



# UMC

## UM23C1025-A/-B

### 131,072 × 8 BIT CMOS MASK-PROGRAMMABLE ROM

PRELIMINARY

#### Features

- 131,072 × 8-bit organization
- Single +5V power supply
- Access times: 120/150 ns (max.)
- Current: Operating: 40 mA (max.)  
Standby: 50  $\mu$ A (max.)
- 3-state outputs for wired-OR expansion
- Fully static operation
- TTL-compatible inputs and outputs
- Mask programmed for  
CE/ $\overline{CE}$  or CS/ $\overline{CS}$   
OE<sub>1</sub> or  $\overline{OE}_1$  or NC  
OE<sub>2</sub> or  $\overline{OE}_2$  or NC  
OE<sub>3</sub> or  $\overline{OE}_3$  or NC
- Available in 32 pin DIP packages

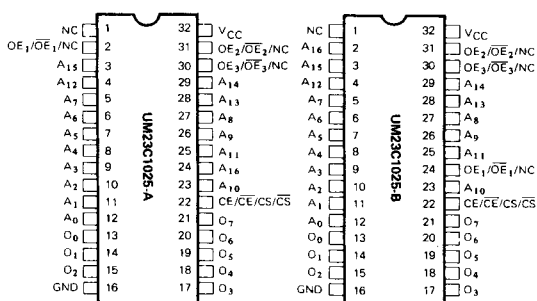
#### General Description

The UM23C1025-A/B is a 131,072 word by 8 bit EPROM-Compatible Read-Only-Memory. It is designed to be compatible with all microprocessors and similar applications where high performance large-bit storage and similar interfacing are important design considerations.

The UM23C1025-A/B offers automatic powerdown controlled by the Chip Enable CE/ $\overline{CE}$  input. When  $\overline{CE}$  goes HIGH (CE goes LOW), the device will automatically power

down and remain in a low power standby mode as long as  $\overline{CE}$  remains HIGH (CE remains LOW). This feature provides system level power savings as much as 99%. Pin 22 may also be mask programmed as CS/ $\overline{CS}$ . An additional feature of UM23C1025-A/-B is the Output Enable OE<sub>1</sub>, OE<sub>2</sub>, OE<sub>3</sub> functions (may be mask programmed as OE/ $\overline{OE}$ /NC) in order to eliminate bus contention in multiple bus microprocessor systems.

#### Pin Configurations





## Pin Description

Pin No.	Symbol	Description
3-12, 23 25-29	$A_0 - A_{15}$	Address Input
13-15, 17-21	$O_0 - O_7$	Data Output
16	GND	Ground
32	$V_{CC}$	Power Supply
1	NC	No Connection
22	$CS/\overline{CS}/CE/\overline{CE}$	Chip Select/Chip Enable Input (Note 1)
2	$OE_1/\overline{OE}_1/NC (-A)$	Output Enable 1 (Note 2)
	$A_{16} (-B)$	Address Input
24	$A_{16} (-A)$	Address Input
	$OE_1/\overline{OE}_1/NC (-B)$	Output Enable 1 (Note 2)
31	$OE_2/\overline{OE}_2/NC$	Output Enable 2 (Note 2)
30	$OE_3/\overline{OE}_3/NC$	Output Enable 3 (Note 2)

## Notes:

- (1) This pin is user-definable as active high or active low.  
 (2) NC is "No Connection".

## Absolute Maximum Ratings\*

Operating Temperature	-10 to +80°C
Storage Temperature	-65 to +150°C
Supply Voltage to Ground Potential	-0.5 to +7.0V
Output Voltage	-0.5 to $V_{CC} + 0.5V$
Input Voltage	-0.5 to $V_{CC} + 0.5V$
Power Dissipation	400 mW

## Recommended DC Operating Conditions

 $(T_A = 0^\circ\text{C to } +70^\circ\text{C})$ 

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply Voltage	4.5	5.0	5.5	V
GND	Supply Voltage	0	0	0	V
$V_{IH}$	Input High Voltage	2.2		$V_{CC} + 0.3$	V
$V_{IL}$	Input Low Voltage	-0.5		0.8	V

## \*Comments

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. 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.

DC Electrical Characteristics  $(T_A = 0^\circ\text{C to } +70^\circ\text{C}, V_{CC} = 5.0V \pm 10\%, GND = 0V)$ 

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$V_{OH}$	Output High Voltage	2.4			V	$I_{OH} = -1.0\text{ mA}$
$V_{OL}$	Output Low Voltage			0.4	V	$I_{OL} = 3.2\text{ mA}$
$V_{IH}$	Input High Voltage	2.2		$V_{CC} + 0.3$	V	
$V_{IL}$	Input Low Voltage	-0.5		0.8	V	
$ I_{LI} $	Input Leakage Current			10	$\mu\text{A}$	$V_{IN} = 0V\text{ to } V_{CC}$
$ I_{LO} $	Output Leakage Current			10	$\mu\text{A}$	$V_{OUT} = 0V\text{ to } V_{CC}$



## DC Electrical Characteristics (Continued)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$I_{CC}$	Operating Supply Current			40	mA	$\overline{CE}/\overline{CS} = V_{IL}$ $CE/CS = V_{IH}$
$I_{SB}$	Standby Supply Current			1.5	mA	$\overline{CE} = V_{IH}$ $CE = V_{IL}$
$I_{SB1}$	Standby Supply Current			50	$\mu A$	$\overline{CE} = V_{CC} - 0.2V$ $CE = 0.2V$

## Capacitance:

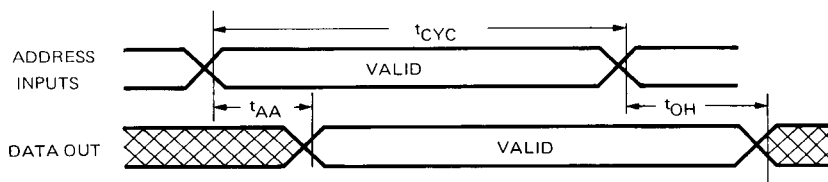
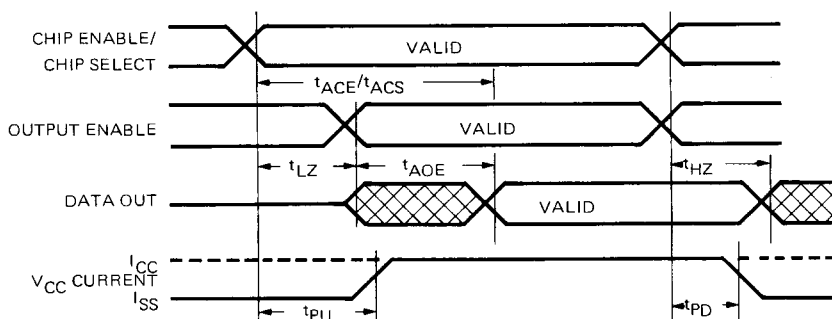
Symbol	Parameter	Min.	Max.	Unit	Test Conditions
$C_I^*$	Input Capacitance		10	pF	$T_A = 25^\circ C$ $f = 1.0 \text{ MHz}$
$C_O^*$	Output Capacitance		10	pF	

\*This parameter is periodically sampled and is not 100% tested. All pins except pin under test tied to AC ground.

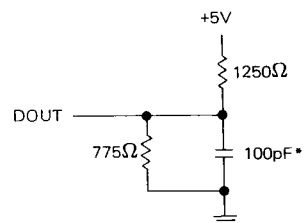
AC Characteristics ( $T_A = 0^\circ C$  to  $+70^\circ C$ ,  $V_{CC} = 5.0V \pm 10\%$ ,  $GND = 0V$ )

Symbol	Parameter	UM23C1025-A/-B/-12		UM23C1025-A/-B/-15		Unit
		Min.	Max.	Min.	Max.	
$t_{CYC}$	Cycle Time	120		150		ns
$t_{AA}$	Address Access Time		120		150	ns
$t_{ACE}$	Chip Enable Access Time		120		150	ns
$t_{ACS}$	Chip Select Access Time		85		100	ns
$t_{AOE}$	Output Enable Access Time		60		90	ns
$t_{OH}$	Output Hold After Address Change	10		10		ns
$t_{LZ}$	Output Low Z Delay	10		10		ns
$t_{HZ}$	Output High Z Delay*		50		50	ns
$t_{PU}$	Power-Up Time	0		0		ns
$t_{PD}$	Power-Down Time		50		50	ns

\* $t_{HZ}$  is specified from either OE/ $\overline{OE}$  or CE/ $\overline{CE}$  going disabled or CS/ $\overline{CS}$  going inactive, whichever occurs first.

**Timing Waveforms****Propagation Delay From Address ( $\overline{CE}/\overline{CE}$  going enabled or  $\overline{CS}/\overline{CS}$  going active)****Propagation Delay From Chip Enable or Chip Select or Output Enable (Address Valid)****AC Test Conditions**

Input Pulse Levels	0.4 – 2.4V
Input Rise and Fall Time	10 ns
Timing Measurement Reference Level	$V_{IL} = 0.8V$ $V_{IH} = 2.2V$
	$V_{OL} = 0.8V$ $V_{OH} = 2.0V$
Output Load	See Fig. 1



\*Including scope and jig

**Fig. 1 Output Load Circuit**



## Functions

Truth Table (UM23C1025-A)

CE	OE <sub>1</sub> (Pin 2)	OE <sub>2</sub>	OE <sub>3</sub>	O <sub>0</sub> – O <sub>7</sub>	Mode
A	A	A	A	Output Data	Read
I	X	X	X	HI – Z	Power Down
A	I	X	X	HI – Z	Output Disable
A	X	I	X	HI – Z	Output Disable
A	X	X	I	HI – Z	Output Disable

Truth Table (UM23C1025-B)

CE	OE <sub>1</sub> (Pin 24)	OE <sub>2</sub>	OE <sub>3</sub>	O <sub>0</sub> – O <sub>7</sub>	Mode
A	A	A	A	Output Data	Read
I	X	X	X	HI – Z	Power Down
A	I	X	X	HI – Z	Output Disable
A	X	I	X	HI – Z	Output Disable
A	X	X	I	HI – Z	Output Disable

1.  $\overline{CE}/\overline{CE}$ ,  $\overline{OE_1}/\overline{OE_1}/NC$ ,  $\overline{OE_2}/\overline{OE_2}/NC$ ,  $\overline{OE_3}/\overline{OE_3}/NC$  are mask programmable which can be selected for active low, active high or no connection.
2. "A" means "Active." "I" means "Inactive." "X" means "Active" or "Inactive."
3. If  $\overline{OE}/\overline{OE}/NC$  is set to no-connection, the input level will be internally fixed at active level.

## Ordering Information

Part No.	Access Time (ns)	Operating Current Max. (mA)	Standby Current Max. (mA)	Package
*UM23C1025-A/-12	120	40	0.05	32L DIP
*UM23C1025-A/-15	150	40	0.05	32L DIP
UM23C1025-B/-12	120	40	0.05	32L DIP
UM23C1025-B/-15	150	40	0.05	32L DIP

\*The UM23C1025-A is EPROM-compatible.