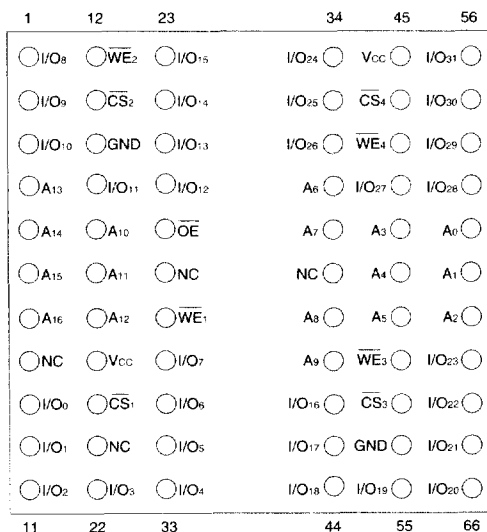


**128Kx32 SRAM MODULE, SMD 5962-93187****FEATURES**

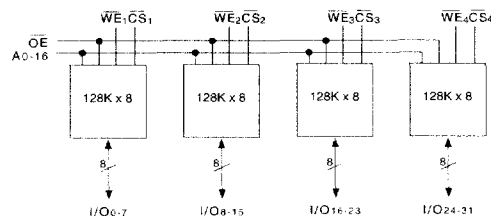
- Access Times of 17, 20, 25, 35, 45, 55ns
- MIL-STD-883 Compliant Devices Available
- Packaging
 - 66-pin, PGA Type, 1.075 inch square, Hermetic Ceramic HIP (Package 400), SMD Number 5962-93187
 - 68 lead, 40mm Low Profile CQFP, 3.5mm (0.140") (Package 502), Package to be developed
 - 68 lead, Hermetic CQFP (G2), 22mm (0.880 inch) square (Package 500). Designed to fit JEDEC 68 lead 0.990" CQFJ footprint (Fig. 3), SMD Number 5962-95595
- Organized as 128Kx32; User Configurable as 256Kx16 or 512Kx8
- Commercial, Industrial and Military Temperature Ranges
- 5 Volt Power Supply
- Low Power CMOS
- TTL Compatible Inputs and Outputs
- Built-in Decoupling Caps and Multiple Ground Pins for Low Noise Operation
- Weight
 - WS128K32-XG2X - 8 grams typical
 - WS128K32-XH1X - 13 grams typical
 - WS128K32-XG4X - 20 grams typical
- All devices are upgradeable to 512Kx32

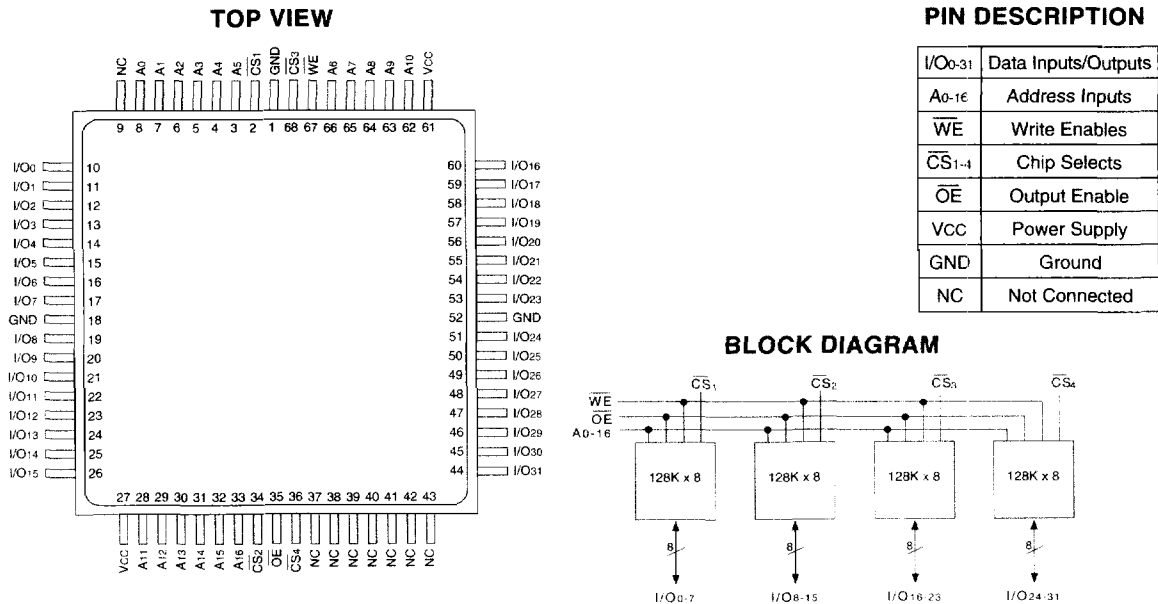
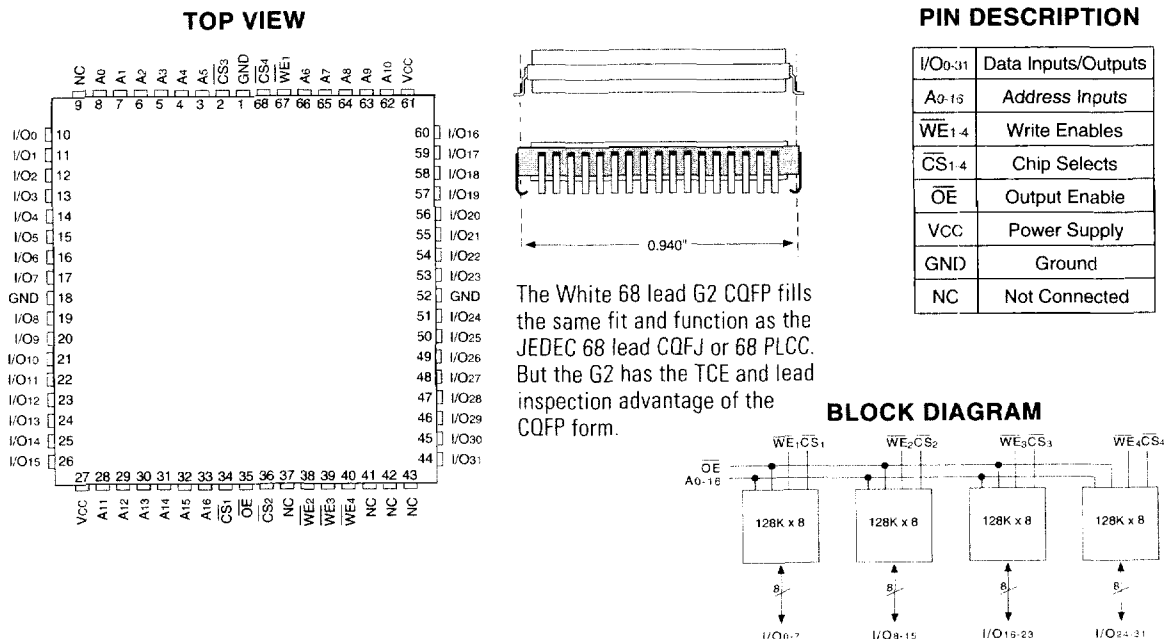
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SRAM MODULES

FIG. 1 PIN CONFIGURATION FOR WS128K32N-XH1X**TOP VIEW****PIN DESCRIPTION**

I/O0-31	Data Inputs/Outputs
A0-16	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 WS128K32-XG4TX, SMD Number 5962-95595****FIG. 3 PIN CONFIGURATION FOR WS128K32-XG2X, SMD Number 5962-95595**



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

TRUTH TABLE

$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	Mode	Data I/O	Power
H	X	X	Standby	High Z	Standby
L	L	H	Read	Data Out	Active
L	X	L	Write	Data In	Active
L	H	H	Out Disable	High Z	Active

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	Conditions	Max	Unit
$\overline{OE}$ capacitance	C _{OE}	V _{IN} = 0 V, f = 1.0 MHz	50	pF
$\overline{WE}$ 1-4 capacitance HIP (PGA)	C _{WE}	V _{IN} = 0 V, f = 1.0 MHz	20	pF
CQFP G4			50	
CQFP G2			20	
$\overline{CS}$ 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.

DC CHARACTERISTICS

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

Parameter	Sym	Conditions	-17		-20		-25		Units
			Min	Max	Min	Max	Min	Max	
Input Leakage Current	I _{LI}	V _{CC} = 5.5, V _{IN} = GND to V _{CC}		10		10		10	μA
Output Leakage Current	I _{LO}	$\overline{CS}$ = V _{IH} , $\overline{OE}$ = V _{IH} , V _{OUT} = GND to V _{CC}		10		10		10	μA
Operating Supply Current	I _{CC}	$\overline{CS}$ = V _{IL} , $\overline{OE}$ = V _{IH} , f = 5MHz, V _{CC} = 5.5		600		600		500	mA
Standby Current	I _{SB}	$\overline{CS}$ = V _{IH} , $\overline{OE}$ = V _{IH} , f = 5MHz, V _{CC} = 5.5		80		80		60	mA
Output Low Voltage	V _{OL}	I _{OL} = 8mA, V _{CC} = 4.5		0.4		0.4		0.4	V
Output High Voltage	V _{OH}	I _{OH} = -4.0mA, V _{CC} = 4.5	2.4		2.4		2.4		V

Parameter	Sym	Conditions	-35		-45		-55		Units
			Min	Max	Min	Max	Min	Max	
Input Leakage Current	I _{LI}	V _{CC} = 5.5, V _{IN} = GND to V _{CC}		10		10		10	μA
Output Leakage Current	I _{LO}	$\overline{CS}$ = V _{IH} , $\overline{OE}$ = V _{IH} , V _{OUT} = GND to V _{CC}		10		10		10	μA
Operating Supply Current	I _{CC}	$\overline{CS}$ = V _{IL} , $\overline{OE}$ = V _{IH} , f = 5MHz, V _{CC} = 5.5		500		440		440	mA
Standby Current	I _{SB}	$\overline{CS}$ = V _{IH} , $\overline{OE}$ = V _{IH} , f = 5MHz, V _{CC} = 5.5		60		60		60	mA
Output Low Voltage	V _{OL}	I _{OL} = 2.1mA, V _{CC} = 4.5		0.4		0.4		0.4	V
Output High Voltage	V _{OH}	I _{OH} = -1.0mA, V _{CC} = 4.5	2.4		2.4		2.4		V

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

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

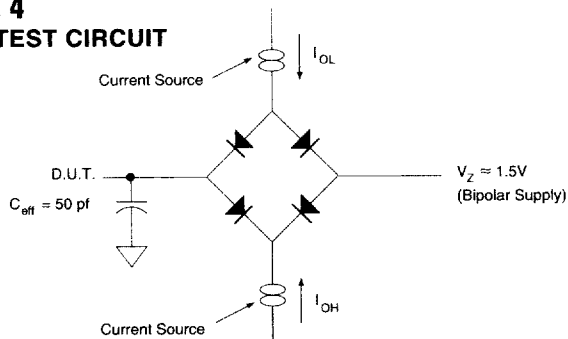
Parameter Read Cycle	Symbol	-17		-20		-25		-35		-45		-55		Units
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Read Cycle Time	t _{RC}	17		20		25		35		45		55		ns
Address Access Time	t _{AA}		17		20		25		35		45		55	ns
Output Hold from Address Change	t _{OH}	0		0		0		0		0		0		ns
Chip Select Access Time	t _{ACS}		17		20		25		35		45		55	ns
Output Enable to Output Valid	t _{OE}		10		12		15		20		25		30	ns
Chip Select to Output in Low Z	t _{CLZ} ¹	3		3		3		3		3		3		ns
Output Enable to Output in Low Z	t _{OLZ} ¹	0		0		0		0		0		0		ns
Chip Disable to Output in High Z	t _{CHZ} ¹		12		12		12		20		20		20	ns
Output Disable to Output in High Z	t _{OHZ} ¹		12		12		12		20		20		20	ns

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

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

Parameter Write Cycle	Symbol	-17		-20		-25		-35		-45		-55		Units
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Write Cycle Time	t _{WC}	17		20		25		35		45		55		ns
Chip Select to End of Write	t _{CW}	14		15		20		25		30		45		ns
Address Valid to End of Write	t _{AW}	15		15		20		25		30		45		ns
Data Valid to End of Write	t _{DW}	10		12		15		20		25		25		ns
Write Pulse Width	t _{WP}	14		15		20		25		30		45		ns
Address Setup Time	t _{AS}	0		0		0		0		0		0		ns
Address Hold Time	t _{AH}	0		0		0		0		0		0		ns
Output Active from End of Write	t _{OW} ¹	3		3		3		4		4		4		ns
Write Enable to Output in High Z	t _{WHZ} ¹		10		12		15		20		25		25	ns
Data Hold Time	t _{DH}	0		0		0		0		0		0		ns

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

FIG. 4
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 Z₀ = 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.



ORDERING INFORMATION

W S 128K 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:

H1 = 1.075" sq. Ceramic Hex-In-line Package, HIP (Package 400)

G2 = 22 mm Ceramic Quad Flat Pack, CQFP (Package 500)

G4T = 40 mm Low Profile CQFP (Package 502)

ACCESS TIME (ns)**IMPROVEMENT MARK:**

N = No Connect at pin 8, 21, 28 and 39 in HIP for Upgrades

ORGANIZATION, 128Kx32

User configurable as 256Kx16 or 512Kx8

SRAM**WHITE MICROELECTRONICS**



Device Type	Speed	Package	SMD No.
128K x 32 SRAM Module	55ns	66 pin HIP (H1)	5962-93187 05H5X
128K x 32 SRAM Module	45ns	66 pin HIP (H1)	5962-93187 06H5X
128K x 32 SRAM Module	35ns	66 pin HIP (H1)	5962-93187 07H5X
128K x 32 SRAM Module	25ns	66 pin HIP (H1)	5962-93187 08H5X
128K x 32 SRAM Module	20ns	66 pin HIP (H1)	5962-93187 09H5X
128K x 32 SRAM Module	17ns	66 pin HIP (H1)	5962-93187 10H5X
128K x 32 SRAM Module	55ns	68 lead CQFP Low Profile (G4T)	5962-95595 05HYX
128K x 32 SRAM Module	45ns	68 lead CQFP Low Profile (G4T)	5962-95595 06HYX
128K x 32 SRAM Module	35ns	68 lead CQFP Low Profile (G4T)	5962-95595 07HYX
128K x 32 SRAM Module	25ns	68 lead CQFP Low Profile (G4T)	5962-95595 08HYX
128K x 32 SRAM Module	20ns	68 lead CQFP Low Profile (G4T)	5962-95595 09HYX
128K x 32 SRAM Module	17ns	68 lead CQFP Low Profile (G4T)	5962-95595 10HYX
128K x 32 SRAM Module	55ns	68 lead CQFP/J (G2)	5962-95595 05HMX
128K x 32 SRAM Module	45ns	68 lead CQFP/J (G2)	5962-95595 06HMX
128K x 32 SRAM Module	35ns	68 lead CQFP/J (G2)	5962-95595 07HMX
128K x 32 SRAM Module	25ns	68 lead CQFP/J (G2)	5962-95595 08HMX
128K x 32 SRAM Module	20ns	68 lead CQFP/J (G2)	5962-95595 09HMX
128K x 32 SRAM Module	17ns	68 lead CQFP/J (G2)	5962-95595 10HMX
128K x 32 SRAM Module	55ns	68 lead CQFP (G4)	5962-95595 05HXX
128K x 32 SRAM Module	45ns	68 lead CQFP (G4)	5962-95595 06HXX
128K x 32 SRAM Module	35ns	68 lead CQFP (G4)	5962-95595 07HXX
128K x 32 SRAM Module	25ns	68 lead CQFP (G4)	5962-95595 08HXX
128K x 32 SRAM Module	20ns	68 lead CQFP (G4)	5962-95595 09HXX
128K x 32 SRAM Module	17ns	68 lead CQFP (G4)	5962-95595 10HXX