AGO-050D1-NN-C1-F

5.0 inch, 800×480, TN screen with normal viewing angle, air bonding CTP

Disclaimer：The product design is subject to alternation and improvement without prior notice.

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1 General Feature

1.1 LCD Parameters

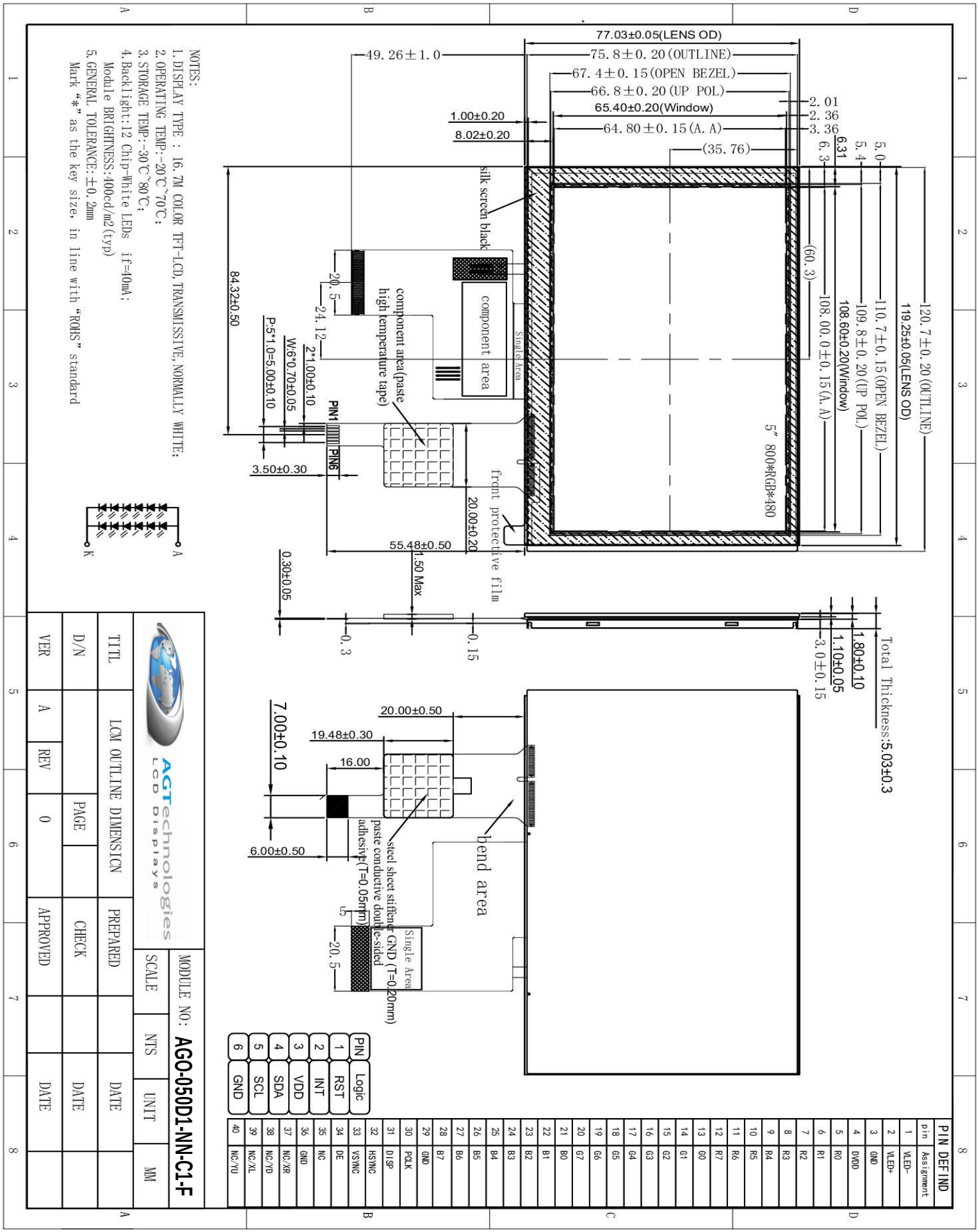
Feature		Description	Unit
Display Spec.	Size	5.0	inch
	Resolution	800(H)*480(V)	pixels
	Pixel Configuration	RGB Vertical stripe	-
	Pixel Pitch	0.135(W)*0.135(H)	mm
	Viewing Direction	6 o'clock	-
Mechanical Characteristics	Outside Dimension	120.7(W)*75.8(H)*3.0(D)	mm
	Active Area	108.0(W)*64.8(H)	mm
	Luminance	300	cd/m²
	LED Numbers	12 LEDS	-
	Pin Order	From left to right 40PIN_0.5mm	-
Electrical Characteristics	Interface	RGB_24bit	-
	Color Depth	16.7M	colors
	Driver Condition	3.3(Type)	V
	Driver IC	ILI6122/ILI6137A-00T004/EK9713CA+ ILI5960/EK73002AB2	-
Temperature Range	Operating Temp.	-20~70	℃
	Storage Temp.	-30~80	℃

1.2 Touch Parameters

Feature	Description
Type	CTP (Capacitive touch panel)
Structure	G+G
Control Type	GT911
Outline Size(mm)	119.25(L)*77.03(W)*1.98(T)
View Area(mm)	108.60(L)*65.40W)
Surface Hardness	6H
Light Transmittance	≧85%
Operating Temperature	-20~70℃
Storage Temperature	-30~80℃

Note：Requirements on Environmental Protection: RoHS

2 Mechanical Drawing



3 Input/Output Terminals

3.1 LCD Input/Output Terminals

Pin NO.	Symbol	Function	Remark
1	VLED-	Power for LED backlight cathode	
2	VLED+	Power for LED backlight anode	
3	GND	Power ground	
4	DVDD	Power voltage	
5	R0	Red Data(LSB)	
6	R1	Red Data	
7	R2	Red Data	
8	R3	Red Data	
9	R4	Red Data	
10	R5	Red Data	
11	R6	Red Data	
12	R7	Red Data(MSB)	
13	G0	Green Data(LSB)	
14	G1	Green Data	
15	G2	Green Data	
16	G3	Green Data	
17	G4	Green Data	
18	G5	Green Data	
19	G6	Green Data	
20	G7	Green Data(MSB)	
21	B0	Blue Data(LSB)	
22	B1	Blue Data	
23	B2	Blue Data	
24	B3	Blue Data	
25	B4	Blue Data	
26	B5	Blue Data	
27	B6	Blue Data	
28	B7	Blue Data(MSB)	
29	GND	Power ground	
30	PCLK	Pixel clock	
31	DISP	Standby mode, Normally pulled high STBYB=“1”,normal operation; STBYB=“0”,timing control, source driver will turn off，all output are High-Z	
32	HSYNC	Horizontal sync input in digital parallel RGB. Negative polarity	
33	VSYNC	Vertical sync input in digital parallel RGB. Negative polarity	
34	DEN	Input data enable control. When DE mode, active High to enable data input (normally pull low)	
35	NC	Not connection	
36	GND	Power ground	
37	NC/XR	Right electrode - differential analog	
38	NC/YD	Bottom electrode - differential analog	
39	NC/XL	Left electrode - differential analog	
40	NC/YU	Top electrode - differential analog	

3.2 TP Input/Output Terminals

Pin NO.	Logic	Remark
1	RST	
2	INT	
3	VDD	
4	SDA	
5	SCL	
6	GND	

4 Electrical Characteristics

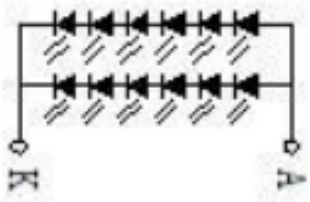
4.1 Driving TFT LCD Panel

Item	Symbol	Min	Typ.	Max	Unit	Remark
Digital Power Voltage	VDD	3.0	3.3	3.6	V	

4.2 LED Backlight Specification

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Voltage for LED Backlight	VL	16.8	18.0	19.8	V	
Current for LED Backlight	IL	-	40	-	mA	
Luminance(with LCD)	Lv	250	300	-	cd/m²	
Uniformity(with L/G)	Avg	75	80	-	%	
LED Life-Time	Hr	-	30000	-	Hour	

Note: 12 LEDs (6 LEDs Serial, 2 ways Parallel)



5 Timing Characteristics

5.1 HV Mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd		800		DCLK
DLCK Frequency	Fclk	26.4	33.3	46.1	MHZ
HSD Period	Th	862	1056	1200	DCLK
Pulse Width	thpw	1	36	40	DCLK
Back Porch	thbp		48		DCLK
Front Porch	tfbp	16	210	354	DCLK
Vertical Display Area	tvd		480		H
VSD Period	tv	510	525	650	H
VSD Pulse Width	Tvpw	1	4	20	H
VSD Back Porch	Tvbp		12		H
VSD Front Porch	tvfp	7	22	147	H

5.2 Mode DC Electrical Characteristics

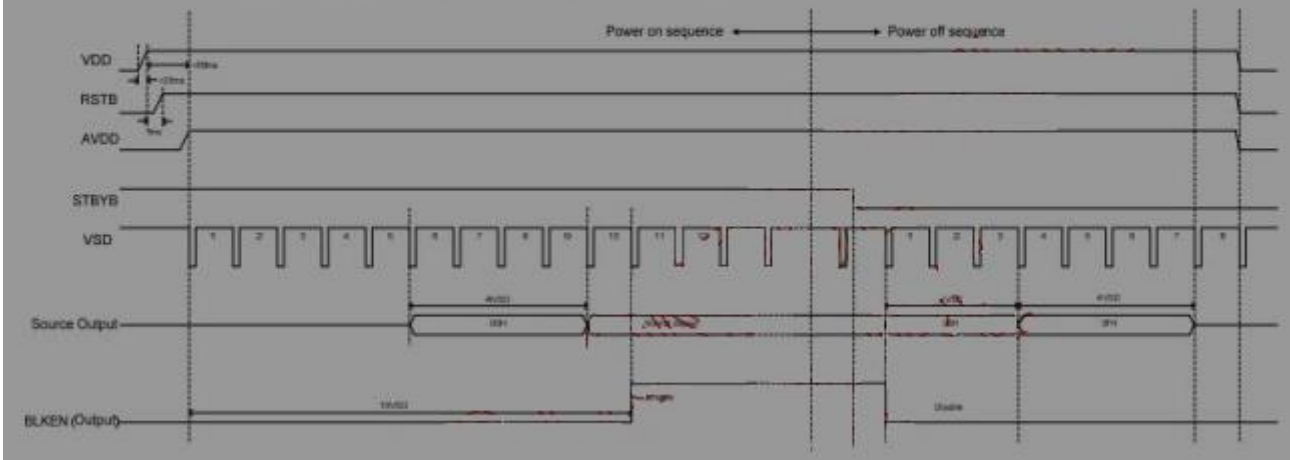
Parameter	Symbol	Conditions	Specification			UNIT
			MIN	TYP	MAX	
Logic high level input voltage	V_{IHLPCD}	LP-CD	450	-	1350	mV
Logic low level input voltage	V_{ILLPCD}	LP-CD	0	-	200	mV
Logic high level input voltage	V_{IHLPRX}	LP-RX (CLK, D0, D1)	880	-	1350	mV
Logic low level input voltage	V_{ILLPRX}	LP-RX (CLK, D0, D1)	0	-	550	mV
Logic low level input voltage	$V_{ILLPRXULP}$	LP-RX (CLK ULP mode)	0	-	300	mV
Logic high level output voltage	V_{OHLPTX}	LP-TX (D0)	1.1	-	1.3	V
Logic low level output voltage	V_{OLLPTX}	LP-TX (D0)	-50	-	50	mV
Logic high level input current	I_{IH}	LP-CD, LP-RX	-	-	10	μA
Logic low level input current	I_{IL}	LP-CD, LP-RX	-10	-	-	μA
Input pulse rejection	SGD	DSI-CLK+/-, DSI-Dn+/- (Note 3)	-	-	300	Vps

Spike/glitch rejection-DSI

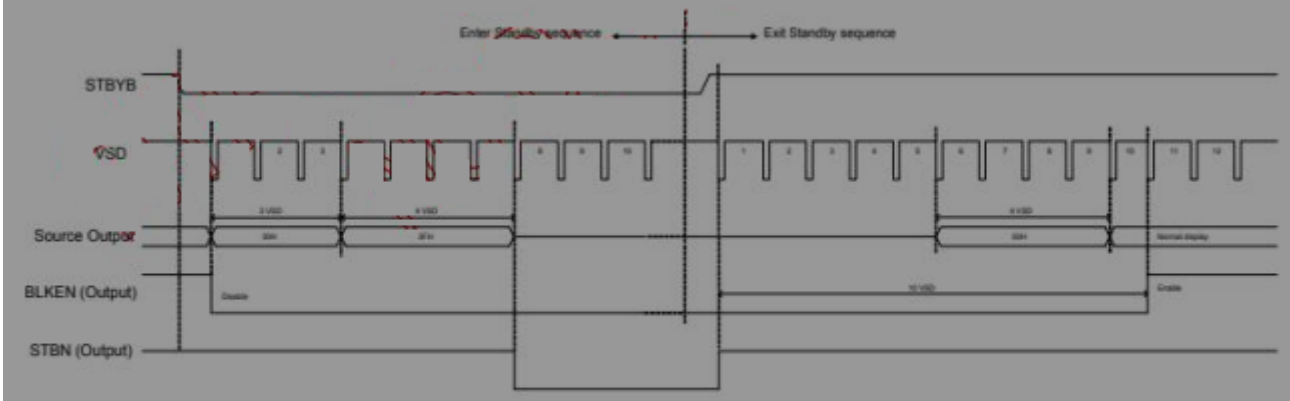
5.3 Up-down Time Sequence

In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within the given specifications. Refer to "AC Characteristics" for more detail on timing.

This is another paragraph of sub-function description.



Power-On/Off Timing Sequence

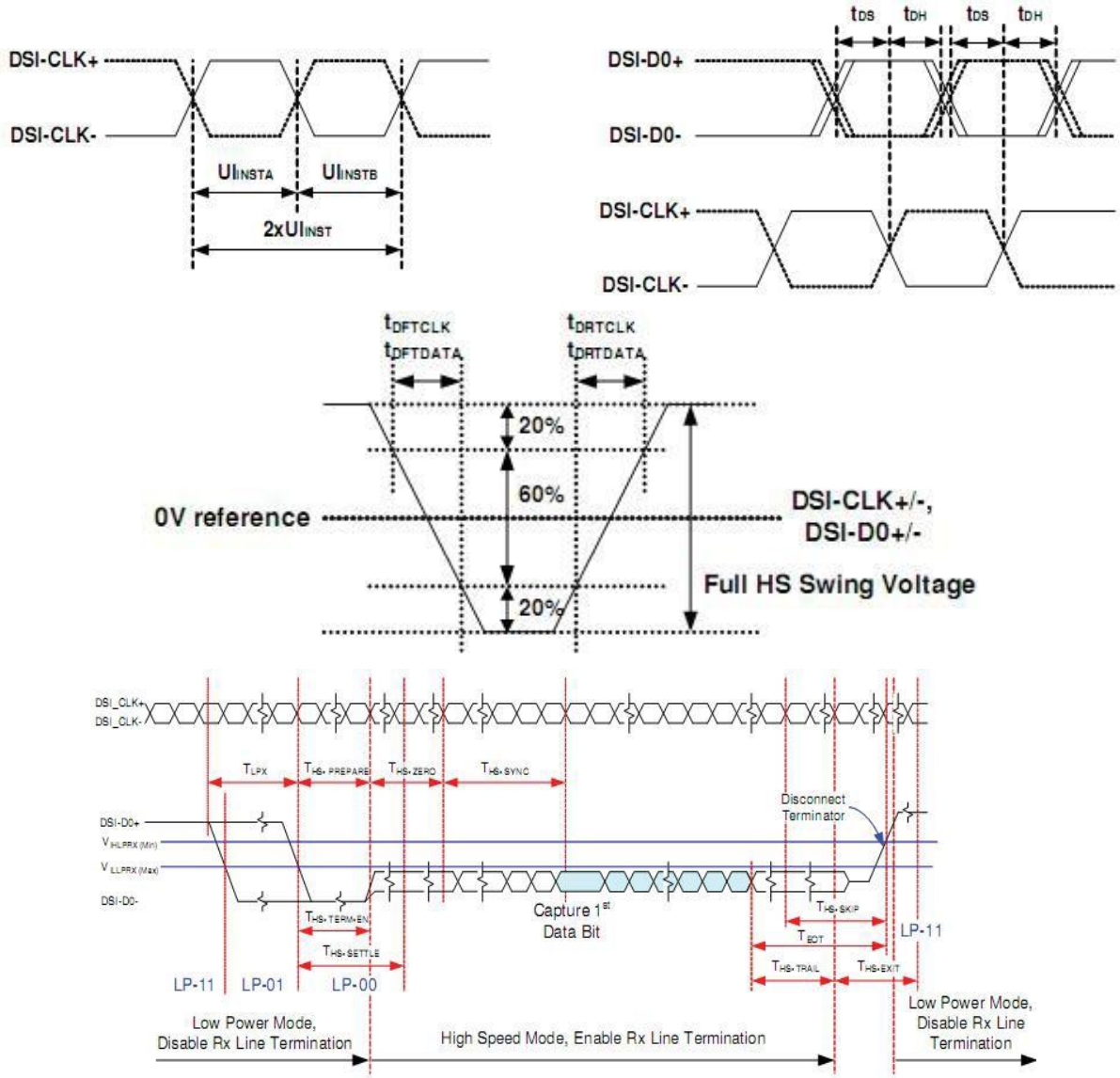


Enter and Exit Standby Mode Sequence

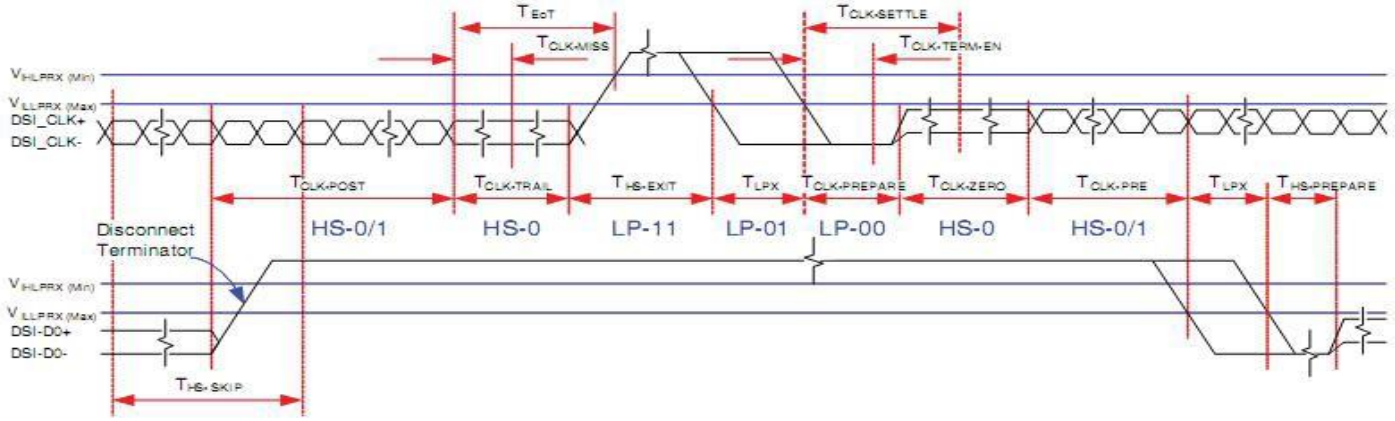
5.4 AC Characteristics

(VSS=VSSI=DVSS=0V, VDDI=1.65V to 3.6V, VDD=2.5V to 3.6V,Ta = -30 to 70°C)

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
DSI-CLK+/-	2xUIINST	Double UI instantaneous	4	-	8	ns	4 Lane (Note 2)
			3	-	8	ns	3 Lane (Note 2)
			2.352	-	8	ns	2 Lane (Note 3)
DSI-CLK+/-	UIINSTA UIINSTB	UI instantaneous halfs (UI = UIINSTA = UIINSTB)	2	-	4	ns	4 Lane (Note 2)
			1.5	-	4	ns	3 Lane (Note 2)
			1.176	-	4	ns	2 Lane (Note 3)
DSI-Dn+/-	tDS	Data to clock setup time	0.15xUI	-	-	ps	
DSI-Dn+/-	tDH	Data to clock hold time	0.15xUI	-	-	ps	
DSI-CLK+/-	tDRTCLK	Differential rise time for clock	150	-	0.3xUI	ps	
DSI-Dn+/-	tDRTDATA	Differential rise time for data	150	-	0.3xUI	ps	
DSI-CLK+/-	tDFTCLK	Differential fall time for clock	150	-	0.3xUI	ps	
DSI-Dn+/-	tDFTDATA	Differential fall time for data	150	-	0.3xUI	ps	



5.5 Clock Lanes-high Speed Mode to/from Low Power Mode Timing

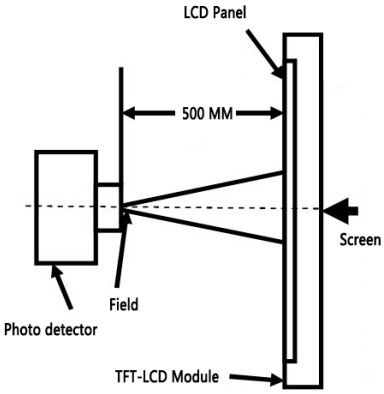


6 Optical Characteristics

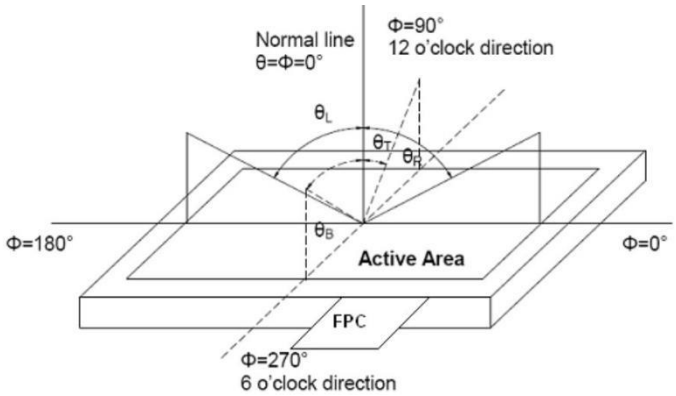
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle	Top	CR≧10	-	50	-	Deg.	Note 2
	Bottom		-	70	-		
	Left		-	70	-		
	Right		-	70	-		
Contrast Ratio	CR	θ=0°	400	500	-		
Response Time	T_r+T_f	θ=0°	-	35	50	ms	Note 4
Color Chromaticity (CIE1931)	Wx	θ=0°	0.260	0.290	0.320		Note 5
	Wy		0.290	0.320	0.350		
	Rx		-	-	-		
	Ry		-	-	-		
	Gx		-	-	-		
	Gy		-	-	-		
	Bx		-	-	-		
	By		-	-	-		
Color Gamut	NTSC		-	55	-	%	

Test conditions:
IF= 40 mA, and the ambient temperature is 25℃.

Note 1: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of LCD.

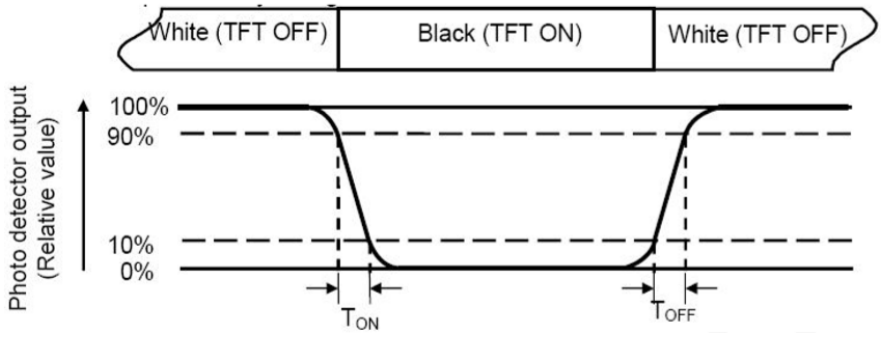


Note 2: Definition of viewing angle range and measurement system
The viewing angle is measured at the center point of the LCD by BM-7A.



Note 3: Definition of color temperature.
When the radiation of the light source is exactly the same in the visible region and the absolute blackbody, the temperature of the blackbody is called the color temperature of the light source. Color temperature is an index to measure the degree of light source color (cold color, warm color). Warm color < 3300K, intermediate color 3300 ~ 5000K, cold color > 5000K.

Note 4: Definition of response time.
The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Time ON (TON) is the time between photo detector output intensity changed from 90% to 10%. And time off (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931).
Color coordinates measured at center point of LCD.

Note 6: Definition of luminance.
Measure the luminance of white state at center point.

7 Environmental Reliability Test

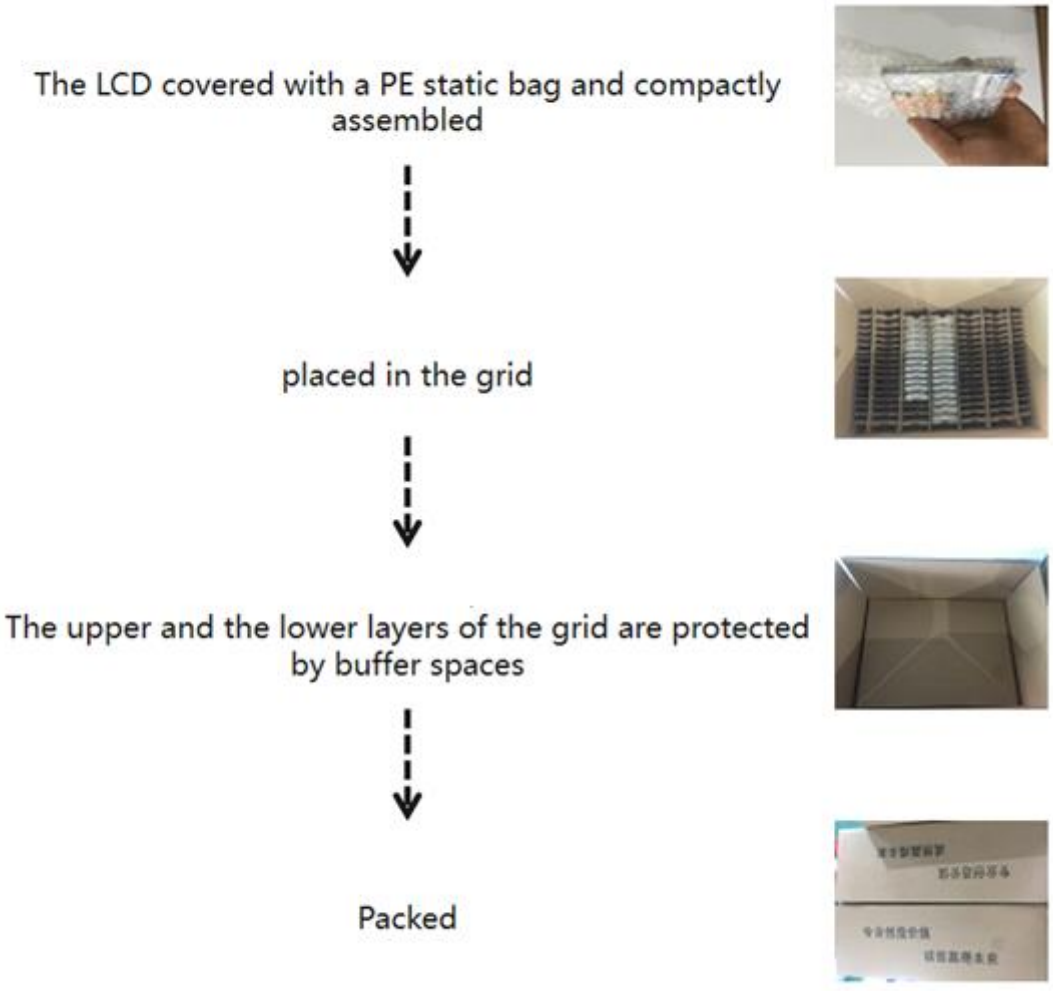
NO	Test Item	Condition	Remarks
1	High Temperature Operation	Ta=+70℃，96hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta=-20℃，96hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta=+80℃，96hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta=-30℃，96hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta=+60℃，90% RH max，96hours	IEC60068-2-78 :2001 GB/T2423.3-2006
6	Thermal Shock (non-operation)	-20℃ 30 min~+60℃ 30 min, after 10cycle, Restore 2H at 25℃ Power off	Start with cold temperature, End with high temperature, IEC60068-2-14:1984, GB 2423.22-2002
7	ESD(non-operation)	150pF,330Ω,Contact:±4KV,Air:±8KV Measure point: LCD glass and metal bezel	IEC61000-4-2:2001 GB/T 17626.2-2006
8	Vibration Test	10Hz~45Hz, 100m/s2, 120min	IEC60068-2-6:1982 GB/T 2423.10-1995
9	Mechanical Shock (Non OP)	Half-sinewave,300m/s2,11ms	IEC60068-2-27:1987 GB/T 2423.5-1995
10	Package Drop Test	800mm, concrete floor,1corner, 3edges, 6 sides each time	IEC60068-2-32:1990 GB/T 2423.8-1995

8 Packing Capacity & Dimension

Dimension			
Dimension(mm)	120.7(W)*77.03(H)*5.03(D)		
Net Weight	-		
Packing Capacity			
Size	**LCD Size and Resolution**	**Layer**	**Quantity (Pcs)**
220mm(L)x160mm(W)x47mm(H)	5.0 inch 800*480	1	1
450mm(L)x350mm(W)x300mm(H)	5.0 inch 800*480	2	120

Packing instruction：

The LCD+TP is placed in the grid, covered with a PE static bag and compactly assembled, the upper and the lower layers of the grid are protected by buffer spaces.



9 Appearance Inspection

9.1 General rules for inspection

9.1.1 Anti-static wearables (anti-static wristbands, gloves) must be worn during the inspection.

9.1.2 Do not use bare hands to touch the position of the device, golden fingers, and the surface of the screen to prevent the sweat from human hands from causing oxidation and affecting the appearance.

9.1.3 It is forbidden to stack products out of specification and handle them with care to avoid damage to components.

9.1.4 The repaired products need to be inspected to prevent rosin and tin slag from exceeding the specifications.

9.1.5 When technical documents and process documents have specific requirements for products, the technical documents and process documents shall be the main requirements.

9.2 Inspection conditions

9.2.1 The conditions of display function check

Angle: ±5°;

Inspection method: visual inspection. The inspection object is 30-40cm away from the light source, and the eye is 30-40cm away from the inspection object;

Illumination: 300-500Lux;

Inspection time: 5-10S.

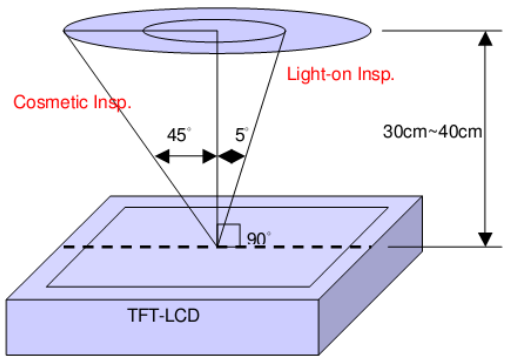
9.2.2 Visual inspection conditions

Angle: ±45°;

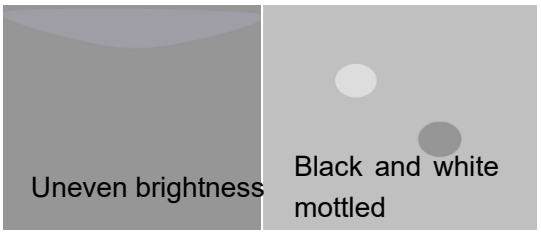
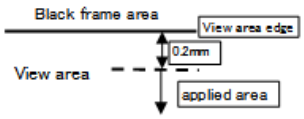
Inspection method: visual inspection. The inspection object is 30-40cm away from the light source, and the eye is 30-40cm away from the inspection object;

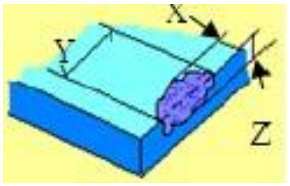
Illumination: 800-1500Lux;

Inspection time: 5-10S.



9.3 Inspection standard

Type	Test Items	Judgement Standard	Defect Category
Display state	Dead pixels	No dead pixels	
	mura	From different angles, the brightness is required to be uniform. Under the 64-level grayscale or pure black interface, there should be no uneven display brightness within the viewing angle range of 45° through 6% ND FILTER. Y series (TV film) LCD screen does not have specific requirements, and the picture inspection does not affect the display as qualified. 	Slight defect
	Light leakage	Under the 64-level grayscale or pure black interface, there should be no obvious light leakage within the viewing angle range of 45° by visual inspection or through 6% ND FILTER. Y series (TV LCD screen) series can be without obvious visual defects.	Slight defect
	Linear foreign bodies	1. W≤0.05, L≤2mm, negligible; 2. 0.05mm＜W≤0.1mm, L≤2mm, N≤3; 3. W＞0.1mm, L＞2mm, not allowed.	Slight defect
	Bubble in OCA	1. D＜0.20mm, negligible; 2. 0.20mm＜D≤0.30mm，N≤4 and，DS＞10mm; 3. 0.30mm＜D≤0.35mm，N≤3 and，DS＞10mm; 4. 0.35mm＜D, fault. (Guarantee area: within 0.2mm outside VA) 	Slight defect
Screen surface	Within the effective area	Spotted: 1. D≤0.2mm and it is not a piece, it is not counted; 2. 0.2mm＜D≤0.5mm, N≤3; 3. D>0.5mm, L>0.5mm, W>0.5mm are not allowed; (The spotted foreign objects shall not exceed the point-line gauge D=0.5, and the black dot coverage shall be checked, and the spotted foreign objects shall be judged within the range of D=0.5)	Slight defect
		Linear: 1. W≤0.05, L≤2mm, ignored; 2. 0.05＜W≤0.1mm, L≤2mm, N≤3; 3. W>0.1mm, L>2mm, not allowed.	
	Outside the effective area Foreign objects Scratches Air bubbles	Foreign objects are not checked, and bubbles are not allowed to D>1mm; Non-inductive scratches of no more than 0.1×8mm are allowed.	Slight defect

	Crack	Not allowed. 	Slight defect
	Notch	1. Does not affect the appearance from the front; 2. Does not affect the relevant alignment; 3. X≤1mm, Y≤1mm, N≤2. 	Slight defect
	Glass side Foreign objects Dirty	1. The foreign body on the side is not controlled; 2. The paint pen marks on the side are not controlled; 3. Side oily note printing is not allowed.	Slight defect
FPC	Cracks Goldfinger crease	Not allowed.	Heavy deficit
	Crease	Slight creases are not controlled; The crease is whitish and has lines, which is not allowed.	Heavy deficit
	Top wound, stab wound	No damage to the line, D≤0.2mm; Damage to the line is not allowed.	Heavy deficit
	Scratch	Slight scratches on the surface are not controlled; Damage to the line is not allowed.	Heavy deficit
	Goldfinger scratch	W≤0.05mm, no control; W＞0.05mm, not allowed; Test probe tip marks are not controlled.	Heavy deficit
	Component	Under soldering, over soldering and false soldering are not allowed.	Heavy deficit

10 Precautions for Use of LCD Modules

10.1 Handling Precautions

10.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, Can only use LCD dedicated cleaner, the following organic solvent can not be used:

- Isopropyl alcohol
- Ethyl alcohol
- Ketone
- Aromatic solvents

10.1.6 Do not attempt to disassemble the LCD Module.

10.1.7 If the logic circuit power is off, do not apply the input signals.

10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an

10.1.9 optimum work environment.

10.1.9.1 Be sure to ground the body when handling the LCD Modules.

10.1.9.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.9.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.9.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage precautions

10.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature: 0℃ ~ 40℃ Relatively humidity: ≤80%.

10.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.3 Transportation Precautions

10.3.1 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

Record of Revision

Rev	Date	Description	Editor
00	2023-03-28	First Release	
01	2023-05-22	Update Luminance	
02	2023-06-05	Update Luminance	