



# 富相科技股份有限公司

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PART NO : GC2002N5SBY1B(LM1077SYL)  
FOR MESSRS. : \_\_\_\_\_

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Accepted by : \_\_\_\_\_

Proposed by :  \_\_\_\_\_

Date : 09,20,2002

## RECORD OF REVISION

DATE	PAGE	SUMMARY
2001,07,31	ALL	CHANGE ALL PAGE ADDRESS AND TEL.
2002,04,01	ALL 03 04 05 06 07 08 09 10	CHANGE COMPANY NAME & LOGO & ADDRESS, FAX, TEL (2)MODULE SIZE 38.0H→37.0H 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS POWER SUPPLY FOR LCD DRIVE MAX.7.0→6.0 DELETE POWER SUPPLY FOR LED 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS SHOCK STORAGE MAX.490.0m/s <sup>2</sup> (50G)→49.0m/s <sup>2</sup> (5G) 5.ELECTRICAL CHARACTERISTICS POWER SUPPLY CURRENT (LOGIC) SYMBOL IDD→IDD(INCLUDING LED B/L) CONDITION VDD=5.0V→VDD-VSS=5.0V TYP. 1.0 → 241 MAX.3.0 → ----- RECOMMENDED LCD DRIVING VOLTAGE SYMBOL $\Phi=10^\circ \rightarrow \Phi=10^\circ \theta = 0^\circ$ Ta=0°C MAX. 4.6→ (4.6) Ta=50°C MAX. 3.5→(3.5) DELETE POWER SUPPLY CURRENT FOR LED 6.OPTICAL CHARACTERISTICS VIEWING AREA MIN.40→----- TYP.-----→40 CONTRAST RATIO MIN.3→----- TYP.-----→2 THE BRIGHTNESS OF BACKLIGHTING SOURCE DELETE CONDITION (*) TYP.-----→50 NOTE 5,6→5 ADD WAVELENGTH ADD NOTE(5) OPTICAL OF LIGHT INTERFACE PIN NO.15,16 REFER TO PAGE 10→ NC ADD TOLERANCE CHANGE 7.2 BLOCK DIAGRAM. CHANGE 8.1 POWER SUPPLY FOR LCM AND LED BACKLINGT. DELETE NOTE
2002,08,01	ALL	CHANGE PART NO.LM1077SYL→GC2002N7SBY1B
2002,09,20	ALL	CHANGE PART NO.GC2002N7SBY1B→ GC2002N5SBY1B

### 3. GENERAL SPECIFICATIONS AND MECHANICAL DATA

#### 3.1 GENERAL SPECIFICATIONS

PLEASE REFER TO:

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

#### 3.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS.

#### 3.3 MECHANICAL DATA

- (1) NUMBER OF DOTS ----- 20CH\*2LINES
- (2) MODULE SIZE ----- 116.0W\*37.0H\*14.0T (MAX) mm
- (3) VIEWING AREA ----- 83.0W\*18.6H mm
- (4) CHARACTER PATTERN ----- 5 \* 7dots + CURSOR
- (5) CHARACTER SIZE ----- 3.20W \* 5.55H mm
- (6) CHARACTER PITCH ----- 3.70W \* 5.95H mm
- (7) DOT SIZE ----- 0.60W \* 0.65H mm
- (8) DOT PITCH ----- 0.65W \* 0.70H mm
- (9) LCD TYPE ----- STN, YELLOW-GREEN, 6 O'CLOCK,  
TRANSFLECTIVE
- (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	V <sub>DD</sub> -V <sub>SS</sub>	-----	6.0	V	
POWER SUPPLY FOR LCD DRIVE	V <sub>DD</sub> -V <sub>O</sub>	-----	6.0	V	
INPUT VOLTAGE	V <sub>I</sub>	V <sub>SS</sub>	V <sub>DD</sub>	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	-10°C	60°C	NOTE(2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	--	4.9 m/s <sup>2</sup> (0.5G)	--	19.6 m/s <sup>2</sup> (2G)	10~300HZ XYZ DIRECTIONS 1 Hr. EACH
SHOCK	--	29.4 m/s <sup>2</sup> (3G)	--	49.0 m/s <sup>2</sup> (5G)	10mS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE(2) : Ta AT -10°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

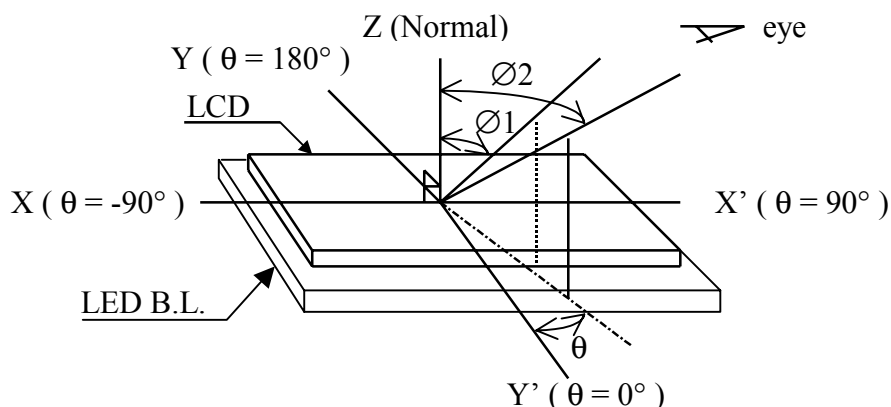
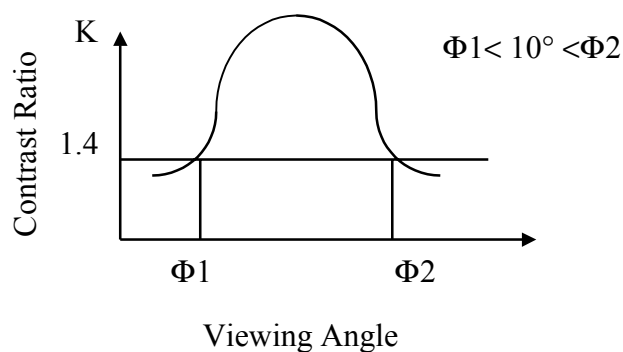
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
INPUT VOLTAGE (H LEVEL)	V <sub>IH</sub>	-----	2.2	-----	-----	V
INPUT VOLTAGE (L LEVEL)	V <sub>IL</sub>	-----	-----	-----	0.6	V
OUTPUT VOLTAGE (H LEVEL)	V <sub>OH</sub>	-I <sub>OH</sub> = 0.2mA	2.4	-----	-----	V
OUTPUT VOLTAGE (L LEVEL)	V <sub>OL</sub>	I <sub>OL</sub> = 1.2mA	-----	-----	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD (INCLUDING LED B/L)	V <sub>DD</sub> -V <sub>SS</sub> = 5.0 V	-----	241	-----	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (1)	V <sub>DD</sub> -V <sub>O</sub> DUTY=1/16 Φ = 10° θ=0°	Ta = 0°C	-----	(4.6)	-----	V
		Ta = 25 °C	-----	4.2	-----	V
		Ta = 50 °C	-----	(3.5)	-----	V
CLOCK OSCILLATION FREQUENCY	F <sub>OSC</sub>	Ta = 25°C	-----	270	-----	KHz

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

## 6. OPTICAL CHARACTERISTICS

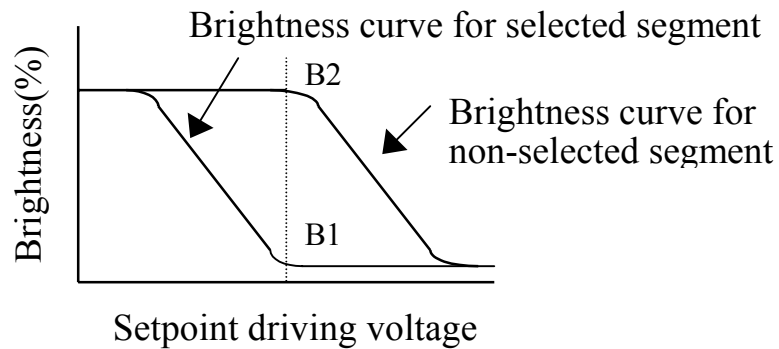
 $T_a = 25^\circ\text{C}$  $V_{DD} = 5.0 \pm 0.25\text{V}$ 

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\Phi 2 - \Phi 1$	$K = 1.4$	-----	40	-----	deg.	1
CONTRAST RATIO	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	2	-----	-----	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 BRIGHTNESS OF BACKLIGHTING SOURCE	B	$\Phi = 0^\circ \theta = 0^\circ$	-----	50	-----	$\text{cd/m}^2$	5
	$\lambda p$	-----	565	570	575	nm	

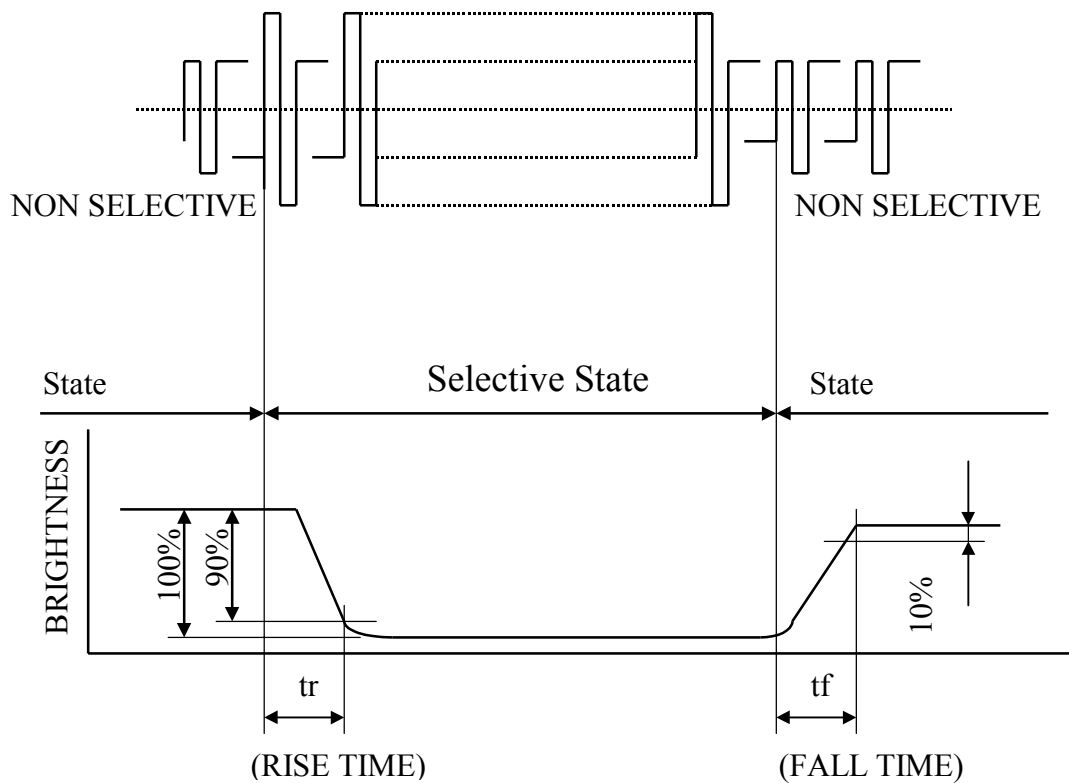
NOTE (1): DEFINITION OF  $\theta$  AND  $\Phi$ NOTE (2): DEFINITION OF VIEWING ANGLE  $\Phi 1$  AND  $\Phi 2$ 

## NOTE (3) : DEFINITION OF CONTRAST "K"

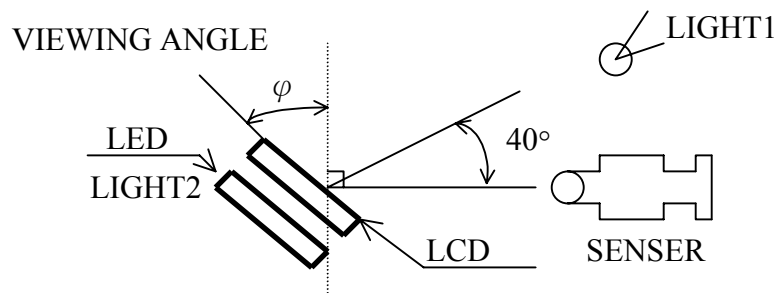
$$K = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



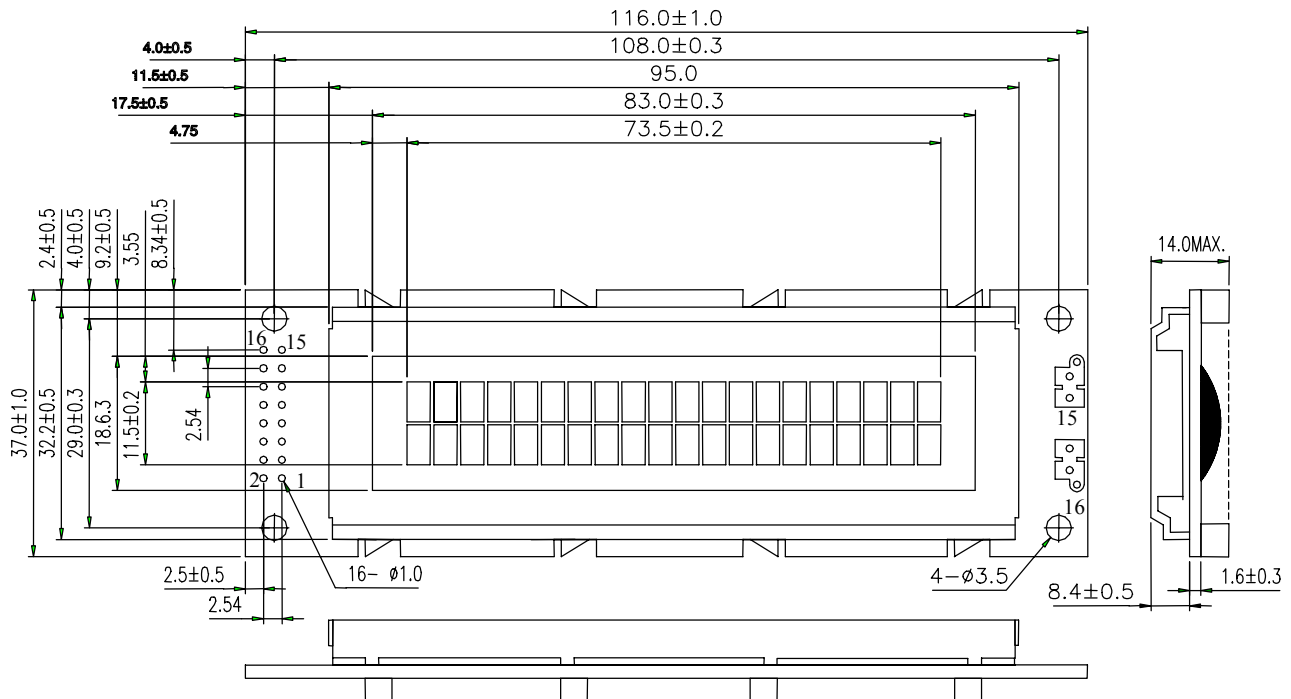
## NOTE(4) : DEFINITION OF OPTICAL RESPONSE



## NOTE (5) : POSITION OF LIGHT



## 7. OUTLINE DIMENSION



UNIT: mm

SCALE: NTS

NOT SPECIFIED TOLERANCE:  $\pm 0.5$  mm

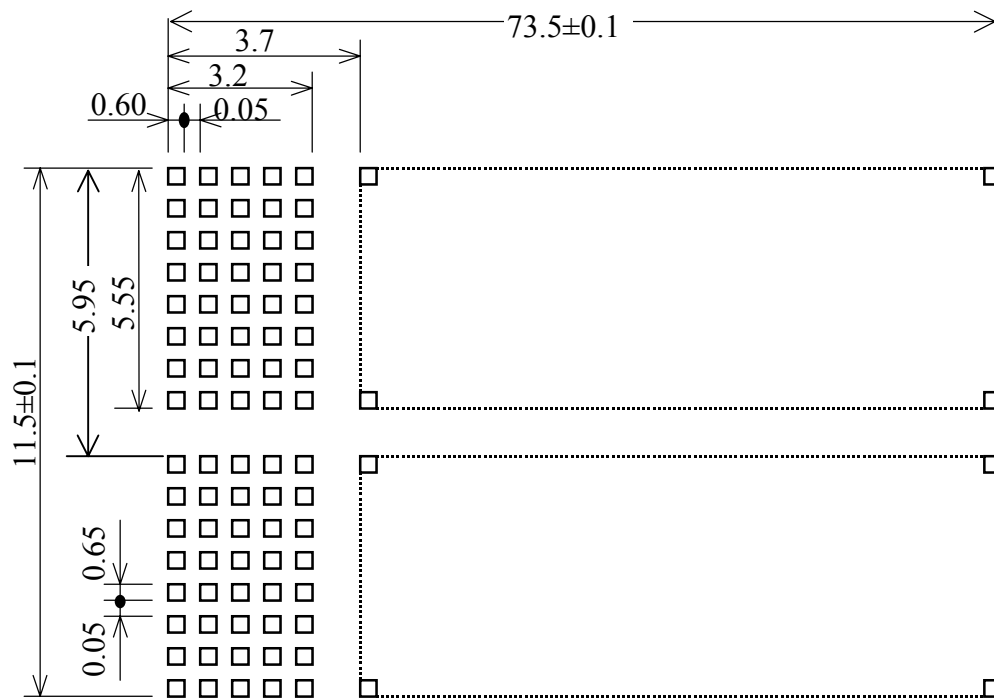
INTERFACE PIN CONNECTION:

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

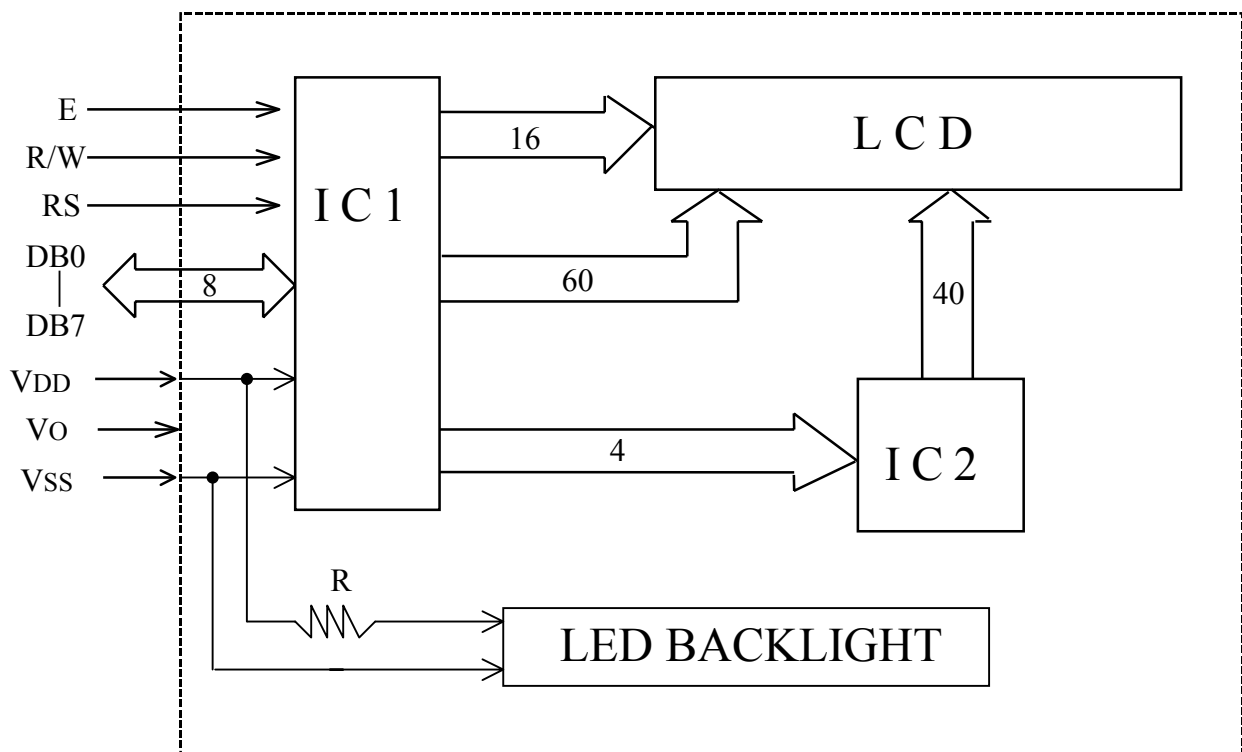
PIN NO.	15	16
SYMBOL	NC	



## 7.1 DETAIL DRAWING OF MATRIX PATTERN

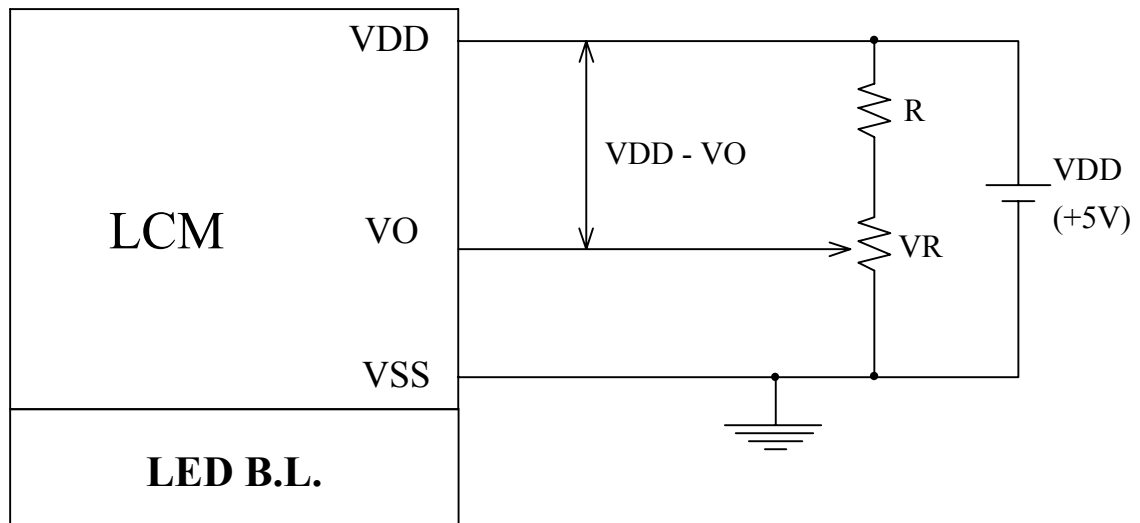
NOT SPECIFIED TOLERANCE:  $\pm 0.01$ mm

## 7.2 BLOCK DIAGRAM.



## 8. POWER SUPPLY.

### 8.1 POWER SUPPLY FOR LCM AND LED BACKLIGHT.



VDD - VO : LCD DRIVING VOLTAGE

VR : 10KΩ ~ 20KΩ