



TFT MODULE SPECIFICATION

## **RVA15MD-NUC64A**

HB, IPS 1.54'' display datasheet  
Rev. 1.2  
2025-10-10

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**Riverdi Sp. z o.o.**

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ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally Black/IPS	/
Size	1.54	inch
Viewing Direction	Free	/
Outside Dimensions (W x H x D)	66.30 x 48.40 x 12.22	mm
Active Area (W x H)	27.72 x 27.72	mm
Pixel Pitch (W x H)	0.1155 x 0.1155	mm
Resolution	240 x 240 (RGB)	/
Brightness	500	cd/m <sup>2</sup>
LCD Interface Type	SPI	/
Color Depth	262K	/
Pixel Arrangement	RGB Vertical Stripe	/
LCD Driver	ST7789	/
With/Without Touch	With Projected Capacitive Touch Panel	/
CTP Driver	ILI2130	/
Touch Interface Type	I2C	/
Bonding Technology	Optical Bonding	/
Weight	29	g

**Note 1.** RoHS3 compliant

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

## 1. REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2024-10-21	Initial Release	
1.1	2025-01-14	Part number update.	
1.2	2025-10-10	Schematic update	

## 2. CONTENTS

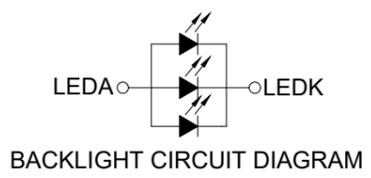
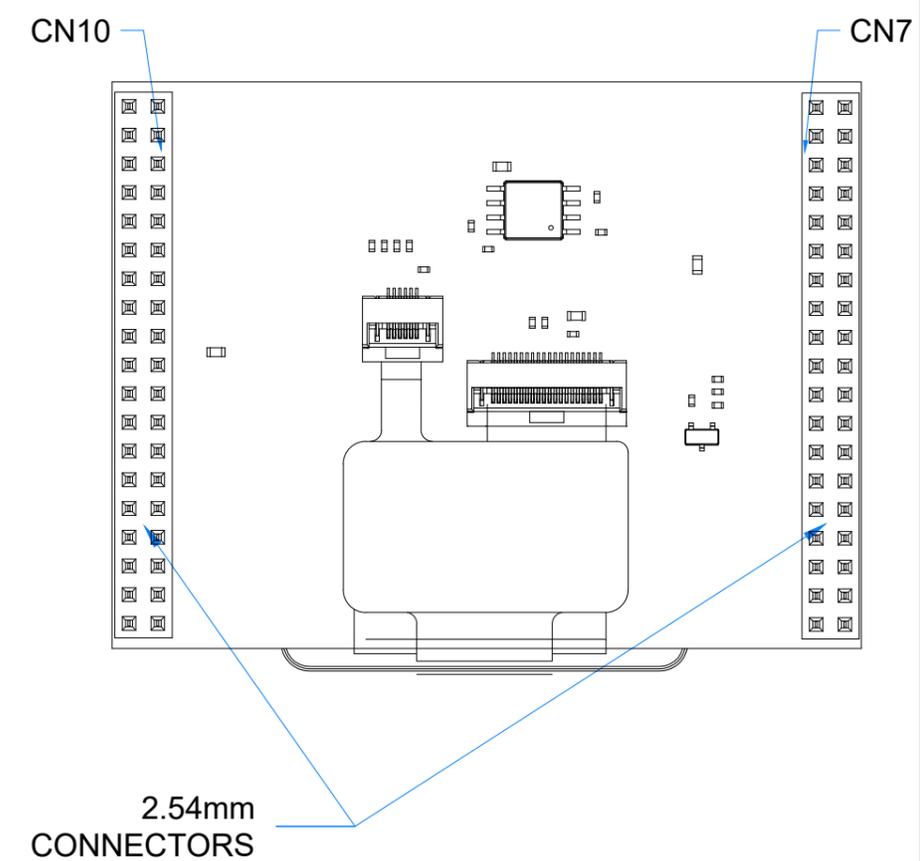
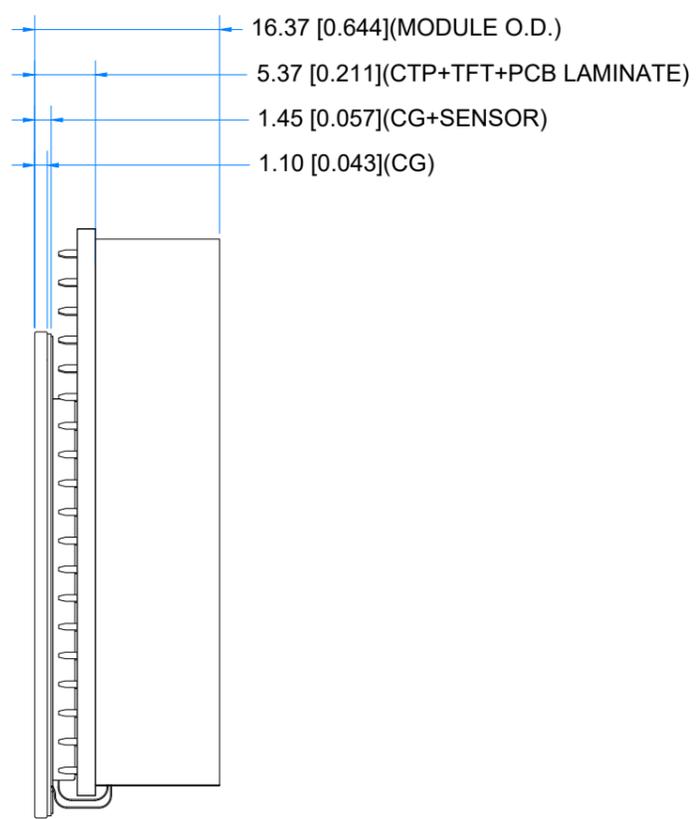
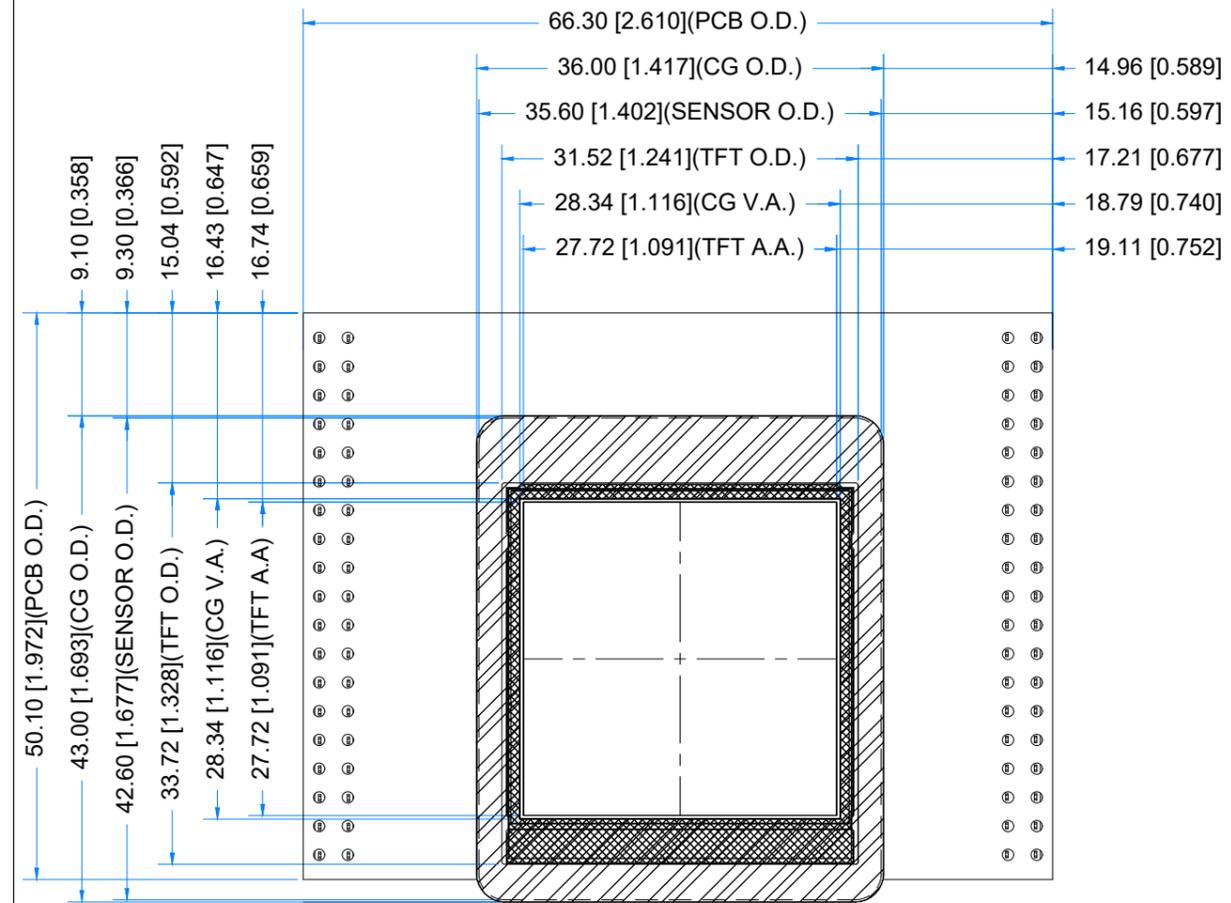
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### 3. MODULE CLASSIFICATION INFORMATION

RV	A	15	M	D	NUC	64	A
1.	2.	3.	4.	5.	6.	7.	8.

NO.	PARAMETER	SYMBOL
1.	BRAND	RV - Riverdi
2.	PRODUCT TYPE	A - Accessories
3.	DISPLAY SIZE	15 - 1.54"
4.	MODEL SERIAL NO.	M - Standard Brightness, IPS
5.	RESOLUTION	D - 240 x 240 px
6.	INTERFACE	NUC - goldpins for Nucleo board
7.	NUMBER OF PINS	64
8.	VERSION	A - 8MB NOR Flash memory

Revision:	Changes:	Date:
1.0	Initial Case	2024.10.21
1.1	Part Number Update	2025.01.14
1.2	Changed Pin Headers, PCBA Changes	2025.10.10



**TFT NOTES:**

1. DISPLAY TYPE: TFT, TRANSMISSIVE, NORMALLY BLACK
2. RESOLUTION: 240\*240
3. VIEWING ANGLE: FREE
4. DRIVER IC: ST7789
5. OPERATING VOLTAGE: V<sub>cc</sub>=2.8V
6. SURFACE LUMINANCE: 500cd/m<sup>2</sup>
7. BACKLIGHT: 3LEDS, V<sub>f</sub>=3.2V, I<sub>f</sub>=60mA

**TP NOTES:**

1. TP STRUCTURE: G+G
2. DRIVER IC: ILI2130
3. SURFACE HARDNESS: ≥6H
4. TRANSMITTANCE: >85%

**GENERAL NOTES:**

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

PN: RVA15MD-NUC64A

SN:

DRAWN: M.Stabinski 2025.10.10 1:0.63

CHECKED: M.Wierzbowski 2025.10.13 [mm]

APPR:

ISO A3 P. 1 of 1

## 5. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage (Logic)	IOVCC	-0.3	4.6	V
System Voltage	VCC <sub>2.8</sub>	-0.3	4.6	V
Input Voltage	V <sub>IN</sub>	-0.3	V <sub>DD</sub> +0.3	V
Operating temperature	T <sub>OP</sub>	-20	70	°C
Storage temperature	T <sub>ST</sub>	-30	80	°C

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

## 6. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Interface operation voltage	IOVCC	1.7	1.8	3.3	V
System voltage	V <sub>CC</sub>	2.5	2.8	3.3	V
System power supply current	I <sub>VCC</sub>	-	44	-	mA
Input High Voltage for LCD	V <sub>IH</sub>	0.7IOVCC	-	IOVCC	V
Input Low Voltage for LCD	V <sub>IL</sub>	VSS	-	0.3IOVCC	V
Output High Voltage for LCD	V <sub>OH</sub>	0.8IOVCC	-	IOVCC	V
Output Low Voltage for LCD	V <sub>OL</sub>	VSS	-	0.2IOVCC	V

## 7. BACKLIGHT ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Driving Voltage	$V_{LED}$	4	5	6	V	Notes 1, 2
Backlight Driving Current	$I_{LED}$	-	60	-	mA	
Backlight Lifetime	-	-	30,000	-	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.

## 8. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	RMK	NOTE
Response Time	Tr+Tf	$\theta=0^\circ$	-	30	-	ms	FIG 1.	4, 7
Contrast Ratio	Cr	$\theta=0^\circ$ Ta=25 °C	-	900	-	---	FIG 2.	1, 7
Surface Luminance	Lv		-	500	-	cd/m <sup>2</sup>		2, 7
Viewing Angle Range	$\theta$	$\theta = 90^\circ$	-	80	-	deg	FIG 3.	6
		$\theta = 270^\circ$	-	80	-	deg		
		$\theta = 0^\circ$	-	80	-	deg		
		$\theta = 180^\circ$	-	80	-	deg		
CIE (x, y) Chromaticity	Rx	$\theta=0^\circ$		0.608		-	FIG 2.	5,7
	Ry	$\theta=0^\circ$		0.323		-		
	Gx	Ta=25 °C		0.317		-		
	Gy			0.549		-		
	Bx			0.145		-		
	By			0.138		-		

**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,  $T_r$ ) and from black to white (Decay Time,  $T_f$ ). For additional information see Figure 1. 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 3.

**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.

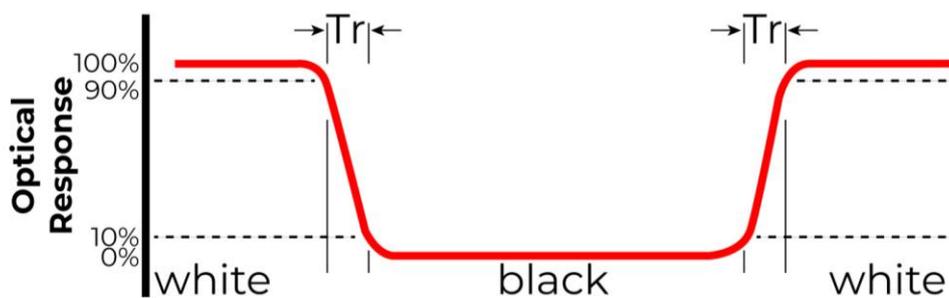


Figure 1. The definition of response time

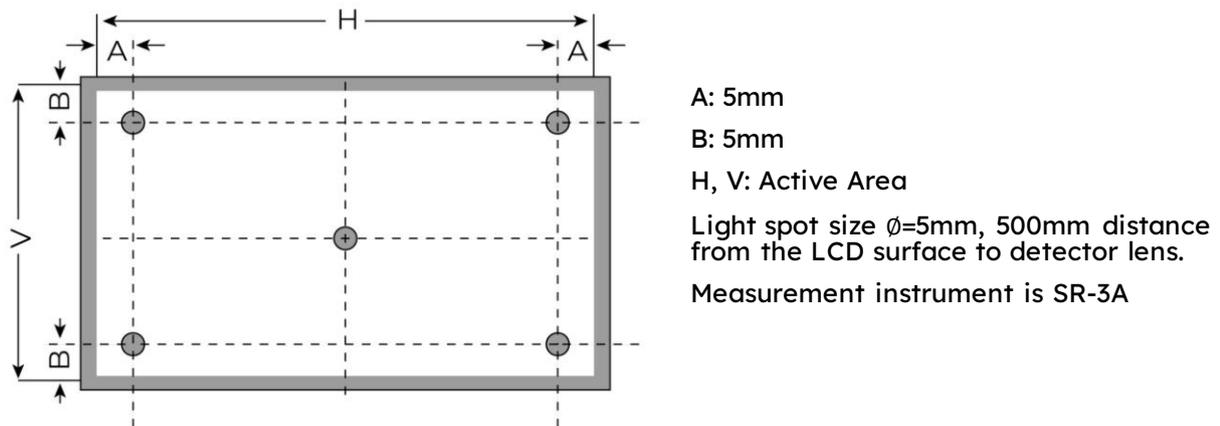


Figure 2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

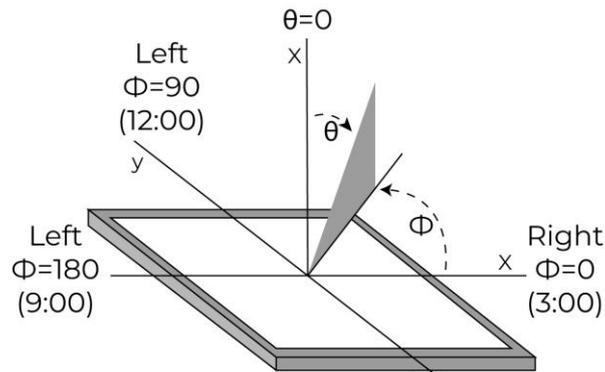
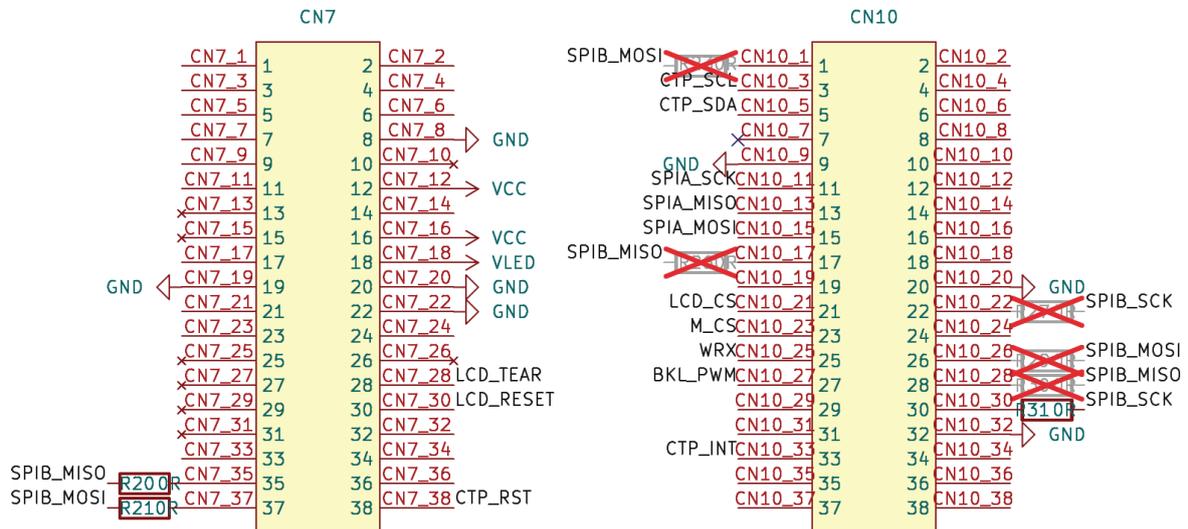


Figure 3. The definition of viewing angle

## 9. INTERFACES DESCRIPTION



### 9.1 CN7

PIN	SYMBOL	DESCRIPTION	I/O/P
8	GND	Ground	P
12	VCC	I/O reference power supply	P
16	VCC	Power supply 3.3V	P
18	VLED	Backlight power supply	P
19	GND	Ground	P
20	GND	Ground	P
22	GND	Ground	P
28	LCD_TEAR	Tear effect signal	O
30	LCD_RESET	LCD Reset	I
35	SPIB_MISO	SPI data output	O
37	SPIB_MOSI	SPI data input	I
38	CTP_RST	CTP Reset	I

## 9.2 CN10

PIN	SYMBOL	DESCRIPTION	I/O/P
<b>1</b>	SPIB_MOSI	SPI data input (Not connected)	I
<b>3</b>	CTP_SCL	CTP serial clock	I
<b>5</b>	CTP_SDA	CTP serial data	I/O
<b>9</b>	GND	Ground	P
<b>11</b>	SPIA_SCK	SPI serial clock	I
<b>13</b>	SPIA_MISO	SPI data output	O
<b>15</b>	SPIA_MOSI	SPI data input	I
<b>17</b>	SPIB_MISO	SPI data output (Not connected)	O
<b>20</b>	GND	Ground	P
<b>21</b>	LCD_CS	LCD chip select	I
<b>22</b>	SPIB_SCK	SPI serial clock (Not connected)	I
<b>23</b>	M_CS	Memory chip select	I
<b>25</b>	WRX	LCD command/data select	I
<b>26</b>	SPIB_MOSI	SPI data input (Not connected)	I
<b>27</b>	BKL_PWM	Backlight PWM control	I
<b>28</b>	SPIB_MISO	SPI data output (Not connected)	O
<b>30</b>	SPIB_SCK	SPI serial clock	I
<b>32</b>	GND	Ground	P
<b>33</b>	CTP_INT	CTP interrupt	I

## 10. EXTERNAL MEMORY

ITEM	DESCRIPTION
<b>Flash</b>	NOR Flash
<b>Size</b>	64Mbit/8Mbyte
<b>Interface</b>	SPI

## 11. CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

### 11.1 Mechanical characteristics

DESCRIPTION	SPECIFICATION
<b>Touch Panel Size</b>	1.54 inch
<b>Outline Dimension of CTP</b>	43.00mm x 36.00mm
<b>Glass Thickness</b>	1.1 mm
<b>CTP View Area</b>	28.34mm x 28.34mm
<b>Sensor Active Area</b>	27.72mm x 27.72mm
<b>Surface Hardness</b>	6H

### 11.2 Electrical characteristics

DESCRIPTION	SPECIFICATION
<b>Controller</b>	ILI2130
<b>Resolution</b>	240x240
<b>Device address 7-bit</b>	0x41

## 12. INSPECTION

Standard acceptance/rejection criteria for TFT module

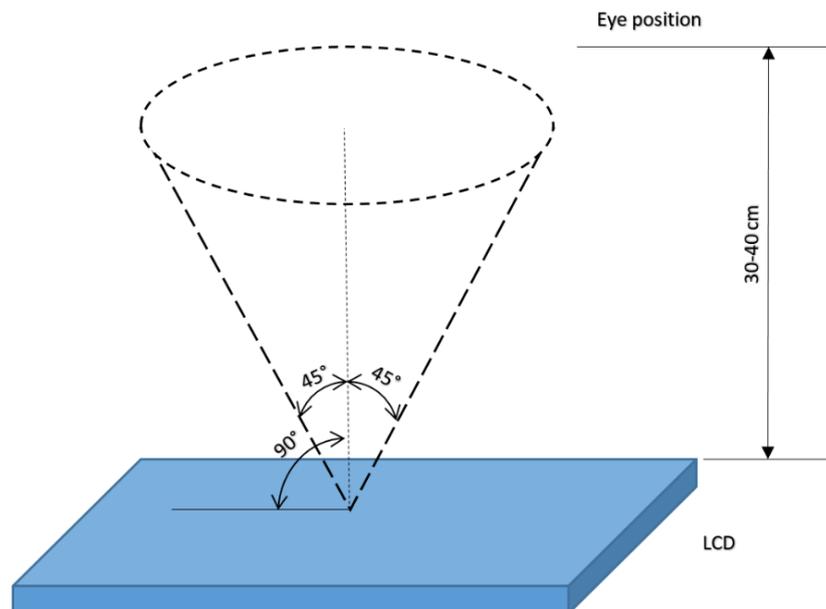
### 12.1 Inspection condition

Ambient conditions:

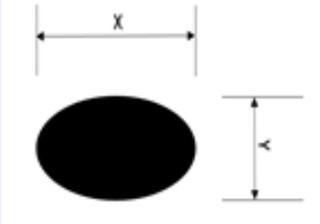
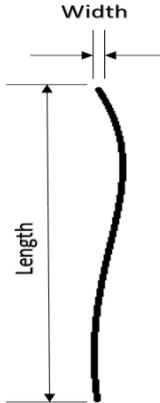
- Temperature:  $25 \pm 2^\circ\text{C}$
- Humidity:  $(60 \pm 10) \%RH$
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

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

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



## 12.2 Inspection standard

ITEM	CRITERION															
Black spots, white spots, light leakage, Foreign Particle (round Type)	<div style="text-align: center;">  </div> <p style="text-align: center;"><math>D=(x+y)/2</math></p> <p style="text-align: center;">Spots density: 10 mm</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Size &lt; 5"</th> </tr> <tr> <th style="width: 50%;">Average Diameter</th> <th style="width: 50%;">Qualified Qty</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.2 \text{ mm}</math></td> <td>Ignored</td> </tr> <tr> <td><math>0.2 \text{ mm} &lt; D \leq 0.3 \text{ mm}</math></td> <td>N = 0</td> </tr> <tr> <td><math>0.5 \text{ mm} &lt; D</math></td> <td>N = 0</td> </tr> </tbody> </table>	Size < 5"		Average Diameter	Qualified Qty	$D \leq 0.2 \text{ mm}$	Ignored	$0.2 \text{ mm} < D \leq 0.3 \text{ mm}$	N = 0	$0.5 \text{ mm} < D$	N = 0					
	Size < 5"															
	Average Diameter	Qualified Qty														
	$D \leq 0.2 \text{ mm}$	Ignored														
$0.2 \text{ mm} < D \leq 0.3 \text{ mm}$	N = 0															
$0.5 \text{ mm} < D$	N = 0															
LCD black spots, white spots, light leakage (line Type)	<div style="text-align: center;">  </div> <p style="text-align: center;">Spots density: 10 mm</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Size &lt; 5"</th> </tr> <tr> <th style="width: 33%;">Length</th> <th style="width: 33%;">Width</th> <th style="width: 33%;">Qualified Qty</th> </tr> </thead> <tbody> <tr> <td><math>L \leq 1.8</math></td> <td><math>W \leq 0.05</math></td> <td>Ignored</td> </tr> <tr> <td><math>L \leq 0.8</math></td> <td><math>0.05 &lt; W \leq 0.1</math></td> <td>N ≤ 3</td> </tr> <tr> <td style="text-align: center;">-</td> <td><math>W &gt; 0.1</math></td> <td>Not allowed</td> </tr> </tbody> </table>	Size < 5"			Length	Width	Qualified Qty	$L \leq 1.8$	$W \leq 0.05$	Ignored	$L \leq 0.8$	$0.05 < W \leq 0.1$	N ≤ 3	-	$W > 0.1$	Not allowed
	Size < 5"															
	Length	Width	Qualified Qty													
	$L \leq 1.8$	$W \leq 0.05$	Ignored													
$L \leq 0.8$	$0.05 < W \leq 0.1$	N ≤ 3														
-	$W > 0.1$	Not allowed														
Bright/Dark Dots	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Size &lt; 5"</th> </tr> <tr> <th style="width: 50%;">Item</th> <th style="width: 50%;">Qualified Qty</th> </tr> </thead> <tbody> <tr> <td>Bright dots</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Dark dots</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Total Bright and Dark Dots</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	Size < 5"		Item	Qualified Qty	Bright dots	1	Dark dots	1	Total Bright and Dark Dots	1					
	Size < 5"															
	Item	Qualified Qty														
	Bright dots	1														
Dark dots	1															
Total Bright and Dark Dots	1															
Clear spots	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Size ≤ 5"</th> </tr> <tr> <th style="width: 50%;">Average Diameter</th> <th style="width: 50%;">Qualified Qty</th> </tr> </thead> <tbody> <tr> <td><math>D &lt; 0.2 \text{ mm}</math></td> <td>Ignored</td> </tr> </tbody> </table>	Size ≤ 5"		Average Diameter	Qualified Qty	$D < 0.2 \text{ mm}$	Ignored									
	Size ≤ 5"															
Average Diameter	Qualified Qty															
$D < 0.2 \text{ mm}$	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		
Touch panel spots	Size ≤ 5"		
	Average Diameter		Qualified Qty
	D < 0.025 mm		N ≤ 2
	0.025 mm < D < 0.5 mm		N ≤ 1
	0.5 mm < D		Not allowed
Touch panel while line scratch	Size ≤ 5"		
	Length	Width	Qualified Qty
	-	W ≤ 0.025	N ≤ 2
	L ≤ 5.0	0.025 < W < 0.05	N ≤ 1
	-	0.05 < W	Not allowed

## 13. 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.

This is not a standalone product. It was designed as an electronic component. It needs integration with a whole system to be fully functional.

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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We're here to ensure your project's success, every step of the way!