



# 富相科技股份有限公司

## SOLOMON Goldentek Display Corp.


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PART NO : GC4004N0SBY1B(LM1190SYL)  
 FOR MESSRS : \_\_\_\_\_

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

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

Date : 09,04,2002

# RECORD OF REVISION

DATE	PAGE	SUMMARY
87.03.07	ALL	PAGES CHANGED
2002,08,30	ALL	CHANGE COPR. NAME & ADDRESS & TEL,FAX CHANGE PART NO.LM1190SYL→GC4004N0SBY1B
	04	4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS SHOCK STORAGE 490.0m/s <sup>2</sup> (50G)→ 49.0m/s <sup>2</sup> (5G)
	10	DELETE NOTE



## 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)
POWER SUPPLY FOR LED	VDD-VSS	-----	6.0	V	

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	
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)	
SHOCK	---	29.4 m/s <sup>2</sup> (3G)	---	49.0 m/s <sup>2</sup> (5G)	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

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

NOTE(3) : Ta ≤ 40°C : 95% RH MAX.  
Ta > 40°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 95%RH AT 40°C. (50%RH AT 50 °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	VDD = 5.0V	-----	1.0	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (1)	VDD-VO DUTY=1/16 Φ = 10°	Ta = 0°C	-----	4.7	-----	V
		Ta = 25 °C	-----	4.4	-----	V
		Ta = 50 °C	-----	3.9	-----	V
POWER SUPPLY CURRENT FOR LED	ILED	VDD=5.0V	-----	-----	840	mA

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

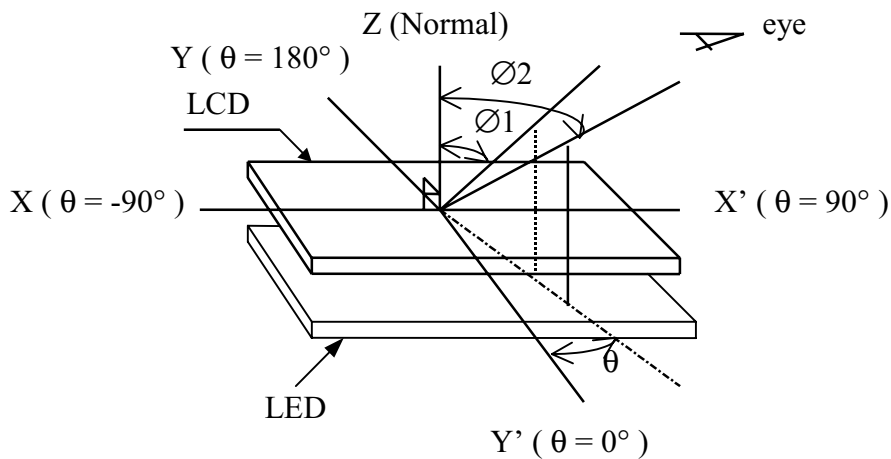
## 6. OPTICAL CHARACTERISTICS

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

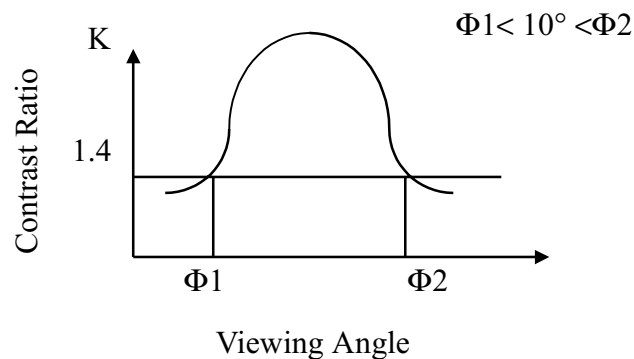
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\Phi 2 - \Phi 1$	$K = 1.4$	20	—	—	deg.	1
CONTRAST RATIO	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	2	—	—	
RESPONSE TIME	tr(rise)	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	250	400	ms	4
	tf(fall)	$\Phi = 10^\circ$ $\theta = 0^\circ$	—	350	450	ms	4
THE BRIGHTNESS OF BACKLIGHTING SOURCE	B	(*) $\Phi = 10^\circ$ $\theta = 0^\circ$	4.0	—	—	cd/m <sup>2</sup>	5

(\* Under normal temperature and humidity in a dark room )

### NOTE(1) : DEFINITION OF $\theta$ AND $\Phi$



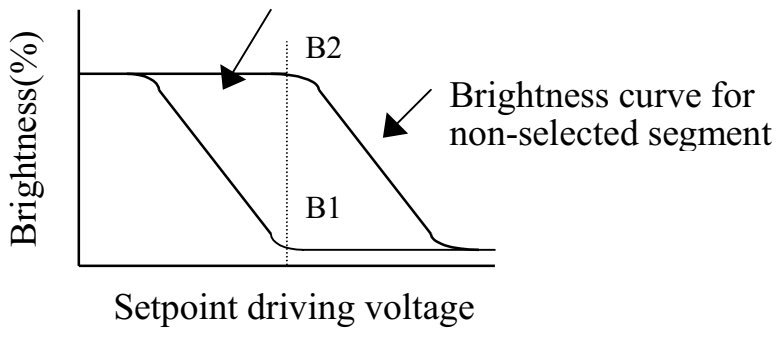
### NOTE (2) : DEFINITION OF VIEWING ANGLE $\Phi 1$ AND $\Phi 2$



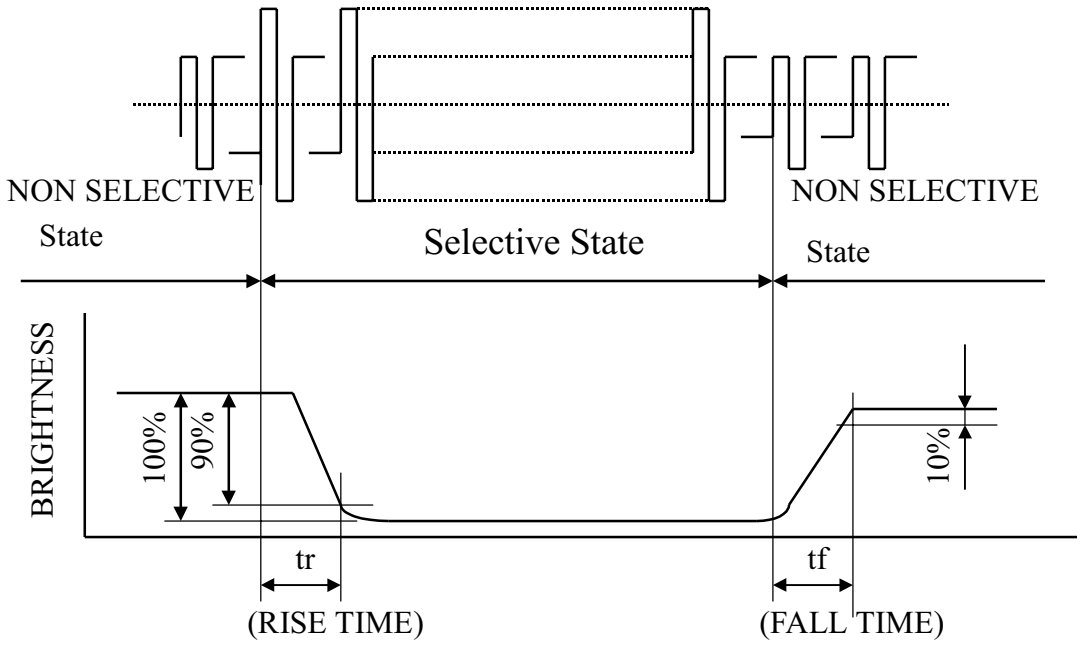
NOTE (3) : DEFINITION OF CONTRAST“K”

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

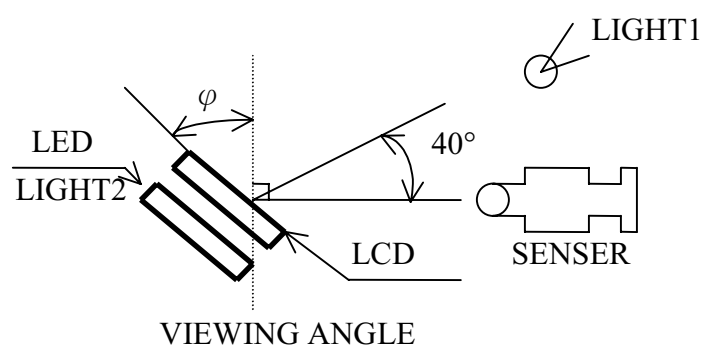
Brightness curve for selected segment



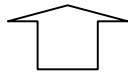
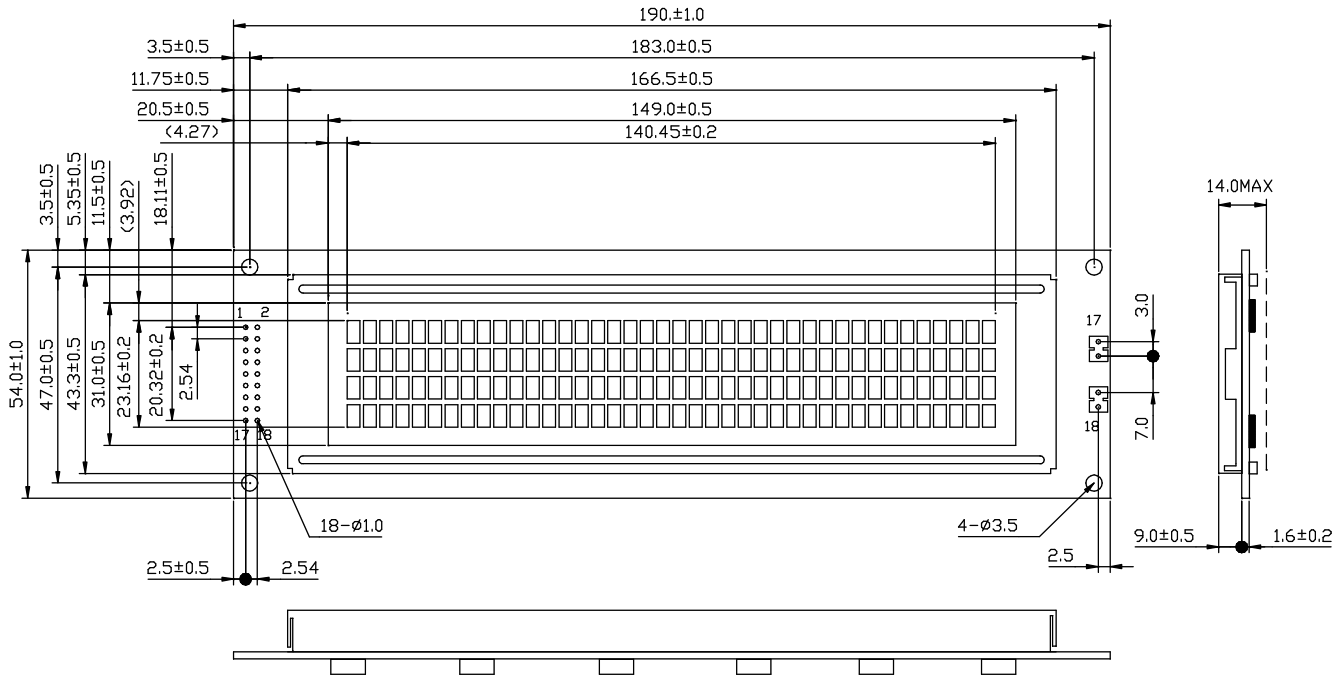
NOTE(4) : THE DEFINITION OF OPTICAL RESPONSE



NOTE (5) : POSITION OF LIGHT



### 7. OUTLINE DIMNESION



6 O'CLOCK

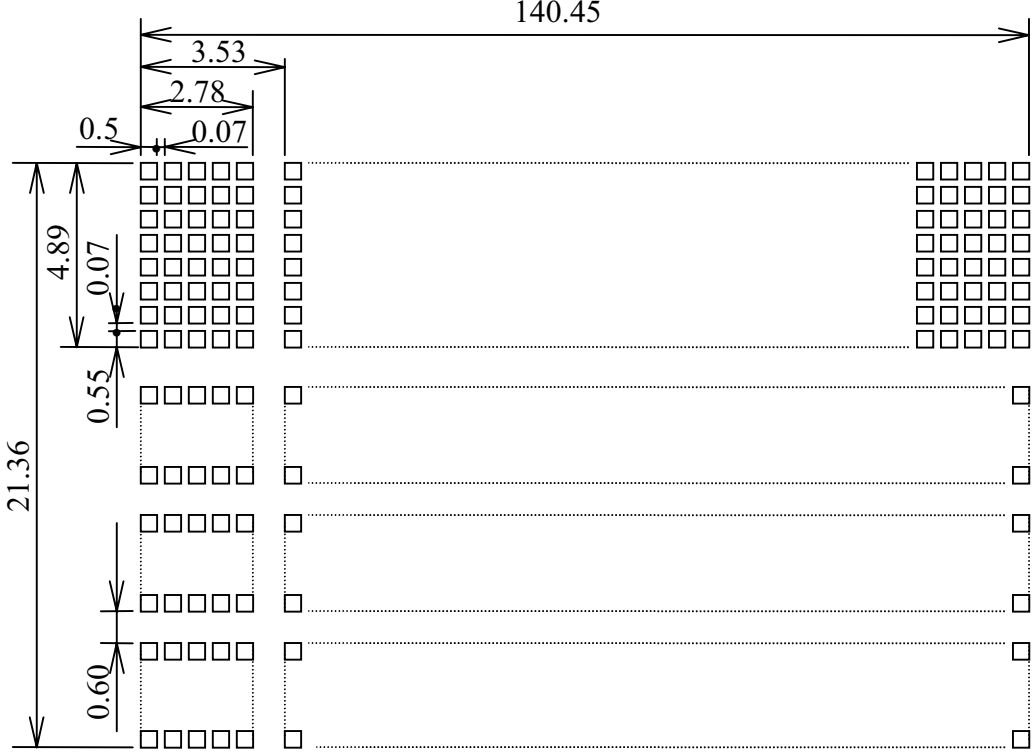
UNIT : mm  
 SCALE : NTS  
 NO SPECIFIED TOLERANCE : ±0.5

### INTERFACE PIN CONNECTION

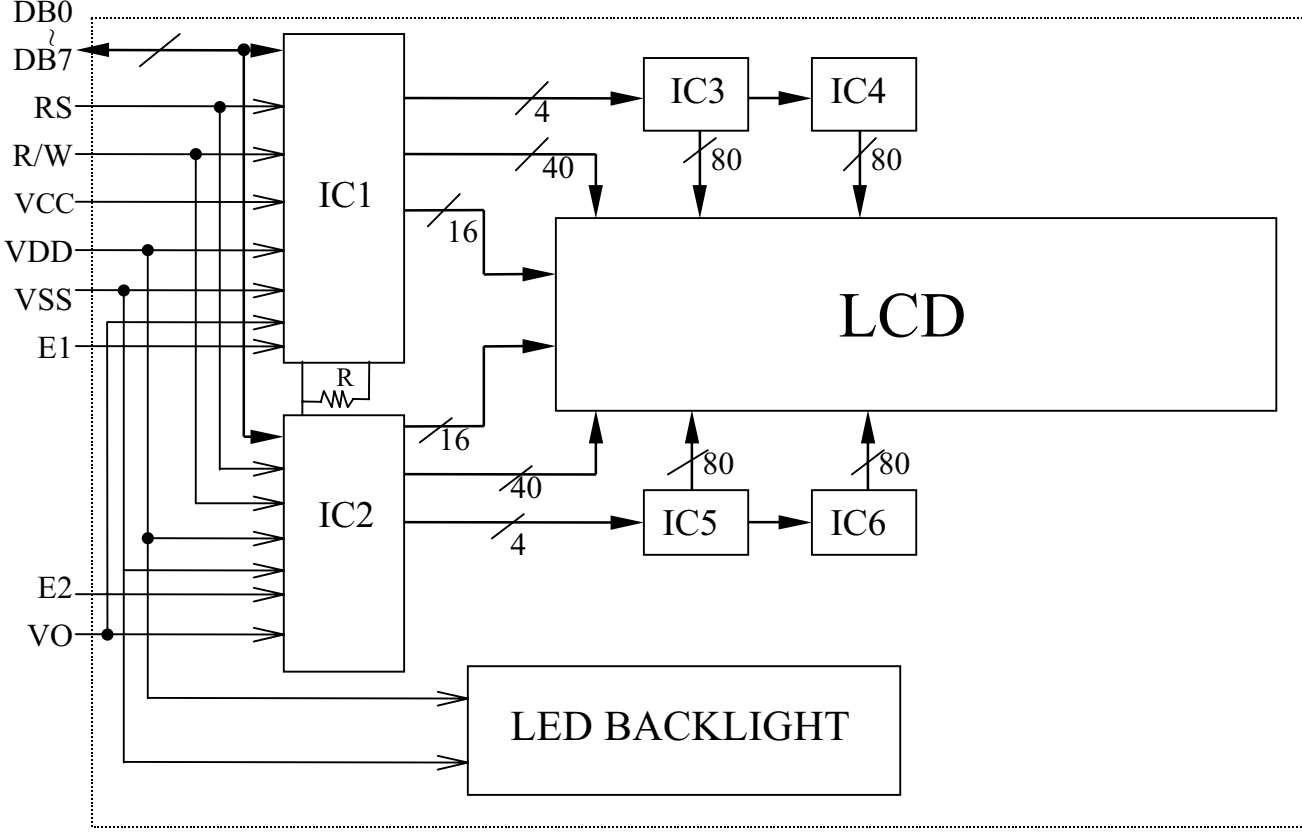
PIN NO	1	2	3	4	5	6	7	8	9
SYMBOL	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	E1
PIN NO	10	11	12	13	14	15	16	17	18
SYMBOL	R/W	RS	VO	VSS	VCC	E2	NC	NC	NC

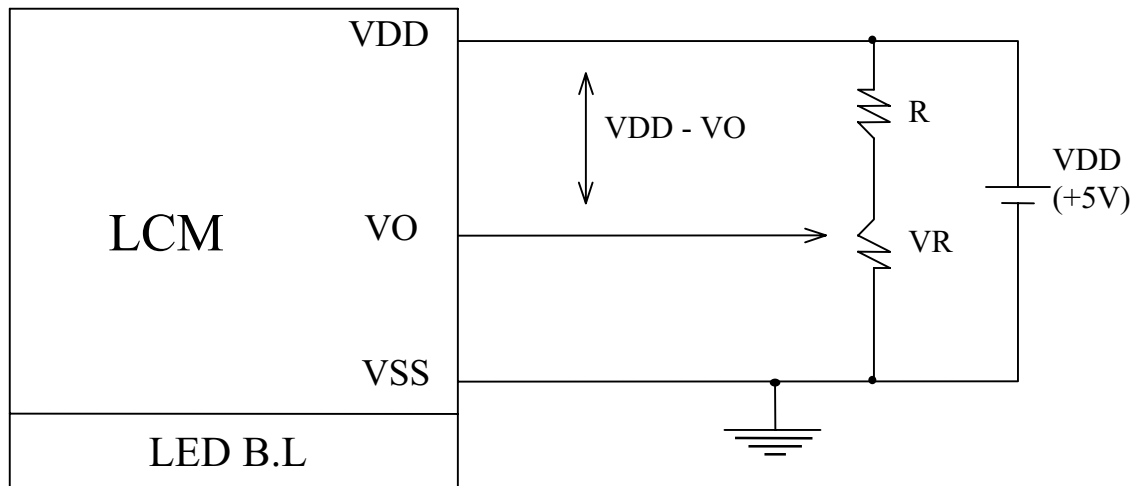


**7.1 DETAIL DRAWING OF MATRIX PATTERN.**



**7.2 BLOCK DIAGRAM.**



**8. POWER SUPPLY.****8.1 POWER SUPPLY FOR LCM AND LED BACKLIGHT**

VDD - VO : LCD DRIVING VOLTAGE

VR : 10KΩ ~ 20KΩ

RECOMMEND RESISTOR R :  $VDD - VO \geq 1.5V$