MODEL NO. :   TM020HBH03

ISSUED DATE: 2010-10-16

VERSION :   Ver 2.0

☐**Preliminary Specification**
■**Final Product Specification**

Customer : _____

Approved by	Notes

SHANGHAI TIANMA Confirmed :

Prepared by	Checked by	Approved by
陈红明 10-19 10'		程梅 2010.10.19

This technical specification is subjected to change without notice

Table of Contents

Record of Revision

Rev	Issued Date	Description	Editor
1.0	2010-08-29	Preliminary Specification Release	Hongming Chen
2.0	2010-10-16	Final Specification Release	Hongming Chen

1 General Specifications

Feature		Spec
Display Spec.	Size	2.0 inch
	Resolution	240(RGB) x 320
	Interface	CPU 8/16bits, 4-Wire SPI
	Color Depth	65/262K
	Technology Type	a-Si
	Pixel Pitch (mm)	0.126x0.126
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	TM with Normally White
	Surface Treatment(Up Polarizer)	Clear Type
	Viewing Direction	9 o'clock
	Gray Scale Inversion Direction	3 o'clock
Mechanical Characteristics	LCM (W x H x D) (mm)	35.60x48.20x3.75
	Active Area(mm)	30.24x40.32
	With/Without TSP	WithTSP
	Weight (g)	10.03
	LED Numbers	2 LEDs (parallel)
Electronic	Driver IC	HX8367-A

Note 1: Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.

Note 2 : Requirements on Environmental Protection: Q/S0002

Note 3 : LCM weight tolerance : +/- 5%

2 Input/Output Terminals

2.1 TFT LCD Panel

No	Symbol	I/O	Description	Comment
1	IM0	I	Mode Select	Note 1
2	LED-A	P	LED Anode	
3	LED-K1	P	LED Cathode	
4	LED-K2	P	LED Cathode	
5	IOVCC	P	Power Supply of I/O Interface	
6	X-	O	TP Pin	
7	Y-	O	TP Pin	
8	X+	O	TP Pin	
9	Y+	O	TP Pin	
10	IM2	I	Mode Select	Note 1
11	ID	O	Connected to Test pad ID_0.5V	
12	/RESET	I	RESET Signal	
13	DB15	I/O	Data Bus	
14	DB14	I/O	Data Bus	
15	DB13	I/O	Data Bus	
16	DB12	I/O	Data Bus	
17	DB11	I/O	Data Bus	
18	DB10	I/O	Data Bus	
19	DB09	I/O	Data Bus	
20	DB08	I/O	Data Bus	
21	DB07	I/O	Data Bus	
22	DB06	I/O	Data Bus	
23	DB05	I/O	Data Bus	
24	DB04	I/O	Data Bus	
25	DB03	I/O	Data Bus	
26	DB02	I/O	Data Bus	
27	DB01	I/O	Data Bus	
28	DB00	I/O	Data Bus	
29	/RD	I	If not used ,connect to VCC	
30	/WR/SCL	I	I80 Parallel：WR 4-Wire Serial: SCL	
31	RS	I	I80 Parallel and 4-Wire Serial: Command /Parament or Display data selection Pin	
32	/CS	I	Chip select signal	
33	VCC	P	Analog Supply	
34	SDI	I	SDI ,if not used, connect to GND	
35	GND	P	GND	
36	TE	O	Fmark signal, connect to test pad TE	

Note2-1:   I/O definition:I-----Input   O---Output   P----Power/Ground

Note 2-2: Interface mode selection pin

IM02	IM0	Interface	DB pin	comment
0	0	I80-parallel 16bit interface	DB15~DB0	Unused DB pins must be fixed to GND level
0	1	I80-parallel 8bit interface	DB15~DB8	Unused DB pins must be fixed to GND level
1	--	4-Wire SPI	SDI	-

Note 2-3: Unused DB pin must fixed to GND level

3 Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V,Ta = 25℃

Item	Symbol	Min	Max	Unit	Remark
Logic Supply Voltage	IOVCC	-0.3	4.6	V	
Analog Supply Voltage	VCC	-0.3	4.6	V	
Input Voltage	/CS,/RD,/WR/SCL,RS, /RESET,IM0,IM2,DB00~15	-0.3	IOVCC +0.5	V	
Back Light Forward Current	I_{LED}	--	25	mA	For each LED
Touch panel operating voltage	X+,Y+,X-,Y-	--	7	V	
Operating Temperature	T_{OPR}	-20	60	℃	
Storage Temperature	T_{STG}	-30	70	℃	

4   Electrical Characteristics

4.1   Driving TFT LCD Panel

GND=0V, Ta=25℃

Item		Symbol	Min	Typ	Max	Unit	Remark
Logic Supply Voltage		IOVCC	1.6	1.8/2.8	3.3	V	
Analog Supply Voltage		VCC	2.5	2.8	3.3	V	
Input Signal Voltage	Low Level	V_{IL}	--		0.2xIOVCC	V	/CS,/RD,/WR,RS,/RESET,IM0,IM2,DB00~15
	High Level	V_{IH}	0.8xIOVCC		IOVCC	V	
Output Signal Voltage	Low Level	V_{OL}	--		0.2xIOVCC	V	
	High Level	V_{OH}	0.8xIOVCC			V	
(Panel+ LSI) Power Consumption	Black Mode (60Hz)		--	13.902		mW	
	Standby Mode		--	0.0532	--	mW	
	Sleeping Mode		--	--	--	mW	

4.2   Driving Backlight

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	--	20	--	mA	
Forward Current Voltage	V_F	--	3.2	--	V	
Backlight Power Consumption	W_{BL}	--	128	--	mW	
Operating Life Time	-	10000	(20000)	-	Hrs	For each LED

Note 1: The figure below shows the connection of backlight LED.
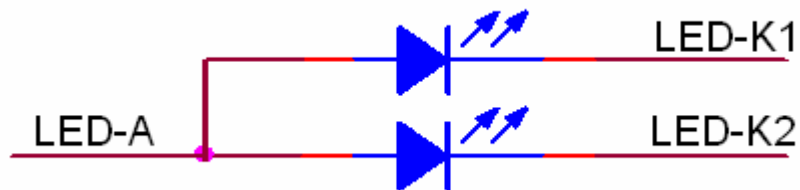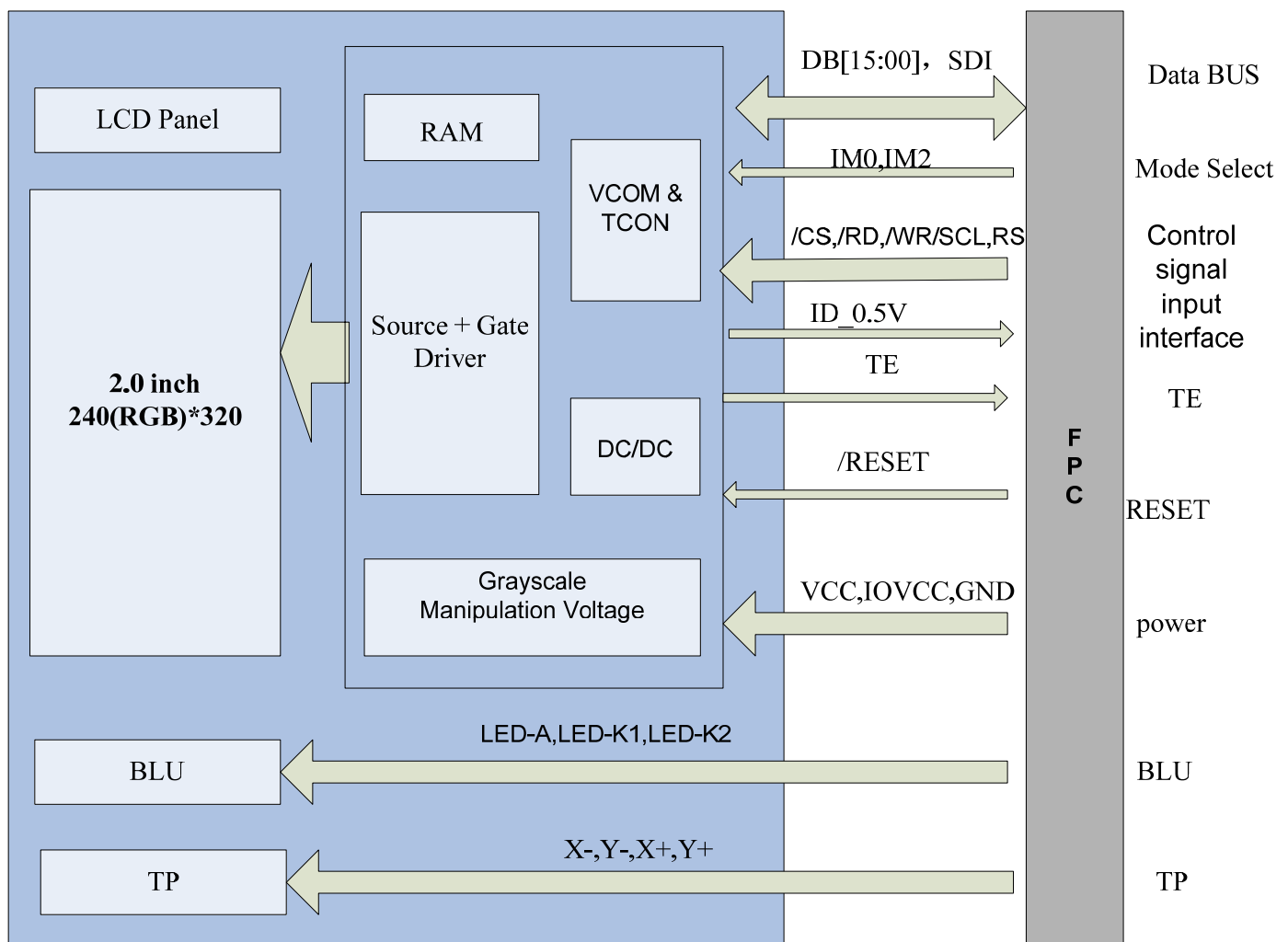

Note 2: One LED: I_F =20mA, V_F =3.2V

Note 3: : I_F is defined for one channel LED.

Optical performance should be evaluated at Ta=25℃ only.

If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

4.3 Block Diagram

LCD Panel	RAM		DB[15:00]，SDI	Data BUS

2.0 inch
240(RGB)*320

VCOM & TCON

Source + Gate Driver

DC/DC

Grayscale Manipulation Voltage

BLU

TP

IM0,IM2 — Mode Select

/CS,/RD,/WR/SCL,RS — Control signal input interface

ID_0.5V

TE — TE

/RESET — RESET

VCC,IOVCC,GND — power

LED-A,LED-K1,LED-K2 — BLU

X-,Y-,X+,Y+ — TP

F P C

5   Timing Chart

Normal Write Mode

5.1.1 CPU Interface
Ta=25℃

(VSSA=0V, IOVCC=1.65V to 3.3V, VCC=2.5V to 3.3V, T$_A$=-30 to 70°C)

Signal	Symbol	Parameter	Spec. Min.	Spec. Typ.	Spec. Max.	Unit	Description
RS	t$_{AST}$	Address setup time	0	-	-	ns	-
	t$_{AHT}$	Address hold time (Write/Read)	10	-	-		
/CS	t$_{CHW}$	Chip select "H" pulse width	0	-	-	ns	-
	t$_{CS}$	Chip select setup time (Write)	15	-	-		
	t$_{RCS}$	Chip select setup time (Read ID)	45	-	-		
	t$_{RCSFM}$	Chip select setup time (Read FM)	355	-	-		
	t$_{CSF}$	Chip select wait time (Write/Read)	10	-	-		
	t$_{CSH}$	Chip select hold time	10	-	-		
/WR/SCL	t$_{WC}$	Write cycle	66	-	-	ns	-
	t$_{WRH}$	Control pulse "H" duration	15	-	-		
	t$_{WRL}$	Control pulse "L" duration	15	-	-		
/RD(ID)	t$_{RC}$	Read cycle (ID)	160	-	-	ns	When read ID data
	t$_{RDH}$	Control pulse "H" duration (ID)	90	-	-		
	t$_{RDL}$	Control pulse "L" duration (ID)	45	-	-		
/RD(FM)	t$_{RCFM}$	Read cycle (FM)	450	-	-	ns	When read from frame memory
	t$_{RDHFM}$	Control pulse "H" duration (FM)	90	-	-		
	t$_{RDLFM}$	Control pulse "L" duration (FM)	355	-	-		
DB[15:00]	t$_{DST}$	Data setup time	10	-	-	ns	For maximum C$_L$=30pF For minimum C$_L$=8pF
	t$_{DHT}$	Data hold time	10	-	-		
	t$_{RAT}$	Read access time (ID)	-	-	80		
	t$_{RATFM}$	Read access time (FM)	-	-	340		
	t$_{ODH}$	Output disable time	20	-	80		

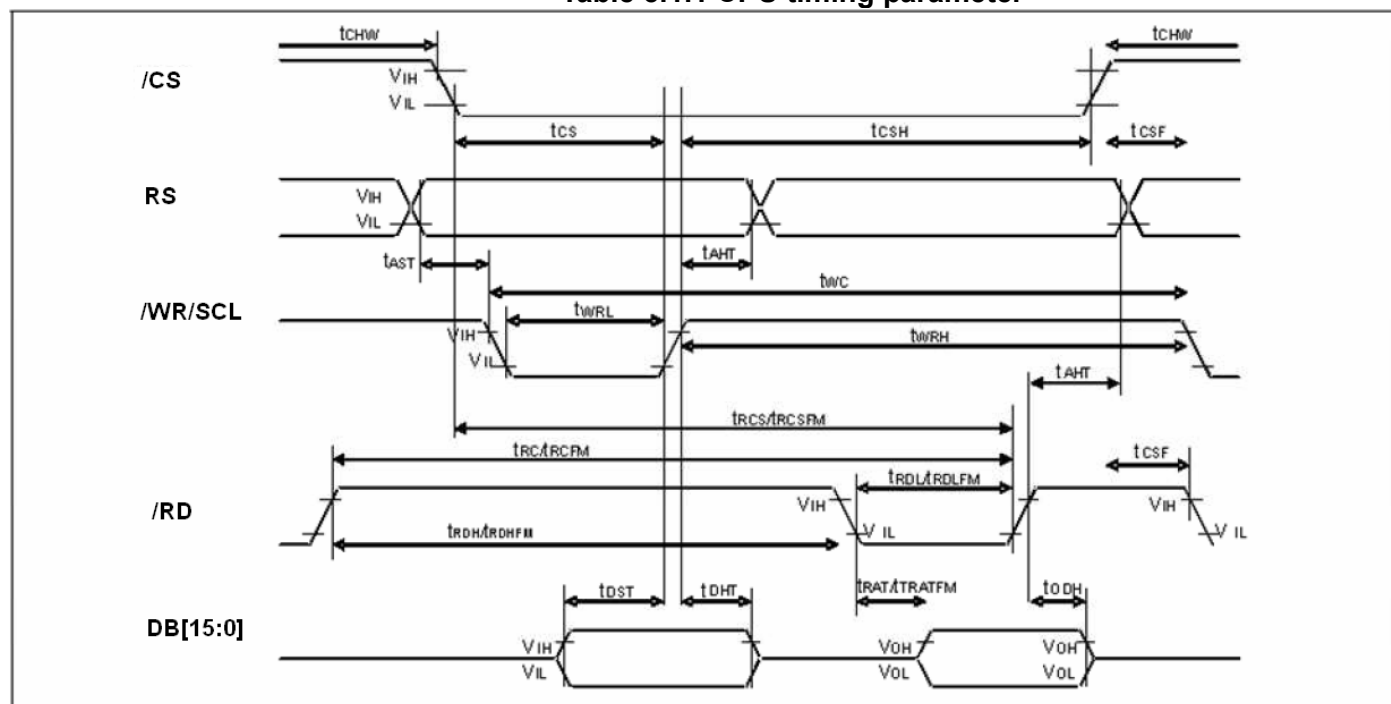**Table 5.1.1 CPU timing parameter**

Figure 5.1.1 I80 System Bus Timing

5.1.2 SPI Interface

(VSSA=0V, IOVCC=1.65V to 3.3V, VCC=2.5V to 3.3V, T_A=-30 to 70° C

Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max.	
Serial clock cycle (Write)	t_{SCYCW}	SCL	66	-	-	ns
SCL "H" pulse width (Write)	t_{SHW}		15	-	-	
SCL "L" pulse width (Write)	t_{SLW}		15	-	-	
Data setup time (Write)	t_{SDS}	SDI	10	-	-	ns
Data hold time (Write)	t_{SDH}		10	-	-	
Serial clock cycle (Read)	t_{SCYCR}	SCL	150	-	-	ns
SCL "H" pulse width (Read)	t_{SHR}		60	-	-	
SCL "L" pulse width (Read)	t_{SLR}		60	-	-	
Access Time	t_{ACC}	SDI for maximum C_L=30pF For minimum C_L=8pF	10	-	70	ns
Output disable time	t_{OH}	SDO For maximum C_L=30pF For minimum C_L=8pF	15	-	50	ns
SCL to Chip select	t_{SCC}	SCL, /CS	15	-	-	ns
/CS "H" pulse width	t_{CHW}	/CS	40	-	-	ns
Chip select setup time	t_{CSS}	/CS	60	-	-	ns
Chip select hold time	t_{CSH}		65	-	-	

Note: The input signal rise time and fall time (tr, tf) is specified at 15 ns or less.
Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.
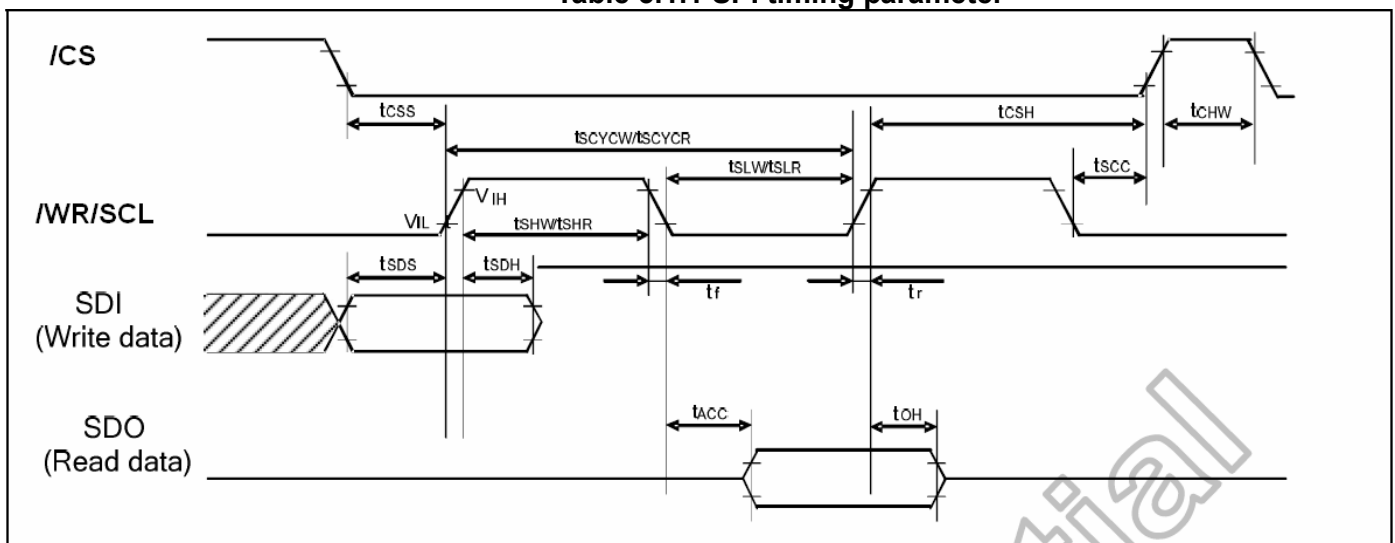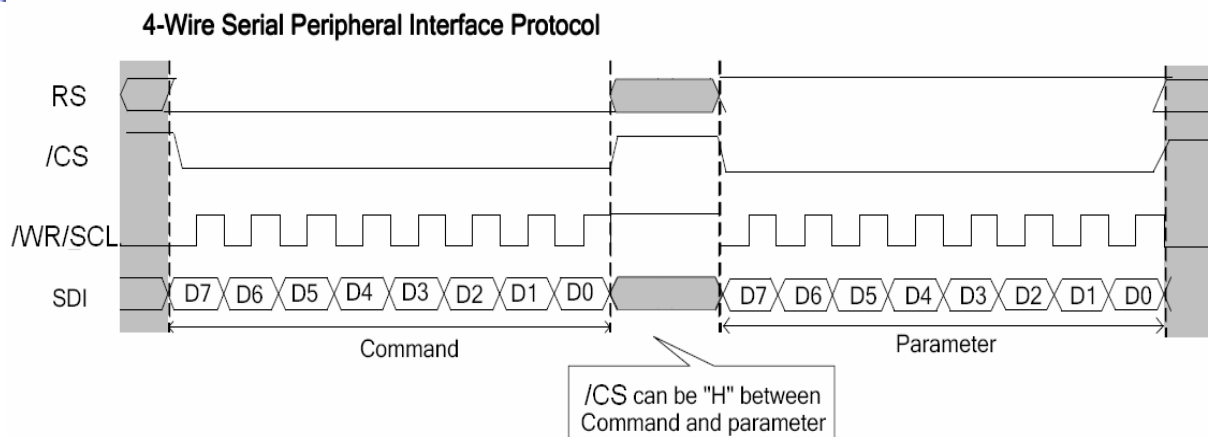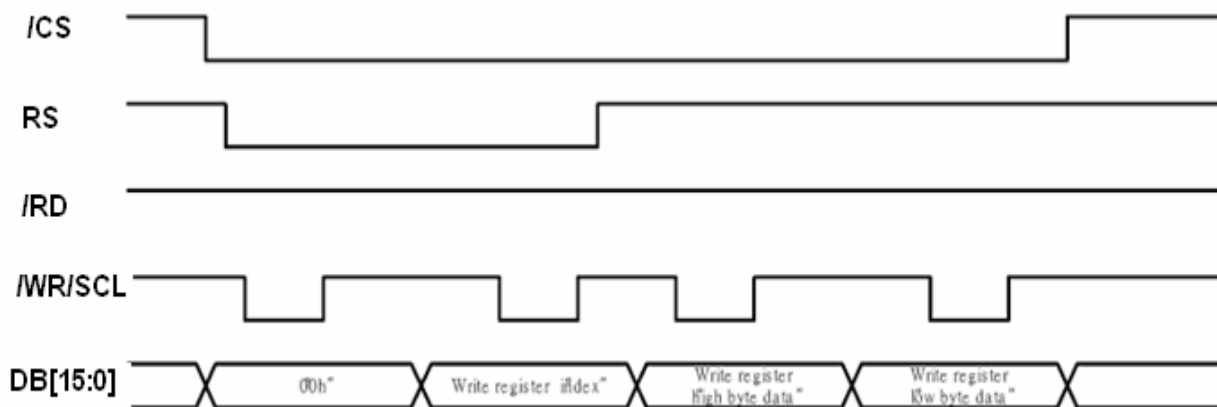
Table 5.1.1 SPI timing parameter

Figure 5.1.2 4-WireSPI System Bus Timing

4-Wire Serial Peripheral Interface Protocol

Figure 5.1.3 Index Register Write Timing in 4-WireSPI System

5.2 Register Write/Read Timing In I80 8/16bit System

5.2.1 I80 16-bit System Bus Interface Timing

a. Write to register

Figure 5.2.1.1 I80 16-bit System Bus Interface Write Timing

b. Read from register

Figure 5.2.1.2 I80 16-bit System Bus Interface Read Timing

5.2.2 I80 8-bit System Bus Interface Timing

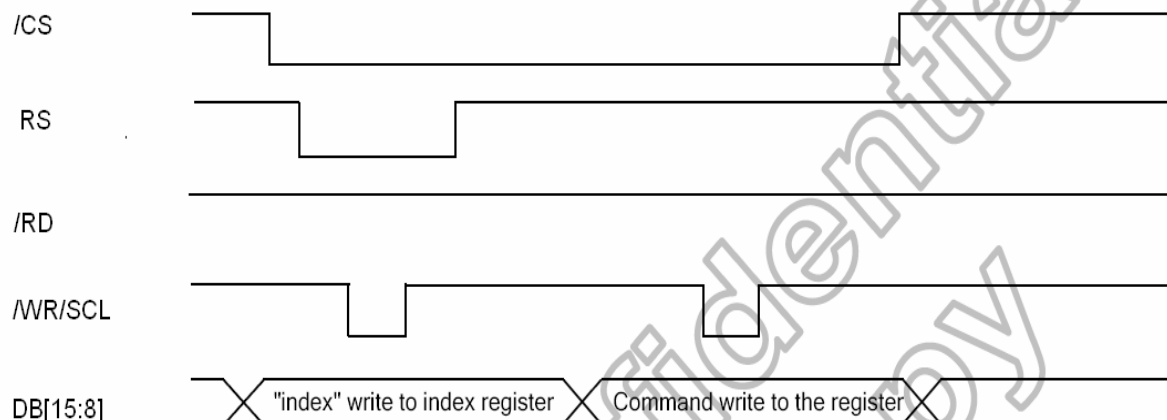a. **Write to register**

Write to the register

Figure 5.2.2.1 I80 8-bit System Bus Interface Write Timing
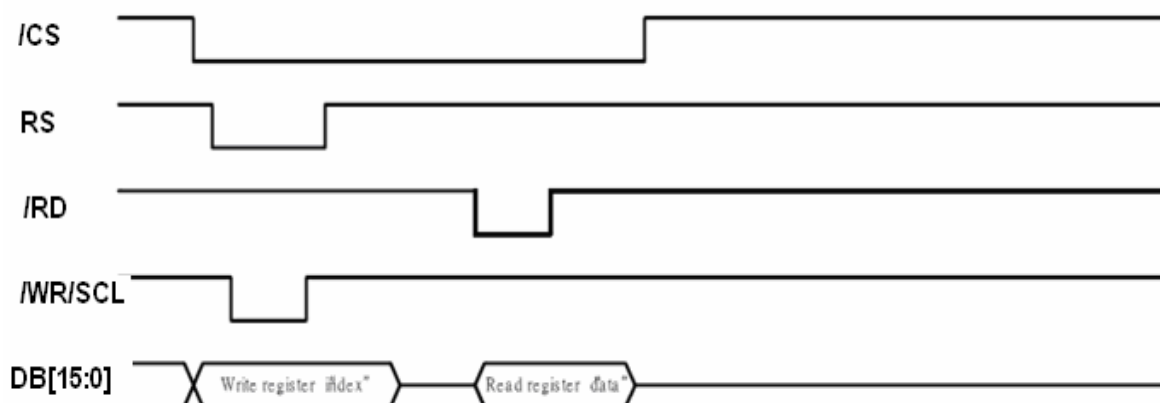
b. **Read from register**

Figure 5.2.2.2 I80 8-bit System Bus Interface Read Timing

5.3 System GRAM Data Format

5.3.1 I80 16-bit System GRAM Data Format

- Parallel 16-bit bus interface typeII (IM3,IM2,IM1,IM0="0010")

Register Command	DB17	DB16	DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Command
Command									x	0	0	1	0	0	0	1	0	x	22H
17H	DB17	DB16	DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Color
03h	x	x	x	x	R3	R2	R1	R0	x	G3	G2	G1	G0	B3	B2	B1	B0	x	4K-Color
05h	R4	R3	R2	R1	R0	G5	G4	G3	x	G2	G1	G0	B4	B3	B2	B1	B0	x	65K-Color
06h	R5	R4	R3	R2	R1	R0	x	x	x	G5	G4	G3	G2	G1	G0	x	x	x	262K-Color (2-pixel/ 3bytes)
	B5	B4	B3	B2	B1	B0	x	x	x	R5	R4	R3	R2	R1	R0	x	x	x	
	G5	G4	G3	G2	G1	G0	x	x	x	B5	B4	B3	B2	B1	B0	x	x	x	
07h	R5	R4	R3	R2	R1	R0	G5	G4	x	G3	G2	G1	G0	B5	B4	B3	B2	x	262K-Color (16+2)
	B1	B0	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
04h	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	R5	R4	x	262K-Color (2+16)
	R3	R2	R1	R0	G5	G4	G3	G2	x	G1	G0	B5	B4	B3	B2	B1	B0	x	

Figure 5.3.1 I80 16-bit System GRAM Data Format

5.3.2 I80 8-bit System GRAM Data Format

- Parallel 8-bit bus interface typeII (IM3,IM2,IM1,IM0="0011")

Register Command	DB17	DB16	DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Command
Command	0	0	1	0	0	0	1	0	x	x	x	x	x	x	x	x	x	x	22H
17H	DB17	DB16	DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Color
03h	R3	R2	R1	R0	G3	G2	G1	G0	x	x	x	x	x	x	x	x	x	x	4K-Color (2-pixel/ 3-byte)
	B3	B2	B1	B0	R3	R2	R1	R0	x	x	x	x	x	x	x	x	x	x	
	G3	G2	G1	G0	B3	B2	B1	B0	x	x	x	x	x	x	x	x	x	x	
05h	R4	R3	R2	R1	R0	G5	G4	G3	x	x	x	x	x	x	x	x	x	x	65K-Color (1-pixel/ 2-byte)
	G2	G1	G0	B4	B3	B2	B1	B0	x	x	x	x	x	x	x	x	x	x	
06h	R5	R4	R3	R2	R1	R0	x	x	x	x	x	x	x	x	x	x	x	x	262K-Color (6+6+6)
	G5	G4	G3	G2	G1	G0	x	x	x	x	x	x	x	x	x	x	x	x	
	B5	B4	B3	B2	B1	B0	x	x	x	x	x	x	x	x	x	x	x	x	
07h	x	x	x	x	x	x	R5	R4	x	x	x	x	x	x	x	x	x	x	262K-Color (2+8+8)
	R3	R2	R1	R0	G5	G4	G3	G2	x	x	x	x	x	x	x	x	x	x	
	G1	G0	B5	B4	B3	B2	B1	B0	x	x	x	x	x	x	x	x	x	x	

Figure 5.3.2 I80 8-bit System GRAM Data Format

5.3.3 4-Wire SPI GRAM Data Format

16-bit Data Transfer Timing Format in 4-wire Serial Bus Interface for GRAM write (Index 17h= 05)
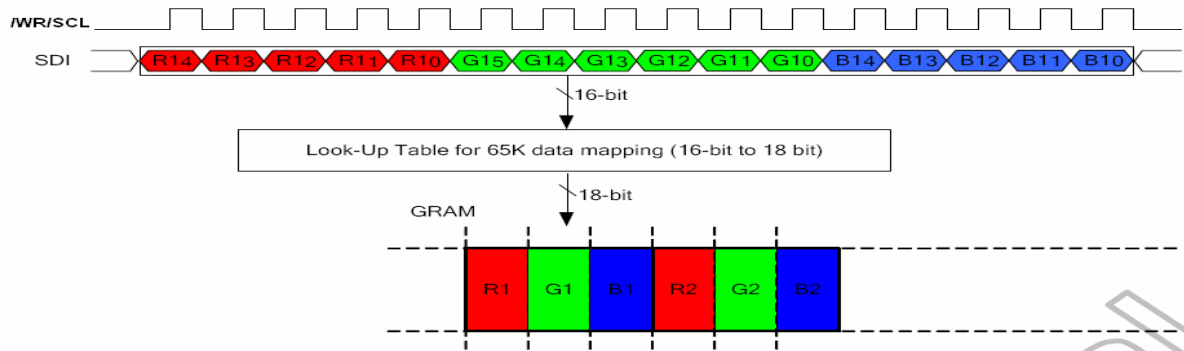

Figure 5.3.3 4-Wire SPI GRAM Data Format

5.4 GRAM Write Timing In I80 8/16bit System

5.4.1 I80 16-bit System Bus Interface Timing
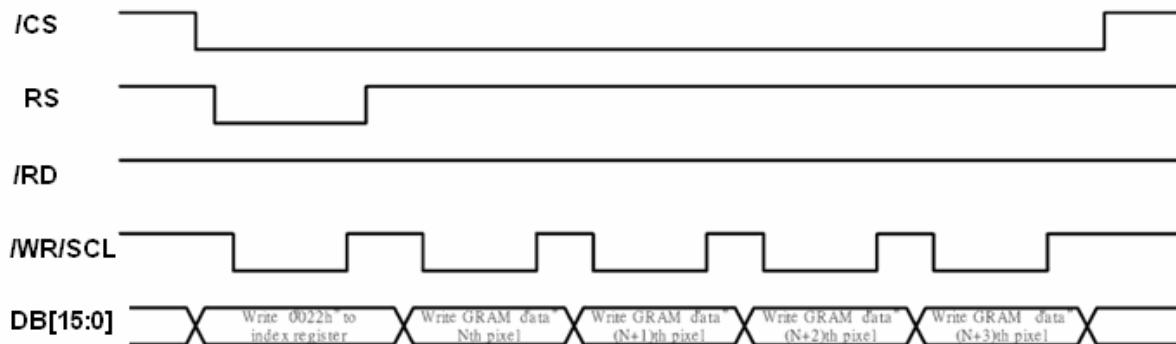
a. Write to GRAM

Figure 5.4.1.1 I80 16-bit System Bus Interface GRAM Write timing
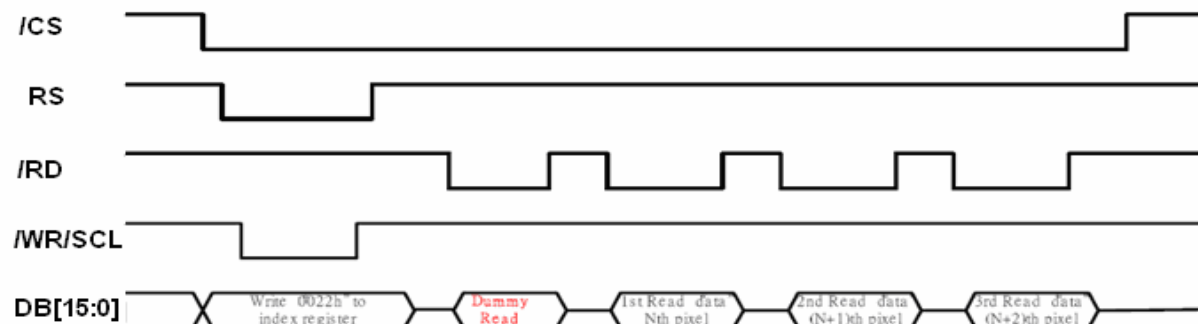
b. Read from GRAM

Figure 5.4.1.2 I80 16-bit System Bus Interface GRAM Read timing

5.4.2 I80 8-bit System Bus Interface Timing
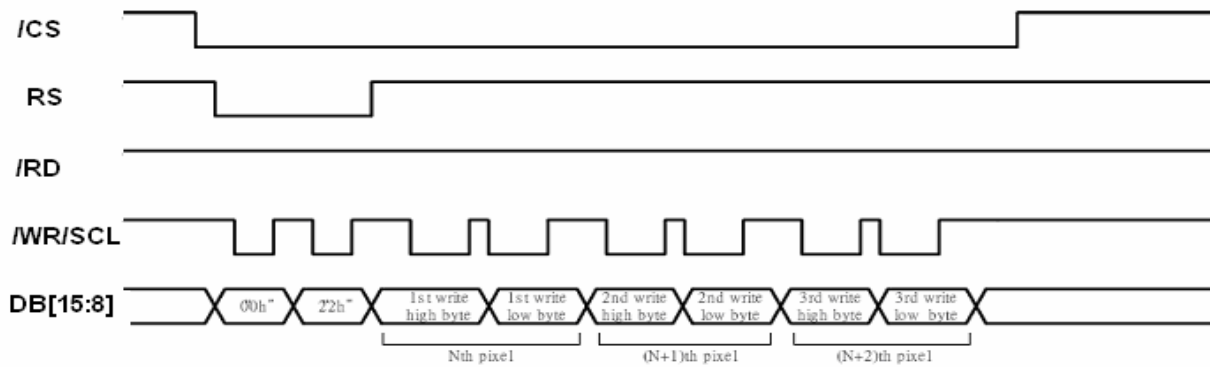
a. Write to GRAM

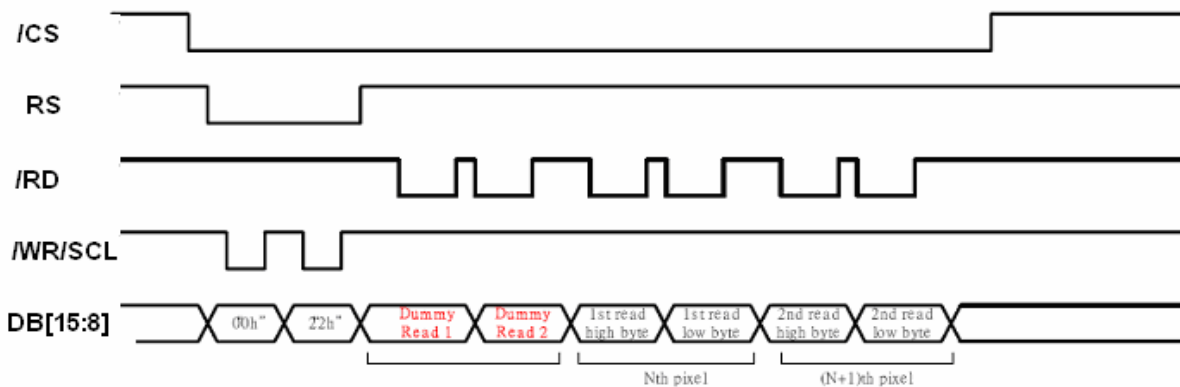**Figure 5.4.2.1 I80 8-bit System Bus Interface GRAM Write timing**

b. Read from GRAM

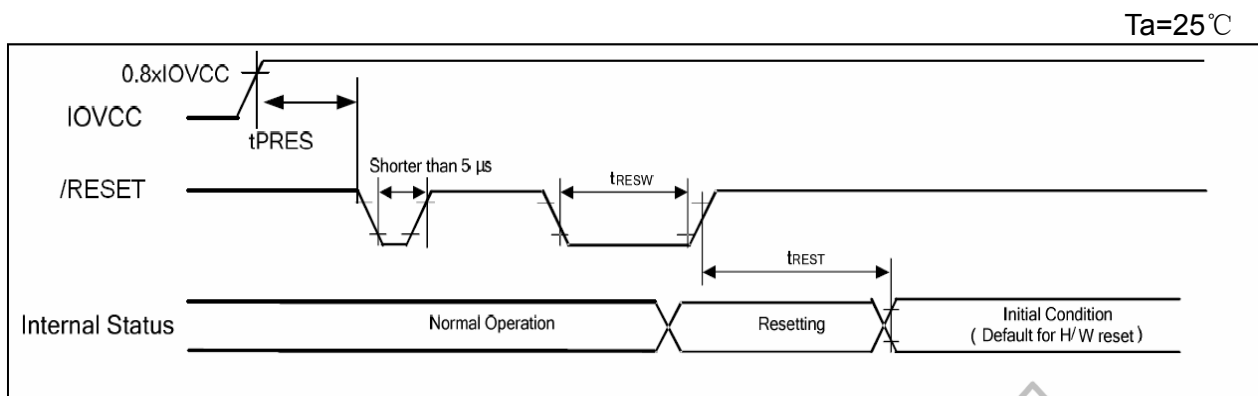**Figure 5.4.2.2 I80 8-bit System Bus Interface GRAM Read timing**

5.5 Reset Timing Characteristics

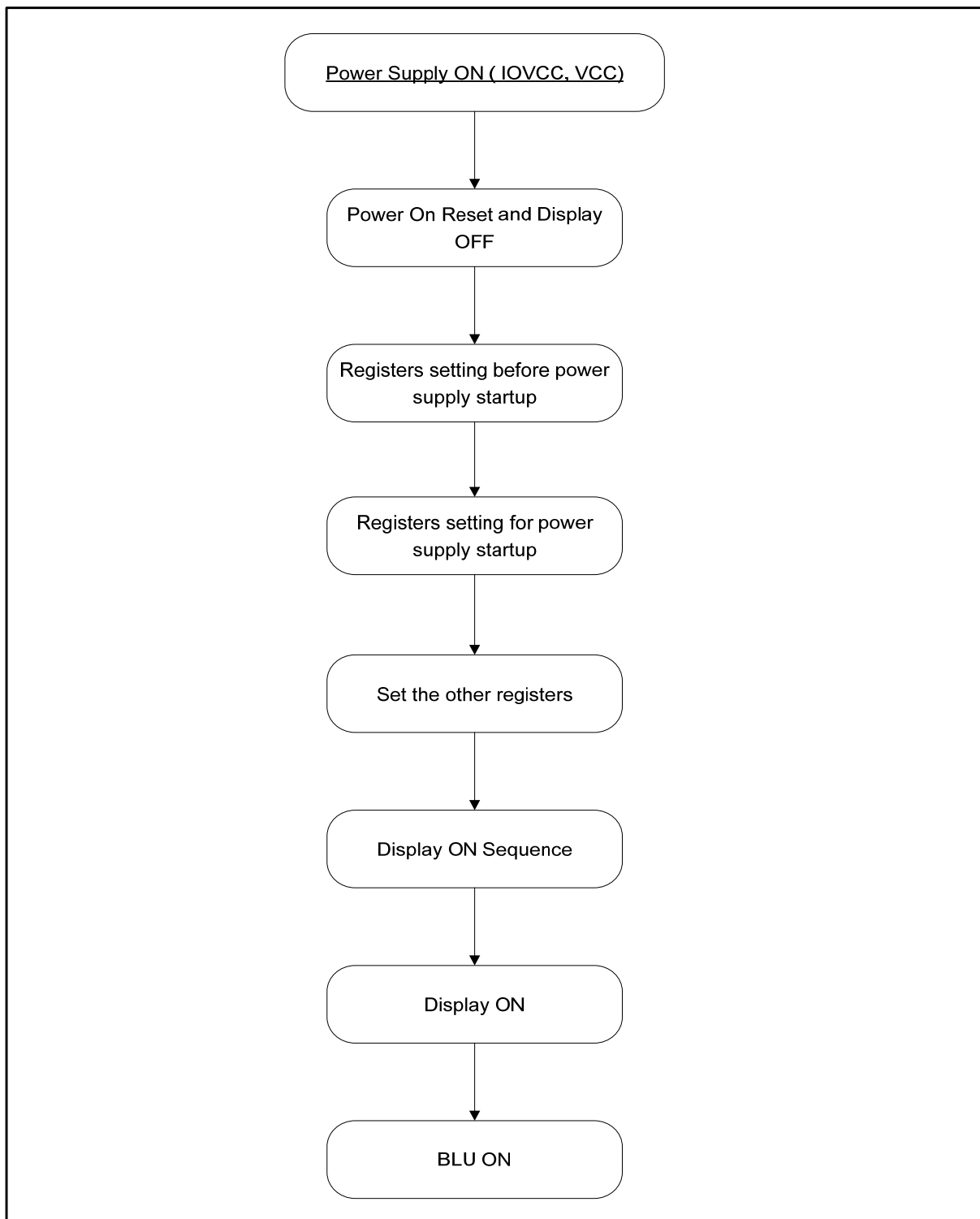Ta=25℃

Figure 5.5 RESET Timing

Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width[1]	/RESET	10	-	-	-	μs
tREST	Reset complete time[2]	-	5	-	-	After 5ms can set command	ms
		-		-	120	When reset applied during STB mode	ms
tPRES	Reset goes high level after Power on time	/RESET & IOVCC	1	-	-	Reset goes high level after Power on	ms

Table 5.5 RESET Timing Parameter

5.6 POWER ON/OFF SEQUENCE

5.6.1 Power On Sequence

```
Power Supply ON ( IOVCC, VCC)
            │
            ▼
Power On Reset and Display
           OFF
            │
            ▼
Registers setting before power
       supply startup
            │
            ▼
Registers setting for power
       supply startup
            │
            ▼
Set the other registers
            │
            ▼
Display ON Sequence
            │
            ▼
Display ON
            │
            ▼
BLU ON
```

5.6.2 Power Off Sequence

```
┌─────────────────────────────────────────────────────┐
│                                                       │
│              ╭─────────────────────╮                  │
│              │   Normal Display    │                  │
│              ╰─────────────────────╯                  │
│                        │                              │
│                        ▼                              │
│              ╭─────────────────────╮                  │
│              │ Display OFF Sequence│                  │
│              ╰─────────────────────╯                  │
│                        │                              │
│                        ▼                              │
│              ╭─────────────────────╮                  │
│              │     Display OFF     │                  │
│              ╰─────────────────────╯                  │
│                        │                              │
│                        ▼                              │
│              ╭─────────────────────╮                  │
│              │  Power Supply Halt  │                  │
│              │      Setting        │                  │
│              ╰─────────────────────╯                  │
│                        │                              │
│                        ▼                              │
│          ╭─────────────────────────────╮              │
│          │ Power Supply OFF (IOVCC, VCC)│              │
│          ╰─────────────────────────────╯              │
│                                                       │
└─────────────────────────────────────────────────────┘
```

---
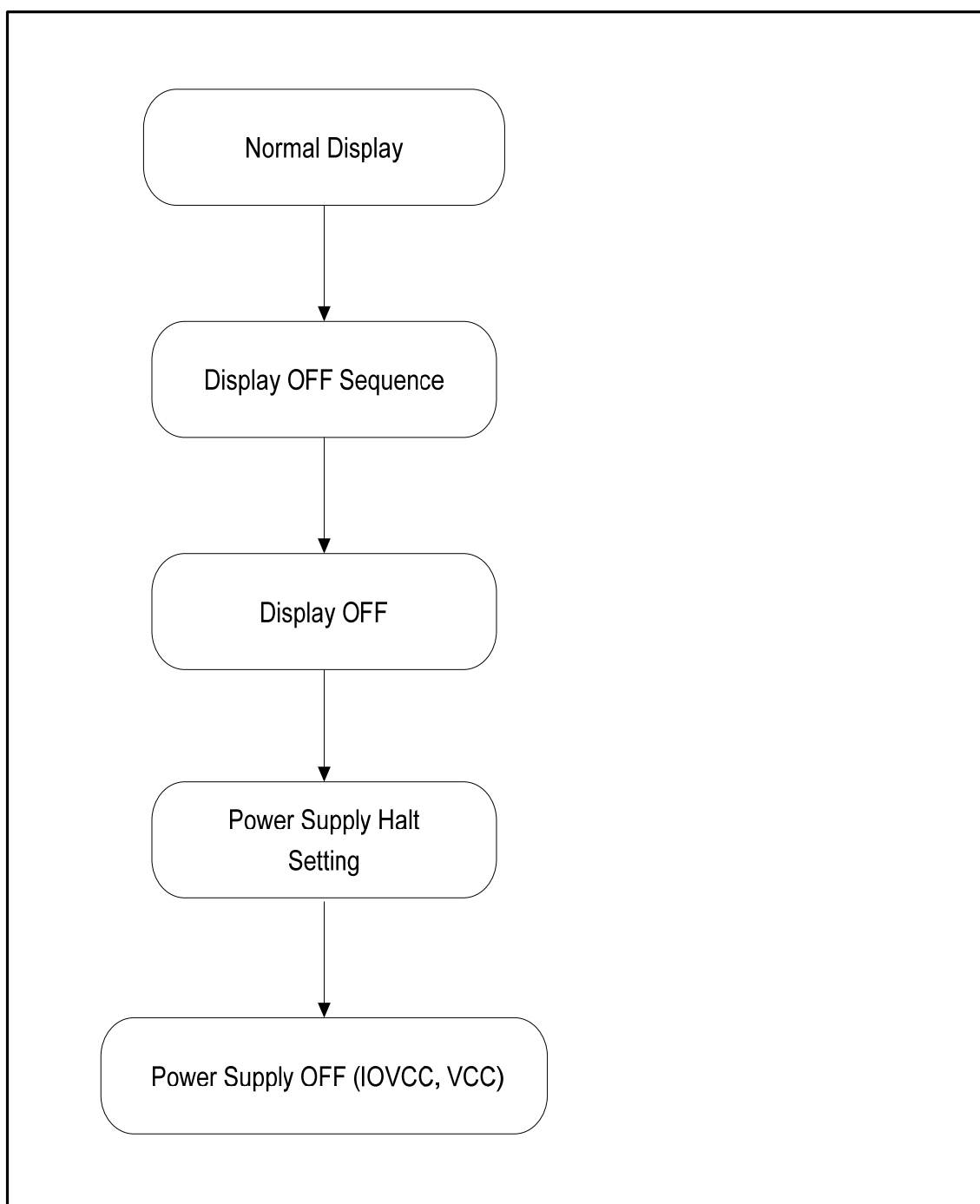
6 Optical Characteristics

Ta=25℃

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	60	70	-	Degree	Note 2
		θB		60	70	-		
		θL		50	60	-		
		θR		60	70	-		
Contrast Ratio		CR	θ=0°	400	500	-	-	Note1 Note3
Response Time		T_{ON}	25℃	-	20	30	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.240	0.290	0.340	-	Note5 Note1
		y		0.260	0.310	0.360		
	Red	x		0.538	0.588	0.638		
		y		0.289	0.339	0.389		
	Green	x		0.289	0.339	0.389		
		y		0.523	0.573	0.623		
	Blue	x		0.116	0.166	0.216		
		y		0.038	0.088	0.138		
Uniformity		U	-	70	80	-	%	Note1 Note6
NTSC		-	-	-	50	-	%	Note 5
Luminance		L		150	170	-	cd/m^2	Note1 Note7

Test Conditions:

1. V_F=3.2V, I_F=20mA(One LED current), the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

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 the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°
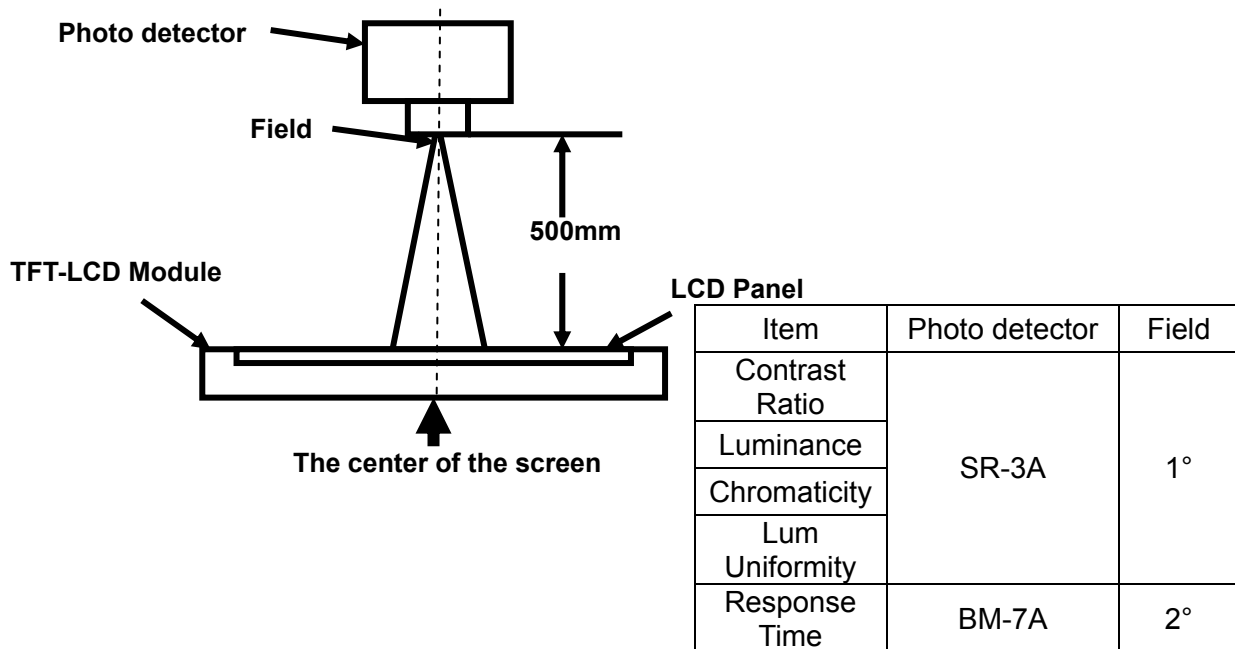
Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80)。
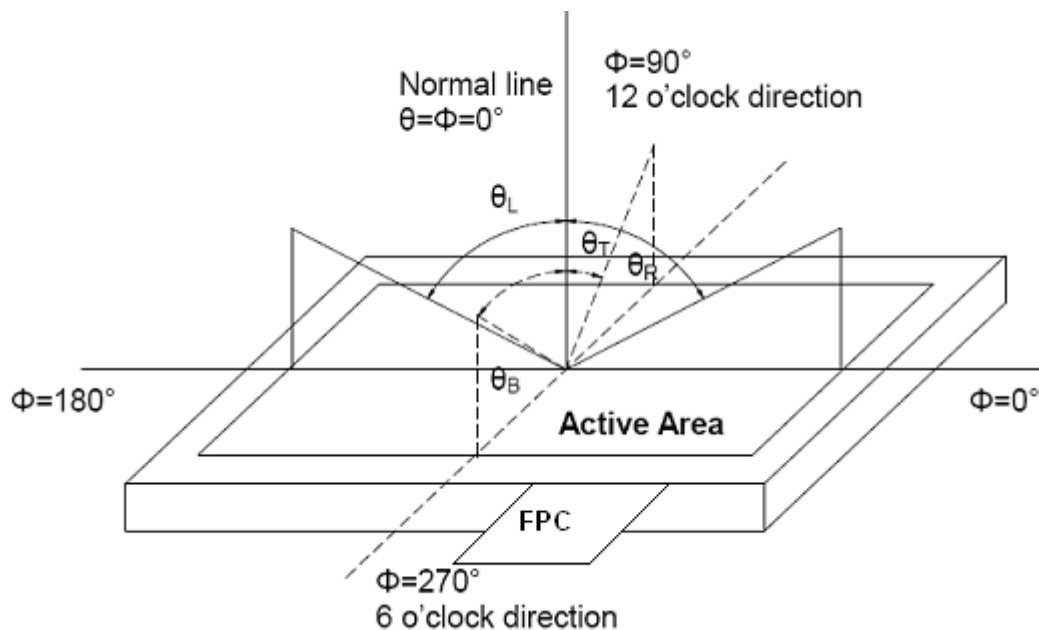
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

"White state ":The state is that the LCD should driven by Vwhite.

"Black state": The state is that the LCD should driven by Vblack.

Vwhite: To be determined   Vblack: To be determined.

Note 4: 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%.
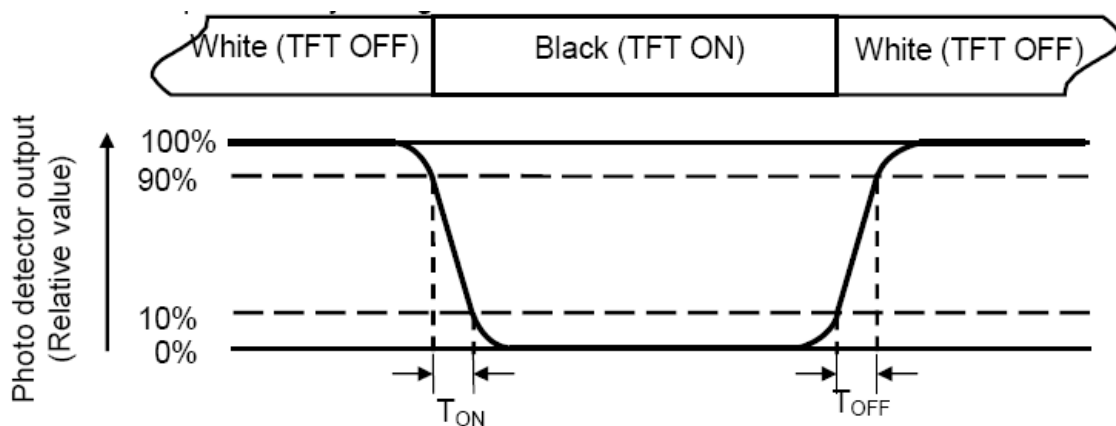
Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = Lmin/ Lmax
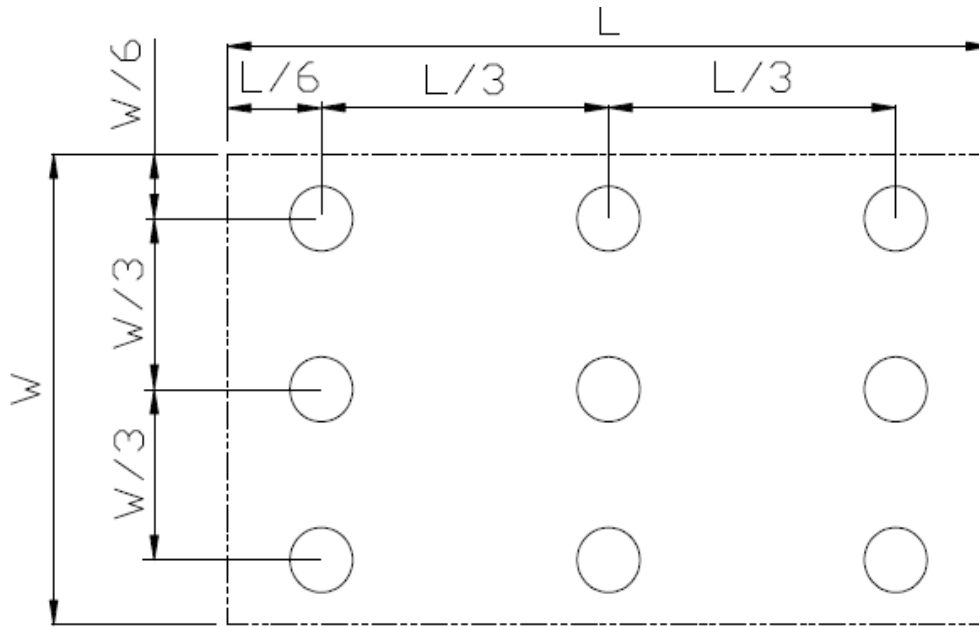
L-------Active area length W----- Active area width

Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: 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	Ts=+70℃,120hrs	Note1 IEC60068-2-1:2007,GB2423.2-2008
2	Low Temperature Operation	Ta=-20℃, 120hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta=+80℃, 120hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta=-30℃, 120hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & High Humidity Storage	Ta=+60℃, 90% RH 120 hours	Note2 IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (Non-operation)	-30℃ 30 min~+70℃ 30 min, Change time:5min, 20 Cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	Electro Static Discharge (Operation)	C=150pF, R=330Ω，5points/panel Air:±8KV, 5times; Contact:±4KV, 5 times; （Environment: 15℃～35℃, 30%～60%, 86Kpa～106Kpa）	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Shock (Non-operation)	60G 6ms, ±X,±Y,±Z 3times, for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

8 Mechanical Drawing

9 Packing Drawing

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM020HBH03-00	35.6X48.2X3.6	0.01003	648	
2	Tray	PET（Transmit）	485×330×13.8	0.1649	21	Anti-static
3	Desiccant	Desiccant	45×35	0.0035	6	
4	BOX	CORRUGATED PAPER	520X345X74	0.35	3	
5	Carton	CORRUGATED PAPER	544×365×250	1.01	1	
6	Dust-Proof Bag	PE	520X345X74	0.03	1	
7	Total weight	12.07　Kg				
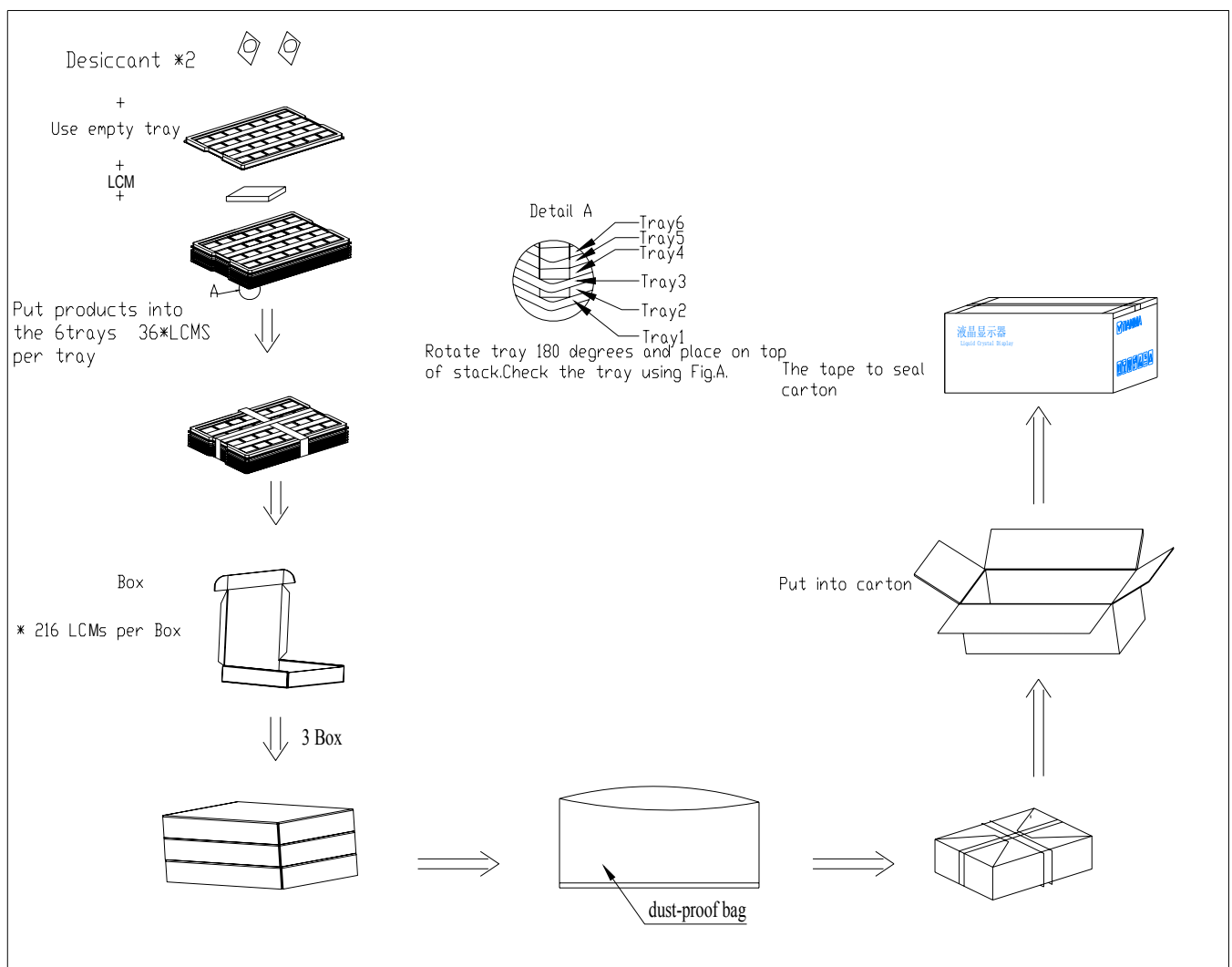
10 Precautions For Use of LCD Modules

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, moisten cloth with one of the following solvents:

－ Isopropyl alcohol

－ Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

－ Water

－ 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 optimum work environment.

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

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

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

10.1.8.4 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

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