REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Corrections to t_{w2}, t_{w3}, and t_{w4} in paragraph 1.4; corrections to t_{THL}/t_{TLH}, t_{PHL1}/t_{PLH1}, and t_{PHL2} in table I; correction to table II; editorial changes.	93-09-29	Monica L. Poelking

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REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A					A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

PMIC N/A

STANDARDIZED MILITARY DRAWING

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AMSC N/A

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DRAWING APPROVAL DATE
91-12-17

REVISION LEVEL
A

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, DIGITAL, CMOS, DUAL PRECISION MONOSTABLE MULTIVIBRATOR, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	**5962-90557**

SHEET 1 OF 14

DESC FORM 193
JUL 91

5962-E254-93

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

9004708 0012410 867

1. SCOPE

1.1 Scope. This drawing describes the 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:

5962-90557	01	E	X
Drawing number	Device type See (1.2.1)	Case outline See (1.2.2)	Lead finish per MIL-M-38510

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

Device type	Generic number	Circuit
01	14538B	Dual, precision, retriggerable/resettable, monostable multivibrator
02	14538B	Dual, precision, retriggerable/resettable, monostable multivibrator

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

1.3 Absolute maximum ratings.

Supply voltage range, device type 01	-0.5 V dc to +20 V dc
Supply voltage range, device type 02	-0.5 V dc to +18 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)	500 mW dc 1/
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/ For T_C = +100°C to +125°C, derate linearly at 12 mW/°C to 200 mW.

1.4 Recommended operating conditions.

Supply voltage (V_{DD}), device type 01	+3.0 V dc to +18 V dc
Supply voltage (V_{DD}), device type 02	+3.0 V dc to +15 V dc
Input voltage range (V_{IN})	0.0 V dc to V_{DD}
Output voltage range (V_{OUT})	0.0 V dc to V_{DD}
Case operating temperature range (T_C)	-55°C to +125°C
Minimum input pulse width, +TR, -TR, or RESET (t_{w1}):	
T_C = +25°C, V_{DD} = 5 V dc, device type 01	140 ns
T_C = +25°C, V_{DD} = 5 V dc, device type 02	170 ns
T_C = +25°C, V_{DD} = 10 V dc, device type 01	80 ns
T_C = +25°C, V_{DD} = 10 V dc, device type 02	90 ns
T_C = +25°C, V_{DD} = 15 V dc, device type 01	60 ns
T_C = +25°C, V_{DD} = 15 V dc, device type 02	80 ns
Minimum output pulse width, Q or $\overline{Q}$ (t_{w2}):	
Device type 01	
C_X = 0.005 µF, R_X = 10 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	64.5 µs
T_C = +25°C, V_{DD} = 10 V dc	63.0 µs
T_C = +25°C, V_{DD} = 15 V dc	63.5 µs
Device type 02	
C_X = 0.002 µF, R_X = 100 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	198 µs
T_C = +25°C, V_{DD} = 10 V dc	200 µs
T_C = +25°C, V_{DD} = 15 V dc	202 µs
Minimum output pulse width, Q or $\overline{Q}$ (t_{w3}):	
Device type 01	
C_X = 0.1 µF, R_X = 100 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	10.5 ms
T_C = +25°C, V_{DD} = 10 V dc	10.6 ms
T_C = +25°C, V_{DD} = 15 V dc	10.6 ms
Device type 02	
C_X = 0.1 µF, R_X = 100 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	9.3 ms
T_C = +25°C, V_{DD} = 10 V dc	9.4 ms
T_C = +25°C, V_{DD} = 15 V dc	9.5 ms
Minimum output pulse width, Q or $\overline{Q}$ (t_{w4}):	
Device type 01	
C_X = 10 µF, R_X = 100 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	1.06 s
T_C = +25°C, V_{DD} = 10 V dc	1.06 s
T_C = +25°C, V_{DD} = 15 V dc	1.07 s
Device type 02	
C_X = 10 µF, R_X = 100 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	0.91 s
T_C = +25°C, V_{DD} = 10 V dc	0.92 s
T_C = +25°C, V_{DD} = 15 V dc	0.93 s
Minimum retrigger time (t_{rr}):	
Device types 01 and 02	
C_X = 0.1 µF, R_X = 100 kΩ	
T_C = +25°C, V_{DD} = 5 V dc	0 ns
T_C = +25°C, V_{DD} = 10 V dc	0 ns
T_C = +25°C, V_{DD} = 15 V dc	0 ns

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.
MIL-STD-1835 - Microcircuit Case Outlines.

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 test 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 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 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.

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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Device types	Group A subgroups	Limits Min	Limits Max	Unit
Quiescent supply current	I_{DD}	V_{DD} = 5 V 1/ V_{IN} = 0.0 V or V_{DD}		All	1,3		5	µA
					2		150	
		V_{DD} = 10 V 1/ V_{IN} = 0.0 V or V_{DD}		All	1,3		10	
					2		300	
		V_{DD} = 15 V 1/ V_{IN} = 0.0 V or V_{DD}		All	1,3		20	
					2		600	
		V_{DD} = 20 V 2/ V_{IN} = 0.0 V or V_{DD}		01	1,3		100	
					2		3000	
Low level output voltage	V_{OL}	V_{IN} = 0.0 V or V_{DD} $\lvert I_O \rvert$ < 1 µA	V_{DD} = 5 V 1/	All	1,2,3		0.05	V
			V_{DD} = 10 V 1/	All	1,2,3		0.05	
			V_{DD} = 15 V	All	1,2,3		0.05	
High level output voltage	V_{OH}	V_{IN} = 0.0 V or V_{DD} $\lvert I_O \rvert$ < 1 µA	V_{DD} = 5 V 1/	All	1,2,3	4.95		
			V_{DD} = 10 V 1/	All	1,2,3	9.95		
			V_{DD} = 15 V	All	1,2,3	14.95		
Low level input voltage	V_{IL}	V_{DD} = 5 V V_O = 0.5 V or 4.5 V		All	1,2,3		1.5	
		V_{DD} = 10 V V_O = 1.0 V or 9.0 V 1/		All	1,2,3		3.0	
		V_{DD} = 15 V V_O = 1.5 V or 13.5 V		All	1,2,3		4.0	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Device types	Group A subgroups	Limits Min	Limits Max	Unit
High level input voltage	V_{IH}	V_{DD} = 5 V V_O = 0.5 V or 4.5 V	All	1,2,3	3.5		V
		V_{DD} = 10 V V_O = 1.0 V or 9.0 V 1/	All	1,2,3	7.0		
		V_{DD} = 15 V V_O = 1.5 V or 13.5 V	All	1,2,3	11.0		
Low level output current	I_{OL}	V_{DD} = 5 V 3/ V_O = 0.4 V V_{IN} = 0.0 V or V_{DD}	All	1	0.51		mA
				2	0.36		
				3	0.64		
		V_{DD} = 10 V 1/ V_O = 0.5 V V_{IN} = 0.0 V or V_{DD}	All	1	1.3		
				2	0.9		
				3	1.6		
		V_{DD} = 15 V 1/ V_O = 1.5 V V_{IN} = 0.0 V or V_{DD}	All	1	3.4		
				2	2.4		
				3	4.2		
High level output current	I_{OH}	V_{DD} = 5 V 3/ V_O = 4.6 V V_{IN} = 0.0 V or V_{DD}	01	1	-0.51		mA
				2	-0.36		
				3	-0.64		
		V_{DD} = 5 V V_O = 4.6 V V_{IN} = 0.0 V or V_{DD}	02	1	-0.51		
				2	-0.36		
				3	-0.64		
		V_{DD} = 5 V 3/ V_O = 2.5 V V_{IN} = 0.0 V or V_{DD}	01	1	-1.6		
				2	-1.15		
				3	-2.0		
		V_{DD} = 5 V V_O = 2.5 V V_{IN} = 0.0 V or V_{DD}	02	1	-2.4		
				2	-1.7		
				3	-3.0		

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Device types	Group A subgroups	Limits Min	Limits Max	Unit
High level output current (cont'd)	I_{OH}	V_{DD} = 10 V 1/ V_O = 9.5 V V_{IN} = 0.0 V or V_{DD}		All	1	-1.3		mA
					2	-0.9		
					3	-1.60		
		V_{DD} = 15 V 1/ V_O = 13.5 V V_{IN} = 0.0 V or V_{DD}		All	1	-3.4		
					2	-2.4		
					3	-4.2		
Input current	I_{IN}	V_{DD} = 18 V		01	1,3		±0.1	µA
					2		±1.0	
		V_{DD} = 15 V		02	1,3		±0.1	
					2		±1.0	
Input capacitance	C_{IN}	V_{IN} = 0 V See 4.3.1c		All	4		7.5	pF
Functional test		See 4.3.1d		All	7,8			
Transition time	t_{THL}, t_{TLH}	R_L = 200 kΩ C_L = 50 pF minimum t_r, t_f = 20 ns	V_{DD} = 5 V	All	9	1.5	200	ns
				01	10,11	1.5	260	
				02	10,11	1.5	300	
			V_{DD} = 10 V 4/	All	9	1.5	100	
				01	10,11	1.5	130	
				02	10,11	1.5	150	
			V_{DD} = 15 V 4/	All	9	1.5	80	
				01	10,11	1.5	104	
				02	10,11	1.5	120	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Device types	Group A subgroups	Limits		Unit
						Min	Max	
Propagation delay time, +TR to Q, -TR to Q, +TR to $\overline{Q}$, -TR to $\overline{Q}$	t_{PHL1}, t_{PLH1}	R_L = 200 kΩ C_L = 50 pF minimum t_r, t_f = 20 ns	V_{DD} = 5 V	All	9	1.5	600	ns
				01	10,11	1.5	780	
				02	10,11	1.5	900	
			V_{DD} = 10 V 4/	All	9	1.5	300	
				01	10,11	1.5	390	
				02	10,11	1.5	450	
			V_{DD} = 15 V 4/	All	9	1.5	220	
				01	10,11	1.5	286	
				02	10,11	1.5	330	
Propagation delay time, RESET to Q, RESET to $\overline{Q}$	t_{PHL2}	R_L = 200 kΩ C_L = 50 pF minimum t_r, t_f = 20 ns	V_{DD} = 5 V	All	9	1.5	500	ns
				01	10,11	1.5	650	
				02	10,11	1.5	750	
			V_{DD} = 10 V 4/	All	9	1.5	250	
				01	10,11	1.5	325	
				02	10,11	1.5	375	
			V_{DD} = 15 V 4/	All	9	1.5	190	
				01	10,11	1.5	247	
				02	10,11	1.5	285	

1/ For device type 01, this parameter is guaranteed, if not tested, to the limits specified in Table I.

2/ At -55°C this test is performed with V_{DD} = 18 V dc.

3/ For device type 01, the I_{OL} and I_{OH} tests are tested 100 percent at T_C = +25°C, and are guaranteed, if not tested, for T_C = -55°C and T_C = +125°C.

4/ This parameter is guaranteed, if not tested, to the limits specified in table I.

Device types	01 and 02
Case outline	E
Terminal number	Terminal symbol
1	C_{X1}
2	$R_X C_{X1}$
3	RESET1
4	+TR1
5	-TR1
6	Q1
7	$\overline{Q1}$
8	V_{SS}
9	$\overline{Q2}$
10	Q2
11	-TR2
12	+TR2
13	RESET2
14	$R_X CX2$
15	C_{X2}
16	V_{DD}

NOTE: CX1, VSS, and CX2 are electrically connected internally

FIGURE 1. Terminal connections.

Device types 01 and 02

Inputs			Outputs	
RESETn	+TRn	-TRn	Qn	$\overline{Qn}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	↑	H	_|‾|_	‾|_|‾
H	L	↓	_|‾|_	‾|_|‾

H = High level (steady-state)

X = Irrelevant (include transitions)

L = Low level (steady-state)

_|‾|_ = One high level pulse

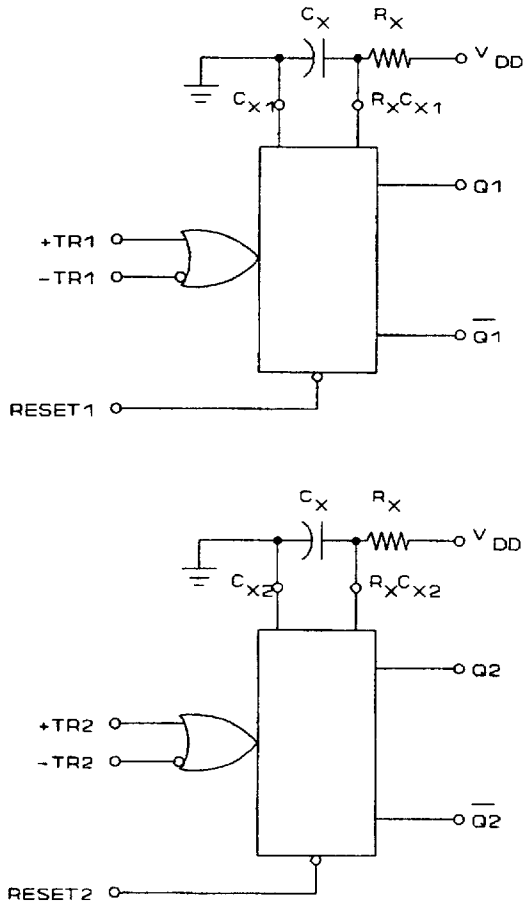
‾|_|‾ = One low level pulse

↓ = Transition, high to low

↑ = Transition, low to high

FIGURE 2. Truth table.

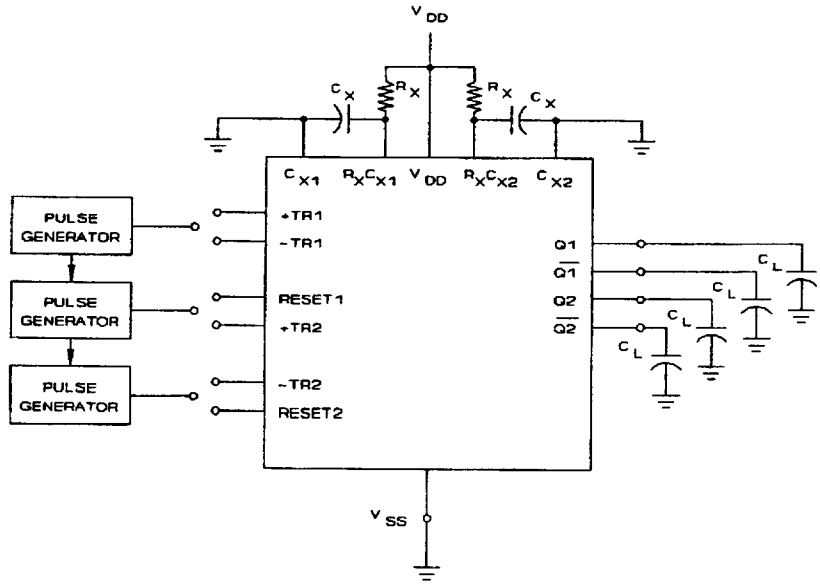
Device types 01 and 02



NOTES:
C_{X1} and C_{X2} are internally connected to V_{SS}.
R_Xn and C_Xn are external components.

FIGURE 3. Logic diagram.

Device types 01 and 02



NOTE: C_L = 50pF, includes probe and jig capacitance.

Device types 01 and 02

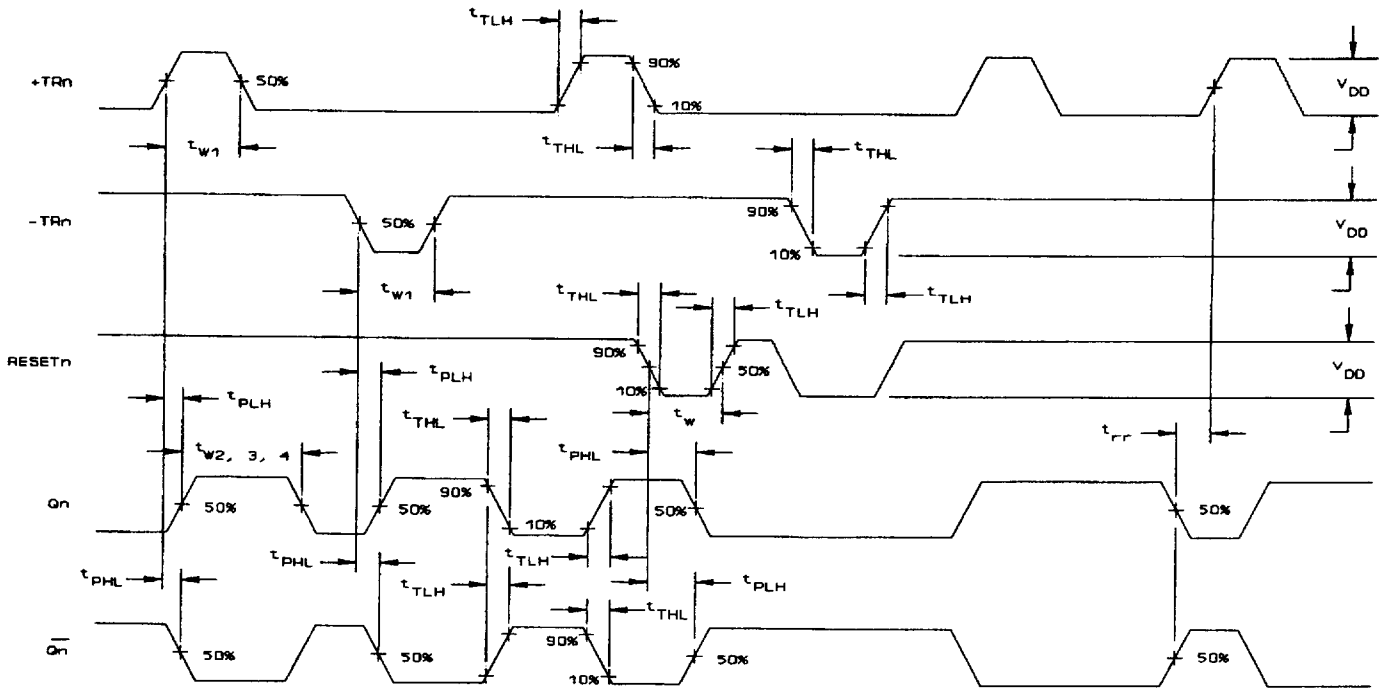


FIGURE 4. Switching waveforms and test circuit.

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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 manufacturers.

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} measurement) shall be measured only for the initial test and after process or design changes which may affect capacitance. Capacitance shall be measured between the designated terminal and GND at a frequency of 1 MHz. Test all applicable pins on five devices with zero failures.

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

(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, 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, 2, 3

* PDA applies to subgroup 1.
** Subgroups 10 and 11, if not tested, are guaranteed to the limits 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 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. The 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, OH 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.