

**REVISIONS**

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED

The original first page of this drawing has been replaced.

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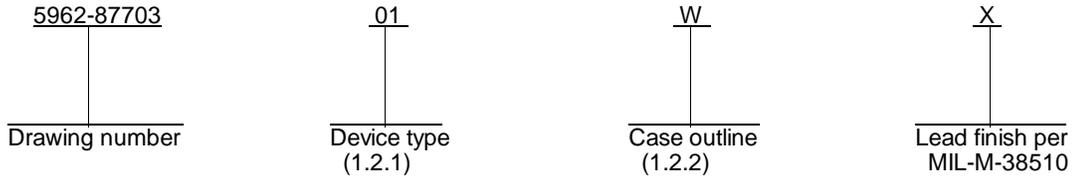
REV STATUS OF SHEETS	REV																			
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13						

PMIC N/A	PREPARED BY Rick C. Officer	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444		
<p align="center"><b>MILITARY DRAWING</b></p> THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A	CHECKED BY D. A. DiCenzo			
	APPROVED BY Robert P. Evans	SIZE <b>A</b>	CAGE CODE <b>67268</b>	<b>5962-87703</b>
	DRAWING APPROVAL DATE 09 November 1987	SHEET 1 OF 13		
	REVISION LEVEL			

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 types. The device types shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>	<u>Access time</u>
01	(See 6.4)	2304-bit bipolar RAM (three-state)	70 ns
02	(See 6.4)	2304-bit bipolar RAM (three-state)	60 ns
03	(See 6.4)	2304-bit bipolar RAM (three-state)	45 ns

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

<u>Outline letter</u>	<u>Case outline</u>
W	D-7 (22-lead, 3/8" x 1 1/8"), dual-in-line package

1.3 Absolute maximum ratings.

Supply voltage .....	+7 V dc maximum
Input voltage .....	+5.5 V dc maximum
Storage temperature range .....	-65° C to +150° C
Maximum power dissipation ( $P_D$ ) .....	1.05 W <sup>1/</sup>
Lead temperature (soldering, 10 seconds) .....	+300° C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ) .....	(See MIL-M-38510, appendix C)
Junction temperature ( $T_J$ ) .....	+200° C

1.4 Recommended operating conditions.

Supply voltage range ( $V_{CC}$ ) .....	+4.75 V dc to +5.25 V dc
Case operating temperature range ( $T_C$ ) .....	-55° C to +125° C
Minimum high level input voltage .....	2.0 V dc
Maximum low level input voltage .....	0.8 V dc

<sup>1/</sup> Must withstand the added  $P_D$  due to short circuit test (e.g.,  $I_{OS}$ ).

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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 Block diagram. The block diagram shall be as specified on figure 3.

3.2.4 Case outline. The case outline 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 recommended case operating temperature range.

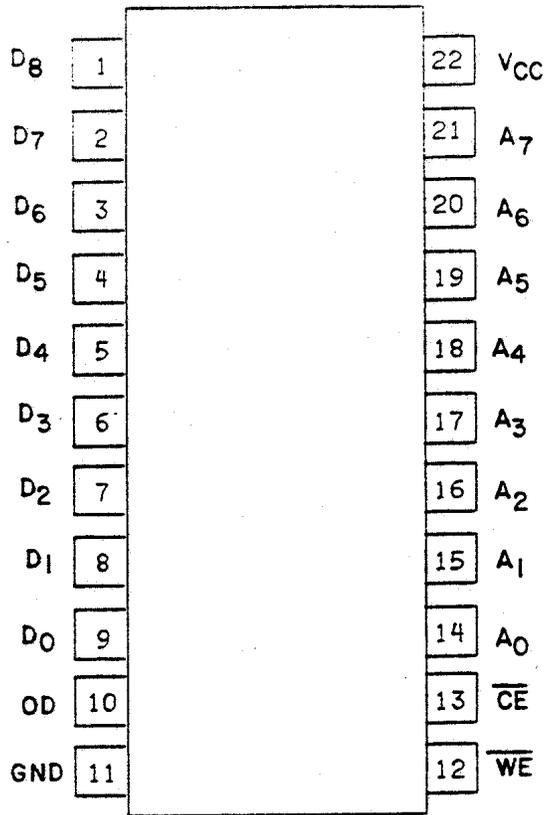
3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

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.

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

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TOP VIEW

FIGURE 1. Terminal connection.

Mode	$\overline{WE}$	$\overline{CE}$	OD	DN in/out
Disable output	X	X	1	High Z
Disable R/W	X	1	X	High Z
Write	0	0	1	Data in
Read	1	0	0	Data out

FIGURE 2. Truth table.

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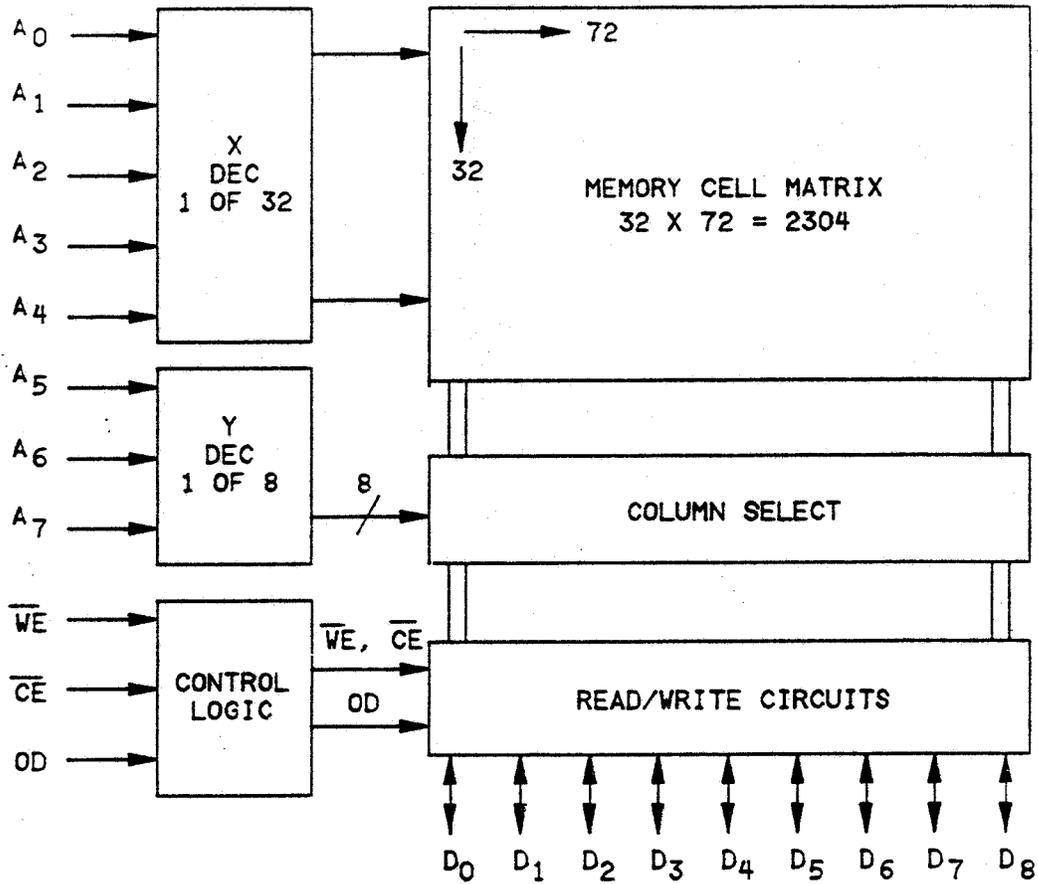


FIGURE 3. Block diagram.

<b>MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		DWG NO. <b>5962-87703</b>
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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> <u>2/</u> -55° C ≤ T <sub>C</sub> ≤ +125° C 4.75 V ≤ V <sub>CC</sub> ≤ 5.25 V See figures 4 and 5	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Input voltage low	V <sub>IL</sub>		All	1, 2, 3		0.8	V
Input voltage high	V <sub>IH</sub>		All	1, 2, 3	2.0		V
Input voltage clamp <u>3/</u>	V <sub>IC</sub>	V <sub>CC</sub> = minimum, I <sub>IN</sub> = -18 mA	All	1, 2, 3		-1.5	V
Output voltage low <u>4/</u>	V <sub>OL</sub>	V <sub>CC</sub> = minimum, I <sub>OL</sub> = 9.6 mA	All	1, 2, 3		0.5	V
Output voltage high <u>5/</u>	V <sub>OH</sub>	V <sub>CC</sub> = minimum, I <sub>OH</sub> = -2 mA	All	1, 2, 3	2.4		V
Input current low	I <sub>IL</sub>	V <sub>CC</sub> = maximum, V <sub>IN</sub> = 0.45 V	01	1, 2, 3		-150	μA
			02,03			-400	
Input current high	I <sub>IH</sub>	V <sub>CC</sub> = maximum, V <sub>IN</sub> = 5.5 V	All	1, 2, 3		40	μA
Output current high Z state	I <sub>OZ</sub>	V <sub>CC</sub> = maximum, CE = high, V <sub>OUT</sub> = 5.5 V CE = high, V <sub>OUT</sub> = 0.5 V	All	1, 2, 3		80 -100	μA
Output short circuit current <u>3/</u> <u>6/</u>	I <sub>OS</sub>	CE = OD, low, V <sub>OUT</sub> = 0 V, stored high, V <sub>CC</sub> = maximum	All	1, 2, 3	-15	-85	mA
V <sub>CC</sub> supply current <u>7/</u>	I <sub>CC</sub>	CE = high, V <sub>CC</sub> = maximum	All	1, 2, 3		200	mA
Address access time	t <sub>AA</sub>	See figures 6 and 7	01	9,10,11		70	ns
			02			60	
			03			45	
Output enable time from OD to output	t <sub>OE</sub>		All	9,10,11		50	ns

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <sup>1/ 2/</sup> -55°C ≤ T <sub>C</sub> ≤ +125°C 4.75 V ≤ V <sub>CC</sub> ≤ 5.25 V See figures 4 and 5	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Output enable time from $\overline{CE}$ to output	t <sub>CE</sub>	See figures 6 and 7	All	9,10,11		50	ns
Output disable time from OD to output	t <sub>OD</sub>		All	9,10,11		50	ns
Output disable time from $\overline{CE}$ to output	t <sub>CD</sub>		All	9,10,11		50	ns
Write pulse width <sup>8/</sup>	t <sub>WP</sub>		01	9,10,11	45		ns
			02,03		40		
Setup time from write to $\overline{WE}$	t <sub>SWC</sub>		All	9,10,11	10		ns
Hold time from $\overline{WE}$ to $\overline{CE}$	t <sub>WHC</sub>		All	9,10,11	10		ns
Setup time from data in to write	t <sub>WSD</sub>		01	9,10,11	45		ns
			02,03		50		
Hold time from write to data in	t <sub>WHD</sub>		All	9,10,11	10		ns
Setup time from address to write	t <sub>WSA</sub>		All	9,10,11	10		ns
Hold time from write to address	t <sub>WHA</sub>		All	9,10,11	15		ns
Setup time from OD to $\overline{CE}$	t <sub>SO</sub>		All	9,10,11	5		ns
Hold time from $\overline{CE}$ to OD	t <sub>HO</sub>		All	9,10,11	5		ns

<sup>1/</sup> All voltage values are with respect to network ground terminal.

<sup>2/</sup> The operating case temperature ranges are guaranteed with transverse air flow exceeding 400 linear feet per minute and a 2 minute warmup. This test condition will be guaranteed by testing at -40°C using instant on testing. Typical thermal resistance values of the package at maximum temperature are:

θ<sub>JC</sub> junction-to-case at 400 fpm air flow: 50°C/W.

θ<sub>JC</sub> junction-to-case still air: 90°C/W.

θ<sub>JC</sub> junction-to-case: 20°C/W.

<sup>3/</sup> Test each pin one at a time.

<sup>4/</sup> Measured with a logic low stored. Output sink current is supplied through a resistor to V<sub>CC</sub>.

<sup>5/</sup> Measured with a logic high.

<sup>6/</sup> Duration of the short circuit should not exceed 1 second.

<sup>7/</sup> I<sub>CC</sub> is measured with the write enable and memory enable inputs grounded, all other inputs at 4.5 V and the output open.

<sup>8/</sup> Minimum required to guarantee a write into the slowest bit.

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DAYTON, OHIO 45444

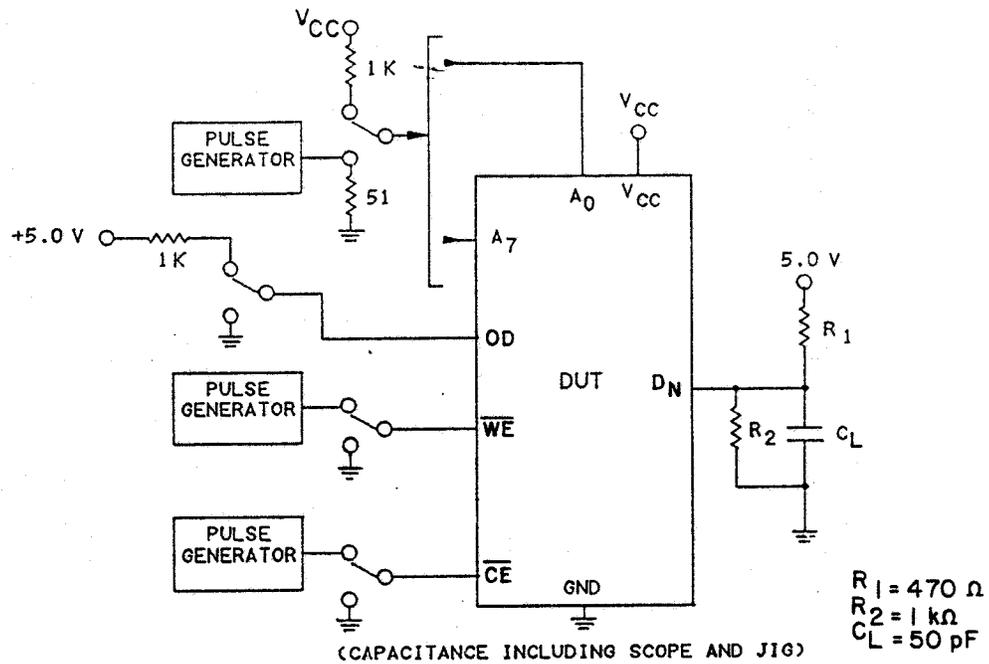
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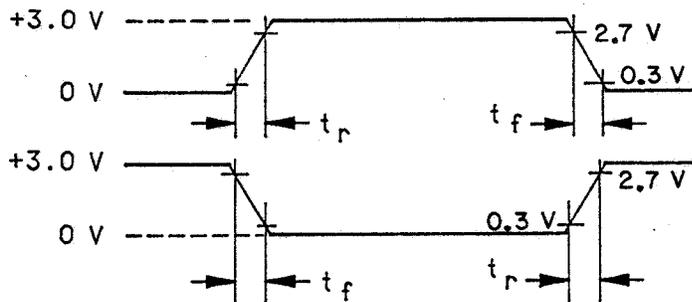




ALL RESISTOR VALUES ARE TYPICAL AND IN OHMS

FIGURE 5. Test load circuit.

ALL INPUT PULSES

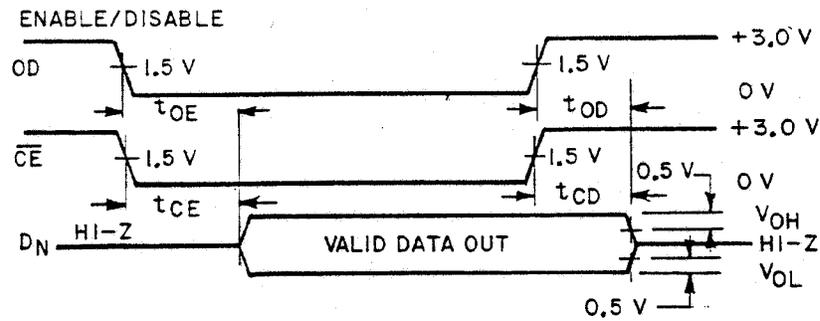


MEASUREMENTS: ALL CIRCUIT DELAYS ARE MEASURED AT THE +1.5 V LEVEL OF INPUTS AND OUTPUT.

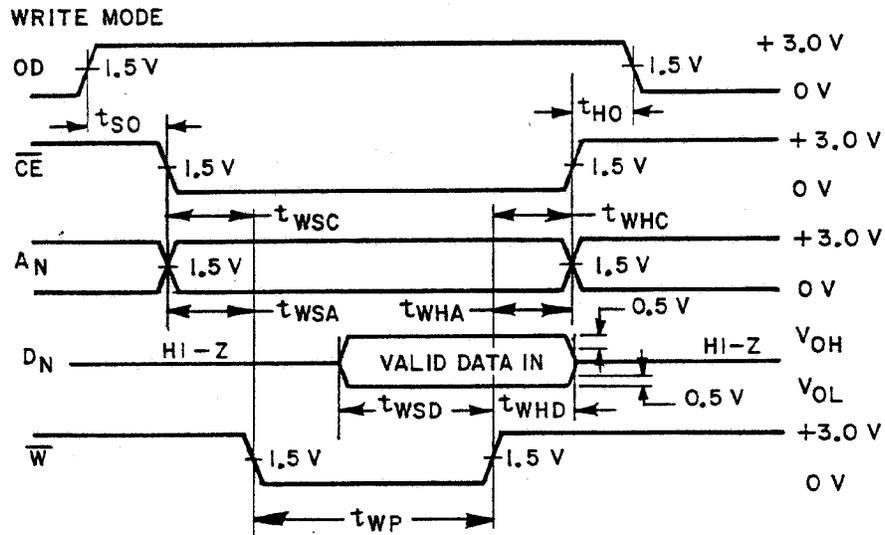
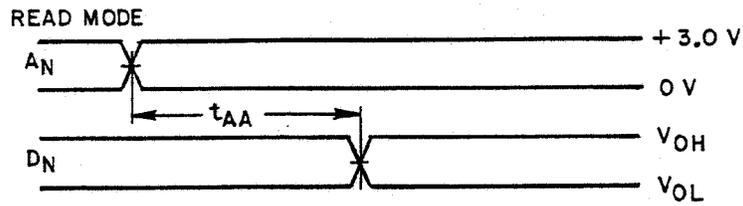
NOTE:  $t_r, t_f \leq 5 \text{ ns}$

FIGURE 6. Voltage waveform.

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NOTE: Assumes  $t_{AA}$  from address to valid data  $\bar{W} = \text{high}$ .



CAUTION: Data bus conflict can occur with  $\bar{CE} = 0$ , apply data source after  $t_{OD(max)}$  and remove data source before  $t_{OE(min)}$ .

FIGURE 7. Timing diagram.

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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 A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2)  $T_A = +125^\circ\text{C}$ , 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 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 7 functional testing shall include verification of instruction set.

##### 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 A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2)  $T_A = +125^\circ\text{C}$ , minimum.

(3) Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510 and method 1005 of MIL-STD-883.

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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
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3
Additional electrical subgroups for group C periodic inspections	---

\* PDA applies to subgroup 1.

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.

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6.4 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have 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 1/ similar part number
5962-8770301WX	18324	82S212/BWA
5962-8770302WX	07263	93479DMQB
5962-8770303WX	07263	93479ADMQB

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

Vendor CAGE number

Vendor name and address

18324

Signetics, Incorporated  
4130 S. Market Court  
Sacramento, CA 95834

07263

Fairchild 4  
1111 39th Avenue, SE  
Puyallup, WA 98373

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