1.8 inch LCD TFT

（1.8 英寸真彩色液晶显示屏）

128RGBx160 Resolution and 65K color

（128x160 分辨率，6 万 5 千种色）

WECHAT

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ST7735S

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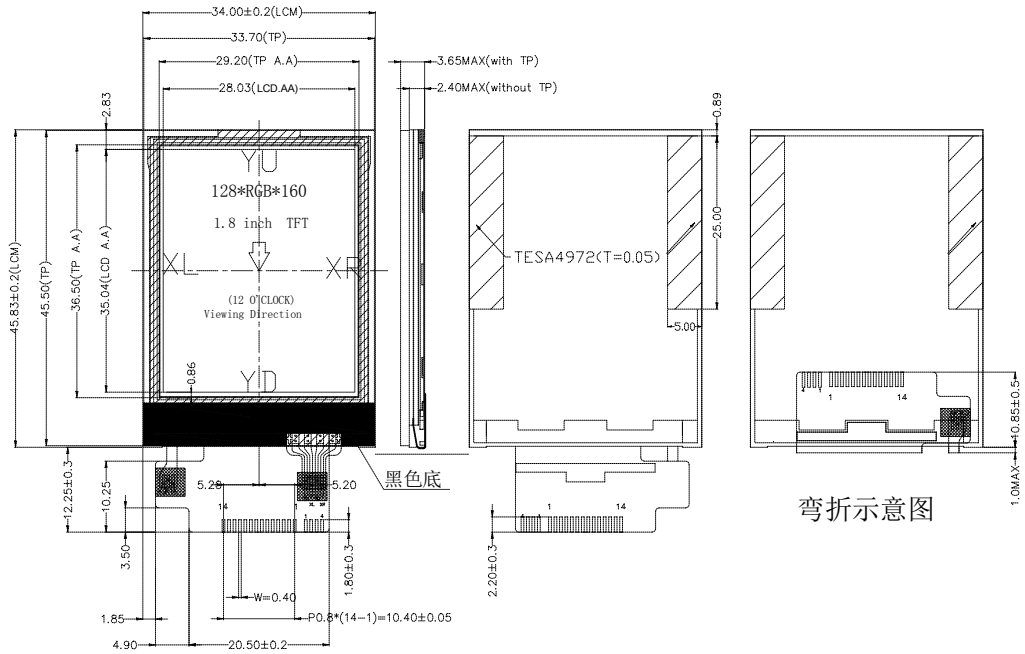
1.General Description 基本描述

MODEL NO 产品型号	STP128160_0177E **Z180ST029 v0.0**
Display Mode 显示模式	Transmissive 全透
Display Format 显示格式	Graphic 128RGB*160 Dot-matrix 128xRGBx160 图形点阵
Input Data 显示屏接口类型	SPI-4wire interface 四线串口
Viewing Direction 视角方向	12 o'clock 12 点钟
Drive 显示屏驱动芯片	ST7735S (台湾矽创)

2. Mechanical Specification 机械规格

Item	Specifications	Unit
Dimensional outline 显示屏外围尺寸（不带触摸）	34.00(W)*45.83(H)*2.40max(T) (FPC not include)	mm
Dimensional outline 显示屏外围尺寸(带触摸）	34.00(W)*45.83(H)*3.65max(T) (FPC not include)	mm
Resolution 分辨率	128RGB*160	dots
LCD Active area 显示尺寸	28.03 (W)*35.04 (H)	mm
Pixel size 像素尺寸	0.219(W)*0.219(H)	mm

3.Mechanical Dimension 机械尺寸图



LCD

Pin	Description
1	NC
2	GND
3	LED-
4	LED+
5	GND
6	/RESET
7	A0
8	SDA
9	SCK
10	VCC
11	IOVCC
12	CS
13	GND
14	NC

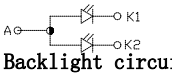
Touch Panel

Pin	Description
1	YU
2	XL
3	YD
4	XR

NOTES:

1. DISPLAY TYPE:262K/65K TFT TRANSMISSIVE NORMAL WHITE
2. OPERATING TEMP: -10° C~60° C
3. STORAGE TEMP: -20° C~70° C
4. LCD DRIVER: COG(IC:ST7735S);
5. BACKLIGHT: 2 CHIP-WHITE LED(Parellel)
6. GENERAL TOLERANCE:±0.20
7. ROHS

背光电路图:



Backlight circuitry

					第三视角:
产品型号:					
部品型号:	LCM外形图			确认:	
版本:	v0.0	单位:	MM	审核:	
日期:	2015.03.18	比例:	1:1	设计:	
UNMRKED TOLERANCE:±0.20 mm				页码:	1 OF 1

4. Electrical Maximum Ratings 电气极限

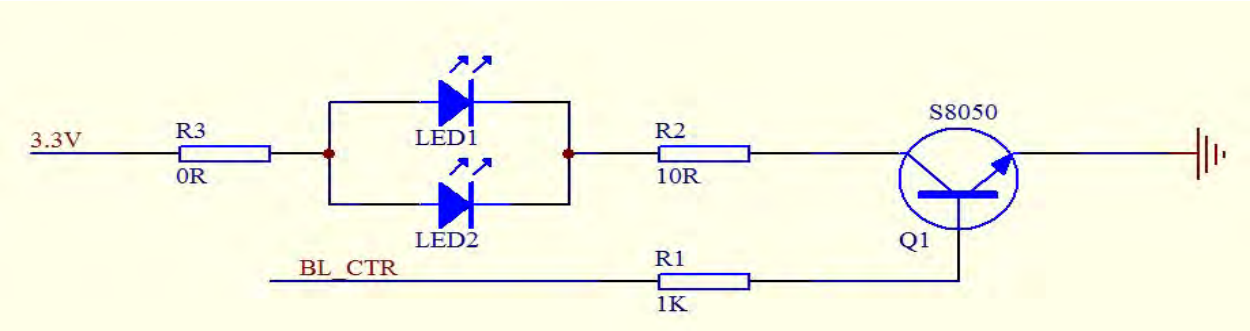
Item 项目	Symbol 符号	Min 最小值	Max 最大值	Unit 单位	Note 备注
Supply voltage（IOVCC） 工作电压(IOVCC)	V	1.8	3.3	V	
Supply voltage（VCC） 工作电压(VCC)	V	2.8	3.3	V	
Operating temperature 工作温度范围	T_{OPR}	-20	70	℃	
Storage temperature 存储温度范围	T_{STR}	-30	80	℃	

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

5. Backlight Characteristic 背光特性

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}	-	30	-	mA
LCD Surface Luminance 显示屏表面亮度	L_S	150	180	-	Cd/m^2
LCM Surface brightness uniform LED 背光源均匀度	L_D	80	-	-	%

附：背光源参考电路



6. Module Function Description 显示模组脚位定义

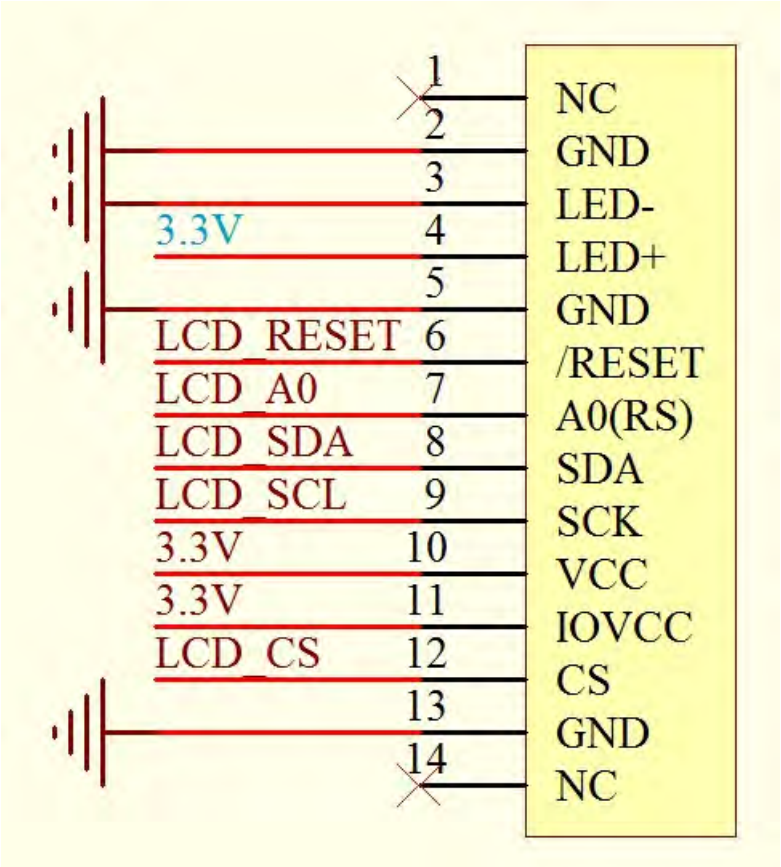
6.1 显示屏脚位定义（Display screen）

PIN No. 引脚序号	Symbol 引脚名称	Description 作用描述	Notes 备注
1	NC	No connection （空脚）	
2	GND	Ground （接地脚）	
3	LED-	Cathode of Backlight （背光负极）	
4	LED+	Anode of Backlight (背光正极 2.9-3.3 伏供电)	
5	GND	Ground （接地脚）	
6	/RESET	LCM Reset pin.Signal is active low （显示屏复位脚，低电平复位）	
7	A0	Register select pin（指令/数据寄存器选择脚） RS='0': Display data.（RS='0':选择指令寄存器） RS='1': Display data.（RS='1':选择数据寄存器）	
8	SDA	Serial data input / output. （串口数据线）	
9	SCK	Serial clock pin. （串口时钟线）	
10	VCC	Power supply for LCM （显示屏电源供电脚 2.8-3.3V）	
11	IOVCC	Power supply for LCM （显示屏电源供电脚 1.8-3.3V）	
12	CS	Chip select pin ("Low" enable) （显示屏驱动芯片片选脚，低电平有效）	
13	GND	Ground （接地脚）	
14	NC	No connection （空脚）	

6.2 触摸屏脚位定义（脚位定义（Touch panel）

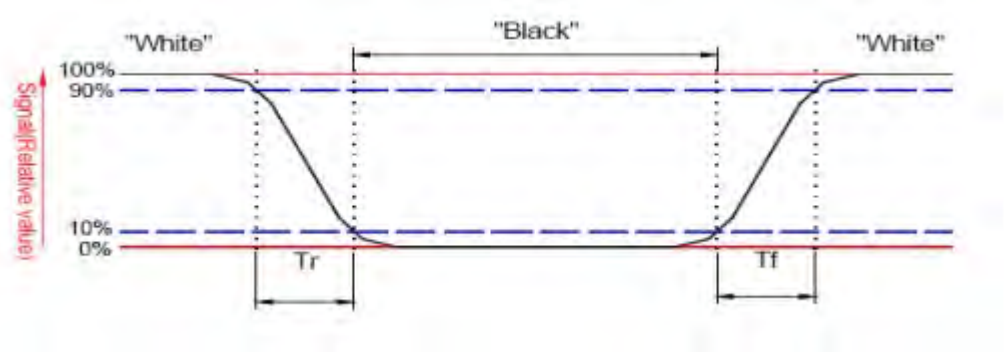
PIN No. 引脚序号	Symbol 引脚名称	**Description** 作用描述	Notes 备注
1	YU	Touch panel control pin 触摸屏控制脚	
2	XL	Touch panel control pin 触摸屏控制脚	
3	YD	Touch panel control pin 触摸屏控制脚	
4	XR	Touch panel control pin 触摸屏控制脚	

附：显示屏 Z180ST029 v0.0 参考应用电路



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°	-	30	60	ms
Contrast ratio 对比度	CR	θ =0°	200	300	-	



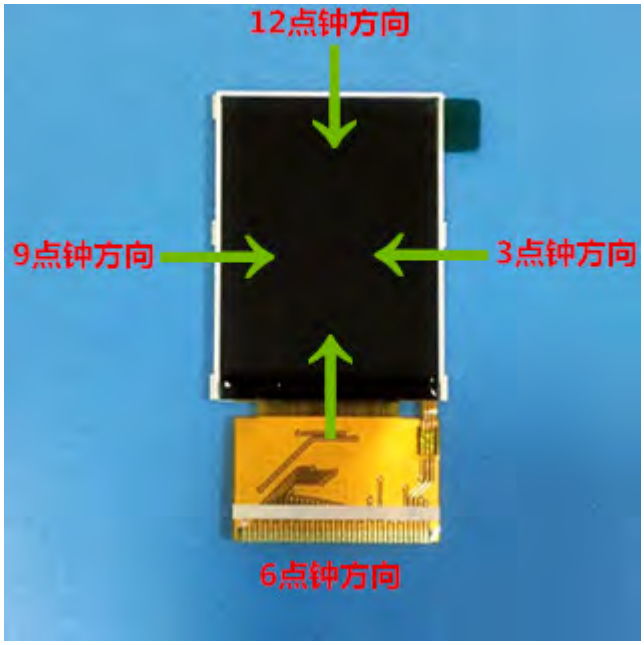
响应时间图示

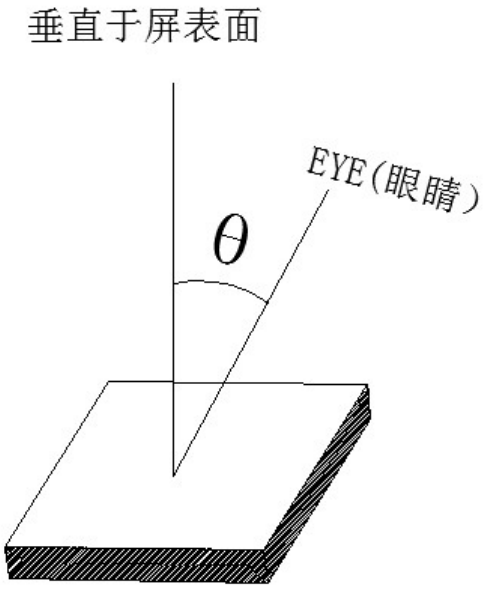
$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

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	20	30	-	Deg. 度
	Bottom 6 点方向	CR≥10 对比度大于等于 10	40	45	-	
	Left 9 点钟方向	CR≥10 对比度大于等于 10	40	45	-	
	Right 3 点钟方向	CR≥10 对比度大于等于 10	40	45	-	





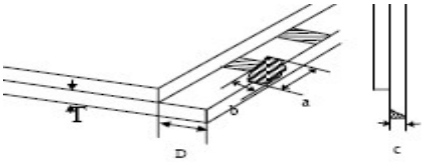
NOTE:3 点, 6 点, 9 点, 12 点方向视角的大小指的是垂直于屏表面的线眼睛视线之间的夹角(0）。

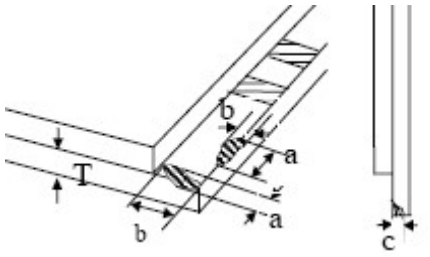
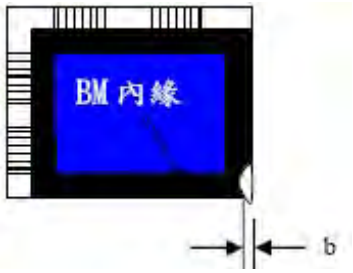
9. Reliability Trial 可靠性实验

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) ν 70 ℃ (30Min) *10CYCLES	

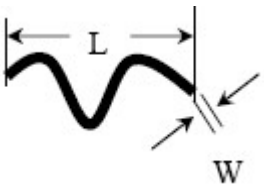
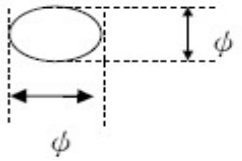
10.Inspection standards 检验标准

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	a: Length, b: Width c: Thickness

		【Accept】 3)c=T b not touch the seal glue 【Accept】 4)a disregards	
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、impurities、eye winker (minor defect)	Φ≦0.15mm	disregard	note2:disregard if out of AA 
		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

模块出货包装示意图：