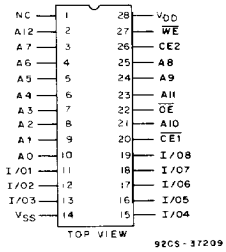
CDM6264C/3

High-Reliability CMOS 8192-Word By 8-Bit LSI Static RAM

Features:

- *Fully static operation*
- *Single power supply: 4.5 V to 5.5 V*
- *All inputs and outputs directly TTL compatible*
- *3-state outputs*
- *Industry-standard 28-pin configuration*
- *Input address buffers gated off with chip disable*
- *Fast access time: t_{AA}=200 ns at +125° C*
- *Low operating power: I_{OPER} = 15 mA maximum*
- *Data retention voltage: 2 V min. -55° to +125° C*
- *Operating-temperature range (max. rating): −55° C to +125° C*



TERMINAL ASSIGNMENT
28-Lead Package

Package Specifications

See Section 11, Fig. 7, b1

The RCA-CDM6264C/3 is a high-reliability 8192-word by 8-bit static random-access memory. It is designed for use in memory systems where high-speed, low power and simplicity in use are desirable. This device has common data input and data output and utilizes a single power supply of 4.5 V to 5.5 V.

Either chip enable ($\overline{CE1}$ or CE2), when not valid, will gate off the address and output buffers and power down the chip to minimum standby power with inputs toggling. The output enable ($\overline{OE}$) controls the output buffers to eliminate bus contention.

The CDM6264C/3 is supplied in 28-lead hermetic, dual-in-line side-brazed ceramic package (D suffix) and in a 32-terminal leadless chip carrier (LCC) ceramic package (J suffix).

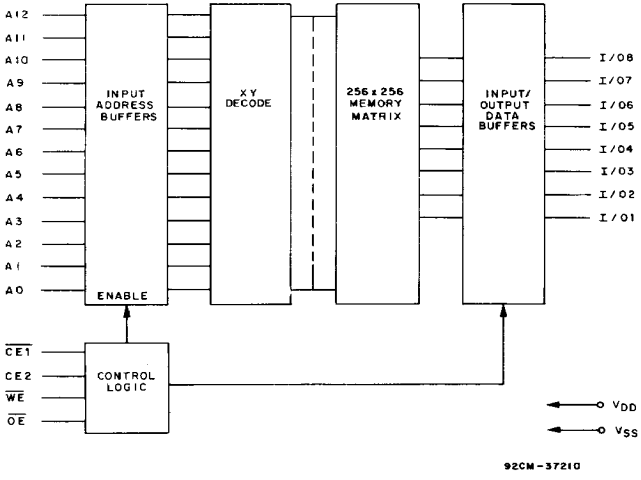
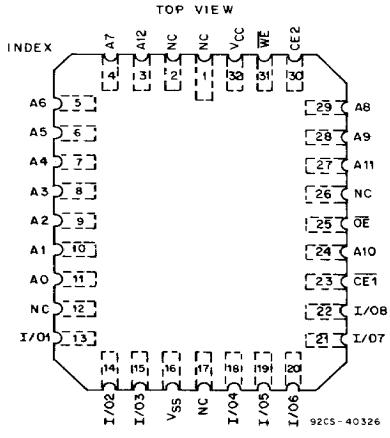


Fig. 1 - Functional block diagram.



TERMINAL ASSIGNMENT
32-Terminal LCC Package

Package Specifications

See Section 11, Fig. 40, c1

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TRUTH TABLE

$\overline{CE1}$	CE2	$\overline{OE}$	$\overline{WE}$	A0 to A12	MODE	DATA I/O	DEVICE CURRENT
H	X	X	X	X	NOT SELECTED	HIGH Z	STANDBY
X	L	X	X	X	NOT SELECTED	HIGH Z	STANDBY
L	H	L	H	STABLE	READ	DATA OUT	ACTIVE
L	H	X	L	STABLE	WRITE	DATA IN	ACTIVE
L	H	H	H	STABLE	OUTPUT DISABLE	HIGH Z	ACTIVE

L = Low H = High X = H or L

MAXIMUM RATINGS, *Absolute-Maximum Values:*

DC SUPPLY-VOLTAGE RANGE, (V_{DD}):
(Voltage reference to V_{SS} terminal) ..... -0.3 to +7 V
INPUT VOLTAGE RANGE, ALL INPUT ..... -0.3 to V_{DD} + 0.3 V
POWER DISSIPATION PER PACKAGE (P_D):
For T_A = -55° to 100°C (PACKAGE TYPE D) ..... 500 mW
For T_A = 100° to 125°C (PACKAGE TYPE D) ..... Derate Linearly at 12 mW/°C to 200 mW
DEVICE DISSIPATION PER OUTPUT TRANSISTOR
For T_A = FULL PACKAGE-TEMPERATURE RANGE ..... 100 mW
OPERATING-TEMPERATURE RANGE (T_A):
PACKAGE TYPE D ..... -55 to +125°C
STORAGE TEMPERATURE RANGE (T_{stg}) ..... -65 to +150°C
LEAD TEMPERATURE FOR D TYPE PACKAGE (DURING SOLDERING):
At distance 1/16 ± 1/32 in. (1.59 ± 0.79 mm) from case for 10 s max. ..... +265°C

OPERATING CONDITIONS at T_A = -55 to +125°C
For maximum reliability, operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC		LIMITS ALL TYPES MIN.	LIMITS ALL TYPES MAX.	UNITS
DC Operating Voltage Range		4.5	5.5	V
Input Voltage Range	V_{IH}	2.2	V_{DD} + 0.3	V
	V_{IL}	-0.3	0.8	V
Input Signal Rise or Fall Time Δ	t_r, t_f	—	5	μs

Δ Input signal rise and fall times with a duration greater than the maximum value can cause loss of stored data in the selected mode.

STATIC ELECTRICAL CHARACTERISTICS at T_A = -55 to +125°C, V_{DD} = 5 V ± 10%, Except as noted

CHARACTERISTIC		CONDITIONS	LIMITS				UNITS
			+25/-55° C		+125° C		
			MIN.	MAX.	MIN.	MAX.	
Standby Device Current	I_{DDS}	$\overline{CE1}$ = V_{IH} or CE2 = V_{IL}	—	3	—	4	mA
	I_{DDS1}	$\overline{CE1}$ = CE2 ≥ V_{DD} -0.2 V or CE2 ≤ 0.2 V	—	0.1	—	1	mA
Output Voltage Low Level	V_{OL} Max.	I_{OL} = 2.1 mA	—	0.4	—	0.4	V
Output Voltage High Level	V_{OH} Min.	I_{OH} = -1 mA	2.4	—	2.4	—	V
Input Leakage Current	I_{IN} Max.	V_{IN} = 0 V to V_{DD}	—	±2	—	±2	μA
3-State Output Leakage	I_{OUT}	$V_{I/O}$ = 0 V to V_{DD}	—	±2	—	±2	μA
Operating Device Current	I_{OPER} #	V_{IN} = V_{IL}, V_{IH} t_{cyc} = 1 μs	—	15	—	15	mA
Input Capacitance	C_{IN}	V_{IN} = 0 V, f = 1 MHz, T_A = 25°C	—	6 *	—	6 *	pF
Output Capacitance	C_{IO}	$V_{I/O}$ = 0 V, f = 1 MHz, T_A = 25°C	—	8 *	—	8 *	pF

Output open circuited.
* Guaranteed, not tested.

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SIGNAL DESCRIPTIONS

A0-A10 (Address Inputs):

These inputs must be stable prior to a write operation, but may change asynchronously during read functions.

I/01-I/08:

8-bit tristate data bus.

$\overline{CE1}$, CE2 (Chip Enable):

Either chip enable, when not true, powers down the chip, disables Read and Write functions, and gates off address and output buffers.

$\overline{OE}$ (Output Enable):

Enables tristate outputs if $\overline{CE1}$ and CE2 are valid and $\overline{WE}$ is high.

$\overline{WE}$ (Write Enable):

Enables Write function, if $\overline{CE1}$ and CE2 are valid. $\overline{WE}$ will dominate if both $\overline{WE}$ and $\overline{OE}$ are low (i.e., the bus will be tristated and a Write will occur).

V_{DD}, V_{SS}:

Power supply connections.

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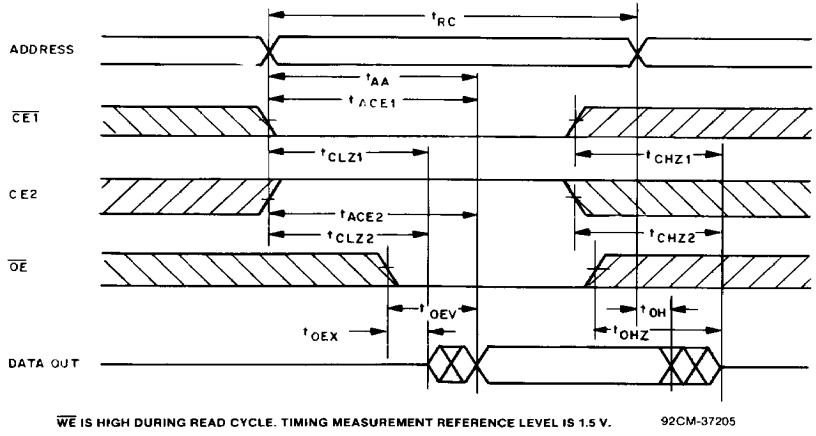
DYNAMIC ELECTRICAL CHARACTERISTICS at T_A = -55 to +125° C, V_{DD} = 5 V ± 10%, Input t_r, t_f = 10 ns; Input Pulse Levels: 0 V to 3 V

CHARACTERISTIC		LIMITS				UNITS
		+25/-55° C		+125° C		
Read Cycle Times, See Fig. 2		**MIN.**	**MAX.**	**MIN.**	**MAX.**	
Read Cycle Time	t_{RC}	150	—	200	—	ns
Address Access Time	t_{AA} *	—	150	—	200	
Chip Enable Access Time	t_{ACE1}, t_{ACE2} *	—	150	—	200	
Chip Enable to Output Active	t_{CLZ1}, t_{CLZ2}	10	—	10	—	
Output Enable to Output Valid	t_{OEV} *	—	70	—	70	
Output Enable to Output Active	t_{OEX}	5	—	5	—	
Chip Disable to Output "High"	t_{CHZ1}, t_{CHZ2}	0	70	0	70	
Output Disable to Output "High" Z	t_{OHZ}	0	60	0	60	
Output Hold from Address Change	t_{OH}	30	—	30	—	

* Indicates 100% testing.



WE IS HIGH DURING READ CYCLE. TIMING MEASUREMENT REFERENCE LEVEL IS 1.5 V. 92CM-37205

Fig. 2 - Read-cycle timing waveforms.

DYNAMIC ELECTRICAL CHARACTERISTICS at T_A = -55 to +125° C, V_{DD} = 5 V ± 10%, Input t_r, t_f = 10 ns; Input Pulse Levels: 0 V to 3 V

CHARACTERISTIC		LIMITS				UNITS
		+25/-55° C		+125° C		
Write Cycle Times, See Fig. 3		MIN.	MAX.	MIN.	MAX.	
Write Cycle Time	t_{WC} *	150	—	200	—	ns
Chip Enable to End of WRITE	t_{CW1}, t_{CW2} *	120	—	170	—	
Address Valid to End of WRITE	t_{AW} *	120	—	170	—	
Address Setup Time	t_{AS} *	0	—	0	—	
Write Enable Width	t_{WW} *	100	—	120	—	
Write Recovery Time	t_{WR} *	0	—	0	—	
Write to Output "High Z"	t_{WHZ}	—	70	—	70	
Input Data Setup Time	t_{DW} *	60	—	80	—	
Input Data Hold Time	t_{DH} *	0	—	0	—	
Output Active from End of Write	t_{OW}	10	—	10	—	

* Indicates 100% testing.

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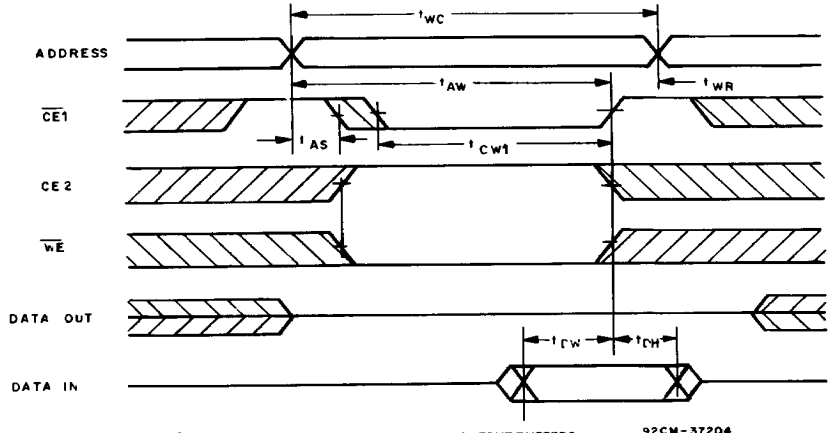
WRITE CYCLE 1 ($\overline{CE1}$ CONTROL)



IN A $\overline{CE1}$ OR CE2 CONTROLLED WRITE CYCLE, THE OUTPUT BUFFERS REMAIN IN A HIGH IMPEDANCE STATE, WHETHER $\overline{OE}$ IS HIGH OR LOW. TIMING MEASUREMENT REFERENCE LEVEL IS 1.5 V.

Fig. 3 - Write-cycle timing waveforms.

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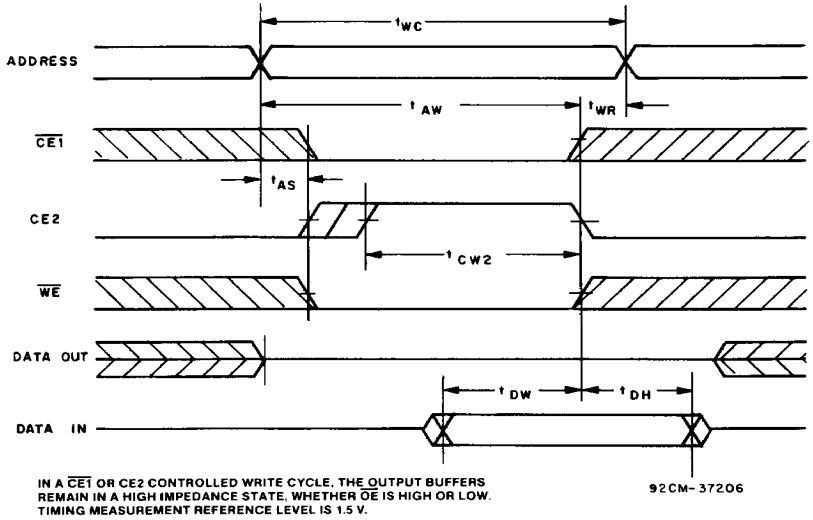
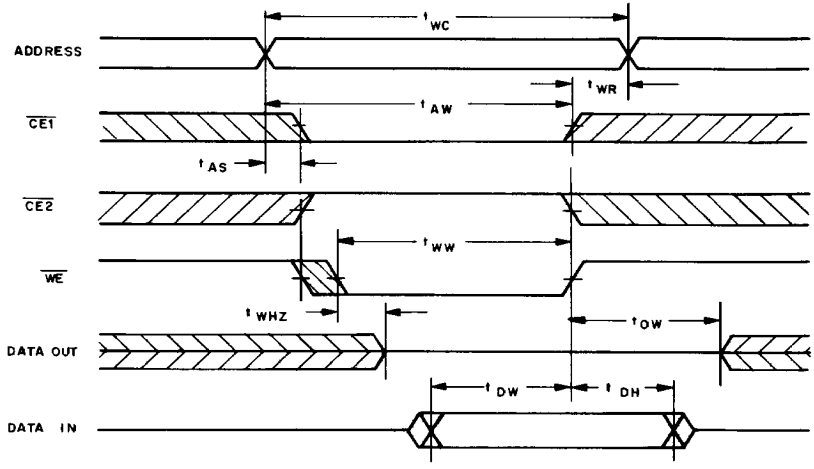
WRITE CYCLE 2 (CE2 CONTROL)



IN A $\overline{CE1}$ OR CE2 CONTROLLED WRITE CYCLE, THE OUTPUT BUFFERS REMAIN IN A HIGH IMPEDANCE STATE, WHETHER $\overline{OE}$ IS HIGH OR LOW.
TIMING MEASUREMENT REFERENCE LEVEL IS 1.5 V.

WRITE CYCLE 3 ($\overline{WE}$ CONTROL)



IF $\overline{OE}$ IS HIGH DURING A $\overline{WE}$ CONTROLLED WRITE CYCLE,
THE OUTPUT BUFFERS REMAIN IN A HIGH IMPEDANCE STATE IN THIS PERIOD.
TIMING MEASUREMENT REFERENCE LEVEL IS 1.5 V.

Fig. 3 - Write-cycle timing waveforms (cont'd).

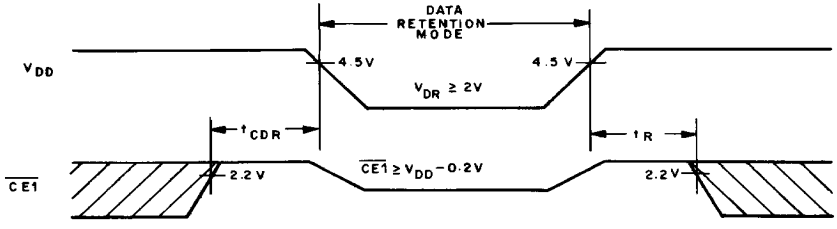
DATA RETENTION CHARACTERISTICS at T_A = -55°C to +125°C; See Fig. 4

CHARACTERISTIC		TEST CONDITIONS	LIMITS		UNITS
			ALL TYPES		
			MIN.	MAX.	
Minimum Data Retention Voltage	V_{DR}	$\overline{CE1} \geq V_{DD}$ -0.2 V or CE2 ≤ 0.2 V	2	5.5	V
Data Retention Quiescent Current	$I_{DD}DR$	V_{DD} = 3 V, $\overline{CE1}$, CE2 ≥ V_{DD} -0.2 V or CE2 ≤ 0.2 V	—	350	μA
Chip Disable to Data Retention Time	t_{CDR}	See Fig. 4	0	—	ns
Recovery to Normal Operation Time	t_R	See Fig. 4	*t_{RC}	—	ns

* t_{RC} = Read Cycle Time

Power Down Time = 500 ns

DATA RETENTION WAVEFORM 1 ($\overline{CE1}$ CONTROL)



DATA RETENTION WAVEFORM 2 (CE2 CONTROL)

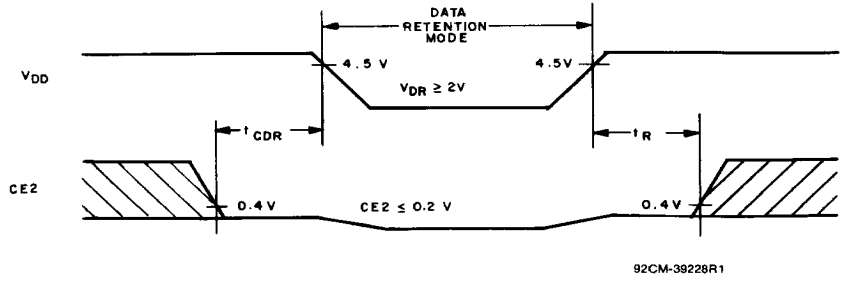


Fig. 4 - Low V_{DD} data-retention timing waveforms.

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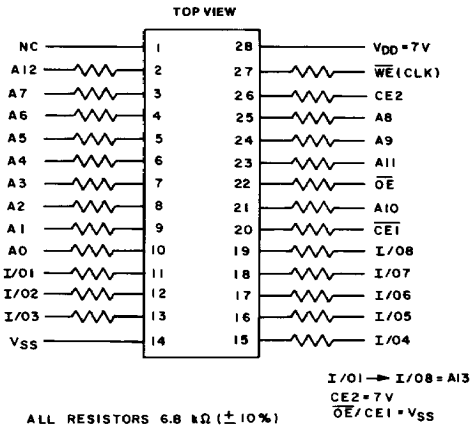
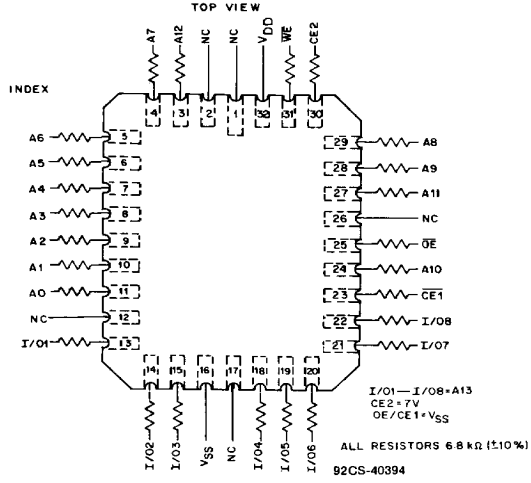
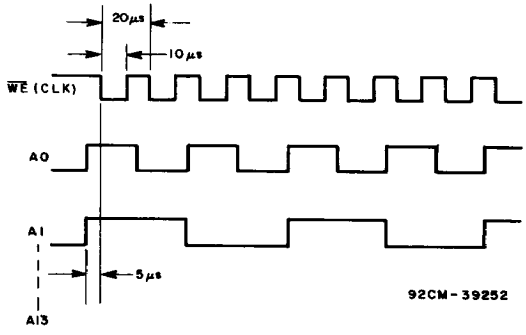


(a) *Burn-in circuit for 28-lead D package.*



(b) *Burn-in circuit from 32-terminal leadless chip-carrier, (LCC), J package.*



(c) *Burn-in circuits timing waveforms.*

TYPE NO.	V_{DD}	TEMP.	TIME
CDM6264CD/3 CDM6264CJ/3	7 V	+125° C	160 Hrs, Min.

Fig. 5 - Dynamic burn-in circuits and timing waveforms.