LM016L·LM016XMBL

- 16 character x 2 lines
- Controller LSI HD44780 is built-in (See page 79).
- +5V single power supply
- Display color: LM016L : Gray
  LM016XMBL : New-gray

MECHANICAL DATA (Nominal dimensions)
Module size ............... 84W x 44H x 10.5T (max.) mm
Effective display area .... 61W x 15.8H mm
Character size (5 x 7 dots) ............ 2.96W x 4.86H mm
Character pitch ............... 3.55 mm
Dot size .................... 0.56W x 0.66H mm
Weight ...................... about 35 g

ABSOLUTE MAXIMUM RATINGS
min. max.
Power supply for logic (VDD − VSS) ............ 0 6.5 V
Power supply for LCD drive
(VDD − VO) ............... 0 6.5 V
Input voltage (VI) ............ VSS VDD  V
Operating temperature (Ta) ............ 0 50 40°C
Storage temperature (Tstg) ............ −20 70 60°C
* Shows the value of type LM016XMBL.

ELECTRICAL CHARACTERISTICS
Ta = 25°C, VDD = 5.0 V ± 0.25 V
Input “high” voltage (VIH) ............ 2.2 V min.
Input “low” voltage (VIL) ............ 0.6 V max.
Output “high” voltage (VOH) (IOL = 0 mA) ............ 2.4 V min.
Output “low” voltage (VOL) (IOL = 1.2 mA) ............ 0.4 V max.
Power supply current (IDD) (VDD = 5.0 V) ............ 1.0 mA typ.
  3.0 mA max.

POWER SUPPLY FOR LCD DRIVE (Recommended)
(VDD−VO)
Duty = 1/16
Range of VDD−VO ............... 1.5~5.25 V
Ta = 0°C .................... 4.6 V typ.
Ta = 25°C .................... 4.4 V typ.
Ta = 50°C .................... 4.2 V typ.

OPTICAL DATA
See page 7

INTERNAL PIN CONNECTION

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>Level</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VSS</td>
<td>–</td>
<td>0V</td>
</tr>
<tr>
<td>2</td>
<td>VDD</td>
<td>–</td>
<td>+5V</td>
</tr>
<tr>
<td>3</td>
<td>VO</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>RS</td>
<td>H/L</td>
<td>L: Instruction code input</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H: Data input</td>
</tr>
<tr>
<td>5</td>
<td>R/W</td>
<td>H/L</td>
<td>H: Data read (LCD module→MPU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L: Data write (LCD module→MPU)</td>
</tr>
<tr>
<td>6</td>
<td>E</td>
<td>H</td>
<td>Enable signal</td>
</tr>
</tbody>
</table>

Notes:
In the HD44780, the data can be sent in either 4-bit 2-operation or
8-bit 1-operation so that it can interface to both 4 and 8 bit MPU’s.
(1) When interface data is 4 bits long, data is transferred using only 4
buses of DBx~DB3, and DB3~DB9 are not used. Data transfer
between the HD44780 and the MPU completes when 4-bit data is
transferred twice. Data of the higher order 4 bits (contents of
DB9~DB12, when interface data is 8 bits long) is transferred first
and then lower order 4 bits (contents of DB4~DB9, when interface
data is 8 bits long).
(2) When interface data is 8 bits long, data is transferred using 8 data
buses of DBx~DB9.

Fig. 1 Display pattern