

MIL-M-38510/163A  
7 August 1984  
~~SUPERSEDED~~  
MIL-M-38510/163(USAF)  
31 March 1977

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, TTL,  
HEX BUS DRIVERS WITH 3-STATE OUTPUTS,  
MONOLITHIC SILICON

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

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, TTL, hex bus driver (3-state) microcircuits. Two product assurance classes and a choice of case outlines and lead finishes are provided and are reflected in the complete part number.

1.2 Part number. The part number shall be in accordance with MIL-M-38510, and as specified herein.

1.2.1 Device type. The device type shall be as follows:

<u>Device type</u>	<u>Circuit</u>
01	Hex bus driver, gated enable inputs for X-Y coincident bus control
02	Hex inverter bus driver, gated enable inputs for X-Y coincident bus control
03	Hex bus driver, 4-line and 2-line enable inputs
04	Hex inverter bus driver, 4-line and 2-line enable inputs

1.2.2 Device class. The device class shall be the product assurance level as defined in MIL-M-38510.

1.2.3 Case outline. The case outline shall be designated as follows:

<u>Outline letter</u>	<u>Case outline (see MIL-M-38510, appendix C)</u>
E	D-2 (16-lead, 1/4" x 7/8"), dual-in-line package
F	F-5 (16-lead, 1/4" x 3/8"), flat package

1.3 Absolute maximum ratings.

Supply voltage range - - - - -	-0.5 V dc to +7.0 V dc
Input voltage range - - - - -	-1.5 V dc at -12 mA to +5.5 V dc
Storage temperature range - - - - -	-65°C to +150°C
Maximum power dissipation ( $P_D$ ) per device 1/	
Device types 01 and 03 - - - - -	275 mW dc
Device type 02 - - - - -	550 mW dc
Device type 04 - - - - -	165 mW dc
Lead temperature (soldering, 10 seconds) - -	+300°C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ):	
Cases E and F - - - - -	(See appendix C of MIL-M-38510)
Junction temperature ( $T_J$ ) 2/ - - - - -	+175°C

1/ Must withstand the added  $P_D$  due to short circuit condition (e.g.  $I_{OS}$ ) at one output for five seconds duration.

2/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions per method 5004 of MIL-STD-883.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Rome Air Development Center (RBE-2), Griffiss AFB, NY 13441, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

**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
Normalized fanout (each input) 3/- - - - -	20 maximum
Case operating temperature range ( $T_C$ ) - - - -	-55°C to +125°C

**2. APPLICABLE DOCUMENTS**

**2.1 Government specifications and standards.** Unless otherwise specified, the following specifications and standards, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this specification to the extent specified herein.

**SPECIFICATION****MILITARY**

MIL-M-38510 - Microcircuits, General Specification for.

**STANDARD****MILITARY**

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

**2.2 Order of precedence.** In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

**3. REQUIREMENTS**

**3.1 Detail specification.** The individual item requirements shall be in accordance with MIL-M-38510, and as specified herein.

**3.2 Design, construction, and physical dimensions.** The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

**3.2.1 Case outlines.** Case outlines shall be as specified in 1.2.3.

**3.2.2 Terminal connections and logic diagrams.** The terminal connections and logic diagrams shall be as specified on figure 1.

**3.2.3 Truth tables.** The truth tables shall be as specified on figure 2.

**3.2.4 Schematic circuits.** The schematic circuits shall be submitted to the preparing activity prior to inclusion of a manufacturer's device in this specification and shall be submitted to the qualifying activity as a prerequisite for qualification. All qualified manufacturers' schematics shall be maintained and available upon request.

**3.3 Lead material and finish.** The lead material and finish shall be in accordance with MIL-M-38510 and 6.4 herein.

**3.4 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/** The device shall fanout in both high and low levels to the specified number of inputs of the same device type as that being tested.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$	Device type	Limits		Unit
				Min	Max	
High-level output voltage	$V_{OH}$	$V_{CC} = 4.5 \text{ V}$ , $V_{IN} = 0.8 \text{ V}$ or $2.0 \text{ V}$ , $I_{OH} = -2 \text{ mA}$	A11	2.4		V
Low-level output voltage	$V_{OL}$	$V_{CC} = 4.5 \text{ V}$ , $V_{IN} = 2.0 \text{ V}$ or $0.8 \text{ V}$ , $I_{OL} = 32 \text{ mA}$	A11		0.4	V
Input clamp voltage	$V_{IC}$	$V_{CC} = 4.5 \text{ V}$ , $I_{IN} = -12 \text{ mA}$ , $T_C = 25^{\circ}\text{C}$	A11		-1.5	V
High-level input current	$I_{IH1}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 2.4 \text{ V}$	A11		40	$\mu\text{A}$
High-level input current	$I_{IH2}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 5.5 \text{ V}$	A11		1	mA
Output clamp voltage	$V_{OC}$	$V_{CC} = 5.5 \text{ V}$ , $I_{OC} = -12 \text{ mA}$ , $T_C = 25^{\circ}\text{C}$	A11		-1.5	V
Inhibited-state output leakage current	$I_{01}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 2.0 \text{ V}$ or $0.8 \text{ V}$ , $V_{OUT} = 2.4 \text{ V}$	A11		40	$\mu\text{A}$
	$I_{02}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 2.0 \text{ V}$ or $0.8 \text{ V}$ , $V_{OUT} = 0.4 \text{ V}$	A11		-40	$\mu\text{A}$
Low-level input current at A input	$I_{IL1}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0.5 \text{ V}$ , Both G inputs at 2.0 V	A11		-40	$\mu\text{A}$
Low-level input current at A input	$I_{IL2}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0.4 \text{ V}$ , Both G inputs at 0.4 V	A11		-1.6	mA
Low-level input current at G input	$I_{IL3}$	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0.4 \text{ V}$ ,	A11		-1.6	mA
Short-circuit output current	$I_{OS}$	$V_{CC} = 5.5 \text{ V}$ 1/	A11	-40	-130	mA
Supply current	$I_{CC}$	$V_{CC} = 5.5 \text{ V}$	01 02 03 04		85 77 85 77	mA
Propagation delay time (low-to-high level output)	$t_{PLH}$	$V_{CC} = 5.0 \text{ V}$ , $R_L = 400\Omega$ , $C_L = 50 \text{ pF}$	01 02 03 04	2	21 22 21 22	ns

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$	Device type	Limits		Unit
				Min	Max	
Propagation delay time (high-to-low level output)	$t_{PHL}$	$V_{CC} = 5.0 \text{ V}$ , $R_L = 400\Omega$ , $C_L = 50 \text{ pF}$	01	2	27	ns
			02	2	21	
			03	2	27	
			04	2	21	
Propagation delay time (disabled to high-level output)	$t_{PZH}$	$V_{CC} = 5.0 \text{ V}$ , $R_L = 400\Omega$ , $C_L = 50 \text{ pF}$	01	2	40	ns
			02	2	40	
			03	2	40	
			04	2	40	
Propagation delay time (high-level to disabled output)	$t_{PHZ}$	$V_{CC} = 5.0 \text{ V}$ , $R_L = (\text{see figure 4})$ , $C_L = 50 \text{ pF}$	01	2	20	ns
			02	2	20	
			03	2	20	
			04	2	20	
Propagation delay time (disabled to low-level output)	$t_{PZL}$	$V_{CC} = 5.0 \text{ V}$ , $R_L = 400\Omega$ , $C_L = 50 \text{ pF}$	01	2	42	ns
			02	2	42	
			03	2	42	
			04	2	42	
Propagation delay time (low-level to disabled output)	$t_{PLZ}$	$V_{CC} = 5.0 \text{ V}$ , $R_L = (\text{see figure 4})$ , $C_L = 50 \text{ pF}$	01	2	32	ns
			02	2	32	
			03	2	32	
			04	2	32	

1/ Not more than one output should be shorted at a time.

3.5 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.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (see table III)	
	Class S devices	Class B devices
Interim electrical parameters (pre burn-in) (method 5004)	1	1
Final electrical test parameters (method 5004)	1*, 2, 3, 9, 10, 11	1*, 2, 3, 9
Group A test requirements (method 5005)	1, 2, 3, 9, 10, 11	1, 2, 3, 9, 10, 11
Group B test requirements (method 5005) subgroup 5	1, 2, 3, 9, 10, 11	N/A
Group C end-point electrical parameters (method 5005)	N/A	1, 2, 3
Additional electrical subgroups for group C periodic inspections	N/A	None
Group D end-point electrical parameters (method 5005)	1, 2, 3	1, 2, 3

\*PDA applies to subgroup 1 (see 4.2c).

### 3.6 Marking. Marking shall be in accordance with MIL-M-38510.

3.7 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 2 (see MIL-M-38510, appendix E).

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-M-38510 and methods 5005 and 5007, as applicable, of MIL-STD-883, except as modified herein.

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

- a. Burn-in (method 1015 of MIL-STD-883).
  - (1) Test condition D, using the circuit shown on figure 3, 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. The percent defective allowable (PDA) shall be as specified in MIL-M-38510.

4.3 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 through 4.4.4).

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-M-38510 and as specified herein. 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 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table I of method 5005 of MIL-STD-883 and as follows:

- a. Electrical test requirements shall be as specified in table II herein.
- b. Subgroups 4, 5, 6, 7, and 8 of table I of method 5005 of MIL-STD-883 shall be omitted.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of method 5005 of MIL-STD-883. Electrical test requirements shall be as specified in table II herein.

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 herein.
- b. Steady-state life test (method 1005 of MIL-STD-883) conditions, or equivalent:
  - (1) Test condition D, using the circuit shown on figure 3, 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.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table IV of method 5005 of MIL-STD-883. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods of inspection. Methods of inspection shall be specified 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.

## 5. PACKAGING

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

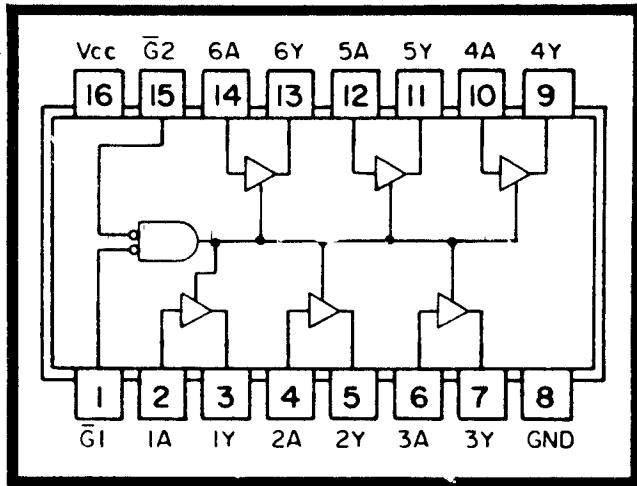
## 6. NOTES

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

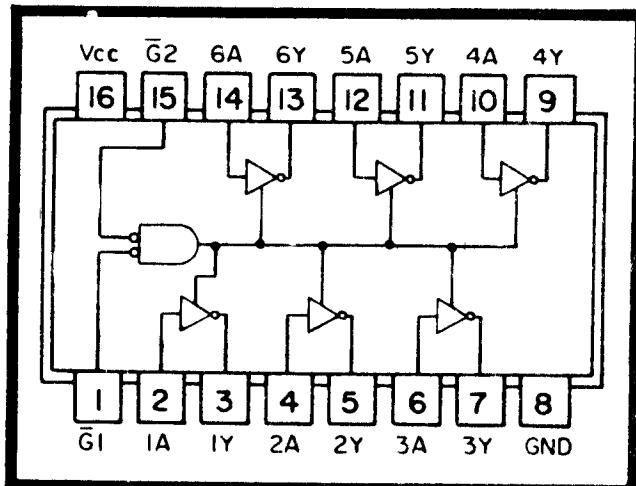
6.2 Ordering data. The acquisition document should specify the following:

- a. Complete part number (see 1.2).
- b. 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.
- c. Requirement for certificate of compliance, if applicable.

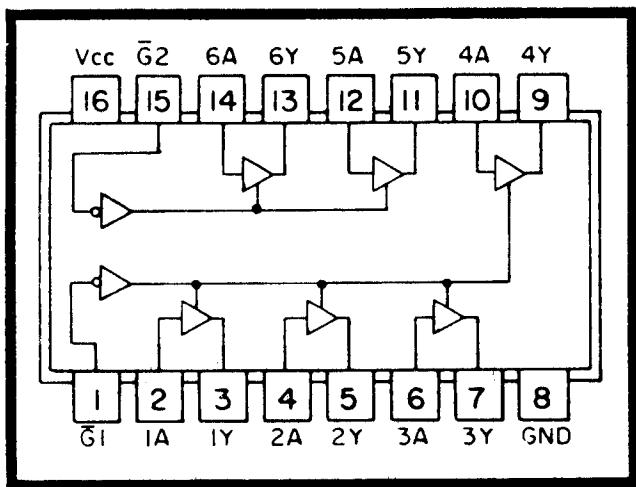
Device type 01



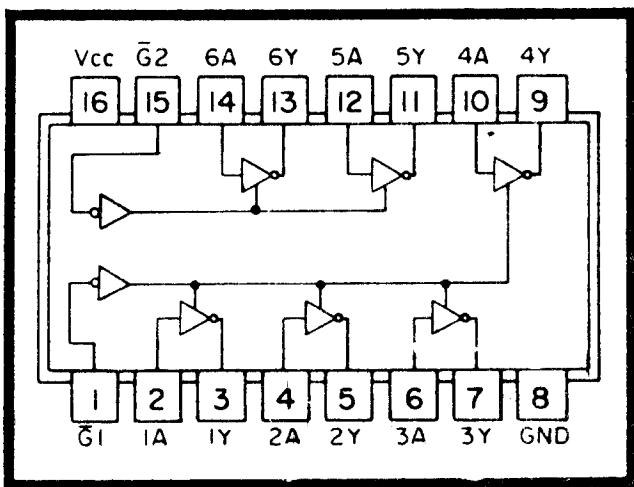
Device type 02



Device type 03



Device type 04

FIGURE 1. Terminal connections and logic diagrams.

Device type 01

INPUTS			OUTPUT
$\bar{G}_1$	$\bar{G}_2$	A	Y
H	X	X	Z
X	H	X	Z
L	L	H	H
L	L	L	L

Device type 02

INPUTS			OUTPUT
$\bar{G}_1$	$\bar{G}_2$	A	Y
H	X	X	Z
X	H	X	Z
L	L	H	L
L	L	L	H

Device type 03

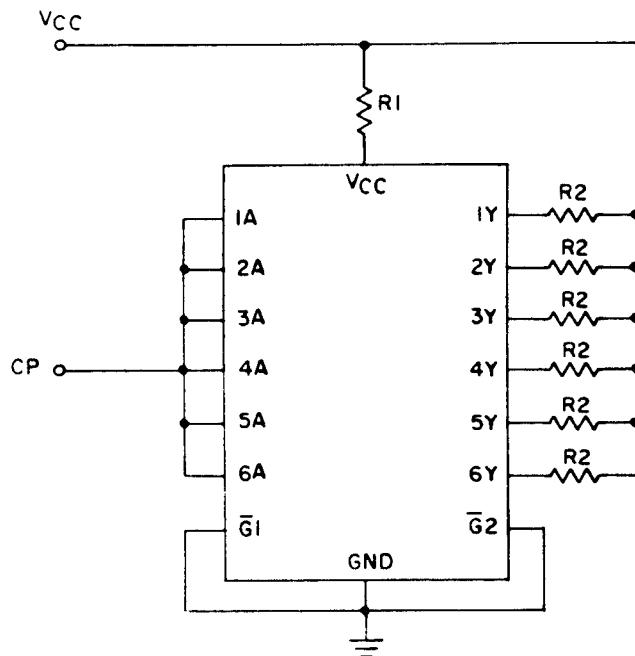
INPUTS		OUTPUT
$\bar{G}$	A	Y
H	X	Z
L	H	H
L	L	L

Device type 04

INPUTS		OUTPUT
$\bar{G}$	A	Y
H	X	Z
L	H	L
L	L	H

H = high level, L = low level,  
 X = irrelevant, Z = high-impedance

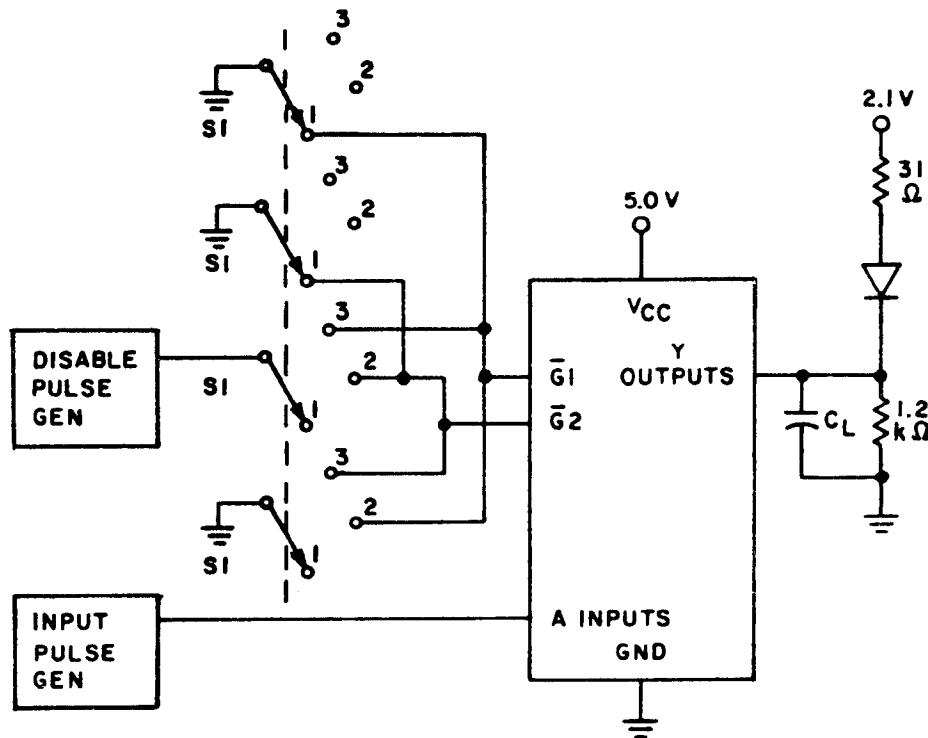
FIGURE 2. Truth tables (each driver).



## NOTES:

1.  $V_{CC}$  and  $R_1$  are such that the minimum voltage at the device terminal is 5.0 volts.
2.  $R_2 = 140\Omega \pm 5\%$ .
3.  $CP = 100 \text{ kHz} \pm 50\%$  square wave; duty cycle =  $50 \pm 15\%$ ;  $V_{IL} = -0.5 \text{ V to } 0.7 \text{ V}$ ;  $V_{IH} = 2.0 \text{ V to } 5.5 \text{ V}$ .

FIGURE 3. Burn-in and life test circuits.



	S1	C <sub>L</sub>
t <sub>PLH</sub>	Pos. 1	50 pF
t <sub>PHL</sub>	Pos. 1	50 pF
t <sub>PHZ</sub>	Pos. 2 or 3	50 pF
t <sub>PLZ</sub>	Pos. 2 or 3	50 pF
t <sub>PZL</sub>	Pos. 2 or 3	50 pF
t <sub>PZH</sub>	Pos. 2 or 3	50 pF

FIGURE 4. Switching time test circuit.

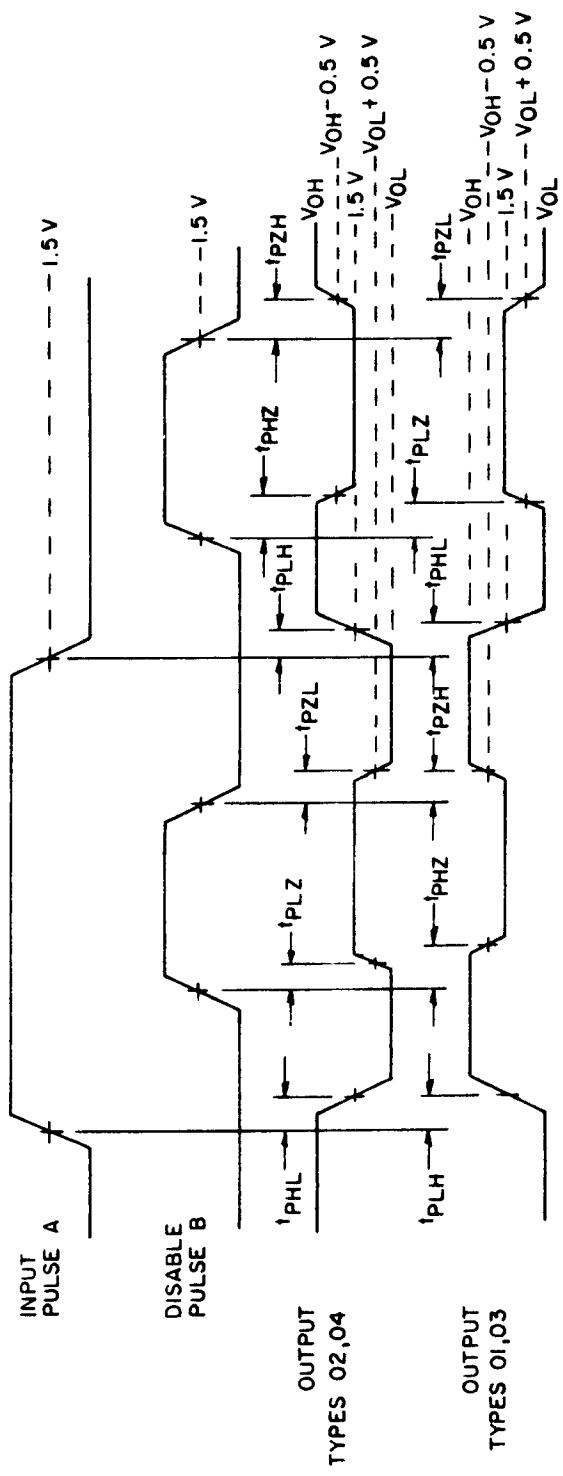


FIGURE 4. Switching time test circuit - Continued.

TABLE III. Group A inspection for device type 01  
Terminal conditions (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E,F Test no.	Test Limits														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	Unit
1 $T_C = +25^\circ C$	$V_{OH}$	3006	1 2 3 4 5 6	0.8 V 2.0 V -2 mA 2.0 V -2 mA 2.0 V	2Y 1A 1Y 4A 5A 6Y	3A 2Y 3Y GND GND GND	4Y 4A 5Y 5A 6Y 6A	5Y 4A 5Y 5A 6Y 6A	6A 5A 6Y 5Y 6Y 6A	$\bar{G}_2$ VCC	Measured terminal	Min	Max					
	$V_{OL}$	3007	7 8 9 10 11 12	0.8 V 0.8 V 0.8 V 0.8 V 0.8 V 0.8 V	32 mA 32 mA 32 mA 32 mA 32 mA 32 mA	0.8 V 0.8 V 0.8 V 0.8 V 0.8 V 0.8 V	32 mA 32 mA 32 mA 32 mA 32 mA 32 mA	0.8 V 0.8 V 0.8 V 0.8 V 0.8 V 0.8 V	32 mA 32 mA 32 mA 32 mA 32 mA 32 mA	0.8 V 0.8 V 0.8 V 0.8 V 0.8 V 0.8 V								
	I <sub>O1</sub>		13 14 15 16 17 18 19 20 21 22 23 24	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	2.4 V 2.4 V	2.4 V 2.4 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	32 mA 32 mA	0.8 V 0.8 V								
	I <sub>O2</sub>		25 26 27 28 29 30 31 32 33 34 35 36	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	0.4 V 0.4 V	0.4 V 0.4 V	0.8 V 0.8 V	0.4 V 0.4 V	2.0 V 2.0 V	0.8 V 0.8 V								
	V <sub>IC</sub>		37 38 39 40 41 42 43 44	-12 mA -12 mA -12 mA -12 mA -12 mA -12 mA -12 mA -12 mA														
	I <sub>TH1</sub>	3010	45 46 47 48 49 50 51 52	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	-12 mA -12 mA -12 mA -12 mA -12 mA -12 mA -12 mA -12 mA	-12 mA -12 mA -12 mA -12 mA -12 mA -12 mA -12 mA -12 mA										

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.  
Terminal conditions (pins not designated may be H  $\geq 2.5$  V, L  $\leq 0.8$  V, or open).

		Test limits																	
Subgroup	Symbol	MIL-STD-883 E,F Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Unit
$T_C = +25^\circ C$	I <sub>IL2</sub>	3010	53	5.5 V	mA														
	I <sub>IL1</sub>	3009	61	2.0 V	0.5 V	A													
	I <sub>IL1</sub>	"	62	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL1</sub>	"	63	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL1</sub>	"	64	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL1</sub>	"	65	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL1</sub>	"	66	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL2</sub>	"	67	0.4 V	mA														
	I <sub>IL2</sub>	"	68	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL2</sub>	"	69	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
$T_C = -55^\circ C$	V <sub>OC</sub>	75	-12 mA	V															
	V <sub>OC</sub>	76	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
	V <sub>OC</sub>	77	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
	V <sub>OC</sub>	78	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
	V <sub>OC</sub>	79	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
	V <sub>OC</sub>	80	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
	I <sub>OS</sub>	3011	81	0.8 V	5.5 V	mA													
	I <sub>OS</sub>	"	82	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>OS</sub>	"	83	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>OS</sub>	"	84	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
I <sub>CC</sub>	I <sub>CC</sub>	3005	87	GND	ns														
	I <sub>CC</sub>	"	91	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>CC</sub>	"	92	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>CC</sub>	"	93	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
3 Same tests, terminal conditions and limits as for subgroup 1, except V <sub>IC</sub> and V <sub>OC</sub> tests are omitted and $T_C = -55^\circ C$ .																			
2 Same tests, terminal conditions and limits as for subgroup 2, except $T_C = -55^\circ C$ .																			
See footnotes at end of table.																			

TABLE III. Group A inspection for device type 01 - Continued.  
Terminal conditions (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	MIL-STD-883 E.F.	Cases			5	6	7	8	9	10	11	12	13	14	15	16	Test limits	
			no.	$\bar{G}_1$	1A	1Y	2A	2Y	3A	3Y	GND	4Y	4A	5Y	5A	6Y	6A	$\bar{G}_2$	VCC
$T_C = +25^\circ C$	tpHL	3003 (Fig. 4)	94	GND	A	OUT	A	OUT	A	OUT	GND	"	"	"	"	"	GND	5.0 V	1A to 1Y 2A to 2Y 3A to 3Y 4A to 4Y 5A to 5Y 6A to 6Y
			95	"							"						"	"	2 ns
			96	"							"						"	"	"
			97	"							"						"	"	"
			98	"							"						"	"	"
			99	"							"						"	"	"
	tpZH		100	B	2.0 V	OUT	2.0 V	OUT	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V	0.8 V	0.8 V	2.0 V	2.0 V	2.0 V	2.0 V
	tpZL		101	GND	0.8 V	"	0.8 V	"	2.0 V	2.0 V	GND	"	0.8 V	0.8 V					
	tpHZ		102	B	2.0 V	"	2.0 V	"	0.8 V	0.8 V	GND	"	2.0 V	2.0 V					
	tplZ		103	B	0.8 V	"					"						"	"	"
$T_C = +125^\circ C$	tpLH		104	GND	A	"	A	OUT	A	OUT	"						"	"	21 ns
			105	"							"						"	"	"
			106	"							"						"	"	"
			107	"							"						"	"	"
			108	"							"						"	"	"
			109	"							"						"	"	"
tpHL			110	"	A	OUT	A	OUT	A	OUT	"						"	"	27 ns
			111	"							"						"	"	"
			112	"							"						"	"	"
			113	"							"						"	"	"
			114	"							"						"	"	"
			115	"							"						"	"	"
tpZH			116	B	2.0 V	OUT	2.0 V	OUT	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V	0.8 V	0.8 V	2.0 V	2.0 V	2.0 V	2.0 V
			117	GND	0.8 V	"	0.8 V	"	2.0 V	2.0 V	GND	"	0.8 V	0.8 V					
			118	B	2.0 V	"	2.0 V	"	0.8 V	0.8 V	GND	"	2.0 V	2.0 V					
			119	B	0.8 V	"					"						"	"	32 ns

11 Same tests, terminal conditions, and limits as subgroup 10, except  $T_C = -55^\circ C$ .

A = Pulse from input pulse gen.

B = Pulse from disable gen.

TABLE III. Group A inspection for device type 02.  
Terminal conditions (pins not designated may be H  $\geq 2.0$  V, L  $\leq 0.8$  V, or open).

Subgroup	Symbol	MIL-STD-883 test no.	Cases E/F	Test limits													
				1	2	3	4	5	6	7	8	9	10	11	12	13	
$T_C = +25^\circ C$	$V_{OL}$	3007	1	0.8 V	2.0 V	32 mA											
		"	2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	4	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	5	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"
$V_{OH}$	$V_{OH}$	3006	7	"	0.8 V	-2 mA	0.8 V										
		"	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	9	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	10	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"
101	$I_{G1}$	13	2.0 V	2.0 V	2.4 V	2.4 V	2.0 V										
		14	0.8 V	0.8 V	2.4 V	2.4 V	0.8 V										
		15	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		16	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		17	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		18	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		19	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		20	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		21	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		22	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		23	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
102	$I_{G2}$	25	2.0 V	0.8 V	0.4 V	0.4 V	2.0 V	0.8 V	0.4 V	0.4 V	2.0 V	0.4 V	0.4 V	0.4 V	2.0 V	0.4 V	0.4 V
		26	0.8 V	0.8 V	2.0 V	0.4 V	0.8 V	0.4 V	2.0 V	0.4 V	0.8 V						
		27	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		28	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		29	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		30	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		31	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		32	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		33	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		34	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
		35	2.0 V	2.0 V	0.8 V	0.8 V	2.0 V										
		36	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V										
VIC	$V_{IC}$	37	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		38	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		39	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		40	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		41	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		42	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
IIH1	$I_{IH1}$	3010	45	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
		"	46	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	47	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	48	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	49	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	50	"	"	"	"	"	"	"	"	"	"	"	"	"	"
G1	$G_1$	37	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		38	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		39	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		40	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		41	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		42	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
G2	$G_2$	43	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		44	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		45	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		46	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		47	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
G3	$G_3$	49	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		50	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		51	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		52	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 02 - Continued.  
Terminal conditions (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	MIL-STD-883 test no.	Cases E,F	Test limits														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
T <sub>C</sub> = +25°C	I1H2	3010	53	5.5 V	5.5 V													
	"	"	54															
	"	"	55															
	"	"	56															
	"	"	57															
	"	"	58															
	"	"	59															
	"	"	60															
I1L1	3009	61	2.0 V	0.5 V														
	"	"	62															
	"	"	63															
	"	"	64															
	"	"	65															
	"	"	66															
I1L2	"	"	67	0.4 V	0.4 V													
	"	"	68															
	"	"	69															
	"	"	70															
	"	"	71															
	"	"	72															
I1L3	"	"	73	"														
I1L3	"	"	74	"														
VOC	"	"	75		-12 mA													
	"	"	76															
	"	"	77															
	"	"	78															
	"	"	79															
	"	"	80															
I0S	3011	81	0.8 V	GND	GND													
	"	"	82	"														
	"	"	83	"														
	"	"	84	"														
	"	"	85	"														
	"	"	86	"														
I0C	3005	87	GND	GND	GND													
	"	"	88	"														
	"	"	89	"														
	"	"	90	"														
	"	"	91	"														
	"	"	92	"														
	"	"	93	"														

2 Same tests, terminal conditions and limits as for subgroup 1, except VIC and VOC tests are omitted and T<sub>C</sub> = +125°C.

3 Same tests, terminal conditions and limits as for subgroup 2, except T<sub>C</sub> = -55°C.

See footnotes at end of table.

TABLE III. Group A inspection for device type 02 - Continued.  
Terminal conditions (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	MIL-STD-883 test method	Cases E,F	Test limits												
				1	2	3	4	5	6	7	8	9	10	11	12	13
9 $T_C = +25^\circ C$	tPHL	3003 (Fig. 4)	94 95 96 97 98 99	GND " " " " " "	A OUT A OUT A OUT	1A 1Y 2A 2Y 3A 3Y	2A 2Y A OUT A OUT	4A 4Y " " " " "	5A 5Y " " " " "	6A 6Y " " " " "	$\Sigma_2$ VCC GND " " " " "	Measured terminal	Min	Max	Unit	
	tpZH		100 101 102 103	GND 2.0 V 0.8 V 2.0 V	A OUT A OUT	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	" " " " "	GND B GND " " " "	1A to 1Y 2A to 2Y 3A to 3Y 4A to 4Y 5A to 5Y 6A to 6Y	2	16	ns
	tpZL															
	tpHZ															
	tpLZ															
10 $T_C = +125^\circ C$	tPHL		104 105 106 107 108 109	GND " " " " " "	A OUT A OUT A OUT	" " " " " "	OUT A OUT A OUT A	" " " " " "	OUT A OUT A OUT A	" " " " " "	" " " " " "	" " " " " "	1A to 1Y 2A to 2Y 3A to 3Y 4A to 4Y 5A to 5Y 6A to 6Y	2	22	ns
	tpZH		110 111 112 113 114 115	" " " " " "	A OUT A OUT A OUT	" " " " " "	OUT A OUT A OUT A	" " " " " "	OUT A OUT A OUT A	" " " " " "	" " " " " "	" " " " " "	1A to 1Y 2A to 2Y 3A to 3Y 4A to 4Y 5A to 5Y 6A to 6Y	2	21	ns
	tpZL															
	tpHZ															
	tpLZ															
11	Same tests, terminal conditions, and limits as subgroup 10, except $T_C = -55^\circ C$ .															

A = Pulse from input pulse gen.

B = Pulse from disable gen.

TABLE III. Group A inspection for device type 03.  
Terminal conditions (pins not designated may be H  $\geq 2.0 \text{ V}$ , L  $\leq 0.8 \text{ V}$ , or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E,F	Test limits																	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Min
$T_C = +25^\circ\text{C}$	Y0H	3006	1	0.8 V	2.0 V	-2 mA	2.0 V	-2 mA	GND	4Y	4A	5Y	5A	6Y	6A	6Y	4.5 V	1Y	2.4 V	V	
		"	2	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"
		"	3	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"
		"	4	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"
		"	5	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"
		"	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"
	VOL	3007	7	0.8 V	0.8 V	32 mA	0.8 V	32 mA	"	"	"	"	"	"	"	"	"	"	0.4 V	"	"
		"	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	1Y	"	"
		"	9	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"
		"	10	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"
		"	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"
		"	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"
T01	Y01	13	2.0 V	2.0 V	2.4 V	0.8 V	2.4 V	0.8 V	2.4 V	0.8 V	2.4 V	0.8 V	2.4 V	0.8 V	2.4 V	0.8 V	2.4 V	0.8 V	5.5 V	1Y	40 $\mu\text{A}$
		14	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"
		15	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"
		16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"
		17	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"
		18	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"
		19	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	1Y	"	"
		20	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"
		21	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"
		22	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"
		23	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"
		24	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"
T02	Y02	25	2.0 V	2.0 V	0.8 V	0.4 V	0.8 V	0.4 V	0.8 V	0.4 V	0.8 V	0.4 V	0.8 V	0.4 V	0.8 V	0.4 V	0.8 V	0.4 V	0.8 V	0.4 V	-40 $\mu\text{A}$
		26	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	1Y	"	"
		27	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"
		28	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"
		29	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"
		30	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"
		31	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"
		32	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	1Y	"	"
		33	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"
		34	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"
		35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"
		36	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"
V1C	Y1C	37	"	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"	"	"	4.5 V	1A	-1.5 V
		38	"	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"	"	"	2A	"	"
		39	"	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"	"	3A	"	"	
		40	"	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"	"	4A	"	"	
		41	"	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"	"	5A	"	"	
		42	"	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"	"	6A	"	"	
T1H1	Y1H1	3010	45	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	5.5 V	1A	40 $\mu\text{A}$
		"	46	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A	"	"
		"	47	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A	"	"
		"	48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4A	"	"
		"	49	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5A	"	"
		"	50	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A	"	"
		"	51	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6G1	"	"
		"	52	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6G2	"	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.  
Terminal conditions (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	MIL-STD-883 test method no.	Cases E,F	Test limits													
				1	2	3	4	5	6	7	8	9	10	11	12	13	
$T_C = +25^\circ C$	I <sub>IL2</sub>	3010	53	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	GND	A	OUT	A	OUT	A	OUT	A	OUT
		"	54	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	55	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	56	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	57	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	58	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	59	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	60	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I <sub>IL1</sub>	3009	61	2.0 V	0.5 V	0.5 V	0.5 V	0.5 V	GND	A	OUT	A	OUT	A	OUT	A	OUT
		"	62	"	"	"	"	"	"	"	"	"	"	"	"	"	"
$T_C = -55^\circ C$	I <sub>IL2</sub>		63	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	64	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	65	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	66	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	67	0.4 V	0.4 V	0.4 V	0.4 V	0.4 V	GND	A	OUT	A	OUT	A	OUT	A	OUT
		"	68	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	69	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	70	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	71	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	72	"	"	"	"	"	"	"	"	"	"	"	"	"	"
I <sub>IL3</sub>	I <sub>IL3</sub>		73	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	74	"	"	"	"	"	"	"	"	"	"	"	"	"	"
I <sub>VOC</sub>		75	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		76	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		77	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		78	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
I <sub>OS</sub>		79	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		80	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	81	0.8 V	5.5 V	GND	5.5 V	GND	GND	A	OUT	A	OUT	A	OUT	A	OUT
		"	82	"	"	"	"	"	"	"	"	"	"	"	"	"	"
I <sub>CC</sub>		83	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	84	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	85	"	"	"	"	"	"	"	"	"	"	"	"	"	"
		"	86	"	"	"	"	"	"	"	"	"	"	"	"	"	"

2 Same tests, terminal conditions and limits as for subgroup 1, except  $V_{CC}$  and  $V_{OC}$  tests are omitted and  $T_C = -55^\circ C$ .

3 Same tests, terminal conditions and limits as for subgroup 2, except  $T_C = -55^\circ C$ .

$T_C = +25^\circ C$	$t_{PLH}$	3003 (Fig. 4)	88	GND	A	OUT	A	OUT	GND	5.0 V	1A to 1Y	2	16	ns
		"	89	"	"	"	"	"	"	"	"	"	"	"
		"	90	"	"	"	"	"	"	"	"	"	"	"
		"	91	"	"	"	"	"	"	"	"	"	"	"
		"	92	"	"	"	"	"	"	"	"	"	"	"
		"	93	"	"	"	"	"	"	"	"	"	"	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 03 - Continued.  
Terminal connections (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	Cases E,F.	Terminal connections												Test limits								
			MIL-STD-883 test no.	$\overline{G}_1$	1A	1Y	$2A$	2Y	3A	3Y	GND	4Y	$4A$	5Y	$5A$	6Y	$6A$	$E_2$	V <sub>CC</sub>	Measured terminal	Min	Max	Unit
$T_C = +25^\circ C$	tPHL	3003 (Fig. 4)	94	GND	A	OUT	A	OUT	A	OUT	GND	"	"	"	"	"	GND	5.0 V	1A to 1Y	2	22	ns	
	tpZH	"	95	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A to 2Y	"	"	"	"
	tpZL	"	96	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A to 3Y	"	"	"	"
	tpHZ	"	97	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4A to 4Y	"	"	"	"
	tpPL	"	98	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5A to 5Y	"	"	"	"
$T_C = +125^\circ C$	tPHL	"	100	B	2.0 V	OUT	2.0 V	"	"	"	"	2.0 V	"	2.0 V	"	"	"	"	$E_1$ to 1Y	"	"	35	"
	tpZH	"	101	"	0.8 V	"	0.8 V	"	"	"	"	0.8 V	"	0.8 V	"	"	"	"	$E_1$ to 1Y	"	"	37	"
	tpZL	"	102	"	2.0 V	"	2.0 V	"	"	"	"	2.0 V	"	2.0 V	"	"	"	"	$E_1$ to 1Y	"	"	16	"
	tpHZ	"	103	"	0.8 V	"	0.8 V	"	"	"	"	0.8 V	"	0.8 V	"	"	"	"	$E_1$ to 1Y	"	"	27	"
	tpPL	"	104	GND	A	OUT	A	OUT	A	OUT	"	"	"	"	"	"	"	"	1A to 1Y	"	"	35	"
$T_C = -55^\circ C$	tPHL	"	105	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A to 2Y	"	"	37	"
	tpZH	"	106	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A to 3Y	"	"	16	"
	tpZL	"	107	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4A to 4Y	"	"	27	"
	tpHZ	"	108	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5A to 5Y	"	"	16	"
	tpPL	"	109	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A to 6Y	"	"	27	"
$T_C = -55^\circ C$	tPHL	"	110	"	A	OUT	A	OUT	A	OUT	"	"	"	"	"	"	"	"	1A to 1Y	"	"	21	"
	tpZH	"	111	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A to 2Y	"	"	21	"
	tpZL	"	112	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A to 3Y	"	"	21	"
	tpHZ	"	113	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4A to 4Y	"	"	21	"
	tpPL	"	114	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5A to 5Y	"	"	21	"
$T_C = -55^\circ C$	tpZH	"	115	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A to 6Y	"	"	21	"
	tPHL	"	116	B	2.0 V	OUT	2.0 V	"	"	"	"	2.0 V	"	2.0 V	"	"	"	"	$E_1$ to 1Y	"	"	40	"
	tpZL	"	117	"	0.8 V	"	0.8 V	"	"	"	"	0.8 V	"	0.8 V	"	"	"	"	$E_1$ to 1Y	"	"	42	"
	tpHZ	"	118	"	2.0 V	"	2.0 V	"	"	"	"	2.0 V	"	2.0 V	"	"	"	"	$E_1$ to 1Y	"	"	20	"
	tpPL	"	119	"	0.8 V	"	0.8 V	"	"	"	"	0.8 V	"	0.8 V	"	"	"	"	$E_1$ to 1Y	"	"	32	"

11 Same tests, terminal conditions, and limits as subgroup 10 except  $T_C = -55^\circ C$ .

A = Pulse from input pulse gen.

B = Pulse from disable gen.

TABLE 11: Group A inspection for device type 04.  
Terminal conditions (pins not designated may be  $H \geq 2.0\text{ V}$ ,  $L \leq -0.8\text{ V}$ , or open).

Subgroup	Symbol	Cases E,F test no.	MIL- STD-883 method	Test limits																			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Min	Max	Unit
T <sub>C</sub> = +25°C	V <sub>OL</sub>	3007	1	0.8 V	2.0 V	32 mA	4.5 V	1Y	0.4 V	V													
		"	2	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"	
		"	3	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"	
		"	4	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"	
		"	5	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"	
		"	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
	V <sub>DH</sub>	3006	7	0.8 V	0.8 V	-2 mA	0.8 V	1Y	2.4 V	V													
		"	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"	
		"	9	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"	
		"	10	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"	
		"	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"	
		"	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
T <sub>O1</sub>		13	2.0 V	2.0 V	2.4 V	2.4 V	2.0 V	2.4 V	5.5 V	1Y	40 uA	A											
		14	"	0.8 V	0.8 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"	
		15	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"	
		16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"	
		17	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"	
		18	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		19	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		20	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		21	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		22	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		23	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		24	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
T <sub>O2</sub>		25	2.0 V	0.8 V	0.4 V	0.4 V	2.0 V	0.8 V	0.4 V	2.0 V	0.8 V	0.4 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	0.8 V	2.0 V	1Y	-40	V	
		26	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2Y	"	"	
		27	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3Y	"	"	
		28	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4Y	"	"	
		29	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5Y	"	"	
		30	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		31	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		32	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		33	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		34	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
		36	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6Y	"	"	
	V <sub>IC</sub>	37	"	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	4.5 V	1A	-1.5 V	V
		38	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A	"	"	
		39	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A	"	"	
		40	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4A	"	"	
		41	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5A	"	"	
		42	"	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	6A	"	"	
		43	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A	"	"	
		44	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A	"	"	
	I <sub>TH1</sub>	3010	45	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	5.5 V	G1	40 uA	A
		"	46	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A	"	"	
		"	47	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A	"	"	
		"	48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	4A	"	"	
		"	49	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	5A	"	"	
		"	50	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A	"	"	
		"	51	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A	"	"	
		"	52	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	6A	"	"	

See footnotes at end of table.

TABLE III. Group A inspection for device type 04 - Continued.  
Terminal conditions (pins not designated may be H  $\geq$  2.0 V, L  $\leq$  0.8 V, or open).

Subgroup	Symbol	MIL-STD-883 E.F.	Cases no.	Test limits												Measured terminal	Unit
				1	2	3	4	5	6	7	8	9	10	11	12		
T <sub>C</sub> = +25°C	I <sub>1H2</sub>	3010	53 54 55 56 57 58 59 60	5.5 V 5.5 V 5.5 V 5.5 V 5.5 V 5.5 V 5.5 V 5.5 V	GND " " " "	A " " " "	OUT " " " "	Y " " " "	Y " " " "	Y " " " "	Y " " " "	Y " " " "	Y " " " "	Y " " " "	5.5 V " " " "	mA " " " "	
I <sub>1L1</sub>	3009	61 62 63 64 65 66	2.0 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	0.5 V " " " "	2.0 V " " " "	µA " " " "	
I <sub>1L2</sub>	67 68 69 70 71 72	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	0.4 V " " " "	-1.6 mA " " " "	
I <sub>1L3</sub>	73 74	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	G <sub>1</sub> G <sub>2</sub>	mA " " " "
V <sub>OC</sub>	75 76 77 78 79 80	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	" " " "	1Y 2Y 3Y 4Y 5Y 6Y	v " " " "
I <sub>OS</sub>	81 82 83 84 85 86	0.8 V " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	GND " " " "	0.8 V " " " "	-40 to -130 mA " " " "	
I <sub>CC</sub>	3005	87	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	V <sub>CC</sub>	77 " "

2 Same tests, terminal conditions and limits as for subgroup 1, except V<sub>IC</sub> and V<sub>OC</sub> tests are omitted and T<sub>C</sub> = +125°C.

3 Same tests, terminal conditions and limits as for subgroup 2, except T<sub>C</sub> = -55°C.

See footnotes at end of table.

TC = +25°C	9 I <sub>PLH</sub>	3003 (F <sub>13</sub> , 4)	88 89 90 91 92 93	GND " " " "	A " " " "	OUT " " " "	A " " " "	OUT " " " "	A " " " "	OUT " " " "	A " " " "	OUT " " " "	A " " " "	OUT " " " "	GND " " " "	5.0 V " " " "
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TABLE III. Group A inspection for device type 04 - Continued.  
Terminal conditions (pins not designated may be H  $\geq 2.0$  V, L  $\leq 0.8$  V, or open).

Subgroup	Symbol	MIL-STD-883 E,F test no.	Cases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Test limits	
			$\bar{G}_1$	1A	1Y	2A	2Y	3A	3Y	GND	4Y	4A	5Y	5A	6Y	$G_1$	$G_2$	V <sub>CC</sub>	Measured terminal	Min Max	Unit
9	tPHL	3003 (Fig. 4)	94	GND	A	OUT	A	OUT	A	GND	"	"	"	"	"	GND	5.0 V	"	1A to 1Y 2A to 2Y 3A to 3Y 4A to 4Y 5A to 5Y 6A to 6Y	2 16 ns	"
TC = +25°C	tpZH	"	95	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZL	"	96	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpHZ	"	97	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpLZ	"	98	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZH	"	99	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
10	tPLH	"	100	B	0.8 V	OUT	0.8 V	0.8 V	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V	"	"	"					
TC = +125°C	tpZH	"	101	"	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	35	"
	tpZL	"	102	"	0.8 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	37	"
	tpHZ	"	103	"	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	16	"
	tpLZ	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	27	"
	tpZH	"	104	GND	A	OUT	A	OUT	A	OUT	"	"	"	"	"	"	"	"	"	"	"
	tpZL	"	105	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpHZ	"	106	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpLZ	"	107	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZH	"	108	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZL	"	109	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpHZ	"	110	"	A	OUT	A	OUT	A	OUT	"	"	"	"	"	"	"	"	"	"	"
	tpLZ	"	111	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZH	"	112	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZL	"	113	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpHZ	"	114	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpLZ	"	115	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	tpZH	"	116	B	0.8 V	OUT	0.8 V	0.8 V	0.8 V	0.8 V	2.0 V	2.0 V	0.8 V	"	"	"					
	tpZL	"	117	"	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	40	"
	tpHZ	"	118	"	0.8 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	42	"
	tpLZ	"	119	"	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	20	"
	tpZH	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	32	"

11 Same tests, terminal conditions, and limits as subgroup 10 except TC = -55°C.

A = Pulse from input pulse gen.

B = Pulse from disable gen.

- d. Requirements for notification of change of product or process to the contracting activity in addition to notification to the qualifying activity, if applicable.
- e. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action and reporting of results, if applicable.
- f. Requirements for product assurance options.
- g. Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements shall not apply to direct purchase by or direct shipment to the Government.
- h. Requirements for "JAN" marking.

6.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-M-38510, MIL-STD-1331, and as follows:

GND - - - - - - - - - - -	Ground zero voltage potential.
V <sub>IN</sub> - - - - - - - - - - -	Voltage level at an input terminal.
V <sub>IC</sub> - - - - - - - - - - -	Input clamp voltage.
I <sub>IN</sub> - - - - - - - - - - -	Current flowing into an input terminal.
T <sub>PHZ</sub> - - - - - - - - - - -	Output disable time (of a three-state output) from high level. The time between the specified reference points on the input and output voltage waveforms with the three-state output changing from the defined high level to a high impedance (off) state.
T <sub>PLZ</sub> - - - - - - - - - - -	Output disable time (of a three-state output) from low level. The time between the specified reference points on the input and output voltage waveforms with the three-state output changing from the defined low level to a high-impedance (off) state.
T <sub>PZH</sub> - - - - - - - - - - -	Output enable time (of a three-state output) to high level. The time between the specified reference points on the input and output voltage waveforms with the three-state output changing from a high-impedance (off) state to the defined high level.
T <sub>PZL</sub> - - - - - - - - - - -	Output enable time (of a three-state output) to low level. The time between the specified reference points on the input and output voltage waveforms with the three-state output changing from a high-impedance (off) state to the defined low level.

6.4 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), lead material and finish C (see 3.3). Longer length leads and lead forming shall not affect the part number.

6.5 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-38510 device types and may have slight physical variations in relation to case size. The presence of this information shall 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-M-38510.

Military device type	Generic-industry type
01	54365
02	54366
03	54367
04	54368

6.6 Manufacturers' designators. Manufacturers' circuits which form a part of this specification are designated with an "X" as shown in table IV herein.

TABLE IV. Manufacturers' designations.

Device type	Circuits		
	A Texas Instruments	B Signetics Corp.	C National Semiconductor Corp.
01	X	X	
02	X	X	
03	X	X	
04	X	X	X

6.7 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:

Army - ER  
Navy - EC  
Air Force - 17

Preparing activity:

Air Force - 17

(Project 5962-0692)

Review activities:

Army - AR, MI  
Navy - OS, SH, TD  
Air Force - 11, 19, 85, 99  
DLA - ES

User activities:

Army - SM  
Navy - AS, CG, MC

Agent:

DLA - ES