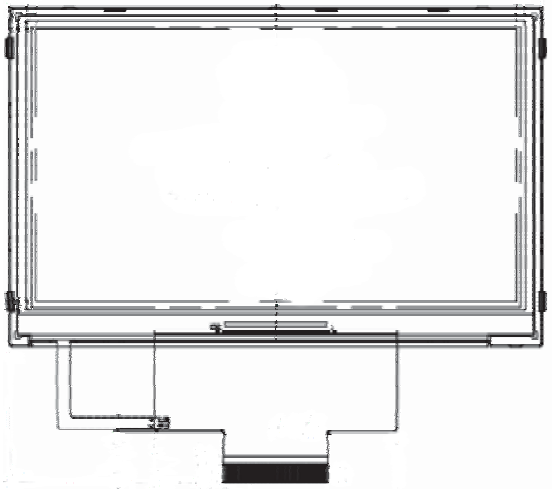
HANTRONIX

PRODUCT SPECIFICATION

HDA430-5S1

4.3', 480x272 TFT COLOR GRAPHICS LCD DISPLAY MODULE



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1. GENERAL INFORMATION

Item	Cont	Unit
LCD Type	TFT TRANSMISSIVE	/
Viewing direction	12:00	O' Clock
Module Size (W - H)	105.5-67.2	mm
Active area (W-H)	95.04-53.86	mm
Number of Dots	480(RGB) *272	/
Driver IC	HX8257	/
Colors	16M	/
Backlight type	LED	/
Interface Type	24- Bits RGB	/
Operating voltage	3.3	V
Operation Temperature Range	-20~70	℃
Storage Temperature Range	-30~80	℃

3.ABSOLUTE MAXIMUM RATINGS

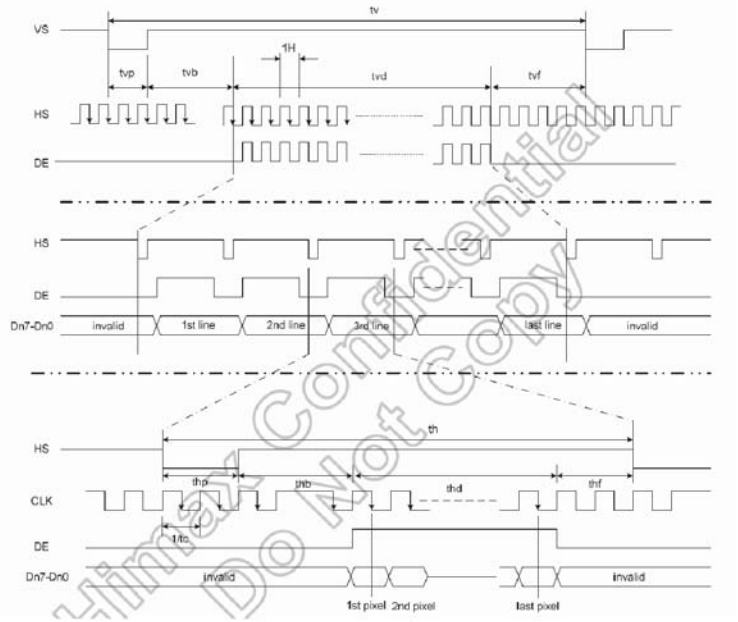
Symbol	Parameter	Spec.			Unit
		Min.	Typ.	Max.	
VDDIO	Logic Power Supply	-0.3	-	4.0	V
VCI	Booster Power Supply	-0.3	-	5.0	V
VCIP	Analog Circuit Power Supply	-0.3	-	5.0	V
VCIX2J	Power supply of analog block and VLCD/VDC regulation	-0.3	-	6.0	V
VDD	Power pin for internal logic circuit	-0.3	-	2.7	V
VGH-VGL	Using External VGH、VGL	-0.3	-	45.0	V
T_A	Operating Temperature	-30	-	85	V

4.AC Characteristics

(480RGBx272, T_A=25°C, VDDIO=1.8V to 3.6V, DVSS= 0V)

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	f_{CLK} (1)	-	9	15	MHz
Hsync cycle	1/th	-	17.14	-	KHz
Vsync cycle	1/tv	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	thp (2)	2	41	41	CLK
Horizontal back porch	thb (2)	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	399	H (1)
Vertical display period	tvd	272	272	272	H (1)
Vertical front porch	tvf	1	2	227	H (1)
Vertical pulse width	tvp (2)	1	10	11	H (1)
Vertical back porch	tvb (2)	1	2	11	H (1)

Note: (1) Unit: CLK=1/ f_{CLK} , H= th,
(2) It is necessary to keep tvp+tvb=12 and thp+thb=43 in sync mode. DE mode is unnecessary to keep it.



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5. BACKLIGHT CHARACTERISTICS

Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	Vf	18.6	19.8	21.0	V	1. IF = 20x2 mA/LED 2.Aperture:1°,12 Point 3.The Measurement instrument is:BM-7 4.Average=min/max*100%
Reverse Current	Ir			15	μA	
Luminance	Lv	8000			cd/m^2	
Average		75			%	
Colour Coordinate	X	0.260		0.320		
	Y	0.260		0.320		

6.OPTICAL SPECIFICATIONS

Item		Symbol	Conditions	Specifications			Unit	Note
				Min.	Typ.	Max.		
Transmittance		T%	Viewing normal angle $\theta_X = \theta_Y = 0°$	-	6.1	-	%	All left side data are based on CMO's following condition – 6 o'clock NTSC: 50% LC: TN Light : C light (Machine:BM5A) Normal Polarizer (Linear Polarizer) Simulation data Reference Only
Contrast Ratio		CR		-	250	-	-	
Response Time		T_R		-	5	-	ms	
		T_F		-	15	-	ms	
Chromaticity	Red	X_R		0.590	0.620	0.650	-	
		Y_R		0.314	0.344	0.374	-	
	Green	X_G		0.276	0.306	0.336	-	
		Y_G		0.533	0.563	0.593	-	
	Blue	X_B		0.103	0.133	0.163	-	
		Y_B		0.119	0.149	0.179	-	
	White	X_W		0.281	0.311	0.341	-	
		Y_W		0.319	0.349	0.379	-	
Viewing Angle	Hor.	θ_{X+}	Center CR≥10	-	60	-	deg.	
		θ_{X-}		-	60	-		
	Ver.	θ_{Y+}		-	60	-		
		θ_{Y-}		-	60	-		

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

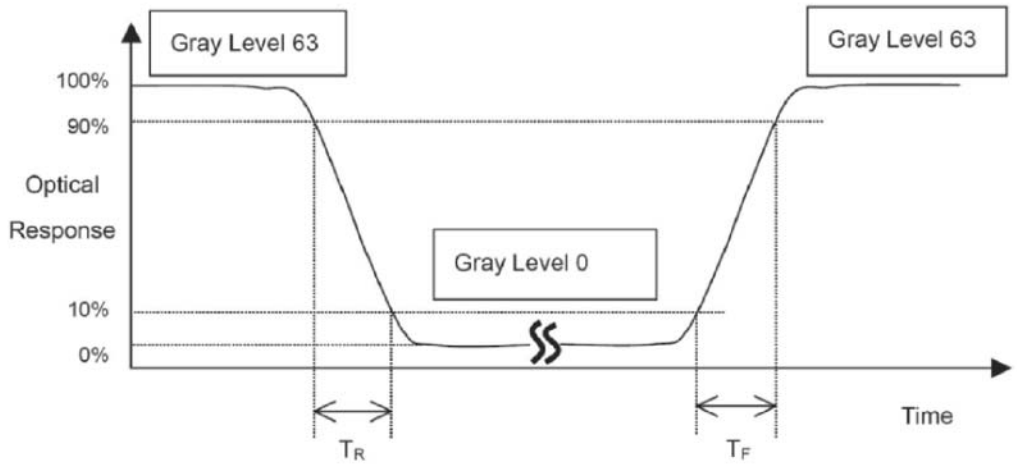
L63: Luminance of gray level 63

L0: Luminance of gray level 0

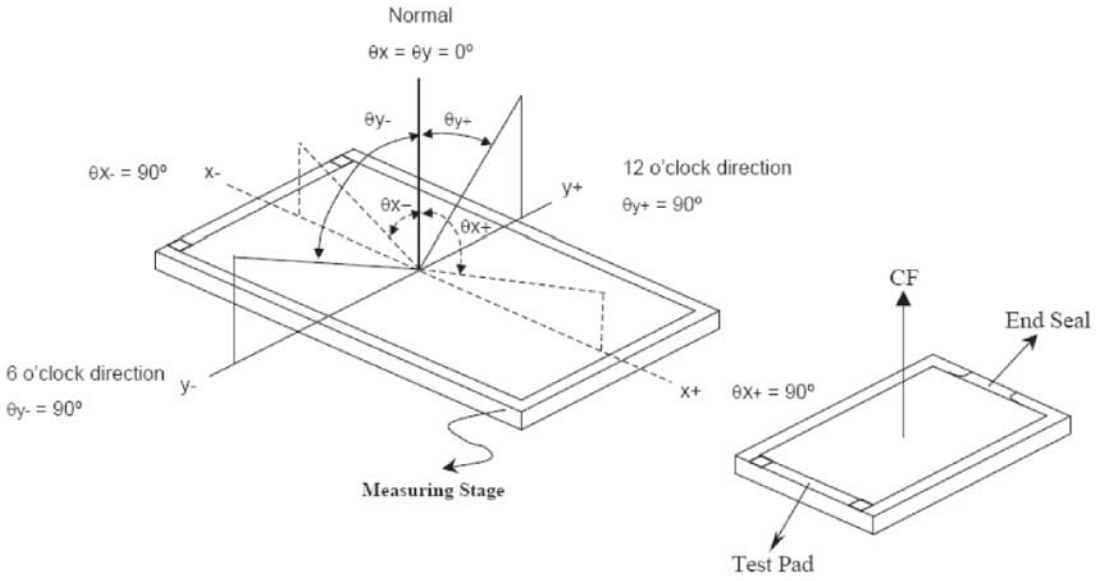
CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (TR, TF):



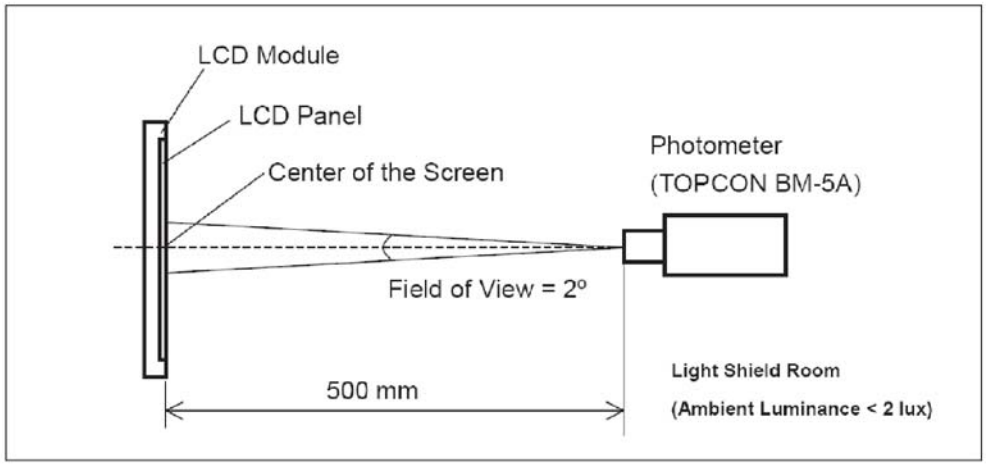
*Note(3) Definition of Viewing Angle



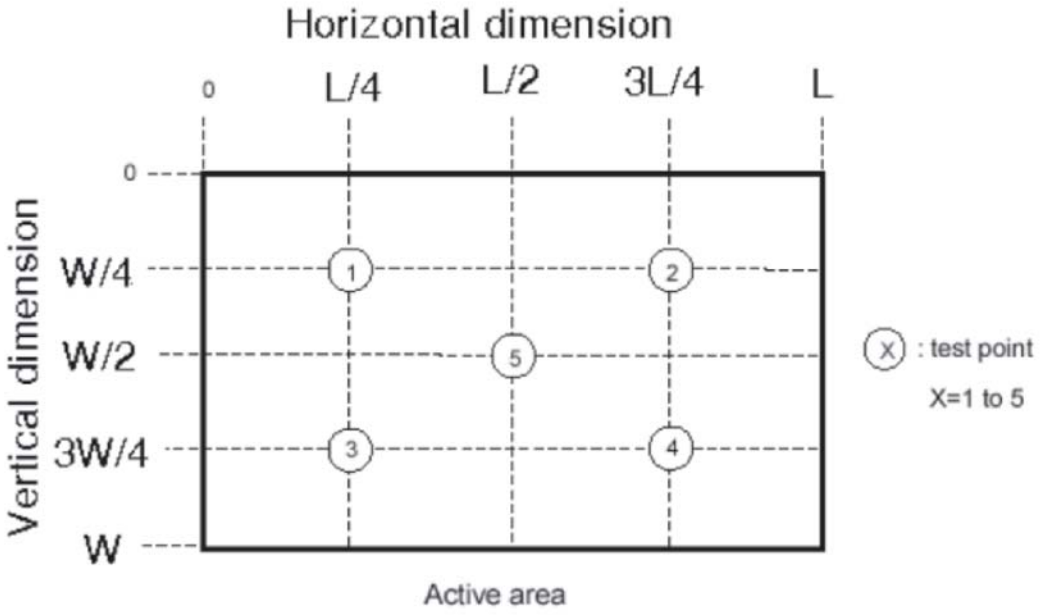
*** The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 12 O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note (5)



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7.INTERFACE DESCRIPTION

Pin No.	Symbol	Description
1-2	GND	Ground
3-4	VCC	Power supply
5-12	R0-R7	Data bit
13-20	G0-G7	Data bit
21-28	B0-B7	Data bit
29	GND	Ground
30	DOTCLK	Clock signal for data
31	DISPLAY	Display control/standby mode selection DISP= "Low":standby; （default） DISP= "High": Normal display
32	HSYNC	Horizontal sync signal; negative polarity
33	VSYNC	Vertical sync signal; negative polarity
34-38	NC	No connection
39-40	K,A	LED backlight

8.APPLICATION CIRCUIT

Please consult our technical department for detail information.

9.INITIAL CODE

Please consult our technical department for detail information

10. RELIABILITY TEST

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	80±2℃/200 hours	Inspection after 2~4hours storage at room temperature,the sample shall be free from defects: 1.Air bubble in the LCD; 2.Sealleak; 3.Non-display; 4.missing segments; 5.Glass crack; 6.Current Idd is twice higher than initial value.
2	Low Temperature Storage	-30±2℃/200 hours	
3	High Temperature Operating	70±2℃/120 hours	
4	Low Temperature Operating	-20±2℃/120 hours	
5	Temperature Cycle	-20 ℃ ~25 ℃~70 ℃ × 10cycles (30min.) (5min.) (30min.)	
6	Damp Proof Test	50℃±5℃×90%RH/120 hours	
7	Vibration Test	Frequency：10Hz~55Hz~10Hz Amplitude：1.5mm, X，Y，Z direction for total 3hours (Packing condition)	
8	Drooping test	Drop to the ground from 1m height, one time, every side of carton. (Packing condition)	
9	ESD test	Voltage:±8KV R: 330Ω C: 150pF Air discharge, 10time	

Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 5~10pcs.

3.For Damp Proof Test, Pure water(Resistance＞10MΩ) should be used.

4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

5.EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.

6.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

7.Please use automatic switch menu(or roll menu) testing mode when test operating mode.

12.INSPECTION CRITERION

OUTGOING QUALITY STANDARD	PAGE 1 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	

This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM.

1 Sample plan

Sampling plan according to GB/T2828.1-2003/ISO 2859-1: 1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:

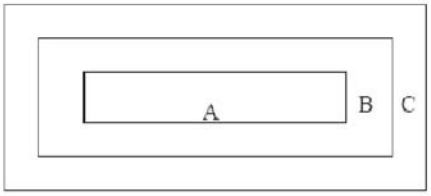
Major defect: AQL 0.65

Minor defect: AQL 1.5

2. Inspection condition

Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within
45° against perpendicular line.

3. Definition of inspection zone in LCD.



Zone A: character/Digit area

Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)

Zone C: Outside viewing area (invisible area after assembly in customer's product)

Fig.1 Inspection zones in an LCD.

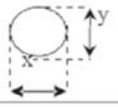
Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

4. Inspection standards

4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	

4.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.2.1	Clear Spots Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer	For dark/white spot, size Φ is defined as $\Phi = (x+y)/2$  1.	Minor
	Dim Spots Circle shaped and dim edged defects	2.	Minor

1.

Size(mm) \ Zone	Acceptable Qty		
	A	B	C
Φ≤0.10	Ignore		Ignore
0.10<Φ≤0.15	2		
0.15<Φ≤0.20	1		
Φ>0.20	0		

2.

Size(mm) \ 2. Zone	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.20<Φ≤0.40	3		
0.40<Φ≤0.60	2		
0.60<Φ≤0.80	1		
0.80<Φ	0		

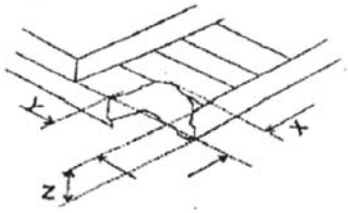
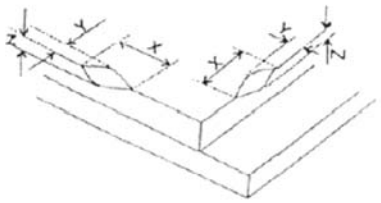
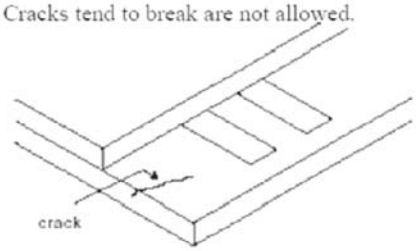
4.2. Cosmetic Defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>4.2.2</td><td>Line defect
Black line,
White line,
Foreign material under polarizer,</td><td>
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≦0.02</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>L≦3.0</td><td>0.02＜W≦0.03</td><td colspan="2">2</td></tr>
<tr><td>L≦2.0</td><td>0.03＜W≦0.05</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.05＜W</td><td colspan="2">Define as spot defect</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.3</td><td>Polarizer scratch</td><td>If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2.
If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≦0.03</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>5.0＜L≦10.0</td><td>0.03＜W≦0.05</td><td colspan="2">2</td></tr>
<tr><td>L≦5.0</td><td>0.05＜W≦0.08</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.08＜W</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.4</td><td>Polarize Air bubble</td><td>Air bubbles between glass & polarizer
<table>
<tr><th>2. Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th></th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≦0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>0.20＜Φ≦0.30</td><td colspan="2">2</td></tr>
<tr><td>0.30＜Φ≦0.50</td><td colspan="2">1</td></tr>
<tr><td>0.50＜Φ</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

4.2. Cosmetic Defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>4.2.2</td><td>Line defect
Black line,
White line,
Foreign material under polarizer,</td><td>
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≦0.02</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>L≦3.0</td><td>0.02＜W≦0.03</td><td colspan="2">2</td></tr>
<tr><td>L≦2.0</td><td>0.03＜W≦0.05</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.05＜W</td><td colspan="2">Define as spot defect</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.3</td><td>Polarizer scratch</td><td>If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2.
If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≦0.03</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>5.0＜L≦10.0</td><td>0.03＜W≦0.05</td><td colspan="2">2</td></tr>
<tr><td>L≦5.0</td><td>0.05＜W≦0.08</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.08＜W</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.4</td><td>Polarize Air bubble</td><td>Air bubbles between glass & polarizer
<table>
<tr><th>2. Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≦0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>0.20＜Φ≦0.30</td><td colspan="2">2</td></tr>
<tr><td>0.30＜Φ≦0.50</td><td colspan="2">1</td></tr>
<tr><td>0.50＜Φ</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

4.3. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.3.5	Glass defect	(i) Chips on corner 	Minor
		X: ≤2.0; Y: ≤S; Z: Disregard Notes: S=contact pad length Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.	
		(ii)Usual surface cracks 	Minor
		X: ≤3.0; Y: <Inner border line of the seal; Z: Disregard	
		(iii) Crack Cracks tend to break are not allowed. 	Major
4.3.6	Parts alignment	1) Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern. 2) Not allow chip or solder component is off center more than 50% of the pad outline.	Minor
4.3.7	SMT	According to the <Acceptability of electronic assemblies> IPC-A-610C class 2 standard. Component missing or function defect are Major defect, the others are Minor defect.	

PIN	SYMBOL	PIN	SYMBOL
1	GND	21	B0
2	GND	22	B1
3	VCC	23	B2
4	VCC	24	B3
5	R0	25	B4
6	R1	26	B5
7	R2	27	B6
8	R3	28	B7
9	R4	29	GND
10	R5	30	DOTCLK
11	R6	31	DISPLAY
12	R7	32	HSYNC
13	G0	33	VSYNC
14	G1	34	NC
15	G2	35	NC
16	G3	36	NC
17	G4	37	NC
18	G5	38	NC
19	G6	39	K
20	G7	40	A

1	Operating Voltage:	Vcc=3.3V typ.
2	Resolution:	480RGB*272
3	Color:	16M
4	Interface:	24-bits RGB
5	Display type:	Transmissive
6	polarizer surface treatment	Clare
7	Viewing Direction:	12:00
8	Operating Temp:	-20°C~70°C
9	Storage Temp:	-30°C~80°C
10	Driver IC:	HX8257
11	Backlight:	high brightness
12	Unspecified tolerance:	±0.2

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