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# EVERBOUQUET INTERNATIONAL CO., LTD.

PART NO.: MC2002DA-SBLW  
FOR MESSRS.: \_\_\_\_\_

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ACCEPTED \_\_\_\_\_

PROPOSED BY : \_\_\_\_\_



## RECORD OF REVISION

DATE	PAGE	SUMMARY

### 3. General specifications

#### 3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-12780)”.

#### 3.2 This individual specification is prior to general specifications

### 4. Mechanical data

- (1) NUMBER OF CHARACTERS -----20 CH \* 2 LINE
- (2) MODULE SIZE -----116.0 W \* 37.0 H \* 9.0 T (Max) mm
- (3) EFFECTIVE AREA -----82.2 W \* 18.6 H mm
- (4) CHARACTER PATTERN -----5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE -----3.2 W \* 5.55 H mm
- (6) CHARACTER PITCH -----3.7 mm
- (7) DOT SIZE -----0.60 W \* 0.65 H mm
- (8) DOT PITCH -----0.65 W \* 0.70 H mm
- (9) VIEWING DIRECTION -----6 O’CLOCK
- (10) LCD TYPE -----STN.BLUE.TRANSMISSIVE
- (11) LED BACKLIGHT COLOR -----WHITE

## 5. Absolute maximum ratings

### 5.1 Electrical absolute maximum ratings

<i>I T E M</i>	<i>SYMBOL</i>	<i>MIN.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>COMMENT</i>
POWER SUPPLY FOR LOGIC	V <sub>DD</sub> -V <sub>SS</sub>	0	6.0	V	-----
INPUT VOLTAGE	V <sub>I</sub>	V <sub>SS</sub>	V <sub>DD</sub>	V	-----
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)

NOTE (1): ELECTRO-STATIC DISCHARGE RESISTANCE IS TESTED BY CHARGING A 200PF CAPACITOR AND DISCHARGING IT BY CONTACT WITH A INTERFACE CONNECTOR PIN.

### 5.2 Environmental absolute maximum ratings

<i>I T E M</i>	<i>OPERATING</i>		<i>STORAGE</i>		<i>COMMENT</i>
	<i>MIN.</i>	<i>MAX.</i>	<i>MIN.</i>	<i>MAX.</i>	
AMBIENT TEMPERATURE	0°C	50°C	-20°C	70°C	-----
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	-----	0.5G	-----	2G	10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	-----	3G	-----	50G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		-----

NOTE (2) : Ta ≤ 50°C: 90% RH MAX.

Ta > 50°C: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50°C. (80% RH AT 60°C)

NOTE (3): 1G = 9.8 m/s<sup>2</sup>

## 6. Electrical characteristics

$$T_a = 25^{\circ}\text{C} \quad V_{DD} = 5.0 \pm 0.25 \text{ V}$$

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>
INPUT VOLTAGE	V <sub>IH</sub>	-----	2.0	-----	V <sub>DD</sub>	V
	V <sub>IL</sub>		V <sub>SS</sub>	-----	0.8	V
OUTPUT VOLTAGE (H LEVEL)	V <sub>OH</sub>	I <sub>OH</sub> = -0.2 mA	2.4	-----	-----	V
	V <sub>OL</sub>	I <sub>OL</sub> = 1.6 mA	-----	-----	0.4	V
POWER SUPPLY CURRENT	I <sub>DD</sub>	V <sub>DD</sub> = 5.0V	-----	2.0	3.5	mA
RECOMMENDED LCD DRIVING VOLTAGE	V <sub>DD</sub> -V <sub>O</sub> DUTY= 1/16	T <sub>a</sub> = 0°C	-----	4.8	-----	V
		T <sub>a</sub> = 25°C	-----	4.5	-----	V
		T <sub>a</sub> = 50°C	-----	4.0	-----	V
POWER SUPPLY CURRENT FOR LED	I <sub>LED</sub>	V <sub>LED</sub> = 5.0V	-----	40	60	mA

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT  $\pm$  0.5V BY EACH MODULE.

## 7. Optical characteristics

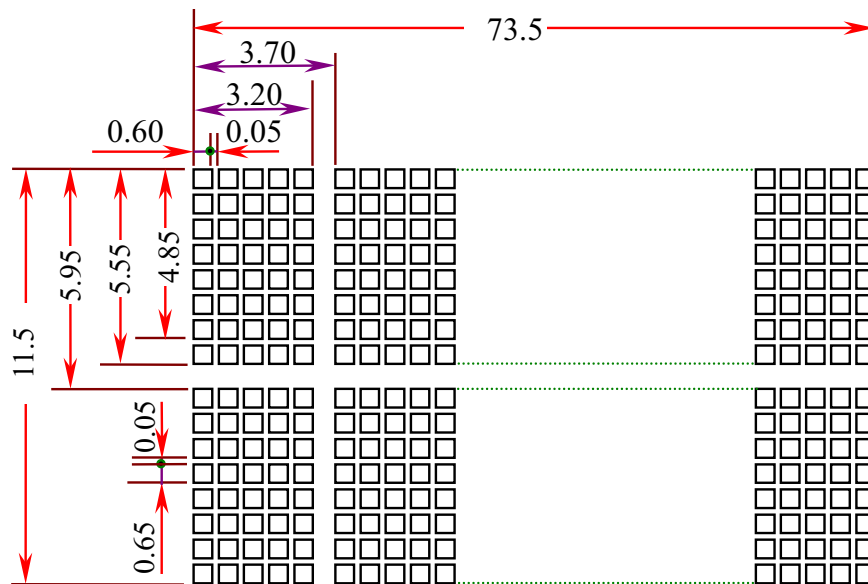
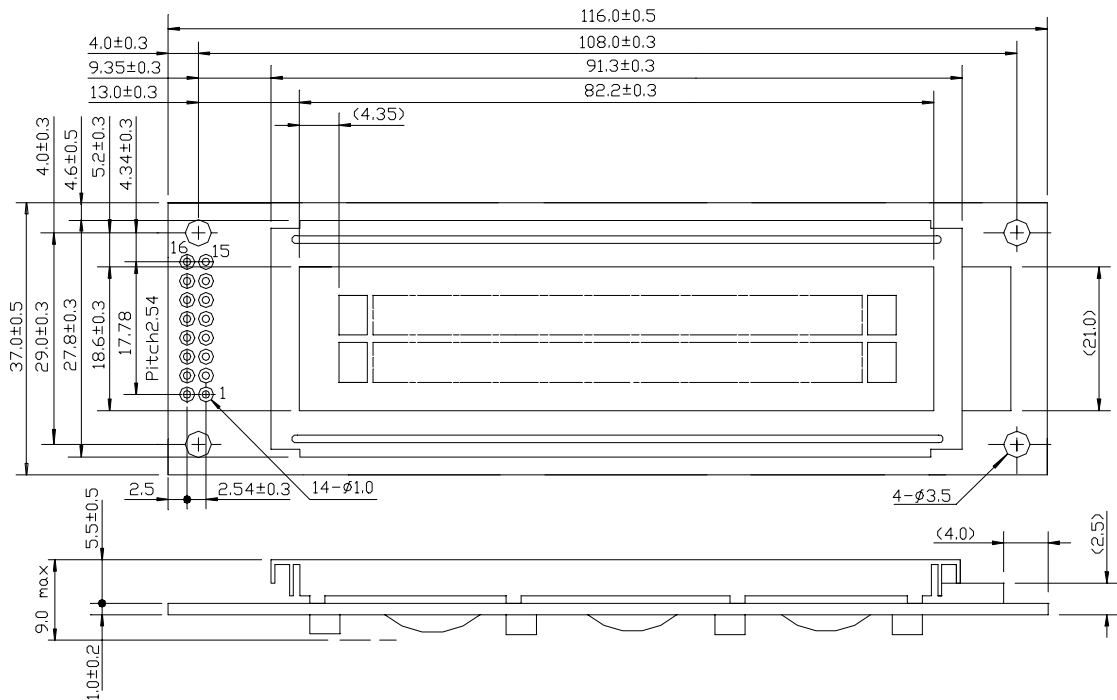
$$T_a = 25^{\circ}\text{C} \quad V_{DD} = 5.0\text{V}$$

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
VIEWING ANGLE	$\Phi 2-\Phi 1$	K = 2.0	30	40	-----	deg.	2
CONTRAST RATIO	K	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	4.0	5.0	-----	-----	2
RESPONSE TIME	t <sub>r</sub> (rise)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	-----	200	350	ms	2
	t <sub>f</sub> (fall)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	-----	300	400	ms	2
BRIGHTNESS FOR LED BACKLIGHT	B	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$	6.0	-----	-----	cd/m <sup>2</sup>	2,3

NOTE (2): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

NOTE (3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

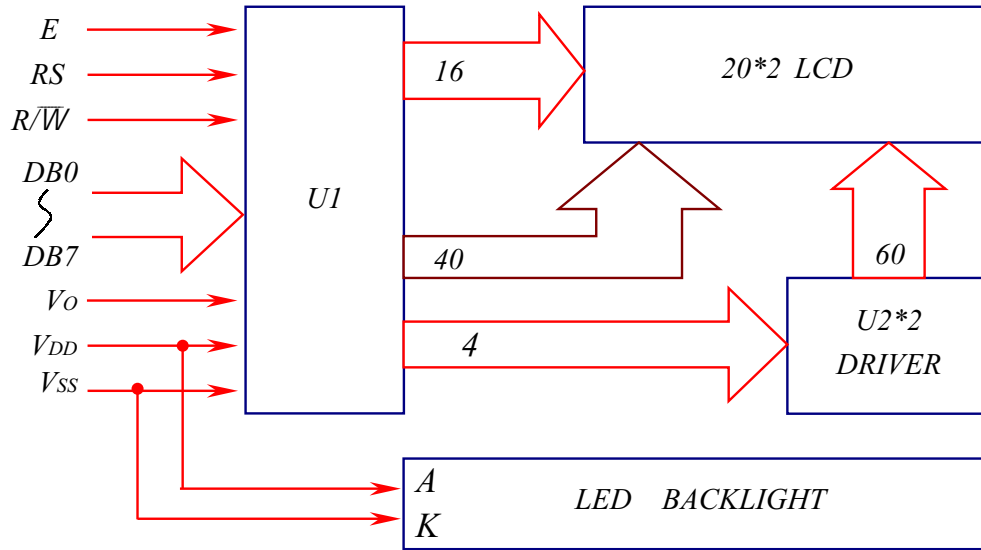
## 8. Outline dimension



### Interface pin connection

<b>PIN NO.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
SYMBOL	V <sub>SS</sub>	V <sub>DD</sub>	V <sub>o</sub>	RS	R/ $\bar{W}$	E	DB0	DB1
<b>PIN NO.</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	NC	NC

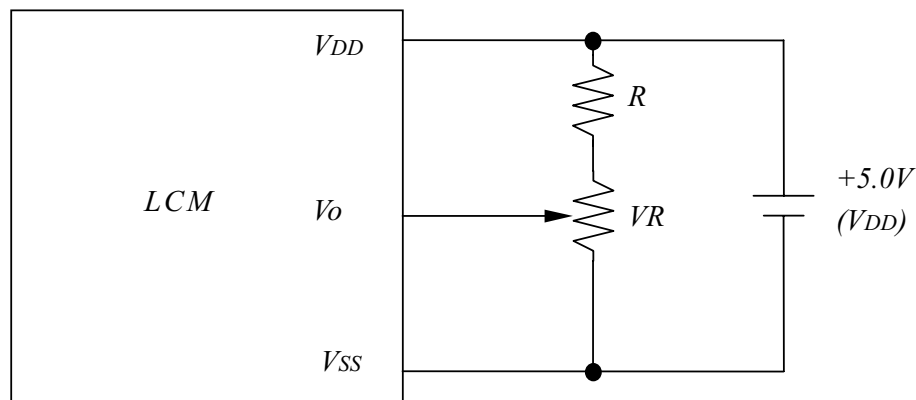
## 9. Block diagram



### Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3

## 10. Power supply for LCM



RECOMMENDED RESISTOR R:  $V_{DD} - V_o \geq 1.5V$

$V_{DD} - V_o$ : LCD DRIVING VOLTAGE

VR:  $10K\Omega \sim 20K\Omega$