

**DISPLAY Elektronik GmbH**

**DATA SHEET**

**LCD MODULE**

**DEM 240128D FGH-PW  
(A-TOUCH)**

*Product Specification*

*Version : 3.1.3*

**26/Aug/2009**

# GENERAL SPECIFICATION

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MODULE NO. :

# DEM 240128D FGH-PW

# (A-TOUCH)

CUSTOMER P/N

VERSION NO.	CHANGE DESCRIPTION	DATE
0	Original Version	04.09.2007
1	CHANGE LED-RESISTORS	28.09.2007
2	UPDATE PCB DRAWING AND BACKLIGHT PARAMETER	28.01.2008
3	UPDATE BACKLIGHT AND PCB DRAWING	30.03.2008
3.1.2	CHANGE DRIVER	04.09.2008
3.1.3	IMPROVE BACKLIGHT	26.08.2009

PREPARED BY: HB

DATE: 26.08.2009

APPROVED BY: MH

DATE: 26.08.2009

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**3. FUNCTIONS & FEATURES**

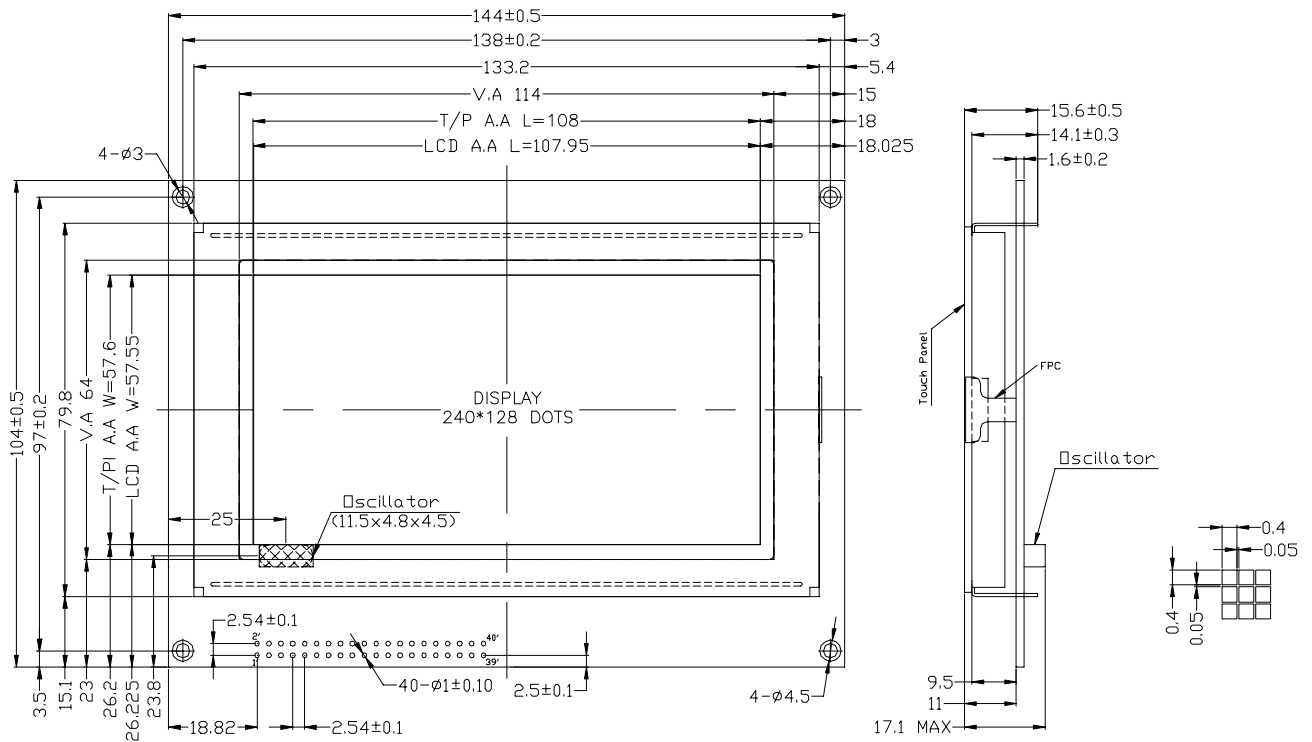
MODULE NAME	LCD TYPE
DEM 240128D FGH-PW (A-TOUCH)	FSTN Transflective Positive Mode

- Glass Thickness : 1.1 mm
- Viewing Direction : 6 O'clock
- Driving Scheme : 1/128 Duty, 1/12 Bias
- Power Supply for logic : 5.0 Volt (typ.)
- Backlight : LED, Lightguide, White,
- Display Content : 240 x 128 Dots
- $V_{LCD}$  (  $V_{LCD}=VDD-V0$  ) : 20.0 Volt (typ.)
- IC Controller : T6963C (Toshiba)
- Touch panel : Anti-glare, 4-Wire-Resistive Touch-Panel on Board
- Operating Temperature : -20°C to +70°C
- Storage Temperature : -25°C to +75°C

**2. MODULE ARTWORK**

- Module Size : 144.00 x 104.00 x 17.10 mm
- Viewing Area : 114.00 x 64.00 mm
- Active Area : 107.95 x 57.55 mm
- Dot Pitch : 0.45 x 0.45 mm
- Dot Size : 0.40 x 0.40 mm
- Dot Gap : 0.05 mm

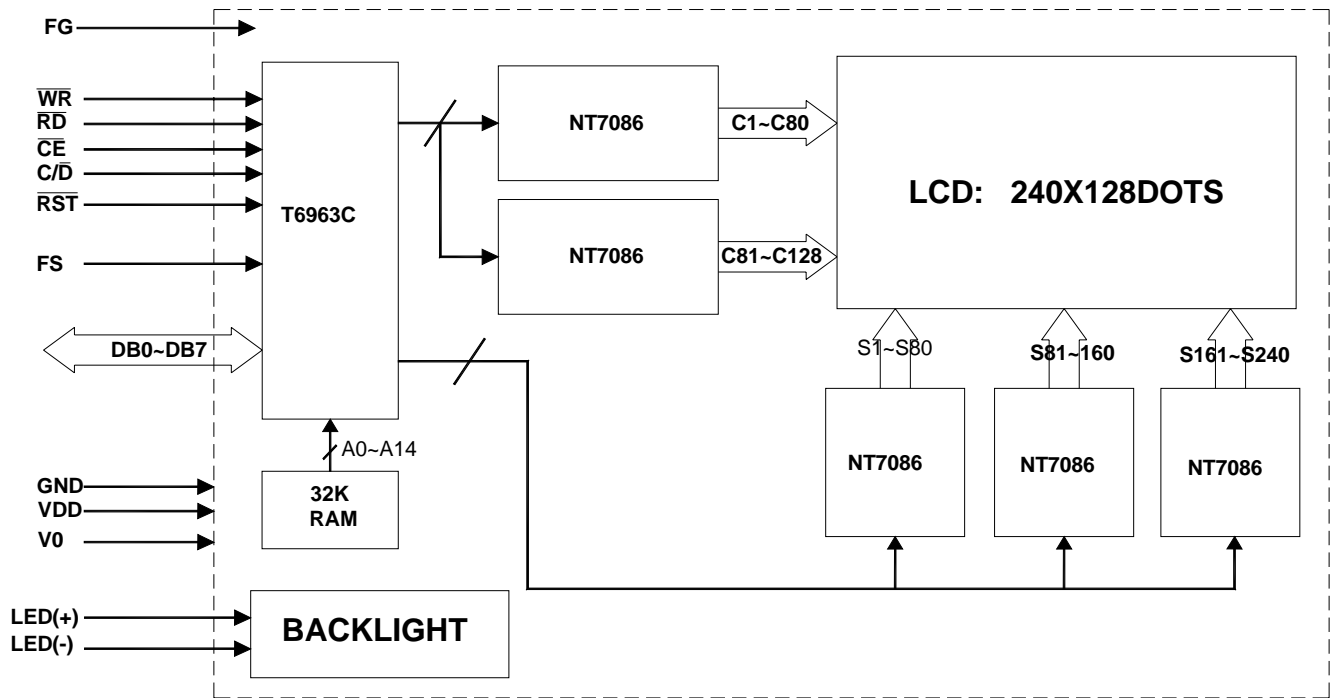
**3. EXTERNAL DIMENSIONS**



Remarks:  
 1, Unmarked tolerance is  $\pm 0.3$   
 2, All materials comply with RoHs.

**4. BLOCK DIAGRAM**

**4.1 Block Diagram of LCD Module**

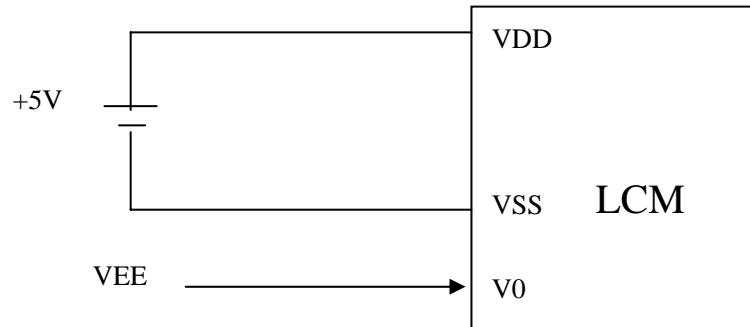


**4.2 Analog Touch Screen Auto-Scanning Block Diagram**



**5. PIN ASSIGNMENT**

NO.	SYMBOL	FUNCTION
1	FG	Frame ground
2	Y-	Y- Position Input
3	VSS	Ground(0V)
4	X+	X+ Position Input
5	VDD	Power supply for logic(+5V)
6	Y+	Y+ Position Input
7	V0	Power supply for LCD drive(-15.5V)
8	X-	X- Position Input
9	/WR	Write Command or data to module when "L"
10,12,14,16, 18,20,22,24, 26,28,30,32, 34,36,38,40	NC	No connection.
11	/RD	Read Command or data from module when "L"
13	/CE	Enable LCD controller when "L"
15	C/D	Command/data select. "H" for command read/write. "L" for data read/write
17	/RST	LCD Controller reset. Controller initialize and DB00-DB07 are set to be high impedance when/RST is "L"
19,21,23,25, 27,29,31,33,	DB0 ~ DB7	LCD data input/output. DB0(pin19) is LSB and DB7(pin33) is MSB.
35	FS	Font select. "H" for 6x8 font and "L" for 8x8 font
37	LED+(A)	Please refer to item 8 PCB drawing and description
39	LED-(K)	

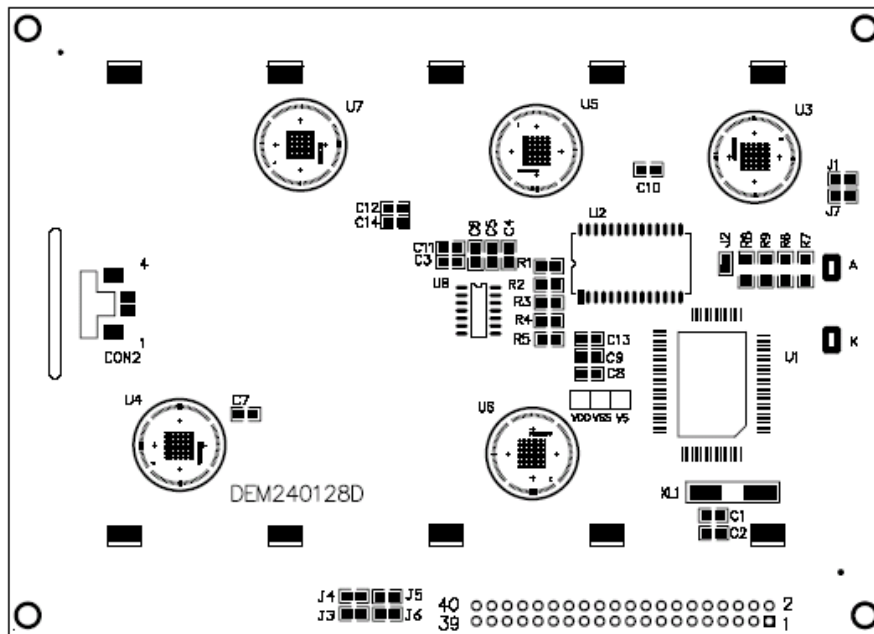
**6. POWER SUPPLY****7. ABSOLUTE MAXIMUM RATINGS (V<sub>SS</sub>=0V, T<sub>a</sub>=25°C)**

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



**8. PCB DRAWING AND DESCRIPTION**

**8.1. PCB DRAWING**



**8.2 DESCRIPTION:**

**8-2-1. The polarity of the pin 37 and the pin 39:**

J3, J5	J6, J4	LED Polarity	
		37 Pin	39 Pin
Each closed	Each open	Anode	Cathode
Each open	Each closed	Cathode	Anode

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

**8-2-2. The J1 is metal-bezel GND to module GND and J7 is mounting holes GND to module GND.**

Note: In application module, J1= J7=0 Ohm,

**8-2-3. The LED resistor on board are used when J2 is open**

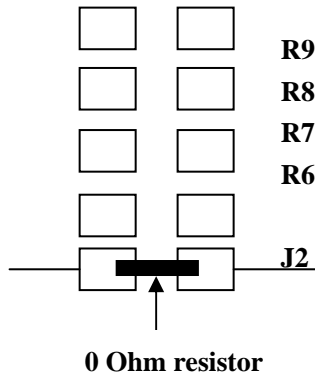
Note: In application module, J2=open

**8-2-4. The R6 and the R7, R8, R9 are the LED resistor.**

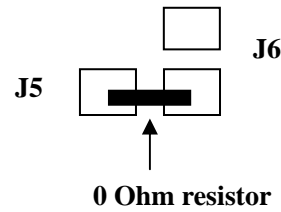
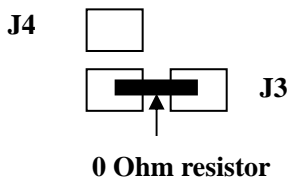
Note: In application module, R8=R9=82 Ohm; R6= R7=open

**8.3 Example application**

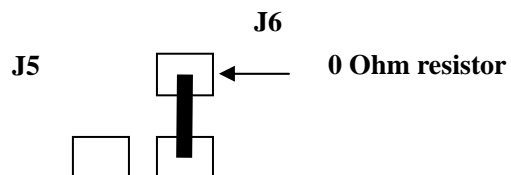
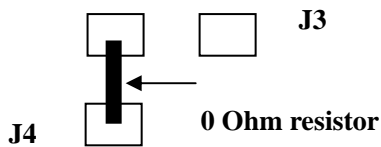
8-3-1. The LED resistors on board can be disabled when J2 is closed. Then customer needs to use external resistors



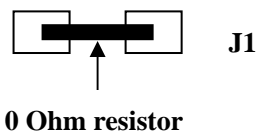
8-3-2. The 37 pin is the anode and the 39 pin is the Cathode as following.



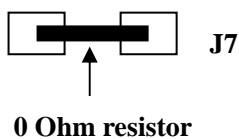
8-3-3. The 37 pin is cathode and the 39 pin is anode as following.



8-3-4. The metal-bezel is on ground as following



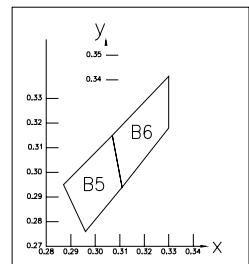
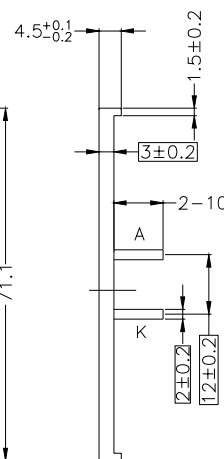
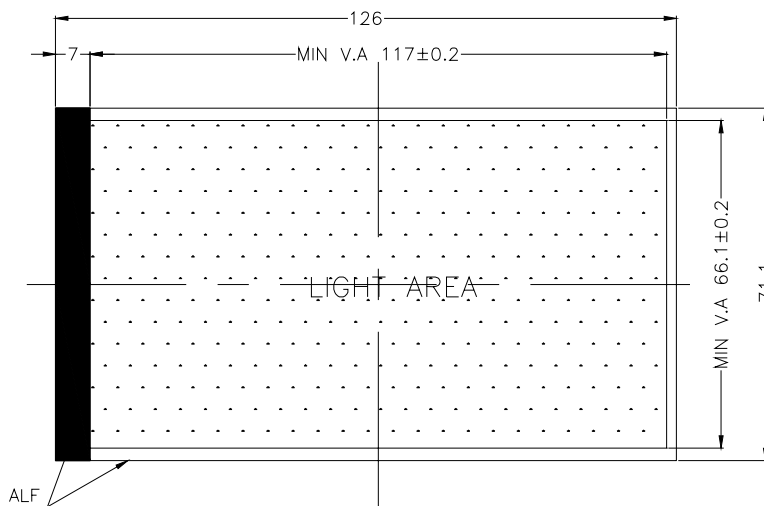
8-3-5. The holes are on ground as following



**9. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS**

**ELECTRICAL–OPTICAL CHARACTERISTICS**

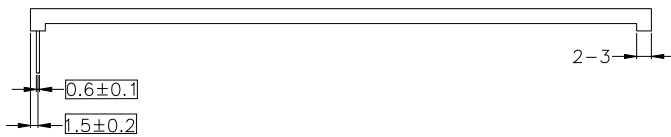
Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	Vf	2.9	3.2	3.4	V	If= 45 mA
Reverse Current	Ir		30		$\mu A$	Vr= 0.8 V
Luminance	Lv	165	220		cd/m <sup>2</sup>	If= 45 mA



**CHROMATICS COORDINATES**

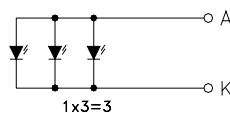
x	0.296	0.287	0.330	0.330
y	0.276	0.295	0.339	0.318

TOLERANCE IS ±0.01

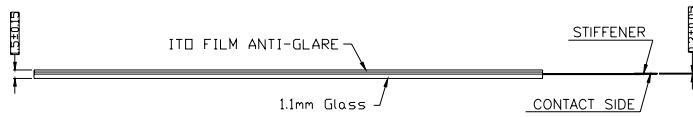
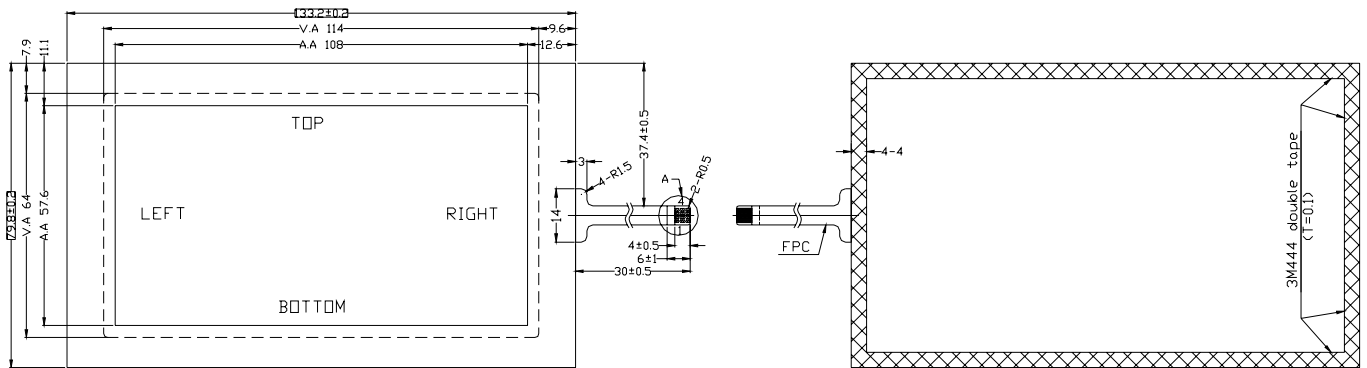


**Remarks:**

- 1.Unmarked tolerance is ±0.3
- 2.Color:white
- 3.All materials comply with RoHs



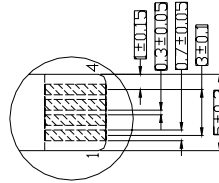
10. TOUCH PANEL DRAWING



TOUCH PANEL	
No	SYMBOL
1	BOTTOM
2	RIGHT
3	TOP
4	LEFT

Characteristics:

- 1, Operating voltage: DC5V
- 2, Operating pressure: 30~70g
- 3, Linearity: ±1.5% or less
- 4, Operating temperature: -10°C~+50°C
- 5, Storage temperature: -20°C~+70°C
- 6, Humidity: <90%RH
- 7, Transmittance: 75% or more
- 8, Connector: FPC
- 9, Film Type: Anti\_Glare
- 10, Lifetime: 1000000 times
- 11, Response time: <10ms



Detail A

Remarks:

- 1, Unmarked tolerance is ±0.3,
- 2, The material comply with RoHS.

**11. ELECTRICAL CHARACTERISTICS**

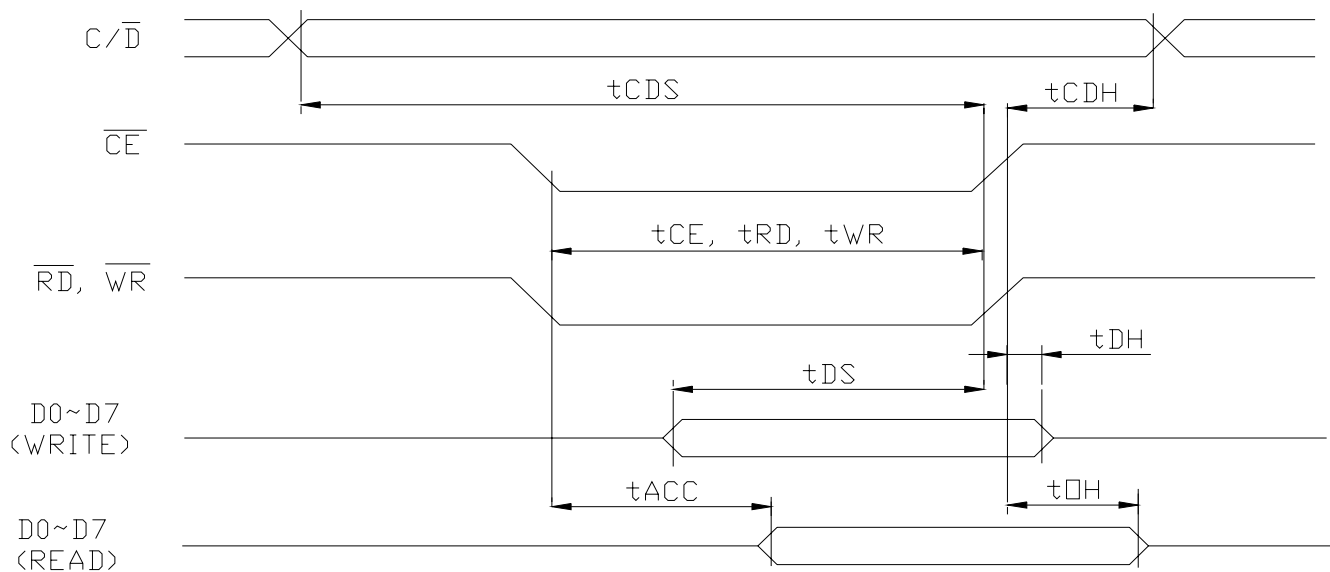
**11.1 DC Characteristics**

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
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	uA
Power Supply for LCD	V <sub>lcd</sub>	V <sub>LCD</sub> =V <sub>DD</sub> -V <sub>0</sub>	19.8	20	20.2	V

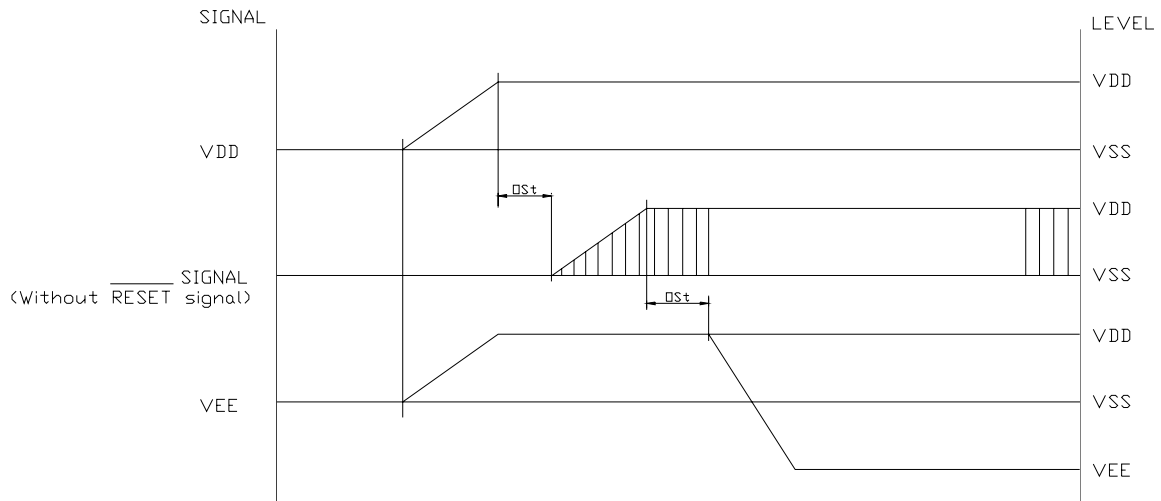
**11.2 AC Characteristics**

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

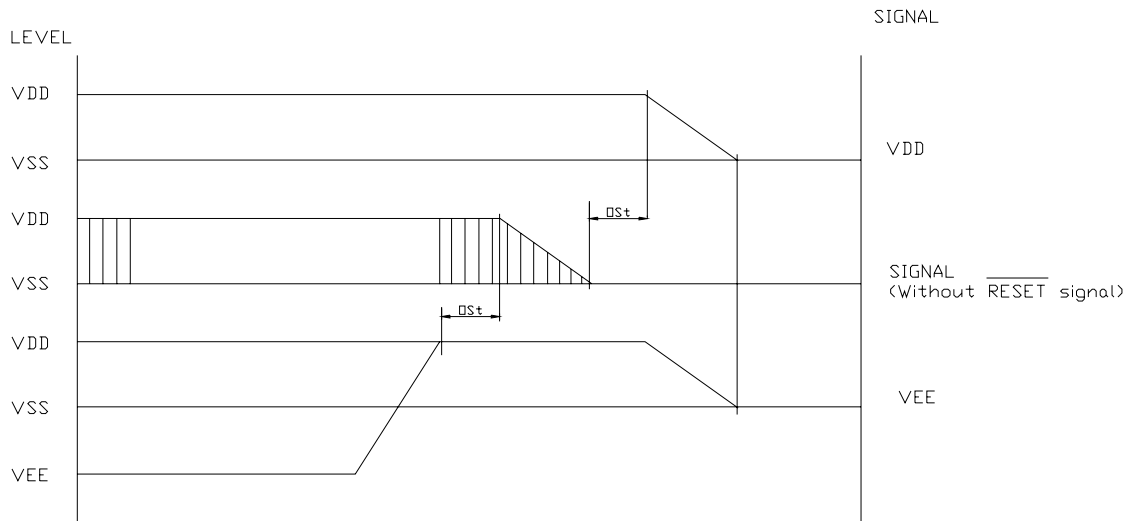


**11.3 Power Supply ON/OFF Sequence**

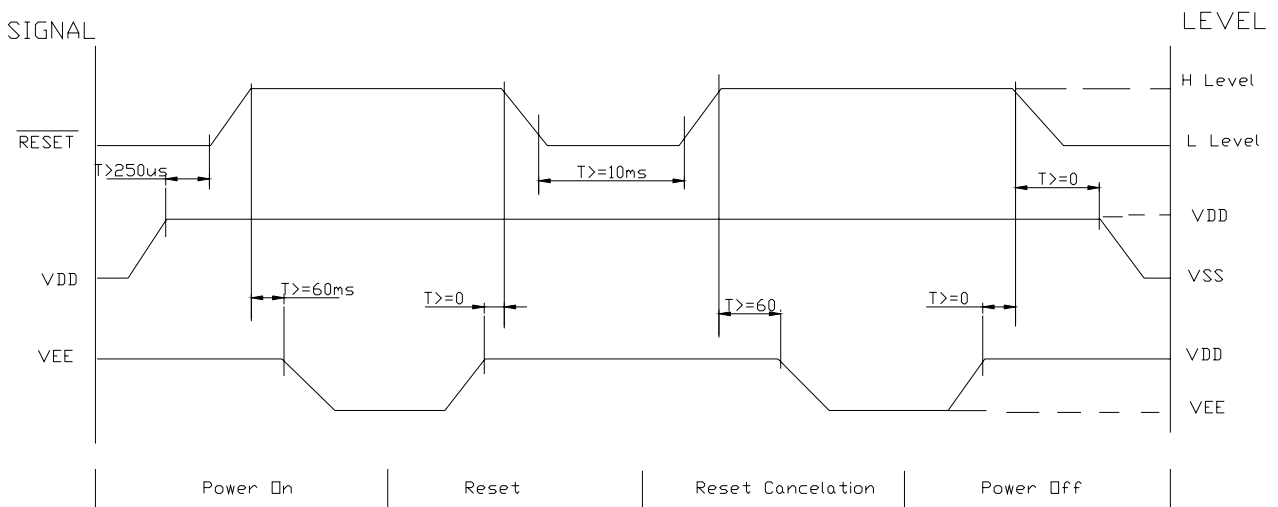
● ON Sequence



● OFF Sequence



● Reset Sequence



Please maintain the above sequence when turn 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.

**12. 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.

**13. 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