



深圳显昶光电科技有限公司

Shenzhen Xianyang Optoelectronic Technology Co., Ltd

PRODUCTION SPECIFICATION OF LCD MODULE

MODULE NO.: XY035HQV6205ANT

Customer Name:			
Customer Part Number:			
Approved By:		Date:	

Prepared By	Checked By	Approved By

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Revision History

Rev	Issued Date	Description	Page	Editor
1.0	Sep 15,2018	First release	All	

1 General Specifications

Feature		Specifications
Display Spec.	LCD type	3.5 inch
	Resolution (H*V)	320(RGB) × 240
	Technology Type	IPS
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Viewing Direction	All o' clock
	Gray Scale Inversion Direction	All o' clock
Mechanical Characteristics	OutlineDimensions (H x V x T) (mm)	76.9*63.9*3
	Active Area(mm)	70.08*52.56
	With /Without Touch screen	Without
	Backlight Type	White LED
	Weight (g)	TBD
Electrical Characteristics	Interface	RGB24BIT
	Driver IC	ST7272A

2 Pin Assignment

Pin No.	Symbol	Description
1	LED-	Backlight LED Ground
2	LED-	Backlight LED Ground
3	LED+	Backlight LED Power
4	LED+	Backlight LED Power
5	NC	Not Use
6	NC	Not Use
7	NC	Not Use
8	/RESET	Hardware Reset
9	SPENA	SPI Interface Data Enable Signal
10	SPCLK	SPI Interface Data Clock
11	SPDAT	SPI Interface Data
12	B0	Blue Data Bit 0
13	B1	Blue Data Bit 1
14	B2	Blue Data Bit 2
15	B3	Blue Data Bit 3
16	B4	Blue Data Bit 4
17	B5	Blue Data Bit 5
18	B6	Blue Data Bit 6
19	B7	Blue Data Bit 7
20	G0	Green Data Bit0
21	G1	Green Data Bit1
22	G2	Green Data Bit2
23	G3	Green Data Bit3
24	G4	Green Data Bit4
25	G5	Green Data Bit5
26	G6	Green Data Bit6
27	G7	Green Data Bit7
28	R0	Red Data Bit0
29	R1	Red Data Bit1
30	R2	Red Data Bit2
31	R3	Red Data Bit3
32	R4	Red Data Bit4
33	R5	Red Data Bit5
34	R6	Red Data Bit6
35	R7	Red Data Bit7
36	HSYNC	Horizontal Sync Input
37	VSNC	Vertical Sync Input
38	DCLK	Dot Data Clock
39	NC	Not Use

40	NC	Not Use
41	VDD	Digital Power
42	VDD	Digital Power
43	NC	Not Use
44	NC	Not Use
45	NC	Not Use
46	NC	Not Use
47	NC	Not Use
48	NC	Not Use
49	NC	Not Use
50	NC	Not Use
51	NC	Not Use
52	DE	Data Enable Input
53	GND	Ground
54	GND	Ground

Note1: I/O definition: I----Input O---Output P----Power/Ground

3 Absolute Maximum Ratings

GND=0V, Ta= 25°C

Item	Symbol	Value	Unit
Power supply voltage for logic	V _{DD}	1.6~3.3	V
Input voltage	V _{in}	V _{DD} +0.3	V
Operating temperature	T _{opr}	-30 to 85	°C
Storage temperature	T _{stg}	-40 to 85	°C

4 Electrical Characteristics

4.1 DC Characteristics (V_{DD}=2.8V, Ta=25°C)

Item	Symbol	Min	Type	Max	Unit	Test condition
Operating voltage	V _{DD}	2.6	2.8	3.3	V	-
Supply current	I _{DD}	-	-	35	mA	V _{DD} =2.8V, Ta=25°C
Input voltage	V _{IH}	0.8V _{DD}	-	V _{DD}	V	-
	V _{IL}	0	-	0.2V _{DD}	V	
Input leakage current	I _{IL}	-1.0	-	1.0	μA	V _{IN} =V _{DD} or V _{SS}

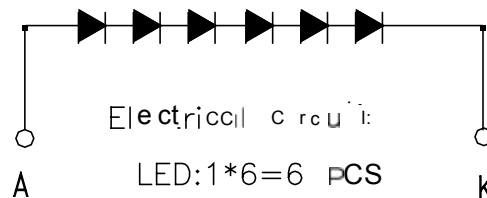
Note: Voltage greater than above may damage the module.

All voltages are specified relative to V_{SS}=0V.

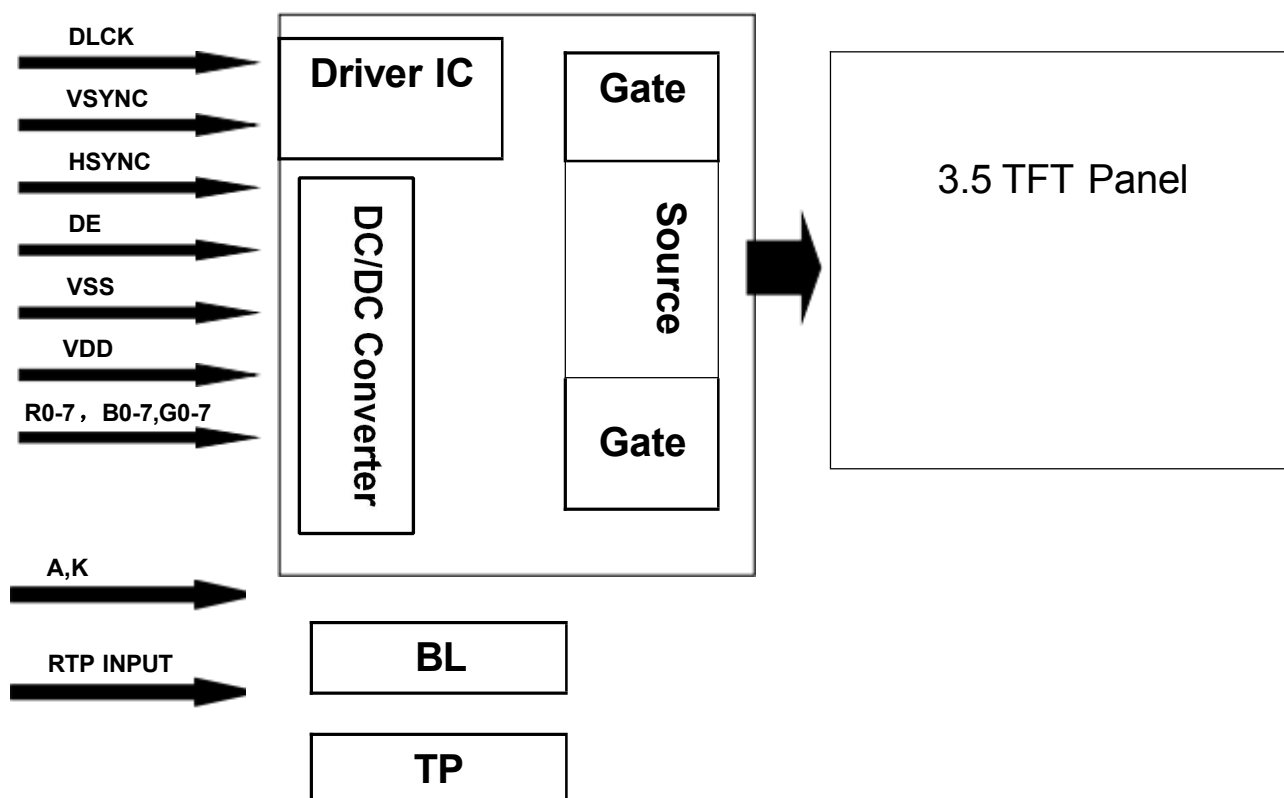
4.2 Driving Backlight

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I _F	--	20	25	mA	
Forward Voltage	V _F	-	19.2	-	V	
Connection mode		--	6S	--		
LED number	/		6		pcs	
LED life	/	20000 hours				

Note1: Optical performance should be evaluated at Ta=25°C 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.

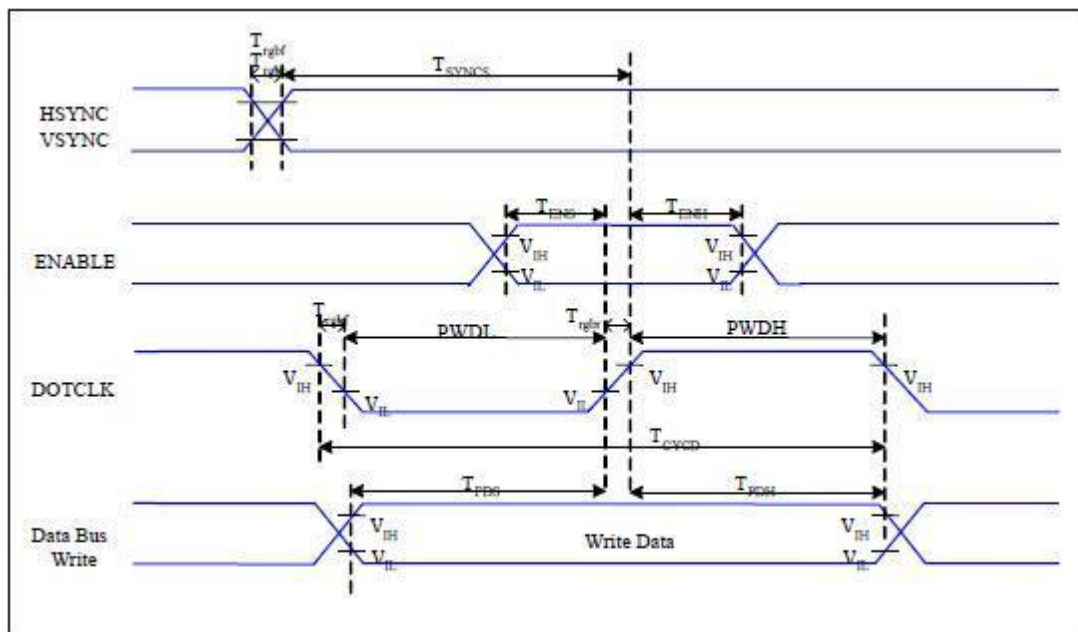


4.3 Block Diagram



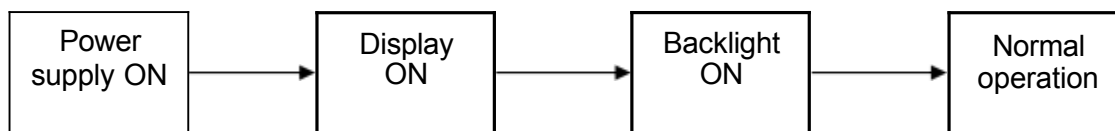
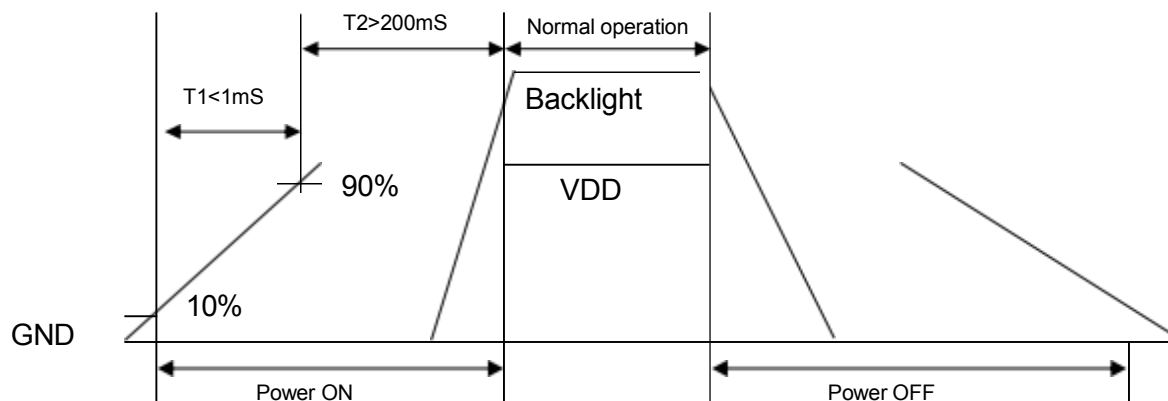
5 INTERFACE TIMING

5.1 RGB interface

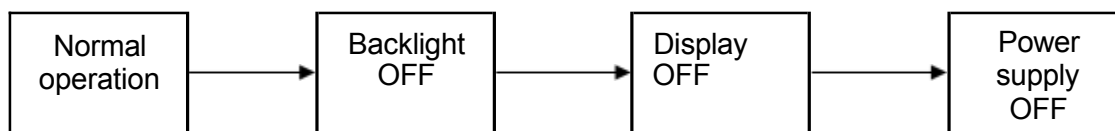


Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	T_{syncs}	VSYSN, HSYN Setup Time	30	-	ns	
ENABLE	T_{ens}	Enable Setup Time	25	-	ns	
	T_{enh}	Enable Hold Time	25	-	ns	
DOTCLK	$PWDH$	DOTCLK High-level Pulse Width	60	-	ns	
	$PWDL$	DOTCLK Low-level Pulse Width	60	-	ns	
	T_{cycp}	DOTCLK Cycle Time	120	-	ns	
	$Trghr, Trghf$	DOTCLK Rise/Fall time	-	20	ns	
DB	T_{pdh}	PD Data Setup Time	50	-	ns	
	T_{pdh}	PD Data Hold Time	50	-	ns	

5.2 Power ON/OFF Timing



Power ON sequence



Power OFF sequence

6 Optical Characteristics

Ta=25°C

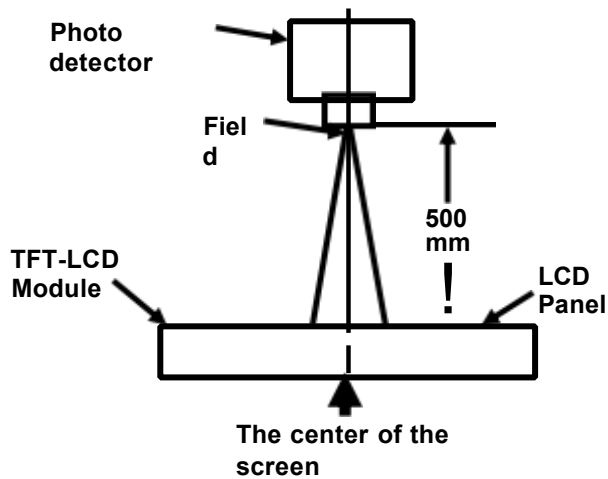
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	$CR \geq 10$	70	80	-	Degree	Note 2
	θB		70	80	-		
	θL		70	80	-		
	θR		70	80	-		
Contrast Ratio	CR	$\theta=0^\circ$	640	800	-	-	Note1 Note3
Response Time	T_{ON}	25°C	-	30	-	ms	Note1 Note4
	T_{OFF}						
Uniformity	U	-	70	80	-	%	Note1 Note6
NTSC	-	-	-	50	-	%	Note 5
Luminance	L		300	350	-	cd/m ²	Note1 Note7

Test Conditions:

1. $V_F=19.2V$, $I_F=20mA$, the ambient temperature is 25°C.
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).

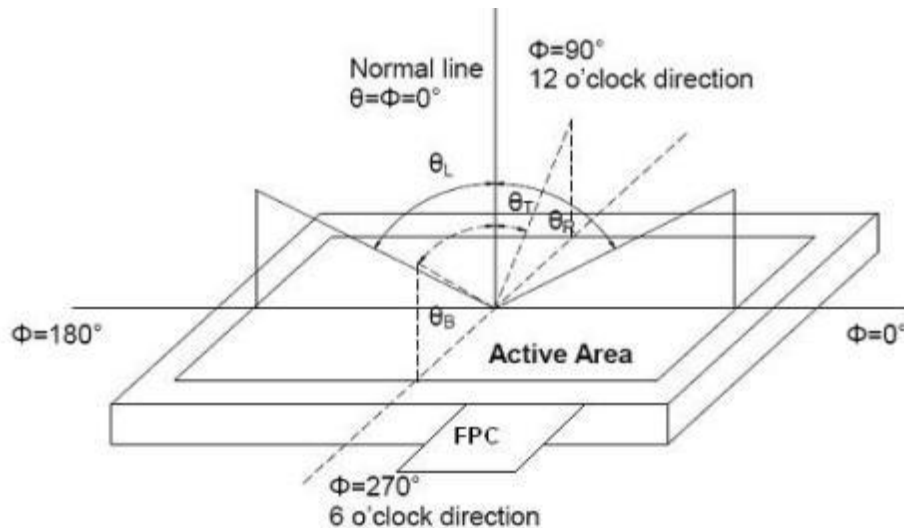


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

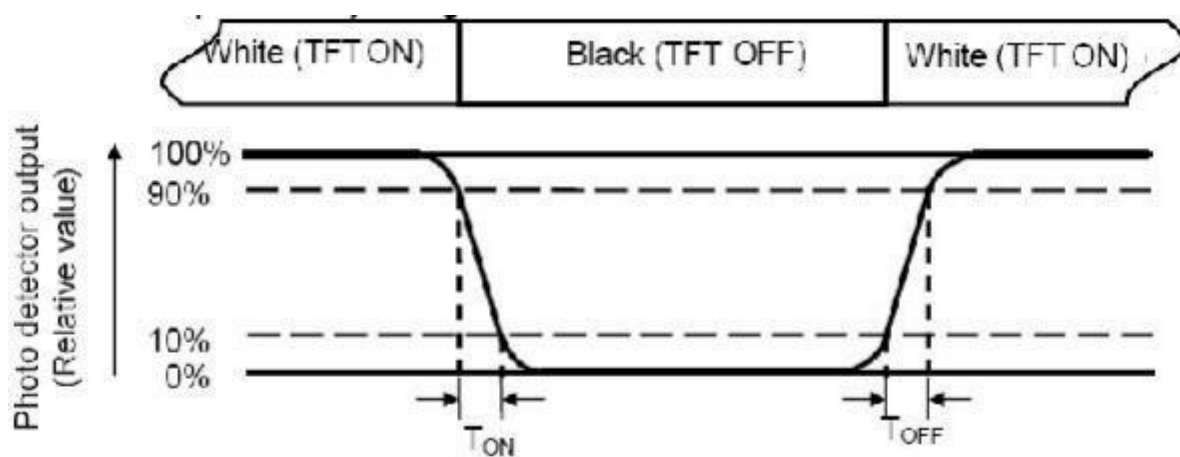
“White state “:The state is that the LCD should be driven by V_{white}.

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

V_{white}: To be determined V_{black}: 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 (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) 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) = L_{min} / L_{max}

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

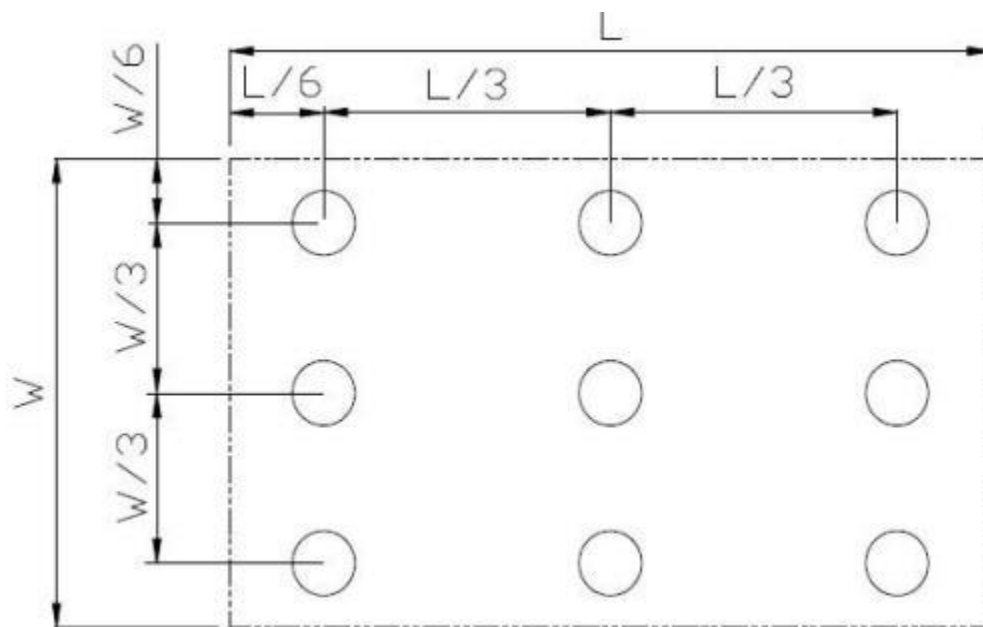


Fig. 2 Definition of uniformity

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

L_{min} : 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

Item	Condition	Time (hrs)	Assessment
High temp. Storage	85. C	120	No abnormalities in functions and appearance
High temp. Operating	85. C	120	
Low temp. Storage	-40. C	120	
Low temp. Operating	-30. C	120	
Humidity	40. C/ 90%RH	120	
Thermal Shock(Non-operation)	-20. C ← 25. C → 70. C (0.5 hour ← 5 min → 0.5 hour)	10cycles	

- 9.1.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 9.1.1.2 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.
- 9.1.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 9.1.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- 9.1.1.5 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 alcoholSolvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
 - Water
 - Ketone
 - Aromatic solvents
- 9.1.1.6 Do not attempt to disassemble the LCD Module.
- 9.1.1.7 If the logic circuit power is off, do not apply the input signals.
- 9.1.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
- 9.1.1.9 Be sure to ground the body when handling the LCD Modules.
- 9.1.1.10 Tools required for assembly, such as soldering irons, must be properly ground.
- 9.1.1.11 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
- 9.1.1.12 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.
- 9.1.1.13 Storage precautions
- 9.1.1.14 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 9.1.1.15 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:
- 9.1.1.16 Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%
- 9.1.1.17 The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.2 Transportation Precautions

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