



SPECIFICATION FOR TFT LCD MODULE

CUSTOMER : _____

CUSTOMER MODULE : _____

HL MODEL : HG101SV004

Preliminary Specification

Final Specification

Customer Confirmation column:

Approved by : _____ Dept. : _____ Data : _____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Designed by	Checked by	Approved by



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REVISION HISTORY

Version	Date	Page	Description
1.0	2023.06.26	ALL	First issue



1. General Description

1.1 DESCRIPTION

HG101SV004 is a color active matrix thin film transistor (TFT) TN liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC ,BL;

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	10.4"	inch
2	Number of Pixels	800×RGB (3) ×600	pixels
3	Active Area	211.2(H) × 158.4(V)	mm
4	Pixel Pitch	0.264(H)×RGB×0.264(V)	um
5	Outline Dimension	228.5(W)×175.5(H)×5.0(T)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally White	-
8	Viewing Direction	6 o'clock	-
9	Pixel Arrangement	RGB vertical stripe	-
10	Border(L/R/U/D)	6.5/2.5/2.5/8	mm
11	Contrast Ratio	800(TYP.)	
12	Surface Treatment	Anti-glare	-
13	Interface	RGB	-
14	Operation Temperature	-20~60	°C
15	Storage Temperature	-30~70	°C
16	Driver IC	~	
17	Response Time	Typ.25,Max.35	MS



2. PIN Description

FH195C-60S-0.5SH (05)

Pin	Symbol	I/O	Function	Remark
1	GND	G	Power Ground	
2	AVDD	P	Analog input voltage	
3	VCC	P	Digital input voltage	
4	R0	I	Red data input (LSB)	
5	R1	I	Red data input	
6	R2	I	Red data input	
7	R3	I	Red data input	
8	R4	I	Red data input	
9	R5	I	Red data input	
10	R6	I	Red data input	
11	R7	I	Red data input (MSB)	
12	G0	I	Green data input (LSB)	
13	G1	I	Green data input	
14	G2	I	Green data input	
15	G3	I	Green data input	
16	G4	I	Green data input	
17	G5	I	Green data input	
18	G6	I	Green data input	
19	G7	I	Green data input (MSB)	
20	B0	I	Blue data input (LSB)	
21	B1	I	Blue data input	
22	B2	I	Blue data input	
23	B3	I	Blue data input	
24	B4	I	Blue data input	
25	B5	I	Blue data input	
26	B6	I	Blue data input	
27	B7	I	Blue data input (MSB)	
28	CLKIN	I	Dot clock input	
29	DEN	I	Data enable signal	
30	NC	-	No connect (please leave it open)	
31	NC	-	No connect (please leave it open)	



32	NC	-	No connect (please leave it open)	
33	NC	I	No connect (please leave it open)	
34	NC	I	No connect (please leave it open)	
35	NC	-	No connect (please leave it open)	
36	VCC	P	Digital input voltage	
37	NC	-	No connect (please leave it open)	
38	GND	G	Power Ground	
39	GND	G	Power Ground	
40	AVDD	P	Analog input voltage	
41	VCOM	P	VCOM DC input	NC
42	DITH	I	Dithering function setting H: Enable dithering function L: Disable dithering function	
43	NC	-	No connect (please leave it open)	
44	VCOM out	O	connect a capacitor	
45	NC		No connect (please leave it open)	
46	NC		No connect (please leave it open)	
47	NC		No connect (please leave it open)	
48	NC		No connect (please leave it open)	
49	NC		No connect (please leave it open)	
50	NC		No connect (please leave it open)	
51	NC		No connect (please leave it open)	
52	NC		No connect (please leave it open)	
53	NC		No connect (please leave it open)	
54	NC		No connect (please leave it open)	
55	NC	-	No connect (please leave it open)	
56	VGH	P	TFT turn on voltage	
57	VCC	P	Digital input voltage	
58	VGL	P	TFT turn off voltage	
59	GND	G	Power Ground	
60	NC	-	No connect (please leave it open)	

I: input , O: output , P: Power

【Note】

- *1): When L/R="0" , set right to left scan dirction
- When L/R="1" , set left to right scan dirction
- When U/D="0" , set top to bottom scan dirction
- When U/D="1" , set bottom to top scan dirction



3. Electrical Characteristics

3.1 ABSOLUTE MAXIMUM RATINGS

Ta = 25°C ± 2

Item	Symbol	Min.	Max.	Unit	Conditions
Digital Supply Voltage	VDD	-0.5	3.66	V	
TFT Gate on voltage	VGH	-0.3	40	V	
TFT Gate off voltage	VGL	VGH-42	0.3	V	
Analog power supply voltage	AVDD	-0.5	13.85	V	

3.2 TFT LCD MODULE

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Digital Supply Voltage	VDD	3.2	3.3	3.8	V	
TFT Gate on voltage	VGH	20	21	22	V	
TFT Gate off voltage	VGL	-7.5	-7	-6.5	V	
TFT Common electrode voltage	VCOM	4.4	4.6	4.8	V	
Analog power supply voltage	AVDD	11	11.5	12	V	

Current Consumption (AGND=GND=0V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Input current for VDD	IVDD	VDD = 3.3V		15	25	mA	Note 1, 2
Input current for AVDD	IAVDD	AVDD = 11.5V		22	40	mA	Note 1, 2
Input current for VGH	IVGH	VGH = 21V	--	1	2	mA	Note 1, 2
Input current for VGL	IVGL	VGL = -7V	--	1	2	mA	Note 1, 2

Note 1: Test Condition is under typical Electrical DC and AC characteristics.

Note 2: Test pattern is White.



4. Power ON/OFF Sequence

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power on: VDD, GND → AVDD, AGND → V1 to V14

Power off: V1 to V14 → AVDD, AGND → VDD, GND

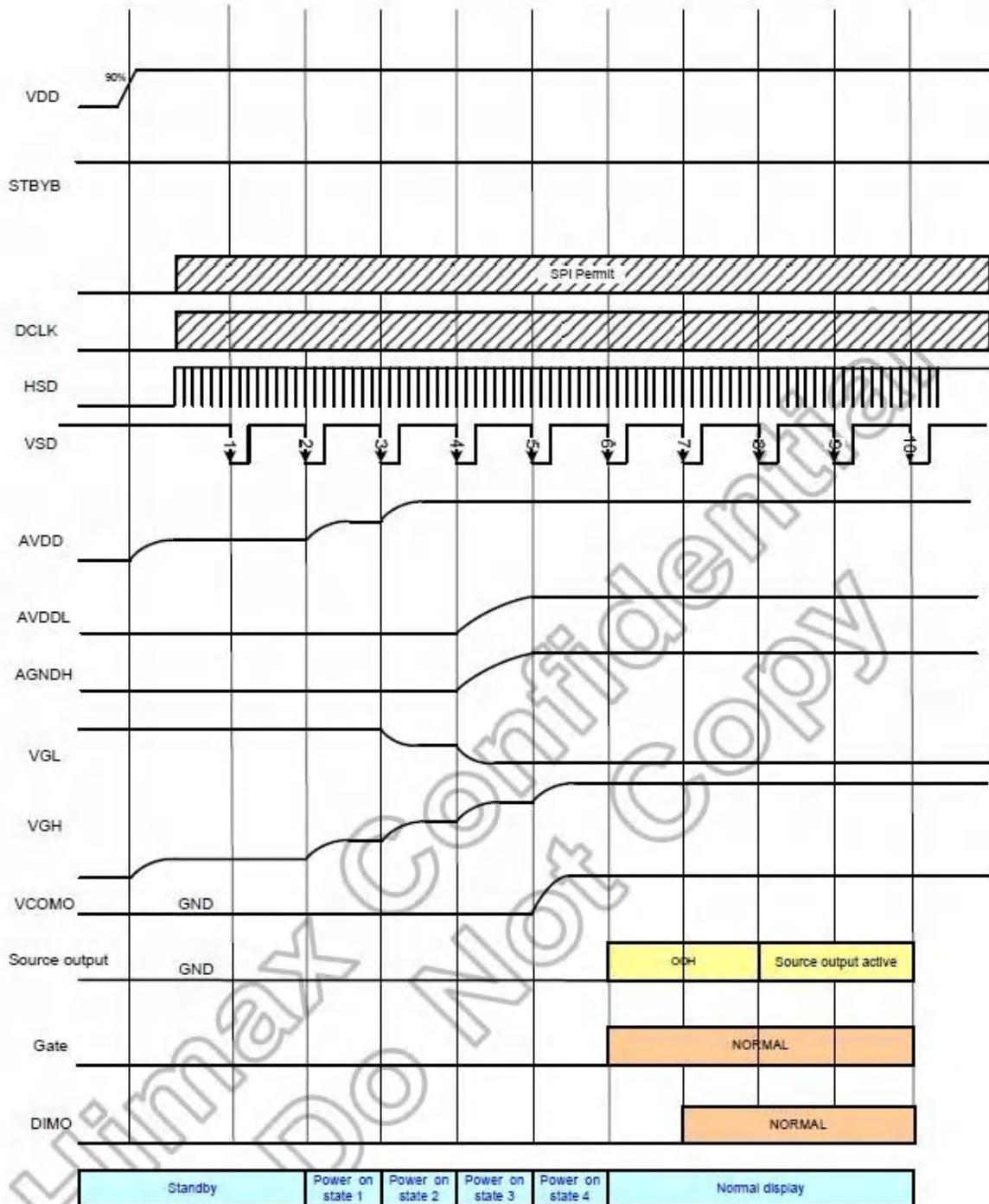


Figure 8.1: Power on timing sequence

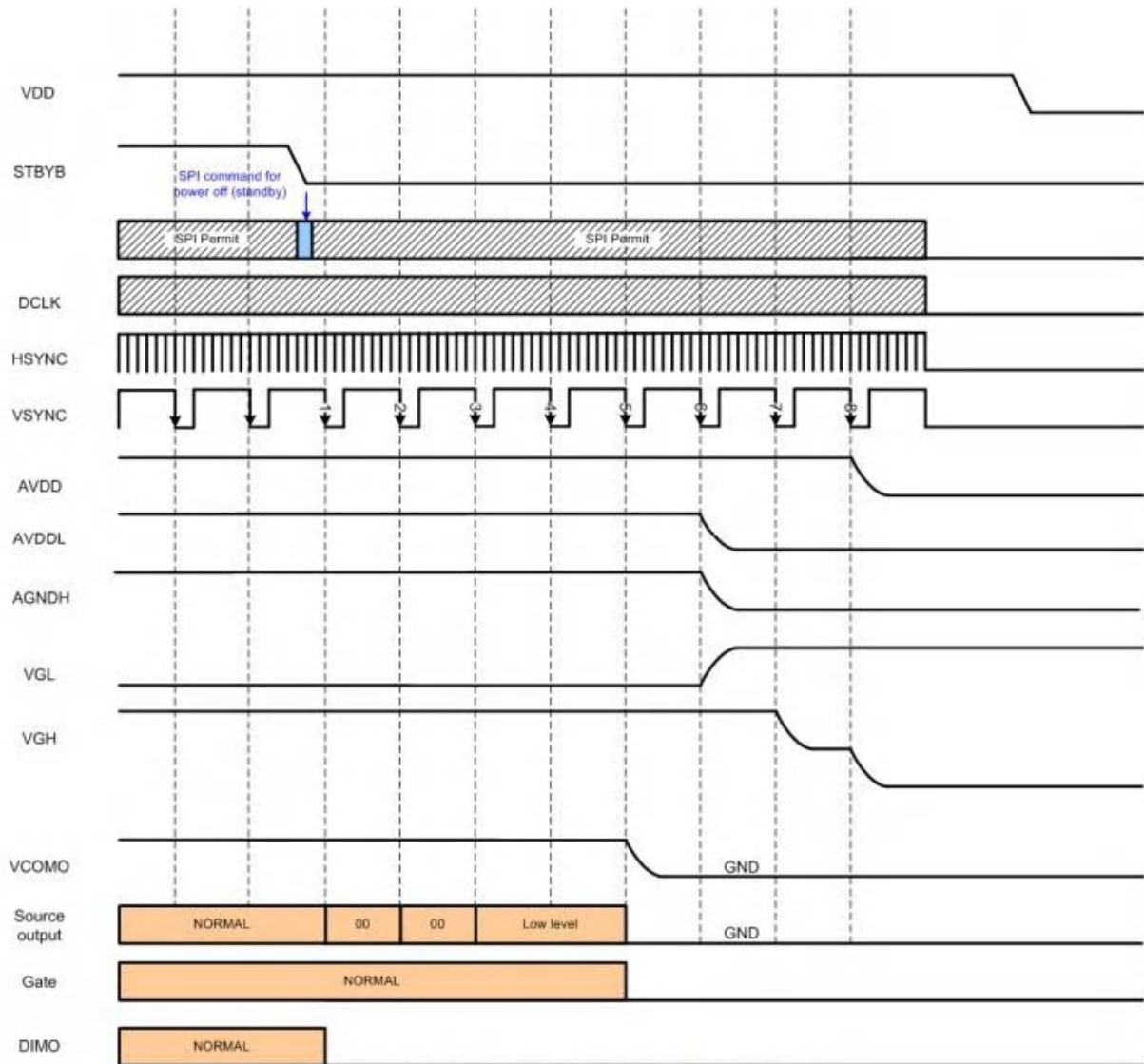


Figure 8.2: Power off timing sequence

Note: Low level=3FH, when NBW=L (Normally white)
Low level=00H, when NBW=H (Normally black)

Power off timing sequence

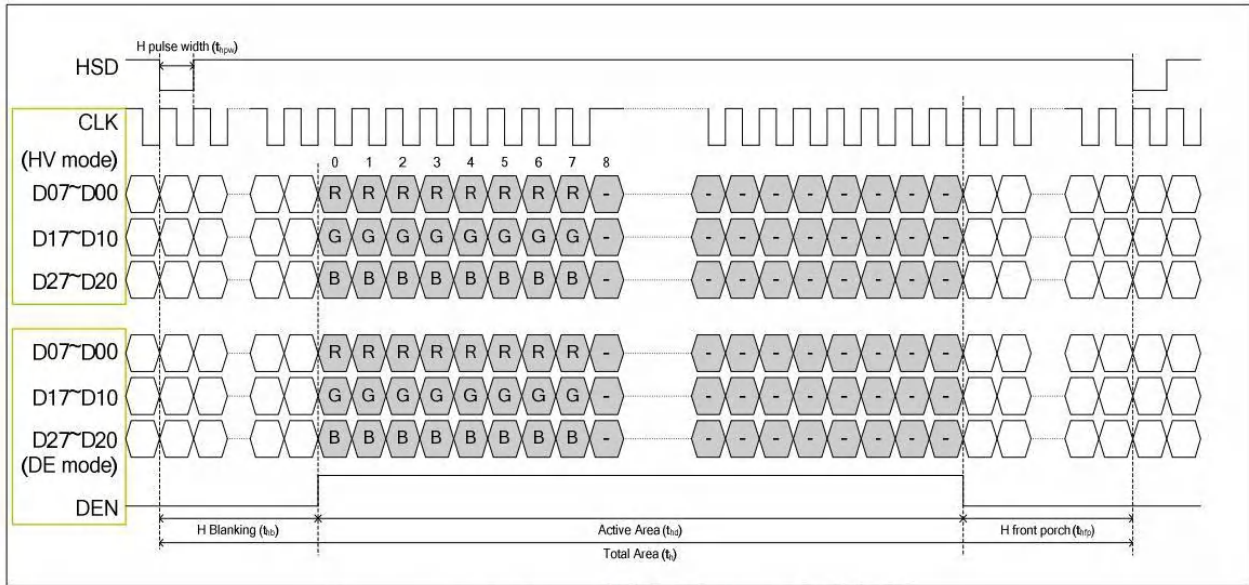


5. Input Signal Timing

DATA INPUT FORMAT

5.1.1 RGB mode data input format

Horizontal timing:



- DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	32.6	39.6	62.4	MHz
Horizontal Display Area	thd	800			DCLK
HSD Period	th	890	1000	1300	DCLK
HSD Blanking	thb+ thfp	90	200	500	DCLK
Vertical Display Area	tvd	600			T_H
VSD Period	tv	610	660	800	T_H
VSD Blanking	tvbp+ tvfp	10	60	200	T_H

Table 10.10: DE mode (800x600)

- HV mode

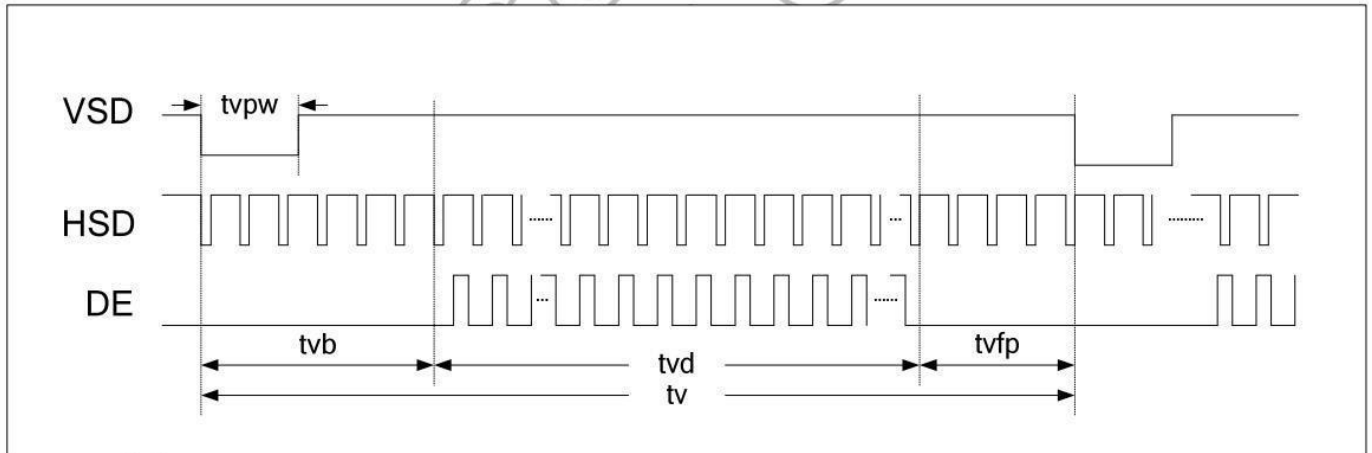
Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	34.5	39.6	50.4	MHz
Horizontal Display Area	thd	800			DCLK
HSD Period	th	900	1000	1200	DCLK
HSD Pulse Width	thpw	1	-	40	DCLK
HSD Back Porch	thbp	88			DCLK
HSD Front Porch	thfp	12	112	312	DCLK

Table 10.11: HV mode horizontal timing (800x600)



Vertical timing:



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		T_H
VSD Period	tv	640	660	700	T_H
VSD Pulse Width	tvpw	1	-	20	T_H
VSD Back Porch	tvbp		39		T_H
VSD Front Porch	tvfp	1	21	61	T_H

Table 10.12: HV mode vertical timing (800x600)



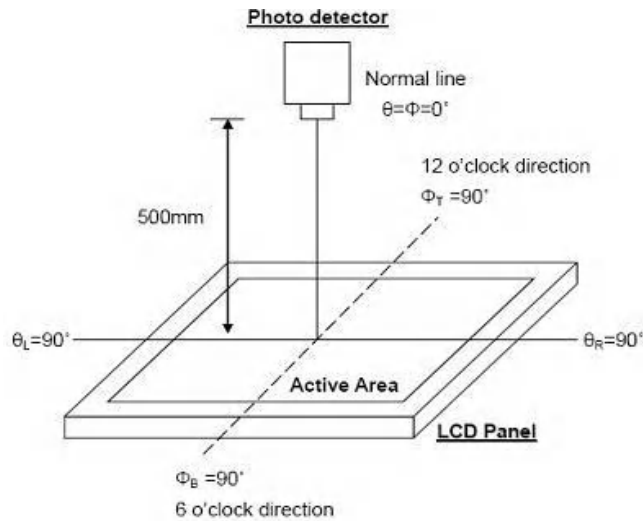
7. Optical Characteristics

Ta=25°C ±2

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio	CR	$\theta = 0^\circ$	600	800	-		Note 1	
Luminance Uniformity	IV-M		70	80	-	%		
Response Time	Rising	T_R	Ta=25°C θ	-	5	10	ms	Note 1 Note
	Falling	T_F		-	20	25		
Viewing Angle range	Left	θ	CR > 10	60	70	-	degree	Note2
	Right	θ		60	70	-	degree	
	Up	Φ		50	60	-	degree	
	Down	Φ		60	70	-	degree	
	Luminance			320	400	-	Cd/m ²	
Color Chromaticity (CIE1931)	White	x		0.27	0.30	0.32		Note1 Note5 Note7
		y		0.30	0.33	0.35		
	Red	x			0.616			
		y			0.284			
	Green	x			0.284			
		y			0.538			
	Blue	x			0.148			
y				0.141				
NTSC			45	60		%		

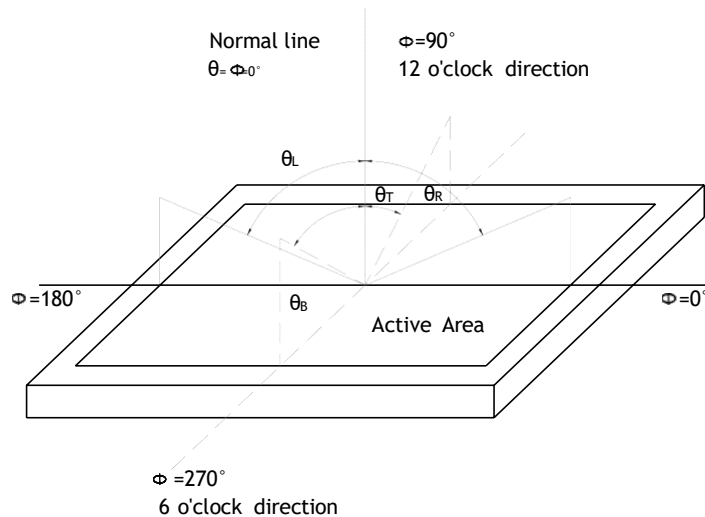


Note1: Definition of optical measurement system



Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note3: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

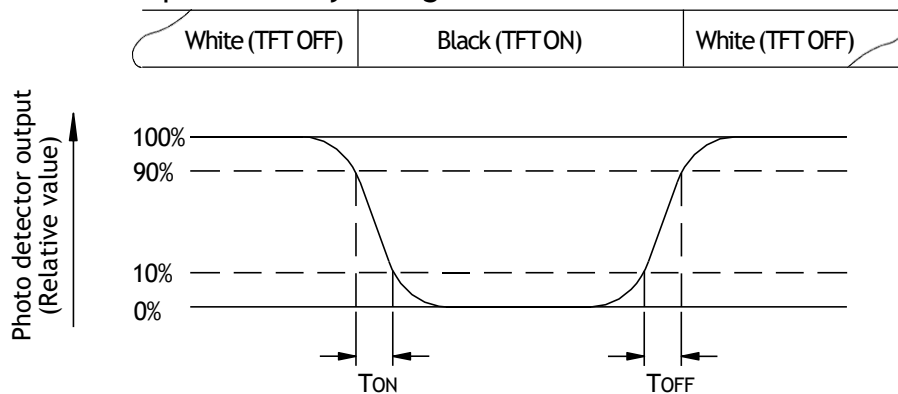


Fig. 6-3 Definition of response time



Note4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

“White state “: The state is that the LCD should drive by V_{white} .

“Black state” : The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

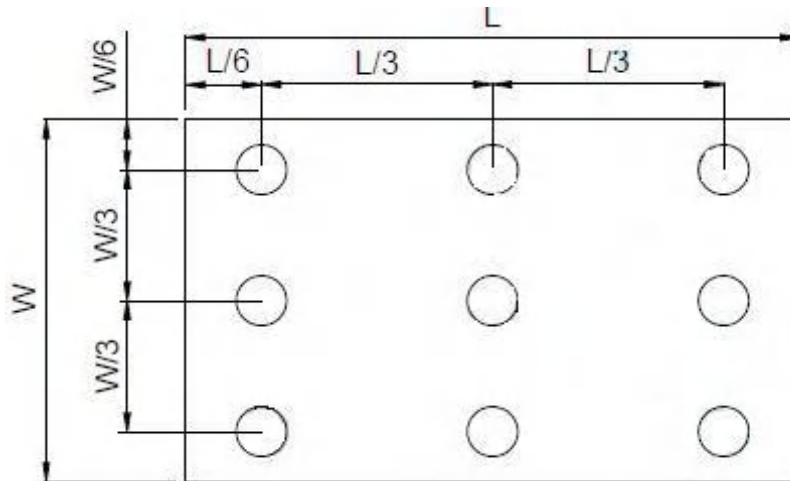
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=240\text{mA}$

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\text{min}} / L_{\text{max}}$$

L----Active area length, W----- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.



8. Quality Assurance System

No.	Test items	Conditions	Remark
1	High Temperature Storage	Ta= 70°C 240Hrs	
2	Low Temperature Storage	Ta= -30°C 240Hrs	
3	High Temperature Operation	Tp= 60°C 240Hrs	
4	Low Temperature Operation	Ta=-20°C 240Hrs	
5	High Temperature & High Humidity	Tp= 50°C. 80% RH 240Hrs	Operation
6	Heat Shock	-10°C~60°C/ 100 cycles 1Hrs/cycle	Non-operation
7	Electrostatic Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B	Note 5

Note 1: Ta: Ambient Temperature. Tp: Panel Surface Temperature

Note 2: In the standard conditions, there is not display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.

Note 3: All the cosmetic specification is judged before the reliability stress.

Note5 : All test techniques follow IEC6100-4-2 standard.



9. Definition Of Labels

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



客户承认

正视图

侧视图

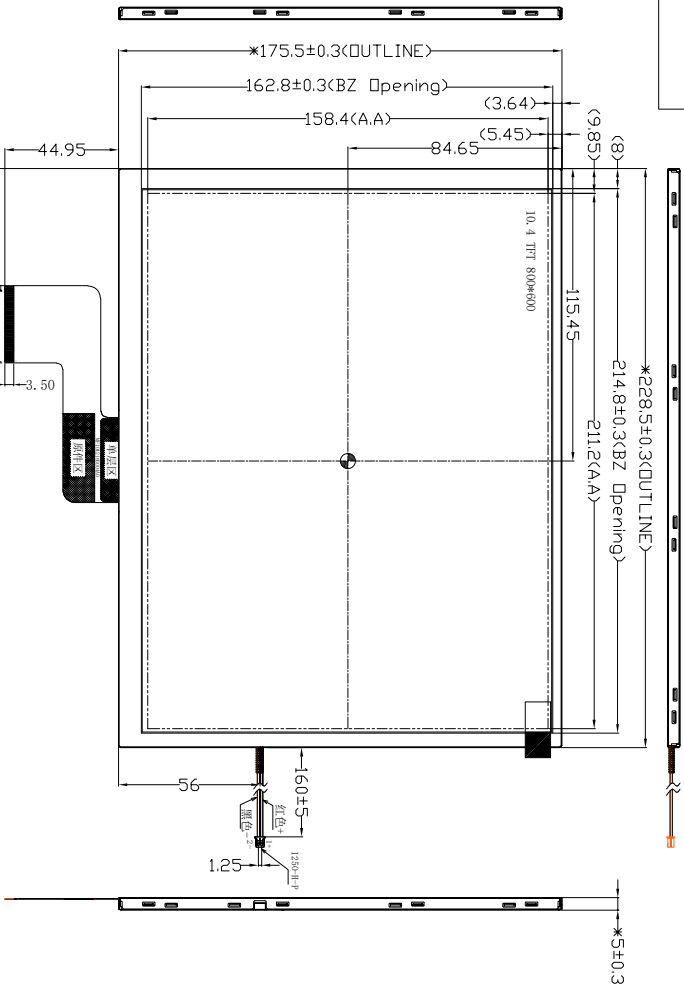
背视图

V0

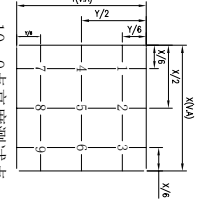
首次发行

2023.05.08

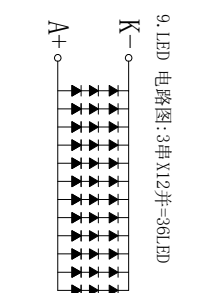
P/N	Symbol
1	GND
2	AVDD
3	VCC
4	R0
5	R1
6	R2
7	R3
8	R4
9	R5
10	R6
11	R7
12	G0
13	G1
14	G2
15	G3
16	G4
17	G5
18	G6
19	G7
20	R0
21	R1
22	R2
23	R3
24	R4
25	R5
26	R6
27	R7
28	CLKN
29	DIRN
30	NC
31	NC
32	NC
33	NC
34	NC
35	VCC
36	VCC
37	NC
38	GND
39	GND
40	AVDD
41	VEOH
42	VGH
43	VCOM
44	NC
45	VCOM out
46	NC
47	NC
48	NC
49	NC
50	NC
51	NC
52	NC
53	NC
54	NC
55	NC
56	VGH
57	VCC
58	VGL
59	GND
60	NC



1. 单位: mm
2. 显示模式: 10.4" Color TFT, Normally White 3.
3. VIEWING DIRECTION: 12.0° CLOCK (最佳视觉视角)
4. 未注倒角: R0.3, 未注尺寸公差: ±0.3
5. "*" 重点管控尺寸; "(") " 参考尺寸
6. "△" 修改位置;
7. 环保符合RoHS要求
8. 光电特性参数:



Item	Symbol	Min	Typ	Max	Unit	Condition
LCM	Luminance	320	400	--	cd/m ²	If= 300 mA
	Uniformity	70	80	--	%	
Coordinate	X	0.255	0.305	0.355	--	Vf= // V
	Y	0.275	0.325	0.375	--	
Forward Voltage	Vf	--	9.5	10.5	V	
Reverse Voltage	Ir	--	--	--	mV	



深圳市鸿光显示有限公司			
UNIT	mm	TITLE	模组工程图
RATIO:	1 : 1	PRODUCT NO	HG104SV004
VIEW:		CUSTOMER NO	
	REV	C1	APPROVED BY
			CHECKED BY
			YF_CHEN
			DATE
			23.05.08



11. Packaging

TBD



12. PRECAUTIONS

12.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
- (2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
- (3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.
- (5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
- (6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
- (9) Do not disassemble the module.
- (10) Do not pull or fold the lamp wire.
- (11) Pins of I/F connector should not be touched directly with bare hands.

12.2 STORAGE PRECAUTIONS

- (1) When storing for a long time, the following precautions are necessary.
 - (a) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 30°C at humidity 50+-10%RH.
 - (b) The polarizer surface should not come in contact with any other object.
 - (c) It is recommended that they be stored in the container in which they were shipped.
 - (d) Storage condition is guaranteed under packing conditions.
 - (e) The phase transition of Liquid Crystal in the condition of the low or high storage temperature will be recovered when the LCD module returns to the normal condition
- (2) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
- (4) It may reduce the display quality if the ambient temperature is lower than 10 °C. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.



12.3 OTHER PRECAUTIONS

(1) Normal operating condition

(a) Display pattern: dynamic pattern (Real display)

(Note) Long-term static display can cause image sticking.

(2) Operating usages to protect against image sticking due to long-term static display

(a) Suitable operating time: under 16 hours a day.

(b) Static information display recommended to use with moving image.

(c) Cycling display between 5 minutes' information(static) display and 10 seconds' moving image.

(3) Abnormal condition just means conditions except normal condition.