



## RVT43HLTNWC00

### 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 )	120.38 x 79.20 x 5.10	mm <sup>3</sup>
Active Area (W × H)	95.04 × 53.86	mm <sup>2</sup>
Pixel Pitch (W × H)	0.198 × 0.198	mm <sup>2</sup>
Resolution	480 (RGB) × 272	/
Brightness	800	cd/m <sup>2</sup>
LCD Interface Type	RGB	/
Color Depth	16.7 M	/
Pixel Arrangement	RGB Vertical Stripe	/
LCD Driver	SC7283	/
With/Without Touch	With Projected Capacitive Touch Panel	/
CTP Driver	ILI2132A	/
Touch Interface	USB/I2C/Optional UART	/
Weight	87	g

**Note 1:** RoHS compliant

**Note 2:** LCM weight tolerance: ± 5%.

## REVISION RECORD

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

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## 1 MODULE CLASSIFICATION INFORMATION

<b>RV</b>	<b>T</b>	<b>43</b>	<b>H</b>	<b>L</b>	<b>T</b>	<b>N</b>	<b>W</b>	<b>C</b>	<b>00</b>
<b>1.</b>	<b>2.</b>	<b>3.</b>	<b>4.</b>	<b>5.</b>	<b>6.</b>	<b>7.</b>	<b>8.</b>	<b>9.</b>	<b>10.</b>

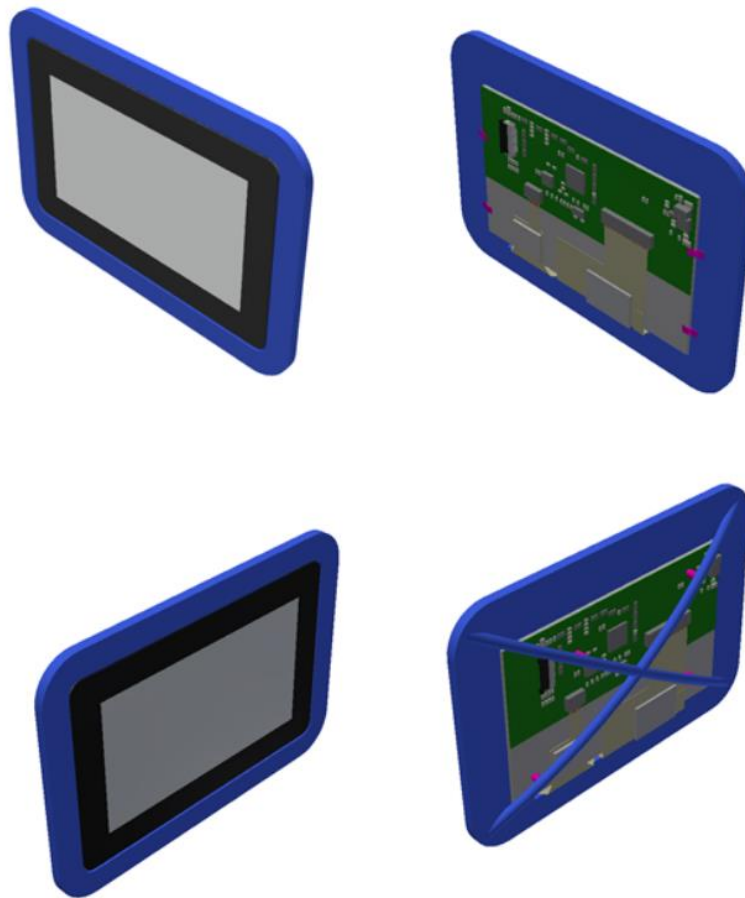
<b>1.</b>	<b>BRAND</b>	<b>RV – Riverdi</b>
<b>2.</b>	<b>PRODUCT TYPE</b>	<b>T – TFT Standard</b>
<b>3.</b>	<b>DISPLAY SIZE</b>	<b>43 – 4.3”</b>
<b>4.</b>	<b>MODEL SERIAL NO.</b>	<b>H – High Brightness, IPS</b>
<b>5.</b>	<b>RESOLUTION</b>	<b>L – 480 x 272 px</b>
<b>6.</b>	<b>INTERFACE</b>	<b>T– TFT LCD, RGB</b>
<b>7.</b>	<b>FRAME</b>	<b>N – No Frame</b>
<b>8.</b>	<b>BACKLIGHT TYPE</b>	<b>W – LED White</b>
<b>9.</b>	<b>TOUCH PANEL</b>	<b>C – With Capacitive Touch Panel</b>
<b>10.</b>	<b>VERSION</b>	<b>00 – (00-99)</b>

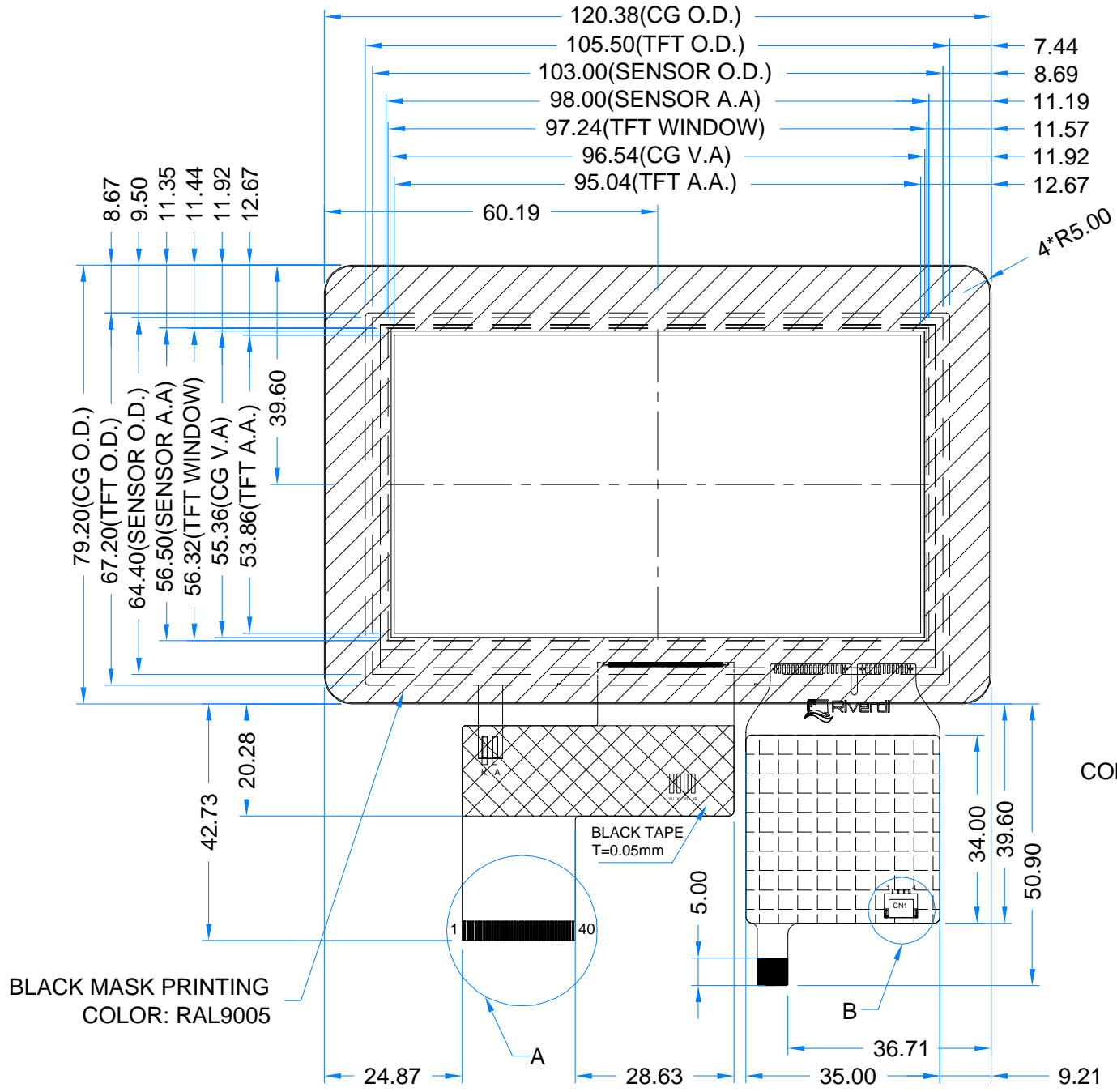
## 2 UxTOUCH ASSEMBLY

UxTouch are LCD TFT displays with specially designed projected capacitive touch panels. UxTouch display can be mounted without any holed in the housing. Our standard UxTouch displays include double-sided adhesive tape (DST) to stick TFT easily to the housing. Basic series include 4.3", 5.0" and 7.0" display sizes.

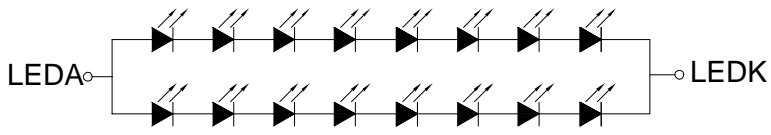
UxTouch models with double-side adhesive tape (PN with endings 00, 01, 03, 04) can be mounted by connecting the glass to the housing. Riverdi recommends to use support brackets assembled to display's back. An additional support will stiffen the whole structure and minimize the influence of external factors such as vibration. Figure 1 below show examples of using support elements.

*Figure 1. Example of using support brackets*



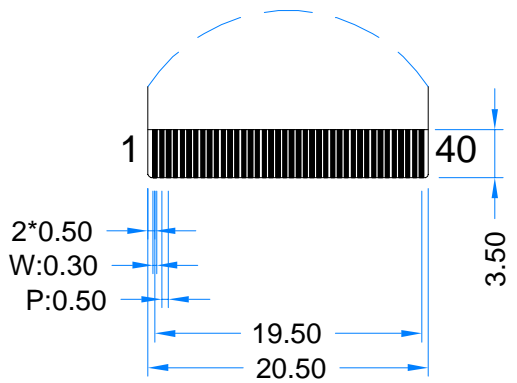


COMPONENT  
1.  
3.5  
CONTACT  
STIFF



LED Diagram Circuit

DETAIL A  
SCALE 2:1



**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. BACKLIGHT: 16PCS LED,  $V_F=25.6V(TYP)$ ,  $I_F=40mA(TYP)$

**TP NOTES:**

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

**GENERAL NOTES:**

1. MODULE SURF
2. OPERATING T
3. STORAGE TEM
4. WITHOUT INDI
5. DIM ACCORDI
5. RoHS COMPLI

## 4 ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Operating Ambient temperature	T <sub>OP</sub>	-20	70	°C	At 25±5°C
Storage Temperature	T <sub>ST</sub>	-30	80	°C	
Operating Ambient Humidity	H <sub>OP</sub>	10	-	% RH	
Storage Ambient Humidity	H <sub>ST</sub>	10	-	% RH	
Power for Circuit Driving	V <sub>dd</sub>	-0.3	4.6	V	
Power for Circuit Logic	V <sub>t</sub>	-0.3	V <sub>dd</sub> + 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	V <sub>IL</sub>	0	-	0.3VDD	V
	High Voltage	V <sub>IH</sub>	0.7VDD	-	VDD	V
Logic Output Voltage	Low Voltage	V <sub>OL</sub>	0	-	0.2VDD	V
	High Voltage	V <sub>OH</sub>	0.8VDD	-	-	V
Power Consumption	Black Mode	P <sub>b</sub>	-	20	25	mW
	Standby Mode	P <sub>w</sub>	-	40	50	mW

## 6 BACKLIGHT DRIVING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Driving Voltage	V <sub>F</sub>	24.4	25.6	27.2	V	Note 1,2
Backlight Driving Current	I <sub>F</sub>	-	40	-	mA	
Backlight Power Consumption	W <sub>BL</sub>	-	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 °C. The values specified are at an approximate distance 500mm from the LCD surface at a viewing angle of  $\Phi$  and  $\theta$  equal to 0°.

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	REMARK	NOTE
Response Time	Tr+Tf	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25 °C	-	30	40	ms	FIG 2.	4
Contrast Ratio	Cr		640	800	-	---	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	$\theta$	$\phi = 90^\circ$	70	80	-	deg	FIG 4.	6
		$\phi = 270^\circ$	70	80	-	deg	FIG 4.	
		$\phi = 0^\circ$	70	80	-	deg	FIG 4.	
		$\phi = 180^\circ$	70	80	-	deg	FIG 4.	
CIE (x, y) Chromaticity	Red	x	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 12.

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

**Note 2.** Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see Figure 23.

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

**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 maximum luminance of 5 points luminance by minimum luminance of 5 points luminance. For more information see Figure 23.

$$\delta \text{ WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

**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 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

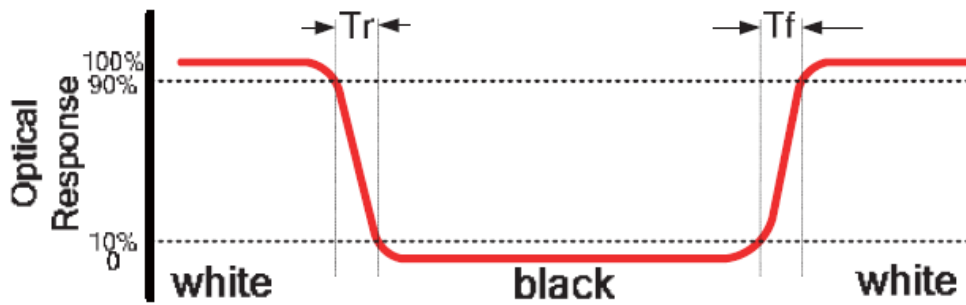


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

A : 5 mm  
B : 5 mm  
H, V : Active Area  
Light spot size  $\varnothing=5\text{mm}$ , 500mm distance from the LCD surface to detector lens  
measurement instrument is TOPCON's luminance meter BM-5

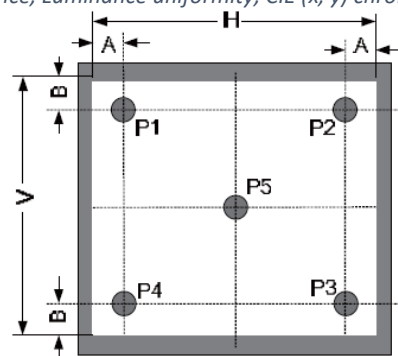
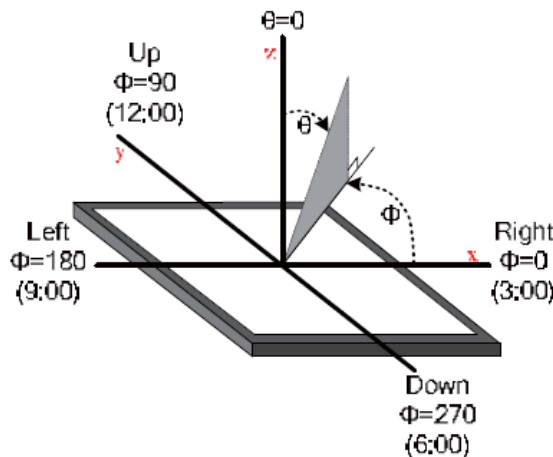
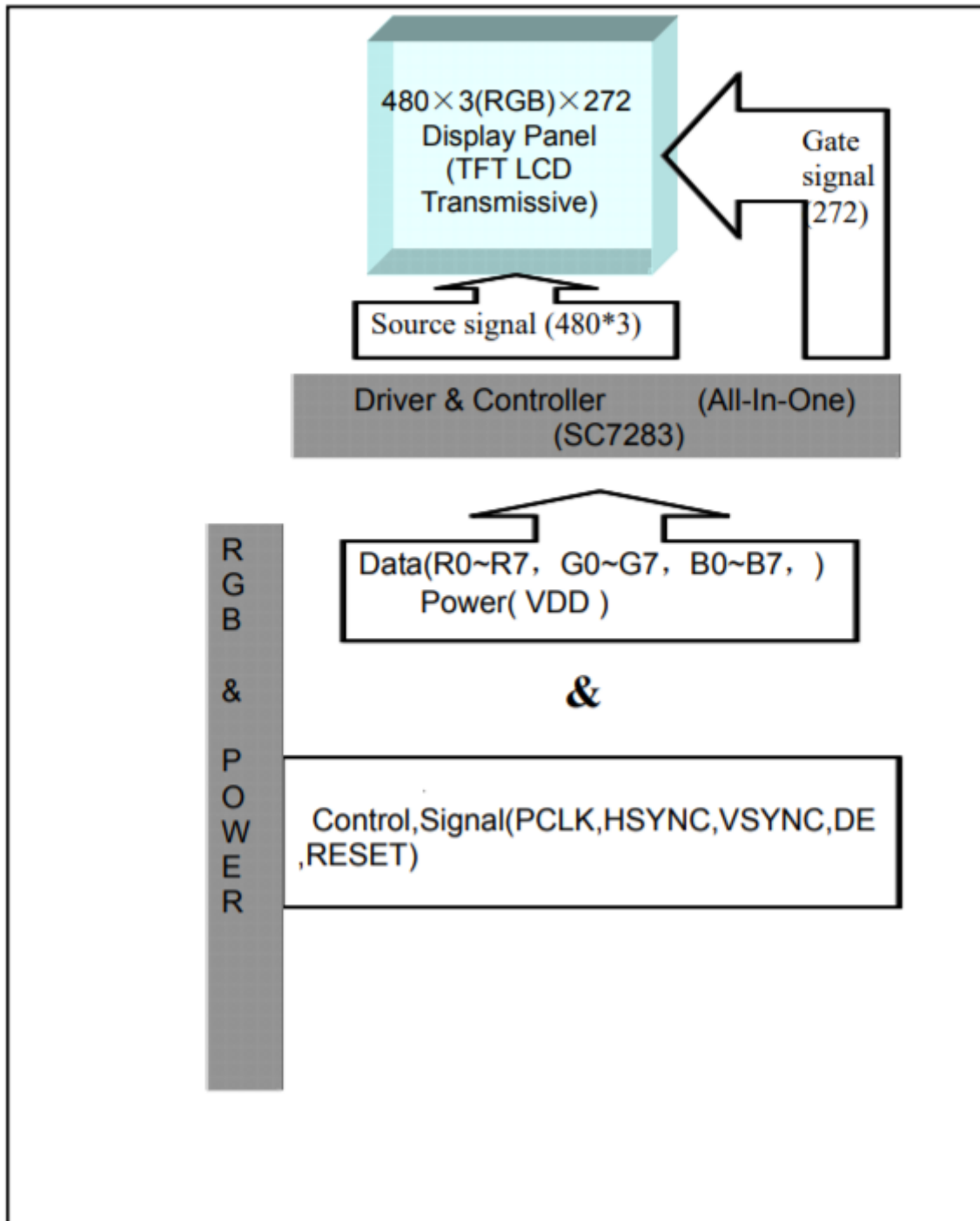


Figure 4. The definition of viewing angle





## 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

### 9.2 Touch panel assignment

PIN NO.	SYMBOL	DESCRIPTION
1	USB_GND	USB_Ground
2	USB_VDD	USB_Power for CTP, DC 5.0 V
3	USB_D-	USB_Data Signal -
4	USB_D+	USB_Data Signal +
5	I2C_GND	I2C_Ground
6	I2C_VDD	I2C_Power For CTP, DC 3.3 V
7	I2C_RST	I2C_Reset Pin
8	I2C_SCL	I2C_Clock Input
9	I2C_INT	I2C_Interrupt Signal from CTP
10	I2C_SDA/TXD	I2C_Data Signal

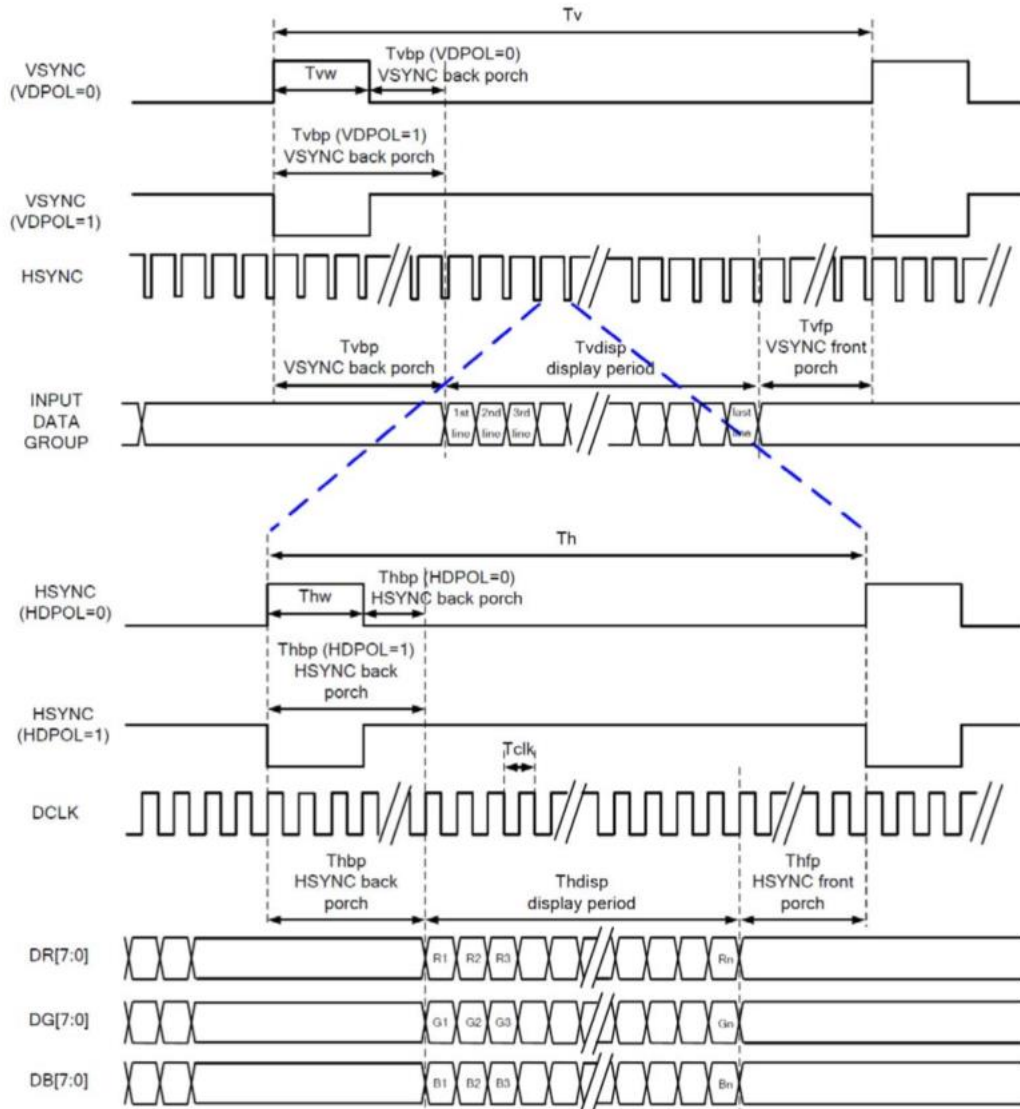
### 9.3 CON1 assignment

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

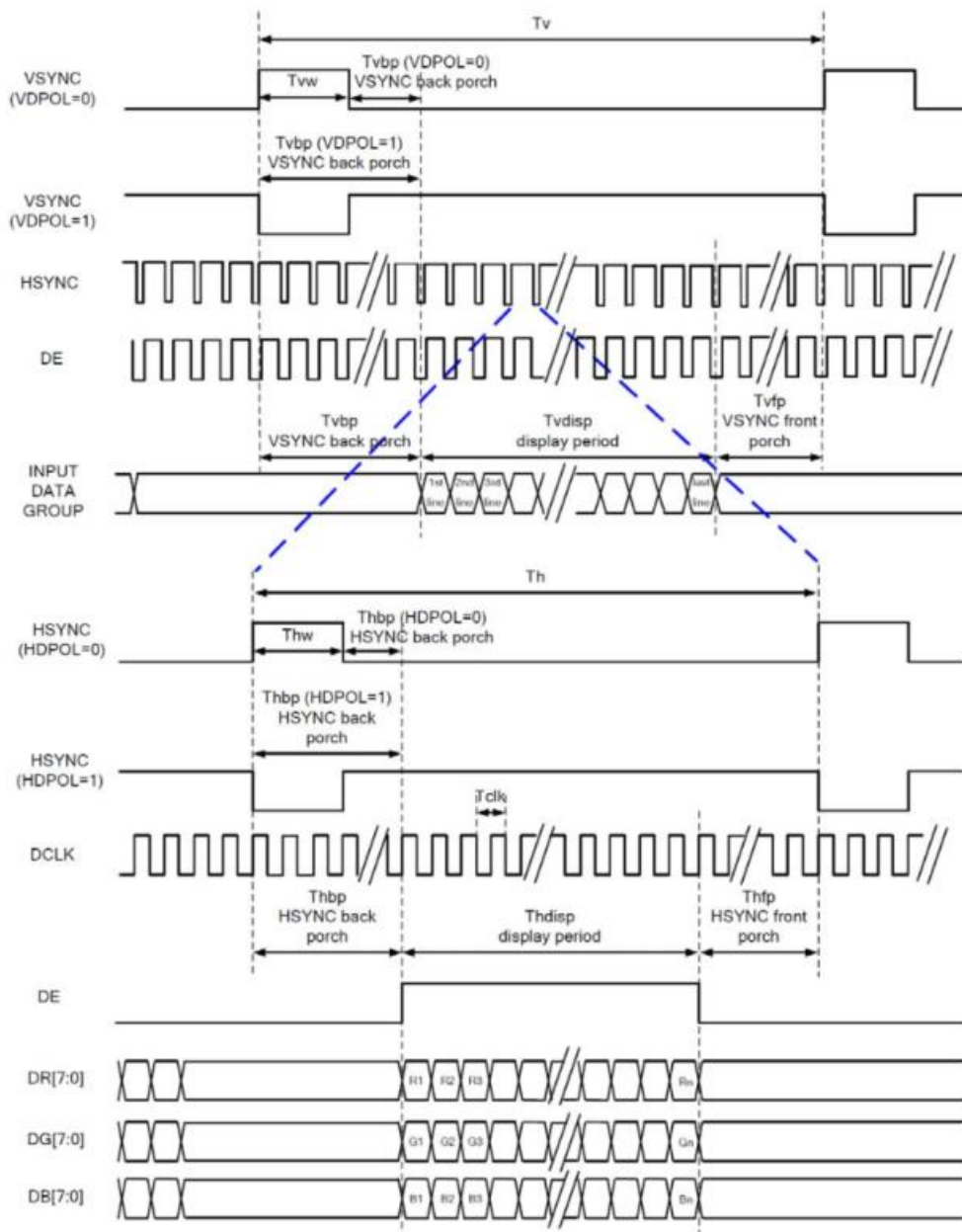
## 10 TIMING CHARACTERISTICS

### 10.1 Timing diagram and input setup timing setting

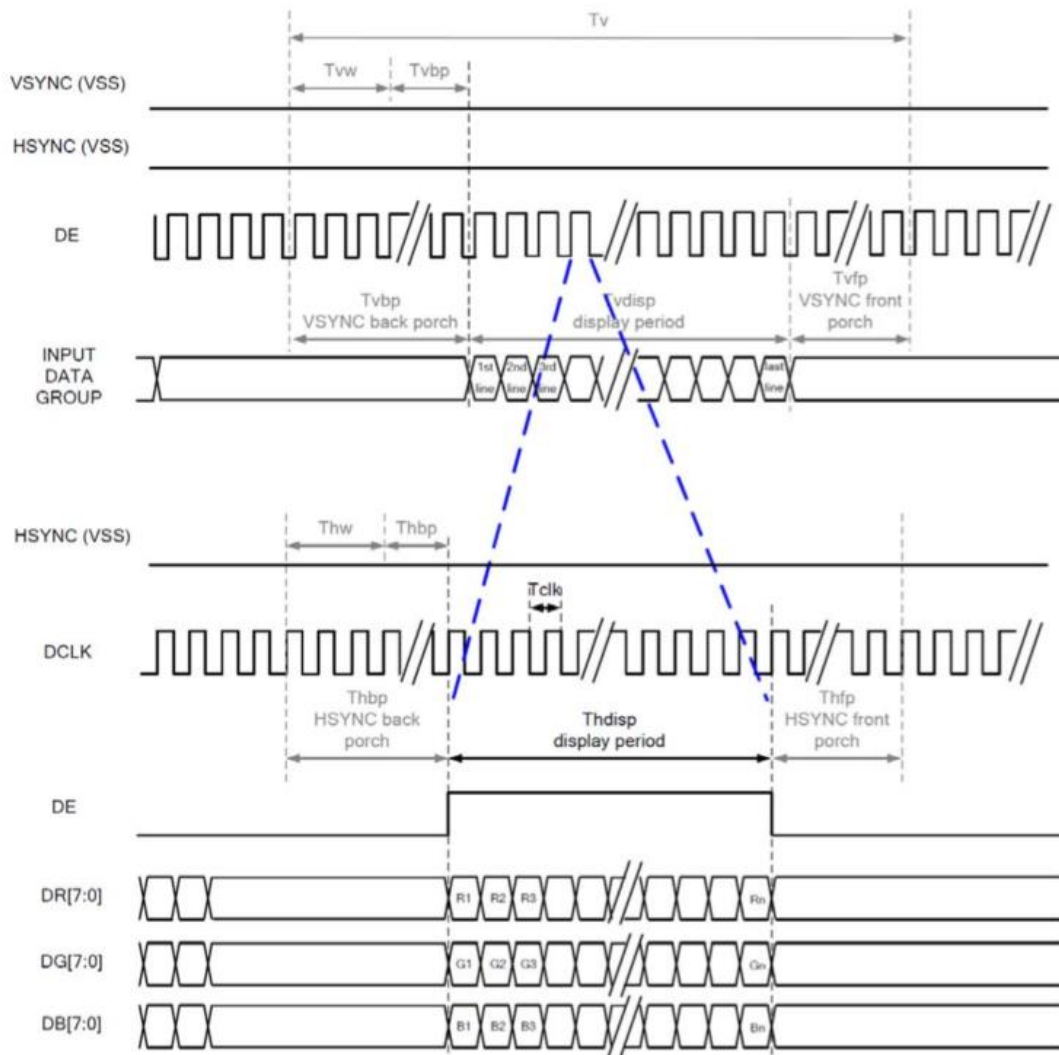
#### 10.1.1 SYNC mode timing diagram



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

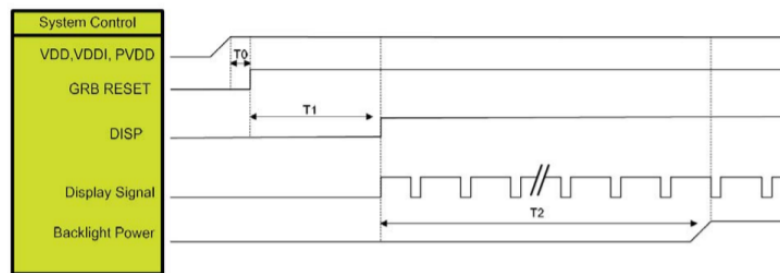
Parallel 24-bit RGB input Timing (PVDD=VDD=VDDI=3.3V,AGND=0V,Ta=25 °C)

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.

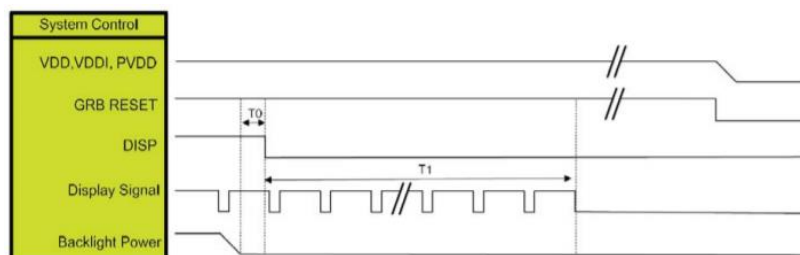
## 10.3 Power ON/OFF sequence

### 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 CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

### 11.1 Mechanical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Touch Panel Size	4.3 inch	UxTouch
Outline Dimension of CTP	120.38 mm x 79.20 mm	UxTouch
Product Thickness	2.15 mm	UxTouch
Glass Thickness	1.1 mm	UxTouch
CTP View Area	96.54 mm x 55.36 mm	UxTouch
Sensor Active Area	98.00 mm x 56.50 mm	UxTouch
Structure type	Glass + Glass	UxTouch
Surface Hardness	6H	UxTouch

### 11.2 Electrical characteristics

DESCRIPTION	SPECIFICATION
Operating Voltage	DC 5.0 V (USB)
	DC 3.3 V (I <sup>2</sup> C)
Power Consumption (IDD)	Active Mode
	Sleep Mode
Interface	90 mA
Linearity	10 mA
Controller	USB / I <sup>2</sup> C/Optional UART
I2C address	+/-1.5mm
Resolution	ILI2132A
	0X82
	480 x 272

## 12 INSPECTION

Standard acceptance/rejection criteria for TFT module.

### 12.1 Inspection condition

Ambient conditions:

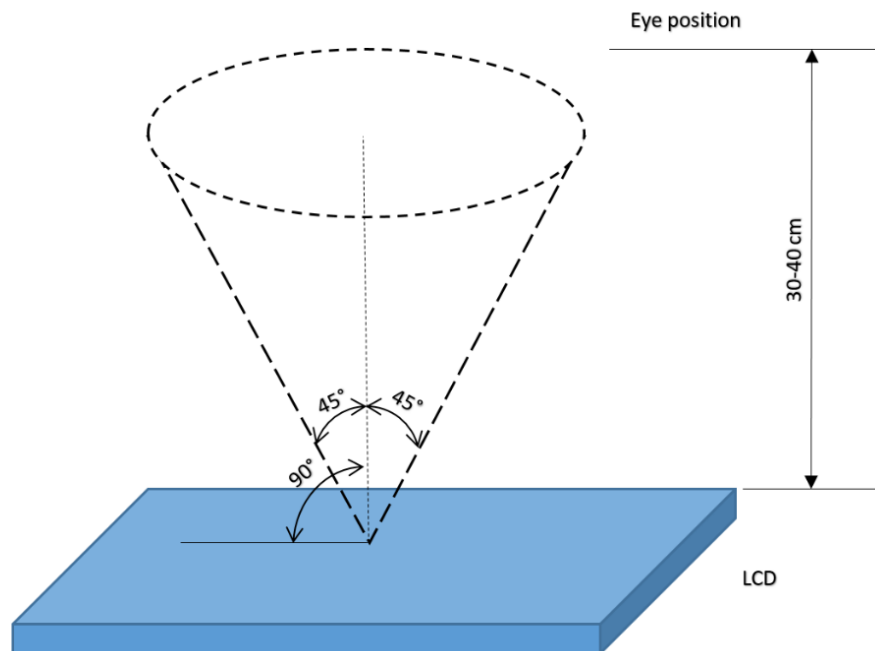
- Temperature:  $25\pm 2^{\circ}\text{C}$
- Humidity:  $(60\pm 10)\%RH$
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

Viewing distance:

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

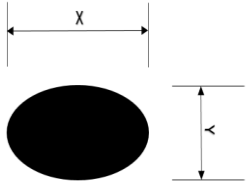
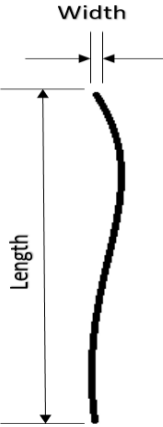
Viewing Angle:

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)	 $D = \frac{(x + y)}{2}$ <p>*Spots density: 10 mm</p> <table border="1"> <thead> <tr> <th colspan="2">3.5" ≤ Size ≤ 5"</th> </tr> <tr> <th>Average Diameter</th> <th>Qualified Qty</th> </tr> </thead> <tbody> <tr> <td>D ≤ 0.15 mm</td> <td>Ignored</td> </tr> <tr> <td>0.15 mm &lt; D ≤ 0.30 mm</td> <td>N≤3</td> </tr> <tr> <td>0.3mm &lt; D</td> <td>Not allowed</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Size =7"</th> </tr> <tr> <th>Average Diameter</th> <th>Qualified Qty</th> </tr> </thead> <tbody> <tr> <td>D ≤ 0.2 mm</td> <td>Ignored</td> </tr> <tr> <td>0.2 mm &lt; D ≤ 0.3 mm</td> <td>N≤3</td> </tr> <tr> <td>0.5mm &lt; D</td> <td>Not allowed</td> </tr> </tbody> </table>	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													
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Bright/Dark Dots	<table border="1"> <thead> <tr> <th colspan="2">3.5" ≤ Size ≤ 5"</th> </tr> <tr> <th>item</th> <th>Qualified Qty</th> </tr> </thead> <tbody> <tr> <td>Bright Dots</td> <td>N≤1</td> </tr> <tr> <td>Dark Dots</td> <td>N≤2</td> </tr> <tr> <td>Total Bright and Dark Dots</td> <td>N≤3</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Size =7"</th> </tr> <tr> <th>item</th> <th>Qualified Qty</th> </tr> </thead> <tbody> <tr> <td>Bright Dots</td> <td>N≤2</td> </tr> <tr> <td>Dark Dots</td> <td>N≤3</td> </tr> <tr> <td>Total Bright and Dark Dots</td> <td>N≤4</td> </tr> </tbody> </table>	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													
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Item	Criterion		
Clear spots	<b>Size &lt; 5"</b>		
	Average Diameter	Qualified Qty	
	D < 0.2 mm	Ignored	
	0.2 mm < D < 0.3 mm	3	
	0.3 mm < D < 0.5 mm	2	
	0.5 mm < D	0	
	<b>Size &gt;= 5"</b>		
	Average Diameter	Qualified Qty	
	D < 0.2 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		
	Polarizer bubbles	<b>3.5" ≤ Size ≤ 5"</b>	
		Average Diameter	Qualified Qty
D ≤ 0.2 mm		Ignored	
0.2 mm < D ≤ 0.3 mm		2	
0.3 mm < D ≤ 0.5 mm		1	
0.5 mm < D		0	
Total Q'ty		3	
<b>Size &gt;= 5"</b>			
Average Diameter		Qualified Qty	
D < 0.25 mm		Ignored	
0.25 mm < D < 0.5 mm		3	
0.5 mm < D		0	
Touch panel spot		<b>Size &lt; 5"</b>	
		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	<b>Size &lt; 5"</b>	
Length		Width	Qualified Qty
-		W < 0.02	Ignored
L < 3.0		0.02 < W < 0.05	2
L < 2.5		0.05 < W < 0.08	
-		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, 120 hours
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 :1.5mm; 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.

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