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EVERBOUQUET INTERNATIONAL CO., LTD.

PART NO. :   MG12064E3-SERIES

FOR MESSRS. :

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92.09.03

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

MG12064E3	-	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 T E M	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	V_{DD}-V_{SS}	0	6.0	V	-------
INPUT VOLTAGE	V_I	V_{SS}	V_{DD}	V	-------
STATIC ELECTRICITY	-------	-------	100	V	NOTE (1)
POWER SUPPLY FOR LED	V_{LED}	------	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):

SYMBOL	V_{LED} MAX.	LED TYPE
$\mathbf{V}_{LED}$	5.5V	YELLOW-GREEN,AMBER,ORANGE,RED
	5.0V	WHITE, BLUE, PURE-GREEN

5.2 Environmental absolute maximum ratings

I T E M	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
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): Ta   50 : 90% RH MAX.
   Ta   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^2

6. Electrical characteristics   Ta = 25 V_{DD} = 5.0 $\pm$0.25 V

I T E M	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
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 mA		V_{DD}-0.4	-------	-------	V
	V_{OL}	I_{OL} = 0.4 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)	Ta=-20°C	------	9.3	------	V
			Ta= 25°C	------	8.9	------	V
			Ta= 70°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 D/$\overline{I}$, R/$\overline{W}$, 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
       ±0.5V BY EACH MODULE.

   (5):   = 0°   VIEWING DIRECTION AT 6 O'CLOCK
          = 180°   VIEWING DIRECTION AT 12 O'CLOCK

   (6): LED CURRENT FOR DIFFERENT LED BACKLIGHT TYPE

LED B.L TYPE	CONDITION	I_{LED}				LED COLOR
		MIN.	TYP.	MAX.	UNIT.	
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 $Ta = 25$ $V_{DD}\text{-}V_O = 8.9V$

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
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 $Ta = 25$ $V_{DD}\text{-}V_O = 8.9V$

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
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

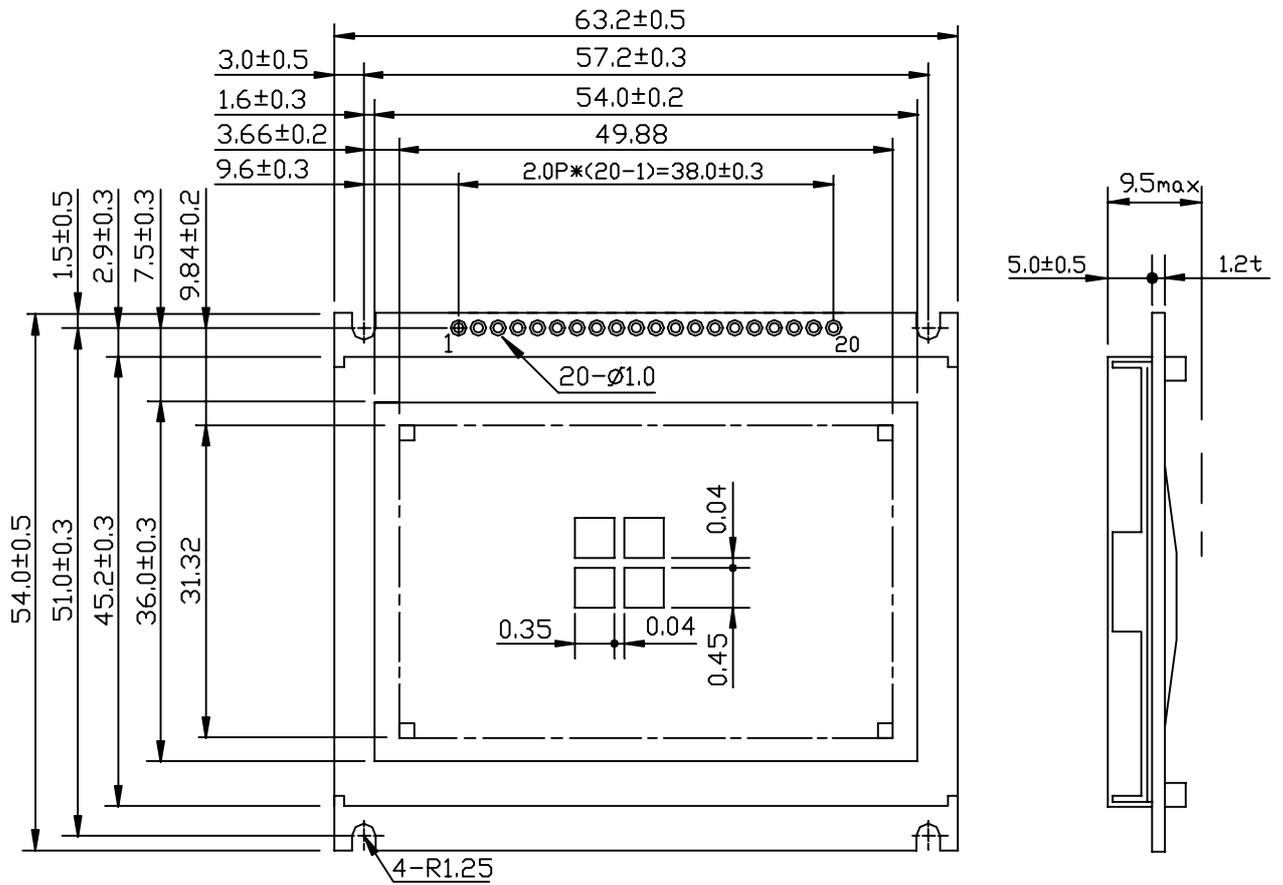| SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
B	= 0° = 0°	5.0	----	----	cd/m^2	NOTE(2) NOTE(3)

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.
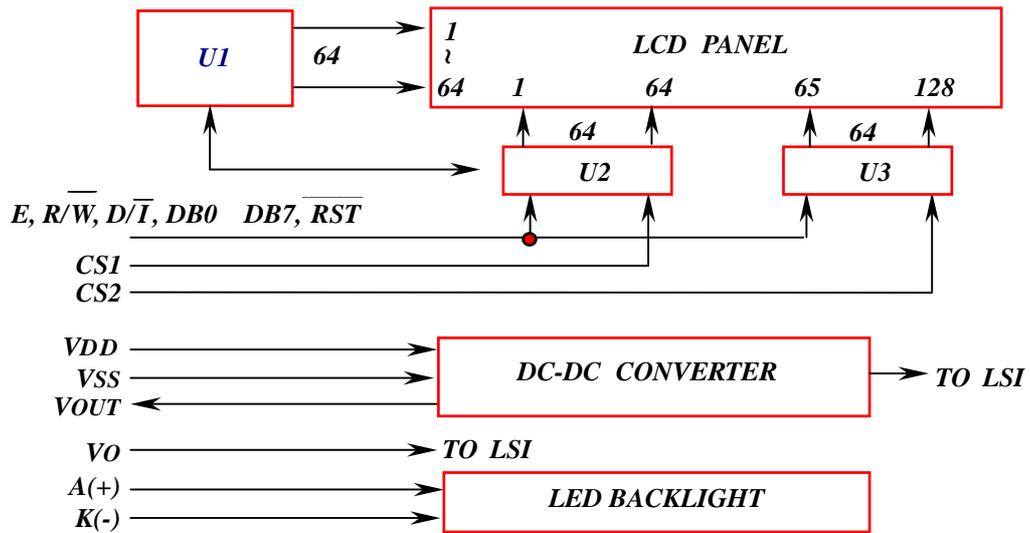
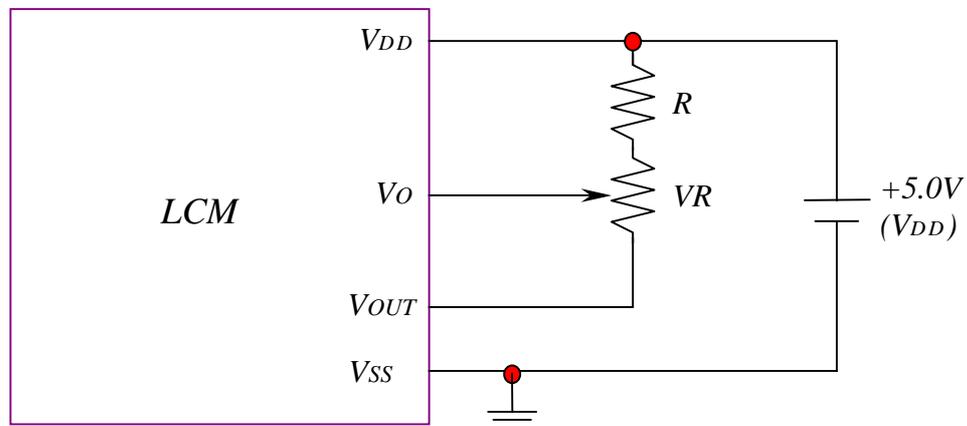# 8. Outline dimension

NOTE :
 1.UNIT : mm
 2.SCALE : NTS

Interface pin connection

PIN NO.	SYMBOL	FUNCTION
1	V_{SS}	GROUND
2	V_{DD}	POWER SUPPLY FOR LOGIC
3	V_O	OPERATING VOLTAGE FOR LCD DRIVING
4	D/$\overline{I}$	H: DATA INPUT L: INSTRUCTION CODE INPUT
5	R/$\overline{W}$	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_{OUT}	POWER SUPPLY FOR LCD DRIVING
19	A(+)	POWER SUPPLY FOR LED (+)
20	K(-)	POWER SUPPLY FOR LED (-)

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9. Block diagram

E, R/$\overline{W}$, D/$\overline{I}$, DB0 DB7, $\overline{RST}$

CS1
CS2

VDD
VSS
VOUT

DC-DC CONVERTER → TO LSI

VO → TO LSI

A(+)
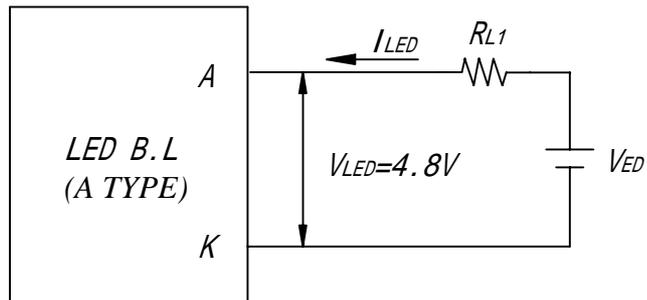K(-)

LED BACKLIGHT

10. Power supply for LCM
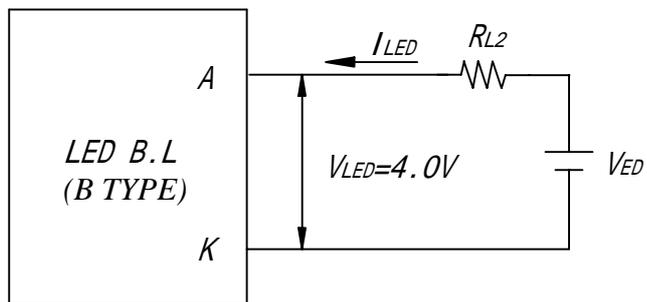

RECOMMENDED RESISTOR R: V$_{DD}$ – V$_{O}$ 1.5V

V$_{DD}$ – V$_{O}$: LCD DRIVING VOLTAGE

VR: 10K   ~20K

10.1 Power supply for backlight

RL1 ≥ (V_ED-V_LED) / I_LED , RL1 ≥ 1W , I_LED ≤ 100.0 mA (max)

RL2 ≥ (V_ED-V_LED) / I_LED , RL2 ≥ 1W , I_LED ≤ 200.0 mA (max)

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