

# Osptek Display

## TFT LCD SPECIFICATION

Model No:

**YDP130FT001-V2**

*osptek*<sup>®</sup>

## Revision Record 修改记录

Rev No 版本号	Date 时间	Description 内容
V.0	2022-10-24	首次发行



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## Revision Record

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## 1.General Specifications 基本规格

No.	Item 项目	Specification 规格	Unit 单位	Remark
1	LCD Size 液晶面板尺寸	1.3	inch	-
2	Panel Type 面板类型	IPS	-	-
3	Resolution 分辨率	240RGBx240	Pixel	-
4	Display Mode 显示模式	Normally Black		-
5	Number of Colors 颜色数量	262K	-	-
6	Viewing Direction 使用视角	ALL	-	Note1
7	NTSC 色彩饱和度	50%	-	Typ.
8	Contrast Ratio 对比度	800	-	
9	Luminance 亮度	320	cd/m2	Typ.
10	Module Size 模组尺寸	32.0(H)x38.15(V)x2.21(D)	mm	Note1
11	Panel Active Area 可视区域	23.40x23.40	mm	Note1
12	Pixel Pitch 像素尺寸	0.0975H) x 0.0975(V)	mm	-
13	Pixel Arrangement 像素排列	RGB Vertical stripe		-
14	Weight 重量	TBD	g	-
15	Driver IC 驱动芯片	ST7789T3	-	-
16	Driver IC RAM Size 记忆体	1382400	bit	-
17	Light Source 背光源	2 LED light	-	-
18	Interface 接口方式	3Line SPI/parallel interface	-	-
19	Operating Temperature 工作温度	-20~+70	°C	-
20	Storage Temperature 存储温度	-30~+80	°C	-

Note 1: Please refer to the mechanical drawing ;

注 1 : 请参照模组图 ;

## 2.Pin Assignments 接口定义

Pin No. Pin 序号	Symbol 符号	Function 功能描述
1	VSS	Ground 接地
2	NC	空脚。
3	TE	Tering effect output pin to synchronize MPU to frame writing.
4	IOVCC(1.8V)	I/O Circuit Power Supply 系统 I/O 端口电压。
5	SDA	Serial data input pin in serial interface operation 串行数据输入/输出引脚。
6	NC	空脚。
7	CS	Chip select pin 片选信号。
8	RESET	Chip reset signal 复位
9	A0	Register select signal. 0:index register; 1:data register. 注册选择信号。
10	WR	Write select signal input 写入信号。
11	RD	Read select signal input 读入信号。
12-19	DB0-DB7	Date Bit 数据位。
20	IM0/2	IM0=" 0" ,MCU8bit;IM0=" 1" ,3SPI
21	VCC(2.8V)	Analog Power Supply for LCM(2.8V) 系统输入电压 2.8V
22	LEDA	Backlight anode 背光正极输入端。
23	RESET	Backlight cathode 背光负极输入端。
24	GND	Ground 接地

## 3. Electrical Specification 电气特性

### 3.1 Absolute Maximum Ratings 极限参数

Item	Symbol	Rating	Unit
Supply Voltage	VDD	- 0.3 ~ +4.6	V
Supply Voltage (Logic)	VDDI	- 0.3 ~ +4.6	V
Driver Supply Voltage	VGH-VGL	-0.3 ~ +30.0	V
Logic Input Voltage Range	VIN	-0.3 ~ VDDI + 0.5	V
Logic Output Voltage Range	VO	-0.3 ~ VDDI + 0.5	V
Operating Temperature Range	TOPR	-30 ~ +85	°C
Storage Temperature Range	TSTG	-40 ~ +125	°C



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### 3. Electrical Specification 电气特性

#### 3.2 Typical Operation Conditions 典型工作条件

Parameter	Symbol	Condition	Specification			Unit	Related Pins
			MIN.	TYP.	MAX.		
Power & Operation Voltage							
System Voltage	VDD	Operating voltage	2.4	2.75	3.3	V	
Interface Operation Voltage	VDDI	I/O Supply Voltage	1.65	1.8	3.3	V	
Gate Driver High Voltage	VGH		12.2		14.97	V	Note 4
Gate Driver Low Voltage	VGL		-12.5		-7.16	V	
Gate Driver Supply Voltage		VGH-VGL	19.36		27.47	V	Note 5
Input / Output							
Logic-High Input Voltage	VIH		0.7VDDI		VDDI	V	Note 1
Logic-Low Input Voltage	VIL		VSS		0.3VDDI	V	Note 1
Logic-High Output Voltage	VOH	IOH = -1.0mA	0.8VDDI		VDDI	V	Note 1
Logic-Low Output Voltage	VOL	IOL = +1.0mA	VSS		0.2VDDI	V	Note 1
Logic-High Input Current	IIH	VIN = VDDI			1	uA	Note 1
Logic-Low Input Current	IIL	VIN = VSS	-1			uA	Note 1
Input Leakage Current	IIL	IOH = -1.0mA	-0.1		+0.1	uA	Note 1
VCOM Voltage							
VCOM amplitude	VCOM			VSS		V	
Source Driver							
Source Output Range	Vsout		VAN		VAP	V	
Gamma Reference Voltage(Positive)	VAP		4.45		6.4	V	Note 6
Gamma Reference Voltage(Negative)	VAN		-4.6		-2.65	V	
Source Output Settling Time	Tr	Below with 99% precision			20	us	Note 2
Output Offset Voltage	VOFFSET				35	mV	Note 3

Table 2 Basic DC Characteristics

### 3.3 Backlight Circuit Characteristics 背光功耗

Item	Symbol	Min.	Typ.	Max.	Unit
LED Current 背光电流	$I_B$		20	-	mA
LED Voltage 背光电压	$V_f$		3.2		V
Power Consumption 功耗	$P_{BL}$	-		-	mW

### 3.4 LCD Current Consumption 液晶面板功耗

Item	Symbol	Typ.	Max.	Unit
Full Mode 正常模式	VCI	-	-	mA
测试条件：VCI=2.8V，IOVCC=2.8V； Interface 驱动类型：行翻转或者列翻转； TN Type=>All Black Pattern. TN型液晶面板=>黑色画面； IPS Type=>All White Pattern. IPS型液晶面板=>白色画面； Temperature：25°C；温度：室温25摄氏度；				
Sleep Mode 休眠模式	VCI	-	-	uA
测试条件：VCI=2.8V，IOVCC=2.8V； DC/DC converter is enabled. Internal oscillator is started and panel scanning is started. 除IC内部晶振和面板扫描外，其他功能都暂停工作； Temperature：25°C；温度：室温25摄氏度；				



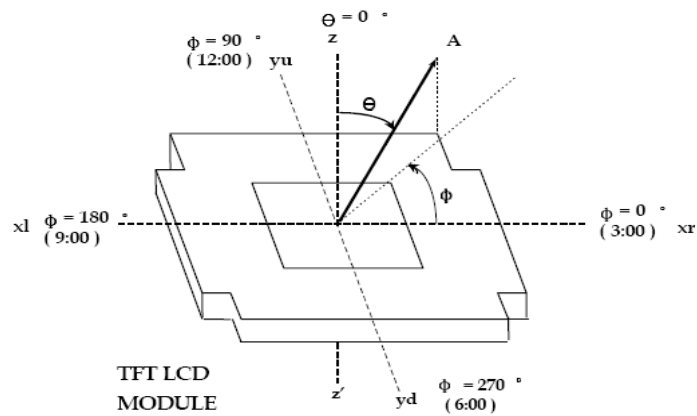
## 4. Optical Specification 光学参数

### 4.1 LCM Optical Characteristics 液晶模组光学特性

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle Range 视角	Left	$\theta_L$	$CR \geq 10$	-	80	-	degree
	Right	$\theta_R$		-	80	-	
	Top	$\theta_T$		-	80	-	
	Bottom	$\theta_B$		-	80	-	
Response Time 响应时间		Ton+Toff	$\theta = \Phi = 0^\circ$	-	30	-	ms
Contrast Ratio 对比度		CR	$\theta = \Phi = 0^\circ$	-	800	-	-
Luminance 亮度		L	$\theta = \Phi = 0^\circ$	-	-	-	cd/m <sup>2</sup>
Color Chromaticity (CIE1931) 色坐标	White	$W_x$	Normal $\theta = \Phi = 0^\circ$	+/-0.02	0.302	+/-0.02	-
		$W_y$			0.325		
	Red	$R_x$			0.624		
		$R_y$			0.329		
	Green	$G_x$			0.288		
		$G_y$			0.522		
	Blue	$B_x$			0.136		
		$B_y$			0.137		
Uniformity 均匀度		$U_L$	$\theta = \Phi = 0^\circ$	80	-	-	%
Flicker 闪烁		-	-	No Visible			-

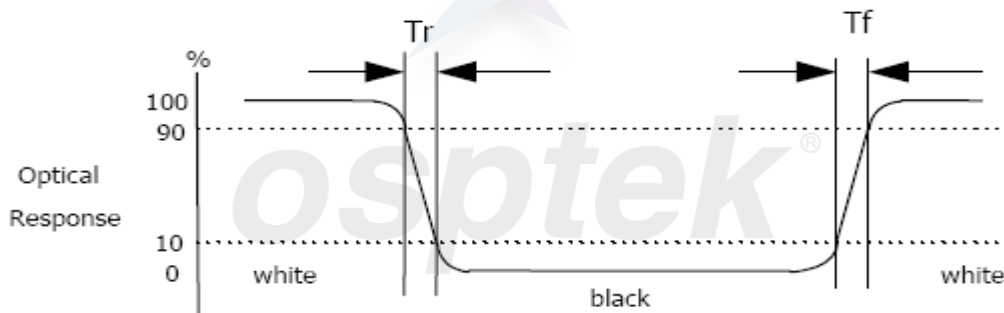
## 4.2 Measurement system 测量系统

### 4.2.1 LCM Viewing Angle



Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

### 4.2.2 Response time



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.

### 4.2.3 Contrast Ratio (CR)

Contrast Ratio (CR) is defined mathematically as:

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

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



## 6. Reliability Test Items 可靠性测试项目

Test Item 测试项目	Test Condition 测试条件	Test result determinant gist 实验结果判定
High temperature storage 高温存储	80±3°C , 24H ;	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.Non-display; 不显示; 3.Glass crack; 玻璃破碎; 4. The electrical characteristics requirements shall be satisfied. 需要满足模块电气性能。
Low temperature storage 低温存储	-30±3°C , 24H ;	
High temperature operation 高温运行测试	70±3°C , 24H ;	
Low temperature operation 低温运行测试	-20±3°C , 24H ;	
High temperature /humidity 高温高湿	60°C±3°C,90%±3%RH , 24H ;	
Thermal Shock 冷热冲击	-30°C/0.5h~+80°C/0.5h for a total 24 cycles ;	
Vibration Test 振动测试	Frequency 10Hz~55Hz~10Hz Amplitude : 1.5mm, X , Y , Z direction for total 1H ; (Packing condition)	
ESD test 静电测试	±2KV, Human Body Mode, 150pF/330Ω ; ±8KV, Air Mode, 150pF/330Ω ;	

Remark: 注意 :

1. The test samples should be applied to only one test item.

每个被测试的模块只能用于其中的一个测试项目。

2. Sample size for each test item is 2pcs.

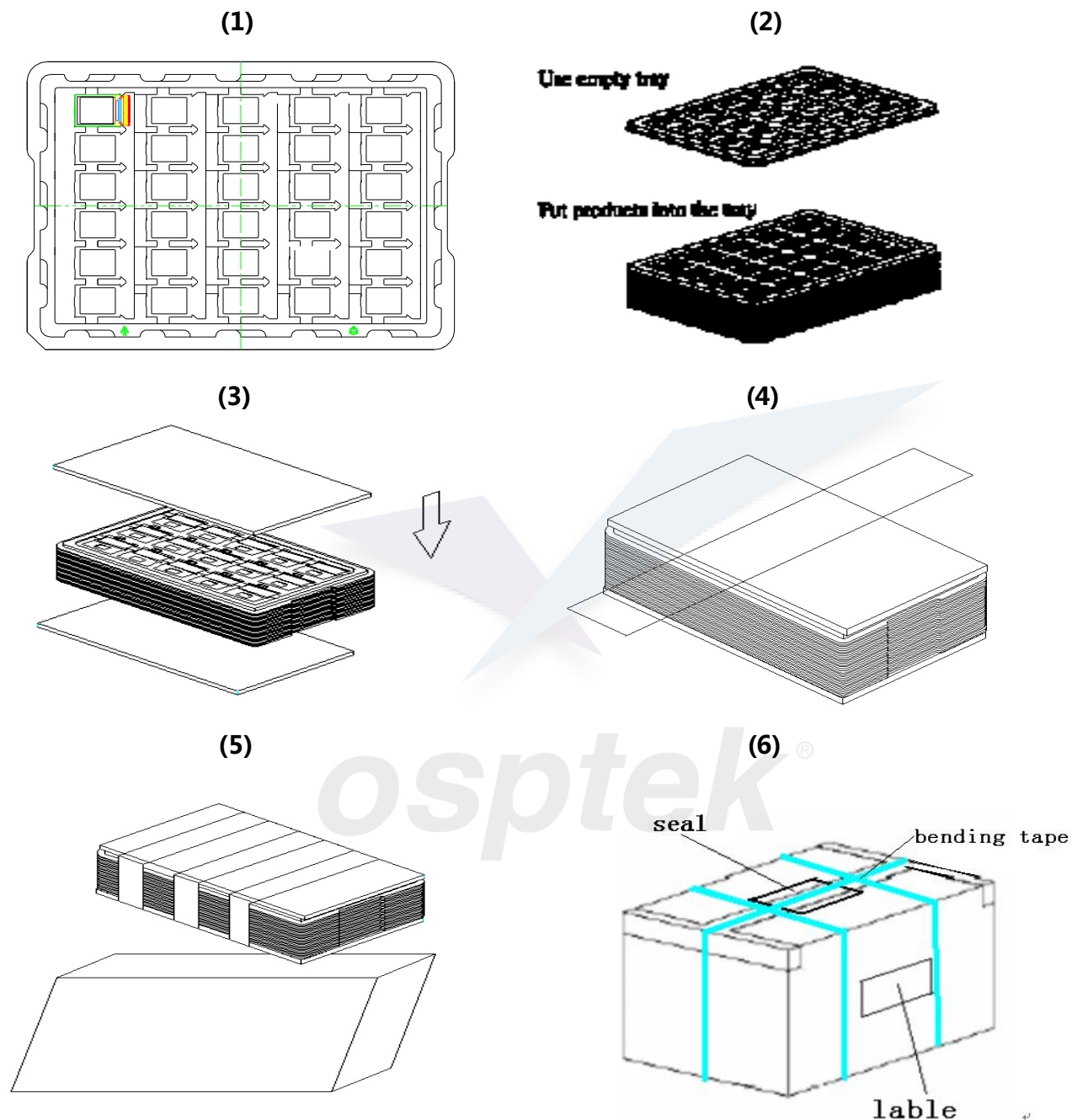
每个测试项目的样品数量为2片。

3. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

故障判断标准:基本规格,电气特性,机械特性,光电特性。

## 7. Packing and Storage Specification(Reference Only) 包装存储

### 7.1 Packing Method 包装方法



1. Put module into tray cavity. 把模块放进托盘.
2. Tray stacking. 托盘叠装.
3. Put 1 foam under the tray stack and 1 foam above. 在托盘上下放卡板.
4. Fix the cardboard to the tray stack with adhesive tape. 绑胶带.
5. Put the tray stack into carton. 把邦好的托盘放进纸箱.
6. Carton sealing with adhesive tape. 封纸箱.

## **7.2 Storage Method 存储方法**

1. Store in an ambient temperature of  $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$ , and in a relative humidity of  $55\%\pm 15\%$ . Don't exceed 12 months and expose to sunlight or fluorescent light.

存储环境温度为  $23\pm 5^{\circ}\text{C}$ ，相对湿度为  $55\%\pm 15\%$ ，存储不能超过 12 个月，不要长时间暴晒。

2. Store in a clean environment, free from dust, active gas, and solvent.

存储在一个干净的环境，不受灰尘，活性气体和溶剂污染。

3. Store in antistatic container.

存储在防静电环境。



## 8. Announcements 注意事项

1. Do not attempt to disassemble or process the LCD module.

请勿拆卸液晶显示模块。

2. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

不要在印制电路板上钻额外的孔，修改形状或更改印制线路板上元件的位置。

3. Except for soldering the interface, do not make any alterations or modifications with a soldering iron; Ensure welding temperature at 320 ° C to 350 ° C, the welding time control within the 10 s, welding note don't stay too long in the same place to avoid scald FPC.

除焊接接口外，不要用烙铁做任何更改；焊接温度保证在 320°C-350°C，焊接时间控制在 10S 以内，焊接时注意不要在同一处停留时间太久以免烫伤 FPC。

4. Other matters in not clear before use, please contact our staff to guide.

其他事项在不清楚使用之前，请联系我司人员指导进行。



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