深圳市金逸晨电子有限公司 版本：A

PRODUCT : LCD MODULE

LCM NO. CY300H4003

SUPPLIER: 深圳市金逸晨电子有限公司

SPECIFICATION

CY300H4003

This LCM uses ROHS material

Revision: A

Preliminary

CY:

崇益确认栏

Quality Assurance Department:
质量部:

Technical Department:
研发部:

Approved by:
核准:

CUSTOMER:

客户确认栏

Approved by:
客户核准:

REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
A	2020-06-19	First release	Preliminary

Table of Contents

1. General Description……

2. Features……

3. Mechanical Specification……

4. Mechanical dimension……

5. Maximum Ratings……..

6. Electrical Characteristics……...

7. Module Function Description……

8. Timing Characteristics……

9. Backlight CharacEtristic……..

10. Electro-optical Characteristics……

11. Reliability……

12. Precautions For Using LCD Modules……..

13. Using LCD Modules…….....

14.Inspection Specification……

1.General Description

CY300H4003 is a 360*RGB*640 dots matrix TFT LCD module. It has a TFT panel Composed of 360*3 sources and 640 gates. The LCM can be easily accessed by micro-controller via MIPI interface.

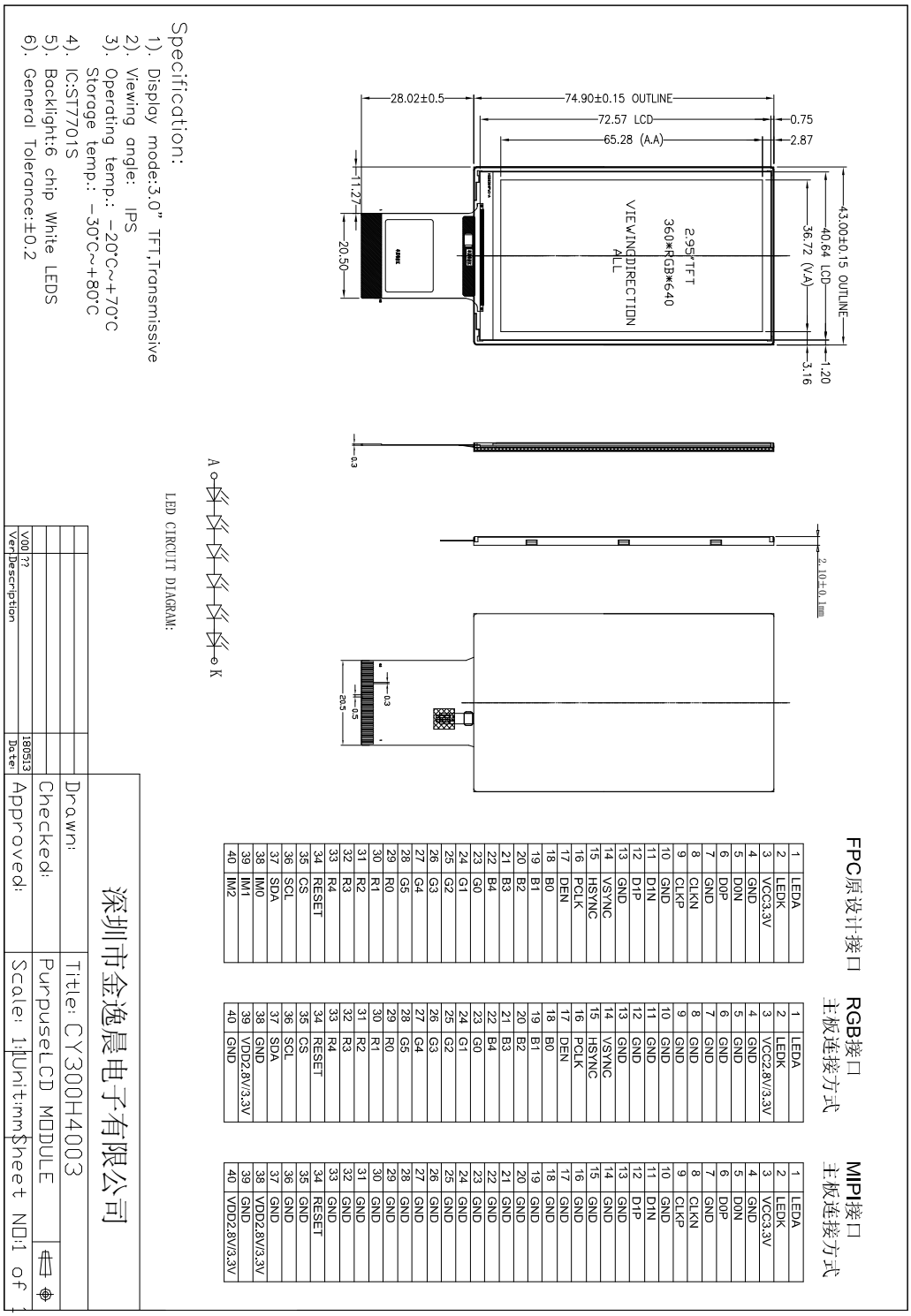
2.Features

LCD type	IPS
Display Format	Graphic 360*RGB*640 Dot-matrix
Interface Type	MIPI
Viewing Direction	ALL
Driver	ST7701S
Backlight	White
Display color	16.7M

3.Mechanical Specification

Item	Specifications	Unit
Dimensional outline	43.00(W)*74.90(H)*2.1(T) (exclude FPC)	mm
Resolution	360*RGB*640	Dots
Active area	36.72(W)*65.28(H)	mm
Pixel Pitch	0.102(W)*0.102(V)	mm
ASSY.TYPE	COG+FPC	--
WEIGHT	TBD	g

4.MechanicalDimension



5. Maximum Ratings

Item	Symbol	Min	Max	Unit	**Note**
Supply voltage for logic	Vci/iovcc	-0.3	4.6	V	
Operating temperature	Topr	-10	50	℃	
Storage temperature	Tstr	-10	50	℃	
Humidity	RH	---	90	%RH	

6.Electrical Characteristics

V_{SS}=0V，V_{DD}=2.8V，T_{OPR} =-20～70℃

Item	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**
Supply power for logic	**V_{DD-Vss}**	**2.5**	**2.8**	**3.3**	**V**
I/O power supply	**iovcc**	**1.65/2.5**	**1.8/2.8**	**3.3/3.3**	
Input high voltage	**V_{IH}**	**0.8Iovcc**	**—**	**V Iovcc**	
Input low voltage	**V_{IL}**	**-0.3**	**—**	**0.2iovcc**	
Output high voltage	**V_{0H}**	**0.8IOVCC**	**—**	**—**	
Output low voltage	**V_{0L}**	**—**	**—**	**0.2V_{DD}**	

7. INTERFACE DESCRIPTION

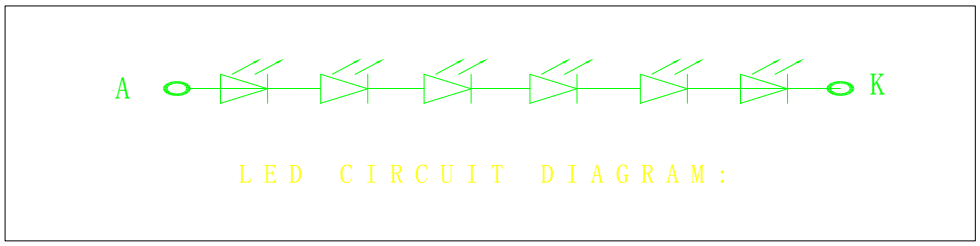
1	LEDA	BL positive pin	
2	LEDK	BL negative pin	
3	VCI	Power supply,2.8V type.	--
4	GND	Power Ground	--
5	D0N	MIPI DSI : Data differential signal input pins. (Data lane0)	--
6	D0P		--
7	GND	Power Ground	GND
8	CLKN	MIPI DSI : CLOCK differential signal input pins.	--
9	CLKP		--
10	GND	Power Ground	GND

11	D1N	MIPI DSI : Data differential signal input pins. (Data lane1)	--
12	D1P		--
13	GND	Power Ground	--
14	VS	Frame synchronizing signal for RGB interface operation	--
15	HS	Line synchronizing signal for RGB interface operation	--
16	PCLK	Dot clock signal for RGB interface operation	--
17	DEN	Data enable signal for RGB interface operation	--
18-22	B0-B4	Bus data	--
23-28	G0-G5	Bus data	--
29-33	R0-R4	Bus data	--
34	RESET	Reset the LCM	--
35	CS	chip select signal	--
36	SCL	Serial clock input for SPI interface.	--
37	SDA	Serial data input/output bidirectional pin for SPI Interface.	--
38	IM0	I/O 口使能	--
39	IM1	I/O 口使能	--
40	IM2	I/O 口使能	--

8.Timing Characteristics

Please refer to the IC Datasheet.

9 Backlight CharacEtristic



9.1 Power supply for led backlight

9.2 Absolute maximum rating

PARAMETER	SYMBOL	SPECIFICATIONS	UNIT
POWER DISSIPATION	PD	Vled X 20mA	mW
OPERATION TEMPERATURE	TOPR	-20℃ ～+70℃	℃
STORAGE TEMPERATURE	TSTG	-30℃ ～+80℃	℃

9.3 Electrical characteristics

Item	Symbol	Min	Typical	Max.	Unit
LEDmodule forward Voltage	V_{LED}	---	**19.2**	---	**V**
LED module current	I_{LED}	----	**20**	----	**mA**
LCM Surface brightness Luminance▼1	L_S	-----	**350**	----	**Cd/m²**
LCM Surface brightness uniform▼2	L_D	----	80	----	**%**

▼1 Test condition is:

(a)Center point on active area

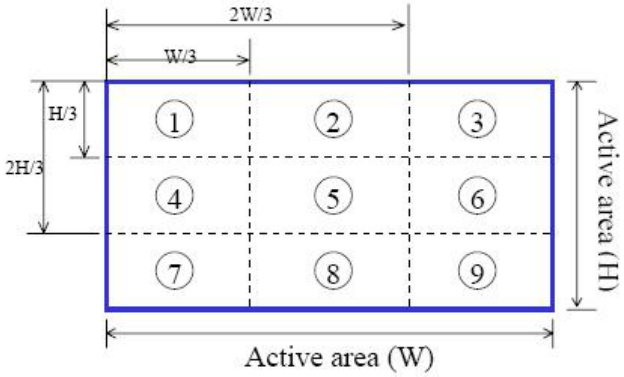
(b)Best Contrast

▼2 Uniform measure condition:

(a)Measure 9 point.Measure location is show below:

(b)Uniform=(Min.brightness/Max.brightness)*100%

(C)Best Contrast.



10. Optical Specification

Optical characteritics are determind after the unit has been on and stable for approximately 30 minutes dark environment at 25℃.the value specified are at an approximate distance 500mm from the lcd surface at a viewing angle and θ equal to 0

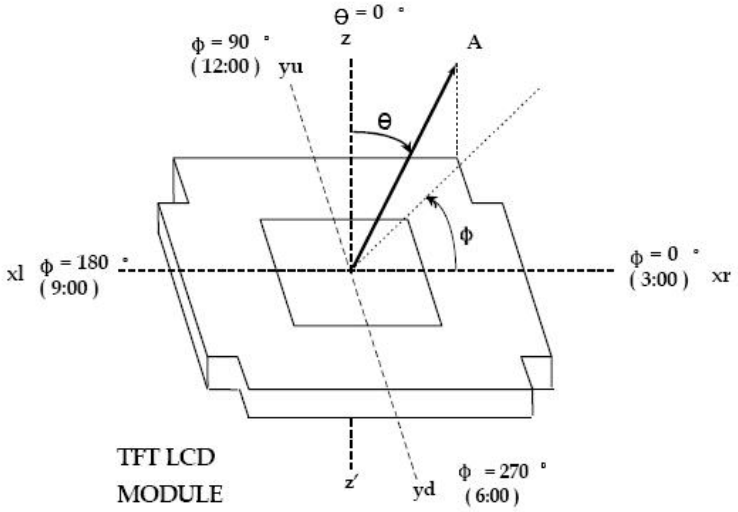
10.1 LCD Optical Characteristics

Ta=25℃

parameter		Symbol	Condition	Min	Typ	Max	Unit
Viewing Angle	Φ=3 O'clock	θ	Cr＞10		80		deg
	Φ= 6 O'clock				80		
	Φ=9 O'clock				80		
	Φ=12 O'clock				80		
Contrast ratio		Cr	θ=0 Φ=0	600	800		
Respone time		Tr+Tf			30		
NTSC		%			60		
CIE(x,y) chromaticty	RED	X	θ=0 Φ=0		0.647		
		Y			0.329		
	GREEN	X			0.279		
		Y			0.550		
	BLUE	X			0.134		
		Y			0.123		
	WHITE	X			0.296		
		Y			0.325		

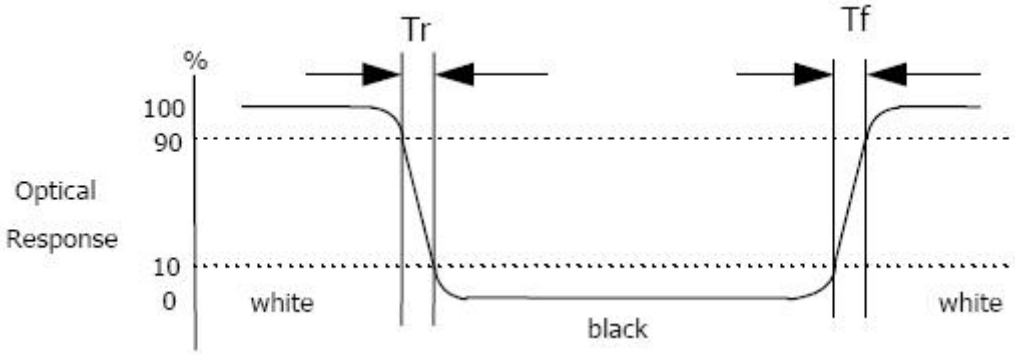
10.2 LCD Optical Characteristics

(1)LCD Viewing Angle



viewing angle is the angle at which the contrast ratio is greater than 10.the angles are determined
for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the lcd surface.

(2) Response time



Response time is the time required for the display to transition from white to black (Rising time, Tr) and from black to white (Falling time, Tf).for additional information

(3)Contrast Ratio(CR)

Contrast Ratio(CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the lcd surface 500mm from the surface with all pixels displaying white.

11.Reliability

11.1.Mtbf

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal.(25℃in the room without sunlight).

11.2.Test condition

NO.	ITEM	CONDITION	Cr
1	High Temperature Non-Operating Test	70℃*48Hrs	*No Defect Of Operational Function In Room Temperature Are Allowable. *IDD of LCM in Pre-and Post-test Should Follow Specification
2	Low Temperature Non-Operating Test	-20℃*48Hrs	
3	High Temperature/Humidity Non-Operating Test	50℃*90%RH*48Hrs	
4	High Temperature Operating Test	60℃*48Hrs	
5	Low Temperature Operating Test	-10℃*48Hrs	
6	Thermal Shock Test	-10℃(30Min) -25℃(5Min) -60(30Min)*2 Cycles	
7	ESD test	Voltage:±6KV R: 330Ω C:150pF Air discharge, 10time	

Notes:

1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature/humidity test.
3. The sample above is individually for every reliability tests condition.

12.PRECAUTIONS FOR USE OF LCD MODULES

12-1 Handing precations

(1) The display panel is made of glass. Do not subject it to a mechanical shock by dropping it or impact.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents :

- Isopropyl alcohol
- Ethyl alcohol

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water
- Ketone
- Aromatic solvents

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the

electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- Be sure to ground the body when handling the LCD modules.
- Tools required for assembling, such as soldering irons, must be properly grounded.
- To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
- The LCD module is coated with a film to protect the display surface.

Exercise care when peeling off this protective film since static electricity may be generated.

12-2 STORAGE PRECAUTIONS

When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags (avoid high temperature /high humidity and low temperatures below 0/℃). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

12-3 OTHERS

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.

13. USING LCD MODULES

13-1 Liquid crystal display modules

LCD is composed of glass and polarizer. Pay attention to the following items when handling.

(1) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.

(2) Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.).

(3) N-hexane is recommended for cleaning the adhesives used to attach front/rear polarizers and reflectors made of organic substances which will be damaged by chemicals such as acetone, toluene, ethanol and isopropylalcohol.

(4) When the display surface becomes dusty, wipe gently with absorbent cotton or other soft material like chamois soaked in petroleum benzin. Do not scrub hard to avoid damaging the display surface.

(5) Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading.

(6) Avoid contacting oil and fats.

(7) Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizers. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(8) Do not put or attach anything on the display area to avoid leaving marks on.

(9) Do not touch the display with bare hands. This will stain the display area and degradate insulation between terminals (some cosmetics are determinated to the polarizers).

(10) As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring.

13-2 Precaution for handing LCD modules

Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

(1) Do not alter, modify or change the shape of the tab on the metal frame.

(2) Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

(3) Do not damage or modify the pattern writing on the printed circuit board.

(4) Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.

(5) Except for soldering the interface, do not make any alterations or modifications with a soldering iron.

(6) Do not drop, bend or twist LCM.

(7) In order to avoid the cracking of the FPC, you should to pay attention to the area of FPC(R50mm) where the FPC was bent .the edge of cover lay ; the area of surface of Ni-Au platting ,the area of soldering land the area of through hole.

13-3 Elecrto-static discharge control

Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC.

(1) Make certain that you are grounded when handing LCM.

(2) Before remove LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential.

(3) When soldering the terminal of LCM, make certain the AC power source for the soldering iron does not leak.

(4) When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

(5) As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.

(6) To reduce the generation of static electricity be careful that the air in the work is not
too dried. A relative humidity of 50%-60% is recommended.

13-4 Precautions for operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (VO). Adjust VO to show the best contrast.

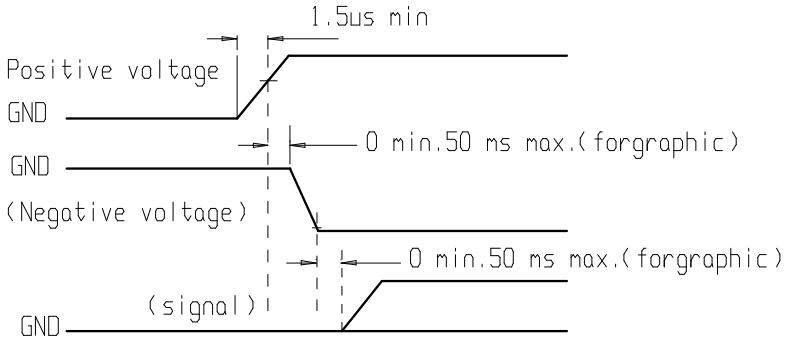
(2) Driving the LCD in the voltage above the limit shortens its life.

(3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.

(4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

(5) Condensation on terminals can cause an electrochemical reaction disrupting the terminal circuit. Therefore, it must be used under the relative condition of 40℃ , 50% RH.

(6) When turning the power on, input each signal after the positive/negative voltage becomes stable.



13-5 Storge

When storing LCD as spares for some years, the following precaution are necessary.

(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for dessicant.

(2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0℃ and 35℃.

(3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped.)

(4) Environmental conditions :

- Do not leave them for more than 160hrs. at 70℃.
- Should not be left for more than 48hrs. at -20℃.

13-6 Safety

(1) It is recommended to crush damaged or unnecessary LCD into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

13-7 Limited warranty

Unless agreed between DX and customer, DX will replace or repair any of its LCD modules which are found to be functionally defective when inspected in accordance with DX LCD acceptance standards (copies available upon request) for a period of one year from date of shipments. Cosmetic/visual defects must be returned to DX within 90 days of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DX limited to repair and/or replacement on the terms set forth above. DX will not be responsible for any subsequent or consequential events.

13-8 Return Lcm Under Warranty

No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are :

- Broken LCD glass.

- Circuit modified in any way, including addition of components.

Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB's eyelet, conductors and terminals.

14.Inspection standard

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

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:

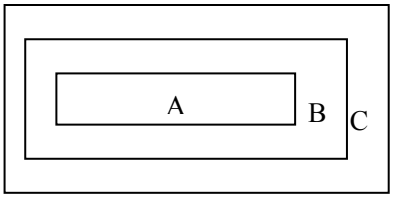
Major defect: AQL 1.0

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.

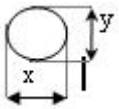
Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for

quality and assembly of customer's product.

14.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
14.1.1	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
14.1.2	Missing	Missing component	
14.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	
14.1.4	linearity	No more than 1.5%	

14.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
	Clear Spots Black and white Spot defect Pinhole, Foreign Particle, polarizer Dirt	For dark/white spot, sizeΦis defined  as Φ= $\frac{(x \boxtimes y)}{2}$	Minor

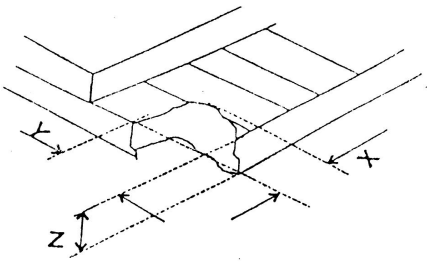
Zone / Size(mm)	Acceptable Qty		
	A	B	C
Φ≤0.1	Ignore		Ignore
0.10＜Φ≤0.2	2		
0.2＜Φ≤0.25	1		
Φ＞0.25	0		

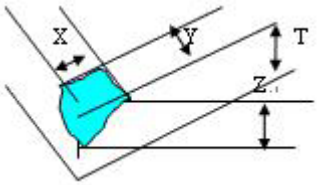
14.2.1	**Clear Spots** TP Dirt	Zone / Size(mm)	Acceptable Qty			
			A	B	C	
		Φ≤0.1	Ignore		Ignore	
		0.10＜Φ≤0.15	3			
		0.15＜Φ≤0.25	2			
		0.25＜Φ	0			
	Dim Spots Circle shaped and dim edged defects	2. Zone / Size(mm)	Acceptable Qty			
			A	B	C	
		Φ≤0.2	Ignore		Ignore	
		0.20＜Φ≤0.40	2			
		0.40＜Φ≤0.60	1			
		0.60＜Φ	0			

Item No	Items to be inspected	Inspection Standard					Classification of defects
	Line defect Black line, White line, Foreign material on polarizer	size(mm)		Acceptable Qty			Minor
		L(Length)	W(Width)	zone			
				A	B	C	
		Ignore	W≤0.02	Ignore		Ignore	
		L≤3.0	0.02＜W≤0.03	2			
		L≤2.0	0.03＜W≤0.05	1			
			0.05＜W	Define as spot defect			

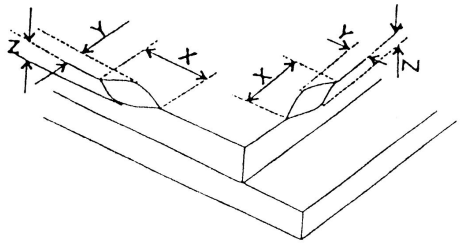
<table>
<tr><td>14.2.2</td><td>Foreign material on TP film</td><td>The line can be seen after mobile phone in the operating condition:
<table>
<tr><td colspan="2">size(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td rowspan="2">L(Length)</td><td rowspan="2">W(Width)</td><td colspan="3">zone</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>L≤5.0</td><td>0.03＜W≤0.05</td><td colspan="2">3</td></tr>
<tr><td></td><td>0.05＜W</td><td colspan="2">Define as spot defect</td></tr>
</table></td><td></td></tr>
<tr><td>14.2.3</td><td>Dim line defect

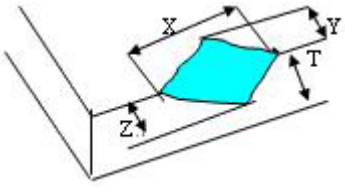
Polarizer scratch
TP film scratch</td><td>If the scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2.
If the scratch can be seen only in non-operating condition or some special angle, judge by the following.
<table>
<tr><td colspan="2">Size(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td rowspan="2">L(Length)</td><td rowspan="2">W(Width)</td><td colspan="3">Zone</td></tr>
<tr><td>A</td><td>B</td><td>C</td></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></td></tr>
</table>

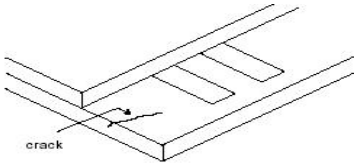
<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>14.2.4</td><td>Polarize
Air bubble</td><td>Air bubbles between glass & polarizer
<table>
<tr><th rowspan="2">2. Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<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>
<tr><td>14.2.5</td><td>Glass defect</td><td>(i) Chips on corner
A:LCD Glass defect


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≤2.0</td><td>≤S</td><td>Disregard</td></tr>
</table>
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.
B:TP Glass defect


<table>
<tr><th>X(mm)</th><th>Y(mm)</th><th>Z(mm)</th></tr>
<tr><td>≤3.0</td><td>≤3.0</td><td>Disregard</td></tr>
</table></td><td>Minor</td></tr>
</table>

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td rowspan="2">14.2.5</td><td rowspan="2">Glass defect</td><td>(ii)Usual surface cracks
A:LCD Glass defect
 

<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≤3.0</td><td><Inner border line of the seal</td><td>Disregard</td></tr>
</table>
B:TP Glass defect
 

<table>
<tr><th>X(mm)</th><th>Y(mm)</th><th>Z(mm)</th></tr>
<tr><td>≤6.0</td><td>＜2.0</td><td>Disregard</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>(iii) Crack
Cracks tend to break are not allowed.
 
</td><td>Major</td></tr>
</table>

14.3 Parts Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
14.3.1	Parts contraposition	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

14.3.2	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.	