



# EVERBOUQUET INTERNATIONAL CO., LTD.

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PART NO. : MC1602M-SL

FOR MESSRS. : \_\_\_\_\_

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ACCEPTED BY : \_\_\_\_\_

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 -----16 CH \* 2 LINE
- (2) MODULE SIZE -----85.0 W \* 32.6 H \* 15.0 T (Max) mm
- (3) EFFECTIVE AREA -----64.5 W \* 16.0 H mm
- (4) CHARACTER PATTERN -----5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE -----2.96 W \* 4.86 H mm
- (6) CHARACTER PITCH -----3.55 mm
- (7) DOT SIZE -----0.56 W \* 0.66 H mm
- (8) DOT PITCH -----0.60 W \* 0.70 H mm
- (9) VIEWING DIRECTION -----6 O’CLOCK
  
- (11) LED COLOR -----YELLOW-GREEN

## 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

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

<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>	-----	2.2	-----	-----	V	
	V <sub>IL</sub>		-----	-----	0.6	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> = 1.2 mA	-----	-----	0.4	V	
POWER SUPPLY CURRENT	I <sub>DD</sub>	V <sub>DD</sub> = 5.0V	-----	1.0	1.5	mA	
RECOMMENDED LCD DRIVING VOLTAGE NOTE(1)	V <sub>DD</sub> -V <sub>O</sub>	DUTY= 1/16 Φ=10° θ=0°	T <sub>a</sub> =0°C	-----	4.9	-----	V
			T <sub>a</sub> =25°C	-----	4.5	-----	V
			T <sub>a</sub> =50°C	-----	4.1	-----	V
POWER SUPPLY CURRENT FOR LED	I <sub>LED</sub>	V <sub>DD</sub> = 5.0	-----	120	150	mA	

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

## 7. Optical characteristics

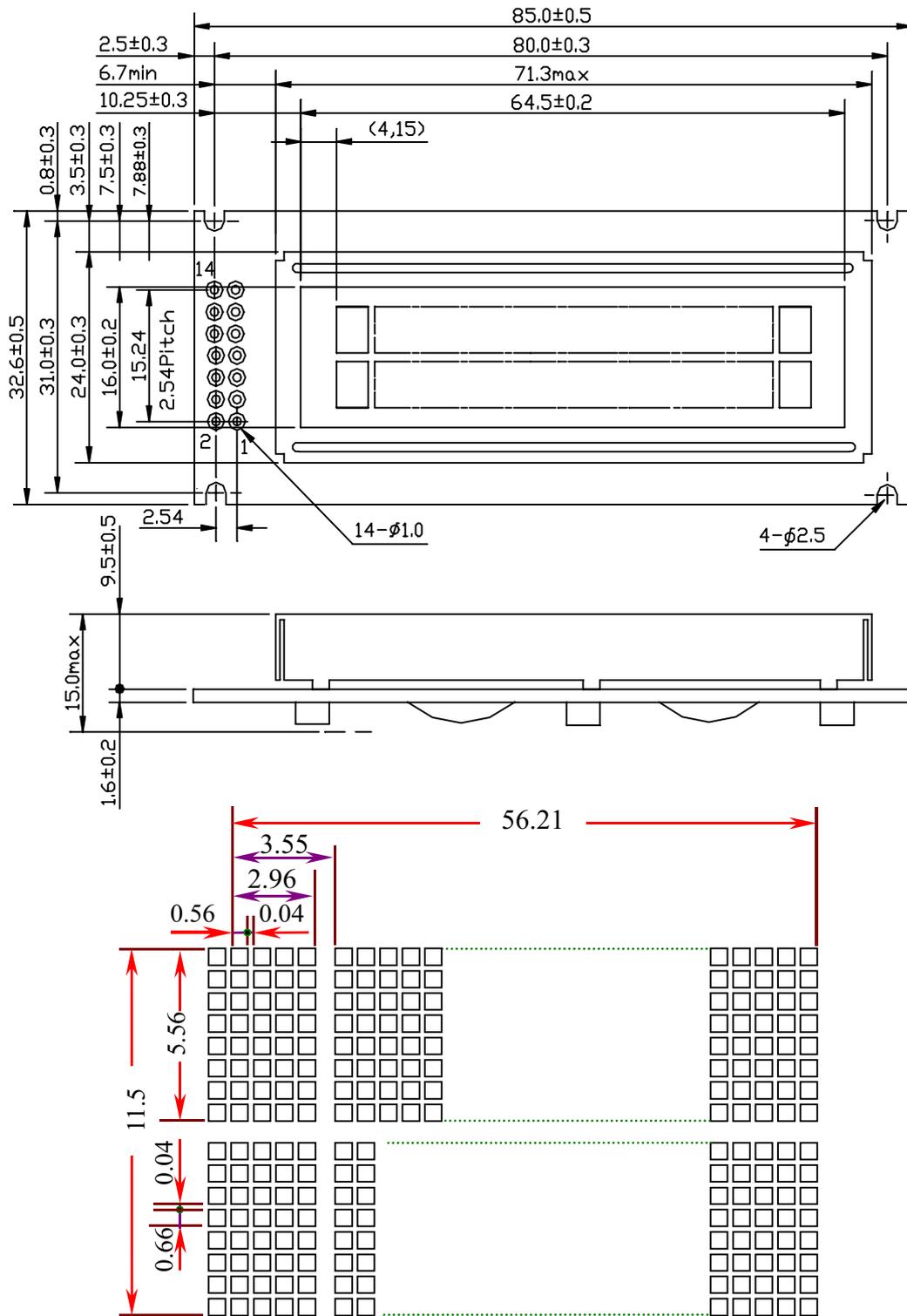
$$T_a = 25\text{ }^\circ\text{C} \quad V_{DD} = 5.0\text{V}$$

<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	Φ2-Φ1	K = 2.0	30	40	-----	deg.	2
CONTRAST RATIO	K	Φ = 10° θ = 0°	3.0	4.0	-----	-----	2
RESPONSE TIME	t <sub>r</sub> (rise)	Φ = 10° θ = 0°	-----	200	350	ms	2
	t <sub>f</sub> (fall)	Φ = 10° θ = 0°	-----	300	400	ms	2
BRIGHTNESS FOR LED BACKLIGHT	B	Φ = 0° θ = 0°	5.0	-----	-----	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.

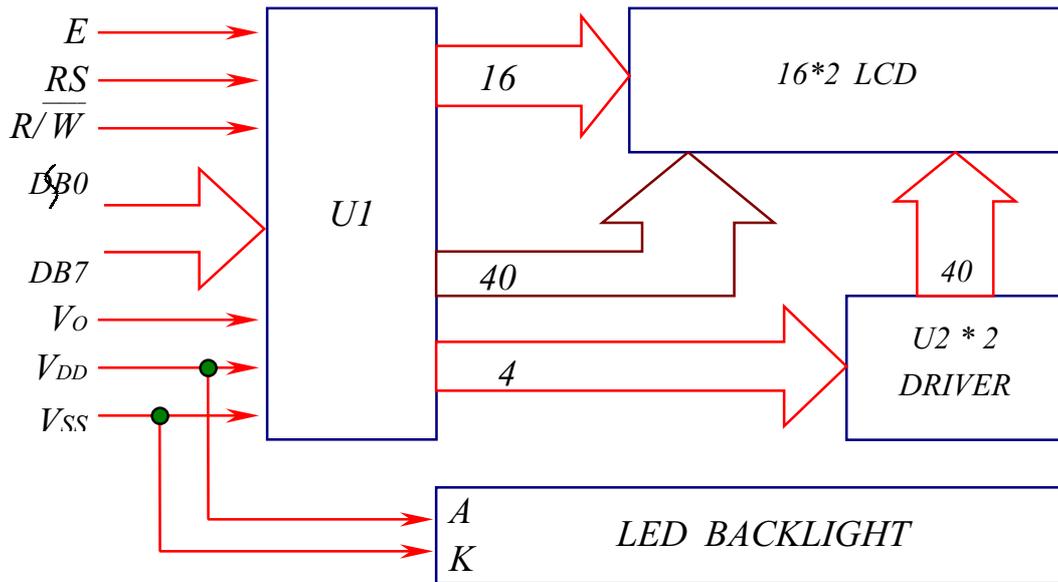
## 8. Outline dimension



### Interface pin connection

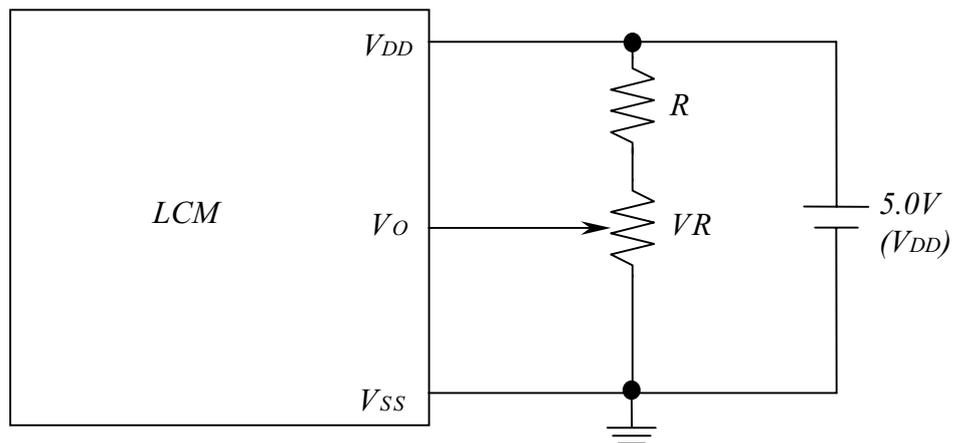
<b>PIN NO.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
SYMBOL	V <sub>SS</sub>	V <sub>DD</sub>	V <sub>O</sub>	RS	R/W	E	DB0
<b>PIN NO.</b>	<b>9</b>	<b>8</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
SYMBOL	DB1	DB2	DB3	DB4	DB5	DB6	DB7

### 9. Block diagram



Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
LINE 2	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F

### 10. Power supply for LCM



RECOMMENDED RESISTOR R:  $V_{DD}-V_0 \geq 1.5V$   
 $V_{DD}-V_0$ : LCD DRIVING VOLTAGE  
 VR:  $10K\Omega \sim 20K\Omega$