Product Specification

Product Name: VGM128128C1F02

Product Code: M02191

Customer
Approved by Customer
Approved Date:

Designed By	Checked By	Approved By	
		R&D	QA

CONTENT

REVISION RECORD

REV.	REVISION DESCRIPTION	REV. DATE	REMARK
Y01	Initial release.	2017-08-02	
A01	Update the value of R2 Update Package Specification	2018-02-27	Page16,17,18,19 Page26

1 Overview

VGM128128C1F02 is a full color OLED display module with 128(RGB)×128 dot matrix. The characteristics of this display module are high brightness, self-emission, high contrast ratio, slim/thin outline, wide viewing angle, wide temperature range, and low power consumption.

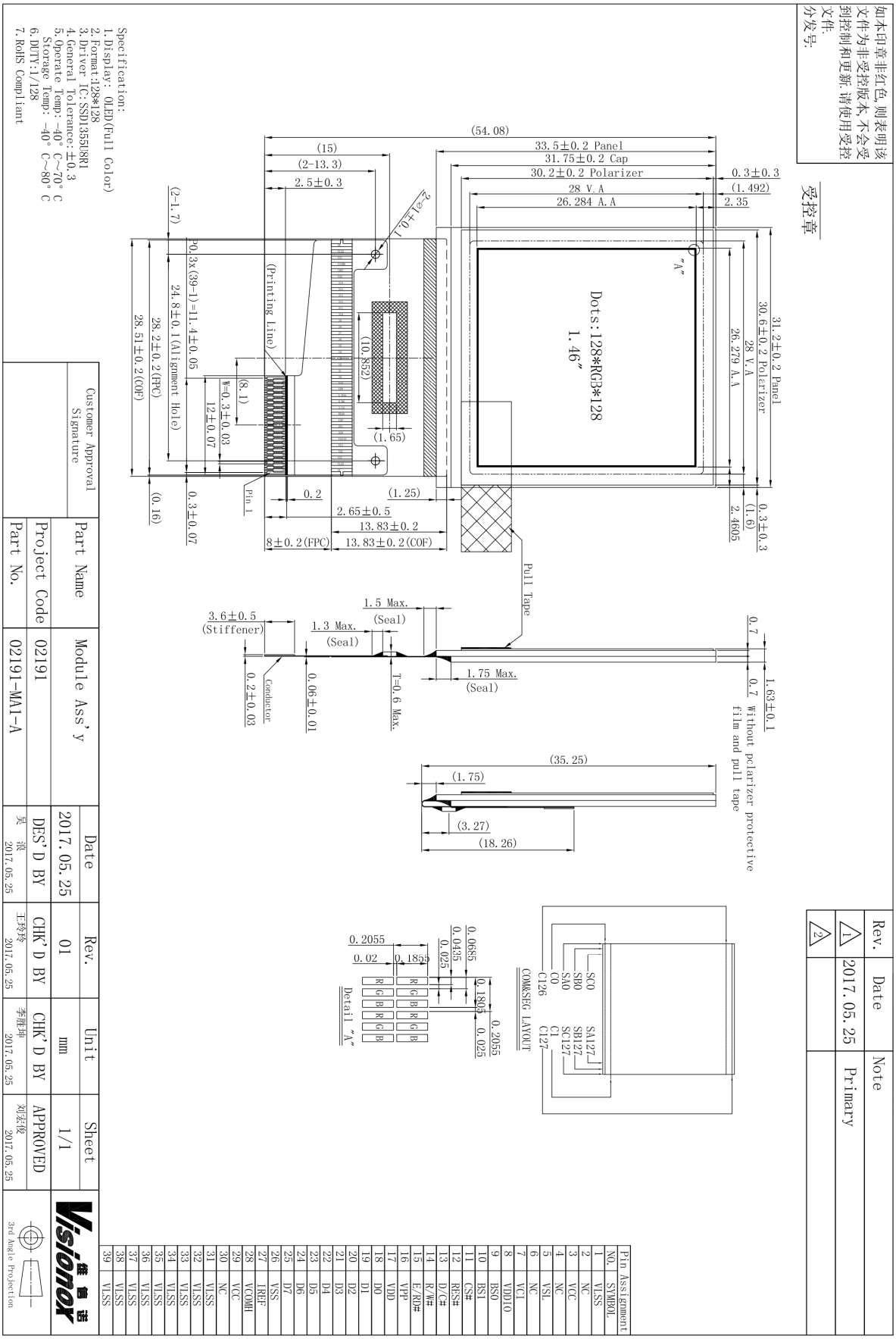
2 Features

- Display Color: Full Color
- Dot Matrix: 128×128
- Driver IC: SSD1355U8R1
- Interface: 8080、6800、3-Wire SPI、4-Wire SPI
- Wide range of operating temperature: -40℃~70℃

3 Mechanical Data

NO.	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128(W)×128(H)	-
2	Dot Size	0.0435(W)×0.1855 (H)	mm^2
3	Dot Pitch	0.0685(W)×0.2055 (H)	mm^2
4	Aperture Rate	57.3	%
5	Active Area	26.279(W)×26.284 (H)	mm^2
6	Panel Size	31.2(W)×33.5(H) ×1.40(T)	mm^3
7	Module Size	31.2(W)×54.08(H) ×1.63(T)	mm^3
8	Diagonal A/A Size	1.46	inch
9	Module Weight	3.50±10%	gram

4 Mechanical Drawing



Pin Assignment		
NO.	SYMBOL	
1	VLSS	
2	NC	
3	VCC	
4	NC	
5	VSL	
6	NC	
7	VCI	
8	VDD1O	
9	BS0	
10	BS1	
11	CS#	
12	RES#	
13	D/C#	
14	R/W#	
15	E/RD#	
16	VPP	
17	VDD	
18	D0	
19	D1	
20	D2	
21	D3	
22	D4	
23	D5	
24	D6	
25	D7	
26	VSS	
27	IREF	
28	VCOMH	
29	VCC	
30	NC	
31	VLSS	
32	VLSS	
33	VLSS	
34	VLSS	
35	VLSS	
36	VLSS	
37	VLSS	
38	VLSS	
39	VLSS	

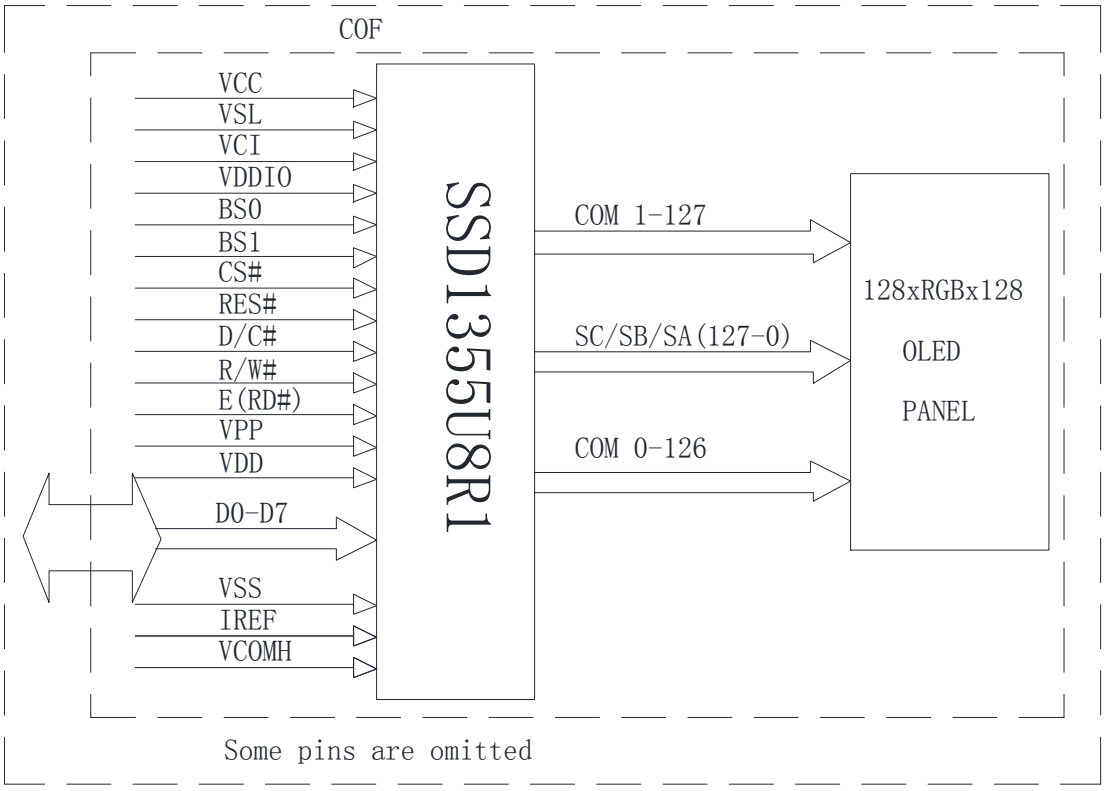
5 Module Interface

IN NO.	PIN NAME	DESCRIPTION
1	VLSS	Analog system ground pin.
2	NC	No Connection.
3	VCC	Power supply for panel driving voltage.This is also the most positive voltage supply pin of the chip.
4	NC	No Connection.
5	VSL	This is segment voltage reference pin.
6	NC	No Connection.
7	VCI	Low voltage power supply.
8	VDDIO	Power supply for interface logic level
9	BS0	Table5-1
10	BS1	Table5-1
11	CS#	Chip select pin, active low.
12	RES#	Reset pin,active low.
13	D/C#	This pin is Data/Command control pin. When the pin is pulled high, the data at D7-D0is treated as display data. When the pin is pulled low, the data at D7-D0 will be transferred to the command register.
14	R/W#	This pin is MCU interface input. When interfacing to a 6800-series microprocessor, this pin will be used as Read/Write (R/W) selection input. Read mode will be carried out when this pin is pulled high and write mode when low. When 8080 interfacing mode is selected, this pin will be the Write (WR#) input.Data write operation is initiated when this pin is pulled low and the chip is selected. When serial interface is selected, this pin R/W#(WR#) must be connected to VSS.
15	E/RD#	This pin is MCU interface input. When interfacing to a 6800-series microprocessor, this pin will be used as the Enable (E) signal. Read/write operation is initiated when this pin is pulled high and the chip is selected. When interfacing to an 8080- microprocessor,this pin receives the Read(RD#)signal. Read/write operation in initiated when this pin is pulled low and the chip is selected. When serial interface is selected, this pin E(RD#) must be connected to VSS.
16	VPP	Power supply for programming OTP.
17	VDD	Power Supply pin for logic operation of the driver.
18~25	D0~D7	Data bus.
26	VSS	Ground.
27	IREF	A resistor should be connented between this pin and VSS.
28	VCOMH	A capacitor should be connected between this pin and VSS.
29	VCC	Power supply for panel driving voltage.
30	NC	No Connection.
31~39	VLSS	Analog system ground pin.

Table5-1

BS[1:0]	Interface
00	4 line SPI
01	3 line SPI
11	8-bit 6800 parallel
10	8-bit 8080 parallel

6 Function Block Diagram



7 Absolute Maximum Ratings

ITEM	SYMBOL	MIN	MAX	UNIT	REMARK
Supply Voltage	V_{DD}	-0.5	2.75	V	IC maximum rating
	V_{DDIO}	-0.5	V_{CI}	V	IC maximum rating
	V_{CC}	0	20	V	IC maximum rating
	V_{CI}	-0.3	4.0	V	IC maximum rating
Operating Temp.	Top	-40	70	℃	-
Storage Temp	Tstg	-40	85	℃	-

Note (1): All of the voltages are on the basis of "VSS = 0V".

Note (2): Permanent breakage of module may occur if the module is used beyond the maximum rating. The module can be normal operated under the conditions according to Section 8 "Electrical Characteristics". Malfunctioning of the module may occur and the reliability of the module may deteriorate if the module is used beyond the conditions.

8 Electrical Characteristics

8.1 DC Electrical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Logic Supply Voltage	V_{DD}	22±3°C, 55±15%R.H	2.4	-	2.6	V
Power Supply for I/O pins	V_{DDIO}	22±3°C, 55±15%R.H	1.6	-	V_{CI}	V
OLED Driver Supply Voltage	V_{CC}	22±3°C, 55±15%R.H	11.5	12	12.5	V
Low voltage power supply	V_{CI}	22±3°C, 55±15%R.H	2.4	-	3.5	
High-level Input Voltage	V_{IH}	-	$0.8\times V_{DDIO}$	-	V_{DDIO}	V
Low-level Input Voltage	V_{IL}	-	0	-	$0.2\times V_{DDIO}$	V
High-level Output Voltage	V_{OH}	-	$0.9\times V_{DDIO}$	-	V_{DDIO}	V
Low-level Output Voltage	V_{OL}	-	0	-	$0.1\times V_{DDIO}$	V

Note : The V_{CC} input must be kept in a stable value; ripple and noise are not allowed.

8.2 Electro-optical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Normal Mode Brightness	L_{br}	All pixels ON(1)	60	80		cd/m^2
Normal Mode Power Consumption	Pt	All pixels ON(1)		348	456	mW
Sleep mode V_{DD} Current	I_{DD_SLEEP}	Display OFF, No panel attached	-	0	20	uA
Sleep mode V_{DDIO} Current	I_{DDIO_SLEEP}	Display OFF, No panel attached	-	0	20	uA
Sleep mode V_{CC} Current	I_{CC_SLEEP}	Display OFF, No panel attached	-	0	20	uA
C.I.E(White)	(x)	x,y(CIE1931)	0.26	0.30	0.34	-
	(y)		0.29	0.33	0.37	-
C.I.E(Red)	(x)	x,y(CIE1931)	0.61	0.65	0.69	-
	(y)		0.30	0.34	0.38	-
C.I.E(Green)	(x)	x,y(CIE1931)	0.26	0.30	0.34	-
	(y)		0.57	0.61	0.64	-
C.I.E(Blue)	(x)	x,y(CIE1931)	0.10	0.14	0.18	-
	(y)		0.13	0.17	0.21	-
Dark Room Contrast	CR	-	≥2000:1	-	-	-
Response Time	-	-	---	10	-	μ s
View Angle	-	-	≥160	-	-	Degree

Note(1): Normal Mode test conditions are as follows:

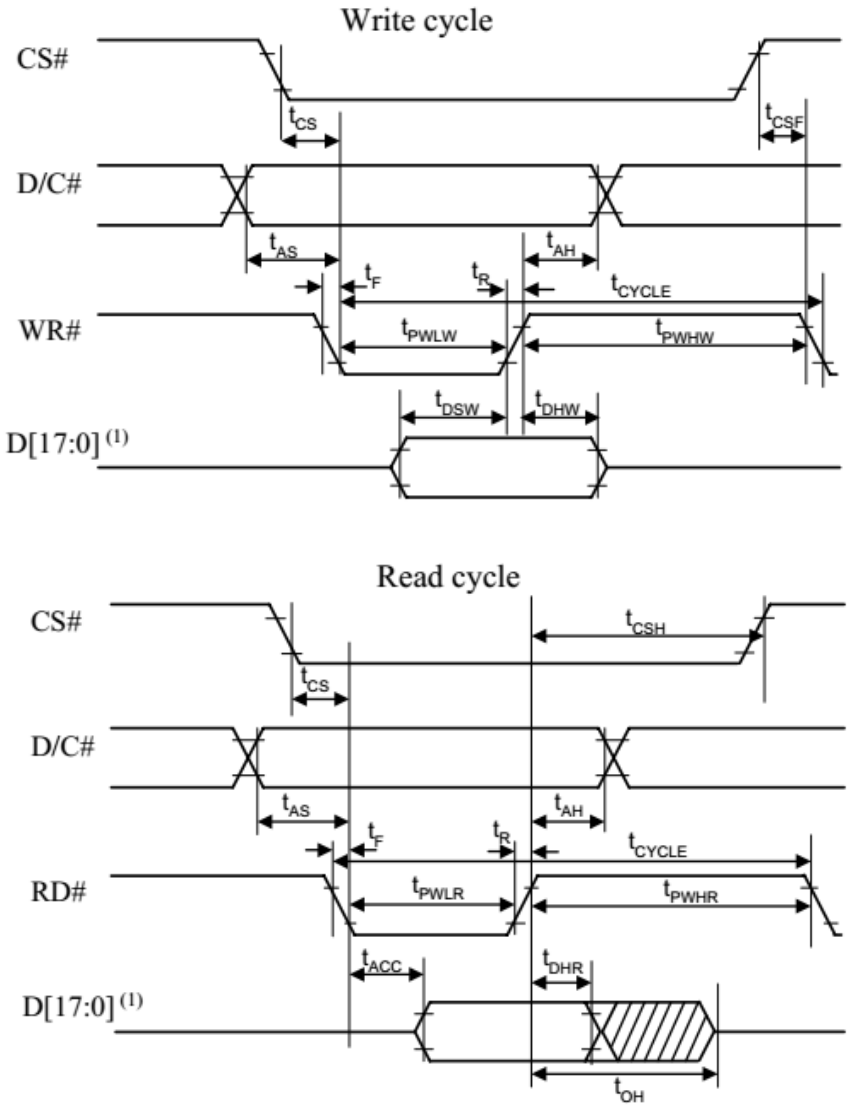
- Driving voltage :12V
- Contrast setting : R: 0xd0 G: 0x58 B: 0x57
- Frame rate : 105Hz
- Duty setting : 1/128

8.3 AC Electrical Characteristics

(1)8080-Series MPU Parallel Interface Timing Characteristics

(V_{DD} - V_{SS} = 2.4 to 2.6V, V_{DDIO}=1.6V, V_{CI} = 2.8V, T_A = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{CYCLE}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	10	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns
t_{DHW}	Write Data Hold Time	7	-	-	ns
t_{DHR}	Read Data Hold Time	20	-	-	ns
t_{OH}	Output Disable Time	-	-	70	ns
t_{ACC}	Access Time	-	-	140	ns
t_{PWLR}	Read Low Time	150	-	-	ns
t_{PWLW}	Write Low Time	60	-	-	ns
t_{PWHR}	Read High Time	60	-	-	ns
t_{PWHW}	Write High Time	60	-	-	ns
t_R	Rise Time	-	-	15	ns
t_F	Fall Time	-	-	15	ns
t_{CS}	Chip select setup time	0	-	-	ns
t_{CSH}	Chip select hold time to read signal	0	-	-	ns
t_{CSF}	Chip select hold time	20	-	-	ns

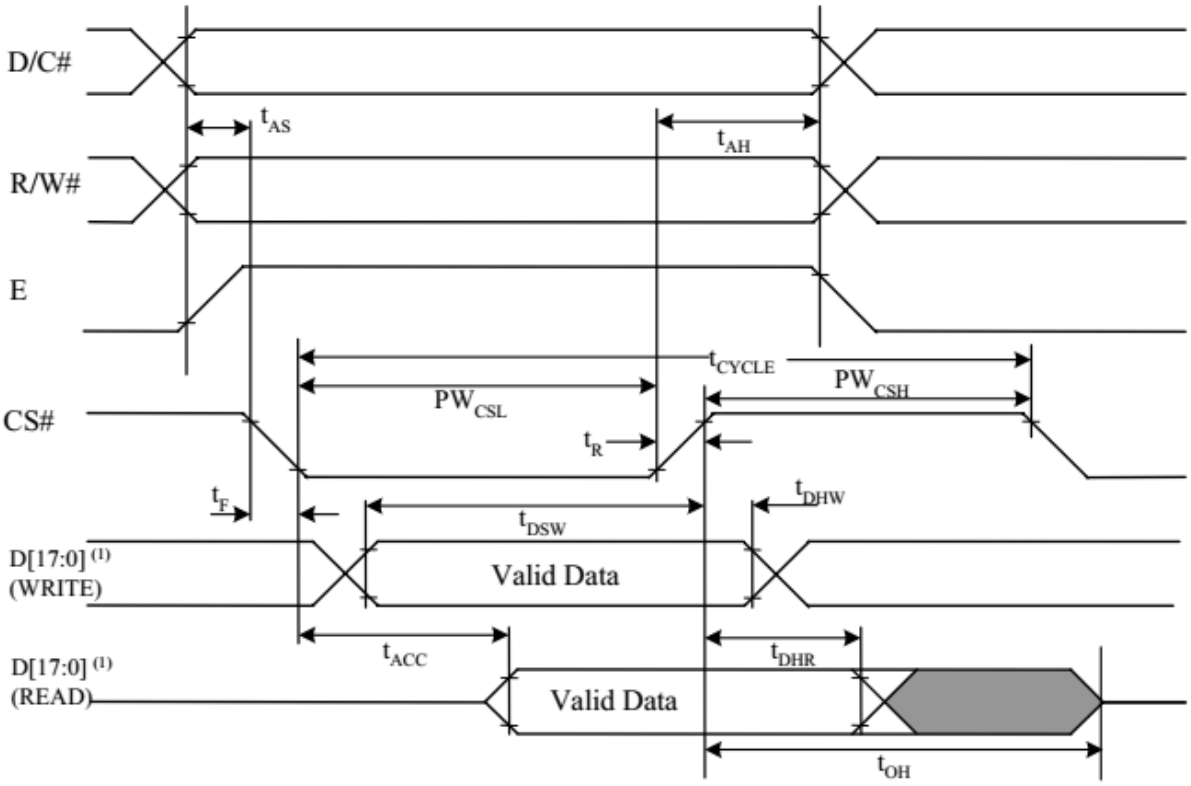


8080-series parallel interface characteristics

(2)6800-Series MPU Parallel Interface Timing Characteristics

(V_{DD} - V_{SS} = 2.4 to 2.6V, V_{DDIO}=1.6V, V_{CI} = 2.8V, T_A = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{CYCLE}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	10	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns
t_{DHW}	Write Data Hold Time	7	-	-	ns
t_{DHR}	Read Data Hold Time	20	-	-	ns
t_{OH}	Output Disable Time	-	-	70	ns
t_{ACC}	Access Time	-	-	140	ns
PW_{CSL}	Chip Select Low Pulse Width (read) Chip Select Low Pulse Width (write)	120 60	-	-	ns
PW_{CSH}	Chip Select High Pulse Width (read) Chip Select High Pulse Width (write)	60 60	-	-	ns
t_R	Rise Time	-	-	15	ns
t_F	Fall Time	-	-	15	ns



Note

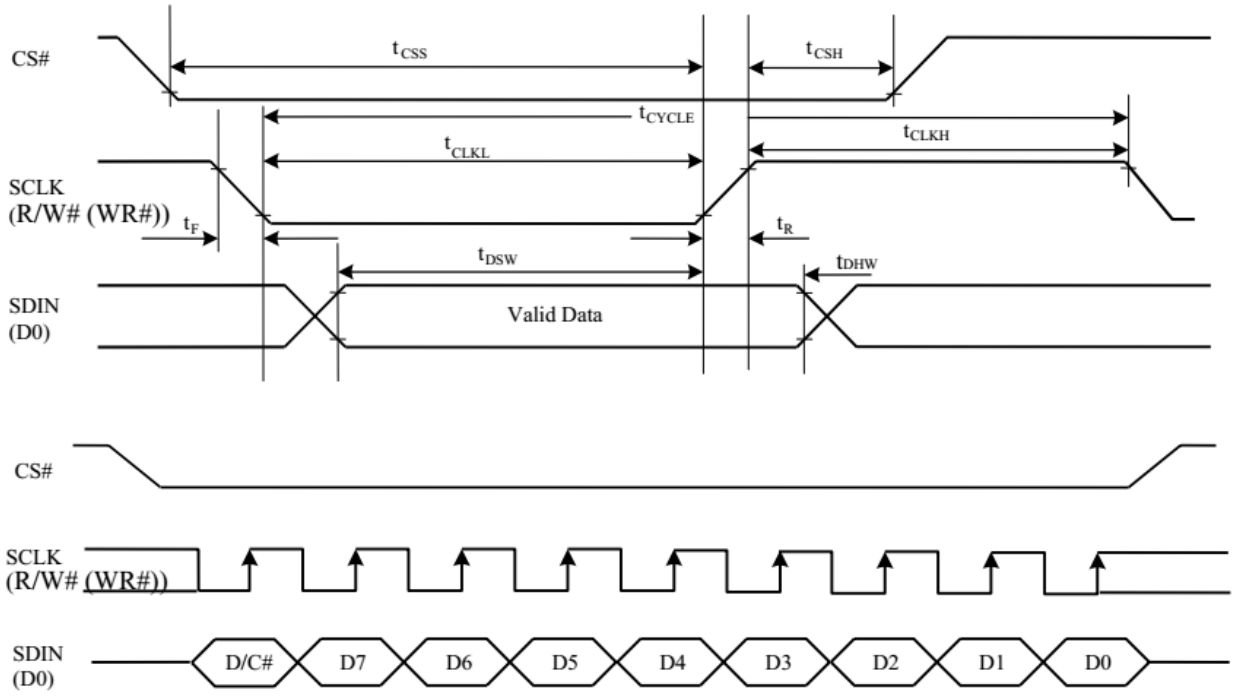
(1) when 8 bit used: D[7:0] instead; when 16 bit used: D[15:0] instead; when 18 bit used: D[17:0] instead.

6800-series parallel interface characteristics

(3) Serial Interface Timing Characteristics (3-wire SPI)

(V_{DD} - V_{SS} = 2.4 to 2.6V, V_{DDIO}=1.6V, V_{CI} = 2.8V, T_A = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	50	-	-	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

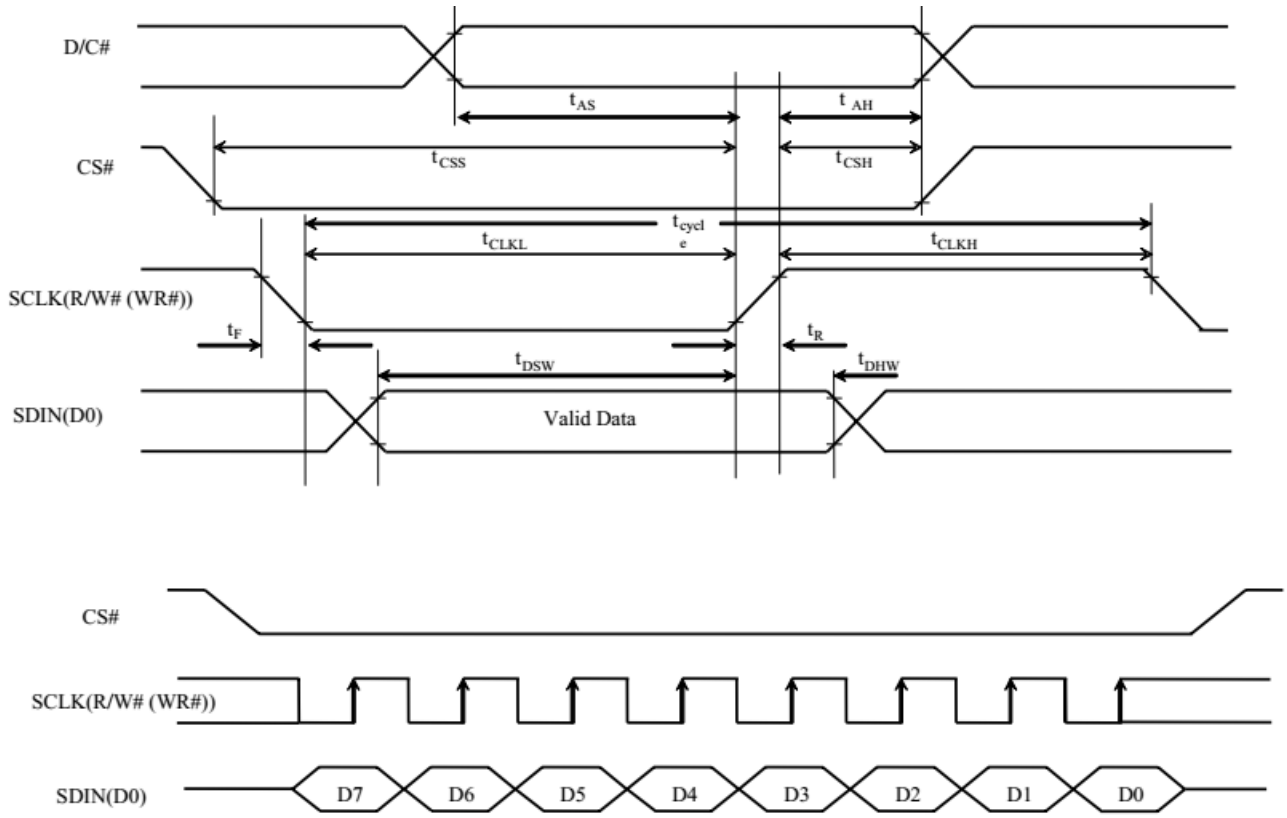


Serial interface characteristics(3-wire SPI)

(4) Serial Interface Timing Characteristics (4-wire SPI)

(V_{DD} - V_{SS} = 2.4 to 2.6V, V_{DDIO}=1.6V, V_{CI} = 2.8V, T_A = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	50	-	-	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



Serial interface characteristics(4-wire SPI)

9 Functional Specification and Application Circuit

9.1 Power ON and Power OFF Sequence

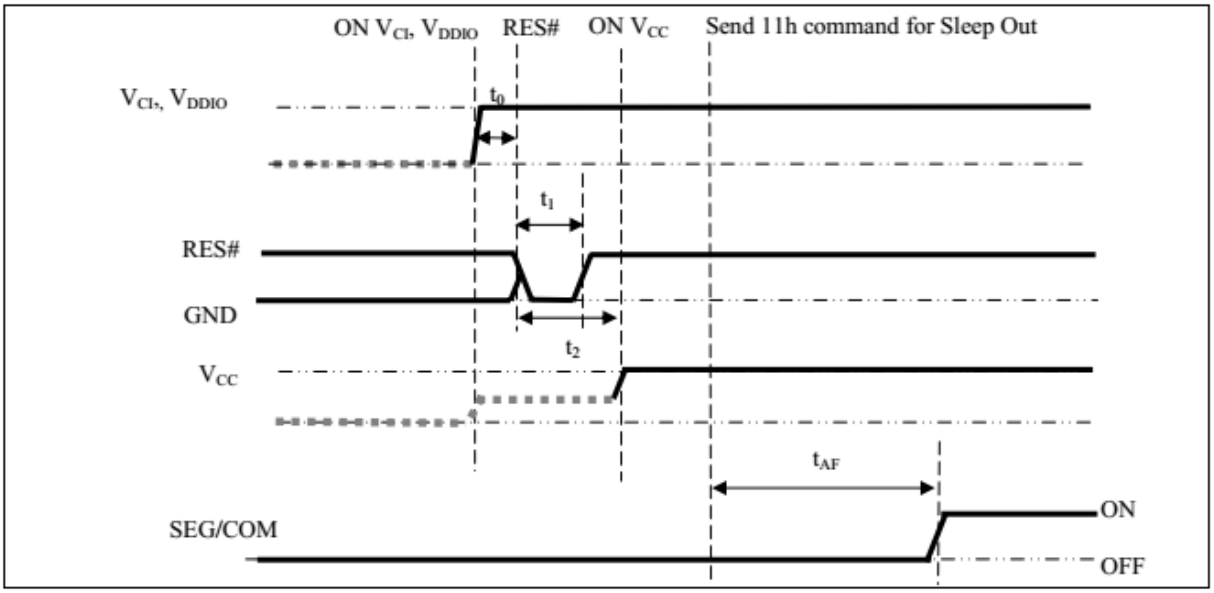
Power ON Sequence:

1. Power ON V_{CI}, V_{DDIO}

2. After V_{CI}, V_{DDIO} become stable, set wait time at least 1ms (t_0) for internal V_{DD} become stable. Then set RES# pin LOW (logic low) for at least 2us (t_1)(4) and then HIGH (logic high).

3. After set RES# pin LOW (logic low), wait for at least 2us (t_2). Then Power ON V_{CC}.(1)

4. After V_{CC} become stable, send command 11h for Sleep Out. SEG/COM will be ON after 200ms (t_{AF}).

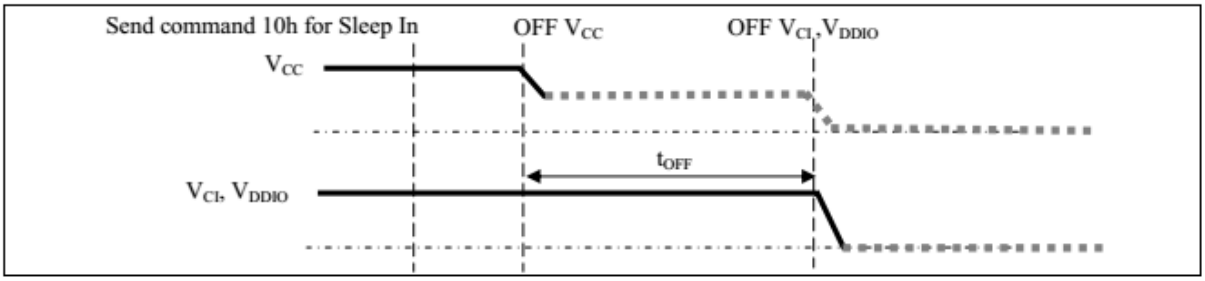


Power OFF Sequence:

1. Send command 10h for Sleep In.

2. Power OFF V_{CC}(1),(2),(3).

3. Wait for t_{OFF}. Power OFF V_{CI}, V_{DDIO}. (where Minimum t_{OFF}=0ms (5) ,Typical t_{OFF}=100ms)



Note:

(1)Since an ESD protection circuit is connected between V_{CI},V_{DDIO} and V_{CC}, V_{CC} becomes lower than V_{CI} whenever V_{CI},V_{DDIO} is ON and V_{CC} is OFF as shown in the dotted line of V_{CC} in above figures.

(2) V_{CC} should be kept float (disable) when it is OFF.

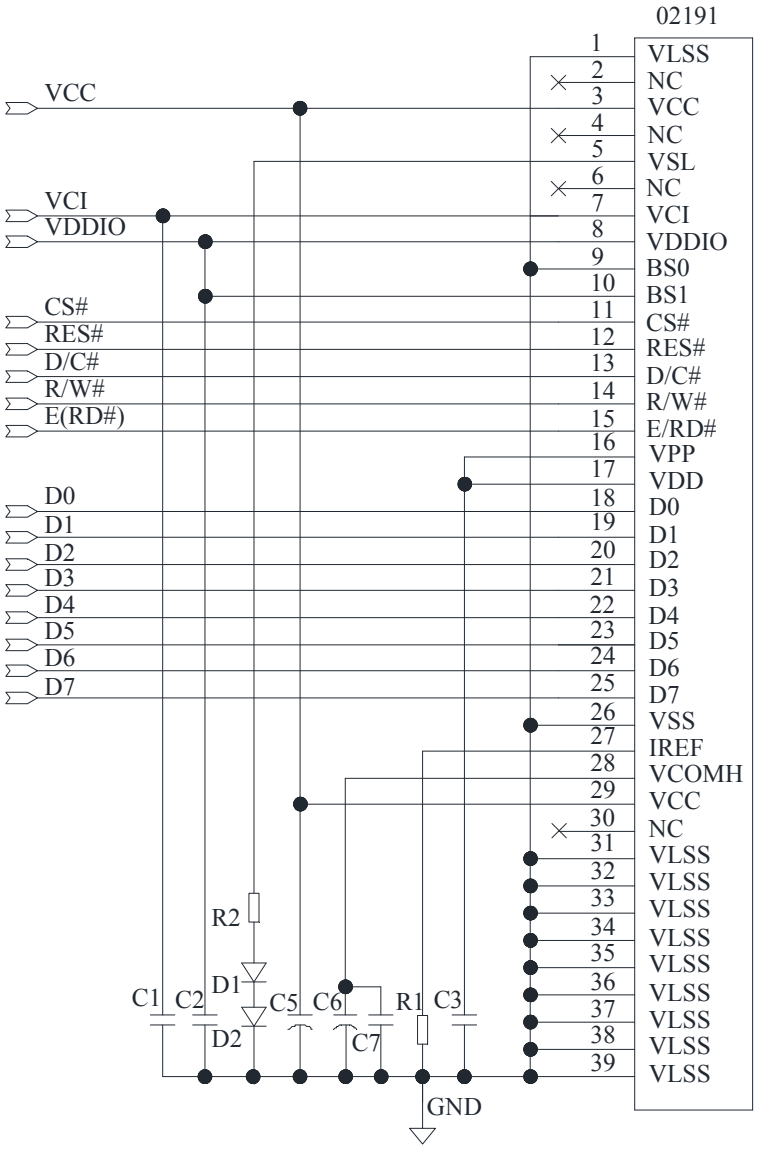
(3) Power Pins(V_{DD}, V_{CC}) can never be pulled to ground under any circumstance.

(4) The register values are reset after t_1.

(5) V_{CI},V_{DDIO} should not be Power OFF before V_{CC} Power OFF.

9.2 Application Circuit

(1).The configuration for 8-bit 8080 mode, external VCC is shown in the following diagram:



V_{CI} > 2.6V, V_{DD} Regulator Enable,Command: B3h A[0]=1b.

Pin connected to MCU interface: D[7:0], E(RD#), R/W#, D/C#, RES# ,CS#

Recommended components

C1,C2,C3: 1uF-0603-X7R±10%.RoHS

C5, C6: 4.7μF/25V.RoHS (Tantalum Capacitors)

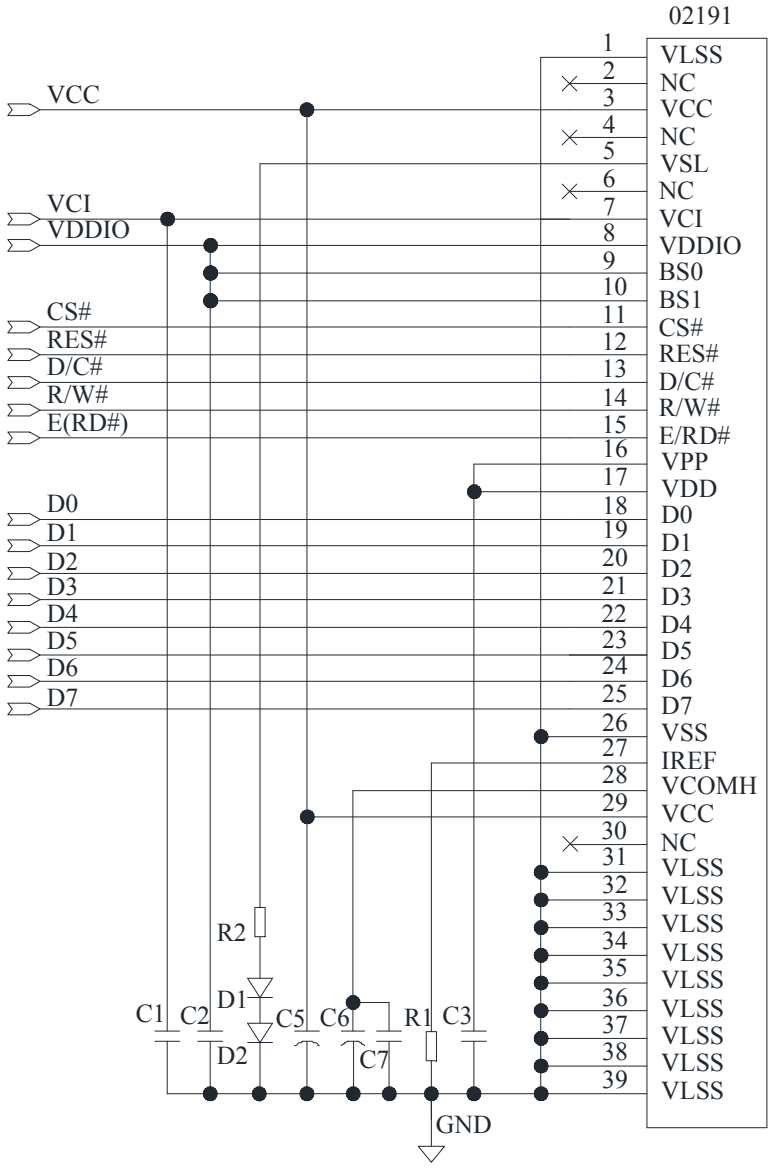
C7: 0.1uF-0603-X7R±10%.RoHS

R1: 0603 1/10W +/-5% 750Kohm.RoHS

R2: 0805 1/8W +/-5% 51 ohm.RoHS

D1,D2: V_{th}=0.7V, 1N4148. RoHS

(2).The configuration for 8-bit 6800 mode, external VCC is shown in the following diagram:



V_{CI} > 2.6V, V_{DD} Regulator Enable,Command: B3h A[0]=1b.

Pin connected to MCU interface: D[7:0], E(RD#), R/W#, D/C#, RES# ,CS#

Recommended components

C1,C2,C3: 1uF-0603-X7R±10%.RoHS

C5, C6: 4.7μF/25V.RoHS (Tantalum Capacitors)

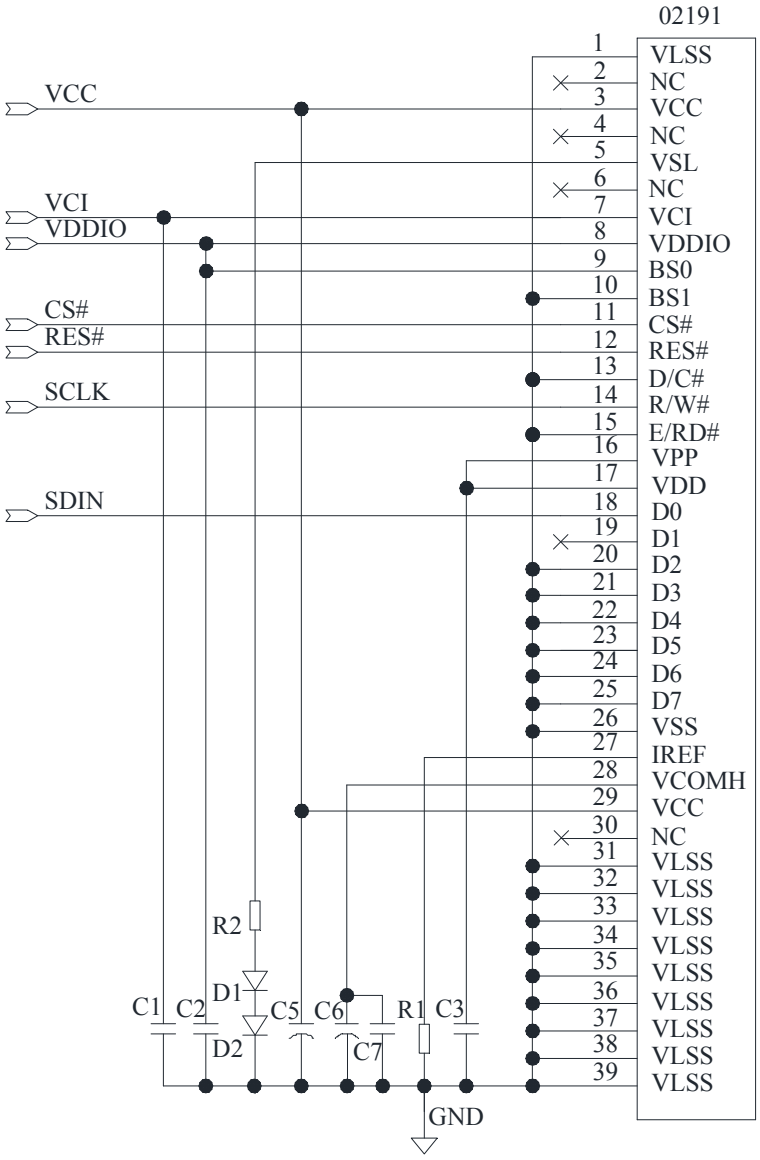
C7: 0.1uF-0603-X7R±10%.RoHS

R1: 0603 1/10W +/-5% 750Kohm.RoHS

R2: 0805 1/8W +/-5% 51 ohm.RoHS

D1,D2: V_{th}=0.7V, 1N4148. RoHS

(3).The configuration for 3-wire SPI mode, external VCC is shown in the following diagram:



V_{CI} > 2.6V, V_{DD} Regulator Enable,Command: B3h A[0]=1b.

Pin connected to MCU interface:SCLK,SDIN, RES# ,CS#

Recommended components

C1,C2,C3: 1uF-0603-X7R±10%.RoHS

C5, C6: 4.7μF/25V.RoHS (Tantalum Capacitors)

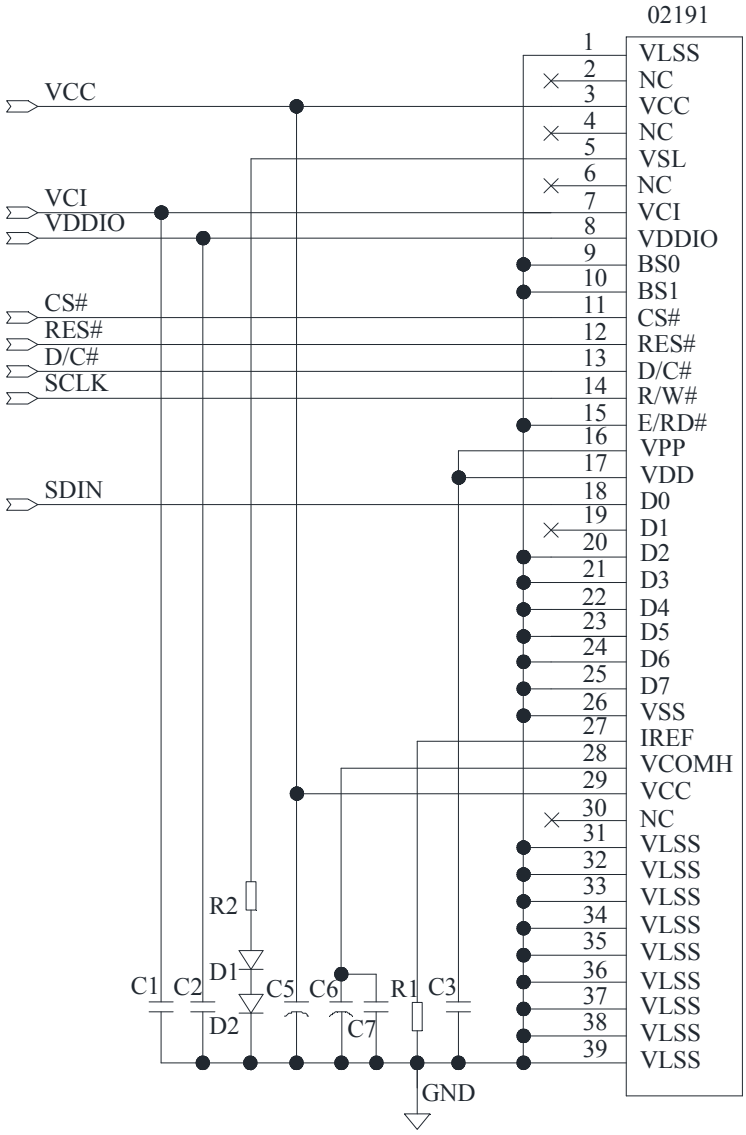
C7: 0.1uF-0603-X7R±10%.RoHS

R1: 0603 1/10W +/-5% 750Kohm.RoHS

R2: 0805 1/8W +/-5% 51 ohm.RoHS

D1,D2: V_{th}=0.7V, 1N4148. RoHS

(4).The configuration for 4-wire SPI mode, external VCC is shown in the following diagram:



V_{CI} > 2.6V, V_{DD} Regulator Enable,Command: B3h A[0]=1b.

Pin connected to MCU interface:SCLK,SDIN, D/C#, RES# ,CS#

Recommended components

C1,C2,C3: 1uF-0603-X7R±10%.RoHS

C5, C6: 4.7μF/25V.RoHS (Tantalum Capacitors)

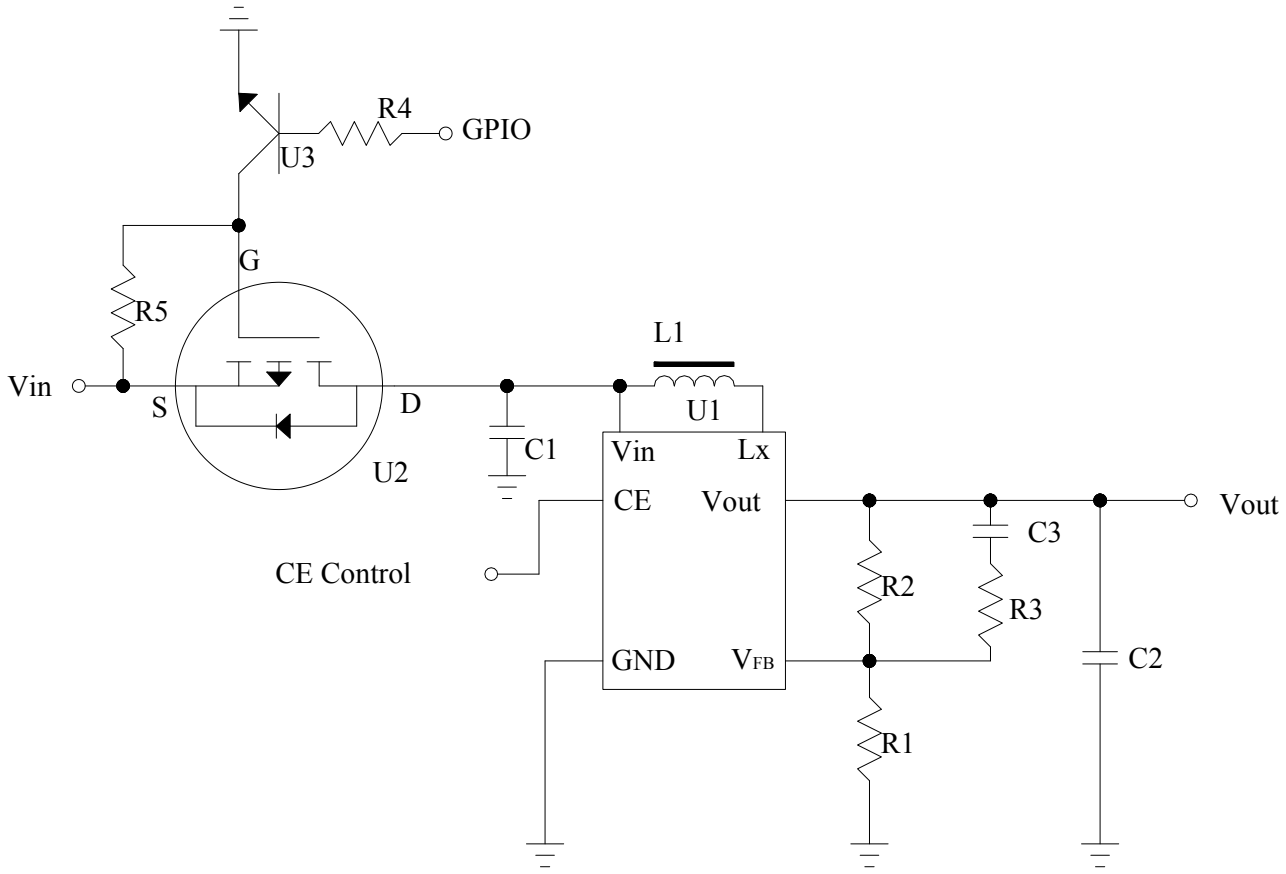
C7: 0.1uF-0603-X7R±10%.RoHS

R1: 0603 1/10W +/-5% 750Kohm.RoHS

R2: 0805 1/8W +/-5% 51 ohm.RoHS

D1,D2: V_{th}=0.7V, 1N4148. RoHS

9.3 External DC-DC application circuit



Recommend component

The C1	: 1 uF-0603-X7R±10%.RoHS
The C2	: 1 uF-0603-X7R±10%.RoHS
The C3	: 220pF-0603-X7R±10%.RoHS
The R1	: 0603 1/10W +/-5% 10Kohm.RoHS
The R2	: 0603 1/10W +/-1% 110Kohm.RoHS
The R3	: 0603 1/10W +/-5% 2Kohm.RoHS
The R4	: 0603 1/10W +/-5% 1Kohm.RoHS
The R5	: 0603 1/10W +/-5% 10Kohm.RoHS
The L1	: 22uH
The U1	: R1200
The U2	: FDN338P
The U3	: SS8050

9.4 Display Control Instruction

Refer to SSD1355U8R1 IC Specification.

9.5 Recommended Software Initialization

```
void init_SSD1355()
{
    cs=0;
    res=0;
    shortdelay(10);
    res=1;
    shortdelay(10);
    write_c(0x01);          //software reset
    write_c(0xfd);          //Command lock
    write_d(0xb3);
    write_c(0xcc);          //set VSL discharge path
    write_d(0xb0);
    write_d(0x16);
    write_c(0x11);          //sleep out
    write_c(0x13);          //normal display
    write_c(0x20);          //invoff
    write_c(0x29);          //disable all pixels off/on
    write_c(0x2a);          //set coluum address
    write_d(0x00);
    write_d(0x7f);
    write_c(0x2b);          //set row address
    write_d(0x00);
    write_d(0x7f);
    write_c(0x34);          //disable tearing effect
    write_c(0x36);          //memory access control
    write_d(0x00);
    write_d(0x01);
    write_c(0x3a);          //interface pixel format
    write_d(0x06);
    write_c(0x51);          //write luminance
    write_d(0xf0);
    write_c(0xb3);          //function selection
    write_d(0x01);          //->0x01
    write_c(0xba);          //set contrast of R
    write_d(0xd0);          //78
```

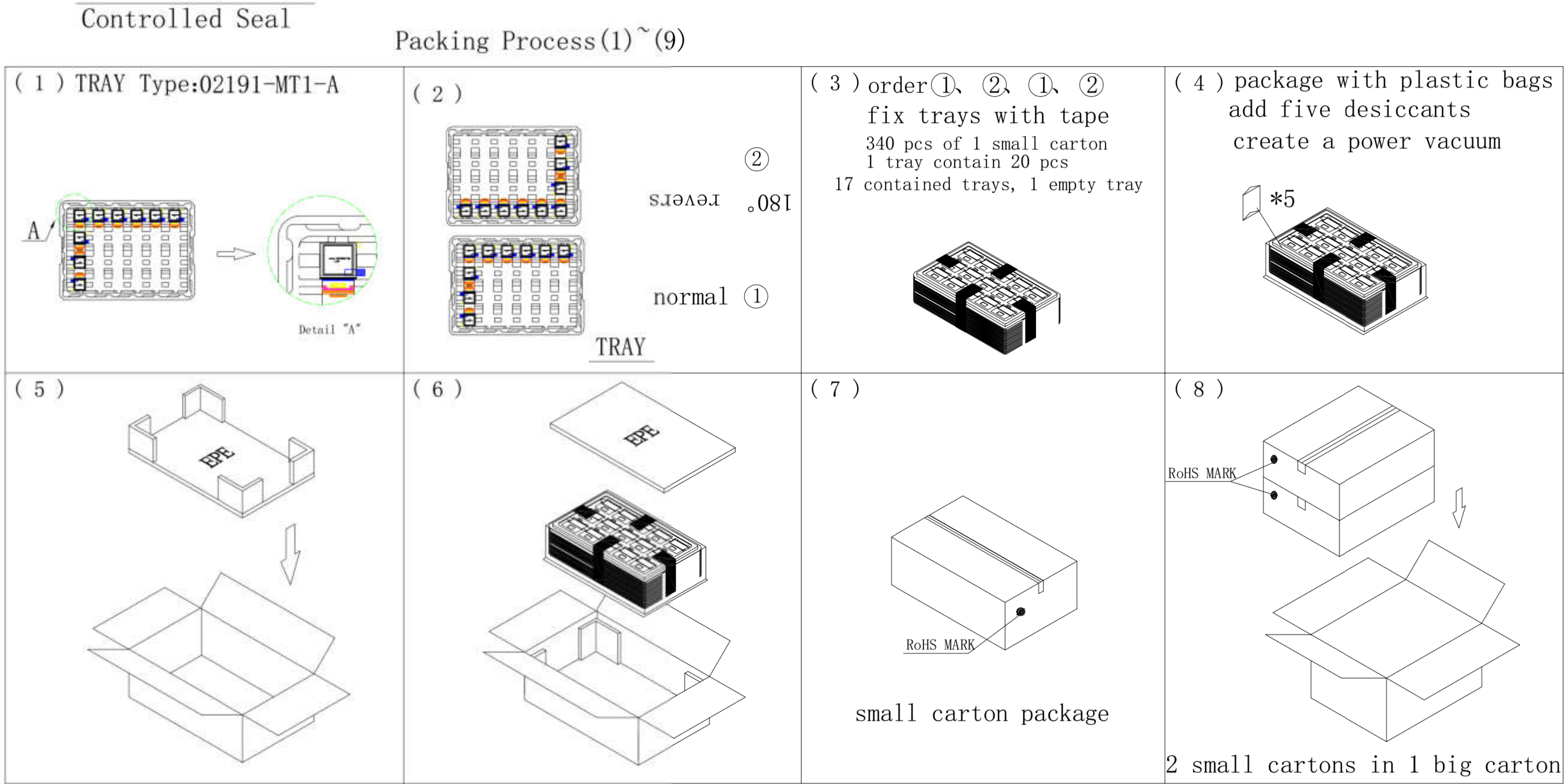
```
write_c(0xbb);          //set contrast of G
write_d(0x58);          //83
write_c(0xbc);          //set contrast of B
write_d(0x57);          //50
write_c(0xbd);          //set first pre-charge voltage
write_d(0x1f);          //->0x05
write_c(0xc8);          //set display offset
write_d(0x00);          //0x00
write_c(0xca);          //set mux ratio
write_d(0x7f);
write_c(0xcd);          //set phase length
write_d(0x55);          //f1
write_c(0xce);          //set second precharge period
write_d(0x07);          //0x07
write_c(0xcf);          //set second precharge speed
write_d(0x02);          //0x02
write_c(0xbe);
write_d(1);
write_d(2);
write_d(3);
write_d(4);
write_d(5);
write_d(6);
write_d(7);
write_d(8);
write_d(9);
write_d(10);
write_d(11);            //21
write_d(12);            //23
write_d(13);            //25
write_d(14);            //27
write_d(15);            //29
write_d(17);            //31
write_d(19);            //33
write_d(23);            //35
write_d(27);            //37
write_d(31);            //39
write_d(35);            //41
```

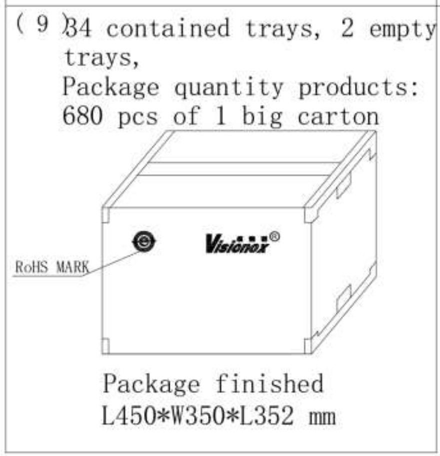
```
        write_d(39);          //43
        write_d(47);          //45
        write_d(53);          //47
        write_d(63);          //49
        write_d(73);          //51
        write_d(83);          //53
        write_d(93);          //55
        write_d(99);          //57
        write_d(109);         //59
        write_d(117);         //61
        write_d(127);         //63
    //G
        write_d(2);
        write_d(3);
        write_d(4);
        write_d(5);
        write_d(7);
        write_d(9);
        write_d(11);
        write_d(13);
        write_d(15);
        write_d(17);
        write_d(19);
        write_d(27);
        write_d(33);
        write_d(37);
        write_d(41);
        write_d(45);
        write_d(49);
        write_d(53);
        write_d(57);
        write_d(61);
        write_d(65);
        write_d(69);
        write_d(73);
        write_d(79);
        write_d(85);
        write_d(91);
```

```
        write_d(97);
        write_d(103);
        write_d(109);
        write_d(115);
        write_d(121);
        write_d(127); //*
    //B
        write_d(1);
        write_d(2);
        write_d(3);
        write_d(4);
        write_d(5);
        write_d(6);
        write_d(7);
        write_d(8);
        write_d(9);
        write_d(10);
        write_d(11);        //21
        write_d(12);        //23
        write_d(13);        //25
        write_d(14);        //27
        write_d(15);        //29
        write_d(17);        //31
        write_d(19);        //33
        write_d(23);        //35
        write_d(27);        //37
        write_d(31);        //39
        write_d(35);        //41
        write_d(39);        //43
        write_d(47);        //45
        write_d(53);        //47
        write_d(63);        //49
        write_d(73);        //51
        write_d(83);        //53
        write_d(93);        //55
        write_d(99);        //57
        write_d(109);       //59
        write_d(117);       //61
```

```
        write_d(127);           //63
        write_c(0xd2);          //set display colck divider/oscillator frequency
        write_d(0x30);          //->0x80
        write_c(0xd3);          //set Vcomh
        write_d(0x02);
        write_c(0xd7);          //GPIO
        write_d(0x00);
        Clear_Screen();
}
```

10 Package Specification





NOTE:1、The inner carton and master carton must be sealed with adhesive tape.

2、Fill up the gap with EPE.

3、If the customer has special needs with the RoHS making, the inner carton and master carton need adhesive new RoHS marking at ⊕ .

4、Packaging materials are not recommended for recycling.

11 Reliability

11.1 Reliability Test

NO.	ITEM	CONDITION	QUANTITY
1	High Temperature (Non-operation)	85℃,240hrs	4
2	Low Temperature (Non-operation)	-40℃,240hrs	4
3	High Temperature (Operation)	70℃,240hrs	4
4	Low Temperature (Operation)	-40℃,240hrs	4
5	High Temperature / High Humidity (Operation)	60℃,90%RH,240hrs	4
6	Thermal shock (Non-operation)	-40℃~85℃(-40℃/30min;transit/3min;85℃/30min;transit/3min) 1cycle: 66min,30cycles	4
7	ESD (Non-operation)	Air discharge model :+/- 8kV Test nine dots and each dots should be discharged ten times and the interval time can't be less than one second.	4
8	Vibration	Frequency: 5~50Hz,0.5G Scan rate: 1 oct/min Time: 2 hrs/axis Test axis: X,Y, Z	1 Carton
9	Drop	Height: 100 cm Sequence: 1 angle, 3 edges and 6 faces	1 Carton

Test and measurement conditions

1. All measurements shall not be started until the specimens attain to temperature stability, the stable time is at least 15 minutes.
2. The degradation of polarizer is ignored for item 5.
3. The tolerance of temperature is ±3℃, and the tolerance of relative humidity is ±5%.

Evaluation criteria

1. The function test is OK.
2. No observable defects.
3. Luminance:≥50% of initial value.
4. Current consumption: within ± 50% of initial value.

11.2 Lifetime

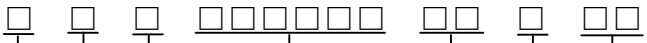
End of lifetime is specified as 50% of initial brightness and the test pattern at operating condition is 50% alternating checkerboard.

ITEM	MIN	MAX	UNIT	CONDITION
Operation Life Time	8000	-	hrs	80 cd/m^2,50% Checkerboard

11.3 Failure Check Standard

After the completion of the described reliability test, the samples were left at room temperature for 2 hrs prior to conducting the failure test at 22±3°C; 55±15% RH.

12 lustration of OLED Product Name



Flow No. :

01~99

Display Color :

R—red

G—green

B—blue

Y—yellow

W—white

A—area color

F—full color

M—amber

Panel Flow No. :

A0~A9, B0~B9…Z0~Z9

Display Format :

Graphic—columns and rows

Character—characters and line number

Segment—segment number

Mixed—pixel number

Product Type :

P—panel

M—module

Display Type :

G—graphic

C—character

S—segment

I—Icon

M—mixed

Company :

V—Visionox

13 Outgoing Quality Control Specifications

13.1 Sampling Method

(1) GB/T 2828.1/ISO2859-1, inspection level Ⅱ, normal inspection, single sample inspection

(2) AQL: Major 0.65; Minor 1.0

13.2 Inspection Conditions

The environmental conditions for test and measurement are performed as follows.

Temperature: 22±3°C

Humidity: 55±15%R.H

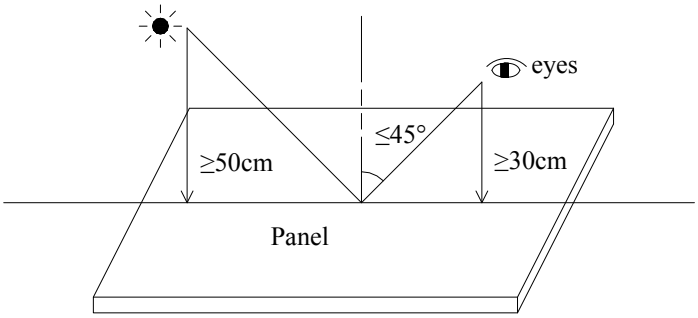
Fluorescent Lamp: 30W

Distance between the Panel & Lamp: ≥50cm

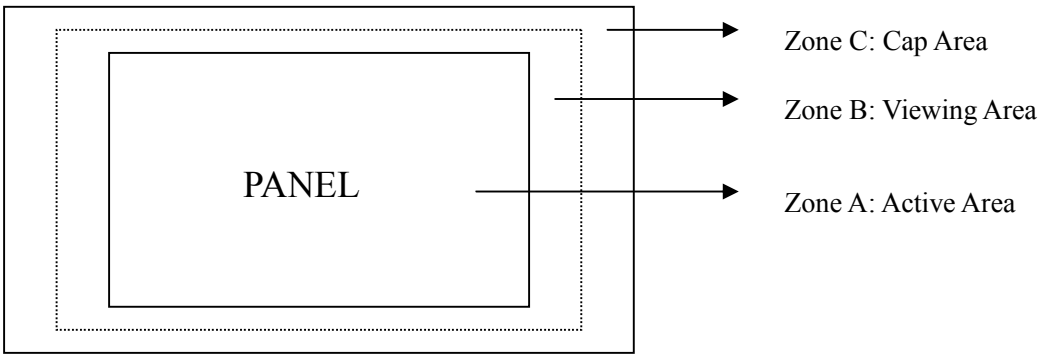
Distance between the Panel & Eyes: ≥30cm

Viewing angle from the vertical in each direction: ≤45°

(See the sketch below)

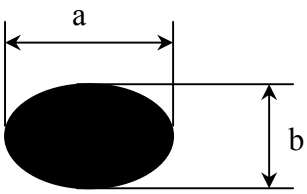


13.3 Quality Assurance Zones

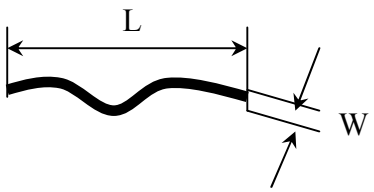


13.4 Inspection Standard

Definition of Φ&L&W (Unit: mm)

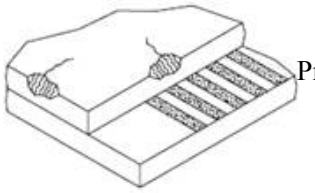
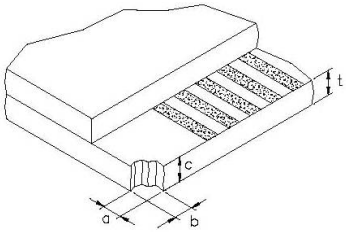
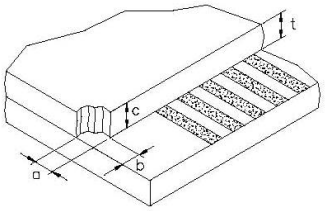
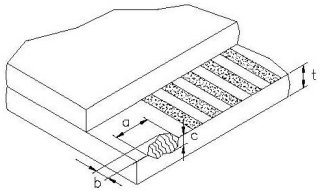
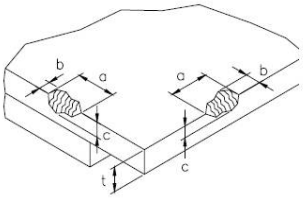
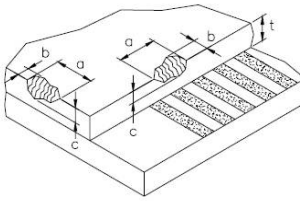


Φ=(a+b)/2



Ⅰ. Appearance Defects

NO.	ITEM	CRITERIA	CLASSIFICATION
1	Polarizer Black or White spot, Dirty spot, Foreign matter, Dent on the polarizer	<table><tr><td rowspan="2">Average Diameter (mm)</td><td colspan="2">Acceptable Number</td></tr><tr><td>Zone A,B</td><td>Zone C</td></tr><tr><td>Φ≤0.15</td><td>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>0.15<Φ≤0.30</td><td>3</td></tr><tr><td>Φ>0.30</td><td>0</td></tr></table>	Minor
2	Scratch/line on the glass/Polarizer	<table><tr><td rowspan="2">Width (mm)</td><td rowspan="2">Length (mm)</td><td colspan="2">Acceptable Number</td></tr><tr><td>Zone A,B</td><td>Zone C</td></tr><tr><td>W≤0.03</td><td>---</td><td>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>0.03<W≤0.08</td><td>L≤5.0</td><td>3</td></tr><tr><td>W>0.08</td><td>---</td><td>0</td></tr></table>	Minor
3	Polarizer Bubble	<table><tr><td rowspan="2">Average Diameter (mm)</td><td colspan="2">Acceptable Number</td></tr><tr><td>Zone A,B</td><td>Zone C</td></tr><tr><td>Φ>0.5</td><td>0</td><td rowspan="3">Ignore</td></tr><tr><td>0.2<Φ≤0.5</td><td>3</td></tr><tr><td>Φ≤0.2</td><td>Ignore</td></tr></table>	Minor
4	Any Dirt & Scratch on Polarizer's Protective Film	Ignore for not affect the polarizer.	Minor
5	Any Dirt on Cap Glass	<table><tr><td>Average Diameter (mm)</td><td>Acceptable Number</td></tr><tr><td>Φ≤0.5</td><td>Ignore</td></tr><tr><td>0.5<Φ≤1.0</td><td>3</td></tr><tr><td>Φ>1.0</td><td>0</td></tr></table>	Minor

6	Glass Crack	 Propagation crack is not acceptable.	Major
7	Corner Chip	 t= Glass thickness Accept a≤2.0mm or b≤2.0mm, c≤t	Minor
8	Corner Chip on Cap Glass	 t= Glass thickness Accept a≤1.5mm or b≤1.5mm, c≤t	Minor
9	Chip on Contact Pad	 t= Glass thickness Accept a≤3.0mm or b≤0.8mm, c≤t (on the contact pin) a≤3.0mm or b≤1.5mm, c≤t (outside of the contact pin)	Minor
10	Chip on Face of Display	 t= Glass thickness Accept a≤1.5mm or b≤1.5mm, c≤t	Minor
11	Chip on Cap Glass	 t= Glass thickness Accept a≤3.0mm or b≤3.0mm, c≤t/2 a≤1.5mm or b≤1.5mm, t/2≤c≤t	Minor
12	Stain on Surface	Stain removable by soft cloth or air blow is acceptable.	Minor
13	TCP/FPC Damage	(1) Crack, deep scratch, deep hole and deep pressure mark on the TCP/FPC are not acceptable. (2) Terminal lead twisted or broken is not allowable. (3) Copper exposed is not allowed by naked eye inspection.	Minor
14	Dimension Unconformity	Checking by mechanical drawing.	Major

Ⅱ. Displaying Defects

<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th><th>CLASSIFICATION</th></tr>
<tr><td>1</td><td>Black/White spot
Dirty spot
Foreign matter</td><td>
<table>
<tr><td rowspan="2">Average Diameter (mm)</td><td colspan="2">Pieces Permitted</td></tr>
<tr><td>Zone A,B</td><td>Zone C</td></tr>
<tr><td>Φ≤0.10</td><td>Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.10<Φ≤0.20</td><td>3</td></tr>
<tr><td>Φ>0.20</td><td></td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>2</td><td>No Display</td><td>Not allowable.</td><td>Major</td></tr>
<tr><td>3</td><td>Irregular Display</td><td>Not allowable.</td><td>Major</td></tr>
<tr><td>4</td><td>Missing Line
(row or column)</td><td>Not allowable.</td><td>Major</td></tr>
<tr><td>5</td><td>Short</td><td>Not allowable.</td><td>Major</td></tr>
<tr><td>6</td><td>Flicker</td><td>Not allowable.</td><td>Major</td></tr>
<tr><td>7</td><td>Abnormal Color</td><td>Refer to the SPEC.</td><td>Major</td></tr>
<tr><td>8</td><td>Luminance NG</td><td>Refer to the SPEC.</td><td>Major</td></tr>
<tr><td>9</td><td>Over Current</td><td>Refer to the SPEC.</td><td>Major</td></tr>
</table>

14 Precautions for operation and Storage

14.1 Precautions for Operation

(1) Since OLED panel is made of glass, do not apply any mechanical shock or impact or excessive force to it when installing the OLED module. Any strong mechanical impact due to falling dropping etc. may cause damage (breakage or cracking).

(2) The polarizer on the OLED surface is made of soft material and is easily scratched. Please take most care when handing. When the surface of the polarizer of OLED Module is contaminated, please wipe it off gently by using moisten soft cloth with isopropyl alcohol, do not use water, ketone or aromatics. If there is saliva or water on the OLED surface, please wipe it off immediately.

(3) When handling OLED module, please be sure that the body and the tools are properly grounded. And do not touch I/O pins with bare hands or contaminate I/O pins, it will cause disconnection or defective insulation of terminals.

(4) Do not attempt to disassemble or process the OLED module.

(5) OLED module should be used under recommended operating conditions shown in the specification. Since the higher voltage leads to the shorter lifetime, be sure to use the specified operating voltage.

(6) Foggy dew, moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage, the deteriorated display quality and electrochemical reaction then leads to shorter life time and permanent damage to the module probably. Please pay attention to the environmental temperature and humidity.

(7) An afterimage is created by the difference in brightness between unused dot and the fixed dot, according to the decrease of brightness of the emitting time. Therefore, to avoid having an afterimage, the full set should be thoroughly used instead of using a fixed dot. When the fixed dot emits, an afterimage can be created.

(8) Flicker could be come out at full on display. And it disappears when frame frequency increase, but brightness decreases too.

14.2 Soldering

(1) Soldering should be performed only on the I/O terminals.

(2) Use soldering irons with proper grounding and no leakage.

(3) Iron:The temperature setting of electric iron is 350℃, but we suggest that during soldering, the tem perature of iron tip should be no higher than 330℃ and soldering be finished within 3~4 seconds.

14.3 Precautions for Storage

(1) Please store OLED module in a dark place. Avoid exposure to sunlight, the light of fluorescent lamp or any ultraviolet ray.

(2) Keep the environment temperature between 10℃ and 35℃ and the relative humidity less than 70%. Avoid high temperature and high humidity.

(3) Keep the OLED modules stored in the container when shipped from supplier before using them is recommended.

(4) Do not leave any article on the OLED module surface for an extended period of time.

14.4 Warranty period

Visionox warrants for a period of 12 months from the shipping date when stored or used under normal condition. In addition to the failure and quality problems caused by man-made damage and force majeure, we promise to provide maintenance and replacement free of charge during the warranty period. If the warranty period has been exceeded, we need to collect the staff's travel expenses, materials and other related costs.