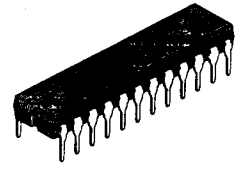
65,536-word × 4-bit High Speed CMOS Static RAM

Description

CXK54256P is a 262,144 bits high speed CMOS static RAM organized as 65,536 words by 4 bits and operates from a single 5V supply.

This device is suitable for use in high speed and low power applications.

24 pin DIP (Plastic)



Features

- Fast access time (Access time)
  CXK54256P-35 35ns (Max.)
  CXK54256P-45 45ns (Max.)
  CXK54256P-55 55ns (Max.)
- Low power consumption (operation) :100mW (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 : 300 mil 24 pin plastic package

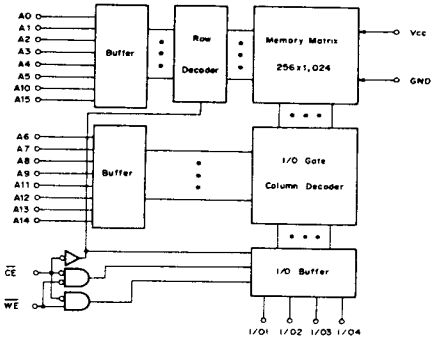
Structure

Silicon gate CMOS IC

Function

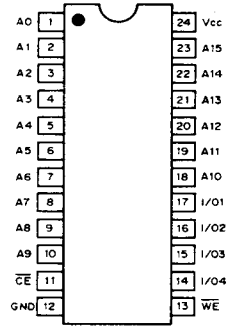
65,536-word × 4-bit static RAM

Block Diagram



Pin Configuration

(Top View)



Pin Description

Symbol	Description
A0 to A15	Address input
I/O1 to I/O4	Data input output
$\overline{CE}$	Chip enable input
$\overline{WE}$	Write enable input
Vcc	+5V power supply
GND	Ground

Absolute Maximum Ratings (Ta = 25℃, 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
Allowable power dissipation	P_D	1.0	W
Operating temperature	Topr	0 to + 70	℃
Storage temperature	Tstg	− 55 to + 150	℃
Soldering temperature • time	Tsolder	260 • 10	℃ • sec

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

Truth Table

$\overline{CE}$	$\overline{WE}$	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℃, GND = 0V)

Item	Symbol	Min.	Typ.	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*	—	0.8	V

***Note**) V_{IL} = − 3.0V Min. for pulse width less than 20ns.

3

Electrical Characteristics

• DC and operating characteristics (V_{CC} = 5V ± 10%, GND = 0V, Ta = 0 to +70°C)

Item	Symbol	Test condition	−35/45/55			Unit
			Min.	Typ.*	Max.	
Input leak current	I_{LI}	V_{IN} = GND to V_{CC} V_{CC} = 5.5V	−1	—	1	μA
Output leak current	I_{LO}	$\overline{CE}$ = V_{IH} $V_{I/O}$ = GND to V_{CC}	−1	—	1	μA
Operating power supply current	I_{CC1}	$\overline{CE}$ = V_{IL}, I_{OUT} = 0mA V_{IN} = V_{IH}/V_{IL}	—	20	45	mA
Average operating current	I_{CC2}	Cycle = Min, Duty = 100% I_{OUT} = 0mA	—	55	85	mA
Standby current	I_{SB1}	$\overline{CE}$ ≧ V_{CC} − 0.2V, V_{IN} ≧ V_{CC} − 0.2V or V_{IN} ≦ 0.2V	—	—	2	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} = 5V, Ta = 25°C

I/O capacitance (Ta = 25°C, f = 1MHz)

Item	Symbol	Test condition	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.

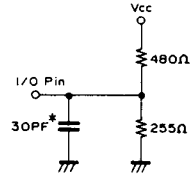
AC characteristics

• AC test conditions

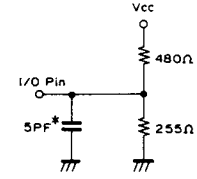
(V_{CC} = 5V ± 10%, Ta = 0 to +70°C)

Item	Condition
Input pulse high level	V_{IH} = 3.0V
Input pulse low level	V_{IL} = 0V
Input rise time	tr = 5ns
Input fall time	tf = 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	− 35		− 45		− 55		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Read cycle time	t_{RC}	35	—	45	—	55	—	ns
Address access time	t_{AA}	—	35	—	45	—	55	ns
Chip enable access time ($\overline{CE}$)	t_{CO}	—	35	—	45	—	55	ns
Output hold from address change	t_{OH}	5	—	5	—	5	—	ns
Chip enable to output in low Z ($\overline{CE}$)	t_{LZ}*	5	—	5	—	5	—	ns
Chip disable to output in high Z	t_{HZ}*	0	15	0	15	0	20	ns
Chip enable to power up time	t_{PU}	0	—	0	—	0	—	ns
Chip disable to power down time	t_{PD}	—	30	—	30	—	30	ns

***Note**) Transition is measured ± 200mV from steady voltage with specified loading in Fig. 1. This parameter is sampled and is not 100% tested.

● **Write cycle**

Item	Symbol	− 35		− 45		− 55		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Write cycle time	t_{WC}	35	—	45	—	55	—	ns
Address valid to end of write	t_{AW}	30	—	35	—	45	—	ns
Chip enable to end of write	t_{CW}	30	—	35	—	45	—	ns
Data to write time overlap	t_{DW}	15	—	20	—	25	—	ns
Data hold from write time	t_{DH}	0	—	0	—	0	—	ns
Write pulse width	t_{WP}	30	—	35	—	45	—	ns
Address set up 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	15	0	15	0	20	ns

***Note**) Transition is measured ± 200mV from steady voltage with specified loading in Fig. 1. This parameter is sampled and is not 100% tested.

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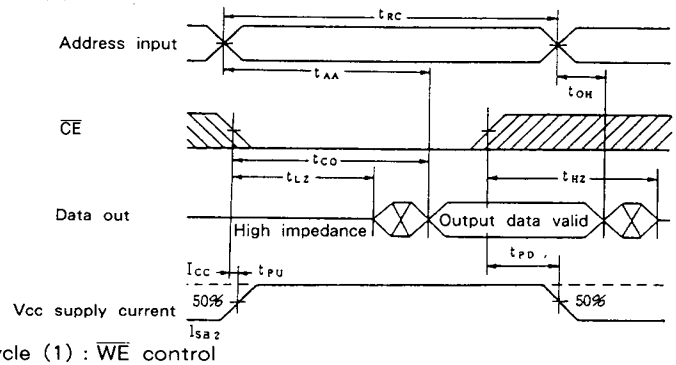
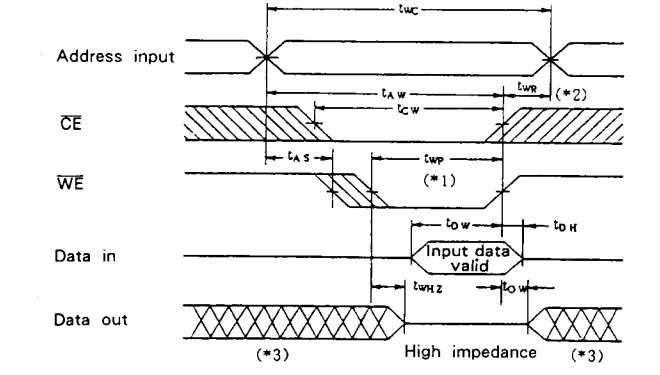
Timing Waveform

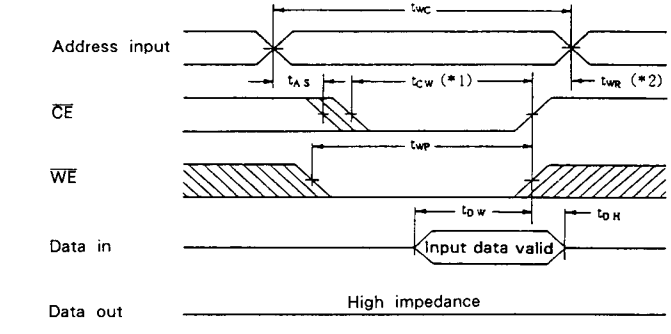
• Read cycle (1) : $\overline{WE}$ = V_{IH}



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



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

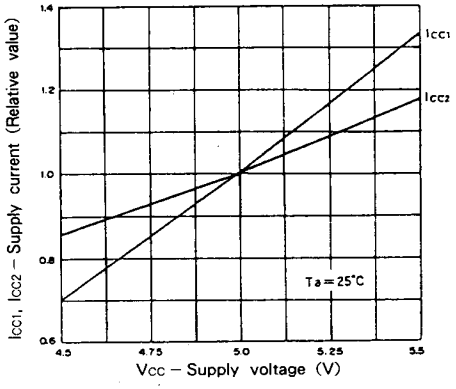


*** Note)**

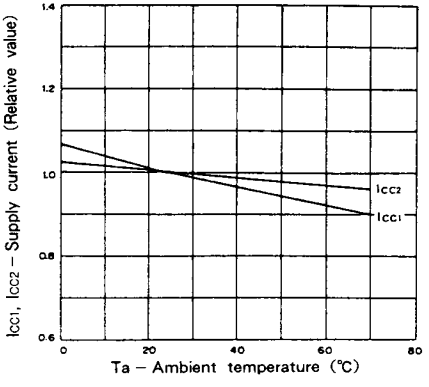
1. A write occurs during the low overlap of $\overline{CE}$ and $\overline{WE}$.
2. t_{WR} is measured from the earlier of $\overline{CE}$ or $\overline{WE}$ going high to the end of write cycle.
3. During this period, I/O pins are in the output state so that the input signals of opposite phase to the output must not be applied.

Example of Representative Characteristics

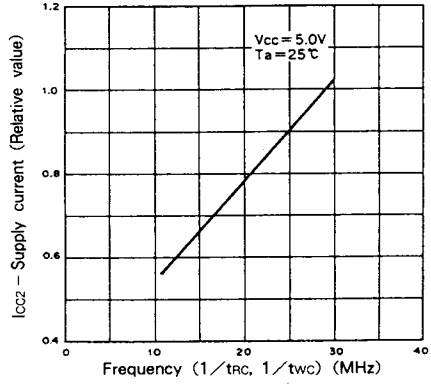
Supply current vs. Supply voltage



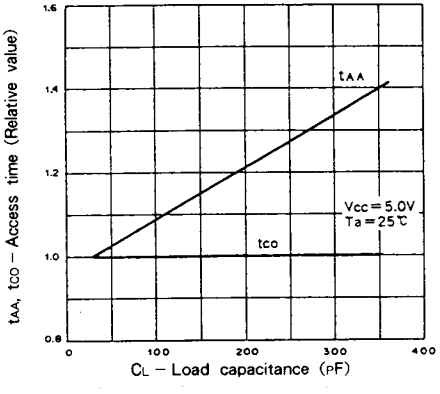
Supply current vs. Ambient temperature



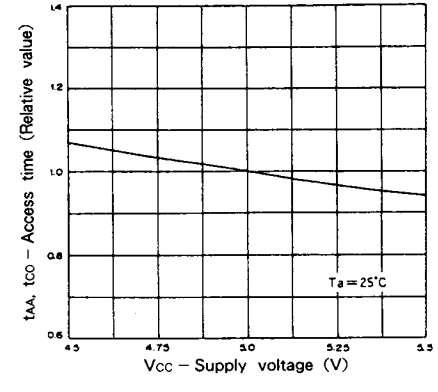
Supply current vs. Frequency



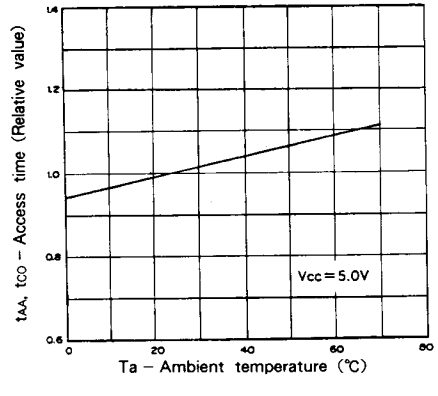
Access time vs. Load capacitance



Access time vs. Supply voltage



Access time vs. Ambient temperature



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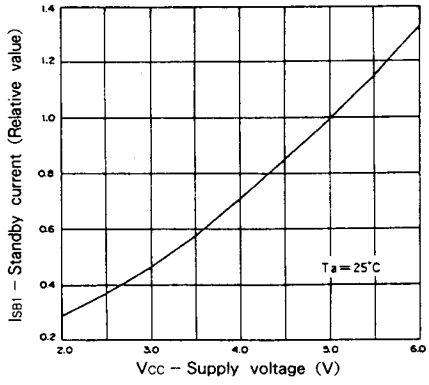
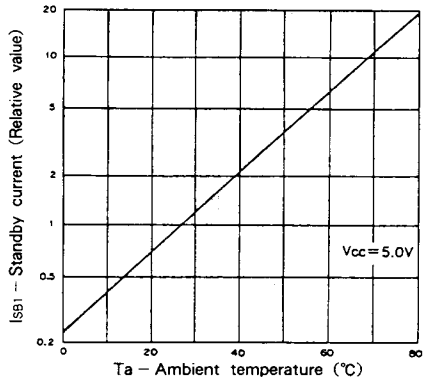
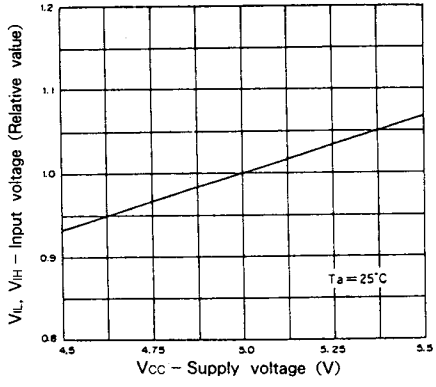
Standby current vs. Supply voltage



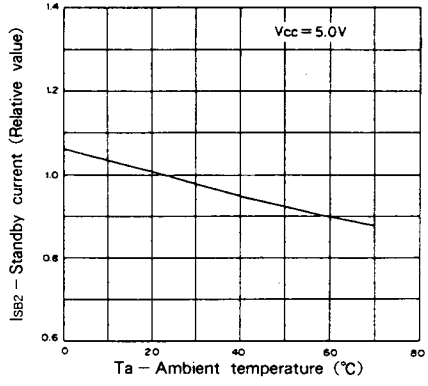
Standby current vs. Ambient temperature



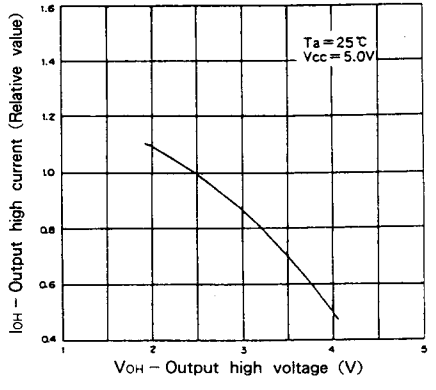
Input voltage level vs. Supply voltage



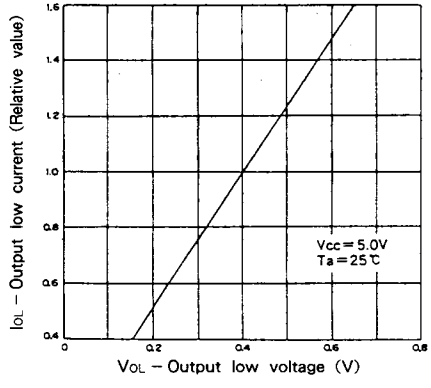
Standby current vs. Ambient temperature



Output high current vs. Output high voltage

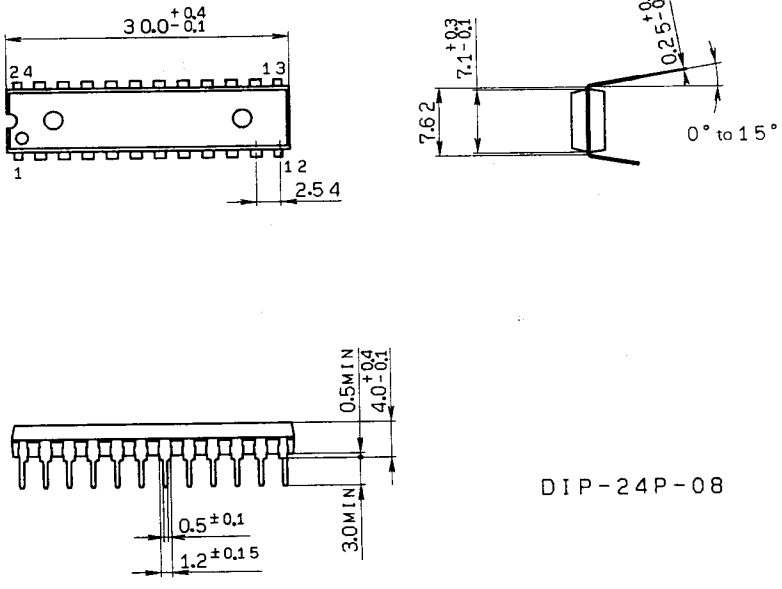


Output low current vs. Output low voltage



Package Outline Unit : mm

CXK54256P 24 pin DIP (Plastic) 300mil 1.5g



DIP-24P-08

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