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PART NO. : MC16011A-SERIES

FOR MESSRS. : _____

CONTENTS

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

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-10-0069)”.

3.2 This individual specification is prior to general specifications

3.3 NUMBERING SYSTEM

MC16011A	B	W	-	S	Y	M	L	O	U	N
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1).CHARACTER FONTS :

PLEASE REFER TO

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-0069)”

(2).LCM TEMPERATURE :

“nil” : NORMAL TEMP

“W” : WIDE TEMP

(3).LCD TYPE :

“T” : TN TYPE

“S” : STN TYPE

“H” : HTN TYPE

“F” : FSTN TYPE

(4).LCD COLOR :

“Y” : YELLOW-GREEN “B” : BLUE(STN/NEGATIVE)/BLACK(FSTN/NEGATIVE)

“G” : GRAY “W” : WHITE(FSTN/POSITIVE)

(5)LCD POLARIZE TYPE

“nil” : TRANSFLECTIVE

“M” : TRANSMISSIVE

(6).BACKLIGHT TYPE :

“L” : LED BACKLIGHT

“R” : REFLECTIVE

(7).BACKLIGHT COLOR :

LED TYPE :

“nil” : YELLOW-GREEN “A” : AMBER “O” : ORANGE

“R” : RED

(8).VIEWING DIRECTION :

“nil” : 6 O’ CLOCK

“3” : 3 O’ CLOCK

“U” : 12 O’ CLOCK

“9” : 9 O’ CLOCK

(9).BACKLIGHT TYPE :

“nil” : LED(+),LED(---)NORMAL

“N” : LED(+),LED(---)CHANGE

4. Mechanical data

- (1) NUMBER OF DOT----- 16 CH * 1 LINE
- (2) MODULE SIZE ----- 80.0 W *36.0 H * “C” T(max) mm
- (3) EFFECTIVE AREA ----- 64.5 W * 16.0 H mm
- (4) CHARACTER PATTERN ----- 5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE----- 3.07 W * 5.73 H mm
- (6) CHARACTER PITCH ----- 3.77 mm
- (7) DOT SIZE ----- 0.55 W * 0.75 H mm
- (8) DOT PITCH ----- 0.63W * 0.83H mm

NOTE : The dimension of "C" , please refer to Outline dimension on PAGE 8/9

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 T E M	CONDITION	OPERATING		STORAGE		COMMENT
		MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	NORMAL	0	50	-20	70	-----
	WIDE	-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

$T_a = 25$

$V_{DD} = 5.0 \pm 0.25 \text{ V}$

<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} =0.205 mA		2.4	-----	-----	V
	V _{OL}	I _{OL} = 1.2 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 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 B.L.	I _{LED}	V _{LED} = 5.0 V		-----	120	150	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

7. Optical characteristics

TN TYPE LCD

$T_a = 25$

$V_{DD}-V_O = 4.2V$

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

$T_a = 25$

$V_{DD}-V_O = 4.5V$

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 /STN BLUETYPE LCD

$T_a = 25$

$V_{DD}-V_O = 4.5V$

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 LCM

SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	LED TYPE	NOTE
B	$\Phi = 0^\circ$ $\theta = 0^\circ$	5.0	----	----	cd/m ²	YELLOW-GREEN, RED, AMBER, ORANGE	NOTE(2) NOTE(3)

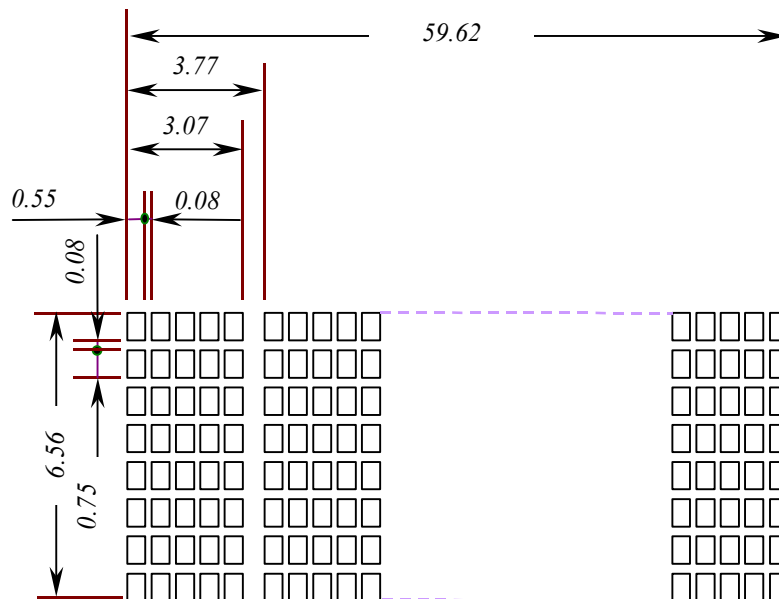
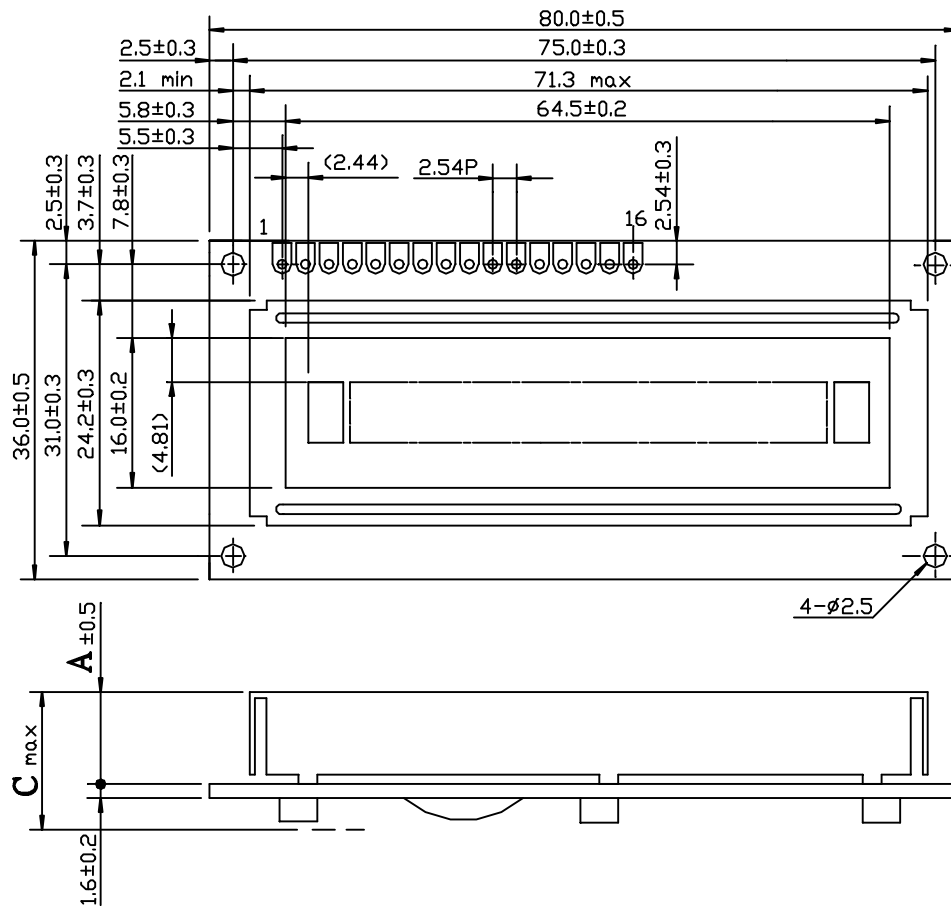
NOTE (1): $\theta = 0^\circ$ WHEN VIEWING ANGLE AT 6 O' CLOCK

$\theta = 180^\circ$ 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.

8. Outline dimension

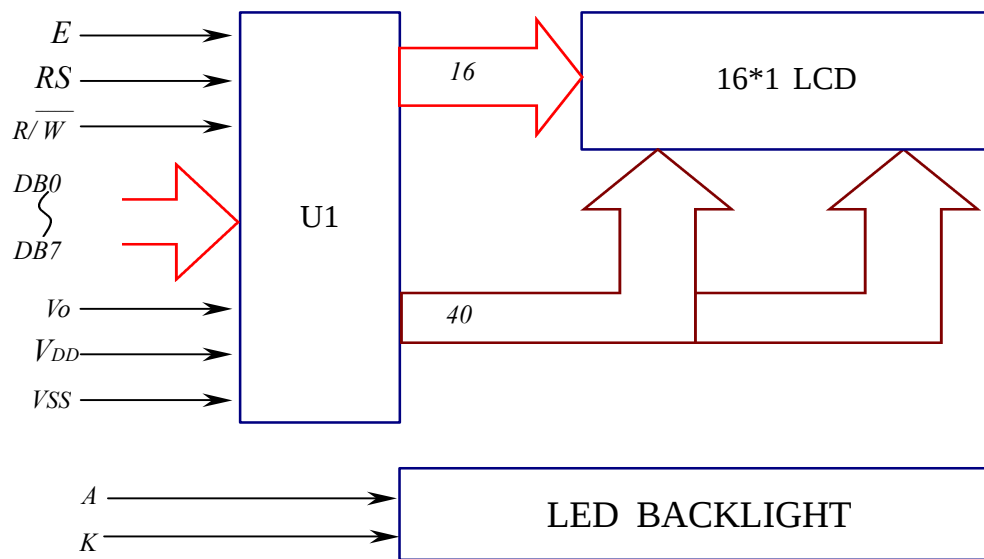


NOTE :
1.UNIT : mm
2.SCALE : NTS

Interface pin connection

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

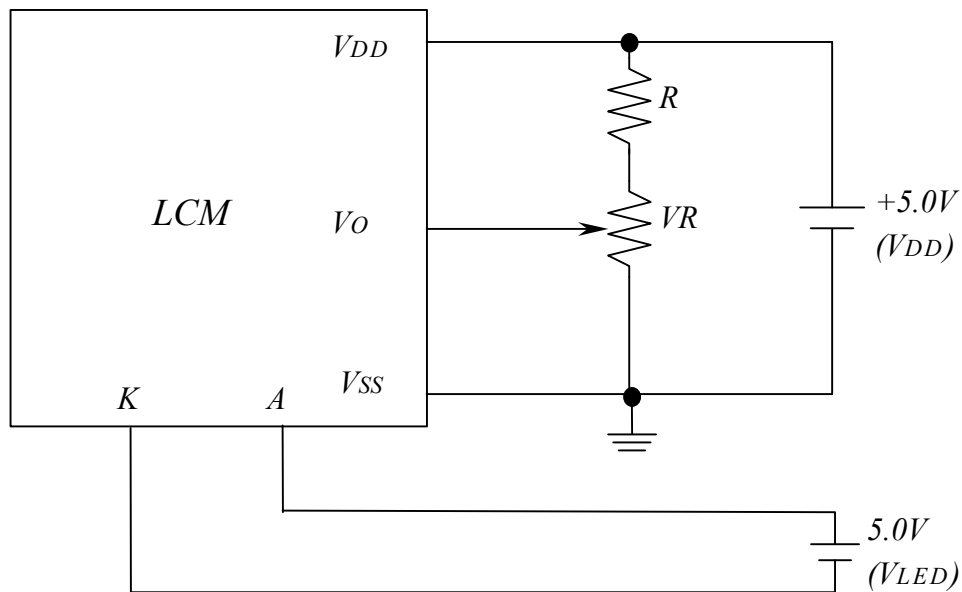
9. Block diagram



Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F

10. Power supply for LCM



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

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

VR: 10K Ω ~ 20K Ω