

## FULLY DECODED 128K BIT MASK PROGRAMMABLE READ ONLY MEMORY

### DESCRIPTION

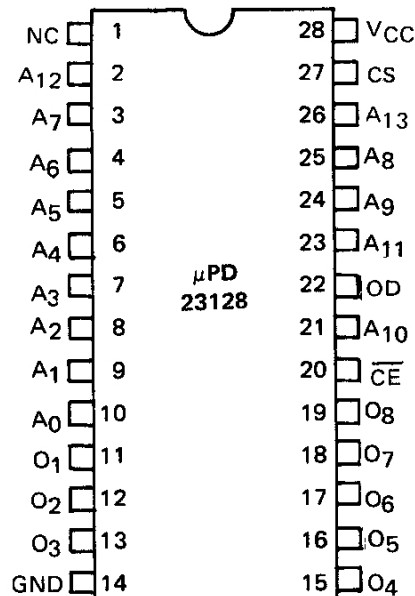
The NEC  $\mu$ PD23128 is a high speed 128K bit mask programmable Read Only Memory organized as 16,384 words by 8 bits. The  $\mu$ PD23128 is fabricated with N-channel MOS technology.

The inputs and outputs are fully TTL compatible. This device operates with a single +5V power supply. The chip select input is programmable. An active high or low level chip select input can be defined and is fixed during the masking process.

### FEATURES

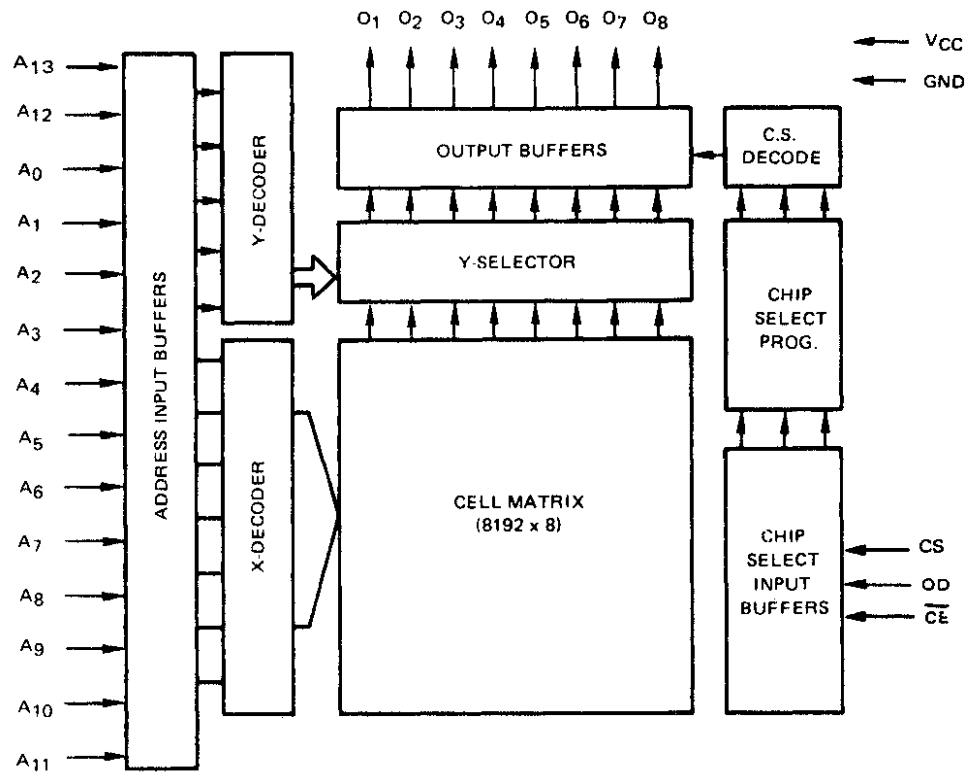
- 16,384 Words x 8 Bits Organization
- Directly TTL Compatible – All Inputs and Outputs
- Single +5V Power Supply
- High Speed – Access Time 250 ns Max.
- Three-State Output – OR-Tie Capability
- One Programmable Chip Select Input for Easy Memory Expansion
- On-Chip Address Fully Decoded
- All Inputs Protected Against Static Charge
- Pin Compatible with 2764
- Available in 28 Pin Ceramic or Plastic Dual-in-Line Package

### PIN CONFIGURATION



### PIN NAMES

|                                  |                          |
|----------------------------------|--------------------------|
| A <sub>0</sub> – A <sub>13</sub> | Address Inputs           |
| O <sub>1</sub> – O <sub>8</sub>  | Data Outputs             |
| CS                               | Programmable Chip Select |
| OD                               | Output Disable           |
| $\overline{\text{CE}}$           | Chip Enable              |



Operating Temperature . . . . .  $-10^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$   
 Storage Temperature . . . . .  $-65^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$   
 Supply Voltage On Any Pin . . . . .  $-0.5$  to  $+7.0$  Volts ①

Note: ① With Respect to Ground.

COMMENT: Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

\* $T_a = 25^{\circ}\text{C}$

$T_a = -10^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ ,  $V_{CC} = +5\text{V} \pm 10\%$ , unless otherwise specified.

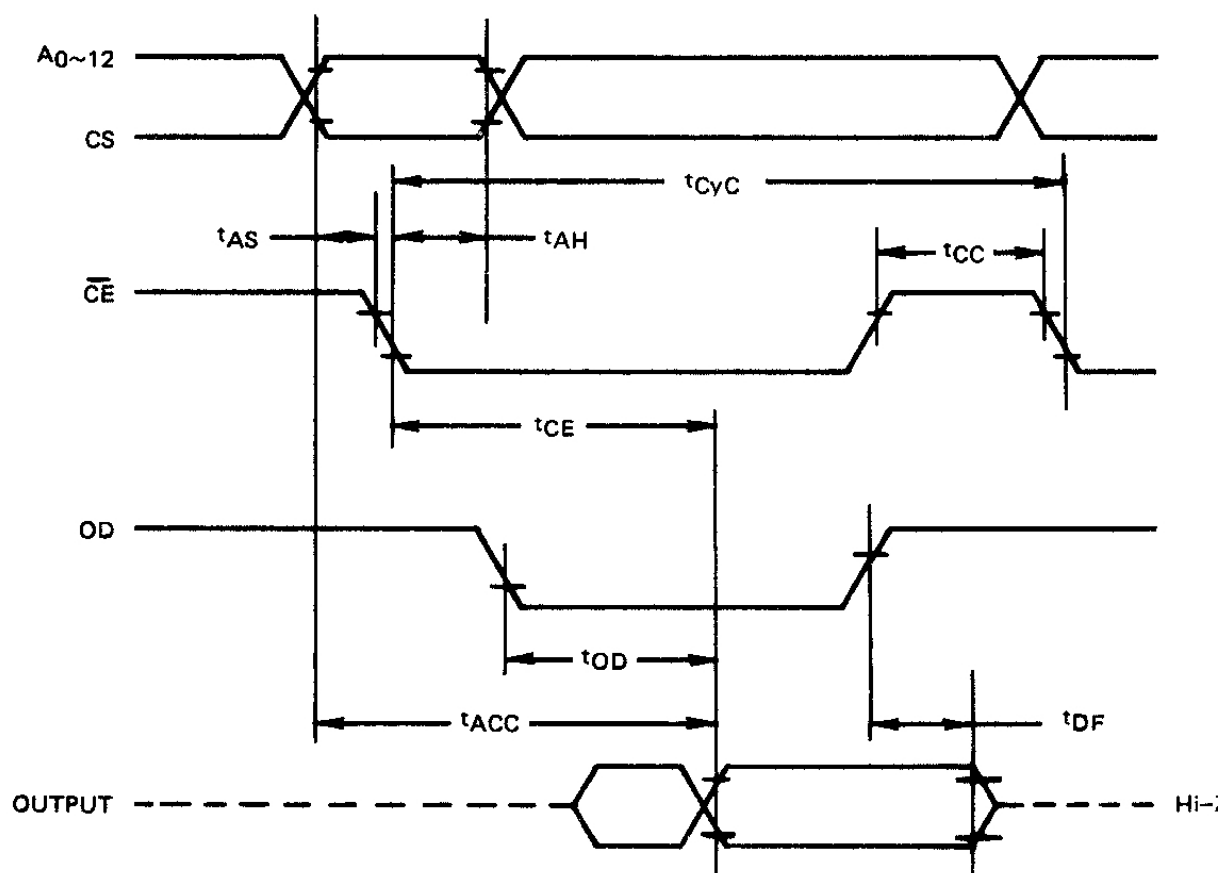
| PARAMETER                              | SYMBOL    | LIMITS |       |                        | UNIT          | TEST CONDITIONS                    |
|--|-----------|--------|-------|------------------------|---------------|------------------------------------|
|  |           | MIN    | TYP ① | MAX                    |               |                                    |
| Input Load Current<br>(All Input Pins) | $I_{LI}$  |        |       | +10                    | $\mu\text{A}$ | $V_{IN} = V_{CC}$                  |
|  |           |        |       | -10                    | $\mu\text{A}$ | $V_{IN} = 0\text{V}$               |
| Output Leakage Current                 | $I_{LOH}$ |        |       | +10                    | $\mu\text{A}$ | Chip Deselected, $V_0 = V_{CC}$    |
| Output Leakage Current                 | $I_{LOL}$ |        |       | -10                    | $\mu\text{A}$ | Chip Deselected, $V_0 = 0\text{V}$ |
| Power Supply Current                   | $I_{CC}$  |        |       | 100                    | mA            |                                    |
| Input "Low" Voltage                    | $V_{IL}$  | -0.5   |       | 0.8                    | V             |                                    |
| Input "High" Voltage                   | $V_{IH}$  | 2.0    |       | $V_{CC} + 1.0\text{V}$ | V             |                                    |
| Output "Low" Voltage                   | $V_{OL}$  |        |       | 0.45                   | V             | $I_{OL} = 2.1\text{ mA}$           |
| Output "High" Voltage                  | $V_{OH}$  | 2.2    |       |                        | V             | $I_{OH} = -400\ \mu\text{A}$       |

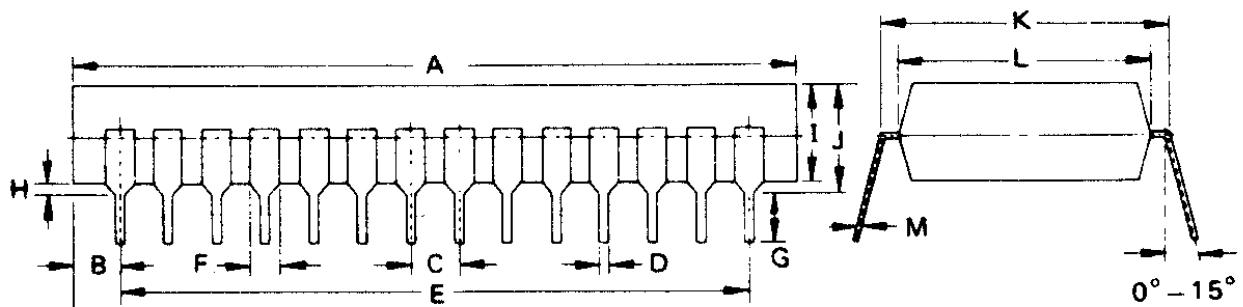
Note: ① Typical Values for  $T_a = 25^{\circ}\text{C}$  and nominal supply voltages.

T<sub>a</sub> = 25°C; f = 1 MHz

| PARAMETER          | SYMBOL           | LIMITS |     |     | UNIT | TEST CONDITIONS                                  |
|--------------------|------------------|--------|-----|-----|------|--|
|                    |                  | MIN    | TYP | MAX |      |  |
| Input Capacitance  | C <sub>IN</sub>  |        |     | 10  | pF   | All Pins Except Pin Under Test Tied to AC Ground |
| Output Capacitance | C <sub>OUT</sub> |        |     | 15  | pF   | All Pins Except Pin Under Test Tied to AC Ground |

| PARAMETER  | SYMBOL           | MIN | TYP | MAX | UNIT | TEST CONDITIONS        |
|--|------------------|-----|-----|-----|------|------------------------|
| Cycle Time                                       | t <sub>CYC</sub> | 350 |     |     | ns   |                        |
| Address Setup Time Referenced to $\overline{CE}$ | t <sub>AS</sub>  | 0   |     |     | ns   |                        |
| Address Hold Time Referenced to $\overline{CE}$  | t <sub>AH</sub>  | 50  |     |     | ns   |                        |
| $\overline{CE}$ Pulse Width                      | t <sub>CE</sub>  |     |     | 250 | ns   |                        |
| OD Pulse Width                                   | t <sub>OD</sub>  |     |     | 120 | ns   |                        |
| Access Time                                      | t <sub>ACC</sub> |     |     | 250 | ns   | t <sub>AS</sub> = 0 ns |
| $\overline{CE}$ Precharge Time                   | t <sub>CC</sub>  | 100 |     |     | ns   |                        |
| Output Turn-Off Delay                            | t <sub>DF</sub>  | 0   |     | 70  | ns   |                        |

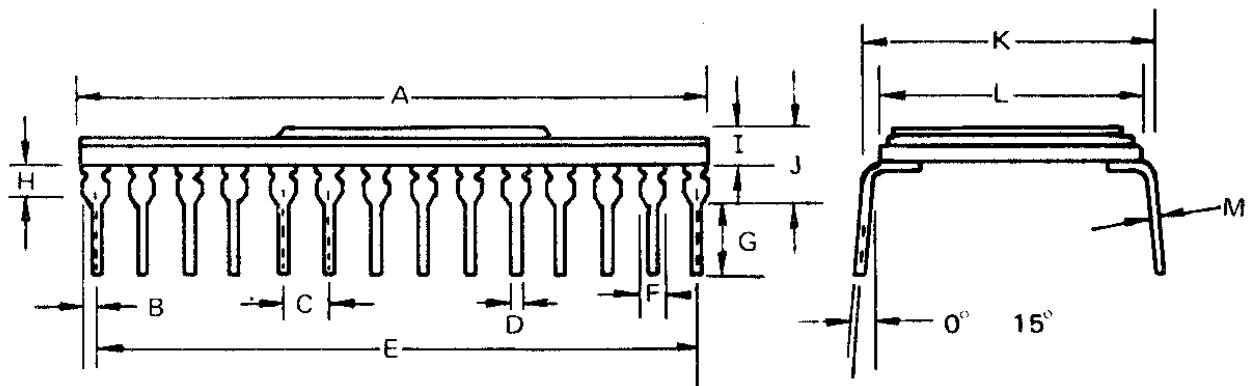




$\mu$ PD23128C

Plastic

| ITEM | MILLIMETERS            | INCHES                    |
|------|------------------------|---------------------------|
| A    | 33 MAX.                | 1.3 MAX.                  |
| B    | 2.53 MAX.              | 0.1 MAX.                  |
| C    | $2.54 \pm 0.1$         | $0.1 \pm 0.004$           |
| D    | $0.5 \pm 0.1$          | $0.02 \pm 0.004$          |
| E    | $27.94 \pm 0.1$        | $1.1 \pm 0.004$           |
| F    | 1.5 MIN.               | 0.059 MIN.                |
| G    | 2.54 MIN.              | 0.1 MIN.                  |
| H    | 0.5 MIN.               | 0.02 MIN.                 |
| I    | 5.22 MAX.              | 0.205 MAX.                |
| J    | 5.72 MAX.              | 0.225 MAX.                |
| K    | 15.24 TYP.             | 0.6 TYP.                  |
| L    | 13.2 TYP.              | 0.52 TYP.                 |
| M    | $0.25^{+0.10}_{-0.05}$ | $0.01^{+0.004}_{-0.0019}$ |



$\mu$ PD23128D

Ceramic

| ITEM | MILLIMETERS     | INCHES            |
|------|-----------------|-------------------|
| A    | 30.78 MAX.      | 1.21 MAX.         |
| B    | 1.53 MAX.       | 0.06 MAX.         |
| C    | $2.54 \pm 0.1$  | $0.10 \pm 0.004$  |
| D    | $0.46 \pm 0.8$  | $0.018 \pm 0.03$  |
| E    | $27.94 \pm 0.1$ | $1.10 \pm 0.004$  |
| F    | 1.02 MIN.       | 0.04 MIN.         |
| G    | 3.2 MIN.        | 0.13 MIN.         |
| H    | 1.02 MIN.       | 0.04 MIN.         |
| I    | 3.23 MAX.       | 0.13 MAX.         |
| J    | 4.25 MAX.       | 0.17 MAX.         |
| K    | 15.24 TYP.      | 0.60 TYP.         |
| L    | 14.93 TYP.      | 0.59 TYP.         |
| M    | $0.25 \pm 0.05$ | $0.010 \pm 0.002$ |