



深圳市天显威科技有限公司
产 品 规 格 书

SPEC-TXW500017I0-A

18-05-2016

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Project No. 项目编号	TXW500017I0
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 540 x 3RGB x960Dots 5.0" TFT LCD

客户确认Customer Approval

项目负责人Project Manager	
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1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
A	2016.05.18	First Release.	liu	



2. General Description

- 5.0”(diagonal), 540 x3 RGB x960dots, 16.7M colors, Transmissive, TFT LCD module.
- Viewing Direction: IPS 全视角
- **Driving IC: ILI9807**
- MIPI Interface
- Logic voltage: 2.8V (typ.).
- With out touch panel.

3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

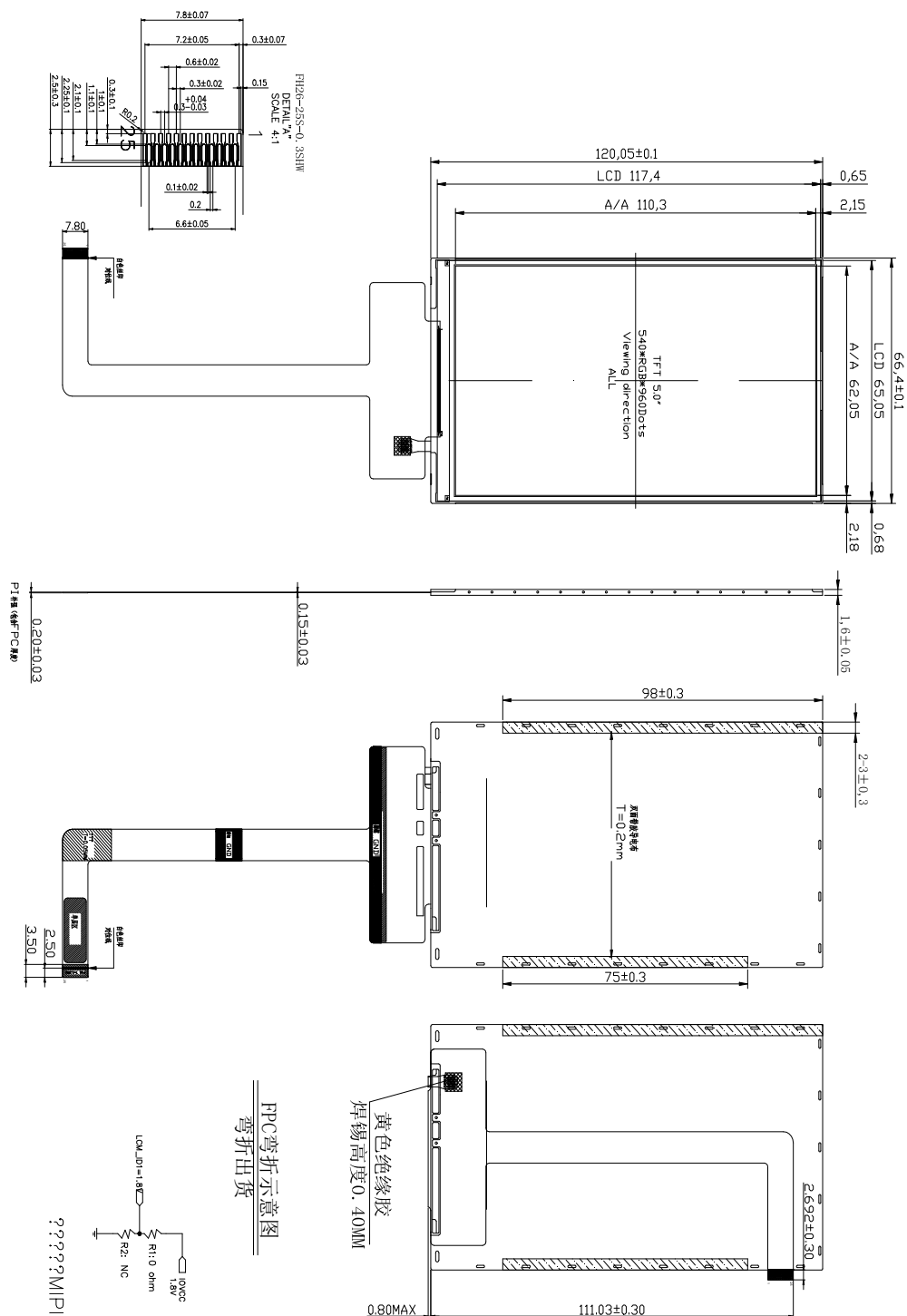
Table 1

Parameter		Specifications	Unit
主屏 Color TFT 540 x3 RGB x960	Outline dimensions	66.4(H) x120.05(V) x 1.6(D)	mm
	TP view area	-----	mm
	TP active area	-----	mm
	LCD active area	62.05(H) x100.3(V)	mm
	Display format	540 x3 RGB x960	dots
	Color configuration	RGB stripes	-
	Dot pitch	115.5(RGB)(W) x 115.5(H)	um
Weight		TBD	grams

4. Interface signals

Figure 1: Outline Drawing

VER.	DESCRIPTION	DATE
#0	THE FIRST ISSUE	2015.05.22



1	LED_D02
2	VDD_2.8V
3	IOVCC_1.8V
4	LED_D01
5	RESET
6	LP1E
7	NC
8	LED_K
9	LED_A
10	GND
11	LMPI_DON
12	LMPI_DOK
13	GND
14	LMPI_CN
15	LMPI_CP
16	GND
17	LMPI_D1N1
18	LMPI_D1N1
19	GND
20	NC
21	NC
22	GND
23	NC
24	NC
25	GND

NOTES:

- 1. MAIN LCD: 5.0" TFT
- 2. OPERATING TEMP: -20°C~70°C
- 3. STORAGE TEMP: -30°C~80°C
- 4. MAIN LCD DRIVER: IL1980T
- 5. BACKLIGHT: 12CHIP-WHITE LED
- 6. UNSPECIFIED TOLERANCES: ±2MM
- 7. ROHS and REACH request: YES

BACKLIGHT CIRCUIT

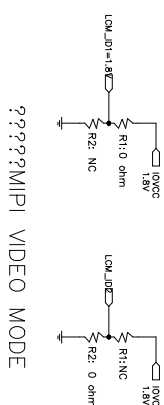


天昱威

型号:	TXW50001710		成品图
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成品图

FPC弯折示意图
弯折出货



?????MIPI VIDEO MODE



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Table 2: Pin assignment

Pin No.	Symbol	Description
1	LCD_ID2	GND
2	VCC(2.8V)	POWER SUPPLY (2.8V) .
3	IOVCC(1.8V)	POWER SUPPLY (1.8V/2.8V) .
4	LCD_ID1	1.8V
5	RESET	Reset signal.
6	FAMRE	Tearing Effect output pin.
7	NC	NC
8	LEDK	POWER SUPPLY- FOR BACKLIGHT CATHODE.
9	LEDA	POWER SUPPLY+ FOR BACKLIGHT ANODE.
10	GND	Ground.
11	DSI_D0N	MIPI-DSI clock data Lane 0 negative-end input/output pin.
12	DSI_D0P	MIPI-DSI clock data Lane 0 positive-end input/output pin.
13	GND	Ground.
14	DSI_CLKN	MIPI-DSI clock data Lane negative-end input pin.
15	DSI_CLKP	MIPI-DSI clock data Lane positive-end input pin.
16	GND	Ground.
17	DSI_D1N	MIPI-DSI clock data Lane 1 negative-end input/output pin.
18	DSI_D1P	MIPI-DSI clock data Lane 1 positive-end input/output pin.
19	GND	Ground
20	NC	NC
21	NC	NC
22	GND	Ground
23	NC	NC
24	NC	NC
25	GND	Ground



5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VDD)	VDD	-0.3	+4.0	V	1
Power supply voltage (IOVCC)	IOVCC	-0.3	+3.6	V	1

Note:

- 1.IOVCC,VCI, GND must be maintained.
- 2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta < 50% RH for 40,C < Ta Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

Typical Electrical Characteristics

At Ta = 25 °C, VCI = 2.6V to 3.3V, IOVCC= 1.65V to 3.3V GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCI-GND		2.6	2.8	3.3	V
Supply voltage (logic)	IOVDD-GND		1.65	1.8	3.3	V
Supply current (Logic & LCD)	ICC	VCI=2.8V	10	15	20	mA
Supply voltage of white LED backlight	VLED =V(BL+)- V(BL-)	Forward current =40mA	18	19.2	20.4	V
Luminance (on the module surface)		Number of LED dies = 12		450		cd/m ²



7. Optical Characteristics

Table 7: Optical specifications

Items		Symbol	Condition	Specifications			Unit
				Min.	Typ.	Max.	
Contrast Ratio		CR		-	500	-	-
Response Time		T _R		-	10	20	ms
		T _F		-	15	20	ms
Chromaticity	Red	X _R		0.604	0.634	0.664	-
		Y _R		0.298	0.328	0.358	-
	Green	X _G		0.264	0.294	0.324	-
		Y _G		0.547	0.577	0.607	-
	Blue	X _B		0.107	0.137	0.167	-
		Y _B		0.104	0.134	0.164	-
	White	X _W	0.272	0.302	0.332	-	
		Y _W	0.305	0.335	0.365	-	
Viewing angle	Hor.	φ1(3 o'clock)	Center CR≥10	-	80	-	deg.
		φ2(9 o'clock)		-	80	-	
	Ver.	θ2(12 o'clock)		-	80	-	
		θ1(6 o'clock)		-	80	-	
NTSC ratio					61.5		%

Note

Note

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L₆₃ / L₀

L₆₃: Luminance of gray level 63

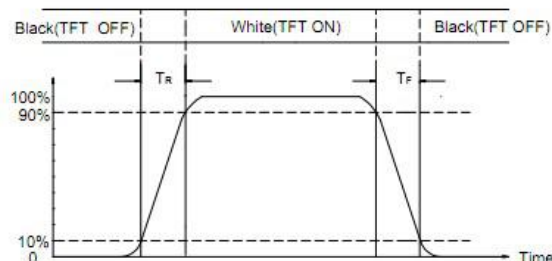
L₀: Luminance of gray level 0

CR = CR (10)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (T_R, T_F):

Figure 3 Definition of Response Time



Note (5) Definition of Transmittance(Module is with signal input)

$$\text{Transmittance} = \frac{\text{Center Luminance of LCD}}{\text{Center Luminance of Back Light}} \times 100\%$$

Figure 3

Note 3: Viewing Angle

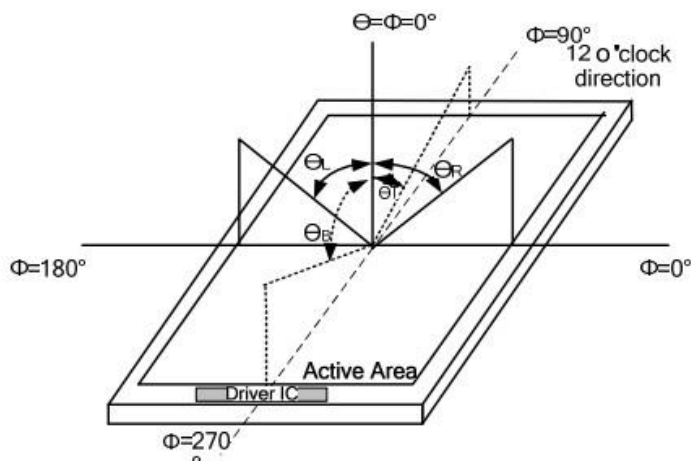


Figure 4

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 15 minutes in a windless room.

Figure 1 Measurement Setup

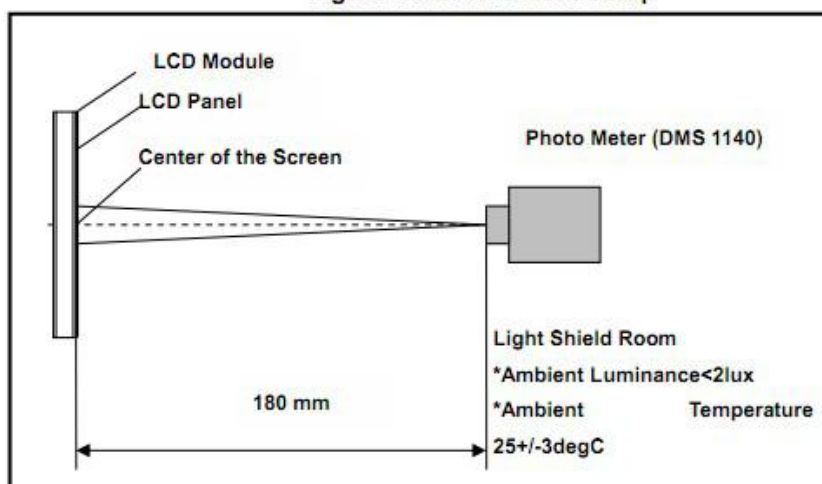


Figure 5

8. Timing Characteristics

8.1 RGB Interface Timing Characteristics of IC

Table 8: Normal Write Mode ($VCC = IOVCC = 2.4 \sim 3.3V$)

Parameter	Symbol	Parameter	Specification			Unit
			MIN	TYP	MAX	
High Speed mode						
DSI-CLK+/-	2xUI _{INST}	Double UI instantaneous	4	-	25	ns
DSI-CLK+/-	UI _{INSTA} , UI _{INSTB}	UI instantaneous Halfs	2	-	12.5	ns
DSI-Dn+/-	t _{DS}	Data to clock setup time	0.15	-	-	UI
DSI-Dn+/-	t _{DH}	Data to clock hold time	0.15	-	-	UI
DSI-CLK+/-	t _{DRTCLK}	Differential rise time for clock	150	-	0.3UI	ps
DSI-Dn+/-	t _{DRTDATA}	Differential rise time for data	150	-	0.3UI	ps
DSI-CLK+/-	t _{DFTCLK}	Differential fall time for clock	150	-	0.3UI	ps
DSI-Dn+/-	t _{DFTDATA}	Differential fall time for data	150	-	0.3UI	ps

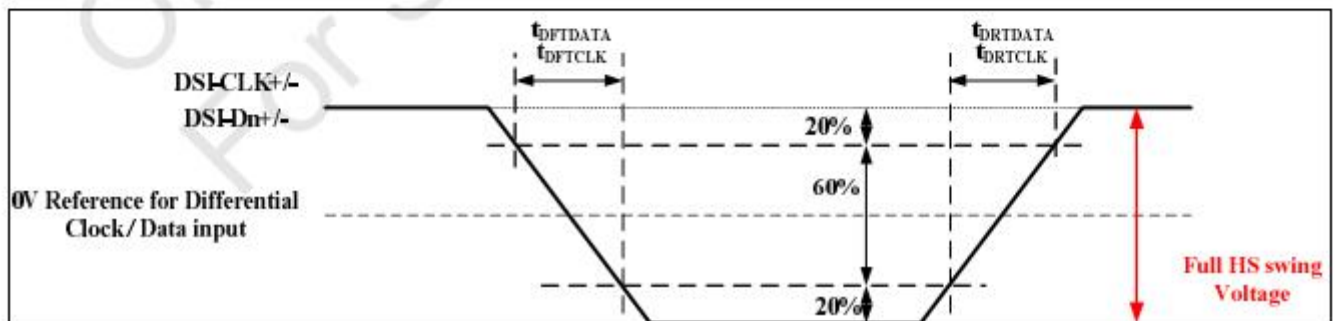
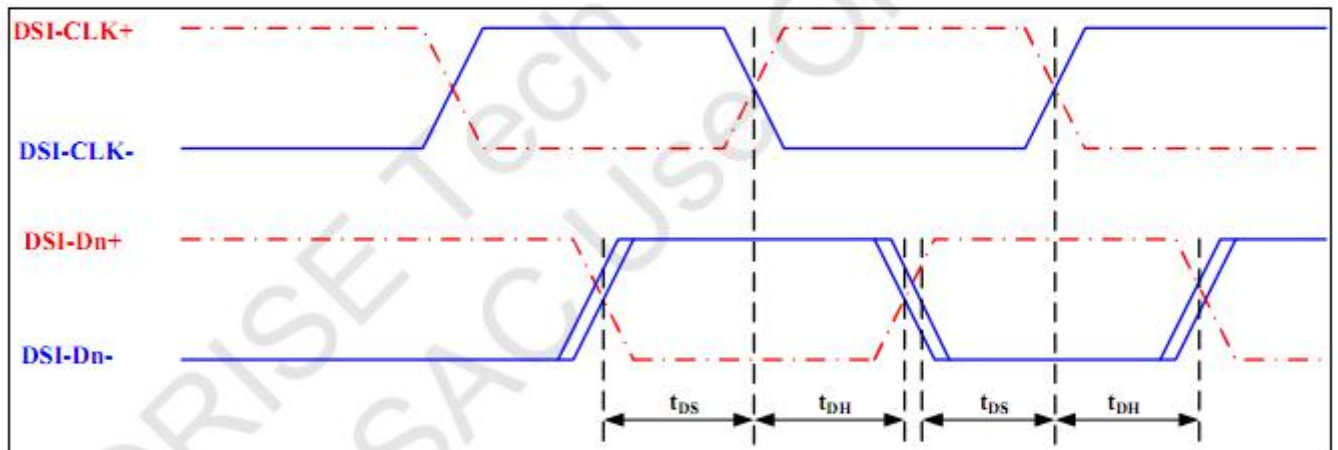
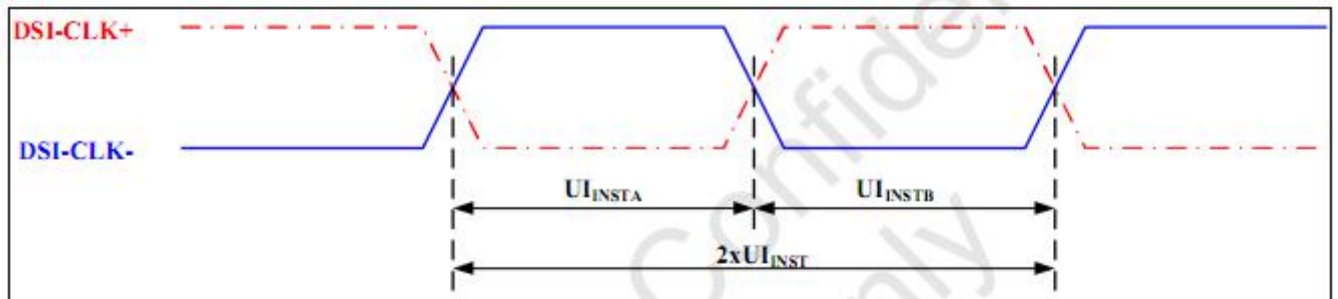


Figure 7. MIPI Interface Bus Timing



8.2 Reset Operation of IC

Table 9: Reset Timing Characteristics ($V_{CC} = I/OV_{CC} = 2.4 \sim 3.3V$)

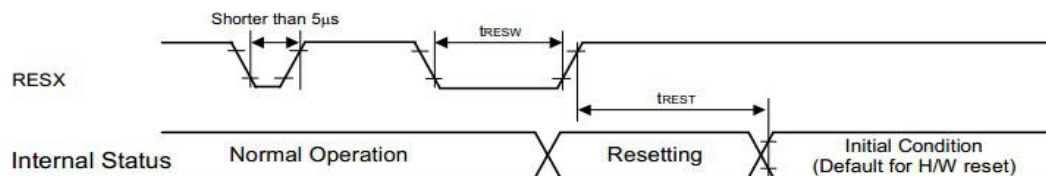


Table 7.3.2.1 Reset input timing

$V_{SS} = 0V$, $V_{DDIO} = 1.6V$ to $3.6V$, $V_{CI} = 2.5V$ to $5.5V$, $T_a = -30$ to $70^\circ C$

Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse width	RESX	10	-	-	-	μs
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-	-	-	120	When reset applied during Sleep out mode	ms

Figure 8: Reset Timing

9. Reliability Test Item

Test Item	Sample Type	Test Condition	Test result determinant gist
High temperature storage	Normal temperature	$70 \pm 3^\circ C$; 96H	the inspection of appearance and function character.
	Wide temperature	$80 \pm 3^\circ C$; 96H	
Low temperature storage	Normal temperature	$-20 \pm 3^\circ C$; 120H	
	Wide temperature	$-30 \pm 3^\circ C$; 120H	
High temperature /humidity storage	Normal temperature	$50^\circ C \pm 3^\circ C$, $90\% \pm 3\% RH$; 96H	no objection of the function character; no fatal objection of the appearance.
	Wide temperature	$60^\circ C \pm 3^\circ C$, $90\% \pm 3\% RH$; 96H	
High temperature operation	Normal temperature	$60 \pm 3^\circ C$; 96H	
	Wide temperature	$70 \pm 3^\circ C$; 96H	
Low temperature operation	Normal temperature	$0 \pm 3^\circ C$; 96H	inspect the objections appearance、function & the whole structure
	Wide temperature	$-20 \pm 3^\circ C$; 96H	
High temperature /humidity operation	Normal temperature	$40^\circ C \pm 3^\circ C$, $90\% \pm 3\% RH$; 96H	
	Wide temperature	$50^\circ C \pm 3^\circ C$, $90\% \pm 3\% RH$; 96H	
Temperature Shock	Normal temperature	$-20 \pm 3^\circ C$, 30min $\rightarrow$ $70 \pm 3^\circ C$, 30min; 10cycle	The inspection of appearance、function & the whole structure
	Wide temperature	$-30 \pm 3^\circ C$, 30min 80 ± 3 , 30min; 10cycle	

9.1 特殊检验要求:

检查项目

可接受标准

备注



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背光

1. 无背光不接受
2. 亮度, 均匀度及功耗须在 SPEC 之内
3. 颜色坐标需在规格内或依据限度

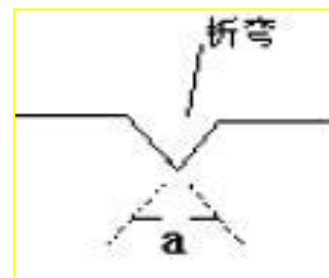
目视检查/放大镜

铁壳

4. 非背光框变形的漏光在玻璃外缘可以接受
- 任何明显可见的损坏、变形和其它铁壳上有锡渣不可接受

FPC

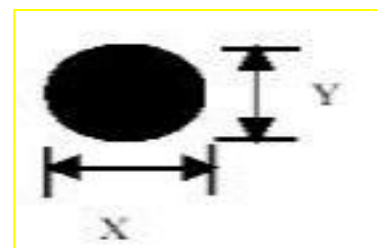
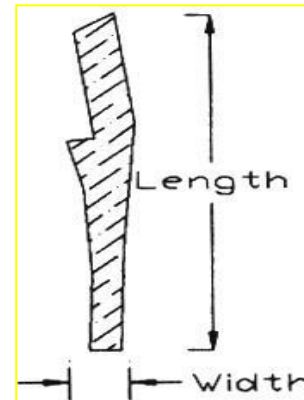
1. 变形和折痕标准如图所示, 两条折痕的角度不能超过 90°
2. 补强板裂、破损、外来材料和气泡的面积, 如果超过补强板的1/5 不能接受
3. 金手指部位有明显划伤、污点和外来细小指针状的异物都不可接受
4. 金手指氧化或者电镀不良不可以接受
5. pad 脱落或者断裂不可接受



9.2 TFT&触摸屏检查标准如下表:

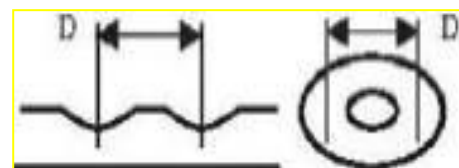
检查项目	Accesible standard		
	length (mm)	wide (mm)	Accesible QTY
1. 线状缺陷(黑/白线等)	-----	$W \leq 0.05$	access
	$L \leq 5$	$0.05 < W \leq 0.1$	1
2. 划伤	length (mm)	wide (mm)	Accesible QTY
	-----	$W \leq 0.05$	access
	$L \leq 5$	$0.05 < W \leq 0.1$	1
3. 点状缺陷	size(mm)	Accesible QTY	
	$D \leq 0.10$	access	
	$0.10 < D \leq 0.20$	2	
	$0.2 < D \leq 0.25$	1	
	$D > 0.25$	0	

备注

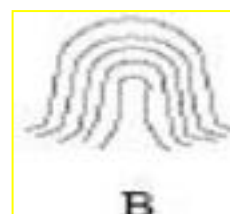
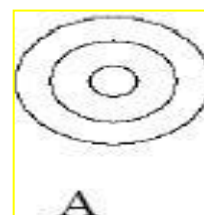


$$D = (\text{长边直径 } X + \text{短边直径 } Y) / 2$$

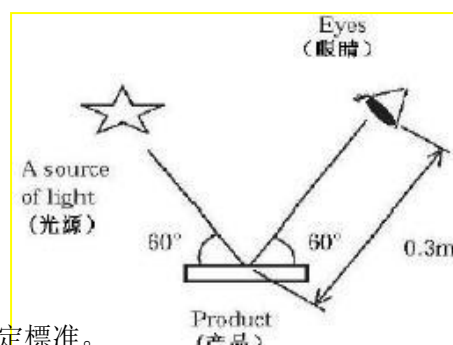
	size(mm)	Accessseble QTY
4. TP 鱼	$D \leq 0.20$	access
眼、凹点、	$0.20 < D \leq 0.30$	6
气泡	$0.3 < D \leq 0.5$	2
	$D > 0.5$	0



5. 均匀牛顿环 (图 A)
1. 如牛顿环面积大小超过 T/P 整个面积的 1/4, 则不可接受.
2. 在荧光灯下, 如牛顿环小于 T/P 的 1/4 且不影响显示字体效果, 则可接受
- A



- 不均匀牛顿环 (图 B)
1. 在无荧光灯下, 如牛顿环大于 7mm, 则不可接受
2. 在荧光灯下, 无论大小只要造成文字失真或直线变形, 判定 NG
- B

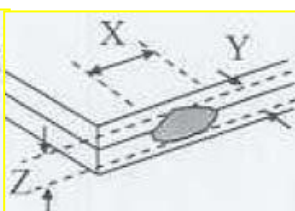
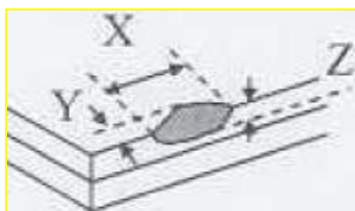


备注: 檢驗時要撕起保護膜, 检查规格参照点状、線状异物混入判定標準。

以上的点缺陷距离必须大于 5mm & 点、线缺陷相加后可接受数量之总和为 5

代号说明: X: 崩裂长度 Y: 崩裂宽度 Z: 崩裂厚度 a: LCD 边长 D: 端子长度 t: 玻璃厚度

6. 表面及中间崩裂



$$Z \leq 1/2t$$

$$Z \leq 1/2t$$

$$X \leq a$$

$$X \leq a$$

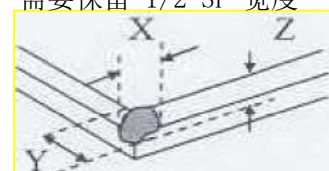
不可以进入 SP 内缘
需要保留 1/2 SP 宽度

7. 角落崩裂

$$Z \leq 1/2t$$

$$X \leq 1/8a$$

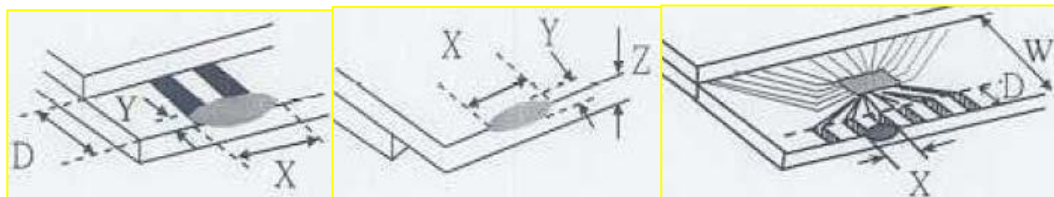
不可以进入 SP 内缘



$$Z \leq 1/2t$$

$$X \leq 1/8a$$

需要保留 1/2 SP 宽度



8 电极端子区崩裂

	X	Y	Z
正面	$X \leq 1/5a$	$Y \leq 0.5\text{mm}$	$z \leq t$
背面	$X \leq 1/5a$	$Y \leq 0.5\text{mm}$	$z \leq 1/2t$

以上崩裂超过一处时间，X 是所有崩裂长度的总和；正面的崩裂不可以进入视区。
每一单处电极的崩裂宽度不超过原电极宽度的 1/4

9. 裂

任何有延伸趋势的裂痕都不可接受



Minor

玻璃、反射片与偏光片的破损及划伤遵照点状缺陷和线状缺陷标准

偏光片、反射片与玻璃不良

不应有贴反、未贴、贴错等现象

尺寸应符合规范，不应无保护膜

Minor

贴歪的偏光片应该显现全部的 SP 框形

缺行、缺列、串扰、乱码不可以接受

色度、灰度、亮度、均匀度和对比度失常（对比 Golden Sample 和 Spec.）

不显示的像素中异常点/线（工艺形成）遵照点状缺陷和线状缺陷标准

显示偏、斜（S）遵照下表：

有效可视面不良（电测）	$S < 0.3\text{mm}$	可接受	Major
	$0.3\text{mm} \leq S < 0.5\text{mm}$	缺陷级别Minor	
	$S \geq 0.5\text{mm}$	缺陷级别Major	

在批处理中如果有两种或两种以上的偏/斜同时存在，遵照最高缺陷级别

表面上不能有软布轻擦不去或气枪吹不干净的异物（包括布丝、灰尘、焊锡球、粘胶、阴影等）依据点线规格判定

条彩，错开，流迹，玻璃漏光依据彩色画面判定

视角错误不可以接受；显示看见水波纹不可以接受；抖面 不可以接受

漏失

1. 视区内发现不规则状黑团，亮团（挤压玻璃会移动）不可以接受

Major

2. 空穴回弹：敲击气泡不可以接受

1. IC 处不可有破损、划伤

2. 封口胶进入视区不可以接受，

COG 区

3. 封口胶脱落，如果渗胶深度达到要求，可以接受。

minor

4. 表面的涂布胶位置依据作业文件要求，高度不可以超过上偏光片，必须完全覆盖端子的 ITO 线路

如果上述不良不发生在可视区域，标准可以适当放松

9.3 TFT 特别检查：

检查项目

可接受标准

图表



深圳市天显威科技有限公司

产 品 规 格 书

SPEC-TXW50001710-A

18-05-2016

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像素缺陷 像素/3 个元素 (R+G+B)

的定义

点/1 个元素 (R/G/B)



亮点: 与周围邻近 pixel 对比较亮的点为亮点, 超过一个 sub pixel 面积的 1/2 时计为一个亮点. 颜色有红、绿、蓝三种, 亮点可在 R、G、B 三个画面中的两个画面可视, 在全白画面不可视;

暗点: 与周围邻近 pixel 对比较暗的点为暗点, 超过一个 sub pixel 面积的 1/2 时计为一个暗点. 颜色为暗黑色, 暗点在 R、G、B 三个画面中的一个画面可视, 在全白画面不可视;

相邻点的定义: 2 个或 3 个点连续元素点 (R+G/G+B/B+R/R+G+B).

		可接受判定标准		
		失效模式	点的形式	数量
点缺陷判定标准	目视/测量卡	亮点	任何 (红, 蓝, 绿)	1 个并不超点状大小上限
			2 个连接点	0
		暗点	暗点	2
			2 个连接点	1
			>=3 个相邻的点	0

10. Suggestions for using LCD modules

10.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated ,clean it with soft cloth. If the LCM is severely contaminated , use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer . The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don't disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD modules.
 - Tools required for assembling, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembling and other work

under dry conditions.

- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

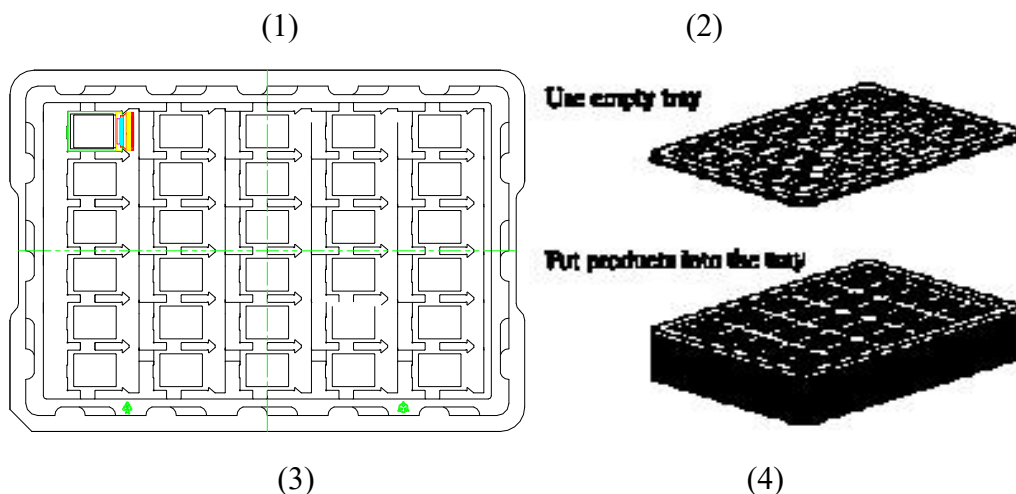
- Do not alter, modify or change the the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

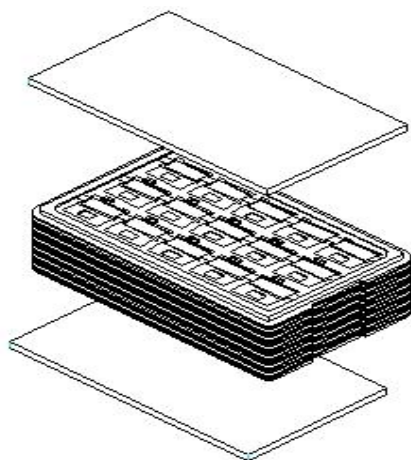
10.2 Storage

- Store in an ambient temperature of 5 to 45 , and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in antistatic container.

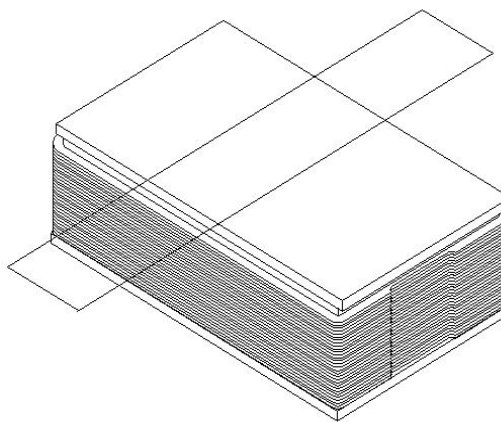
11. Packing (Reference only)

Packing Method

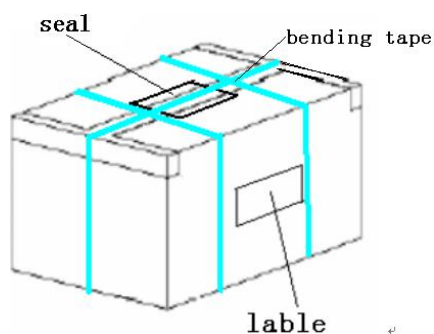
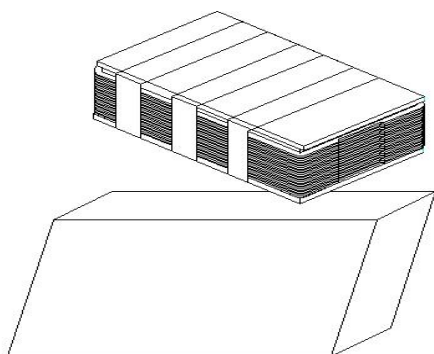




(5)



(6)



1. Put module into tray cavity :
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

- END -