



PRODUCT SPECIFICATION

KADI Model: KD123BWU10EP

CUSTOMER Model: -

Description: 12.3" TFT-LCD Module

Version: 1.0

KADI	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2023.9.19	2023.9.19	2023.9.19

CUSTOMER APPROVAL	SIGNATURE	DATE



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1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	12.3	inch
Number of Pixels	1920 (H) RGB x 720 (V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	o' clock
Interface	LVDS	-
Display Colors	16.7M	colors
Outline Dimension	300.03 (H) x 121.01 (V) x 16.70 (D)	mm
Active Area	292.03 (H) x 109.51 (V)	mm
Pixel Pitch	0.1520 (H) x 0.1520 (V)	mm
Driver IC	TBD	-
Operation Temperature	-30~80	°C
Storage Temperature	-40~85	°C

Note1:Requirements on environmental protection RoHS compliant.

2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	5.0	V	Note 1

Note 1:Permanent damage may occur to the LCD module if beyond this specification.

Functional operation should be restricted to the conditions described under normal operating conditions.



3. Electrical Characteristics

3.1 Recommended Operating Condition for TFT LCD

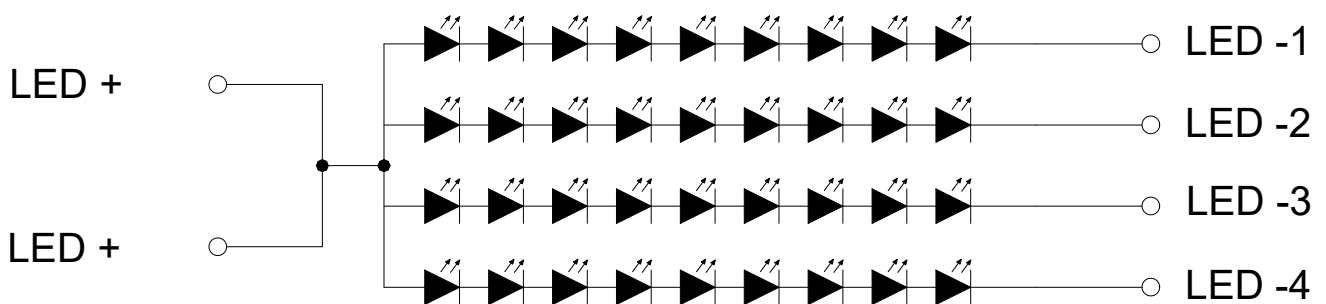
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VCC	3.0	3.3	3.6	V	
Analog supply current	I _{VCC}	-	TBD	-	mA	VCC=3.3V
Logic input voltage	V _{IH}	0.7*VCC	-	VCC	V	
	V _{IL}	GND	-	0.3*VCC	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I _F	-	240	-	mA	
Driving Voltage	V _F	24.3	-	30.6	V	
Power consumption	W _{BL}	5.832	-	7.344	W	
LED Life-Time	N/A	30,000	-	-	Hours	Ta=25°C Note 1

Note 1: LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2: LED circuit :





4. Interface Pin Assignment

4.1 LCM Pin Assignment

No.	Symbol	Description
1	GND	Ground
2-12	NC	No connection
13	VCC	No connection
14	VCC	Power supply
15	NC	No connection
16	NC	No connection
17	NC	No connection
18	NC	No connection
19	NC	No connection
20	NC	No connection
21	GND	Ground
22	STBYB	Standby mode
23	Fail-det	Fail detect function output pin
24	NC	No connection
25	RESET	LCD reset
26	BIST-EN	Enable BIST function
27	NC	No connection
28	DIST_I2C_SDA	Display I2C DATA
29	DIST_I2C_SCL	Display I2C CLOCK
30	GND	Ground
31	DA_N_E	LVDS Receiver Signal(-)
32	DA_P_E	LVDS Receiver Signal(+)
33	GND	Ground
34	DB_N_E	LVDS Receiver Signal(-)
35	DB_P_E	LVDS Receiver Signal(+)
36	GND	Ground
37	DC_N_E	LVDS Receiver Signal(-)
38	DC_P_E	LVDS Receiver Signal(+)
39	GND	Ground
40	DCLK_N_E	LVDS Receiver CLK Signal(-)
41	DCLK_P_E	LVDS Receiver CLK Signal(+)
42	GND	Ground
43	DD_N_E	LVDS Receiver Signal(-)
44	DD_P_E	LVDS Receiver Signal(+)
45	GND	Ground
46	DA_N_O	LVDS Receiver Signal(-)



47	DA_P_O	LVDS Receiver Signal(+)
48	GND	Ground
49	DB_N_O	LVDS Receiver Signal(-)
50	DB_P_O	LVDS Receiver Signal(+)
51	GND	Ground
52	DC_N_O	LVDS Receiver Signal(-)
53	DC_P_O	LVDS Receiver Signal(+)
54	GND	Ground
55	DCLK_N_O	LVDS Receiver CLK Signal(-)
56	DCLK_P_O	LVDS Receiver CLK Signal(+)
57	GND	Ground
58	DD_N_O	LVDS Receiver Signal(-)
59	DD_P_O	LVDS Receiver Signal(+)
60	GND	Ground

4.2 Backlight LED FPC Pin Assignment

No.	Symbol	Description
1	LEDA	Power for LED backlight (Anode)
2	LEDA	Power for LED backlight (Anode)
3	NC	No connection
4	LEDK1	Power for LED backlight (Cathode)
5	LEDK2	Power for LED backlight (Cathode)
6	LEDK3	Power for LED backlight (Cathode)
7	LEDK4	Power for LED backlight (Cathode)
8	NC	No connection
9	NTC1	Thermistor
10	NTC2	Thermistor

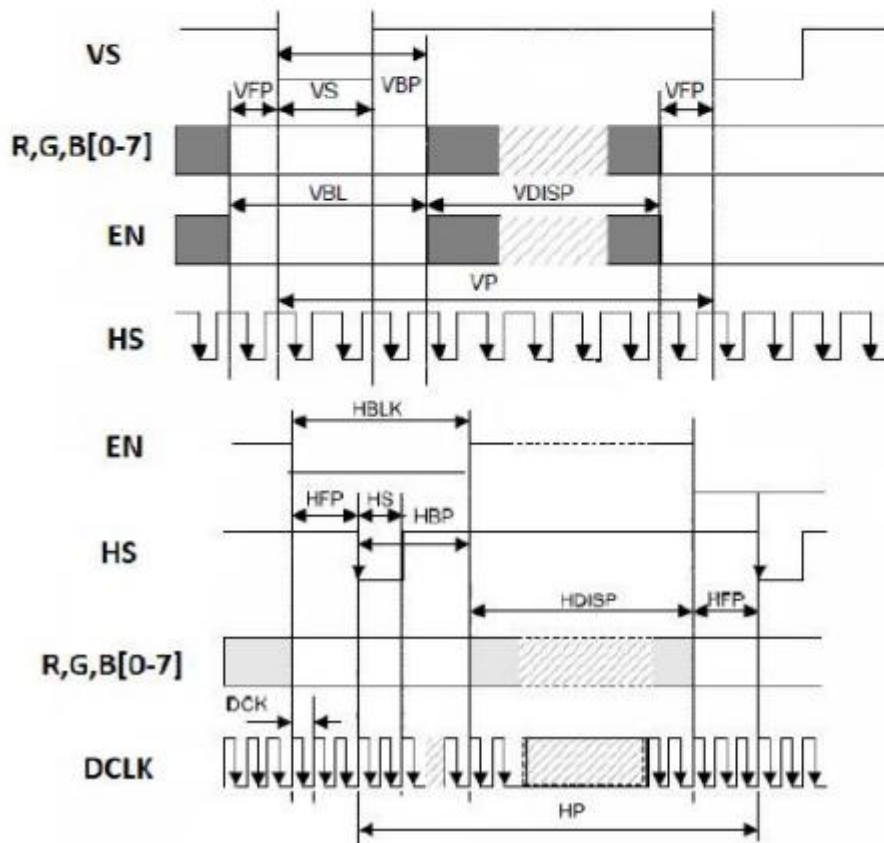


5. Interface Characteristics

5.1 Timing Diagram of Interface Signal

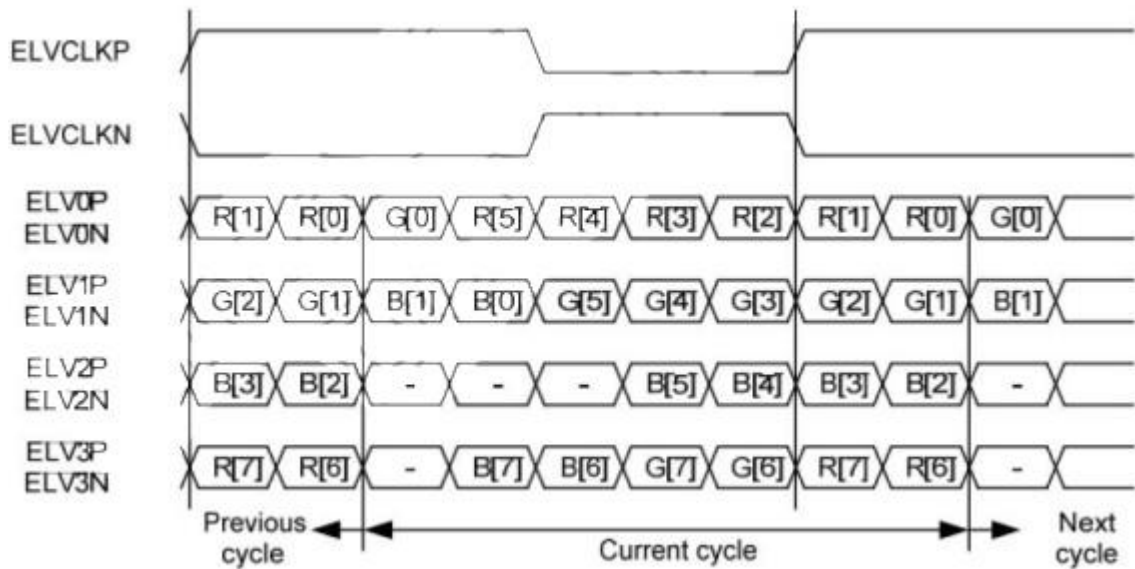
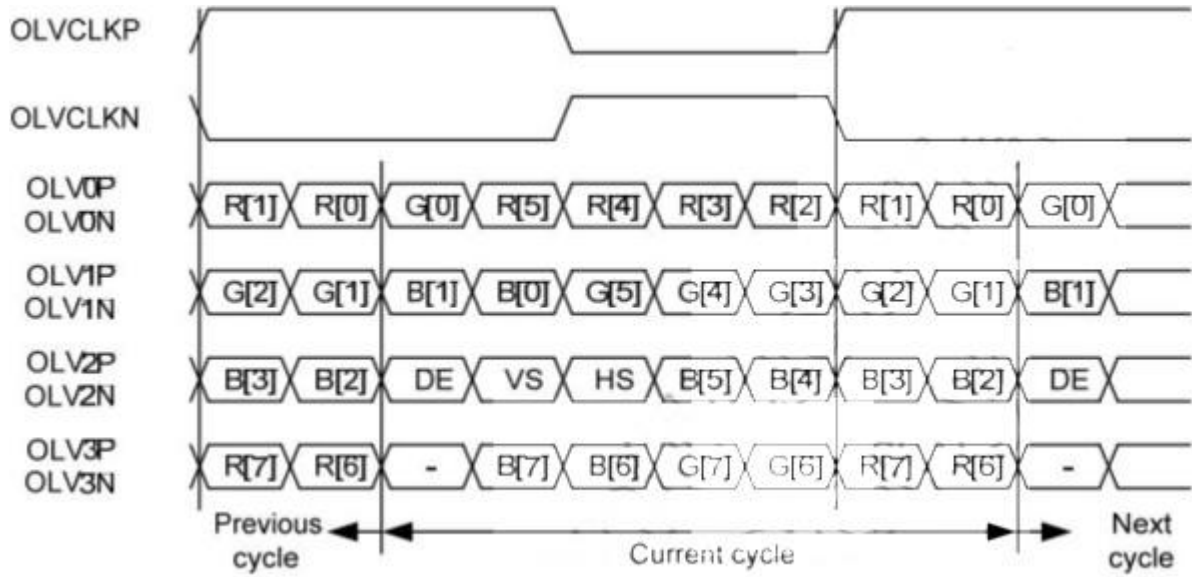
DE mode for 1920RGBx720

Parameter	Symbol	Min	Typ	Max	Unit	Note
DCLK	Fclk	44.8	46.06	49.8	Mhz	
HSD	th	1008	1010	1056	tclk	
	thd		960		tclk	
	thb	48	50	96	tclk	
VSD	tv	740	760	786	th	
	tvd		720		th	
	tvb	20	40	66	th	
Frame rate	Fr	-	60	-	Hz	



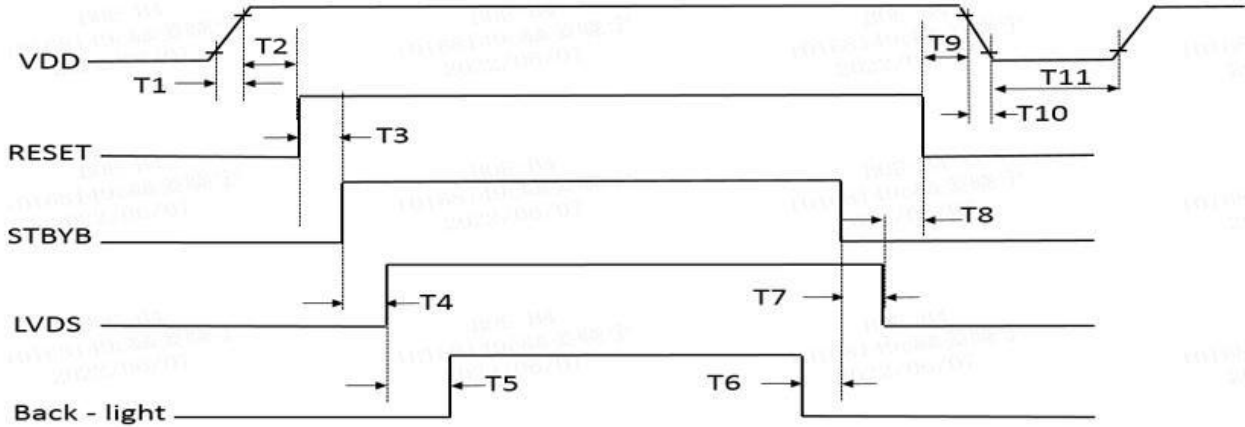


5.2 Data Input Format





5.3 TFT LCM Power ON/OFF Sequence



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	20	-	-	ms
T3	1	-	-	ms
T4	0	-	50	ms
T5	200	-	-	ms
T6	200	-	-	ms
T7	0	-	50	ms
T8	100	-	-	ms
T9	0	-	-	ms
T10	0.5	-	10	ms
T11	1000	-	-	ms

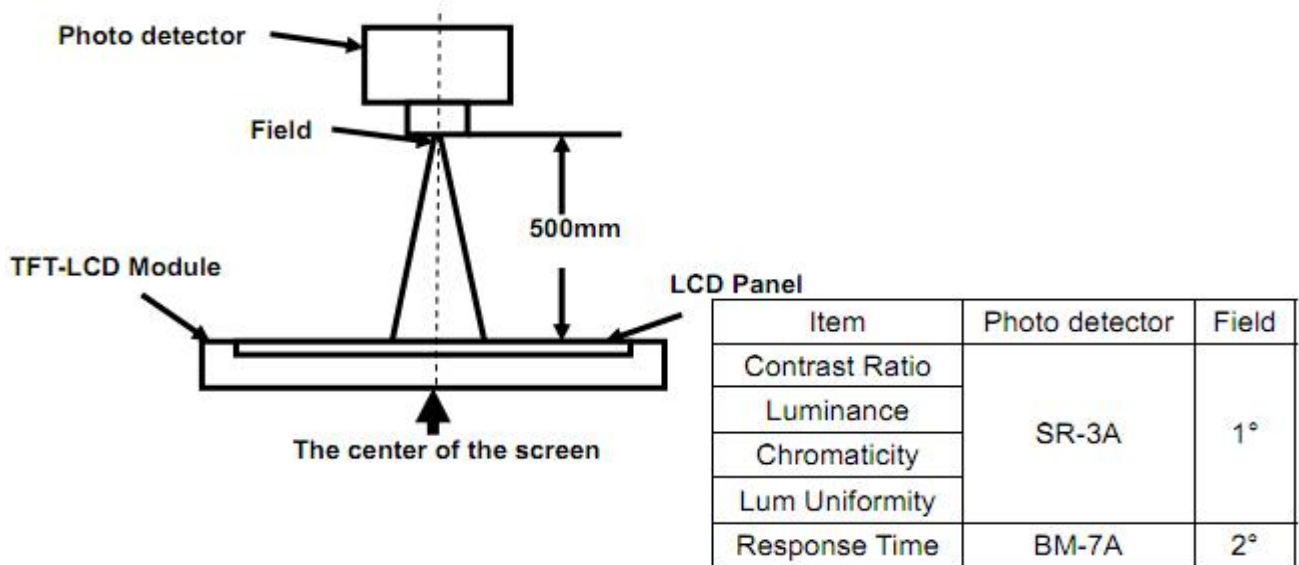


6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10) B/L ON	θ_T	$\Phi=90^\circ$ (12 o'clock)	80	85	-	deg	Note2
	θ_B	$\Phi=270^\circ$ (6 o'clock)	80	85	-	deg	Note2
	θ_L	$\Phi=180^\circ$ (9 o'clock)	80	85	-	deg	Note2
	θ_R	$\Phi=0^\circ$ (3 o'clock)	80	85	-	deg	Note2
Response Time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	15	17	msec	Note4
	T_{OFF}		-	15	17	msec	Note4
Contrast Ratio	CR		800	1000	-	-	Note1 Note3
Color Chromaticity	W_X		0.260	0.310	0.360	-	Note1 Note5
	W_Y		0.280	0.330	0.380	-	Note1 Note5
Luminance	L		800	950	-	cd/m ²	Note1 Note7
Luminance Uniformity	Y_U		70	80	-	%	Note1 Note6
NTSC	-		60	72	-	%	-

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.



Note 2: Definition of viewing angle and measurement system

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

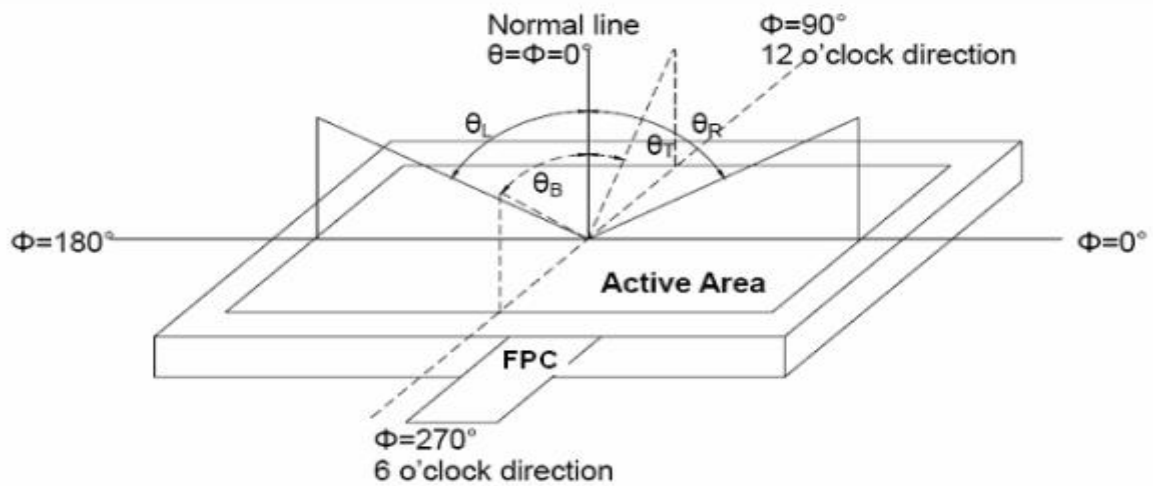


Fig. 1 Definition of viewing angle

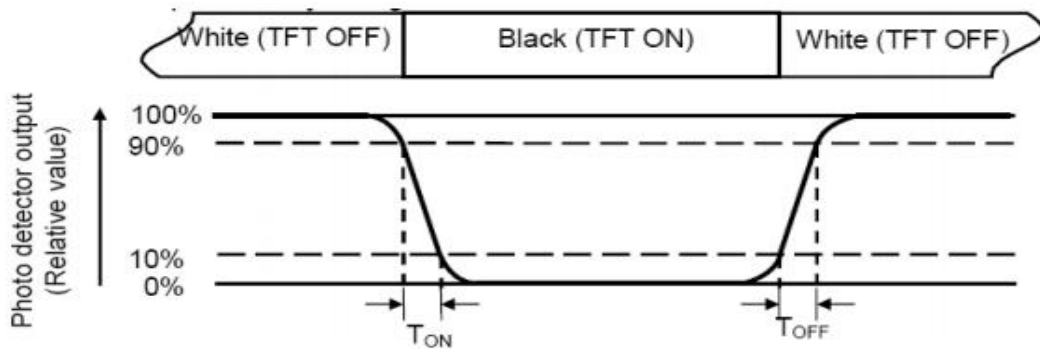
Note 3: Definition of contrast ratio

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$



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

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.2.

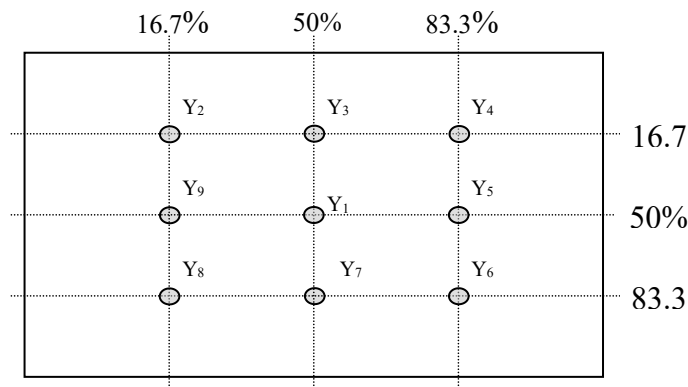


Fig. 2 Definition of points

Note 7: Definition of Luminance (Refer Fig. 2)

Surface luminance is the luminance with all pixels displaying white.

L_v = Average Surface Luminance with all white pixels($P_1, P_2, P_3, \dots, P_n$).



7. Reliability Test Items

Test Item	Test Conditions
High Temperature Storage	Ta= +85°C 96hrs
Low Temperature Storage	Ta= -40°C 96hrs
High Temperature Operation	Ta= +80°C 96hrs
Low Temperature Operation	Ta= -30°C 96hrs
High Temperature and Humidity Storage	Ta= +60°C, 90% RH 96hrs
Thermal Shock (Non-operation)	-40°C/30 min ~ +80°C/30 min for 20 cycles Start with cold temperature end with high temperature
Electro Static Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B R=330Ω,C=150pF
Vibration	Sweep: 10Hz~55Hz~10Hz Stroke: 1.5mm 2 hrs for each direction of X .Y. Z.
Mechanical Shock	60G 6ms,±X,±Y,±Z 3 times for each direction
Package Drop Test	Height: 60 cm 1 corner, 3 edges, 6 surfaces

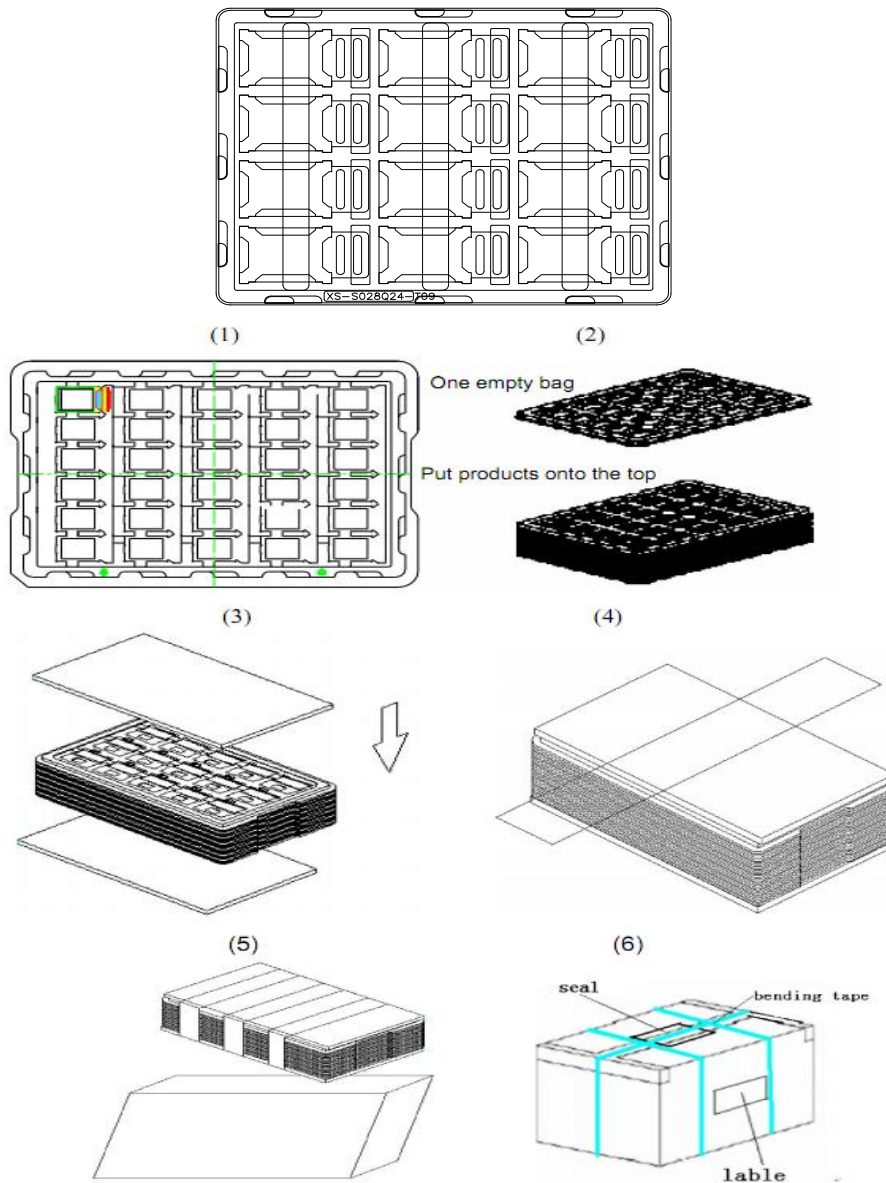
Notes: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

- 1). Air bubble in the LCD
- 2). Seal leak or Glass crack
- 3). Non display or abnormal display
- 4). Brightness reduction >50%



9. Packing

Packing Method



Steps:

1. Put module into tray cavity
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above
4. Fix the cardboard to the tray stack with adhesive tape
5. Put the tray stack into carton
6. Carton sealing with adhesive tape



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
- Ketene
- 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°C ~40°C 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.