# 512Kx8 PLASTIC SRAM

PLASTIC PLUS® FEATURES

- Access Times of 15, 20, 25ns
- Standard Commercial Off-The-Shelf (COTS) Memory Devices for Extended Temperature Range
- JEDEC Standard 36 pin Plastic SOJ Package
- Electrical and Speed Characteristics for:
  - Military Temperature (-55°C to +125°C)
  - Industrial Temperature (-40°C to +85°C)
- Burn-in and Temperature Cycling Available
- Organized as 512K x 8
- Center Power/Ground Pins (Revolutionary)
- 5 Volt Power Supply
- Low Power ("L") Version Available
- Battery Back-Up Operation

* This product is subject to change without notice.

PIN CONFIGURATION FOR WPS512K8X-XRJX

Top View
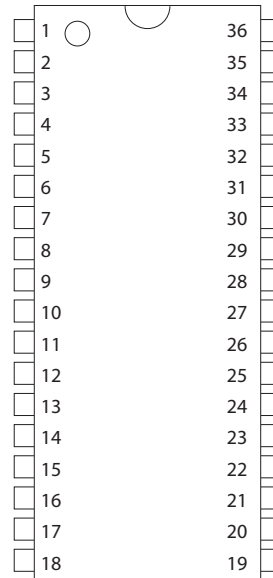
PIN DESCRIPTION

A_{0-18}	Address Inputs
I/0A0-19	Data Input/Output
WE#	Chip Select
CS#	Output Enable
OE#	Write Enable
V_{CC}	+5.0V Power
V_{SS}	Ground
NC	Not Connected

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Operating Temperature (Mil.)	T_A	-55	+125	°C
Operating Temperature (Ind.)	T_A	-40	+85	°C
Storage Temperature	T_{STG}	-65	+150	°C
Signal Voltage Relative to V_{SS}	V_G	-0.5	V_{CC} + 0.5	V
Supply Voltage	V_{CC}	-0.5	7.0	V

NOTES:

1. Minimum DC voltage is -0.5V on input/output pins. During transitions, this level may undershoot to -2.0V for periods <20ns. Maximum DC voltage on input/output pins is V_{CC} + 0.5V which, during transitions, may overshoot to V_{CC} + 2.0V for periods <20ns.
2. Minimum DC input voltage on pins A9, OE#, and RESET is -0.5V. During voltage transitions, A9, OE#, and RESET may undershoot V_{SS} to -2.0V for periods of up to 20ns. See Figure 6. Maximum DC input voltage on pin A9 is +12.5V which may overshoot to +13.5V for periods up to 20ns.
3. Output shorted for no more than one second. No more than one output shorted at a time.

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a Stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	4.5	5.5	V
Input High Voltage	V_{IH}	2.2	V_{CC} + 0.5	V
Input Low Voltage	V_{IL}	-0.3	+0.8	V
Operating Temp. (Mil.)	T_A	-55	+125	°C
Operating Temp. (Ind.)	T_A	-40	+85	°C

CAPACITANCE
T_A = +25°C

Parameter	Symbol	Conditions	Max	Unit
Input capacitance	C_{IN}	V_{IN} = 0V, f = 1.0 MHz	6	pF
Output capacitance	C_{OUT}	V_{IN} = 0V, f = 1.0 MHz	8	pF

This parameter is guaranteed by design but not tested.

TRUTH TABLE

CS	WE#	OE#	Mode	I/O Pin	VCC Current
H	X	X	Power Down	High-Z	I_{SB}
L	H	H	Out Disable	High-Z	I_{CC}
L	H	L	Read	D_{OUT}	I_{CC}
L	L	X	Write	D_{IN}	I_{CC}

DC CHARACTERISTICS
V_{CC} = 5.0V, V_{SS} = 0V, T_A = -55 +125°C

Parameter	Symbol	Conditions	Min	Max	Unit
Input Leakage Current	I_{LI}	V_{CC} = 5.5, V_{IN} = V_{SS} to V_{CC}		10	µA
Output Leakage Current	I_{LO}	CS = V_{IH}, OE = V_{IH}, V_{OUT} = V_{SS} to V_{CC}		10	µA
V_{CC} Read Current (1, 2)	I_{CC}	CS = V_{IL}, OE = V_{IH}, f = 5MHz, Vcc = 5.5		180	mA
V_{CC} Standby Current (2, 5)	I_{BS}	CS = V_{IH}, OE = V_{IH}, f = 5MHz, Vcc = 5.5		15	µA
Output Low Voltage	V_{OL}	I_{OL} = 8.0mA, Vcc = 4.5		0.4	V
Output High Voltage	V_{OH}	I_{OH} = -4.0mA, Vcc = 4.5	2.4		V

NOTES: DC test conditions: VIL = 0.3V, VIH = Vcc -0.3V

Data Retention Characteristics
(WPS512K8L-XRJX Only)
(TA = -55°C TO +125°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Data Retention Supply Voltage	I_{LI}	V_{CC} = 5.5, V_{IN} = V_{SS} to V_{CC}	2.0		5.5	V
Low Power Data Retention	I_{LO}	CS = V_{IH}, OE = V_{IH}, V_{OUT} = V_{SS} to V_{CC}		300	800	µA

AC CHARACTERISTICS

(V_{CC} = 5.0V, V_{SS} = 0V, TA = -55°C TO +125°C)

Parameter	Symbol	-15[+]		-20		-25		Unit
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	t_{RC}	15		20		25		ns
Address Access Time	t_{AA}		15		20		25	ns
Output Hold from Address Change	t_{OH}	0		0		0		ns
Chip Select Access Time	t_{ACS}		15		20		25	ns
Output Enable to Output Valid	t_{OE}		8		10		12	ns
Chip Select to Output in Low Z	t_{CLZ}[1]	3		3		3		ns
Output Enable to Output in Low Z	t_{OLZ}[1]	0		0		0		ns
Chip Disable to Output in High Z	t_{CHZ}[1]		7		8		10	ns
Output Disable to Output in High Z	t_{OHZ}[1]		7		8		10	ns

* 15ns bit available in the lower power option

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

AC CHARACTERISTICS

V_{CC} = 5.0V, GND = 0V, -55°C ≤ T_A ≤ +125°C

Parameter	Symbol	-15[+]		-20		-25		Unit
		Min	Max	Min	Max	Min	Max	
Write Cycle Time	t_{WC}	15		20		25		ns
Chip Select to End of Write	t_{CW}	12		12		15		ns
Address Valid to End of Write	t_{AW}	12		12		15		ns
Data Valid to End of Write	t_{DW}	8		9		10		ns
Write Pulse Width	t_{WP}	12		13		15		ns
Address Setup Time	t_{AS}	0		0		0		ns
Address Hold Time	t_{AH}	0		0		0		ns
Output Active from End of Write	t_{OW}[1]	0		0		0		ns
Write Enable to Output in High Z	t_{WHZ}[1]		8		8		10	ns
Data Hold Time	t_{DH}	0		0		0		ns

* 15ns bit available in the lower power option

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

## AC TEST CONDITIONS

D.U.T.
C_{eff} = 50 pf
I_{OL}
Current Source
I_{OH}
Current Source
V_Z 1.5V
(Bipolar Supply)

AC TEST CONDITIONS

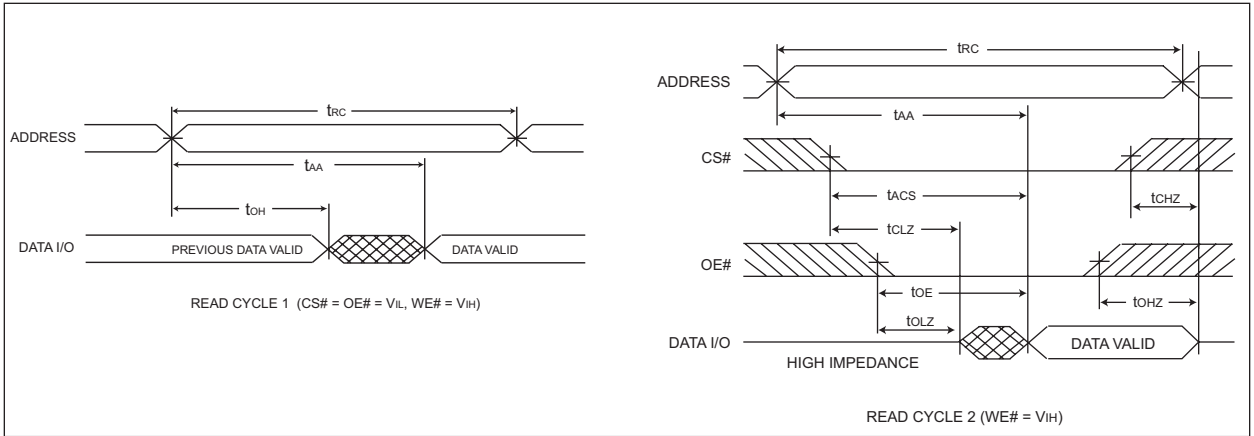| Parameter	Typ	Unit
Input Pulse Levels	V_{IL} = 0, V_{IH} = 3.0	V
Input Rise and Fall	5	ns
Input and Output Reference Level	1.5	V
Output Timing Reference Level	1.5	V

Notes:
VZ is programmable from -2V to +7V.
I_{OL} & I_{OH} programmable from 0 to 16mA.
Tester Impedance Z0 = 75 Ω.
VZ is typically the midpoint of VOH and VOL.
I_{OL} & I_{OH} are adjusted to simulate a typical resistive load circuit.
ATE tester includes jig capacitance.
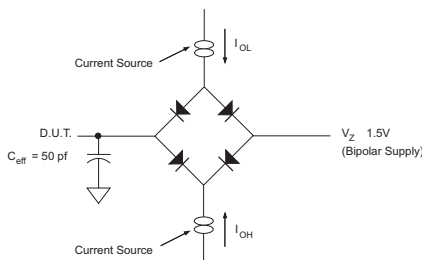
TIMING WAVEFORM - READ CYCLE

READ CYCLE 1 (CS# = OE# = V$_{IL}$, WE# = V$_{IH}$)

READ CYCLE 2 (WE# = V$_{IH}$)

WRITE CYCLE - WE# CONTROLLED

WRITE CYCLE 1, WE# CONTROLLED
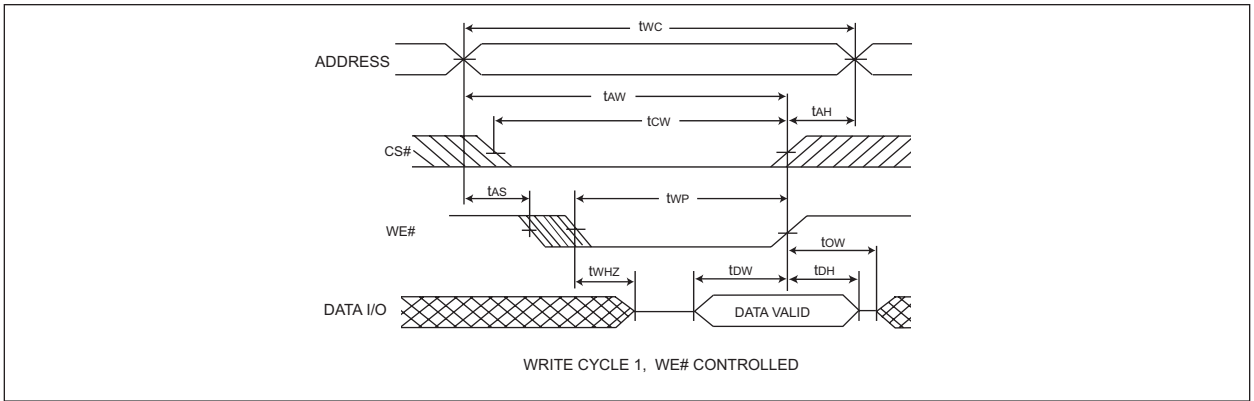
WRITE CYCLE - CS# CONTROLLED

WRITE CYCLE 2, CS# CONTROLLED

White Electronic Designs Corp. reserves the right to change products or specifications without notice.

WPS512K8X-XRJX

PACKAGE 101: 32 LEAD, CERAMIC SOJ

ORDERING INFORMATION

W P S 512K 8 X X - XXX RJ X

WHITE ELECTRONIC DESIGNS CORP.

PLASTIC PLUS®

SRAM

ORGANIZATION, 512K x 8

Blank = Standard Power

L = Low Power

IMPROVEMENT MARK:

    B = Burn-in

    T = Temperature Cycling

    C = Burn-in and Temperature Cycle

ACCESS TIME (ns):

PACKAGE:

    RJ = Revolutionary

DEVICE GRADE:

    M = Military Temperature   -55°C to +125°C

    I = Industrial Temperature   -40°C to +85°C