332-4849 (LM016L-S) (S-factory location not relevant to spec).

HITACHI

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 ($V_{DD}-V_{SS}$)	0	6.5 V
Power supply for LCD drive ($V_{DD}-V_O$)	0	6.5 V
Input voltage (Vi)	V_{SS}	V_{DD} V
Operating temeprature (Ta)	0	50 40* °C
Storage temperature (Tstg)	−20	70 60* °C

* Shows the value of type LM016XMBL.

ELECTRICAL CHARACTERISTICS

$Ta = 25°C$, $V_{DD} = 5.0\ V \pm 0.25\ V$

Input "high" voltage (V_{IH})	2.2 V min.
Input "low" voltage (V_{IL})	0.6 Vmax.
Output "high" voltage (V_{OH}) ($-I_{OH} = 0.2$ mA)	2.4 V min.
Output "low" voltage (V_{OL}) ($I_{OL} = 1.2$ mA)	0.4 Vmax.
Power supply current (I_{DD}) ($V_{DD} = 5.0$ V)	1.0 mA typ. 3.0 mA max.

POWER SUPPLY FOR LCD DRIVE (Recommended) (V_{DD}-V_O)

Duty = 1/16

Range of $V_{DD}-V_O$	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

Pin No.	Symbol	Level	Function	
1	V_{SS}	–	0V	Power supply
2	V_{DD}	–	+5V	
3	V_O	–	–	
4	RS	H/L	L: Instruction code input H: Data input	
5	R/W	H/L	H: Data read (LCD module→MPU) L: Data write (LCD module←MPU)	
6	E	H, H→L	Enable signal	
7	DB0	H/L	Data bus line Note (1), (2)	
8	DB1	H/L		
9	DB2	H/L		
10	DB3	H/L		
11	DB4	H/L		
12	DB5	H/L		
13	DB6	H/L		
14	DB7	H/L		

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 DB_4~DB_7 and DB_0~DB_3 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 DB_4~DB_7 when interface data is 8 bits long) is transferred first and then lower order 4 bits (contents of DB_0~DB_3 when interface data is 8 bits long).

(2) When interface data is 8 bits long, data is transferred using 8 data buses of DB_0~DB_7.

Unit: mm

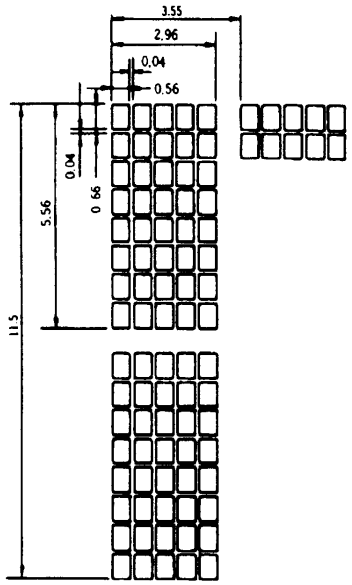

Fig. 1 Display pattern

Unit: mm

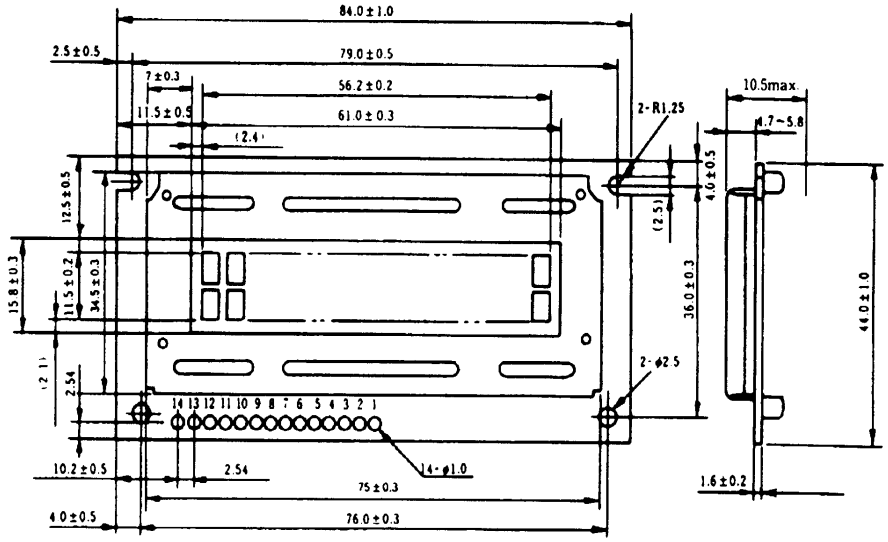

Fig. 2 External dimensions

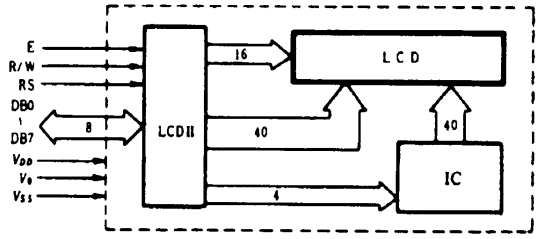

Fig. 3 Block diagram

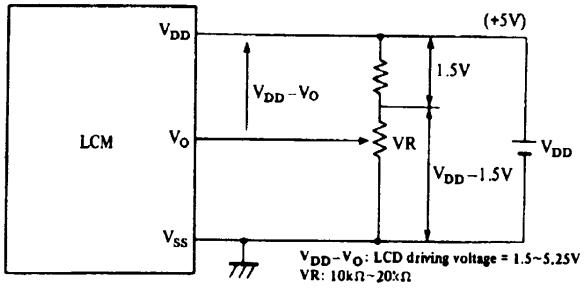

Fig. 4 Power supply