Riverdi

RVT50HQHNWC00-B

HB, IPS 5.0" HDMI LCD TFT DATASHEET

Rev.1.0
2023-02-24

ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally Black/IPS	/
Size	5.0	Inch
Viewing Direction	Free	/
Outside Dimensions (W x H x D)	136.00 x 92.80 x 21.28	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 (RGB) x 480	/
Brightness	850	cd/m^2
Color Depth	16.7 M	/
Pixel Arrangement	RGB Vertical Stripe	/
Controller of the Main Board	TFP401APZPR	/
Video Interface	HDMI	/
With/Without Touch	With Projected Capacitive Touch Panel	/
CTP Driver	ILI2132A	/
Touch Panel Interface	USB-C	/
Power Supply	Power Jack (DC 7.0V – 36.0 V) USB-C (DC 5.0V)	V
Weight	125	g

Note 1. RoHS3 compliant

Note 2. LCM weight tolerance: ± 5%.

1. REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2023-02-24	Initial version	

2. CONTENTS

3. MODULE CLASSIFICATION INFORMATION

RV	T	50	H	Q	H	N	W	C	00	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	50 – 5.0"
4.	MODEL SERIAL NO.	H – High Brightness, IPS
5.	RESOLUTION	Q – 800 x 480 px
6.	INTERFACE	H – HDMI
7.	FRAME	N – Without Mounting Metal Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	C – With Capacitive Touch Panel
10.	VERSION	00 – uxTouch
11.	BONDING TECHNOLOGY	B – Optical Bonding

4. uxTouch ASSEMBLY GUIDE

uxTouch are LCD TFT displays with specially designed projected capacitive touch panels. uxTouch display can be mounted without any additional holes in the housing. Our standard uxTouch displays include double-sided adhesive tape (DST) to stick TFT easily to the housing.

uxTouch models with double-side adhesive tape can be mounted by fastening the glass to the housing.
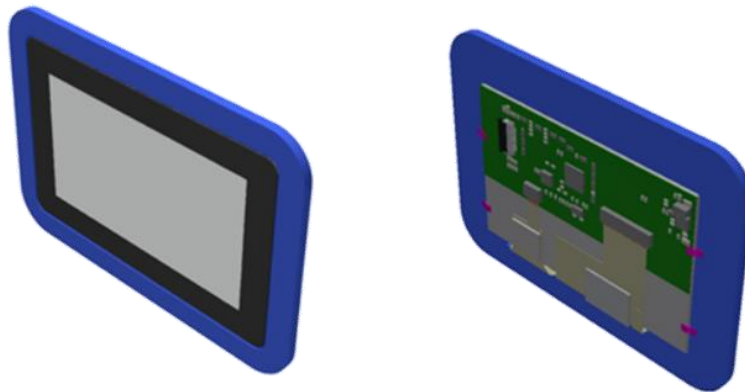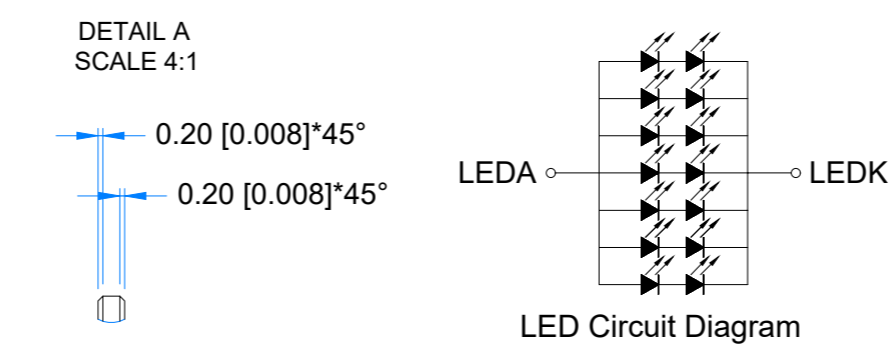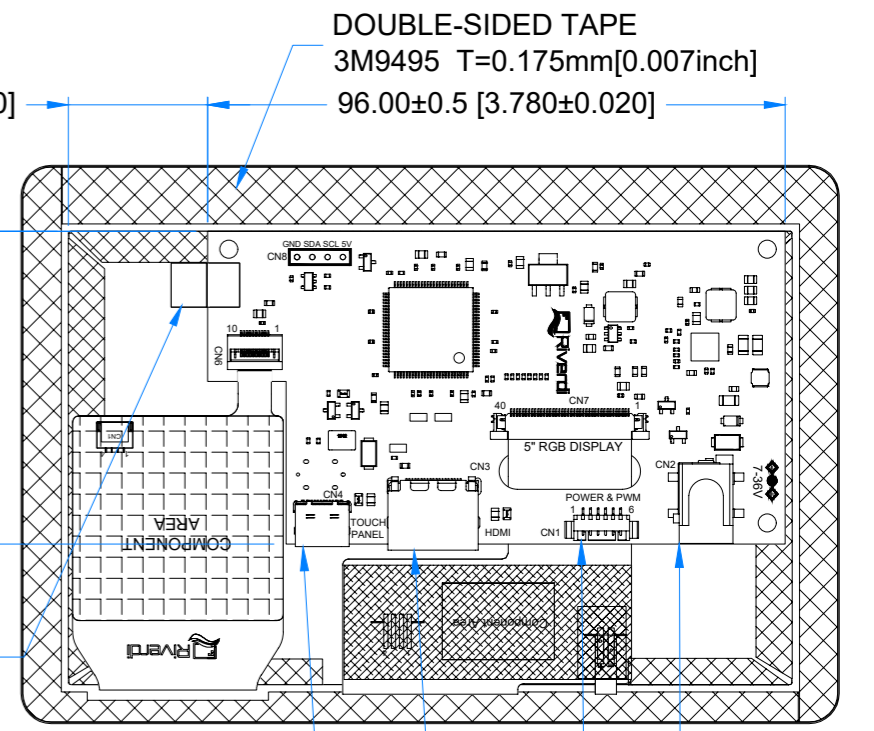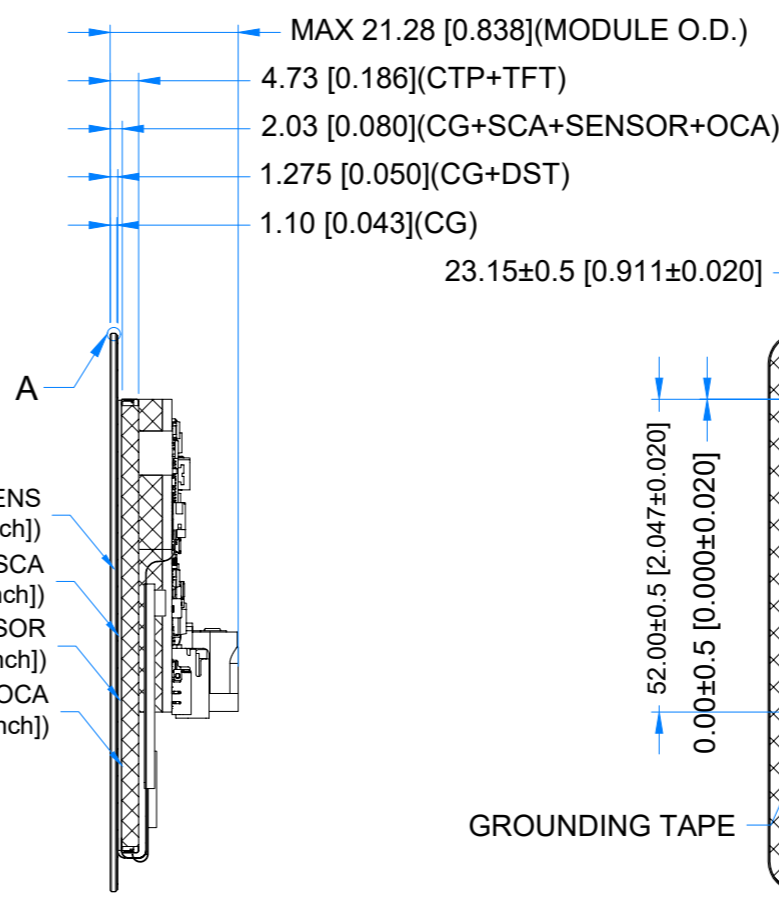

Figure 1. Example of using the support brackets

4. uxTouch ASSEMBLY GUIDE

136.00 [5.354](CG O.D.)
120.30 [4.736](TFT O.D.)
119.90 [4.720](SENSOR O.D.)
110.00 [4.331](SENSOR A.A.)
108.60 [4.276](CG V.A.)
108.00 [4.252](TFT A.A.)
68.00 [2.677]

7.87 [0.310]
8.07 [0.318]
13.00 [0.512]
13.70 [0.539]
14.00 [0.551]

4*R5.00 [R0.197]

10.94 [0.431]
11.14 [0.439]
13.00 [0.512]
13.70 [0.539]
14.00 [0.551]

92.80 [3.654](CG O.D.)
75.40 [2.969](TFT O.D.)
74.80 [2.945](SENSOR O.D.)
66.80 [2.630](SENSOR A.A.)
65.40 [2.575](CG V.A.)
64.80 [2.551](TFT A.A.)
46.40 [1.827]

BLACK MASK PRINTING
RAL9005

MAX 21.28 [0.838](MODULE O.D.)
4.73 [0.186](CTP+TFT)
2.03 [0.080](CG+SCA+SENSOR+OCA)
1.275 [0.050](CG+DST)
1.10 [0.043](CG)

A

LENS
(T=1.1mm[0.043inch])
SCA
(T=0.2mm[0.008inch])
SENSOR
(T=0.55mm[0.022inch])
OCA
(T=0.175mm[0.007inch])

DETAIL A
SCALE 4:1

0.20 [0.008]*45°
0.20 [0.008]*45°

LEDA — LEDK

LED Circuit Diagram

DOUBLE-SIDED TAPE
3M9495 T=0.175mm[0.007inch]

23.15±0.5 [0.911±0.020]
96.00±0.5 [3.780±0.020]

52.00±0.5 [2.047±0.020]
0.00±0.5 [0.000±0.020]

GND SDA SCL 5V
CN8
5" RGB DISPLAY
POWER & PWM
COMPONENT AREA
TOUCH PANEL
HDMI
CN1
7-36V

GROUNDING TAPE

DC
2.1*5.5mm

HDMI
TYPE-A

MOLEX
53261-0671

USB
TYPE-C

6. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Operating Temperature	T_{OP}	-20	70	°C
Storage Temperature	T_{ST}	-30	80	
Storage Humidity (@ 25 ± 5°C)	H_{ST}	10	-	% RH
Operating Ambient Humidity (@ 25 ± 5°C)	H_{OP}	10	-	

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

7. ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Supply Voltage via DC JACK or CN1		VDD	7.0	12.0	36.0	V	Note 1
Supply Voltage via USBC		VDDUSBC	4.7	5.0	5.5		Note 2
PWM Logic Input Voltage	Low Voltage	I_{VILPWM}	0	-	0.4		
	High Voltage	I_{VIHPWM}	1	-	VDD		
EN Logic Input Voltage	Low Voltage	I_{VILEN}	0	-	1.2		
	High Voltage	I_{VIHEN}	1.35	-	VDD		
PWM Frequency		F_{PWM}	1	10	100	kHz	

Note 1. The module can be powered via DC jack or CN1 (POWER&PWM) or USB-C
The VDD pin of CN1 is connected directly to the DC jack. Please do not power the module via DC Jack and CN1 at the same time.
Note 2. When DC jack and USB-C (or CN1 and USB-C) are both powered, DC jack (or CN1) is the main power supply.

PARAMETER	SYMBOL	BL 0%	BL 50%	BL 100%	UNIT	NOTE
Current Drawn from VDD When VEN is active high	I_{VDD}	230	350	500	mA	VDD=7.0V
		145	220	300		VDD=12.0V
		90	130	170		VDD=24.0V
		75	100	130		VDD=36.0V
Current Drawn from VDD when VEN is low	I_{VDD}	-	0.65	-	mA	VDD=7.0V
		-	1.20	-		VDD=12.0V
		-	2.60	-		VDD=24.0V
		-	3.90	-		VDD=36.0V
Current drawn from VDDUSBC	$I_{VDDUSBC}$	260	410	630		Note 3

Note 2. 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%.
Test condition:
1. Ambient temp 25 °C
2.PCAP is in Active mode
Note 3. VEN indicates the input voltage of power enable pin of POWER & PWM interface(CN1).

When VEN is set to "High", the module is powered on.

When VEN is set to "Low", the module is powered off.

Note 4. The module can't be switched off via EN pin if USB-C is the only power input.

8. BACKLIGHT DRIVING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Power Consumption	W$_{BL}$	-	1680		mW	100% backlight
Lifetime	-	-	50,000	-	hours	Note 1

Note 1. 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.

9. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	RMK	NOTE
Response Time	Tr+Tf		-	30	40	ms	FIG 2.	4,7
Contrast Ratio	Cr	θ=0° ∅=0° Ta=25 °C	800	1000	-	---	FIG 3.	1,7
Luminance Uniformity	δ WHITE		-	75	80	%		3,7
Surface Luminance	Lv		-	850	-	cd/m^2		2,7
Viewing Angle Range	θ	∅ = 90°	-	80	-	deg	FIG 4.	6
		∅ = 270°	-	80	-			
		∅ = 0°	-	80	-			
		∅ = 180°	-	80	-			
CIE (x, y) Chromaticity	Rx	θ=0° ∅=0° Ta=25 °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 at 100% backlight. For more information see Figure 3.

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 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.
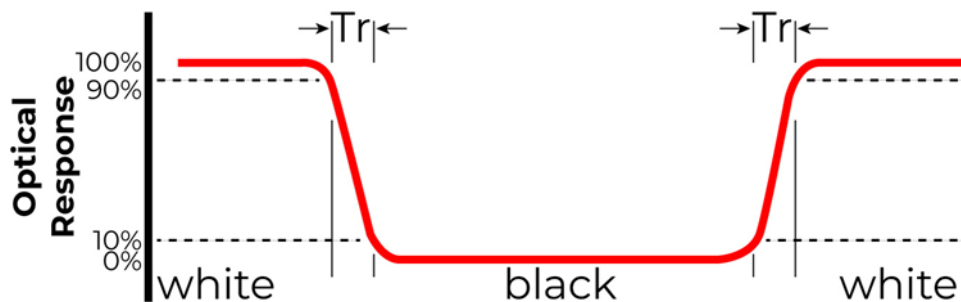

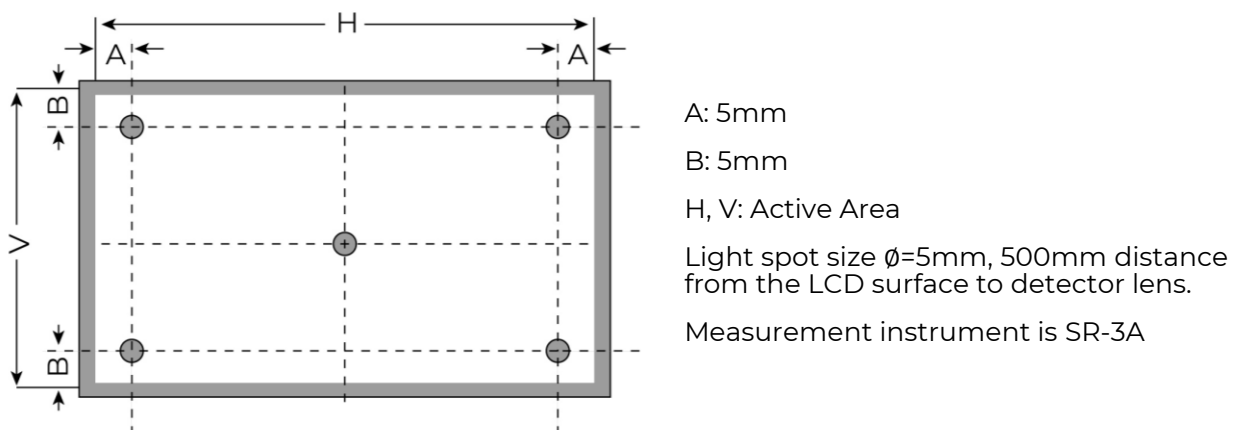*Figure 2. The definition of response time*

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 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity
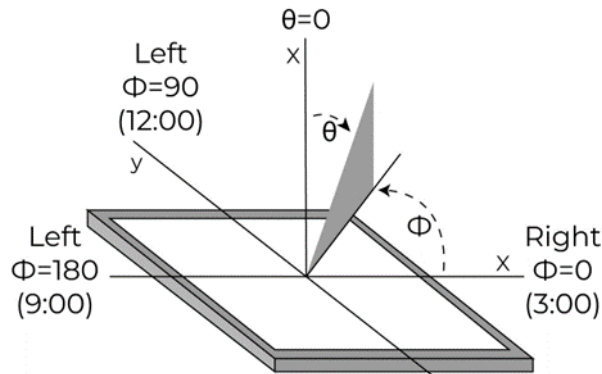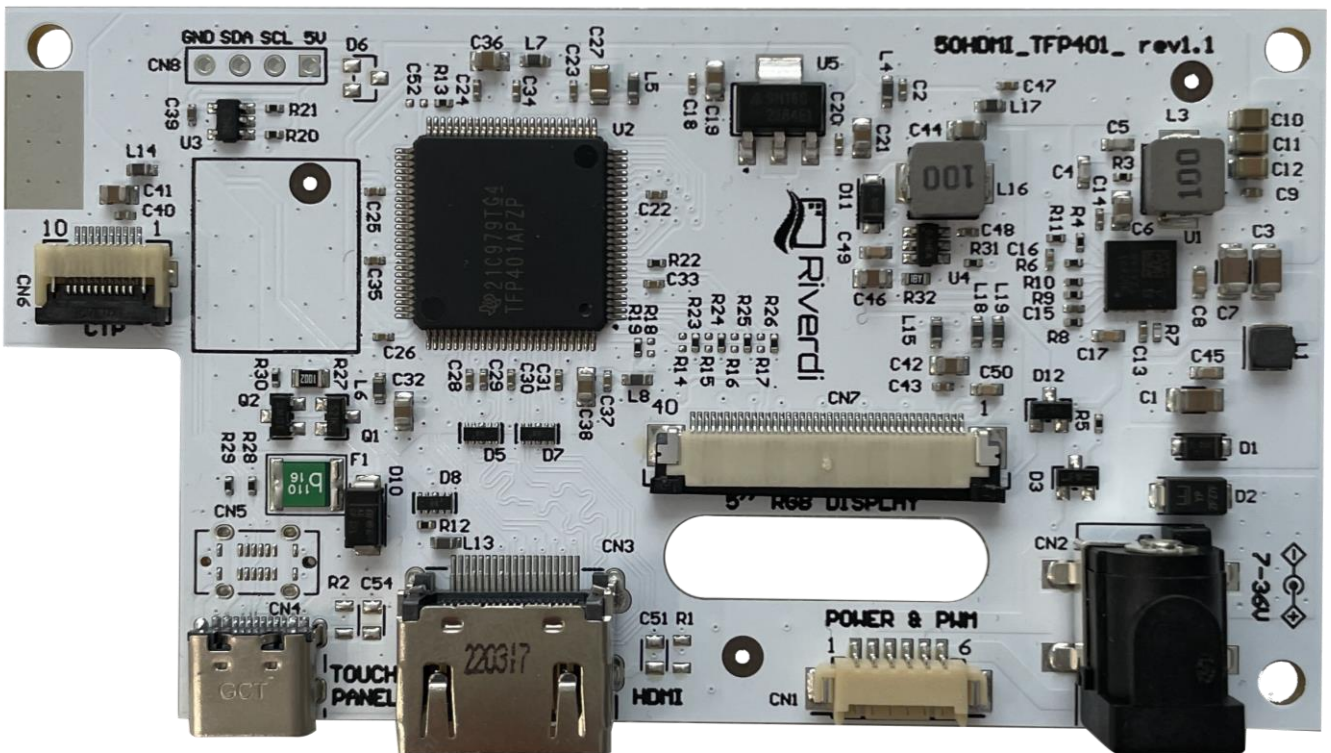
Figure 4. The definition of viewing angle

10. INTERFACE DESCRIPTION

10.1 PCB overview

10.2 DC Jack

The DC jack power connector features 5.5 mm OD; 2.1mm ID. The input voltage ranges from 7.0V to 36.0V.

10.3 Backlight PWM & Power

The 1.25mm, 6-pin Molex connector labeled as "POWER &PWM' (CN1) is a multifunctional interface. It can be used to power the module, also can be used to control the backlight PWM. A PWM frequency in the range of 1kHz –100kHz must be used.

PIN NO.	SYMBOL	DESCRIPTION	NOTE
1	VDD	Power supply (7.0V- 36.0 V)	Note 1
2	VDD	Power supply (7.0V- 36.0 V)	
3	PWM	PWM input	
4	EN	Power enable, active high (Default pulled up to VDD)	Note 2
5	GND	Ground	
6	GND	Ground	

Note 1. Alternative power supply.

Note 2. The module can't be switched off via EN pin if USB-C is the only power input.

Note 3. Matched Riverdi power supply cable: RVA-0106M-1.25FF-1.

10.4 HDMI

This is a HDMI signal source connector.

The horizontal HDMI is mounted by default. If you need to change it to the vertical HDMI connector, please contact: contact@riverdi.com

10.5 USB-C

Despite the function of connecting touch panel, USB-C connector can also be used as a power supply.
However, the module can't be switched off via EN pin if USB-C is the only power input.

The horizontal USB-C connector (CN4) is mounted by default. Vertical USB-C connector can be mounted through CN5. If you need to change the type of USB-C connector, please contact:contact@riverdi.com

11. DISPLAY SPECIFICATION

The TFT of the module applies Riverdi high brightness, IPS, 5.0" RGB: RVT50HQTNWC00-B

For detailed information, please refer to datasheet of display.

12.CAPACITIVE TOUCH SCREEN PANLE SPECIFICATIONS

12.1 Mechanical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Touch Panel Size	5.0 inch	aTouch
Outline Dimension of CTP	136.00 mm x 92.80 mm	
Product Thickness	2.03 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	

12.2 Electrical characteristics

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

13.INSPECTION

Standard acceptance/rejection criteria for TFT module

13.1 Inspection condition

Ambient conditions:

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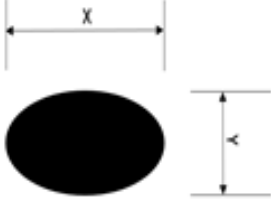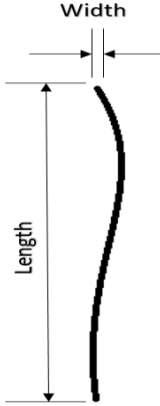- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

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

Viewing Angle: U/D: 45°/45°, L/R: 45°/45°
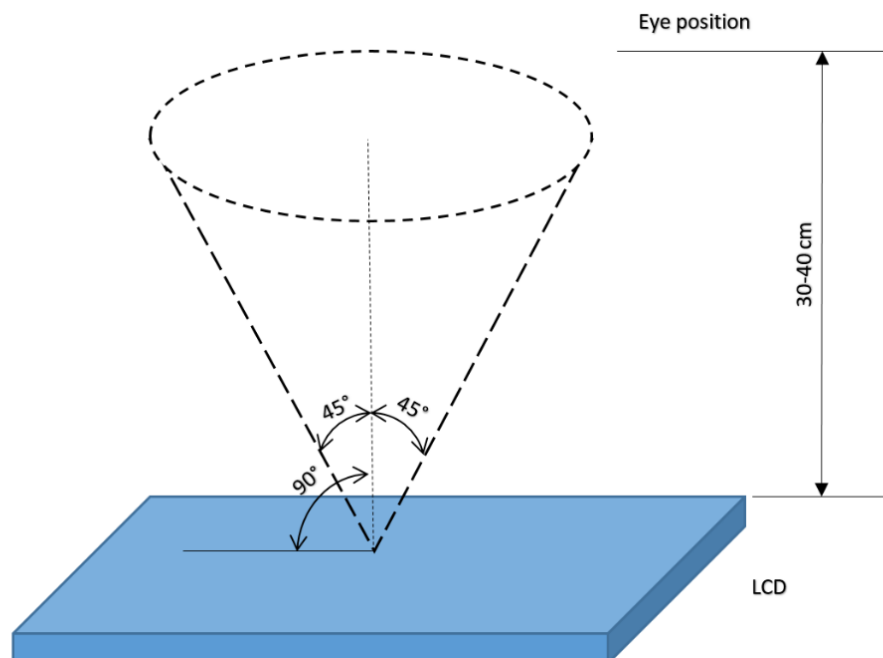
13.2 Inspection standard

ITEM	CRITERION		
Black spots, white spots, light leakage, Foreign Particle (round Type)	D=(x+y)/2 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

ITEM		CRITERION		
LCD black spots, white spots, light leakage (line Type)	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	0.10 < W	Not allowed

ITEM	CRITERION	
Bright/Dark 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 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

14. RELIABILITY TEST

NO.	TEST ITEM	TEST CONDITION
1	High Temperature Storage	80°C/120 hours
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℃, 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
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. 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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