



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 : GC1602N0SHN1B(LM1010SGR)
 FOR MESSRS : _____

CONTENTS

NO.	ITEM	PAGE
1.	COVER	1
2.	RECORD OF REVISION	2
3.	GENERAL SPECIFICATION AND MECHANICAL DATA	3
4.	ABSOLUTE MAXIMUM RATINGS	4
5.	ELECTRICAL CHARACTERISTICS	5
6.	OPTICAL CHARACTERISTICS	6~7
7.	OUTLINE DIMENSION	8~9
8.	POWER SUPPLY FOR LCD MODULE	10

Accepted by : _____

Proposed by : *Mike Mo*
 Date : 08,01,2002

RECORD OF REVISION

DATE	PAGE	SUMMARY
87.02.19	ALL	PAGES CHANGED
2002,04,16	ALL 04 05 06 08 09	CHANGE COMPANY NAME & LOGO & ADDRESS, FAX, TEL 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. POWER SUPPLY FOR LOGIC MAX. 7.0→6.0 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS. SHOCK STORAGE 490.0m/s ² (50G)→ 49.0m/s ² (5G) 5. ELECTRICAL CHARACTERISTICS. RECOMMENDED LCD DRIVING VOLTAGE Ta= 0°C TYP.4.6→(4.9) Ta= 50°C TYP.4.1→(4.0) 6. OPTICAL CHARACTERISTICS VIEWING AENLGE MIN. 40→20 TYP. -----→40 CONTRAST RATIO MIN. 3→----- TYP. -----→2 CHANGE DIMENSION ADD TOLERANCE
2002,07,31	ALL	CHANGE PART NO. LM1010SGR → GC1602N0SHN1B

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 DOTS ----- 16CH*2LINE
- (2) MODULE SIZE ----- 80.0W*36.0H*9.0T (MAX) mm
- (3) EFFECTIVE AREA ----- 64.5W*13.8H mm
- (4) CHARACTER PATTERN ----- 5 * 7dots + CURSOR
- (5) CHARACTER SIZE ----- 2.95W*4.35H mm
- (6) CHARACTER PITCH ----- 3.65 mm*5.05Hmm
- (7) DOT SIZE ----- 0.55W * 0.5H mm
- (8) DOT PITCH ----- 0.60W * 0.55H mm
- (9) LCD TYPE ----- STN,GRAY,6 O'CLOCK,
REFLECTIVE

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD-VSS	-----	6.0	V	
POWER SUPPLY FOR LCD DRIVING VOLTAGE	VDD-VO	-----	13.5	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=5.0V±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	VDD=5.0V	-----	1.0	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE(1)	VDD-VO DUTY=1/16 φ=10°	Ta = 0 °C	-----	(4.8)	-----	V
		Ta = 25 °C	-----	4.4	-----	V
		Ta = 50 °C	-----	(4.0)	-----	V
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25 °C	-----	270	-----	KHz

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

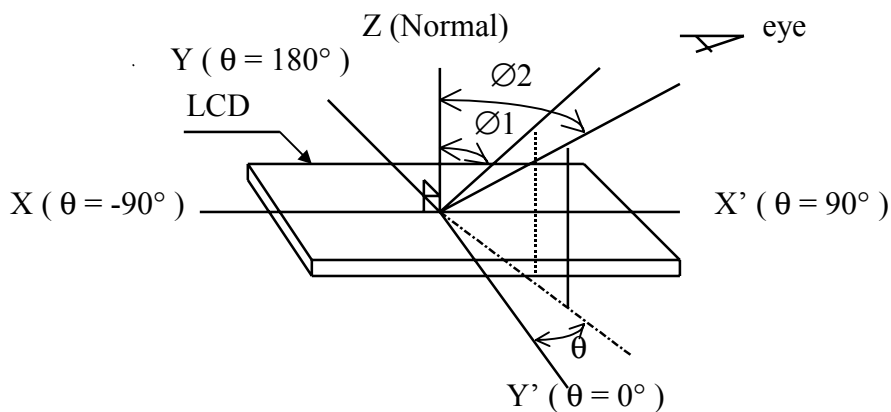
6.OPTICAL CHARACTERISTICS

Ta = 25°C

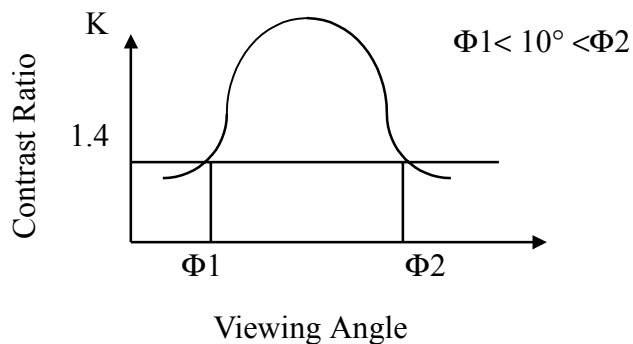
VDD = 5.0V± 0.25V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	$\Phi 2-\Phi 1$	K= 1.4	20	40	-----	deg.	
CONTRAST RATION	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	2	-----	-----	
RESPONSE TIME	tr(rise)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	250	400	ms	
	tf(fall)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	350	450	ms	

NOTE (1) : DEFINITION OF θ AND Φ



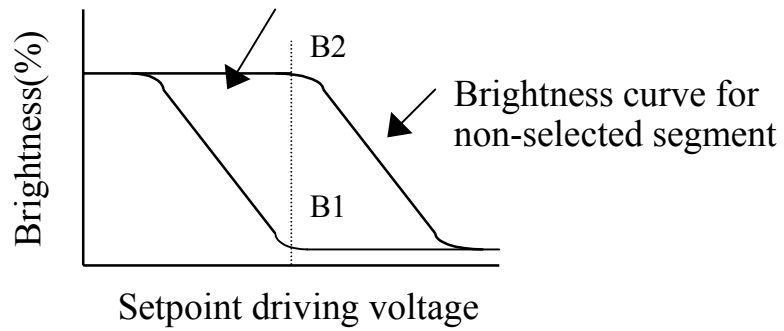
NOTE (2) : DEFINITION OF VIEWING ANGLE $\Phi 1$ AND $\Phi 2$



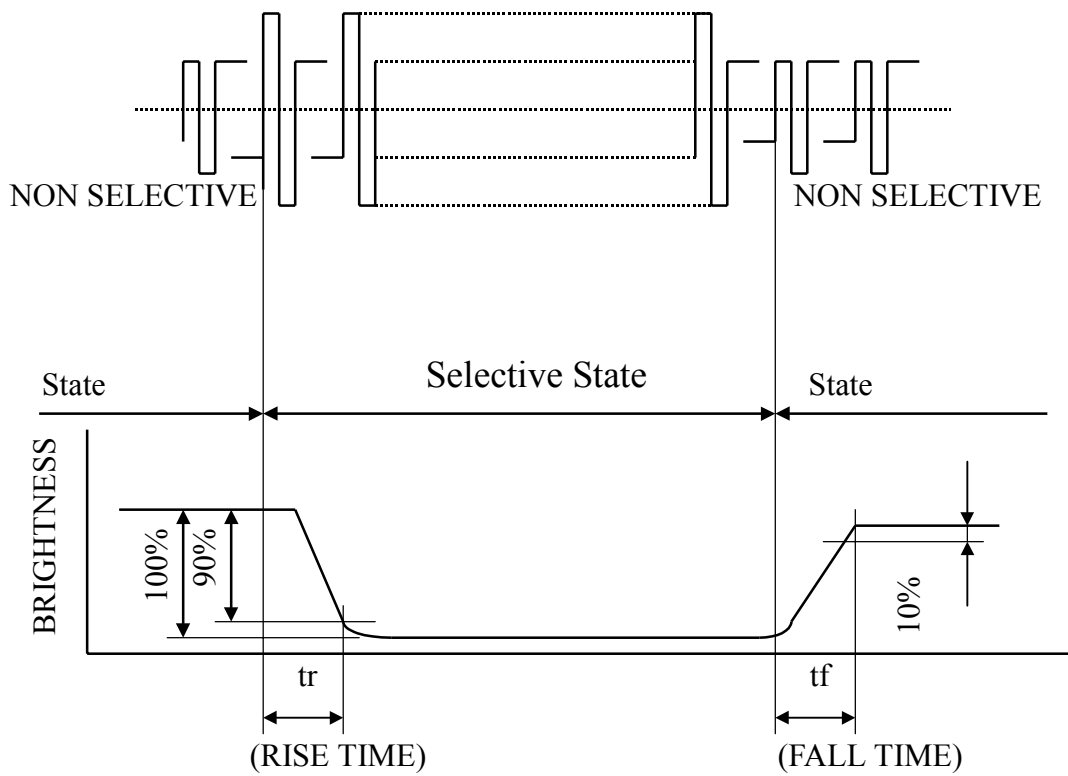
NOTE (3) : DEFINITION OF CONTRAST“K”

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

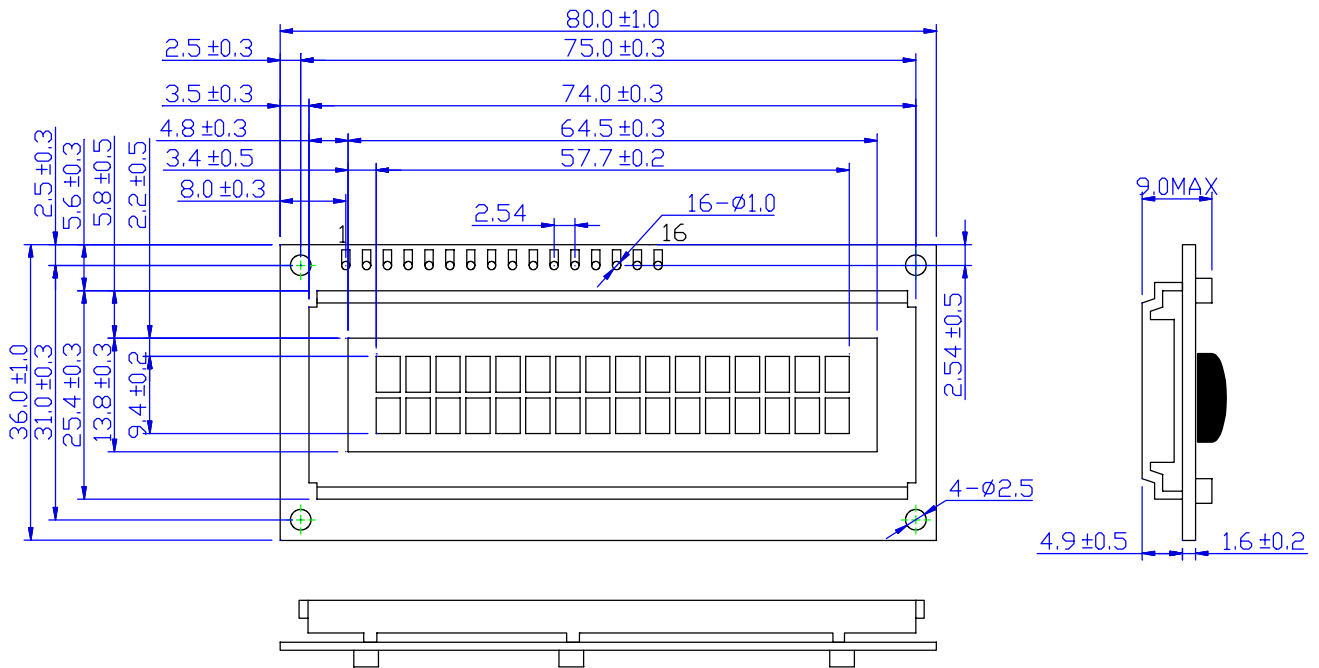
Brightness curve for selected segment



NOTE(4) : DEFINITION OF OPTICAL RESPONSE



7.OUTLINE DIMENSION

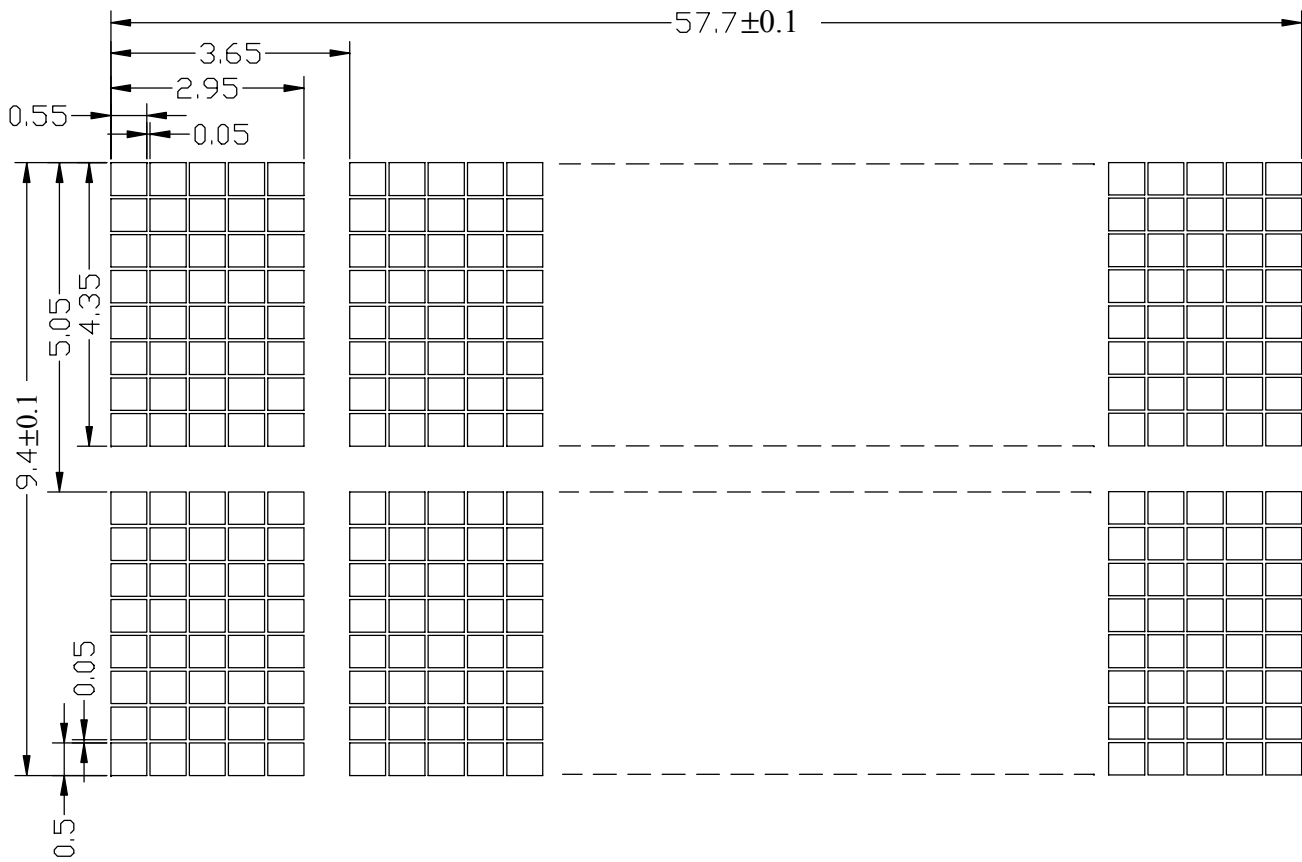


↑
6 O'CLOCK

*INTERFACE PIN CONNECTOR

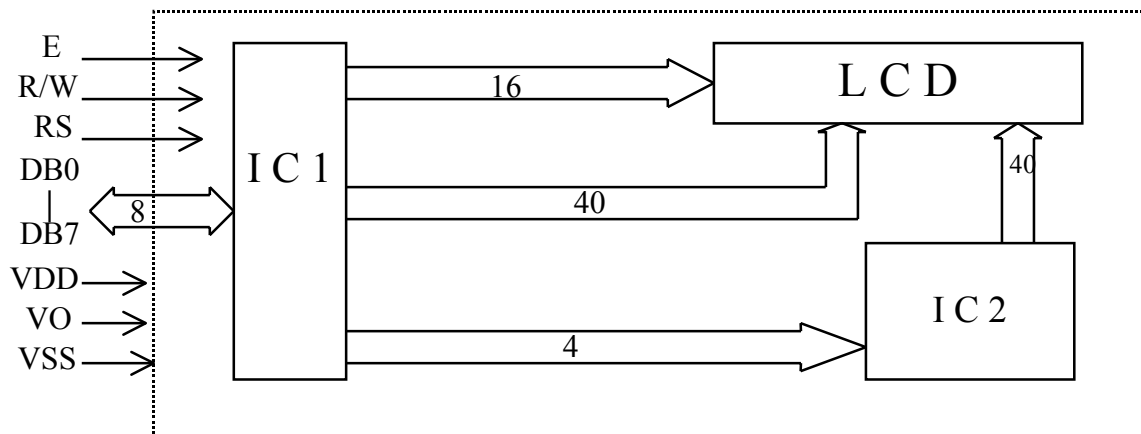
PIN NO.	1	2	3	4	5	6	7	8
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0	DB1
PIN NO.	9	10	11	12	13	14	15	16
SYMBOL	DB2	DB3	DB4	DB5	DB6	DB7	NC	NC

7.1 DETAIL DRAWING OF MATRIX PATTERN



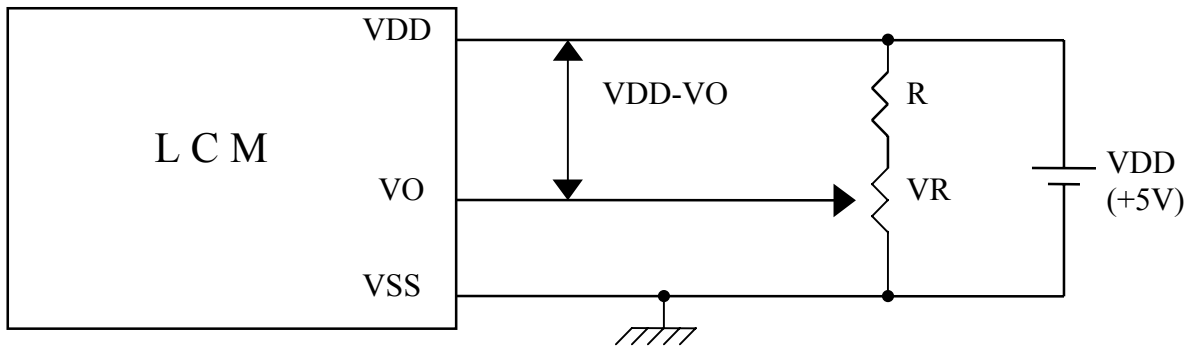
NOT SPECIFIED TOLERANCE: ± 0.01 mm

7.2 BLOCK DIAGRAM



8. POWER SUPPLY.

8.1 POWER SUPPLY LCM AND LED BACKLIGHT.



VDD – VO : LCD DRIVING VOLTAGE

VR : 10KΩ ~ 20KΩ