

SSD1963 7"



This datasheet gives detailed information about the Riverdi 7" SSD1963 displays. The displays come in different versions: with **capacitive, resistive, or no touchscreen**, with a decorative **cover glass**, as well as with our 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	7.0	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		SSD1963	/
Interface Type		Parallel 8/16b (i80 by default) – SPI	/
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	S	x	W	x	ox
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

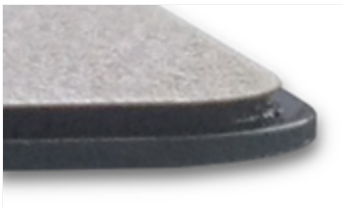
1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard
3.	DISPLAY SIZE	70 – 7.0”
4.	MODEL SERIAL NO.	A (A-Z) U-UxTouch
5.	RESOLUTION	Q– 800x480px
6.	INTERFACE	S – TFT+SSD1963
7.	FRAME	N – No Frame F – Mounting Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	N – No Touch Panel R – Resistive Touch Panel C – Capacitive Touch Panel
10.	VERSION	Ox (00-99)

2. Assembly guide – integration


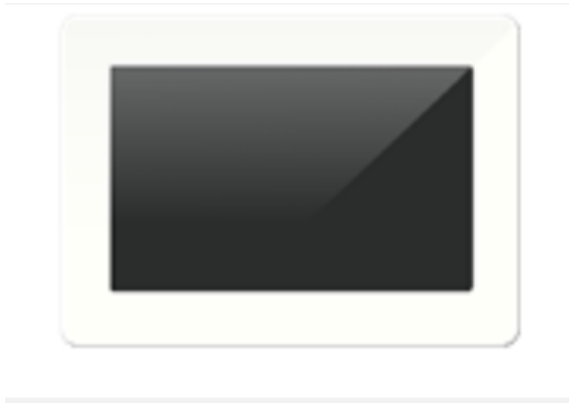
Three options of rear side adhesive tape are available: double side adhesive tape 0.2 mm with 3M 467MP glue, foam double side adhesive tape 0.5 mm with DST 3M 9495LE glue or without any tape.

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:

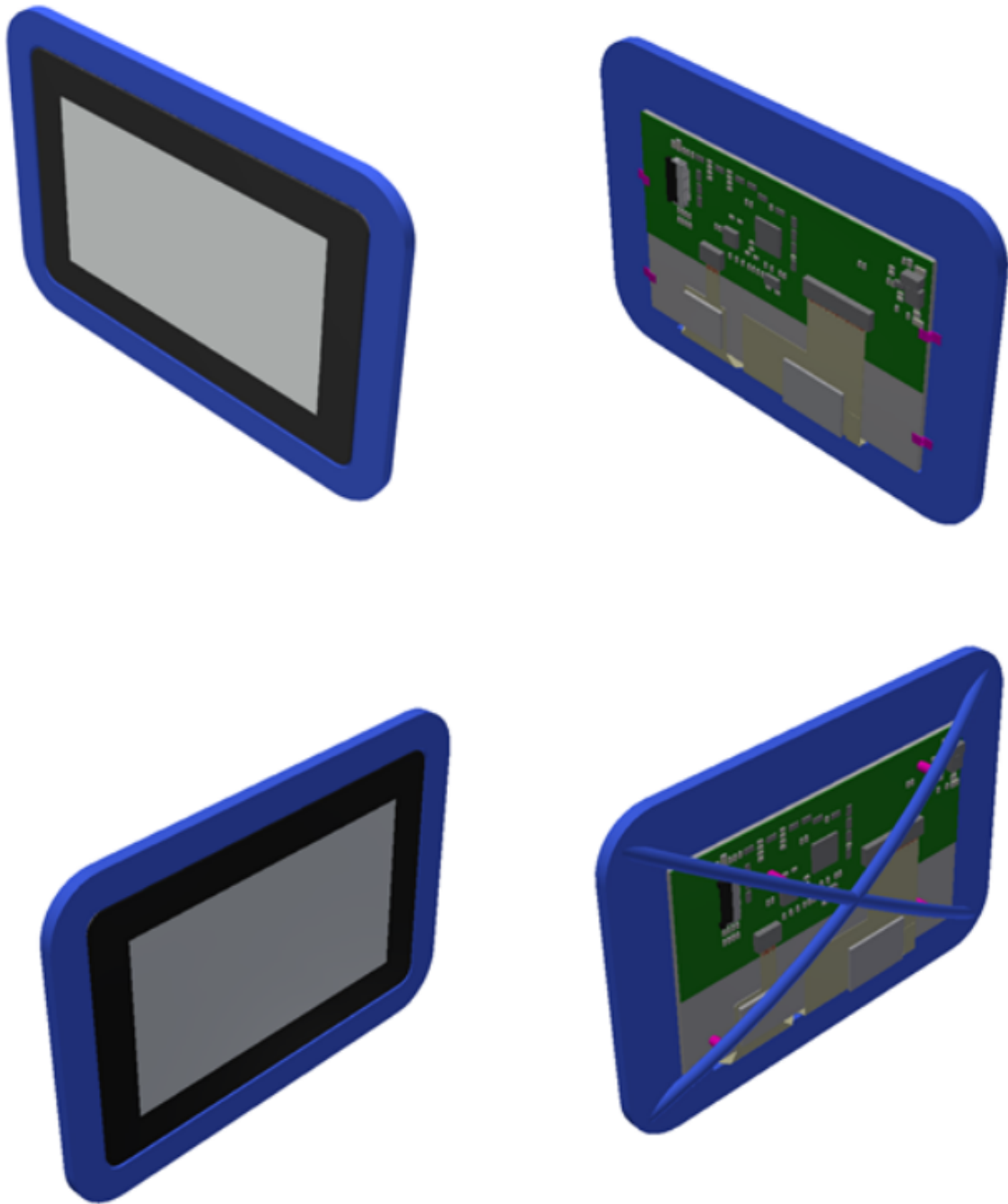
PART NUMBER	DESCRIPTION
RVT70AQSNWN00 V2	SSD1963, No mounting frame, No touch panel, Rev 2.0
RVT70AQSNWR00 V2	SSD1963, No mounting frame, RTP, Rev 2.0
RVT70AQSNWC00 V2	SSD1963, No mounting frame, CTP, Rev 2.0
RVT70AQSFWN00 V2	SSD1963, With mounting frame, No touch panel, Rev 2.0
RVT70AQSFWR00 V2	SSD1963, With mounting frame, RTP, Rev 2.0
RVT70AQSFWC00 V2	SSD1963, With mounting frame, CTP, Rev 2.0
RVT70UQSNWC00 V2	SSD1963, CTP uxTouch, black cover glass, 0.2mm DST, Rev 2.0
RVT70UQSNWC01 V2	SSD1963, CTP uxTouch, black cover glass, 0.5 mm DST, Rev 2.0
RVT70UQSNWC02 V2	SSD1963, CTP uxTouch, black cover glass, no DST, Rev 2.0
RVT70UQSNWC03 V2	SSD1963, CTP uxTouch, white cover glass, 0.2mm DST, Rev 2.0
RVT70UQSNWC04 V2	SSD1963, CTP uxTouch, white cover glass, 0.5 mm 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 hole 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.

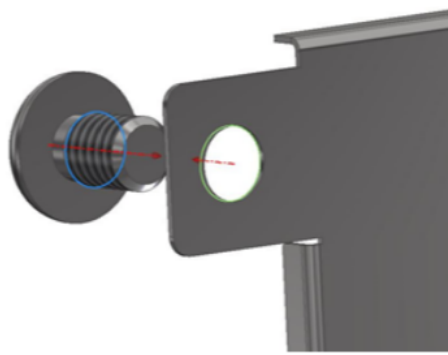
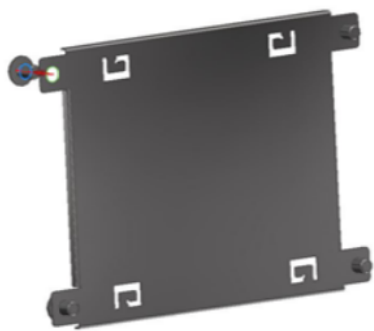
Figure 1. Example of using support brackets



2.2. Mounting frame

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
Input Voltage for Logic	VIN	-0.3	VDD	V
Input voltage for LED inverter	BLVDD	-0.3	7.0	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Humidity	RH	–	90% (Max 60°C)	RH

5. Electrical characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTES
Supply Voltage For Module	VDD	3.0	3.3	3.6	V	
Input Voltage for LED Inverter	BLVDD	2.8	5.0	5.5	V	
Input Voltage ‘H’ level for BL_E pin	BL_Eh	1.5	–	5.5	V	
Input Voltage ‘L’ level for BL_E pin	BL_El	0	–	0.7	V	
Input current (exclude LED backlight)	IDD	–	95	115	mA	
LED backlight current	IDDbacklight	–	450	540	mA	BLDD=5v
Input Voltage ‘H’ level	VIH	0.7VDD	–	VDD	V	
Input Voltage ‘L’ level	VIL	0	–	0.2VDD	V	
LED Life Time	–	30000	50000	–	Hrs	Note1

Note1: 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	$\theta=0^{\circ}$ $\phi=0^{\circ}$ Ta=25	–	20	35	ms	FIG 1.	4
Contrast Ratio	Cr		400	500	–	—	FIG 2.	1
Luminance Uniformity	δ WHITE		70	75	–	%	FIG 2.	3

Surface		TFT		$\varnothing = 90^{\circ}$ $\varnothing = 270^{\circ}$	400	500	–			
Luminance	TFT+CTP		Lv		360	450	–	cd/m2	FIG 2.	2
	TFT+RTP		θ		320	400	–	deg	FIG 3. FIG 3.	6
		40			50	–				
		60			70	–				
Viewing Angle Range		$\varnothing = 0^{\circ}$			60	70	–			
		$\varnothing = 180^{\circ}$	60		70	–	deg	FIG 3.		
Red		x			0.522	0.572	0.622			
		y			0.300	0.350	0.400			
CIE (x, y) Chromaticity	Green	x	$\theta=0^{\circ}$ $\varnothing=0^{\circ}$ Ta=25		0.311	0.361	0.411	FIG 2.	5	
		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 4 .

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

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information, see Figure 4 .

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

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 4 .

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

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 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

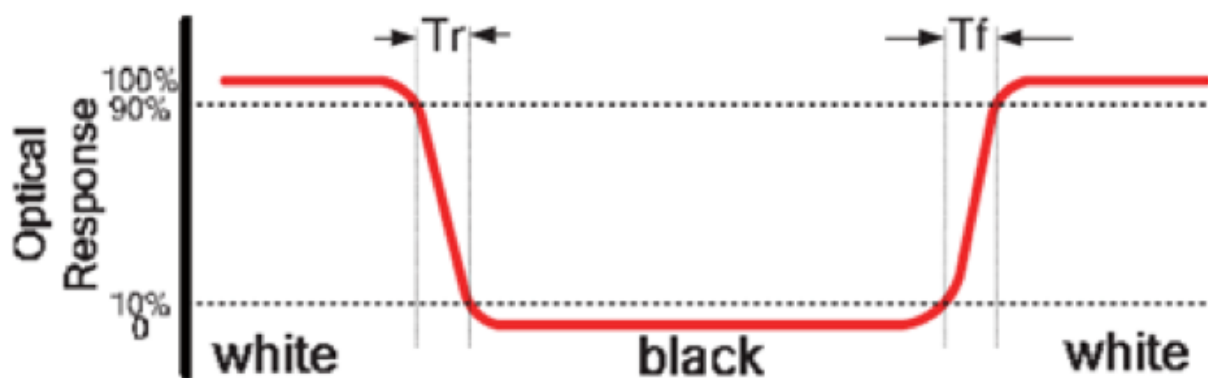


Figure 4. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

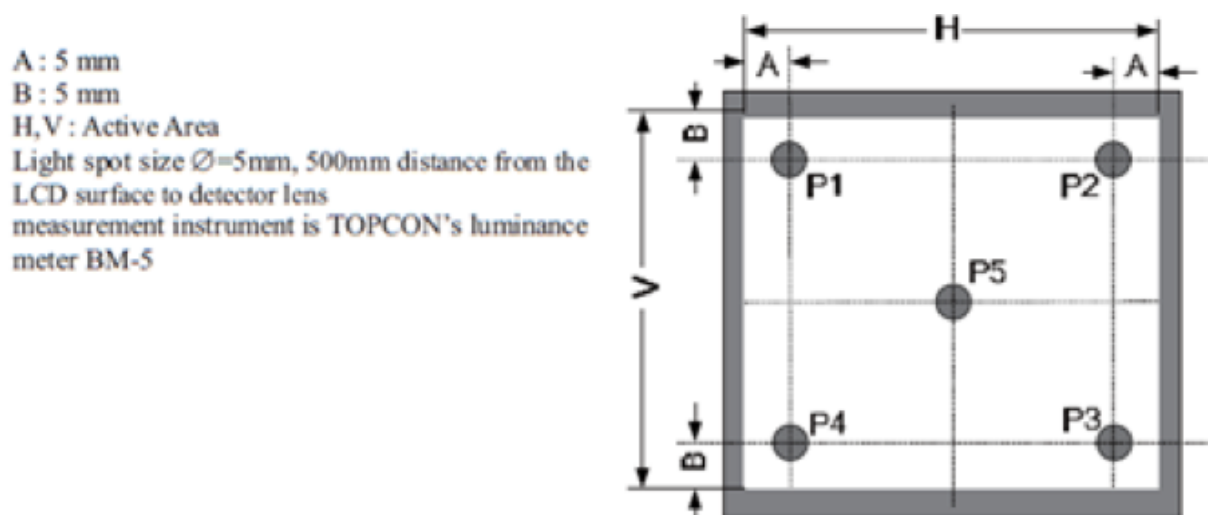
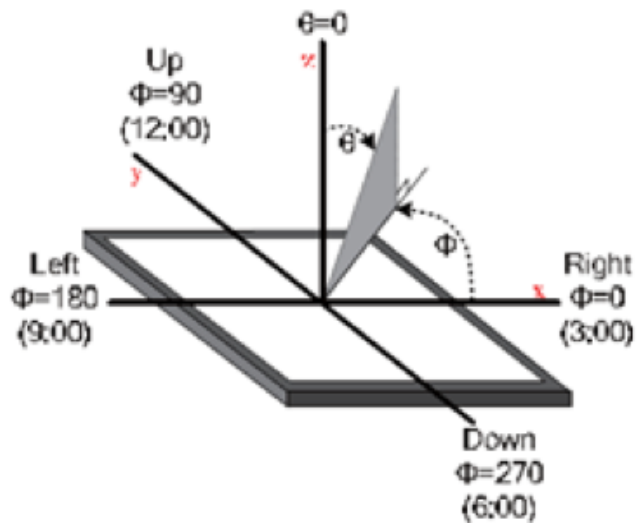


Figure 5. The definition of viewing angle



7. Interface description

PIN NO.	SYMBOL	I/O	DESCRIPTION	REMARK
1	GND	P	Power Ground	
2	VDD	P	Power Supply: +3.3V	
3	BL_E	I	Backlight Control Signal, H: On/L: Off (internally pulled-up to BLVDD)	
4	D/C	I	Data/Command Select	
5	WR	I	Write Strobe Signal	
6	RD	I	Read Strobe Signal	
7-22	D0-D15	I	Data Bus. Pins not used should be floating.	
23	NC	–	No Connection	
24	TP_INT (CTP module)	O	Touch Panel INT	
	NC (no touch and RTP module)	–	NC	
25	CS	I	Chip Select	
26	RESET	I	Hardware reset	
27	L/R	I	Left / Right selection	1,2,3,4
28	U/D	I	Up/Down selection	1,2,3,4
29	TP_SCL (CTP module)	I/O	Touch Panel I2C SCL Signal	
	XL (RTP module)	–	Touch left electrode	
	NC (no touch module)	–	No Connection	
30	TP_SDA (CTP module)	I/O	Touch Panel I2C SDA Signal	
	YU (RTP module)	–	Touch up electrode	
	NC (no touch module)	–	No Connection	

31	TP_RST (CTP module)	I	Touch Panel RST Signal, Active Low	
	XR (RTP module)	–	Touch right electrode	
	NC (no touch module)	–	No Connection	
32	TP_WAKE (CTP module)	I	Touch Panel Wake Signal, Active Low	
	YD (RTP module)	–	Touch down electrode	
	NC (no touch module)	–	No Connection	
33	BLGND	P	Backlight ground, can be connected to GND	
34	BLGND	P	Backlight ground, can be connected to GND	
35	BLVD	P	Backlight power supply, can be connected to VDD	
36	BLVD	P	Backlight power supply, can be connected to VDD	

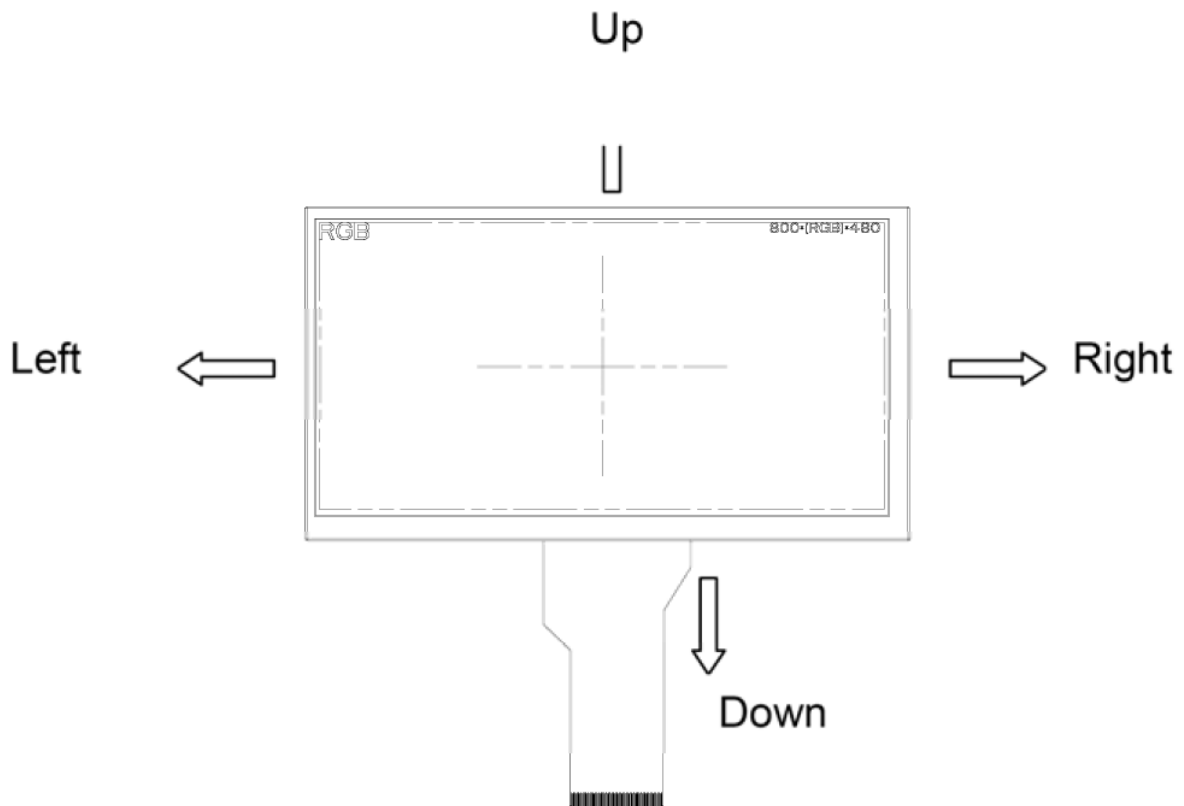
Note 1: Selection of scanning mode.

SET OF SCAN CONTROL INPUT		SCANNING DIRECTION
UD	LR	
GND	VDD	Up To Down, Left To Right
VDD	GND	Down To Up, Right To Left
GND	GND	Up To Down, Right To Left
VDD	VDD	Down To Up, Left To Right

Note 2: Definition of scanning direction.

Refer to the figure Figure 6.

Figure 6. Definition of scanning direction



Note 3: Normally (internally) pull high.

Note 4: Normally (internally) pull low.

8. Interface timing characteristics

8.1. 8080 mode

The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, D[15:0]. This interface uses WR# to define a write cycle and RD# for read cycle. If the WR# goes low when the CS# signal is low, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes low and end at the rising edge of RD#.

Interface	Cycle	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]
16 bits (565 format)	1 st			R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5
16 bits	1 st			R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4
	2 nd			B7	B6	B5	B4	B3	B2	B1	B0	R7	R6	R5	R4
	3 rd			G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4
12 bits	1 st							R7	R6	R5	R4	R3	R2	R1	R0

	2 nd							G3	G2	G1	G0	B7	B6	B5	B4
9 bits	1 st										R5	R4	R3	R2	R1
	2 nd										G2	G1	G0	B5	B4
8 bits	1 st											R7	R6	R5	R4
	2 nd											G7	G6	G5	G4
	3 rd											B7	B6	B5	B4

8.2. Parallel 8080-series Interface Timing

Figure 7. Parallel 8080-series Interface Timing Diagram (Write Cycle)

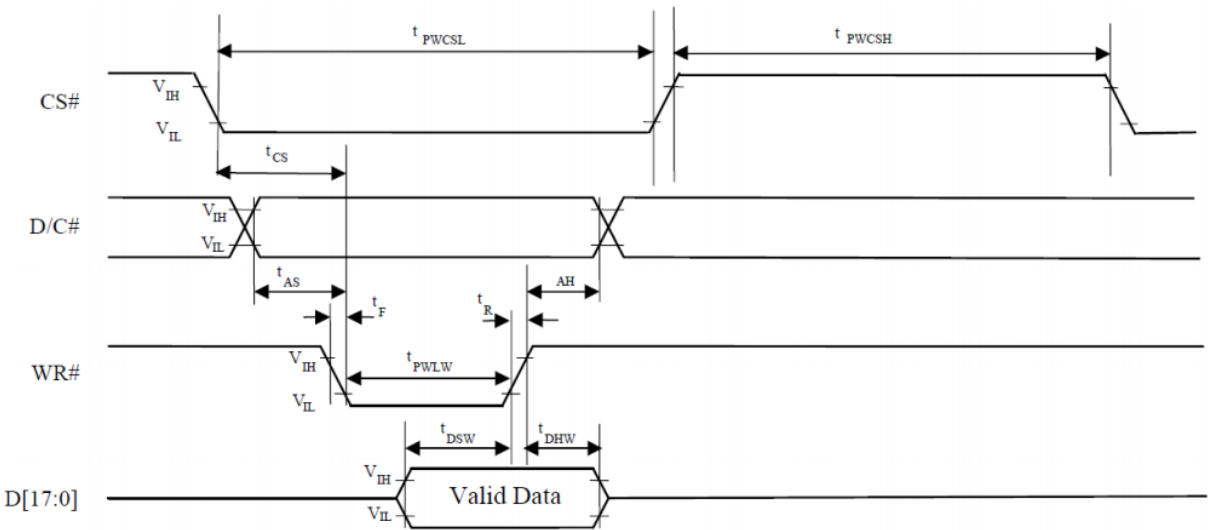
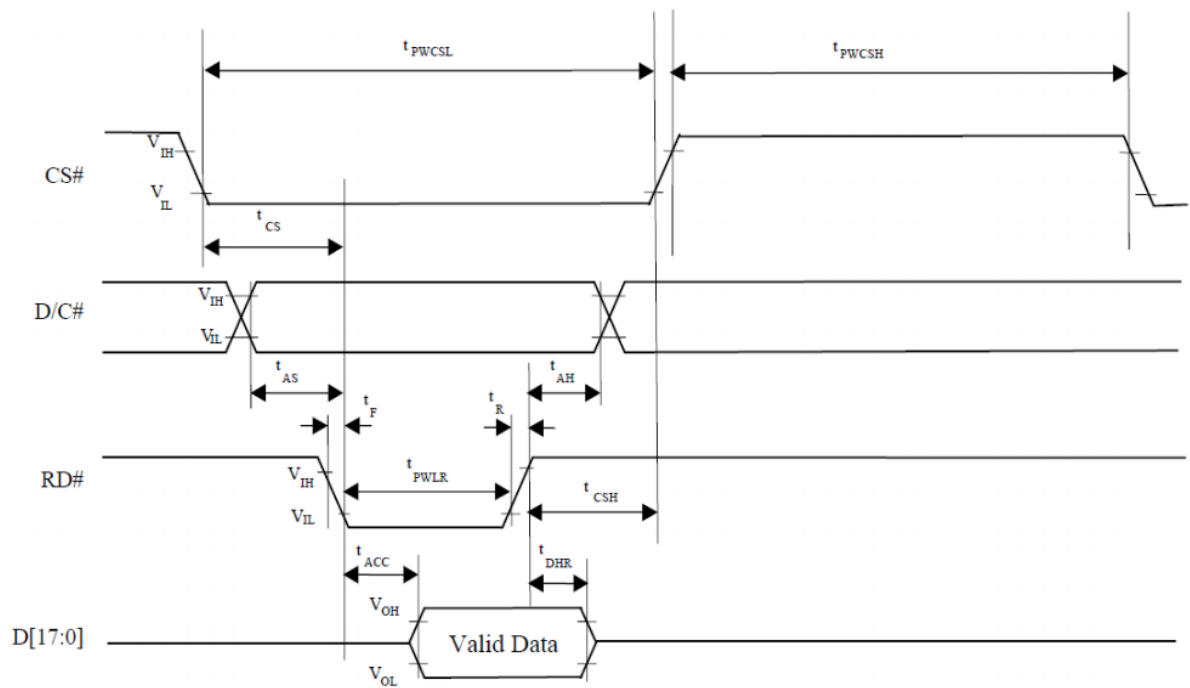


Figure 8. Parallel 8080-series Interface Timing Diagram (Read Cycle)



9. LCD timing characteristics

9.1. Parallel RGB input 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

9.2. Clock and data input time diagram

Figure 9. Horizontal input timing diagram

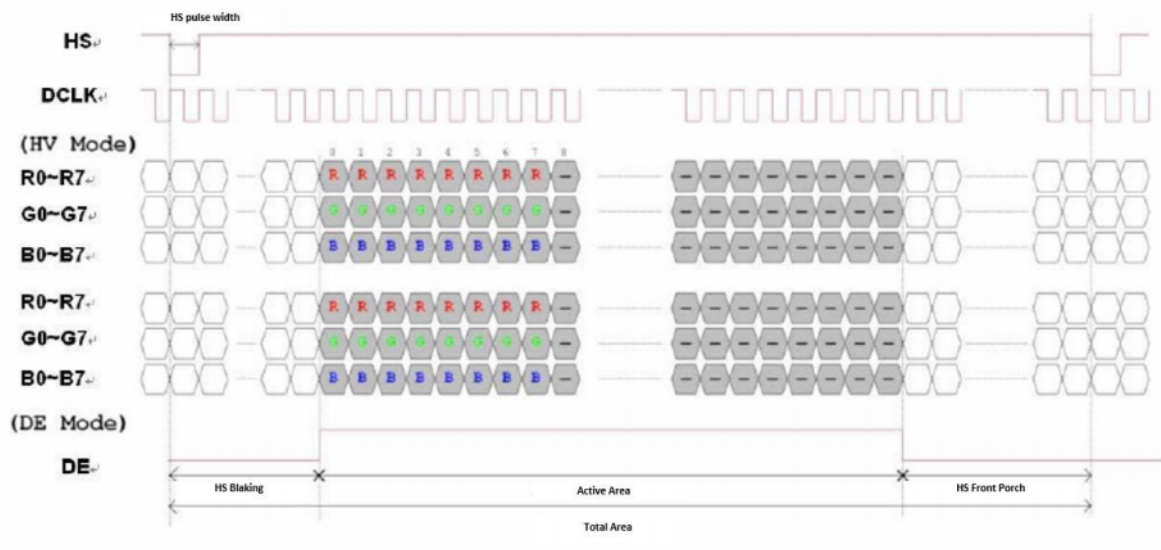
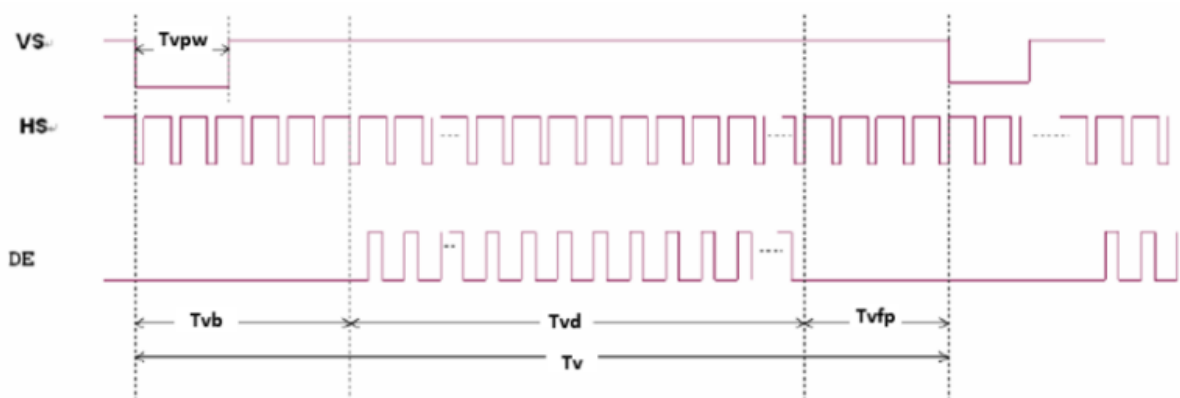


Figure 10. Vertical input timing diagram



10. Touch panel specifications

10.1. 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

10.1.1. For capacitive touch panel

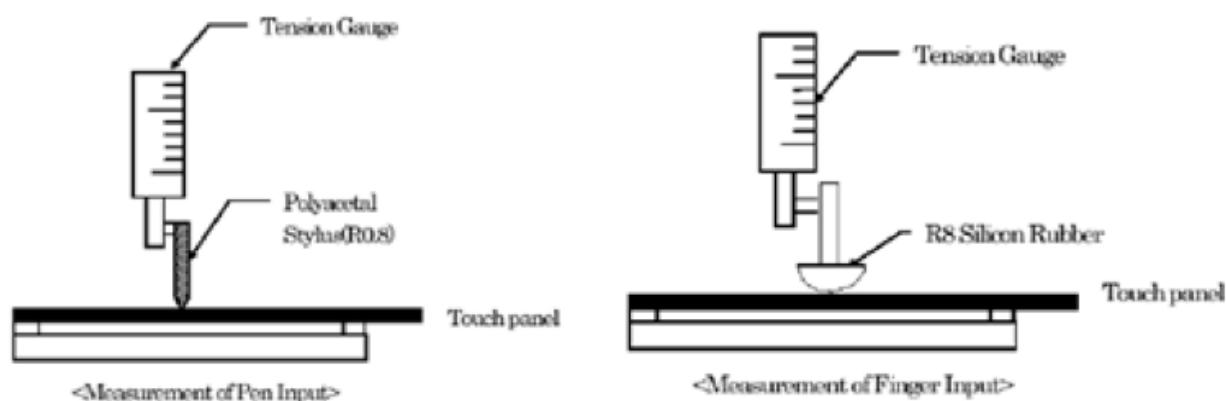
DESCRIPTION		SPECIFICATION
Operating Voltage		DC 2.8~3.6V
Power Consumption (IDD)	Active Mode	10~18mA
	Sleep Mode	30~50μA
Interface		I ² C
Linearity		<1.5%
Controller		FT5426
I2C address		0x38 (7 bit address)
Resolution		1792*1024

10.1.2. For resistive touch panel

ITEM	VALUE			UNIT	REMARK
	Min.	Typ.	Max.		
Linearity	-3.0	–	30	%	Analog X and Y directions
Terminal Resistance	440	–	1100	Ω	X
	100	–	420	Ω	Y
Insulation Resistance	25	–	–	MΩ	DC 25V
Voltage	–	–	10	V	DC
Chattering	–	–	10	ms	100kΩ pull-up
Transparency	78	–	–	%	JIS K7105

10.2. 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.

10.2.1 for capacitive touch panel

DESCRIPTION	INL SPECIFICATION	REMARK
Touch Panel Size	7.0 inch	
Outline Dimension (OD)	164.4mm x 99.45mm	Cover Lens Outline
Outline Dimension (OD) -UxTouch	179.96mm x 119.00mm	Cover Lens Outline
Product Thickness	2.3mm	
Glass Thickness	1.1mm	
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	

10.2.2. 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

10.3. Capacitive touch panel parameters

10.3.1. Interface timing characteristics

PARAMETER	MIN	MAX	UNIT
SCL Frequency	0	400	kHz
Bus Free Time Between a STOP and START Condition	4.7	/	μs
Hold Time (repeated) START Condition	4.0	/	μs
Data Setup Time	250	/	ns
Setup Time for Repeated START Condition	4.7	/	μs
Setup Time for STOP Condition	4.0	/	μs

10.3.2. I2C Read/Write Interface description

Figure 11. Write N bytes to I2C slave

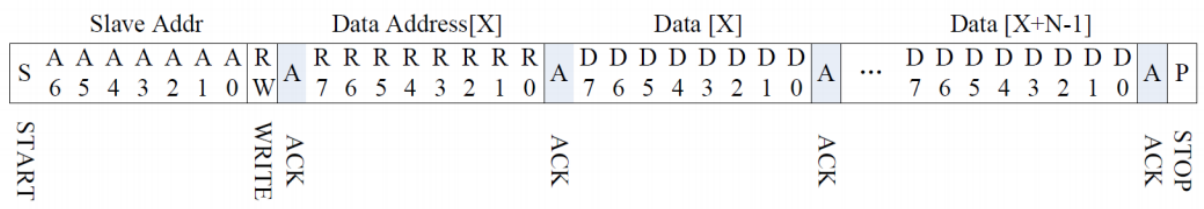


Figure 12. Set Data Address

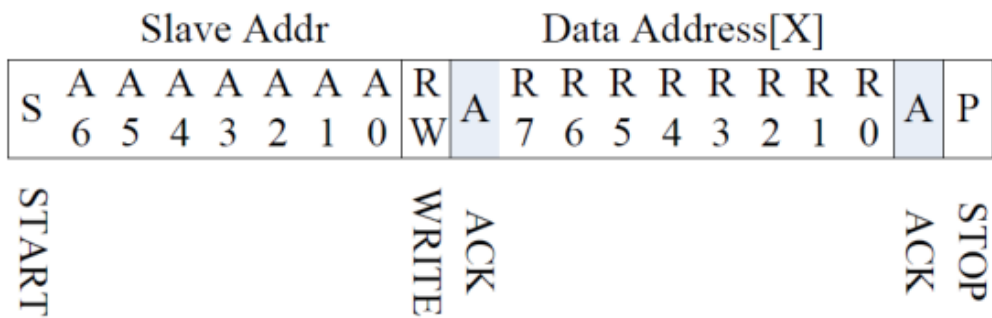
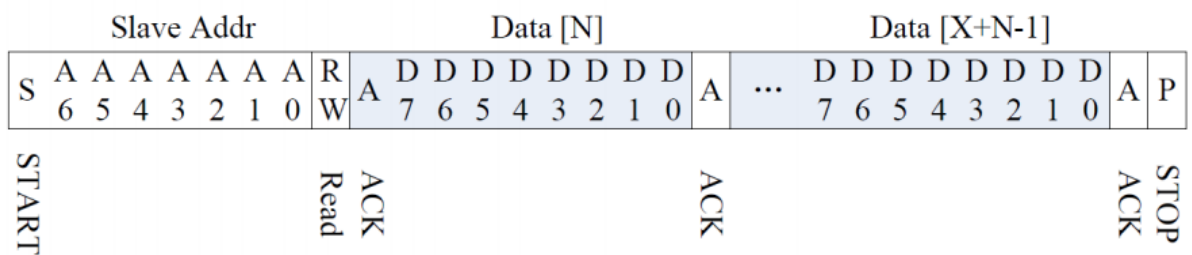


Figure 13. Read X bytes from I2C Slave



10.3.3. Communication of the I2C interface with host

Figure 14. Communication of the I2C interface with Host

17h	TOUCH4_YH	4th Touch ID[3:0]				4th Touch X Position[11:8]				R
18h	TOUCH4_YL	4th Touch Y Position[7:0]								R
19h										R
1Ah										R
1Bh	TOUCH5_XH	5th Event Flag				5th Touch X Position[11:8]				R
1Ch	TOUCH5_XL	5th Touch X Position[7:0]								R
1Dh	TOUCH5_YH	5th Touch ID[3:0]				5th Touch X Position[11:8]				R
1Eh	TOUCH5_YL	5th Touch Y Position[7:0]								R

10.3.5 Data description

DEVICE_MODE

This register is the device mode register, configure it to determine the current mode of the chip.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
00h	6:4	Device Mode [2:0]	000b Work Mode
			100b Factory Mode – Read Raw Data

GEST_ID

This register describes the gesture of a valid touch.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
01h	7:0	Gesture ID [7:0]	Gesture ID
			0x10 Move Up
			0x14 Move Down
			0x18 Move Right
			0x48 Zoom In
			0x49 Zoom Out
			0x00 No Gesture

TD_STATUS

This register is the Touch Data status register.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
02h	3:0	Number of Touch Points [2:0]	How Many Points Detected
	7:4		1-5 is Valid

TOUCHn_XH(n:1-10)

This register describes MSB of the X coordinate of the nth touch point and the corresponding event flag.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
03h ~ 39h	7:6	Event Flag	00b: Put Down 01b: Put Up 10b: Contact 11b: Reserved
	5:4		Reserved
	3:0	Touch X Position [11:8]	MSB of Touch X Position in Pixels

TOUCHn_XL(n:1-10)

This register describes LSB of the X coordinate of the nth touch point.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
04h ~ 3Ah	7:0	Touch X Position [7:0]	LSB of the Touch X Position in Pixels

TOUCHn_YH(n:1-10)

This register describes MSB of the Y coordinate of the nth touch point and corresponding touch ID.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
05h ~ 3Bh	7:4	Touch ID[3:0]	Touch ID of Touch Point
	3:0	Touch X Position [11:8]	MSB of Touch Y Position in Pixels

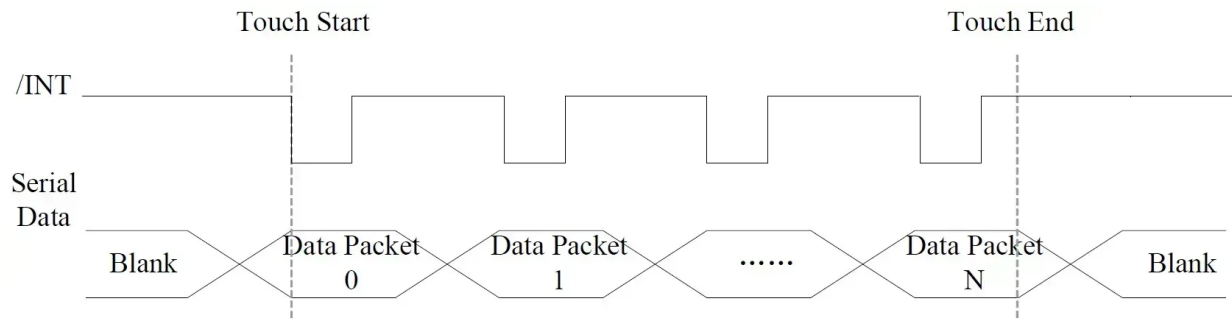
TOUCHn_YL(n:1-10)

This register describes LSB of the Y coordinate of the nth touch point.

ADRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
05h ~ 3Bh	7:0	Touch X Position [7:0]	LSB of the Touch Y Position in Pixels

10.3.6 Interrupt Trigger Mode

Figure 15. Interrupt trigger mode timing



11. Inspection

Standard acceptance/rejection criteria for TFT module.

11.1. Inspection condition

Ambient conditions:

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

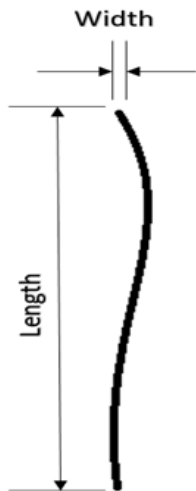
Viewing distance:

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

Viewing Angle:

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

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

	<table><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>	D<0.25 mm	Ignored	0.25 mm < D < 0.5 mm	3	0.5 mm < D	0																										
D<0.25 mm	Ignored																																
0.25 mm < D < 0.5 mm	3																																
0.5 mm < D	0																																
Electrical Dot Defect	<table><tr><td colspan="2">Size < 5"</td></tr><tr><td>item</td><td>Qualified Qty</td></tr><tr><td>Black do defect</td><td>4</td></tr><tr><td>Bright dot defect</td><td>2</td></tr><tr><td>Total Dot</td><td>5</td></tr></table> <table><tr><td colspan="2">Size >= 5"</td></tr><tr><td>item</td><td>Qualified Qty</td></tr><tr><td>Black do defect</td><td>5</td></tr><tr><td>Bright dot defect</td><td>2</td></tr><tr><td>Total Dot</td><td>5</td></tr></table>	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												
Size < 5"																																	
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Bright dot defect	2																																
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Item	Criterion																																
Touch panel spot	<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 < 0.4 mm</td><td>5</td></tr><tr><td>0.4 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<0.25 mm</td><td>Ignored</td></tr><tr><td>0.25 mm < D < 0.5 mm</td><td>4</td></tr><tr><td>0.5 mm < D</td><td>0</td></tr></table>	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										
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0.25 mm < D < 0.5 mm	4																																
0.5 mm < D	0																																
Touch panel White Line Scratch	<table><tr><td colspan="2">Size < 5"</td><td></td></tr><tr><td>Length</td><td>Width</td><td>Qualified Qty</td></tr><tr><td>–</td><td>W< 0.02</td><td>Ignored</td></tr><tr><td>L < 3.0</td><td>0.02 < W <0.05</td><td rowspan="2">2</td></tr><tr><td>L < 2.5</td><td>0.05 < W <0.08</td></tr><tr><td>–</td><td>0.08 < W</td><td>0</td></tr></table> <table><tr><td colspan="2">Size >= 5"</td><td></td></tr><tr><td>Length</td><td>Width</td><td>Qualified Qty</td></tr><tr><td>–</td><td>W< 0.03</td><td>Ignored</td></tr><tr><td>L < 5.0</td><td>0.03 < W <0.05</td><td>2</td></tr><tr><td>–</td><td>0.05 < W</td><td>0</td></tr></table>	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
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12. Reliability test

NO.	TEST ITEM	TEST CONDITION
1	High Temperature Storage	80±2°C/240hours
2	Low Temperature Storage	-30±2°C/240hours
3	High Temperature Operating	70±2°C/240hours
4	Low Temperature Operating	-20±2°C/240hours
5	Temperature Cycle	-30±2°C~25~80±2°C × 20 cycles (30min.) (5min.) (30min.)
6	Damp Proof Test	60°C ±5°C × 90%RH/240hours
7	Vibration Test	Frequency 10Hz~55Hz Amplitude of vibration: 1.5mm Sweep: 10Hz~55Hz~10Hz X, Y, Z 2 hours for each direction.
8	Package Vibration Test	Random vibration :0.15G*G/HZ from 5-200HZ, -6dB/Octave from 200-500HZ of each direction of X.Y. Z (6 hours for total)
9	Package Drop Test	Height:60 cm 1 corner,3 edges,6 surfaces
10	ESD Test	Air: ±8KV 150pF/330Ω 5 times Contact: ±4KV 150pF/330Ω 5 times
11	Mechanical Shock	100G 6ms, X, Y, Z 3 times for each direction

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 January 12, 2021

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