REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add device types 03 and 04. Add vendor CAGE 01295. Technical and editorial changes throughout.	91-02-26	

REV																									
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REV																									
SHEET																									
REV STATUS OF SHEETS	REV	A	A	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

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

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DRAWING APPROVAL DATE
17 JANUARY 1990

REVISION LEVEL
A

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, DIGITAL, ADVANCED CMOS, 8-BIT IDENTITY COMPARATOR, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-89793
A	67268	

SHEET

DESC FORM 193
SEP 87

* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E080

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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:

5962-89793	01	R	X
Drawing number	Device type (1.2.1)	Case outline (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 function
01	54ACT520	8-bit identity comparator, TTL compatible inputs
02	54ACT521	8-bit identity comparator, TTL compatible inputs
03	54ACT11520	8-bit identity comparator, TTL compatible inputs
04	54ACT11521	8-bit identity comparator, TTL compatible inputs

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
R	D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package
S	F-9 (20-lead, .540" x .300" x .100"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range (V_{CC}) 1/	-0.5 V dc to +6.0 V dc
DC input voltage range (V_{IN}) 1/	-0.5 V dc to V_{CC} + 0.5 V dc
DC output voltage range (V_{OUT}) 1/	-0.5 V dc to V_{CC} + 0.5 V dc
DC input diode current (I_{IK})	±20 mA
DC output diode current (per pin) (I_{OK})	±50 mA
DC V_{CC} or GND current	±100 mA
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D)	500 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C
Junction temperature (T_J) 2/	+175°C

1/ Unless otherwise specified, all voltages are referenced to ground.
2/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions in accordance with method 5004 of MIL-STD-883.

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1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	+4.5 V dc to +5.5 V dc
Input voltage range	0.0 V dc to V_{CC}
Output voltage range	0.0 V dc to V_{CC}
Case operating temperature range (T_C)	-55°C to +125°C
Input rise or fall time: (t_r, t_f):	
V_{CC} = 4.5 V, 5.5 V	8 ns/V

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.

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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 Logic diagrams. The logic diagrams shall be as specified on figure 3.

3.2.4 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 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-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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ 1/ unless otherwise specified		Device type	Group A subgroups	Limits		Unit
						Min	Max	
High level output voltage	V_{OH}	V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OH} = -50 µA 1/	V_{CC} = 4.5 V	All	1, 2, 3	4.4		V
			V_{CC} = 5.5 V			5.4		
		V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OH} = -24 mA 1/	V_{CC} = 4.5 V			3.7		
			V_{CC} = 5.5 V			4.7		
		V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OH} = -50 mA 1/	V_{CC} = 5.5 V			3.85		
Low level output voltage	V_{OL}	V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OL} = 50 µA 1/	V_{CC} = 4.5 V	All	1, 2, 3		0.1	V
			V_{CC} = 5.5 V				0.1	
		V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OL} = 24 mA 1/	V_{CC} = 4.5 V				0.5	
			V_{CC} = 5.5 V				0.5	
		V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OL} = 50 mA 1/	V_{CC} = 5.5 V				1.65	
High level input voltage	V_{IH}	2/	V_{CC} = 4.5 V	All	1, 2, 3	2.0		V
			V_{CC} = 5.5 V			2.0		
Low level input voltage	V_{IL}	2/	V_{CC} = 4.5 V	All	1, 2, 3		0.8	V
			V_{CC} = 5.5 V				0.8	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ 1/ unless otherwise specified		Device type	Group A subgroups	Limits Min	Limits Max	Unit
Input leakage current	I_{IL1}	V_{IN} = 0.0 V	V_{CC} = 5.5 V	01,03	1, 2, 3		-1.0	mA
				02,04			-1.0	µA
B inputs	I_{IH1}	V_{IN} = 5.5 V		01,03			10.0	µA
				02,04			1.0	µA
Input leakage current, other inputs	I_{IL2}	V_{IN} = 0.0 V	V_{CC} = 5.5 V	01,03	1, 2, 3		-1.0	µA
				02,04			-1.0	µA
	I_{IH2}	V_{IN} = 5.5 V		01,03			+1.0	µA
				02,04			1.0	µA
Maximum I_{CC}/TTL inputs high	delta I_{CC}	V_{CC} = 5.5 V, One input at 3.4 V, Other inputs at GND or V_{CC}		All	1, 2, 3		1.6	mA
Quiescent current	I_{CC}	V_{IN} = V_{CC} or GND, V_{CC} = 5.5 V		01,02, 04	1, 2, 3		160	µA
Quiescent current	I_{CC}	B inputs at GND	Other inputs = V_{CC} or GND,	03	1, 2, 3		8.0	mA
		B inputs open	V_{CC} = 5.5 V	03			160	µA
Input capacitance	C_{IN}	See 4.3.1c		All	4		10	pF
Power dissipation capacitance	C_{PD}	See 4.3.1c 3/		All	4		60	
Functional tests		Tested at V_{CC} = 4.5 V and repeated at V_{CC} = 5.5 V, see 4.3.1d		All	7, 8			
Propagation delay time, An or Bn to $\overline{O}_A$=B	t_{PHL1}	V_{CC} = 4.5 V 4/ C_L = 50 pF R_L = 500Ω See figure 4		01,02	9	1.5	11.0	ns
					10, 11	1.5	12.5	
					9	1.5	12.4	
				03,04	10, 11	1.5	14.8	
	t_{PLH1}			01,02	9	1.5	12.0	
					10, 11	1.5	12.0	
				03,04	9	1.5	13.0	
					10, 11	1.5	15.9	

See footnotes at end of table.

* U.S. GOVERNMENT PRINTING OFFICE 1990-549-249

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ 1/ unless otherwise specified	Device type	Group A subgroups	Limits Min	Limits Max	Unit
Propagation delay time, $\overline{I}_{A=B}$ to $\overline{O}_{A=B}$	t_{PHL2}	V_{CC} = 4.5 V 4/ C_L = 50 pF R_L = 500Ω See figure 4	01,02	9	1.5	8.5	ns
				10, 11	1.5	9.0	
			03,04	9	1.5	9.0	
				10, 11	1.5	10.4	
	t_{PLH2}		01,02	9	1.5	8.5	
				10, 11	1.5	8.5	
			03,04	9	1.5	9.3	
				10, 11	1.5	11.2	

1/ V_{OH} and V_{OL} will be tested at V_{CC} = 4.5 V. V_{OH} and V_{OL} are guaranteed, if not tested, for V_{CC} = 5.5 V. Limits shown apply to operation at V_{CC} = 5.0 V ± 0.5 V. Transmission driving tests are performed at V_{CC} = 5.5 V with a 2 ms duration maximum.

2/ The V_{IH} and V_{IL} tests are not required, and shall be applied as forcing functions for the V_{OH} or V_{OL} tests.

3/ Power dissipation capacitance (C_{PD}), determines the dynamic power consumption, $P_D = (C_{PD} + C_L)(V_{CC} \times V_{CC})\ f + I_{CC}\ (V_{CC})$, and dynamic current consumption (I_S) is, $I_S = (C_{PD} + C_L)\ V_{CC}\ f + I_{CC}$.

4/ AC limits at V_{CC} = 5.5 V are equal to limits at V_{CC} = 4.5 V and are guaranteed by testing at V_{CC} = 4.5 V. Minimum ac limits are guaranteed for V_{CC} = 5.5 V by guardbanding V_{CC} = 4.5 V limits to 1.5 ns (minimum).

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 3.6 herein).

(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.

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Device types	01 and 02	03 and 04	
Case outlines	R, S, 2	R	2
Terminal number	Terminal symbol		
1	$\overline{I}_{A=B}$	B1	B3
2	A0	A1	A3
3	B0	B0	B2
4	A1	A0	A2
5	B1	GND	$\overline{I}_{A=B}$
6	A2	$\overline{O}_{A=B}$	B1
7	B2	B7	A1
8	A3	A7	B0
9	B3	B6	A0
10	GND	A6	GND
11	A4	B5	$\overline{O}_{A=B}$
12	B4	A5	B7
13	A5	B4	A7
14	B5	A4	B6
15	A6	V_{CC}	A6
16	B6	B3	B5
17	A7	A3	A5
18	B7	B2	B4
19	$\overline{O}_{A=B}$	A2	A4
20	V_{CC}	$\overline{I}_{A=B}$	V_{CC}

A0 - A7 = Word A inputs
B0 - B7 = Word B inputs
$\overline{I}_{A=B}$ = Expansion or enable inputs
$\overline{O}_{A=B}$ = Identity output

FIGURE 1. Terminal connections.

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Device types 01, 02, 03, and 04

Inputs		Outputs
$\overline{I}_{A=B}$	A, B	$\overline{O}_{A=B}$
L	A = B*	L
L	A ≠ B	H
H	A = B*	H
H	A ≠ B	H

H = High voltage level
L = Low voltage level
* = A0 = B0, A1 = B1, A2 = B2, ..., A7 = B7

FIGURE 2. Truth table.

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Device types 01 and 03

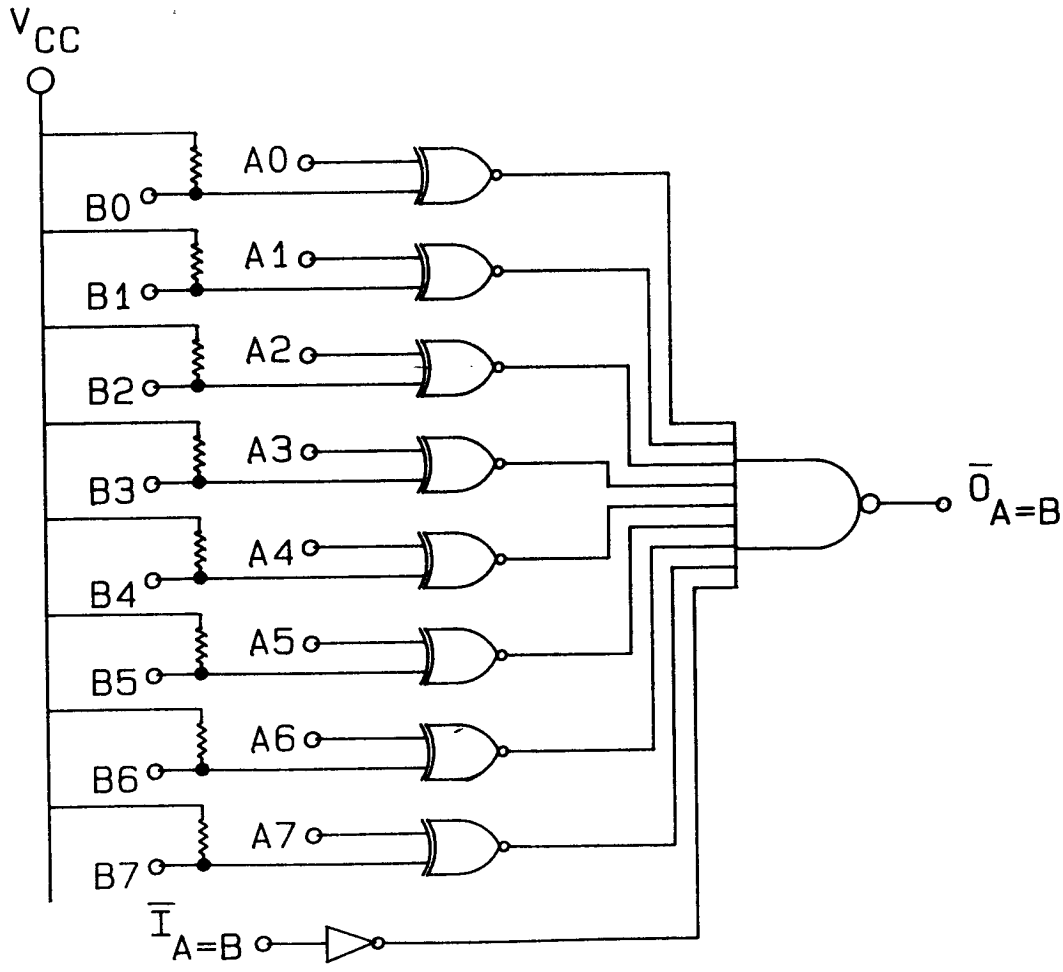

FIGURE 3. Logic diagrams.

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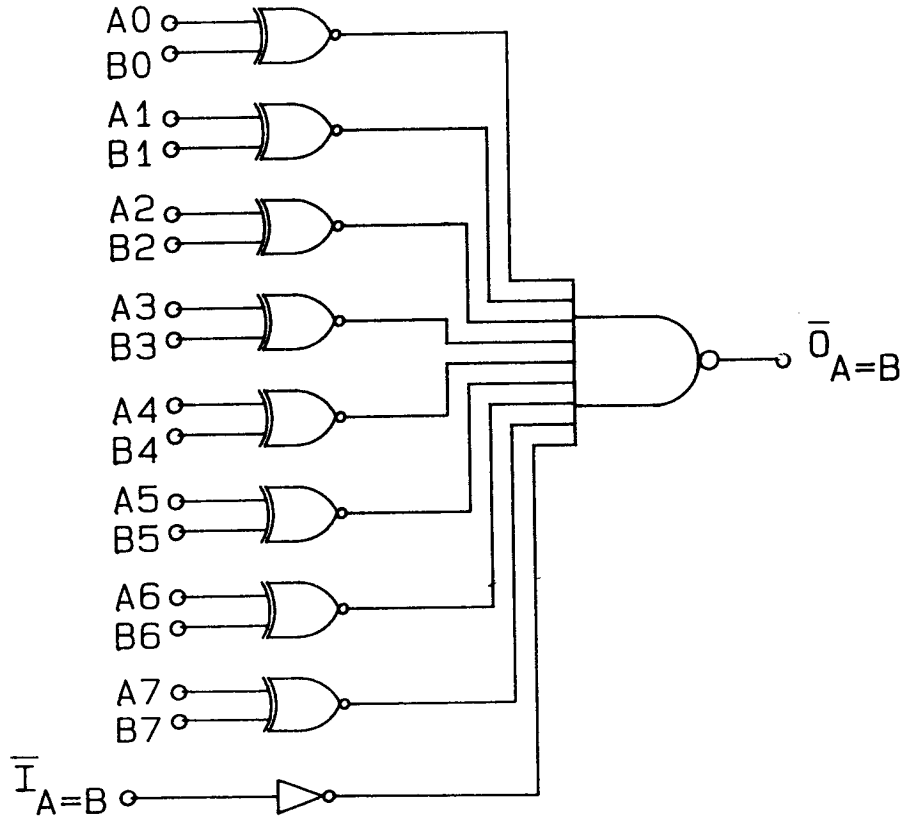

FIGURE 3. Logic diagrams - Continued.

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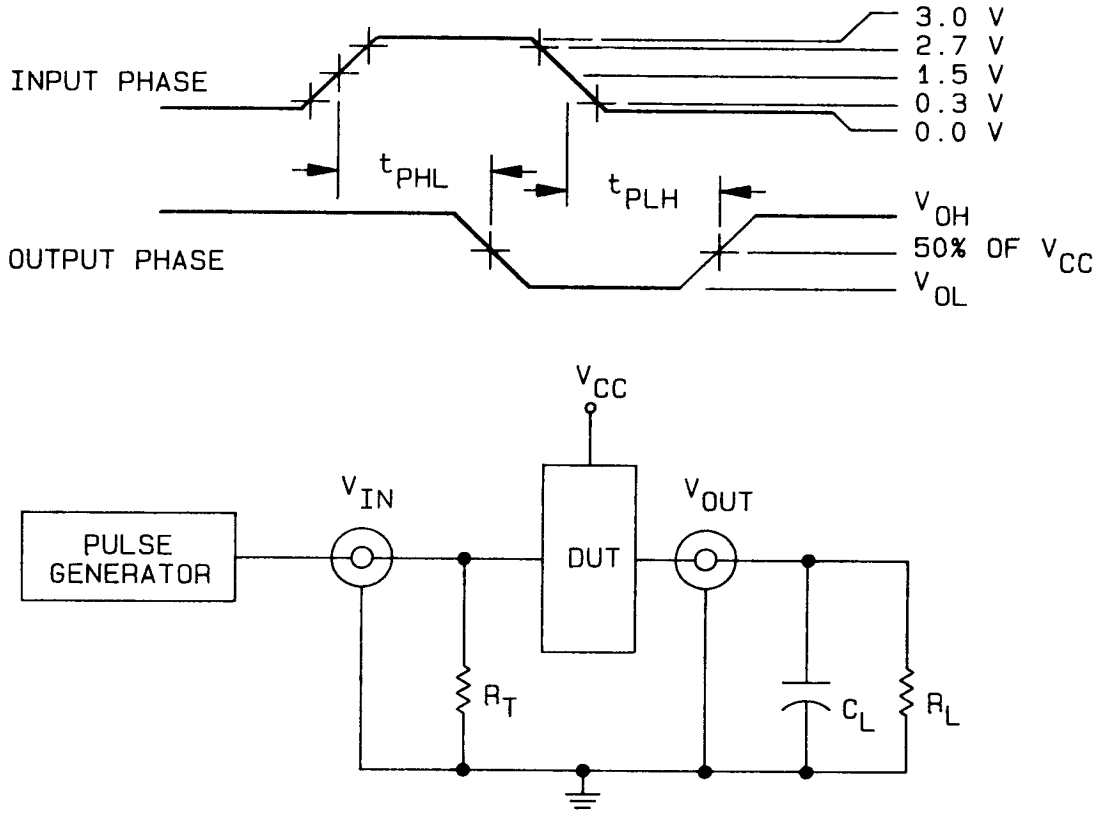

NOTES:
1. C_L = 50 pF, includes probe and jig capacitance.
2. R_L = 500Ω, R_T = Termination resistance and should be equal to Z_{out} of the pulse generator; 50Ω.
3. $t_r = t_f$ = 3.0 ns (10 percent to 90 percent), unless otherwise specified.

FIGURE 4. Switching waveforms and test circuit.

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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, 4, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

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_{PD} measurements) 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 tests shall verify the truth table as specified on figure 2.

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°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.

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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. 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 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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