

Product Specification

Product Name: VGM128064A0Y05

Product Code: M0001G

Customer
Approved by Customer
Approved Date:

Designed By	Checked By	Approved By	
		R&D	QA
李仕波 2.20/14	李仕波 2.16.20	高朋 2014.2.20	沈倩 2/20.14

CONTENT

REVISION RECORD	3
1 OVERVIEW	4
2 FEATURES	4
3 MECHANICAL DATA	4
4 MECHANICAL DRAWING	5
5 MODULE INTERFACE	6
6 FUNCTION BLOCK DIAGRAM	7
6.1 FUNCTION BLOCK DIAGRAM	7
6.2 PANEL LAYOUT DIAGRAM.....	7
7 ABSOLUTE MAXIMUM RATINGS	8
8 ELECTRICAL CHARACTERISTICS	9
8.1 DC ELECTRICAL CHARACTERISTICS.....	9
8.2 ELECTRO-OPTICAL CHARACTERISTICS.....	9
8.3 AC ELECTRICAL CHARACTERISTICS.....	10
9 FUNCTIONAL SPECIFICATION AND APPLICATION CIRCUIT	13
9.1 POWER ON AND POWER OFF SEQUENCE	13
9.2 APPLICATION CIRCUIT	14
9.3 EXTERNAL DC-DC APPLICATION CIRCUIT.....	17
9.4 DISPLAY CONTROL INSTRUCTION.....	18
9.5 RECOMMENDED SOFTWARE INITIALIZATION	18
10 PACKAGE SPECIFICATION	20
11 RELIABILITY	21
11.1 RELIABILITY TEST	21
11.2 LIFETIME	21
11.3 FAILURE CHECK STANDARD.....	22
12 ILLUSTRATION OF OLED PRODUCT NAME	22
13 OUTGOING QUALITY CONTROL SPECIFICATIONS	23
13.1 SAMPLING METHOD	23
13.2 INSPECTION CONDITIONS.....	23
13.3 QUALITY ASSURANCE ZONES	23
13.4 INSPECTION STANDARD	24
14 PRECAUTIONS FOR OPERATION AND STORAGE	27
14.1 PRECAUTIONS FOR OPERATION	27
14.2 SOLDERING	27
14.3 PRECAUTIONS FOR STORAGE	27
14.4 WARRANTY PERIOD	27

1 Overview

VGM128064A0Y05 is a grayscale 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.

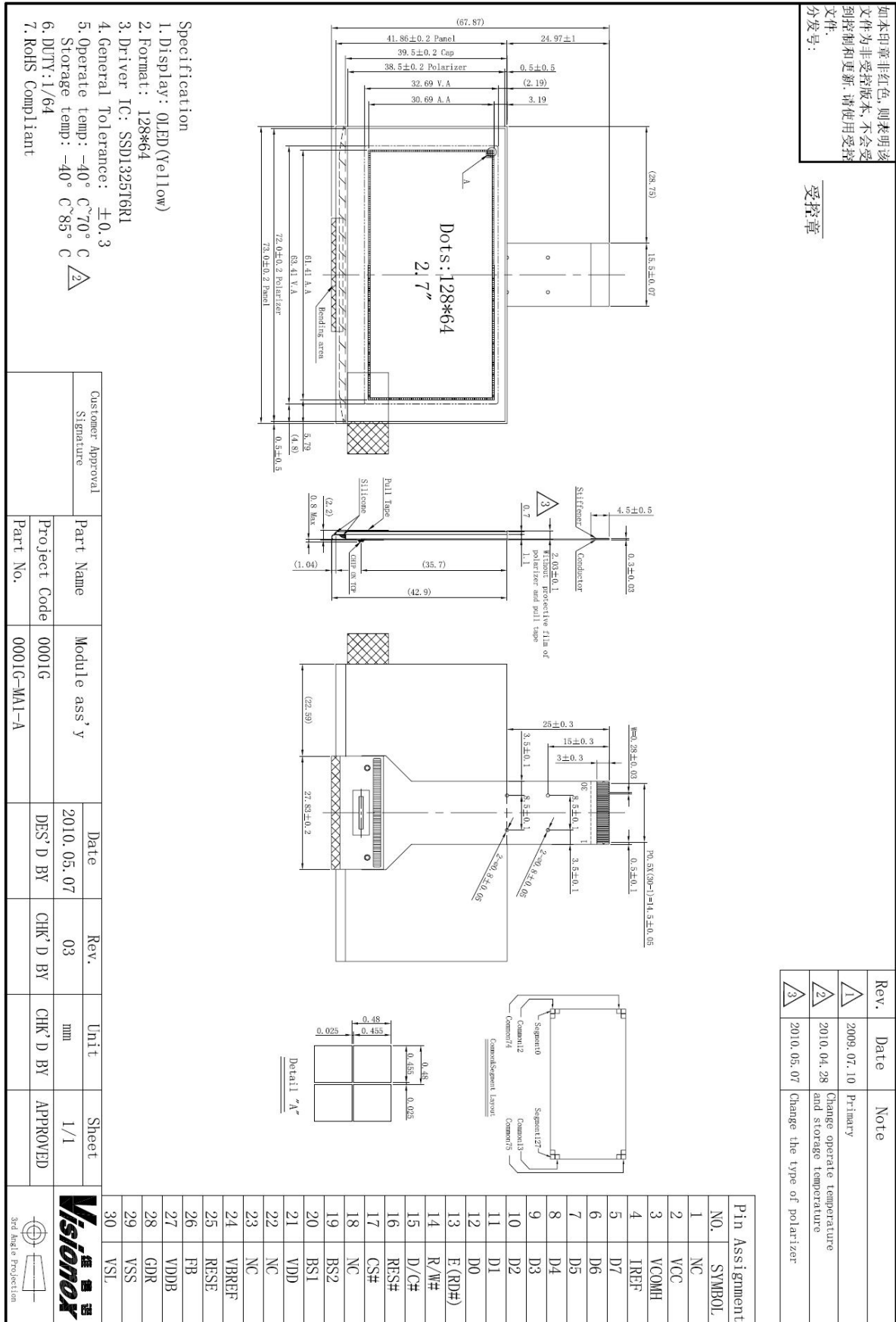
2 Features

- Display Color: Yellow
- Dot Matrix: 128×64
- Driver IC: SSD1325T6R1
- Interface: 8-bit 8080, 8-bit 6800, SPI
- Wide range of operating temperature: -40℃ to 70℃

3 Mechanical Data

NO.	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128(W)×64(H)	-
2	Dot Size	0.455(W)×0.455 (H)	mm ²
3	Dot Pitch	0.48(W)×0.48 (H)	mm ²
4	Aperture Rate	90	%
5	Active Area	61.41(W)×30.69 (H)	mm ²
6	Panel Size	73.0(W)×41.86 (H) ×1.8 (T)	mm ³
7	Module Size	73.0(W)×67.87 (H) ×2.2(T)	mm ³
8	Diagonal A/A Size	2.70	inch
9	Module Weight	13.25±10%	gram

4 Mechanical Drawing

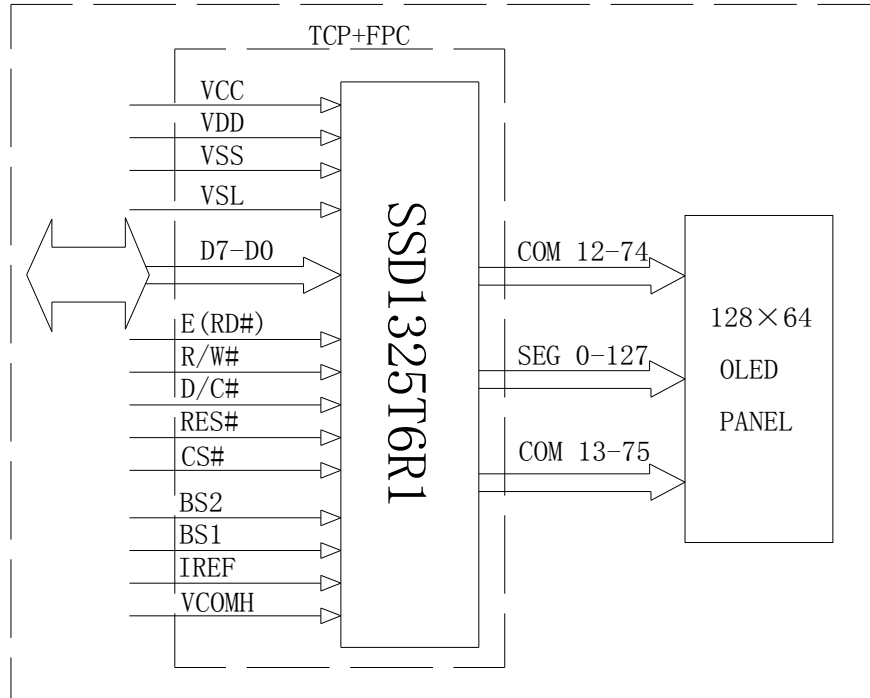


5 Module Interface

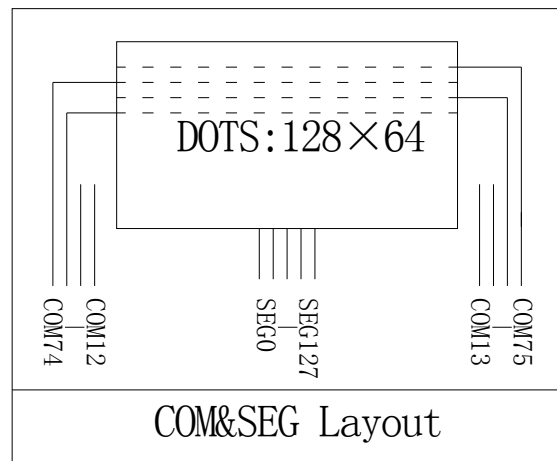
PIN NO.	PIN NAME	DESCRIPTION												
1	NC	No Connection.												
2	VCC	OLED drive voltage, it should be supplied externally.												
3	VCOMH	This is an input pin for the voltage output high level for COM signals. A capacitor should be connected between this pin and VSS.												
4	IREF	This is a segment current reference pin. A resistor should be connected between this pin and VSS. Set the current at 10uA.												
5~12	D7~D0	Data bus. When serial interface mode is selected, D0 will be the serial clock input, SCLK; D1 will be the serial data input: SDIN.												
13	E(RD#)	8080: data read enable pin; 6800: Read/Write enable pin.												
14	R/W#	8080: data write enable pin; 6800: Read/Write select pin.												
15	D/C#	Data/Command Select. H: Data; L: Command.												
16	RES#	Reset, active low.												
17	CS#	Chip Select, active low.												
18	NC	No Connection.												
19	BS2	These are MCU interface input selection pins. See the following table for selecting different interfaces: <table><tr><td>Pin Name</td><td>6800-parallel Interface</td><td>8080-parallel interface</td><td>Serial Interface</td></tr><tr><td>BS1</td><td>0</td><td>1</td><td>0</td></tr><tr><td>BS2</td><td>1</td><td>1</td><td>0</td></tr></table>	Pin Name	6800-parallel Interface	8080-parallel interface	Serial Interface	BS1	0	1	0	BS2	1	1	0
Pin Name	6800-parallel Interface		8080-parallel interface	Serial Interface										
BS1	0		1	0										
BS2	1		1	0										
20	BS1													
21	VDD	Power supply pin for core logic operation.												
22~23	NC	No connection.												
24	VBREF	Reserved pin; No connection and left float.												
25	RESE	This pin connects to the source current pin of the external NMOS of the booster circuit.												
26	FB	This is a reserved pin. It should be kept NC (i.e. Float during normal operation).												
27	VDDDB	This is a reserved pin. It must be connected to VDD.												
28	GDR	This is a reserved pin. It should be kept NC (i.e. Float during normal operation).												
29	VSS	Ground.												
30	VSL	Output pin for the voltage output low level for SEG signals. A capacitor should be connected between this pin and VSS.												

6 Function Block Diagram

6.1 Function Block Diagram



6.2 Panel Layout Diagram



7 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	+15	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 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	TYPE	MAX	UNIT
Logic Supply Voltage	VDD	22±3°C, 55±15%R.H	2.4	3.0	3.5	V
OLED Driver Supply Voltage	VCC	22±3°C, 55±15%R.H	11.5	12	12.5	V
High-level Input Voltage	V _{IH}	-	0.8×VDD	-	VDD	V
Low-level Input Voltage	V _{IL}	-	0	-	0.2×VDD	V
High-level Output Voltage	V _{OH}	-	0.9×VDD	-	VDD	V
Low-level Output Voltage	V _{OL}	-	0	-	0.1×VDD	V

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

8.2 Electro-optical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYPE	MAX	UNIT
Normal Mode Brightness	L _{br}	All pixels ON(1)	80	100	-	cd/m ²
Sleep mode Current	ISLEEP	No loading	-	0.2	5	uA
Normal Mode Power Consumption	Pt	All pixels ON(1)	-	432	528	mW
C.I.E(Yellow)	(x)	x,y(CIE1931)	0.40	0.44	0.48	-
	(y)		0.50	0.54	0.60	-
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 : 0x45
- Frame rate : 105Hz
- Duty setting : 1/64

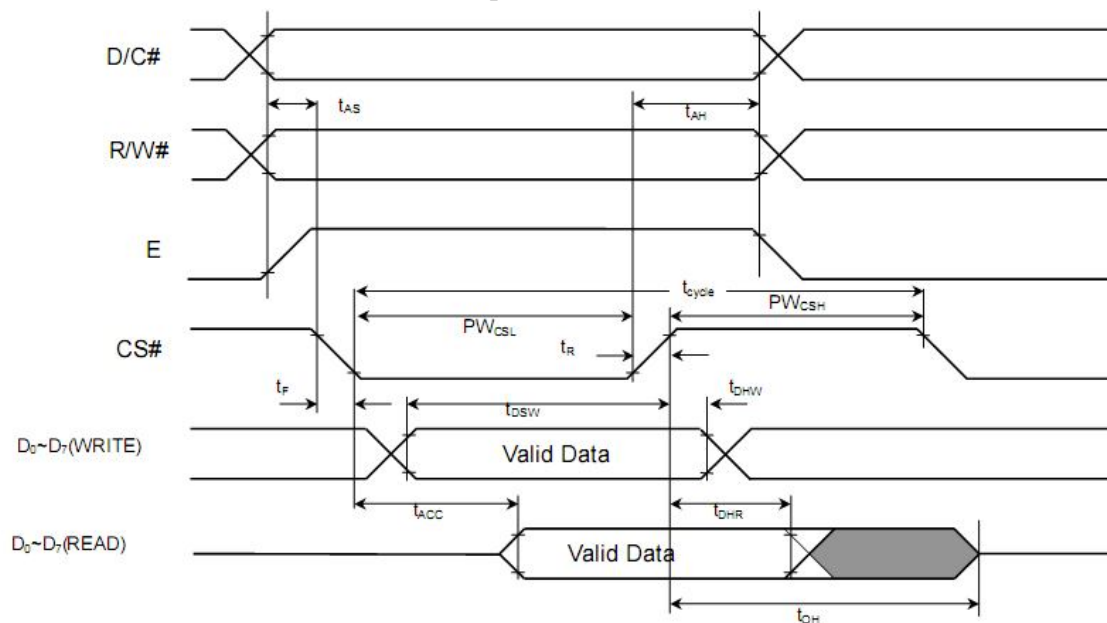
8.3 AC Electrical Characteristics

(1)6800-Series MPU Parallel Interface Timing Characteristics

(VDD - VSS = 2.4V to 3.5V, TA = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	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
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

6800-series MCU parallel interface characteristics



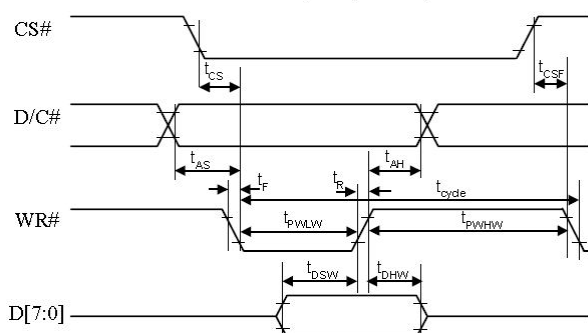
(2)8080-Series MPU Parallel Interface Timing Characteristics

(VDD - VSS = 2.4V to 3.5V, TA = 25°C)

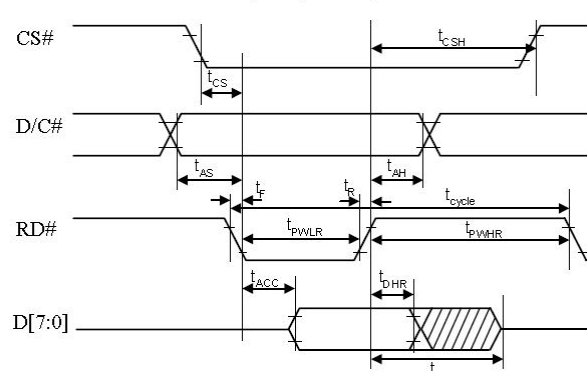
Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	10	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns
t_{DHW}	Write Data Hold Time	15	-	-	ns
t_{DHR}	Read Data Hold Time	20	-	-	ns
t_{OH}	Output Disable Time	-	-	70	ns
t_{ACC}	Access Time	-	-	140	ns
t_{PWLW}	Read Low Time	120	-	-	ns
t_{PWLW}	Write Low Time	60	-	-	ns
t_{PWHR}	Read High Time	60	-	-	ns
t_{PWHR}	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 MPU parallel interface characteristics

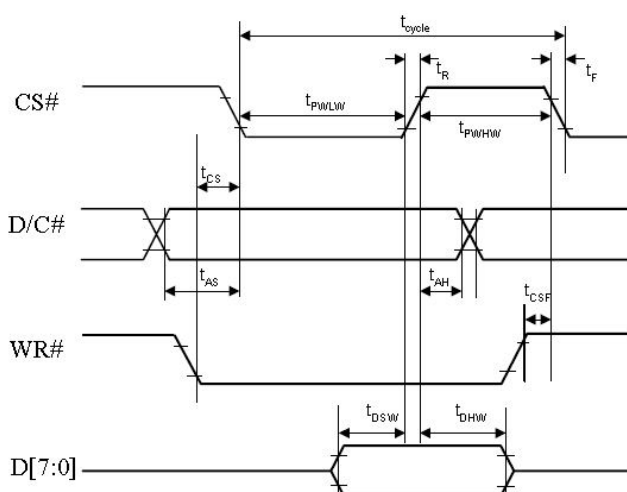
Write cycle (Form 1)



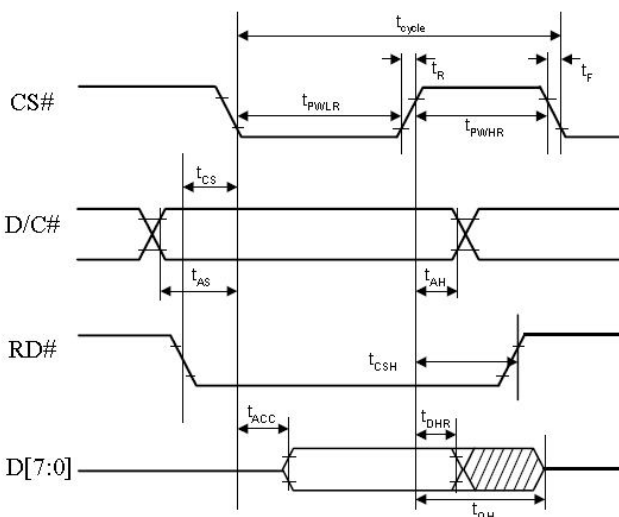
Read cycle (Form 1)



Write cycle (Form 2)



Read cycle (Form 2)

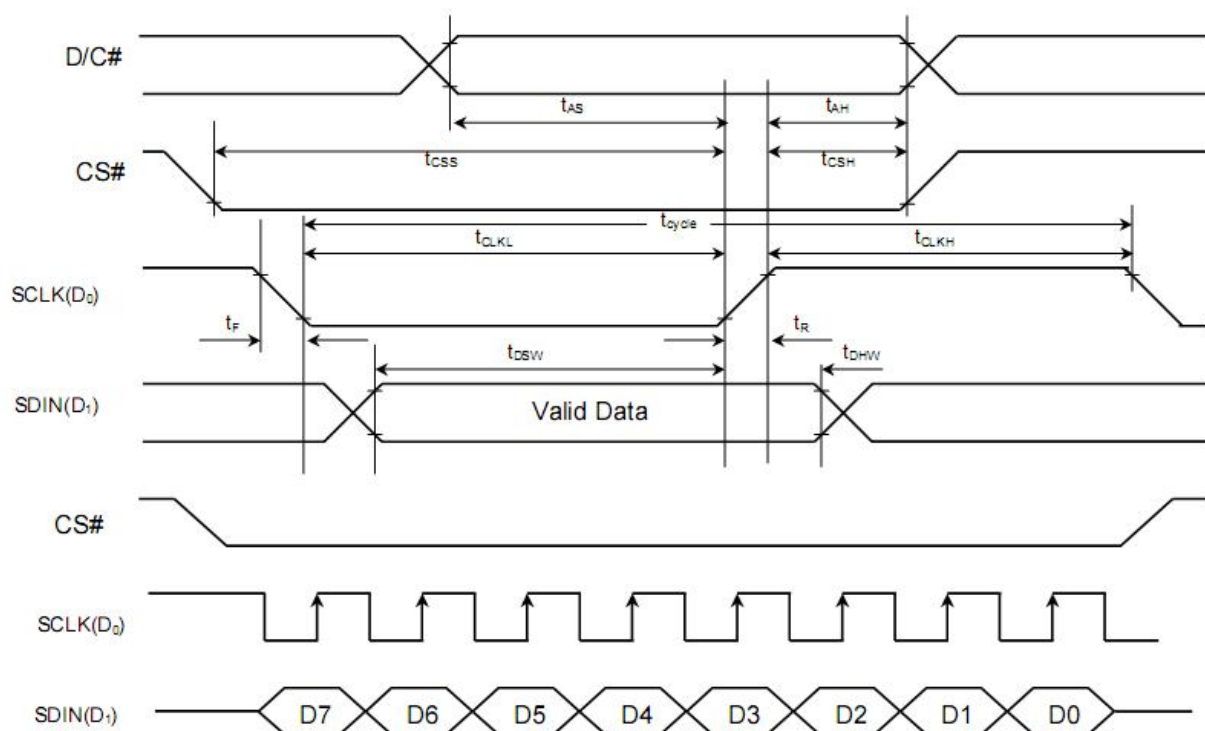


(3)Serial Interface Timing Characteristics

(VDD - VSS = 2.4V to 3.5V, TA = 25°C)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	250	-	-	ns
t_{AS}	Address Setup Time	150	-	-	ns
t_{AH}	Address Hold Time	150	-	-	ns
t_{CSS}	Chip Select Setup Time	120	-	-	ns
t_{CSH}	Chip Select Hold Time	60	-	-	ns
t_{DSW}	Write Data Setup Time	100	-	-	ns
t_{DHW}	Write Data Hold Time	100	-	-	ns
t_{CLKL}	Clock Low Time	100	-	-	ns
t_{CLKH}	Clock High Time	100	-	-	ns
t_R	Rise Time	-	-	15	ns
t_F	Fall Time	-	-	15	ns

Serial interface characteristics

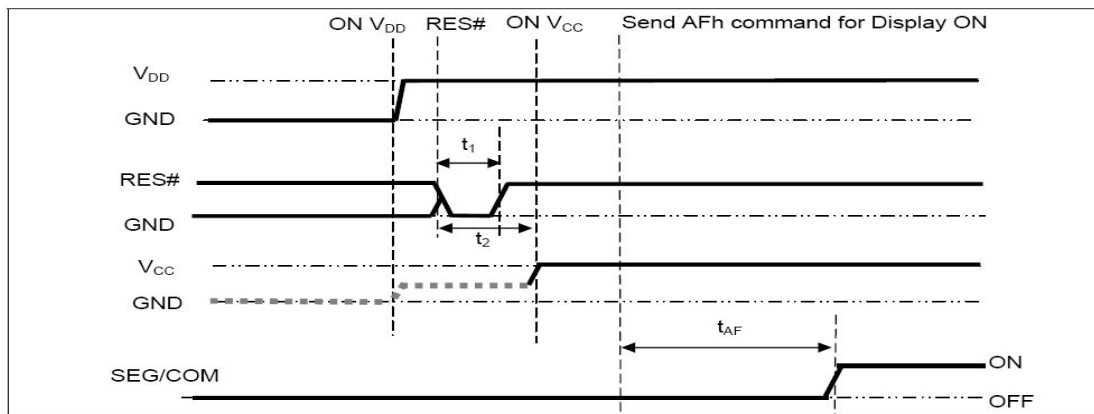


9 Functional Specification and Application Circuit

9.1 Power ON and Power OFF Sequence

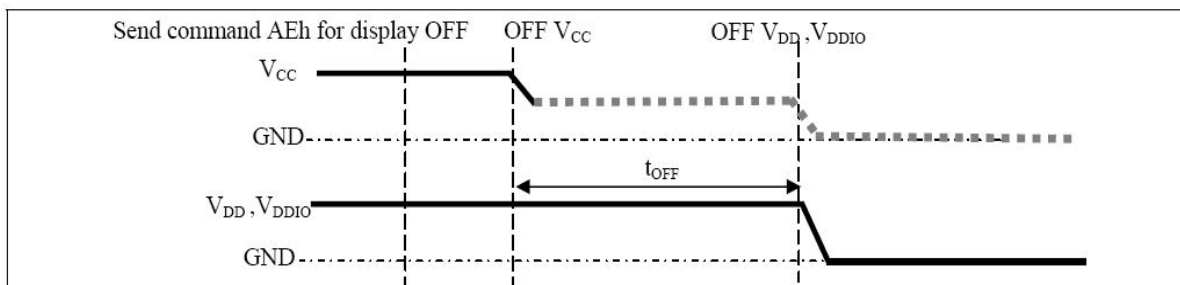
Power ON Sequence:

1. Power ON VDD.
2. After VDD become stable, set RES# pin LOW (logic low) for at least 3 μ s (t_1) and then HIGH (logic high).
3. After set RES# pin LOW (logic low), wait for at least 3 μ 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. Wait for t_{OFF} . Power OFF VDD. (where Minimum t_{OFF} =0ms, Typical t_{OFF} =100ms)

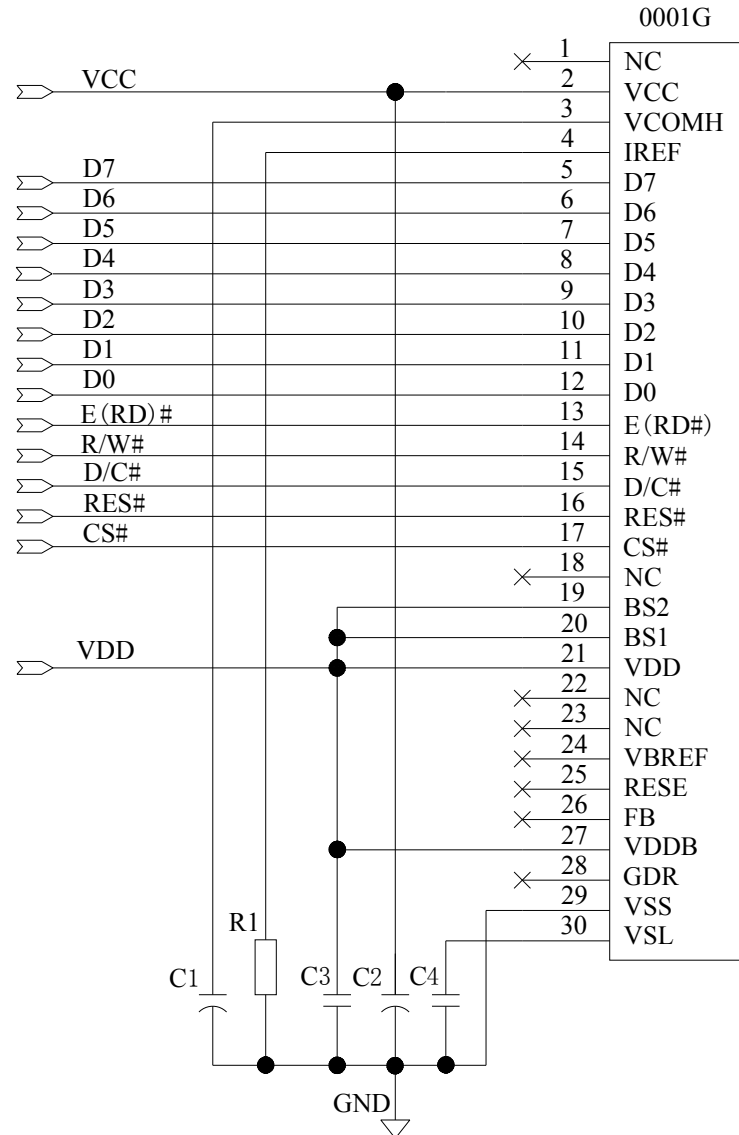


Note:

- (1) Since an ESD protection circuit is connected between VDD and VCC, VCC becomes lower than VDD whenever VDD is ON and VCC is OFF as shown in the dotted line of VCC in above figures.
- (2). VCC should be kept float (disable) when it is OFF.

9.2 Application Circuit

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



Pin connected to MCU interface: D[7:0], E(RD#), R/W#, D/C#, CS#, RES#
GDR, VBREF, RESE, FB should be left open.

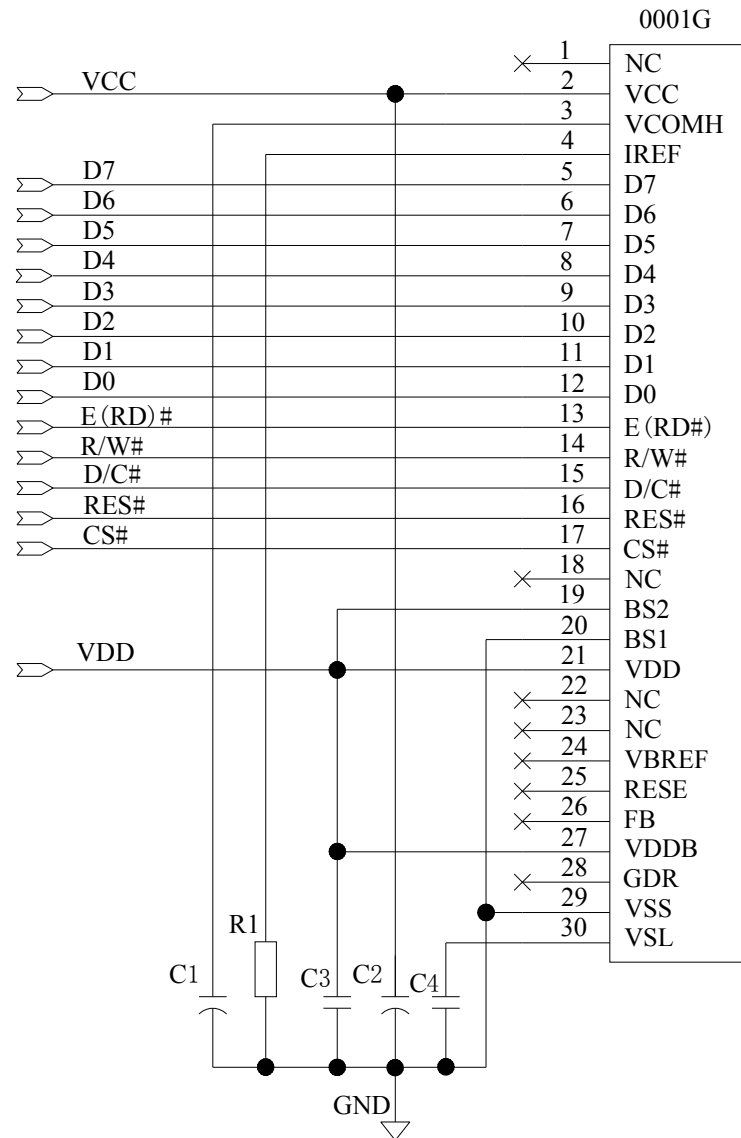
Recommended components

C1,C2,: 4.7μF/25V.ROHS (Tantalum Capacitors)

C3,C4: 0.1uF-0603-X7R±10%.ROHS

R1: 0603 1/10W +/-5% 910Kohm.ROHS

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



Pin connected to MCU interface: D[7:0], E(RD#), R/W#, D/C#, CS#, RES#
GDR, VBREF, RESE, FB should be left open.

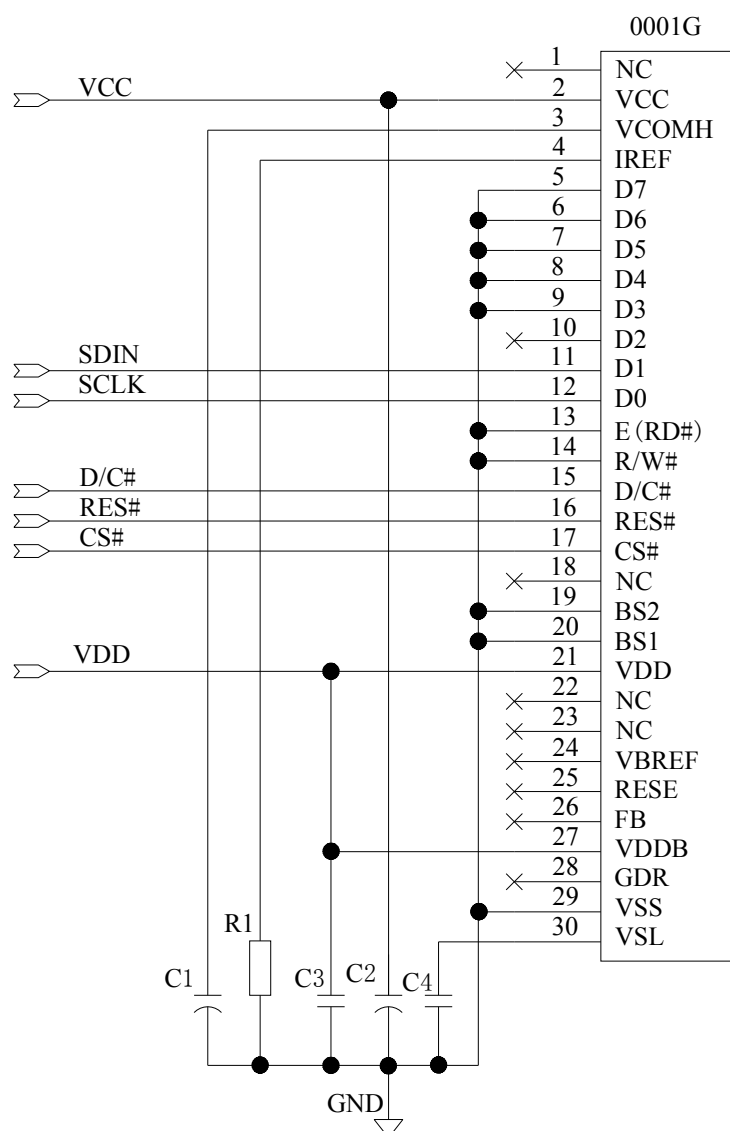
Recommended components

C1,C2,: 4.7μF/25V.ROHS (Tantalum Capacitors)

C3,C4: 0.1uF-0603-X7R±10%.ROHS

R1: 0603 1/10W +/-5% 910Kohm.ROHS

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



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

GDR, VBREF, RESE,FB should be left open.

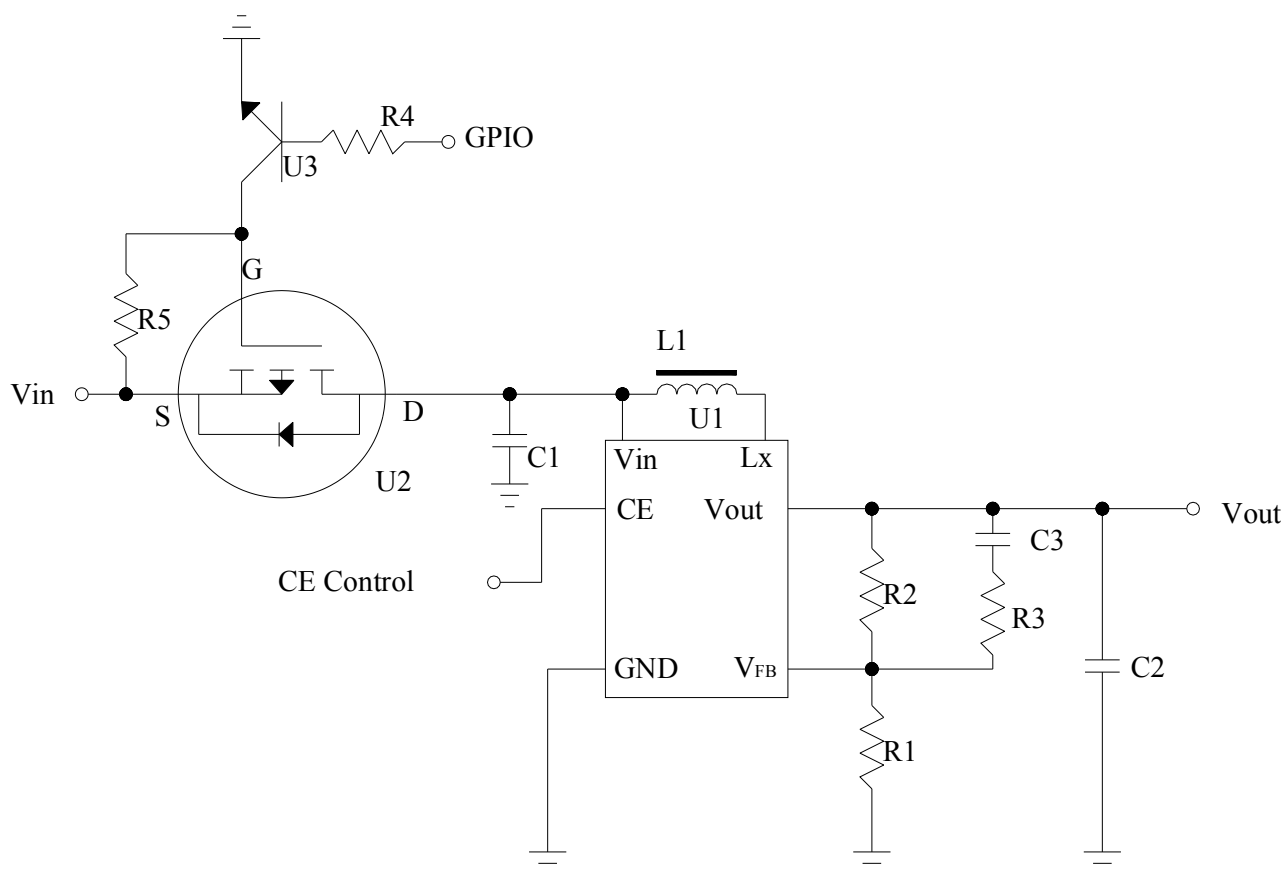
Recommended components

C1,C2,: 4.7 μ F/25V.ROHS (Tantalum Capacitors)

C3,C4: 0.1 μ F-0603-X7R $\pm$ 10%.ROHS

R1: 0603 1/10W +/-5% 910Kohm.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	: 8050

9.4 Display Control Instruction

Refer to SSD1325 IC Specification.

9.5 Recommended Software Initialization

void init_program()

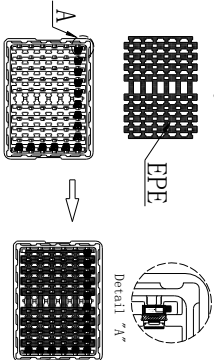
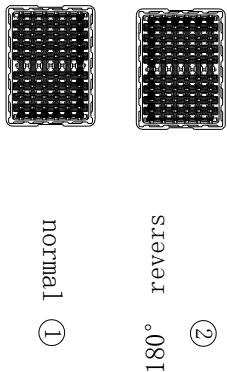
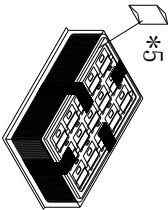
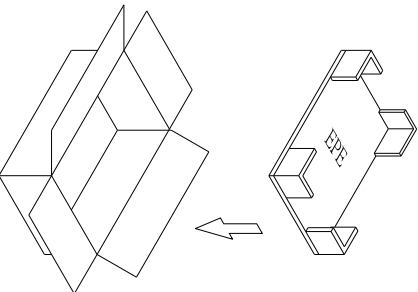
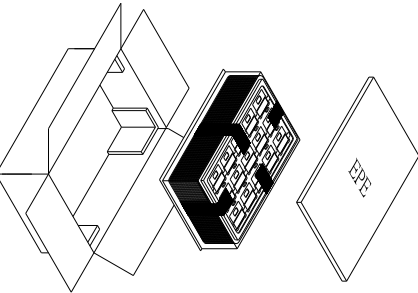
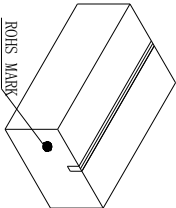
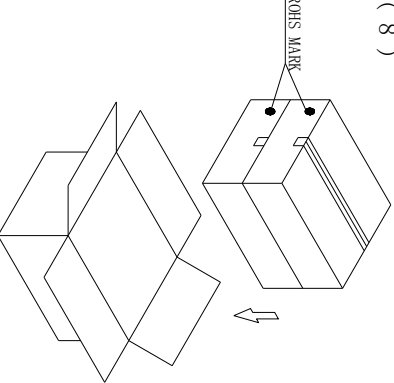
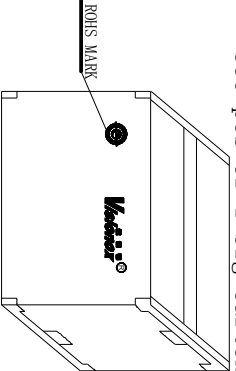
```
{
    write_c(0xae);
    write_c(0x15);    // set column address
    write_c(0x00);    // start column    0
    write_c(0x3f);    // end column    127
    write_c(0x75);    // set row address
    write_c(0x0d);    // start row    12
    write_c(0x4c);    // end row    75
    write_c(0x81);    // set contrast control
    write_c(0x45);
    write_c(0x86);    // full current range
    write_c(0xa0);    //segment remap
    write_c(0x52);    //
    write_c(0xa1);    // start line
    write_c(0x0d);
    write_c(0xa2);    // display offset
    write_c(0x4c);
    write_c(0xa4);    //normal display
    write_c(0xa8);    // set multiplex ratio
    write_c(0x3f);
    write_c(0xb0);
    write_c(0x28);
    write_c(0xb1);    // set phase leghth
    write_c(0xf1);    //f1
    write_c(0xb2);    // set row period
    write_c(0x2d);    //
    write_c(0xb3);    // set dclk
    write_c(0xf2);
    write_c(0xb4);    // set phase leghth
    write_c(0x20);    //00
    write_c(0xbe);
    write_c(0x1f);    //1f
    write_c(0xbc);
    write_c(0x20);
```

```
write_c(0xbf);  
write_c(0x0e);  
write_c(0xae);  
}
```

10 Package Specification

Controlled Seal

Packing Process (1)~(9)

(1) TRAY Type:0001G-MT1-C Add EPE in every contained tray 	(2) 	(3) order ①、②、①、② fix trays with tape 168 pcs of 1 small carton 1 tray contain 12 pcs 14 contained trays, 1 empty tray 	(4) package with plastic bags add five desiccants create a power vacuum 
(5) 	(6) 	(7) 	(8) 
(9) 28 contained trays, 2 empty trays, Package quantity products: 336 pcs of 1 big carton  Package finished	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 .		

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	Vibration	Frequency: 5~50Hz,0.5G Scan rate: 1 oct/min Time: 2 hrs/axis Test axis: X,Y, Z	1 Carton
8	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 $\pm 3^{\circ}\text{C}$, 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.

11.2 Lifetime

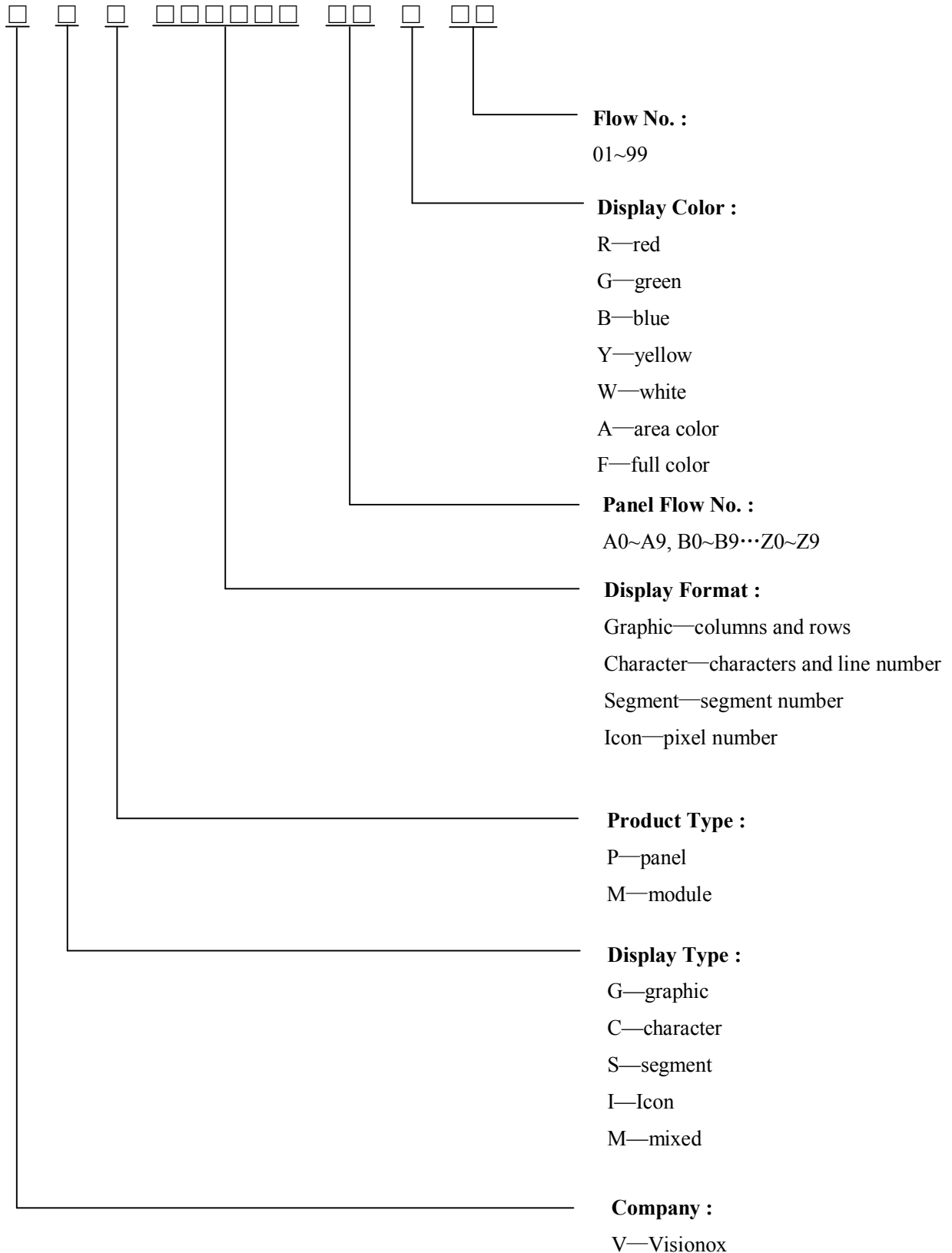
End of lifetime is specified as 50% of initial brightness and the test pattern at operating condition is 50% alternating checkerboard.

ITEM	MIN	MAX	UNIT	CONDITION
Operation Life Time	40,000	-	hrs	100 cd/m ² , 50% alternating checkerboard 22 $\pm$ 3℃; 55 $\pm$ 15% RH.

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 $22\pm3^{\circ}\text{C}$; $55\pm15\%$ RH.

12 Illustration of OLED Product Name



13 Outgoing Quality Control Specifications

13.1 Sampling Method

- (1) GB/T 2828.1-2003/ISO2859-1: 1999, 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: $22 \pm 3^{\circ}\text{C}$

Humidity: $55 \pm 15\% \text{R.H}$

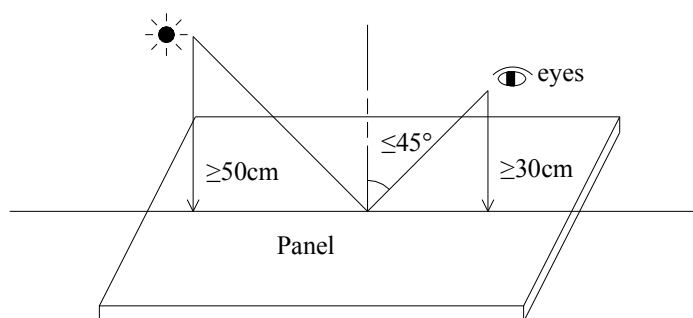
Fluorescent Lamp: 30W

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

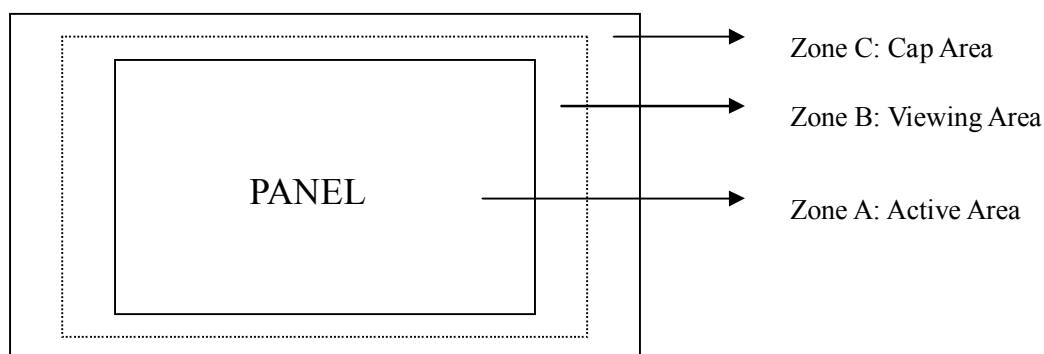
Distance between the Panel & Eyes: $\geq 30\text{cm}$

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

(See the sketch below)

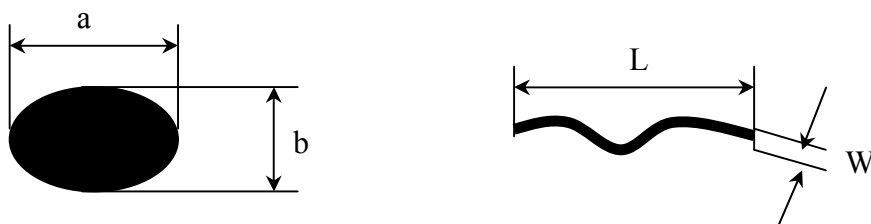


13.3 Quality Assurance Zones

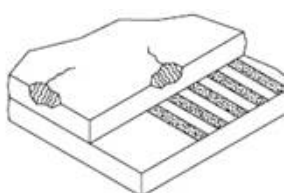


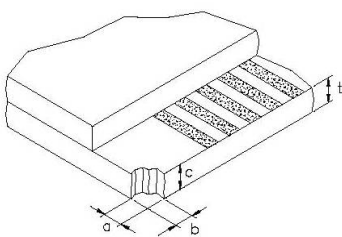
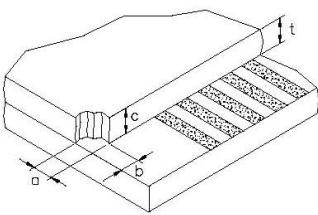
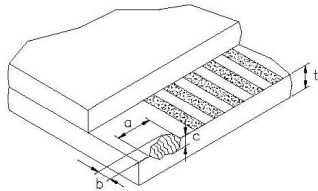
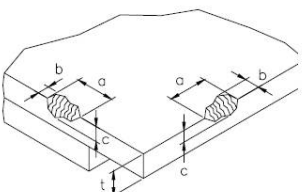
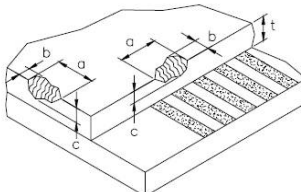
13.4 Inspection Standard

Definition of Φ &L&W (Unit: mm)



I . Appearance Defects

NO.	ITEM	CRITERIA	CLASSIFICATION																
1	Polarizer Black or White spot, Dirty spot, Foreign matter, Dent on the polarizer	<table><tr><th rowspan="2">Average Diameter (mm)</th><th colspan="2">Acceptable Number</th></tr><tr><th>Zone A,B</th><th>Zone C</th></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><th rowspan="2">Width (mm)</th><th rowspan="2">Length (mm)</th><th colspan="2">Acceptable Number</th></tr><tr><th>Zone A,B</th><th>Zone C</th></tr><tr><td>$W \leq 0.03$</td><td>---</td><td>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$0.03 < W \leq 0.08$</td><td>$L \leq 5.0$</td><td>3</td></tr><tr><td>$W > 0.08$</td><td>---</td><td>0</td></tr></table>	Width (mm)	Length (mm)	Acceptable Number		Zone A,B	Zone C	$W \leq 0.03$	---	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 5.0$	3	$W > 0.08$	---	0	Minor
Width (mm)	Length (mm)	Acceptable Number																	
		Zone A,B	Zone C																
$W \leq 0.03$	---	Ignore	Ignore																
$0.03 < W \leq 0.08$	$L \leq 5.0$	3																	
$W > 0.08$	---	0																	
3	Polarizer Bubble	<table><tr><th rowspan="2">Average Diameter (mm)</th><th colspan="2">Acceptable Number</th></tr><tr><th>Zone A,B</th><th>Zone C</th></tr><tr><td>$\Phi > 0.5$</td><td>0</td><td rowspan="3">Ignore</td></tr><tr><td>$0.2 < \Phi \leq 0.5$</td><td>3</td></tr><tr><td>$\Phi \leq 0.2$</td><td>Ignore</td></tr></table>	Average Diameter (mm)	Acceptable Number		Zone A,B	Zone C	$\Phi > 0.5$	0	Ignore	$0.2 < \Phi \leq 0.5$	3	$\Phi \leq 0.2$	Ignore	Minor				
Average Diameter (mm)	Acceptable Number																		
	Zone A,B	Zone C																	
$\Phi > 0.5$	0	Ignore																	
$0.2 < \Phi \leq 0.5$	3																		
$\Phi \leq 0.2$	Ignore																		
4	Any Dirt & Scratch on Polarizer's Protective Film	Ignore for not affect the polarizer.	Acceptable																
5	Glass Crack	 Propagation crack is not acceptable.	Major																

6	Corner Chip	 $t = \text{Glass thickness}$ Accept $a \leq 2.0\text{mm}$ or $b \leq 2.0\text{mm}$, $c \leq t$	Minor
7	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
8	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 $b \leq 1.5\text{mm}$, $c \leq t$ (outside of the contact pin)	Minor
9	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
10	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
11	Stain on Surface	Stain removable by soft cloth or air blow is acceptable.	Minor
12	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
13	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	
		$\Phi\leq0.10$	Ignore	Ignore	
		$0.10 < \Phi\leq0.20$	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	Short	Not allowable.			Major
6	Flicker	Not allowable.			Major
7	Abnormal Color	Refer to the SPEC.			Major
8	Luminance NG	Refer to the SPEC.			Major
9	Over Current	Refer to the SPEC.			Major

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: no higher than 300°C and 3~4 sec during soldering.

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°C and 35°C and the relative humidity less than 60%. 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.