64K x 32 Static RAM Module

Features

- **High-density 2-Mbit SRAM module**
- **High-speed CMOS SRAMs**
  - **Access time of 25 ns**
- **Low active power**
  - **5.4W (max.)**
- **SMD technology**
- **TTL-compatible inputs and outputs**
- **Low profile**
  - **Max. height of .5 in.**
- **Small PCB footprint**
  - **1.0 sq. in.**

Functional Description

The CYM1832 is a high-performance 2-Mbit static RAM module organized as 64K words by 32 bits. This module is constructed from eight 64K x 4 SRAMs in SOJ packages mounted on an epoxy laminate board with pins. Four chip selects ($\overline{CS_1}$, $\overline{CS_2}$, $\overline{CS_3}$, and $\overline{CS_4}$) are used to independently enable the four bytes. Reading or writing can be executed on individual bytes or on any combination of multiple bytes through proper use of selects.

Writing to each byte is accomplished when the chip select ($\overline{CS_N}$) and write enable ($\overline{WE}$) inputs are both LOW. Data on the input/output pins (I/O_X) is written into the memory location specified on the address pins (A_0 through A_{15}).

Reading the device is accomplished by taking the chip selects ($\overline{CS_N}$) LOW, while write enable ($\overline{WE}$) remains HIGH. Under these conditions, the contents of the memory location specified on the address pins will appear on the data input/output pins (I/O_X).

The data input/output pins stay in the high-impedance state when write enable ($\overline{WE}$) is LOW or the appropriate chip selects are HIGH.

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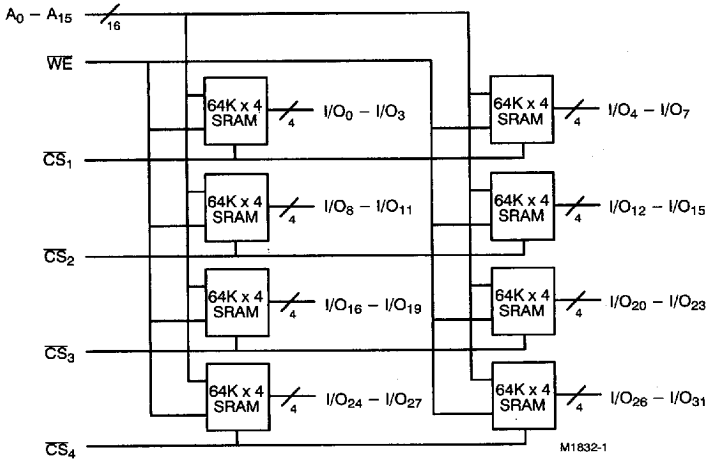
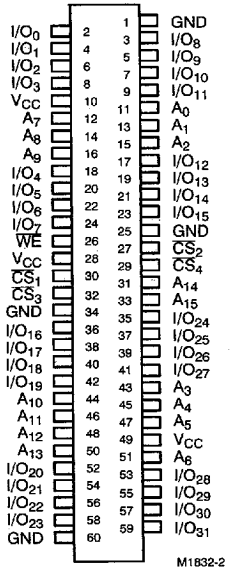
Logic Block Diagram



Pin Configuration

ZIP
Top View



Selection Guide

	1832–25	1832–35	1832–45	1832–55
Maximum Access Time (ns)	25	35	45	55
Maximum Operating Current (mA)	980	980	980	980
Maximum Standby Current (mA)	240	240	240	240

Maximum Ratings

(Above which the useful life may be impaired.)

Storage Temperature ..... −45°C to +125°C

Ambient Temperature with Power Applied ..... −10°C to +85°C

Supply Voltage to Ground Potential ..... −0.5V to +7.0V

DC Voltage Applied to Outputs in High Z State ..... −0.5V to +7.0V

DC Input Voltage ..... −0.5V to +7.0V

Output Current into Outputs (LOW) ..... 20 mA

Operating Range

Range	Ambient Temperature	V_{CC}
Commercial	0°C to +70°C	5V ± 10%

Electrical Characteristics Over the Operating Range

Parameter	Description	Test Conditions	CYM1832 Min.	CYM1832 Max.	Unit
V_{OH}	Output HIGH Voltage	V_{CC} = Min., I_{OH} = − 4.0 mA	2.4		V
V_{OL}	Output LOW Voltage	V_{CC} = Min., I_{OL} = 8.0 mA		0.4	V
V_{IH}	Input HIGH Voltage		2.2	V_{CC}	V
V_{IL}	Input LOW Voltage[1]		−0.5	0.8	V
I_{IX}	Input Load Current	GND ≤ V_I ≤ V_{CC}	−20	+20	µA
I_{OZ}	Output Leakage Current	GND ≤ V_O ≤ V_{CC}, Output Disabled	−100	+100	µA
I_{CC}	V_{CC} Operating Supply Current	V_{CC} = Max., I_{OUT} = 0 mA, $\overline{CS}_N$ ≤ V_{IL}		980	mA
I_{SB1}	Automatic $\overline{CS}$ Power-Down Current[2]	Max. V_{CC}, $\overline{CS}_N$ ≥ V_{IH}, Min. Duty Cycle = 100%		240	mA
I_{SB2}	Automatic $\overline{CS}$ Power-Down Current[2]	Max. V_{CC}, $\overline{CS}_N$ ≥ V_{CC} − 0.2V, V_{IN} ≥ V_{CC} − 0.2V or V_{IN} ≤ 0.2V		120	mA

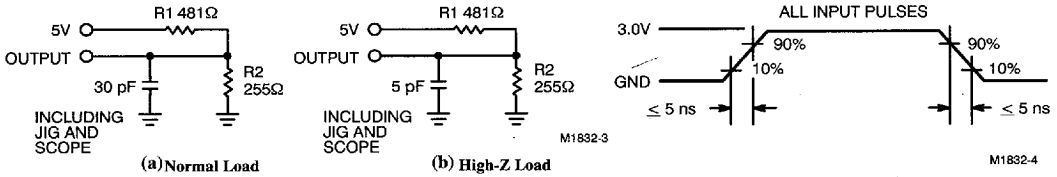
Capacitance[3]

Parameter	Description	Test Conditions	Max.	Unit
C_{INA}	Input Capacitance (A_X, $\overline{WE}$)	T_A = 25°C, f = 1 MHz, V_{CC} = 5.0V	60	pF
C_{INB}	Input Capacitance ($\overline{CS}$)		25	pF
C_{OUT}	Output Capacitance		15	pF

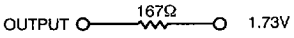
Notes:

1. V_{IL}(min.) = −3.0V for pulse widths less than 20 ns.
2. A pull-up resistor to V_{CC} on the $\overline{CS}$ input is required to keep the device deselected during V_{CC} power-up, otherwise I_{SB} will exceed values given.
3. Tested on a sample basis.

AC Test Loads and Waveforms



Equivalent to: THÉVENIN EQUIVALENT



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Switching Characteristics Over the Operating Range[4]

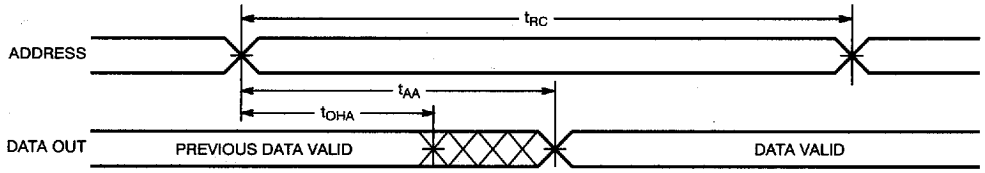
Parameter	Description	1832–25		1832–35		1832–45		1832–55		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
READ CYCLE										
t_{RC}	Read Cycle Time	25		35		45		55		ns
t_{AA}	Address to Data Valid		25		35		45		55	ns
t_{OHA}	Data Hold from Address Change	3		3		3		3		ns
t_{ACS}	$\overline{CS}$ LOW to Data Valid		25		35		45		55	ns
t_{LZCS}	$\overline{CS}$ LOW to Low Z[5]	2		3		3		3		ns
t_{HZCS}	$\overline{CS}$ HIGH to High Z[5, 6]	0	15	0	25	0	30	0	30	ns
t_{PU}	$\overline{CS}$ LOW to Power-Up	0		0		0		0		ns
t_{PD}	$\overline{CS}$ HIGH to Power-Down		25		35		45		55	ns
WRITE CYCLE[7]										
t_{WC}	Write Cycle Time	25		35		45		55		ns
t_{SCS}	$\overline{CS}$ LOW to Write End	20		30		40		45		ns
t_{AW}	Address Set-Up to Write End	20		30		35		45		ns
t_{HA}	Address Hold from Write End	2		2		5		5		ns
t_{SA}	Address Set-Up to Write Start	2		3		5		5		ns
t_{PWE}	$\overline{WE}$ Pulse Width	20		30		35		45		ns
t_{SD}	Data Set-Up to Write End	15		20		25		35		ns
t_{HD}	Data Hold from Write End	3		5		5		5		ns
t_{LZWE}	$\overline{WE}$ HIGH to Low Z	3		3		3		3		ns
t_{HZWE}	$\overline{WE}$ LOW to High Z[6]	0	15	0	15	0	20	0	30	ns

Notes:

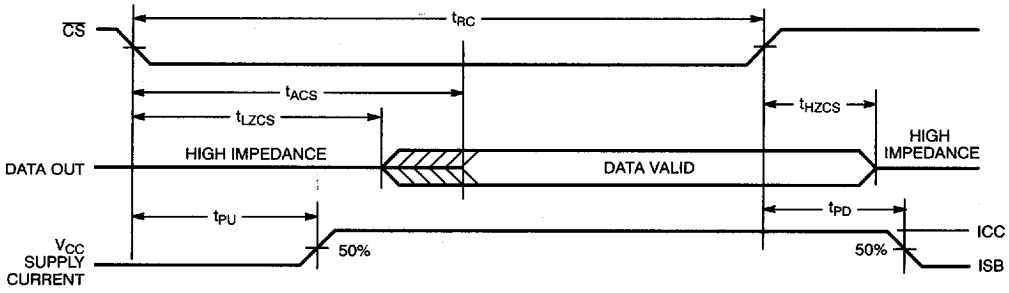
4. Test conditions assume signal transition times of 5 ns or less, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V, and output loading of the specified I_{OL}/I_{OH} and 30-pF load capacitance.
5. At any given temperature and voltage condition, t_{HZCS} is less than t_{LZCS} for any given device. These parameters are guaranteed by design and not 100% tested.
6. t_{HZCS} and t_{HZWE} are specified with $C_L = 5$ pF as in part (b) of AC Test Loads and Waveforms. Transition is measured ±500 mV from steady state voltage.
7. The internal write time of the memory is defined by the overlap of $\overline{CS}$ LOW and $\overline{WE}$ LOW. Both signals must be LOW to initiate a write and either signal can terminate a write by going HIGH. The data input set-up and hold timing should be referenced to the rising edge of the signal that terminates the write.

Switching Waveforms

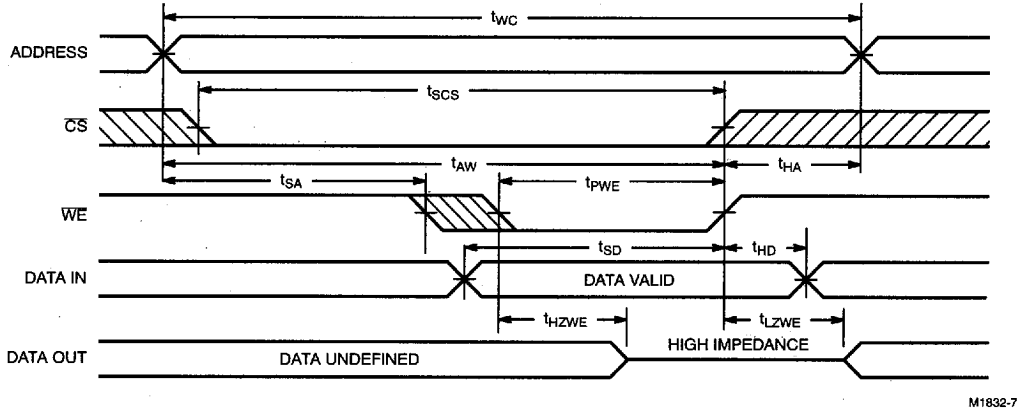
Read Cycle No. 1[8, 9]



Read Cycle No. 2[9, 10]



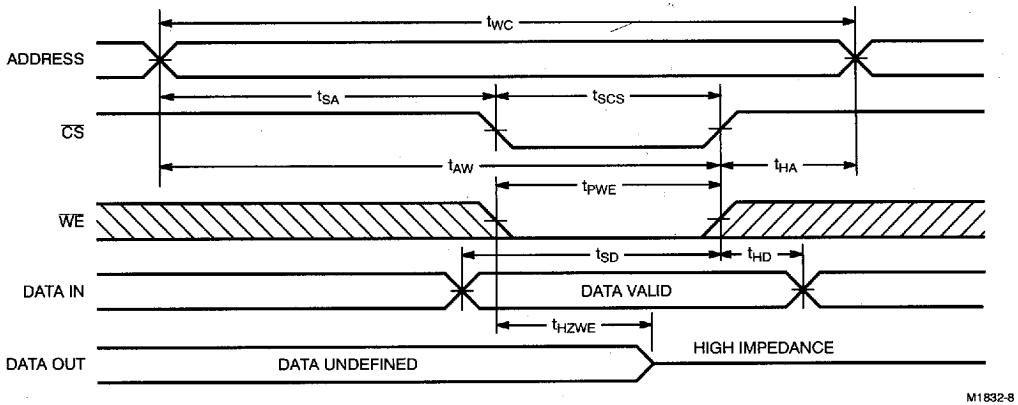
Write Cycle No. 1 ($\overline{WE}$ Controlled)[7]



Notes:
8. Device is continuously selected, $\overline{CS} = V_{IL}$.
9. $\overline{WE}$ is HIGH for read cycle.
10. Address valid prior to or coincident with $\overline{CS}$ transition LOW.

Switching Waveforms (continued)

Write Cycle No. 2 ($\overline{CS}$ Controlled)[7, 11]



Note:
11. If $\overline{CS}$ goes HIGH simultaneously with $\overline{WE}$ HIGH, the output remains in a high-impedance state.

Truth Table

$\overline{CS}_N$	$\overline{WE}$	Input/Outputs	Mode
H	X	High Z	Deselect/Power-Down
L	H	Data Out	Read
L	L	Data In	Write

Ordering Information

Speed	Ordering Code	Package Name	Package Type	Operating Range
25	CYM1832PZ–25C	PZ02	60-Pin Plastic ZIP Module	Commercial
35	CYM1832PZ–35C	PZ02	60-Pin Plastic ZIP Module	Commercial
45	CYM1832PZ–45C	PZ02	60-Pin Plastic ZIP Module	Commercial
55	CYM1832PZ–55C	PZ02	60-Pin Plastic ZIP Module	Commercial

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