

512Kx8 Plastic Monolithic SRAM CMOS

FEATURES

- 512Kx8 bit CMOS Static
- Random Access Memory
 - Access Times of 17, 20, 25ns
 - Data Retention Function (LPA version)
 - Extended Temperature Testing
 - Data Retention Functionality Testing
- 36 lead JEDEC Approved Revolutionary Pinout
 - Plastic SOJ (Package 319)
- Single +5V ($\pm 10\%$) Supply Operation
- RoHS compliant

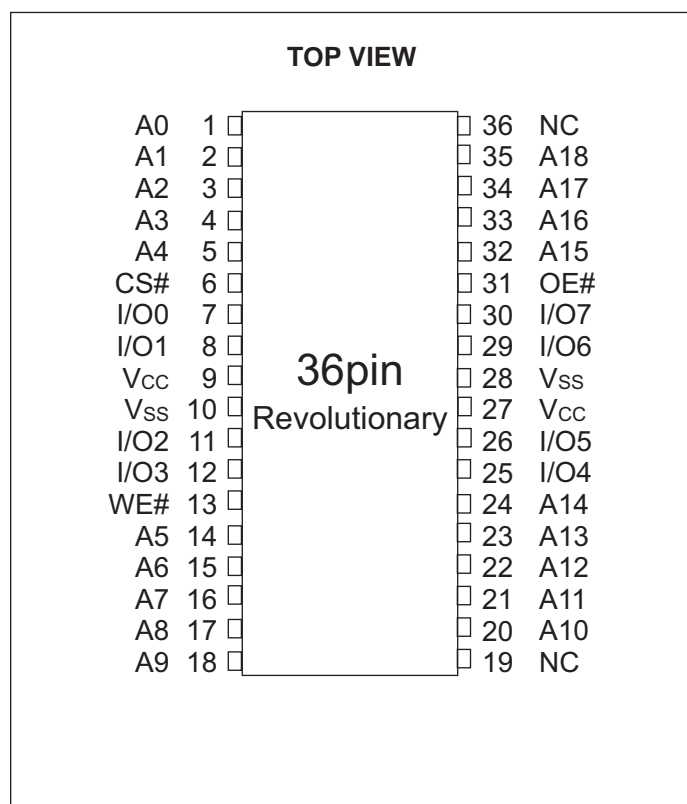
WEDC's ruggedized plastic 512Kx8 SRAM that allows the user to capitalize on the cost advantage of using a plastic component while not sacrificing all of the reliability available in a full military device.

Extended temperature testing is performed with the test patterns developed for use on WEDC's fully compliant 512Kx8 SRAMs. WEDC fully characterizes devices to determine the proper test patterns for testing at temperature extremes. This is critical because the operating characteristics of device change when it is operated beyond the commercial guarantee a device that operates reliably in the field at temperature extremes. Users of WEDC's ruggedized plastic benefit from WEDC's extensive experience in characterizing SRAMs for use in military systems.

WEDC ensures Low Power devices will retain data in Data Retention mode by characterizing the devices to determine the appropriate test conditions. This is crucial for systems operating at -40°C or below and using dense memories such as 512Kx8s.

WEDC's ruggedized plastic SOJ is footprint compatible with WEDC's full military ceramic 36 pin SOJ.

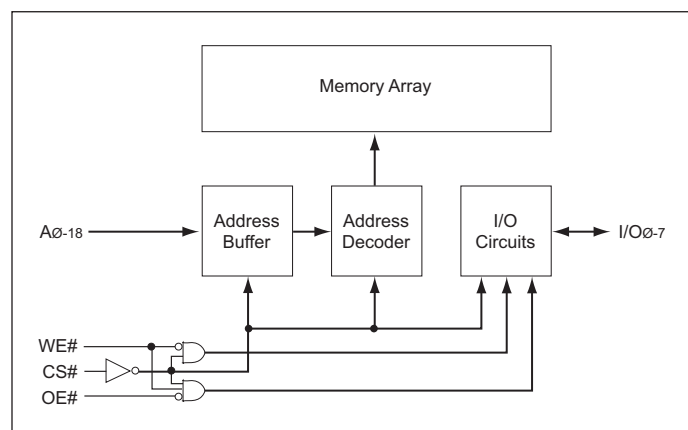
FIGURE 1 – PIN CONFIGURATION



PIN Description

I/O0-7	Data Inputs/Outputs
A0-18	Address Inputs
WE#	Write Enables
CS#	Chip Selects
OE#	Output Enable
Vcc	Power (+5V $\pm 10\%$)
Vss	Ground
NC	Not Connected

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameter		Unit
Voltage on any pin relative to Vss	-0.5 to 7.0	V
Operating Temperature TA (Ambient)		
Commercial	0 to +70	°C
Industrial	-40 to +85	°C
Military	-55 to +125	°C
Storage Temperature, Plastic	-65 to +150	°C
Power Dissipation	1.5	W
Output Current	20	mA
Junction Temperature, TJ	175	°C

NOTE:
 Stress greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions greater than those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TRUTH TABLE

OE#	CS#	WE#	Mode	Output	Power
X	H	X	Standby	High Z	Icc2, Icc3
H	L	H	Output Deselect	High Z	Icc1
L	L	H	Read	Data Out	Icc1
X	L	L	Write	Data In	Icc1

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	Vcc	4.5	5.0	5.5	V
Supply Voltage	Vss	0	0	0	V
Input High Voltage	V _{IH}	2.0	—	V _{CC} + 0.5	V
Input Low Voltage	V _{IL}	-0.5	—	+0.8	V

CAPACITANCE

TA = +25°C

Parameter	Symbol	Condition	Max	Unit
Address Lines	CI	V _{IN} = V _{CC} or V _{SS} , f = 1.0MHz	8	pF
Data Lines	CO	V _{IN} = V _{CC} or V _{SS} , f = 1.0MHz	8	pF

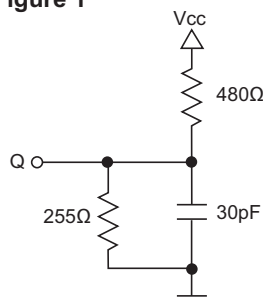
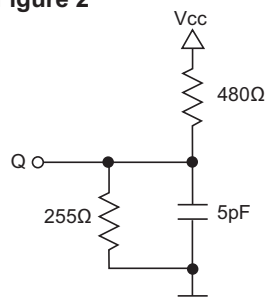
These parameters are sampled, not 100% tested.

DC CHARACTERISTICS

Vcc = 5V, Vss = 0V, -55°C ≤ TA ≤ +125°C

Parameter	Symbol	Conditions	Min	Max	Units
Input Leakage Current	I _{LI}	V _{CC} = 5.5, V _{IN} = V _{SS} to V _{CC}		10	μA
Output Leakage Current	I _{LO}	CS# = V _{IL} , OE# = V _{IH} , V _{OUT} = V _{SS} to V _{CC}		10	μA
Operating Supply Current	I _{CC}	CS# = V _{IL} , OE# = V _{IH} , f = 5MHz, V _{CC} = 5.5		180	mA
Standby Current	I _{SB}	CS# = V _{IH} , OE# = V _{IH} , f = 5MHz, V _{CC} = 5.5		15	mA
Output High Voltage	V _{OH}	I _{OH} = -4.0mA, V _{CC} = 4.5	2.4		V
Output Low Voltage	V _{OL}	I _{OL} = 8.0mA, V _{CC} = 4.5		0.4	V

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

AC TEST CONDITIONS
Figure 1

Figure 2


Input Pulse Levels	Vss to 3.0V
Input Rise and Fall Times	5ns
Input and Output Timing Levels	1.5V
Output Load	Figure 1

NOTE: For t_{EHQZ}, t_{GHQZ} and t_{wLOZ}, CL = 5pF (Figure 2)

AC CHARACTERISTICS – READ CYCLE
 $V_{CC} = 5.0V, V_{SS} = 0V, 0^{\circ}C \leq T_A \leq +70^{\circ}C$

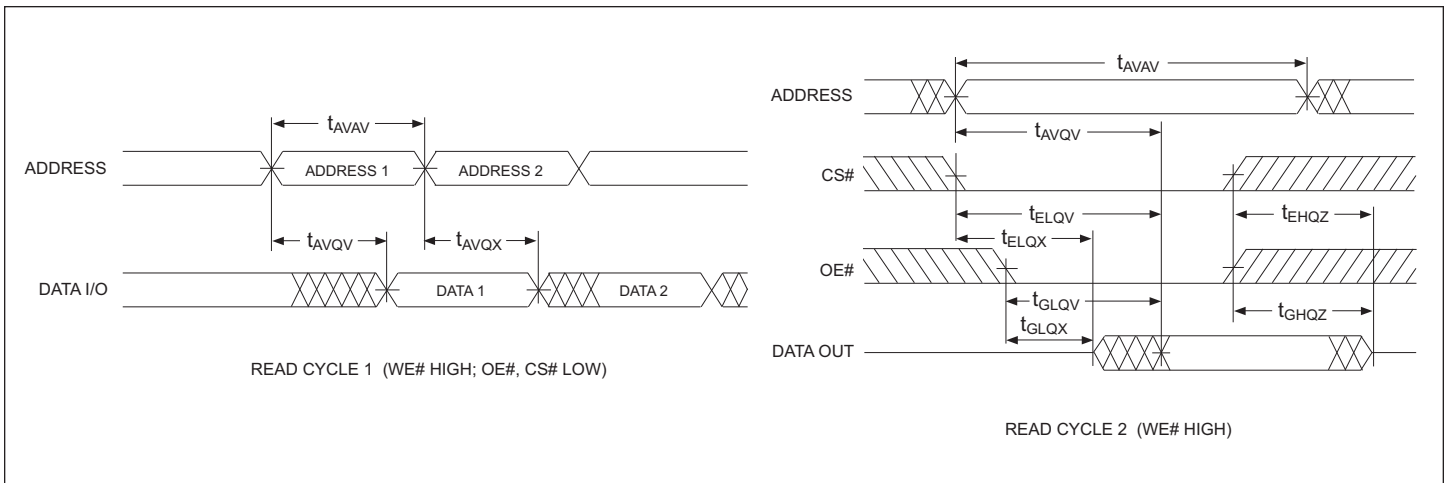
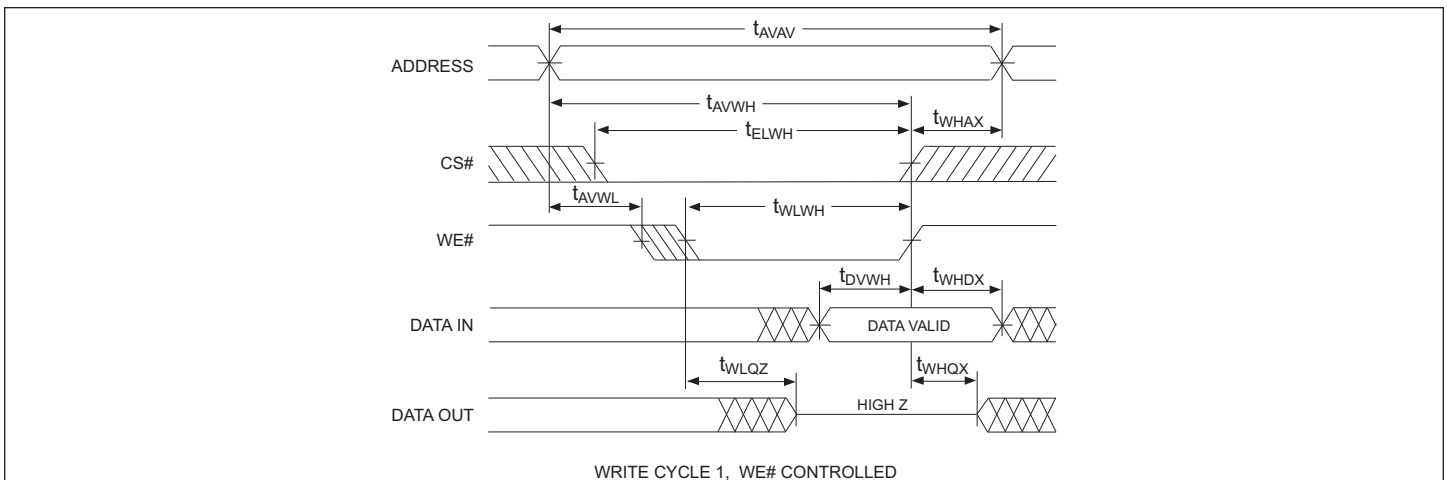
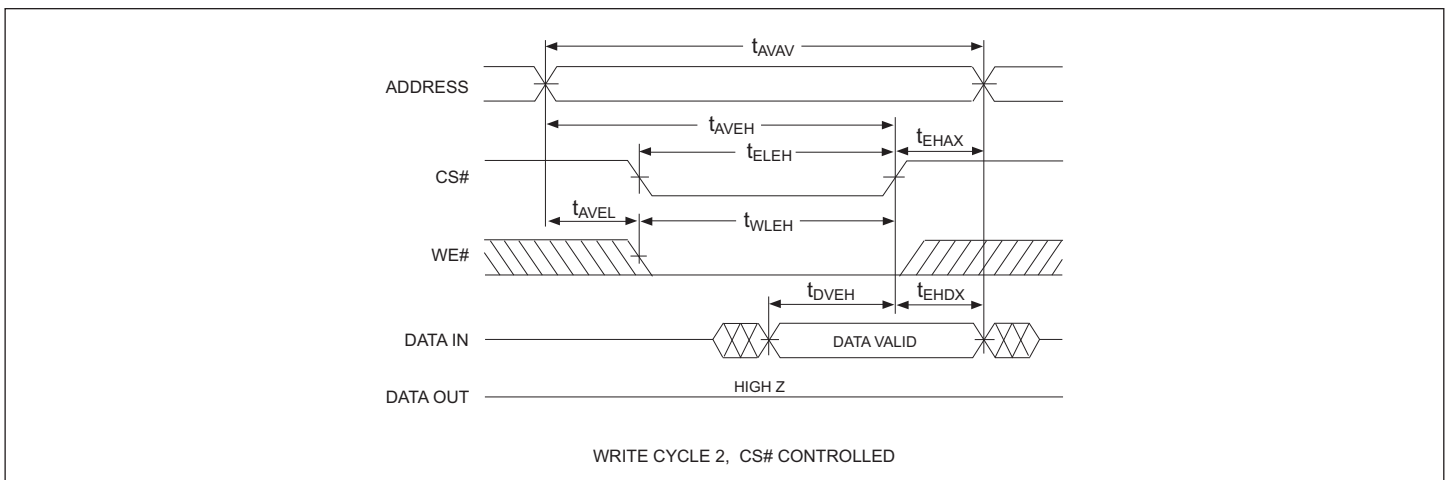
Parameter	Symbol		17ns		20ns		25ns		Units
	JEDEC	Alt.	Min	Max	Min	Max	Min	Max	
Read Cycle Time	t _{AVAV}	t _{RC}	17		20		25		ns
Address Access Time	t _{AVQV}	t _{AA}		17		20		25	ns
Chip Enable Access Time	t _{ELQV}	t _{ACS}		17		20		25	ns
Chip Enable to Output in Low Z (1)	t _{ELQX}	t _{CLZ}	3		3		3		ns
Chip Disable to Output in High Z (1)	t _{EHQZ}	t _{CHZ}	0	7	0	8	0	10	ns
Output Hold from Address Change	t _{AVQX}	t _{OH}	0		0		0		ns
Output Enable to Output Valid	t _{GLQV}	t _{OE}		8		10		12	ns
Output Enable to Output in Low Z (1)	t _{GLQX}	t _{OLZ}	0		0		0		ns
Output Disable to Output in High Z(1)	t _{GHQZ}	t _{OHZ}	0	7	0	8	0	10	ns

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

AC CHARACTERISTICS – WRITE CYCLE
 $V_{CC} = 5.0V, V_{SS} = 0V, 0^{\circ}C \leq T_A \leq +70^{\circ}C$

Parameter	Symbol		17ns		20ns		25ns		Units
	JEDEC	Alt.	Min	Max	Min	Max	Min	Max	
Write Cycle Time	t _{AVAV}	t _{WC}	17		20		25		ns
Chip Enable to End of Write	t _{ELWH}	t _{CW}	14		15		17		ns
	t _{ELEH}	t _{CW}	14		15		17		ns
Address Setup Time	t _{AVWL}	t _{AS}	0		0		0		ns
	t _{AVEL}	t _{AS}	0		0		0		ns
Address Valid to End of Write	t _{AVWH}	t _{AW}	14		15		17		ns
	t _{AVEH}	t _{AW}	14		15		17		ns
Write Pulse Width	t _{WLWH}	t _{WP}	14		15		17		ns
	t _{WLEH}	t _{WP}	14		15		17		ns
Write Recovery Time	t _{WHAX}	t _{WR}	0		0		0		ns
	t _{EHAX}	t _{WR}	0		0		0		ns
Data Hold Time	t _{WHDX}	t _{DH}	0		0		0		ns
	t _{EHDX}	t _{DH}	0		0		0		ns
Write to Output in High Z (1)	t _{WLOZ}	t _{WHZ}	0	8	0	8	0	10	ns
Data to Write Time	t _{DVWH}	t _{DW}	8		10		12		ns
	t _{DVEH}	t _{DW}	8		10		12		ns
Output Active from End of Write (1)	t _{WHQX}	t _{WLZ}	0		0		0		ns

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

FIGURE 2 – TIMING WAVEFORM — READ CYCLE

FIGURE 3 – WRITE CYCLE — WE# CONTROLLED

FIGURE 4 – WRITE CYCLE — CS# CONTROLLED


DATA RETENTION CHARACTERISTICS (EDI88512LPA ONLY)
 $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$

Characteristic Low Power Version only	Sym	Conditions	Min	Typ	Max	Units
Data Retention Voltage	V_{DD}	$V_{DD} = 2.0\text{V}$	2	–	–	V
Data Retention Quiescent Current	I_{CCDR}	$CS\# \geq V_{DD} - 0.2\text{V}$	–	–	15	mA
Chip Disable to Data Retention Time	T_{CDR}	$V_{IN} \geq V_{DD} - 0.2\text{V}$	0	–	–	ns
Operation Recovery Time	T_R	or $V_{IN} \leq 0.2\text{V}$	T_{AVAV}	–	–	ns

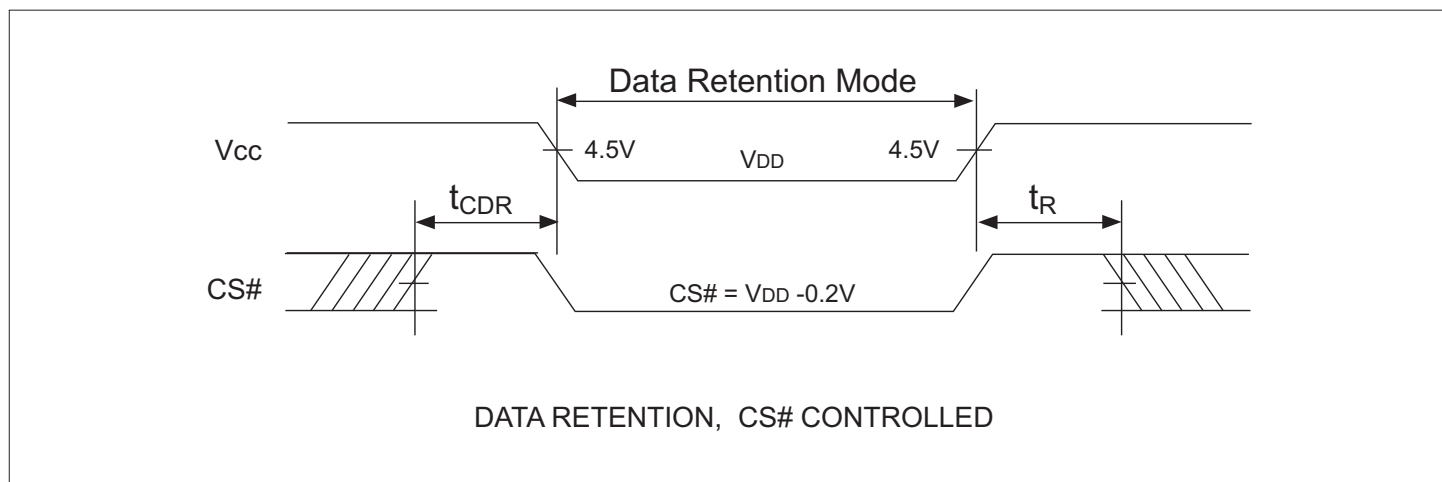
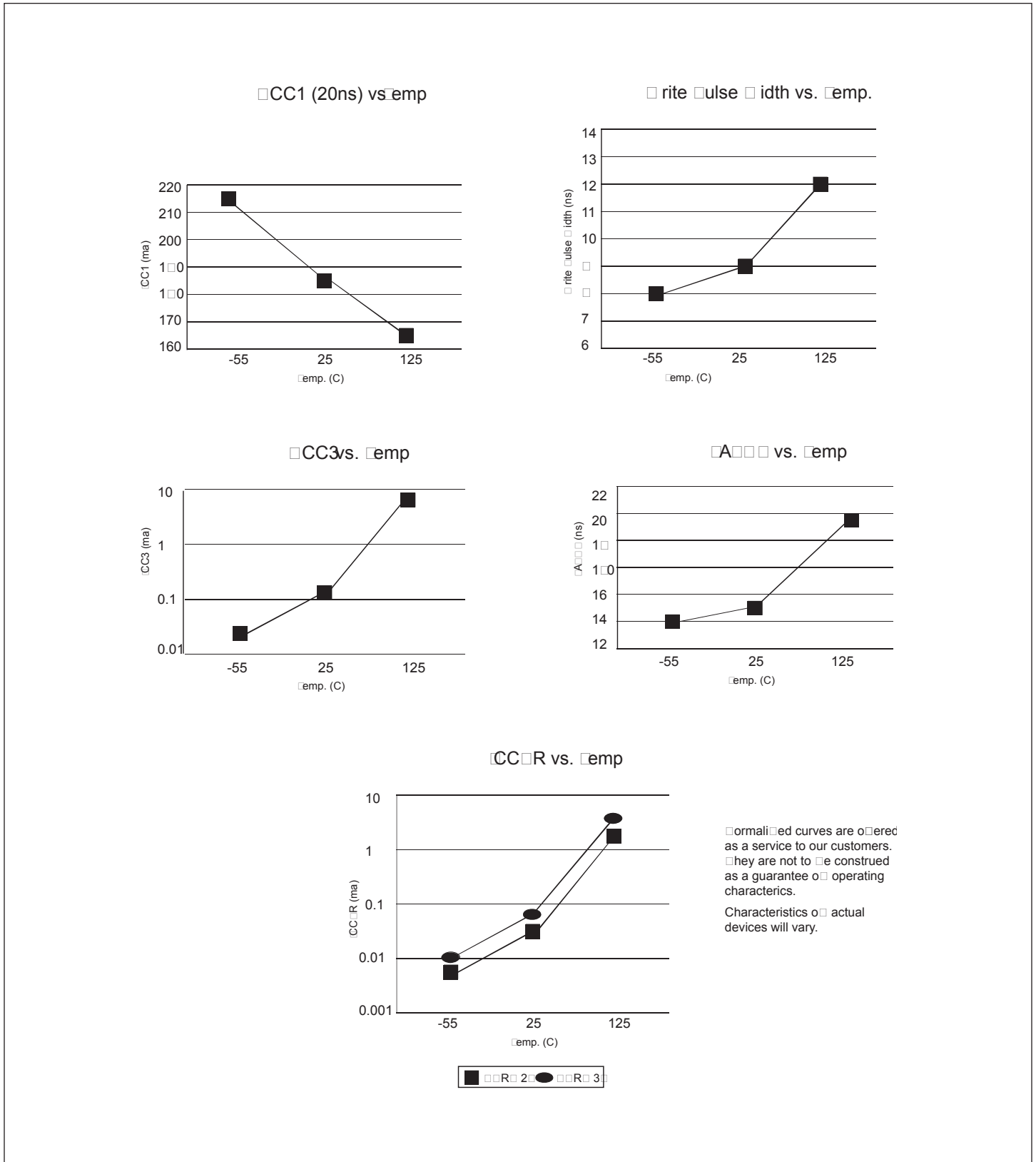
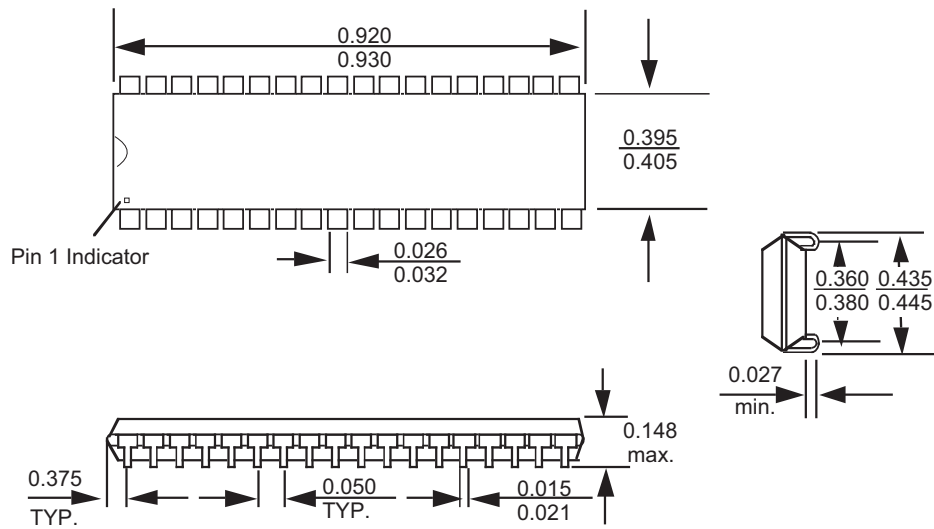
FIGURE 5 – DATA RETENTION — CS# CONTROLLED


FIGURE 6 – NORMALIZED OPERATING GRAPHS





PACKAGE 319: 36 LEAD, PLASTIC SMALL OUTLINE J-LEAD (SOJ)



ALL DIMENSIONS ARE IN INCHES



ORDERING INFORMATION

	EDI 8 8512 CA - X X X G
MICROSEMI CORPORATION: _____	_____
SRAM: _____	_____
ORGANIZATION, 512Kx8: _____	_____
TECHNOLOGY: _____	_____
CA = CMOS Standard Power	
LPA = Low Power	
ACCESS TIME (ns): _____	_____
PACKAGE TYPE: _____	_____
M = 36 lead Plastic SOJ	
RJ = Revolutionary	
DEVICE GRADE: _____	_____
B = Military Grade*	
M = Military Screened -55°C to +125°C	
I = Industrial -40°C to +85°C	
C = Commercial 0°C to +70°C	
RoHS COMPLIANT: _____	_____

*This product is processed the same as the 5962-XXXXXMX product but all test and mechanical requirements are per the Microsemi data sheet.

ORDERING INFORMATION

	W P S 512K 8 X X - XXX RJ X G A
MICROSEMI CORPORATION: _____	_____
PLASTIC PLUS®: _____	_____
SRAM: _____	_____
ORGANIZATION, 512K x 8: _____	_____
POWER: _____	_____
Blank = Standard Power	
L = Low Power	
IMPROVEMENT MARK: _____	_____
B = Burn-in	
T = Temperature Cycling	
C = Burn-in and Temperature Cycle	
ACCESS TIME (ns): _____	_____
PACKAGE: _____	_____
RJ = Revolutionary	
DEVICE GRADE: _____	_____
M = Military Temperature -55°C to +125°C	
I = Industrial Temperature -40°C to +85°C	
RoHS COMPLIANT: _____	_____
SOLDER DIPPED: _____	_____

Document Title

512K x 8 Plastic Monolithic SRAM CMOS

Revision History

Rev #	History	Release Date	Status
Rev 7	Added RoHS compliance	November 2008	Final
Rev 8	Changes (Pg. 2, 8) 8.1 Add solder dipped to package options 8.2 Change CI to 8pF 8.3 Change V_{IH} to 2.0V and V_{IL} to -0.5V	February 2009	Final
Rev 9	Changes (Pg. 9) 9.1 Change document title: 512K x 8 Plastic Monolithic SRAM CMOS	March 2009	Final
Rev 10	Changes (Pg. 1-9) 10.1 Change document layout from White Electronic Designs to Microsemi	February 2011	Final
Rev 11	Changes (Pg. 8) 11.1 Changed EDI88512CA-XXMG Device Grade "B" description from "MIL-STD-883 Compliant" to "Military Grade*."	May 2014	Final