

# **AZ DISPLAYS, INC.**

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COMPLETE LCD SOLUTIONS

## SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER:  
DATE:

AGM1212N SERIES  
APRIL 04, 2007

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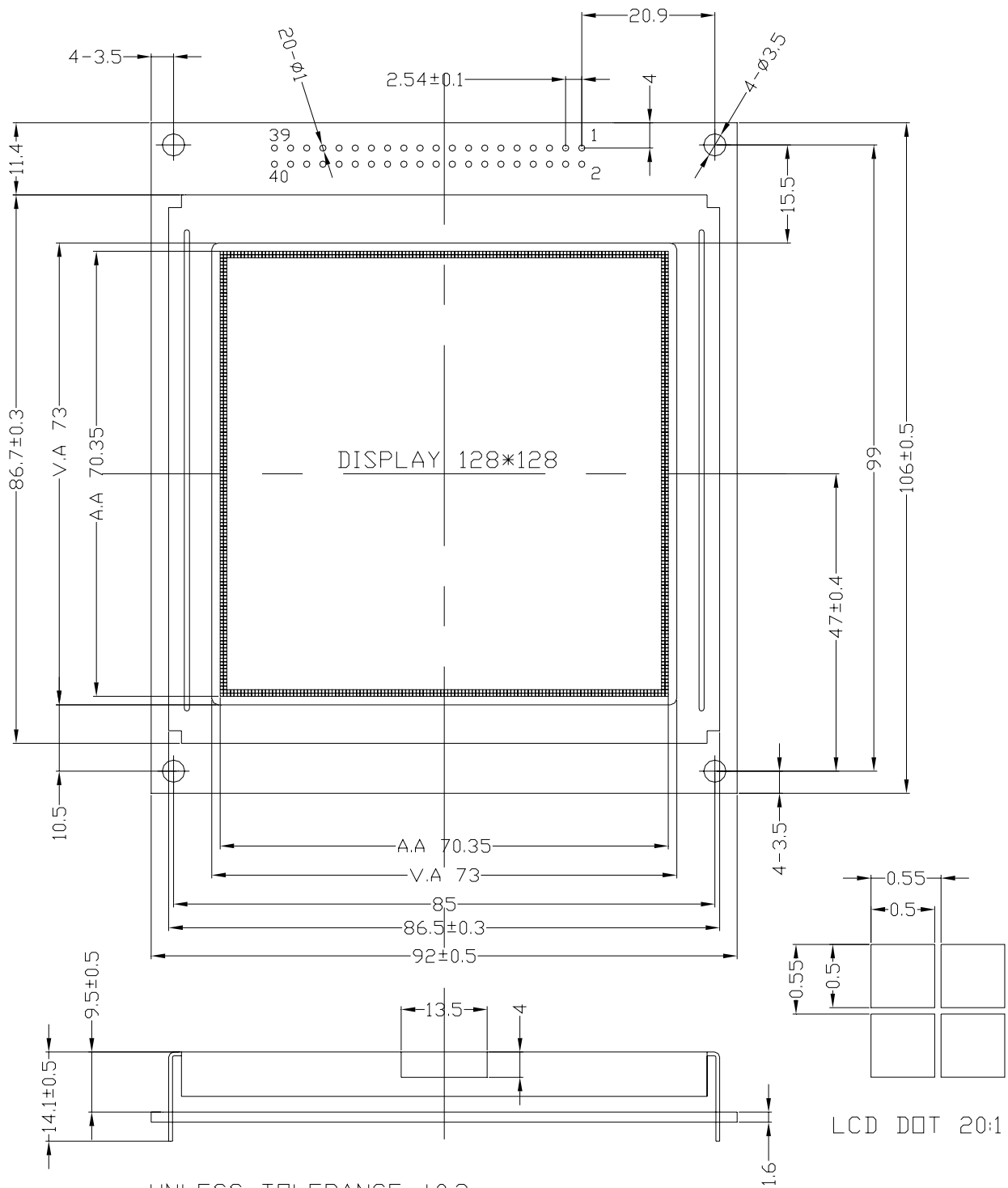
## 1. FUNCTIONS

|                        |                        |
|------------------------|------------------------|
| Glass Thickness        | : 1.1mm                |
| Viewing Direction      | : 6 O'clock            |
| Driving Scheme         | : 1/128Duty, 1/12 Bias |
| Power Supply for logic | : 5.0V                 |
| Backlight Color        | : White                |
| Display Content        | : 128*128 Dots         |
| V <sub>LCD</sub>       | : 18.5V                |
| Operation Temperature  | : -20 to +70°C         |
| Storage temperature    | : -25 to +75°C         |
| Controller IC          | : T6963C               |
| Driver IC              | : S6B0086              |

## 2. MODULE

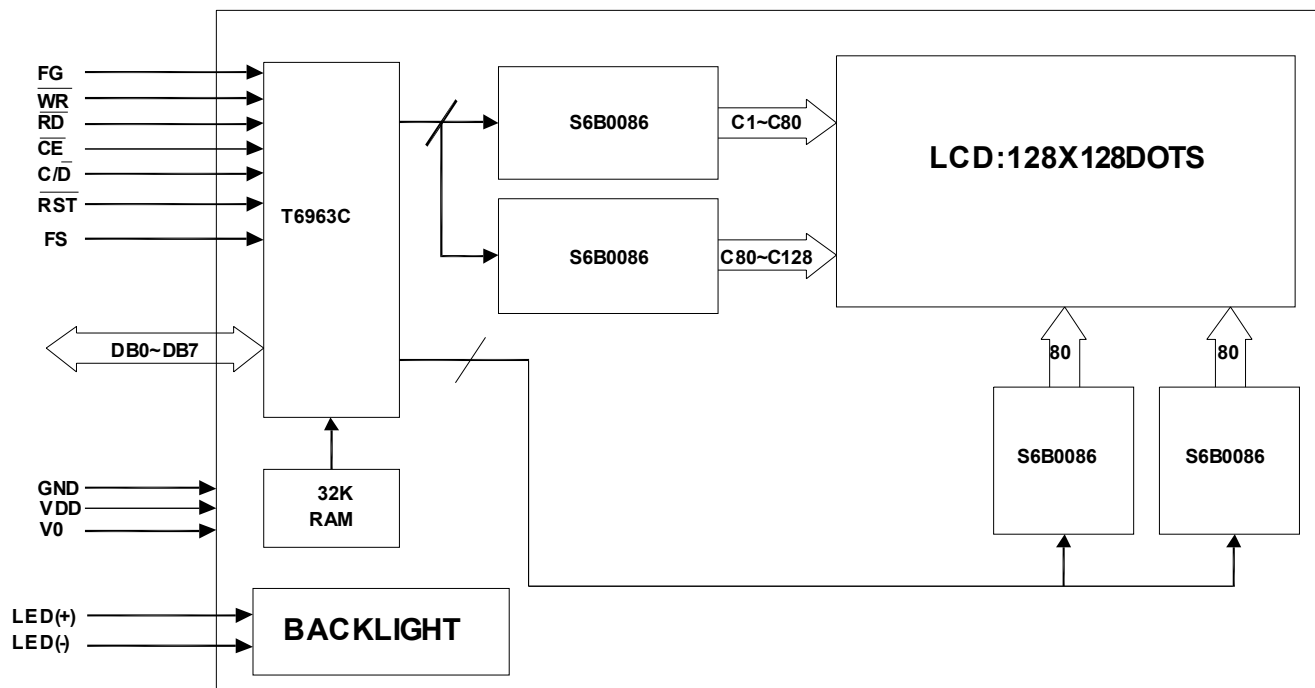
|              |                          |
|--------------|--------------------------|
| Module Size  | : 106(L)*92(W)*14.1(H)mm |
| Viewing Area | : 73(L)mm*73(W)mm        |
| Active Area  | : 70.35(L)mm*70.35(W)mm  |
| Dot Pitch    | : 0.55(W)mm*0.55(H)mm    |
| Dot Size     | : 0.50(W)mm*0.50(H)mm    |
| Dot Gap      | : 0.05mm                 |

### 3. EXTERNAL DIMENSIONS



UNLESS TOLERANCE  $\pm 0.2$   
THE MATERIAL IS LEAD-FREE

## 4. BLOCK DIAGRAM



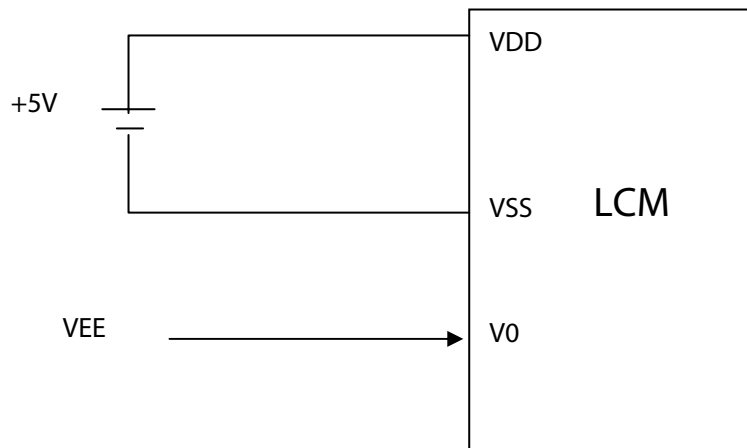
## 5. PIN ASSIGNMENT

| NO.      | SYMBOL                | FUNCTION  |
|----------|-----------------------|---|
| 1        | FG                    | Frame ground  |
| 2        | /CSCAN                | Active LOW : Force column scan counter to run continuously in order to obtain a complete cycle  |
| 3        | V <sub>SS</sub>       | Ground  |
| 4,6,8,10 | D <sub>S00~DS03</sub> | 4 bits to indicate the column being scanned range 0 to 15 corresponding to COL1 to COL16, with DS00 as LSB. Output is latched at the most recently touched position. When read while "TOUCH" is positive, the touched column is identified.*        |
| 5        | V <sub>DD</sub>       | Power supply for logic(+5V)   |
| 7        | V <sub>0</sub>        | Power supply for LCD drive  |
| 9        | /WR                   | Write Command or data to module when "L"  |
| 11       | /RD                   | Read Command or data from module when "L"   |
| 12,14,16 | D <sub>S04~DS06</sub> | 3 bits to indicate the row being scanned range 0 to 7 corresponding to ROW1 to ROW8, with DS4 as LSB & DS6 as MSB. Output is latched at the most recently touched position. When read while "TOUCH" is positive, the touched column is identified.* |
| 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"   |
| 18       | //SCAN                | Active LOW : Standby to scan. Scanning will begin when a touch is identified at any of the sensing position, and will continue until touch is removed.  |

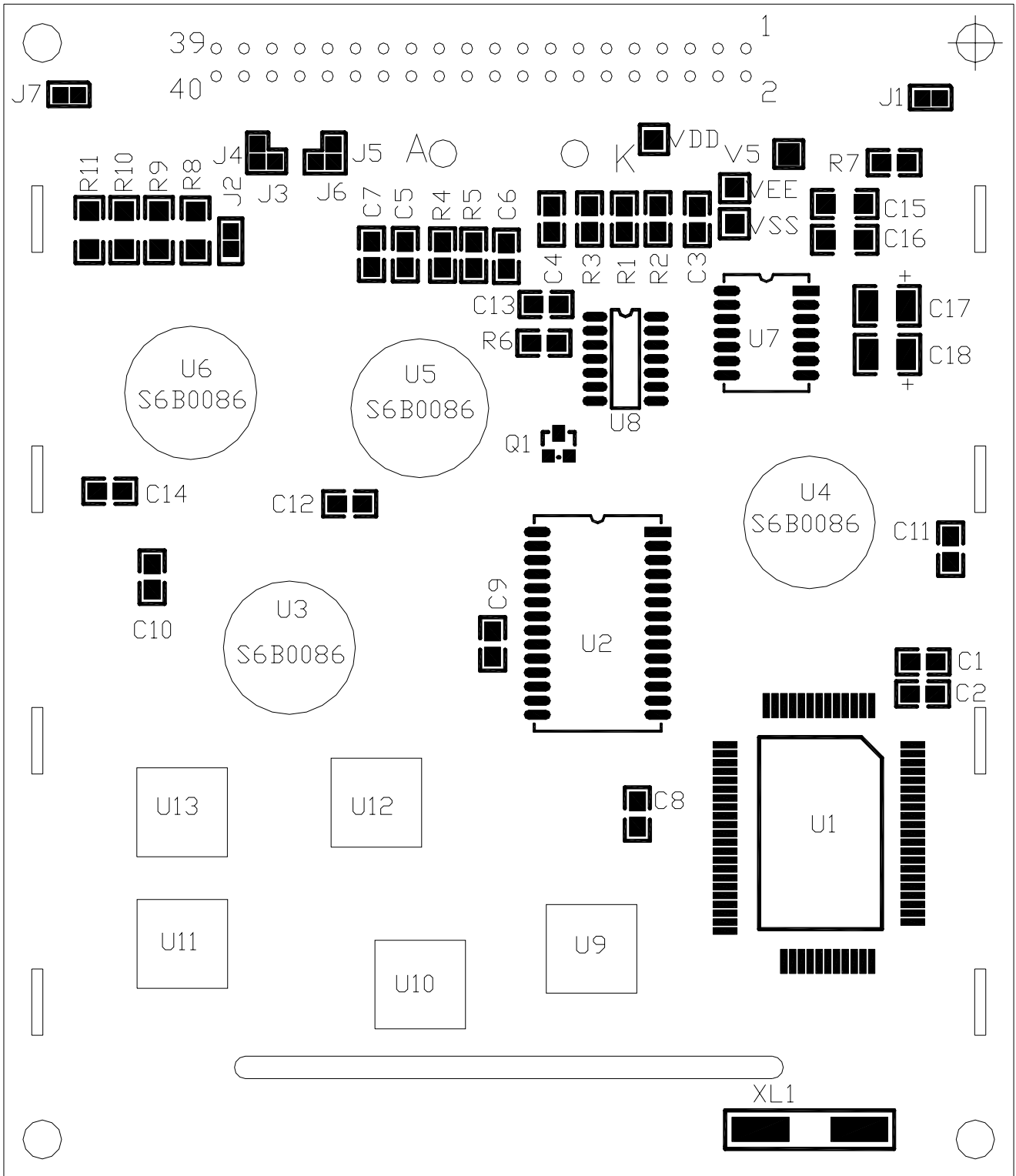
|                                |         |          |  |
|--------------------------------|---------|----------|--|
| 19,21,23,25,<br>27,29,31,33,   |         | DB0 ~DB7 | LCD data input/output. DB0(pin10) is LS B and DB7(pin17) is MSB .  |
| 20                             | EN      | D        | A 4ms positive pulse generated at the end of a complete scan cycle (Max cycle time: 64ms)                |
| 22                             | T       | OUCH     | A 2ms positive pulse when scanning reaches an identified touch position. It can be used as an interrupt. |
| 24,26,28,30,3<br>2,34,36,38,40 |         | NC. No   | Connection   |
| 35                             |         | FS       | Font select. "H" for 6x 8 font & " L " for 8x8 font  |
| 37                             | LED     | +(A)     | Please refer to item 8.1 PCB drawing and description   |
| 39                             | LED-(K) |          |  |

\* If D 500 to DS06 is read at the "END, then the last touched position will be identified.

## 6. POWER SUPPLY



## 7.1 PCB DRAWING AND DESCRIPTION



Note: It is only a draft drawing to show the components on the PCB. We should update the drawing after the PCB sample is approved.

**DESCRIPTION:**

7-1-1.The polarity of the pin 37 and the pin 39:

| symbol | symbol state       | J3,J5       | J6, | J4          | LED Polarity |         |
|--------|--------------------|-------------|-----|-------------|--------------|---------|
|        |                    |             |     |             | 37 Pin       | 39 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 =J2=closed,J4=J6= open.

7-1-2. The J1 is metal-bezel GND to module GND and J7 is mountingholes GND to module GND.

Note: In application module, J1= J7=closed

7-1-3.The LED resistor should be bridged when J2 is closed

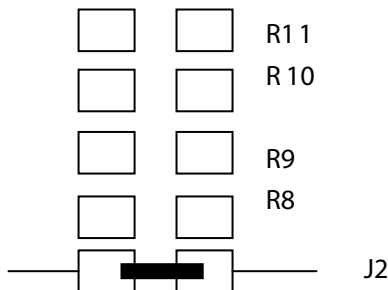
Note: In application module, J2=closed

7-1-4.The R8 and the R9, R10, R11 are the LED resistor.

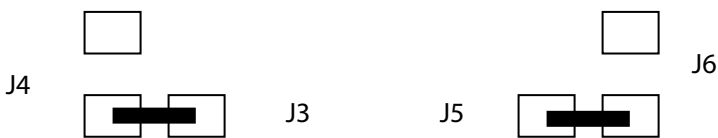
Note: In application module, R8 = R9= R10= R11=open

**7.2 Example application**

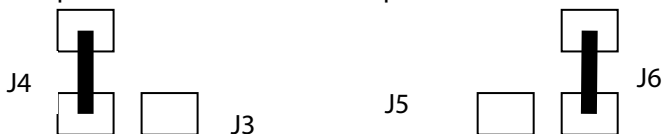
7-2-1. The LED resistor should be bridged as following.



7-2-2. The 37 pin is the anode and the 39 pin is the cathode as following.



7-2-3.The 37 pin is the cathode and the 39 pin is the anode as following.



7-2-4. The metal-bezel is on ground as following.



## 8. ABSOLUTE MAXIMUM RATINGS( $V_{SS}=0V$ , $T_a=25^{\circ}C$ )

| PARAMETER              | SYMBOL    | RATING                 | UNIT        |
|------------------------|-----------|------------------------|-------------|
| Supply Voltage (Logic) | $V_{DD}$  | -0.3 to 7.0            | V           |
| Input voltage          | $V_{IN}$  | -0.3 to $V_{DD} + 0.3$ | V           |
| Operating Temperature  | $T_{opr}$ | -20 to +70             | $^{\circ}C$ |
| Storage Temperature    | $T_{stg}$ | -25 to +75             | $^{\circ}C$ |

## 9. ELECTRICAL CHARACTERISTICS

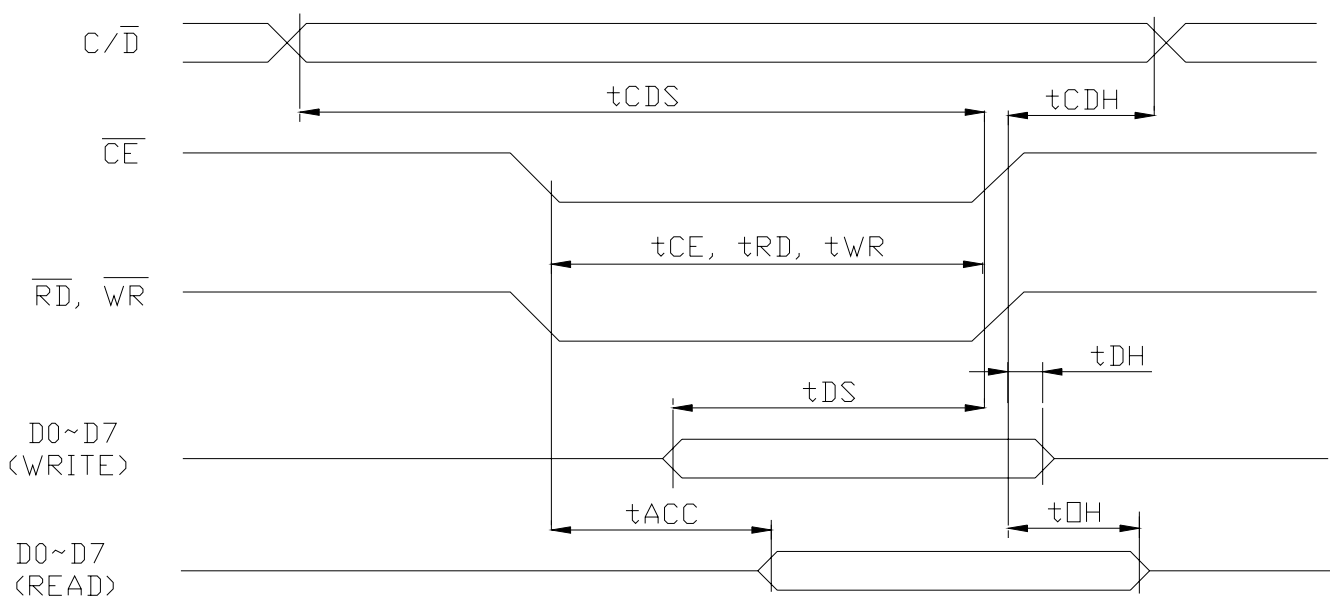
### 1). DC Characteristics

$T_a=25^{\circ}C$ ,  $V_{SS}=0V$

| Parameter                      | Symbol          | Conditions                           | Min.         | Typ. | Max.     | Units   |
|--------------------------------|-----------------|--------------------------------------|--------------|------|----------|---------|
| Supply Voltage (Logic)         | $V_{DD}-V_{SS}$ | -                                    | 4.5          | 5.0  | 5.5      | V       |
| High Level Input Voltage       | $V_{IH}$        | $V_{DD}=5.0V \pm 10\%$               | $V_{DD}-2.2$ | -    | $V_{DD}$ | V       |
| Low Level Input Voltage        | $V_{IL}$        | $V_{DD}=5.0V \pm 10\%$               | 0            | -    | 0.8      | V       |
| High Level Output Voltage      | $V_{OH}$        | $I_{OH}=0.75mA$                      | $V_{DD}-0.3$ | -    | $V_{DD}$ | V       |
| Low Level Output Voltage       | $V_{OL}$        | $I_{OL}=0.75mA$                      | 0            | -    | 0.3      | V       |
| Current Consumption(Operating) | $I_{DD(1)}$     | $V_{DD}=5.0V$<br>$f_{OSC} = 3.0 MHz$ | -            | 3.3  | 6.0      | mA      |
| Current Consumption(Halt)      | $I_{DD(2)}$     | $V_{DD}=5.0V$                        |              |      | 3        | $\mu A$ |

### 2). AC Characteristics

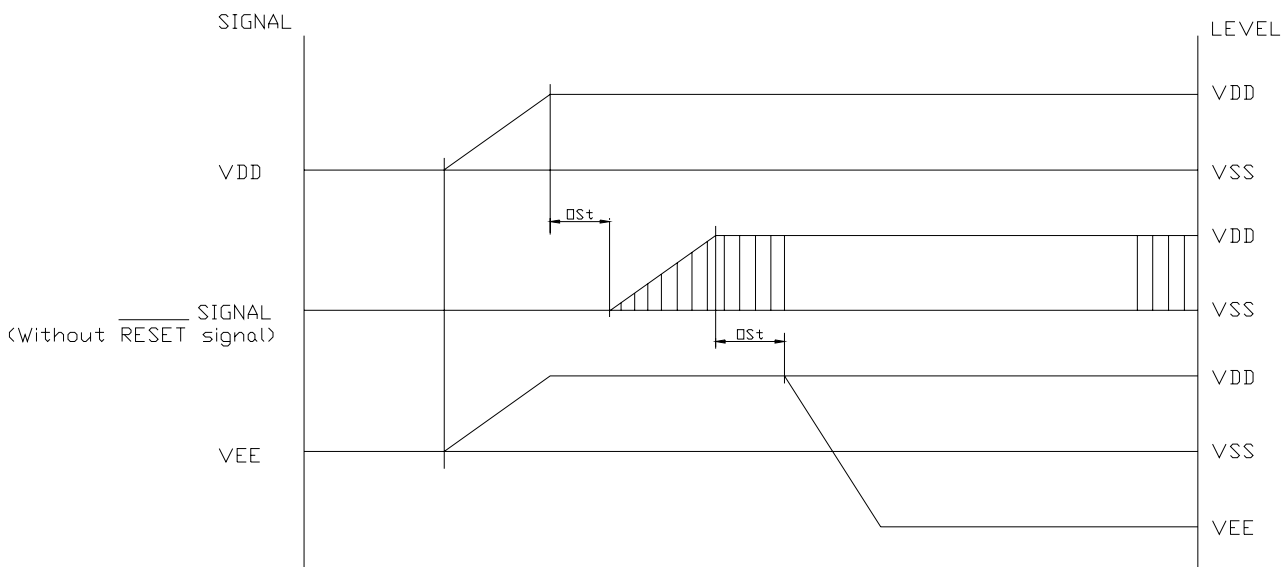
| Parameter              | Symbol                      | Min. | Max. | Units |
|------------------------|-----------------------------|------|------|-------|
| C/D Setup Time         | $t_{CDS}$ 10                | 0    | -    | ns    |
| C/D Hold Time          | $t_{CDH}$ 10                |      | -    | ns    |
| CE, RD, WR Pulse Width | $t_{CE}, t_{RD}, t_{WR}$ 80 |      | -    | ns    |
| Data Setup Time        | $t_{DS}$ 80                 |      | -    | ns    |
| Data Hold Time         | $t_{DH}$ 40                 |      | -    | ns    |
| Access Time            | $t_{ACC}$ -                 |      | 150  | ns    |
| Output Hold Time       | $t_{OH}$ 10                 |      | 50   | ns    |



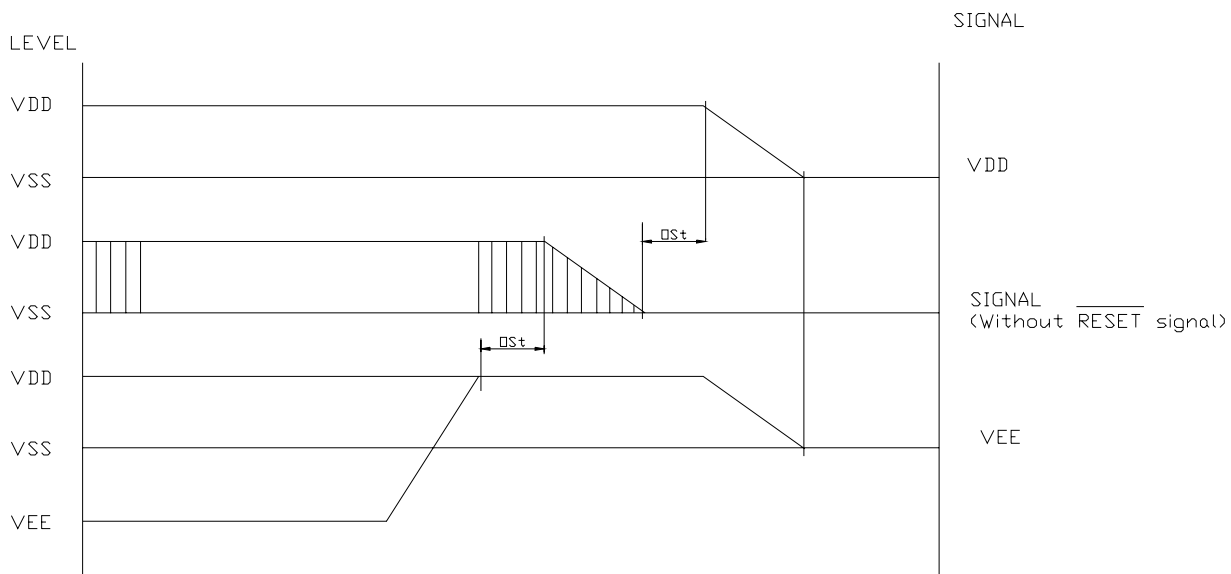


### 3). Power Supply ON/OFF Sequence

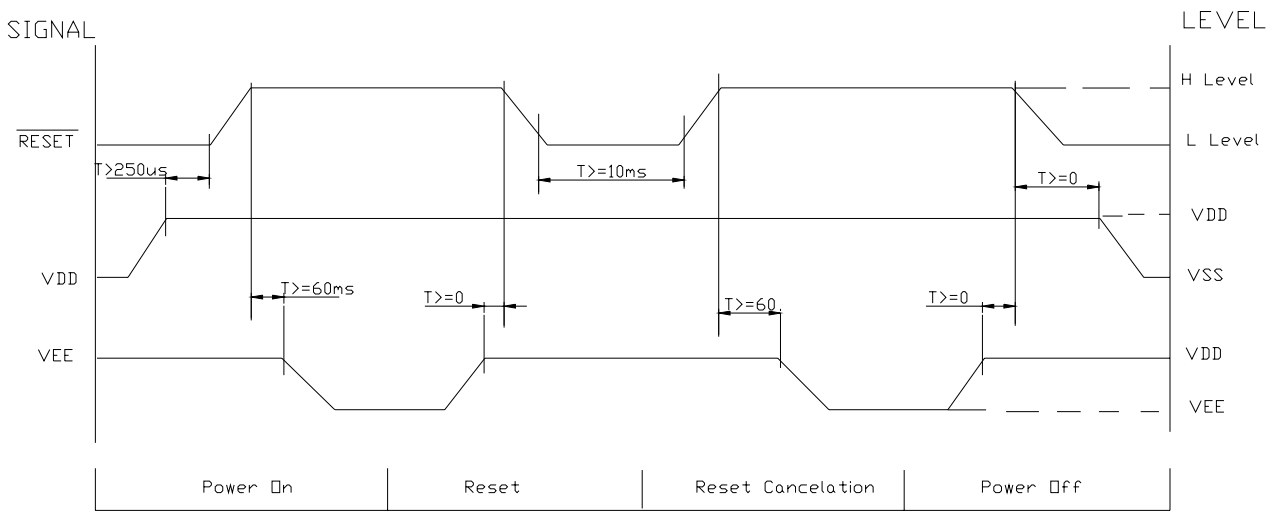
#### ON Sequence



#### 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.

## 10. BACKLIGHT ELECTRICAL/ OPTICAL SPECIFICATIONS

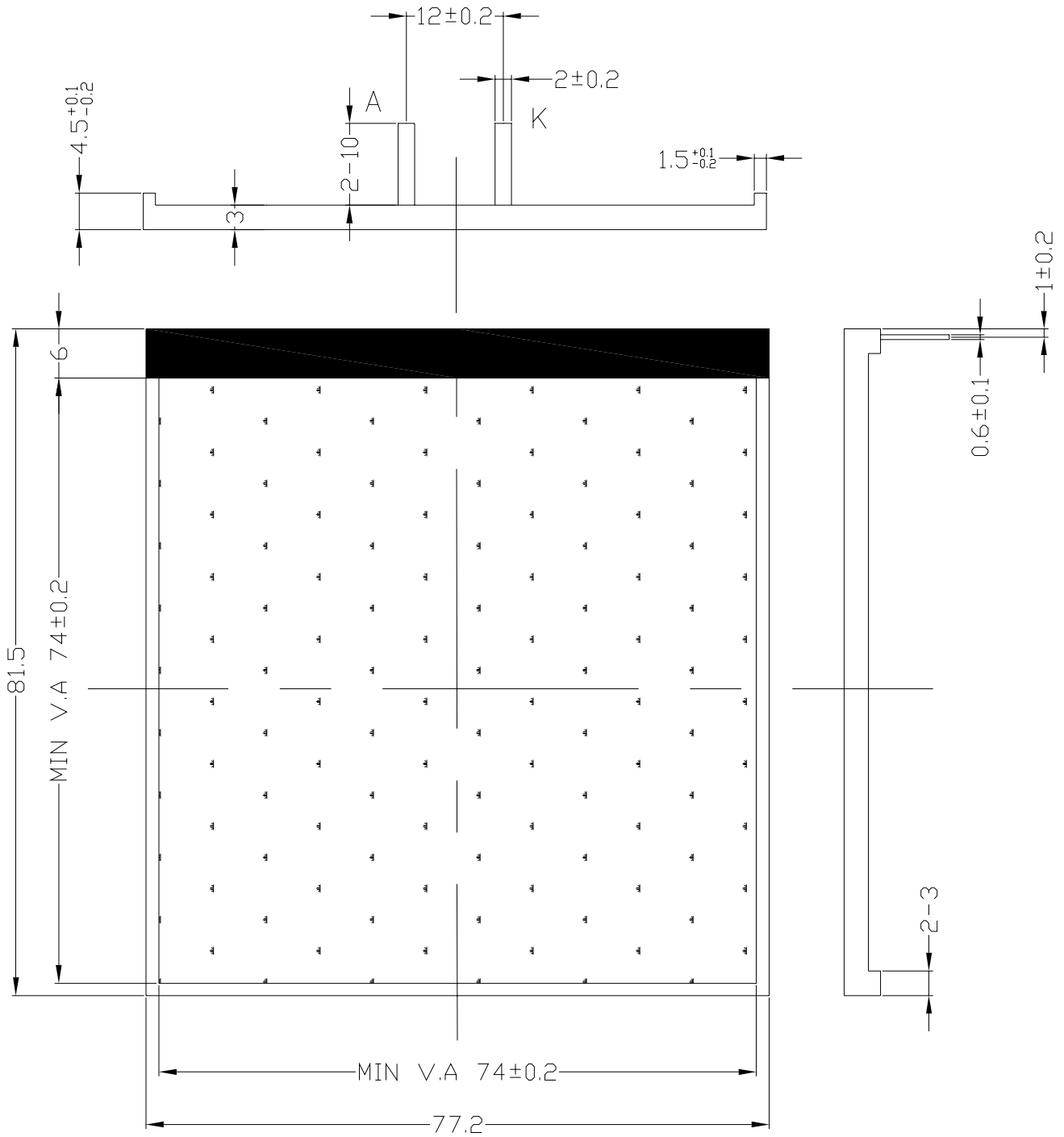
### 10.1 Absolute Maximum Ratings ( $T_a=25^\circ C$ )

| 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                | $P_d$    |                            | 225    | mW   |

### 10.2 Backlight Electrical/Optical Characteristics

| Item                     | Symbol          | Min.  | Typ. | Max. | Unit     | Condition  |
|--------------------------|-----------------|-------|------|------|----------|------------|
| Forward Voltage          | $V_f$           | 2.9   | 3.2  | 3.5  | V        | $I_f=45mA$ |
| Reverse Current          | $I_r$           |       | 30   |      | $\mu A$  | $V_r=0.8V$ |
| Peak Wave Length         | $\lambda_p$     |       |      |      | nm       |            |
| Spectral Line Half Width | $\Delta\lambda$ |       |      |      | nm       |            |
| Luminance                | $L_v$           |       | TBD  |      | $cd/m^2$ | $I_f=45mA$ |
| Backlight Color          |                 | White |      |      |          |            |

10.3 Backlight Drawing



UNLESS TOLERANCE ±0.3  
 THE COLOR IS WHITE  
 THE MATERIAL IS LEAD-FREE

