

March 1997

### Features

- **Fast Access Time**
  - $V_{DD} = 5V$  ..... 450ns
  - $V_{DD} = 10V$  ..... 250ns
- **Common Data Inputs and Outputs**
- **Multiple Chip Select Inputs to Simplify Memory System Expansion**

### Ordering Information

5V	10V	PACKAGE	TEMP. RANGE	PKG. NO.
CDP1823CE	CDP1823E	PDIP	-40°C to +85°C	E24.6
CDP1823CD	CDP1823D	SBDIP	-40°C to +85°C	D24.6
CDP1823CDX	-	Burn-In		D24.6

### Description

The CDP1823 and CDP1823C are 128-word by 8-bit CMOS SOS static random-access memories. These memories are compatible with general-purpose microprocessors. The two memories are functionally identical. They differ in that the CDP1823 has a recommended operating voltage range of 4V to 10.5V, and the CDP1823C has a recommended operating voltage range of 4V to 6.5V.

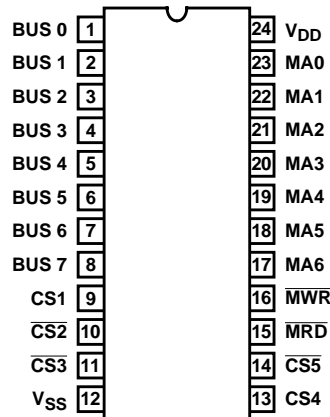
The CDP1823 memory has 8 common data input and data output terminals for direct connection to a bidirectional data bus and is operated from a single voltage supply. Five chip-select inputs are provided to simplify memory-system expansion. In order to enable the CDP1823, the chip-select inputs  $\overline{CS2}$ ,  $\overline{CS3}$  and  $\overline{CS5}$  require a low input signal, and the chip-select inputs CS1 and CS4 require a high input signal.

The  $\overline{MRD}$  signal enables all 8 output drivers when in the low state and should be in a high state during a write cycle.

After valid data appear at the output, the address inputs may be changed immediately. Output data will be valid until either the  $\overline{MRD}$  signal goes high, the device is deselected, or  $t_{AA}$  (access time) after address changes.

### Pinout

CDP1823, CDP1823C  
(PDIP, SBDIP)  
TOP VIEW



**CDP1823, CDP1823C**

**OPERATIONAL MODES**

<b>FUNCTION</b>	<b>MRD</b>	<b>MWR</b>	<b>CS1</b>	<b>CS2</b>	<b>CS3</b>	<b>CS4</b>	<b>CS5</b>	<b>BUS TERMINAL STATE</b>
Read	0	X	1	0	0	1	0	Storage State of Addressed Word
Write	1	0	1	0	0	1	0	Input High-Impedance
Stand-By (Active)	1	1	1	0	0	1	0	High Impedance
Not Selected	X	X	0	X	X	X	X	High Impedance
	X	X	X	1	X	X	X	High Impedance
	X	X	X	X	1	X	X	High Impedance
	X	X	X	X	X	0	X	High Impedance
	X	X	X	X	X	X	1	High Impedance

Logic 1 = High, Logic 0 = Low, X = Don't Care

## CDP1823, CDP1823C

### Absolute Maximum Ratings

DC Supply Voltage Range, ( $V_{DD}$ ) (All Voltages Referenced to $V_{SS}$ Terminal)	
CDP1823	-0.5V to +11V
CDP1823C	-0.5V to +7V
Input Voltage Range, All Inputs	-0.5V to $V_{DD} + 0.5V$
DC Input Current, Any One Input	$\pm 10mA$
Operating Temperature Range ( $T_A$ )	
Package Type D	-55°C to +125°C
Package Type E	-40°C to +85°C

### Thermal Information

Thermal Resistance (Typical)	$\theta_{JA}$ (°C/W)	$\theta_{JC}$ (°C/W)
PDIP Package	60	N/A
SBDIP Package	60	17
Maximum Storage Temperature Range ( $T_{STG}$ )	-65°C to +150°C	
Maximum Junction Temperature		
Plastic Package	+150°C	
Maximum Lead Temperature (During Soldering)	300°C	

**Recommended Operating Conditions** At  $T_A$  = Full Package Temperature Range. For maximum reliability, operating conditions should be selected so that operation is always within the following ranges:

PARAMETER	LIMITS				UNITS
	CDP1823D		CDP1823CD		
	MIN	MAX	MIN	MAX	
Supply Voltage Range	4	10.5	4	6.5	V
Recommended Input Voltage Range	$V_{SS}$	$V_{DD}$	$V_{SS}$	$V_{DD}$	V

**Static Electrical Specifications** At  $T_A$  = -40°C to +85°C, Except as Noted:

PARAMETER	SYMBOL	CONDITIONS			LIMITS						UNITS
		$V_O$ (V)	$V_{IN}$ (V)	$V_{DD}$ (V)	CDP1823			CDP1823C			
					MIN	(NOTE 1) TYP	MAX	MIN	(NOTE 1) TYP	MAX	
Quiescent Device Current	$I_{DD}$	-	0, 5	5	-	-	500	-	-	500	$\mu A$
		-	0, 10	10	-	-	1000	-	-	-	$\mu A$
Output Low (Sink) Current	$I_{OL}$	0.4	0, 5	5	2	4	-	2	4	-	mA
		0.5	0, 10	10	4.5	9	-	-	-	-	mA
Output High (Source) Current	$I_{OH}$	4.6	0, 5	5	-1	-2	-	-1	-2	-	mA
		9.5	0, 10	10	-2.2	-4.4	-	-	-	-	mA
Output Voltage Low-Level	$V_{OL}$	-	0, 5	5	-	0	0.1	-	0	0.1	V
		-	0, 10	10	-	0	0.1	-	-	-	V
Output Voltage High-Level	$V_{OH}$	-	0, 5	5	4.9	5	-	4.9	5	-	V
		-	0, 10	10	9.9	10	-	-	-	-	V
Input Low Voltage	$V_{IL}$	0.5, 4.5	-	5	-	-	1.5	-	-	1.5	V
		0.5, 9.5	-	10	-	-	3	-	-	-	V
Input High Voltage	$V_{IH}$	0.5, 9.5	-	5	3.5	-	-	3.5	-	-	V
		0.5, 9.5	-	10	7	-	-	-	-	-	V
Input Leakage Current	$I_{IN}$	Any Input	0, 5	5	-	-	$\pm 5$	-	-	$\pm 5$	$\mu A$
			0, 10	10	-	-	$\pm 10$	-	-	-	$\mu A$
Operating Current (Note 2)	$I_{DD1}$	-	0, 5	5	-	4	8	-	4	8	mA
		-	0, 10	10	-	8	16	-	-	-	mA
Three-State Output Leakage Current	$I_{OUT}$	0, 5	0, 5	5	-	-	$\pm 5$	-	-	$\pm 5$	$\mu A$
		0, 10	0, 10	10	-	-	$\pm 10$	-	-	-	$\mu A$
Input Capacitance	$C_{IN}$	-	-	-	-	5	7.5	-	5	7.5	pF
Output Capacitance	$C_{OUT}$	-	-	-	-	10	15	-	10	15	pF

**NOTES:**

1. Typical values are for  $T_A$  = +25°C and nominal  $V_{DD}$ .
2. Outputs open circuited; Cycle time = 1 $\mu s$ .

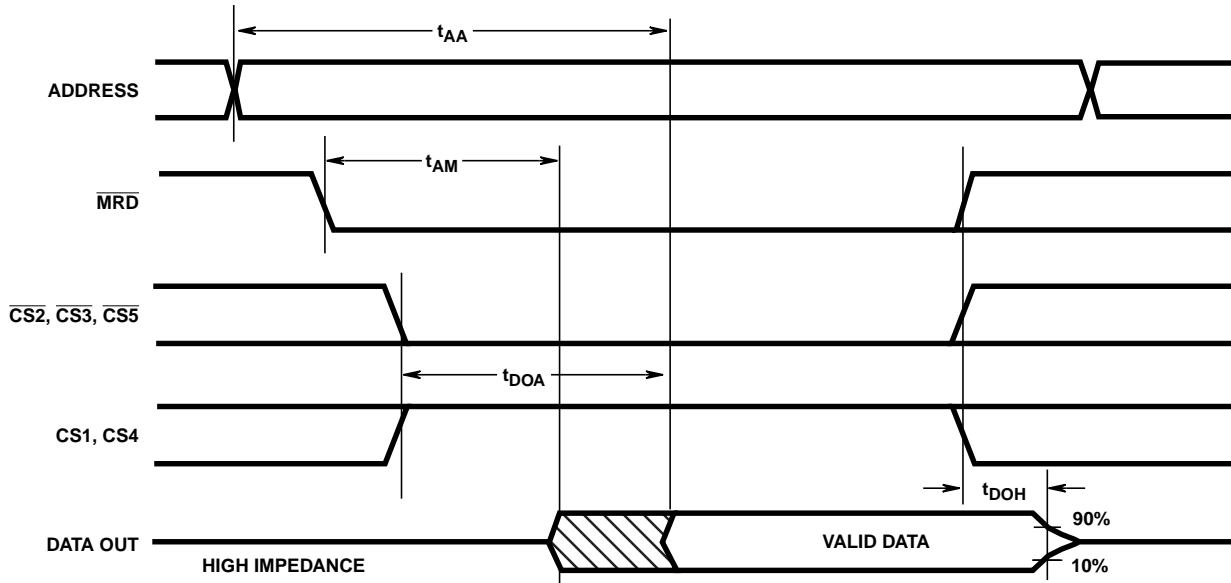
## CDP1823, CDP1823C

**Dynamic Electrical Specifications** At  $T_A = -40$  to  $+85^\circ\text{C}$ ,  $V_{DD} \pm 5\%$ ,  $t_R, t_F = 20\text{ns}$ ,  $C_L = 100\text{pF}$

PARAMETER	SYMBOL	$V_{DD}$ (V)	LIMITS						UNITS
			CDP1823			CDP1823C			
			(NOTE 2) MIN	(NOTE 1) TYP	MAX	(NOTE 2) MIN	(NOTE 1) TYP	MAX	
Read Cycle (See Figure 1)									
Access Time From Address Change	$t_{AA}$	5	-	275	450	-	275	450	ns
		10	-	150	250	-	-	-	ns
Access Time From Chip Select	$t_{DOA}$	5	-	150	250	-	150	250	ns
		10	-	100	150	-	-	-	ns
$\overline{\text{MRD}}$ to Output Active	$t_{AM}$	5	-	150	250	-	150	250	ns
		10	-	100	150	-	-	-	ns
Data Hold Time After Read	$t_{DOH}$	5	25	50	75	25	50	75	ns
		10	15	25	40	-	-	-	ns

**NOTES:**

1. Typical values are at  $T_A = 25^\circ\text{C}$  and nominal voltage.
2. Time required by a limit device to allow for the indicated function.



**NOTE:**

1.  $\overline{\text{MWR}}$  is high during read operation. Timing measurement reference is  $0.5 V_{DD}$ .

**FIGURE 1. READ CYCLE TIMING DIAGRAM**

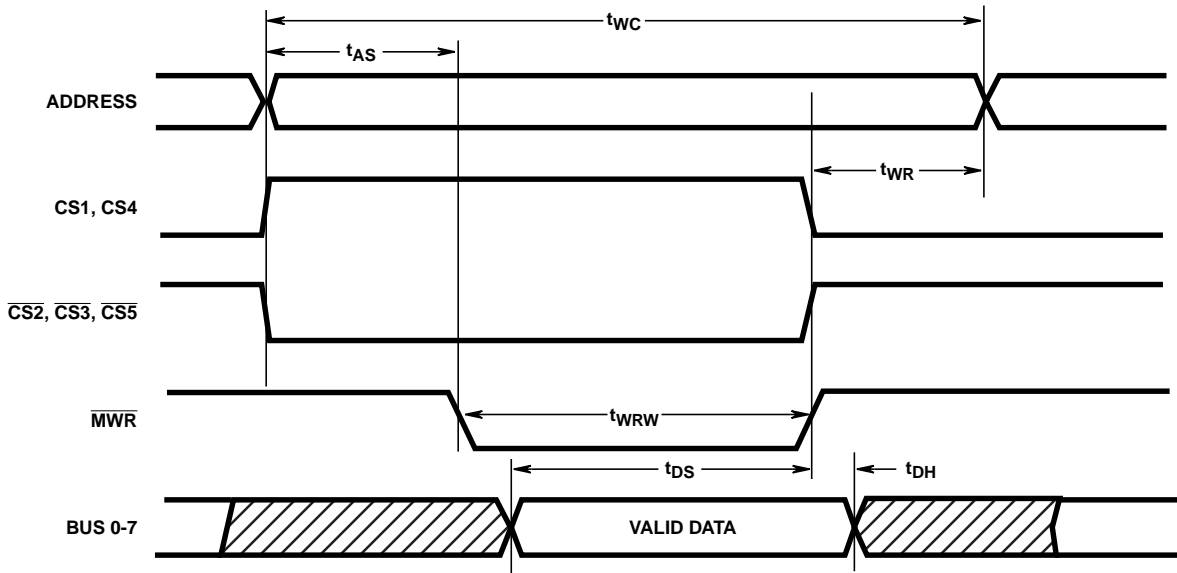
## CDP1823, CDP1823C

**Dynamic Electrical Specifications** At  $T_A = -40$  to  $+85^\circ\text{C}$ ,  $V_{DD} \pm 5\%$ ,  $t_R, t_F = 20\text{ns}$ ,  $C_L = 100\text{pF}$

PARAMETER	SYMBOL	$V_{DD}$ (V)	LIMITS						UNITS
			CDP1823			CDP1823C			
			(NOTE 2) MIN	(NOTE 1) TYP	MAX	(NOTE 2) MIN	(NOTE 1) TYP	MAX	
Write Cycle (See Figure 2)									
Write Recovery	$t_{WR}$	5	75	-	-	75	-	-	ns
		10	50	-	-	-	-	-	ns
Write Cycle	$t_{WC}$	5	400	-	-	400	-	-	ns
		10	225	-	-	-	-	-	ns
Write Pulse Width	$t_{WRW}$	5	200	-	-	200	-	-	ns
		10	100	-	-	-	-	-	ns
Address Setup Time	$t_{AS}$	5	125	-	-	125	-	-	ns
		10	75	-	-	-	-	-	ns
Data Setup Time	$t_{DS}$	5	100	-	-	100	-	-	ns
		10	75	-	-	-	-	-	ns
Data Hold Time From $\overline{MWR}$	$t_{DH}$	5	75	-	-	75	-	-	ns
		10	50	-	-	-	-	-	ns

**NOTES:**

1. Typical values are at  $T_A = 25^\circ\text{C}$  and nominal voltage.
2. Time required by a limit device to allow for the indicated function.



**NOTE:**

1.  $\overline{MRD}$  must be high during write operation.

**FIGURE 2. WRITE CYCLE TIMING DIAGRAM**

## CDP1823, CDP1823C

### Data Retention Specifications At $T_A = -40$ to $+85^\circ\text{C}$ , see Figure 3

PARAMETER	TEST CONDITIONS		LIMITS						UNITS
	$V_{DR}$ (V)	$V_{DD}$ (V)	CDP1823			CDP1823C			
			MIN	(NOTE 1) TYP	MAX	MIN	(NOTE 1) TYP	MAX	
Minimum Data Retention Voltage, $V_{DR}$	-	-	-	1.5	2	-	1.5	2	V
Data Retention Quiescent Current, $I_{DD}$	2	-	-	30	100	-	30	100	$\mu\text{A}$
Chip Deselect to Data Retention Time $t_{CDR}$	-	5	600	-	-	600	-	-	ns
	-	10	300	-	-	-	-	-	ns
Recovery to Normal Operation Time $t_{RC}$	-	5	600	-	-	600	-	-	ns
	-	10	300	-	-	-	-	-	ns
$V_{DD}$ to $V_{DR}$ Rise and Fall Time $t_R, t_F$	2	5	1	-	-	1	-	-	$\mu\text{s}$

NOTE:

Typical values are for  $T_A = 25^\circ\text{C}$  and nominal  $V_{DD}$ .

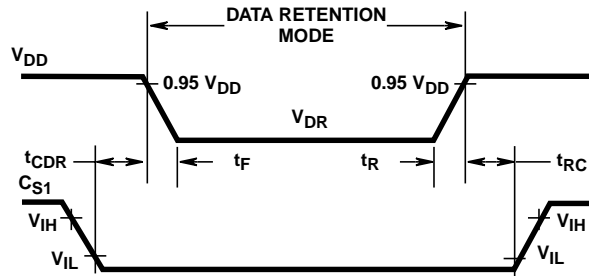


FIGURE 3. LOW  $V_{DD}$  DATA RETENTION TIMING WAVEFORMS

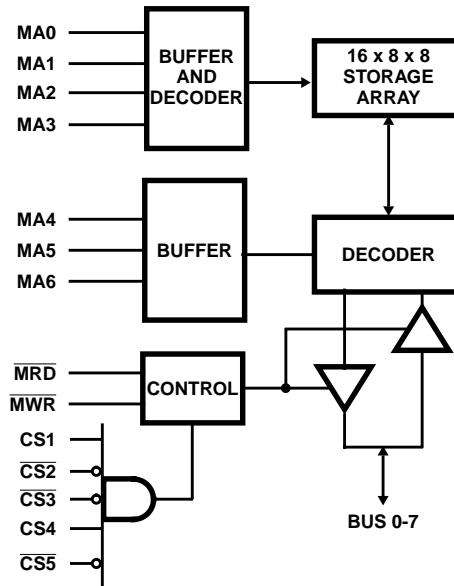


FIGURE 4. FUNCTIONAL DIAGRAM

## CDP1823, CDP1823C

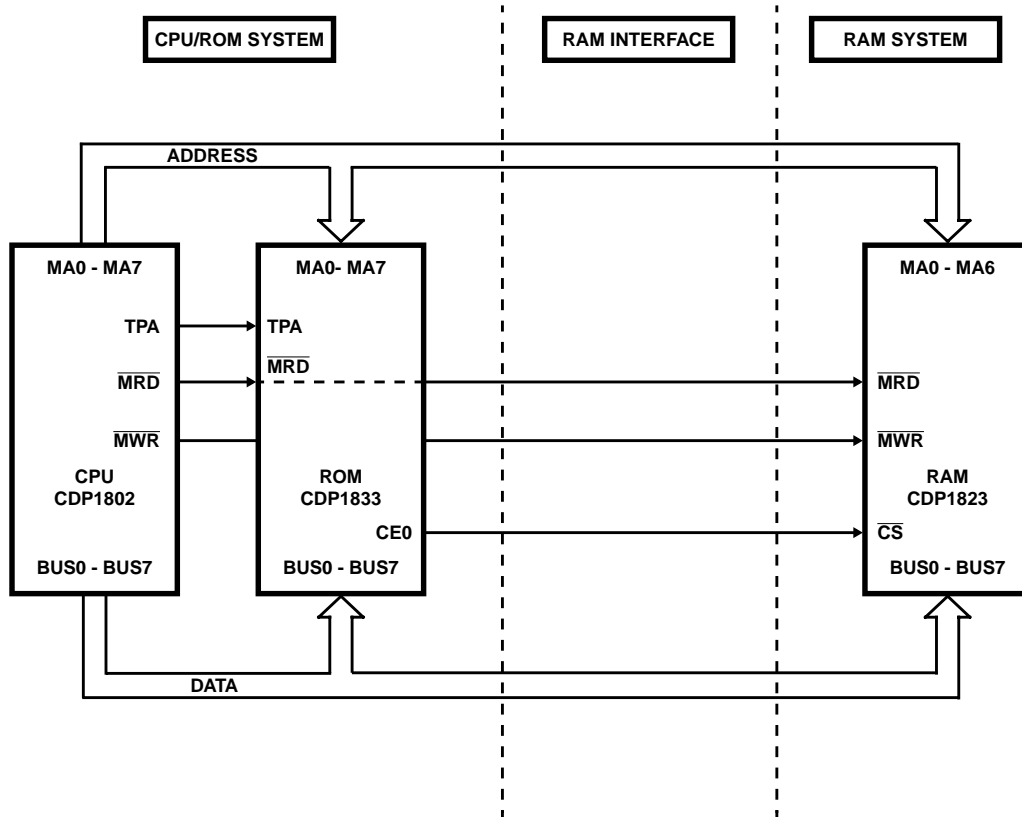


FIGURE 5. CDP1823 (128 x 8) MINIMUM SYSTEM (128 x 8)

All Intersil semiconductor products are manufactured, assembled and tested under **ISO9000** quality systems certification.

*Intersil products are sold by description only. Intersil Corporation reserves the right to make changes in circuit design and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.*

For information regarding Intersil Corporation and its products, see web site <http://www.intersil.com>

### Sales Office Headquarters

**NORTH AMERICA**  
Intersil Corporation  
P. O. Box 883, Mail Stop 53-204  
Melbourne, FL 32902  
TEL: (407) 724-7000  
FAX: (407) 724-7240

**EUROPE**  
Intersil SA  
Mercure Center  
100, Rue de la Fusee  
1130 Brussels, Belgium  
TEL: (32) 2.724.2111  
FAX: (32) 2.724.22.05

**ASIA**  
Intersil (Taiwan) Ltd.  
Taiwan Limited  
7F-6, No. 101 Fu Hsing North Road  
Taipei, Taiwan  
Republic of China  
TEL: (886) 2 2716 9310  
FAX: (886) 2 2715 3029

This datasheet has been downloaded from:

[www.DatasheetCatalog.com](http://www.DatasheetCatalog.com)

Datasheets for electronic components.



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

**[LittleDiode.com](http://LittleDiode.com)**

Looking forward to providing you with the best possible service.