

**DISPLAY Elektronik GmbH**

**DATA SHEET**

**LCD MODULE**

**DEM 128064H SBH-PW-N**

*Product Specification*

*Version : 7.1.2*

**23.10.2012**

# GENERAL SPECIFICATION

---

MODULE NO. :

# DEM 128064H SBH-PW-N

CUSTOMER P/N:

VERSION NO	CHANGE DESCRIPTION	DATE
0	ORIGINAL VERSION	15.03.2005
1	CHANGED SERIES	09.05.2005
2	CHANGED MODULE DRAWING	25.05.2005
3	CHANGED BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS	29.06.2005
4	CHANGED PCB DRAWING AND DESCRIPTION	01.11.2005
5	CHANGED PCB DRAWING AND DESCRIPTION	07.11.2005
6	ADDED VERSION	07.08.2006
7	MODIFY CONTRAST REGULATION	09.08.2006
7.1.1	CHANGE IC	29.10.2008
7.1.2	CHANGE SRAM	23.10.2012

PREPARED BY: LL

DATE: 23.10.2012

APPROVED BY: MH

DATE: 23.10.2012

**CONTENTS**

**1.FUNCTIONS & FEATURES .....2**

**2. MODULE ARTWORK .....2**

**3. EXTERNAL DIMENSIONS .....3**

**4. BLOCK DIAGRAM .....3**

**5. PIN ASSIGNMENT .....4**

**6. POWER SUPPLY .....4**

**7. PCB DRAWING AND DESCRIPTION.....5**

**8. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS.....6**

**9. ABSOLUTE MAXIMUM RATINGS( V<sub>ss</sub>=0V, Ta=25°C) .....7**

**10. ELECTRICAL CHARACTERISTICS .....7**

**11. LCD MODULES HANDLING PRECAUTIONS ..... 10**

**12. OTHERS ..... 10**

**1. FUNCTIONS & FEATURES**

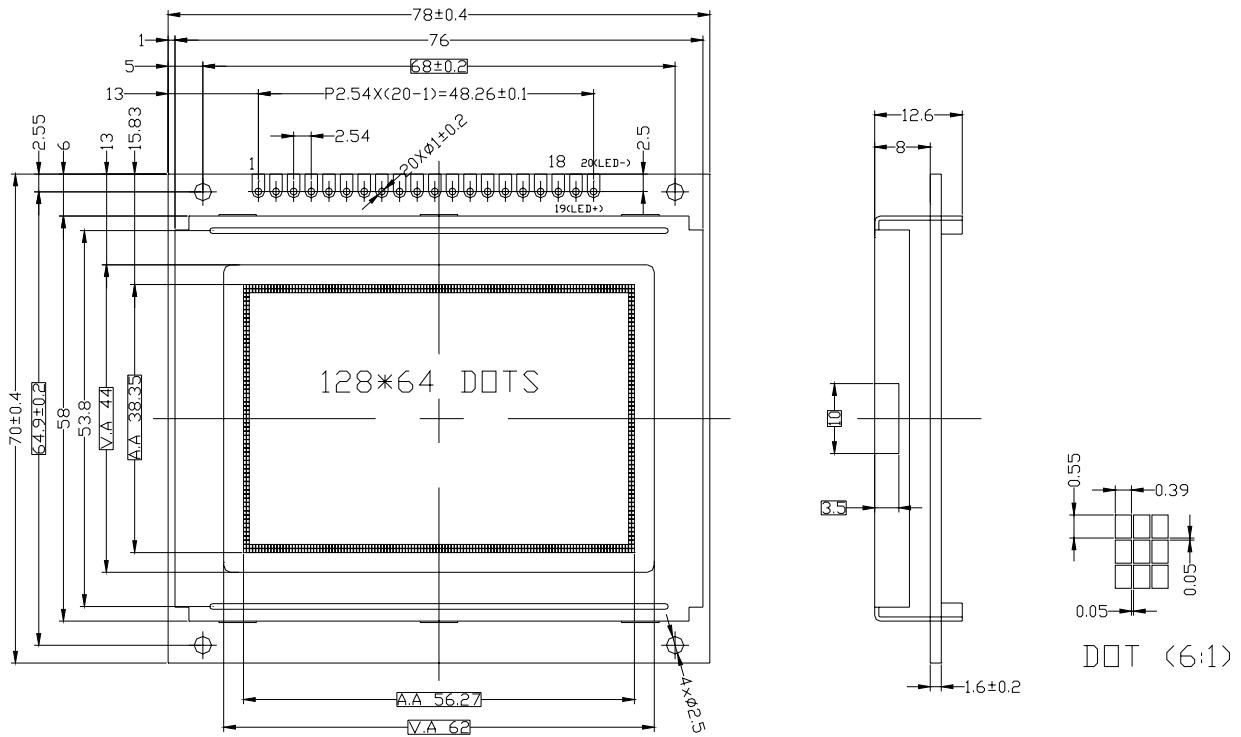
MODULE NAME	LCD TYPE
DEM 128064H SBH-PW-N	STN-Blue transmissive Negative Mode

- Display Format : 128 x 64 Dots
- Glass Thickness : 1.1mm
- Viewing Direction : 6 O'clock
- Driving Scheme : 1/64 Duty, 1/9 Bias
- Power Supply for logic : 5.0 Volt (typ.)
- Backlight Color : LED, Lightguide, White
- $V_{LCD}$  : 12.6 Volt (typ.)
- Operation temperature : -20°C to +70°C
- Storage temperature : -25°C to +75°C
- LCD-Controller : T6963C (Toshiba)
- DC/DC-Converter : NJU7670M (or equivalent) on Board

**2. MODULE ARTWORK**

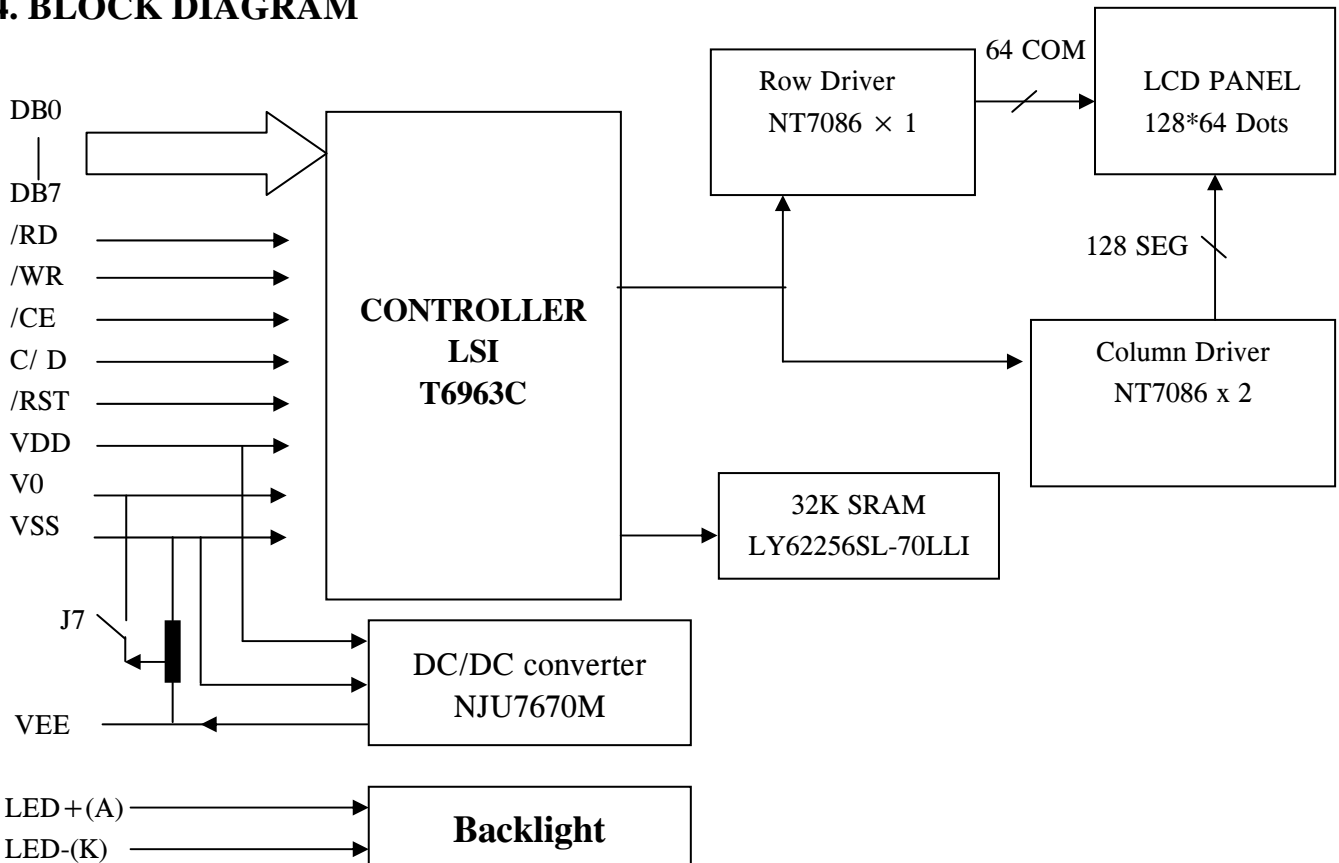
- Module Size : 78.00 x 70.00 x 12.60 mm
- Viewing Area : 62.00 x 44.00 mm
- Active Area : 56.27 x 38.35 mm
- Dot Pitch : 0.44 x 0.60 mm
- Dot Size : 0.39 x 0.55 mm
- Dot Gap : 0.05 mm

3. EXTERNAL DIMENSIONS



REMARKS:  
 1.UNMARKED TOLERANCE IS ±0.3;  
 2.ALL MATERIAL COMPLY WITH ROHS.

4. BLOCK DIAGRAM

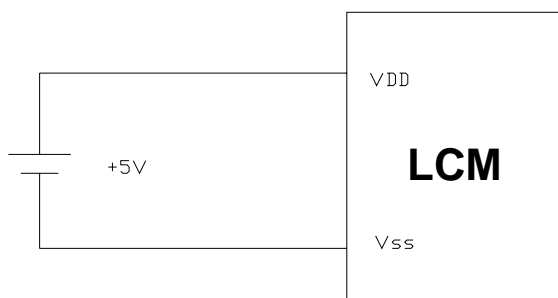


**5. PIN ASSIGNMENT**

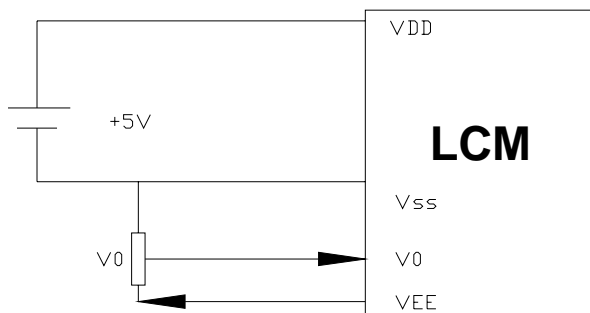
NO.	SYMBOL	FUNCTION
1	VEE	Power supply output for LCD
2	VSS	Ground (0V)
3	VDD	Power Supply(+5V)
4	V0	Power Supply for LCD Drive
5	/WR	Data write. Write data to controller T6963C when “L”
6	/RD	Data read. Read data from controller T6963C when “L”
7	/CE	Chip enable of controller when “L”
8	C/ D	Command/Data read/write. “H” for command read/write and “L” for data read/write
9	/RST	Controller reset when “L”
10	DB0	Data input/output(LSB)
11	DB1	Data input/output
12	DB2	Data input/output
13	DB3	Data input/output
14	DB4	Data input/output
15	DB5	Data input/output
16	DB6	Data input/output
17	DB7	Data input/output(MSB)
18	FS	Font select. “H” for 6x8 font & “L” for 8x8 font
19	LED+(A)	Anode of LED backlight
20	LED-(K)	Cathode of LED backlight

**6. POWER SUPPLY**

- **Mode(Internal contrast regulation)-J7 is close**

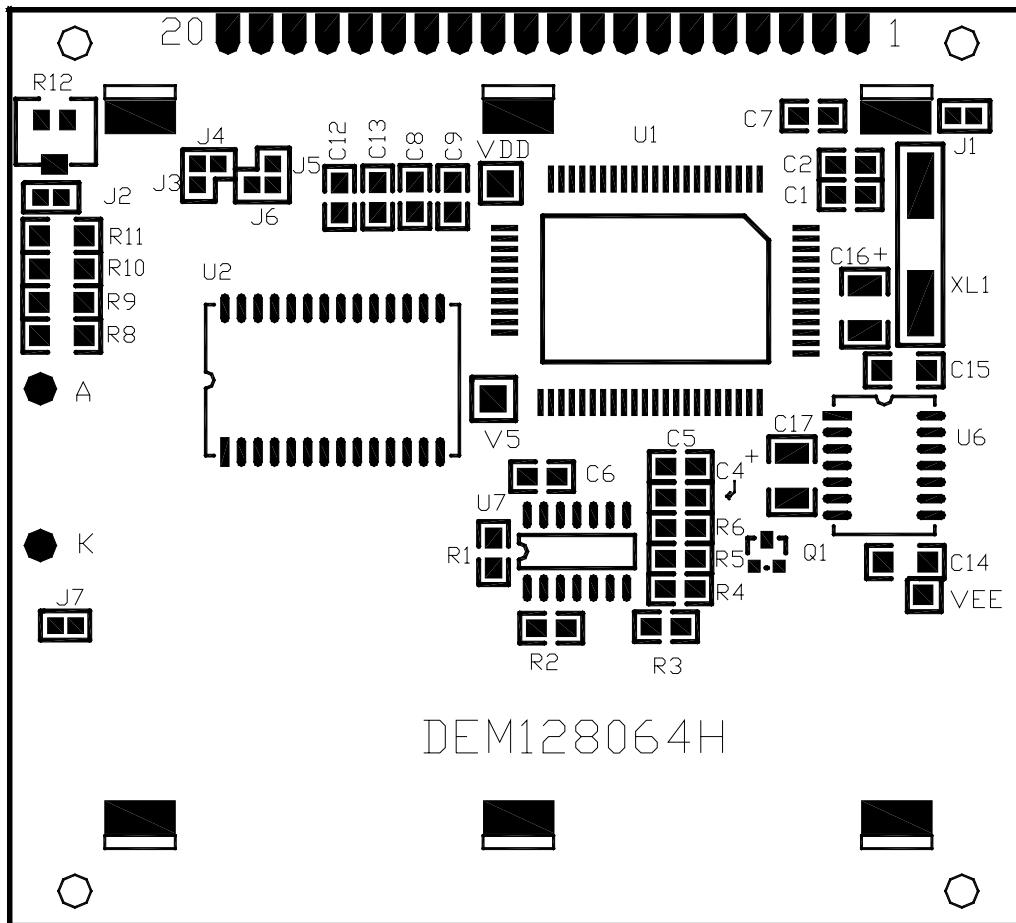


- **Mode(external contrast regulation)-J7 is open**



**7. PCB DRAWING AND DESCRIPTION**

**7.1. PCB DRAWING**



**7.2. PCB DESCRIPTION**

**7.2.1..The polarity of the pin 19 and the pin 20:**

symbol	symbol state	J3,J5	J6, J4	LED Polarity	
				19 Pin	20 Pin
J6,J4	Each solder-bridge	Each closed	Each open	Anode	Cathode
J3,J5	Each solder-bridge	Each open	Each closed	Cathode	Anode

Note: In application module, J3=J5 =0 Ohm, J4=J6=open.

**7.2.2. The metal-bezel is set be on ground when the J1 is closed**

Note: In application module, J1=0 Ohm

**7.2.3. The LED resistor on board are used when J2 is open.**

Note: In application module, J2=open

**7.2.4.The module use internal contrast regulation when J7 is closed.**

Note: In application module, J7 is open, but potentiometer is calibrated by the factory.

**7.2.5.The R8 and the R9, R10, R11 are the LED resistor.**

Note: In application module, R8=R10=R11=Not used , R9=47 Ohm .

**8. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS**

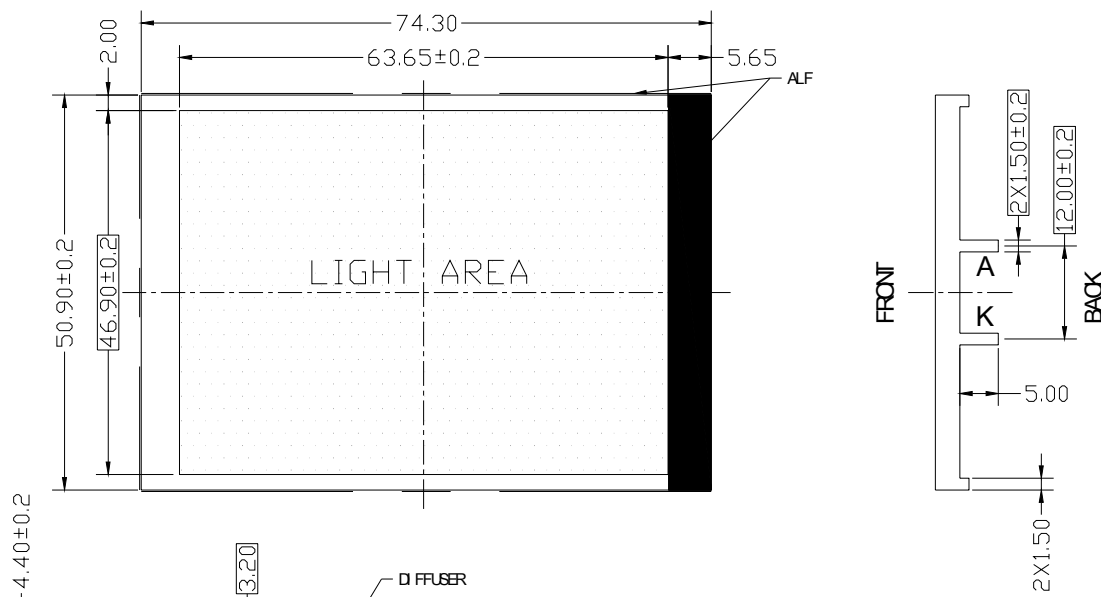
**8-1 Absolute Maximum Ratings (Ta=25°C)**

Item	Symbol	Conditions	Rating	Unit
Absolute Maximum Forward Current	$I_{fm}$		75	mA
Peak Forward Current	$I_{fp}$	1 msec Plus 10% Duty Cycle	180	mA
Reverse Voltage	$V_r$		1	V
Power Dissipation	$P_d$		180	mW

**8-2 Backlight Electro/Optical Characteristics**

Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	$V_f$	2.9	3.3	3.6	V	$I_f = 45 \text{ mA}$
Reverse Current	$I_r$		35		$\mu A$	$V_r = 0.8 \text{ V}$
Peak wave length	$\lambda_P$				nm	$I_f = 45 \text{ mA}$
Spectral Line Half width	$\Delta\lambda$				nm	$I_f = 45 \text{ mA}$
* Luminance	$L_v$	90	120		$cd/m^2$	$I_f = 45 \text{ mA}$

**8-3 Backlight Drawing**

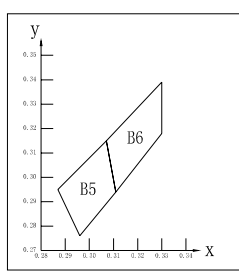


REMARKS:  
 1.UNMARKED TOLERANCE IS ±0.3;  
 2.ALL MATERIAL COMPLY WITH ROHS;  
 3.COLOR IS WHITE.

GEOMETRIC COORDINATES

x	0.296	0.287	0.330	0.330
y	0.276	0.295	0.339	0.318

TOLERANCE IS ± 0.01





**9. ABSOLUTE MAXIMUM RATINGS( V<sub>SS</sub>=0V, Ta=25°C)**

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage (Logic)	V <sub>DD</sub>	-0.3 to 7.0	V
Input voltage	V <sub>IN</sub>	-0.3 to V <sub>DD</sub> +0.3	V
Operating Temperature	T <sub>opr</sub>	-20 to +70	°C
Storage Temperature	T <sub>stg</sub>	-25 to +75	°C

**10. ELECTRICAL CHARACTERISTICS**

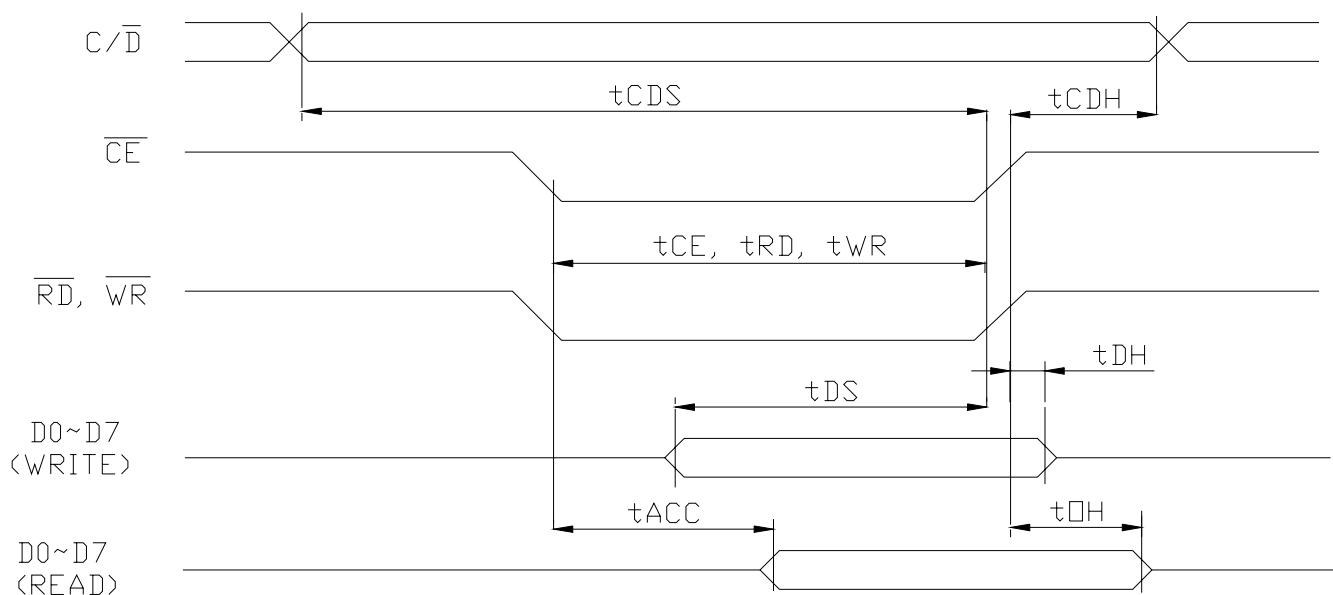
**10.1 DC Characteristics**

Ta=25°C, VSS=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V <sub>DD</sub> -V <sub>SS</sub>	-	4.5	5.0	5.5	V
High Level Input Voltage	V <sub>IH</sub>	V <sub>DD</sub> =5.0V±10%	V <sub>DD</sub> -2.2	-	V <sub>DD</sub>	V
Low Level Input Voltage	V <sub>IL</sub>	V <sub>DD</sub> =5.0V±10%	0	-	0.8	V
High Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> =0.75mA	V <sub>DD</sub> -0.3	-	V <sub>DD</sub>	V
Low Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> =0.75mA	0	-	0.3	V
Current Consumption(Operating)	I <sub>DD(1)</sub>	V <sub>DD</sub> =5.0V f <sub>osc</sub> = 3.0 MHz	-	3.3	6.0	mA
Current Consumption(Halt)	I <sub>DD(2)</sub>	V <sub>DD</sub> =5.0V	-	-	3	μA

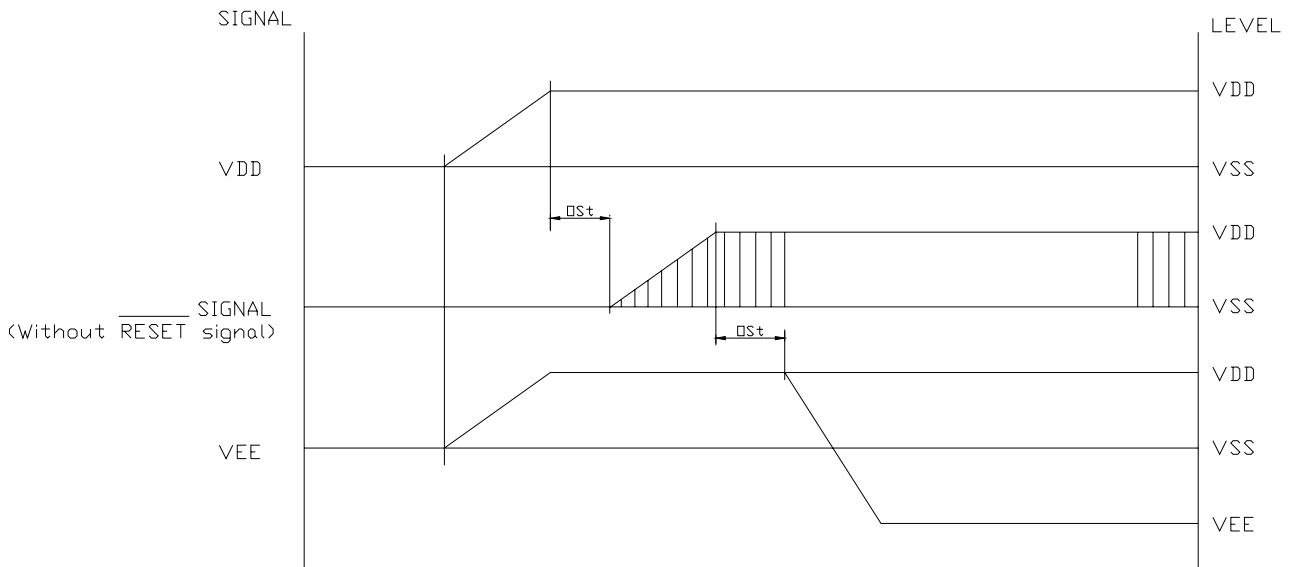
**10.2 AC Characteristics**

Parameter	Symbol	Min.	Max.	Units
C/D Setup Time	t <sub>CDS</sub>	100	-	ns
C/D Hold Time	t <sub>CDH</sub>	10	-	ns
CE, RD, WR Pulse Width	t <sub>CE</sub> , t <sub>RD</sub> , t <sub>WR</sub>	80	-	ns
Data Setup Time	t <sub>DS</sub>	80	-	ns
Data Hold Time	t <sub>DH</sub>	40	-	ns
Access Time	t <sub>ACC</sub>	-	150	ns
Output Hold Time	t <sub>OH</sub>	10	50	ns

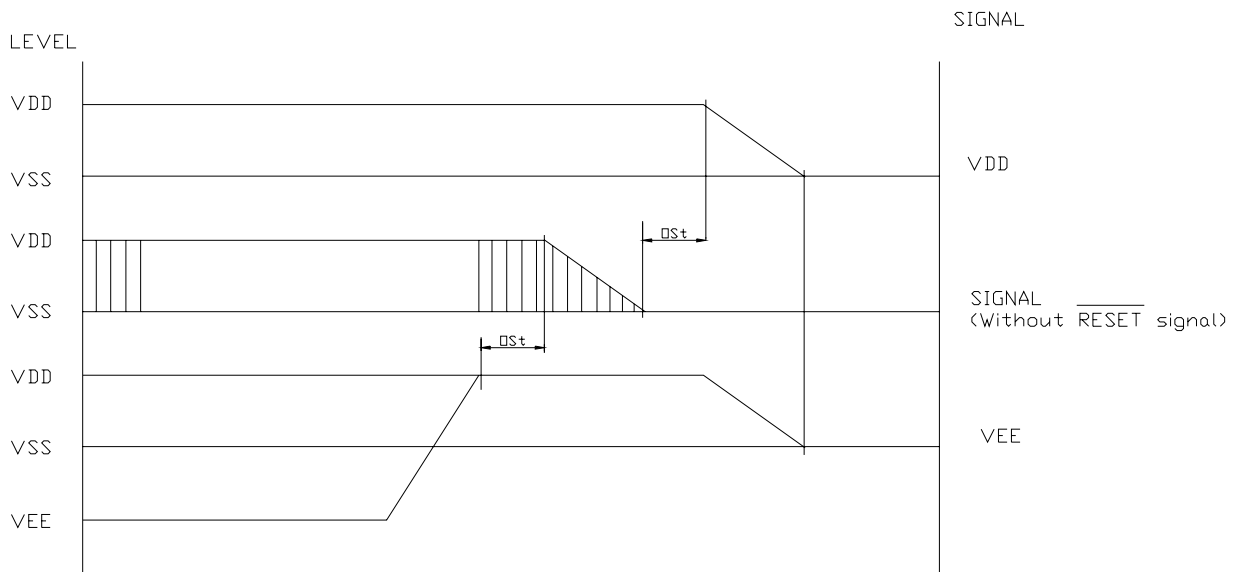


**10.3 Power Supply ON/OFF Sequence**

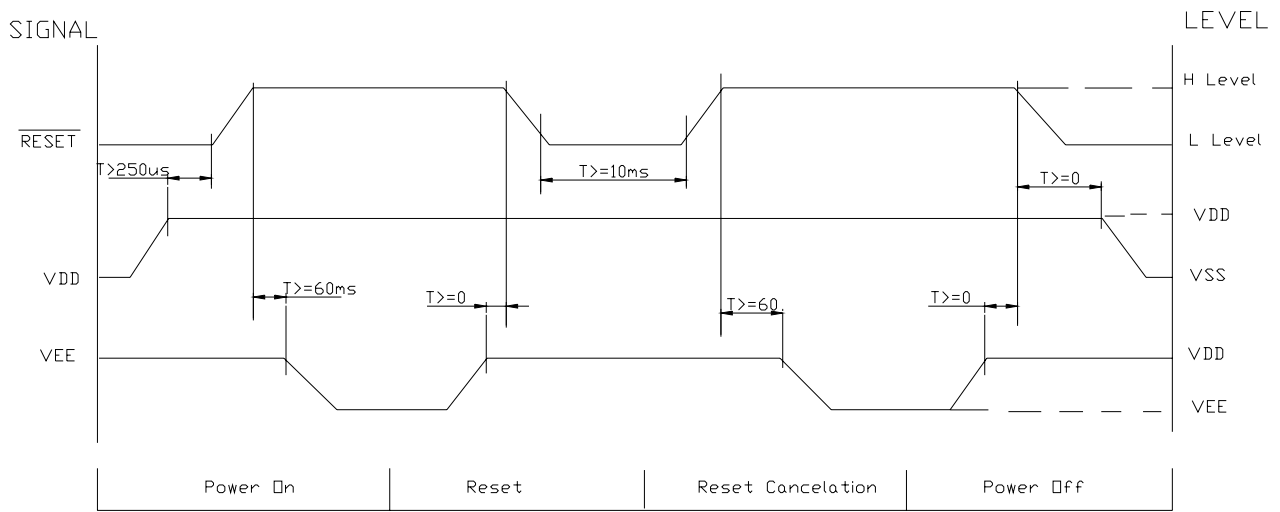
● **ON Sequence**



● **OFF Sequence**



● **Reset Sequence**



Please maintain the above sequence when turning on and off the power supply of the module.

If VEE is supplied to the module while internal alternate signal for LCD driving (M) is unstable or RESET is active, DC component will be supplied to the LCD panel. This may cause damage to the LCD module.

**11. LCD MODULES HANDLING PRECAUTIONS**

- Please remove the protection foil of polarizer before using.
- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.
- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.
- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  - Be sure to ground the body when handling the LCD module.
  - Tools required for assembly, such as soldering irons, must be properly grounded.
  - To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- Storage precautions

When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0°C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

**12. OTHERS**

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.
- If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.
- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
  - Exposed area of the printed circuit board
  - Terminal electrode sections