32M-Bit (4M x 8/2M x 16) CMOS MASK ROM

FEATURES

- **Switchable organization**
  4,194,304 x 8 (byte mode)
  2,097,152 x 16 (word mode)
- **Fast access time: 150ns (max.)**
- **Supply voltage: single +5V**
- **Current consumption**
  Operating: 60mA (max.)
  Standby: 50 μA (max.)
- **Fully static operation**
- **All inputs and outputs TTL compatible**
- **Three state outputs**
- **Polarity programmable chip enable and output enable pin**
- **Package: 44-pin, 600 mil, plastic SOP**

GENERAL DESCRIPTION

The KM23C32000G is a fully static mask programmable ROM fabricated using silicon gate CMOS process technology, and is organization either as 4,194,304 x 8 bit (byte mode) or as 2,097,152 x 16 bit (word mode) depending on BHE voltage level. (See mode selection table).

This device operates with a 5V single power supply, and all inputs and outputs are TTL compatible. Because of its asynchronous operation, it requires no external clock assuring extremely easy operation.

It is suitable for use in program memory of microprocessor, and data memory, character generator.

The KM23C32000G in a 44-SOP, provides polarity programmable CE and OE buffer as user option mode.

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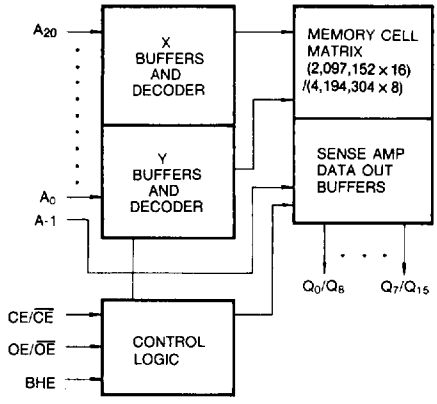
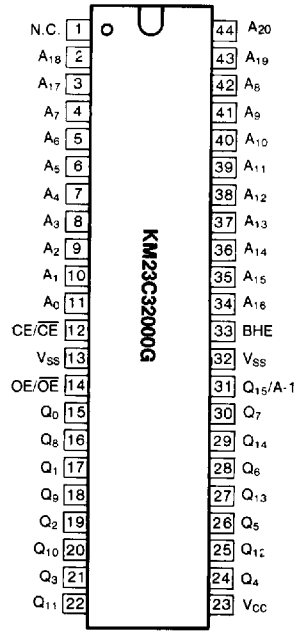
FUNCTIONAL BLOCK DIAGRAM



Pin Name	Pin Function
A_0-A_{20}	Address Inputs
Q_0-Q_{14}	Data Outputs
Q_{15}/A-1	Output 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}	Ground
N.C.	No Connection

* User Selectable Polarity

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Voltage on Any Pin Relative to V_{SS}	V_{IN}	−0.3 to +7.0	V
Temperature Under Bias	T_{bias}	−10 to + 85	°C
Storage Temperature	T_{stg}	−55 to +150	°C

* Permanent device damage may occur if "ABSOLUTE MAXIMUM RATINGS" are exceeded. Functional Operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS (Voltage reference to V_{SS}, T_A = 0 to 70°C)

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
Supply Voltage	V_{SS}	0	0	0	V

DC CHARACTERISTICS

Parameter	Symbol	Test Conditions	Min	Max	Unit
Operating Current	I_{CC}	$\overline{CE}$ = $\overline{OE}$ = V_{IL}, f = 6.7MHz all output open	—	60	mA
Standby Current (TTL)	I_{SB1}	$\overline{CE}$ = V_{IH}, all output open	—	1	mA
Standby Current (CMOS)	I_{SB2}	$\overline{CE}$ = V_{CC}, all output open	—	50	μA
Input Leakage Current	I_{LI}	V_{IN} = 0 to V_{CC}	—	10	μA
Output Leakage Current	I_{LO}	V_{OUT} = 0 to V_{CC}	—	10	μA
Input High Voltage, All Inputs	V_{IH}		2.2	V_{CC} + 0.3	V
Input Low Voltage, All Inputs	V_{IL}		−0.3	0.8	V
Output High Voltage Level	V_{OH}	I_{OH} = −400μA	2.4	—	V
Output Low Voltage Level	V_{OL}	I_{OL} = 2.1mA	—	0.4	V

CAPACITANCE (T_a = 25°C, f = 1.0MHz)

Item	Symbol	Test Conditions	Min	Max	Unit
Output Capacitance	C_{OUT}	V_{OUT} = 0V	—	12.0	pF
Input Capacitance	C_{IN}	V_{IN} = 0V	—	12.0	pF

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

MODE SELECTION

CE/$\overline{CE}$	OE/$\overline{OE}$	BHE	Q_{15}/A-1	Mode	Data	Power
L/H	X	X	X	Standby	High-Z	Standby
H/L	L/H	X	X	Operating	High-Z	Active
	H/L	H	Output	Operating	Q_0-Q_{15}: Dout	Active
		L	Input	Operating	Q_0-Q_7: Dout Q_8-Q_{14}: High-Z	Active

AC CHARCTERISTICS

(Ta=0° to +70°C, V_{CC}=5V± 10%, unless otherwise noted.)

TEST CONDITIONS

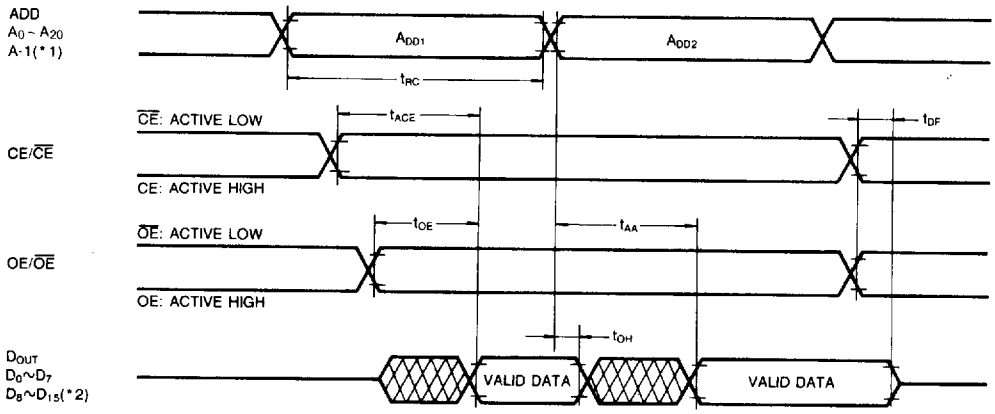
Item	Value
Input Pulse Levels	0.6V to 2.4V
Input Rise and Fall Times	10ns
Input and Output timing Levels	0.8V and 2.0V
Output Loads	1 TTL Gate and CL=100pF

READ CYCLE

Parameter	Symbol	KM23C32000G-15		KM23C32000G-20		KM23C32000G-25		Unit
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	t_{RC}	150		200		250		ns
Chip Enable Access Time	t_{ACE}		150		200		250	ns
Address Access Time	t_{AA}		150		200		250	ns
Output Enable Access Time	t_{OE}		70		90		110	ns
Output or Chip Disable to Output High-Z	t_{DF}		30		40		50	ns
Output Hold from Address Change	t_{OH}	0		0		0		ns

TIMING DIAGRAM

READ



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

* After power up, in order to prevent wrong operation of special application, dummy cycle of CE or any address input (Min. 80ns) is required.

44 LEAD SMALL OUTLINE PACKAGE (KM23C32000G)

Unit: Inches (mm)