



# ALL SHORE INDUSTRIES, INC.

## SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

**MODULE #: ASI-B-2406AS-GD-\_WS/W**

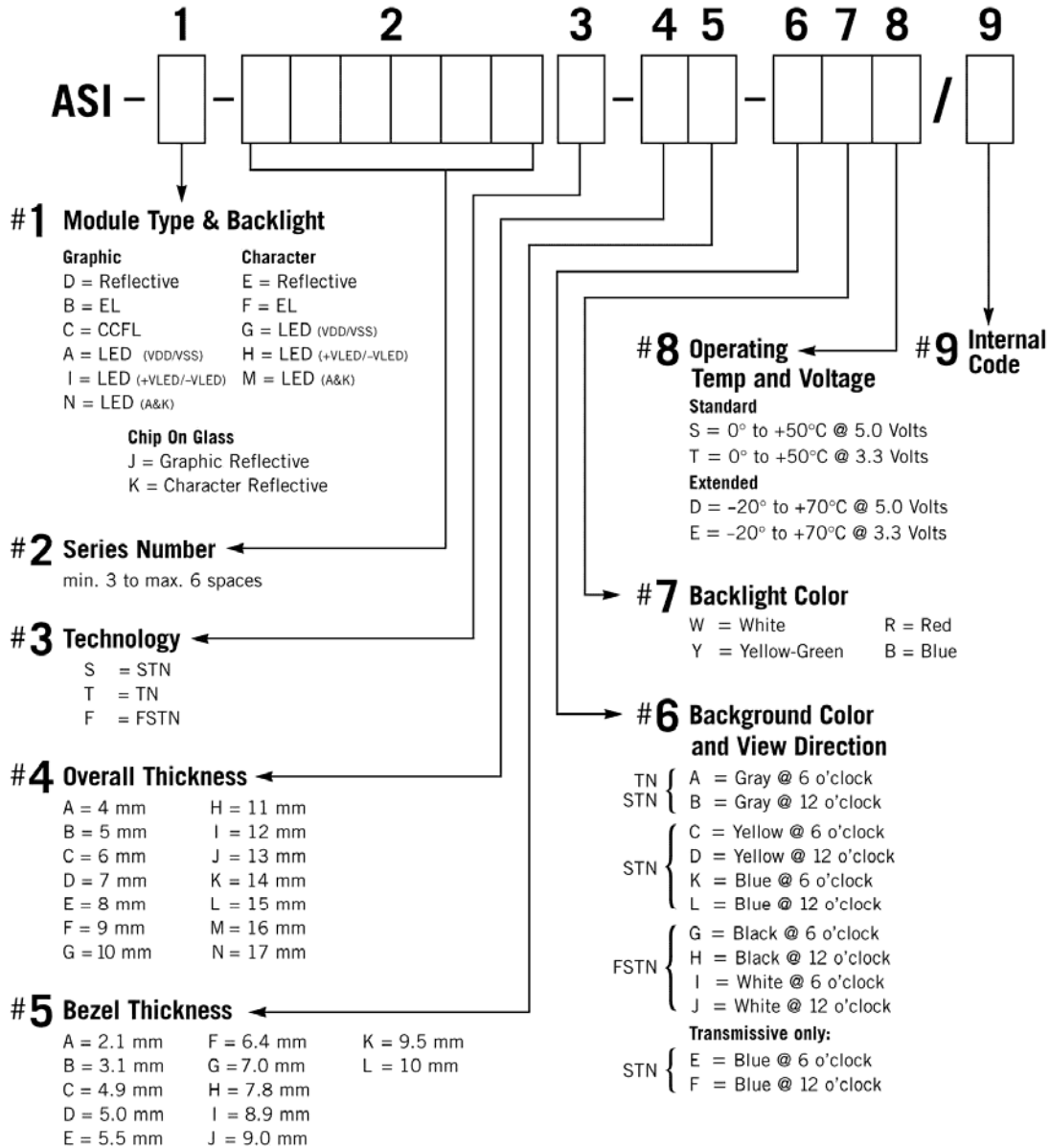
( 1 )	NUMBER OF DOTS	-----	240W X 64.0H DOTS
( 2 )	MODULE SIZE	-----	180.0W X 65.0H X 15.0D (max)mm
( 3 )	EFFECTIVE AREA	-----	134W X 40.0H mm
( 4 )	ACTIVE AREA	-----	127.16W X 33.88H mm
( 5 )	DOT SIZE	-----	0.49W X 0.49H mm
( 6 )	DOT PITCH	-----	0.53W X 0.53H mm
( 7 )	DRIVING METHOD	-----	1 /64 DUTY MULTIPLEX DRIVE
( 8 )	VIEWING DIRECTION	-----	6 or 12 O ' CLOCK
( 9 )	LCD TYPE	-----	FSTN, STN YELLOW, GRAY, BLUE
( 10 )	EL COLOR	-----	WHITE
( 11 )	CONTROLLER	-----	T6963C





MODEL NO : ASI-B-2406AS-GD- WS/W

**LCD MODULE PART NUMBERING SYSTEM**



NOTE: Some options may not be available in specific modules. Please contact your Sales Representative to check availability.



**MODEL NO : ASI-B-2406AS-GD-\_WS/W**

*General specifications*

*General specifications*

*PLEASE REFER TO:*

*“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-6963C)”.*


*This individual specification is prior to general specifications*

*Mechanical data*

(1) NUMBER OF DOT----- 240 W\* 64 H DOTS

(2) MODULE SIZE ----- 180.0 W \* 65.0 H \* C T (Max) mm

(The value of “C” refer to Outline Dimension P8/11)

(3) EFFECTIVE AREA ----- 134.0 W \* 40.0 H mm 

(4) ACTIVE AREA ----- 127.16 W \* 33.88 H mm

(5) DOT SIZE----- 0.49 W \* 0.49 H mm

(6) DOT PITCH ----- 0.53 W \* 0.53 H mm



## MODEL NO : ASI-B-2406AS-GD-\_WS/W

### *Absolute maximum ratings*

#### *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-Vss</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 EL BACKLIGHT	V <sub>EL</sub>	-----	AC200	V <sub>rms</sub>	f <sub>EL</sub> =1.0KHz 60 SEC.MAX
	f <sub>EL</sub>	-----	2.0	KHz	AC115 V <sub>rms</sub> 60 SEC.MAX
POWER SUPPLY FOR LED	V <sub>LED</sub>	-----	6.0	V	-----

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

#### *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
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): T<sub>a</sub> ≤ 50°C: 90% RH MAX.

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

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



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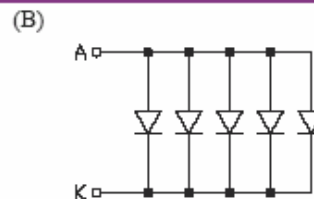
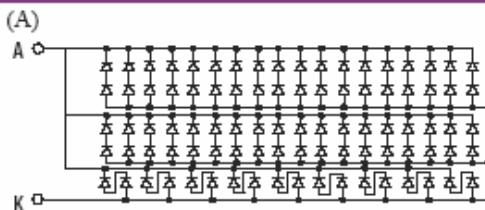
*Electrical characteristics*

$T_a = 25^{\circ}C$        $V_{DD} = 5.0 \pm 0.25 V$

ITEM	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 (1)	$V_{IH}$	H LEVEL	2.0	-----	$V_{DD}$	V	
	$V_{IL}$	L LEVEL	0	-----	0.8	V	
OUTPUT VOLTAGE NOTE (2)	$V_{OH}$	$I_{OH} = -0.3 \text{ mA}$	2.4	-----	-----	V	
	$V_{OL}$	$I_{OH} = 3.0 \text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT, NOTE (3)	$I_{DD}$	$V_{DD}-V_{SS} = 5.0 \text{ V}$	-----	20.0	30.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(4)	$V_{DD}-V_O$	STN/ FSTN DUTY =1/64 $\Phi=10^{\circ}$ NOTE(5)	$T_a=-20^{\circ}C$	-----	13.1	-----	V
			$T_a= 0^{\circ}C$	-----	12.9	-----	V
			$T_a= 25^{\circ}C$	-----	12.7	-----	V
			$T_a= 50^{\circ}C$	-----	12.5	-----	V
			$T_a= 70^{\circ}C$	-----	12.4	-----	V
POWER SUPPLY CURRENT FOR EL BACKLIGHT	$I_{EL}$	$V_{EL} = 115V_{rms}$ $f_{EL} = 400Hz$	-----	8.0	-----	mA <sub>rms</sub>	
POWER SUPPLY CURRENT FOR LED	$I_{LED}$	-----	-----	NOTE(6)	NOTE(6)	mA	

- NOTE (1): APPLIED TO TERMINALS DBO ~ DB7,  $\overline{WR}$ ,  $\overline{RD}$ ,  $\overline{CS}$ ,  $\overline{C/D}$ ,  $\overline{RES}$ , FS  
 (2): APPLIED TP TERMINALS DBO ~ DB7  
 (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):  $\theta = 0^{\circ}$  : VIEWING ANGLE AT 6 O'CLOCK  
 $\theta = 180^{\circ}$  : VIEWING ANGLE AT 12 O'CLOCK  
 (6): LED CURRENT OF DEFFERENT LED TYPE

TYPE	$V_{LED}$	$I_{LED}$ TYP. / MAX.	LED TYPE
A	5.0V	450mA / 700mA	YELLOW-GREEN ,ORANGE (ARRAY LED)
B	4.0V	75mA / 100mA	WHITE (EDGE LED)





## MODEL NO : ASI-B-2406AS-GD-\_WS/W

### Optical characteristics

#### STN TYPE LCD

 $T_a = 25^{\circ}\text{C}$   $V_{DD}-V_O=12.7\text{V}$ 

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	$\Phi 2-\Phi 1$	$K = 2.0$ NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	$\Phi = 10^{\circ}$ NOTE(1)	3.0	4.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	$\Phi = 10^{\circ}$ NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	$\Phi = 10^{\circ}$ NOTE(1)	----	300	400	ms	NOTE(2)

#### FSIN TYPE LCD

 $T_a = 25^{\circ}\text{C}$   $V_{DD}-V_O=12.7\text{V}$ 

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	$\Phi 2-\Phi 1$	$K = 2.0$ NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	$\Phi = 10^{\circ}$ NOTE(1)	4.0	5.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	$\Phi = 10^{\circ}$ NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	$\Phi = 10^{\circ}$ NOTE(1)	----	300	400	ms	NOTE(2)

### Brightness for backlight

SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	LED TYPE	NOTE
B	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$	4.0	----	----	cd/m <sup>2</sup>	EL BACKLIGHT	NOTE(2)
		5.0	----	----		YELLOW-GREEN、ORANGE	NOTE(3)
		5.0	----	----		WHITE	

NOTE (1):  $\theta = 0^{\circ}$  WHEN VIEWING ANGLE AT 6 O'CLOCK

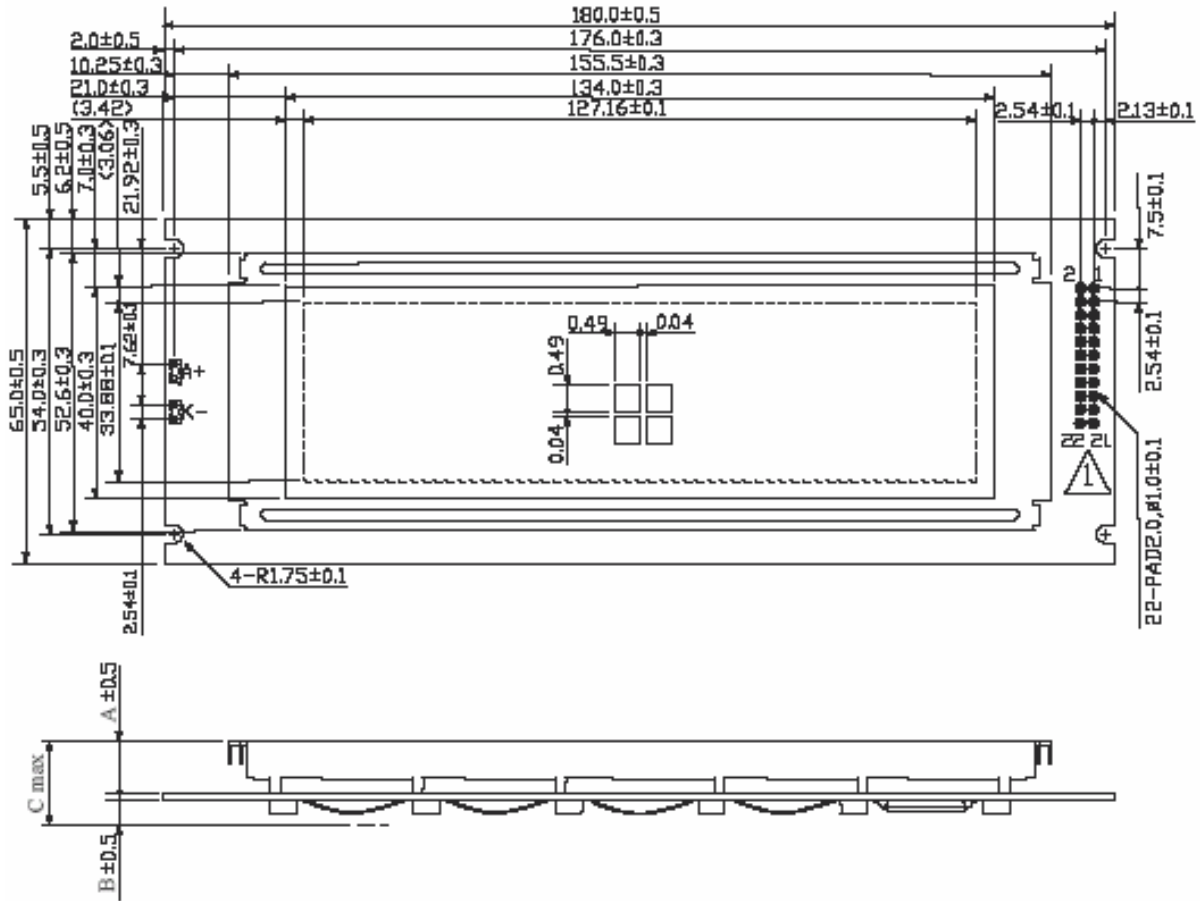
$\theta = 180^{\circ}$  WHEN VIEWING ANGLE AT 12 O'CLOCK

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

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

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6. OUTLINE DIMENSION



NOTE :

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

THICKNESS	A	B	C	UNIT
EL & NO B.L	5.0	1.6	10.0	mm
LED B.L	9.0	1.6	15.0	mm



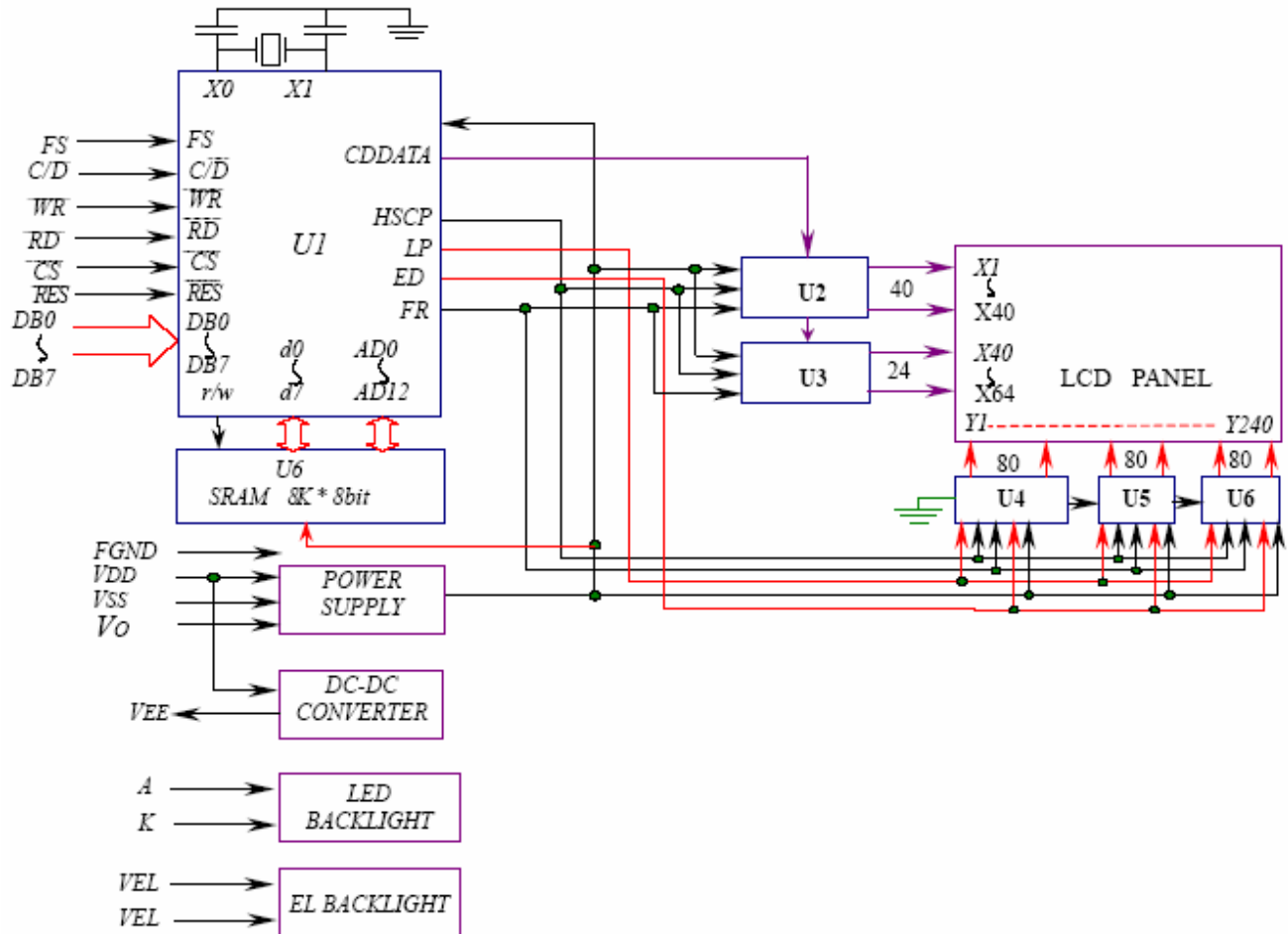
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### Interface pin connection

PIN NO.	SYMBOL	FUNCTION
1	FGND	FRAME GROUND
2	V <sub>SS</sub>	POWER SUPPLY ( GND )
3	V <sub>DD</sub>	POWER SUPPLY ( +5V )
4	V <sub>O</sub>	OPERATING VOLTAGE FOR LCD DRIVING
5	$\overline{WR}$	L: DATA WRITE ( LCD MODULE ← MPU )
6	$\overline{RD}$	L: DATA READ ( LCD MODULE → MPU )
7	$\overline{CS}$	L: CHIP ENABLE
8	C/ $\overline{D}$	$\overline{WR}$ ="L",C/ $\overline{D}$ ="H": COMMAND WRITE C/ $\overline{D}$ ="L": DATA WRITE $\overline{RD}$ ="L",C / $\overline{D}$ ="H" :STATUS READ C/ $\overline{D}$ ="L" : DATA READ
9	V <sub>EE</sub>	POWER SUPPLY FOR LCD DRIVING OUTPUT
10	$\overline{RES}$	L: RESET
11	DB0	DATA INPUT/OUTPUT (LSB)
12	DB1	DATA INPUT/OUTPUT
13	DB2	DATA INPUT/OUTPUT
14	DB3	DATA INPUT/OUTPUT
15	DB4	DATA INPUT/OUTPUT
16	DB5	DATA INPUT/OUTPUT
17	DB6	DATA INPUT/OUTPUT
18	DB7	DATA INPUT/OUTPUT (MSB)
19	FS	TERMINALS FOR SELECTION OF COLUMNS H: 6 * 8 FONT    L: 8 * 8 FONT
20	N.C	NO CONNECTION
21	N.C	NO CONNECTION
22	N.C	NO CONNECTION
-----	A	POWER SUPPLY FOR LED BACKLIGHT
-----	K	POWER SUPPLY FOR LED BACKLIGHT

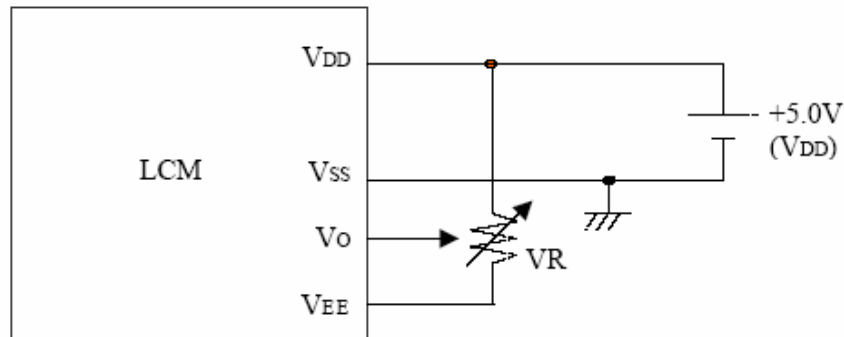
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Block diagram



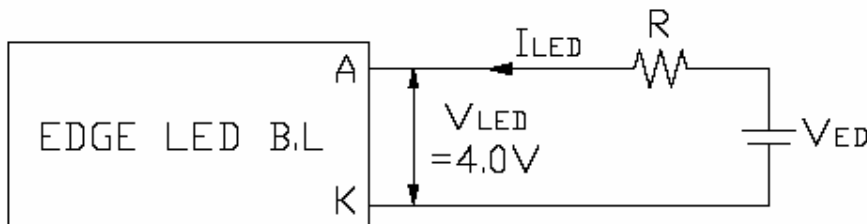
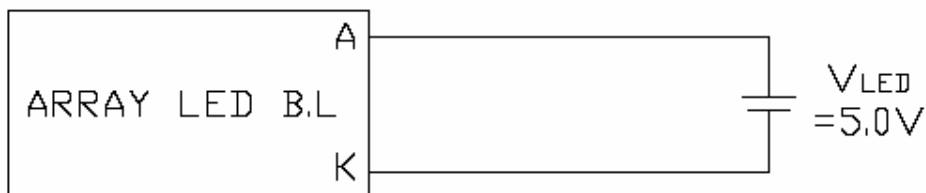
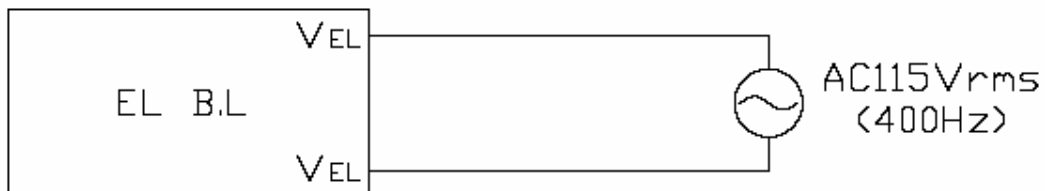
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*Power supply for LCM*



$V_{DD}-V_o$ : LCD DRIVING VOLTAGE  
 $V_R$ : 200K $\Omega$

*Power supply for backlight*



$$R \geq (V_{ED}-V_{LED}) / I_{LED}, I_{LED} \leq 100.0 \text{ mA (max)}$$