512Kx16 SRAM MODULE *ADVANCED**

FEATURES

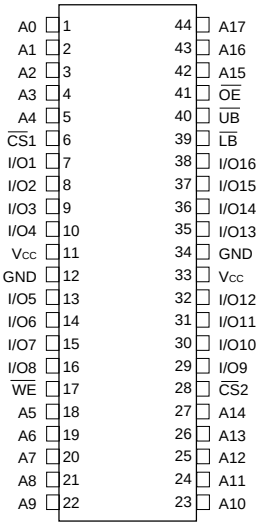
- Access Times 17, 20, 25, 35ns
- MIL-STD-883 Compliant Devices Available
- Packaging
  - 44 pin Ceramic SOJ (Package 102)
  - 44 lead Ceramic Flatpack (Package 209)
- Organized as two banks of 256Kx16
- Data Byte Control:
  Lower Byte ($\overline{LB}$) = I/O1-8
  Upper Byte ($\overline{UB}$) = I/O9-16
- Data I/O Compatible with 3.3V devices
- 2V Minimum Data Retention for battery back up operation
- Commercial, Industrial and Military Temperature Range
- 5 Volt Power Supply (3.3V parts also available)
- Low Power CMOS
- TTL Compatible Inputs and Outputs

* *This data sheet describes a product that may or may not be under development and is subject to change or cancellation without notice.*

PIN CONFIGURATION FOR WS512K16-XXX

44 CSOJ
44 FLATPACK

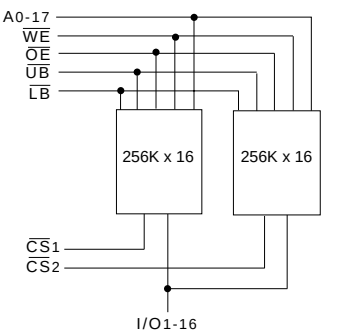
TOP VIEW



PIN DESCRIPTION

A0-17	Address Inputs
$\overline{LB}$	Lower-Byte Control (I/O1-8)
$\overline{UB}$	Upper-Byte Control (I/O9-16)
I/O1-16	Data Input/Output
$\overline{CS}$1-2	Chip Select
$\overline{OE}$	Output Enable
$\overline{WE}$	Write Enable
VCC	+5.0V Power
GND	Ground
NC	No Connection

BLOCK DIAGRAM



TRUTH TABLE

$\overline{CS_1}$	$\overline{CS_2}$	$\overline{WE}$	$\overline{OE}$	$\overline{LB}$	$\overline{UB}$	Mode	Data I/O		Power
							I/O_{1-8}	I/O_{9-16}	
H	H	X	X	X	X	Not Select	High Z	High Z	Standby
L	H	H	H	X	X	Output Disable	High Z	High Z	Active
H	L								
L	H	X	X	H	H				
H	L								
H	L	H	L	L	H	Read	Data Out	High Z	Active
L	H			H	L		High Z	Data Out	
				L	L		Data Out	Data Out	
H	L	L	X	L	H	Write	Data In	High Z	Active
L	H			H	L		High Z	Data In	
				L	L		Data In	Data In	

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T_A	-55	+125	°C
Storage Temperature	T_{STG}	-65	+150	°C
Signal Voltage Relative to GND	V_G	-0.5	Vcc+0.5	V
Junction Temperature	T_J		150	°C
Supply Voltage	V_{CC}	-0.5	7.0	V

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} + 0.3	V
Input Low Voltage	V_{IL}	-0.3	+0.8	V
Operating Temp. (Mil.)	T_A	-55	+125	°C

CAPACITANCE

(T_A = +25°C)

Parameter	Symbol	Condition	Max	Unit
Input capacitance	C_{IN}	V_{IN} = 0V, f = 1.0MHz	25	pF
Output capicitance	C_{OUT}	V_{OUT} = 0V, f = 1.0MHz	25	pF

This parameter is guaranteed by design but not tested.

DC CHARACTERISTICS

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

Parameter	Sym	Conditions	Min	Max	Units
Input Leakage Current	I_{LI}	V_{CC} = 5.5, V_{IN} = GND to V_{CC}		10	µA
Output Leakage Current	I_{LO}	$\overline{CS}$ = V_{IH}, $\overline{OE}$ = V_{IH}, V_{OUT} = GND to V_{CC}		10	µA
Operating Supply Current	I_{CC}	$\overline{CS}$ = V_{IL}, $\overline{OE}$ = V_{IH}, f = 5MHz, Vcc = 5.5		290	mA
Standby Current	I_{SB}	$\overline{CS}$ = V_{IH}, $\overline{OE}$ = V_{IH}, f = 5MHz, Vcc = 5.5		30	mA
Output Low Voltage	V_{OL}	I_{OL} = 8mA, V_{CC} = 4.5		0.4	V
Output High Voltage	V_{OH}	I_{OH} = -4.0mA, V_{CC} = 4.5	2.4		V

NOTE: DC test conditions: V_{IH} = V_{CC} -0.3V, V_{IL} = 0.3V

DATA RETENTION CHARACTERISTICS

(T_A = -55°C to +125°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Data Retention Supply Voltage	V_{DR}	$\overline{CS}$ ≥ V_{CC} -0.2V	2.0		5.5	V
Data Retention Current	I_{CCDR1}	V_{CC} = 3V		2.0	12.0*	mA

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

AC CHARACTERISTICS

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

Parameter	Symbol	-17		-20		-25		-35		Units
Read Cycle		**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	
Read Cycle Time	t_{RC}	17		20		25		35		ns
Address Access Time	t_{AA}		17		20		25		35	ns
Output Hold from Address Change	t_{OH}	0		0		0		0		ns
Chip Select Access Time	t_{ACS}		17		20		25		35	ns
Output Enable to Output Valid	t_{OE}		10		12		15		20	ns
Chip Select to Output in Low Z	t_{CLZ}[1]	2		5		5		5		ns
Output Enable to Output in Low Z	t_{OLZ}[1]	0		0		0		0		ns
Chip Disable to Output in High Z	t_{CHZ}[1]		9		10		12		15	ns
Output Disable to Output in High Z	t_{OHZ}[1]		9		10		12		15	ns
$\overline{LB}$, $\overline{UB}$ Access Time	t_{BA}		10		12		14		17	ns
$\overline{LB}$, $\overline{UB}$ Enable to Low Z Output	t_{BLZ}[1]	0		0		0		0		ns
$\overline{LB}$, $\overline{UB}$ Disable to High Z Output	t_{BHZ}[1]		9		10		12		15	ns

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

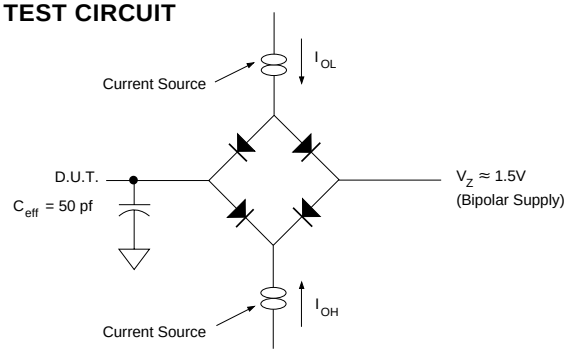
AC CHARACTERISTICS

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

Parameter	Symbol	-17		-20		-25		-35		Units
Write Cycle		**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	
Write Cycle Time	t_{WC}	17		20		25		35		ns
Chip Select to End of Write	t_{CW}	14		17		20		25		ns
Address Valid to End of Write	t_{AW}	14		17		20		25		ns
Data Valid to End of Write	t_{DW}	10		12		15		20		ns
Write Pulse Width	t_{WP}	14		17		20		25		ns
Address Setup Time	t_{AS}	0		0		0		0		ns
Address Hold Time	t_{AH}	0		0		0		0		ns
Output Active from End of Write	t_{OW}[1]	0		0		0		0		ns
Write Enable to Output in High Z	t_{WHZ}[1]		9		10		10		15	ns
Data Hold Time	t_{DH}	0		0		0		0		ns
$\overline{LB}$, $\overline{UB}$ Valid to End of Write	t_{BW}	14		17		20		25		ns

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

AC TEST CIRCUIT

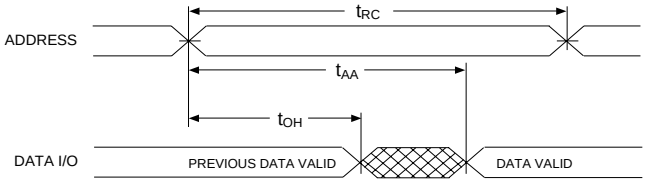


AC TEST CONDITIONS

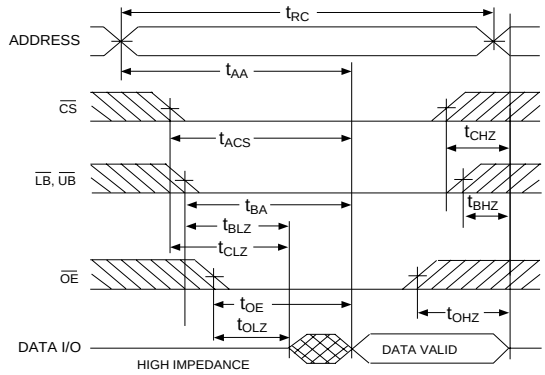
Parameter	Typ	Unit
Input Pulse Levels	V_{IL} = 0, V_{IH} = 3.0	V
Input Rise and Fall	5	ns
Input and Output Reference Level	1.5	V
Output Timing Reference Level	1.5	V

NOTES:
V_Z is programmable from -2V to +7V.
I_{OL} & I_{OH} programmable from 0 to 16mA.
Tester Impedance Z_0 = 75 Ω.
V_Z is typically the midpoint of V_{OH} and V_{OL}.
I_{OL} & I_{OH} are adjusted to simulate a typical resistive load circuit.
ATE tester includes jig capacitance.

TIMING WAVEFORM - READ CYCLE

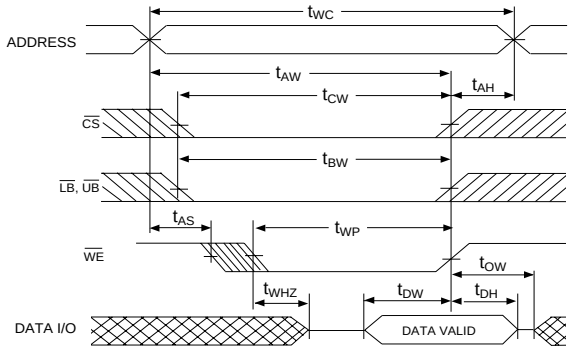


READ CYCLE 1 ($\overline{CS}$ = $\overline{OE}$ = V_{IL}, $\overline{UB}$ or $\overline{LB}$ = V_{IL}, $\overline{WE}$ = V_{IH})



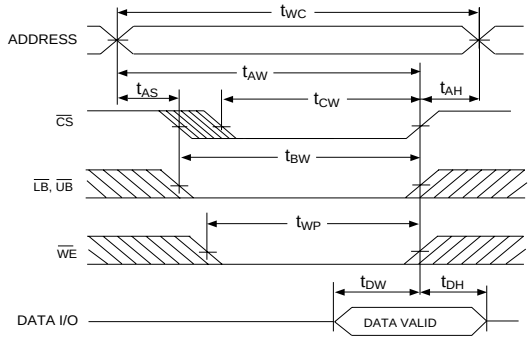
READ CYCLE 2 ($\overline{WE}$ = V_{IH})

WRITE CYCLE - $\overline{WE}$ CONTROLLED



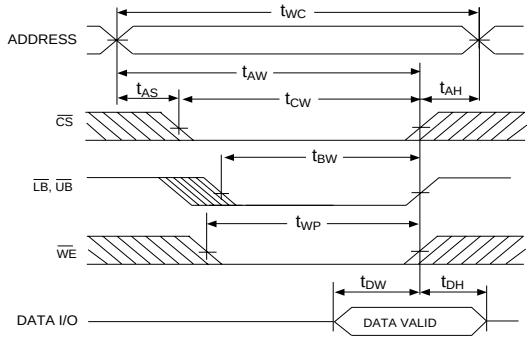
WRITE CYCLE 1, $\overline{WE}$ CONTROLLED

WRITE CYCLE - $\overline{CS}$ CONTROLLED



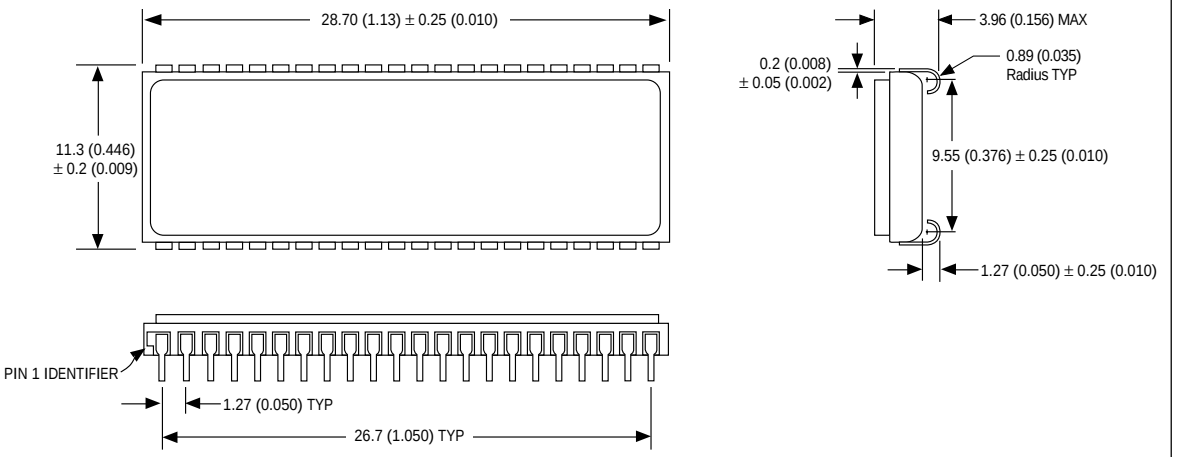
WRITE CYCLE 2, $\overline{CS}$ CONTROLLED

WRITE CYCLE - $\overline{LB}$, $\overline{UB}$ CONTROLLED



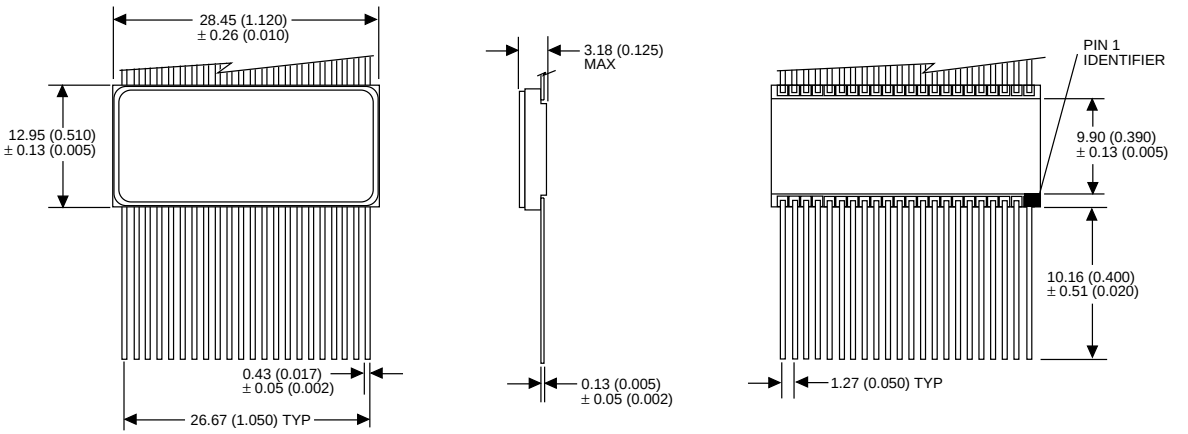
WRITE CYCLE 3, $\overline{LB}$, $\overline{UB}$ CONTROLLED

PACKAGE 102: 44 LEAD, CERAMIC SOJ



ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES

PACKAGE 209: 44 LEAD, CERAMIC FLAT PACK



ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES

ORDERING INFORMATION