μPD23C4000
4,194,304-Bit
Mask-Programmable CMOS ROM

Description

The μPD23C4000 is a 4,194,304-bit ROM fabricated with CMOS silicon-gate technology. The device is static in operation and has three-state outputs, fully TTL-compatible inputs and outputs, and an output enable pin which is mask-programmable and can be specified as active low, active high, or don't care.

The μPD23C4000 can be hardware-configured as either 256K x 16 bits or as 512K x 8 bits by tying the WORD/$\overline{\text{BYTE}}$ pin high or low, respectively. In the word configuration, pins O_0-O_{15} are active. In the byte configuration, pin O_{15}/A_{-1} becomes the additional bit required to address 512K bytes.

The μPD23C4000 is available in a 40-pin plastic DIP and a 64-pin plastic QFP.

Features

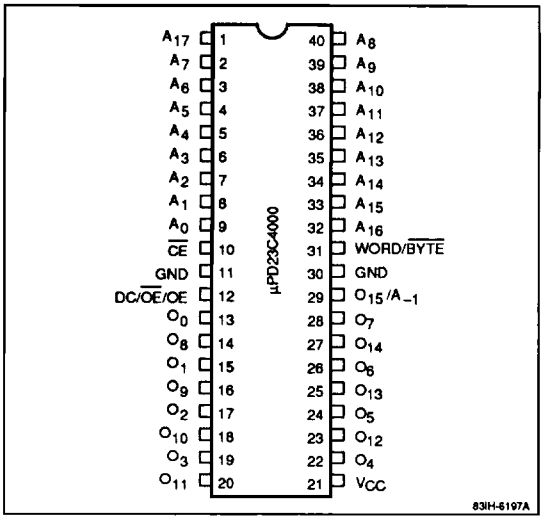
- Programmable organization
  - 262,144 words by 16 bits (word)
  - 524,288 words by 8 bits (byte)
- Fast access time of 250 ns maximum
- TTL-compatible inputs and outputs
- Three-state outputs
- Single +5-volt power supply
- CMOS technology
- Fully static operation
- Low power dissipation
- 40-pin plastic DIP or 64-pin plastic QFP packaging

Ordering Information

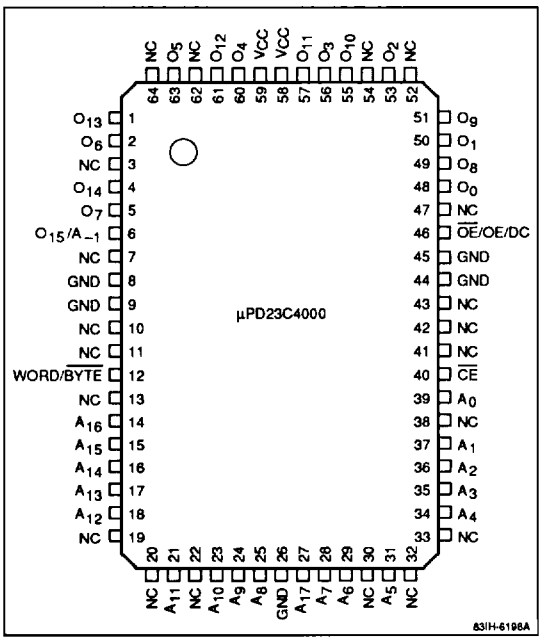
Part Number	Access Time (max)	Package
μPD23C4000C	250 ns	40-pin plastic DIP
μPD23C4000GF	250 ns	64-pin plastic QFP

Pin Configurations

40-Pin Plastic DIP



64-Pin Plastic QFP



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Pin Identification

Symbol	Function
A_0 - A_{17}	Address inputs
O_0 - O_{14}	Outputs
O_{15}/A_{-1}	Output 15 (word)/LSB address (byte)
$\overline{CE}$	Chip enable
$\overline{OE}$/OE/DC	Output enable (Note 1)
Word/$\overline{BYTE}$	Word/byte select input
GND	Ground
V_{CC}	+5-volt power supply
NC	No connection

Notes:

(1) This pin is user definable as active low, active high, or "don't care."

Capacitance

T_A = 25°C; f = 1 MHz

Parameter	Symbol	Min	Typ	Max	Unit
Input capacitance	C_I			15	pF
Output capacitance	C_O			15	pF

Absolute Maximum Ratings

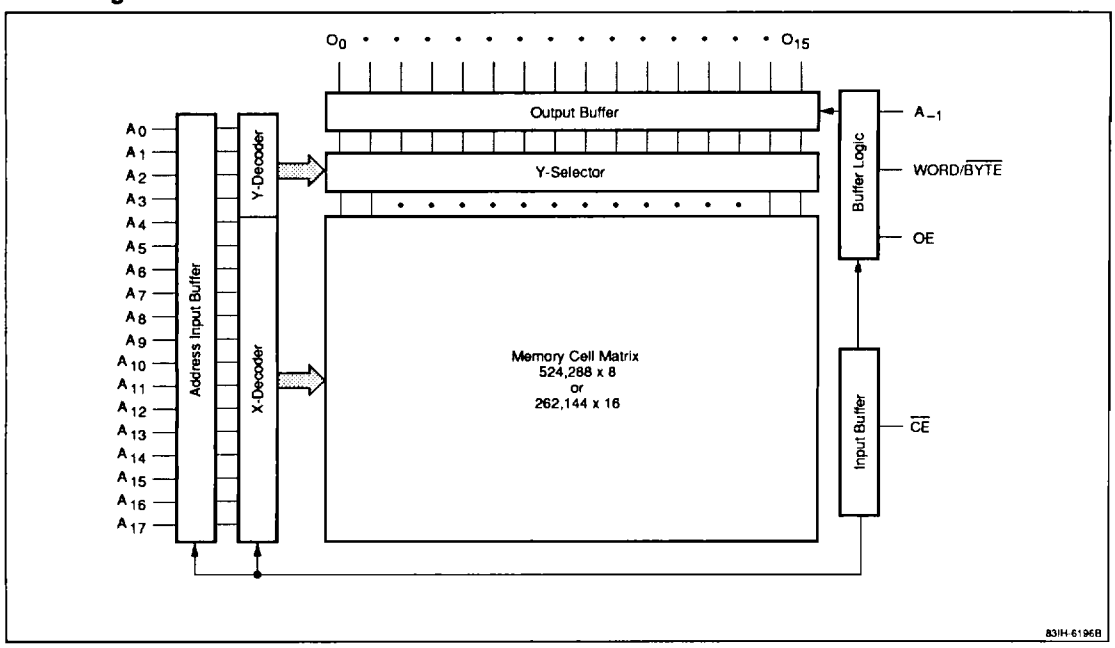
Supply voltage, V_{CC}	−0.3 to +7.0 V
Input voltage, V_I	−0.3 V to V_{CC} + 0.3 V
Output voltage, V_O	−0.3 V to V_{CC} + 0.3 V
Operating temperature, T_{OPR}	−10 to +70°C
Storage temperature, T_{STG}	−65 to +150°C

Exposure to Absolute Maximum Ratings for extended periods may affect device reliability; exceeding the ratings could cause permanent damage. The device should be operated within the limits specified under DC and AC Characteristics.

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Input voltage, high	V_{IH}	2.2		V_{CC} + 0.3	V
Input voltage, low	V_{IL}	−0.3		0.8	V
Supply voltage	V_{CC}	4.5	5.0	5.5	V
Ambient temperature	T_A	−10		70	°C

Block Diagram



DC Characteristics

T_A = −10 to +70°C; V_{CC} = +5.0 V ±10%

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage, high	V_{OH}	2.4			V	I_{OH} = −400 μA
Output voltage, low	V_{OL}			0.4	V	I_{OL} = +2.5 mA
Input leakage current	I_{LI}	−10		10	μA	V_I = 0 V to V_{CC}
Output leakage current	I_{LOH}	−10		10	μA	V_O = 0 V to V_{CC}; chip deselected
Power supply current	I_{CC1}			50	mA	$\overline{CE}$ = V_{IL}
	I_{CC2}			1.5	mA	$\overline{CE}$ = V_{IH}; chip deselected
	I_{CC3}			100	μA	$\overline{CE}$ ≥ V_{CC} − 0.2 V; chip deselected

AC Characteristics

T_A = −10 to +70°C; V_{CC} = +5.0 V ±10%

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Address access time	t_{ACC}			250	ns	
Chip enable access time	t_{CE}			250	ns	
Output enable access time	t_{OE}			110	ns	
Output hold time	t_{OH}	0			ns	
Output disable time	t_{DF}	0		70	ns	
Output disable time for O_8-O_{15} referenced to WORD/$\overline{BYTE}$	t_{HDF}			100	ns	
Output enable access time referenced to WORD/$\overline{BYTE}$	t_{WB}			250	ns	

Notes:

(1) Input voltage rise and fall times = 20 ns; input and output timing reference levels = 0.8 and 2.0 V; output load = 1 TTL + 100 pF.

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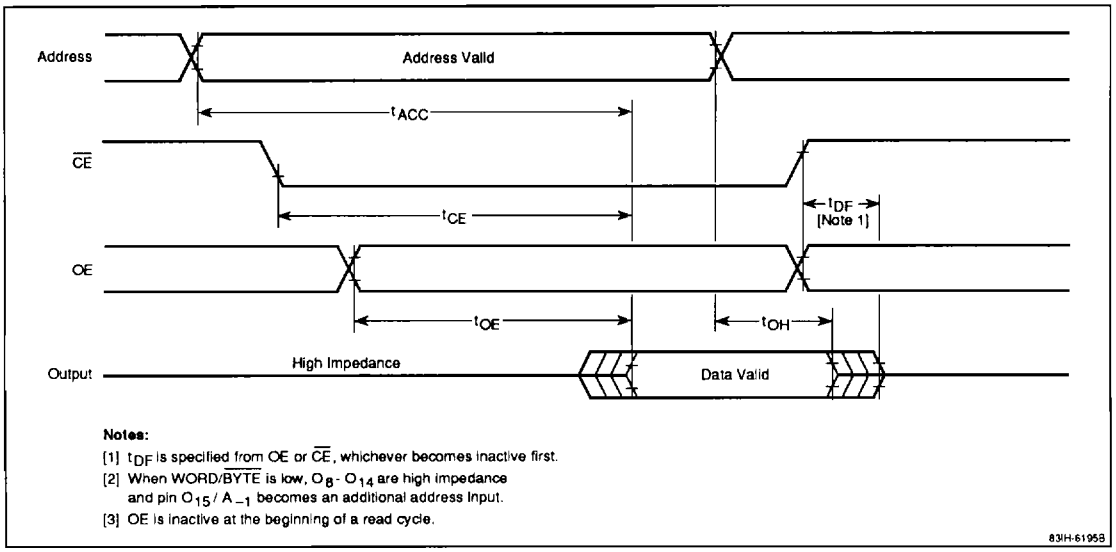
Timing Waveform

Read Cycle



Notes:
[1] t_{DF} is specified from OE or $\overline{CE}$, whichever becomes inactive first.
[2] When WORD/$\overline{BYTE}$ is low, O_8 - O_{14} are high impedance and pin O_{15} / A_{-1} becomes an additional address input.
[3] OE is inactive at the beginning of a read cycle.

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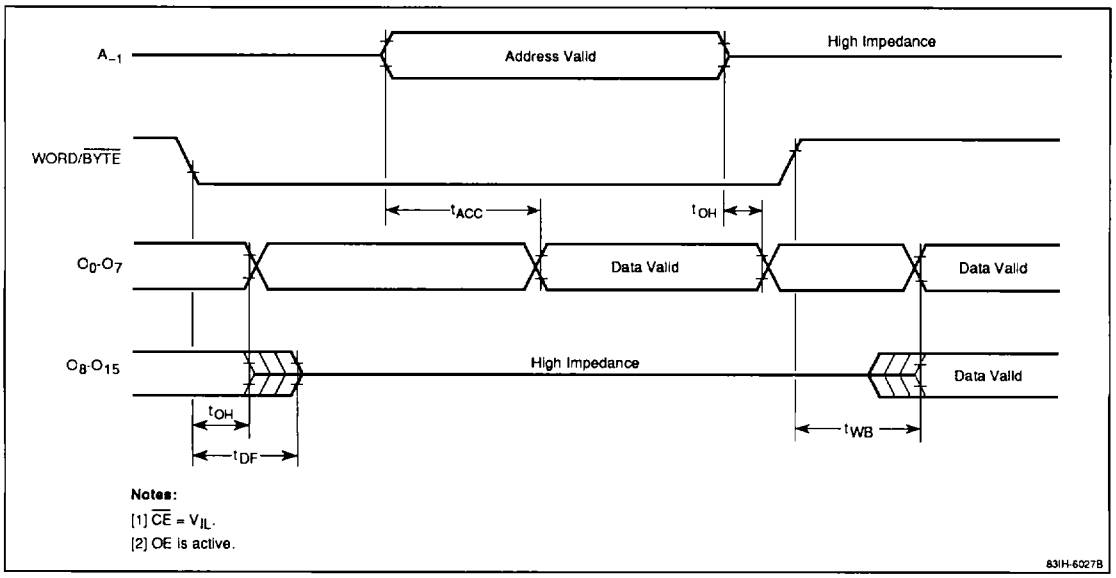
WORD/$\overline{BYTE}$ Selection Timing



Notes:
[1] $\overline{CE}$ = V_{IL}.
[2] OE is active.

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