GoldStar
GOLDSTAR ELECTRON CO., LTD.

GM23C16000A

2M×8/1M×16 BIT
CMOS MASK ROM

Description

The GM23C16000A high performance read only memory is organized either as 2,097,152×8 bit (Byte Mode) or as 1,048,576×16 bit (Word Mode) followed by BHE mode select. The GM23C16000A offers automatic power down controlled by the mask programmed CE or $\overline{CE}$ input. The low power feature allows the battery operation. The large size of 16M bit memory density is ideal for character generator, data or program memory in microprocessor application.

Features

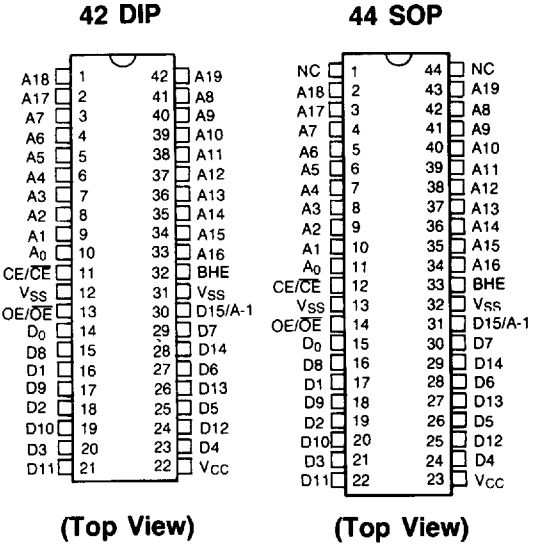
- Switchable organiztion
  - Byte mode: 2M×8 bit
  - Word mode: 1M×16 bit
- Single +5V Supply
- TTL compatible
- Access Time: 120ns/150ns/200ns (Max)
- Programmable chip enable and output enable
- Low power consumption
  - Operating: 50mA (Max.)
  - Standby: 50μA (Max.)
- Byte or Word switchable by BHE pin (BHE can be switched on the fly or a DC signal)
- Package:
  GM23C16000A: 42 Pin Plastic DIP (600 mil)
  GM23C16000AFW: 44 Pin Plastic SOP (600 mil)

Pin Description

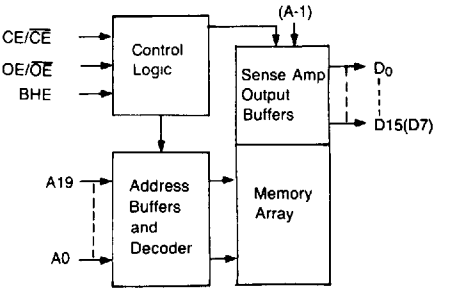
Pin	Function
A0~A19	Address Input
D0~D14	Data Output
D15/A-1	Output Data 15 (Word Mode)/ LSB Address (Byte Mode)
BHE	WORD/BYTE Selection
CE/$\overline{CE}$*	Chip Enable
OE/$\overline{OE}$*	Output Enable
V_{CC}	Power (+5V)
V_{SS}	GND
N.C.	No Connection

*User Selectable Polarity

Pin Configuration



Block Diagram



Absolute Maximum Ratings*

Symbol	Parameter	Rating	Unit
T_A	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

*Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Function operating 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 extendes periods may attect device reliability.

Recommended 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} = 5.0V ± 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}			40	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	Conditions	Min	Max	Unit
C_I	Input Capacitance	V_{IN} = 0V		10	pF
C_O	Output Capacitance	V_{OUT} = 0V		10	pF

Note: Capacitance is periodically sampled and not 100% tested.

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	GM23C16000A-12		GM23C16000A-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 Timming Level	0.8V to 2.0V
Output Load	See Fig. 1

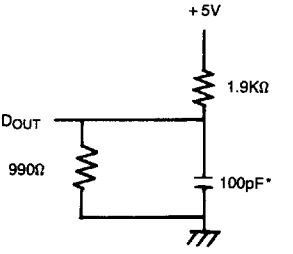
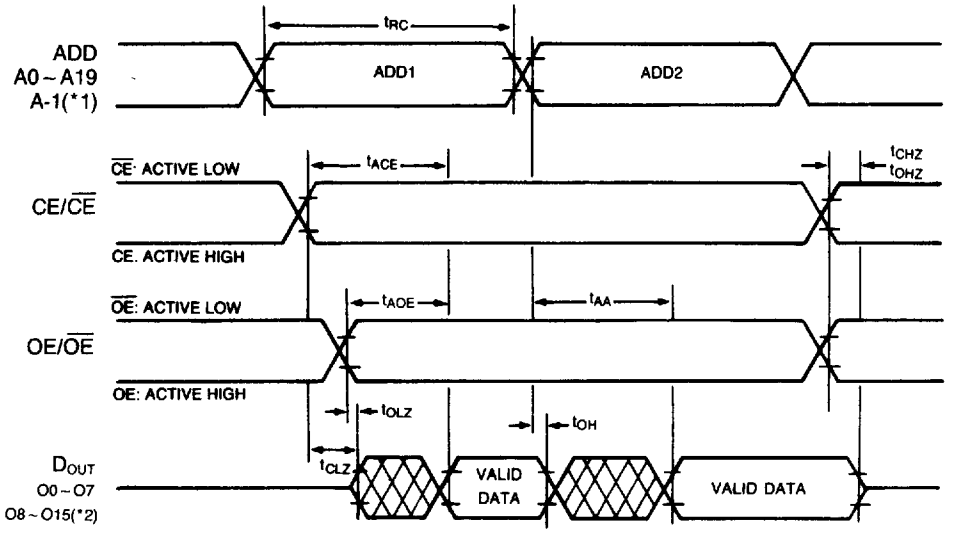


Fig. 1 Output Load Circuit

TIMING WAVEFORMS

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

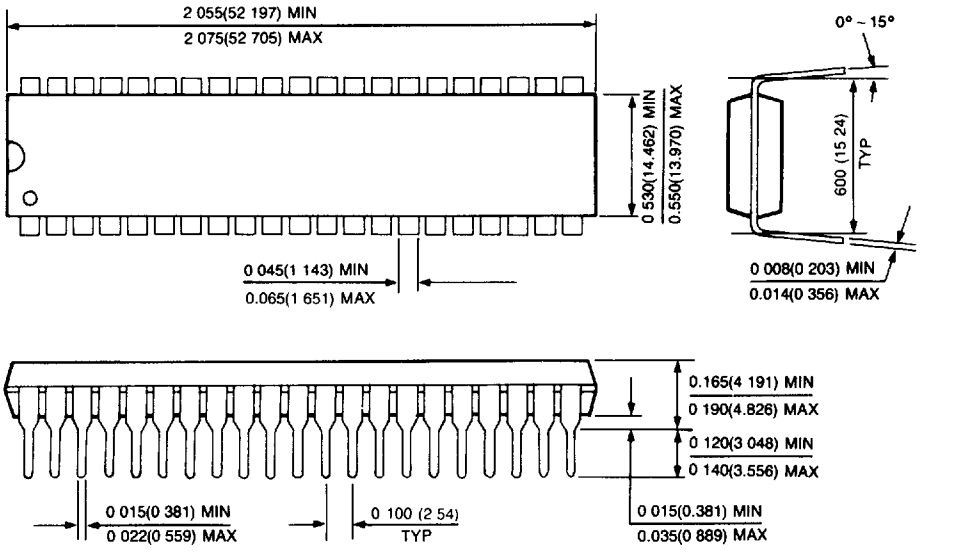


(*1) Byte Mode only. A-1 is Least Significant Bit Address. (BHE = V_{IL})
(*2) Word Mode only. (BHE = V_{IH})

Package Dimension

Unit: Inches (mm)

42 DIP



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