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PART NO : GC2004N4SKY1B(LM1100SGL)
FOR MESSRS : _____

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Accepted by : _____

Proposed by :  _____

Date : 09,20,2002

RECORD OF REVISION

DATE	PAGE	SUMMARY
1992,07,07		3.3 MECHANICAL DATA (6) CHARACTER PITCH : 3.55mm→3.55W*3.35H mm
1995,11,07	3	3.3 MECHANICAL DATA (5) CHARACTER SIZE ----- 2.95W * 4.15Hmm → 2.95W * 4.75Hmm
1998,05,04	ALL	PAGES CHANGED (CHANGE TO COMMON BOARD AND ADD SIDE-LIGHT INFORMATION)
2002,09,20	ALL 04 11	CHANGE CORP. NAME & ADDRESS & TEL, FAX CHANGE PART NO. LM1100SGL→GC2004N4SKY1B 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS. SHOCK STORAGE 490.0m/s ² (50G)→49.0m/s ² (5G) DELETE NOTE

6. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD-VSS	0	6.5	V	
POWER SUPPLY FOR LCD DRIVING VOLTAGE	VDD-VO	0	6.5	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	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 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
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25 °C	-----	270	-----	KHz
POWER SUPPLY CURRENT FOR LED	ILED	VDD=5.0V,NOTE (2)	-----	150	-----	mA
		VDD=5.0V,NOTE (3)	-----	-----	40	mA

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

NOTE (2) : WITH DOT-MATRIX LED

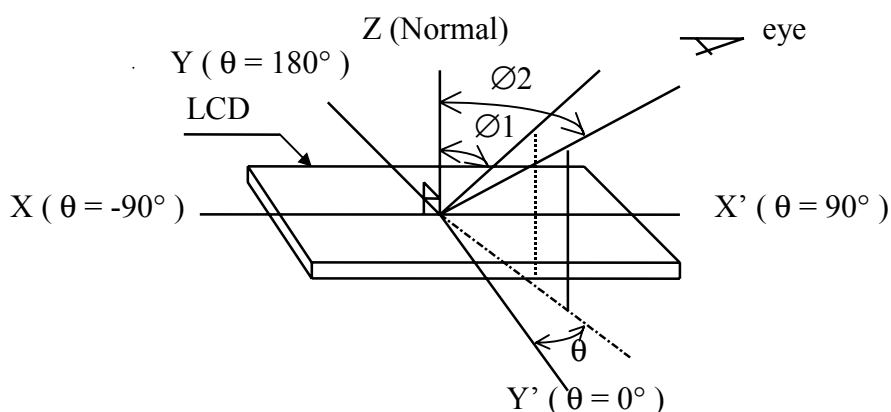
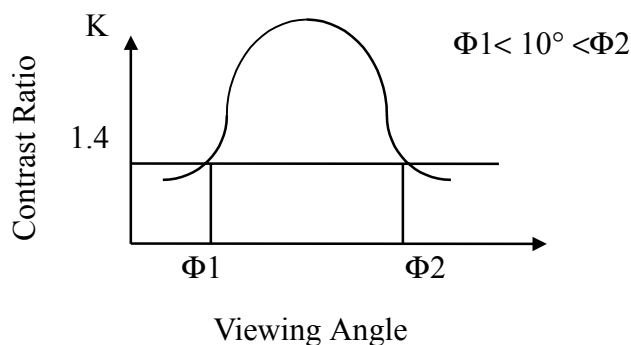
NOTE (3) : WITH SIDE-BACKLIGHT

6. OPTICAL CHARACTERISTICS

Ta = 25°C

VDD = 5.0V±0.25V

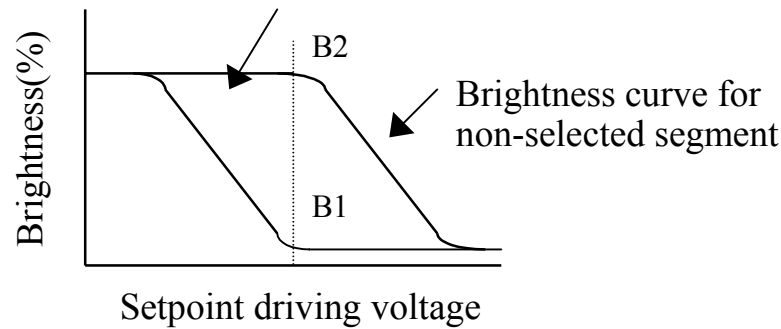
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\Phi 2-\Phi 1$	K= 1.4	20	-----	-----	deg.	1
CONTRAST RATIO	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	2	-----	-----	2,3
RESPONSE TIME	tr(rise)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	250	400	ms	4
	tf(fall)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	250	400	ms	4
THE BRIGHTNESS OF BACKLIGHTING SOURCE	B	(*) $\Phi = 0^\circ$ $\theta = 0^\circ$	4.0	-----	-----	cd/m ²	5,6
			3.0	-----	-----		5,7

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

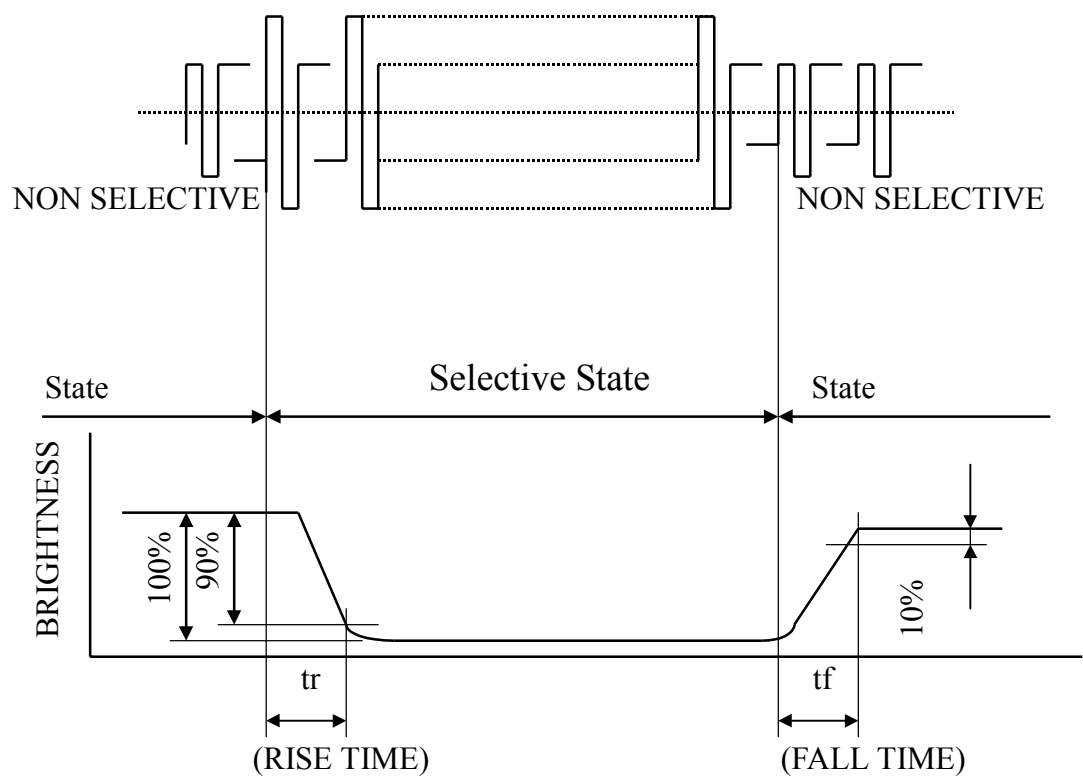
NOTE (3) : DEFINITION OF CONTRAST“K”

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

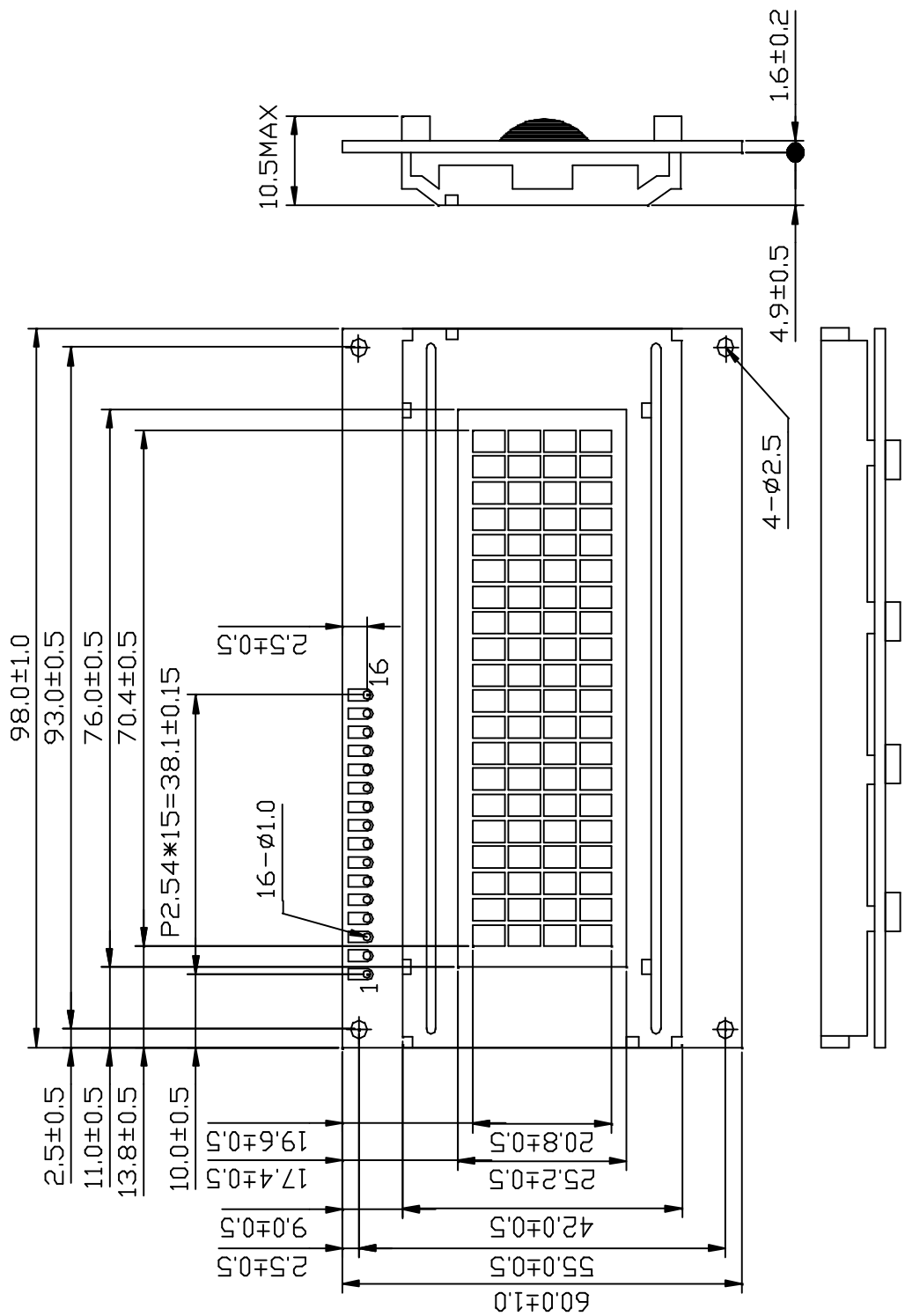
Brightness curve for selected segment



NOTE(4) : DEFINITION OF OPTICAL RESPONSE



7. OUTLINE DIMENSION



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



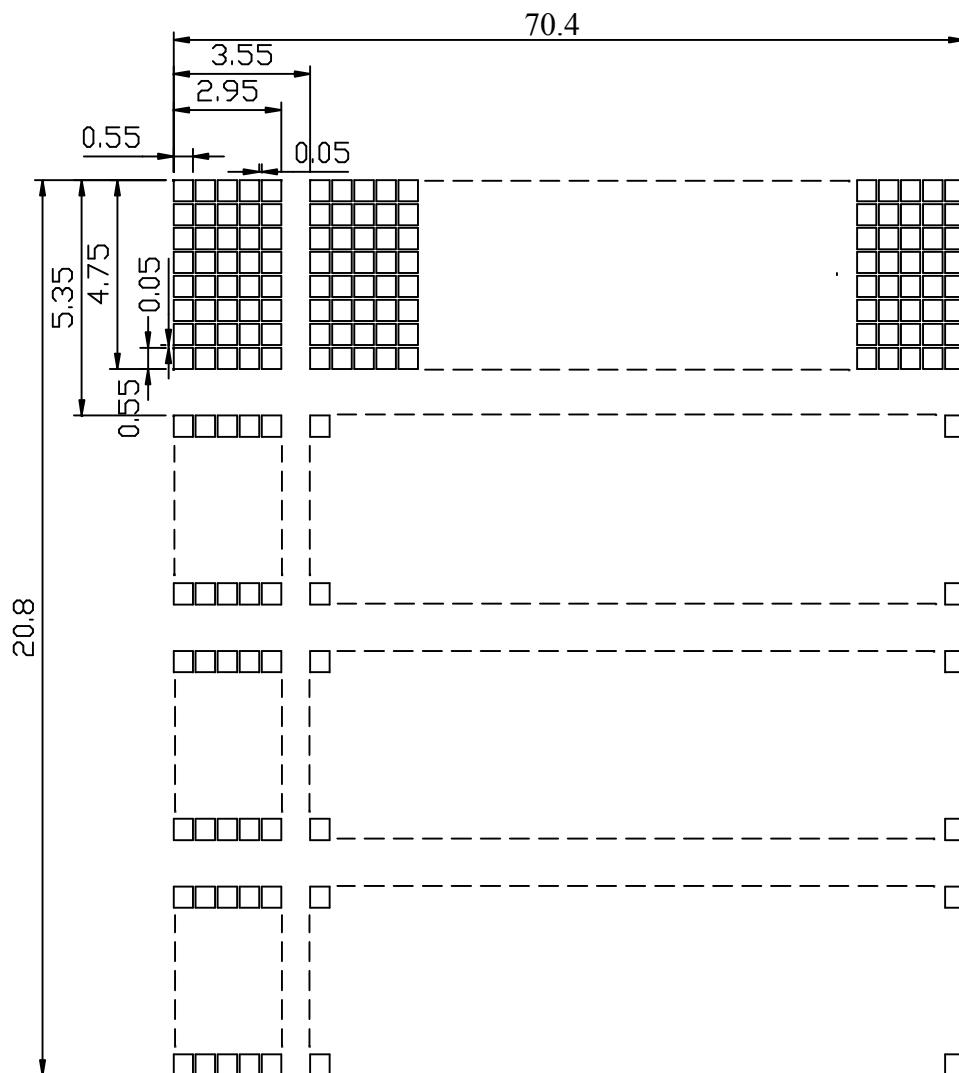
6°O CLOCK

INTERFACE PIN CONNECTION

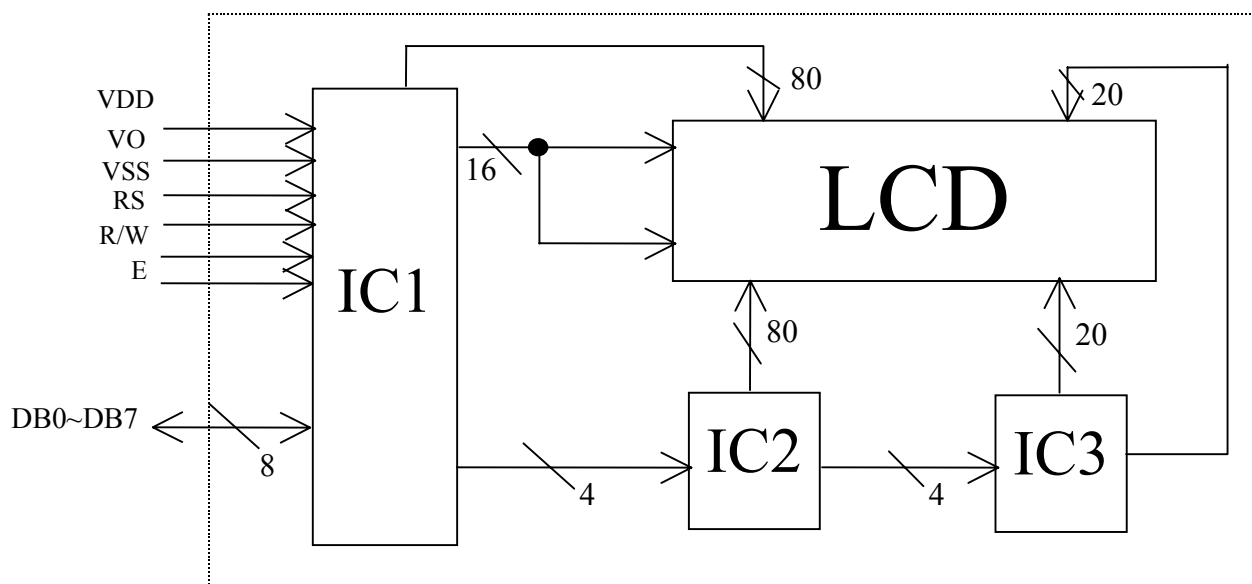
PIN NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	NC	NC

7.1 DETAIL DRAWING OF MATERIX PATTERN

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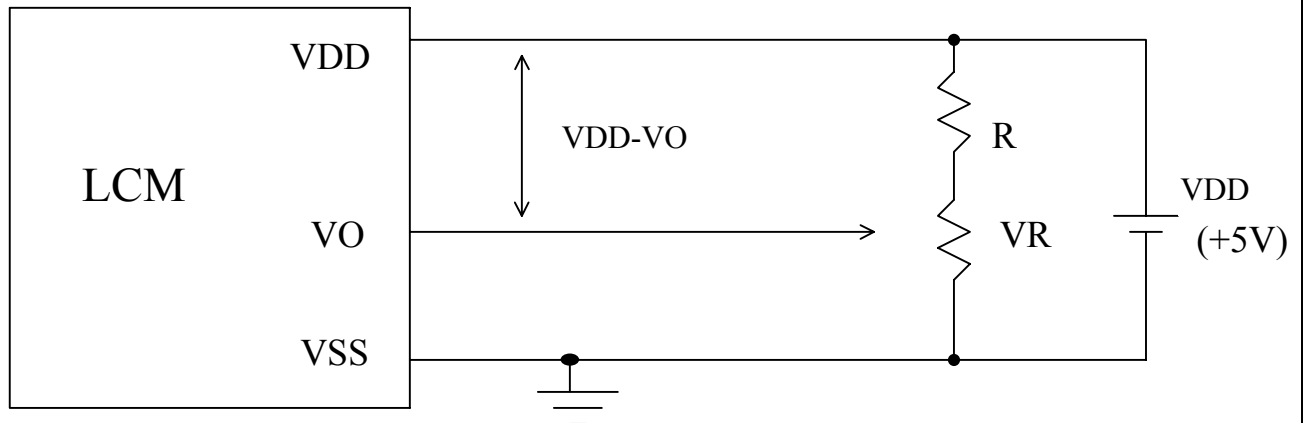


7.2 BLOCK DIAGRAM



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

8.2 DISPLAY DATA ADDRESS CHARTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3
LINE 3	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7
LINE 4	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7