FocusLCDs.com
LCDs MADE SIMPLE®
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TFT | CHARACTER | UWVD | FSC | SEGMENT | CUSTOM | REPLACEMENT

LCD Resources:

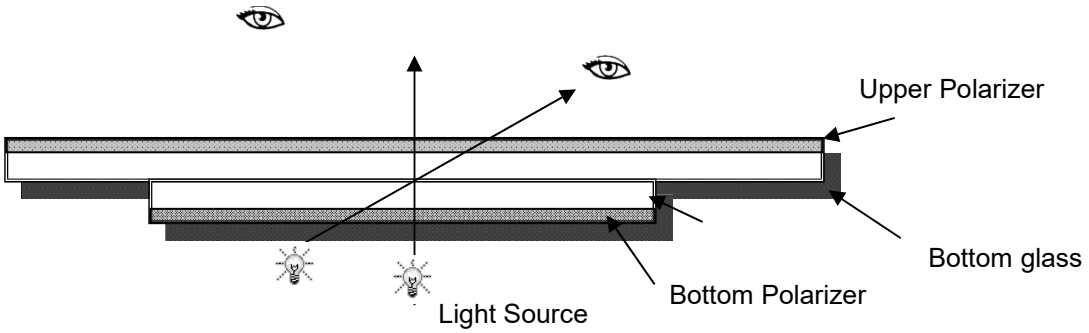
TFT Quality Inspection Standards

TFT Quality Inspection Standards

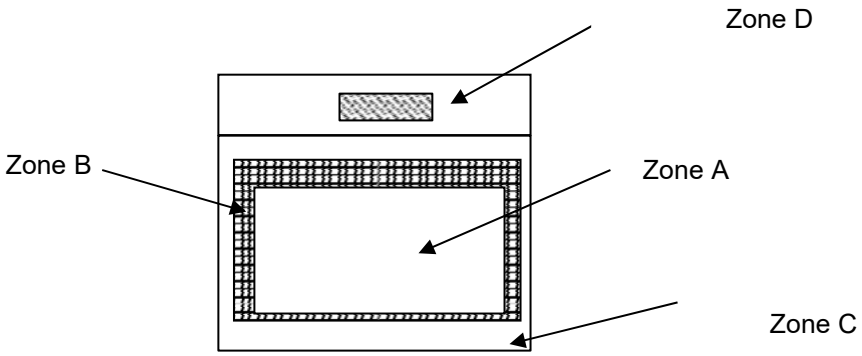
Visual & Function Inspection Standards

Inspection conditions

Inspection performed under the following conditions is recommended:
Temperature: 25±5°C
Humidity 65%±10%RH
Viewing Angle: Normal viewing angle.
Illumination: Single fluorescent lamp (300 to 700Lux)
Viewing distance: 30-50cm



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 cannot be seen after assembly by customer.)
Zone D: IC Bonding Area

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

Sampling Plan

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

AQL:

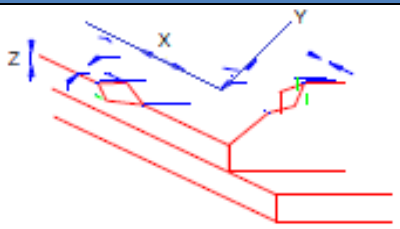
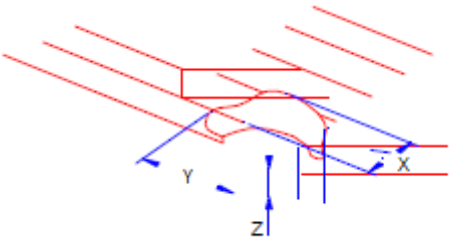
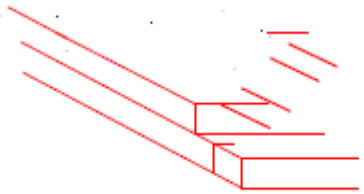
Major defect	Minor defect
0.65	1.5

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 not lighting, abnormal lighting 4) TP not functioning	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	Spot Line defect	Light dot, Dim spot, Polarizer Bubble; Polarizer accidented spot.	
6	Soldering appearance	Good soldering, peeling off is not allowed.	
7	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

Criteria Visual

LCD Broken/Crack

No.	Description	Criteria	Visual
1	Edge of LCD Broken	X ≤ 3mm Y < border line seal Z ≤ T	
2	LCD Corner Broken	X ≤ 3mm Y < L Z ≤ T	
3	LCD Crack	Not allowed	

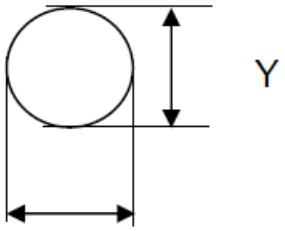
Note: X=Length, Y=Width, Z=Height, L=Length of ITO, T=Height of LCD

Number	Items	Criteria
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight not lighting	Not allowed
5	TP not functioning	Not allowed

Spot Defect

No	Description	Acceptable Quality			
1	Light Dot: LCD/TP/Polarizer black/white spot, light dot, pinhole, dent, stain	Size (mm)	Zone		
		φ	A	B	C
		$\varphi \leq 0.10$	Ignore		Ignore
		$0.10 \leq \varphi \leq 0.20$	3 (distance≥10mm)		
		$0.20 \leq \varphi \leq 0.25$	2		
		$\varphi > 0.3$	0		
2	Dim Spot: LCD/TP/Polarizer dim dot, light leakage, dark spot	$\varphi \leq 0.1$	Ignore		Ignore
		$0.10 \leq \varphi \leq 0.20$	3 (distance≥10mm)		
		$0.20 \leq \varphi \leq 0.25$	2		
		$\varphi > 0.30$	0		
3	Polarizer Accident Spot	$\varphi \leq 0.2$	Ignore		Ignore
		$0.3 \leq \varphi \leq 0.5$	2(distance≥10mm)		
		$\varphi > 0.5$	0		
4	Polarizer Bubble	$\varphi \leq 0.2$	Ignore		Ignore
		$0.2 \leq \varphi \leq 0.4$	3(distance≥10mm)		
		$0.4 \leq \varphi \leq 0.6$	2		
		$\varphi > 0.6$	0		

Visual:



$\Phi=(X+Y)/2$

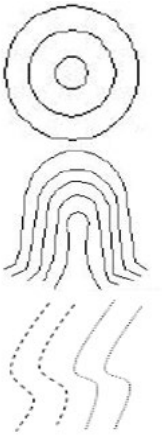
Line Defect

No.	Description	Width(mm)	Length(mm)	Acceptable Quality		
1	Line Defect: LCD/TP/Polarizer backlight black/white line, scratch, stain.	W	L	A	B	C
		$W \leq 0.03$	Ignore	Ignore		Ignore
		$0.03 \leq W \leq 0.04$	$L \leq 3.0$	$N \leq 2$		
		$0.04 \leq W \leq 0.05$	$L \leq 2.0$	$N \leq 1$		
		$W > 0.05$	Define as spot defect			

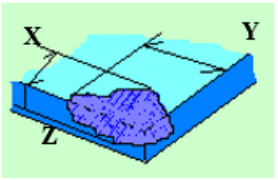
Electronic Components SMT

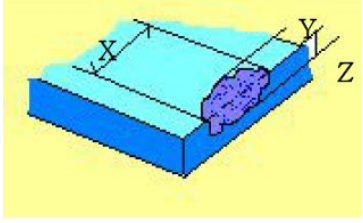
According to IPC-A-610C class Ⅱ standard. Function defect and missing part are major defects, the others are minor defects.

RTP Related

<table>
<tr><th>No.</th><th>Description</th><th colspan="5">Acceptable Quality</th></tr>
<tr><td rowspan="5">1</td><td rowspan="5">TP film bubble/ accident spot</td><td colspan="2">Size(mm)</td><td colspan="2">A</td><td>B</td><td>C</td></tr>
<tr><td colspan="2">$\varphi \leq 0.1$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td colspan="2">$0. \leq \varphi \leq 0.$</td><td colspan="2">3 (distance≤ 10mm)</td></tr>
<tr><td colspan="2">$0. \leq \varphi \leq 0.3$</td><td colspan="2">2</td></tr>
<tr><td colspan="2">$\varphi > 0.2$</td><td colspan="2">0</td></tr>
<tr><td rowspan="5">2</td><td rowspan="5">TP film scratch</td><td>Width(mm)</td><td>Length (mm)</td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>$W \leq 0.$</td><td>Ignore</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>0.043≤ W≤ 0.04</td><td>L ≤ 3</td><td colspan="2">N ≤ 2</td></tr>
<tr><td>0.04 ≤ W≤ 0.05</td><td>L ≤ 2</td><td colspan="2">N ≤ 1</td></tr>
<tr><td>W>0.05</td><td colspan="4">Define as spot defect</td></tr>
<tr><td>3</td><td>Assembly deflection</td><td colspan="5">Beyond the edge of backlight ≤ 0.2mm</td></tr>
<tr><td>4</td><td>Bulge (undulation included)</td><td colspan="5">The ITO film plumped below 0.40mm
 
</td></tr>
<tr><td>3</td><td>Newton ring</td><td colspan="3">Area > 1/3 TP Area NG
Area ≤ 1/3 TP Area OK</td><td colspan="2">  </td></tr>
<tr><td>4</td><td>TP corner broken

X: length
Y: width
Z: height</td><td colspan="3">X ≤ 3mm
Y ≤ 3mm
Z < LCD thickness

Circuitry broken is not allowed</td><td colspan="2"> 
</td></tr>
<tr><td>5</td><td>TP edge broken
X: length
Y: width
Z: height</td><td colspan="3">X ≤ 4mm
Y ≤ 2mm
Z < LCD thickness

Circuitry broken is not allowed</td><td colspan="2"> 
</td></tr>
</table>

Reliability Test Result

Condition

Item	Condition
High Temperature Operating	70℃,96H
Low Temperature Operating	-20℃, 96HR
High Temperature Storage	80℃, 96HR
Low Temperature Storage	-30℃, 96HR
High Temperature & High Humidity Storage	+60℃, 90% RH, 96 hours.
Thermal Shock (Non-operation)	30℃,30 min ↔ 80℃,30 min Change time:5min 20CYC.
ESD test	C=150pF, R=330, 5points/panel Air±8KV, 5times; Contact±6KV, 5 times; (Environment: 15℃~35℃, 30%~60%).
Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).
Box Drop Test	1 Corner 3 Edges 6 faces,80cm (medium box)

Inspection After Test: Inspection after 2-4 hours storage at room temperature, the sample shall be free from defects:

1. Air bubble in LCD
2. Non-display
3. Missing segments/line;
4. Glass crack
5. Current IDD is twice higher than initial value

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 judged as a good part.
5. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.