CAT# LCD-117
SPEC / Hook-Up Sheet

Please note: We don't have the manufacturer's spec sheets for this LCD. We believe that the following pages for Hitachi LM052L to be equivalent.

LM052L

- 16 character x 2 lines
- Controller LSI HD44780 is built-in (see section 6).
- +5V single power supply

MECHANICAL DATA (Nominal dimensions)

Module size	80W x 36H x 11T (max.) mm
Effective display area	64.5W x 13.8H mm
Character size (5 x 7 dots)	2.95W x 3.8H mm
Character pitch	3.65 mm
Dot size	0.55W x 0.5H mm
Weight	about 25 g

ABSOLUTE MAXIMUM RATINGS

	min.	max.
Power supply for logic ($V_{DD}-V_{SS}$)	0	7.0 V
Power supply for LCD drive ($V_{DD}-V_O$)	0	13.5 V
Input voltage (Vi)	V_{SS}	V_{DD} V
Operating temperature (Ta)	0	50°C
Storage temperature (Tstg)	−20	70°C

ELECTRICAL CHARACTERISTICS

Ta = 25°C, V_{DD} = 5.0 V ± 0.25 V

Input "high" voltage (Vi_H)	2.2 V min.
Input "low" voltage (Vi_L)	0.6 V max.
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 V max.
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

Ta = 0°C	4.2 V typ.
Ta = 25°C	4.0 V typ.
Ta = 50°C	3.6 V typ.

OPTICAL DATA ..... See page 15.

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

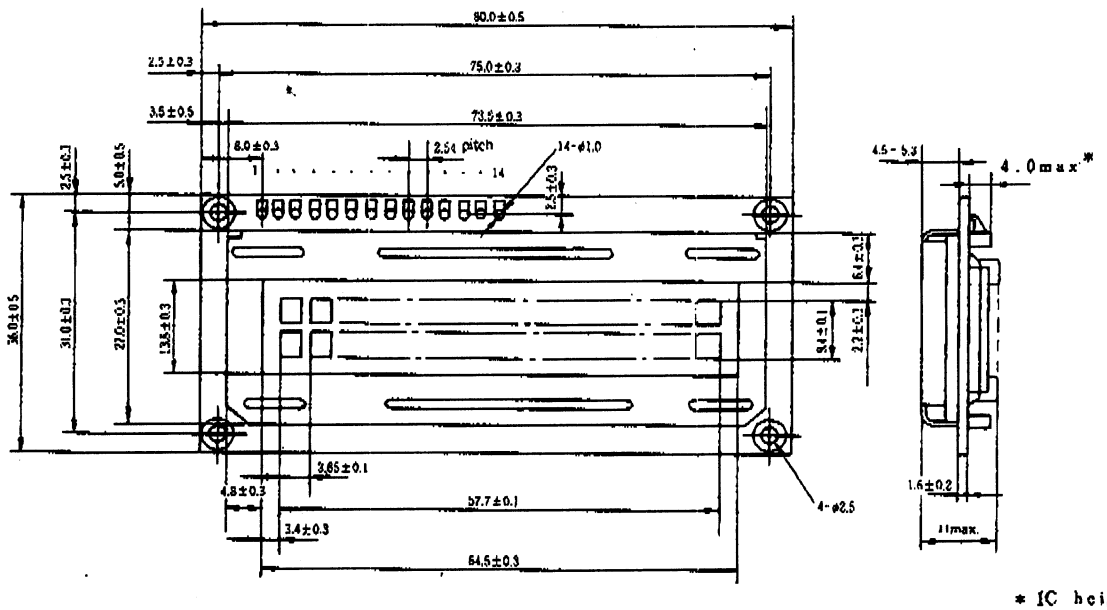

Fig. 1 External dimension

LM075L

- 16 character × 2 lines
- Controller LSI HD44780 is built-in (see section 6).
- +5V single power supply
- Large numeral font set (see page 176).

MECHANICAL DATA (Nominal dimensions)

Module size	80W x 36H x 11T (max.) mm
Effective display area	64.5W x 13.8H mm
Character size (5 x 7 dots)	2.95W x 3.8H mm
Character pitch	3.65 mm
Dot size	0.55W x 0.5H mm
Weight	about 25 g

ABSOLUTE MAXIMUM RATINGS

	min.	max.
Power supply for logic ($V_{DD}-V_{SS}$)	0	7.0 V
Power supply for LCD drive ($V_{DD}-V_O$)	0	13.5 V
Input voltage (Vi)	V_{SS}	V_{DD} V
Operating temperature (Ta)	0	50°C
Storage temperature (Tstg)	−20	70°C

ELECTRICAL CHARACTERISTICS

Ta = 25°C, V_{DD} = 5.0 V ± 0.25 V.

Input "high" voltage (Vi_H)	2.2 V min.
Input "low" voltage (Vi_L)	0.6 V max.
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 V max.
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

Ta = 0°C	4.2 V typ.
Ta = 25°C	4.0 V typ.
Ta = 50°C	3.6 V typ.

OPTICAL DATA ..... See page 15.

INTERNAL 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	
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10	DB3	H/L	
11	DB4	H/L	
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14	DB7	H/L	

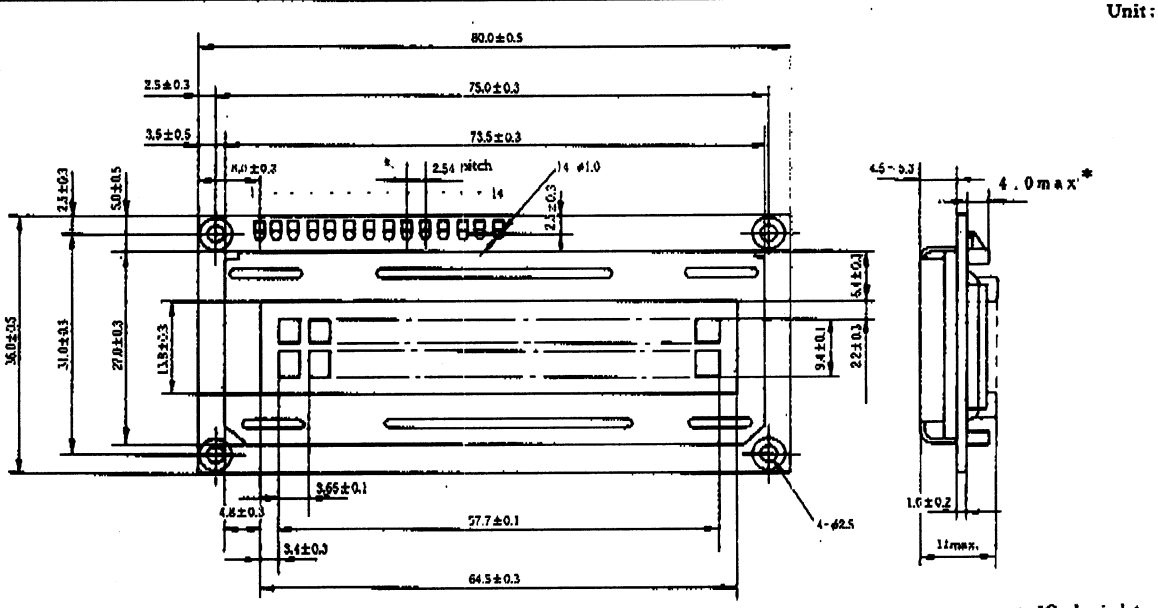
Notes:

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



* IC height

Fig. 1 External dimension

4. FEATURES

1. THE FEATURES OF LCD MODULE ARE AS FOLLOWS.

- DISPLAY MODE : STN, NORMAL TEMPERATURE
  POSITIVE, T/F
- COLOR : DISPLAY DOT : BLUE
  BACK GROUND : GRAY
- DISPLAY FORMAT : 40 CHARACTERS X 4 LINE
- INPUT DATA : 4-BIT OR 8-BIT INTERFACE AVAILABLE
- MULTIPLEXING RATIO : 1/16 DUTY
- VIEWING DIRECTION : 6 O'CLOCK
- BACK LIGHT : E/L WHITE
- OTHERS : SPC 0.6T. BLACK COATING

5. MECHANICAL SPECIFICATION

ITEM	SPECIFICATION	UNIT	REMARK
MODULE SIZE	190.0 [W] X 54.0 [H] X 10.0MAX. [T]	mm	* REFERENCE DIMENSIONAL OUTLINE
VIEWING AREA	147.0 [W] X 29.5 [H]	mm	
EFFECTIVE DISPLAY AREA	141.25 [W] X 23.24 [H]	mm	
CHARACTER FONT	5 X 7 DOT WITH CURSOR	-	
CHARACTER SIZE	2.80 [W] X 4.91 [H]	mm	
CHARACTER PITCH	3.55 [W] X 6.11 [H]	mm	
DOT SIZE	0.52[W] X 0.57 [H]	mm	
WEIGHT	ABOUT 105	g	

8. ELECTRICAL & OPTICAL CHARACTERISTICS

8-1 ELECTRICAL CHARACTERISTICS [Vdd = 5V ± 10%, GND = 0V, Ta = -20 ℃ TO +75 ℃]

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT	REMARK
			MIN.	TYP.	MAX.		
POWER SUPPLY FOR LOGIC	Vdd-Vss	-	4.5	5.0	5.5	V	
INPUT HIGH VOLTAGE	VIH	-	2.2	-	Vdd	V	
INPUT LOW VOLTAGE	VIL	-	-0.3	-	0.6	V	
OUTPUT HIGH VOLTAGE	VOH	IOH = 0.2mA	2.4	-	-	V	
OUTPUT LOW VOLTAGE	VOL	IOL = 1.2mA	-	-	0.4	V	
CURRENT CONSUMPTION FOR LOGIC & LC DRIVING	Id *	Vdd = 5.0 V		6.5	8.0	mA	
OPERATING VOLTAGE FOR LCD	Vdd -Vo	Top= ℃ Top= 25℃ Top= ℃	- - -	- 4.2 -	- - -	V	
FRAME FREQUENCY	f FLM	-	-	82.0	-	Hz	

** : WHEN ALL CHARATER FONT ARE DISPLAYED AS "5".

8-2. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS		STANDARD VALUE			UNIT	NOTE
				MIN.	TYP.	MAX.		
VIEWING ANGLE	$\phi 2-\phi 1$	K ≧ 2.0		60	-	-	DEG.	1, 2
CONTRAST RATIO	K	θ= 0°, ϕ= 15°		3	5	-	-	3
RESPONSE TIME(RISING)	Tr	ϕ, θ = 0°	Top= 0℃ Top= 25℃ Top= ℃	- - -	700 200 -	800 250 -	ms	4
RESPONSE TIME(FALLING)	Tf	ϕ, θ = 0°	Top= 0℃ Top= 25℃ Top= ℃	- - -	800 250 -	1000 300 -	ms	4

* ALL VALUE IS MEASURED BY DMS (MADE IN AUTRONIC) UNDER THE TEST CONDITIONS - Vdd-Vo = 4.2V, 1/16 DUTY, 1/4 BIAS, f FLM = 82 Hz, Ta = 25℃.

9. TERMINAL FUNCTIONS & BLOCK DIAGRAM

9-1. TERMINAL FUNCTIONS

PIN NO	SYMBOL	LEVEL	NAME	FUNCTION DESCRIPTION
1	Vss	-	GND	0 V
2	Vdd	-	POWER SUPPLY FOR LOGIC	5V± 10%
3	Vo	-	OPERATING VOLTAGE FOR LCD	REF. 7
4	RS	H/L	REGISTER SELECTION	H: DATA INPUT L: INSTR. DATA INPUT
5	R/W	H/L	READ / WRITE	H: READ, L: WRITE
6	E1	H, H/L	ENABLE SIGNAL1	-
7	E2	H, H/L	ENABLE SIGNAL2	-
8	D0	H/L	DATA LINE	DISPLAY DATA INPUT
9	D1	H/L	DATA LINE	DISPLAY DATA INPUT
10	D2	H/L	DATA LINE	DISPLAY DATA INPUT
11	D3	H/L	DATA LINE	DISPLAY DATA INPUT
12	D4	H/L	DATA LINE	DISPLAY DATA INPUT
13	D5	H/L	DATA LINE	DISPLAY DATA INPUT
14	D6	H/L	DATA LINE	DISPLAY DATA INPUT
15	D7	H/L	DATA LINE	DISPLAY DATA INPUT
16	NC	-	-	-

9-2. BLOCK DIAGRAM