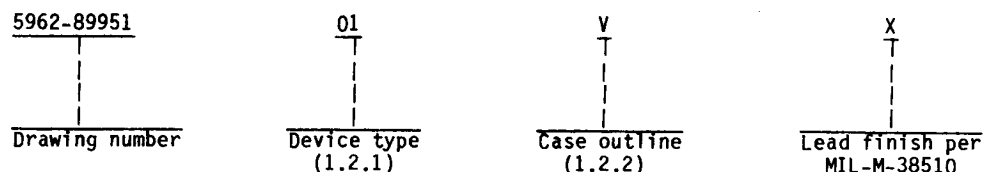


1. SCOPE

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 or Identifying Number PIN). The complete PIN shall be as shown in the following example:



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

Device type	Generic number	Circuit function	Access time	Endurance	
				Store cycles	Data changes per bit
01	(See 6.6)	256 X 4 bit, nonvolatile static RAM	300 ns	10,000	1,000
02	(See 6.6)	256 X 4 bit, nonvolatile static RAM	300 ns	50,000	5,000
03	(See 6.6)	256 X 4 bit, nonvolatile static RAM	300 ns	100,000	10,000

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

Outline letter	Case outline
V	D-6 (18-lead, .300" row spacing, .960" x .310" x .200") dual-in-line package

1.3 Absolute maximum ratings.

Temperature under bias - - - - -	-65°C to +135°C
Storage temperature (T _{STG}) - - - - -	-65°C to +150°C
Voltage on any pin with respect to ground - - - - -	-1.0 V to +7.0 V dc
DC output current - - - - -	5.0 mA
Lead temperature (soldering, 10 seconds) (T _{SOL}) - - -	300°C
Power dissipation (P _D) - - - - -	0.50 W
Thermal resistance, junction-to-case (θ _{JC}) - - - - -	See MIL-M-38510, appendix C
Junction temperature (T _J) - - - - -	150°C

1.4 Recommended operating conditions.

Supply voltage (V _{CC}) - - - - -	4.5 V dc to 5.5 V dc
Minimum high level input voltage (V _{IH}) - - - - -	+2.0 V dc
Maximum high level input voltage (V _{IH}) - - - - -	+V _{CC} + 1.0 V dc
Minimum low level input voltage (V _{IL}) - - - - -	-1.0 V dc
Maximum low level input voltage (V _{IL}) - - - - -	+0.8 V dc
Case operating temperature range (T _C) - - - - -	-55°C to +125°C

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin 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.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standard, and bulletin 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 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

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

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

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

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

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C V _{SS} = 0 V, 4.5 V ≤ V _{CC} ≤ 5.5 V unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Input low voltage	V _{IL}		A11	1,2,3	-1.0	0.8	V
Input high voltage	V _{IH}		A11	1,2,3	2.0	V _{CC} ⁺ 1.0	V
Output low voltage	V _{OL}	V _{IL} = 0.8 V, V _{IH} = 2.0 V, I _{OL} = 4.2 mA	A11	1,2,3		0.4	V
Output high voltage	V _{OH}	V _{IL} = 0.8 V, V _{IH} = 2.0 V, I _{OH} = -2 mA	A11	1,2,3	2.4		V
Input load current	I _{LI}	V _{IN} = GND to V _{CC}	A11	1,2,3		10	μA
Output leakage current	I _{LO}	V _{OUT} = GND to V _{CC}	A11	1,2,3		10	μA
Power supply current	I _{CC}	All inputs = V _{CC} , I _{I/O} = 0 mA	A11	1,2,3		70	mA
Input capacitance	C _{IN}	V _{IN} = 0 V, T _A = 25°C, Frequency = 1.0 MHz, V _{CC} = 5 V See 4.3.1c 1/	A11	4		6	pF
Input/output capacitance	C _{I/O}	V _{I/O} = 0 V, T _A = 25°C, Frequency = 1.0 MHz, V _{CC} = 5 V See 4.3.1c 1/	A11	4		8	pF
Read cycle time	t _{RC}	See figure 4 2/	A11	9,10,11	300		ns
Access time	t _A	See figure 4 2/	A11	9,10,11		300	ns
Chip select to output valid	t _{CO}	See figure 4 2/	A11	9,10,11		200	ns
Output hold from address change	t _{OH}	See figure 4 2/	A11	9,10,11	50		ns

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _C < +125°C V _{SS} = 0 V, 4.5 V < V _{CC} < 5.5 V unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Chip select to output in low Z	t _{LZ}	See figure 4 2/	A11	9,10,11	10		ns
Chip deselect to output in high Z	t _{HZ}	See figure 4 2/	A11	9,10,11	10	100	ns
Write cycle time	t _{WC}	See figure 5 2/	A11	9,10,11	300		ns
Chip select to end of write	t _{CW}	See figure 5 2/	A11	9,10,11	150		ns
Address setup time	t _{AS}	See figure 5 2/	A11	9,10,11	50		ns
Write pulse width	t _{WP}	See figure 5 2/	A11	9,10,11	150		ns
Write recovery time	t _{WR}	See figure 5 2/	A11	9,10,11	25		ns
Data valid to end of write	t _{DW}	See figure 5 2/	A11	9,10,11	100		ns
Data hold time	t _{DH}	See figure 5 2/	A11	9,10,11	20		ns
Write enable to output in high Z	t _{WZ}	See figure 5 2/	A11	9,10,11	10	100	ns
Output active from end of write	t _{OW}	See figure 5 2/	A11	9,10,11	10		ns
Store cycle time	t _{STC}	See figure 6 2/	A11	9,10,11		10	ns
Store pulse width	t _{STP}	See figure 6 2/	A11	9,10,11	100		ns
Store to output in high Z	t _{STZ}	See figure 6 2/	A11	9,10,11		500	ns
Output active from end of store	t _{OST}	See figure 6 2/	A11	9,10,11	10		ns
Array recall cycle time	t _{RCC}	See figure 6 2/	A11	9,10,11	1200		ns

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _C < +125°C V _{SS} = 0 V, 4.5 V < V _{CC} < 5.5 V unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Recall pulse width	t _{RCP} 3/	See figure 6 2/	A11	9,10,11	450		ns
Recall output in high Z	t _{RCZ}	See figure 6 2/	A11	9,10,11		150	ns
Output active from end of recall	t _{ORC}	See figure 6 2/	A11	9,10,11	10		ns
Recalled data access time from end of recall	t _{ARC}	See figure 6 2/	A11	9,10,11		750	ns

1/ Tested initially and after any design or process changes which may affect this parameter, and is guaranteed to the limits specified in table I.

2/ AC test conditions:
 Input high level V_{IH} = 3.0 V
 Input low level V_{IL} = 0.0 V
 Input rise/fall times t_R = 10 ns
 Output voltage high V_{IH} > 1.5 V
 Output voltage low V_{IL} < 1.5 V
 Output load = C_L = 100 pF
 Input and output timing levels = 1.5 V.

3/ Array recall rise time must be less than 1 μs

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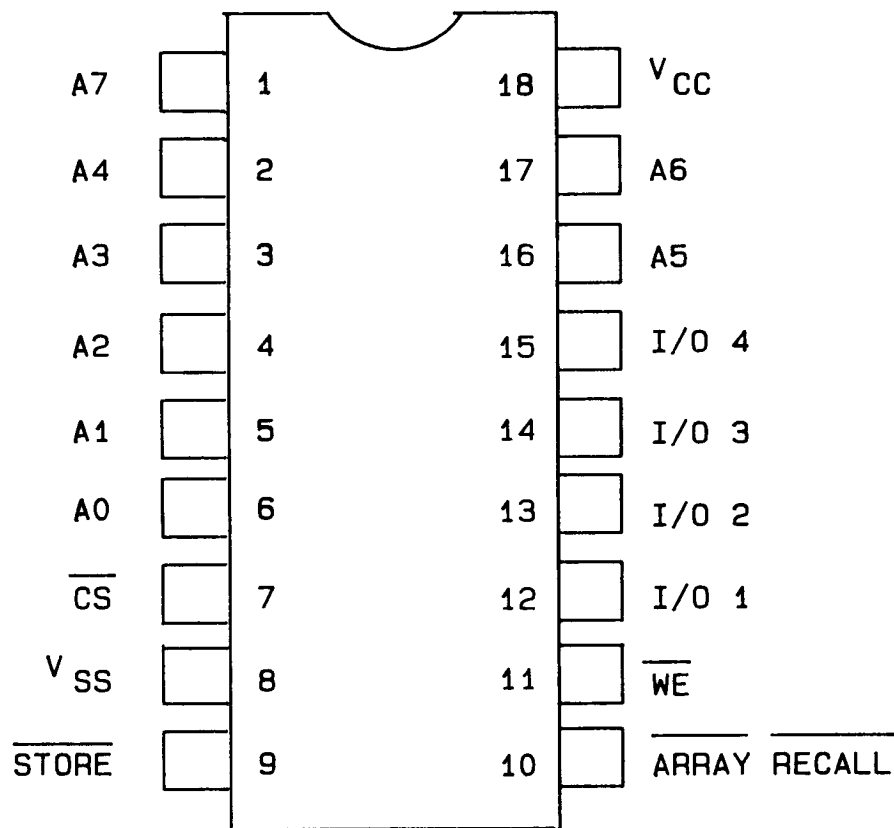
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TOP VIEW

FIGURE 1. Terminal connections.

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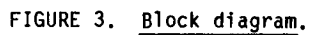
CE	WE	Array Recall	Store	Mode	I/O
H	X	H	H	Not selected ^{1/}	Output high Z
L	H	H	H	Read RAM	Output data
L	L	H	H	Write "1" into RAM	Input data high
L	L	H	H	Write "0" into RAM	Input data low
X	H	L	H	Array recall	Output high Z
H	X	L	H	Array recall	Output high Z
X	H	H	L	Nonvolatile storing ^{2/}	Output high Z
H	X	H	L	Nonvolatile storing ^{2/}	Output high Z

^{1/} Chip is deselected but may be automatically completing a store cycle.

^{2/} STORE = L is required only to initiate the store cycle, after which the store cycle will be automatically completed (STORE = X).

FIGURE 2. Truth table.

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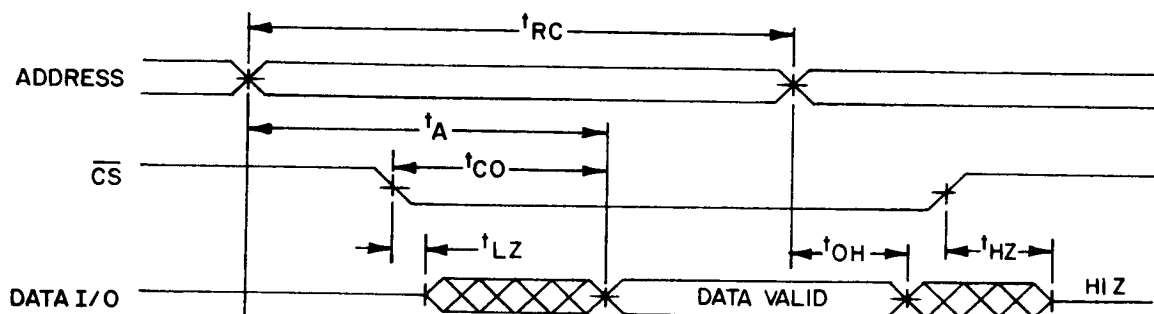


FIGURE 4. Switching waveforms (read cycle).

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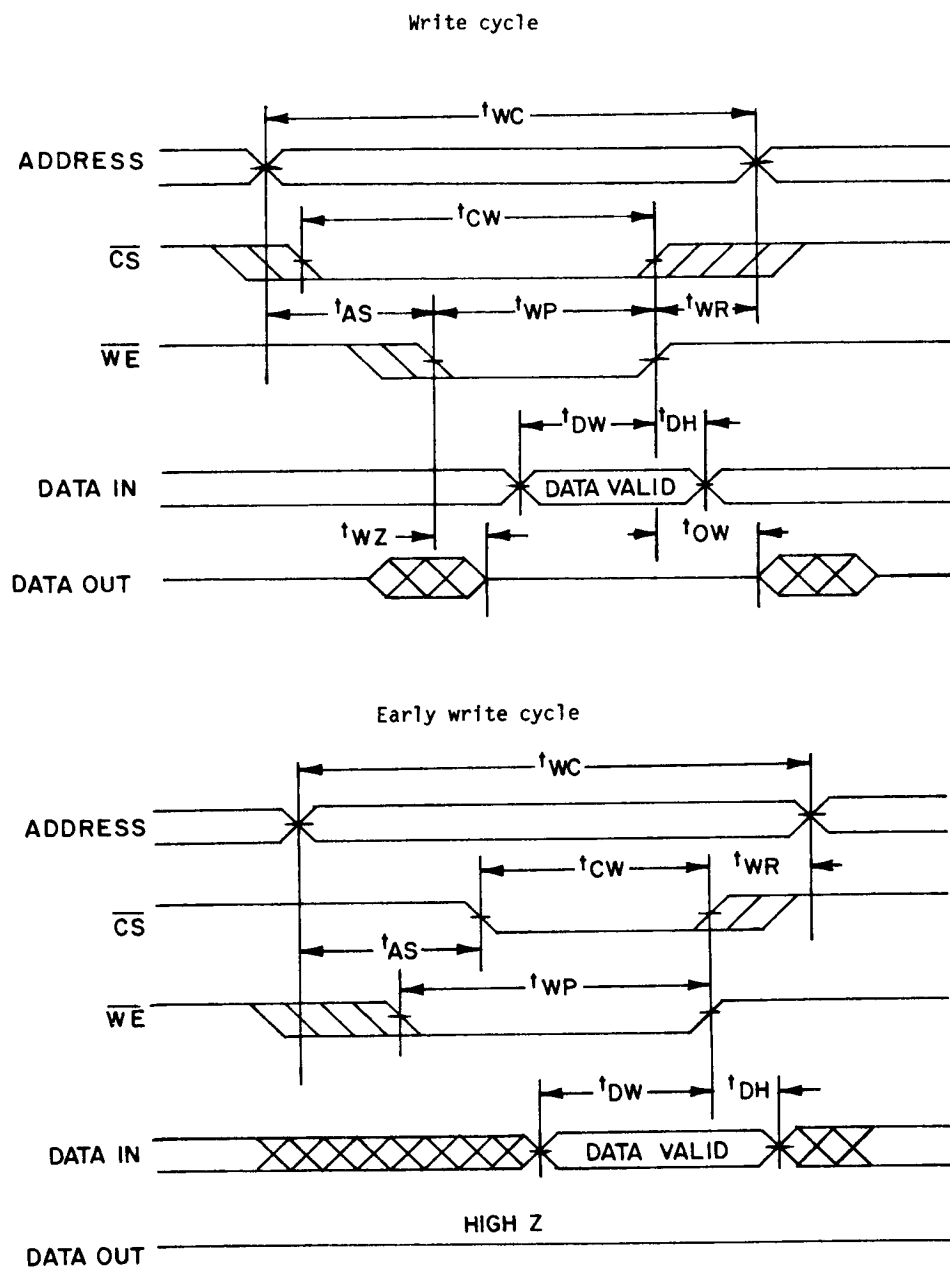
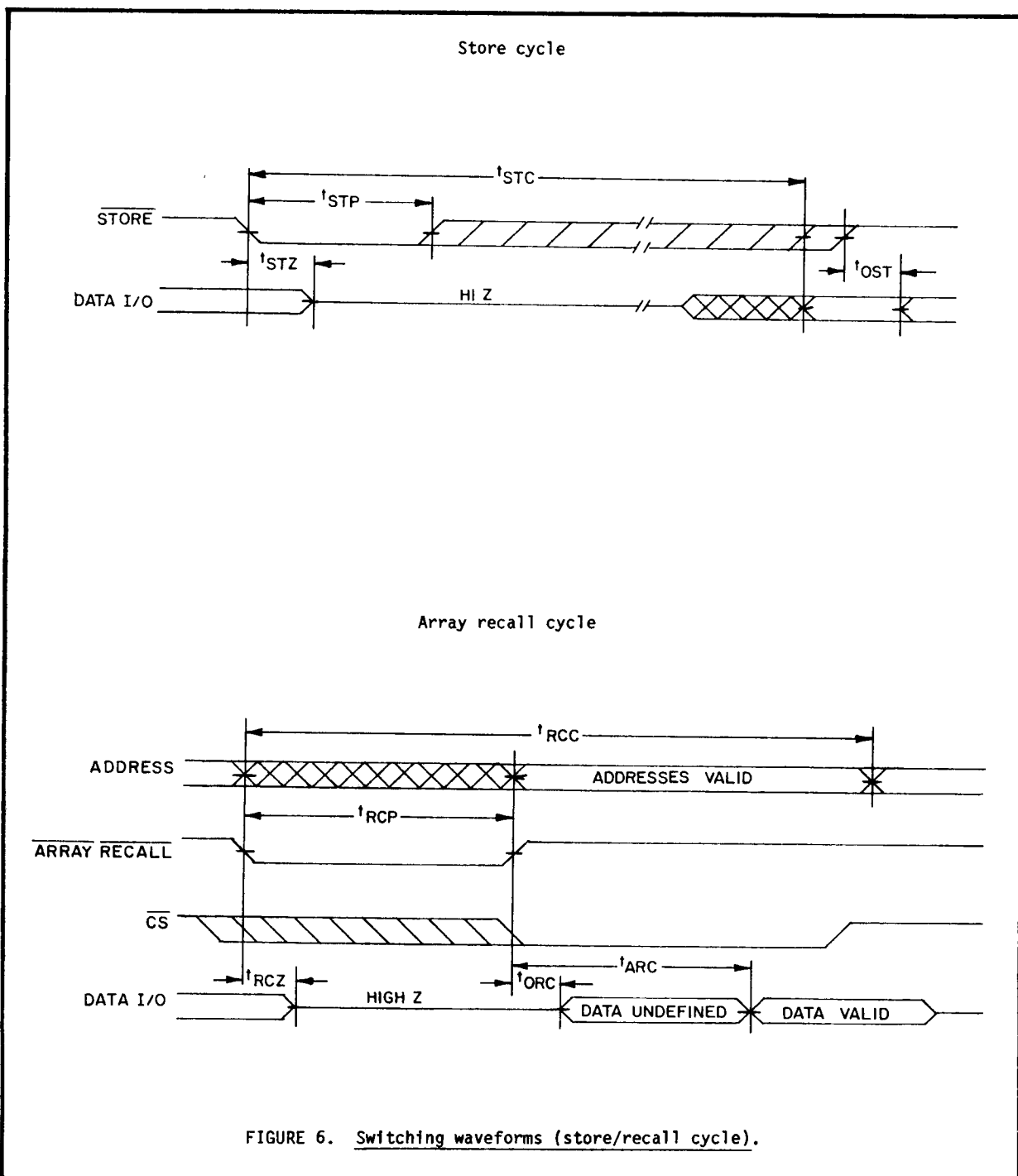


FIGURE 5. Switching waveforms (write cycle).

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3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 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 MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 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.

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

3.9 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 3.6 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 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 (C_{IN} and $C_{I/O}$ measurements) shall be measured only for the initial test and after process or design changes which may affect capacitance.

d. Subgroups 7 and 8 shall include verification of the truth table.

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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 conditions, method 1005 of MIL-STD-883.
 - (1) Test condition C or D using the circuit submitted with the certificate of compliance (see 3.6 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, 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*,8A, 8B,9,10,11
Group A test requirements (method 5005)	1,2,3,4**,7,8A, 8B,9,10,11
Groups C and D end-point electrical parameters (method 5005)	2,3,7,8A,8B

* PDA applies to subgroups 1 and 7.

** See 4.3.1c.

5. PACKAGING

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

6. NOTE

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 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

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6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6022.

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

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS.

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