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MCOT096064AZ-RGBM	96 x 64	OLED Module
Specification		
Version: 1	Date: 09/03/2013	
Revision		
1	05/03/2013	First Issue

Display Features	
Resolution	96 x 64
Appearance	RGB on Black
Logic Voltage	2.8V
Interface	Multi
Module Size	25.70 x 22.20 x 1.50mm
Operating Temperature	-40°C ~ +80°C
Construction	COT

RoHS compliant

Box Quantity	Weight / Display
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* - For full design functionality, please use this specification in conjunction with the SSD1331 specification. (Provided Separately)

Display Accessories	
Part Number	**Description**

Optional Variants	
Appearance	**Voltage**

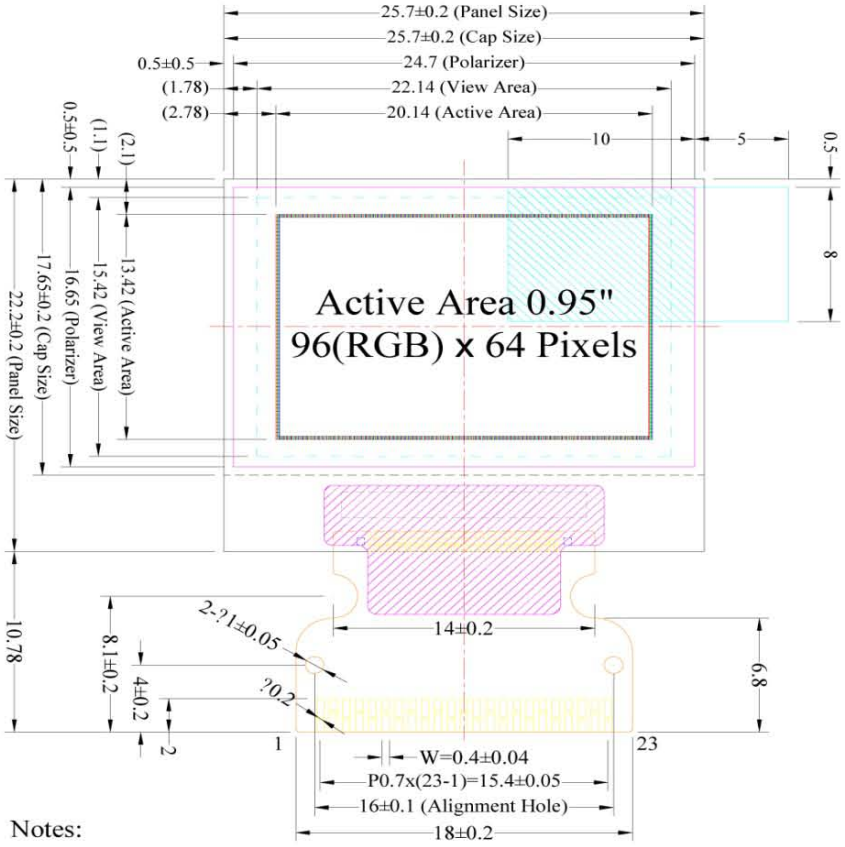
Functions and Features

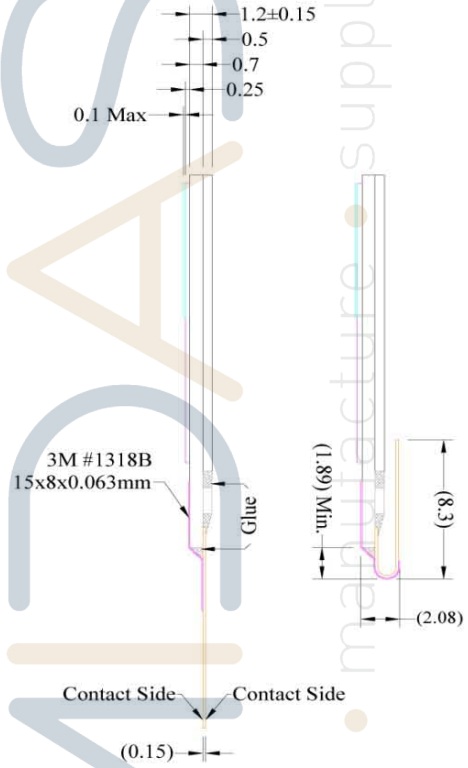
- 96X64 Graphic
- Built-in controller
- viewing angle Free
- Wide Temperature -40℃ ~ +80℃ (Operating)
- RoHS compliant

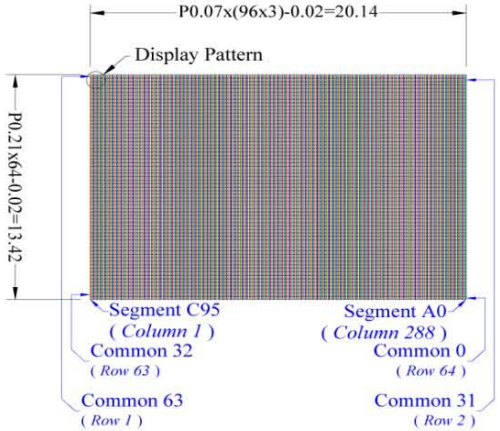
Mechanical Specification

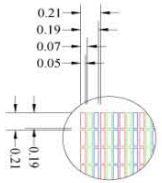
Item	Description	
Product No.	MCOT096064AZ-RGBM	
Inch	0.95”	
Color	262,144 Colors	
Active Area	20.14(W)×13.42(H)	mm
Panel Size	25.70(W)×22.20(H)×1.50(D)	mm
Dot Size	0.05(W)×0.19(H)	mm
Dot Pitch	0.07(W)×0.21(H)	mm
Display Format	96×64	
Duty Ratio	1/64 Duty	Duty
Controller	SSD1331 or Equivalent	
Operation Temperature	-40~80	°C
Storage Temperature	-40~80	°C
Response Time	≤10	us
Assembly	Connector	

Mechanical Drawing









Display Pattern
Scale (5:1)

Pin	Symbol
1	NC
2	VSS
3	VDD
4	VDDIO
5	BS1
6	BS2
7	IREF
8	CS#
9	RES#
10	D/C#
11	R/W#
12	E
13	D0
14	D1
15	D2
16	D3
17	D4
18	D5
19	D6
20	D7
21	VCOMH
22	VCC
23	N.C.

Notes:

1. Driver IC: SSD1331Z
2. Die Size: 13067um x 1547um
3. FPC Number: UT-0231-P01
4. Interface:
   8-bit 68XX/80XX Parallel, 4-wire SPI
5. The film terminal use "Au Plating"
6. General Tolerance: ±0.30
7. The total thickness (1.35 Max) is without Polarizer & Remove Tape.
   The actual assembled total thickness with above materials should be 1.70 Max.

Pin Description

Power Supply

Pin Number	Symbol	Type	Function
2	VSS	P	*Ground of OEL System* This is a ground pin. It also acts as a reference for the logic pins, the OEL driving voltages, and the analog circuits. It must be connected to external ground.
3	VDD		*Power Supply Pins for Core VDD* This is a voltage supply pin. It must be connected to external source.
4	VDDIO		*Power Supply for Interface Logic Level* It should be match with the MCU interface voltage level. VDDIO must always be equal or lower than VDD.
22	VCC		*Power Supply for Interface Logic Level* It should be match with the MCU interface voltage level. VDDIO must always be equal or lower than VDD.

MCU Interface

Pin Number	Symbol	Type	Function
8	CS#	I	Chip Select This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low.
9	RES#	I	Power Reset for Controller and Driver This pin is reset signal input. When the pin is low, initialization of the chip is executed.
10	D/C#	I	Data/Command Control This pin is Data/Command control pin. When the pin is pulled high, the input at D0~D7 is treated as display data. When the pin is pulled low, the input at D0~D7 will be transferred to the command register. For detail relationship to MCU interface signals, please refer to the Timing Characteristics Diagrams.
11	R/W# (WR#)	I	Data/Command Control This pin is Data/Command control pin. When the pin is pulled high, the input at D0~D7 is treated as display data. When the pin is pulled low, the input at D0~D7 will be transferred to the command register. For detail relationship to MCU interface signals, please refer to the Timing Characteristics Diagrams.
12	E(RD#)	I	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.
13~20	D0~D7	I/O	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.

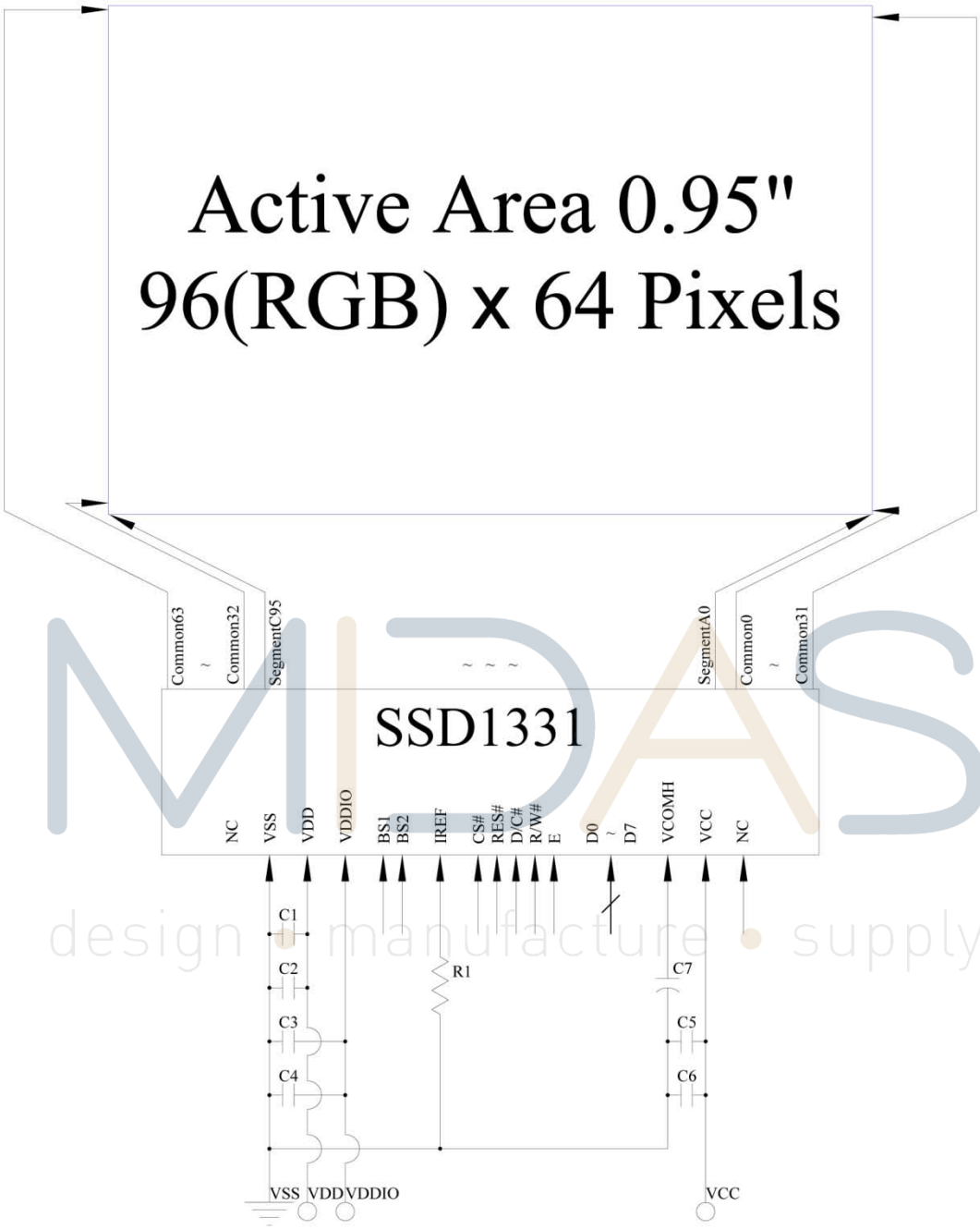
System Control Pins

<table>
<tr><th>Pin Number</th><th>Symbol</th><th>Type</th><th colspan="4">Function</th></tr>
<tr><td rowspan="4">5
6</td><td rowspan="4">BS1
BS2</td><td rowspan="4">I</td><td colspan="4">Communicating Protocol Select
These pins are MCU interface selection input. See the following table:</td></tr>
<tr><td></td><td>68XX-parallel</td><td>80XX-parallel</td><td>Serial</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>
<tr><td>7</td><td>IRFE</td><td>I</td><td colspan="4">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 at 10uA.</td></tr>
<tr><td>21</td><td>VCOMH</td><td>O</td><td colspan="4">Voltage Output High Level for COM Signal
The COM signal deselected voltage level. A tantalum capacitor should be connected between this pin and VSS.</td></tr>
</table>

Reserve

Pin Number	Symbol	Type	Function
1,23	N.C.	-	Reserved Pin (Supporting Pin) The supporting pins can reduce the influences from stresses on the function pins.

Block Diagram



MCU Interface Selection: BS1 and BS2

Pins connected to MCU interface: D7~D0, E/RD#, R/W#, CS#, D/C#, and RES#

C1, C3, C5: 10μF

C2, C4, C6: 0.1μF

C6, C9: 4.7μF / 25V Tantalum Capacitor

C7: 4.7uF/20V Tantalum CAP

R1: 1.2MΩ, R1 = (Voltage at IREF – VSS) / IREF

DC Characteristics

Item	Symbol	Condition	Min.	Type	Max.	Unit
Supply Voltage for Logic	VDD		2.4	2.8	3.5	Volt
Supply Voltage for I/O Pins	VDDIO		1.6	2.8	3.5	Volt
Driver Supply Voltage	VCC	Note 3	-	14	-	Volt
Operating Current for VDD	IDD	Note 4	-	0.2	0.6	mA
		Note 5	-	0.2	0.6	mA
Operating Current for VCC	ICC	Note 4	-	8	11	mA
		Note 5	-	13.5	18	mA
Sleep Mode Current for VDD	IDD,Sleep		-	1	2	μA
Sleep Mode Current for VCC	ICC,Sleep		-	<2	2	μA

Note 3: Brightness (Lbr) and Driver Supply Voltage (VCC) are subject to the change of the panel characteristics and the customer's request.

Note 4: VDD = 2.8V, VCC = 14V "Software Initial Setting", 50% Display Area Turn on.

Note 5: VDD = 2.8V, VCC = 14V"Software Initial Setting", 100% Display Area Turn on.

Optical Characteristics

Item	Symbol	Conditions	Min.	Typ	Max.	Unit
Brightness(White)	Lbr	With Polarizer Note 3	80	100	-	cd/㎡
C.I.E. (White)	(X)	With Polarizer	0.26	0.30	0.34	
	(Y)		0.30	0.33	0.36	
C.I.E. (Red)	(X)	With Polarizer	0.57	0.61	0.65	
	(Y)		0.30	0.34	0.38	
C.I.E. (Green)	(X)	With Polarizer	0.26	0.30	0.34	
	(Y)		0.58	0.62	0.66	
C.I.E. (Blue)	(X)	C With Polarizer	0.10	0.14	0.18	
	(Y)		0.14	0.18	0.22	
Dark Room Contrast	CR	-	-	>10000:1	-	
Viewing anglerange	-	-	-	Free	-	Degree

* Optical measurement taken at VDD = 2.8V, VCC_C= 14V.

Absolute Maximum rating

Item	Symbol	Min.	Max.	Unit	Notes
Supply Voltage	VDD	-0.3	4	Volt	1,2
Driver Supply Voltage	VCC	0	15	Volt	1,2
VCC Supply Current	Icc	-	25	Volt	1,2
Life Time (55 cd/㎡)		30,000	---	Hour	

Note 1: All the above voltages are on the basis of “VSS = 0V”.

Note 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 3. “Optics Characteristics”. If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

AC Characteristics

Please refer “SSD1331 specification.

Actual Application Example

Command usage and explanation of an actual example

<Initialization>