STP0280A2-240320 Series

TFT LCD PANEL USER MANUAL

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Reference Controller Datasheet

TFT LCD Panel Selection Guide

ST7789V

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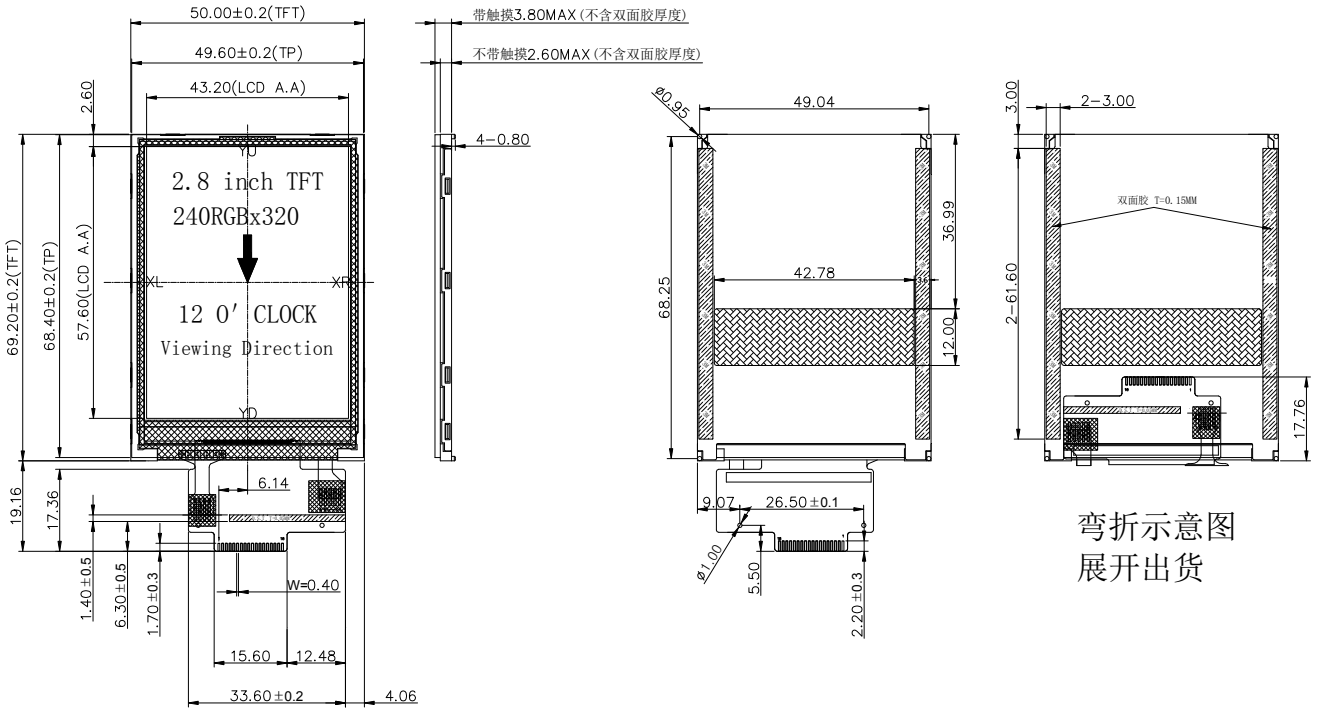
1.General Description 基本描述

MODEL NO 产品型号	**STP0280A2-240320** (YT280S010)
Display Mode 显示模式	Transmissive 全透
Display Format 显示格式	Graphic 240RGB*320 Dot-matrix 240xRGBx320 图形点阵
Input Data 显示屏接口类型	4 Line-SPI interface 4 线-SPI 串口
Viewing Direction 视角方向	12 o'clock 12 点钟
Drive 显示屏驱动芯片	ST7789V (台湾矽创)

2. Mechanical Specification 机械规格

Item	Specifications	Unit
Dimensional outline 显示屏外围尺寸	50.00(W)*69.20(H)*2.60(T)（NTP） 50.00(W)*69.20(H)*3.80(T)（RTP） (FPC not include)	mm
Resolution 分辨率	240RGB*320	dots
LCD Active area 显示尺寸	43.20(W)*57.60 (H)	mm
Pixel size 像素尺寸	0.18W)*0.18(H)	mm

3.Mechanical Dimension 机械尺寸图

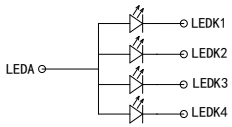


弯折示意图
展开出货

PIN	SYMBOL
1	GND
2	RESET
3	SCL
4	D/C
5	CSX
6	SDA
7	SDO
8	GND
9	VDD
10	LEDA
11	LEDK1
12	LEDK2
13	LEDK3
14	LEDK4
15	XL
16	YU
17	XR
18	YD

NOTES:
1. DISPLAY TYPE:TFT
2. OPERATING TEMP: -20° C~70° C
3. STORAGE TEMP: -30° C~80° C
4. LCD DRIVER: COG(IC:ST7789V);
5. BACKLIGHT: 4 CHIP-WHITE LED(Parellel)
6. GENERAL TOLERANCE:±0.20
7. ROHS

背光电路图:



CIRCUIT DIAGRAM
(I=60MA V=3.0-3.4V)

SHENZHEN SURENOO TECHNOLOGY CO.,LTD. 深圳市襄诺科技有限公司				第三视角:	
产品型号:	STP0280A2-240320 (YT280S010)				
部品型号:	LCM外形图			确认:	
版本:	v0.0	单位:	MM	审核:	
日期:	2018.08.16	比例:	1:1	设计:	
UNMRKED TOLERANCE:±0.20 mm				页码:	1 OF 1

4. Electrical Maximum Ratings 电气极限

Item 项目	Symbol 符号	Min 最小值	Max 最大值	Unit 单位	Note 备注
Supply voltage（VDDI） 工作电压(VDDI)	V	1.8	3.3	V	-
Supply voltage（VDD） 工作电压(VDD)	V	2.8	3.3	V	-
Operating temperature 工作温度范围	T_{OPR}	-20	70	℃	-
Storage temperature 存储温度范围	T_{STR}	-30	80	℃	-

※NOTE: VDDI 和 VDD 可以直接连一起，共用一组（2.8V~3.3V）电压供电。

5. Brightness characteristic&Power dissipation 亮度特性&功耗

Item 项目	Symbol 符号	Min 最小值	Typical 典型值	Max 最大值	Unit
LED module Forward voltage LED 背光源正向电压	V_{LED}	2．9	3.1	3.3	V
LED module current LED 背光源电流	I_{LED}	-	60	-	mA
LCD Surface Luminance 显示屏表面亮度	L_S	250	300	-	Cd/m^2
LCM Surface brightness uniform LED 背光源均匀度	L_D	80	-	-	%
LCD power dissipation 显示屏总功耗	P_{LCD}	-	0.22	-	W

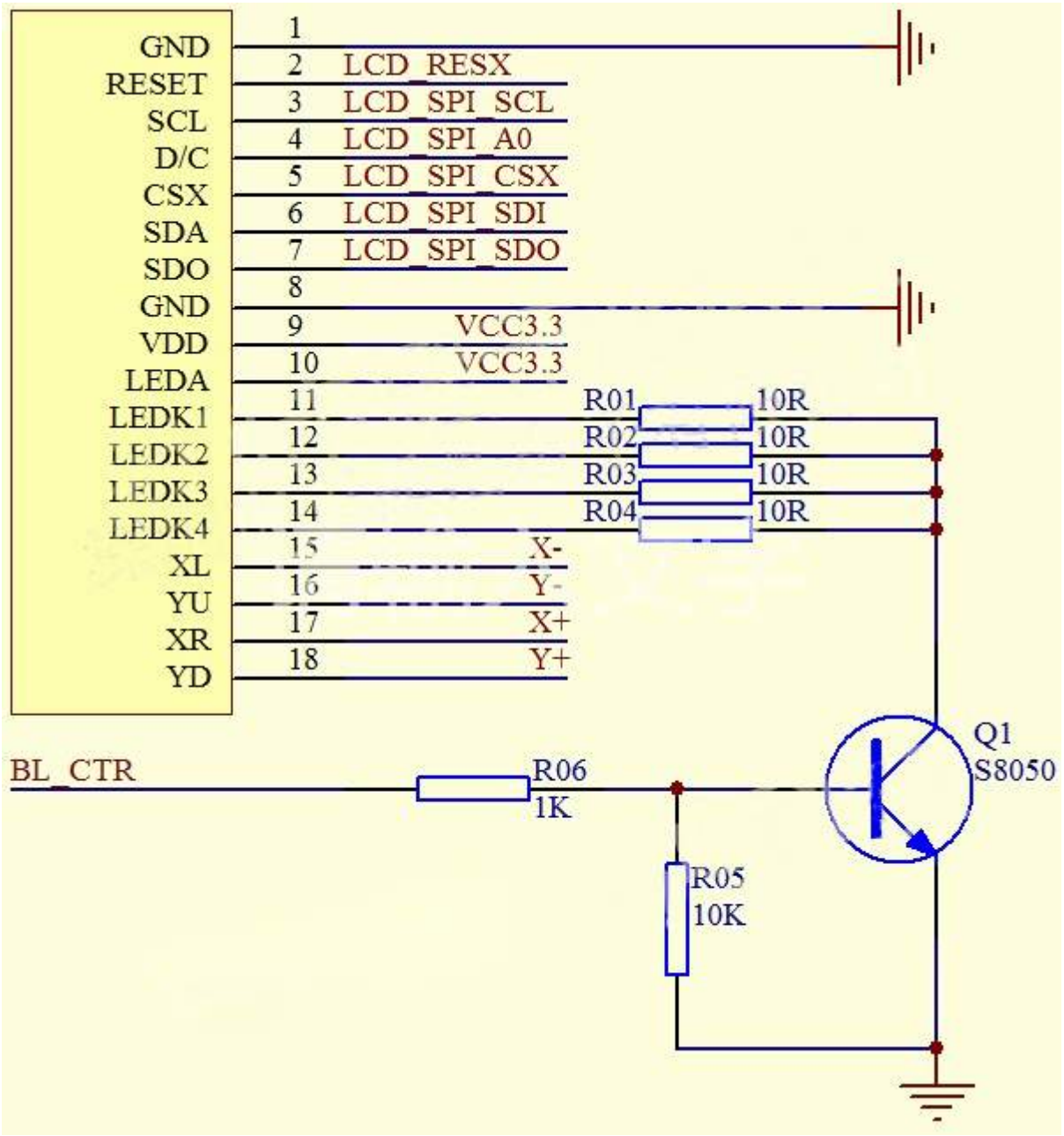
※NOTE:$P_{LCD=VDD*(I_{LED}+I_{LCD})}$

6. Module Function Description 显示屏脚位定义

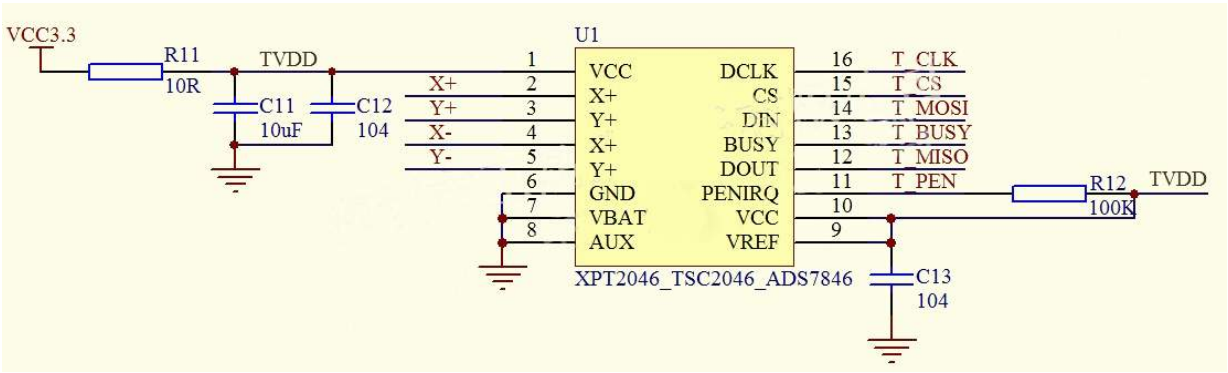
PIN No. 引脚序号	Symbol 引脚名称	Description 作用描述	Notes 备注
1	**GND**	Ground （接地脚）	-
2	**RESET**	-This signal will reset the device and it must be applied to properly initialize the chip. -Signal is active low. （显示屏复位脚，低电平有效）	-
3	**SCL**	-This pin is used to be serial interface clock. （4 线-SPI 串口时钟）	-
4	**D/C**	- Display data/command selection pin in 4-line serial interface. （4 线-SPI 数据/指令选择选择脚）	-
5	**CSX**	-Chip selection pin Low enable. High disable. （显示屏驱动芯片选脚，低电平使能）	-
6	**SDA**	SPI interface input pin. -The data is latched on the rising edge of the SCL signal. -If not used, please fix this pin at VDDI or DGND level. （4 线-SPI 数据输入，不用时接 VDDI 或 GND）	-
7	**SDO**	-SPI interface output pin. -The data is output on the falling edge of the SCL signal. -If not used, let this pin open. （4 线-SPI 数据输出,不用时悬空）	-
8	**GND**	Ground （接地脚）	-

9	**VDD**	Power Supply for Analog, Digital System and Booster Circuit. （显示屏主电源供电脚 2.8-3.3V）	-
10	**LEDA**	Anode of Backlight (2.9V-3.3V Typical:3.1V) （背光正极供电脚,电压范围:2.9-3.3V,典型值:3.1V）	-
11	**LEDK1**	Cathode of Backlight （背光负极供电脚）	-
12	**LEDK2**	Cathode of Backlight （背光负极供电脚）	-
13	**LEDK3**	Cathode of Backlight （背光负极供电脚）	-
14	**LEDK4**	Cathode of Backlight （背光负极供电脚）	-
15	**XL**	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
16	**YU**	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
17	**XR**	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
18	**YD**	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-

附图 6-1：显示屏 STP0280A2 4 线SPI 串口参考应用电路



附图 6-2：触摸屏参考应用电路



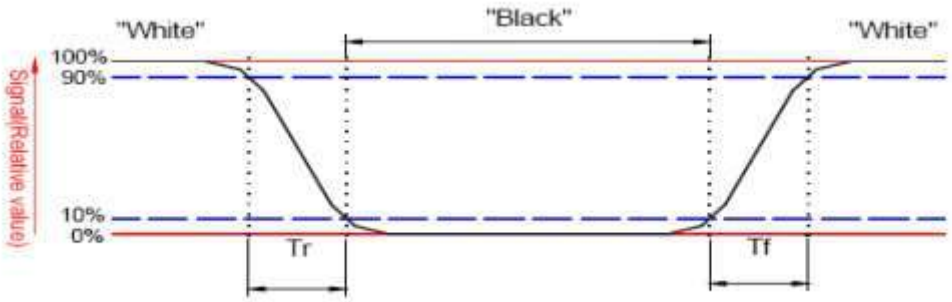
※NOTE:

1.若为不带触摸版本，参考附图 6-1 连接电路，把显示屏的 XL、YU、XR、YD 四个触摸脚悬空即可。

2.若为带触摸版本，参考附图 6-2 触摸应用连接电路。

7.Response time&Contrast ratio 响应时间与对比度

Item 项目	Symbol 符号	Condition 条件	Remark			Unit 单位
			Min. 最小值	Typ. 典型值	Max. 最大值	
Response time 响应时间	Tr+Tf	θ =0°	-	25	40	ms
Contrast ratio 对比度	CR	θ =0°	350	500	-	-



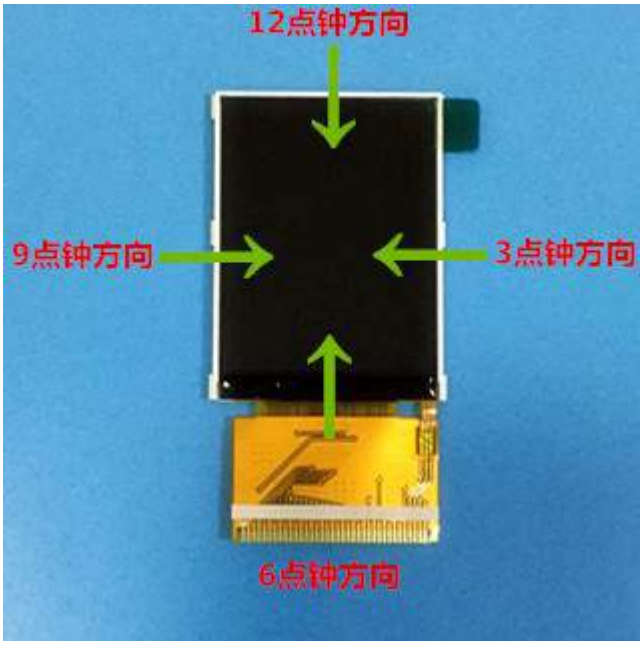
响应时间图示

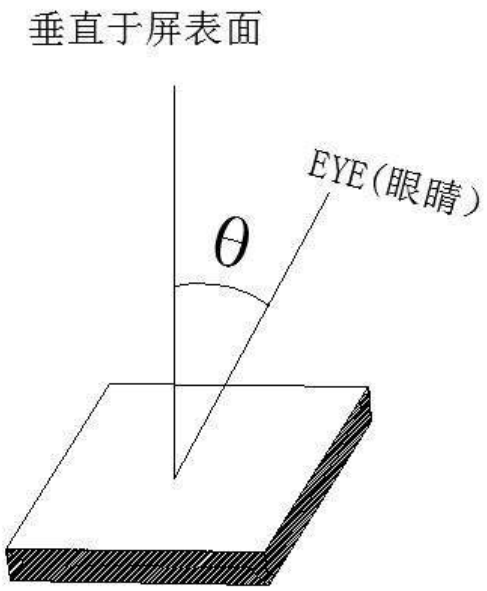
$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

对比度计算公式

8.Viewing Angle 视角宽度

Item 项目	Symbol 符号	Condition 条件	Remark			Unit 单位
			Min. 最小值	Typ. 典型值	Max. 最大值	
Viewing angle 视角宽度	Top 12 点钟方向	CR≥10 对比度大于等于 10	40	50	-	Deg. 度
	Bottom 6 点方向	CR≥10 对比度大于等于 10	55	65	-	
	Left 9 点钟方向	CR≥10 对比度大于等于 10	55	65	-	
	Right 3 点钟方向	CR≥10 对比度大于等于 10	55	65	-	





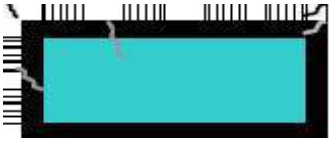
NOTE:3 点, 6 点, 9 点, 12 点方向视角的大小指的是垂直于屏表面的线眼睛视线之间的夹角(0）。

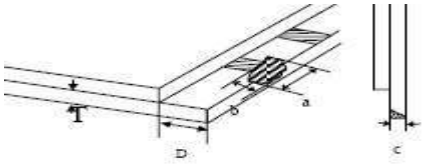
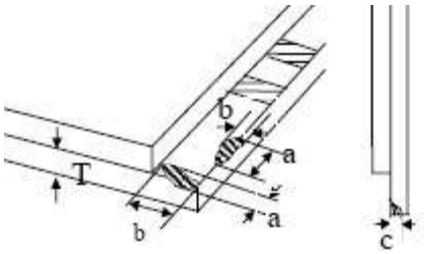
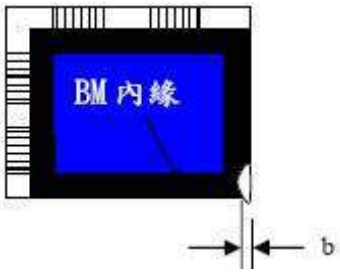
9. Reliability Trial 可靠性实验

NO. 序号	ITEM 实验项目	CONDITION 实验环境	CRITERION 实验规范
1	High Temperature Non-Operating Test 高温存储实验	80℃*120Hrs	No Defect Of Operational Function In Room Temperature Are Allowable 室温运行功能无缺陷
2	Low Temperature Non-Operating Test 低温存储实验	-30℃*120Hrs	
3	High Temperature/Humidity Non Operating Test 高温高湿实验	60℃*90%RH*120Hrs	
4	High Temperature Operating Test 高温工作实验	70℃*72Hrs	
5	Low Temperature Operating Test 低温工作实验	-20℃*72Hrs	
6	Thermal Shock Test 热冲实验	-20 ℃ (30Min) Q70 ℃ (30Min) *10CYCLES	

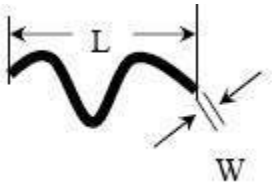
10.Inspection standards 检验标准

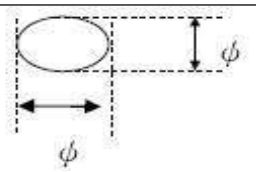
10.1Glass defect

NO	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	
2	Cracks (Major defect)	1. Linear cracks panel 【Reject】 2. Nonlinear crack contrast by limited sample	
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage. 1) b≤1/3Pin width(non bonding area) 【Accept】 2)bonding area≤0.5mm 【Accept】	A: Length, b: Width

4	Pin-side ,conductive area damaged (minor defect)	(a c: disregards) b≤1/3of effective length for bonding electrode 【Accept】	a: length, b: Width, c: Thickness 
5	Pin-side,non-conductive area damaged (minor defect)	1)Damage area don't touch the ITO (Inclueling contraposition mark, except scribing mark) 【Accept】 2)C<T b≦BM1/3of width 【Accept】 3)c=T b not touch the seal glue 【Accept】 4)a disregards	a: Length, b: Width c: Thickness 
6	Non-pin-side damage (minor defect)	c<T 1)b exceeds 1/3Bm 【Reject】 c=T b not touch the seal glue 【Reject】	c: Thickness b: width of  damage

10.2LCD appearance defect(View area)

NO	Defect item	Criteria		Remark
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA 
		W≦0.03mm	disregard	
		0.03mm<W≦0.05mm; L≦3.0mm	2	
		0.05mm<W≦0.1mm; L≦3.0mm	1	
		W>0.1mm;L>3.0mm	0	
2	Polarizer bubble、concave and convex (minor defect)	Φ≦0.2mm	disregard	note1: Φ=(L+W)/2, L:Length, W :Width note2:disregard if out of AA
		0.2mm<Φ≦0.3mm	2	
		0.3mm<Φ≦0.5mm	1	
		0.5mm<Φ	0	
3	Black dots、dirty dots、	Φ≦0.15mm	disregard	note2:disregard if out of AA

	impurities、eye winker (minor defect)	0.15mm< Φ ≦0. 25mm	2	
		0.25mm< Φ ≦0. 3mm	1	
		0.3mm< Φ	0	
4	Polarizer prick (minor defect)	Φ ≦0.1mm	disregard	note1: Φ=(L+W)/2, L=Length, W=Width note2:the distance between two dots>5mm
		0.1mm< Φ ≦0. 25mm	3	
		Φ >0. 25mm	0	

11.Package Method 包装方法

显示屏出货包装示意图：