EVER CATCHER GROUP
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PART NO. : MGG12A61BW-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:

a.*"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-10000)"*

b.*"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (IC-NT7538)"*

3.2 This individual specification is prior to general specifications

3.3 Numbering System

MGG12A61BW - F W L W

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

(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

"R" ： REFLECTIVE

(4).BACKLIGHT COLOR：

"nil" ： YELLOW-GREEN "A" ： AMBER "B" ： BLUE

"G" ： GREEN "O" ： ORANGE "R" ： RED

"W" ： WHITE

4. Mechanical data

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

(2) MODULE SIZE ---------- (a) WITH B/L 76.0 W * 49.0 H * 5.0 T (max) mm

(b) WITHOUT B/L 68.0 W * 47.3 H * 2.1 T (max)mm

(3) EFFECTIVE AREA---------- 64.5 W * 37.0 H mm

(4) ACTIVE AREA---------- 59.49 W * 29.73 H mm

(5) DOT SIZE---------- 0.435 W * 0.435 H mm

(6) DOT PITCH---------- 0.465 W * 0.465 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	VDD-VSS	-0.3	3.6	V	----------	
BOOSTER OUTPUT VOLTAGE	VOUT	-0.3	14.0	V	----------	
STATIC ELECTRICITY	----------	-----	100	V	NOTE(1)	
POWER SUPPLY FOR LED	VLED	------	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 T E M	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-20°C	70°C	----------
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
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)

6. Electrical characteristics

Ta = 25℃

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR CIRCUIT	VDD-VSS	----------		2.4	-----	3.5	V
	VDD2-VSS	----------		2.4	-----	3.5	V
BOOSTER OUTPUT VOLTAGE	VOUT	----------		6.0	-----	12.0	V
VOLTAGE REGULATOR OPERATION VOLTAGE	V0	----------		4.5	-----	11.5	V
INPUT VOLTAGE	VIH	H LEVEL		0.8VDD	-----	VDD	V
	VIL	L LEVEL		VSS	-----	0.2VDD	V
OUTPUT VOLTAGE	VOH	IOH= -0.5mA		0.8VDD	-----	VDD	V
	VOL	IOH= 0.5mA		VSS	-----	0.2VDD	V
POWER SUPPLY CURRENT	IDD	VDD-VSS = 3 .0 V		-------	150	255	μA
OSCILLATION FREQUENCY	fOSC	----------		18.0	22.0	26.0	kHz
RECOMMENDED LCD DRIVING VOLTAGE,NOTE(1)	VO-VSS DUTY =1/65 BIAS=1/9 θ= 0°	Ta=-20℃	Φ=10°	-------	-----	-------	V
			Φ=-10°	-------	-------	-------	
		Ta= 0℃	Φ=10	-------	-------	-------	V
			Φ=-10°	-------	-------	-------	
		Ta= 25℃	Φ=10°	-------	(8.4)	-------	V
			Φ=-10°	-------	(8.6)	-------	
		Ta= 50℃	Φ=10°	-------	-----	-------	V
			Φ=-10°	-------	-------	-------	
		Ta= 70℃	Φ=10°	-------	-------	-------	V
			Φ=-10°	-------	-------	-------	
POWER SUPPLY CURRENT FOR LED	ILED	VLED=4.0V,NOTE(2)		-------	30	40	mA
		VLED=5.0V,NOTE(2)		-------	45	60	mA

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

(2):

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

7. Optical characteristics

Ta = 25°C V_O-V_{SS} =8.4V

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 θ= 0°	30	40	----	deg.	NOTE(1)
CONTRAST RATIO	K	Φ= 10°(-10°) θ= 0°	3.0	4.0	----	----	NOTE(1)
RESPONSE TIME	tr (rise)	Φ= 10°(-10°) θ= 0°	----	200	350	ms	NOTE(1)
	tf (fall)	Φ= 10°(-10°) θ= 0°	----	300	400	ms	NOTE(1)

Brightness for backlight

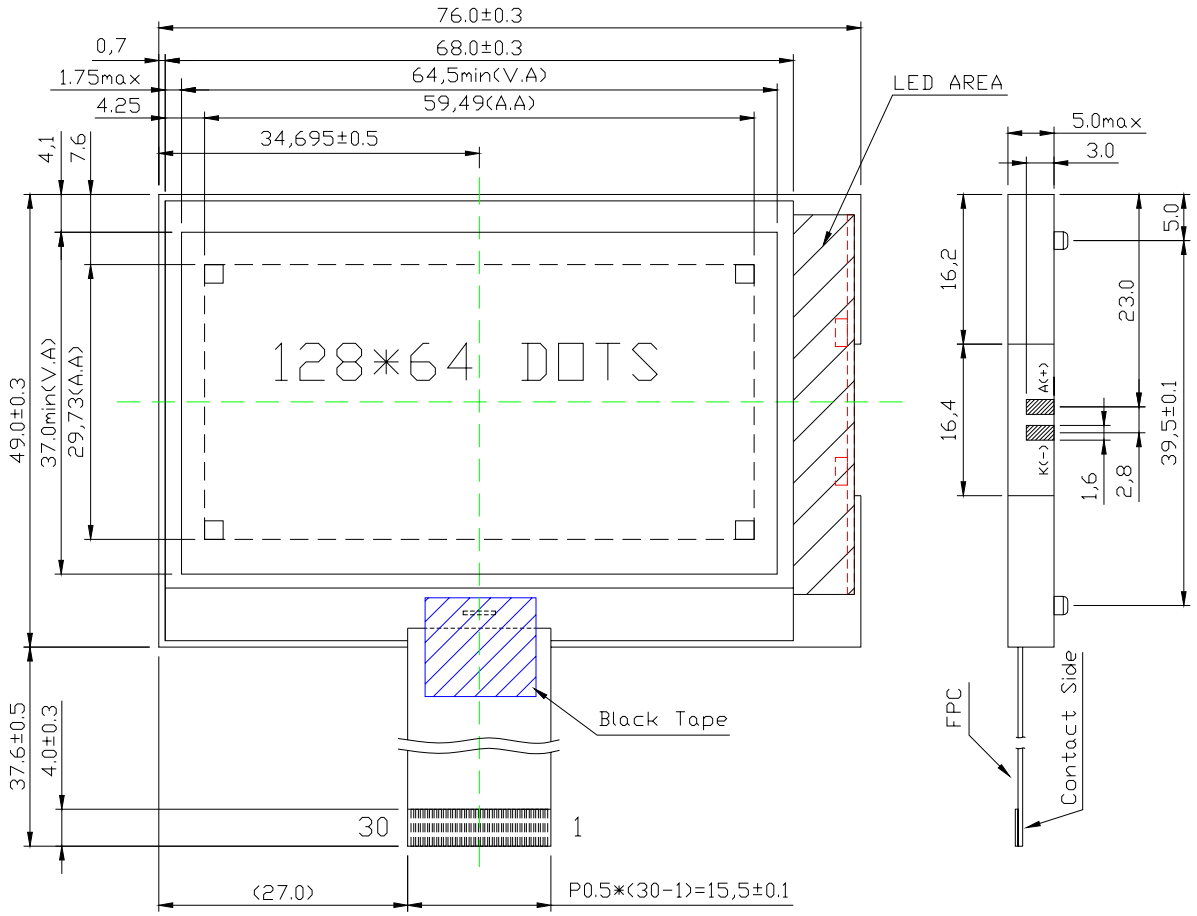
SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	BACKLIGHT TYPE	NOTE
B	Φ = 0° θ = 0° Ta = 25 °C	5.0	------	------	cd/m^2	TYPE A LED (COLOR:WHITE、BLUE、PURE GREEN)	NOTE(1) NOTE(2)
		4.0	------	------		TYPE B LED(COLOR: AMBER、YELLOW-GREEN 、ORANGE、RED)	

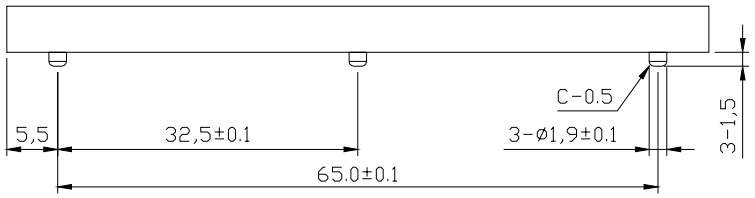
NOTE (1): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

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

8.Outline dimension

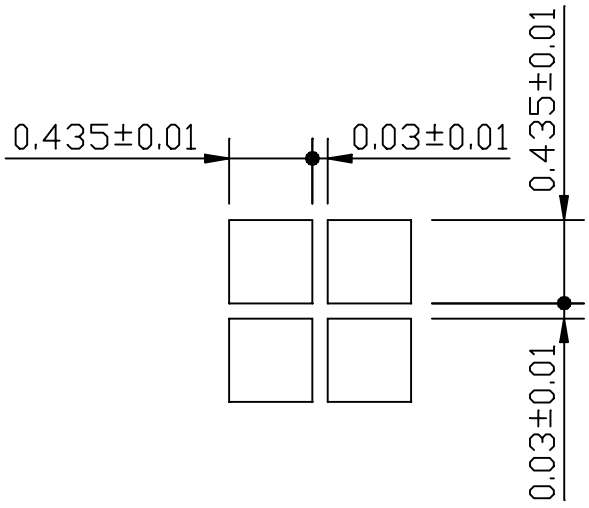
(a) With Backlight



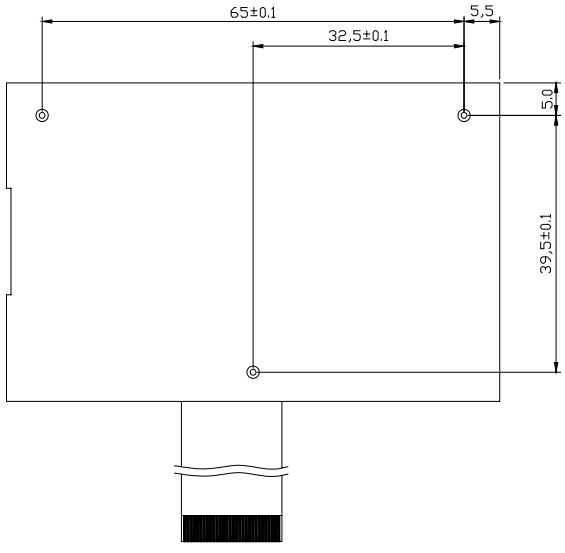


NOTE:
1.UNIT:mm
2.SCALE:NTS

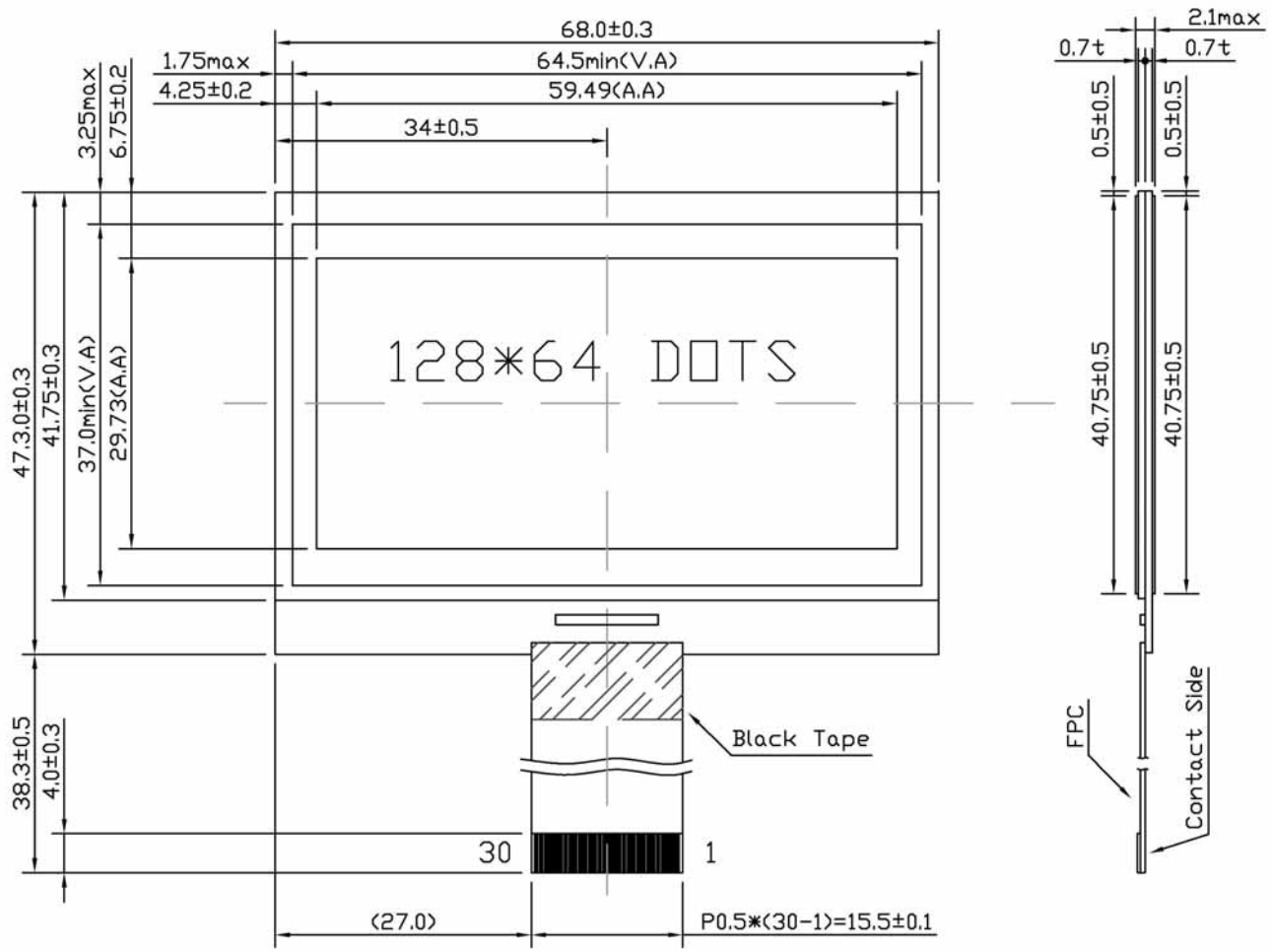
*DOT SIZE：



*BACK OF LCM:



(b) Without Backlight



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

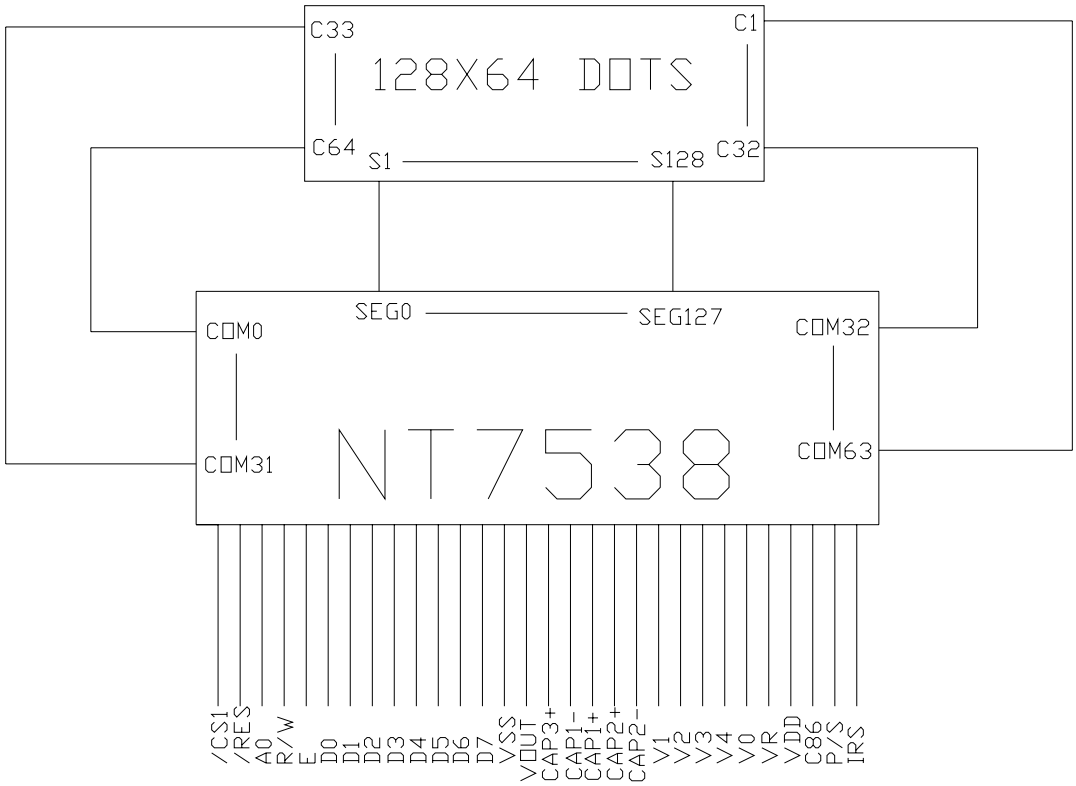
8.1 Interface connection

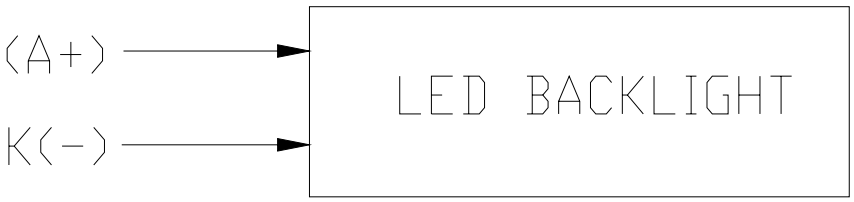
PIN NO.	SYMBOL	FUNCTION
1	$\overline{CS1}$	CHIP SELECT "L"➔ACTIVE
2	$\overline{RES}$	"L" : RESET
3	A0	"L" :INSTRUCTION "H" :DISPLAY DATA
4	R/$\overline{W}$ $\overline{WR}$	(When 8080-series) : $\overline{WR}$ IS "L" (When 6800-series) : Read mode➔ R/$\overline{W}$ IS "H" Write mode➔ R/$\overline{W}$ IS "L"
5	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: $V_0 \geqq V_1 \geqq V_2 \geqq V_3 \geqq V_4 \geqq V_{SS}$
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	P/S	DATA INPUT : "H"➔ PARALLEL,"L"➔ SERIAL
30	IRS	V0 VOLTAGE LEVEL ADJUSTMENT

8.2 LED Backlight Interface connection:

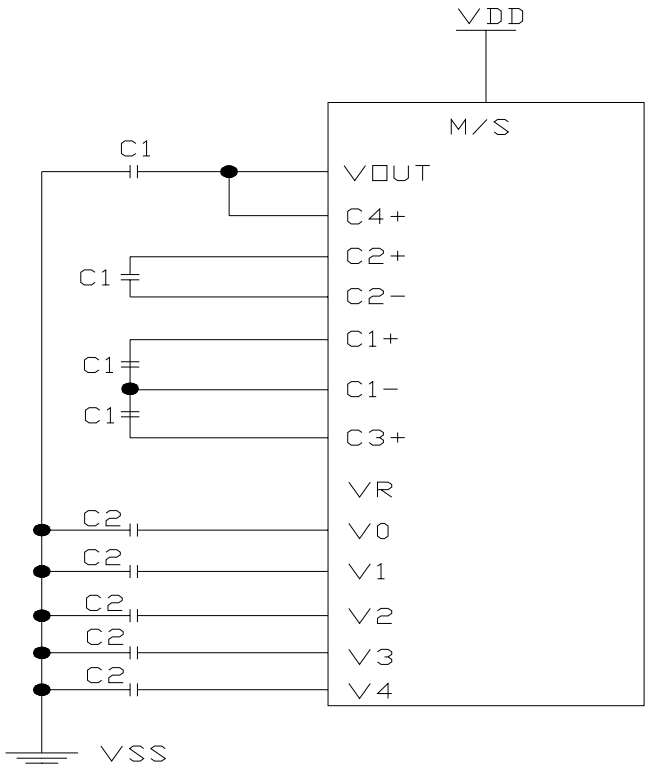
PIN NO.	SYMBOL	FUNCTION
------	A(+)	POWER SUPPLY FOR LED ANODE
------	K(-)	POWER SUPPLY FOR LED CATHODE

9. Block diagram





10. Power supply for LCM



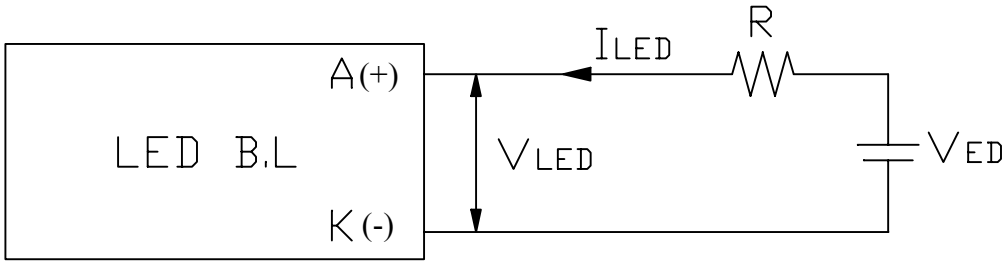
NOTE:

1.RECOMMANDED VALUE OF CAPACITORS: C1=1.0~4.7uF

C2=0.47~2.2uF

2.V0=(1+Ra/Rb)*VEV=(1+Rb/Ra)*(1-(63-α)/162)*VREG

10.1 Power supply for backlight



R≧(VED-VLED)/ILED

TYPE	*VLED*	*ILED (max)*	*LED COLOR*
A	4.0 V	40 mA	WHITE、BLUE、GREEN
B	5.0 V	60 mA	AMBER、YELLOW-GREEN、ORANGE、RED