LCD MOUDULE 2004B1
Product Preview

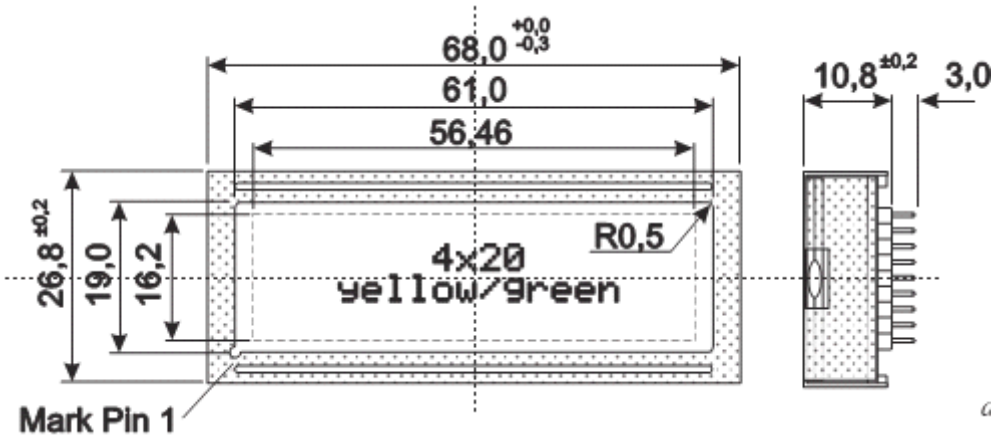
1. FEATURES

* HIGH CONTRAST LCD SUPERTWIST DISPLAY
*CONTROLLER SSD1803(NEAR 100% COMPATIBLE WITH KS0073 AND HD44780)
*INTERFACE FOR 4-AND 8-BIT DATA BUS
*SERIAL SPI INTERFACE(SID,SOD,SCLK)
*POWER SUPPLY +3.3V..+5V
*OPERATING TEMPERATURE RANGE -20~+70℃
* STORAGE TEMPERATURES RANGE -30~+80℃
*LED BACKLIGHT Y/G MAX. 150MA@+25℃
*NO SCREWS REQUIRED:SOLDER ON IN PCB ONLY
*DETACHABLE VIA 9-PIN SOCKET EA B200-9(2PCS .REQUIRED)

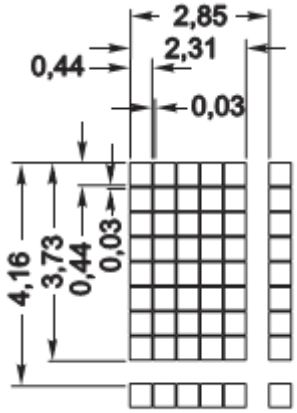
2. Mechanical Data

Item	Standard Value	Unit
LCD Type	STN, Positive Image, Transflective	- -
LCD Duty	1/33	- -
LCD Bias	1/6	- -
Viewing Direction	6 : 00	O'Clock
Character Structure (C*L)	20*4	Dots
DOT Size (W*H)	0.44×0.44	mm
Dot Pit(W*H)	0.47×0.47	mm
Characte Size(W*H)	2.31×3.73	mm
Characte Pit(W*H)	2.85×4.16	mm
Module Dimension (W*H*T)	68.0×26.8×10	mm
Effective Display Area (W*H)	61.0×19.0	mm

3. EXTERNAL DIMENSION :



3. CHARACTE DIMENSION:



4 . PINOUT

Pin	Symbol	Level	Function		Pin	Symbol	Level	Function
1	VSS	L	Power Supply 0V (GND)		10	D3	H / L	Display Data
2	VDD	H	Power Supply +5V		11	D4 (D0)	H / L	Display Data
3	VEE	-	Contrast adjustment, input		12	D5 (D1)	H / L	Display Data
4	RS (CS)	H / L	H=Data, L=Command		13	D6 (D2)	H / L	Display Data
5	R/W (SID)	H / L	H=Read, L=Write		14	D7 (D3)	H / L	Display Data, MSB
6	E (SCLK)	H	Enable (falling edge)		15	-	-	NC (see EA DIP122-5N)
7	D0 (SOD)	H / L	Display Data, LSB		16	RES	L	Reset (internal Pullup 10k)
8	D1	H / L	Display Data		17	A	-	LED B/L+ Resistor required
9	D2	H / L	Display Data		18	C	-	LED B/L-

5. TABLE OF COMMAND(SSD1803,IE=HIGH)

Instruction	RE	Instruction Code										Description	Execution Time (fosc = 270kHz)
		RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Clear display	X	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. and set DDRAM address to "00H" from AC	1.53ms
Return home	0	0	0	0	0	0	0	0	0	1	X	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	1.53ms
Power down mode	1	0	0	0	0	0	0	0	0	1	PD	Set power down mode bit. PD = "1": power down mode set, PD = "0": power down mode disable	39us
Entry mode set	0	0	0	0	0	0	0	0	1	I/D	S	Assign cursor moving direction. I/D = "1": increment, I/D = "0": decrement. S = "1": make display shift of the enabled lines by the DS4 DS1 bits in the shift enable instruction. S = "0": display shift disable	39us
	1	0	0	0	0	0	0	0	1	1	B/D	Segment bi-direction function. BID = "0": Seg1 -> Seg100, BID = "1": Seg100 -> Seg1.	
Display On/Off control	0	0	0	0	0	0	0	1	D	C	B	Set display/cursor/blink on/off D = "1": display on, D = "0": display off, C = "1": cursor on, C = "0": cursor off, B = "1": blink on, B = "0": blink off.	39us
Extended function set	1	0	0	0	0	0	0	1	FW	B/W	NW	Assign font width, black/white inverting of cursor, and 4-line display mode control bit. FW = "1": 6-dot font width, FW = "0": 5-dot font width, B/W = "1": black/white inverting of cursor enable, B/W = "0": black/white inverting of cursor disable NW = "1": 4-line display mode, NW = "0": 1-line or 2-line display mode	39us
Cursor or display shift / Bias ratio select	0	0	0	0	0	0	1	S/C	R/L	BS1	BS0	Cursor or display shift. S/C = "1": display shift, S/C = "0": cursor shift, R/L = "1": shift to right, R/L = "0": shift to left. BS1:BS0 = “00”: 1/4 bias (POR at display line=1) BS1:BS0 = “01”: 1/5 bias BS1:BS0 = “10”: 1/6 bias (POR at display line=2 or 4) BS1:BS0 = “11”: 1/7 bias *Note: BS1 and BS0 are only activated in internal divider option	39us
Shift enable	1	0	0	0	0	0	1	DS4	DS3	DS2	DS1	(when DH = "1") Determine the line for display shift. DS1 = "1/0": 1st line display shift enable/disable DS2 = "1/0": 2nd line display shift enable/disable DS3 = "1/0": 3rd line display shift enable/disable DS4 = "1/0": 4th line display shift enable/disable.	39us

Scroll enable	1	0	0	0	0	0	1	HS4	HS3	HS2	HS1	(when DH = "0") Determine the line for horizontal smooth scroll. HS1 = "1/0": 1st line dot scroll enable/disable HS2 = "1/0": 2nd line dot scroll enable/disable HS3 = "1/0": 3rd line dot scroll enable/disable HS4 = "1/0": 4th line dot scroll enable/disable.	39us
Function set	0	0	0	0	0	1	DL	N	RE (0)	DH	REV	Set interface data length DL = "1": 8-bit, DL = "0": 4-bit Numbers of display line when NW = "0", N = "1": 2-line, N = "0": 1-line Extension register, RE("0") Shift/scroll enable DH = "1": display shift enable DH = "0": dot scroll enable. Reverse bit REV = "1": reverse display, REV = "0": normal display.	39us
	1	0	0	0	0	1	DL	N	RE (1)	BE	0	Set DL, N, RE("1") CGRAM/SEGRAM blink enable BE = " 1/0": CGRAM/SEGRAM blink enable/disable	
set CGRAM address	0	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter.	39us
set SEGRAM address	1	0	0	0	1	X	X	AC3	AC2	AC1	AC0	Set SEGRAM address in address counter.	39us
set DDRAM address	0	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter.	39us
set scroll quantity	1	0	0	1	X	SQ5	SQ4	SQ3	SQ2	SQ1	SQ0	Set the quantity of horizontal dot scroll.	39us
Read busy flag and address/ part ID	X	0	1	BF	AC6 / ID6	AC5 / ID5	AC4 / ID4	AC3 / ID3	AC2 / ID2	AC1 / ID1	AC0 / ID0	Can be known whether during internal operation or not by reading BF. The contents of address counter or the part ID can also be read. When it is read the first time, the address counter can be read. When it is read the second time, the part ID can be read. * In the Serial Interface, data can only be read in Continuous Read Operation, details please refer to Fig.7-12. BF = "1": busy state BF = "0": ready state	0us
write data	X	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM / CGRAM / SEGRAM).	43us
read data	X	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM / CGRAM / SEGRAM).	43us

NOTES**:**

1. When an MPU program with busy flag (DB7) checking is made, 1/2 fosc (is necessary) for executing the next instruction by the "E" signal after the busy flag (DB7) goes to "Low"
2. "X": Don’t care

6.CHARACTER SET

A Full character set is built in already. Additiaonally to that 8more characters can be defined individually.

APPENDIX I SSD1803M1 CGROM CHARACTER CODE