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PART NO : GC1602P8SKY1B(LM1180SGL)
 FOR MESSRS : _____

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Accepted by : _____

Proposed by :  _____

Date : 09,20,2002

RECORD OF REVISION

DATE	PAGE	SUMMARY
84.10.21	3	3.3 MECHANICAL DATA (5) CHARACTER SIZE -----2.96W*4.86H mm → 2.96W*5.56H mm
86.09.03	ALL	ADDRESS CHANGED
87.04.18	ALL	PAGES CHANGED (CHANGED TO COMMON BOARD AND ADD SIDE-LIGHT INFORMATION)
88.11.26	8	PAGE CHANGED
2002,02,26	ALL 04 05 06 08 09 11	CHANGE ADDRESS , FAX , TEL & COMPANY NAME 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. DELETE POWER SUPPLY FOR LED 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS. SHOCK STORAGE 490.0m/s ² (50G)→ 49.0m/s ² (5G) 85%RH→90%RH 5. ELECTRICAL CHARACTERISTICS. VDD=5.0±10%→5.0±0.25V POWER SUPPLY CURRENT TYP.1.0→131 MAX.3.0→ ---- DELETE POWER SUPPLY CURRENT FOR LED & NOTE(3) 6. OPTICAL CHARACTERISTICS. VDD=5.0V→VDD=5.0±25V RESOPNSE TIME tr (rise) MAX.350→400 tf(fall) TYP.250→350 MAX. 400→450 ADD WAVELENGTH DELETE NOTE(7) 7.DIMENSION OUTLINE. PIN15 ,16 REFER TO PAGE 11→ PIN 15,16 N.C 7.1 DETAIL DRAWING OF MATRIX PATTERN. ADD TOLERANCE CHANGE 7.2 BLOCK DIAGRAM. DELETE PAGE11 NOTE
2002,03,11	08	ADD DIMENSION
2002,08,08	ALL	CHANGE PART NO.LM1180SGL→GC1602R0SKY1B
2002,09,19	ALL	CHANGE PART NO. GC1602R0SKY1B→GC1602P8SKY1B

3. GENERAL SPECIFICATIONS AND MECHANICAL DATA

3.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (SP-10-001)".

3.2 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS.

3.3 MECHANICAL DATA

- (1) NUMBER OF CHARACTER ----- 16CH*2LINES
- (2) MODULE SIZE ----- 84.0W*44.0H*12.5T (Max) mm
- (3) VIEWING AREA ----- 63.5W*15.8H mm
- (4) CHARACTER PATTERN ----- 5*7 DOTS+CORSOR
- (5) CHARACTER SIZE ----- 2.96W*5.56H mm
- (6) CHARACTER PITCH ----- 3.55 mm*5.94H mm
- (7) DOT SIZE ----- 0.56W*0.66H mm
- (8) DOT PITCH ----- 0.60W*0.70Hmm
- (9) LCD TYPE -----STN, GRAY, Transflective , 6 O'clock
- (10) LED COLOR----- YELLOW-GREEN

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD-VSS	0	6.0	V	
POWER SUPPLY FOR LCD DRIVE	VDD-VO	0	6.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)

NOTE(1) : TEST METHOD AND CONDITIONS AFTER CHARGING UP 200PF CAPACITOR BY STATED VOLTAGE , THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE MODULE.

4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

ITEM	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	0°C	50°C	-20°C	60°C	NOTE (2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	--	4.9 m/s ² (0.5G)	--	19.6 m/s ² (2G)	10~300Hz XYZ DIRECTIONS 1 Hr. EACH
SHOCK	--	29.4 m/s ² (3G)	--	49.0 m/s ² (5G)	10 mSEC. XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE(2) : Ta AT -20°C : 48HR MAX.
60°C : 168HR MAX.

NOTE(3) : Ta ≤ 40°C :90% RH MAX.
Ta > 40°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 40°C.

5. ELECTRICAL CHARACTERISTICS.

Ta = 25°C

VDD = 5.0 ± 0.25V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
INPUT VOLTAGE (H LEVEL)	VIH	-----	2.2	-----	-----	V
INPUT VOLTAGE (L LEVEL)	VIL	-----	-----	-----	0.6	V
OUTPUT VOLTAGE (H LEVEL)	VOH	-IOH = 0.2mA	2.4	-----	-----	V
OUTPUT VOLTAGE (L LEVEL)	VOL	IOL = 1.2mA	-----	-----	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD (INCLUDING LED B/L)	VDD = 5.0V	-----	131	-----	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD-VO DUTY=1/16 φ = 10°	Ta = 0°C	-----	4.6	-----	V
		Ta = 25 °C	-----	4.4	-----	V
		Ta = 50 °C	-----	4.2	-----	V
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25°C	-----	270	-----	KHZ

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

6.OPTICAL CHARACTERISTICS

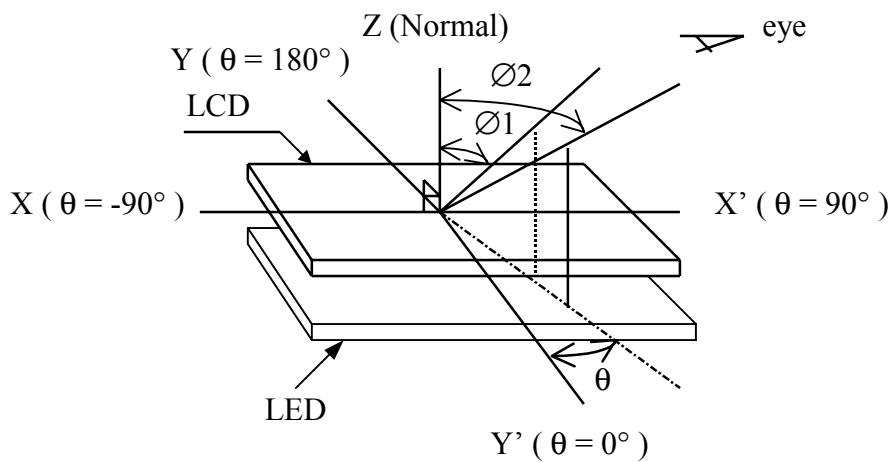
Ta = 25°C

VDD = 5.0± 0.25V

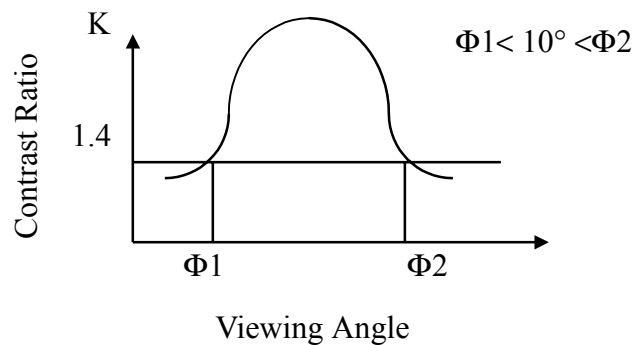
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\Phi 2-\Phi 1$	K= 1.4	—	40	—	deg.	1
CONTRAST RATIO	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	3	—	—	2,3
RESPONSE TIME	tr(rise)	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	250	400	ms	4
	tf(fall)	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	350	450	ms	4
THE BRIGHTHNESS OF BACKLIGHTING SOURCE	B	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	20	—	cd/m ²	5,6
	λp	—	565	570	575	nm	

NOTE (6) : DOT-MATRIX TYPE LED

NOTE (1) : DEFINITION OF θ AND Φ

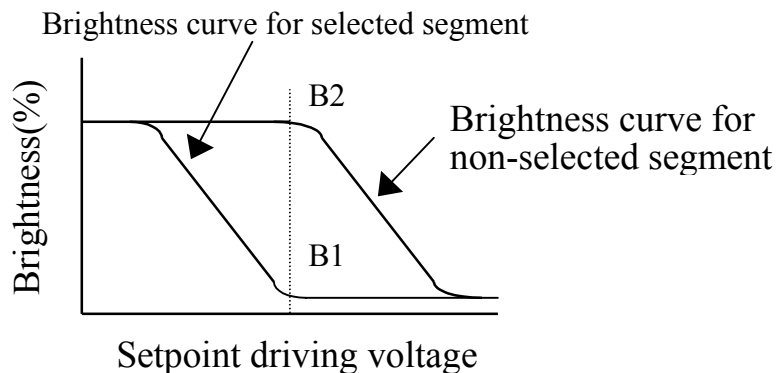


NOTE (2) : DEFINITION OF VIEWING ANGLE $\Phi 1$ AND $\Phi 2$

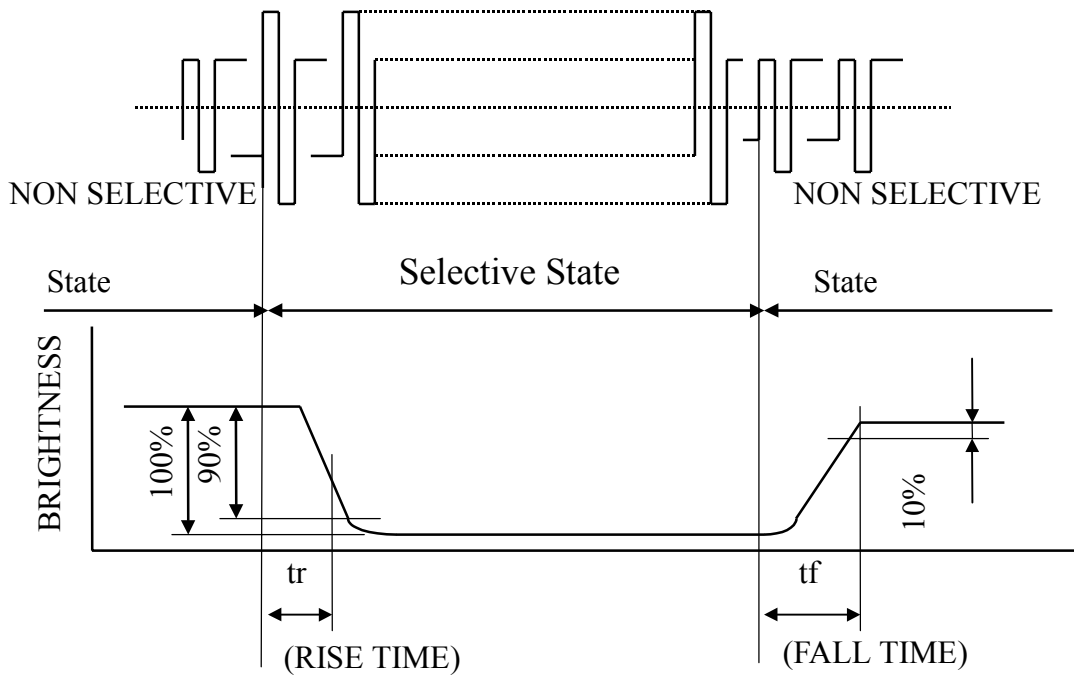


NOTE (3) : DEFINITION OF CONTRAST“K”

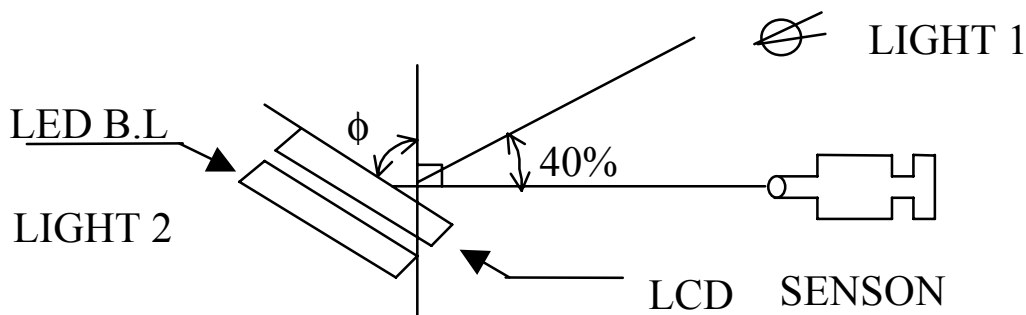
$$K = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



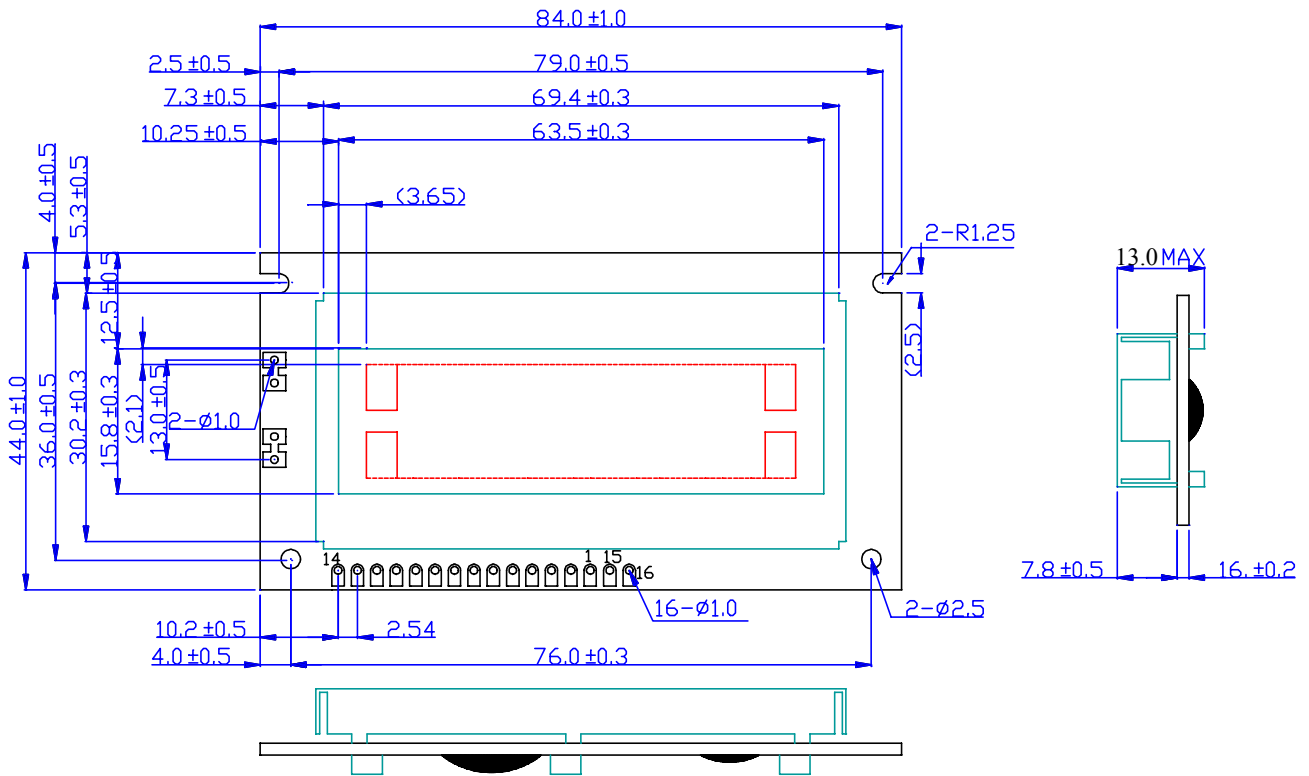
NOTE(4) : DEFINITION OF OPTICAL RESPONSE



NOTE(5) : OPTICAL OF LIGHT



7. DIMENSION OUTLINE.



NO SPECIFIED TOLERANCE:±0.3

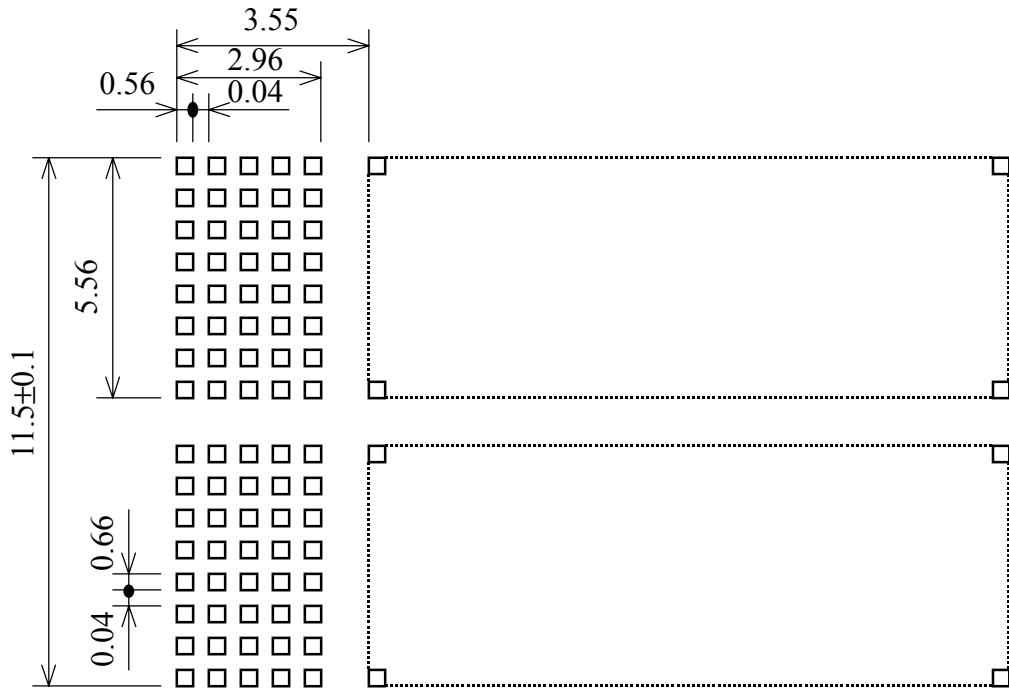
SCALE : NTS

UNIT : mm

INTERFACE PIN CONNECTION.

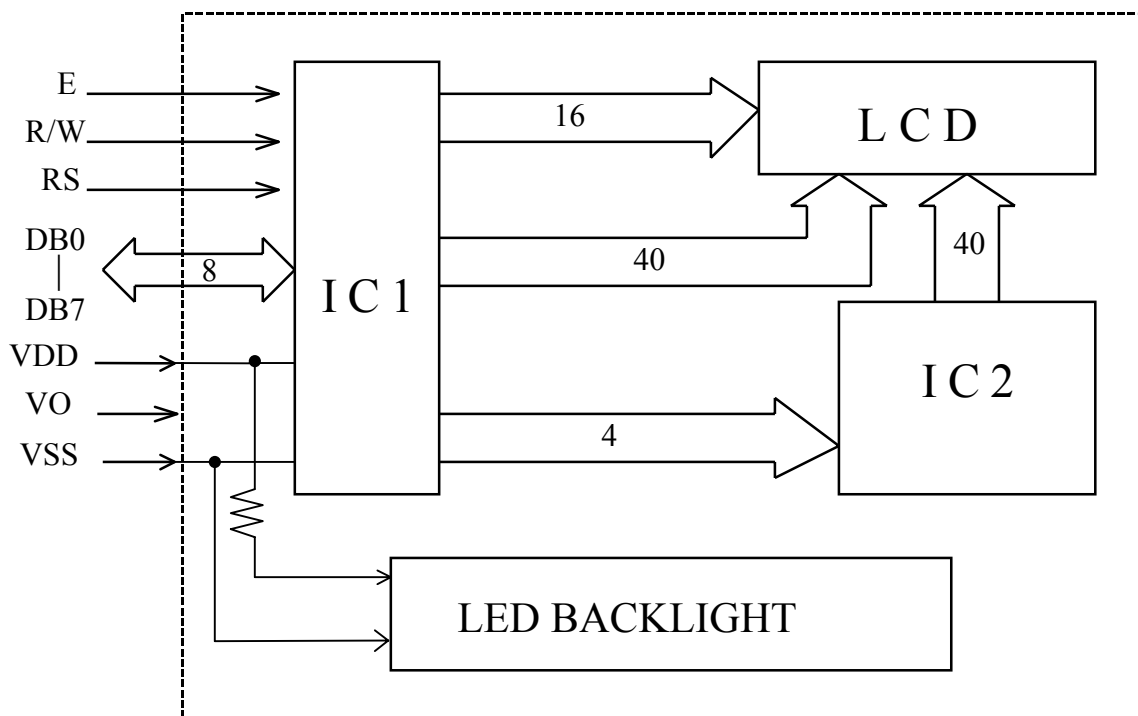
PIN NO	1	2	3	4	5	6	7	8	9	10
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0	DB1	DB2	DB3
PIN NO	11	12	13	14	15	16				
SYMBOL	DB4	DB5	DB6	DB7	N.C	N.C				

7.1 DETAIL DRAWING OF MATRIX PATTERN.



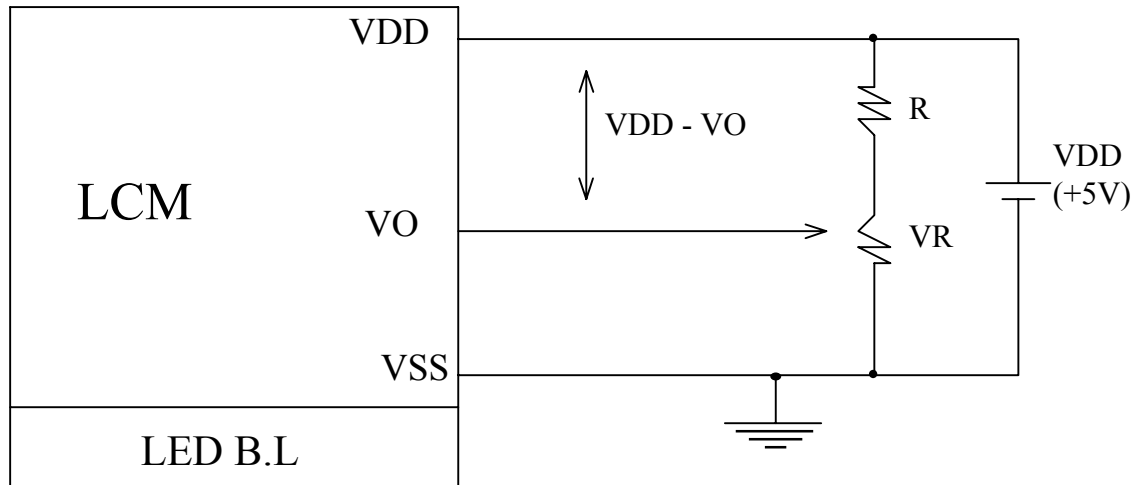
NOT SPECIFIED TOLERANCE : $\pm 0.01\text{mm}$

7.2 BLOCK DIAGRAM.



8. POWER SUPPLY.

8.1 POWER SUPPLY FOR LCM AND LED BACKLIGHT.



VDD - VO : LCD DRIVING VOLTAGE

VR : 10K Ω ~ 20K Ω