

广东高展光电股份有限公司

GUANGDONG SUPERVIEW OPTOELECTRONICS CO.,LTD.

样品承认书

APPROVAL SHEET

PRODUCT MODEL	G17703AE01A8(GD3219B)		
REMARKS	TFT MODULE, 128(RGB) * 160PIXELS		
APPROVED SIGNATURE BY SUPERVIEW	PREPARED BY	CHECKED BY	APPROVED BY

APPROVED SIGNATURE BY CUSTOMER:

PREPARED BY	CHECKED BY	APPROVED BY

[illegible]

CONTENT

1. GENERAL SPECIFICATION.....	4
2. BLOCK DIAGRAM.....	5
3. MECHANICAL DRAWING.....	6
4. INTERFACE PIN ASSIGNMENT.....	7
5. ELECTRICAL SPECIFICATION for TFT.....	8
6. OPTICAL CHARACTERISTICS.....	15
7. THE STANDARD OF INSPECTION FOR TFT.....	17
8. RELIABILITY TESTS.....	26
9. PRECAUTIONS.....	26
10. LIMITED WARRANTY.....	27

1. GENERAL SPECIFICATION

1.1 Description

The G17703AE01A8 is a color active matrix Thin Film Transistor (TFT) Liquid Crystal Display (LCD) that uses amorphous silicon(a-Si) TFT as a switching device. This model is composed of a single 1.77 inches transmissive type main TFT-LCD panel. The resolution of the panel is 128*160 pixels and can display up to 262K color.

1.2 Feature

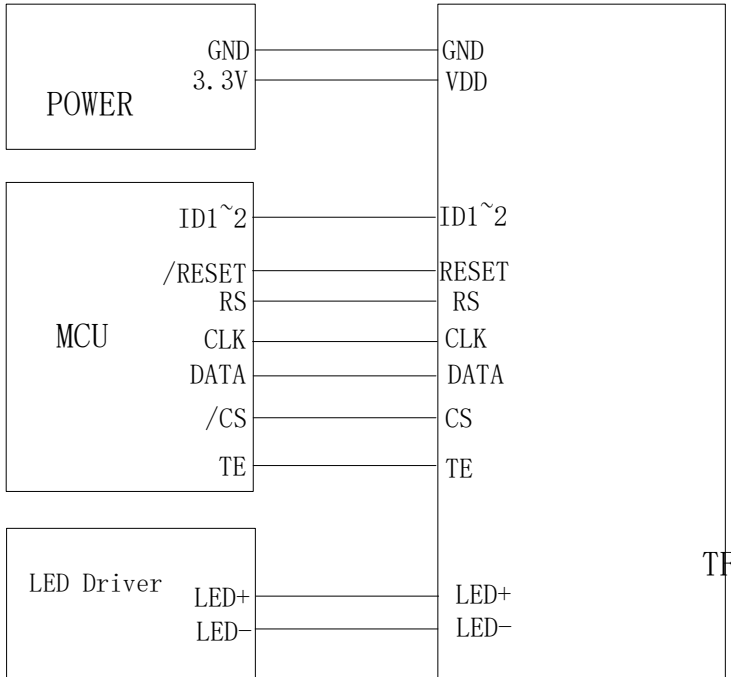
- TN type for main TFT-LCD panel
- Structure COG+FPC+BL
- Full, Normal (Still), Partial, Sleep, mode are available

1.3 General Specification

No.	Item	Specification	Unit	Remark
1	LCD Size	1.77	inch	-
2	Panel Type	a-Si TFT transmissive	-	-
3	Resolution	128 x (RGB) x 160	pixel	-
4	Display Mode	Normally White	-	-
5	Display Number of Colors	262K	-	-
6	Viewing Direction (Gray inversion)	12 o'clock	-	Note
7	Contrast Ratio	450(Typ)	-	-
8	Luminance	200(MIN)	cd/m2	-
9	Module Size	34(W) x45.8(L) x2.4(T)	mm	Note
10	Active Area	28.032(W) x 35.04(L)	mm	Note
11	Pixel Pitch	0.219(W) x 0.219 (L)	mm	-
12	Weight	TBD(TYP)	g	-
13	Driver IC	ST7735S	-	-
14	Light Source	3 White LEDs	-	-
15	Interface	8080 8bit	-	-
16	Operating Temperature	-20~70	℃	-

Note: Please refer to the mechanical drawing.

2. BLOCK DIAGRAM



3. MECHANICAL DRAWING

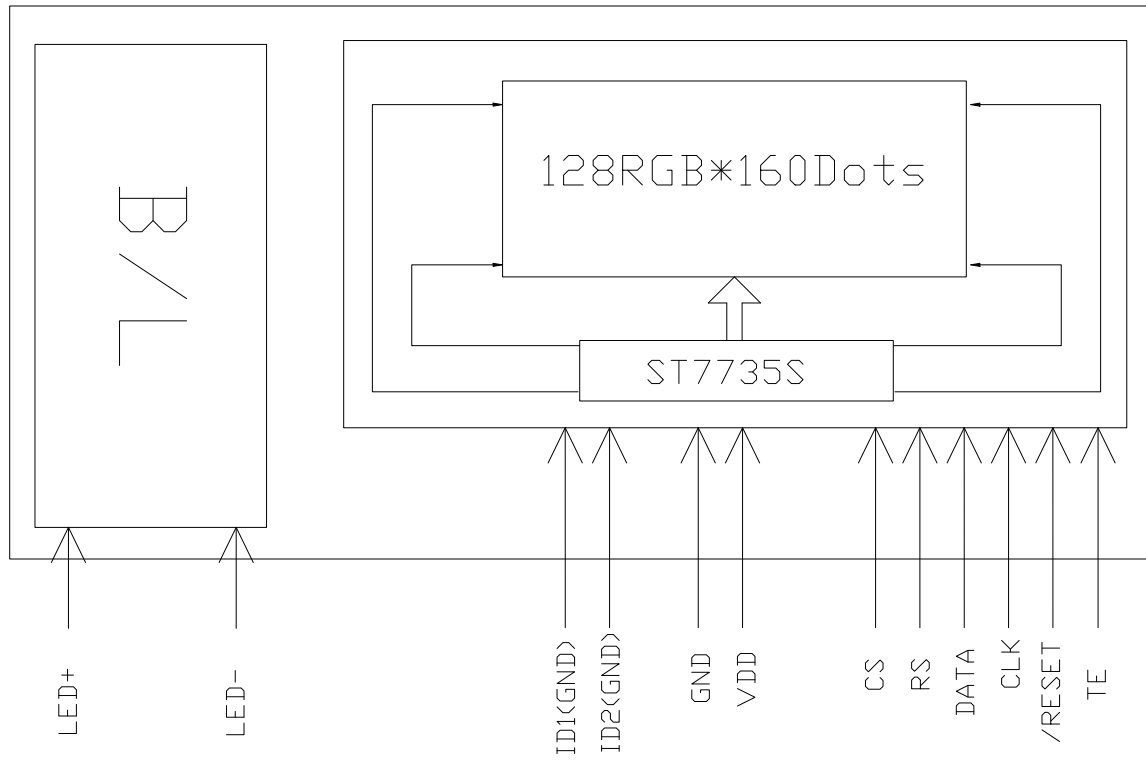
DIMENSION RANGE	
Dimension	Unit
0 ~ 1	mm
1 ~ 15	mm
15 ~ 60	mm
60 ~ 150	mm
150 ~ 300	mm
300 ~ 600	mm
600 ~ 1200	mm
1200 ~ 2400	mm
2400 ~ 4800	mm
4800 ~ 9600	mm
9600 ~ 19200	mm
19200 ~ 38400	mm
38400 ~ 76800	mm
76800 ~ 153600	mm
153600 ~ 307200	mm
307200 ~ 614400	mm
614400 ~ 1228800	mm
1228800 ~ 2457600	mm
2457600 ~ 4915200	mm
4915200 ~ 9830400	mm
9830400 ~ 19660800	mm
19660800 ~ 39321600	mm
39321600 ~ 78643200	mm
78643200 ~ 157286400	mm
157286400 ~ 314572800	mm
314572800 ~ 629145600	mm
629145600 ~ 1258291200	mm
1258291200 ~ 2516582400	mm
2516582400 ~ 5033164800	mm
5033164800 ~ 10066329600	mm
10066329600 ~ 20132659200	mm
20132659200 ~ 40265318400	mm
40265318400 ~ 80530636800	mm
80530636800 ~ 161061273600	mm
161061273600 ~ 322122547200	mm
322122547200 ~ 644245094400	mm
644245094400 ~ 1288490188800	mm
1288490188800 ~ 2576980377600	mm
2576980377600 ~ 5153960755200	mm
5153960755200 ~ 10307921510400	mm
10307921510400 ~ 20615843020800	mm
20615843020800 ~ 41231686041600	mm
41231686041600 ~ 82463372083200	mm
82463372083200 ~ 164926744166400	mm
164926744166400 ~ 329853488332800	mm
329853488332800 ~ 659706976665600	mm
659706976665600 ~ 1319413953331200	mm
1319413953331200 ~ 2638827906662400	mm
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5277655813324800 ~ 10555311626649600	mm
10555311626649600 ~ 21110623253299200	mm
21110623253299200 ~ 42221246506598400	mm
42221246506598400 ~ 84442493013196800	mm
84442493013196800 ~ 168884986026393600	mm
168884986026393600 ~ 337769972052787200	mm
337769972052787200 ~ 675539944105574400	mm
675539944105574400 ~ 1351079888211148800	mm
1351079888211148800 ~ 2702159776422297600	mm
2702159776422297600 ~ 5404319552844595200	mm
5404319552844595200 ~ 10808639105689190400	mm
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21617278211378380800 ~ 43234556422756761600	mm
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86469112845513523200 ~ 172938225691027046400	mm
172938225691027046400 ~ 345876451382054092800	mm
345876451382054092800 ~ 691752902764108185600	mm
691752902764108185600 ~ 1383505805528216371200	mm
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2767011611056432742400 ~ 5534023222112865484800	mm
5534023222112865484800 ~ 11068046444225730969600	mm
11068046444225730969600 ~ 22136092888451461939200	mm
22136092888451461939200 ~ 44272185776902923878400	mm
44272185776902923878400 ~ 88544371553805847756800	mm
88544371553805847756800 ~ 177088743107611695513600	mm
177088743107611695513600 ~ 354177486215223391027200	mm
354177486215223391027200 ~ 708354972430446782054400	mm
708354972430446782054400 ~ 1416709944860893564108800	mm
1416709944860893564108800 ~ 2833419889721787128217600	mm
2833419889721787128217600 ~ 5666839779443574256435200	mm
5666839779443574256435200 ~ 11333679558887148512870400	mm
11333679558887148512870400 ~ 22667359117774297025740800	mm
22667359117774297025740800 ~ 45334718235548594051481600	mm
45334718235548594051481600 ~ 90669436471097188102963200	mm
90669436471097188102963200 ~ 181338872942194376205926400	mm
181338872942194376205926400 ~ 362677745884388752411852800	mm
362677745884388752411852800 ~ 725355491768777504823705600	mm
725355491768777504823705600 ~ 1450710983537555009647411200	mm
1450710983537555009647411200 ~ 2901421967075110019294822400	mm
2901421967075110019294822400 ~ 5802843934150220038589764800	mm
5802843934150220038589764800 ~ 11605687868300440077795529600	mm
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23211375736600880155591059200 ~ 46422751473201760311182118400	mm
46422751473201760311182118400 ~ 92845502946403520622364236800	mm
92845502946403520622364236800 ~ 185691005892807041247288473600	mm
185691005892807041247288473600 ~ 371382011785614082494576947200	mm
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2971056094284912659956555577600 ~ 5942112188569825319913111155200	mm
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1521180720273875281897756455731200 ~ 3042361440547750563795512911462400	mm
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6084722881095501127591025822924800 ~ 12169445762191002255182051645849600	mm
12169445762191002255182051645849600 ~ 24338891524382004510364103291699200	mm
24338891524382004510364103291699200 ~ 48677783048764009020728206583398400	mm
48677783048764009020728206583398400 ~ 97355566097528018041456413166796800	mm
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17126972312471518573844613779681327587555257600 ~ 34253944624943037147689227559362655175111052800	mm
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274031556999544297181513820474912412008888422400 ~ 54806311399908859436302764094982482417777644800	mm
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7015207859188334007846753804145405155555417600 ~ 1403041571837666801569350760829010311111083200	mm
1403041571837666801569350760829010311111083200 ~ 2806083143675333603138701521658020622222166400	mm
2806083143675333603138701521658020622222166400 ~ 5612166287350667206277403043316041244444332800	mm
561216628735066720627740304331604124	

4.INTERFACE PIN ASSIGNMENT

1	GND	Ground
2	TE	Tearing effect output
3	GND	Ground
4	DB7	<i>Data bus</i>
5	CS	Chip select input pin ("Low"enable)in MPU I/F and SPI I/F
6	DB6	<i>Data bus</i>
7	GND	Ground
8	DB5	<i>Data bus</i>
9	GND	Ground
10	DB4	<i>Data bus</i>
11	GND	Ground
12	DB3	<i>Data bus</i>
13	GND	Ground
14	DB2	<i>Data bus</i>
15	GND	Ground
16	DB1	<i>Data bus</i>
17	GND	Ground
18	DB0	<i>Data bus</i>
19	GND	Ground
20	WR	Write strobe signal to write data when RD is "Low" in MPU interface.
21	GND	Ground
22	RS	Display data/command selection in 80-series MPU I/F.RS="0":Command RS="1":Display data.
23	RESET	Reset signal (Low:active)
24	VDD	a supply voltage to the analog circuil
25	GND	Ground
26	LEDA	LED anode
27	LEDK	LED cathode
28	GND	Ground

5. ELECTRICAL SPECIFICATION for TFT

5.1. APPLICATION CIRCUIT



5.2. TFT ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	STANDARD VALUE			UNIT
		MIN	TYP	MAX	
Power Supply for Analog	VCC	-0.3	-	5.5	V
Power Supply for Digital IO	IOVCC	-0.3	-	3.5	V

Note: Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is applied.

5.3. TFT TYPICAL OPERATION CONDITION

5.3.1 TFT DC Characteristics

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
Power Supply for Analog	VDD	Ta=25 °C	2.5	2.8	3.5	V
Power Supply for Digital IO	IOVDD	Ta=25 °C	1.65	1.8	3.3	V
Input Signal "H" Level	V _{IH}	-	0.7IOVDD	-	IOVDD	V
Input Signal "L" Level	V _{IL}	-	0	-	0.3IOVDD	V
Output Signal "H" Level	V _{OH}	I _{OH} =-1.0mA	0.8IOVDD	-	IOVDD	V
Output Signal "L" Level	V _{OL}	I _{OL} =1.0mA	0	-	0.2IOVDD	V
Frame Frequency	FRAME	-	50	70	80	Hz

Note: IOVDD=1.65 to 3.3V, VDD=2.5 to 3.5V, AGND=GND=0V, Ta=-20 to 70° C

5.3.2 TFT Current Consumption

Item	Symbol	Values		Unit	Remark
		type	Max.		
8080 8Bits					
Normal(Still) Mode	I _{CC1}	40	60	mA	Note1
Standby Mode	I _{CC1}	-	150	uA	Note2

Note1: Test Condition

Typ: IOVCC=VCI=2.85V

Display Pattern: All Pixel White

Frame Rate=60Hz at 2-dot Inversion

Max. current check pattern:

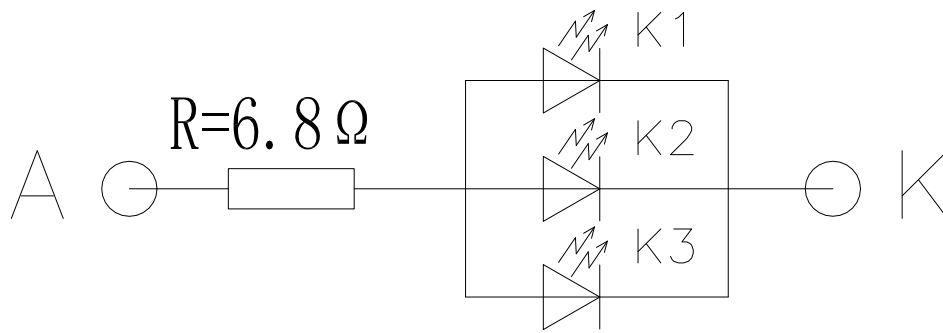


White

Note2: In the standby mode, all the internal display operations are suspended including the internal R-C oscillator.

5.4. BACKLIGHT SPECIFICATION

5.4.1 BACKLIGHT CIRCUIT



LED CIRCUIT

5.4.2 ELECTRICAL CHARACTERISTICS

(T=25℃)

PARAMETER	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
FORWARD VOLTAGE	VF	IF=30mA	2.8	3.05	3.3	v

5.5. 4-wire Serial Interface

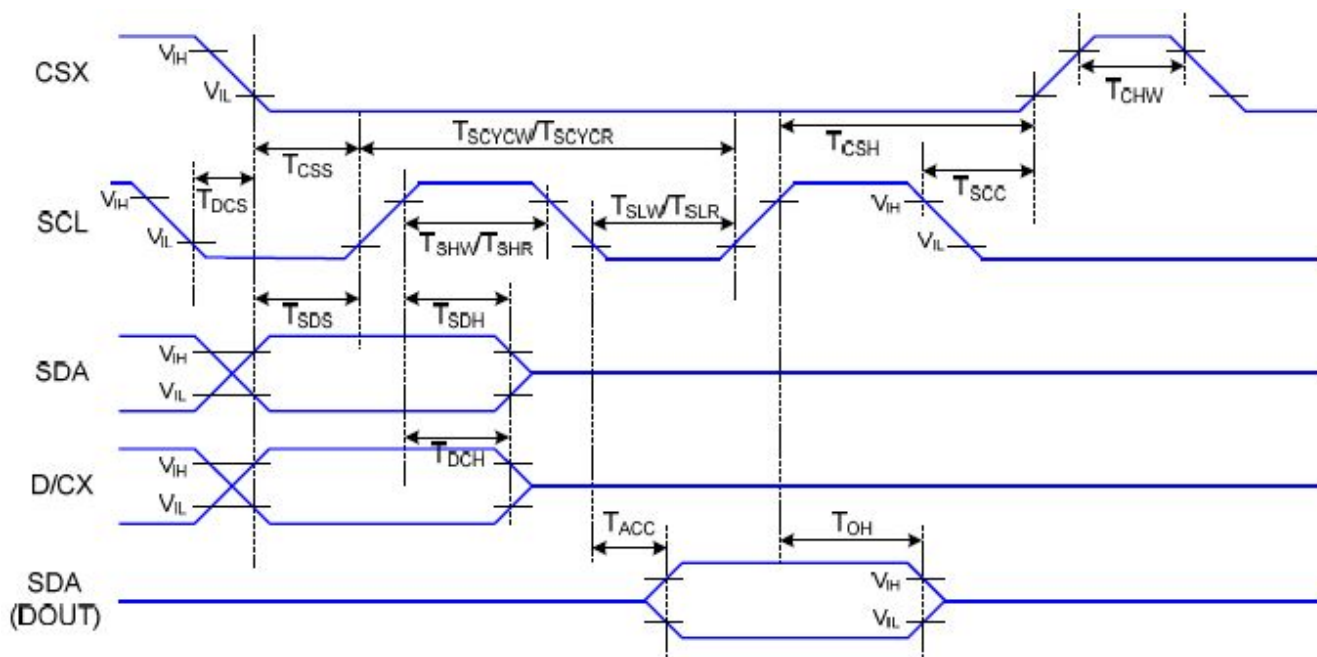


Fig. 5.5.1 4-Wire Serial command format

T_a=25 °C, V_{DDI}=1.65~3.7V, V_{DD}=2.3~4.8V

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip select setup time (write)	45		ns	
	TCSH	Chip select hold time (write)	45		ns	
	TCSS	Chip select setup time (read)	60		ns	
	TSCC	Chip select hold time (read)	65		ns	
	TCHW	Chip select "H" pulse width	40		ns	
SCL	TSCYCW	Serial clock cycle (Write)	66		ns	-write command & data ram
	TSHW	SCL "H" pulse width (Write)	15		ns	
	TSLW	SCL "L" pulse width (Write)	15		ns	
	TSCYCR	Serial clock cycle (Read)	150		ns	-read command & data ram
	TSHR	SCL "H" pulse width (Read)	60		ns	
	TSLR	SCL "L" pulse width (Read)	60		ns	
D/CX	TDCS	D/CX setup time	10		ns	
	TDCH	D/CX hold time	10		ns	
SDA (DIN) (DOUT)	TSDS	Data setup time	10		ns	
	TSDH	Data hold time	10		ns	
	TACC	Access time	10	50	ns	For maximum CL=30pF For minimum CL=8pF
	TOH	Output disable time	15	50	ns	

Fig 5.5.2. 4-line Serial Interface Characteristics

Note : The rising time and falling time (T_r, T_f) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of V_{DDI} for Input signals.

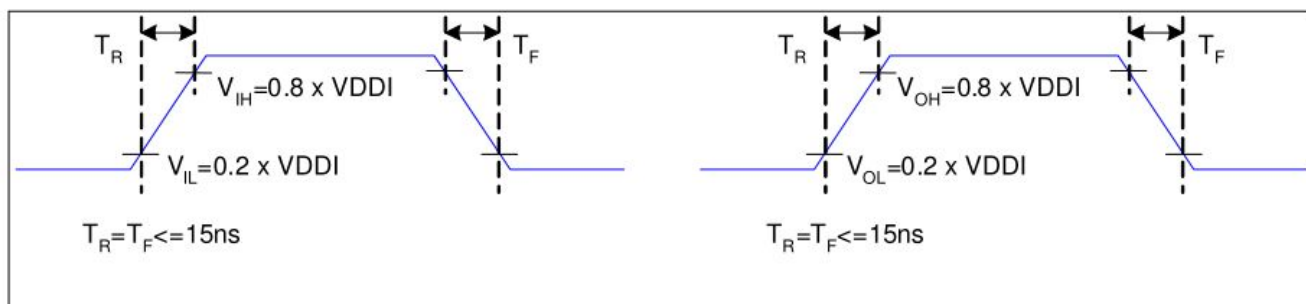
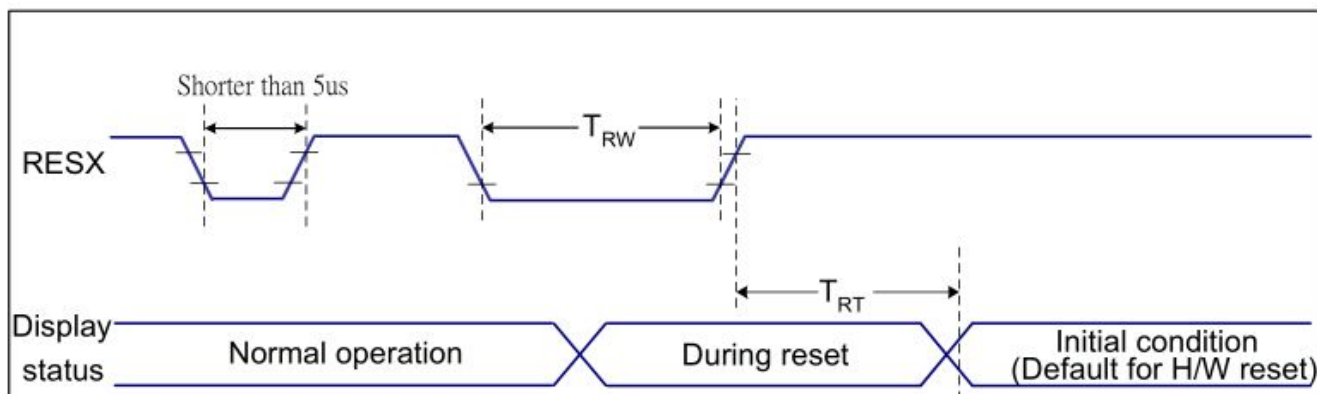


Fig 5.5.3 Rising and Falling Timing for I/O Signal

Note: The rising time and falling time (T_r , T_f) of input signal and fall time are specified at 15 ns or less. Logic high and low levels are specified as 20% and 80% of VDDI for Input signals.

5.6. TFT RESET TIMING CHARACTERISTICS



Reset Timing

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, $T_a = -30 \sim 70^\circ\text{C}$

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Table Reset Timing

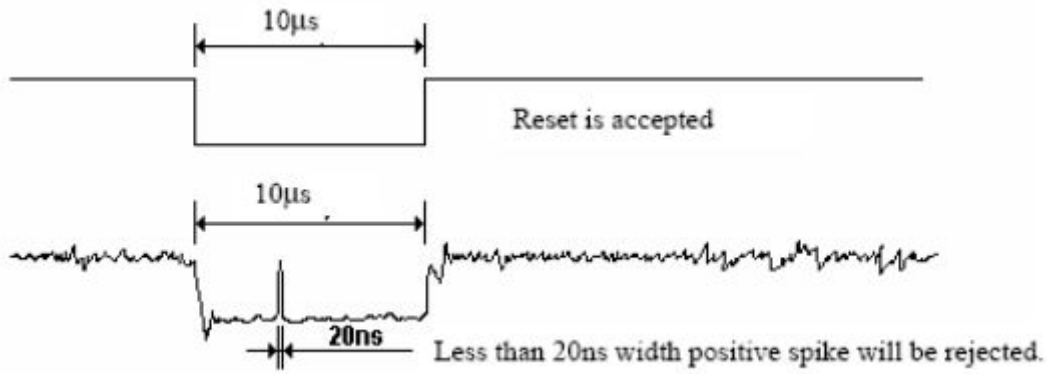
Notes:

- The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (t_{RT}) within 5 ms after a rising edge of RESX.
- Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

- During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode.) and then return to Default condition for Hardware Reset.

- Spike Rejection also applies during a valid reset pulse as shown below:



5. When Reset applied during Sleep In Mode.
6. When Reset applied during Sleep Out Mode.
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

6.OPTICAL CHA

(T_a=+25°C, V_{CI}=+2.85V IOVCC=+1.8V, I_B=20mA)

Item		Symbol	Condition	Values			Unit	Remark
				Min.	Typ.	Max.		
Viewing Angle Range	Left	θ _L	CR ≥ 10	35	45	-	degree	Note 1
	Right	θ _R		35	45	-		
	Top	Φ _T		35	45	-		
	Bottom	Φ _B		10	20	-		
Response Time		Rising	Normal θ=Φ=0°	-	2	4	ms	Note 2
		Falling		-	6	12		
Contrast Ratio		CR	Normal θ=Φ=0°	--	500	-	-	Note 3
Luminance		L	Normal θ=Φ=0°		200	--	cd/m ²	Note 4
Color temperaturey	White		Normal θ=Φ=0°	-750	6750	+750	K	Note 5

Judgement criterion:

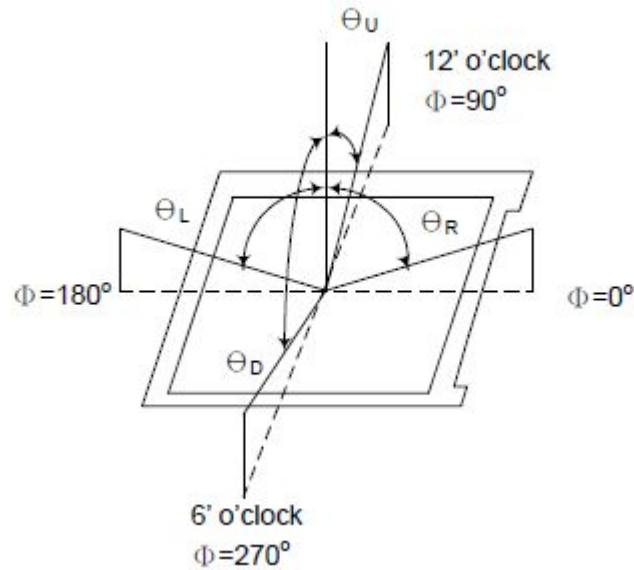
$$\Delta c'_{\text{白}} = \sqrt{(\Delta u')^2 + (\Delta v'/1.5)^2} = \sqrt{(u'_{\text{白}} - u'_{\text{白0}})^2 + [(v'_{\text{白}} - v'_{\text{白0}})/1.5]^2}$$

, the "u'_{白0}" and "u'_{白0}" is the type value in the Figure 1.

the error of the Red 、 Green and Blue must be controlled as follow

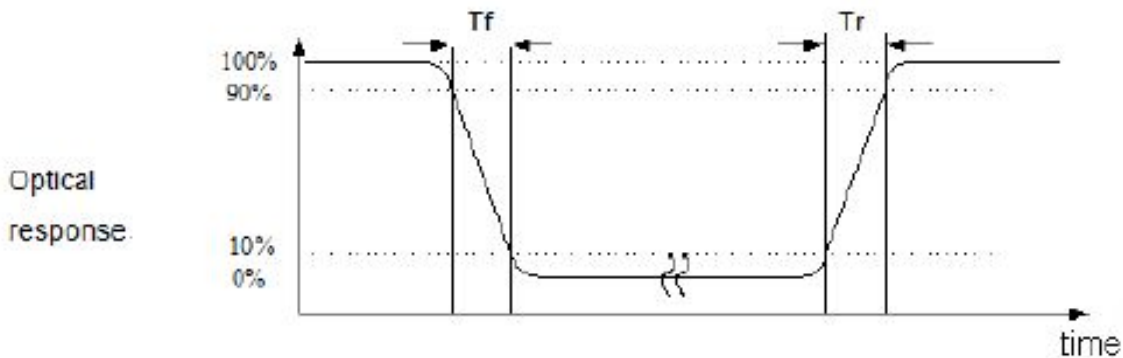
$$\Delta c'_{\text{白}} \leq 0.0115, \Delta c'_{\text{红}} \leq 0.0230, \Delta c'_{\text{绿}} \leq 0.0230, \Delta c'_{\text{蓝}} \leq 0.0230。$$

Note 1: Definition of viewing angle range



Note 2: Definition of response time

The output signals of TRD-100 are measured when the input signals are changed to "White" (falling time) and from "White" to Black" (rising time). respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 4: Definition of luminance

Measured at the center area of the panel when LCD panel is driven at "white" state.

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD when panel is driven at "White", "Red", "Green" and "Blue" state respectively.

7.THE STANDARD OF INSPECTION FOR TFT

1. Scope

Specifications contain

- * Display Quality Evaluation
- * Mechanics Specification

2. Sampling plan

Unless there is other agreement , sampling plan for incoming inspection should follow GB2828-2003.

2.1 Lot size: Quantity per shipment as one lot (different model as different lot .)

2.2 Sampling type: Normal inspection, single sampling.

2.3 Sampling level: Level II.

2.4 AQL

Acceptable Quality Level

MA : AQL 0.40

Major defect: AQL=0.40

MI : AQL 0.65

Minor defect: AQL=0.65

MA+MI : AQL 0.65

Total defect : AQL=0.65

3. Panel inspection condition

3.1 Environment:Room Temperature: $25\pm 5^{\circ}\text{C}$.Humidity: $55\pm 5\%$ RH.Illumination: 800~1200Lux.

3.2 Inspection Distance: 25 ± 5 cm from the inspector to the module.

3.3 Inspection Angle:The vision of inspector should be perpendicular to the surface of the module.

4. Display Quality

4.1 Function Related:

defect type	definition
重缺陷 (MA)	show or functional defects, serious deviation from the specifications, customers can not work properly.
	Severe skin defects, serious deviation from the specifications, the client does not work properly.
轻缺陷 (MI)	slightly deviate from the specifications, does not affect the product function, but the appearance of an impact on product

Note: 1. The following standards unless otherwise specified, units are mm .

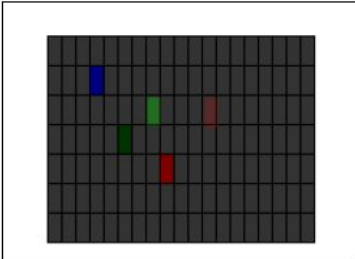
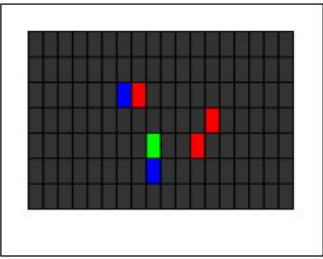
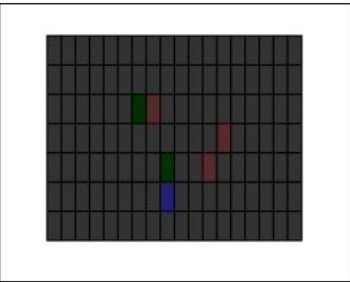
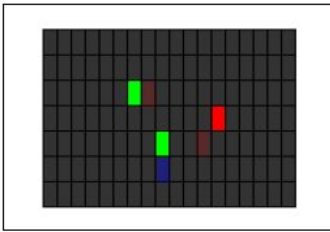
2. The following criteria for use in TFT small size: 7 inches or less (does not contain a 7-inch) TFT products.

4.2 functional test

Defect Type		Inspection method and acceptance		A level
LCD/Pol /BL/TP screen point defect	4.3 inches below	Line film card	$\Phi \leq 0.1$	ignore
			$0.1 < \Phi \leq 0.15$	2
			$0.15 < \Phi \leq 0.2$	1
			$\Phi > 0.2$	0

dot shape defect of LCD/PO L/BLU/T P	4.3 inches above		$\Phi \leq 0.1$	ignore
			$0.1 < \Phi \leq 0.15$	2
			$0.15 < \Phi \leq 0.2$	1
			$0.2 < \Phi \leq 0.25$	1
			$\Phi > 0.25$	0
	distance between dots	Line film card	/	≥ 5
Line shape defect of LCD/POL /BLU/TP	/	Line film card	$w \leq 0.02$	ignore
	/		$L \leq 4, 0.02 < w \leq 0.03$	2
	/		$L \leq 4, 0.03 < w \leq 0.05$	2
			$w > 0.05$	follow dot defect
	distance between lines	Line film card	/	≥ 5
show state	no display	visible	/	NG
	abnormal display		/	
	Lack of planning		/	
	Muiti plan		/	
	Lack of screen		/	
	White		/	follow the limited sample
	Mura		/	
	Triad/white		/	
	flash		/	
	strong/light		/	

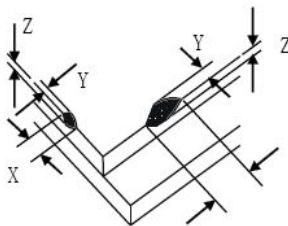
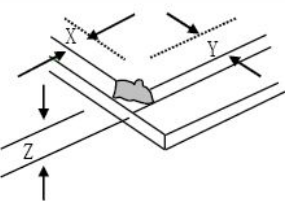
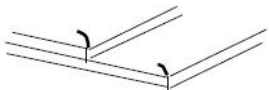
	Interference pattern		/	
POL	lack of border	visible	See the border of an right view	NG
BLU	LED no display	visible	/	NG
	LED Unstable		/	
	LED dark		/	
	dirt		/	
	mura	/	follow the limited sample	
	light leakage	/		
	film bump	/		
	white line	Line film card	/	Follow line defect
	dark line		/	
	scratch		/	
TP	do not convert	When Click the screen ,touch screen test point can not convert		NG
	automatically convert	Do not click on the touch screen when the test point test point automatically converted		
dots	bright dots (4.3 inches below)	Leak 10x eyepiece		1
	bright dots (4.3 inches above)			1

	dark dots (4.3 inches below)	Leak 10x eyepie ce		ignore
	dark dots (4.3 inches above)			
	2-adjacent bright dots (4.3 inches below)	Leak 10x eyepie ce		0
	2-adjacent bright dots (4.3 inches above)			1
	2-adjacent dark dots (4.3 inches below)	Leak 10x eyepie ce		ignore
	2-adjacent dark dots (4.3 inches above)			
	Bright and Dark Dots (4.3 inches below)	Leak 10x eyepie ce		1
	Bright and Dark Dots (4.3 inches above)			1

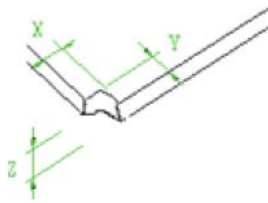
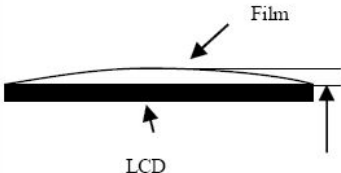
	distance between two dots	Line film card	/	≥ 5
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4.3 Visual Inspection specification

defect type		Inspection method and acceptance		
dot defect of pol/TP	4.3 inches below	Leak 10x eyepie ce.Line film card	$\Phi \leq 0.1$	ignore
			$0.1 < \Phi \leq 0.15$	2
			$0.15 < \Phi \leq 0.2$	1
			$\Phi > 0.2$	0
	4.3 inches above		$\Phi \leq 0.1$	ignore
			$0.1 < \Phi \leq 0.15$	2
			$0.15 < \Phi \leq 0.2$	1
			$0.2 < \Phi \leq 0.25$	1
			$\Phi > 0.25$	0
	Distance between dot defect	Line film card	/	≥ 5
line shape defect	/	Leak 10x eyepie ce.Line film card	$w \leq 0.02$	ignore
	/		$L \leq 4, 0.02 < w \leq 0.03$	2
	/		$L \leq 4, 0.03 < w \leq 0.05$	2
			$w > 0.05$	Follow dot defect
	Distance between dot defect	Line film card	/	≥ 5
tape	Adhesion is not enough	tear the protective film can not afford		NG
protective film	dirt	visible	oil, jelly, finger printing	NG

pol	indentation	/	/	Follow limited sample			
	skin dirt	visible	/	NG			
	bubble	Visible,Line film card	border area	$\Phi \leq$ width of dark border			
			view area	Follow dot defect			
broken	edge broken	Visible,Line film card		X ignore Y ≤ black border width Z ≤ single glass thickness			
	corner broken	Visible,Line film card		X ≤ black border width Y ≤ black border width Z ≤ single glass thickness			
			corner chipping	<table border="1"><tr><td>X*Y</td><td>Z</td></tr><tr><td>≤ 4mm²</td><td>≤ T</td></tr></table>	X*Y	Z	≤ 4mm ²
	X*Y	Z					
≤ 4mm ²	≤ T						
crack	visible		NG				
Cell bubble	/	visible	/	NG			
Lc leakage	/	visible	/	NG			
Silicone	does not cover ITO lead	visible	/	NG			
FPC	broken	visible	/	NG			
	scratch	Line film card	Injury to the base material and influence electricity	NG			
	dirt	visible	/	NG			
	fold	visible	/	NG			

	burr	Visible	/	NG
	connecting finger dirt	Visible	oil, jelly, finger printing	NG
	PI film	Visible	Skew ,dislocation	NG
tape	peeling	Visible	/	NG
BLU	Location column fracture,def ormation	Visible	/	NG
	FPC broken		/	
	Plastic box broken,defo rmation		/	
bezel	scratch	Visible	oil, jelly, finger printing	NG
	Clasp is not tightened	Visible	/	NG
	wrap	Visible	Follow specification	NG
	deformation	Visible	/	NG
Touch panel	pattern	Visible	Pattern dimness	NG
	dot or line defect	Leak 10x eyepiece.Li ne film card	/	follow dot or line defect
	dirt	Visible	/	Limit sample
	Top wound, scratch, surface crease	Visible Visual mirror	/	follow dot or line defect

	Scratch、 drape	Leak 10x eyepiece.Li ne film card								
	FPC broken	visible	/	NG						
	edge broken	Line film card		<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤2</td><td>≤2</td><td>≤T</td></tr></table> X ≤black border width Y ≤ black border width Z ≤ single glass thickness Note: enter the display area is NG	X	Y	Z	≤2	≤2	≤T
X	Y	Z								
≤2	≤2	≤T								
	crack	visible		NG						
	newtong ring	visible		≤1/5 panel						
	irregular newtong ring	visible		≤1/4 panel						
	film rouse	Line film card		≤0.4						

Note:

1.Inspection conditions and environment:

(1) lighting:100W cool white fluorescent lamp,the distance between illuminant and TP is 500 to 550mm, illuminance is 600 to 800 Lux.

(2) Distance:The distance between eyes and the surface of TP is 300 to 350mm.

(3) location:It is 45°from the examine plane to the desktop.Up and down,left and right,each turn 90°.

(4) The time to examine each piece is not less than 12 seconds.

2.Under 25% contrast,if the defect can be seem,is Hard Scratch, if can't be seem,is Soft Scratch.

3.The standard must be checked with Cover Glass.

8.RELIABILITY TESTS

ITEM	CONDITION	CRITERION
Operating Temperature Test	High Temperature: +60 °C, 120 hrs	No defects in display and operational functions
	Low Temperature: -20 °C, 120 hrs	
Storage Temperature Test	High Temperature: +70 °C, 120 hrs	No defects in display and operational functions
	Low Temperature: -20 °C, 120 hrs	
Humidity Endurance Test	60°C, 90%RH, 120 hrs	No defects in display and operational functions
Thermal Shock Test	-20 °C (30mins)~ +70 °C (30mins) 10 cycles	No defects in display and operational functions
Electro Static Discharge	± 4KV, Human BodyMode, 150pF/330Ω; ± 8KV, Air Mode, 150pF/330Ω	No defects in display and operational functions

NOTE:

- 1) The samples must be free from defect before test, must be restored at room condition at least for 2 hours after reliability test before any inspection.
- 2) Before test the function of TP, the sample must be placed in room temperature for 24hrs after RA test.

9. PRECAUTIONS**9.1. HANDLING**

- 9.1.1. Polarizer Cleaning, Petroleum ether (or N-hexane) is recommended for cleaning the front/rear polarizers and reflectors, acetone, toluene and ethanol are not allowed to avoid damaging the surface.
- 9.1.2. Body grounding, must wear Anti-ESD wrist strap while pick up LCDs.
- 9.1.3. FPC Soldering, less than 300°C/3S, solder must be grounding on grounding bench.
- 9.1.4. If use electric Screwdriver to do assembly, screwdriver must be grounding.

9.2. STORAGE

- 9.2.1. Keep in a sealed polyethylene bag.
 - 9.2.2. Keep in a dark place.
 - 9.2.3. Keep in temperature between 0°C and 35°C.
- NOT** allowed at 70°C for more than 160 Hours, or at -20°C for more than 48 Hrs.

9.3. SAFETY

If liquid crystal leak out of a damaged glass cell, **DO NOT** put it in your mouth or touch eyes, if the liquid crystal touch your skin or clothes, please wash it off immediately using soap and water.

10. LIMITED WARRANTY

Unless otherwise agreed between Superview and customer, Superview will replace or repair any of its LCD modules which are found to be functionally defective when inspected in accordance with Superview LCD acceptance standards (copies available upon request) for a period of one year from date of shipments. Cosmetic/visual defects over specs must be returned to Superview within 30 days of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of Superview limited to repair and/or replacement on the terms set forth above. Superview shall not be responsible for any subsequent or consequential events.

10.1. RETURNING LCM UNDER WARRANTY – TERMS AND CONDITIONS

10.1.1. No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are :

- Broken LCD glass.
- Circuit modified in any way, including addition of components.

10.1.2. Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB's eyelet, conductors and terminals.