



RVT50HQTFWN00

IPS RGB 5.0" LCD TFT DATASHEET

Rev.1.1
2021-07-28

ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally black/IPS	/
Size	5.0	Inch
Viewing Direction	Free	/
Outside Dimensions (W x H x D)	137.50 x 76.60 x 3.48	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 x 480 (RGB)	/
Brightness	1000	cd/m ²
LCD Interface Type	RGB	/
Color Depth	16.7 M	/
Pixel Arrangement	RGB Vertical Stripe	/
LCD Driver	ST7262-G4	/
With/Without Touch	Without Touch Panel	/
Surface Treatment	Anti-Glare	/
LCD Input Voltage	3.3	V
Weight	74	g

Note 1: RoHS3 compliant**Note 2:** LCM weight tolerance: $\pm 5\%$.



1. REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2020-08-05	Initial Release	
1.1	2021-07-28	Updating new template	



2. CONTENTS

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3. MODULE CLASSIFICATION INFORMATION

RV	T	50	H	Q	T	F	W	N	00
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

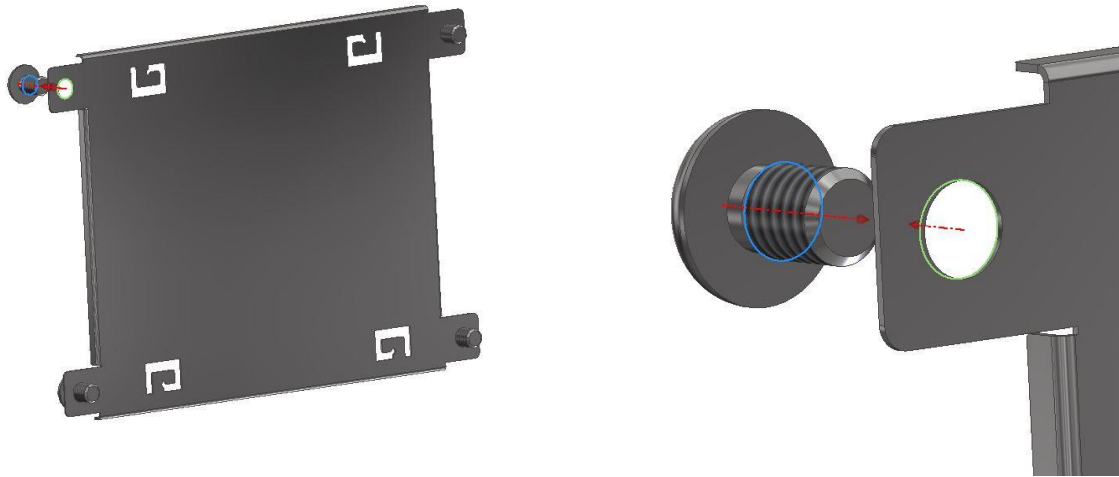
NO.	PARAMETER	SYMBOL
1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard
3.	DISPLAY SIZE	50 – 5.0"
4.	MODEL SERIAL NO.	H – High Brightness, IPS
5.	RESOLUTION	Q – 800 x 480 px
6.	INTERFACE	T – TFT LCD, RGB
7.	FRAME	F – With Mounting Metal Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	N – Without Touch Panel
10.	VERSION	00 – (00-99)

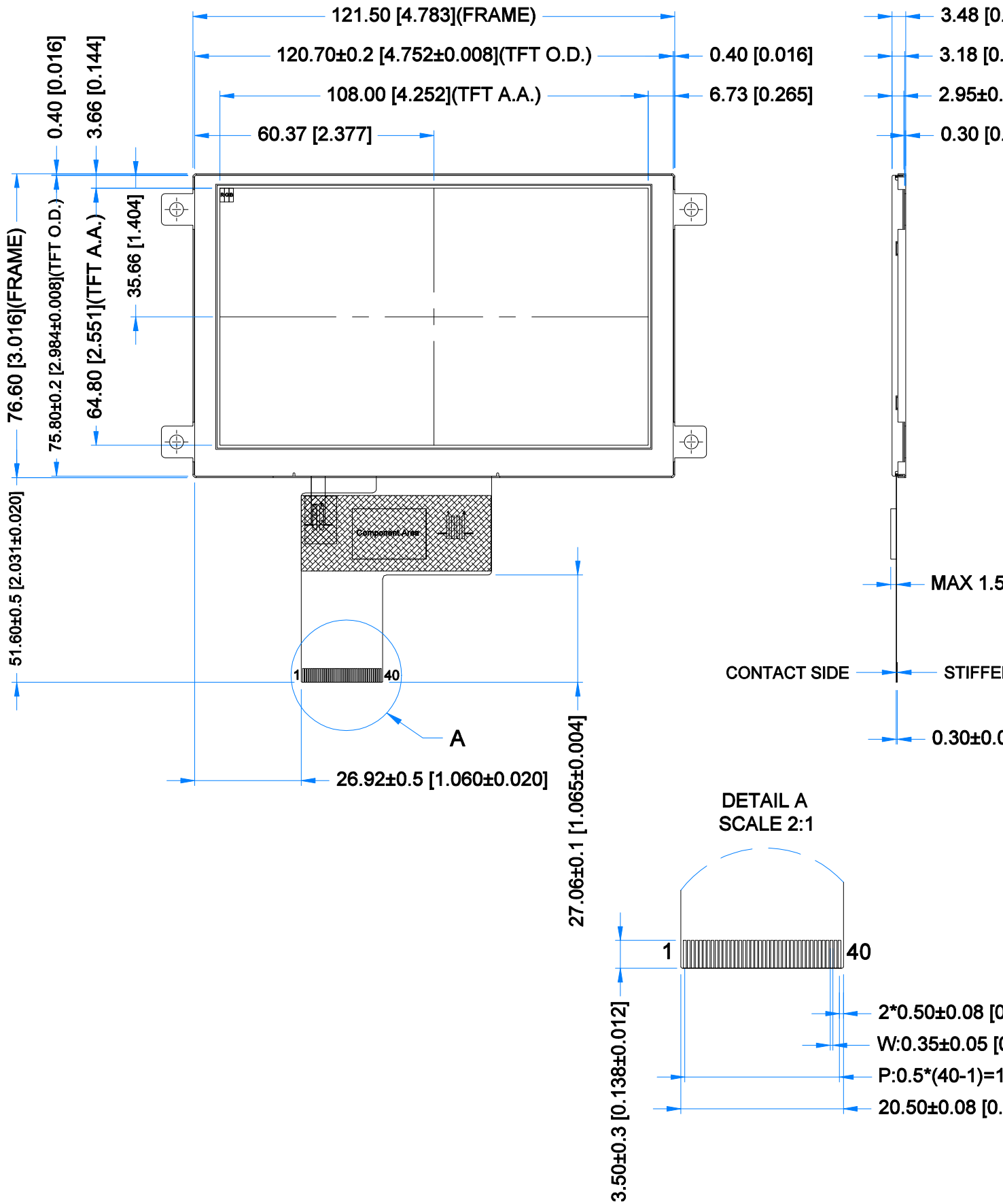
4. ASSEMBLY GUIDE

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





TFT NOTES:

1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
2. RESOLUTION: 800x480
3. VIEWING ANGLE: FREE
4. IC CONTROLLER: ST7262-G4
5. OPERATING VOLTAGE: 3.3V
6. SURFACE LUMINANCE: 1000 cd/m²
7. BACKLIGHT: 14-LED WHITE, Vf=12.0V, If=140mA

GENERAL NOTES:

1. OPERATING TEMPERATURE: -20°C ~ 70°C
2. STORAGE TEMPERATURE: -30°C ~ 80°C
3. WITHOUT INDIVIDUAL TOLERANCE: ±0.2mm[0.008inch]
4. RoHS COMPLIANT



6. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Operating Ambient temperature	T_{OP}	-20	70	°C
Storage Temperature	T_{ST}	-30	80	°C
Operating Ambient Humidity	H_{OP}	10	-	% RH
Power for Circuit Driving	V_{DD}	-0.3	5	V
Backlight Forward Current	I_{LED}	-	25	mA

Note. The above are maximum values. If exceeded, they may cause permanent damage to the unit.

7. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	
Power Supply for analog circuit	V_{DD}	3.0	3.3	3.6	V	
Logic Input Voltage	Low Voltage	V_{IL}	0	-		$0.3V_{DD}$
	High Voltage	V_{IH}	$0.7V_{DD}$	-		V_{DD}
Logic Output Voltage	Low Voltage	V_{OL}	-	-		0.4V
	High Voltage	V_{OH}	$V_{DD} - 0.4V$	-	-	
Power Consumption	Black Mode	P_b	-	80	85	mA
	Standby Mode	P_w	-	40	50	µA

8. BACKLIGHT ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Driving Voltage	V_F	11.2	12.0	12.8	V	Notes 1, 2
Backlight Driving Current	I_F	-	140	-	mA	
Backlight Power Consumption	W_{BL}	-	1680	-	mW	
Backlight Lifetime	-	-	50,000	-	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. Should this range be exceeded, the operation cannot be guaranteed even if the values may be without the absolute maximum ratings.

Note 3. If LED is driven by high current, the lifetime of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating lifetime is estimated data.

9. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	RMK	NOTE
Response Time	Tr+Tf	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25 °C	-	30	-	ms	FIG 2.	4
Contrast Ratio	Cr		-	1000	-	---	FIG 3.	1
Luminance Uniformity	δ WHITE		-	75	-	%	FIG 3.	3
Surface Luminance	Lv		900	1000	-	cd/m ²	FIG 3.	2
Viewing Angle Range	θ	$\phi = 90^\circ$	-	80	-	deg	FIG 4.	6
		$\phi = 270^\circ$	-	80	-	deg	FIG 4.	
		$\phi = 0^\circ$	-	80	-	deg	FIG 4.	
		$\phi = 180^\circ$	-	80	-	deg	FIG 4.	
CIE (x, y) Chromaticity	Rx	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25 °C	0.575	0.615	0.655	-	FIG 3.	5
	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		0.295	0.336	0.378	-		

Note 1. Contrast Ratio (CR) is defined mathematically as below, for more information see **Błąd! Nieprawidłowy odsyłacz do zakładki: wskazuje na nią samą.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 3.

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

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 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 **Błąd! Nieprawidłowy odsyłacz do zakładki: wskazuje na nią samą.1.** 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

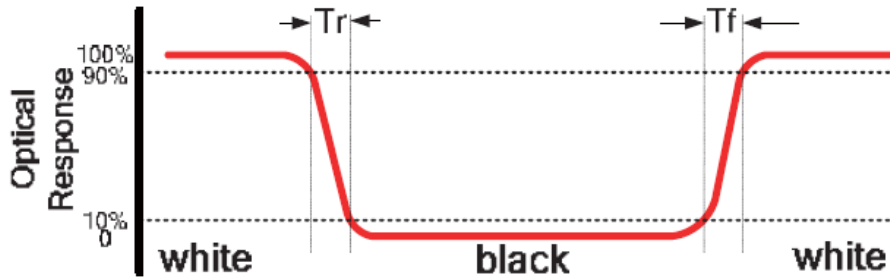


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

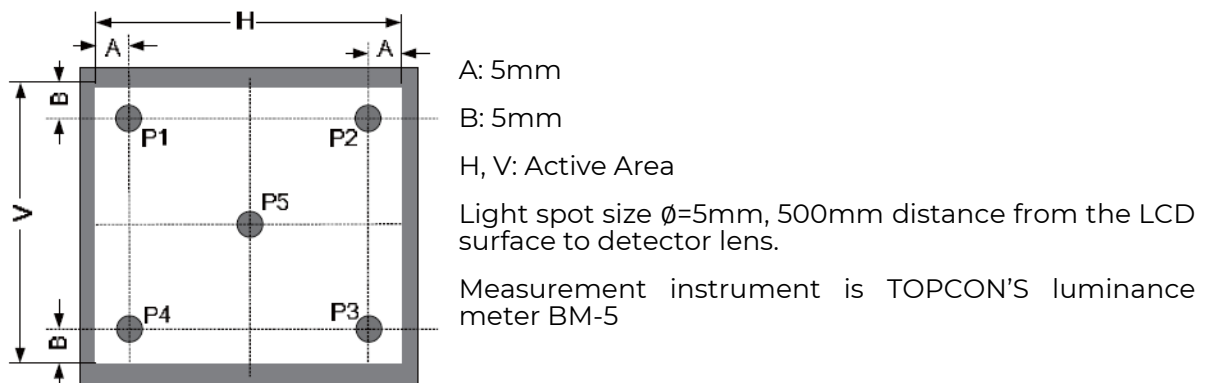
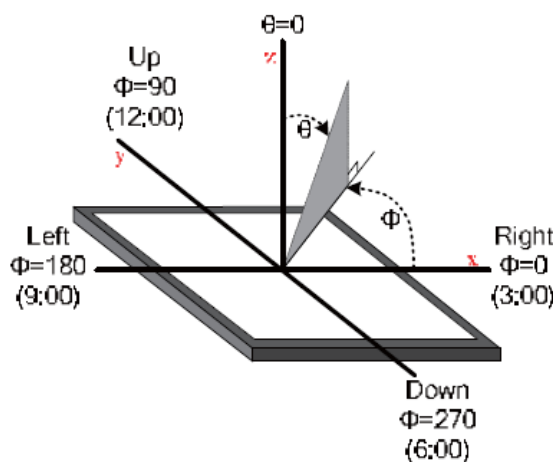
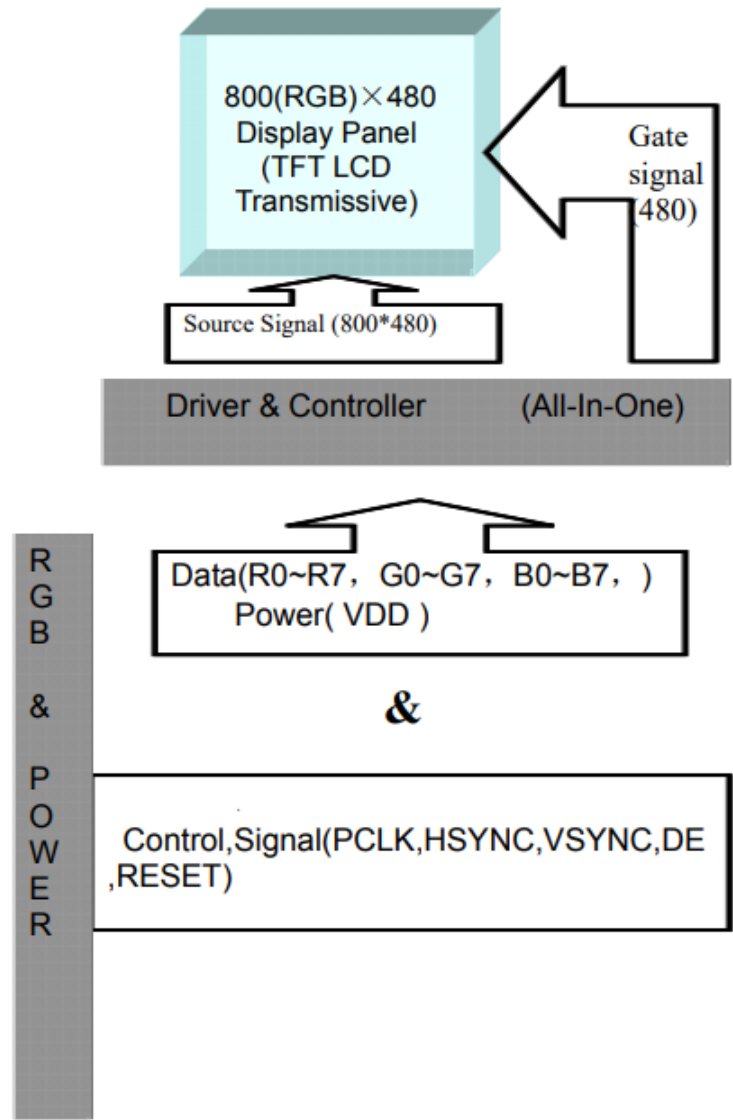


Figure 4. The definition of viewing angle





10. BLOCK DIAGRAM





11. INTERFACES DESCRIPTION

11.1 TFT assignment

PIN NO.	SYMBOL	DESCRIPTION
1	VLED-	Backlight Power Input PIN Cathode
2	VLED+	Backlight Power Input PIN Anode
3	GND	Ground
4	VDD	Power Supply Voltage
5-12	R0-R7	Red Data
13-20	G0-G7	Green Data
21-28	B0-B7	Blue Data
29	GND	Ground
30	DCLK	Clock for Input Data
31	DISP	Display on/off Control
32	HSYNC	Horizontal Synchronized Signal
33	VSYNC	Vertical Synchronized Signal
34	DE	Data Input Enable
35	NC	Not Connect
36	GND	Ground
37	NC	No Connection
38	NC	No Connection
39	NC	No Connection
40	NC	No Connection



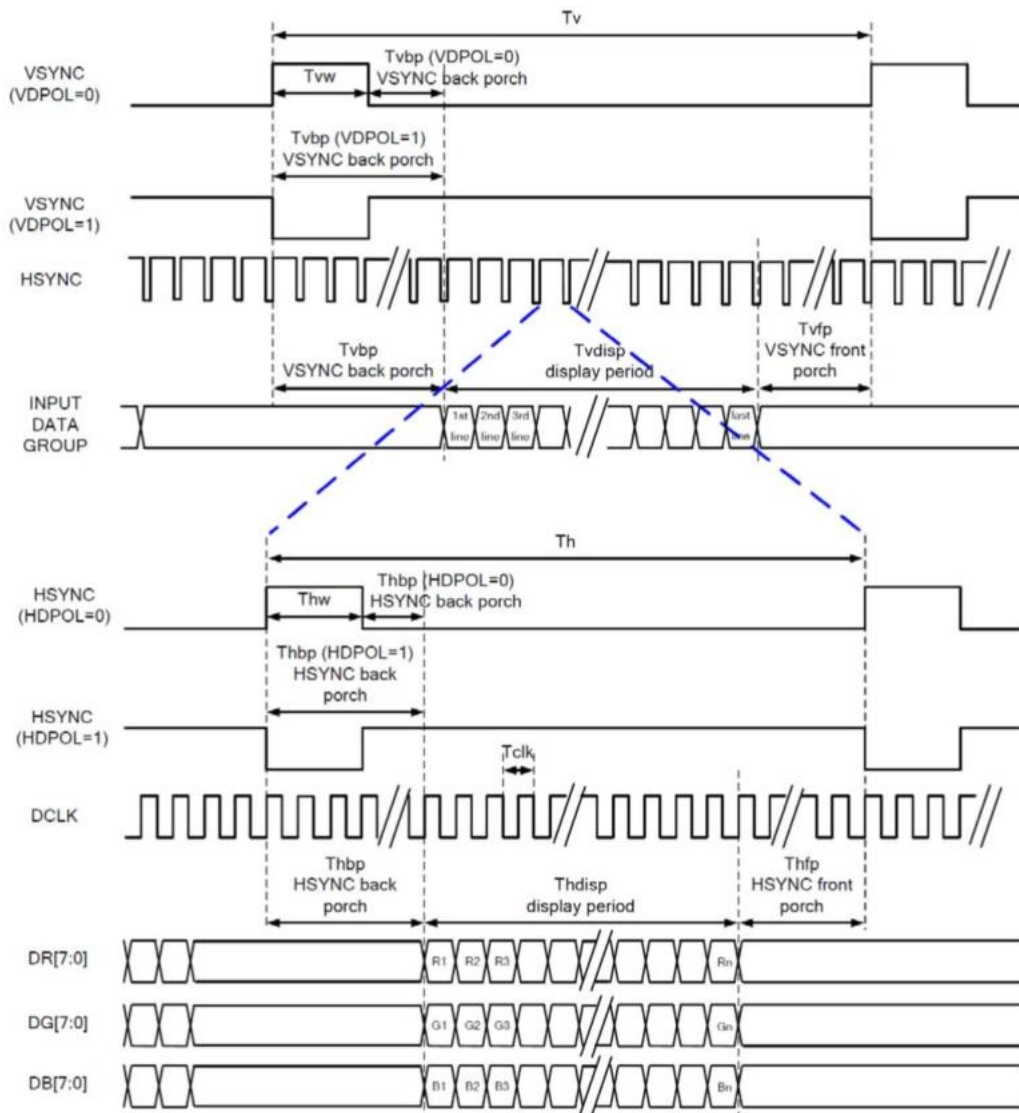
12. TIMING CHARACTERISTICS

12.1 RGB mode selection

RGB MODE SELECTION	DCLK	HSYNC	VSYNC	DE
SYNC-DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

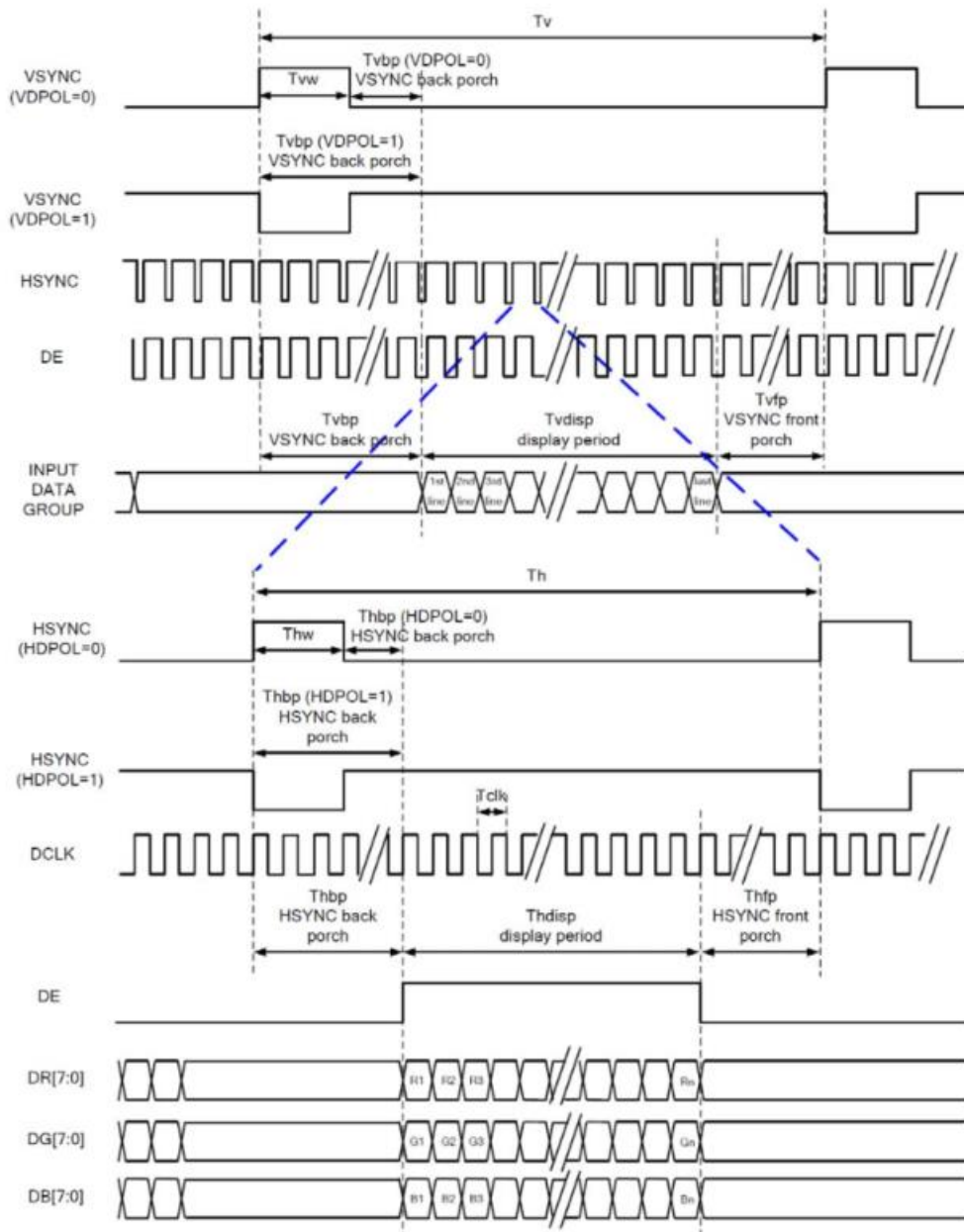
12.2 System bus timing for RGB interface

12.2.1 SYNC Mode



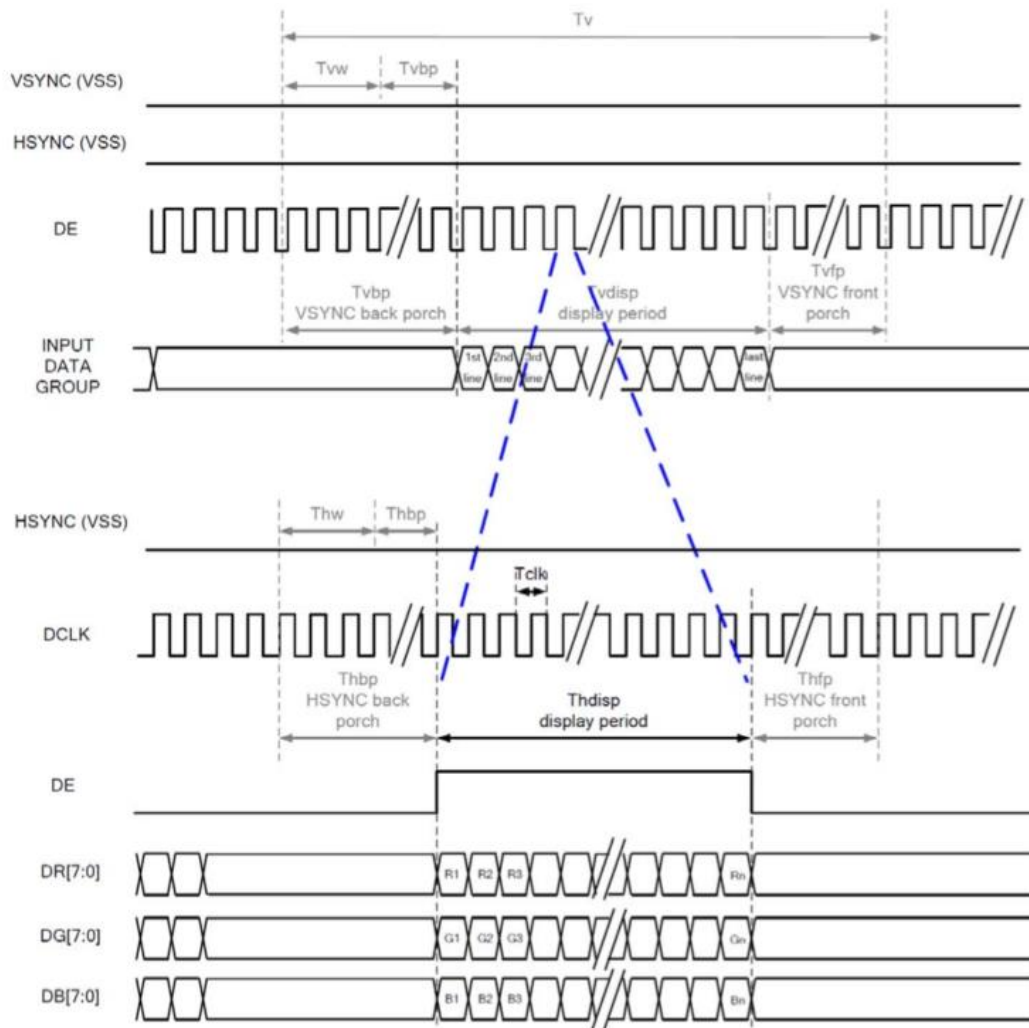


12.2.2 SYNC-DE Mode





12.2.3 DE Mode



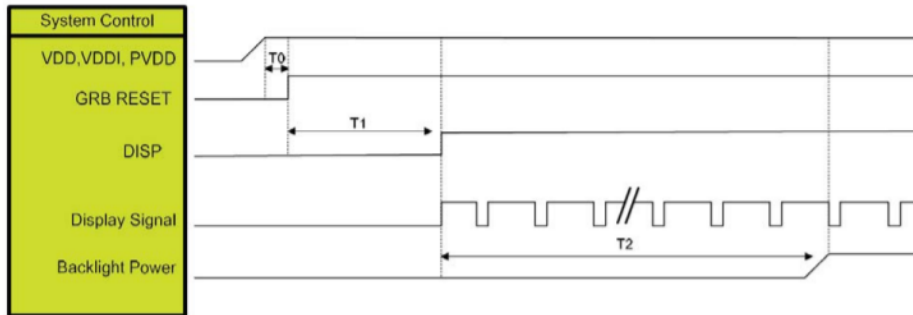
12.3 Parallel 24-bit RGB input timing table

Parallel 24-bit RGB input Timing (PVDD=VDD=VDDI=3.3V,AGND=0V,Ta=25 °C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	
DCLK Frequency	Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK
	Display Period	Tdisp	800			
	Hsync Back Porch	Thbp	4	8	48	
	Hsync Front Porch	Thfp	4	8	48	
	Hsync Pulse Width	Thw	2	4	8	
VSYNC	Period Time	Tv	488	496	504	HSYNC
	Display Period	Tdisp	480			
	Vsync Back Porch	Tvbp	4	8	12	
	Vsync Front Porch	Tvfp	4	8	12	
	Vsync Pulse Width	Tvw	2	4	8	

12.4 Power ON/OFF sequence

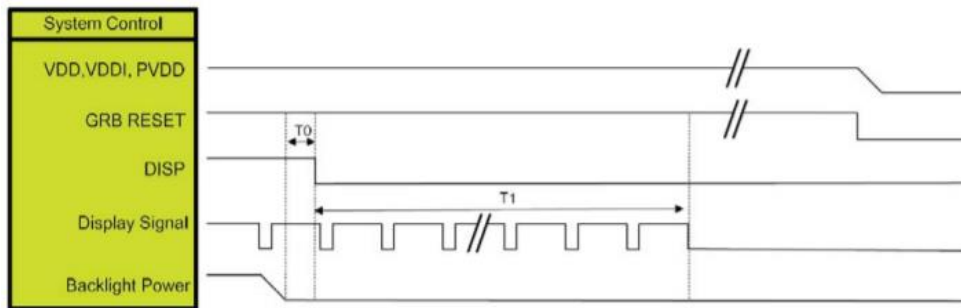
12.4.1 Power On sequence



SYMBOL	DESCRIPTION	MIN. TIME	UNIT
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET=" High" to DISP=" High "	10	
T2	Display Signal output to Backlight Power on	250	

Note. RGB interface display signal: DCLK, VSYNC, HSYNC, DE, DR [7:0], DB [7:0].

12.4.2 Power Off sequence



SYMBOL	DESCRIPTION	MIN. TIME	UNIT
T0	Backlight Power off to DISP=" Low"	5	ms
T1	DISP =" Low" to IC internal voltage discharge complete	100	ms

Note. RGB interface display signal: DCLK, VSYNC, HSYNC, DE, DR [7:0], DB [7:0]

13. INSPECTION

Standard acceptance/rejection criteria for TFT module

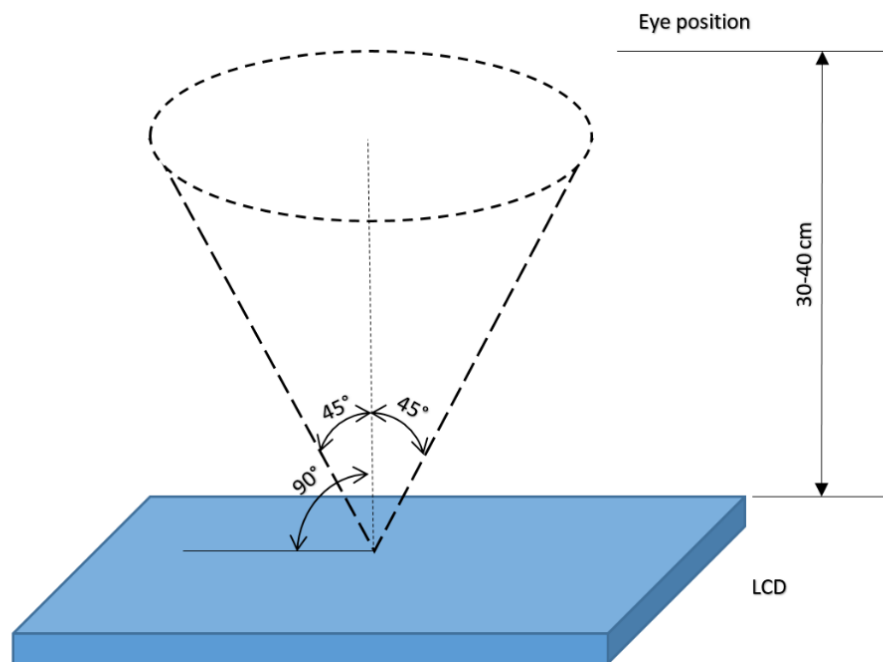
13.1 Inspection condition

Ambient conditions:

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

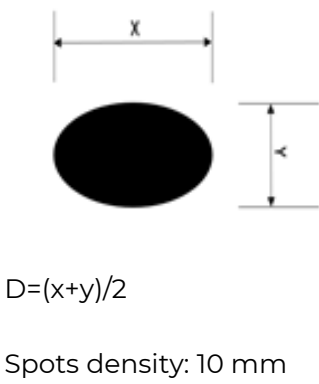
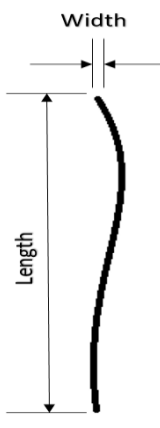
Viewing distance: $35 \pm 5\text{cm}$ between inspector bare eye and LCD.

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





13.2 Inspection standard

ITEM		CRITERION		
Black spots, white spots, light leakage, Foreign Particle (round Type)	 <p>$D=(x+y)/2$ 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
	$3.0 < L$	$0.1 < W$	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		



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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