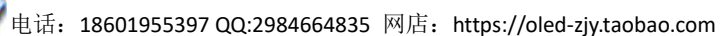|		
Part Name	:	OEL Display Module
Customer Part ID	:	
ZHONG JY Part ID	:	ZJY-M312P9PG01
Doc NO	:	ZJY1911083121

Customer:

Approved by

From: Zhongjingyuan Electronic Technology Co. LTD

Approved by

Notes:
1. Please contact ZHONGJINGYUAN. before assigning your product based on this module specification
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by Zhongjingyuan Electronic Technology Co. for any intellectual property claims or other problems that may result from application based on the module described herein.

Part Number	Revision	Revision Content	Revised on
ZJY-M312P9PG01	A	New	January 13, 2018

中景园电子技术有限公司
电话：18601955397 QQ:2984664835 网店：https://oled-zjy.taobao.com

Directory

1.Basic Specifications

1.1 Display Specifications

1) Display Mode: Passive Matrix
2) Display Color: Monochrome with 16 Gray Scales (White, blue, yellow and green are available, Customers choose according to their needs)
3) Drive Duty: 1/64 Duty
4) Font：Chinese English font

1.2 Mechanical Specifications

1) Outline Drawing: According to the annexed outline drawing
2) Number of Pixels: 256 × 64
3) Module Size:102x35(mm)
4) Panel Size: 88.00 × 27.80 × 2.00 (mm)
5) Active Area: 76.78 × 19.18 (mm)
6) Pixel Pitch: 0.30 × 0.30 (mm)
7) Pixel Size: 0.28 × 0.28 (mm)
8) Weight: 22 (g)

1.3 Active Area / Memory Mapping & Pixel Construction

1.4 Mechanical Drawing

内径3mm外径4.5mm
四个孔到板边距离均为3mm
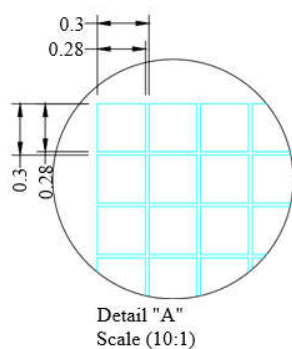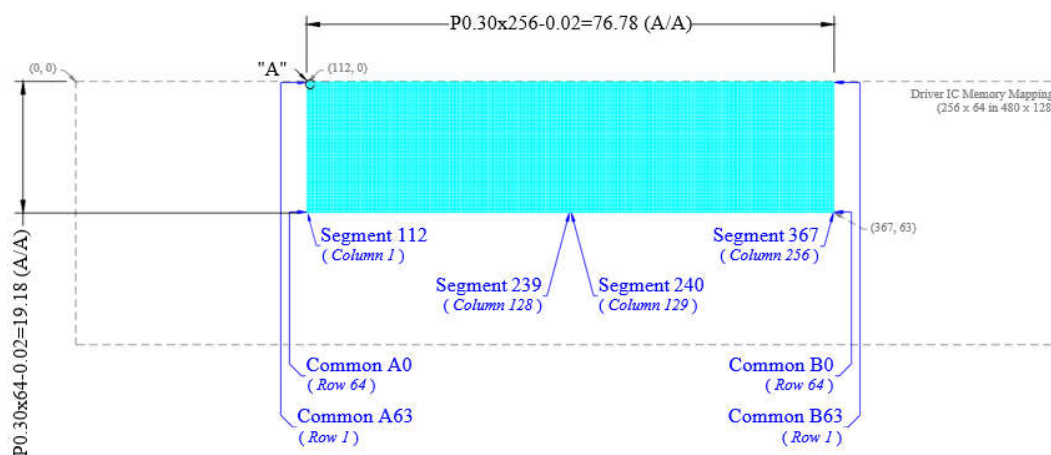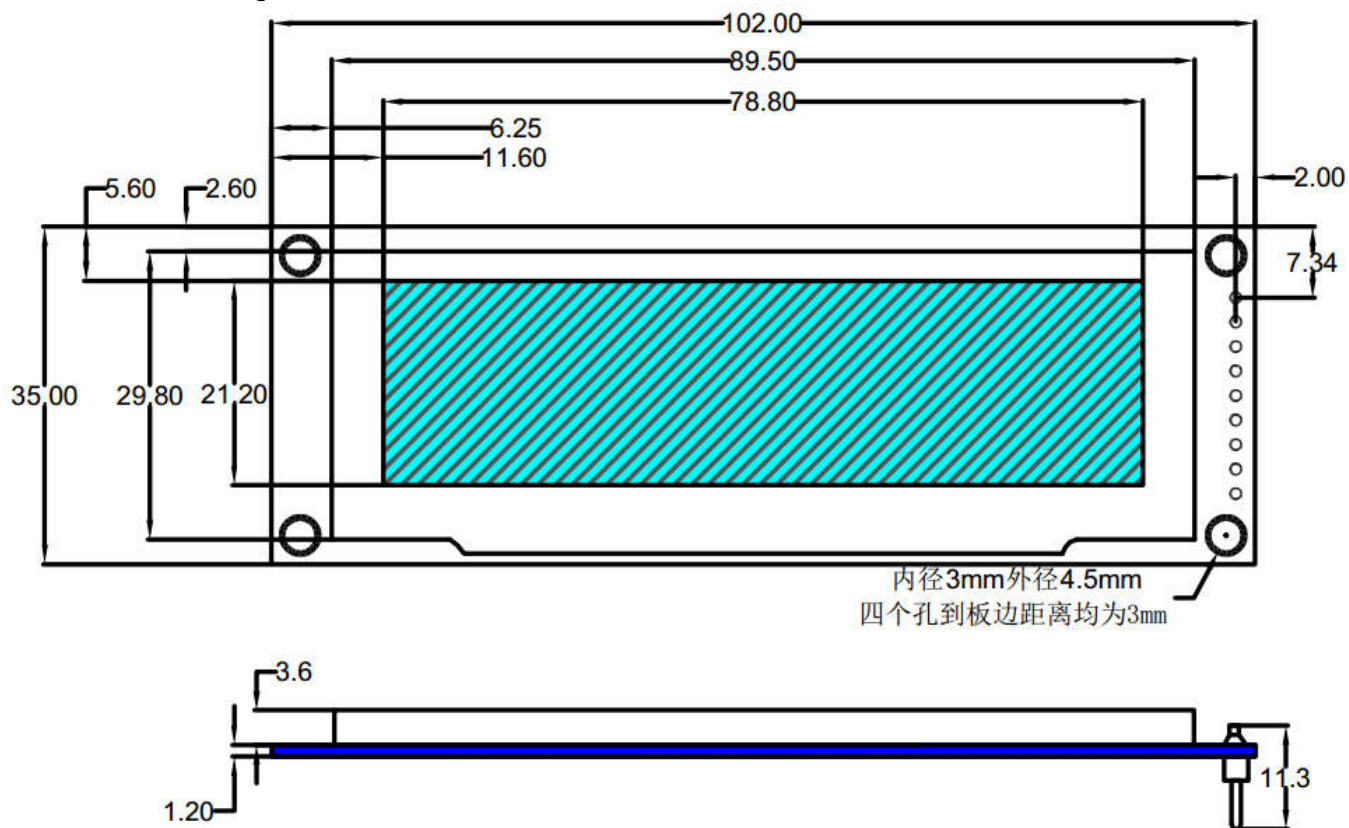
1. Color: Light **White, blue, yellow and green**

2. Driver IC: SSD1322

3. Interface: SPI

PIN	Symbol
1	GND
2	VCC
3	SCL
4	SDA
5	RES
6	DC
7	CS1
8	FSO
9	CS2

1.5 Pin Definition

| Pin Number	Symbol	I/O	Function
1	GND	Power	**Ground of Logic Circuit** This is a ground pin. It also acts as a reference for the logic pins. It must be connected to external ground.
2	VCC	Power	**Power Supply for Logic Circuit** This is a voltage supply pin. It must be connected to external source.
3	SCL	I	SPI mode is selected, SCL will be the serial clock input SCLK
4	SDA	I	SPI mode is selected, SDA will be serial data input SDIN
5	RES	I	**Power Reset for Controller and Driver** This pin is reset signal input. When the pin is low, initialization of the chip is executed. Keep this pin pull high during normal operation.
6	DC	I	**Data/Command Control** This pin is Data/Command control pin. When the pin is pulled high and serial interface mode is selected, the data at SDA will be interpreted as data. When it is pulled low, the data at SDA will be transferred to the command register. In I^{2}C mode, this pin acts as SA0 for slave address selection. For detail relationship to MCU interface signals, please refer to the Timing Characteristics Diagrams.
7	CS1	I	**OLED Chip Select** This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low. If you want to save an IO pin, the cs pin can be connected directly to theground, but not suspended
8	FSO	O	Font data output
9	CS2	I	**FONT IC Chip Select** This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low. If you want to save an IO pin, the cs pin can be connected directly to theground, but not suspended

1.6 Circuit schematic
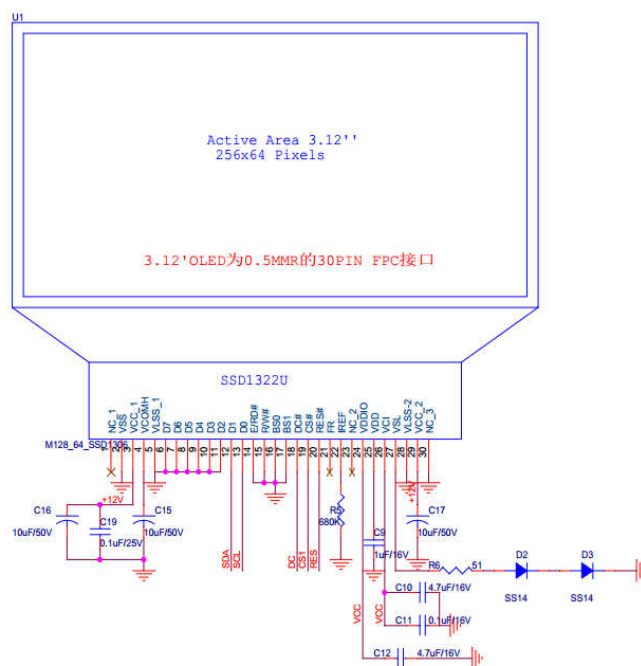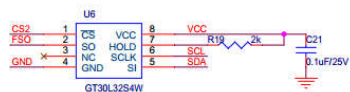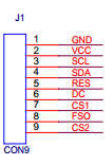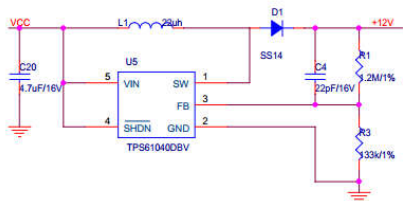
2.Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage for Display	VCC	3	3.5	V	1, 2
Operating Temperature	T_{OP}	-40	70	°C	3
Storage Temperature	T_{STG}	-40	85	°C	3
Life Time (80 cd/m^2)		25,000	-	hour	4
Life Time (60 cd/m^2)		40,000	-	hour	4

Note 1: All the above voltages are on the basis of "V_{SS} = 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 to Section 3. "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: V_{CC} = 3.3V, T_a = 25°C, 50% Checkerboard.
Software configuration follows Section   Initialization.
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.

3. Optics & Electrical Characteristics

3.1 Optics Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Brightness	L_{br}	Note 5	60	80	-	cd/m^2
C.I.E.	(x) (y)	C.I.E. 1931	0.12 0.22	0.16 0.26	0.20 0.30	
Dark Room Contrast	CR		-	>10,000:1	-	
Viewing Angle			-	Free	-	degree

3.2 DC Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage for Display	VCC	Note 5	3	.3	3.5	V
High Level Input	V_{IH}	I_{OUT} = 100μA, 3.3MHz	0.8× VCC	-	V_{DD}	V
Low Level Input	V_{IL}	I_{OUT} = 100μA, 3.3MHz	0	-	0.2×V_{DD}	V
High Level Output	V_{OH}	I_{OUT} = 100μA, 3.3MHz	0.9×V_{DD}	-	V_{DD}	V
Low Level Output	V_{OL}	I_{OUT} = 100μA, 3.3MHz	0	-	0.1×V_{DD}	V

		Note 6	-	60	80	mA
Operating Current for V_{CC}	I_{CC}	Note 7	-	90	110	mA
		Note 8	-	120	180	mA
Sleep Mode Current for V_{CC}	$I_{CC, SLEEP}$		-	6	33	μA

ote 5: Brightness (L_{br}) and Supply Voltage for Display (V_{CC}) are subject to the change of the panel characteristics and the customer's request.
Note 6: V_{CC} = 3.3V, 30% Display Area Turn on.
Note 7: V_{CC} = 3.3V, 50% Display Area Turn on.
Note 8: V_{CC} = 3.3V, 100% Display Area Turn on.

3.3 AC Characteristics

3.3.1 OLED 4-WIRE-SPI Interface Timing Characteristics:

Symbol	Description	Min	Max	Unit
t_{cycle}	Clock Cycle Time	100	-	ns
t_{AS}	Address Setup Time	15	-	ns
t_{AH}	Address Hold Time	15	-	ns
t_{CSS}	Chip Select Setup Time	20	-	ns
t_{CSH}	Chip Select Hold Time	10	-	ns
t_{DSW}	Write Data Setup Time	15	-	ns
t_{DHW}	Write Data Hold Time	15	-	ns
t_{CLKL}	Clock Low Time	20	-	ns
t_{CLKH}	Clock High Time	20	-	ns
t_R	Rise Time	-	15	ns
t_F	Fall Time	-	15	ns

(V_{CC} - V_{SS} = 3V to 3.5V, T_a = 25°C)
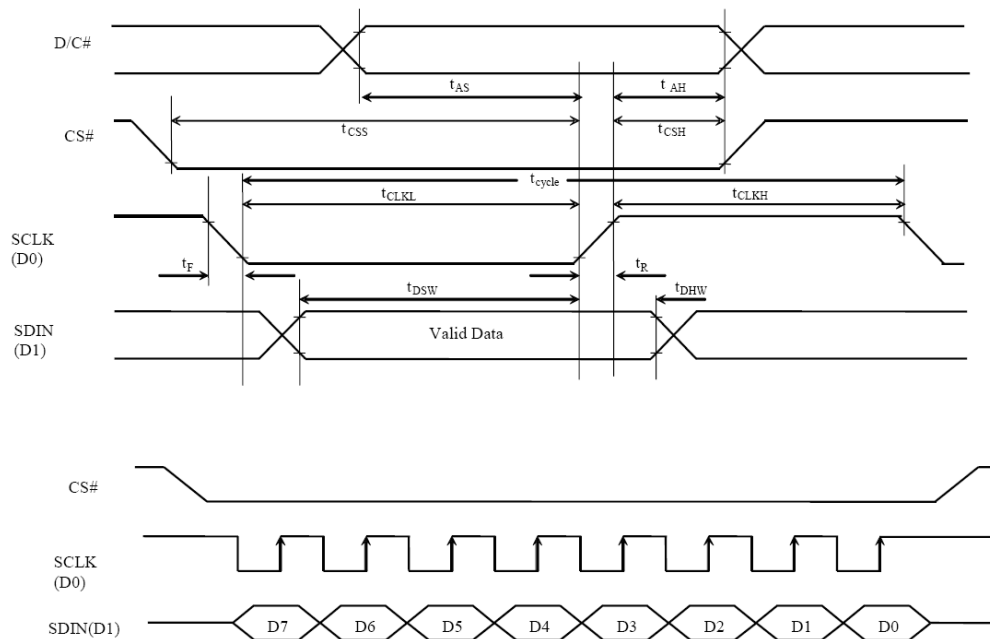
3.3.2 FONT IC SPI Interface Timing Characteristics:

Symbol	Alt.	Parameter	Min.	Max.	Unit
Fc	Fc	Clock Frequency	D.C.	30	MHz
tCH	tCLH	Clock High Time	15		ns
tCL	tCLL	Clock Low Time	15		ns
tCLCH		Clock Rise Time(peak to peak)	0.1		V/ns
tCHCL		Clock Fall Time (peak to peak)	0.1		V/ns
tSLCH	tCSS	CS# Active Setup Time (relative to SCLK)	5		ns
tCHSL		CS# Not Active Hold Time (relative to SCLK)	5		ns
tDVCH	tDSU	Data In Setup Time	2		ns
tCHDX	tDH	Data In Hold Time	5		ns
t CHSH		CS# Active Hold Time (relative to SCLK)	5		ns
t SHCH		CS# Not Active Setup Time (relative to SCLK)	5		ns
t SHSL	tCSH	CS# Deselect Time	100		ns
t SHQZ	tDIS	Output Disable Time		9	ns
t CLQV	tv	Clock Low to Output Valid		9	ns
t CLQX	tHO	Output Hold Time	0		ns

Serial Input Timing
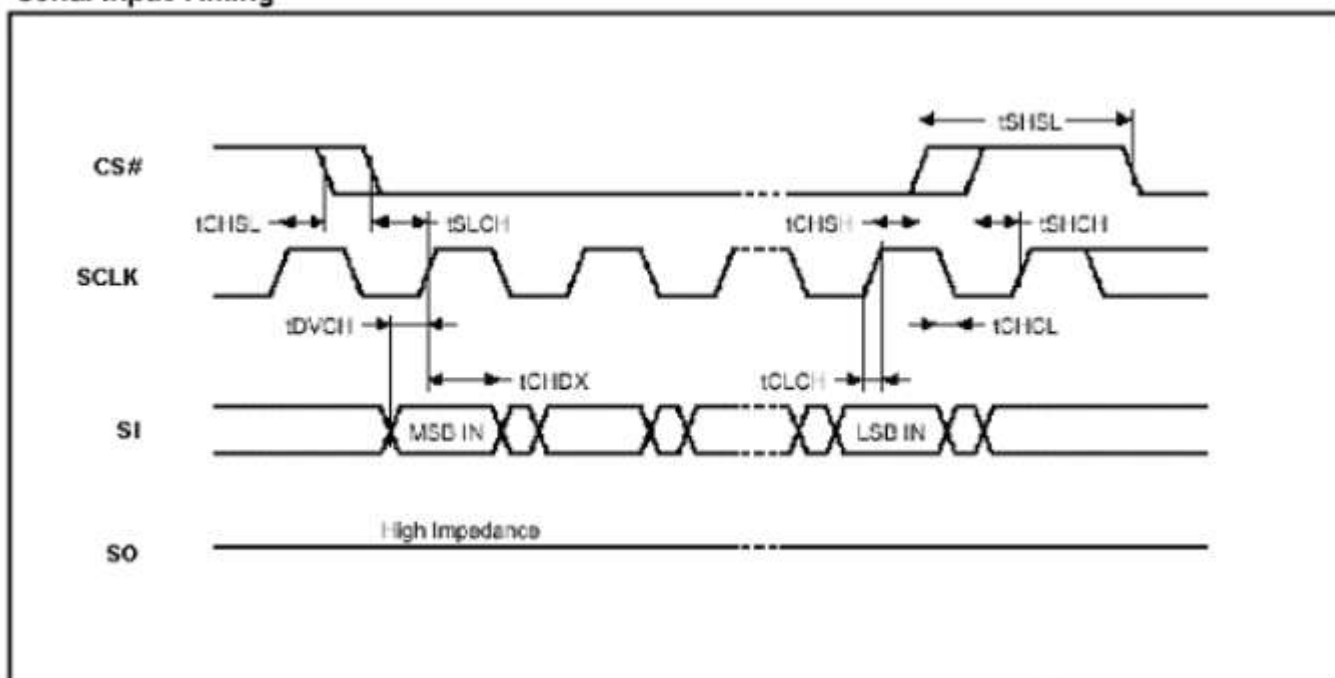
Output Timing
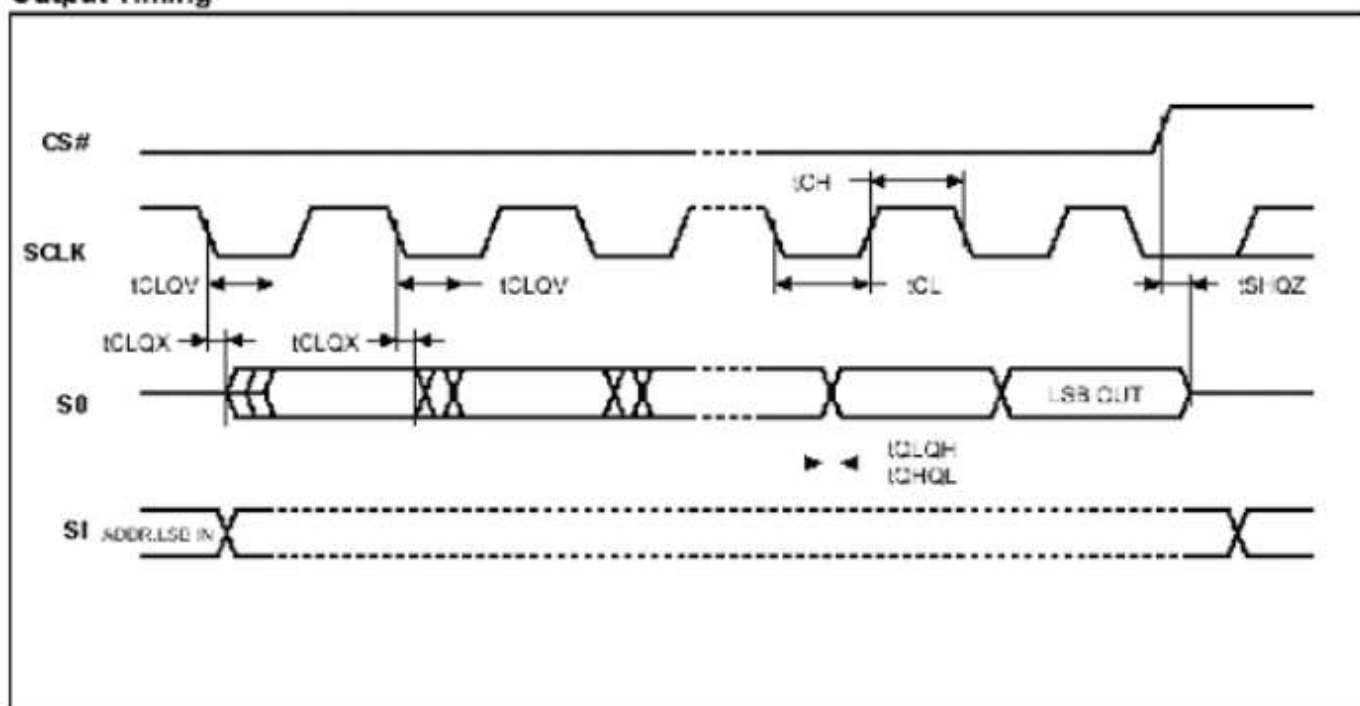
4.Functional Specification

4.1 Commands

Refer to the Technical Manual for the SSD1322, FONT ic commands Refer to the Technical Manual for theGT20L16S1Y

4.2 Reset Circuit

When RES# input is low, the chip is initialized with the following status:
1. Display is OFF
2. 480×128 Display Mode
3. Normal segment and display data column and row address mapping (SEG0 mapped to column address 00h and COM0 mapped to row address 00h)
4. Display start line is set at display RAM address 0
5. Column address counter is set at 0
6. Normal scan direction of the COM outputs
7. Contrast control register is set at 7Fh

4.3 Actual Application Example

<Power up Sequence>

Column 1:

(V_CI/V_DDIO/V_CC off State)

↓

Power up V_CI/V_DDIO
(RES# as Low State)

↓

Power Stabilized (300ms Delay Recommended)

↓

Set RES# as High
(100μs Delay Minimum)

↓

Initialized State
(Parameters as Default)

↓

Command Lock
0xFD, 0x12

↓

Set Display Off
0xAE

↓

Initial Settings Configuration

↓

Set Display Clock Divide Ratio/Oscillator Frequency
0xB3, 0x91

↓

Set Multiplex Ratio
0xCA, 0x3F

↓

Set Display Offset
0xA2, 0x00

Column 2:

Set Display Start Line
0xA1, 0x00

↓

Set Re-Map & Dual COM Line Mode
0xA0, 0x14, 0x11

↓

Set GPIO
0xB5, 0x00

↓

Function Selection
0xAB, 0x01

↓

Set Segment Low Voltage
0xB4, 0xA0, 0xFD

↓

Set Contrast Current
0xC1, 0x9F

↓

Master Contrast Current Control
0xC7, 0x0F

↓

Select Gray Scale Table 0xB8,
0x0C, 0x18, 0x24, 0x30,
0x3C, 0x48, 0x54, 0x60,
0x6C, 0x78, 0x84, 0x90,
0x9C, 0xA8, 0xB4

↓

Enable Gray Scale Table 0x00

↓

Set Phase Length
0xB1, 0xE8

Column 3:

Enhance Driving Scheme Capability
0xD1, 0x82, 0x20

↓

Set Pre-Charge Voltage
0xBB, 0x1F

↓

Set Second Pre-Charge Period
0xB6, 0x08

↓

Set VCOMH Deselect Level
0xBE, 0x07

↓

Set Display Mode
0xA6

↓

Clear Screen

↓

Power up V_CC & Stabilized
(Delay Recommended)

↓

Set Display On
0xAF

↓

Power Stabilized (200ms Delay Recommended)

↓

(*Display Data Sent*)
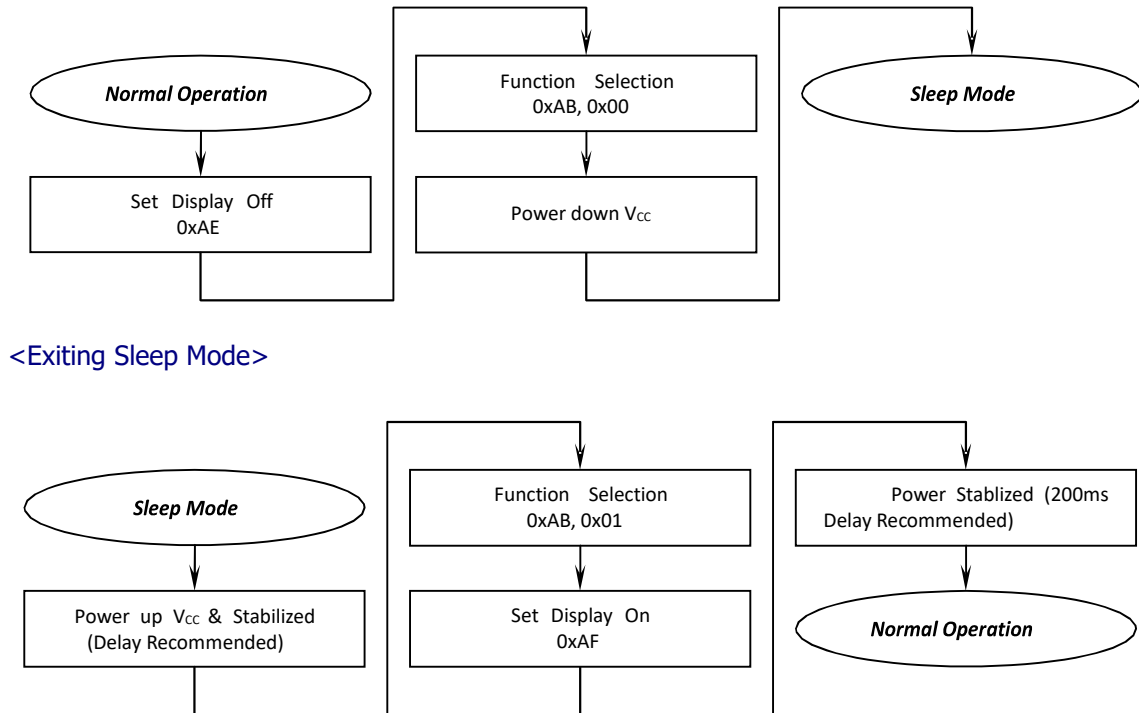
If the noise is accidentally occurred at the displaying window during the operation, please reset the display in order to recover the display function.

<Entering Sleep Mode>

```
  ┌──────────────────────────┐                    ┌──────────────────────┐
  ▼                          ▼                    ▼
╭────────────────╮   ┌──────────────────┐   ╭────────────────╮
│ Normal Operation│   │ Function  Selection│   │   Sleep Mode   │
╰────────────────╯   │    0xAB, 0x00     │   ╰────────────────╯
        │            └──────────────────┘
        ▼                     ▼
┌────────────────┐   ┌──────────────────┐
│ Set  Display  Off│   │  Power down Vcc  │
│      0xAE        │   └──────────────────┘
└────────────────┘
```

<Exiting Sleep Mode>

```
  ┌──────────────────────────┐                    ┌──────────────────────────┐
  ▼                          ▼                    ▼
╭────────────────╮   ┌──────────────────┐   ┌──────────────────────────┐
│   Sleep Mode   │   │ Function  Selection│   │ Power  Stablized (200ms  │
╰────────────────╯   │    0xAB, 0x01     │   │   Delay Recommended)     │
        │            └──────────────────┘   └──────────────────────────┘
        ▼                     ▼                         ▼
┌──────────────────────┐ ┌──────────────────┐ ╭──────────────────────────╮
│Power up Vcc & Stabilized│ │ Set  Display  On │ │    Normal Operation      │
│ (Delay Recommended)   │ │      0xAF         │ ╰──────────────────────────╯
└──────────────────────┘ └──────────────────┘
```

5. The connection between the MCU and the display screen

5.1 Software 4-SPI and MCU connection
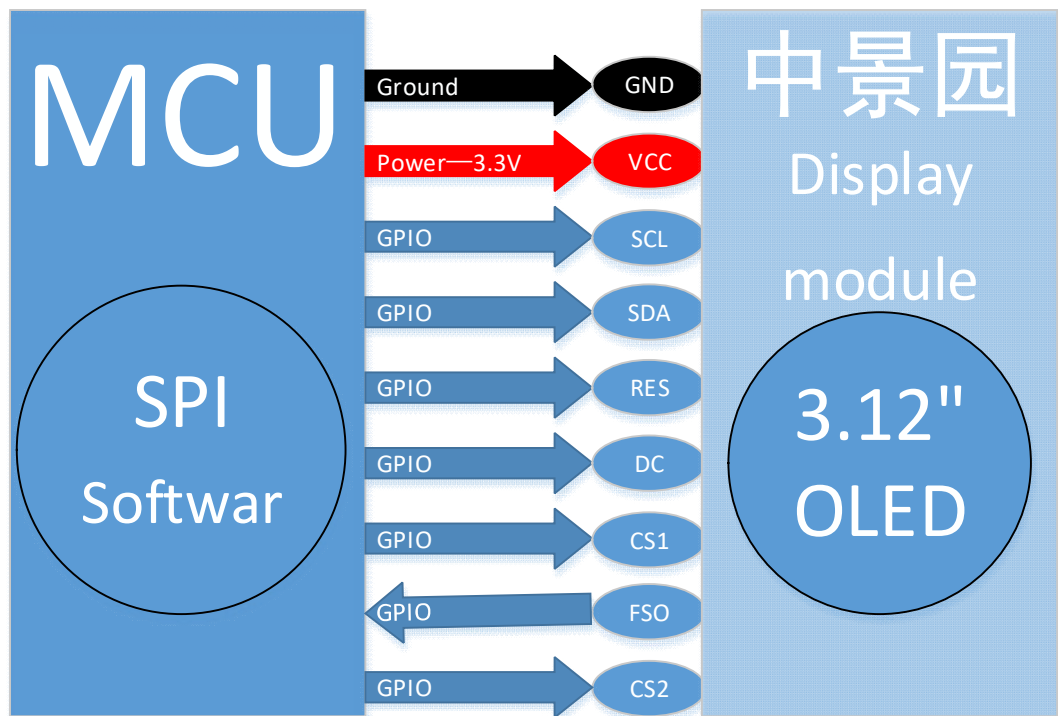
5.2 Hardware 4-SPI and MCU connection
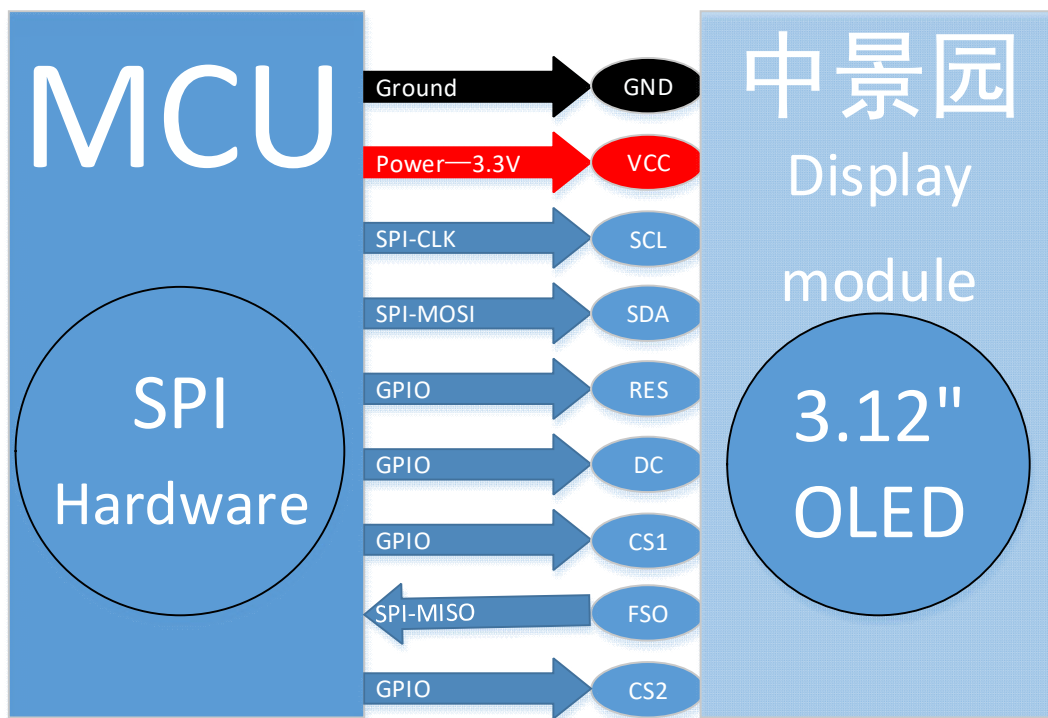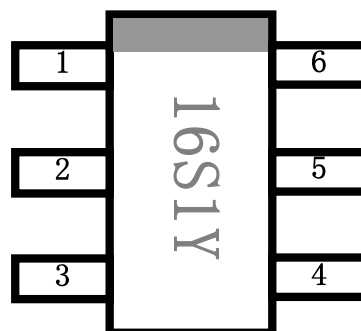
6.字库概述

GT20L16S1Y是一款内含15X16点阵的汉字库芯片，支持GB2312国标简体汉字（含有国家信标委合法授权）ASCII字符。排列格式为竖置横排。用户通过字符内码，利用本手册提供的方法计算出该字符点阵在芯片中的地址，可从该地址连续读出字符点阵信息。

6.1芯片特点

- 数据总线：SPI 串行总线接口
- 点阵排列方式：字节竖置横排
- 时钟频率：30MHz(max.)@3.3V
- 工作电压：2.2V~3.6V
- 电流：

工作电流：8mA待机电流：8uA

- 封装：SOT23-6
- 尺寸 SOT23-6：2.9mmX1.6 mm x1.10mm
- 工作温度：-20℃~85℃

6.2芯片内容

分类	字库内容	编码体系（字符集）	字符数
汉字及字符	15X16 点GB2312 标准点阵字库	GB2312	6763+376
	8X16 点国标扩展字符	GB2312	126
	5X7 点ASCII 字符	ASCII	96
	7X8 点ASCII 字符	ASCII	96

ASCII 字符	8X16 点ASCII 字符	ASCII	96
	8X16 点ASCII 粗体字符	ASCII	96
	16 点阵不等宽ASCII 方头（Arial）字符	ASCII	96
	16 点阵不等宽ASCII 白正（TimesNewRoman）字符	ASCII	96

字型样张

15X16 点 GB2312 汉字

啊阿埃挨哎唉哀皑癌蔼矮艾
碍爱隘鞍氨安俺按暗岸胺案
肮昂盎凹敖熬翱袄傲奥懊澳
芭捌扒叭吧笆八疤巴拔跋靶
把耙坝霸罢爸白柏百摆佰败
拜稗斑班搬扳般颁板版扮拌

8x16 点国标扩展字符

!"#¥%&'()*+,-./012345
6789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`a

5x7 点 ASCII 字符

!"#¥%&'()*+,-./0123456789:
=>?@ABCDEFGHIJKLMNOPQRSTUV
YZ[\]^ `abcdefghijklmnopqr

7x8 点 ASCII 字符

!"#$%&'()*+,-./01234
6789:;<=>?@ABCDEFGHIJ
LMNOPQRSTUVWXYZ[\]^_`
bcdefghijklmnopqrstuv
6789:;<=>?@ABCDEFGHIJ

8x16 点 ASCII 字符

!"#¥%&'()*+,-./012345
6789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`a

8x16 点 ASCII 粗体字符

!"#$%&'()*+,-./012345
9:;<=>?@ABCDEFGHIJKLM
ijklmnopqrstuvwxyz{i}

16 点阵不等宽 ASCII 方头

!"#$%&'()*+,-./0123456789:;<=>
DEFGHIJKLMNOPQRSTUVWX
abcdefghijklmnopqrstuvwxyz{

16 点阵不等宽 ASCII 白正

!"#$%&'()*+,-./0123456789
;<=>?@ABCDEFGHIJKLM
cdefghijklmnopqrstuvwxyz{|}

中景园电子企业店铺地址：https://oled-zjy.taobao.com
业务咨询：黄先生 18601955397

店铺二维码：