WINSTAR Display

OLED SPECIFICATION

Model No:

WEO012864ABXPP3N0Y000

SPECIFICATION Version: D

CUSTOMER :
MODULE NO. : WEO012864ABXPP3N0Y000

APPROVED BY: **(FOR CUSTOMER USE ONLY)**	

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
RELEASE DATE:			

■APPROVAL FOR SPECIFICATIONS ONLY

□APPROVAL FOR SPECIFICATIONS AND SAMPLE

MODEL NO：

RECORDS OF REVISION			DOC. FIRST ISSUE
VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2022/04/21		First release
A	2022/10/05		Modify Reliability Test and measurement conditions
B	2023/04/27		Modify Lifetime note
C	2023/05/18		Modify the inspection criteria name of the inspection specification
D	2023/06/09		Modify Inspection specification

Contents

1.Module Classification Information

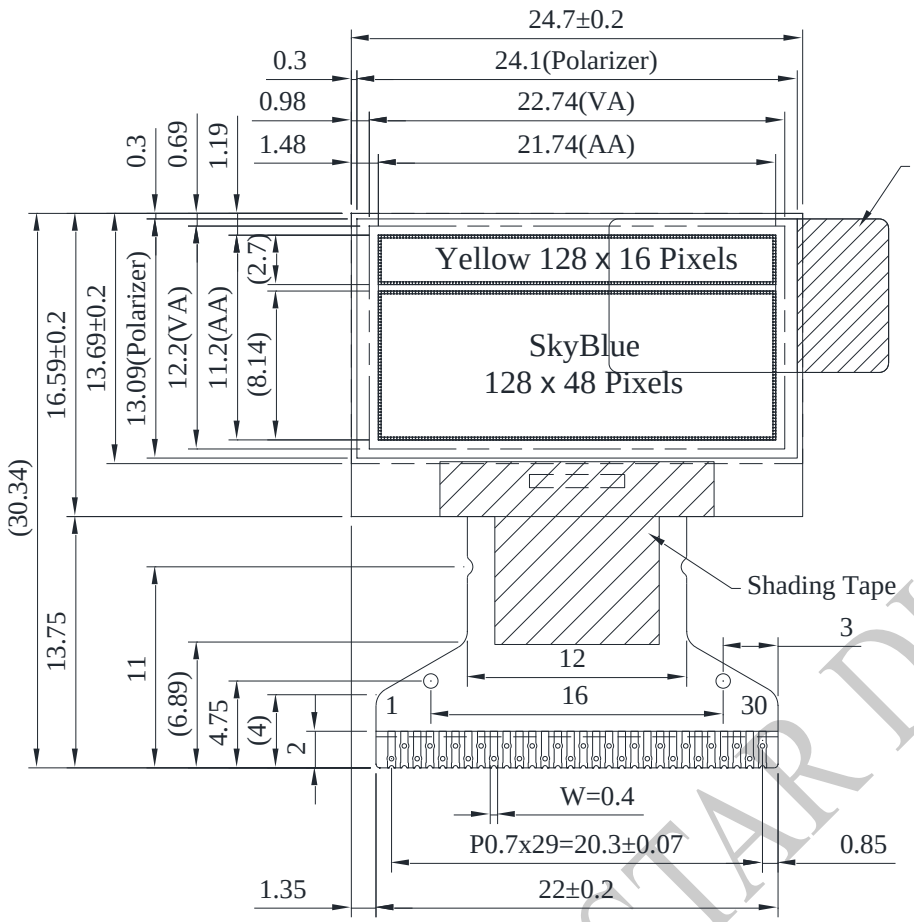
W	E	O	012864	AB	X	P	P	3	N	0	Y	0	00
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭

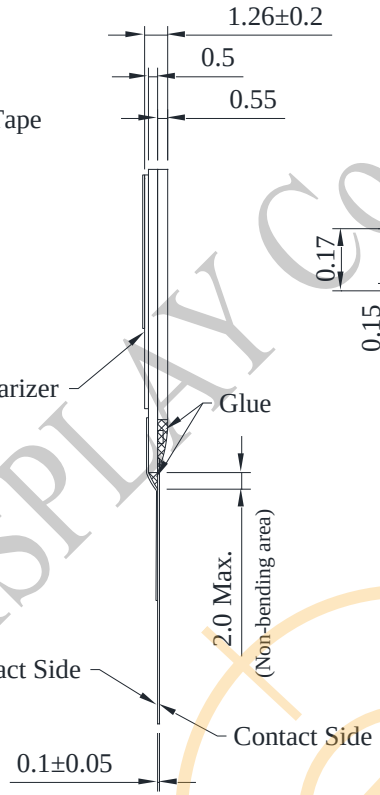
1	Brand：WINSTAR DISPLAY CORPORATION			
2	E：OLED			
3	Display Type	H：COB Character	G：COB Graphic	
		O：COG	F：COG + FR	
		P：COG + FR + PCB	X：COF	
		A：COG + PCB	N：COF + FR + PCB	
4	Dot Matrix： 128 * 64			
5	Serials code			
6	Emitting Color	A：Amber	R：Red	C：Full Color
		B：Blue	W：White	
		G：Green	L：Yellow	
		S：Sky Blue	X：Dual Color	
7	Polarizer	P：With Polarizer; N: Without Polarizer A：Anti-glare Polarizer		
8	Display Mode	P：Passive Matrix ; N：Active Matrix		
9	Driver Voltage	3：3.0~3.3V ； 5：5.0V		
10	Touch Panel	N：Without touch panel; T: With touch panel		
11	Product type	0：Standard		
12	Inspection Grade	0：Standard Y：Consumer grade		
13	Option	0：Default		
14	Serial No.	Serial number(00~99)		

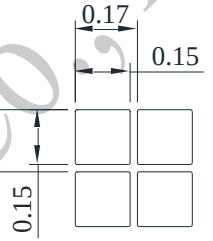
2.General Specification

Item	Dimension	Unit
Dot Matrix	128 × 64 Dots	–
Module dimension	24.7 × 16.59 × 1.26	mm
Active Area	21.74 × 11.20	mm
Pixel Size	0.15 × 0.15	mm
Pixel Pitch	0.17 × 0.17	mm
Display Mode	Passive Matrix	
Display Color	Yellow / Sky Blue	
Drive Duty	1/64 Duty	
IC	SSD1315	
Interface	6800,8080,SPI,I2C	
Size	0.96 inch	

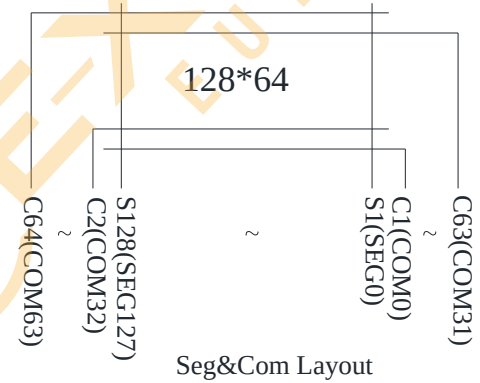
3. Contour Drawing & Block Diagram







PIN	SYMBOL	PIN	SYMBOL
1	NC(GND)	16	R/W#
2	C2P	17	E/RD#
3	C2N	18	D0
4	C1P	19	D1
5	C1N	20	D2
6	VBAT	21	D3
7	NC	22	D4
8	VSS	23	D5
9	VDD	24	D6
10	BS0	25	D7
11	BS1	26	IREF
12	BS2	27	VCOMH
13	CS#	28	VCC
14	RES#	29	VLSS
15	D/C#	30	NC(GND)

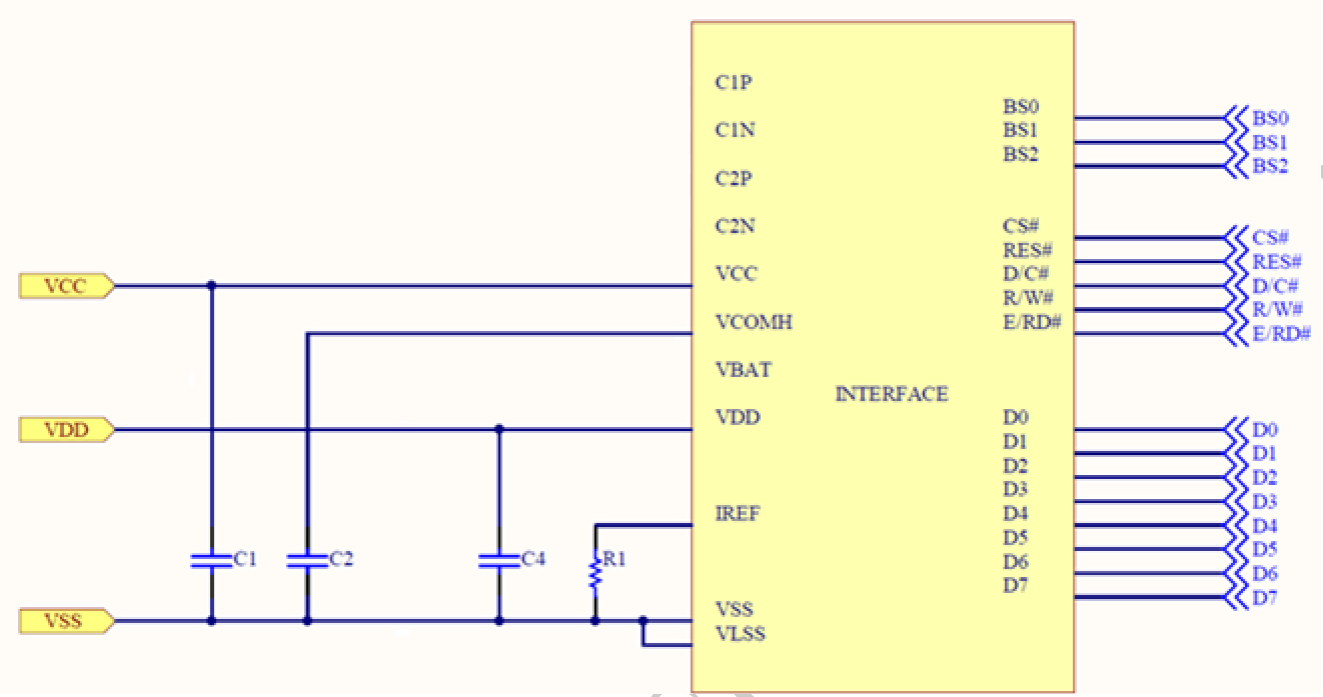


Seg&Com Layout

The non-specified tolerance of dimension is ±0.3mm.

3.1 Application recommendations

External VCC Solution



Recommended components：

C1, C2：2.2uF

C4：1.0uF

Bus Interface selection: (Must be set the BS[2:0], refer to Section 4)

8-bits 6800 and 8080 parallel, 3 or 4-wire SPI, I2C

Voltage at IREF = VCC – 3V. For VCC = 8V, IREF = 30uA:

R1 = (Voltage at IREF - VSS) / IREF

= (8-3)V / 30uA

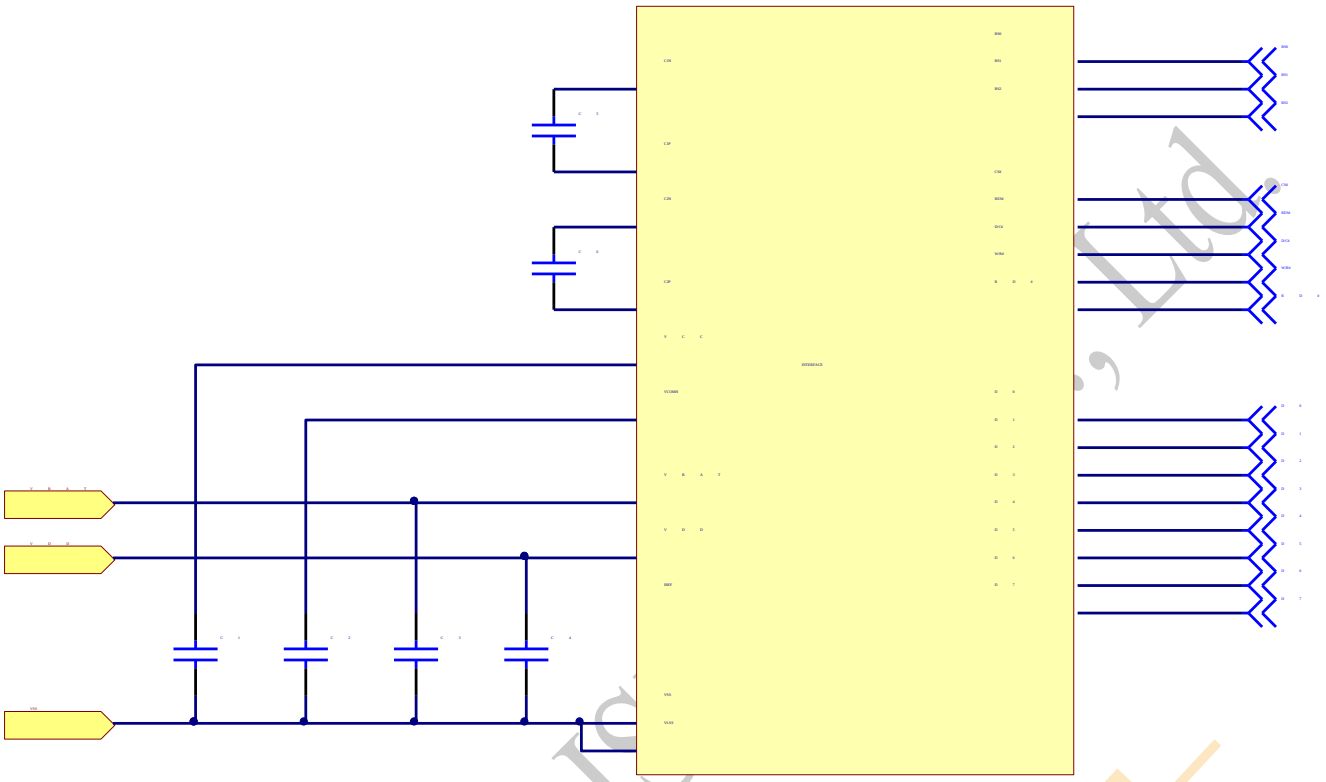
≧166K ohm(2)

Note:

(1).The capacitor value is recommended value. Select appropriate value against module application.

(2). Minimum value. When OLED product application, then R1 must be greater than the calculated value.

Built-in DC-DC Solution



Recommended components：

C1, C2：2.2uF

C3, C4：1.0uF

C5, C6：1.0uF/10V

Bus Interface selection: (Must be set the BS[2:0], refer to item 4)

8-bits 6800 and 8080 parallel, 3 or 4-wire SPI, I2C

IREF should be left open.

4.Interface Pin Function

<table>
<tr><th>No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>1</td><td>N.C.
(GND)</td><td>The supporting pins can reduce the influences from stresses on the function pins.
These pins must be connected to external ground.</td></tr>
<tr><td>2</td><td>C2P</td><td rowspan="4">C1P/C1N – Pin for charge pump capacitor; Connect to each other with a capacitor.
C2P/C2N – Pin for charge pump capacitor; Connect to each other with a capacitor.</td></tr>
<tr><td>3</td><td>C2N</td></tr>
<tr><td>4</td><td>C1P</td></tr>
<tr><td>5</td><td>C1N</td></tr>
<tr><td>6</td><td>VBAT</td><td>This is the power supply pin for the internal buffer of the DC/DC voltage converter.
It must be connected to external source when the converter is used. It should be connected to VDD when the converter is not used.</td></tr>
<tr><td>7</td><td>NC</td><td>NC</td></tr>
<tr><td>8</td><td>VSS</td><td>This is a ground pin.</td></tr>
<tr><td>9</td><td>VDD</td><td>Power supply pin for core logic operation.</td></tr>
<tr><td>10</td><td>BS0</td><td rowspan="3">These pins are MCU interface selection input. See the following table:
<table>
<tr><th></th><th>BS0</th><th>BS1</th><th>BS2</th></tr>
<tr><td>I2C</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>3-wire SPI</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td>4-wire SPI</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>8-bit 68XX Parallel</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>8-bit 80XX Parallel</td><td>0</td><td>1</td><td>1</td></tr>
</table></td></tr>
<tr><td>11</td><td>BS1</td></tr>
<tr><td>12</td><td>BS2</td></tr>
<tr><td>13</td><td>CS#</td><td>This pin is the chip select input connecting to the MCU.
The chip is enabled for MCU communication only when CS# is pulled LOW (active LOW).</td></tr>
<tr><td>14</td><td>RES#</td><td>This pin is reset signal input. When the pin is low, initialization of the chip is executed. Keep this pin HIGH (i.e. connect to VDD) during normal operation.</td></tr>
<tr><td>15</td><td>D/C#</td><td>This pin is Data/Command control pin connecting to the MCU.
When the pin is pulled HIGH, the data at D[7:0] will be interpreted as data.
When the pin is pulled LOW, the data at D[7:0] will be transferred to a command register.
In I2C mode, this pin acts as SA0 for slave address selection.
When 3-wire serial interface is selected, this pin must be connected to VSS.</td></tr>
<tr><td>16</td><td>R/W#</td><td>This is read / write control input pin connecting to the MCU interface.
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 (i.e. connect to VDD) and write mode when LOW.
When 8080 interface 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 or I2C interface is selected, this pin must be connected to VSS.</td></tr>
</table>

17	E/RD#	This pin is MCU interface input. When 6800 interface mode is selected, 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 8080 interface mode is selected, this pin receives the Read (RD#) signal. Read operation is initiated when this pin is pulled LOW and the chip is selected. When serial or I2C interface is selected, this pin must be connected to VSS.
18~25	D0~D7	These pins are bi-directional data bus connecting to the MCU data bus. Unused pins are recommended to tie LOW. When serial interface mode is selected, D2 should be either tied LOW or tied together with D1 as the serial data input: SDIN, and D0 will be the serial clock input: SCLK. When I2C mode is selected, D2, D1 should be tied together and serve as SDAout, SDAin in application and D0 is the serial clock input, SCL.
26	IREF	When external IREF is used, a resistor should be connected between this pin and VSS to maintain the IREF current at a maximum of 30uA. When internal IREF is used, this pin should be kept NC.
27	VCOMH	COM signal deselected voltage level. A capacitor should be connected between this pin and VSS.
28	VCC	Power supply for panel driving voltage. This is also the most positive power voltage supply pin. When charge pump is enabled, a capacitor should be connected between this pin and VSS.
29	VLSS	This is an analog ground pin. It should be connected to VSS externally.
30	NC (GND)	The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.

5.Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage for Logic	VDD	0	4	V	1,2
Charge Pump Regulator Supply Voltage	VBAT	-0.3	6.0	V	1,2
Supply Voltage for Display	VCC	0	18.0	V	1,2
Operating Temperature	TOP	-30	+70	°C	—
Storage Temperature	TSTG	-30	+70	°C	—

Note ：

1. All the above voltages are on the basis of “VSS = 0V”.
2. When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according to Section 6 ‘’Electrical Characteristics’’. If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.
3. The absolute limit temperature was verified according to the test conditions of reliability test (See section 9. Reliability) , and module was met all criteria.

6.Electrical Characteristics

6.1 DC Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage for Logic	VDD	—	1.65	3.0	3.3	V
Supply Voltage for Display (Supplied Externally)	VCC	—	7.5	8.0	8.5	V
Charge Pump Regulator Supply Voltage	VBAT	—	3.0	3.5	4.2	V
Charge Pump Output Voltage for Display (Generated by Internal DC/DC)	Charge Pump VCC	—	7.0	7.5	—	V
Input High Volt.	VIH	—	0.8×VDD	—	VDD	V
Input Low Volt.	VIL	—	0	—	0.2×VDD	V
Output High Volt.	VOH	—	0.9×VDD	—	VDD	V
Output Low Volt.	VOL	—	0	—	0.1×VDD	V
Operating Current for VCC (Display 50% Pixel on) (VCC Supplied Externally)	ICC	VCC =8V	—	5.0	7.5	mA
Display 50% Pixel on (VCC Generated by Internal DC/DC)	IBAT	VBAT=3.5V	—	15	22.5	mA

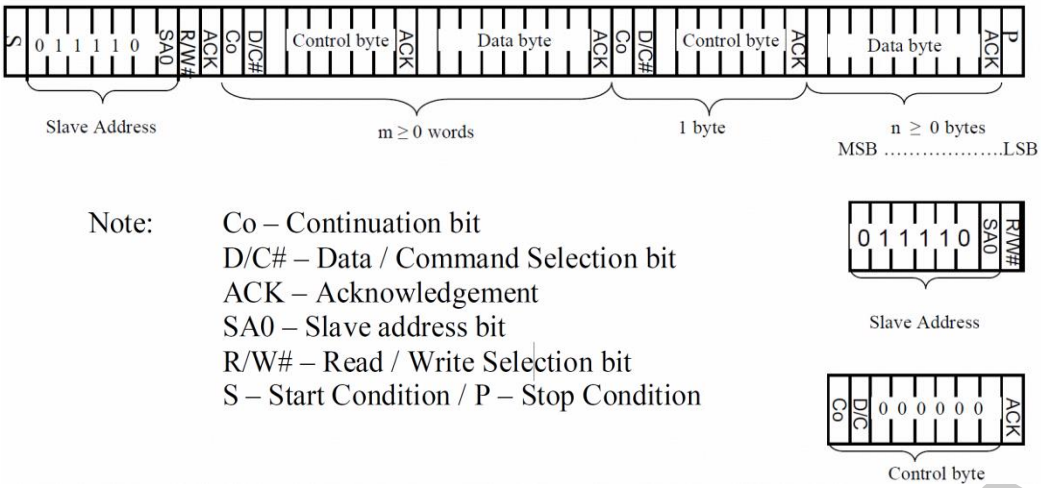
Note：The VCC (VPP) value can be adjusted according to the demand brightness. When VCC (VPP) is lowered, the brightness decreases or when VCC (VPP) is increased, the brightness increases. The VCC (VPP) value is set within the recommended range. The life time of OLED is directly related to the set brightness, and lower brightness helps to improve the life time.

6.2 Initial code

```
void Initial IC(){

      Write_command(0xAE);    // Display Off

      Write_command(0xD5);    //SET DISPLAY CLOCK
      Write_command(0x80);    //105HZ

      Write_command(0xA8);    //Select Multiplex Ratio
      Write_command(0x3F);    //Default => 0x3F (1/64 Duty)

      Write_command(0xD3);    //Setting Display Offset
      Write_command(0x00);    //00H Reset

      Write_command(0x40);    //Set Display Start Line

      Write_command(0x8D);    //Set Charge Pump
      Write_command(0x10);    //Disable Charge Pump
      //Write_command(0x14);    //Enable Charge Pump

      Write_command(0xAD);    //Internal IREF Setting
      Write_command(0x20);      //Disable internal IREF
      //Write_command(0x30);    //Enable internal IREF

      Write_command(0xA1);    //Set Segment Re-Map Default

      Write_command(0xC8);    //Set COM Output Scan Direction

      Write_command(0xDA);    //Set COM Hardware Configuration
      Write_command(0x12);    //Alternative COM Pin

      Write_command(0x81);    //Set Contrast Control
      Write_command(0x1F);

      Write_command(0xD9); //Set Pre-Charge period
      Write_command(0x22);

      Write_command(0xDB); //Set Deselect Vcomh level
      Write_command(0x30);

      Write_command(0xA4);    //Entire Display ON

      Write_command(0xA6);    //Set Normal Display

      Write_command(0xAF); // Display ON
}
```

Note 1: Initial code is for reference only. Please make the best adjustment with the OLED module.
Note 2: Command: Set Contrast Control (0x81) , This command sets the Contrast Setting of the display. The chip has 255 contrast steps from 01h to FFh. The segment output current increases as the contrast step value increases. The segment current increases, the OLED brightness increases.

I2C-bus data format



(a)I2C address bit (SA0)
The slave address is following the start condition for recognition use. The slave address is either “b0111100” or “b0111101” by changing the SA0 to LOW or HIGH (D/C pin acts as SA0).

(b)“R/W#” bit is used to determine the operation mode of the I2C-bus interface. R/W#=1, it is in read mode. R/W#=0, it is in write mode.

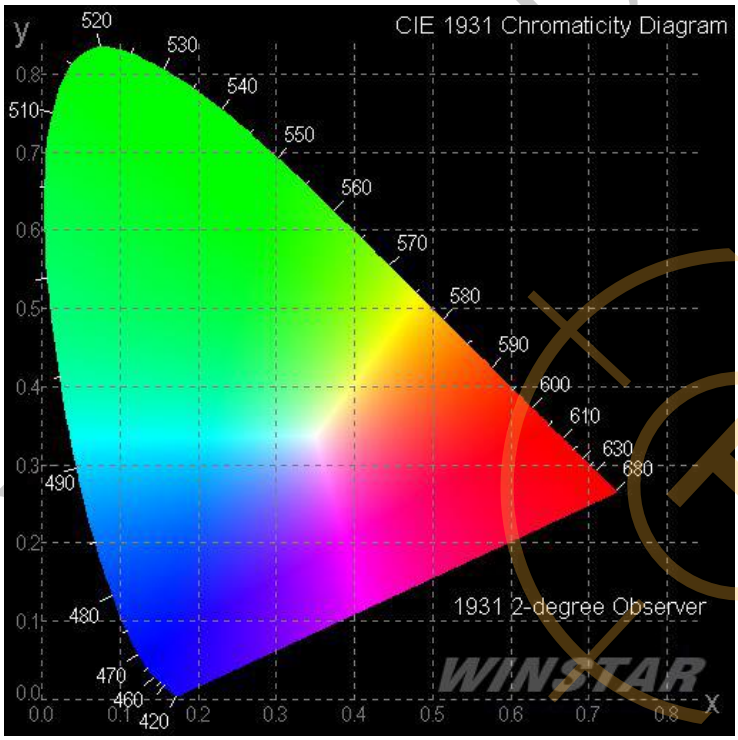
(c)After the transmission of the slave address, either the control byte or the data byte may be sent across the SDA. A control byte mainly consists of Co and D/C# bits following by six “0”’s.

a. If the Co bit is set as logic “0”, the transmission of the following information will contain data bytes only.
b. The D/C# bit determines the next data byte is acted as a command or a data. If the D/C# bit is set to logic “0”, it defines the following data byte as a command. If the D/C# bit is set to logic “1”, it defines the following data byte as a data which will be stored at the GDDRAM. The GDDRAM column address pointer will be increased by one automatically after each data write.

7.Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V)θ	–	160	–	–	deg
	(H)φ	–	160	–	–	deg
Contrast Ratio	CR	Dark	10,000:1	–	–	–
Response Time	T rise	–	–	10	–	μs
	T fall	–	–	10	–	μs
Display with 100% checkerboard Brightness(1)			60	80	–	cd/m²
CIEx(Yellow)		(CIE1931)	0.43	0.47	0.51	–
CIEy(Yellow)		(CIE1931)	0.46	0.50	0.54	–
CIEx(Sky Blue)		(CIE1931)	0.11	0.16	0.21	–
CIEy(Sky Blue)		(CIE1931)	0.21	0.26	0.31	–

Note 1: The brightness value is based on the setting of Vcc(VPP) equal to the Typical value.



8.OLED Lifetime

ITEM	Conditions	Min	Typ	Remark
Operating Life Time	Ta=25°C / Initial 50% checkerboard brightness Typical Value	20,000 Hrs	–	Note

Note:

1. Lifetime is defined the amount of time when the luminance has decayed to <50% of the minimal brightness.
2. This analysis method uses life data obtained under accelerated conditions to extrapolate an estimated probability density function (*pdf*) for the product under normal use conditions.
3. Screen saving mode will extend OLED lifetime.
4. Lifetime is not guaranteed one but expected lifetime in normal condition.

9.Reliability

Content of Reliability Test

Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Applicable Standard**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	70°C 240hrs	———
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 240hrs	———
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 240hrs	———
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-30°C 240hrs	———
High Temperature/ Humidity Operation	Endurance test applying the high temperature and high humidity Operation for a long time.	60°C,90%RH 120hrs	———

*** Supply voltage for OLED system =Operating voltage at 25°C

Test and measurement conditions

1. All measurements shall not be started until the specimens attain to temperature stability.
After the completion of the described reliability test, the samples were left at room temperature for 2 hrs prior to conducting the functional test at 23±5°C; 55±15% RH.
2. All-pixels on/off exchange is used as operation test pattern.
3. The degradation of Polarizer are ignored for High Temperature storage, High Temperature/Humidity Storage, Temperature Cycle.
4. No Condensation.

Evaluation criteria

1. The function test is OK.
2. No observable defects.

APPENDIX:

RESIDUE IMAGE

Because the pixels are lighted in different time, the luminance of active pixels may reduce or differ from inactive pixels. Therefore, the residue image will occur. To avoid the residue image, every pixel needs to be lighted up uniformly.

10.Inspection specification

Environment Required

Customer's test & measurement are required to be conducted under the following conditions:

Temperature: 23± 5°C
Humidity: 55±15% RH
Fluorescent Lamp: 30W
Distance between the Panel & Lamp: ≥ 50cm
Distance between the Panel & Eyes of the Inspector: ≥ 30cm
Finger glove (or finger cover) must be worn by the inspector.
Inspection table or jig must be anti-electrostatic.

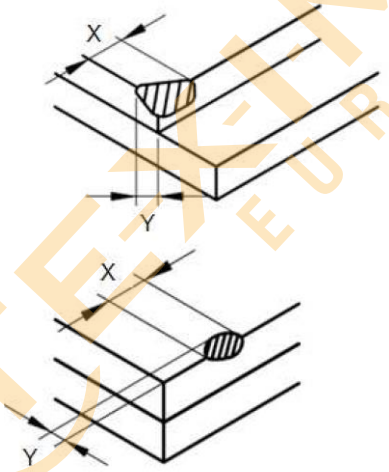
Sampling Plan

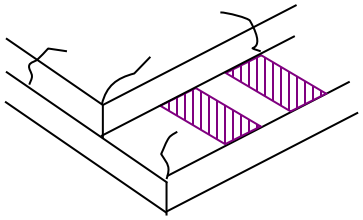
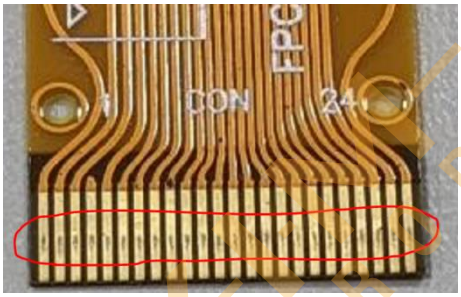
Level II, Normal Inspection, Single Sampling, MIL-STD-105E

Criteria & Acceptable Quality Level

Partition	AQL	Definition
Major	0.65	Defects in Pattern Check (Display On)
Minor	1.0	Defects in Cosmetic Check (Display Off)

Cosmetic Check (Display Off) in Non-Active Area

Check Item	Classification	Criteria
Panel General Chipping	Minor	X > 6 mm (Along with Edge) Y > 1 mm (Perpendicular to edge) 

Panel Crack	Minor	Any crack is not allowable. 
Check Item	**Classification**	**Criteria**
Copper Exposed (Even Pin or Film)	Minor	Not Allowable by Naked Eye Inspection
Film or Trace Damage	Minor	
Terminal Lead Prober Mark	Acceptable	
Glue or Contamination on Pin (Couldn't Be Removed by Alcohol)	Minor	

Ink Marking on Back Side of panel (Exclude on Film)	Acceptable	Ignore for Any

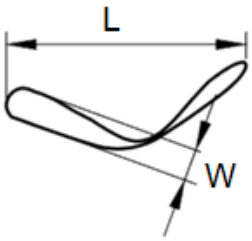
Cosmetic Check (Display Off) in Active Area

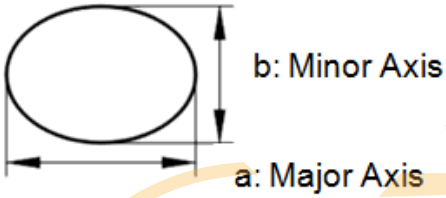
It is recommended to execute in clear room environment (class 10k) if actual in necessary.

Check Item	Classification	Criteria
Any Dirt & Scratch on Polarizer's Protective Film	Acceptable	Ignore for not Affect the Polarizer
Scratches, Fiber, Line-Shape Defect (On Glass display side)	Minor	W ≤ 0.1 Ignore W > 0.1 L ≤ 2 n ≤ 1 L > 2 n = 0
Dirt, Black Spot, Foreign Material, (On Glass display side)	Minor	Φ ≤ 0.1 Ignore 0.1 < Φ ≤ 0.25 n ≤ 1 0.25 < Φ n = 0
Fingerprint, Flow Mark (On Glass display side)	Minor	Not Allowable

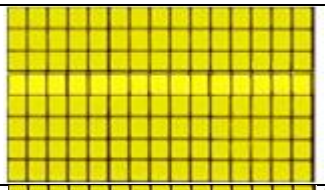
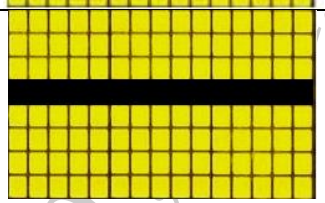
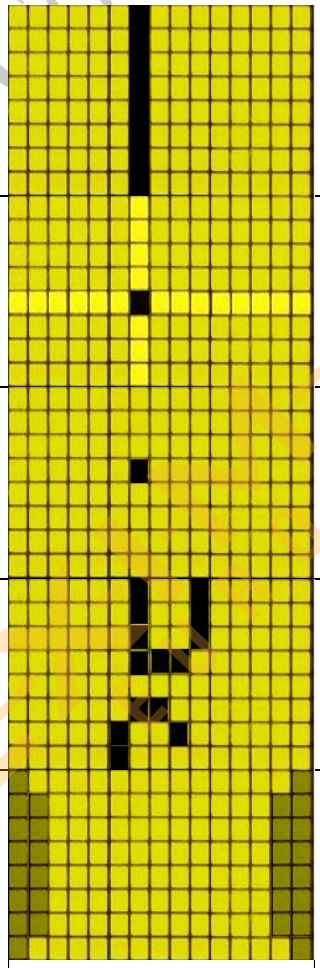
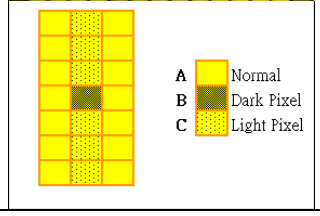
Note：

1. Protective film should not be tear off when cosmetic check.
2. Definition of W & L & Φ (Unit: mm): Φ = (a + b) / 2





Pattern Check (Display On) in Active Area

Check Item	Classification	Criteria
No Display	Major	Not Allowable
Bright Line	Major	
Missed Line	Major	
Pixel Short	Major	
Darker Pixel	Major	
Wrong Display	Major	
Un-uniform (Luminance Variation within a Display)	Major	

11.Precautions in use of OLED Modules

Modules

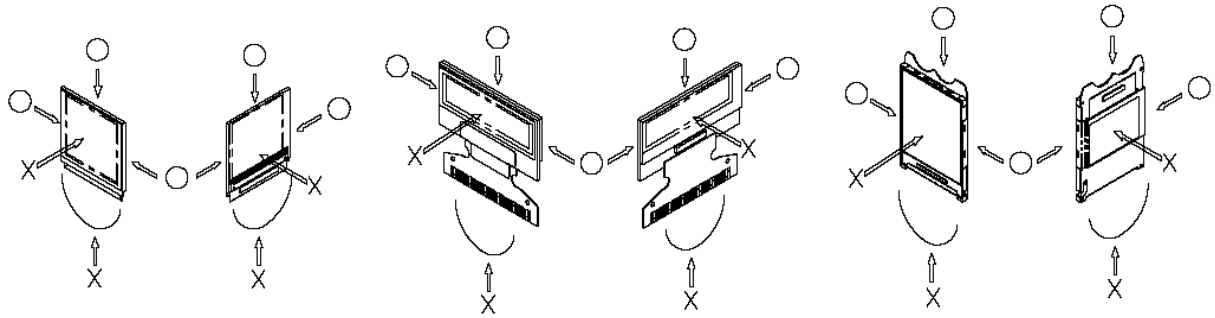
(1) Avoid applying excessive shocks to module or making any alterations or modifications to it.
(2) Don't make extra holes on the printed circuit board, change the components or modify its shape of OLED display module.
(3) Don't disassemble the OLED display module.
(4) Do not apply input signals while the logic power is off.
(5) Don't operate it above the absolute maximum rating.
(6) Don't drop, bend or twist OLED display module.
(7) Soldering: only to the I/O terminals.
(8) Hot-Bar FPC soldering condition: 280~350C, less than 5 seconds.
(9) Winstar has the right to change the passive components (Resistors, capacitors and other passive components will have different appearance and color caused by the different supplier.) and change the PCB Rev. (In order to satisfy the supplying stability, management optimization and the best product performance...etc, under the premise of not affecting the electrical characteristics and external dimensions, Winstar have the right to modify the version.)
(10) Winstar has the right to upgrade or modify the product function.
(11) For COG & COF structure OLED products, customers should reserve VCC (VPP) adjustment function or software update function when designing OLED supporting circuit. (The progress of OLED light-emitting materials will increase the conversion efficiency and the brightness. The brightness can be adjusted if necessary).

11.1. Handling Precautions

(1) Since the display panel is being made of glass, do not apply mechanical impacts such as dropping from a high position.
(2) If the display panel is broken by some accident and the internal organic substance leaks out, be careful not to inhale nor lick the organic substance.
(3) If pressure is applied to the display surface or its neighborhood of the OLED display module, the cell structure may be damaged. So, be careful not to apply pressure to these sections.
(4) The polarizer covering the surface of the OLED display module is soft and easily scratched.
(5) When the surface of the polarizer of the OLED display module has soil, clean the surface. It takes advantage by using following adhesion tape.
* Scotch Mending Tape No. 810 or an equivalent
Never try to breathe upon the soiled surface nor wipe the surface using cloth containing solvent such as ethyl alcohol, since the surface of the polarizer will become cloudy.
Also, pay attention that the following liquid and solvent may spoil the polarizer:
* Water
* Ketone
* Aromatic Solvents
(6) Protection film is being applied to the surface of the display panel and removes the protection film before assembling it. At this time, if the OLED display module has been stored for a long period of time, residue adhesive material of the protection film may remain on the surface of the display panel after removed of the film. In such case, remove the residue material by the method introduced in the above Section 5.
(7) Do not touch the following sections whenever possible while handling the OLED display modules.
* Pins and electrodes

* Pattern layouts such as the TCP & FPC

(8) Hold OLED display module very carefully when placing OLED display module into the System housing. Do not apply excessive stress or pressure to OLED display module. And, do not over bend the film with electrode pattern layouts. These stresses will influence the display performance. Also, secure sufficient rigidity for the outer cases.



(9) Do not apply stress to the LSI chips and the surrounding molded sections.

(10) Pay sufficient attention to the working environments when handing OLED display modules to prevent occurrence of element breakage accidents by static electricity.
* Be sure to make human body grounding when handling OLED display modules.
* Be sure to ground tools to use or assembly such as soldering irons.
* To suppress generation of static electricity, avoid carrying out assembly work under dry environments.
* Protective film is being applied to the surface of the display panel of the OLED display module. Be careful since static electricity may be generated when exfoliating the protective film.

11.2. Storage Precautions

(1) When storing OLED display modules, put them in static electricity preventive bags to avoid be directly exposed to sun or lights of fluorescent lamps. And, also, place in the temperature 25±5°C and Humidity below 65% RH.(We recommend you to store these modules in the packaged state when they were shipped from Winstar. At that time, be careful not to let water drops adhere to the packages or bags.)

(2) When the OLED display module is being dewed or when it is placed under high temperature or high humidity environments, the electrodes may be corroded if electric current is applied. Please store it in clean environment.

11.3. Designing Precautions

(1) The absolute maximum ratings are the ratings which cannot be exceeded for OLED display module, and if these values are exceeded, OLED display module may be damaged.

(2) To prevent occurrence of malfunctioning by noise, pay attention to satisfy the VIL and VIH specification and to make the signal line cable as short as possible.

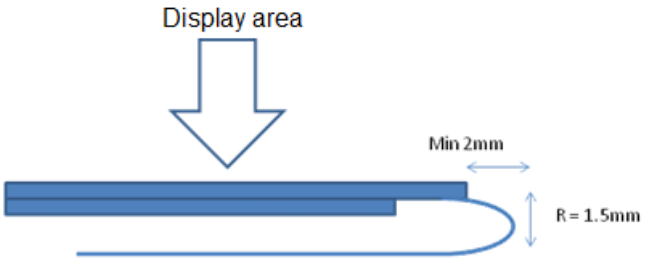
(3) We recommend you to install excess current preventive unit (fuses, etc.) to the power circuit (VDD / VCC). (Recommend value: 0.5A)

(4) Pay sufficient attention to avoid occurrence of mutual noise interference with the nearby devices.

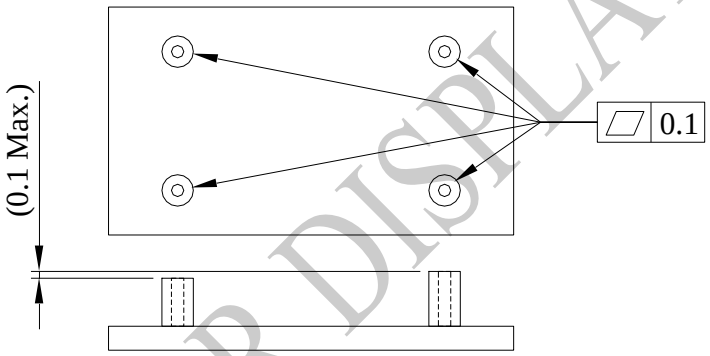
(5) As for EMI, take necessary measures on the equipment side basically.

(6) If the power supplied to the OLED display module is forcibly shut down by such errors as taking out the main battery while the OLED display panel is in operation, we cannot guarantee the quality of this OLED display module.
* Connection (contact) to any other potential than the above may lead to rupture of the IC.

(7) If this OLED driver is exposed to light, malfunctioning may occur and semiconductor elements may change their characteristics.
(8) The internal status may be changed, if excessive external noise enters into the module. Therefore, it is necessary to take appropriate measures to suppress noise generation or to protect module from influences of noise on the system design.
(9) We recommend you to make periodical refreshment of the operation statuses (re-setting of the commands and re-transference of the display data) to cope with catastrophic noise.
(10) It's pretty common to use "Screen Saver" to extend the lifetime and Don't use the same image for long time in real application. When an OLED display module is operated for a long of time with fixed pattern, an afterimage or slight contrast deviation may occur.
(11) The limitation of FPC and Film bending.



(12) The module should be fixed balanced into the housing, or the module may be twisted.



(13) Please heat up a little the tape sticking on the components when removing it; otherwise the components might be damaged.

11.4. Precautions when disposing of the OLED display modules

(1) Request the qualified companies to handle industrial wastes when disposing of the OLED display modules. Or, when burning them, be sure to observe the environmental and hygienic laws and regulations.

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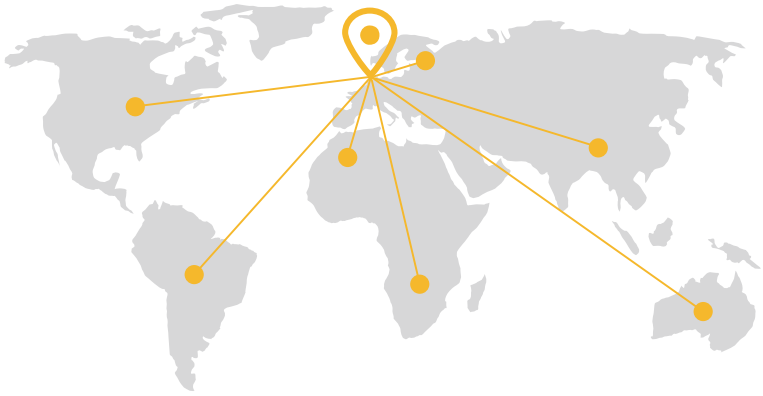
Texim Europe - contact details



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