

SPECIFICATIONS OF LIQUID CRYSTAL DISPLA

CUSTOMER: _____
MODEL NO: **HW120531FCSA0**
Date Code : **140317A**

Signature by Customer:	
SAMPLE NO.	121018A
Remarks	

CHECKED BY	Certified by QA	PREPARED BY

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Revision Status :

NO	Contents	Revision record	Date
1		120817A	2012-08-17
2		121018A	2012-10-18
3		140317A	2014-03-17
4			
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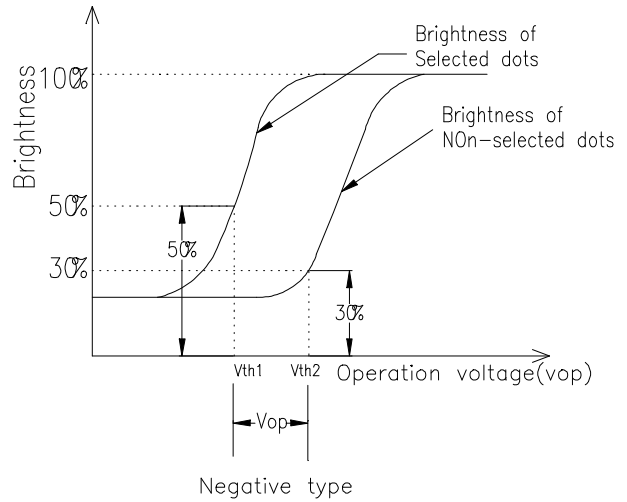
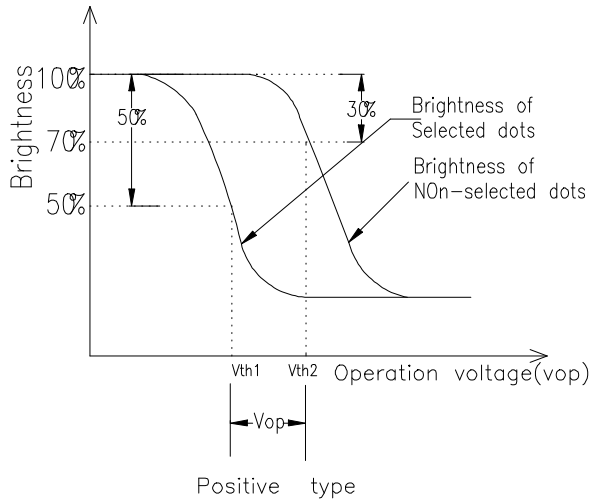
1. Features :

Item		Feature	Item	Feature
Panel Dimension		82.0*34.0	Viewing Area	76.0*23.0
Display Mode		FSTN/POSITIVE	Driving Condition	1/32D, 1/6B 5.5V
Display Type		TRANSFLECTIVE	Viewing Direction	10:30
Color	Display	BLACK	Operation Temp	-30°C~85°C
	Ground	WHITE	Storage Temp	-40°C~85°C
Connector		COG+PIN		

2. Electro-optical Characteristics :

Item	Symbol	Temp(°C)	Rating			Unit	Note	
			Min	Typ	Max			
Recommended Driving Voltage	VLCD	50				V	Note1	
		25	5.2	5.5	5.8			
		0						
Consumption current	I _{DD}	25		0.27		mA		
Response Time	Rise Time	Tr	25		250	750	Ms	Note2
	Fall Time	Tf	25		300	900		
Frame Frequency	f _F	25	32	64	128	Hz		
D.C Resistance	R _{LC}	25	100			MΩ		
Viewing angle Cr ≥ 2	ψ=0°	θ ₁	25		15		Deg	Note4
	ψ=180°	θ ₂			35			
	ψ=90°	θ ₃			25			
	ψ=270°	θ ₄			25			
Viewing Direction		10:30CLOCK						
Contrast Ratio	Cr	25	6	8			Note3	

Notel. Definition of operation voltage (Vop)



Conditions

Vth1: (1)Temperature: See Individual Specification

(2)Viewing Angle (θ): Minimum Value Individual Specification

(3)Driving Frequency: Maximum Value In Individual Specification

(4) Waveform: Selected Waveform

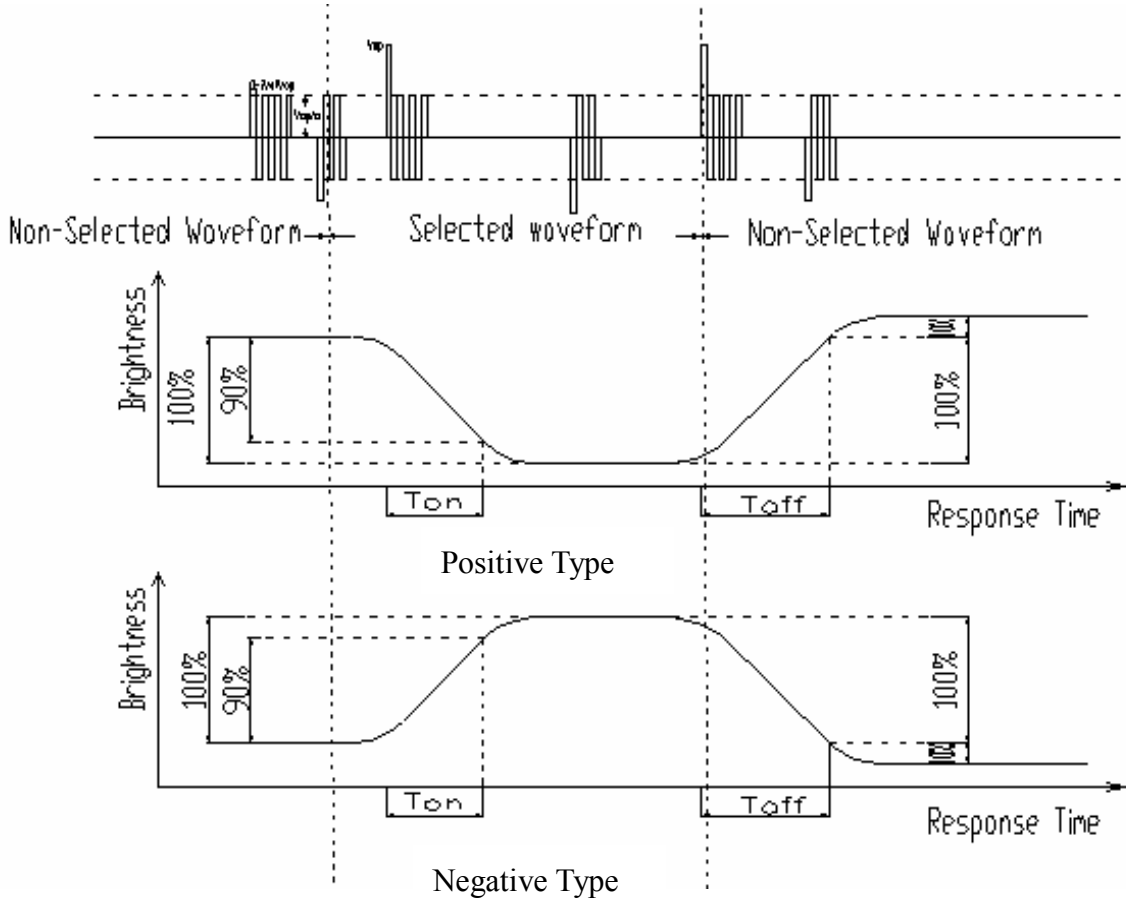
Vth2: (1)Temperature: See Individual Specification

(2)Viewing Angle(θ): Maximum Value In Individual Specification

(3)Driving Frequency: Maximum Value In Individual Specification

(4)Waveform: Non-selected Waveform

Note 2. Definition of response time

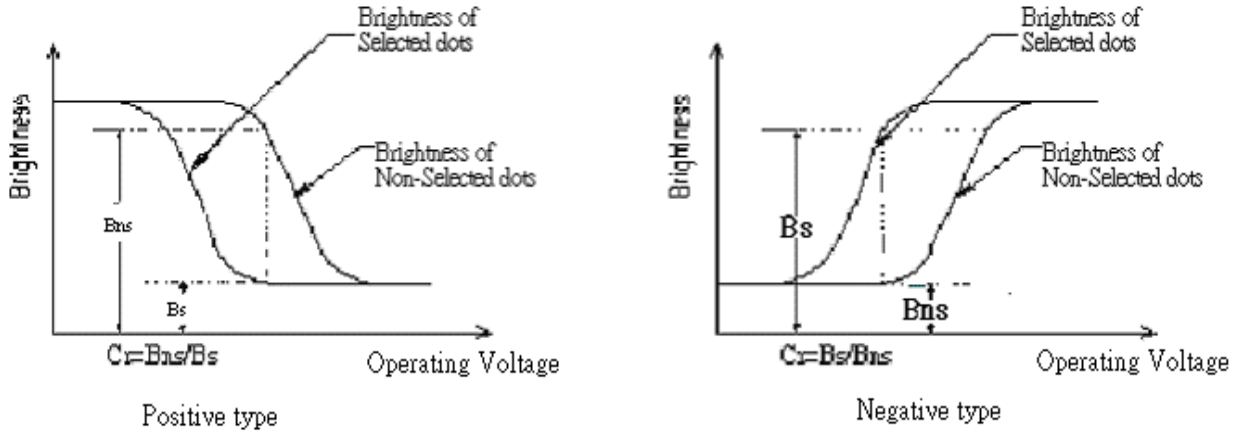


Conditions:

- (1) Viewing Angle(θ): Minimum Value In Individual Specification
- (2) Operating Voltage (Vop): See Individual Specification
- (3) Driving Frequency: Typical Value In Individual Specification
- (4) Driving Waveform: See Individual Specification
- (5) Measuring Temperature: See Individual Specification

Note 3 Definition of contrast ratio C.R

3.1 Brightness-operating Voltage Curve



Conditions:

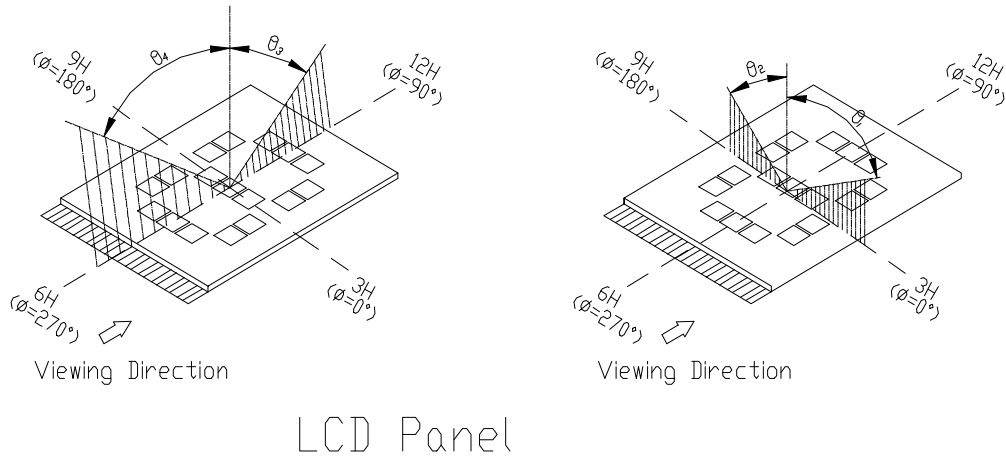
- (1) Operating Voltage: Vop
- (2) Temperature: See Individual Specification
- (3) Viewing Angles: See Individual Specification
- (4) Driving Frequency: Typical value In Individual Specification
- (5) Driving waveform: 1/N Duty, 1/a Bias waveform

3.2 Definition of Contrast Ratio (Cr)

$$\text{Positive type: Cr} = \frac{\text{Brightness of Non-Selected dots (Bns)}}{\text{Brightness of Selected dots (Bs)}}$$

$$\text{Negative type: Cr} = \frac{\text{Brightness of Selected dots (Bs)}}{\text{Brightness of Non-Selected dots (Bns)}}$$

Note 4 Viewing Angle



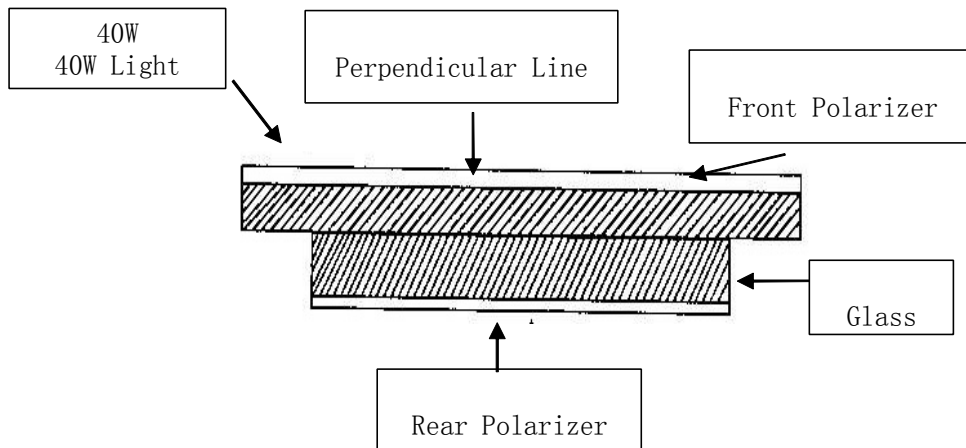
Viewing Angles ($\theta_1, \theta_2, \theta_3, \theta_4$) measuring conditions:

- (1) Temperature : See Individual Specification
- (2) Operation Voltage (Vop): See Individual Specification
- (3) Contrast Ratio (Cr) Minimum: Cr =2
- (4) Driving Frequency: See Individual Specification

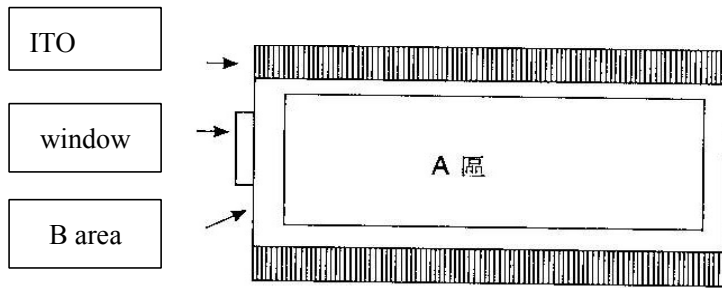
3. Quality Specification

1. LCD APPEARANCE AND ELECTRO-OPTICAL STANDARDS :

Under 40W fluorescent light, Where should be 30cm from the eyes . All Inspection items are conducted under the condition that the polarizer protective film be not removed.



2: APPLICABLE SCOPE :



Area A:Viewing area

Area B:Out of viewing area

The edge of viewing area

4. RELIABILITY CHARACTERISTICS

4.1 Life Time:Longer than 100000HRS at room temperature without direct irradiation of sun light.

4.2 Reliability characreristics shall meet following requirements.

Test Item	Test Condition	Acceptability
High temperature test	85°C X 240 Hrs	Tested samples shall function normally after completion of each test
Low temperature test	-30°C X 240 Hrs.	
Thermal shock test	-30°C/30min → 25°C/5 min → 85°C /30 min → 25°C/5 min 5 Cycles.	
Humidity	40°C X 90%RH X 240Hrs	

REMARK:Samples subjected to the test shall be “not operating” condition.

5. CAUTIONS OR USING

5.1 HANDING PRECAUTIONS

- 5.1.1 For LCD is made of glass,mechanical shocks on carrying and storing cause damages and cracks that make it useless,so handle with care.
- 5.1.2 If hands and cloths are touched with LC,for the LCD,clean them with alcohol quickly.
- 5.1.3 The polarizer shouldn't be touched with water or chemicals.
- 5.1.4 The polarizer surface is easy to be scratched,so sharp things like glass or tweezer shouldn't be touched on it.
- 5.1.5 Don't touch the connection terminal of LCD panels with bare hands.

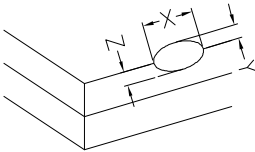
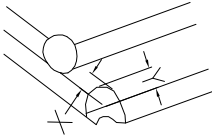
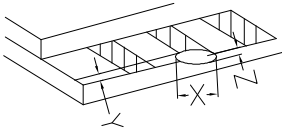
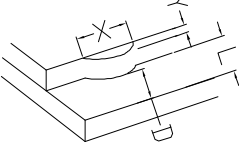
5.2 PRACAUTIONS FOR OPERATION

- 5.2.1 The protecting film on the polarizer should be removed before setting.
- 5.2.2 Don't apply Dcvoltage to LCD panels.
- 5.2.3 For pin soldering,the work should be done in 3 seconds with 30W soldering iron.
- 5.2.4 Power supplies should always be turned on before the input signals are applied, and input signals should be turned off before power supplies are turned off.

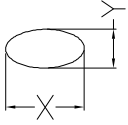
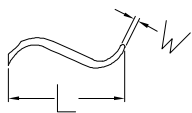
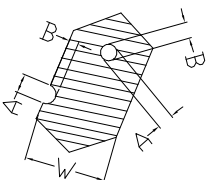
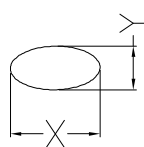
5.3 PRECAUTIONS FOR STORAGE

- 5.3.1 Avoid storage in high temperature and high humidity.
- 5.3.2 Don't exposure the LCD panel to the direct sunlight or UV light ,etc.
- 5.3.3 Don't place the LCD panel togrther with chemicals.

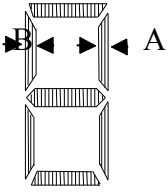
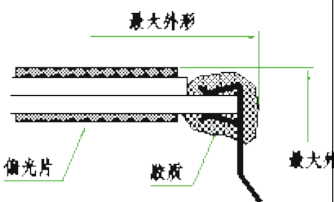
6. INSPECTION CRITERIA

NO	Item	Criteria		AQL																			
1	Electrical Testing	(1) non-display (2) segment missing (3) segment short (4) viewing direction wrong	Don't accept	0.65																			
2	Dimension state	Dimension out of the specification		1.00																			
3	Glass crack	<p>Substrate check symbol Definition: X: Length direction Y: Short side direction Z: Thickness direction T: Glass thickness K: LCD length L: Single connector width</p> <p>(1) General crack</p>  <table border="1" data-bbox="815 943 1342 1106"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$1/8K \geq$</td> <td>Not over viewing area</td> <td>$T \geq$</td> </tr> </tbody> </table> <p>(2) Corner</p>  <table border="1" data-bbox="815 1160 1342 1323"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$1/8K \geq$</td> <td>Not over viewing area</td> <td>No check</td> </tr> </tbody> </table> <p>(3) Contact pad crack</p>  <table border="1" data-bbox="879 1442 1331 1606"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$1/8K \geq$</td> <td>$1/3L \geq$</td> <td>No check</td> </tr> </tbody> </table> <p>1. Cracks on the contact area cannot exceed 1/2 of the glass thickness. 2. Y not to exceed 1/3 seal width</p> <p>(4) Substrate protuberance and internal crack</p>  <p style="text-align: right;">$D < 2/3L$, Reject</p> <p>(5) No progressive glass cracks allowed</p>		X	Y	Z	$1/8K \geq$	Not over viewing area	$T \geq$	X	Y	Z	$1/8K \geq$	Not over viewing area	No check	X	Y	Z	$1/8K \geq$	$1/3L \geq$	No check		2.50
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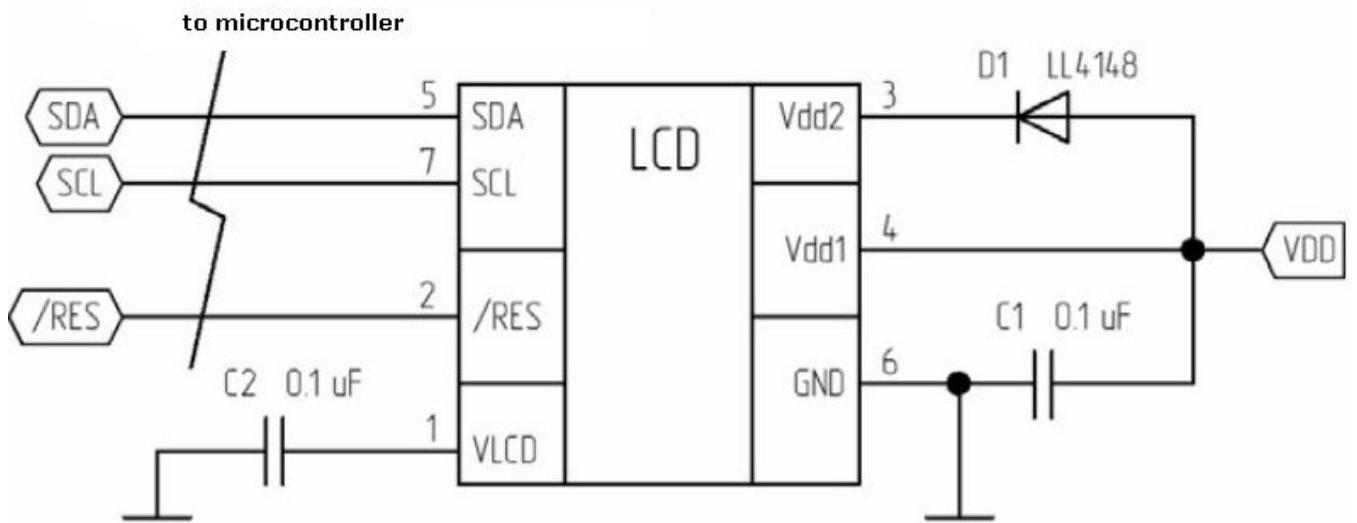
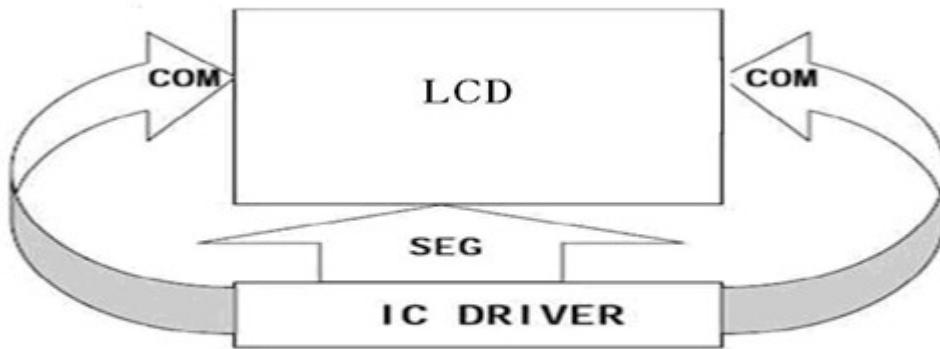
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NO	Item	Criterion	AQL																								
4.	<p>Black spot , white spot (including polarizer) $\emptyset = (X+Y) / 2$</p> <p style="text-align: center;">unit:mm</p>	<p>(1) Round type</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Size</th> <th>Acceptable QTY</th> </tr> </thead> <tbody> <tr> <td>$\emptyset \leq 0.10$</td> <td>Accept</td> </tr> <tr> <td>$0.10 < \emptyset \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \emptyset \leq 0.25$</td> <td>1</td> </tr> <tr> <td>$0.25 < \emptyset$</td> <td>0</td> </tr> </tbody> </table> <p>(2) Line type</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Length L</th> <th>Width W</th> <th>Acceptable QTY</th> </tr> </thead> <tbody> <tr> <td>accept</td> <td>$0.015 \geq W$</td> <td>No check</td> </tr> <tr> <td>$3.0 \geq L$</td> <td>$0.050 \geq W$</td> <td rowspan="2">2</td> </tr> <tr> <td>$2.5 \geq L$</td> <td>$0.080 \geq W$</td> </tr> <tr> <td></td> <td>$0.100 < W$</td> <td>As round type</td> </tr> </tbody> </table> <p>(3) No more than 2 spots and lines within 3 mm. Maximum combined total of round and line defects is 4.</p> <p>(4) Scratches criterion is same as that of Round type.</p>	Size	Acceptable QTY	$\emptyset \leq 0.10$	Accept	$0.10 < \emptyset \leq 0.20$	2	$0.20 < \emptyset \leq 0.25$	1	$0.25 < \emptyset$	0	Length L	Width W	Acceptable QTY	accept	$0.015 \geq W$	No check	$3.0 \geq L$	$0.050 \geq W$	2	$2.5 \geq L$	$0.080 \geq W$		$0.100 < W$	As round type	1.50
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5.	<p>Pixel deformation</p>	<p>Symbols: W: segment width \emptyset: average of diameter $= (A+B) / 2$</p> <p>(1) Pin hole and deformation</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Width</th> <th>Acceptable Defect</th> </tr> </thead> <tbody> <tr> <td>$W < 0.4$</td> <td>$\emptyset \leq 0.20$ and $\emptyset \leq 1/2W$</td> </tr> <tr> <td>$W \geq 0.4$</td> <td>$\emptyset \leq 0.25$ and $\emptyset \leq 1/3W$</td> </tr> </tbody> </table> <p style="text-align: center;">r 0.10mm ,acceptable</p> <p>(2) Pixel size should be in the range of 95% to 100% of the normal dimension and the gap between pixels should be less than 150% of normal dimension.</p>	Width	Acceptable Defect	$W < 0.4$	$\emptyset \leq 0.20$ and $\emptyset \leq 1/2W$	$W \geq 0.4$	$\emptyset \leq 0.25$ and $\emptyset \leq 1/3W$	2.5																		
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6.	<p>Polarizer bubble $\emptyset = (X+Y) / 2$</p>	 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>size \emptyset</th> <th>Acceptable QTY</th> </tr> </thead> <tbody> <tr> <td>$\emptyset \leq 0.20$</td> <td>No check</td> </tr> <tr> <td>$0.20 < \emptyset \leq 0.50$</td> <td>3</td> </tr> <tr> <td>$0.50 < \emptyset \leq 1.00$</td> <td>2</td> </tr> <tr> <td>$1.00 < \emptyset$</td> <td>0</td> </tr> <tr> <td>Total QTY</td> <td>3</td> </tr> </tbody> </table>	size \emptyset	Acceptable QTY	$\emptyset \leq 0.20$	No check	$0.20 < \emptyset \leq 0.50$	3	$0.50 < \emptyset \leq 1.00$	2	$1.00 < \emptyset$	0	Total QTY	3	1.5												
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Total QTY	3																										

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7.	rainbow		<ol style="list-style-type: none"> Reference sample Outside V.A can pass
8.	Combination skew		<ol style="list-style-type: none"> Deformation size $\leq \pm 15\%$ can pass $B-A > 0.25$ mm can't accept
9.	Polarizer skew		Reference drawing size tolerance .
10.	LCD color difference		<ol style="list-style-type: none"> Same batch products color same, different batch color similar. Color reference sample
11.	Box glue		1. Box glue enter into V.A can't accept
12.	PIN defect		<ol style="list-style-type: none"> PIN skew $> 5^\circ$ can't accept PIN glue had glued on polarizer. can't accept
13.	Voltage deviation		<ol style="list-style-type: none"> Reference sample Vop can't diverge $\pm 0.3V$

7. BLOCK DIAGRAM



8. LCM DRAWING

