

# 筠鼎科技股份有限公司 YUNDING TECH CO., LTD

## APPROVAL SHEET

MODEL NO: YD043L07NT01Approval option:  Specification Sample

### ■ Customer' s Confirmation

Customer :
<b>Approved by:</b>
<b>Date:</b>
<b>Note:</b>

### ■ Center Confirmed:

Approved	Checked by	Made by

## Records of Revision

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	REMARK

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## 1. Introduction

### 1.1 Scope of application

This specification applies to the Negative type TFT transmissive dot matrix LCD module.

LCD specification: Dots 480xRGBx272.

As to basic specification of the driver IC, refer to the IC (HX8257A ) specification and data sheet.

### 1.2 Structure:

Double display structure:

TFT Module + FPC +BL

FULL 262k Color4.3 inch TFT LCD size for main LCD;

One bare chip with gold bump (COG) TECH;

24 BITS RGB interface;

### 1.3 TFT features:

Structure: TFT PANNEL+IC+FPC+BL;

Transmissive Type LCD

480 dot-source and 272 dot-gate outputs;

262k Color

White LED back light;

24 BITS RGB interface;

### 1.4 Applications:

Mobile phone

PSP

PDA

GPS

Etc...

## 2. General specification

ITEM	Standard value	UNIT
LCD Type	TFT Transmissive	---
Driver element	a-Si TFT Active matrix	
Number of Dots	480*(RGB)*272	Dots
Pixel Arrangement	RGB Vertical Stripe	
Active Area	53.86 *95.04	mm
Viewing Area (W*H)	/	mm
Viewing Direction	6 0' clock	
Driver IC	HX8257A	
Module Size (W*H*T)	67.2x105.5x2.9	mm
Approx. Weight	TBD	g
Back Light	White LED	
System interface	24 BITS RGB interface	

### 3. Mechanical drawing

**NOTES:**

- 1) GENERAL TOLERANCE: ±0.2
- 2) BACKLIGHT: 10 WHITE LED (20mA/CHIP RECOMMENDATION)
- 3) MODE: IC:HX8257A, 262K COLORS, 1FT IN, NORMAL WHITE

FIN Symbol	Function Description
1 VLED+	Power for LED backlight cathode
2 VLED-	Power for LED backlight anode
3 GND	Power ground
4 VDD	Power voltage
5 R0	Red data (LSB)
6 R1	Red data
7 R2	Red data
8 R3	Red data
9 R4	Red data
10 R5	Red data
11 R6	Red data
12 R7	Red data (MSB)
13 G0	Green data (LSB)
14 G1	Green data
15 G2	Green data
16 G3	Green data
17 G4	Green data
18 G5	Green data
19 G6	Green data (MSB)
20 B0	Blue data (LSB)
21 B1	Blue data
22 B2	Blue data
23 B3	Blue data
24 B4	Blue data
25 B5	Blue data
26 B6	Blue data
27 B7	Blue data (MSB)
28 GND	Power ground
29 VDD	Power voltage
30 VSS	Power ground
31 DISP	Display on/off
32 HSTX	Horizontal sync signal
33 VSYNC	Vertical sync signal
34 VCC	Power voltage
35 NC	No connect
36 GND	Power ground
37 XR	Right electrode - differential analog
38 YL	Left electrode - differential analog
39 YH	Top electrode - differential analog
40 YL	Bottom electrode - differential analog

**DETAIL A**  
5:1

**LED CIRCUIT DIAGRAM**

**TITLE**  
MODULE SPEC.

**DRAWING NO.**  
YD043L07NT01

**DRW** JERRY  
**CHK** JERRY  
**APP** JERRY  
**DES** JERRY

**DATE** \_\_\_\_\_

**CUSTOMER'S APPROVAL**

**AMENDMENT**

筠鼎科技股份有限公司

## 4. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply voltage for logic	$V_{DD}$	-0.3	4.0	V
Input voltage for logic	$V_{IN}$	-0.5	$V_{DD} + 0.3$	V
Supply current (One LED)	$I_{LED}$		30	mA
Operating temperature	$T_{OP}$	-30	+80	°C
Storage temperature	$T_{ST}$	-40	+95	°C

## 5. ELECTRICAL CHARACTERISTICS

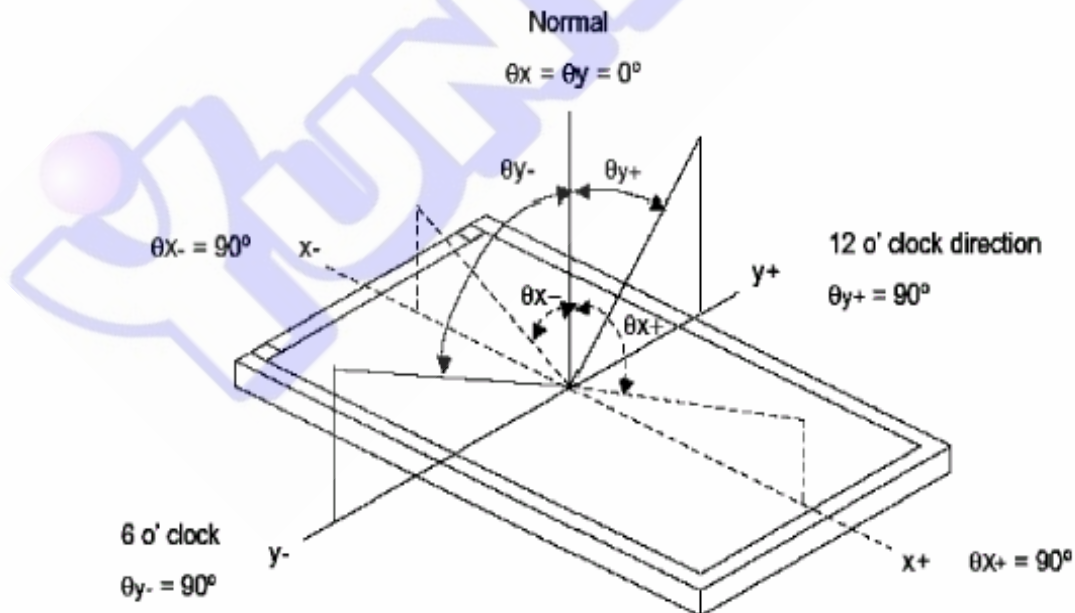
Item	Symbol	Min	Typ	Max	Unit	Applicable terminal
Supply voltage for logic	$V_{DD}$	3.0	3.3	3.6	V	$V_{DD}$
Input voltage	$V_{IL}$	-0.3	-	$0.3 V_{DD}$	V	
	$V_{IH}$	$0.8 V_{DD}$	-	$V_{DD}$	V	
Input leakage current	$I_{LKG}$				$\mu A$	
LED Forward voltage	$V_f$	3.0	3.2	3.4	V	--
Input backlight current	$I_{LED}$	-	20	25	mA	With One LED



## 6. OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE	
			MIN.	TYP.	MAX			
Brightness	B	Viewing normal angle	--	450	-	Cd/m <sup>2</sup>	All left side data are based on wasam's product reference only	
Contrast Ratio	CR		400	500	--	--		
Response Time	Tr+Tf		--	50	70	ms		
CIE Color coordinate	Red		X <sub>R</sub>	--	0.581			
			Y <sub>R</sub>		0.345			
	Green		X <sub>G</sub>	--	0.348			
			Y <sub>G</sub>		0.581			
	Blue	X <sub>B</sub>	--	0.153				
		Y <sub>B</sub>		0.095				
White	X <sub>w</sub>	--	0.315					
	Y <sub>w</sub>		0.335					
Viewing Angle	Hor.	$\theta_{x+}$	60	70	--	Deg.		
		$\theta_{x-}$	60	70	--			
	Ver.	$\theta_{y+}$	60	70	--			
		$\theta_{y-}$	40	50	--			
Uniformity	Un		75	80		%		

**Note 1 : Definition of Viewing Angle  $\theta_x$  and  $\theta_y$  :**

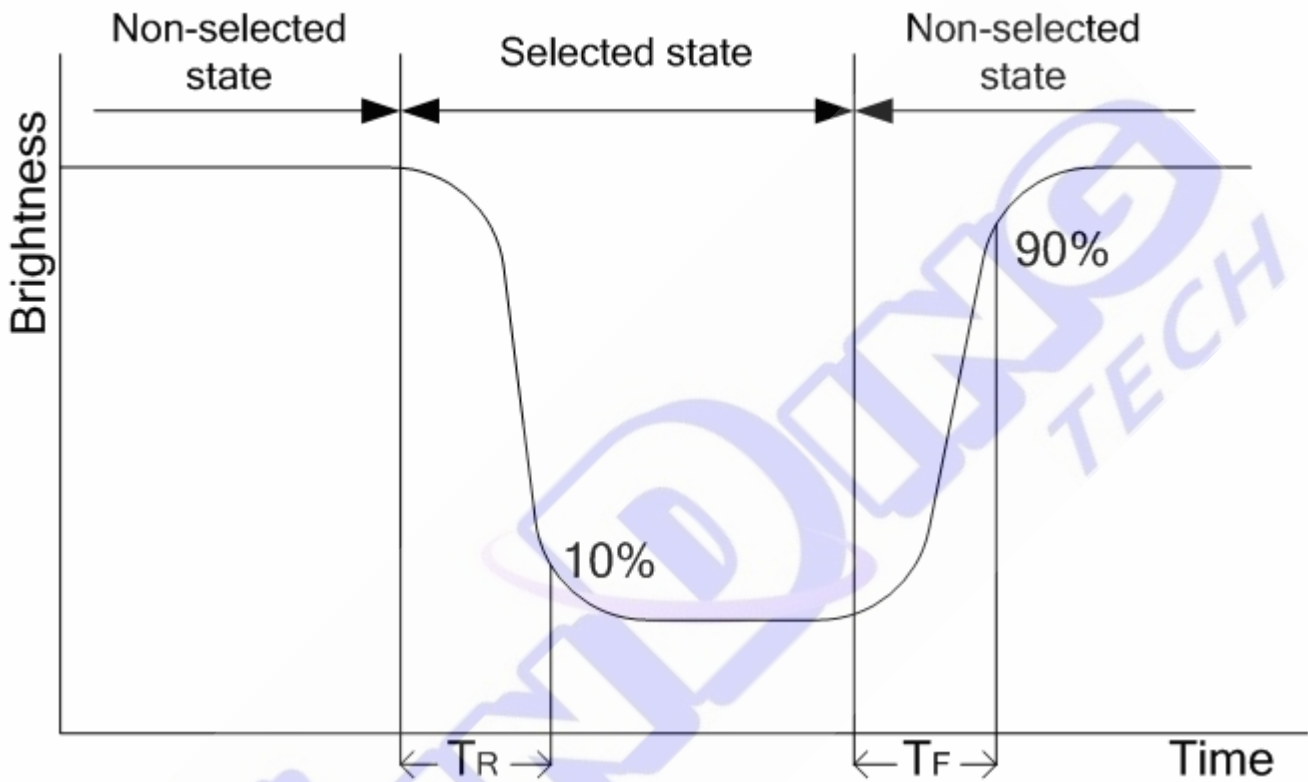




Note 2: Definition of contrast ratio CR:

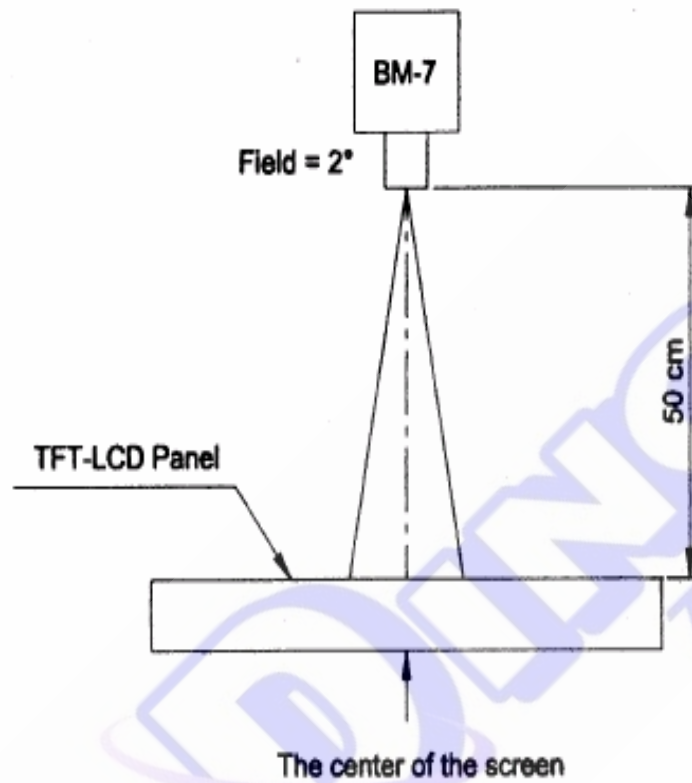
$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

Note 3: Definition of response time ( $T_R$ ,  $T_F$ )

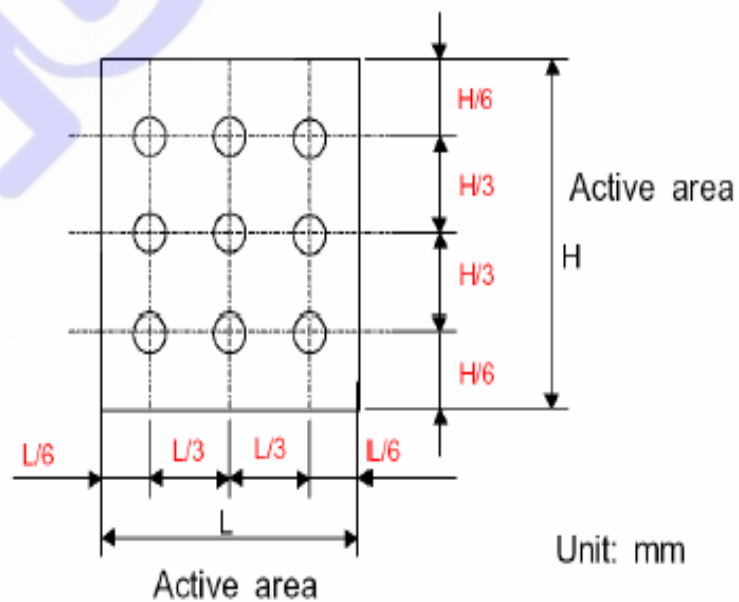


**: The brightness test equipment setup**

**20mA Field=2° (As measuring "black" image, field=2° is the best testing condition)**



**Note 4 :**

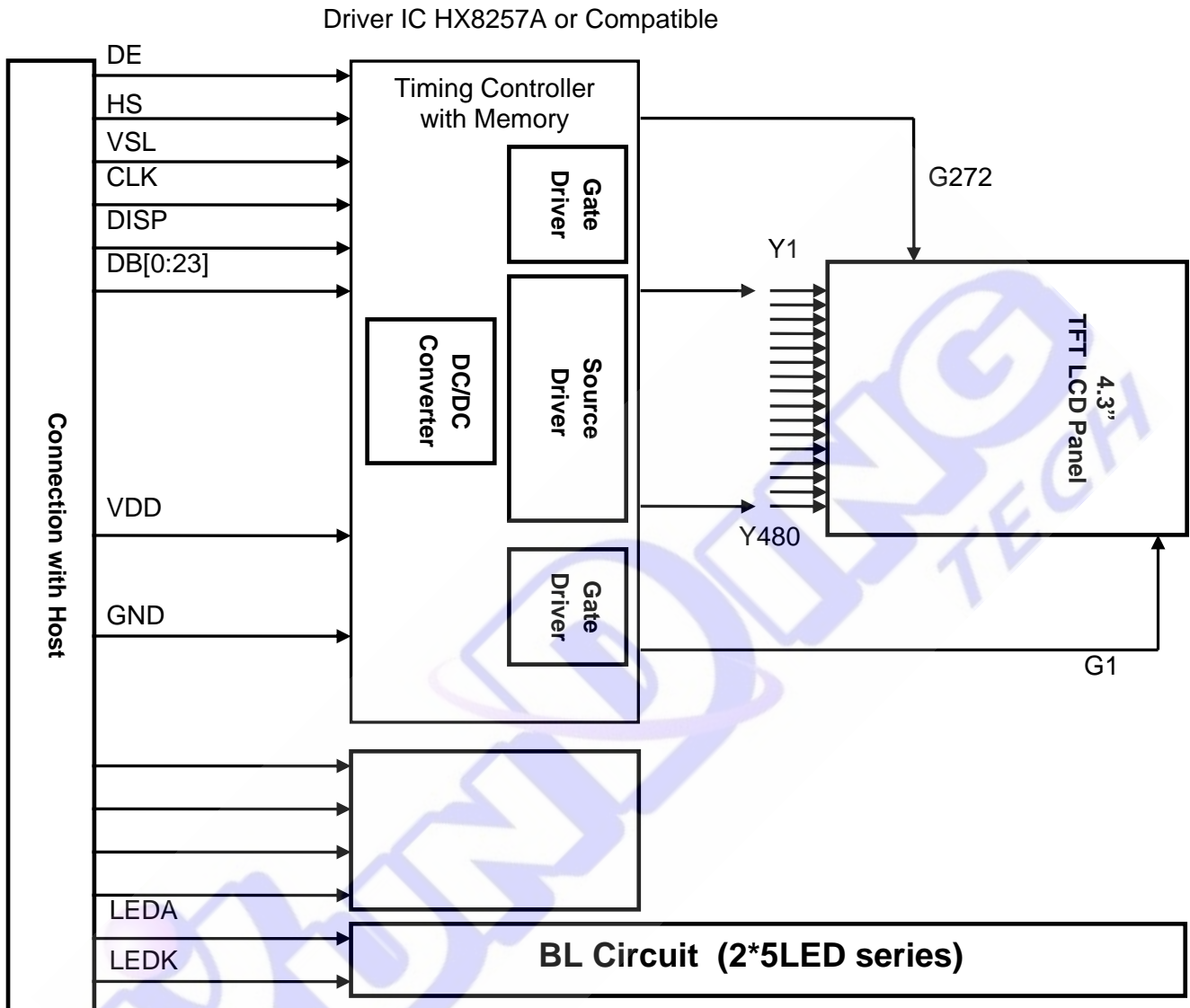


## 7. Interface Pin Function

. Table 2: Pin assignment

Pin No. "	Symbol"	Description"
1"	VLED-	Cathode of LED backlight"
2"	VLED+	Anode of LED backlight"
3"	GND"	Power ground"
4"	VDD"	Power voltage"
5"	R0"	Red data (LSB) "
6"	R1"	Red data"
7"	R2"	Red data"
8"	R3"	Red data"
9"	R4"	Red data"
10"	R5"	Red data"
11"	R6"	Red data"
12"	R7"	Red data (MSB) "
13"	G0"	Green data (LSB) "
14"	G1"	Green data"
15"	G2"	Green data"
16"	G3"	Green data"
17"	G4"	Green data"
18"	G5"	Green data"
19"	G6"	Green data"
20"	G7"	Green data (MSB) "
21"	B0"	Blue data (LSB) "
22"	B1"	Blue data"
23"	B2"	Blue data"
24"	B3"	Blue data"
25"	B4"	Blue data"
26"	B5"	Blue data"
27"	B6"	Blue data"
28"	B7"	Blue data (MSB) "
29	GND	Power ground
30"	DCLK"	Pixel clock"
31"	DISP"	Display on/off"
32"	HSYN"	Horizontal sync signal"
33"	VSYNC"	Vertical sync signal"
34"	DE"	Data enable"
35"	NC"	NO connect"
36"	GND"	Power ground"
37"	XR"	Right electrode -differential analog"
38"	YD"	Bottom electrode -differential analog"
39"	XL"	Left electrode -differential analog"
40"	YU"	Top electrode -differential analog"

## 8. BLOCK DIAGRAM



## 9. LCM Quality Criteria

### 9.1 VISUAL & FUNCTION INSPECTION STANDARD

#### 9.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

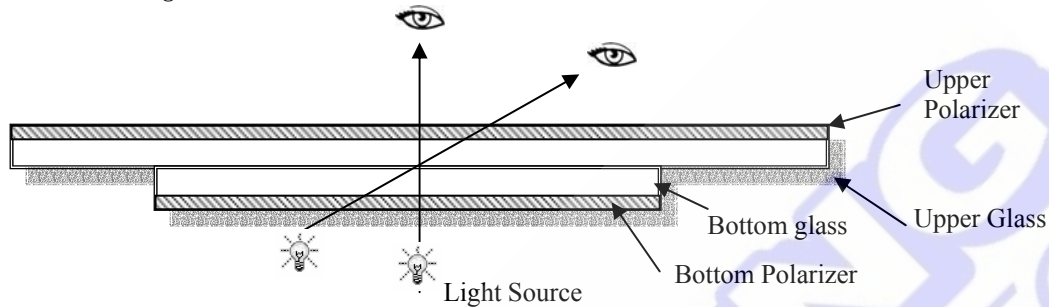
Temperature :  $25 \pm 5^\circ\text{C}$

Humidity :  $65\% \pm 10\%RH$

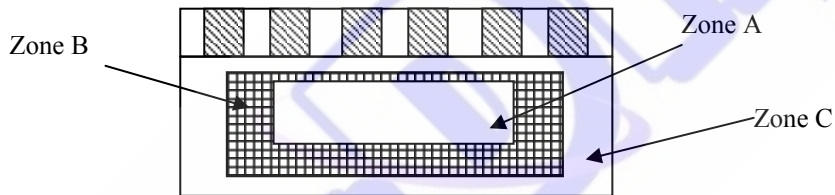
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



#### 9.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn' t effect product function or appearance after assembly by customer.

#### 9.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

AQL:

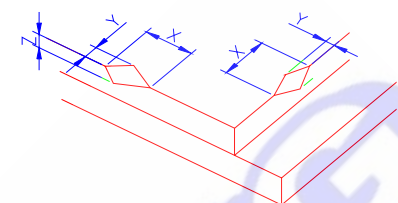
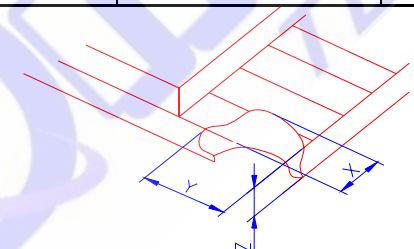
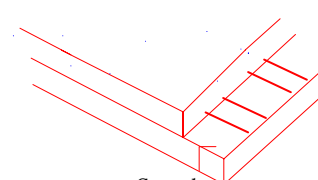
Major defect	Minor defect
0.65	1.5

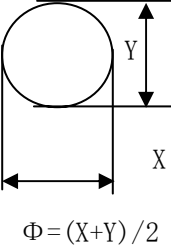
LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	

3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

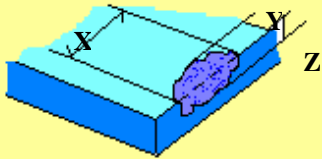
9.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken  NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 <table border="1" data-bbox="845 784 1388 940"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>≤3.0mm</td> <td>&lt;Inner border line of the seal</td> <td>≤T</td> </tr> </table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
	X	Y	Z					
	≤3.0mm	<Inner border line of the seal	≤T					
(2)LCD corner broken	 <table border="1" data-bbox="909 1232 1324 1310"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>≤3.0mm</td> <td>≤L</td> <td>≤T</td> </tr> </table>	X	Y	Z	≤3.0mm	≤L	≤T	
X	Y	Z						
≤3.0mm	≤L	≤T						
(3) LCD crack	 <p>Crack Not allowed</p>							

Number	Items	Criteria (mm)																																																																	
2.0	Spot defect   $\Phi = (X+Y)/2$	<p>① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)</p> <table border="1" data-bbox="448 309 1238 674"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.10</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.15</math></td> <td colspan="3">3 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.15 &lt; \Phi \leq 0.2</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>0.2 &lt; \Phi</math></td> <td colspan="3">0</td> </tr> </tbody> </table> <p>② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)</p> <table border="1" data-bbox="448 741 1238 1106"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.1</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.1 &lt; \Phi \leq 0.2</math></td> <td colspan="3">2 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.3</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>\Phi &gt; 0.3</math></td> <td colspan="3">0</td> </tr> </tbody> </table> <p>③ Polarizer accidented spot</p> <table border="1" data-bbox="448 1173 1238 1485"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.5</math></td> <td colspan="3">2 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>\Phi &gt; 0.5</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.10$	Ignore			$0.10 < \Phi \leq 0.15$	3 ( distance $\geq 10\text{mm}$ )			$0.15 < \Phi \leq 0.2$	1			$0.2 < \Phi$	0			Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore			$0.1 < \Phi \leq 0.2$	2 ( distance $\geq 10\text{mm}$ )			$0.2 < \Phi \leq 0.3$	1			$\Phi > 0.3$	0			Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi \leq 0.5$	2 ( distance $\geq 10\text{mm}$ )			$\Phi > 0.5$	0		
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$\Phi > 0.5$	0																																																																		
	Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	<table border="1" data-bbox="448 1518 1238 1883"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Length(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.03</math></td> <td>Ignore</td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.05</math></td> <td><math>L \leq 3.0</math></td> <td colspan="3"><math>N \leq 2</math></td> </tr> <tr> <td><math>0.05 &lt; W \leq 0.08</math></td> <td><math>L \leq 2.0</math></td> <td colspan="3"><math>N \leq 2</math></td> </tr> <tr> <td><math>0.08 &lt; W</math></td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Length(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.03$	Ignore	Ignore			$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$			$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$			$0.08 < W$	Define as spot defect																																								
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3.0	Polarizer Bubble	<table border="1"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.4</math></td> <td colspan="3">2 (distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.4 &lt; \Phi \leq 0.6</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>0.6 &lt; \Phi</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi \leq 0.4$	2 (distance $\geq 10\text{mm}$ )			$0.4 < \Phi \leq 0.6$	1			$0.6 < \Phi$	0			
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$0.4 < \Phi \leq 0.6$	1																									
$0.6 < \Phi$	0																									
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect , the others are minor defect.																								
5.0	TP Related	<table border="1"> <thead> <tr> <th rowspan="2">TP bubble/ accidented spot</th> <th rowspan="2">Size <math>\Phi</math> (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.1</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.1 &lt; \Phi \leq 0.2</math></td> <td colspan="3">2</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.3</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>0.3 &lt; \Phi</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	TP bubble/ accidented spot	Size $\Phi$ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore			$0.1 < \Phi \leq 0.2$	2			$0.2 < \Phi \leq 0.3$	1			$0.3 < \Phi$	0		
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$0.3 < \Phi$	0																									
Assembly deflection	beyond the edge of backlight $\leq 0.15\text{mm}$																									
Newton Ring	<p>Newton Ring area <math>&gt; 1/3</math> TP area NG</p> <p>Newton Ring area <math>\leq 1/3</math> TP area OK</p>																									
TP corner broken	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>X \leq 3.0\text{mm}</math></td> <td><math>Y \leq 3.0\text{mm}</math></td> <td><math>Z &lt; \text{LCD thickness}</math></td> </tr> </tbody> </table>	X	Y	Z	$X \leq 3.0\text{mm}$	$Y \leq 3.0\text{mm}$	$Z < \text{LCD thickness}$																			
X	Y	Z																								
$X \leq 3.0\text{mm}$	$Y \leq 3.0\text{mm}$	$Z < \text{LCD thickness}$																								
X: length Y: width Z: height		* Circuitry broken is not																								

		allowed.							
	TP edge broken X: length Y: width Z: height	<table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td><math>X \leq 6.0\text{mm}</math></td> <td><math>Y \leq 2.0\text{mm}</math></td> <td><math>Z &lt; \text{LCD thickness}</math></td> </tr> </table>	X	Y	Z	$X \leq 6.0\text{mm}$	$Y \leq 2.0\text{mm}$	$Z < \text{LCD thickness}$	
X	Y	Z							
$X \leq 6.0\text{mm}$	$Y \leq 2.0\text{mm}$	$Z < \text{LCD thickness}$							
		* Circuitry broken is not allowed.							

Criteria ( functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

## 9.2 RELIABILITY TEST

NO	ITEM	CONDTTION	STANDARD
1	High Temp. Storage	70°C, 12 hours	1. Functional test is OK. Missing Segment, short, unclear segment, non-display, display abnormally and liquid crystal leak are un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-20°C, 12 hours	
3	High Temp. Operation	60°C, 12 hours	
4	Low Temp. Operation	-10°C, 12 hours	
5	High temperature and high Humidity storage	40°C, 90%RH ,12 hours	
6	Thermal and cold shock	Static state, -20°C (30 Min) ~70°C (30 Min) ~ -20°C (30Min) , packaging, 10 cycles	
7	Vibration test	Packaging, Frequency : 10-55Hz Amplitude : 1.0mm, Each direction on X,Y axe 0.5 houre, circle 2 hours	1. Function test is OK. 2. No glass crack, chipped glass, end seal loose and fall, epoxy frame crack and so on.
8	Dropping test	Pack products into the carton box. Drop it from 80cm height to ground. Once for each side of the carton	3. No structure loose and fall.

**NOTE:**

9.2.1 The reliability items will be fully performed in new sample qualification,

9.2.2 The reliability status will be tested as monitor during mass production. Individual reliability test shall be

performed by lot , Moreover, the individual reliability item shall be decided according to reliability plan.

9.2.3 All samples are inspected after keeping in the room with normal temperature and humidity for 2 hours or above.

9.2.4 Vibration test: It is not necessary to test for those products without assembly frame , back light ,PCB and so on.

9.2.5 Dropping test : It is necessary for affirming new package.

9.2.6 For the high temperature and high humidity test, pure water of over 10 MΩ.cm should be used.

9.2.7 Each test item applies for test LCM only once .Then tested LCM cannot be used again in any other test item.

9.2.8 The quantity of LCM examination for each test item is 5pcs to 10pcs.

### 9.3 Safety instructions

9.3.1 If the LCD panel breaks, be careful not to get any liquid crystal substance in your mouth.

9.3.2 If the liquid crystal substance touches your skin or clothes, please wash it off immediately by using soap and water.

### 9.4 Handling Precautions

9.4.1 Avoid static electricity damaging the LSI.

9.4.2 Do not remove the panel or frame from the module .

9.4.3 The polarizing plate of the display is very fragile . So, please handle it very carefully.

9.4.4 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of the plate.

9.4.5 The color tone of display and background of LCM has the possibility to be changed in the storage temperature range.

9.4.6 Pay attention to the working environment, as the element may be destroyed by static electricity.

--Be sure to ground human body and electric appliance during work.

--Avoid working in a dry environment to minimize the generations of static electricity.

--Static electricity may be generated when the protective film is fast peeled off.

9.4.7 When soldering the terminal of LCM, make certain the AC power source of soldering iron does not leak.

9.4.8 If the display surface becomes contaminated ,breathe on the surface and gently wipe it with a soft-dry- clean cloth .If it is heavily contaminated ,moisten cloth with the following solvent(ex:Ethyl alcohol).Solvents other than those above-mentioned may damage the polarizer(Especially ,do not use them .ex: Warter / Ketone)

### 9.5 Operation instructions

9.5.1 It is recommended to drive the LCD within the specified voltage limits, try to adjust the operating voltage for the optimal contrast, the color and contrast of LCD panel will varies at different temperature.

9.5.2 Response time is greatly delayed at low operating temperature range. However, this does not mean the LCD will be out of the order, It will recover when it returns to the specified temperature range.

9.5.3 If the display area is pushed hard during operation, the display will become abnormal.

9.5.4 Do not operate the LCD at the environments over the specified conditions, this may cause damage on the LCD and shorten the lifetime.

### 9.6 Storage instructions:

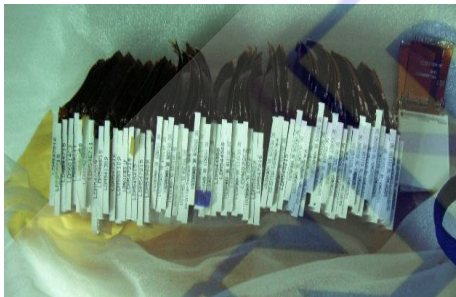
9.6.1 Store LCDs in a sealed polyethylene bag.

9.6.2 Store LCDs in a dark place, Do not expose to sunlight or fluorescent light. Keep the temperature between 0°Cand 35°C.

9.6.3 Avoid the polarizer touch any other object, ( It is recommended to store them in the container in which they were shipped.)

### 9.7 Limited Warranty

- 9.7.1 will replace or repair any of its LCD modules, which are found to be defective, when inspected in accordance with LCM acceptance standards ( copies available upon request ) for a period of 12 months from ink- print date on product
- 9.7.2 Any defects must be returned to within 60 days since ship-out. Confirmation of such date shall be based on freight documents. The warranty liability of wasam limited to repair and/or replacement on defects above (7.1,7.2)
- 9.7.3 No warranty can be granted if the precautions stated above have been disregarded. The typical samples are as below:
- LCD glass crack/break
  - PCB outlet is damaged or modified.
  - PCB conductors damaged.
  - Circuit modified with by grinding, engraving or painting varnish.
  - FPC crack
- 9.7.4 Modules must be returned with sufficient description of the failures of defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB outlet, conductors and terminals. Modules must be packed with the container in which they were shipped.



## 10. Packing method

-----TBD