REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add the W package to the drawing. Changes on pages 1, 2, 6, 9, 10, 11, 12, and 13. Editorial changes throughout.	1989 APR 21	M. A. Frye

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REV STATUS OF SHEETS	REV	A	A				A			A	A	A	A	A											
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13											

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY: James E. Jamison

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APPROVED BY: M. A. Frye

DRAWING APPROVAL DATE: 6 MAY 1988

REVISION LEVEL: A

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, DIGITAL, NMOS, 256 X 4 STATIC RAM (SRAM) MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	5962-88595

SHEET 1 OF 13

DESC FORM 193
SEP 87

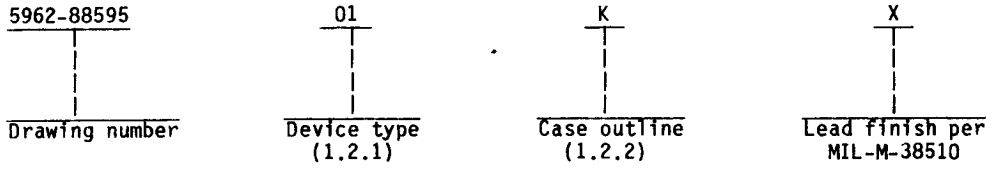
* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E1240

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device type. The device type shall identify the circuit function as follows:

Device type	Generic number	Circuit function	Access time
01	(See 6.4)	256 x 4 NMOS static RAM	35 ns

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
K	F-6 (24-lead, .640" x .420" x .090"), flat package
W	D-7 (22-lead, 1.111" x .420" x .225"), dual-in-line package

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
DC voltage applied to outputs	-0.5 V dc to +7.0 V dc
DC input voltage range	-0.5 V dc to +7.0 V dc
DC output current	20 mA
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) 1/	1.0 W 1/
Lead temperature (soldering, 10 seconds)	+260°C
Thermal resistance, junction-to-case (θ_{JC}): Cases K and W	See MIL-M-38510, appendix C
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	4.5 V dc to 5.5 V dc
Case operating temperature range (T_C)	-55°C to +125°C

1/ Must withstand the added P_D due to short circuit test; e.g., I_{OS}.

2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full case operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C < T_C < +125°C$ V_{CC} = 4.5 V to 5.5 V unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Output high voltage	V_{OH}	V_{CC} = 4.5 V, I_{OH} = -5.2 mA	1, 2, 3	All	2.4		V
Output low voltage	V_{OL}	V_{CC} = 4.5 V, I_{OL} = 8.0 mA	1, 2, 3	All		0.4	V
Input high voltage	V_{IH}		1, 2, 3	All	2.1	V_{CC}	V
Input low voltage	V_{IL}		1, 2, 3	All	-2.5	0.8	V
Input low current	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0	1, 2, 3	All	-10		µA
Input high current	I_{IH}	V_{CC} = 5.5 V, V_{IN} = 5.5 V	1, 2, 3	All		10	µA
Output current, high impedance	I_{OZ}	$V_{OL} \leq V_{OUT} \leq V_{OH}$, output disabled	1, 2, 3	All	-50	50	µA
Output short circuit current 1/	I_{OS}	V_{CC} = 5.5 V, V_{OUT} = 0 V	1, 2, 3	All	-25	-100	mA
Power supply current (active)	I_{CC}	V_{CC} = 5.5 V, CS_1 = $\overline{WE}$ = 0 V, CS_2 = $\overline{OE}$ = A_0-A_7 = 5.0 V, I_{OUT} = 0 mA	1, 2, 3	All		135	mA
Input capacitance	C_{IN}	V_{CC} = 4.5 V, f = 1.0 MHz, T_C = +25°C, V_{IN} = 0 V, See 4.3.1c	4	All		5.0	pF
Output capacitance	C_{OUT}		4	All		8.0	pF
Chip select time	t_{ACS}	See figures 3 and 4 2/	9, 10, 11	All		25	ns
Chip select to high impedance	t_{ZRCS}	See figures 3 and 4 3/	9, 10, 11	All		30	ns
Output enable time	t_{AOS}	See figures 3 and 4 2/	9, 10, 11	All		25	ns

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ V_{CC} = 4.5 V to 5.5 V unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Output enable to high impedance	t_{ZROS}	See figures 3 and 4 3/	9, 10, 11	All		30	ns
Address access time	t_{AA}	See figures 3 and 4 2/	9, 10, 11	All		35	ns
Write disable to high impedance	t_{ZWS}	See figures 3 and 5 3/	9, 10, 11	All		30	ns
Write recovery time	t_{WR}	See figures 3 and 5 2/	9, 10, 11	All		25	ns
Write pulse width	t_W	See figures 3 and 5 2/ 4/	9, 10, 11	All	25		ns
Data setup time prior to write	t_{WSD}	See figures 3 and 5 2/	9, 10, 11	All	5.0		ns
Data hold time after write	t_{WHD}	See figures 3 and 5 2/	9, 10, 11	All	5.0		ns
Address setup time	t_{WSA}	See figures 3 and 5 2/ 4/	9, 10, 11	All	5.0		ns
Address hold time	t_{WHA}	See figures 3 and 5 2/	9, 10, 11	All	5.0		ns
Chip select setup time	t_{WSCS}	See figures 3 and 5 2/	9, 10, 11	All	5.0		ns
Chip select hold time	t_{WHCS}	See figures 3 and 5 2/	9, 10, 11	All	5.0		ns

1/ Not more than one output should be shorted at a time, and duration of short circuit shall not exceed 30 seconds.

2/ Test conditions assume signal transition times of 10 ns or less. Timing is referenced at input and output levels of 1.5 V. Output loading is equivalent to the specified I_{OL}/I_{OH} with a load capacitance of 30 pF.

3/ Test conditions assume signal transition times of 10 ns or less. Transition is measured at steady-state high level of -500 mV or steady-state low level of +500 mV on the output from 1.5 V level on the input with a load capacitance of 5.0 pF.

4/ t_W is measured at t_{WSA} = minimum. t_{WSA} is measured at t_W = minimum.

Device type	01	
Case outlines	K	W
Terminal number	Terminal symbol	
1	A_3	A_3
2	A_2	A_2
3	A_1	A_1
4	A_0	A_0
5	A_5	A_5
6	A_6	A_6
7	A_7	A_7
8	V_{SS}(GND)	V_{SS}(GND)
9	D_1	D_1
10	O_1	O_1
11	D_2	D_2
12	NC	O_2
13	NC	D_3
14	O_2	O_3
15	D_3	D_4
16	O_3	O_4
17	D_4	CS_2
18	O_4	$\overline{OE}$
19	CS_2	$\overline{CS_1}$
20	$\overline{OE}$	$\overline{WE}$
21	$\overline{CS_1}$	A_4
22	$\overline{WE}$	V_{CC}
23	A_4	---
24	V_{CC}	---

FIGURE 1. Terminal connections.

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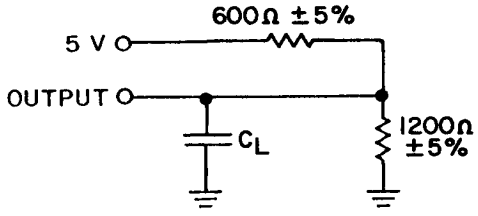
Device type 01

Input					Output	Mode
$\overline{OE}$	$\overline{CS_1}$	CS_2	$\overline{WE}$	D_n	O_n	
X	H	X	X	X	High Z	Not selected
X	X	L	X	X	High Z	Not selected
L	L	H	H	X	On	Read stored data
X	L	H	L	L	High Z	Write "0"
X	L	H	L	H	High Z	Write "1"
H	L	H	H	X	High Z	Output disabled
H	L	H	L	L	High Z	Write "0" (output disabled)
H	L	H	L	H	High Z	Write "1" (output disabled)

H = Logic 1 state
L = Logic 0 state
X = Don't care
HIGH Z = High impedance state

FIGURE 2. Truth table.



Measurement	C_L (including scope and jig capacitance)
t_{ZRCS}, t_{ZROS}, and t_{ZWS}	C_L = 5.0 pF
All others	C_L = 30 pF

FIGURE 3. Output load circuit.

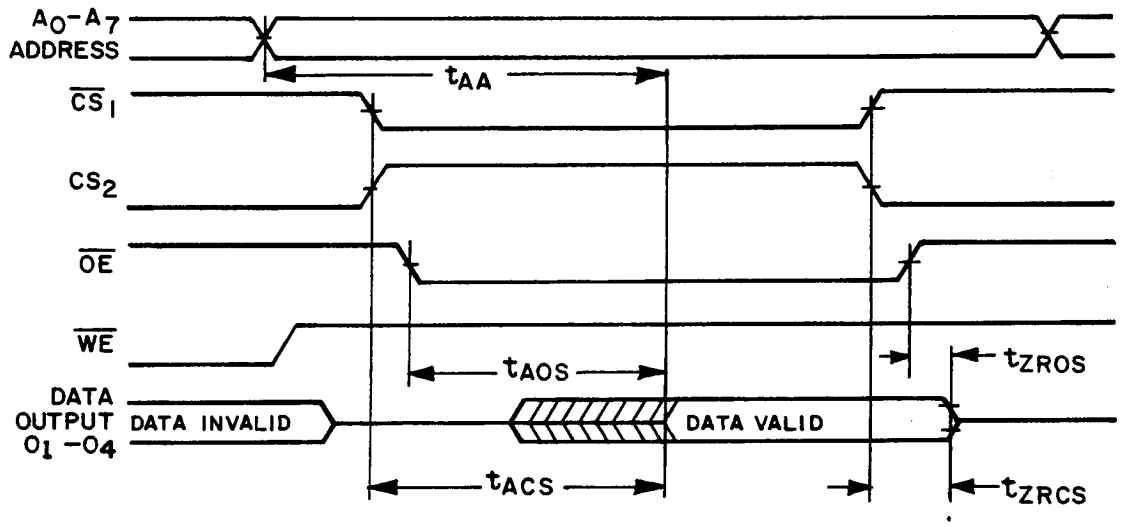
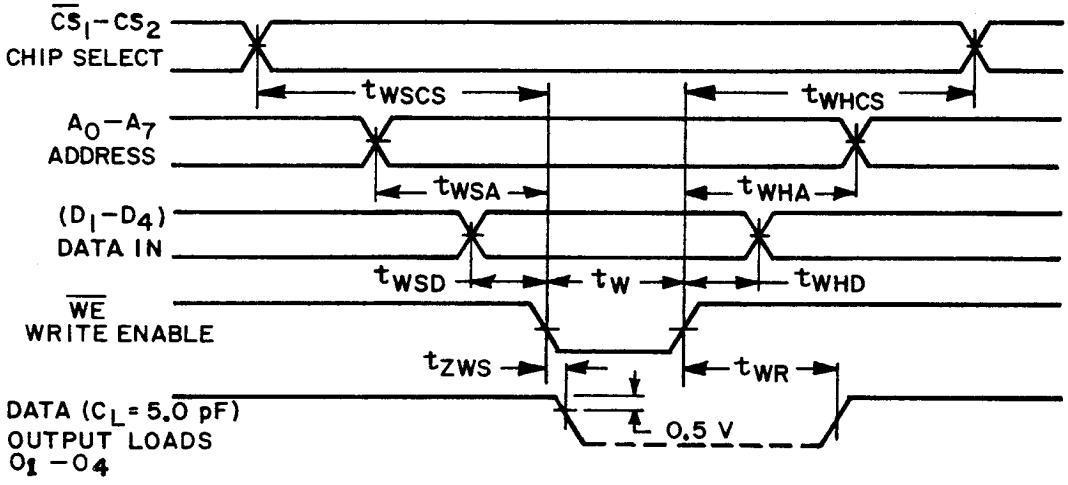


FIGURE 4. Read cycle timing diagram.



NOTE: Timing diagram represents one solution which results in an optimum cycle time. Timing may be changed in various applications as long as the worst-case limits are not violated.

FIGURE 5. Write cycle timing diagram.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883:

(1) Test condition C or D, using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 (C_{IN} and C_{OUT} measurements) shall be measured only for initial characterization and after process or design changes which may affect input or output capacitance. Sample size is 15 devices with no failures, and all input and output terminals tested.

d. Subgroups 7 and 8 tests sufficient to verify the truth table.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test, method 1005 of MIL-STD-883 conditions:

(1) Test condition C or D, using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 7*, 8, 9, 10, 11
Group A test requirements (method 5005)	1, 2, 3, 4**, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	2, 3, 7, 8

* PDA applies to subgroups 1 and 7.
** See 4.3.1c.

4.4 Electrostatic discharge sensitivity (ESDS). Electrostatic discharge sensitivity (ESDS) testing shall be performed in accordance wih MIL-STD-883, method 3015 and MIL-M-38510 for initial testing and after any design or process changes which may affect input or output protection circuitry. The option to categorize devices as ESD sensitive without performing the test is not allowed. Only those device types that pass ESDS testing at 1,000 volts or greater shall be considered as conforming to the requirements of this drawing.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
5962-8859501KX	34335	AM9122-35/BKA
5962-8859501WX	34335	AM9122-35/BWA

1/ Caution. Do not use this number for item acquisition. Items acquired by this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address
34335	Advanced Micro Devices, Incorporated 901 Thompson Place P.O. Box 3453 Sunnyvale, CA 94088

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