

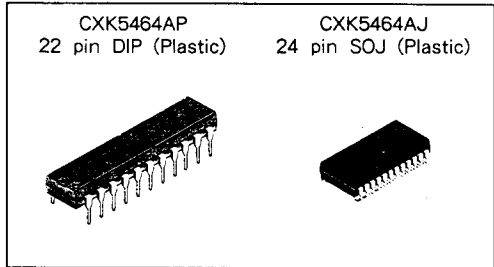
16,384-word × 4-bit High Speed CMOS Static RAM

Description

CXK5464AP/AJ are 65,536 bits high speed CMOS static RAMs organized as 16,384 words by 4 bits and operate from a single 5V supply.

Features

- Fast access time :
 - CXK5464AP/AJ-25 25ns (Max.)
 - CXK5464AP/AJ-30 30ns (Max.)
 - CXK5464AP/AJ-35 35ns (Max.)
- Low power operation : 125mW (Typ.)
- Single + 5V supply : + 5V ± 10 %
- Fully static memory...No clock or timing strobe required.
- Equal access and cycle time.
- Common data input and output : Three-state output
- Directly TTL compatible : All inputs and outputs.
- High density : 300mil 22 pin plastic DIP
300mil 24 pin plastic SOJ



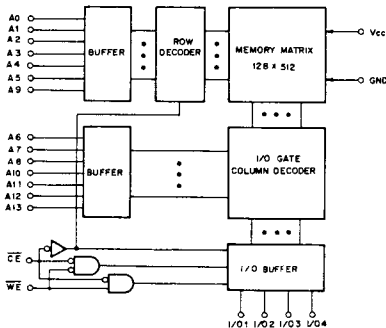
Function

16,384-word × 4-bit static RAM

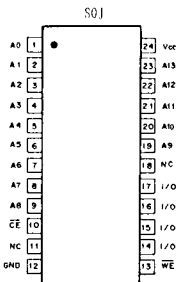
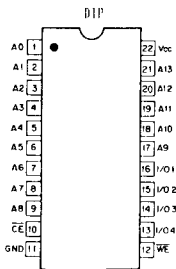
Structure

Silicon gate CMOS IC

Block Diagram



Pin Configuration (Top view)



Pin Description

Symbol	Description
A0 to A13	Address input
I/O1 to I/O4	Data input output
CE	Chip enable input
WE	Write enable input
Vcc	+ 5V Power supply
GND	Ground
NC	Non connection

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Absolute Maximum Ratings

(Ta = 25°C, GND = 0V)

Item	Symbol	Rating	Unit
Supply voltage	V _{CC}	- 0.5* to + 7.0	V
Input voltage	V _{IN}	- 0.5* to V _{CC} + 0.5	V
Input and output voltage	V _{I/O}	- 0.5* to V _{CC} + 0.5	V
Operating temperature	T _{opr}	0 to + 70	°C
Storage temperature	T _{stg}	- 55 to + 150	°C
Soldering temperature	T _{solder}	260 • 10	°C • sec
Allowable power dissipation	P _D	1.0	W

* V_{CC}, V_{IN}, V_{I/O} = - 3.5V Min. for pulse width less than 20ns.

Truth Table

CE	WE	Mode	I/O1 to I/O4	V _{CC} Current
H	X	Not selected	High Z	I _{SB1} , I _{SB2}
L	H	Read	Data out	I _{CC1} , I _{CC2}
L	L	Write	Data in	I _{CC1} , I _{CC2}

X: "H" or "L"

DC Recommended Operating Conditions

(Ta = 0 to + 70°C, GND = 0V)

Item	Symbol	Min.	Typ.*1	Max.	Unit
Supply voltage	V _{CC}	4.5	5.0	5.5	V
Input high voltage	V _{IH}	2.2	—	V _{CC} + 0.3	V
Input low voltage	V _{IL}	- 0.3*2	—	0.8	V

* 1. V_{CC} = 5V, Ta = 25°C

* 2. V_{IL} = - 3.0V Min. for pulse width less than 20ns.

Electrical Characteristics

● **DC and operating characteristics** ($V_{CC} = 5V \pm 10\%$, $GND = 0V$, $T_a = 0$ to $+70^\circ C$)

Item	Symbol	Test conditions	- 25/30/35			Unit
			Min.	Typ.*	Max.	
Input leak current	I_{LI}	$V_{IN} = GND$ to V_{CC}	- 1	—	1	μA
Output leak current	I_{LO}	$\overline{CE} = V_{IH}$ or $\overline{WE} = V_{IL}$ $V_{I/O} = GND$ to V_{CC}	- 1	—	1	μA
Operating supply current	I_{CC1}	$\overline{CE} = V_{IL}$, $I_{OUT} = 0mA$ $V_{IN} = V_{IH}/V_{IL}$	—	25	45	mA
Average operating current	I_{CC2}	Cycle = Min., Duty = 100 % $I_{OUT} = 0mA$	—	60	90	mA
Standby current	I_{SB1}	$\overline{CE} \geq V_{CC} - 0.2V$, $V_{IN} \geq V_{CC} - 0.2V$ or $V_{IN} \leq 0.2V$	—	—	1	mA
	I_{SB2}	$\overline{CE} = V_{IH}$	—	15	30	mA
Output high voltage	V_{OH}	$I_{OH} = -4.0mA$	2.4	—	—	V
Output low voltage	V_{OL}	$I_{OL} = 8.0mA$	—	—	0.4	V

* $V_{CC} = 5.0V$, $T_a = 25^\circ C$

I/O capacitance

($T_a = 25^\circ C$, $f = 1MHz$)

Item	Symbol	Test conditions	Min.	Max.	Unit
Input capacitance	C_{IN}	$V_{IN} = 0V$	—	7	pF
Input/Output capacitance	$C_{I/O}$	$V_{I/O} = 0V$	—	7	pF

Note) This parameter is sampled and is not 100% tested.

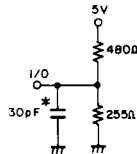
AC characteristics

● **AC test conditions**

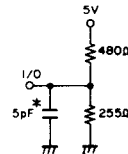
($V_{CC} = 5V \pm 10\%$, $T_a = 0$ to $+70^\circ C$)

Item	Conditions
Input pulse high level	$V_{IH} = 3.0V$
Input pulse low level	$V_{IL} = 0V$
Input rise time	$t_r = 5ns$
Input fall time	$t_f = 5ns$
Input and output reference level	1.5V
Output load conditions	Fig. 1

Output Load (1)



Output Load (2)**



* including scope and jig
** for t_{LZ} , t_{HZ} , t_{OW} , t_{WHZ}

Fig. 1

●Read cycle

Item	Symbol	- 25		- 30		- 35		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Read cycle time	t _{RC}	25	—	30	—	35	—	ns
Address access time	t _{AA}	—	25	—	30	—	35	ns
Chip enable access time (CE)	t _{CO}	—	25	—	30	—	35	ns
Output hold from address change	t _{OH}	5	—	5	—	5	—	ns
Chip enable to output in low Z (CE)	t _{LZ} *	5	—	5	—	5	—	ns
Chip disable to output in high Z	t _{HZ} *	0	10	0	15	0	15	ns
Chip enable to power up time	t _{PU}	0	—	0	—	0	—	ns
Chip enable to power down time	t _{PD}	—	20	—	25	—	25	ns

* Transition is measured $\pm 200\text{mV}$ from steady voltage with specified loading in Fig. 1.
This parameter is sampled and is not 100% tested.

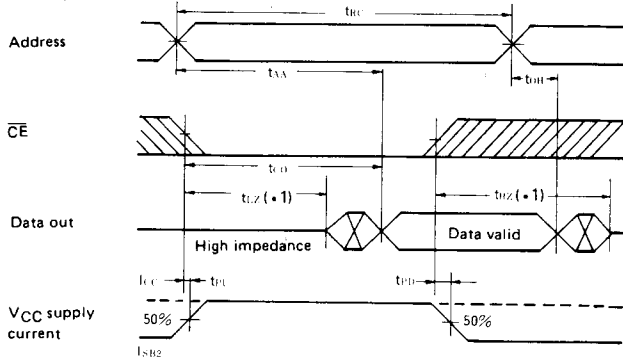
●Write cycle

Item	Symbol	- 25		- 30		- 35		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Write cycle time	t _{WC}	25	—	30	—	35	—	ns
Address valid to end of write	t _{AW}	20	—	25	—	30	—	ns
Chip enable to end of write	t _{CW}	20	—	25	—	30	—	ns
Data to write time overlap	t _{DW}	12	—	15	—	15	—	ns
Data hold from write time	t _{DH}	0	—	0	—	0	—	ns
Write pulse width	t _{WP}	20	—	25	—	30	—	ns
Address setup time	t _{AS}	0	—	0	—	0	—	ns
Write recovery time	t _{WR}	0	—	0	—	0	—	ns
Output active from end of write	t _{OW} *	5	—	5	—	5	—	ns
Write to output in high Z	t _{WHZ} *	0	10	0	10	0	15	ns

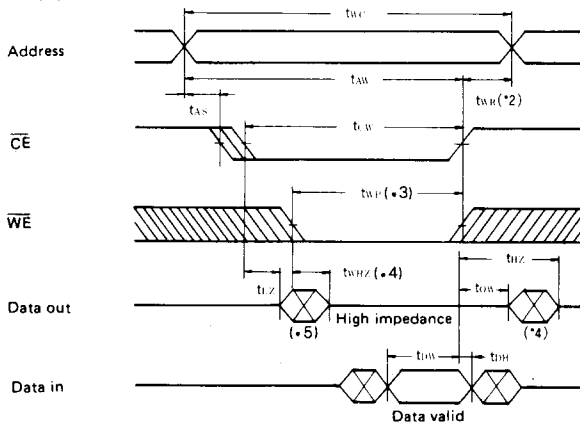
* Transition is measured $\pm 200\text{mV}$ from steady voltage with specified loading in Fig. 1.
This parameter is sampled and is not 100% tested.

Timing Waveform

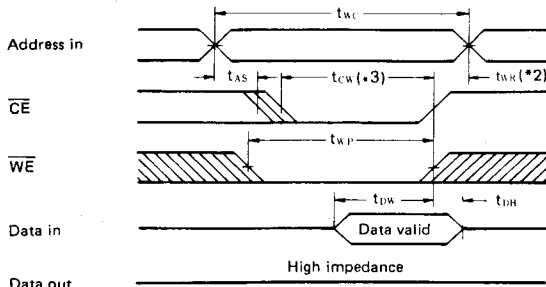
- Read cycle : $\overline{WE} = V_{IH}$



- Write cycle (1) : \overline{WE} control



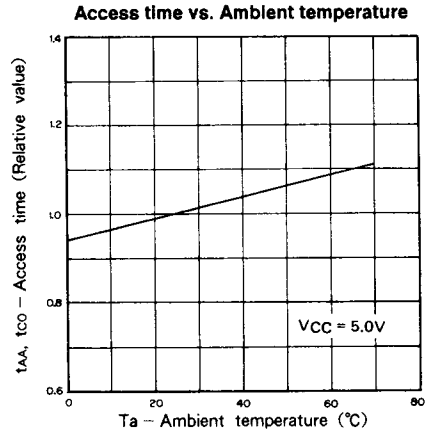
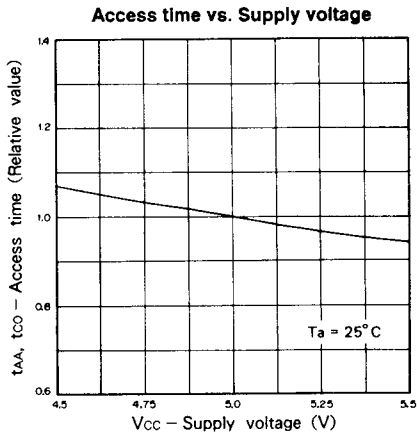
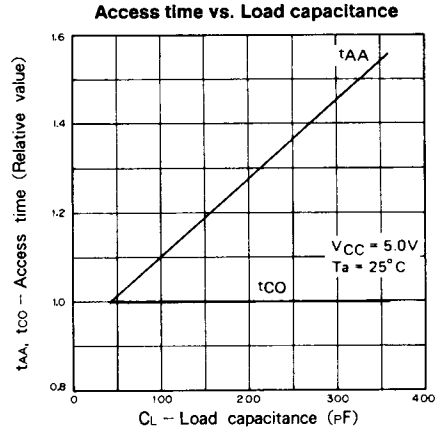
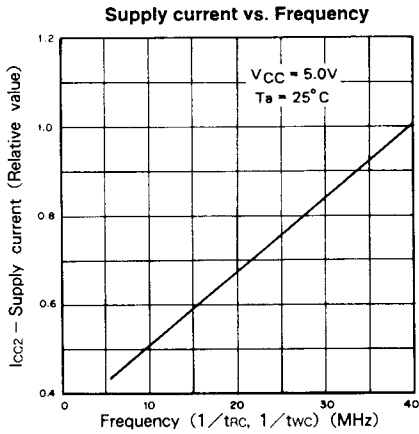
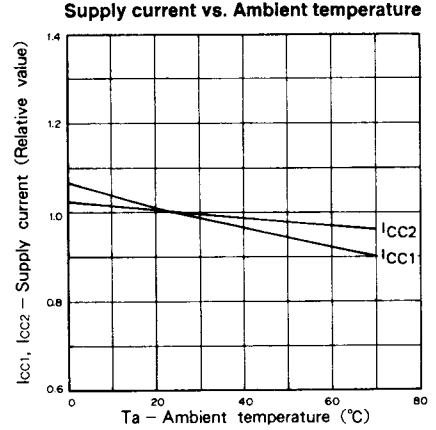
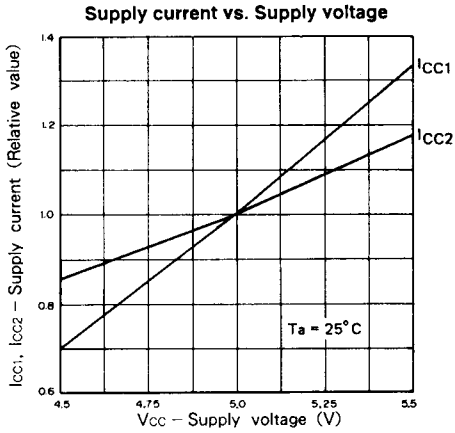
- Write cycle (2) : \overline{CE} control

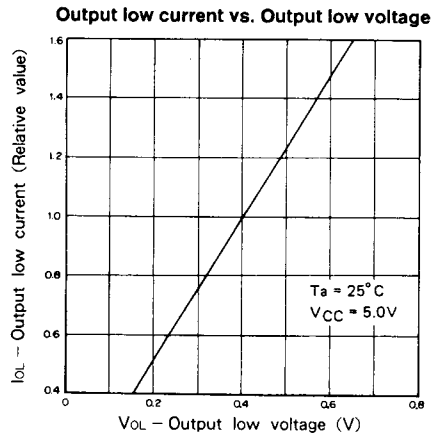
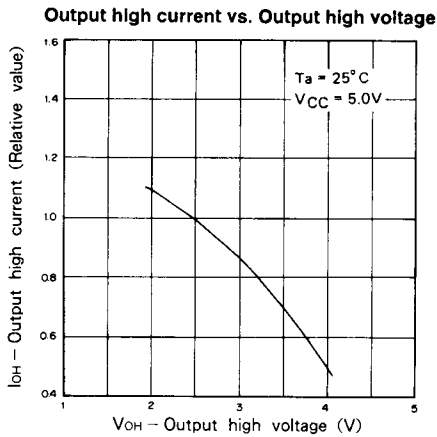
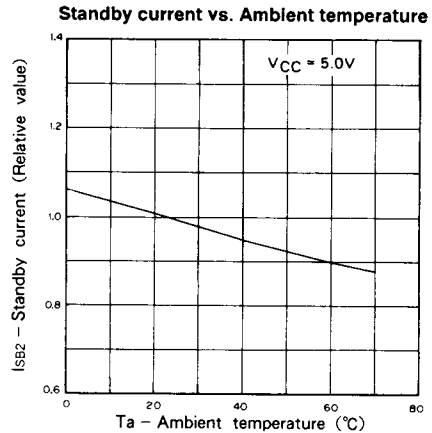
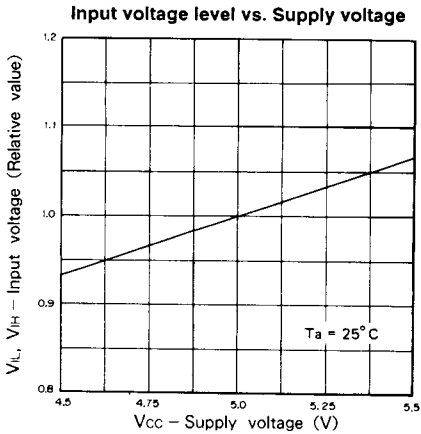
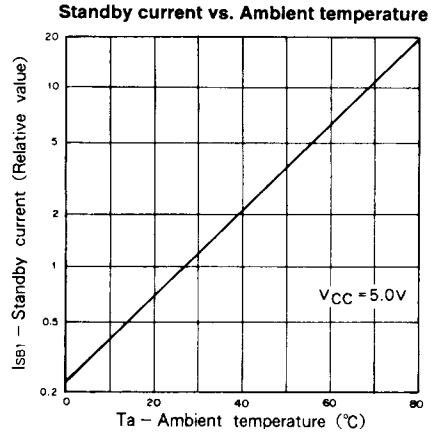
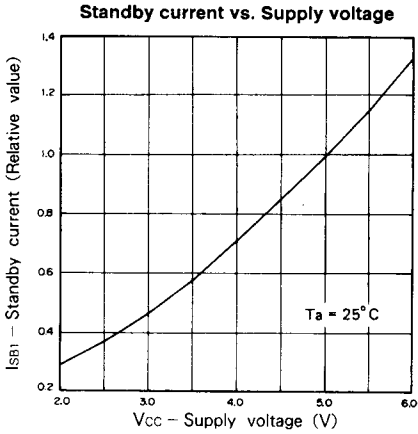


***Note)**

1. At any conditions, t_{HZ} is less than t_{LZ} .
2. t_{WR} is measured from the earlier of \overline{CE} or \overline{WE} going high to the end of write cycle.
3. A write occurs during the low overlap of \overline{CE} and \overline{WE} .
4. If \overline{CE} low transition occurs simultaneously with the \overline{WE} low transition or after the \overline{WE} transition, output remains in a high impedance state.
5. During this period, I/O pins are in the output state so that the input signals of opposite phase to the output must not be applied.

Example of Representative Characteristics

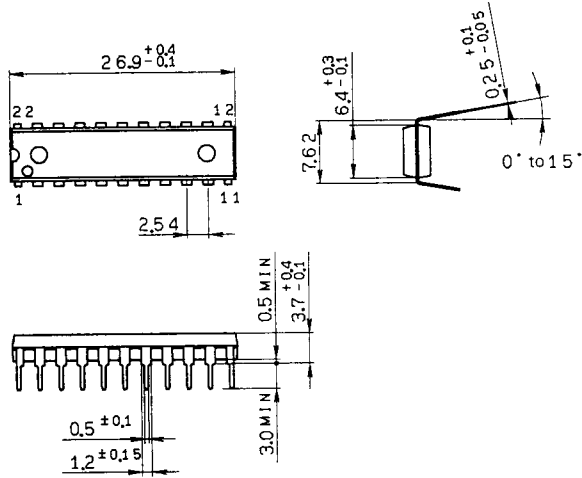




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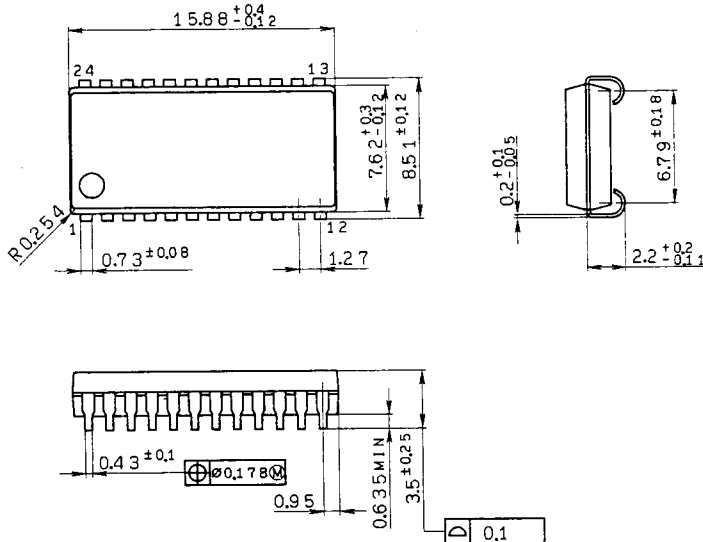
Package Outline Unit : mm

CXK5464AP 22 pin DIP (Plastic) 300mil 1.3g



DIP-22P-02

CXK5464AJ 24 pin SOJ (Plastic) 300mil 0.7g



SOJ-24P-01