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Specification	
Part Number:	MCOT256064BA-BM
Version:	
Date:	

Midas Displays OLED Part Number System

MCO	B	21605	A	*	V	-	E	W	I	*
1	2	3	4	5	6		7	8	9	10

1	=	**MCO:**	Midas Displays OLED
2	=	**Blank:**	**B**: COB (Chip on Board) **T**: TAB (Taped Automated Bonding)
3	=	**No of dots:**	**(**e.g. 240064 = 240 x 64 dots) (e.g. 21605 = 2 x 16 5mm C.H.)
4	=	**Series**	A to Z
5	=	**Series Variant:**	A to Z and 1 to 9 **– see addendum**
6	=	**Operating Temp Range:**	**A:** -30+85° C **V:** -40+80° C **Y:** -40 +70° C **Z:** -30+70° C **X**: -40 +85° C
7	=	**Character Set:**	**Blank**: Not Applicable **E:** Multi European Font Set (English/Japanese – Western European (K) – Cyrillic (R))
8	=	**Colour:**	**Y:** Yellow **W:** White **B:** Blue **R:** Red **G:** Green **RGB**: Full Colour
9	=	**Interface:**	**P:** Parallel **I:** I²C **S:** SPI **M:** Multi
10	=	**Voltage Variant:**	e.g. **3** = 3v

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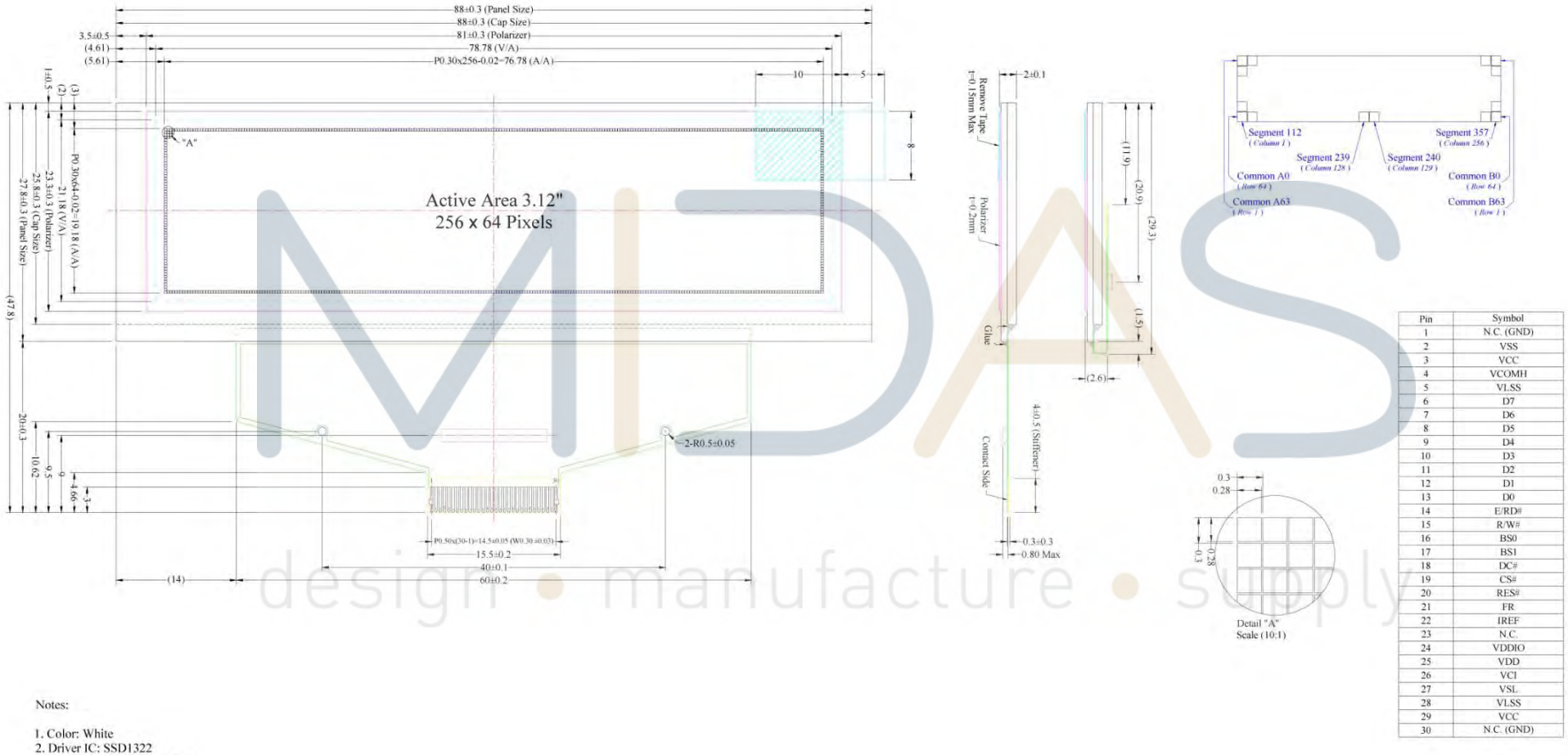
Functions and Features

- 256X64 Graphic
- Built-in controller
- viewing angle Free
- Wide Temperature -40℃ ~ +85℃ (Operating)
- RoHS compliant

Mechanical Specification

Item	Description	
Product No.	MCOT256064BA-BM	
Inch	3.12”	
Color	Blue	
Active Area	76.78(W)×19.18(H)	mm
Panel Size	88.00(W)×27.80(H)×2.00(D)	mm
Dot Size	0.28(W)×0.28(H)	mm
Dot Pitch	0.3(W)×0.3(H)	mm
Display Format	256×64	
Duty Ratio	1/64 Duty	Duty
Controller	SSD1322 or Equivalent	
Operation Temperature	-40~85	°C
Storage Temperature	-40~90	°C
Response Time	≤10	us
Assembly	Connector	

Mechanical Drawing



Pin	Symbol
1	N.C. (GND)
2	VSS
3	VCC
4	VCOMH
5	VLSS
6	D7
7	D6
8	D5
9	D4
10	D3
11	D2
12	D1
13	D0
14	E/RD#
15	R/W#
16	BS0
17	BS1
18	DC#
19	CS#
20	RES#
21	FR
22	IREF
23	N.C.
24	VDDIO
25	VDD
26	VCI
27	VSL
28	VLSS
29	VCC
30	N.C. (GND)

Notes:

1. Color: White
2. Driver IC: SSD1322
3. Die Size: 12374um x 1526um
4. COF Number: SSD1322U
5. Interface:
   8-bit 68XX/80XX Parallel, 3-/4-wire SPI
6. General Tolerance: ±0.30
7. The total thickness (2.10 Max) is without polarizer protective film & remove tape.
   The actual assembled total thickness with above materials should be 2.35 Max.

Pin Description

Power Supply

Pin Number	Symbol	Type	Function
26	VCI	P	**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.
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.
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 signals pins (BS0~BS1, D0~D7, control signals…) pull high, they should be connected to VDDIO.
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.
3,29	VCC		**Power Supply for OEL Panel** These are the most positive voltage supply pin of the chip. They must be connected to external source.
5,28	VLSS		**Ground of Analog Circuit** These are the analog ground pins. They should be connected to VSS externally.

Driver

Pin Number	Symbol	Type	Function
22	IREF	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 lower than 10uA.
4	VCOMH	P	**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.
27	VSL	P	**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.

Testing Pads

Pin Number	Symbol	Type	Function
21	FR	O	**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.

Interface

<table>
<tr><th>Pin Number</th><th>Symbol</th><th>Type</th><th>Function</th></tr>
<tr><td rowspan="6">16
17</td><td rowspan="6">BS0
BS1</td><td rowspan="9">I</td><td>Communicating Protocol Select
These pins are MCU interface selection input. See the following table:
<table>
<tr><td></td><td>BS1</td><td>BS2</td></tr>
<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>
</table></td></tr>
<tr><td>20</td><td>RES#</td><td>Power Reset for Controller and Driver
This pin is reset signal input. When the pin is low, initialization of the chip is executed.</td></tr>
<tr><td>19</td><td>CS#</td><td>Chip Select
This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low.</td></tr>
<tr><td>18</td><td>D/C#</td><td>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.</td></tr>
<tr><td>14</td><td>E/RD#</td><td>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.</td></tr>
<tr><td>15</td><td>R/W#</td><td>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 or I2C mode is selected, this pin must be connected to VSS.</td></tr>
</table>

6~13	D7~D0	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. Unused pins must be connected to VSS except for D2 in serial mode.

Reserve

Pin Number	Symbol	Type	Function
23	N.C.	-	**Reserved Pin** The N.C. pin between function pins is reserved for compatible and flexible design.
1,30	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.

Block Diagram

MCU Interface Selection: BS0 and BS1
Pins connected to MCU interface: D7~D0, E/RD#, R/W#, D/C#, CS#, and RES#

C1, C3, C5: 0.1 μ F
C2, C4: 4.7 μ F
C6: 10 μ F
C7: 1 μ F
C8: 4.7 μ F / 25V Tantalum Capacitor
R1: 680k Ω□, R1 = (Voltage at IREF – VSS) / IREF
R2: 50 Ω□, 1/4W
D1:□□□□□□≤1.4V, 0.5W

DC Characteristics

Item	Symbol	Condition	Min.	Type	Max.	Unit
Supply Voltage for Operation	V_{CI}		2.4	2.8	3.5	Volt
Supply Voltage for Logic	V_{DD}		2.4	2.5	2.6	Volt
Supply Voltage for I/O Pins	V_{DDIO}		1.65	1.8	VCI	Volt
Supply Voltage for Display	V_{CC}	Note 5	11.5	12	12.5	Volt
Operating Current for VCI	I_{CI}		-	180	300	μA
Operating Current for VCC	I_{CC}	Note 6	-	17.8	22.3	mA
		Note 7	-	28.1	35.1	mA
		Note 8		47.7	59.7	mA
Sleep Mode Current for VCI	$I_{CI,SLEEP}$		-	20	100	μA
Sleep Mode Current for VCC	$I_{CC,SLEEP}$		-	2	10	μA

Note 5: Brightness (Lbr) and Supply Voltage for Display (VCC) are subject to the change of the panel characteristics and the customer's request.

Note 6: VCI = 2.8V, VCC = 12.0V, 30% Display Area Turn on.

Note 7: VCI = 2.8V, VCC = 12.0V, 50% Display Area Turn on.

Note 8: VCI = 2.8V, VCC = 12.0V, 100% Display Area Turn on.

Optical Characteristics

Item	Symbol	Conditions	Min.	Typ	Max.	Unit
Brightness	Lbr	-	-	80	-	cd/㎡
C.I.E. (Blue)	(X) (Y)	C.I.E	0.12 0.22	0.16 0.26	0.20 0.30	
Dark Room Contrast	CR	-	-	>10000:1	-	
Viewing anglerange	-	-	-	Free	-	Degree

* Optical measurement taken at VDD = 2.8V, VCC = 12V.

Absolute Maximum rating

Item	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage for Operation	VCI	-0.3	-	4	Volt	1,2
Supply Voltage for Logic	VDD	-0.5	-	2.75	Volt	1,2
Supply Voltage for I/O Pins	VDDIO	-0.5	-	VCI	Volt	1,2
Supply Voltage for Display	Vcc	-0.5	-	16	Volt	1,2
Life Time (45 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. “Optics”. If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

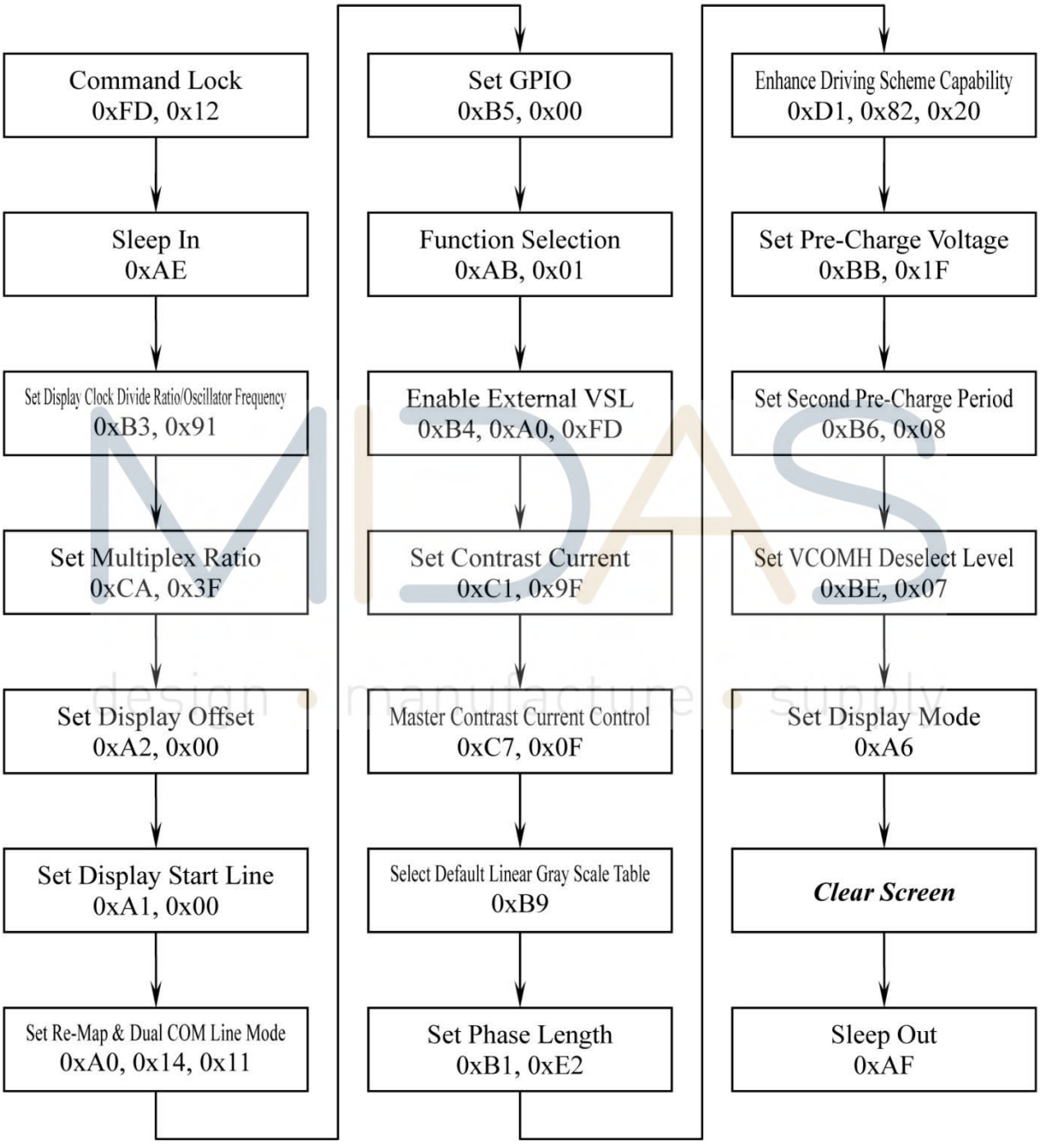
AC Characteristics

Please refer “SSD1322 specification.

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.