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The LCD(M) Specialist

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FOR MESSRS.: _____

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ACCEPTED BY : _____ PROPOSED BY : _____

RECORD OF REVISION

DATE	PAGE	SUMMARY
2001/02/08	6/8	ADD THE OUTLINE DIMENSION OF LIGHT GUIDE.

3. General specifications

3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-61202)”.

3.2 This individual specification is prior to general specifications

4. Mechanical data

- (1) NUMBER OF DOTS -----128 W * 64 H DOTS
- (2) MODULE SIZE -----93.0 W * 70.0 H * 15.0 T (Max) mm
- (3) EFFECTIVE AREA -----71.0 W * 39.0 H mm
- (4) ACTIVE AREA -----66.52 W * 33.24 H mm
- (5) DOT SIZE-----0.48 W * 0.48 H mm
- (6) DOT PITCH -----0.52 W * 0.52 H mm
- (7) VIEWING DIRECTION-----6 O’CLOCK
- (8) LCD TYPE-----STN.BLUE/NEGATIVE.TRANSMISSIVE.
- (9) LED 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°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

Ta = 25°C

V_{DD} = 5.060.25 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>	
POWER SUPPLY VOLTAGE FOR CIRCUIT	V _{DD} -V _{SS}	-----	4.75	5.0	5.25	V	
INPUT VOLTAGE NOTE (2)	V _{IH}	H LEVEL	0.7V _{DD}	-----	V _{DD}	V	
	V _{IL}	L LEVEL	0	-----	0.3V _{DD}	V	
OUTPUT VOLTAGE NOTE (1)	V _{OH}	I _{OH} = -0.3 mA	2.4	-----	-----	V	
	V _{OL}	I _{OL} = 0.3 mA	-----	-----	0.4	V	
POWER SUPPLY CURRENT, NOTE (3)	I _{DD}	V _{DD} -V _{SS} =5.0V	-----	5.0	8.0	mA	
LCD DISPLAY DUTY RATIO	DUTY	-----	-----	1/64	-----	-----	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE (4)	V _{DD} -V _O	Φ = 10° ν = 0°	Ta = 50°C	-----	8.4	-----	V
			Ta = 25°C	-----	8.8	-----	V
			Ta = 0°C	-----	9.2	-----	V
POWER SUPPLY CURRENT FOR LED	I _{LED}	V _{LED} = 5.0V	-----	100	150	mA	

NOTE (1): APPLIED TO TERMINALS DB0~DB7

NOTE (2): APPLIED TO TERMINALS D/I, R/W, E, DB0~DB7, CS1, CS2, RST

NOTE (3): THE DISPLAY PATTERN IS ALL "ON", OR ALL "OFF"

NOTE (4): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT 60.5V BY EACH MODULE.

7. Optical characteristics

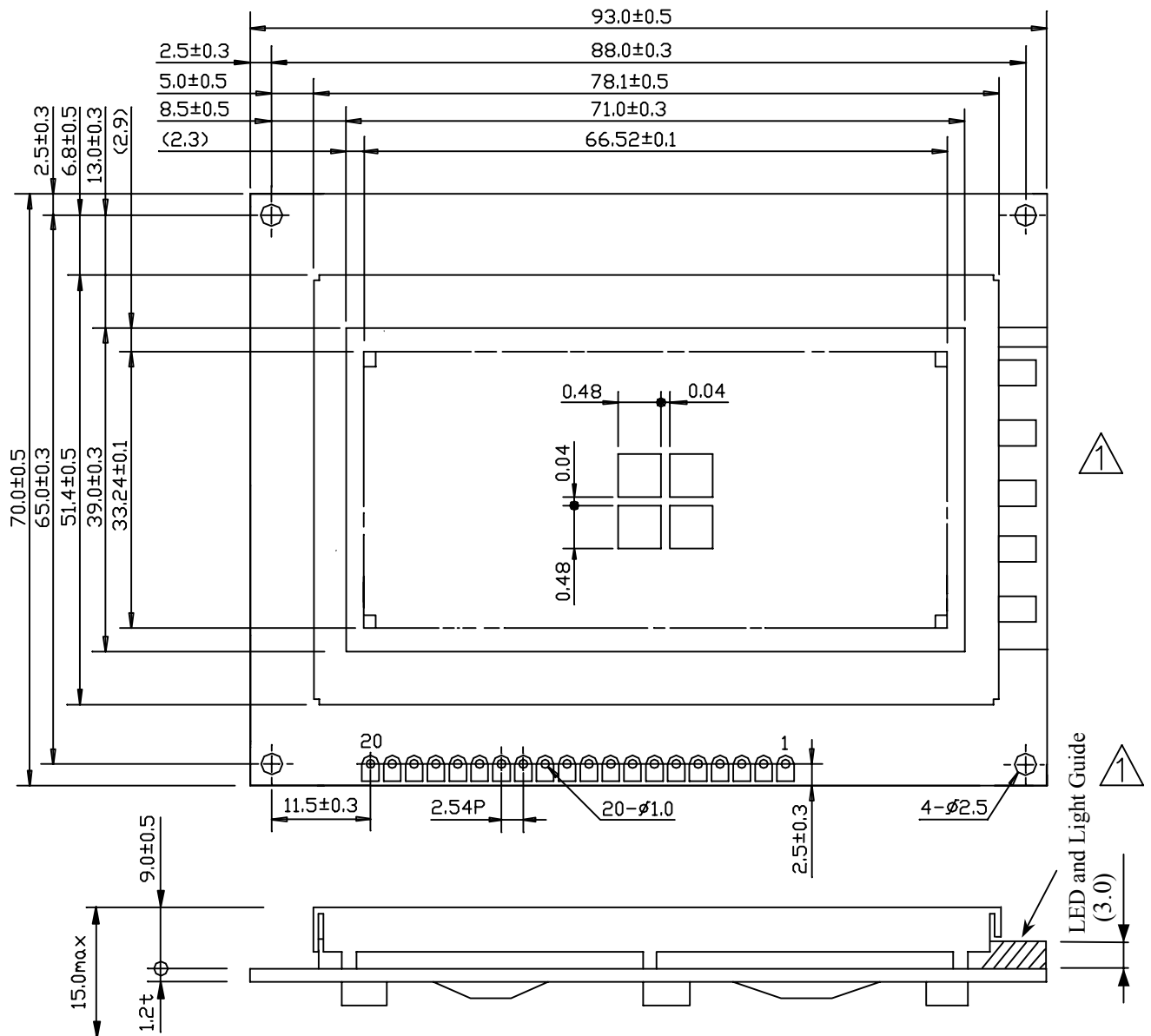
Ta = 25°C V_{DD} = 5.0V

<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	Φ2-Φ1	K = 2.0	30	40	-----	deg.	2
CONTRAST RATIO	K	Φ = 10° ν = 0°	4.0	5.0	-----	-----	2
RESPONSE TIME	tr (rise)	Φ = 10° ν = 0°	-----	200	350	ms	2
	tf (fall)	Φ = 10° ν = 0°	-----	300	400	ms	2
BRIGHTNESS FOR LED BACKLIGHT	B	Φ = 0° ν = 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. Dimensional outline

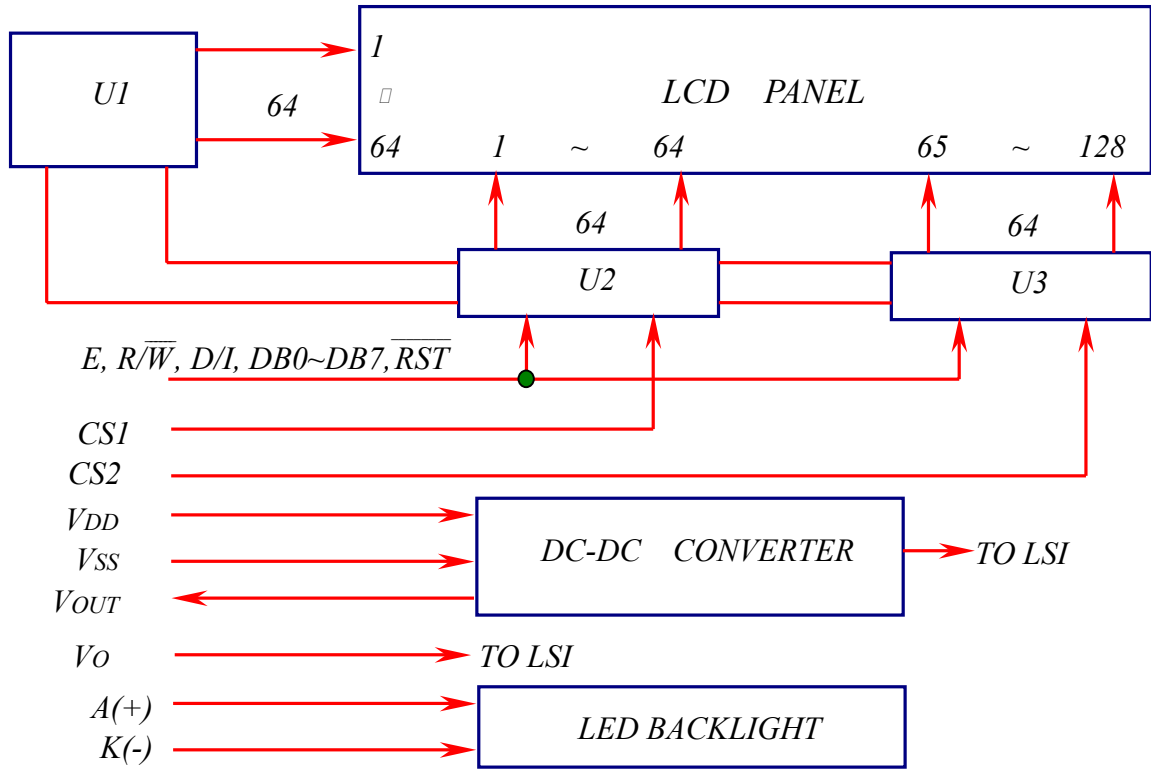


PIN NO.	1	2	3	4	5	6	7	8	9	10
SYMBOL	V _{SS}	V _{DD}	V _o	D/I	R/W	E	DB0	DB1	DB2	DB3
PIN NO.	11	12	13	14	15	16	17	18	19	20
SYMBOL	DB4	DB5	DB6	DB7	CS1	CS2	R _{ST}	V _{OUT}	A(+)	K(-)

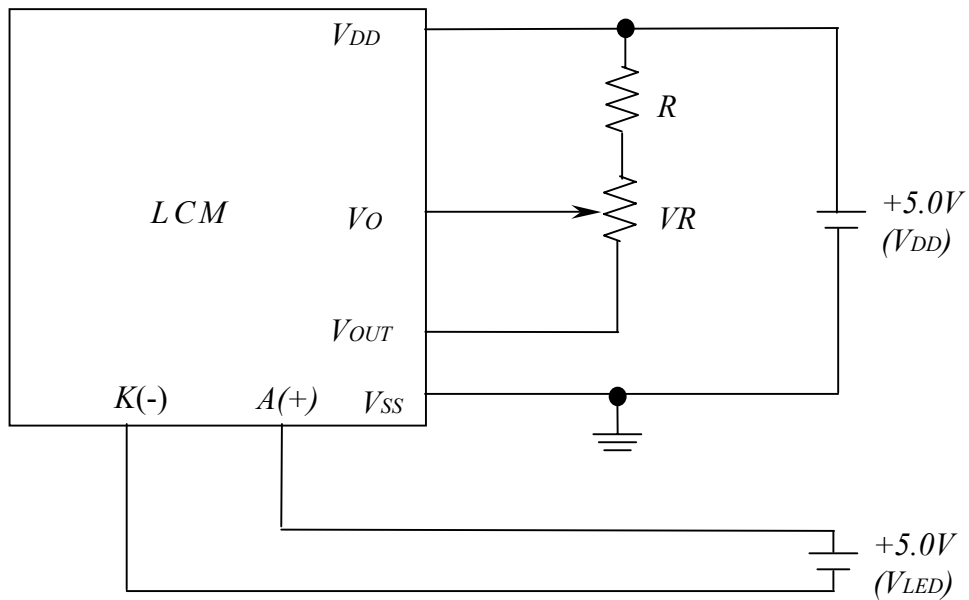
8.1 Interface

PIN NO.	SYMBOL	FUNCTION
1	V _{SS}	GROUND
2	V _{DD}	POWER SUPPLY FOR LCD LOGIC
3	V _O	OPERATING VOLTAGE FOR LCD DRIVING
4	D/I	H: DATA INPUT L: INSTRUCTION CODE INPUT
5	R/ \overline{W}	H: DATA READ (LCD MODULE → MPU) L: DATA WRITE (LCD MODULE ← MPU)
6	E	ENABLE SIGNAL
7	DB0	DATA INPUT / OUTPUT (LSB)
8	CB1	DATA INPUT / OUTPUT
9	CB2	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	CS1	H: CHIP SELECTION FOR IC1
16	CS2	H: CHIP SELECTION FOR IC2
17	\overline{RST}	L: RESET
18	V _{OUT}	POWER SUPPLY FOR LCD DRIVING
19	A (+)	POWER SUPPLY FOR LED BACKLIGHT
20	K (-)	POWER SUPPLY FOR LED BACKLIGHT

9. Block diagram



10. Power supply for LCM



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