厦门市易阳光电子有限公司
XIAMEN ESHINE DISPLAY CO.,LTD

Specifications for Approval

LCM MODULE

MODEL:EG320240C0-FSW-FTW Ver:A

CUSTOMER'S APPROVAL	
CUSTOMER :	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWD	PD REVIEWD	PREPARED By
KEN		BOSE	J.N

◆ This specification is subject to change without notice. Please contact E-Shine or its representative before designing your product based on this specification.

Records of Revision

DATE	REF.PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	REMARK
2025-01-22		A	First Issue	

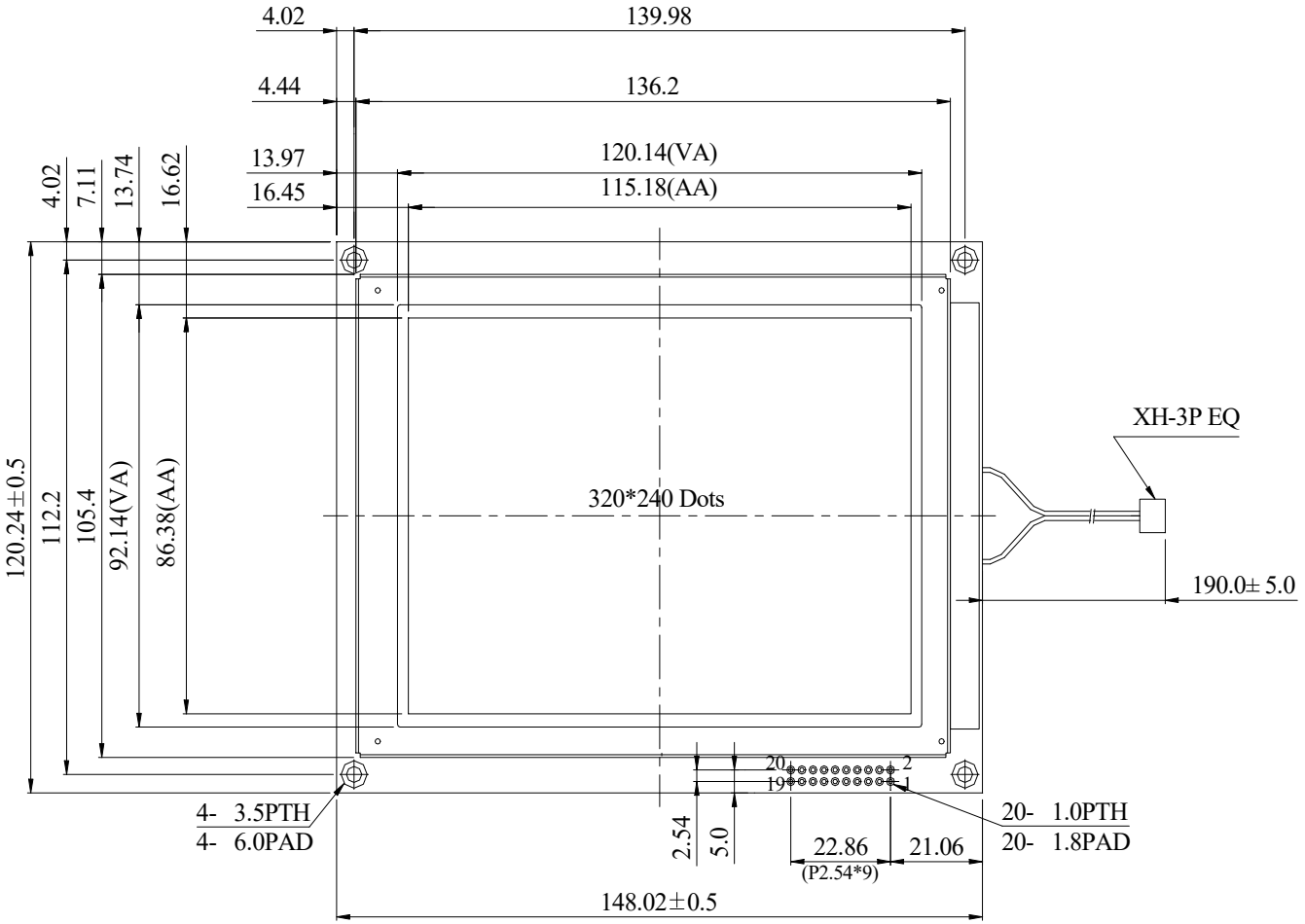
Contents

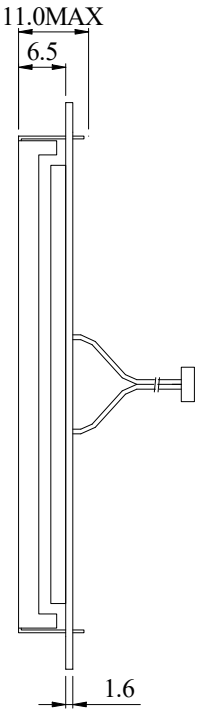
1. General Specification

Item	Dimension	Unit
Number of dots	320 x 240	—
Module dimension	148.02 x 120.24 x 15.6 (MAX)	mm
View area	120.14 x 92.14	mm
Active area	115.18 x 86.38	mm
Dot size	0.34 x 0.34	mm
Dot pitch	0.36 x 0.36	mm
LCD type	FSTN,Positive , Trans-flective （In this mode, the LCD can work in direct sunlight.）	
Duty/Bias	1/240,duty,1/12bias	
View direction	12 o’clock	
Backlight Type	LED White	
IC	RA8835K	
Interface	68 series	

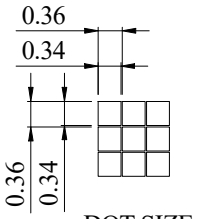
2. Mechanical Drawing

REV	DESCRIPTION:	DATE





PIN NO.	SYMBOL
1	Vss
2	Vdd
3	Vo
4	$\overline{RD}$
5	$\overline{WR}$
6	A0
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	$\overline{CS}$
16	$\overline{RES}$
17	Vee
18	FGND
19	NC
20	NC



DOT SIZE
SCALE 10/1

Notes:

1.Hot pressed ends of HS & LC are fixed by glue

2.part surface to be coated with water proof glue

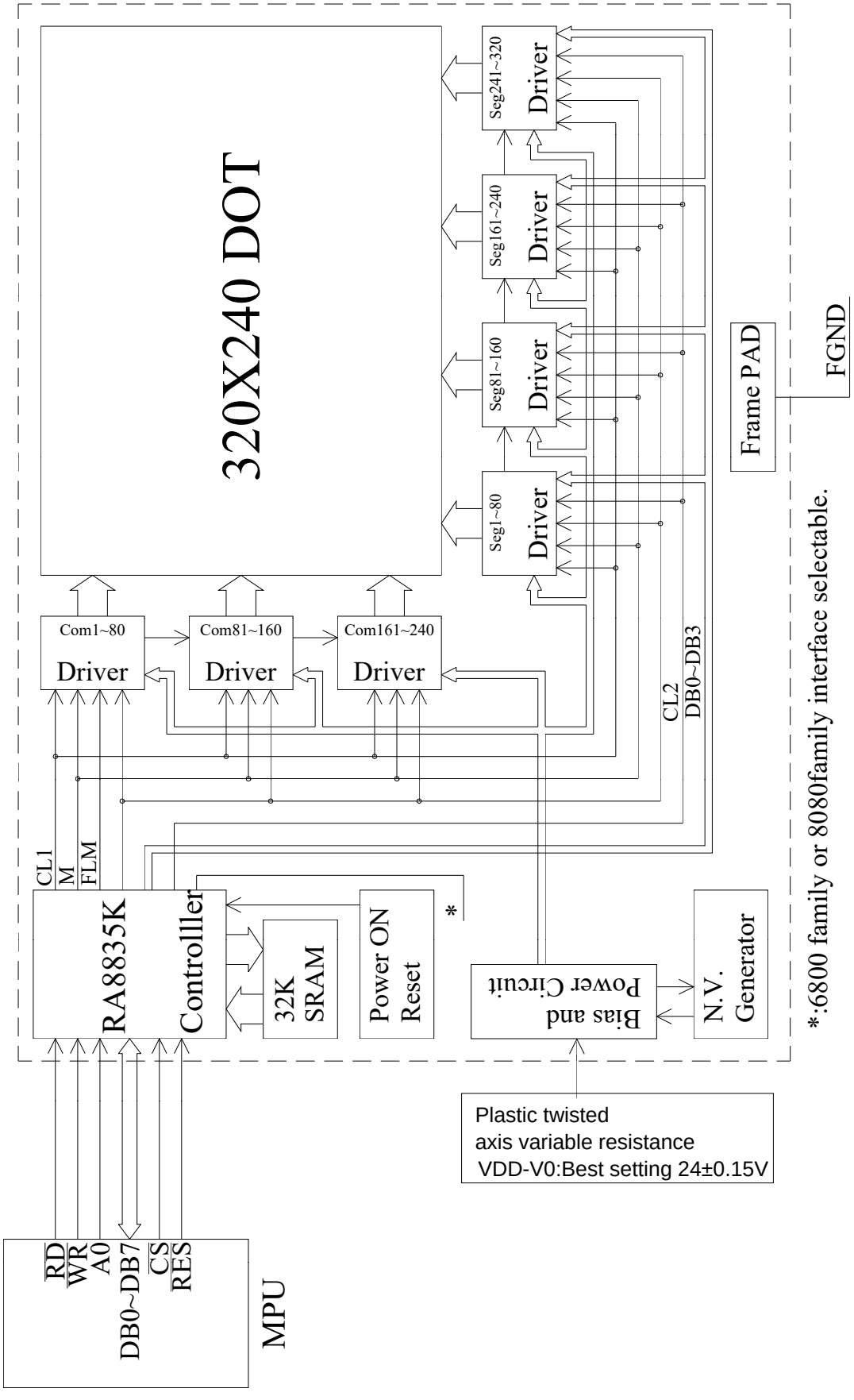
3.Frame foot scraping paint and soldering)

XIAMEN ESHINE DISPLAY.,LTD

E-SHINE

	SCALE	MATERIAL	FINISH	MODEL NAME	EG320240C0-FSW-FTW
	DO NOT ON SCALE	N/A	N/A		
VERSION	TOLERANCE	NO.	UNIT	TITLE	LCM
A	X.X ±0.30 X.XX ±0.10	1/1	mm		
DATE	APPROVED	CHECKED	DRAWN	FILE NAME	E:\WORK\LCD
2025.01.22			LEE		

3. Block Diagram



4. Interface Pin Function

No.	Symbol	Description
1	VSS	GND
2	VDD	Power supply for Logic
3	VO	No connection (Best setting:VDD-V0=24.15±0.15V)
4	/RD	8080 family: Read signal,6800 family :Enable Clock
5	/WR	8080 family: Write signal,6800 family :R/W signal
6	A0	RD =L,WR=H A0=L: Data Read A0=H: Status read RD =H,WR=L A0=L: Data Write A0=H: Command write For80 Family
		RD =L,WR=H A0=L: Command write A0=H: Data read RD =H,WR=L A0=L: Status read A0=H: Data write For68 Family
7~14	DB0~DB7	Data bus line
15	/CS	Chip select ,Active L
16	/RES	Controller reset signal, Active L
17	Vee	Negative voltage output
18	FGND	Frame Ground
19	NC	No Connection
20	NC	No Connection

5. Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit
Operating Temperature	TOP	-20	+70	℃
Storage Temperature	TST	-30	+80	℃
Input Voltage	VIN	-0.3	VDD+0.3	V
Supply Voltage For Logic	VDD-VSS	-0.3	6.5	V
Supply Voltage For LCD	VDD -V0	0	32	V

6. Electrical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage For Logic	VDD-VSS	—	4.5	5.0	5.5	V
Supply Voltage For LCD	VDD-VO	Ta=25℃	22.00	22.40	22.80	V
Input High Volt.	VIH	—	0.5VDD	—	VDD	V
Input Low Volt.	VIL	—	VSS	—	0.2VDD	V
Output High Volt.	VOH	—	VDD -0.4	—	—	V
Output Low Volt.	VOL	—	—	—	VSS +0.4	V
Supply Current	IDD	VDD=5.0V	90.0	100.0	105.0	mA

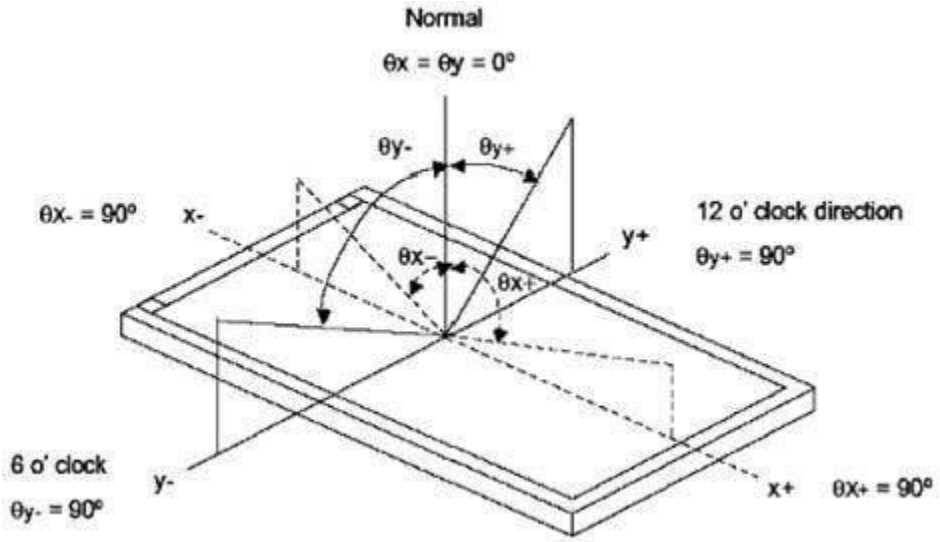
Backlight Characteristics

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	ILED	40	128	160	mA	V=5.0V
Supply Voltage	V	3.4	3.5	3.6	V	—
Reverse Voltage	VR	—	—	5	V	—
Luminance (Without LCD)	IV	384	420	—	cd/m2	ILED=128mA
Color	White					

7. Operating principle & Driving method

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	θL	CR≧2	0	—	45	ψ= 180°
	θR	CR≧2	0	—	45	ψ= 0°
	θT	CR≧2	0	—	60	ψ= 90°
	θB	CR≧2	0	—	30	ψ= 270°
Contrast Ratio	CR	—	—	5	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	150	200	ms

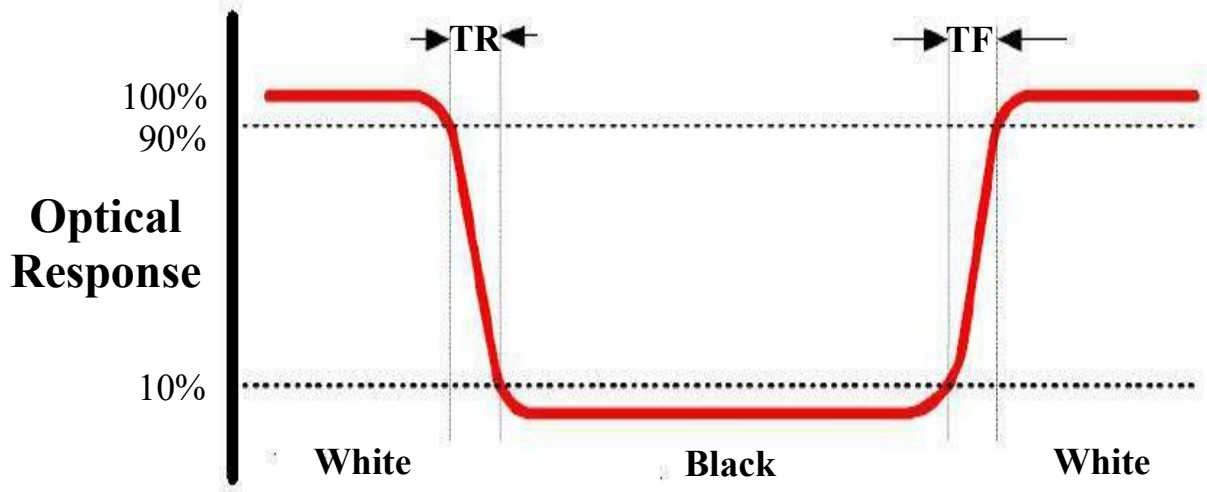
Note 1: Definition of Viewing Angle θx and θy:



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

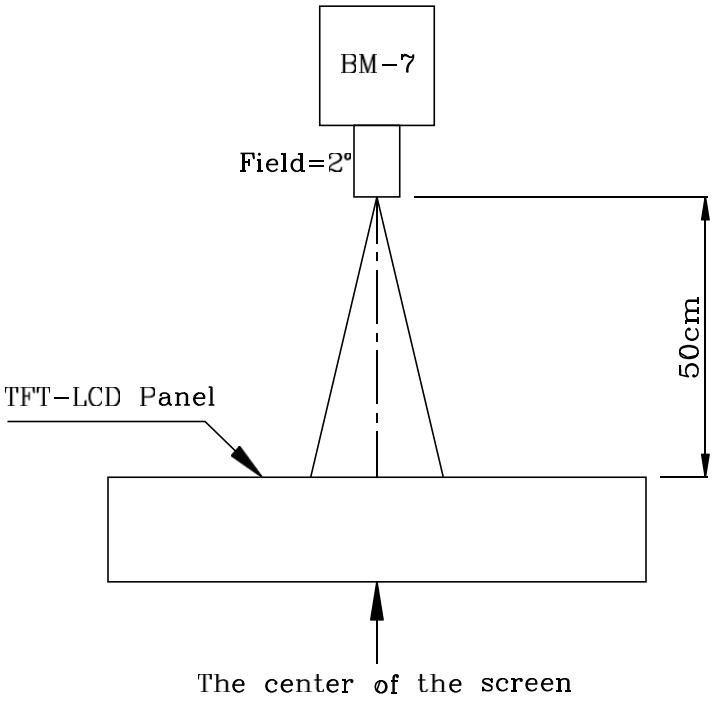
Note 3: Definition of Response Time(Tr,Tf)



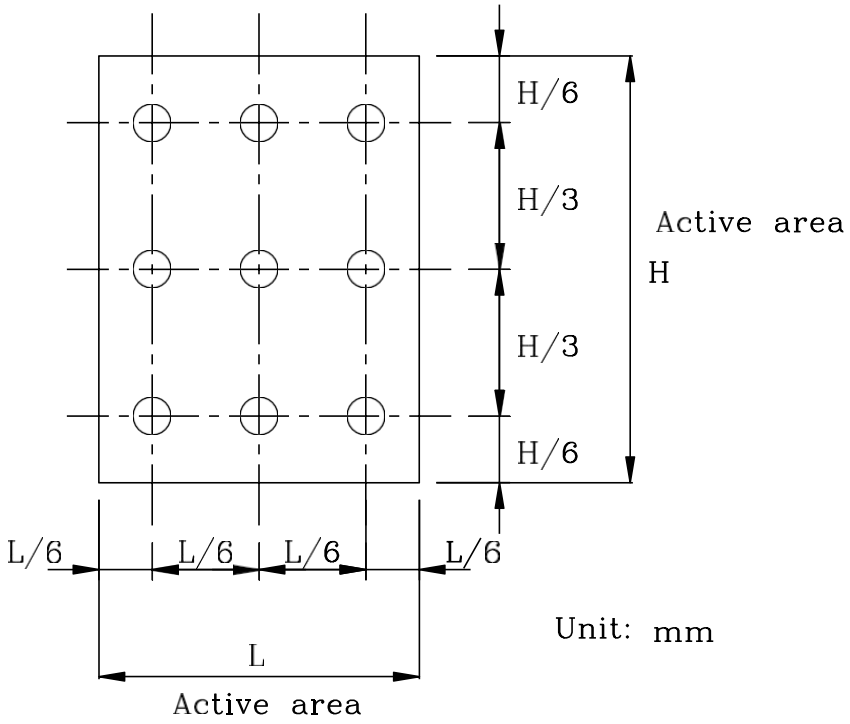
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field=2 ⬭ (As measuring “black” image, field=2 ⬭ is the best testing condition)



②The Brightness Test Point Setup



8. Timing Characteristics

Refer to the Technical Manual for IC

9. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

No.	Item	Description
01	High temperature operation	The sample should be allowed to stand at 70℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -20℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 80℃ for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.
04	Low temperature storage	The sample should be allowed to stand at -30℃ for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.
05	Moisture storage	The sample should be allowed to stand at 60℃,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.
06	Thermal shock storage	The sample should be allowed to stand the following 10 cycles : -40℃ for 30 minutes → normal temperature for 5 minutes → +90℃ for 30 minutes → normal temperature for 5 minutes, as one cycle.
07	Packing vibration	Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X,Y,Z 2 hours for each direction.
08	Packing drop test	According to ASTM-D-5327.
09	Electrical Static Discharge	Air: ±4KV 150pF/330Ω 5 times
		Contact: ±2KV 150pF/330Ω 5 time

*Sample size for each test item is 3~5pcs

9.2 Testing Conditions and Inspection Criteria

For the final test, the testing sample must be stored at room temperature for 24 hours. After the tests listed in Table 9.2, standard specifications for reliability will be executed in order to ensure stability.

No.	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

10. Specification of Quality Assurance

This standard of Quality Assurance confirms to the quality of LCD module products supplied by E-SHINE.

10.1 Quality Test

Before delivering, the supplier should conduct the following tests to confirm the quality of products.

Electrical-Optical Characteristics: According to the individual specification to test the product.

Appearance Characteristics: According to the individual specification to test the product.

Reliability Characteristics: According to the definition of reliability on the specification for testing products.

10.2 Delivery Test

Before delivering, the supplier should conduct the delivery test.

- Test method: According to MIL-STD105E.General Inspection Level Ⅱ take a single Time.

The defects classify of AQL as following:

Major defect: AQL = 0.65

Minor defect: AQL = 2.5

Total defects: AQL = 2.5

10.3 Non-conforming Analysis & Deal With Manners

10.3.1 Non-conforming Analysis

Purchaser should provide the data detail of non-conforming sample and the non-conforming.

After receiving the data detail from purchaser, the analysis of non-conforming should be finished within two weeks.

- If the analysis can't be finished on time, supplier must notice purchaser 3 days in advance.

10.3.2 Disposition of non-conforming

If any product defect be found during assembling, supplier must change the good for every defect after confirmation.

Both supplier and customer should analyze the reason and discuss the disposition of non-conforming when the reason of nonconforming is not sure.

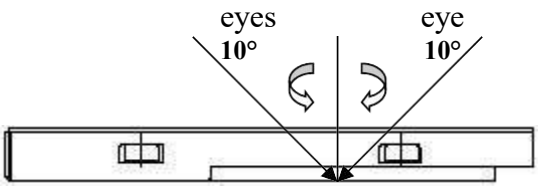
10.4 Agreement items

Both parties should negotiate together when the following problems happen.
There is any problem of standard of quality assurance, and both sides should agree that it must be modified.
There is any argument item which does not record in the standard of quality assurance.
Any other special problem.

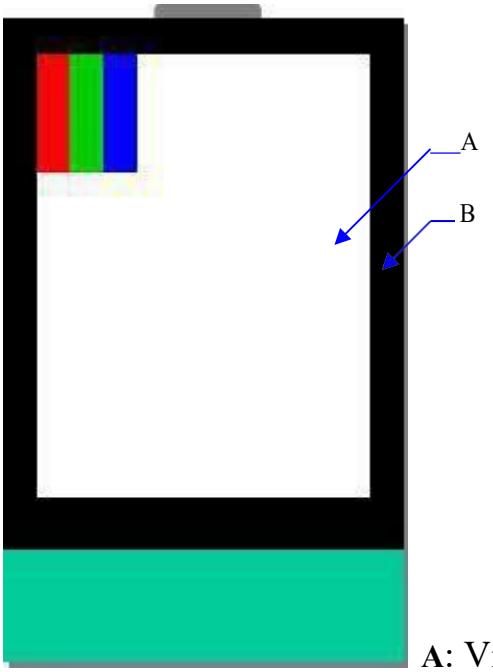
10.5 Standard of The Product Appearance Test

10.5.1 Manner of appearance test

- The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
  When test the model of transmissive product must add the reflective plate.
- The test direction is base on around 10° of vertical line.
- Temperature: 25±5℃ Humidity: 60±10%RH



Definition of area:

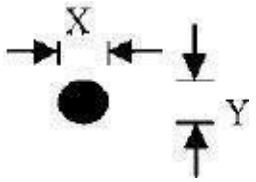


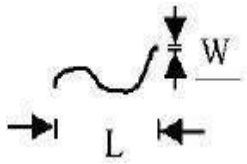
A: Viewing area B: Outside viewing area

10.5.2 Basic principle

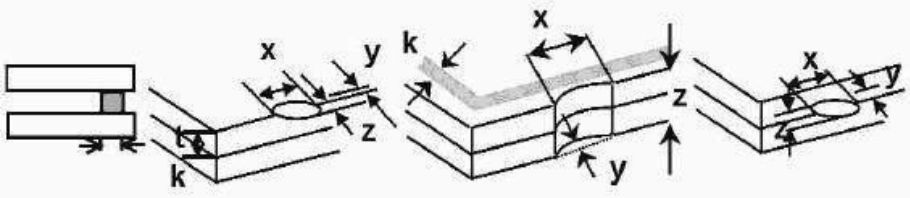
When the standard can not be described, AQL will be applied.
The sample of the lowest acceptable quality level must be negotiated by both supplier and customer when any dispute happened.
New item must be added on time when it is necessary.

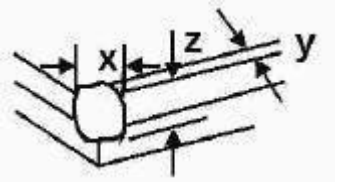
10.6 Inspection Specification

<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>01</td><td>Electrical Testing</td><td>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 Flicker</td><td>0.65</td></tr>
<tr><td>02</td><td>Black or White spots or Bright spots or Color spots on LCD (Display only)</td><td>2.1 White and black or color spots on display ≦ 0.25mm, no more than Five spots.
2.2 Densely spaced: No more than three spots within 3mm.</td><td>2.5</td></tr>
<tr><td rowspan="2">03</td><td rowspan="2">LCD and Touch Panel black spots, white spots, contaminati on (non – display)</td><td>3.1 Round type: As following drawing
Φ = (X+Y) / 2
 

* Densely spaced: No more than two spots within 3mm.
<table><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>Φ≦0.10</td><td>Accept no dense</td></tr><tr><td>0.10< Φ≦0.20</td><td>2</td></tr><tr><td>0.20< Φ≦0.25</td><td>2</td></tr><tr><td>0.25< Φ≦0.30</td><td>1</td></tr><tr><td>0.30< Φ</td><td>0</td></tr></table></td><td>2.5</td></tr>
<tr><td>3.2 Line type: (As following drawing)
 

* Densely spaced: No more than two lines within 3mm.
<table><tr><th>Length(mm)</th><th>Width(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>---</td><td>W≦0.02</td><td>Accept no dense</td></tr><tr><td>L≦3.0</td><td>0.02<W≦0.05</td><td rowspan="2">2</td></tr><tr><td>L≦2.5</td><td>0.03<W≦0.08</td></tr><tr><td>---</td><td>0.08<W</td><td>Rejection</td></tr></table></td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO.</th><th>Item</th><th colspan="3">Criterion</th><th>AQL</th></tr>
<tr><td rowspan="6">04</td><td rowspan="6">Polarizer bubbles</td><td rowspan="6">If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction</td><td>Size Φ(mm)</td><td>Acceptable Q'ty</td><td rowspan="6">2.5</td></tr>
<tr><td>Φ≦0.20</td><td>Accept no dense</td></tr>
<tr><td>0.20< Φ≦0.50</td><td>3</td></tr>
<tr><td>0.50< Φ≦1.00</td><td>2</td></tr>
<tr><td>1.00< Φ</td><td>0</td></tr>
<tr><td>Total Q’ty</td><td>3</td></tr>
<tr><td>05</td><td>Scratches</td><td colspan="3">Follow NO.3 -2 Line Type.</td><td></td></tr>
<tr><td>06</td><td>Chipped glass</td><td colspan="3">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:
 

<table><tr><th>z: Chip thickness</th><th>y: Chip width</th><th>x: Chip length</th></tr><tr><td>Z≦1/2t
⊙ Unit: mm</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table>⊙ If there are 2 or more chips, x is the total length of each chip
6.1.2 Corner crack:
 

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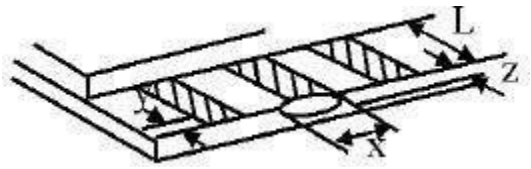
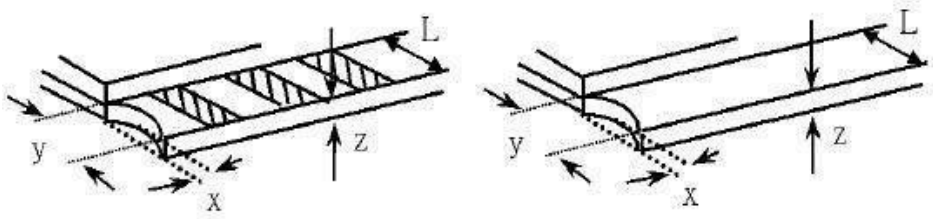
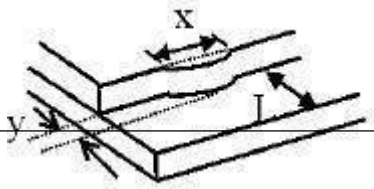
⊙ Unit: mm</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table>⊙ If there are 2 or more chips, x is the total length of each chip</td><td>2.5</td></tr>
</table>

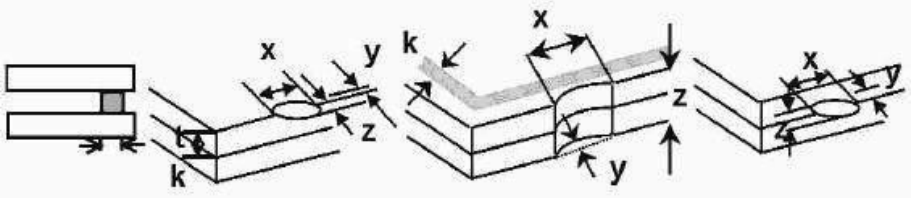
<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>07</td><td>Glass crack</td><td>
Symbols:
x: Chip length y: Chip width z: Chip thickness
k: Seal width t: Glass thickness a: LCD side length
L: Electrode pad length
7.2 Protrusion over terminal:
7.2.1 Chip on electrode pad:


<table>
<tr><th>y: Chip width</th><th>x: Chip length</th><th>z: Chip thickness</th></tr>
<tr><td>y≦0.5mm</td><td>x≦1/8a</td><td>0< z≦t</td></tr>
</table>
7.2.2 Non-conductive portion:


<table>
<tr><th>y: Chip width</th><th>x: Chip length</th><th>z: Chip thickness</th></tr>
<tr><td>y≦L</td><td>x≦1/8a</td><td>0< z≦t</td></tr>
</table>
⊙ If there 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 mot be damaged.
7.2.3 Substrate protuberance and internal crack


<table>
<tr><th>y: width</th><th>x: length</th></tr>
<tr><td>y≦1/3L</td><td>X≦a</td></tr>
</table>
</td><td>2.5</td></tr>
</table>

NO.	Item	Criterion	AQL
08	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	2.5 2.5 0.65
10	Bezel	Bezel must comply with product specifications.	2.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	2.5 2.5 2.5 2.5 0.65 0.65
12	FPC	12.1 FPC terminal damage ≦ 1/2 FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage ≦ 1/2 alignment area and can not affect the function , we judge accept.	2.5 2.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC.	2.5 0.65

<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>14</td><td>Touch Panel Chipped glass</td><td>
Symbols:
x: Chip length y: Chip width z: Chip thickness
k: Seal width t: Touch Panel Total thickness a: LCD side length
L: Electrode pad length
14.1 General glass chip:
14.1.1 Chip on panel surface and crack between panels:


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<tr><td>Z≦t</td><td>≦1/2 k and not over viewing area</td><td>x≦1/8a</td></tr>
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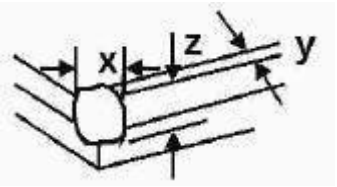
⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip
14.1.2 Corner crack:


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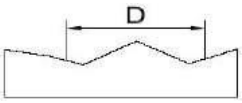
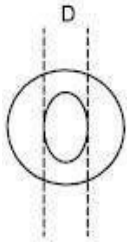
<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>15</td><td>Touch Panel(Fish eye、dent and bubble on film)</td><td>
<table>
<tr><td>SIZE(mm)</td><td>Acceptable Q’ty</td></tr>
<tr><td>Φ≦0.2</td><td>Accept no dense</td></tr>
<tr><td>0.2< D ≦0.4</td><td>5</td></tr>
<tr><td>0.4< D ≦0.5</td><td>2</td></tr>
<tr><td>0.5< D</td><td>0</td></tr>
</table>




</td><td>2.5</td></tr>
<tr><td>16</td><td>Touch Panel Newton ring</td><td>Newton ring dimension ≦ 1/2 touch panel area and not affect font and line distortion(≦2.5%) , it is acceptable.</td><td>2.5</td></tr>
<tr><td>17</td><td>Touch Panel Linearity</td><td>Less than 2.5% is acceptable.</td><td>2.5</td></tr>
<tr><td>18</td><td>LCD Ripple</td><td>Touch the touch panel , can not see the LCD ripple.
Pen: R 1.0mm silicon rubber.
Operation Force: 80g</td><td>2.5</td></tr>
<tr><td>19</td><td>General appearance</td><td>19.1 Pin type must match type in specification sheet.
19.2 LCD pin loose or missing pins.
19.3 Product packaging must the same as specified on packaging specification sheet.
19.4 Product dimension and structure must conform to product specification sheet.</td><td>0.65
0.65
0.65
0.65</td></tr>
</table>

11. General Precautions

11.1. Safety

- Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

11.2. Handling

- The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
- The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
- To avoid contamination on the display surface, do not touch the module surface with bare hands.
- Keep a space so that the LCD panels do not touch other components.
- Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
- Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
- Do not leave module in direct sunlight to avoid malfunction of the ICs.

11.3. Static Electricity

- Be sure to ground module before turning on power or operating module.
- Do not apply voltage which exceeds the absolute maximum rating value.

11.4. Storage

- Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
- Do not store the module in surroundings containing organic solvent or corrosive gas.
- Store the module in an anti-electrostatic container or bag.

11.5. Cleaning

- Do not wipe the polarizer with dry cloth. It might cause scratch.
- Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

12. Packing Method

----TBD