# GM23C8100

512K×16/1M × 8 BIT
CMOS MASK ROM

## Description

The GM23C8100 high performance read only memory is organized either as 1,048,576×8 bit (Byte Mode) or as 524,288×16 bit (Word Mode) followed by BHE mode select.
The GM23C8100 offers automatic power down controlled by the mark programmed CE or $\overline{CE}$ input. The low power feature allows the battery operation. The large size of 8M bit memory density is ideal for character generator, data or program memory in microprocessor application. This ROM is packaged in 42 pin DIP.

## Features

- Switchable organization
  - — Byte mode: 1,048,576×8 bit
  - — Word mode: 524,288×16 bit
- Single +5V Power Supply
- TTL compatible inputs and outputs
- High Speed: 200ns (Max)
- Low power consumption
  Operating: 50mA (Max.)
  Standby: 30$\mu$A (Max.)
- Byte or Word switchable by BHE pin (BHE can be switched on the fly or a DC signal)
- Polarity programmable chip enable and output enable.
- Package:
  GM23C8100: 42 Pin Plastic DIP (600mil)

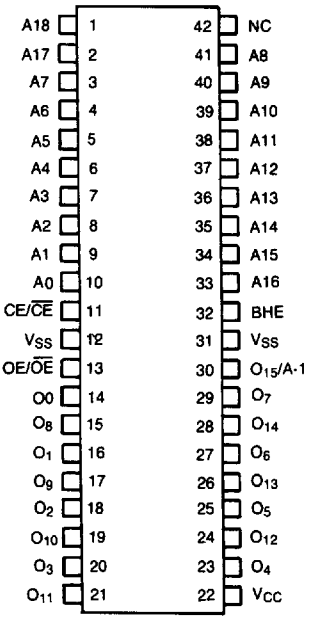
## Pin Description

| Pin | Function |
|---|---|
| A0 ~ A18 | Address Inputs |
| O0 ~ O14 | Data Outputs |
| O15/A-1 | Output Data 15 (Word mode)/ LSB Address (Byte mode) |
| BHE | Word/Byte Selection |
| CE/$\overline{CE}$* | Chip Enable |
| OE/$\overline{OE}$* | Output Enable |
| $V_{CC}$ | Supply Power (+5V) |
| $V_{SS}$ | Ground |
| NC | No Connection |

*User Selectable Polarity.

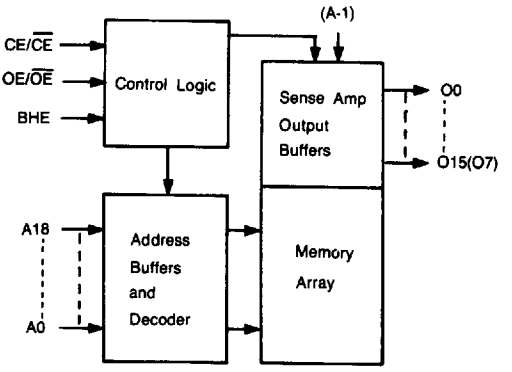
## Pin Configuration

### 42 DIP




(Top View)

## Block Diagram



## Absolute Maximum Ratings*

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $T_A$ | Ambient Operating Temperature | −10 ~ 80 | °C |
| $T_{STG}$ | Storage Temperature | −65 ~ 150 | °C |
| $V_{CC}$ | Supply Voltage to Ground Potential | −0.5 ~ 7.0 | V |
| $V_{OUT}$ | Output Voltage | −0.5 ~ $V_{CC}$ + 0.5 | V |
| $V_{IN}$ | Input Voltage | −0.5 ~ $V_{CC}$ + 0.5 | V |

***Comments**

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

## Recommended DC Operating Condition ($V_{CC}$ = 5.0V ± 10%, $T_A$ = 0 ~ 70°C)

| Symbol | Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply Voltage | 4.5 | 5.0 | 5.5 | V |
| $V_{SS}$ | Supply Voltage | 0 | 0 | 0 | V |
| $V_{IH}$ | Input High Voltage | 2.2 | — | $V_{CC}$ + 0.3 | V |
| $V_{IL}$ | Input Low Voltage | −0.3 | — | 0.8 | V |

## DC Electrical Characteristics ($V_{CC}$ = 5.0 ± 10%, $T_A$ = 0 ~ 70°C)

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{OH}$ | Output High Voltage | $I_{OH}$ = −1mA | 2.4 | | | V |
| $V_{OL}$ | Output Low Voltage | $I_{OL}$ = 3.2mA | | | 0.4 | V |
| $I_{I(L)}$ | Input Leakage Current | $V_{IN}$ = 0V to $V_{CC}$ | | | ±10 | μA |
| $I_{O(L)}$ | Output Leakage Current | $V_{OUT}$ = 0V to $V_{CC}$ | | | ±10 | μA |
| $I_{CC}$ | Operating Supply Current (f = 6.7MHz) | $\overline{CE}$ = $V_{IL}$, CE = $V_{IH}$ | | | 50 | mA |
| $I_{SB1}$ | Standby Current (TTL) | $\overline{CE}$ = $V_{IH}$, all Output Open | | | 1 | mA |
| $I_{SB2}$ | Standby Current (CMOS) | $\overline{CE}$ = $V_{CC}$, all Output Open | | | 30 | μA |

## Capacitance ($T_A$ = 25°C, f = 1.0 MHz)

| Symbol | Parameter | Condition | Min | Max | Unit |
|---|---|---|---|---|---|
| $C_I$ | Input Capacitance | $V_{IN}$ = 0V | | 10 | pF |
| $C_O$ | Output Capacitance | $V_{OUT}$ = 0V | | 10 | pF |

## Mode Selection

| Mode | CE/$\overline{CE}$ | OE/$\overline{OE}$ | BHE | 00~07 | 08~014 | 015/A-1 | Power |
|---|---|---|---|---|---|---|---|
| Standby | L/H | X | X | High Z | | High Z | Standby |
| 16 Bit Operating | H/L | H/L | H | Data Out | | | Active |
| 8 Bit Operating | | | L | Data Out (Lower 8 Bit) | High Z | L | |
| | | | | Data Out (Upper 8 Bit) | | H | |
| Output Disable | | L/H | X | High Z | | X | |

## AC Operating Characteristics ($V_{CC}=5.0\pm10\%$, $T_A=0\sim70°C$)

| Symbol | Parameter | GM23C8100-20 | | Unit |
|---|---|---|---|---|
| | | Min | Max | |
| $t_{RC}$ | Read Cycle Time | 200 | | ns |
| $t_{ACE}$ | Chip Enable Access Time | | 200 | ns |
| $t_{AA}$ | Address Access Time | | 200 | ns |
| $t_{AOE}$ | Output Enable Access Time | | 80 | ns |
| $t_{OH}$ | Output Hold From Address Change | 10 | | ns |
| $t_{OHZ}$<br>$t_{CHZ}$ | Output or Chip Disable to Output High-Z | | 70 | ns |
| $t_{OLZ}$<br>$t_{CLZ}$ | Output or Chip Enable to Output Low-Z | 10 | | ns |

## AC Test Condition

| | |
|---|---|
| Input Pulse Level | 0.4V to 2.4V |
| Input Rise and Fall Time | 10ns |
| Input and Output Timming Level | 0.8V to 2.0V |
| Output Load | See Fig. 1 |

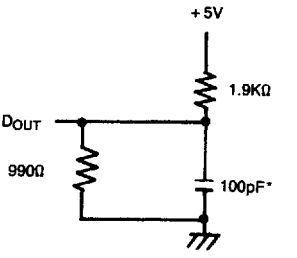
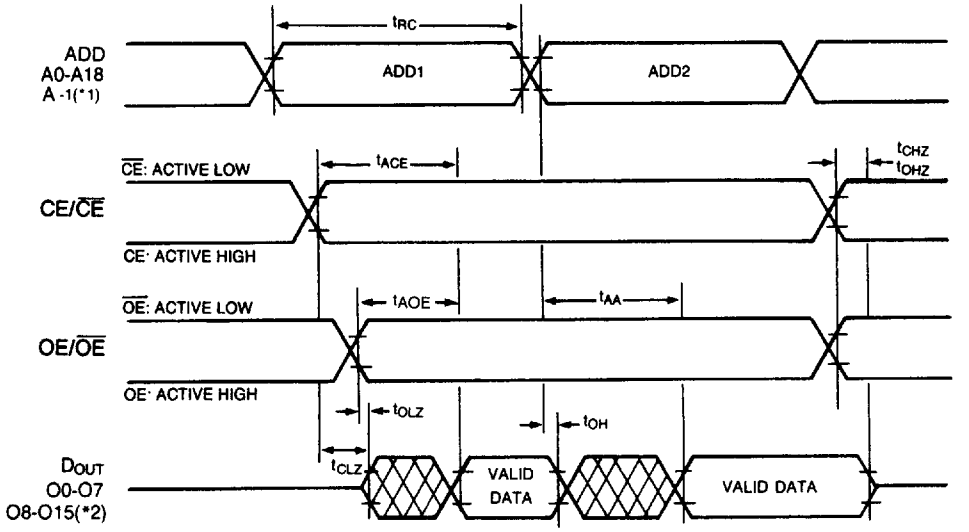



**Fig. 1 Output Load Circuit**

## TIMING WAVEFORMS

### Word Mode (BHE = $V_{IH}$)/Byte Mode (BHE = $V_{IL}$)




(*1) Byte Mode only. A-1 is Least Significant Bit Address. (BHE = $V_{IL}$)
(*2) Word Mode only. (BHE = $V_{IH}$)

## Package Dimensions

### 42 DIP

Unit: Inches (mm)