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The LCD(M) Specialist

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FOR MESSRS. : _____

CONTENTS

NO.	ITEM	PAGE
1.	COVER	1
2.	RECORD OF REVISION	2
3.	GENERAL SPECIFICATION	3
4.	MECHANICAL DATA	3
5.	ABSOLUTE MAXIMUM RATINGS	4
6.	ELECTRICAL CHARACTERISTICS	5
7.	OPTICAL CHARACTERISTICS	5
8.	OUTLINE DIMENSION	6
9.	BLOCK DIAGRAM	7
10.	POWER SUPPLY	7



ACCEPTED BY : PROPOSED BY :

RECORD OF REVISION

DATE	PAGE	SUMMARY

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 CHARACTERS -----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.NEGATIVE.TRANSMISSIVE
- (11) LED BACKLIGHT COLOR -----WHITE

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	50	-20	70	-----
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 : 90% RH MAX.

Ta > 50 : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50 . (80% RH AT 60)

NOTE (3): 1G = 9.8 m/s²

6. Electrical characteristics $T_a = 25$ $V_{DD} = 5.0 \pm 0.25$ 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}	-----	2.0	-----	V _{DD}	V
	V _{IL}		V _{SS}	-----	0.8	V
OUTPUT VOLTAGE (H LEVEL)	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	3.5	V
RECOMMENDED LCD DRIVING VOLTAGE	V _{DD-Vo} DUTY= 1/16	T _a = 0	-----	5.0	-----	V
		T _a = 25	-----	4.6	-----	V
		T _a = 50	-----	4.3	-----	V
POWER SUPPLY CURRENT FOR LED	I _{LED}	V _{LED} = 5.0V	-----	80	120	mA

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

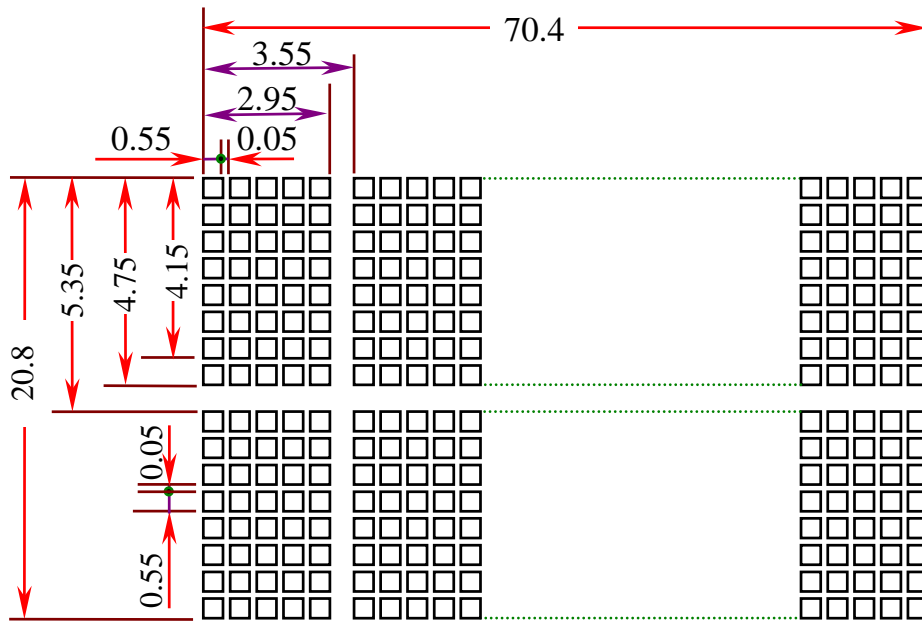
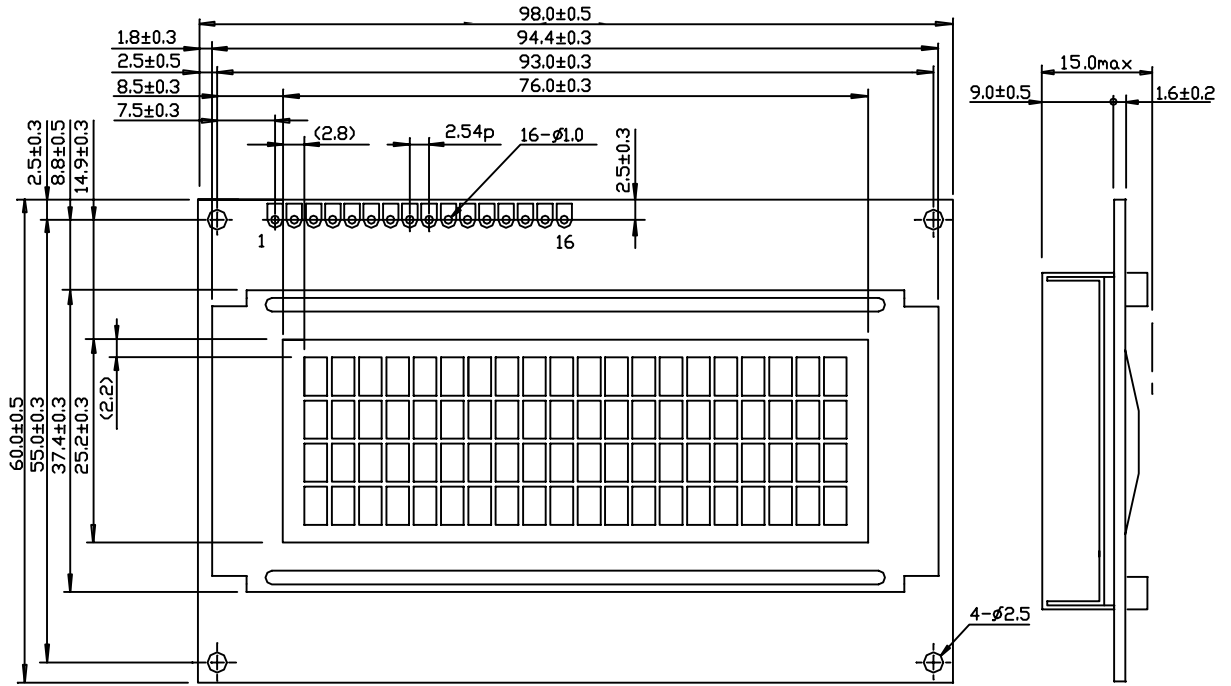
7. Optical characteristics $T_a = 25$ $V_{DD} = 5.0$ V

<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	2- 1	K = 2.0	30	40	-----	deg.	2
CONTRAST RATIO	K	= 10° = 0°	40	5.0	-----	-----	2
RESPONSE TIME	t _r (rise)	= 10° = 0°	-----	200	350	ms	2
	t _f (fall)	= 10° = 0°	-----	300	400	ms	2
BRIGHTNESS FOR LED BACKLIGHT	B	= 0° = 0°	6.0	-----	-----	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.

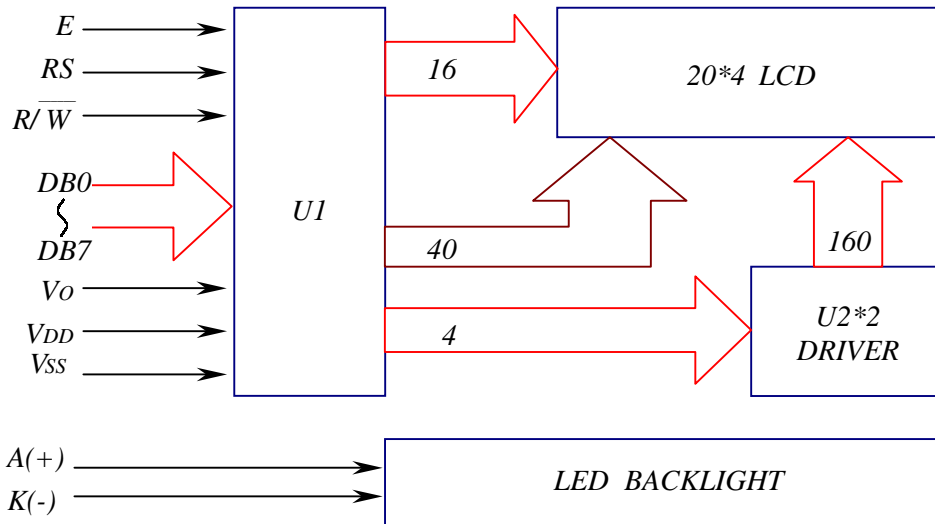
8. Outline dimension



Interface pin connection

PIN NO.	1	2	3	4	5	6	7	8
SYMBOL	VSS	VDD	Vo	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(-)

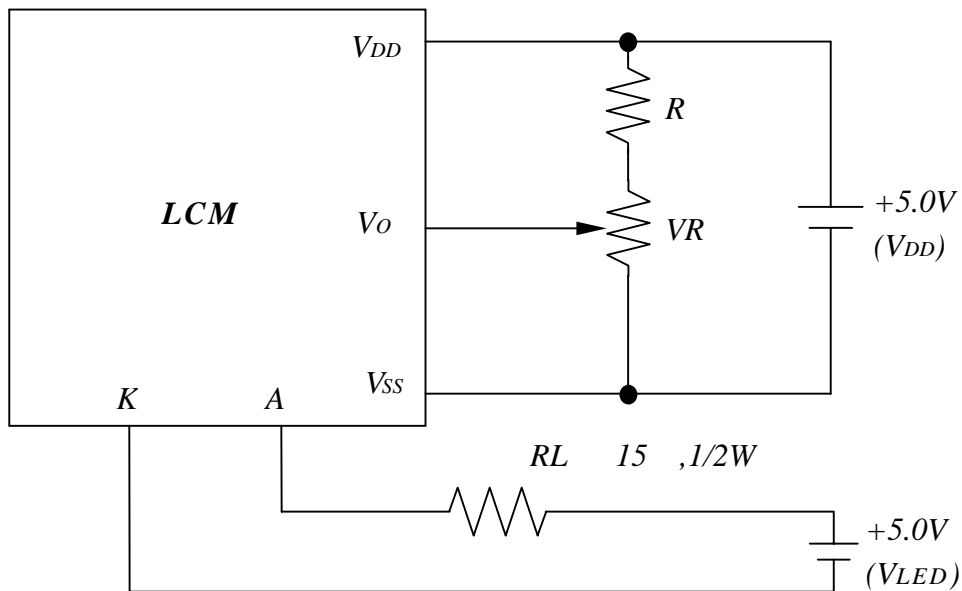
9. Block diagram



Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3
LINE 3	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7
LINE 4	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7

10. Power supply for LCM



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