

LCM Specification

Preliminary specification

Final Specification

Project No. 项目编号	TFT-H040B5WVIL4N45		
Customer 客户名称			
Module No. 客户型号			
Product type 产品内容	TFT LCD Module 480 x 3RGB x 800 Dots 4.0" TFT LCD		
Signature by customer: 客户确认签章:			
<input type="checkbox"/> Trial production		<input type="checkbox"/> Mass production	
编 制	电子审核	结构审核	批 准
Y. L			

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Shenzhen Hot Display Technology Co., Ltd

1 Document revision history :

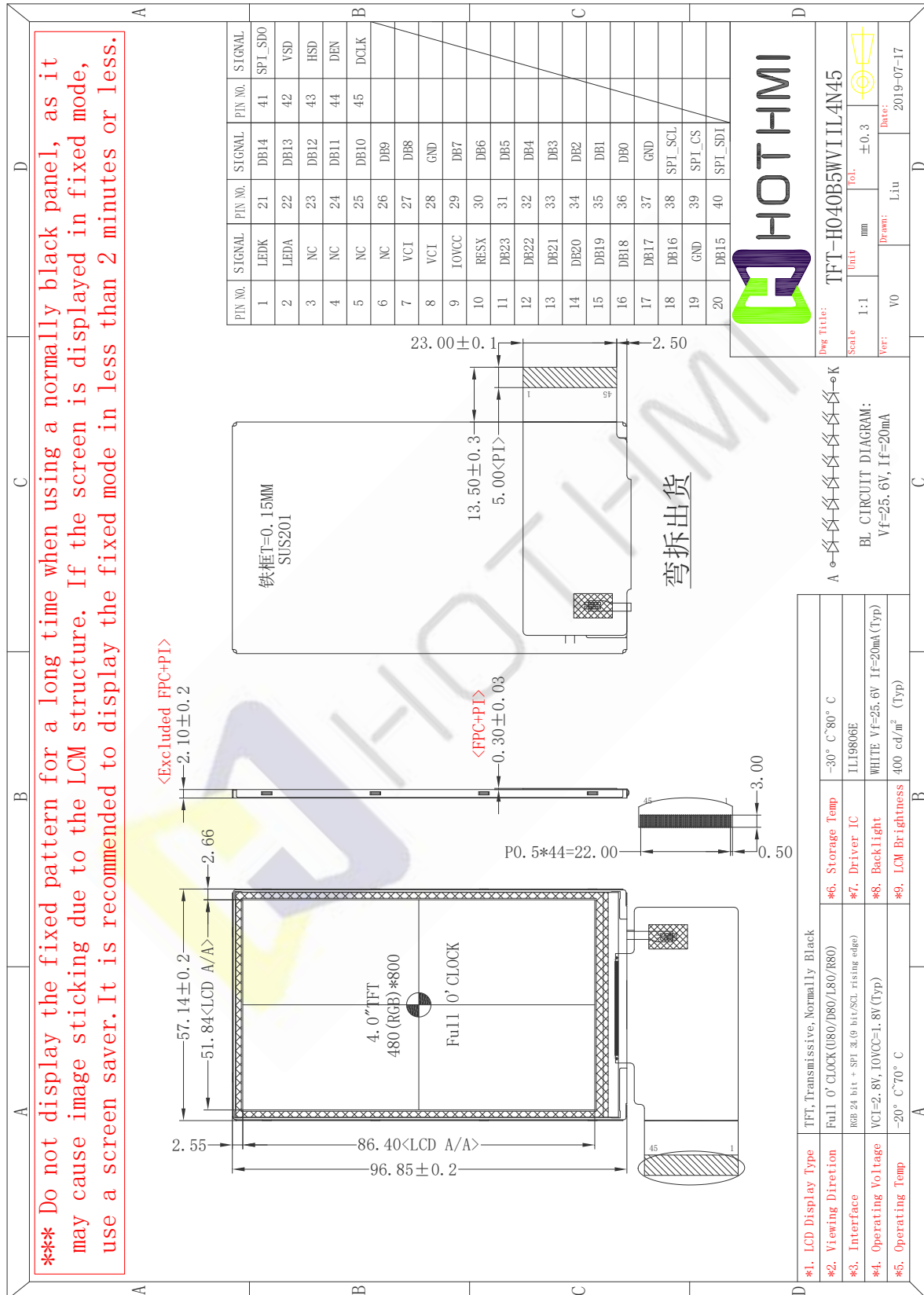
DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
0	2019-7-25	First Release.	Y.L	



1. General Feature:

Item	Standard Value	Unit
Display Size	4.0"	--
Number of Pixels	480(H)x3(RGB)*800(V)	--
Active Area	51.84(H) *86.40(V)	mm
Outline Dimension	57.14(H) ×96.85× 2.10(V)	mm
Viewing Direction	FULL O'Clock	-
Interface	RGB 24 Bit + SPI 3L	-
LCM Driver IC	ILI9806E	-
LCM Driver Condition	VCI=3.3V	V
Backlight	White LED	-
Touch Panel	Without Touch Panel	-
CTP Driver IC	---	
CTP Driver Condition	---	
Operation Temperature	-20~70	°C
Storage Temperature	-30~80	°C

2. Outline Dimensions

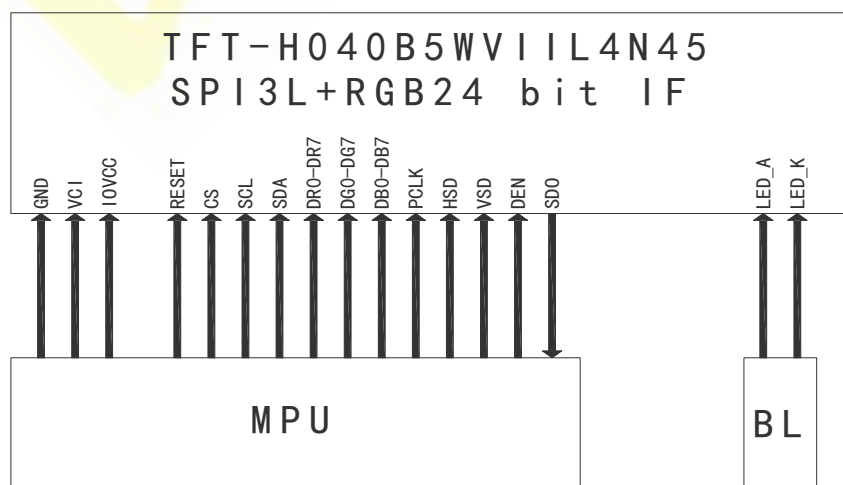


3. Pin Description

3.1 Pin Description

Pin NO.	Symbol	Description
1	LED_K	LED Cathode
2	LED_A	LED Anode
3-6	NC	No Connector
7,8	VCI	Analog Power(3.0 ~ 3.6 V)
9	IOVCC	Analog Power(1.65 ~ 3.6 V)
10	RESET	Reset input
11-18	DB23-DB16	Data bus.
19	GND	Ground
20-27	DB15-DB8	Data bus.
28	GND	Ground
29-36	DB7-DB0	Data bus.
37	GND	Ground
38	SCL	Serial clock input for SPI interface
39	CS	A chip select signal
40	SDI	Serial data input
41	SD0	Serial data output
42	VSD	Vertical sync signal.
43	HSD	Horizontal sync signal.
44	DEN	Data input enable. Display access is enabled when DE is "L" .
45	PCLK	Pixel clock input pin
---END---		

3.2 Wiring Diagram



4. Electrical Characteristics

4-1 TFT LCD Module Operating Conditions

Item	Symbol	Condition	Min	Type	Max	Unit
Interface logic circuits	IOVCC	-	1.65	1.8	3.6	V
Analog Power supply	VCI	-	3.0	3.3	3.6	V
TFT Gate on voltage	VGH	-	10.0	-	16.0	V
TFT Gate off voltage	VGL	-	-16.0	-	-10.0	V

4-2 LED back light specification (pera chip)

Item	Symbol	Condition	Min	Type	Max	Unit
Forward voltage	Vt	If=20mA	22.4	25.6	28.8	V
Forward current	Ipn	/1-chip	-	20	-	mA
Luminance(With LCD)	Lv	If=20mA	300	400	-	cd/m ²
Luminous color	White					

4-3 CTP Operating Conditions

Item	Symbol	Condition	Min	Type	Max	Unit
Power Supply Voltages	VDD	-	2.8	3.30	3.60	V
I/O Digital Voltage	IOVDD	-	2.8	3.30	3.60	V

5. OPTICAL SPECIFICATION

5.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance 1lux and temperature = 25 ± 2°C) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. The center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement.

5.2 Optical Specifications

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ L	CR>10	-	80	-	Deg.	Note 1
		Θ R		-	80	-	Deg.	
	Vertical	Θ U		-	80	-	Deg.	
		Θ D		-	80	-	Deg.	
Contrast ratio		CR	$\Theta = 0^\circ$	720	900	-		Note2
Color Gamut		CG		65	70	-	%	
White Chromaticity		Wx			(0.310)			
		Wy			(0.336)			
Reproduction of color	Red	Rx	$\Theta = 0^\circ$	-0.02	(0.647)	+0.02		Note4 (Based on C Light)
		Ry			(0.317)			
	Green	Gx			(0.275)			
		Gy			(0.582)			
	Blue	Bx			(0.140)			
		By			(0.088)			
Response Time (Rising + Falling)		Tr+Tf	$\Theta = 0^\circ$ Ta= 25°C	-	35	45	ms	Note5
Transmittance(with Polarizer)		Tr		-	(4.14)	-	%	Note3

Note:

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o' clock direction and the vertical or 6, 12 o' clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black)

state . (see FIGUR 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value without APF and without CG.

4. The color chromaticity coordinates specified in the above table shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. The electro-optical response time measurements shall be made as FIGURE 2 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_f .

Figure1 Measurement Set Up

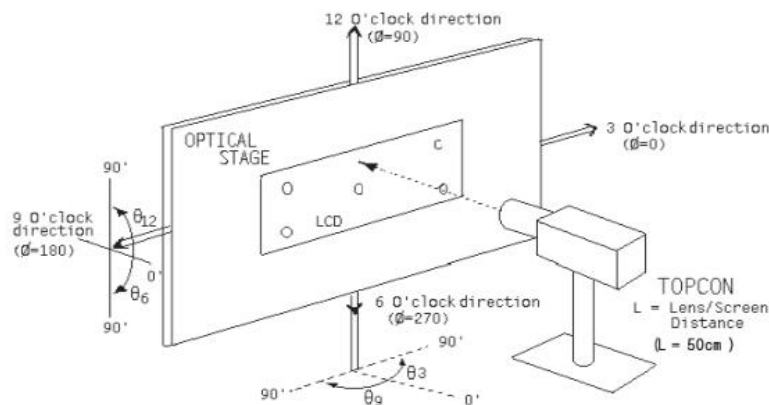
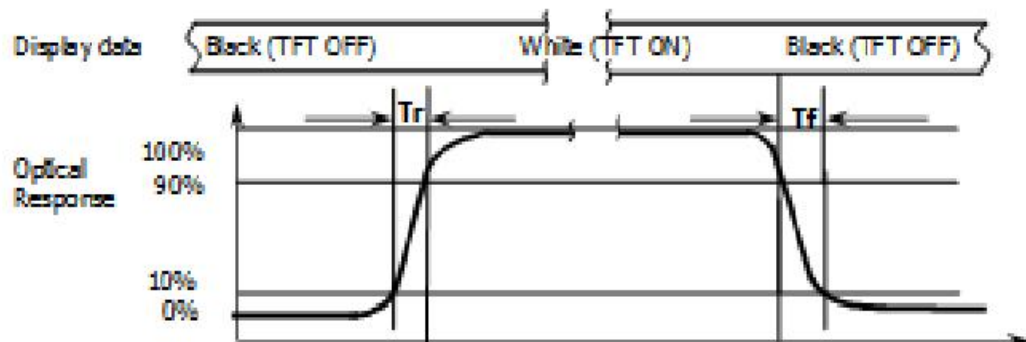
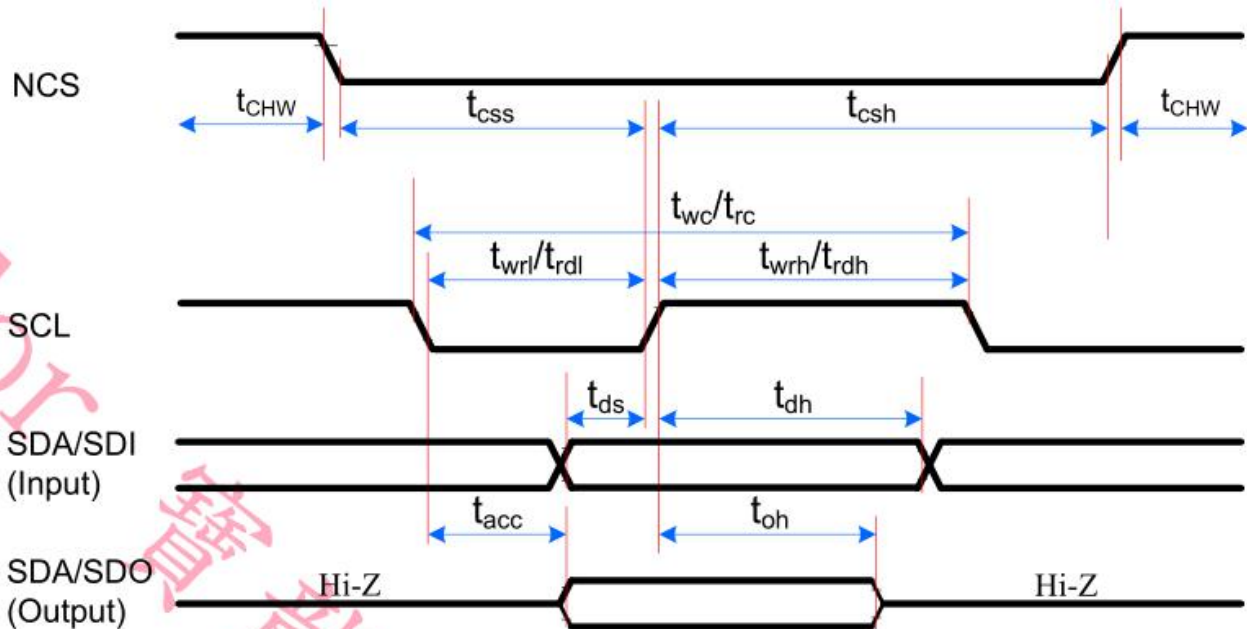


Figure2 Response Time Testing



6. Timing Characteristics of Input Signals

6-1 Serial Interface Characteristics (3-line serial)

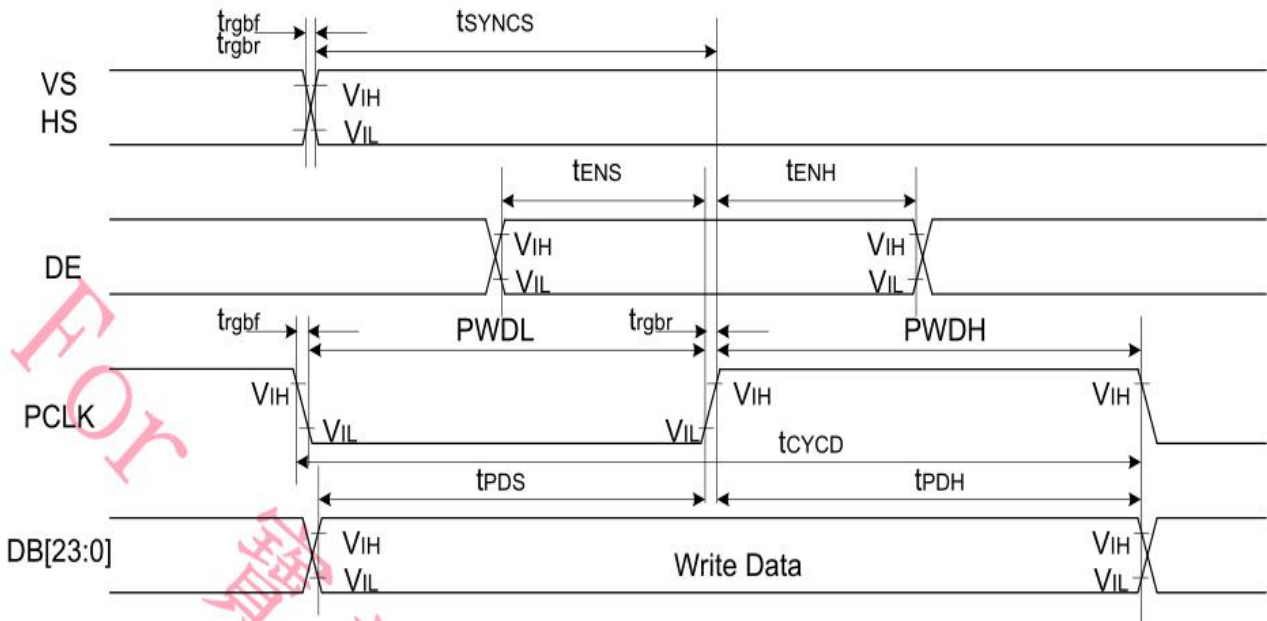


Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	15	-	ns	
	t_{csh}	Chip select hold time (Read)	15	-	ns	
	t_{CHW}	CS "H" pulse width	40	-	ns	
SCL	t_{wc}	Serial clock cycle (Write)	30	-	ns	
	t_{wrh}	SCL "H" pulse width (Write)	10	-	ns	
	t_{wrl}	SCL "L" pulse width (Write)	10	-	ns	
	t_{rc}	Serial clock cycle (Read)	150	-	ns	
	t_{rdh}	SCL "H" pulse width (Read)	60	-	ns	
	t_{rdl}	SCL "L" pulse width (Read)	60	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	10	100	ns	For maximum CL=30pF
	t_{oh}	Output disable time (Read)	15	100	ns	For minimum CL=8pF
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	10	-	ns	
	t_{dh}	Data hold time (Write)	10	-	ns	

Note:

- $T_a = -30$ to 70 °C, $IOVCC = 1.65V$ to $3.6V$, $VCI = 2.5V$ to $3.6V$, $T = 10 \pm 0.5ns$.
- Does not include signal rise and fall times.

6-2 RGB Interface Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VS/ HS	t_{SYNCS}	VS/HS setup time	5	-	ns	24/18/16-bit bus RGB interface mode
	t_{SYNCH}	VS/HS hold time	5	-	ns	
DE	t_{ENS}	DE setup time	5	-	ns	
	t_{ENH}	DE hold time	5	-	ns	
DB[23:0]	t_{POS}	Data setup time	5	-	ns	
	t_{PDH}	Data hold time	5	-	ns	
PCLK	$PWDH$	PCLK high-level period	13	-	ns	
	$PWDL$	PCLK low-level period	13	-	ns	
	t_{CYCD}	PCLK cycle time	28	-	ns	
	t_{rgbr}, t_{rgbf}	PCLK, HS, VS rise/fall time	-	15	ns	

Note: $T_a = -30$ to 70 °C, $IOVCC=1.65V$ to $3.6V$, $VCI=2.5V$ to $3.6V$, $DGND=0V$

Parameter	Symbols	Condition	Min.	Typ.	Max.	Units
Frame Rate	FR		54		66	fps
Horizontal Low Pulse width	HLW		1		-	DOTCLK
Horizontal Back Porch	HBP		2		126	DOTCLK
Horizontal Address	HACT			480		DOTCLK
Horizontal Front Porch	HFP		2		-	DOTCLK
Vertical Low Pulse width	VLW		1		126	Line
Vertical Back Porch	VBP		1		126	Line
Vertical Address	VACT				864	Line
Vertical Front Porch	VFP		1		255	Line
Data Clock	DCLK		16.6		35.7	MHz

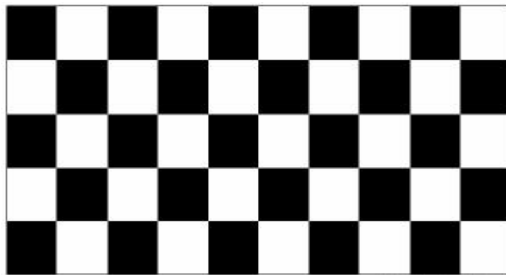
7. RELIABILITY TEST

7-1 Temperature and Humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Storage	Ta=+80 o C, 240hrs	
Low Temperature Storage	Ta=-30 o C, 240hrs	
High Temperature Operation	Ta=+70 o C, 240hrs	
Low Temperature Operation	Ta=-20 o C, 240hrs	
High Temperature and High Humidity (Operating)	Ta=+60 o C, 90%RH, 240hrs	

Note: (1) All tests above are practiced at module type.

(2) There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

7-2 Shock and Vibration

ITEMS	CONDITIONS
Packing Shock (Non-Operation)	<ul style="list-style-type: none"> ● Shock level:980m/s² ● Waveform:1/2 Sine wave,6msec ● ±X, ±Y ±Z,each axis 1 times
Packing Vibration (Non-Operation)	<ul style="list-style-type: none"> ● Frequency range:8-33.3HZ ● Stoke:1.0mm ● Sweep: 10Hz-50Hz ● x,y,z 2 hours for each direction

7-3 Electrostatic Discharge

TEST ITEM	CONDITIONS
ESD (Non-operation)	150pF,330 Ω , Contact±4KV,Air :±8KV.Note 1
	200pF,0 Ω , ±200V Contact test.Note 2

Note:Measure Point:

- 1.LCD glass and metal bezel
- 2.IF connector pins

8. HANDLING & CAUTIONS

8-1 Caution For Operation

◆ Since the LCM is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass may be broken.

◆ It is indispensable to drive the LCM within the specified voltage limit since the higher voltage than the limit causes LCM's life shorter. An electro-chemical reaction due to DC causes undesirable deterioration of the LCM so that the use of DC drive should be avoided.

◆ Do not connect or disconnect the LCM to or from the system when power is on.

◆ Never use the LCM under abnormal conditions of high temperature and high humidity.

◆ When exposed to drastic fluctuation of temperature (hot to cold or cold to hot), the LCM may be affected; specifically, drastic temperature fluctuation from cold to hot, produces dew on the LCM's surface which may affect the operation of the polarizer on the LCM.

◆ Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand LCM may turn black at temperature above its operational range. However those phenomena do not mean malfunction or out of order with the LCM. The LCM will revert to normal operation once the temperature returns to the recommended temperature range for normal operation.

◆ Do not display the fixed pattern for a long time when using a normally black panel, as it may cause image sticking due to the LCM structure. If the screen is displayed in fixed mode, use a screen saver. It is recommended to display the fixed mode in less than 2 minutes or less.

◆ Do not disassemble and/or re-assemble LCM module

7-2 Caution Against Static Charge

◆ The LCM uses C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to V_{DD} or V_{SS}, do not input any signals before power is turned on, and ground your body, work/assembly area, assembly equipments to protect against static electricity.

◆ Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, if possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.

◆ Avoid the use of work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.

◆ In handling the LCM, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary

9. LCD display initialization code

```

Void Panel_initial_code(void)
{
//-----Reset sequence-----//
LCD_RESET=1;
Delay(1); //Delay 1ms
LCD_RESET=0;
Delay(10); //Delay 10ms
LCD_RESET=1;
Delay(120); //Delay 120ms
//-----//
//=====//
//===== Page 1 Command =====//
//=====//

SPI_WriteComm(0xFF);
SPI_WriteData(0xFF);
SPI_WriteData(0x98);S
PI_WriteData(0x06);
SPI_WriteData(0x04);
SPI_WriteData(0x01);    // Change to Page 1
Delay(50);
SPI_WriteComm(0x08);SPI_WriteData(0x1);SPI_WriteData(0x10);    // output SDA
Delay(50);
SPI_WriteComm(0x21);SPI_WriteData(0x1);SPI_WriteData(0x01);    // DE = 1 Active
Delay(50);
SPI_WriteComm(0x30);SPI_WriteData(0x1);SPI_WriteData(0x02);    // 480 X 800
Delay(50);
SPI_WriteComm(0x31);SPI_WriteData(0x1);SPI_WriteData(0x02);    // Column Inversion
Delay(50);
SPI_WriteComm(0x40);SPI_WriteData(0x1);SPI_WriteData(0x10);    // 2.5VCI/-2VCL  15
Delay(50);
SPI_WriteComm(0x41);SPI_WriteData(0x1);SPI_WriteData(0x33);    // 6/-6 44  55
Delay(50);
SPI_WriteComm(0x42);SPI_WriteData(0x1);SPI_WriteData(0x03);    //
Delay(50);
SPI_WriteComm(0x43);SPI_WriteData(0x1);SPI_WriteData(0x09);    // VGH_CLAMP OFF ;
Delay(50);
SPI_WriteComm(0x44);SPI_WriteData(0x1);SPI_WriteData(0x07);    // VGL_CLAMP ON ;
Delay(50);

```

```
SPI_WriteComm(0x50);SPI_WriteData(0x1);SPI_WriteData(0x78); //50
Delay(50);
SPI_WriteComm(0x51);SPI_WriteData(0x1);SPI_WriteData(0x78); //50
Delay(50);

SPI_WriteComm(0x52);SPI_WriteData(0x1);SPI_WriteData(0x00); //Flicker
Delay(50);
SPI_WriteComm(0x53);SPI_WriteData(0x1);SPI_WriteData(0x73); //Flicker6D
Delay(50);
SPI_WriteComm(0x57);SPI_WriteData(0x1);SPI_WriteData(0x50);
Delay(50);
SPI_WriteComm(0x60);SPI_WriteData(0x1);SPI_WriteData(0x07); // SDTI
Delay(50);
SPI_WriteComm(0x61);SPI_WriteData(0x1);SPI_WriteData(0x00); // CRTI
Delay(50);
SPI_WriteComm(0x62);SPI_WriteData(0x1);SPI_WriteData(0x08); // EQTI
Delay(50);
SPI_WriteComm(0x63);SPI_WriteData(0x1);SPI_WriteData(0x00); // PCTI
Delay(50);
//+++++ Gamma Setting ++++++//

SPI_WriteComm(0xA0);SPI_WriteData(0x1);SPI_WriteData(0x00); // Gamma 255
Delay(50);
SPI_WriteComm(0xA1);SPI_WriteData(0x1);SPI_WriteData(0x07); // Gamma 251
Delay(50);
SPI_WriteComm(0xA2);SPI_WriteData(0x1);SPI_WriteData(0x0d); // Gamma 247
Delay(50);
SPI_WriteComm(0xA3);SPI_WriteData(0x1);SPI_WriteData(0x0c); // Gamma 239
Delay(50);
SPI_WriteComm(0xA4);SPI_WriteData(0x1);SPI_WriteData(0x04); // Gamma 231
Delay(50);
SPI_WriteComm(0xA5);SPI_WriteData(0x1);SPI_WriteData(0x07); // Gamma 203
Delay(50);
SPI_WriteComm(0xA6);SPI_WriteData(0x1);SPI_WriteData(0x06); // Gamma 175
Delay(50);
SPI_WriteComm(0xA7);SPI_WriteData(0x1);SPI_WriteData(0x04); // Gamma 147
Delay(50);
SPI_WriteComm(0xA8);SPI_WriteData(0x1);SPI_WriteData(0x09); // Gamma 108
Delay(50);
```

```
SPI_WriteComm(0xA9);SPI_WriteData(0x1);SPI_WriteData(0x0C); // Gamma 80
Delay(50);
SPI_WriteComm(0xAA);SPI_WriteData(0x1);SPI_WriteData(0x14); // Gamma 52
Delay(50);
SPI_WriteComm(0xAB);SPI_WriteData(0x1);SPI_WriteData(0x08); // Gamma 24
Delay(50);
SPI_WriteComm(0xAC);SPI_WriteData(0x1);SPI_WriteData(0x0e); // Gamma 16
Delay(50);
SPI_WriteComm(0xAD);SPI_WriteData(0x1);SPI_WriteData(0x17); // Gamma 8
Delay(50);
SPI_WriteComm(0xAE);SPI_WriteData(0x1);SPI_WriteData(0x0e); // Gamma 4
Delay(50);
SPI_WriteComm(0xAF);SPI_WriteData(0x1);SPI_WriteData(0x00); // Gamma 0
Delay(50);
///=====Nagitive
SPI_WriteComm(0xC0);SPI_WriteData(0x1);SPI_WriteData(0x00); // Gamma 255
Delay(50);
SPI_WriteComm(0xC1);SPI_WriteData(0x1);SPI_WriteData(0x06); // Gamma 251
Delay(50);
SPI_WriteComm(0xC2);SPI_WriteData(0x1);SPI_WriteData(0x0C); // Gamma 247
Delay(50);
SPI_WriteComm(0xC3);SPI_WriteData(0x1);SPI_WriteData(0x0c); // Gamma 239
Delay(50);
SPI_WriteComm(0xC4);SPI_WriteData(0x1);SPI_WriteData(0x04); // Gamma 231
Delay(50);
SPI_WriteComm(0xC5);SPI_WriteData(0x1);SPI_WriteData(0x07); // Gamma 203
Delay(50);
SPI_WriteComm(0xC6);SPI_WriteData(0x1);SPI_WriteData(0x06); // Gamma 175
Delay(50);
SPI_WriteComm(0xC7);SPI_WriteData(0x1);SPI_WriteData(0x04); // Gamma 147
Delay(50);
SPI_WriteComm(0xC8);SPI_WriteData(0x1);SPI_WriteData(0x08); // Gamma 108
Delay(50);
SPI_WriteComm(0xC9);SPI_WriteData(0x1);SPI_WriteData(0x0C); // Gamma 80
Delay(50);
SPI_WriteComm(0xCA);SPI_WriteData(0x1);SPI_WriteData(0x13); // Gamma 52
Delay(50);
SPI_WriteComm(0xCB);SPI_WriteData(0x1);SPI_WriteData(0x08); // Gamma 24
Delay(50);
SPI_WriteComm(0xCC);SPI_WriteData(0x1);SPI_WriteData(0x0e); // Gamma 16
```

```
Delay(50);
SPI_WriteComm(0xCD);SPI_WriteData(0x1);SPI_WriteData(0x18); // Gamma 8
Delay(50);
SPI_WriteComm(0xCE);SPI_WriteData(0x1);SPI_WriteData(0x0e); // Gamma 4
Delay(50);
SPI_WriteComm(0xCF);SPI_WriteData(0x1);SPI_WriteData(0x00); // Gamma 0
Delay(50);
```

```
//=====//
```

```
//===== Page 6 Command =====//
```

```
//=====//
```

```
SPI_WriteComm(0xFF);
SPI_WriteData(0xFF);
SPI_WriteData(0x98);
SPI_WriteData(0x06);
SPI_WriteData(0x04);
SPI_WriteData(0x06); // Change to Page 6
Delay(50);
SPI_WriteComm(0x00);SPI_WriteData(0x1);SPI_WriteData(0x21);
Delay(50);
SPI_WriteComm(0x01);SPI_WriteData(0x1);SPI_WriteData(0x0A);
Delay(50);
SPI_WriteComm(0x02);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x03);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x04);SPI_WriteData(0x1);SPI_WriteData(0x01);
Delay(50);
SPI_WriteComm(0x05);SPI_WriteData(0x1);SPI_WriteData(0x01);
Delay(50);
SPI_WriteComm(0x06);SPI_WriteData(0x1);SPI_WriteData(0x80);
Delay(50);
SPI_WriteComm(0x07);SPI_WriteData(0x1);SPI_WriteData(0x06);
Delay(50);
SPI_WriteComm(0x08);SPI_WriteData(0x1);SPI_WriteData(0x01);
Delay(50);
SPI_WriteComm(0x09);SPI_WriteData(0x1);SPI_WriteData(0x80);
Delay(50);
SPI_WriteComm(0x0A);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
```



```
SPI_WriteComm(0x0B);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x0C);SPI_WriteData(0x1);SPI_WriteData(0x0A);
Delay(50);
SPI_WriteComm(0x0D);SPI_WriteData(0x1);SPI_WriteData(0x0A);
Delay(50);
SPI_WriteComm(0x0E);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x0F);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x10);SPI_WriteData(0x1);SPI_WriteData(0xF0);
Delay(50);
SPI_WriteComm(0x11);SPI_WriteData(0x1);SPI_WriteData(0xF4);
Delay(50);
SPI_WriteComm(0x12);SPI_WriteData(0x1);SPI_WriteData(0x04);
Delay(50);
SPI_WriteComm(0x13);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x14);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x15);SPI_WriteData(0x1);SPI_WriteData(0xC0);
Delay(50);
SPI_WriteComm(0x16);SPI_WriteData(0x1);SPI_WriteData(0x08);
Delay(50);
SPI_WriteComm(0x17);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x18);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x19);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x1A);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x1B);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x1C);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);
SPI_WriteComm(0x1D);SPI_WriteData(0x1);SPI_WriteData(0x00);
Delay(50);

SPI_WriteComm(0x20);SPI_WriteData(0x1);SPI_WriteData(0x01);
```

```

Delay(50);
SPI_WriteComm(0x21);SPI_WriteData(0x1);SPI_WriteData(0x23);
Delay(50);
SPI_WriteComm(0x22);SPI_WriteData(0x1);SPI_WriteData(0x45);
Delay(50);
SPI_WriteComm(0x23);SPI_WriteData(0x1);SPI_WriteData(0x67);
Delay(50);
SPI_WriteComm(0x24);SPI_WriteData(0x1);SPI_WriteData(0x01);
Delay(50);
SPI_WriteComm(0x25);SPI_WriteData(0x1);SPI_WriteData(0x23);
Delay(50);
SPI_WriteComm(0x26);SPI_WriteData(0x1);SPI_WriteData(0x45);
Delay(50);
SPI_WriteComm(0x27);SPI_WriteData(0x1);SPI_WriteData(0x67);
Delay(50);

SPI_WriteComm(0x30);SPI_WriteData(0x1);SPI_WriteData(0x01);
Delay(50);
SPI_WriteComm(0x31);SPI_WriteData(0x1);SPI_WriteData(0x11); //GOUT1
Delay(50);
SPI_WriteComm(0x32);SPI_WriteData(0x1);SPI_WriteData(0x00); //GOUT2
Delay(50);
SPI_WriteComm(0x33);SPI_WriteData(0x1);SPI_WriteData(0xEE); //GOUT3
Delay(50);
SPI_WriteComm(0x34);SPI_WriteData(0x1);SPI_WriteData(0xFF); //GOUT4
Delay(50);
SPI_WriteComm(0x35);SPI_WriteData(0x1);SPI_WriteData(0xCB); //GOUT5 GCK4
Delay(50);
SPI_WriteComm(0x36);SPI_WriteData(0x1);SPI_WriteData(0xDA); //GOUT6 GCK3
Delay(50);
SPI_WriteComm(0x37);SPI_WriteData(0x1);SPI_WriteData(0xAD); //GOUT7 GCK2
Delay(50);
SPI_WriteComm(0x38);SPI_WriteData(0x1);SPI_WriteData(0xBC); //GOUT8 GCK1
Delay(50);
SPI_WriteComm(0x39);SPI_WriteData(0x1);SPI_WriteData(0x76); //GOUT9 STV1
Delay(50);
SPI_WriteComm(0x3A);SPI_WriteData(0x1);SPI_WriteData(0x67); //GOUT10 STV2
Delay(50);
SPI_WriteComm(0x3B);SPI_WriteData(0x1);SPI_WriteData(0x22); //GOUT11
Delay(50);

```

```

SPI_WriteComm(0x3C);SPI_WriteData(0x1);SPI_WriteData(0x22); //GOUT12
Delay(50);
SPI_WriteComm(0x3D);SPI_WriteData(0x1);SPI_WriteData(0x22); //GOUT13
Delay(50);
SPI_WriteComm(0x3E);SPI_WriteData(0x1);SPI_WriteData(0x22); //GOUT14
Delay(50);
SPI_WriteComm(0x3F);SPI_WriteData(0x1);SPI_WriteData(0x22);
Delay(50);
SPI_WriteComm(0x40);SPI_WriteData(0x1);SPI_WriteData(0x22);
Delay(50);

```

```

SPI_WriteComm(0x52);SPI_WriteData(0x1);SPI_WriteData(0x10);
Delay(50);
SPI_WriteComm(0x53);SPI_WriteData(0x1);SPI_WriteData(0x10);
Delay(50);
SPI_WriteComm(0x54);SPI_WriteData(0x1);SPI_WriteData(0x13);
Delay(50);

```

```

//=====//
//===== Page 7 Command =====//
//=====//

```

```

SPI_WriteComm(0xFF);
SPI_WriteData(0xFF);
SPI_WriteData(0x98);
SPI_WriteData(0x06);
SPI_WriteData(0x04);
SPI_WriteData(0x07); // Change to Page 7
Delay(50);
SPI_WriteComm(0xB3);SPI_WriteData(0x1);SPI_WriteData(0x10);
Delay(50);
SPI_WriteComm(0x17);SPI_WriteData(0x1);SPI_WriteData(0x22);
Delay(50);
SPI_WriteComm(0x02);SPI_WriteData(0x1);SPI_WriteData(0x77);
Delay(50);
SPI_WriteComm(0x26);SPI_WriteData(0x1);SPI_WriteData(0xB2);
Delay(50);
SPI_WriteComm(0xE1);SPI_WriteData(0x1);SPI_WriteData(0x79);
Delay(50);
//=====//

```

```

SPI_WriteComm(0xFF);

```

```
SPI_WriteData(0xFF);  
SPI_WriteData(0x98);  
SPI_WriteData(0x06);  
SPI_WriteData(0x04);  
SPI_WriteData(0x00);    // Change to Page 0  
Delay(50);  
SPI_WriteComm(0x35);SPI_WriteData(0x00);  
Delay(50);  
SPI_WriteComm(0x11);SPI_WriteData(0x00);    // Sleep-Out  
Delay(120);  
SPI_WriteComm(0x29);SPI_WriteData(0x00);    // Display on  
Delay(50);  
}
```

```
Void Sleep in (void)
{
SPI_WriteComm(0xFF);
SPI_WriteData(0xFF);
SPI_WriteData(0x98);
SPI_WriteData(0x06);
SPI_WriteData(0x04);
SPI_WriteData(0x00);      // Change to Page 0
Delay(50);
SPI_WriteComm(0x28);SPI_WriteData(0x00);      // Display Off
Delay(50);
SPI_WriteComm(0x10);SPI_WriteData(0x00);      // Sleep-In
Delay(120);
}
```

```
Void Sleep out (void)
{
SPI_WriteComm(0xFF);
SPI_WriteData(0xFF);
SPI_WriteData(0x98);
SPI_WriteData(0x06);
SPI_WriteData(0x04);
SPI_WriteData(0x00);      // Change to Page 0
Delay(50);

SPI_WriteComm(0x11);SPI_WriteData(0x00);      // Sleep-Out
Delay(120);
SPI_WriteComm(0x29);SPI_WriteData(0x00);      // Display on
Delay(50);
}
```

--END--