Tianma Micro-Electronics CO.,LTD

TFT-LCD Module Incoming Inspection Standard

Customer	
Model Name	
Date	2016/6/17
Version	1.0

Customer Approval	
Title	LEAD SYSTEM DESIGNER
Name	Magnus Hall
Date	27-JUN-2018

	Prepared By	Checked by	Approved By
Title:			
Name:			
Date:			

HISTORY OF REVISION

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2016-6-17	First release	

1. Scope:

The incoming inspection standards shall be applied to TFT-LCD Modules (hereinafter called "Modules") that supplied by Tianma Micro-Electronics Corporation.

2. Incoming Inspection

The customer shall inspect the modules within twenty calendar days of the delivery date（the "inspection period）at its own cost. The result of the inspection（acceptance or rejection） shall be recorded in writing, and a copy of this writing will be promptly sent to the seller, If the results of the inspecting from buyer does not send to the seller within twenty calendar days of the delivery date. The modules shall be regards as acceptance.

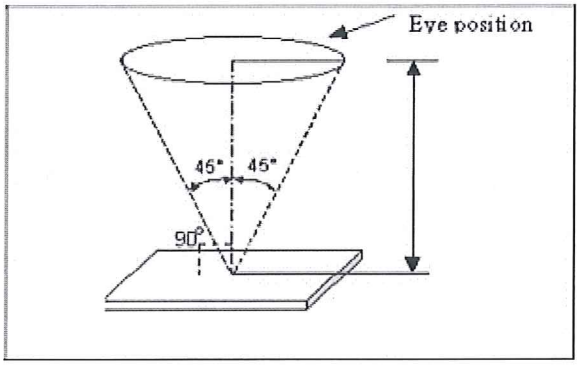
Should the customer fail to notify the seller within the inspection period, the buyers right to reject the modules. Shall be lapsed and the modules shall be deemed to have been accepted by the buyer.

3. Inspection Sampling Method

3.1. Lot size: Quantity per shipment lot per model
3.2. Sampling type: Normal inspection, Single sampling
3.3. Inspection level: II
3.4. Sampling table: MIL-STD-105D
3.5. Acceptable quality level （AQL）
Major defect: AQL=0.65
Minor defect: AQL=1.00

4. Inspection Conditions

4.1 Ambient conditions:
a. Temperature: Room temperature 25±5℃
b. Humidity: (60±10) %RH
c. Illumination: Appearance 1000±200 Lux, Display 100±50 Lux (The luminance at an inspection desk surface with single non-directive fluorescent lamp)
4.2 Viewing distance
The distance between the LCD and the inspector's eyes shall be at least 30±5 cm.
4.3 Viewing Angle
L/R: 45°/45°



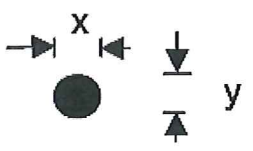
5. Inspection Criteria

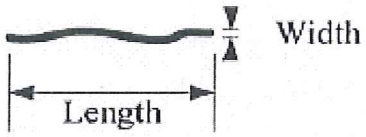
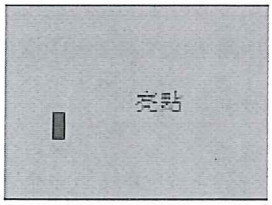
Defects are classified as major defects and minor defects according to the degree of defectiveness defined herein.

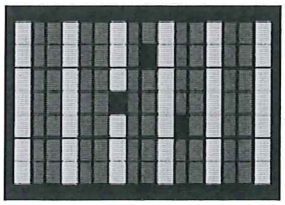
5.1 Major defect

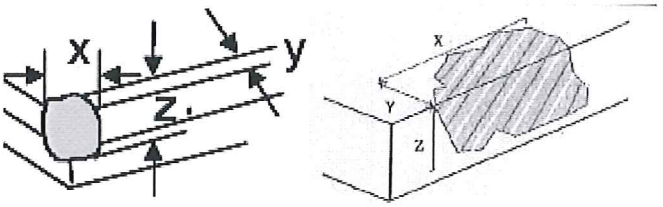
Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
5.1.2	missing	Missing function component
5.1.3	Crack	Glass Crack

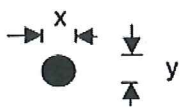
5.2 Minor defect

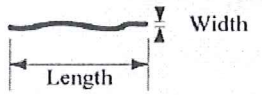
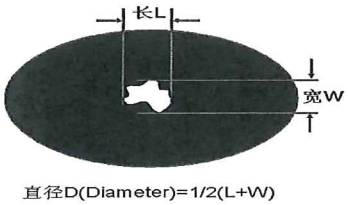
Item No	Items to be inspected	Inspection standard
5.2.1	Spot Defect Including Black spot White spot	For dark/white spot is defined $\varphi = (x+y) / 2$ 

<table>
<tr><td rowspan="4"></td><td rowspan="4">Pinhole
Foreign particle
Polarizer dirt
BL particle</td><td colspan="2"></td></tr>
<tr><td>Size φ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>φ≤0.10</td><td>Ignore</td></tr>
<tr><td>0.10 < φ≤0.20</td><td>3</td></tr>
<tr><td rowspan="5">5.2.2</td><td rowspan="5">Line Defect Including Black line
White line
Scratch
BL Dirt</td><td colspan="2">Define:

</td></tr>
<tr><td>Width(mm)
Length(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>W≤0.03</td><td>Ignore</td></tr>
<tr><td>0.03 < W≤0.05
L≤5.0</td><td>3</td></tr>
<tr><td>0.05 < W, L>5.0</td><td>Not allowed</td></tr>
<tr><td rowspan="4">5.2.3</td><td rowspan="4">Polarizer Dent/Bubble</td><td>Size φ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>φ≤0.15</td><td>Ignore</td></tr>
<tr><td>0.15 < φ≤0.3</td><td>3</td></tr>
<tr><td>0.3 < φ</td><td>Not allowed</td></tr>
<tr><td rowspan="3">5.2.4</td><td rowspan="3">Electrical Dot Defect</td><td colspan="2">Bright and Black dot define:


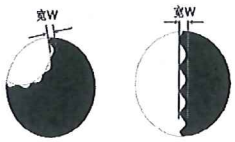
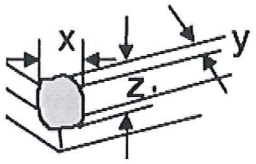
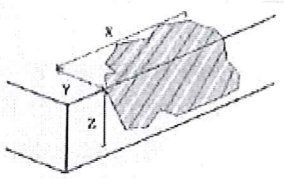
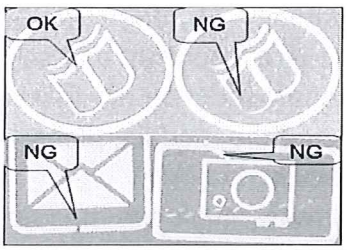
and
</td></tr>
<tr><td>Item</td><td>Acceptable Quantity</td></tr>
<tr><td colspan="2"></td></tr>
</table>

<table>
<tr><td rowspan="3"></td><td rowspan="3"></td><td colspan="2">Dark dot defect</td><td>3</td></tr>
<tr><td colspan="2">Bright dot defect</td><td>0</td></tr>
<tr><td colspan="2">Total Dot</td><td>3</td></tr>
<tr><td rowspan="2">5.2.5</td><td rowspan="2">Cluster mini Electrical Dot Defect</td><td colspan="3">Cluster small bright dot define：Φ＜0.1mm</td></tr>
<tr><td colspan="3">Invisible under 2% ND filter</td></tr>
<tr><td>5.2.6</td><td>Mura</td><td colspan="3">Invisible under 2% ND filter in 50% grayscale pattern and black pattern.</td></tr>
<tr><td rowspan="2">5.2.7</td><td rowspan="2">FPC</td><td colspan="2">Broken</td><td>Not allowed</td></tr>
<tr><td colspan="2">Crease</td><td>Invisible copper line</td></tr>
<tr><td rowspan="5">5.2.8</td><td rowspan="5">Glass defect</td><td colspan="3">Corner Fragment: Side Fragment:


T：Glass thickness X: Length
Y: Width Z: thickness</td></tr>
<tr><td colspan="2">Size(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>Corner Fragment</td><td>X≤1.5mm
Y≤0.8mm
Z≤T</td><td>Ignore</td></tr>
<tr><td>Side Fragment</td><td>X≤5.0mm
Y ≤0.8mm
Z≤T</td><td>Ignore</td></tr>
<tr><td>5.2.9</td><td>Touch panel spot
Including white dot</td><td colspan="3">Define :
φ=(x+y)／2

</td></tr>
</table>

<table>
<tr><td rowspan="4"></td><td rowspan="4">Black dot
Assemble dirt
Foreign particle</td><td colspan="2"></td></tr>
<tr><td>Size φ (mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>φ≤0.15</td><td>Ignore</td></tr>
<tr><td>0.15＜φ≤0.3</td><td>3</td></tr>
<tr><td rowspan="5">5.2.10</td><td rowspan="5">Line defect
Including white line, Black line
Scratch Assemble dirt</td><td colspan="2">Define:

</td></tr>
<tr><td>Size D (mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>W≤0.05</td><td>Ignore</td></tr>
<tr><td>0.05 < W≤0.10
L≤5.0</td><td>3</td></tr>
<tr><td>0.10 < W , L>5.0</td><td>Not allowed</td></tr>
<tr><td rowspan="5">5.2.11</td><td rowspan="5">Pin hole
Including leakage printing dirt</td><td colspan="2">Define :


直径D(Diameter)=1/2(L+W)</td></tr>
<tr><td>Size D (mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>D≤0.10</td><td>Ignore</td></tr>
<tr><td>0.10＜D≤0.15</td><td>2</td></tr>
<tr><td>D＞0.15</td><td>Not allowed</td></tr>
<tr><td rowspan="3">5.2.12</td><td rowspan="3">Dent / convex</td><td>Size D (mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>D≤0.15</td><td>Ignore</td></tr>
<tr><td>0.15＜D≤0.30</td><td>3</td></tr>
</table>

		D＞0.30	Not allowed
5.2.13	Ink jag	Define: 	
		Size w (mm)	Acceptable Quantity
		Window area W≤0.20	Ignore
		Edge area W≤0.30	Ignore
5.2.14	Touch panel fragment	Corner Fragment:  Side Fragment: 	
		Size w (mm)	Acceptable Quantity
		X≤0.20 Y≤0.20 Z≤T /5	2/per side
5.2.15	Assemble bubble	Size w (mm)	Acceptable Quantity
		D≤0.1	Ignore
5.2.16	LED hole/ camera eye/IR/ICON printing ink dot	Size w (mm)	Acceptable Quantity
		D≤0.1	Ignore
		D＞0.1	Not allowed
5.2.17	Printing ink color	The printing ink color should be consistent with design drawing (or customer standard sample).	
5.2.18	Screen fonts/logos/symbols		Font/LOGO silky Smooth/no jagged/shadow/penetration/ wear/displacement/broken line and wire defects

Note: 1. Dot defect is defined as the defective area of the dot area is larger than

50% of the dot area.

2. Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.
3. Foreign particle on the surface of the LCM should be ignored.
4. The distance between black dot defects or black and bright dot defects should be more than 5mm apart.

6. Mechanics specification

As for the outside dimension, weight of the modules, please refer to product specification for more details

7. Precaution

Please pay attention to the following items when you use the LCD Modules:

7-1 Do not twist or bend the module and prevent the unsuitable external force for display module during assembly.
7-2 Adopt measures for good heat radiation. Be sure to use the module with in the specified temperature.
7-3 Avoid dust or oil mist during assembly.
7-4 Following the correct power sequence while operating. Do not apply the invalid signal, otherwise, it will cause improper shut down and damage the module.
7-5 Less EMI: it will be more safety and less noise.
7-6 Please operate module in suitable temperature. The response time & brightness will drift by different temperature.
7-7 Avoid to display the fixed pattern (exclude the white pattern) in a long period, otherwise, it will cause image stains.
7-8 Be sure to turn off the power when connection of disconnecting the circuit.
7-9 Polarizer scratches easily, please handle it carefully.
7-10 Display surface never likes dirt of stains.
7-11 A dew drop may lead to destruction. Please wipe off and moisture before using module.
7-12 Sudden temperature changes cause condensation, and it will cause polarizer damaged.
7-13 High temperature and humidity may degrade performance. Please do not expose the module to the direct sunlight and so on.
7-14 Acetic acid or chlorine compounds are not friends with TFT display module.
7-15 Static electricity will damage the module, please do not touch the module without any grounded device.
7-16 Do not disassemble and reassemble the module by self.
7-17 Be careful do not touch the rear side directly.

7-18 Not strong vibration or shock. It will cause module broken.
7-19 Storage the modules in suitable environment with regular packing.
7-20 Be careful or injury from a broken display module.
7-21 Please avoid the pressure adding to the surface (front or rear side) of modules, because it will cause the display non-uniformity of other function issue.