HITACHI

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FOR MESSRS.: _____ DATE. Nov.13,2008

CUSTOMER'S ACCEPTANCE SPECIFICATIONS

SP12N001-T

CONTENTS

ACCEPTED BY; _____ PROPOSED BY; Elton Liu

RECORD OF REVISION

DATE	SHEET No.	SUMMARY
May.29,'02	7B64PS 2703 SP12N001-T-2 PAGE 3-1/1	CHANGED: 3.MECHANICAL DATA (10)LCD Controller IC LC7982A → LC7981
	7B64PS 2707 SP12N001-T-2 PAGE 7-1/1	CHANGED: 10.TIMING CHARACTERISTICS Ta=-20 to 75℃ → Ta=0 to 50℃
	7B64PS 2708 SP12N001-T-2 PAGE 8-1/1	CHANGED: 12.POWER AND INTERFACE TIMING SEQUENCE Note : controller LC7982A → LC7981
Nov.13,'08	7B64PS 2703 SP12N001-T-3 PAGE 3-1/1	Changed : 4.MECHANICAL DATA (9) EL NO.NEL-5LL-715-W → C180-W620-A2 Maker : NEC → SOD

3.GENERAL SPECIFICATIONS.

3.1 Standard Specifications
3284PS 2501 – 401 – 1

This individual specifications is prior to general specification.

Note 1. No HITACHI mark, No. ITEM No. be printed on PCB.

4. MECHANICAL DATA

(1)	Number Of Dots	256 (W) × 64 (H) DOTS
(2)	Module Size	160.0 (W) × 68.0 (H) × 9.5 (D) (MAX.) mm
(3)	Effective Display Area	126.3 (W) × 37.0 (H) mm
(4)	Dot Size	0.44 (W) × 0.44 (H) mm
(5)	Dot Pitch	0.47 (W) × 0.47 (H) mm
(7)	Viewing Direction	6 O'clock
(8)	LCD Type	New gray mode with EL backlight
		lighting color white
(9)	EL	No.C180-W620-A2
		Maker: SOD
(10)	LCD Controller IC	LC7981/SANYO

5. ABSOLUTE MAXIMUM RATINGS

5.1 Electrical Absolute Maximum Ratings.

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	COMMENT
Power Supply For Logic	VDD - VSS	0	-	7.0	V	
Power Supply For Drive	VDD - VEE	0	-	22.0	V	
Input Voltage	VI	VSS	-	VDD	V	
Static Electricity	-	-	-	100	V	
EL Power Supply	VEL	-	-	AC150	Vrms	
	fEL	50	-	1000	HZ	AC100Vrms

5.2 Environmental Absolute Maximum Ratings.

ITEM	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	0°C	40°C	-20°C	60°C	Note(2,3)
Humidity	NOTE (1)		NOTE (1)		Without Condensation
Vibration	-	$4.9m/S^2$ (0.5G)	-	$19.6m/S^2$ (2G)	XYZ Direction
Shock	-	$29.4m/S^2$ (3G)	-	$490.0m/S^2$ (50G)	
Corrosive Gas	Not Acceptable		Not Acceptable		

Note (1) Ta ≦ 40°C : 85%RH max.

Ta > 40°C : Absolute humidity must be lower than the humidity of 85%RH at 40°C.

Note (2) Ta AT - 20°C < 48hr.

Note (3) Background color of LCD changes depending on temperature

0°C : PURPLISH - GRAY

↕

25°C : GREENISH - GRAY

↕

40°C : GREEN - GRAY

40°C ~ 50°C : No permanent damage

6. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Circuit Power Supply Voltage	VDD - VSS	-	4.75	5.0	5.25	V
LC Driver Circuit Power Supply Voltage	VEE - VSS	-	-12.5	-13.0	-13.5	V
Input Voltage Note (1)	H ViH	-	0.8 x VDD	-	VDD	V
	L ViL	-	0	-	0.2 x VDD	V
Input Leak Current	Iin		-5.0	-	5.0	μA
Output Leak Current	Iout		-10.0	-	10.0	
Clock Frequency Note (2)	fCL2		-	-	1.2	MHz
Power Consumption	PW	VDD = 5.0V Ta = 25°C	-	-	250	mW
Recommended LC Driving Voltage Note (3)	VDD - V0 θ = 0° ϕ = 10°	Ta = 0°C	-	16.2	-	V
		Ta = 25°C	-	15.3	-	
		Ta = 40°C	-	14.7	-	
EL Power Supply Note (4)	VEL	fEL = 400HZ	-	100	-	Vrms
	IEL	VEL = 100Vrms fEL = 400HZ	-	-	100	mArms

Note (1) Applied to DB0~DB7 , $\overline{CS}$, E , R/W , RS.
Note (2) Internal clock
Note (3) Recommended LC driving voltage may fluctuate about +/-0.5V by each module.
Note (4) Recommended EL Inverter : NEL – D32 – 48. Maker : NEC

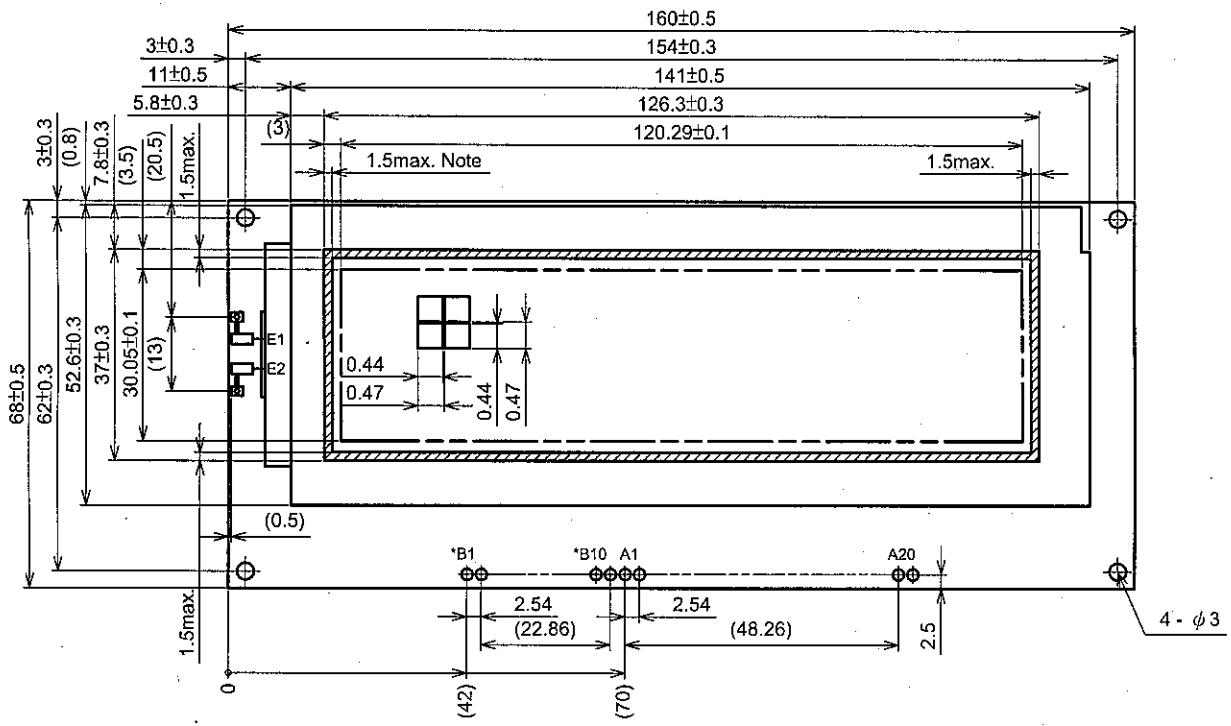
7. OPTICAL DATA

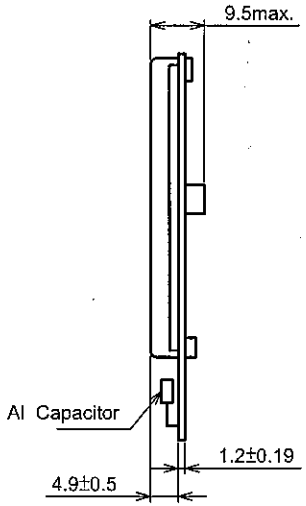
Ta=25°C VDD=5.0V VEE=-13.0V VDD-V0=15.3V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Viewing Area	ϕ2 - ϕ1	K=1.4	-	40	-	deg.	1
Contrast Ratio	K	ϕ = 10° θ = 0°	-	3.0	-	-	1
Response Time	tr(rise)	ϕ = 10° θ = 0°	-	250	400	ms	1
	tf(fall)	ϕ = 10° θ = 0°	-	300	450	ms	1
EL Brightness	BEL	ϕ = 10° θ = 0°	-	10.0	-	cd / m^2	1

NOTE (1) See general specifications for definition of optical characteristics.

8.DIMENSIONAL OUTLINE

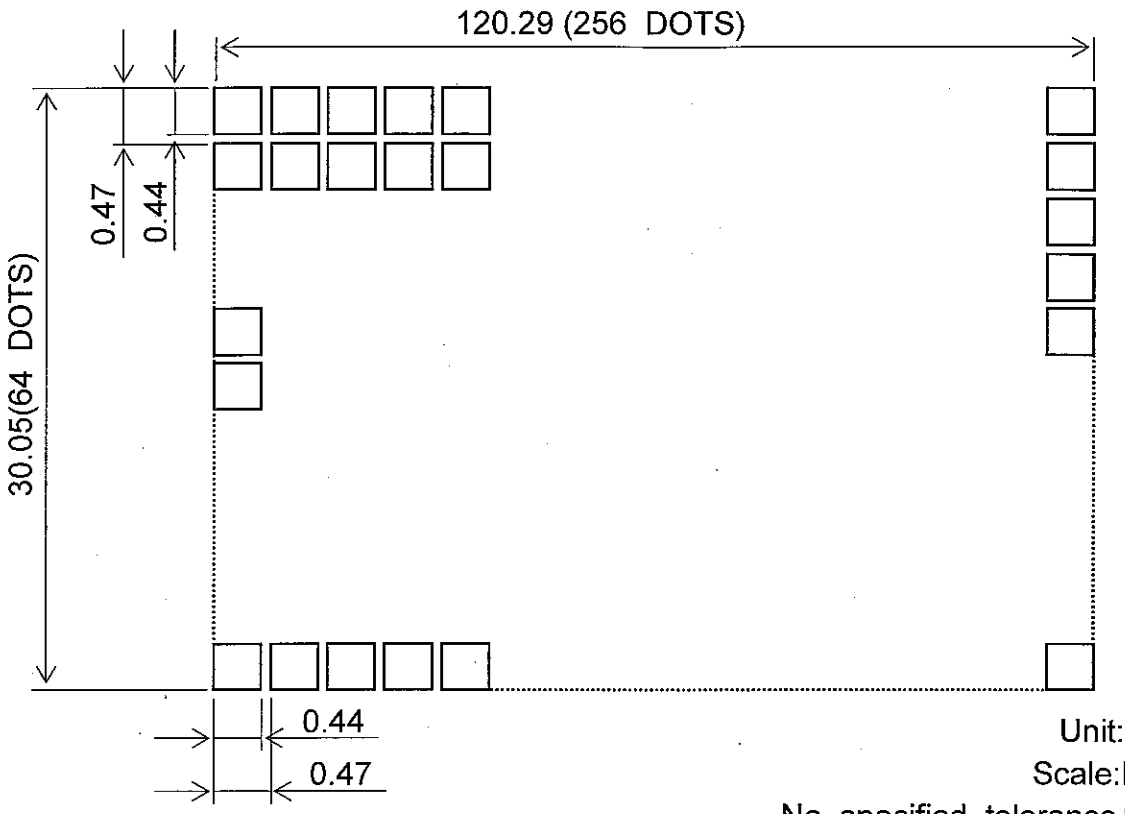




Viewing Direction

Note : EL sealing area
*B1 ~ B10 pads should not be used. Do not connect any signals to these pads.
Use pin no A1 ~ A20 for interface.

Note (1) Detail drawing of matrix pattern

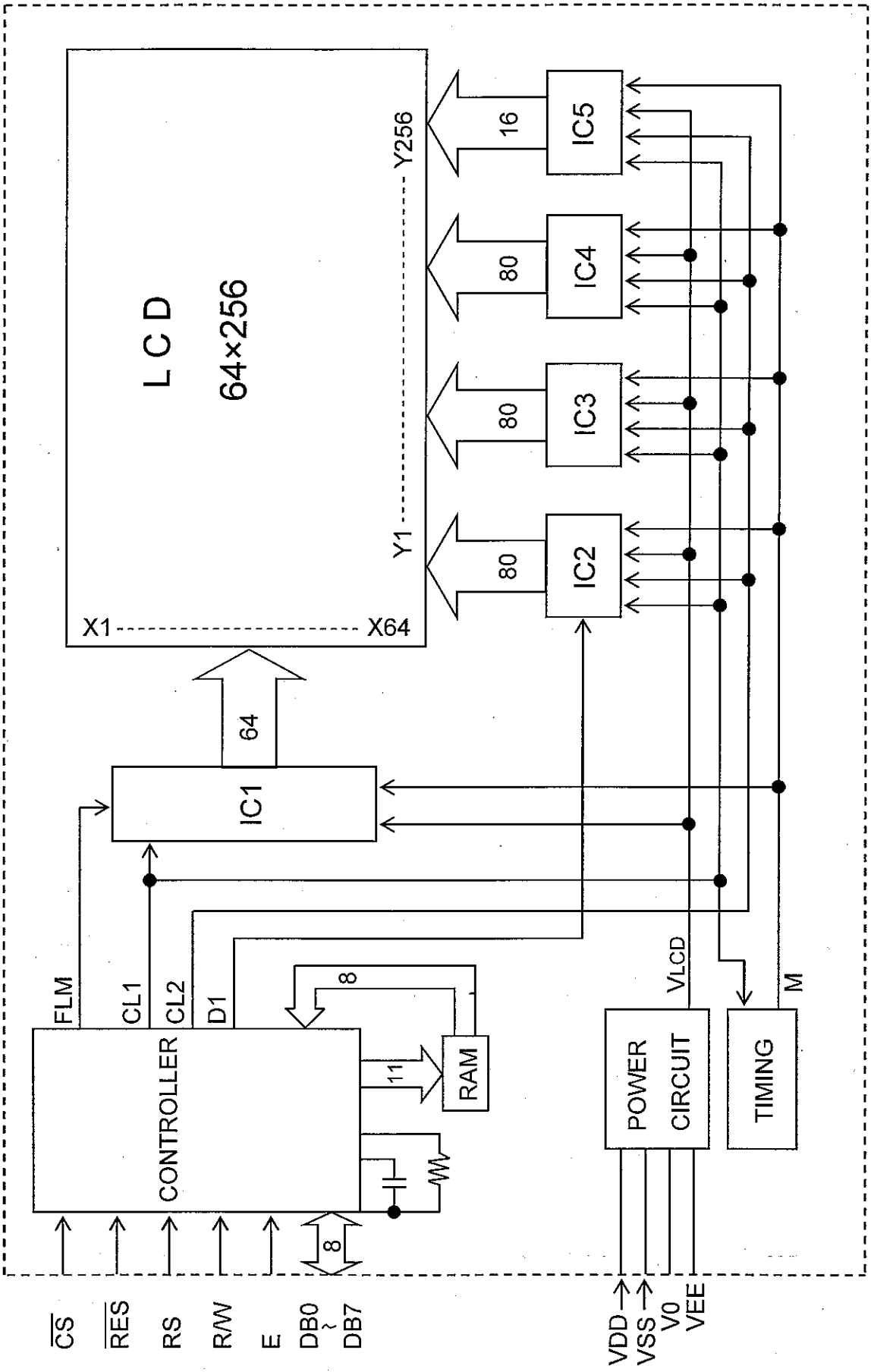


Unit:mm
Scale:NTS
No specified tolerance+/-0.1

Note (2) Internal pin connection

PIN No.	SYMBOL	FUNCTION
A1	VSS	Ground
A2	VDD	Power Supply For Logic
A3	V0	Power Supply For LCD Drive
A4	RS	Register Select
A5	R/W	Read/Write
A6	E	Enable
A7~14	DB0~DB7	Data Bus
A15	$\overline{CS}$	Chip Select
A16	$\overline{RES}$	Reset
A17	VEE	Power Supply For LCD
A18~20	NC	No Connection
E1	VEL	EL Driving Voltage
E2	VEL	EL Driving Voltage

9.BLOCK DIAGRAM



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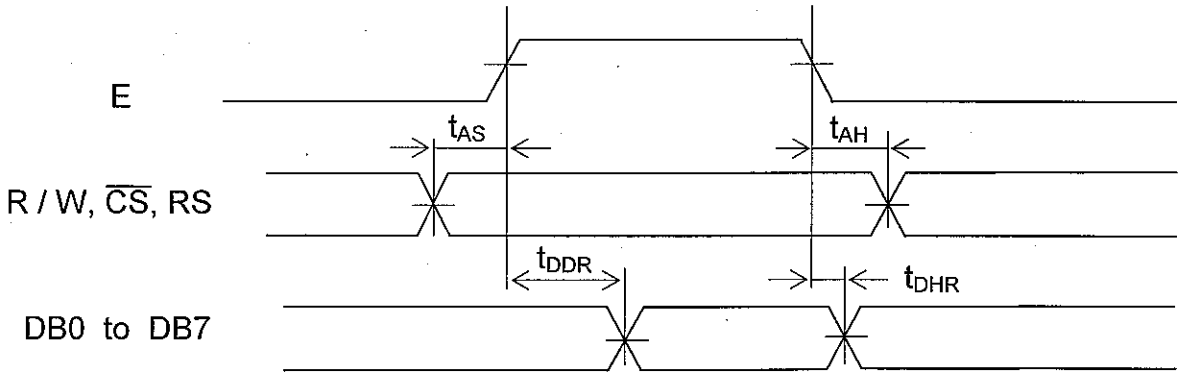
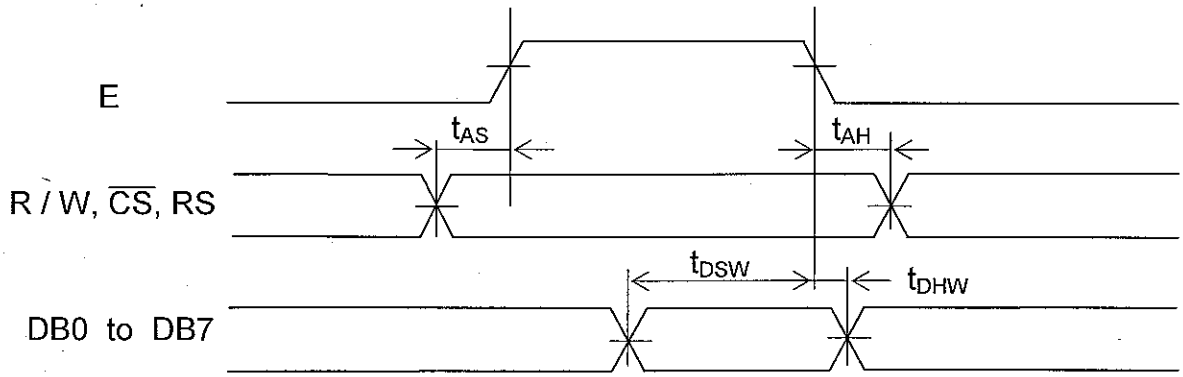
10.TIMING CHARACTERISTICS

- Bus read / write operation 1

Read cycle



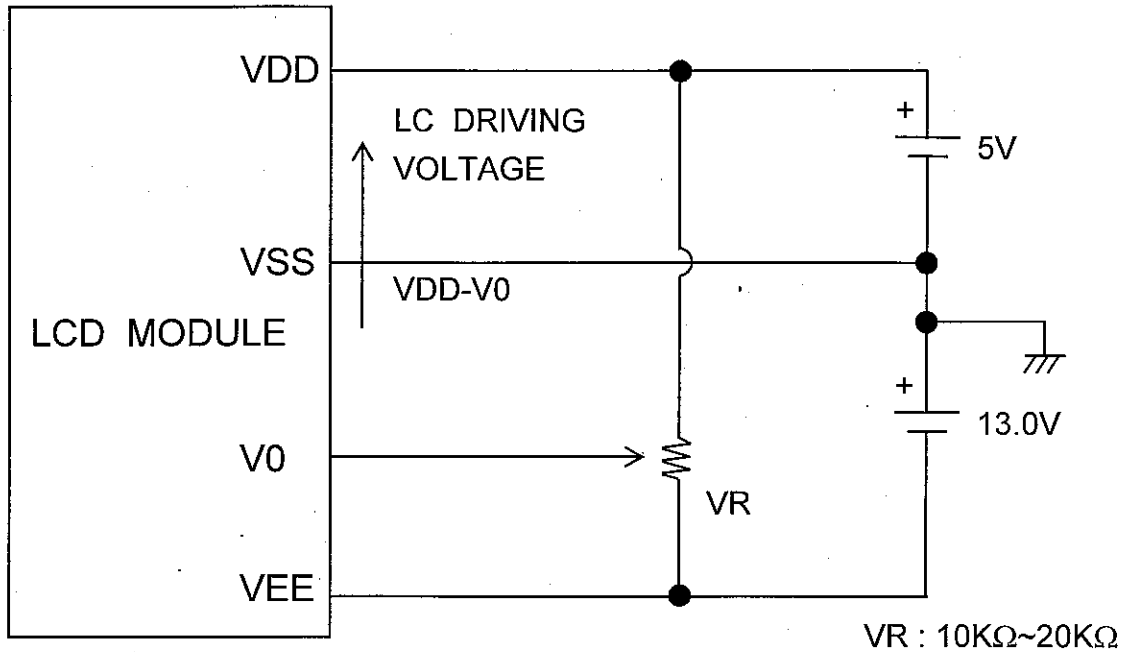
Write cycle



Ta = 0 to + 50°C , V_{DD} = 5V±5% , GND = 0V

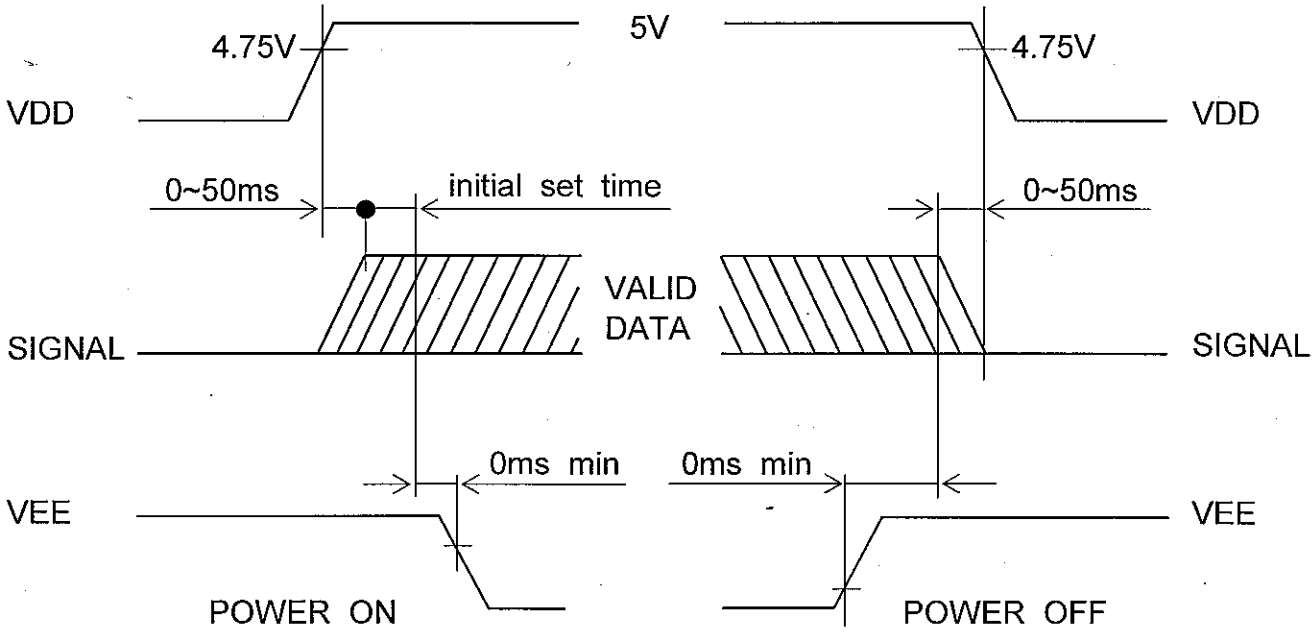
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Address setup time	t_{AS}		90			ns
Address hold time	t_{AH}		10			ns
Data delay time (read)	t_{DDR}	C_L = 50 pF			140	ns
Data hold time (read)	t_{DHR}		10			ns
Data setup time (write)	t_{DSW}		220			ns
Data hold time (write)	t_{DHW}		20			ns

11.POWER SUPPLY FOR LCD MODULE



VR : 10KΩ~20KΩ

12.POWER AND INTERFACE TIMING SEQUENCE



Note : Initial set time – the time is initial instructions set time of controller LC7981.
(Initial instructions : (1) Mode control.
(2) Set character pitch.
(3) Set number of characters.
(4) Set number of time division.