



ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

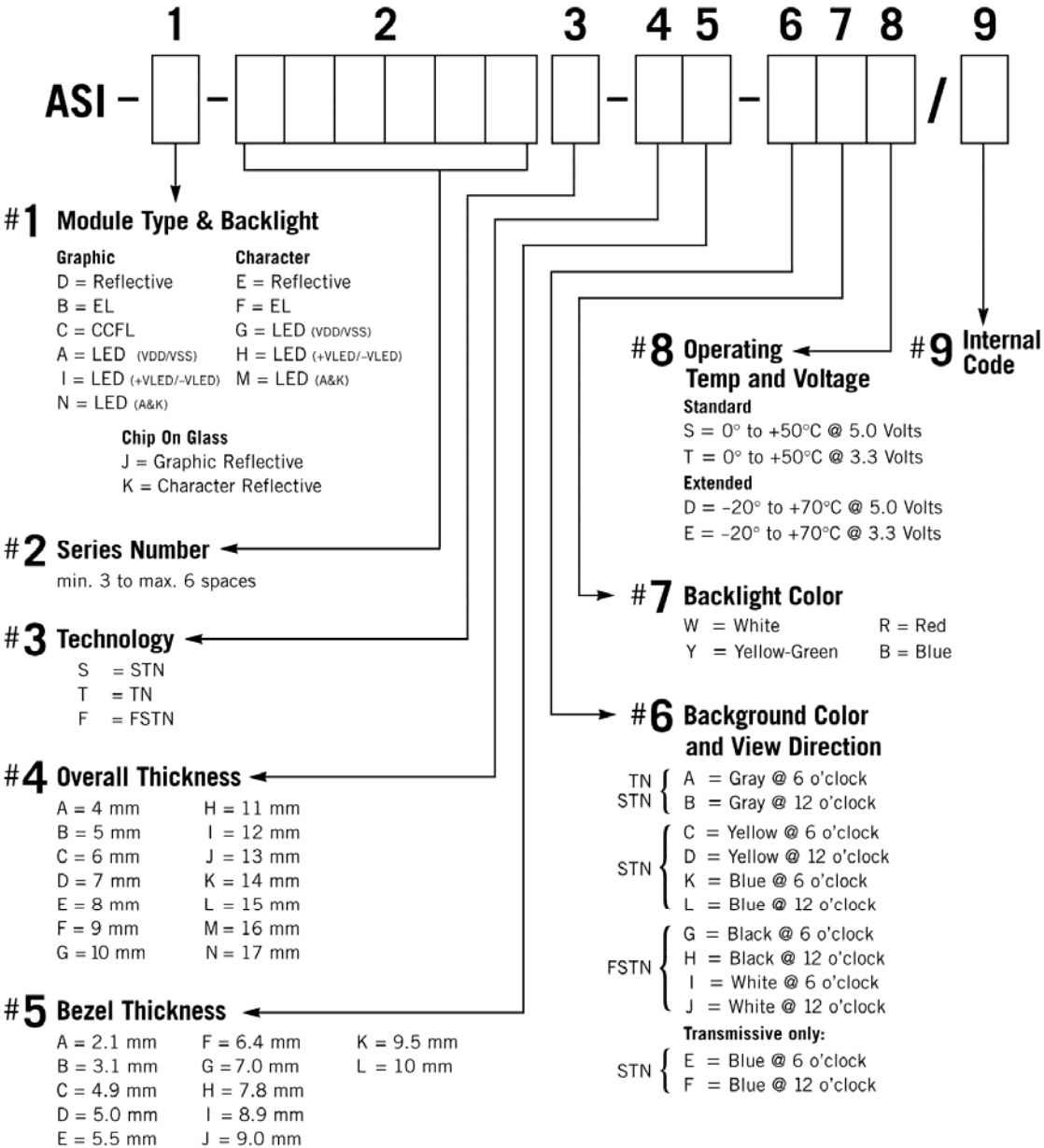
MODULE # : ASI-_-402AS-LK-_YS/W

- (1) NUMBER OF CHARACTERS-----40 CH * 2 LINE
- (2) MODULE SIZE -----182.0 W * 33.5 H * 10.0 T (Max) mm
- (3) EFFECTIVE AREA -----154.0 W * 15.3 H mm
- (4) CHARACTER PATTERN -----5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE-----3.20 W * 4.85 H mm
- (6) CHARACTER PITCH -----3.70 mm
- (7) DOT SIZE-----0.60 W * 0.65 H mm
- (8) DOT PITCH -----0.65 W * 0.70 H mm



MODEL NO : ASI_-402AS-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_-402AS-LK-_YS/W

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

AS - 10 – 12780

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER : 12780

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

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3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . (AT Ta = 25°C)

<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}	5.5V	YELLOW-GREEN,AMBER,ORANGE,RED
	5.0V	BLUE,PURE GREEN,WHITE



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3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATING

ITEM	CONDITION	OPERATING		STORAGE		COMMENT
		MIN.	MAX.	MIN.	MAX.	
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): $T_a \leq 50^\circ\text{C}$: 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 (3): $1G = 9.8 \text{ m/s}^2$

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4. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
INPUT VOLTAGE	V _{IH}	-----	2.0	-----	V _{DD}	V	
	V _{IL}	-----	V _{SS}	-----	0.8	V	
OUTPUT VOLTAGE	V _{OH}	-I _{OH} = 0.2 mA	2.4	-----	-----	V	
	V _{OL}	I _{OL} = 1.6 mA	-----	-----	0.4	V	
POWER SUPPLY CURRENT	I _{DD}	V _{DD} = 5.0V	-----	2.0	3.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(1)	V _{DD} -V _O	STN/ FSTN DUTY =1/16 Φ=10° NOTE(2)	Ta=-20°C	-----	4.8	-----	V
			Ta= 0°C	-----	4.7	-----	V
			Ta= 25°C	-----	4.5	-----	V
			Ta= 50°C	-----	4.3	-----	V
			Ta= 70°C	-----	4.2	-----	V
		TN DUTY =1/16 Φ=25° NOTE(2)	Ta=-20°C	-----	4.7	-----	V
			Ta= 0°C	-----	4.6	-----	V
			Ta= 25°C	-----	4.2	-----	V
			Ta= 50°C	-----	3.8	-----	V
			Ta= 70°C	-----	3.7	-----	V
POWER SUPPLY CURRENT FOR NOTE(3)	I _{LED}	V _{LED} NOTE(3)	-----	30	40	mA	

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ±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

LED B.L TYPE	V _{LED}	I _{LED}				LED COLOR
		MIN.	TYP.	MAX.	UNIT.	
A	4.5V	----	30	40	mA	YELLOW-GREEN、AMBER、ORANGE、RED
B	4.0V	----	30	40	mA	BLUE、WHITE、PURE GREEN

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5. OPTICAL CHARACTERISTICS .

$T_a = 25^{\circ}\text{C}$ $V_{DD} = 5.0\text{V}$
 $T_a = 25^{\circ}\text{C}$ $V_{DD}-V_O = 4.2\text{V}$

TN TYPE LCD

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

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

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)

FSTN /STN BLUE TYPE LCD

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

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 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、PURE GREEN、 WHITE	NOTE(3)

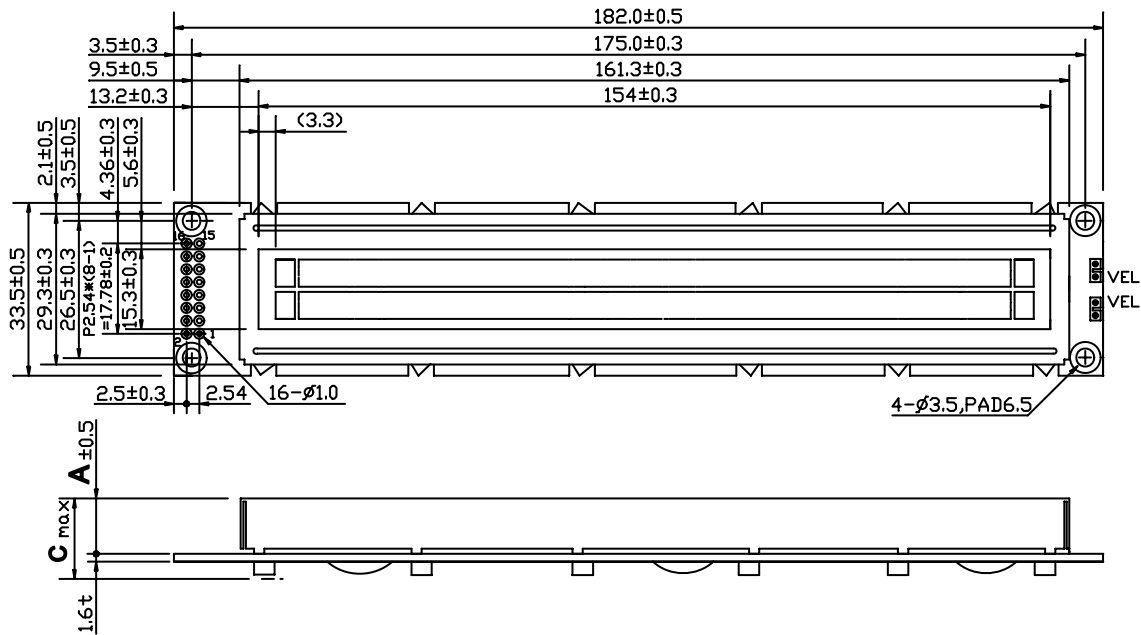
NOTE (1): $\theta = 0^{\circ}$ WHEN VIEWING ANGLE AT 6 O'CLOCK
 $\theta = 180^{\circ}$ WHEN VIEWING ANGLE AT 12 O'CLOCK

(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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6. OUTLINE DIMENSION



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

Interface pin connection

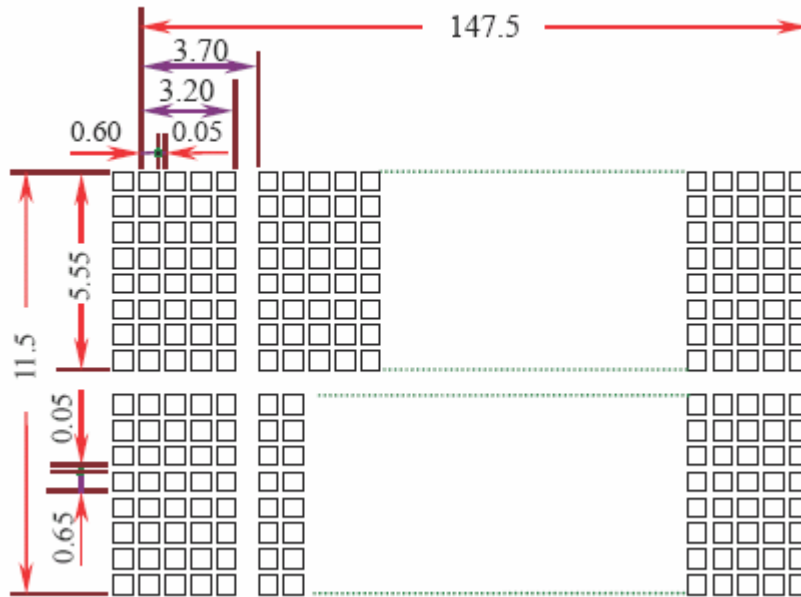
<i>PIN NO.</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0
<i>PIN NO.</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>
SYMBOL	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Interface pin connection

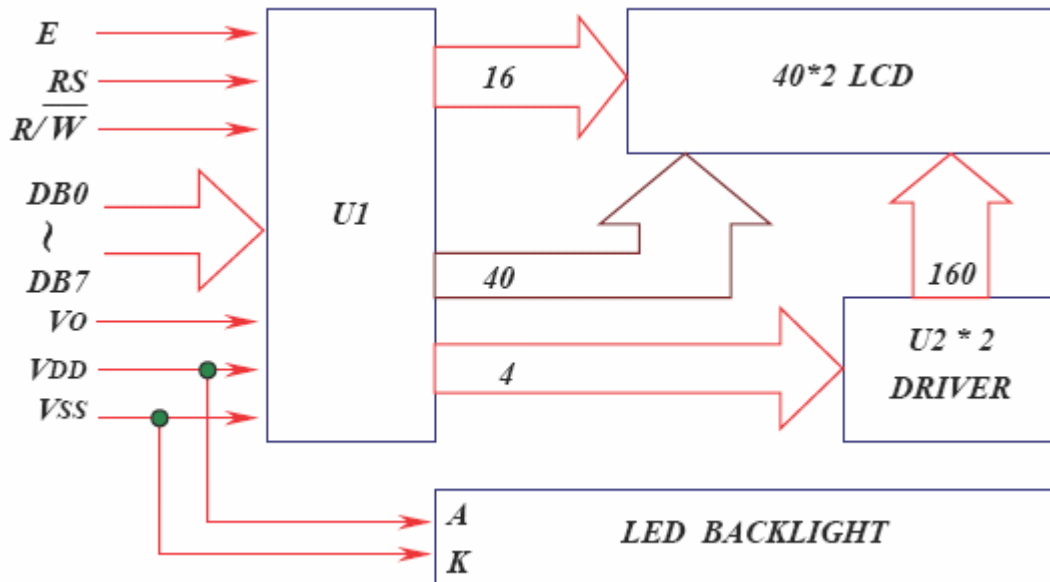
<i>PIN NO.</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0	DB1
<i>PIN NO.</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	A(+)	K(-)

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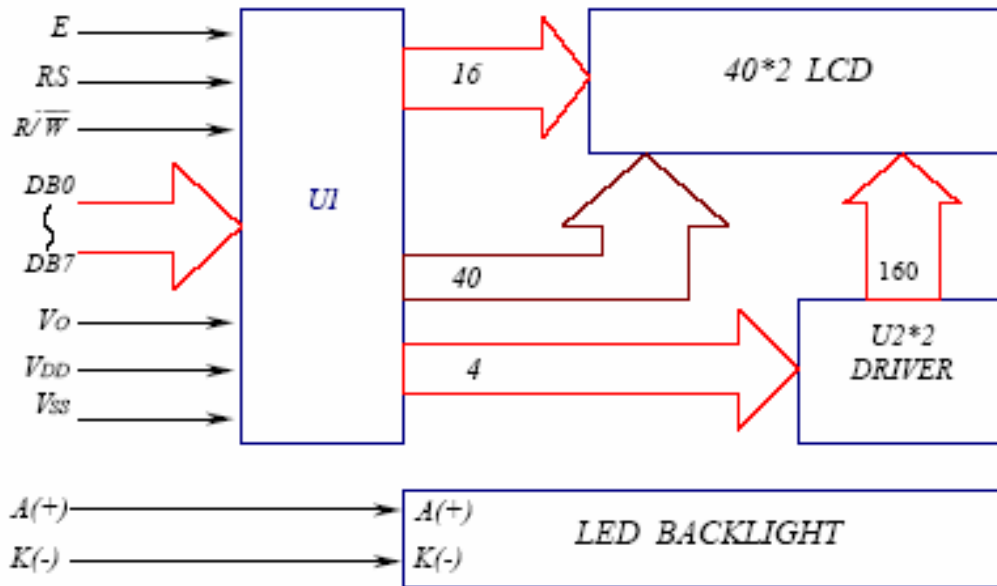
7. DETAIL DRAWING OF DOT MATRIX



8. BLOCK DIAGRAM



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9 DATA DISPLAY ADDRESS CHART

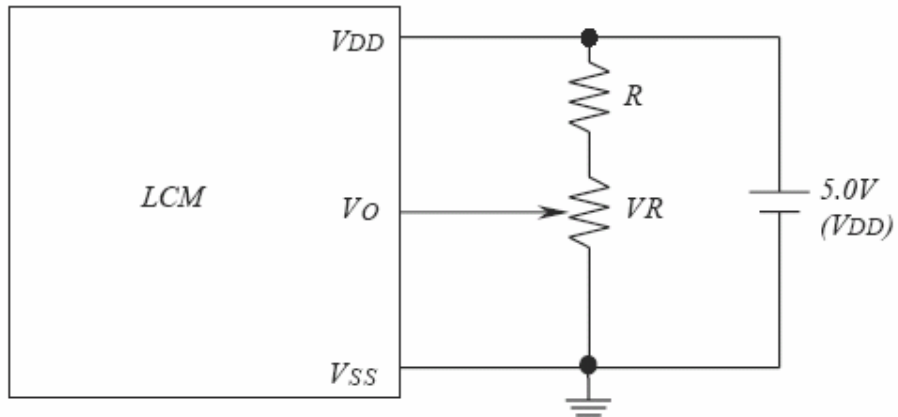
Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13
LINE 2	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	50	51	52	53

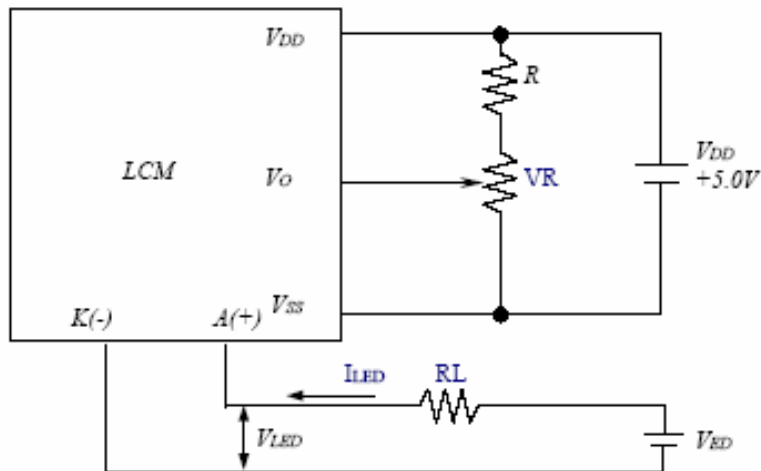
Character	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
LINE 1	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27
LINE 2	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	60	61	62	63	64	65	66	67

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10. POWER SUPPLY



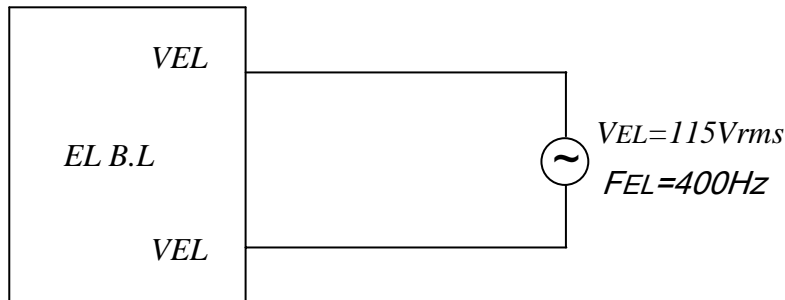
RECOMMENDED RESISTOR R: $V_{DD} - V_O \geq 1.5V$
 $V_{DD} - V_O$: LCD DRIVING VOLTAGE
 VR: $10K\Omega \sim 20K\Omega$



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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<i>ITEM</i>	<i>LED TYPE</i>	<i>CONDITION</i>
Limit resistor of LED (RL)	A	$RL \geq ((V_{LED}-4.5V) / I_{LED})$, $I_{LED} \leq 40mA$
	B	$RL \geq ((V_{LED}-4.0V) / I_{LED})$, $I_{LED} \leq 40mA$



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.