

样品规格承认书

Specification

客户名称(CUSTOMER) :

型号名称(LCM CODE (Ver.)) : **ST035HMM-A50 (Ver: 0)**

描述(Description) : **3.5" a-Si TFT 液晶显示屏**

客户确认:
**CUSTOMER
APPROVED:**

APPROVED BY	CHECK BY	PREPARED BY

LCM SPECIFICATION

RECORDS OF REVISION

Date	Rev.	Description	Note	Page
2010/11/25	0	New sample		

Contents

1. SPECIFICATIONS

- 1.1 Features
- 1.2 Mechanical Specifications
- 1.3 Absolute Maximum Ratings
- 1.4 DC Electrical Characteristics
- 1.5 Optical Characteristics
- 1.6 Backlight

2. MODULE STRUCTURE

- 2.1 Counter Drawing
- 2.2 Interface Pin Description
- 2.3 Timing Characteristics
- 2.4 Display Command

3. INSPECTION SPECIFICATIONN

4. PRECAUTION RELATING PRODUCT HANDLING

- 4.1 Safety
- 4.2 Handling
- 4.3 Storage

LCM SPECIFICATION

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	320(R+G+B) *480 Dots
LCD Type	a-Si TFT, Positive, Transmissive
Viewing Direction	All O'clock
Backlight	6 LED White Color
Interface	8080 MPU interface (16-bit bus)
Controller/driver IC	ILI9481

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	84.96 (L) x 56.54(W) x 2.35(T)	mm
Viewing Area	74.44 (L) x 49.96 (W)	mm
Active Area	73.44 (L) x 48.96(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}	-	V_{SS}	-	$0.3 V_{DD}$	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}	$V_{DD} = 2.8V$	-	4	6	mA

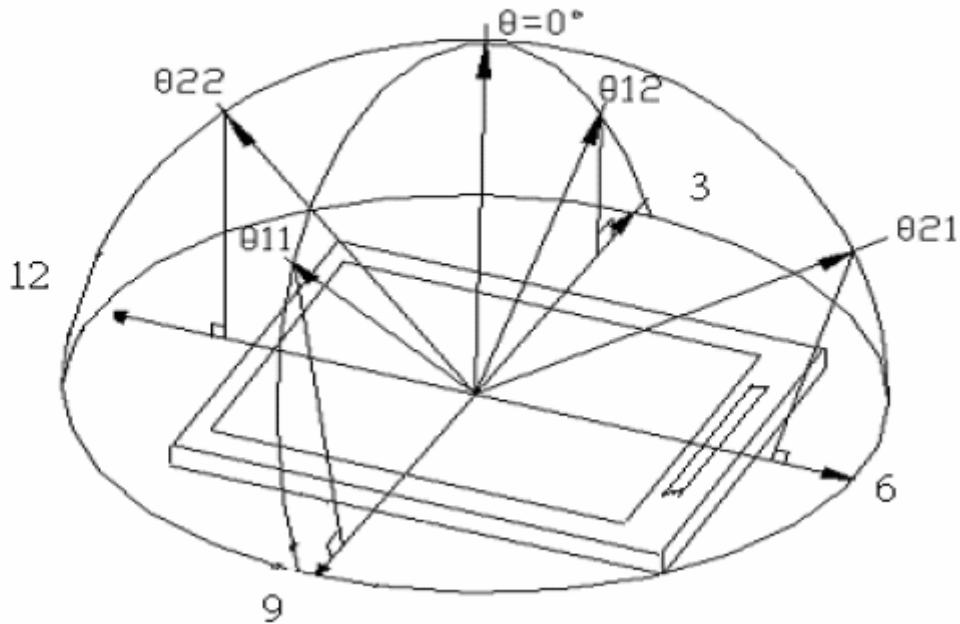
1.5 Optical Characteristics

$T_a = 25^\circ C$

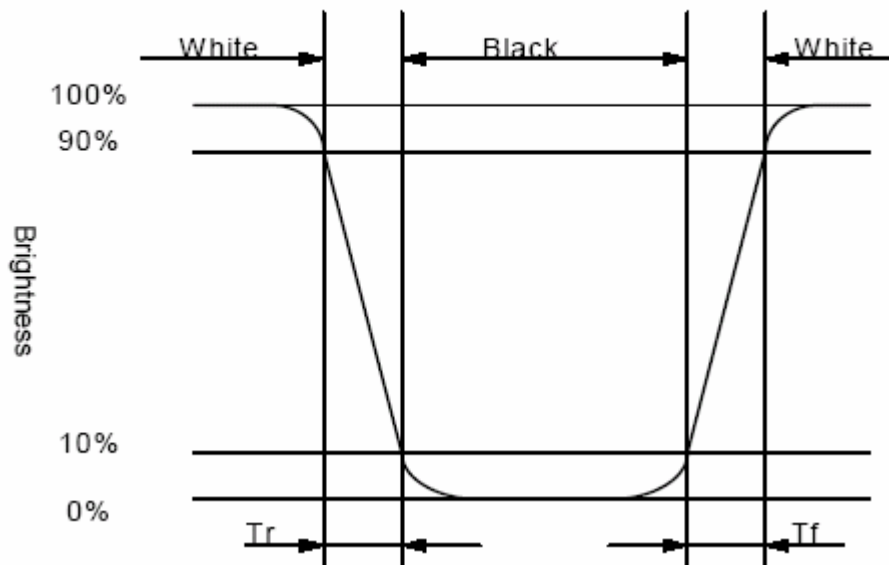
Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	θ_{11}, θ_{12}	$C \geq 10, \phi = 0^\circ$	--	80	--	Note6-1
	θ_{21}		--	80	--	Note6-1
	θ_{22}		--	80	--	Note6-1
Contrast Ratio	C	$\theta = 0^\circ, \phi = 0^\circ$	--	500	-	--
Response Time(rise)	tr	$\theta = 0^\circ, \phi = 0^\circ$	-	10ms	--	Note6-3
Response Time(fall)	tf	$\theta = 0^\circ, \phi = 0^\circ$	-	20ms	--	Note6-3
Luminance	B	$\theta = 0^\circ \ \phi = 0^\circ$	-	160	-	cd/m ²

LCM SPECIFICATION

Note 6-1 : The definitions of viewing angles



Note 6-3 : The definition of response time :



1.6 Backlight & LED Characteristics

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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℃	-	198	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*6	2.8	3.3	3.5	V
Reverse Current	IR	VR= 5V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 15mA*6	3200	-	-	cd/m ²
CIE Color Coordinate (without LCD)	X	IF= 15mA*6	0.260	-	0.310	—
	Y		0.260	-	0.310	
Color	WHITE					

*1 This value will be changed while mass production.

2. MODULE STRUCTURE

2.1 Counter Drawing

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Rec.	Revision content description	Date	
#0	FIRST ISSUE	2010-09-30	
#1	修改背光尺寸	2010-10-09	
#2	修改背光铁框 & 双面胶位置	2010-10-15	

客户参考图

No.	PIN NAME
1	GND/TE
2	VCC
3	ID/VCC
4	CSX
5	RSX
6	WRX
7	RDX
8	RESET
9	DB0
10	DB1
11	DB2
12	DB3
13	DB4
14	DB5
15	DB6
16	DB7
17	DB8
18	DB9
19	DB10
20	DB11
21	DB12
22	DB13
23	DB14
24	DB15
25	GND
26	YD(NC)
27	XL(NC)
28	YU(NC)
29	XR(NC)
30	LEDK1
31	LEDK2
32	LEDK3
33	LEDK4
34	LEDK5
35	LEDK6
36	LEDA
37	GND

CIRCUIT DIAGRAM
If=20mA*6

NOTES:

- DRIVE IC : ILI9481
- DISPLAY MODE : TFT 262K Color LCD, Transmissive, Normally black
- VIEWING DIRECTION : Free / MVA
- BACKLIGHT: 6CHIP-WHITE LED, parallel connection
- OPERATING TEMPERATURE: -20° C TO 70° C
STORAGE TEMPERATURE: -30° C TO 80° C
- 产品满足ROHS要求
- 建议客户视窗按A.A区域单边外扩0.5~0.8mm。
- GENERAL TOLERANCE : ± 0.20

SUNRISE	MODULE No.	DESIGNED CHEN		CHECKED	VERIFIED	APPROVED	FILE NAME
	ST035HMM-A50						CD
UNIT	SCALE						
mm	A4	1:1					
		MATERIAL NUMBER	WEIGHT				
			TOTAL				

2.2 Interface Pin Description

LCM SPECIFICATION

NO	SYMBOL	FUNCTION
1	GND	GROUND
2	VCC	POWER SUPPLY(2.8V)
3	IOVCC	POWER SUPPLY FOR INTERFACE PINS(1.8V/2.8V)
4	CS	Chip select signal ("L" →Active)
5	RS	Data / Command select signal("L"→ register index; "H"→data)
6	WR	Write signal ("L" →Active)
7	RD	Read signal ("L" →Active)
8	RESET	Chip reset signal ("L" →Active)
9~24	DB0~DB15	DATA BUS
25	GND	GROUND
26	YD(NC)	TOUCH PANEL PIN/OPEN
27	XL(NC)	TOUCH PANEL PIN/OPEN
28	YU(NC)	TOUCH PANEL PIN/OPEN
29	XR(NC)	TOUCH PANEL PIN/OPEN
30	LEDK1	BACK LIGHT K-
31	LEDK2	BACK LIGHT K-
32	LEDK3	BACK LIGHT K-
33	LEDK4	BACK LIGHT K-
34	LEDK5	BACK LIGHT K-
35	LEDK6	BACK LIGHT K-
36	A(+)	BACK LIGHT A+
37	GND	GROUND

2.3 Timing Characteristics

Please refer to ILI9481 DATASHEET.

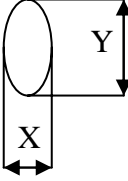
2.4 Display Command

Please refer to ILI9481 DATASHEET.

LCM SPECIFICATION

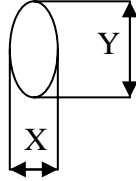
3. INSPECTION SPECIFICATION

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" 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
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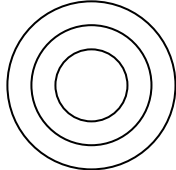
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5	不明显的黑白点 Dim Spots	$\phi = (X+Y) / 2$ A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of V.A.)																												
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6	线不良 Line defect	<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">尺寸 Size (mm)</th> <th colspan="3" style="text-align: center;">接受个数 Acceptable Quantity</th> </tr> <tr> <th style="text-align: center;">L (Length)</th> <th style="text-align: center;">W (width)</th> <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;">Ignore</td> <td style="text-align: center;">$W \leq 0.03$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$L < 5.0$</td> <td style="text-align: center;">$0.03 < W \leq 0.05$</td> <td colspan="2" style="text-align: center;">2</td> <td rowspan="2" style="text-align: center;">Ignore</td> </tr> <tr> <td></td> <td style="text-align: center;">$0.05 < W$</td> <td colspan="2" style="text-align: center;">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			$L < 5.0$	$0.03 < W \leq 0.05$	2		Ignore		$0.05 < W$	以脏污论 Define as spot defect			
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7	偏光片刮伤 Polarizer Scratch	<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">尺寸 Size (mm)</th> <th colspan="3" style="text-align: center;">Acceptable Quantity</th> </tr> <tr> <th style="text-align: center;">L (Length)</th> <th style="text-align: center;">W (width)</th> <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;">Ignore</td> <td style="text-align: center;">$W \leq 0.03$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$L \leq 10$</td> <td style="text-align: center;">$0.03 < W \leq 0.05$</td> <td style="text-align: center;">2</td> <td colspan="2" rowspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$L < 5.0$</td> <td style="text-align: center;">$0.05 < W \leq 0.08$</td> <td style="text-align: center;">1</td> </tr> <tr> <td></td> <td style="text-align: center;">$0.08 < W$</td> <td style="text-align: center;">0</td> </tr> </tbody> </table>			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
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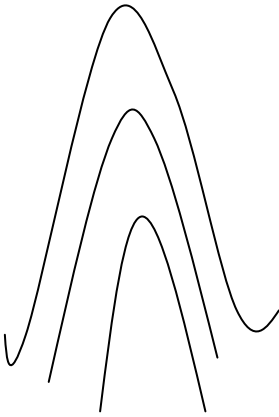
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8	偏光片与玻璃间气泡 Polarize Air bubble	区域 Zone			接受个数 Acceptable Quantity			
		尺寸 Size			A	B	C	
		$\phi \leq 0.2\text{mm}$			Ignore			Ignore
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$			2			
		$0.3\text{mm} < \phi \leq 0.5\text{mm}$			1			
$\phi > 0.5\text{mm}$			0					

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>	

LCM SPECIFICATION

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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LCM SPECIFICATION

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.