



MULTI-INNO TECHNOLOGY CO., LTD.

OLED MODULE SPECIFICATION

Model : MI9664FO-2

Revision	1.1
Engineering	
Date	
Our Reference	

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1 Overview

MI9664FO-2 is a full color OLED display module with 96(RGB)×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: 65k Full Color
- Dot Matrix: 96(RGB)×64
- Driver IC: SSD1331Z
- Interface: 8-bit 8080、8-bit 6800、SPI
- Wide range of operating temperature: -40°C~70°C
- Storage Temp: -40°C~85°C

3 Mechanical Data

NO.	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	96(W)(RGB)×64(H)	-
2	Dot Size	0.045(W)×0.19 (H)	mm ²
3	Dot Pitch	0.07(W)×0.21 (H)	mm ²
4	Aperture Rate	58	%
5	Active Area	20.135(W)×13.42 (H)	mm ²
6	Panel Size	24.8(W)×22.42(H) ×1.1(H)	mm ³
7	Module Size	24.8(W)×44.82(H) ×1.33(H)	mm ³
8	Diagonal A/A Size	0.95	inch
9	Module Weight	1.48±10%	gram

5 Module Interface

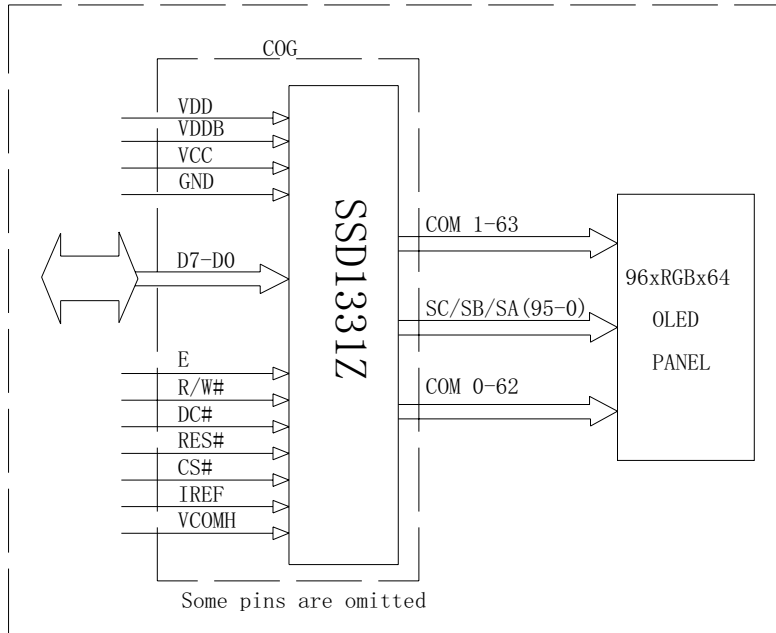
PIN NO.	PIN NAME	DESCRIPTION
1	VCC	This is the most positive voltage supply pin of the chip.
2	VCOMH	A capacitor should be connected between this pin and VSS.
3~10	D7~D0	Data bus.
11	E	This pin is MCU interface input. When interfacing to a 6800-series microprocessor, this pin will be used as the Enable (E) signal. Read/write operation is initiated when this pin is pulled high and the chip is selected.
12	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.
13	DC#	This pin is Data/Command control pin. When the pin is pulled high, the data at D7-D0 is treated as display data. When the pin is pulled low, the data at D7-D0 will be transferred to the command register.
14	RES#	Reset pin, active low.
15	CS#	Chip select pin, active low.
16	IREF	A resistor should be connected between this pin and VSS.
17	BS2	Table:5-1
18	BS1	
19	VDD	Power Supply pin for logic operation of the driver.
20~22	NC	NO connection.
23	VDDB	Reserved pin. It should be connected to VDD externally.
24~25	GND	Ground.

Table:5-1

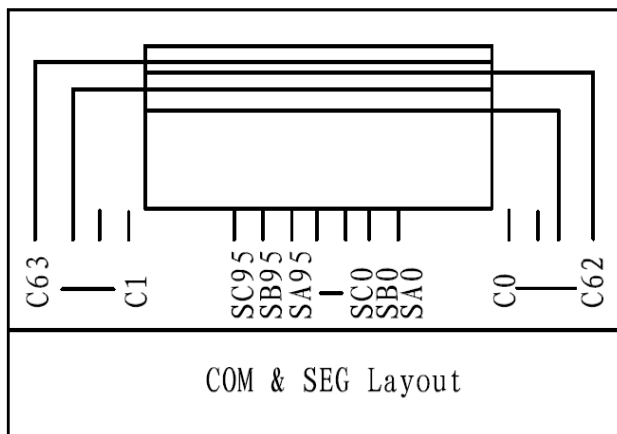
BS[2:1]	Bus Interface Selection
00	SPI
10	8-bit 6800 parallel
11	8-bit 8080 parallel

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	V _{DD}	-0.3	4	V	IC maximum rating
OLED Operating voltage	V _{CC}	0	18	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	V_{DD}	22±3°C, 55±15%R.H	2.4	2.7	3.5	V
OLED Driver Supply Voltage	V_{CC}	22±3°C, 55±15%R.H	12.5	13	13.5	V
High-level Input Voltage	V_{IH}	-	$0.8 \times V_{DD}$	-	-	V
Low-level Input Voltage	V_{IL}	-	0	-	$0.2 \times V_{DD}$	V
High-level Output Voltage	V_{OH}	-	$0.9 \times V_{DD}$	-	V_{DD}	V
Low-level Output Voltage	V_{OL}	-	0	-	$0.1 \times V_{DD}$	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	TYPE	MAX	UNIT
Normal Mode Brightness	L _{br}	All pixels ON(1)	80	100		cd/m ²
Standby Mode Brightness		Standby Mode 10% pixels ON(2)		10		cd/m ²
Normal Mode Power Consumption	Pt	All pixels ON(1)		169	203	mW
Standby Mode Power Consumption		Standby Mode 10% pixels ON(2)		15		mW
C.I.E(White)	(x)	x,y(CIE1931)	0.26	0.30	0.34	-
	(y)		0.28	0.32	0.36	-
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)	0.25	0.29	0.33	-
	(y)		0.54	0.58	0.62	-
C.I.E(Blue)	(x)	x,y(CIE1931)	0.10	0.14	0.18	-
	(y)		0.12	0.16	0.20	-
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 :13V
- Contrast setting : 0x06
- Frame rate : 107
- Duty setting : 1/64

Note(2): Standby Mode test conditions are as follows:

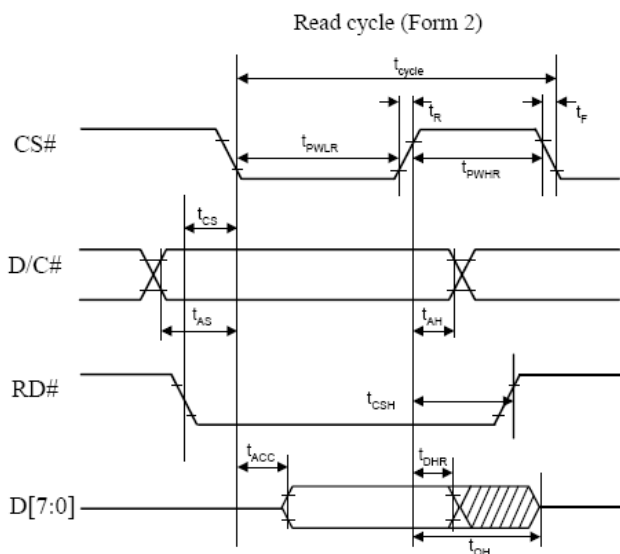
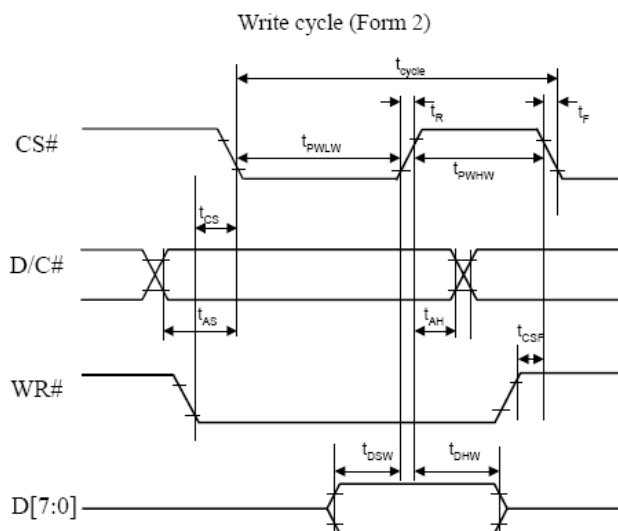
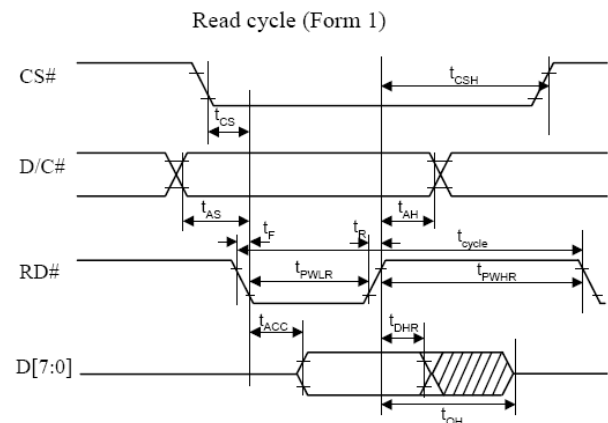
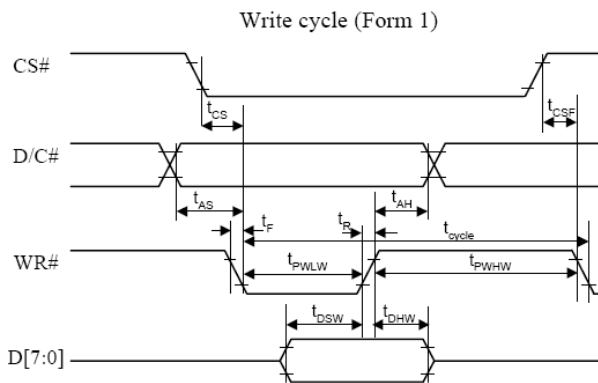
- Driving voltage : 13V
- Contrast setting : 0x06
- Frame rate : 107
- Duty setting : 1/64

8.3 AC Electrical Characteristics

(1)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	130	-	-	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	10	-	-	ns
t_{DHR}	Read Data Hold Time	20	-	-	ns
t_{OH}	Output Disable Time	-	-	70	ns
t_{ACC}	Access Time	-	-	140	ns
$t_{\text{PWL R}}$	Read Low Time	150	-	-	ns
$t_{\text{PWL W}}$	Write Low Time	60	-	-	ns
$t_{\text{PWH R}}$	Read High Time	60	-	-	ns
$t_{\text{PWH W}}$	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

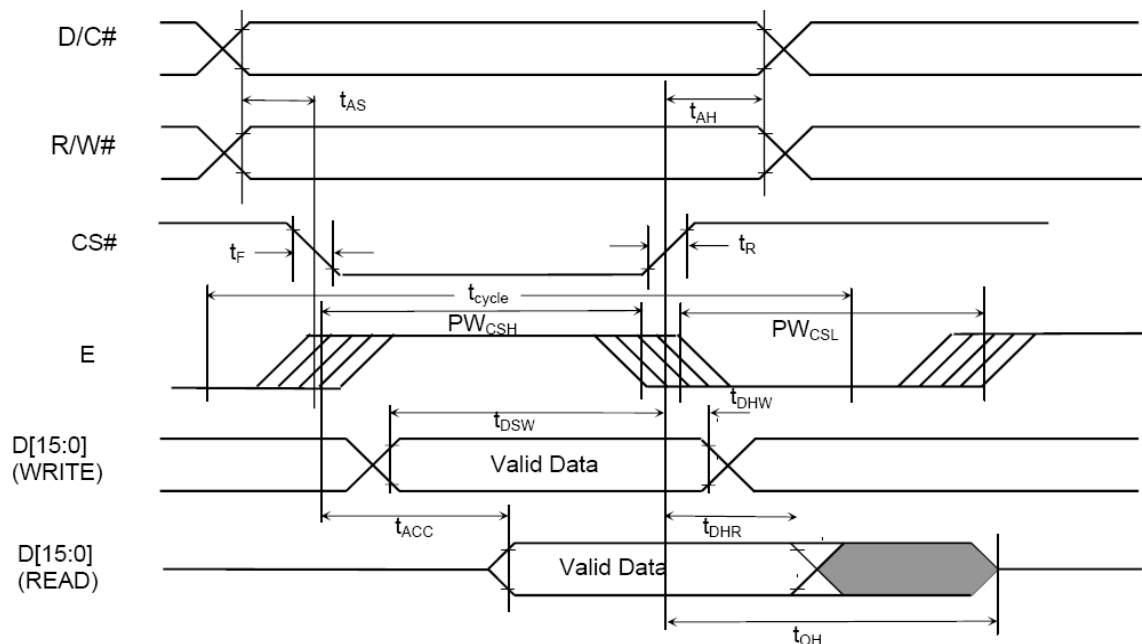


8080-series parallel interface characteristics

(2)6800-Series MPU Parallel Interface Timing Characteristics

(VDD - VSS = 2.4V to 3.5V, TA = 25°C)

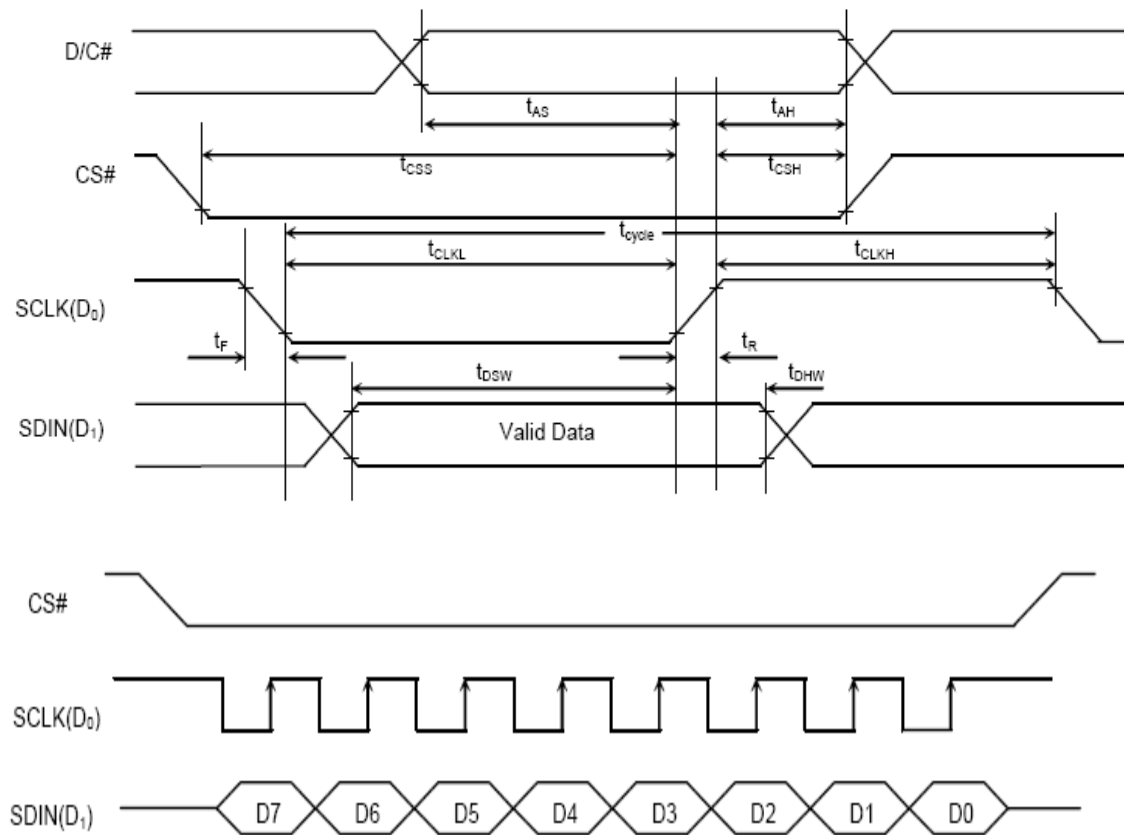
Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	130	-	-	ns
PW_{CSL}	Control Pulse Low Width (write cycle)	60	-	-	ns
PW_{CSH}	Control Pulse High Width (write cycle)	60	-	-	ns
t_{cycle}	Clock Cycle Time (read cycle)	200	-	-	ns
PW_{CSL}	Control Pulse Low Width (read cycle)	100	-	-	ns
PW_{CSH}	Control Pulse High Width (read cycle)	100	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	10	-	-	ns
t_{DSW}	Data Setup Time	40	-	-	ns
t_{DHW}	Data Hold Time	10	-	-	ns
t_{ACC}	Data Access Time	-	-	140	ns
t_{OH}	Output Hold time	-	-	70	ns
t_{R}	Rise Time	-	-	15	ns
t_{F}	Fall Time	-	-	15	ns


6800-series parallel interface characteristics

(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	150	-	-	ns
t_{AS}	Address Setup Time	40	-	-	ns
t_{AH}	Address Hold Time	40	-	-	ns
t_{CSS}	Chip Select Setup Time	75	-	-	ns
t_{CSH}	Chip Select Hold Time	60	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns
t_{DHW}	Write Data Hold Time	40	-	-	ns
t_{CLKL}	Clock Low Time	75	-	-	ns
t_{CLKH}	Clock High Time	75	-	-	ns
t_{R}	Rise Time	-	-	15	ns
t_{F}	Fall Time	-	-	15	ns



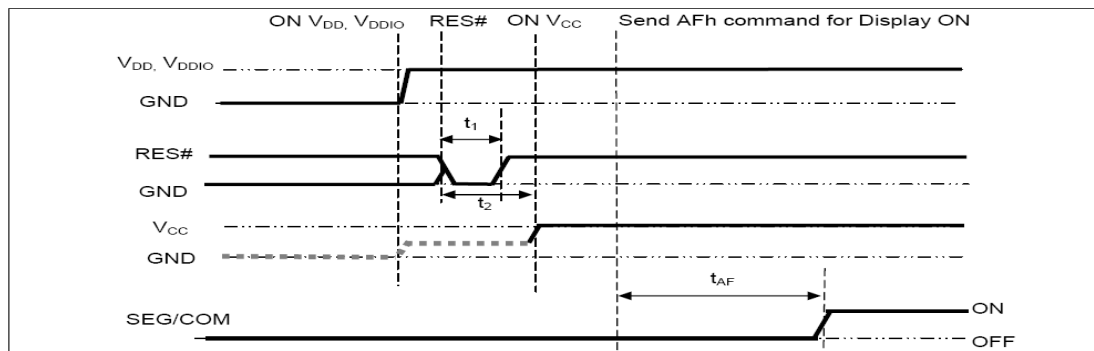
Serial interface characteristics

9 Functional Specification and Application Circuit

9.1 Power ON and Power OFF Sequence

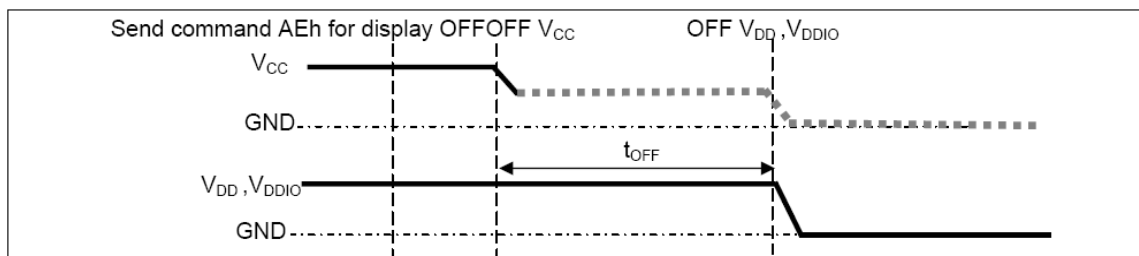
Power ON Sequence:

1. Power ON V_{DD}
2. After V_{DD} become stable, set RES# pin LOW (logic low) for at least $3\mu s$ (t_1)⁽⁴⁾ and then HIGH (logic high).
3. After set RES# pin LOW (logic low), wait for at least $3\mu s$ (t_2). Then Power ON V_{CC} ⁽¹⁾.
4. After V_{CC} 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 V_{CC} ^{(1),(2),(3)}.
3. Power OFF V_{DD} after t_{OFF} .⁽⁵⁾ (Typical $t_{OFF}=100ms$)

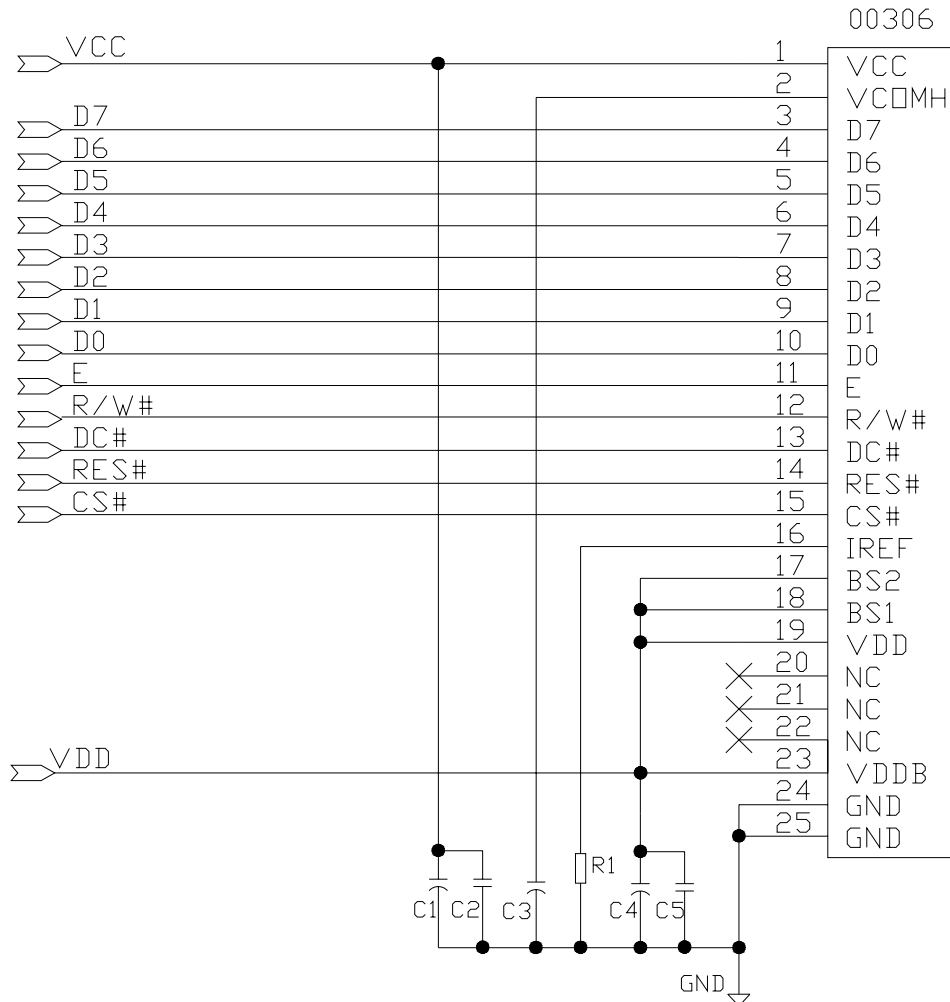


Note:

- (1) Since an ESD protection circuit is connected between V_{DD} and V_{CC} , V_{CC} becomes lower than V_{DD} whenever V_{DD} 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_{DD} should not be Power OFF before V_{CC} Power OFF

9.2 Application Circuit

The configuration for 8080-parallel interface mode, external V_{CC} is shown in the following diagram:



Note:

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

Recommended components:

C1,C3,C4: 4.7 μ F/25V.ROHS (Tantalum Capacitors)

C2,C5: 0.1 μ F-0603-X7R \pm 10%.ROHS

R1: 0603 1/10W \pm 5% 910Kohm.ROHS

9.3 Display Control Instruction

Refer to SSD1331 IC Specification.

9.4 Recommended Software Initialization

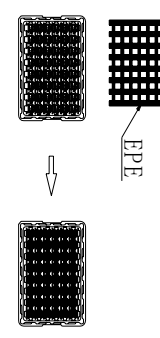
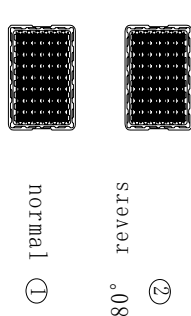

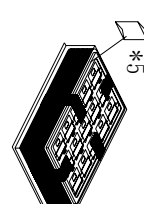
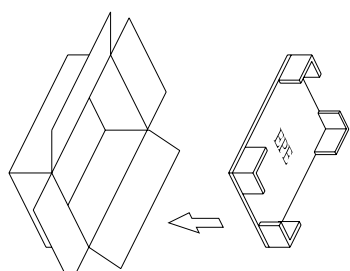
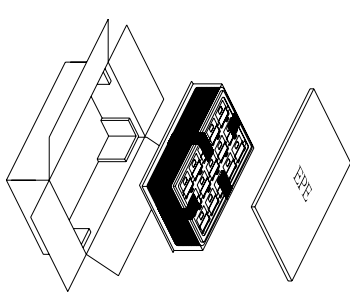
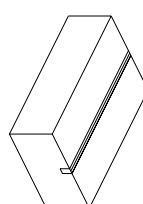
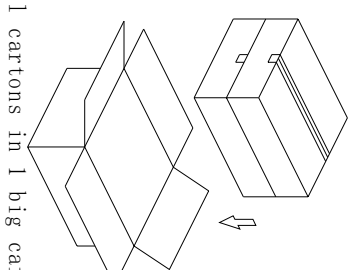
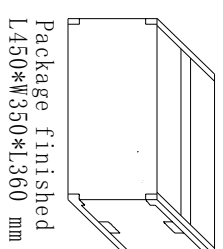
```
void init_program()
{
    write_c(0xfd);           // command lock
    write_c(0x12);
    write_c(0xae);         // display off
    write_c(0xa4);         // Normal Display mode
    write_c(0x15);         //set column address
    write_c(0x00);         //column address start 00
    write_c(0x5f);         //column address end 95
    write_c(0x75);         //set row address
    write_c(0x00);         //row address start 00
    write_c(0x3f);         //row address end 63
    write_c(0x87);         //master current control
    write_c(0x06)
    write_c(0x83);         //Set Contrast for Color R
    write_c(0xc0);
    write_c(0x82);         //Set Contrast for Color G
    write_c(0x65);
    write_c(0x81);         //Set Contrast for Color B
    write_c(0x95)
    write_c(0x8a)
    write_c(0x61)
    write_c(0x8b)
    write_c(0x62)
    write_c(0x8c);
    write_c(0x63);
    write_c(0xa0);         //set re-map & data format
    write_c(0x72);         //Horizontal address increment
    write_c(0xa1);         //set display start line
    write_c(0x00);         //start 00 line
    write_c(0xa2);         //set display offset
    write_c(0x00);
    write_c(0xa8);         //set multiplex ratio
    write_c(0x3f);
    write_c(0xad);
    write_c(0x8f);
    write_c(0xb0);         //set power save
    write_c(0x1a);
    write_c(0xb1);
    write_c(0xf1);         // Phase 2 period Phase 1 period
    write_c(0xb3);         //Set Display clock divide ratio/ Oscillator Frequencyosci
```




```
write_c(0xd0);      //0.97MHz
write_c(0xbb);      //Set pre-charge
write_c(0x3e);
write_c(0xbe);      //Set VCOMH
write_c(0x3e);
write_c(0xb9);
write_c(0xb8);      //Set Gray scale table
write_c(0xad);      //select external VCCsupply at Display on
write_c(0x8e);      //select External Vp voltage supply
write_c(0xaf);      //Display on
}
```

10 Package Specification

Package order (1) ~ (9)

<p>(1) Tray : 370*273 t=0.8mm Add EPE in every contained tray</p> 	<p>(2)</p>  <p>server ② normal ①</p>	<p>(3) order ① ② ① ② fix trays with tape Package quantity products: 420 pcs of 1 small carton 1 tray contain 28 pcs 15 contained trays, 1 empty tray</p> 	<p>(4) package with plastic bags add five desiccants create a power vacuum *5</p> 
<p>(5)</p> 	<p>(6)</p> 	<p>(7)</p>  <p>small carton package L425*W330*L175 mm</p>	<p>(8)</p>  <p>2 small cartons in 1 big carton</p>
<p>(9)</p> <p>30 contained trays, 2 empty trays, Package quantity products: 840 pcs of 1 big carton</p>  <p>Package finished L450*W350*L1360 mm</p>			

NOTE: Tape on the small carton & big carton

11 Reliability

11.1 Reliability Test

NO.	ITEM	CONDITION	QUANTITY
1	High Temperature (Non-operation)	85°C,240hrs	4
2	Low Temperature (Non-operation)	-40°C,240hrs	4
3	High Temperature (Operation)	70°C,240hrs	4
4	Low Temperature (Operation)	-40°C,240hrs	4
5	High Temperature / High Humidity (Operation)	60°C,90%RH,240hrs	4
6	Thermal shock (Non-operation)	-40°C~80°C(-40°C/40min;transit/3min;80°C/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

- All measurements shall not be started until the specimens attain to temperature stability, the stable time is at least 15 minutes.
- The degradation of polarizer is ignored for item 5.
- The tolerance of temperature is $\pm 3^{\circ}\text{C}$, and the tolerance of relative humidity is $\pm 5\%$.

Evaluation criteria

- The function test is OK.
- No observable defects.
- Luminance: $\geq 50\%$ of initial value.
- 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	16000	-	hrs	100 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 $22\pm 3^{\circ}\text{C}$; $55\pm 15\%$ RH.

12 Outgoing Quality Control Specifications

12.1 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

12.2 Inspection Conditions

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

Temperature: $22 \pm 3^{\circ}\text{C}$

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

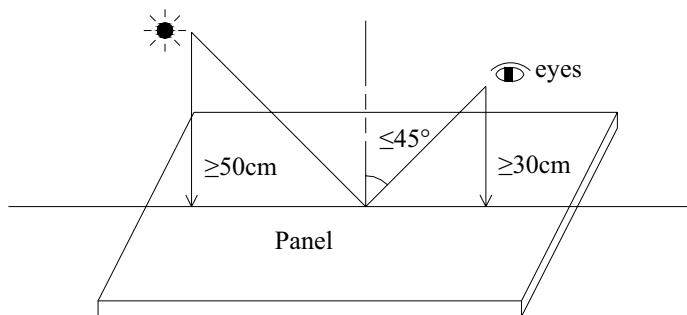
Fluorescent Lamp: 30W

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

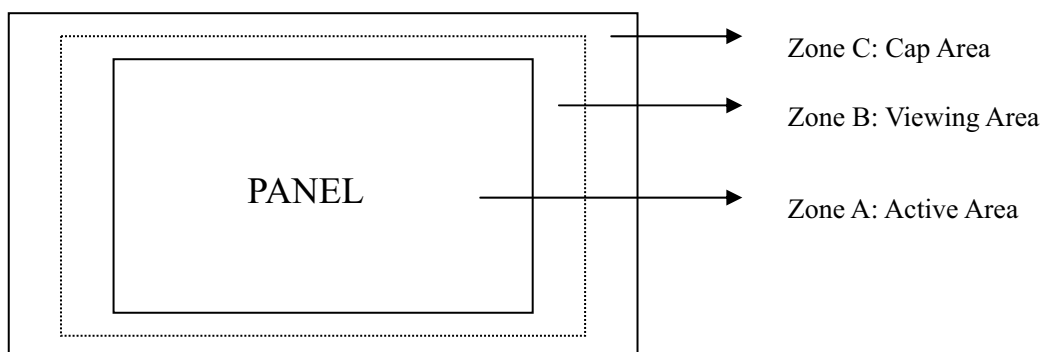
Distance between the Panel & Eyes: $\geq 30\text{cm}$

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

(See the sketch below)

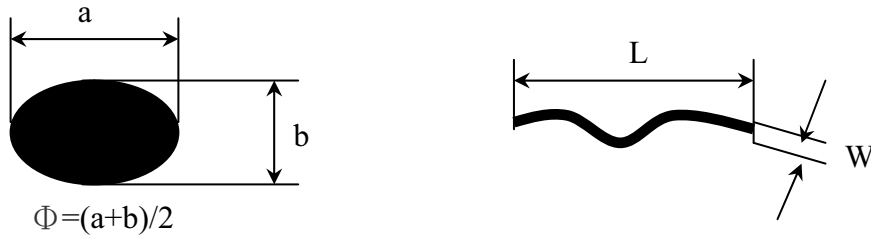


12.3 Quality Assurance Zones



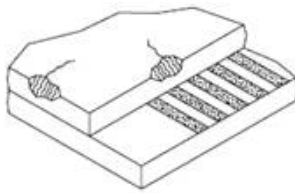
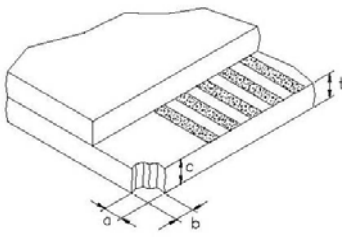
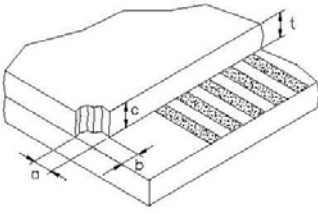
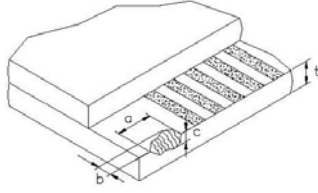
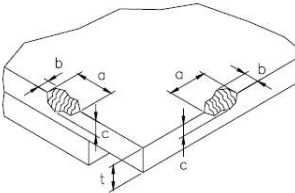
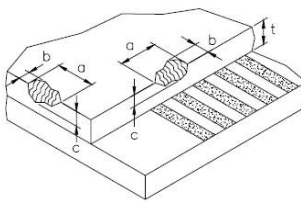
12.4 Inspection Standard

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 border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </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				
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2	Scratch/line on the glass/Polarizer	<table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </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
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4	Any Dirt & Scratch on Polarizer's Protective Film	Ignore for not affect the polarizer.	Acceptable																
5	Any Dirt on Cap Glass	<table border="1"> <thead> <tr> <th>Average Diameter (mm)</th> <th>Acceptable Number</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.5$</td> <td>Ignore</td> </tr> <tr> <td>$0.5 < \Phi \leq 1.0$</td> <td>3</td> </tr> <tr> <td>$\Phi > 1.0$</td> <td>0</td> </tr> </tbody> </table>	Average Diameter (mm)	Acceptable Number	$\Phi \leq 0.5$	Ignore	$0.5 < \Phi \leq 1.0$	3	$\Phi > 1.0$	0	Minor								
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5	Glass Crack	 <p>Propagation crack is not acceptable.</p>	Major
6	Corner Chip	 <p>t= Glass thickness Accept $a \leq 2.0\text{mm}$ or $b \leq 2.0\text{mm}$, $c \leq t$</p>	Minor
7	Corner Chip on Cap Glass	 <p>t= Glass thickness Accept $a \leq 1.5\text{mm}$ or $b \leq 1.5\text{mm}$, $c \leq t$</p>	Minor
8	Chip on Contact Pad	 <p>t= 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)</p>	Minor
9	Chip on Face of Display	 <p>t= Glass thickness Accept $a \leq 1.5\text{mm}$ or $b \leq 1.5\text{mm}$, $c \leq t$</p>	Minor
10	Chip on Cap Glass	 <p>t= 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 $b \leq 1.5\text{mm}$, $t/2 \leq c \leq t$</p>	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.	ITEM	CRITERIA	CLASSIFICATION															
1	Black/White spot Dirty spot Foreign matter	<table border="1"> <thead> <tr> <th data-bbox="517 371 794 443">Average Diameter (mm)</th> <th colspan="2" data-bbox="794 371 1153 409">Pieces Permitted</th> </tr> <tr> <td data-bbox="517 409 794 472">$\Phi \leq 0.10$</td> <td data-bbox="794 409 979 472">Zone A,B</td> <td data-bbox="979 409 1153 472">Zone C</td> </tr> <tr> <td data-bbox="517 472 794 535">$0.10 < \Phi \leq 0.20$</td> <td colspan="2" data-bbox="794 472 1153 535">Ignore</td> </tr> <tr> <td data-bbox="517 535 794 544">$\Phi > 0.20$</td> <td data-bbox="794 535 979 544">3</td> <td data-bbox="979 535 1153 544">Ignore</td> </tr> <tr> <td data-bbox="517 544 794 553">$\Phi > 0.20$</td> <td colspan="2" data-bbox="794 544 1153 553">0</td> </tr> </thead> </table>	Average Diameter (mm)	Pieces Permitted		$\Phi \leq 0.10$	Zone A,B	Zone C	$0.10 < \Phi \leq 0.20$	Ignore		$\Phi > 0.20$	3	Ignore	$\Phi > 0.20$	0		Minor
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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															

13 Precautions for operation and Storage

13.1 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.

13.2 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.

13.3 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.