | 15 | 49 | |



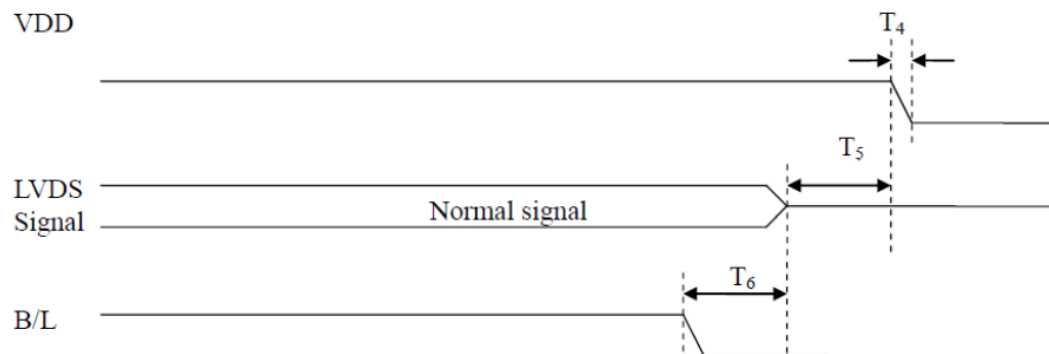
11.3 Power ON/OFF sequence

11.3.1 Power on sequence



| PARAMETER | VALUE | | | UNIT |
|-----------|-------|------|------|------|
| | MIN. | TYP. | MAX. | |
| T1 | 0.5 | 2 | 10 | ms |
| T2 | 0 | 5 | 50 | |
| T3 | 130 | 136 | 210 | |

11.3.2 Power off sequence



| PARAMETER | VALUE | | | UNIT |
|-----------|-------|------|------|------|
| | MIN. | TYP. | MAX. | |
| T4 | 0.5 | 2 | 10 | ms |
| T5 | 0 | 7 | 50 | |
| T6 | 0 | 2 | 100 | |



12. CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

12.1 Mechanical characteristics

| DESCRIPTION | SPECIFICATION | REMARK |
|--------------------------|-----------------------|--------|
| Touch Panel Size | 10.1 inch | aTouch |
| Outline Dimension of CTP | 229.26 mm x 148.90 mm | |
| Product Thickness | 2.35 mm | |
| Glass Thickness | 1.1 mm | |
| CTP View Area | 217.96 mm x 136.60 mm | |
| Sensor Active Area | 218.96 mm x 137.60 mm | |
| Structure Type | Glass + Glass | |
| Surface Hardness | 7H | |

12.2 Electrical characteristics

| DESCRIPTION | SPECIFICATION | REMARK |
|-------------------------|---------------|--------|
| Power Consumption (IDD) | Active Mode | 90 mA |
| | Sleep Mode | 10 mA |
| Linearity | +/- 1.5mm | |
| Controller | ILI2132A | |
| Resolution | 1280 x 800 | |

13. INSPECTION

Standard acceptance/rejection criteria for TFT module

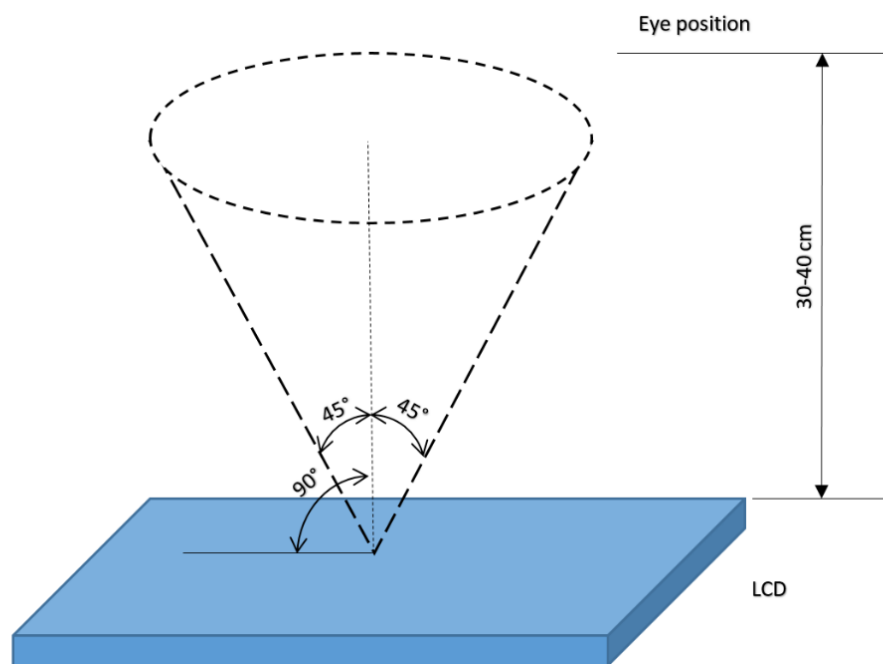
13.1 Inspection condition

Ambient conditions:

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

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

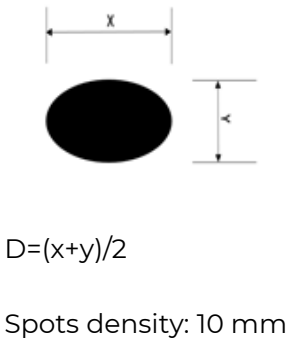

Viewing Angle: U/D: $45^{\circ}/45^{\circ}$, L/R: $45^{\circ}/45^{\circ}$





13.2 Inspection standard

The LCD TFT has zero bad pixels. Please refer the item “Bright/Dark dots”.

| ITEM | | CRITERION | | |
|--|--|----------------------------------|-------------------------|---------------|
| Black spots, white spots, light leakage, Foreign Particle (round Type) |  <p>$D=(x+y)/2$ Spots density: 10 mm</p> | Size = 10.1" | | |
| | | Average Diameter | Qualified Qty | |
| | | $D \leq 0.2$ mm | Ignored | |
| | | $0.2 \text{ mm} < D \leq 0.3$ mm | $N \leq 4$ | |
| | | $0.5 \text{ mm} < D$ | Not allowed | |
| LCD black spots, white spots, light leakage (line Type) |  <p>Spots density: 10 mm</p> | Size = 10.1" | | |
| | | Length | Width | Qualified Qty |
| | | - | $W \leq 0.05$ | Ignored |
| | | $L \leq 5.0$ | $0.05 < W \leq 0.1$ | $N \leq 3$ |
| | | $5.0 < L$ | $0.10 < W$ $5.0 < L$ | Not allowed |
| Bright/Dark Dots | Size = 10.1 | | | |
| | Item | Qualified Qty | | |
| | Bright dots | 0 | | |
| | Dark dots | 0 | | |
| | Cluster Bright Dots or Dark Dots | 0 | | |
| Total Bright and Dark Dots | | 0 | | |
| Clear spots | Size ≥ 5.0 " | | | |
| | Average Diameter | Qualified Qty | | |
| | $D < 0.2$ mm | Ignored | | |
| | $0.2 \text{ mm} < D < 0.3$ mm | 4 | | |
| | $0.3 \text{ mm} < D < 0.5$ mm | 2 | | |
| | $0.5 \text{ mm} < D$ | 0 | | |
| Spots density: 10 mm | | | | |
| Touch panel spots | Size ≥ 5.0 " | | | |
| | Average Diameter | Qualified Qty | | |
| | $D < 0.25$ mm | Ignored | | |
| | $0.25 \text{ mm} < D < 0.5$ mm | 4 | | |
| $0.5 \text{ mm} < D$ | | 0 | | |
| Touch panel white line scratch | Size ≥ 5.0 " | | | |
| | Length | Width | Qualified Qty | |
| | - | $W < 0.03$ | Ignored | |
| | $L < 5.0$ | $0.03 < W < 0.05$ | 2 | |
| - | | $0.05 < W$ | 0 | |



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. 100 cycles. Then test at room temperature after 1 hour | Note 2 |
| 7 | Vibration Test | Frequency: 10 ÷ 55 Hz. Stroke: 1.5 mm. Sweep: 10Hz ÷ 55Hz ÷ 10 Hz. 2 hours for each direction of X, Y, Z (Total 6 hours) | |
| 8 | Package Drop Test | Height: 60 cm 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

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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