



# ALL SHORE INDUSTRIES, INC.

## SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

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

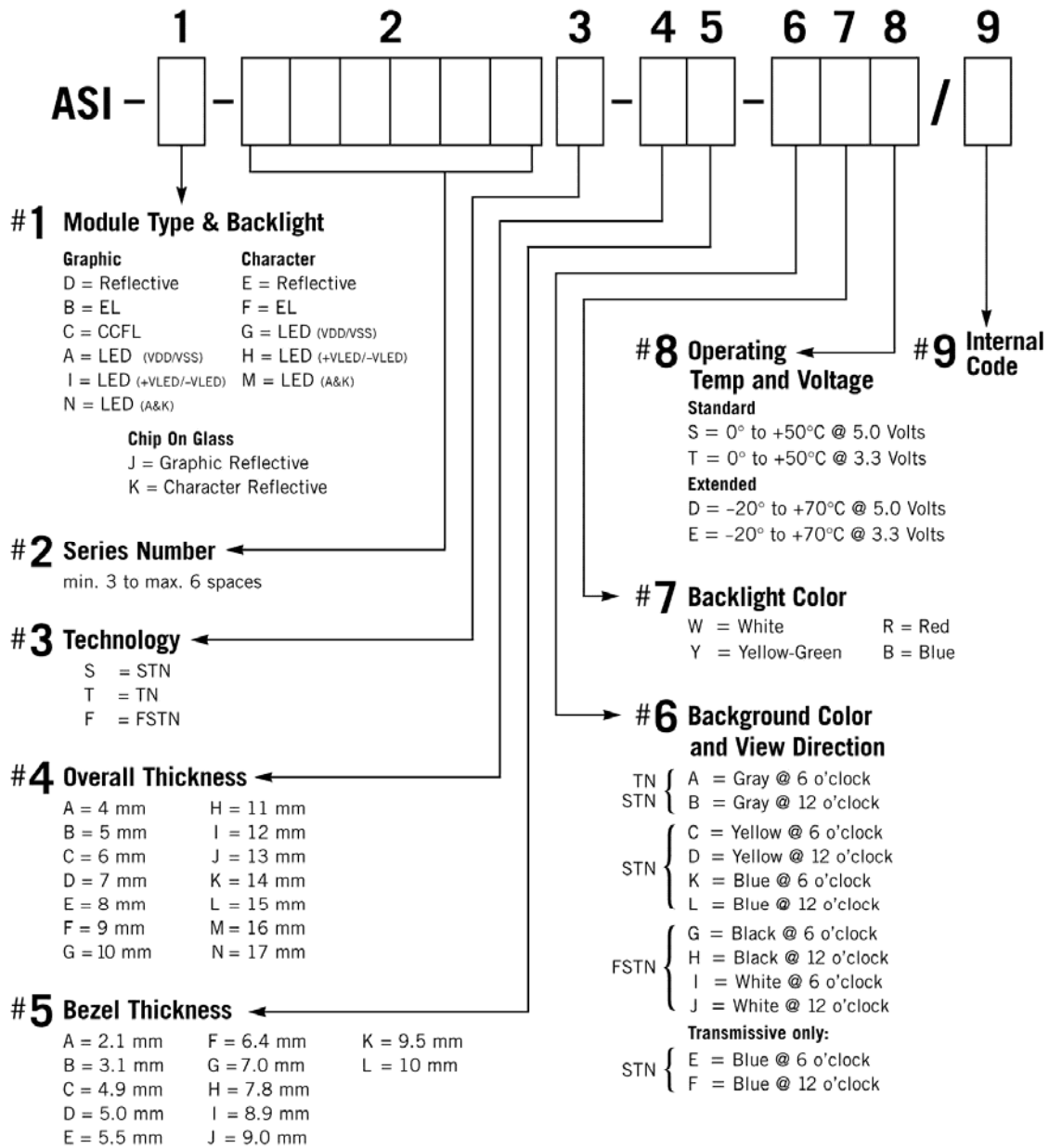
- (1) NUMBER OF DOT-----16 CH \* 2 LINE
- (2) MODULE SIZE-----80.0 W \*36.0 H \* 10.0 T(max) mm
- (3) EFFECTIVE AREA -----64.5 W \* 16.0 H mm
- (4) CHARACTER PATTERN -----5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE-----2.96W \* 4.86 H mm
- (6) CHARACTER PITCH -----3.55 mm
- (7) DOT SIZE-----0.56 W \* 0.66 H mm
- (8) DOT PITCH -----0.60W \* 0.70H mm





MODEL NO : ASI-E-162BS-GC-\_S/W

**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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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

**AS – 002A**

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

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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 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):

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

#### Environmental absolute maximum ratings

<i>I T E M</i>	<i>CONDITION</i>	<i>OPERATING</i>		<i>STORAGE</i>		<i>COMMENT</i>
		<i>MIN.</i>	<i>MAX.</i>	<i>MIN.</i>	<i>MAX.</i>	
AMBIENT TEMPERATURE	NORMAL	0°C	50°C	-20°C	70°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**
 $T_a = 25^\circ\text{C}$ 
 $V_{DD} = 5.0V \pm 0.25 V$ 

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	
INPUT VOLTAGE	$V_{IH}$	-----	2.2	-----	-----	V	
	$V_{IL}$	-----	-----	-----	0.6	V	
OUTPUT VOLTAGE	$V_{OH}$	$-I_{OH} = 0.205 \text{ mA}$	2.4	-----	-----	V	
	$V_{OL}$	$I_{OL} = 1.2 \text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT	$I_{DD}$	$V_{DD} = 5.0V$	-----	1.0	1.5	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(1)	$V_{DD}-V_O$	STN/ FSTN DUTY =1/16 $\Phi=10^\circ$ NOTE(2)	$T_a = -20^\circ\text{C}$	-----	4.8	-----	V
			$T_a = 0^\circ\text{C}$	-----	4.7	-----	V
			$T_a = 25^\circ\text{C}$	-----	4.5	-----	V
			$T_a = 50^\circ\text{C}$	-----	4.3	-----	V
			$T_a = 70^\circ\text{C}$	-----	4.2	-----	V
		TN DUTY =1/16 $\Phi=25^\circ$ NOTE(2)	$T_a = -20^\circ\text{C}$	-----	4.7	-----	V
			$T_a = 0^\circ\text{C}$	-----	4.6	-----	V
			$T_a = 25^\circ\text{C}$	-----	4.2	-----	V
			$T_a = 50^\circ\text{C}$	-----	3.8	-----	V
			$T_a = 70^\circ\text{C}$	-----	3.7	-----	V
POWER SUPPLY CURRENT FOR NOTE(3)	$I_{LED}$	NOTE(3)	-----	NOTE(3)	NOTE(3)	mA	

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT  $\pm 0.5V$  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

<i>LED B.L TYPE</i>	$V_{LED}$	$I_{LED}$				<i>LED COLOR</i>
		<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT.</i>	
A	4.8V	-----	30	40	mA	YELLOW-GREEN、AMBER、ORANGE、RED
$\triangle$ B (double LED)	4.0V	-----	30	40	mA	BLUE、WHITE、PURE GREEN
$\triangle$ C (single LED)	4.0V	-----	15	20	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 LCM

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

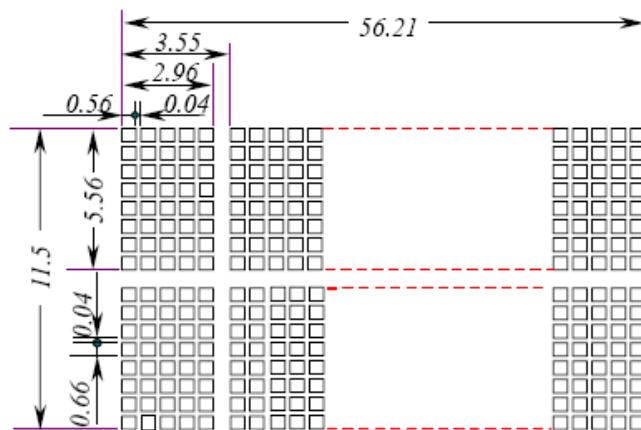
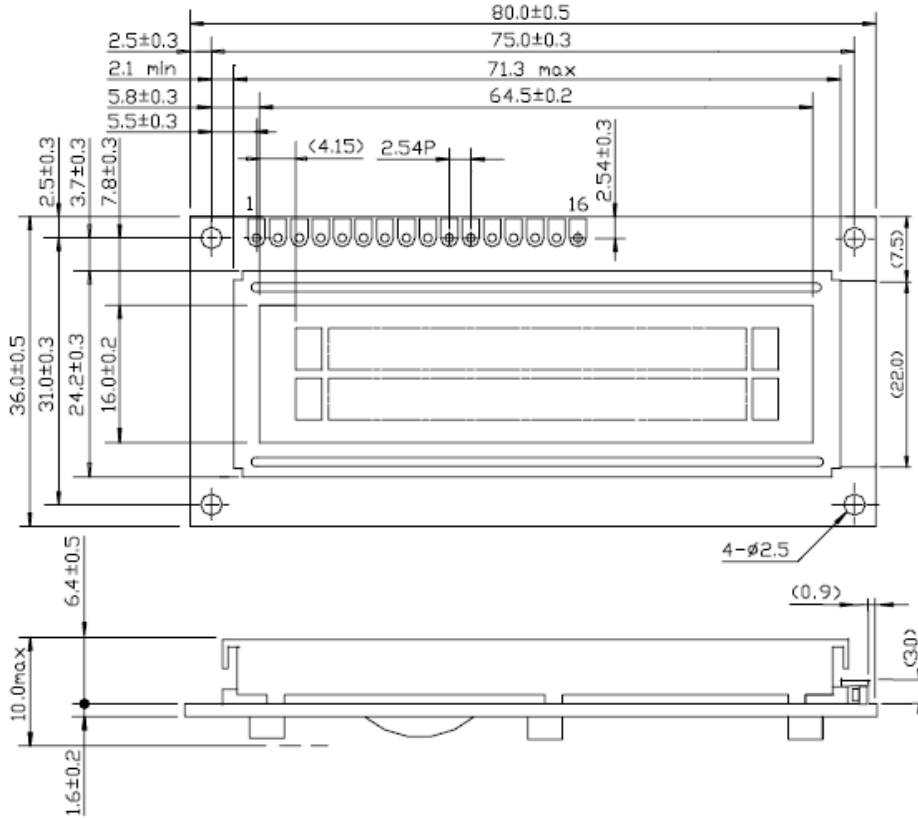
(2): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR  
 DEFINITION OF OPTICAL CHARACTERISTICS.

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



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*Outline dimension*



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

*Interface pin connection*

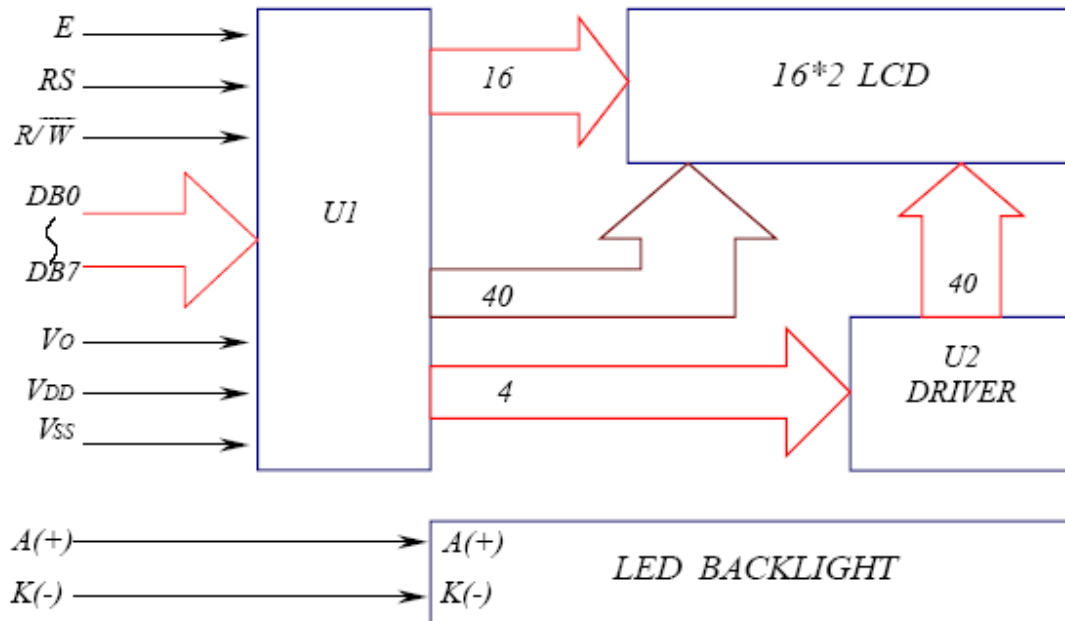
<i>PIN NO.</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
SYMBOL	V <sub>SS</sub>	V <sub>DD</sub>	V <sub>O</sub>	R <sub>S</sub>	R/ $\bar{W}$	E	DB0	DB1
<i>PIN NO.</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7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





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*Block diagram*



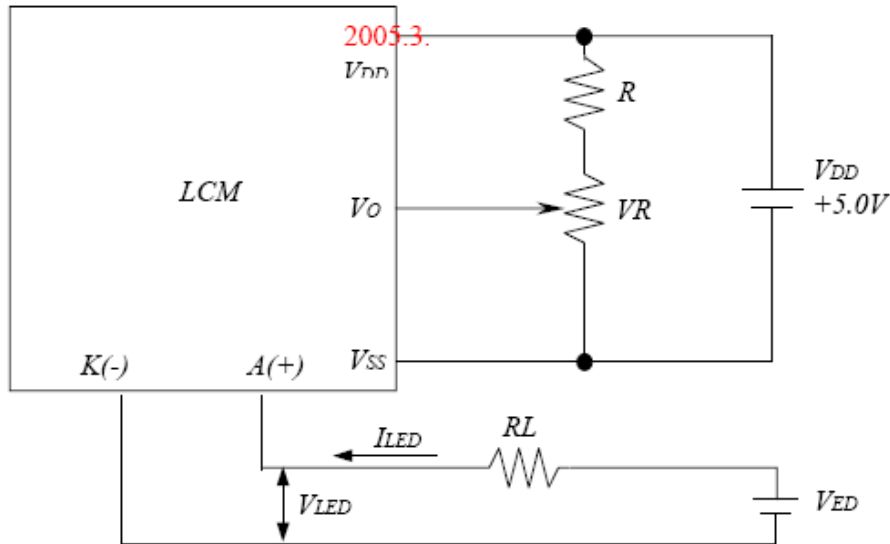
*Display data address charts*

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	$RL \geq ((V_{ED}-4.8V) / I_{LED})$ , $I_{LED} \leq 40mA$
	B	$RL \geq ((V_{ED}-4.0V) / I_{LED})$ , $I_{LED} \leq 40mA$
	C	$RL \geq ((V_{ED}-4.0V) / I_{LED})$ , $I_{LED} \leq 20mA$

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.