



ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

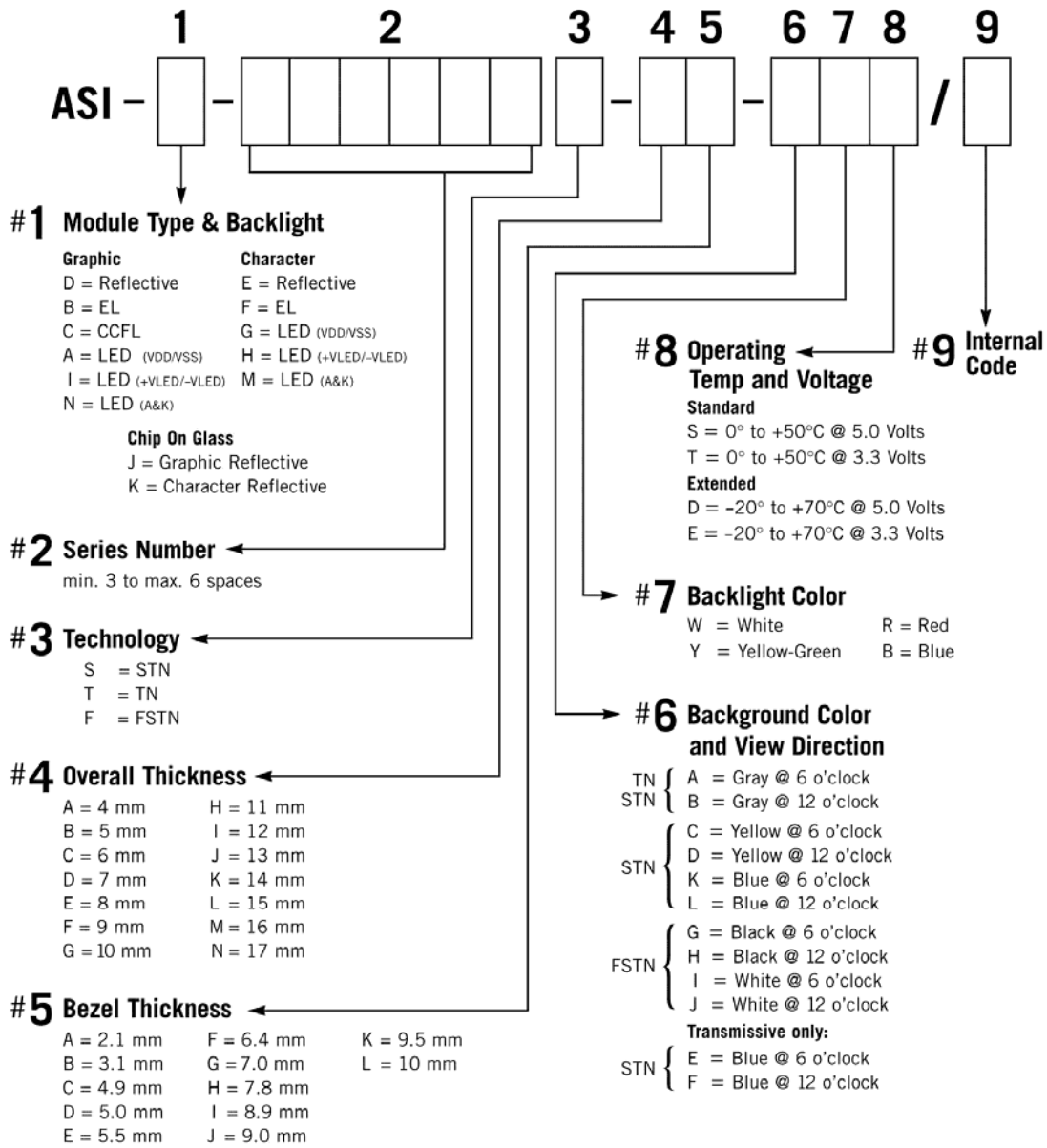
MODULE #: ASI-G-162FS-GF-_WS/W

- (1) NUMBER OF DOT-----16 CH * 2 LINE
- (2) MODULE SIZE -----84.0 W * 44.0 H * 10.0T(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 -----0.60 W * 0.70H mm



MODEL NO : ASI_-162FS-GF-_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_-162FS-GF-_WS/W

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

- (1) NUMBER OF DOT-----16 CH * 2 LINE
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3. 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	6.0	V	-----
INPUT VOLTAGE	V_i	V_{SS}	V_{DD}	V	-----
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)
POWER SUPPLY FOR LED	V_{LED}	-----	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_{LED} MAX.</i>	<i>LED TYPE</i>
V_{LED}	6.0V	YELLOW-GREEN,AMBER,ORANGE,RED
	5.0V	BLUE,GREEN,WHITE

5.2 Environmental absolute maximum ratings

<i>I T E M</i>	<i>OPERATING</i>			<i>STORAGE</i>		<i>COMMENT</i>
	<i>CONDITION</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 (3)		NOTE (3)		NO CONDENSATION	
VIBRATION NOTE (4)	-----	0.5G	-----	2G		10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (4)	-----	3G	-----	50G		10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		-----	

NOTE (3): $T_a \leq 50^\circ\text{C}$: 90% RH MAX.

$T_a > 50^\circ\text{C}$: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50°C . (80%RH AT 60°C)

NOTE (4): 1G = 9.8 m/s^2



MODEL NO : ASI_-162FS-GF-_WS/W

4. ELECTRICAL CHARACTERISTICS

Electrical characteristics

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

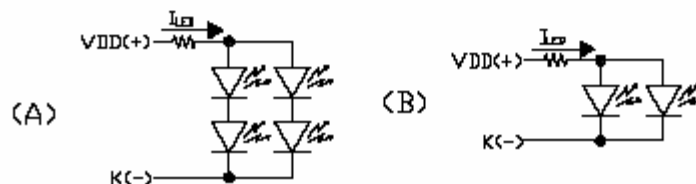
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
INPUT VOLTAGE	V_{IH}	-----	2.2	-----	-----	V	
	V_{IL}	-----	-----	-----	0.6	V	
OUTPUT VOLTAGE	V_{OH}	$-I_{OH} = 0.205\text{ mA}$	2.4	-----	-----	V	
	V_{OL}	$I_{OL} = 1.2\text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT	I_{DD}	$V_{DD} = 5.0\text{V}$	-----	1.0	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)	$T_a=-20^\circ\text{C}$	-----	4.5	-----	V
			$T_a= 0^\circ\text{C}$	-----	4.4	-----	V
			$T_a= 25^\circ\text{C}$	-----	4.2	-----	V
			$T_a= 50^\circ\text{C}$	-----	4.0	-----	V
			$T_a= 70^\circ\text{C}$	-----	3.9	-----	V
POWER SUPPLY CURRENT FOR LED	I_{LED}	V_{LED}	-----	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 DEFFERENT LED TYPE

TYPE	I_{LED} TYP. / MAX.	LED TYPE
A	30mA / 40mA	YELLOW-GREEN 、 AMBER 、 ORANGE 、 RED
B	30mA / 40mA	BLUE 、 GREEN 、 WHITE



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Optical characteristics

TN TYPE LCD

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

I T E M	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

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

I T E M	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 TYPE LCD

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

I T E M	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 ²	YELLOW-GREEN、RED、 AMBER、ORANGE	NOTE(2)
	$\theta = 0^{\circ}$	6.0	----	----			BLUE、GREEN、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.

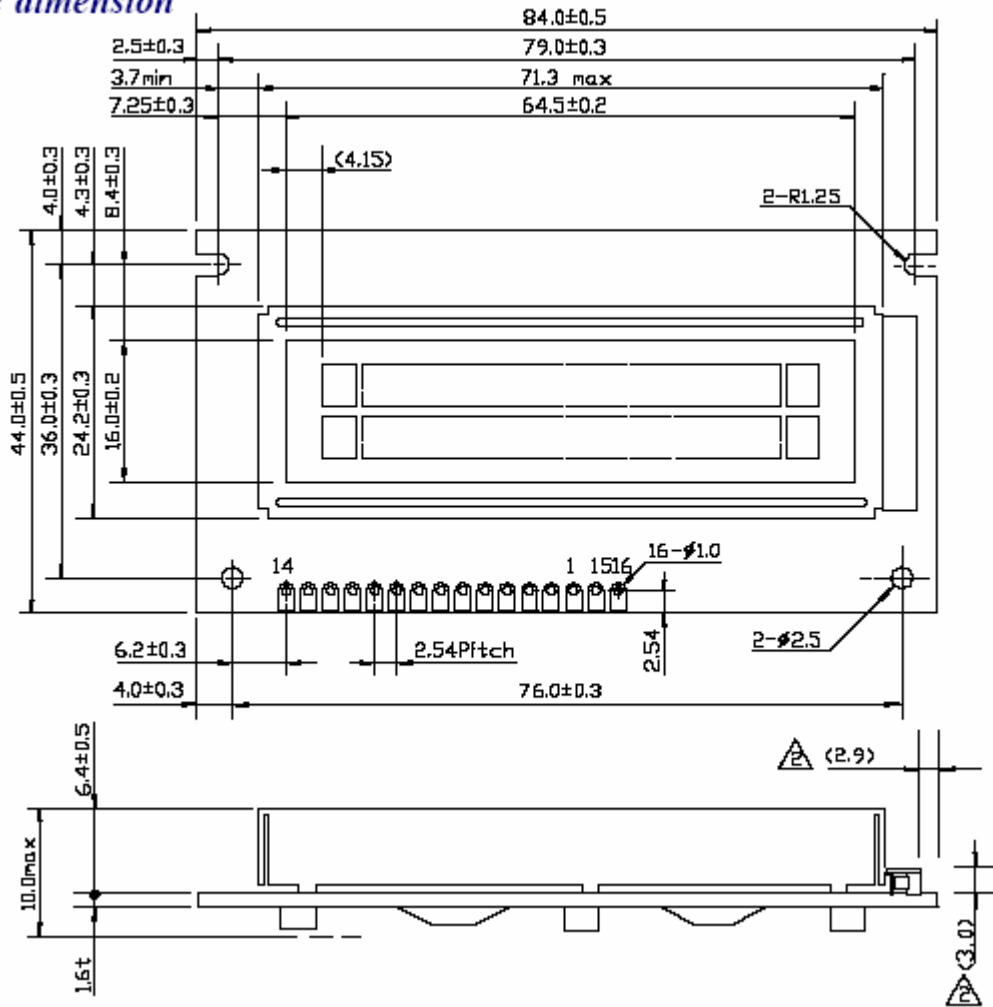
(3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.



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6. OUTLINE DIMENSION

Outline dimension



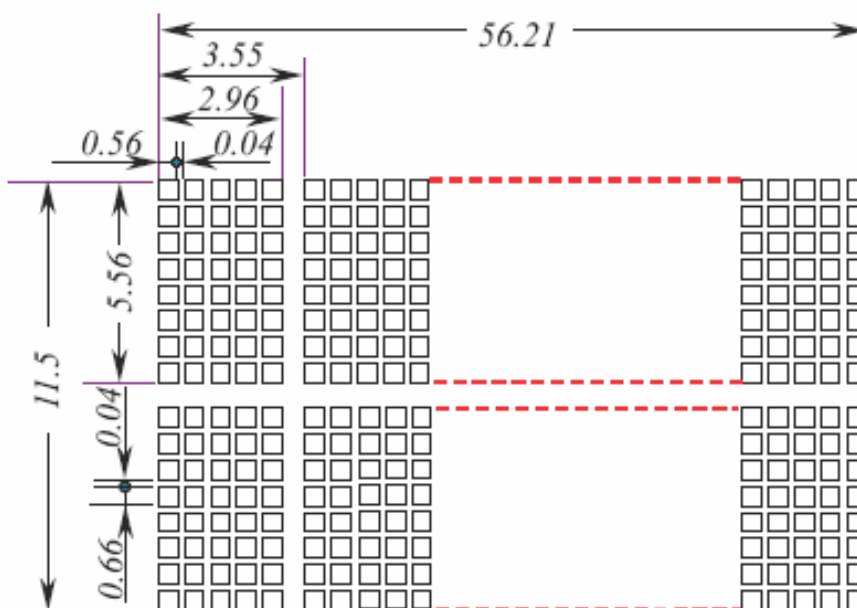


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Note: Available in different bezel size and options.

THICKNESS	Bezel	PCB	Overall	UNIT
EL & NO B.L	4.9	1.6	10.0	mm
LED B.L (edge)	5.5	1.0	10.0	mm
LED B.L (array)	7.0	1.0	10.0	mm
LED B.L (edge)	6.4	1.6	10.0	mm
LED B.L (array)	7.8	1.6	13.0	mm
LED B.L (array)	8.9	1.6	15.0	mm
LED B.L (array)	9.5	1.6	15.0	mm

Dot Matrix





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7. Interface Pin Connection Options:

G) LED powered on (VDD/VSS).

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 _{SS}	V _{DD}	V _O	RS	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	NC	NC

H) LED powered on +VLED/-VLED with built in current limiting resistor.

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 _{SS}	V _{DD}	V _O	RS	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	+V _{LED}	-V _{LED}

M) LED powered on A & K with external current limiting resistor require by end user.

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 _{SS}	V _{DD}	V _O	RS	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(-)

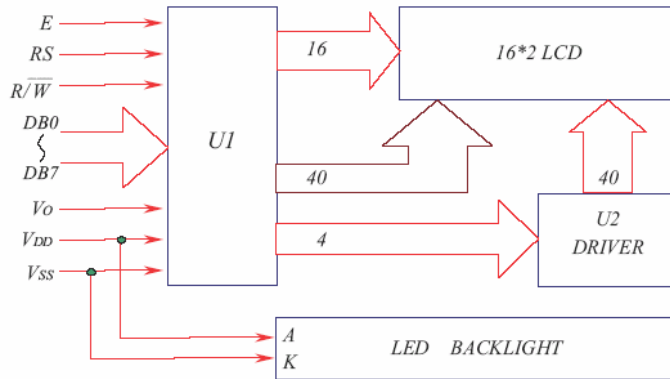
8. Character Display Data

<i>Character</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>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF

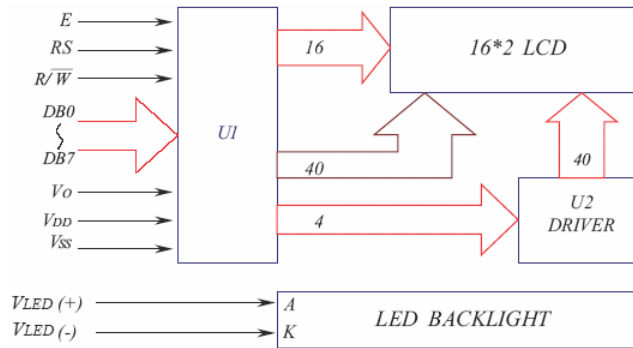
MODEL NO : ASI_-162FS-GF-_WS/W

9. Block Diagram

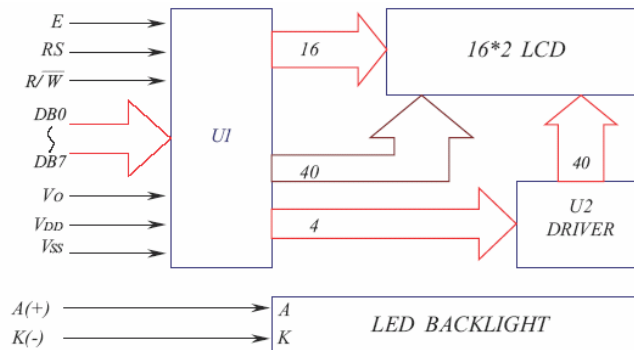
G) LED powered on (VDD/VSS).



G) LED powered on +VLED/-VLED with built in current limiting resistor.



M) LED powered on A & K with current limiting resistor require by end user

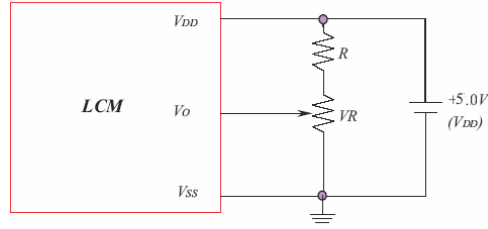


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10. Power Supply

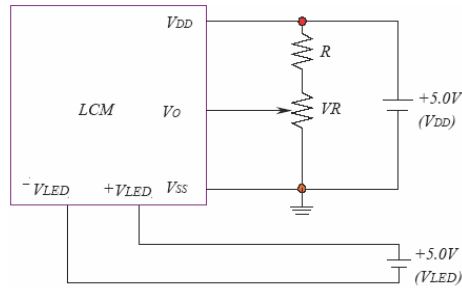
10.1 Power Supply For LCM and LED Backlight Options

G) LED powered on (VDD/VSS).



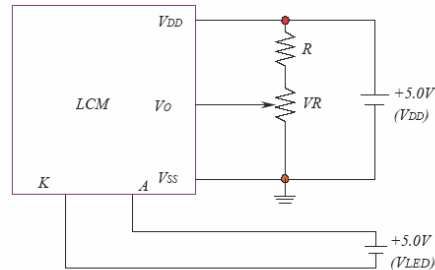
RECOMMENDED RESISTOR R : $V_{DD}-V_o \geq 1.5V$
 $V_{DD}-V_o$: LCD DRIVING VOLTAGE
 VR: $10K\Omega \sim 20K\Omega$

H) LED powered on +VLED/-VLED with built in current limiting resistor.



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

M) LED powered on A & K with external current limiting resistor require by end user.



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



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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.