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PART NO : GG2406N8SKY1S(LM6270SGL)
 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.	BLOCK DIAGRAM	8
8.	TIMING CHARACTERISTICS	9
9.	OUTLINE DIMENSION	10~11
10.	POWER SUPPLY FOR LCD MODULE	12

Accepted by : _____

Proposed by :  _____

Date : 09,04,2002

RECORD OF REVISION

DATE	PAGE	SUMMARY
2002,08,30	ALL 04	CHANGE NEW ADDRESS & TEL,FAX & COMP NAME. CHANGE PART NO.LM6270SGL→ GG2406N8SKY1S 4.2 ENVIRONMENTAL 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 DOTS ----- 240.0W*64.0 DOTS
 (2) MODULE SIZE ----- 180.0W*65.0H*17.0 T (MAX) mm
 (3) EFFECTION AREA ----- 133.0W*40.0H mm
 (4) DOT SIZE ----- 0.49W*0.49H mm
 (5) DOT PITCH ----- 0.53W*0.53H mm
 (6) VIEWING DIRECTION----- 6 O'CLOCK
 (7) LCD TYPE ----- STN,GRAY,TRANSFLECTIVE
 (8) LED COLOR ----- YELLOW-GREEN

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD-VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVING	VDD-VEE	0	22.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	-----	-----	100	V	
POWER SUPPLY FOR LED	VLED-GND	-----	5.0	V	

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 (1.2G)	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.

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
LOGIC CIRCUIT POWER SUPPLY VOLTAGE	VDD - VSS	-----	4.75	5.0	5.25	V
LCD DRIVER POWER SUPPLY VOLTAGE	VEE - VSS	-----	-3.7	-5.7	-10	V
INPUT VOLTAGE NOTE (1)	VI	H LEVEL	VDD-2.2	-----	VDD	V
		L LEVEL	0	-----	0.8	V
OUTPUT CIRCUIT NOTE (2)	VOH	-----	VDD-0.3	-----	VDD	V
	VOL	-----	0	-----	0.3	V
LOGIC CIRCUIT POWER SUPPLY CURRENT NOTE (2)	IDD	VDD – VSS=5.0V VEE – VSS=-5.7	-----	25	-----	mA
LCD DRIVER CIRCUIT POWER SUPPLY CURRENT NOTE (2)	IEE	VDD – VSS=5.0V VEE – VSS=-5.7	-----	3	-----	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE(3)	VDD-VEE $\Phi=10^\circ$ $\theta=0^\circ$ DUTY = 1/64	Ta = 0°C	-----	-----	13.1	V
		Ta = 25 °C	-----	-----	10.7	V
		Ta = 50 °C	8.0	-----	-----	V
POWER SUPPLY FOR LED	ILED	VLED-GND=5V	-----	550	-----	mA

NOTE(1) : APPEND TO TERMINALS (WR,RD,CE,C/D,RST,FS,DO~D7)

NOTE(2) : THE DISPLAY PATTERN IS ALL "Q"

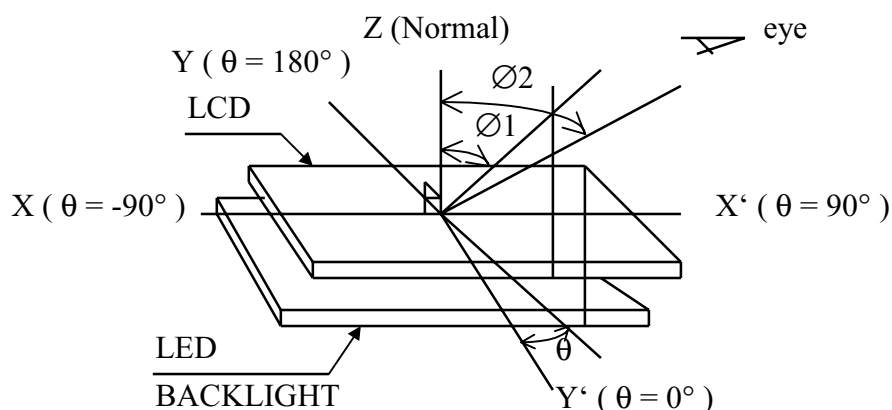
NOTE(3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTATE
ABOUT $\pm 0.5V$ BY EACH MODULE.

6. OPTICAL CHARACTERISTICS

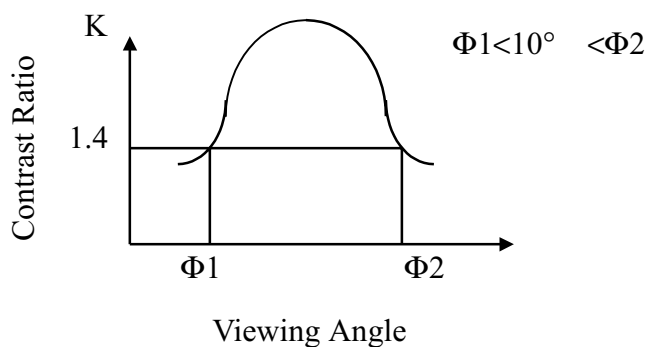
 $T_a = 25^{\circ}\text{C}$
 $V_{DD} = 5.0\text{V} \pm 0.25\text{V}$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	UNIT
VIEWING AREA	$\Phi 2 - \Phi 1$	$K \geq 1.4$	20	30	-----	deg.	1,2,5
CONTRAST RATIO	K	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	1.4	3	-----	-----	3,5
RESPONSE TIME	tr(rise)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	-----	250	-----	ms	4,5
	tf(fall)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	-----	400	-----	ms	4,5
BRIGHTNESS OF BACKLIGHT	B	$\Phi = 0^{\circ}$ $\theta = 0^{\circ}$	4.0	(10)	-----	cd/m ²	-----

NOTE (1) : DEFINITION OF θ AND Φ



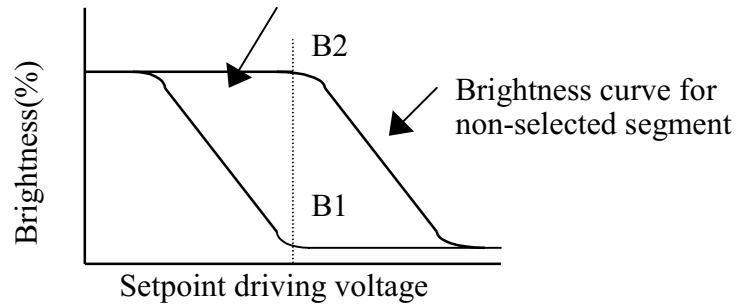
NOTE (2) : DEFINITION OF VIEWING ANGLE $\Phi 1$ AND $\Phi 2$



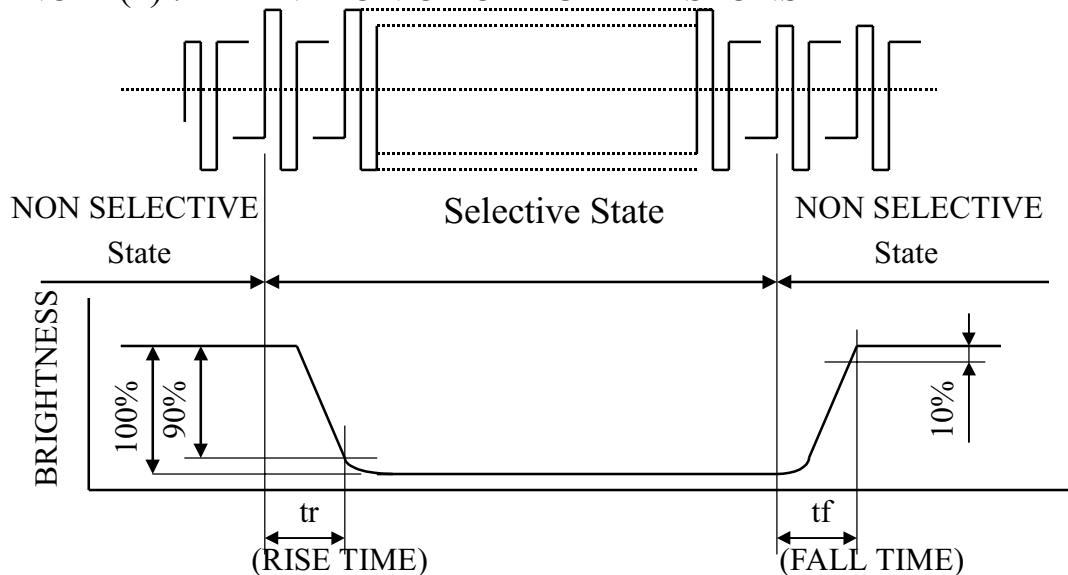
NOTE (3) : DEFINITION OF CONTRAST“K”

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

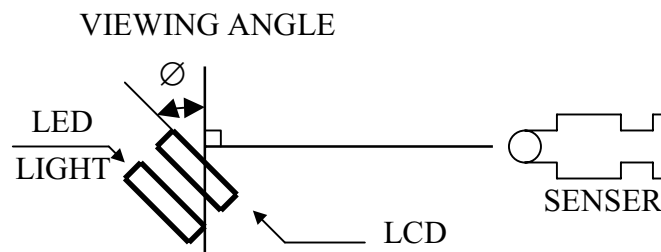
Brightness curve for selected segment



NOTE(4) : DEFINITION OF OPTICAL RESPONSE



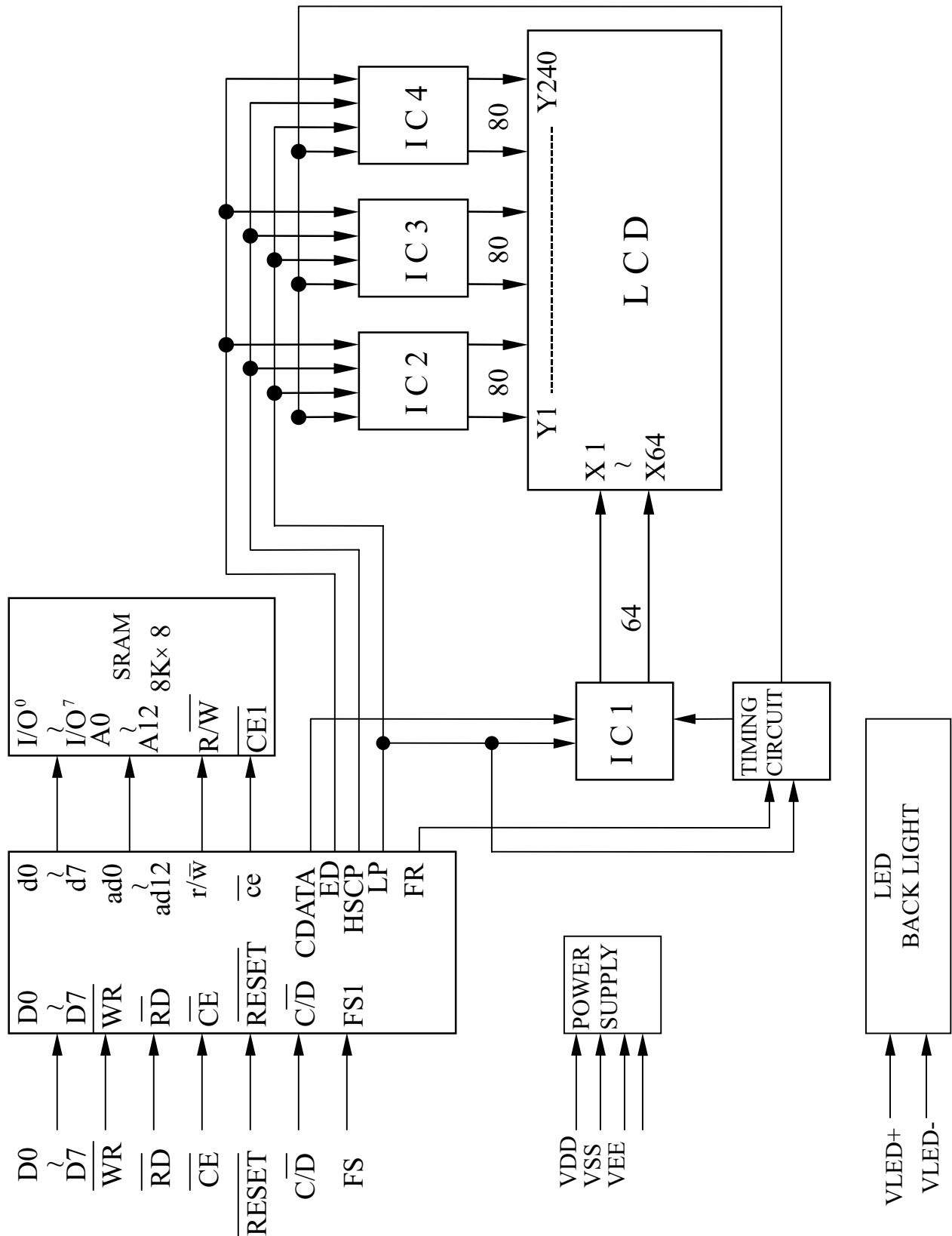
NOTE (5) : POSITION OF LIGHT



NOTE (6) : BRIGHTNESS UNIFORMITY DEFINED AS FOLLWING

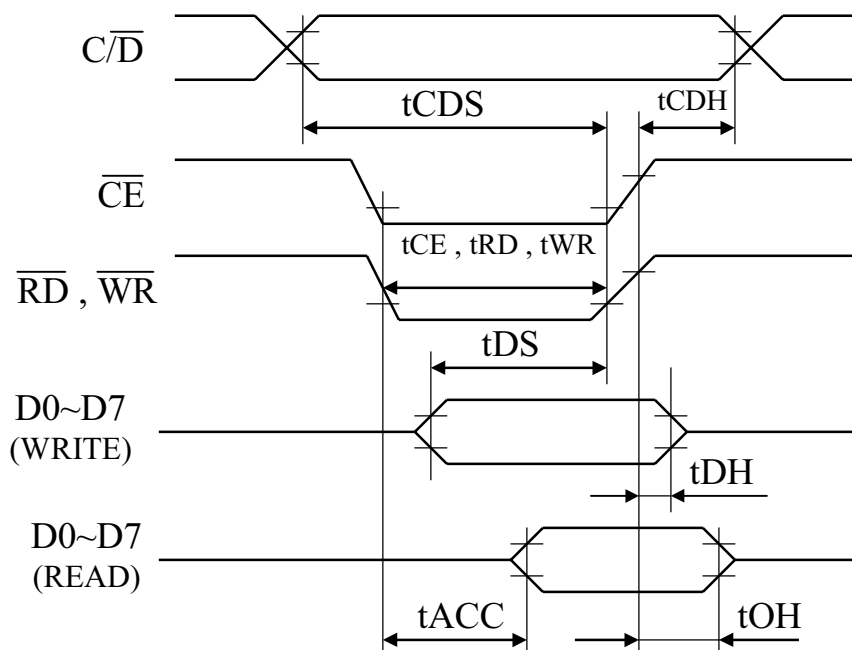
$$\frac{(\text{MAXIMUN BRIGHTNESS OR MINUMUNM BRIGHTNESS})-\text{AVERAGE BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}}$$

7. BLOCK DIAGRAM.



8. TIMING CHARACTERISTICS.

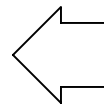
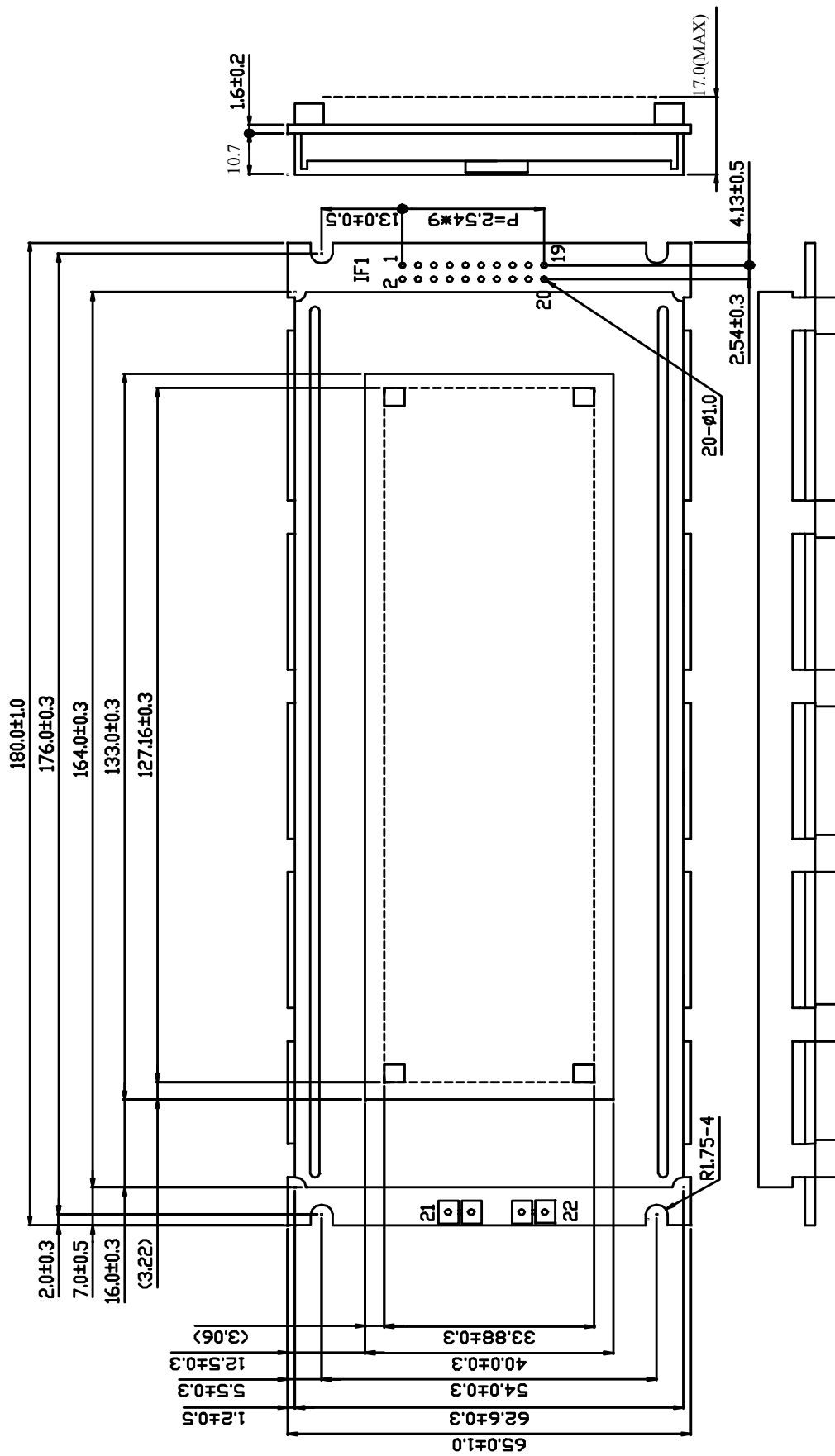
Bus Timing



VDD = 5V±0.25V

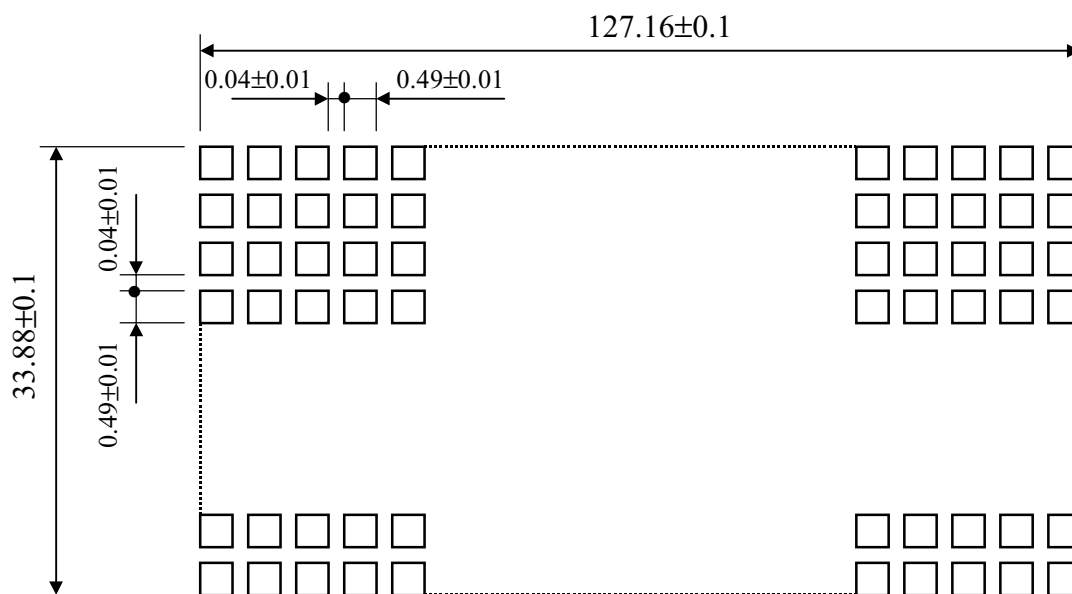
ITME	SYMBOL	CONDITIONS	MIN.	MAX.	UNIT
$\overline{C/D}$ Set Up Time	t_{CDS}		100	-----	ns
$\overline{C/D}$ Hold Time	t_{CDH}		10	-----	ns
$\overline{CE}, \overline{RD}, \overline{WR}$, Pulse width	t_{CE}, t_{RD}, t_{WR}		80	-----	ns
Data Set Up Time	t_{DS}		80	-----	ns
Data Hold Time	t_{DH}		40	-----	ns
Access Time	t_{ACC}		-----	150	ns
Output Hold Time	t_{OH}		10	50	ns

9. OUTLINE DIMENSION



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

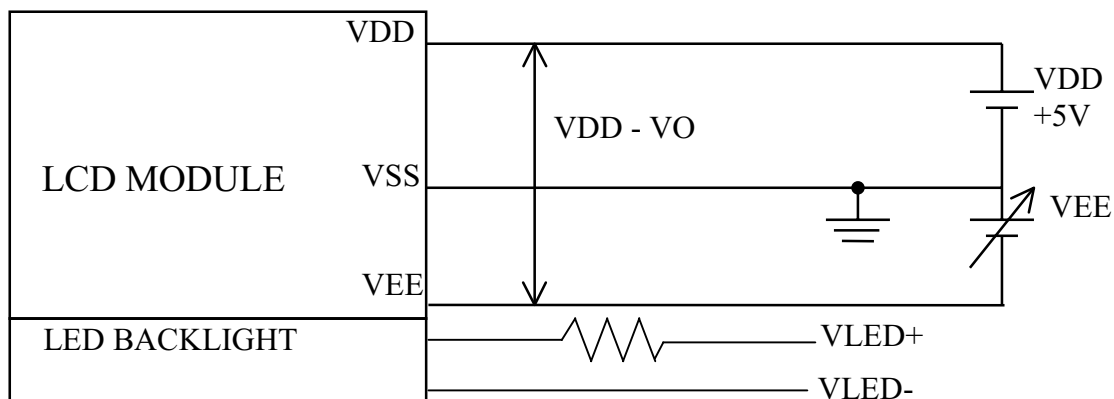
NOTE1. DETAIL DRAWING OF MATRIX PATTERN



IF1:

PIN NO	SYMBOL	FUNCTION
1	FGND	FRAME GROUND (CONNECTED TO METAL BEZEL)
2	GND	GROUND (SIGNAL GROUND 0V)
3	VDD	POWER SUPPLY FOR LOGIC (+5V)
4	VEE	POWER SUPPLY FOR LCD DRIVER
5	$\overline{\text{WR}}$	WRITE SIGNAL
6	$\overline{\text{RD}}$	READ SIGNAL
7	$\overline{\text{CE}}$	CHIP ENABLE
8	$\overline{\text{C/D}}$	$\overline{\text{WR}} = \text{"L"} , \overline{\text{C/D}} = \text{"H"} : \text{COMMAND WRITE}$ $\overline{\text{C/D}} = \text{"L"} : \text{DATA WRITE}$ $\overline{\text{RD}} = \text{"L"} , \overline{\text{C/D}} = \text{"H"} : \text{STATUS READ}$ $\overline{\text{C/D}} = \text{"L"} : \text{DATA READ}$
9	NC	NO CONNECTION
10	$\overline{\text{RESET}}$	CONTROLLER RESET ("L" : RESET)
11	DO	DATA INPUT / OUTPUT (LSB)
12	D1	DATA INPUT/OUTPUT
17	D6	
18	D7	DATA INPUT / OUTPUT (MSB)
19	FS	FONT SELECT : CONNECT TO VDD : 6*8 PIXEL / FONT CONNECT TO GND : 8*8 PIXEL / FONT
20	NC	NO CONNECTION
21	VLED+	POWER SUPPLY FOR VLED+
22	VLED-	POWER SUPPLY FOR VLED-

10. POWER SUPPLY FOR LCM



10.1 POWER AND INTERFACE TIMING SEQUENCE .

