

# 样品规格承认书

## Specification

客户名称(CUSTOMER) :

型号名称(LCM CODE (Ver.)) : NT40IVGM17C

描述(Description) : 3.95' a-Si TFT 液晶显示屏

客户确认:  
CUSTOMER  
APPROVED:

APPROVED BY	CHECK BY	PREPARED BY

## RECORDS OF REVISION

Date	Rev.	Description	Note	Page
2019/11/28	1	First issue.		

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# 1. SPECIFICATIONS

## 1.1 Features

Item	Standard Value
Display Type	480(R+G+B) * 480 Dots
LCD Type	a-Si TFT, Positive, Transmissive
Viewing Direction	ALL'clock
Backlight	10-LED White Color
Interface	MIPI interface
Controller/driver IC	ST7701s

## 1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	86(H) ×86(W) ×3.85(T)	mm
Viewing Area	74.256 (H) ×76.176 (W)	mm
Active Area	71.856 (H) ×70.176 (W)	mm
Pixel pitch	0.1497 (H) ×0.1462 (W)	mm

Note : For detailed information please refer to LCM drawing

## 1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V <sub>CI</sub>	-	-0.3	4.6	V
LCD Driver Supply Voltage	V <sub>GH-VSS</sub>	-	-0.3	18.5	V
Input voltage	V <sub>in</sub>		-0.3	4.6	V
Operating Temperature	T <sub>OP</sub>	-	-20	+70	°C
Storage Temperature.	T <sub>ST</sub>	-	-30	+80	°C
Storage Humidity	H <sub>D</sub>	T <sub>a</sub> < 40 °C	-	90	%RH

## 1.4 DC Electrical Characteristics

$V_{CI} = 2.4 \sim 3.3V$ ,  $V_{SS} = 0V$ ,  $T_a = 25^\circ C$

Item	Symbol	Condition	Min.	Type	Max.	Unit
Logic Supply Voltage	$V_{CI}$	-	2.4	3.3	3.4	V
I/O Supply Voltage	$IO_{VCC}$	-	1.65		3.3	
“H” Input Voltage	$V_{IH}$	-	$0.8 V_{DD}$	-	$V_{DD}$	V
“L” Input Voltage	$V_{IL}$	-	$V_{SS}$	-	$0.2 V_{DD}$	V
“H” Output Voltage	$V_{OH}$	-	$0.8V_{DD}$	-	$V_{DD}$	V
“L” Output Voltage	$V_{OL}$	-	$V_{SS}$	-	$0.2 V_{DD}$	V
Supply Current	$I_{DD}$	$V_{CI} = 2.8V$	-	-	30	mA

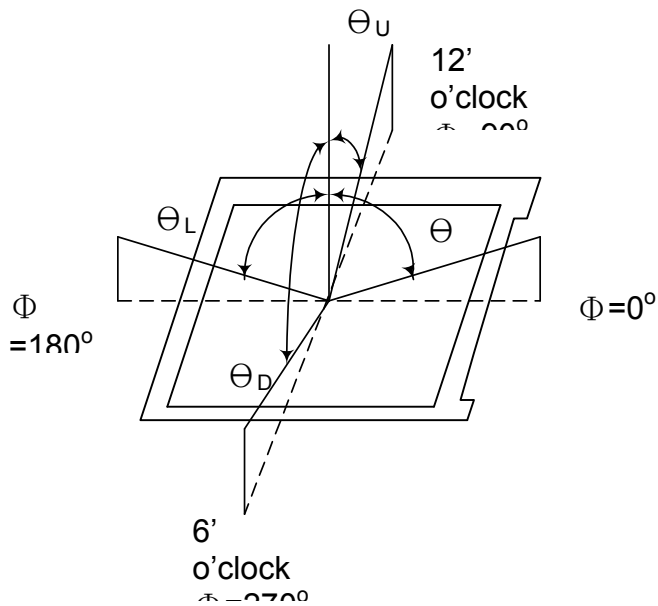
## 1.5 Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Transmittance (with Polarizer)	T (%)	$\Theta=0$ Normal viewing angle	—	(4.2)	—	%	Measuring with normal polarizer , Reference Only Base on $V_{op}=5.1V$	
Transmittance (without Polarizer)	T (%)		—	(14.7)	—	%		
Contrast Ratio	CR		640	800	—	—	(1)(2)	
Response Time	$T_{R+T_F}$		—	25	35	msec	(1)(3)	
Color Gamut	(%)		55	60	—	%	C-light	
Color Chromaticity (CIE1931)	White		$W_x$	—	TBD	—	—	(1)(4) CF glass C-light
			$W_y$	—	TBD	—		
	Red		$R_x$	—	TBD	—		
			$R_y$	—	TBD	—		
	Green		$G_x$	—	TBD	—		
		$G_y$	—	TBD	—			
Blue	$B_x$	—	TBD	—				
	$B_y$	—	TBD	—				
Viewing Angle	Hor.	$\Theta_L$	70	80	—	—	(1)(4) Measuring with normal polarizer , Reference Only	
		$\Theta_R$	70	80	—			
	Ver.	$\Theta_U$	70	80	—			
		$\Theta_D$	70	80	—			
Brightness	300 cd/m <sup>2</sup>							

■ FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-

5A for other optical characteristics.

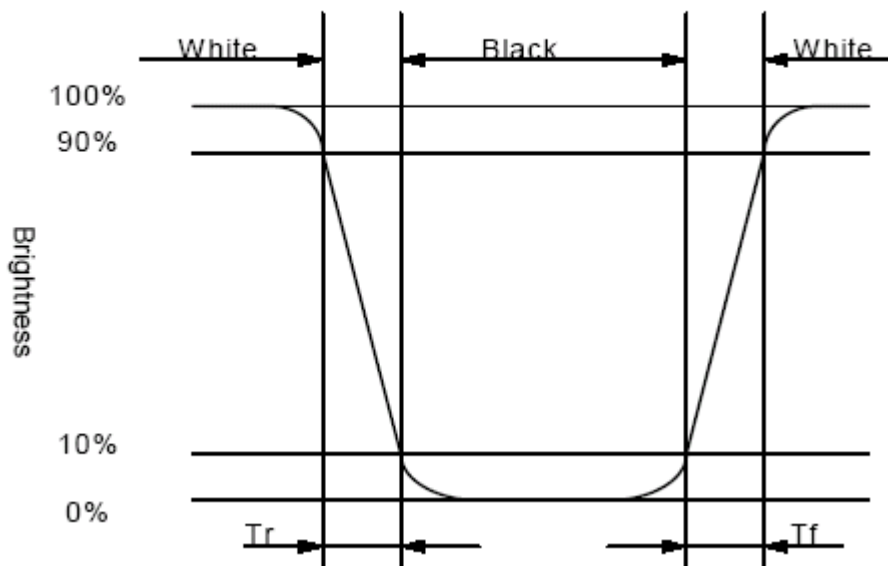
Note (1) Definition of Viewing Angle:



Note (2) Definition of Contrast Ratio (CR) :  
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note 6-3 : The definition of response time :



## 1.6 Backlight & LED Characteristics

**Maximum Ratings**

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	50(10 LED)	mA
Reverse Voltage	VR	Ta =25℃	-	50	V
Power Dissipation	PO	Ta =25℃	-	900	mW
Operating Temperature	T <sub>OP</sub>	-	-20	70	℃
Storage Temperature	T <sub>ST</sub>	-	-30	80	℃
Solder Temp. for 3 Seconds	-	-	-	260	℃

**Electrical / Optical Characteristics**

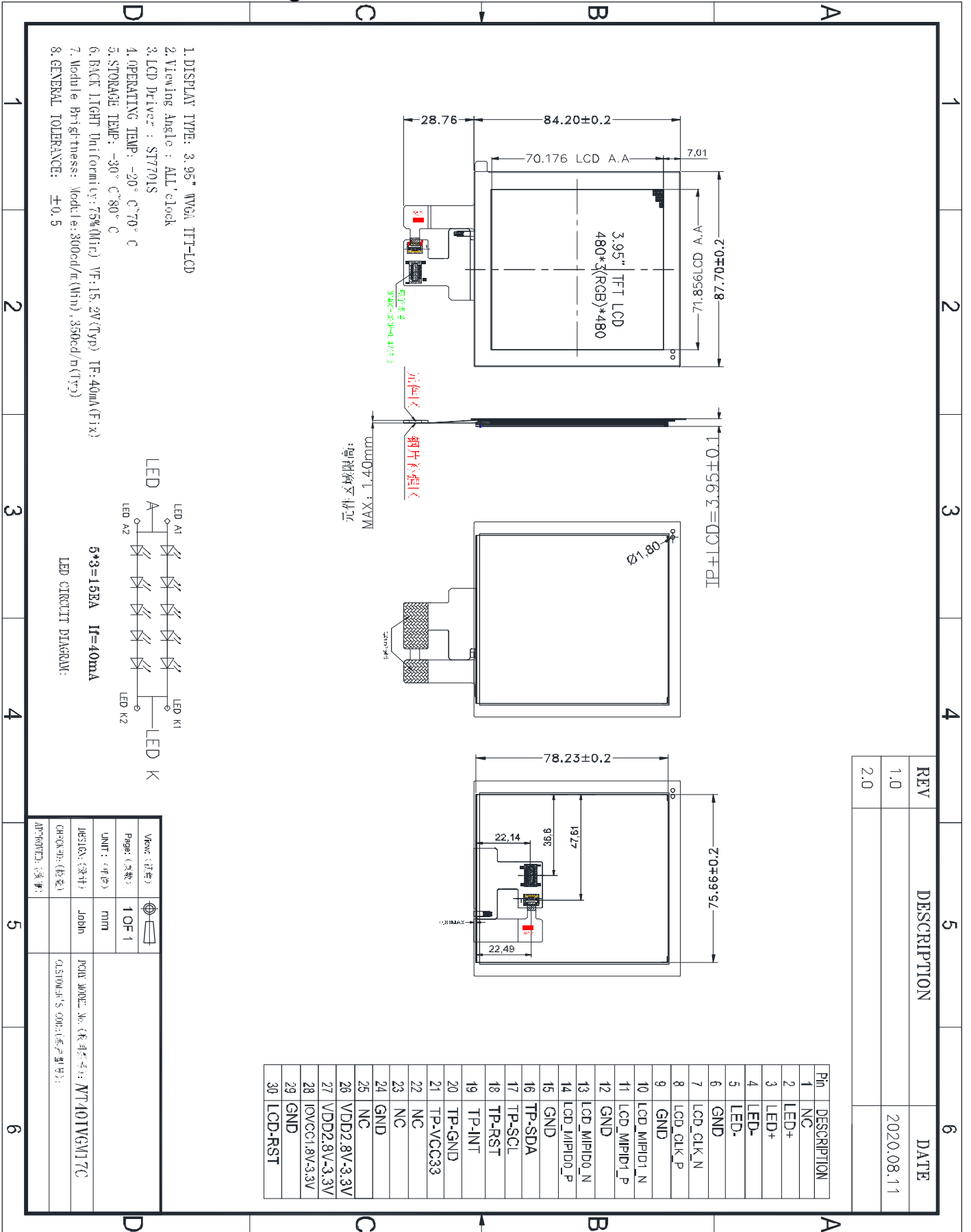
VSS = 0V, Ta =25℃

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	LED-A	IF= 40mA	-	15.5	-	V
Reverse Current	IR	VR= 50V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 40mA	4500		-	cd/m <sup>2</sup>
CIE Color Coordinate (without LCD)	X	IF= 40mA	0.250	-	0.310	—
	Y		0.250	-	0.310	
Color	WHITE					

\*1 This value will be changed while mass production.

# 2. MODULE STRUCTURE

## 2.1 Counter Drawing





## 2.2 Interface Pin Description

No.	Symbol	Function	Remark
1	NC	NC	
2	LEDA	Backlight Anode	
3	LEDA	Backlight Anode	
4	LED_K	Backlight Cathode	
5	LED_K	Backlight Cathode	
6	GND	Ground	
7	MIPI_CLN	These pins are DSI-CLK+/- differential clock signals	
8	MIPI_CLP	These pins are DSI-CLK+/- differential clock signals	
9	GND	Ground	
10	MIPI_D1N	These pins are DSI-D1+/- differential data signals	
11	MIPI_D1P	These pins are DSI-D1+/- differential data signals	
12	GND	Ground	
13	MIPI_D0N	These pins are DSI-D0+/- differential data signals	
14	MIPI_D0P	These pins are DSI-D0+/- differential data signals	
15	GND	Ground	
16	TP-SDA	TP-SDA	
17	TP-SCL	TP-SCL	
18	TP-RST	TP-RST	
19	TP-INT	TP-INT	
20	TP-GND	TP -Ground	
21	TP-VCC	TP-Power supply for analog	
22	NC	NC	
23	NC	NC	
24	GND	Ground	
25	NC	NC	
26	VDD	Power supply for analog	
27	VDD	Power supply for analog	
28	IOVCC	Power supply for logic	
29	GND	Ground	
30	LCD-RSEST	The external reset input	

## 2.3 Timing Characteristics

Please refer to ST7701s DATASHEET.

## 2.4 Display Command

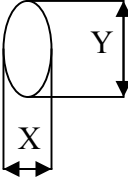
Please refer to ST7701s DATASHEET.

## 2.5 Touchpanel Charactoeistics

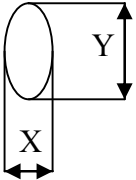
NO.	项目 Item	单位	规格尺寸 Value	备注 Note
1	最大电压值 Max voltage	V	DC 5V	
2	线性度 Linearity	%	±1.5	Load 120gf
3	回路阻抗 Terminal resistance	Ω	Film side: 150~500	
			Glass side: 400~800	
4	绝缘阻抗 Insulation resistance	MΩ	≥10	DC25V
5	操作荷重 Operation force	g	40~100	R0.8 TP Pen
6	表面硬度 Hardness	H	≥3	
7	笔划寿命 Pen sliding life	次	≥ 100, 000	100g, 60mm/s, R0.8 POM

### 3. INSPECTION SPECIFICATION

NO.	项目 Item	经验标准 Inspection Standard	判断 Result	备注 Note
1	整体功能 All functional defects	1) 不显示 No display 2) 显示异常 Display abnormally 3) 缺划 (横或竖, 横&竖) Missing vertical, horizontal segment 4) 短路 Short circuit 5) 背光不亮或闪烁 Backlight no lighting, flickering and abnormal lighting.	不允许 Reject	
2	缺失 Missing	少成分 Missing component	不允许 Reject	
3	外观尺寸 Outline dimension	同 CD 图 Overall outline dimension beyond the drawing is not allowed		

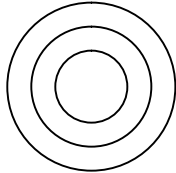
NO.	项目 Item	检验标准 Inspection Standard	备注 Note																					
4	清楚的黑白点 Clear Spots	$\phi = (X+Y) / 2$  A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of VA)																						
		<table border="1"> <thead> <tr> <th rowspan="2">区域 Zone 尺寸 Size</th> <th colspan="3">接受个数 Acceptable Quantity</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\phi \leq 0.1\text{mm}</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.1\text{mm} &lt; \phi \leq 0.2\text{mm}</math></td> <td colspan="2">3</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>0.2\text{mm} &lt; \phi \leq 0.25\text{mm}</math></td> <td colspan="2">2</td> </tr> <tr> <td><math>\phi &gt; 0.25\text{mm}</math></td> <td colspan="2">0</td> </tr> </tbody> </table>	区域 Zone 尺寸 Size	接受个数 Acceptable Quantity			A	B	C	$\phi \leq 0.1\text{mm}$	Ignore			$0.1\text{mm} < \phi \leq 0.2\text{mm}$	3		Ignore	$0.2\text{mm} < \phi \leq 0.25\text{mm}$	2		$\phi > 0.25\text{mm}$	0		
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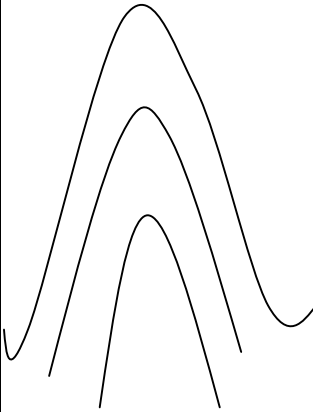
NO.	项目 Item	检验标准 Inspection Standard	备注 Note
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5	不明显的黑白点 Dim Spots	$\phi = (X+Y) / 2$  A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of V.A.)																											
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6	线不良 Line defect	<table border="1"> <thead> <tr> <th colspan="2">尺寸 Size (mm)</th> <th colspan="3">接受个数 Acceptable Quantity</th> </tr> <tr> <th>L (Length)</th> <th>W (width)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>Ignore</td> <td><math>W \leq 0.03</math></td> <td colspan="2">Ignore</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>L &lt; 5.0</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td colspan="2">2</td> </tr> <tr> <td></td> <td><math>0.05 &lt; W</math></td> <td colspan="2">以脏污论 Define as spot defect</td> </tr> </tbody> </table>	尺寸 Size (mm)		接受个数 Acceptable Quantity			L (Length)	W (width)	A	B	C	Ignore	$W \leq 0.03$	Ignore		Ignore	$L < 5.0$	$0.03 < W \leq 0.05$	2			$0.05 < W$	以脏污论 Define as spot defect					
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7	偏光片刮伤 Polarizer Scratch	<table border="1"> <thead> <tr> <th colspan="2">尺寸 Size (mm)</th> <th colspan="3">Acceptable Quantity</th> </tr> <tr> <th>L (Length)</th> <th>W (width)</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>Ignore</td> <td><math>W \leq 0.03</math></td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>L \leq 10</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td colspan="2">2</td> </tr> <tr> <td><math>L &lt; 5.0</math></td> <td><math>0.05 &lt; W \leq 0.08</math></td> <td colspan="2">1</td> </tr> <tr> <td></td> <td><math>0.08 &lt; W</math></td> <td colspan="2">0</td> </tr> </tbody> </table>	尺寸 Size (mm)		Acceptable Quantity			L (Length)	W (width)	A	B	C	Ignore	$W \leq 0.03$	Ignore		Ignore	$L \leq 10$	$0.03 < W \leq 0.05$	2		$L < 5.0$	$0.05 < W \leq 0.08$	1			$0.08 < W$	0	
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8	偏光片与玻璃间气 泡 Polarize Air bubble	<table border="1"> <thead> <tr> <th rowspan="2">区域 Zone 尺寸 Size</th> <th colspan="3">接受个数 Acceptable Quantity</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\phi \leq 0.2\text{mm}</math></td> <td colspan="2">Ignore</td> <td rowspan="2">Ignore</td> </tr> <tr> <td><math>0.2\text{mm} &lt; \phi \leq 0.3\text{mm}</math></td> <td colspan="2">2</td> </tr> </tbody> </table>	区域 Zone 尺寸 Size	接受个数 Acceptable Quantity			A	B	C	$\phi \leq 0.2\text{mm}$	Ignore		Ignore	$0.2\text{mm} < \phi \leq 0.3\text{mm}$	2														
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		0.3mm < $\phi$ ≤ 0.5mm	1		
		$\phi$ > 0.5mm	0		

牛顿环/干涉纹 Newton Ring

NO.	项目 Item	检验标准 Inspection Standard	备注 Note
9	规则 Inerratic	<p>1. 在整个触摸屏检查区域内（可视区）超过 1/3 范围，不可；When Newton ring dimension is more than 1/3 of sample dimension, it is regarded as a defect.</p> <p>2. 直径≤5mm，且在整个触摸屏检查区（可视区）域小于 1/3 范围，不影响透过率及失真；不计 When Newton ring dimension is less than 1/3 of sample dimension is not affect font effect and line distortion under a ceiling fluorescent light, it is acceptable.</p>	

10	不规则 Atactic	<p>1. 在照明环境下牛顿环有影响清晰度和透过率，失真；不可。As long as Newton ring affects font effect and line distortion under a ceiling fluorescent light, it is regarded as a defect.</p> <p>2. 在整个触摸屏检查区域（可视区）内，超过 1/2，不可。φ≤10mm；不计。When φ≤10mm ,it is acceptable</p>	
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## **4. PRECAUTION RELATING PRODUCT HANDLING**

### **4.1 SAFETY**

**4.1.1** If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.

**4.1.2** If the liquid crystal touches your skin or clothes , please wash it off immediately  
by  
using soap and water.

### **4.2 HANDLING**

**4.2.1** Avoid any strong mechanical shock which can break the glass.

**4.2.2** Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.

**4.2.3** Do not remove the panel or frame from the module.

**4.2.4** The polarizing plate of the display is very fragile. So , please handle it very carefully, Do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)

**4.2.5** Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.

**4.2.6** Do not touch the display area with bare hands , this will stain the display area.

**4.2.7** Do not use ketonic solvent & aromatic solvent. Use with a soft cloth soaked with A cleaning naphtha solvent.

**4.2.8** To control temperature and time of soldering is  $280 \pm 10^{\circ}\text{C}$  and 3-5 sec.

**4.2.9** To avoid liquid (include organic solvent) stained on LCM.

### **4.3 STORAGE**

**4.3.1** Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.

**4.3.2** Do not place the module near organics solvents or corrosive gases.

**4.3.3** Do not crush, shake , or jolt the module.