

3.5 inch LCD TFT

(3.5 英寸真彩色液晶显示屏)

320RGBx480 Resolution and 65K color

(320x480 分辨率, 6 万 5 千种色)

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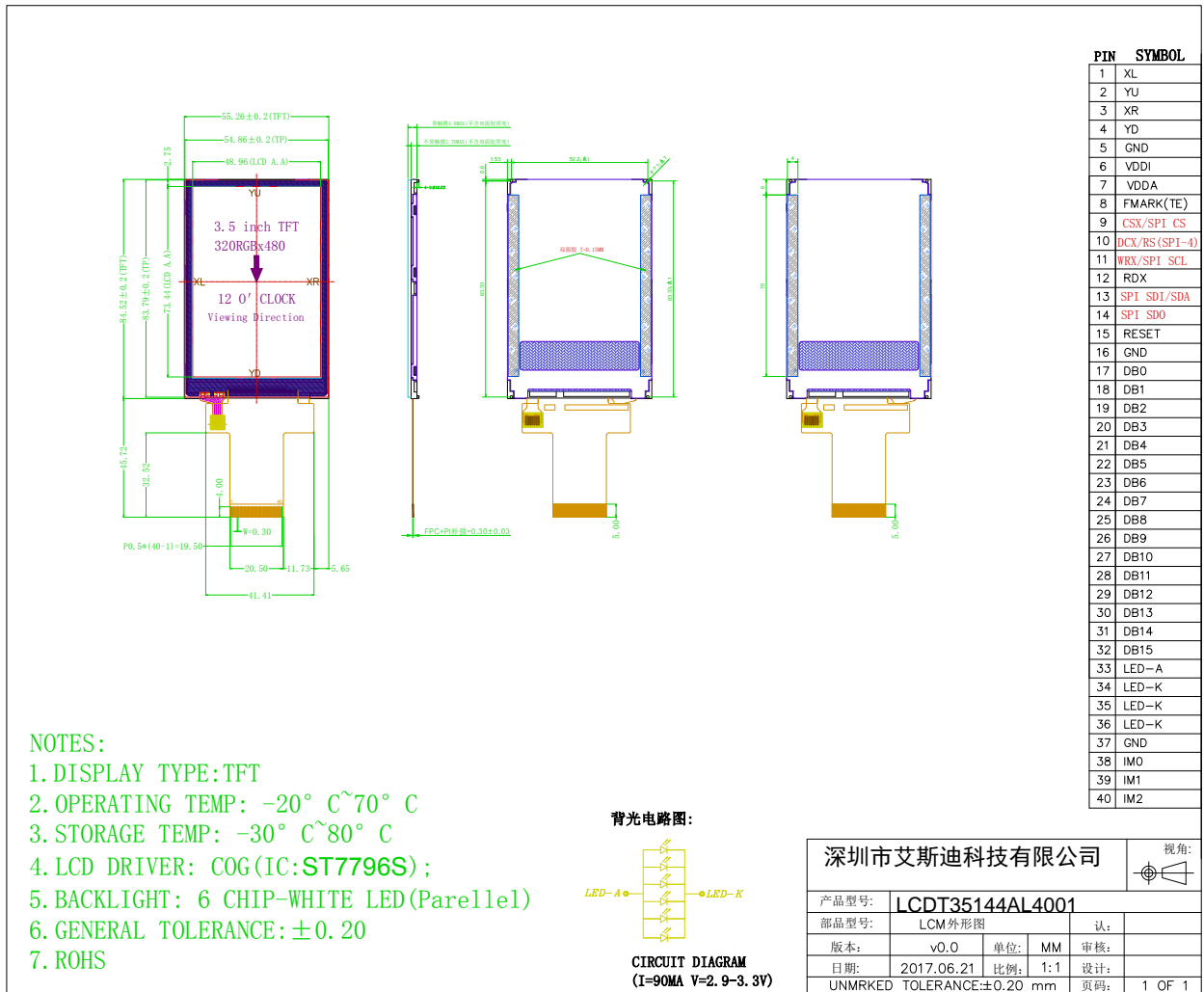
1. General Description 基本描述

MODEL NO 产品型号	LCDT35144AL4001
Display Mode 显示模式	Transmissive 全透
Display Format 显示格式	Graphic 320RGB*480 Dot-matrix 320xRGB 480 图形点阵
Input Data 显示屏接口类型	Line-SPI/ Line-SPI/8bit/16bit interface 3线-SPI 串口 线-SPI 串口 8位并口 16位并口
Viewing Direction 视角方向	12 o'clock 12点钟
Drive 显示屏驱动芯片	ST7796 (台湾矽创)

2. Mechanical Specification 机械规格

Item	Specifications	Unit
Dimensional outline 显示屏外围尺寸	55.26(W)*84.52(H)*2.70(T) (不带触摸) 55.26(W)*84.52(H)*4.00(T) (带触摸) (FPC not include)	
Resolution 分辨率	320RGB*480	dots
CD Active area 显示尺寸	48.96(W)*73.44 (H)	
Pixel size 像素尺寸	0.153(W)*0.153(H)	

3.Mechanical Dimension 机械尺寸图



4. Electrical Maximum Ratings

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

※NOTE: VDDI 和 VDDA 可以直接连一起, 共用一组 (2.8V~3.3V) 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 D 背光源正向电压	V _{LED}	2.9	3.1	3.3	V
LED module current D 背光源电流	I _{LED}	-	108	-	mA
LCD Surface Luminance 显示屏表面亮度	L _S	280	300	-	Cd/m ²
LCM Surface brightness uniform D 背光源均匀度	L _D	80	-	-	%
LCD power dissipation 显示屏总功耗	P _{LCD}	-	0.35	-	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	XL	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
2	YU	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
	XR	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
	YD	Touch panel Logical foot (四线电阻触摸屏逻辑脚)	-
5	GND	Ground (接地脚)	-
6	VDDI	Power Supply for I/O System. (显示屏 I/O 口电源供电脚 1.8-3.3V)	-
7	VDDA	Power Supply for Analog, Digital System and Booster Circuit. (显示屏主电源供电脚 2.8-3.3V)	-
8	FMARK(TE)	Tearing effect signal is used to synchronize MCU to frame memory (帧同步调节, 一般用于摄像头同步调节, 不用时悬空)	-
9	CSX/SPI CS	-Chip selection pin Low enable. High disable. (显示屏驱动芯片选脚, 低电平使能)	-
10	DCX/RS(SPI-4)	-Display data/command selection pin in MCU interface. (MCU 接口的数据/指令选择选择脚) DCX=' 1' : display data or parameter. (DCX=1:选择显示数据或参数寄存器) DCX=' 0' : command data (DCX=0:选择指令寄存器)	-
11	WRX/SPI SCL	- Write enable in MCU parallel interface. (在并口模式下, 用作并口的写使能信号) - In SPI mode, this pin is used as SCL. (在串口模式下, 用作 SPI 的时钟脚)	复用脚

12	RDX	-Read enable in 8080 MCU parallel interface. -If not used, please fix this pin at VDDI or GND. (并口的读使能信号, 不需要用时接 VDDI 或 GND)	-																									
13	SPI SDI/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. (SPI 数据输入, 不用时接 VDDI 或 GND)	-																									
14	SPI SDO	-SPI interface output pin. -The data is output on the falling edge of the SCL signal. -If not used, let this pin open. (SPI 数据输出, 不用时悬空)	-																									
15	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)	-																									
16	GND	Ground (接地脚)	-																									
17-24	DB0-DB7	MCU parallel interface data bus. (MCU 低 8 位并联接口数据线)	-																									
25-32	DB8-DB15	MCU parallel interface data bus. (MCU 高 8 位并联接口数据线)	-																									
	LED-A	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)	-																									
4-36	LED-K	Cathode of Backlight (背光负极供电脚)	-																									
7	GND	Ground (接地脚)	-																									
38	IM0	-Th U (U 接口模式选择脚)	-																									
9	IM1	<table border="1"> <thead> <tr> <th>IM2</th> <th>IM1</th> <th>IM0</th> <th>MCU interfac Mode</th> <th>Data pin</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>0</td> <td>80-16bit parallel I/F</td> <td>DB15-DB0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>80-8bit parallel I/F</td> <td>DB7-DB0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>3-line 9bit serial I/F</td> <td>SDA:in SDO:out</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>4-line 8bit serial I/F</td> <td>SDA:in SDO:out</td> </tr> </tbody> </table>	IM2	IM1	IM0	MCU interfac Mode	Data pin	0	1	0	80-16bit parallel I/F	DB15-DB0	0	1	1	80-8bit parallel I/F	DB7-DB0	1	0	1	3-line 9bit serial I/F	SDA:in SDO:out	1	1	1	4-line 8bit serial I/F	SDA:in SDO:out	-
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附 6-1: 显示屏 YT350S006_16 位并口参 应用电路

附图 6-2: 显示屏 YT350S006_8 位并口参 应用电路

附图 6-3: 显示屏 YT350S006_3 线-SPI 串口参 应用电路

附图 6-4: 显示屏 YT350S006_4 线-SPI 串口参 应用电路

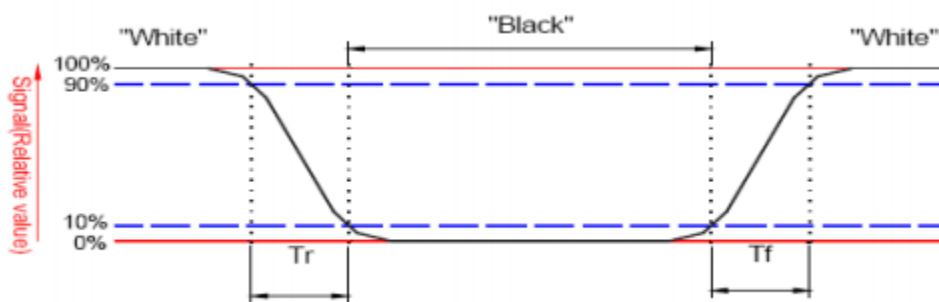
附图 6-5: 触摸屏参 应用电路

※NOTE:

1. 为不带触 版本, 参 附图 6-1、附图 6-2、附图 6-3 或附图 6-4 连接电路, 把显示屏的 XL、YU、XR、YD 四个触摸脚悬空即可。
2. 本, 参考附图 6-5 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	$\theta = 0^\circ$	-	20	40	ms
Contrast ratio 对比度	CR	$\theta = 0^\circ$	-	500	-	-



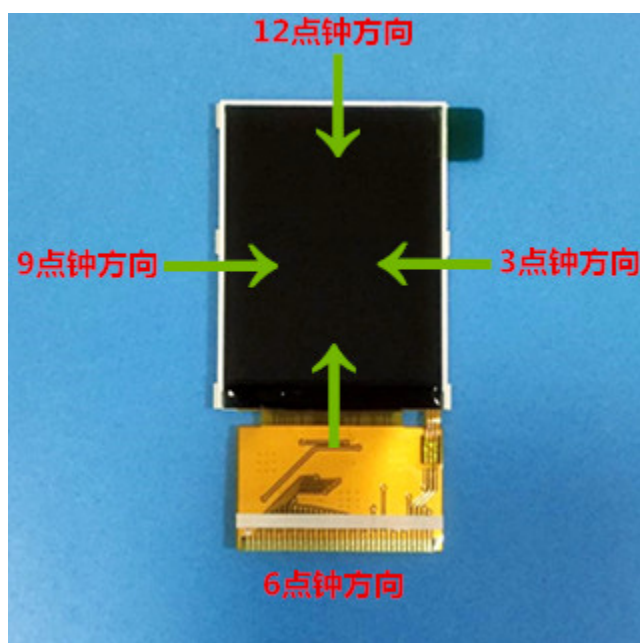
响应时间图示

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

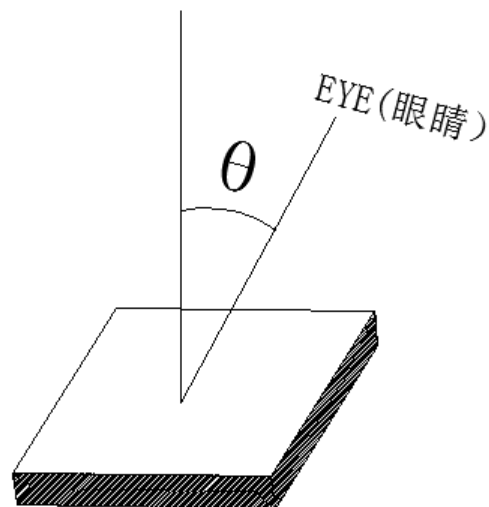
对比度计算公式

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	$CR \geq 10$ 对比度大于等于 10	50	60	-	Deg. 度
	Bottom 6点钟方向	$CR \geq 10$ 对比度大于等于 10	50	60	-	
	Left 9点钟方向	$CR \geq 10$ 对比度大于等于 10	60	70	-	
	Right 点钟方向	$CR \geq 10$ 对比度大于等于 10	60	70	-	



垂直于屏表面



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θ)。

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°C*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°C*120Hrs	
	High Temperature/Humidity Non Operating Test 高温高湿实验	60°C*90%RH*120Hrs	
	High Temperature Operating Test 高温工作实验	70°C*72Hrs	
5	Low Temperature Operating Test 低温工作实验	-20°C*72Hrs	
6	Thermal Shock Test 热冲实验	-20 °C (30Min) v 70 °C (30Min) *10CYC S	

10. Inspection standards 检验标准
10.1 Glass 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	
	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage. 1) $b \leq 1/3$ Pin width(non bonding area) 【Accept】 2) bonding area ≤ 0.5 mm 【Accept】	A: Length, b: Width
	Pin-side ,conductive area damaged (minor defect)	(a c: disregards) $b \leq 1/3$ of effective length for bonding electrode 【Accept】	a: length, b: Width, c: Thickness
5	Pin-side, non-conductive area damaged	1) Damage area don't touch the ITO (Including contraposition mark,	a: Length, b: Width c: Thickness

	(minor defect)	except scribing mark) 【Accept】 2) $C < T$ $b \leq BM1/3$ of width 【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 $1/ B_m$ 【Reject】 $c = T$ b not touch the seal glue 【Reject】	c: Thickness b: width of damage

10.2 LCD appearance defect (View area)

NO	Defect item	Criteria		Remark
		Specification	Allowable	
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	$W \leq 0.0$	disregard	note1: L: Length, W: Width note2: disregard if out of AA
		$0.03 < W \leq 0.05\text{mm};$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{m} < W \leq 0.1\text{mm};$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{m}; L \leq 3.0\text{m}$	0	
2	Polarizer bubble、 concave and convex (minor defect)	$\phi \leq 0.2$	disregard	note1: $\phi = (L+W)/2$, L: Length, W: Width note2: disregard if out of AA
		$0.2\text{m} < \phi \leq 0.3\text{mm}$	2	
		$0.3\text{m} < \phi \leq 0.5\text{mm}$	1	
		$0.5\text{m} < \phi$	0	
	Black dots、dirty dots、 impurities、eye winker (minor defect)	$\phi \leq 0.15$	disregard	note2: disregard if out of AA
		$0.15\text{m} < \phi \leq 0.25\text{mm}$	2	
		$0.25\text{m} < \phi \leq 0.3\text{mm}$	1	
		$0.3 < \phi$	0	
	Polarizer prick (minor defect)	$\phi \leq 0.1$	disregard	note1: $\phi = (L+W)/2$, L=Length, W=Width note2: the distance between two dots $> 5\text{m}$
		$0.1\text{m} < \phi \leq 0.25\text{mm}$		
		$\phi > 0.25\text{mm}$	0	

11.Package Method 包装方法

显示屏出货包装示意图：

