

Osptek Display

TFT LCD SPECIFICATION

Model No:

YDP146BT001-V12

osptek[®]

Revision Record

Rev No.	Date	Description
A/0	2024-06-20	First Release



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Revision Record

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The logo for Osptek, featuring the word "osptek" in a lowercase, sans-serif font with a registered trademark symbol (®) to the upper right. The logo is light gray and is positioned centrally on the page, partially overlapping the bottom of the table of contents.

1.General Specifications

No.	Item 项目	Specification 规格	Unit 单位	Remark
1	LCD Size 液晶面板尺寸	1.46	inch	-
2	Panel Type 面板类型	IPS	-	-
3	Resolution 分辨率	70RGBx160	Pixel	-
4	Display Mode 显示模式	Normally Black	-	-
5	Number of Colors 颜色数量	262k	-	-
6	Viewing Direction 视角	ALL	-	Note1
7	NTSC 色彩饱和度	50%	-	Typ.
8	Contrast Ratio 对比度	1500	-	Typ.
9	Luminance 亮度	-	cd/m2	Typ.
10	ASSY Module Size 总成模组尺寸	22.06x42.0x3.36	mm	Note1
11	Panel Active Area 可视区域	14.15(H) × 32.35(V)	mm	Note1
12	Pixel Pitch 像素尺寸	TBD	mm	-
13	Pixel Arrangement 像素排列	RGB Vertical Stripe	-	-
14	Weight 重量	TBD	g	-
15	Driver IC 驱动芯片	NV3022B3	-	-
16	Driver IC RAM Size 记忆体	RAM	bit	-
17	Light Source 背光源	3white LEDs	-	-
18	Interface 接口方式	4-SPI	-	-
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

No.Pin 序号	Symbol 符号	Function 功能描述
1	RESET	This signal for reset the device
2	TE	Tearing effect output pin to synchronize MPU to frame writing.
3	CS	Chip select input pin("Low" enable)
4	SCL	Serial clock signal in SPI interface
5	SDA	interface data bus
6	GND	Ground
7	LEDA	LED Positive
8	LEDK	LED Negative
9	VDD	Power supply pin.VCC=2.5~3.3V
10	TP-INT	This signal for interrupt TP
11	TP-RST	This signal for reset TP
12	TP-SDA	IIC Serial data signal for TP
13	TP-SCL	IIC Serial clock signal for TP
14	GND	Ground
15	RS	Data or command selection in parallel interface

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3. Electrical Specification

3.1 Absolute Maximum Ratings

Item 项目	Symbol	Value	Unit	Remark
Analog Power Supply Voltage 模拟供电电压	VCI	-0.3~+4.6	V	-
Digital Power Supply Voltage 数字电源电压	VCC	-0.3~+4.6	V	-
I/O Power Supply Voltage I/O端口供电电压	IOVCC	-0.3~4.5	V	-



3.2 Typical Operation Conditions

Item 项目	Symbol	Min.最小	Typ.典型	Max.最大	Unit
Analog Supply Voltage 模拟供电电压	V _{CI}	2.5	2.8	3.3	V
Digital Supply Voltage 数字电源电压	V _{CC}	2.5	2.8	3.3	V
I/O Supply Voltage 接口电压	IOVCC	1.65	1.8/2.8	3.3	V
Input High Voltage 输入高电平	V _{IH}	0.8*IOVCC	-	IOVCC	V
Input Low Voltage 输入低电平	V _{IL}	0	-	0.2*IOVCC	V
Output High Voltage 输出高电平	V _{OH}	0.8*IOVCC	-	IOVCC	V
Output Low Voltage 输出低电平	V _{OL}	0	-	0.2*IOVCC	V

The logo for Osptek, featuring a stylized 'X' shape composed of two overlapping triangles in light blue and purple, positioned above the word 'osptek' in a lowercase, sans-serif font with a registered trademark symbol (®).

3.3 Backlight Circuit Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
LED Current 背光电流	I_B	-	60	-	mA
LED Voltage 背光电压	V_f	2.8	3.0	3.2	V
Power Consumption 功耗	P_{BL}	-	-	-	mW

3.4 LCD Current Consumption

Item	Symbol	Typ.	Max.	Unit
Full Mode 正常模式	VCI+IOVCC	-	-	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+IOVCC	-	TYP 40	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；				

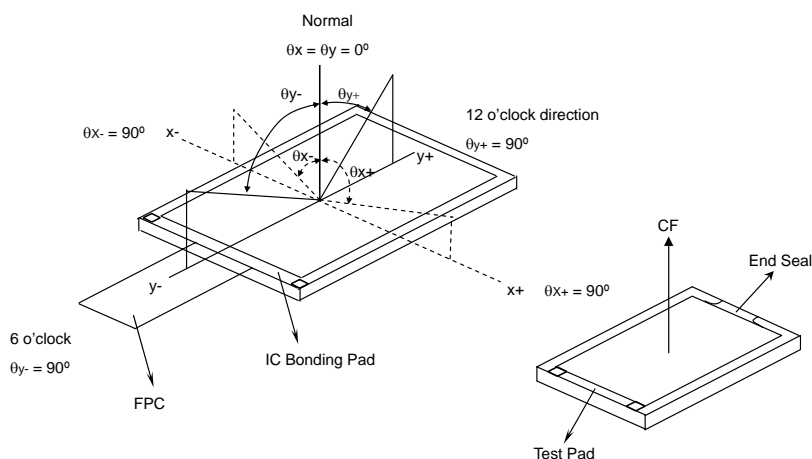
4. Optical Specification

4.1 LCM Optical Characteristics

4.1LCMOptical Characteristics 液晶模组光学特性 Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle Range 视角	Left	θ_L	CR>10		85	-	degree
	Right	θ_R			85	-	
	Top	θ_T			85	-	
	Bottom	θ_B			85	-	
Response Time 响应时间		Ton+Toff	$\theta=\Phi=0^\circ$	-	30	35	ms
Contrast Ratio 对比度		CR	$\theta=\Phi=0^\circ$	-	1200	-	TYP.
Luminance 亮度		L	$\theta=\Phi=0^\circ$	-	-	-	cd/m ²
Color Chromaticity (CIE1931) 色坐标	White	W_x	Normal $\theta=\Phi=0^\circ$		0.310		-
		W_y			0.342		
	Red	R_x			0.653		
		R_y			0.330		
	Green	G_x			0.321		
		G_y			0.572		
	Blue	B_x			0.134		
		B_y			0.119		
Uniformity 均匀度		U_L	$\theta=\Phi=0^\circ$	-	TBD	-	%
Flicker 闪烁		-	-	≤20%			-

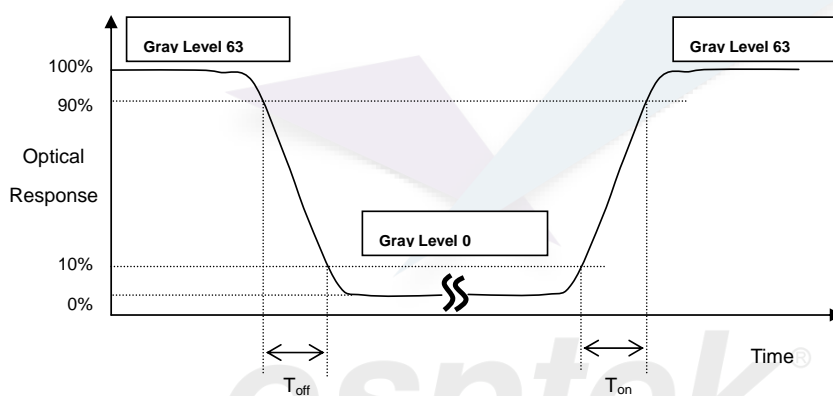
4.2 Measurement system

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

Test Item 测试项目	TestCondition 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	50°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	±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.

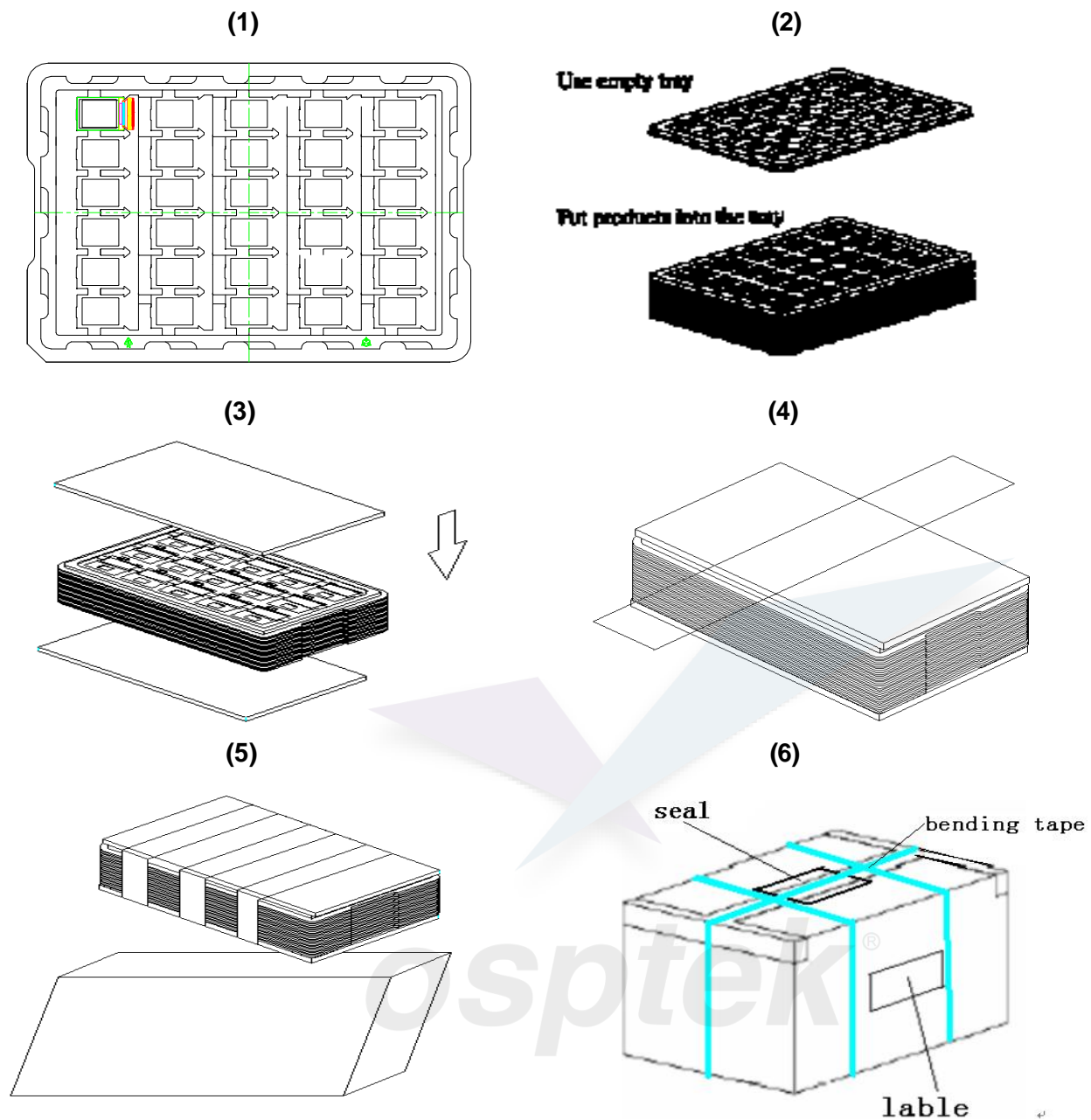
每个测试项目的样品数量为2片。

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)

7.1 Packing Method



1. Put module into tray cavity.
2. Tray stacking.
3. Put 1 foam under the tray stack and 1 foam 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.

7.2 Storage Method

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



8. Announcements

1. Do not attempt to disassemble or process the LCD module.
2. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
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.
4. Other matters in not clear before use, please contact our staff to guide.
5. Under the specified electrical parameters, the ambient temperature is 23 ° C \pm 5 ° C, the humidity is 55% \pm 15%, and the hardware is not damaged. The normal service life is 30,000-50,000 hours.

