



GM23C32000FW

4M × 8/2M × 16BIT
CMOS MASK ROM

Description

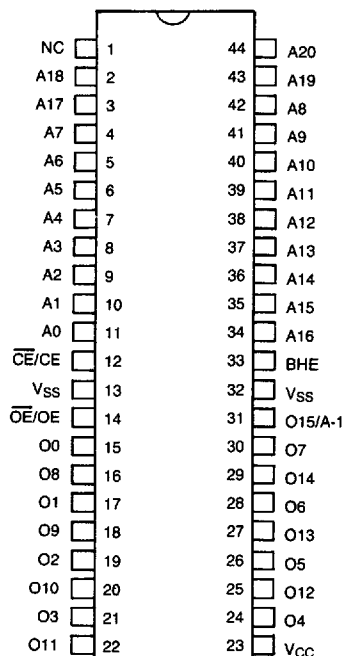
The GM23C32000FW high performance read only memory is organized either as 4,194,304 × 8 (byte mode) or 2,097,152 × 16 bits (word mode) and has an access time of 120/150 ns. It needs no external control clock to assure simple operation, because of its asynchronous operation. It is designed to be suitable for use in program memory of game machine, data memory and entertainments. The GM23C32000FW is packaged in a 44-SOP, provides polarity programmable CE and OE buffer as user option mode.

Features

- Switchable organization
 - Byte mode: 4,194,304 × 8 bit
 - Word mode: 2,097,152 × 16 bit
- Single +5V Supply
- Access Time: 120ns/150ns (Max)
- Operating current: 60mA (Max)
- Standby current: 100μA (Max)
- TTL-compatible inputs and outputs
- Programmable Chip Enable and Out Enable
- 3-state outputs for wired-OR expansion
- Fully static operation
- Package: GM23C32000FW: 44 Pin Plastic SOP (600 mil)

Pin Configuration

44 SOP



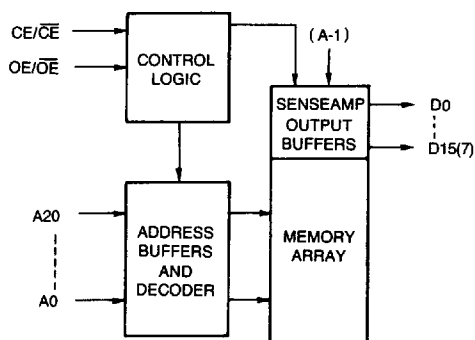
(TOP View)

Pin Description

Pin	Function
A0 ~ A20	Address Input
O0 ~ O14	Data Output
O15/A-1	Output 15 (Word Mode)/ LSB Address (Byte Mode)
$\overline{CE}/CE^*$	Chip Enable
$\overline{OE}/OE^*$	Output Enable
BHE	WORD/BYTE Selection
Vcc	Power (+5V)
Vss	GND
NC	No Connection

* User Selectable Polarity

Block Diagram



Absolute Maximum Ratings*

Symbol	Parameter	Rating	Unit
T _A	Ambient Operating Temperature	- 10 ~ 85	°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

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}			60	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			100	μA

Capacitance (T_A = 25°C, f = 1.0 MHz)

Symbol	Parameter	Condition	Min	Max	Unit
C _I	Input Capacitance	V _{IN} = 0V		8	pF
C _O	Output Capacitance	V _{OUT} = 0V		8	pF

Mode Selection

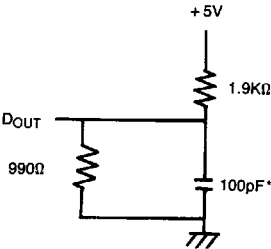
Mode	CE/ $\overline{\text{CE}}$	OE/ $\overline{\text{OE}}$	BHE	00 ~ 07	08 ~ 014	015/A-1	Power
Standby	L/H	X	X	High Z		High Z	Standby
16 Bit Operating	H/L	H/L	H	Data Out			Active
8 Bit Operating			L	Data Out (Lower 8 Bit)	High Z	L	
				Data Out (Upper 8 Bit)		H	
Output Disable		L/H	X	High Z		X	

AC Operating Characteristics (VCC = 5.0 ± 10%, TA = 0 ~ 70°C)

Symbol	Parameter	GM23C32000FW-12		GM23C32000FW-15		Unit
		Min	Max	Min	Max	
t _{RC}	Read Cycle Time	120		150		ns
t _{ACE}	Chip Enable Access Time		120		150	ns
t _{AA}	Address Access Time		120		150	ns
t _{AOE}	Output Enable Access Time		60		70	ns
t _{OH}	Output Hold From Address Change	10		10		ns
t _{OHZ} t _{CHZ}	Output or Chip Disable to Output High-Z		50		60	ns
t _{OLZ} t _{CLZ}	Output or Chip Enable to Output Low-Z	10		10		ns

AC Test Condition

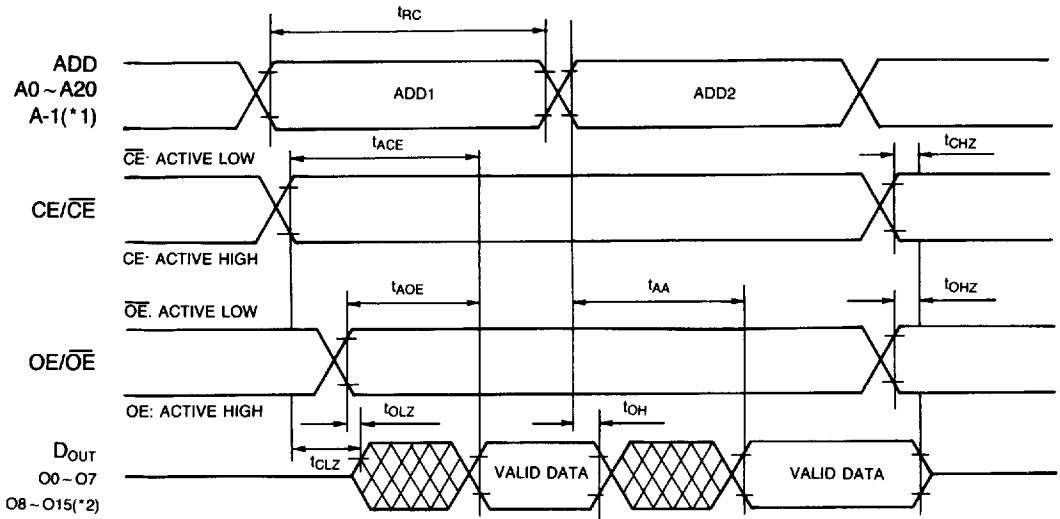
Input Pulse Level	0.4V to 2.4V
Input Rise and Fall Time	10ns
Input and Output Timing Level	0.8V to 2.0V
Output Load	See Fig. 1



* Including scope and jig.

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 Dimension

44 SOP

