



# EVERBOUQUET INTERNATIONAL CO., LTD.

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PART NO. : MGG1206D-SERIES

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

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

## RECORD OF REVISION

DATE	PAGE	SUMMARY
2004/12/27	P3	3. Add the backlight type "T" : TRANSFLECTIVE
	P4	4. Modify the module size (b) : 63.0W    56.0W
		4. Modify the dot size : 0.34W*0.34H    0.33W*0.33H
		4. Modify the dot pitch : 0.38W*0.38H    0.37W*0.37H
	P8~9	8. Modify the Outline dimension

### 3. General specifications

#### 3.1 General specifications

PLEASE REFER TO:

- a. "CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-10000)"
- b. "CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (IC-EM65565A)"

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

#### 3.3 Numbering System

**MGG1206D** - 

F	W	L	W	U
---	---	---	---	---

  
(1) (2) (3) (4) (5)

(1).LCD TYPE :

- "S" : STN TYPE
- "F" : FSTN TYPE

(2).LCD COLOR :

- "Y" : YELLOW-GREEN
- "G" : GRAY
- "B" : BLUE(STN/ NEGATIVE) / BLACK(FSTN/ NEGATIVE)
- "W" : WHITE(FSTN/ POSITIVE)

(3).BACKLIGHT TYPE :

- "L" : LED BACKLIGHT
- △ "T" : TRANSFLECTIVE
- "R" : REFLECTIVE

(4).BACKLIGHT COLOR :

- "nil" : YELLOW-GREEN    "A" : AMBER    "B" : BLUE
- "G" : GREEN    "O" : ORANGE    "R" : RED
- "W" : WHITE

(5).VIEWING ANGLE :

- "nil" : 6 O' CLOCK
- "U" : 12 O' CLOCK

#### 4. *Mechanical data*

(1) NUMBER OF DOT-----128 W\* 64 H DOTS

(2) MODULE SIZE -----(a) WITH B/L 65.0 W \* 39.2 H \* 5.0 T (max)mm

△ (b) WITHOUT B/L 56.0 W \* 37.7 H \* 2.1 T (max)mm

(3) EFFECTIVE AREA ----- 53.0 W \* 29.0 H mm

(4) ACTIVE AREA ----- 48.6 W \* 24.28 H mm

△ (5) DOT SIZE----- 0.33 W \* 0.33 H mm

△ (6) DOT PITCH----- 0.37 W \* 0.37 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>	-0.3	4.0	V	-----	
BOOSTER OUTPUT VOLTAGE	V <sub>OUT</sub>	-0.3	12.0	V	-----	
STATIC ELECTRICITY	-----	-----	100	V	NOTE(1)	
POWER SUPPLY FOR LED ( SINGLE COLOR )	V <sub>LED</sub>	-----	6.0	V	LED Color	Amber, Orange, Yellow-Green, Red
		-----	5.0	V		White, Blue, Pure Green

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	-20	70	-20	70	-----
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 : 90%RH MAX.

Ta > 50 : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE  
HUMIDITY OF 90% RH AT 50 . (80% RH AT 60 )

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

## 6. Electrical characteristics

$T_a = 25$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
POWER SUPPLY VOLTAGE FOR CIRCUIT	VDD-VSS	-----	2.4	-----	3.3	V	
BOOSTER OUTPUT VOLTAGE	VOUT	-----	6.0	-----	12.0	V	
VOLTAGE REGULATOR OPERATION VOLTAGE	V0	-----	4.5	-----	11.5	V	
BASE VOLTAGE	VREG	-----	2.06	2.15	2.24	V	
POWER SUPPLY CURRENT	IDD	VDD-VSS = 3.0 V	-----	220	290	$\mu$ A	
RECOMMENDED LCD DRIVING VOLTAGE,NOTE(1)	VO-VSS	DUTY =1/64 BIAS=1/9 = 10° NOTE(2)	Ta = -20	-----	-----	-----	V
			Ta = 0	-----	-----	-----	V
			Ta = 25	-----	(8.0)	-----	V
			Ta = 60	-----	-----	-----	V
			Ta = 70	-----	-----	-----	V
POWER SUPPLY CURRENT FOR LED	ILED	VLED=4.0V,NOTE(3)	-----	90	120	mA	
		VLED=5.0V,NOTE(3)	-----	60	80	mA	

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

(2): = 0° : VIEWING ANGLE AT 6 O' CLOCK  
= 180° : VIEWING ANGLE AT 12 O' CLOCK

(3):

TYPE	VLED	LED COLOR
<b>A</b>	4.0 V	WHITE、 BLUE、 PURE GREEN
<b>B</b>	5.0 V	AMBER、 YELLOW-GREEN 、 ORANGE、 RED

## 7. Optical characteristics

### STN TYPE LCD

Ta = 25

V<sub>O</sub>-V<sub>SS</sub> = 8.0V

ITEM	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 TYPE LCD

Ta = 25

V<sub>O</sub>-V<sub>SS</sub> = 8.0V

ITEM	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 backlight

SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	BACKLIGHT TYPE	NOTE
B	= 0°	5.0	-----	-----	cd/m <sup>2</sup>	TYPE A(LED COLOR: WHITE, BLUE, PURE GREEN )	NOTE(2)
	= 0° Ta = 25	4.0	-----	-----		TYPE B(LED COLOR: AMBER, YELLOW-GREEN , ORANGE, RED )	NOTE(3)

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

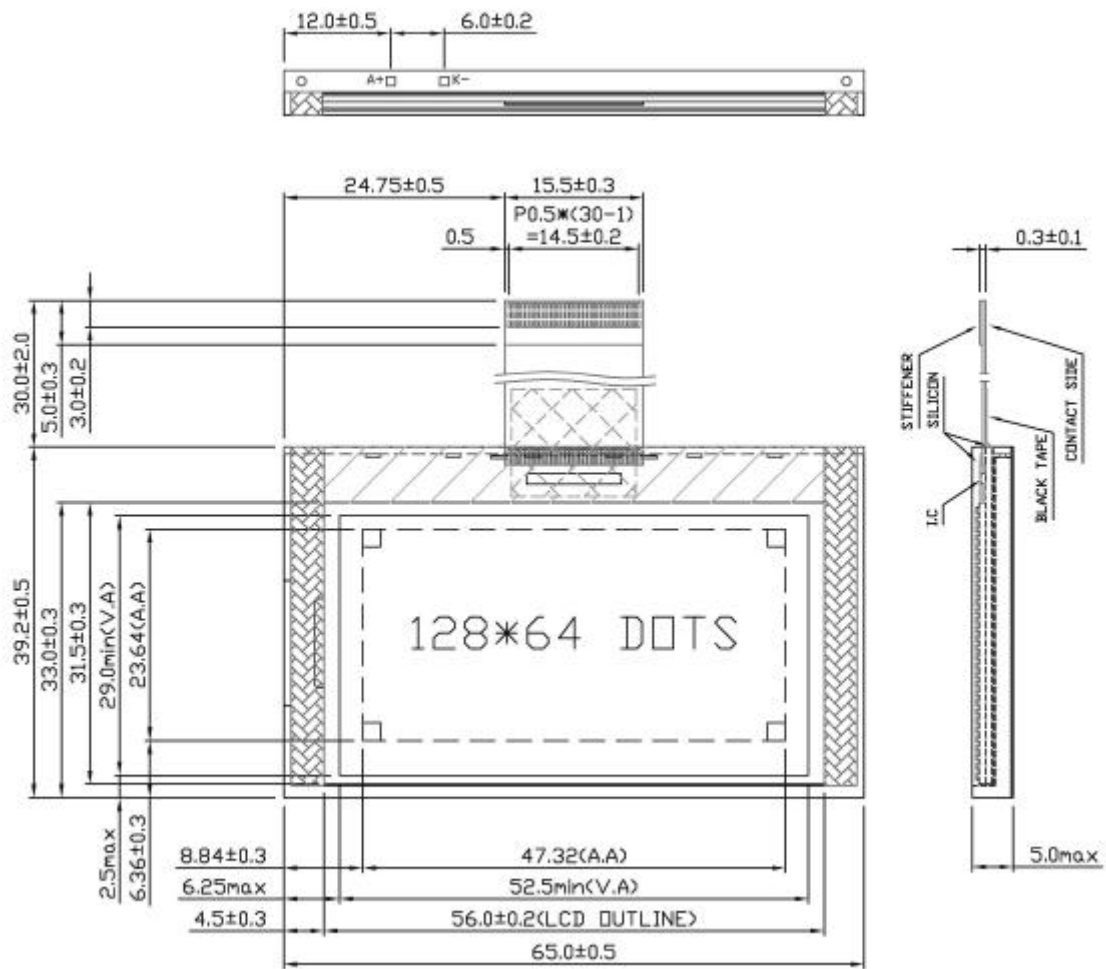
= 180° WHEN VIEWING ANGLE AT 12 O' CLOCK

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

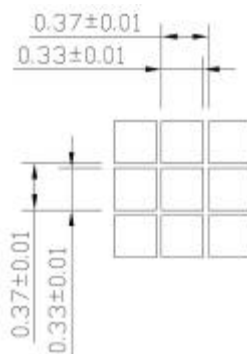
(3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

## 8. Outline dimension

### ① (a) With Backlight



DOT SIZE:



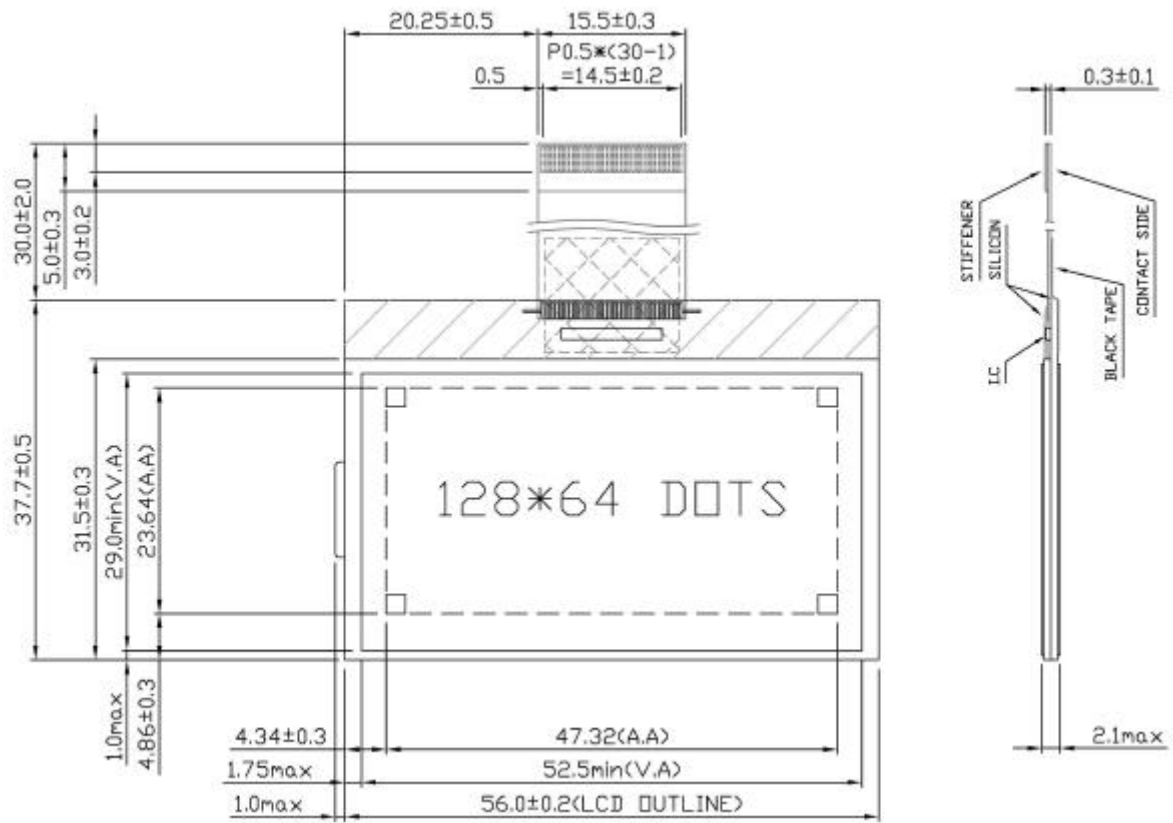
NOTE :

1.UNIT : mm

2.SCALE : NTS



**⚠ (b) Without Backlight**



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

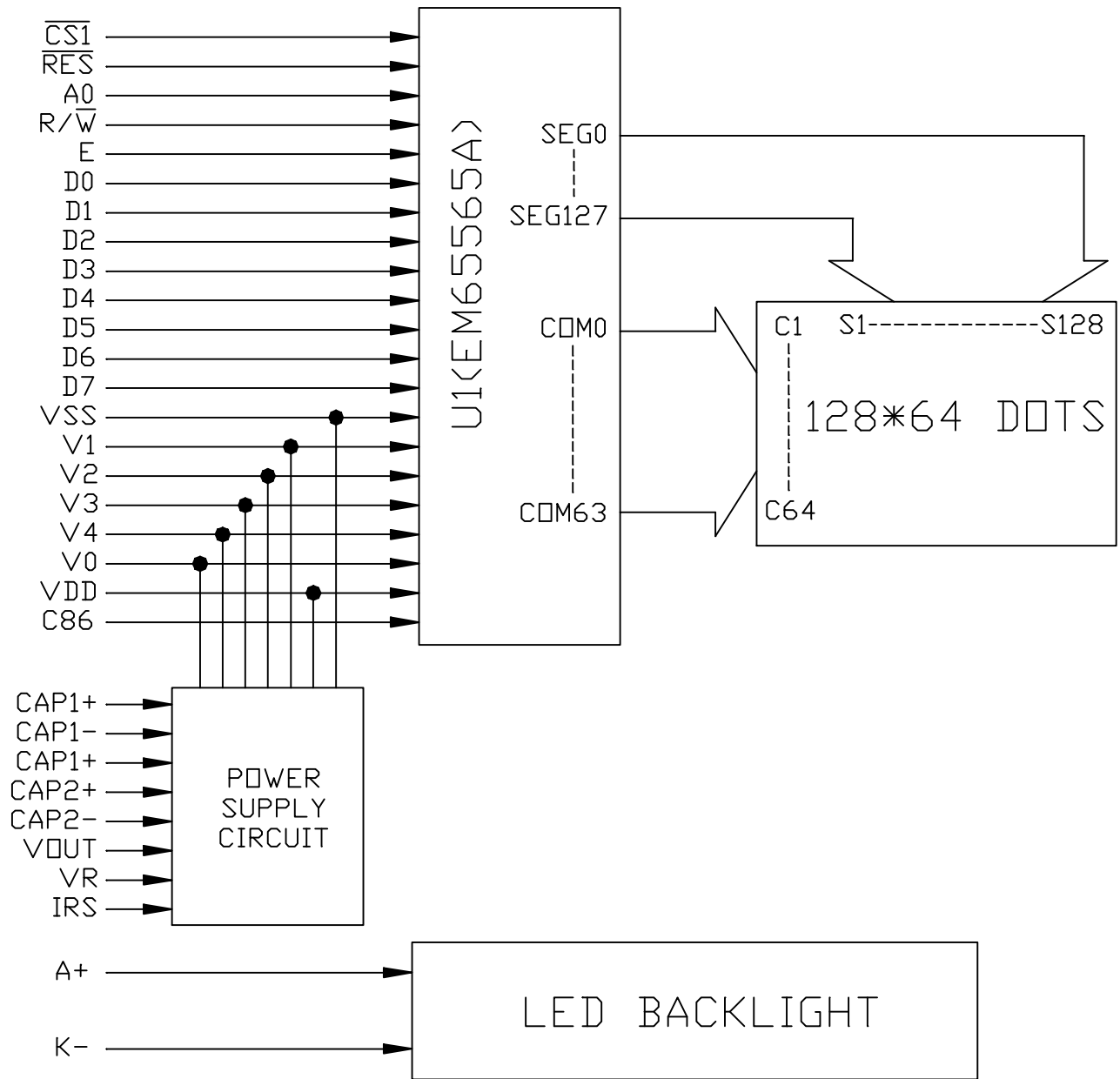
### 8.1 Interface connection

<b>PIN NO.</b>	<b>SYMBOL</b>	<b>FUNCTION</b>
1	$\overline{CS1}$	CHIP SELECT "L" → ACTIVE
2	$\overline{RES}$	"L" : RESET
3	A0	"L" :INSTRUCTION "H" :DISPLAY DATA
4	$\frac{R/\overline{W}}{WR}$	(When 8080-series) : $\overline{WR}$ IS "L" (When 6800-series) : Read mode → $R/\overline{W}$ IS "H" Write mode → $R/\overline{W}$ IS "L"
5	$\frac{E}{\overline{RD}}$	$\overline{RD}$ :(When to 8080-series) E : (When to 6800-series)
6	DB0	DATA INPUT/OUTPUT (LSB)
7	DB1	DATA INPUT/OUTPUT
8	DB2	DATA INPUT/OUTPUT
9	DB3	DATA INPUT/OUTPUT
10	DB4	DATA INPUT/OUTPUT
11	DB5	DATA INPUT/OUTPUT
12	DB6	DATA INPUT/OUTPUT
13	DB7	DATA INPUT/OUTPUT (MSB)
14	VSS	GROUND
15	VOUT	DC-DC VOLTAGE CONVERTER OUTPUT
16	CAP3+	INTERNAL DC/DC VOLTAGE CONVERTER
17	CAP1-	INTERNAL DC/DC VOLTAGE CONVERTER
18	CAP1+	INTERNAL DC/DC VOLTAGE CONVERTER
19	CAP2+	INTERNAL DC/DC VOLTAGE CONVERTER
20	CAP2-	INTERNAL DC/DC VOLTAGE CONVERTER
21	V1	LCD DRIVER SUPPLY VOLTAGES. THE VOLTAGE DETERMINED BY LCD CELL IS IMPEDANCE-CONVERTED BY A RESISTIVE DRIVER OR AN OPERATIONAL AMPLIFIER FOR APPLICATION. VOLTAGES SHOULD HAVE THE FOLLOWING RELATIONSHIP: $V_0 \quad V_1 \quad V_2 \quad V_3 \quad V_4 \quad V_{SS}$
22	V2	
23	V3	
24	V4	
25	V0	
26	VR	VOLTAGE ADJUSTMANT PAD.APPLIES VOLTAGE BETWEEN V0 AND VSS USING A RESISTIVE DIVIDER.
27	VDD	POWER SUPPLY INPUT
28	C86	"H" → 6800 SERIES "L" → 8080 SERIES
29	IRS	V0 VOLTAGE LEVEL ADJUSTMENT
30	VDD	POWER SUPPLY INPUT

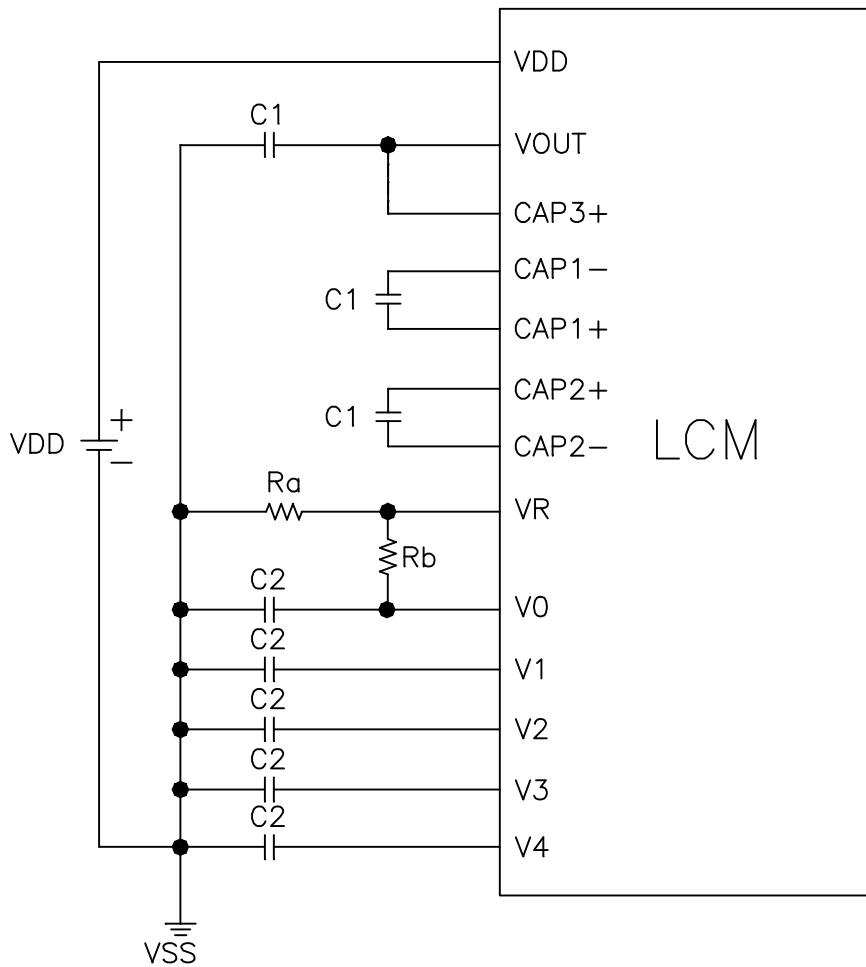
### 8.2 LED Backlight Interface connection:

<b>PIN NO.</b>	<b>SYMBOL</b>	<b>FUNCTION</b>
-----	A(+)	POWER SUPPLY FOR LED ANODE
-----	K(-)	POWER SUPPLY FOR LED CATHODE

### 9. Block diagram



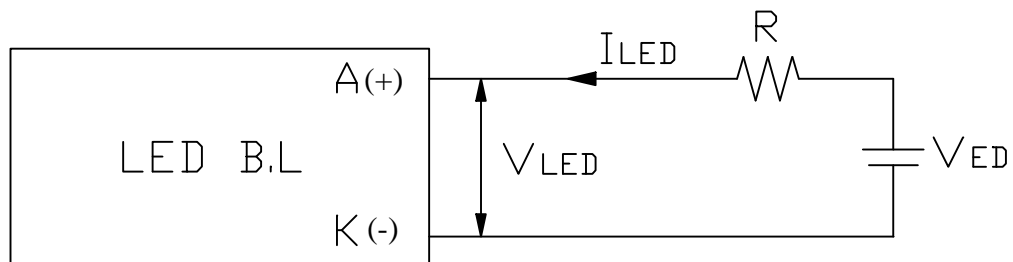
## 10. Power supply for LCM



NOTE:

1. RECOMMENDED VALUE OF CAPACITORS:  $C1 = 1.0 \sim 4.7 \mu\text{F}$   
 $C2 = 0.47 \sim 2.2 \mu\text{F}$
2.  $V_o = (1 + R_a/R_b) * (1 - (63 - X)/162) * V_R$ ,  $X = 0, 1, 2, \dots, 62, 63$

### 10.1 Power supply for backlight



TYPE	VLED	ILED (max)	THE VALUE OF R
A	4.0 V	100 mA	$(V_{ED} - V_{LED}) / I_{LED}$
B	5.0 V	80 mA	