PRODUCT SPECIFICATION

Customer	
Project	
Part No.	**Z15002-KFJ-789V-Y2**
Remarks	□APPOVAL FOR SPECIFICATION ONLY ■APPOVAL FOR SPECIFICATION AND SAMPLE

CUSTOMER			**ZHUNYIKEJI**		
Approved By	Checked By	Prepared By	Approved By	Checked By	Prepared By
					YAN, Yan

Revision Record

Rev. No.	Date	Description
V1.0	2020-9-12	Preliminary Specification Release.
V2.0	2020-9-15	Change PIN foot order

Contents

1. General Specifications

No.	Item	Standard Value	Unit
1	Resolution	240 × RGB × 240	pixel
2	LCM Outline Dimension	31.52（W）× 33.72（H）× 1.94(T)	mm
3	LCD Outline Dimension	30.12（W）× 33.12（H）× 0.8(T)	mm
4	LCD Active Area	27.72 × 27.72	mm
5	Pixel Pitch	0.1155 × 0.1155	mm
6	Display Mode	Normal Black	
7	Pixel Arrangement	RGB Vertical Stripe	
8	Viewing Angle	ALL	
9	Color Configuration	RGB	
10	LCD Transmittance	Typ.: 4.9% Min.: 4.4%	
11	LCD Contrast Ratio	Typ.: 900;Min.:700	
12	FPC Version	Z15002-KFJ V2	
13	Interface	8-bit MCU/16-bit MCU	
14	Operating Temperature	-20°C~ 70°C	
15	Storage Temperature	-30°C~ 80°C	
16	Backlight Arrangement	LED/3 Parallel(3 lights in total)	
17	Luminance	-	nit
18	Weight	-	

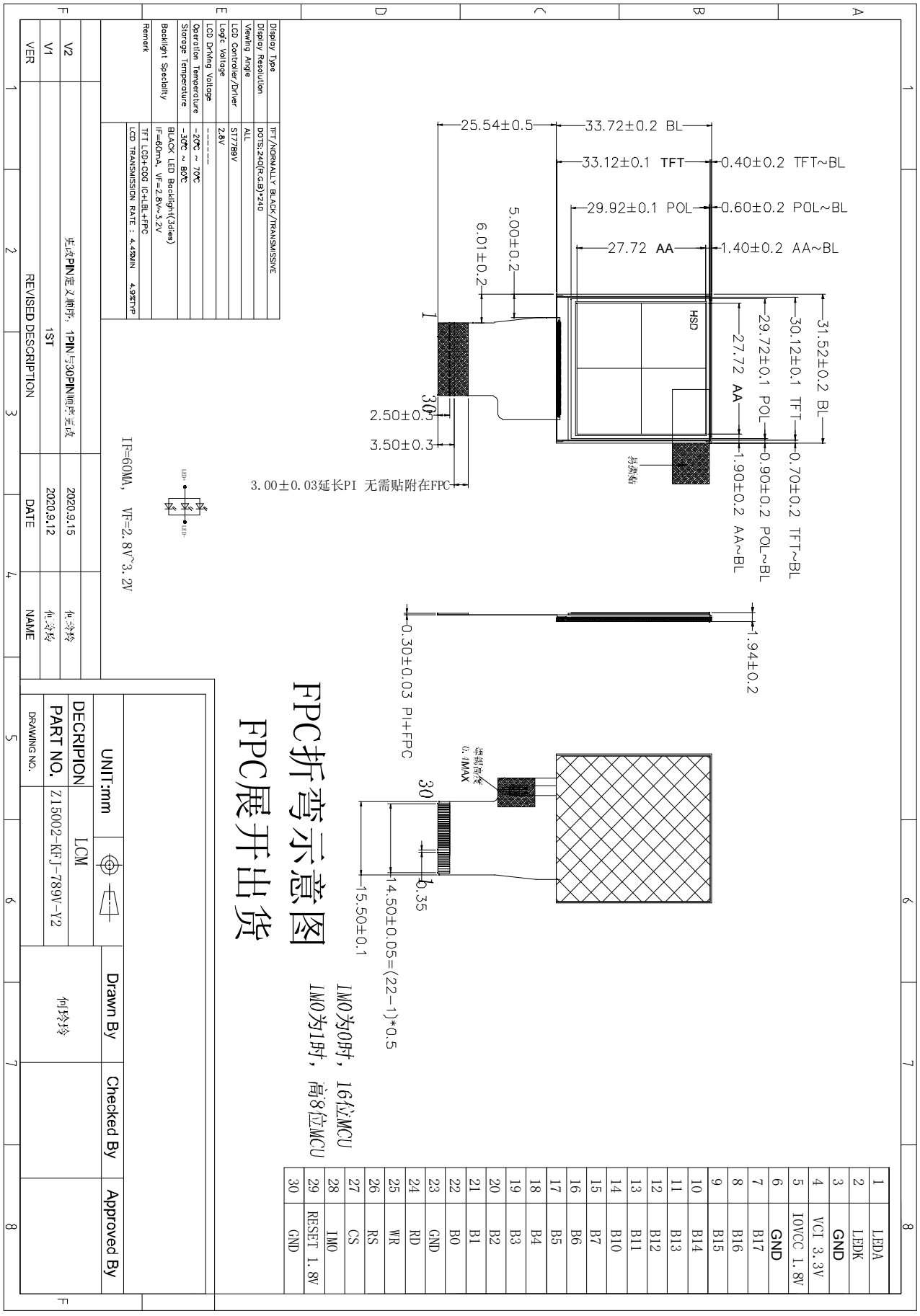
Zhunyi Technology can promise the consistency of the same batch of products. Therefore, there is no commitment to consistency between different batches.

2. Interface Definition Description

PIN NO.	PIN DEF.	FUNCTION DESC.
1	LED-A	POWER SUPPLY+ FOR BACKLIGHT
2	LED-K	POWER SUPPLY- FOR BACKLIGHT CATHODE
3	GND	Ground
4	VDD	POWER SUPPLY（3.3V）
5	VDDI	POWER SUPPLY（1.8V）
6	GND	Ground
7	B17	MCU parallel interface data bus.
8	B16	MCU parallel interface data bus.
9	B15	MCU parallel interface data bus.
10	B14	MCU parallel interface data bus.
11	B13	MCU parallel interface data bus.
12	B12	MCU parallel interface data bus.
13	B11	MCU parallel interface data bus.
14	B10	MCU parallel interface data bus.
15	B7	MCU parallel interface data bus.
16	B6	MCU parallel interface data bus.
17	B5	MCU parallel interface data bus.
18	B4	MCU parallel interface data bus.
19	B3	MCU parallel interface data bus.
20	B2	MCU parallel interface data bus.
21	B1	MCU parallel interface data bus.
22	B0	MCU parallel interface data bus.
23	GND	Ground
24	RD	Read strobe signal.
25	WR	Write strobe signal.
26	RS	Ground
27	CS	Chip selection signal.
28	IM0	IM0→0，16-bit MCU（B0-B7,B10-B17） IM0→1，8-bit MCU (B10-B17),B0-B7→GND
29	RESET	Reset Signal pin（1.8V）
30	GND	Ground

RESET voltage should be consistent with VDDI voltage, or there probably is black screen fault when power on.

3. Drawing



1	LEDA
2	LEDK
3	GND
4	VCI 3.3V
5	IOVCC 1.8V
6	GND
7	B17
8	B16
9	B15
10	B14
11	B13
12	B12
13	B11
14	B10
15	B7
16	B6
17	B5
18	B4
19	B3
20	B2
21	B1
22	B0
23	GND
24	RD
25	WR
26	RS
27	CS
28	IM0
29	RESET 1.8V
30	GND

Display Type	TFT/NORMALLY BLACK/TRANSMISSIVE		
Display Resolution	DOTS:240(R.G.B)*240		
Viewing Angle	ALL		
LCD Controller/Driver	ST7789V		
Logic Voltage	2.8V		
LCD Driving Voltage	------		
Operation Temperature	-20℃ ~ 70℃		
Storage Temperature	-30℃ ~ 80℃		
Backlight Specialty	BLACK LED Backlight(3slies) IF=60mA, VF=2.8V~3.2V		
Remark	TFT LCD+COG IC+LBL+FPC LCD TRANSMISSION RATE : 4.42MIN 4.92TYP		
VER	REVISED DESCRIPTION	DATE	NAME
V2	定义顺序，1PIN与30PIN顺序更改	2020.9.15	何玲玲
V1	1ST	2020.9.12	何玲玲

UNIT:mm			
DECRIPION	LCM		
PART NO.	Z15002-KFJ-789V-Y2		
DRAWING NO.	Drawn By	Checked By	Approved By
	何玲玲		

4. Electrical Specifications

4.1. DC Specifications

Item	Symbol	Specification			Unit
		Min.	Typ.	Max.	
TFT Gate On Voltage	VGH	-	12	-	V
TFT Gate Off Voltage	VGL	-	-7	-	V
TFT Common Electrode Voltage	Vcom	-	0	-	V

4.2. Typical Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit
Analog Supply Voltage	VCI	2.7	2.8	3.3	V
Digital Supply Voltage	VDD	2.7	2.8	3.3	V
I/O Supply Voltage	IOVCC	1.65	1.8	3.3	V
Input High Voltage	VIH	0.8 × IOVCC	-	IOVCC	V
Input Low Voltage	VIL	0	-	0.2 × IOVCC	V
Output High Voltage	VOH	0.8 × IOVCC	-	-	V
Output Low Voltage	VOL	-	-	0.2 × IOVCC	V

4.3. Backlight Circuit Specifications

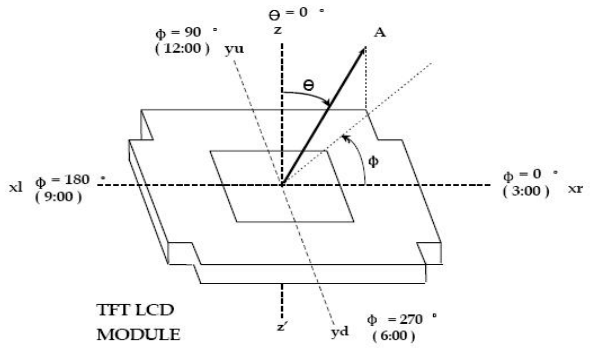
Item	Symbol	Min.	Typ.	Max.	Unit
Current	I_B	-	60	-	mA
Voltage	V_f	2.8	3.0	3.3	V
Power Consumption	PBL	-	180	-	mW

4.4. LCD Power Consumption

Mode	Symbol	Typ.	Max.	Unit
Normal Mode	VCI+IOVCC	-	-	mA
Test Condition: VCI=2.8V，IOVCC=1.8V.				
Interface Drive Type: row flipping or column flipping.				
IPS Type LCD Panel => All Black.				
TN Type => All White.				
Temperature: 25°C.				
Mode	**Symbol**	**Typ.**	**Max.**	**Unit**
Sleep Mode	VCI+IOVCC	-	-	μA
Test Condition: VCI=2.8V, IOVCC=1.8V.				
DC/DC converter is enabled. Internal oscillator is started and panel scanning is started.				
Except for the IC internal crystal oscillator and panel scanning, other functions are suspended.				
Temperature: 25°C.				

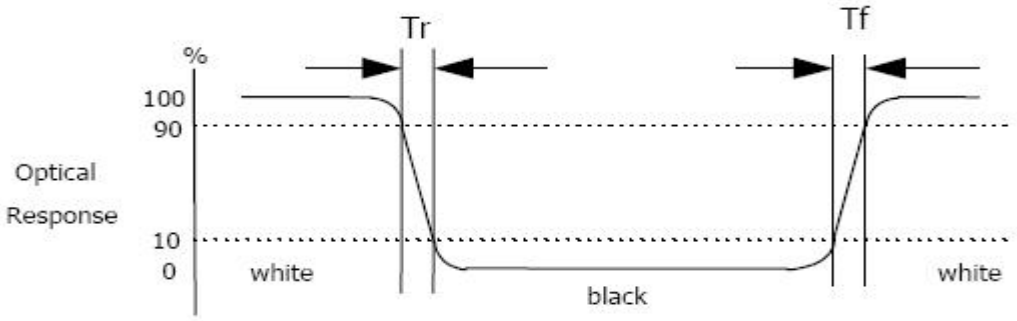
4.5. Measuring System

4.5.1. LCM Viewing Angle



Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

4.5.2. Response Time



Response time is the time required for the display to transition from white to black (Rising time, Tr) and from black to white (Falling time, Tf) for additional information.

4.5.3. Contrast Ratio (CR)

Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

4.6. Power On / Power Off

VDDI and VDDA can be applied or powered down in any order. During the Power Off sequence, if the LCD is in the Sleep Out mode, VDDA and VDDI must be powered down with minimum 120msec. If the LCD is in the Sleep In mode, VDDA and VDDI can be powered down with minimum 0msec after the RESX is released. CSX can be applied at any timing or can be permanently grounded. RESX has high priority over CSX.

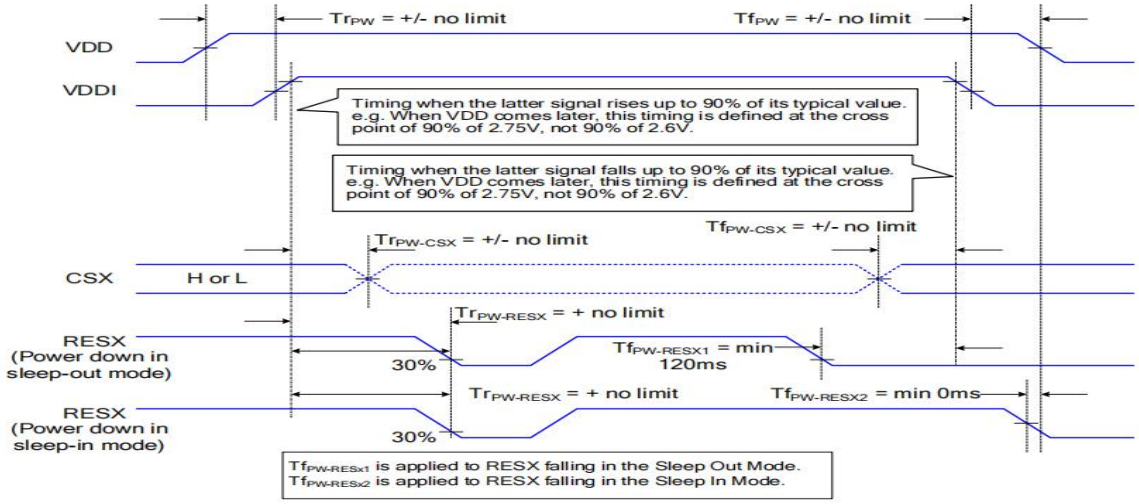
Notes:

1. There will be no damage to the ST7701S if the power sequences are not met.

2. There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.

3. There will be no abnormal visible effects on the display between the end of Power On Sequence and before receiving the Sleep Out command, and also between receiving the Sleep In command and the Power Off Sequence.

4. If the RESX line is not steadily held by the host during the Power On Sequence as defined in Sections 9.1 and 9.2, then it will be necessary to apply the Hardware Reset (RESX) after the completion of the Host Power On Sequence to ensure correct operations. Otherwise, all the functions are not guaranteed. The power on/off sequence is illustrated below



5. Delivery Inspection

No.	Defect	Standard		Defect Grade	Result
1	Spot Defect (including bright spot / color spot / bubble / dark spot, etc.)	< 7 inches (excluding 6.95 and 7 inches) No full fit	Φ ≤ 0.15mm Not limited in number, not dense	Ignore	OK
			0.15mm < Φ ≤ 0.20mm DS ≥ 10mm No.≤ 2	Minor Defect	OK
			Φ > 0.20mm	Serious Defect	NG
		Φ: defect diameter. The above points shall not be dense, and the distance between points shall be greater than or equal to 10mm.			
		< 7 inches (excluding 6.95 and 7 inches) Full fit	Φ ≤ 0.10mm Not limited in number, not dense	Ignore	OK
			0.10mm < Φ ≤ 0.15mm DS ≥ 10mm No.≤ 2	Minor Defect	OK
			Φ > 0.15mm	Serious Defect	NG
		Φ: defect diameter. DS: spacing. The above points shall not be dense, and the distance between points shall be greater than or equal to 10mm.			

		> 7 inches (excluding 6.95 and 7 inches) No full fit	Φ ≤ 0.15mm Not limited in number, not dense	Ignore	OK
			0.15mm < Φ ≤ 0.25mm No.≤ 2	Minor Defect	OK
			Φ > 0.25mm	Serious Defect	NG
		Φ: defect diameter. The above points shall not be dense, and the distance between points shall be greater than or equal to 10mm.			
2	Black spots (including assembly foreign matters)	< 7 inches (excluding 6.95 and 7 inches) No full fit /Full fit	Φ ≤ 0.10mm No.≤ 3 Non dense	Minor Defect	OK
			0.10mm < Φ ≤ 0.15mm No.≤ 2	Minor Defect	OK
			Φ > 0.15mm	Serious Defect	NG
		Φ: defect diameter. The above points shall not be dense, and the distance between points shall be greater than or equal to 10mm.			
		> 7 inches (excluding 6.95 and 7 inches) No full fit	Φ ≤ 0.15mm No.≤ 3 Non dense	Minor Defect	OK
			0.15mm < Φ ≤ 0.20mm No.≤ 2	Minor Defect	OK
			Φ > 0.20mm	Serious Defect	NG
		Φ: defect diameter. The above points shall not be dense, and the distance between points shall be greater than or equal to 10mm.			
3	Polarizer Bubble	Display Area	Judge by Spot Defect		
		Black Edge Area	The distance from the edge of the display area is greater than 0.5mm.	Minor defect	OK
			The distance from the edge of the	Judge by Spot Defect	

			display area is less than 0.5mm.			
4	Polarizer Bump (Mark)	Display Area / Black Edge Area	Invisible when the touch screen or cover plate is assembled.		Minor Defect	OK
5	Color and Luminance	Item	Method	Instrument	Median	Tolerance Range
		Color	x, y Color Coordinate	Optical Instrument BM-7	According to the actual test on the sample confirmed by the customer.	± 0.04
		Luminance	Average the brightness EV at 9 points	Optical Instrument BM-7	According to the actual test on the sample confirmed by the customer.	± 20%
6	Other Standards	Subject to the negotiation by both parties.				
7	Warranty Period	One year after sale.				
8	Websites	Official: https://en.zhunyikeji.com/ Globle Resources: https://zhunyi.manufacturer.globalsources.com/ Alibaba: https://zhunyikeji.en.alibaba.com/ 1688: https://shop9641057ru80o3.1688.com/				

6. Reliability Test

Item	Condition	Result Determination
High-Temperature Storage	80°C 240h	After the test, leave the LCD samples indoors at normal temperature and humidity for 2 - 4h for function and appearance inspection. The sample should meet the requirements on electrical performance, but be free from the following defects: 1. Air bubble in the module, 2. No display, 3. Glass crack.
Low-Temperature Storage	-30°C 240h	
High-Temperature Operation	70°C 240h	
Low-Temperature Operation	-20°C 240h	
High-Temperature and High-Humidity	60°C 90%RH 240h	
Thermal Cycling Test	-30°C/0.5h ~ +80°C/0.5h 24 cycles in total	
Vibration Test	Frequency: 10Hz ~ 55Hz ~ 10Hz Amplitude: 0.75mm x, y, z direction for 1h in total (Packing Condition)	
ESD Test	±3kV Human Body Mode 150pF/330Ω ±6kV Air Mode 150pF/330Ω	

Note:

1) **Each module under test can only be used for one of the test items.**
2) **The quantity of samples for each test item is 2.**
3) **Fault Judgment Criterion: Basic Specifications, Electrical Specifications, Mechanical Specifications, Optical Specifications.**

7. Precautions

7.1. The display screen consists of glass and polarizer. Since the glass is fragile, the user must pay special attention to the edge area, and protect it from falling, vibration, or mechanical impact.

7.2. If the display screen is damaged and the liquid crystal material leaks, be sure not to get any in the mouth. If the liquid crystal material contacts the skin or clothes, flush off with soap and water.

7.3. Do not apply excessive force to the display screen or the joint part, or the color will change. Do not touch the display screen with bare hands, which will stain the display area and degraded insulation between terminals (some of the appearance is determined by the polarizer).

7.4. The polarizer covering the display panel of the LCD module is soft and easy to be scratched, be sure to handle carefully. Do not touch, impact, press, or rub the exposed polarizers with anything harder than an HB pencil lead (e.g.: glass, tweezers, etc.). Do not place or attach anything onto the display area to avoid leaving marks. The condensed material on the surface or terminals due to cold will damage or stain the polarizer. After the test in low temperature environment, the product must be warmed up in a container before put into the room temperature environment.

7.5. If the display panel is stained, blow warm air onto the surface and gently wipe it with a soft and dry cloth. If it is seriously contaminated, wipe it with a wet cloth dipped in one of the following solvents:

- glycerol
- ethyl Alcohol

Do not scrub, and avoid damaging the display panel.

7.6. Solvents other than those mentioned above may damage the polarizer. In particular, never use any of the following solvents:

- water
- ketone
- arene

Wipe off saliva or water drop immediately, the contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil or grease.

7.7. Special note: minimize electrode corrosion. Because electrode corrosion can be accelerated by water droplets, condensation of humidity, or electrification in a high humidity environment.

7.8. Assemble the LCD Module by the mounting holes. Make sure the LCD module make sure there is no bending, distortion, or deformation. Do not forcibly pull or bend the transmission wire or the backlight wire.

7.9. Do not disassemble the LCD module.

7.10. NC terminal should be disconnected. Do not connect any device.

7.11. If the logic circuit power supply is off, do not send the input signal.

7.12. Since the LCD module is integrated with CMOS, pay special attention to the modules. To prevent electrostatic damage, be careful to maintain an suitable work environment.

- Make sure the module has the same potential as the human body before take the LCD module out of the packing box for assembly. The reliable grounding is necessary during module processing.
- The required tool, such as the electric soldering iron, must be reliably grounded. Make sure the it is connected to AC power supply, and no electric leakage. When fixing the module with electric screwdriver, it must be grounded, to reduce the electromagnetic wave generated by the electric commutator spark as much as possible.
- Do not assemble or operate under dry condition to reduce the static electricity. To reduce static electricity, the workplace must not be too dry. The recommended relative humidity is 50 - 60%. Keep your work clothes and work table grounded as much as possible
- The LCD module is coated with a film to protect the display surface. Be careful when peeling off the film to reduce the generated static electricity.

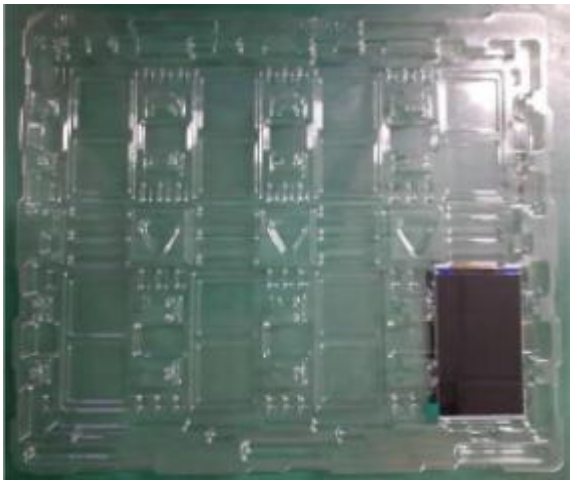
7.13. Since the LCD module has high precision assembly and regulation, try to avoid excessive impact on the module or making any changes:

- Do not change the shape of the tab on the metal frame.
- Do not drill any extra hole, modify the shape, or change the position of component on the printed circuit board.
- Do not change or damage the pattern on the printed circuit board.
- Never modify the zebra strip (conductive rubber) or heat seal connector.
- Do not make any change with the electric soldering iron except for the joint.
- Do not throw, bend or twist.

8. Packing and Storage

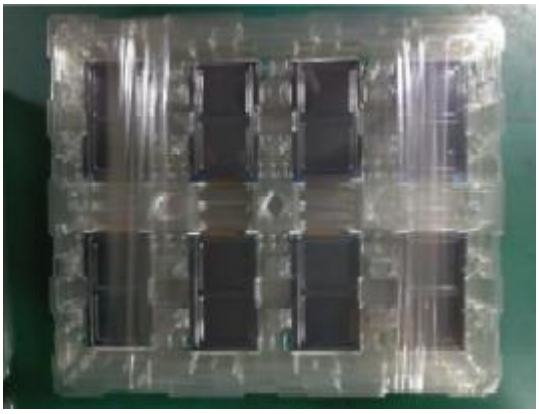
8.1. Packing Method

Step 1



Put the products into a vacuum formed tray one by one. Each vacuum formed tray can hold 8 products in total.

Step 2



Layer the vacuum formed trays in stagger, and then wrap them with the tape.

Step 3

Put the packaged products into the carton, and fix the vacuum formed trays with the EPE to protect the products.

Step 4

The cartons should be taped and shipped with labels.

8.2. Storage Method

Store in an ambient temperature of 23±5°C, and in a relative humidity of 60±15%. The storage period should not exceed 12 months. Do not expose to the sun for a long period of time.

8.2.1. Store in clean environment, free from dust, active gas, or solvent.

8.2.2. Store in anti-static environment.

8.3. Nomenclature

PART NO: Z 4 3 0 1 4 - P 4 0 - S 7 8 3 - Y 1

- Y 1 → Version Number of Display Screen
- S 7 8 3 → Abbreviation of IC Model Number
- P 4 0 → Project Name
- 0 1 4 → Product ID
- 4 3 → LCD Dimension
- Z → Abbreviation of Company Name

8.4. Label

Shenzhen Zhunyi Technology Co., Ltd.		
Product:	Display Screen	LEVEL:3
Spec.:		
P/N:		
Lot:		
D/C		
Qty.:		
Supplier Code:		
PO		
R/K		
Version: A		XXXXXXX, YYYY-00000000000000000, KKKK, WWWW, AAAAA.