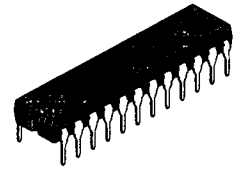
262,144-word × 1 bit High Speed CMOS Static RAM

Description

CXK51256P is 262,144-word × 1 bit high speed CMOS static RAM organized as 262,144-word by 1 bit 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)
  CXK51256P-35 35ns (Max.)
  CXK51256P-45 45ns (Max.)
  CXK51256P-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.
- Separate data input and output.
- Three-state output.
- Directly TTL compatible : All input and output.
- High density : 300mil 24 pin plastic package

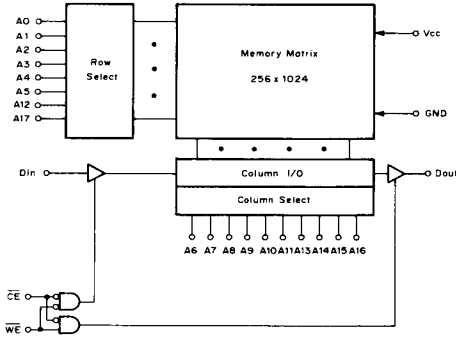
Function

262,144-word × 1 bit static RAM

Structure

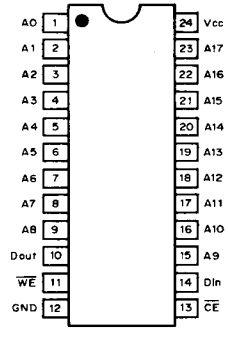
Silicon gate CMOS IC

Block Diagram



Pin Configuration

(Top View)



Pin Description

Symbol	Description
A0 to A17	Address input
Din	Data input
Dout	Data output
$\overline{CE}$	Chip enable input
$\overline{WE}$	Write enable input
Vcc	+5V Power supply
GND	Ground

Absolute Maximum Ratings

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
Voltage applied to output	V_{OUT}	− 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	Tsolder	260 • 10	℃ • sec

***Note**) V_{CC}, V_{IN}, V_{OUT} min = − 3.5V for pulse width less than 20ns.

Truth Table

$\overline{CE}$	$\overline{WE}$	Mode	Data out	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	High Z	I_{CC1}, I_{CC2}

X : "H" or "L"

DC Recommended Operating Conditions Ta = 0 to + 70℃, 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

Note) *1. V_{CC} = 5V, Ta = 25℃
*2. V_{IL} min = − 3.0V for pulse width less than 20ns.

3

Electrical Characteristics

DC and operating characteristics

V_{CC} = 5V ± 10%, GND = 0V, Ta = 0 to +70℃

Item	Symbol	Test condition	−35/45/55			Unit
			Min.	Typ.	Max.	
Input leakage current	I_{LI}	V_{IN} = GND to V_{CC} V_{CC} = 5.5V	−1	—	1	μA
Output leakage current	I_{LO}	$\overline{CE}$ = V_{IH} V_{OUT} = 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

I/O capacitance

Ta = 25℃, f = 1MHz

Item	Symbol	Test condition	Min.	Max.	Unit
Input capacitance	C_{IN}	V_{IN} = 0V	—	7	pF
Output capacitance	C_{OUT}	V_{OUT} = 0V	—	7	pF

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

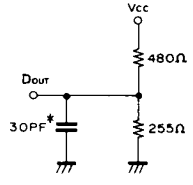
AC characteristics

- **AC test conditions**

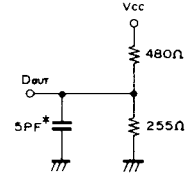
V_{CC} = 5V ± 10%, Ta = 0 to +70℃

Item	Condition
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 timing reference level	1.5V
Output load	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	20	0	20	0	25	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

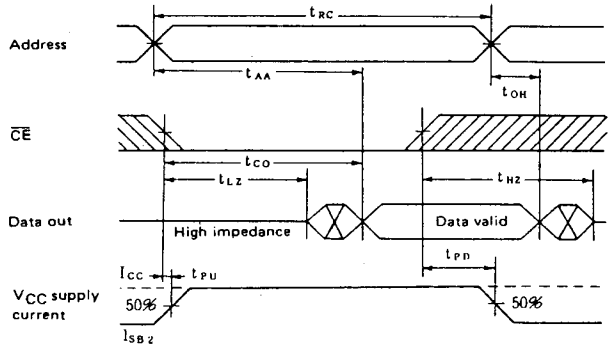
Item	Symbol	−35		−45		−55		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Write cycle time	t_{WC}	35	—	45	—	55	—	ns
Address valid to end of write	t_{AW}	30	—	35	—	45	—	ns
Chip enable to end of write	t_{CW}	30	—	35	—	45	—	ns
Data to write time overlap	t_{DW}	20	—	25	—	25	—	ns
Data hold from write time	t_{DH}	0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

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

3

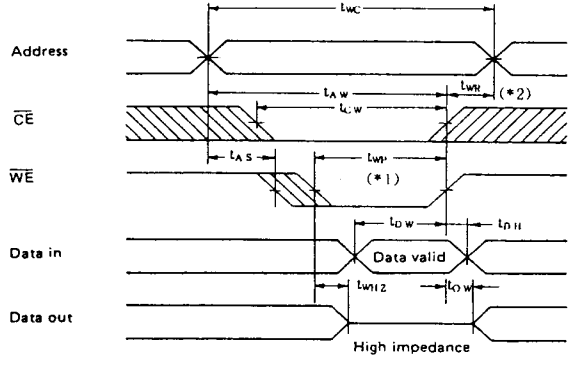
Timing Waveform

1) Read cycle [$\overline{WE}$ = V_{IH}]

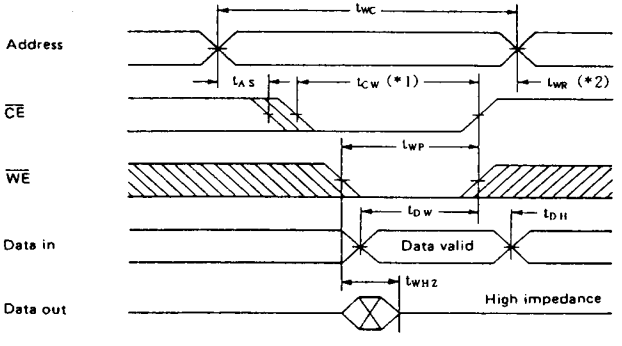


2) Write cycle

- Write cycle 1 : $\overline{WE}$ control



- Write cycle 2 : $\overline{CE}$ control

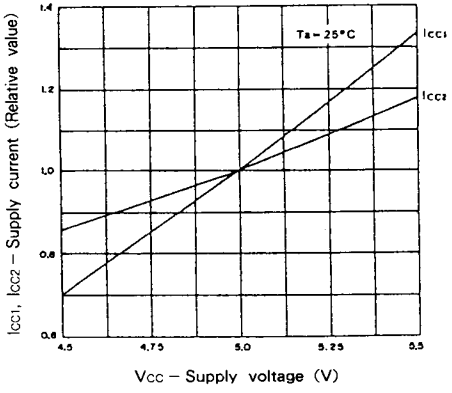


***Note)**

1. A write occures 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.

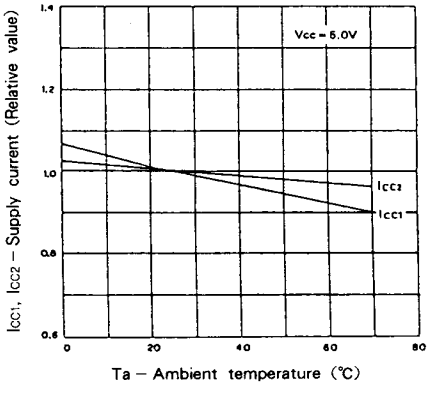
Example of Representative Characteristics

Supply current vs. Supply voltage



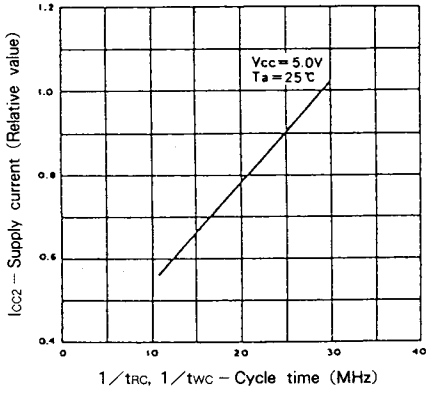
VCC – Supply voltage (V)

Supply current vs. Ambient temperature



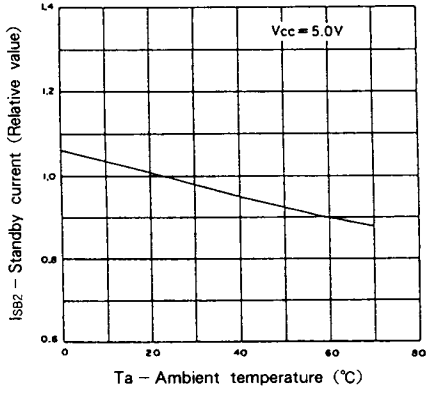
Ta – Ambient temperature (°C)

Supply current vs. Cycle time



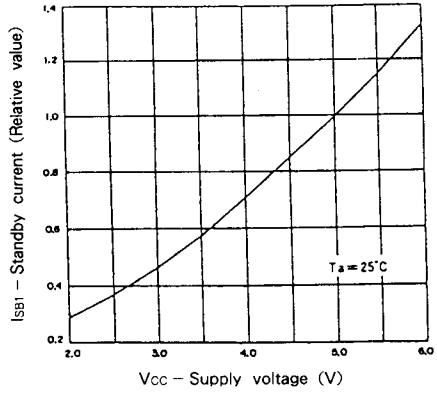
1/tRC, 1/twc – Cycle time (MHz)

Standby current vs. Ambient temperature



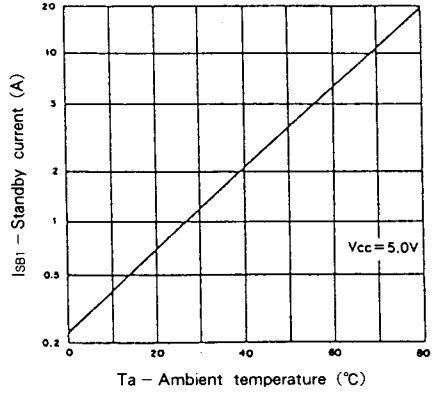
Ta – Ambient temperature (°C)

Standby current vs. Supply voltage



VCC – Supply voltage (V)

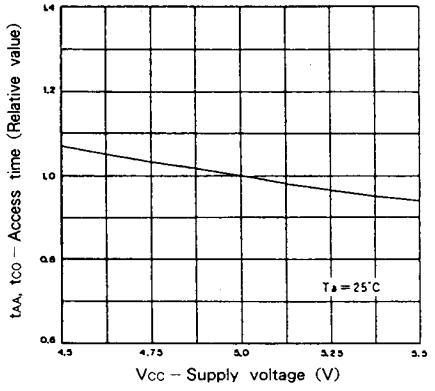
Standby current vs. Ambient temperature



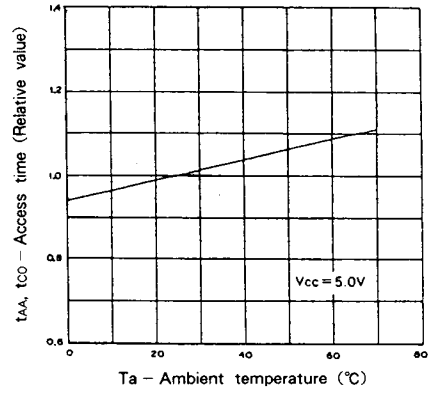
Ta – Ambient temperature (°C)

3

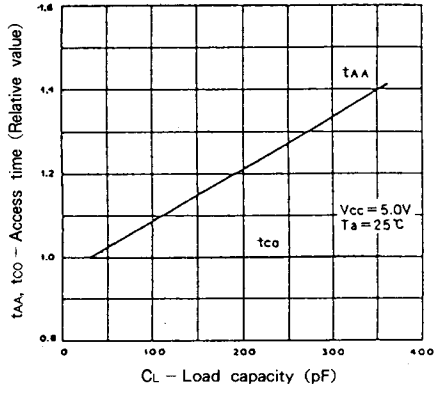
Access time vs. Supply voltage



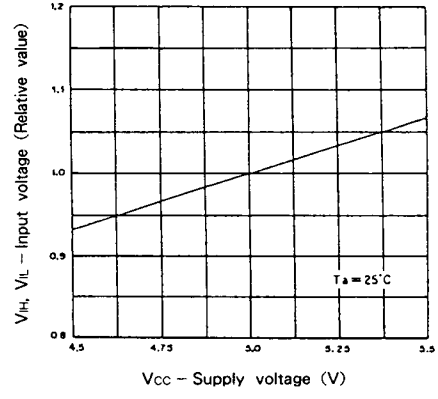
Access time vs. Ambient temperature



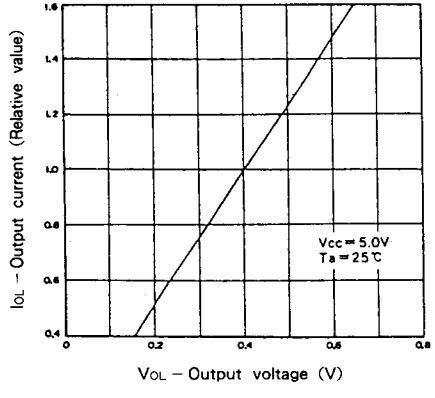
Access time vs. Load capacity



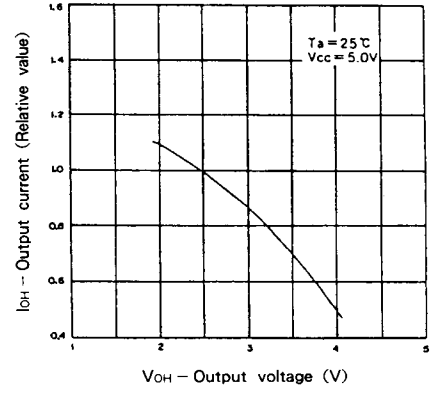
Input voltage vs. Supply voltage



Output current vs. Output voltage

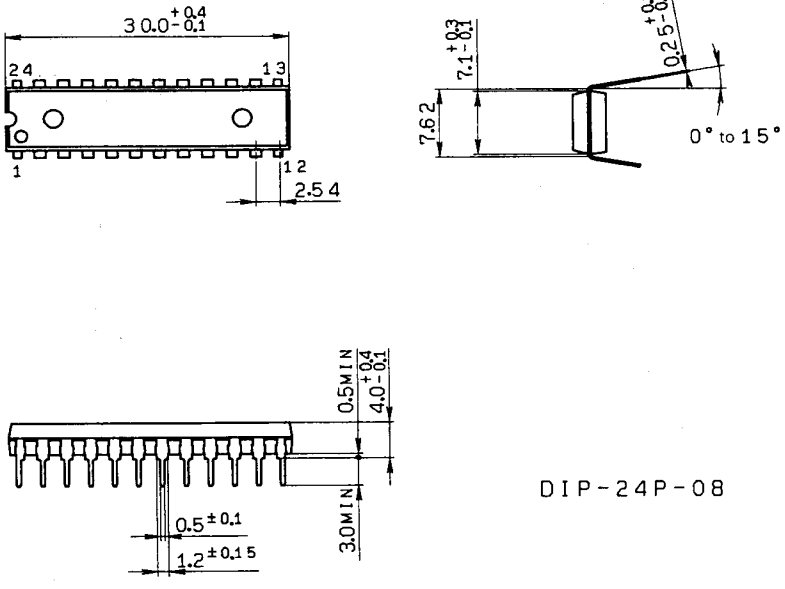


Output current vs. Output voltage



Package Outline Unit : mm

24 pin DIP (Plastic) 300mil 1.5g



DIP-24P-08

3