



RVT101HVLFWCA0

## IPS LVDS 10.1" LCD TFT DATASHEET

Rev.1.1

2021-09-09

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 <sup>2</sup>
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	<p>Correcting the Operating/standby current</p> <p>From:</p> <table border="1"> <tr> <td>Operating Current</td> <td><math>I_{VDD=3.3V}</math></td> <td>-</td> <td>15</td> <td>20</td> </tr> <tr> <td>Standby Current</td> <td><math>I_{ST}</math></td> <td>-</td> <td>-</td> <td>25</td> </tr> </table> <p>To:</p> <table border="1"> <tr> <td>Operating Current</td> <td><math>I_{VDD=3.3V}</math></td> <td>-</td> <td>280</td> <td>420</td> </tr> <tr> <td>Standby Current</td> <td><math>I_{ST}</math></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																			



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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.

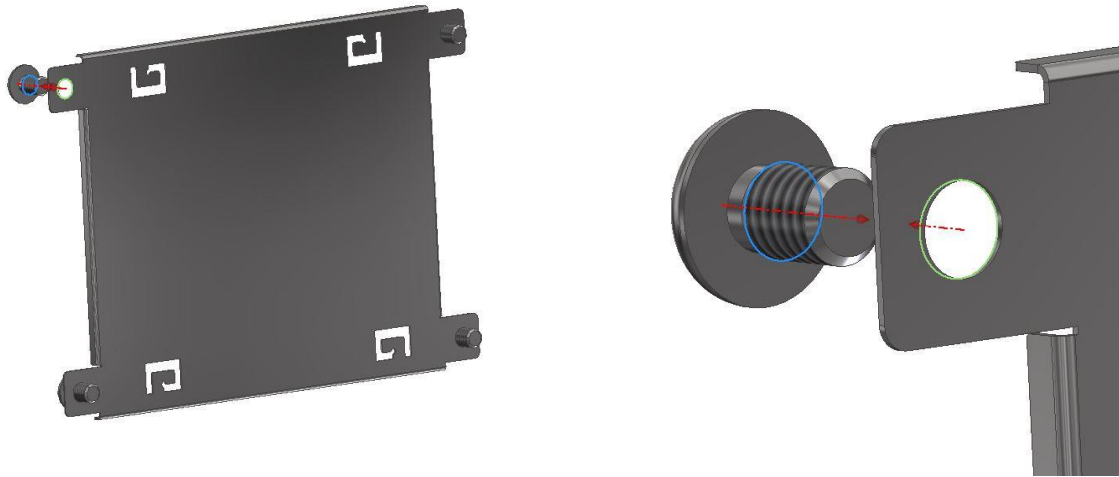
NO.	PARAMETER	SYMBOL
1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard
3.	DISPLAY SIZE	101 – 10.1"
4.	MODEL SERIAL NO.	H – High Brightness, IPS
5.	RESOLUTION	V – 1280 x 800 px
6.	INTERFACE	L – TFT LCD, LVDS
7.	FRAME	F – With Mounting Metal Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	C – With Capacitive Touch Panel
10.	VERSION	A0 – aTouch

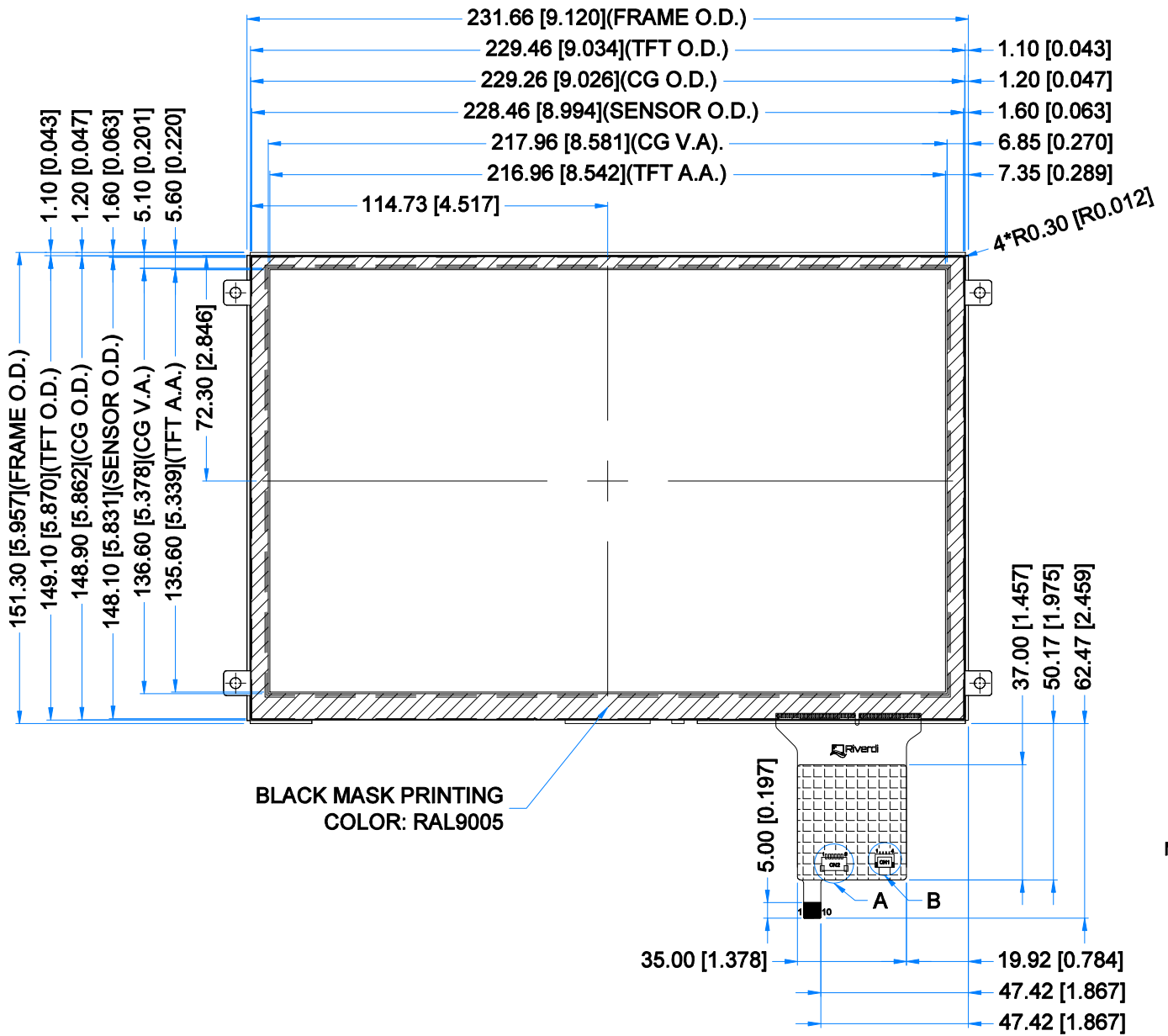
## 4. ASSEMBLY GUIDE

### 4.1 Mounting frame

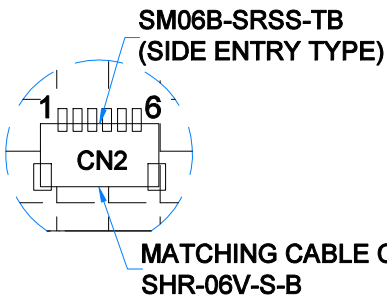
For dimensions 3.5", 4.3", 5.0", 7.0" and 10.1", the product with mounting frame version is available. Thanks to the four catches attached to the side, frame provides strong assembly to the surface by mounting element (like the screw, see Figure 1). The frames are specially designed to fit Riverdi products perfectly. The diameter of the mounting hole is 3.5mm.

Figure 1. Mounting frame

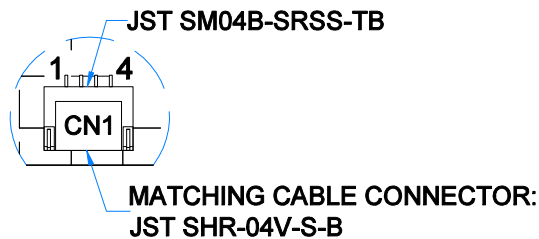




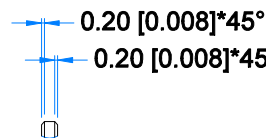
DETAIL A  
 SCALE 4:1



DETAIL B  
 SCALE 4:1



DETAIL C  
 SCALE 4:1



**TFT NOTES:**

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

**TP NOTES:**

1. TP STRUCTURE: G+G
2. CG THICKNESS: 1.10mm
3. SURFACE HARDNESS: 7H
4. DRIVER IC: ILI2132A
5. INTERFACE: USB; I2C; OPTIONAL UART
6. OPERATING VOLTAGE: 3.3V(CTP I2C); 5.0V(CTP USB);

**GENERAL NOTES:**

1. MODULE SURF
2. OPERATING T
3. STORAGE TE
4. WITHOUT IND  
 $\pm 0.3mm[0.012]$
5. RoHS COMPL



## 6. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage for Module	V <sub>DD</sub>	-0.3	3.9	V
Operating Temperature	T <sub>OP</sub>	-20	70	°C
Storage Temperature	T <sub>ST</sub>	-30	80	°C

**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 <sub>DD</sub>	2.6	3.3	3.6	V
Operating Current	I <sub>VDD=3.3V</sub>	-	280	420	mA
Standby Current	I <sub>ST</sub>	-	1.5	2.0	mA

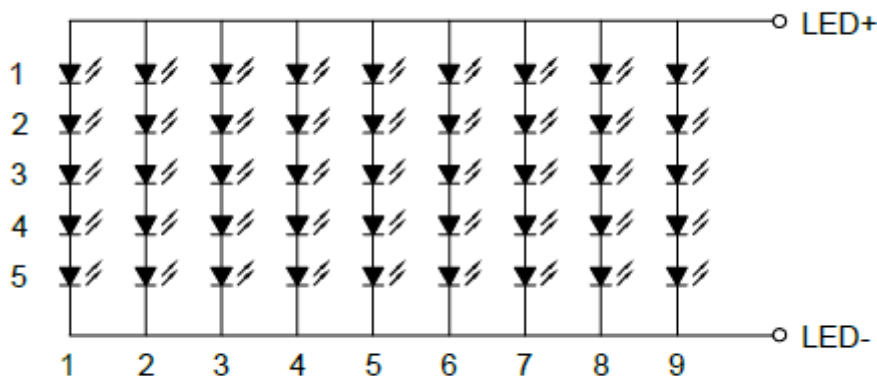
## 8. BACKLIGHT ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Driving Voltage	V <sub>F</sub>	15.0	16.0	17.0	V	
Backlight Driving Current	I <sub>F</sub>	315	360	405	mA	
Backlight Power Consumption	W <sub>BL</sub>	-	5760	-	mW	
LED Lifetime	-	-	50,000	-	hours	Note 1

**Note 1.** Each LED: I<sub>F</sub> =40 mA, V<sub>F</sub>=3.2 ±0.2V.

**Note 2.** Optical performance should be evaluated at T<sub>a</sub>=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	$\delta$ WHITE		-	75	-	%	FIG 3.	3
Surface Luminance	Lv		-	800	-	cd/m <sup>2</sup>	FIG 3.	2
Viewing Angle Range	$\theta$	$\varnothing = 90^\circ$	75	85	-	deg	FIG 4.	6
		$\varnothing = 270^\circ$	75	85	-	deg	FIG 4.	
		$\varnothing = 0^\circ$	75	85	-	deg	FIG 4.	
		$\varnothing = 180^\circ$	75	85	-	deg	FIG 4.	
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  $\delta$  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, Tr) and from black to white (Decay Time, Tf). For additional information see Figure 2. The test equipment is Autronic-Melchers's ConoScope series.

**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.** Viewing angle is the angle at which the contrast ratio is greater than 2. 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.** For viewing angle and response time testing, the testing data is based on Autronic-Melchers's ConoScope series. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, CIE the test data is based on TOPCON's BM-5 photo detector.

Figure 2. The definition of response time

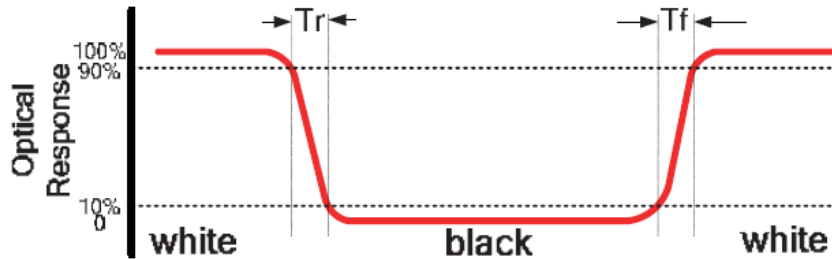


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

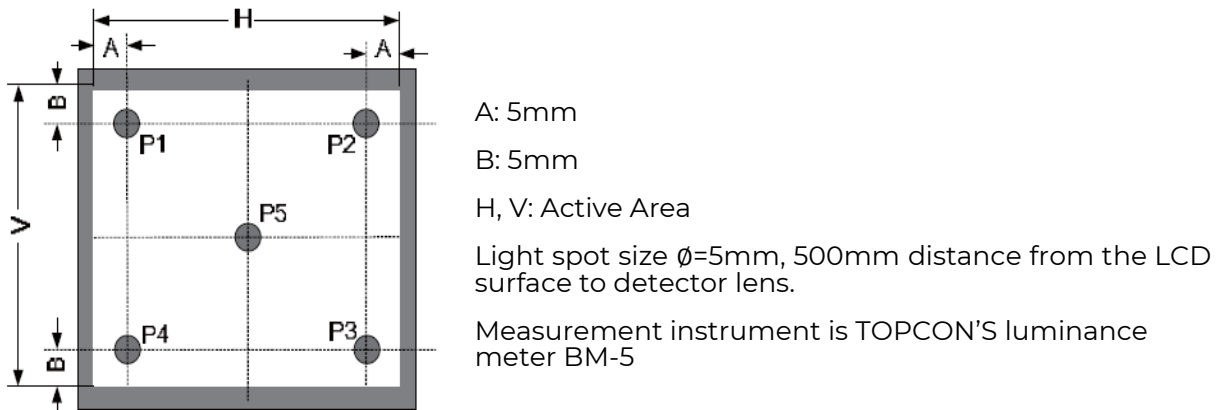
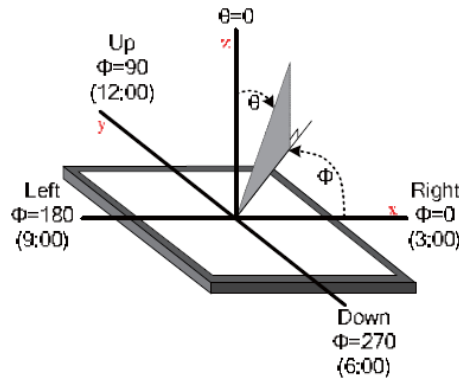


Figure 4. The definition of viewing angle





## 10. INTERFACES DESCRIPTION

### 10.1 TFT assignment

PIN NO.	SYMBOL	I/O	DESCRIPTION
1	NC	-	No Connection
2	V <sub>DD</sub>	P	Power Supply, 3.3V
3	V <sub>DD</sub>	P	Power Supply, 3.3V
4	NC	-	No Connection
5	NC	-	No Connection
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	NC	-	No Connection
27	NC	-	No Connection
28	NC	-	No Connection
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

PIN NO.	SYMBOL	DESCRIPTION	NOTE
1	USB_GND	USB_ Ground	
2	USB_VDD	USB Power for CTP, 5.0V	
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	
7	I2C_RST	I2C _Reset Pin, Active low	Note 1
8	I2C_SCL	I2C _Clock Input	
9	I2C_INT	I2C _Interrupt Signal from CTP, Active low	
10	I2C_SDA	I2C _Data Signal	

**Note 1.** External pull-up resistors are required.

## 10.3 CON1 assignment

PIN NO.	SYMBOL	DESCRIPTION
1	USB_VDD	USB_Power for CTP, DC 5.0V
2	USB_D-	USB _Data Signal -
3	USB_D+	USB _Data Signal +
4	USB_GND	USB_Ground

## 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	

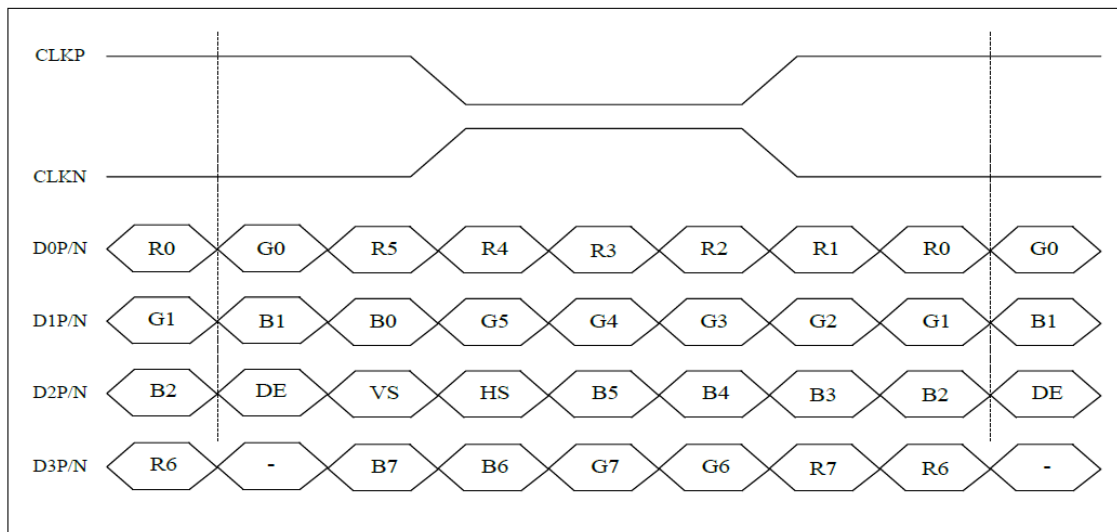
**Note 1.** External are required.



## 11. TIMING CHARACTERISTICS

### 11.1 LVDS interface characteristic

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



**Note 1: Control signals** DE VS HS: Active Low

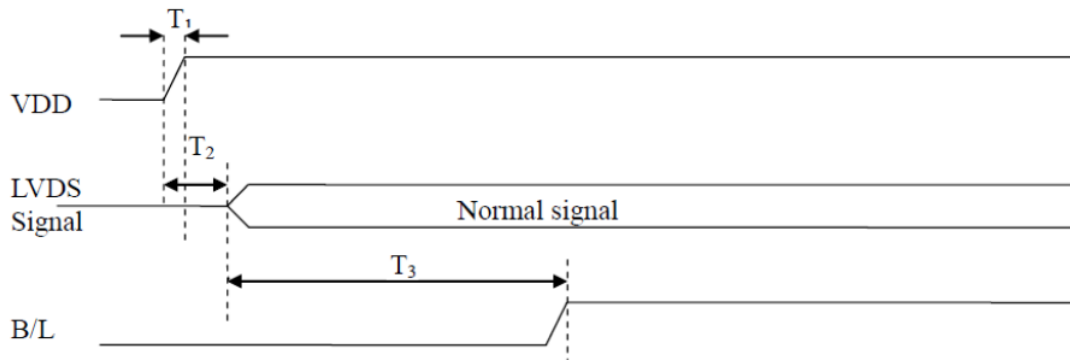
### 11.2 Timing table

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	



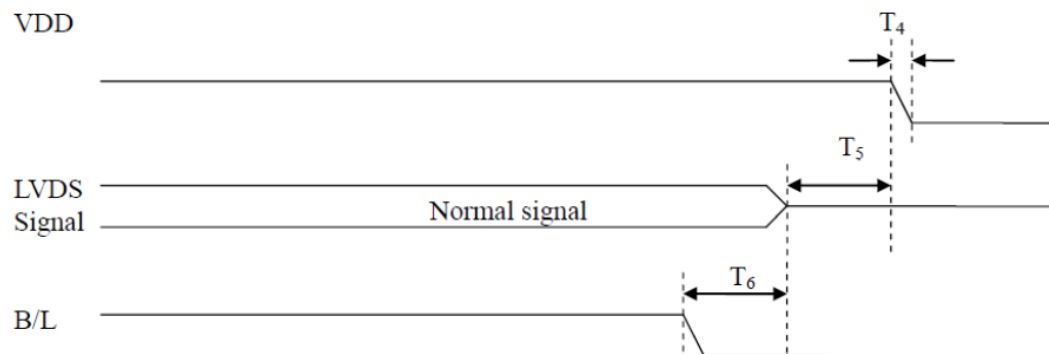
### 11.3 Power ON/OFF sequence

#### 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

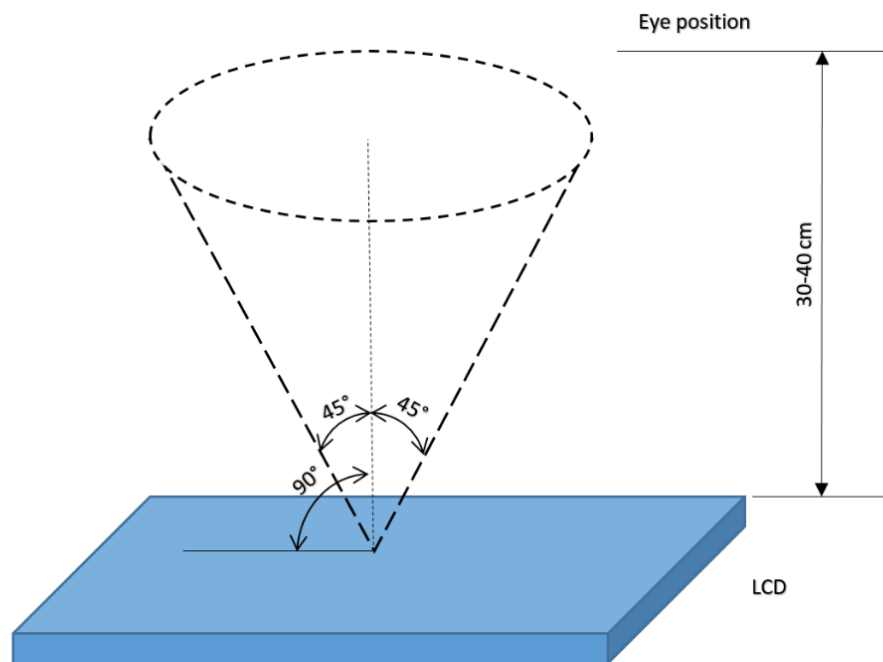
### 13.1 Inspection condition

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.

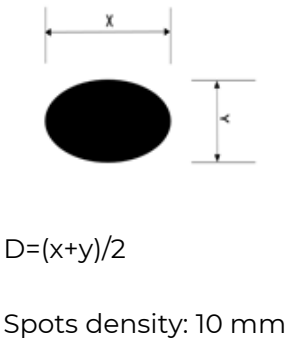
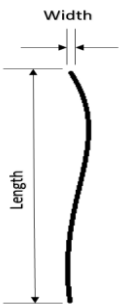
Viewing Angle: U/D:  $45^{\circ}/45^{\circ}$ , L/R:  $45^{\circ}/45^{\circ}$





### 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)		Size = 10.1"		
		Average Diameter	Qualified Qty	
		$D \leq 0.2 \text{ mm}$	Ignored	
		$0.2 \text{ mm} < D \leq 0.3 \text{ mm}$	N≤4	
		$0.5\text{mm} < D$	Not allowed	
LCD black spots, white spots, light leakage (line Type)		Size = 10.1"		
		Length	Width	Qualified Qty
		-	$W \leq 0.05$	Ignored
		$L \leq 5.0$	$0.05 < W \leq 0.1$	N≤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		
Clear spots	Size ≥ 5.0"			
	Average Diameter	Qualified Qty		
	$D < 0.2 \text{ mm}$	Ignored		
	$0.2 \text{ mm} < D < 0.3 \text{ mm}$	4		
	$0.3 \text{ mm} < D < 0.5 \text{ mm}$	2		
	$0.5 \text{ mm} < D$	0		
Touch panel spots	Size ≥ 5.0"			
	Average Diameter	Qualified Qty		
	$D < 0.25 \text{ mm}$	Ignored		
	$0.25 \text{ mm} < D < 0.5 \text{ mm}$	4		
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

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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