

UM23C4100

PRELIMINARY

262,144 X 16/524,288 X 8 BIT CMOS MASK ROM

Features

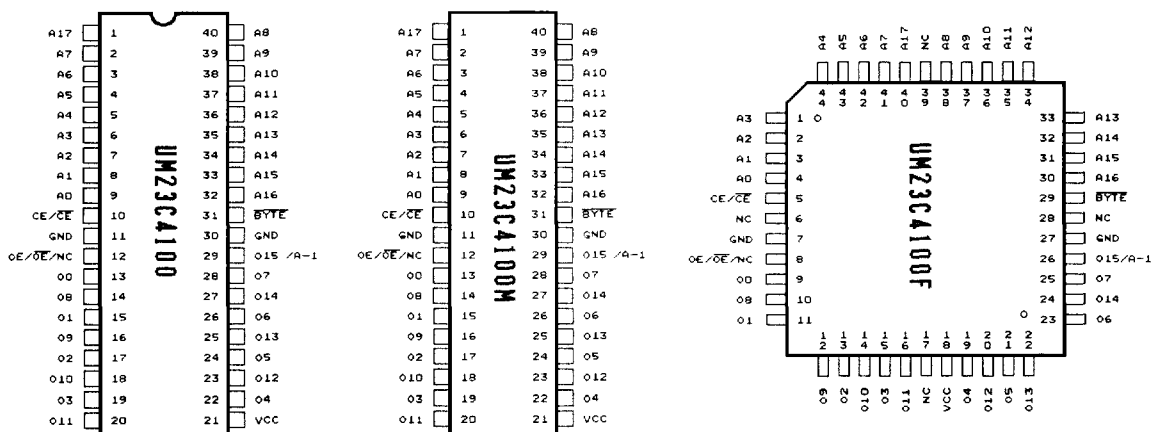
- 262,144 x 16-bit/524,288x 8-bit organization
- Single +5V power supply
- Access times: 100/120 ns (max.)
- Current: Operating: 60mA (max.)
Standby: 100 μ A (max.)
- Three-state outputs for wired -OR expansion
- Mask Programmed for Chip Enable (Power-down) $\overline{\text{CE}}$ / $\overline{\text{OE}}$ and Output Enable $\overline{\text{OE}}$ / $\overline{\text{OE}}$ / NC
- Full static operation
- TTL- compatible inputs and outputs
- Available in 40-pin DIP, 40-pin SOP or 44-pin QFP packages

General Description

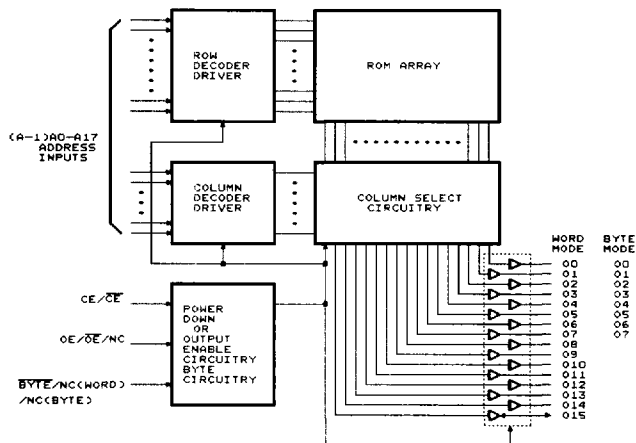
The UM23C4100 high-performance Read Only Memory is configured either 524,288 x 8 bits or 262,144 x 16 bits. It is designed to be compatible with all microprocessors and similar applications where high-performance, large-bit storage, and simple interfacing are important design considerations.

The UM23C4100 offers automatic power-down controlled by the Chip Enable $\overline{\text{CE}}$ / $\overline{\text{OE}}$ input. When $\overline{\text{CE}}$ / $\overline{\text{OE}}$ goes low/high, the device will automatically power-down and remain in a low power standby mode as long as $\overline{\text{CE}}$ / $\overline{\text{OE}}$ remains low/high. Pin 12 (QFP, Pin 8) may be mask programmed as $\overline{\text{OE}}$ / $\overline{\text{OE}}$ / NC (active high or low or no connection) in order to eliminate bus contention in multiple bus microprocessor systems.

Pin Configurations



Block Diagram



Pin Description (for DIP-40 and SOP-40)

Pin No.	Symbol	Description	Note
1 - 9, 32 - 40	A0 - A17	Address Input	
13 - 20, 22 - 28	O0 - O14	Data Output	
29	O15/A-1	Output 15 (Word mode)/LSB Address (BYTE mode)	
11, 30	GND	Ground	
21	VCC	Power Supply	
10	CE/ $\overline{\text{CE}}$	Chip Enable	1
12	OE/ $\overline{\text{OE}}$ /NC	Output Enable	2
31	$\overline{\text{BYTE}}$	Word/Byte Selection	3

Pin Description (for QFP-44)

Pin No.	Symbol	Description	Note
1 - 4, 30 - 38, 40 - 44	A0 - A17	Address Input	
9 - 16, 19 - 25,	O0 - O14	Data Output	
26	O15/A-1	Output 15 (Word mode)/LSB Address (byte mode)	
7, 27	GND	Ground	
6, 17, 28, 39	NC	No Connection	
18	VCC	Power Supply	
5	CE/ $\overline{\text{CE}}$	Chip Enable	1
8	OE/ $\overline{\text{OE}}$ /NC	Output Enable	2
29	$\overline{\text{BYTE}}$	Word/Byte Selection	3

Notes:

1. This pin is user-definable as active low or active high.
2. This pin is user-definable as active low, active high, or no connection.
3. See Function Table.

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

Symbol	Parameter	Min.	Max.	Unit
VCC	Supply Voltage	4.5	5.5	V
GND	Ground	0	0	V
V _{IH}	Input High Voltage	2.2	VCC + 0.3	V
V _{IL}	Input Low Voltage	-0.5	0.8	V

Absolute Maximum Ratings*

Ambient Operating Temperature -10 to $+80^{\circ}\text{C}$
 Storage Temperature -65 to $+150^{\circ}\text{C}$
 Supply Voltage to Ground Potential -0.5 to 7.0V
 Output Voltage -0.5 to VCC + 0.5
 Input Voltage -0.5 to VCC + 0.5
 Power Dissipation 400mW

***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.

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

Symbol	Parameter	Min.	Max.	Unit	Conditions	Note
V _{OH}	Output HIGH Voltage	2.4		V	I _{OH} = -1.0mA	
V _{OL}	Output LOW Voltage		0.4	V	I _{OL} = 3.2mA	
V _{IH}	Input HIGH Voltage	2.2	VCC + 0.3	V		
V _{IL}	Input LOW Voltage	-0.5	0.8	V		
I _{LI}	Input Leakage Current		10	μA	V _{IN} = 0V to VCC	
I _{LO}	Output Leakage Current		10	μA	V _{OUT} = 0V to VCC	1
I _{CC}	Operating Supply Current		60	mA	T _{cyc} = min.	2
I _{SB}	Standby Supply Current		1.5	mA	$\overline{\text{CE}} = \text{V}_{\text{IH}}$, CE = V _{IL}	
I _{SB1}	Standby Supply Current		100	μA	CE = VCC - 0.2V , CE = 0.2V	

Capacitance :

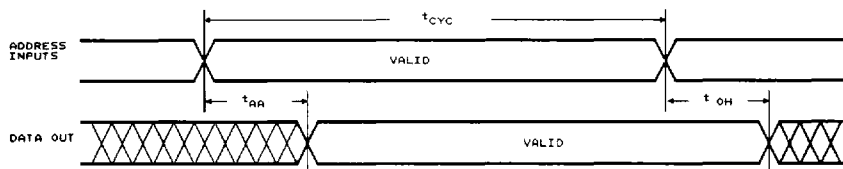
Symbol	Parameter	Min.	Max.	Unit	Conditions	Note
C _I	Input Capacitance		10	pF	T _A = 25°C f = 1.0MHz	3
C _O	Output Capacitance		10	pF		

AC Characteristics (T_A = 0°C to +70°C, V_{CC} = 5.0V ± 10%, GND = 0V)

Symbol	Parameter	100ns		120ns		Unit	Note
		Min.	Max.	Min.	Max.		
t _{CYC}	Cycle Time	100		120		ns	
t _{AA}	Address Access Time		100		120	ns	
t _{ACE}	Chip Enable Access Time		100		120	ns	
t _{AOE}	Output Enable Access Time		50		60	ns	
t _{OH}	Output Hold after Address Change	10		10		ns	
t _{LZ}	Output LOW Z Delay	10		10		ns	4, 6
t _{HZ}	Output HIGH Z Delay		20		25	ns	5, 6

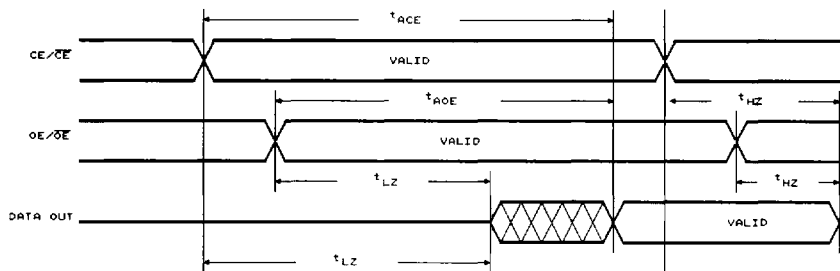
Notes :

1. OE/CE = V_{IL}, $\overline{\text{OE}} / \overline{\text{CE}} = \text{V}_{\text{IH}}$ (Output is unloaded)
2. V_{IN} = V_{IH} / V_{IL}, but OE/CE = V_{IH}, $\overline{\text{OE}} / \overline{\text{CE}} = \text{V}_{\text{IL}}$ (Output is unloaded)
3. This parameter is periodically sampled and is not 100% tested. All pins, except pins under test, are tied to ACground.
4. Output LOW impedance delay (t_{LZ}) is measured from CE / $\overline{\text{CE}}$ or OE / $\overline{\text{OE}}$ going active.
5. Output HIGH impedance delay (t_{HZ}) is measured from CE / $\overline{\text{CE}}$ or OE / $\overline{\text{OE}}$ going inactive.
6. This parameter is sampled and not 100% tested.

Timing Waveforms
Propagation Delay From Address (CE / $\overline{\text{CE}}$ = Active, OE / $\overline{\text{OE}}$ = Active)


Timing Waveforms (continued)

Propagation Delay From Chip Enable, or Output Enable (Address Valid)



AC Test Conditions (For 100/120ns)

Input Pulse Levels	0.4V - 2.4V
Input Rise and Fall Times	10 ns
Timing Measurement Reference Level	$V_{IL} = 0.8V$ $V_{IH} = 2.2V$ $V_{OL} = 0.8V$ $V_{OH} = 2.0V$
Output Load	1 TTL gate and $C_L = 100pF$

Function Table

CE / $\overline{CE}$	OE / $\overline{OE}$ / NC	BYTE	O15/A-1	O0 - O7	O8 - O15	Mode
A	A	H	Data pin O15	Data out	Data out	Word
A	A	L	LSB address A-1	Data out	Hi - Z	Byte
I	X	X	X	Hi - Z	Hi - Z	Power-Down
A	I	X	X	Hi - Z	Hi - Z	Output Disable

Note: 1. CE / $\overline{CE}$ and OE / $\overline{OE}$ / NC are mask programmable as either active low, active high, or no connection.
2. "A" means "Active," "I" means "Inactive," "X" means "Disregard."



UM23C4100

Ordering Information

Part No.	Access Time (ns)	Package
UM23C4100	100/120	40L DIP
UM23C4100M	100/120	40L SOP
UM23C4100F	100/120	44L QFP

