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IN REPLY
REFER TO

DSCC-VAC

04-October-04

MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION

SUBJECT: Initial Draft of MIL-M-38510/58 revision D; Project Number 5962-2079

The initial draft for this subject document, dated 04-October-04, is now available for viewing and downloading from the DSCC-VA Web site:

http://www.dscc.dla.mil/Programs/MilSpec/DocSearch.asp

The changes to this document are to update the document to the latest requirements of MIL-PRF-38535 and to reactivate the specification and update the boilerplate to the latest MIL-STD-961 revision E requirements.

Concurrence or comments are required at this Center within 45 days from the date of this letter. Late comments will be held for the next coordination of the document. Comments from military departments must be identified as either "Essential" or "Suggested". Essential comments must be justified with supporting data. Military review activities should forward comments to their custodians of this office, as applicable, in sufficient time to allow for consolidating the department reply.

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/ signed /

Thomas M. Hess
Chief
Active Devices Team

cc:
VSC
VQC

NOTE: This draft, dated 04 Oct., 2004 , prepared by the Defense Supply Center Columbus (DSCC-VAC) has not been approved and is subject to modification. DO NOT USE PRIOR TO APPROVAL.
(Project 5962-2079)

INCH-POUND

MIL-M-38510/58D
DRAFT

SUPERSEDING
MIL-M-38510/58C
1 October 1986

MILITARY SPECIFICATION
MICROCIRCUITS, DIGITAL, CMOS, SWITCHES,
MONOLITHIC SILICON, POSITIVE LOGIC

Reactivated after xx xxxx. 2004 and may be used for new and existing designs and acquisitions.

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, CMOS, logic microcircuits. Two product assurance classes and a choice of case outlines, lead finishes, and radiation hardness assurance (RHA) are provided and are reflected in the complete Part or Identifying Number (PIN). For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535 (see 6.3).

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

1.2.1 Device types. The device types are as follows:

Device type	Circuit
01	Quad bilateral switch
02	Quad bilateral switch
51	Quad bilateral switch
52	Quad bilateral switch

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

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

Outline letter	Descriptive designator	Terminals	Package style
A	GDFP5-F14 or CDFP6-F14	14	Flat pack
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
D	GDFP1-F14 or CDFP2-F14	14	Flat pack
T	CDFP3-F14	14	Flat pack
X 1/ 2/	GDFP5-F14 or CDFP6-F14	14	Flat pack, except A dimension equals 0.1” (2.54 mm) max
Y 1/ 2/	GDFP1-F14 or CDFP2-F14	14	Flat pack, except A dimension equals 0.1” (2.54 mm) max

1/ As an exception to the nickel plate or undercoating paragraph of MIL-PRF-38535, appendix A, for case outlines X and Y only, the leads of bottom brazed ceramic packages (i.e., configuration 2 of case outlines A or D) may have electroless nickel undercoating which is 50 to 200 microinches (1.27 to 5.08 μm) thick provided the lead finish is hot solder dip (i.e., finish letter A) and provided that, after any lead forming, an additional hot solder dip coating is applied which extends from the outer tip of the lead to no more than 0.015 inch (0.38 mm) from the package edge.

2/ For bottom or side brazed packages, case outlines X and Y only, the S_1 dimension may go to .000 inch (.00 mm) minimum.

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990, or email CMOS@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil.

1.3 Absolute maximum ratings.

Supply voltage range (V_{DD} - V_{SS}):	
Device types 01 and 02	-0.5 V dc to +15.5 V dc
Device types 51 and 52	-0.5 V dc to +18.0 V dc
Input current (each input)	±10 mA
Input voltage range	$(V_{SS} - 0.5\ V) \leq V_I \leq (V_{DD} + 0.5\ V)$
Storage temperature range (T_{STG})	-65° to +175°C
Maximum power dissipation (P_D)	175 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction to case (θ_{JC})	See MIL-STD-1835
Junction temperature (T_J)	175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{DD} - V_{SS}):	
Device types 01 and 02	4.5 V dc to 12.5 V dc
Device types 51 and 52	4.5 V dc to 15.0 V dc
Input high voltage range (V_{IH}):	
Device types 01 and 02	2.05 V to 5.0 V dc @ V_{DD} = 5.0 V dc
	11.85 V to 12.5 V dc @ V_{DD} = 12.5 V dc
Device types 51 and 52	V_{OL} = 10% V_{DD}, V_{OH} = 90% V_{DD}
	3.5 V to 5.0 V dc @ V_{DD} = 5.0 V dc
	8.0 V to 10.0 V dc @ V_{DD} = 10.0 V dc
	11.0 V to 15.0 V dc @ V_{DD} = 15.0 V dc
Input low voltage range (V_{IL}):	
Device types 01 and 02	0.0 V to 0.95 V dc @ V_{DD} = 5.0 V dc
	0.0 V to 2.4 V dc @ V_{DD} = 12.5 V dc
Device types 51 and 52	V_{OL} = 10% V_{DD}, V_{OH} = 90% V_{DD}
	0.0 V to 1.5 V dc @ V_{DD} = 5.0 V dc
	0.0 V to 2.0 V dc @ V_{DD} = 10.0 V dc
	0.0 V to 4.0 V dc @ V_{DD} = 15.0 V dc
Load capacitance	50 pF maximum
Case operating temperature range (T_C)	-55°C to +125°C

2. 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 standards 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 SPECIFICATION

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

DEPARTMENT OF DEFENSE STANDARDS

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

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or www.dodssp.daps.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 document 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.

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 4.3 and 6.4).

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. Although eutectic die bonding is preferred, epoxy die bonding may be performed. However, the resin used shall be Dupont 5504 Conductive Silver Paste, or equivalent, which is cured at 200°C ±10°C for a minimum of 2 hours. The use of equivalent epoxies or cure cycles shall be approved by the qualifying activity. Equivalency shall be demonstrated in data submitted to the qualifying activity for verification.

3.3.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.3.2 Truth table. The truth table shall be as specified on figure 2.

3.3.3 Switching time test circuit and waveforms. The switching time test circuit and waveforms shall be as specified on figures 3 and 4.

3.3.4 ON resistance test. The ON resistance test shall be as specified on figures 5, 6, and 7.

3.3.5 Switch leakage current. The switch leakage current shall be specified on figure 8.

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

3.3.7 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. Unless otherwise specified, the electrical performance characteristics are as specified in table I, and apply over the full recommended case operating temperature range.

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.

3.7.1 Radiation hardness assurance identifier. The radiation hardness assurance identifier shall be in accordance with MIL-PRF-38535 and 4.5.4 herein.

3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 39 (see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$, V_{SS} = 0 V Unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Positive clamping input to V_{DD}	V_{IC} (pos)	T_C = 25°C, V_{DD} = GND, V_{SS} = Open, Output = Open, I_I = 1 mA	All		1.5	V
Negative clamping input to V_{SS}	V_{IC} (neg)	T_C = 25°C, V_{DD} = Open, V_{SS} = GND, Output = Open, I_I = -1 mA	All		-6	V
Quiescent supply current	I_{SS}	V_{DD} = 15 V dc Any combination of inputs	All		-550	nA
High level output voltage	V_{OH1}	V_{IN} = 5 V, V_{DD} = 5 V dc, I_{OH} = 0, Control input = V_{IH} (see table III)	01, 02	4.95		V
	V_{OH2}	V_{IN} = 12.5 V, V_{DD} = 12.5 V dc I_{OH} = 0, Control input = V_{IH} (see table III)	01, 02	11.25		V
	V_{OH3}	V_{IN} = 15 V, V_{DD} = 15 V dc, I_{OH} = 0, Control input = V_{IH}	51, 52	14.95		V
Low level output voltage	V_{OL1}	V_{IN} = 0 V, V_{DD} = 5 V dc, I_{OL} = 0, Control input = V_{IH} (see table III)	01, 02		-0.05	V
	V_{OL2}	V_{IN} = 0 V, V_{DD} = 12.5 V dc, I_{OL} = 0, Control input = V_{IH} (see table III)	01, 02		1.25	V
	V_{OL3}	V_{IN} = 0 V, V_{DD} = 15 V dc, I_{OL} = 0, Control input = V_{IH}	51, 52		0.05	V
Input high control voltage	V_{IH1}	V_{DD} = 5 V dc $V_O \ge$ 4.5 V	51, 52	3.5		V
	V_{IH2}	V_{DD} = 10 V dc $V_O \ge$ 9.0 V	51, 52	7.0		V
	V_{IH3}	V_{DD} = 15 V dc $V_O \ge$ 13.5 V	51, 52	11.0		V

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le 125°C$, V_{SS} = 0 V unless otherwise specified		Device type	Limits		Unit
					Min	Max	
Input low control voltage	V_{IL1}	V_{DD} = 5 V dc $V_O \le 0.5$ V		52		1.5	V
				51		1.0	V
	V_{IL2}	V_{DD} = 10 V dc $V_O \le 1.0$ V		52		3.0	V
				51		2.0	V
	V_{IL3}	V_{DD} = 15 V dc $V_O \le 1.5$ V		52		4.0	V
				51		2.5	V
Output low (sink) current	I_{OL1}	V_{DD} = 5 V dc, V_{IN} = 5 V V_{OL} = 0.4 V dc		51, 52	0.36		mAdc
	I_{OL2}	V_{DD} = 15 V dc, V_{IN} = 15 V V_{OL} = 1.5 V dc		51, 52	2.4		mAdc
Output high (source) current	I_{OH1}	V_{DD} = 5 V dc, V_{OH} = 4.6 V V_{IN} = 5 V		51, 52	-0.36		mAdc
	I_{OH2}	V_{DD} = 15 V dc V_{IN} = 15 V V_{OH} = 13.5 V dc		51, 52	-2.4		mAdc
Input leakage current 2/	I_{IH}	Measure inputs sequentially	V_{DD} = 15 V dc	01, 02		45	nA
			V_{DD} = 18 V dc	51		45	
				52		100	
	I_{IL}	Measure inputs sequentially	V_{DD} = 15 V dc	01, 02		-45	nA
			V_{DD} = 18 V dc	51		-45	
				52		-100	
Input capacitance	C_{ic}	V_{DD} = 0 V dc, f = 1 MHz T_C = 25°C		All		12	pF
Input capacitance	C_{is}	V_{DD} = 5 V dc, f = 1 MHz T_C = 25°C		All		20	pF
Output capacitance	C_{os}			01, 51		15	pF
				02, 52		20	
Feedthrough capacitance	C_{ics}			All		20	pF

See footnotes at end of table.

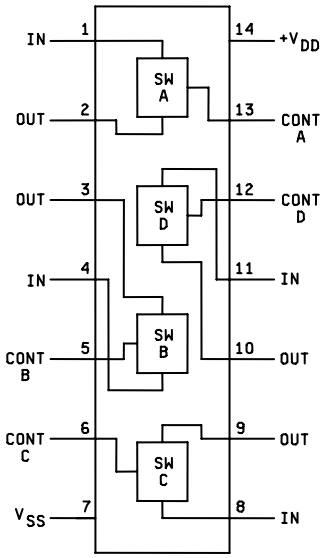
TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le 125°C$, V_{SS} = 0 V unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay times, switch input to output	t_{PHL}	V_{DD} = 5 V dc, C_L = 50 pF (see figure 3) R_L = 200 kΩ	01, 51	4	156	ns
			02, 52	4	80	ns
	t_{PLH}		01, 51	4	130	ns
			02, 52	4	85	ns
Propagation delay time, control input to switch output	t_{PZH}, t_{PZL}, t_{PHZ}, t_{PLZ}	V_{DD} = 5 V dc, C_L = 50 Pf (see figure 4) R_L = 1 kΩ	All	4	90	ns
Switch "ON" resistance	R_{ON1}	V_{DD} = 5.0 V dc V_{SS} = GND	01, 51		1.8	kΩ
			02, 52		600	Ω
	R_{ON2}	V_{DD} = 7.5 V dc V_{SS} = -7.5 V dc	01, 51		450	Ω
			02, 52		250	Ω
	R_{ON3}	V_{DD} = 10.0 V dc V_{SS} = GND	01, 51		750	Ω
			02, 52		350	Ω
Switch leakage current	I_{DOFF1}	V_{DD} = +5.0 V dc, V_{SS} = 0 V dc	All		|45|	nA
	I_{DOFF2}	V_{DD} = 0 V dc, V_{SS} = -5.0 V dc				
	I_{DOFF3}	V_{DD} = +10.0 V dc, V_{SS} = 0 V dc				
	I_{DOFF4}	V_{DD} = 0 V dc, V_{SS} = -10.0 V dc				
	I_{DOFF5}	V_{DD} = +15 V dc, V_{SS} = 0 V dc				
	I_{DOFF6}	V_{DD} = 0 V dc, V_{SS} = -15.0 V dc				

1/ Complete terminal conditions shall be as specified in table III.
2/ Input current at node.

DEVICE TYPES 01 AND 51

CASES A,C,D,X AND Y



DEVICE TYPES 02 AND 52

CASES A,C,D,X AND Y
FOR DEVICE TYPE 2
CASES A,C,D,T,X AND Y
FOR DEVICE TYPE 52

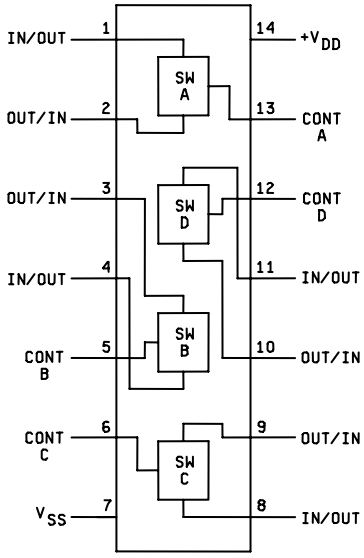
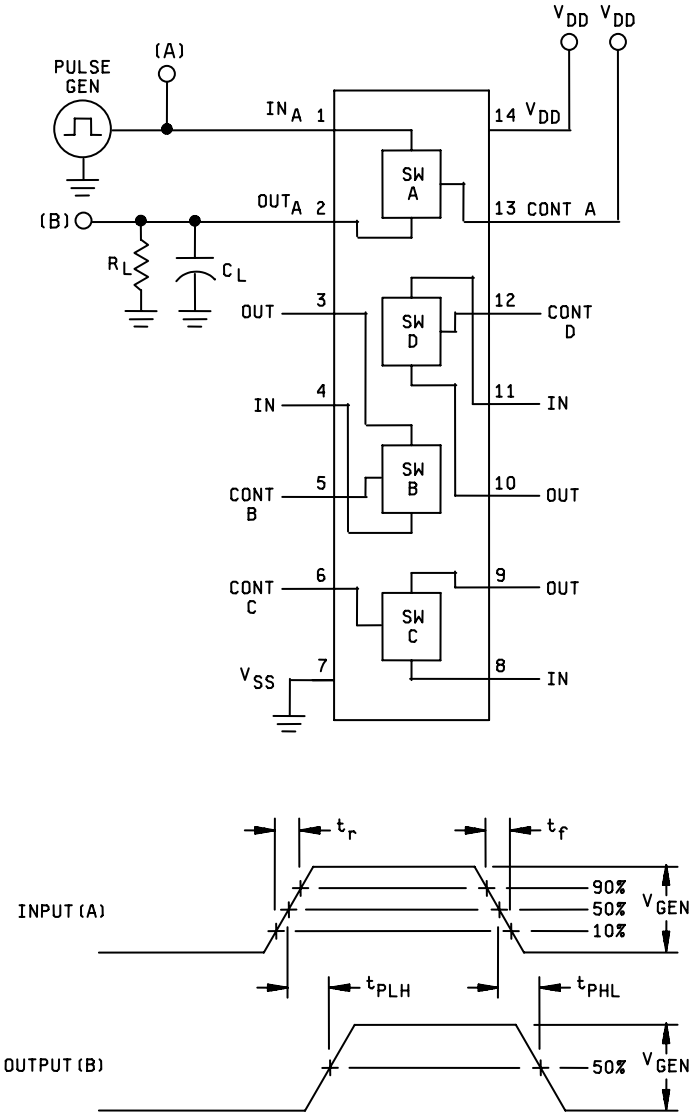


FIGURE 1. Terminal connections.

Truth table, each switch		
Input		Output
V_C	V_{IS}	V_{OS}
1	0	0
1	1	1
0	0	Open
0	1	Open

Positive logic: Switch on V_C = “1”
Switch off V_C = “0”

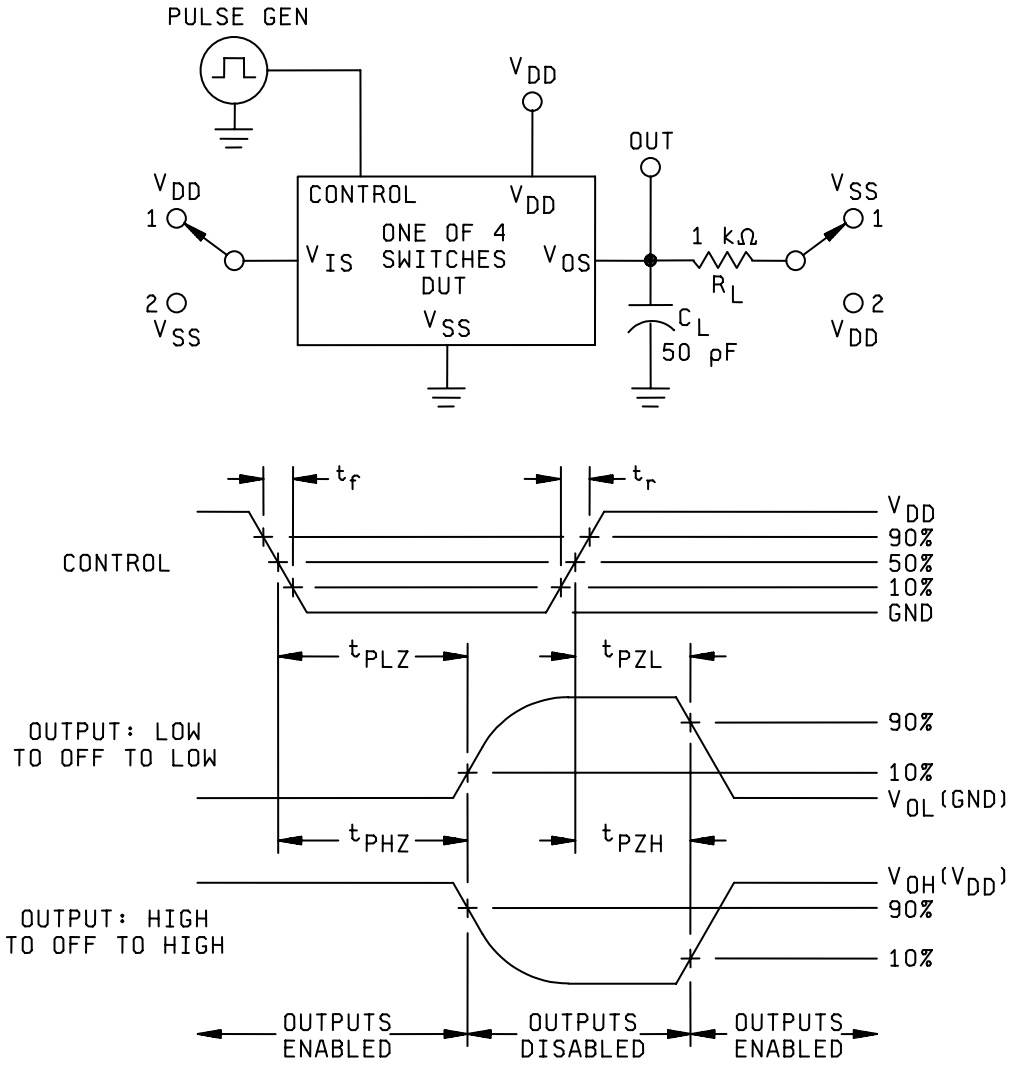
FIGURE 2. Truth table.



NOTES:

1. Pulse generator conditions: $V_{GEN} = V_{DD} \pm 1\%$, duty cycle = 50%, t_r and t_f = 20 ns ±2.0 ns, PRR = 500 kHz, and $Z_{OUT} = 50\Omega$.
2. C_L = 50 pF, R_L = 200 kΩ ±10%, includes probe and jig impedance.
3. Identical switching measurements are obtained from switch A, switch B, switch C, and switch D.

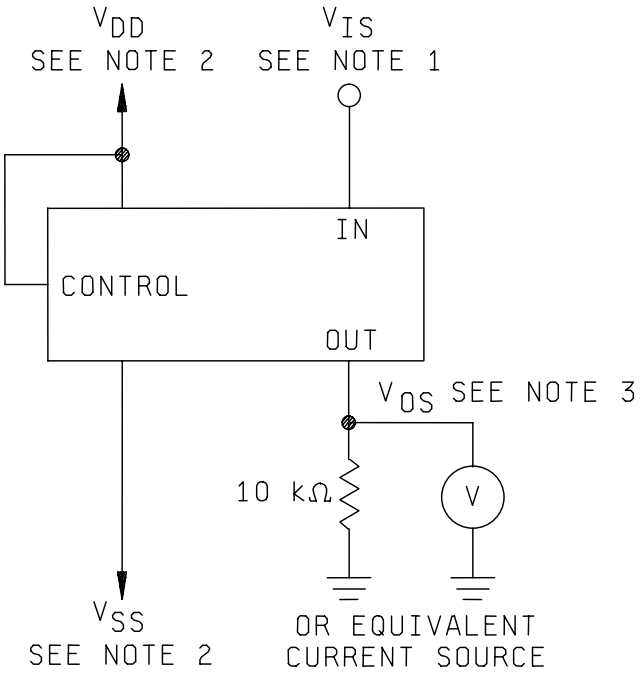
FIGURE 3. Switching time test circuit and waveforms, switch input to switch output.



NOTES:

1. Pulse generator has the following characteristics: $V_{GEN} = V_{DD} \pm 1\%$, duty cycle = 50%, t_r and $t_f \leq 20$ ns and $Z_{OUT} = 50\Omega$.
2. C_L = 50 pF, R_L = 1 kΩ, includes probe and jig impedance.
3. Identical switching measurements are obtained from switch A, switch B, switch C, and switch D.
4. Switch position 1 for t_{PZH} and t_{PHZ} tests; switch position 2 for t_{PLZ} and t_{PZL} tests.

FIGURE 4. Switching time test circuit and waveforms, switch control input to switch output.



NOTES:

1.

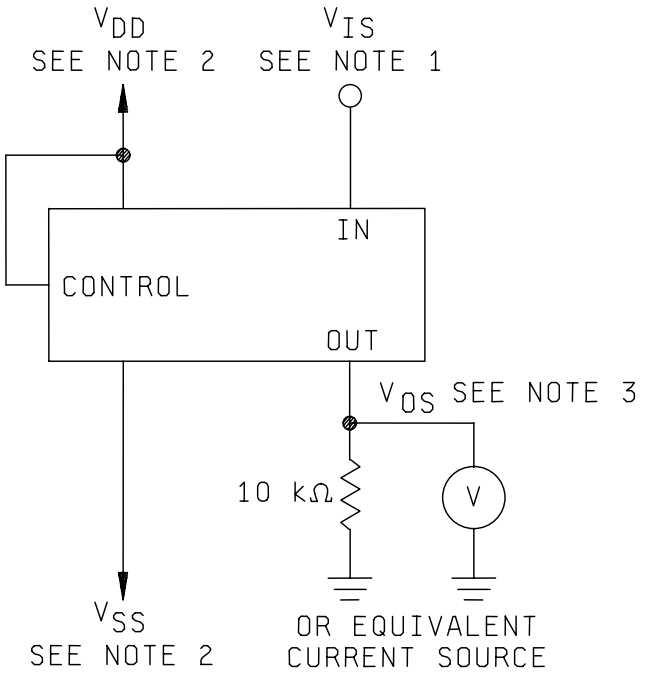
R_{ON1} Number	R_{ON1} (1)	R_{ON1} (2)	R_{ON1} (3)	R_{ON1} (4)
V_{IS}	+0.5 V	1.0 V	4.0 V	5.0 V

2. Conditions for V_{DD} and V_{SS}: V_{DD} = 5.0 V, V_{SS} = 0 V.
3. Translation from V_{OS} to R_{ON}:

$$R_{ON} = \frac{V_{IS} - V_{OS}}{V_{OS} / 10\ k\Omega}$$

4. See table III for complete terminal conditions.

FIGURE 5. ON resistance test, R_{ON1}.



NOTES:

1.

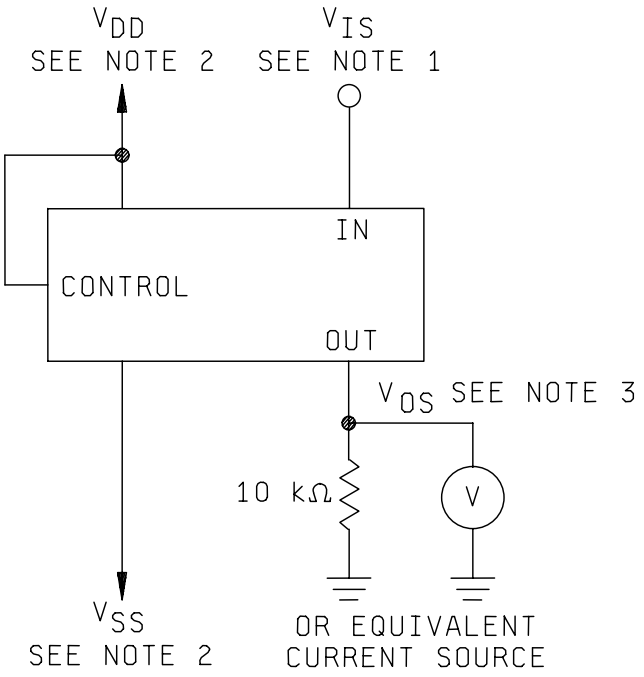
R_{ON2} Number	R_{ON2} (1)	R_{ON2} (2)	R_{ON2} (3)
V_{IS}	-5.0 V	+0.6 V	+5.0 V

2. Conditions for V_{DD} and V_{SS}: V_{DD} = +7.5 V, V_{SS} = -7.5 V.
3. Translation from V_{OS} to R_{ON}:

$$R_{ON} = \frac{V_{IS} - V_{OS}}{V_{OS} / 10\ k\Omega}$$

4. See table III for complete terminal conditions.
5. At the manufacturer's option, during R_{ON2} tests, V_{DD}, V_{SS}, and V_{IS} may be varied provided the absolute value equals +15.0 V.

FIGURE 6. ON resistance test, R_{ON2}.



NOTES:

1.

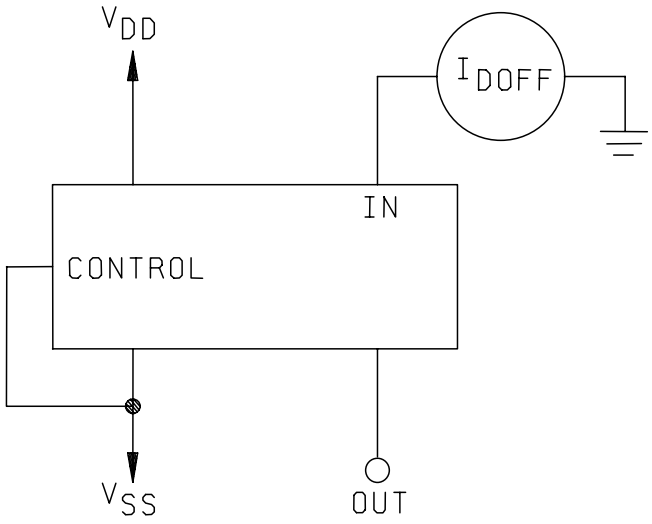
R_{ON3} Number	R_{ON3} (1)	R_{ON3} (2)	R_{ON3} (3)
V_{IS}	+2.5 V	5.0 V	7.5 V

2. Conditions for V_{DD} and V_{SS}: V_{DD} = +10.0 V, V_{SS} = 0 V.
3. Translation from V_{OS} to R_{ON}:

$$R_{ON} = \frac{V_{IS} - V_{OS}}{V_{OS} / 10\ k\Omega}$$

4. See table III for complete terminal conditions.

FIGURE 7. ON resistance test, R_{ON3}.



NOTES:

1.

I_{DOFF} NUMBERS	V_{DD}	V_{SS}	Out
I_{DOFF-1}	+5.0 V	GND	+2.5 V
I_{DOFF-2}	GND	-5.0 V	-2.5 V
I_{DOFF-3}	+10.0 V	GND	+5.0 V
I_{DOFF-4}	GND	-10.0 V	-5.0 V
I_{DOFF-5}	+15.0 V	GND	+7.5 V
I_{DOFF-6}	GND	-15.0 V	-7.5 V

2. Identical measurements shall be performed on switch A, switch B, switch C, and switch D.

FIGURE 8. Switch leakage current.

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 affect the form, fit, or function as described herein.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38535 and shall be conducted on all devices 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. Delete the sequence specified as interim (pre-burn-in) electrical parameters through interim (post-burn-in) electrical parameters of table IA of MIL-PRF-38535 and substitute lines 1 through 7 of table II herein.

c. Burn-in (method 1015 of MIL-STD-883).

(1) Unless otherwise specified in the manufacturers QM plan for static tests (test condition A), ambient temperature (T_A) shall be +125°C minimum. Test duration for each static test shall be 24 hours minimum for class S devices and in accordance with table I of method 1015 for class B devices.

i. For static burn-in I, all inputs shall be connected to 0.0 V.

ii. For static burn-in II, all inputs shall be connected to V_{DD}.

iii. Except for V_{DD} and V_{SS}, the terminal shall be connected through resistors whose value is 2 kΩ to 47 kΩ. The actual measured value of the resistor selected shall not exceed ±20% of its branded value due to use, heat or age.

iv. Output may be open or connected to $V_{DD}/2$.

v. V_{DD} = 12.5 V minimum, 15 V maximum for device types 01and 02.
V_{DD} = 15 V minimum, 18 V maximum for device types 51 and 52.
$V_{DD}/2 = V_{DD}/2$ ±1.0 V for all devices.
V_{SS} = 0.0 V.

(2) Unless otherwise specified in the manufacturers QM plan for dynamic test (test condition D), ambient temperature shall be +125°C minimum. Test duration shall be in accordance with table I of method 1015.

i. Except for V_{DD} and V_{SS}, the terminals shall be connected through resistors whose value is 2 kΩ to 47 kΩ. The actual measured value of the resistor selected shall not exceed ±20% of its branded value due to use, heat or age.

ii. Input signal requirements: Square wave, 50% duty cycle; 25 kHz < PRR < 1 MHz; t_{TLH} and t_{THL} < 1 μs. Voltage level: Minimum = V_{SS} – 0.5 V, +10% V_{DD}; Maximum = V_{DD} + 0.5 V, -10% V_{DD}.

iii. V_{DD} = 12.5 V minimum, 15 V maximum for device types 01 and 02.
V_{DD} = 15 V minimum, 18 V maximum for device types 51 and 52.
$V_{DD}/2 = V_{DD}/2$ ±1.0 V for all devices.
V_{SS} = 0.0 V.

d. Interim and final electrical test parameters shall be as specified in table II.

e. For class S devices, post dynamic burn-in, or class B devices, post static burn-in, electrical parameter measurements may, at the manufacturer's option, be performed separately or included in the final electrical parameter requirements.

f. When device types 01 and 02 are qualified by extension (see 4.3.1), they shall be screened in accordance with the requirements for corresponding device types 51 and 52.

TABLE II. Electrical test requirements.

Line no.	MIL-PRF-38535 test requirements	Class S device 1/			Class B device 1/		
		Ref. par.	Table III Subgroups 2/	Table IV delta limits 3/	Ref. par.	Table III subgroups 2/	Table IV delta limits 3/
1	Interim electrical parameters		1			1	
2	Static burn-in I (method 1015)	4.2c 4.5.2					
3	Same as line 1		1	Δ			
4	Static burn-in II (method 1015)	4.2c 4.5.2			4.2c 4.5.2	4/	
5	Same as line 1	4.2e	1*	Δ	4.2e	1*	Δ
6	Dynamic burn-in (method 1015)	4.2c 4.5.2					
7	Same as line 1	4.2e	1*	Δ			
8	Final electrical parameters (method 5004)		1*, 2, 3, 9			1*, 2, 3, 9	
9	Group A test requirements (method 5005)	4.4.1	1, 2, 3, 4, 9, 10, 11		4.4.1	1, 2, 3, 4, 9, 10, 11	
10	Group B test when using method 5005 QCI option	4.4.2	1, 2, 3, 9, 10, 11	Δ			
11	Group C end-point electrical parameters (method 5005)				4.4.3	1, 2, 3	Δ
12	Group D end-point electrical parameters (method 5005)	4.4.4	1, 2, 3		4.4.4	1, 2, 3	

1/ Blank spaces indicate tests are not applicable.

2/ * indicates PDA applies to subgroup 1 (see 4.2.1).

3/ Δ indicates delta limits shall be required only on table III subgroup 1, where specified, and the delta values shall be computed with reference to the previous interim electrical parameters.

4/ The device manufacturer may at his option either perform delta measurements or within 24 hours after burn-in (or removal of bias) perform the final electrical parameter measurements.

4.2.1 Percent defective allowable (PDA).

a. The PDA for class S devices shall be 5 percent for static burn-in and 5 percent for dynamic burn-in, based on the exact number of devices submitted to each separate burn-in.

b. Static burn-in I and II failure shall be cumulative for determining the PDA.

c. The PDA for class B devices shall be in accordance with MIL-PRF-38535 for static burn-in. Dynamic burn-in is not required.

d. Those devices whose measured characteristics, after burn-in, exceed the specified delta (Δ) limits or electrical parameter limits specified in table III, subgroup 1, are defective and shall be removed from the lot. The verified failures divided by the total number of devices in the lot initially submitted to burn-in shall be used to determine the percent defective for the lot and the lot shall be accepted or rejected based on the specified PDA.

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

4.3.1 Qualification extension. When authorized by the qualifying activity, if a manufacturer qualifies to a 51 or 52 device type which is manufactured identically to a 01 or 02 device type on this specification, then the 01 or 02 device type may be part I qualified by conducting only group A electrical tests and any electrical tests specified as additional group C subgroups and submitting data in accordance with 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, D, and E inspections (see 4.4.1 through 4.4.5).

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 performed in accordance with table II herein.

b. Subgroups 5, 6, 7, and 8 shall be omitted.

c. Subgroup 4 (C_I measurement) shall be measured only for initial qualification and after process or design changes that may affect input capacitance. Capacitance shall be measured between the designated terminal and V_{SS} at a frequency of 1 MHz.

d. Subgroups 9 and 11 shall be measured only for initial qualification and after process or design changes which may affect dynamic performance.

e. At the manufacturers option, test tapes may be programmed simultaneously for each identical section provided that each output is measured and each specified input combination is tested.

f. When device types 01 and 02 are qualified by extension (see 4.3.1), these device types will be inspected (QCI) according to the requirements for device types 51 and 52, respectively.

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. Delta limits shall apply only to subgroup 1 of group C inspection and shall consist of tests specified in table IV 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.

c. When device types 01 and 02 are qualified by extension (see 4.3.1), these device types will be inspected (QCI) according to the requirements for device types 51 and 52, respectively.

TABLE III. Group A inspection for device type 01.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
V_{IC} (pos)		1													1 mA	GND	CA		1.5					V
		2					1 mA									"	CB		"					"
		3						1 mA								"	CC		"					"
		4												1 mA		"	CD		"					"
V_{IC} (neg)		5							GND						-1 mA		CA		-6					"
		6					-1 mA		"								CB		"					"
		7						-1 mA	"								CC		"					"
		8							"					-1 mA			CD		"					"
I_{SS} 2/ 3/	3005	9	15 V	GND	GND	15 V	GND	GND	"	15 V	GND	GND	15 V	GND	GND	15 V	V_{SS}		-30		-550			nA
	"	10	GND	15 V	15 V	GND	"	"	"	GND	15 V	15 V	GND	"	"	"	"		"		"			"
	"	11	"			"	15 V	15V	"	"			"	15 V	15 V	"	"		"		"			"
V_{OH1} 4/	3006	12				5.0V	V_{IH1}	V_{IL1}	"	"				GND	GND	5.0V	OB	4.95		4.95		4.95		V
	"	13				GND	V_{IL1}	V_{IH1}	"	5.0V				"	"	"	OC	"		"		"		"
	"	14	GND				GND	GND	"				5.0V	V_{IH1}	V_{IL1}	"	OD	"		"		"		"
	"	15	5.0V				"	"	"				GND	V_{IL1}	V_{IH1}	"	OA	"		"		"		"
V_{OH2} 4/	"	16				12.5V	V_{IH2}	V_{IL2}	"	GND				GND	GND	12.5V	OB	11.25		11.25		11.25		"
	"	17				GND	V_{IL2}	V_{IH2}	"	12.5V				"	"	"	OC	"		"		"		"
	"	18	GND				GND	GND	"				12.5V	V_{IH2}	V_{IL2}	"	OD	"		"		"		"
	"	19	12.5V				"	"	"				GND	V_{IL2}	V_{IH2}	"	OA	"		"		"		"
V_{OL1} 4/	3007	20				GND	V_{IH1}	V_{IL1}	"	5.0V				GND	GND	5.0V	OB		50		50		50	mV
	"	21				5.0V	V_{IL1}	V_{IH1}	"	GND				"	"	"	OC		"		"		"	"
	"	22	5.0V				GND	GND	"				GND	V_{IH1}	V_{IL1}	"	OD		"		"		"	"
	"	23	GND				"	"	"				5.0V	V_{IL1}	V_{IH1}	"	OA		"		"		"	"
V_{OL2} 4/	"	24				GND	V_{IH2}	V_{IL2}	"	12.5V				GND	GND	12.5V	OB		1.25		1.25		1.25	V
	"	25				12.5V	V_{IL2}	V_{IH2}	"	GND				"	"	"	OC		"		"		"	"
	"	26	12.5V				GND	GND	"				GND	V_{IH2}	V_{IL2}	"	OD		"		"		"	"
	"	27	GND				"	"	"				12.5V	V_{IL2}	V_{IH2}	"	OA		"		"		"	"
I_{IH1} 5/	3010	28	15V			15V	15V	15V	"	15V			15V	15V	15V	15V	All inputs together		+12					nA
I_{IH2}	"	29	GND			GND	15V	GND	"	GND			GND	GND	GND	"	CB		1.0		45			"
	"	30	"			"	GND	15V	"	"			"	"	"	"	CC		"		"			"
	"	31	"			"	"	GND	"	"			"	15V	"	"	CD		"		"			"
	"	32	"			"	"	"	"	"			"	GND	15V	"	CA		"		"			"
	"	33	15V			"	"	"	"	"			"	"	GND	"	IA		2.0		"			"
	"	34	GND			15V	"	"	"	"			"	"	"	"	IB		"		"			"
	"	35	"			GND	"	"	"	15V			"	"	"	"	IC		"		"			"
	"	36	"			"	"	"	"	GND			15V	"	"	"	ID		"		"			"
I_{IL1} 5/	3009	37	"			"	"	"	"	"			GND	"	"	"	All inputs together		-12					"
I_{IL2}	3009	38	GND			GND	GND	GND	GND	GND			GND	GND	GND	15V	CB		-1.0		-45			nA
	"	39	"			"	"	"	"	"			"	"	"	"	CC		"		"			"
	"	40	"			"	"	"	"	"			"	"	"	"	CD		"		"			"
	"	41	"			"	"	"	"	"			"	"	"	"	CA		"		"			"
	"	42	"			"	"	"	"	"			"	"	"	"	IA		-2.0		"			"
	"	43	"			"	"	"	"	"			"	"	"	"	IB		"		"			"
	"	44	"			"	"	"	"	"			"	"	"	"	IC		"		"			"
	"	45	"			"	"	"	"	"			"	"	"	"	ID		"		"			"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 01 - Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
R_{ON1}		46	0.5V	6/					GND						5.0V	5.0V	OA		700		750		550	Ω
		47			6/	0.5V	5.0V		"							"	OB		"		"		"	"
		48						5.0V	"	0.5V	6/					"	OC		"		"		"	"
		49							"			6/	0.5V	5.0V		"	OD		"		"		"	"
		50	1.0V	6/					"						5.0V	"	OA		1.0 k		1.1 k		750	"
		51			6/	1.0V	5.0V		"							"	OB		"		"		"	"
		52						5.0V	"	1.0V	6/					"	OC		"		"		"	"
		53							"			6/	1.0V	5.0V		"	OD		"		"		"	"
		54	4.0V	6/					"						5.0V	"	OA		1.2 k		1.8 k		850	"
		55			6/	4.0V	5.0V		"							"	OB		"		"		"	"
		56						5.0V	"	4.0V	6/					"	OC		"		"		"	"
		57							"			6/	4.0V	5.0V		"	OD		"		"		"	"
		58	5.0V	6/					"						5.0V	"	OA		800		950		750	"
		59			6/	5.0V	5.0V		"							"	OB		"		"		"	"
		60						5.0V	"	5.0V	6/					"	OC		"		"		"	"
		61							"			6/	5.0V	5.0V		"	OD		"		"		"	"
R_{ON2}		62	-5.0V	7/					-7.5V						7.5V	7.5V	OA		250		300		250	"
		63			7/	-5.0V	7.5V		"							"	OB		"		"		"	"
		64						7.5V	"	-5.0V	7/					"	OC		"		"		"	"
		65							"			7/	-5.0V	7.5V		"	OD		"		"		"	"
		66	0.6V	7/					"						7.5V	"	OA		400		450		300	"
		67			7/	0.6V	7.5V		"							"	OB		"		"		"	"
		68						7.5V	"	0.6V	7/					"	OC		"		"		"	"
		69							"			7/	0.6V	7.5V		"	OD		"		"		"	"
		70	5.0V	7/					"						7.5V	"	OA		350		400		"	"
		71			7/	5.0V	7.5V		"							"	OB		"		"		"	"
		72						7.5V	"	5.0V	7/					"	OC		"		"		"	"
		73							"			7/	5.0V	7.5V		"	OD		"		"		"	"
R_{ON3}		74	2.5V	8/					GND						10V	10V	OA		450		500		350	"
		75			8/	2.5V	10V		"							"	OB		"		"		"	"
		76						10V	"	2.5V	8/					"	OC		"		"		"	"
		77							"			8/	2.5V	10V		"	OD		"		"		"	"
		78	5.0V	8/					"						10V	"	OA		650		700		500	"
		79			8/	5.0V	10V		"							"	OB		"		"		"	"
		80						10V	"	5.0V	8/					"	OC		"		"		"	"
		81							"			8/	5.0V	10V		"	OD		"		"		"	"
		82	7.5V	8/					"						10V	"	OA		600		750		"	"
		83			8/	7.5V	10V		"							"	OB		"		"		"	"
		84						10V	"	7.5V	8/					"	OC		"		"		"	"
		85							"			8/	7.5V	10V		"	OD		"		"		"	"
I_{DOFF1}	Fig. 8	86	9/	9/	9/	9/	9/	9/	"	9/	9/	9/	9/	9/	9/	5.0V	9/		45		45		45	nA
I_{DOFF2}	"	87	"	"	"	"	"	"	-5.0V	"	"	"	"	"	"	GND	"		"		"		"	"
I_{DOFF3}	"	88	"	"	"	"	"	"	GND	"	"	"	"	"	"	10V	"		"		"		"	"
I_{DOFF4}	"	89	"	"	"	"	"	"	-10V	"	"	"	"	"	"	GND	"		"		"		"	"
I_{DOFF5}	"	90	"	"	"	"	"	"	GND	"	"	"	"	"	"	15V	"		"		"		"	"
I_{DOFF6}	"	91	"	"	"	"	"	"	15V	"	"	"	"	"	"	GND	"		"		"		"	"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 01 - Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 4 T_C = 25°C						
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
C_C	3012	92					10/		GND							GND	CB		12					pF
	"	93						10/	"							"	CC		"					"
	"	94							"					10/		"	CD		"					"
	"	95							"						10/	"	CA		"					"
C_{is}	3012	96	10/				GND	GND	GND					GND	GND	5.0V	IA		15					"
	"	97				10/	"	"	"					"	"	"	IB		"					"
	"	98					"	"	"	10/				"	"	"	IC		"					"
	"	99					"	"	"				10/	"	"	"	ID		"					"
C_{os}	"	100		11/			"	"	"					"	"	"	OA		"					"
	"	101			11/		"	"	"					"	"	"	OB		"					"
	"	102					"	"	"		11/			"	"	"	OC		"					"
	"	103					"	"	"			11/		"	"	"	OD		"					"
C_{ios}	"	104	12/	12/			"	"	"					"	"	"	IA, OA		"					"
	"	105			12/	12/	"	"	"					"	"	"	IB, OB		"					"
	"	106					"	"	"	12/	12/			"	"	"	IC, OC		"					"
	"	107					"	"	"			12/	12/	"	"	"	ID, OD		"					"
																		Subgroup 9 T_C = 25°C		Subgroup 10 T_C = 125°C		Subgroup 11 T_C = -55°C		
																		Min	Max	Min	Max	Min	Max	
t_{PLH}	3003 Fig. 3	108	IN	OUT			GND	GND	GND					GND	5.0V	5.0V	IA to OA	4	125	7	130	4	114	ns
	"	109			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	110					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	111					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHL}	"	112	IN	OUT			"	"	"					GND	5.0V	"	IA to OA	"	130	"	156	"	130	"
	"	113			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	114					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	115					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHZ}	Fig. 4	116	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	70	"	90	"	50	"
	"	117			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	118					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	119					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZH}	Fig. 4	120	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	121			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	122					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	123					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PLZ}	Fig. 4	124	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	125			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	126					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	127					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZL}	Fig. 4	128	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	129			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	130					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	131					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
V_{IC} (pos)		1					1 mA									GND	CB		1.5					V
		2						1 mA								"	CC		"					"
		3												1 mA		"	CD		"					"
		4													1 mA	"	CA		"					"
V_{IC} (neg)		5					-1 mA		GND								CB		-6					"
		6						-1 mA	"								CC		"					"
		7							"					-1 mA			CD		"					"
		8							"						-1 mA		CA		"					"
I_{SS} 2/ 3/	3005	9	15 V	GND	GND	15 V	GND	GND	"	15 V	GND	GND	15 V	GND	GND	15 V	V_{SS}		-30		-550			nA
	"	10	GND	15 V	15 V	GND	"	"	"	GND	15 V	15 V	GND	"	"	"	"		"		"			"
	"	11	"			"	15 V	15 V	"	"			"	15 V	15 V	"	"		"		"			"
V_{OH1} 4/	3006	12				5.0V	V_{IH1}	V_{IL1}	"	"				GND	GND	5.0V	OB	4.95		4.95		4.95		V
	"	13				GND	V_{IL1}	V_{IH1}	"	5.0V				"	"	"	OC	"		"		"		"
	"	14	GND				GND	GND	"				5.0V	V_{IH1}	V_{IL1}	"	OD	"		"		"		"
	"	15	5.0V				"	"	"				GND	V_{IL1}	V_{IH1}	"	OA	"		"		"		"
V_{OH2} 4/	"	16				12.5V	V_{IH2}	V_{IL2}	"	GND				GND	GND	12.5V	OB	11.25		11.25		11.25		"
	"	17				GND	V_{IL2}	V_{IH2}	"	12.5V				"	"	"	OC	"		"		"		"
	"	18	GND				GND	GND	"				12.5V	V_{IH2}	V_{IL2}	"	OD	"		"		"		"
	"	19	12.5V				"	"	"				GND	V_{IL2}	V_{IH2}	"	OA	"		"		"		"
V_{OL1} 4/	3007	20				GND	V_{IH1}	V_{IL1}	"	5.0V				GND	GND	5.0V	OB		50		50		50	mV
	"	21				5.0V	V_{IL1}	V_{IH1}	"	GND				"	"	"	OC		"		"		"	"
	"	22	5.0V				GND	GND	"				GND	V_{IH1}	V_{IL1}	"	OD		"		"		"	"
	"	23	GND				"	"	"				5.0V	V_{IL1}	V_{IH1}	"	OA		"		"		"	"
V_{OL2} 4/	"	24				GND	V_{IH2}	V_{IL2}	"	12.5V				GND	GND	12.5V	OB		1.25		1.25		1.25	V
	"	25				12.5V	V_{IL2}	V_{IH2}	"	GND				"	"	"	OC		"		"		"	"
	"	26	12.5V				GND	GND	"				GND	V_{IH2}	V_{IL2}	"	OD		"		"		"	"
	"	27	GND				"	"	"				12.5V	V_{IL2}	V_{IH2}	"	OA		"		"		"	"
I_{IH1} 5/	3010	28	15V			15V	15V	15V	"	15V			15V	15V	15V	15V	All inputs together		+12					nA
I_{IH2}	"	29	GND			GND	15V	GND	"	GND			GND	GND	GND	"	CB		1.0		45			"
	"	30	"			"	GND	15V	"	"			"	"	"	"	CC		"		"			"
	"	31	"			"	"	GND	"	"			"	15V	"	"	CD		"		"			"
	"	32	"			"	"	"	"	"			"	GND	15V	"	CA		"		"			"
	"	33	15V			"	"	"	"	"			"	"	GND	"	IA		2.0		"			"
	"	34	GND			15V	"	"	"	"			"	"	"	"	IB		"		"			"
	"	35	"			GND	"	"	"	15V			"	"	"	"	IC		"		"			"
	"	36	"			"	"	"	"	GND			15V	"	"	"	ID		"		"			"
I_{IL1} 5/	3009	37	"			"	"	"	"	"			GND	"	"	"	All inputs together		-12					"
I_{IL2}	3009	38	GND			GND	GND	GND	GND	GND			GND	GND	GND	15V	CB		-1.0		-45			nA
	"	39	"			"	"	"	"	"			"	"	"	"	CC		"		"			"
	"	40	"			"	"	"	"	"			"	"	"	"	CD		"		"			"
	"	41	"			"	"	"	"	"			"	"	"	"	CA		"		"			"
	"	42	"			"	"	"	"	"			"	"	"	"	IA		-2.0		"			"
	"	43	"			"	"	"	"	"			"	"	"	"	IB		"		"			"
	"	44	"			"	"	"	"	"			"	"	"	"	IC		"		"			"
	"	45	"			"	"	"	"	"			"	"	"	"	ID		"		"			"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02 - Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminals conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
R_{ON1}		46	0.5V	6/					GND						5.0V	5.0V	OA		400		450		400	Ω
		47			6/	0.5V	5.0V		"							"	OB		"		"		"	"
		48						5.0V	"	0.5V	6/					"	OC		"		"		"	"
		49							"			6/	0.5V	5.0V		"	OD		"		"		"	"
		50	1.0V	6/					"						5.0V	"	OA		450		500		450	"
		51			6/	1.0V	5.0V		"							"	OB		"		"		"	"
		52						5.0V	"	1.0V	6/					"	OC		"		"		"	"
		53							"			6/	1.0V	5.0V		"	OD		"		"		"	"
		54	4.0V	6/					"						5.0V	"	OA		550		600		550	"
		55			6/	4.0V	5.0V		"							"	OB		"		"		"	"
		56						5.0V	"	4.0V	6/					"	OC		"		"		"	"
		57							"			6/	4.0V	5.0V		"	OD		"		"		"	"
		58	5.0V	6/					"						5.0V	"	OA		400		450		400	"
		59			6/	5.0V	5.0V		"							"	OB		"		"		"	"
		60						5.0V	"	5.0V	6/					"	OC		"		"		"	"
		61							"			6/	5.0V	5.0V		"	OD		"		"		"	"
R_{ON2}		62	-5.0V	7/					-7.5V						7.5V	7.5V	OA		200		250		200	"
		63			7/	-5.0V	7.5V		"							"	OB		"		"		"	"
		64						7.5V	"	-5.0V	7/					"	OC		"		"		"	"
		65							"			7/	-5.0V	7.5V		"	OD		"		"		"	"
		66	0.6V	7/					"						7.5V	"	OA		"		"		"	"
		67			7/	0.6V	7.5V		"							"	OB		"		"		"	"
		68						7.5V	"	0.6V	7/					"	OC		"		"		"	"
		69							"			7/	0.6V	7.5V		"	OD		"		"		"	"
		70	5.0V	7/					"						7.5V	"	OA		"		"		"	"
		71			7/	5.0V	7.5V		"							"	OB		"		"		"	"
		72						7.5V	"	5.0V	7/					"	OC		"		"		"	"
		73							"			7/	5.0V	7.5V		"	OD		"		"		"	"
R_{ON3}		74	2.5V	8/					GND						10V	10V	OA		300		350		300	"
		75			8/	2.5V	10V		"							"	OB		"		"		"	"
		76						10V	"	2.5V	8/					"	OC		"		"		"	"
		77							"			8/	2.5V	10V		"	OD		"		"		"	"
		78	5.0V	8/					"						10V	"	OA		250		300		250	"
		79			8/	5.0V	10V		"							"	OB		"		"		"	"
		80						10V	"	5.0V	8/					"	OC		"		"		"	"
		81							"			8/	5.0V	10V		"	OD		"		"		"	"
		82	7.5V	8/					"						10V	"	OA		"		"		"	"
		83			8/	7.5V	10V		"							"	OB		"		"		"	"
		84						10V	"	7.5V	8/					"	OC		"		"		"	"
		85							"			8/	7.5V	10V		"	OD		"		"		"	"
I_{DOFF1}	Fig. 8	86	9/	9/	9/	9/	9/	9/	"	9/	9/	9/	9/	9/	9/	5.0V	9/		45		45		45	nA
I_{DOFF2}	"	87	"	"	"	"	"	"	-5.0V	"	"	"	"	"	"	GND	"		"		"		"	"
I_{DOFF3}	"	88	"	"	"	"	"	"	GND	"	"	"	"	"	"	10V	"		"		"		"	"
I_{DOFF4}	"	89	"	"	"	"	"	"	-10V	"	"	"	"	"	"	GND	"		"		"		"	"
I_{DOFF5}	"	90	"	"	"	"	"	"	GND	"	"	"	"	"	"	15V	"		"		"		"	"
I_{DOFF6}	"	91	"	"	"	"	"	"	-15V	"	"	"	"	"	"	GND	"		"		"		"	"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02 - Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 4 T_C = 25°C					
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
C_C	3012	92					10/		GND							GND	CB		12					pF
	"	93						10/	"							"	CC		"					"
	"	94							"					10/		"	CD		"					"
	"	95							"						10/	"	CA		"					"
C_{is}	3012	96	10/				GND	GND	GND					GND	GND	5.0V	IA		20					pF
	"	97				10/	"	"	"					"	"	"	IB		"					"
	"	98					"	"	"	10/				"	"	"	IC		"					"
	"	99					"	"	"				10/	"	"	"	ID		"					"
C_{os}	"	100		11/			"	"	"					"	"	"	OA		"					"
	"	101			11/		"	"	"					"	"	"	OB		"					"
	"	102					"	"	"		11/			"	"	"	OC		"					"
	"	103					"	"	"			11/		"	"	"	OD		"					"
C_{ios}	"	104	12/	12/			"	"	"					"	"	"	IA, OA		"					"
	"	105			12/	12/	"	"	"					"	"	"	IB, OB		"					"
	"	106					"	"	"	12/	12/			"	"	"	IC, OC		"					"
	"	107					"	"	"			12/	12/	"	"	"	ID, OD		"					"
																		Subgroup 9 T_C = 25°C		Subgroup 10 T_C = 125°C		Subgroup 11 T_C = -55°C		
																		Min	Max	Min	Max	Min	Max	
t_{PLH}	3003 Fig. 3	108	IN	OUT			GND	GND	GND					GND	5.0V	5.0V	IA to OA	4	70	7	85	4	70	ns
	"	109			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	110					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	111					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHL}	"	112	IN	OUT			"	"	"					GND	5.0V	"	IA to OA	"	60	"	80	"	50	"
	"	113			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	114					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	115					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHZ}	Fig. 4	116	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	70	"	90	"	55	"
	"	117			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	118					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	119					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZH}	Fig. 4	120	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	121			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	122					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	123					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PLZ}	Fig. 4	124	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	125			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	126					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	127					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZL}	Fig. 4	128	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	129			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	130					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	131					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"

See footnotes on next sheet.

TABLE III. Group A inspection for device type 02 - Continued.

1/ Pins not designated may be “High” level logic, “Low” level logic, or open. Exceptions are as follows: $V_{IC(pos)}$ tests, the V_{SS} terminal shall be open; $V_{IC(neg)}$ tests, the V_{DD} terminal shall be open.

2/ I_{SS} measurements shall be run in sequence.

3/ When performing quiescent current measurements (I_{SS}), the meter shall be placed to that all currents Flow through the meter. The outputs during the I_{SS} measurement shall be open.

4/ V_{IH1} = 3.8 V at 25°C, 3.6 V at 125°C, 3.95 V at -55°C.
V_{IH2} = 11.4 V at 25°C, 10.95 V at 125°C, 11.85 V at -55°C.
V_{IL1} = 1.1 V at 25°C, 0.85 V at 125°c, 1.25 V at -55°C.
V_{IL2} = 3.3 V at 25°C, 2.55 V at 125°C, 4.05 V at -55°C.

5/ The device manufacturer may, at his option, measure I_{IL} and I_{IH} at 25°C for each individual input or measure all inputs together. frequency = 1 MHz.

6/ See figure 5.

7/ See figure 6.

8/ See figure 7.

9/ See figure 8.

10/ C_c and C_{is} – connect capacitance bridge between measured input terminal and V_{SS}, frequency = 1 MHz.

11/ C_{os} – connect capacitance bridge between measured output terminal and V_{SS}, frequency = 1 MHz.

12/ C_{ios} – connect capacitance bridge between measured input and output terminals.

TABLE III. Group A inspection for device type 51.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
V_{IC} (pos)		1													1 mA	GND	CA		1.5					V
		2					1 mA									"	CB		"					"
		3						1 mA								"	CC		"					"
		4												1 mA		"	CD		"					"
V_{IC} (neg)		5							GND						-1 mA		CA		-6					"
		6					-1 mA		"								CB		"					"
		7						-1 mA	"								CC		"					"
		8							"					-1 mA			CD		"					"
I_{SS} 2/ 3/	3005	9	18 V	GND	GND	18 V	GND	GND	GND	18 V	GND	GND	18 V	GND	GND	18 V	V_{SS}		-30		-550			nA
	"	10	GND	18 V	18 V	GND	"	"	"	GND	18 V	18 V	GND	"	"	"	"		"		"			"
	"	11	"			"	18 V	18 V	"	"			"	18 V	18 V	"	"		"		"			"
V_{OH3}	3006	12	"			15V	15V	GND	"	"			"	GND	GND	15V	OB	14.95		14.95		14.95		V
	"	13	"			GND	GND	15V	"	15V			"	"	"	"	OC	"		"		"		"
	"	14	"			"	"	GND	"	GND			15V	15V	"	"	OD	"		"		"		"
	"	15	15V			"	"	"	"	"			GND	GND	15V	"	OA	"		"		"		"
V_{OL3}	3007	16	GND			"	15V	"	"	15V			"	"	GND	"	OB		.05		.05		.05	"
	"	17	"			15V	GND	15V	"	GND			"	"	"	"	OC		"		"		"	"
	"	18	15V			GND	"	GND	"	"			"	15V	"	"	OD		"		"		"	"
	"	19	GND			"	"	"	"	"			15V	GND	15V	"	OA		"		"		"	"
V_{IH1}		20	"			5.0V	3.5V	"	"	"			GND	"	GND	5V	OB	4.5		4.5		4.5		"
		21	"			GND	GND	3.5V	"	5.0V			"	"	"	"	OC	"		"		"		"
		22	"			"	"	GND	"	GND			5.0V	3.5V	GND	"	OD	"		"		"		"
		23	5.0V			"	"	"	"	"			GND	GND	3.5V	"	OA	"		"		"		"
V_{IH2}		24	GND			10V	7.0V	"	"	"			"	"	GND	10.0V	OB	9.0		9.0		9.0		"
		25	"			GND	GND	7.0V	"	10V			"	"	"	"	OC	"		"		"		"
		26	"			"	"	GND	"	GND			10V	7.0V	GND	"	OD	"		"		"		"
		27	10V			"	"	"	"	"			GND	GND	7.0V	"	OA	"		"		"		"
V_{IH3}		28	GND			15V	11.0V	"	"	"			"	"	GND	15V	OB	13.5		13.5		13.5		"
		29	"			GND	GND	11.0V	"	15V			"	"	"	"	OC	"		"		"		"
		30	"			"	"	GND	"	GND			15V	11.0V	GND	"	OD	"		"		"		"
		31	15V			"	"	"	"	"			GND	GND	11.0V	"	OA	"		"		"		"
V_{IL1}		32	GND			5.0V	1.0V	"	"	"			GND	GND	GND	5.0V	OB		0.5		0.5		0.5	"
		33	"			GND	GND	1.0V	"	5.0V			"	"	"	"	OC		"		"		"	"
		34	"			"	"	GND	"	GND			5.0V	1.0V	"	"	OD		"		"		"	"
		35	5.0V			"	"	"	"	"			GND	GND	1.0V	"	OA		"		"		"	"
V_{IL2}		36	GND			10.0V	2.0V	GND	"	"			"	"	GND	10.0V	OB		1.0		1.0		1.0	"
		37	"			GND	GND	2.0V	"	10.0V			"	"	"	"	OC		"		"		"	"
		38	"			"	"	GND	"	GND			10.0V	2.0V	"	"	OD		"		"		"	"
		39	10.0V			"	"	"	"	"			GND	GND	2.0V	"	OA		"		"		"	"
V_{IL3}		40	GND			15.0V	2.5V	"	"	"			"	"	GND	15.0V	OB		1.5		1.5		1.5	"
		41	"			GND	GND	2.5V	"	15.0V			"	"	"	"	OC		"		"		"	"
		42	"			"	"	GND	"	GND			15.0V	2.5V	"	"	OD		"		"		"	"
		43	15.0V			"	"	"	"	"			GND	GND	2.5V	"	OA		"		"		"	"
I_{OL1}		44	GND		0.4V	"	5.0V	"	"	5.0V			"	"	GND	5V	OB	0.51		0.36		0.64		mA
		45	"			5.0V	GND	5.0V	"	GND	0.4V		"	"	"	"	OC	"		"		"		"
		46	5.0V			GND	"	GND	"	"		0.4V	"	5.0V	"	"	OD	"		"		"		"
		47	GND	0.4V		"	"	"	"	"			5.0V	GND	5.0V	"	OA	"		"		"		"
I_{OL2}		48	"		1.5V	"	15V	"	"	15V			GND	"	GND	15V	OB	3.4		2.4		4.2		"
		49	"			15V	GND	15V	"	GND	1.5V		"	"	"	"	OC	"		"		"		"
		50	15V			GND	"	GND	"	"		1.5V	"	15V	"	"	OD	"		"		"		"
		51	GND	1.5V		"	"	"	"	"			15V	GND	15V	"	OA	"		"		"		"

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 51 – Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
I_{OH1}		52	GND		4.6V	5.0V	5.0V	GND	GND	GND			GND	GND	GND	5.0V	OB	-0.51		-0.36		-0.64		mA
		53	"			GND	GND	5.0V	"	5.0V	4.6V		"	"	"	"	OC	"		"		"		"
		54	"			"	"	GND	"	GND		4.6V	5.0V	5.0V	"	"	OD	"		"		"		"
		55	5.0V	4.6V		"	"	"	"	"			GND	GND	5.0V	"	OA	"		"		"		"
I_{OH2}		56	GND		13.5V	15V	15V	"	"	"			"	"	GND	15V	OB	-3.4		-2.4		-4.2		"
		57	"			GND	GND	15V	"	15V	13.5V		"	"	"	"	OC	"		"		"		"
		58	"			"	"	GND	"	GND		13.5V	15V	15V	"	"	OD	"		"		"		"
		59	15V	13.5V		"	"	"	"	"			GND	GND	15V	"	OA	"		"		"		"
I_{IH1} 4/	3010	60	18V			18V	18V	18V	"	18V			18V	18V	18V	18V	All inputs together		+8					nA
I_{IH2}	"	61	GND			GND	18V	GND	"	GND			GND	GND	GND	"	CB		1.0		45			"
	"	62	"			GND	GND	18V	"	"			"	"	"	"	CC		"		"			"
	"	63	"			"	"	GND	"	"			"	18V	"	"	CD		"		"			"
	"	64	"			"	"	"	"	"			"	GND	18V	"	CA		"		"			"
	"	65	18V			"	"	"	"	"			"	"	GND	"	IA		"		"			"
	"	66	GND			18V	"	"	"	"			"	"	"	"	IB		"		"			"
	"	67	"			GND	"	"	"	18V			"	"	"	"	IC		"		"			"
	"	68	"			"	"	"	"	GND			18V	"	"	"	ID		"		"			"
I_{IL1} 4/	3009	69	"			"	"	"	"	"			GND	"	"	"	All inputs together		-8.0					"
I_{IL2}	"	70	GND			GND	GND	GND	GND	GND			GND	GND	GND	18V	CB		-1.0		-45			"
	"	71	"			"	"	"	"	"			"	"	"	"	CC		"		"			"
	"	72	"			"	"	"	"	"			"	"	"	"	CD		"		"			"
	"	73	"			"	"	"	"	"			"	"	"	"	CA		"		"			"
	"	74	"			"	"	"	"	"			"	"	"	"	IA		"		"			"
	"	75	"			"	"	"	"	"			"	"	"	"	IB		"		"			"
	"	76	"			"	"	"	"	"			"	"	"	"	IC		"		"			"
	"	77	"			"	"	"	"	"			"	"	"	"	ID		"		"			"
R_{ON1}		78	0.5V	5/					"						5.0V	5.0V	OA		700		750		550	Ω
		79			5/	0.5V	5.0V		"							"	OB		"		"		"	"
		80						5.0V	"	0.5V	5/					"	OC		"		"		"	"
		81							"			5/	0.5V	5.0V		"	OD		"		"		"	"
		82	1.0V	5/					"						5.0V	"	OA		1.0 k		1.1 k		750	"
		83			5/	1.0V	5.0V		"							"	OB		"		"		"	"
		84						5.0V	"	1.0V	5/					"	OC		'		"		"	"
		85							"			5/	1.0V	5.0V		"	OD		"		"		"	"
		86	4.0V	5/					"						5.0V	"	OA		1.2 k		1.8 k		850	"
		87			5/	4.0V	5.0V		"							"	OB		"		"		"	"
		88						5.0V	"	4.0V	5/					"	OC		"		"		"	"
		89							"			5/	4.0V	5.0V		"	OD		"		"		"	"
		90	5.0V	5/					"						5.0V	"	OA		800		950		700	"
		91			5/	5.0V	5.0V		"							"	OB		"		"		"	"
		92						5.0V	"	5.0V	5/					"	OC		"		"		"	
		93							"			5/	5.0V	5.0V		"	OD		"		"		"	

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 51 – Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
R_{OH2}		94	-5.0V	6/			7.5V		-7.5V						7.5V	7.5V	OA		250		300		250	Ω
		95			6/	-5.0V			"							"	OB		"		"		"	"
		96						7.5V	"	-5.0V	6/					"	OC		"		"		"	"
		97							"			6/	-5.0V	7.5V		"	OD		"		"		"	"
		98	0.6V	6/					"						7.5V	"	OA		400		450		300	"
		99			6/	0.6V	7.5V		"							"	OB		"		"		"	"
		100						7.5V	"	0.6V	6/					"	OC		"		"		"	"
		101							"			6/	0.6V	7.5V		"	OD		"		"		"	"
		102	5.0V	6/					"						7.5V	"	OA		350		400		"	"
		103			6/	5.0V	7.5V		"							"	OB		"		"		"	"
		104						7.5V	"	5.0V	6/					"	OC		"		"		"	"
		105							"			6/	5.0V	7.5V		"	OD		"		"		"	"
R_{OH3}		106	2.5V	7/					GND						10V	10V	OA		450		500		350	Ω
		107			7/	2.5V	10V		"							"	OB		"		"		"	"
		108						10V	"	2.5V	7/					"	OC		"		"		"	"
		109							"			7/	2.5V	10V		"	OD		"		"		"	"
		110	5.0V	7/					"						10V	"	OA		650		700		500	"
		111			7/	5.0V	10V		"							"	OB		"		"		"	"
		112						10V	"	5.0V	7/					"	OC		"		"		"	"
		113							"			7/	5.0V	10V		"	OD		"		"		"	"
		114	7.5V	7/					"						10V	"	OA		600		750		"	"
		115			7/	7.5V	10V		"							"	OB		"		"		"	"
		116						10V	"	7.5V	7/					"	OC		"		"		"	"
		117							"			7/	7.5V	10V		"	OD		"		"		"	"
I_{DOFF1}	Fig 8	118	8/	8/	8/	8/	8/	8/	GND	8/	8/	8/	8/	8/	8/	5.0V	8/		45		45		45	nA
I_{DOFF2}	"	119	"	"	"	"	"	"	-5.0V	"	"	"	"	"	"	GND	"		"		"		"	"
I_{DOFF3}	"	120	"	"	"	"	"	"	GND	"	"	"	"	"	"	10V	"		"		"		"	"
I_{DOFF4}	"	121	"	"	"	"	"	"	-10.0V	"	"	"	"	"	"	GND	"		"		"		"	"
I_{DOFF5}	"	122	"	"	"	"	"	"	GND	"	"	"	"	"	"	15V	"		"		"		"	"
I_{DOFF6}	"	123	"	"	"	"	"	"	-15.0V	"	"	"	"	"	"	GND	"		"		"		"	"
																		Subgroup 4 T_C = 25°C						
																		Min	Max					
C_c	3012	124					9/		GND							GND	CB		12					pF
	"	125						9/	"							"	CC		"					"
	"	126							"					9/		"	CD		"					"
	"	127							"						9/	"	CA		"					"
C_{is}	"	128	9/				GND	GND	"					GND	GND	5.0V	IA		20					"
	"	129				9/	"	"	"					"	"	"	IB		"					"
	"	130					"	"	"	9/				"	"	"	IC		"					"
	"	131					"	"	"				9/	"	"	"	ID		"					"
C_{os}	"	132		10/			"	"	"					"	"	"	OA		15					"
	"	133			10/		"	"	"					"	"	"	OB		"					"
	"	134					"	"	"		10/			"	"	"	OC		"					"
	"	135					"	"	"			10/		"	"	"	OD		"					"
C_{ios}	"	136	11/	11/			"	"	"					"	"	"	IA, OA		20					"
	"	137			11/	11/	"	"	"					"	"	"	IB, OB		"					"
	"	138					"	"	"	11/	11/			"	"	"	IC, OC		"					"
	"	139					"	"	"			11/	11/	"	"	"	ID, OD		"					"

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 51 – Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,X,Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 9 T_C = 25°C		Subgroup 10 T_C = 125°C		Subgroup 11 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
t_{PLH}	3003	140	IN	OUT			GND	GND	GND					GND	5.0V	5.0V	IA to OA	4	125	7	130	4	114	ns
	Fig. 3	141			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	142					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	143					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHL}	"	144	IN	OUT			GND	GND	GND					GND	5.0V	5.0V	IA to OA	"	130	"	156	"	130	"
	"	145			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	146					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	147					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHZ}	Fig. 4	148	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	70	"	90	"	50	"
	"	149			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	150					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	151					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZH}	"	152	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	153			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	154					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	155					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PLZ}	"	156	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	157			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	158					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	159					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZL}	"	160	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	161			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	162					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	163					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 52.

Symbol	MIL-STD-883 method	Cases A, C,D,T,X, Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
V_{IC} (POS)		1					1 mA									GND	CB		1.5					V
		2						1 mA								"	CC		"					"
		3												1 mA		"	CD		"					"
		4													1 mA	"	CA		"					"
V_{IC} (NEG)		5					-1 mA		GND							"	CB		-6					"
		6						-1 mA	"							"	CC		"					"
		7							"					-1 mA		"	CD		"					"
		8							"						-1 mA	"	CA		"					"
I_{SS} 2/ 3/	3005	9	18 V	GND	GND	18 V	GND	GND	"	18 V	GND	GND	18 V	GND	GND	18 V	V_{SS}		-30		-550			nA
	"	10	GND	18 V	18 V	GND	"	"	"	GND	18 V	18 V	GND	"	"	"	"		"		"			"
	"	11	"			"	18 V	18 V	"	"			"	18 V	18 V	"	"		"		"			"
V_{OH3}	3006	12	"			15 V	15 V	GND	"	"			"	GND	GND	15 V	OB	14.95		14.95		14.95		V
	"	13	"			GND	GND	15 V	"	15 V			"	"	"	"	OC	"		"		"		"
	"	14	"			"	"	GND	"	GND			15 V	15 V	"	"	OD	"		"		"		"
	"	15	15 V			"	"	"	"	"			GND	GND	15 V	"	OA	"		"		"		"
V_{OL3}	3007	16	GND			"	15 V	"	"	15 V			"	"	GND	"	OB		.05		.05		.05	"
	"	17	"			15 V	GND	15 V	"	GND			"	"	"	"	OC		"		"		"	"
	"	18	15 V			GND	"	GND	"	"			"	15 V	"	"	OD		"		"		"	"
	"	19	GND			"	"	"	"	"			15 V	GND	15 V	"	OA		"		"		"	"
V_{IH1}		20	"			5.0 V	3.5 V	GND	"	"			GND	GND	GND	5.0 V	OB	4.5		4.5		4.5		"
		21	"			GND	GND	3.5 V	"	5.0 V			"	"	"	"	OC	"		"		"		"
		22	"			"	"	GND	"	GND			5.0 V	3.5 V	"	"	OD	"		"		"		"
		23	5.0 V			"	"	"	"	"			GND	GND	3.5 V	"	OA	"		"		"		"
V_{IH2}		24	GND			10 V	7.0 V	"	"	"			"	GND	GND	10.0V	OB	9.0		9.0		9.0		"
		25	"			GND	GND	7.0 V	"	10 V			"	"	"	"	OC	"		"		"		"
		26	"			"	"	GND	"	GND			10 V	7.0 V	"	"	OD	"		"		"		"
		27	10.0V			"	"	"	"	"			GND	GND	7.0 V	"	OA	"		"		"		"
V_{IH3}		28	GND			15 V	11.0 V	"	"	"			"	GND	GND	15 V	OB	13.5		13.5		13.5		"
		29	"			GND	GND	11.0 V	"	15 V			"	"	"	"	OC	"		"		"		"
		30	"			"	"	GND	"	GND			15 V	11.0V	"	"	OD	"		"		"		"
		31	15.0V			"	"	"	"	"			GND	GND	11.0V	"	OA	"		"		"		"
V_{IL1}		32	GND			5.0V	1.5V	GND	"	"			GND	GND	GND	5.0V	OB		0.5		0.5		0.5	"
		33	"			GND	GND	1.5V	"	5.0V			"	"	"	"	OC		"		"		"	"
		34	"			"	"	GND	"	GND			5.0V	1.5V	"	"	OD		"		"		"	"
		35	5.0V			"	"	"	"	"			GND	GND	1.5V	"	OA		"		"		"	"
V_{IL2}		36	GND			10V	3.0V	GND	"	"			"	"	GND	10V	OB		1.0		1.0		1.0	"
		37	"			GND	GND	3.0V	"	10V			"	"	"	"	OC		"		"		"	"
		38	"			"	"	GND	"	GND			10V	3.0V	"	"	OD		"		"		"	"
		39	10V			"	"	"	"	"			GND	GND	3.0V	"	OA		"		"		"	"
V_{IL3}		40	GND			15V	4.0V	"	"	"			"	GND	GND	15V	OB		1.5		1.5		1.5	"
		41	"			GND	GND	4.0V	"	15V			"	"	"	"	OC		"		"		"	"
		42	"			"	"	GND	"	GND			15V	4.0V	"	"	OD		"		"		"	"
		43	15V			"	"	"	"	"			GND	GND	4.0V	"	OA		"		"		"	"
I_{OL1}		44	GND		0.4V	"	5.0V	"	"	5.0V			"	"	GND	5.0V	OB	0.51		0.36		0.64		mA
		45	"			5.0V	GND	5.0V	"	GND	0.4V		"	"	"	"	OC	"		"		"		"
		46	5.0V			GND	"	GND	"	"		0.4V	"	5.0V	"	"	OD	"		"		"		"
		47	GND	0.4V		"	"	"	"	"			5.0V	GND	5.0V	"	OA	"		"		"		"

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 52 – Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,T,X, Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
I_{OL2}		48	GND		1.5V	GND	15V	GND	GND	15V			GND	GND	GND	15V	OB	3.4		2.4		4.2		mA
		49	"			15V	GND	15V	"	GND	1.5V		"	"	"	"	OC	"		"		"		"
		50	15V			GND	"	GND	"	"		1.5V	"	15V	"	"	OD	"		"		"		"
		51	GND	1.5V		"	"	"	"	"			15V	GND	15V	"	OA	"		"		"		"
I_{OH1}		52	"		4.6V	5.0V	5.0V	"	"	"			GND	"	GND	5.0V	OB	-0.51		-0.36		-0.64		"
		53	"			GND	GND	5.0V	"	5.0V	4.6V		"	"	"	"	OC	"		"		"		"
		54	"			"	"	GND	"	GND		4.6V	5.0V	5.0V	"	"	OD	"		"		"		"
		55	5.0V	4.6V		"	"	"	"	"			GND	GND	5.0V	"	OA	"		"		"		"
I_{OH2}		56	GND		13.5V	15V	15V	"	"	"			"	"	GND	15V	OB	-3.4		-2.4		-4.2		"
		57	"			GND	GND	15V	"	15V	13.5V		"	"	"	"	OC	"		"		"		"
		58	"			"	"	GND	"	GND		13.5V	15V	15V	"	"	OD	"		"		"		"
		59	15V	13.5V		"	"	"	"	"			GND	GND	15V	"	OA	"		"		"		"
I_{IH1} 4/	3010	60	18 V			18 V	18 V	18 V	"	18 V			18 V	18 V	18 V	18 V	All inputs together		+800					nA
I_{IH2}	"	61	GND			GND	18 V	GND	"	GND			GND	GND	GND	"	CB		100		100			"
	"	62	"			"	GND	18 V	"	"			"	"	"	"	CC		"		"			"
	"	63	"			"	"	GND	"	"			"	18 V	"	"	CD		"		"			"
	"	64	"			"	"	"	"	"			"	GND	18 V	"	CA		"		"			"
	"	65	18 V			"	"	"	"	"			"	"	GND	"	IA		"		"			"
	"	66	GND			18 V	"	"	"	"			"	"	"	"	IB		"		"			"
	"	67	"			GND	"	"	"	18 V			"	"	"	"	IC		"		"			"
	"	68	"			"	"	"	"	GND			18 V	"	"	"	ID		"		"			"
I_{IL1} 4/	3009	69	"			"	"	"	"	"			GND	"	"	"	All inputs together		-800					"
I_{IL2}	"	70	GND			GND	GND	GND	GND	GND			GND	GND	GND	18 V	CB		-100		-100			"
	"	71	"			"	"	"	"	"			"	"	"	"	CC		"		"			"
	"	72	"			"	"	"	"	"			"	"	"	"	CD		"		"			"
	"	73	"			"	"	"	"	"			"	"	"	"	CA		"		"			"
	"	74	"			"	"	"	"	"			"	"	"	"	IA		"		"			"
	"	75	"			"	"	"	"	"			"	"	"	"	IB		"		"			"
	"	76	"			"	"	"	"	"			"	"	"	"	IC		"		"			"
	"	77	"			"	"	"	"	"			"	"	"	"	ID		"		"			"
R_{ON1}		78	0.5 V	5/					"						5.0 V	5.0 V	OA		400		450		400	Ω
		79			5/	0.5 V	5.0 V		"							"	OB		"		"		"	"
		80						5.0 V	"	0.5 V	5/					"	OC		"		"		"	"
		81							"			5/	0.5 V	5.0 V		"	OD		"		"		"	"
		82	1.0 V	5/					"						5.0 V	"	OA		450		500		450	"
		83			5/	1.0 V	5.0 V		"							"	OB		"		"		"	"
		84						5.0 V	"	1.0 V	5/					"	OC		"		"		"	"
		85							"			5/	1.0 V	5.0 V		"	OD		"		"		"	"
		86	4.0 V	5/					"						5.0 V	"	OA		550		600		550	"
		87			5/	4.0 V	5.0 V		"							"	OB		"		"		"	"
		88						5.0 V	"	4.0 V	5/					"	OC		"		"		"	"
		89							"			5/	4.0 V	5.0 V		"	OD		"		"		"	"
		90	5.0 V	5/					"						5.0 V	"	OA		400		450		400	"
		91			5/	5.0 V	5.0 V		"							"	OB		"		"		"	"
		92						5.0 V	"	5.0 V	5/					"	OC		"		"		"	"
		93							"			5/	5.0 V	5.0 V		"	OD		"		"		"	"

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 52 – Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,T,X, Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
R_{OH2}		94	-5.0V	6/			7.5V		-7.5V						7.5V	7.5V	OA		200		250		200	Ω
		95			6/	-5.0V			"							"	OB		"		"		"	"
		96						7.5V	"	-5.0V	6/					"	OC		"		"		"	"
		97							"			6/	-5.0V	7.5V		"	OD		"		"		"	"
		98	0.6V	6/					"						7.5V	"	OA		"		"		"	"
		99			6/	0.6V	7.5V		"							"	OB		"		"		"	"
		100						7.5V	"	0.6V	6/					"	OC		"		"		"	"
		101							"			6/	0.6V	7.5V		"	OD		"		"		"	"
		102	5.0V	6/					"						7.5V	"	OA		"		"		"	"
		103			6/	5.0V	7.5V		"							"	OB		"		"		"	"
		104						7.5V	"	5.0V	6/					"	OC		"		"		"	"
		105							"			6/	5.0V	7.5V		"	OD		"		"		"	"
R_{OH3}		106	2.5V	7/			10V		GND						10V	10V	OA		300		350		300	"
		107			7/	2.5V			"							"	OB		"		"		"	"
		108						10V	"	2.5V	7/					"	OC		"		"		"	"
		109							"			7/	2.5V	10V		"	OD		"		"		"	"
		110	5.0V	7/					"						10V	"	OA		250		300		250	"
		111			7/	5.0V	10V		"							"	OB		"		"		"	"
		112						10V	"	5.0V	7/					"	OC		"		"		"	"
		113							"			7/	5.0V	10V		"	OD		"		"		"	"
		114	7.5V	7/					"						10V	"	OA		"		"		"	"
		115			7/	7.5V	10V		"							"	OB		"		"		"	"
		116						10V	"	7.5V	7/					"	OC		"		"		"	"
		117							"			7/	7.5V	10V		"	OD		"		"		"	"
I_{DOFF1}	Fig. 8	118	8/	8/	8/	8/	8/	8/	GND	8/	8/	8/	8/	8/	8/	5.0V	8/		-45		-45		-45	nA
I_{DOFF2}	"	119	"	"	"	"	"	"	-5.0V	"	"	"	"	"	"	GND	"		45		45		45	"
I_{DOFF3}	"	120	"	"	"	"	"	"	GND	"	"	"	"	"	"	10V	"		-45		-45		-45	"
I_{DOFF4}	"	121	"	"	"	"	"	"	-10.0V	"	"	"	"	"	"	GND	"		45		45		45	"
I_{DOFF5}	"	122	"	"	"	"	"	"	GND	"	"	"	"	"	"	15V	"		-45		-45		-45	"
I_{DOFF6}	"	123	"	"	"	"	"	"	-15.0V	"	"	"	"	"	"	GND	"		45		45		45	"
																		Subgroup 4 T_C = 25°C						
																		Min	Max					
C_c	3012	124					9/		GND							GND	CB		12					pF
	"	125						9/	"							"	CC		"					"
	"	126							"					9/		"	CD		"					"
	"	127							"						9/	"	CA		"					"
C_{is}	"	128	9/				GND	GND	"					GND	GND	5.0V	IA		20					"
	"	129				9/	"	"	"					"	"	"	IB		"					"
	"	130					"	"	"	9/				"	"	"	IC		"					"
	"	131					"	"	"				9/	"	"	"	ID		"					"
C_{os}	"	132		10/			"	"	"					"	"	"	OA		"					"
	"	133			10/		"	"	"					"	"	"	OB		"					"
	"	134					"	"	"		10/			"	"	"	OC		"					"
	"	135					"	"	"			10/		"	"	"	OD		"					"
C_{ios}	"	136	11/	11/			"	"	"					"	"	"	IA, OA		"					"
	"	137			11/	11/	"	"	"					"	"	"	IB, OB		"					"
	"	138					"	"	"	11/	11/			"	"	"	IC, OC		"					"
	"	139					"	"	"			11/	11/	"	"	"	ID, OD		"					"

See footnotes at end of device type 52.

TABLE III. Group A inspection for device type 52 – Continued.

Symbol	MIL-STD-883 method	Cases A, C,D,T,X, Y	Terminal conditions 1/														Measured terminal	Test limits						Unit
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		Subgroup 9 T_C = 25°C		Subgroup 10 T_C = 125°C		Subgroup 11 T_C = -55°C		
		Test no.	IA	OA	OB	IB	CB	CC	V_{SS}	IC	OC	OD	ID	CD	CA	V_{DD}		Min	Max	Min	Max	Min	Max	
t_{PLH}	3003	140	IN	OUT			GND	GND	GND					GND	5.0V	5.0V	IA to OA	4	70	7	85	4	70	ns
	Fig. 3	141			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	142					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	143					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHL}	"	144	IN	OUT			GND	GND	GND					GND	5.0V	"	IA to OA	"	60	"	80	"	50	"
	"	145			OUT	IN	5.0V	"	"					"	GND	"	IB to OB	"	"	"	"	"	"	"
	"	146					GND	5.0V	"	IN	OUT			"	"	"	IC to OC	"	"	"	"	"	"	"
	"	147					"	GND	"			OUT	IN	5.0V	"	"	ID to OD	"	"	"	"	"	"	"
t_{PHZ}	Fig. 4	148	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	70	"	90	"	55	"
	"	149			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	150					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	151					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZH}	Fig. 4	152	5.0V	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	153			OUT	5.0V	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	154					GND	IN	"	5.0V	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	155					"	GND	"			OUT	5.0V	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PLZ}	Fig. 4	156	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	157			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	158					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	159					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"
t_{PZL}	Fig. 4	160	GND	OUT			"	"	"					GND	IN	"	CA to OA	"	"	"	"	"	"	"
	"	161			OUT	GND	IN	"	"					"	GND	"	CB to OB	"	"	"	"	"	"	"
	"	162					GND	IN	"	GND	OUT			"	"	"	CC to OC	"	"	"	"	"	"	"
	"	163					"	GND	"			OUT	GND	IN	"	"	CD to OD	"	"	"	"	"	"	"

1/ Pins not designated may be "High" level logic, "Low" level logic, or open. Exceptions are as follows: $V_{IC(pos)}$ tests, the V_{SS} terminal shall be open; $V_{IC(neg)}$ tests, the V_{DD} terminal shall be open.
2/ I_{SS} measurements shall be run in sequence.
3/ When performing quiescent current measurements (I_{SS}), the meter shall be placed so that all currents flow through the meter. The outputs during the I_{SS} measurement shall be open.
4/ The device manufacturer may, at his option, measure I_{IL} and I_{IH} at 25°C for each individual input or measure all inputs together.
5/ See figure 5.
6/ See figure 6.
7/ See figure 7.
8/ See figure 8.
9/ C_c and C_{is} – connect capacitance bridge between measured input terminal and V_{SS}, frequency = 1 MHz.
10/ C_{os} – connect capacitance bridge between measured output terminal and V_{SS}, frequency = 1 MHz.
11/ C_{ios} – connect capacitance bridge between measured input and output terminals, frequency = 1 MHz.

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.

4.4.5 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.7 herein). RHA levels for device classes B and S shall be as specified in MIL-PRF-38535 and 4.5.4 herein.

4.5 Methods of inspection. Methods of inspection shall be specified and as follows:

4.5.1 Voltage and current. Unless otherwise specified, all voltages given are referenced to the microcircuit V_{SS} terminal. Currents given are conventional current and positive when flowing into the referenced terminal.

4.5.2 Burn-in and life test cool down procedures. When the burn-in and life tests are completed and prior to removal of bias voltages, the devices under test (DUT) shall be cooled to a temperature of 25°C ±3°C; then, electrical parameter end-point measurements shall be performed.

TABLE IV. Delta limits at 25°C.

Parameter 1/	Device types	
	01, 02	51, 52
I_{SS}	±25 nA	±25 nA
V_{OL1}	±0.04 V	
V_{OH1}	±0.08 V	
I_{OL1}		±15%
I_{OH1}		±15%

1/ Each of the above parameters shall be recorded before and after the required burn-in and life tests to determine delta (Δ).

4.5.3 Quiescent supply current (I_{SS} test). When performing quiescent supply current measurements (I_{SS}), the meter shall be placed so that all currents flow through the meter.

4.5.4 Radiation hardness assurance (RHA) testing. The RHA testing shall be performed in accordance with test procedures and sampling specified in MIL-PRF-38535 and herein.

a. Before irradiation, selected samples shall be assembled in qualified packages and pass the governing electrical parameters (group A subgroup 1 at 25°C) and also be subjected to the threshold-voltage test in table VII in order to calculate the delta threshold (ΔV_T) after irradiation.

b. The devices shall be subjected to a total radiation dose as specified in MIL-PRF-38535 for the radiation hardness assurance level being tested, and meet the end-point electrical parameters as defined in table V at 25°C, after exposure. The start and completion of the end-point electrical parameter measurements shall not exceed 2 hours following irradiation.

c. Threshold-voltage test circuit conditions shall be as specified in table VII on figure 9. In situ and remote testing, the tests shall be performed with the devices biased in accordance with table VI and the bias may be interrupted for up to 1 minute to remove devices to the remote bias fixture.

d. After irradiation, the devices shall pass the truth table test as specified in subgroup 7 in table III or if subgroup 7 is not required, then an equivalent truth table test shall be performed.

TABLE V. Radiation hardened end-point electrical parameters at 25°C.

Parameter	Test limits (All device types)	V_{DD}	
		Device types	
		01, 02	51, 52
V_{TN}	0.3 V min	V_{DD} = 10 V	V_{DD} = 10 V
V_{TP}	2.8 V max	V_{DD} = 10 V	V_{DD} = 10 V
ΔV_T	1.4 V max	V_{DD} = 10 V	V_{DD} = 10 V
I_{SS}	100 x max limit	V_{DD} = 15 V	V_{DD} = 18 V
t_{PLH}	1.35 x max limit	V_{DD} = 5 V	V_{DD} = 5 V
t_{PHL}	1.35 x max limit	V_{DD} = 5 V	V_{DD} = 5 V

TABLE VI. Bias during exposure to radiation.

Device type	Pin connections 1/		
	V_{DD} = 10 V dc (through a 30 kΩ to 60 kΩ resistor)	V_{SS} = GND	V_{DD} = 10 V dc
01, 51	1, 4, 5, 6, 8, 11, 12, 13	7	14
02, 52	1, 4, 5, 6, 8, 11, 12, 13	7	14

1/ Pins not designated are open, or tied to 10 V dc through a 30 kΩ to 60 kΩ resistor.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements are as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of 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

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

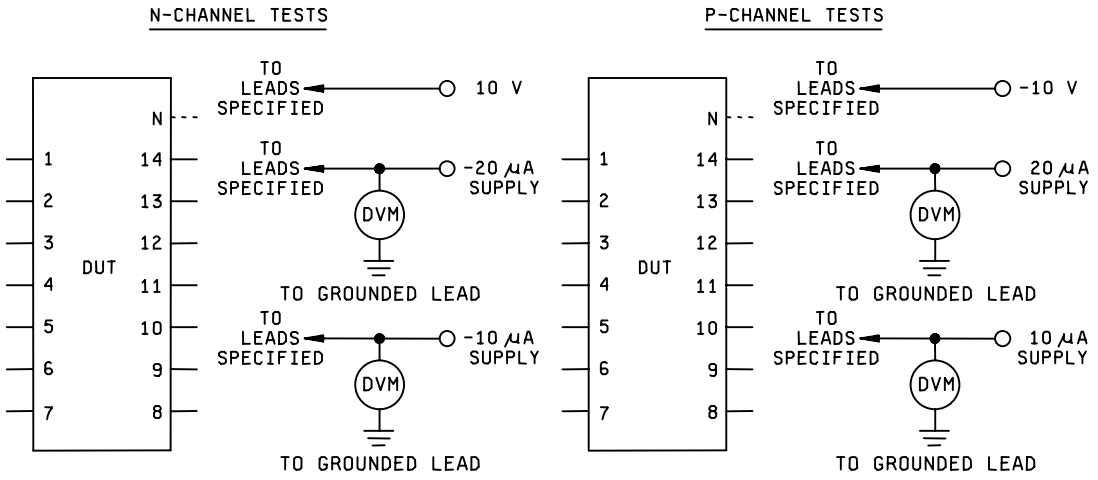


FIGURE 9. Threshold-voltage test circuit.

TABLE VII. Threshold-voltage test circuit conditions.

Device	GND	10 V	V_{TN} measured at		GND	-10 V	V_{TP} measured at	
			-20 μA supply	-10 μA supply			20 μA supply	10 μA supply
01, 51	13	5, 6, 12, 14		7	13	5-7, 12		14
02, 52	13	5, 6, 12, 14		7	13	5-7, 12		14

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 quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.

d. Requirements for certificate of compliance, if applicable.

e. Requirements for notification of change of product or process to contracting activity in addition to notification to the qualifying activity, 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. Requirements for product assurance and radiation hardness assurance options.

h. Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements should 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 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 contractors parts lists.

6.4 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, P.O. Box 3990, Columbus, Ohio 43218-3990.

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

C_I and C_C ..... Input terminal-to-V_{SS} capacitance.
C_{ios} ..... Switch input to output capacitance.
C_{os} ..... Output terminal-to-V_{SS} capacitance.
GND ..... Ground zero voltage potential.
I_{SS} ..... Quiescent supply current.
R_{on} ..... Switch on resistance in voltage using 1 mA current.
T_A ..... Free air temperature.
V_{DD} ..... Positive supply voltage.
V_{is} ..... Input signal.
V_{os} ..... output signal.
V_{SS} ..... Negative supply voltage.

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 S for National Aeronautics and Space Administration or class B for Department of Defense (see 1.2.2), lead material and finish A (see 3.4). Longer length leads and lead forming should not affect the part number.

6.7 Data reporting. When specified in the purchase order or contract, a copy of the following data, as applicable, will be supplied.

a. Attributes data for all screening tests (see 4.2) and variables data for all static burn-in, dynamic burn-in, and steady-state life tests (see 3.6).

b. A copy of each radiograph.

c. The technology conformance inspection (TCI) data (see 4.4).

d. Parameter distribution data on parameters evaluated during burn-in (see 3.6).

e. Final electrical parameters data (see 4.2d).

f. RHA delta limits.

6.8 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, post irradiation performance or reliability factors equivalent to MIL-M-38510 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.

Military device type	Generic-industry type
01	4016A
02	4066A
51	4016B
52	4066B

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

(Project 5962-2079)

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

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 ASSIST Online database at www.dodssp.daps.mil.