

INCH POUND

MIL-M-38510/74C
21 NOVEMBER 2005
SUPERSEDING
MIL-M-38510/74B
28 OCTOBER 1985

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, BIPOLAR, SCHOTTKY TTL,
AND-OR-INVERT GATES, MONOLITHIC SILICON

Inactive for new design after 6 September 1996.

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product herein shall consist of this specification sheet and MIL-PRF 38535.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, Schottky TTL, AND-OR-INVERT logic gating microcircuits. Two product assurance classes and a choice of case outlines and lead finishes are provided and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.4).

1.2 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-38535, and as specified herein.

1.2.1 Device type. The device type is as follows:

<u>Device type</u>	<u>Circuit</u>
01	Dual 2-wide, 2-input AND-OR-INVERT gate
02	4-2-3-2 input AND-OR-INVERT gate
03	4-2-3-2 input AND-OR-INVERT gate with open collector

1.2.2 Device class. The device class is the product assurance level as defined in MIL-PRF-38535.

1.2.3 Case outline. The case outlines are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
A	GDFP5-F14, CDFP6-F14	14	Flat package
B	GDFP4-F14	14	Flat package
C	GDIP1-T14, CDIP2-T14	14	Dual in line package
D	GDFP1-F14, CDFP2-F14	14	Flat Package
2	CQCC1-N20	20	Square chip carrier package
X	CQCC2-N20	20	Square chip carrier package

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43218-3990, or emailed to bipolar@dsccl.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
Input voltage range	-1.2 V dc at -18 mA to +5.5 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation per device (P_D) <u>1/</u>	121 mW for type 01 88 mW for type 02 and 03
Lead temperature (soldering, 10 seconds)	300°C
Thermal resistance, junction-to-case (θ_{JC}):	
Cases A, B, C, D, 2, and X	(See MIL-STD-1835)
Junction temperature (T_J) <u>2/</u>	+175°C

1.4 Recommended operating conditions.

Supply voltage (V_{CC}).....	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc <u>3/</u>
Case operating temperature range (T_C)	-55°C to 125°C

2.0 APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standard form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard for Microelectronics.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document takes precedence. Nothing in this document however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

1/ Must withstand the added P_D due to short circuit condition (e.g., I_{OS}).

2/ Maximum junction temperature should not be exceeded except for allowable short duration burn-in screening condition per MIL-PRF-38535.

3/ $V_{IL} = 0.7$ V at 125°C

3. REQUIREMENTS

3.1 Qualification. Microcircuits furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturers list before contract award (see 4.2 and 6.3).

3.2 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.

3.3.1 Logic diagram and terminal connections. The logic diagram and terminal connections shall be as specified on figure 1.

3.3.2 Truth tables and logic equations. The truth tables and logic equations shall be as specified on figure 2.

3.3.3 Schematic circuits. The schematic circuit shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity upon request.

3.3.4 Case outlines. The case outlines shall be as specified in 1.2.3.

3.4 Lead material and finish. The lead material and finish shall be in accordance with MIL-PRF-38535 (see 6.6).

3.5 Electrical performance characteristics. The electrical performance characteristics are as specified in table I, and apply over the full recommended case operating temperature range, unless otherwise specified.

3.6 Electrical test requirements. The electrical test requirements for each device class shall be the subgroups specified in Table II. The electrical tests for each subgroup are described in Table III.

3.7 Marking. Marking shall be in accordance with MIL-PRF-38535 and 1.2 herein.

3.8 Microcircuit group assignment. The devices type 01 and 02, covered by the specification shall be in microcircuit group number 8 (see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C	Device type	Limits		Unit
				Min	Max	
High level output voltage	V _{OH}	V _{CC} = 4.5 V, V _{IN} = 0.8 V I _{OH} = -1 mA <u>1/</u> T _C = +125°C, V _{IN} = 0.7 V	01, 02	2.5	---	V
Low level output voltage	V _{OL}	V _{CC} = 4.5 V, I _{OL} = 20 mA V _{IN} = 2.0 V for all inputs of gate under test <u>2/</u>	01, 02, 03	---	0.5	V
		T _C = +125°C			0.45	V
Input clamp voltage	V _{IC}	V _{CC} = 4.5 V, I _{IN} = -18 mA T _C = 25°C	01, 02, 03	---	-1.2	V
High level input current	I _{IH1}	V _{CC} = 5.5 V, V _{IN} = 2.7 V <u>2/</u>	01, 02, 03	---	50	μA
High level input current	I _{IH2}	V _{CC} = 5.5 V, V _{IN} = 5.5 V <u>2/</u>	01, 02, 03	---	1.0	mA
Low level input current	I _{IL}	V _{CC} = 5.5 V, V _{IN} = 0.5 V <u>1/</u>	01, 02, 03	-1.0	-2.0	mA
Short circuit output current	I _{OS}	V _{CC} = 5.5 V <u>3/</u>	01, 02	-40	-100	mA
High level supply current	I _{CCH}	V _{CC} = 5.5 V V _{IN} = 0 V	01	---	18.0	mA
			02	---	12.5	
			03	---	11.0	
Low level supply current	I _{CCL}	V _{CC} = 5.5 V V _{IN} = 5.5 V	01	---	22.0	mA
			02	---	16.0	
			03	---	16.0	
Collector cut off current	I _{CEX}	V _{CC} = 5.5 V, V _{IL} = GND V _{IH} = 5.5 V	01, 02	---	250	μA
		V _{CC} = 4.5 V, V _{IL} = GND V _{IH} = 5.5 V	03	---	250	μA
Propagation delay time, high to low level	t _{PHL}	C _L = 50 pF ± 10%, R _L = 280Ω	01, 02	2.0	10.0	ns
			03	2.0	13.0	
Propagation delay time, low to high level	t _{PLH}	C _L = 50 pF ± 10%, R _L = 280Ω	01, 02	2.0	9.0	ns
			03	2.0	16.0	

1/ All unspecified inputs at 5.5 volts.

2/ All unspecified inputs grounded.

3/ Not more than one output should be shorted at a time, duration of test not to exceed five seconds.

TABLE II. Electrical test requirements.

MIL-PRF-38535 Test requirements	Subgroups (see table III)	
	Class S Devices <u>1/</u>	Class B Devices
Interim electrical parameters	1	1
Final electrical test parameters	1*, 2, 3, 9, 10, 11	1*, 2, 3, 9
Group A test requirements	1, 2, 3, 9, 10, 11	1, 2, 3, 9, 10, 11
Group B electrical test parameters when using the method 5005 QCI option <u>2/</u>	1, 2, 3, 9, 10, 11	N/A
Group C end-point electrical Parameters	1, 2, 3, 9, 10, 11	1, 2, 3
Group D end point electrical Parameters	1, 2, 3	1, 2, 3

*PDA applies to subgroup 1.

1/ Class S product assurance class is not applicable for device type 03.

2/ Group B testing requirements shall apply to device types 01 and 02 only.

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not effect the form, fit, or function as described herein.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535.

4.3 Screening. Screening shall be in accordance with MIL-PRF-38535, and shall be conducted prior to qualification and conformance inspection. The following additional criteria shall apply:

- a. The burn-in test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing 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.
- b. Interim and final electrical test parameters shall be as specified in table II, except interim electrical parameters test prior to burn-in is optional at the discretion of the manufacturer.
- c. Additional screening for space level product shall be as specified in MIL-PRF-38535.

4.4 Technology Conformance Inspection (TCI). Technology conformance inspection shall be in accordance with MIL-PRF-38535 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table III of MIL-PRF-38535 and as follows:

- a. Tests shall be as specified in table II.
- b. Subgroups 4, 5, 6, 7, and 8 shall be omitted.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of MIL-PRF-38535.

4.4.3 Group C inspection. Group C inspection shall be in accordance with table IV of MIL-PRF-38535 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing 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.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows:

4.5.1 Voltage and current. All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional and positive when flowing into the referenced terminal.

DEVICE TYPE 01

Truth table (each gate)				
Input				Output
A	B	C	D	Y
H	H	*	*	L
*	*	H	H	L

* Either H or L – All other combinations of H and L at the input, give H output.

Positive logic: $Y = \overline{(AB)} + (CD)$

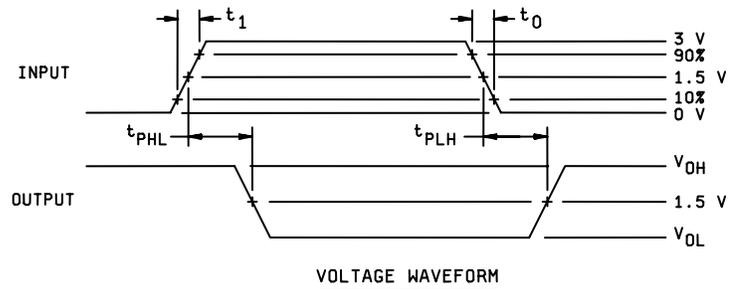
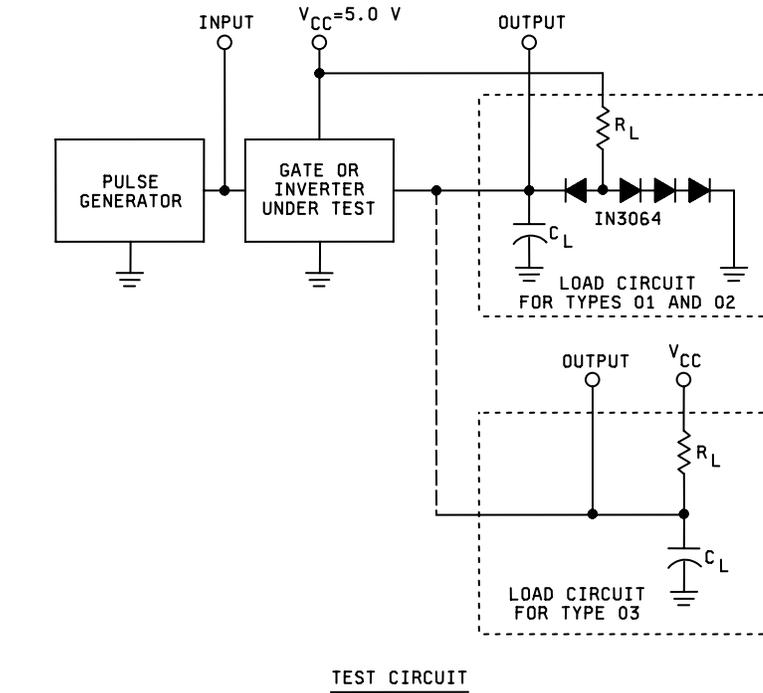
DEVICE TYPES 02 AND 03

Input											Output
A	B	C	D	E	F	G	H	I	J	K	Y
H	H	H	H	*	*	*	*	*	*	*	L
*	*	*	*	H	H	*	*	*	*	*	L
*	*	*	*	*	*	H	H	H	*	*	L
*	*	*	*	*	*	*	*	*	H	H	L

* Either H or L – All other combinations of H and L at the input, give H output.

Positive logic: $Y = \overline{ABCD} + EF + GHI + JK$

FIGURE 2. Truth tables and logic equations.



NOTES:

1. The pulse generator has the following characteristics: $t_1 = t_0 < 2.5 \text{ ns}$, $\text{PRR} \leq 1 \text{ MHz}$; and $Z_{\text{OUT}} \cong 50 \Omega$.
2. $C_L = 50 \text{ pF} \pm 10 \%$ minimum, including scope probe, wiring, and stray capacitance, without package in test fixture.
3. Voltage measurements are to be made with respect to network ground terminal.

FIGURE 3. Switching time test circuit.

TABLE III. Group A inspection for device type 01.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.8 V, or open)

Subgroup	Symbol	MIL-STD-883 method	Cases																Measured terminal	Limits		Unit	
			2, X 1/	2	3	4	6	8	9	10	12	13	14	16	18	20	Min	Max					
			A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13				14			
			Test no.	1A	2A	2B	2C	2D	2Y	GND	1Y	1C	1D	NC	NC	1B	V _{CC}						
1 T _C =25°C	V _{OH}	3006	1	0.8 V	5.5 V	5.5 V	5.5 V	5.5 V			GND	-1 mA	GND	GND	GND	5.5 V	4.5 V	1Y	2.5		V		
		"	2	5.5 V	"	"	"	"	"	"	"	-1 mA	GND	GND	"	"	0.8 V	"	1Y	"	"	"	
		"	3	GND	"	"	"	"	"	"	"	"	-1 mA	0.8 V	5.5 V	"	"	GND	"	1Y	"	"	"
		"	4	GND	"	"	"	"	"	"	"	"	-1 mA	5.5 V	0.8 V	"	"	GND	"	1Y	"	"	"
		"	5	5.5 V	0.8 V	"	GND	GND	-1 mA	"	"	"	"	5.5 V	5.5 V	"	"	5.5 V	"	2Y	"	"	"
		"	6	"	5.5 V	0.8 V	GND	GND	-1 mA	"	"	"	"	"	"	"	"	"	"	2Y	"	"	"
		"	7	"	GND	GND	0.8 V	5.5 V	-1 mA	"	"	"	"	"	"	"	"	"	"	2Y	"	"	"
		"	8	"	GND	GND	5.5 V	0.8 V	-1 mA	"	"	"	"	"	"	"	"	"	"	2Y	"	"	"
	V _{OL}	3007	9	2.0 V	GND	GND	GND	GND			"	20 mA	GND	GND	"	"	2.0 V	"	1Y		0.5	"	
		"	10	GND	GND	GND	GND	GND			"	20 mA	2.0 V	2.0 V	"	"	GND	"	1Y		"	"	
		"	11	GND	2.0 V	2.0 V	GND	GND		20 mA	"	"	GND	GND	"	"	GND	"	2Y		"	"	
		"	12	GND	GND	GND	2.0 V	2.0 V		20 mA	"	"	GND	GND	"	"	GND	"	2Y		"	"	
	I _{IL}	3009	13	0.5 V	5.5 V	5.5 V	5.5 V	5.5 V			"		5.5 V	5.5 V	"	"	5.5 V	5.5 V	1A	-1	-2	mA	
		"	14	5.5 V	5.5 V	5.5 V	"	"	"	"	"	"	"	"	"	"	0.5 V	"	1B	"	"	"	
		"	15	"	0.5 V	5.5 V	"	"	"	"	"	"	"	"	"	"	5.5 V	"	2A	"	"	"	
		"	16	"	5.5 V	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	2B	"	"	"	
		"	17	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	2C	"	"	"	
		"	18	"	"	"	5.5 V	0.5 V	0.5 V	"	"	"	"	"	"	"	"	"	2D	"	"	"	
		"	19	"	"	"	5.5 V	5.5 V	5.5 V	"	"	"	"	0.5 V	"	"	"	"	1C	"	"	"	
		"	20	"	"	"	5.5 V	5.5 V	5.5 V	"	"	"	"	5.5 V	0.5 V	"	"	"	1D	"	"	"	
I _{IH1}	3010	21	2.7 V	GND	GND	GND	GND			"		GND	GND	"	"	GND	"	1A		50	μA		
	"	22	GND	GND	GND	"	"	"	"	"	"	"	"	"	"	2.7 V	"	1B		"	"		
	"	23	"	2.7 V	GND	"	"	"	"	"	"	"	"	"	"	GND	"	2A		"	"		
	"	24	"	GND	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	2B		"	"		
	"	25	"	"	GND	2.7 V	"	"	"	"	"	"	"	"	"	"	"	2C		"	"		
	"	26	"	"	"	GND	2.7 V	"	"	"	"	"	"	"	"	"	"	2D		"	"		
	"	27	"	"	"	"	GND	2.7 V	"	"	"	"	2.7 V	GND	"	"	"	1C		"	"		
	"	28	"	"	"	"	"	"	"	"	"	"	GND	2.7 V	"	"	"	1D		"	"		
I _{IH2}	"	29	5.5 V	"	"	"	"			"		"	GND	"	"	"	"	1A		+1	mA		
	"	30	GND	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	"	1B		"	"		
	"	31	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	GND	"	2A		"	"		
	"	32	"	GND	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	2B		"	"		
	"	33	"	"	GND	5.5 V	"	"	"	"	"	"	"	"	"	"	"	2C		"	"		
	"	34	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	2D		"	"		
	"	35	"	"	"	"	5.5 V	5.5 V	"	"	"	"	5.5 V	"	"	"	"	1C		"	"		
	"	36	"	"	"	"	"	"	"	"	"	"	GND	5.5 V	"	"	"	1D		"	"		
I _{OS}	3011	37	GND	"	"	"	"			"	GND	GND	GND	"	"	"	"	1Y	-40	-100	"		
	"	38	"	GND	GND	GND	GND	GND	GND	"	"	"	"	"	"	"	"	2Y	-40	-100	"		
I _{CCL}	3005	39	5.5 V	5.5 V	5.5 V	GND	GND			"		GND	GND	"	"	5.5 V	"	V _{CC}		22	"		
I _{CCH}	3005	40	GND	GND	GND	GND	GND			"		GND	GND	"	"	GND	"	V _{CC}		18	"		
V _{IC}	"	41	-18 mA	"	"	"	"			"		"	"	"	"	"	4.5 V	1A		-1.2	V		
	"	42	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	"	2A		"	"		
	"	43	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	2B		"	"		
	"	44	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	2C		"	"		
	"	45	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	2D		"	"		
	"	46	"	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	1C		"	"		
	"	47	"	"	"	"	"	"	"	"	"	"	-18 mA	"	"	"	"	1D		"	"		
	"	48	"	"	"	"	"	"	"	"	"	"	"	-18 mA	"	"	"	1B		"	"		
I _{CEX}	"	49	GND	5.5 V		5.5 V	GND	GND	"	"	"	5.5 V	5.5 V	1Y		250	μA						
	"	50	5.5 V	GND	5.5 V	5.5 V	GND	GND	5.5 V	"	5.5 V	5.5 V	"	"	"	5.5 V	5.5 V	2Y		250	μA		
2	Same tests, terminal conditions and limits as subgroup 1, except T _C = 125°C and V _{IC} tests are omitted. (V _{IL} = 0.7 V and V _{OL} (max) = 0.45 V).																						
3	Same tests, terminal conditions and limits as subgroup 1, except T _C = -55°C and V _{IC} tests are omitted.																						

TABLE III. Group A inspection for device type 01 – Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.8 V, or open)

Subgroup	Symbol	MIL-STD-883 method	Cases															Measured terminal	Limits		Unit
			2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20		Min	Max	
			A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14				
			Test no.	1A	2A	2B	2C	2D	2Y	GND	1Y	1C	1D	NC	NC	1B	V _{CC}				
9 T _c =25°C	t _{PHL}	3003 Fig. 3	51	IN	GND	GND	GND	GND		GND	OUT	GND	GND	GND	GND	2.7 V	5.0 V	1A to 1Y	2.0	8.0	ns
	t _{PHL}		52	GND	IN	2.7 V	"	"				"	"	"	"	GND	"	2A to 2Y	"	8.0	"
	t _{PLH}		53	IN	GND	GND	"	"		OUT	"	OUT	"	"	"	2.7 V	"	1A to 1Y	"	7.0	"
	t _{PLH}		54	GND	IN	2.7 V	"	"		OUT	"	"	"	"	"	GND	"	2A to 2Y	"	7.0	"
10 T _c =125°C	t _{PHL}	"	55	IN	GND	GND	"	"		"	OUT	"	"	"	"	2.7 V	"	1A to 1Y	"	10.0	"
	t _{PHL}	"	56	GND	IN	2.7 V	"	"		OUT	"	"	"	"	GND	"	2A to 2Y	"	10.0	"	
	t _{PLH}	"	57	IN	GND	GND	"	"		"	OUT	"	"	"	2.7 V	"	1A to 1Y	"	9.0	"	
	t _{PLH}	"	58	GND	IN	2.7 V	"	"		OUT	"	GND	GND	"	"	GND	"	2A to 2Y	"	9.0	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T _c = -55°C.																				

1/ Cases 2 and X pins not designated are NC.

TABLE III. Group A inspection for device type 02.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.8 V, or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit		
				A	E	F	G	H	I	GND	Y	J	K	B	C	D	V _{CC}		Min	Max			
1 T _C =25°C	V _{OH}	3006	1	0.8 V	0.8 V	5.5 V	0.8 V	5.5 V	5.5 V	GND	-1 mA	0.8 V	5.5 V	5.5 V	5.5 V	5.5 V	4.5 V	Y	2.5		V		
			2	5.5 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	0.8 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	"	"	"	"	
			3	5.5 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	5.5 V	"	"	"	"	"
			4	5.5 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	0.8 V	5.5 V	5.5 V	"	"	"	"	"
	V _{OL}	3007	5	2.0 V	GND	GND	GND	GND	GND	GND	"	20 mA	GND	GND	GND	2.0 V	2.0 V	2.0 V	"	"	0.5	"	
			6	GND	2.0 V	2.0 V	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	GND	"	"	"	"	"
			7	GND	GND	GND	2.0 V	2.0 V	2.0 V	2.0 V	"	"	GND	GND	GND	GND	GND	GND	"	"	"	"	"
			8	GND	"	"	2.0 V	2.0 V	GND	GND	GND	GND	"	"	"	"	"						
	I _{IL}	3009	9	0.5 V	5.5 V	"	"	"	5.5 V	5.5 V	A	-1	-2	mA									
			10	5.5 V	"	"	"	"	"	"	"	"	"	"	0.5 V	5.5 V	5.5 V	5.5 V	B	"	"	"	
			11	"	"	"	"	"	"	"	"	"	"	"	5.5 V	0.5 V	5.5 V	"	C	"	"	"	
			12	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	5.5 V	"	D	"	"	"	
			13	"	0.5 V	"	"	"	"	"	"	"	"	"	"	"	5.5 V	"	"	E	"	"	"
			14	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	F	"	"	"
			15	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	G	"	"	"
			16	"	"	"	"	0.5 V	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"
			17	"	"	"	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	I	"	"	"
			18	"	"	"	"	"	"	5.5 V	5.5 V	"	"	0.5 V	"	"	"	"	"	J	"	"	"
	19	"	"	"	"	"	"	5.5 V	5.5 V	"	"	5.5 V	0.5 V	"	"	"	"	K	"	"	"		
	I _{IH1}	3010	20	2.7 V	GND	GND	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	"	A		50.0	μA	
			21	GND	"	"	"	"	"	"	"	"	"	"	2.7 V	GND	GND	"	B	"	"	"	
			22	"	"	"	"	"	"	"	"	"	"	"	"	2.7 V	GND	"	C	"	"	"	
			23	"	"	"	"	"	"	"	"	"	"	"	"	"	2.7 V	GND	"	D	"	"	"
			24	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	GND	"	E	"	"	"
			25	"	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"	F	"	"	"
			26	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	G	"	"	"
			27	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"
			28	"	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	I	"	"	"
			29	"	"	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	J	"	"	"
			30	"	"	"	"	"	"	"	"	"	"	2.7 V	GND	"	"	"	"	K	"	"	"
	I _{IH2}	3010	31	5.5 V	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	A		1.0	mA	
			32	GND	"	"	"	"	"	"	"	"	"	"	"	5.5 V	GND	"	B	"	"	"	
			33	"	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	GND	"	C	"	"	
			34	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	D	"	"	
			35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	GND	"	E	"	
			36	"	5.5 V	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	F	"	"	
			37	"	"	"	5.5 V	GND	"	"	"	"	"	"	"	"	"	"	"	G	"	"	
			38	"	"	"	"	5.5 V	GND	"	"	"	"	"	"	"	"	"	"	H	"	"	
			39	"	"	"	"	"	5.5 V	GND	"	"	"	"	"	"	"	"	"	I	"	"	
			40	"	"	"	"	"	"	5.5 V	GND	"	"	"	"	"	"	"	"	J	"	"	
			41	"	"	"	"	"	"	"	"	"	"	5.5 V	GND	"	"	"	"	K	"	"	
	I _{OS}	3011	42	"	"	"	"	"	"	"	"	GND	"	GND	"	"	"	Y	-40	-100	"		
	I _{CC1}	3005	43	5.5 V	"	"	"	"	"	"	"	"	"	GND	5.5 V	5.5 V	5.5 V	V _{CC}	"	16	"		
	I _{CCH}	3005	44	GND	"	"	"	"	"	"	"	"	"	GND	GND	GND	GND	V _{CC}	"	12.5	"		
	V _{IC}		45	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	"	4.5 V	A		-1.2	V	
			46	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	"	E	"	"	"	
			47	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	"	F	"	"	
			48	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	G	"	"	
			49	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	H	"	"	
			50	"	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	I	"	"	
			51	"	"	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	J	"	"	
	52	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	K	"	"			
	53	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B	"	"			
	54	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	C	"	"			
	55	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
	I _{CEX}		56	GND	GND	5.5 V	GND	5.5 V	5.5 V	"	"	5.5 V	GND	5.5 V	5.5 V	5.5 V	5.5 V	Y		250	μA		
2	Same tests, terminal conditions and limits as for subgroup 1, except T _C = 125°C and V _{IC} tests are omitted. (V _{IL} = 0.7 V and V _{OL} (max) = 0.45 V).																						
3	Same tests, terminal conditions and limits as for subgroup 1, except T _C = -55°C and V _{IC} tests are omitted.																						

TABLE III. Group A inspection for device type 02. Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.8 V, or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit		
				A	E	F	G	H	I	GND	Y	J	K	B	C	D	V _{CC}		Min	Max			
9 T _C =25°C	t _{PHL}	3003 Fig. 3	57	IN	GND	GND	GND	GND	GND	GND	OUT	GND	GND	2.7 V	2.7 V	2.7 V	5.0 V	A to Y	2.0	8.0	ns		
			58	GND	IN	2.7 V	GND	GND	GND	GND	GND	"	GND	GND	GND	GND	GND	GND	"	"	"	"	
			59	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	GND	"	"	"	"	
			60	GND	GND	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	"	"	"	"	
	t _{PLH}	"	"	61	IN	GND	GND	GND	GND	GND	GND	"	"	GND	GND	2.7 V	2.7 V	2.7 V	"	A to Y	"	7.0	"
				62	GND	IN	2.7 V	GND	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	"	"	"	"
				63	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	GND	"	"	"	"
				64	GND	GND	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	"	"	"	"
10 T _C =125°C	t _{PHL}	"	65	IN	GND	GND	GND	GND	GND	GND	"	"	GND	GND	2.7 V	2.7 V	2.7 V	"	A to Y	"	10.0	"	
			66	GND	IN	2.7 V	GND	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	"	"	"	"	
			67	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	GND	"	"	"	"	
			68	GND	GND	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	"	"	"	"	
	t _{PLH}	"	"	69	IN	GND	GND	GND	GND	GND	GND	"	"	GND	GND	2.7 V	2.7 V	2.7 V	"	A to Y	"	9.0	"
				70	GND	IN	2.7 V	GND	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	"	"	"	"
				71	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	GND	"	"	"	"
				72	GND	GND	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	"	"	"	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55°C.																						

TABLE III. Group A inspection for device type 03.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.8 V, or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit					
				A	E	F	G	H	I	GND	Y	J	K	B	C	D	V _{CC}		Min	Max						
1 T _C =25°C	V _{OL}	3007	1	2.0 V	GND	GND	GND	GND	GND	GND	20 mA	GND	GND	2.0 V	2.0 V	2.0 V	4.5 V	Y		0.5	V					
			2	GND	2.0 V	2.0 V	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	"	"	"	"	"				
			3	GND	GND	2.0 V	2.0 V	GND	GND	GND	GND	"	"	GND	GND	GND	GND	GND	"	"	"	"	"			
			4	GND	GND	GND	GND	GND	GND	GND	GND	"	"	2.0 V	2.0 V	GND	GND	GND	"	"	"	"	"			
	V _{IC}			5	-18 mA	-18 mA												5.5 V	A		-1.2	V				
				6															"	E		"	"			
				7															"	F		"	"			
				8															"	G		"	"			
				9															"	H		"	"			
				10															"	I		"	"			
				11															"	J		"	"			
				12															"	K		"	"			
				13															"	B		"	"			
				14															"	C		"	"			
				15															"	D		"	"			
	I _{CEX}			16	GND	GND	5.5 V	GND	5.5 V	5.5 V	5.5 V	"	5.5 V	GND	5.5 V	5.5 V	5.5 V	4.5 V	Y		250	μA				
				17	5.5 V	5.5 V	GND	5.5 V	5.5 V	5.5 V	5.5 V	"	"	5.5 V	GND	5.5 V	5.5 V	5.5 V	"	"	"	"	"			
				18	5.5 V	5.5 V	GND	5.5 V	5.5 V	5.5 V	5.5 V	"	"	5.5 V	GND	5.5 V	5.5 V	5.5 V	"	"	"	"	"			
				19	5.5 V	5.5 V	GND	5.5 V	5.5 V	5.5 V	5.5 V	"	"	5.5 V	GND	5.5 V	5.5 V	5.5 V	"	"	"	"	"			
	I _{IH1}	3010		20	2.7 V	GND	GND	GND	GND	GND	"		GND	GND	GND	GND	GND	5.5 V	A		50	μA				
				21	GND	"	"	"	"	"	"	"	"	"	"	2.7 V	GND	GND	"	B		"	"			
				22	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	C		"	"		
				23	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	D		"	"	
				24	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	E		"	"	
				25	"	GND	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	F		"	"	
				26	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	G		"	"	
				27	"	"	"	GND	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	H		"	"	
				28	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	I		"	"	
				29	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	J		"	"	
	30	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	K		"	"				
I _{IH2}			31	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A		1.0	mA				
			32	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B		"	"			
			33	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	C		"	"		
			34	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	D		"	"	
			35	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	E		"	"	
			36	"	GND	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	F		"	"	
			37	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	G		"	"
			38	"	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H		"	"
			39	"	"	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	I		"	"
			40	"	"	"	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	J		"	"
			41	"	"	"	"	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	K		"	"
I _{IL}	3009		42	0.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	"		5.5 V	"	5.5 V	5.5 V	5.5 V	"	A		-1	-2					
			43	5.5 V	"	"	"	"	"	"	"	"	"	"	"	0.5 V	5.5 V	5.5 V	"	B		"	"			
			44	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	0.5 V	5.5 V	"	C		"	"			
			45	"	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	0.5 V	5.5 V	"	D		"	"		
			46	"	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	0.5 V	"	E		"	"		
			47	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	5.5 V	"	F		"	"		
			48	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	G		"	"	
			49	"	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	H		"	"	
			50	"	"	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	I		"	"
			51	"	"	"	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	"	J		"	"
			52	"	"	"	"	"	"	5.5 V	0.5 V	"	"	"	"	"	"	"	"	"	"	"	K		"	"
I _{CCL}	3005	53	5.5 V	GND	GND	GND	GND	GND	GND	"		GND	GND	5.5 V	5.5 V	5.5 V	"	V _{CC}		16	"					
I _{CCH}	3005	54	GND	GND	GND	GND	GND	GND	GND	"		GND	GND	GND	GND	GND	"	V _{CC}		11	"					
2	Same tests, terminal conditions and limits as for subgroup 1, except T _C = 125°C and V _{IC} tests are omitted. (V _{OL} (max) = 0.45 V).																									
3	Same tests, terminal conditions and limits as for subgroup 1, except T _C = -55°C and V _{IC} tests are omitted.																									

TABLE III. Group A inspection for device type 03 Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V, low ≤ 0.8 V, or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit		
				A	E	F	G	H	I	GND	Y	J	K	B	C	D	V _{CC}		Min	Max			
9 T _c =25°C	t _{PHL}	3003 Fig. 3	55	IN	GND	GND	GND	GND	GND	GND	GND	OUT	GND	GND	2.7 V	2.7 V	2.7 V	5.0 V	A to Y	2.0	10.0	ns	
			56	GND	IN	2.7 V	GND	GND	GND	"	"	GND	GND	GND	GND	GND	GND	GND	"	E to Y	"	"	"
			57	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	GND	"	G to Y	"	"	"
			58	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	GND	GND	"	J to Y	"	"	"
	t _{PLH}	"	"	59	IN	GND	GND	GND	GND	GND	"	"	GND	GND	2.7 V	2.7 V	2.7 V	"	A to Y	"	12.0	"	
				60	GND	IN	2.7 V	GND	GND	GND	"	"	GND	GND	GND	GND	GND	GND	"	E to Y	"	"	"
10 T _c =125°C	t _{PHL}	"	61	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	"	G to Y	"	"	"	
			62	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	GND	"	J to Y	"	"	"	
			63	IN	GND	GND	GND	GND	GND	"	"	GND	GND	2.7 V	2.7 V	2.7 V	"	"	A to Y	"	13.0	"	
			64	GND	IN	2.7 V	GND	GND	GND	"	"	GND	GND	GND	GND	GND	GND	"	"	E to Y	"	"	"
	t _{PLH}	"	"	65	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	"	"	G to Y	"	"	"
				66	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	GND	"	"	J to Y	"	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T _c = -55°C.	"	67	IN	GND	GND	GND	GND	GND	GND	"	"	GND	GND	2.7 V	2.7 V	2.7 V	"	A to Y	"	16.0	"	
			68	GND	IN	2.7 V	GND	GND	GND	"	"	GND	GND	GND	GND	GND	GND	"	"	E to Y	"	"	"
			69	GND	GND	GND	IN	2.7 V	2.7 V	"	"	GND	GND	GND	GND	GND	GND	"	"	G to Y	"	"	"
			70	GND	GND	GND	GND	GND	GND	"	"	IN	2.7 V	GND	GND	GND	GND	"	"	J to Y	"	"	"

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but it is not mandatory)

6.1 Intended use. Microcircuits conforming to this specification are intended for logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. PIN and compliance identifier, if applicable (see 1.2).
- c. Requirements for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- d. Requirement for certificate of compliance, if applicable.
- e. Requirements for notification of change of product or process to acquiring activity. In addition, notification to the qualifying activity is required if applicable.
- f. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action, and reporting of results, if applicable.
- g. Requirement for product assurance options.
- h. Requirements for special carriers, lead lengths or lead forming. If applicable, these requirements shall not affect the part number. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.
- i. Requirements for "JAN" marking.
- j. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

6.4 Superseding information. The requirements of MIL-M-38510 have been superseded to take advantage of the available Qualified Manufacturer Listing (QML) system provided by MIL-PRF-38535. Previous references to MIL-M-38510 in this document have been replaced by appropriate references to MIL-PRF-38535. All technical requirements now consist of this specification and MIL-PRF-38535. The MIL-M-38510 specification sheet number and PIN have been retained to avoid adversely impacting existing government logistics systems and contractor's parts lists.

6.5 Abbreviations, symbols and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-HDBK-1331, and as follows:

GND	Electrical ground (common terminal)
I_{IN}	Current flowing into an input terminal.
V_{IN}	Voltage level at an input terminal.

6.6 Logistic support. Lead materials and finishes (see 3.4) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2) and lead material and finish A (see 3.4). Longer length leads and lead forming shall not affect the part number.

6.7 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic industry type. Generic industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-35810 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

<u>Device type</u>	<u>Commercial type</u>
01	54S51
02	54S64
03	54S65

6.8 Manufacturers' designations. Manufacturers' circuits included in this specification are designated as shown in table IV.

<u>Table IV. Manufacturers' designations</u>				
Device Type	Texas Instruments	Signetics Corporation	Fairchild Semiconductor	National Semiconductor
	Circuits			
	A	B	C	D
01	X	X	X	X
02	X	X	X	X

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

Custodians:
 Army – CR
 Navy - EC
 Air Force –11
 DLA-CC

Preparing activity:
 DLA - CC

Review activities:
 Army – MI, SM
 Navy – AS, CG, MC, SH, TD
 Air Force – 03, 19, 99

(Project 5962-2005-031)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.