



富相科技股份有限公司

SOLOMON Goldentek Display Corp.

KAOHSIUNG FACTORY : NO. 18 Ta-Yeh St., Ta-Fa Industrial Park, Ta-Liao
 Hsiang, Kaohsiung Hsien 831, TAIWAN , R.O.C.
 TEL : 886-7-788-6800
 FAX : 886-7-788-6806~8

PART NO : GC4002N0SAN1B(LM1030SYR)
 FOR MESSRS : _____

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Accepted by : _____

Proposed by : *Mike Ma*

Date : 09,23,2002

RECORD OF REVISION

DATE	PAGE	SUMMARY
1998,02,16	ALL	ALL PAGES CHANGE
2002,09,20	ALL 04	CHANGE CORP. NAME & ADDRESS & TEL,FAX CHANGE PART NO.LM1030SYR→GC4002N0SAN1B 4.2 EVNIRONMENTAL ABSOLUTE MAXIMUM RATINGS. SHOCK STORAGE 490.0m/s ² (50G)→49.0m/s ² (5G)

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 ----- 40CH*2LINE
- (2) MODULE SIZE ----- 182.0W*33.50H*11.0T (max) mm
- (3) EFFECTIVE AREA ----- 154.0W*15.3H mm
- (4) CHARACTER PATTERN ----- 5*7 dots + cursor
- (5) CHARACTER SIZE ----- 3.20W*5.55H mm
- (6) CHARACTER PITCH ----- 3.70 mm
- (7) DOT SIZE ----- 0.60W*0.65H mm
- (8) DOT PITCH ----- 0.65W*0.70 H mm
- (9) VIEWING DIRECTION ----- 6 O’CLOCK
- (10) LCD TYPE ----- STN,YELLOW-GREEN,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 85%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	IDD	VDD = 5.0 V	——	1.0	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (1)	VDD-VO	Ta = 0°C	——	4.6	——	V
	DUTY=1/16	Ta = 25°C	——	4.4	——	V
	φ=10°	Ta = 50°C	——	3.5	——	V

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

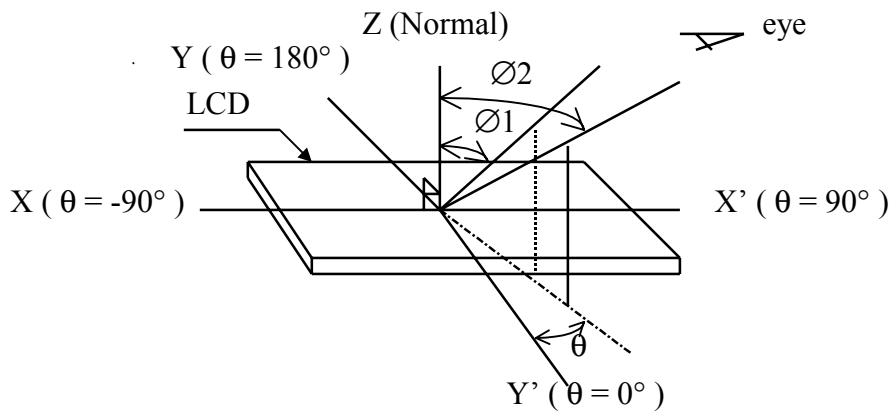
6. OPTICAL CHARACTERISTICS

Ta = 25°C

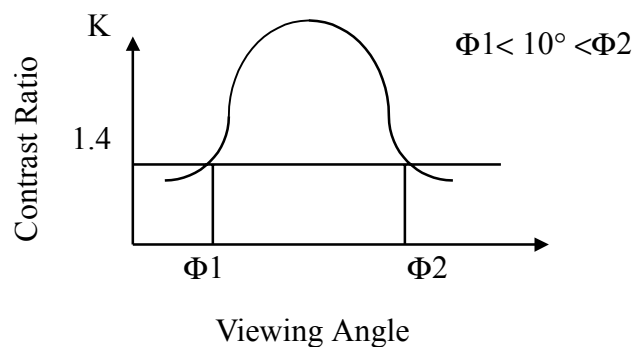
VDD = 5.0±0.25V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\Phi 2-\Phi 1$	K= 1.4	20	—	—	deg.	1,2
CONTRAST RATIO	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	3	—	—	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

NOTE (1) : DEFINITION OF θ AND Φ

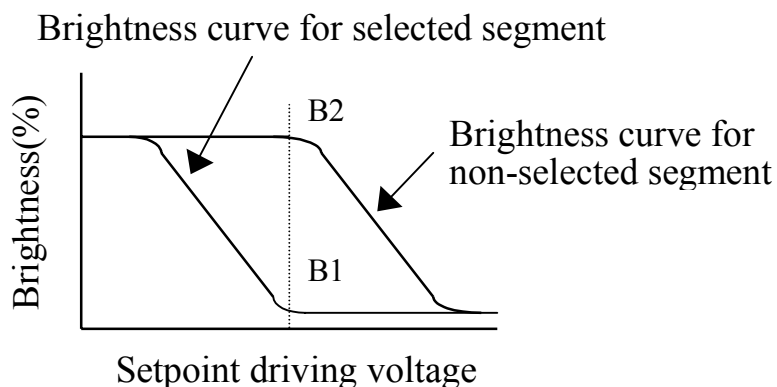


NOTE (2) : DEFINITION OF VIEWING ANGLE $\Phi 1$ AND $\Phi 2$

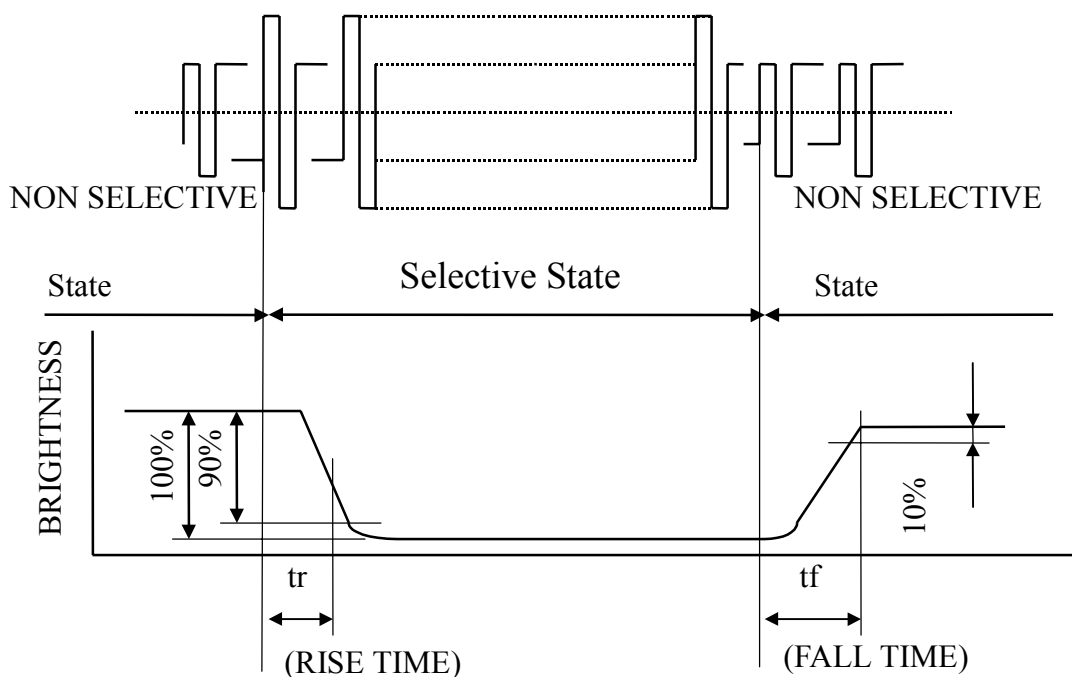


NOTE (3) : DEFINITION OF CONTRAST“K”

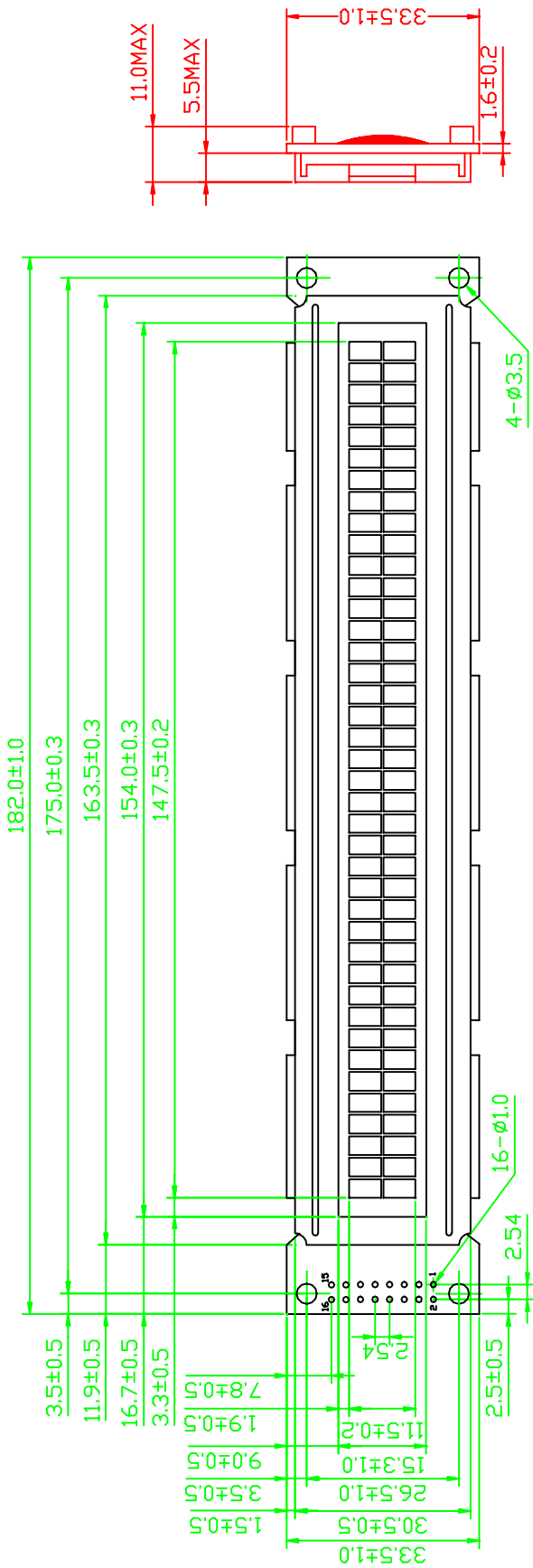
$$K = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



NOTE(4) : DEFINITION OF OPTICAL RESPONSE



7. OUTLINE DIMENSION.

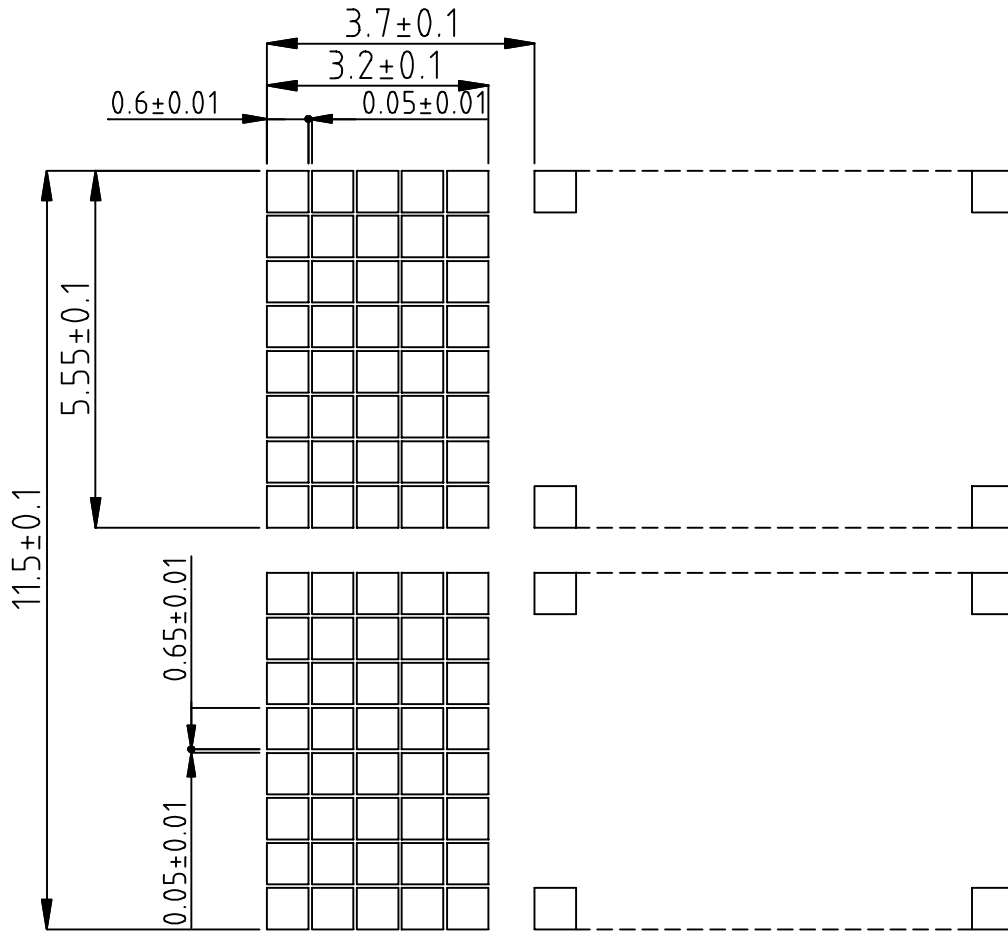


UNIT : mm
 SCALE : NTS
 NO SPECIFIED TOLERANCE:±0.3

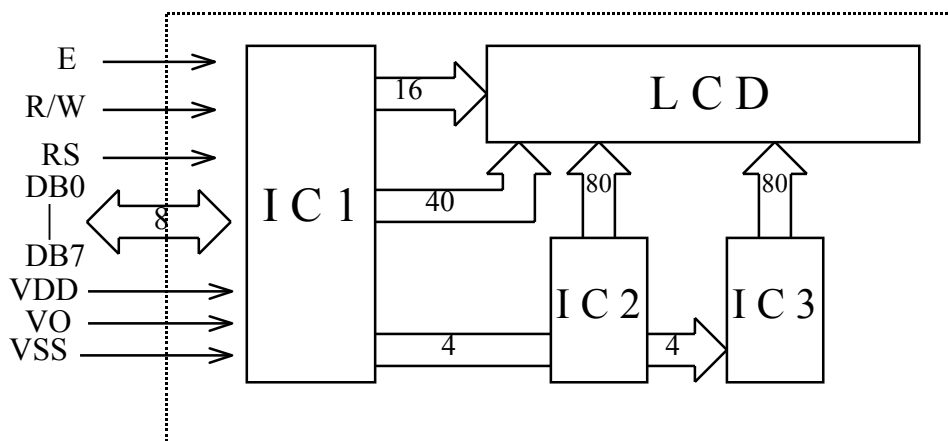
INTERFACE PIN CONNECTION

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

7.1 DETAIL DRAWING OF MATERIX PATTERN.

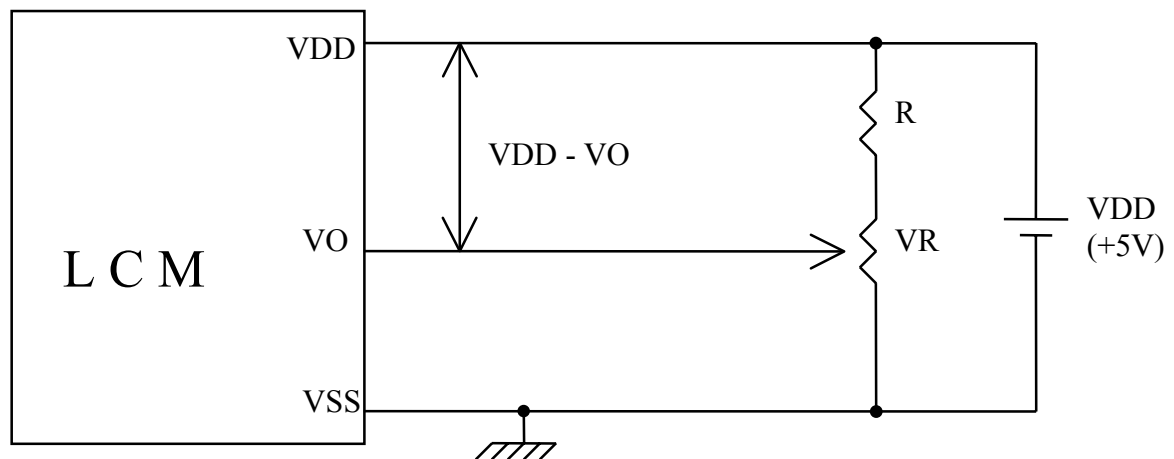


7.2 BLOCK DIAGRAM.



8. POWER SUPPLY.

8.1 POWER SUPPLY FOR LCM



VDD - VO LCD DRIVING VOLTAGE

VR : 10K Ω ~ 20K Ω

RECOMMEND RESISTOR R : VDD-VO \geq 1.5V