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PART NO. : MG2406B-SERIES

FOR MESSRS. :

CONTENTS

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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-10-79810)"

3.2 This individual specification is prior to general specifications

3.3 NUMBERING SYSTEM

MG2406B	-	S	Y	M	L	W	U
		(1)	(2)	(3)	(4)	(5)	(6)

(1).LCD TYPE：
"S" ： STN TYPE
"F" ： FSTN TYPE

(2).LCD COLOR：
"Y"：YELLOW-GREEN "B" ： BLUE(STN/NEGATIVE)/BLACK(FSTN/NEGATIVE)
"G"：GRAY "W" ： WHITE(FSTN/POSITIVE)

(3).LCD POLARIZE TYPE
"nil" ： TRANSFLECTIVE
"M" ： TRANSMISSIVE

(4).BACKLIGHT TYPE：
"E" ： EL BACKLIGHT
"L" ： LED BACKLIGHT
"R" ： REFLECTIVE

(5).BACKLIGHT COLOR：
LED TYPE：
"nil" ： YELLOW-GREEN "A" ： AMBER "B" ： BLUE
"G" ： PURE-GREEN "O" ： ORANGE "R" ： RED
"W" ： WHITE
EL TYPE ：
"nil" ： WHITE "B" ： BLUE-GREEN

(6).VIEWING DIRECTION：
"nil" ： 6 O'CLOCK "3" ： 3 O'CLOCK
"U" ： 12 O'CLOCK "9" ： 9 O'CLOCK

4. Mechanical data

(1) NUMBER OF DOT---------- 240 W* 64 H DOTS

(2) MODULE SIZE---------- 140.0 W * 62.0 H * "C" T (Max) mm

(3) EFFECTIVE AREA---------- 116.0 W * 37.0 H mm

(4) ACTIVE AREA---------- 105.57 W * 31.97 H mm

(5) DOT SIZE ---------- 0.41 W * 0.47 H mm

(6) DOT PITCH---------- 0.44 W * 0.50 H mm

NOTE：The dimension of "C"， please refer to Outline dimension on PAGE 8/11

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

I T E M	SYMBOL	MIN.	MAX.	UNIT	COMMENT
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 EL BACKLIGHT	V_{EL}	------	AC200	Vrms	f_{EL}=1.0KHz 60 SEC.MAX
	f_{EL}	------	2.0	KHz	AC115 Vrms 60 SEC.MAX
POWER SUPPLY FOR LED	V_{LED}	------	5.0	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	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20℃	70℃	-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/s^2

6. Electrical characteristics

Ta = 25℃ V_{DD} = 5.0±0.25 V

I T E M	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR CIRCUIT	V_{DD}-V_{SS}	----------		4.75	5.0	5.25	V
INPUT VOLTAGE	V_{IH}	H LEVEL		2.0	-------	V_{DD}	V
	V_{IL}	L LEVEL		0	-------	0.8	V
OUTPUT VOLTAGE	V_{OH}	I_{OH} = -0.3 mA		2.4	------	V_{DD}	V
	V_{OL}	I_{OH} = 3.0 mA		0	------	0.4	V
POWER SUPPLY CURRENT	I_{DD}	V_{DD}-V_{SS} = 5.0 V		-------	10.0	20.0	mA
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(1)	V_{DD}-V_O	STN/ FSTN DUTY =1/64 Φ=10° NOTE(2)	Ta=-20°C	------	8.9	------	V
			Ta= 25°C	------	8.5	------	V
			Ta= 70°C	------	8.1	------	V
POWER SUPPLY CURRENT FOR EL BACKLIGHT	I_{EL}	V_{EL} = 115Vrms f_{EL} = 400Hz		------	8.0	------	mArms
POWER SUPPLY CURRENT FOR LED	I_{LED}	NOTE(3)		-------	NOTE(3)	NOTE(3)	mA

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

(2): θ = 0° ：VIEWING DIRECTION AT 6 O'CLOCK

θ = 180°：VIEWING DIRECTION AT 12 O'CLOCK

(3): LED CURRENT FOR DIFFERENT LED BACKLIGHT TYPE

LED B.L TYPE	CONDITION	I_{LED}				LED COLOR
		MIN.	TYP.	MAX.	UNIT.	
LED B.L (ARRAY)	V_{LED} = 5.0V	-----	280	420	mA	YELLOW-GREEN RED、AMBER、ORANGE
LED B.L (EDGE)	V_{LED} =4.0V	-----	75	100	mA	BLUE、WHITE PURE-GREEN

7. Optical characteristics

STN TYPE LCD *Ta = 25℃ V_{DD}-V_O =8.5V*

I T E M	*SYMBOL*	*CONDITION*	*MIN.*	*TYP.*	*MAX.*	*UNIT*	*NOTE*
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	3.0	4.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	NOTE(2)

FSTN、STN BLUE TYPE LCD *Ta = 25℃ V_{DD}-V_O =8.5V*

I T E M	*SYMBOL*	*CONDITION*	*MIN.*	*TYP.*	*MAX.*	*UNIT*	*NOTE*
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	4.0	5.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	NOTE(2)

Brightness for LCM backlight

SYMBOL	*CONDITION*	*MIN.*	*TYP.*	*MAX.*	*UNIT*	*LED TYPE*	*NOTE*
B	Φ = 0° θ = 0°	4.0	----	----	cd/m²	EL BACKLIGHT	NOTE(2) NOTE(3)
		5.0	----	----		YELLOW-GREEN、RED AMBER、ORANGE	
		6.0	----	----		BLUE、WHITE、PURE-GREEN	

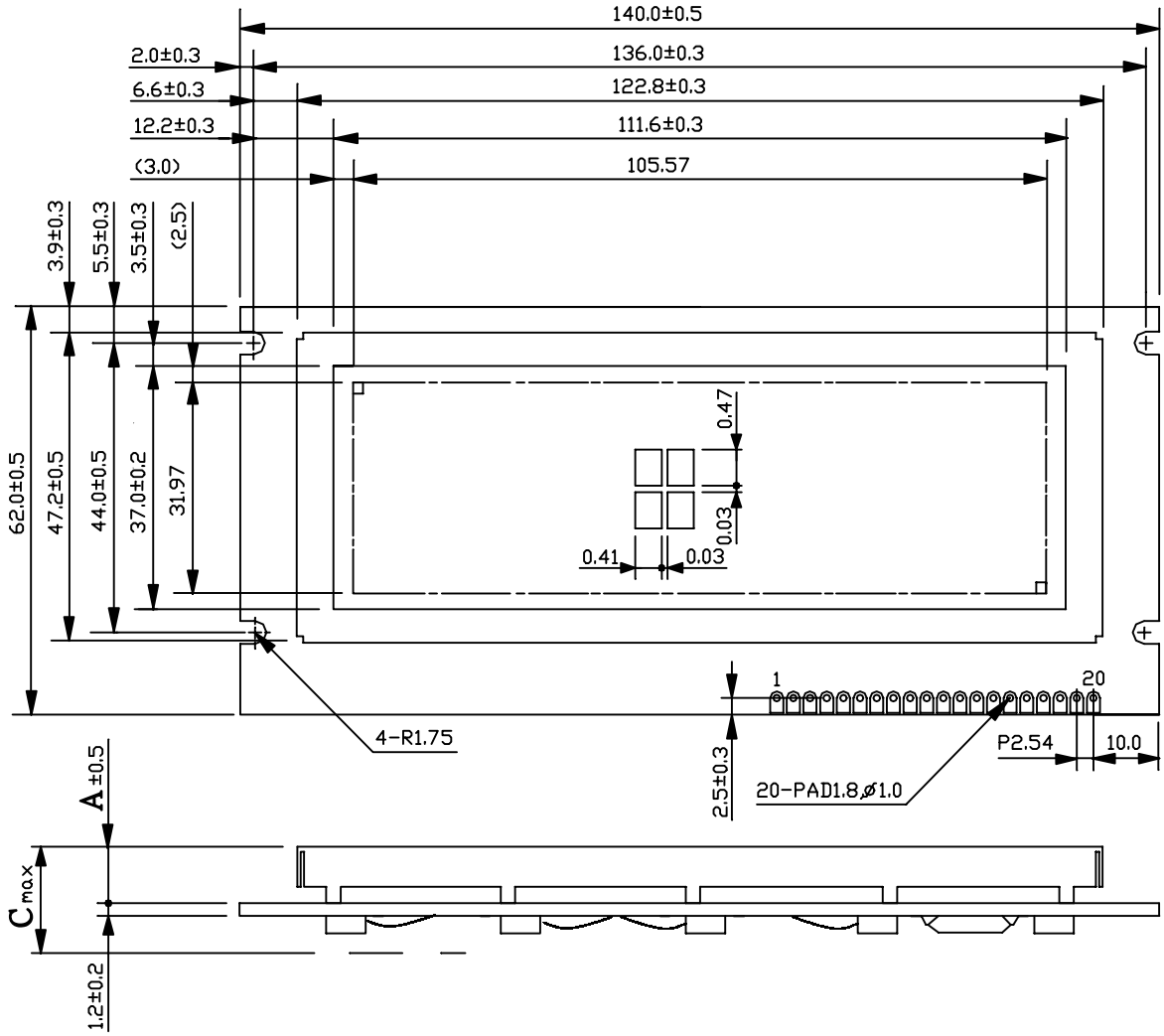
NOTE (1): θ = 0° : VIEWING DIRECTION AT 6 O'CLOCK

θ = 180° : VIEWING DIRECTION AT 12 O'CLOCK

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



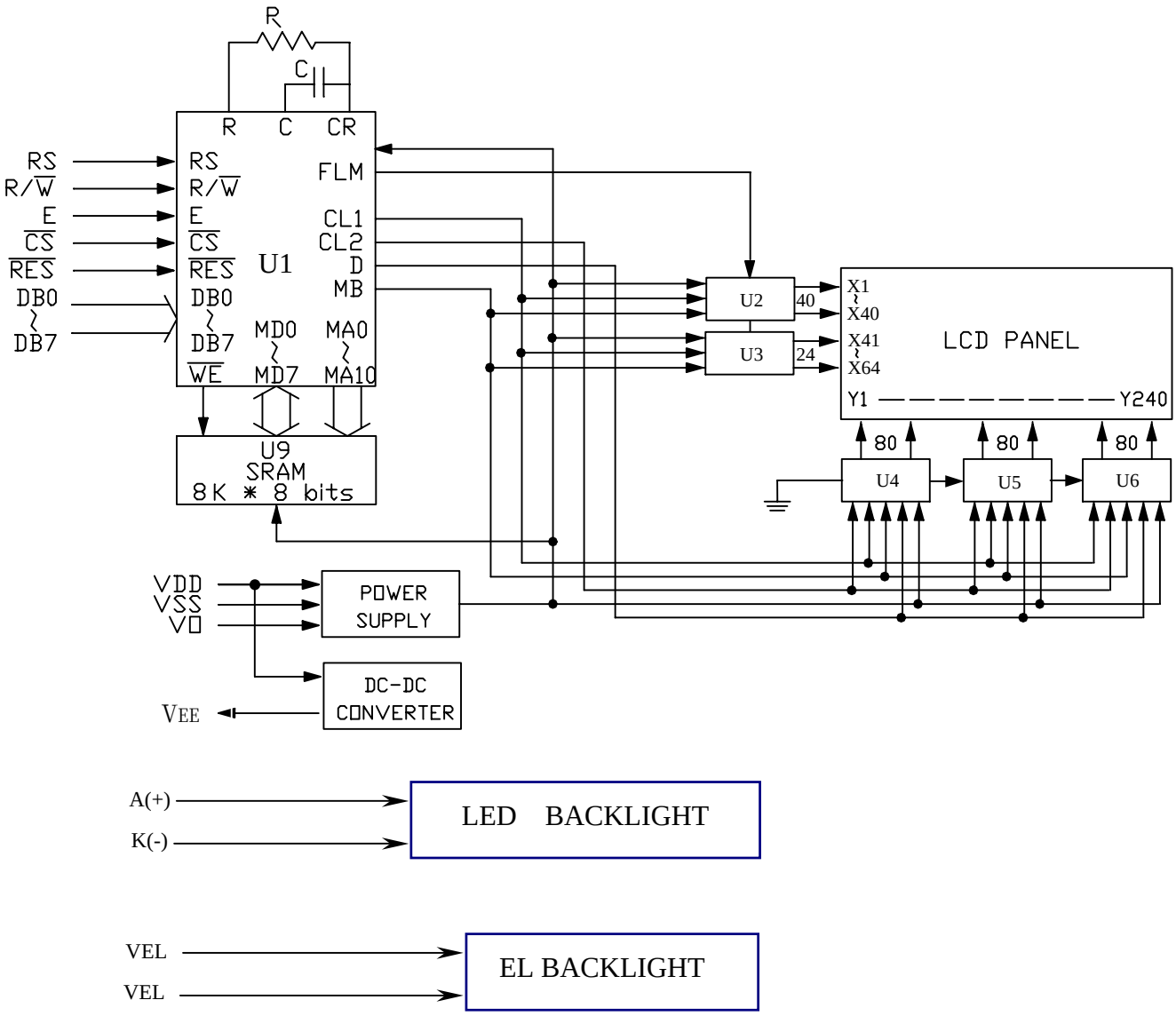
TYPE	A	C
LED B.L	10.0	15.0
EL & NO B.L	4.9	9.5

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

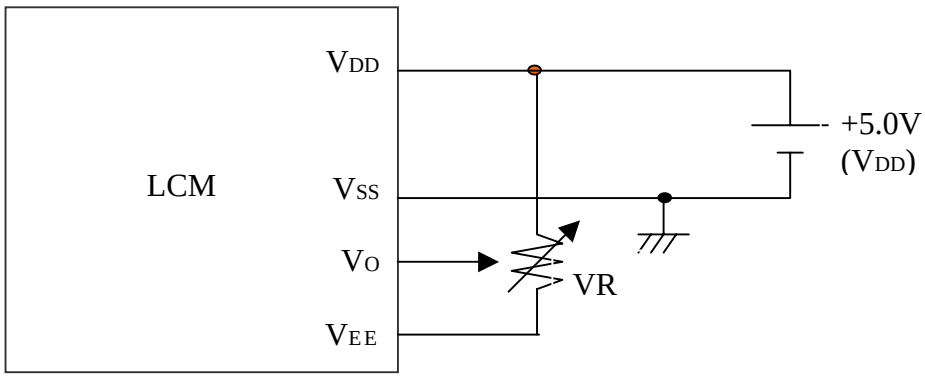
Interface pin connection

PIN NO.	SYMBOL	FUNCTION
1	V_{SS}	POWER SUPPLY (GND)
2	V_{DD}	POWER SUPPLY (+5.0V)
3	V_O	OPERATING VOLTAGE FOR LCD DRIVING
4	RS	L : DATA INPUT H : INSTRUCTION CODE INPUT
5	R/$\overline{W}$	H: DATA READ (LCD MODULE → MPU) L: DATA WRITE (LCD MODULE ← MPU)
6	E	ENABLE SINGAL
7	DB0	DATA INPUT/OUTPUT (LSB)
8	DB1	DATA INPUT/OUTPUT
9	DB2	DATA INPUT/OUTPUT
10	DB3	DATA INPUT/OUTPUT
11	DB4	DATA INPUT/OUTPUT
12	DB5	DATA INPUT/OUTPUT
13	DB6	DATA INPUT/OUTPUT
14	DB7	DATA INPUT/OUTPUT (MSB)
15	$\overline{CS}$	L: CHIP ENABLE
16	$\overline{RES}$	L: RESET
17	V_{EE}	POWER SUPPLY FOR LCD DRIVING OUTPUT
18	N.C	NO CONNECTION
19	A(+) (V_{EL})	POWER SUPPLY FOR LED BACKLIGHT (+) (POWER SUPPLY FOR EL)
20	K(-) (V_{EL})	POWER SUPPLY FOR LED BACKLIGHT (-) (POWER SUPPLY FOR EL)

9. Block diagram



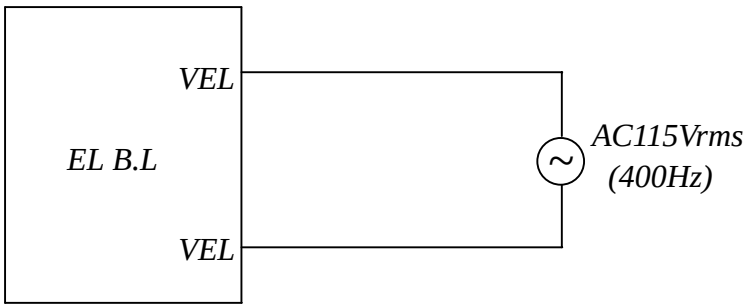
10. Power supply for LCM

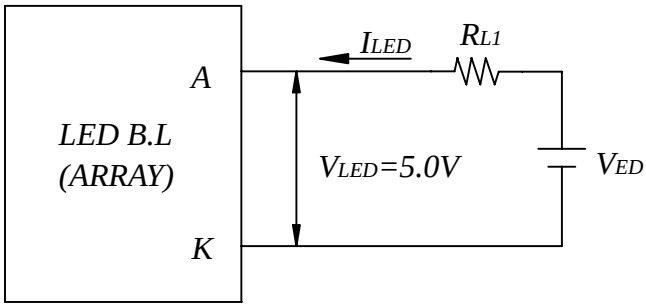


VDD-VO: LCD DRIVING VOLTAGE

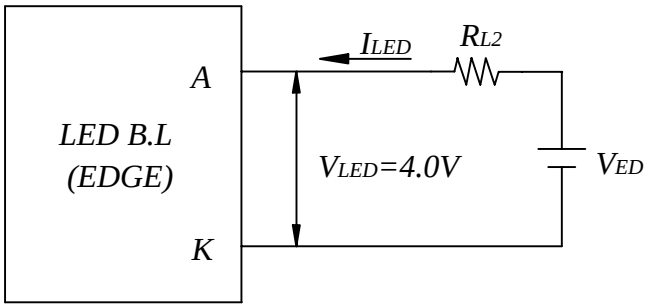
VR: 200KΩ

10.1 Power supply for backlight





RL1≧(VED-VLED) / ILED , ILED≦420.0 mA (max)



RL2≧(VED-VLED) / ILED , ILED≦100.0 mA (max)