**Winstar Display Co., LTD**
**華凌光電股份有限公司**

*住址: 407 台中市中清路 163 號*
*No.163 Chung Ching RD.,*
*Taichune, Taiwan, R.O.C*

*WEB: http://www.winstar.com.tw*
*E-mail: winstar@winstar.com.tw*
*Tel:886-4-24262208 Fax : 886-4-24262207*

# SPECIFICATION

**CUSTOMER :** _____

**MODULE NO.: WH1601A-NBG-ETV#**

| | |
|---|---|
| **APPROVED BY:**<br>**( FOR CUSTOMER USE ONLY )** | **PCB VERSION:** **DATA:** |

| SALES BY | APPROVED BY | CHECKED BY | PREPARED BY |
|---|---|---|---|
| | | | |
| **ISSUED DATE:** | | | |

Represented by:

FIRST Components s.r.l.
www.first-components.com
technical@first-components.com
+39 0332 1888005

# 2.Precautions in use of LCD Modules

(1)Avoid applying excessive shocks to the module or making any alterations or modifications to it.
(2)Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
(3)Don't disassemble the LCM.
(4)Don't operate it above the absolute maximum rating.
(5)Don't drop, bend or twist LCM.
(6)Soldering: only to the I/O terminals.
(7)Storage: please storage in anti-static electricity container and clean environment.

# 3.General Specification

| Item | Dimension | Unit |
|---|---|---|
| Number of Characters | 16 characters x 1 Lines | — |
| Module dimension | 80.0 x 36.0 x 9.7(MAX) | mm |
| View area | 66.0 x 16.0 | mm |
| Active area | 59.62 x 6.56 | mm |
| Dot size | 0.55 x 0.75 | mm |
| Dot pitch | 0.63 x 0.83 | mm |
| Character size | 3.07 x 6.56 | mm |
| Character pitch | 3.77 x 6.56 | mm |
| LCD type | TN Positive, Gray Reflective,<br>(In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.) | |
| Duty | 1/16 | |
| View direction | 6 o'clock | |

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# 4.Absolute Maximum Ratings

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Operating Temperature | $T_{OP}$ | -20 | — | +70 | ℃ |
| Storage Temperature | $T_{ST}$ | -30 | — | +80 | ℃ |
| Input Voltage | $V_I$ | $V_{SS}$ | — | $V_{DD}$ | V |
| Supply Voltage For Logic | $V_{DD}$-$V_{SS}$ | -0.3 | — | 7 | V |
| Supply Voltage For LCD | $V_{DD}$-$V_0$ | -0.3 | — | 13 | V |

# 5.Electrical Characteristics

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage For Logic | $V_{DD}$-$V_{SS}$ | — | 2.7 | 3.0 | 3.3 | V |
| Supply Voltage For LCD | $V_{DD}$-$V_0$ | Ta=-20℃ | — | — | 5.6 | V |
| | | Ta=25℃ | — | 4.5 | — | V |
| | | Ta=70℃ | 3.7 | — | — | V |
| Input High Volt. | $V_{IH}$ | — | 0.7 $V_{DD}$ | — | $V_{DD}$ | V |
| Input Low Volt. | $V_{IL}$ | — | Vss | — | 0.6 | V |
| Output High Volt. | $V_{OH}$ | — | 0.7 | — | — | V |
| Output Low Volt. | $V_{OL}$ | — | — | — | 0.2 | V |
| Supply Current | $I_{DD}$ | $V_{DD}$=3V | 1.0 | 1.2 | 1.5 | mA |

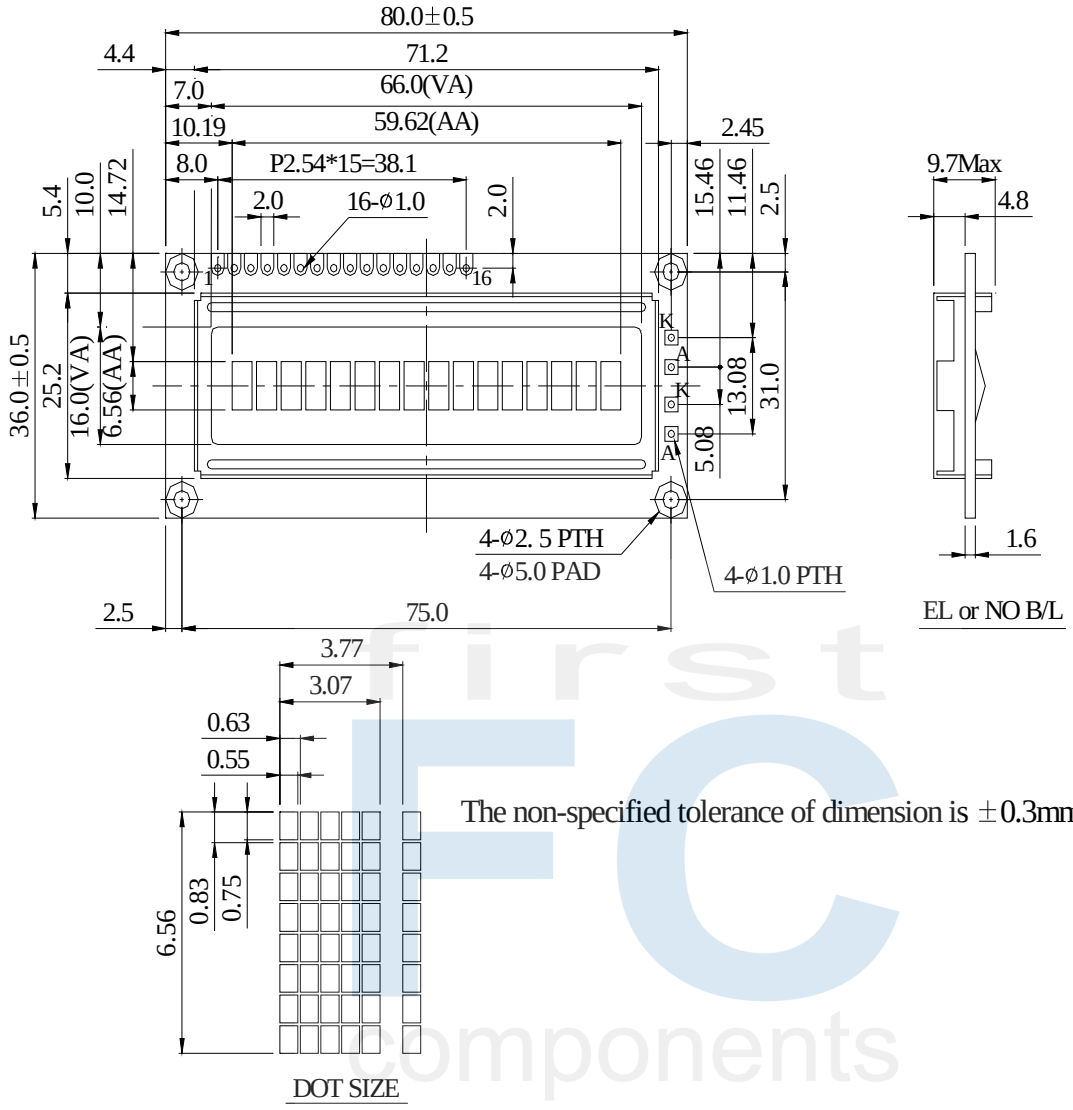
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# 7.Interface Pin Function

| Pin No. | Symbol | Level | Description |
|---|---|---|---|
| 1 | $V_{SS}$ | 0V | Ground |
| 2 | $V_{DD}$ | 3.0V | Supply Voltage for logic |
| 3 | VO | (Variable) | Operating voltage for LCD |
| 4 | RS | H/L | H: DATA, L: Instruction code |
| 5 | R/W | H/L | H: Read(MPU→Module) L: Write(MPU→Module) |
| 6 | E | H,H→L | Chip enable signal |
| 7 | DB0 | H/L | Data bus line |
| 8 | DB1 | H/L | Data bus line |
| 9 | DB2 | H/L | Data bus line |
| 10 | DB3 | H/L | Data bus line |
| 11 | DB4 | H/L | Data bus line |
| 12 | DB5 | H/L | Data bus line |
| 13 | DB6 | H/L | Data bus line |
| 14 | DB7 | H/L | Data bus line |
| 15 | A | — | Power supply for B/L(+) |
| 16 | K | — | Power supply for B/L( - ) |

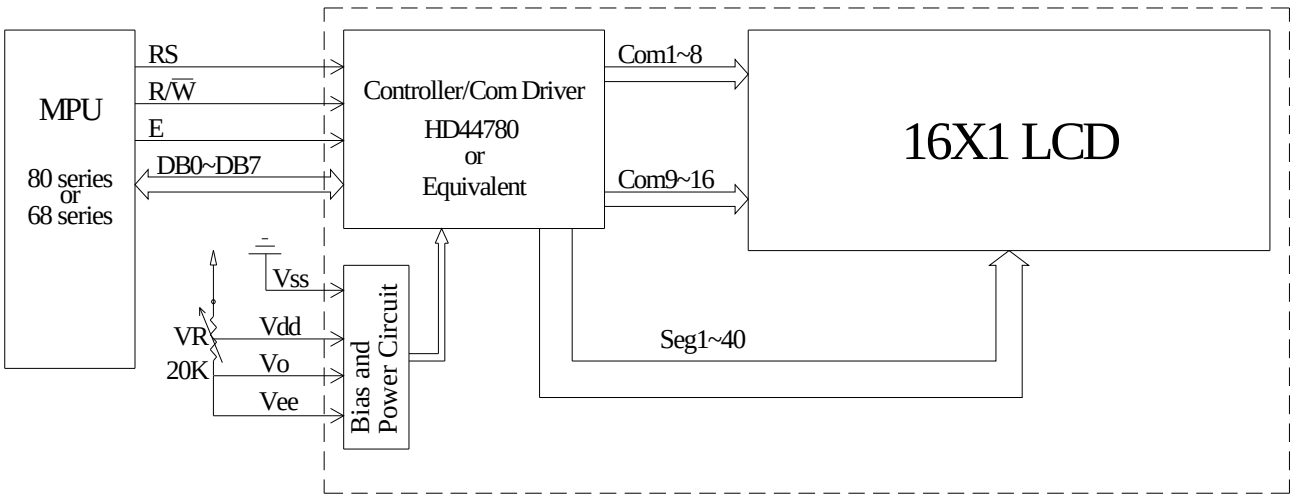
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# 8.Contour Drawing &Block Diagram




| PIN NO. | SYMBOL |
|---|---|
| 1 | Vss |
| 2 | Vdd |
| 3 | Vo |
| 4 | RS |
| 5 | R/$\overline{W}$ |
| 6 | E |
| 7 | DB0 |
| 8 | DB1 |
| 9 | DB2 |
| 10 | DB3 |
| 11 | DB4 |
| 12 | DB5 |
| 13 | DB6 |
| 14 | DB7 |
| 15 | A |
| 16 | K |

The non-specified tolerance of dimension is ±0.3mm.




External contrast adjustment.