



# 128Kx8 MONOLITHIC SRAM, SMD 5962-96691

## FEATURES

- Access Times 70, 85, 100, 120ns
- Revolutionary, Center Power/Ground Pinout JEDEC Approved
  - 32 lead Ceramic SOJ (Package 101)
- Evolutionary, Corner Power/Ground Pinout JEDEC Approved
  - 32 pin Ceramic DIP (Package 300)
  - 32 lead Ceramic SOJ (Package 101)
  - 32 lead Ceramic Flat Pack (Package 206)
- MIL-STD-883 Compliant Devices Available
- Commercial, Industrial and Military Temperature Range
- 5 Volt Power Supply
- Low Power CMOS
- 2V Data Retention Devices Available (Low Power Version)
- TTL Compatible Inputs and Outputs

### REVOLUTIONARY PINOUT

32 CSOJ (DR)

#### TOP VIEW

A0	1	32	A16
A1	2	31	A15
A2	3	30	A14
A3	4	29	A13
$\overline{CS}$	5	28	$\overline{OE}$
I/O1	6	27	I/O8
I/O2	7	26	I/O7
Vcc	8	25	GND
GND	9	24	Vcc
I/O3	10	23	I/O6
I/O4	11	22	I/O5
$\overline{WE}$	12	21	A12
A4	13	20	A11
A5	14	19	A10
A6	15	18	A9
A7	16	17	A8

### EVOLUTIONARY PINOUT

32 DIP (C)  
32 CSOJ (DE)  
32 FLATPACK (FE)

#### TOP VIEW

NC	1	32	Vcc
A16	2	31	A15
A14	3	30	NC
A12	4	29	$\overline{WE}$
A7	5	28	A13
A6	6	27	A8
A5	7	26	A9
A4	8	25	A11
A3	9	24	$\overline{OE}$
A2	10	23	A10
A1	11	22	$\overline{CS}$
A0	12	21	I/O7
I/O0	13	20	I/O6
I/O1	14	19	I/O5
I/O2	15	18	I/O4
GND	16	17	I/O3

### PIN DESCRIPTION

A0-16	Address Inputs
I/O0-7	Data Input/Output
$\overline{CS}$	Chip Select
$\overline{OE}$	Output Enable
$\overline{WE}$	Write Enable
Vcc	+5.0V Power
GND	Ground



**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

**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	H	H	Out Disable	High Z	Active
L	X	L	Write	Data In	Active

**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

**CAPACITANCE  
(TA = +25°C)**

Parameter	Symbol	Condition	Package	Max	Unit
Input capacitance	C <sub>IN</sub>	V <sub>IN</sub> = 0V, f = 1.0MHz	32 Pin CSOJ, DIP, Flat Pack Evolutionary	12	pF
			32 Pin CSOJ Revolutionary	20	pF
Output capacitance	C <sub>OUT</sub>	V <sub>OUT</sub> = 0V, f = 1.0MHz	32 Pin CSOJ, DIP, Flat Pack Evolutionary	12	pF
			32 Pin CSOJ Revolutionary	20	pF

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

**DC CHARACTERISTICS  
(VCC = 5.0V, GND = 0V, TA = -55°C TO +125°C)**

Parameter	Sym	Conditions	-70		-85		-100		-120		Units
			Min	Max	Min	Max	Min	Max	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		10		10		10	μA
Output Leakage Current	I <sub>LO</sub>	$\overline{CS} = V_{IH}, \overline{OE} = V_{IH}, V_{OUT} = GND \text{ to } V_{CC}$		10		10		10		10	μA
Operating Supply Current	I <sub>CC</sub>	$\overline{CS} = V_{IH}, \overline{OE} = V_{IH}, f = 5\text{MHz}, V_{CC} = 5.5$		30		30		30		30	mA
Standby Current	I <sub>SB</sub>	$\overline{CS} = V_{IH}, \overline{OE} = V_{IH}, f = 5\text{MHz}, V_{CC} = 5.5$		5		5		5		5	mA
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 2.1mA, V <sub>CC</sub> = 4.5		0.4		0.4		0.4		0.4	V
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -1.0mA, V <sub>CC</sub> = 4.5	2.4		2.4		2.4		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  
(TA = -55°C TO +125°C)**

Parameter	Symbol	Conditions	-70		-85		-100		-120		Units
			Min	Max	Min	Max	Min	Max	Min	Max	
Data Retention Supply Voltage	V <sub>DR</sub>	$\overline{CS} \geq V_{CC} - 0.2V$	2.0	5.5	2.0	5.5	2.0	5.5	2.0	5.5	V
Data Retention Current	I <sub>CCDR1</sub>	V <sub>CC</sub> = 3V		1		1		1		1	mA



**AC CHARACTERISTICS**  
(VCC = 5.0V, TA = -55°C To +125°C)

Parameter	Symbol	-70		-85		-100		-120		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Read Cycle Time	t <sub>RC</sub>	70		85		100		120		ns
Address Access Time	t <sub>AA</sub>		70		85		100		120	ns
Output Hold from Address Change	t <sub>OH</sub>	3		3		3		3		ns
Chip Select Access Time	t <sub>ACS</sub>		70		85		100		120	ns
Output Enable to Output Valid	t <sub>OE</sub>		35		45		50		60	ns
Chip Select to Output in Low Z	t <sub>CLZ</sub> <sup>1</sup>	3		3		3		3		ns
Output Enable to Output in Low Z	t <sub>OLZ</sub> <sup>1</sup>	0		0		0		0		ns
Chip Disable to Output in High Z	t <sub>CHZ</sub> <sup>1</sup>		25		25		35		35	ns
Output Disable to Output in High Z	t <sub>OHZ</sub> <sup>1</sup>		25		25		35		35	ns

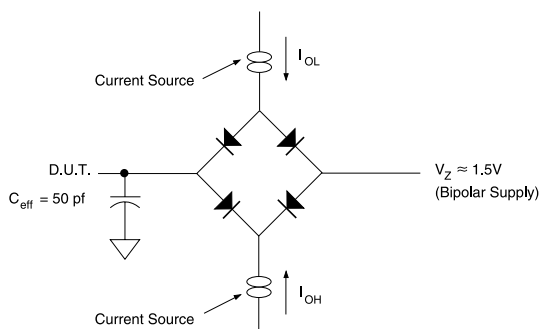
1. This parameter is guaranteed by design but not tested.

**AC CHARACTERISTICS**  
(VCC = 5.0V, TA = -55°C To +125°C)

Parameter	Symbol	-70		-85		-100		-120		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Write Cycle Time	t <sub>WC</sub>	70		85		100		120		ns
Chip Select to End of Write	t <sub>CW</sub>	60		75		80		100		ns
Address Valid to End of Write	t <sub>AW</sub>	60		75		80		100		ns
Data Valid to End of Write	t <sub>DW</sub>	30		35		40		50		ns
Write Pulse Width	t <sub>WP</sub>	50		55		70		80		ns
Address Setup Time	t <sub>AS</sub>	0		0		0		0		ns
Address Hold Time	t <sub>AH</sub>	5		5		5		5		ns
Output Active from End of Write	t <sub>OW</sub> <sup>1</sup>	5		5		5		5		ns
Write Enable to Output in High Z	t <sub>WHZ</sub> <sup>1</sup>		25		30		35		35	ns
Data Hold Time	t <sub>DH</sub>	0		0		0		0		ns

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

**AC TEST CIRCUIT**



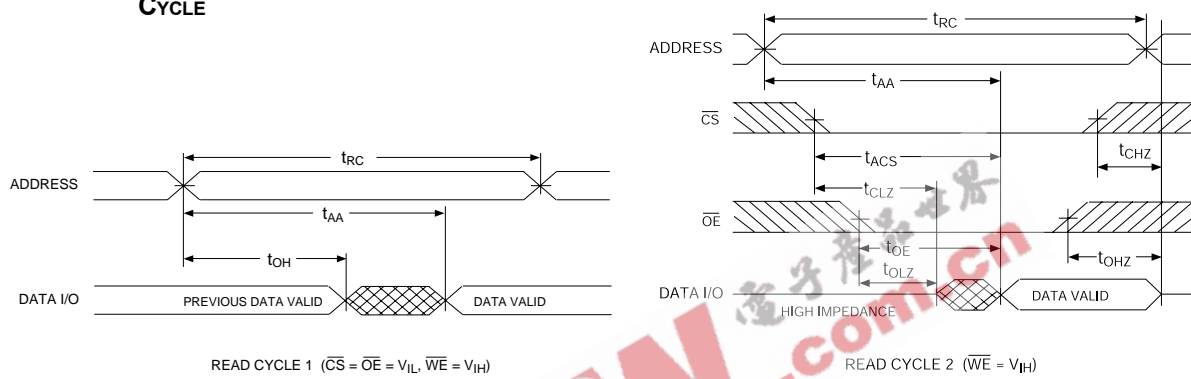
**AC TEST CONDITIONS**

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

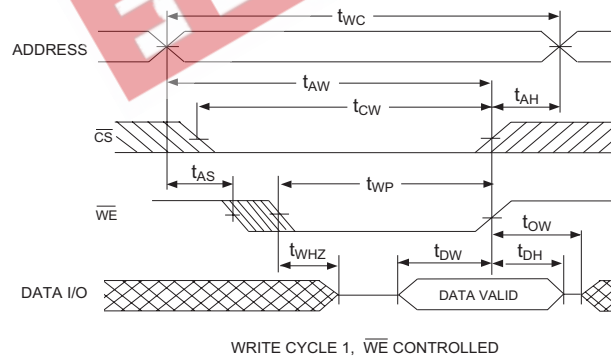
Notes:  
 $V_Z$  is programmable from -2V to +7V.  
 $I_{OL}$  &  $I_{OH}$  programmable from 0 to 16mA.  
 Tester Impedance  $Z_0 = 75\Omega$ .  
 $V_Z$  is typically the midpoint of  $V_{OH}$  and  $V_{OL}$ .  
 $I_{OL}$  &  $I_{OH}$  are adjusted to simulate a typical resistive load circuit.  
 ATE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



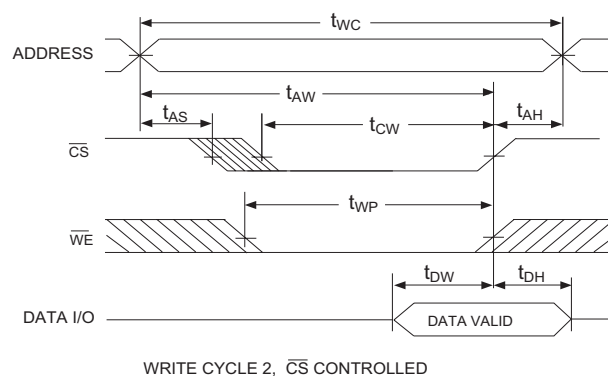
### TIMING WAVEFORM - READ CYCLE



### WRITE CYCLE - $\overline{WE}$ CONTROLLED

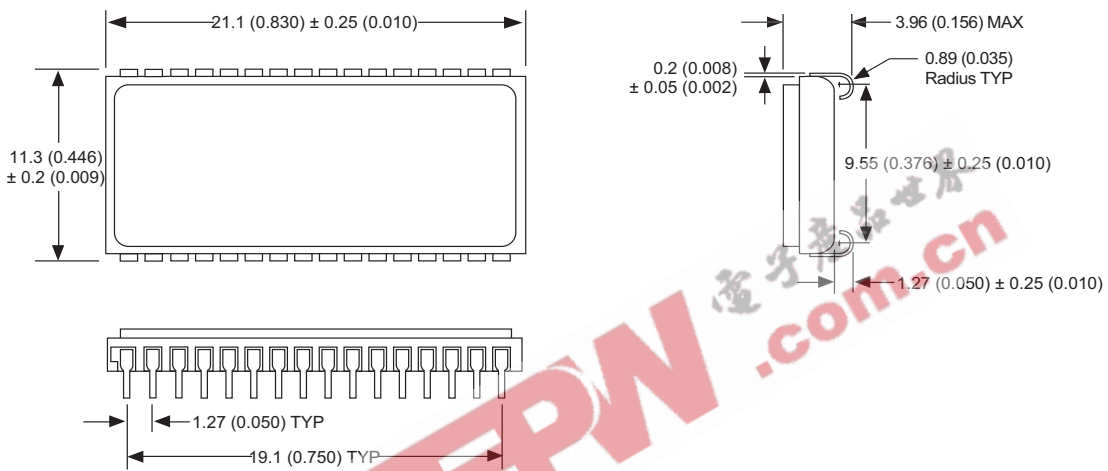


### WRITE CYCLE - $\overline{CS}$ CONTROLLED



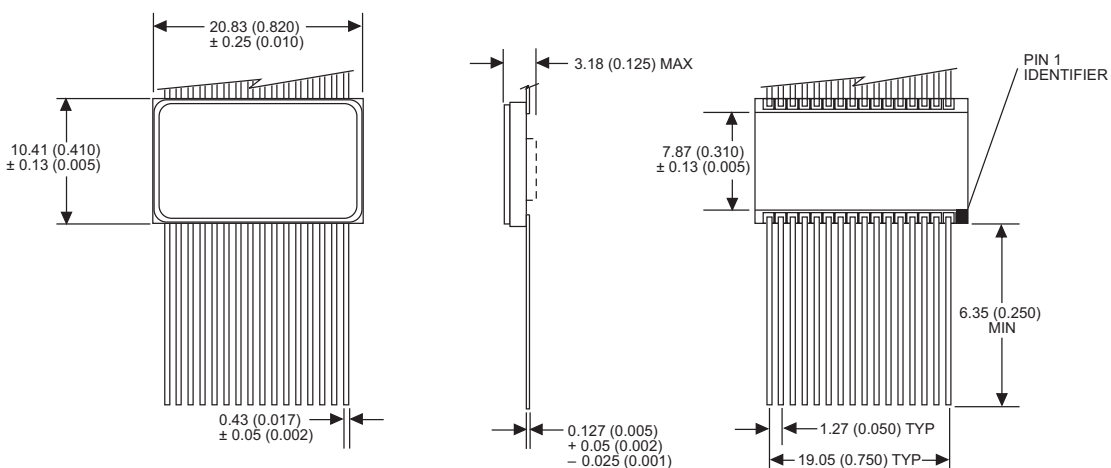


**PACKAGE 101: 32 LEAD, CERAMIC SOJ**



ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES

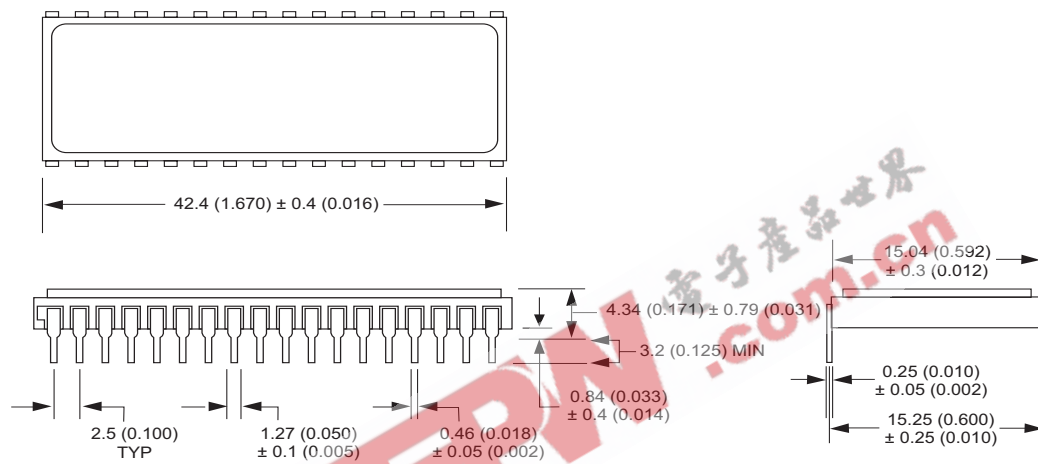
**PACKAGE 206: 32 LEAD, CERAMIC FLAT PACK**



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**PACKAGE 300: 32 PIN, CERAMIC DIP, SINGLE CAVITY SIDE BRAZED**



ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES



**DATA RETENTION CHARACTERISTICS**  
**(TA = -55°C TO +125°C)**  
**LOW POWER VERSION ONLY**

Parameter	Symbol	Conditions			Units
			Min	Max	
Data Retention Supply Voltage	VDR	$\overline{CS} \geq V_{CC} - 0.2V$	2.0	5.5	V
Data Retention Current	ICCDR3	VCC = 2V		750	$\mu A$

**ORDERING INFORMATION**

W M S 128K 8 X - XXX X X X

**LEAD FINISH:**

Blank = Gold plated leads  
 A = Solder clip leads

**DEVICE GRADE:**

M = Military Screened -55°C to +125°C  
 I = Industrial -40°C to +85°C  
 C = Commercial 0°C to +70°C

**PACKAGE:**

C = 32 Pin Ceramic .600" DIP (Package 300)  
 DE = 32 Lead Ceramic SOJ (Package 101) Evolutionary  
 DR = 32 Lead Ceramic SOJ (Package 101) Revolutionary  
 FE = 32 Lead Ceramic Flat Pack (Package 206)

**ACCESS TIME (ns)**

**IMPROVEMENT MARK**

L = Low Power for 2V Data Retention

**ORGANIZATION, 128Kx8**

**SRAM**

**MONOLITHIC**

**WHITE ELECTRONIC DESIGNS CORP.**



DEVICE TYPE	SPEED	PACKAGE	SMD NO.
128K x 8 SRAM Monolithic	120ns	32 lead SOJ Revol (DR)	5962-96691 01HUX
128K x 8 SRAM Monolithic	100ns	32 lead SOJ Revol (DR)	5962-96691 02HUX
128K x 8 SRAM Monolithic	85ns	32 lead SOJ Revol (DR)	5962-96691 03HUX
128K x 8 SRAM Monolithic	70ns	32 lead SOJ Revol (DR)	5962-96691 04HUX
128K x 8 SRAM Monolithic	120ns	32 lead SOJ Evol (DE)	5962-96691 01HTX
128K x 8 SRAM Monolithic	100ns	32 lead SOJ Evol (DE)	5962-96691 02HTX
128K x 8 SRAM Monolithic	85ns	32 lead SOJ Evol (DE)	5962-96691 03HTX
128K x 8 SRAM Monolithic	70ns	32 lead SOJ Evol (DE)	5962-96691 04HTX
128K x 8 SRAM Monolithic	120ns	32 pin DIP (C)	5962-96691 01HYX
128K x 8 SRAM Monolithic	100ns	32 pin DIP (C)	5962-96691 02HYX
128K x 8 SRAM Monolithic	85ns	32 pin DIP (C)	5962-96691 03HYX
128K x 8 SRAM Monolithic	70ns	32 pin DIP (C)	5962-96691 04HYX
128K x 8 SRAM Monolithic	120ns	32 pin Flatpack (FE)	5962-96691 01HNX
128K x 8 SRAM Monolithic	100ns	32 pin Flatpack (FE)	5962-96691 02HNX
128K x 8 SRAM Monolithic	85ns	32 pin Flatpack (FE)	5962-96691 03HNX
128K x 8 SRAM Monolithic	70ns	32 pin Flatpack (FE)	5962-96691 04HNX