



SPECIFICATIONS
FOR LCD MODULE

MATRIX ORBITAL NO.	MOP-GL24064R
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DATE	PAGE	DESCRIPTION
2007/1/30. .	- -	First release

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1. Module Classification Information

AM0064R-02
1 2 3 4

1	Brand □ ACMMI
2	Display Type □ Custom-made serials no.
3	RoHS compliant: R → YES NONE → NO
4	Internal Code : Model serials no.

2. Precautions in use of LCD Modules

- (1) Avoid applying excessive shocks to the module or making any alterations or modifications to it.
- (2) Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
- (3) Don't disassemble the LCM.
- (4) Don't operate it above the absolute maximum rating.
- (5) Don't drop, bend or twist LCM.
- (6) Soldering: only to the I/O terminals.
- (7) Storage: please storage in anti-static electricity container and clean environment.

3. General Specification

Item	Dimension	Unit
Number of Dots	240 x 64	□
Module dimension(With LED Backlight)	112.0 x 38.0 x 21.0□MAX□	mm
View area	98.0 x 28.4	mm
Active area	93.57 x 24.93	mm
Dot size	0.36 x 0.36	mm
Dot pitch	0.39 x 0.39	mm
LCD type	STN	
Duty	1/64	
View direction	12 o'clock	
Backlight Type	White backlight	

4. Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	
Input Voltage	V_I	-0.3	VDD+0.3	V	
Supply Voltage For Logic	VDD-V _{SS}	-0.3	7.0	V	
Supply Voltage For LCD	V _{DD} -V ₀	Vdd-13.5	0	V	
Standard Temperature LCM	Operating Temp.	Top	0	50	□
	Storage Temp.	Tstr	-10	60	□
Wide Temperature LCM	Operating Temp.	Top	-20	70	□
	Storage Temp.	Tstr	-30	80	□

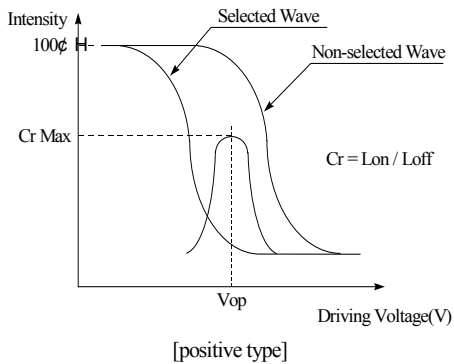
5. Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	□	2.7	3.3	5.0	V
Supply Voltage For LCD	$V_{DD}-V_0$	$T_a=25^\circ\text{C}$ □	10.8	11.0	11.5	V
Input High Volt.	V_{IH}	□	$0.7 V_{DD}$	□	V_{DD}	V
Input Low Volt.	V_{IL}	□	V_{SS}	□	$0.3 V_{DD}$	V
Supply Current	I_{DD}	$V_{DD}=3.3\text{V}$		23.0	28.0	mA
Supply Voltage of White backlight	V_{LED}	Forward current =60 mA Number of LED dice 4	2.9	3.1	3.3	V

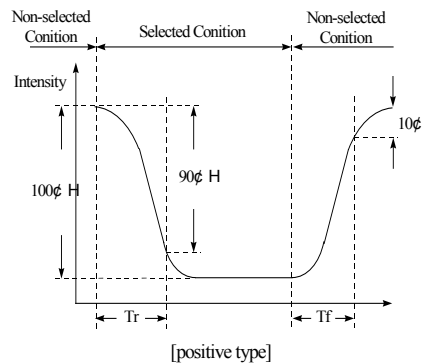
6. Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V) θ	CR \square 2	-20	\square	35	deg
	(H) ϕ	CR \square 2	-30	\square	30	deg
Contrast Ratio	CR	\square	\square	3	\square	\square
Response Time	T rise	\square	\square	\square	250	ms
	T fall	\square	\square	\square	250	ms

Definition of Operation Voltage (Vop)



Definition of Response Time (Tr, Tf)



Conditions :

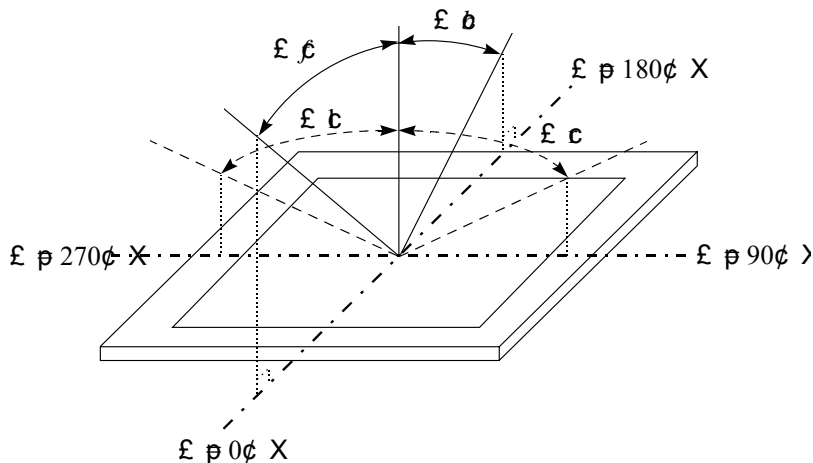
Operating Voltage : Vop

Viewing Angle(θ \square ϕ) : 0 \square 0 \square

Frame Frequency : 64 HZ

Driving Waveform : 1/N duty , 1/a bias

Definition of viewing angle(CR 2)

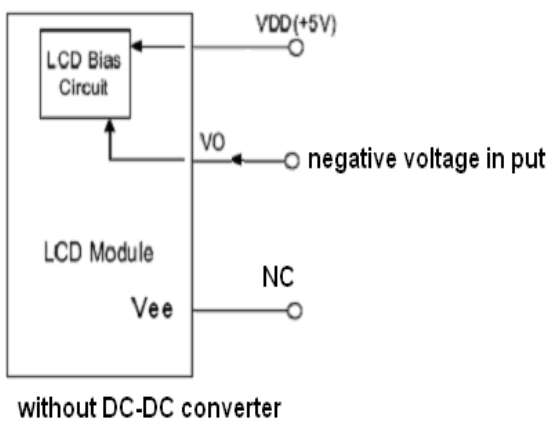


7. Interface Pin Function

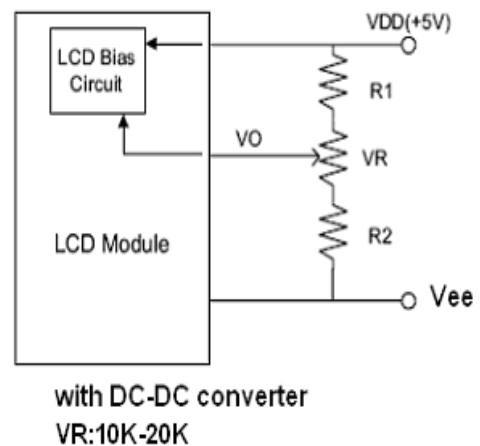
Pin No.	Symbol	Level	Description
1	FGND	-	Frame GND
2	V _{SS}	0V	Ground
3	V _{DD}	3.3V	Supply Voltage for logic
4	V ₀		Supply voltage for LCD
5	/WR	H/L	Write Signal L:Active
6	/RD	H/L	Read Signal L:Activ
7	/CE	H/L	Chip enable Signal L:Active
8	C/D	H/L	Write Mode H:Command,L:Data write; Read Mode H:Status read,L:Data read
9	NC		No Connector
10	/RST	H/L	Reset signal
11~18	DB0~DB7	H/L	Data bus
19	FS	H/L	Font Switch H:6x8 dots, L:8x8 dots
20	V _{ee}		Negative Voltage Output
21	LEDR		Red LED Backlight Anode No Connect
22	LEDG		Green LED Backlight Anode also as White Backlight Anode
23	LEDB		Blue LED Backlight Anode No Connect
24	LEDK		Backlight Cathode

8. POWER SUPPLY

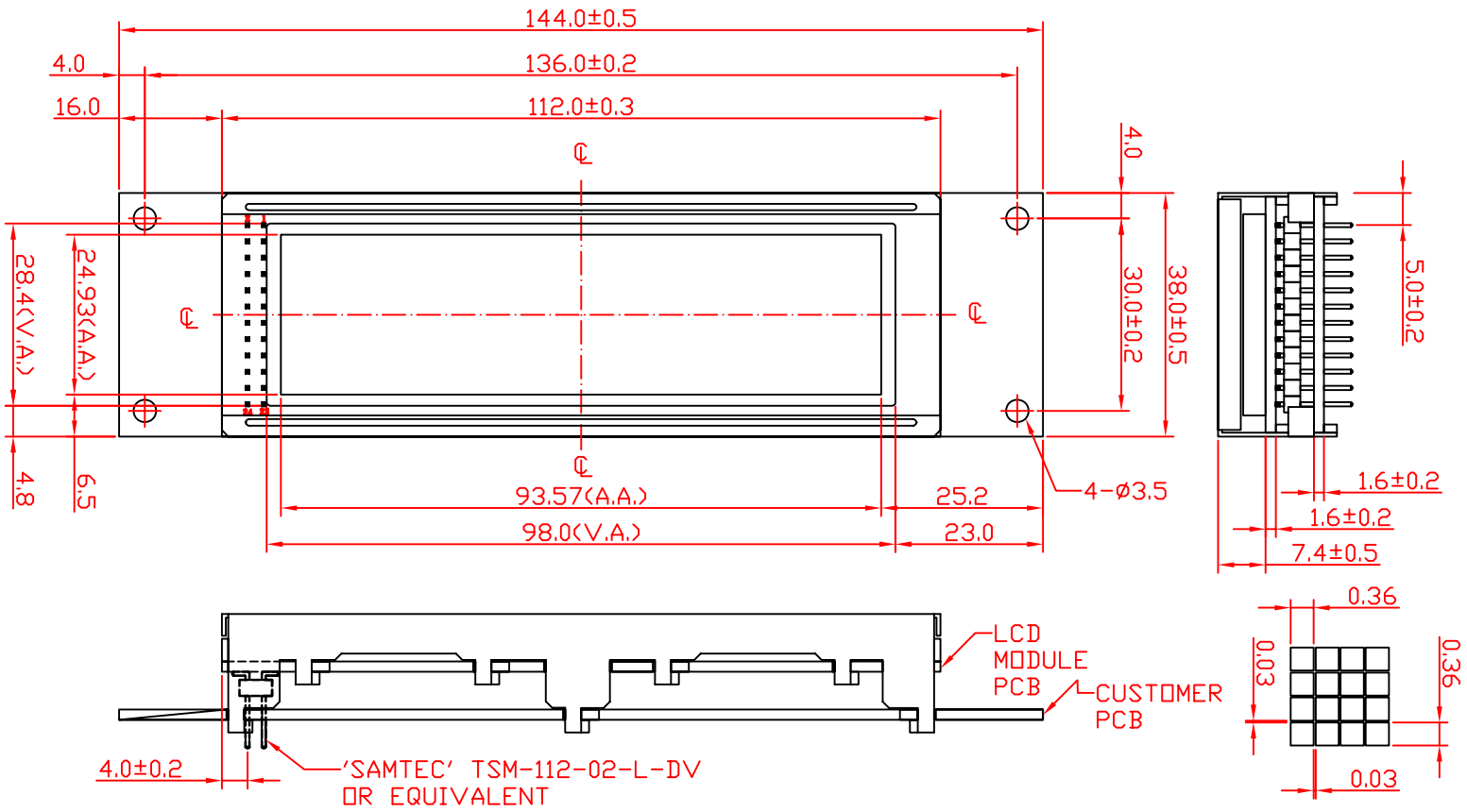
Without Negative Power on PCB



With Negative Power on PCB

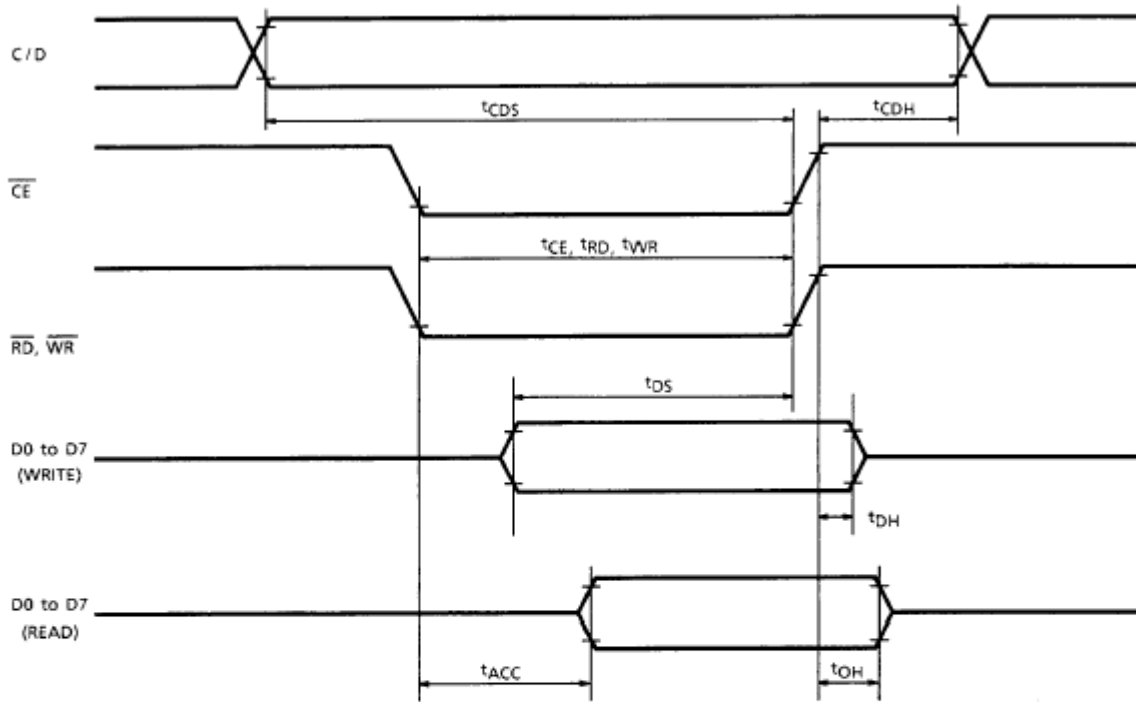


9. Contour Drawing



10. Timing Characteristics

Bus Timing



TEST CONDITIONS (Unless otherwise noted, $V_{DD} = 5.0V \pm 10\%$, $V_{SS} = 0V$, $T_a = -20$ to $75^\circ C$)

ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
C/D Set-up Time	t_{CDS}	—	100	—	ns
C/D Hold Time	t_{CDH}	—	10	—	ns
\overline{CE} , \overline{RD} , \overline{WR} Pulse Width	t_{CE}, t_{RD}, t_{WR}	—	80	—	ns
Data Set-up Time	t_{DS}	—	80	—	ns
Data Hold Time	t_{DH}	—	40	—	ns
Access Time	t_{ACC}	—	—	150	ns
Output Hold Time	t_{OH}	—	10	50	ns

11. Instruction Table

COMMAND DEFINITIONS

COMMAND	CODE	D1	D2	FUNCTION
REGISTERS SETTING	00100001	X address	Y address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
	00100100	Low address	High address	Set Address Pointer
SET CONTROL WORD	01000000	Low address	High address	Set Text Home Address
	01000001	Columns	00H	Set Text Area
	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area
MODE SET	1000X000	—	—	OR mode
	1000X001	—	—	EXOR mode
	1000X011	—	—	AND mode
	1000X100	—	—	Text Attribute mode
	10000XXX	—	—	Internal CG ROM mode
	10001XXX	—	—	External CG RAM mode
DISPLAY MODE	10010000	—	—	Display off
	1001XX10	—	—	Cursor on, blink off
	1001XX11	—	—	Cursor on, blink on
	100101XX	—	—	Text on, graphic off
	100110XX	—	—	Text off, graphic on
	100111XX	—	—	Text on, graphic on
CURSOR PATTERN SELECT	10100000	—	—	1-line cursor
	10100001	—	—	2-line cursor
	10100010	—	—	3-line cursor
	10100011	—	—	4-line cursor
	10100100	—	—	5-line cursor
	10100101	—	—	6-line cursor
	10100110	—	—	7-line cursor
	10100111	—	—	8-line cursor
DATA AUTO READ / WRITE	10110000	—	—	Set Data Auto Write
	10110001	—	—	Set Data Auto Read
	10110010	—	—	Auto Reset
DATA READ / WRITE	11000000	Data	—	Data Write and Increment ADP
	11000001	—	—	Data Read and Increment ADP
	11000010	Data	—	Data Write and Decrement ADP
	11000011	—	—	Data Read and Decrement ADP
	11000100	Data	—	Data Write and Nonvariable ADP
	11000101	—	—	Data Read and Nonvariable ADP
SCREEN PEEK	11100000	—	—	Screen Peek
SCREEN COPY	11101000	—	—	Screen Copy

X : invalid

COMMAND	CODE	D1	D2	FUNCTION
BIT SET / RESET	11110XXX	—	—	Bit Reset
	11111XXX	—	—	Bit Set
	1111X000	—	—	Bit 0 (LSB)
	1111X001	—	—	Bit 1
	1111X010	—	—	Bit 2
	1111X011	—	—	Bit 3
	1111X100	—	—	Bit 4
	1111X101	—	—	Bit 5
	1111X110	—	—	Bit 6
	1111X111	—	—	Bit 7 (MSB)

X : invalid

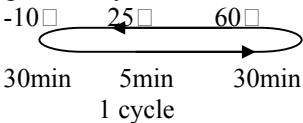
12. Quality Assurance

Screen Cosmetic Criteria

Item	Defect	Judgment Criterion	Partition																				
1	Spots	<p>A)Clear</p> <table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.1$</td> <td>Disregard</td> </tr> <tr> <td>$0.1 < d \leq 0.2$</td> <td>6</td> </tr> <tr> <td>$0.2 < d \leq 0.3$</td> <td>2</td> </tr> <tr> <td>$0.3 < d$</td> <td>0</td> </tr> </tbody> </table> <p>Note: Including pin holes and defective dots which must be within one pixel size.</p> <p>B)Unclear</p> <table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < d \leq 0.5$</td> <td>6</td> </tr> <tr> <td>$0.5 < d \leq 0.7$</td> <td>2</td> </tr> <tr> <td>$0.7 < d$</td> <td>0</td> </tr> </tbody> </table>	Size: d mm	Acceptable Qty in active area	$d \leq 0.1$	Disregard	$0.1 < d \leq 0.2$	6	$0.2 < d \leq 0.3$	2	$0.3 < d$	0	Size: d mm	Acceptable Qty in active area	$d \leq 0.2$	Disregard	$0.2 < d \leq 0.5$	6	$0.5 < d \leq 0.7$	2	$0.7 < d$	0	Minor
Size: d mm	Acceptable Qty in active area																						
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$0.5 < d \leq 0.7$	2																						
$0.7 < d$	0																						
2	Bubbles in Polarizer	<table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.3$</td> <td>Disregard</td> </tr> <tr> <td>$0.3 < d \leq 1.0$</td> <td>3</td> </tr> <tr> <td>$1.0 < d \leq 1.5$</td> <td>1</td> </tr> <tr> <td>$1.5 < d$</td> <td>0</td> </tr> </tbody> </table>	Size: d mm	Acceptable Qty in active area	$d \leq 0.3$	Disregard	$0.3 < d \leq 1.0$	3	$1.0 < d \leq 1.5$	1	$1.5 < d$	0	Minor										
Size: d mm	Acceptable Qty in active area																						
$d \leq 0.3$	Disregard																						
$0.3 < d \leq 1.0$	3																						
$1.0 < d \leq 1.5$	1																						
$1.5 < d$	0																						
3	Scratch	In accordance with spots cosmetic criteria. When the light reflects on the panel surface, the scratches are not to be remarkable.	Minor																				
4	Allowable Density	Above defects should be separated more than 30mm each other.	Minor																				
5	Coloration	Not to be noticeable coloration in the viewing area of the LCD panels. Back-light type should be judged with back-light on state only.	Minor																				

13. 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.	60□ 96hrs	—
Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-10□ 96hrs	—
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	50□ 96hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	0□ 96hrs	—
High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	60□, 90%RH 96hrs	—
High Temperature/ Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	50□, 90%RH 96hrs	—
Temperature Cycle	Endurance test applying the low and high temperature cycle. 	-10□/60□ 10 cycles	—
Mechanical Test			
Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz→1.5mmp-p 22~500Hz→1.5G Total 0.5hrs	—
Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sign wave 11 msdc 3 times of each direction	—

***Supply voltage for logic system=5V. Supply voltage for LCD system =Operating voltage at 25□