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## 1 Revision History

Date	Changes
2018-10-11	First release

## 2 Main Features

Item	Specification	Unit
Diagonal Size	3.12	inch
Display Mode	Passive Matrix OLED	-
Display Colors	Monochrome (16 Gray Scale )	Colors
Resolution	256 x 64	pixel
Controller IC	SSD1322	-
Interface	4wire SPI	-
Active Area	76.78 x 19.18	mm
Module Dimension	102.00 x 35.00	mm
Weight	TBD	g

## 3 Pin Description

### 3.1 Panel Pin Description

Pin No.	Symbol	Function Description															
1	N.C(GND)	Reserved Pin(Supporting Pin) The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.															
2	VSS	Ground of Logic Circuit This is a ground pin. It also acts as a reference for the logic pins. It must be connected to external ground.															
3	VCC	Power supply for OEL Panel These are the most positive voltage supply pin of the chip. They must be connected to external source.															
4	VCOMH	Voltage Output High Level for COM Signal This pin is the input pin for the voltage output high level for COM signals. A tantalum capacitor should be connected between this pin and VSS.															
5	VLSS	Ground of Analog Circuit These are the analog ground pins. They should be connected to VSS externally.															
6-13	D7-D0	Host Data Input/ Output Bus These pins are 8-bit bi-directional data bus to be connected to the microprocessor's data bus. When serial mode is selected, D1 will be the serial data input SDIN and D0 will be the serial clock input SCLK. Unused pins must be connected to VSS except for D2 in serial mode.															
14	E/RD#	Read/Write Enable or Read This pin is MCU interface input. When interfacing to a 68XX-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 CS# is pulled low. When connecting to an 80XX-microprocessor, this pin receives the Read (RD#) signal. Data read operation is initiated when this pin is pulled low and CS# is pulled low. When serial mode is selected, this pin must be connected to VSS.															
15	R/W#	Read/Write Select or Write This pin is MCU interface input. When interfacing to a 68XX-series microprocessor, this pin will be used as Read/Write (R/W#) selection input. Pull this pin to "High" for read mode and pull it to "Low" for write mode. When 80XX 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 CS# is pulled low. When serial mode is selected, this pin must be connected to VSS.															
16-17	BS0 BS1	Communicating Protocol Select These pin are MCU interface selection input. See the following table: <table border="1" data-bbox="550 1590 1356 1758"> <thead> <tr> <th></th> <th>BS0</th> <th>BS1</th> </tr> </thead> <tbody> <tr> <td>3-wire SPI</td> <td>1</td> <td>0</td> </tr> <tr> <td>4-wire SPI</td> <td>0</td> <td>0</td> </tr> <tr> <td>8-bit 68XX Parallel</td> <td>1</td> <td>1</td> </tr> <tr> <td>8-bit 80XX Parallel</td> <td>0</td> <td>1</td> </tr> </tbody> </table>		BS0	BS1	3-wire SPI	1	0	4-wire SPI	0	0	8-bit 68XX Parallel	1	1	8-bit 80XX Parallel	0	1
	BS0	BS1															
3-wire SPI	1	0															
4-wire SPI	0	0															
8-bit 68XX Parallel	1	1															
8-bit 80XX Parallel	0	1															
18	D/C#	Data/Command Control This pin is Data/Command control pin. When the pin is pulled high, the input at D7~D0 is treated as display data. When the pin is pulled low, the input at D7~D0 will be transferred to the command register. For detail relationship to MCU interface signals, please refer to the Timing Characteristics Diagrams.															
19	CS#	Chip Select															

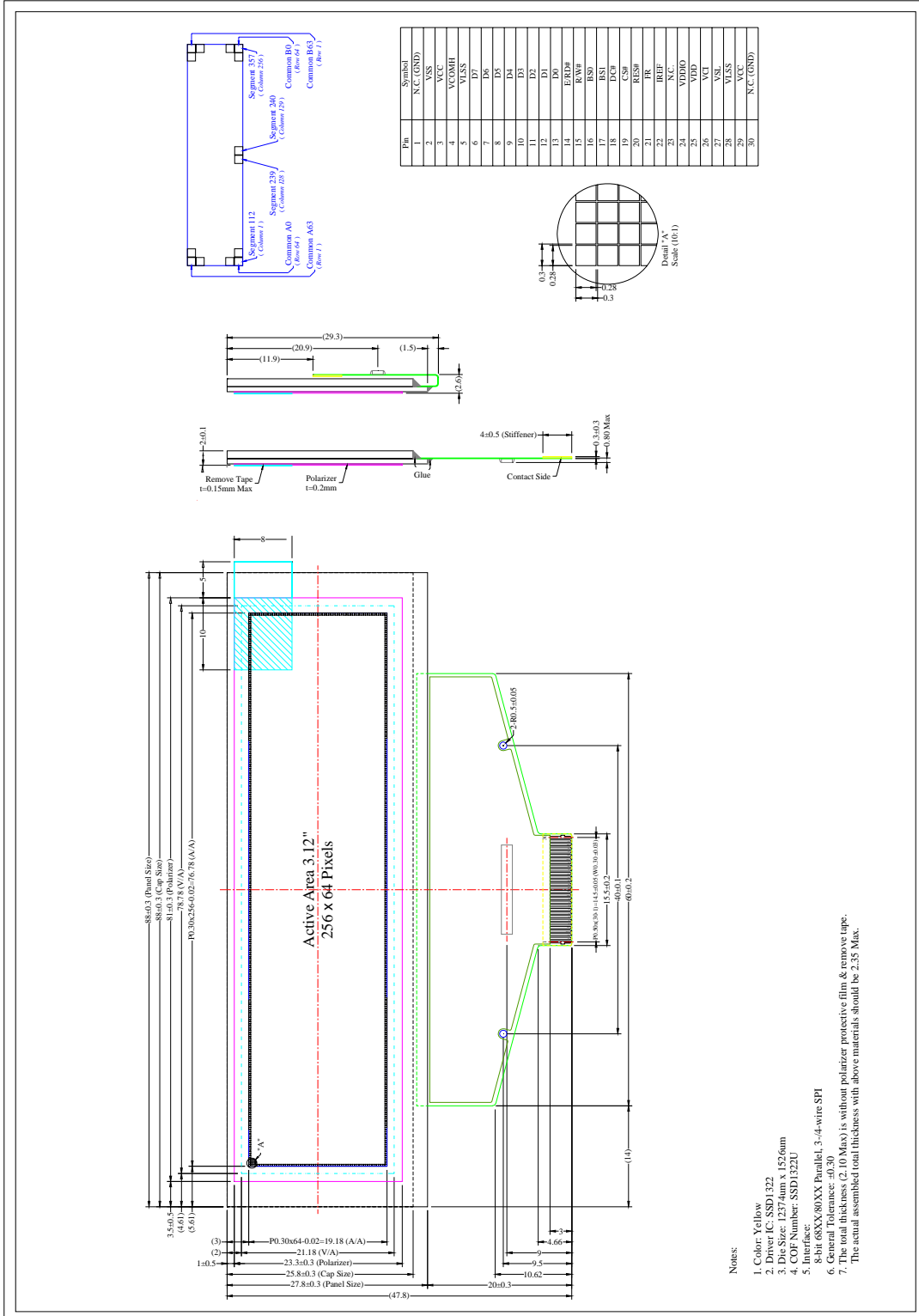
		This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low.
20	RES#	Power Reset for Controller and Driver This pin is reset signal input. When the pin is low, initialization of the chip is executed.
21	FR	Frame Frequency Triggering Signal This pin will send out a signal that could be used to identify the driver status. Nothing should be connected to this pin. It should be left open individually.
22	IREF	Current Reference for Brightness Adjustment This pin is segment current reference pin. A resistor should be connected between this pin and VSS. Set the current lower than 10uA
23	N.C	Reserved Pin No connection
24	VDDIO	Power Supply for I/O Pin This pin is a power supply pin of I/O buffer. It should be connected to VDD or external source. All I/O signal should have VIH reference to VDDIO. When I/O signal pins (BS0~BS1, D0~D7, control signals...) pull high, they should be connected to VDDIO.
25	VDD	Power Supply for Core Logic Circuit This is a voltage supply pin. It can be supplied externally (within the range of 2.4~2.6V) or regulated internally from VCI. A capacitor should be connected between this pin & VSS under all circumstances.
26	VCI	Power Supply for Operation This is a voltage supply pin. It must be connected to external source & always be equal to or higher than VDD & VDDIO.
27	VSL	Voltage Output Low Level for SEG Signal This is segment voltage reference pin. When external VSL is not used, this pin should be left open. When external VSL is used, this pin should connect with resistor and diode to ground.
28	VLSS	Ground of Analog Circuit These are the analog ground pins. They should be connected to VSS externally.
29	VCC	Power supply for OEL Panel These are the most positive voltage supply pin of the chip. They must be connected to external source.
30	N.C(GND)	Reserved Pin(Supporting Pin) The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.

### 3.2 Module Pin Description

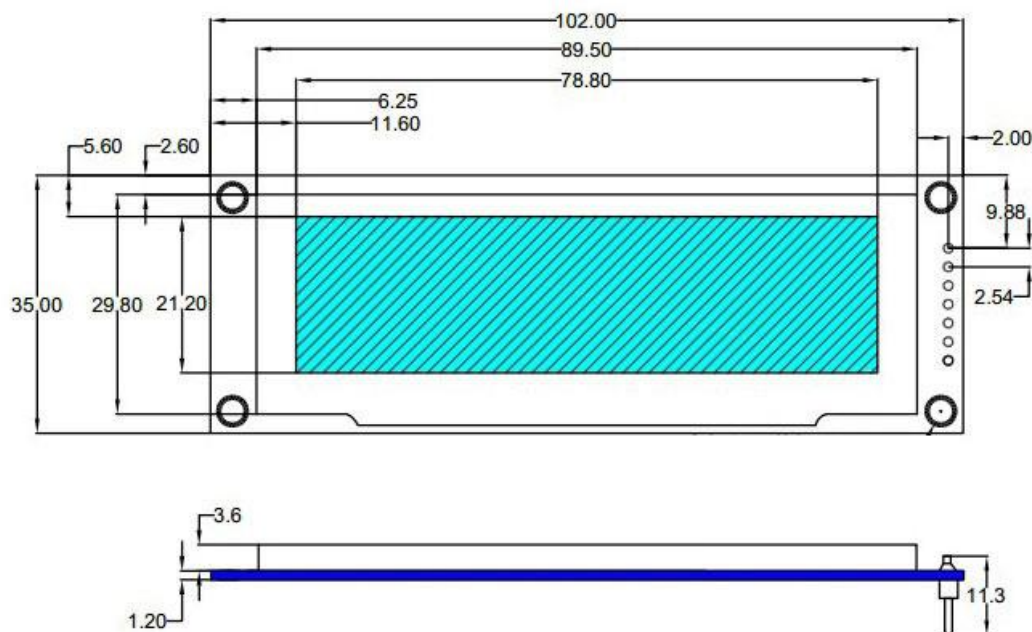
Pin No.	Symbol	Function Description
1	GND	Ground
2	VCC	Power Supply 3.3V
3	SCL	SPI Clock
4	SDA	SPI DATA
5	RES	OLED reset Pin.
6	D/C	Data/Command Control This pin is Data/Command control pin.
7	CS	Chip Select This pin is pulled low to active. Connect to ground if no used .

## 4 Mechanical Drawing

### 4.1 Panel Mechanical Drawing



## 4.2 Module Mechanical Drawing



## 5 Electrical Characteristics

Item	Symbol	Condition	Min	Typ.	Max	Unit
Power supply	VCC		2.6	3.3	3.5	V
Supply Voltage for Display(for OLED Panel)	VPP		11.5	12	12.5	V
Operating Current for VPP	ISP		-	-	55	uA
Operating Maximum Temperature	TOP		-30	-	85	°C
Storage Maximum Temperature	TST		-40	-	90	°C

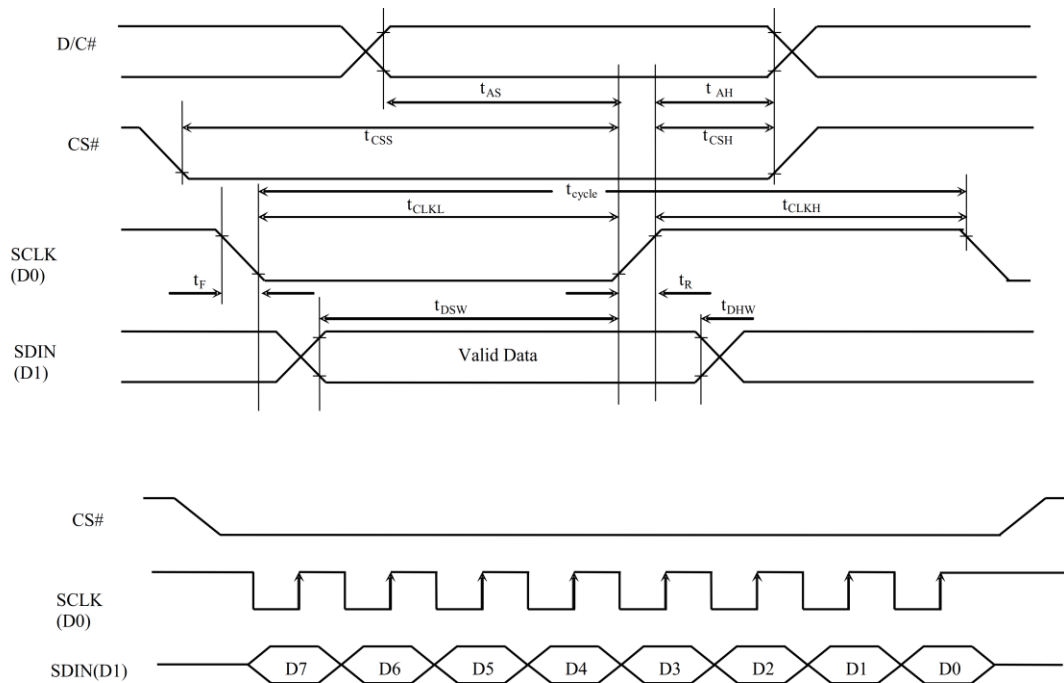
## 6 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit
View Angles		160	-	-	°
Response Time (25 °C)	Tr + Tf	-	10	-	ns
Brightness	Lbr	60	80	-	cd/m <sup>2</sup>
Dark room Contrast Ratio	CR	2000:1	-	-	

## 7 Timing characteristics (4-wire SPI)

( $V_{DD} - V_{SS} = 2.4$  to  $2.6V$ ,  $V_{DDIO} = 1.6V$ ,  $V_{CI} = 3.3V$ ,  $T_A = 25^\circ C$ )

Symbol	Parameter	Min	Typ	Max	Unit
$t_{cyle}$	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	10	-	-	ns
$t_{DSW}$	Write Data Setup Time	15	-	-	ns
$t_{DHW}$	Write Data Hold Time	15	-	-	ns
$t_{CLKL}$	Clock Low Time	20	-	-	ns
$t_{CLKH}$	Clock High Time	20	-	-	ns
$t_R$	Rise Time	-	-	15	ns
$t_F$	Fall Time	-	-	15	ns

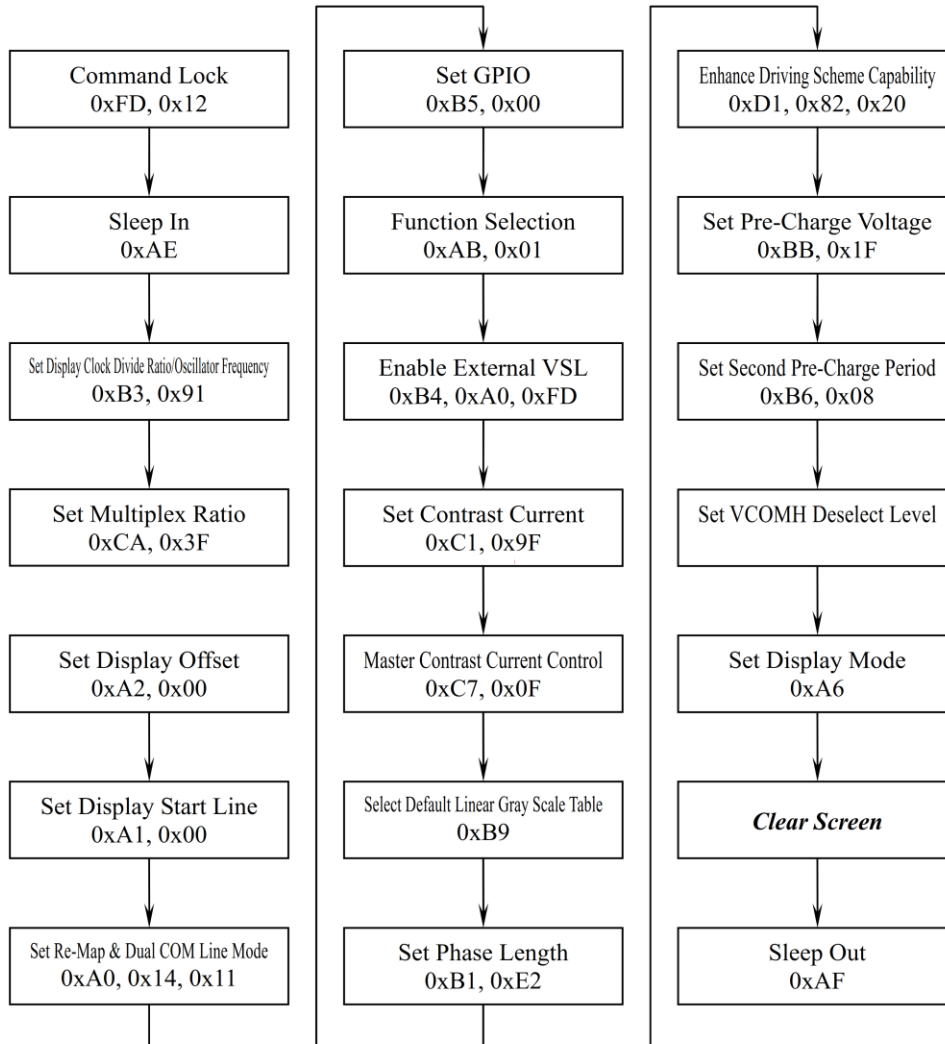




## 8 Actual Application Example

Command usage and explanation of an actual example

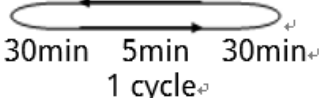
<Initialization>



If the noise is accidentally occurred at the displaying window during the operation, please reset the display in order to recover the display function.



## 11 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	85°C 200hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-40°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-40 °C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	60°C,90%RH 96hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation 	-40°C/85°C 10 cycles	-
Vibration Test	Endurance test applying the vibration during transportation and using	Total fixed amplitude: 15mm; Vibration: 10~55Hz; One cycle 60 seconds to 3 directions of X, Y, Z, for each 16 minutes.	3
Static Electricity Test	Endurance test apply the electric stress to the terminal.	VS=800V, RS=1.5kΩ, CS=100pF, 1 time.	-

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal. Temperature and humidity after remove from the rest chamber.

Note3: Test performed on product itself, not inside a container.

## 12 Warranty and Conditions

<http://www.displaymodule.com/pages/faq>