



# 512Kx32 SRAM MODULE, SMD 5962-94611 PRELIMINARY\*

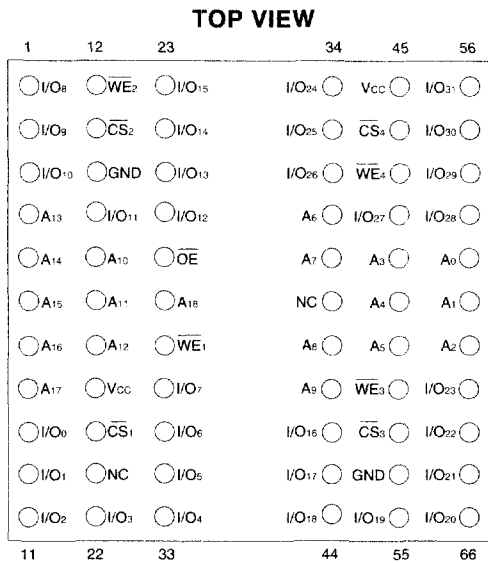
## FEATURES

- Access Times of 17, 20, 25, 35, 45, 55ns
- Packaging
  - 66 pin, PGA Type, 1.385 inch square, Hermetic Ceramic HIP (Package 402)
  - 68 lead, 40mm Hermetic Low Profile CQFP, 3.5mm (0.140") (Package 502), Package to be developed.
  - 68 lead, Hermetic CQFP (G2), 22mm (0.880 inch) square (Package 500). Designed to fit JEDEC 68 lead 0.990" CQFJ footprint (Fig. 3)
- Organized as 512Kx32, User Configurable as 1Mx16 or 2Mx8
- Commercial, Industrial and Military Temperature Ranges
- TTL Compatible Inputs and Outputs
- 5 Volt Power Supply
- Low Power CMOS
- Built-in Decoupling Caps and Multiple Ground Pins for Low Noise Operation
- Weight
  - WS512K32-XG2X - 8 grams typical
  - WS512K32-XH2X - 13 grams typical
  - WS512K32-XG4TX - 20 grams typical

\* This data sheet describes a product under development, not fully characterized, and is subject to change without notice.

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FIG. 1 PIN CONFIGURATION FOR WS512K32N-XH2X



### PIN DESCRIPTION

I/O0-31	Data Inputs/Outputs
A0-18	Address Inputs
WE1-4	Write Enables
CS1-4	Chip Selects
OE	Output Enable
VCC	Power Supply
GND	Ground
NC	Not Connected

### BLOCK DIAGRAM

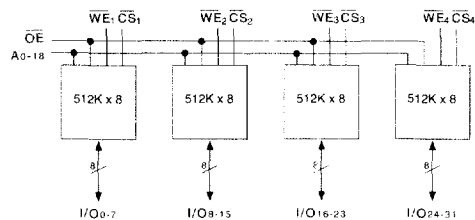
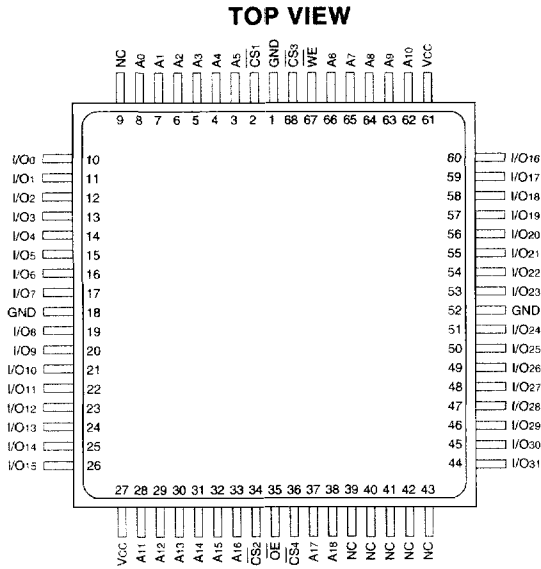




FIG. 2 PIN CONFIGURATION FOR WS512K32-XG4TX



**PIN DESCRIPTION**

I/O0-31	Data Inputs/Outputs
A0-18	Address Inputs
WE	Write Enables
CS1-4	Chip Selects
OE	Output Enable
Vcc	Power Supply
GND	Ground
NC	Not Connected

**BLOCK DIAGRAM**

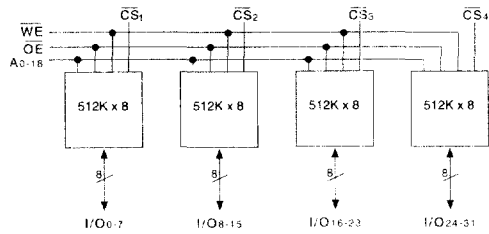
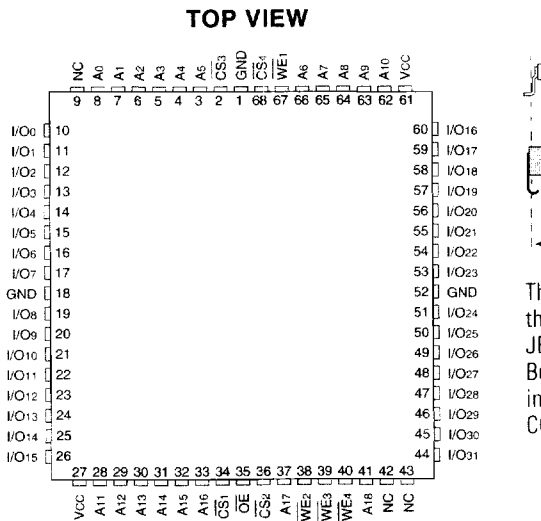
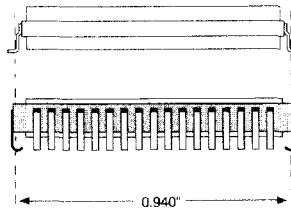


FIG. 3 PIN CONFIGURATION FOR WS512K32-XG2X



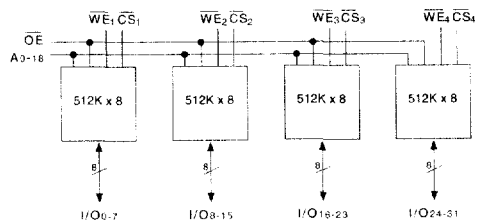
**PIN DESCRIPTION**

I/O0-31	Data Inputs/Outputs
A0-18	Address Inputs
WE1-4	Write Enables
CS1-4	Chip Selects
OE	Output Enable
Vcc	Power Supply
GND	Ground
NC	Not Connected



The White 68 lead G2 CQFP fills the same fit and function as the JEDEC 68 lead CQFJ or 68 PLCC. But the G2 has the TCE and lead inspection advantage of the CQFP form.

**BLOCK DIAGRAM**





**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

**CAPACITANCE**

(T<sub>A</sub> = +25°C)

Parameter	Symbol	Conditions	Max	Unit
OE capacitance	C <sub>OE</sub>	V <sub>IN</sub> = 0 V, f = 1.0 MHz	50	pF
WE <sub>1-4</sub> capacitance HIP (PGA) CQFP G4	C <sub>WE</sub>	V <sub>IN</sub> = 0 V, f = 1.0 MHz	20	pF
CQFP G2			50	
CS <sub>1-4</sub> capacitance	C <sub>CS</sub>	V <sub>IN</sub> = 0 V, f = 1.0 MHz	20	pF
Data I/O capacitance	C <sub>I/O</sub>	V <sub>I/O</sub> = 0 V, f = 1.0 MHz	20	pF
Address input capacitance	C <sub>AD</sub>	V <sub>IN</sub> = 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 <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>	-0.5	+0.8	V
Operating Temp (Mil)	T <sub>A</sub>	-55	+125	°C

**LOW CAPACITANCE CQFP**

(T<sub>A</sub> = +25°C)

Parameter	Symbol	Conditions	Max	Unit
OE capacitance	C <sub>OE</sub>	V <sub>IN</sub> = 0 V, f = 1.0 MHz	32	pF
CQFP G4 capacitance	C <sub>WE</sub>	V <sub>IN</sub> = 0 V, f = 1.0 MHz	32	pF
CS <sub>1-4</sub> capacitance	C <sub>CS</sub>	V <sub>IN</sub> = 0 V, f = 1.0 MHz	15	pF
Data I/O capacitance	C <sub>I/O</sub>	V <sub>I/O</sub> = 0 V, f = 1.0 MHz	15	pF
Address input capacitance	C <sub>AD</sub>	V <sub>IN</sub> = 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<sub>CC</sub> = 5.0V, V<sub>SS</sub> = 0V, T<sub>A</sub> = -55°C to +125°C)

Parameter	Symbol	Conditions	Units	
			Min	Max
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>	CS = V <sub>IH</sub> , OE = V <sub>IH</sub> , V <sub>OUT</sub> = GND to V <sub>CC</sub>		10 μA
Operating Supply Current x 32 Mode	I <sub>CC</sub> x 32	CS = V <sub>IL</sub> , OE = V <sub>IH</sub> , f = 5MHz, V <sub>CC</sub> = 5.5		520 mA
Standby Current	I <sub>SB</sub>	CS = V <sub>IH</sub> , OE = V <sub>IH</sub> , f = 5MHz, V <sub>CC</sub> = 5.5		60 mA
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 8mA for 17 - 35ns, I <sub>OL</sub> = 2.1mA for 45 - 55ns, V <sub>CC</sub> = 4.5		0.4 V
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -4.0mA for 17 - 35ns, I <sub>OH</sub> = -1.0mA for 45 - 55ns, V <sub>CC</sub> = 4.5	2.4	V

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

**DATA RETENTION CHARACTERISTICS**

(T<sub>A</sub> = -55°C to +125°C)

Parameter	Symbol	Conditions	Units		
			Min	Typ	Max
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>CCR1</sub>	V <sub>CC</sub> = 3V		3.2	12* mA

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

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AC CHARACTERISTICS
(VCC = 5.0V, VSS = 0V, TA = -55°C to +125°C)

Table with 14 columns: Parameter, Symbol, -17 (Min, Max), -20 (Min, Max), -25 (Min, Max), -35 (Min, Max), -45 (Min, Max), -55 (Min, Max), Units. Rows include Read Cycle Time, Address Access Time, Output Hold from Address Change, etc.

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

AC CHARACTERISTICS
(VCC = 5.0V, VSS = 0V, TA = -55°C to +125°C)

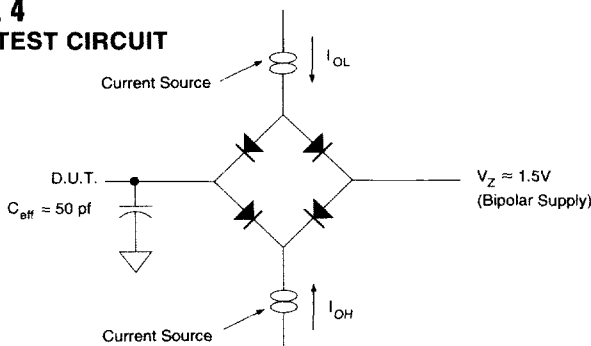
Table with 14 columns: Parameter, Symbol, -17 (Min, Max), -20 (Min, Max), -25 (Min, Max), -35 (Min, Max), -45 (Min, Max), -55 (Min, Max), Units. Rows include Write Cycle Time, Chip Select to End of Write, Address Valid to End of Write, etc.

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

2. The Address Setup Time of minimum 2ns is for the G2 and H2 packages. tAS minimum for G4 and G4T packages is 0ns.

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FIG. 4 AC TEST CIRCUIT



AC TEST CONDITIONS

Table with 3 columns: Parameter, Typ, Unit. Rows include Input Pulse Levels, Input Rise and Fall, Input and Output Reference Level, Output Timing Reference Level.

NOTES:

Vz is programmable from -2V to +7V. IOL & IOH programmable from 0 to 16mA. Tester Impedance Z0 = 75 Ω. Vz is typically the midpoint of VOH and VOL. IOL & IOH are adjusted to simulate a typical resistive load circuit. ATE tester includes jig capacitance.



ORDERING INFORMATION

W S 512K 32 X - 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:

- H2 = Ceramic Hex-In-line Package, HIP (Package 402)
- G2 = 22mm Ceramic Quad Flat Pack, CQFP (Package 500)
- G4T = 40mm Low Profile CQFP (Package 502)

ACCESS TIME (ns)

IMPROVEMENT MARK:

- N = No Connect at pin 21 and 39 in HIP for Upgrades
- F = Low Capacitance CQFP

ORGANIZATION, 512Kx32

User configurable as 1Mx16 or 2Mx8

SRAM

WHITE MICROELECTRONICS

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DEVICE TYPE	SPEED	PACKAGE	SMD NO.
512K x 32 SRAM Module	55ns	66 pin HIP (H2)	5962-94611 05HXX
<b>512K x 32 SRAM Module</b>	<b>45ns</b>	<b>66 pin HIP (H2)</b>	<b>5962-94611 06HXX</b>
512K x 32 SRAM Module	35ns	66 pin HIP (H2)	5962-94611 07HXX
512K x 32 SRAM Module	25ns	66 pin HIP (H2)	5962-94611 08HXX
<b>512K x 32 SRAM Module</b>	<b>20ns</b>	<b>66 pin HIP (H2)</b>	<b>5962-94611 09HXX</b>
512K x 32 SRAM Module	17ns	66 pin HIP (H2)	5962-94611 10HXX
512K x 32 SRAM Module	55ns	68 lead CQFP Low Profile (G4T)	5962-94611 05HYX
<b>512K x 32 SRAM Module</b>	<b>45ns</b>	<b>68 lead CQFP Low Profile (G4T)</b>	<b>5962-94611 06HYX</b>
512K x 32 SRAM Module	35ns	68 lead CQFP Low Profile (G4T)	5962-94611 07HYX
512K x 32 SRAM Module	25ns	68 lead CQFP Low Profile (G4T)	5962-94611 08HYX
<b>512K x 32 SRAM Module</b>	<b>20ns</b>	<b>68 lead CQFP Low Profile (G4T)</b>	<b>5962-94611 09HYX</b>
512K x 32 SRAM Module	17ns	68 lead CQFP Low Profile (G4T)	5962-94611 10HYX
512K x 32 SRAM Module	55ns	68 lead CQFP/J (G2)	5962-94611 05HMX
<b>512K x 32 SRAM Module</b>	<b>45ns</b>	<b>68 lead CQFP/J (G2)</b>	<b>5962-94611 06HMX</b>
512K x 32 SRAM Module	35ns	68 lead CQFP/J (G2)	5962-94611 07HMX
512K x 32 SRAM Module	25ns	68 lead CQFP/J (G2)	5962-94611 08HMX
<b>512K x 32 SRAM Module</b>	<b>20ns</b>	<b>68 lead CQFP/J (G2)</b>	<b>5962-94611 09HMX</b>
512K x 32 SRAM Module	17ns	68 lead CQFP/J (G2)	5962-94611 10HMX