



# ALL SHORE INDUSTRIES, INC.

## SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

**MODULE #:** ASI-E-162AS-GC\_S/W

### *Mechanical data*

- (1) NUMBER OF CHARACTER ----- 16 CH \* 2 LINE
- (2) MODULE SIZE ----- 122.0 W \* 44.0 H \* 10.0 T (max) mm
- (3) EFFECTIVE AREA ----- 99.0 W \* 24.0 H mm
- (4) CHARACTER PATTERN ----- 5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE----- 4.84 W \* 8.06 H mm
- (6) CHARACTER PITCH----- 6.0 mm
- (7) DOT SIZE----- 0.92 W \* 1.10 H mm
- (8) DOT PITCH ----- 0.98 W \* 1.16 H mm



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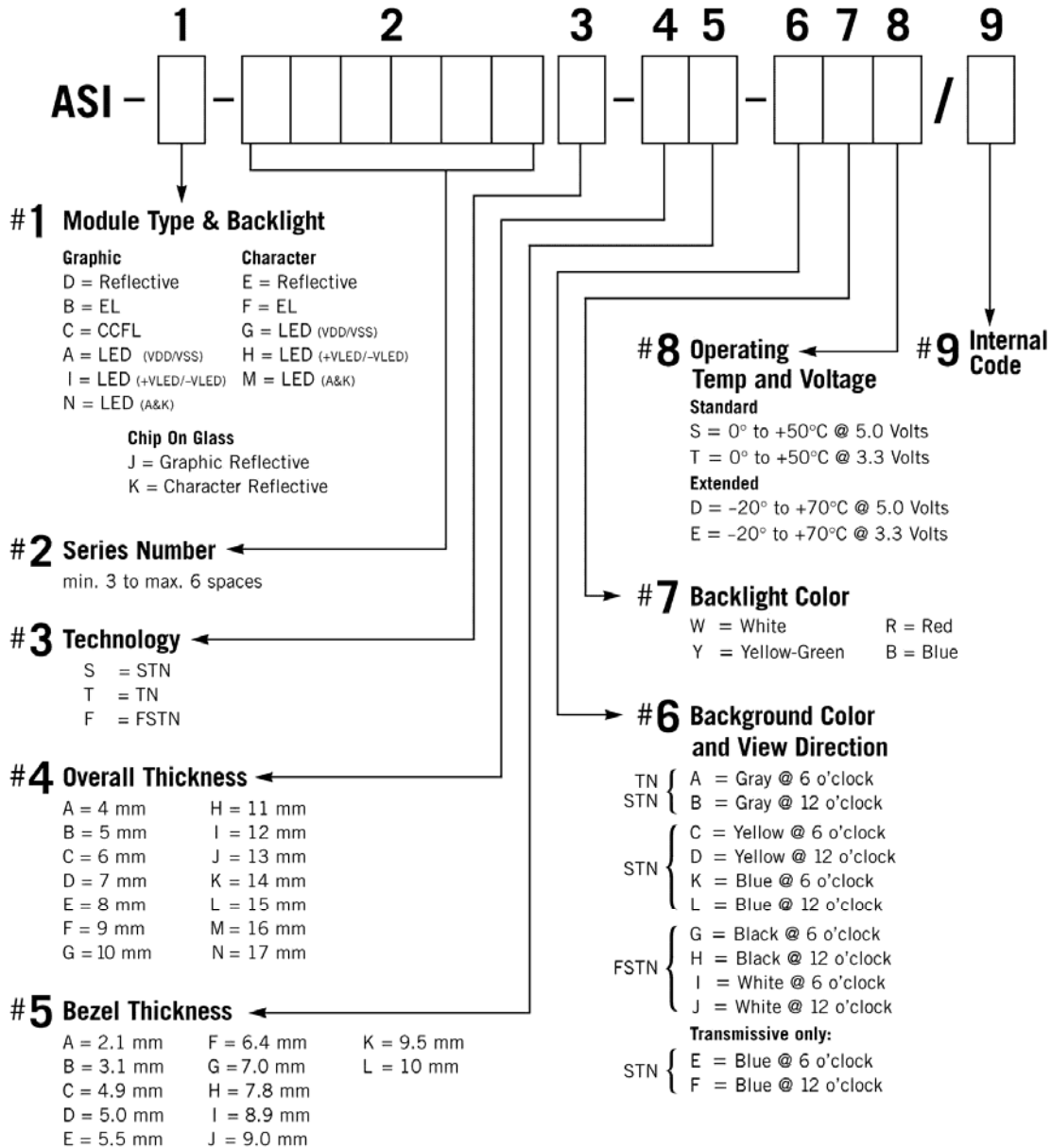
**RECORD OF REVISION**

<b>DATE</b>	<b>PAGE</b>	<b>SUMMARY</b>
2004/7/23	3/10	Add (7) BACKLIGHT COLOR : "W" : WHITE
2004/7/23	6/10	Add Electrical characteristics : Power supply current for LED
2004/7/23	8/10	Change Interface pin connection : pin 15 : NC → A (+) , pin16 : NC → K (-)
2005/3/24	5/10	Modify the STORAGE : -20°C~70°C → -30°C~80°C of Environmental absolute maximum ratings.
	8/10	Modify the ACTIVE AREA of Outline dimension.



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**LCD MODULE PART NUMBERING SYSTEM**



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



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### Absolute maximum ratings

#### Electrical absolute maximum ratings

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
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 LED	V <sub>LED</sub>	-----	NOTE(2)	V	-----

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

NOTE (2):

SYMBOL	V <sub>LED</sub> MAX.	LED TYPE
V <sub>LED</sub>	5.5V	YELLOW-GREEN,AMBER,ORANGE,RED
	5.0V	BLUE,PURE GREEN,WHITE

#### Environmental absolute maximum ratings



ITEM	CONDITION	OPERATING		STORAGE		COMMENT
		MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	NORMAL	0°C	50°C	-30°C	80°C	-----
	WIDE	-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


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

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
INPUT VOLTAGE	V <sub>IH</sub>	-----	2.2	-----	-----	V	
	V <sub>IL</sub>	-----	-----	-----	0.6	V	
OUTPUT VOLTAGE	V <sub>OH</sub>	-I <sub>OH</sub> = 0.205 mA	2.4	-----	-----	V	
	V <sub>OL</sub>	I <sub>OL</sub> = 1.2 mA	-----	-----	0.4	V	
POWER SUPPLY CURRENT	I <sub>DD</sub>	V <sub>DD</sub> = 5.0V	-----	1.0	1.5	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(1)	V <sub>DD</sub> -V <sub>O</sub>	STN/ FSTN DUTY =1/16 Φ=10° NOTE(2)	T <sub>a</sub> =-20°C	-----	4.8	-----	V
			T <sub>a</sub> = 0°C	-----	4.7	-----	V
			T <sub>a</sub> = 25°C	-----	4.5	-----	V
			T <sub>a</sub> = 50°C	-----	4.3	-----	V
			T <sub>a</sub> = 70°C	-----	4.2	-----	V
		TN DUTY =1/16 Φ=25° NOTE(2)	T <sub>a</sub> =-20°C	-----	4.7	-----	V
			T <sub>a</sub> = 0°C	-----	4.6	-----	V
			T <sub>a</sub> = 25°C	-----	4.2	-----	V
			T <sub>a</sub> = 50°C	-----	3.8	-----	V
			T <sub>a</sub> = 70°C	-----	3.7	-----	V
POWER SUPPLY CURRENT FOR NOTE(3)	I <sub>LED</sub>	V <sub>LED</sub> 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 ANGLE AT 6 O'CLOCK  
 $\theta = 180^{\circ}$  : VIEWING ANGLE AT 12 O'CLOCK

(3): LED CURRENT OF DIFFERENT LED TYPE

LED B.L TYPE	V <sub>LED</sub>	I <sub>LED</sub>				LED COLOR
		MIN.	TYP.	MAX.	UNIT.	
A	4.2V	-----	170	270	mA	YELLOW-GREEN、AMBER、ORANGE、RED
B	4.0V	-----	30	40	mA	BLUE、WHITE、PURE GREEN



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### Optical characteristics

#### TN TYPE LCD

 $T_a = 25^\circ\text{C}$   $V_{DD}-V_O = 4.2V$ 

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	$\Phi 2-\Phi 1$	K = 1.4 NOTE(1)	20	30	----	deg.	NOTE(2)
CONTRAST RATIO	K	$\Phi = 25^\circ$ NOTE(1)	2.0	3.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	$\Phi = 25^\circ$ NOTE(1)	----	150	250	ms	NOTE(2)
	tf (fall)	$\Phi = 25^\circ$ NOTE(1)	----	150	250	ms	NOTE(2)

#### STN TYPE LCD

 $T_a = 25^\circ\text{C}$   $V_{DD}-V_O = 4.5V$ 

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)

#### FSTN /STN BLUE TYPE LCD

 $T_a = 25^\circ\text{C}$   $V_{DD}-V_O = 4.5V$ 

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 LED backlight

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

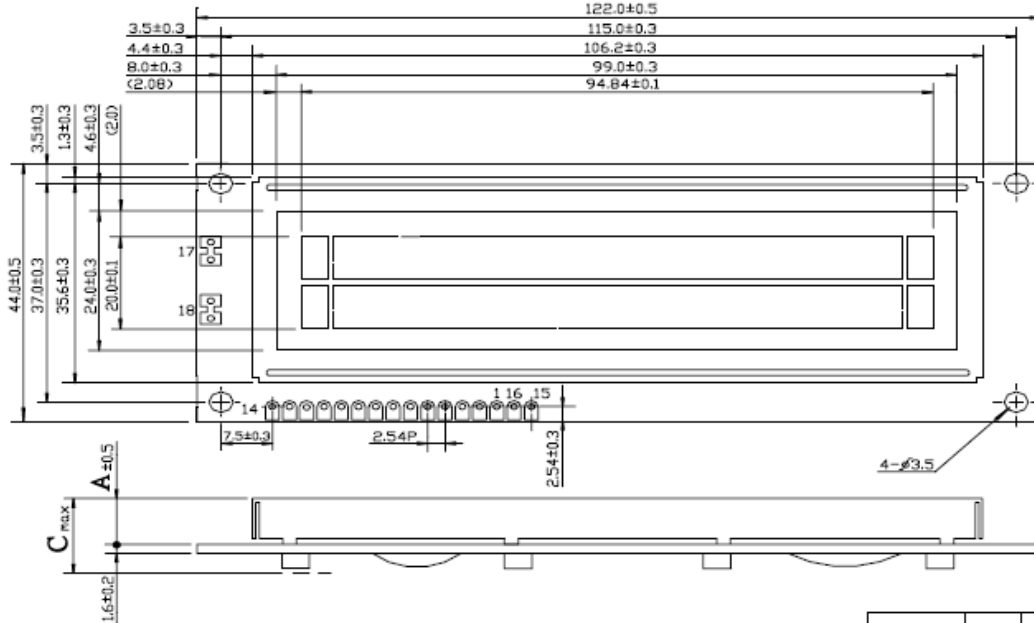
NOTE (1):  $\theta = 0^\circ$  WHEN VIEWING ANGLE AT 6 O'CLOCK  
 $\theta = 180^\circ$  WHEN VIEWING ANGLE AT 12 O'CLOCK

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

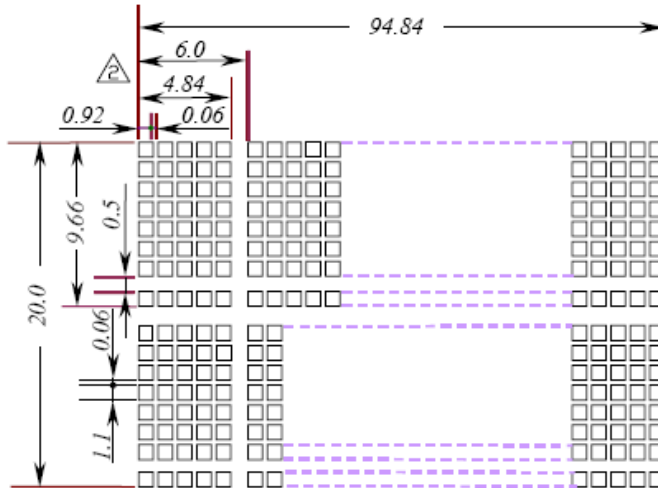
(3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

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*Outline dimension*



TYPE	A	C
LED B.L	9.5	15.0
NO B.L	4.9	10.0



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

*Interface pin connection*

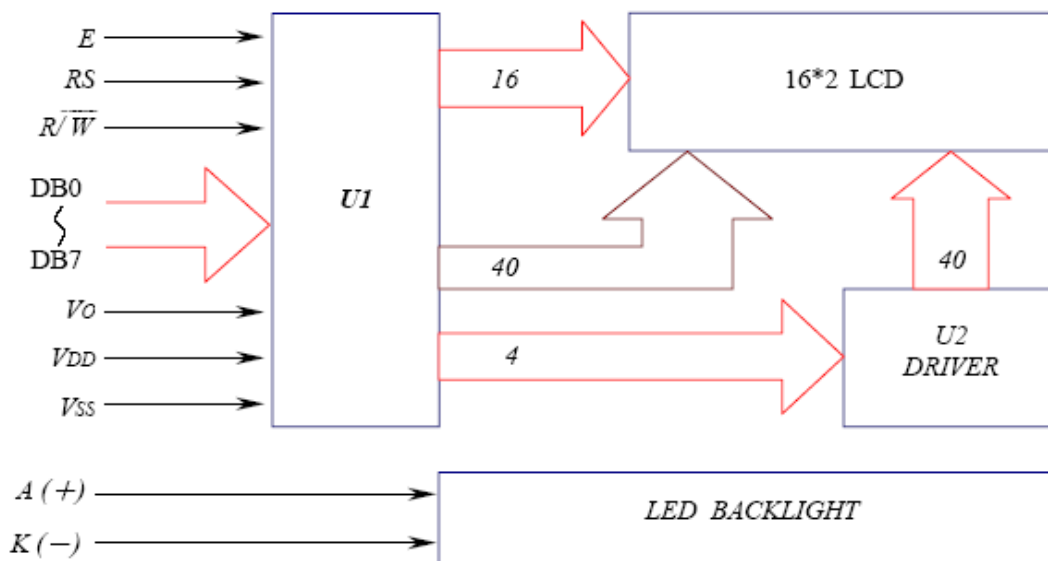
<b>PIN NO.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
SYMBOL	V <sub>SS</sub>	V <sub>DD</sub>	V <sub>O</sub>	R <sub>S</sub>	R <sub>W</sub>	E	DB0	DB1
<b>PIN NO.</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	A (+)	K (-)





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*Block diagram*



*Display data address charts*

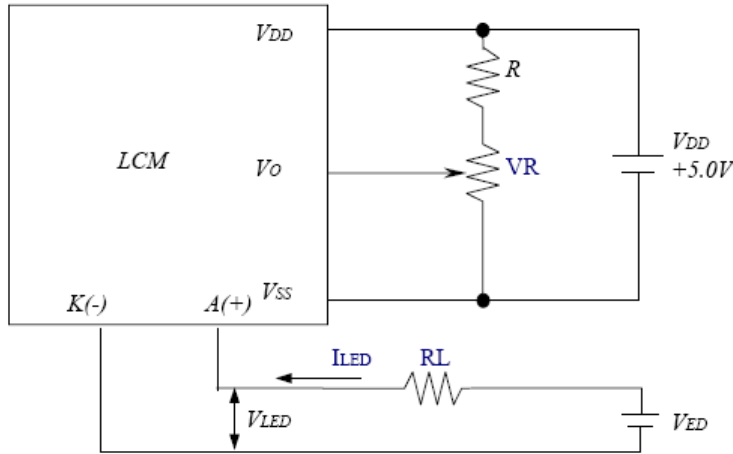
Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
LINE 2	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F





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*Power supply for LCM*



RECOMMENDED RESISTOR R :  $V_{DD}-V_o \geq 1.5V$   
 $V_{DD}-V_o$ : LCD DRIVING VOLTAGE  
 VR:  $10K\Omega \sim 20K\Omega$

ITEM	LED TYPE	CONDITION
Limit resistor of LED (RL)	A	$RL \geq ((V_{ED}-4.2V) / I_{LED})$ , $I_{LED} \leq 270mA$
	B	$RL \geq ((V_{ED}-4.0V) / I_{LED})$ , $I_{LED} \leq 40mA$

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.