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# EVERBOUQUET INTERNATIONAL CO., LTD.

PART NO. : MG12064E3-SERIES

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-10-61202)”.

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

#### 3.3 NUMBERING SYSTEM

<b>MG12064E3</b>	-	<table border="1"><tr><td>S</td><td>Y</td><td>M</td><td>L</td><td>W</td><td>U</td></tr></table>	S	Y	M	L	W	U
S	Y	M	L	W	U			
		(1)	(2)	(3)	(4)	(5)	(6)	

(1).LCD TYPE :

“S” : STN TYPE

“F” : FSTN TYPE

(2).LCD COLOR :

“Y” : YELLOW-GREEN      “B” : BLUE(STN/NEGATIVE)/BLACK(FSTN/NEGATIVE)

“G” : GRAY      “W” : WHITE(FSTN/POSITIVE)

(3).LCD POLARIZE TYPE

“nil” : TRANSFLECTIVE

“M” : TRANSMISSIVE

(4).BACKLIGHT TYPE :

“L” : LED BACKLIGHT

(5).BACKLIGHT COLOR :

LED TYPE :

“nil” : YELLOW-GREEN      “A” : AMBER      “B” : BLUE

“G” : PURE-GREEN      “O” : ORANGE      “R” : RED

“W” : WHITE

(6).VIEWING DIRECTION :

“nil” : 6 O’CLOCK      “3” : 3 O’CLOCK

“U” : 12 O’CLOCK      “9” : 9 O’CLOCK

#### ***4. Mechanical data***

- (1) NUMBER OF DOTS----- 128 CH \* 64 DOTS
- (2) MODULE SIZE ----- 63.2 W \* 54.0 H \* 9.5 T (max) mm
- (3) EFFECTIVE AREA----- 54.0 W \* 36.0 H mm
- (4) ACTIVE AREA ----- 49.88 W \* 31.32 H
- (5) DOT SIZE----- 0.35 W \* 0.45 H mm
- (6) DOT PITCH----- 0.39 W \*0.49 H mm

## 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	V <sub>LED</sub>	-----	NOTE(2)	V	-----

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

NOTE (2):

<i>SYMBOL</i>	<i>V<sub>LED</sub> MAX.</i>	<i>LED TYPE</i>
V <sub>LED</sub>	5.5V	YELLOW-GREEN,AMBER,ORANGE,RED
	5.0V	WHITE, BLUE, PURE-GREEN

### 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	-20	70	-20	70	-----
HUMIDITY	NOTE (3)		NOTE (3)		NO CONDENSATION
VIBRATION NOTE (4)	-----	0.5G	-----	2G	10 300HZ XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (4)	-----	3G	-----	50G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		-----

NOTE (3): T<sub>a</sub> ≤ 50 : 90% RH MAX.

T<sub>a</sub> > 50 : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50 . (80%RH AT 60 )

NOTE (4): 1G = 9.8 m/s<sup>2</sup>

## 6. Electrical characteristics

$T_a = 25$

$V_{DD} = 5.0 \pm 0.25 V$

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	
POWER SUPPLY VOLTAGE FOR CIRCUIT	$V_{DD}-V_{SS}$	-----	4.75	5.0	5.25	V	
INPUT VOLTAGE NOTE (2)	$V_{IH}$	H LEVEL	$0.7V_{DD}$	-----	$V_{DD}$	V	
	$V_{IL}$	L LEVEL	$V_{SS}$	-----	$0.3V_{DD}$	V	
OUTPUT VOLTAGE NOTE (1)	$V_{OH}$	$I_{OH} = -0.4 \text{ mA}$	$V_{DD}-0.4$	-----	-----	V	
	$V_{OL}$	$I_{OL} = 0.4 \text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT, NOTE (3)	$I_{DD}$	$V_{DD}-V_{SS} = 5.0V$	-----	5.0	8.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(4)	$V_{DD}-V_O$	STN/ FSTN DUTY =1/64 =10° NOTE(5)	$T_a = -20^\circ C$	-----	9.3	-----	V
			$T_a = 25^\circ C$	-----	8.9	-----	V
			$T_a = 70^\circ C$	-----	8.5	-----	V
POWER SUPPLY CURRENT FOR LED	$I_{LED}$	NOTE(6)	-----	NOTE(6)	NOTE(6)	mA	

NOTE(1): APPLIED TO TERMINALS DB0~DB7

(2): APPLIED TO TERMINALS  $\overline{D/I}$ ,  $\overline{R/W}$ , E, DB0~DB7, CS1, CS2,  $\overline{RST}$

(3): THE DISPLAY PATTERN IS ALL "ON", OR ALL "OFF"

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

(5):  $= 0^\circ$  : VIEWING DIRECTION AT 6 O'CLOCK

$= 180^\circ$  : VIEWING DIRECTION AT 12 O'CLOCK

(6): LED CURRENT FOR DIFFERENT LED BACKLIGHT TYPE

<i>LED B.L TYPE</i>	<i>CONDITION</i>	<i>I<sub>LED</sub></i>				<i>LED COLOR</i>
		<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT.</i>	
A	$V_{LED} = 4.8V$	-----	75	100	mA	YELLOW-GREEN, AMBER, ORANGE, RED
B	$V_{LED} = 4.0V$	-----	150	200	mA	BLUE, WHITE, PURE-GREEN

## 7. Optical characteristics

### STN TYPE LCD

$T_a = 25$

$V_{DD}-V_O = 8.9V$

<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	2- 1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	= 10° NOTE(1)	3.0	4.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	= 10° NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	= 10° NOTE(1)	----	300	400	ms	NOTE(2)

### FSTN, STN BLUE TYPE LCD

$T_a = 25$

$V_{DD}-V_O = 8.9V$

<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	2- 1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	= 10° NOTE(1)	4.0	5.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	= 10° NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	= 10° NOTE(1)	----	300	400	ms	NOTE(2)

### Brightness for LED backlight

<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
B	= 0° = 0°	5.0	----	----	cd/m <sup>2</sup>	NOTE(2) NOTE(3)

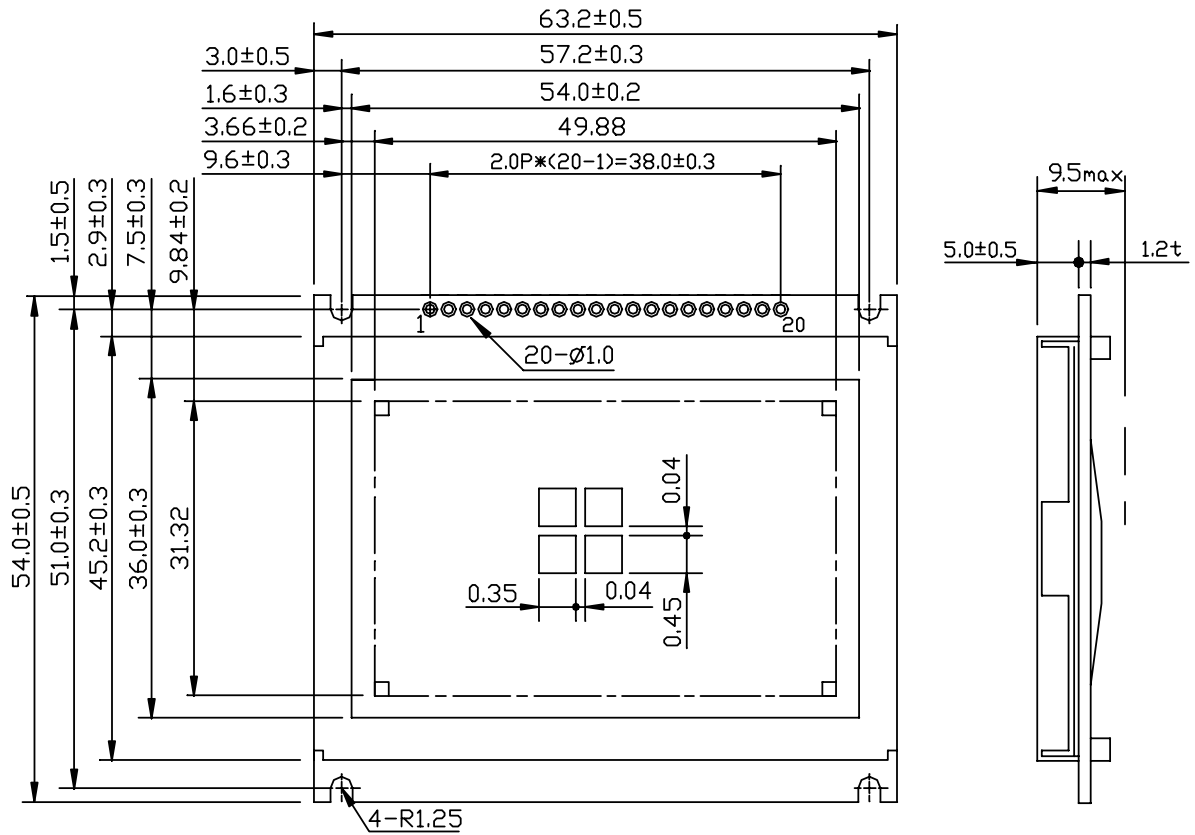
NOTE (1): = 0° : VIEWING DIRECTION AT 6 O'CLOCK

= 180° : VIEWING DIRECTION AT 12 O'CLOCK

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



NOTE :

1.UNIT : mm

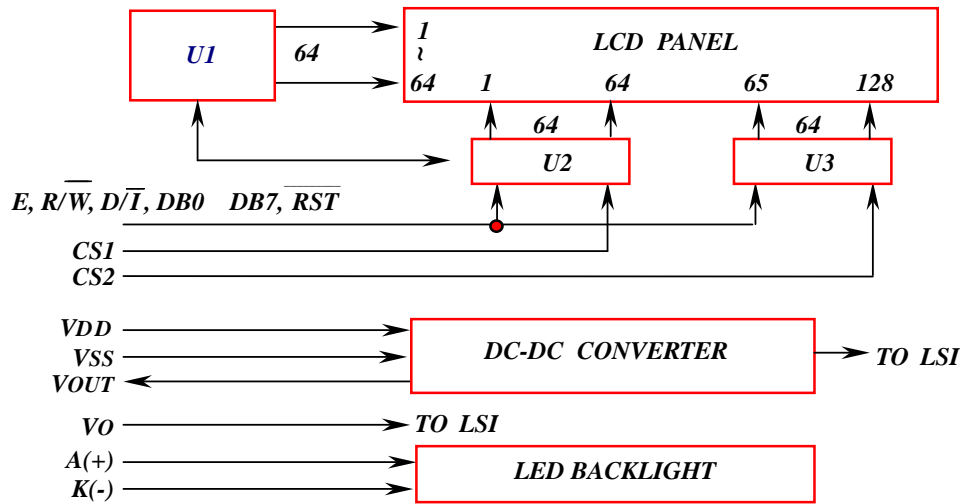
2.SCALE : NTS



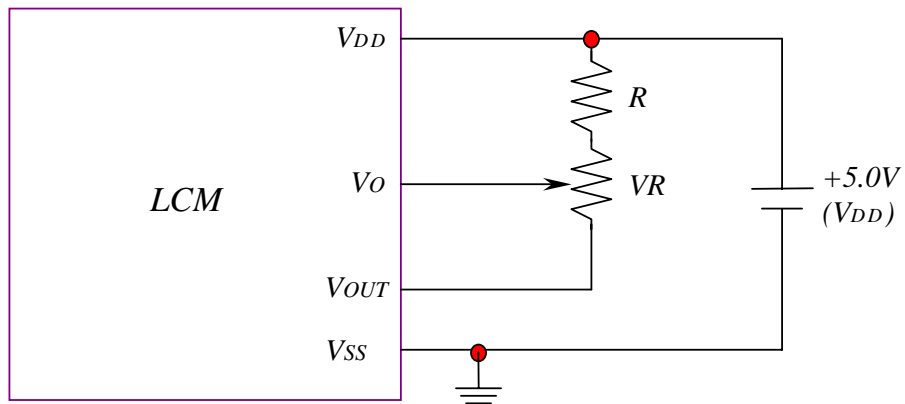
### *Interface pin connection*

PIN NO.	SYMBOL	FUNCTION
1	V <sub>SS</sub>	GROUND
2	V <sub>DD</sub>	POWER SUPPLY FOR LOGIC
3	V <sub>O</sub>	OPERATING VOLTAGE FOR LCD DRIVING
4	D/ $\bar{I}$	H: DATA INPUT L: INSTRUCTION CODE INPUT
5	$\overline{R/W}$	H: DATA READ (LCD MODULE MPU) L: DATA WRITE (LCD MODULE MPU)
6	E	ENABLE SIGNAL
7	DB0	DATA INPUT/OUTPUT (LSB)
8	DB1	DATA INPUT/OUTPUT
9	DB2	DATA INPUT/OUTPUT
10	DB3	DATA INPUT/OUTPUT
11	DB4	DATA INPUT/OUTPUT
12	DB5	DATA INPUT/OUTPUT
13	DB6	DATA INPUT/OUTPUT
14	DB7	DATA INPUT/OUTPUT (MSB)
15	CS1	H: CHIP SELECTION FOR IC1
16	CS2	H: CHIP SELECTION FOR IC2
17	$\overline{RST}$	L: RESET
18	V <sub>OUT</sub>	POWER SUPPLY FOR LCD DRIVING
19	A(+)	POWER SUPPLY FOR LED (+)
20	K(-)	POWER SUPPLY FOR LED (-)

## 9. Block diagram



## 10. Power supply for LCM

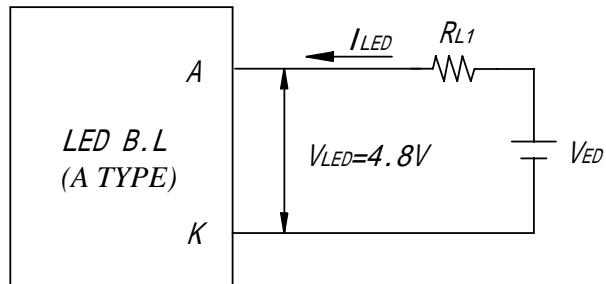


RECOMMENDED RESISTOR R:  $V_{DD} - V_O \cdot 1.5V$

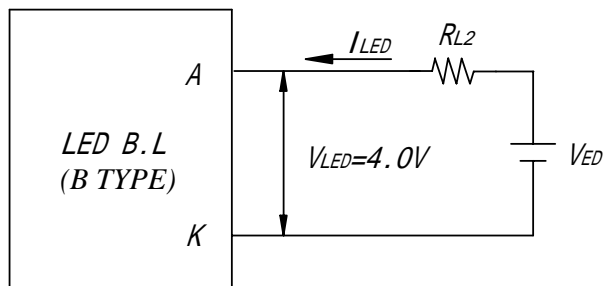
$V_{DD} - V_O$ : LCD DRIVING VOLTAGE

VR: 10K ~20K

### 10.1 Power supply for backlight



$R_{L1} = (V_{ED} - V_{LED}) / I_{LED}$ ,  $R_{L1} = 1W$ ,  $I_{LED} = 100.0 \text{ mA (max)}$



$R_{L2} = (V_{ED} - V_{LED}) / I_{LED}$ ,  $R_{L2} = 1W$ ,  $I_{LED} = 200.0 \text{ mA (max)}$