Product Specification

Customer: _____

Model Name: GXO46-30MA-A1 _____

Date: _____

Version: _____

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

Contents

1. Record of Revision

Version	Revise Date	Content	Editor
1.0	2022/03/23	First Release.	Gary Luo

2 General Specifications

Feature		Spec
Characteristics	Size	4.58 inch
	Resolution	320(horizontal)*960(Vertical)
	Interface	2 Lane mipi
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (um)	114.9x114.9
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	LCD Driver IC	-
	Viewing Direction	ALL
	Gray Scale Inversion Direction	ALL
Mechanical	LCM (W x H x D) (mm)	41.57*118.8*2.5
	Active Area(mm)	36.768 x 110.304
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	8 LED

Note 1: Viewing direction is following the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS

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

3 Input/Output Terminals

Pin.No	Symbol	Function
1	VLED+	Power for LED backlight (Anode)
2-3	VLED-	Power for LED backlight (Cathode)
4	VCI	Power Supply 2.8V
5	IOVCC	Power Supply 1.8V-2.8V
6	RSTB	LCM RESET signals
7	TE	Tearing effect output
8	PWM	The PWM frequrncy output for LCD driver control
9	GND	Power ground
10	D0P	DSI-D0+data signals
11	D0N	DSI-D0-data signals
12	GND	Power ground
13	D1P	DSI-D1+data signals
14	D1N	DSI-D1-data signals
15	GND	Power ground
16	CLKP	DSI-Clock+
17	CLKN	DSI-Clock-
18	GND	Power ground
19-20	NC	NC
21	GND	Power ground
22-23	NC	NC
24	GND	Power ground
25	TP_INT	Touch Interrupt
26	TP_SDA	Touch IIC Data signal
27	TP_SCL	Touch IIC Clock signal
28	TP_RESET	Touch Reset Signal
29	TP_VCI	Touch Power supply
30	TP_IOVCC	Touch Power supply

4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.3	3.6	V	
Input Signal Voltage	V_{in}	-0.3	VDD+0.3	V	
Logic Output Voltage	V_{OUT}	-0.3	VDD+0.3	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

5 Electrical Characteristics

5.1 Operating conditions:

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Power Voltage	V_{cc}	3.0	3.3	3.6	V	
MIPI Supply Voltage	Vcc_IF	1.4	--	1.6	V	
VDD Input high voltage level	VIH	0.7*VDD	-	VDD	V	
VDD Input low voltage level	VIL	0	-	0.3*VDD	V	
VDD Output high voltage level	VOH	0.8*VDD	-	-		
VDD Output low voltage level	VOL	VOL	-	-	V	

5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I_F	-	40	-	mA	
Power Consumption			-	-	mW	
LED Voltage	V_F	11.2	12	12.8	V	Note 1
LED Life Time	W_{BL}	25000		-	Hr	Note 2,3

Note 1 : There are 4*2 Groups LED
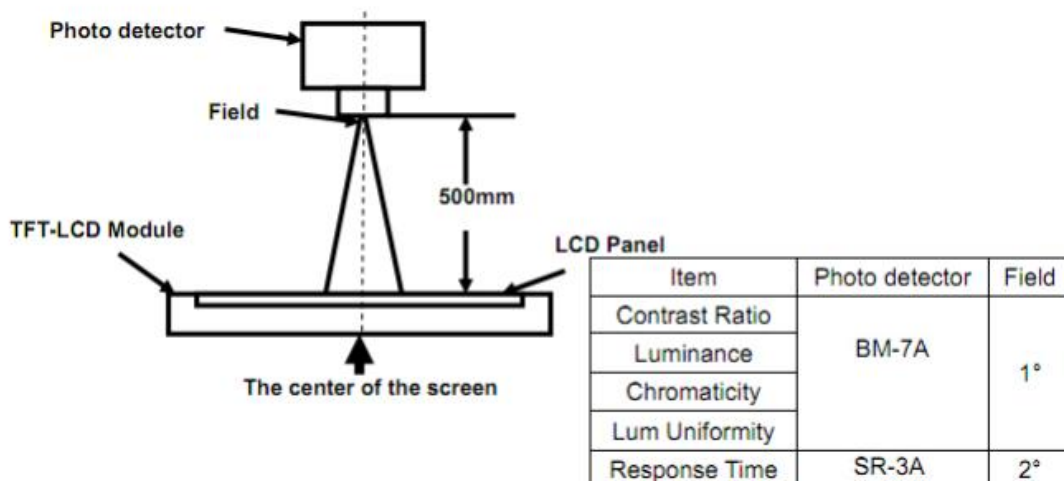
Note 2 : Ta = 25℃

Note 3 : Brightess to be decreased to 50% of the initial value

6. Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10	-	80	-	Degree.	Note2
		θ_B		-	80	-		
		θ_L		-	80	-		
		θ_R		-	80	-		
Contrast Ratio		CR	Θ =0	1000	1200	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	25	35	ms	Note1, Note4
		T_{OFF}		-	25	35		
Chromaticity	White	X_W	Backlight is on	-	0.302	-	-	Note1, Note5
		Y_W		-	0.319	-	-	
	Red	X_R		-	0.590	-	-	
		Y_R		-	0.347	-	-	
	Green	X_G		-	0.340	-	-	
		Y_G		-	0.581	-	-	
	Blue	X_B		-	0.153	-	-	
		Y_B		-	0.104	-	-	
Uniformity		U		80	-	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		L		260	300			Note1, Note7

Test Conditions:

1. IF= 20mA (one channel),the ambient temperature is 25℃.

2. The test systems refer to Note 1 and Note 2.

Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	2°

Note 2: Definition of viewing angle range and measurement system.
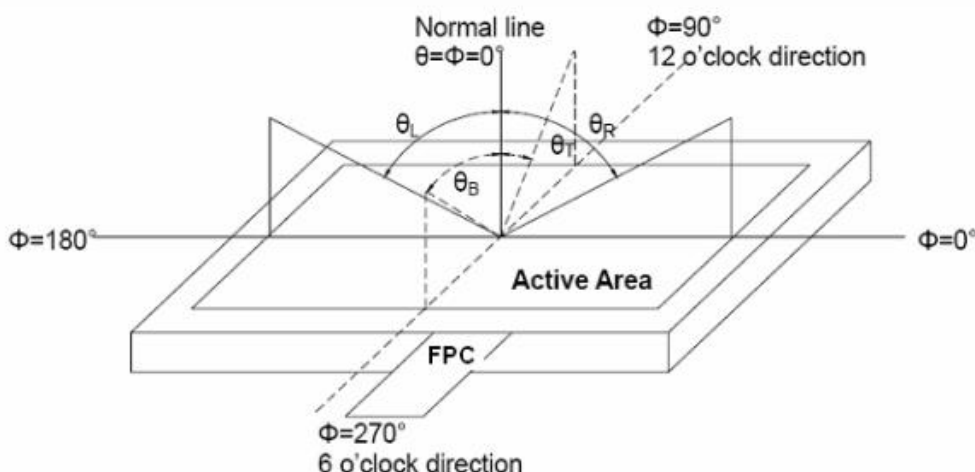Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

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%.
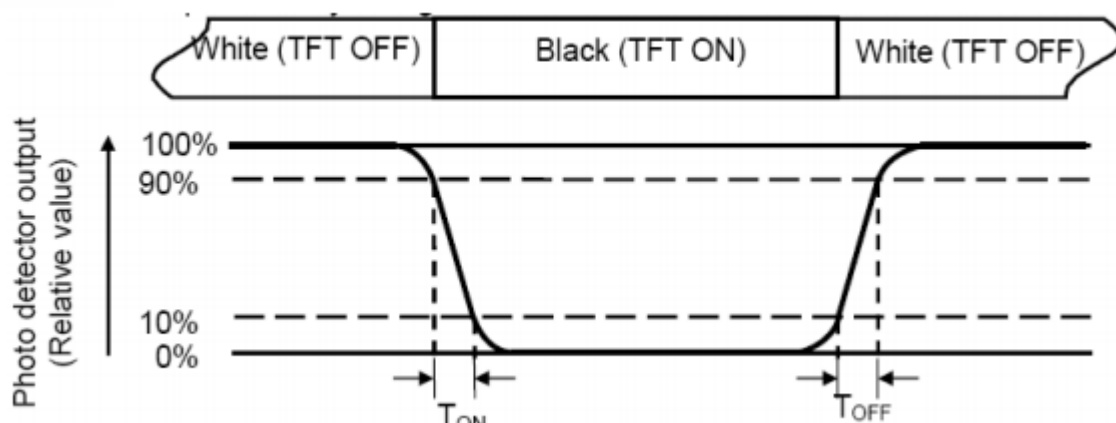
Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.
Note 6: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the Center of each measuring area
Luminance Uniformity (U) = Lmin/ Lmax100%
L-------Active area length W----- Active area width
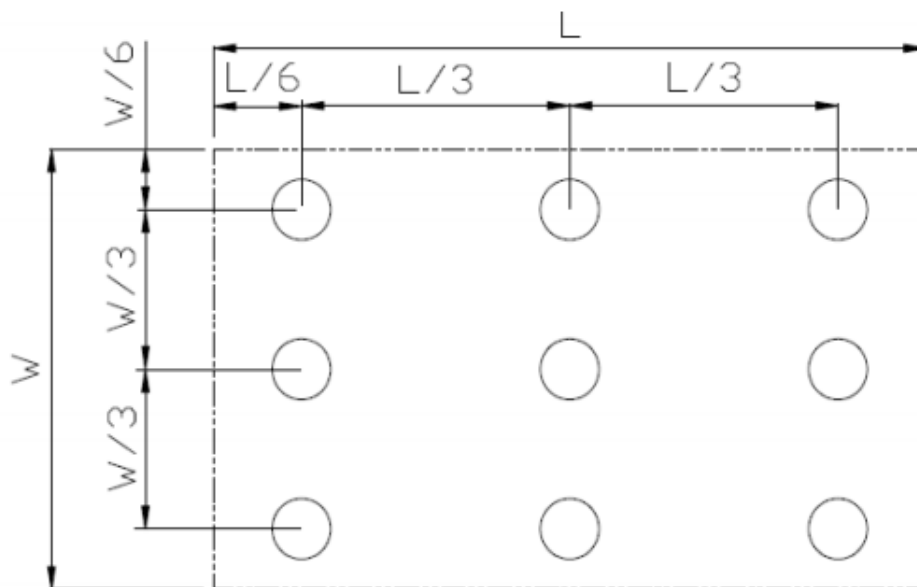

Fig. 2 Definition of uniformity

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.
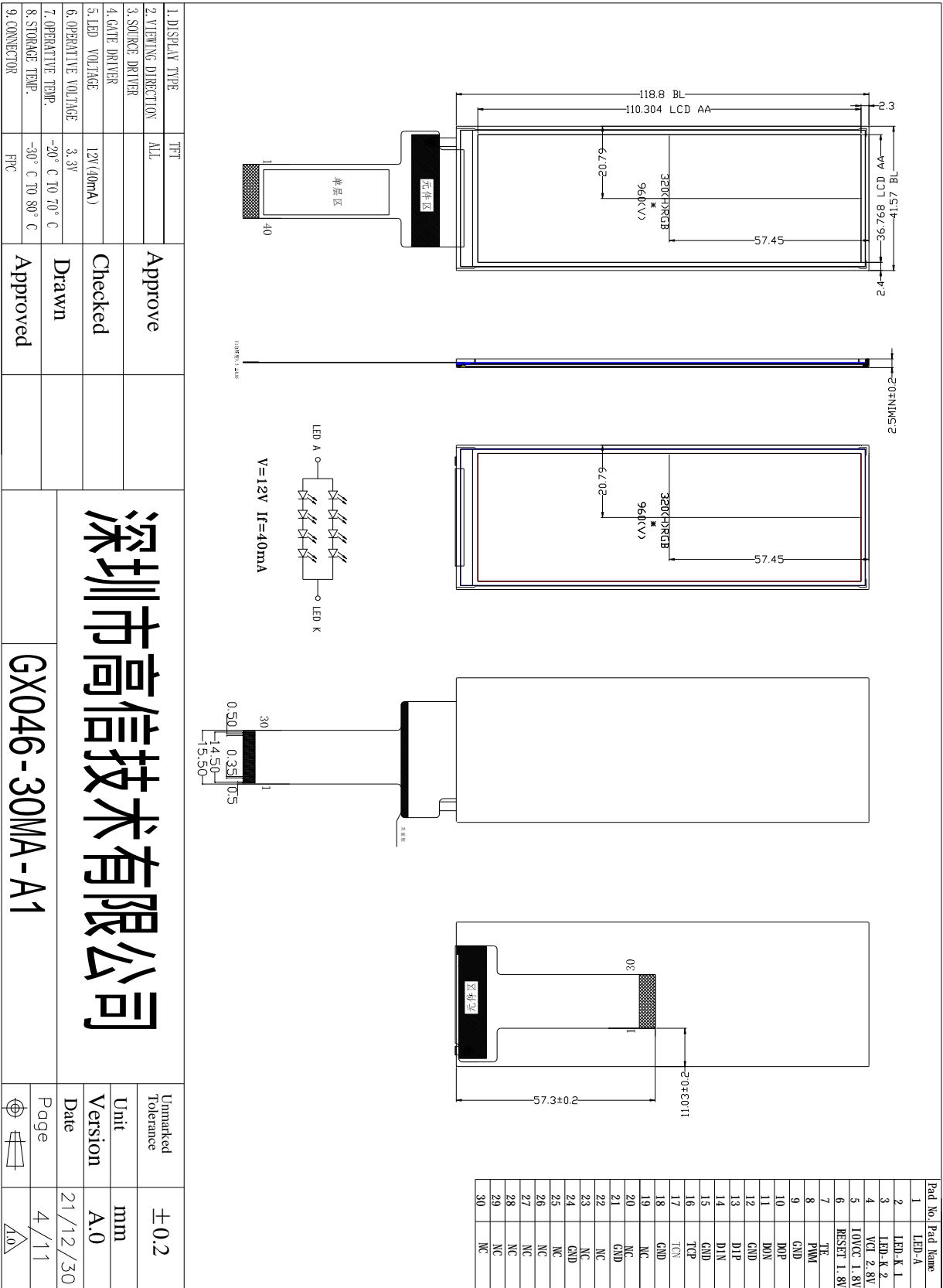
7. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.
    2. Ta is the ambient temperature of sample.

8. Mechanical Drawing

No.	Item	Value
1.	DISPLAY TYPE	TFT
2.	VIEWING DIRECTION	ALL
3.	SOURCE DRIVER	
4.	GATE DRIVER	
5.	LED VOLTAGE	12V (40mA)
6.	OPERATIVE VOLTAGE	3.3V
7.	OPERATIVE TEMP.	−20°C TO 70°C
8.	STORAGE TEMP.	−30°C TO 80°C
9.	CONNECTOR	FPC

Approve	
Checked	
Drawn	
Approved	

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Unmarked Tolerance	±0.2
Unit	mm
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LED A — LED K
V=12V If=40mA

Drawing dimensions: 118.8 BL, 110.304 LCD AA, 2.3, 20.79, 320(H)RGB×960(V), 36.768 LCD AA, 41.57 BL, 57.45, 2.4, 2.5 MIN±0.2, 57.3±0.2, 110.03±0.2, 0.50, 14.50, 15.50, 0.35, 0.5

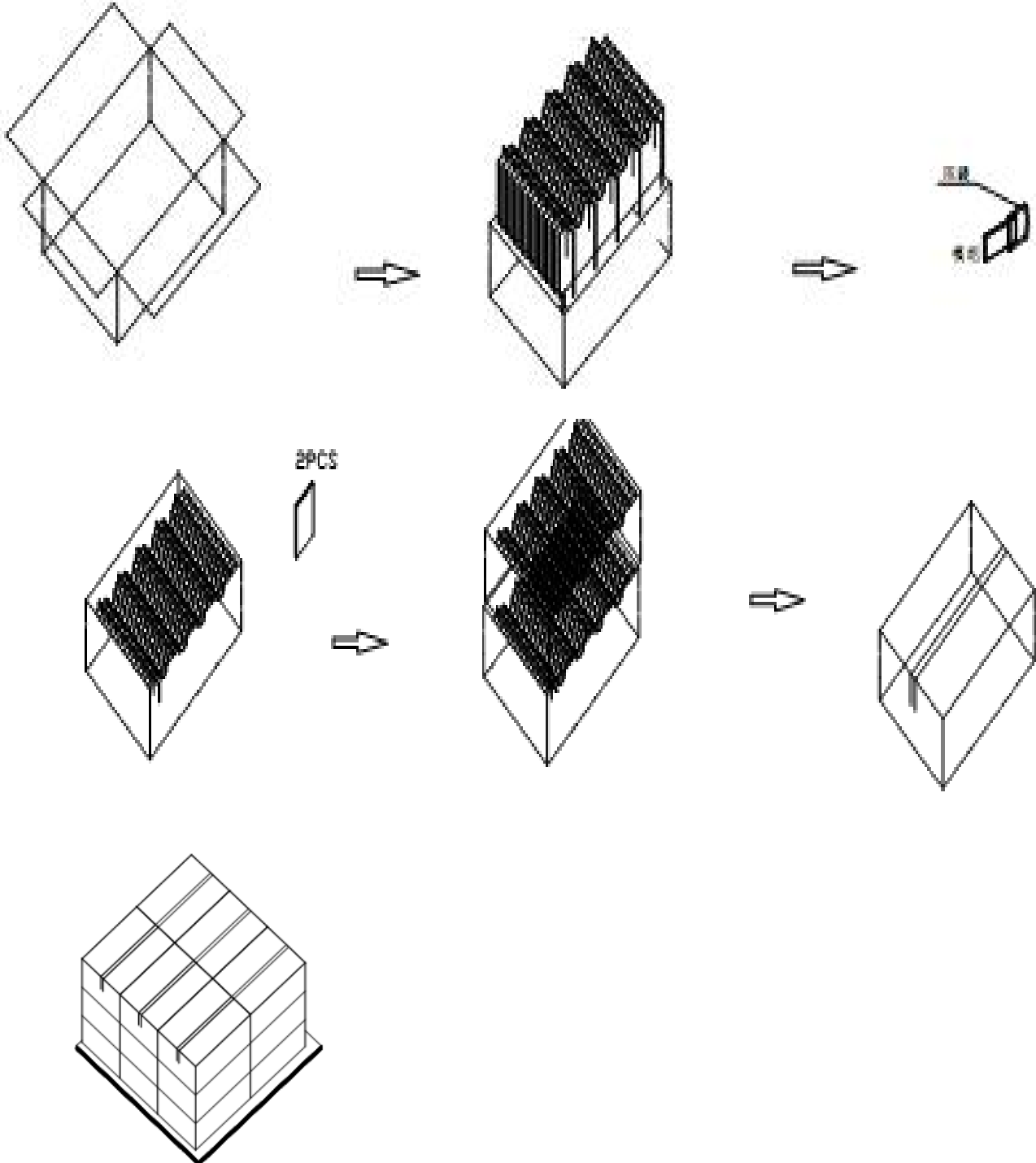| Pad No.	Pad Name
1	LED A
2	LED K 1
3	LED K 2
4	VCI 2.8V
5	IOVCC 2.8V
6	RESET 1.8V
7	TE
8	PWM
9	GND
10	DIP
11	DIN
12	GND
13	IIP
14	IIN
15	GND
16	TCP
17	TCN
18	GND
19	NC
20	GND
21	NC
22	NC
23	NC
24	GND
25	NC
26	NC
27	NC
28	NC
29	NC
30	NC

9. Packing

Packing Method

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℃ ～ 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.