REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Changes in accordance with NOR 5962-R008-92	91-10-18	M. A. Frye
B	Changes in footnotes at the end of table I. Editorial changes throughout.	92-10-29	M. A. Frye

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

REV																			
SHEET																			
REV																			
SHEET																			

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

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
Rick C. Officer

CHECKED BY
Charles E. Besore

APPROVED BY
Michael A. Frye

DRAWING APPROVAL DATE
90-08-08

REVISION LEVEL
B

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, CMOS LATCHED 8- AND 16-CHANNEL ANALOG MULTIPLEXERS, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-89710
A	67268	

SHEET 1 OF 12

DESC FORM 193
JUL 91

5962-E660-92

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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
01	ADG526A	CMOS 16-channel multiplexer latched
02	ADG527A	CMOS 8-channel multiplexer latched

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
X	GDIP1-T28 or CDIP2-T28	28	Dual-in-line
3	CQCC1-N28	28	Square leadless chip carrier

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 (V_{DD}) to V_{SS} . . . . . 44 V dc
Supply voltage (V_{DD}) to GND . . . . . 25 V dc
V_{SS} to GND . . . . . -25 V dc
Analog inputs: 1/
  Voltage at S or D . . . . . V_{SS} -2.0 V dc to V_{DD} +2.0 V dc or 20 mA, whichever occurs first
  Continuous current, S or D 20 mA
  Pulsed current, S or D (1.0 ms duration, 10% duty cycle) . 40 mA
DC input voltages 1/ . . . . . V_{SS} -4.0 V dc to V_{DD} +4.0 V dc or 20 mA, whichever occurs first
Storage temperature range . . . . . -65°C to +150°C
Lead temperature (soldering, 10 seconds) . . . . . +300°C
Power dissipation to +75°C (P_D) . . . . . 470 mW 2/
Thermal resistance, junction-to-case (θ_{JC}):
  Cases X and 3 . . . . . See MIL-STD-1835
Junction temperature (T_J) . . . . . +175°C

1.4 Recommended operating conditions.

Supply voltage to ground (V_{SS}) . . . . . -15 V dc
Supply voltage to ground (V_{DD}) . . . . . +15 V dc
Ambient operating temperature range (T_A) . . . . . -55°C to +125°C

1/ Overvoltage at A, EN, $\overline{WR}$, $\overline{RS}$, S, or D will be clamped by diodes. Current should be limited to the maximum rating above.
2/ Derate above T_A = +75°C at 6.0 mW/°C.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, 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 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth tables. The truth tables 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 herein, the electrical performance characteristics are as specified in table I and apply over the full ambient 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.

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).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device type	Group A subgroups	Limits Min	Limits Max	Unit
Dual supply							
Analog signal range	V_{ANALOG}	T_A = +25°C 2/	01,02	4	-15	+15	V
Drain-source "ON" resistance	$R_{DS(ON)}$	V_{DD} = 14.25 V, V_{SS} = -14.25 V, I_{DS} = 1.0 mA, V_D = 5.0 V, $V_S = V_D + (I_{DS} \times R_{ON})$	01,02	1		300	Ω
		V_{DD} = 14.25 V, V_{SS} = -14.25 V, I_{DS} = 1.0 mA, V_D = 5.0 V, $V_S = V_D + (I_{DS} \times R_{ON})$	01,02	2,3		400	Ω
		V_{DD} = 10.8 V, V_{SS} = -10.8 V, I_{DS} = 1.0 mA, V_D = 5.0 V, $V_S = V_D + (I_{DS} \times R_{ON})$	01,02	1 2,3		450 600	Ω
Source "OFF" leakage current	$I_{S(OFF)}$	3/	01,02	1 2,3		1.0 50	nA
Drain "OFF" leakage current	$I_{D(OFF)}$	3/	01	1 2,3		1.0 200	nA
			02	1 2,3		1.0 100	
Drain "ON" leakage current	$I_{D(ON)}$	3/	01	1 2,3		1.0 200	nA
			02	1 2,3		1.0 100	
Differential "OFF" output leakage	$I_{DIFF(OFF)}$	3/	02	2,3		25	nA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Dual supply - Continued							
High level input current	I_{INH}	V_{DD} = 16.5 V, V_{SS} = -16.5 V, V_{IN} = 16.5 V	01,02	1,2,3		1.0	µA
Low level input current	I_{INL}	V_{DD} = 16.5 V, V_{SS} = -16.5 V, V_{IN} = 0 V	01,02	1,2,3		1.0	µA
Supply current	I_{DD}	V_{DD} = 16.5 V, V_{SS} = -16.5 V, V_{INH} = 2.4/15 V, V_{INL} = 0.8/0 V	01,02	1,2,3		1.5	mA
Supply current	I_{SS}	V_{DD} = 16.5 V, V_{SS} = -16.5 V, V_{INH} = 2.4/15 V, V_{INL} = 0.8/0 V	01,02	1,2,3		0.2	mA
Delay time	t_{OPEN}	V_1 = ±10 V, See figure 3 4/	01,02	9 10,11	25 10		ns
Enable delay time	t_{ON}/ t_{OFF} (EN)	See figure 3 4/	01,02	9 10,11		300 400	ns
Single supply							
Analog signal range	V_{ANALOG}	T_A = +25°C 2/ V_{SS} = 0 V	01,02	4	0	+15	V
Drain-source "ON" resistance	$R_{DS(ON)}$	V_{DD} = 10.8 V, V_{SS} = 0 V, I_{DS} = 0.5 mA, V_D = 5.0 V $V_S = V_D + (I_{DS} * R_{ON})$	01,02	1 2,3		700 1000	Ω
Source "OFF" leakage current	$I_{S(OFF)}$	5/	01,02	1 2,3		1.0 50	nA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device types	Group A subgroups	Limits Min	Limits Max	Unit
Single supply - continued							
Drain "OFF" leakage current	$I_{D(OFF)}$	5/	01	1		1.0	nA
				2,3		200	
			02	1		1.0	
				2,3		100	
Drain "ON" leakage current	$I_{D(ON)}$	5/	01	1		1.0	nA
				2,3		200	
			02	1		1.0	
				2,3		100	
Differential "OFF" output leakage	$I_{DIFF(OFF)}$	5/	02	2,3		25	nA
High level input current	I_{INH}	V_{DD} = 16.5 V, V_{SS} = 0 V, V_{IN} = 16.5 V	01,02	1,2,3		1.0	µA
Low level input current	I_{INL}	V_{DD} = 16.5 V, V_{SS} = 0 V, V_{IN} = 0 V	01,02	1,2,3		1.0	µA
Supply current	I_{DD}	V_{DD} = 16.5 V, V_{SS} = 0 V, V_{INH} = 2.4/15 V, V_{INL} = 0.8/0 V	01,02	1,2,3		1.5	mA
Delay time	t_{OPEN}	V_1 = 10/0 V, V_{SS} = 0 V See figure 3 4/	01,02	9	25		ns
				10,11	10		
Enable delay time	t_{ON}/ t_{OFF} (EN)	See figure 3, V_{SS} = 0 V 4/	01,02	9		450	ns
				10,11		600	

1/ Unless otherwise specified, V_{DD} = +15 V, V_{SS} = -15 V and logic inputs are at desired logic levels (2.4 V and 0.8 V).
2/ This parameter is tested initially and after any process or changes which may affect it.
3/ V_{DD} = 16.5 V, V_{SS} = -16.5 V, V_D = +10 V/-10 V, V_S = -10 V/+10 V, V_{INL} = 0.8 V, V_{INH} = 2.4 V.
4/ Figure 3 refers to type 01 devices. For 02 devices the test circuits are functionally identical, but there are some DUT pin name changes.
5/ V_{DD} = 16.5 V, V_{SS} = 0 V, V_D = +10 V/-10 V, V_S = 0 V/+10 V, V_{INL} = 0.8 V, V_{INH} = 2.4 V.

Device types	01	02
Case outlines	X and 3	X and 3
Terminal number	Terminal symbol	
1	V_{DD}	V_{DD}
2	NC	DB
3	RS	RS
4	S16	S8B
5	S15	S7B
6	S14	S6B
7	S13	S5B
8	S12	S4B
9	S11	S3B
10	S10	S2B
11	S9	S1B
12	GND	GND
13	WR	WR
14	A3	NC
15	A2	A2
16	A1	A1
17	A0	A0
18	EN	EN
19	S1	S1A
20	S2	S2A
21	S3	S3A
22	S4	S4A
23	S5	S5A
24	S6	S6A
25	S7	S7A
26	S8	S8A
27	V_{SS}	V_{SS}
28	D	DA

NC = No connection

FIGURE 1. Terminal connections.

Device type 01

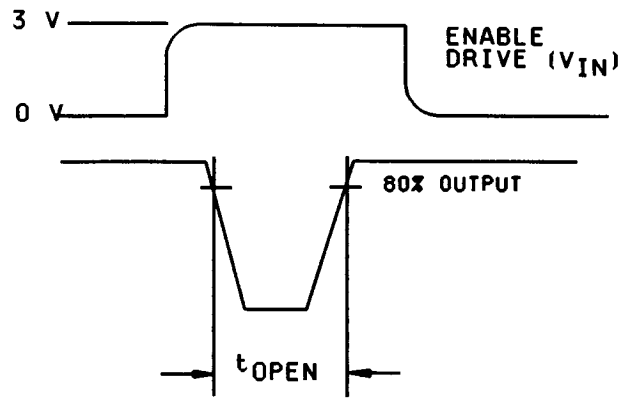
A3	A2	A1	A0	EN	$\overline{WR}$	RS	ON SWITCH
X	X	X	X	X	_|‾	1	Retains previous switch condition
X	X	X	X	X	X	0	None (address and enable latches cleared)
X	X	X	X	0	0	1	None
0	0	0	0	1	0	1	1
0	0	0	1	1	0	1	2
0	0	1	0	1	0	1	3
0	0	1	1	1	0	1	4
0	1	0	0	1	0	1	5
0	1	0	1	1	0	1	6
0	1	1	0	1	0	1	7
0	1	1	1	1	0	1	8
1	0	0	0	1	0	1	9
1	0	0	1	1	0	1	10
1	0	1	0	1	0	1	11
1	0	1	1	1	0	1	12
1	1	0	0	1	0	1	13
1	1	0	1	1	0	1	14
1	1	1	0	1	0	1	15
1	1	1	1	1	0	1	16

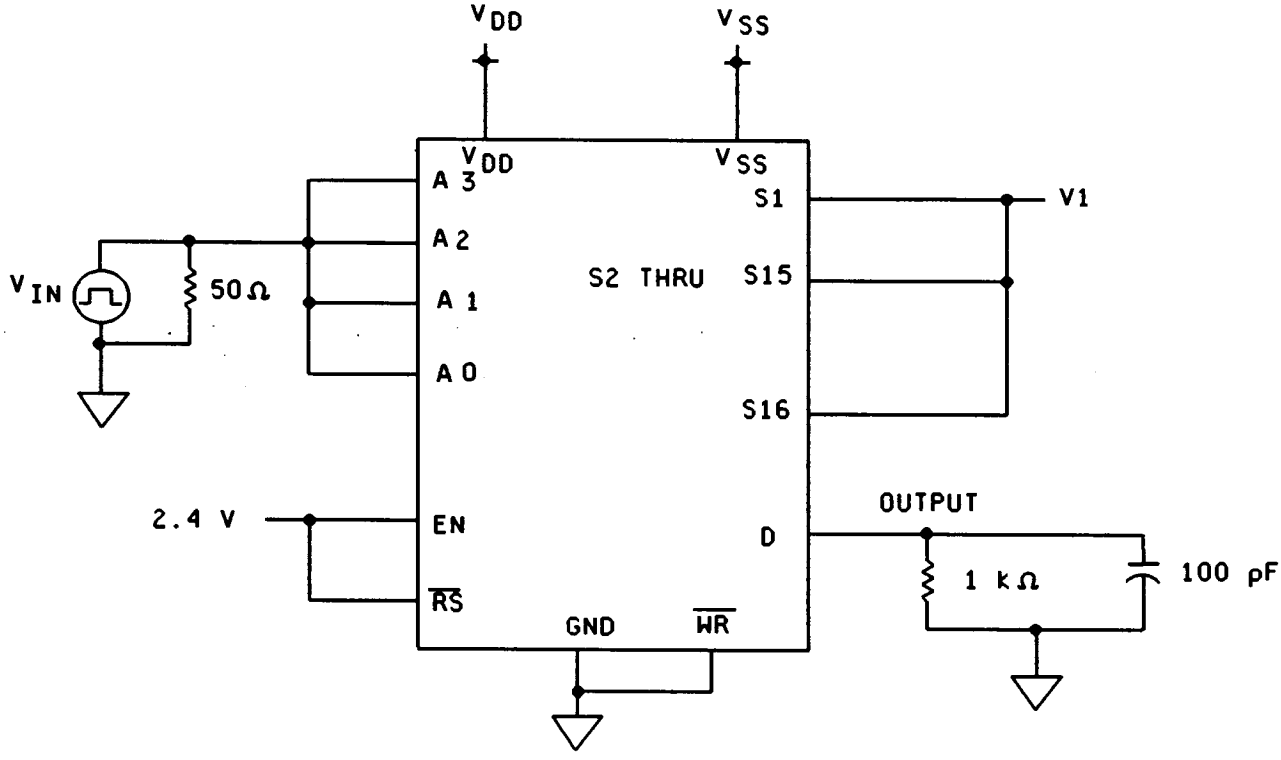
Device type 02

A2	A1	A0	EN	$\overline{WR}$	RS	ON SWITCH
X	X	X	X	_|‾	1	Retains previous switch condition
X	X	X	X	X	0	None (address and enable latches cleared)
X	X	X	0	0	1	None
0	0	0	1	0	1	1
0	0	1	1	0	1	2
0	1	0	1	0	1	3
0	1	1	1	0	1	4
1	0	0	1	0	1	5
1	0	1	1	0	1	6
1	1	0	1	0	1	7
1	1	1	1	0	1	8

X = Do not care
_|‾ = signal is switching from low to high

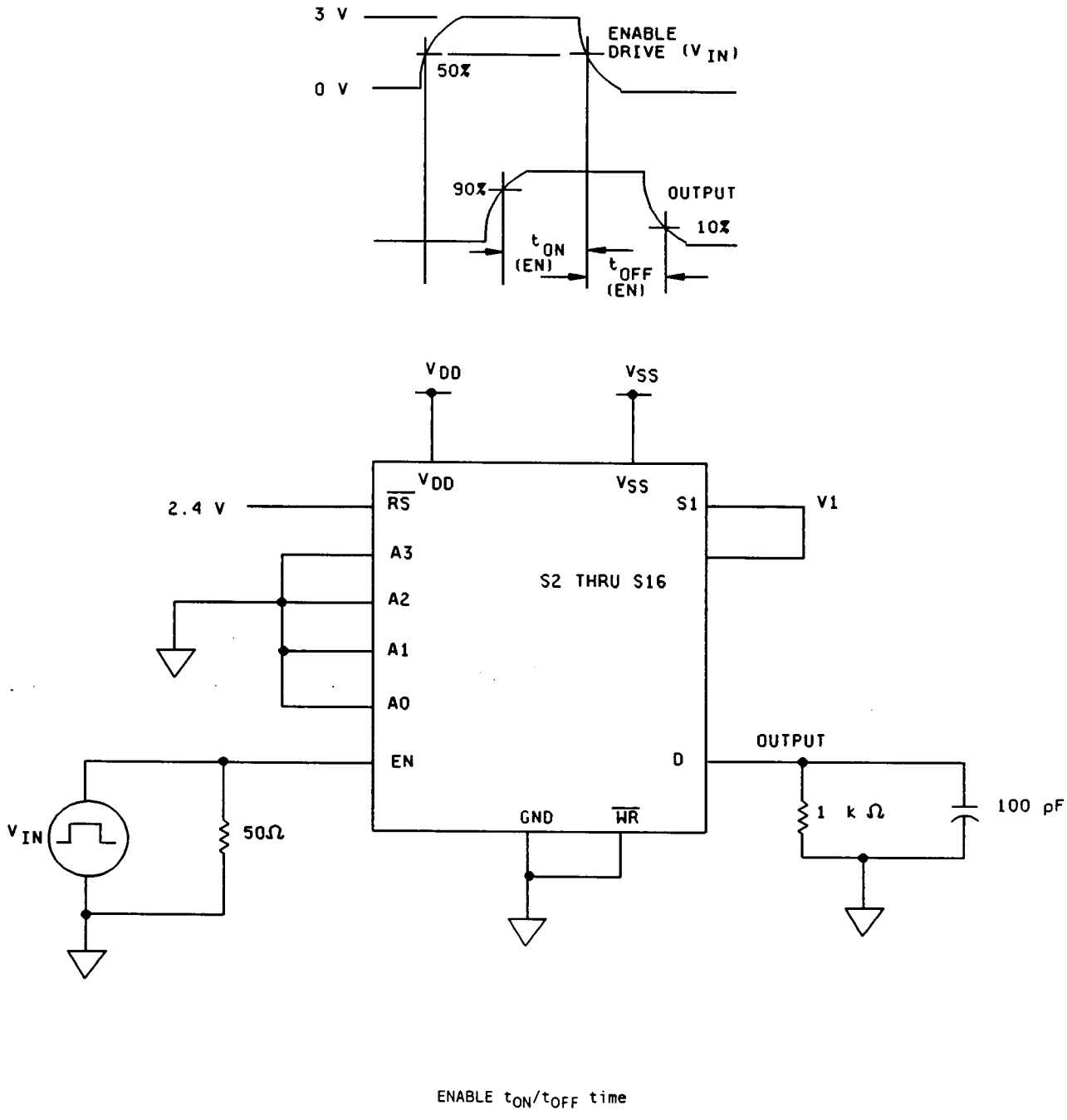
FIGURE 2. Truth tables.





BREAK-BEFORE-MAKE DELAY, t_{OPEN}

FIGURE 3. Test circuits.



ENABLE t_{ON}/t_{OFF} time

FIGURE 3. Test circuits - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89710
		REVISION LEVEL B	SHEET 10

DESC FORM 193A
JUL 91

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°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. Subgroup 4 (analog signal range) shall be measured only for the initial test and after process or design changes which may affect analog signal range.

c. Subgroups 5 and 6 shall be omitted.

d. Subgroups 7 and 8 testing shall be 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 conditions, method 1005 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 1005 of MIL-STD-883.

(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 (in accordance with method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*,2,3,7,8,9
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)	1

* PDA applies to subgroup 1.

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

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 (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).

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.