

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
B	Remove one vendor - FSCM - 04713. Editorial changes throughout.	84-03-22	Monica Poelking
C	Table I: Remove minimum ac limits and change t_{PHL} and t_{PLH} limits.	84-05-14	Monica Poelking
D	Add vendor CAGE 34371. Remove vendor CAGE 07263. Technical changes in 1.3, 1.4, table I. Change to military drawing format. Change drawing CAGE code to 67268. Add device type 02. Editorial changes throughout.	90-03-26	Monica Poelking
E	IAW Nor 5962-R107-92.	92-01-10	Monica Poelking
F	Redrawn with changes. Add device type 03. Technical changes to table I. Updated boilerplate. Editorial changes throughout.	94-01-13	Monica Poelking

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

CURRENT CAGE CODE 67268

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PMIC N/A				PREPARED BY Marcia B. Kelleher				DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444																									
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				APPROVED BY Monica L. Poelking																													
				DRAWING APPROVAL DATE 79-05-15																													
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				SIZE A		CAGE CODE 14933				79015																							
				SHEET		1		OF		14																							

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5962-E328-93

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
01	40528	Differential 4-channel analog multiplexer/demultiplexer
02	40528	Differential 4-channel analog multiplexer/demultiplexer
03	140528	Differential 4-channel analog multiplexer/demultiplexer

1.2.2 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line package
F	GDIP2-F16 or CDFP3-F16	16	Flat package

1.2.3 Lead finish. The lead finish shall be as specified in MIL-M-38510. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings.

Supply voltage range (V_{DD}):	
Device types 01 and 03	-0.5 V dc to +18 V dc
Device type 02	-0.5 V dc to +20 V dc
Input voltage range	-0.5 V dc to $V_{DD} + 0.5$ V dc
DC input current	± 10 mA
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) ^{1/}	500 mW dc
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-STD-1835
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC}):	
Device types 01 and 03	+3.0 V dc to +15 V dc
Device type 02	+3.0 V dc to +18 V dc
Case operating temperature range (T_C)	-55°C to +125°C

^{1/} For $T_C = +100^\circ\text{C}$ to +125°C, derate linearly at 12 mW/°C to 200 mW.

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standards 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.

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

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

(Copies of the specification, standards 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 outlines. The case outlines 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 Logic diagram. The logic 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 apply over the full case operating temperature range.

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TABLE 1. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ unless otherwise specified	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Quiescent supply current	I_{DD}	$V_{DD} = 5\text{ V}, \frac{1}{V_{IN} = 0.0\text{ V}}$ or V_{DD}	All	1, 3		5	μA
				2		150	
		$V_{DD} = 10\text{ V}, \frac{1}{V_{IN} = 0.0\text{ V}}$ or V_{DD}	All	1, 3		10	
				2		300	
		$V_{DD} = 15\text{ V}, \frac{1}{V_{IN} = 0.0\text{ V}}$ or V_{DD}	All	1, 3		20	
				2		600	
Low level input voltage	V_{IL}	$V_{DD} = 5\text{ V},$ $V_{EE} = V_{SS}$ $R_L = 1\text{ k}\Omega$ to V_{SS} $I_{IS} < 2\text{ }\mu\text{A}$ on all off channels	All	1, 2, 3		1.5	V
		$V_{DD} = 10\text{ V},$ $R_L = 1\text{ k}\Omega$ to V_{SS} $\frac{3}{I_{IS} < 2\text{ }\mu\text{A}}$ on all off channels	All	1, 2, 3		3.0	
		$V_{DD} = 15\text{ V},$ $R_L = 1\text{ k}\Omega$ to V_{SS} $I_{IS} < 2\text{ }\mu\text{A}$ on all off channels	All	1, 2, 3		4.0	
High level input voltage	V_{IH}	$V_{DD} = 5\text{ V},$ $R_L = 1\text{ k}\Omega$ to V_{SS} $I_{IS} < 2\text{ }\mu\text{A}$ on all off channels	All	1, 2, 3	3.5		V
		$V_{DD} = 10\text{ V}, \frac{3}{R_L = 1\text{ k}\Omega}$ to V_{SS} $I_{IS} < 2\text{ }\mu\text{A}$ on all off channels	All	1, 2, 3	7.0		
		$V_{DD} = 15\text{ V},$ $R_L = 1\text{ k}\Omega$ to V_{SS} $I_{IS} < 2\text{ }\mu\text{A}$ on all off channels	All	1, 2, 3	11.0		

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 unless otherwise specified	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Input current	I _{IN}	V _{DD} = 15 V, V _{IN} = 0.0 V or V _{DD}	01, 03	1, 3		±0.1	μA
				2		±1.0	
		V _{DD} = 20 V, V _{IN} = 0.0 V or V _{DD} 2/	02	1, 3		±0.1	
				2		±1.0	
Input capacitance	C _{IN}	V _{IN} = 0 V, T _C = +25°C, See 4.3.1c	All	4		7.5	pF
Functional test		See 4.3.1d	All	7			
On-state resistance	R _{ON}	V _{DD} = 5 V	01,	1		2500	Ω
				2		3500	
				3		2000	
			02 03	1		1050	
				2		1300	
				3		800	
		V _{DD} = 10 V	01	1		500	
				2		660	
				3		340	
			02	1		400	
				2		550	
				3		310	
		V _{DD} = 15 V	03	1		500	
				2		550	
				3		400	
			01,	1		280	
				2		400	
				3		220	
			02	1		240	
				2		320	
				3		200	
			03	1		280	
				2		320	
				3		220	

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Propagation delay time, signal input to output	t _{PHL1} , t _{PLH1}	R _L = 200 kΩ, C _L = 50 pF t _L = t _f = 20 ns See figure 4	V _{DD} = 5 V	01	9	60	ns
					10, 11	90	
				02 4/	9	1.5 60	
					10, 11	1.5 90	
				03	9	75	
					3/ 10, 11	112.5	
			V _{DD} = 10 V	01, 03	9	35	
					3/ 10, 11	50	
				02 4/	9	1.5 30	
					10, 11	1.5 45	
				01 3/	9	25	
					10, 11	35	
			V _{DD} = 15 V	02 4/	9	1.5 20	
					10, 11	1.5 30	
				03	9	25	
					3/ 10, 11	37.5	
Propagation delay time, address to signal output	t _{PHL2} , t _{PLH2}	R _L = 10 kΩ C _L = 50 pF t _f = t _r = 20 ns See figure 4	V _{DD} = 5 V	01,	9	1000	
					10, 11	1400	
				02	9	1.5 720	
					10, 11	1.5 1080	
				03	9	650	
					3/ 10, 11	975	

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ unless otherwise specified	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Propagation delay time, address to signal output	$t_{\text{PHL2}},$ t_{PLH2}	$R_L = 10\text{ k}\Omega$ $C_L = 50\text{ pF}$ $t_r = t_f = 20\text{ ns}$ See figure 4	$V_{\text{DD}} = 10\text{ V}$	01,	9	360	ns
					10, 11	505	
				02	9	1.5 320	
				$\frac{3}{3/}$	10, 11	1.5 480	
				03	9	260	
				$\frac{3}{3/}$	10, 11	390	
Propagation delay time, address to to signal output	$t_{\text{PHL2}},$ t_{PLH2}		$V_{\text{DD}} = 15\text{ V}$	01, $\frac{3}{3/}$	9	240	
					10, 11	335	
				02	9	1.5 240	
				$\frac{3}{3/}$	10, 11	1.5 360	
				03	9	180	
				$\frac{3}{3/}$	10, 11	270	
Propagation delay time, inhibit to signal out (Channel turning ON)	$t_{\text{PZH}},$ t_{PZL}	$R_L = 10\text{ k}\Omega,$ $C_L = 50\text{ pF},$ $t_r = t_f = 20\text{ ns}$ See figure 4	$V_{\text{DD}} = 5\text{ V}$	01,	9	1200	
					10, 11	1800	
				02	9	1.5 720	
					10, 11	1.5 1080	
				03	9	600	
				$\frac{3}{3/}$	10, 11	900	
			$V_{\text{DD}} = 10\text{ V}$	01,	9	450	
					10, 11	630	
				02	9	1.5 320	
				$\frac{3}{3/}$	10, 11	1.5 480	
				03	9	310	
				$\frac{3}{3/}$	10, 11	465	

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified		Device types	Group A subgroups	Limits		Unit
						Min	Max	
Propagation delay time, inhibit to signal out (channel turning on)	t _{PZH} , t _{PZL}	R _L = 10kΩ C _L = 50 pF t _r = t _f = 20 ns See figure 4	V _{DD} = 15 V	01, 3/	9		320	
					10, 11		450	
				02 3/	9	1.5	240	
					10, 11	1.5	360	
				03	9		250	
					3/ 10, 11		375	
Propagation delay time, inhibit to signal out (Channel turning OFF)	t _{PHZ} , t _{PLZ}	R _L = 1kΩ C _L = 50 pF t _r = t _f = 20 ns See figure 4	V _{DD} = 5 V	01	9		420	
					10, 11		630	
				02	9	1.5	450	
					10, 11	1.5	675	
				03	9		600	
					3/ 10, 11		900	
Propagation delay time, inhibit to signal out (Channel turning OFF)	t _{PHZ} , t _{PLZ}	R _L = 1 kΩ, C _L = 50 pF, t _r = t _f = 20 ns See figure 4	V _{DD} = 10 V 5/	01	9		200	ns
					10, 11		280	
				02 3/	9	1.5	210	
					10, 11	1.5	315	
				03	9		310	
					3/ 10, 11		465	
			V _{DD} = 15 V 5/	01 3/	9		150	
					10, 11		210	
				02 3/	9	1.5	160	
					10, 11	1.5	240	
				03 3/	9		250	
					3/ 10, 11		375	

1/ Guaranteed, if not tested, to the specified limits, for device type 02.

2/ This test is performed at V_{DD} = 18 V at -55°C.

3/ Guaranteed, if not tested, to the specified limits.

4/ Guaranteed by R_{ON} test as specified in table I.5/ Device type 03 R_L = 10 kΩ.

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Device types	01, 02, and 03
Case outlines	E and F
Terminal number	Terminal symbol
1	Y0
2	Y2
3	Y
4	Y3
5	Y1
6	INHIBIT
7	VEE
8	VSS
9	B
10	A
11	X3
12	X0
13	X
14	X1
15	X2
16	VDD

FIGURE 1. Terminal connections.

Devices types 01, 02, and 03

Inhibit	Select		On switches	
	B	A		
L	L	L	Y0	X0
L	L	H	Y1	X1
L	H	L	Y2	X2
L	H	H	Y3	X3
H	X	X	None	None

H = High voltage level
L = Low voltage level
X = Irrelevant

FIGURE 2. Truth table.

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Device types 01, 02 and 03

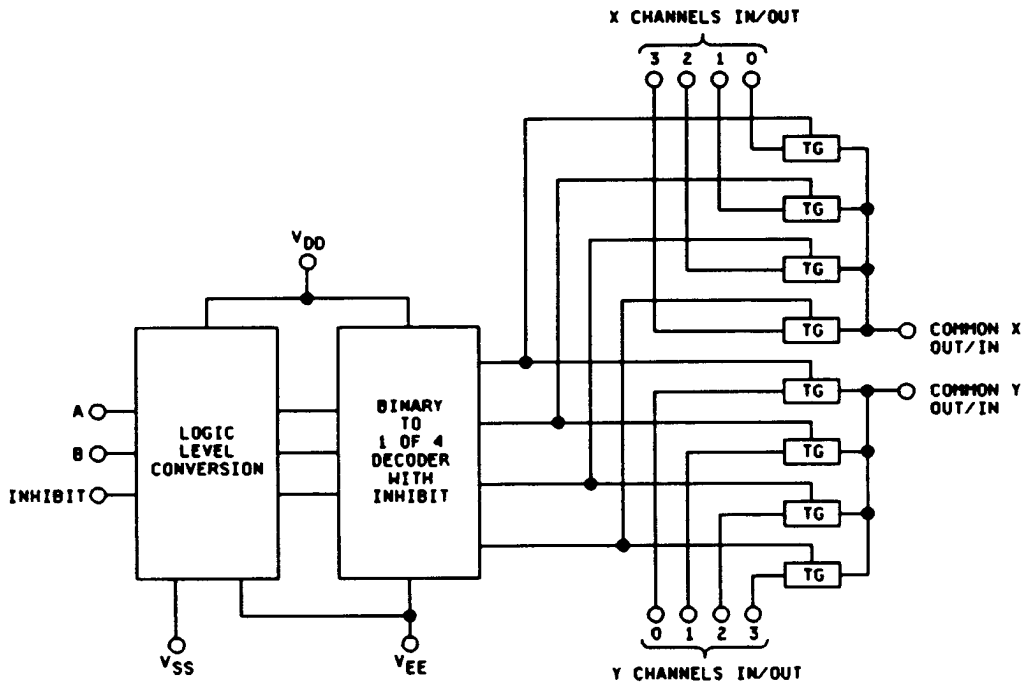


FIGURE 3. Logic diagram.

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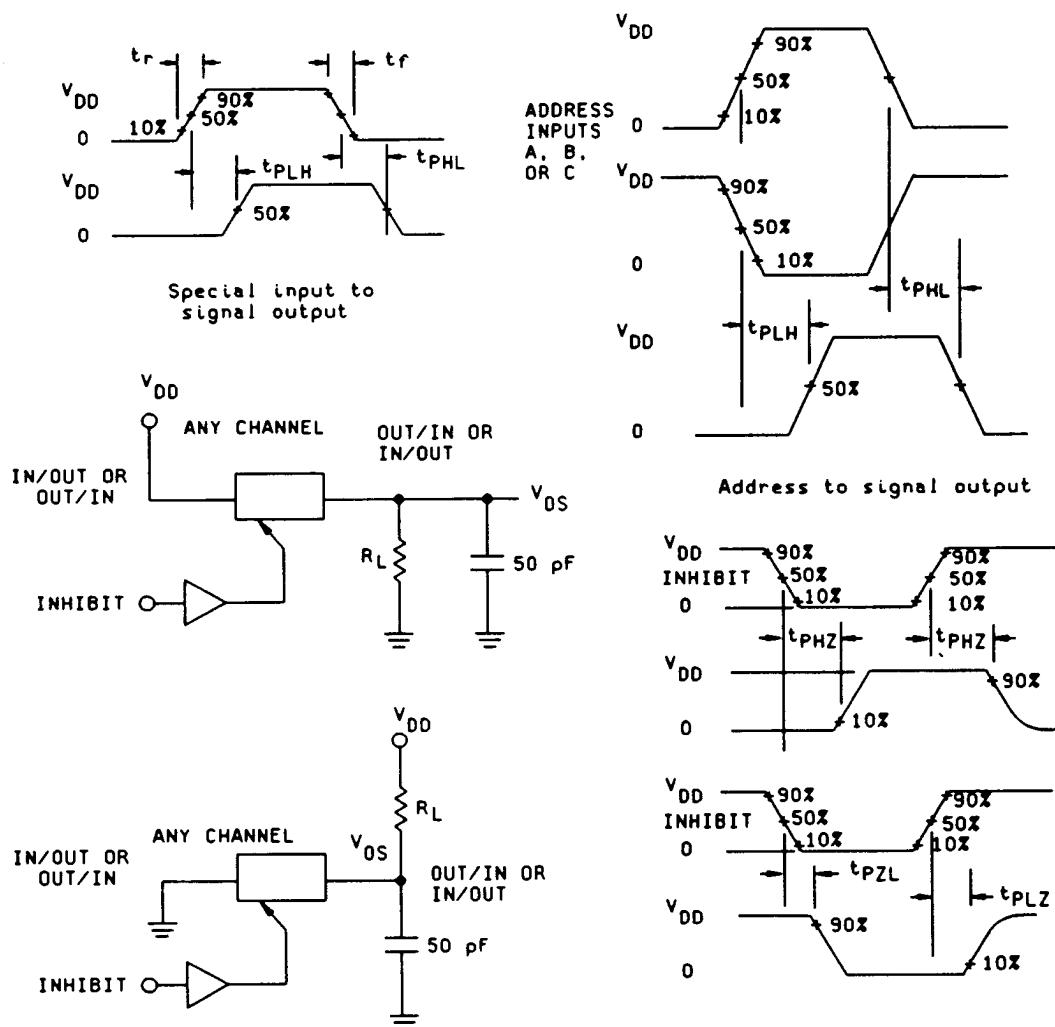


FIGURE 4. Switching waveforms and test circuits.

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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.

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-EC 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-EC 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 A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(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, 6, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 (C_{IN} measurement) shall be measured only for the initial test and after process or design changes which may affect input capacitance. Test all applicable pins on five devices with zero failures.

d. Subgroup 7 tests shall include verification of the truth table as specified on figure 2.

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TABLE II. Electrical test requirements.

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

* PDA applies to subgroup 1.

** Subgroups 10 and 11, if not tested, shall be
guaranteed to the specified limits in table I.

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 A, B, 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.

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 original equipment manufacturer 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 microelectronics devices (FSC 5962) should contact DESC-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone (513) 296-5377.

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-EC.

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