LM018L

- 40 character x 2 lines
- Controller LSI HD44780 is built-in (See page 79).
- +5V single power supply
- Display color: LM018L : Gray

MECHANICAL DATA (Nominal dimensions)

Module size	182W x 35.5H (max.) x 10.5T (max.) mm
Effective display area	154.0W x 15.3H mm
Character size (5 x 7 dots)	3.2W x 4.85H mm
Character pitch	3.7 mm
Dot size	0.6W x 0.65H mm
Weight	about 65g

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 (V_i)	V_{SS}	V_{DD} V
Operating temperature (Ta)	0	50 40°C
Storage temperature (Tstg)	−20	70 60°C

ELECTRICAL CHARACTRISTICS

Ta=25°C, V_{DD}=5.0V ±0.25V

Input "high" voltage (V_{IH})	2.2V min.
Input "low" voltage (V_{IL})	0.6V max.
Output "high" voltage (V_{OH}) ($-I_{OH}$=0.2mA)	2.4V min.
Output "low" voltage (V_{OL}) (I_{OL}=1.2mA)	0.4V max.
Power supply current (I_{DD}) (V_{DD}=5.0V)	2.0 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

PIN CONNECTION

Pin No.	Symbol	Level	Function
1	V_{SS}	—	0V — Power supply
2	V_{DD}	—	+5V — Power supply
3	V_O	—	— — Power supply
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

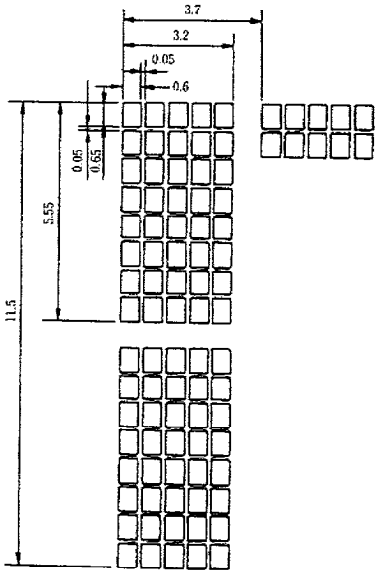

Fig. 1 Display pattern

Unit: mm

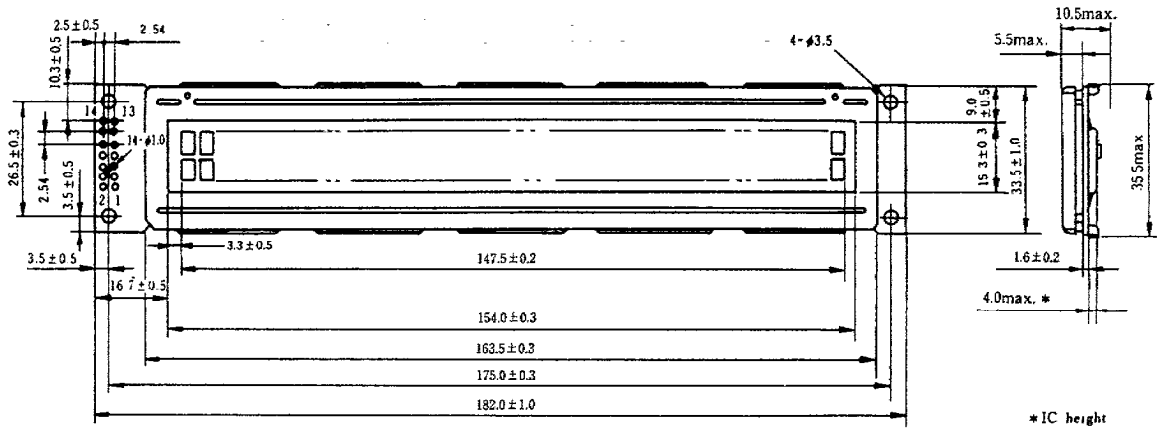

Fig. 2 External dimensions

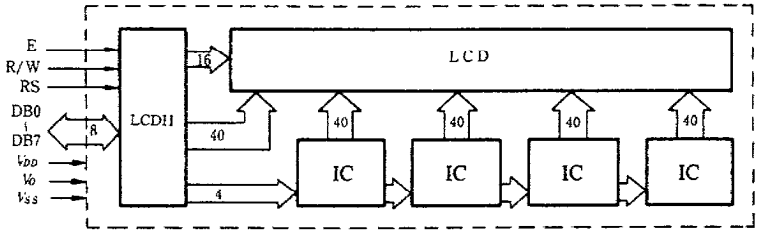

Fig. 3 Block diagram

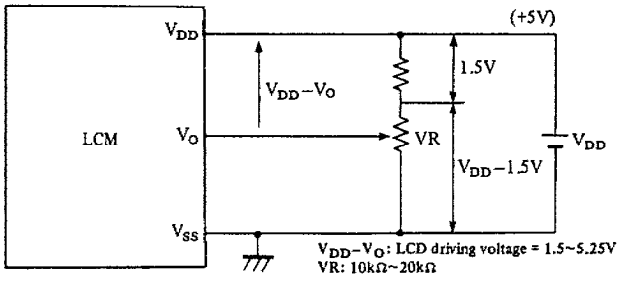

Fig. 4 Power supply

TIMING CHARACTERISTICS

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Enable cycle time	t_{cyc}	Fig. 5, Fig. 6	1.0	–	–	μs
Enable pulse width	PW_{EH}	Fig. 5, Fig. 6	450	–	–	ns
Enable rise/fall time	t_{Er}, t_{Ef}	Fig. 5, Fig. 6	–	–	25	ns
RS, R/W set up time	t_{AS}	Fig. 5, Fig. 6	140	–	–	ns
Data delay time	t_{DDR}	Fig. 6	–	–	320	ns
Data set up time	t_{DSW}	Fig. 5	195	–	–	ns
Hold time	t_H	Fig. 5, Fig. 6	20	–	–	ns

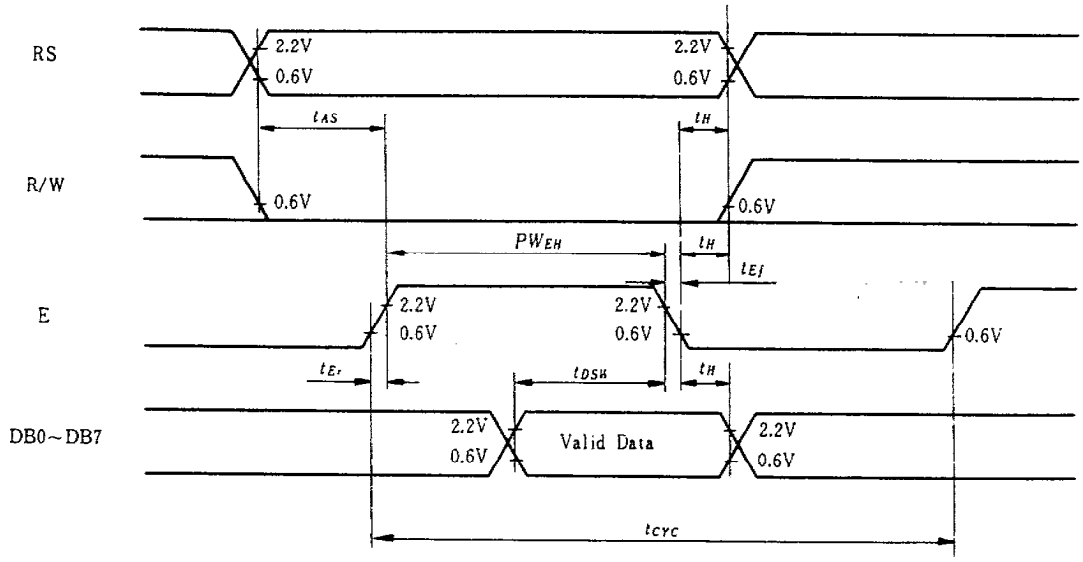

Fig. 5 Interface timing (data write)

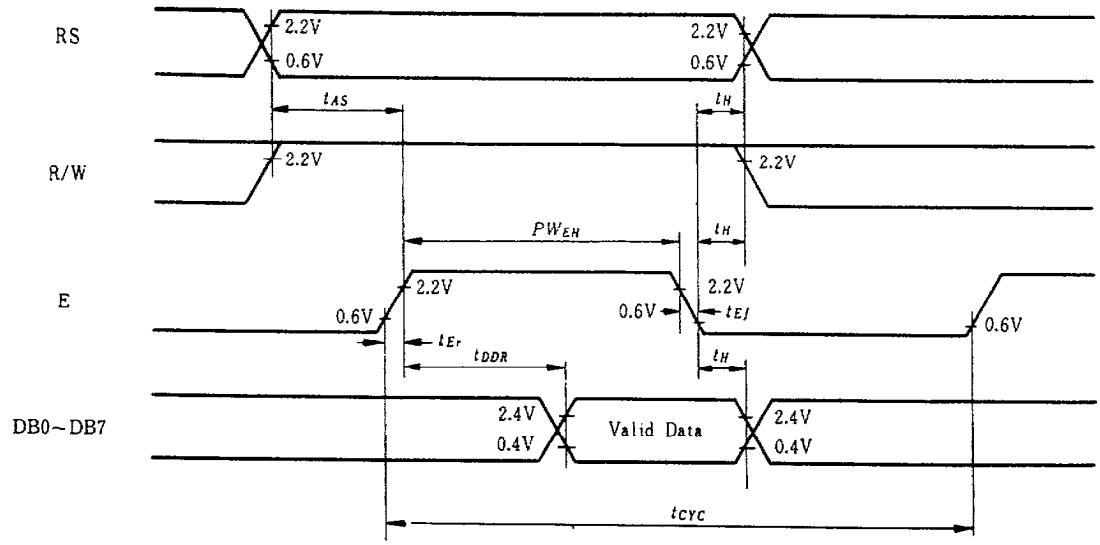

Fig. 6 Interface timing (data read)