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PART NO. : MGG2432B-SERIES

FOR MESSRS. : _____

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ACCEPTED BY: _____

PROPOSED BY : _____



RECORD OF REVISION

DATE	PAGE	SUMMARY
2007/6/14	P.7~P.11	Modify the order of pages
	P.3	3.3 Modify the numbering system 4. Modify the Mechanical data
	P.5	6. Modify the Electrical characteristics
	P.6	7. Modify the Optical characteristics
	P.8	8. Modify the contact of LCM change from 22pins to 24pins Modify the height of LCM : 9.4T→10.0T
	P.9	8.1 Modify the Interface : Add $\overline{\text{RES}}$ and SEL1
	P.10	9. Modify the Block diagram
	P.11	10.1 Modify the Power supply for backlight
2008/2/1	P.3	3.3 Modify the numbering system : MGG2432BT→MGG2432B
	P.5	6. Modify the Electrical characteristics : VIH min. : 0.8VDD→0.5VDD

3. General specifications

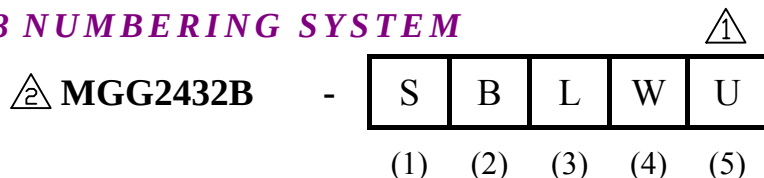
3.1 General specifications

PLEASE REFER TO:

- a. "CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-10000)".
- b. "CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (IC-RA8835)".

3.2 This individual specification is prior to general specifications

3.3 NUMBERING SYSTEM



(1).LCD TYPE :

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

(2).LCD COLOR :

- "B" : BLUE(STN-NEGATIVE) / BLACK(FSTN-NEGATIVE)
"W" : WHITE(FSTN-POSITIVE)

(3).BACKLIGHT TYPE :

- "L" : LED BACKLIGHT

(4).BACKLIGHT COLOR :

LED TYPE :

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

① (5).VIEWING ANGLE :

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



4. Mechanical data

- (1) NUMBER OF DOTS ----- 320 W * 240 H DOTS
- (2) MODULE SIZE ----- 92.1 W * 83.3 H * 10.0 T (max) mm
- (3) EFFECTIVE AREA ----- 79.8 W * 60.6 H (min) mm
- (4) ACTIVE AREA ----- 76.785W * 57.585 H mm
- (5) DOT SIZE ----- 0.225 W * 0.225 H mm
- (6) DOT PITCH-----0.24 W * 0.24 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	$V_{DD}-V_{SS}$	0	5.5	V	-----	
INPUT VOLTAGE	V_I	V_{SS}	V_{DD}	V	-----	
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)	
POWER SUPPLY FOR LED	$V_{LED}-V_{SS}$	-----	5.0	V	LED Color	Amber、 Orange Yellow-Green、 Red
		-----	6.0	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°C	70°C	-20°C	70°C	-----
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION

NOTE (2) : $T_a \leq 50^{\circ}\text{C}$: 85% RH MAX.

$T_a > 50^{\circ}\text{C}$: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 85% RH AT 50°C.



6. Electrical characteristics

$T_a = 25^{\circ}\text{C}$

<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	VDD-VSS	-----	4.75	5.0	5.25	V
INPUT VOLTAGE	VIH	H LEVEL 	0.5VDD	-----	VDD	V
	VIL	L LEVEL	VSS	-----	0.2VDD	V
POWER SUPPLY VOLTAGE FOR LCD DRIVING	VEE-VSS	-----	27.5	28.0	28.5	V
POWER SUPPLY CURRENT FOR LOGIC, NOTE (1)	IDD	VDD-VSS=5.0V Vo-VSS=24.7V	-----	20.0	30.0	mA
POWER SUPPLY LCD CURRENT	IEE	VDD-VSS=5.0V Vo-VSS=24.7V	-----	5.0	7.0	mA
RECOMMENDED LCD DRIVING VOLTAGE,NOTE(2)	VO-VSS	STN/ FSTN Φ=10° θ = 0°	Ta=-20°C	-----	-----	V
		Ta= 25°C	-----	(23.5)	-----	V
		Ta= 70°C	-----	-----	-----	V
FRAME FREQUENCY, NOTE (3)	FFLM	-----	70	75	80	Hz
POWER SUPPLY CURRENT FOR LED	ILED	VLED=4.0V,NOTE(4)	-----	120	160	mA
		VLED=4.8V,NOTE(4)	-----			

NOTE (1) : THE DISPLAY PATTERN IS ALL “ON”, OR ALL “OFF”

(2) : RECOMMENDED LCD DIRVING VOLTGE MAY FLUCTUATE ABOUT±0.5V BY EACH MODULE.

(3) : NEED TO MAKE SURE OF FLICKING AND RIPPING OF DISPLAY WHEN SETTING THE FRAME FREQUENCY IN YOUR SET .

(4) :

<i>TYPE</i>	<i>VLED</i>	<i>LED COLOR</i>
A	4.0 V	WHITE、BLUE、 PURE GREEN
B	4.8 V	AMBER、YELLOW-GREEN、 ORANGE、 RED



7. Optical characteristics

STN TYPE LCD

Ta = 25°C V_O-V_{SS}=23.5V

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	3.0	4.0	----	----	
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	

FSTN TYPE LCD

Ta = 25°C V_O-V_{SS}=23.5V

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	4.0	5.0	----	----	
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	

Brightness for backlight

SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	B.L COLOR	NOTE
B	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$	Dots all on	40	-----	-----	cd/m ²	WHITE、BLUE、 PURE GREEN NOTE(4)	NOTE(2) NOTE(3)
	I _{LED} =120mA STN/FSTN NEGATIVE	Dots all off	15	-----	-----			
	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$ I _{LED} =120mA STN/FSTN POSITIVE	Dots all off	10	-----	-----		YELLOW-GREEN 、RED、ORANGE、 AMBER NOTE(5)	
	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$ I _{LED} =60mA	Dots all off	3	-----	-----			

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

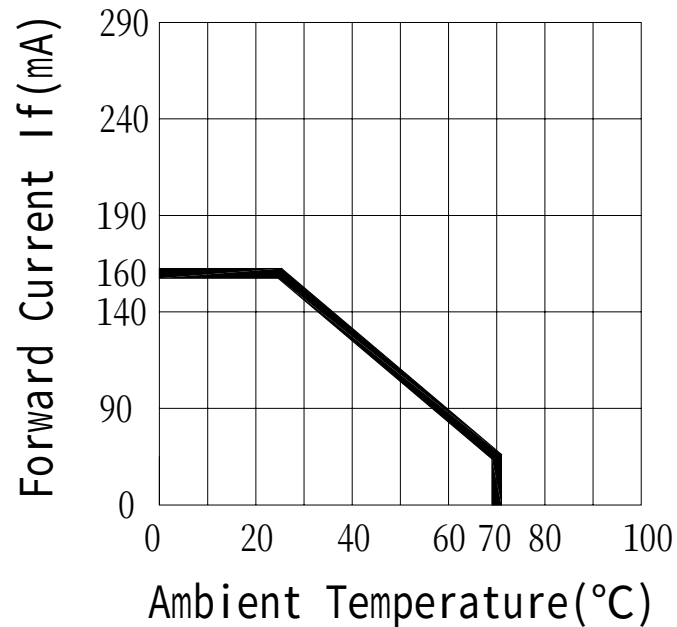
θ= 180° WHEN VIEWING ANGLE AT 12 O'CLOCK

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

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

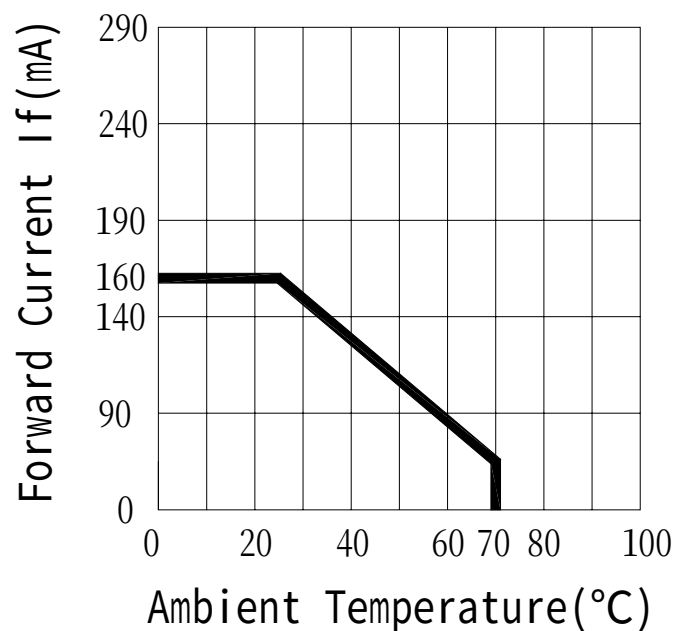
(4) : CURRENT REDUCTION RATE OF LED BACKLIGHT IS ACCORDING TO THE GRAPH INDICATED BELOW :

Forward Current Derating Curve



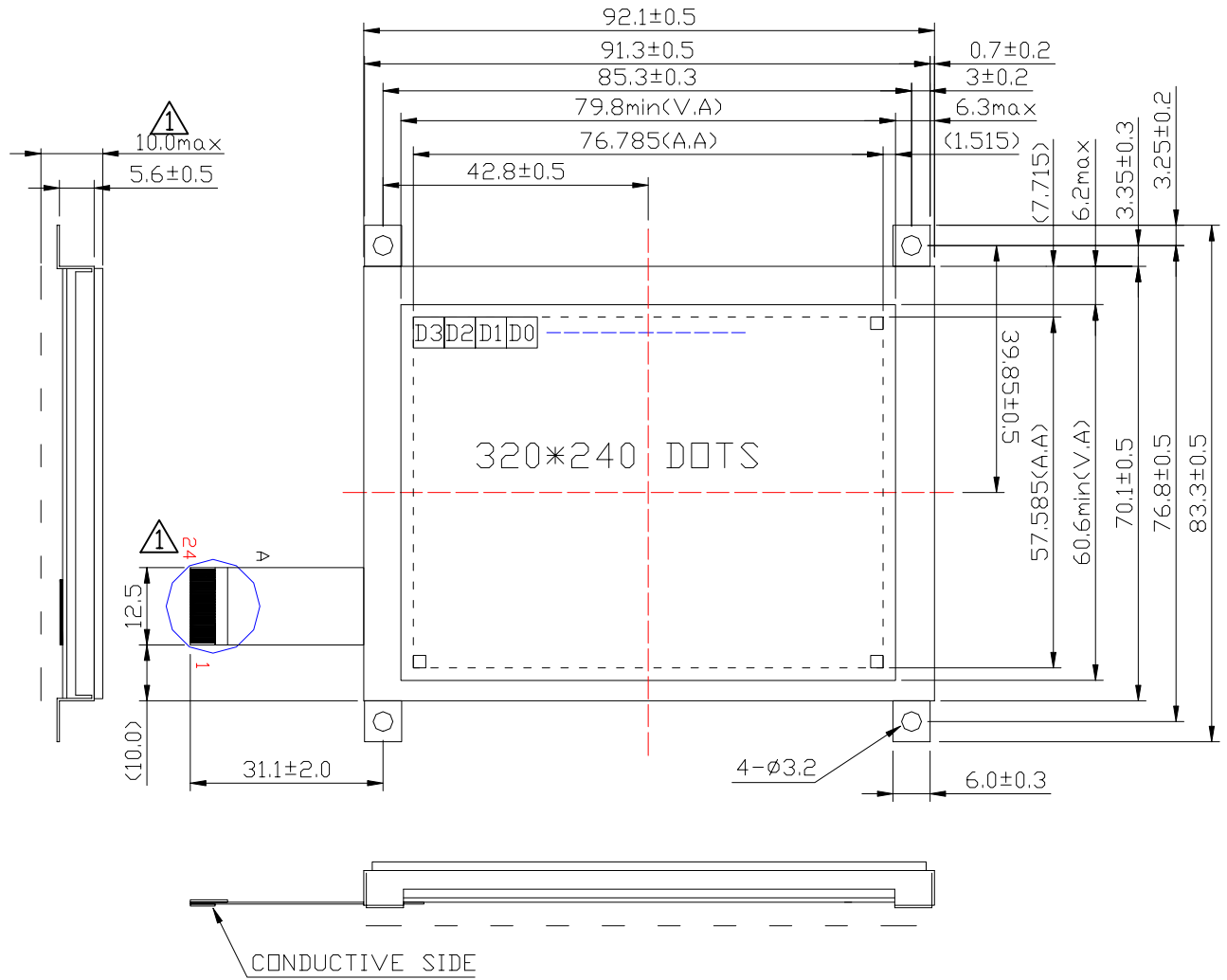
(5) : CURRENT REDUCTION RATE OF LED BACKLIGHT IS ACCORDING TO THE GRAPH INDICATED BELOW :

Forward Current Derating Curve

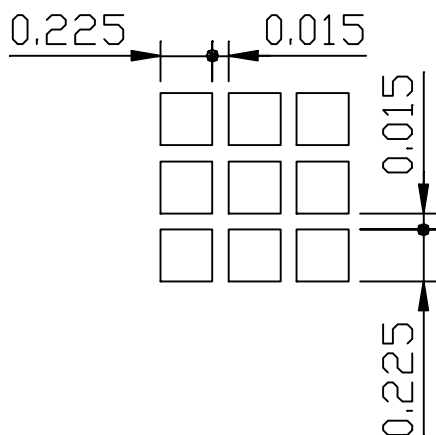




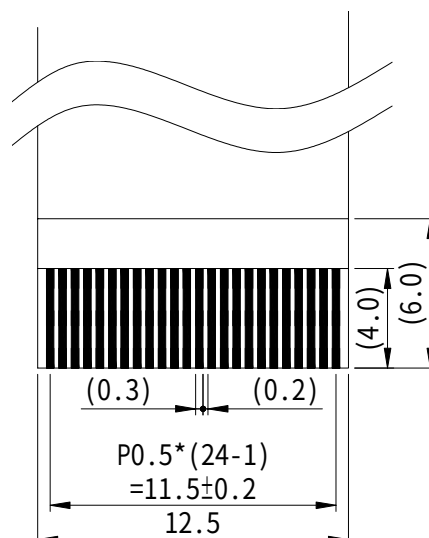
8. Outline dimension



(a) Dot size:



(b) Detail of A:



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

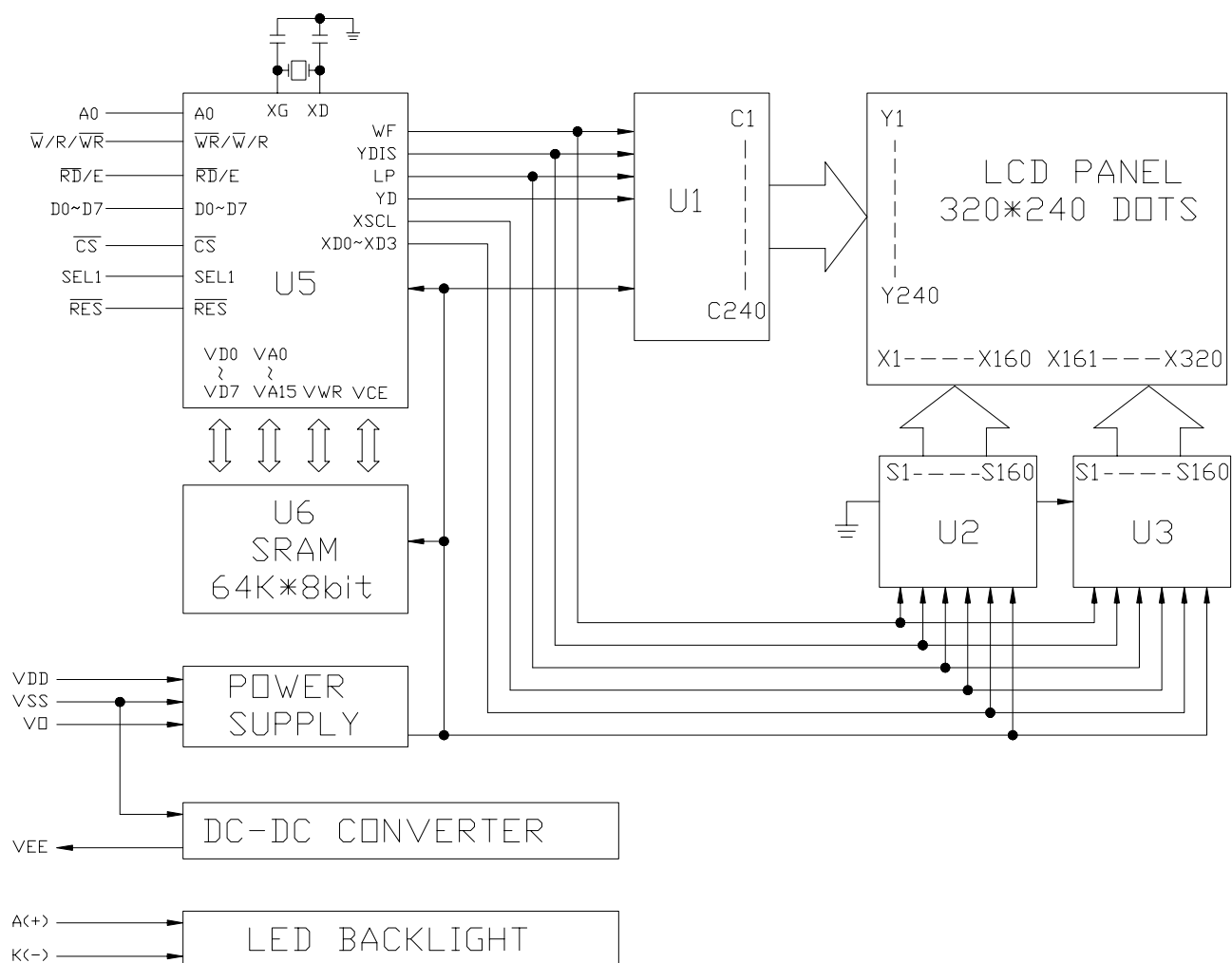
① 8.1 Interface

Pin Assignment

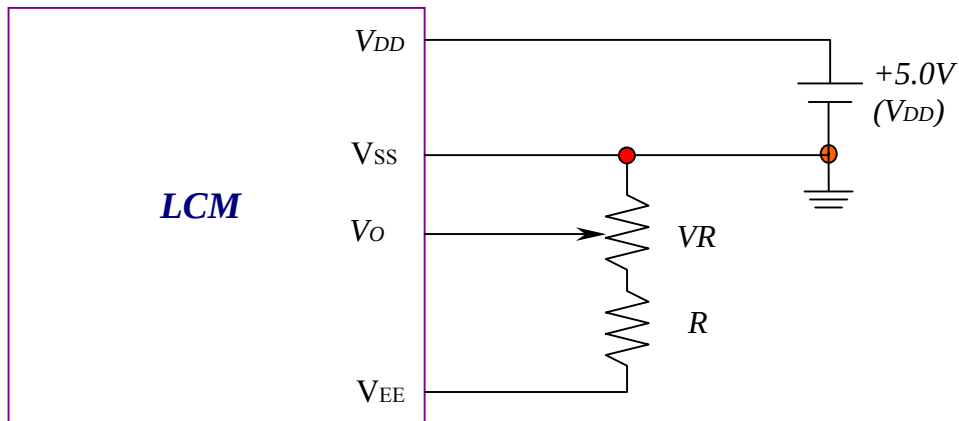
PIN NO.	SYMBOL	FUNCTION
1	VSS	POWER SUPPLY (GND)
2	VDD	POWER SUPPLY (+5V)
3	VO	OPERATING VOLTAGE FOR LCD DRIVING
4	AO	DATA TYPE SELECTION
5	$\overline{WR}(R/\overline{W})$	(When 8080-series) : $\overline{WR}$ IS (L) (When 6800-series) : Read mode : $R/\overline{W}$ IS (H) Write mode : $R/\overline{W}$ IS (L)
6	$\overline{RD}/E$	$\overline{RD}$: (When to 8080-series) E : (When to 6800-series)
7	D0	DATA INPUT/OUTPUT
8	D1	DATA INPUT/OUTPUT
9	D2	DATA INPUT/OUTPUT
10	D3	DATA INPUT/OUTPUT
11	D4	DATA INPUT/OUTPUT
12	D5	DATA INPUT/OUTPUT
13	D6	DATA INPUT/OUTPUT
14	D7	DATA INPUT/OUTPUT
15	$\overline{CS}$	L:CHIP SELECTION
① 16	$\overline{RES}$	L: RESET
17	V _{EE}	POWER SUPPLY FOR LCD DRIVING (OUTPUT)
① 18	SEL1	8080 OR 6800 FAMILY INTERFACE SELECT L:80 SERIES , H:68 SERIES
19	A(+)	POWER SUPPLY FOR LED(+)
20	K(-)	POWER SUPPLY FOR LED(-)
21	N.C	NO CONNECTION
22	N.C	NO CONNECTION
23	N.C	NO CONNECTION
24	N.C	NO CONNECTION



9. Block diagram



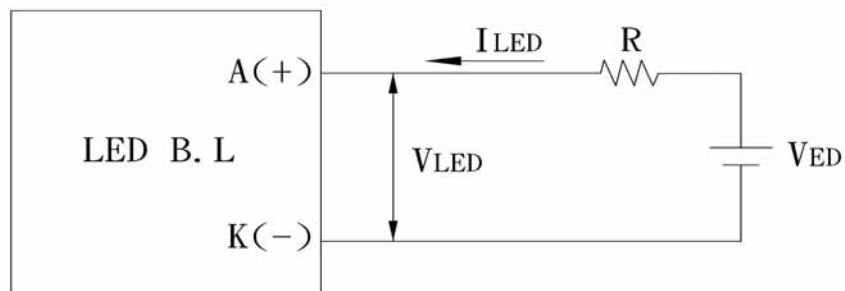
10. Power supply for LCM



$V_{LCD}-V_{SS}$: LCD DRIVING VOLTAGE

VR: 200 K Ω

10.1 Power supply for backlight



$$R \geq (V_{ED} - V_{LED}) / I_{LED}$$

TYPE	VLED	ILED (max)	THE VALUE OF R
A	4.0 V	160 mA	WHITE, BLUE, PURE GREEN
B	4.8 V		AMBER, YELLOW-GREEN, ORANGE, RED