

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, TTL, PARITY  
GENERATORS/CHECKERS, MONOLITHIC SILICON

This amendment forms a part of Military Specification MIL-M-38510/19(USAF), dated 14 February 1975.

PAGE 1

1.2, delete (including example of part number) and substitute:

"1.2 Part number. The part number shall be in accordance with MIL-M-38510."

PAGE 3

TABLE I: Delete and substitute new table I as printed on page 5 of this amendment.

PAGE 4

TABLE I,  $t_{PHL5}$ , maximum limit column: Delete "17" and substitute "19."

PAGE 5

\* Add new paragraph:

"3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 4 (see MIL-M-38510, Appendix E)."

\* TABLE II, delete and substitute:

"TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (see table III)		
	Class S devices	Class B devices	Class C devices
Interim electrical parameters (pre burn-in) (method 5004)	1	1	None
Final electrical test parameters (method 5004)	1*, 2,3,7, 9, 10, 11	1*, 2,3, 7, 9	1, 7
Group A test requirements (method 5005)	1,2,3,7,8, 9, 10, 11	1,2,3,7, 9, 10, 11	1,2,3, 7, 9
Group C end point electrical parameters (method 5005)	N/A	1, 2, 3	1
Additional electrical subgroups for group C periodic inspections	N/A	None	10, 11
Group D end point electrical parameters (method 5005)	1, 2, 3	1, 2, 3	1

\* PDA applies to subgroup 1 (see 4.3.c.)."

\* 4.1, line 1: Delete "Method 5005" and substitute "Methods 5005 and 5007, as applicable".

\* 4.2, delete and substitute:

"4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-M-38510. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, and D inspections (see 4.4.1, 4.4.2, 4.4.3, and 4.4.4)."

\* 4.3, delete and substitute:

"4.3 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to qualification and quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test (method 1015 of MIL-STD-883).
  1. Test condition D or E, using the circuit shown on figure 5, or equivalent.
  2.  $T_A = 125^\circ\text{C}$  minimum.
- 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. Percent defective allowable (PDA) - The PDA for class S devices shall be as specified in MIL-M-38510. The PDA for class B devices shall be 10 percent based on failures from group A, subgroup 1 test after cooldown as final electrical test in accordance with method 5004 of MIL-STD-883, and with no intervening electrical measurements. If interim electrical parameter tests are performed prior to burn-in, failures resulting from pre-burn-in screening may be excluded from the PDA. If interim electrical parameter tests prior to burn-in are omitted, then all screening failures shall be included in the PDA. The verified failures of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent defective for that lot, and the lot shall be accepted or rejected based on the PDA for the applicable device class."

PAGE 6

\* 4.4, add new sentence:

"Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, and D inspections (see 4.4.1, 4.4.2, 4.4.3, and 4.4.4)."

4.4.1, first sentence: Delete "consist of the test subgroups and LTPD values show in" and substitute "be in accordance with".

\* 4.4.1(b), delete and substitute:

"(b) Subgroups 4, 5, and 6 of table I of method 5005 of MIL-STD-883) shall be omitted."

4.4.2, delete and substitute:

"4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of Method 5005 of MIL-STD-883."

\* 4.4.3, delete and substitute:

"4.4.3 Group C inspection. Group C inspection shall be in accordance with table III of method 5005 of MIL-STD-883 and as follows:

- a. End point electrical parameters shall be as specified in table II.
- b. Subgroups 3 and 4 shall be added to the group C inspection requirements for class C devices and shall consist of the tests, conditions, and limits specified for subgroups 10 and 11 of group A.

- c. Operating life test (method 1005 of MIL-STD-883) conditions:
  - 1. Test condition D or E, using the circuit shown on figure 4, or equivalent.
  - 2.  $T_A = 125^\circ\text{C}$ , minimum.
  - 3. Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510 and method 1005 of MIL-STD-883."

\* Add new paragraph:

"4.4.4 Group D inspection. Group D inspection shall be in accordance with table IV of method 5005 of MIL-STD-883 and as follows:

- a. End point electrical parameters shall be specified in table III."

PAGE 9

\* FIGURE 4, device type 01: Identify existing schematic as "circuit A." Add new circuit, identified as "circuit B", as printed on page 6 of this amendment. Add new circuit as "circuit C" as printed on page 7 of this amendment.

PAGES 12 AND 13

TABLE III, device type 01: Delete and substitute new table III as printed on pages 8 and 9 of this amendment.

PAGE 19

TABLE III, tests 202 through 205, maximum limits column: Delete "17" and substitute "19."

PAGE 20

\* 4.5.2: Delete.

\* 4.6, delete and substitute:

"4.6 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-M-38510, except that the rough handling test shall not apply."

\* 5: Delete "PREPARATION FOR DELIVERY" and substitute "PACKAGING".

\* 5.1, delete and substitute:

"5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510."

\* 6.2, line 2: Delete "purposes" and substitute "support".

\* 6.3, add new sentence:

" i. Requirement for JAN marking."

PAGE 21

\* 6.6, line 1: Delete "unilaterally supercede" and substitute "will replace".

NOTE: The margins of this amendment are marked with an asterisk to indicate where changes from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment.

Custodian:  
Air Force - 17

Review activities:  
Air Force - 11, 99  
DLA - ES

User activity:  
Air Force - 19

Preparing activity:  
Air Force - 17

Agent:  
DLA - ES

(project 5962-F386)

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions	Test limits		
			Min	Max	Unit
High level output voltage	$V_{OH}$	$V_{CC} = 4.5 \text{ V}$ , $V_{IH} = 2 \text{ V}$ $V_{IL} = 0.8 \text{ V}$ , $I_{OH} = -800 \mu\text{A}$	2.4	---	V
Low level output voltage	$V_{OL}$	$V_{CC} = 4.5 \text{ V}$ , $V_{IH} = 2 \text{ V}$ $V_{IL} = 0.8 \text{ V}$ , $I_{OL} = 16 \text{ mA}$	---	0.4	V
Input clamp voltage	$V_{IC}$	$V_{CC} = 4.5 \text{ V}$ , $I_{IN} = -12 \text{ mA}$ $T_A = 25^\circ\text{C}$	---	-1.5	V
High level input current	$I_{IH1}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 2.4 \text{ V}$	---	40	$\mu\text{A}$
High level input current (Even IN and Odd IN)	$I_{IH2}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 2.4 \text{ V}$	---	80	$\mu\text{A}$
High level input current	$I_{IH3}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 5.5 \text{ V}$	---	100	$\mu\text{A}$
High level input current (Even IN and Odd IN)	$I_{IH4}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 5.5 \text{ V}$	---	200	$\mu\text{A}$
Low level input current	$I_{IL1}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0.4 \text{ V}$	-0.7	-1.6	mA
Low level input current (Even IN and Odd IN)	$I_{IL2}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0.4 \text{ V}$	-0.7	-3.2	mA
Short circuit output current	$I_{OS}$	$V_{CC} = 5.5 \text{ V}$ <u>1/</u>	-20	-55	mA
Supply current	$I_{CC}$	$V_{CC} = 5.5 \text{ V}$ , $V_{odd} = V_{even} = 2.4 \text{ V}$	---	49	mA
Propagation delay to high logic level (data to $\Sigma$ even, even input grounded)	$t_{PLH1}$	$C_L = 50 \text{ pF}$ , $R_L = 400 \Omega$	2	67	ns

See footnote at end of table.

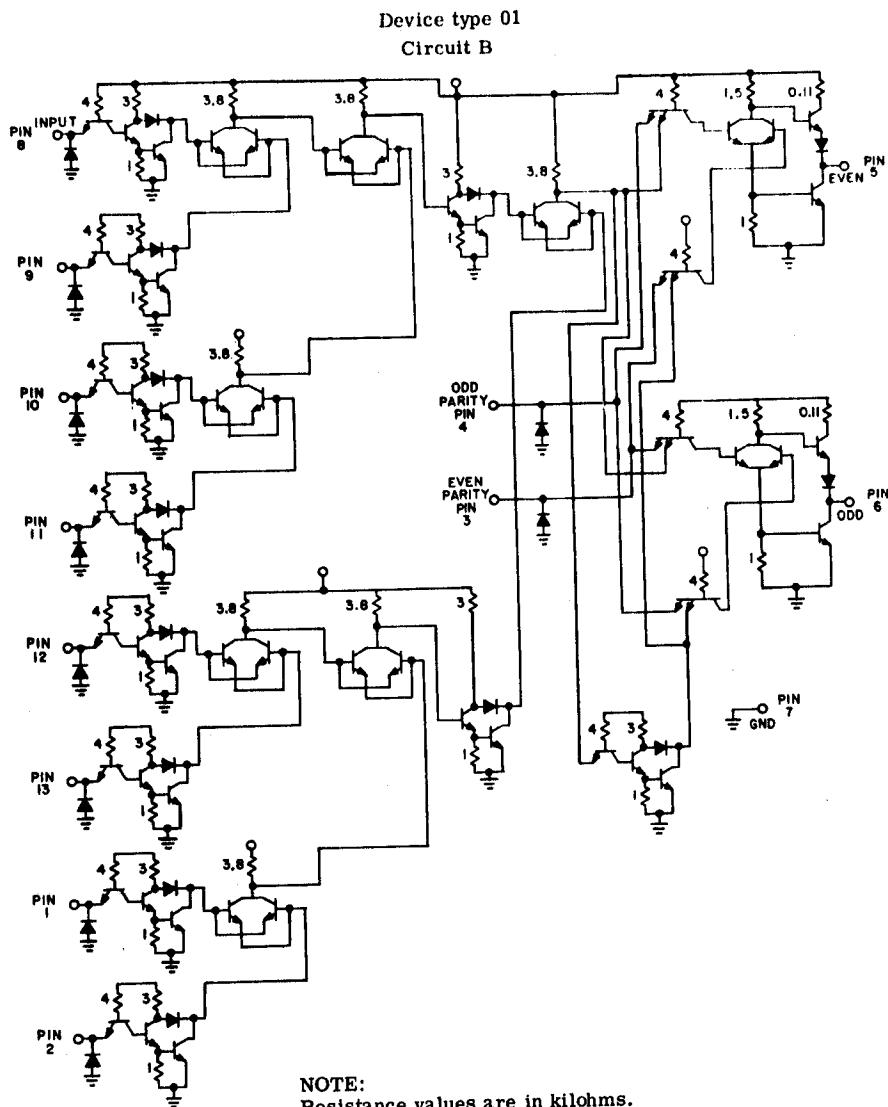


FIGURE 4. Schematic circuit - Continued.

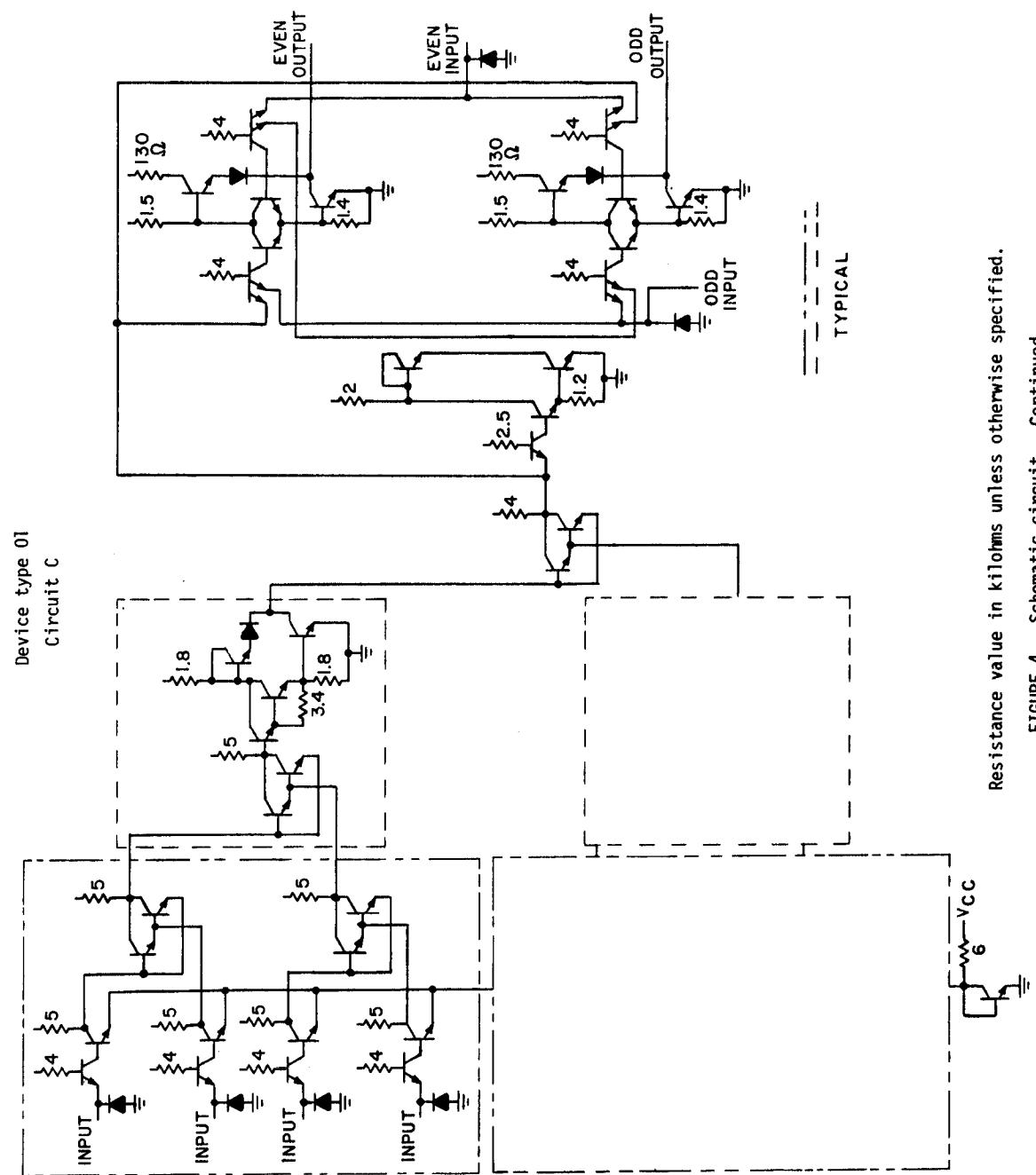


TABLE III. Group A Inspection for device type 01.  
(pins not designated may be high  $\geq 2.0\text{ V}$  or low  $\leq -0.8\text{ V}$ , or open)

Subgroup	Symbol	MIL-STD-883 method	Case A B C D				Terminal conditions (pins not designated may be high $\geq 2.0\text{ V}$ or low $\leq -0.8\text{ V}$ , or open)												Test limits															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Imp F	Imp G	Imp H	Imp I	Imp J	Imp K	Imp L	Imp M	Imp N	Imp O	Imp P	Imp Q	Imp R	Imp S	Imp T	Imp U		
$T_A = 25^\circ\text{C}$	V <sub>OH</sub>	3006	1	2.0 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V											
	V <sub>OL</sub>	3007	2	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V				
	V <sub>IC</sub>	13	8	0.8 V	2.0 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V				
	I <sub>OH1</sub>	3010	14																															
	I <sub>OL1</sub>	31	23	4.5 V	GND	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V			
	I <sub>OH2</sub>	32	24																															
	I <sub>OL2</sub>	33	25																															
	I <sub>OH3</sub>	34	26																															
	I <sub>OL3</sub>	35	27																															
	I <sub>OH4</sub>	36	28																															
$T_A = 100^\circ\text{C}$	V <sub>OH</sub>	3006	3	2.0 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V										
	V <sub>OL</sub>	3007	4	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V		
	V <sub>IC</sub>	13	5	0.8 V	2.0 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	
	I <sub>OH1</sub>	3010	14																															
	I <sub>OL1</sub>	31	23	4.5 V	GND	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V
	I <sub>OH2</sub>	32	24																															
	I <sub>OL2</sub>	33	25																															
	I <sub>OH3</sub>	34	26																															
	I <sub>OL3</sub>	35	27																															
	I <sub>OH4</sub>	36	28																															

TABLE III. Group A inspection for device type 01 - Continued.  
Terminal conditions (pins not designated may be high  $\geq 2.0$  V or low  $\leq .8$  V, or open)

Subgroup	Symbol	MIL-STD-883 method	Case A,B,CD	Test No.	Terminal conditions (pins not designated may be high $\geq 2.0$ V or low $\leq .8$ V, or open)								Meas. terminal	Test limits				
					1	2	3	4	5	6	7	8	9					
1 $T_A = 25^\circ C$	IIL1	3009	47		Inp G	Inp H	Even IN	Odd IN	$\Sigma$ Even OUT	$\Sigma$ Odd OUT	GND	Inp A	Inp B	Inp C	Inp D	5.5 V	Inp A Inp B Inp C Inp D Inp E Inp F Inp G Inp H	-0.7 mA -1.6 mA
					48	49												
					50	51												
	IIL2				52	53	0.4 V	0.4 V										
					54	55	2.0 V	GND	0.4 V	0.4 V		2.0 V	GND	2.0 V	GND	2.0 V	GND	
					56	57			0.4 V	0.4 V		2.0 V	GND	2.0 V	GND	2.0 V	GND	
	IQS	3011	58															
	IQS	3011	59		0.8 V	2.0 V	GND	GND				2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	
	IQS	3011	60		0.8 V	2.0 V	GND	GND				2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	
	I <sub>CC</sub>	3005	61															
2	Same tests, terminal conditions, and limits as subgroup 1, except $T_A = 125^\circ C$ and VIC tests are omitted.																	
3	Same tests, terminal conditions, and limits as subgroup 1, except $T_A = -55^\circ C$ and VIC tests are omitted.																	
9 $T_A = 25^\circ C$	tpLH1 (Fig 6)	3003	62		GND	GND	5.0 V	OUT			GND	GND	GND	GND	GND	5.0 V	A to GND	2 ns
					63													
					64													
					65													
					66													
					67													
					68													
					69													