

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	E096QJ-W-H30-40
Product Name	0.96 OLED Module
Version	V1.0
Date	2024-06-30

- ☐ Preliminary Specification
☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
1.0	2024.06.30	-	First issued	-

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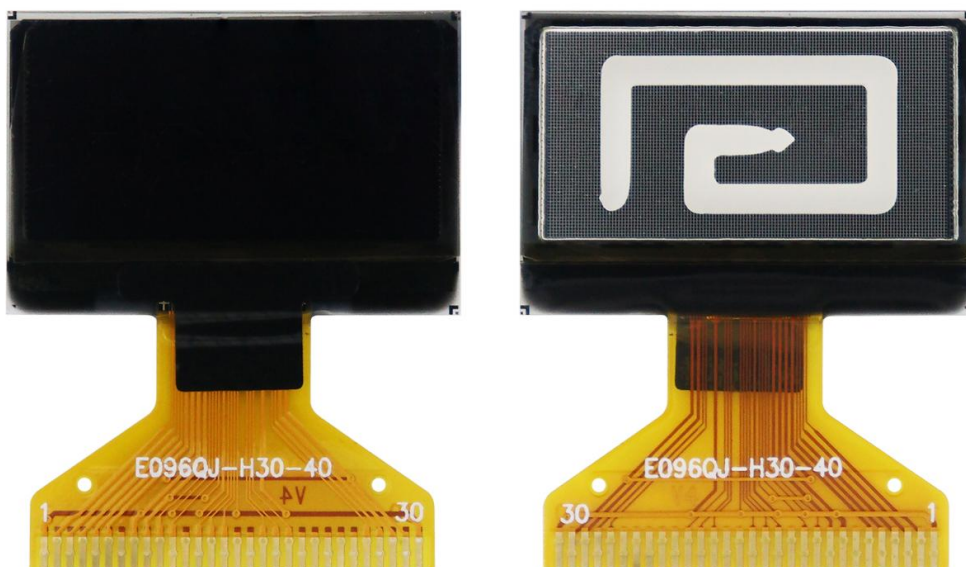
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1. General Parameter

NO.	Features	Details	Unit
1	Display Size(Diagonal)	0.96"	Inch
2	LCD type	OLED	-
3	View Direction	ALL	-
4	Drive Duty	1/64	-
5	Resolution	128 x 64	Pixels
6	Module size	24.7(W)×30.52(H)×1.43 (T)	mm
7	Active Area	21.74 (W)×11.18 (H)	mm
8	Pixel Pitch	0.17(W)×0.175(H)	mm
9	Pixel Size	0.15(W)×0.155(H)	mm
10	Interface	I ² C / SPI	-
11	Display Colors	White	-
12	Driver IC	SSD1315	-
13	IC package type	COG	-
14	Operating Temperature	-20℃~70℃	℃
15	Storage Temperature	-30℃~80℃	℃
16	Weight	-	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	+4	V
Charge Pump Regulator Supply Voltage	VBAT	-0.3	+6	V
Operating Voltage	VCC	0	16	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tst	-30	80	°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.

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
Logic Supply Voltage	VDD	1.65	-	3.5	V
Charge Pump Regulator Supply Voltage	VBAT	3.0	-	4.5	V
Operating Voltage	VCC	7.5	-	16	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}	-	-	0.1*VDD	V
VCC Supply Current	ICC	-	625	1000	uA
VDD Supply Current	IDD	-	160	220	uA

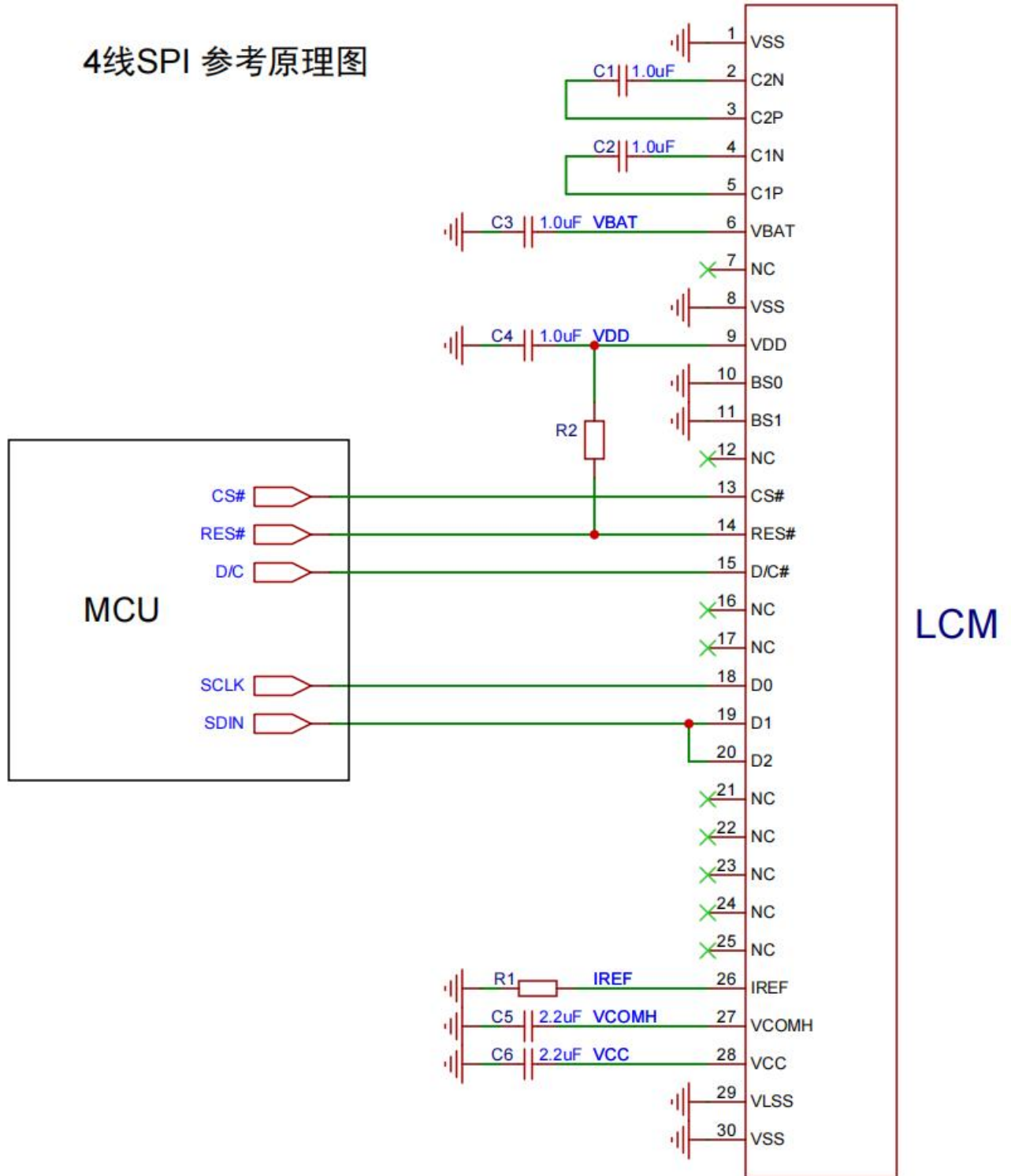
Note 1 : Brightness (Lbr) and Supply Voltage for Display (VCC) are subject to the change of the panel characteristics and the customer’ s request.

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

6. Pins Definitions.

Pin. No	Symbol	Description															
1	VSS	Ground pin. It must be connected to external ground.															
2	C2N	for charge pump capacitor; Connect to each other with a capacitor.															
3	C2P																
4	C1N	for charge pump capacitor; Connect to each other with a capacitor.															
5	C1P																
6	VBAT	Power supply for charge pump regulator circuit.															
		Status	VBAT	VDD	VCC												
		Enable charge pump	Connect to external VBAT source	Connect to external VDD source	A capacitor should be connected between this pin and VSS												
		Disable charge pump	Keep float	Connect to external VDD source	Connect to external VCC source												
7	NC	No connection.															
8	VSS	Ground pin. It must be connected to external ground.															
9	VDD	Power supply pin for core logic operation.															
10	BS0	<table><tr><th>Name</th><th>I²C</th><th>4-wire SPI</th><th>3-wire SPI</th></tr><tr><td>BS0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>BS1</td><td>1</td><td>0</td><td>0</td></tr></table>				Name	I ² C	4-wire SPI	3-wire SPI	BS0	0	0	1	BS1	1	0	0
Name	I ² C					4-wire SPI	3-wire SPI										
BS0	0					0	1										
BS1	1	0	0														
11	BS1																
12	NC	No connection.															
13	CS#	This pin is the chip select input connecting to the MCU. The chip is enabled for MCU communication only when CS# is pulled LOW (active LOW).															
14	RES#	This pin is reset signal input. When the pin is pulled LOW, initialization of the chip is executed. Keep this pin HIGH (i.e. connect to VDD) during normal operation.															
15	D/C#	This is the Data/Command control pad that determines whether the data bits are data or a command. In I2C interface, this pad serves as SA0 to distinguish the different address of OLED driver.															
16-17	NC	No connection.															
18	D0	When serial interface mode is selected, D2 should be either tied LOW or tied together with D1 as the serial data input: SDIN, and D0 will be the serial clock input: SCLK.															
19	D1																
20	D2	When I2C mode is selected, D2, D1 should be tied together and serve as SDAout, SDAin in application and D0 is the serial clock input, SCL.															
21-25	NC	No connection.															
26	IREF	This is segment output current reference pin. When external IREF is used, a resistor should be connected between this pin and VSS to maintain the IREF current at 30uA. Please refer to IC Specification manual for the details of resistor value.															
27	VCOMH	COM signal deselected voltage level. A capacitor should be connected between this pin and VSS															
28	VCC	Power supply for panel driving voltage. This is also the most positive power voltage supply pin. When charge pump is enabled, a capacitor should be connected between this pin and VSS.															
29	VLSS	This is an analog ground pin. It should be connected to VSS externally.															
30	VSS	Ground pin. It must be connected to external ground.															

7. Schematic Diagram.

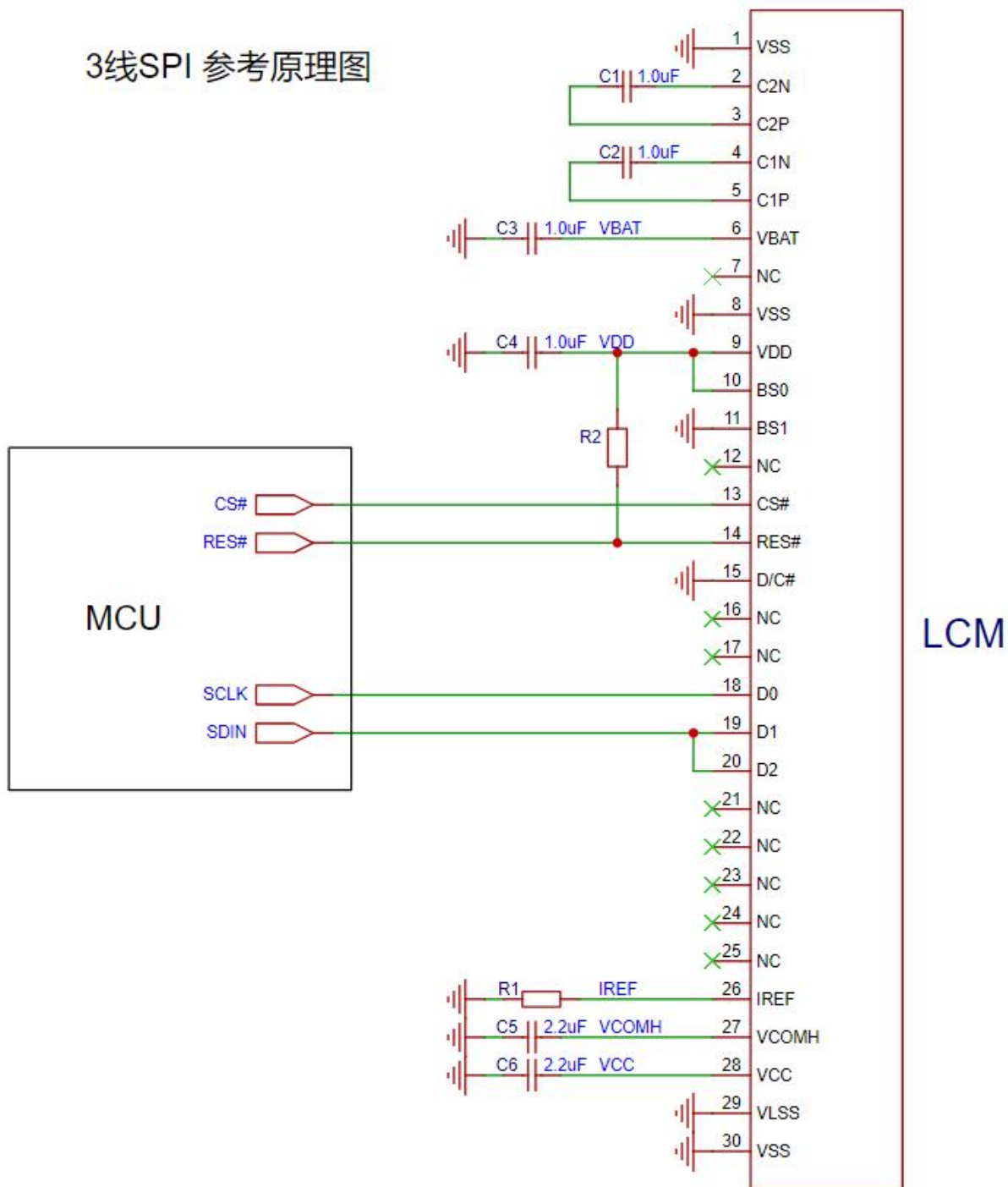


Since the voltage at IREF pin is $VCC - 3V$, the value of resistor R1 can be found as below:

For IREF = 30uA, VCC =12V:

$$\begin{aligned}
 R1 &= (\text{Voltage at IREF} - VSS) / IREF \\
 &= (12 - 3) / 30\mu A \\
 &= 300K
 \end{aligned}$$

3线SPI 参考原理图



Since the voltage at IREF pin is $VCC - 3V$, the value of resistor R1 can be found as below:

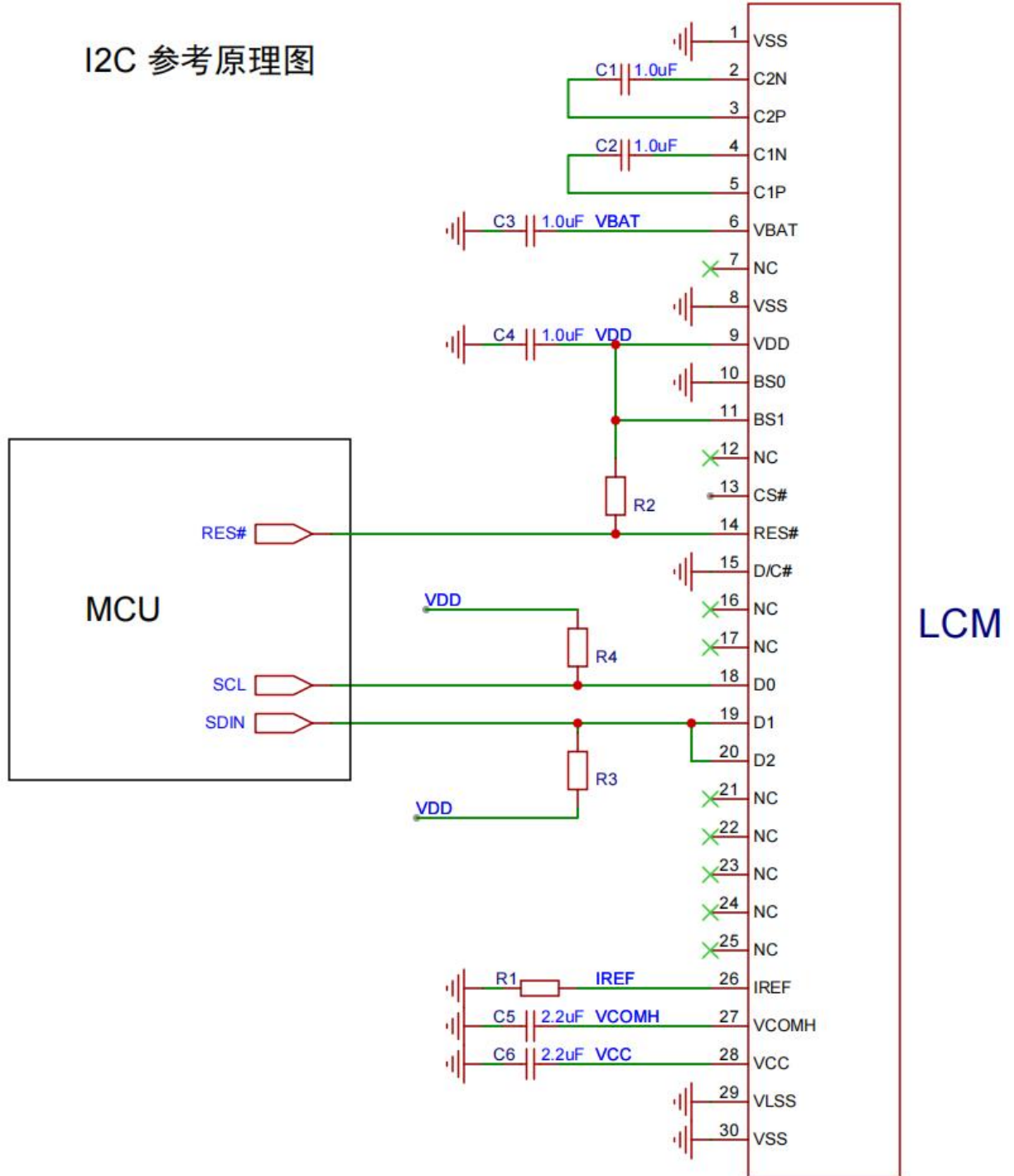
For $IREF = 30\mu A$, $VCC = 12V$:

$$R1 = (\text{Voltage at IREF} - VSS) / IREF$$

$$= (12 - 3) / 30\mu A$$

$$= 300K$$

I2C 参考原理图



Since the voltage at IREF pin is $VCC - 3V$, the value of resistor R1 can be found as below:

For IREF = 30uA, VCC = 12V:

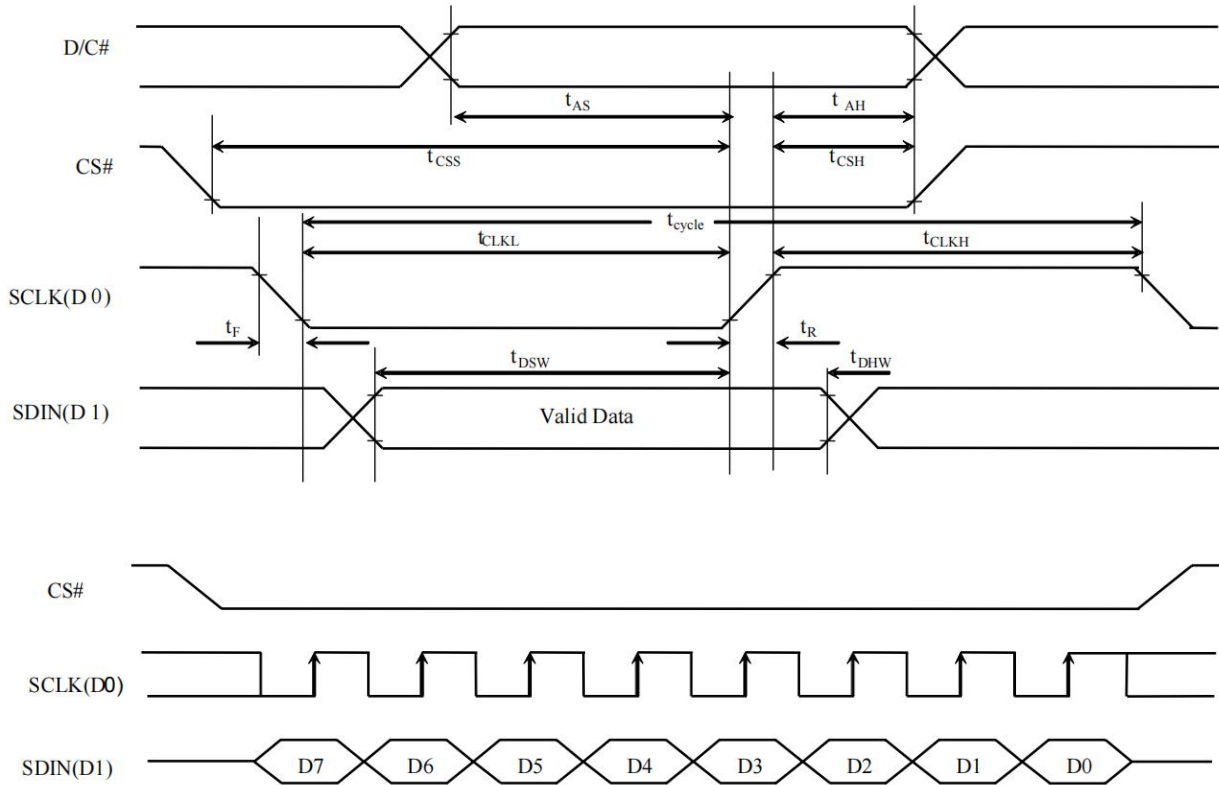
$$R1 = (\text{Voltage at IREF} - VSS) / IREF$$

$$= (12 - 3) / 30\mu A$$

$$= 300K$$

8. Timing Characteristics.

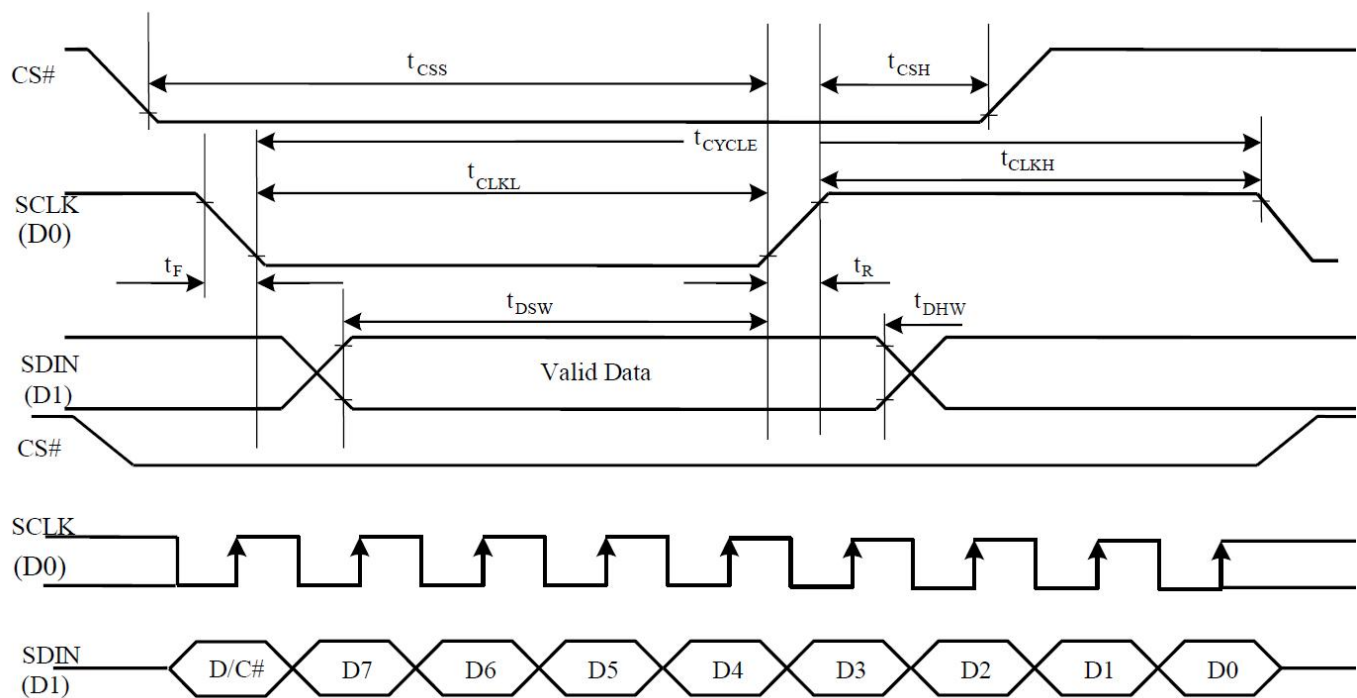
Serial interface characteristics (4 Wire SPI)



(VDD - VSS = 1.65V~3.5V, TA = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
tcycle	Clock Cycle Time	100	-	-	ns
tAS	Address Setup Time	15	-	-	ns
tAH	Address Hold Time	15	-	-	ns
tCSS	Chip Select Setup Time	20	-	-	ns
tCSH	Chip Select Hold Time	20	-	-	ns
tDSW	Write Data Setup Time	15	-	-	ns
tDHW	Write Data Hold Time	25	-	-	ns
tCLKL	Clock Low Time	30	-	-	ns
tCLKH	Clock High Time	30	-	-	ns
tR	Rise Time	-	-	40	ns
tF	Fall Time	-	-	40	ns

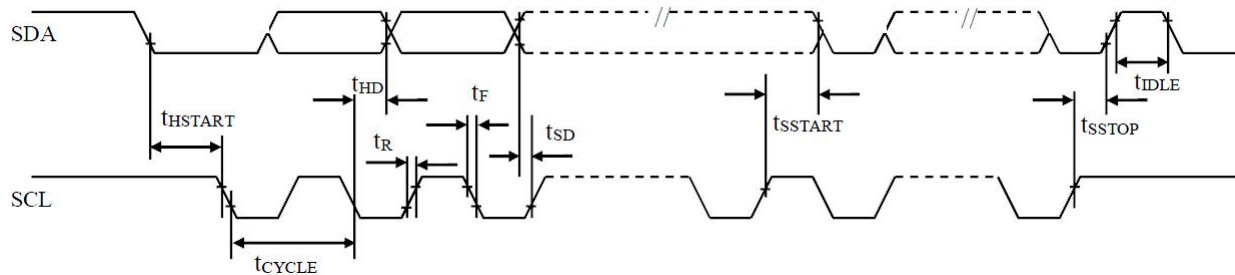
Serial interface characteristics (3 Wire SPI)



(VDD - VSS = 1.65V~3.5V, TA = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
tcycle	Clock Cycle Time	100	-	-	ns
tCSS	Chip Select Setup Time	20	-	-	ns
tCSH	Chip Select Hold Time	20	-	-	ns
tDSW	Write Data Setup Time	15	-	-	ns
tDHW	Write Data Hold Time	25	-	-	ns
tCLKL	Clock Low Time	30	-	-	ns
tCLKH	Clock High Time	30	-	-	ns
tR	Rise Time	-	-	40	ns
tF	Fall Time	-	-	40	ns

Serial interface characteristics (I²C)



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
$t_{SSSTART}$	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

9. Optical Characteristics.

All data in below based the condition (Ta = 22±3℃,60±10%RH).

Items		Symbol	Min.	Typ.	Max.	Unit	Remark
Operating Luminance		L	120	150*	-	cd/m ²	-
Color Coordinate	White	CIE x	0.230	0.270	0.310	CIE1931	Darkroom
		CIE y	0.265	0.305	0.345		
Operating Life Time*		Top	10,000	-	-	Hours	L= 120 cd/m ²

Note:

1.L=150 cd/m² is based on VDD=2.8V, VBAT=3.5V, VCC Generated by Internal DC/DC Circuit 7.5V, Contrast command setting 0X8F.

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 defective 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。)