

Product Specification

(Household Appliances and Industrial control)

Product Name: VGM128064A3Y01

Product Code: M0359U

Customer
Approved by Customer
Approved Date:

Designed By	Checked By	Approved By	
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1 Application filed

Household Appliances and Industrial control

2 Overview

VGM128064A3Y01 is a monochrome OLED display module with 128×64 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.

3 Features

- Display Color: Yellow
- Dot Matrix:128×64
- Driver IC: SP80H0
- Interface: 8-bit 8080,8-bit 6800, 4-SPI, I²C
- Wide range of operating temperature: -40°C to 70°C
- Wide range of Storage temperature: -40°C to 85°C

4 Mechanical Data

NO.	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128(W)×64(H)	-
2	Dot Size	0.254(W)×0.254(H)	mm ²
3	Dot Pitch	0.274(W)×0.274(H)	mm ²
4	Aperture Rate	86	%
5	Active Area	35.052(W)×17.516(H)	mm ²
6	Panel Size	42.04(W)×27.22(H) ×1.2(T)	mm ³
7	Module Size	42.04(W)×70.62(H) ×1.43(T)	mm ³
8	Diagonal A/A Size	1.54	inch
9	Module Weight	TBD±10%	g

5 Mechanical Drawing

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Rev.	Date	Note
△1	2024.10.29	Base on M03590; Modify Color (White→Yellow)
△2		

The technical drawing illustrates the physical specifications of the M03590 module. The top view shows a rectangular panel with a central display area labeled "Dots:128*64 1.54\". Key dimensions include a total width of 43.4±0.5 mm and a height of 42.04±0.2 mm. Various layers are identified, such as the Panel, Cap, Polarizer, V.A., and A.A. layers. Mounting features like the Bonding Area, UV tape, Pull tape, and Stiffener are also shown with their respective dimensions. A detailed inset labeled "Detail A (20:1)" provides a magnified view of the corner structure, showing dimensions like 0.274 mm and 0.02 mm. The bottom view, titled "COM & SEG LAYOUT", displays the internal circuitry patterns for COM and SEG lines, with labels C63-C32 and S127-S0 CO-C31.

Specification:

1. Display: OLED(Yellow)
2. Format: 128*64
3. Driver IC: SP80H0
4. DUTY: 1/64
5. Operate Temp: -40° C~70° C
6. Storage Temp: -40° C~85° C
7. HSF Compliant

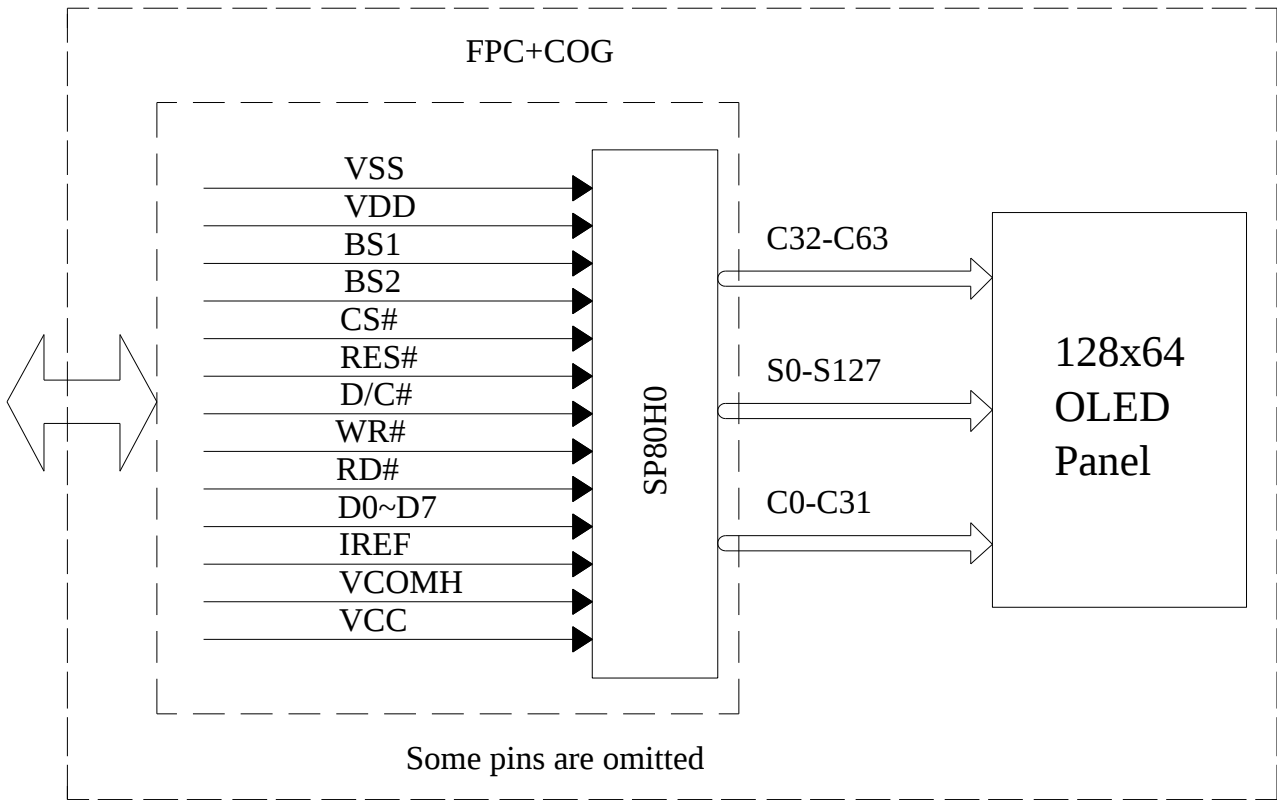
No.	Symbol	Pin Assignmentt
1	NC	
2	VSS	
3	VSS	
4	NC	
5	VDD	
6	BS1	
7	BS2	
8	CS#	
9	RFS#	
10	D/C#	
11	WR#	
12	RD#	
13	D0	
14	D1	
15	D2	
16	D3	
17	D4	
18	D5	
19	D6	
20	D7	
21	IREF	
22	VCOMH	
23	VCC	
24	NC	

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6 Module Interface

PIN NO.	PIN NAME	DESCRIPTION								
1	NC	No Connection.								
2,3	VSS	Ground.								
4	NC	No Connection.								
5	VDD	Power supply pin for core logic operation.								
6	BS1	MCU bus interface selection pins.								
		Pin	I ² C Interface	6800 parallel interface	8080 parallel interface	Serial interface				
7	BS2	BS1	1	0	1	0				
		BS2	0	1	1	0				
8	CS#	Chip select, active low. In I ² C mode, this pin should be connected to VSS.								
9	RES#	Reset,active low.								
10	D/C#	H:Data; L :Command.In I ² C mode, this pin acts as SA0 for slave address selection.								
11	WR#	8080: Write; 6800: Read/Write select pin; SPI or I ² C:connected to VSS.								
12	RD#	8080: Read; 6800: Read/Write enable pin; SPI or I ² C:connected to VSS.								
13~20	D[0:7]	Data bus.								
		Pin Name Bus Interface	Data/Command Interface							
			D7	D6	D5	D4	D3	D2	D1	D0
			8-bit 8080 D[7:0]							
			8-bit 6800 D[7:0]							
			SPI	Tie LOW				NC	SDIN	SCLK
		I ² C	Tie LOW				SDA _{OUT}	SDA _{IN}	SCL	
21	IREF	This is a segment current reference pin. A resistor should be connected between this pin and VSS. Set the current at 10uA.								
22	VCOMH	The pin for COM signal deselected voltage level. A capacitor should be connected between this pin and VSS.								
23	VCC	Power supply for panel driving voltage.								
24	NC	No Connection.								

7 Function Block Diagram



8 Absolute Maximum Ratings

ITEM	SYMBOL	MIN	MAX	UNIT	REMARK
Logic supply voltage	VDD	-0.3	+4.0	V	IC maximum rating
OLED Operating voltage	VCC	-0	+17	V	IC maximum rating
Operating Temp.	Top	-40	+70	°C	-
Storage Temp	Tstg	-40	+85	°C	-

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 9 “Electrical Characteristics”. Malfunctioning of the module may occur and the reliability of the module may deteriorate if the module is used beyond the conditions.

9 Electrical Characteristics

9.1 DC Electrical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYPE	MAX	UNIT
Logic Supply Voltage	VDD	-	1.65	-	3.3	V
OLED Driver Supply Voltage	VCC	-	12.7	13	13.3	V
High-level Input Voltage	V _{IHC}	-	0.8×VDD	-	-	V
Low-level Input Voltage	V _{ILC}	-	-	-	0.2×VDD	V
High-level Output Voltage	V _{OHC}	-	0.9×VDD	-	-	V
Low-level Output Voltage	V _{OLC}	-	-	-	0.1×VDD	V

Note : The VCC,VDD input must be kept in a stable value; ripple and noise are not allowed.

9.2 Electro-optical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYPE	MAX	UNIT
Normal Mode Brightness (Without Polarizer)	L _{br}	All pixels ON ⁽¹⁾	80	100	-	cd/m ²
Normal Mode Power Consumption	P _t	All pixels ON ⁽¹⁾	-	286	344.5	mW
ICC Sleep mode Current	ICC,SLEEP	VDD = 1.65V ~3.3V, VCC = 7V~16V Display OFF, No panel attached	-	-	20	uA
IDD Sleep mode Current	IDD,SLEEP	VDD = 1.65V ~3.3V, VCC = 7V~16V Display OFF, No panel attached	-	-	20	uA
C.I.E(Yellow)	(X)	x, y(CIE1931)	0.40	0.44	0.48	-
	(Y)		0.50	0.54	0.58	-
Dark Room Contrast	CR	-	10000:1	-	-	-
Response Time	-	-	-	10	-	μs
View Angle	-	-	160	-	-	Degree

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

- Driving voltage: 13V
- Contrast setting: 0x50
- Frame rate: 109Hz
- Duty setting: 1/64

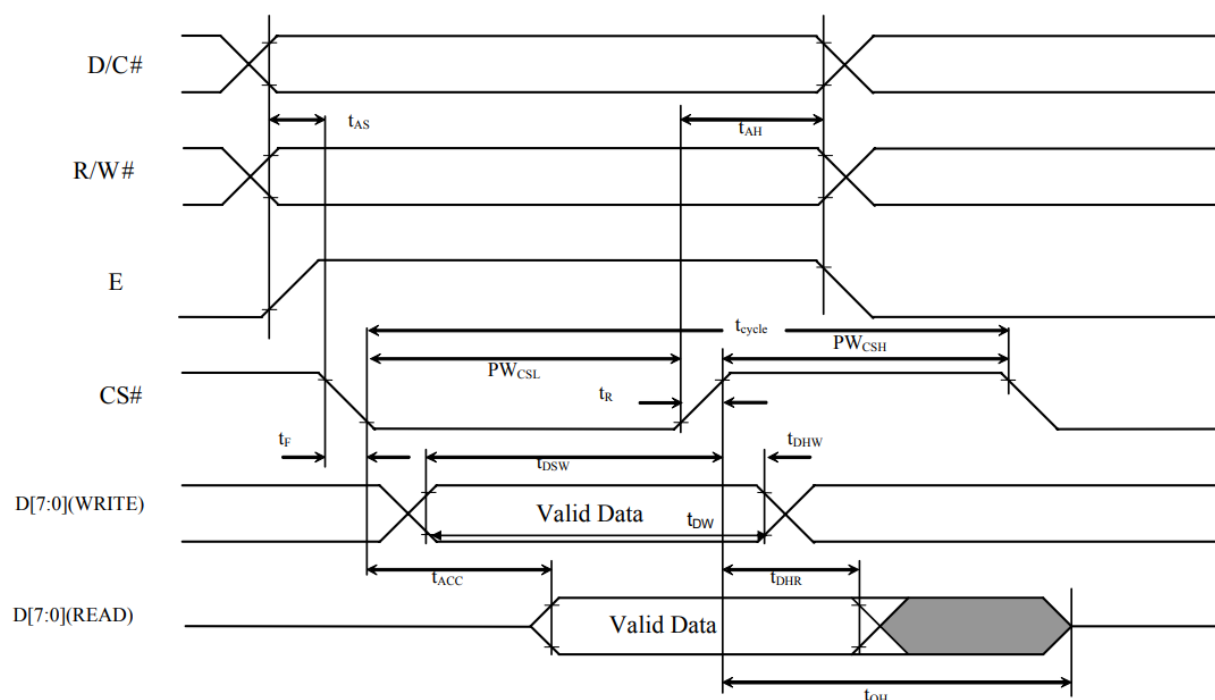
9.3 AC Electrical Characteristics

(1) 6800-Series MPU Parallel Interface Timing Characteristics

(VDD - VSS = 1.65V to 3.3V, TA = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	20	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DW}	Data Write Time	80	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns </td
t_{DHW}	Write Data Hold Time	20	-	-	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	-	-	40	ns
t_{F}	Fall Time	-	-	40	ns

6800-series MCU parallel interface characteristics



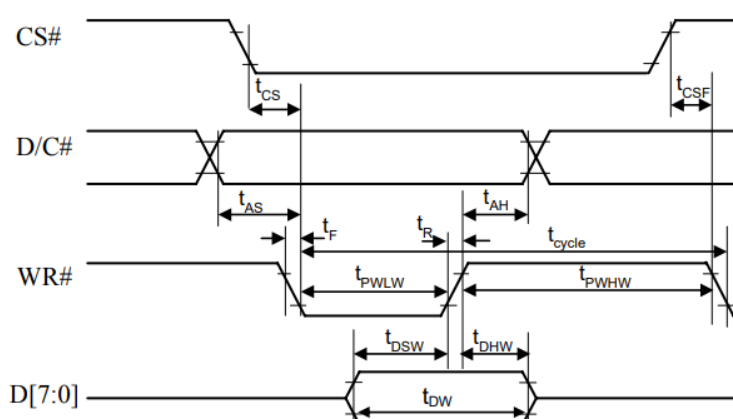
(2)8080-Series MPU Parallel Interface Timing Characteristics

(V_{DD} - V_{SS} = 1.65V ~ 3.3V, T_A = 25°C)

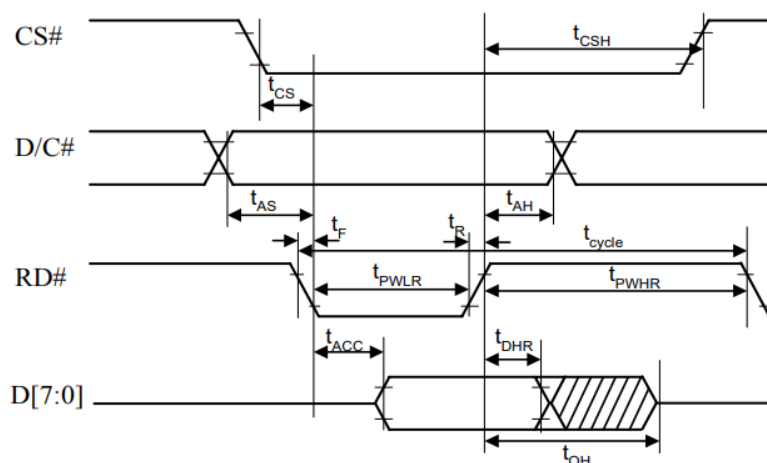
Symbol	Parameter	Min	Typ	Max	Unit
t _{cycle}	Clock Cycle Time	300	-	-	ns
t _{AS}	Address Setup Time	20	-	-	ns
t _{AH}	Address Hold Time	0	-	-	ns
t _{DW}	Data Write Time	70	-	-	ns
t _{DSW}	Write Data Setup Time	40	-	-	ns
t _{DHW}	Write Data Hold Time	15	-	-	ns
t _{DHR}	Read Data Hold Time	20	-	-	ns
t _{OH}	Output Disable Time	-	-	70	ns
t _{ACC}	Access Time	-	-	140	ns
t _{PWLR}	Read Low Time	120	-	-	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	-	-	40	ns
t _F	Fall Time	-	-	40	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 (Form 1)

Write cycle



Read Cycle

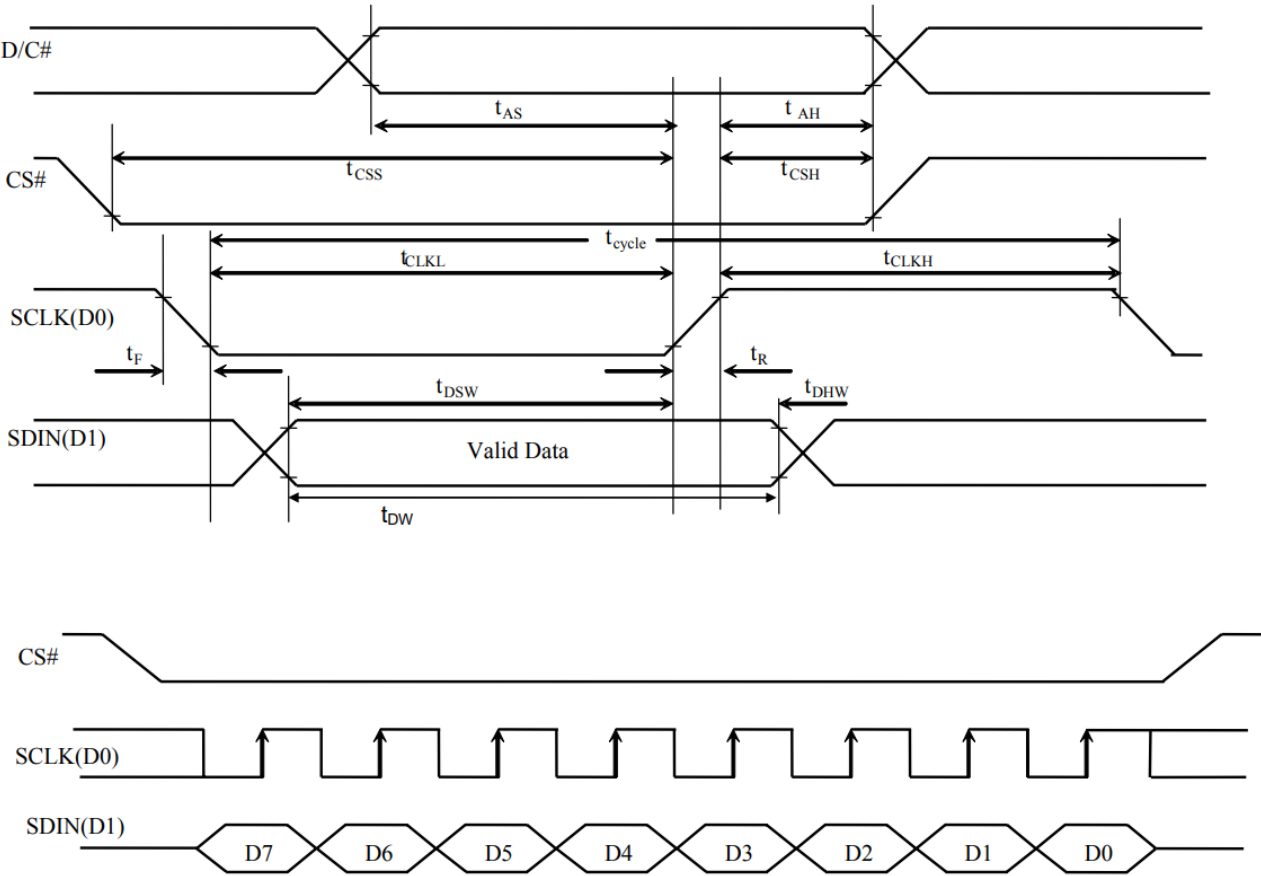


(3)Serial Interface Timing Characteristics

(VDD - VSS = 1.65V to 3.3V, TA = 25°C)

Symbol	Parameter	Min	Typ	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	50	-	-	ns
t _{DW}	Data Write Time	55	-	-	ns
t _{DSW}	Write Data Setup Time	15	-	-	ns
t _{DHW}	Write Data Hold Time	15	-	-	ns
t _{CLKL}	Clock Low Time	50	-	-	ns
t _{CLKH}	Clock High Time	50	-	-	ns
t _R	Rise Time	-	-	40	ns
t _F	Fall Time	-	-	40	ns

Serial interface characteristics

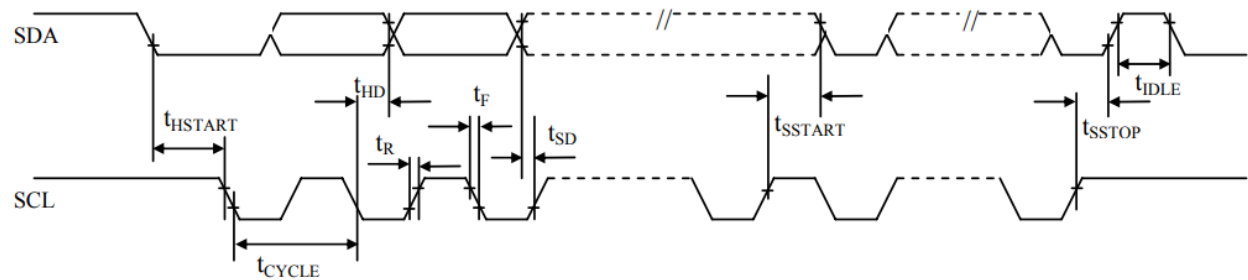


(4) I²C interface Timing Characteristics

(VDD - VSS = 1.65V to 3.3V, TA = 25°C)

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

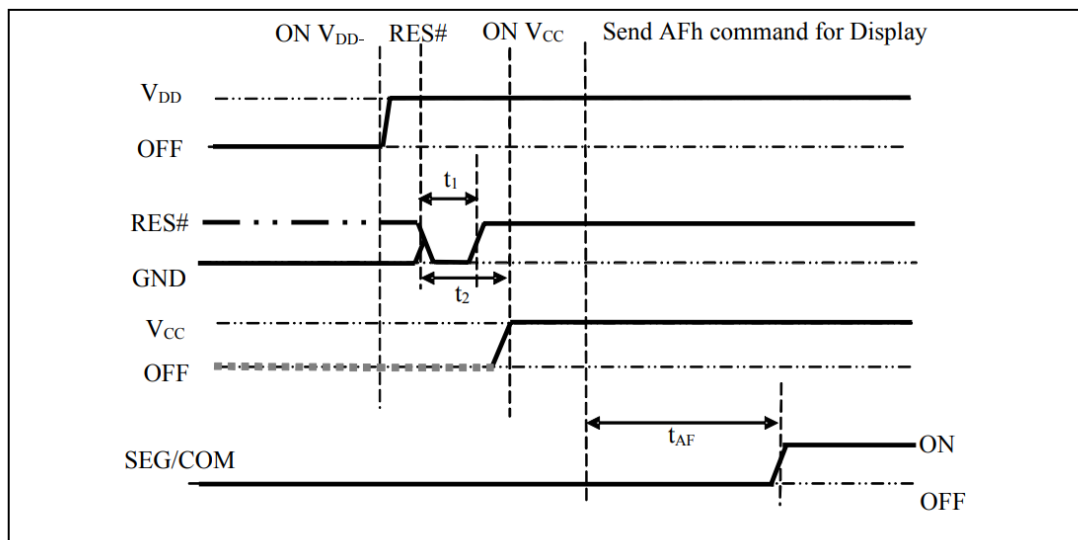


10 Functional Specification and Application Circuit

10.1 Power ON and Power OFF Sequence

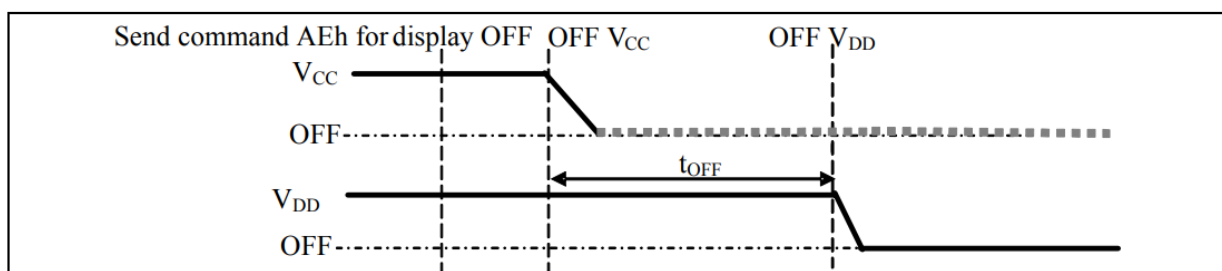
Power ON Sequence:

1. Power ON VDD.
2. After VDD become stable, set RES pin LOW (logic low) for at least $3\mu s$ (t_1)⁽³⁾ and then HIGH (logic high).
3. After set RESB pin LOW (logic low), wait for at least $3\mu s$ (t_2). Then Power ON VCC.⁽¹⁾
4. After VCC become stable, send command AFh for display ON. SEG/COM will be ON after $100ms$ (t_{AF}).



Power OFF Sequence:

1. Send command AEh for display OFF.
2. Power OFF VCC.^{(1), (2)}
3. Power OFF VDD after t_{OFF} . (where Minimum $t_{OFF}=0ms$, Typical $t_{OFF}=100ms$)

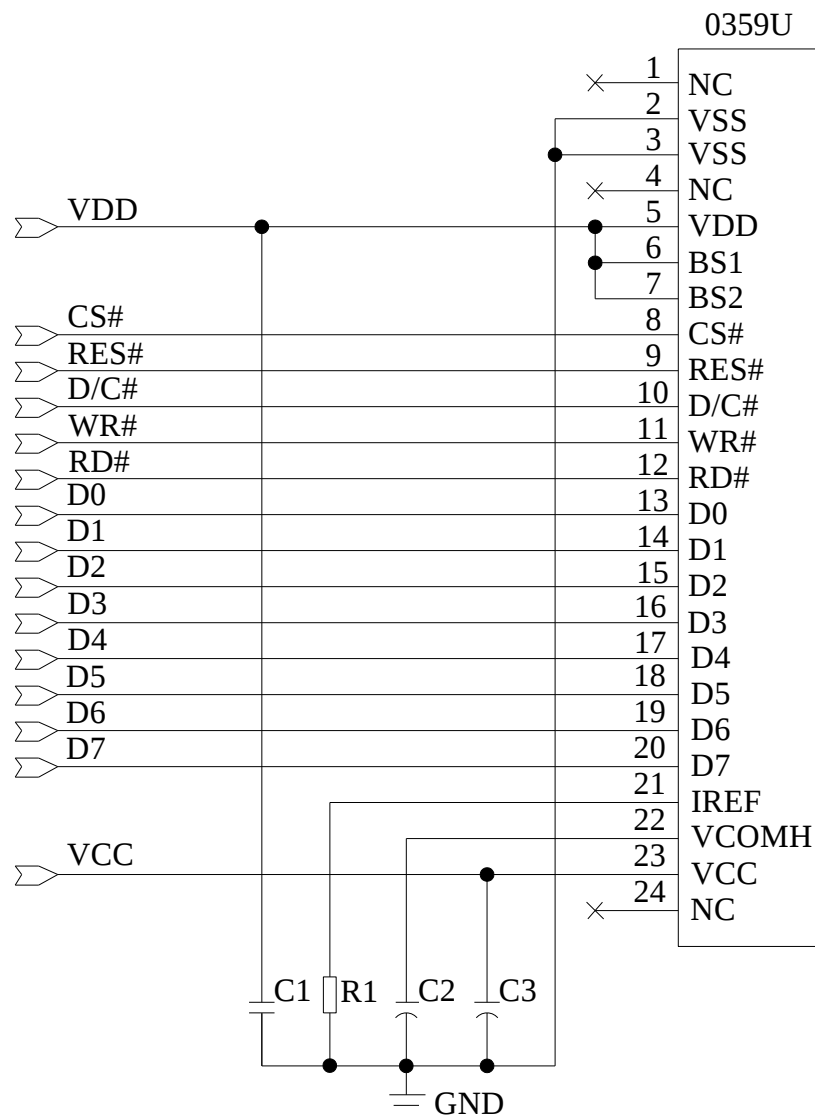


Note:

- (1) VCC should be kept float (disable) when it is OFF.
- (2) Power Pins (VDD, VCC) can never be pulled to ground under any circumstance.
- (3) The register values are reset after t_1 .
- (4) VDD should not be Power OFF before VCC Power OFF.

10.2 Application Circuit

10.2.1 The configuration for 8080-parallel interface mode, external VCC is shown in the following diagram:



Pin connected to MCU interface: D[7:0],CS#,RES#,D/C#,WR#,RD#

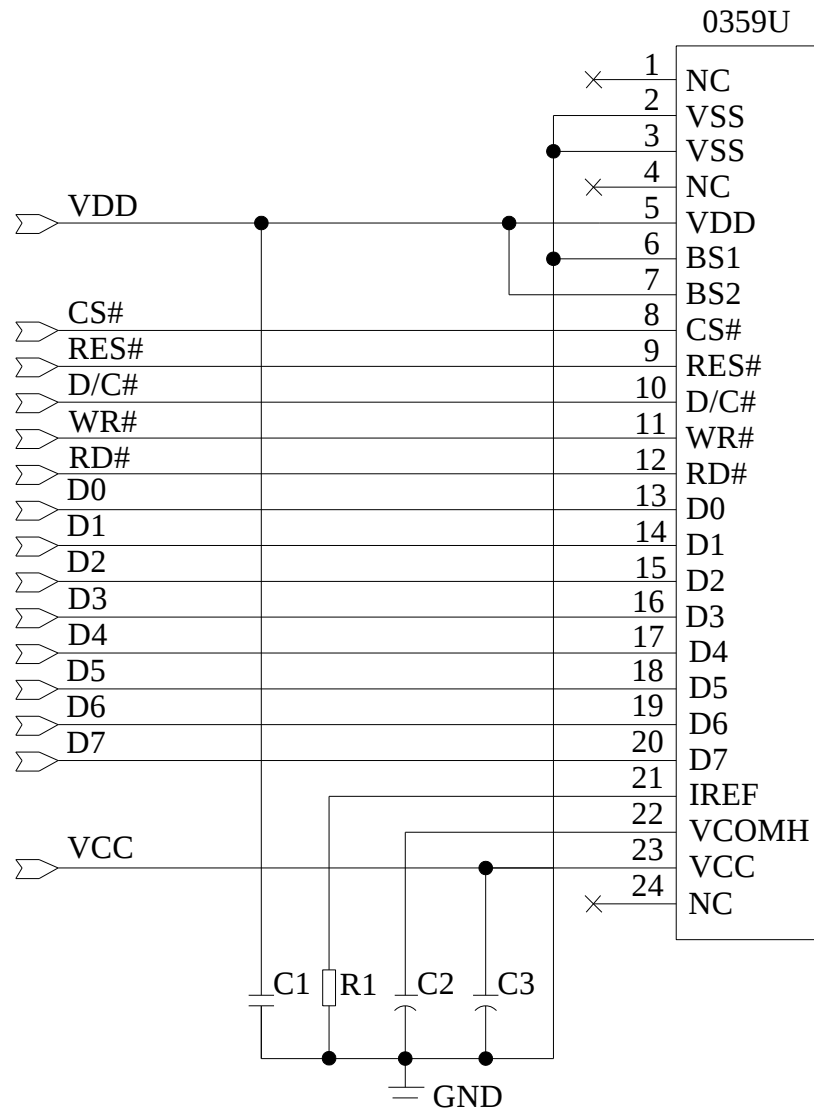
Recommended components

C1: 1uF-0603-X7R±10%.RoHS

C2, C3: 2.2μF/25V.RoHS (Tantalum Capacitors)

R1: 0603 1/10W +/-5% 910KΩ.RoHS

10.2.2 The configuration for 6800-parallel interface mode, external VCC is shown in the following diagram:



Pin connected to MCU interface: D[7:0], CS#, RES#, D/C#, WR#, RD#

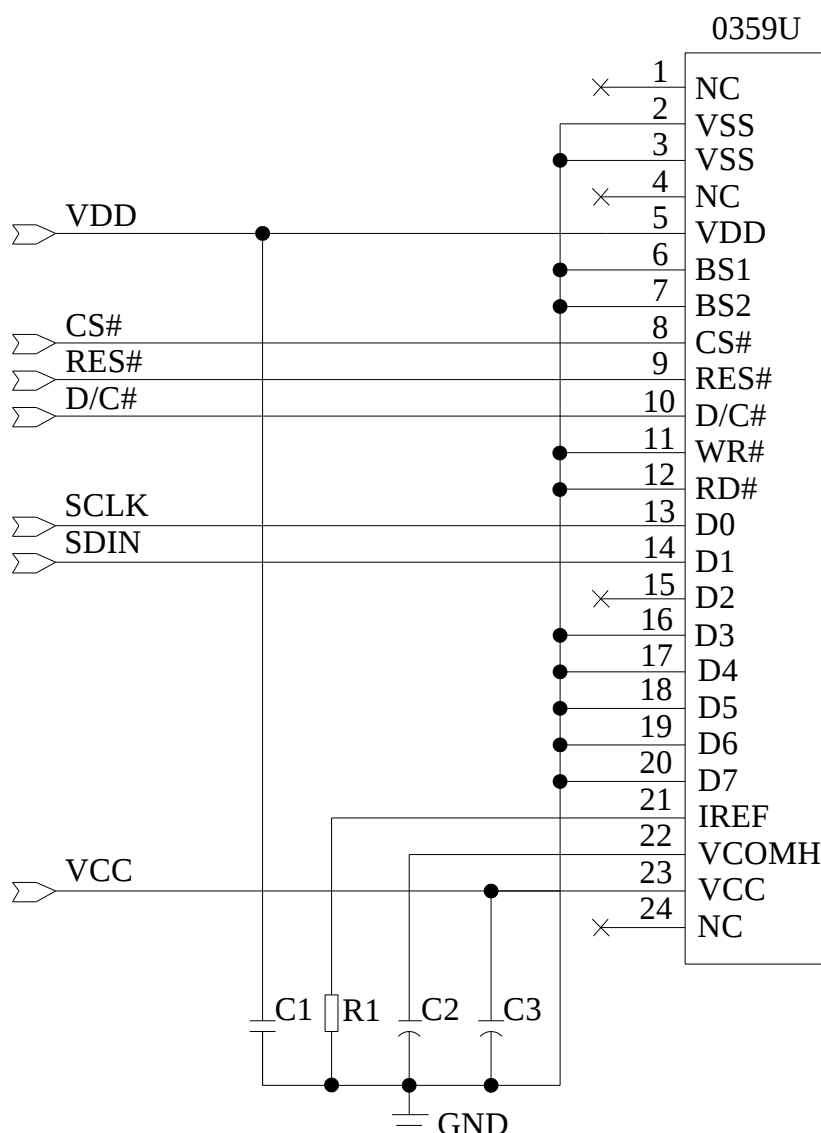
Recommended components

C1: 1uF-0603-X7R±10%.RoHS

C2, C3: 2.2μF/25V.RoHS (Tantalum Capacitors)

R1: 0603 1/10W +/-5% 910KΩ.RoHS

10.2.3 The configuration for SPI interface mode, external VCC is shown in the following diagram:



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

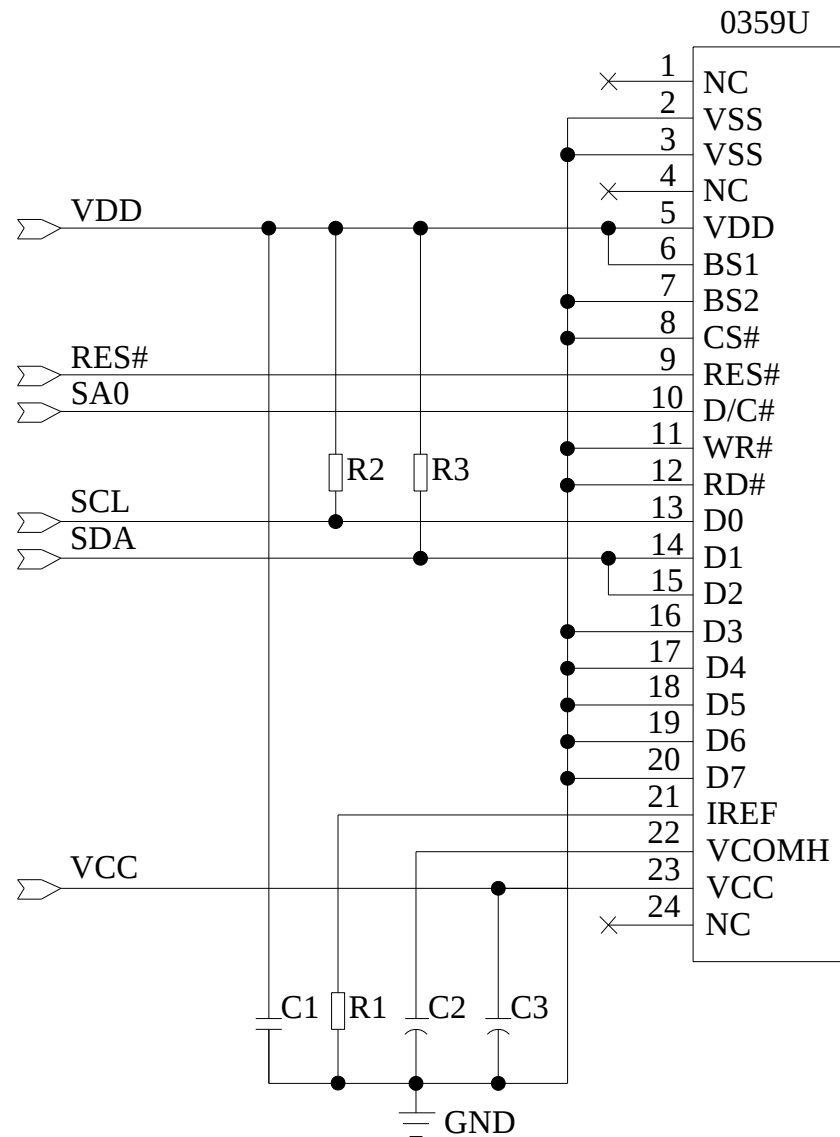
Recommended components

C1: 1uF-0603-X7R±10%.RoHS

C2, C3: 2.2μF/25V.RoHS (Tantalum Capacitors)

R1: 0603 1/10W +/-5% 910KΩ.RoHS

10.2.4 The configuration for I²C interface mode, external VCC is shown in the following diagram:



Pin connected to MCU interface: RES#,SA0,SCL,SDA

SA0	I ² C Address
0	0x78
1	0x7A

Recommended components

C1: 1uF-0603-X7R±10%.RoHS

C2, C3: 2.2μF/25V.RoHS (Tantalum Capacitors)

R1: 0603 1/10W +/-5% 910KΩ.RoHS

R2, R3: 0603 1/10W +/-5% 10KΩ.RoHS

10.3 Display Control Instruction

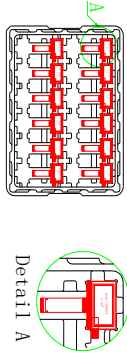
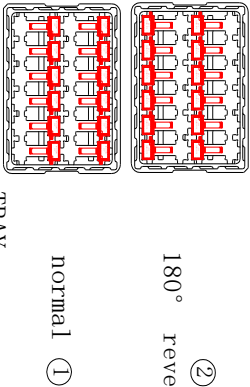
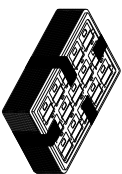
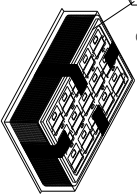
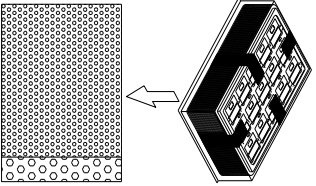
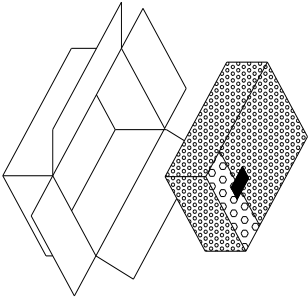
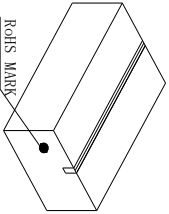
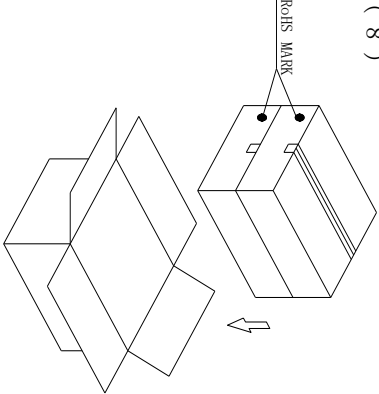
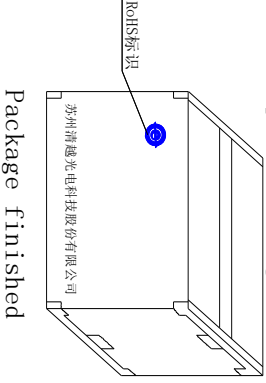
Refer to SP80H0 IC Specification.

10.4 Recommended Software Initialization

In order to ensure the reliability and stability of the module, the module must initialized use the following code, Malfunctioning of the module may occur and the reliability of the module may deteriorate if the module is used beyond the initialize code.

```
void Init_IC()
{
    Write_Command(0xAE);    //Set Display Off
    Write_Command(0x81);    //contrast control
    Write_Command(0x50);
    Write_Command(0xA4);    //Set Entire Display On/Off
    Write_Command(0xA6);    //Set Normal Display
    Write_Command(0x20);    //Set Data Address Mode
    Write_Command(0x02);
    Write_Command(0x40);    //Set Display Start Line
    Write_Command(0xA0);    //Segment Remap
    Write_Command(0xA8);    //multiplex ration mode:64
    Write_Command(0x3F);
    Write_Command(0xC0);    //Set COM Output Scan Direction
    Write_Command(0xD3);    // Set COM0 ( Set Display Offset )
    Write_Command(0x00);
    Write_Command(0xDA);    //common pads hardware: alternative
    Write_Command(0x12);
    Write_Command(0xD5);    //Set Frame Rate
    Write_Command(0x90);    //109Hz
    Write_Command(0xD9);    //set pre-charge period
    Write_Command(0x1F);
    Write_Command(0xDB);    //VCOM deselect level mode
    Write_Command(0x34);    //0.78*vcc
    Clear_Screen();
    Write_Command(0xAF);    //Set Display On
}
```

11 Package Specification

Packing Process (1) ~ (9)			
(1) Tray Type: 00130-MT1-A Display face up 	(2)  normal ① 180° revers ②	(3) order ①、②、①、② fix trays with tape 264 pcs of 1 small carton 1 tray contain 12 pcs 22 contained trays, 1 empty tray 	(4) Use vacuum bag to package the tray and add 5 bags of desiccant into the vacuum bag *5 
(5) After tray be packaged, wrap the package in a bubble bag and seal with scotch tape. 	(6) 	(7) small carton package 	(8) 2 small cartons in 1 big carton 
(9) 44 contained trays, 2 empty trays, Package quantity products: 528 pcs of 1 big carton  RoHS标识 苏州清越光电科技股份有限公司 Package finished	NOTE:1、 The inner carton and master carton must be sealed with adhesive tape. 2、 Fill up the gap with tray. 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 .		

12 Reliability

12.1 Reliability Test

NO.	ITEM	CONDITION	QUANTITY
1	High Temperature (Non-operation)	85°C,240h	5
2	Low Temperature (Non-operation)	-40°C,240h	5
3	High Temperature (Operation)	70°C,240h	5
4	Low Temperature (Operation)	-40°C,240h	5
5	High Temperature / High Humidity (Operation)	60°C,90%RH,240h	5
6	Thermal shock (Non-operation)	-40 °C ~85 °C (-30 °C /30min;transit/5min;85 °C /30min;transit/5min) 1cycle: 70min,30cycles	5
7	ESD Air discharge (Non-operation)	± 8kV, Test 9 point; Each point discharge 10 times. Time interval is not less than 1 second.	5

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 $\pm 3^{\circ}\text{C}$, and the tolerance of relative humidity is $\pm 5\%$.

Evaluation criteria

1. The function test is OK.
2. No observable defects.
3. Luminance: $\geq 50\%$ of initial value.
4. Current consumption: within $\pm 50\%$ of initial value.

12.2 Lifetime

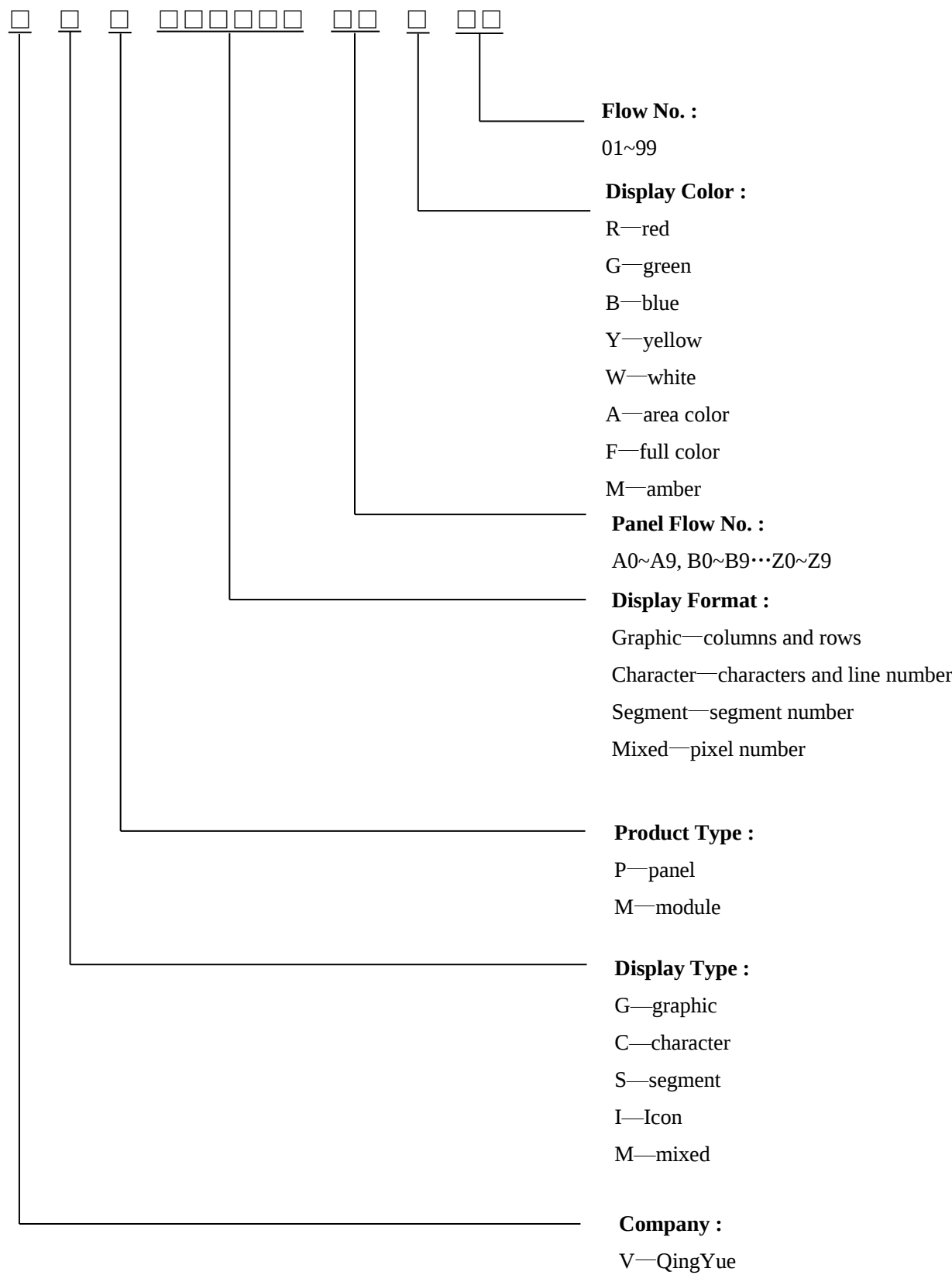
End of lifetime is specified as 50% of initial brightness and the test pattern at operating condition is 50% alternating checkerboard.

ITEM	MIN	MAX	UNIT	CONDITION
Operation Life Time	40,000	-	h	100 cd/m ² , 50% alternating checkerboard, 22±5°C, 55±25% RH

12.3 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±5°C; 55±25% RH.

13 Illustration of OLED Product Name



14 Outgoing Quality Control Specifications

14.1 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

14.2 Inspection Conditions

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

Temperature: $22 \pm 5^{\circ}\text{C}$

Humidity: $55 \pm 25\% \text{R.H}$

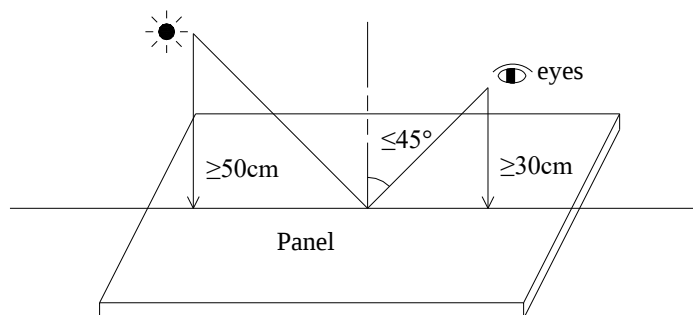
Fluorescent Lamp: 30W

Distance between the Panel & Lamp: $\geq 50\text{cm}$

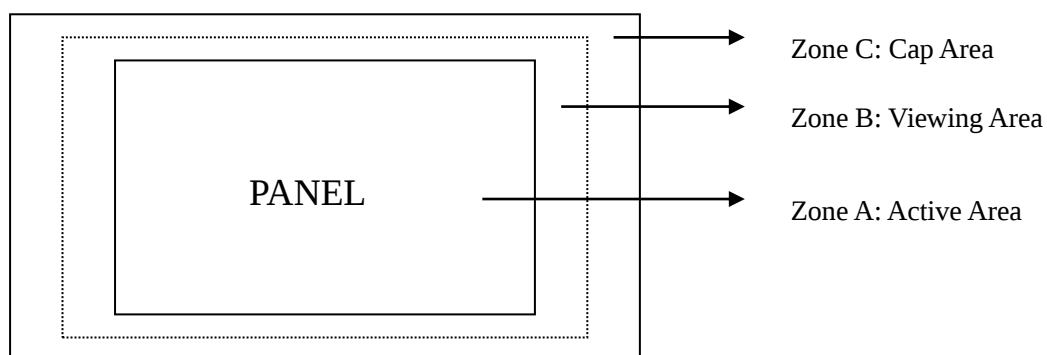
Distance between the Panel & Eyes: $\geq 30\text{cm}$

Viewing angle from the vertical in each direction: $\leq 45^{\circ}$

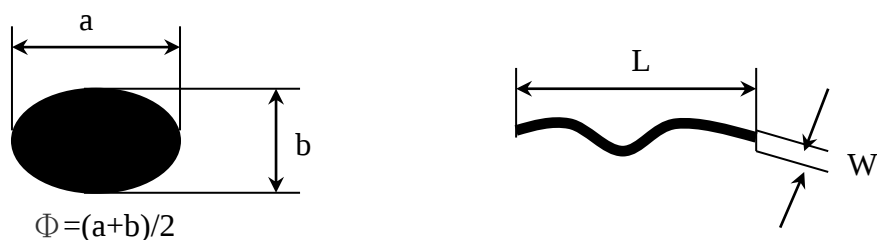
(See the sketch below)



14.3 Quality Assurance Zones

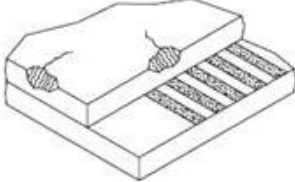
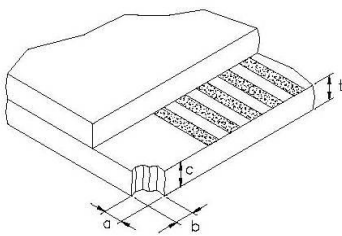
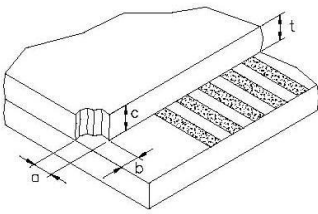
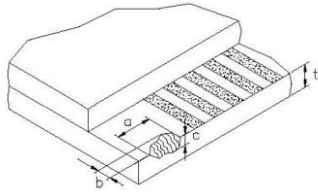
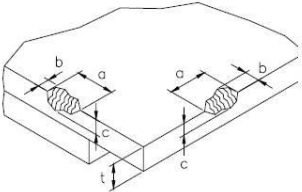
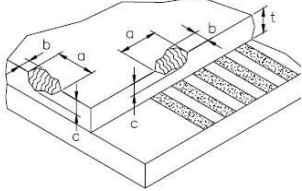


14.4 Inspection Standard



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>$\Phi \leq 0.15$</td><td>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$0.15 < \Phi \leq 0.30$</td><td>3</td></tr><tr><td>$\Phi > 0.30$</td><td>0</td></tr></table>	Average Diameter (mm)	Acceptable Number		Zone A,B	Zone C	$\Phi \leq 0.15$	Ignore	Ignore	$0.15 < \Phi \leq 0.30$	3	$\Phi > 0.30$	0	Minor				
Average Diameter (mm)	Acceptable Number																		
	Zone A,B	Zone C																	
$\Phi \leq 0.15$	Ignore	Ignore																	
$0.15 < \Phi \leq 0.30$	3																		
$\Phi > 0.30$	0																		
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>$W \leq 0.05$</td><td>-</td><td>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$0.05 < W \leq 0.10$</td><td>$L \leq 5.0$</td><td>3</td></tr><tr><td>$W > 0.10$</td><td>-</td><td>0</td></tr></table>	Width (mm)	Length (mm)	Acceptable Number		Zone A,B	Zone C	$W \leq 0.05$	-	Ignore	Ignore	$0.05 < W \leq 0.10$	$L \leq 5.0$	3	$W > 0.10$	-	0	Minor
Width (mm)	Length (mm)	Acceptable Number																	
		Zone A,B	Zone C																
$W \leq 0.05$	-	Ignore	Ignore																
$0.05 < W \leq 0.10$	$L \leq 5.0$	3																	
$W > 0.10$	-	0																	
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>$\Phi \leq 0.2$</td><td>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$0.2 < \Phi \leq 0.5$</td><td>3</td></tr><tr><td>$\Phi > 0.5$</td><td>0</td></tr></table>	Average Diameter (mm)	Acceptable Number		Zone A,B	Zone C	$\Phi \leq 0.2$	Ignore	Ignore	$0.2 < \Phi \leq 0.5$	3	$\Phi > 0.5$	0	Minor				
Average Diameter (mm)	Acceptable Number																		
	Zone A,B	Zone C																	
$\Phi \leq 0.2$	Ignore	Ignore																	
$0.2 < \Phi \leq 0.5$	3																		
$\Phi > 0.5$	0																		
4	Any Dirt & Scratch on Polarizer's Protective Film	Ignore for not affect the polarizer.	Minor																
5	Any Dirt on Cap Glass	Inside the Cap, Ignore the dirt without moving.	Minor																

6	Glass Crack	 Propagation crack is not acceptable.	Major
7	Corner Chip	 $t = \text{Glass thickness}$ Accept $a \leq 2.0\text{mm}$ or $b \leq 2.0\text{mm}$, $c \leq t$	Minor
8	Corner Chip on Cap Glass	 $t = \text{Glass thickness}$ Accept $a \leq 1.5\text{mm}$ or $b \leq 1.5\text{mm}$, $c \leq t$	Minor
9	Chip on Contact Pad	 $t = \text{Glass thickness}$ Accept $a \leq 3.0\text{mm}$ or $b \leq 0.8\text{mm}$, $c \leq t$ (on the contact pin) $a \leq 3.0\text{mm}$ or $b \leq 2.0\text{mm}$, $c \leq t$ (outside of the contact pin)	Minor
10	Chip on Face of Display	 $t = \text{Glass thickness}$ Accept $a \leq 1.5\text{mm}$ or $b \leq 1.5\text{mm}$, $c \leq t$	Minor
11	Chip on Cap Glass	 $t = \text{Glass thickness}$ Accept $a \leq 3.0\text{mm}$ or $b \leq 3.0\text{mm}$, $c \leq t/2$ $a \leq 1.5\text{mm}$ or $b \leq 1.5\text{mm}$, $t/2 \leq c \leq t$	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

NO.	Items	Criteria			Classification
1	Black/White spot Dirty spot Foreign matter	Average Diameter (mm)	Pieces Permitted		Minor
			Zone A,B	Zone C	
		$\Phi \leq 0.10$	Ignore	Ignore	
		$0.10 < \Phi \leq 0.20$	3		
		$\Phi > 0.20$	0		
2	No Display	Not allowable.			Major
3	Irregular Display	Not allowable.			Major
4	Missing Line (row or column)	Not allowable.			Major
5	Abnormal Color	Refer to the SPEC.			Major
6	Luminance NG	Refer to the SPEC.			Major

15 Precautions for operation and Storage

15.1 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.

15.2 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°C, but we suggest that during soldering, the temperature of iron tip should be no higher than 330°C and soldering be finished within 3~4 seconds.

15.3 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°C and 35°C 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.

15.4 Warranty period

QingYue warrants for a period of 12 months from the shipping date when stored or used under normal condition. In addition to 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.