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The LCD(M) Specialist

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PART NO.: PMC2004E-SYL-2

FOR MESSRS.: _____

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ACCEPTED BY: PROPOSED BY :

RECORD OF REVISION

DATE	PAGE	SUMMARY
6.28.1999	7	Changed block diagram to the new block diagram.
	8	Changed power supply for LCM to the new power supply for LCM.

3. General specifications

3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-12780)”.

3.2 This individual specification is prior to general specifications

4. Mechanical data

- (1) NUMBER OF CHARACTER----- 20 CH * 4 LINE
- (2) MODULE SIZE----- 98.0 W * 60.0 H * 15.0 T (max) mm
- (3) EFFECTIVE AREA ----- 76.0 W * 25.2 H mm
- (4) CHARACTER PATTERN ----- 5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 2.95 W * 4.15 H mm
- (6) CHARACTER PITCH ----- 3.55 mm
- (7) DOT SIZE----- 0.55 W * 0.55 H mm
- (8) DOT PITCH ----- 0.60 W * 0.60 H mm
- (9) VIEWING DIRECTION----- 6 O’CLOCK
- (10) LCD TYPE ----- STN.YELLOW-GREEN.TRANSFLECTIVE.
- (11) LED BACKLIGHT COLOR ----- YELLOW-GREEN

5. 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}	————	6.0	V	

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

5.2 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	0°C	50°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): Ta * 50°C: 90% RH MAX.

Ta ≥ 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/s²

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

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>
INPUT VOLTAGE	V _{IH}	—————	2.2	—————	—————	V
	V _{IL}		—————	—————	0.6	V
OUTPUT VOLTAGE	V _{OH}	-I _{OH} = 0.2 mA	2.4	—————	—————	V
	V _{OL}	I _{OL} = 1.2 mA	—————	—————	0.4	V
POWER SUPPLY CURRENT	I _{DD}	V _{DD} = 5.0V	—————	2.0	3.5	mA
RECOMMENDED LCD DRIVING VOLTAGE	V _{DD-Vo} DUTY= 1/16	T _a = 0°C	—————	5.0	—————	V
		T _a = 25°C	—————	4.8	—————	V
		T _a = 50°C	—————	4.3	—————	V
POWER SUPPLY CURRENT FOR LED	I _{LED}	V _{LED} = 5.0V	—————	200	350	mV

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

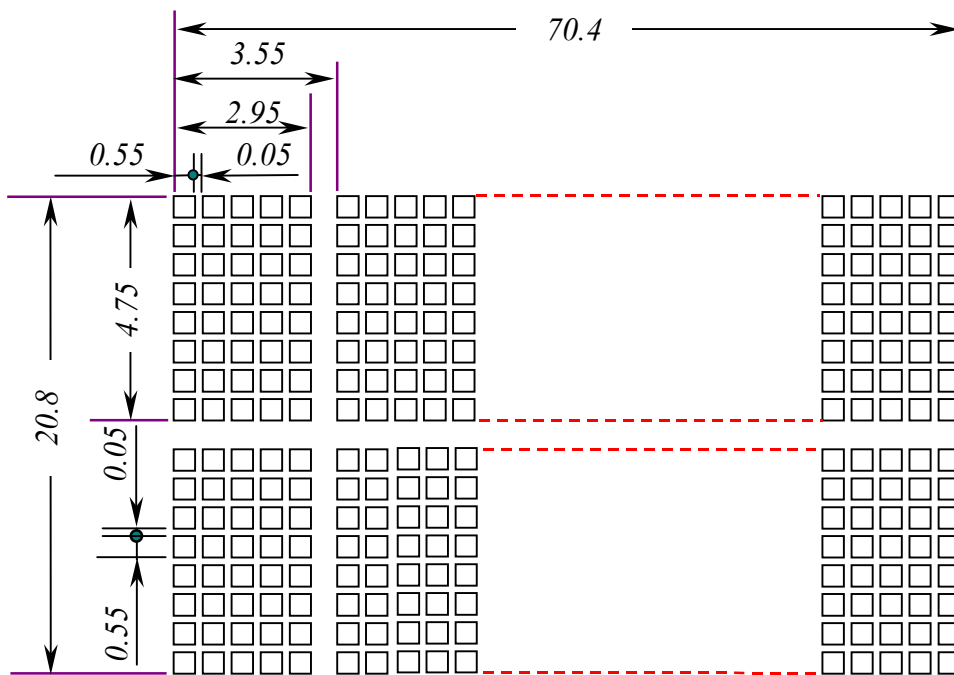
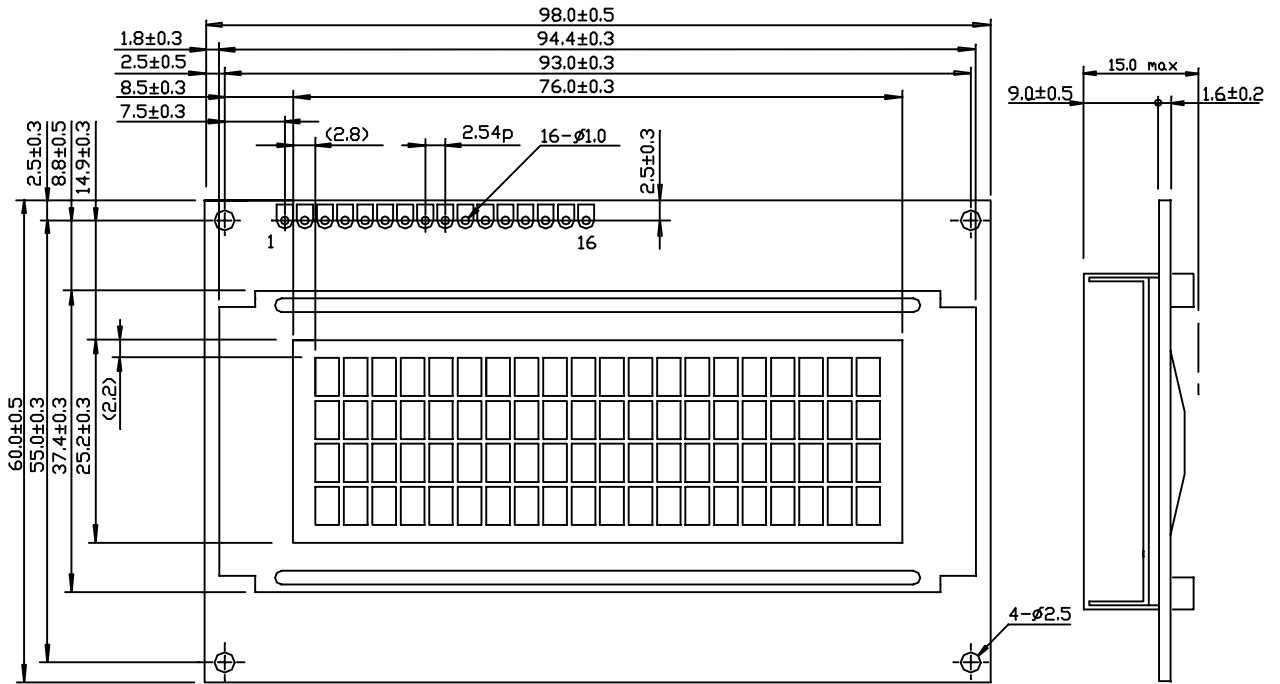
7. Optical characteristics $T_a = 25^{\circ}\text{C}$ $V_{DD} = 5.0\text{V}$

<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	30	40	—————	deg.	2
CONTRAST RATIO	K	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	—————	5	—————	—————	2
RESPONSE TIME	t _r (rise)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	—————	250	400	ms	2
	t _f (fall)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	—————	350	450	ms	2
BRIGHTNESS FOR LED BACKLIGHT	B	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$	5.0	—————	—————	cd/m ²	2,3

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

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

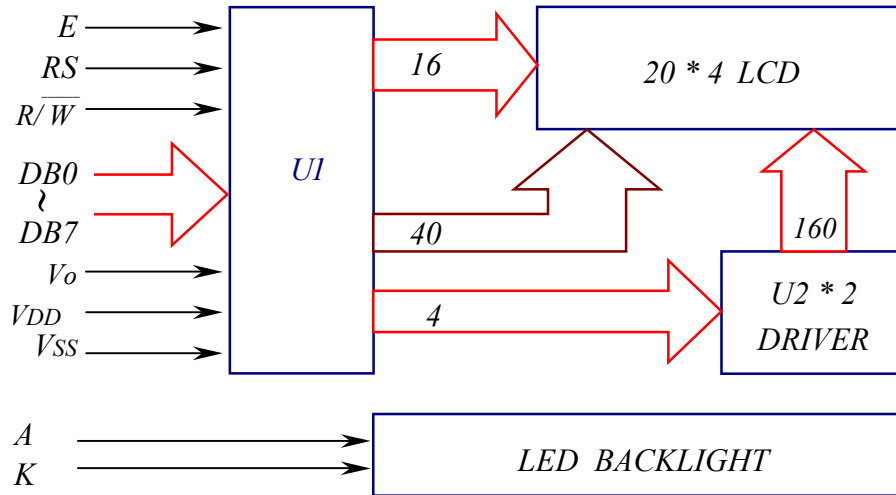
8. Outline dimension



Interface pin connection

PIN NO.	1	2	3	4	5	6	7	8
SYMBOL	V _{SS}	V _{DD}	V _o	RS	R/W	E	DB0	DB1
PIN NO.	9	10	11	12	13	14	15	16
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	A	K

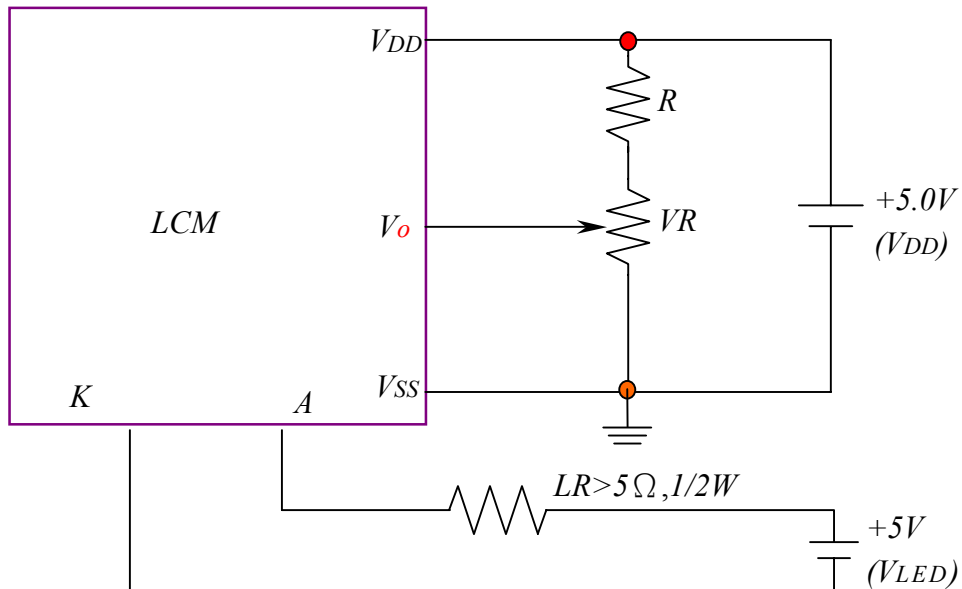
9. Block diagram



Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	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

10. Power supply for LCM



RECOMMENDED RESISTOR R: $V_{DD} - V_o \geq 1.5V$

$V_{DD} - V_o$: LCD DRIVING VOLTAGE

VR: $10K\Omega \sim 20K\Omega$