

4M-Bit (512Kx8) CMOS MASK ROM

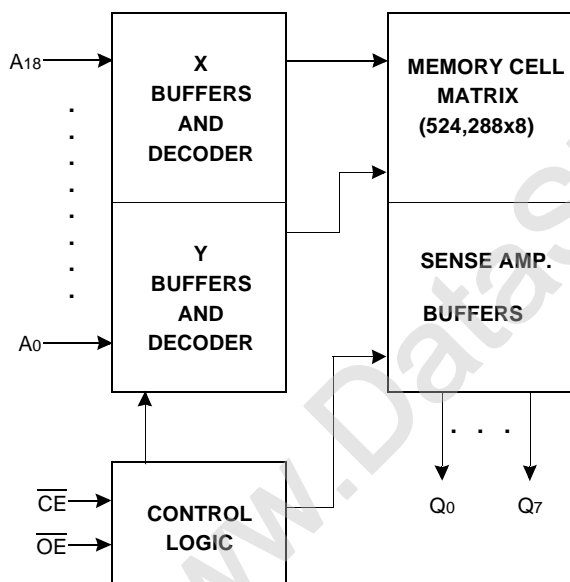
FEATURES

- 524,288 x 8 bit organization
- Fast access time
  - 3.3V Operation : 100ns(Max.)
  - 3.0V Operation : 120ns(Max.)
  - 2.5V Operation : 250ns(Max.)
- Supply voltage
  - KM23V4000D(E)TY : single +3.0V/ single +3.3V
  - KM23S4000D(E)TY : single +2.5V
- Current consumption
  - Operating : 25mA(Max.)
  - Standby : 30µA(Max.)
- Fully static operation
- All inputs and outputs TTL compatible
- Three state outputs
- Package
  - . KM23V(S)4000D(E)TY : 32-TSOP1-0820

GENERAL DESCRIPTION

The KM23V4000D(E)TY and KM23S4000D(E)TY are fully static mask programmable ROM organized 524,288 x 8 bit. It is fabricated using silicon gate CMOS process technology. This device operates with low 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 KM23V4000D(E)TY and KM23S4000D(E)TY are packaged in a 32-TSOP1.

FUNCTIONAL BLOCK DIAGRAM

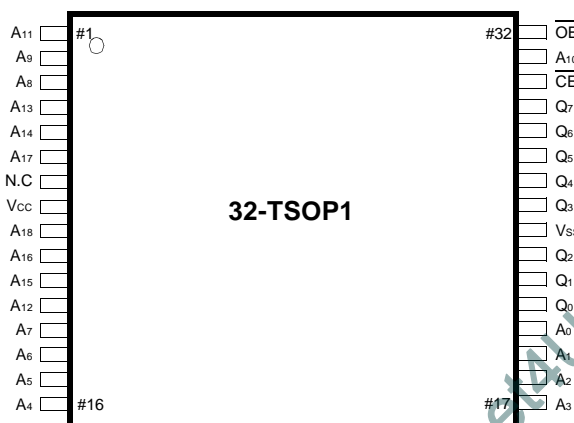


Pin Name	Pin Function
A0 - A18	Address Inputs
Q0 - Q7	Data Outputs
$\overline{CE}$	Chip Enable
$\overline{OE}$	Output Enable
Vcc	Power
Vss	Ground
N.C	No Connection

PRODUCT INFORMATION

Product	Operating Temp Range	Vcc Range (Typical)	Speed (ns)
KM23V4000DTY	0°C~70°C	3.3V/3.0V	100/120
KM23S4000DTY		2.5V	250
KM23V4000DETY	-20°C~85°C	3.3V/3.0V	100/120
KM23S4000DETY		2.5V	250

PIN CONFIGURATION



KM23V4000D(E)TY  
KM23S4000D(E)TY

**ABSOLUTE MAXIMUM RATINGS**

Item	Symbol	Rating	Unit	Remark
Voltage on Any Pin Relative to V <sub>SS</sub>	V <sub>IN</sub>	-0.3 to +4.5	V	-
Temperature Under Bias	T <sub>BIAS</sub>	-10 to +85	°C	-
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C	-
Operating Temperature	T <sub>A</sub>	0 to +70	°C	KM23V4000DTY KM23S4000DTY
		-20 to +85	°C	KM23V4000DETY KM23S4000DETY

**NOTE** : 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<sub>SS</sub>)

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	V <sub>CC</sub>	2.7/3.0	3.0/3.3	3.3/3.6	V
		2.3	2.5	2.7	V
	V <sub>SS</sub>	0	0	0	V

**DC CHARACTERISTICS**

Parameter	Symbol	Test Conditions	Min	Max	Unit	
Operating Current	I <sub>CC</sub>	$\overline{CE}=\overline{OE}=V_{IL}$ , all outputs open	V <sub>CC</sub> =3.3±0.3V	-	25	mA
			V <sub>CC</sub> =3.0±0.3V	-	20	mA
			V <sub>CC</sub> =2.5±0.2V	-	15	mA
Standby Current(TTL)	I <sub>SB1</sub>	$\overline{CE}=V_{IH}$ , all outputs open	-	500	µA	
Standby Current(CMOS)	I <sub>SB2</sub>	$\overline{CE}=V_{CC}$ , all outputs open	-	30	µA	
Input Leakage Current	I <sub>LI</sub>	V <sub>IN</sub> =0 to V <sub>CC</sub>	-	10	µA	
Output Leakage Current	I <sub>LO</sub>	V <sub>OUT</sub> =0 to V <sub>CC</sub>	-	10	µA	
Input High Voltage, All Inputs	V <sub>IH</sub>		2.0	V <sub>CC</sub> +0.3	V	
Input Low Voltage, All Inputs	V <sub>IL</sub>	KM23V4000D(E)TY	-0.3	0.6	V	
		KM23S4000D(E)TY	-0.3	0.4	V	
Output High Voltage Level	V <sub>OH</sub>	KM23V4000D(E)TY	I <sub>OH</sub> =-400µA	2.4	-	V
		KM23S4000D(E)TY	I <sub>OH</sub> =-400µA	2.0	-	V
Output Low Voltage Level	V <sub>OL</sub>	I <sub>OL</sub> =2.1mA	-	0.4	V	

**NOTE** : Minimum DC Voltage(V<sub>IL</sub>) is -0.3V on input pins. During transitions, this level may undershoot to -2.0V for periods <20ns.  
Maximum DC voltage on input pins(V<sub>IH</sub>) is V<sub>CC</sub>+0.3V which, during transitions, may overshoot to V<sub>CC</sub>+2.0V for periods <20ns.

**MODE SELECTION**

CE	OE	Mode	Data	Power
H	X	Standby	High-Z	Standby
L	H	Operating	High-Z	Active
	L	Operating	Dout	Active

## CAPACITANCE (T<sub>A</sub>=25°C, f=1.0MHz)

Item	Symbol	Test Conditions	MIN	Max	Unit
Output Capacitance	C <sub>OUT</sub>	V <sub>OUT</sub> =0V	-	10	pF
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> =0V	-	10	pF

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

## AC CHARACTERISTICS (V<sub>CC</sub>=3.3V/3.0V±0.3V / V<sub>CC</sub>=2.5V±0.2V, unless otherwise noted.)

### TEST CONDITIONS

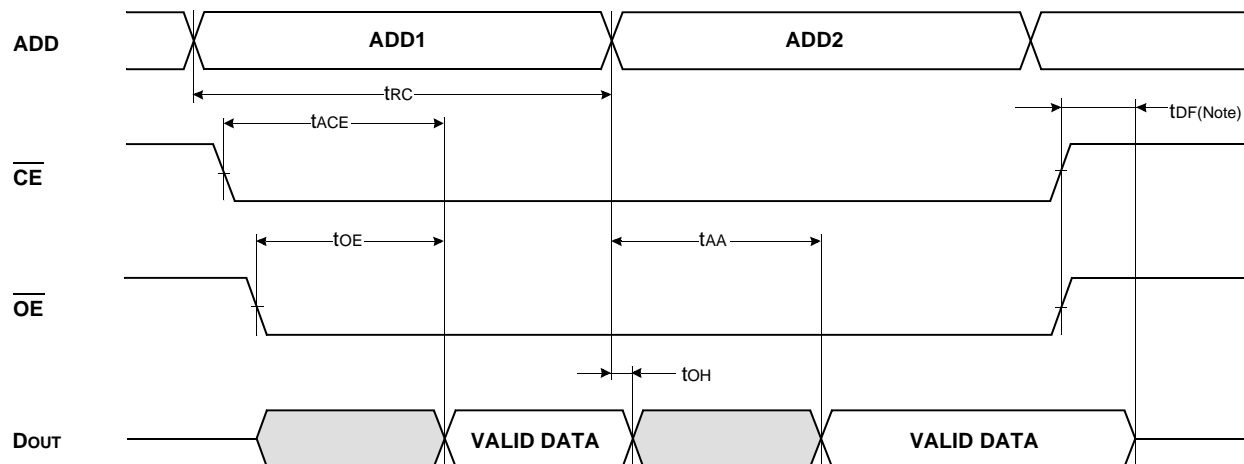
Item	Value
Input Pulse Levels	0.45V to 2.4V (at V <sub>CC</sub> =3.3V/3.0V)
	0.4V to 2.2V (at V <sub>CC</sub> =2.5V)
Input Rise and Fall Times	10ns
Input and Output timing Levels	1.5V (at V <sub>CC</sub> =3.3V/3.0V)
	1.1V (at V <sub>CC</sub> =2.5V)
Output Loads	1 TTL Gate and C <sub>L</sub> =100pF

### READ CYCLE

Item	Symbol	V <sub>CC</sub> =3.3V±0.3V		V <sub>CC</sub> =3.0V±0.3V		V <sub>CC</sub> =2.5V±0.2V		Unit
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	t <sub>RC</sub>	100		120		250		ns
Chip Enable Access Time	t <sub>ACE</sub>		100		120		250	ns
Address Access Time	t <sub>AA</sub>		100		120		250	ns
Output Enable Access Time	t <sub>OE</sub>		50		60		110	ns
Output or Chip Disable to Output High-Z	t <sub>DF</sub>		20		20		50	ns
Output Hold from Address Change	t <sub>OH</sub>	0		0		0		ns

### TIMING DIAGRAM

#### READ



NOTE : t<sub>DF</sub> is defined as the time at which the outputs achieve the open circuit condition and is not referenced to V<sub>OH</sub> or V<sub>OL</sub> level.

PACKAGE DIMENSIONS

(Unit : mm/inch)

