

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	E109XI-W-H16-02
Product Name	1.09 OLED Module
Version	V1.0
Date	2025-04-08

- ☐ Preliminary Specification
☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
1.0	2025.04.08	-	First issued	-

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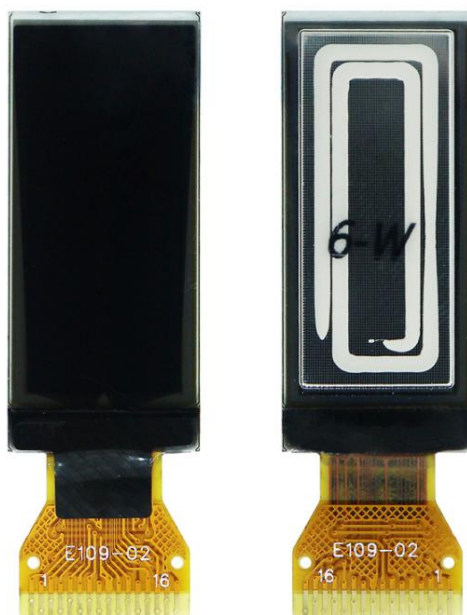
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1. General Parameter

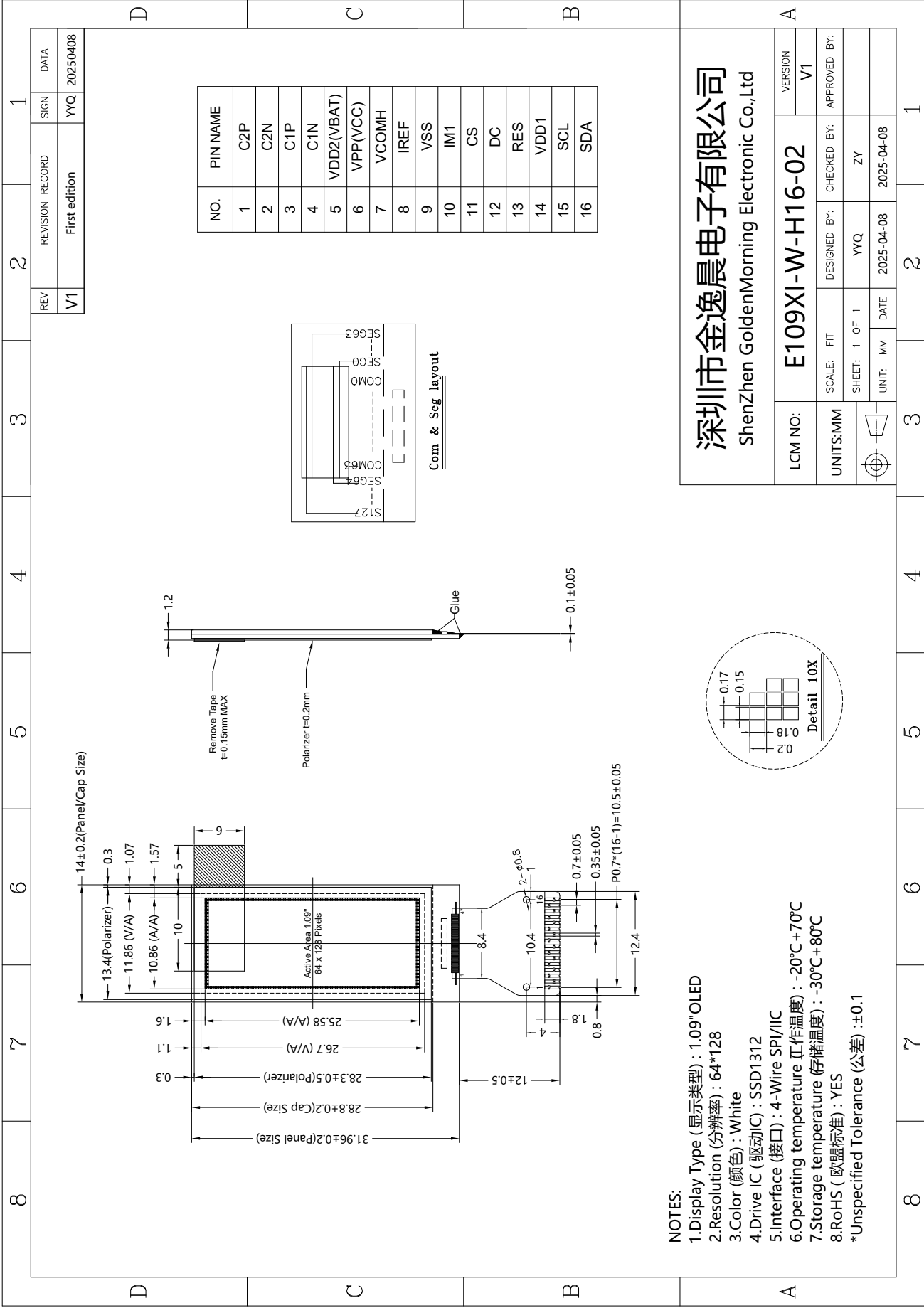
NO.	Features	Details	Unit
1	Display Size(Diagonal)	1.09"	Inch
2	LCD type	OLED	-
3	View Direction	ALL	-
4	Drive Duty	1/64	-
5	Resolution	64(H) x 128(V)	Pixels
6	Module size	14(W) x 31.96(H) x 1.2(T)	mm
7	Active Area	10.86(W) x 25.58(H)	mm
8	Pixel Pitch	0.17(W) x 0.2(H)	mm
9	Pixel Size	0.15(W) x 0.18(H)	mm
10	Interface	4-wire SPI/IIC	-
11	Display Colors	White	-
12	Driver IC	SSD1312	-
13	IC package type	COG	-
14	Operating Temperature	-30℃~80℃	℃
15	Storage Temperature	-40℃~85℃	℃
16	Weight	-	g

Note 1 : Please refer to the mechanical drawing.

2. Physical drawing



3. Mechanical Dimension



4. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.3	4	V
Supply Voltage for Display	VCC	0	18	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tst	-30	80	°C
Life Time(cd/m2)	Top	-	-	hour

Note 1 : All the above voltages are on the basis of “VSS = 0V” .

Note 2 : When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according “Optics & Electrical Characteristics” . If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

Note 3 : The defined temperature ranges do not include the polarizer. The maximum withstood temperature of the polarizer should be 80°C.

Note 4 : 50% Checkerboard.End of lifetime is specified as 50% of initial brightness reached. The average operating lifetime at room temperature is estimated by the accelerated operation at high temperature conditions.

5. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Analog Supply Voltage	VDD	1.65	-	3.5	V
Operating Voltage	VCC	7.5	-	16.5	V
Input high voltage	V _{IN}	0.8*VDD	-	-	V
Input low voltage	V _{IL}	-	-	0.2*VDD	V
Output high voltage	V _{OH}	0.9*VDD	-	-	V
Output low voltage	V _{OL}	0	-	0.1*VDD	V
VCC Supply Current	ICC	-	625	1000	uA
VDD Supply Current	IDD	-	160	220	uA

Note 1 : Brightness (Lbr) and Supply Voltage for Display (VCC) are subject to the change of the panel characteristics and the customer’ s request.

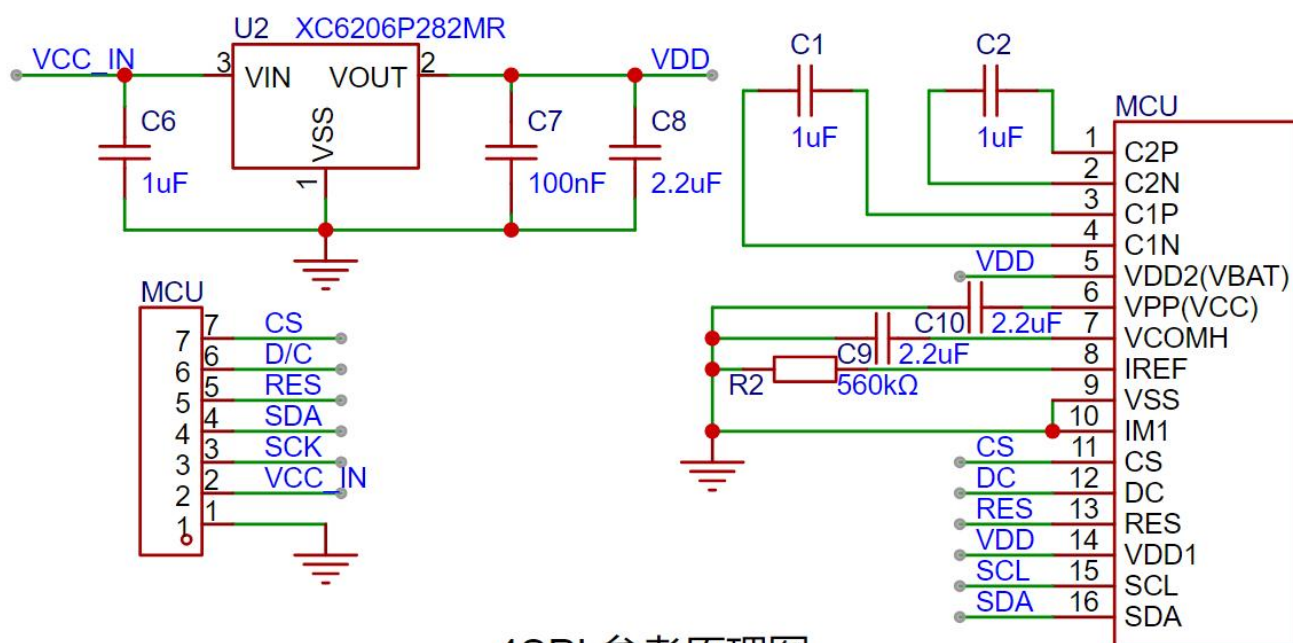
Note 2 : The above refers to the DC characteristics of the LCD screen.

6. Pins Definitions.

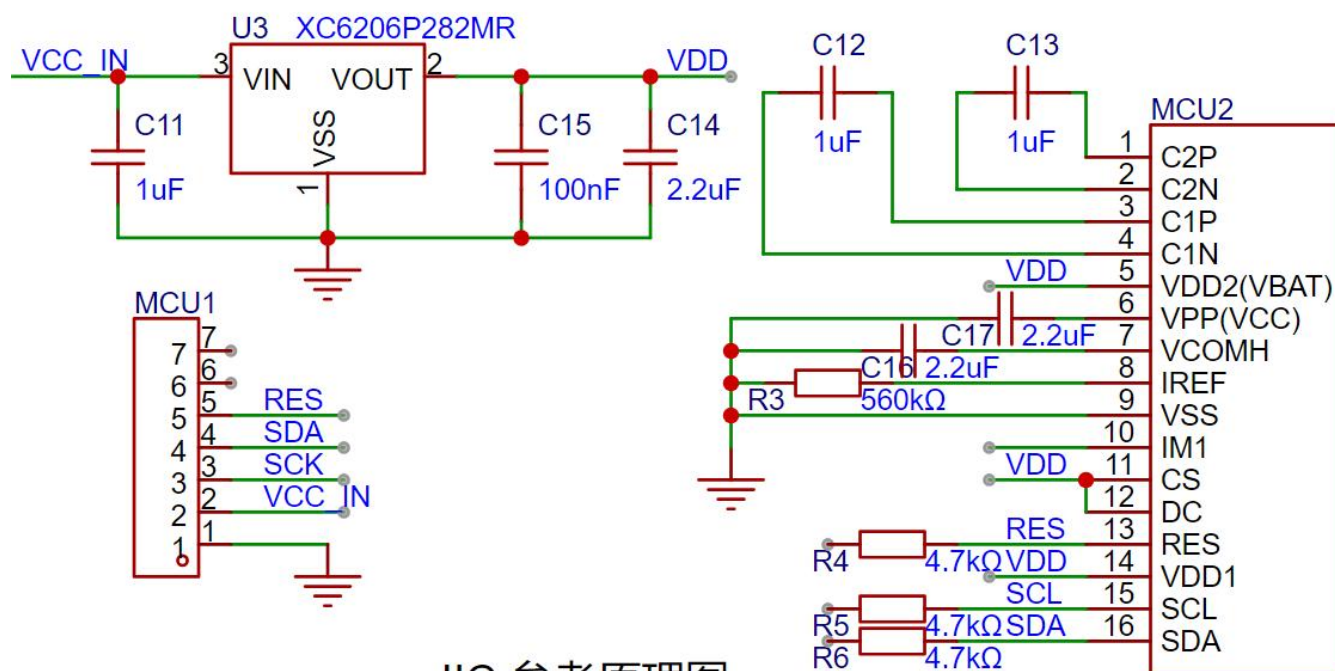
Pin.No	Symbol	Description
1	C2P	C2P/C2N – Pin for charge pump capacitor; Connect to each other with a capacitor
2	C2N	
3	C1P	C1P/C1N – Pin for charge pump capacitor; Connect to each other with a capacitor.
4	C1N	
5	VDD2(VBAT)	Power Supply for DC/DC Converter Circuit
6	VPP(VCC)	OLED panel power supply. Generated by internal charge pump. Connect to capacitor. It could be supplied externally
7	VCOMH	This is a pad for the voltage output high level for common signals. A capacitor should be connected between this pad and GND
8	IREF	This is a segment current reference pad. A resistor should be connected between this pad and GND.
9	VSS	Ground pin. It must be connected to external ground.
10	IM1	IIM1 operates in a high-level interface mode as IIC, and in a low-level interface mode as 4SPI.
11	CS	Chip select pin ("Low" enable).
12	DC	This pin is Data/Command control pin connecting to the MCU.
13	RES	This is a reset signal input pad. When RES is set to "L",the settings are initialized.
14	VDD1	Power supply pin for core logic operation.
15	SCL	Serial clock pin.
16	SDA	SPI interface input/output pin.

Note 1 : See the IC Specification manual for details.

7. Schematic Diagram.



4SPI 参考原理图



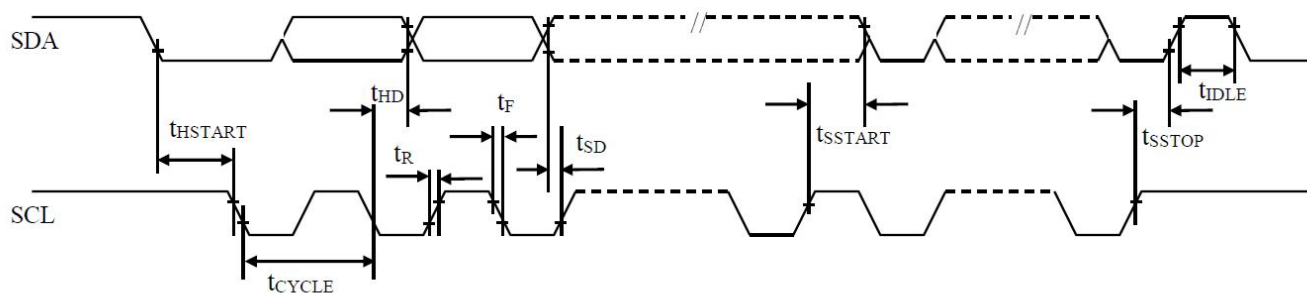
IIC 参考原理图

8. PInterface Pins Definitions.

I2C Interface Timing Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	2.5	-	-	us
t_{HSTART}	Start condition Hold Time	0.6	-	-	us
t_{HD}	Data Hold Time (for “SDA _{OUT} ” pin)	0	-	-	ns
	Data Hold Time (for “SDA _{IN} ” pin)	300	-	-	ns
t_{SD}	Data Setup Time	100	-	-	ns
t_{SSTART}	Start condition Setup Time (Only relevant for a repeated Start condition)	0.6	-	-	us
t_{SSTOP}	Stop condition Setup Time	0.6	-	-	us
t_{R}	Rise Time for data and clock pin	-	-	300	ns
t_{F}	Fall Time for data and clock pin	-	-	300	ns
t_{IDLE}	Idle Time before a new transmission can start	1.3	-	-	us

I2C interface Timing characteristics

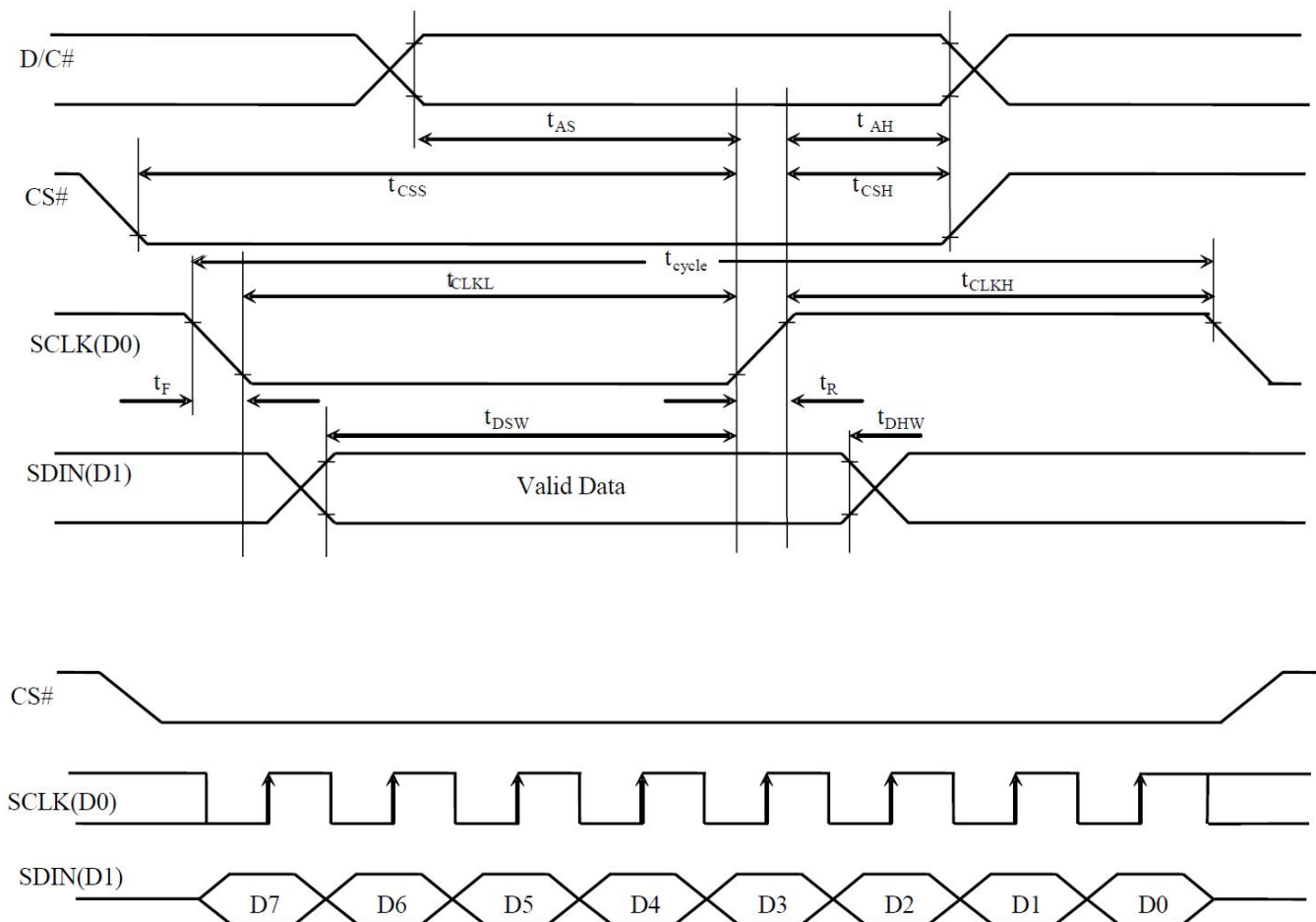


Serial Interface Timing Characteristics (4-wire SPI)

($V_{DD} - V_{SS} = 1.65V \sim 3.5V$, $T_A = 25^\circ C$)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	50	-	-	ns
t_{AS}	Address Setup Time	10	-	-	ns
t_{AH}	Address Hold Time	10	-	-	ns
t_{CSS}	Chip Select Setup Time	10	-	-	ns
t_{CSH}	Chip Select Hold Time	10	-	-	ns
t_{DSW}	Write Data Setup Time	10	-	-	ns
t_{DHW}	Write Data Hold Time	10	-	-	ns
t_{CLKL}	Clock Low Time	15	-	-	ns
t_{CLKH}	Clock High Time	20	-	-	ns
t_R	Rise Time	-	-	10	ns
t_F	Fall Time	-	-	10	ns

Serial interface characteristics (4-wire SPI)



9. Optical Characteristics.

All data in below based the condition ($T_a = 22 \pm 3^\circ\text{C}$, $60 \pm 10\% \text{RH}$).

以下参数均基于 $T_a = 22 \pm 3^\circ\text{C}$, $60 \pm 10\% \text{RH}$ 的条件。

Items 项目		Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Operating Luminance 工作亮度		L	80	120*	-	cd/m ²	-
Color Coordinate 色坐标	White	CIE x	0.24	0.27	0.30	CIE1931	Darkroom
		CIE y	0.26	0.29	0.32		
Operating Life Time* 工作寿命		Top	10,000	-	-	Hours	L= 120 cd/m2

Note(注意事项):

1. $L=120 \text{ cd/m}^2$ is based on $V_{DD}=2.8\text{V}$, $V_{BAT}=3.5\text{V}$, V_{CC} Generated by Internal DC/DC Circuit 7.5V , Contrast command setting 0X1F.

$L=120 \text{ cd/m}^2$ 基于 $V_{DD}=2.8\text{V}$, $V_{BAT}=3.5\text{V}$, V_{CC} 由内部 DC/DC 电路产生 7.5V , 对比度设置为 0X1F。

2. **Life Time** is defined when the Luminance has decayed to less than 50% of the initial Luminance specification.

(Odd and even chess board alternately displayed).

(The initial value should be closed to the typical value after adjusting.)

寿命的定义为当亮度衰减到初始亮度 50% 时所消耗的时间。

(奇数和偶数棋盘交替显示)。

(初始亮度值应调试到接近典型值的大小)。

The above data are the data of OLED MODULE with polarizer, for reference only.

以上数据为带偏光片的 OLED 模块数据，仅供参考。

10. Reliability

10.1. MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal.

10.2. Test Condition

No	Item	Condition	Criteria
1	High Temperature Operating	70℃*24Hrs	1. No Defect Of Operational Function In Room Temperature Are Allowable. 2. IDD of LCM in Pre-and Post-Test Should Follow Specification.
2	Low Temperature Operating	-20℃*24Hrs	
3	High Humidity Storage	50℃*90%RH*24Hrs	
4	High Temperature Storage	80℃*24Hrs	
5	Low Temperature Storage	-30℃*24Hrs	
6	Thermal Cycling Test Storage	-	
7	Packing vibration	-	
8	Electrical Static Discharge	-	
		-	
9	Drop Test (Packaged)	-	

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

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

Note 3 : No defection function allowable.

11. Precautions

11.1. Storage Conditions

- 11.1.1. Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $45\pm20\%\text{RH}$.
- 11.1.2. Store in anti-static electricity container.
- 11.1.3. Store in clean environment, free from dust, active gas, and solvent.
- 11.1.4. Do not place the module near organics solvents or corrosive gases.
- 11.1.5. Do not crush, shake, or jolt the module.
- 11.1.6. Strong light exposure causes degradation of polarizer and color filter.

11.2. Handling Precautions

- 11.2.1. Avoid static electricity, which can damage the CMOS LSI.
- 11.2.2. The polarizing plate of the display is very fragile, please handle it very carefully.
- 11.2.3. Do not give external shock.
- 11.2.4. Do not apply excessive force on the surface.
- 11.2.5. Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.
- 11.2.6. Reverse and use within ratings in order to keep performance and prevent damage
- 11.2.7. Do not remove the panel or frame from the module.
- 11.2.8. 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.

11.3. Limited Warranty

- 11.3.1. Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss. (我们的保证责任仅限于修理和/或更换。我们将不負責任何相应的损失。)
- 11.3.2. If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used. (如果可能, 我们建议客户在 6 个月内用完所有模块。如果模块存放时间超过 12 个月, 我们建议在使用模块前重新检查。)
- 11.3.3. The warranty period is twelve months from the date of delivery. Buyer shall complete the assembly of all processes within twelve months of validity. During the warranty period, if the product quality problems, our company will be responsible for repair and replacement. All products must be stored and handled in accordance with regulations. Under warranty. When the goods do not comply with the above terms, we do not provide warranty services. (保修期为交货之日起十二个月。买方应在 12 个月内完成所有流程的组装。在保修期内, 如果产品出现质量问题, 我公司将负责维修和更换。所有产品必须按照规定储存和处理。在保修期内。当货物不符合上述条款时, 我们不提供保修服务。)