



PHOENIX DISPLAY INTERNATIONAL, INC.

PHOENIX DISPLAY INTERNATIONAL, INC SPECIFICATION FOR LCD MODULE

CUSTOMER	
PART NUMBER	PDI018A0P-S13
DESCRIPTION	1.77" TFT 128 x 160
VERSION	0
ISSUE DATE	03-31-2012

COMPANY ADDRESS :

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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 Interface Pin Description**
- 2.2 Timing Characteristics**
- 2.3 Display Command**
- 2.4 Touchpanel Characteristics**

3. INSPECTION SPECIFICATIONN

4. PRECAUTION RELATING PRODUCT HANDLING

- 4.1 Safety**
- 4.2 Handling**
- 4.3 Storage**

5. MODULE STRUCTURE

- 5.1 Counter Drawing**

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	128(R+G+B) * 160 Dots
LCD Type	a-Si TFT, Positive, Transmissive
Viewing Direction	12 O'clock
Backlight	2-LED White Color
Interface	8080 MPU 8bit interface
Controller/driver IC	ILI9163C

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	46.7 (L) x 34.7 (W) x 2.55 (T)	mm
Viewing Area	36.04 (L) x 29.03 (W)	Mm
Active Area	35.04 (L) x 28.03 (W)	mm
Pixel pitch	0.219 (L) x 0.219 (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

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

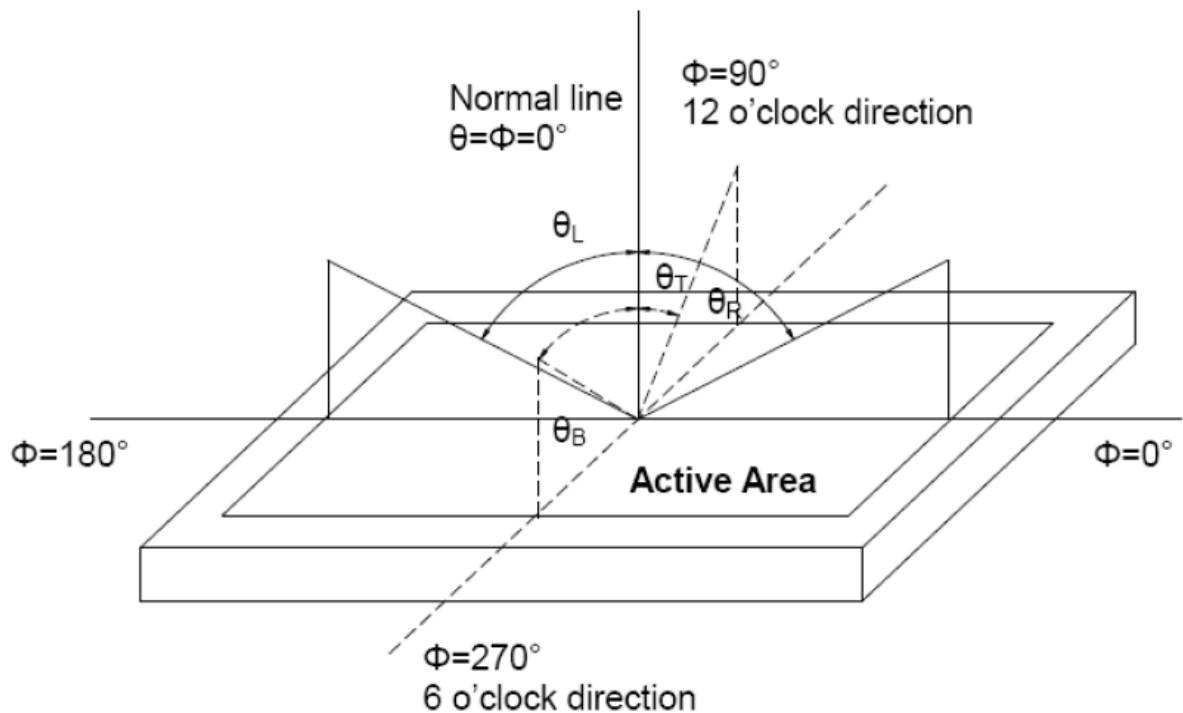
1.5 Optical Characteristics

$T_a = 25^\circ C$

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	T_{on}	25°C	--	30ms	--	Note 4
	T_{off}		--		--	
Luminance	B	$\theta = 0^\circ, \phi = 0^\circ$	-	170	-	cd/m ²

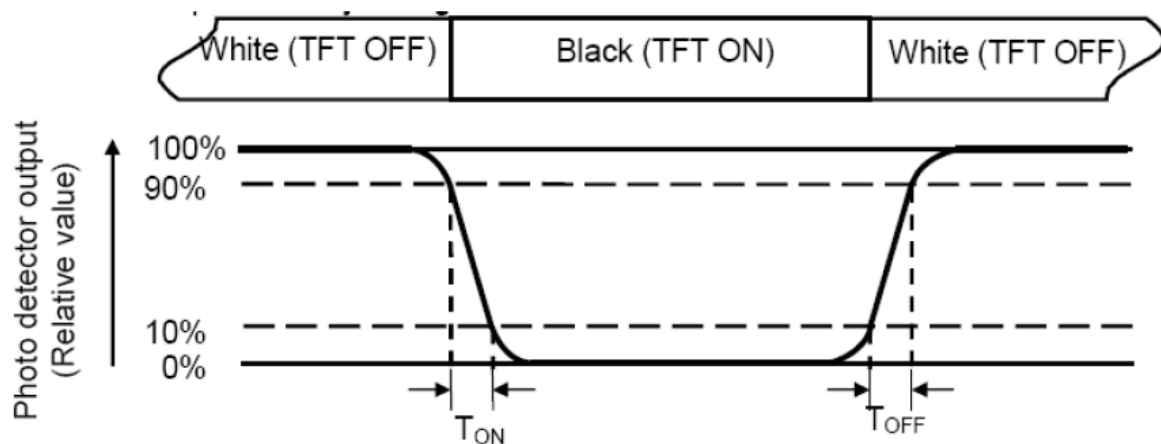
Note 2: Definition of viewing angle range and measurement system.

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%.



1.6 Backlight & LED Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	20 (1 LED)	mA
Reverse Voltage	VR	Ta =25°C	-	5	V
Power Dissipation	PO	Ta =25°C	-	320	mW
Operating Temperature	T _{OP}	-	-20	70	°C
Storage Temperature	T _{ST}	-	-30	80	°C
Solder Temp. for 3 Seconds	-	-	-	260	°C

Electrical / Optical Characteristics

VSS = 0V, Ta =25°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 15mA*2	2.9	3.2	3.5	V
Reverse Current	IR	VR= 5V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 15mA*2	-	2000	-	cd/m ²
CIE Color Coordinate (without LCD)	X	IF= 15mA*2	0.26	-	0.32	—
	Y		0.27	-	0.33	
Color	WHITE					

*1 This value will be changed while mass production.

2. MODULE STRUCTURE

2.1 Interface Pin Description

NO	SYMBOL	FUNCTION
1	X+	Touch Panel Pin
2	Y+	Touch Panel Pin
3	X-	Touch Panel Pin
4	Y-	Touch Panel Pin
5	GND	GROUND
6	CS	Chip select signal ("L" →Active)
7	RS	Data / Command select signal("L"→ register index; "H"→data)
8	WR	Write signal ("L" →Active)
9	RD	Read signal ("L" →Active)
10~27	DB0~DB17	DATA BUS
28	RESET	Chip reset signal ("L" →Active)
29	FMARK	Tearing effect output pin
30	IM0	NC
31	IM1	NC
32	IOVCC	POWER SUPPLY CIRCUIT
33	VCC	POWER SUPPLY CIRCUIT
34	A1	BACK LIGHT A
35	A2	BACK LIGHT A
36	A3	BACK LIGHT A
37	A4	BACK LIGHT A
38	NC	NC
39	K	BACK LIGHT K

2.2 Timing Characteristics

Please refer to ILI9163C DATASHEET.

2.3 Display Command

Please refer to ILI9163C DATASHEET.

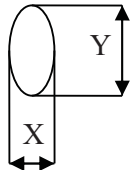
2.4 Touchpanel Characteristics

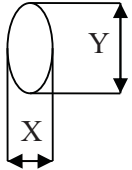
NO.	项目 Item	单位	规格尺寸 Value	备注 Note
1	最大电压值 Max voltage	V	DC 5V	
2	线性度 Linearity	%	±1.5	Load 120gf
3	回路阻抗 Terminal resistance	Ω	Film side: 150~500	
			Glass side: 400~800	
4	绝缘阻抗 Insulation resistance	MΩ	≥10	DC25V
5	操作荷重 Operation force	g	40~100	R0.8 TP Pen
6	表面硬度 Hardness	H	≥3	
7	笔划寿命 Pen sliding life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

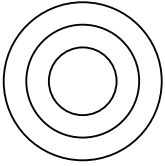
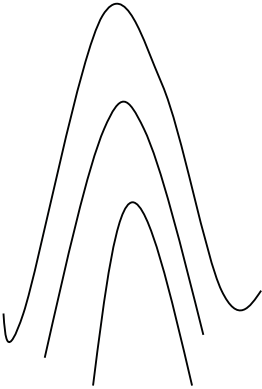
2	缺失 Missing	少成分 Missing component	不允许 Reject	
3	外观尺寸 Outline dimension	同 CD 图 Overall outline dimension beyond the drawing is not allowed		

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)																								
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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"> <tr> <td colspan="2">尺寸 Size (mm)</td> <td colspan="3">接受个数 Acceptable Quantity</td> </tr> <tr> <td>L (Length)</td> <td>W (width)</td> <td>A</td> <td>B</td> <td>C</td> </tr> <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</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> </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"> <tr> <td colspan="2">尺寸 Size (mm)</td> <td colspan="3">Acceptable Quantity</td> </tr> <tr> <td>L (Length)</td> <td>W (width)</td> <td>A</td> <td>B</td> <td>C</td> </tr> <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 colspan="2">2</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$L < 5.0$</td> <td>$0.05 < W \leq 0.08$</td> <td colspan="2">1</td> </tr> <tr> <td></td> <td>$0.08 < W$</td> <td colspan="2">0</td> </tr> </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	<table border="1"> <tr> <td rowspan="2">区域 Zone 尺寸 Size</td> <td colspan="3">接受个数 Acceptable Quantity</td> </tr> <tr> <td>A</td> <td>B</td> <td>C</td> </tr> <tr> <td>$\phi \leq 0.2\text{mm}$</td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$0.2\text{mm} < \phi \leq 0.3\text{mm}$</td> <td colspan="2">2</td> </tr> <tr> <td>$0.3\text{mm} < \phi \leq 0.5\text{mm}$</td> <td colspan="2">1</td> </tr> <tr> <td>$\phi > 0.5\text{mm}$</td> <td colspan="2">0</td> </tr> </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		$0.3\text{mm} < \phi \leq 0.5\text{mm}$	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>	

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.

5. MODULE STRUCTURE

5.1 Counter Drawing

