Riverdi
Display Solution Experts

RVT43HLTFWN00

IPS RGB 4.3" LCD TFT Datasheet

Rev.1.0

2020-08-05

ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally black/IPS	/
Size	4.3	Inch
Viewing Direction	Free	/
Outside Dimensions (W × H × D)	106.30 x 83.98 x 3.48	mm^3
Active Area (W × H)	95.04 × 53.86	mm^2
Pixel Pitch (W × H)	0.198 × 0. 198	mm^2
Resolution	480 (RGB) × 272	/
Brightness	1000	cd/m^2
LCD Interface Type	RGB	/
Color Depth	16.7 M	/
Pixel Arrangement	RGB Vertical Stripe	/
LCD Driver	SC7283	/
With/Without Touch	Without Touch Panel	/
Surface Treatment	Anti-Glare	/
LCD Input Voltage	3.3	V
Weight	67	g

Note 1: RoHS compliant

Note 2: LCM weight tolerance: ± 5%.

REVISION RECORD

REVNO.	REVDATE	CONTENTS	REMARKS
1.0	2020-08-05	Initial Release	

CONTENTS

1 MODULE CLASSIFICATION INFORMATION

RV	T	43	H	L	T	F	W	N	00
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

|		
1.	BRAND	**RV** – **Riverdi**
2.	PRODUCT TYPE	**T – TFT Standard**
3.	DISPLAY SIZE	**43 – 4.3"**
4.	MODEL SERIAL NO.	**H – High Brightness, IPS**
5.	RESOLUTION	**L – 480 x 272 px**
6.	INTERFACE	**T– TFT LCD, RGB**
7.	FRAME	**F – With Metal Frame**
8.	BACKLIGHT TYPE	**W – LED White**
9.	TOUCH PANEL	**N – Without Touch Panel**
10.	VERSION	**00 – (00-99)**
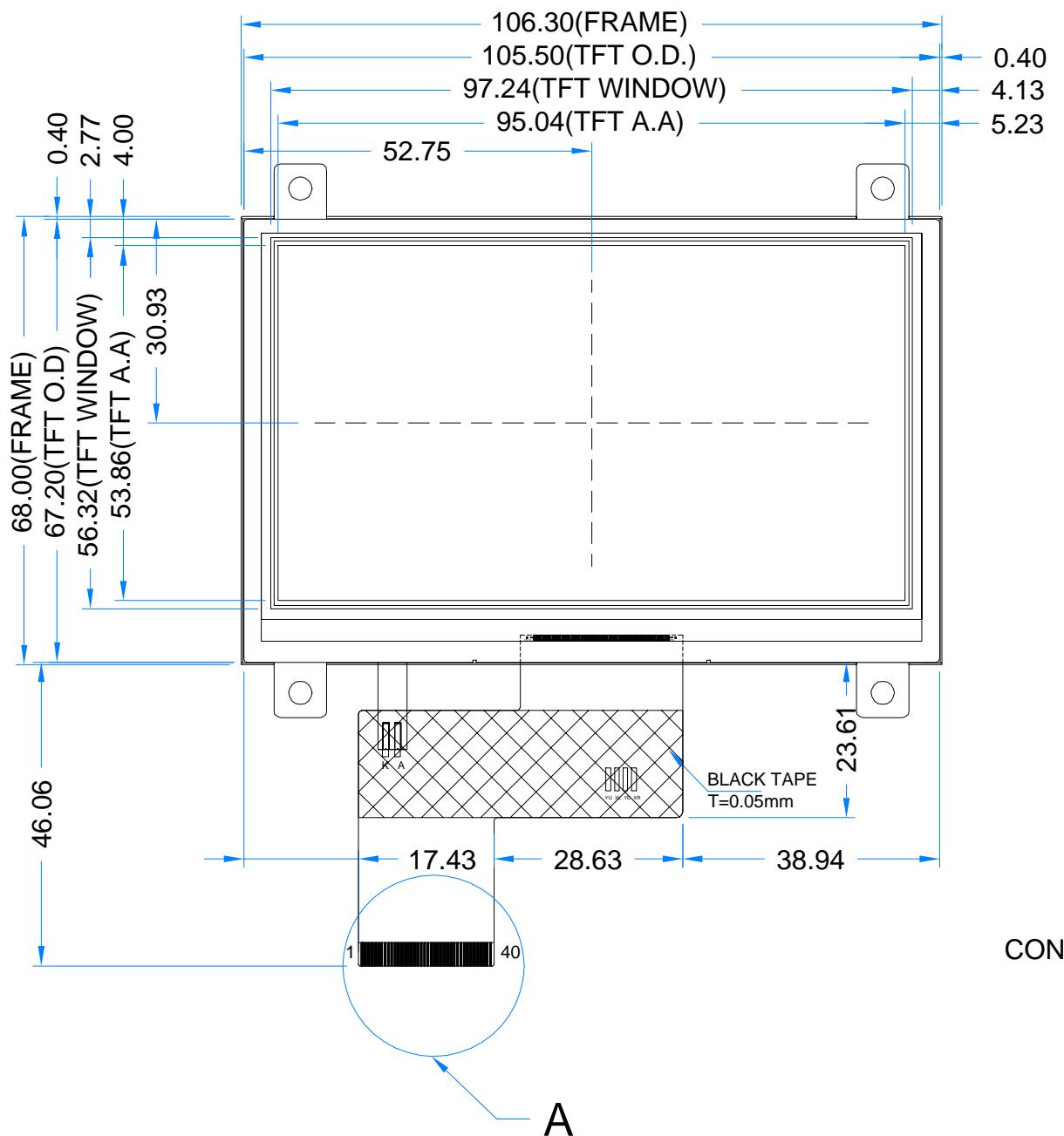
2 ASSEMBLY GUIDE

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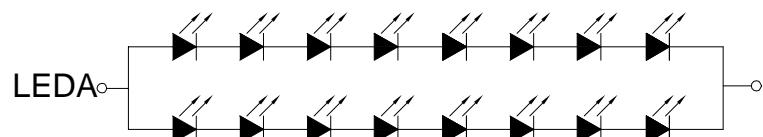
For dimensions 3.5", 4.3", 5.0" and 7.0" the product with mounting frame version is available. Thanks to the four catches attached to the side, frame provides strong assembly to the surface by mounting element (like the screw, see Figure 1). The frames are specially designed to fit Riverdi products perfectly.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

Figure 1. Mounting frame

106.30(FRAME)
105.50(TFT O.D.)
97.24(TFT WINDOW)
95.04(TFT A.A)
52.75

0.40
4.13
5.23

0.40
2.77
4.00

30.93

68.00(FRAME)
67.20(TFT O.D)
56.32(TFT WINDOW)
53.86(TFT A.A)

46.06

23.61

BLACK TAPE
T=0.05mm

17.43
28.63
38.94

1   40

A

CONTACT SIDE

LEDA

LED Diagram Circuit

TFT NOTES:
1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
2. RESOLUTION: 480x272
3. VIEWING ANGLE: FREE
4. INTERFACE: RGB
5. LCD DRIVER:SC7283
6. LOGIC VOLTAGE:3.3V
7. SURFACE LUMINANCE: 1000 cd/m ^{2}(TYP)
8. BACKLIGHT: 16 PCS LED, V_F=25.6V(TYP), I_F=40mA(TYP)

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

4 ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Operating Ambient temperature	T_{OP}	-20	70	°C	At 25±5°C
Storage Temperature	T_{ST}	-30	80	°C	
Operating Ambient Humidity	H_{OP}	10	-	% RH	
Storage Ambient Humidity	H_{ST}	10	-	% RH	
Power for Circuit Driving	V_{dd}	-0.3	4.6	V	
Power for Circuit Logic	V_t	-0.3	V_{dd} + 0.3	V	

Note. The following are maximum values. If exceeded it may cause operation or damage to the unit.

5 ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT
Power Supply for Analog Circuit		VDD	3.0	3.3	3.6	V
Logic Input Voltage	Low Voltage	VIL	0	-	0.3VDD	V
	High Voltage	VIH	0.7VDD	-	VDD	V
Logic Output Voltage	Low Voltage	VOL	0	-	0.2VDD	V
	High Voltage	VOH	0.8VDD	-	-	V
Power Consumption	Black Mode	Pb	-	20	25	mW
	Standby Mode	Pw	-	40	50	mW

6 BACKLIGHT DRIVING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Driving Voltage	V_F	24.4	25.6	27.2	V	Note 1,2
Backlight Driving Current	I_F	-	40	-	mA	
Backlight Power Consumption	W_{BL}	-	1024	-	mW	
Backlight Life Time	-	-	50,000	-	Hrs	Note 3

Note 1. Unless specified, the ambient temperature Ta=25°C.

Note 2. The recommended operating conditions refer to a range in which operation of this product is guaranteed. Should this range is 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, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

7 ELECTRO-OPTICAL CHARACTERISTICS

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 ℃. The values specified are at an approximate distance 500mm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

ITEM		SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	REMARK	NOTE
Response Time		Tr+Tf	θ=0° ∅=0° Ta=25 °C	-	30	40	ms	FIG 2.	4
Contrast Ratio		Cr		640	800	-	---	FIG 3.	1
Luminance Uniformity		δ WHITE		-	75	-	%	FIG 3.	3
Surface Luminance		Lv		-	1000	-	cd/m^2	FIG 3.	2
Viewing Angle Range		θ	∅ = 90°	70	80	-	deg	FIG 4.	6
			∅ = 270°	70	80	-	deg	FIG 4.	
			∅ = 0°	70	80	-	deg	FIG 4.	
			∅ = 180°	70	80	-	deg	FIG 4.	
CIE (x, y) Chromaticity	Red	x	θ=0° ∅=0° Ta=25 °C	0.579	0.619	0.659		FIG 3.	5
		y		0.290	0.330	0.370			
	Green	x		0.346	0.386	0.426			
		y		0.539	0.579	0.619			
	Blue	x		0.070	0.110	0.150			
		y		0.091	0.131	0.171			
	White	x		0.280	0.320	0.360			
		y		0.305	0.345	0.384			

Note 1. Contrast Ratio(CR) is defined mathematically as below, for more information see Figure 1.

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

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see Figure 2.

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

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 maximum luminance of 5 points luminance by minimum 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, Tr) and from black to white (Decay Time, Tf). For additional information see Figure 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 3.

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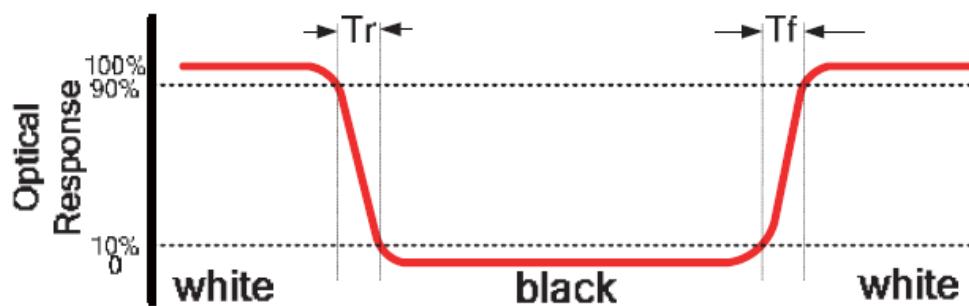
Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

A : 5 mm
B : 5 mm
H,V : Active Area
Light spot size ∅=5mm, 500mm distance from the LCD surface to detector lens
measurement instrument is TOPCON's luminance meter BM-5
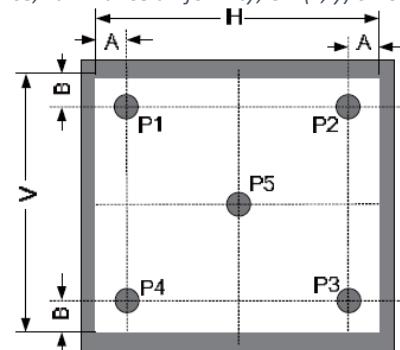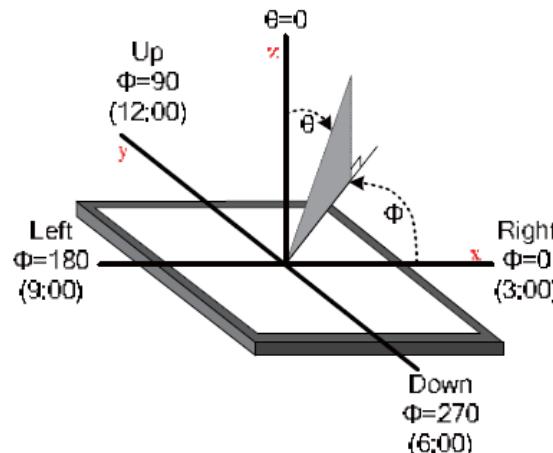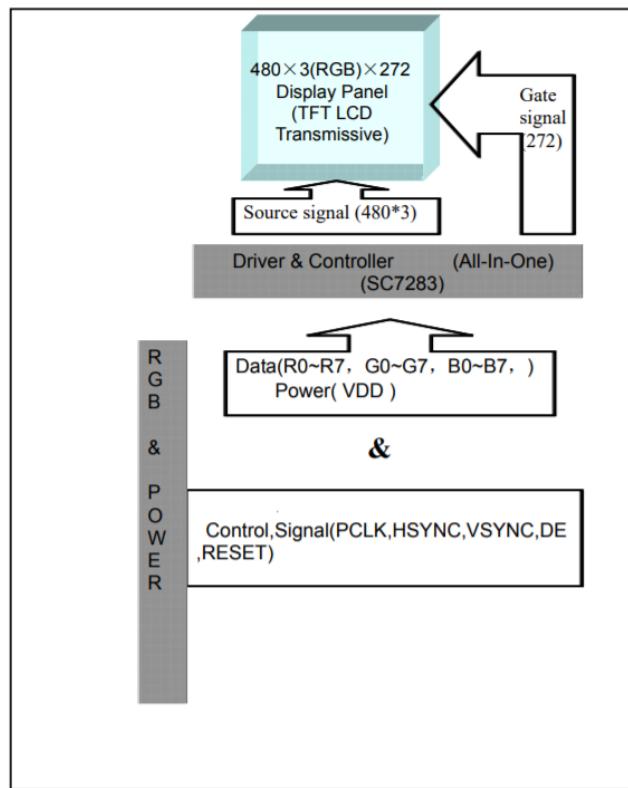
Figure 4.The definition of viewing angle

8   BLOCK DIAGRAM

9   INTERFACE DESCRIPTION
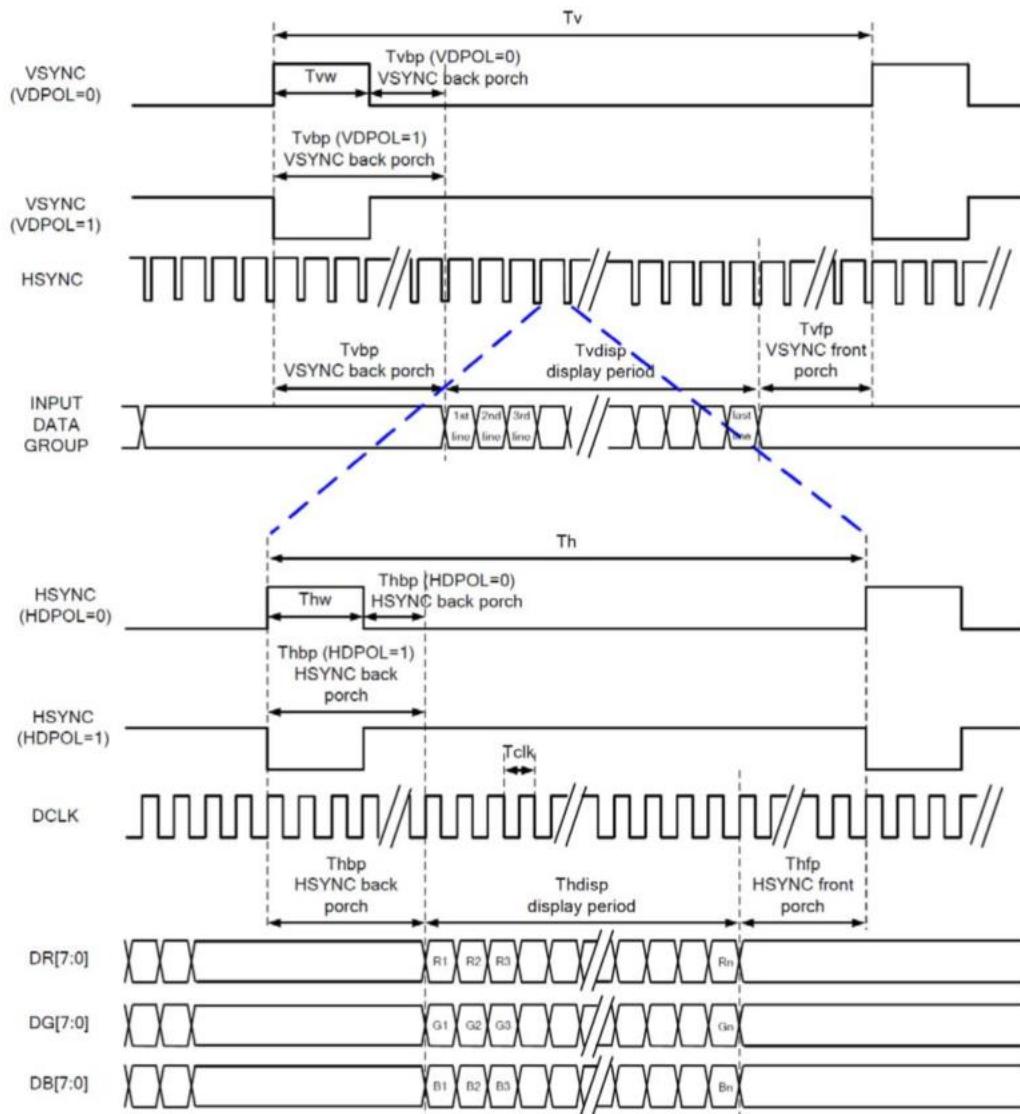
9.1   TFT assignment

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	Data Clock Signal
31	DISP	Standby Mode DISP="1", Normal Operation DISP="0", Standby Mode.
32	HSYNC	Horizontal Synchronized Signal
33	VSYNC	Vertical Synchronized Signal
34	DE	Data Input Enable
35	NC	Not Connect
36	GND	Ground
37	NC/XR	No Connection If without TP
38	NC/YD	No Connection If without TP
39	NC/XL	No Connection If without TP
40	NC/YU	No Connection If without TP
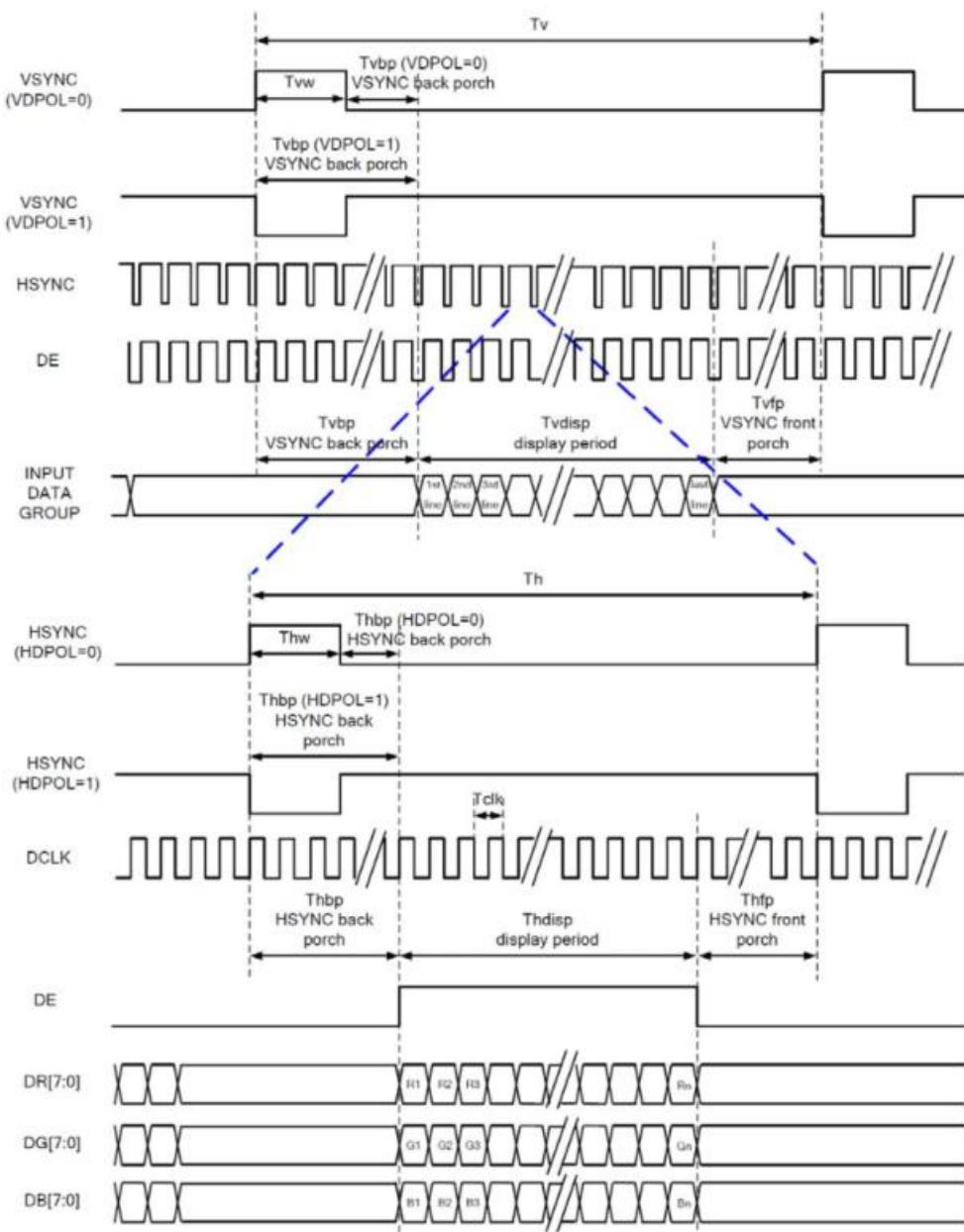
10 TIMING CHARACTERISTICS

10.1 Timing diagram and input setup timing setting
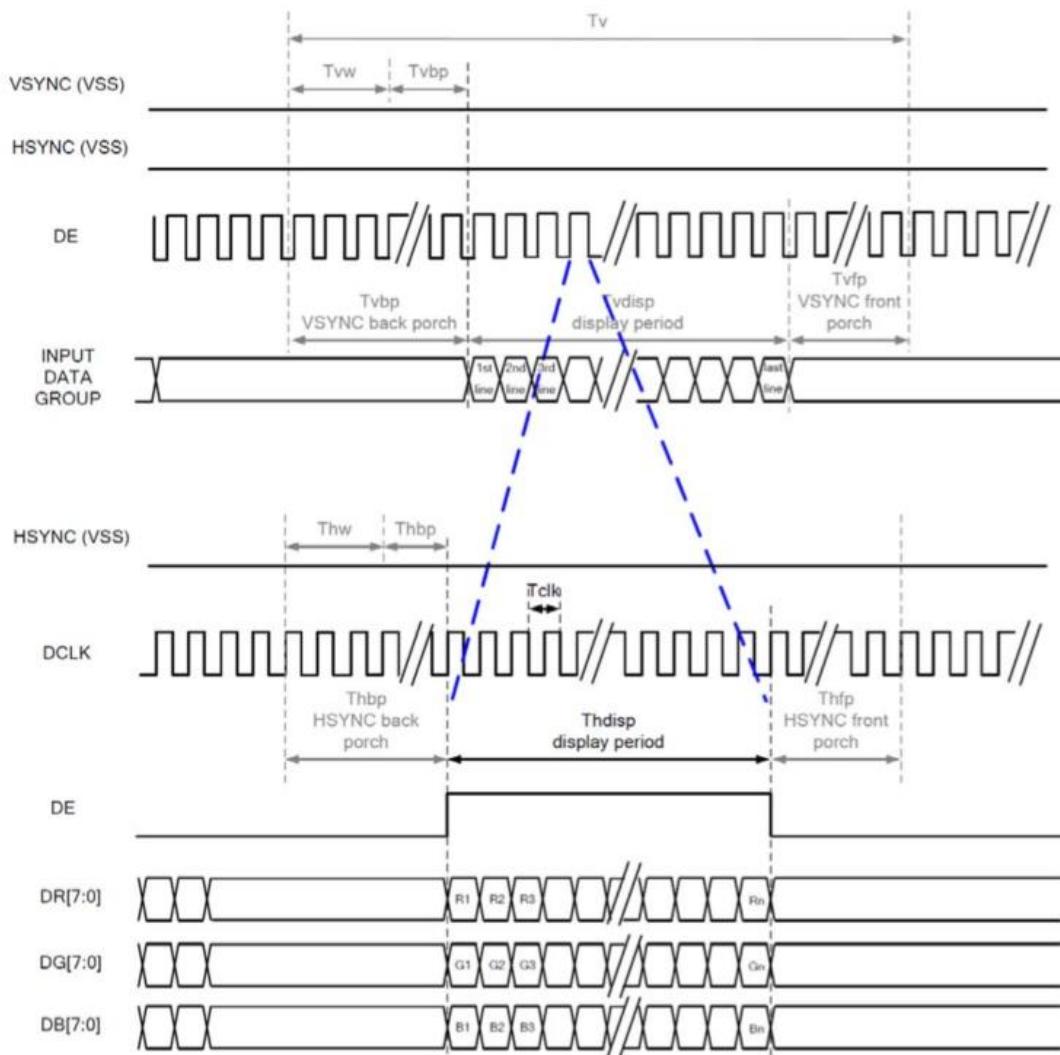
10.1.1 SYNC mode timing diagram

10.1.2 SYNC-DE mode timing diagram

10.1.3 DE mode timing diagram

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

Note. "Input" means these signals are driven by host side.

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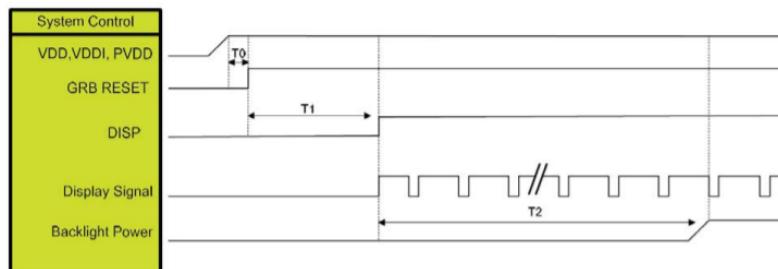
Parallel 24-bit RGB input Timing (PVDD=VDD=VDDI=3.3V,AGND=0V,Ta=25 °C)

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT	NOTE
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_BLANKING setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pluse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	276	292	321	HSYNC	
	Display Period	Tvdisp		272		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	By V_BLANKING setting
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pluse Width	Tvw	2	4	12	HSYNC	

Note. It's necessary to keep Tvbp=12 and Thbp=43 in sync mode. DE mode is unnecessary to keep it**.**
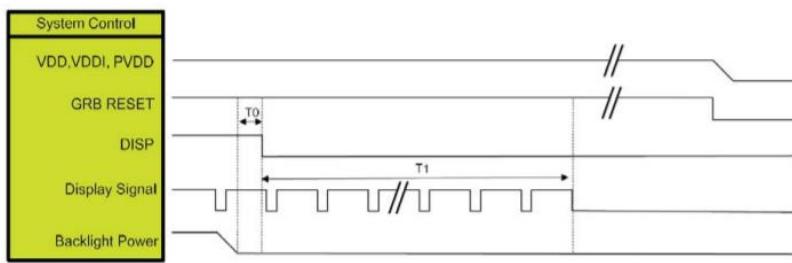
10.3 Power ON/OFF sequence

10.3.1 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	ms
T2	Display Signal output to Backlight Power on	250	ms

10.3.2 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	80	ms

11 INSPECTION

Standard acceptance/rejection criteria for TFT module.

11.1 Inspection condition

Ambient conditions:
- Temperature: 25±2°C
- Humidity: (60±10)%RH
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)
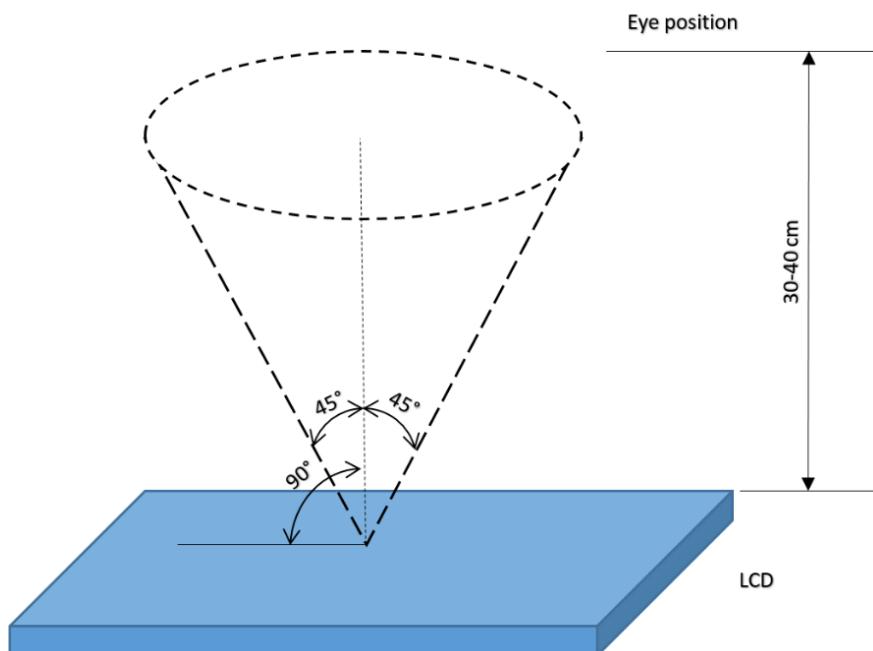
Viewing distance:
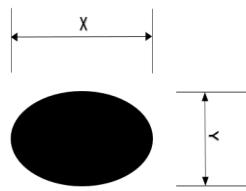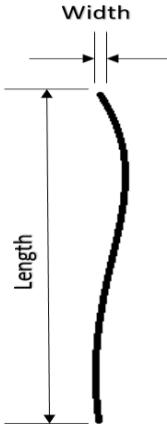
35±5cm between inspector bare eye and LCD.

Viewing Angle:

U/D: 45°/45°, L/R 45°/45°

11.2 Inspection standard

Item	Criterion
Black spots, white spots, light leakage, Foreign Particle (round Type)	$D = \dfrac{(x+y)}{2}$ *Spots density: 10 mm
LCD black spots, white spots, light leakage (line Type)	*Spots density: 10 mm
Bright/Dark Dots	

Black spots, white spots, light leakage, Foreign Particle (round Type)

3.5" ≤ Size ≤ 5"	
Average Diameter	Qualified Qty
D ≤ 0.15 mm	Ignored
0.15 mm < D ≤ 0.30 mm	N≤3
0.3mm < D	Not allowed

Size =7"	
Average Diameter	Qualified Qty
D ≤ 0.2 mm	Ignored
0.2 mm < D ≤ 0.3 mm	N≤3
0.5mm < D	Not allowed

LCD black spots, white spots, light leakage (line Type)

3.5" ≤ Size ≤ 5"		
Length/mm	Width/mm	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	0.1< W	Not allowed

Size =7"		
Length	Width	Qualified Qty
-	W ≤ 0.05	Ignored
L ≤ 5.0	0.05< W ≤ 0.1	3
5.0 < L	0.10< W	Not allowed

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

Size =7"	
item	Qualified Qty
Bright Dots	N≤2
Dark Dots	N≤3
Total Bright and Dark Dots	N≤4

Item	Criterion
Clear spots	<table><tr><td colspan="2">Size < 5"</td></tr><tr><td>Average Diameter</td><td>Qualified Qty</td></tr><tr><td>D < 0.2 mm</td><td>Ignored</td></tr><tr><td>0.2 mm < D < 0.3 mm</td><td>3</td></tr><tr><td>0.3 mm < D < 0.5 mm</td><td>2</td></tr><tr><td>0.5 mm < D</td><td>0</td></tr></table> <table><tr><td colspan="2">Size >= 5"</td></tr><tr><td>Average Diameter</td><td>Qualified Qty</td></tr><tr><td>D<0.2 mm</td><td>Ignored</td></tr><tr><td>0.2 mm < D < 0.3 mm</td><td>4</td></tr><tr><td>0.3 mm < D < 0.5 mm</td><td>2</td></tr><tr><td>0.5 mm < D</td><td>0</td></tr></table> *Spots density: 10 mm
Polarizer bubbles	<table><tr><td colspan="2">3.5" ≤ Size ≤ 5"</td></tr><tr><td>Average Diameter</td><td>Qualified Qty</td></tr><tr><td>D ≤ 0.2 mm</td><td>Ignored</td></tr><tr><td>0.2 mm < D ≤ 0.3 mm</td><td>2</td></tr><tr><td>0.3 mm < D ≤ 0.5mm</td><td>1</td></tr><tr><td>0.5 mm < D</td><td>0</td></tr><tr><td>Total Q'ty</td><td>3</td></tr></table> <table><tr><td colspan="2">Size >= 5"</td></tr><tr><td>Average Diameter</td><td>Qualified Qty</td></tr><tr><td>D<0.25 mm</td><td>Ignored</td></tr><tr><td>0.25 mm < D < 0.5 mm</td><td>3</td></tr><tr><td>0.5 mm < D</td><td>0</td></tr></table>

12 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, 120 hours
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 :1.5mm; Sweep:10HZ~55HZ~10HZ; 2 hours for each direction of X, Y, Z(6 hours for total)
8	Package Drop Test	Height: 60 cm 1 corner,3 edges,6 surfaces
9	ESD Test	± 2KV, Human body mode,100pF/1500Ω

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.

12 RELIABILITY TEST

13 LEGAL INFORMATION

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