



512Kx32 SRAM MODULE, SMD 5962-94611

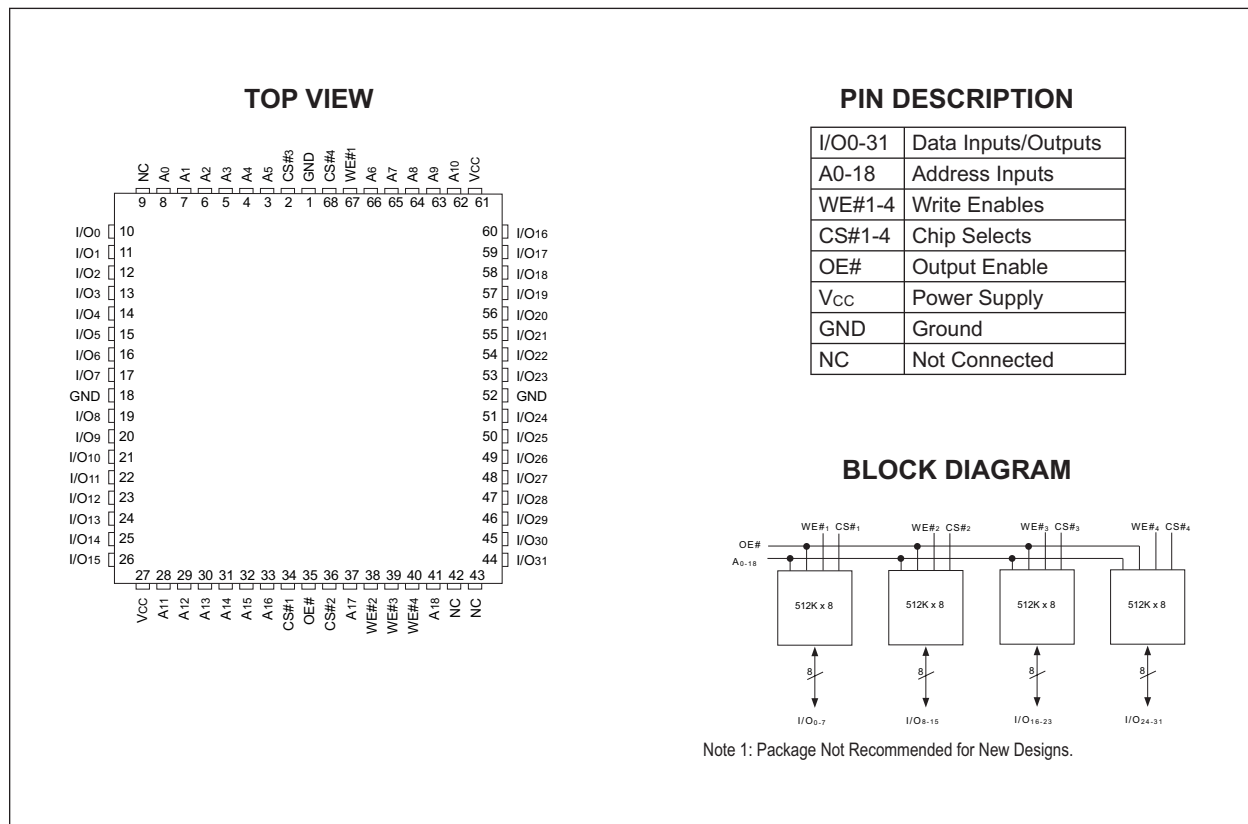
FEATURES

- Access Times of 70, 85, 100, 120ns
- Packaging
 - 68 lead, Hermetic CQFP (G2T)¹, 22.4mm (0.880 inch) square. 4.57mm (0.180 inch) high (Package 509)
- Organized as 512Kx32, User Configurable as 1Mx16 or 2Mx8
- Commercial, Industrial and Military Temperature Ranges
- TTL Compatible Inputs and Outputs
- 5V Power Supply
- Low Power CMOS
- Built-in Decoupling Caps and Multiple Ground Pins for Low Noise Operation
- Weight
 - WS512K32-XG2TX¹ - 8 grams typical

Note 1: Package Not Recommended for New Designs.

This product is subject to change without notice.

FIGURE 1 – PIN CONFIGURATION FOR WS512K32-XG2TX¹





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	V _{CC} +0.5	V
Junction Temperature	T _J		150	°C
Supply Voltage	V _{CC}	-0.5	7.0	V

CAPACITANCE

T_A = +25°C

Parameter	Symbol	Conditions	Max	Unit
OE# capacitance	C _{OE}	V _{IN} = 0 V, f = 1.0 MHz	50	pF
WE# ₁₋₄ capacitance CQFP G2T	C _{WE}	V _{IN} = 0 V, f = 1.0 MHz	15	pF
CS# ₁₋₄ capacitance	C _{CS}	V _{IN} = 0 V, f = 1.0 MHz	20	pF
Data I/O capacitance	C _{I/O}	V _{I/O} = 0 V, f = 1.0 MHz	20	pF
Address input capacitance	C _{AD}	V _{IN} = 0 V, f = 1.0 MHz	50	pF

This parameter is guaranteed by design but not tested.

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}	-0.5	+0.8	V
Operating Temp (Mil)	T _A	-55	+125	°C

LOW CAPACITANCE CQFP

T_A = +25°C

Parameter	Symbol	Conditions	Max	Unit
OE# capacitance	C _{OE}	V _{IN} = 0 V, f = 1.0 MHz	32	pF
CQFP G4 capacitance	C _{WE}	V _{IN} = 0 V, f = 1.0 MHz	32	pF
CS# ₁₋₄ capacitance	C _{CS}	V _{IN} = 0 V, f = 1.0 MHz	15	pF
Data I/O capacitance	C _{I/O}	V _{I/O} = 0 V, f = 1.0 MHz	15	pF
Address input capacitance	C _{AD}	V _{IN} = 0 V, f = 1.0 MHz	32	pF

This parameter is guaranteed by design but not tested.

TRUTH TABLE

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

DC CHARACTERISTICS

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

Parameter	Symbol	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}	CS# = V _{IH} , OE# = V _{IH} , V _{OUT} = GND to V _{CC}		10	μA
Operating Supply Current x 32 Mode	I _{CC} x 32	CS# = V _{IL} , OE# = V _{IH} , f = 5MHz, V _{CC} = 5.5		200	mA
Standby Current	I _{SB}	CS# = V _{IH} , OE# = V _{IH} , f = 5MHz, V _{CC} = 5.5		4.0	mA
Output Low Voltage	V _{OL}	I _{OL} = 2.1mA, V _{CC} = 4.5		0.4	V
Output High Voltage	V _{OH}	I _{OH} = -1.0mA, 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}	CS# ≥ V _{CC} - 0.2V	2.0		5.5	V
Data Retention Current	I _{CCDR1}	V _{CC} = 3V		0.4	1.6	mA



AC CHARACTERISTICS

 $V_{CC} = 5.0V$, $V_{SS} = 0V$, $T_A = -55^{\circ}C$ to $+125^{\circ}C$

Parameter	Symbol	-70		-85		-100		-120		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Read Cycle										
Read Cycle Time	t_{RC}	70		85		100		120		ns
Address Access Time	t_{AA}		70		85		100		120	ns
Output Hold from Address Change	t_{OH}	5		5		5		5		ns
Chip Select Access Time	t_{ACS}		70		85		100		120	ns
Output Enable to Output Valid	t_{OE}		35		40		50		60	ns
Chip Select to Output in Low Z	t_{CLZ}^1	10		10		10		10		ns
Output Enable to Output in Low Z	t_{OLZ}^1	5		5		5		5		ns
Chip Disable to Output in High Z	t_{CHZ}^1		25		25		35		35	ns
Output Disable to Output in High Z	t_{OHZ}^1		25		25		35		35	ns

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

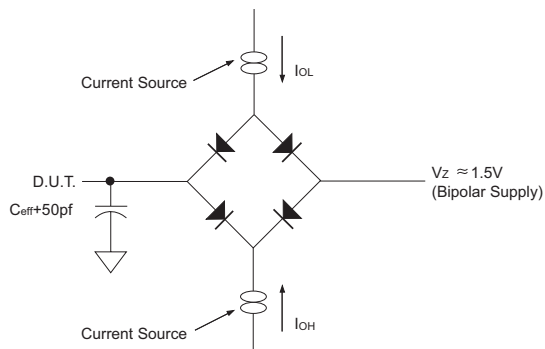
AC CHARACTERISTICS

 $V_{CC} = 5.0V$, $V_{SS} = 0V$, $T_A = -55^{\circ}C$ to $+125^{\circ}C$

Parameter	Symbol	-15*		-17		-20		-25		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Write Cycle										
Write Cycle Time	t_{WC}	70		85		100		120		ns
Chip Select to End of Write	t_{CW}	60		75		80		100		ns
Address Valid to End of Write	t_{AW}	60		75		80		100		ns
Data Valid to End of Write	t_{DW}	30		30		40		40		ns
Write Pulse Width	t_{WP}	50		50		60		60		ns
Address Setup Time	t_{AS}	0		0		0		0		ns
Address Hold Time	t_{AH}	5		5		5		5		ns
Output Active from End of Write	t_{OW}^1	5		5		5		5		ns
Write Enable to Output in High Z	t_{WHZ}^1		25		25		35		35	ns
Data Hold from Write Time	t_{DH}	0		0		0		0		ns

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

FIGURE 2 – 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 $Z_0 = 75 \Omega$.

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.



FIGURE 3 – TIMING WAVEFORM - READ CYCLE

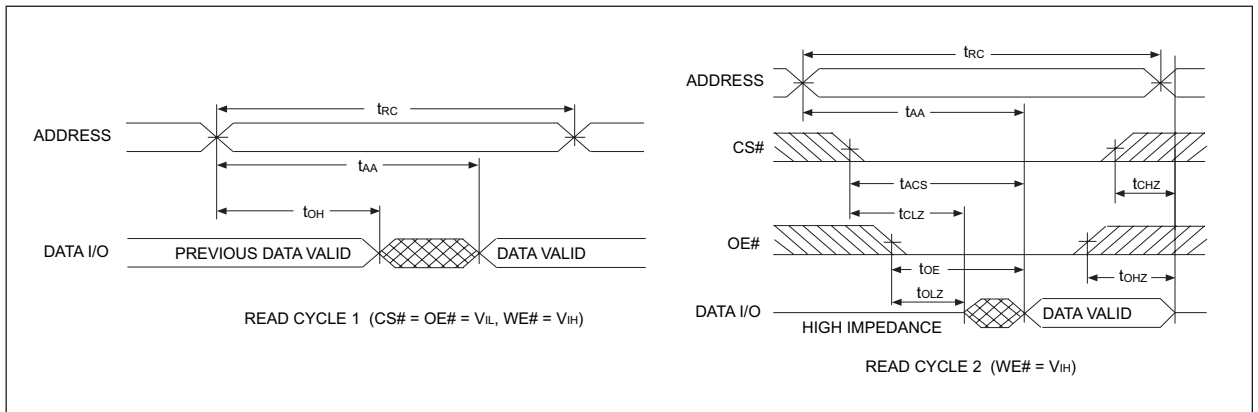


FIGURE 4 – WRITE CYCLE - WE# CONTROLLED

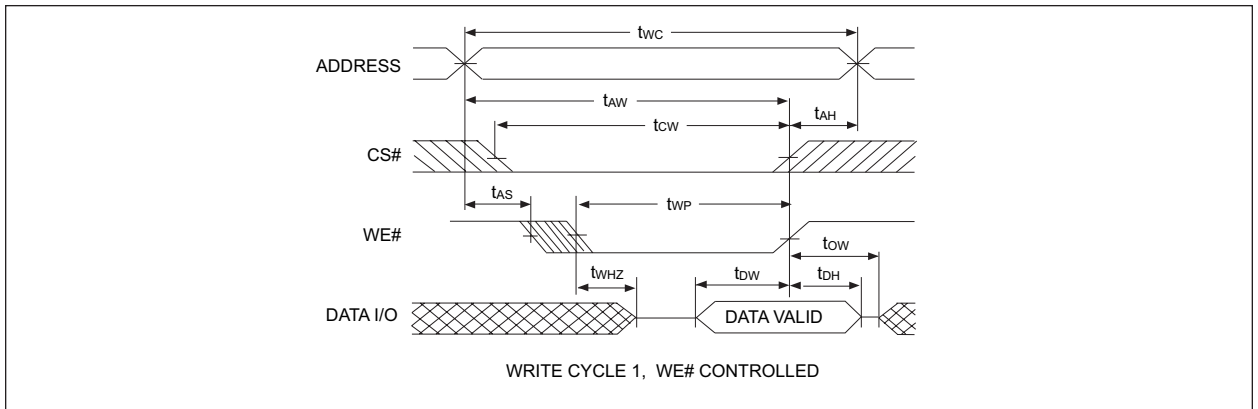
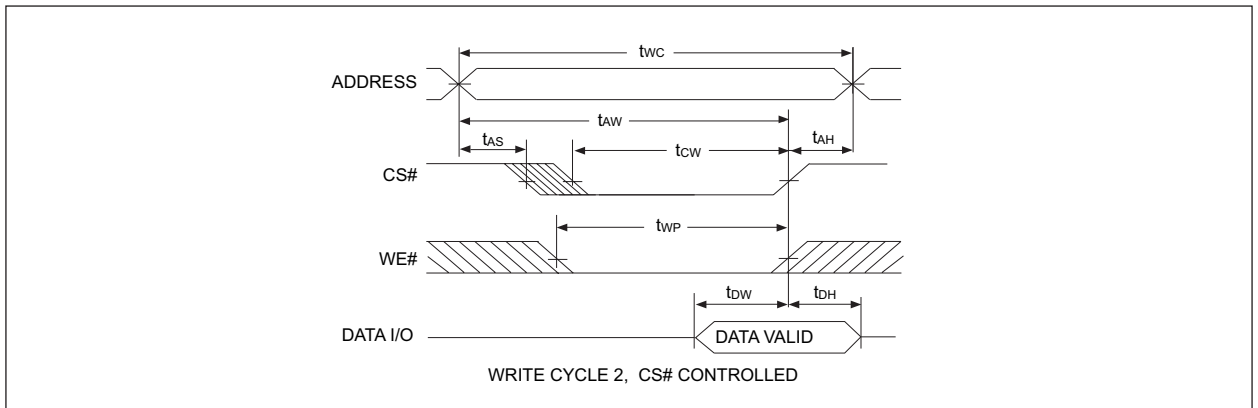
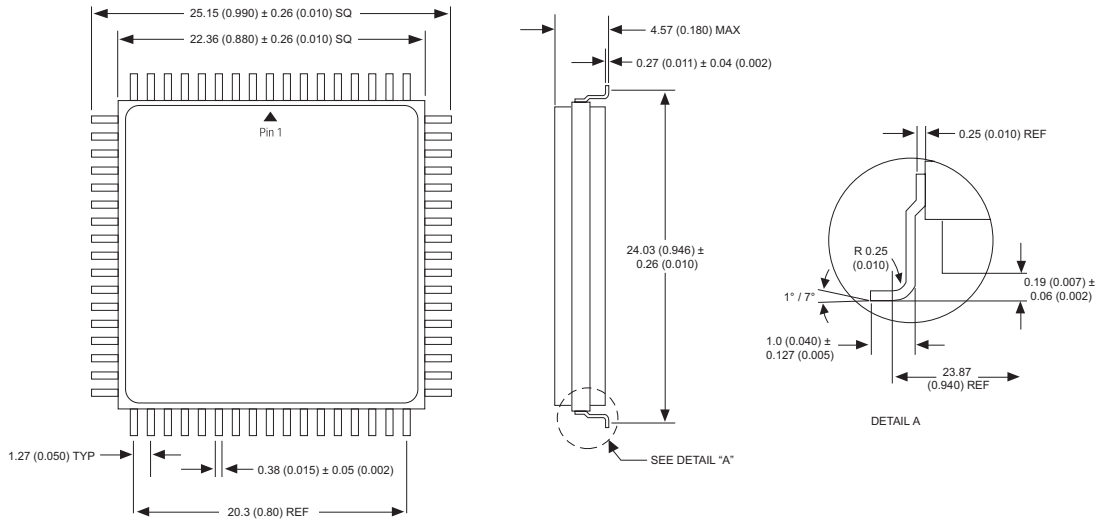


FIGURE 5 – WRITE CYCLE - CS# CONTROLLED





PACKAGE 509: 68 LEAD, CERAMIC QUAD FLAT PACK, CQFP (G2T)¹



Note 1: Package Not Recommended for New Designs.

ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES



ORDERING INFORMATION

W S 512K 32 - XXX X X X

LEAD FINISH:

Blank = Gold plated leads

A = Solder dip leads

DEVICE GRADE:

Q = MIL-STD-883 Compliant

M = Military Screened -55°C to +125°C

I = Industrial -40°C to 85°C

C = Commercial 0°C to +70°C

PACKAGE TYPE:

G2T¹ = 22.4mm Ceramic Quad Flat Pack, Low Profile CQFP (Package 509)

ACCESS TIME (ns)

ORGANIZATION, 512Kx32

User configurable as 1Mx16 or 2Mx8

SRAM

WHITE ELECTRONIC DESIGNS CORP.

Note 1: Package Not Recommended for New Designs.

DEVICE TYPE	SPEED	PACKAGE	SMD NO.
512K x 32 SRAM Module	120ns	68 lead CQFP (G2T) ¹	5962-94611 01HMX
512K x 32 SRAM Module	100ns	68 lead CQFP (G2T) ¹	5962-94611 02HMX
512K x 32 SRAM Module	85ns	68 lead CQFP (G2T) ¹	5962-94611 03HMX
512K x 32 SRAM Module	70ns	68 lead CQFP (G2T) ¹	5962-94611 04HMX