



华田信科电子有限公司

HTdisplay Electronic CO.,LTD

PRODUCT TFT LCD MODULE

产品名称：TFT 液晶显示模块

MODELNO

模块型号：HT0350T4060LM04ANN

SUPPLIER HTdisplay

供应商：华田信科

DATE

日期：2019-01-09

# SPECIFICATIONS

## 产品规格书

Version 版本号: V0

This module uses ROHS material

模块用环保材料

HTdisplay(华田信科)		Customer (客户)
PREPARED BY 制定		<b>Approved By</b>
CHECKED BY 审核		
Quality Department 品质		
Approved by 批准		

北京华田信科电子有限公司

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**REVISION RECORD    修改记录**

REV NO. 版本号	REV DATE 修改日期	CONTENTS 内容	REMARKS 注释
V0	2019-01-09	First release	Preliminary

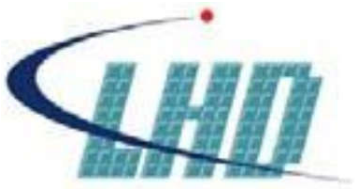


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### 1. GENERAL INFORMATION 主要特征描述

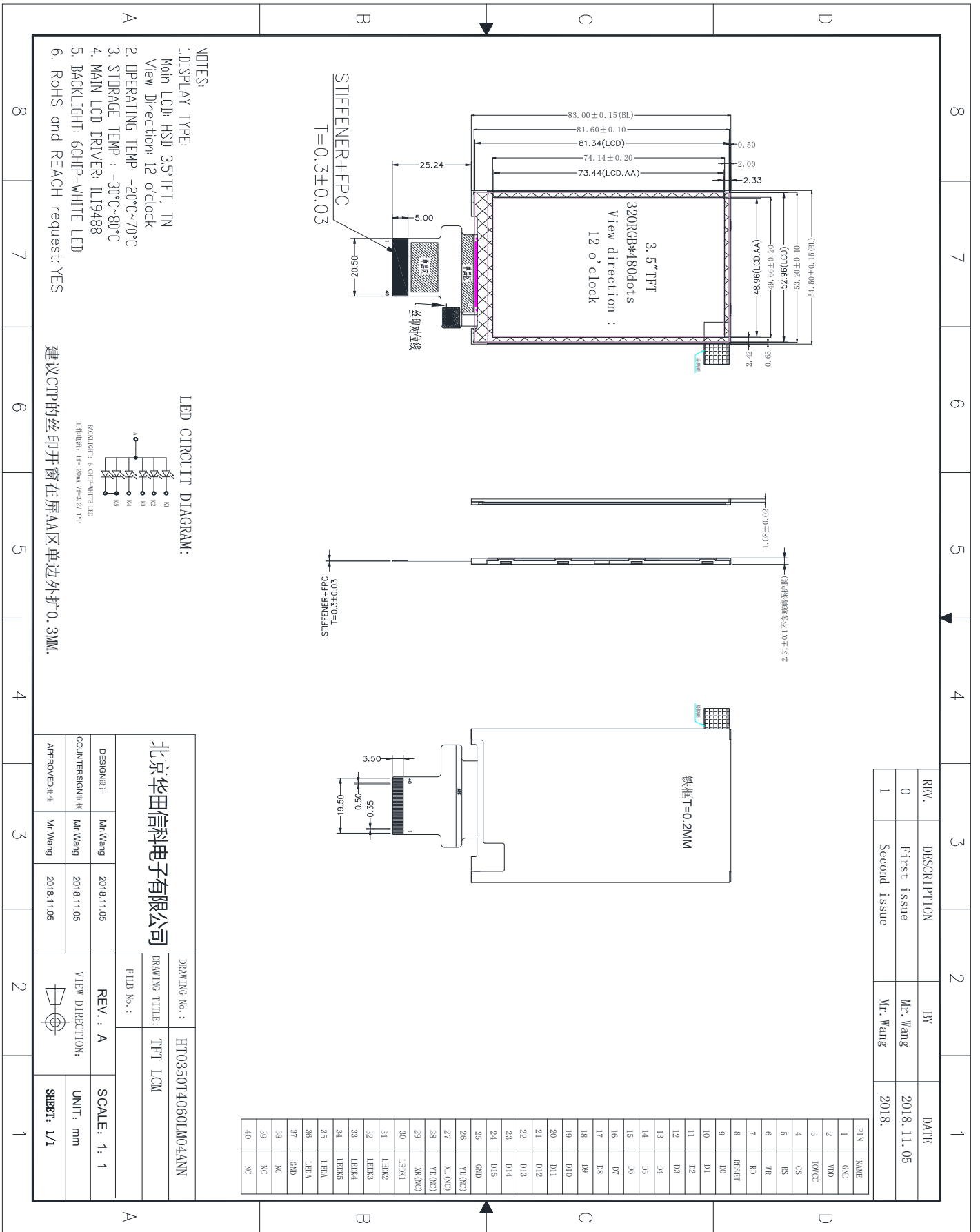
Item 项目	Contents 内容	Unit 单位
LCD Type 液晶显示类型	TFT/TRANSMISSIVE	---
Viewing Direction 视角方向	12:00	O'Clock
Outline Dimensions (W × H×T) 外形尺寸 (宽 × 高 × 厚)	54.50(W) × 83.00(H) × 2.31(T)	mm
Viewing area 可视区域	49.66 x 74.14	mm
Active area 有效区域 (宽 × 高)	48.96(W) x 73.44(H)	mm
Number of Dots 点阵	320RGB x 480 Dots	---
Pixel pitch (W × H) 像素点尺寸	0.153*0.153	mm
Driver IC 驱动 IC	ILI9488	---
Interface Type 接口类型	Mcu16Bit	---
Input voltage 输入电压	2.8	V
Module Power consumption 模块功耗	TBD	MW
Colors 色彩	262	K
Backlight Type 背光类型	LED	---



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### 2. OUTLINE DRAWING 外形尺寸



REV.	DESCRIPTION	BY	DATE
0	First issue	Mr. Wang	2018.11.05
1	Second issue	Mr. Wang	2018.

北京华田信科电子有限公司		DRAWING No.:	HT0350140601M04ANN
DESIGNER:	Mr. Wang	2018.11.05	
COUNTERSIGNER:	Mr. Wang	2018.11.05	
APPROVED/DATE:	Mr. Wang	2018.11.05	
REV.:	A	SCALE:	1:1
VIEW DIRECTION:		UNIT:	mm
SHEET:	1/1		



### 3. ABSOLUTE MAXIMUM RATINGS 极限参数

Item 项目	Symbol 符号	Min 最小值	Max 最大值	Unit 单位
Supply voltage for logic 逻辑电压	VDD	-0.3	3.3	V
Input voltage 输入电平	VIN	-0.3	VDD+ 0.3	V
Operating temperature 使用温度	TOP	-20	70	°C
Storage temperature 存储温度	TST	-30	80	°C
Humidity 湿度	RH		90%(Max60 °C)	RH

### 4. ELECTRICAL CHARACTERISTICS 模块电气特性

Item 项目	Symbol 符号	Min 最小值	Typ 典型值	Max 最大值	Unit 单位
Supply voltage for logic 逻辑电压	VDD	2.5	2.8	3.3	V
Input Current 输入电流	I <sub>dd</sub>		TBD	TBD	mA
Input voltage 'H' level 输入高电平	V <sub>IH</sub>	0.7VDD	-	VDD	V
Input voltage 'L' level 输入低电平	V <sub>IL</sub>	VSS		0.3VDD	V
Output voltage 'H' level 输出高电平	V <sub>OH</sub>	0.8VDD		VDD	V
Output voltage 'L' level 输出低电平	V <sub>OL</sub>	VSS		0.2VDD	V

### 5. BACKLIGHT CHARACTERISTICS 背光电气特性

Item 项目	Symbol 符号	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	Condition 条件
Forward voltage 正向电压	V <sub>f</sub>	3.0	3.2	3.4	V	I <sub>f</sub> =6*20mA
Number of LED LED数量			6		Piece	
Connection mode 连接类型	P		Parallel			
Luminous Intensity 亮度参数			330		Cd/m <sup>2</sup>	

Parallel (P) (并联); Series (S) (串联)。

Using condition: constant current driving method I<sub>f</sub>=120mA(+/-10%).

使用条件: 恒流的驱动方式是 I<sub>f</sub>=120mA(+/-10%).



### 6. ELECTRO-OPTICAL CHARACTERISTICS 光电参数

#### 6.1

Items 项目	Symbol 符号	Condition 条件	Specifications 规格	Unit	Note 备注		
Transmittance 透过率	T%	Viewing Angle 观察角度 $\Theta = 0$	(Without Polarizer): 14.59	%	Color gamut: 60% S(%)		
Contrast Ratio 对比度	CR		500	-			
Response Time 响应时间	Ton+Toff		Rising: 4 Falling: 12	ms			
			Min 最小值	Typ 典型值	Max 最大值	-	
Chromaticity 色度	Red 红	XR	Viewing Angle 观察角度 $\Theta = 0$	0.626	-		
		YR		0.334	-		
	Green 绿	XG		0.277	-		
		YG		0.549	-		
	Blue 蓝	XB		0.142	-		
		YB		0.122	-		
	White 白	Xw		0.303	-		
	Yw	0.325	-				
Viewing angle	Hor.	$\Theta_L$	CR>10	60	70	-	Viewing Angle base on using EWV Polarizer , Reference Only
		$\Theta_R$		60	70	-	
	Ver.	$\Theta_U$		60	70	-	
		$\Theta_D$		40	60	-	

#### 6.2

Response time is the time required for the display to transition from white to black (Rising time,  $T_r$ ) and from black to white (Falling time,  $T_f$ ).for additional information.

响应时间是在阶跃响应中，输出信号达到稳定值的特定范围的时间，包括上升时间和下降时间。

(3) Contrast Ratio(CR) 对比度

Contrast Ratio(CR) is defined mathematically as: CR 公式定义

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

对比度 (CR) =  $L_{\text{亮}} / L_{\text{暗}}$

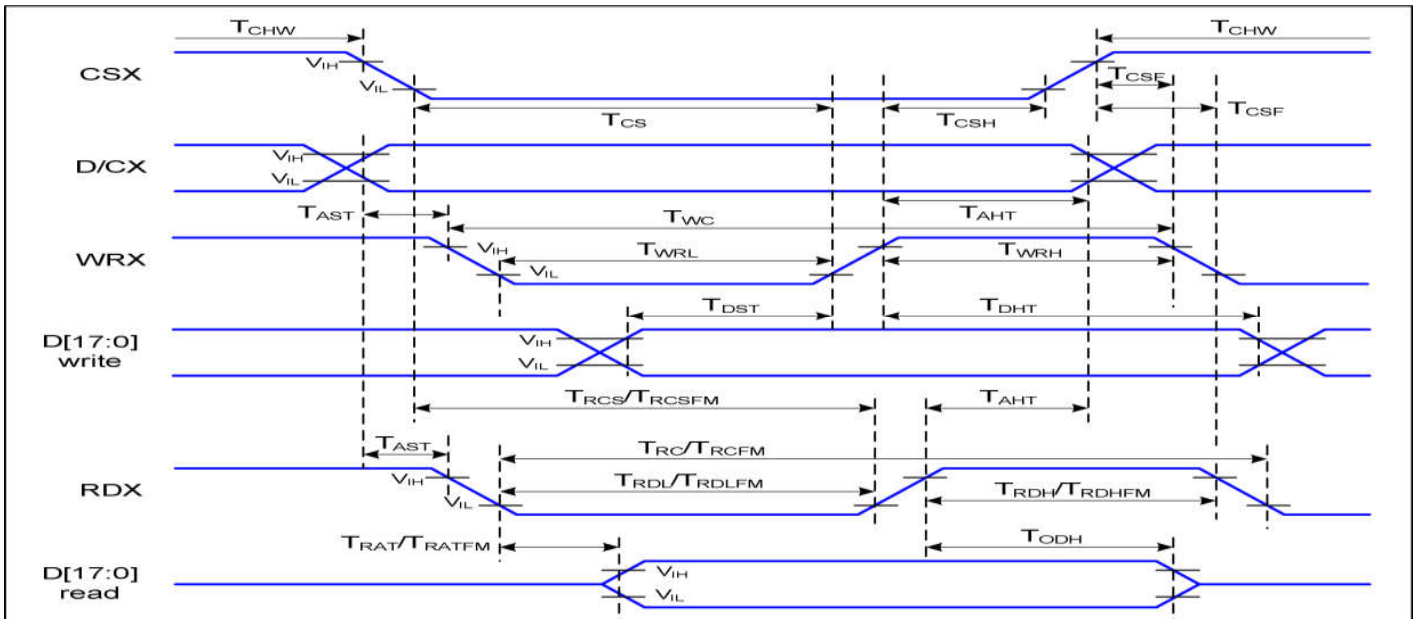
式中： $L_{\text{亮}}$ — 产品在选择态下的亮度；  $L_{\text{暗}}$ — 产品在非选择态下的亮度。

Surface luminance is the center point across the lcd surface 500mm from the surface with all pixels displaying white.

表面亮度是显示白色画面时测试的亮度值。



### 7. READ/WRITE TIMING 读/写时序



Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	TAST	Address Setup Ttime	0		ns	-
	TAHT	Address Hold Time (Write/Read)	10		ns	
CSX	TCHW	Chip Select "H" Pulse Width	0		ns	-
	TCS	Chip Select Setup Time (Write)	15		ns	
	TRCS	Chip Select Setup Time (Read ID)	45		ns	
	TRCSFM	Chip Select Setup time (Read FM)	355		ns	
	TCSF	Chip Select Wait Time (Write/Read)	10		ns	
	TCSH	Chip Select Hold Time	10		ns	
WRX	TWC	Write Cycle	66		ns	
	TWRH	Control Pulse "H" Duration	15		ns	
	TWRL	Control Pulse "L" Duration	15		ns	
RDX (ID)	TRC	Read Cycle (ID)	160		ns	When Read ID Data
	TRDH	Control Pulse "H" Duration (ID)	90		ns	
	TRDL	Control Pulse "L" Duration (ID)	45		ns	
RDX (FM)	TRCFM	Read Cycle (FM)	450		ns	When Read from Frame Memory
	TRDHFM	Control Pulse "H" Duration (FM)	90		ns	
	TRDLFM	Control Pulse "L" Duration (FM)	355		ns	
D[17:0]	TDST	Data Setup Time	10		ns	For CL=30pF
	TDHT	Data Hold Time	10		ns	
	TRAT	Read Access Time (ID)		40	ns	
	TRATFM	Read Access Time (FM)		340	ns	
	TODH	Output Disable Time	20	80	ns	

NOTE :This section is only for reference,Details please refer to the IC specification.

备注：本节内容仅供参考，详细参数信息请参阅 IC 规格书。

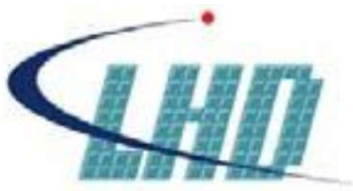




8. INTERFACE DESCRIPTION 接口定义描述

No. 序号	SYMBOL 符号	I/O	Description 描述
1	GND		Ground for digital circuits.
2	VCI		Analog supply voltage range VCI to AVSS: 2.8V/3.3V
3	IOVCC		Power supply for I/O block: 1.8V/2.8V/3.3V
4	CS		Chip select input pin.
5	RS		This pin is used to select "Data or Command" in the parallel interface.
6	WR		8080 system: Serves as a write signal and writes data at the rising edge.
7	RD		8080 system: Serves as a read signal and MCU read data at the rising edge.
8	RESET		The external reset input.
9-24	D0-D15		16-bit parallel bi-directional data bus for MCU system interface mode.
25	GND		Ground for digital circuits.
26	YU(NC)		TP Up
27	XL(NC)		TP left
28	YD(NC)		TP down
29	XR(NC)		TP right
30-34	LED-(K1-K4)		LED power cathode
35-36	LED+(A)		LED power anode
37	GND		Ground for digital circuits.
38-40	NC		-

Note: The voltage power of the interface logic pin depend on IOVCC and GND, Such as DBn, IMn and function pins



### 9. REFERENCE APPLICATION CIRCUIT 参考应用电路

**Please consult our technical department for detail information.**

详细资料请联系我们的技术部门。

### 10. RELIABILITY TEST CONDITIONS 可靠性试验条件

No. 序号	Test Item 试验项目	Test condition 试验条件	Inspection after test 判断标准
1	High Temperature Storage 高温存放	85°C±2°C 96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 试验结束后, 已测试的 LCD 样品必须在室内正常温湿度环境下放置 2~4 个小时以上才能进行功能和外观检查, 样品不允许有以下缺陷: 1.Air bubble in the LCD; 模块中有气泡; 2.Sealleak; 封口松脱; 3.Non-display; 不显示; 4.missing segments; 漏笔 5.Glass crack; 玻璃破碎; 6.Current Idd is twice higher than initial value. 电流 Idd 大于初时值的2倍.
2	Low Temperature Storage 低温存放	-40°C±2°C 96H	
3	High Temperature Operation 高温操作	80°C±3°C 96H	
4	Low Temperature Operation 低温操作	-30°C±3°C 96H	
5	High Temperature /Humidity Storage 高温高湿	40°C±3°C 90%RH 96H	
6	Temperature Cycle 冷热循环	-30°C←→25°C←→80°C 5min  30min ←→25°C , 5min after 10cycle, Restore 4H at 25°C	
7	Vibration Test (package state) 振荡试验	10Hz~150Hz, 100m/s <sup>2</sup> , 120min	
8	Dropping test 跌落试验	Drop to the ground from 0.5m height, one time, every side of carton. (Packing condition)	
9	ESD test 静电试验	Voltage:±10KV R: 330Ω C: 150pF Air discharge, 10time	



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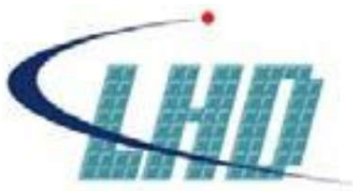
After completing the reliability test, leave the samples under the room temperature and for the following inspection items:  
可靠性测试完成后，在室温存放 4 小时，再按以下步骤检测。

1. No clearly visible defects or deterioration of display quality allowed.  
无明显的质量及外观上的不合格。
2. No function-related abnormalities.  
应无任何功能异常。
3. Connected parts still connecting tightly.  
外观的接合部分依然紧密连接
4. Display characteristics fulfill initial value, contrast ratio should be an least 30% of initial value.  
显示特性满足初期的规格，对比度不低于最初对比度的 30%。

## 11. Storage Precautions 储存注意事项

11.1 When storing the LCD modules, the following precaution are necessary:  
液晶显示模块的存储依照以下几点：

- 1、Store them in a sealed polyethylene bag. If properly sealed, there is no need for the desiccant.  
使用聚乙烯袋密封，如果密封得当，不需要干燥剂。
- 2、Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35 °C, and keep the relative humidity between 40%RH and 60%RH.  
避光保存，避免直接暴露在太阳光或荧光灯下，保持温度在 0~35 摄氏度之间，保持相对湿度在 40%RH 和 60%RH 之间。
- 3、The polarizer surface should not come in contact with any other objects (We advise you to store them in the anti-static electricity container in which they were shipped).  
偏光片表面避免接触其他物质（建议在货运时存放防静电包装中）。
- 4、Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.  
液晶在低温会凝固（低于储存温度范围以下）会导致缺陷或产生气泡（黑或白）如果模块处于低温下，也会产生气泡。
- 5、If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be gained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.  
如果液晶显示模块长时间工作于同一个显示图案，换屏时会出现鬼影和轻微的对比度不均。停止使用一段时间后可恢复到正常状态。此现象不会严重影响性能可靠性。



11.2 To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

为最小限度地降低由静电等对液晶显示模块性能的破坏，使用模块时避免接触下列区域：

1 - Exposed area of the printed circuit board.

- 印制电路板裸露区域。

2 -Terminal electrode sections.

- 印制电路板引出端子区域。

## 12. INSPECTION CRITERION 检查标准

**Please consult our Quality Department for detail information.**

详细信息请联系我们的品质部门。

## 13. PRECAUTIONS FOR USE OF LCD MODULES 使用注意事项

### 13.1 Handling Precautions

13.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

13.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

13.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

13.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

13.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol

— Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer.

Especially, do not use the following:



— Water

— Ketone

— Aromatic solvents

13.1.6 Do not attempt to disassemble the LCD Module.

13.1.7 If the logic circuit power is off, do not apply the input signals.

13.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- a. Be sure to ground the body when handling the LCD Modules.
- b. Tools required for assembly, such as soldering irons, must be properly ground.
- c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
- d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

## 13.2 Storage precautions

13.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

13.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature :                   0°C ~ 40°C

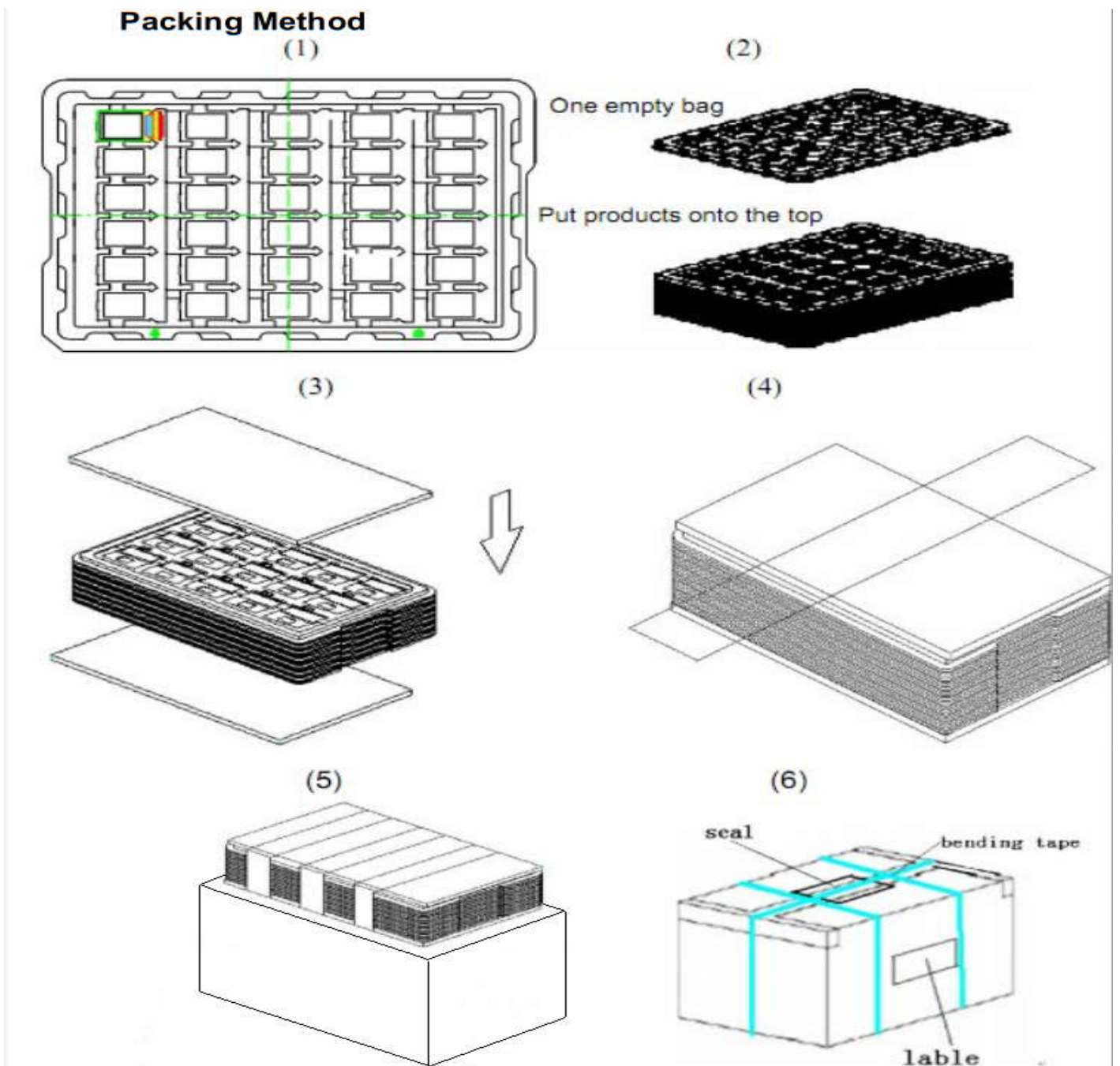
Relatively humidity:           ≤80%

13.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

13.2.4 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.



## 14. Packing 包装方式



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.

注意：包装方式图仅作参考，因实际出货可能存在同一款屏有不同的客户都在使用，不同客户可能会出现不同的包装要求，因此具体产品出货时请以工厂实际出货时的包装方式为准。

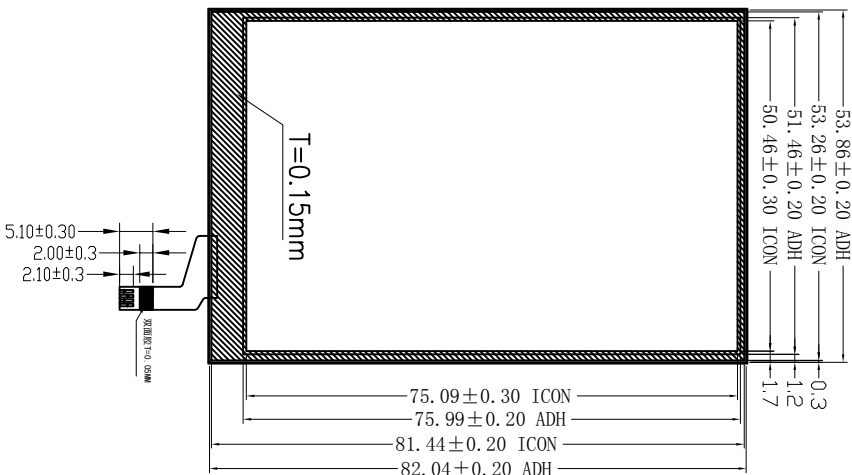
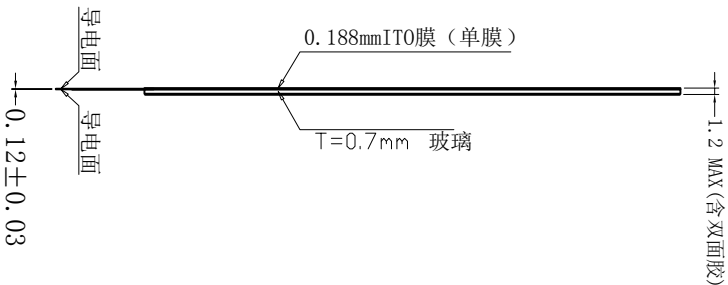
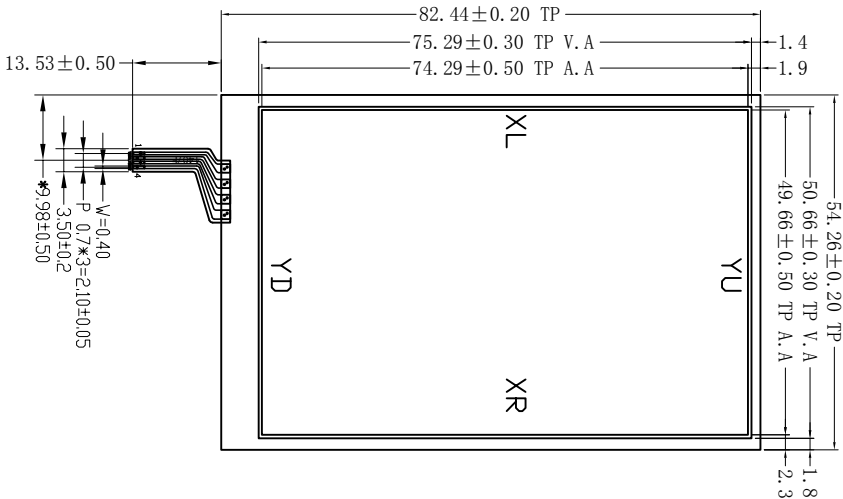
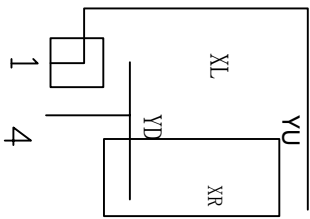
1	YU
2	XL
3	YD
4	XR

01版本改FPC

正面图

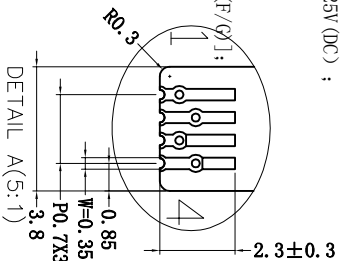
侧面图

反面图



技术参数:

- 1、工作条件: DC5V;
- 2、操作压力: 50~120g;
- 3、线性度  $\leq \pm 1.5\%$ ; 绝缘阻抗  $\geq 20M\Omega$ , 25V (DC) ;
- 4、工作环境:  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ;
- 5、储存环境:  $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$ ;
- 6、透光率:  $> 80\%$ ;
- 7、结构类型: PET[薄膜]单层膜/玻璃型(F/Q) ;
- 8、产品总厚度: 触摸屏 MAX 1.2mm
- 9、出线方式: FPC出线;
- 10、ITO Film: 亮面防刮。  
Glass:  $500\Omega/\square$  (0.7mm)  
tail: FPC (pitch=0.7mm)
11. X: 200-900 QY; 200-900 Q.
12. 使用寿命: 1,000,000次;
13. 响应时间:  $< 20\text{ms}$ ;
14. 未注明公差:  $\pm 0.2$ ; 控制尺寸:



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SCALE: 1 : 1 NOT TO SCALE		UNITS MM	
PAGE: 1 OF 2		DATE	
GENERAL TOL. 0.50mm		DATE	
APPROVALS	DATE	DATE	
APP Mychan	2016-12-24	DATE	
CHK Amor:11	2016-12-24	DATE	
CUSTOMER P/N :		DATE:	
PROJECTION		2016-12-24	