

深圳市智诚光电发展有限公司

PRODUCT SPECIFICATIONS

For Customer: _____ : APPROVAL FOR SPECIFICATION

Customer Model No. _____ : APPROVAL FOR SAMPLE

Module No.: ZC043IA01-500

Date:2020.03.03

Version :A

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For Customer's Acceptance:

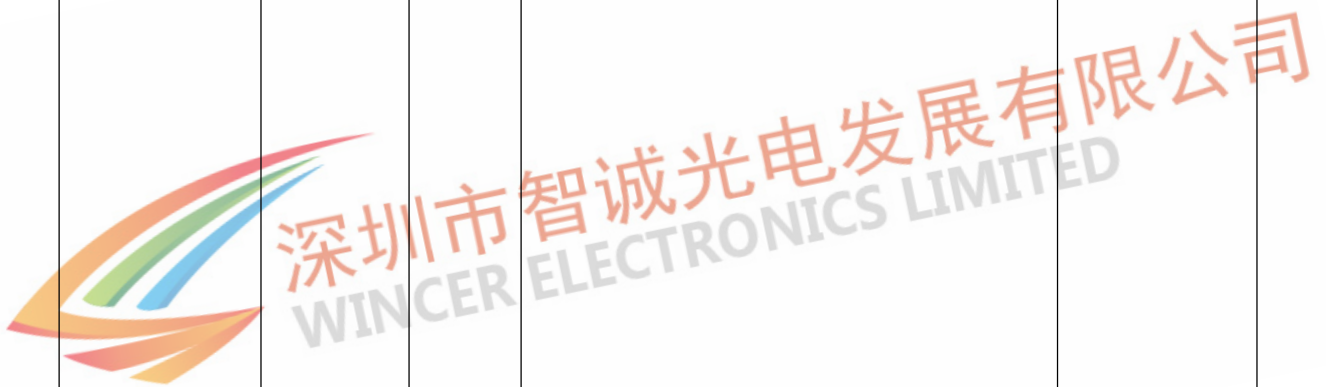
Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT

深圳市智诚光电发展有限公司

2. Revision Record

Date	Rev.No.	Page	Revision Items	Prepared
2020.03.03				



3. General Specifications

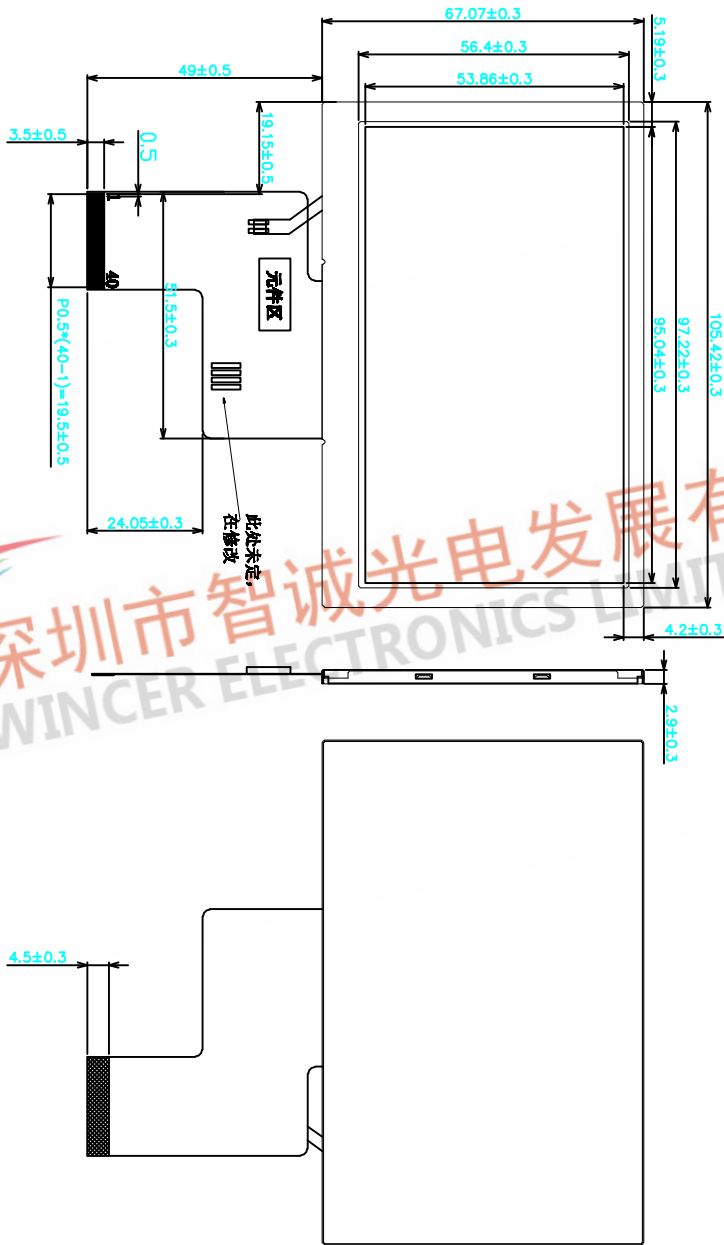
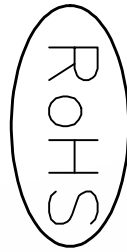
ZC043IA01-500 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light unit. The 4.3" display area contains 800 x 480 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	Normally Black, Transmissive	-	
Display color	16.7M		1
Viewing Direction	ALL	O' Clock	
Operating temperature	-20~+70	°C	
Storage temperature □	-30~+80	°C	
Module Size	105.50(W)*67.20(H)*3.00(T)	MM	+ -0.2
Active Area □	95.04(W)*53.858(H)	MM	
Number of Dots	800×RGB×480	dots	
Data Transfer	RGB interface	-	

4.Outline.Drawing

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FIELD	尺寸	Tolerance	公差
0.00 - 0.50	±0.08		
0.51 - 30.00	±0.10		
30.01 - 60.00	±0.15		
60.01 - 120.0	±0.20		
120.0 - 180.0	±0.30		
180.0 - 250.0	±0.30		
Angle (角度)	±1°		



4.3"IPS (单口)		APPROVED BY	核准	CHECKED BY	审核	DRAWN BY	绘图
DATE	日期	UNIT	单位	mm			

1	VLD*
2	VLD*
3	GND
4	VDD
5	RD
6	RD
7	RD
8	RD
9	RD
10	RD
11	RD
12	RD
13	RD
14	RD
15	RD
16	RD
17	RD
18	RD
19	RD
20	RD
21	RD
22	RD
23	RD
24	RD
25	RD
26	RD
27	RD
28	RD
29	RD
30	RD
31	RD
32	RD
33	RD
34	RD
35	RD
36	RD
37	RD
38	RD
39	RD
40	RD

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5. Absolute Maximum Ratings(Ta=25°C)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Power supply	VDD	-0.3	-	3.96	V	
	AVDD	-0.5	-	14.85	V	
	VGL	-	-10.5	-	V	
	VGH	-	13	-	V	
Operating Temperature	TOP	-30	-	70	°C	
Storage Temperature	TST	-30	-	85	°C	

1. If the module is above these absolute maximum ratings. It may become permanently damaged.

Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. VDD>V_{SS} must be maintained.

3. Please be sure users are grounded when handing LCD Module.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30°C	85°C	-20°C	70 °C	1,2
Humidity	-	-	-	-	3

6. Electrical Specifications and Timing Characteristics

6.1 Electrical characteristics(V_{SS}=0V ,Ta=25°C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VDD	Ta=25°C	2.8	3.3	3.6	V	
Input voltage	'H'	V _{IH}	VDD=3.3V	0.7VDD	-	VDD	V
	'L'	V _{IL}	VDD=3.3V	0	-	0.3VDD	V
Current Consumption	I _{CC1}	Normal mode	-	-	-	mA	2
	I _{CC2}	Sleep mode	-	0.03	0.09	mA	2

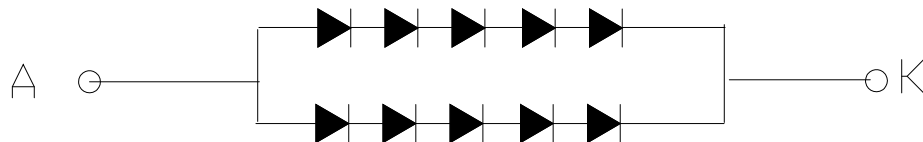
Note:

1:When an optimum contrast is obtained in transmissive mode.

2: Tested in 1×1 chessboard pattern.

6.2 LED backlight specification(V_{SS}=0V ,Ta=25°C)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage		-	-	15	-	V	
Supply current	I _f	-	-	45	-	MA	



Note:

1: V_{LED}=V_{LED}(+)-V_{LED}(-).

2:The current of LED is 20mA.

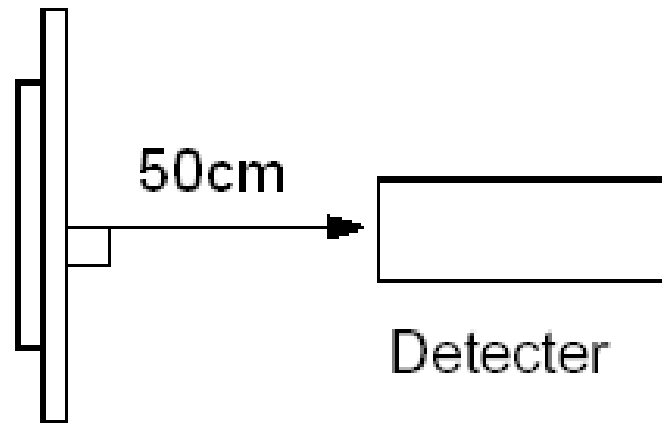
A LED drive in constant current mode is recommended.

6.3 Interface signals

Pin	Symbol	Description.
1	LED_K	Backlight LED Ground
2	LED_A	Backlight LED Power
3	GND	GND
4	VDD	Power supply
5~12	R0-R7	Red data bus
13~20	G0-G7	Green data bus
21~28	B0-B7	Blue data bus
29	GND	GND
30	PCLK	Data clock
31	DISP	Standby mode select pin
32	HSYNC	Line SYNC signal
33	VSYNC	Frame SYNC signal
34	DE	Data Enable Input
35	NC	NC
36	GND	GND
37	X1	Touch Panel Control Pin
38	Y1	Touch Panel Control Pin
39	X2	Touch Panel Control Pin
40	Y2	Touch Panel Control Pin

7. Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Brightness	Bp	$\theta=0^\circ$	-		-	Cd/m ²	1	
Uniformity	Δ Bp	$\Phi=0^\circ$	75	80	-	%	1,2	
Viewing Angle	3:00	$Cr \geq 10$	70	80	-	Deg	3	
	6:00		70	80	-			
	9:00		70	80	-			
	12:00		70	80	-			
Contrast Ratio	Cr	$\theta=0^\circ$		1200				
Response Time	T_r+T_f	$\Phi=0^\circ$		30	40	ms	5	
Color of CIE Coordinate	W	x		0.311			1,6	
				0.388				
		Y	-	-	-			
	R	x						
		y						
		Y	-	-	-			
	G	x	$\theta=0^\circ$					
		y	$\Phi=0^\circ$					
		Y		-	-	-		
	B	x						
		y						
		Y		-	-	-		
NTSC Ratio								

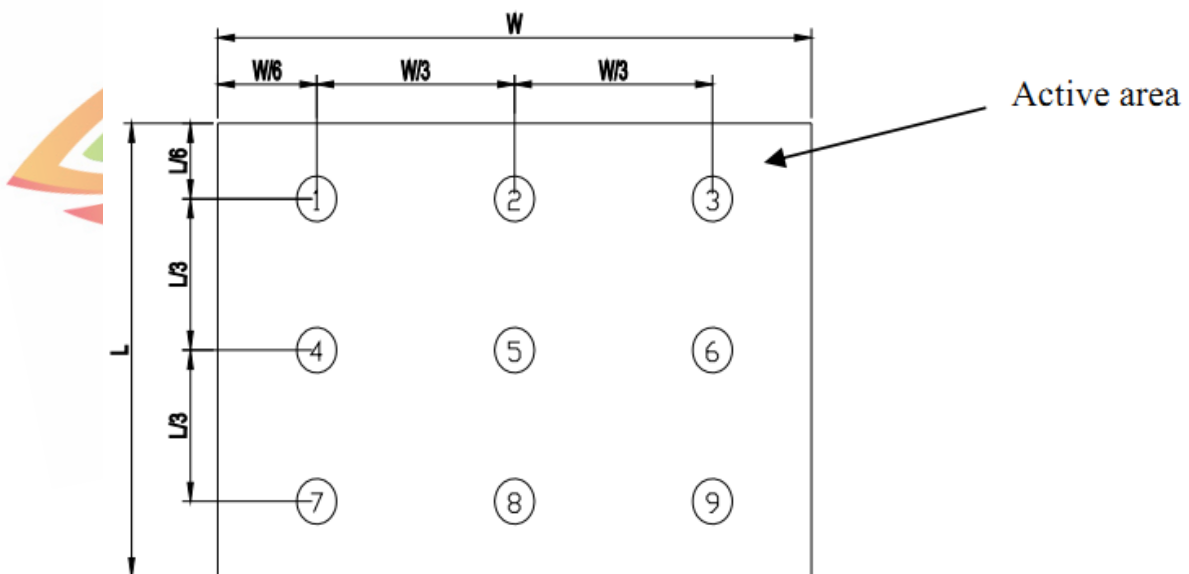


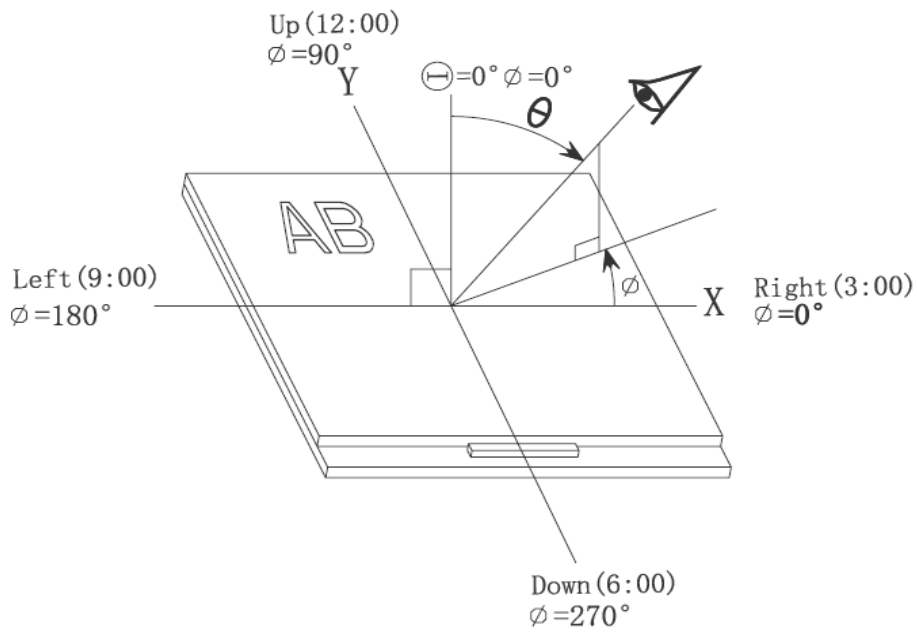
Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta B_p = B_p (\text{Min.}) / B_p (\text{Max.}) \times 100 (\%)$$

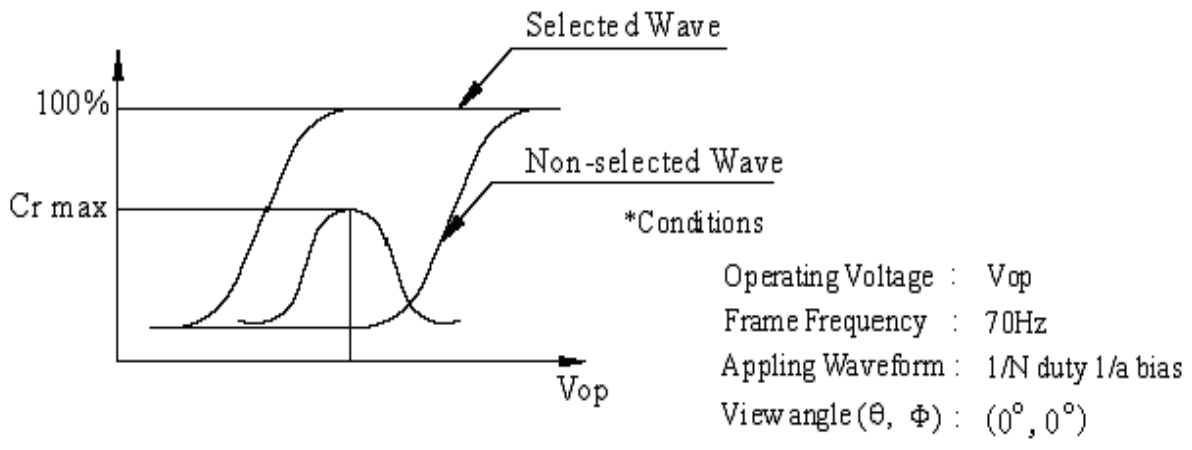
$B_p (\text{Max.})$ = Maximum brightness in 9 measured spots

$B_p (\text{Min.})$ = Minimum brightness in 9 measured spots.

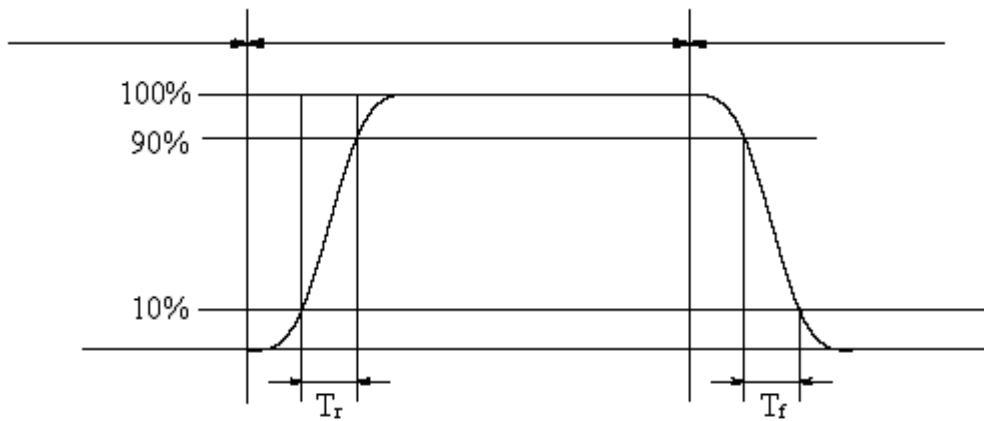




Note 4: Definition of contrast ratio.(Test LCD using DMS501)

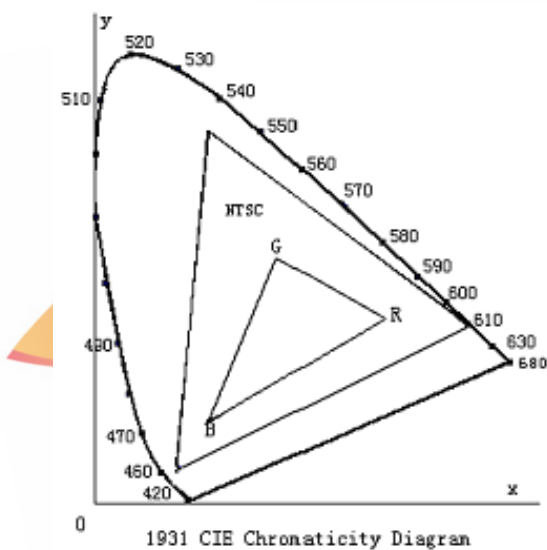


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The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

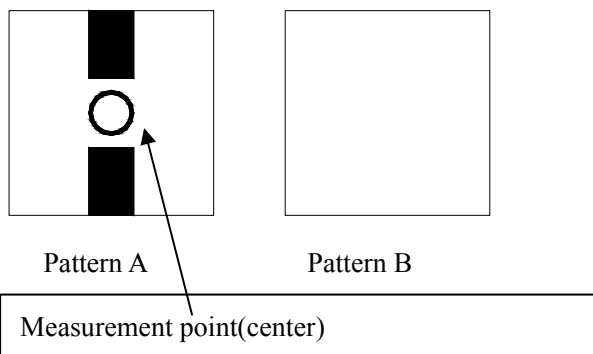


Color gamut:

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.

$$\text{Cross talk ratio}(\%) = \frac{|\text{pattern A Brightness} - \text{pattern B Brightness}|}{\text{pattern A Brightness}} \times 100$$



Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80°C±2°C 96 H Restore 2H at 25°C Power off	1. After testing, cosmetic and electrical defects should not happen. 2. Total current consumption should not be more than twice of initial value.
2	Low Temperature Storage	-30°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	70°C±2°C 96 H Restore 2H at 25°C Power on	
4	Low Temperature Operation	-20 °C±2°C 96H Restore 4H at 25°C Power on	
5	High Temperature/Humidity Operation	60°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-20°C → 70°C 30min 5min 30min after 5 cycle, Restore 2H at 25°C Power off	
7	Vibration Test	10Hz~150Hz, 100m/s ² , 120min	Not allowed cosmetic and electrical defects.
8	Shock Test	Half- sine wave, 300m/s ² , 11ms	
9	ESD Test	Air discharge: ±8KV, Contact discharge: ±4KV	

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

degrade usability for product applications, including all functional defects(such as no display, abnormal display, open or missing segment, short circuit, missing component), outline dimension beyond the drawing, progressive defects and those affecting reliability.

Minor defects (MI): A minor defect refers to a defect which is not considered to be able to substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation, such as black spot, white spot, bright spot, pinhole, black line, white line, contrast variation, glass defect, polarizer defect, etc.

9.2 Definition of inspection range

<p>For dot defect of TFT LCD which is not smaller than 3 inches, dividing three areas to make a judgment (according to figure 1).</p> <p>A area : center of viewing area B area : periphery of viewing area C area : Outside viewing area</p> <p>For other defects, dividing two areas to make a judgment (according figure 2).</p> <p>A zone : Inside Viewing area B zone : Outside Viewing area</p> <p>X1(A.A~V.A): 2mm X2(A.A~V.A): 2mm Y1(A.A~V.A): 2mm Y2(A.A~V.A): 2mm</p>	<p>Figure 2</p>
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9.3 Inspection items and general notes

General notes	<p>1.Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and SH.</p> <p>2.Viewing area should be the area which SH guarantees.</p> <p>3.Limit sample should be prior to this Inspection standard.</p> <p>4.Viewing judgment should be under static pattern.</p> <p>5.Inspection conditions Inspection distance: 250 mm (from the sample) Temperature : 25±5 °C Inspection angle : 45 degrees in 6 o'clock direction (all defects in viewing area should be inspected from this direction)</p>	
Inspection items	Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble	The color of a small area is different from the remainder. The phenomenon doesn't change with voltage
	Contrast variation	The color of a small area is different from the remainder. The phenomenon changes with voltage
	Polarizer defect	Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass
	Dot defect (TFT LCD)	The pixel appears bright or dark abnormally when display
	Functional defect	No display, Abnormal display, Open or missing segment, Short circuit, False viewing direction

	Glass defect	Glass crack, Shaved corner of glass, Surplus glass
	PCB defect	Components assembly defect

9.4 Outgoing Inspection level

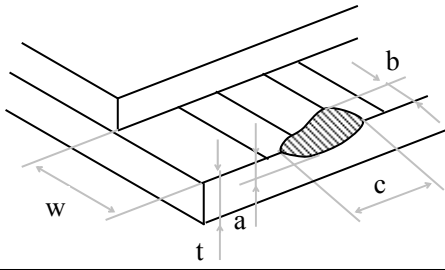
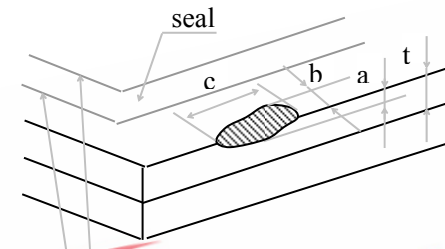
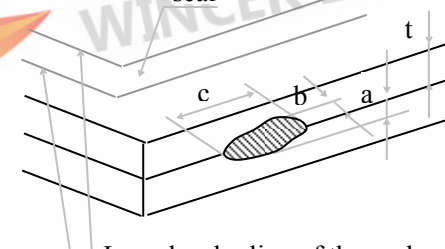
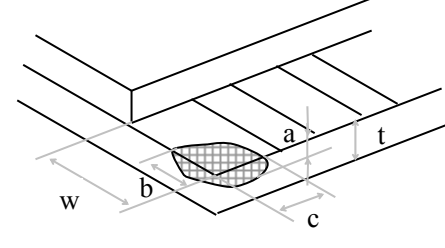
Outgoing Inspection standard	Inspection conditions	Inspection				
		Min.	Max.	Unit	IL	AQL
Major Defects	See 8.3 general notes	See 8.5			II	0.065
Minor Defects	See 8.3 general notes	See 8.5			II	0.065

Note: Sampling standard conforms to GB2828

9.5 Inspection Items and Criteria

Inspection items		Judgment standard				
		Category	Acceptable number			
			A zone	B zone		
1	Black spot, White spot, Pinhole, Foreign Particle, Particle in or on glass, Scratch on glass $\Phi=(a+b)/2(\text{mm})$ $(a/b < 2.5)$	A	$\Phi \leq 0.20$	Neglected	Neglected	
		B	$0.20 < \Phi \leq 0.25$	3	Neglected	
		C	$0.25 < \Phi \leq 0.3$	2	Neglected	
		D	$0.3 < \Phi \leq 0.4$	1	3	
		E	$0.4 < \Phi \leq 0.5$	0	2	
		Total defective point(B,C)			1	-
		2	Black line, White line, and Particle Between Polarizer and glass, Scratch on glass $L/W \geq 2.5$	A	$W \leq 0.03$	Neglected
B	$0.03 < W \leq 0.05$ $L \leq 3.0$			3	Neglected	
C	$0.05 < W \leq 0.1$ $L \leq 3.0$			2	Neglected	
D	$0.05 < W \leq 0.1$ $L \leq 4.0$			1	3	
E	$W > 0.1$ $L > 4.0$			0	2	
Total defective point(B,C)					1	-
3	Bright spot			any size		none
4	Contrast	A	$\Phi < 0.2$	Neglected	Neglected	

	variation		B	$0.2 < \Phi \leq 0.3$	2	
			C	$0.3 < \Phi \leq 0.4$	1	
			D	$0.4 < \Phi$	0	
			Total defective point(B,C)		3	
5	Bubble inside cell		any size		none	none
6	Polarizer defect (if Polarizer is used)	Scratch ,damage on polarizer, Particle on polarizer or between polarizer and glass.	Refer to item 1 and item 2.			
		Bubble, dent and convex	A	$\Phi \leq 0.1$	Neglected	Neglected
			B	$0.1 < \Phi \leq 0.2$	2	Neglected
			C	$0.2 < \Phi \leq 0.3$	1	2
7	Surplus glass	Stage surplus glass	 $B \leq 0.3\text{mm}$			
		Surrounding surplus glass	 Should not influence outline dimension and assembling.			
8	Open segment or open common		Not permitted			
9	Short circuit		Not permitted			
10	False viewing direction		Not permitted			
11	Contrast ratio uneven		According to the limit specimen			
12	Crosstalk		According to the limit specimen			
13	Black /White spot(display)		Refer to item 1			
14	Black /White line(display)		Refer to item 2			

Inspection items		Judgment standard		Acceptable number	
		Category(application: B zone)			
15	Glass defect crack	i) The front of lead terminals 	A	$a \leq t, b \leq 1/5W, c \leq 3\text{mm}$	Max.3 defects allowed
		ii) Surrounding crack-non-contact side 	B	Crack at two sides of lead terminals should not cover patterns and alignment mark	
		iii) Surrounding crack- contact side 		$b < \text{Inner borderline of the seal}$	
				$b < \text{Outer borderline of the seal}$	
		iv) Corner 	A	$a \leq t, b \leq 3.0, c \leq 3.0$	
			B	Glass crack should not cover patterns u and alignment mark and patterns.	

Inspection items		Judgment standard	
		Category(application: B zone)	
16	PCB defect	<p>Component soldering: No cold soldering、short、open circuit、burr、tin ball The flat encapsulation component position deviation must be less than 1/3 width of the pin (Pic.1); the sheet component deviation: Pin deviates from the pad and contact with the near components is not permitted (Pic.2)</p>	
		<p>lead defect: The lead lack must be less than 1/3 of its width; The lead burr must be less than 1/3 of the seam; Impurities connect with the near leads is not permitted</p>	
		<p>Connector soldering: Soldering tin is at contact position of the plug and socket is not permitted No foundation is scald Serious cave distortion on plug and socket contact pin is not permitted</p>	
		<p>Glue on root of the speaker receiver and motor lead: The insulative coat of the lead must join into the PCB; the protected glue must envelop to the insulative coat.</p>	