TFT MODULE SPECIFICATION

RVT121HVUNWCA0-B

HB, IPS, USB C 12.1” LCD TFT display datasheet
Rev. 1.0
2025-05-23

Riverdi Sp. z o.o.

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ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally Black/IPS	/
Size	12.1	Inch
Viewing Direction	Free	/
Outside Dimensions (W x H x D)	276.56 x 179.46 x 14.72	mm
Active Area (W x H)	261.12 x 163.20	mm
Pixel Pitch (W x H)	0.1695 x 0.1695	mm
Resolution	1280 (RGB) x 800	/
Brightness	850	cd/m^2
Color Depth	16.7 M	/
Pixel Arrangement	RGB Vertical Stripe	/
Controller of the main board	LT7911D	/
Interface	USB-C	/
With/Without Touch	With Projected Capacitive Touch Panel	/
CTP Driver	ILI2511	/
Touch Panel Interface	USB-C	/
Power Supply	USB-C (5.0V)	V
Weight	837	g

Note 1. RoHS3 compliant

Note 2. LCM weight tolerance: ± 5%.

1. REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2025-05-23	Initial release	

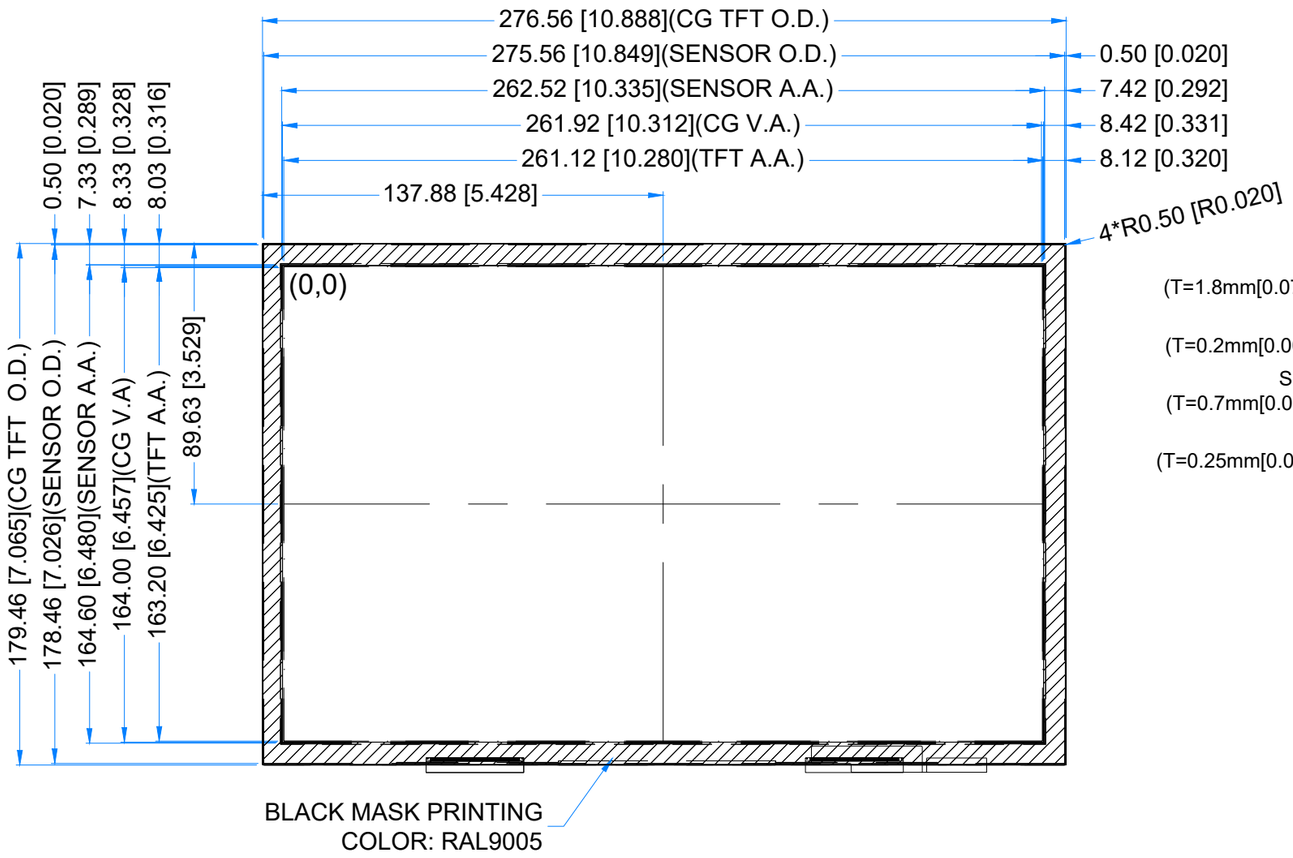
2. CONTENTS

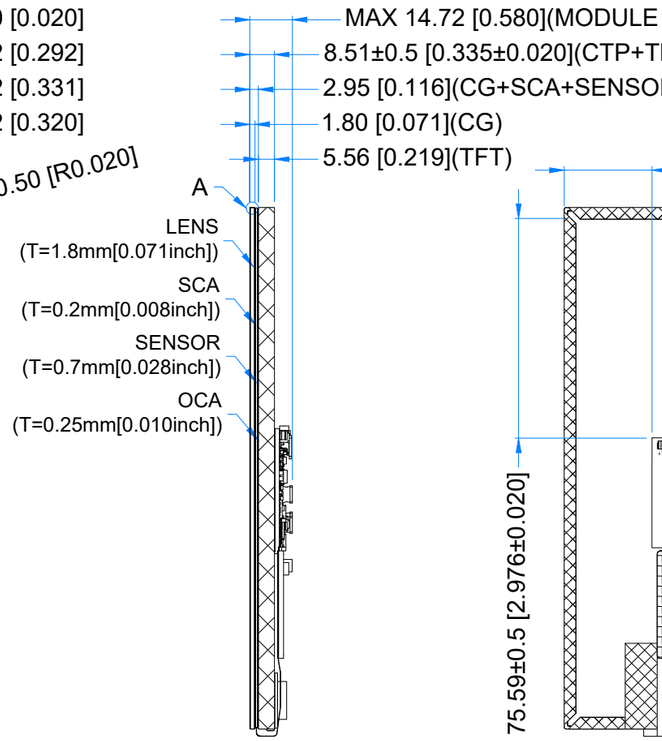
3. MODULE CLASSIFICATION INFORMATION

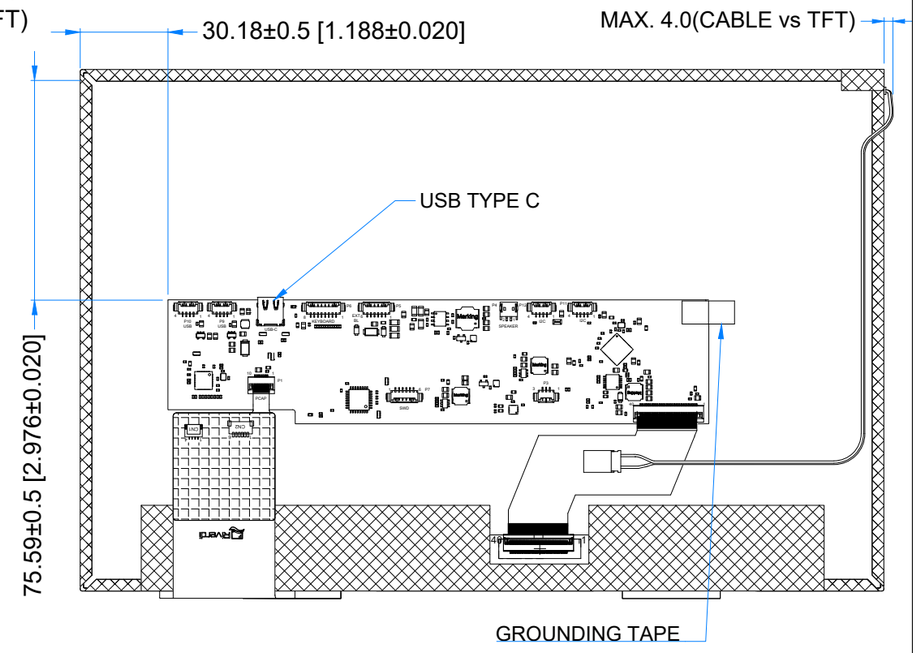
RV	T	121	H	V	U	N	W	C	A0	B
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.

NO.	PARAMETER	SYMBOL
1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard
3.	DISPLAY SIZE	121 – 12.1”
4.	MODEL SERIAL NO.	H – High Brightness, IPS
5.	RESOLUTION	V – 1280 x 800 px
6.	INTERFACE	U – USB C
7.	FRAME	N – Without Mounting Metal Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	C – with Capacitive Touch panel
10.	VERSION	A0 – aTouch
11.	BONDING TECHNOLOGY	B- Optical bonding

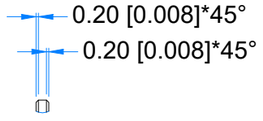
Revision:	Changes:	Date:
1.0	Initial Case	2025.04.11

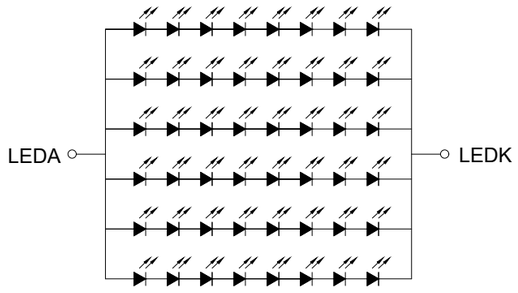






DETAIL A
SCALE 4:1





LED Diagram Circuit

LCM NOTES:
1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
2. RESOLUTION: 1280x800
3. VIEWING ANGLE: FREE
4. CONTROLLER IC OF MAIN BOARD: LT7911D
5. VIDEO INTERFACE: USB-C
6. POWER SUPPLY: USB-C
7. MODULE SURFACE LUMINANCE: 850cd/m^2

TP NOTES:
1. TP STRUCTURE: G+G
2. CG THICKNESS: 1.8mm[0.071inch]
3. SURFACE HARDNESS: 6H
4. DRIVER IC: ILI2511
5. 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[0.012inch]
4. RoHS3 COMPLIANT

PN: RVT121HVUNWCA0-B				Riverdi
SN:				
DRAWN:	M.Suchocki	2025.04.11	1:2.11	
CHECKED:	M.Wierzbowski	2025.04.11	[mm]	
APPR:			ISO A3	P. 1 of 1

5. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage for Module	V_{DD}	-0.5	5.5	V
Operating Temperature	T_{OP}	-20	70	°C
Storage Temperature	T_{ST}	-30	80	°C
Storage Humidity (@ 25 ± 5°C)	H_{ST}	10	-	% RH
Operating Ambient Humidity (@ 25 ± 5°C)	H_{OP}	10	-	% RH

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	NOTE
Supply Voltage for Module	V_{DD}	4.7	5.0	5.3	V	

PARAMETER	SYMBOL	BL 0%	BL 50 %	BL 100%	UNIT	NOTE
Current drawn from V_{DD}@5.0V	I_{VDD}	460	1675	2670	mA	Note 1

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

Values of current may vary due to type of used cable.

7. BACKLIGHT ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Power Consumption	WBL	-	5,76	-	W	
Lifetime	-	-	50,000	-	hours	Note 1

Note 1. Unless specified, the ambient temperature T_a = 25℃

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	θ=0° ø=0° Ta=25 °C	-	25	35	ms	FIG 1.	4, 7
Contrast Ratio	Cr		-	800	1000	---	FIG 2.	1, 7
Surface Luminance	Lv		-	850	-	cd/m 2		2, 7
Viewing Angle Range	θ	ø = 90°	75	85	-	deg	FIG 3.	6
		ø = 270°	75	85	-	deg		
		ø = 0°	75	85	-	deg		
		ø = 180°	75	85	-	deg		
CIE (x, y) Chromaticity	Rx	θ=0° ø=0° Ta=25 °C	0.22	0.26	0.30	-	FIG 2.	5,7
	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 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.

Lv = 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 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.

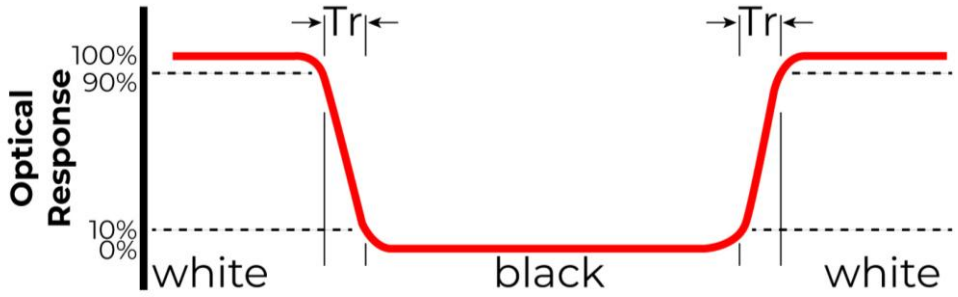
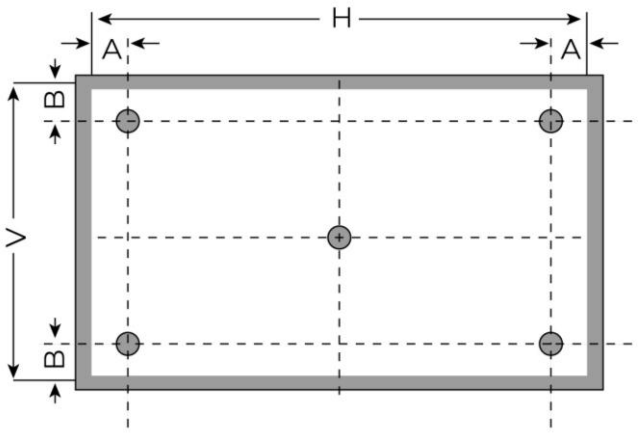


Figure 1. The definition of response time



A: 5mm

B: 5mm

H, V: Active Area

Light spot size ∅=5mm, 500mm distance from the LCD surface to detector lens.

Measurement instrument is SR-3A

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

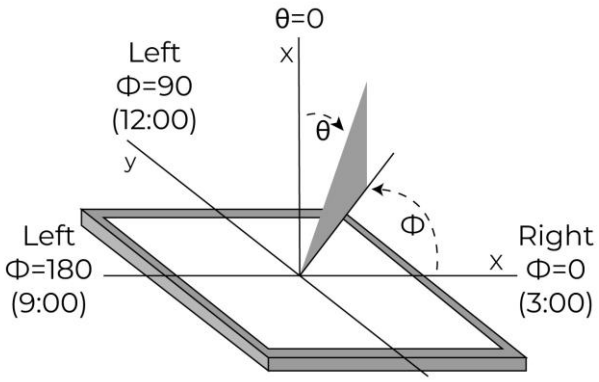
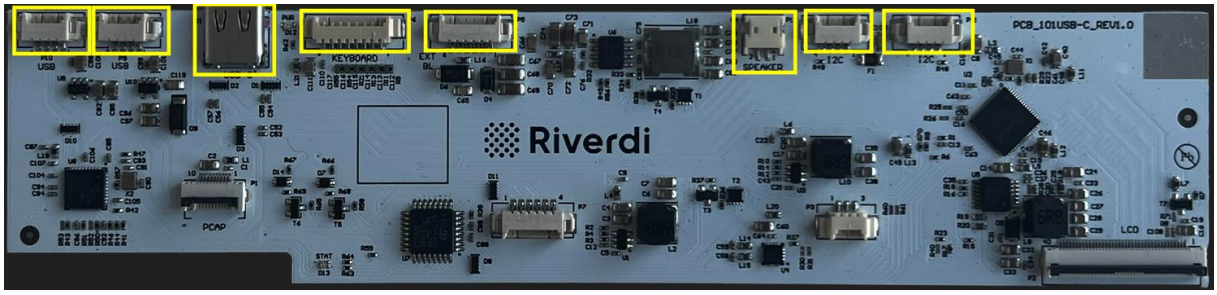


Figure 3. The definition of viewing angle

9. INTERFACES DESCRIPTION

9.1 PCB overview



NAME	CONNECTOR	DESCRIPTION	NOTE
P9, P10	USB	USB molex	
VIDEO/ TOUCH PANEL	USB-C	Video interface/Touch panel interface	
P6	External keyboard connector	Molex 53261-0871 or alternative; Horizontal, 1.25mm pitch; 8 pins. The connector is reserved for external keyboard.	
P5	Backlight PWM & Power	Molex 53261-0671 or alternative; Horizontal, 1.25mm pitch; 6 pins. The unit realizes the function of digital dimming. This connector enables to control backlight PWM externally. Alternative power supply.	
P4	Speaker	Speaker molex	
P11, P12	I2C	I2C molex	

Note 1. External keyboards are optional, not included in the standard kit.

9.2 USB interface (P9, P10)

PIN	SYMBOL	DESCRIPTION
1	VBUS	Power supply, 5.0V
2	USB_N	USB_D-
3	USB_P	USB_D+
4	GND	Ground

9.3 Video/Touch panel interface – USB-C

PIN	SYMBOL	DESCRIPTION
A4/B4	VBUSA/VBUSB	Power supply, 5.0V
A9/B9	VBUSA/VBUSB	Power supply, 5.0V
A2/B2	SSTXP1/SSTXP2	Super speed differential pair transmit positive
A3/B3	SSTXN1/SSTXN2	Super speed differential pair transmit negative
A5/B5	CC1/CC2	Configuration channel
A6/B6	DP1/DP2	Differential pair positive
A7/B7	DN1/DN2	Differential pair negative
A8/B8	SBU1/SBU2	Sideband use
A10/B10	SSRXN2/SSRXN1	Super speed differential pair receive positive
A11/B11	SSRXP2/SSRXP1	Super speed differential pair receive positive
A1/B1	GND	Ground
A12/B12	GND	Ground

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

Note 2. Matched Riverdi cable accessory: USB-A 2.0 TO USB-C CABLE

9.4 External keyboard – P6

PIN	SYMBOL	DESCRIPTION
1	INP1	Brightness level rise
2	INP2	Brightness level decrease
3	INP3	Switch Input 3 – reserved, not used
4	INP4	Switch Input 4 – reserved, not used
5	INP5	Switch Input 5 – reserved, not used
6	INP6	Switch Input 6 – reserved, not used
7	GND	Ground
8	VCC	Power supply, 3.3V

Note. External keyboard is by default to change backlight brightness level.

9.5 Backlight PWM & Power – P5

PIN	SYMBOL	DESCRIPTION	NOTE
1	GND	Ground	
2	GND	Ground	
3	EXT_DIMM	External dimming	Note 1, 3
4	EXT_EN	External dimming enable	Note 3
5	VIN2	Power supply, 6-36V	Note 2
6	VIN2	Power supply, 6-36V	Note 2

Note 1. PWM frequency range: 1kHz - 5kHz.

100% PWM duty cycle corresponds to maximum brightness

0% PWM duty cycle corresponds to minimum brightness

Note 2. Matched Riverdi cable accessory: RVA-0106M-1.25FF-1.

Note 3. Notice
V_L < 1.2V = active low
V_H > 2.4V … 36V = active high

Socket used for external power supply.

9.6 Speaker – P4

PIN	SYMBOL	DESCRIPTION	NOTE
1	OUTP	Speaker coil „+” terminal	
2	OUTN	Speaker coil „-” terminal	

Note. Max available power for connected speaker 3W (4Ω).

9.7 I2C – P11, P12

PIN	SYMBOL	DESCRIPTION	NOTE
1	VBUS	Power supply, 5.0V	
2	SCL	Serial clock	
3	SDA	Serial data	
4	GND	Ground	

10. DISPLAY SPECIFICATION

The TFT of the module applies Riverdi high brightness, IPS, 12.1” LVDS: RVT121HVLNWA00

The supported resolution of the display in this module is 1280*800.

For detailed information, please refer to datasheet of display.

11. CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

11.1 Mechanical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Touch Panel Size	12.1 inch	aTouch
Outline Dimension of CTP	275.56 mm x 178.46 mm	
Product Thickness	2.95 mm	
Glass Thickness	1.8 mm	
CTP View Area	261.92 mm x 164.00 mm	
Sensor Active Area	261.12 mm x 163.20 mm	
Surface Hardness	6H	

11.2 Electrical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Linearity	+/-1.5mm	
Controller	ILI2511	
Resolution	1280 x 800	

12. INSPECTION

Standard acceptance/rejection criteria for TFT module

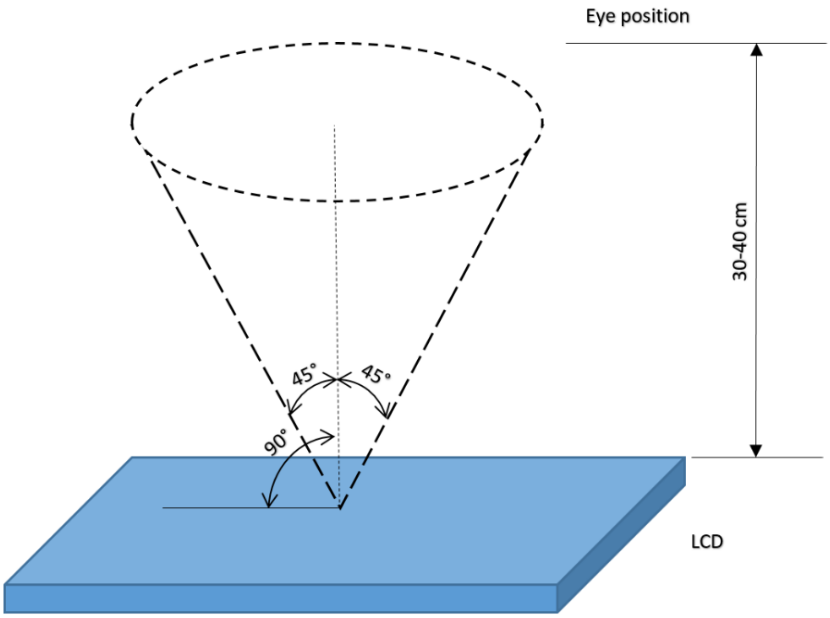
12.1 Inspection condition

Ambient conditions:

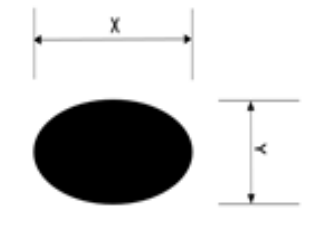
- Temperature: 25 ± 2°C
- Humidity: (60 ± 10) %RH
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

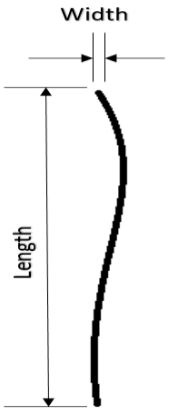
Viewing distance: 35 ± 5cm between inspector bare eye and LCD.

Viewing Angle: U/D: 45°/45°, L/R: 45°/45°



12.2 Inspection standard

<table>
<tr><th>ITEM</th><th colspan="4">CRITERION</th></tr>
<tr><td rowspan="5">Black spots, white spots, light leakage, Foreign Particle (round Type)</td><td rowspan="5"> 

D=(x+y)/2
Spots density: 10 mm</td><td colspan="3">Size = 12.1”</td></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>N≤4</td></tr>
<tr><td colspan="2">0.5 mm < D</td><td>Not allowed</td></tr>
<tr><td rowspan="5">LCD black spots, white spots, light leakage (line Type)</td><td rowspan="5"> 

Spots density: 10 mm</td><td colspan="3">Size = 12.1”</td></tr>
<tr><td>Length</td><td>Width</td><td>Qualified Qty</td></tr>
<tr><td>-</td><td>W ≤ 0.05</td><td>Ignored</td></tr>
<tr><td>L ≤ 5.0</td><td>0.05 < W ≤ 0.1</td><td>N≤3</td></tr>
<tr><td>5.0 < L</td><td>0.10 < W
5.0 < L</td><td>Not allowed</td></tr>
<tr><td rowspan="5">Bright/Dark Dots</td><td colspan="4">Size = 12.1”</td></tr>
<tr><td colspan="2">Item</td><td colspan="2">Qualified Qty</td></tr>
<tr><td colspan="2">Bright dots</td><td colspan="2">0</td></tr>
<tr><td colspan="2">Dark dots</td><td colspan="2">0</td></tr>
<tr><td colspan="2">Cluster bright dots or dark dots</td><td colspan="2">0</td></tr>
<tr><td colspan="2">Total bright and dark dots</td><td colspan="2">0</td></tr>
</table>

Clear spots	Size ≥ 5.0”		
	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		
Touch panel spots	Size ≥ 5.0”		
	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	Size ≥ 5.0”		
	Length	Width	Qualified Qty
	-	W ⩽ 0.03	Ignored
	L ⩽ 5.0	0.03 < W < 0.05	2
	-	0.05 < W	0

13. 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	40℃, 90%RH, 120Hrs	
6	Thermal Cycling Test (No operation)	-20℃ for 30min, 70℃ 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)	

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

14. 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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