

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	E154XB-W-H30-98
Product Name	1.54 OLED Module
Version	V1.0
Date	2022-06-24

- ☐ Preliminary Specification
- ☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
1.0	2022.06.24	-	First issued	-

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1. General Parameter

NO.	Features	Details	Unit
1	Display Size(Diagonal)	1.54"	Inch
2	LCD type	OLED	-
3	View Direction	ALL	-
4	Drive Duty	1/64	-
5	Resolution	128*64	Dots
6	Module size	42.04(W) x 27.22(H) x 1.25(T)	mm
7	Active Area	35.04(W) x 17.51(H)	mm
8	Pixel Pitch	0.274(W) x 0.274(H)	mm
9	Pixel Size	0.249(W) x 0.249(H)	mm
10	Interface	8-bit 68XX/80XX, 3/4-wire SPI, I2C	-
11	Display Colors	White	-
12	Driver IC	CH1116	-
13	IC package type	COG	-
14	Operating Temperature	-20℃~70℃	℃
15	Storage Temperature	-30℃~80℃	℃
16	Weight	3.3	g

Note 1 : Please refer to the mechanical drawing.

2. Physical drawing



[illegible]

4. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.3	3.6	V
Supply Voltage for Display	VCC	-0.3	14.5	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tst	-30	8	°C

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.

5. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Analog Supply Voltage	VDD	1.65	-	3.5	V
Operating Voltage	VCC	6.4	-	14	V
Input high voltage	V _{IN}	0.8*VDD	-	-	V
Input low voltage	V _{IL}	VSS	-	0.2*VDD	V
Output high voltage	V _{OH}	0.8*VDD	-	-	V
Output low voltage	V _{OL}	VSS	-	0.2*VDD	V
VCC Supply Current	ICC	-	-	600	uA
VDD Supply Current	IDD	-	-	1500	uA

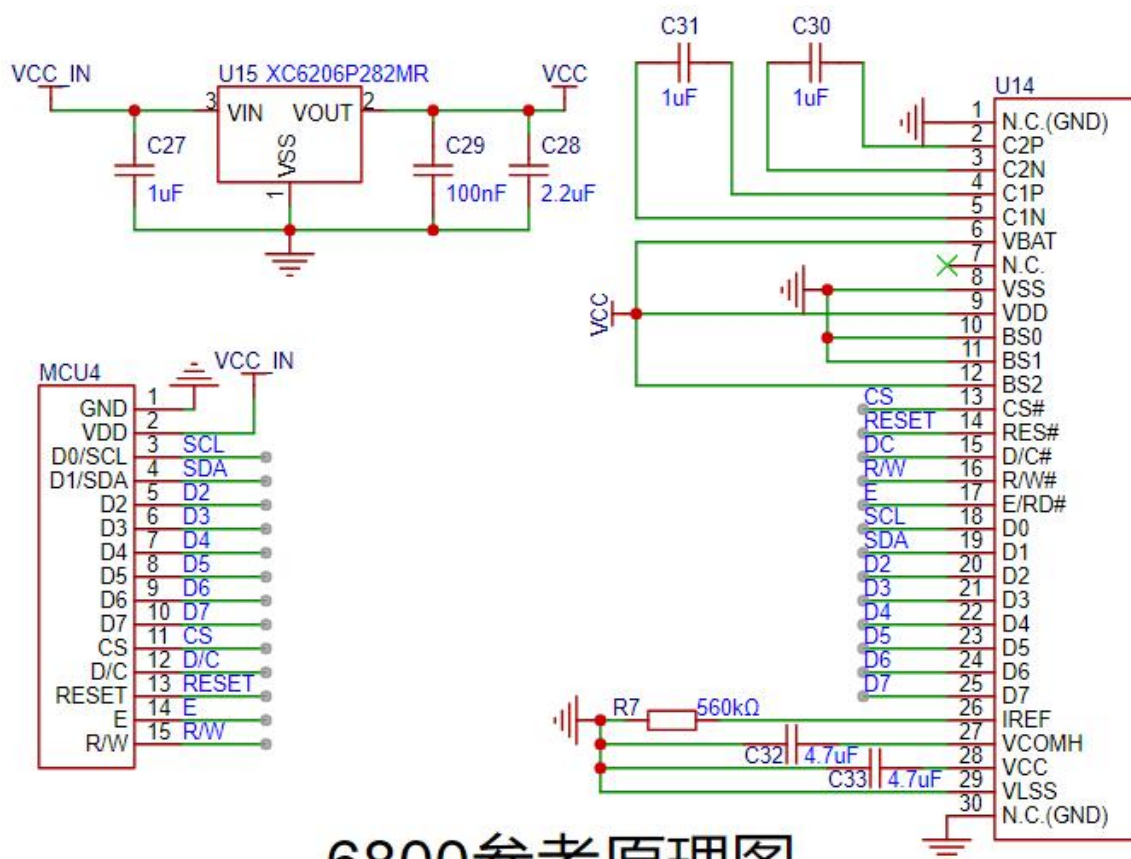
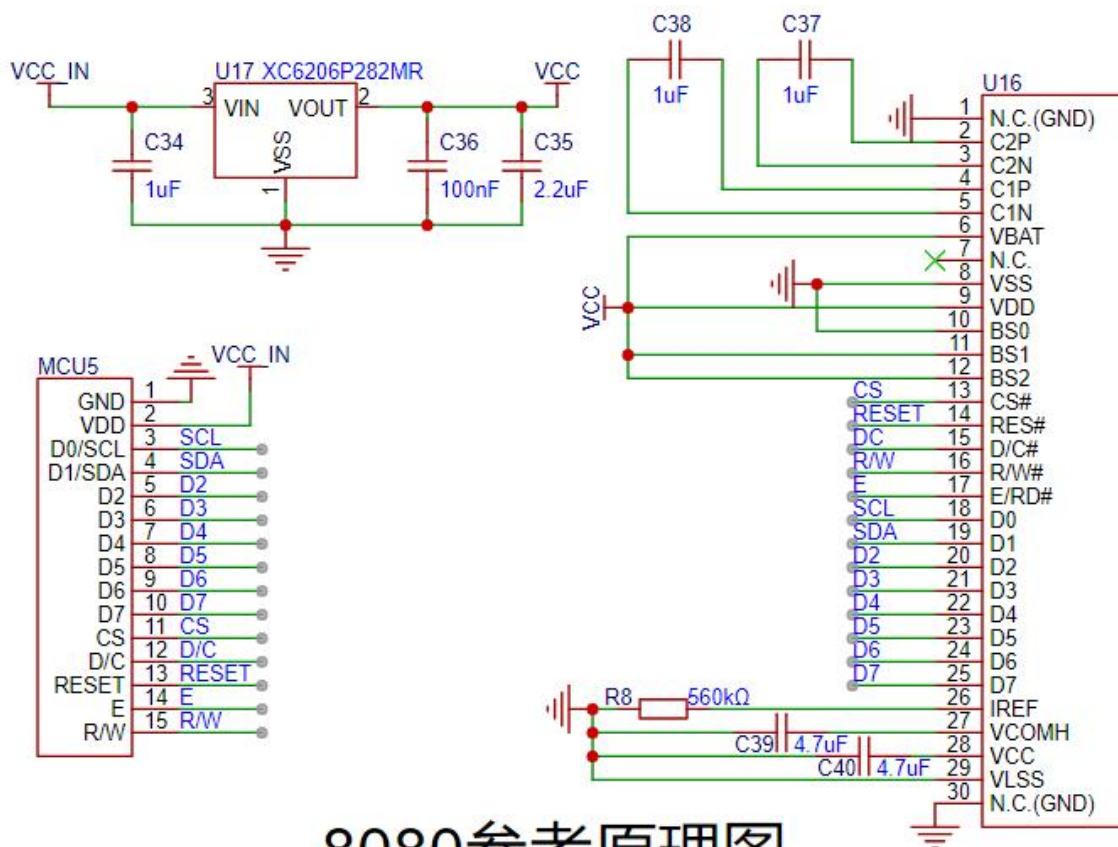
Note 1 : Brightness (Lbr) and Supply Voltage for Display (VCC) are subject to the change of the panel characteristics and the customer' s request.

6. Pins Definitions.

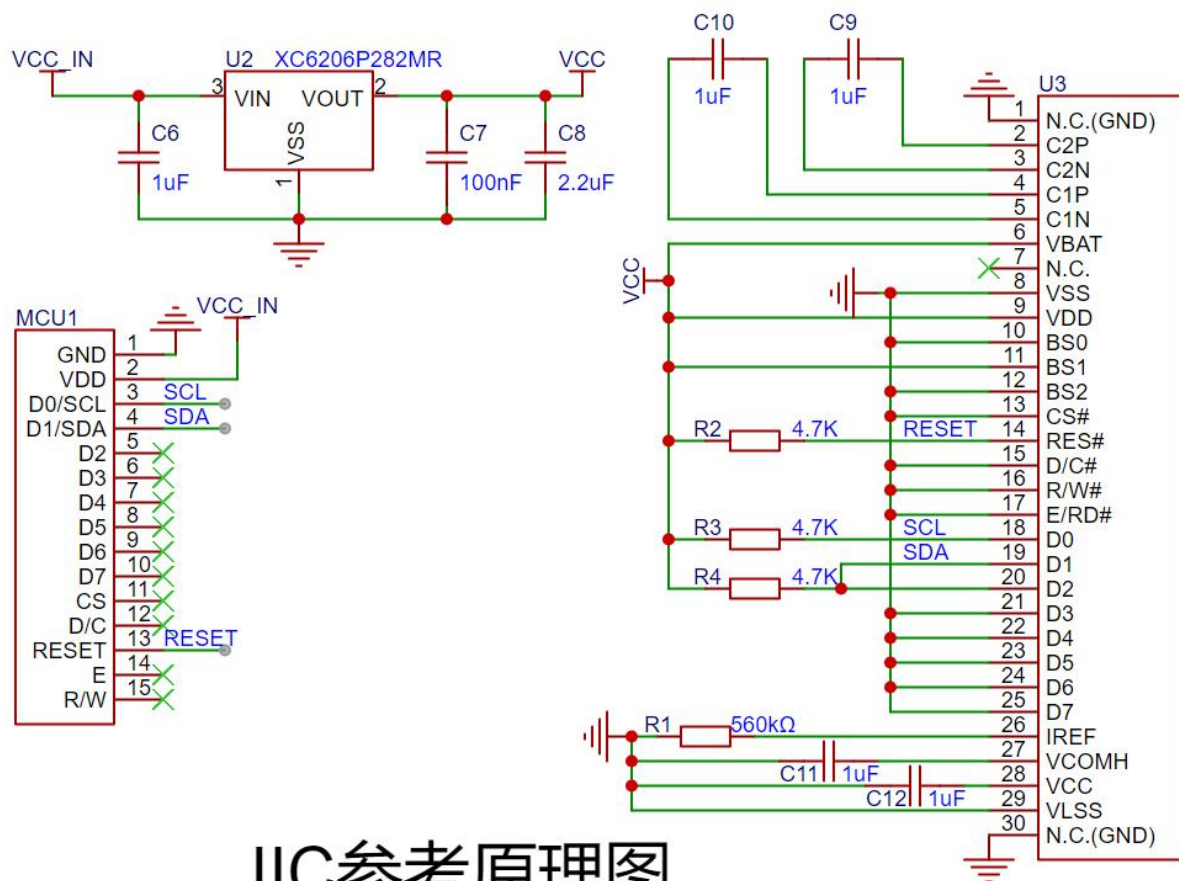
Pin.No	Symbol	Description
1	N.C.(GND)	Antistatic wire. It should connect to the external ground
2	C2P	C2P/C2N – Pin for charge pump capacitor; Connect to each other with a capacitor
3	C2N	
4	C1P	
5	C1N	C1P/C1N – Pin for charge pump capacitor; Connect to each other with a capacitor.
6	VBAT	3.0 – 4.2V power supply pad for Power supply for charge pump circuit. This pin should be disconnected when VPP is supplied externally
7	N.C.	NC
8	VSS	Ground pin. It must be connected to external ground.
9	VDD	Power supply pin for core logic operation.
10	BS0	These are the MPU interface mode select pads. Note:
11	BS1	0 is connected to GND
12	BS2	1 is connected to VDD
13	CS#	This pad is the chip select input. When CS = “L”, then the chip select becomes active, and data/command I/O is enabled.
14	RES#	This is a reset signal input pad. When RES is set to “L”,the settings are initialized.
15	D/C#	This pin is Data/Command control pin connecting to the MCU.
16	R/W#	When R/W = “H”: Read. When R/W = “L”: Write.
17	E/RD#	When RD = “H”: Enable. When RD = “L”: Disable
18-25	D0-07	This is an 8-bit bi-directional data bus that connects to an 8-bit MPU data bus.
26	IREF	This is a segment current reference pad. A resistor should be connected between this pad and GND.
27	VCOMH	This is a pad for the voltage output high level for common signals. A capacitor should be connected between this pad and GND
28	VCC	OLED panel power supply. Generated by internal charge pump. Connect to capacitor. It could be supplied externally
29	VLSS	Ground pin. It must be connected to external ground.
30	N.C.(GND)	Antistatic wire. It should connect to the external ground

Note 1 : See the IC Specification manual for details.

7. Schematic Diagram.



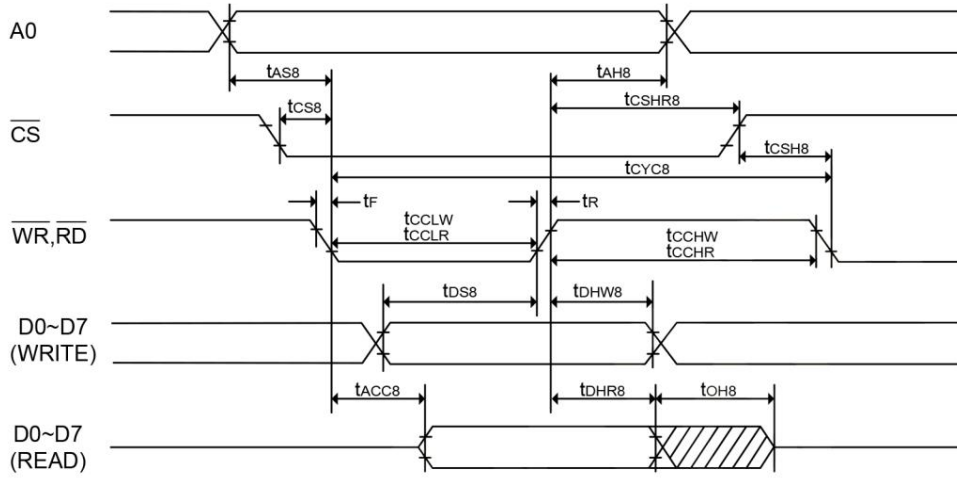




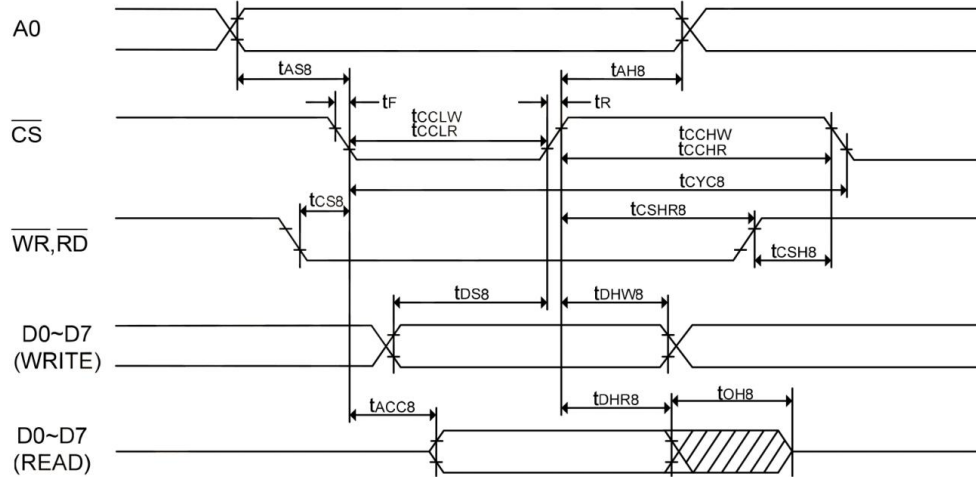
IIC参考原理图

8. Timing Characteristics.

(1) System buses Read/Write characteristics 1 (For the 8080 Series Interface MPU)



8080-series parallel interface cycle (Form1)



8080-series parallel interface cycle (Form2)

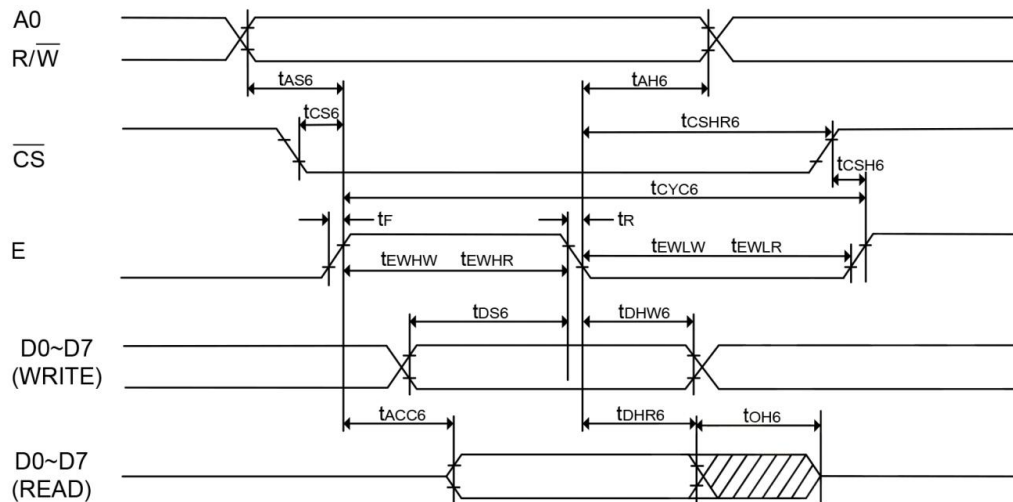
(VDD1 = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tcyc8	System cycle time	600	-	-	ns	
tas8	Address setup time	0	-	-	ns	
tah8	Address hold time	0	-	-	ns	
tds8	Data setup time	80	-	-	ns	
tdhw8	Write Data hold time	20	-	-	ns	
tdhr8	Read Data hold time	20	-	-	ns	
toh8	Output disable time	-	-	140	ns	CL = 100pF
tacc8	RD access time	-	-	280	ns	CL = 100pF
tcclw	Control L pulse width (WR)	300	-	-	ns	
tcclr	Control L pulse width (RD)	300	-	-	ns	
tcchw	Control H pulse width (WR)	300	-	-	ns	
tcchr	Control H pulse width (RD)	300	-	-	ns	
tr	Rise time	-	-	30	ns	
tf	Fall time	-	-	30	ns	
tcs8	Chip select setup time	0	-	-	ns	
tcsH8	Chip select hold time	40	-	-	ns	
tcsHR8	Chip select hold time to read signal	40	-	-	ns	

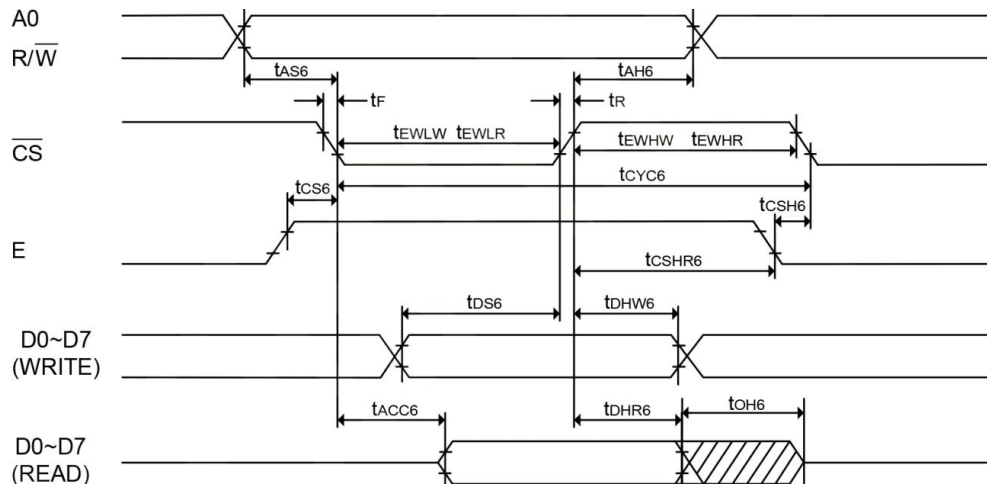
(V_{DD1} = 2.4 - 3.5V, T_A = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
t _{CYC8}	System cycle time	300	-	-	ns	
t _{AS8}	Address setup time	0	-	-	ns	
t _{AH8}	Address hold time	0	-	-	ns	
t _{DS8}	Data setup time	40	-	-	ns	
t _{DHW8}	Write Data hold time	10	-	-	ns	
t _{DHR8}	Read Data hold time	10	-	-	ns	
t _{OH8}	Output disable time	-	-	70	ns	C _L = 100pF
t _{ACC8}	$\overline{RD}$ access time	-	-	140	ns	C _L = 100pF
t _{CCLW}	Control L pulse width (WR)	150	-	-	ns	
t _{CCLR}	Control L pulse width (RD)	150	-	-	ns	
t _{CCHW}	Control H pulse width (WR)	150	-	-	ns	
t _{CCHR}	Control H pulse width (RD)	150	-	-	ns	
t _R	Rise time	-	-	15	ns	
t _F	Fall time	-	-	15	ns	
t _{CS8}	Chip select setup time	0	-	-	ns	
t _{CSH8}	Chip select hold time	20	-	-	ns	
t _{CSHR8}	Chip select hold time to read signal	20	-	-	ns	

(2) System buses Read/Write Characteristics 2 (For the 6800 Series Interface MPU)



6800-series parallel interface cycle (Form1)



6800-series parallel interface cycle (Form2)

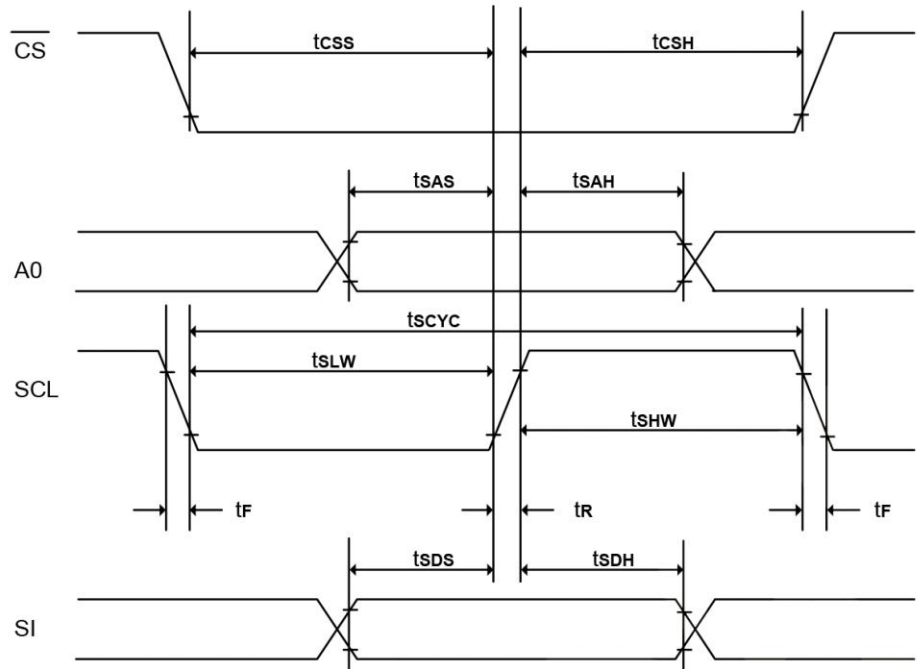
(VDD1 = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tcyc6	System cycle time	600	-	-	ns	
tAS6	Address setup time	0	-	-	ns	
tAH6	Address hold time	0	-	-	ns	
tDS6	Data setup time	80	-	-	ns	
tDHW6	Write Data hold time	20	-	-	ns	
tDHR6	Read Data hold time	20	-	-	ns	
tOH6	Output disable time	-	-	140	ns	CL = 100pF
tACC6	Access time	-	-	280	ns	CL = 100pF
tEWHW	Enable H pulse width (Write)	300	-	-	ns	
tEWHR	Enable H pulse width (Read)	300	-	-	ns	
tEWLW	Enable L pulse width (Write)	300	-	-	ns	
tEWLR	Enable L pulse width (Read)	300	-	-	ns	
tR	Rise time	-	-	30	ns	
tF	Fall time	-	-	30	ns	
tCS6	Chip select setup time	0	-	-	ns	
tCSH6	Chip select hold time	40	-	-	ns	
tCSHR6	Chip select hold time to read signal	40	-	-	ns	

(VDD1 = 2.4 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tcyc6	System cycle time	300	-	-	ns	
tAS6	Address setup time	0	-	-	ns	
tAH6	Address hold time	0	-	-	ns	
tDS6	Data setup time	40	-	-	ns	
tDHW6	Write Data hold time	10	-	-	ns	
tDHR6	Read Data hold time	10	-	-	ns	
tOH6	Output disable time	-	-	70	ns	CL = 100pF
tACC6	Access time	-	-	140	ns	CL = 100pF
tEWHW	Enable H pulse width (Write)	150	-	-	ns	
tEWHR	Enable H pulse width (Read)	150	-	-	ns	
tEWLW	Enable L pulse width (Write)	150	-	-	ns	
tEWLR	Enable L pulse width (Read)	150	-	-	ns	
tR	Rise time	-	-	15	ns	
tF	Fall time	-	-	15	ns	
tCS6	Chip select setup time	0	-	-	ns	
tCSH6	Chip select hold time	20	-	-	ns	
tCSHR6	Chip select hold time to read signal	20	-	-	ns	

(3) System buses Write characteristics 3 (For 4 wire SPI)



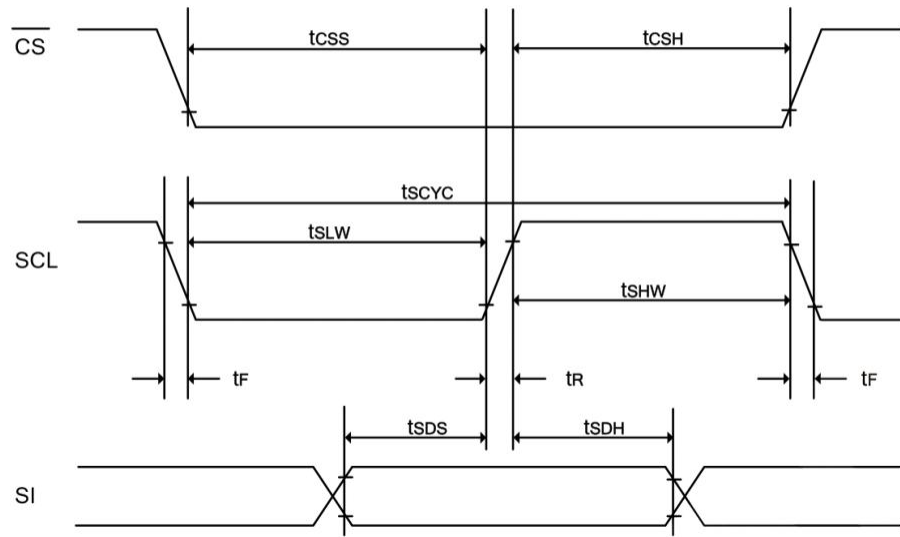
(V_{DD1} = 1.65 - 3.5V, T_A = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tscyc	Serial clock cycle	100	-	-	ns	
tsAS	Address setup time	60	-	-	ns	
tSAH	Address hold time	60	-	-	ns	
tSDS	Data setup time	40	-	-	ns	
tSDH	Data hold time	40	-	-	ns	
tcSS	$\overline{CS}$ setup time	90	-	-	ns	
tCSH	$\overline{CS}$ hold time time	24	-	-	ns	
tSHW	Serial clock H pulse width	40	-	-	ns	
tSLW	Serial clock L pulse width	40	-	-	ns	
tR	Rise time	-	-	6	ns	
tF	Fall time	-	-	6	ns	

(V_{DD1} = 2.4 - 3.5V, T_A = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tscyc	Serial clock cycle	50	-	-	ns	
tsAS	Address setup time	30	-	-	ns	
tSAH	Address hold time	30	-	-	ns	
tSDS	Data setup time	20	-	-	ns	
tSDH	Data hold time	20	-	-	ns	
tcSS	$\overline{CS}$ setup time	45	-	-	ns	
tCSH	$\overline{CS}$ hold time time	12	-	-	ns	
tSHW	Serial clock H pulse width	20	-	-	ns	
tSLW	Serial clock L pulse width	20	-	-	ns	
tR	Rise time	-	-	3	ns	
tF	Fall time	-	-	3	ns	

(4) System buses Write characteristics 4(For 3 wire SPI)



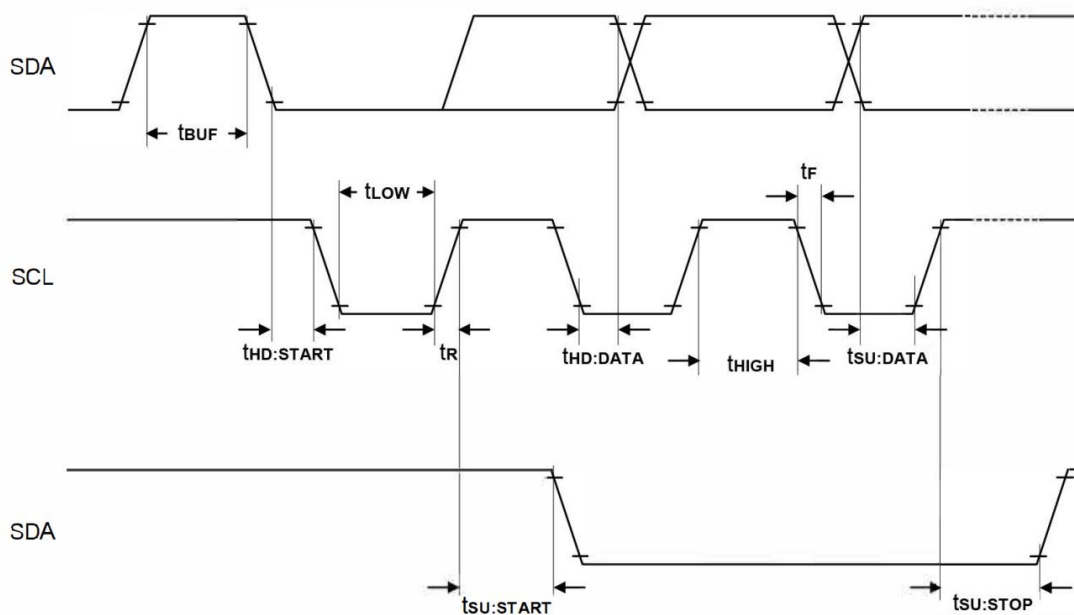
(V_{DD1} = 1.65 - 3.5V, T_A = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tscyc	Serial clock cycle	100	-	-	ns	
tSDS	Data setup time	40	-	-	ns	
tSDH	Data hold time	40	-	-	ns	
tcss	CS setup time	90	-	-	ns	
tCSH	CS hold time time	24	-	-	ns	
tSHW	Serial clock H pulse width	40	-	-	ns	
tSLW	Serial clock L pulse width	40	-	-	ns	
tR	Rise time	-	-	6	ns	
tF	Fall time	-	-	6	ns	

(V_{DD1} = 2.4 - 3.5V, T_A = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tscyc	Serial clock cycle	50	-	-	ns	
tSDS	Data setup time	20	-	-	ns	
tSDH	Data hold time	20	-	-	ns	
tcss	CS setup time	45	-	-	ns	
tCSH	CS hold time time	12	-	-	ns	
tSHW	Serial clock H pulse width	20	-	-	ns	
tSLW	Serial clock L pulse width	20	-	-	ns	
tR	Rise time	-	-	3	ns	
tF	Fall time	-	-	3	ns	

(5) I²C interface characteristics



(VDD1 = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
f _{SCL}	SCL clock frequency	DC	-	400	kHz	
T _{LOW}	SCL clock Low pulse width	1.3	-	-	uS	
T _{HIGH}	SCL clock H pulse width	0.6	-	-	uS	
T _{SU:DATA}	data setup time	100	-	-	nS	
T _{HD:DATA}	data hold time	0	-	0.9	uS	
T _R	SCL + SDA rise time	20+0.1Cb	-	300	nS	
T _F	SCL + SDA fall time	20+0.1Cb	-	300	nS	
C _b	Capacity load on each bus line	-	-	400	pF	
T _{SU:START}	Setup time for re-START	0.6	-	-	uS	
T _{HD:START}	START Hold time	0.6	-	-	uS	
T _{SU:STOP}	Setup time for STOP	0.6	-	-	uS	
T _{BUF}	Bus free times between STOP and START condition	1.3	-	-	uS	

9. Optical Characteristics.

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

Items		Symbol	Min.	Typ.	Max.	Unit	Remark
Operating Luminance		L	90	110*	-	cd/m ²	-
Color Coordinate	White	CIE x	0.24	0.28	0.32	CIE1931	Darkroom
		CIE y	0.28	0.32	0.36		
Operating Life Time*		Top	20,000	-	-	Hours	L= 110 cd/m2

Note:

1. L=110 cd/m² is based on VDD1=2.8V, VPP=12.0V, Contrast command setting 0x9F.
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.)

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

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。我们将不负任何相应的损失。)
- 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。)