


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

| Display Features | |  | Box Quantity | Weight / Display |
|-----------------------|------------------------|---|--------------|------------------|
| 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 | | | |

* - 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

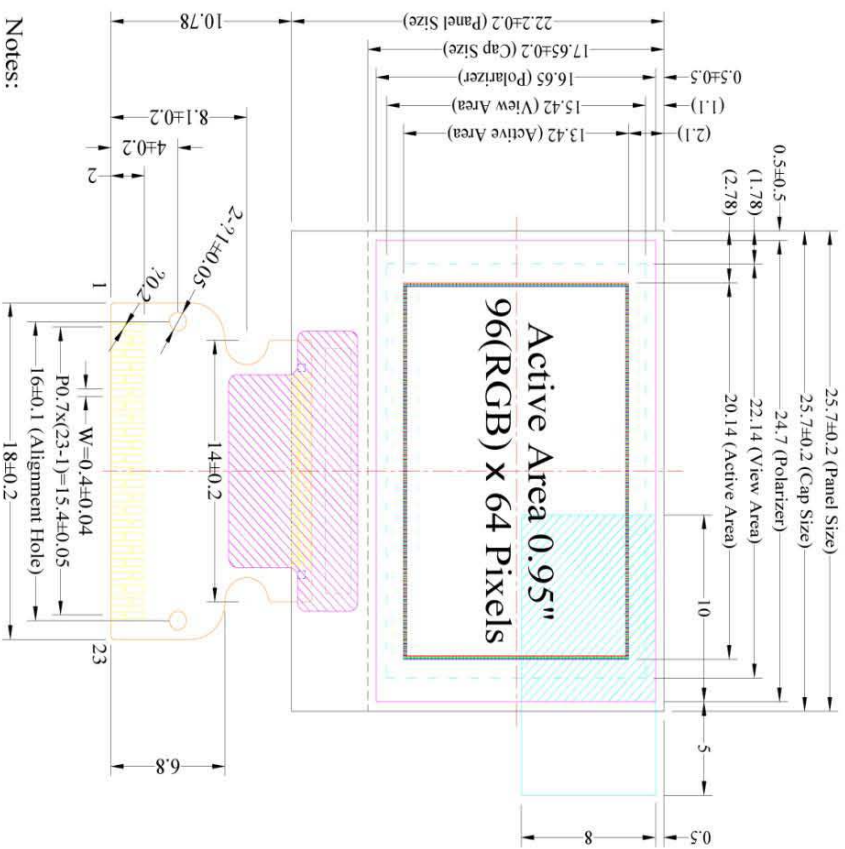
- 96X64 Graphic
- Built-in controller
- viewing angle Free
- Wide Temperature -40°C ~ +80°C (Operating)
- RoHS compliant

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 | |

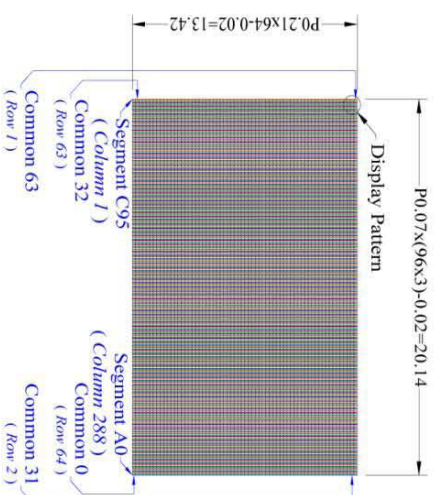
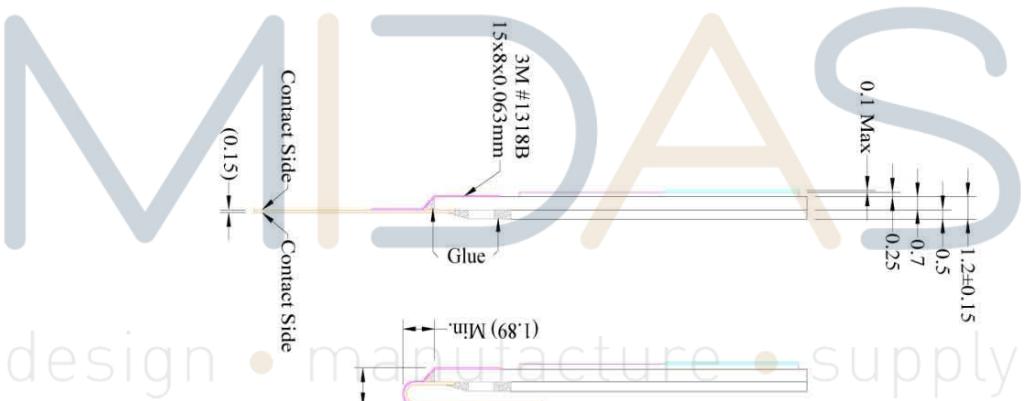


Mechanical Drawing

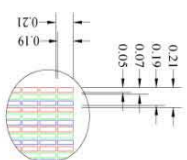


Notes:

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 should be 1.70 Max.



Display Pattern
Scale (5:1)



| Pin | Symbol |
|-----|--------|
| 1 | NC |
| 2 | VSS |
| 3 | VDD |
| 4 | VDIO |
| 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. |

Pin Description

Power Supply

| Pin Number | Symbol | Type | Function |
|------------|--------|------|--|
| 2 | VSS | P | <i>Ground of OEL System</i> 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 | | <i>Power Supply Pins for Core VDD</i> This is a voltage supply pin. It must be connected to external source. |
| 4 | VDDIO | | <i>Power Supply for Interface Logic Level</i> It should be match with the MCU interface voltage level. VDDIO must always be equal or lower than VDD. |
| 22 | VCC | | <i>Power Supply for Interface Logic Level</i> It should be match with the MCU interface voltage level. VDDIO must always be equal or lower than VDD. |

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MCU Interface

| Pin Number | Symbol | Type | Function |
|------------|---------------|------|---|
| 8 | CS# | I | <p>Chip Select</p> <p>This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low.</p> |
| 9 | RES# | I | <p>Power Reset for Controller and Driver</p> <p>This pin is reset signal input. When the pin is low, initialization of the chip is executed.</p> |
| 10 | D/C# | I | <p>Data/Command Control</p> <p>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.</p> |
| 11 | R/W# (WR#) | I | <p>Data/Command Control</p> <p>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.</p> |
| 12 | E(RD#) | I | <p>Read/Write Enable or Read</p> <p>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.</p> <p>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.</p> |
| 13~20 | D0~D7 | I/O | <p>Host Data Input/Output Bus</p> <p>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.</p> |



System Control Pins

| Pin Number | Symbol | Type | Function | | | | | | | | | | | | |
|------------|---------------|------|--|--------|---------------|---------------|--------|-----|---|---|---|-----|---|---|---|
| 5 | BS1 | I | Communicating Protocol Select These pins are MCU interface selection input. See the following table: | | | | | | | | | | | | |
| 6 | BS2 | | <table border="1"> <thead> <tr> <th></th> <th>68XX-parallel</th> <th>80XX-parallel</th> <th>Serial</th> </tr> </thead> <tbody> <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> </tbody> </table> | | 68XX-parallel | 80XX-parallel | Serial | BS1 | 0 | 1 | 0 | BS2 | 1 | 1 | 0 |
| | 68XX-parallel | | 80XX-parallel | Serial | | | | | | | | | | | |
| BS1 | 0 | | 1 | 0 | | | | | | | | | | | |
| BS2 | 1 | 1 | 0 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 7 | IRFE | I | 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. | | | | | | | | | | | | |
| 21 | VCOMH | O | Voltage Output High Level for COM Signal The COM signal deselected voltage level. A tantalum capacitor should be connected between this pin and VSS. | | | | | | | | | | | | |

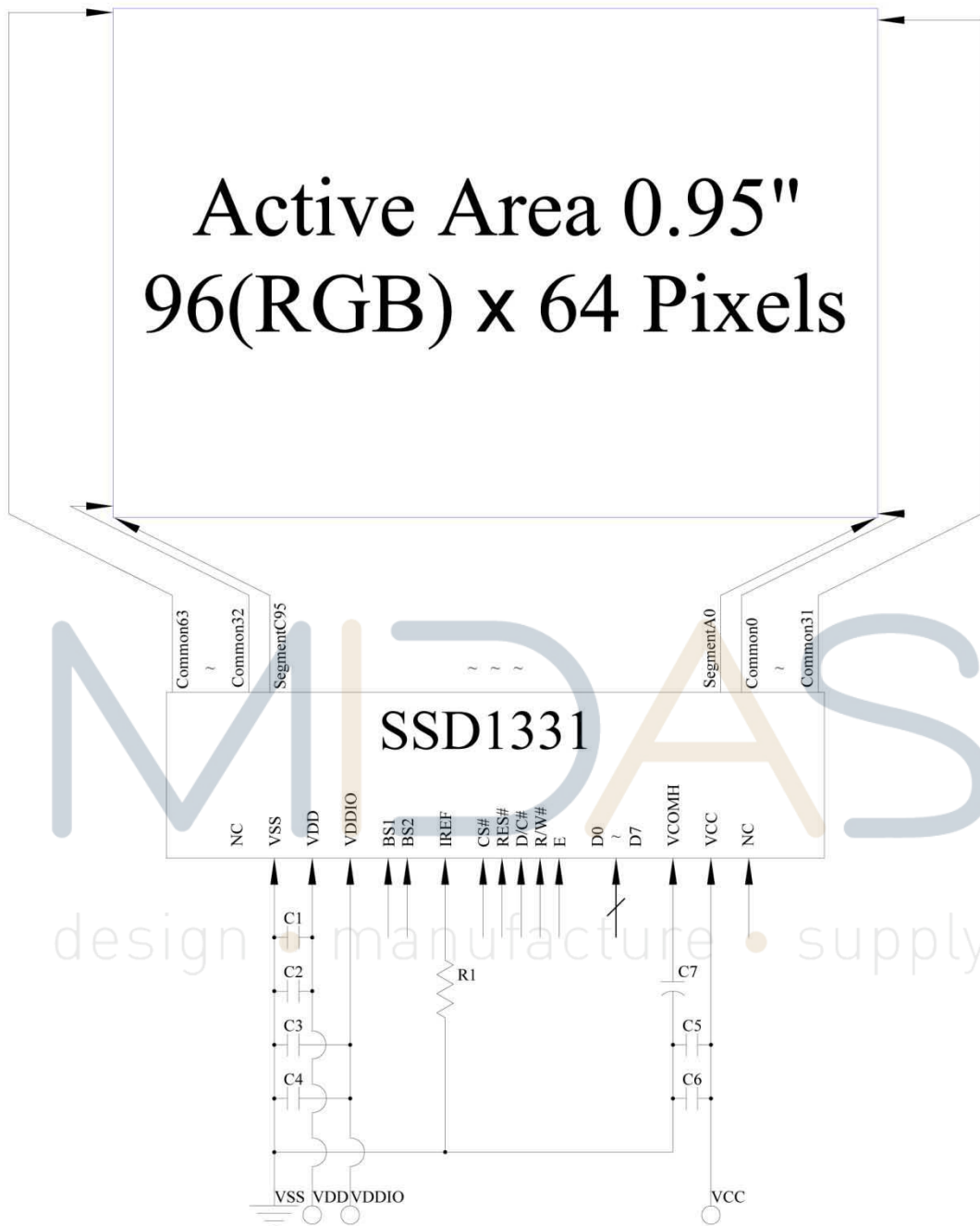
Reserve

| 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. |

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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: 10 μ F

C2, C4, C6: 0.1 μ F

C6, C9: 4.7 μ F / 25V Tantalum Capacitor

C7: 4.7 μ F/20V Tantalum CAP

R1: 1.2M Ω , 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/m ² |
| 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 angle range | - | - | - | 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/m ²) | | 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>

