

样品规格承认书

Specification

客户名称(CUSTOMER) : _____

型号名称(LCM CODE (Ver.)) : **ST024C0C-AJ1 (Ver: 0)**

描述(Description) : 2.4" a-Si TFT 液晶显示屏

客户确认:
**CUSTOMER
APPROVED:**

APPROVED BY	CHECK BY	PREPARED BY

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RECORDS OF REVISION

Date	Rev.	Description	Note	Page
2010-3-23	0	New sample		

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1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	240(R+G+B) * 320 Dots
LCD Type	a-Si TFT, Positive, Transmissive CPT
Viewing Direction	12 O'clock
Backlight	4LED White Color
Interface	8080 MPU 18/16/9/8-bit interface
Controller/driver IC	ST7781

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	60.26 (L) x 42.72(W) x 3.35 (T)	mm
Viewing Area	54.45 (L) x 38.72 (W)	mm
Active Area	48.96 (L) x 36.72(W)	mm
Pixel pitch	0.153 (L) x 0.153(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 _{DD}	-	-0.3	4.6	V
LCD Driver Supply Voltage	V _{GH-VSS}	-	-0.3	18.5	V
Input voltage	V _{in}		-0.3	4.6	V
Operating Temperature	T _{OP}	-	-20	+70	°C
Storage Temperature.	T _{ST}	-	-30	+80	°C
Storage Humidity	H _D	T _a < 40 °C	-	90	%RH

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1.4 DC Electrical Characteristics

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

Item	Symbol	Condition	Min.	Type	Max.	Unit
Logic Supply Voltage	V_{DD}	-	2.4	2.8	3.3	V
“H” Input Voltage	V_{IH}	-	$0.7 V_{DD}$	-	V_{DD}	V
“L” Input Voltage	V_{IL}	-	-0.3V	-	$0.3 V_{DD}$	V
“H” Output Voltage	V_{OH}	-	$0.8V_{DD}$	-	-	V
“L” Output Voltage	V_{OL}	-	-	-	$0.2 V_{DD}$	V
Supply Current	I_{DD}	$V_{DD} = 2.8V$	-	4		mA

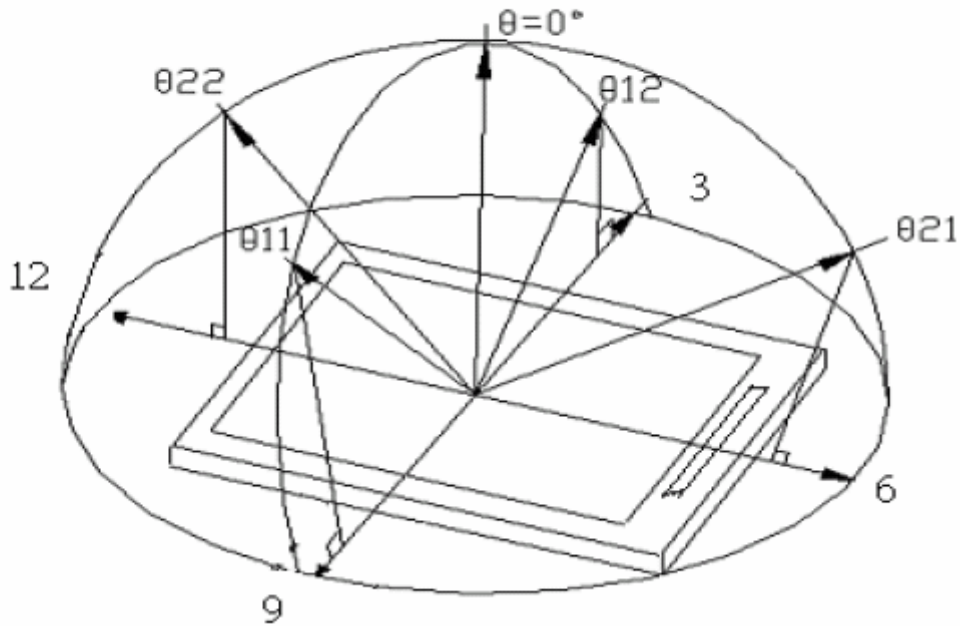
1.5 Optical Characteristics

$T_a = 25^\circ C$

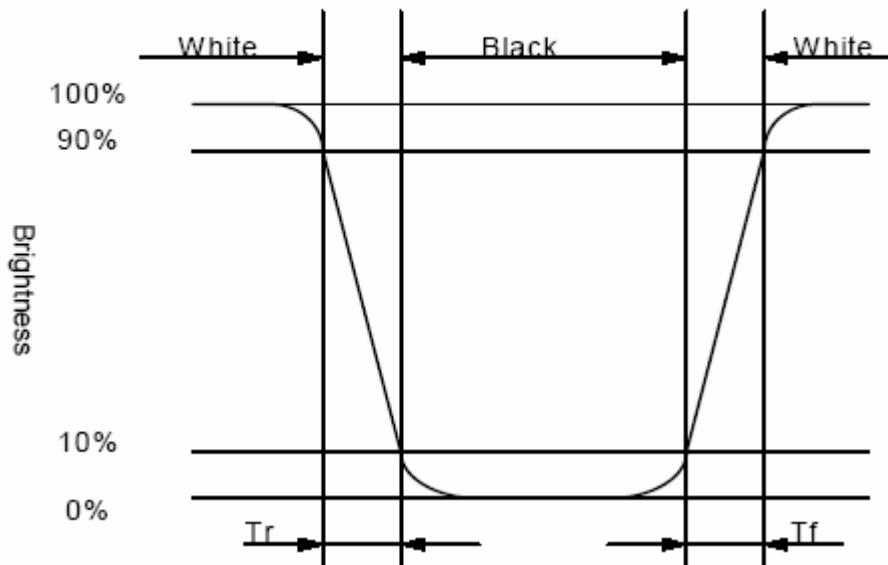
Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	θ_{11}, θ_{12}	$C \geq 10, \varnothing = 0^\circ$	--	45	--	Note6-1
	θ_{21}		--	35	--	Note6-1
	θ_{22}		--	15	--	Note6-1
Contrast Ratio	C	$\theta = 0^\circ, \varnothing = 0^\circ$	150	250	-	--
Response Time(rise)	t_r	$\theta = 0^\circ, \varnothing = 0^\circ$	-	10ms	20ms	Note6-3
Response Time(fall)	t_f	$\theta = 0^\circ, \varnothing = 0^\circ$	-	20ms	30ms	Note6-3
Luminance	B	$\theta = 0^\circ \text{ \& } \varnothing = 0^\circ$	-	180	-	cd/m^2

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Note 6-1 : The definitions of viewing angles



Note 6-3 : The definition of response time :



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1.6 Backlight & LED Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	20 (1 LED)	mA
Reverse Voltage	VR	Ta =25℃	-	5	V
Power Dissipation	PO	Ta =25℃	-	210	mW
Operating Temperature	T _{OP}	-	-20	70	℃
Storage Temperature	T _{ST}	-	-30	80	℃
Solder Temp. for 3 Seconds	-	-	-	260	℃

Electrical / Optical Characteristics

VSS = 0V, Ta =25℃

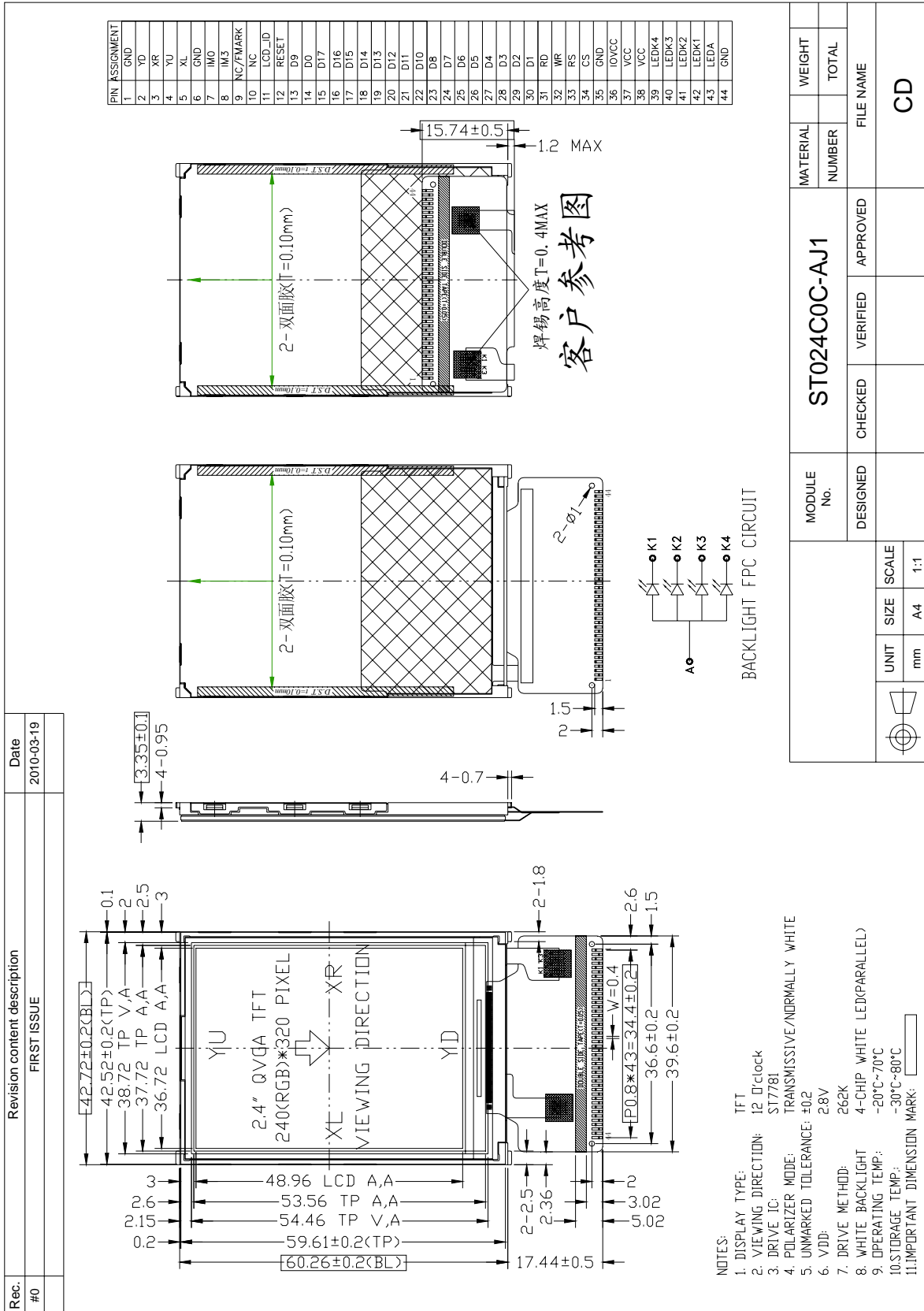
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 15mA*4	2.8	3.3	3.5	V
Reverse Current	IR	VR= 5V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 15mA*4	4000	4200	-	cd/m ²
CIE Color Coordinate (without LCD)	X	IF= 15mA*4	0.250	-	0.310	—
	Y		0.260	-	0.320	
Color	WHITE					

*1 This value will be changed while mass production.

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2. MODULE STRUCTURE

2.1 Counter Drawing



MODULE No.	ST024C0C-AJ1		WEIGHT	
	DESIGNED	APPROVED	MATERIAL NUMBER	TOTAL
	CHECKED	VERIFIED	FILE NAME	
			CD	

UNIT	SIZE	SCALE
mm	A4	1:1

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2.2 Interface Pin Description

NO	SYMBOL	FUNCTION
1	GND	GROUND
2	YD	TOUCH PANEL PIN
3	XR	TOUCH PANEL PIN
4	YU	TOUCH PANEL PIN
5	XL	TOUCH PANEL PIN
6	GND	GROUND
7	IM0	IM3=0,IM0=1:Select 8-bit interface,DB17~DB10 IM3=1,IM0=1:Select 9-bit interface,DB17~DB9
8	IM3	IM3=0,IM0=0:Select 16-bit interface,DB17~DB10,DB8~DB1 IM3=1,IM0=0:Select 18-bit interface,DB17~DB0
9	NC/FMARK	OPEN/Frame head pulse signal
10	NC	OPEN
11	LCD_ID	OPEN
12	RESET	Chip reset signal ("L" →Active)
13	D9	Data BUS
14	D0	Data BUS
15~22	D17~D10	Data BUS
23~30	D10~D1	Data BUS
31	RD	Read signal ("L" →Active)
32	WR	Write signal ("L" →Active)
33	RS	Data / Command select signal("L"→ register index; "H"→data)
34	CS	Chip select signal ("L" →Active)
35	GND	GROUND
36	IOVCC	POWER SUPPLY CIRCUIT FOR INTERFACE PINS
37	VCC	POWER SUPPLY CIRCUIT
38	VCC	POWER SUPPLY CIRCUIT
39	LEDK4	BACK LIGHT K4
40	LEDK3	BACK LIGHT K3
41	LEDK2	BACK LIGHT K2
42	LEDK1	BACK LIGHT K1
43	LEDA	BACK LIGHT A+
44	GND	GROUND

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2.3 Timing Characteristics

Please refer to ST7781 DATASHEET.

2.4 Display Command

Please refer to ST7781 DATASHEET.

2.5 Touchpanel Characteristics

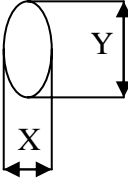
NO.	项目 Item	单位	规格尺寸 Value	备注 Note
1	最大电压值 Max voltage	V	DC 5V	
2	线性度 Linearity	%	±1.5	Load 120gf
3	回路阻抗 Terminal resistance	Ω	Film side: 150~500	
			Glass side: 400~800	
4	绝缘阻抗 Insulation resistance	MΩ	≥10	DC25V
5	操作荷重 Operation force	g	40~100	R0.8 TP Pen
6	表面硬度 Hardness	H	≥3	
7	笔划寿命 Pen sliding life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

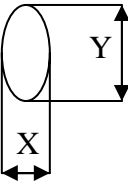
3. INSPECTION SPECIFICATION

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	

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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	$\phi = (X+Y) / 2$ <div style="text-align: center;">  </div> <p>A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of VA)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">区域 Zone 尺寸 Size</th> <th colspan="3" style="text-align: center;">接受个数 Acceptable Quantity</th> </tr> <tr> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\phi \leq 0.1\text{mm}$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.1\text{mm} < \phi \leq 0.2\text{mm}$</td> <td style="text-align: center;">3</td> <td colspan="2" rowspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.2\text{mm} < \phi \leq 0.25\text{mm}$</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">$\phi > 0.25\text{mm}$</td> <td style="text-align: center;">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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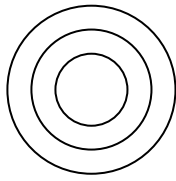
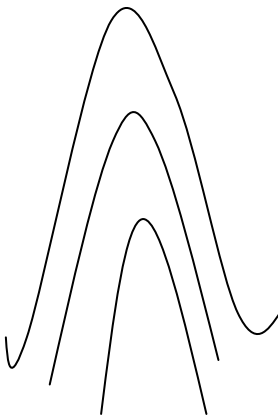
NO.	项目 Item	检验标准 Inspection Standard	备注 Note
5	不明显的黑白点 Dim Spots	$\phi = (X+Y) / 2$ <div style="text-align: center;">  </div> <p>A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of V.A.)</p>	

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		区域 Zone	接受个数 Acceptable Quantit			
		尺寸 Size	A	B	C	
		$\phi \leq 0.3\text{mm}$	Ignore		Ignore	
		$0.3\text{mm} < \phi \leq 0.6\text{mm}$	2			
$\phi > 0.6\text{mm}$	0					
6	线不良 Line defect	尺寸 Size (mm)		接受个数 Acceptable Quantity		
		L (Length)	W (width)	A	B	C
		Ignore	$W \leq 0.03$	Ignore		
		$L < 5.0$	$0.03 < W \leq 0.05$	2		Ignore
			$0.05 < W$	以脏污论 Define as spot defect		
7	偏光片刮伤 Polarizer Scratch	尺寸 Size (mm)		Acceptable Quantity		
		L (Length)	W (width)	A	B	C
		Ignore	$W \leq 0.03$	Ignore		
		$L \leq 10$	$0.03 < W \leq 0.05$	2		Ignore
		$L < 5.0$	$0.05 < W \leq 0.08$	1		
			$0.08 < W$	0		
8	偏光片与玻璃间气 泡 Polarize Air bubble	区域 Zone	接受个数 Acceptable Quantity			
		尺寸 Size	A	B	C	
		$\phi \leq 0.2\text{mm}$	Ignore		Ignore	
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$	2			
		$0.3\text{mm} < \phi \leq 0.5\text{mm}$	1			
		$\phi > 0.5\text{mm}$	0			

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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$\leq 5\text{mm}$, 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>在整个触摸屏检查区域（可视区）内, 超过 1/2, 不可。$\phi \leq 10\text{mm}$; 不计。When $\phi \leq 10\text{mm}$, 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.