



## RVT50HQHNWCA0

## 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)	120.70x 75.80 x 22.01	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	800	cd/m <sup>2</sup>
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	TBD	g

**Note 1.** RoHS3 compliant

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



1. REVISION RECORD

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



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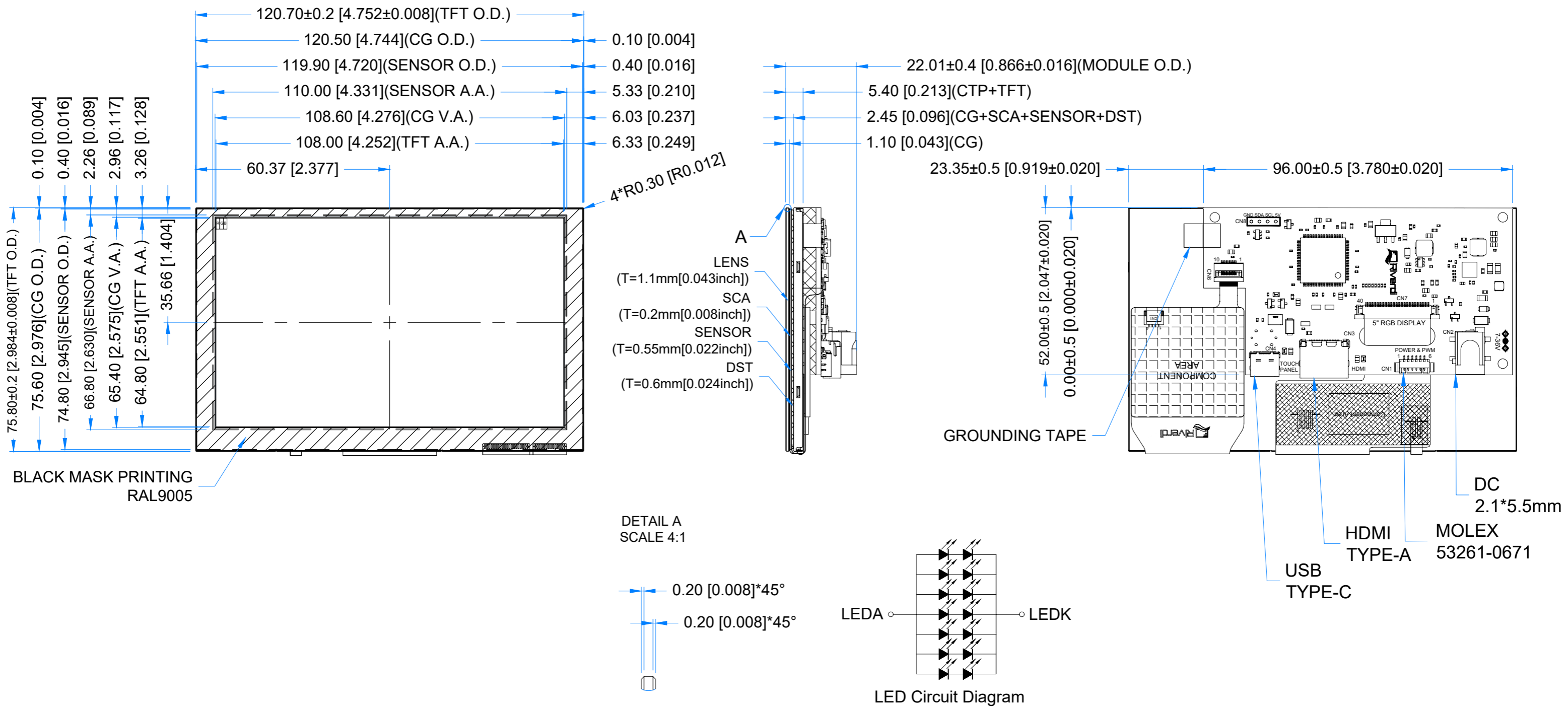


### 3. MODULE CLASSIFICATION INFORMATION

RV	T	50	H	Q	H	N	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	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	A0 – aTouch

Revision:	Changes:	Date:
1.0	Initial Case	2023.01.20



**LCM NOTES:**

- LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
- RESOLUTION: 800x480
- VIEWING ANGLE: FREE
- MODULE SURFACE LUMINANCE: 800 cd/m<sup>2</sup>
- CONTROLLER IC OF MAIN BOARD: TFP401APZPR
- VIDEO INTERFACE: HDMI
- POWER SUPPLY: POWER JACK (7.0-36.0V); USB-C.

**TP NOTES:**

- TP STRUCTURE: G+G
- CG THICKNESS: 1.10mm[0.043inch]
- SURFACE HARDNESS: 7H
- DRIVER IC: ILI2132A
- INTERFACE:USB-C

**GENERAL NOTES:**

- AIR BONDING BETWEEN TFT AND CTP
- OPERATING TEMPERATURE: -20°C ~ 70°C
- STORAGE TEMPERATURE: -30°C ~ 80°C
- WITHOUT INDIVIDUAL TOLERANCE: ±0.3mm[0.012inch]
- TOLERANCE OF PCB PLACEMENT: ±0.5mm[0.020inch]
- RoHS3 COMPLIANT

PN: RVT50HQHNWCA0

SN:

DRAWN: M.Natywa

CHECKED: Carol Gao

APPR:



2023.01.20	1:1.18	
2023.02.24	[mm]	
ISO A3	P. 1 of 1	



## 5. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Operating Temperature	T <sub>OP</sub>	-20	70	°C
Storage Temperature	T <sub>ST</sub>	-30	80	
Storage Humidity (@ 25 ± 5°C)	H <sub>ST</sub>	10	-	% RH
Operating Ambient Humidity (@ 25 ± 5°C)	H <sub>OP</sub>	10	-	

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

## 6. 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	IVILPWM	0	-		0.4	
	High Voltage	VIHPWM	1	-		VDD	
EN Logic Input Voltage	Low Voltage	IVILEN	0	-		1.2	
	High Voltage	VIHEN	1.35	-		VDD	
PWM Frequency	FPWM	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	BL	BL	UNIT	NOTE
		0%	50%	100%		
Current Drawn from VDD When VEN is active high	IVDD	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	IVDD	-	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	IVDDUSBC	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.

## 7. BACKLIGHT DRIVING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Power Consumption	WBL	-	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.

## 8. 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	-	30	40	ms	FIG 2.	4,7
Contrast Ratio	Cr		800	1000	-	---	FIG 3.	1,7
Luminance Uniformity	$\delta$ WHITE		-	75	80	%		3,7
Surface Luminance	Lv		-	800	-	cd/m <sup>2</sup>		2,7
Viewing Angle Range	$\theta$	$\varnothing = 90^\circ$	-	80	-	deg	FIG 4.	6
		$\varnothing = 270^\circ$	-	80	-			
		$\varnothing = 0^\circ$	-	80	-			
		$\varnothing = 180^\circ$	-	80	-			
CIE (x, y) Chromaticity	Rx	$\theta=0^\circ$ $\varnothing=0^\circ$ Ta=25 °C	0.575	0.615	0.655	-	FIG 3.	5,7
	Ry		0.296	0.336	0.376			
	Cx		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.

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

**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 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,  $T_r$ ) and from black to white (Decay Time,  $T_f$ ). 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.

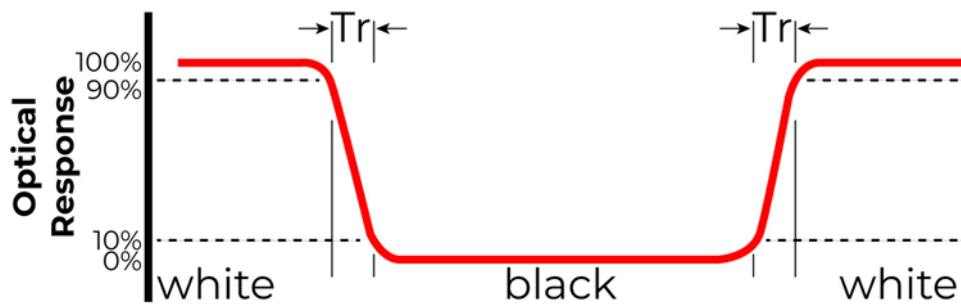


Figure 2. The definition of response time

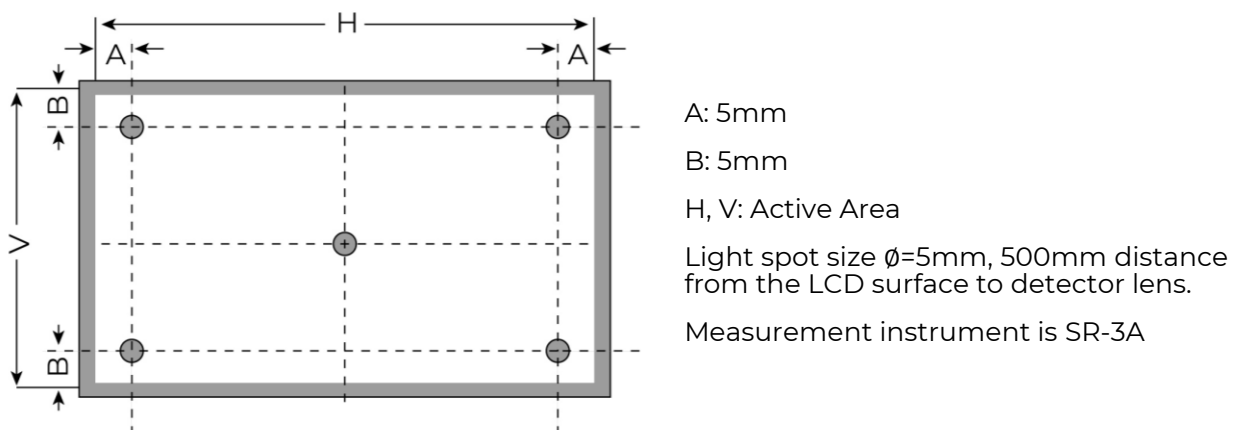


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity



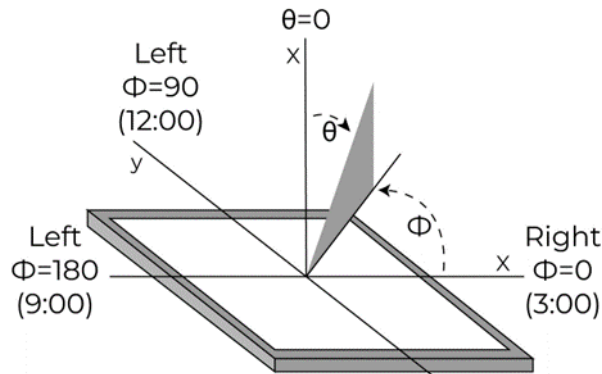
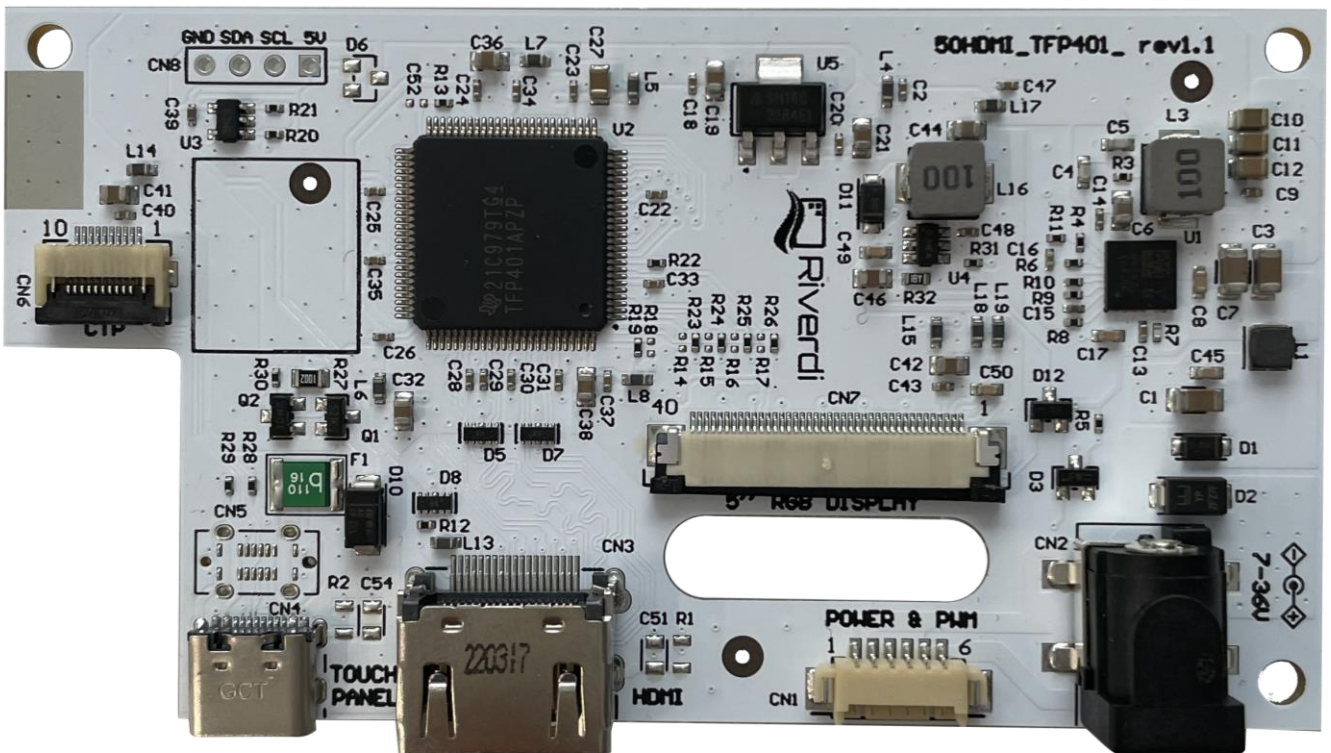


Figure 4. The definition of viewing angle

## 9. INTERFACE DESCRIPTION

### 9.1 PCB overview



### 9.2 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.



### 9.3 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.

### 9.4 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](mailto:contact@riverdi.com)

### 9.5 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](mailto:contact@riverdi.com)

## 10. DISPLAY SPECIFICATION

The TFT of the module applies Riverdi high brightness, IPS, 5.0" RGB: RVT50HQTNWCA0

For detailed information, please refer to datasheet of display.



## 11. CAPACITIVE TOUCH SCREEN PANLE SPECIFICATIONS

### 11.1 Mechanical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Touch Panel Size	5.0 inch	aTouch
Outline Dimension of CTP	120.50 mm x 75.60 mm	
Product Thickness	2.45 mm	
Glass Thickness	1.1 mm	
CTP View Area	108.60 mm x 65.40 mm	
Sensor Active Area	110.00 mm x 64.80 mm	
Structure type	Glass + Glass	
Surface Hardness	7H	

### 11.2 Electrical characteristics

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

## 12. INSPECTION

Standard acceptance/rejection criteria for TFT module

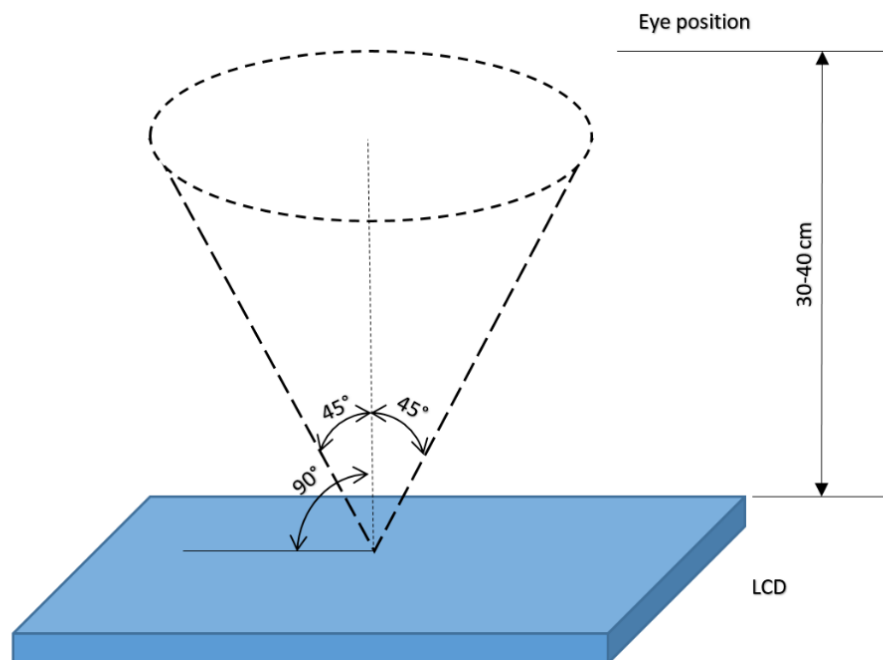
### 12.1 Inspection condition

Ambient conditions:

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

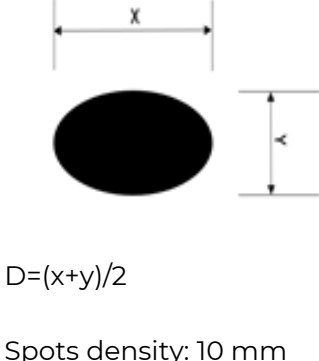
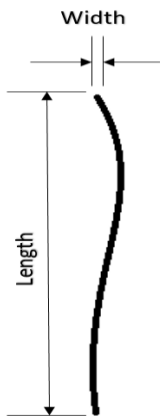
Viewing distance:  $35 \pm 5\text{cm}$  between inspector bare eye and LCD.

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)	 <p><math>D=(x+y)/2</math></p> <p>Spots density: 10 mm</p>	$3.5'' \leq \text{Size} \leq 5''$		
		Average Diameter	Qualified Qty	
		$D \leq 0.15 \text{ mm}$	Ignored	
		$0.15 \text{ mm} < D \leq 0.3 \text{ mm}$	N≤3	
		$0.3\text{mm} < D$	Not allowed	
LCD black spots, white spots, light leakage (line Type)	 <p>Spots density: 10 mm</p>	$3.5'' \leq \text{Size} \leq 5''$		
		Length	Width	Qualified Qty
		-	$W \leq 0.03$	Ignored
		$L \leq 3.0$	$0.03 < W \leq 0.05$	2
		$L \leq 3.0$	$0.05 < W \leq 0.1$	1
		$3.0 < L$	$0.10 < W$	Not allowed
Bright/Dark Dots	$3.5'' \leq \text{Size} \leq 5''$			
	Item	Qualified Qty		
	Bright dots	N ≤ 1		
	Dark dots	N ≤ 2		
Total Bright and Dark Dots		N ≤ 3		
Clear spots	$\text{Size} \leq 5''$			
	Average Diameter	Qualified Qty		
	$D < 0.2 \text{ mm}$	Ignored		
	$0.2 \text{ mm} < D < 0.3 \text{ mm}$	3		
	$0.3 \text{ mm} < D < 0.5 \text{ mm}$	2		
	$0.5 \text{ mm} < D$	0		
Spots density: 10 mm				
Polarizer bubbles	$3.5'' \leq \text{Size} \leq 5''$			
	Average Diameter	Qualified Qty		
	$D \leq 0.2 \text{ mm}$	Ignored		
	$0.2 \text{ mm} < D \leq 0.3 \text{ mm}$	2		
	$0.2 \text{ mm} < D \leq 0.5 \text{ mm}$	1		
	$0.5 \text{ mm} < D$	0		
	Total Q'ty	3		
$\text{Size} \leq 5''$				



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

### 13. 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°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
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.



## 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.

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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