

# KOE

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## JDI Group

Kaohsiung Opto-Electronics Inc.

FOR MESSRS : \_\_\_\_\_

DATE : May 1<sup>st</sup>, 2012

### CUSTOMER'S ACCEPTANCE SPECIFICATIONS

## SP12N001-T

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ACCEPTED BY: \_\_\_\_\_

PROPOSED BY: 

## 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°C → Ta=0 to 50°C
	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
May 01,'12	All pages	Company name changed: KAOHSIUNG HITACHI ELECTRONICS CO.,LTD. ↓ KAOHSIUNG OPTO-ELECTRONICS INC.

### 3.GENERAL SPECIFICATIONS.

#### 3.1 Standard Specifications

3284PS 2501 – 401 – 1

This individual specifications is prior to general specification.

Note 1. No KOE 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	Note2,3
Humidity	Note1		Note1		Without Condensation
Vibration	-	4.9m/S <sup>2</sup> (0.5G)	-	19.6m/S <sup>2</sup> (2G)	XYZ Direction
Shock	-	29.4m/S <sup>2</sup> (3G)	-	490.0m/S <sup>2</sup> (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 Note1	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 Note2	fCL2		-	-	1.2	MHz
Power Consumption	PW	VDD = 5.0V Ta = 25°C	-	-	250	mW
Recommended LC Driving Voltage Note3	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 Note4	VEL	fEL = 400HZ	-	100	-	Vrms
	I <sub>EL</sub>	V <sub>EL</sub> = 100Vrms f <sub>EL</sub> = 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

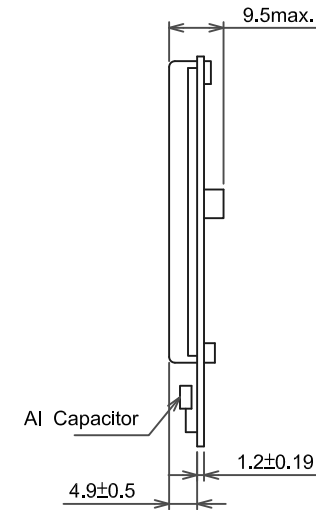
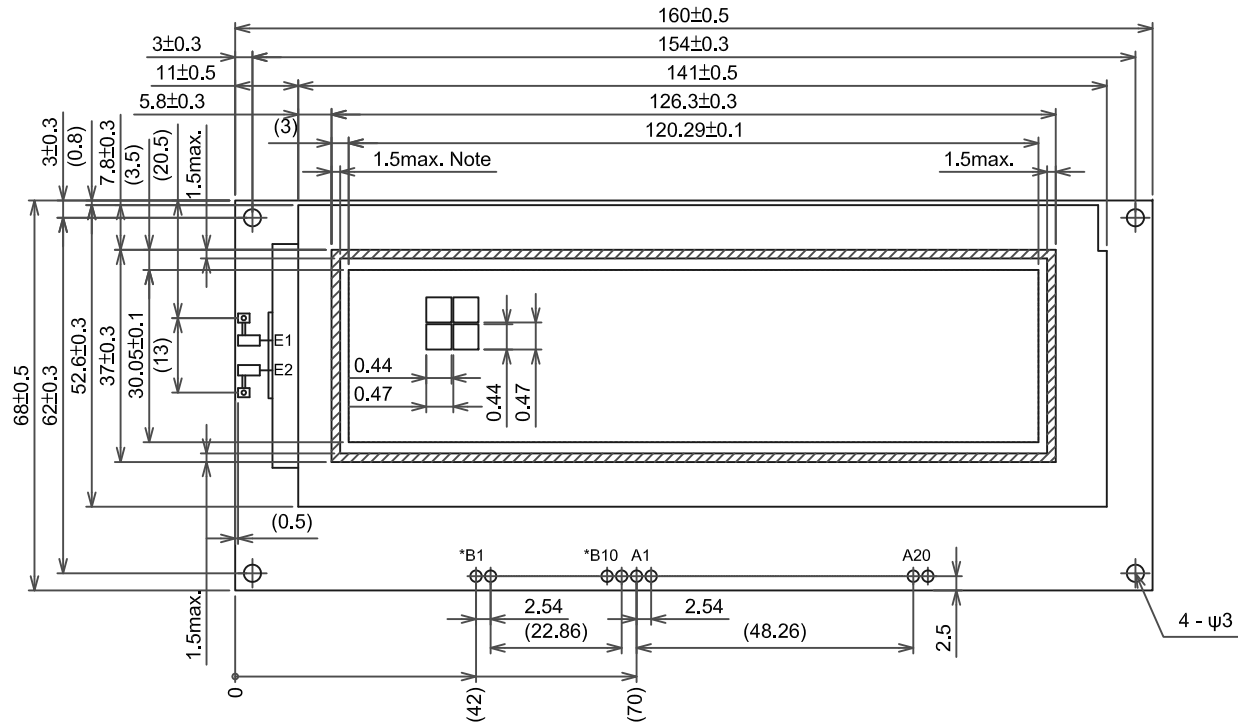
## 7. OPTICAL DATA

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 <sup>2</sup>	1

Note 1: See general specifications for definition of optical characteristics.

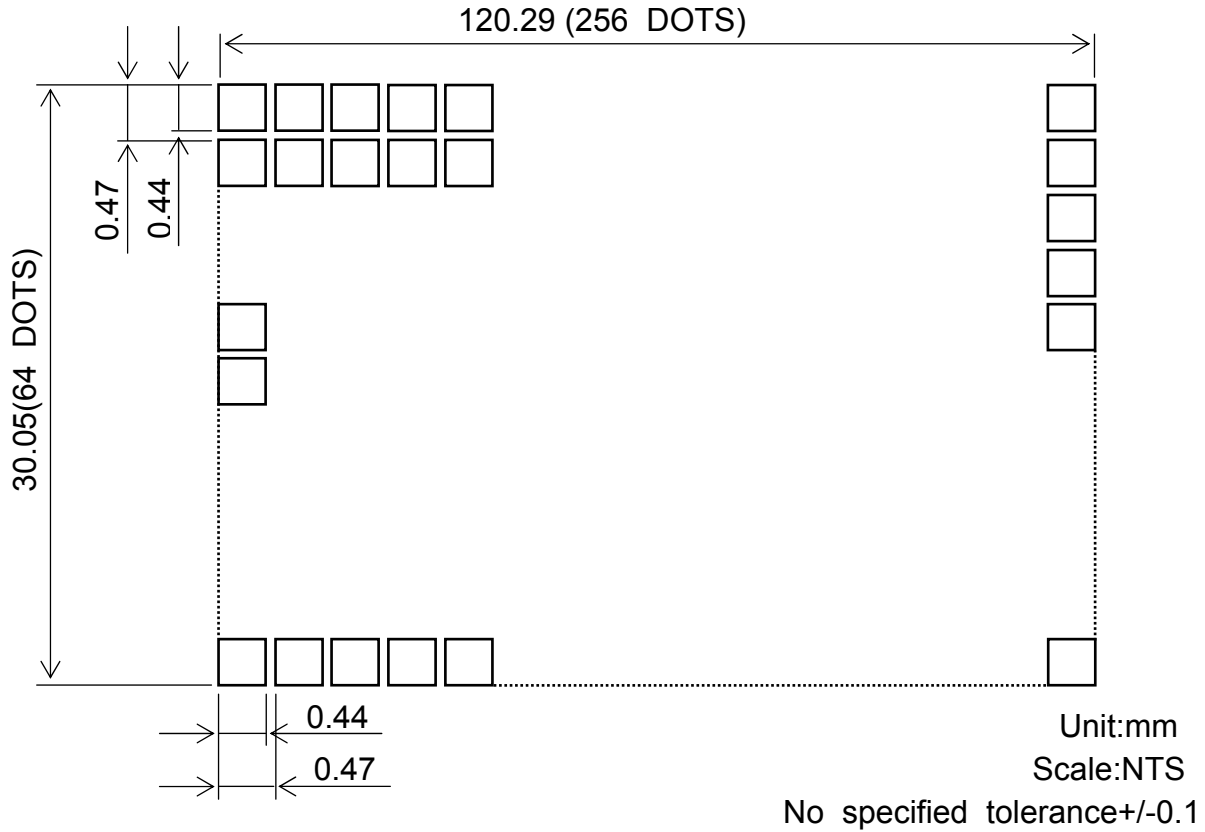
# 8.DIMENSIONAL OUTLINE



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.

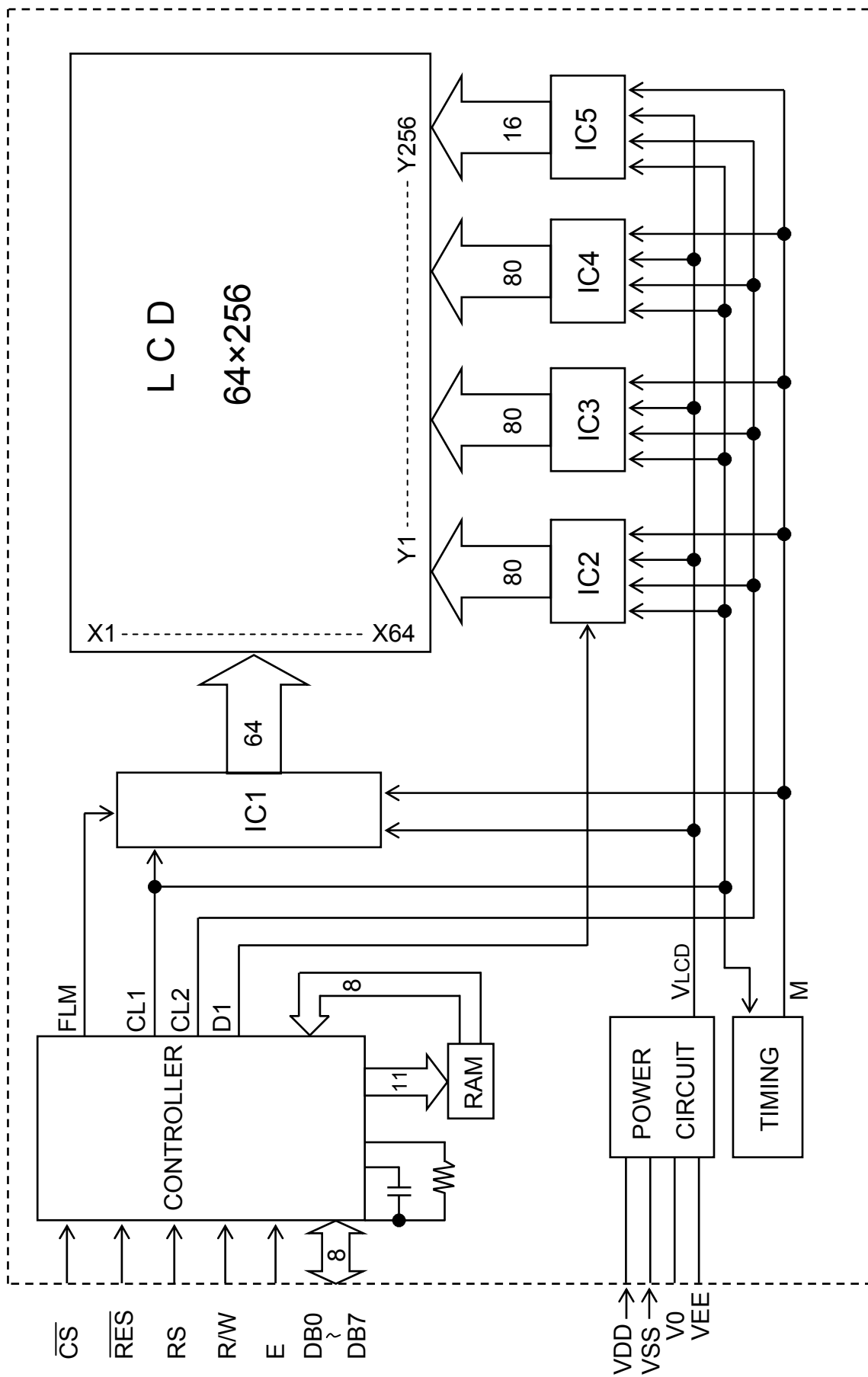
Note 1: Detail drawing of matrix pattern



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	$\overline{\text{CS}}$	Chip Select
A16	$\overline{\text{RES}}$	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

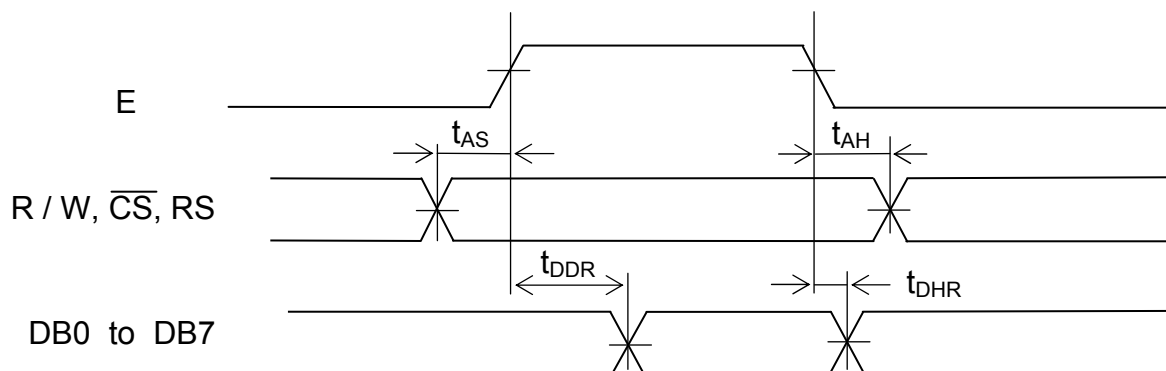




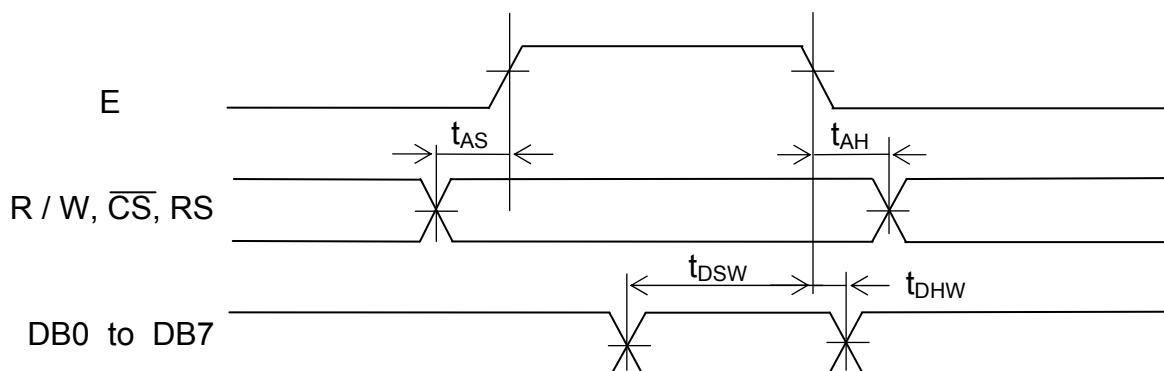
## 10.TIMING CHARACTERISTICS

- Bus read / write operation 1

Read cycle



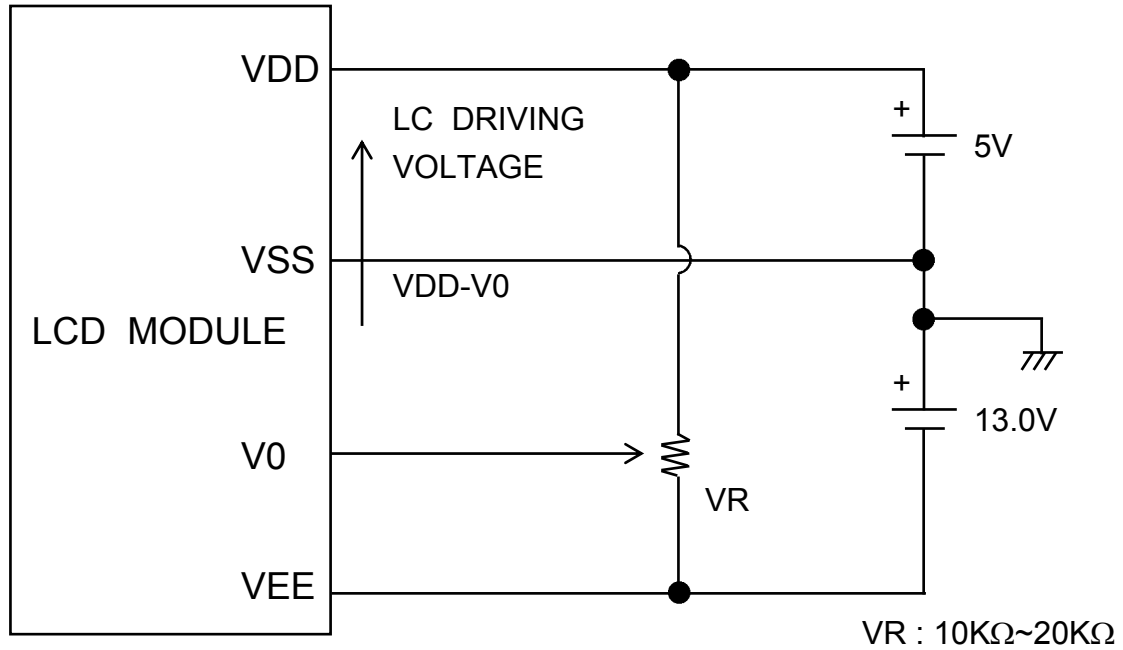
Write cycle



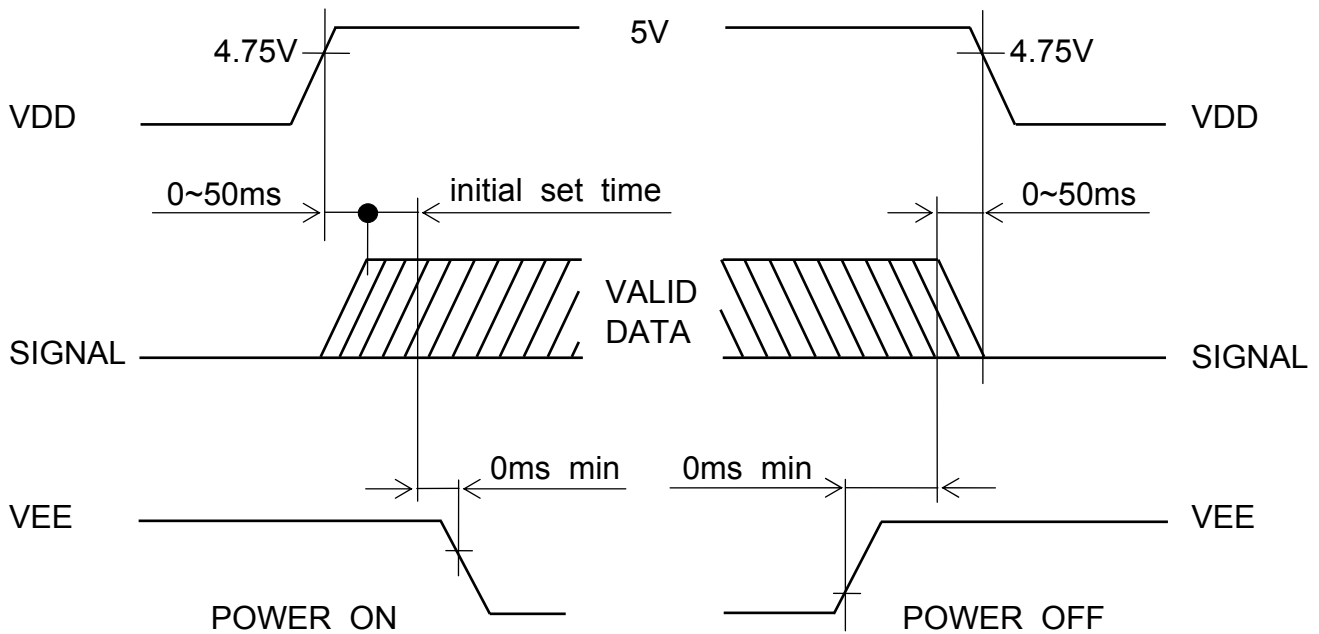
$T_a = 0$  to  $+50^\circ\text{C}$ ,  $V_{DD} = 5V \pm 5\%$ ,  $GND = 0V$

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)	$t_{DDR}$	$C_L = 50 \text{ pF}$			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



## 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.