



FS-JM10I REV. A
(JM082ASFYLYHC-06)

FEB/2008

PAGE 1 OF 26

DOCUMENT NUMBER AND REVISION

FS-JM10I REV. A
(JM082ASFYLYHC-06)

DOCUMENT TITLE:
SPECIFICATION
OF
LCD MODULE TYPE

CUSTOMER	
MODEL NUMBER	JM10I
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	LIANG YUN		2008.02.28
CHECKED BY	JIANG HAI		08.2.29
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DOCUMENT REVISION HISTORY 1:

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CONTENTS

	<u>Page No.</u>
1. GENERAL DESCRIPTION	4
2. MECHANICAL SPECIFICATIONS	4
3. INTERFACE SIGNALS	7
4. ABSOLUTE MAXIMUM RATINGS	7
4.1 ELECTRICAL MAXIMUM RATINGS (Ta=25°C)	7
4.2 ENVIRONMENTAL CONDITION	8
5. ELECTRICAL SPECIFICATIONS	8
5.1 TYPICAL ELECTRICAL CHARACTERISTICS	8
5.2 TIMING SPECIFICATIONS	9
5.3 INSTRUCTUION TABLE	11
6. QUALITY UNITS	12



Specification of LCD Module Type Item No.: JM10I

1. General Description

- 8 Characters x 2 lines STN Positive Transflective Dot Matrix LCD Module.
- Viewing Angle: 6 O'clock direction.
- Driving duty: 1/16 Duty, 1/5 bias.
- 'SAMSUNG' KS0066U LCD Controller & Driver or equivalent.
- MPU interface.
- Power Supply: +5.0V.
- Yellow-Green LED Backlight.

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	58.0 (W) x 32.0(H) x15.0MAX. (D)	mm
Viewing area	38.0(W) x 16.0(H)	mm
Display format	8 characters x 2 lines	
Character size	2.96(W) x 5.56(H) (5 x 8 dots)	mm
Character spacing	0.59(W) x 0.38(H)	mm
Character pitch	3.55(W) x 5.94(H)	mm
Dot size	0.56(W) x 0.66(H)	mm
Dot spacing	0.04(W) x 0.04 (H)	mm
Dot pitch	0.60(W) x 0.70(H)	mm
Weight:	TBD	grams

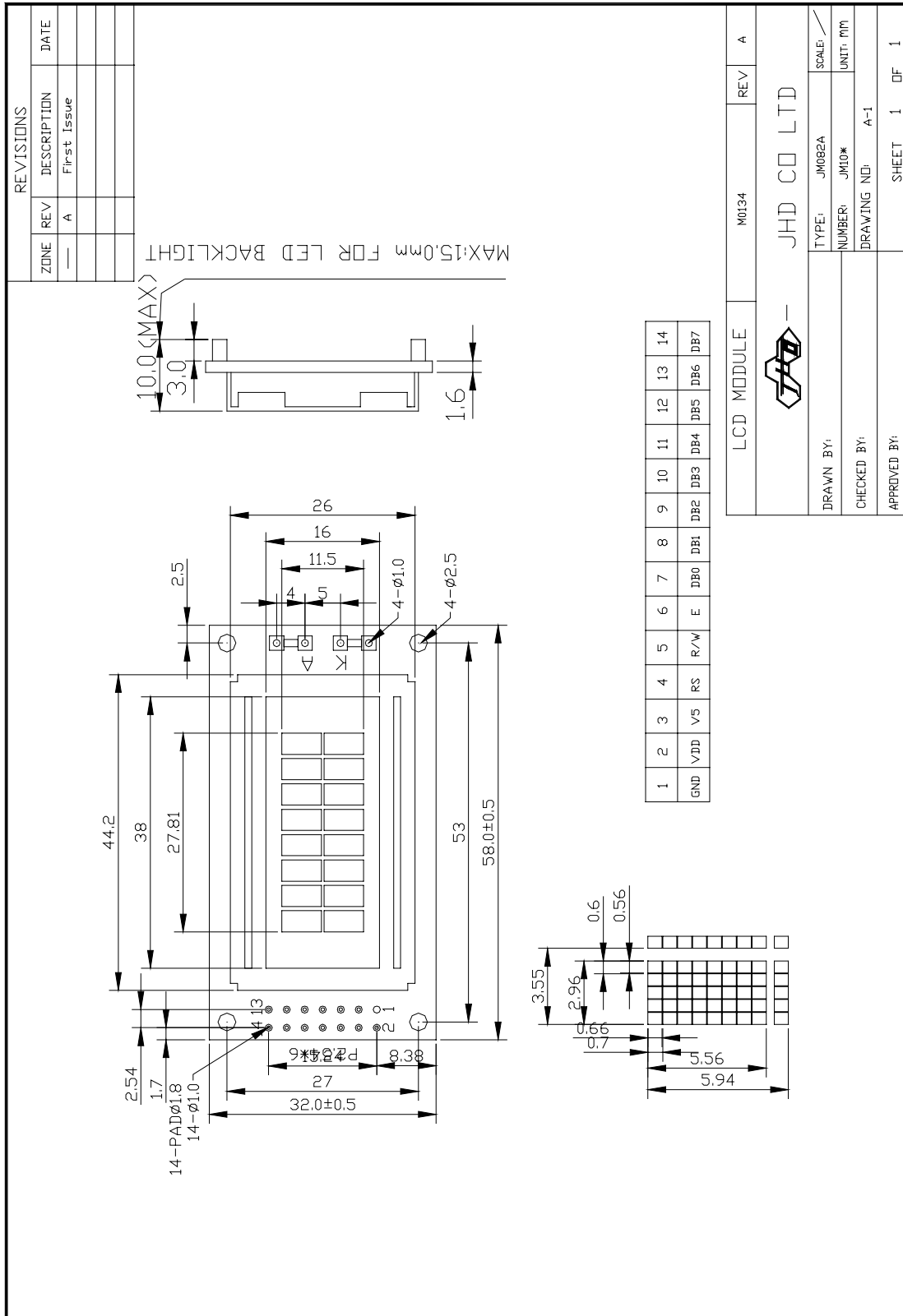


Figure 1: Module Specification

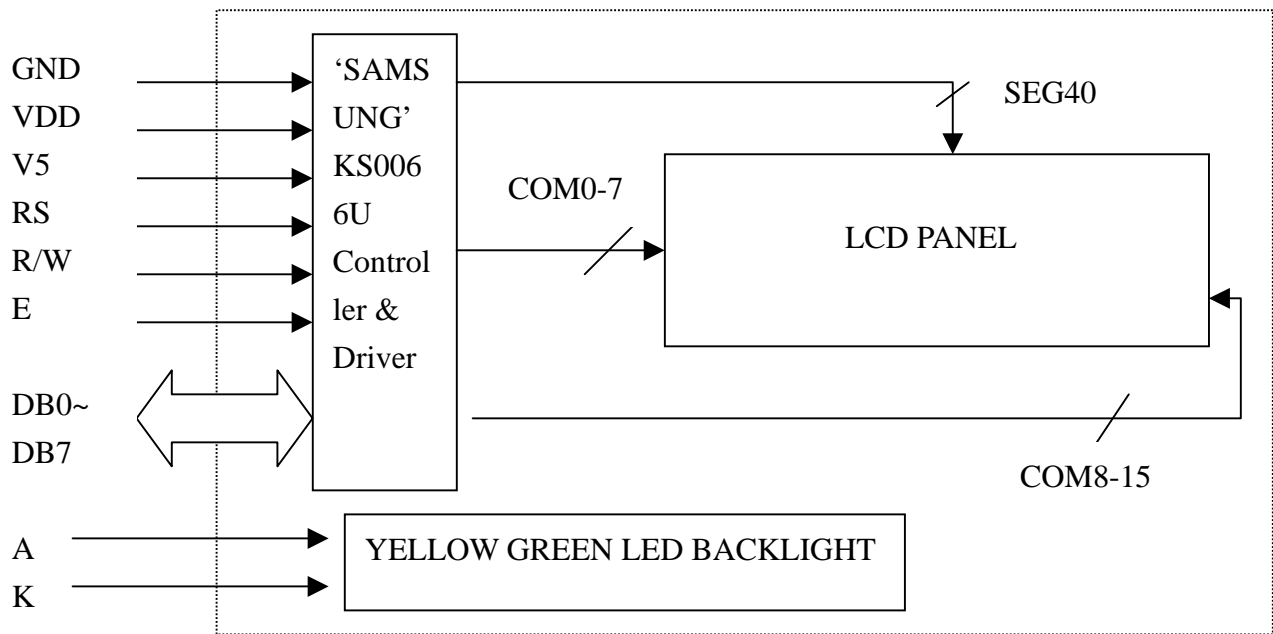


Figure 2(a): BLOCK DIAGRAM

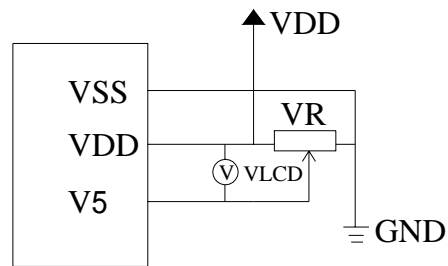


Figure 2(b): Recommended the power supply circuit



3. Interface signals

Table 2

Pin No.	Symbol	Description
1	GND	Ground (0V).
2	VDD	Power supply for logic.
3	V5	Power supply for LCD
4	RS	Register select (H=DATA, L=Instruction)
5	R/W	Read/Write L=MPU to LCM, H= LCM to MPU
6	E	Enable.
7	DB0	Data bus. The data input/output pin.
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
-	A	Anode of the backlight.
-	K	Cathode of the backlight.

4. Absolute Maximum Ratings

4.1 Electrical Maximum Ratings (Ta = 25 °C)

Table 3

Parameter	Symbol	Min.	Max.	Unit
Power Supply voltage (Logic)	VDD	-0.3	+7.0	V
Power supply voltage (VLCD)	VLCD	VDD-15.0	VDD+0.3	V
Input voltage range	VIN	-0.3	VDD+0.3	V

Note:

The modules may be destroyed if they are used beyond the absolute maximum ratings.

All voltage values are referenced to GND= 0V, VLCD=VDD-V5.



4.2 Environmental Condition

Table 4

Item	Operating Temperature (T _{opr})		Storage Temperature (T _{stg})		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	-20°C	+70°C	-20°C	+70°C	Dry

5. Electrical Specifications

5.1 Typical Electrical Characteristics

At Ta = 25 °C, VDD = 5.0V±0.2, GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD-GND		4.8	5.0	5.2	V
Supply voltage (LCD)	VLCD	VDD =+5.0V, Note 1	3.2	3.4	3.6	V
Input signal voltage	V _{IH}	“H” level	2.2	-	VDD	V
	V _{IL}	“L” level	-0.3	-	0.6	V
Supply Current (Logic)	IDD	Note 1	-	1.4	2.1	mA
Supply voltage for backlight	VLED	Forward current =60mA	4.0	4.2	4.4	V

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.



5.2 Timing Specifications

At $T_a = -20^{\circ}\text{C}$ To $+70^{\circ}\text{C}$, $V_{DD} = +5.0\text{V} \pm 0.2$, $GND = 0\text{V}$.

Refer to Fig. 3 & Fig. 4, the bus-timing diagram for MPU Interface.

Table 6

Mode	Characteristic	Symbol	Min.	Typ.	Max.	Unit
Write Mode (Refer to Fig-3)	E Cycle Time	t_c	500	-	-	ns
	E Rise / Fall Time	t_R, t_F	-	-	20	
	E Pulse Width (High, Low)	t_w	230	-	-	
	R/W and RS Setup Time	t_{su1}	40	-	-	
	R/W and RS Hold Time	t_{h1}	10	-	-	
	Data Setup Time	t_{su2}	80	-	-	
	Data Hold Time	t_{h2}	10	-	-	
Read Mode (Refer to Fig-4)	E Cycle Time	t_c	500	-	-	ns
	E Rise / Fall Time	t_R, t_F	-	-	20	
	E Pulse Width (High, Low)	t_w	230	-	-	
	R/W and RS Setup Time	t_{su}	40	-	-	
	R/W and RS Hold Time	t_H	10	-	-	
	Data Output Delay Time	t_D	-	-	120	
	Data Hold Time	t_{DH}	5	-	-	

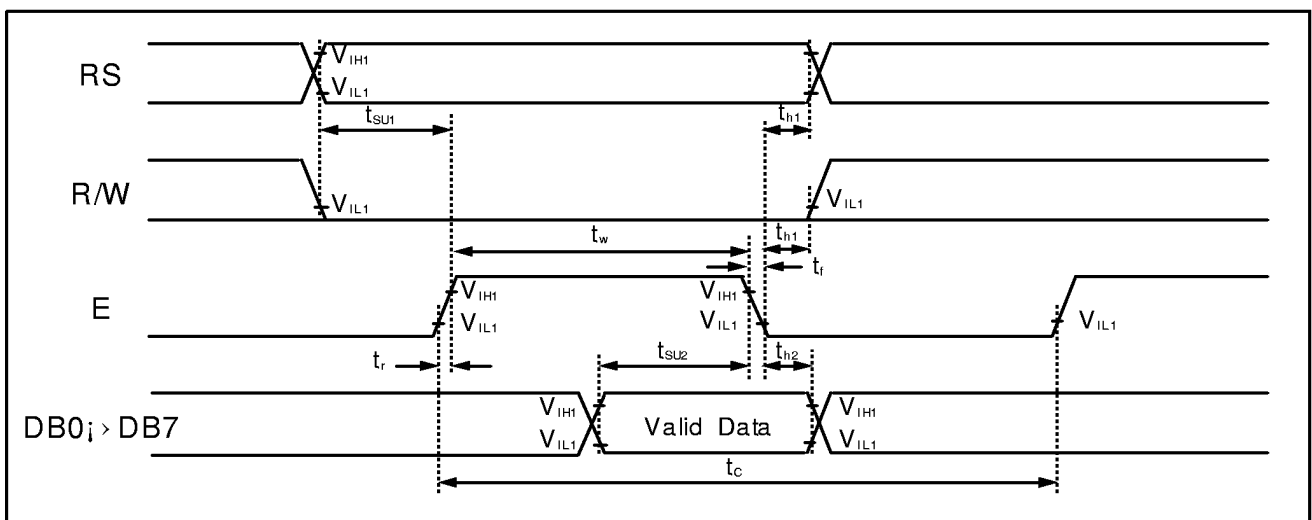


Figure 3: MPU Write timing.

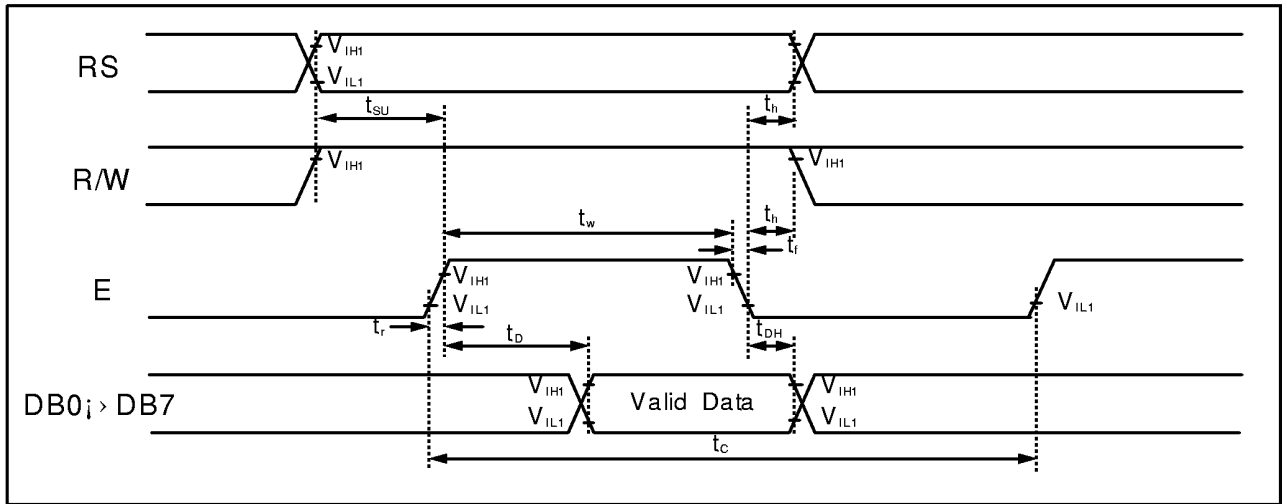


Figure 4: MPU Read timing.



5.3 Instruction Table

Table 8

Instruction	Instruction Code											Description	Execution time (fosc=270 kHz)
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0			
Clear Display	0	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM and set DDRAM address to "00H" from AC	1.53 ms
Return Home	0	0	0	0	0	0	0	0	0	1	-	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	1.53 ms
Entry Mode Set	0	0	0	0	0	0	0	0	1	I/D	SH	Assign cursor moving direction and enable the shift of entire display.	39 μs
Display ON/OFF Control	0	0	0	0	0	0	0	1	D	C	B	Set display(D), cursor(C), and blinking of cursor(B) on/off control bit.	39 μs
Cursor or Display Shift	0	0	0	0	0	0	1	S/C	R/L	-	-	Set cursor moving and display shift control bit, and the direction, without changing of DDRAM data.	39 μs
Function Set	0	0	0	0	0	1	DL	N	F	-	-	Set interface data length (DL: 8-bit/4-bit), numbers of display line (N: 2-line/1-line) and, display font type (F:5×11dots/5×8 dots)	39 μs
Set CGRAM Address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0		Set CGRAM address in address counter.	39 μs
Set DDRAM Address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0		Set DDRAM address in address counter.	39 μs
Read Busy Flag and Address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0		Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	0 μs
Write Data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0		Write data into internal RAM (DDRAM/CGRAM).	43 μs
Read Data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0		Read data from internal RAM (DDRAM/CGRAM).	43 μs



6. Quality Units

6.1.0 Purpose

This standard for quality assurance should define the quality of LCD module products to customer by JINGHUA DISPLAYS LTD.

6.2.0 Scope

This document defines general provisions as well as inspection standards for LCD module supplied by JINGHUA DISPLAYS LTD, except for those with special requirements from customer.

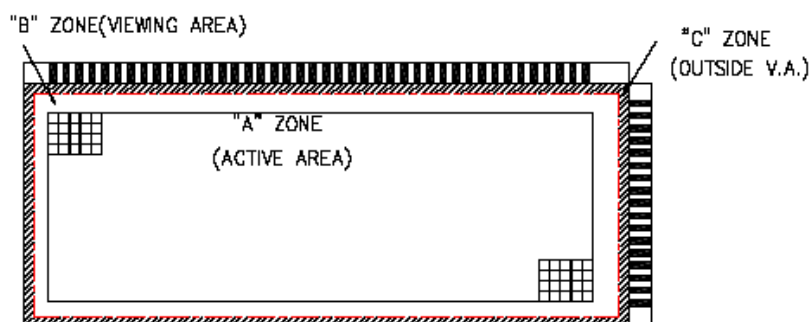
6.3.0 Definition

6.3.1 Definition of area

A Zone: Active area.

B Zone: Viewing area.

C Zone: Outside Viewing area.



6.3.2 Definition of size

Large size(L): Less than or equal to 1 Pcs / 7 " ×14 " unit glass.

Middle size(M): 2~6 Pcs / 7 " ×14 " unit glass.

Small size(S): more than 6 Pcs/7 " ×14 " unit glass.



6.4.0 Quality Specification

6.4.1 Conditions of Cosmetic Inspection

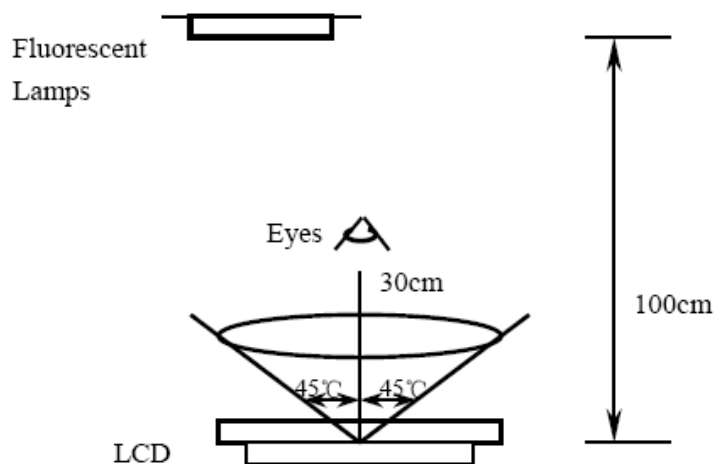
6.4.1.1 Tests should be conducted under the following conditions:

Ambient temperature: $22 \pm 5^{\circ}\text{C}$.

Ambient humidity: $65 \pm 20\%RH$.

Ambient Luminance: 40 watt fluorescent lamp.





An appearance test should be conducted by human sight at approximately 30 cm distance from the LCD module under fluorescent light. Distance between LCD and fluorescent lamps should be 100 cm or more. Viewing direction for inspection is 45° from vertical against LCD.



6.4.1.2 when test the model of transmissive product must add the reflective plate.

6.4.2 Sampling plan

Unless otherwise agreed in writing, the sampling inspection shall be applied to the incoming inspection of customer.

-  Lot size: Quantity of shipment lot per model.
-  Sampling type: Normal inspection, single sampling.
-  Sampling Level: Level II.
-  Sampling table: GB/T2828.1. (GB-national standard of China.)



6.4.3 Classification of defects and Acceptable quality level

Defects are classified as either a major or minor defect defined as follows:

- 📖 Major defect: It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
- 📖 Minor defect: It is a defect that will not result in functioning problem with deviation classified.

The AQL for major and minor defects is defined as follows:

Partition	Definition	AQL
Major defect	Functional defective as product.	0.4
Minor defect	Satisfy all functions as product but not satisfy cosmetic standard.	1.0

6.4.4 Applicable instrument

- 📖 LCD module tester.
- 📖 Multimeter.
- 📖 Caliper.
- 📖 Defect size filming standard.



6.4.5 Inspection quality criterion

6.4.5.1 LCD panel part.


The inspection specification as following list:

Classify	Item	Description of defects	Inspection criterion	Drawing specification	
Major defect	1. Non-display.	Product no function.	Not accept.		
	2. LCD with wrong view direction.	Difference in Spec.	Not accept.		
	3. Segment missing.	Part or all pattern do not light up.	Not accept.		
	4. Occur high current.	Current exceed designed value.	Not accept.		
	5. LC leakage.	LC does not fulfill the glass cell.	Not accept.		
	6. Deviation from drawing.	LCM Dimension difference from drawing and over tolerance	According to dimensions noted in the specification.		
	7. Wrong type applied.	Wrong polarizer attachment.		Not accept.	
		Pin attached wrong type applied.		Not accept.	
8. Incorrect pins quantity	Pin attached wrong quantity applied.		Not accept.		



<p>Minor defect</p>	<p>9. Pattern deformation</p>	<p>Segment fatter or smaller.</p>	<p>Accept if c or $d \leq 1/4 - 1/5W$, or refer to the defect specimen. W = Segment width</p> <p>Accept if $a-b \leq 1/4a$, or refer to the defect specimen. a = Segment width</p>																					
<p>Minor defect</p>	<p>10. Pinholes</p>	<p>black spot/ white spot at activated state.</p>	<p>1. Large size LCD Accept if can't be found at 1m distance and will not enlarge under electronic test.</p> <p>2. Middle size LCD</p> <table border="1" data-bbox="627 1003 986 1193"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.10$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \varnothing \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.30$</td> <td>0</td> </tr> </tbody> </table> <p>3. Small size LCD</p> <table border="1" data-bbox="627 1238 986 1429"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.20$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.20$</td> <td>0</td> </tr> </tbody> </table> <p>4. For the dot pattern: Accept $X, Y \leq 2/3L, H$ ($X, Y = (\text{Max } X, Y)$)</p> <p>5. Only allow one defect in one segment.</p> <p>6. The nearest distance allowed between two pinholes is 20mm.</p>	Diameter (mm)	Accept QTY	$\varnothing \leq 0.10$	Not count	$0.10 < \varnothing \leq 0.20$	2	$0.20 < \varnothing \leq 0.30$	1	$\varnothing > 0.30$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.15$	2	$0.15 < \varnothing \leq 0.20$	1	$\varnothing > 0.20$	0	<p>$\varnothing = (X + Y) / 2$</p>
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<p>Minor defect</p>	<p>11. Blemishes and foreign matters.</p>	<p>Black spot/ dust on LCD. (non-display)</p>	<p>Positive panel:</p> <p>1. A zone.</p> <p>(1) Large size LCD Accept if can't be found at 1m distance and will not enlarge under electronic test.</p> <p>(2) Middle size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \varnothing \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.30$</td> <td>0</td> </tr> </tbody> </table> <p>(3) Small size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.20$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.20$</td> <td>0</td> </tr> </tbody> </table> <p>2. B zone. 1.5 times of acceptable largest diameter size of Zone A.</p> <p>3. C area Not count.</p> <p>Negative panel:</p> <p>1. A zone.</p> <p>(1) Large size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.15$</td> <td>Not count</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.30$</td> <td>3</td> </tr> <tr> <td>$0.30 < \varnothing \leq 0.50$</td> <td>1</td> </tr> <tr> <td>$\varnothing > 0.50$</td> <td>0</td> </tr> </tbody> </table> <p>(2) Middle size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$\varnothing > 0.20$</td> <td>0</td> </tr> </tbody> </table> <p>(3) Small size LCD</p> <table border="1"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.1$</td> <td>Not count</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$\varnothing > 0.15$</td> <td>0</td> </tr> </tbody> </table>	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.20$	2	$0.20 < \varnothing \leq 0.30$	1	$\varnothing > 0.30$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.15$	2	$0.15 < \varnothing \leq 0.20$	1	$\varnothing > 0.20$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.15$	Not count	$0.15 < \varnothing \leq 0.30$	3	$0.30 < \varnothing \leq 0.50$	1	$\varnothing > 0.50$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.20$	2	$\varnothing > 0.20$	0	Diameter (mm)	Accept QTY	$\varnothing \leq 0.1$	Not count	$0.10 < \varnothing \leq 0.15$	2	$\varnothing > 0.15$	0	 <p style="text-align: center;">$\varnothing = (X + Y) / 2$</p>
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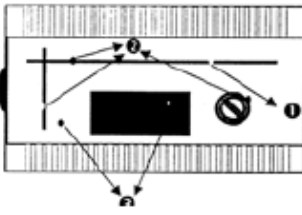
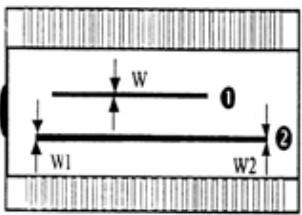
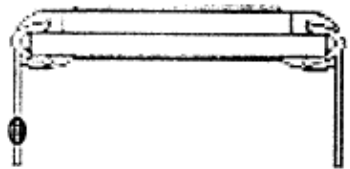


<p>Minor defect</p>	<p>12 Black lines and scratches.</p>	<p>Scratch on glass or polarizer surface. And foreign linear matters in LCD.</p>	<p>Positive panel: 1. A 、 B zone. (1) Large size LCD Accept if can't be found at 1m distance and will not enlarge under electronic test.</p> <p>(2) Middle size LCD</p> <table border="0"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.02$</td> <td>Not count</td> </tr> <tr> <td>$0.02 < W \leq 0.03, L \leq 3$</td> <td>2</td> </tr> <tr> <td>$0.03 < W \leq 0.05, L \leq 2$</td> <td>2</td> </tr> <tr> <td>$0.02 < W \leq 0.03, L > 3$</td> <td>0</td> </tr> <tr> <td>$0.03 < W \leq 0.05, L > 2$</td> <td>0</td> </tr> <tr> <td>$W > 0.05$</td> <td>As the spot criteria.</td> </tr> </tbody> </table> <p>(3) Small size LCD</p> <table border="0"> <thead> <tr> <th>Diameter (mm)</th> <th>Accept QTY</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.02$</td> <td>Not count</td> </tr> <tr> <td>$0.02 < W \leq 0.03, L \leq 3$</td> <td>2</td> </tr> <tr> <td>$0.03 < W \leq 0.05, L \leq 1$</td> <td>1</td> </tr> <tr> <td>$0.02 < W \leq 0.03, L > 3$</td> <td>0</td> </tr> <tr> <td>$0.03 < W \leq 0.05, L > 1$</td> <td>0</td> </tr> <tr> <td>$W > 0.05$</td> <td>As the spot criteria.</td> </tr> </tbody> </table> <p>2. C zone Not count.</p>	Diameter (mm)	Accept QTY	$W \leq 0.02$	Not count	$0.02 < W \leq 0.03, L \leq 3$	2	$0.03 < W \leq 0.05, L \leq 2$	2	$0.02 < W \leq 0.03, L > 3$	0	$0.03 < W \leq 0.05, L > 2$	0	$W > 0.05$	As the spot criteria.	Diameter (mm)	Accept QTY	$W \leq 0.02$	Not count	$0.02 < W \leq 0.03, L \leq 3$	2	$0.03 < W \leq 0.05, L \leq 1$	1	$0.02 < W \leq 0.03, L > 3$	0	$0.03 < W \leq 0.05, L > 1$	0	$W > 0.05$	As the spot criteria.	
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Minor defect	13.Scratch on PI coating.	PI coating scratched.	The visible scratch of A zone can not accepted at 30cm view distance.																																							
Minor defect	14.Rainbow	Arches, circular or parallel colorful spread.	According to the limit specimen.																																							
Minor defect	15.Bubbles or wrinkles in polarizer	Bubbles or wrinkles between polarizer and glass.	According to black spot/ foreign material specification.																																							



Minor defect	16. Position of polarizer attachment	16.1 Wrong polarizer attachment in position or dimension.	Polarizer protruding from edge of glass and exceeding/ within the maximum external dimension of LCD.	
Minor defect	17. Ink printing defect	17.1 Ink line/ pattern broken	Not accept.	
		17.2 Ink pattern/ line jagged.	Accept if the thick or thin part is less than or equal to 25% segment width or according to the limit specimen.	
		17.3 Light leakage	When activated with current white light appears in the position of pinhole or scratch due to ink printing misalignment. According to the pinhole specification.	
Minor defect		17.4 Ink printing pattern/ line uneven	Reject if the thick or thin is more than 1/2W. Reject when $W1 - W2 \leq 1/3W$.	
Minor defect	18. Pin defect.	18.1 Corrosion or foreign material on terminal legs.	Pin incoming defect: oxidized, damage (including pins plating damaged), excess epoxy on bottom glass or terminal legs, which are not acceptable.	
Minor defect		18.2 Pin deviation over tolerance	According to the specification.	



Minor defect	19. Chipped glass on corner		19.1 Chip in lead contact area.	a	b	c	Accept QTY	
				$a \leq 3\text{mm}$ ($L \geq 5\text{mm}$)	$b \leq 1/2W$	$c \leq T$	2	
			$a < 1/2L$ ($L < 5\text{mm}$)	$b \leq 1/2W$	$c \leq T$	2		
			19.2 Others	a	b	c	Accept QTY	
				not exceed 1/2 width of seal		$c \leq T$	2	
Minor defect	20. Glass chip on edge			a	b	c	Accept QTY	
				$a \leq 3\text{mm}$	not exceed 1/2 width of seal	$c \leq 3/4T$	2	
Minor defect	21. Chipped electrode pad	21.1 Glass chip on ITO edge	COG and TAB product.	a	b	c	Accept QTY	
				$a \leq 2\text{mm}$ (and not exceed 3 ITO terminal)	$b \leq W/5$	$T > 0.7\text{mm}$ $c \leq 1/2T$ $T \leq 0.7\text{mm}$ $c \leq T$	2	
Minor defect			Others	a	b	c	Accept QTY	
				$a \leq 3\text{mm}$ (and not exceed 4 ITO terminal)	$b \leq W/4$	$c \leq T$	2	



Minor defect	21.2 Glass chip on ITO back	COG and TAB product.	a	b	c	Accept QTY	
			$a \leq 3\text{mm}$	$b \leq W/4$	$T > 0.7\text{mm}$ $c \leq 1/2T$ $T \leq 0.7\text{mm}$ $c \leq T$	2	
		Others	a	b	c	Accept QTY	
			$a \leq 5\text{mm}$	$b \leq W/4$	$c \leq T$	2	
Minor defect	22.Mechanical damage.	Extended crack inspector shall attempt to remove the chip with tweezers, re-evaluate if the remaining defect is still a crack or a chip.	B		Accept QTY		
			$b \leq 1/5W$		2		
Minor defect	23.Glass cracks		Not accept				

Remark:

The minimum space between any 2 defects (spot, dirt) should more than 20mm, and Max. allowed defect QTY in total:

Large size LCD : Zone A: $\leq 5/\text{unit}$, Zone B $\leq 5/\text{unit}$;

Middle size LCD : Zone A: $\leq 3/\text{unit}$, Zone B $\leq 3/\text{unit}$;

Small size LCD: Zone A: $\leq 2/\text{unit}$, Zone B $\leq 2/\text{unit}$.



6.4.5.2 Other part

The inspection specification as following list:

NO	Items	Criterion of defects	AQL
1	Backlight	1.Lumination source flickers. 2.Using spot, lines and contamination standard of LCD to judge the spots or scratches defect on backlight. 3.Not allow unlighted on backlight. 4.Colour and luminance of backlight should correspond its specification.	Major Minor Major Major
2	PCB, COB	1.COB seal may not have pinholes larger than 0.2mm or contamination. 2.COB seal surface may not have pinholes through to the IC. 3.The height of the COB should not exceed the height indicated in the assembly diagram. 4.Beyond 2mm of the seal area, there may not have sealant on the PCB. 5.No oxidation or contamination on PCB connector. 6.Parts on PCB should correspond the characteristic, and not allow wrong parts, missing parts or additional parts. 7.The jumper on the PCB should correspond to the characteristic. 8.The solder which gets on bezel, LED pad, zebra pad or screw hole pad should be smoothed down.	Minor Minor Major Minor Minor Major Minor Major
3	Soldering	1.No unmelted solder pastes on the PCB. 2.No cold solder joints, solder connection missing, oxidation of solder. 3.No short circuits in components on PCB.	Minor Minor Minor
4	General Appearance	1.No oxidation, contamination, curves ,cracks or bends on interface Pin of TCP. 2.No solder residue or solder balls on product. 3.The IC on the TCP may not be damaged. 4.The residual rosin or tin oil of soldering (component or chip component) is not turned into brown or black color. 5.Packing method correspond the specification. 6.Dimension and structure correspond the specification sheet. 7.No dirt and break on the heat seal.	Minor Minor Major Minor Major Major Major



6.5.0 Reliability

The LCD module shall not fail the following reliability test.

ITEM	Condition		Criterion
High temperature operation	+70 8h		1.Total current consumption should be below double of initial value. 2.Cosmetic defects should not be happened.
Low temperature operation	-20 8h		
Humidity	Storage	40 93%RH 24h	
	Operation	40 93%RH 8h	
High temperature storage	+70 10h		
Low temperature storage	-20 10h		
Thermal shock storage	-20 +70 60min 60min 5 cycle		
Vibration (Package state)	50Hz 0.7mm 30min in each direction (X, Y, Z).		
Falling test (Packaged state)	Weight 15kg; Falling height: 80cm. Weight < 15kg; Falling height: 100cm.		



6.6. Quality Assurance

6.6.1 JINGHUA DISPLAYS will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with the LCM specification, for a period of one year from the date of shipment. Confirmation of such date shall be based on freight documents.

No warranty can be granted if any of the precautions stated in handling LCD and LCD Modules above have been disregarded.

6.6.2 In returning the LCD and LCD Modules, they must be properly packaged and there should be detailed description of the failures or defects. Broken glass, scratches on polarizers, mechanical damages as well as defects that are caused by accelerated environmental tests are excluded from warranty.

6.7. Precautions in Use of LCM

1. Handling of LCM

1.1 Don't give external shock.

1.2 Liquid crystal is chemical hazardous substance. Once the liquid crystal inside it leaks out, be sure not to get any in your mouth. If the liquid is adhered your skin or clothes etc, wash it off using soap and water thoroughly and immediately.

1.3 Don't apply excessive force on the display surface.

1.4 Don't scratch and dirty polarizer of covering the display surface of the LCD module.

1.5 In order to prevent static electricity from destructing, be sure to wear gauntlet that is tested up to grade.

2. Storage

2.1 Store in dark places and do not expose to sunlight or fluorescent light. Keep the temperature between 0°C and 40°C and the humidity lower than 60%RH. Please consult JINGHUA DISPLAYS LTD. for other storage requirements.

2.2 Storage in a clean environment, free-dust and well ventilated.

2.3 Storage in anti-static electricity container.

3. Soldering

3.1 The soldering temperature is 260±5°C and soldering Time should be less than 3 sec, and soldering iron power should be less than 30w.

3.2 Re-soldering: no more than 3 times.

3.3 The soldering point should be further than 1.6 mm from body.

“Shenzhen Jinghua Displays CO.,LTD. reserves the right to change this specification.”