

客户名称(CUSTOMER) : _____
 客户项目(PROJECT) : _____
 型号名称(LCM CODE (Ver.)) : **ST035H0M-FNC (Ver: 0)**
 描述(Description) : **3.5" a-Si TFT 液晶显示屏**

客户确认: CUSTOMER APPROVED:	
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LCM SPECIFICATION

RECORDS OF REVISION

Date	Rev.	Description	Note	Page
	0	New sample		

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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	12 O'clock
Backlight	6-LED White Color
Interface	8080 MPU 16 bit interface
Controller/driver IC	RM68140

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	82.94 (L) x 54.46 (W) x 2.10(T)	mm
Viewing Area	73.44 (L) x 48.96 (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	Ta < 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}	-	$0.8 V_{DD}$	-	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}	$V_{DD} = 2.8V$	-	4	6	mA

1.5 Optical Characteristics

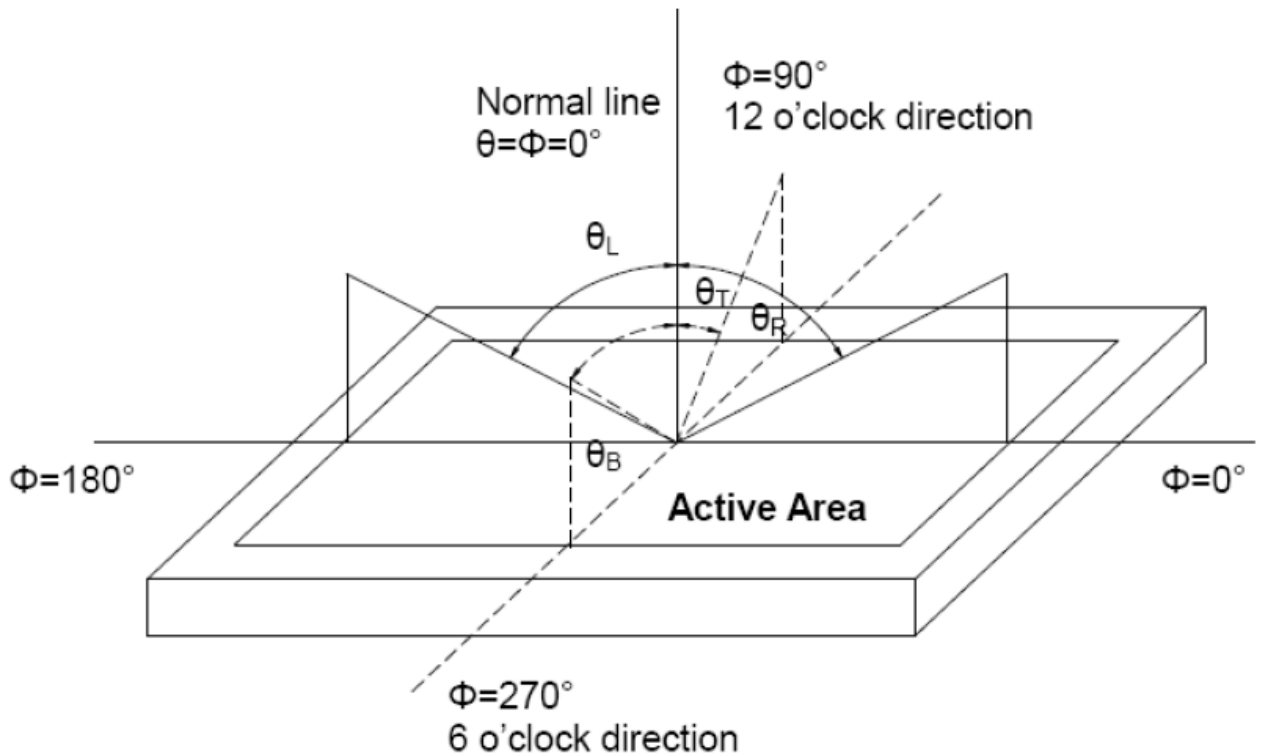
$T_a = 25^\circ C$

Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	θT	$C \geq 10, \phi = 0^\circ$	--	45	--	Note 2
	θB		--	45	--	Note 2
	θL		--	45	--	Note 2
	θR		--	20	--	Note 2
Contrast Ratio	C	$\theta = 0^\circ, \phi = 0^\circ$	--	250	--	--
Response Time	Ton	25°C	--	30ms	--	Note 4
	Toff		--		--	
Luminance	B	$\theta = 0^\circ \phi = 0^\circ$	-	260	-	cd/m ²

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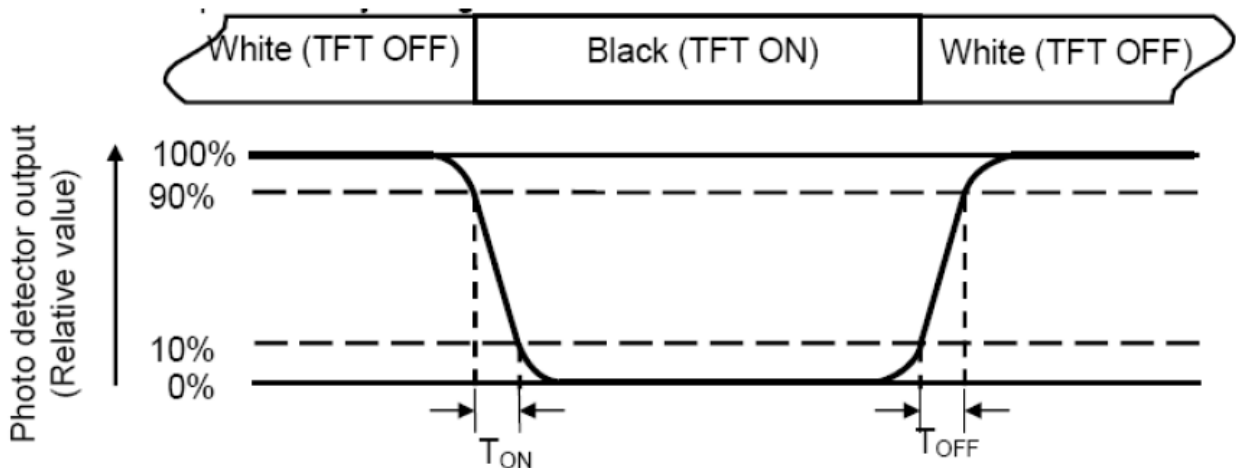
Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).



Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



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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℃	-	320	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	3.0	3.2	3.4	V
Reverse Current	IR	VR= 5V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 15mA*6	-	3800	-	cd/m ²
CIE Color Coordinate (without LCD)	X	IF= 15mA*6	0.26	-	0.32	—
	Y		0.27	-	0.33	
Color	WHITE					

*1 This value will be changed while mass production.

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2. MODULE STRUCTURE

2.1 Interface Pin Description

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	XR/NC	OPEN
27	YD/NC	OPEN
28	XL/NC	OPEN
29	YU/NC	OPEN
30	LEDK1	BACK LIGHT -
31	LEDK2	BACK LIGHT -
32	LEDK3	BACK LIGHT -
33	LEDK4	BACK LIGHT -
34	LEDK5	BACK LIGHT -
35	LEDK6	BACK LIGHT -
36	LEDA	BACK LIGHT +
37	GND	GROUND
38~39	NC	OPEN
40	TE	Tearing effect output

2.2 Timing Characteristics

Please refer to RM68140 DATASHEET.

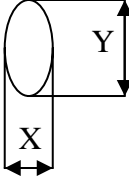
2.3 Display Command

Please refer to RM68140 DATASHEET.

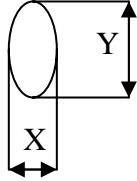
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3. INSPECTION SPECIFICATION

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	$\phi = (X+Y) / 2$  <p>A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of VA) D: 不密集: 两点之间间距 $D \geq 10\text{mm}$</p> <table border="1" data-bbox="459 1496 1054 1890"> <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>$\phi \leq 0.1\text{mm}$</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.1\text{mm} < \phi \leq 0.15\text{mm}$</td> <td>2</td> <td>不密集</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.15\text{mm} < \phi \leq 0.2\text{mm}$</td> <td>1</td> <td></td> </tr> <tr> <td>$\phi > 0.2\text{mm}$</td> <td>0</td> <td></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			$0.1\text{mm} < \phi \leq 0.15\text{mm}$	2	不密集	Ignore	$0.15\text{mm} < \phi \leq 0.2\text{mm}$	1		$\phi > 0.2\text{mm}$	0		
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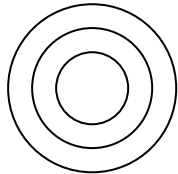
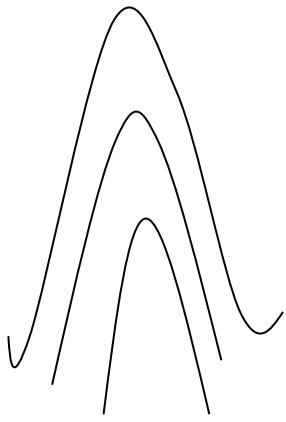
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5	不明显的黑白点 Dim Spots	$\phi = (X+Y) / 2$  <p>A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of V.A.) D: 不密集: 两点之间间距 $D \geq 10\text{mm}$</p> <table border="1" data-bbox="459 698 1051 1043"> <thead> <tr> <th rowspan="2">区域 Zone 尺寸 Size</th> <th colspan="3">接受个数 Acceptable Quantit</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\phi \leq 0.2\text{mm}$</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.2\text{mm} < \phi \leq 0.3\text{mm}$</td> <td>1</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$\phi > 0.3\text{mm}$</td> <td>0</td> <td colspan="2">Ignore</td> </tr> </tbody> </table>	区域 Zone 尺寸 Size	接受个数 Acceptable Quantit			A	B	C	$\phi \leq 0.2\text{mm}$	Ignore			$0.2\text{mm} < \phi \leq 0.3\text{mm}$	1	Ignore		$\phi > 0.3\text{mm}$	0	Ignore									
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6	线不良 Line defect	<table border="1" data-bbox="459 1093 1254 1480"> <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>$W \leq 0.03$</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$L < 5.0$</td> <td>$0.03 < W \leq 0.05$</td> <td colspan="2">2 不密集</td> <td rowspan="2">Ignore</td> </tr> <tr> <td></td> <td>$0.05 < W$</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			$L < 5.0$	$0.03 < W \leq 0.05$	2 不密集		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" data-bbox="459 1529 1254 1827"> <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>$W \leq 0.03$</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$L \leq 10$</td> <td>$0.03 < W \leq 0.05$</td> <td>2</td> <td colspan="2" rowspan="3">Ignore</td> </tr> <tr> <td>$L < 5.0$</td> <td>$0.05 < W \leq 0.08$</td> <td>1</td> </tr> <tr> <td></td> <td>$0.08 < W$</td> <td>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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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		
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$		2 不密集		
		$0.3\text{mm} < \phi \leq 0.5\text{mm}$		1		
$\phi > 0.5\text{mm}$		0			Ignore	

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 1/6 范围，不可；When Newton ring dimension is more than 1/6 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 1/6 范围，不影响透过率及失真；不计 When Newton ring dimension is less than 1/6 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.

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5. MODULE STRUCTURE

5.1 Counter Drawing

