



# EVERBOUQUET INTERNATIONAL CO., LTD.

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PART NO. : MC1602X-SYR

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

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

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

**RECORD OF REVISION**

<b>DATE</b>	<b>PAGE</b>	<b>SUMMARY</b>

### **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 -----59.0 W \* 29.3 H \* 4.5 T (Max) mm
- (3) EFFECTIVE AREA -----52.0 W \* 15.0 H mm
- (4) CHARACTER PATTERN-----5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE-----2.45 W \* 4.08 H mm
- (6) CHARACTER PITCH -----2.95 mm
- (7) DOT SIZE-----0.45 W \* 0.54 H mm
- (8) DOT PITCH -----0.50 W \* 0.59 H mm
- (9) VIEWING DIRECTION-----6 O’CLOCK
- (10) LCD TYPE-----STN.YELLOW-GREEN.REFLECTIVE.

## 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: 85% RH MAX.

Ta > 50°C: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 85% RH AT 50°C. (50% RH AT 60°C)

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

## 6. Electrical characteristics

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

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	
POWER SUPPLY VOLTAGE FOR CIRCUIT	$V_{DD}-V_{SS}$	-----	4.75	5.0	5.25	V	
INPUT VOLTAGE	$V_{IH}$	-----	2.2	-----	-----	V	
	$V_{IL}$	-----	-----	-----	0.6	V	
OUTPUT VOLTAGE	$V_{OH}$	$-I_{OH} = 0.2\text{ mA}$	2.4	-----	-----	V	
	$V_{OL}$	$I_{OL} = 1.2\text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT	$I_{DD}$	$V_{DD} = 5.0\text{V}$	-----	1.5	2.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE	$V_{DD}-V_O$	DUTY= 1/16 $\Phi=10^\circ$	$T_a=0^\circ\text{C}$	-----	4.9	-----	V
			$T_a=25^\circ\text{C}$	-----	4.5	-----	V
			$T_a=50^\circ\text{C}$	-----	4.1	-----	V

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

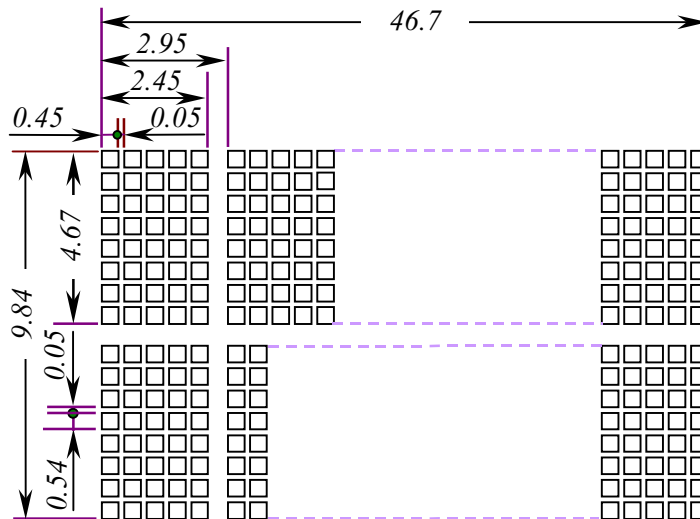
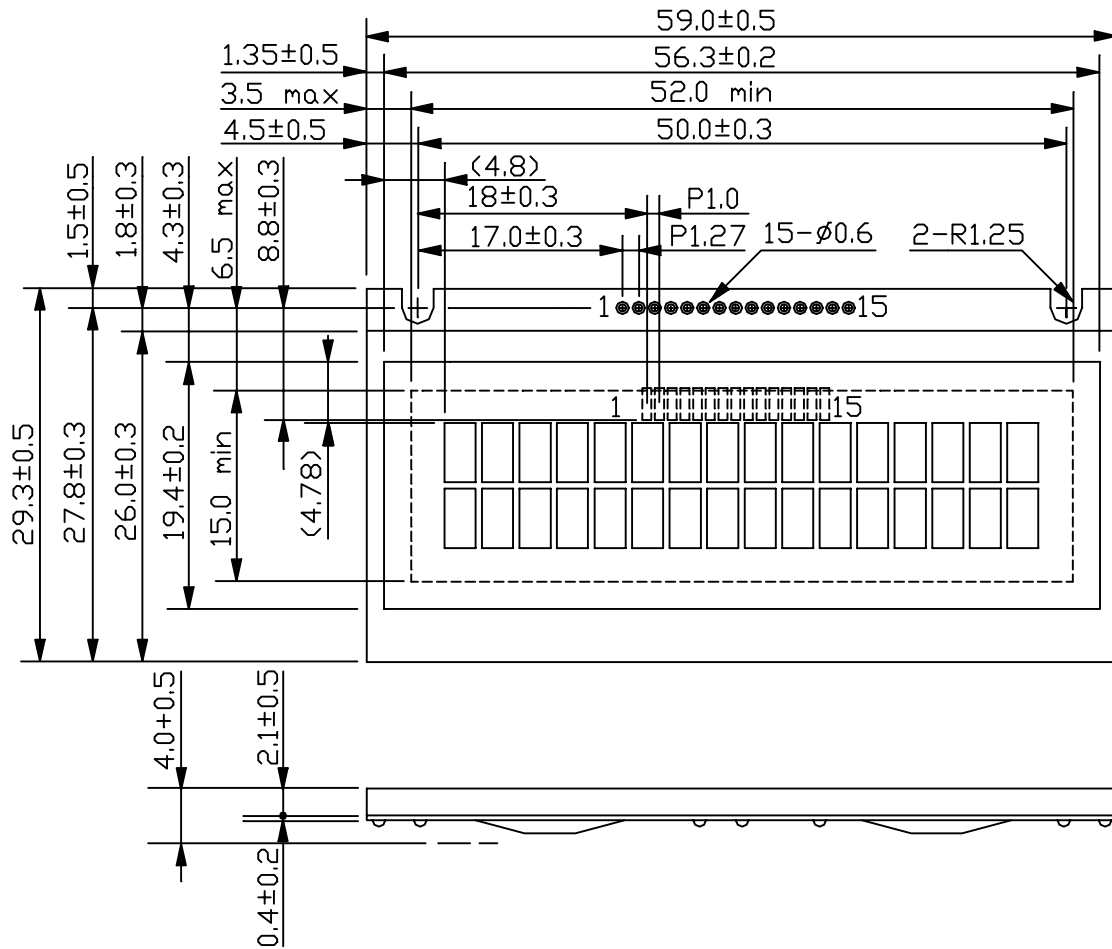
## 7. Optical characteristics

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

<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	$\Phi = 10^\circ$ $\theta = 0^\circ$	3	4	-----	-----	2
RESPONSE TIME	tr (rise)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	200	350	ms	2
	tf (fall)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	300	400	ms	2

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

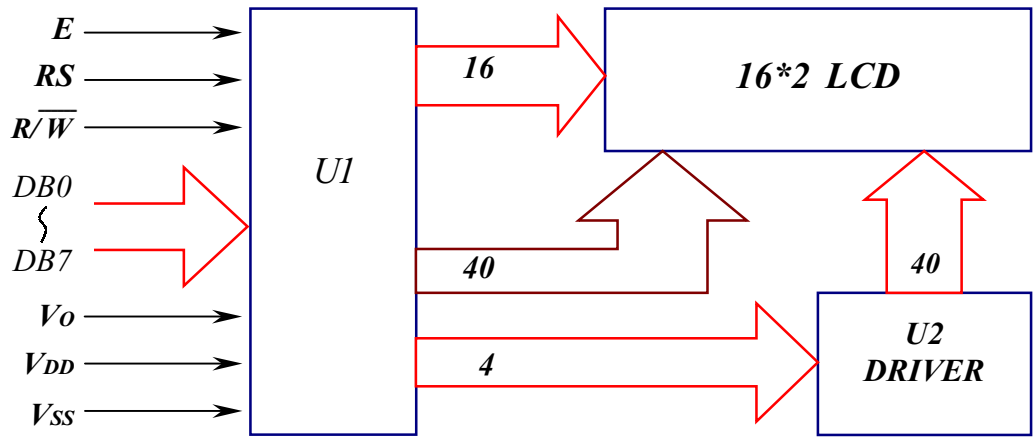
## 8. Outline dimension



### 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	N.C	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>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
SYMBOL	DB1	DB2	DB3	DB4	DB5	DB6	DB7	

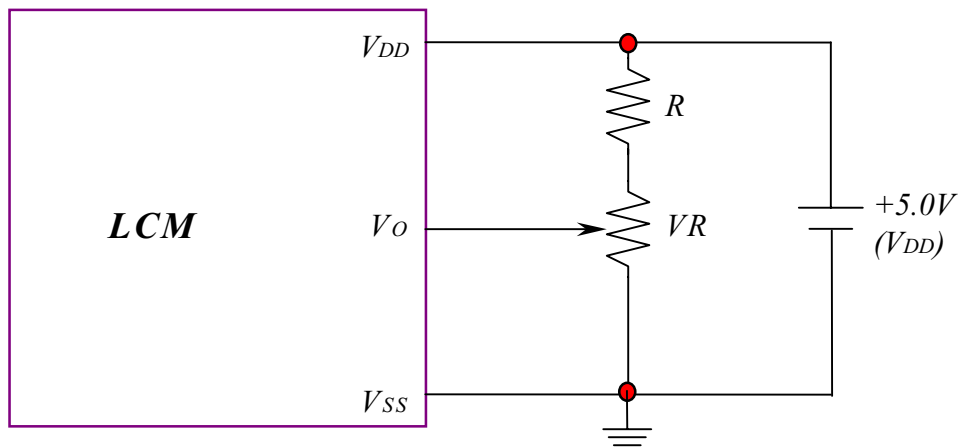
### 9. Block diagram



### Display data address charts

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

### 10. Power supply for LCM



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