ISO 9001:2000 FM86067

BONA Display Specialist

BT1000SRTDF

Product

Standard LCD Module
320(RGB) x 240 Dots graphic type
TFT 65K NEGATIVE LCD
COG bonding type
Wide temperature
With LED back light
Rohs Compliance

Version	Prepared / Date	Approved / Date
0	Deng lianfang 5/6-06	Zhanghong 5/6-06

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1. RECORD OF REVISION

Version	Content	Date
0.0	Original	5/6-06

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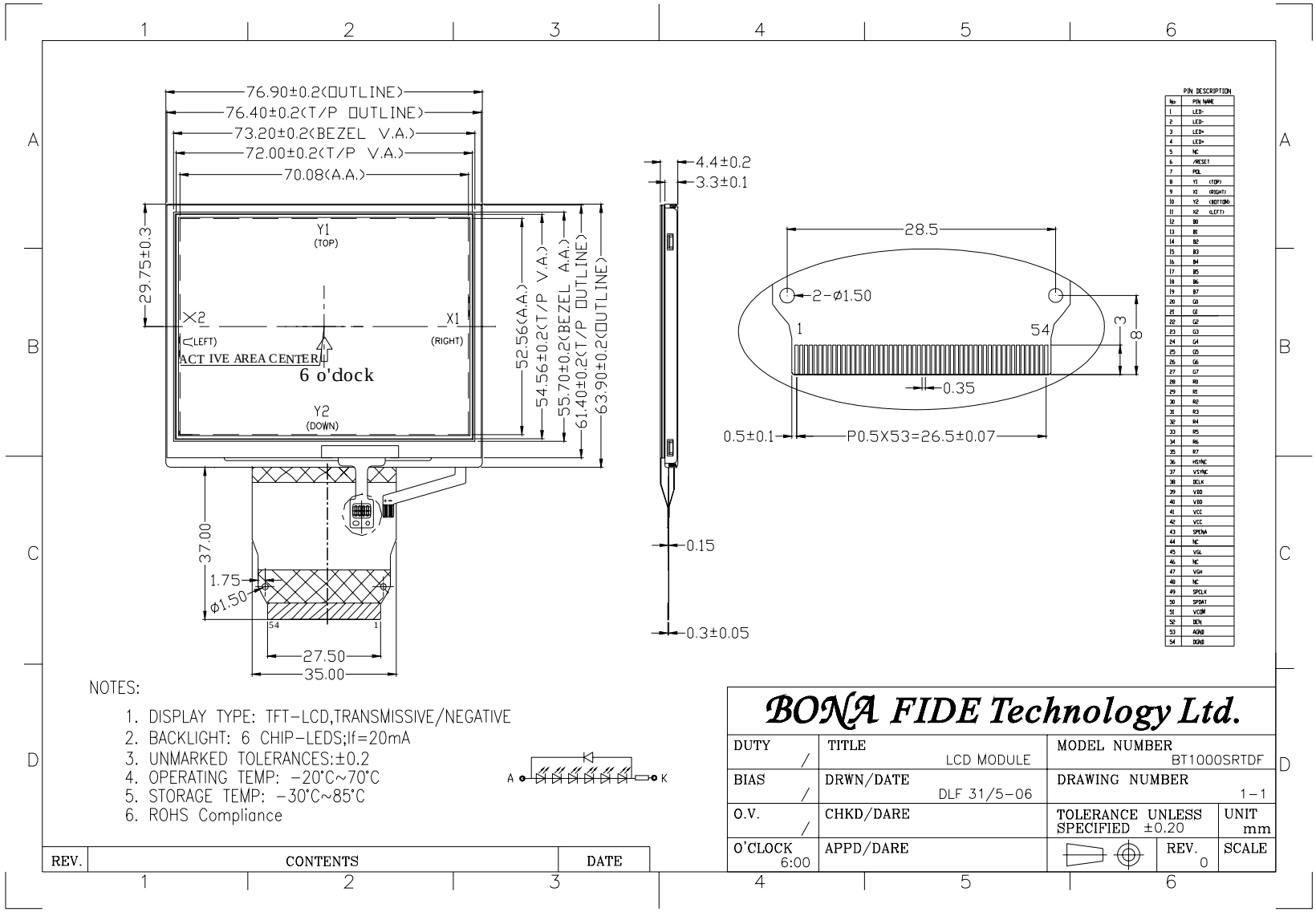
2. PHYSICAL DATA

Item	Contents	Unit
LCD type	TFT 65K Negative Transmissive	---
Viewing direction	6:00	O'clock
Module size (W×H×T)	76.9 × 63.9 × 3.3 MAX	mm
Viewing area (W×H)	72.0 × 54.56	mm
Active area	70.08 x 52.56	mm
Number of dots	320(RGB) × 240	---
Dot pitch (W×H)	0.073 × 0.219	mm
Operation temperature	-20 ~70	℃
Storage temperature	-30 ~85	℃
Driving IC	HX8218A & HX8615A	---
Back light type	6 chip LEDs, If=20mA	---
Interface Mode	24-bit parallel RGB	---

3. OUTLINE DIMENSIONS



NOTES:

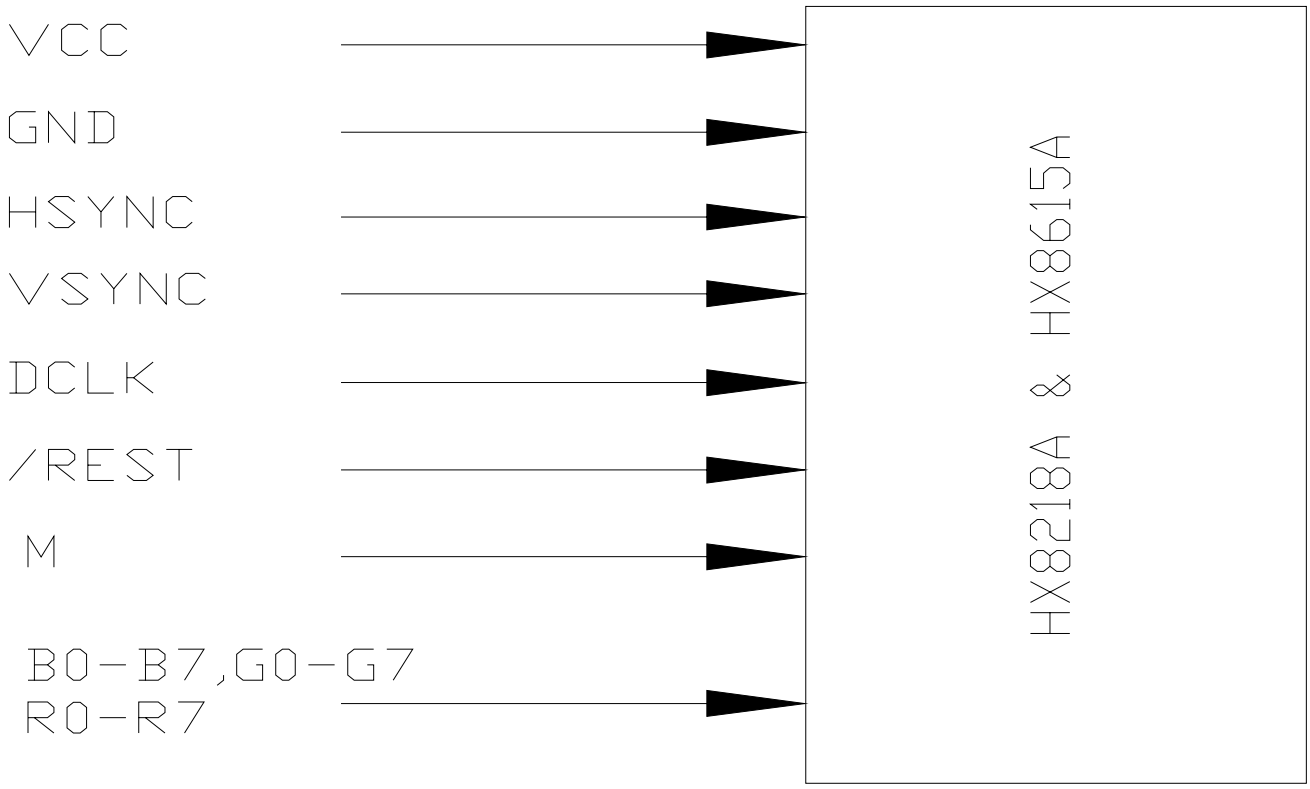
1. DISPLAY TYPE: TFT-LCD,TRANSMISSIVE/NEGATIVE
2. BACKLIGHT: 6 CHIP-LEDS;If=20mA
3. UNMARKED TOLERANCES:±0.2
4. OPERATING TEMP: -20°C~70°C
5. STORAGE TEMP: -30°C~85°C
6. ROHS Compliance

REV.	CONTENTS	DATE

BONA FIDE Technology Ltd.

DUTY /	TITLE LCD MODULE	MODEL NUMBER BT1000SRTDF	
BIAS /	DRWN/DATE DLF 31/5-06	DRAWING NUMBER 1-1	
O.V. /	CHKD/DARE	TOLERANCE UNLESS SPECIFIED ±0.20	UNIT mm
O'CLOCK 6:00	APPD/DARE	REV. 0	SCALE

4. BLOCK DIAGRAM



5. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Min	Max	Unit
Power Voltage	VDD, VCC	GND=0	-0.3	+7.0	V
	VGH	GND=0	-0.3	+32.0	V
	VGL	GND=0	-22.0	+0.3	V
	VGH-VGL	GND=0	-0.3	+45.0	V
Input Signal voltage	VIN	GND=0	-0.3	VDD+0.3	V
Logic Output Voltage	VOUT	GND=0	-0.3	+0.7	V

NOTE:

1. Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

6. ELECTRICAL CHARACTERISTICS

6-1.DC Characteristics

Item	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Power Voltage	VCC	3.0	3.3	3.6	V	
	VDD	3.8	5	5.5	V	
	VGH	-	15.4	-	V	
	VGL	-	-7.7	-	V	
Low level input voltage	VIL	0	-	0.3 VCC	V	CLKIN,HSD,VSD,DIN[7:0],SPCK, SPDA,SPENA
Hight level input voltage	VIH	0.7 VCC	-	VCC	V	CLKIN,HSD,VSD,DIN[7:0],SPCK, SPDA,SPENA
Analog operating current	IVDD	-	-	TBD	mA	FCLKIN=27MHz,FOEH=15.7KHz, VDDA=5V

6-2.AC Characteristics

Please Refer to the SPEC of HX8218A & HX8615A.

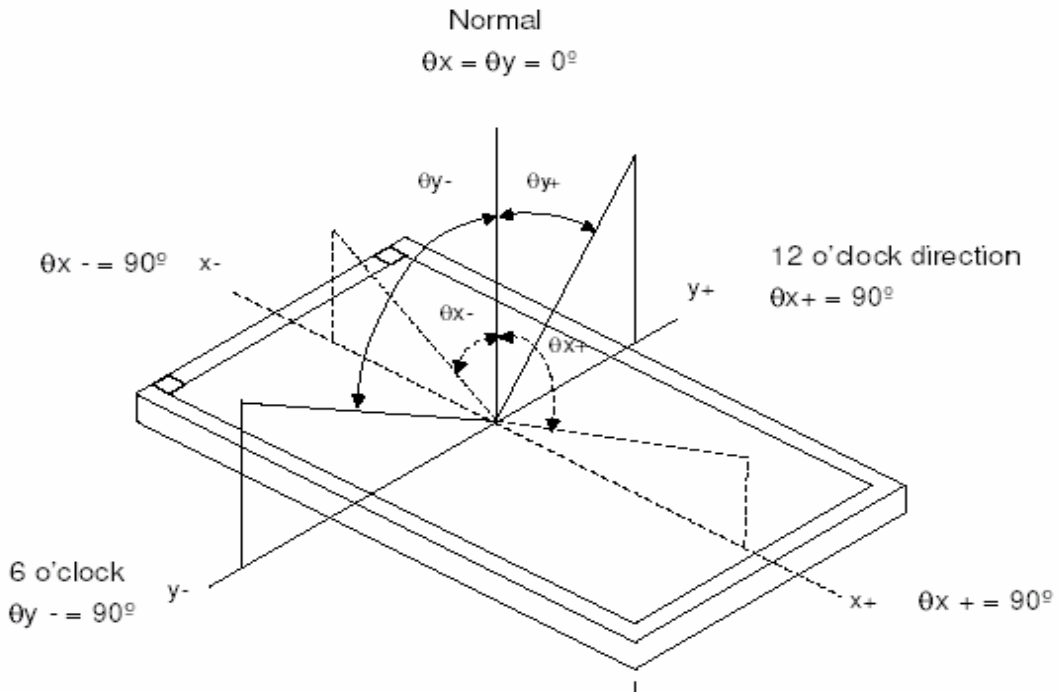
7. ELECTRO-OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Threshold voltage		Vsat	-	-	2.3	-	V	(5)
		Vth	-	-	1.46	-	V	
Transmittance (with POL)		T(%)	-	-	6.36	-	-	
Contrast Ratio		CR	θ=0 Normal viewing angle	-	300	-	-	(1) (2)
Response time		T_R+T_F		-	25	-	msec	(1) (3)
Color gamut		S(%)			63%			(C-light)
Color chromaticity (CIE1931)	White	Wx		0.292	0.312	0.332		(1) (4) CF glass (C-light)
		Wy		0.313	0.333	0.353		
	Red	Rx		0.622	0.642	0.662		
		Ry		0.309	0.329	0.349		
	Green	Gx		0.267	0.287	0.307		
		Gy		0.557	0.577	0.597		
	Blue	Bx		0.115	0.135	0.155		
		By		0.083	0.103	0.123		
Viewing angle	Hor.	θ_L	CR>10	50	60	-		
		θ_R		50	60	-		
	Ver.	θ_U		30	40	-		
		θ_D		50	60	-		
Optima View Direction		6 O'clock						(6)

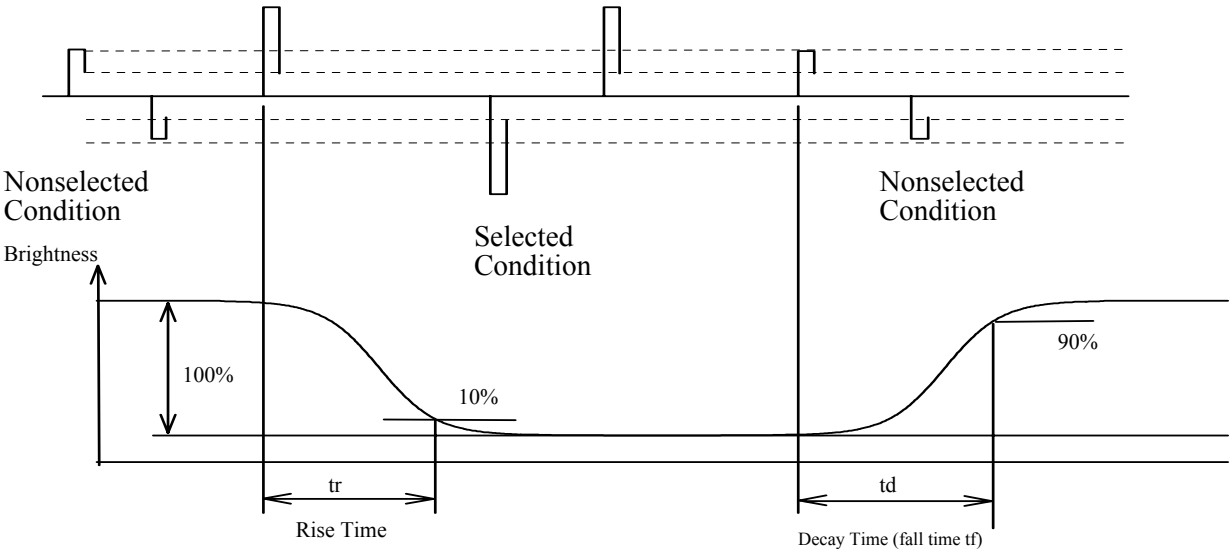
-Measuring Condition

Measuring surrounding: dark room
Ambient temperature: 25±2℃
30min. warm-up time.
Polarizer: CF Side: AMN-3244SV.
TFT Side: AMN-3244SVAG25.

Note (1) Definition of Viewing Angle (θx, θy):



Optical Definitions



Response Time

$$\text{Contrast ratio} = \frac{\text{Brightness at nonselected segment (B2)}}{\text{Brightness at selected segment (B1)}}$$

Contrast ratio (CR)

8. INTERFACE PIN CONNECTIONS

NO.	Symbol	Function
1	VBL-	Backlight LED Ground
2	VBL-	Backlight LED Ground
3	VBL+	Backlight LED Power
4	VBL+	Backlight LED Power
5	NC	Not Connect
6	/RESET	Hardware Reset
7	POL(M)	Polarity Signal Connect to Vcom driving circuit
8	Y1	Top electrode
9	X1	Right electrode
10	Y2	Bottom electrode
11	X2	Left electrode
12	B0	Blue Data
13	B1	
14	B2	
15	B3	
16	B4	
17	B5	
18	B6	
19	B7	
20	G0	Green Data
21	G1	
22	G2	
23	G3	
24	G4	
25	G5	
26	G6	
27	G7	
28	R0	Red Data
29	R1	
30	R2	
31	R3	
32	R4	
33	R5	
34	R6	
35	R7	
36	HSYNC	Horizontal Sync Input
37	VSYNC	Vertical Sync Input
38	DCLK	Dot Data Clock

39	V_{DD}	Analog Power
40	V_{DD}	Analog Power
41	V_{CC}	Digital Power
42	V_{CC}	Digital Power
43	SPENA	SPI Interface Data Enable Signal
44	NC	Not Connect
45	V_{GL}	Gate OFF Power
46	NC	Not Connect
47	V_{GH}	Gate ON Power
48	NC	Not Connect
49	SPCLK	SPI Interface Data Clock
50	SPDAT	SPI Interface Data
51	VCOM	Driving Input
52	ENB	Data Enable Input
53	GND	Ground
54	GND	Ground

9. SPECIFICATION OF QUALITY ASSURANCE

1、Summary

The customer should check and accept the products of BONA within one month after reception. This standard for Quality Assurance should affirm the quality of LCD products to supply to purchaser by BONA. Entire process is controlled according to QS9000.

2、Standard for quality test

2.1 Inspection Before delivering, the supplier should take the following tests, and affirm the quality of product.

2.2 Electro-Optical Characteristics

According to the individual specification to test the product.

2.3 Test of Appearance Characteristics:

According to the individual specification to test the product.

2.4 Test of Reliability Characteristics

According to the definition of reliability on specification for test product.

2.5 Delivery Test

Before delivering, the supplier should take the delivery test

2.6 Test Method: According to the MIL-STD-105E General Inspection level II take a single time.

2.7 The defects classify of AQL as following

Major defect : AQL=0.1 (E) AQL=0.25(C)

Minor defect:: AQL= 0.65

Total defects: AQL = 0.65

3、Nonconforming Analysis & Deal With Manners

Nonconforming Analysis

3.1 Purchaser should supply the detail data of nonconforming sample and the non-suitable state.

3.2 After accepting the detail data from purchaser ,the analysis of nonconforming should be finished in two weeks.

3.3 If supplier can not finish analysis on time ,must announce purchaser before two weeks.

4、Disposition of nonconforming

4.1 If find any supplier defect during assembly line ,supplier must change the good product for every defect after recognition.

4.2 Both supplier and customer should analysis the reason and discuss the disposition of nonconforming when the reason of nonconforming is not sure.

5、Agreement items.

Both sides should discuss together when the following problems happen:

5.1 There is any problem of standard of quality assurance ,and both sides think that must be modifier.

5.2 There is any argument item which does not record in the quality assurance.

5.3 Any other special problem.

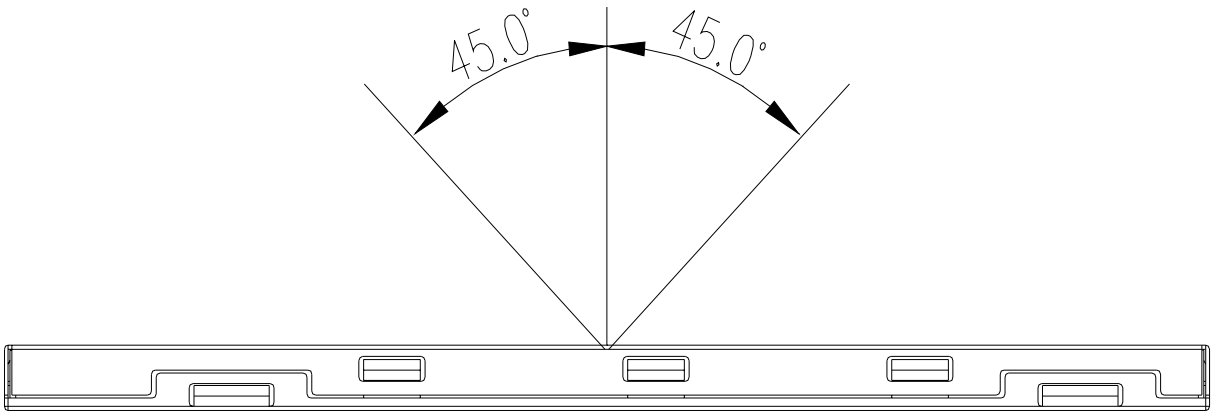
6、Standard of the Product Appearance Test

Manner of appearance test

6.1 The test must be under 20W*2 or 40W fluorescent light ,and the distance of view must be at 30 cm.

6.2 When test the model of Transmissive product must add the reflective plate.

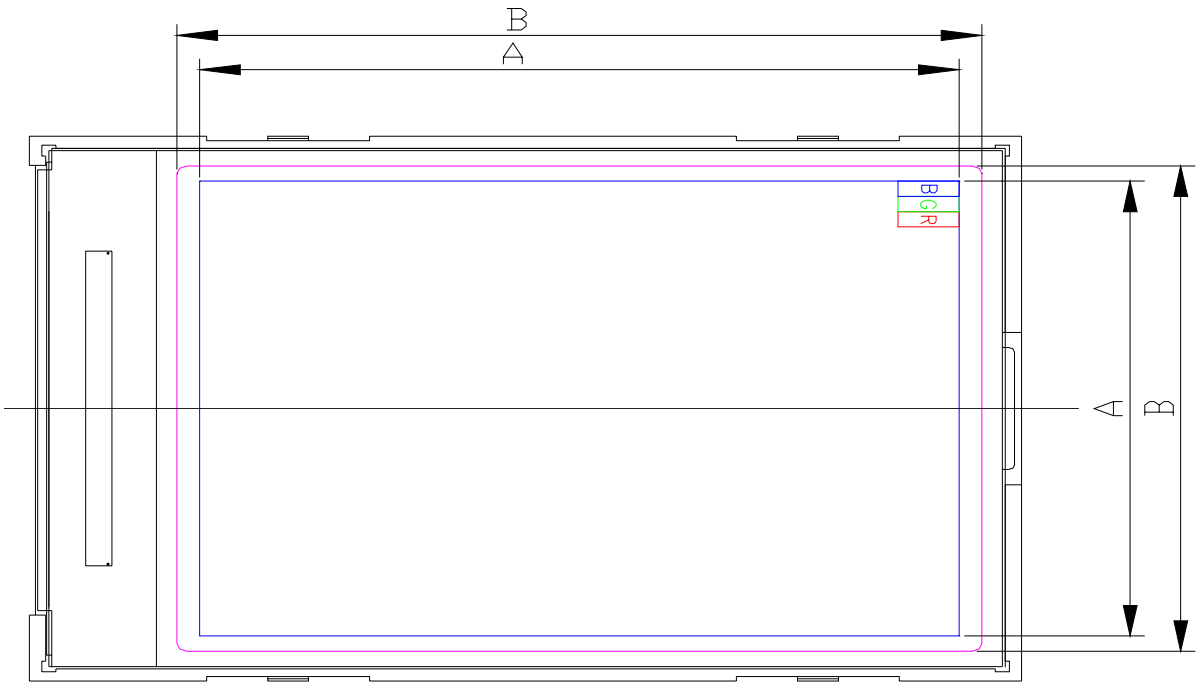
6.3 The test direction is base on about around 45 degree of vertical line.



6.4 Definition of Area:

A Area: Viewing area

B Area: Out of viewing area



7、Basic principle:

7.1 It will accord to the AQL when the standard can not be described.

7.2 The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

7.3 Must add new item on time when it is necessary.

10. INSPECTION SPECIFICATION

1、Electrical Testing

1.1 Missing vertical, horizontal segment, segment contrast defect.

1.2 Missing character, dot or icon.

1.3 Display malfunction.

1.4 No function or no display.

1.5 Current consumption exceeds product specifications.

1.6 LCD viewing angle defect.

1.7 Mixed product types.

1.8 Contrast defect

2、Black or white spots on LCD (display only)

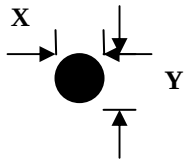
2.1 White and black spots on display ≦0.20mm, no more than three white or black spots present.

2.2 Densely spaced: No more than two spots or lines within 5mm

3、LCD black spots, white spots, contamination(non-display)

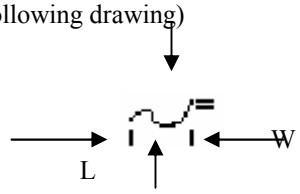
3.1 Round type: As following drawing

ψ=(x+y)/2



SIZE	**Acceptable QTY**
ψ≦0.10	Accept no dense
0.10< ψ≦0.15	2
0.15 ≦ψ≦0.20	1
total	2

3.2 Line Type: (As following drawing)



Length	**Width**	**Acceptable QTY**
---	W≦0.02	Accept no dense
L≦3.0	0.02< W≦0.03	2
L≦2.5	0.03< W≦0.05	
---	0.05< W	As round type

4、Polarizer bubbles

If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.

Size ψ	**Acceptable QTY**
ψ≦0.20	Accept no dense
0.20< ψ≦0.50	2

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5、Scratches

Follow NO.3 LCD black spots, white spots, contamination

6、Chipped glass

Symbols:

x: Chip length y: Chip width z: Chip thickness

k: Seal width t: Glass thickness a: LCD side length

L: Electrode pad length

6.1 General glass chip:

6.1.1 Chip on panel surface and crack between panels:

z: chip thickness	y: chip width	x: chip length
z<=1/2t	Not over viewing area	X<=a
1/2t<z<=2t	Not exceed 1/3k	X<=1/2a

If there are 2 or more chips, x is the total length of each chip.

6.1.2 Corner crack:

z: chip thickness	y: chip width	x: chip length
z<=1/2t	Not over viewing area	X<=a
1/2t<z<=2t	Not exceed 1/3k	X<=1/2a

If there are 2 or more chips, x is the total length of each chip.

6.2 Protrusion over terminal:

6.2.1 Chip on electrode pad:

y: Chip width	x: chip length	z: chip thickness
y<=0.5mm	X<=a	0<z<=t

6.2.2 Non-conductive portion:

y: Chip width	x: chip length	z: chip thickness
y<=L	X<=1/8a	0<z<=t

If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.

If the product will be heat sealed by the customer, the alignment mark must not be damaged.

6.2.3 Substrate protuberance and internal crack.

y: width	x:length
y<=1/4L	x<=a

7、Cracked glass

The LCD with extensive crack is not acceptable.

8、Backlight elements

8.1 Illumination source flickers when lit.

8.2 Spots or scratches that appear when lit must be judged using LCD spot, lines and contamination standards.

8.3 Backlight doesn't light or color is wrong

9、Soldering

9.1 No unmelted solder paste may be present on the PCB.

9.2 No cold solder joints, missing solder connections, oxidation or icicle.

9.3 No residue or solder balls on PCB.

9.4 No short circuits in components on PCB.

10、General appearance

10.1 No oxidation, contamination, curves or, bends on interface pin(OLB) of TCP.

10.2 No cracks on interface pin(OLB) of TCP

10.3 NO contamination, solder residue or solder balls on product.

10.4 The IC on the TCP may not be damaged, circuits.

10.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it cause the interface pin to sever.

10.6 The residual rosin or tin oil of soldering(component or chip component) is not burned into brown or black color.

10.7 Sealant on top of the ITO circuit has not hardened

10.8 Pin type must match type in specification sheet.

10.9 LCD pin loose or missing pins.

10.10 Product packaging must the same as specified on packaging specification sheet.

10.11 Product dimension and structure must conform to product specification sheet.

10.12 The appearance of Heat Seal should not admit any dirt and break.

11. RELIABILITY

Test Item	Sample Type	Test Condition	test result determinant gist
High temperature storage	Normal temperature	70±3℃;240H	the inspection of appearance and function character.
	Broad temperature	80±3℃;240H	
Low temperature storage	Normal temperature	-20±3℃;240H	
	Broad temperature	-30±3℃;240H	
High temperature /humidity storage	Normal temperature	50℃±3℃,90%± 3%RH;240H	
	Broad temperature	60℃±3℃,90%± 3%RH;240H	
High temperature operation	Normal temperature	60±3℃;96H	no objection of the function character; no fatal objection of the appearance.
	Broad temperature	70±3℃;96H	
Low temperature operation	Normal temperature	0±3℃;96H	
	Broad temperature	-20±3℃;96H	
High temperature /humidity operation	Normal temperature	40℃±3℃,90%± 3%RH;96H	
	Broad 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
	Broad temperature	-30±3℃,30min 80± 3,30min;10cycle	The inspection of appearance、function & the whole structure
ESD test	ALL	Discharge modality: Air discharge. Discharge voltage:± 2KV/±4 KV/±6K± 8KV/±12KV/15KV	.no software error & objection in ±2KV~±12KV,no hardware errors & objection in ±15KV.
		Discharge modality: Contact discharge Discharge voltage: ±2KV/±4 KV/±6KV/ ±8KV	no software errors & objection in ±2KV~±12KV,no hardware errors & objection in ±8KV.
Bend test	ALL	Bend velocity: 60time/min; Bendtimes:50000tims	Stimulate the folder ’s repeat folding, no objection of display function
Vibration test	ALL	frequencyrange:10HZ~55 HZ;swing:0.75mm;Z-axist direction: 60min.	the inspection of appearance、function & the whole structure
High Temperature braise test	ALL	120~123℃,100%RH, 1.2~2ATM;8H	The inspection of LCD(no paster)samples' frame glue, envelop glue and leakage of LC.

12. SUGGESTIONS FOR USING LCD MODULES

- **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.

- **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.

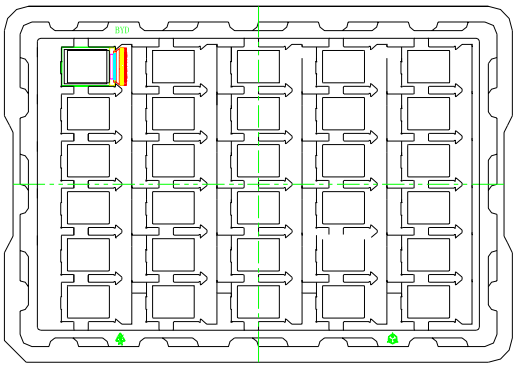
(2) Storage in a clean environment, free from dust, active gas, and solvent.

(3) Store in antistatic container.

13. PACKING

● **Packing Method**

(1)



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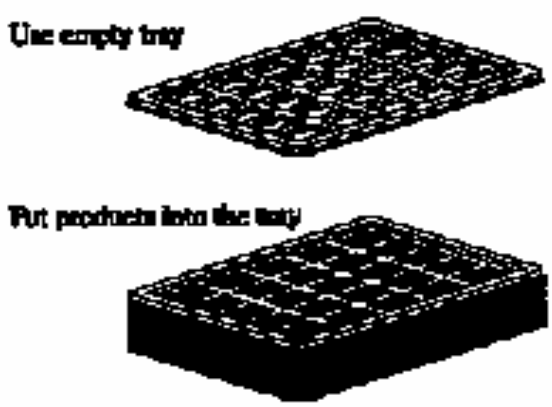

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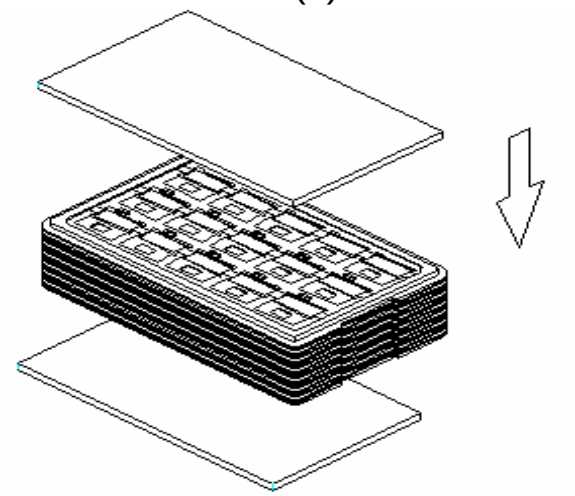

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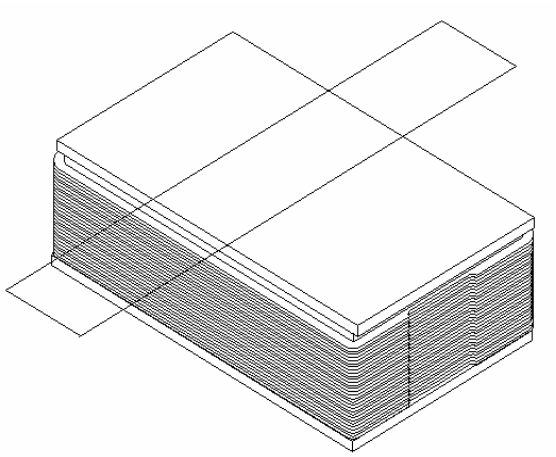

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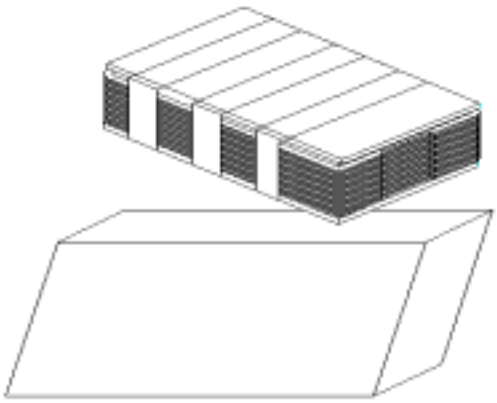

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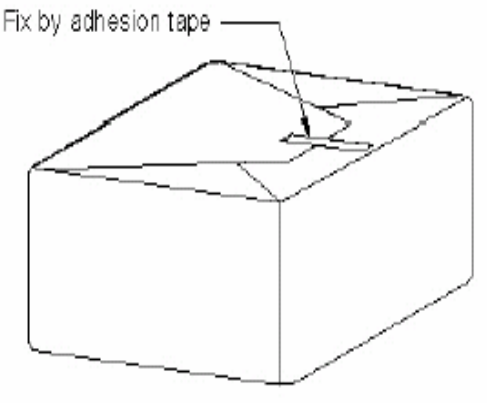

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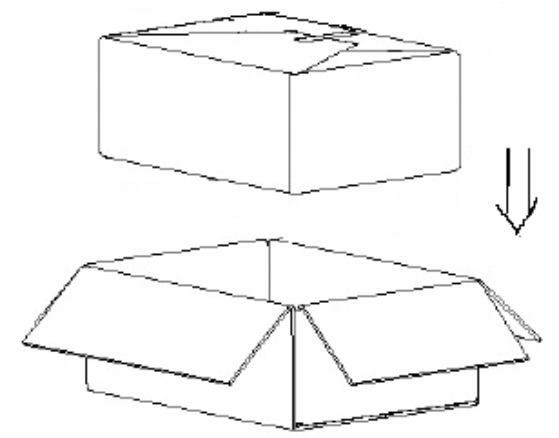

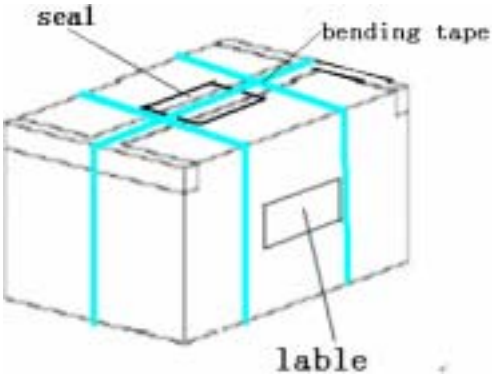

(1). Put module into tray cavity :
(2). Tray stacking
(3). Put 1 cardboard under the tray stack and 1 cardboard above:
(4). Fix the cardboard to the tray stack with adhesive tape:
(5). Put the tray stack and 4 pcs desiccant into the LDPE bag
(6). Fix the LDPE bag with adhesive tape:
(7). Put LDPE bag with tray stack into carton.:
(8). Carton sealing with adhesive tape.