PRODUCT SPECIFICATION

Customer	
Project	
Part No.	Z35039-P50T
Remarks	□APPOVAL FOR SPECIFICATION ONLY ■APPOVAL FOR SPECIFICATION AND SAMPLE

CUSTOMER			ZHUNYIKEJI		
Approved By	Checked By	Prepared By	Approved By	Checked By	Prepared By
				Shi Jin	Yang ZiFeng

Revision Record

Rev. No.	Date	Description
V1.0	2022-12-16	Preliminary Specification Release.

Contents

1. General Specifications

No.	Item	Specification	Unit
1	Display Size (Diagonal)	3.5	inch
2	Display Resolution	320(H）×RGB×240（V）	pixels
3	Pixel Pitch	219(H）×217.75（V）	um
4	LCM Outline Dimension (Without FPC）	76.9 (W) ×63.9 (H) ×3.1 (T)	mm
5	LCD Active Area	70.08（W）×52.26（H）	mm
6	View Direction (Gray Inversion)	6 O'clock	-
7	Driver IC	SSD2199	-
8	Pixel Arrangement	RGB-Stripe	-
9	Display Mode	Normal White	-
10	Pixel driving Element	a-Si TFT	-
11	LCD Transmittance	/	-
12	LCD Contrast Ratio	Typ.: 400 Min:320	-
13	FPC Version	/	-
14	Interface	MCU/RGB/SPI	-
15	Operating Temperature	-20°C~ 70°C	-
16	Storage Temperature	-30°C~ 80°C	-
17	Backlight Arrangement	LED/6 Series 1 Parallel (6 lights in total)	-
18	Luminance	Typ.:400	nit
19	Weight	/	kg

2. Interface Definition Description

PIN NO.	PIN DEF.	FUNCTION DESC.
1~2	VCI	Power supply for analog
3	VSS	Ground.
4	VDDIO	Voltage input pin for logic I/O
5	VSS	Ground.
6	RESB	System reset pin. - An active low pulse at this pin will reset the IC, Connect to VDDIO in normal operation
7	DC/SDC (RS)	A register select signal. Low: select an index or status register, High: select a control register.
8	$E/\overline{RD}$	6800-system : **E** (enable signal) 8080-system : **RD** (read strobe signal) Serial mode : Not used and should be connected to VDDIO or Vss
9	WR	8080-system : **WR** (write strobe signal)
10	CS	**CS** : Chip select pin
11	SCL	Serial clock input
12	SDO	Data output pin in serial interface
13	SDI	Data input pin in serial interface
14	WSYNC	Ram Write Synchronization output -Leave it OPEN when not used
15~32	DB17~DB0	Data bus.
33	VSS	Ground.
34	DOTCLK	Dot-clock signal and oscillator source.
35	HSYNC	Line Synchronization input
36	VSYNC	Frame/Ram Write Synchronization input
37	OE	Display enable pin from controller.
38	VSS	Ground.
39	PS0	
40	PS1	
41	PS2	Refer of Table1
42	PS3	
43	VSS	Ground.

44~47	NC	Not Connection
48	VSS	Ground.
49	LEDK	Cathode of LED backlight.
50	LEDA	Anode of LED backlight.
RESET voltage should be consistent with VDDI voltage, or there probably is black screen fault when power on.		

Table1

PS3	PS2	PS1	PS0	Interface Mode
0	0	0	0	16-bit 6800 parallel interface (DB1-DB8&DB10-DB17)
0	0	0	1	8-bit 6800 parallel interface (DB10-DB17)
0	0	1	0	16-bit 8080 parallel interface (DB1-DB8&DB10-DB17)
0	0	1	1	8-bit 8080 parallel interface (DB10-DB17)
0	1	0	0	9-bit generic D[17:9] (262k colour) + 3-wire SPI If 65K color, D12 shorts to D17 internally
0	1	0	1	16-bit generic (262k colour)+ 3-wire SPI
0	1	1	0	18-bit generic (262k colour)+ 3-wire SPI
0	1	1	1	6-bit generic D[17:12] (262k colour) + 3-wire SPI
1	0	0	0	18-bits 6800 parallel interface (DB0-17)
1	0	0	1	9-bits 6800 parallel interface (DB9-17)
1	0	1	0	18-bit 8080 parallel interface(DB0-17)
1	0	1	1	9-bit 8080 parallel interface (DB9-17)
1	1	1	0	3-wire SPI
1	1	1	1	4-wire SPI

3. Mechanical Drawing

Front View

Right Side View

Back View

27.41±0.5
63.90±0.2 BL
55.36 FRAME OPEN
52.56 LCD A/A
3.12±0.2
25.85±0.5
7.65
4.50
50
component area
1
25.55

76.90±0.2 BL
72.88 FRAME OPEN
70.08 LCD A/A
320(R.G.B)×240 Dots
3.5" TFT
VIEWING DIRECTION

3.41±0.2
3.20±0.2

0.30±0.03
2-φ1
1.80
0.50
0.50
0.30
0.50
22.20
24.50
25.50
50
3.00
6.50
Z35039-P50T
K A

Z35039-P50T

Display Type | TFT/NORMALLY WHITE/TRANSMISSIVE
Display Resolution | DOTS:320(R.G.B)*240
Viewing Angle | 6 O'CLOCK
LCD Contoller/Driver | SSD2119
Operation Temperature | -20℃ ~ 70℃
Storage Temperature | -30℃ ~ 80℃
Backlight Speciality | White LED Backlight(6 dies) IF=20mA, VF=16.8V~19.8V
TFT LCD+COG IC+LBL+FPC
LCD TRANSMISSION RATE :

450cd/mm(TYP)
Voltage : VF=16.8V~19.8V,18V<(TYP)
Current : IF=20mA
Backlight LED Circuit Diagram

Unmark tolerance:±0.2mm
Materials and processes comply with "RoHS" standards

F						
	VER					
	v1		1ST			
			REVISED DESCRIPTION	2022.12.02	shijin	
		1	2	3	4	
		VER	REVISED DESCRIPTION	DATE	NAME	

UNIT:mm
DECRIPION | LCM
PART NO. | Z35039-P50T
DRAWING NO.

Shenzhen zhunyi Technology Co., Ltd

Drawn By | shijin
Checked By |
Approved By |

PS3	PS2	PS1	PS0	Interface Type	DB pin use
0	0	0	0	MCU 8080-16bit	DB[17:10] DB[8:1]
0	0	0	1	MCU 8080-8bit	DB[17:10]
0	1	1	0	3-wire 9bit data	SDI: In, SDO:Out
0	1	1	1	4-wire 8bit data	SDI: In, SDO:Out
1	1	1	0	SCL,CS,RS, serial interface	SCL,CS,RS, SDI: In, SDO:Out

1.If not use pin,fix it to GND、IOVCC or NC.
2.If use RGB mode,PLS select serial interface

Pin Description:

1	VCI	26	DB5
2	VCI	27	DB4
3	VSS	28	DB3
4	VDDIO	29	DB2
5	VSS	30	DB1
6	RESET	31	DB0
7	DC/SDC	32	VSS
8	E/RD	33	NC
9	WR	34	DOTCLK
10	CS	35	HSYNC
11	SCL	36	VSYNC
12	SDO	37	OE
13	SDI	38	VSS
14	WSYNC	39	PS0
15	HSYNC	40	PS1
16	DB17	41	PS2
17	DB16	42	PS3
18	DB15	43	VSS
19	DB14	44	NC
20	DB13	45	NC
21	DB12	46	NC
22	DB11	47	NC
23	DB10	48	VSS
24	DB9	49	LEDK
25	DB8	50	LEDA

4. Electrical Specifications

4.1. LCD Optical Charcteristics

Item		Symbol	Conditions	Specification			Unit	Note
				Min.	Typ.	Max.		
Transmittance (With PL)		T(%)	Viewing normal angle x = Y =0	-	-	-	%	-
Contrast Ratio		CR		320	400	-	-	-
Response Time		TR+TF		-	25	35	ms	-
Viewing Angle	Hor.	Θx+	CR≧10 at 25℃	45	60	-	deg.	-
		Θx-		45	60	-		
	Ver.	Θy+		25	40	-		
		Θy-		45	60	-		

4.2. Electrical Specifications

Item	Symbol	Specification			Unit
		Min.	Typ.	Max.	
Power For Analog Circuit	AVDD	-	-	-	V
TFT Gate On Voltage	VGH	-	-	-	V
TFT Gate Off Voltage	VGL	-	-	-	V
TFT Common Electrode Voltage	Vcom	-	-	-	V

4.3. Typical Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit
Digital Supply Voltage	VCC	2.5	3.3	3.6	V
I/O Supply Voltage	VDDIO	1.8	-	3.3	V
Input High Voltage	VIH	0.8 × VCC	-	VCC	V
Input Low Voltage	VIL	-0.3	-	0.2 × VCC	V

Output High Voltage	VOH	-	-	-	V
Output Low Voltage	VOL	-	-	-	V

4.4. Backlight Circuit Specifications

Item		Symbol	Min.	Typ.	Max.	Unit	Test Condition
Current		I_B	-	20	-	mA	-
Voltage		V_f	18	19.2	20.4	V	-
LCM Uniformity		-	80	-	-	%	If=20mA
Life Time		-	30000	-	-	Hr.	
Power Consumption		PBL	-	384	-	mW	
LCM Chromaticity Coordinate	Red	Rx	-	0.633	-		Average the brightness EV at 9 points，Optical Instrument BM-7
		Ry	-	0.329	-		
	Green	Gx	-	0.297	-		
		Gy	-	0.577	-		
	Blue	Bx	-	0.133	-		
		By	-	0.129	-		
	White	Wx	-	0.320	-		
		Wy	-	0.360	-		

4.5. LCD Power Consumption

Mode	Symbol	Typ.	Max.	Unit
Normal Mode	VCC+VDDIO	-	-	mA
Test Condition: VCC=3.3V.				
Interface Drive Type: row flipping or column flipping.				
IPS Type LCD Panel => All Black Pattern.				
TN Type LCD Panel => All White Pattern.				
Temperature: 25°C.				
Mode	**Symbol**	**Typ.**	**Max.**	**Unit**

Sleep Mode	VCC+VDDIO	-	-	μA
Test Condition: VCC=3.3V.				
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.				

4.6. Measuring System

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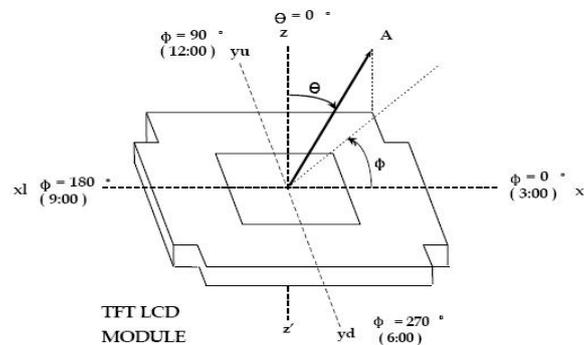
Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

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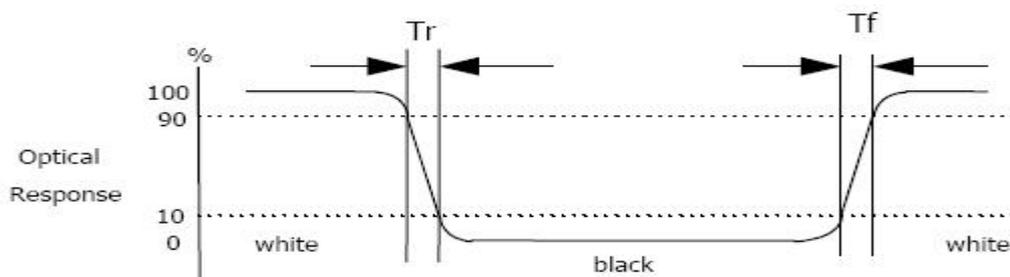
Response time is the time required for the display to transition from white to black (Rising time, Tr) and from black to white (Falling time, Tf) for additional information.

4.6.3. 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.

4.7. Power On / Power Off

4.7.1. Power On/Off
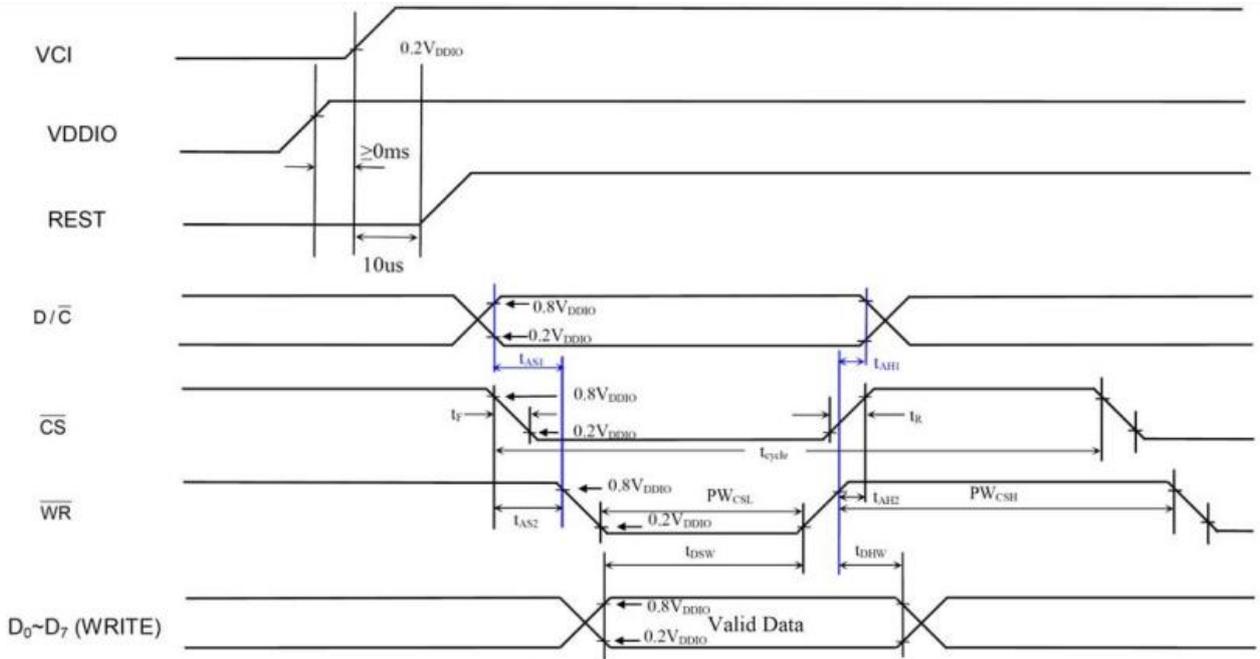
Remark: It's highly recommended that $\overline{RD}$ remains high for the whole write cycle

Read Cycle
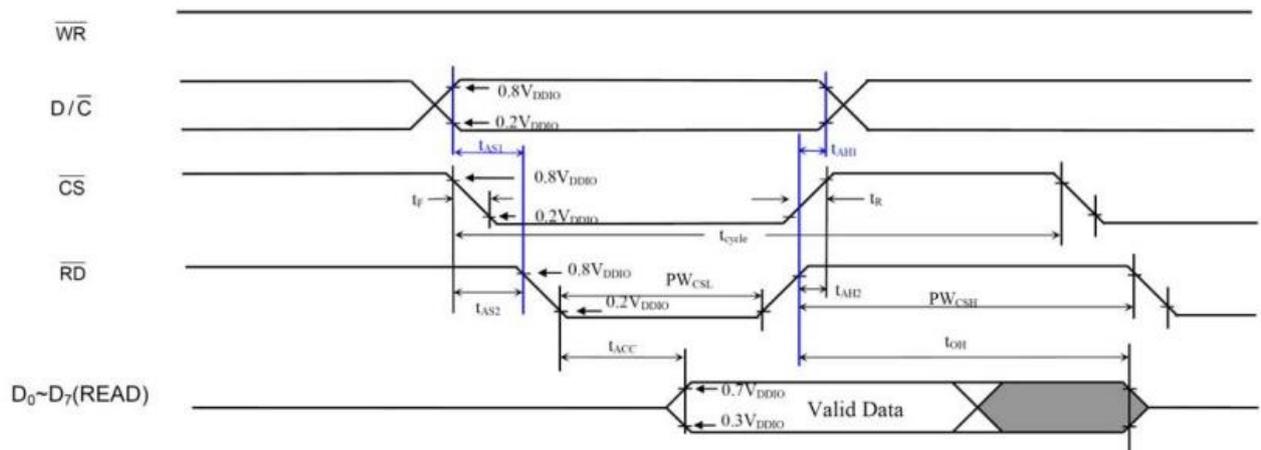
5. Delivery Inspection

5.1. Quality Inspection Environmental Conditions

5.1.1. Viewing distance: the normal viewing distance between the screen and the inspector is 30±5cm；Inspection Angle: 90°±45° (90° indicates that the inspector's perspective is perpendicular to the product to be inspected).

5.1.2. Visual inspection illumination: 1000±200LUX;Electrical inspection illumination: 200±100LUX;Ambient temperature 25±5℃, ambient humidity 55±15%RH.
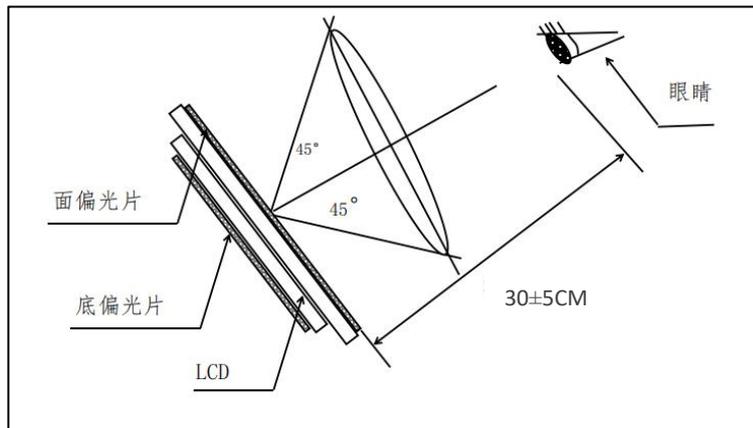
5.2. Quality Inspection Standard

No.	Defect	Standard		Defect Grade	Result
1	Spot Defect (including bright spot / color spot / bubble / dark spot, etc.)	＜ 7 inches	$\Phi \leq 0.10mm$	Ignore	OK
			$0.10mm < \Phi \leq 0.20mm$ $DS \geq 10mm$	Minor Defect	OK
			$\Phi > 0.20mm$	Serious Defect	NG
		≧ 7 inches	$\Phi \leq 0.15mm$	Ignore	OK
			$0.15mm < \Phi \leq 0.25mm$ $DS \geq 10mm$	Minor Defect	OK
			$\Phi > 0.25mm$	Serious Defect	NG
		Φ: defect diameter. DS: spacing.			
2	Linear Defect (scratches,	＜ 7 inches	W≤0.02mm, L: unlimited	Ignore	OK

		0.02mm < W ≤ 0.03mm L ≤ 5mm	Minor Defect	OK
filaments, etc.)		W > 0.03mm	Serious Defect	NG
	≧ 7 inches	W ≤ 0.03mm L: unlimited	Ignore	OK
		0.03mm < W ≤ 0.05mm L ≤ 5mm	Minor Defect	OK
		W > 0.05mm	Serious Defect	NG
	W: defect width. L: defect length. DS: spacing.			

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 display area is less than 0.5mm.	Judge by Spot Defect	

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	Guarantee	ROHS、REACH
9	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 120H	After the test, leave the LCD samples indoors at normal temperature and humidity for 2H 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 120H	
High-Temperature Operation	70°C 120H	
Low-Temperature Operation	-20°C 120H	
High-Temperature and High-Humidity	40°C 90%RH 120H	
Thermal Cycling Test	-20°C/0.5H ~ +70°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	±6kV Human Body Mode 150pF/330Ω ±8kV 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.
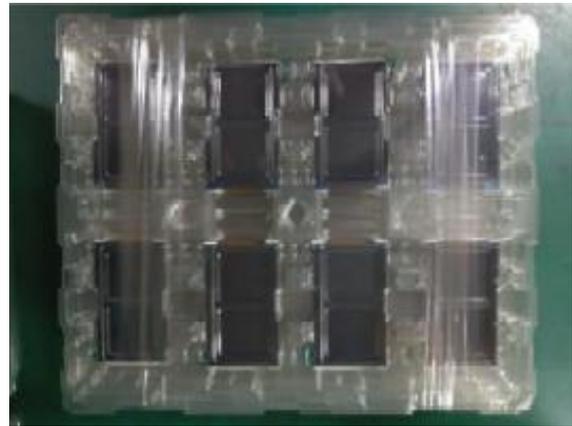
- Do not throw, bend or twist.

8. Packing and Storage

8.1. Packing Method

Step 1

Take 1pcs of the product, put it into a anti-static bag.

Step 2

Take 2 bags of product to place into the carton, make sure they are surface to surface. Put a piece of EPE pad between the carton and the separator to protect the products.

Step 3

Put the products into cartons one by one, each carton contains 60 pieces of products.

Step 4

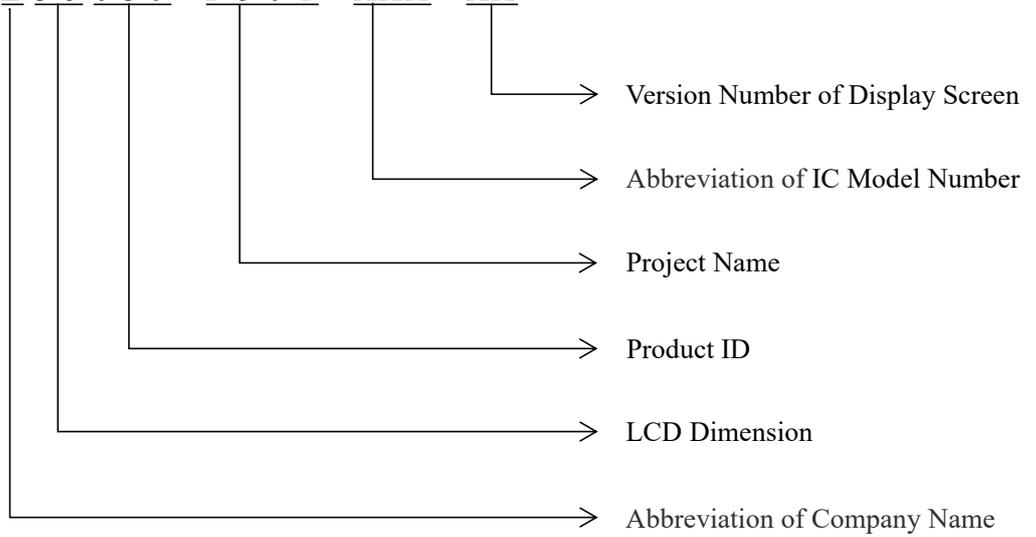The cartons should be taped and shipped with labels.

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 3 5 0 3 9 - P 5 0 T - XXX - XX

→ Version Number of Display Screen

→ Abbreviation of IC Model Number

→ Project Name

→ Product ID

→ LCD Dimension

→ 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.