



# ALL SHORE INDUSTRIES, INC.

## SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

**MODULE #: ASI-\_-2406BS-LK-\_YS/W**

- (1) NUMBER OF DOT----- 240 W\* 64 H DOTS
- (2) MODULE SIZE----- 125.0 W \* 60.0 H \* "C" T (Max) mm
- (3) EFFECTIVE AREA----- 111.6 W \* 37.0 H mm
- (4) ACTIVE AREA----- 105.57 W \* 31.97 H mm
- (5) DOT SIZE ----- 0.41 W \* 0.47 H mm
- (6) DOT PITCH----- 0.44 W \* 0.50 H mm



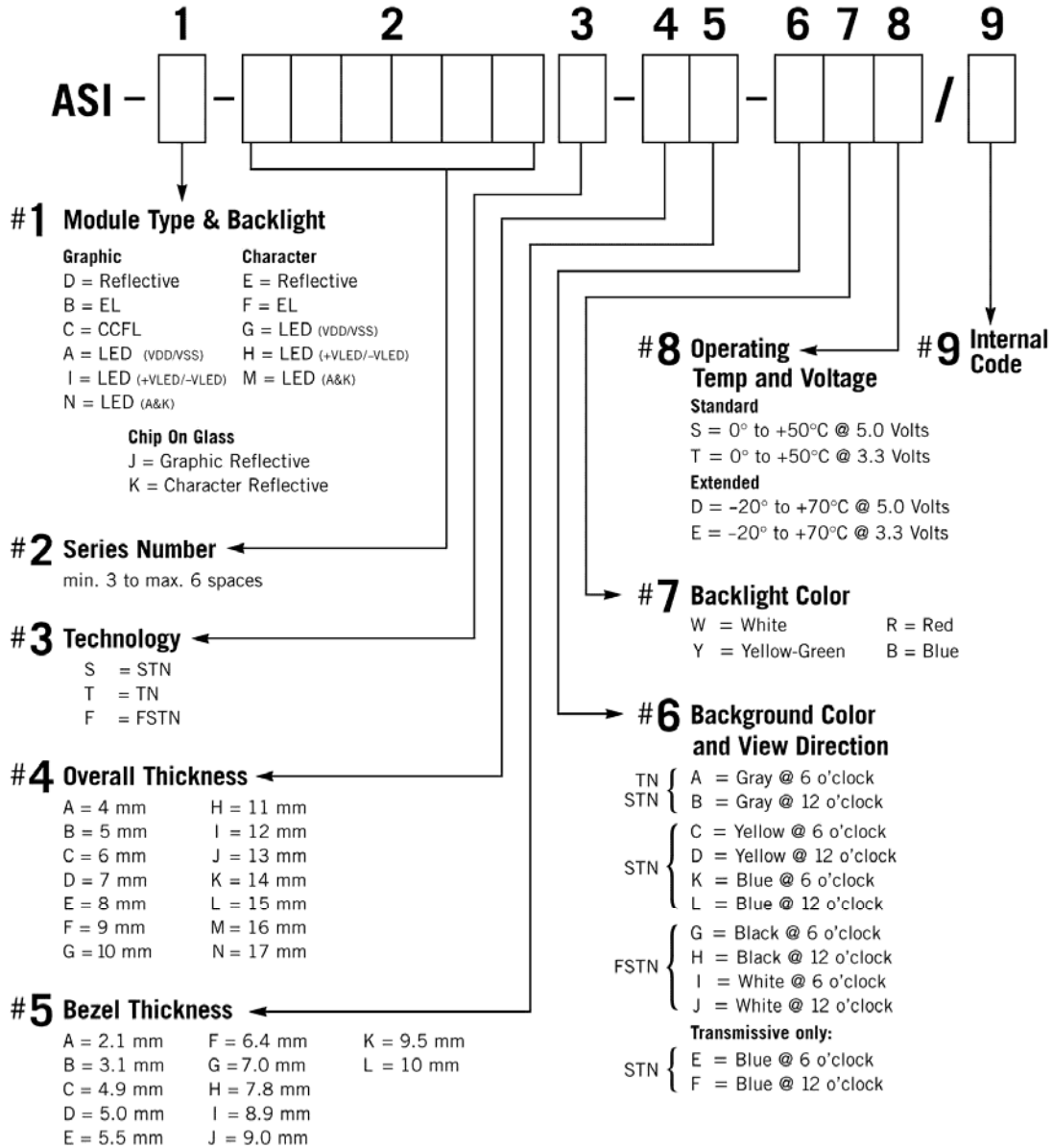
**MODEL NO : ASI\_-2406BS-LK-\_YS/W**

RECORDS OF REVISION		DOC . FIRST ISSUE May, 2005
DATE	REVISED DRAWING NO.	SUMMARY



MODEL NO : ASI\_-2406BS-LK-\_YS/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\_-2406BS-LK-\_YS/W**

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOT----- 240 W\* 64 H DOTS
- (2) MODULE SIZE----- 125.0 W \* 60.0 H \* "C" T (Max) mm
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### *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</sub> -V <sub>SS</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>	-----	5.0	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*

$T_a = 25^{\circ}\text{C} \quad V_{DD} = 5.060.25 \text{ V}$

<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	$V_{DD}-V_{SS}$	-----	4.75	5.0	5.25	V	
INPUT VOLTAGE	$V_{IH}$	H LEVEL	2.0	-----	$V_{DD}$	V	
	$V_{IL}$	L LEVEL	0	-----	0.8	V	
OUTPUT VOLTAGE	$V_{OH}$	$I_{OH} = -0.3 \text{ mA}$	2.4	-----	-----	V	
	$V_{OL}$	$I_{OH} = 3.0 \text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT	$I_{DD}$	$V_{DD}-V_{SS} = 5.0 \text{ V}$	-----	10.0	20.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(1)	$V_{DD}-V_O$	STN/ FSTN DUTY =1/64 $\Phi=10^{\circ}$ NOTE(2)	$T_a=-20^{\circ}\text{C}$	-----	8.9	-----	V
			$T_a=25^{\circ}\text{C}$	-----	8.5	-----	V
			$T_a=70^{\circ}\text{C}$	-----	8.1	-----	V
POWER SUPPLY CURRENT FOR EL BACKLIGHT	$I_{EL}$	$V_{EL} = 115V_{rms}$ $f_{EL} = 400\text{Hz}$	-----	8.0	-----	mArms	
POWER SUPPLY CURRENT FOR LED	$I_{LED}$	NOTE(3)	-----	NOTE(3)	NOTE(3)	mA	

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

(2):  $\theta = 0^{\circ}$  : VIEWING DIRECTION AT 6 O'CLOCK

$\theta = 180^{\circ}$  : VIEWING DIRECTION AT 12 O'CLOCK

(3): LED CURRENT FOR DIFFERENT LED BACKLIGHT TYPE

<i>LED B.L TYPE</i>	<i>CONDITION</i>	<i>I<sub>LED</sub></i>				<i>LED COLOR</i>
		<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT.</i>	
LED B.L (ARRAY)	$V_{DD} = 5.0\text{V}$	-----	280	420	mA	YELLOW-GREEN、RED AMBER、ORANGE
LED B.L (EDGE)	$V_{LED} = 4.0\text{V}$	-----	75	100	mA	BLUE、WHITE PURE-GREEN

<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	$V_{DD}-V_{SS}$	-----	4.75	5.0	5.25	V


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**Optical characteristics**
**STN TYPE LCD**
 $T_a = 25^{\circ}\text{C}$   $V_{DD}-V_O = 8.5\text{V}$ 

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
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)

**FSTN、STN BLUE TYPE LCD**
 $T_a = 25^{\circ}\text{C}$   $V_{DD}-V_O = 8.5\text{V}$ 

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
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 LCM backlight**

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

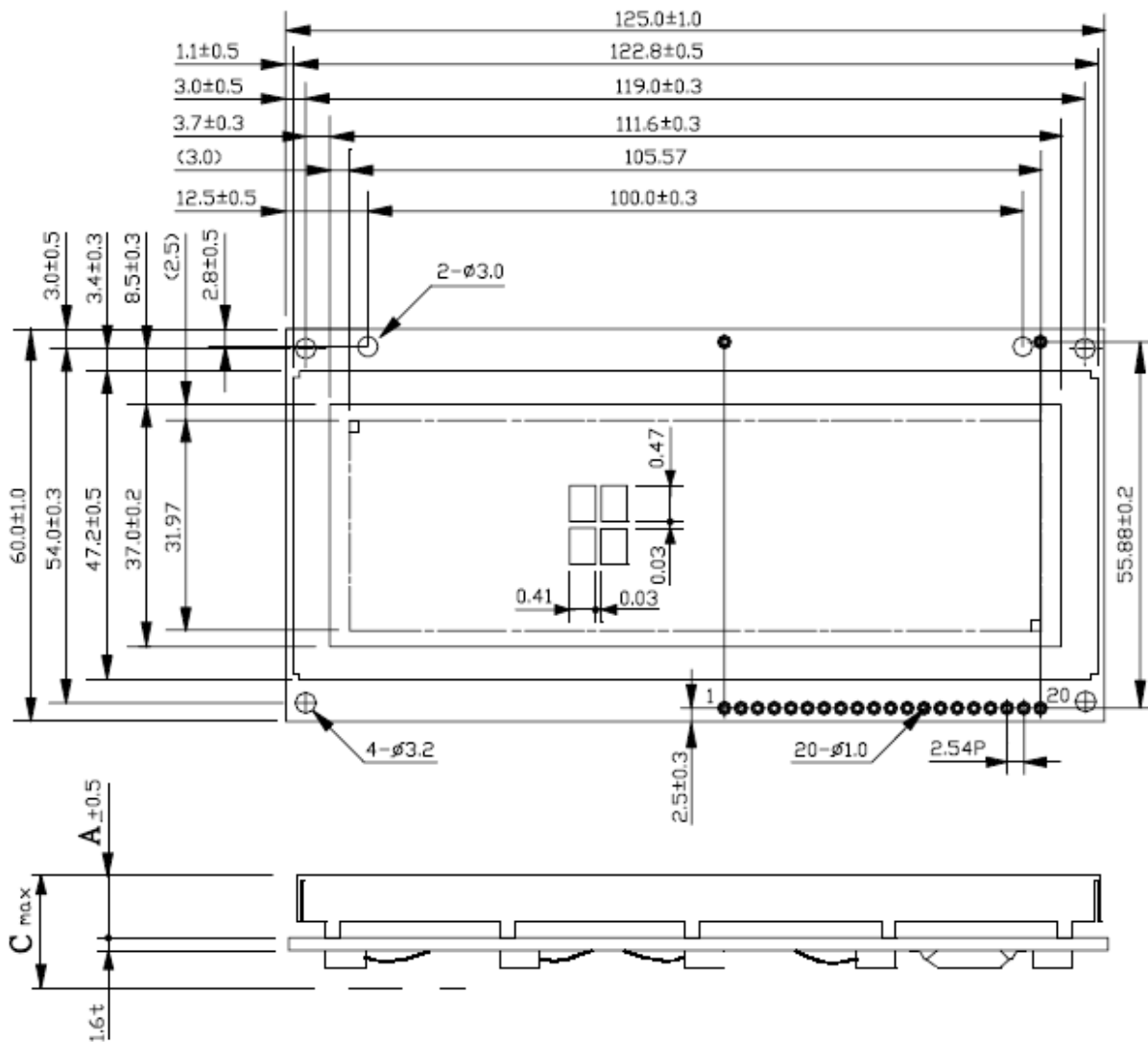
NOTE (1):  $\theta = 0^{\circ}$  : VIEWING DIRECTION AT 6 O'CLOCK  
 $\theta = 180^{\circ}$  : VIEWING DIRECTION AT 12 O'CLOCK

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

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

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Outline dimension



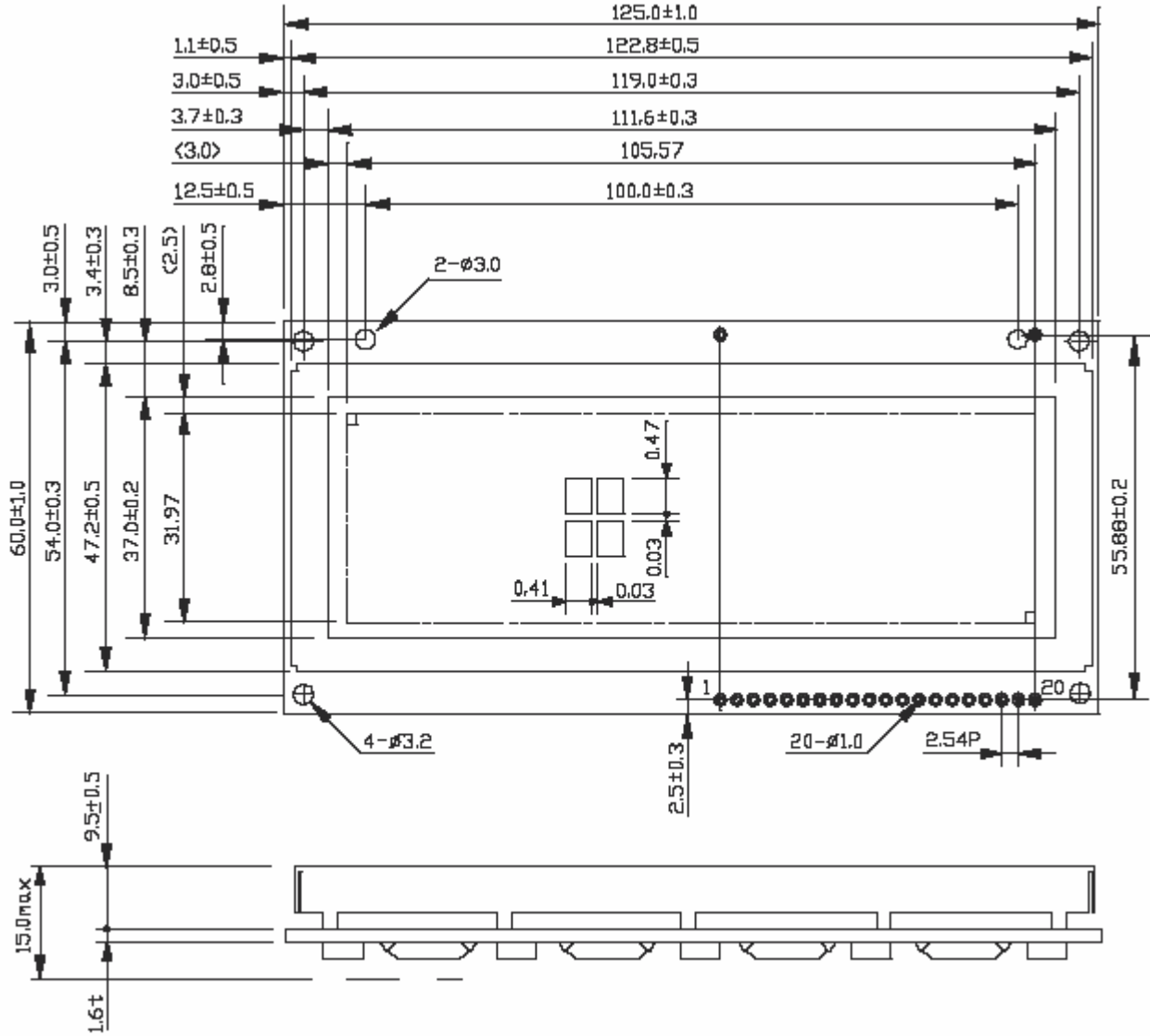
TYPE	A	C
LED B.L	9.5	15.0
EL & NO B.L	4.5	10.0

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





MODEL NO : ASI\_-2406BS-LK-\_YS/W



PIN NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SYMBOL	VSS	VDD	VO	C/D	RD	WR	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	CE	RES	VEE	LC	LK	LA



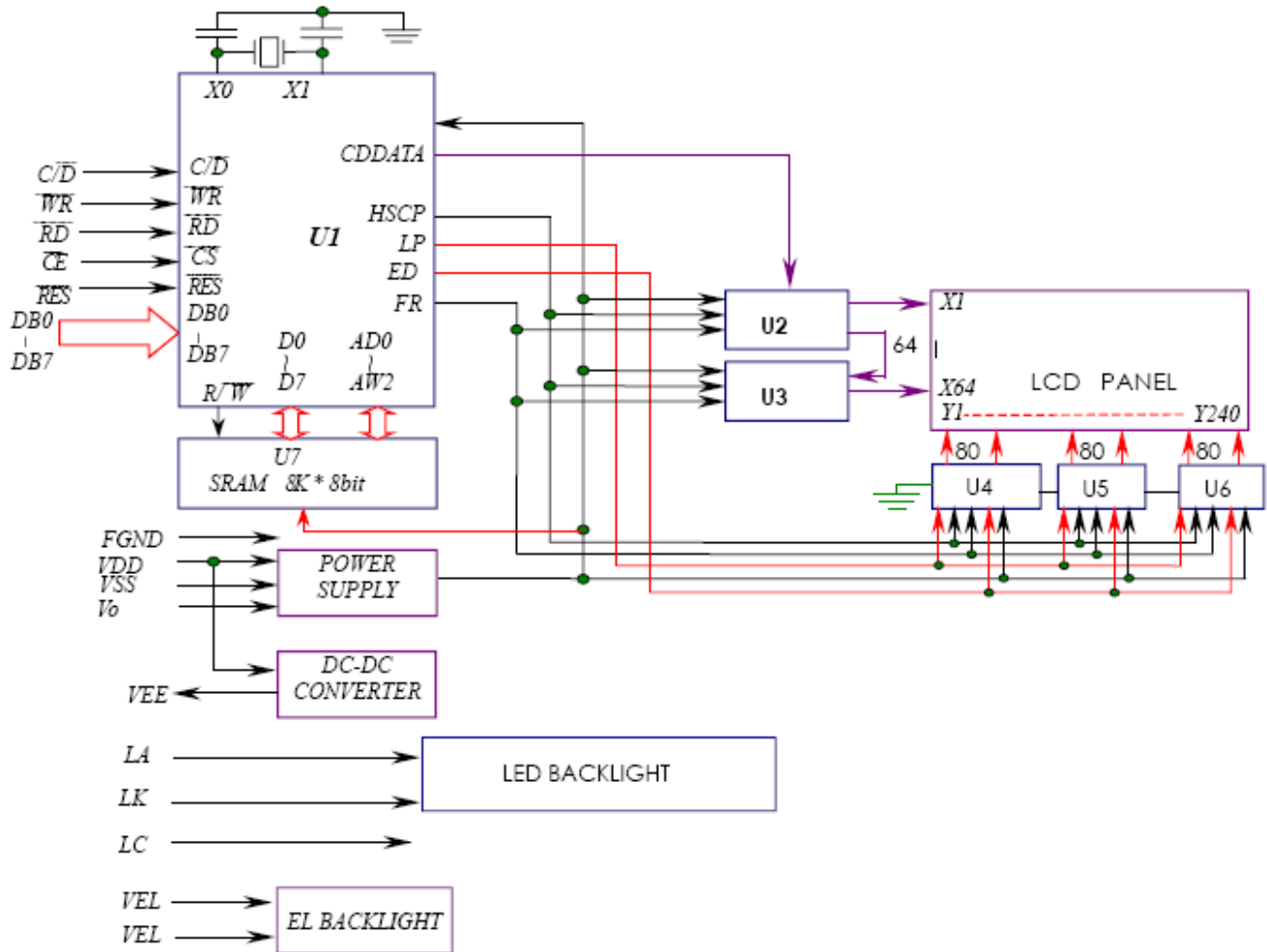
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### Interface pin connection

PIN NO.	SYMBOL	FUNCTION
1	V <sub>SS</sub>	POWER SUPPLY ( GND )
2	V <sub>DD</sub>	POWER SUPPLY ( +5V )
3	V <sub>O</sub>	OPERATING VOLTAGE FOR LCD DRIVING
4	C/ $\bar{D}$	$\bar{WR}="L", C/\bar{D}="H"$ : COMMAND WRITE C/ $\bar{D}="L"$ : DATA WRITE $\bar{RD}="L", C / \bar{D}="H"$ :STATUS READ C/ $\bar{D}="L"$ : DATA READ
5	$\bar{RD}$	L: DATA READ ( LCD MODULE → MPU )
6	$\bar{WR}$	L: DATA WRITE ( LCD MODULE ← MPU )
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	$\bar{CE}$	L: CHIP ENABLE
16	$\bar{RES}$	L: RESET
17	V <sub>EE</sub>	POWER SUPPLY FOR LCD DRIVING OUTPUT
18	LC	H: LED BACKLIGHT LIGHT ON
19	LK	POWER SUPPLY FOR LED BACKLIGHT (-)
20	LA	POWER SUPPLY FOR LED BACKLIGHT (+)

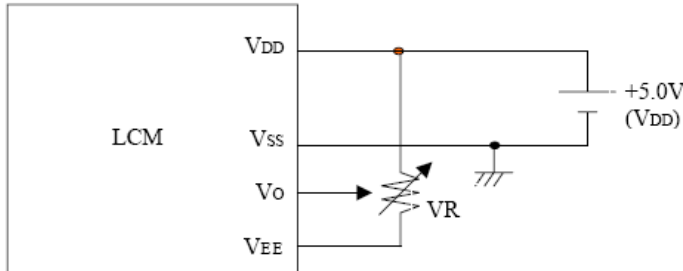
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Block diagram



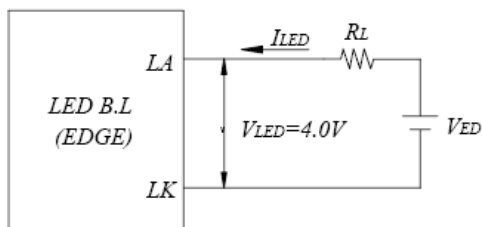
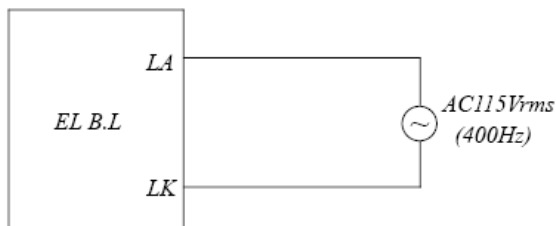
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*Power supply for LCM*



V<sub>DD</sub>-V<sub>o</sub>: LCD DRIVING VOLTAGE  
 VR: 200KΩ

*10.1 Power supply for backlight*



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

*The information presented in this datasheet has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Information contained herein is for selection purposes only, and is subject to change without notice. Please contact ASI for current datasheets prior to designing.*