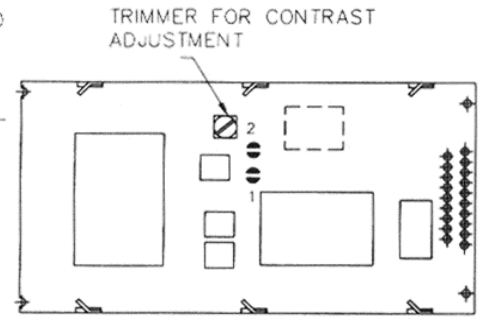
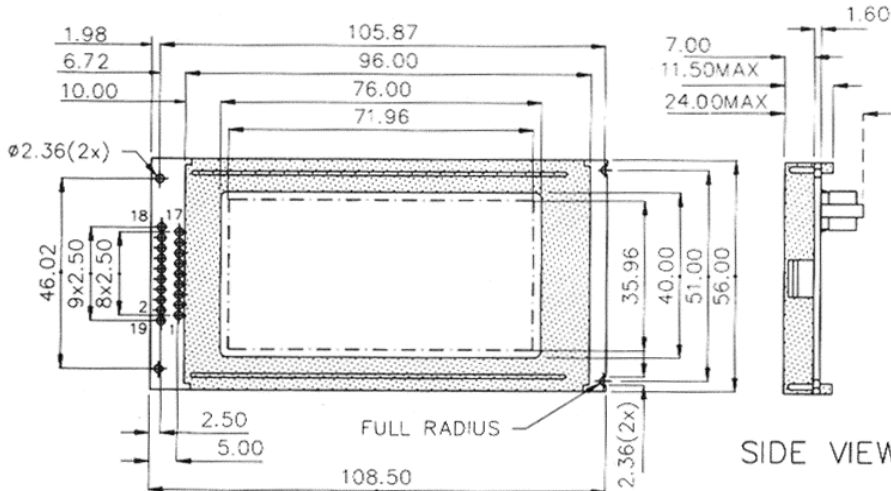


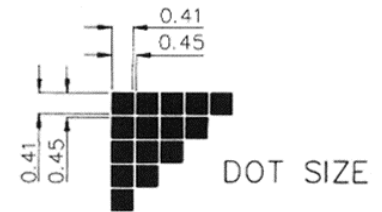
### MODULE DIMENSIONS

DIMENSIONS IN MM



BOTTOM VIEW

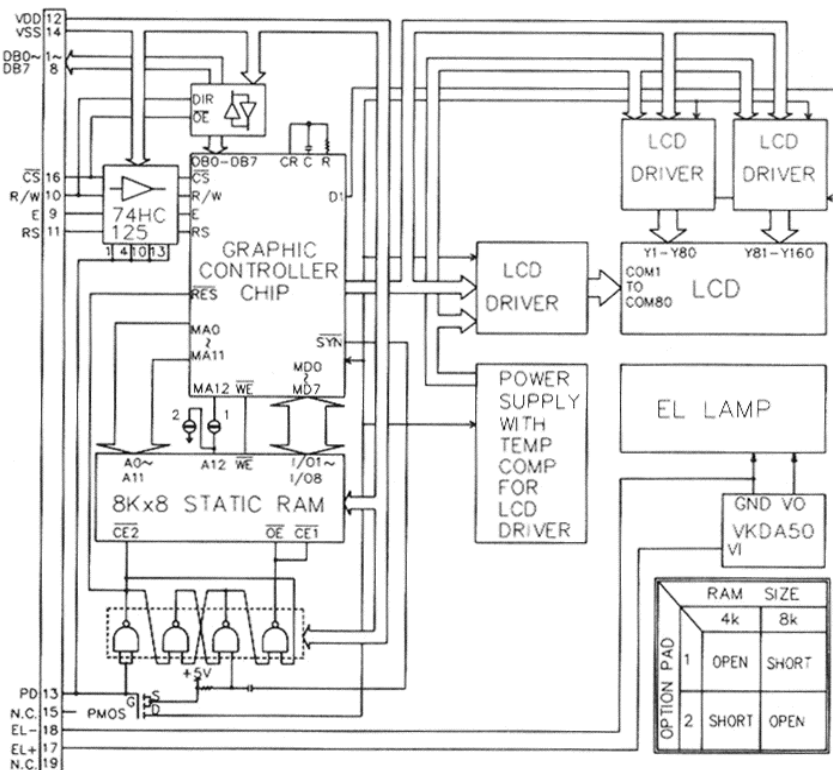
SIDE VIEW



DOT SIZE

FRONT VIEW

### BLOCK DIAGRAM



### PIN-OUT ASSIGNMENT

| PIN NO | SYMBOL  | LEVEL  | FUNCTION   |
|--------|---------|--------|--|
| 1~8    | DB7~DB0 | H/L    | 8-bit data bus   |
| 9      | E       | H, H→L | ENABLE<br>E=H...Data can be read<br>E=H→L...Data can be written  |
| 10     | R/W     | H/L    | Read/Write<br>R/W=1...Read<br>R/W=0...Write                      |
| 11     | RS      | H/L    | REGISTER SELECT<br>RS=1...Instruction<br>RS=0...Data             |
| 12     | VDD     | -      | Power supply terminal of module +5V DC.                          |
| 13     | PD      | -      | Power down input<br>PD=1...Power down mode<br>PD=0...Normal mode |
| 14     | VSS     | -      | Terminal of module ground.                                       |
| 15     | NC      | -      | No connection  |
| 16     | CS      | L      | Chip select.   |
| 17     | EL+     | +5V DC | Supply for EL driver circuitry.                                  |
| 18     | EL-     | 0V     | Terminal of EL ground  |

| OPTION PAD | RAM SIZE |       |
|------------|----------|-------|
|            | 4k       | 8k    |
| 1          | OPEN     | SHORT |
| 2          | SHORT    | OPEN  |

### ABSOLUTE MAXIMUM RATING

| NO. | PARAMETER              | SYMBOL            | MIN      | MAX      | UNIT |
|-----|------------------------|-------------------|----------|----------|------|
| 1.  | Power supply for logic | $V_{DD} - V_{SS}$ | 0        | 7.0      | V    |
| 2.  | Input voltage          | $V_i$             | $V_{SS}$ | $V_{DD}$ | V    |
| 3.  | Operating temperature  | $T_a$             | 0        | 50       | °C   |
| 4.  | Storage temperature    | $T_{stg}$         | -20      | 70       | °C   |

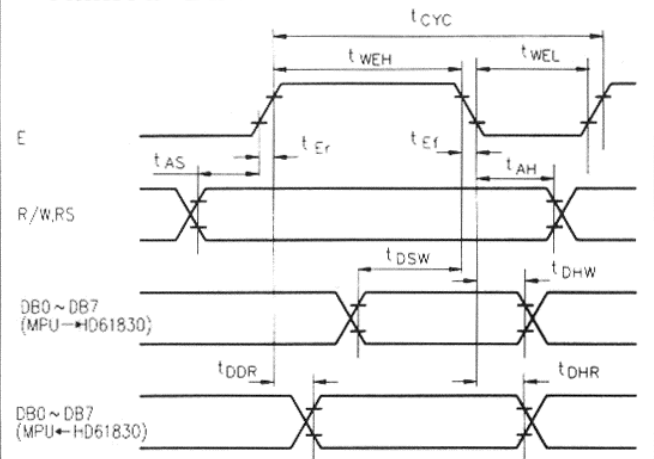
### ELECTRICAL CHARACTERISTICS (Ta = +25°C)

| NO. | PARAMETER                           | SYMBOL               | CONDITION           | MIN       | TYP | MAX  | UNIT |
|-----|-------------------------------------|----------------------|---------------------|-----------|-----|------|------|
| 1.  | Supply voltage                      | $V_{DD}$             | -                   | 4.75      | 5.0 | 5.25 | V    |
| 2.  | Supply module current - Normal mode | $I_{DD}$             | $V_{DD} = 5.0V$     | -         | 15  | 20   | mA   |
| 3.  | Module standby current              | $I_{DDSBY}$          | $P_D = 5.0V$        | -         | 1.0 | -    | mA   |
| 4.  | Input high voltage for logic        | $V_{IH}$             | $V_{DD} = 4.5V$     | 3.15      | -   | -    | V    |
| 5.  | Input low voltage for logic         | $V_{IL}$             | $V_{DD} = 4.5V$     | 0         | -   | 1.0  | V    |
| 6.  | Output high voltage for logic       | $V_{OH}$             | $-I_{OH} = -0.02mA$ | 4.4       | -   | -    | V    |
| 7.  | Output low voltage for logic        | $V_{OL}$             | $I_{OL} = 0.02mA$   | -         | -   | 1.0  | V    |
| 8.  | $P_D$ (Power down) Input voltage    | $V_{IH}$<br>$V_{IL}$ | $V_{DD} = 5.0V$     | 4.5V<br>- | -   | 0.1  | V    |
| 9.  | EL driver input voltage             | $V_{ELT}$            | -                   | -         | 5.0 | -    | V    |
| 10. | EL supply current                   | $I_{EL}$             | $EL+ = 5.0V$        | -         | 80  | 100  | mA   |

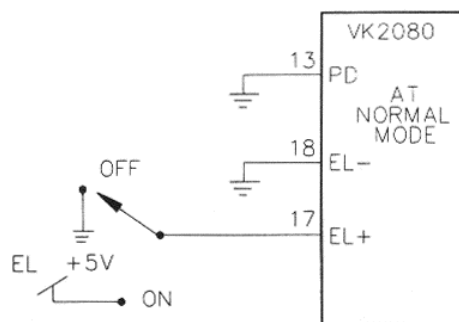
### TIMING CHARACTERISTICS

| NO. | PARAMETER              | SYMBOL    | MIN  | TYP | MAX | UNIT    |
|-----|------------------------|-----------|------|-----|-----|---------|
| 1.  | Enable cycle time      | $t_{cyc}$ | 1.0  | -   | -   | $\mu S$ |
| 2.  | Enable pulse width     | $t_{WEH}$ | 0.45 | -   | -   | $\mu S$ |
|     |                        | $t_{WEL}$ | 0.45 | -   | -   | $\mu S$ |
| 3.  | Enable raise time      | $t_{Er}$  | -    | -   | 25  | ns      |
| 4.  | Enable fall time       | $t_{Ef}$  | -    | -   | 25  | ns      |
| 5.  | Set-up time            | $t_{AS}$  | 140  | -   | -   | ns      |
| 6.  | Data set-up time       | $t_{DSW}$ | 225  | -   | -   | ns      |
| 7.  | Data delay time        | $t_{DDR}$ | -    | -   | 225 | ns      |
| 8.  | Address hold time      | $t_{AH}$  | 10   | -   | -   | ns      |
| 9.  | Data hold time (Write) | $t_{DHW}$ | 10   | -   | -   | ns      |
| 10. | Data hold time (Read)  | $t_{DHR}$ | 20   | -   | -   | ns      |

### TIMING DIAGRAM



### APPLICATION DIAGRAM



### RAM OPTION

| RAM SIZE | DISPLAY MODE         |
|----------|----------------------|
| 4K       | Character or graphic |
| 8K       | Graphic only         |

NOTE :  
Instruction set,  
PLEASE REFER TO HD61830.