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PART NO : GC1601N0TRN1B(LM1000TGR)
 FOR MESSRS : _____

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Accepted by : _____

Proposed by : 
 Date : 08,27,2002

RECORD OF REVISION

DATE	PAGE	SUMMARY
1998.02.18	ALL	ALL PAGES CHANGE ◦
2002.06.12	5	1. VDD-VO:Ta=0℃ 4.0→4.9, Ta=25℃ 3.7→4.4, Ta=50℃ 3.2→4.0 ◦ 2.DELETE CLOCK OSCILLATION FREQUENCY ◦
	6	1.CHANGED VIEWING ANGLE:20(MIN)→20(TYP.) ◦
2002,07,31	ALL	CHANGE PART NO.LM1000TGR→GL1601N0THN1B
2002,08,26	ALL	CHANGE PART NO.GL1601N0THN1B→GC1601N0TRN1B

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*1LINE
- (2) MODULE SIZE ----- 80W*36H*9.0(max)T mm
- (3) VIEWING AREA----- 64.5W*13.8H mm
- (4) DISPLAY AREA ----- 59.62W*6.56H mm
- (5) CHARACTER PATTERN ----- 5*7 DOTS + CURSOR
- (6) CHARACTER SIZE----- 3.07W*6.56H mm
- (7) CHARACTER PITCH ----- 3.77 mm
- (8) DOT SIZE----- 0.55W*0.75H mm
- (9) DOT PITCH ----- 0.63W*0.83H mm
- (10) VIEWING DIRECTION ----- 6 O’CLOCK
- (11) LCD TYPE ----- TN, GRAY, REFLECTIVE

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 SUPPELY CURRENT	IDD	VDD = 5.0 V	——	1.0	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (1)	VDD-VO DUTY=1/16 φ=25°	Ta = 0°C	——	(4.9)	——	V
		Ta = 25 °C	——	4.4	——	V
		Ta = 50 °C	——	(4.0)	——	V

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

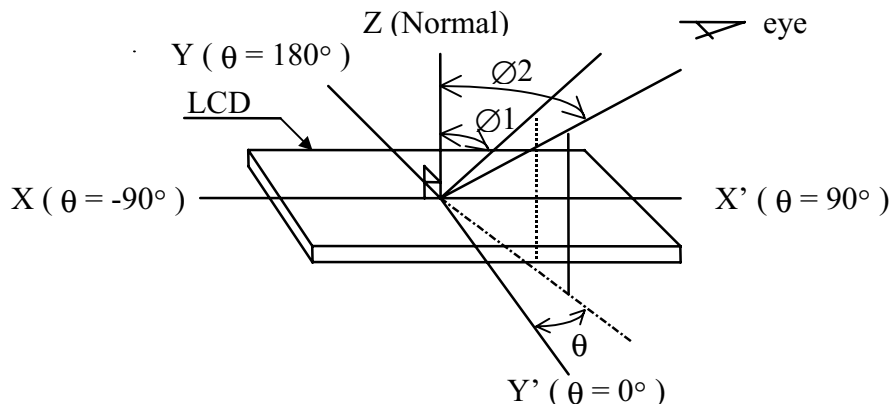
6. OPTICAL CHARACTERISTICS

Ta = 25°C

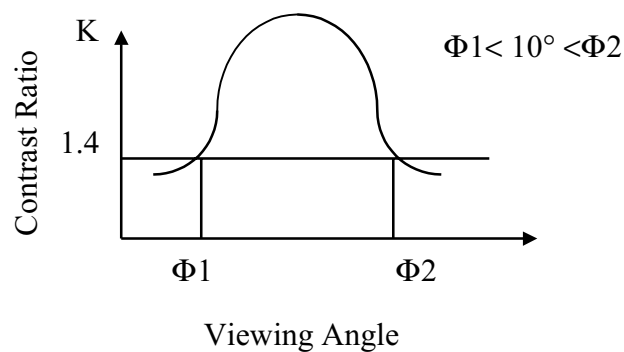
VDD = 5.0V±0.25V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	$\Phi 2-\Phi 1$	K= 1.4	—	20	—	deg.	1
CONTRAST RATIO	K	$\Phi = 25^\circ$ $\theta = 0^\circ$	—	2	—	—	2,3
RESPONSE TIME	tr(rise)	$\Phi = 25^\circ$ $\theta = 0^\circ$	—	250	—	ms	4
	tf(fall)	$\Phi = 25^\circ$ $\theta = 0^\circ$	—	250	—	ms	4

NOTE (1) : DEFINITION OF θ AND Φ

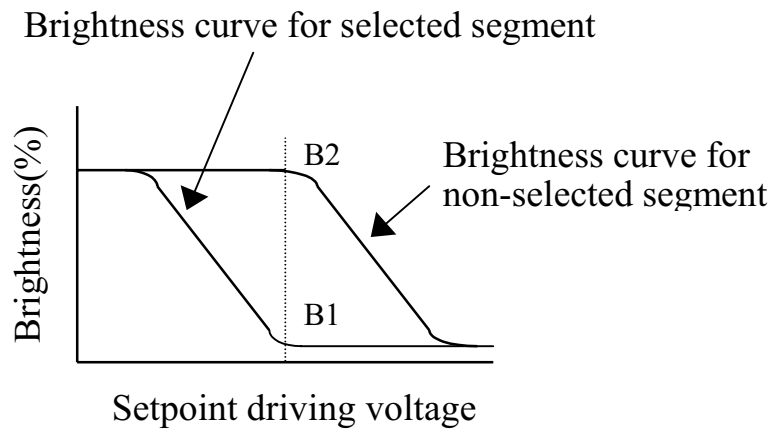


NOTE (2) : DEFINITION OF VIEWING ANGLE $\Phi 1$ AND $\Phi 2$

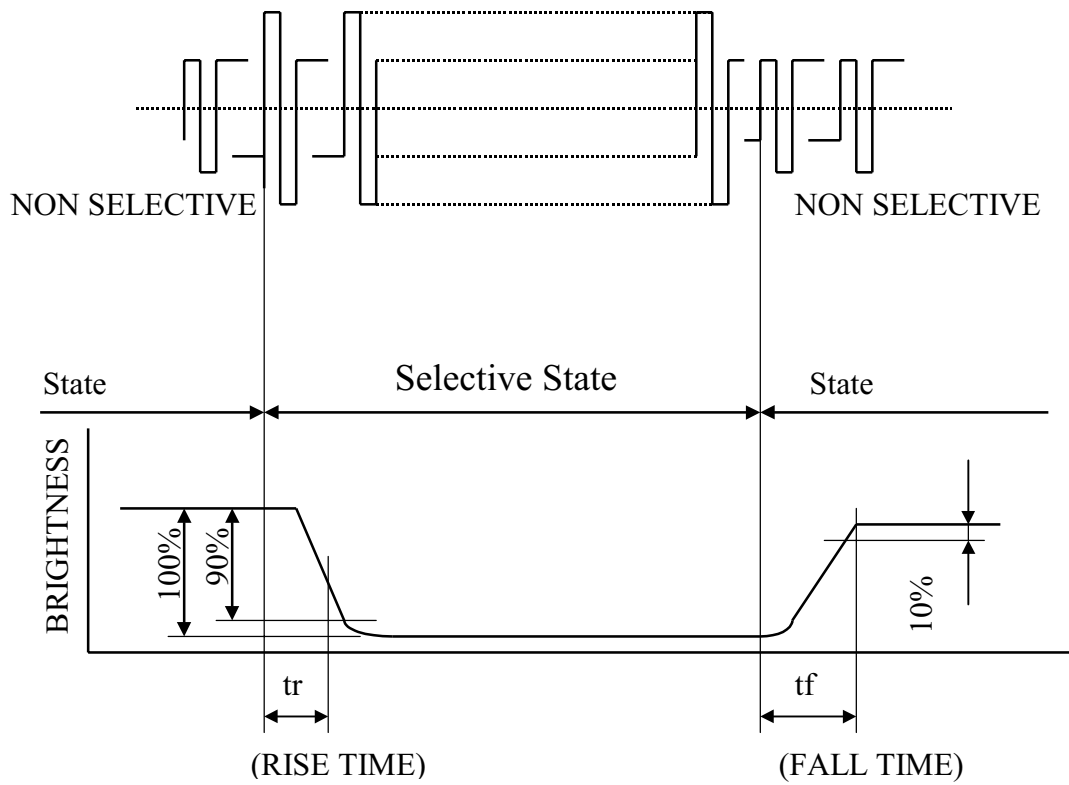


NOTE (3) : DEFINITION OF CONTRAST“K”

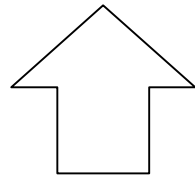
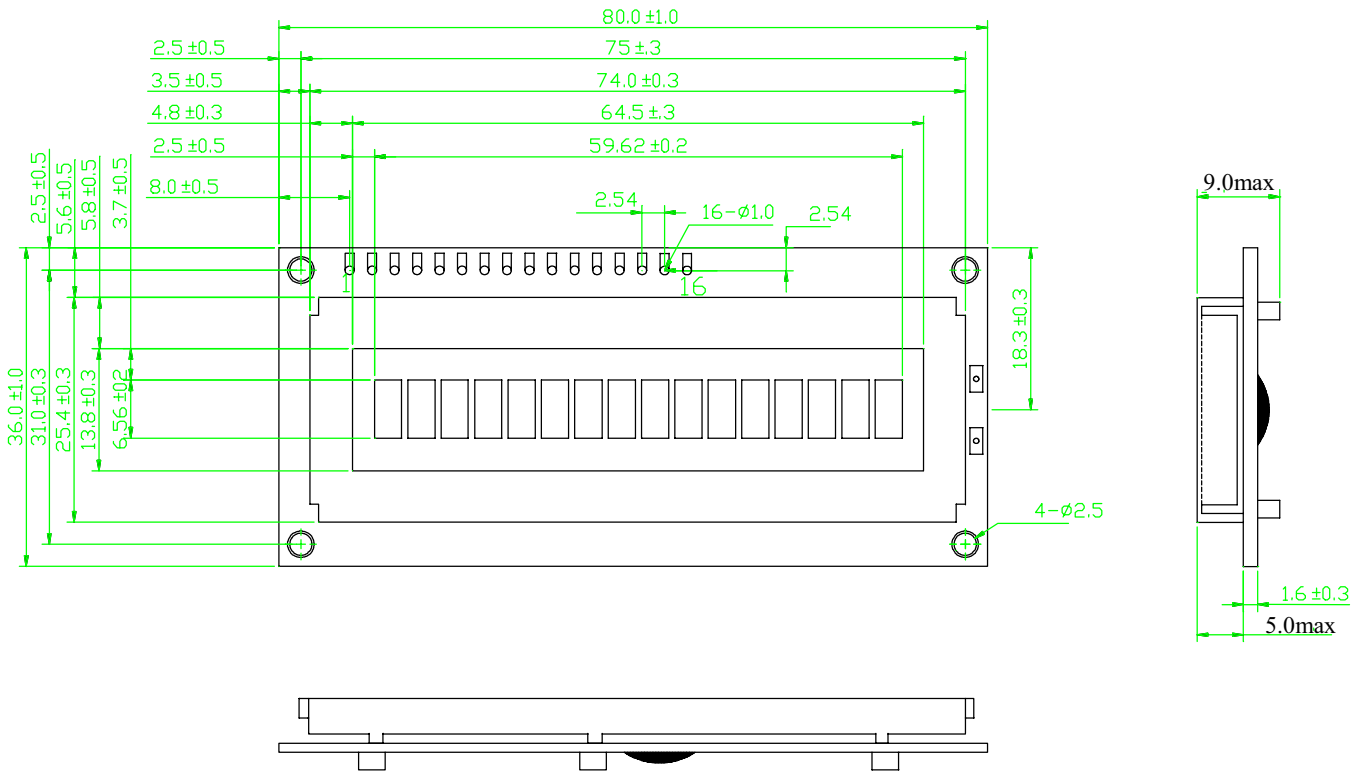
$$K = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



NOTE(4) : DEFINITION OF OPTICAL RESPONSE



7. OUTLINE DIMENSION.



60°CLOCK

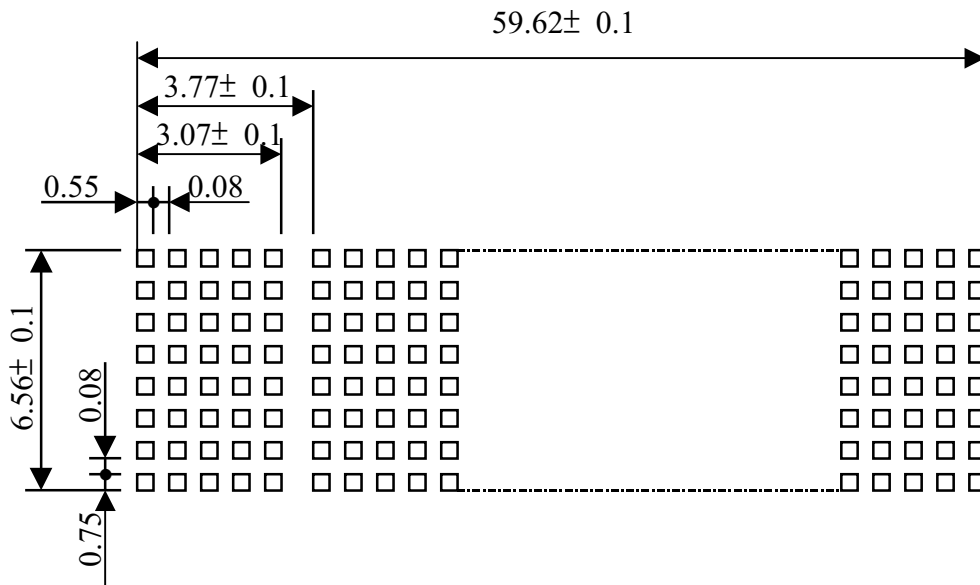
NOT SPECIFIED TOLERANCE IS ± 0.5 mm

UNIT : mm

INTERFACE PIN CONNECTION.

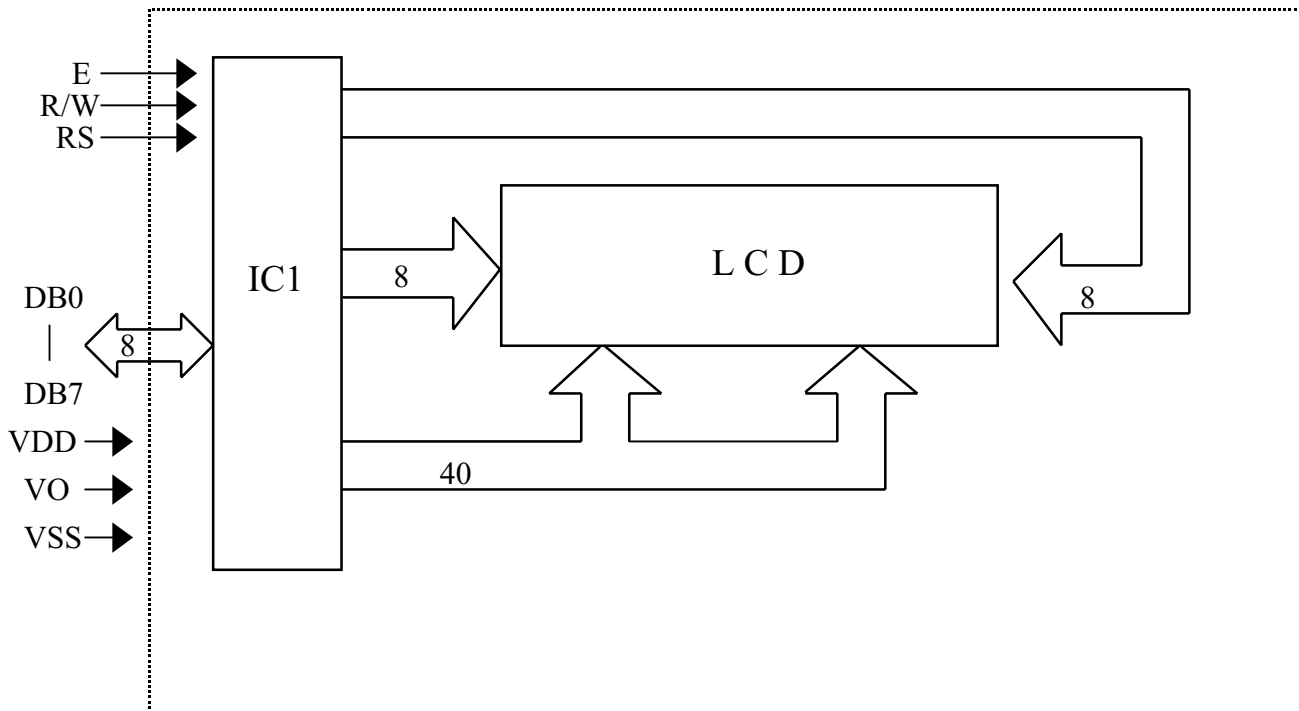
PIN NO	1	2	3	4	5	6	7	8	9	10	11	12
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5
PIN NO	13	14	15	16								
SYMBOL	DB6	DB7	NC									

7.1 DETAIL DRAWING OF MATRIX PATTERN.

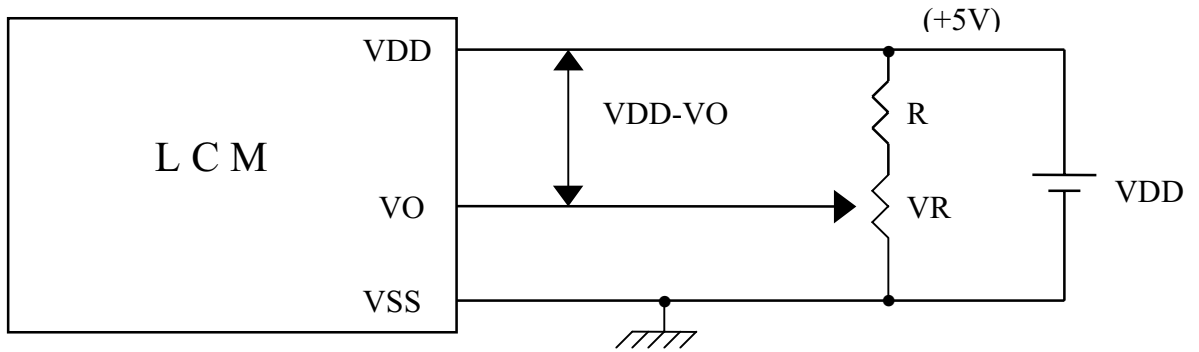


NOT SPECIFIED TOLERANCE IS ± 0.01 mm

7.2 BLOCK DIAGRAM.



8. POWER SUPPLY.



$VDD - VO$ (LCD DRIVING VOLTAGE) $\geq 1.5V$

$VR : 10K\Omega \sim 20K\Omega$