

-1-41501

- ### MECHANICAL DATA (Nominal dimensions)

ABSOLUTE MAXIMUM RATINGS

min

max

Power supply for LCD drive

Input voltage (V_i) V_{SS} V_{DD} V

Operating temperature (T_a) 0 50°C

Operating temperature (T _o)	-55	125 °C
Storage temperature (T _{stg})	-20	70 °C

Storage temperature (1stg) -20 70 °C

EL Power Supply (when fitted)

Voltage (VEL) AC 150 Vrms

Frequency (fEL) (at 100 Vms) 1kHz

$$T_a = 25^\circ\text{C}, V_{DD} = 5.0\text{ V} \pm 0.25\text{ V}$$

Input "high" voltage (V_{IH}) 2.2 V min.

Input "low" voltage (V_{iL}) 0.6 V max.

Output "high" voltage (V_{OH}) ($-I_{OH} = 0.2 \text{ mA}$), 2.4V min.

Output "low" voltage (V_{OL}) ($I_{OL} = 1.2 \text{ mA}$) . . . 0.4V max.

Power supply current (I_{DD}) ($V_{DD} = 5.0\text{ V}$) . . . 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

$T_a = 0^\circ\text{C}$ 4.6 V typ.

Ta = 25°C 4.2 V typ.

$T_a = 50^\circ\text{C}$ 3.5 V typ.

Power Supply for FI (when fitted)

VEL (typ. at 400Mz) 100 Vms

fEL (max at VEL 100V, fEL 400Hz)	16mA
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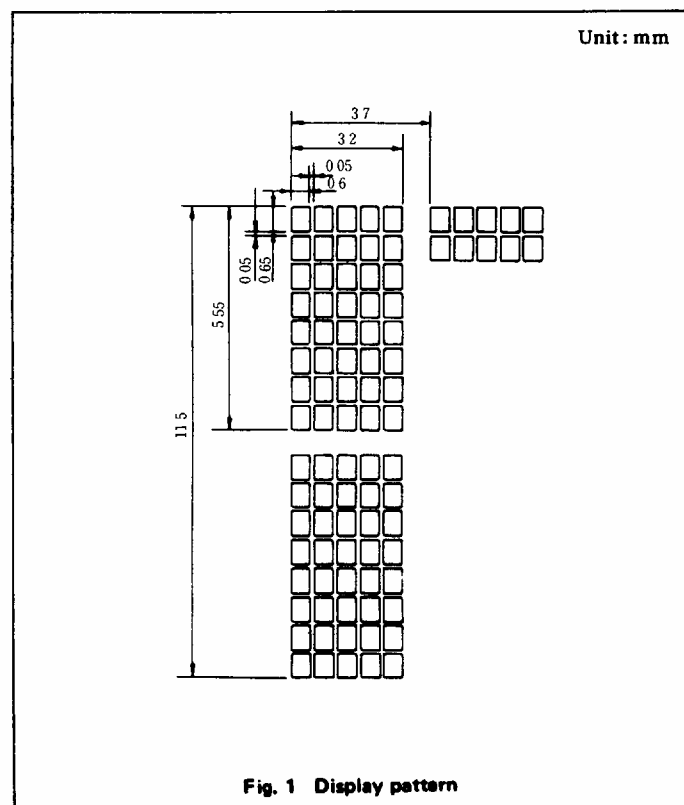
Luminescent output of EL (where fitted) at $\varnothing = 25^{\circ}\text{C}$, $\varnothing = 0^{\circ}\text{C}$ - $6\text{cd} / \text{m}^2$ typ.

Pin No.	Symbol	Level	Function
1	V _{SS}	—	0V
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 $DB_4 \sim DB_7$ and $DB_0 \sim DB_3$ 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 $DB_4 \sim DB_7$ when interface data is 8 bits long) is transferred first and then lower order 4 bits (contents of $DB_0 \sim DB_3$ when interface data is 8 bits long).
- (2) When interface data is 8 bits long, data is transferred using 8 data buses of $DB_0 \sim DB_7$.



Unit: mm

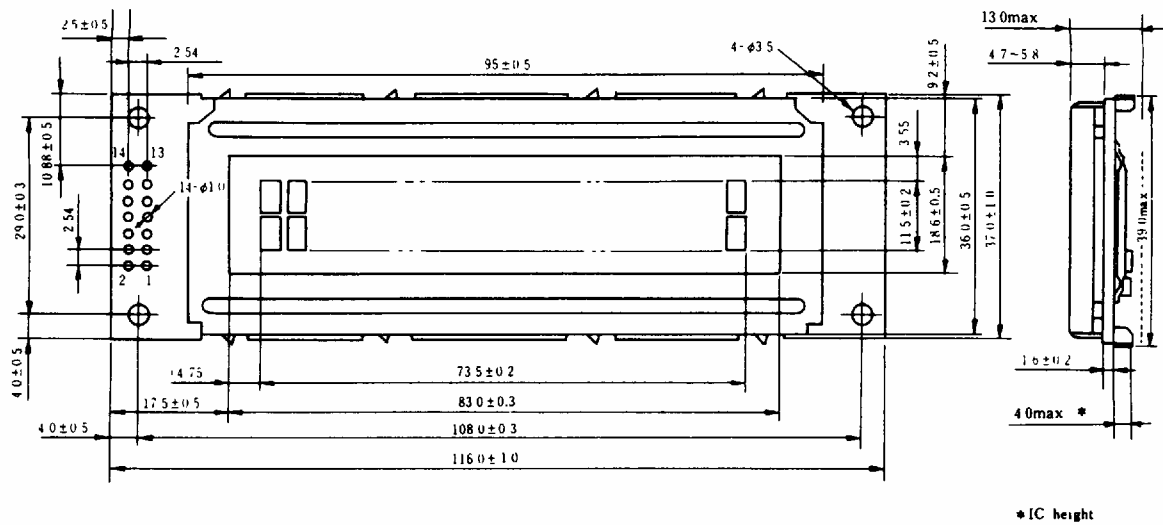


Fig. 2 External dimensions

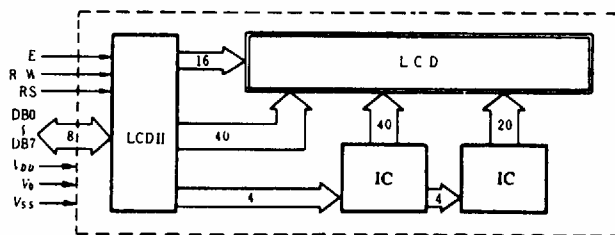


Fig. 3 Block diagram

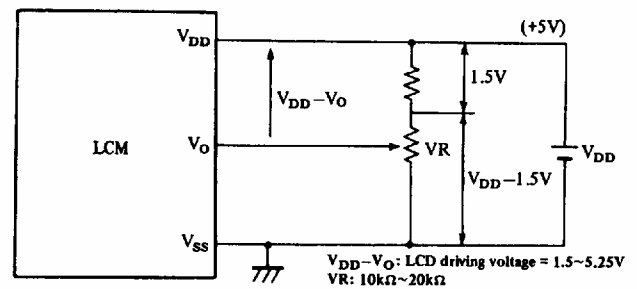
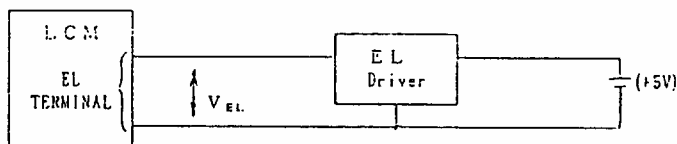


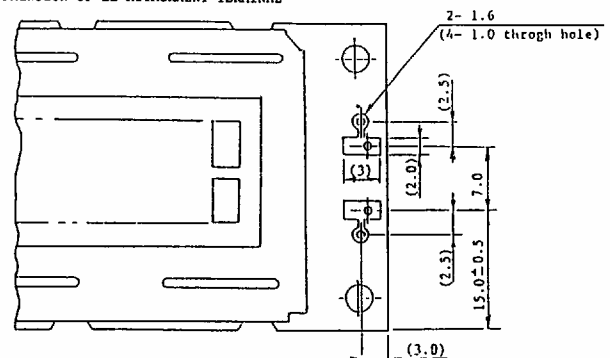
Fig. 4 Power supply

9.2 POWER SUPPLY FOR EL



THE EL BACKLIGHTING IS: NEC'S NEL-SLL-420-C
THE EL DRIVER IS: NEC'S NEL-D32-46.

DIMENSION OF EL ATTACHMENT TERMINAL



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

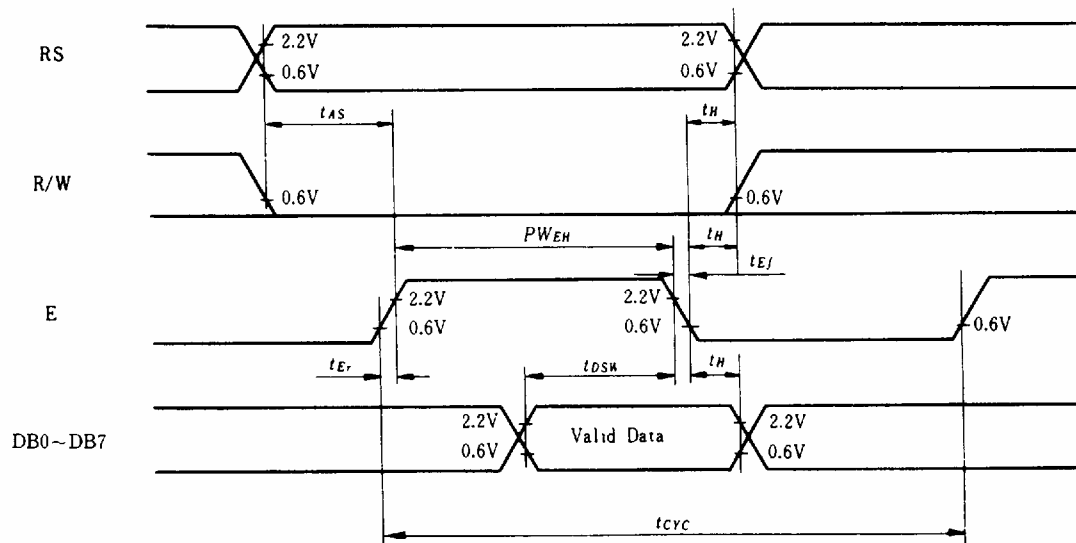


Fig. 5 Interface timing (data write)

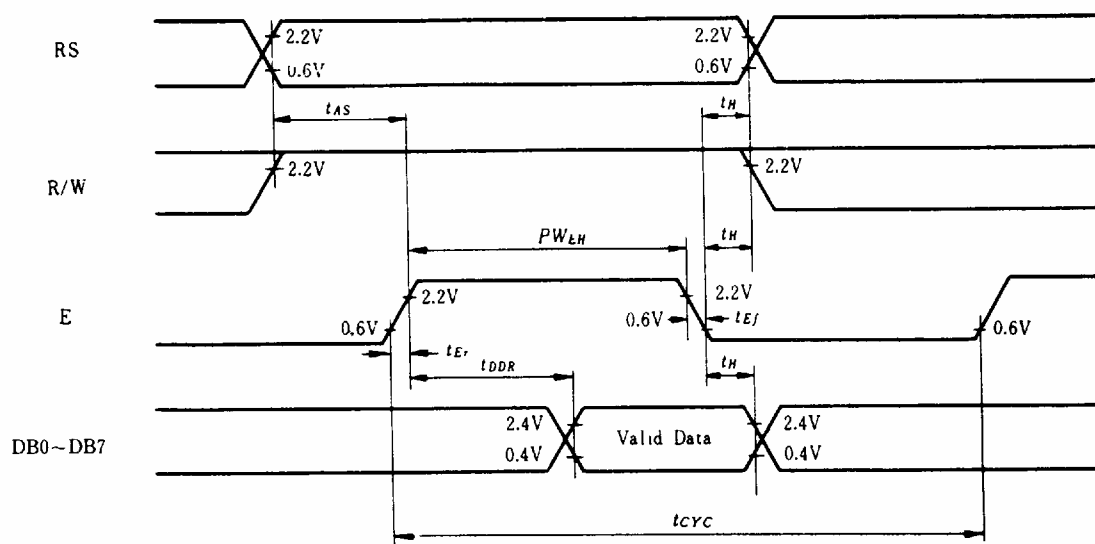


Fig. 6 Interface timing (data read)