



# 2x512Kx8 DUALITHIC™ SRAM

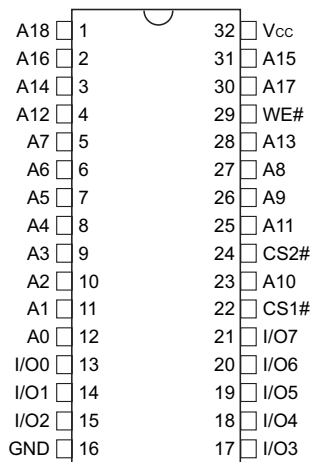
## FEATURES

- Access Times 70, 85, 100ns
- Evolutionary, Corner Power/Ground Pinout
- Packaging:
  - 32 pin, Hermetic Ceramic DIP (Package 300)
- Organized as two banks of 512Kx8
- Commercial, Industrial and Military Temperature Ranges
- 5 Volt Power Supply
- Low Power CMOS
- TTL Compatible Inputs and Outputs
- Output Enable Internally tied to GND.

\* This product is under development, is not qualified or characterized and is subject to change without notice.

### Pin Configuration FOR WS1M8-XCX

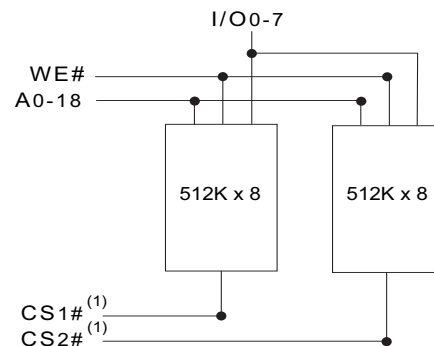
32 DIP  
Top View



### Pin Description

A0-18	Address Inputs
I/O0-7	Data Input/Output
CS1-2#	Chip Selects
WE#	Write Enable
Vcc	+5.0V Power Supply
GND	Ground

### Block Diagram



NOTE:

1. CS1# and CS2# are used to select the lower and upper 512Kx8 of the device. CS1# and CS2# must not be enabled at the same time.



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T <sub>A</sub>	-55	+125	°C
Storage Temperature	T <sub>STG</sub>	-65	+150	°C
Signal Voltage Relative to GND	V <sub>G</sub>	-0.5	V <sub>CC</sub> +0.5	V
Junction Temperature	T <sub>J</sub>		150	°C
Supply Voltage	V <sub>CC</sub>	-0.5	7.0	V

## TRUTH TABLE

CS#	WE#	Mode	Data I/O	Power
H	X	Standby	High Z	Standby
L	H	Read	Data Out	Active
L	L	Write	Data In	Active

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>CC</sub>	4.5	5.5	V
Input High Voltage	V <sub>IH</sub>	2.2	V <sub>CC</sub> + 0.3	V
Input Low Voltage	V <sub>IL</sub>	-0.3	+0.8	V
Operating Temp. (MIL)	T <sub>A</sub>	-55	+125	°C

## CAPACITANCE

T<sub>A</sub> = +25°C

Parameter	Symbol	Conditions	Max	Unit
Input capacitance	C <sub>IN</sub>	V <sub>IN</sub> = 0V, f = 1.0 MHz	28	pF
Output capacitance	C <sub>OUT</sub>	V <sub>OUT</sub> = 0V, f = 1.0 MHz	28	pF

This parameter is guaranteed by design but not tested.

## DC CHARACTERISTICS

V<sub>CC</sub> = 5.0V, V<sub>SS</sub> = 0V, -55°C ≤ T<sub>A</sub> ≤ +125°C

Parameter	Sym	Conditions	Min	Max	Units
Input Leakage Current	I <sub>LI</sub>	V <sub>CC</sub> = 5.5, V <sub>IN</sub> = GND to V <sub>CC</sub>		10	μA
Output Leakage Current	I <sub>LO</sub> <sup>1</sup>	CS# = V <sub>IH</sub> , V <sub>OUT</sub> = GND to V <sub>CC</sub>		10	μA
Operating Supply Current	I <sub>CC</sub> <sup>1</sup>	CS# = V <sub>IL</sub> , f = 5MHz, V <sub>CC</sub> = 5.5		55	mA
Standby Current	I <sub>SB</sub> <sup>1</sup>	CS# = V <sub>IH</sub> , f = 5MHz, V <sub>CC</sub> = 5.5		2	mA
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 2.1mA		0.4	V
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -1.0mA	2.4		V

NOTE: DC test conditions: V<sub>IH</sub> = V<sub>CC</sub> - 0.3V, V<sub>IL</sub> = 0.3V

1. OE# is internally tied to GND.

## DATA RETENTION CHARACTERISTICS

-55°C ≤ T<sub>A</sub> ≤ +125°C

Characteristic	Sym	Conditions	Min	Typ	Max	Units
Data Retention Supply Voltage	V <sub>DR</sub>	CS# ≥ V <sub>CC</sub> - 0.2V	2.0		5.5	V
Data Retention Current	I <sub>CCDR1</sub>	V <sub>CC</sub> = 3V		150	800*	μA

\* Also available in Low Power version. Please call factory for information.



**AC CHARACTERISTICS**

V<sub>CC</sub> = 5.0V, GND = 0V, -55°C ≤ T<sub>A</sub> ≤ +125°C

Parameter	Symbol	-70		-85		-100		Units
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	t <sub>RC</sub>	70		85		100		ns
Address Access Time	t <sub>AA</sub>		70		85		100	ns
Output Hold from Address Change	t <sub>OH</sub>	0		0		0		ns
Chip Select Access Time	t <sub>ACS</sub>		70		85		100	ns
Chip Select to Output in Low Z	t <sub>CLZ</sub> <sup>1</sup>	5		5		5		ns
Chip Disable to Output in High Z	t <sub>CHZ</sub> <sup>1</sup>		25		25		25	ns

1. This parameter is guaranteed by design but not tested.

**AC CHARACTERISTICS**

V<sub>CC</sub> = 5.0V, GND = 0V, -55°C ≤ T<sub>A</sub> ≤ +125°C

Parameter	Symbol	-70		-85		-100		Units
		Min	Max	Min	Max	Min	Max	
Write Cycle Time	t <sub>WC</sub>	70		85		100		ns
Chip Select to End of Write	t <sub>CW</sub>	60		75		80		ns
Address Valid to End of Write	t <sub>AW</sub>	60		75		80		ns
Data Valid to End of Write	t <sub>DW</sub>	30		30		40		ns
Write Pulse Width	t <sub>WP</sub>	50		50		60		ns
Address Setup Time	t <sub>AS</sub>	0		0		0		ns
Address Hold Time	t <sub>AH</sub>	5		5		5		ns
Output Active from End of Write	t <sub>OW</sub> <sup>1</sup>	5		5		5		ns
Write Enable to Output in High Z	t <sub>WHZ</sub> <sup>1</sup>		25		25		35	ns
Data Hold Time	t <sub>DH</sub>	0		0		0		ns

1. This parameter is guaranteed by design but not tested.

**AC TEST CIRCUIT**

The diagram shows an AC test circuit. It features a bridge circuit with four diodes. A D.U.T. (Device Under Test) is connected to the bridge. A current source is connected to the top node, and another current source is connected to the bottom node. The bridge is connected to a bipolar supply V<sub>Z</sub> = 1.5V. A capacitor C<sub>eff</sub> = 50 pf is connected to the D.U.T. input. The output current is labeled I<sub>OL</sub> and I<sub>OH</sub>.

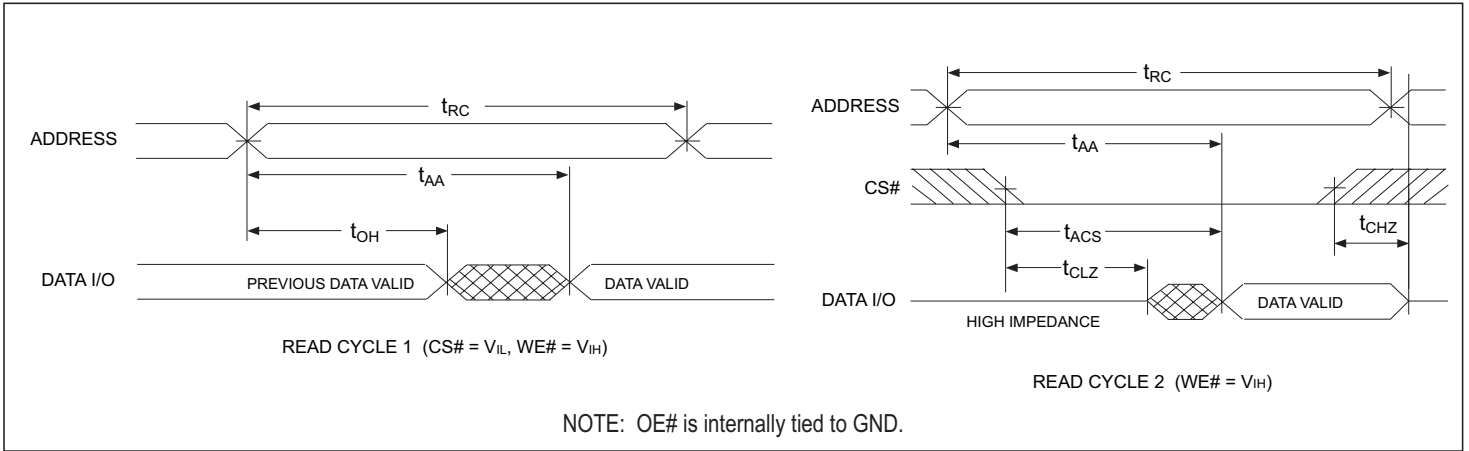
**AC Test Conditions**

Parameter	Typ	Unit
Input Pulse Levels	V <sub>IL</sub> = 0, V <sub>IH</sub> = 3.0	V
Input Rise and Fall	5	ns
Input and Output Reference Level	1.5	V
Output Timing Reference Level	1.5	V

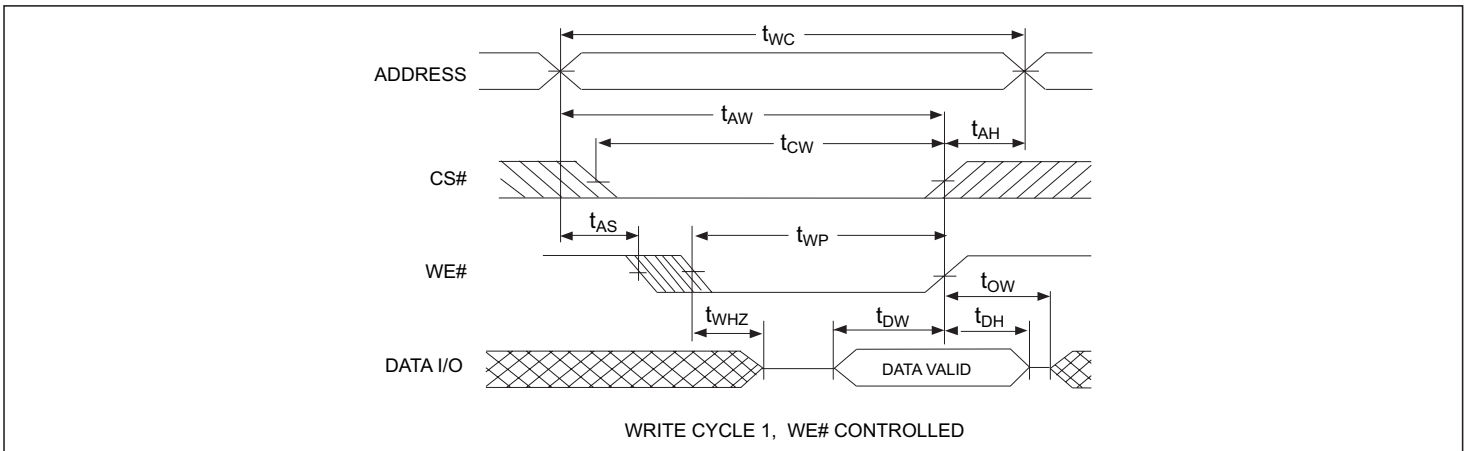
Notes:  
V<sub>Z</sub> is programmable from -2V to +7V.  
I<sub>OL</sub> & I<sub>OH</sub> programmable from 0 to 16mA.  
Tester Impedance Z<sub>0</sub> = 75Ω.  
V<sub>Z</sub> is typically the midpoint of V<sub>OH</sub> and V<sub>OL</sub>.  
I<sub>OL</sub> & I<sub>OH</sub> are adjusted to simulate a typical resistive load circuit.  
ATE tester includes jig capacitance.



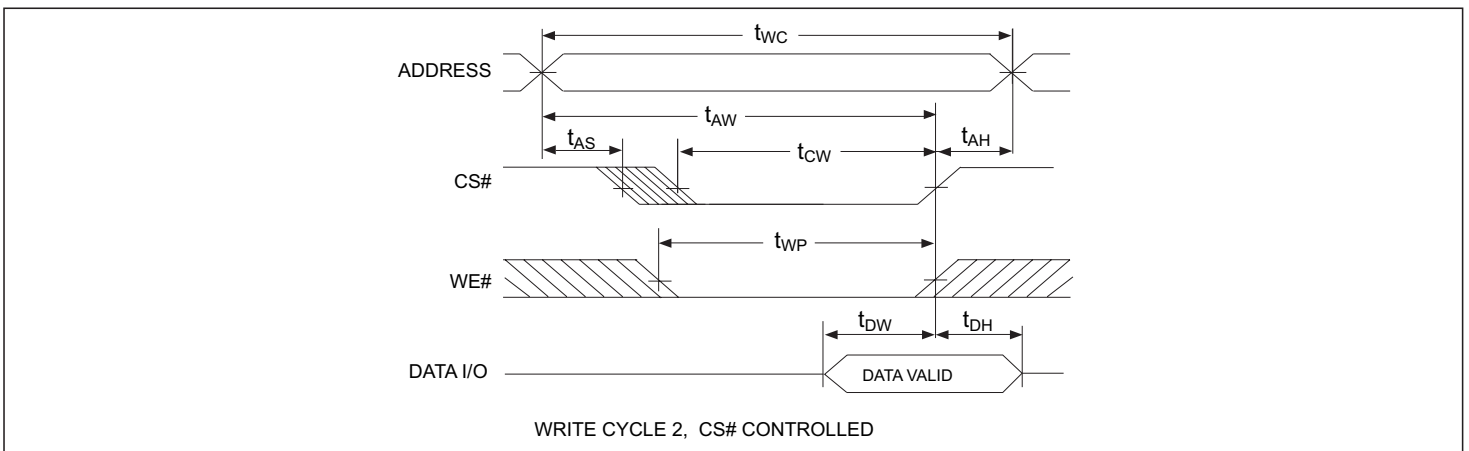
TIMING WAVEFORM – READ CYCLE



WRITE CYCLE – WE# CONTROLLED

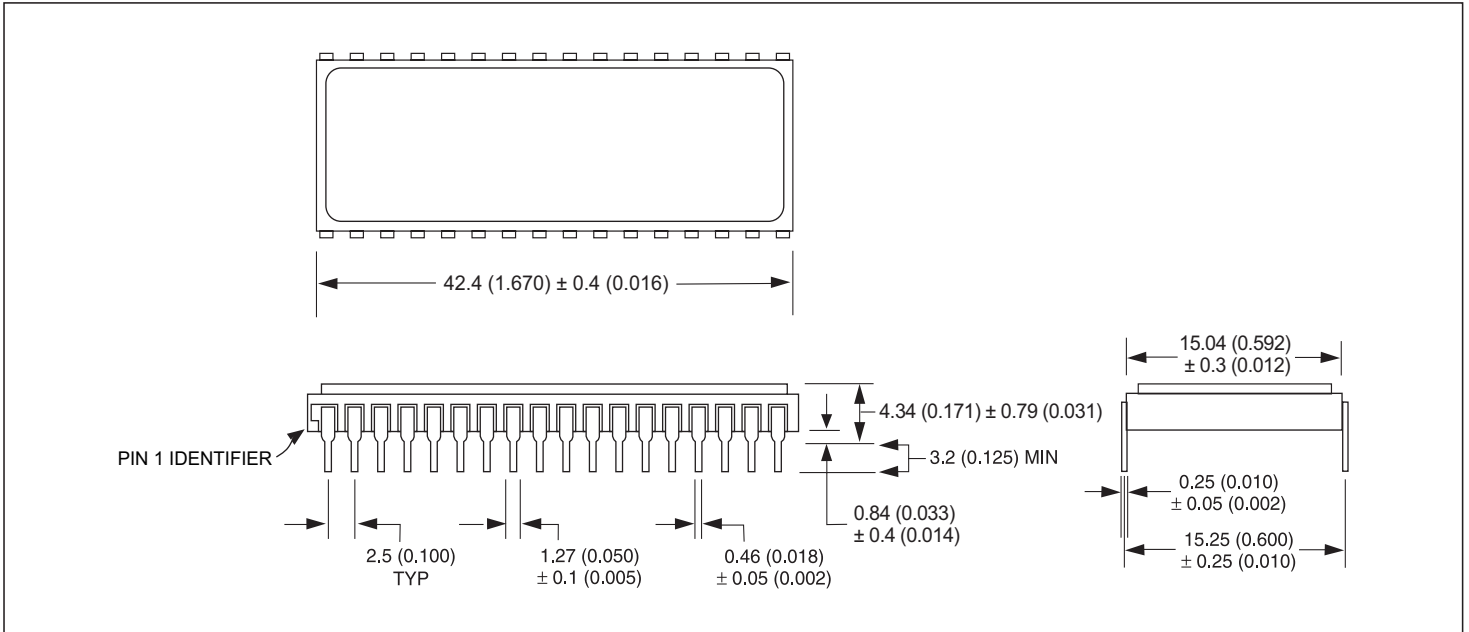


WRITE CYCLE – CS# CONTROLLED





PACKAGE 300: 32 PIN, CERAMIC DIP, SINGLE CAVITY SIDE BRAZED



ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES

ORDERING INFORMATION

W S 1M8 - XXX C X X

LEAD FINISH:

- Blank = Gold plated leads
- A = Solder dip leads

DEVICE GRADE:

- M = Military Screened -55°C to +125°C
- I = Industrial -40°C to +85°C
- C = Commercial 0°C to +70°C

PACKAGE:

- C = Ceramic 0.600" DIP (Package 300)

ACCESS TIME (ns)

ORGANIZATION, two banks of 512K x 8

SRAM

WHITE ELECTRONIC DESIGNS CORP.