



TFT MODULE SPECIFICATION

RVA15MD-NUCLEO64A

HB, IPS 1.54" display datasheet
Rev. 1.0
2024-10-21

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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 ²
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	

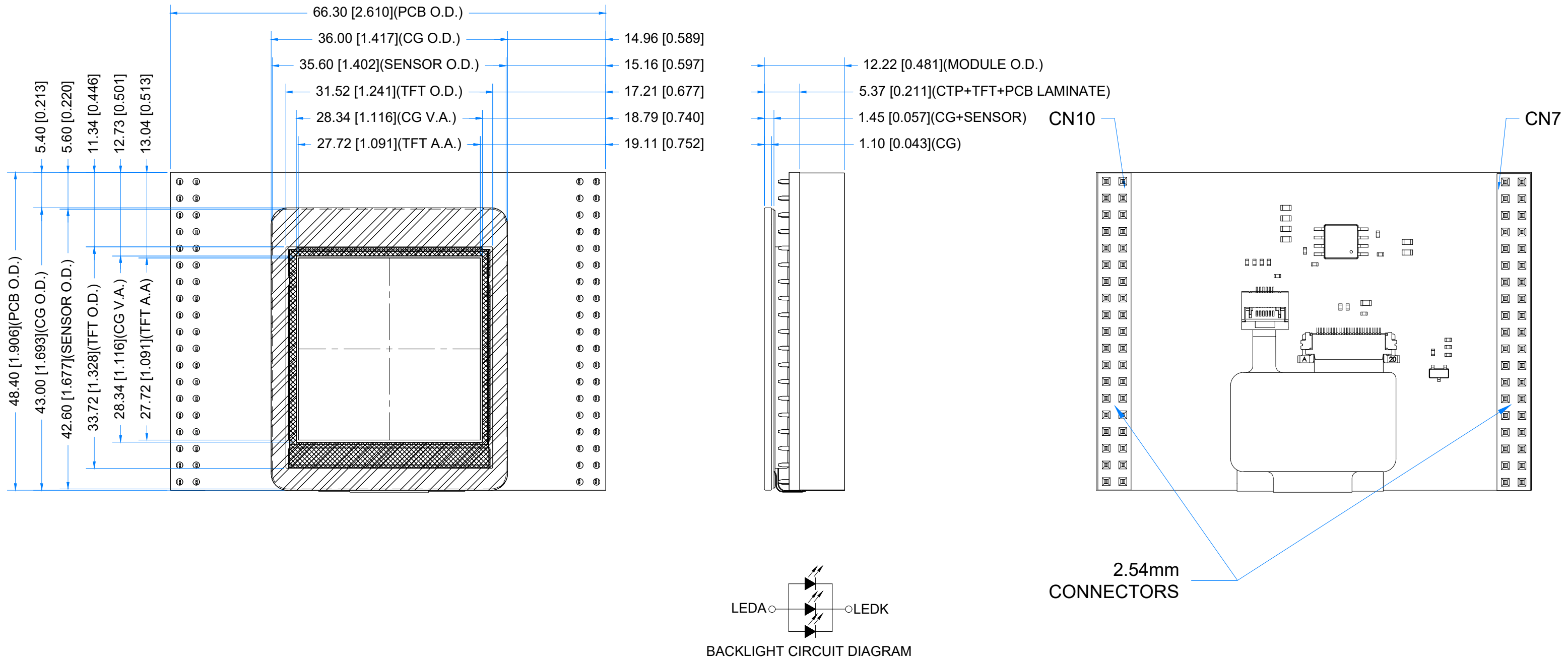
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3. MODULE CLASSIFICATION INFORMATION

RV	A	15	M	D	NUCLEO	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	NUCLEO – goldpins for Nucleo board
7.	NUMBER OF PINS	64
8.	VERSION	A – 8MB NOR Flash memory



TFT NOTES: 1. DISPLAY TYPE: TFT, TRANSMISSIVE, NORMALLY BLACK 2. RESOLUTION: 240*240 3. VIEWING ANGLE: FREE 4. DRIVER IC: ST7789 5. OPERATING VOLTAGE: Vcc=2.8V 6. SURFACE LUMINANCE: 500cd/m ² 7. BACKLIGHT: 3LEDS, V _f =3.2V, I _f =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-NUCLEO64A			
			SN:			
			DRAWN: M.Natywa		2024.09.06	1:0.58
CHECKED: M.Wierzbowski		2024.09.06	[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 _{2.8}	-0.3	4.6	V
Input Voltage	V _{IN}	-0.3	V _{DD} +0.3	V
Operating temperature	T _{OP}	-20	70	°C
Storage temperature	T _{ST}	-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 _{CC}	2.5	2.8	3.3	V
System power supply current	I _{VCC}	-	44	-	mA
Input High Voltage for LCD	V _{IH}	0.7IOVCC	-	IOVCC	V
Input Low Voltage for LCD	V _{IL}	VSS	-	0.3IOVCC	V
Output High Voltage for LCD	V _{OH}	0.8IOVCC	-	IOVCC	V
Output Low Voltage for LCD	V _{OL}	VSS	-	0.2IOVCC	V

7. BACKLIGHT ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Driving Voltage	V_{LED}	-	3.2	-	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 ²		2, 7
Viewing Angle Range	θ	$\theta = 90^\circ$	-	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.

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

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, 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.

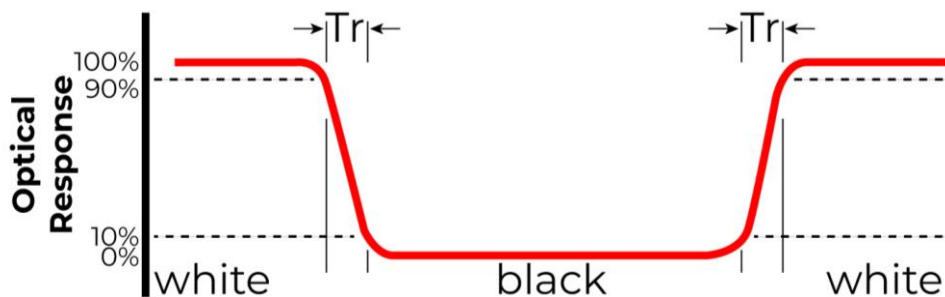


Figure 1. The definition of response time

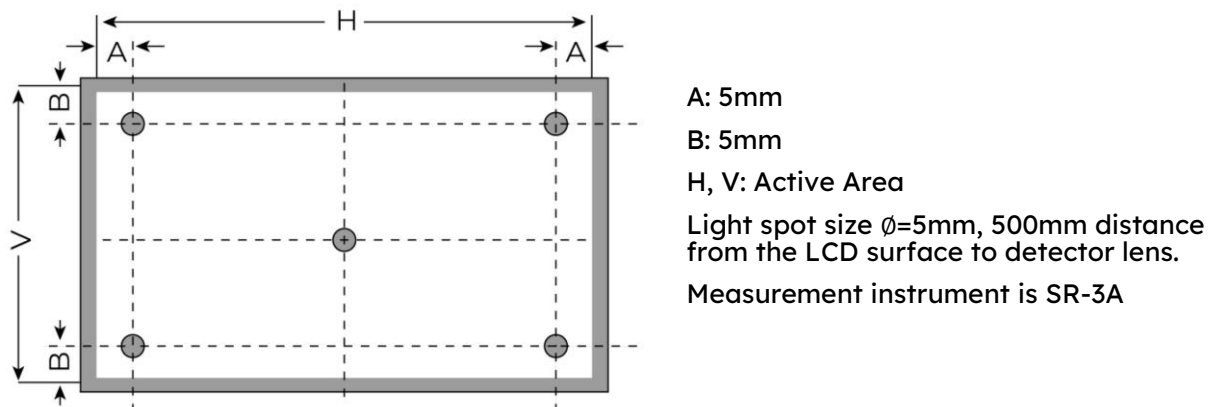


Figure 2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

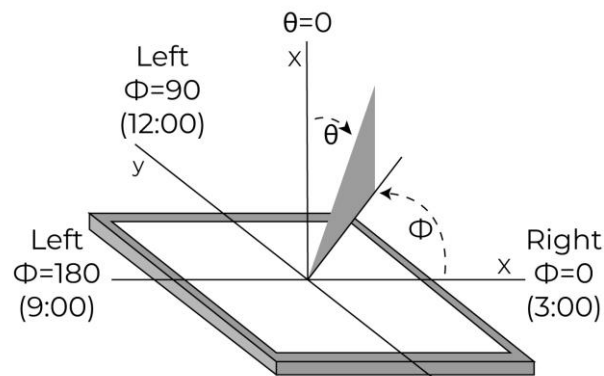
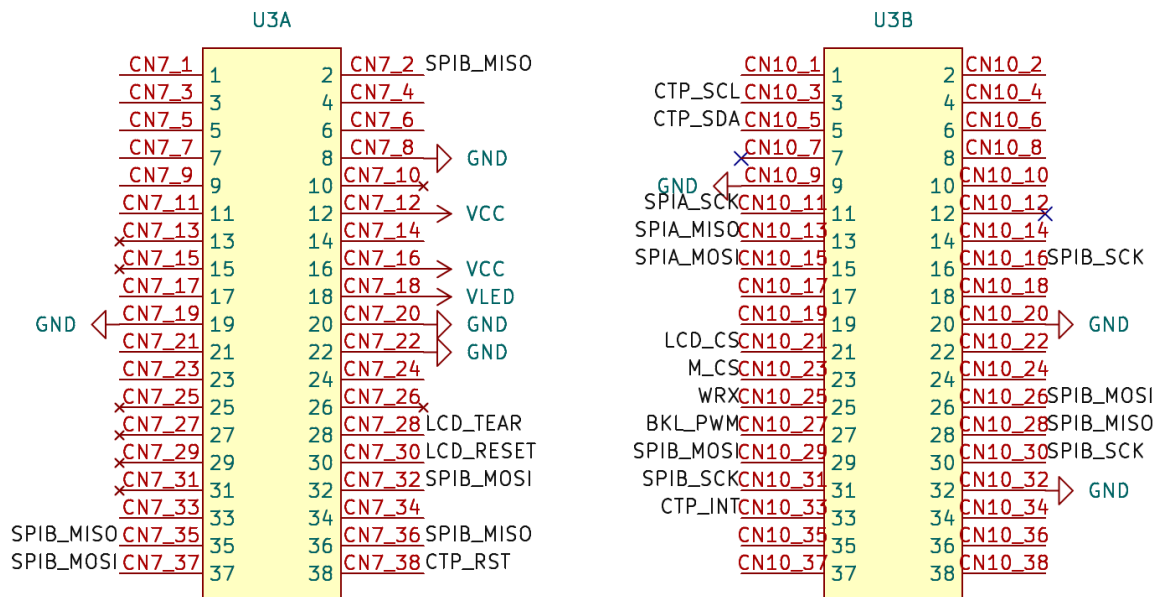


Figure 3. The definition of viewing angle

9. INTERFACES DESCRIPTION



9.1 CN7

PIN	SYMBOL	DESCRIPTION	I/O
2	SPIB_MISO	SPI data output	O
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

32	SPIB_MOSI	SPI data input	I
35	SPIB_MISO	SPI data output	O
36	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
2	SPIB_MISO	SPI data output	O
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
32	SPIB_MOSI	SPI data input	I
35	SPIB_MISO	SPI data output	O
36	SPIB_MISO	SPI data output	O
37	SPIB_MOSI	SPI data input	I
38	CTP_RST	CTP Reset	I

10. EXTERNAL MEMORY

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

11. CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

11.1 Mechanical characteristics

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

11.2 Electrical characteristics

DESCRIPTION	SPECIFICATION
Controller	ILI2130
Resolution	240x240
Device address 7-bit	0x41

12. INSPECTION

Standard acceptance/rejection criteria for TFT module

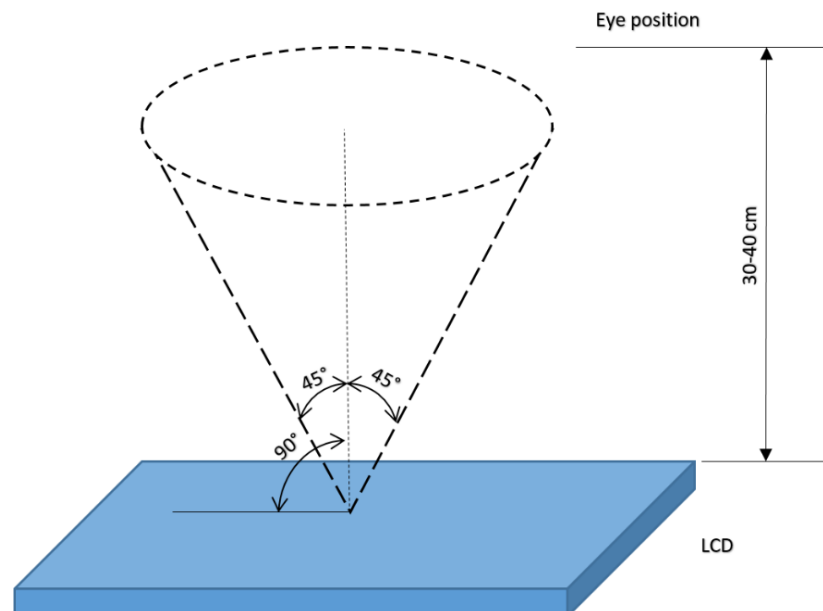
12.1 Inspection condition

Ambient conditions:

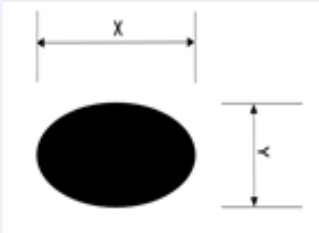
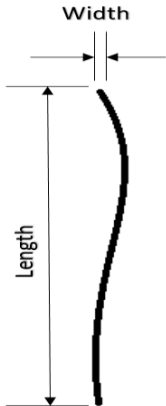
- Temperature: $25 \pm 2^{\circ}\text{C}$
- Humidity: $(60 \pm 10) \% \text{RH}$
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

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)	 $D=(x+y)/2$ Spots density: 10 mm	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)	 Spots density: 10 mm	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	Size < 5"			
	Item		Qualified Qty	
	Bright dots		1	
	Dark dots		1	
	Total Bright and Dark Dots		1	
Clear spots	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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