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# EVERBOUQUET INTERNATIONAL CO., LTD.

PART NO. : MC1604D9-SBLW

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

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

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



## RECORD OF REVISION

<i>DATE</i>	<i>PAGE</i>	<i>SUMMARY</i>
2002/6/27	5/7	5.Modify the electrical characteristics : ILED (TYP.)=45mA→70mA , ILED (MAX.)=60mA→100mA °
2002/8/01	5/7	5.Modify the electrical characteristics : VLED = 5.0V→4.0V ILED (TYP.)=70mA→45mA , ILED (MAX.)=100mA→60mA °
	6/7	8.Modify outline dimension
	7/7	10.Modify power supply for LCM

### **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 \* 4 LINE
- (2) MODULE SIZE -----77.0 W \* 51.0 H \* 10.0 T (Max) mm
- (3) EFFECTIVE AREA -----61.8 W \* 25.2 H mm
- (4) CHARACTER PATTERN -----5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE-----2.95 W \* 4.15 H mm
- (6) CHARACTER PITCH -----3.55 mm
- (7) DOT SIZE -----0.55 W \* 0.55 H mm
- (8) DOT PITCH-----0.60 W \* 0.60 H mm
- (9) VIEWING DIRECTION -----6 O’CLOCK
- (10) LCD TYPE-----STN.BLUE/NEGATIVE.TRANSMISSIVE
- (11) LED 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)
POWER SUPPLY FOR LED BACKLIGHT	V <sub>LED</sub>	-----	6.0	V	-----

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

Ta = 25°C VDD = 5.0 ± 0.25 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	V <sub>OH</sub>	-I <sub>OH</sub> = 0.2 mA	2.4	-----	-----	V	
	V <sub>OL</sub>	I <sub>OH</sub> = 1.2 mA	-----	-----	0.4	V	
POWER SUPPLY CURRENT	I <sub>DD</sub>	V <sub>DD</sub> = 5.0 V	-----	1.5	2.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE NOTE (1)	V <sub>DD</sub> -V <sub>O</sub>	DUTY= 1/16 Φ=10° θ=0°	Ta=0°C	-----	4.7	-----	V
			Ta=25°C	-----	4.5	-----	V
			Ta=50°C	-----	4.3	-----	V
POWER SUPPLY CURRENT FOR LED BACKLIGHT	I <sub>LED</sub>	 V <sub>LED</sub> =4.0V	-----	 45	 60	mA	

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

## 7. Optical characteristics

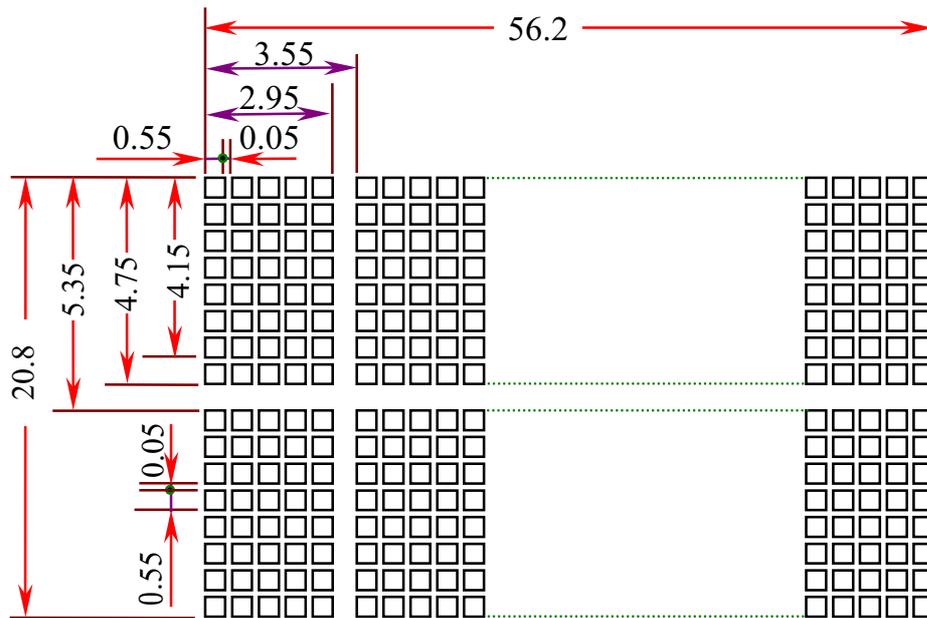
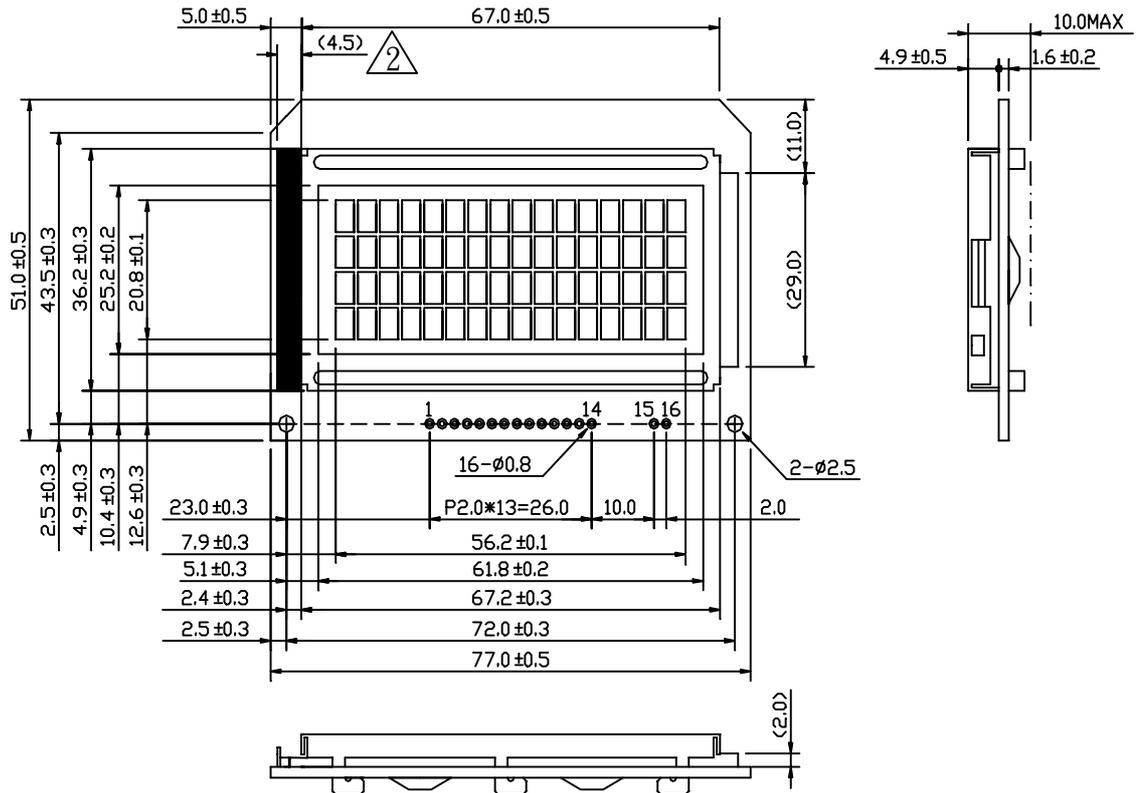
Ta = 25°C V<sub>DD</sub>-V<sub>O</sub> = 4.5V

<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	Φ <sub>2</sub> -Φ <sub>1</sub>	K = 2.0 θ = 0°	30	40	-----	deg.	1
CONTRAST RATIO	K	Φ = 10° θ = 0°	3	4	-----	-----	1
RESPONSE TIME	tr (rise)	Φ = 10° θ = 0°	-----	200	350	ms	1
	tf (fall)	Φ = 10° θ = 0°	-----	300	400	ms	1
BRIGHTNESS FOR LED BACKLIGHT	B	Φ = 0° θ = 0° I <sub>LED</sub> =45mA	6.0	-----	-----	cd/m <sup>2</sup>	1,2

NOTE (1): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

NOTE (2): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

## 8. Outline dimension

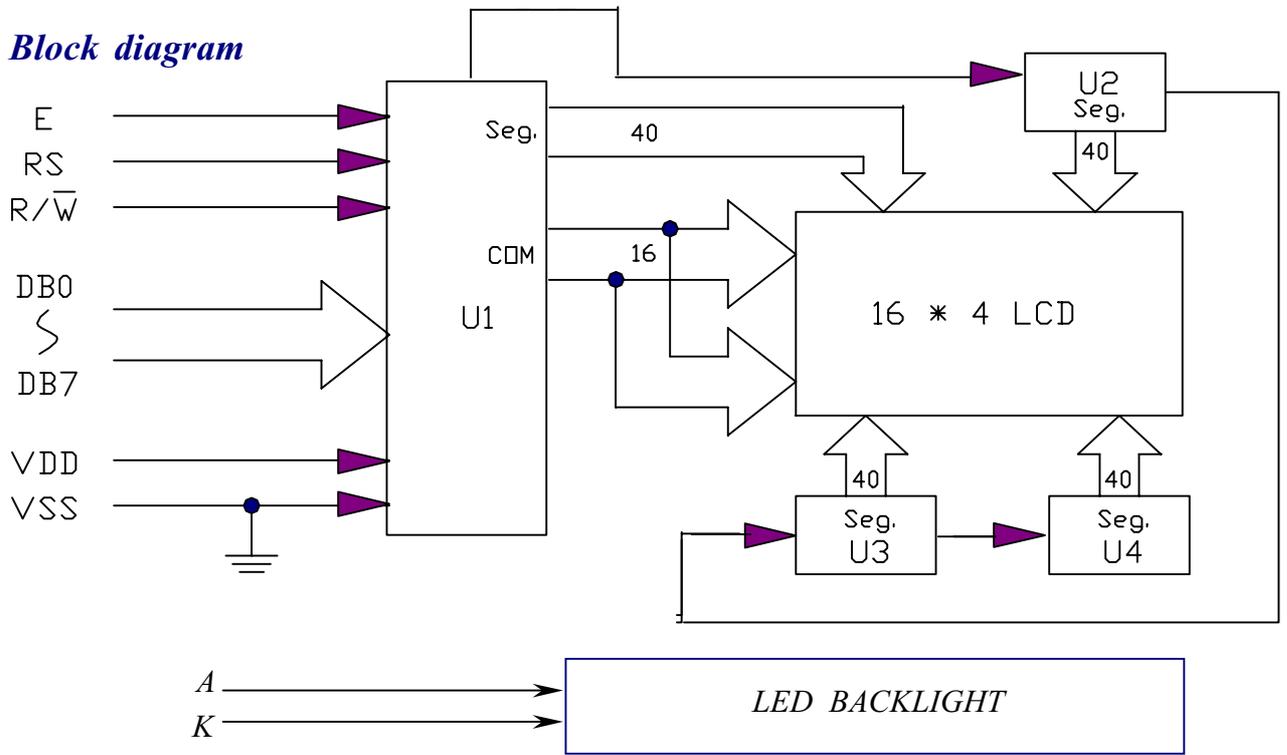


UNIT:mm  
SCALE:NTS

### 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	A	K

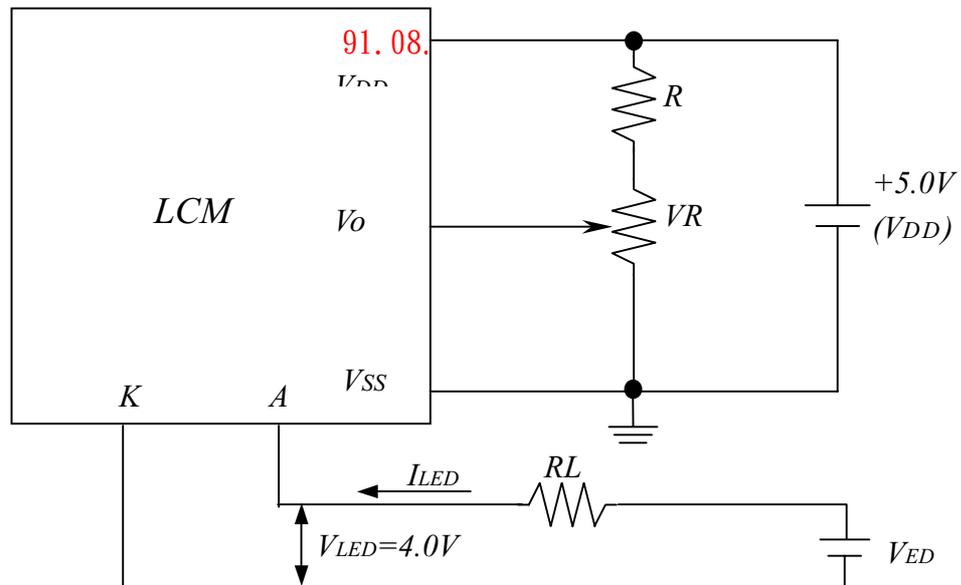
### 9. Block diagram



### Display data address charts

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
LINE 3	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
LINE 4	50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F

### 10. Power supply for LCM $\triangle$



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

$RL \geq ((V_{ED} - 4.0V) / I_{LED})$ ,  $1/2W$ ,  $I_{LED} \leq 60mA$

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

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