



深圳市一众显示科技有限公司

SHEN ZHEN TEAM SOURCE DISPLAY TECH. CO, LTD.

TFT-LCD Module Specification

Module NO.: TST018AOP-SE3

Version: V1.1

☐ APPROVAL FOR SPECIFICATION

☐ APPROVAL FOR SAMPLE

For Customer' s Acceptance:	
Approved by	Comment

Team Source Display:		
Presented by	Reviewed by	Organized by

Version No.	Date	Content	Remark
V1.0	2017-04-06	Initial Release	
V1.1	2018-07-26	update drawing and Luminance	

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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	6 O'clock
Backlight	2-LED White Color
Interface	SPI interface
Controller/driver IC	ILI9163V

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	46.70 (L) x 34.70(W) x 2.55(T)	mm
Viewing Area	36.04(L)X29.03(W)	Mm
Active Area	35.04 (L) x28.03 (W)	mm
Pixel pitch	0.219 (H) x 0.219 (V)	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

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

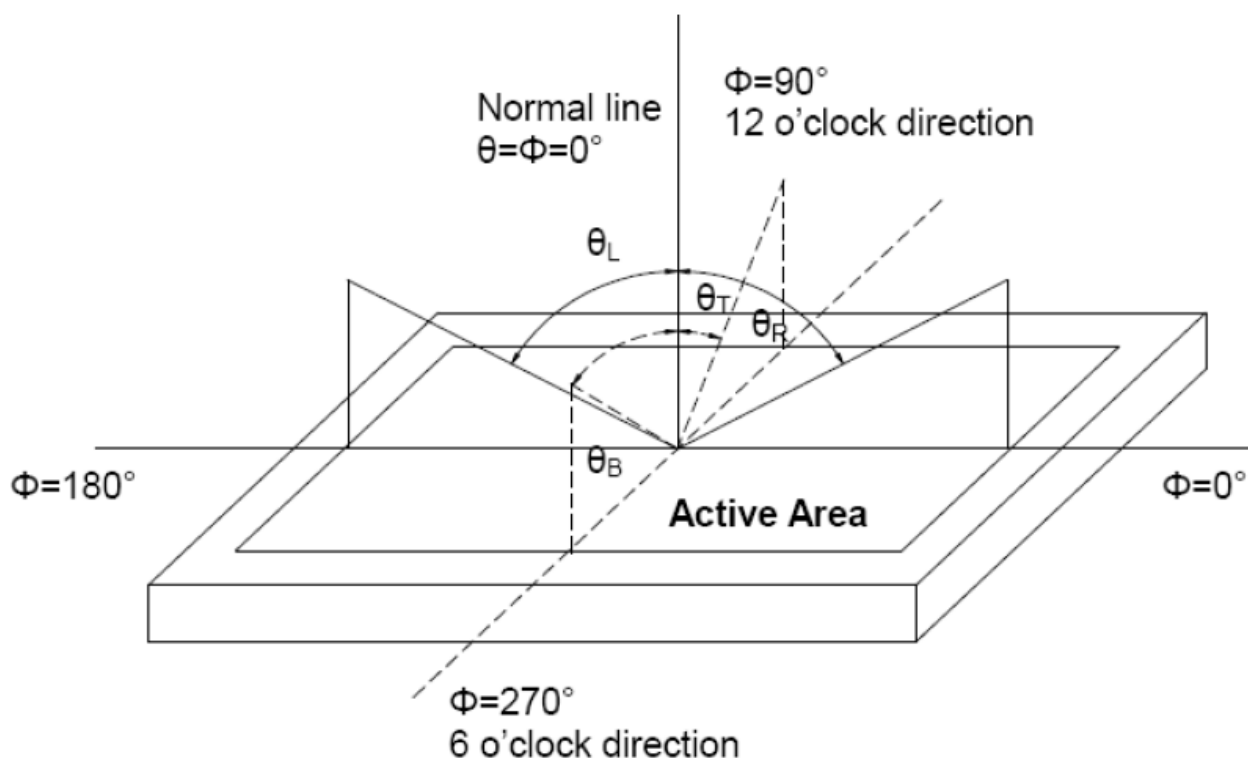
1.5 Optical Characteristics

 $T_a = 25^{\circ}C$

Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	θT	$C \geq 10, \phi = 0^{\circ}$	--	20	--	Note 2
	θB		--	45	--	Note 2
	θL		--	45	--	Note 2
	θR		--	45	--	Note 2
Contrast Ratio	C	$\theta = 0^{\circ}, \phi = 0^{\circ}$	--	300	--	--
Response Time	Ton	25°C	--	30ms	--	Note 4
	Toff					
Luminance	B	$\theta = 0^{\circ} \phi = 0^{\circ}$	250	300		cd/m ²

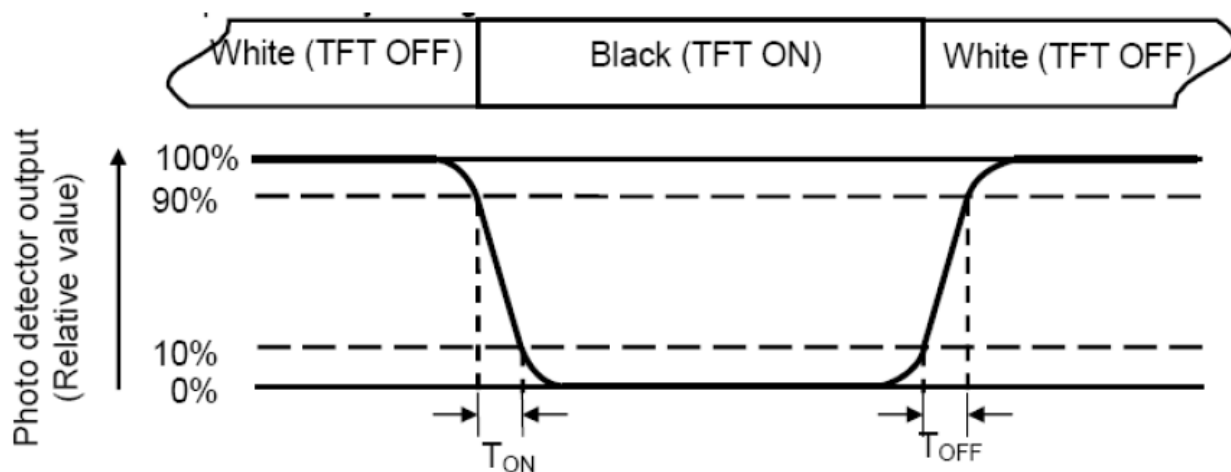
Note 2: Definition of viewing angle range and measurement system.

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℃	-	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*2	2.9	3.1	3.3	V
Reverse Current	IR	VR= 5V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 15mA*2	-	4000	-	cd/m ²
CIE Color Coordinate (with LCD)	X	IF= 15mA*2	0.235	0.255	0.275	—
	Y		0.230	0.250	0.270	
Color	WHITE					

*1 This value will be changed while mass production.

2. MODULE STRUCTURE

2.1 Interface Pin Description

NO	SYMBOL	FUNCTION
1-2	GND	GROUND
3	NC	OPEN
4	GND	GROUND
5	IOVCC	POWER SUPPLY CIRCUIT FOR INTERFACE PINS(1.8V/2.8V)
6	RST	Chip reset pin ("Low Active").
7	RS	data/ command selection
8	SCL	as a synchronous clock
9	SDI	Serial data input / output
10	CS	Chip selection pin
11	GND	GROUND
12	VDD	POWER SUPPLY CIRCUIT(2.8V)
13	A	BACKLIGHT+
14-15	K1,K2	BACKLIGHT-
16	GND	GROUND

2.2 Timing Characteristics

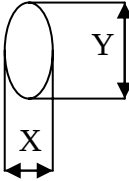
Please refer to ILI9163V DATASHEET.

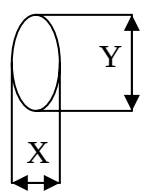
2.3 Display Command

Please refer to ILI9163V DATASHEET.

3. INSPECTION SPECIFICATIONN

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>$\phi \leq 0.1\text{mm}$</td><td colspan="3">Ignore</td></tr> <tr> <td>$0.1\text{mm} < \phi \leq 0.2\text{mm}$</td><td colspan="3" rowspan="3">Ignore</td></tr> <tr> <td>$0.2\text{mm} < \phi \leq 0.25\text{mm}$</td></tr> <tr> <td>$\phi > 0.25\text{mm}$</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			$0.1\text{mm} < \phi \leq 0.2\text{mm}$	Ignore			$0.2\text{mm} < \phi \leq 0.25\text{mm}$	$\phi > 0.25\text{mm}$	
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$0.2\text{mm} < \phi \leq 0.25\text{mm}$																				
$\phi > 0.25\text{mm}$																				

NO.	项目 Item	检验标准 Inspection Standard	备注 Note																											
5	不明显的黑白点 Dim Spots	$\phi = (X+Y) / 2$ A: AA 区（显示区） B: VA 区（可视区） C: 可视区以外(Out of V.A.) 																												
		<table><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><tr><td>$\phi \leq 0.3\text{mm}$</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$0.3\text{mm} < \phi \leq 0.6\text{mm}$</td><td colspan="2">2</td></tr><tr><td>$\phi > 0.6\text{mm}$</td><td colspan="2">0</td></tr></table>		区域 Zone 尺寸 Size	接受个数 Acceptable Quantit			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											
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$0.3\text{mm} < \phi \leq 0.6\text{mm}$	2																													
$\phi > 0.6\text{mm}$	0																													
6	线不良 Line defect	<table><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><tr><td>Ignore</td><td>$W \leq 0.03$</td><td colspan="3">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$L < 5.0$</td><td>$0.03 < W \leq 0.05$</td><td colspan="2">2</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			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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	$0.05 < W$	以脏污论 Define as spot defect																												
7	偏光片刮伤 Polarizer Scratch	<table><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><tr><td>Ignore</td><td>$W \leq 0.03$</td><td colspan="3">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$L \leq 10$</td><td>$0.03 < W \leq 0.05$</td><td colspan="2">2</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			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	
		尺寸 Size（mm）		Acceptable Quantity																										
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		$L \leq 10$	$0.03 < W \leq 0.05$	2																										
		$L < 5.0$	$0.05 < W \leq 0.08$	1																										
	$0.08 < W$	0																												

8	偏光片与玻璃间气泡 Polarize Air bubble				
		区域 Zone 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		

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

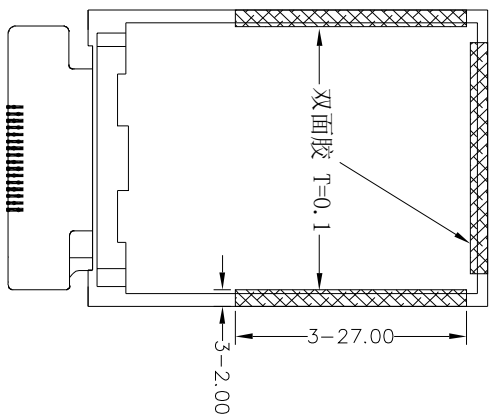
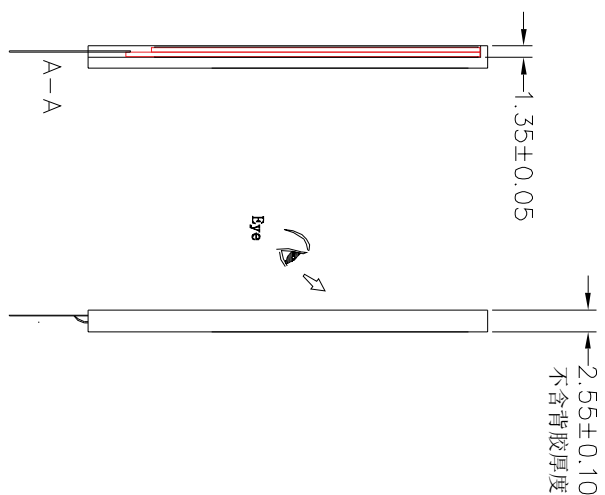
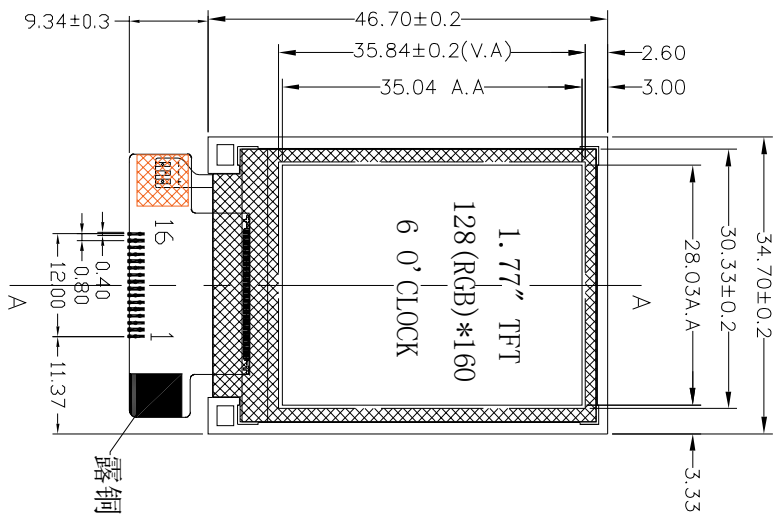
- 4.3.1 Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 4.3.2 Do not place the module near organics solvents or corrosive gases.
- 4.3.3 Do not crush, shake , or jolt the module.

Packing

PARAMETER	Specification	Unit
Outside box	390(L) x 350(W) x 480(H)	mm
Inside pearl wool box	330(L)x185(W)x110(H)	mm
Product quantity of Inside box	128	pcs
Total product quantity	128*8=1024	pcs
Total weight	13 $\pm$ 0.5	Kg

5. MODULE STRUCTURE

Description	
PIN	NAME
1	GND
2	GND
3	ID
4	GND
5	IDVDD
6	RSTB
7	RS
8	SCL
9	SDI
10	CS
11	GND
12	VDD
13	LEDA
14	LEDK1
15	LEDK2
16	GND



LCD Type	1.77" TFT, Transmissive, Normally white, TN
Resolution	128(RGB)*160
View Direction	6 O'CLOCK
Driver IC	IL9163V
Color Depth	65K
Interface Types	4wire SPI
Operating voltage	2.8V
TP/Lens	Without
Backlight LEDs	2 LEDs, 40mA, 3.1V
Surface luminance	250(Min), 300(Typ) cd/m2
Operating temperature	-20 °C ~ 70 °C
Storage Temperature	-30 °C ~ 80 °C
Storage Humidity	60% ~ 90% max

Need to pay attention to		the key size with *	
版本 (Version)	变更记录 (Change History)	视角 (View)	比例 (Proportion)
V1		单位 (Unit)	页 面 (Page)
V2		产品型号 (Product Type)	1 / 1
		图纸版本 (Version)	V2

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DONG GUAN TEAM SOURCE DISPLAY TECH. CO, LTD.

设计 (DESIGN)
审核 (AUDITING)
批准 (APPROVED)