

PRODUCT SPECIFICATIONS

APPROVAL SHEET 承认书

Customer 客户名称	
Part NO. 产品型号	070TFT-EWV1
Product type 产品内容	Mode: Transmissive type .Normally white. TFT LCD Module LCD Module: Graphic 800RGB*480Dot-matrix
Remarks 备注栏	<input type="checkbox"/> APPROVAL FOR SPECIFICATIONS ONLY <input checked="" type="checkbox"/> APPROVAL FOR SPECIFICATIONS AND SAMPLE <input checked="" type="checkbox"/> USED PANEL: BOE
Signature by Customer: 客户确认签章	

Issued by	Checked by	Approved by	
		PD	QA

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1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
01	2016.10.20	First Release.	YANG	

2. General Description

- 7.0”(diagonal), 800 x RGB x 480 dots, colors, Transmissive, TFT LCD module.
- Viewing Direction: 6 o’clock.
- Driving IC:EK971BB3、EK9716BD3 or equivalent TFT controller/driver.
- RGB(18)bits data bus (I80 system interface).
- Logic voltage: 3.0V (typ.).
- Touch panel.

3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

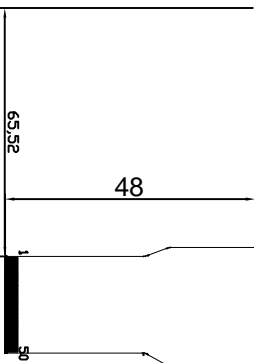
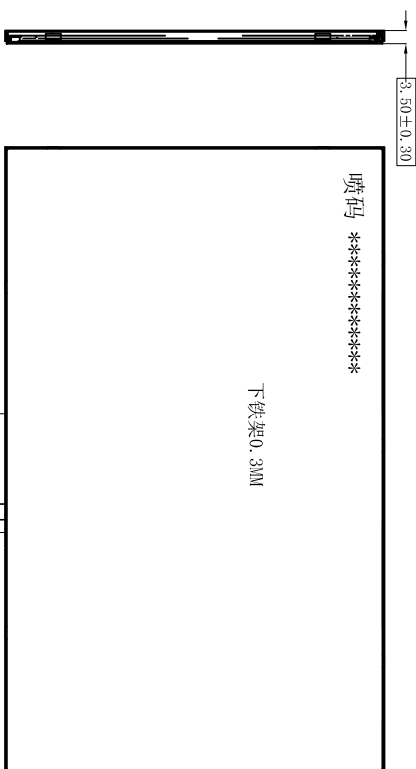
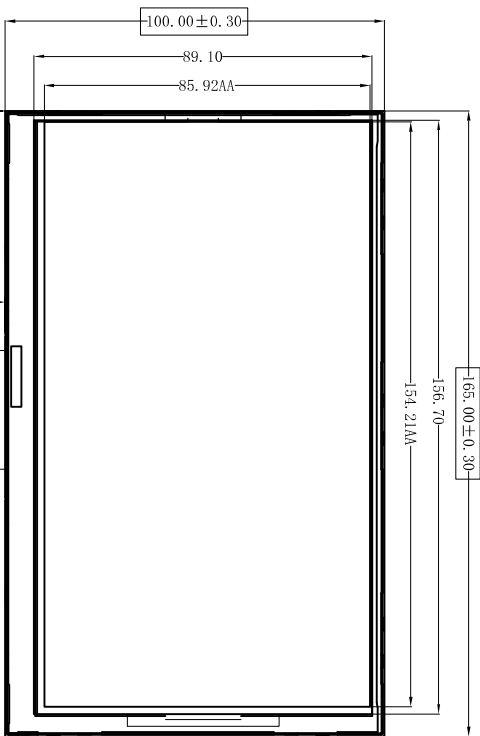
Table 1

Parameter		Specifications	Unit
Outline dimensions		165(W) x 100(H) x 3.5(D) (Exclude FPC, cables of touch panel and backlight)	mm
Color TFT 800xRGBx4 00			mm
			mm
	LCD active area	154.08(W) x 85.92(H)	mm
	Display format	800x RGB x 480	dots
	Color configuration	RGB stripes	-
	Dot pitch	0.1926(RGB)(W) x 0.1790(H)	mm
Weight		TBD	grams

Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
TFT Gate on voltage	VGH	17.5	18.5	19.5	V	
TFT Gate off voltage	VGL	-7.5	-6.5	-5.5	V	
TFT Common electrode voltage	VCOM	2.8	3.0	3.2	V	
Analog power supply voltage	AVDD	9.6	9.8	10.0	V	

REF #	DATE	DESCRIPTION	NAME



NO	TITLE	QUANTITY
1	SMD LEDX800	18
2	Steel BOX (铁盒)	2
3	REFLECTIVE (反光纸)	1
4	THIN BRN-1 (上排阻器)	1
5	THIN BRN-1 (上排阻器)	1
6	DIFUSER TAPE (扩散纸)	1
7	PCB (电路板)	1
8	LIGHT GUIDE (导光板)	1
9	HOUSING (外壳)	1
10	SMD LEDX800	18

Item	Symbol	Min	Typ	Max	Unit	Operation
Forward Voltage	V _F	8.60	9.60	10.5	V	I _F =140 mA
Reverse Current	I _R	—	—	15μA	μA	V _R = 5 V
Wavelength	λ	0.25	—	0.315	nm	—
Viewing Angle	2θ	—	—	—	°	—
Luminous Intensity	I _v	—	—	—	cd/m ²	I _F =140 mA
Operating Temperature	T _{op}	80	—	—	°C	—
Storage Temperature	T _{stg}	-30	—	80	°C	—

CUSTOMER'S NAME	CUSTOMER'S CODE	EDITION
BRT CODE	PRODUCT CODE	EDITION
KW700203	KW700203W21-B	A
DESIGN 设计	CHECK 审核	REVIEW 确认
杨洋		

- 备注:
- 颜色: 白色;
 - 单位: mm;
 - 未按比例出图;
 - △为更改标记;
 - 标示 请贵司确认;
 - 尺寸测量方法:
 - 未注尺寸公差 ± 0.20, 未注圆角 R0.2;
 - () 为参考尺寸, □ 为重点控制尺寸;
 - 所有材料均符合 "RoHS" 要求。

* 注: 规格, 保存条件不好时, 会降低反射率(扩散)与导光板(胶框)的粘附力, 推荐保存条件为: 温度: 25° C ± 10° C, 湿度: 65%RH ± 20%RH.

Figure 1: Outline Drawing

4. Interface signals

Table 2: Pin assignment

Pin No	Symbol	Description
1	VLED+	Power supply for backlight
2	VLED+	Power supply for backlight
3	VLED-	The backlight ground
4	VLED-	The backlight ground
5	GND	Ground
6	VCOM	For external VCOM DC input
7	DVDD	Digital Power
8	MODE	DE/SYNC mode select MODE3=H: DE mode(normally pull high) MODE3=L: HSD/VSD mode
9	DE	Data enable signal
10	VS	Vertical sync input.Negative polarity
11	HS	Horizontal sync input.Negative polarity
12	B7	Blue data Input
13	B6	Blue data Input
14	B5	Blue data Input
15	B4	Blue data Input
16	B3	Blue data Input
17	B2	Blue data Input
18	B1	Blue data Input
19	B0	Blue data Input
20	G7	Green data Input
21	G6	Green data Input
22	G5	Green data Input
23	G4	Green data Input
24	G3	Green data Input
25	G2	Green data Input
26	G1	Green data Input
27	G0	Green data Input
28	R7	Red data Input
29	R6	Red data Input
30	R5	Red data Input
31	R4	Red data Input
32	R3	Red data Input
33	R2	Red data Input
34	R1	Red data Input
35	R0	Red data Input
36	GND	Ground
37	DCLK	Clock input
38	GND	Ground
39	SHLR	Source right or left sequence control SHLR=H: right

		shift, Left Right SHLR=L: left right, Right Left
40	U/D	Gate up or down scan control UPDN=H: up shift, Down Up UPDN=L: down shift, Up Down
41	VGH	Positive Power for TFT
42	VGL	Negative Power for TFT
43	AVDD	Analog Power
44	RESET	Global reset pin.Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (RC circuit :R=10K Ω , C=1uF))
45	NC	Not connect
46	VCOM	For external VCOM DC input
47	DITHB	Dithering setting DITH="H" 6-bit resolution (last 2 bits of input data turncated) DITH="L" 8-bit resolution (default setting)
48	GND	Ground
49	NC	Not connect
50	NC	Not connect

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VDD)	VCC	-0.3	+5.0	V	1

Note:

- 1.VCC, GND must be maintained.
- 2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature			No condensation	

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

Typical Electrical Characteristics

At Ta = 25 °C, VCC=IOVCC= 3.0V to 3.6V, GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (logic)	VDD-GND		3.0	3.3	3.6	V
Supply current (Logic & LCD)	ICC	VCC=3.3V	-	8	15	mA
Supply voltage of white LED21 star backlight	VLED =V(LED+)- V(LED-)	Forward current =140 mA Number of LED dies =21	9.6	9.8	10.0	V
Luminance (on the module surface)			-	350	-	cd/m ²

7. Optical Characteristics

Table 7: Optical specifications

Items	Symbol	Condition	Specifications			Unit
			Min.	Typ.	Max.	
Contrast Ratio	CR		-	300	-	-
Response Time	T _R		-	10	20	ms
	T _F		-	15	20	ms
Chromaticity	Red	X _R	0.604	0.634	0.664	-
		Y _R	0.298	0.328	0.358	-
	Green	X _G	0.264	0.294	0.324	-
		Y _G	0.547	0.577	0.607	-
	Blue	X _B	0.107	0.137	0.167	-
		Y _B	0.104	0.134	0.164	-
	White	X _W	0.272	0.302	0.332	-
		Y _W	0.305	0.335	0.365	-
Viewing angle	Hor.	φ1(3 o'clock)	-	45	-	deg.
		φ2(9 o'clock)	-	45	-	
	Ver.	θ2(12 o'clock)	-	35	-	
		θ1(6 o'clock)	-	15	-	
NTSC ratio				61.5		%

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

L63: Luminance of gray level 63

L0: Luminance of gray level 0

$$\text{CR} = \text{CR}(10)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):

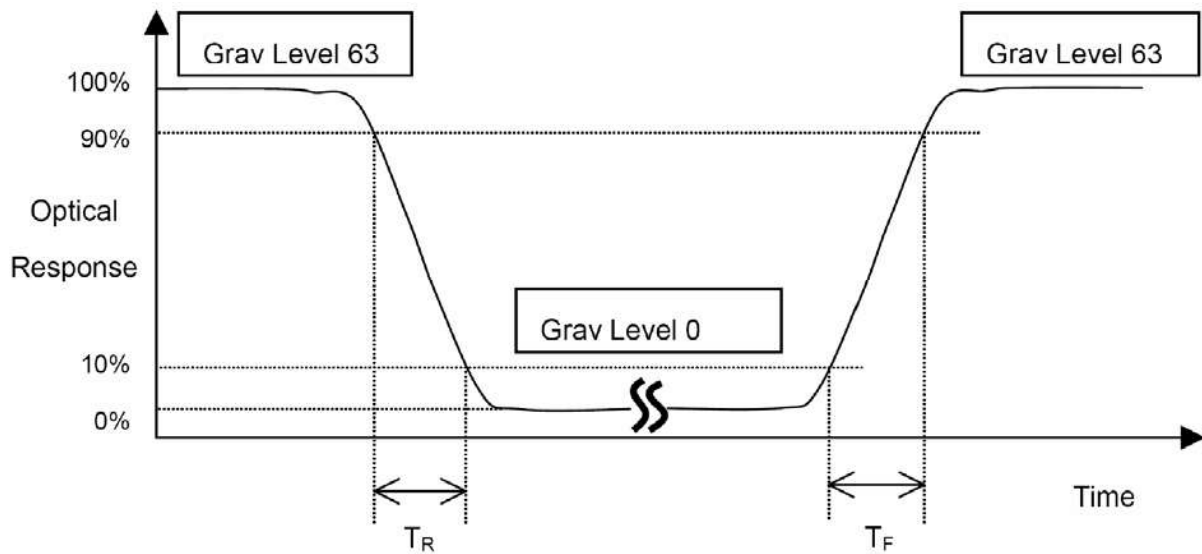


Figure 3

Note 3: Viewing Angle

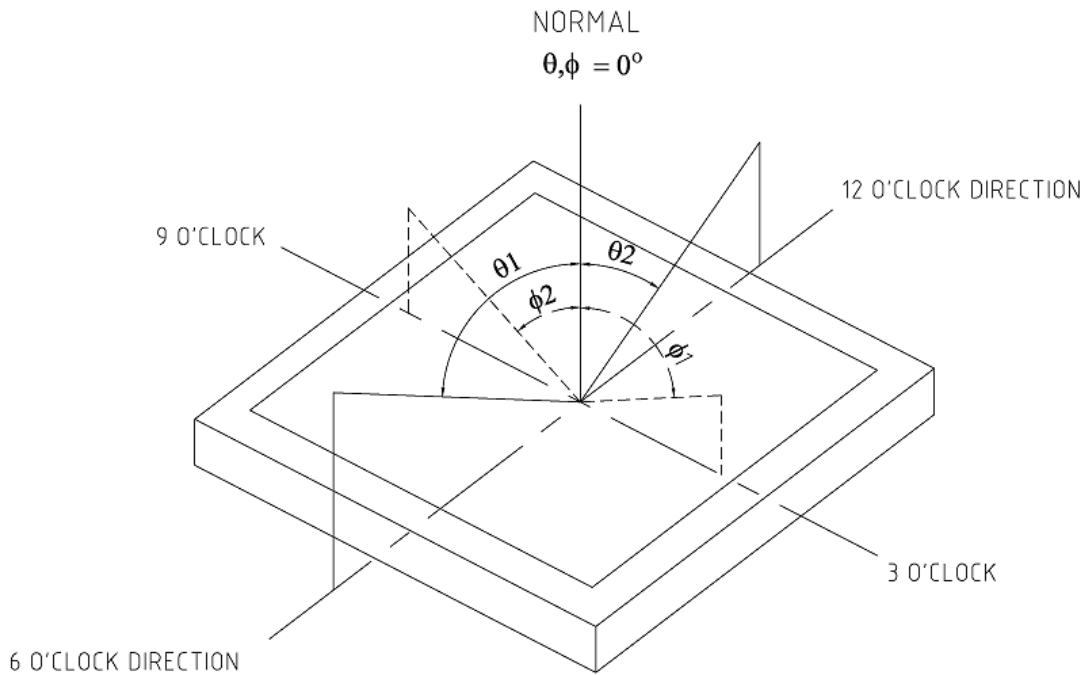


Figure 4

The above “Viewing Angle” is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 12 O’clock. Module maker can increase the “Viewing Angle” by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

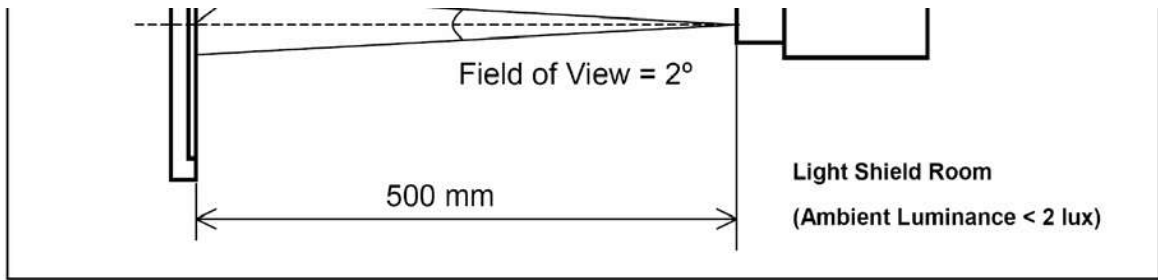


Figure 5

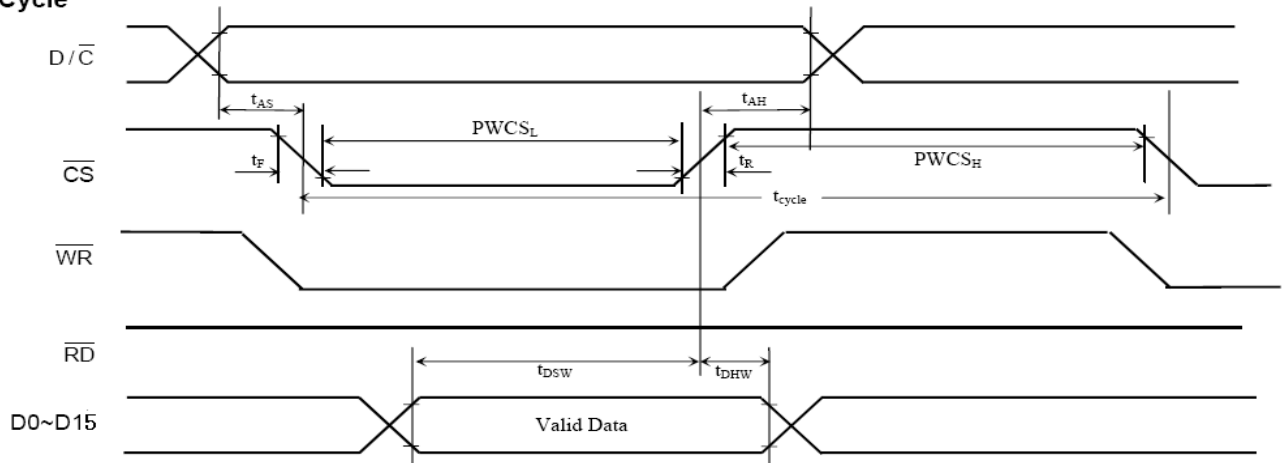
8. Timing Characteristics

8.1 80-system Bus Interface Timing Characteristics of IC

Table 8: Normal Write Mode (VCC = IOVCC=2.4~3.3V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	100	-	-	ns
t_{cycle}	Clock Cycle Time (read cycle)	1000	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Data Setup Time	5	-	-	ns
t_{DHW}	Data Hold Time	5	-	-	ns
t_{ACC}	Data Access Time	250	-	-	ns
t_{OH}	Output Hold time	100	-	-	ns
PWCS _L	Pulse Width /CS low (write cycle)	50	-	-	ns
PWCS _H	Pulse Width /CS high (write cycle)	50	-	-	ns
PWCS _L	Pulse Width /CS low (read cycle)	500	-	-	ns
PWCS _H	Pulse Width /CS high (read cycle)	500	-	-	ns
t_R	Rise time	-	-	4	ns
t_F	Fall time	-	-	4	ns

Write Cycle



Read Cycle

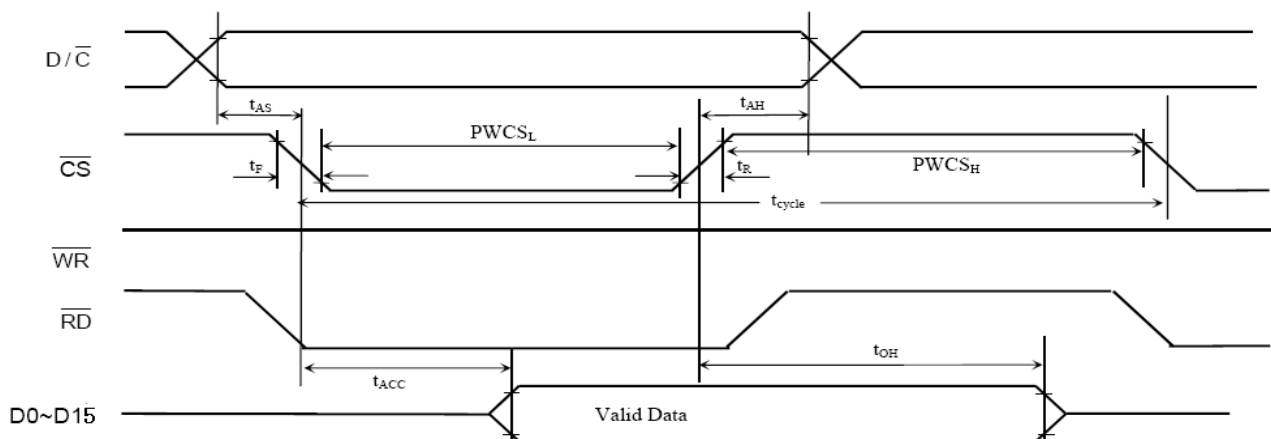


Figure 7. 80-system Bus Timing

8.2 Reset Operation of IC

Table 9: Reset Timing Characteristics ($V_{CC} = I_{OVCC} = 2.4 \sim 3.3V$)

Item	Symbol	Unit	Min.	Typ.	Max.
Reset low-level width	tRES	ms	1	-	-
Reset rise time	trRES	μs	-	-	10

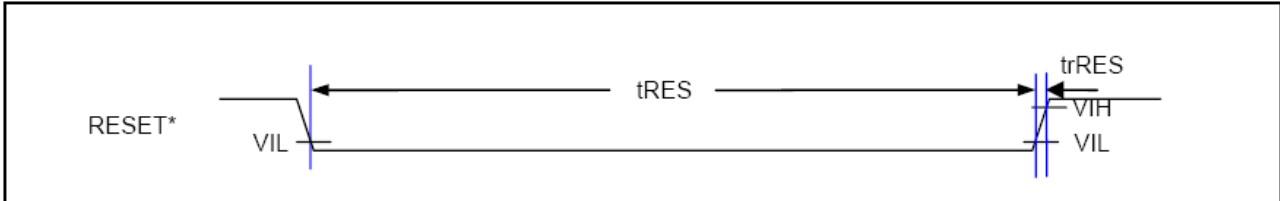


Figure 8: Reset Timing

9. Reliability Test Item

Test Item	Sample Type	Test Condition	Test result determinant gist
High temperature storage	Normal temperature	70±3℃;96H	the inspection of appearance and function character.
	Wide temperature	80±3℃;96H	
Low temperature storage	Normal temperature	-20±3℃;120H	
	Wide temperature	-30±3℃;120H	
High temperature /humidity storage	Normal temperature	50℃±3℃,90%±3%RH;96H	
	Wide temperature	60℃±3℃,90%±3%RH;96H	
High temperature operation	Normal temperature	60±3℃;96H	no objection of the function character; no fatal objection of the appearance.
	Wide temperature	70±3℃;96H	
Low temperature operation	Normal temperature	0±3℃;96H	
	Wide temperature	-20±3℃;96H	
High temperature /humidity operation	Normal temperature	40℃±3℃,90%±3%RH;96H	
	Wide temperature	50℃±3℃,90%±3%RH;96H	
Temperature Shock	Normal temperature	-20±3℃,30min→70±3℃,30min;10cycle	inspect the objections appearance、function & the whole structure
	Wide temperature	-30±3℃,30min 80±3,30min;10cycle	The inspection of appearance、function & the whole structure

10. Suggestions for using LCD modules

10.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated ,clean it with soft cloth. If the LCM is severely contaminated , use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer . The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don't disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD modules.
 - Tools required for assembling, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
 - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

10.2 Storage

1. Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.