



一众显示科技有限公司

TEAM SOURCE DISPLAY TECH. CO, TD.

TFT-LCD Module Specification

Module NO.: TST101WUIH-79C

Version: V1.0

☐ APPROVAL FOR SPECIFICATION

☐ APPROVAL FOR SAMPLE

For Customer' s Acceptance:	
Approved by	Comment

Team Source Display:		
Presented by	Reviewed by	Approved by
Zahi	Aron	Aron

Version No.	Date	Content	Remark
V1.0	2020-11-09	Initial Release	

CONTENTS

1. GENERAL CHARACTERISTICS	- 3 -
2. PRODUCT DRAWINGS	- 4 -
3. INTERFACE DESCRIPTION	- 5 -
3.1. LCM INTERFACE DESCRIPTION	- 5 -
3.2. CTP INTERFACE DESCRIPTION	- 7 -
4. TIMING CHARACTERISTICS	- 7 -
4.1. VIDEO INPUT TIMING FOR MULTI-DROP TYPE	- 7 -
4.2. POWER ON/OFF SEQUENCE	- 7 -
5. ABSOLUTE MAXIMUM RATINGS	- 12 -
6. ELECTRICAL CHARACTERISTICS	- 12 -
7. BACKLIGHT CHARACTERISTICS	- 12 -
8. LCD OPTICAL SPECIFICATIONS	- 13 -
9. CAPACITIVE TOUCH PANEL SPECIFICATIONS	- 15 -
9.1. MECHANICAL CHARACTERISTICS	- 15 -
9.2. ELECTRICAL CHARACTERISTICS	- 15 -
9.3. INTERFACE TIMING CHARACTERISTICS	- 15 -
10. RELIABILITY TEST	- 16 -
11. SUGGESTIONS FOR USING LCD MODULES	- 17 -
11.1. HANDLING OF LCM	- 17 -
11.2. STORAGE	- 17 -

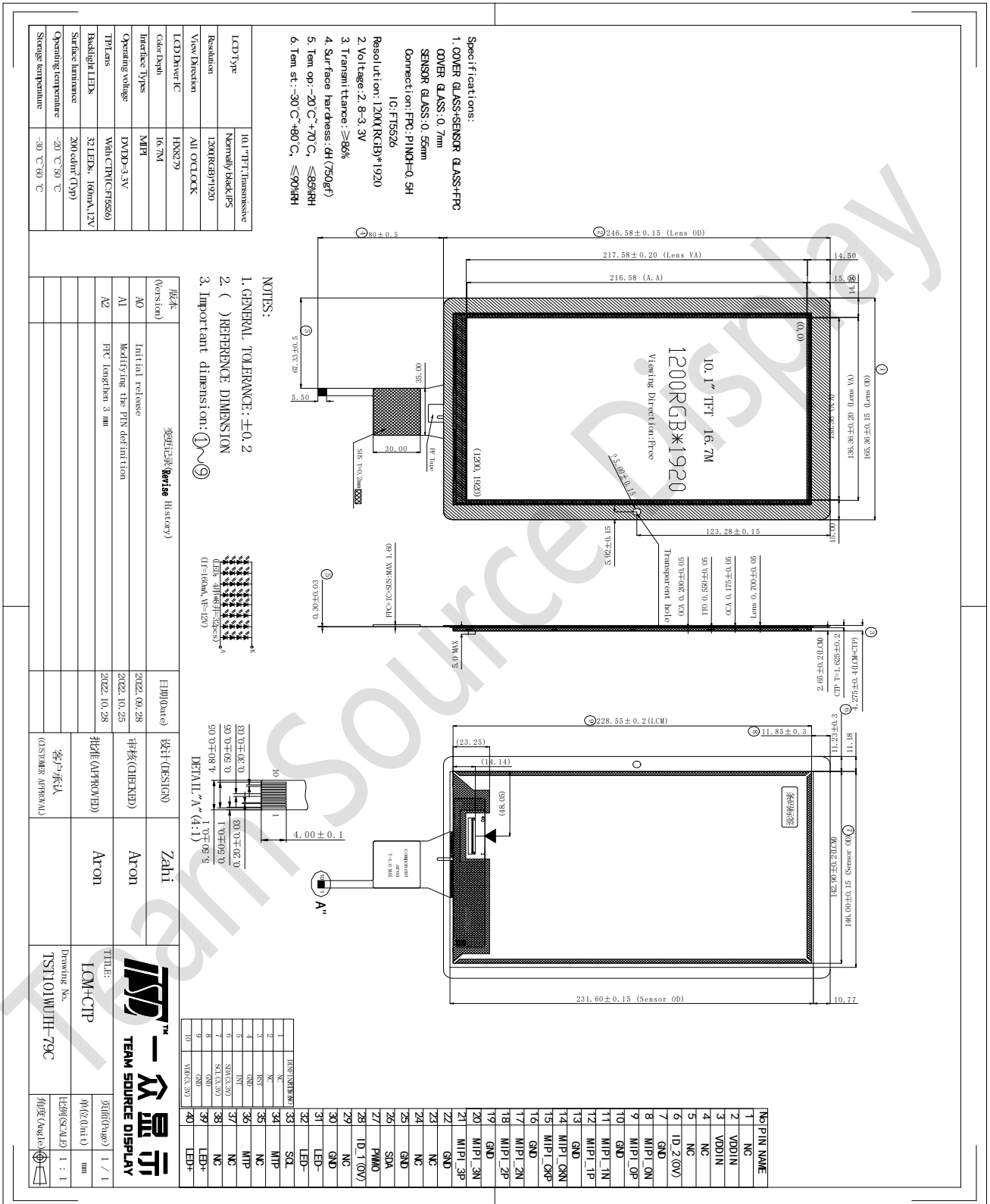
1. General Characteristics

ITEM	Specification	Unit
LCD Type	a-Si TFT, Transmissive, Normally black	-
LCD Size	10.1	inch
Resolution (W x H)	1200(RGB) × 1920	pixel
CTP+LCM size	165.36(H) x 246.58(V) x 4.275(T)	mm
LCM size	142.9(H) x 228.55(V) x 2.65(T)	mm
Active Area	135.36 (H) x 216.58(V)	mm
Sub pixel size	37.6(H)x112.8(V)	um
Viewing Direction	ALL o'clock	-
Color Depth	16.7M	-
Pixel Arrangement	RGB-stripe	-
Backlight Type	32 LED, 160mA	-
Surface Luminance	200	cd/m2
Surface Treatment	Hardness: 6H	-
Interface Type	MIPI	-
Input Voltage	3.3	V
With/Without TP	With CTP(IC:FT5526)	-
Weight	TBD	g

Note 1: RoHS compliant

Note 2: LCM weight tolerance: ± 5%.

2. Product drawings



3. Interface description

3.1. LCM interface description

PIN NO.	Symbol	description
1	NC	No connect
2-3	VDDIN	Power voltage for digital circuit
4	NC	No connect
5	NC	No connect
6	ID_2(0V)	ID_2(0V)
7	GND	No connect
8	MIPI_0N	Negative MIPI differential clock input
9	MIPI_0P	Positive MIPI differential clock input
10	GND	No connect
11	MIPI_1N	Negative MIPI differential clock input
12	MIPI_1P	Positive MIPI differential clock input
13	GND	No connect
14	MIPI_CKN	Negative MIPI differential clock input
15	MIPI_CKP	Positive MIPI differential clock input
16	GND	No connect
17	MIPI_2N	Negative MIPI differential clock input
18	MIPI_2P	Positive MIPI differential clock input
19	GND	No connect
20	MIPI_3N	Negative MIPI differential clock input

21	MIPI_3P	Positive MIPI differential clock input
22	GND	Power ground
23-24	NC	No connect
25	GND	Power ground
26	SDA	SDA
27	PWM0	PWM0
28	ID_1(OV)	ID_1(OV)
29	NC	No connect
30	GND	Power ground
31-32	LED-	LED Cathode
33	SCL	SCL
34	MTP	MTP
35	NC	No connect
36	MTP	MTP
37~38	NC	No connect
39~40	LED+	LED Anode

3.2. CTP interface description

PIN NO.	Symbol	description
1	NC	Ground. (0V)
2	NC	Ground. (0V)
3	RST	External Reset, Low is active
4	GND	Ground. (0V)
5	INT	Interrupt request to the host
6	SDA(3.3V)	I2C data input and output
7	SCL(3.3V)	I2C clock input
8	GND	Ground. (0V)
9	GND	Ground. (0V)
10	VDD(3.3V)	Power supply

4. Timing Characteristics

4.1. Video input timing for multi-Drop type

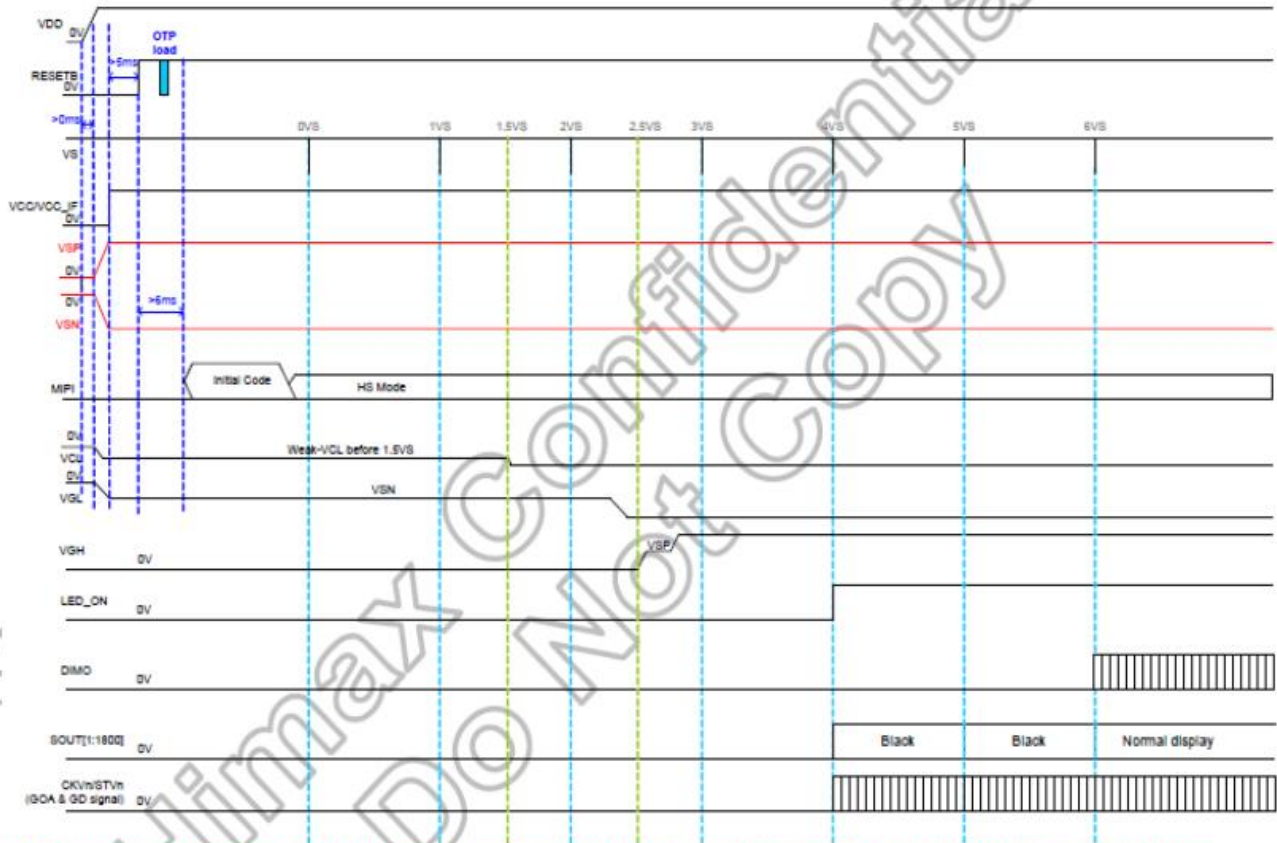
Input Timing	Symbol	1200RGBx1920			1200RGBx1600			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
PCLK Frequency	-	-	156	-	-	131	-	MHz
Horizontal Total	THT	-	1340	2047	-	1340	2047	DCLK
Horizontal Synchronization	THS	-	24	-	-	24	-	DCLK
Horizontal Back Porch	THB	-	80	-	-	80	-	DCLK
Horizontal Address	THA	-	1200	-	-	1200	-	DCLK
Horizontal Front Porch	THF	-	60	-	-	60	-	DCLK
Vertical Frequency	-	-	60	-	-	60	-	Hz
Vertical Total ⁽¹⁾	TVT	-	1944	2047	-	1624	1750	THT
Vertical Synchronization	TVS	-	2	-	-	2	-	THT
Vertical Back Porch	TVB	-	10	-	-	10	-	THT
Vertical Address	TVA	-	1920	-	-	1600	-	THT
Vertical Front Porch	TVF	-	14	-	-	14	-	THT

4.2. Power on/off sequence

6.2.1 Power on sequence PWRMD=0 → max. Power on time=7VS

After reset state or exit STB mode, the power on sequence will start.

To prevent the device from damage due to latch up, The VGL will be earlier than VGH. At 2.25VS the VGL negative high voltage will be generated via the external charge pump circuit. Then at 2.5VS the VGH positive high voltage can be generated via the external charge pump circuit. One SCHOTTKY diode is necessary between VGL and GND when VDD and VSP start at the same time.



Note: (1) Finish to write the GOA MUX (page1 registers) and GOA timing setting (page3 registers) within 50ms after reset pulls to high.

6.2.1 Power off sequence PWRMD=0 → max. Power off time=5VS

When enter STB mode, the STBYB signal will be set to low. The power off sequence will start.

Power-off sequence

External VSP/VSN. Internal VGH/VGL.

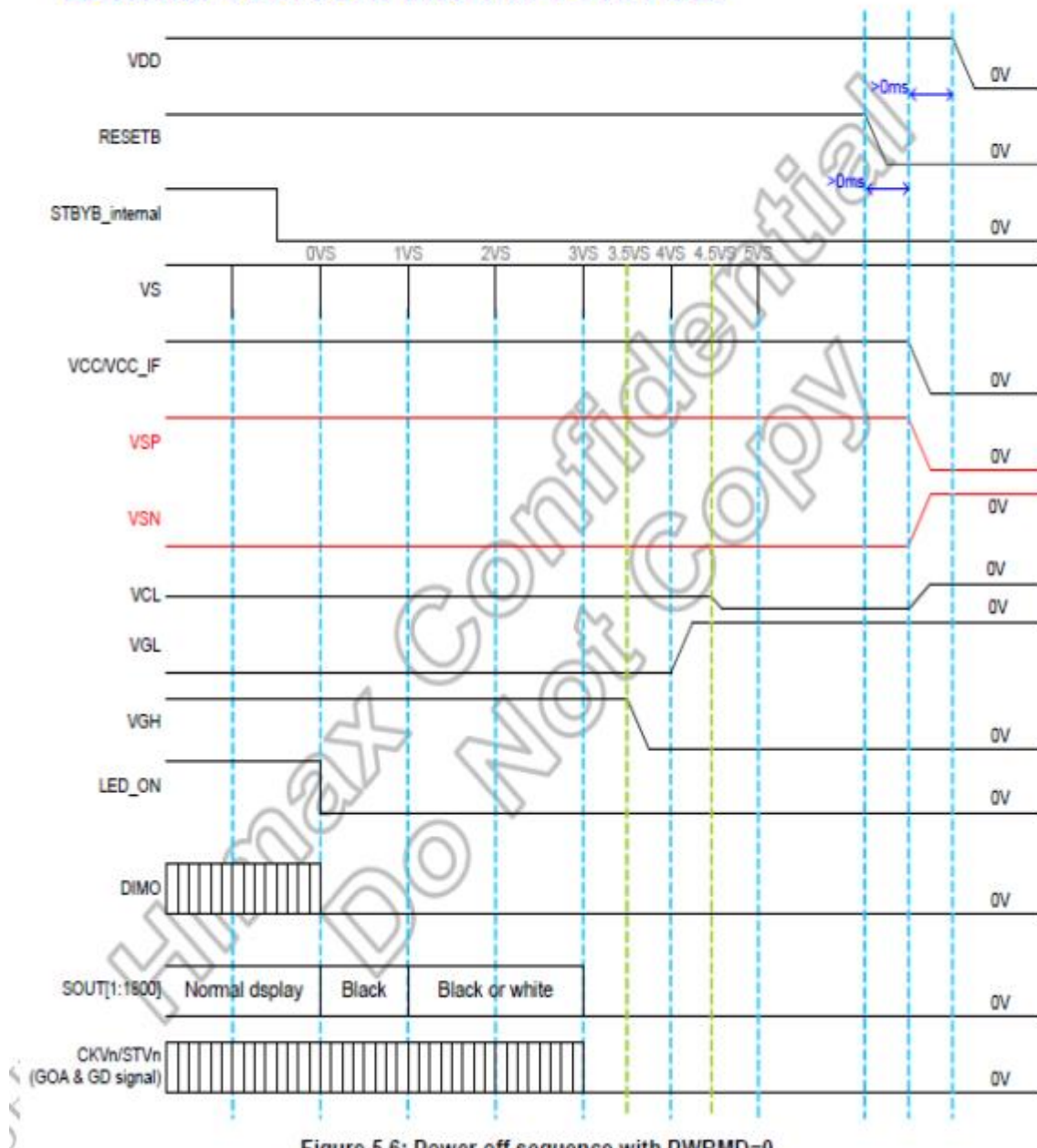
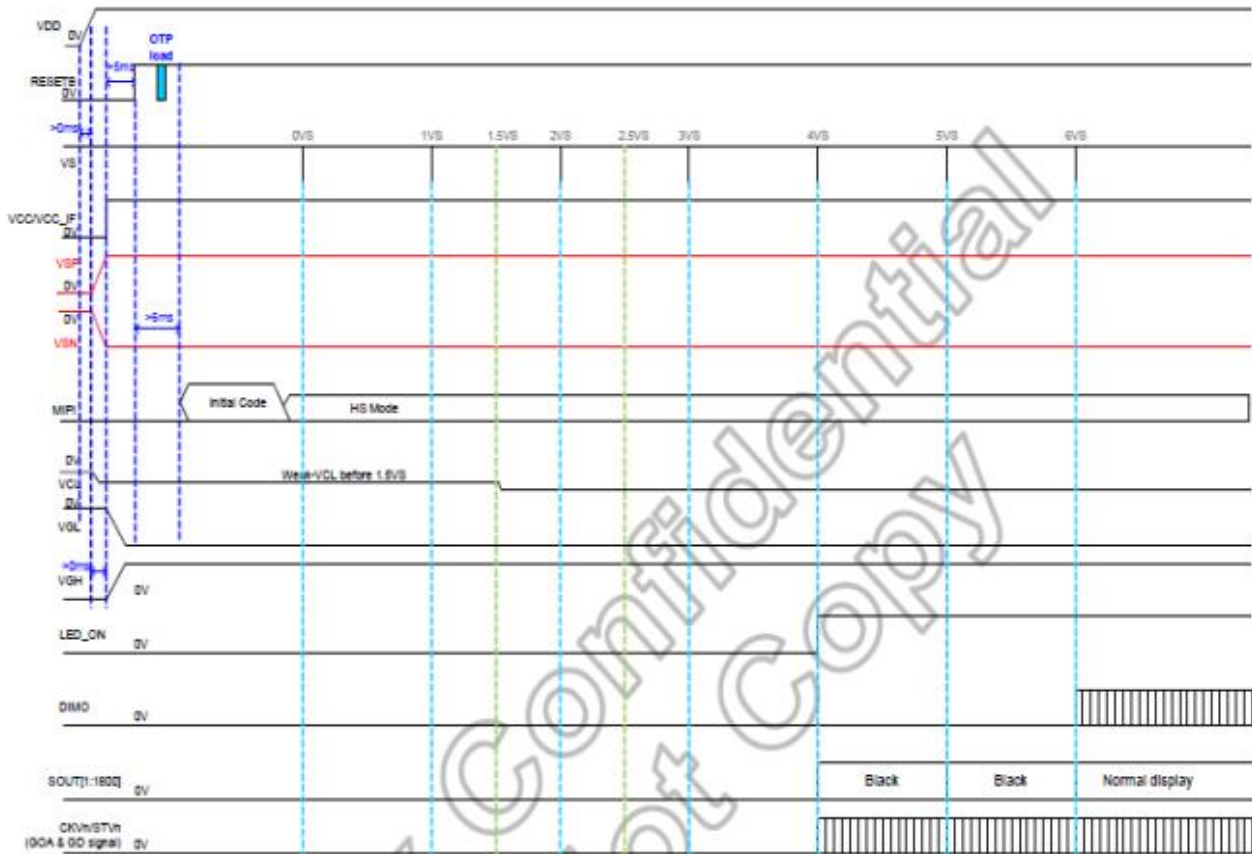


Figure 5.6: Power off sequence with PWRMD=0

6.2.2 Power on sequence PWRMD=1 → Max. Power on time=6VS

After reset state or exit STB mode, the power on sequence will start. One SCHOTTKY diode is necessary between VGL and GND when VDD and VSP start at the same time.



Note: (1) Finish to write the GOA MUX (page1 registers) and GOA timing setting (page3 registers) within 50ms after reset pulls to high

Figure 5.7: Power on sequence with PWRMD=1 and repair OP disable

6.2.3 Power off sequence PWRMD=1 → max. Power off time=4.5VS

When enter STB mode, the STBYB signal will be set to low then the power off sequence will start.

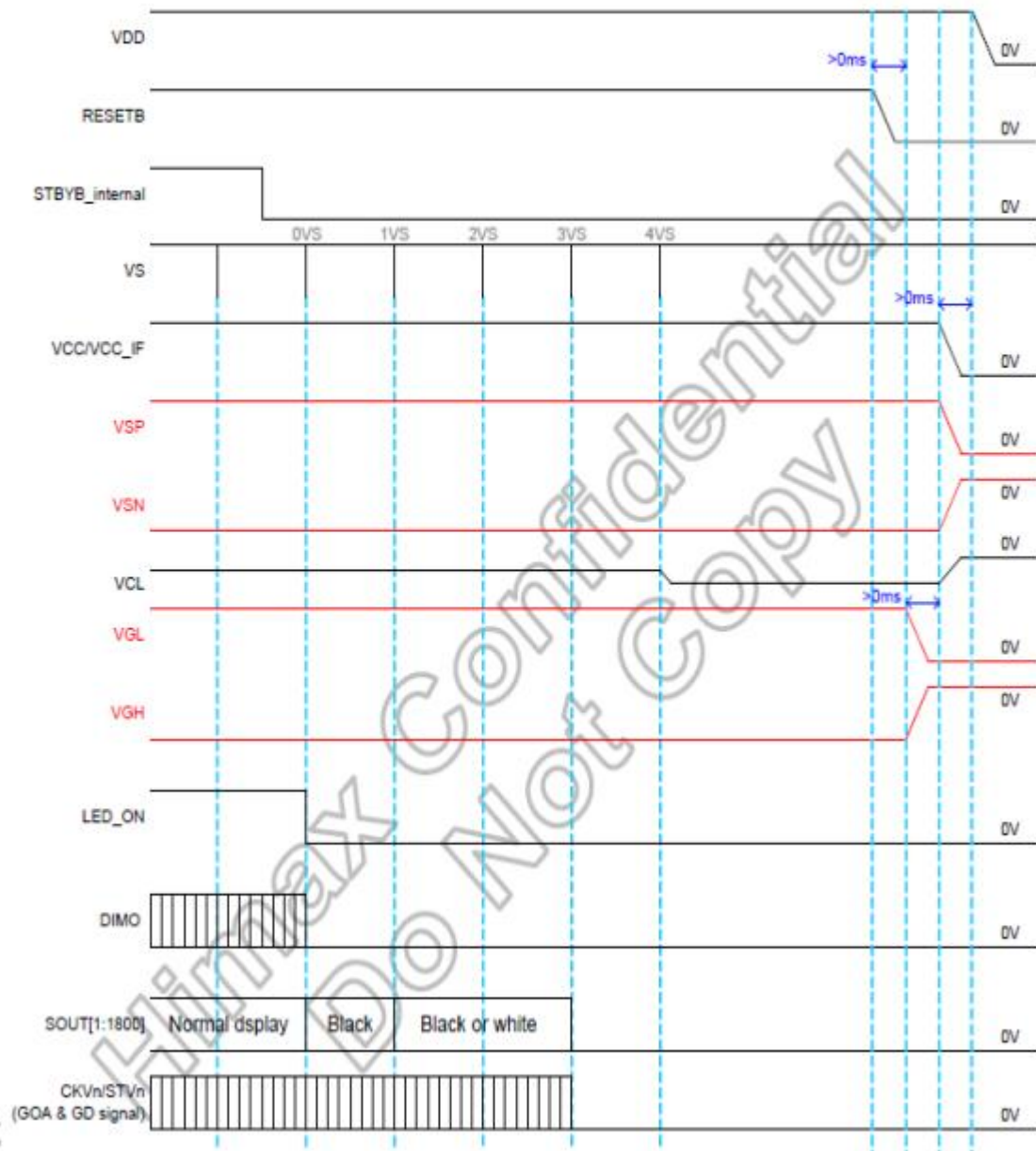


Figure 5.8: Power off sequence with PWRMD=1

5. Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply voltage for analog	VDD	-0.5	5	V
Supply voltage for logic	AVDD	-0.5	10	V
Supply voltage for logic	AVEE	-0.5	10	V
Operating Temperature	TOP	-20	50	° C
Storage Temperature	TST	-30	60	° C
Humidity	RH	-	90%(Max 60° C)	RH

6. Electrical Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Analog operating voltage	VDD	3.0	3.3	3.6	V
Current for driver	IVDDIN	-	32	55	MA
	IAVDD	-	28	50	
	IAVEE	-	25	45	

7. Backlight Characteristics

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Voltage for LED backlight	V _f	11.2	12	13.2	V
Current for LED backlight	I _f	-	180	-	mA
Power consumption	W _{bl}	-	2160	-	mW
Uniformity	Avg	-	80	-	%
LED Life Time	-	30000	40000	-	Hrs

Note:

- 1.The LED life time is defined as the module brightness decrease to 50% original brightness at Ta=25°C, 60%RH ±5 %.
2. The life time of LED will be reduced if LED is driven by high current, high ambient temperature and humidity conditions.
3. Typical operating life time is an estimated data.
4. Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded .Functional operation should be restricted to the conditions described under normal operating conditions.

8. LCD Optical specifications

Item	Symbol	Condition	Specification			Unit	Remark
			Min	Typ	Max		
Response time (By Quick)	Tr+Tf	$\theta = 0^\circ$	-	30	-	ms	Note 5
Contrast ratio	CR	$\theta = 0^\circ$	-	800	-		Note 2,6
Viewing angle	Top	$CR \geq 10$	-	85	-	Deg.	Note 2,6,7
	Bottom	$CR \geq 10$	-	85	-		
	Left	$CR \geq 10$	-	85	-		
	Right	$CR \geq 10$	-	85	-		
Color Filter Chromaticity with C light	Wx	$\theta = 0^\circ$	Typ -0.03	TBD	Typ +0.03		Note 3
	Wy			TBD			
	Rx			TBD			
	Ry			TBD			
	Gx			TBD			
	Gy			TBD			
	Bx			TBD			
	By			TBD			
NTSC			-	69	%		Note 3

Note 1: Ambient temperature = 25°C.

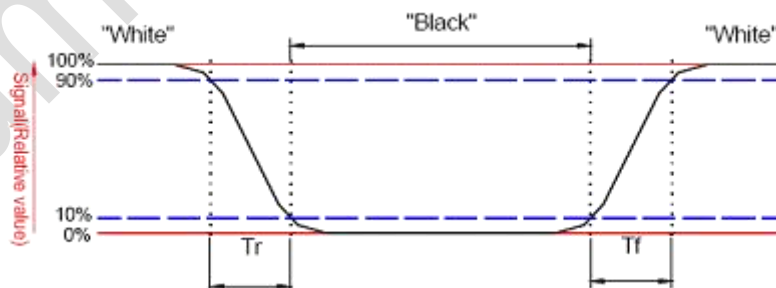
Note 2: To be measured with a viewing cone of 2° by Topcon luminance meter BM-5A.

Note 3: To be measured with Otsuta chromaticity meter LCF-2100M, CF only measure under C light simulation.

Note 4: BOE shipping status is cell without polarizer. Transmittance of Specification is cell with polarizer.
The tolerance of Transmittance is $\pm 10\%$.

Note 5: 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.

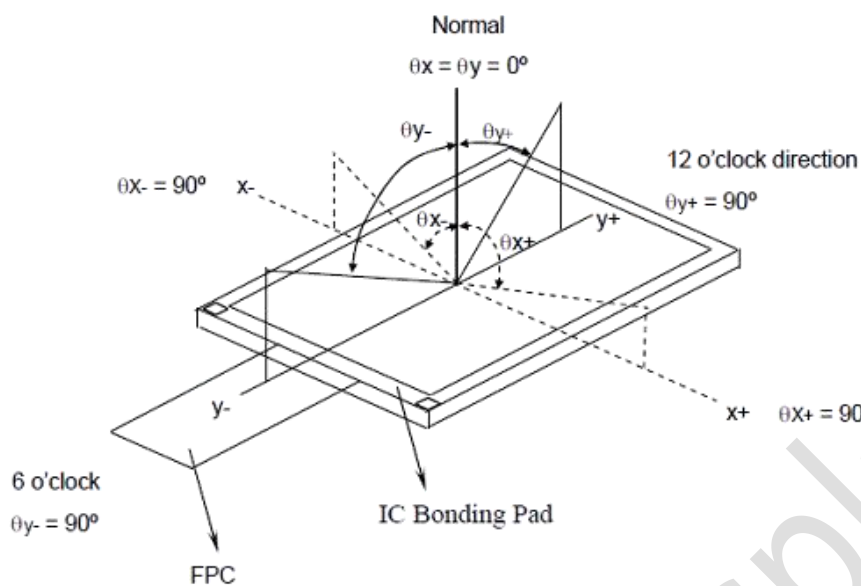


Note 6: Definition of contrast ratio:

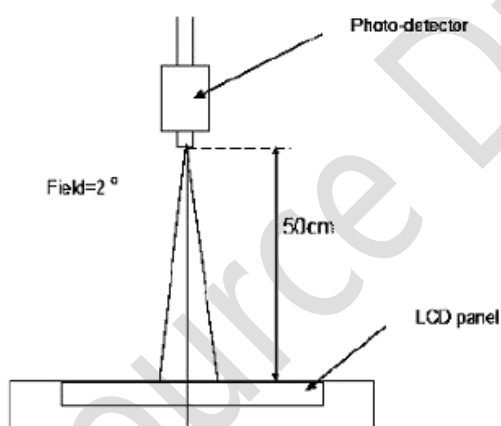
Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

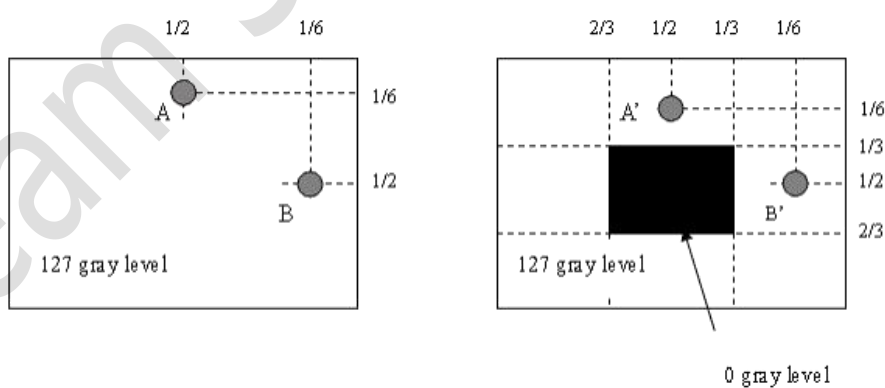
Note 7: Definition of viewing angle



Note 8: Optical characteristic measurement setup.



Note 9:



$1 \text{ LA-LA}' / \text{LA} \times 100\% = 2\% \text{ max.}$, LA and LA' are brightness at location A and A'.

$1 \text{ LB-LB}' / \text{LB} \times 100\% = 2\% \text{ max.}$, LB and LB' are brightness at location B and B'.

9. Capacitive Touch Panel specifications

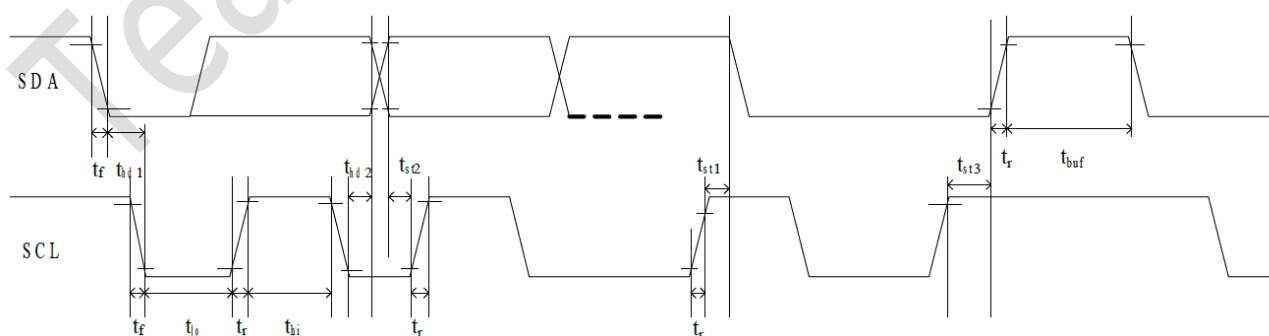
9.1. Mechanical characteristics

DESCRIPTION	INL SPECIFICATION	REMARK
Touch Panel Size	10.1	
Outline Dimension (OD)	165.36(H) x246.58(V) mm	Cover Lens Outline
Product Thickness	1.625mm	
Glass Thickness	0.7mm	
View Area	136.36x217.58mm	
Input Method	5 Fingers	
Activation Force	Touch	
Surface Hardness	≥6H	

9.2. Electrical characteristics

DESCRIPTION		SPECIFICATION
Operating Voltage		DC 2.8~3.3V&5V
Power Consumption (IDD)	Active Mode	TBD
	Sleep Mode	TBD
Interface		I ² C
Controller IC		FT5526
I ² C address		-
Resolution		1200*1920

9.3. Interface timing characteristics



PARAMETER	Symbol	MIN	MAX	UNIT
SCL Frequency		-	400K	Hz
SCL low period	tlo	4.7	-	us
SCL high period	thi	0.6	-	uS
SCL setup time for START condition	tst1	0.6	-	uS
SCL setup time for STOP condition	tst3	0.6	-	uS
SCL hold time for START condition	thd1	0.6	-	uS
SDA setup time	tst2	0.1	-	us
SDA hold time	thd2	0	-	us

10.RELIABILITY TEST

NO.	TEST ITEM	TEST CONDITION	INSPECTION AFTER TEST
1	High Temperature Storage	60±2°C/96 hours	Inspection after 2~4 hours storage at room temperature and humidity. The condensation is not accepted. The sample shall be free from defects: 1. Air bubble in the LCD 2. Seal leak 3. Non-display 4. Missing segments 5. Glass crack
2	Low Temperature Storage	-30±2°C/96 hours	
3	High Temperature Operating	50±2°C/96 hours	
4	Low Temperature Operating	-20±2°C/96 hours	
5	Temperature Cycle	-30±2°C ~ 25~ 60± 2°C × 10 cycles (30 min.) (5min.) (30min.)	
6	Damp Proof Test	60°C ±5°C × 90%RH/96 hours	
7	Vibration Test	Frequency 10Hz~55Hz Stroke: 1.5mm Sweep: 10Hz~150 Hz~10Hz 2 hours For each direction of X, Y, Z	
8	Shock Test	Half-sine, wave, 300m/s	
9	Packing Drop Test	Height: 80 cm 1 corner, concrete floor	
10	Electrostatic Discharge Test	C=150pF, R=330 Ω Air: ±8KV 150pF/330Ω 30 times Contact: ±4KV,20 times	

11. Suggestions for using LCD modules

11.1. Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated, clean it with soft cloth. If the LCM is severely contaminated, use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer. The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don't disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD modules.
 - Tools required for assembling, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
 - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

11.2. Storage

1. Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.

