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LVDS 7"



This datasheet gives detailed information about the Riverdi 7" LVDS displays. The displays come in different versions: with **capacitive, resistive, or no touchscreen**, with a decorative **cover glass**, as well as with or without a **metal mounting frame**.

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Rev.2.0

2020-02-12

ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally white	/
Size	7	Inch
Viewing Direction	12:00 (without image inversion)	O' Clock
Gray Scale Inversion Direction	6:00	O' Clock

Number of Dots		800 x (RGB) × 480	/
Driver IC		GM8284DD	/
Interface Type		LVDS	/
Brightness	no touch module	500	cd/m2
	CTP module	450	
	RTP module	400	
Color Depth		16.7M	/
Pixel Arrangement		RGB Vertical Stripe	/
Surface Treatment		Anti-glare / Clear (for CTP)	/
Input Voltage		3.3	V

Note 1: RoHS, REACH SVHC compliant

Note 2: LCM weight tolerance: ± 5%.

Revision Record

REV NO.	REVDATE	CONTENTS	REMARKS
1.0	2019-06-07	Rev 1.0	
2.0	2020-02-12	Rev 2.0	<p>Note 1: Due to the EOL of the RVT7.0A800480TNWN00 module,</p> <p>all modules combined are updated and marked with V2 at the end of the PN.</p> <p>Note 2: Update Brightness, External dimensions, Timing Characteristics.</p>

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1. Module classification information

RV	T	70	x	Q	L	x	W	x	Ox
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard F – TFT Custom
3.	DISPLAY SIZE	70 – 7.0”
4.	MODEL SERIAL NO.	A (A-Z) U – UxTouch
5.	RESOLUTION	Q– 800×480 px
6.	INTERFACE	L – LVDS interface
7.	FRAME	N – No Frame F – Mounting Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	N – No Touch Panel R – Resistive Touch Panel C – Capacitive Touch Panel
10.	VERSION	Ox (00-99)

2. Assembly guide – integration



Three options of rear side adhesive tape are available: double side adhesive tape 0.2 mm with 3M 467MP glue, foam double side adhesive tape 0.5 mm with DST 3M 9495LE glue or without any tape.

There are also two versions of glass color: black and white.

Rear side adhesive tape options:

		
Double side adhesive tape with DST 3M 9495LE glue (total thickness 0.2mm)	Foam double side adhesive tape with 3M 9495LE glue (total thickness 0.5mm)	Without tape

Cover glass color options:

	
BLACK	WHITE

Product options:

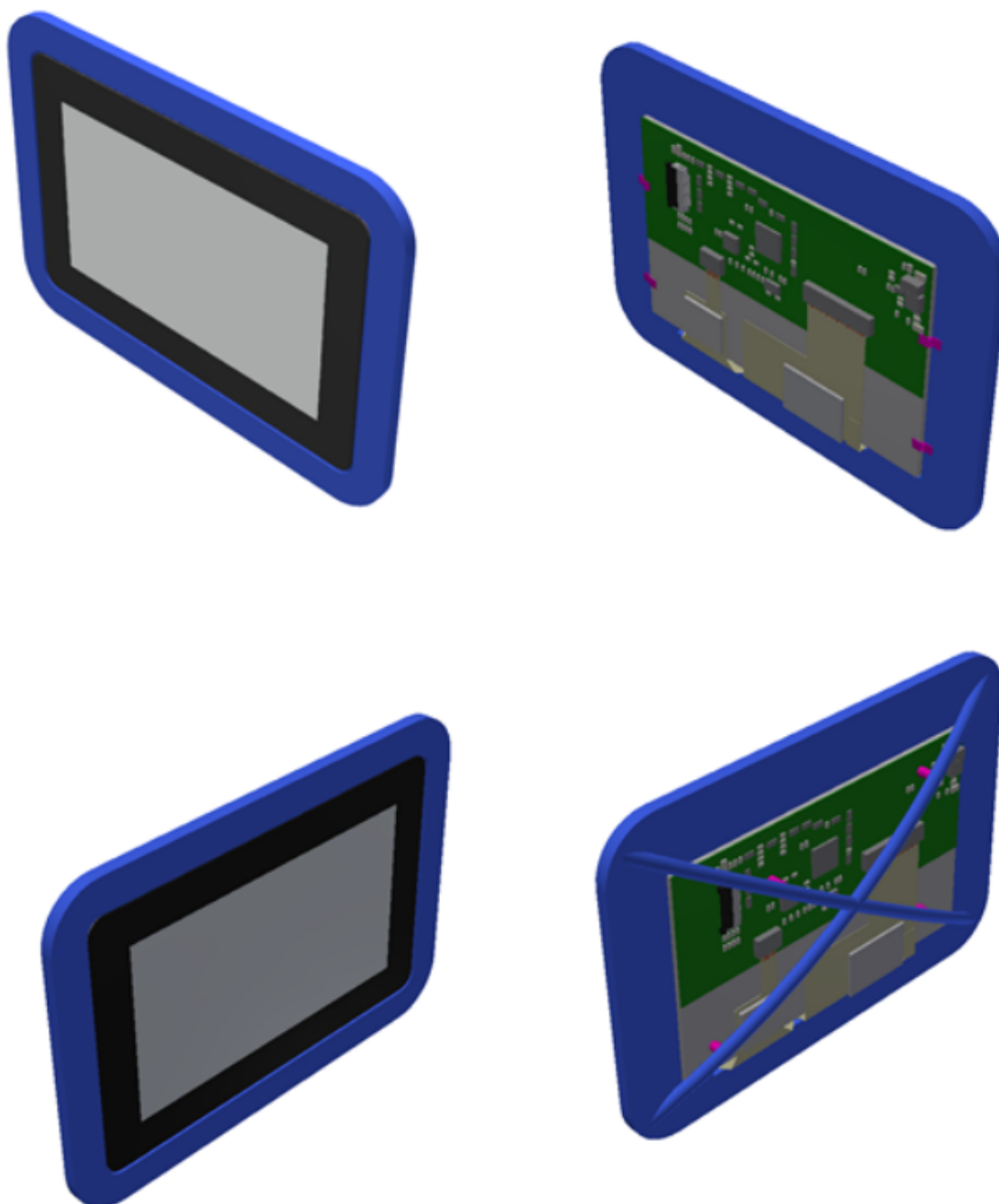
PART NUMBER	DESCRIPTION
RVT70AQLNWN00 V2	LVDS, No mounting frame, No touch panel, Rev 2.0
RVT70AQLNWR00 V2	LVDS, No mounting frame, RTP, Rev 2.0
RVT70AQLNWC00 V2	LVDS, No mounting frame, CTP, Rev 2.0
RVT70AQLFWN00 V2	LVDS, With mounting frame, No touch panel, Rev 2.0
RVT70AQLFWR00 V2	LVDS, With mounting frame, RTP, Rev 2.0
RVT70AQLFWC00 V2	LVDS, With mounting frame, CTP, Rev 2.0
RVT70UQLNWC00 V2	LVDS, CTP uxTouch, black cover glass, 0.2mm DST, Rev 2.0
RVT70UQLNWC01 V2	LVDS, CTP uxTouch, black cover glass, 0.5 mm DST, Rev 2.0
RVT70UQLNWC02 V2	LVDS, CTP uxTouch, black cover glass, no DST, Rev 2.0
RVT70UQLNWC03 V2	LVDS, CTP uxTouch, white cover glass, 0.2mm DST, Rev 2.0
RVT70UQLNWC04 V2	LVDS, CTP uxTouch, white cover glass, 0.5 mm DST, Rev 2.0
RVT70UQLNWC05 V2	LVDS, CTP uxTouch, white cover glass, no DST, Rev 2.0

2.1. UxTouch assembly

UxTouch are LCD TFT displays with specially designed projected capacitive touch panels. UxTouch display can be mounted without any holes in the housing. Our standard UxTouch displays include double-sided adhesive tape (DST) to stick TFT easily to the housing.

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 and Figure 2 below show examples of using support elements.

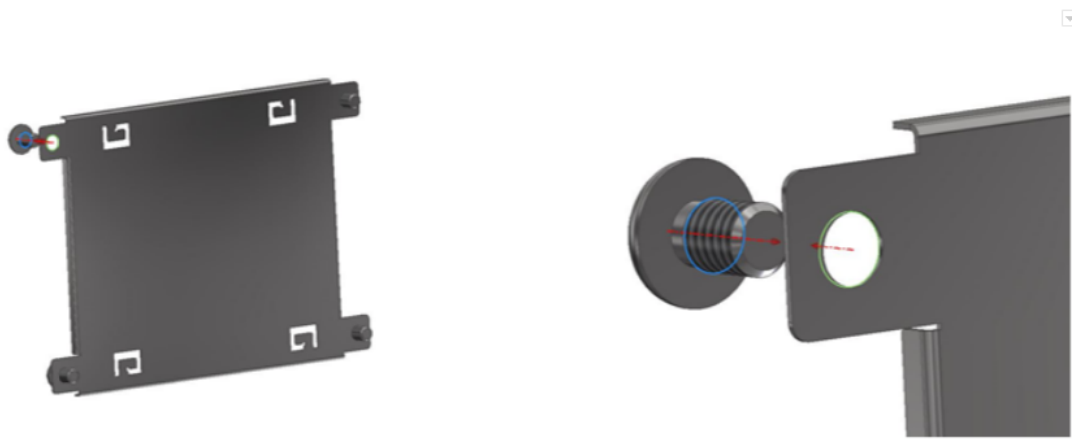
Figure 1. Example of using support brackets



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 3). The frames are specially designed to fit Riverdi products perfectly. The diameter of the mounting hole is 3.5mm.

Figure 2. Mounting frame



3. Drawings

4. Absolute maximum ratings

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage for Logic	VDD	-0.3	5.0	V
Supply Voltage for LED Inverter	BLVDD	-0.3	7.0	V
Input Voltage for Logic	VIN	-0.3	VDD	V
Operating Temperature	T _{OP}	-20	70	°C
Storage Temperature	T _{ST}	-30	80	°C
Humidity	RH	–	90% (Max 60°C)	RH

5. Electrical characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage For Module	VDD	–	3.3	–	V
Input Voltage for LED Inverter	BLVDD	2.8	5.0	5.5	V
LED Backlight Current	IDDbacklight (@ 5V)	–	450	540	mA
Input Voltage ' H ' level	V _{IH}	0.7VDD	–	VDD	mA
Input Voltage ' L ' level	V _{IL}	0	–	0.2VDD	V
LED Life Time	–	30000	50000	–	Hrs

Note: The LED life time is defined as the module brightness decrease to 50% original brightness at Ta=25°C

6. Electro-optical characteristics

ITEM		SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	REMARK	NOTE
Response Time		Tr+Tf	θ=0° ø=0° Ta=25	–	20	35	ms	Figure 4	4
Contrast Ratio		Cr		400	500	–	—	Figure 5	1
Luminance Uniformity		δ WHITE		70	75	–	%	Figure 5	3
Surface Luminance	TFT	Lv		400	500	–	cd/m2	Figure 5	2
	TFT+CTP		360	450	–				
	TFT+RTP		320	400	–				
Viewing Angle Range		θ	ø = 90°	40	50	–	deg	Figure 6	6
			ø = 270°	60	70	–	deg	Figure 6	
			ø = 0°	60	70	–	deg	Figure 6	
			ø = 180°	60	70	–	deg	Figure 6	
CIE (x, y) Chromaticity	Red	x	θ=0° ø=0° Ta=25	0.522	0.572	0.622	Figure 6	5	
		y		0.300	0.350	0.400			
	Green	x		0.311	0.361	0.411			
		y		0.526	0.576	0.626			
	Blue	x		0.097	0.147	0.197			
		y		0.038	0.088	0.138			
	White	x		0.266	0.316	0.366			
		y		0.266	0.316	0.366			

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.

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

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 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, T_r) and from black to white (Decay Time, T_f). For additional information see FIG 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 the 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.

Note 8. For TFT module, Gray scale reverse occurs in the direction of panel viewing angle.

Figure 3. The definition of response time

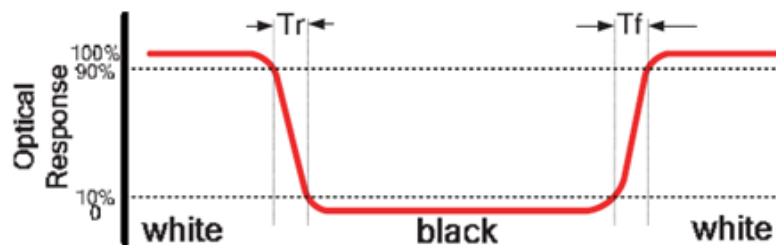


Figure 4. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

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

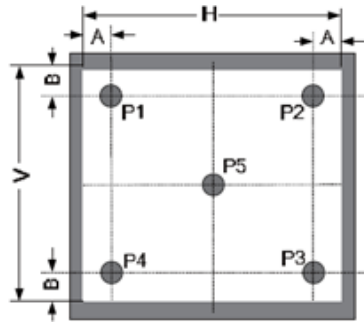
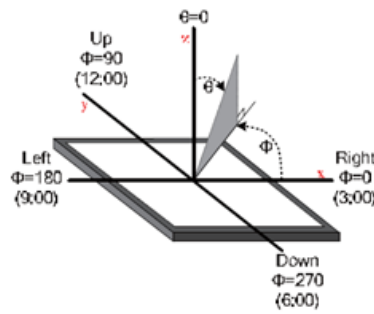


Figure 5.The definition of viewing angle



7. Interface description

PIN NO.	SYMBOL	DESCRIPTION
1	GND	Power Ground
2	RXCLK+	LVDS Clock Output Signal +
3	RXCLK-	LVDS Clock Output Signal -
4	GND	Power Ground
5	RXC0+	LVDS Channel 0 Input Signal +
6	RXC0-	LVDS Channel 0 Input Signal -
7	GND	Power Ground
8	RXC1+	Channel 1 Input Signal +
9	RXC1-	Channel 1 Input Signal -
10	GND	Power Ground
11	RXC2+	LVDS Channel 2 Input Signal +
12	RXC2-	LVDS Channel 2 Input Signal -
13	VDD	Power Supply: +3.3V
14	RXC3+	LVDS Channel 3 Input Signal +
15	RXC3-	LVDS Channel 3 Input Signal -
16	VDD	Power Supply: +3.3V
17	RESET	Global Reset Pin

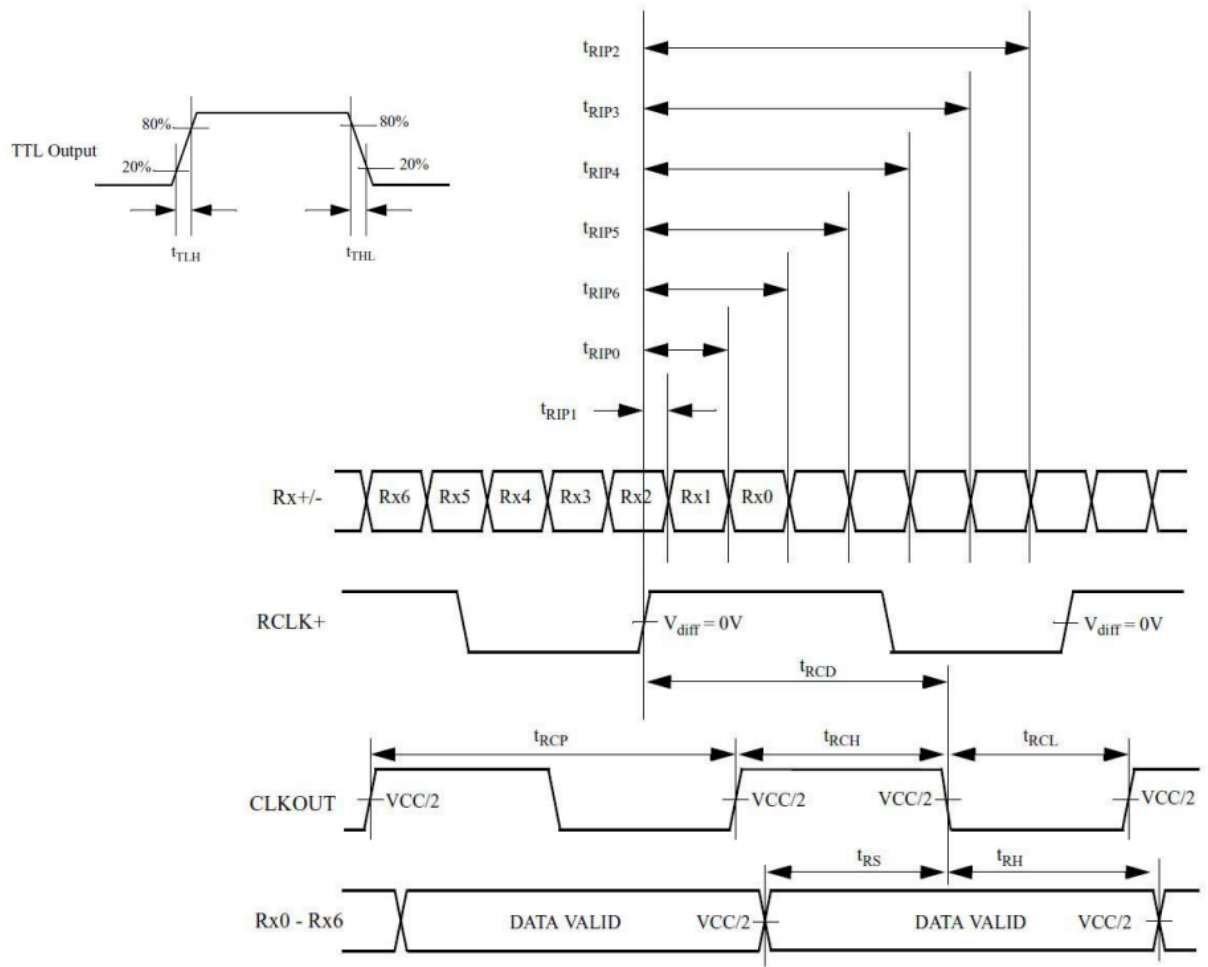
18	BLGND	Backlight Ground
19	BLGND	Backlight Ground
20	BLVDD	Backlight Supply Voltage
21	BLVDD	Backlight Supply Voltage
22	BLENA	Backlight Enable Signal
23	XL (for RTP)	X-Right
	TP_SDA (for CTP)	Touch Panel I2C SDA Signal
	NC (for no touch)	Not connected
24	YD (for RTP)	Y-Bottom
	TP_SCL (for CTP)	Touch Panel I2C SCL Signal
	NC (for no touch)	Not connected
25	XR (for RTP)	X-Left
	TP_RST (for CTP)	Touch Panel I2C RST Signal
	NC (for no touch)	Not connected
26	YU (for RTP)	Y-Up
	TP_INT (for CTP)	Touch Panel I2C INT Signal
	NC (for no touch)	Not connected

8. LVDS switching characteristics

8.1. LVDS Timing Condition

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
CLK OUT Period	tRCP	11.76	30.06(T)	50.0	ns
CLK OUT High Time	tRCH	–	4T/7	–	ns
CLK OUT Low Time	tRCL	–	3T/7	–	ns
RCLK+/- to CLK OUT Delay	tRCD	–	5T/7	–	ns
TTL Data Setup to CLK OUT	tRS	0.35T-0.3	–	–	ns
TTL Data Hold from CLK OUT	tRH	0.45T-1.6	–	–	ns
TTL Low to High Transition Time	tTLH	–	2.0	3.0	ns
TTL Low to Low Transition Time	tTHL	–	1.8	3.0	ns
Input Data Position0 (T=11.76ns)	tRIP1	-0.4	0.0	0.4	ns
Input Data Position0 (T=11.76ns)	tRIP0	T/7-0.4	T/7	T/7+0.4	ns
Input Data Position0 (T=11.76ns)	tRIP6	2T/7-0.4	2T/7	2T/7+0.4	ns
Input Data Position0 (T=11.76ns)	tRIP5	3T/7-0.4	3T/7	3T/7+0.4	ns
Input Data Position0 (T=11.76ns)	tRIP4	4T/7-0.4	4T/7	4T/7+0.4	ns
Input Data Position0 (T=11.76ns)	tRIP3	5T/7-0.4	5T/7	5T/7+0.4	ns
Input Data Position0 (T=11.76ns)	tRIP2	6T/7-0.4	6T/7	6T/7+0.4	ns
Phase Lock Loop Set	tRPLL	–	–	10	ms

8.2. LVDS AC Timing Characteristic

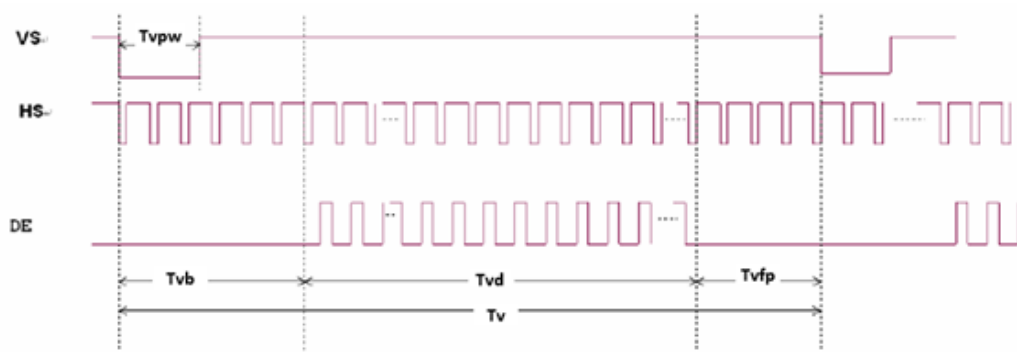


8.3. Clock and data input time diagram

Figure 6. Horizontal Input timing diagram



Figure 7. Vertical input timing diagram



8.4. Parallel RGB timing table

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
DCLK Frequency	Fclk	26.0	30.0	36.0	MHz
VSD Period Time	tv	515	525	535	TH
VSD Display Area	tvd	480			TH
VSD Blanking	tvb	10			TH
VSD Front Porch	tvfp	12	22	32	TH
VSD Pulse Width	tvpw	–	13	–	TH
HSD Pulse Width	thpw	–	30	–	DCLK
HSD Period Time	th	1026	1056	1086	DCLK
HSD Display Area	thd	800			DCLK
HSD Blanking	thb	16			DCLK
HSD Front Porch	thfp	180	210	240	DCLK

9. Touch panel specifications

9.1. Electrical characteristics

Note: Avoid operating with hard or sharp material such as a ball point pen or a mechanical pencil except a polyacetal pen (tip R0.8mm or less) or a finger

9.1.1. For capacitive touch panel

DESCRIPTION	SPECIFICATION
Operating Voltage	DC 2.8~3.3V

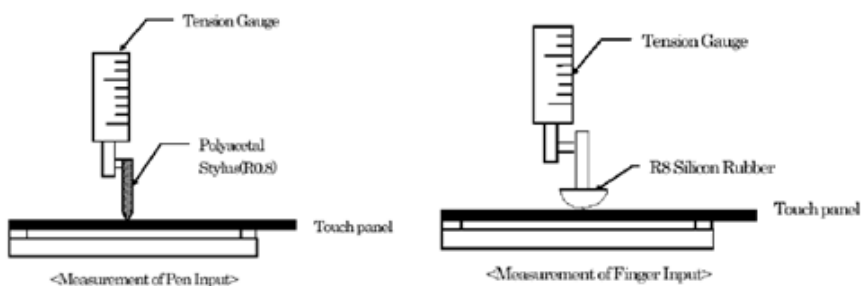
Power Consumption (IDD)	Active Mode	TBD μ A
	Sleep Mode	TBD μ A
Interface		I ² C
Linearity		<1.5%
Controller		FT5426
I2C address		0x38 (7 bit address)
Resolution		1792*1084

9.1.2. For resistive touch panel

ITEM	VALUE			UNIT	REMARK
	Min.	Typ.	Max.		
Linearity	-3.0	-	3.0	%	Analog X and Y directions
Terminal Resistance	440	-	1000	Ω	X
	100	-	420	Ω	Y
Insulation Resistance	25	-	-	M Ω	DC DC 25V
Voltage	-	-	10	V	DCDC
Chattering	-	-	10	ms	100k Ω pull-up
Transparency	78	-	-	%	JIS K7105

9.2. Mechanical characteristics

Note 1: Force test condition, Input DC 5V on X direction, Drop off Polyacetal Stylus (R0.8), until output voltage stabilize, then get the R8.0mm Silicon rubber and do finger Activation force test. Next step, 9 points.



Note 2: Measurement surface area conditions, Scratch 100,000 times straight line on the film with a stylus change every 20,000 times with Force: 250gf, Speed: 60mm/sec by R0.8 polaceteal stylus.

Note 3: Pitting test, Pit 1, 000, 000 times on the film with R0.8 silicon rubber with Force: 250gf and Speed: 2 times/sec.

9.2.1 for capacitive touch panel

DESCRIPTION	INL SPECIFICATION	REMARK
Touch Panel Size	7.0 inch	
Outline Dimension (OD)	164.4 mm x 99.45 mm	Cover Lens Outline
Outline Dimension (OD) – UxTouch	179.96 x 119.0mm	Cover Lens Outline
Product Thickness	2.3 mm	
Glass Thickness	1.1 mm	
Ink View Area	155.08mm x 87.42mm	
Sensor Active Area	156.68mm x 88.52mm	
Input Method	5 Finger	
Activation Force	Touch	
Surface Hardness	≥7H	

9.2.2. For resistive touch panel

Note 1: Force test condition, Input DC 5V on X direction, drop off Polyacetal Stylus (R0.8), until output voltage stabilize, then get the R8.0mm Silicon rubber and do finger Activation force test. Next step, 9 points.

ITEM	VALUE			UNIT	REMARK
	Min.	Typ.	Max.		
Activation Force	20	–	100	gf	Note 1
Durability-Surface Scratching	Write 100,000	–	–	characters	Note 2
Durability-Surface Pitting	1,000,000	–	–	touches	Note 3
Surface Hardness	3	–	–	H	JIS K5400

10. Inspection

Standard acceptance/rejection criteria for TFT module.

10.1. Inspection condition

Ambient conditions:

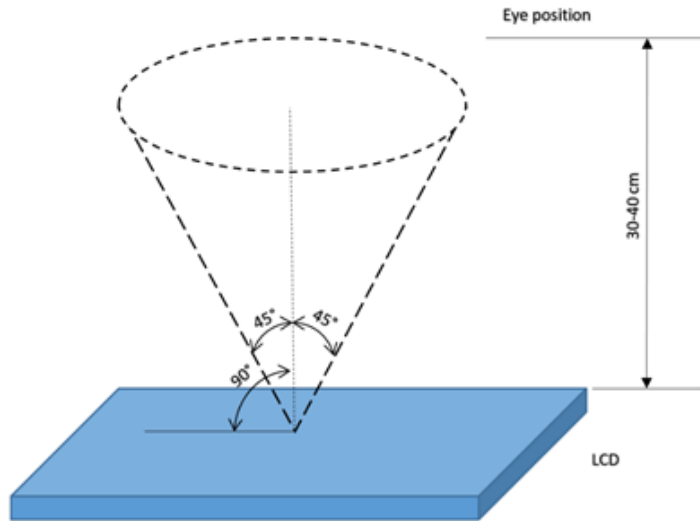
- Temperature: 25±°C
- Humidity: (60±10) %RH
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

Viewing distance:

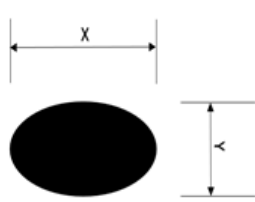
35±5cm between inspector bare eye and LCD.

Viewing Angle:

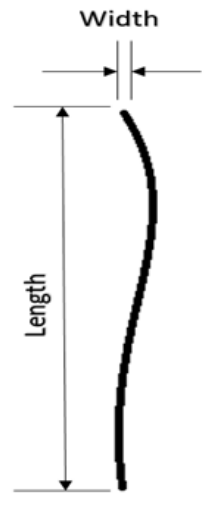
U/D: 45°/45°, L/R 45°/45°



10.2 Inspection standard

Item	Criterion																								
<p>Black spots, white spots, light leakage, Foreign Particle (round Type)</p>	<div style="text-align: center;">  </div> $D = \frac{(x + y)}{2}$ <p>*Spots density: 10 mm</p> <table border="1" data-bbox="981 974 1401 1818"> <thead> <tr> <th colspan="2" style="background-color: #cccccc;">Size < 5"</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 < 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> <tr> <th colspan="2" style="background-color: #cccccc;">Size >= 5"</th> </tr> <tr> <th>Average Diameter</th> <th>Qualified Qty</th> </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> </tbody> </table>	Size < 5"		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	Size >= 5"		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
	Size < 5"																								
	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																							
	Size >= 5"																								
	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																								

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



*Spots density: 10 mm

Size < 5"		
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

Size >= 5"		
Length	Width	Qualified Qty
-	W < 0.02	Ignored
L < 3.0	0.02 < W < 0.05	4
L < 2.5	0.05 < W < 0.08	
-	0.08 < W	0

Item	Criterion
------	-----------

Clear spots

Size < 5"	
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

Size >= 5"	
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

Size < 5"	
Average Diameter	Qualified Qty
D < 0.2 mm	Ignored
0.2 mm < D < 0.5 mm	3
0.5 mm < D < 1 mm	2
1 mm < D	0
Total Q'ty	3

Size >= 5"	
Average Diameter	Qualified Qty

D<0.25 mm	Ignored
0.25 mm < D < 0.5 mm	3
0.5 mm < D	0

Electrical Dot Defect

Size < 5"	
item	Qualified Qty
Black do defect	4
Bright dot defect	2
Total Dot	5

Size >= 5"	
item	Qualified Qty
Black do defect	5
Bright dot defect	2
Total Dot	5

Item	Criterion
------	-----------

Touch panel spot

Size < 5"	
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

Size >= 5"	
Average Diameter	Qualified Qty
D<0.25 mm	Ignored
0.25 mm < D < 0.5 mm	4
0.5 mm < D	0

Touch panel White Line Scratch

Size < 5"		
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

Size >= 5"		
Length	Width	Qualified Qty
-	W< 0.03	Ignored
L < 5.0	0.03 < W <0.05	2
-	0.05 < W	0

11. Reliability test

NO.	TEST ITEM	TEST CONDITION	REMARKS
1	High Temperature Storage	80±2°C/240hours	Note 2
2	Low Temperature Storage	-30±2°C/240hours	Note 1,2
3	High Temperature Operating	70±2°C/240hours	
4	Low Temperature Operating	-20±2°C/240hours	Note 1
5	Temperature Cycle	-30±2°C~25±2°C ~80±2°C × 20 cycles (30min.) (5min.) (30min.)	Note 1,2
6	Damp Proof Test	60°C ±5°C × 90%RH/240hours	
7	Vibration Test	Frequency 10Hz~55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X, Y, Z 2 hours for each direction.	
8	Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
9	ESD Test	Air: ±8KV 150pF/330Ω 5 times Contact: ±4KV 150pF/330Ω 5 times	
10	ESD Test for RTP	Air: ±8KV 150pF/330Ω 5 times Contact: ±4KV 150pF/330Ω 5 times	

Note 1: Without water condensation.

Note 2: The function test shall be conducted after 2 hours storage at the room temperature and humidity after removed from the test chamber.



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Updated on September 17, 2021

[LVDS 7" High Resolution series →](#)

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