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**PART NUMBER****4031ABEA-ROCV**

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**Rochester Electronics  
Manufactured Components**

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer. (OCM)

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

**Quality Overview**

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
  - Class Q Military
  - Class V Space Level

**Qualified Suppliers List of Distributors (QSLD)**

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

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*The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.*

INCH-POUND

MIL-M-38510/57F  
21 January 2005

SUPERSEDING  
MIL-M-38510/57E  
30 November 1987

MILITARY SPECIFICATION  
MICROCIRCUITS, DIGITAL, CMOS, STATIC SHIFT REGISTER,  
MONOLITHIC SILICON, POSITIVE LOGIC

Reactivated after 21 Jan. 2005 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535 (see 6.3).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:

<u>Device type</u>	<u>Circuit</u>
01	Dual 4-stage/dual 5-stage static shift register
02	8-stage synchronous parallel or serial input/serial output static shift register
03	Dual 4-stage serial input/parallel output static shift register
04	8-stage asynchronous parallel input/serial output or synchronous serial input/serial output static shift register
05	64-stage static shift register
06	8-stage bidirectional parallel/serial input/output bus register
51	Dual 4-stage/dual 5-stage static shift register
52	8-stage synchronous parallel or serial input/serial output static shift register
53	Dual 4-stage serial input/parallel output static shift register
54	8-stage asynchronous parallel input/serial output or synchronous serial input/serial output static shift register
55	64-stage static shift register
56	8-stage bi-directional parallel/serial input/output bus register

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:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
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
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack

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@dsc.dla.mil](mailto:CMOS@dsc.dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

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J	GDIP1-T24 or CDIP2-T24	24	Dual-in-line
K	GDFP2-F24 or CDFP3-F24	24	Flat pack
N	CDFP4-F16	16	Flat pack
T	CDFP3-F14	14	Flat pack
X <u>1/</u> <u>2/</u>	GDFP5-F14 or CDFP6-F14	14	Flat pack, except A dimension equals 0.100" (2.54 mm) max
Y <u>1/</u> <u>2/</u>	GDFP1-F14 or CDFP2-F14	14	Flat pack, except A dimension equals 0.100" (2.54 mm) max
Z <u>1/</u> <u>2/</u>	GDFP2-F16 or CDFP3-F16	16	Flat pack, except A dimension equals 0.100" (2.54 mm) max
U <u>1/</u> <u>2/</u>	GDFP2-F24 or CDFP3-F24	24	Flat pack, except A dimension equals 0.100" (2.54 mm) max

1.3 Absolute maximum ratings.

Supply voltage range ( $V_{DD} - V_{SS}$ ):	
Device types 01-06.....	-0.5 V dc to +15.5 V dc
Device types 51-56.....	-0.5 V dc to +18.0 V dc
Input current (each input) .....	$\pm 10$ mA
Input voltage range .....	$(V_{SS} - 0.5 \text{ V}) \leq V_I \leq (V_{DD} + 0.5 \text{ V})$
Storage temperature range ( $T_{STG}$ ).....	-65° to +175°C
Maximum power dissipation ( $P_D$ ) .....	200 mW
Lead temperature (soldering, 10 seconds) .....	+300°C
Thermal resistance, junction to case ( $\theta_{JC}$ ).....	See MIL-STD-1835
Junction temperature ( $T_J$ ) .....	175°C

1.4 Recommended operating conditions.

Supply voltage range ( $V_{DD} - V_{SS}$ ):	
Device types 01-06.....	4.5 V dc to 12.5 V dc
Device types 51-56.....	4.5 V dc to 15.0 V dc
Input low voltage range ( $V_{IL}$ ):	
Device types 01-06.....	0.0 V to 0.85 V dc @ $V_{DD} = 5.0$ V dc 0.0 V to 2.1 V dc @ $V_{DD} = 12.5$ V dc
Device types 51-56.....	$V_{OL} = 10\% V_{DD}$ , $V_{OH} = 90\% V_{DD}$ 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
Input high voltage range ( $V_{IH}$ ):	
Device types 01-06.....	3.95 V to 5.0 V dc @ $V_{DD} = 5.0$ V dc 10 V to 12.5 V dc @ $V_{DD} = 12.5$ V dc
Device types 51-56.....	$V_{OL} = 10\% V_{DD}$ , $V_{OH} = 90\% V_{DD}$ 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
Load capacitance .....	50 pF maximum
Case operating temperature range ( $T_C$ ) .....	-55°C to +125°C

1/ As an exception to nickel plate or undercoating paragraph of MIL-PRF-38535, appendix A, for case outlines X, Y, Z, and U only, the leads of bottom brazed ceramic packages (i.e., configuration 2 of case outlines A, D, F, or K) may have electroless nickel undercoating which is 50 to 200 microinches (1.27 to 5.08  $\mu\text{m}$ ) 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 edge.

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

## 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 <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this 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 Logic diagrams. The logic diagrams shall be as specified on figure 2.

3.3.3 Truth tables. The truth tables shall be as specified on figure 3.



3.3.4 Switching time test circuit and waveforms. The switching time test circuit and waveforms shall be as specified on figure 4.

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

3.3.6 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 40 (see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $V_{SS} = 0\text{ V}$ $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ Unless otherwise specified		Device type	Limits		Unit
					Min	Max	
Positive clamping input to $V_{DD}$	$V_{IC(POS)}$	$T_C = 25^{\circ}\text{C}$ , $V_{DD} = \text{GND}$ , $V_{SS} = \text{Open}$ , Output = Open, $I_I = 1\text{ mA}$		All		+1.5	V dc
Negative clamping input to $V_{DD}$	$V_{IC(NEG)}$	$T_C = 25^{\circ}\text{C}$ , $V_{DD} = \text{Open}$ , $V_{SS} = \text{GND}$ , Output = Open, $I_I = -1\text{ mA}$		All		-6.0	V dc
Quiescent supply current	$I_{SS}$	Any combination of inputs	$V_{DD} = 15\text{ V dc}$	01		3.0	$\mu\text{A}$
				02, 03, 04, 06		5.0	
				05		20	
			$V_{DD} = 18\text{ V dc}$	51		3.0	
				52, 53, 54, 56		5.0	
				55		20.0	
High level output voltage, any output any output Q output $\overline{Q}$ output Delayed clock output any output	$V_{OH1}$	$V_{DD} = 5\text{ V dc}$ See table III	$I_{OH} = -70\ \mu\text{A}$	01	4.5		V
			$I_{OH} = -55\ \mu\text{A}$	02, 03, 04			
			$I_{OH} = -225\ \mu\text{A}$	05			
			$I_{OH} = -60\ \mu\text{A}$	05			
			$I_{OH} = -280\ \mu\text{A}$	05			
			$I_{OH} = -35\ \mu\text{A}$	06			
High level output voltage	$V_{OH2}$	$V_{DD} = 12.5\text{ V dc}$ See table III $I_{OH} = 0\text{ A}$		01, 02, 03, 04, 05, 06	11.25		V
High level output voltage	$V_{OH3}$	$V_{DD} = 15\text{ V dc}$ See table III $I_{OH} = 0\text{ A}$		51, 52, 53, 54, 55, 56	14.95		V
Low level output voltage, any output Q output $\overline{Q}$ output Delayed clock output any output	$V_{OL1}$	$V_{DD} = 5\text{ V dc}$ See table III	$I_{OL} = 85\ \mu\text{A}$	01, 02, 03, 04		0.50	V
			$I_{OL} = 900\ \mu\text{A}$	05			
			$I_{OL} = 60\ \mu\text{A}$	05			
			$I_{OL} = 280\ \mu\text{A}$	05			
			$I_{OL} = 70\ \mu\text{A}$	06			
Low level output voltage	$V_{OL2}$	$V_{DD} = 12.5\text{ V dc}$ See table III $I_{OL} = 0\text{ A}$		01, 02, 03, 04, 05, 06		1.25	V
Low level output voltage	$V_{OL3}$	$V_{DD} = 15\text{ V dc}$ See table III $I_{OL} = 0\text{ A}$		51, 52, 53, 54, 55, 56		0.05	V
Output low (sink) current	$I_{OL1}$	$V_{DD} = 5\text{ V dc}$ $V_{OL} = 0.4\text{ V dc}$ $V_{IN} = V_{SS}$		51, 53 52, 54, 55, 56	0.36		mA dc
	$I_{OL2}$	$V_{DD} = 15\text{ V dc}$ $V_{OL} = 1.5\text{ V dc}$ $V_{IN} = V_{SS}$			2.40		

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ $V_{SS} = 0\text{ V}$ $-55^{\circ}\text{C} \leq T_C \leq 125^{\circ}\text{C}$ Unless otherwise specified		Device type	Limits		Unit
					Min	Max	
Output high (source) current	$I_{OH1}$	$V_{DD} = 5\text{ V dc}$ $V_{OH} = 4.6\text{ V dc}$ $V_{IN} = V_{DD}$		51, 53 52, 54, 55, 56	-0.36		mA dc
	$I_{OH2}$	$V_{DD} = 15\text{ V dc}$ $V_{OH} = 13.5\text{ V dc}$ $V_{IN} = V_{DD}$			-2.4		
Input leakage current (high)	$I_{IH} \underline{2/}$	Measure inputs sequentially	$V_{DD} = 15\text{ V dc}$	01, 04, 05, 06,		45	nA
				02, 03		100	
			$V_{DD} = 18\text{ V dc}$	51, 52, 53, 55, 56		45	nA
				54		100	
Input leakage current (low)	$I_{IL} \underline{2/}$	Measure inputs sequentially	$V_{DD} = 15\text{ V dc}$	01, 04 05, 06		-45	nA
				02, 03		-100	
			$V_{DD} = 18\text{ V dc}$	51, 52, 53, 55, 56		-45	nA
				54		-100	
Input capacitance test	$C_i$	$V_{DD} = 0\text{ V dc}$ , $f = 1\text{ MHz}$ $T_C = 25^{\circ}\text{C}$	01, 05		70	pF	
			02, 03, 04, 06		12		
			56		7.5		
			51, 53 52, 54		12		
			55		70		
Propagation delay, high to low level (CLOCK to any output)	$t_{PHL}$	$V_{DD} = 5.0\text{ V dc}$	01	20	1200	ns	
			51	20	560		
			06	13	1300		
			56	13	980		
			(CLOCK or reset to output)	04	20		1465
			(Reset to output)	54	20		490
			(CLOCK to Q output)	03	20		1465
				53	20		490
				02	13		1465
				52	13		450
				03	20		1465
				53	20		560
				05	13		1590
				55	13		840
			(CLOCK to $\overline{Q}$ output)	05	13		1980
				55	13		840
			(CLOCK to delayed CLOCK output)	05	13		975
				55	13		350

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ V <sub>SS</sub> = 0 V -55°C ≤ T <sub>C</sub> ≤ 125°C Unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay, low to high level (CLOCK to any output)  (CLOCK or reset to output) (CLOCK to Q output)  (CLOCK to $\bar{Q}$ output) (CLOCK to delayed CLOCK output)	t <sub>PLH</sub>	V <sub>DD</sub> = 5.0 V dc	01	20	1200	ns
			51	20	560	
			06	13	1300	
			56	13	980	
			04	20	1465	
			54	20	490	
			02	13	1465	
			52	13	450	
			03	20	1465	
			53	20	560	
			05	13	1590	
			55	13	840	
			05	13	1980	
			55	13	840	
Transition time, high to low level (Any output)  (Q output)  ( $\bar{Q}$ output) (Delayed CLOCK output)	t <sub>THL</sub>	V <sub>DD</sub> = 5.0 V dc	01	13	1140	ns
			51	13	200	
			02	10	975	
			52,56	10	280	
			03	13	975	
			53,54	13	280	
			04	13	1050	
			06	10	1300	
			05	10	435	
			55	10	280	
			05	10	2100	
			55	10	280	
			05	10	525	
			55	10	200	
Transition time, low to high level (Any output)  (Q output)  ( $\bar{Q}$ output) (Delayed CLOCK output)	t <sub>TLH</sub>	V <sub>DD</sub> = 5.0 V dc	01	13	1140	ns
			51	13	200	
			02	10	1350	
			52,56	10	280	
			03	13	1465	
			53,54	13	280	
			04	13	1350	
			06	10	2300	
			05	10	510	
			55	10	280	
			05	10	2100	
			55	10	280	
			05	10	525	
			55	10	200	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

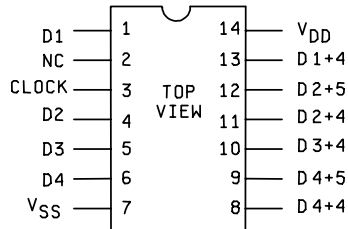
Test	Symbol	Conditions <u>1/</u> $V_{SS} = 0\text{ V}$ $-55^{\circ}\text{C} \leq T_C \leq 125^{\circ}\text{C}$ Unless otherwise specified	Device type	Limits		Unit			
				Min	Max				
Maximum CLOCK frequency	$f_{CL}$	$V_{DD} = 5.0\text{ V dc}$ , $C_L = 50\text{ pF}$	01,02	700		kHz			
			03,04	700					
			05	550					
			06	525					
						51	1.4		MHz
						52	1.2		
						53	1.5		
						54	1.0		
						55	800		kHz
						56	750		
Setup time	$t_{SETUP}$	$V_{DD} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ $T_C = 25^{\circ}\text{C}$	01,51	115		ns			
			53	150					
			02,03, 04	500					
			52,54	180					
			05	680					
			55	300					
			06	650					
			56	240					
Minimum CLOCK pulse width	$t_p$	$V_{DD} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ $T_C = 25^{\circ}\text{C}$	01,04,06	330					
			02,03,05	400					
			51,54	200					
			52	180					
			53,56	250					
			55	300					
Minimum reset pulse width	$t_{p(RS)}$		03,05	400		ns			
Minimum high level AE, P/S, A/S pulse width	$t_{PH}$		06,56	480					

1/ Complete terminal conditions shall be as specified in table III.

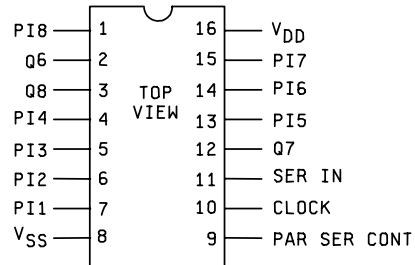
2/ Input current at one input node.

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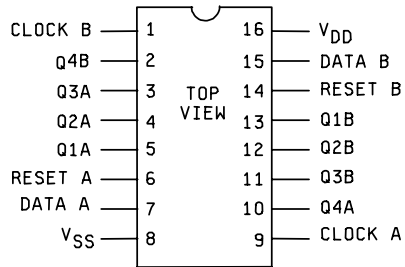
DEVICE TYPES 01 AND 51  
CASES A,C,D,T,X AND Y



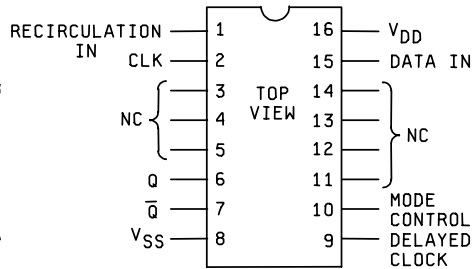
DEVICE TYPES 02,04,52 AND 54  
CASES E,F,N AND Z



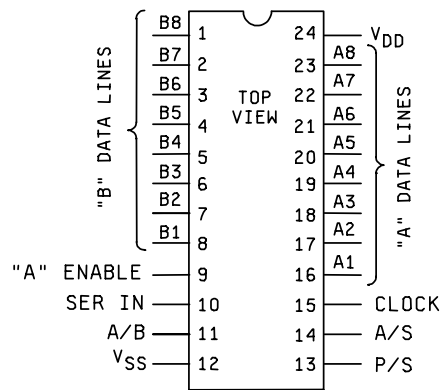
DEVICE TYPES 03 AND 53  
CASES E,F,N AND Z



DEVICE TYPES 05 AND 55  
CASES E,F,N AND Z



DEVICE TYPES 06 AND 56  
CASES J,K AND U



NC = No connection

FIGURE 1. Terminal connections.

DEVICE TYPES 01 AND 51

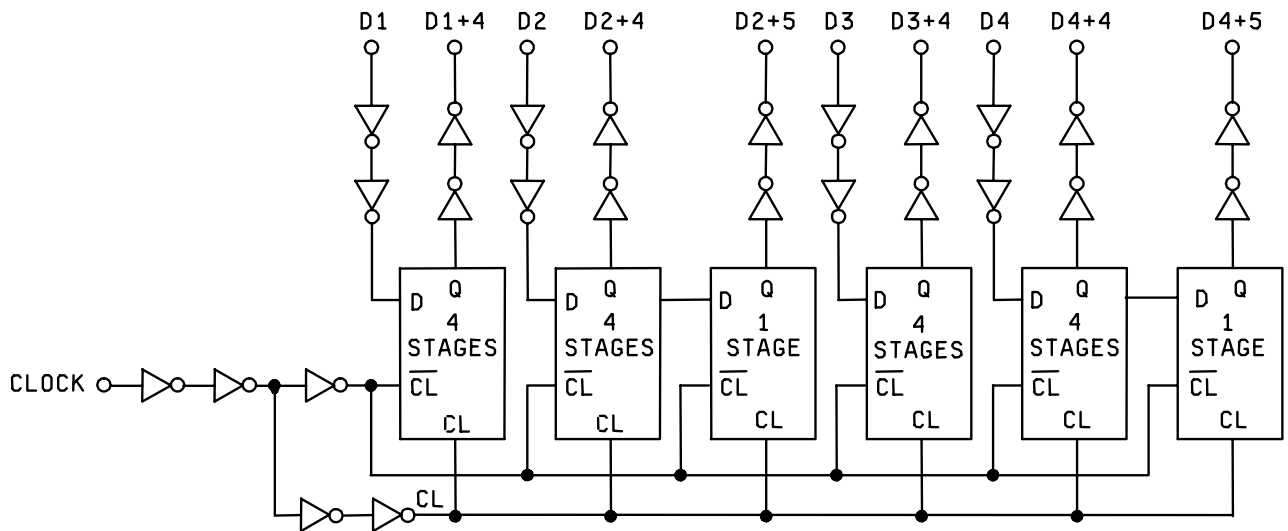


FIGURE 2. Logic diagrams.

DEVICE TYPES 02 AND 52

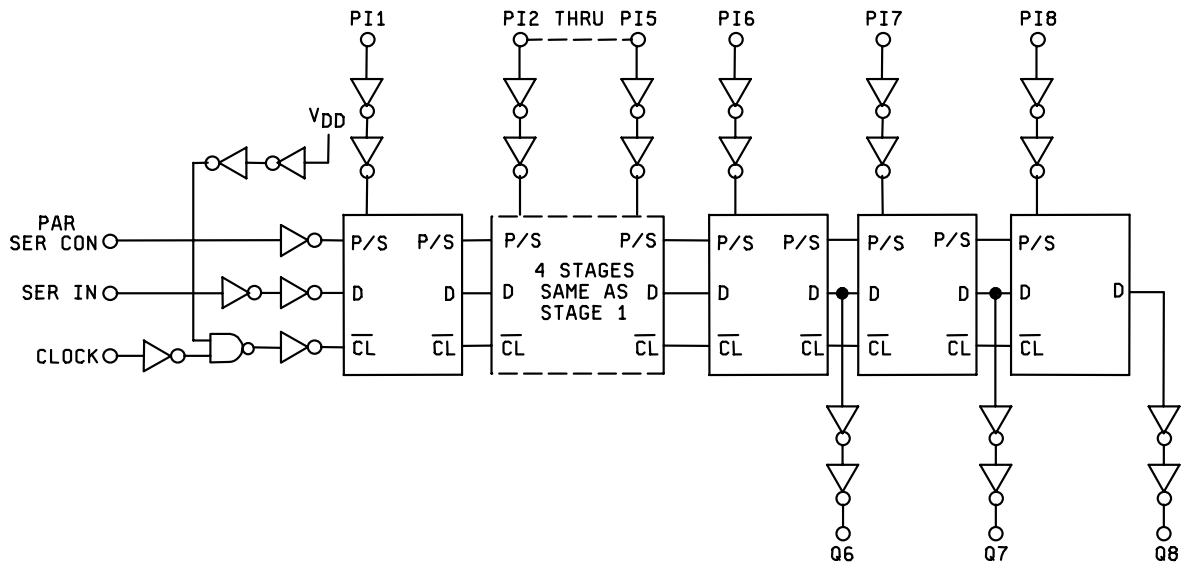


FIGURE 2. Logic diagrams – Continued.



DEVICE TYPES 03 AND 53

(1/2 SHOWN)

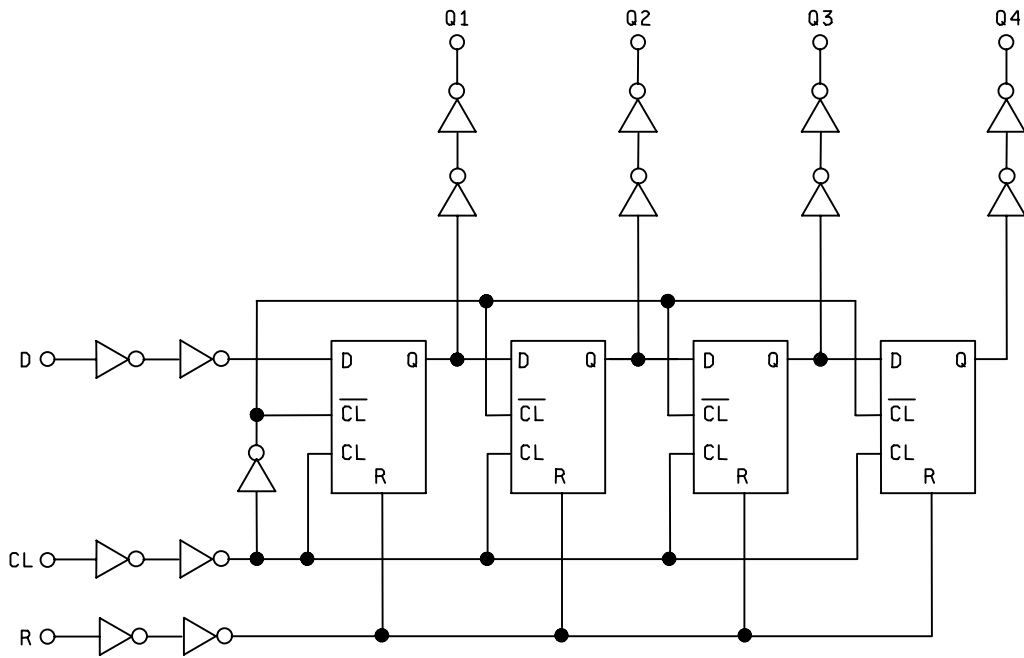


FIGURE 2. Logic diagrams - Continued.

DEVICE TYPES 04 AND 54

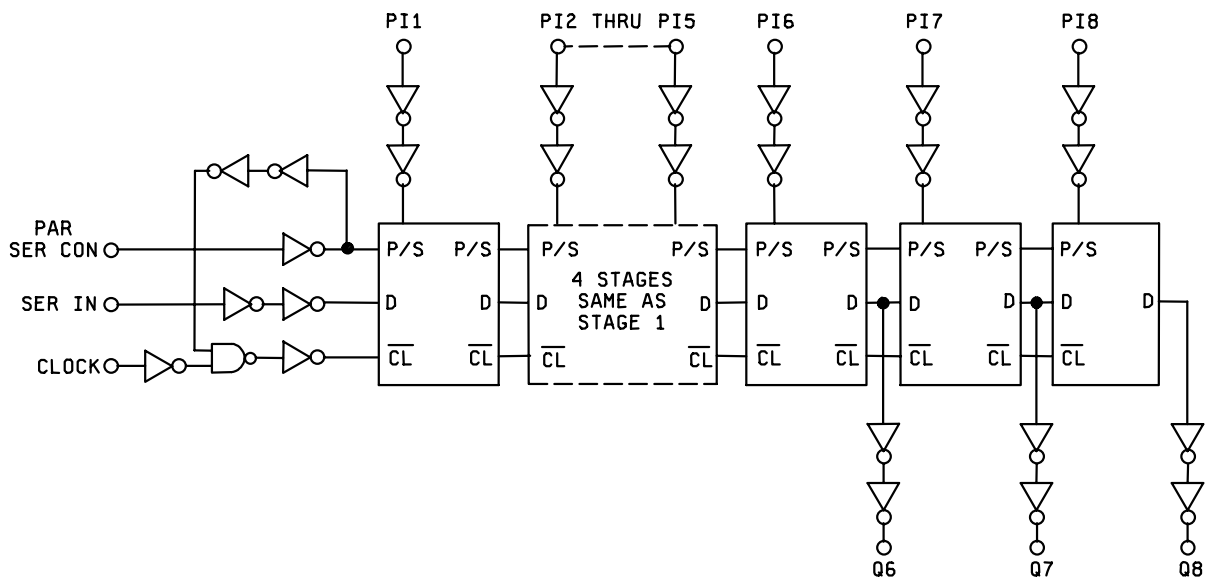


FIGURE 2. Logic diagrams - Continued.

DEVICE TYPES 05 AND 55

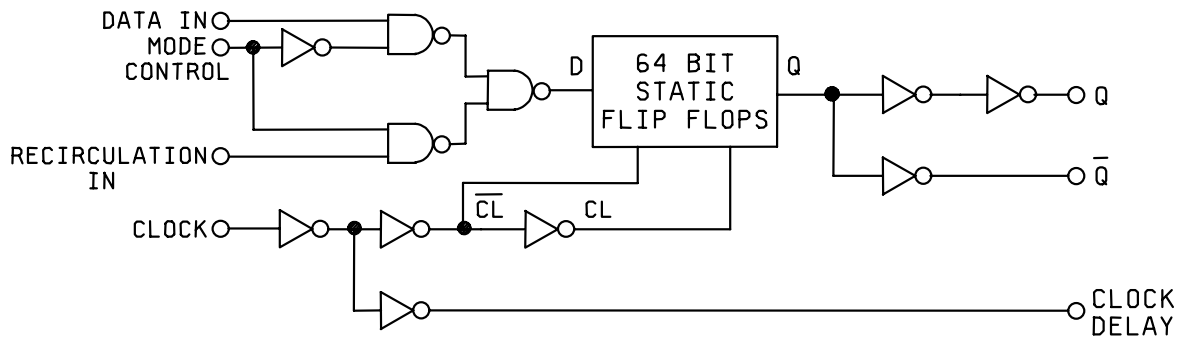


FIGURE 2. Logic diagrams - Continued.

DEVICE TYPES 06 AND 56

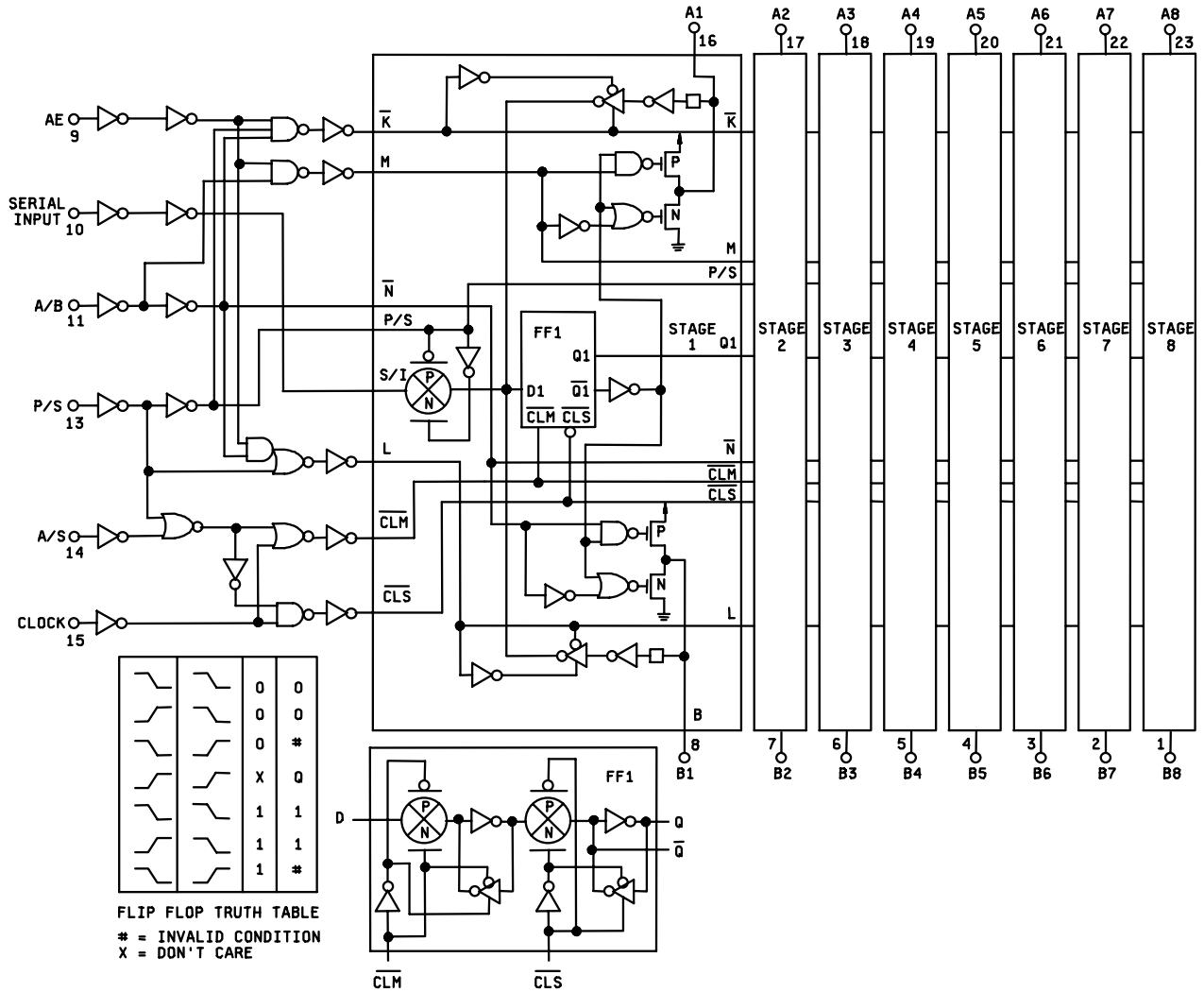


FIGURE 2. Logic diagrams - Continued.

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Device types 01 and 51

Inputs		Output
D	CL (level change)	D+1
0	↓	0
1	↓	1
X	↑	NC

Positive Logic 0  $\approx V_{SS}$ .

Positive Logic 1  $\approx V_{DD}$ .

NC = No change.

↓ = Clock transition from high to low.

↑ = Clock transition from low to high.

X = Don't care.

Device types 02 and 52

Inputs					Output	
CL (level change)	Serial IN	PAR/SER control	PI-1	PI-n	Q1 (internal)	Qn
↑	X	1	0	0	0	0
↑	X	1	1	0	1	0
↑	X	1	0	1	0	1
↑	X	1	1	1	1	1
↑	0	0	X	X	0	Qn-1
↑	1	0	X	X	1	Qn-1
↓	X	X	X	X	Q1	Qn

Positive Logic 0  $\approx V_{SS}$ .

Positive Logic 1  $\approx V_{DD}$ .

↓ = Clock transition from high to low.

↑ = Clock transition from low to high.

X = Don't care.

Device types 03 and 53

Inputs			Output	
CL (level change)	D	R	Q1	Qn
↑	0	0	0	Qn-1
↑	1	0	1	Qn-1
↓	X	0	Q1	Qn
X	X	1	0	0

Positive Logic 0  $\approx V_{SS}$ .

Positive Logic 1  $\approx V_{DD}$ .

↓ = Clock transition from high to low.

↑ = Clock transition from low to high.

X = Don't care.

FIGURE 3. Truth tables.

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Device types 04 and 54

CL (level change)	Inputs				Output	
	Serial input	Paralle/serial control	PI-1	PI-n	Q1 (internal)	Qn
X	X	1	0	0	0	0
X	X	1	0	1	0	1
X	X	1	1	0	1	0
X	X	1	1	1	1	1
↑	0	0	X	X	0	Qn-1
↑	1	0	X	X	1	Qn-1
↓	X	0	X	X	Q1	Qn

Positive logic 0  $\approx$  V<sub>SS</sub>.  
 Positive logic 1  $\approx$  V<sub>DD</sub>.  
 ↓ = Clock transition from high to low.  
 ↑ = Clock transition from low to high.  
 X = Don't care.

Device types 05 and 55

INPUT CONTROL CIRCUIT TRUTH TABLE

DATA	RECIRC.	MODE	BIT INTO STAGE 1
1	X	0	1
0	X	0	0
X	1	1	1
X	0	1	0

TYPICAL STAGE TRUTH TABLE

D	CL (level change)	D+1
0	↑	0
1	↑	1
X	↓	NC

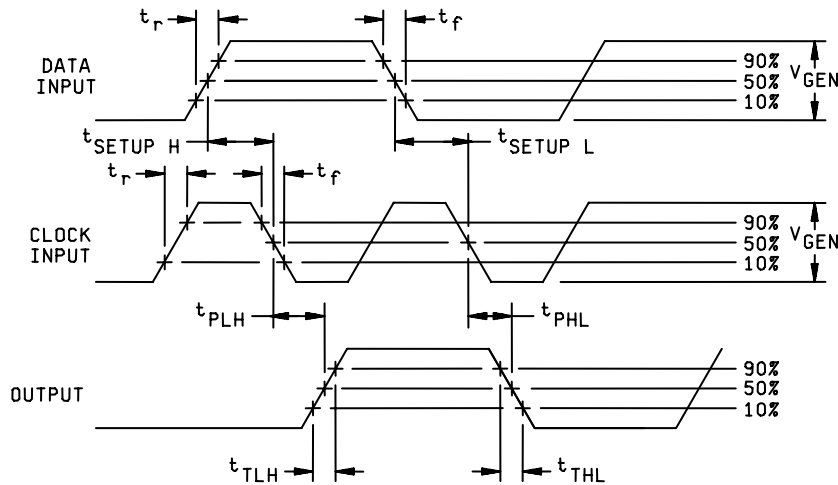
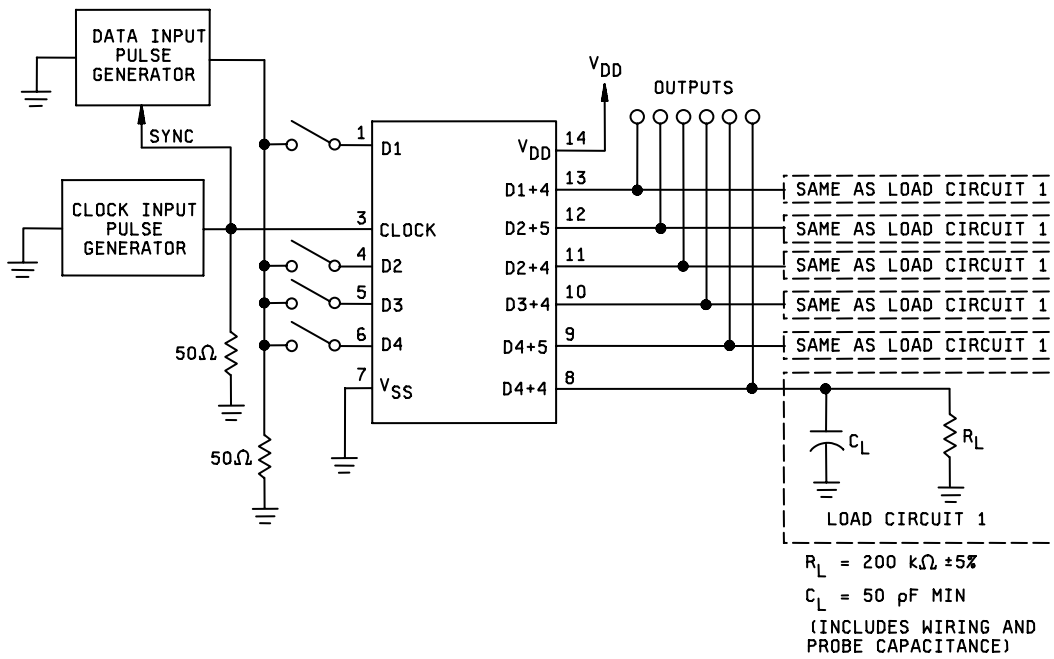
Device types 06 and 56

"A" Enable	P/S	A/B	A/S	Operation *
L	L	L	X	Serial mode; synch. serial data input, "A" parallel data outputs disabled
L	L	H	X	Serial mode; synch. serial data input, "B" parallel data output
L	H	L	L	Parallel mode; "B" synch. parallel data inputs, "A" parallel data outputs disabled
L	H	L	H	Parallel mode; "B" asynch. parallel data inputs, "A" parallel data outputs disabled
L	H	H	L	Parallel mode; "A" parallel data inputs disabled, "B" parallel data outputs, synch. data recirculation
L	H	H	H	Parallel mode; "A" parallel data inputs disabled, "B" parallel data outputs, asynch. data recirculation
H	L	L	X	Serial mode; synch. serial data input, "A" parallel data output
H	L	H	X	Serial mode; synch. serial data input, "B" parallel data output
H	H	L	L	Parallel mode; "B" synch. parallel data input, "A" parallel data output
H	H	L	H	Parallel mode; "B" asynch. parallel data input, "A" parallel data output
H	H	H	L	Parallel mode; "A" synch. parallel data input, "B" parallel data output
H	H	H	H	Parallel mode; "A" asynch. parallel data input, "B" parallel data output

\* Outputs change at positive transition of clock in the serial mode and when the A/S/ control input is "low" in the parallel mode.

Positive logic 0  $\approx$  V<sub>SS</sub>.  
 Positive logic 1  $\approx$  V<sub>DD</sub>.  
 NC = No change.  
 ↓ = Clock transition from high to low.  
 ↑ = Clock transition from low to high.  
 X = Don't care.

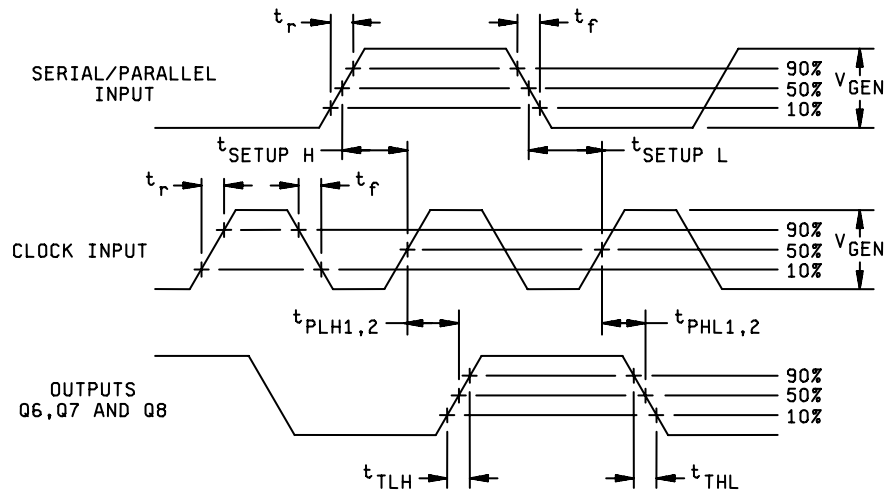
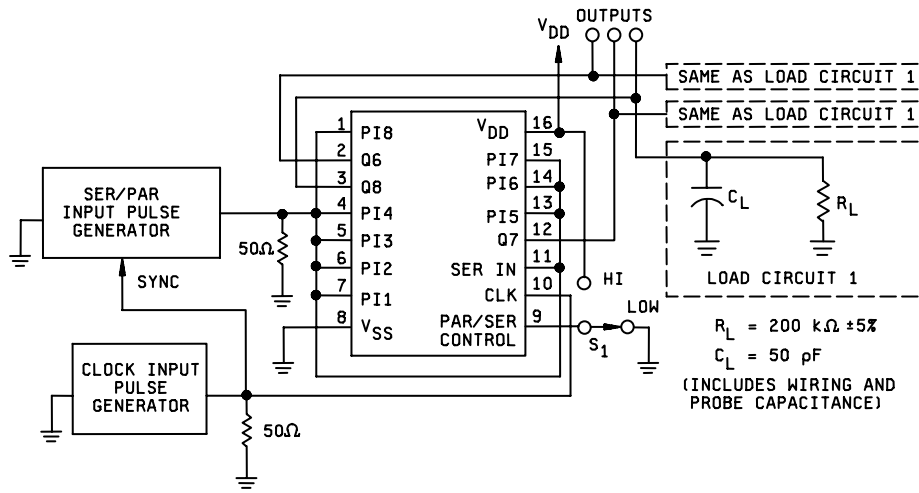
FIGURE 3. Truth tables – Continued.



NOTES:

1. The pulse generators have the following characteristics:  $V_{GEN} = V_{DD} \pm 1$  percent,  $t_r$  and  $t_f \leq 20$  ns, duty cycle = 50 percent,  $Z_{OUT} = 50\Omega$ .
2.  $t_{SETUP H} = t_{SETUP L} = 80$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUP H} = t_{SETUP L} = 115$  ns at  $T_A = 125^\circ\text{C}$ .
3. Requirements for MAX clock frequency ( $f_{CL}$ ) are established by setting the parameter to the limits given in table III and observing proper output state changes.
4. Initially, apply clock input pulses with data inputs low and set all outputs low.

FIGURE 4. Switching time test circuit and waveforms.

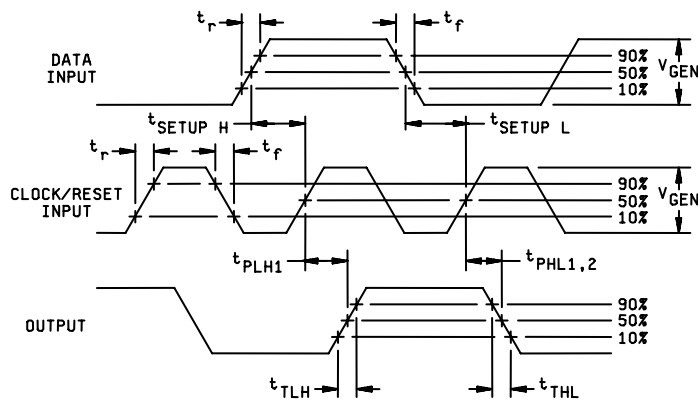
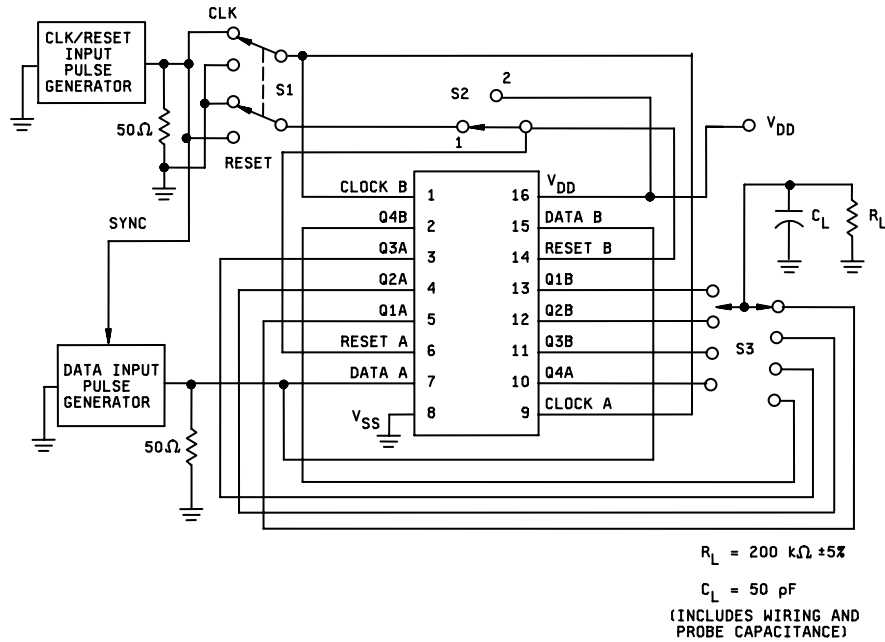


## NOTES:

1. The pulse generators have the following characteristics:  $V_{GEN} = V_{DD} \pm 1$  percent,  $t_r$  and  $t_f \leq 20$  ns, duty cycle = 50 percent,  $Z_{OUT} = 50\Omega$ .
2. When measuring  $t_{PHL1}$  and  $t_{PLH1}$ , set parallel serial control switch S1 to "LOW". Initially, apply clock pulse with serial/parallel inputs at 0 V to set outputs low.
3. When measuring  $t_{PHL2}$ ,  $t_{PLH2}$ ,  $t_{THL}$ , and  $t_{TLH}$ , set parallel serial control switch S1 to "HI". Initially, apply clock pulses with serial/parallel inputs at 0 V to set outputs low.
4.  $t_{SETUPH} = t_{SETUPL} = 350$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUPH} = t_{SETUPL} = 500$  ns at  $T_A = 125^\circ\text{C}$ . For device type 02,  $t_{SETUPH} = t_{SETUPL} = 130$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUPH} = t_{SETUPL} = 180$  ns at  $T_A = 125^\circ\text{C}$ .
5. Requirements for MAX clock frequency ( $f_{CL}$ ) are established by setting the parameter to the limits given in table III and observing proper output state changes.

FIGURE 4. Switching time test circuit and waveforms – Continued.

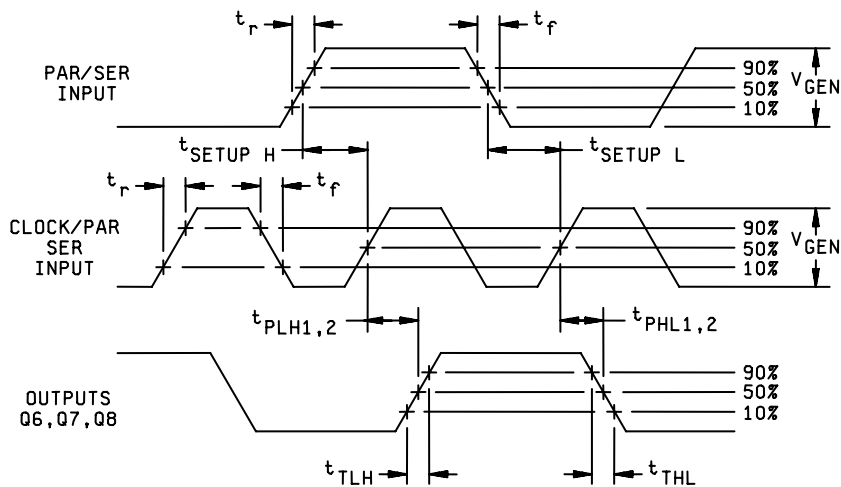
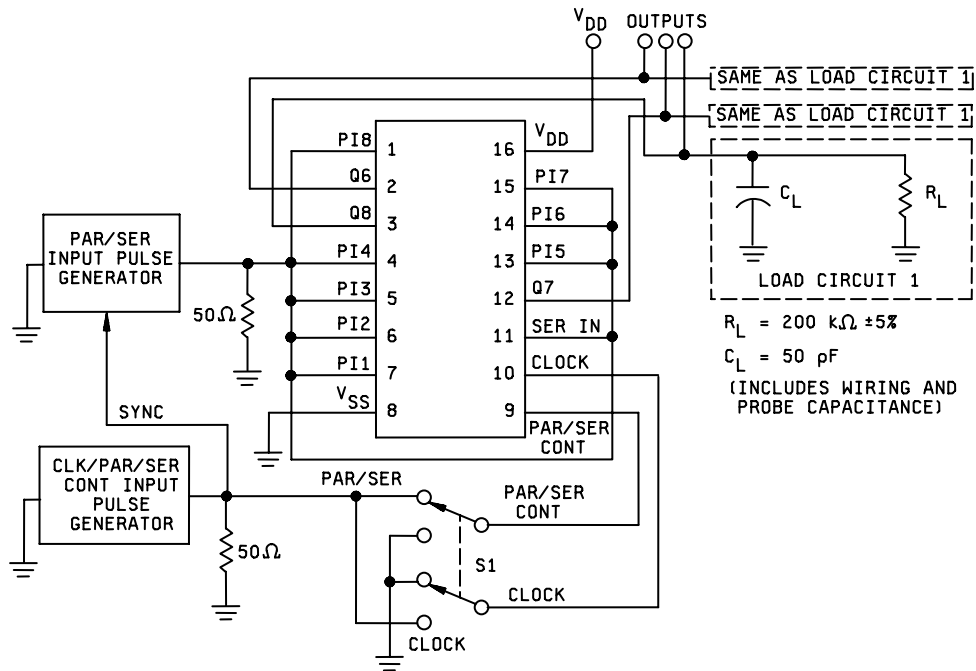




NOTES:

1. The pulse generators have the following characteristics:  $V_{GEN} = V_{DD} \pm 1$  percent,  $t_r$  and  $t_f \leq 20$  ns, duty cycle = 50 percent,  $Z_{OUT} = 50 \Omega$ .
2. When measuring  $t_{PHL1}$ ,  $t_{PLH1}$ ,  $t_{THL}$ , and  $t_{TLH}$ , set switch S1 to clock position. Momentarily set switch S2 to position 2 to set outputs low and return to position 1.
3. When measuring  $t_{PHL2}$  set switch S2 to reset position. Momentarily set switch S2 to position 2 to set outputs low and return to position 1.
4.  $t_{SETUPH} = t_{SETUPL} = 350$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUPH} = t_{SETUPL} = 500$  ns at  $T_A = 125^\circ\text{C}$ . For device types 03 and 53,  $t_{SETUPH} = t_{SETUPL} = 108$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ; 150 ns at  $T_A = 125^\circ\text{C}$ .
5. For  $f_{CL}$ , set switch S1 to clock. Requirements for MAX clock frequency ( $f_{CL}$ ) are established by setting the parameter to the limits given in table III and observing proper output state changes.

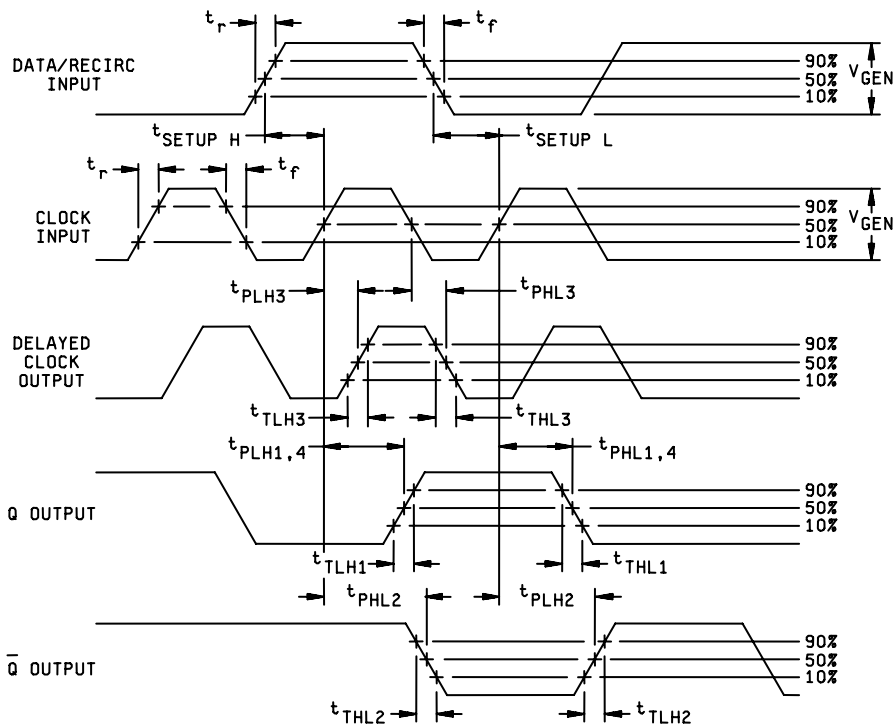
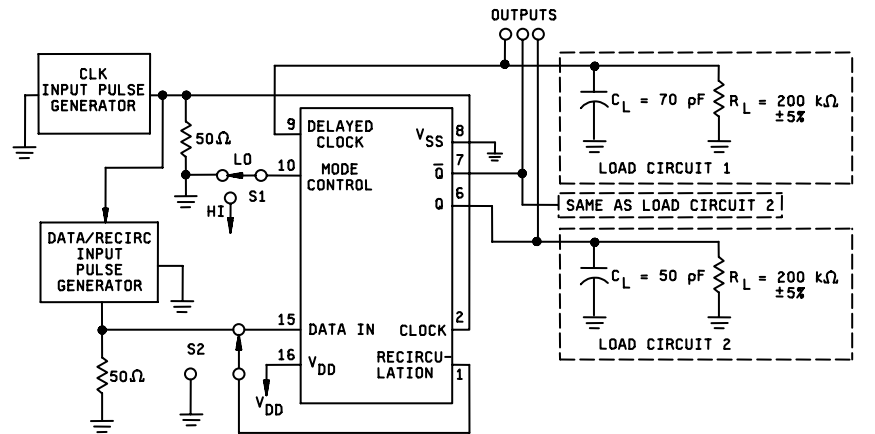
FIGURE 4. Switching time test circuit and waveforms – Continued.



## NOTES:

1. The pulse generators have the following characteristics:  $V_{GEN} = V_{DD} \pm 1$  percent,  $t_r$  and  $t_f \leq 20$  ns, duty cycle = 50 percent,  $Z_{OUT} = 50\Omega$ .
2. When measuring  $t_{PHL1}$  and  $t_{PLH1}$ , set switch S1 to parallel/serial position.
3. When measuring  $t_{PHL2}$ ,  $t_{PLH2}$ ,  $t_{THL}$ , and  $t_{TLH}$ , set switch S1 to clock position.
4.  $t_{SETUPH} = t_{SETUPL} = 350$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUPH} = t_{SETUPL} = 500$  ns at  $T_A = 125^\circ\text{C}$ . For device types 04 and 54,  $t_{SETUPH} = t_{SETUPL} = 130$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ; 180 ns at  $T_A = 125^\circ\text{C}$ .
5. For  $f_{CL}$ , set switch S1 to clock. Requirements for MAX clock frequency ( $f_{CL}$ ) are established by setting the parameter to the limits given in table III and observing proper output state changes.

FIGURE 4. Switching time test circuit and waveforms – Continued.

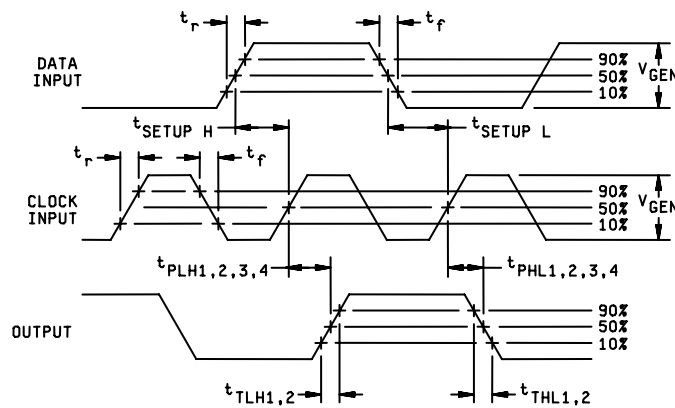
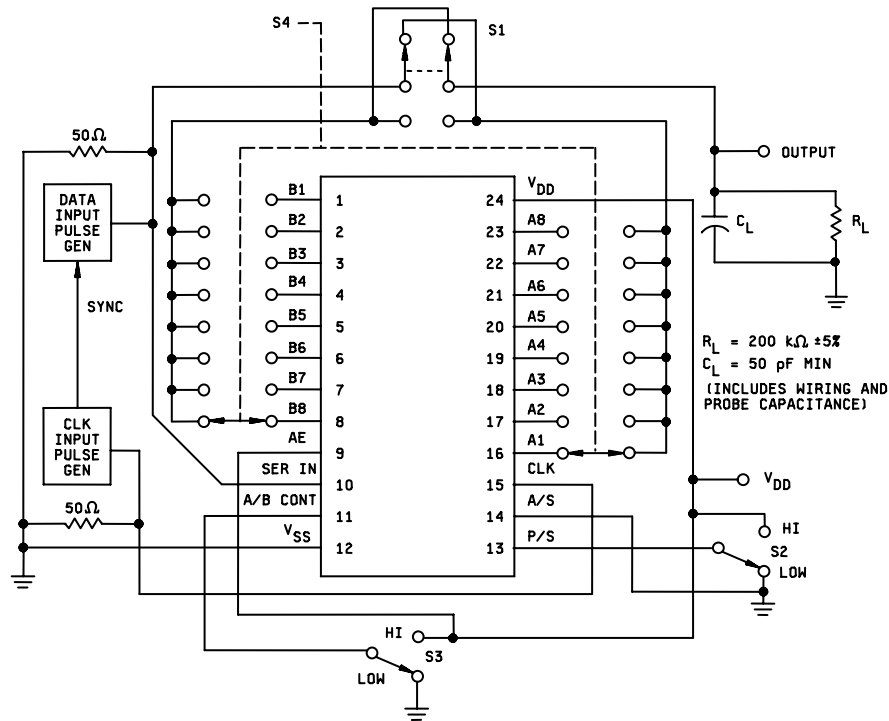


NOTES:

1. The pulse generators have the following characteristics:  $V_{GEN} = V_{DD} \pm 1$  percent,  $t_r$  and  $t_f \leq 20$  ns, duty cycle = 50 percent,  $Z_{OUT} = 50\Omega$ .
2. When measuring  $t_{PHL1}$ ,  $t_{PHL2}$ ,  $t_{PHL3}$ ,  $t_{PLH1}$ ,  $t_{PLH2}$ ,  $t_{PLH3}$ ,  $t_{THL1}$ ,  $t_{THL2}$ ,  $t_{THL3}$ ,  $t_{TLH1}$ ,  $t_{TLH2}$ , and  $t_{TLH3}$ , set switch S1 to low position.
3. When measuring  $t_{PHL4}$  and  $t_{PLH4}$ , set switch S2 to high position.
4.  $t_{SETUPH} = t_{SETUPL} = 400$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUPH} = t_{SETUPL} = 680$  ns at  $T_A = 125^\circ\text{C}$ . For device types 05 and 55,  $t_{SETUPH} = t_{SETUPL} = 215$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ; 300 ns at  $T_A = 125^\circ\text{C}$ .
5. For  $f_{CL}$ , set switch S1 to low position. Requirements for MAX clock frequency ( $f_{CL}$ ) are established by setting the parameter to the limits given in table III and observing proper output state changes.

FIGURE 4. Switching time test circuit and waveforms – Continued.

## Device types 06 and 56



## NOTES:

1. The pulse generators have the following characteristics:  $V_{GEN} = V_{DD} \pm 1$  percent,  $t_r$  and  $t_f \leq 20$  ns, duty cycle = 50 percent,  $Z_{OUT} = 50\Omega$ .
2. When measuring  $t_{PHL1}$ ,  $t_{PLH1}$ ,  $t_{THL1}$ , and  $t_{TLH1}$ , set switch S2 and S3 to high position.
3. When measuring  $t_{PHL2}$ ,  $t_{PLH2}$ ,  $t_{THL2}$ , and  $t_{TLH2}$ , set switch S2 to high position and S3 to low position.
4. When measuring  $t_{PHL3}$  and  $t_{PLH3}$ , set switch S2 to low position and S3 to high position.
5. When measuring  $t_{PHL4}$  and  $t_{PLH4}$ , set switch S2 to low position and S3 to low position.
6.  $t_{SETUPH} = t_{SETUPL} = 500$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ;  $t_{SETUPH} = t_{SETUPL} = 650$  ns at  $T_A = 125^\circ\text{C}$ . For device types 06 and 56,  $t_{SETUPH} = t_{SETUPL} = 172$  ns at  $T_A = 25^\circ\text{C}$  and  $-55^\circ\text{C}$ ; 240 ns at  $T_A = 125^\circ\text{C}$ .
7. For  $f_{CL}$ , set switch S2 to low position and S3 to low position and then high position. Requirements for MAX clock frequency ( $f_{CL}$ ) are established by setting the parameter to the limits given in table III and observing proper output state changes.

FIGURE 4. Switching time test circuit and waveforms – Continued.

## 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 k $\Omega$  to 47 k $\Omega$ . The actual measured value of the resistor selected shall not exceed  $\pm 20\%$  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 01 through 06.  
 $V_{DD} = 15$  V minimum, 18 V maximum for device types 51 through 56.  
 $V_{DD}/2 = V_{DD}/2 \pm 1.0$  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 k $\Omega$  to 47 k $\Omega$ . The actual measured value of the resistor selected shall not exceed  $\pm 20\%$  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  $t_{THL} < 1$   $\mu$ s. 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 through 06.  
 $V_{DD} = 15$  V minimum, 18 V maximum for device types 51 through 56.  
 $V_{DD}/2 = V_{DD}/2 \pm 1.0$  V.  
 $V_{SS} = 0.0$  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 through 06 are qualified by extension (see 4.3.1), they shall be screened in accordance with the requirements for corresponding device types 51 through 56.

TABLE II. Electrical test requirements.

Line no.	MIL-PRF-38535 test requirements	Class S device <u>1/</u>			Class B device <u>1/</u>		
		Ref. par.	Table III Subgroups <u>2/</u>	Table IV delta limits <u>3/</u>	Ref. par.	Table III subgroups <u>2/</u>	Table IV delta limits <u>3/</u>
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	<u>4/</u>	
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, 7, 9			1*, 2, 3, 7, 9	
9	Group A test requirements (method 5005)	4.4.1	1, 2, 3, 4, 7, 8, 9, 10, 11		4.4.1	1, 2, 3, 4, 7, 8, 9, 10, 11	
10	Group B test when using method 5005 QCI option	4.4.2	1, 2, 3, 7, 8, 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 ( $\Delta$ ) 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, for qualifying inspection, if a manufacturer qualifies to a 51-56 device type, which is manufactured identically to a 01-06 device type on this specification, then the 01-06 device type may be part I qualified by conducting only worst case 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 and 6 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 through 06 are qualified by extension (see 4.3.1), these device types will be inspected (QCI) according to the requirements for device types 51 through 56, 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 through 06 are qualified by extension (see 4.3.1), these device types will be inspected (QCI) according to the requirements for device types 51 through 56, respectively.

TABLE III. Group A inspection for device type 01.

Symbol	MIL-STD-883 method	Cases A, C, D, T, X, Y	Terminal conditions and limits 1/														Measured Terminal	Test limits						Unit	
			Symbol	D1	NC	Clock	D2	D3	D4	V <sub>SS</sub>	D4+4	D4+5	D3+4	D2+4	D2+5	D1+4		V <sub>DD</sub>	Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
		Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14		Min	Max	Min	Max	Min	Max		
V <sub>IC</sub> (pos)	1	2	1mA			1mA										GND	D1							V	
		3					1mA									"	Clock							"	
		4						1mA								"	D2	1.5	"					"	
		5							1mA							"	D3		"					"	
																"	D4		"					"	
V <sub>IC</sub> (neg)	6	7	-1mA			-1mA			GND								D1							"	
		8					-1mA			"							Clock							"	
		9						-1mA		"								D2	-6	"					"
		10							-1mA	"								D3		"					"
I <sub>SS</sub> 2/	3005	11	GND		/	GND	GND	GND	"							15.0V	None							μA	
		12	15.0V		"	15.0V	15.0V	15.0V	"							"	"							"	
		13	GND			GND	GND	GND	"							"	"							"	
		14	15.0V	3		15.0V	15.0V	15.0V	"							"	"	-0.3		-3.0					"
		15	GND			GND	GND	GND	"							"	"								"
		16	15.0V			GND	15.0V	15.0V	"							"	"								"
		17	15.0V			15.0V	15.0V	15.0V	"							"	"								"
		18	15.0V			GND	15.0V	15.0V	"							"	"								"
		19	GND			GND	GND	GND	"							"	"								"
V <sub>OH1</sub>	3006	20	V <sub>IH1</sub>		/	V <sub>IH1</sub>	V <sub>IH1</sub>	V <sub>IH1</sub>	"	I <sub>OH 6/</sub>						5.0V	D4+4	4.5						"	
		21	4/		"	4/	4/	4/	"		I <sub>OH 6/</sub>					"	D4+5	"						"	
		22	"	5		"	"	"	"			I <sub>OH 6/</sub>				"	D3+4	"	4.5		4.5			V	
		23	"			"	"	"	"				I <sub>OH 6/</sub>			"	D2+4	"						"	
		24	"			"	"	"	"					I <sub>OH 6/</sub>		"	D2+5	"							"
V <sub>OH2</sub>	3006	25	"		"	"	"	"							I <sub>OH 6/</sub>	D1+4	"							"	
		26	V <sub>IH2</sub>			V <sub>IH2</sub>	V <sub>IH2</sub>	V <sub>IH2</sub>	"							12.5V	D4+4	11.25							"
		27	7/			7/	7/	7/	"							"	D4+5	"							"
		28	"			"	"	"	"							"	D3+4	"	11.25		11.25				"
		29	"			"	"	"	"							"	D2+4	"							"
		30	"			"	"	"	"							"	D2+5	"							"
V <sub>OL1</sub>	3007	31	"		"	"	"	"							"	D1+4	"							"	
		32	V <sub>IL1</sub>			V <sub>IL1</sub>	V <sub>IL1</sub>	V <sub>IL1</sub>	"	I <sub>OL 9/</sub>						5.0V	D4+4								"
		33	8/			8/	8/	8/	"		I <sub>OL 9/</sub>					"	D4+5							"	
		34	"			"	"	"	"			I <sub>OL 9/</sub>				"	D3+4	0.5		0.5		0.5			"
		35	"			"	"	"	"				I <sub>OL 9/</sub>			"	D2+4								"
V <sub>OL2</sub>	3007	36	"		"	"	"	"							"	D2+5								"	
		37	"		"	"	"	"							"	D1+4								"	
		38	V <sub>IL2</sub>			V <sub>IL2</sub>	V <sub>IL2</sub>	V <sub>IL2</sub>	"							12.5V	D4+4								"
		39	10/			10/	10/	10/	"							"	D4+5								"
		40	"			"	"	"	"							"	D3+4	1.25		1.25		1.25			"
		41	"			"	"	"	"							"	D2+4								"
		42	"			"	"	"	"							"	D2+5								"
		43	"			"	"	"	"							"	D1+4								"

See footnotes at end of device type 01.



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

Symbol	MIL-STD-883 method	Cases A, C, D, T, X, Y	Terminal conditions and limits 1/														Measured Terminal	Test limits						Unit
			D1	NC	Clock	D2	D3	D4	V <sub>SS</sub>	D4+4	D4+5	D3+4	D2+4	D2+5	D1+4	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13		14	Min	Max	Min	Max	Min	
I <sub>IH1</sub> 11/ I <sub>IH2</sub>	3010	44	15.0V		15.0V	15.0V	15.0V	15.0V	GND							15.0V	All inputs together							nA
		45	15.0V		15.0V	GND	GND	GND	"							"	D1	5.0	"		"			"
		46	GND		GND	15.0V	GND	GND	"							"	Clock	1.0	"	45	"			"
		47	"	GND	GND	15.0V	GND	GND	"							"	D2							"
		48	"	"	GND	GND	15.0V	GND	"							"	D3							
49	"	"	GND	GND	15.0V	GND	"							"	D4								"	
I <sub>IL1</sub> 11/ I <sub>IL2</sub>	3009	50	GND		GND	GND	GND	GND	GND							15.0V	All inputs together							nA
		51	"		"	"	"	"	"							"	D1	-5.0	"		"			"
		52	"		"	"	"	"	"	"						"	Clock	-1.0	"	-45	"			"
		53	"	"	"	"	"	"	"	"						"	D2							"
		54	"	"	"	"	"	"	"	"						"	D3							
55	"	"	"	"	"	"	"	"						"	D4								"	
																	Subgroup 4 T <sub>C</sub> = 25°C							
																	Min	Max						
C <sub>i</sub>	3012	56	12/		12/				GND							GND	D1							pF
		57			12/				"							"	Clock		70					"
		58				12/			"							"	D2		12					"
		59					12/		"							"	D3		12					"
		60						12/	"							"	D4		12					
																	Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8					
																	T <sub>C</sub> = 25°C		T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C			
																	Min	Max	Min	Max	Min	Max		
Truth table test	3014 13/	61	GND	14	/	GND	GND	GND	GND							5.0V	None	See 15/, 16/						
		62	5.0V		"	5.0V	5.0V	5.0V	5.0V	"						"	None							
		63	GND		"	GND	GND	GND	GND	"						"	None							
		64	"		"	"	"	"	"	"	L		L	L		"	All							
		65	"		"	GND	"	"	"	"	"	L		L		"	outputs							
		66	"		"	GND	"	"	"	"	"	"		"		"	"							
		67	"		"	GND	"	"	"	"	"	"		"		"	"							
		68	5.0V		"	5.0V	5.0V	5.0V	5.0V	"	"	"		"		"	"							
		69	"		"	"	"	"	"	"	"	"		"		"	"							
		70	"		"	"	"	"	"	"	"	"		"		"	"							
		71	"		"	"	"	"	"	"	"	"		"		"	"							
		72	"		"	GND	"	"	"	"	"	H	L	H	H	L	H		"					
		73	"		"	5.0V	"	"	"	"	"	H	L	H	H	L	H		"					
74	"	"	GND	"	"	"	"	"	L	L	L	L	L	L	"									
75	"	"	5.0V	"	"	"	"	"	L	H	L	L	H	L	"									
76	"	"	GND	"	"	"	"	"	L	L	L	L	L	L	"									

See footnotes at end of device type 01.

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

Symbol	MIL-STD-883 method	Cases A, C, D, T, X, Y	Terminal conditions and limits 1/														Measured Terminal	Test limits						Unit
			Symbol	D1	NC	Clock	D2	D3	D4	V <sub>SS</sub>	D4+4	D4+5	D3+4	D2+4	D2+5	D1+4		V <sub>DD</sub>	Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C	
		Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14		Min	Max	Min	Max	Min	Max	
t <sub>PHL</sub>	3003 Fig. 4	77						IN	GND	OUT						5.0V	Clock to D4+4	20	800	30	1200	20	800	ns
		78		IN	"			IN	"		OUT					"	Clock to D4+5	"	"	"	"	"	"	"
		79			"		IN		"		OUT					"	Clock to D3+4	"	"	"	"	"	"	"
		80			"	IN		"			OUT					"	Clock to D2+4	"	"	"	"	"	"	"
		81			"	IN		"			OUT					"	Clock to D2+5	"	"	"	"	"	"	"
		82	IN		"				"			OUT				"	Clock to D1+4	"	"	"	"	"	"	"
t <sub>PLH</sub>	3003 Fig. 4	83						IN	GND	OUT						5.0V	Clock to D4+4	20	650	30	975	20	650	ns
		84		IN	"			IN	"		OUT					"	Clock to D4+5	"	"	"	"	"	"	"
		85			"		IN		"		OUT					"	Clock to D3+4	"	"	"	"	"	"	"
		86			"	IN		"			OUT					"	Clock to D2+4	"	"	"	"	"	"	"
		87			"	IN		"			OUT					"	Clock to D2+5	"	"	"	"	"	"	"
		88	IN		"				"			OUT				"	Clock to D1+4	"	"	"	"	"	"	"
t <sub>THL</sub>	3004 Fig. 4	89			"			IN	"	OUT					"	D4+4	13	760	18	1140	13	760	"	
		90			"			IN	"		OUT				"	D4+5	"	"	"	"	"	"	"	
		91			"		IN		"		OUT				"	D3+4	"	"	"	"	"	"	"	
		92			"	IN		"			OUT				"	D2+4	"	"	"	"	"	"	"	"
		93			"	IN		"				OUT			"	D2+5	"	"	"	"	"	"	"	"
		94	IN		"				"			OUT			"	D1+4	"	"	"	"	"	"	"	"
t <sub>TLH</sub>		95			"			IN	"	OUT					"	D4+4	"	"	"	"	"	"	"	
		96			"			IN	"		OUT				"	D4+5	"	"	"	"	"	"	"	
		97		"	"		IN		"		OUT				"	D3+4	"	"	"	"	"	"	"	
		98		"	"	IN		"			OUT				"	D2+4	"	"	"	"	"	"	"	
		99		"	"	IN		"				OUT			"	D2+5	"	"	"	"	"	"	"	
		100	IN	"	"				"			OUT			"	D1+4	"	"	"	"	"	"	"	
f <sub>CL</sub> (max) 17/	101	102			"			IN	"	OUT					"	Clock							μs	
		103			"			IN	"		OUT				"	"							"	
		104		"	"	IN		IN	"			OUT			"	"		1.0		1.4		1.0	"	
		105		"	"	IN		IN	"						"	"		"		"		"	"	
		106	IN	"	"				"						"	"		"		"		"	"	
				"	"				"						"	"		"		"		"	"	

See footnotes on next page.

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

- 1/ Terminals not designated may be “HIGH” level logic, “LOW” level logic, or open except as follows:  
IC(POS) tests; the V<sub>SS</sub> terminal shall be open.  
IC(NEG) tests; the V<sub>DD</sub> terminal shall be open.  
V<sub>SS</sub> tests; the output terminals shall be open.
- 2/ Test numbers 11 through 19 shall be run in sequence. See 4.5.3.
- 3/ Apply single clock pulse; V<sub>IN</sub> = 0 V to V<sub>DD</sub>.
- 4/ V<sub>IH1</sub> = 3.8 V at 25°C, 3.6 V at 125°C, 3.95 V at -55°C.
- 5/ Apply clock pulse; V<sub>IN</sub> = 0 V to V<sub>DD</sub> until proper output state is achieved.
- 6/ I<sub>OH</sub> = -100 μA at 25°C, -70 μA at 125°C, -125 μA at -55°C.
- 7/ V<sub>IH2</sub> = 9.5 V at 25°C, 9.25 V at 125°C, 9.75 V at -55°C.
- 8/ V<sub>IL1</sub> = 1.1 V at 25°C, 0.85 V at 125°C, 1.35 V at -55°C.
- 9/ I<sub>OL</sub> = 125 μA at 25°C, 85 μA at 125°C, 155 μA at -55°C.
- 10/ V<sub>IL2</sub> = 2.8 V at 25°C, 2.55 V at 125°C, 3.05 V at -55°C.
- 11/ The device manufacturer may, at his option, measure I<sub>IL</sub> and I<sub>IH</sub> at 25°C for each individual input or measure all inputs together.
- 12/ See 4.4.1c.
- 13/ Test numbers 61 through 76 shall be run in sequence.
- 14/ Apply single clock pulse; V<sub>IN</sub> = 0 V to V<sub>DD</sub>.
- 15/ The output voltage limits for each temperature are “H” = V<sub>DD</sub> - 0.5 V min. and “L” = V<sub>SS</sub> + 0.5 V max.
- 16/ The functional tests shall be performed at V<sub>IH</sub> and V<sub>DD</sub> ≤ 5.0 V and ≥ 15 V.
- 17/ The maximum clock frequency (f<sub>CL</sub>) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.

TABLE III. Group A inspection for device type 02.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S Control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max	
			Test no.																							
V <sub>IC</sub> (POS)	1	2 3 4 5 6 7 8 9 10 11	1mA			1mA	1mA	1mA	1mA								GND	PI8 PI4 PI3 PI2 PI1 P/S control Clock Serial In	1.5						V	
V <sub>IC</sub> (NEG)	12	13 14 15 16 17 18 19 20 21 22	-1mA			-1mA	-1mA	-1mA	-1mA	GND							PI8	PI4 PI3 PI2 PI1 P/S control Clock Serial In PI5 PI6 PI7	-6						V	
I <sub>SS</sub> 2/	3005	23 24 25 26 27 28 29 30 31 32	GND GND GND 15.0V			GND GND 15.0V	15.0V GND 15.0V	GND GND 15.0V	15.0V 15.0V 15.0V	" " "	15.0V "	15.0V GND 15.0V	GND GND 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	None " " V <sub>SS</sub> None V <sub>SS</sub> None None V <sub>SS</sub>	-0.5		-5.0				μA	
V <sub>OH1</sub>	3006	33 34 35	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	I <sub>OH 4/</sub>		V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	" " "	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	5/ " "	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	I <sub>OH 4/</sub>	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	V <sub>IH1 3/</sub> V <sub>IH1 3/</sub> V <sub>IH1 3/</sub>	5.0V 5.0V 5.0V	Q6 Q7 Q8	4.5 4.5 4.5		4.5 4.5 4.5	4.5 4.5 4.5		V	
V <sub>OH2</sub>		36 37 38	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>			V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	" " "	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	" " "	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	12.5V 12.5V 12.5V	Q6 Q7 Q8	11.25 11.25 11.25		11.25 11.25 11.25	11.25 11.25 11.25		V	
V <sub>OL1</sub>		39 40 41	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	I <sub>OL 7/</sub>		V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	" " "	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	" " "	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	I <sub>OL 7/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	V <sub>IL1 8/</sub> V <sub>IL1 8/</sub> V <sub>IL1 8/</sub>	5.0V 5.0V 5.0V	Q6 Q7 Q8		0.5 0.5		0.5 0.5	0.5 0.5	
V <sub>OL2</sub>		42 43 44	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>			V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	" " "	V <sub>IH2 6/</sub> V <sub>IH2 6/</sub> V <sub>IH2 6/</sub>	" " "	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	V <sub>IL2 9/</sub> V <sub>IL2 9/</sub> V <sub>IL2 9/</sub>	12.5V 12.5V 12.5V	Q6 Q7 Q8	1.25 1.25 1.25		1.25 1.25 1.25	1.25 1.25 1.25		V	

See footnotes at end of device type 02.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S Control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	Min	Max	Min	Max	Min	
I <sub>IH1</sub> 10/	3010	45	15.0V			15.0V	15.0V	15.0V	15.0V	GND	15.0V	15.0V	15.0V		15.0V	15.0V	15.0V	15.0V	All inputs together							nA
I <sub>IH2</sub>		46	15.0V			GND	GND	GND	GND	"	GND	GND	GND		"	"	"	"	PI8	1100					"	
		47	"			15.0V	GND	GND	GND	"	"	"	"		"	"	"	"	PI4	"					"	
		48	"			GND	15.0V	GND	"	"	"	"	"	GND	"	"	"	"	PI3	100	"	100	"		"	
		49	"			"	GND	15.0V	GND	"	"	"	"	"	"	"	"	"	PI2	"					"	
		50	"			"	"	"	GND	15.0V	"	"	"	"	"	"	"	"	PI1	"					"	
		51	"			"	"	"	"	GND	15.0V	"	"	"	"	"	"	"	P/S control	"					"	
		52	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Clock	"					"	
		53	"			"	"	"	"	"	GND	15.0V	GND	15.0V	"	"	"	"	Serial In	"					"	
		54	"			"	"	"	"	"	"	"	"	"	15.0V	"	"	"	PI5	"					"	
	55	"			"	"	"	"	"	"	"	"	"	GND	15.0V	"	"	PI6	"					"		
	56	"			"	"	"	"	"	"	"	"	"	GND	GND	15.0V	"	PI7	"					"		
I <sub>IL1</sub> 10/	3009	57	GND			GND	GND	GND	GND	GND	GND	GND		GND	GND	GND	15.0V	All inputs together							nA	
I <sub>IL2</sub>		58	"			"	"	"	"	"	"	"	"	"	"	"	"	PI8	-1100					"		
		59	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI4	"					"	
		60	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI3	-100	"	-100	"		"	
		61	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI2	"					"	
		62	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI1	"					"	
		63	"			"	"	"	"	"	"	"	"	"	"	"	"	"	P/S control	"					"	
		64	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Clock	"					"	
		65	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Serial In	"					"	
		66	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI5	"					"	
	67	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI6	"					"		
	68	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI7	"					"		
																			Subgroup 4 T <sub>C</sub> = 25°C							
																			Min	Max						
C <sub>I</sub>	3012	69	11/			11/	11/	11/	11/	GND							GND	PI8							"	
		70								"							"	PI4							"	
		71								"							"	PI3							"	
		72								"							"	PI2							"	
		73								"							"	PI1							"	
		74								"	11/						"	P/S control							"	
		75								"							"	Clock					pF		"	
		76								"		11/					"	Serial In							"	
		77								"							"	PI5							"	
		78								"							"	PI6							"	
		79								"							"	PI7							"	

See footnotes at end of device type 02.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S Control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	T <sub>C</sub> = 125°C		T <sub>C</sub> = 125°C		
																							Min	Max	Min	
Truth table test 12/	3014	80	5.0V			5.0V	5.0V	5.0V	5.0V	GND	5.0V	5.0V	GND		5.0V	5.0V	5.0V	5.0V	None	See 13/ and 14/						
		81	5.0V			5.0V	5.0V	5.0V	5.0V	"	5.0V	GND	"		5.0V	5.0V	5.0V	5.0V	None							
		82	5.0V	H	H	5.0V	5.0V	5.0V	5.0V	"	5.0V	5.0V	"	H	5.0V	5.0V	5.0V	5.0V	All							
		83	GND	"	"	5.0V	5.0V	5.0V	5.0V	"	GND	5.0V	"	"	GND	GND	GND	GND	outputs							
		84	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		85	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"							
		86	"	"	"	"	"	"	"	"	"	5.0V	5.0V	"	"	"	"	"	"							
		87	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		88	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"							
		89	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		90	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"							
		91	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		92	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"							
		93	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		94	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"							
		95	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		96	"	L	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"							
		97	"	L	"	"	"	"	"	"	"	GND	"	"	"	"	"	"	"							
		98	"	H	"	"	"	"	"	"	"	5.0V	"	L	"	"	"	"	"							
		99	"	"	"	"	"	"	"	"	"	GND	"	L	"	"	"	"	"							
		100	"	"	L	"	"	"	"	"	"	5.0V	"	H	"	"	"	"	"							
101	"	"	L	"	"	"	"	"	"	GND	"	"	"	"	"	"	"									
102	"	"	H	"	"	"	"	"	"	5.0V	"	"	"	"	"	"	"									
103	"	"	H	"	"	"	"	"	"	5.0V	5.0V	GND	"	"	"	"	"									
104	"	"	H	"	"	"	"	"	"	5.0V	GND	"	"	"	"	"	"									
105	"	L	L	"	"	"	"	"	"	5.0V	5.0V	"	L	"	"	"	"									
106	5.0V	L	L	5.0V	5.0V	5.0V	5.0V	5.0V	"	GND	GND	"	L	5.0V	5.0V	5.0V	"									

See footnotes at end of device type 02.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S Control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max	
			Test no.																							
Truth table test 12/	3014	107	5.0V	L	L	5.0V	5.0V	5.0V	5.0V	GND	GND	5.0V	GND	L	5.0V	5.0V	5.0V	5.0V	All outputs	}	See 13/ and 14/					
	108	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	109	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	110	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	111	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	112	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	113	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	114	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	115	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	116	"	"	"	"	"	"	"	"	"	"	GND	5.0V	"	"	"	"	"								
	117	"	"	H	H	"	"	"	"	"	"	5.0V	5.0V	H	"	"	"	"								
	118	GND	"	"	GND	GND	GND	GND	"	GND	GND	GND	GND	"	GND	GND	GND	"								
	119	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	120	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	121	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	122	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	123	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	124	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	125	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								
	126	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"								
	127	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"								

See footnotes at end of device type 02.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S Control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max	
t <sub>PHL1</sub>	3003 Fig. 4	128	IN	OUT		IN	IN	IN	IN	GND	GND	IN	IN		IN	IN	IN	5.0V	Clock to Q6	13	975	18	1465	13	975	ns
		129	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"
		130	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"
t <sub>PLH1</sub>		131	"	OUT		"	"	"	"	"	"	"	"		"	"	"	"	Clock to Q6	"	"	"	"	"	"	"
		132	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"
		133	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"
t <sub>PHL2</sub>		134	"	OUT		"	"	"	"	"	5.0V	"	"		"	"	"	"	Clock to Q6	"	"	"	"	"	"	"
		135	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"
		136	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"
t <sub>PLH2</sub>	137	"	OUT		"	"	"	"	"	"	"	"		"	"	"	"	Clock to Q6	"	"	"	"	"	"	"	
	138	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"	
	139	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"	
t <sub>THL</sub>	3004 Fig. 4	140	"	OUT		"	"	"	"	"	"	"		"	"	"	"	Q6	10	650	14	975	10	650	"	
		141	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	Q7	"	650	"	975	"	650	"
		142	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Q8	"	650	"	975	"	650	"
143		"	OUT		"	"	"	"	"	"	"	"		"	"	"	"	Q6	"	900	"	1350	"	900	"	
144		"			"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	Q7	"	900	"	1350	"	900	"
145		"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Q8	"	900	"	1350	"	900	"
f <sub>CL</sub> (max) 15/	146	147							"	GND	"	"					"	Clock							μs	
		148	OUT	OUT						"	GND	"	"	OUT				"	Clock	1.0	1.0	1.4	1.4	1.0	1.0	μs

See footnotes on next page.



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

- 1/ Terminals not designated may be “HIGH” level logic, “LOW” level logic, or open except as follows:  
 $I_{C(POS)}$  tests; the  $V_{SS}$  terminal shall be open.  
 $I_{C(NEG)}$  tests; the  $V_{DD}$  terminal shall be open.  
 $V_{SS}$  tests; the output terminals shall be open.
- 2/ Test numbers 23 through 32 shall be run in sequence. See 4.5.3.
- 3/  $V_{IH1} = 3.8 \text{ V}$  at 25°C, 3.6 V at 125°C, 3.95 V at -55°C.
- 4/  $I_{OH} = -80 \text{ }\mu\text{A}$  at 25°C, -55  $\mu\text{A}$  at 125°C, -100  $\mu\text{A}$  at -55°C.
- 5/ Apply clock pulse;  $V_{IN} = 0 \text{ V}$  to  $V_{DD}$  until proper output state is achieved.
- 6/  $V_{IH2} = 9.5 \text{ V}$  at 25°C, 9.25 V at 125°C, 9.75 V at -55°C.
- 7/  $I_{OL} = 120 \text{ }\mu\text{A}$  at 25°C, 85  $\mu\text{A}$  at 125°C, 150  $\mu\text{A}$  at -55°C.
- 8/  $V_{IL1} = 1.1 \text{ V}$  at 25°C, 0.85 V at 125°C, 1.35 V at -55°C.
- 9/  $V_{IL2} = 2.8 \text{ V}$  at 25°C, 2.55 V at 125°C, 3.05 V at -55°C.
- 10/ 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.
- 11/ See 4.4.1c.
- 12/ Test numbers 80 through 127 shall be run in sequence.
- 13/ The output voltage limits for each temperature are “H” =  $V_{DD} - 0.5 \text{ V min.}$  and “L” =  $V_{SS} + 0.5 \text{ V max.}$
- 14/ The functional tests shall be performed at  $V_{IH}$  and  $V_{DD} \leq 5.0 \text{ V}$  and  $\geq 15 \text{ V}$ .
- 15/ The maximum clock frequency ( $f_{CL}$ ) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.

TABLE III. Group A inspection for device type 03.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			Clock B	Q4B	Q3A	Q2A	Q1A	Reset A	Data A	V <sub>SS</sub>	Clock A	Q4A	Q3B	Q2B	Q1B	Reset B	Data B	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C			
																				Test no.	1	2	3	4	5		6
V <sub>IC</sub> (POS)	1	2 3 4 5 6	1mA						1mA	1mA							1mA	1mA	GND	Clock A Data A Reset A Clock B Data B Reset B	1.5	"	"	"	"	"	V
V <sub>IC</sub> (NEG)	7	8 9 10 11 12	-1mA					-1mA	-1mA	GND	-1mA								GND	Clock A Data A Reset A Clock B Data B Reset B	-6	"	"	"	"	"	"
I <sub>SS</sub> 2/	3005	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	GND 15.0V 15.0V GND 15.0V 15.0V GND 15.0V GND 15.0V GND 15.0V GND 15.0V 15.0V					15.0V 15.0V GND " " " " " " " " " " " " " " " "	15.0V " " " " " " " " " " " " " " " "	" " " " " " " " " " " " " " " "	GND 15.0V " " " " " " " " " " " " " " " "					15.0V 15.0V GND " " " " " " " " " " " " " " " "	15.0V " " " " " " " " " " " " " " " "	15.0V " " " " " " " " " " " " " " " "	V <sub>SS</sub> None " " " " " " " " " " " " " " " "	-0.5	"	-5.0	"	"	"	"	μA
V <sub>OH1</sub>	3006	28 29 30 31 32 33 34 35	GND " " " " " " " " " " " " " " " "		I <sub>OH</sub>	I <sub>OH</sub>	I <sub>OH</sub> 4/	V <sub>IL1</sub> 5/	V <sub>IH1</sub> 6/	" " " " " " " " " " " " " " " "	3/						GND " " " " " " " " " " " " " " " "	GND " " " " " " " " " " " " " " " "	5.0V " " " " " " " " " " " " " " " "	Q1A Q2A Q3A Q4A Q1B Q2B Q3B Q4B	4.5	"	"	4.5	"	"	V
V <sub>OH2</sub>		36 37 38 39 40 41 42 43	GND " " " " " " " " " " " " " " " "				V <sub>IL2</sub> 7/	V <sub>IH2</sub> 8/	" " " " " " " " " " " " " " " "	3/							GND " " " " " " " " " " " " " " " "	GND " " " " " " " " " " " " " " " "	12.5V " " " " " " " " " " " " " " " "	Q1A Q2A Q3A Q4A Q1B Q2B Q3B Q4B	11.25	"	"	11.25	"	"	"

See footnotes at end of device type 03.



TABLE III. Group A inspection for device type 03 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																	Measured terminal	Test limits						Unit
			Clock B	Q4B	Q3A	Q2A	Q1A	Reset A	Data A	V <sub>SS</sub>	Clock A	Q4A	Q3B	Q2B	Q1B	Reset B	Data B	V <sub>DD</sub>	Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Min		Max	Min	Max	Min	Max		
			T <sub>C</sub> = 25°C		T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C																				
Truth table test 12/	3014	80	5.0V	L	L	L	L	5.0V	5.0V	GND	5.0V	L	L	L	L	5.0V	5.0V	5.0V	All outputs	See 13/, 14/							
		81	5.0V	"	"	"	L	L	GND	"	5.0V	"	"	"	L	GND	"	"									
		82	GND	"	"	"	L	"	"	"	GND	"	"	"	L	"	"	"									
		83	5.0V	"	"	"	H	"	"	"	5.0V	"	"	"	H	"	"	"									
		84	5.0V	"	"	"	H	"	GND	"	5.0V	"	"	"	H	"	GND	"									
		85	GND	"	"	"	H	"	GND	"	GND	"	"	"	H	"	GND	"									
		86	5.0V	"	"	H	L	"	GND	"	5.0V	"	"	H	L	"	GND	"									
		87	5.0V	"	"	H	L	"	5.0V	"	5.0V	"	"	H	L	"	GND	"									
		88	GND	"	"	H	L	"	"	"	GND	"	"	H	L	"	5.0V	"									
		89	5.0V	"	H	L	H	"	"	"	5.0V	"	H	L	H	"	"	"									
		90	GND	"	H	L	"	"	"	"	GND	"	H	L	"	"	"	"									
		91	5.0V	H	L	H	"	"	"	"	5.0V	H	L	H	"	"	"	"									
		92	GND	H	L	"	"	"	"	"	GND	H	L	"	"	"	"	"									
		93	5.0V	L	H	"	"	"	"	"	5.0V	L	H	"	"	"	"	"									
		94	GND	L	"	"	"	"	"	"	GND	L	"	"	"	"	"	"									
		95	5.0V	H	"	"	"	"	"	"	5.0V	H	"	"	"	"	"	"									
		96	GND	H	"	"	"	"	"	"	GND	H	"	"	"	"	"	"									
		97	GND	L	L	L	L	5.0V	"	"	GND	L	L	L	L	5.0V	"	"									
		98	5.0V	L	L	L	L	5.0V	"	"	5.0V	L	L	L	L	5.0V	"	"									
																			Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C				
																			Min	Max	Min	Max	Min	Max			
t <sub>PHL1</sub>	3003 Fig. 4	99				OUT	GND	IN	GND	IN					GND		5.0V	Clock A to Q1A	20	975	30	1465	20	975	ns		
		100				OUT	"	"	"	"					"		"	Clock A to Q2A	"	"	"	"	"	"	"		
		101			OUT		"	"	"	"					"		"	Clock A to Q3A	"	"	"	"	"	"	"		
		102					"	"	"	"	OUT				"		"	Clock A to Q4A	"	"	"	"	"	"	"		
		103	IN				"	"	"	"					OUT	"	IN	"	Clock B to Q1B	"	"	"	"	"	"	"	
		104	IN					GND						OUT		GND	IN	5.0V	Clock B to Q2B	20	975	30	1465	20	975	ns	
		105	"					"	GND	"	"			OUT		"	"	"	Clock B to Q3B	"	"	"	"	"	"	"	
106	"	OUT				"	"	"	"					"	"	"	Clock B to Q4B	"	"	"	"	"	"	"			

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			Clock B	Q4B	Q3A	Q2A	Q1A	Reset A	Data A	V <sub>SS</sub>	Clock A	Q4A	Q3B	Q2B	Q1B	Reset B	Data B	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
t <sub>PLH1</sub>	3003 Fig. 4	107					OUT	GND	IN	GND	IN					GND		5.0V	Clock A to Q1A	20	975	30	1465	20	975	ns	
		108				OUT		"	"	"	"					"		"	Clock A to Q2A	"	"	"	"	"	"	"	
		109			OUT			"	"	"	"					"		"	Clock A to Q3A	"	"	"	"	"	"	"	
		110							"	"	"	OUT				"		"	Clock A to Q4A	"	"	"	"	"	"	"	
		111	IN					"	"	"	"			OUT		"	IN	"	"	Clock B to Q1B	"	"	"	"	"	"	"
		112	"					"	"	"	"			OUT		"	"	"	"	Clock B to Q2B	"	"	"	"	"	"	"
		113	"					"	"	"	"			OUT		"	"	"	"	Clock B to Q3B	"	"	"	"	"	"	"
		114	"	OUT				"	"	"	"					"	"	"	"	Clock B to Q4B	"	"	"	"	"	"	"
t <sub>PHL2</sub>	3003 Fig. 4	115	GND				OUT	IN			GND							"	Reset to Q1A	"	"	"	"	"	"	"	
		116	"			OUT		"	"	"	"					"		"	Reset to Q2A	"	"	"	"	"	"	"	
		117	"		OUT			"	"	"	"					"		"	Reset to Q3A	"	"	"	"	"	"	"	
		118	"					"	"	"	"	OUT				"		"	Reset to Q4A	"	"	"	"	"	"	"	
		119	"					"	"	"	"			OUT	IN	"		"	Reset to Q1B	"	"	"	"	"	"	"	
		120	"					"	"	"	"			OUT		"		"	Reset to Q2B	"	"	"	"	"	"	"	
		121	"					"	"	"	"			OUT		"		"	Reset to Q3B	"	"	"	"	"	"	"	
		122	"	OUT				"	"	"	"					"		"	Reset to Q4B	"	"	"	"	"	"	"	
t <sub>THL</sub>	3004 Fig. 4	123				OUT	OUT	GND	IN	"	IN					GND		"	Q1A	13	650	18	975	13	650	"	
		124				OUT		"	"	"	"					"		"	Q2A	"	"	"	"	"	"	"	
		125			OUT			"	"	"	"					"		"	Q3A	"	"	"	"	"	"	"	
		126						"	"	"	"	OUT				"		"	Q4A	"	"	"	"	"	"	"	
		127	IN					"	"	"	"			OUT	OUT	"	IN	"	"	Q1B	"	"	"	"	"	"	"
		128	"					"	"	"	"			OUT		"	"	"	"	Q2B	"	"	"	"	"	"	"
		129	"					"	"	"	"			OUT		"	"	"	"	Q3B	"	"	"	"	"	"	"
		130	"	OUT				"	"	"	"					"	"	"	"	Q4B	"	"	"	"	"	"	"
t <sub>TLH</sub>	3004 Fig. 4	131				OUT	OUT	"	IN	"	IN					"		"	Q1A	"	975	"	1465	"	975	"	
		132				OUT		"	"	"	"					"		"	Q2A	"	"	"	"	"	"	"	
		133			OUT			"	"	"	"					"		"	Q3A	"	"	"	"	"	"	"	
		134						"	"	"	"			OUT		"		"	Q4A	"	"	"	"	"	"	"	
		135	IN					"	"	"	"			OUT	OUT	"	IN	"	"	Q1B	"	"	"	"	"	"	"
		136	"					"	"	"	"			OUT		"	"	"	"	Q2B	"	"	"	"	"	"	"
		137	"					"	"	"	"			OUT		"	"	"	"	Q3B	"	"	"	"	"	"	"
		138	"	OUT				"	"	"	"					"	"	"	"	Q4B	"	"	"	"	"	"	"

See footnotes at end of device type 03.



TABLE III. Group A inspection for device type 04.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
V <sub>IC</sub> (POS)	1	2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1mA			1mA	1mA	1mA	1mA								GND	PI8, PI4, PI3, PI2, PI1, P/S control, Clock, Serial IN, PI5, PI6, PI7	1.5	"						V	
V <sub>IC</sub> (NEG)	12	13, 14, 15, 16, 17, 18, 19, 20, 21, 22	-1mA			-1mA	-1mA	-1mA	-1mA	GND							PI8	PI4, PI3, PI2, PI1, P/S control, Clock, Serial IN, PI5, PI6, PI7	-6	"						"	
I <sub>SS</sub> 2/	3005	23, 24, 25, 26, 27, 28, 29	GND, 15.0V, 15.0V, 15.0V, GND, GND			GND, 15.0V, 15.0V, 15.0V, GND, GND	15.0V, GND, 15.0V, 15.0V, 15.0V, 15.0V	GND, 15.0V, GND, 15.0V, GND, 15.0V	15.0V, GND, 15.0V, 15.0V, 15.0V, 15.0V	"	15.0V	GND, 15.0V, 15.0V, 15.0V, 15.0V, 15.0V	15.0V	GND, 15.0V, 15.0V, 15.0V, 15.0V, 15.0V	GND, 15.0V, 15.0V, 15.0V, 15.0V, 15.0V	15.0V, GND, 15.0V, 15.0V, 15.0V, 15.0V	V <sub>SS</sub> , V <sub>SS</sub> , None, V <sub>SS</sub> , None, V <sub>SS</sub> , V <sub>SS</sub>	-0.5	"	-5.0	"				μA		
V <sub>OH1</sub>	3006	30, 31, 32	V <sub>IH1 3/</sub> , V <sub>IH1 3/</sub> , V <sub>IH1 3/</sub>	I <sub>OH 4/</sub>		V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	"	5/	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	I <sub>OH</sub>	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	V <sub>IH1</sub> , V <sub>IH1</sub> , V <sub>IH1</sub>	5.0V, 5.0V, 5.0V	Q6, Q7, Q8	4.5, 4.5, 4.5		4.5, 4.5		4.5, 4.5			"	
V <sub>OH2</sub>		33, 34, 35	V <sub>IH2 6/</sub> , V <sub>IH2 6/</sub> , V <sub>IH2 6/</sub>		I <sub>OH</sub>	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	"	"	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>		V	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	V <sub>IH2</sub> , V <sub>IH2</sub> , V <sub>IH2</sub>	12.5V, 12.5V, 12.5V	Q6, Q7, Q8	11.25, 11.25, 11.25	4.5	11.25, 11.25, 11.25	4.5	11.25, 11.25, 11.25		V	
V <sub>OL1</sub>		36, 37, 38	V <sub>IL1 7/</sub> , V <sub>IL1 7/</sub> , V <sub>IL1 7/</sub>	I <sub>OL 8/</sub>		V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	"	"	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	I <sub>OL</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	V <sub>IL1</sub> , V <sub>IL1</sub> , V <sub>IL1</sub>	5.0V, 5.0V, 5.0V	Q6, Q7, Q8	0.5, 0.5, 0.5		0.5, 0.5		0.5, 0.5, 0.5		"	
V <sub>OL2</sub>	39, 40, 41	V <sub>IL2 9/</sub> , V <sub>IL2 9/</sub> , V <sub>IL2 9/</sub>			V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	"	"	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>		V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	V <sub>IL2</sub> , V <sub>IL2</sub> , V <sub>IL2</sub>	12.5V, 12.5V, 12.5V	Q6, Q7, Q8	1.25, 1.25, 1.25		1.25, 1.25, 1.25		1.25, 1.25, 1.25		"		
I <sub>IH1</sub> 10/	3010	42	15.0V			15.0V	15.0V	15.0V	15.0V	"	15.0V	15.0V	15.0V	V	15.0V	15.0V	15.0V	15.0V	All inputs together		11.0						nA

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max	
I <sub>IH2</sub>	3010	43	15.0V			GND	GND	GND	GND	GND	GND	GND			GND	GND	15.0V	PI8	1.0	45			nA			
		44	GND			15.0V	GND	GND	"	"	"	"			"	"	"	PI4								
		45	"			GND	15.0V	GND	"	"	"	"	GND		"	"	"	PI3								
		46	"			"	GND	15.0V	"	"	"	"	"		"	"	"	PI2								
		47	"			"	"	GND	15.0V	"	"	"	"		"	"	"	PI1								
		48	"			"	"	"	GND	15.0V	"	"	"		"	"	"	P/S control								
		49	"			"	"	"	"	GND	15.0V	"	"		"	"	"	Clock								
		50	"			"	"	"	"	"	GND	15.0V	"		"	"	"	Serial IN								
		51	"			"	"	"	"	"	"	GND	15.0V	GND		"	"	"						PI5		
		52	"			"	"	"	"	"	"	"	GND	GND	15.0V		"	"						PI6		
		53	"			"	"	"	"	"	"	"	GND	GND	GND	15.0V		"						"	PI7	
I <sub>IL1</sub>	3010	54	GND			GND	GND	GND	GND	GND	GND			GND	GND	15.0V	All inputs together		-11.0			nA				
I <sub>IL2</sub>		55	"			"	"	"	"	"	"	"			"	"	"	PI8	-1.0	-45			"			
		56	"			"	"	"	"	"	"	"			"	"	"	PI4								
		57	"			"	"	"	"	"	"	"			"	"	"	PI3								
		58	"			"	"	"	"	"	"	"			"	"	"	PI2								
		59	"			"	"	"	"	"	"	"			"	"	"	PI1								
		60	"			"	"	"	"	"	"	"			"	"	"	P/S control								
		61	"			"	"	"	"	"	"	"			"	"	"	Clock								
		62	"			"	"	"	"	"	"	"			"	"	"	Serial IN								
		63	"			"	"	"	"	"	"	"			"	"	"	PI5								
		64	"			"	"	"	"	"	"	"			"	"	"	PI6								
65	"			"	"	"	"	"	"	"			"	"	"	PI7										
																		Subgroup 4 T <sub>C</sub> = 25°C								
																		Min	Max							
C <sub>i</sub>	3012	66	<u>11/</u>			<u>11/</u>	<u>11/</u>			GND							GND	PI8	12				"			
		67								"							"	PI4								
		68								"							"	PI3								
		69								"							"	PI2								
		70								"							"	PI1								
		71								"							"	P/S control								
		72								"							"	Clock								
		73								"							"	Serial IN								
		74								"							"	PI5								
		75								"							"	PI6								
76								"							"	PI7										

See footnotes at end of device type 04.



TABLE III. Group A inspection for device type 04 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit																
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8																				
																				1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16	Min	Max	T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C	
																																							Min	Max	Min	Max
Truth table test 12/	3014	77	GND	L	L	GND	GND	GND	GND	GND	5.0V	5.0V	GND	L	GND	GND	GND	5.0V	All outputs	See 13/, 14/																						
		78	GND	"	"	GND	GND	GND	GND	"	GND	5.0V	GND	"	GND	GND	GND	"																								
		79	5.0V	"	"	5.0V	5.0V	5.0V	GND	"	"	15/	5.0V	"	5.0V	5.0V	5.0V	"																								
		80	"	"	"	5.0V	5.0V	GND	5.0V	"	"	"	"	"	"	"	"	"																								
		81	"	"	"	5.0V	GND	5.0V	GND	"	"	"	5.0V	"	"	"	"	"																								
		82	"	"	"	GND	5.0V	GND	"	"	"	"	"	"	"	"	"	"																								
		83	"	"	"	5.0V	GND	"	"	"	"	"	"	"	GND	"	"	"																								
		84	"	"	"	5.0V	"	"	"	"	"	GND	"	"	GND	"	"	"																								
		85	"	H	"	GND	"	"	"	"	"	5.0V	"	"	5.0V	GND	"	"																								
		86	"	H	"	"	"	"	"	"	"	GND	"	"	5.0V	GND	"	"																								
		87	"	L	"	"	"	"	"	"	"	5.0V	"	H	GND	5.0V	GND	"																								
		88	"	L	"	"	"	"	"	"	"	GND	"	H	"	5.0V	GND	"																								
		89	GND	H	H	"	"	"	"	"	"	5.0V	"	"	"	GND	5.0V	"																								
		90	5.0V	"	L	"	"	"	"	"	"	15/	"	H	"	GND	5.0V	"																								
		91	GND	"	H	"	"	"	"	"	"	15/	"	H	"	"	"	"																								
		92	"	"	H	"	"	"	"	"	"	GND	"	H	"	"	"	"																								
		93	"	L	L	"	"	"	"	"	"	5.0V	GND	L	"	"	"	"																								
		94	"	"	"	"	"	"	"	"	"	GND	GND	GND	"	"	"	"																								
		95	5.0V	"	"	5.0V	5.0V	5.0V	5.0V	"	"	5.0V	"	"	5.0V	5.0V	5.0V	"																								
		96	"	"	"	"	"	"	"	"	"	15/	"	"	"	"	"	"																								
97	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																										
98	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																										
99	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																										
100	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"																										
101	"	H	H	"	"	"	"	"	"	5.0V	GND	"	H	"	"	"																										
102	"	"	"	"	"	"	"	"	"	GND	GND	5.0V	"	"	"	"																										
103	GND	"	"	GND	GND	GND	"	"	"	GND	5.0V	5.0V	"	GND	GND	GND																										
104	GND	"	"	GND	GND	5.0V	"	"	"	GND	15/	5.0V	"	GND	GND	GND																										

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 7 T <sub>C</sub> =25°C		Subgroup 8				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	T <sub>C</sub> =125°C		T <sub>C</sub> =-55°C		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max										
Truth table test 12/	3014	105	GND	H	H	GND	5.0V	5.0V	5.0V	GND	GND	15/	5.0V	H	GND	GND	GND	5.0V	All outputs	See 13/, 14/						
		106	"	H	H	5.0V	5.0V	5.0V	5.0V	"	GND	15/	"	H	GND	"	"	"								
		107	"	H	H	5.0V	5.0V	5.0V	5.0V	"	GND	15/	"	H	5.0V	"	"	"								
		108	"	L	L	GND	GND	GND	GND	"	GND	15/	5.0V	"	L	GND	"	"			"					
		109	"	"	"	GND	GND	"	"	"	GND	15/	"	"	GND	"	"	"								
		110	5.0V	"	"	5.0V	5.0V	"	"	"	"	"	"	"	5.0V	5.0V	5.0V	"								
		111	"	"	"	5.0V	GND	"	"	"	"	"	"	"	5.0V	"	"	"								
		112	"	"	"	GND	GND	"	"	"	"	"	"	"	5.0V	"	"	"								
		113	"	"	"	GND	GND	"	"	"	"	"	"	"	GND	"	"	"								
																					Subgroup 9 T <sub>C</sub> =25°C		Subgroup 10 T <sub>C</sub> =125°C		Subgroup 11 T <sub>C</sub> =-55°C	
																			Min	Max	Min	Max	Min	Max		
t <sub>PHL1</sub>	3003 Fig. 4	114	IN	OUT		GND	GND	GND	GND	GND	IN	GND			GND	IN	IN	5.0V	P/S control to Q6	20	975	30	1465	20	975	ns
		115	"			"	"	"	"	"	"	"		OUT	"	"	"	"	P/S control to Q7	"	"	"	"	"	"	"
		116	"		OUT	"	"	"	"	"	"	"			"	"	"	"	P/S control to Q8	"	"	"	"	"	"	"
t <sub>PLH1</sub>		117	"	OUT		"	"	"	"	"	"			OUT	"	"	"	"	P/S control to Q6	"	"	"	"	"	"	"
		118	"			"	"	"	"	"	"			OUT	"	"	"	"	P/S control to Q7	"	"	"	"	"	"	"
		119	"		OUT	"	"	"	"	"	"	"			"	"	"	"	P/S control to Q8	"	"	"	"	"	"	"
t <sub>PHL2</sub>		120									GND	IN	IN					"	Clock to Q6	"	"	"	"	"	"	"
		121									"	"	"	"				"	Clock to Q7	"	"	"	"	"	"	"
		122	OUT		OUT						"	"	"	"	OUT				"	Clock to Q8	"	"	"	"	"	"
t <sub>PLH2</sub>		123									"	"	"	"				"	Clock to Q6	"	"	"	"	"	"	"
		124									"	"	"	"				"	Clock to Q7	"	"	"	"	"	"	"
		125	OUT		OUT						"	"	"	"	OUT				"	Clock to Q8	"	"	"	"	"	"
t <sub>THL</sub>	3004 Fig. 4	126								"	"	"	"	OUT				"	Q6	13	700	18	1050	13	700	"
		127								"	"	"	"	OUT				"	Q7	"	700	"	1050	"	700	"
		128	OUT		OUT					"	"	"	"	OUT				"	Q8	"	700	"	1050	"	700	"
t <sub>TLH</sub>		129								"	"	"	"	OUT				"	Q6	"	900	"	1350	"	900	"
		130								"	"	"	"	OUT				"	Q7	"	900	"	1350	"	900	"
		131	OUT		OUT					"	"	"	"	OUT				"	Q8	"	900	"	1350	"	900	"
f <sub>CL</sub> (max) 13/	132	133								"	"	"	"	OUT				"	Clock		1.0		1.4		1.0	μs
		134	OUT		OUT					"	"	"	"	OUT				"	Clock		1.0		1.4		1.0	μs

See footnotes on next page.

TABLE III. Group A inspection for device type 04 – Continued.

- 1/ Terminals not designated may be “HIGH” level logic, “LOW” level logic, or open except as follows:  
 $I_{C(PoS)}$  tests; the  $V_{SS}$  terminal shall be open.  
 $I_{C(NEG)}$  tests; the  $V_{DD}$  terminal shall be open.  
 $V_{SS}$  tests; the output terminals shall be open.
- 2/ Test numbers 23 through 29 shall be run in sequence. See 4.5.3.
- 3/  $V_{IH1} = 3.8 \text{ V}$  at 25°C, 3.6 V at 125°C, 3.95 V at -55°C.
- 4/  $I_{OH} = -80 \text{ }\mu\text{A}$  at 25°C, -55  $\mu\text{A}$  at 125°C, -100  $\mu\text{A}$  at -55°C.
- 5/ Apply clock pulse;  $V_{IN} = 0 \text{ V}$  to  $V_{DD}$  until proper output state is achieved.
- 6/  $V_{IH2} = 9.5 \text{ V}$  at 25°C, 9.25 V at 125°C, 9.75 V at -55°C.
- 7/  $V_{IL1} = 1.1 \text{ V}$  at 25°C, 0.85 V at 125°C, 1.35 V at -55°C.
- 8/  $I_{OL} = 120 \text{ }\mu\text{A}$  at 25°C, 85  $\mu\text{A}$  at 125°C, 150  $\mu\text{A}$  at -55°C.
- 9/  $V_{IL2} = 2.8 \text{ V}$  at 25°C, 2.55 V at 125°C, 3.05 V at -55°C.
- 10/ 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.
- 11/ See 4.4.1c.
- 12/ Test numbers 77 through 113 shall be run in sequence.
- 13/ The output voltage limits for each temperature are “H” =  $V_{DD} - 0.5 \text{ V min.}$  and “L” =  $V_{SS} + 0.5 \text{ V max.}$
- 14/ The functional tests shall be performed at  $V_{IH}$  and  $V_{DD} \leq 5.0 \text{ V}$  and  $\geq 15 \text{ V}$ .
- 15/ Apply clock pulse;  $V_{IN} = 0 \text{ V dc}$  to  $V_{DD}$ .
- 16/ The maximum clock frequency ( $f_{CL}$ ) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.

TABLE III. Group A inspection for device type 05.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit						
			Recirc. in	Clock	NC	NC	NC	Q	Q̄	V <sub>SS</sub>	Delayed clock	Mode cont.	NC	NC	NC	NC	Data in	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> =25°C		Subgroup 2 T <sub>C</sub> =125°C		Subgroup 3 T <sub>C</sub> =-55°C								
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	Min	Max	Min	Max	Min		Max					
V <sub>IC</sub> (POS)	1	2	1mA	1mA														GND	Recirc in	1.5	"					V						
		3									1mA								"								Clock					
		4																1mA	Mode cont.							"						
V <sub>IC</sub> (NEG)	5	6	-1mA	-1mA						GND									Recirc in	-6	"					"						
		7									"								"								Clock					
		8								"									Mode cont.							"						
I <sub>SS</sub> 2/	3005	9	GND	3/														15.0V	15.0V	None	-2.0	"	-20	"	"	μA						
		10	"	"							"								GND	GND							"					"
		11	"	"							"								15.0V	15.0V							"					"
		12	"	"							"								GND	GND							"					"
		13	"	"							"								15.0V	15.0V							"					"
		14	"	"							"								GND	GND							"					"
		15	"	"							"								15.0V	15.0V							"					"
		16	"	"							"								GND	GND							"					"
		17	"	"							"								15.0V	15.0V							"					"
		18	"	"							"								GND	GND							"					"
		19	"	"							"								15.0V	15.0V							"					"
		20	"	"							"								GND	GND							"					"
		21	"	"							"								15.0V	15.0V							"					"
		22	"	"							"								GND	GND							"					"
		23	"	"							"								15.0V	15.0V							"					"
		24	"	"							"								GND	GND							"					"
		25	"	"							"								15.0V	15.0V							"					"
		26	"	"							"								GND	GND							"					"
		27	"	"							"								15.0V	15.0V							"					"
		28	"	"							"								GND	GND							"					"
		29	"	"							"								15.0V	15.0V							"					"
		30	"	"							"								GND	GND							"					"
		31	"	"							"								15.0V	15.0V							"					"
		32	"	"							"								GND	GND							"					"
		33	"	"							"								15.0V	15.0V							"					"
		34	"	"							"								GND	GND							"					"
		35	"	"							"								15.0V	15.0V							"					"
		36	"	"							"								GND	GND							"					"
	37	"	"							"								15.0V	15.0V	"					"							
	38	"	"							"								GND	GND	"					"							
	39	"	"							"								15.0V	15.0V	"					"							
	40	"	"							"								GND	GND	"					"							
	41	"	"							"								15.0V	15.0V	"					"							
	42	"	"							"								GND	GND	"					"							
	43	"	"							"								15.0V	15.0V	"					"							
	44	"	"							"								GND	GND	"					"							
	45	"	"							"								15.0V	15.0V	"					"							

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued.

Symbol	MIL-STD-883 method	Cases E, F, N, Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit							
			Recirc in	Clock	NC	NC	NC	Q	$\bar{Q}$	V <sub>SS</sub>	Delayed clock	Mode cont.	NC	NC	NC	NC	Data in	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C									
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max								
I <sub>SS</sub> 2/	3005	46	GND	3/						GND							GND	15.0V	None													μA	
		47	"	"						"								15.0V	"	"												"	
		48	"	"						"								GND	"	"	-2.0											"	
		49	"	"						"								15.0V	"	"												"	
		50	"	"						"								GND	"	"												"	
		51	"	"						"								15.0V	"	"												"	
		52	"	"						"								GND	"	"												"	
		53	"	"						"								15.0V	"	"												"	
		54	"	"						"								GND	"	"												"	
		55	"	"						"								15.0V	"	"												"	
		56	"	"						"								GND	"	"												"	
		57	"	"						"								15.0V	"	"												"	
		58	"	"						"								GND	"	"												"	
		59	"	"						"								15.0V	"	"												"	
				60	GND	3/						GND							GND	15.0V	None												μA
				61	"	"						"							15.0V	"	"												"
				62	"	"						"							GND	"	"	-2.0											"
				63	"	"						"							15.0V	"	"												"
				64	"	"						"							GND	"	"												"
				65	"	"						"							15.0V	"	"												"
				66	"	"						"							GND	"	"												"
				67	"	"						"							15.0V	"	"												"
				68	"	"						"							GND	"	"												"
				69	"	"						"							15.0V	"	"												"
				70	"	"						"							GND	"	"												"
				71	"	15.0V						"							15.0V	"	V <sub>SS</sub>												"
				72	"	GND						"							GND	"	V <sub>SS</sub>												"
				73	"	15.0V						"							15.0V	"	None												"
		74	15.0V	"						"							GND	"	V <sub>SS</sub>												"		
		75	15.0V	"						"							GND	"	V <sub>SS</sub>												"		
		76	GND	"						"							15.0V	"	V <sub>SS</sub>												"		
V <sub>OH1</sub>	3006	77	V <sub>IL1 4/</sub>	5/					I <sub>OH1 6/</sub>	"							V <sub>IH1 9/</sub>	5.0V	Q	4.5											"		
		78	V <sub>IL1 4/</sub>	5/					"	I <sub>OH2 7/</sub>	"							V <sub>IL1</sub>	5.0V	$\bar{Q}$	4.5											"	
		79	V <sub>IL1 4/</sub>	V <sub>IH1</sub>						I <sub>OH3 8/</sub>	"							V <sub>IL1</sub>	5.0V	Delayed clock	4.5	4.5	4.5	4.5	4.5	4.5	V					"	
V <sub>OH2</sub>		80	V <sub>IL2 10/</sub>	5/						"							V <sub>IH2 11/</sub>	12.5V	Q	11.25											"		
		81	V <sub>IL2 10/</sub>	5/						"							V <sub>IL2</sub>	12.5V	$\bar{Q}$	11.25	11.25	11.25	11.25	11.25	11.25						"		
		82	V <sub>IL2 10/</sub>	V <sub>IH2</sub>						"							V <sub>IH2</sub>	12.5V	Delayed clock	11.25	11.25	11.25	11.25	11.25	11.25						"		
V <sub>OL1</sub>	3007	83	V <sub>IL1</sub>	5/					I <sub>OL1 12/</sub>	"							V <sub>IL1</sub>	5.0V	Q												"		
		84	V <sub>IL1</sub>	5/						I <sub>OL2 13/</sub>	"							V <sub>IH1</sub>	5.0V	$\bar{Q}$		0.5										"	
		85	V <sub>IL1</sub>	V <sub>IL1</sub>						I <sub>OL3 14/</sub>	"							V <sub>IL1</sub>	5.0V	Delayed clock	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		"	
V <sub>OL2</sub>		86	V <sub>IL2</sub>	5/						"							V <sub>IL2</sub>	12.5V	Q												"		
		87	V <sub>IL2</sub>	5/						"							V <sub>IH2</sub>	12.5V	$\bar{Q}$		1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25		"		
		88	V <sub>IL2</sub>	V <sub>IL2</sub>						"							V <sub>IL2</sub>	12.5V	Delayed clock	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25		"		

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			Recirc. in	Clock	NC	NC	NC	Q	$\bar{Q}$	V <sub>SS</sub>	Delayed clock	Mode cont.	NC	NC	NC	NC	Data in	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C			
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	Min	Max	Min	Max	Min		Max
I <sub>IH1</sub> 15/ I <sub>IH2</sub>	3010	89	15.0V	15.0V						GND		15.0V					15.0V	15.0V	All inputs together							nA	
		90	15.0V	GND						"		GND					GND	"	Recirc. in	4.0	"					"	
		91	GND	15.0V						"		GND					GND	"	Clock	1.0	"	45	"			"	
		92 93	"	"						"	GND	15.0V GND					15.0V	"	Mode control Data in		"					"	
I <sub>IL1</sub> 15/ I <sub>IL2</sub>	3009	94	"	"					"		"					GND	"	All inputs together								"	
		95	"	"					"		"					"	"	Recirc. in	-4.0	"					"		
		96	"	"					"		"					"	"	Clock		"					"		
		97 98	"	"					"		"					"	"	Mode control Data in	-1.0	"	-45	"				"	
																			Subgroup 4 T <sub>C</sub> = 25°C								
																			Min	Max							
C <sub>i</sub>	3012	99	16/							GND							GND		Recirc in							pF	
		100		16/															Clock		70					"	
		101										16/							Mode control	12	12					"	
		102														16/			Data in		12					"	
																			Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8 T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C				
																			Min	Max	Min	Max	Min	Max			
Truth table test 17/	3014	103	GND	5.0V						GND		GND					5.0V	5.0V	None	} See 18/, 19/, 20/							
		104	GND	GND						"		"					5.0V	"	"								
		105	GND	5.0V						"		"					5.0V	"	"								
		106	5.0V	GND						"		"					GND	"	"								
		107	5.0V	5.0V						"		"					GND	"	"								
		108	GND	GND						"		"					5.0V	"	"								
		109	"	5.0V						"		"					"	"	"								
		110	"	GND						"		"	5.0V				"	"	"								
		111	"	5.0V						"		"	"				"	"	"								
		112	5.0V	GND						"		"	"				GND	"	"								
		113	"	5.0V						"		"	"				GND	"	"								
		114	"	21/						"		"	GND				5.0V	"	"								
		115	"	5.0V						"		"	"				"	"	"		All outputs						
		116	"	GND						"		"	"	H	L		"	"	"								
		117	"	5.0V						"		"	"	L	L		"	"	"								
		118	"	GND						"		"	"	L	H		"	"	"								
119	"	5.0V						"		"	"	H	L		"	"	"										
120	"	GND						"		"	"	L	L		"	"	"										
121	"	5.0V						"		"	"	L	H		"	"	"										
122	"	GND						"		"	"	L	H		"	"	"										
123	"	5.0V						"		"	"	H	L		"	"	"										

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit		
			Recirc. in	Clock	NC	NC	NC	Q	$\bar{Q}$	V <sub>SS</sub>	Delayed clock	Mode cont.	NC	NC	NC	NC	Data in	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C				
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	Min	Max	Min	Max	Min		Max	
t <sub>PHL1</sub>	3003 Fig. 4	124	GND	IN				OUT		GND		GND					IN	5.0V	Clock to Q	13	1060	18	1590	13	1060	ns		
t <sub>PHL2</sub>		125	GND	"					OUT	"		GND					IN	"	Clock to Q	"	1320	"	1980	"	1320	"		
t <sub>PHL3</sub>		126	GND	"							"	OUT	GND					"	"	Clock to delayed clock	"	650	"	975	"	650	"	
t <sub>PHL4</sub>		127	IN	"				OUT		"			5.0V					"	"	Clock to Q	"	1060	"	1590	"	1060	"	
t <sub>PLH1</sub>		128	GND	"				OUT		"			GND				IN	"	"	Clock to Q	"	1060	"	1590	"	1060	"	
t <sub>PLH2</sub>		129	GND	"					OUT	"			GND				IN	"	"	Clock to Q	"	1320	"	1980	"	1320	"	
t <sub>PLH3</sub>		130	GND	"						"		OUT	GND					"	"	Clock to delayed clock	"	650	"	975	"	650	"	
t <sub>PLH4</sub>		131	IN	"				OUT		"			5.0V					"	"	Clock to Q	"	1060	"	1590	"	1060	"	
t <sub>THL1</sub>		3004 Fig. 4	132	GND	"			OUT		"			GND				IN	"	"	Q	10	290	14	435	10	290	"	
t <sub>THL2</sub>	133		GND	"				OUT	"			GND				IN	"	"	Q	"	1400	"	2100	"	1400	"		
t <sub>THL3</sub>	134		GND	"						"		OUT	GND					"	"	Delayed clock	"	350	"	525	"	350	"	
t <sub>TLH1</sub>	3004 Fig. 4	135	GND	IN			OUT		"			GND				IN	5.0V	"	Q	10	340	14	510	10	340	ns		
t <sub>TLH2</sub>		136	GND	"				OUT	"			"				IN	"	"	Q	"	1400	"	2100	"	1400	"		
t <sub>TLH3</sub>		137	GND	"						"		OUT	"					"	"	Delayed clock	"	350	"	525	"	350	"	
f <sub>CL</sub> (max) 22/	138	139		"			OUT		"		OUT	"					"	"	Clock							μs		
		140		"				OUT		"		"				IN	"	"	"		1.25	"				"	"	
		141	IN	"					OUT	"		"	5.0V					"	"	"		"					"	"
		142	IN	"					OUT	"		"	5.0V					"	"	"		"					"	"

See footnotes on next page.

TABLE III. Group A inspection for device type 05 – Continued.

- 1/ Terminals not designated may be “HIGH” level logic, “LOW” level logic, or open except as follows:  
 $I_{C(POS)}$  tests; the  $V_{SS}$  terminal shall be open.  
 $I_{C(NEG)}$  tests; the  $V_{DD}$  terminal shall be open.  
 $V_{SS}$  tests; the output terminals shall be open.
- 2/ Test numbers 9 through 76 shall be run in sequence. See 4.5.3.
- 3/ Apply single clock pulse;  $V_{IN} = 0$  V dc to  $V_{DD}$ .
- 4/  $V_{IL1} = 1.1$  V at 25°C, 0.85 V at 125°C, 1.35 V at -55°C.
- 5/ Apply clock pulse;  $V_{IN} = 0$  V to  $V_{DD}$  until proper output state is achieved.
- 6/  $I_{OH1} = -320$   $\mu$ A at 25°C, -225  $\mu$ A at 125°C, -400  $\mu$ A at -55°C.
- 7/  $I_{OH2} = -90$   $\mu$ A at 25°C, -60  $\mu$ A at 125°C, -110  $\mu$ A at -55°C.
- 8/  $I_{OH3} = -400$   $\mu$ A at 25°C, -280  $\mu$ A at 125°C, -480  $\mu$ A at -55°C.
- 9/  $V_{IH1} = 3.8$  V at 25°C, 3.6 V at 125°C, 3.95 V at -55°C.
- 10/  $V_{IL2} = 2.8$  V at 25°C, 2.55 V at 125°C, 3.05 V at -55°C.
- 11/  $V_{IH2} = 9.5$  V at 25°C, 9.25 V at 125°C, 9.75 V at -55°C.
- 12/  $I_{OL1} = 1.3$  mA at 25°C, 0.5 mA at 125°C, 1.5 mA at -55°C.
- 13/  $I_{OL2} = 90$   $\mu$ A at 25°C, 60  $\mu$ A at 125°C, 110  $\mu$ A at -55°C.
- 14/  $I_{OL3} = 400$   $\mu$ A at 25°C, 280  $\mu$ A at 125°C, 480  $\mu$ A at -55°C.
- 15/ 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.
- 16/ See 4.4.1c.
- 17/ Test numbers 103 through 123 shall be run in sequence.
- 18/ The output voltage limits for each temperature are “H” =  $V_{DD} - 0.5$  V min. and “L” =  $V_{SS} + 0.5$  V max.
- 19/ For all test conditions, delayed clock ( $CL_D$ ) is clock delayed by two inverters.
- 20/ The functional tests shall be performed at  $V_{IH}$  and  $V_{DD} \leq 5.0$  V and  $\geq 15$  V.
- 21/ Apply 59 clock pulses;  $V_{IN} = 0$  V dc to  $V_{DD}$ .
- 22/ The maximum clock frequency ( $f_{CL}$ ) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.





TABLE III. Group A inspection for device type 06 – Continued.

Symbol	MIL-STD-883 method	Cases J.K.U. Symbol	Terminal conditions and limits 1/																								Measured terminal	Test limits						Unit
			B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6	A7	A8	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		Min	Max	Min	Max	Min	Max	
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	Min	Max	Min	Max	Min	
V <sub>OL1</sub>	3007	58								5.0V		5.0V	GND	5.0V	GND	5/	9/								5.0V	B1							V	
		59																9/								B2								
		60																		9/							B3	0.5						
		61																									B4		0.5					
		62																									B5							
		63																									B6							
		64																									B7							
		65	8/																								B8							
		66		8/																							A1							
		67												GND													A2							
		68																		8/							A3							
		69																			8/						A4							
		70																				8/					A5							
		71																					8/				A6							
72																						8/			A7									
73	9/	9/	9/	9/	9/	9/	9/	9/	9/	9/	9/														A8									
74											9/														A1									
V <sub>OL2</sub>	3010	75								12.5V		12.5V		12.5V				10/							12.5V	B1								
		76																	10/							B2								
		77																		10/						B3	1.25							
		78																			10/					B4		1.25						
		79																				10/				B5								
		80																					10/			B6								
		81																						10/		B7								
		82																							10/	B8								
		83												GND												A1								
		84																								A2								
		85																								A3								
		86																								A4								
		87																								A5								
		88																								A6								
89																								A7										
90																								A8										
91	10/	10/	10/	10/	10/	10/	10/	10/	10/	10/	10/													A1										
I <sub>HI1</sub> 11/	3010	92								15.0V	15.0V	15.0V		15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	All HIGH level inputs together		14					nA		
		92A	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	GND	15.0V	GND		15.0V	15.0V	15.0V										12							
		93	15.0V	GND	GND	GND	GND	GND	GND	GND	GND	GND			GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	B8								
		94	GND	15.0V	GND	GND	GND	GND	GND	GND	GND	GND														B7								
		95		GND	15.0V	GND	GND	GND	GND	GND	GND	GND														B6	1.0		45					
		96			GND	15.0V	GND	GND	GND	GND	GND	GND														B5								
		97				GND	15.0V	GND	GND	GND	GND	GND														B4								
		98					15.0V	GND	15.0V	GND	15.0V	GND														B3								
		99						15.0V	GND	15.0V	GND	15.0V														B2								
		100							15.0V	GND	15.0V	GND														B1								
		101								15.0V	GND	15.0V														AE								
		102									15.0V	GND														Ser. IN								
		103										15.0V														A/B								
		104											15.0V													P/S								
105												15.0V												A/S										
106													15.0V											Clock										
107														15.0V										A1										
108															15.0V									A2										
109																15.0V								A3										
110																	15.0V							A4										
111																		15.0V						A5										
112																			15.0V					A6										
113																				15.0V				A7										
114																					15.0V			A8										

See footnotes at end of device type 06.

TABLE III. Group A inspection for device type 06 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U	Terminal conditions and limits 1/																								Measured terminal	Test limits						Unit	
			Symbol	B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6	A7	A8		V <sub>DD</sub>	Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
				Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23	24	Min	Max	Min	Max		Min
I <sub>IL1</sub> 11/	3009	115	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	15.0V	All inputs together		-22					nA	
I <sub>IL2</sub>		116	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B8		-1.0		-45			"		
		117	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B7		"		"		"	"		
		118	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B6		"		"		"	"		
		119	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B5		"		"		"	"		
		120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B4		"		"		"	"		
		121	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B3		"		"		"	"		
		122	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B2		"		"		"	"		
		123	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	B1		"		"		"	"		
		124	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	AE		"		"		"	"		
		125	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Ser IN		"		"		"	"		
		126	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A/B		"		"		"	"		
		127	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	P/S		"		"		"	"		
		128	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A/S		"		"		"	"		
		129	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock		"		"		"	"		
		130	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A1		"		"		"	"		
		131	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A2		"		"		"	"		
		132	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A3		"		"		"	"		
		133	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A4		"		"		"	"		
		134	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A5		"		"		"	"		
		135	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A6		"		"		"	"		
		136	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A7		"		"		"	"		
		137	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A8		"		"		"	"		
																								Subgroup 4 T <sub>C</sub> = 25°C											
C <sub>i</sub>	3012	138									12/	12/	GND												GND	AE						pF			
		139										12/	"												"	Serial In	12	"				"			
		140										12/	"												"	A/B	"	"				"			
		141											"												"	P/S	"	"				"			
		142											"												"	A/S	"	"				"			
		143											"												"	Clock	"	"				"			
																								Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8									
Truth table test 13/	3014	144										5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	All outputs	} See 14/, 15/							
		145	L	H	L	H	L	H	L	H		5.0V	"	"	5.0V	"	"	5.0V	"	"	5.0V	"	"	5.0V	"	"									
		146	"	"	"	"	"	"	"	"		GND	"	"	GND	"	"	GND	"	"	GND	"	"	GND	"	"									
		147	"	"	"	"	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		148	"	"	"	"	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		149	H	L	H	L	H	L	H	L		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		150	"	"	"	"	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		151	"	"	"	"	"	"	"	"		5.0V	"	"	5.0V	"	"	5.0V	"	"	5.0V	"	"	5.0V	"	"									
		152	"	"	"	"	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		153	L	H	L	H	L	H	L	H		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		154	H	L	H	L	H	L	H	L		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		155	L	H	L	H	L	H	L	H		GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		156	L	H	L	H	L	H	L	H		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		157	L	H	L	H	L	H	L	H		GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		158	"	"	"	"	"	"	"	"		GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		159	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V		5.0V	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		160	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		161	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		162	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									
		163	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V		"	"	"	"	"	"	"	"	"	"	"	"	"	"	"									

See footnotes at end of device type 06.

TABLE III. Group A inspection for device type 06 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U	Terminal conditions and limits 1/																								Measured terminal	Test limits						Unit					
			Symbol	B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6	A7	A8		V <sub>DD</sub>	Subgroup 7		Subgroup 8								
				Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23	24	T <sub>C</sub> = 25°C		T <sub>C</sub> = 125°C			T <sub>C</sub> = -55°C				
					Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max		Min	Max	Min	Max								
Truth table test 13/	3014	164	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	L	H	L	H	L	H	L	H	L	H	5.0V	All outputs	See 14/, 15/									
		165	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	H	L	L	H	L	H	L	H	L	H	"											
		166	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	H	L	L	H	L	H	L	H	L	H	"											
		167	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	H	L	H	L	H	L	H	L	H	"											
		168	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	H	L	H	L	H	L	H	L	H								"			
		169	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	H	L	H	L	H	L	H	L	H								"			
		170	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	L	H	L	H	L	H	L	H	"											
																								Subgroup 9		Subgroup 10		Subgroup 11											
																								T <sub>C</sub> = 25°C		T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C											
																								Min	Max	Min	Max	Min	Max	Min	Max								
t <sub>PHL1</sub>	3003 Fig. 4	171									5.0V																5.0V	Clock to B1	13	1100	18	1300	13	1000	ns				
		172										5.0V																"	Clock to B2	"	"	"	"	"	"	"			
		173										"																"	Clock to B3	"	"	"	"	"	"	"			
		174										"																"	Clock to B4	"	"	"	"	"	"	"			
		175										"																"	Clock to B5	"	"	"	"	"	"	"			
		176										"																"	Clock to B6	"	"	"	"	"	"	"			
		177										"																"	Clock to B7	"	"	"	"	"	"	"			
t <sub>PLH1</sub>		178	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	IN	"	Clock to B8	"	"	"	"	"	"	"				
		179										"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	Clock to B1	"	1300	"	1500	"	1200	"				
		180										"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	"	Clock to B2	"	"	"	"	"	"	"				
		181										"	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	"	Clock to B3	"	"	"	"	"	"	"				
		182										"	"	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	"	Clock to B4	"	"	"	"	"	"	"				
		183										"	"	"	"	"	"	"	"	"	"	"	IN	IN	IN	IN	"	Clock to B5	"	"	"	"	"	"	"				
		184										"	"	"	"	"	"	"	"	"	"	"	IN	IN	IN	IN	"	Clock to B6	"	"	"	"	"	"	"				
t <sub>PHL2</sub>		185	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to B7	"	"	"	"	"	"	"				
		186	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to B8	"	"	"	"	"	"	"				
		187										"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	Clock to A1	"	1100	"	1300	"	1000	"				
		188										"	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	Clock to A2	"	"	"	"	"	"	"				
		189										"	"	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	"	Clock to A3	"	"	"	"	"	"	"				
		190										"	"	"	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	"	Clock to A4	"	"	"	"	"	"	"				
		191										"	"	"	"	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	"	Clock to A5	"	"	"	"	"	"	"				
t <sub>PHL2</sub>		192									"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to A6	"	"	"	"	"	"	"				
		193									"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to A7	"	"	"	"	"	"	"				
			IN	IN	IN	IN	IN	IN	IN	IN	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to A8	"	"	"	"	"	"	"				

See footnotes at end of device type 06.

TABLE III. Group A inspection for device type 06 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U Symbol	Terminal conditions and limits 1/																								Measured terminal	Test limits						Unit	
			B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6	A7	A8	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		Min	Max	Min	Max	Min	Max		
t <sub>PLH2</sub>	3003 Fig. 4	195								IN	5.0V		GND	5.0V	GND	IN	OUT	OUT								5.0V	Clock to A1	13	1300	18	1500	13	1200	ns	
		196								IN		GND															Clock to A2								
		197																		OUT								Clock to A3							
		198																										Clock to A4							
		199				IN																						Clock to A5							
		200			IN																							Clock to A6							
		201		IN																								Clock to A7							
		202																								OUT		Clock to A8							
t <sub>PHL3</sub>		203								OUT		IN	5.0V		GND												Clock to B1		1100		1300		1000		
		204								OUT																	Clock to B2								
		205								OUT																		Clock to B3							
		206								OUT																		Clock to B4							
		207				OUT																						Clock to B5							
		208			OUT																							Clock to B6							
		209		OUT																								Clock to B7							
		210								OUT																		Clock to B8							
t <sub>PLH3</sub>		211								OUT																	Clock to B1		1300		1500		1200		
		212																									Clock to B2								
		213																									Clock to B3								
		214																									Clock to B4								
		215				OUT																						Clock to B5							
		216			OUT																							Clock to B6							
		217		OUT																								Clock to B7							
		218																										Clock to B8							
t <sub>PHL4</sub>		219										GND						OUT	OUT								Clock to A1		1100		1300		1000		
		220																									Clock to A2								
		221																									Clock to A3								
		222																									Clock to A4								
		223																									Clock to A5								
		224																									Clock to A6								
		225																									Clock to A7								
		226																									Clock to A8								

See footnotes at end of device type 06.

TABLE III. Group A inspection for device type 06 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U Symbol	Terminal conditions and limits 1/																								Measured terminal	Test limits						Unit
			B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6	A7	A8	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		Min	Max	Min	Max	Min	Max	
t <sub>PLH4</sub>	3003 Fig. 4	227								5.0V	IN	GND	GND	GND	GND	IN	OUT	OUT								5.0V	Clock to A1	13	1300	18	1500	13	1200	ns
		228								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A2	"	"	"	"	"	"	"	
		229								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A3	"	"	"	"	"	"	"	
		230								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A4	"	"	"	"	"	"	"	
		231								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A5	"	"	"	"	"	"	"	
		232								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A6	"	"	"	"	"	"	"	
		233								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A7	"	"	"	"	"	"	"	
234								"	"	"	"	"	"	"	"	"	OUT						"	Clock to A8	"	"	"	"	"	"	"			
t <sub>THL1</sub>	3004 Fig. 4	235						OUT	"	"	"	5.0V	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	IN	"	B1	10	1100	14	1300	10	1000	"	
		236						OUT	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B2	"	"	"	"	"	"	"	
		237						OUT	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B3	"	"	"	"	"	"	"	
		238						OUT	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B4	"	"	"	"	"	"	"	
		239						OUT	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B5	"	"	"	"	"	"	"	
		240						OUT	"	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B6	"	"	"	"	"	"	"	
		241	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B7	"	"	"	"	"	"	"	
242	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B8	"	"	"	"	"	"	"			
t <sub>TLH1</sub>		243						OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B1	"	2000	"	2300	"	1800	"		
		244						OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B2	"	"	"	"	"	"	"		
		245						OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B3	"	"	"	"	"	"	"		
		246						OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B4	"	"	"	"	"	"	"		
		247						OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B5	"	"	"	"	"	"	"		
		248						OUT	"	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B6	"	"	"	"	"	"	"		
		249	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B7	"	"	"	"	"	"	"		
250	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	"	"	"	"	"	IN	IN	IN	IN	IN	IN	IN	IN	"	B8	"	"	"	"	"	"	"				
t <sub>THL2</sub>		251						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A1	"	1100	"	1300	"	1000	"		
		252						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A2	"	"	"	"	"	"	"		
		253						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A3	"	"	"	"	"	"	"		
		254						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A4	"	"	"	"	"	"	"		
		255						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A5	"	"	"	"	"	"	"		
		256						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A6	"	"	"	"	"	"	"		
		257	IN	IN	IN	IN	IN	IN	IN	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A7	"	"	"	"	"	"	"		
258	IN	IN	IN	IN	IN	IN	IN	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A8	"	"	"	"	"	"	"				
t <sub>TLH2</sub>		259						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A1	"	2000	"	2300	"	1800	"		
		260						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A2	"	"	"	"	"	"	"		
		261						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A3	"	"	"	"	"	"	"		
		262						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A4	"	"	"	"	"	"	"		
		263						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A5	"	"	"	"	"	"	"		
		264						IN	"	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A6	"	"	"	"	"	"	"		
		265	IN	IN	IN	IN	IN	IN	IN	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A7	"	"	"	"	"	"	"		
266	IN	IN	IN	IN	IN	IN	IN	"	"	"	"	"	"	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	"	A8	"	"	"	"	"	"	"				

See footnotes at end of device type 06.

TABLE III. Group A inspection for device type 06 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U Symbol	Terminal conditions and limits 1/																								Measured terminal	Test limits						Unit	
			B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6	A7	A8	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	Min	Max	Min	Max	Min		Max
f <sub>CL</sub> (max) 16/	267	268								5.0V	IN	GND	GND	GND	GND	IN	OUT	OUT								5.0V	Clock							μs	
		269								"	"	"	"	"	"	"	"	"	OUT	OUT						"	"	1.3	"	1.9	"	1.3	"	"	
		270								"	"	"	"	"	"	"	"	"			OUT					"	"	"	"	"	"	"	"	"	
		271								"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		272								"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		273								"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		274								"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		275						OUT		"	"	5.0V	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		276						OUT		"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		277						OUT		"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		278					OUT			"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		279				OUT				"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	
		280			OUT					"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	"
		281	OUT	OUT						"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	"
		282	OUT	OUT						"	"	"	"	"	"	"	"	"								"	"	"	"	"	"	"	"	"	"

- 1/ Terminals not designated may be "HIGH" level logic, "LOW" level logic, or open except as follows:
  - 1C(POS) tests; the V<sub>SS</sub> terminal shall be open.
  - 1C(NEG) tests; the V<sub>DD</sub> terminal shall be open.
  - V<sub>SS</sub> tests; the output terminals shall be open.
  - I<sub>H1</sub> tests; the undesignated terminals shall be open.
- 2/ In device type 06, circuit C, all terminals except 12 and 24 are inputs connected to gate structures; therefore, the table III, V<sub>IC(POS)</sub> and V<sub>IC(NEG)</sub> tests shall be expanded to include testing terminals 1 through 8, and 16 through 23.
- 3/ Test numbers 13 through 23 shall be run in sequence. See 4.5.3.
- 4/ I<sub>OH</sub> = -50 μA at 25°C, -35 μA at 125°C, -75 μA at -55°C.
- 5/ Apply clock pulse; V<sub>IN</sub> = 0 V to V<sub>DD</sub> until proper output state is achieved.
- 6/ V<sub>IH1</sub> = 3.8 V at 25°C, 3.6 V at 125°C, 3.95 V at -55°C.
- 7/ V<sub>IH2</sub> = 9.5 V at 25°C, 9.25 V at 125°C, 9.75 V at -55°C.
- 8/ I<sub>OL</sub> = 100 μA at 25°C, 70 μA at 125°C, 124 μA at -55°C.
- 9/ V<sub>IL1</sub> = 1.1 V at 25°C, 0.85 V at 125°C, 1.35 V at -55°C.
- 10/ V<sub>IL2</sub> = 2.8 V at 25°C, 2.55 V at 125°C, 3.05 V at -55°C.
- 11/ The device manufacturer may, at his option, measure I<sub>IL</sub> and I<sub>IH</sub> at 25°C for each individual input or measure all inputs together.
- 12/ See 4.4.1c.
- 13/ Test numbers 144 through 170 shall be run in sequence.
- 14/ The output voltage limits for each temperature are "H" = V<sub>DD</sub> -0.5 V min. and "L" = V<sub>SS</sub> +0.5 V max.
- 15/ The functional tests shall be performed at V<sub>IH</sub> and V<sub>DD</sub> ≤ 5.0 V and ≥ 15 V.
- 16/ The maximum clock frequency (f<sub>CL</sub>) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.





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

Symbol	MIL-STD-883 method	Cases A C,D,T,X,Y	Terminal conditions and limits 1/														Measured terminal	Test limits						Unit						
			Symbol	D1	NC	Clock	D2	D3	D4	V <sub>SS</sub>	D4+4	D4+5	D3+4	D2+4	D2+5	D1+4		V <sub>DD</sub>	Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C							
				1	2	3	4	5	6	7	8	9	10	11	12	13		14	Min	Max	Min	Max	Min		Max					
				Test no.																										
I <sub>OH1</sub>			50	5.0V	/	5.0V	5.0V	5.0V	GND	4.6V	4.6V	4.6V	4.6V	4.6V	4.6V	5.0V	D4+4	-0.51												
			51	"		"	"	"	"	"							"	"	"	"	"	"	"	D4+5	"					
			52	"		"	"	"	"	"							"	"	"	"	"	"	"	D3+4	"	-0.35		-0.64		
			53	"	4	"	"	"	"	"							"	"	"	"	"	"	"	D2+4	"					mA
			54	"		"	"	"	"	"							"	"	"	"	"	"	"	D2+5	"					
55	"		"	"	"	"	"	"	"	"	"	"	"	"	D1+4	"														
I <sub>OH2</sub>			56	15.0V		15.0V	15.0V	15.0V	"	13.5V	13.5V	13.5V	13.5V	13.5V	13.5V	15.0V	D4+4	-3.4												
			57	"		"	"	"	"	"							"	"	"	"	"	"	D4+5	"						
			58	"		"	"	"	"	"							"	"	"	"	"	"	D3+4	"	-2.4		-4.2			
			59	"		"	"	"	"	"							"	"	"	"	"	"	D2+4	"						
			60	"		"	"	"	"	"							"	"	"	"	"	"	D2+5	"						
61	"		"	"	"	"	"	"	"	"	"	"	"	D1+4	"															
I <sub>IH1</sub> 6/	3010		62	18.0V		18.0V	18.0V	18.0V	"						18.0V	All inputs together		5.0					nA							
			I <sub>IH2</sub>	63	18.0V		18.0V	GND	GND	GND	"						"	D1												
64	GND			GND	18.0V	GND	GND	"						"	Clock															
65	"			GND	18.0V	GND	GND	"						"	D2															
66	"	GND			GND	18.0V	GND	GND	"					"	D3	1.0		45												
67	"		GND	18.0V	GND	GND	18.0V	"					"	D4																
I <sub>IL1</sub> 6/	3009		68	GND		GND	GND	GND	"						"	All inputs together		-5.0												
			I <sub>IL2</sub>	69	GND		18.0V	18.0V	18.0V	"						"	D1													
70	18.0V			GND	18.0V	18.0V	"						"	Clock																
71	"	18.0V			18.0V	GND	18.0V	"					"	D2																
72	"			18.0V	18.0V	GND	18.0V	"					"	D3	-1.0		-45													
73	"		18.0V	18.0V	GND	18.0V	GND	"				"	D4																	
C <sub>i</sub>	3012		74	Z/		Z/	Z/		GND						GND	D1							pF							
			75							"					"	Clock														
			76				Z/			"					"	D2														
			77					Z/		"					"	D3	12.0													
			78					Z/		"					"	D4														
Truth table test 8/	3014		79	GND		/	GND	GND	GND	GND						5.0V	None	} See 9/												
			80	5.0V		"	5.0V	5.0V	5.0V	"						"	None													
			81	GND		"	GND	GND	GND	"						"	None													
			82		3	"	"	"	"	"						"	None													
			83			GND	"	"	"	"						"	All outputs													
			84			GND	"	"	"	"						"														
			85			GND	"	"	"	"						"														
			86	5.0V		5.0V	5.0V	5.0V	5.0V	"						"														
			87			"	"	"	"	"						"														
			88			"	"	"	"	"						"														
			89			"	"	"	"	"						"														
			90			GND	"	"	"	"		H	L	H	H	L	H		"											
			91			5.0V	"	"	"	"		H	L	H	H	L	H		"											
			92			GND	"	"	"	"		L	H	L	L	L	L		"											
			93			5.0V	"	"	"	"		L	H	L	L	L	L		"											
			94			GND	"	"	"	"		L	L	L	L	L	L		"											

See footnotes at end of device type 51.

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

Symbol	MIL-STD-883 method	Cases A C,D,T,X,Y	Terminal conditions and limits 1/														Measured terminal	Test limits						Unit	
			Symbol	D1	NC	Clock	D2	D3	D4	V <sub>SS</sub>	D4+4	D4+5	D3+4	D2+4	D2+5	D1+4		V <sub>DD</sub>	Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C		
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13		14	Min	Max	Min	Max	Min		Max
t <sub>PHL</sub>	3003 Fig. 4	95			IN			IN	GND	OUT	OUT	OUT				5.0V	Clock to D4+4	20	421	30	560	20	421	ns	
		96			"			IN	"		OUT	OUT				"	Clock to D4+5	"	"	"	"	"	"	"	
		97			"			IN	"			OUT				"	Clock to D3+4	"	"	"	"	"	"	"	
		98			"	IN			"				OUT			"	Clock to D2+4	"	"	"	"	"	"	"	
		99			"	IN			"					OUT		"	Clock to D2+5	"	"	"	"	"	"	"	
		100	IN			"			"						OUT	"	Clock to D1+4	"	"	"	"	"	"	"	
t <sub>PLH</sub>	3003 Fig. 4	101			"			IN	"	OUT	OUT	OUT				"	Clock to D4+4	"	"	"	"	"	"	"	
		102			"			IN	"		OUT	OUT				"	Clock to D4+5	"	"	"	"	"	"	"	
		103			"			IN	"			OUT				"	Clock to D3+4	"	"	"	"	"	"	"	
		104		"	"	IN			"			OUT				"	Clock to D2+4	"	"	"	"	"	"	"	
		105			"	IN			"				OUT			"	Clock to D2+5	"	"	"	"	"	"	"	
		106	IN			"			"					OUT		"	Clock to D1+4	"	"	"	"	"	"	"	
t <sub>THL</sub>	3004 Fig. 4	107			"			IN	"	OUT	OUT	OUT				"	D4+4	13	150	18	200	13	150	"	
		108			"			IN	"		OUT	OUT				"	D4+5	"	"	"	"	"	"	"	
		109			"			IN	"			OUT				"	D3+4	"	"	"	"	"	"	"	
		110			"	IN			"			OUT				"	D2+4	"	"	"	"	"	"	"	
		111			"	IN			"				OUT			"	D2+5	"	"	"	"	"	"	"	
		112	IN			"			"					OUT		"	D1+4	"	"	"	"	"	"	"	
t <sub>TLH</sub>	3004 Fig. 4	113			"			IN	"	OUT	OUT	OUT				"	D4+4	"	"	"	"	"	"	"	
		114			"			IN	"		OUT	OUT				"	D4+5	"	"	"	"	"	"	"	
		115			"			IN	"			OUT				"	D3+4	"	"	"	"	"	"	"	
		116		"	"	IN			"			OUT				"	D2+4	"	"	"	"	"	"	"	
		117			"	IN			"				OUT			"	D2+5	"	"	"	"	"	"	"	
		118	IN			"			"					OUT		"	D1+4	"	"	"	"	"	"	"	
f <sub>CL</sub> (max) 10/	119	120			"			IN	"	OUT	OUT	OUT				"	Clock							μs	
		121			"			IN	"		OUT	OUT				"	"							"	
		122			"			IN	"			OUT				"	"		.54		.714		.54		"
		123			"	IN			"				OUT			"	"								"
		124	IN			"			"					OUT		"	"								"

See footnotes on next page.

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

- 1/ Terminals not designated may be “HIGH” level logic, “LOW” level logic, or open except as follows:  
 $I_{C(pos)}$  tests; the  $V_{SS}$  terminal shall be open.  
 $I_{C(neg)}$  tests; the  $V_{DD}$  terminal shall be open.  
 $V_{SS}$  tests; the output terminals shall be open.
- 2/ The  $I_{SS}$  test measurements shall be run in sequence.
- 3/ Apply single clock pulse;  $V_{IN} = 0\text{ V}$  to  $V_{DD}$ .
- 4/ Apply clock pulse;  $V_{IN} = 0\text{ V}$  dc to  $V_{DD}$  until proper output state is achieved.
- 5/  $V_{IH}$  and  $V_{IL}$  tests are performed by repeating the truth table test (numbers 79 through 94) using the input and output conditions as follows:

Test	$V_{DD}$	Input levels		Output levels	
		H	L	H	L
$V_{IL1}$ $V_{IH1}$	5.0V	3.5V	1.5V	Min 4.5V	Max 0.5V
$V_{IL2}$ $V_{IH2}$	10.0V	7.0V	3.0V	9.0V	1.0V
$V_{IL3}$ $V_{IH3}$	15.0V	11.0V	4.0V	13.5V	1.5V

- 6/ 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.
- 7/ See 4.4.1c.
- 8/ The truth table test shall be performed in sequence.
- 9/ The truth table tests shall be performed at  $V_{IH}$  and  $V_{DD} \leq 5\text{ V}$  dc and  $\geq 18\text{ V}$  dc.  
 $L = V_{SS} + 0.5\text{ V}$  maximum, and  $H = V_{DD} - 0.50\text{ V}$  dc minimum.
- 10/ The maximum clock frequency ( $f_{CL}$ ) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.
- 11/ The device manufacturer may perform  $V_{IL}/V_{IH}$  tests as functional tests.

TABLE III. Group A inspection for device type 52.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max	
			Test no.																							
V <sub>IC</sub> (pos)	1	2-11	1mA			1mA	1mA	1mA	1mA								GND	PI8 PI4 PI3 PI2 PI1 P/S control Clock Serial In PI5 PI6 PI7	1.5					V		
V <sub>IC</sub> (neg)	12	13-22	-1mA			-1mA	-1mA	-1mA	-1mA	GND							GND	PI8 PI4 PI3 PI2 PI1 P/S control Clock Serial In PI5 PI6 PI7	-6					V		
I <sub>SS</sub> 2/	3005	23-32	GND GND GND 18.0V			GND 18.0V GND 18.0V	18.0V GND 18.0V GND	GND 18.0V GND 18.0V	18.0V GND 18.0V GND	" " " " GND " " "	18.0V GND 18.0V 18.0V	GND GND GND 18.0V	18.0V 18.0V 18.0V 18.0V	GND GND GND 18.0V	18.0V 18.0V 18.0V 18.0V	18.0V 18.0V 18.0V 18.0V	None " " " V <sub>SS</sub> None V <sub>SS</sub> None None V <sub>SS</sub>	-0.5		-5.0			μA			
V <sub>OH3</sub>	3006	33-35	15.0V 15.0V 15.0V			15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	" " "	15.0V 3/ 3/ 3/	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	Q6 Q7 Q8	14.95 14.95 14.95		14.95 14.95 14.95		14.95 14.95 14.95		V		
V <sub>OL3</sub>	3007	36-38	GND GND GND			GND GND GND	GND GND GND	GND GND GND	GND GND GND	" " "	" " "	GND GND GND	GND GND GND	GND GND GND	GND GND GND	GND GND GND	Q6 Q7 Q8		0.05 0.05		0.05 0.05		0.05 0.05		V	
V <sub>IH1</sub> 12/		39	4/	4/	4/	4/	4/	4/	4/	"	4/	4/	4/	4/	4/	4/	4/	All outputs	4/	4/	4/	4/	4/	4/	4/	V
V <sub>IH2</sub> 12/		40	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
V <sub>IH3</sub> 12/		41	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
V <sub>IL1</sub> 12/		42	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
V <sub>IL2</sub> 12/		43	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
V <sub>IL3</sub> 12/		44	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V
I <sub>OL1</sub>		45-47	GND " 0.4V " 0.4V			GND " 0.4V " 0.4V	GND " 0.4V " 0.4V	GND " 0.4V " 0.4V	GND " 0.4V " 0.4V	" 5.0V 5.0V	3/ " "	GND " 0.4V "	" " 0.4V "	GND " 0.4V "	GND " 0.4V "	GND " 0.4V "	5.0V 5.0V 5.0V	Q6 Q7 Q8	0.51 0.51 0.51		0.36 0.36		0.64 0.64		mA	
I <sub>OL2</sub>		48-50	" 1.5V " 1.5V " 1.5V			" 1.5V " 1.5V " 1.5V	" 1.5V " 1.5V " 1.5V	" 1.5V " 1.5V " 1.5V	" 1.5V " 1.5V " 1.5V	" 15.0V 15.0V	" " 1.5V "	" " 1.5V "	" " 1.5V "	" " 1.5V "	" " 1.5V "	" " 1.5V "	15.0V 15.0V 15.0V	Q6 Q7 Q8	3.4 3.4 3.4		2.4 2.4		4.2 4.2		V	

See footnotes at end of device type 52.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit		
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max			
			Test no.																									
I <sub>OH1</sub>		51	5.0V	4.6V		5.0V	5.0V	5.0V	5.0V	GND	5.0V	3/	5.0V		5.0V	5.0V	5.0V	5.0V	Q6	-0.51		-0.36		-0.64		mA		
		52	5.0V			5.0V	5.0V	5.0V	5.0V	"	5.0V	"	5.0V	4.6V	5.0V	5.0V	5.0V	5.0V	Q7	-0.51		-0.36		-0.64		"		
		53	5.0V		4.6V	5.0V	5.0V	5.0V	5.0V	"	5.0V	"	5.0V		5.0V	5.0V	5.0V	5.0V	Q8	-0.51		-0.36		-0.64		"		
I <sub>OH2</sub>		54	15.0V	13.5V		15.0V	15.0V	15.0V	15.0V	"	15.0V	"	15.0V		15.0V	15.0V	15.0V	15.0V	Q6	-3.4		-2.4		-4.2		"		
		55	15.0V			15.0V	15.0V	15.0V	15.0V	"	15.0V	"	15.0V	13.5V	15.0V	15.0V	15.0V	15.0V	Q7	-3.4		-2.4		-4.2		"		
		56	15.0V		13.5V	15.0V	15.0V	15.0V	15.0V	"	15.0V	"	15.0V		15.0V	15.0V	15.0V	15.0V	Q8	-3.4	-2.4	-2.4	-4.2	-4.2		"		
I <sub>IH1</sub> 5/	3010	57	18.0V			18.0V	18.0V	18.0V	"	18.0V	18.0V	18.0V	18.0V	18.0V	18.0V	18.0V	18.0V	All inputs together		11						nA		
I <sub>IH2</sub>		58	18.0V		18.0V	GND	GND	GND	GND	"	GND	GND	GND			GND	GND	"	PI8								"	
		59	GND			18.0V	GND	GND	GND	"	"	"	"			"	"	"	PI4								"	
		60	"			GND	GND	GND	"	"	"	"	"	GND		"	"	"	PI3	1		45					"	
		61	"			"	GND	GND	"	"	"	"	"			"	"	"	PI2								"	
		62	"			"	"	GND	"	"	"	"	"			"	"	"	PI1								"	
		63	"			"	"	"	"	"	"	"	"			"	"	"	P/S control								"	
		64	"			"	"	"	"	"	"	"	"			"	"	"	Clock								"	
		65	"			"	"	"	"	"	"	"	"			"	"	"	Serial In								"	
		66	"			"	"	"	"	"	"	"	"			"	"	"	PI5								"	
67	"			"	"	"	"	"	"	"	"			"	"	"	PI6								"			
68	"			"	"	"	"	"	"	"	"			"	"	"	PI7								"			
I <sub>IL1</sub> 5/	3009	69	"			"	"	"	"	"	"	"	"	"	"	"	"	All inputs together		-11						"		
I <sub>IL2</sub>		70	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI8								"	
		71	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI4								"	
		72	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI3	-1		-45					"	
		73	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI2								"	
		74	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI1								"	
		75	"			"	"	"	"	"	"	"	"	"	"	"	"	"	P/S control								"	
		76	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Clock								"	
		77	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Serial In									"
		78	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI5								"	
		79	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI6								"	
		80	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI7								"	
																			Subgroup 4 T <sub>C</sub> = 25°C									
																			Min	Max								
C <sub>i</sub>	3012	81	Z/			Z/				GND								GND	PI8							pF		
		82	"			"				"								"	PI4							"		
		83	"			"	Z/			"								"	PI3							"		
		84	"			"		Z/		"								"	PI2							"		
		85	"			"			Z/		"							"	PI1							"		
		86	"			"				Z/								"	P/S control							"		
		87	"			"					Z/		Z/					"	Clock							"		
		88	"			"								Z/				"	Serial In							"		
		89	"			"									Z/			"	PI5							"		
		90	"			"										Z/		"	PI6							"		
91	"			"											Z/	"	PI7							"				

See footnotes at end of device type 52.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z Test no.	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit		
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 7		Subgroup 8						
																				T <sub>C</sub> = 25°C		T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C				
																				Min	Max	Min	Max	Min	Max			
Truth table test	3014 8/	92	5.0V			5.0V	5.0V	5.0V	5.0V	GND	5.0V	5.0V	GND		5.0V	5.0V	5.0V	5.0V	None	See 9/, 10/								
		93	5.0V			5.0V	5.0V	5.0V	5.0V	"	5.0V	GND	"		5.0V	5.0V	5.0V	"	None									
		94	5.0V	H	H	5.0V	5.0V	5.0V	5.0V	"	5.0V	5.0V	"	H	5.0V	5.0V	5.0V	"	All									
		95	GND			GND	GND	GND	GND	"	GND	5.0V	"	"	GND	GND	GND	"	outputs									
		96	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		"							
		97	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		"							
		98	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		99	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		100	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		101	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		102	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		103	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		104	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		105	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		106	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		107	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		108	"	"	L	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		109	"	"	L	"	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		110	"	"	H	"	"	"	"	"	"	"	"	5.0V	"	L	"	"	"		"							
		111	"	"	"	"	"	"	"	"	"	"	"	GND	"	L	"	"	"		"							
		112	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	H	"	"	"		"							
		113	"	"	"	L	"	"	"	"	"	"	"	GND	"	"	"	"	"		"							
		114	"	"	"	L	"	"	"	"	"	"	"	5.0V	"	"	"	"	"		"							
		115	"	"	"	H	"	"	"	"	"	"	5.0V	GND	"	"	"	"	"		"							
		116	"	"	"	H	"	"	"	"	"	"	5.0V	GND	"	"	"	"	"		"							
		117	"	"	L	L	"	"	"	"	"	"	5.0V	GND	"	L	"	"	"		"							
		118	5.0V	"	"	"	5.0V	5.0V	5.0V	5.0V	"	GND	"	"	"	5.0V	5.0V	5.0V	"		"							
119	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"										
120	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
121	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
122	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
123	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
124	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
125	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
126	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
127	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
128	"	"	"	"	"	"	"	"	"	"	5.0V	GND	5.0V	"	"	"	"	"										
129	"	"	H	H	"	"	"	"	"	"	5.0V	5.0V	5.0V	H	"	"	"	"										
130	GND	"	"	"	GND	GND	GND	GND	"	GND	"	"	"	GND	GND	GND	"	"										
131	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
132	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
133	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
134	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
135	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
136	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
137	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										
138	"	"	"	"	"	"	"	"	"	"	"	GND	"	"	"	"	"	"										
139	"	"	"	"	"	"	"	"	"	"	"	5.0V	"	"	"	"	"	"										

See footnotes at end of device type 52.

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

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
			Test no.																								
t <sub>PHL1</sub>	3003 Fig. 4	140	IN	OUT		IN	IN	IN	IN	GND	GND	IN	IN		IN	IN	IN	5.0V	Clock to Q6	13	338	18	450	13	338	ns	
		141	IN			IN	IN	IN	IN	IN	GND	GND	IN	IN	OUT	IN	IN	IN	5.0V	Clock to Q7	"	"	"	"	"	"	ns
		142	IN		OUT	IN	IN	IN	IN	IN	GND	GND	IN	IN	IN	IN	IN	IN	5.0V	Clock to Q8	"	"	"	"	"	"	ns
t <sub>PLH1</sub>	3003 Fig. 4	143	IN	OUT		IN	IN	IN	IN	GND	GND	IN	IN		IN	IN	IN	5.0V	Clock to Q6	13	338	18	450	13	338	ns	
		144	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"
		145	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"
t <sub>PHL2</sub>	3003 Fig. 4	146	"	OUT		"	"	"	"	"	5.0V	"	"		"	"	"	"	Clock to Q6	"	"	"	"	"	"	"	
		147	"			"	"	"	"	"	"	"	"	OUT	"	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"
		148	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"
t <sub>PLH2</sub>	3003 Fig. 4	149	"	OUT		"	"	"	"	"	"	"	"	OUT	"	"	"	"	Clock to Q6	"	"	"	"	"	"	"	
		150	"			"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q7	"	"	"	"	"	"	"
		151	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	"	Clock to Q8	"	"	"	"	"	"	"
t <sub>THL</sub>	3004 Fig. 4	152	"	OUT		"	"	"	"	"	"	"	"	OUT	"	"	"	"	Q6	10	210	14	280	10	210	"	
		153	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Q7	"	"	"	"	"	"	"	
		154	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Q8	"	"	"	"	"	"	"	
t <sub>TLH</sub>	3004 Fig. 4	155	"	OUT		"	"	"	"	"	"	"	"	OUT	"	"	"	"	Q6	"	"	"	"	"	"	"	
		156	"			"	"	"	"	"	"	"	"	"	"	"	"	"	Q7	"	"	"	"	"	"	"	
		157	"		OUT	"	"	"	"	"	"	"	"	"	"	"	"	"	Q8	"	"	"	"	"	"	"	
f <sub>CL</sub> (max) 11/	3004 Fig. 4	159								"	GND	"	"	OUT				"	Clock							μs	
		160	OUT	OUT							"	GND	"	"					"	Clock	.625	"	.833	"	.625	"	μs

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- 1/ Terminals not designated may be "HIGH" level logic, "LOW" level logic, or open except as follows: V<sub>IC(pos)</sub> tests; the V<sub>SS</sub> terminal shall be open. I<sub>C(neg)</sub> tests; the V<sub>DD</sub> terminal shall be open. I<sub>SS</sub> test; the output terminal shall be open.
- 2/ I<sub>SS</sub> tests; the output terminals shall be performed in sequence.
- 3/ Apply a single clock pulse; V<sub>IN</sub> = 0 V dc to V<sub>DD</sub>.
- 4/ V<sub>IH</sub> and V<sub>IL</sub> tests are performed by repeating the truth table test (numbers 92 through 139) using the input and output conditions as follows:

Test	V <sub>DD</sub>	Input		Output	
		H	L	H	L
V <sub>IH1</sub> V <sub>IL1</sub>	5.0V	3.5V	1.5V	4.5V min	0.5V max
V <sub>IH2</sub> V <sub>IL2</sub>	10.0V	7.0V	3.0V	9.0V min	1.0V max
V <sub>IH3</sub> V <sub>IL3</sub>	15.0V	11.0V	4.0V	13.5V min	1.5V max

- 5/ The device manufacturer may, at his option, measure I<sub>IL</sub> and I<sub>IH</sub> at 25°C for each individual input or measure all inputs together.
- 6/ Apply six (6) clock pulses, V<sub>IN</sub> = 0 V dc to V<sub>DD</sub>.
- 7/ See 4.4.1c.
- 8/ Truth table test shall be run in sequence.
- 9/ The output voltage limits for each temperature are "H" = V<sub>DD</sub> - 0.5 V min and "L" = V<sub>SS</sub> + 0.5 V max.
- 10/ The truth table tests shall be performed at V<sub>IH</sub> and V<sub>DD</sub> ≤ 5 V dc and ≥ 18 V dc.
- 11/ The maximum clock frequency (f<sub>CL</sub>) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.
- 12/ The device manufacturer may perform V<sub>IL</sub>/V<sub>IH</sub> tests as functional tests.





TABLE III. Group A inspection for device type 53 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																	Measured terminal	Test limits						Unit	
			Clock B	Q4B	Q3A	Q2A	Q1A	Reset A	Data A	V <sub>SS</sub>	Clock A	Q4A	Q3B	Q2B	Q1B	Reset B	Data B	V <sub>DD</sub>	Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Min		Max	Min	Max	Min	Max			
			Test no.																									
I <sub>OL1</sub>		50	GND			0.4V	0.4V	GND	GND	GND	3/					GND	GND	5.0V	Q1A	0.51								
		51	"					"	"	"	"					"	"	"	Q2A	"								
		52	"		0.4V			"	"	"	"					"	"	"	Q3A	"	0.36		0.64					mA
		53	"					"	"	"	"	0.4V				"	"	"	Q4A	"								
		54	3/					"	"	"	GND					"	"	"	Q1B	"								
		55	"					"	"	"	"					"	"	"	Q2B	"								
		56	"					"	"	"	"					"	"	"	Q3B	"								
57	"	0.4V					"	"	"	"				"	"	"	Q4B	"										
I <sub>OL2</sub>		58	GND			1.5V	1.5V	1.5V	"	"	"	3/				"	"	15.0V	Q1A	3.4								
		59	"					"	"	"	"				"	"	"	Q2A	"									
		60	"		1.5V			"	"	"	"				"	"	"	Q3A	"	2.4		4.2						
		61	"					"	"	"	"	1.5V				"	"	"	Q4A	"								
		62	3/					"	"	"	GND	1.5V				"	"	"	Q1B	"								
		63	"					"	"	"	"					"	"	"	Q2B	"								
		64	"					"	"	"	"					"	"	"	Q3B	"								
65	"	1.5V					"	"	"	"				"	"	"	Q4B	"										
I <sub>OH1</sub>		66	GND			4.6V	4.6V	4.6V	"	5.0V	"	3/				"	"	5.0V	Q1A	-0.51								
		67	"					"	"	"	"				"	"	"	Q2A	"									
		68	"		4.6V			"	"	"	"				"	"	"	Q3A	"	-0.36		-0.64						
		69	"					"	"	"	"	4.6V				"	"	"	Q4A	"								
		70	3/					"	GND	"	GND					"	5.0V	"	Q1B	"								
		71	"					"	"	"	"					"	"	"	Q2B	"								
		72	"					"	"	"	"					"	"	"	Q3B	"								
73	"	4.6V					"	"	"	"				"	"	"	Q4B	"										
I <sub>OH2</sub>		74	GND			13.5V	13.5V	13.5V	"	15.0V	"	3/				"	GND	15.0V	Q1A	-3.4								
		75	"					"	"	"	"				"	"	"	Q2A	"									
		76	"		13.5V			"	"	"	"				"	"	"	Q3A	"	-2.4		-4.2						
		77	"					"	"	"	"	13.5V				"	"	"	Q4A	"								
		78	3/					"	GND	"	GND					"	15.0V	"	Q1B	"								
		79	"					"	"	"	"					"	"	"	Q2B	"								
		80	"					"	"	"	"					"	"	"	Q3B	"								
81	"	13.5V					"	"	"	"				"	"	"	Q4B	"										
I <sub>IH1</sub> 5/	3010	82	18.0V					18.0V	18.0V	"	18.0V					18.0V	18.0V	18.0V	All inputs together		6.0							nA
		83	GND					GND	GND	"	18.0V					GND	GND	"	Clock A									
I <sub>IH2</sub>		84	GND					GND	18.0V	"	GND					"	"	"	Data A									
		85	GND					18.0V	GND	"	"					"	"	"	Reset A		1.0		45					
		86	18.0V					"	"	"	"					"	"	"	Clock B									
		87	GND					"	"	"	"					"	18.0V	"	Data B									
		88	"					"	"	"	"					18.0V	GND	"	Reset B									
I <sub>IL1</sub> 5/	3009	89	"					"	"	"	"				"	"	"	All inputs together		-6.0								
		90	"					"	"	"	"				"	"	"	Clock A										
I <sub>IL2</sub>		91	"					"	"	"	"				"	"	"	Data A										
		92	"					"	"	"	"				"	"	"	Reset A		-1.0		-45						
		93	"					"	"	"	"				"	"	"	Clock B										
		94	"					"	"	"	"				"	"	"	Data B										
		95	"					"	"	"	"				"	"	"	Reset B										

See footnotes at end of device type 53.



TABLE III. Group A inspection for device type 53 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			Clock B	Q4B	Q3A	Q2A	Q1A	Reset A	Data A	V <sub>SS</sub>	Clock A	Q4A	Q3B	Q2B	Q1B	Reset B	Data B	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	Min	Max	Min	Max	Min		Max
t <sub>PLH1</sub>	3003 Fig. 4	129	IN				OUT	GND	IN	GND	IN					GND	IN	5.0V	Clock A to Q1A Clock A to Q2A Clock A to Q3A Clock A to Q4A Clock B to Q1B Clock B to Q2B Clock B to Q3B Clock B to Q4B	20	421	30	560	20	421	ns	
		130	"			OUT	"	"	"	"	"					"	"	"		"	"	"	"	"	"	"	
		131	"		OUT			"	"	"	"					"	"	"		"	"	"	"	"	"	"	"
		132	"					"	"	"	"	OUT				"	"	"		"	"	"	"	"	"	"	"
		133	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	"
		134	"					"	"	"	"			OUT		"	"	"		"	"	"	"	"	"	"	"
		135	"					"	"	"	"			OUT		"	"	"		"	"	"	"	"	"	"	"
		136	"	OUT				"	"	"	"					"	"	"		"	"	"	"	"	"	"	"
t <sub>PHL2</sub>	3003 Fig. 4	137	GND				OUT	IN	IN	GND	GND					IN	IN	5.0V	Reset A to Q1A Reset A to Q2A Reset A to Q3A Reset A to Q4A Reset B to Q1B Reset B to Q2B Reset B to Q3B Reset B to Q4B	20	368	30	490	20	368	ns	
		138	"			OUT	"	"	"	"	"					"	"	"		"	"	"	"	"	"	"	
		139	"		OUT			"	"	"	"					"	"	"		"	"	"	"	"	"	"	"
		140	"					"	"	"	"	OUT				"	"	"		"	"	"	"	"	"	"	"
		141	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	"
		142	"					"	"	"	"			OUT		"	"	"		"	"	"	"	"	"	"	"
		143	"					"	"	"	"			OUT		"	"	"		"	"	"	"	"	"	"	"
		144	"	OUT				"	"	"	"					"	"	"		"	"	"	"	"	"	"	"
t <sub>THL</sub>	3004 Fig. 4	145	IN				OUT	GND	"	"	IN					GND	"	"	Q1A Q2A Q3A Q4A Q1B Q2B Q3B Q4B	13	210	18	280	13	210	"	
		146	"			OUT	"	"	"	"	"				"	"	"	"		"	"	"	"	"	"	"	
		147	"		OUT			"	"	"	"				"	"	"	"		"	"	"	"	"	"	"	
		148	"					"	"	"	"	OUT				"	"	"		"	"	"	"	"	"	"	
		149	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	
		150	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	
		151	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	
		152	"	OUT				"	"	"	"					"	"	"		"	"	"	"	"	"	"	
t <sub>TLH</sub>	3004 Fig. 4	153	"				OUT	"	"	"	"				"	"	"	"	Q1A Q2A Q3A Q4A Q1B Q2B Q3B Q4B	"	"	"	"	"	"	"	
		154	"			OUT	"	"	"	"	"				"	"	"	"		"	"	"	"	"	"		
		155	"		OUT			"	"	"	"				"	"	"	"		"	"	"	"	"	"		
		156	"					"	"	"	"	OUT				"	"	"		"	"	"	"	"	"	"	
		157	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	
		158	"					"	"	"	"			OUT		"	"	"		"	"	"	"	"	"	"	
		159	"					"	"	"	"				OUT	"	"	"		"	"	"	"	"	"	"	
		160	"	OUT				"	"	"	"					"	"	"		"	"	"	"	"	"	"	

See footnotes at end of device type 53.

TABLE III. Group A inspection for device type 53 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit
			Clock B	Q4B	Q3A	Q2A	Q1A	Reset A	Data A	V <sub>SS</sub>	Clock A	Q4A	Q3B	Q2B	Q1B	Reset B	Data B	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max	
			Test no.																							
f <sub>CL</sub> (max) 10/	161	162	IN			OUT	OUT	GND	IN	GND	IN						5.0v	Clock A		.5					μs	
		163	"		OUT			"	"	"	"						"	"	"		.667	"		"	"	
		164	"					"	"	"	"	OUT					"	"	"				.5	"	"	
		165	"					"	"	"	"						"	"	"					"	"	
		166	"					"	"	"	"						"	"	"					"	"	
		167	"					"	"	"	"		OUT	OUT			"	"	"					"	"	
		168	"	OUT				"	"	"	"						"	"	"					"	"	

- 1/ Terminals not designated may be "HIGH" level logic, "LOW" level logic, or open except as follows: V<sub>IC(pos)</sub> tests; the V<sub>SS</sub> terminal shall be open. V<sub>IC(neg)</sub> tests; the V<sub>DD</sub> terminal shall be open. I<sub>SS</sub> test; the output terminal shall be open.
- 2/ I<sub>SS</sub> test measurements shall be performed in sequence.
- 3/ Apply a clock pulse; V<sub>IN</sub> = 0 V dc to V<sub>DD</sub> until proper output state is achieved.
- 4/ V<sub>IH</sub> and V<sub>IL</sub> tests are performed by repeating the truth table tests (numbers 102 through 120) using the input conditions as follows:

Test	V <sub>DD</sub>	Input		Output	
		H	L	H	L
V <sub>IH1</sub> V <sub>IL1</sub>	5.0V	3.5V	1.5V	4.5V min	0.5 max
V <sub>IH2</sub> V <sub>IL2</sub>	10.0V	7.0V	3.0V	9.0V min	1.0V max
V <sub>IH3</sub> V <sub>IL3</sub>	15.0V	11.0V	4.0V	13.5V min	1.5V max

- 5/ The device manufacturer may, at his option, measure I<sub>IL</sub> and I<sub>IH</sub> at 25°C for each individual input or measure all inputs together.
- 6/ See 4.4.1c.
- 7/ Truth table test shall run in sequence.
- 8/ The truth table test shall be performed at V<sub>IH</sub> and V<sub>DD</sub> ≤ 5.0 V dc and ≥ 18.0 V dc.
- 9/ The output voltage limits for each temperature are "H" = V<sub>DD</sub> -0.5 V min and "L" = V<sub>SS</sub> +0.5 V max.
- 10/ The maximum clock frequency (f<sub>CL</sub>) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.

TABLE III. Group A inspection for device type 54.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
			Test no.																								
V <sub>IC</sub> (pos)	1	2 3 4 5 6 7 8 9 10 11	1mA			1mA	1mA	1mA	1mA	1mA							GND	PI8 PI4 PI3 PI2 PI1 P/S control Clock Serial In PI5 PI6 PI7	1.5						V		
V <sub>IC</sub> (neg)	12	13 14 15 16 17 18 19 20 21 22	-1mA			-1mA	-1mA	-1mA	-1mA		GND							PI8 PI4 PI3 PI2 PI1 P/S control Clock Serial In PI5 PI6 PI7	-6						V		
I <sub>SS</sub> 2/	3005	23 24 25 26 27 28 29	GND 18.0V 18.0V 18.0V GND GND GND			GND 18.0V 18.0V 18.0V GND 18.0V 18.0V	18.0V GND 18.0V 18.0V GND 18.0V 18.0V	18.0V GND 18.0V 18.0V GND 18.0V 18.0V			18.0V 18.0V 18.0V 18.0V 18.0V 18.0V 18.0V	GND GND 18.0V 18.0V 18.0V 18.0V 18.0V						V <sub>SS</sub> V <sub>SS</sub> None V <sub>SS</sub> None V <sub>SS</sub> V <sub>SS</sub>	-0.5		-5.0				μA		
V <sub>OH3</sub>	3006	30 31 32	15.0V 15.0V 15.0V			15.0V 15.0V 15.0V	15.0V 15.0V 15.0V	15.0V 15.0V 15.0V			15.0V 3/ 15.0V 15.0V							Q6 Q7 Q8	14.95 14.95 14.95			14.95 14.95 14.95				V	
V <sub>OL3</sub>	3007	33 34 35	GND GND GND			GND GND GND	GND GND GND	GND GND GND										Q6 Q7 Q8	.05 .05 .05			.05 .05 .05				V	
V <sub>IH1</sub>			4/	4/	4/	4/	4/	4/			4/	4/	4/	4/	4/	4/	4/	All outputs	4/	4/	4/	4/	4/	4/	4/	V	
V <sub>IH2</sub>		37																									V
V <sub>IH3</sub>		38																									V
V <sub>IL1</sub>	36	39																									V
V <sub>IL2</sub>		40																									V
V <sub>IL3</sub>		41																									V
I <sub>OL1</sub>		42 43 44	GND " 0.4V "			GND " 0.4V "	GND " 0.4V "	GND " 0.4V "			5.0V 3/ 5.0V 5.0V	GND " 0.4V "						Q6 Q7 Q8	0.51 0.51 0.51			0.36 0.36 0.64		0.64 0.64 0.64		mA	
I <sub>OL2</sub>		45 46 47	" 1.5V "			" 1.5V "	" 1.5V "	" 1.5V "			15.0V 15.0V 15.0V	" 1.5V "					Q6 Q7 Q8	3.4 3.4 3.4			2.4 2.4 2.4		4.2 4.2 4.2				
I <sub>OH1</sub>		48 49 50	5.0V 5.0V 5.0V	4.6V		5.0V 5.0V 5.0V	5.0V 5.0V 5.0V	5.0V 5.0V 5.0V			5.0V 5.0V 5.0V	" 5.0V "	5.0V 4.6V 5.0V	5.0V 5.0V 5.0V	5.0V 5.0V 5.0V	5.0V 5.0V 5.0V	Q6 Q7 Q8	-0.51 -0.51 -0.51			-0.36 -0.36 -0.36		-0.64 -0.64 -0.64				

See footnotes at end of device type 54.

TABLE III. Group A inspection for device type 54 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
			Test no.																								
I <sub>OH2</sub>		51	15.0V	13.5V		15.0V	15.0V	15.0V	15.0V	GND	15.0V	3/	15.0V		15.0V	15.0V	15.0V	15.0V	Q6	-3.4							mA
		52	15.0V			15.0V	15.0V	15.0V	15.0V	"	15.0V	3/	15.0V	13.5V	15.0V	15.0V	15.0V	15.0V	Q7	-3.4		-2.4		-4.2		mA	
		53	15.0V		13.5V	15.0V	15.0V	15.0V	15.0V	"	15.0V	3/	15.0V		15.0V	15.0V	15.0V	15.0V	Q8	-3.4	-2.4	-2.4	-4.2	-4.2	mA		
I <sub>IH1</sub> 5/ I <sub>IH2</sub>	3010	54	18.0V			18.0V	18.0V	18.0V	"	18.0V	18.0V	18.0V		18.0V	18.0V	18.0V	18.0V	All inputs together		1100					nA		
55		18.0V		18.0V	GND	GND	GND	GND	"	GND	GND	GND		"	GND	GND	"	PI8							"		
56		GND			18.0V	GND	GND	GND	"	"	"	"		"	"	"	"	PI4								"	
57		"			GND	18.0V	GND	GND	"	"	"	"		GND	"	"	"	PI3	100		100					"	
58		"			"	GND	18.0V	GND	"	"	"	"		"	"	"	"	PI2								"	
59		"			"	"	GND	18.0V	"	"	"	"		"	"	"	"	PI1								"	
60		"			"	"	"	GND	18.0V	"	"	"		"	"	"	"	P/S control								"	
61		"			"	"	"	"	GND	18.0V	"	"		"	"	"	"	Clock								"	
62		"			"	"	"	"	"	"	"	"		"	"	"	"	Serial In								"	
63		"			"	"	"	"	"	"	"	"		"	"	"	"	PI5								"	
64	"			"	"	"	"	"	"	"	"		"	"	"	"	PI6								"		
65	"			"	"	"	"	"	"	"	"		"	"	"	"	PI7								"		
I <sub>IL1</sub> 5/ I <sub>IL2</sub>	3009	66	"			"	"	"	"	"	"	"	"	"	"	"	"	All inputs together		-1100						"	
67		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI8								"	
68		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI4								"	
69		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI3	-100		-100					"	
70		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI2								"	
71		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI1								"	
72		"			"	"	"	"	"	"	"	"	"	"	"	"	"	P/S control								"	
73		"			"	"	"	"	"	"	"	"	"	"	"	"	"	Clock								"	
74		"			"	"	"	"	"	"	"	"	"	"	"	"	"	Serial In								"	
75		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI5								"	
76		"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI6								"	
77	"			"	"	"	"	"	"	"	"	"	"	"	"	"	PI7								"		
																			Subgroup 4 T <sub>C</sub> =25°C								
																			Min	Max							
C <sub>i</sub>	3012	78	6/			6/				GND							GND	PI8							pF		
		79								"							"	PI4							"		
		80								"							"	PI3							"		
		81					6/			"							"	PI2							"		
		82						6/		"							"	PI1							"		
		83							6/	"							"	P/S control							"		
		84								"	6/						"	Clock							"		
		85								"		6/					"	Serial In							"		
		86								"			6/				"	PI5							"		
		87								"				6/			"	PI6							"		
		88								"					6/		"	PI7							"		

See footnotes at end of device type 54.



TABLE III. Group A inspection for device type 54 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			PI8	Q6	Q8	PI4	PI3	PI2	PI1	V <sub>SS</sub>	P/S control	Clock	Serial In	Q7	PI5	PI6	PI7	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	Min	Max	Min	Max	Min		Max
t <sub>THL</sub>	3004 Fig. 4	138								GND	GND	IN	IN					5.0V	Q6	13	210	18	280	13	210	ns	
		139								"	"	"	"	OUT				"	Q7	"	"	"	"	"	"	"	
		140	OUT		OUT					"	"	"	"					"	Q8	"	"	"	"	"	"	"	
t <sub>TLH</sub>		141								"	"	"	"					"	Q6	"	"	"	"	"	"	"	
		142								"	"	"	"	OUT				"	Q7	"	"	"	"	"	"	"	
		143	OUT		OUT					"	"	"	"					"	Q8	"	"	"	"	"	"	"	
f <sub>CL</sub> (max)		145								"	"	"	"	OUT				"	Clock		.75		"		"	μs	
11/		146	OUT		OUT					"	"	"	"					"	Clock		"	1.0	"	.75	"	μs	

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- 1/ Terminals not designated may be "HIGH" level logic, "LOW" level logic, or open except as follows: V<sub>IC(pos)</sub> tests; the V<sub>SS</sub> terminal shall be open. I<sub>C(neg)</sub> tests; the V<sub>DD</sub> terminal shall be open. I<sub>SS</sub> tests; the output terminals shall be open.
- 2/ The I<sub>SS</sub> test measurements shall be performed in sequence.
- 3/ Apply clock pulse; V<sub>IN</sub> = 0 V dc to V<sub>DD</sub> until proper state is achieved.
- 4/ V<sub>IH</sub> and V<sub>IL</sub> tests are performed by repeating the truth table tests (numbers 89 through 125) using the input and output conditions as shown below:

Test	V <sub>DD</sub>	Input		Output	
		H	L	H	L
V <sub>IH1</sub>	5.0V	3.5V	1.5V	Min	Max
V <sub>IL1</sub>				4.5V	0.5V
V <sub>IH2</sub>	10.0V	7.0V	3.0V	9.0V	1.0V
V <sub>IL2</sub>	15.0V	11.0V	4.0V	13.5V	1.5V
V <sub>IH3</sub>					
V <sub>IL3</sub>					

- 5/ The device manufacturer may, at his option, measure I<sub>IL</sub> and I<sub>IH</sub> at 25°C for each individual input or measure all inputs together.
- 6/ See 4.4.1c.
- 7/ The truth table test shall be performed in sequence.
- 8/ Apply clock pulse, V<sub>IN</sub> = 0 V dc to V<sub>DD</sub>, t<sub>p</sub> = 500 ns (min), t<sub>THL</sub> = 10 ns ± 10%.
- 9/ The output voltage limits for each temperature are "H" = V<sub>DD</sub> - 0.5 V min and "L" = V<sub>SS</sub> + 0.5 V max.
- 10/ The truth table tests shall be performed at V<sub>IH</sub> and V<sub>DD</sub> ≤ 5 V dc and ≥ 18 V dc.
- 11/ The maximum clock frequency (f<sub>CL</sub>) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.





TABLE III. Group A inspection for device type 55 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/														Measured terminal	Test limits						Unit										
			Recir In	Clock	NC	NC	NC	Q	$\bar{Q}$	V <sub>SS</sub>	Delayed clock	Mode cont	NC	NC	NC	NC		Data In	V <sub>DD</sub>	Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C			Subgroup 3 T <sub>C</sub> = -55°C									
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16	Min	Max	Min	Max		Min	Max								
I <sub>SS</sub> 2/	3005	46	GND	3/						GND						GND	18.0V	None														μA		
		47	"	"						"						"	"	"														"		
		48	"	"						"						"	"	"															"	
		49	"	"						"						"	"	"															"	
		50	"	"						"						"	"	"															"	
		51	"	"						"						"	"	"															"	
		52	"	"						"						"	"	"															"	
		53	"	"						"						"	"	"															"	
		54	"	"						"						"	"	"															"	
		55	"	"						"						"	"	"															"	
		56	"	"						"						"	"	"															"	
		57	"	"						"						"	"	"															"	
		58	"	"						"						"	"	"															"	
		59	"	"						"						"	"	"															"	
60	"	"						"						"	"	"															"			
61	"	"						"						"	"	"															"			
62	"	"						"						"	"	"															"			
V <sub>OH3</sub>	3006	63	GND	3/						GND						18.0V	18.0V	None														μA		
		64	"	"						"						"	"	"															"	
		65	"	"						"						"	"	"															"	
		66	"	"						"						"	"	"															"	
		67	"	"						"						"	"	"															"	
		68	"	"						"						"	"	"															"	
		69	"	"						"						"	"	"															"	
		70	"	"						"						"	"	"															"	
		71	"	18.0V						"						"	"	"															"	
		72	"	GND						"						"	"	"																"
		73	"	18.0V						"						"	"	"																"
		74	18.0V	"						"						"	"	"																"
		75	18.0V	"						"						"	"	"																"
		76	GND	"						"						"	"	"																"
V <sub>OL3</sub>	3007	77	GND	4/						"						15.0V	15.0V	Q	14.95													"		
		78	GND	4/						"						GND	"	Q	"													"		
		79	GND	15.0V						"						"	"	Delayed clock	"	14.95													V	
V <sub>IH1</sub>	84	80	GND	4/						"						GND	"	Q														"		
		81	GND	4/						"						15.0V	"	Q														"		
		82	GND	GND						"						GND	"	Delayed clock	0.05														"	
V <sub>IH2</sub>	85	83	"	"						"						"	"	All outputs	5/	5/	5/	5/	5/	5/	5/	5/	5/	5/	5/	5/	5/	"		
		86	"	"						"						"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
		87	"	"						"						"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
V <sub>IL1</sub>	88	89	"	"						"						"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
		90	"	"						"						"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
		91	"	4/						"						GND	5.0V	Q	0.51														"	
I <sub>OL1</sub>	89	92	"	4/					0.4V	"						GND	5.0V	Q	0.51														"	
		93	"	4/					0.4V	"						5.0V	5.0V	Q	0.51														"	
		94	"	GND					0.4V	"						GND	5.0V	Delayed clock	0.51	0.36	0.36	0.64	0.64										mA	
I <sub>OL2</sub>	92	92	"	4/					1.5V	"						GND	15.0V	Q	3.4													"		
		93	"	4/					1.5V	"						15.0V	15.0V	Q	3.4														"	
		94	"	GND					1.5V	"						GND	15.0V	Delayed clock	3.4	2.4	2.4	4.2	4.2										"	

See footnotes at end of device type 55.

TABLE III. Group A inspection for device type 55 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			Recir In	Clock	NC	NC	NC	Q	$\bar{Q}$	V <sub>SS</sub>	Delayed clock	Mode cont	NC	NC	NC	NC	Data In	V <sub>DD</sub>		Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
I <sub>OH1</sub>		95	GND	4/						GND							5.0V	5.0V	Q Q Delayed clock	-0.51		-0.36		-0.64		mA	
		96	"	4/						"							GND	5.0V			-0.51		-0.36		-0.64		
		97	"	5.0V						"	GND						5.0V	5.0V			-0.51		-0.36		-0.64		
I <sub>OH2</sub>		98	"	4/						"							15.0V	15.0V	Q Q Delayed clock	-3.4		-2.4		-4.2		"	
		99	"	4/						"							GND	15.0V			-3.4		-2.4		-4.2		
		100	"	15.0V						"							15.0V	15.0V			-3.4	-2.4	-2.4	-4.2			-4.2
I <sub>IH1</sub> 6/	3010	101	18.0V	18.0V												18.0V	18.0V	All inputs together		4						nA	
I <sub>IH2</sub>	3010	102	18.0V	GND						GND							GND	18.0V	Recir In		1					nA	
		103	GND	18.0V						"							GND	"	Clock		"						
		104	"	GND						"	GND	18.0V					GND	"	Mode cont		45						
		105	"	"						"	GND	GND					18.0V	"	Data In		"						
I <sub>IL1</sub> 6/	3009	106	"	"						"						GND	"	All inputs together		-4							
		I <sub>IL2</sub>	107	"	"					"							"	"	Recir In		-1						
										"						"	"	Clock		"							
										"						"	"	Mode cont		"							
										"						"	"	Data In		"							
																			Subgroup 4 T <sub>C</sub> = 25°C								
																			Min	Max							
C <sub>i</sub>	3012	111	Z/	Z/						GND							GND	Recir In		12					pF		
		112								"							GND	Clock		70							
		113								"	Z/						"	Mode cont		12							
		114								"						7/	"	Data In		12							
																			Subgroup 7 T <sub>C</sub> = 25°C		Subgroup 8						
																			Min	Max	T <sub>C</sub> = 125°C		T <sub>C</sub> = -55°C				
Truth table test 8/	3014	115	GND	5.0V						GND							5.0V	5.0V	None	} See 9/, 10/, 11/							
		116	GND	GND						"							5.0V	"	"								
		117	GND	5.0V						"							5.0V	"	"								
		118	5.0V	GND						"							GND	"	"								
		119	5.0V	5.0V						"							GND	"	"								
		120	GND	GND						"							5.0V	"	"								
		121	"	5.0V						"							"	"	"								
		122	"	GND						"							"	"	"								
		123	"	5.0V						"							"	"	"								
		124	5.0V	GND						"							"	"	"								
		125	"	5.0V						"							GND	"	"								
		126	"	12/						"							GND	"	"								
		127	"	5.0V						"							5.0V	"	"								
		128	"	GND						"							"	"	"								
		129	"	5.0V						"							"	"	"								
		130	"	GND						"							"	"	"								
		131	"	5.0V						"							"	"	"								
132	"	GND						"							"	"	"										
133	"	5.0V						"							"	"	"										
134	"	GND						"							"	"	"										
135	"	5.0V						"							"	"	"										

See footnotes at end of device type 55.

TABLE III. Group A inspection for device type 55 – Continued.

Symbol	MIL-STD-883 method	Cases E,F,N,Z	Terminal conditions and limits 1/																Measured terminal	Test limits						Unit	
			Recir In	Clock	NC	NC	NC	Q	$\bar{Q}$	V <sub>SS</sub>	Delayed clock	Mode cont	NC	NC	NC	NC	Data In	V <sub>DD</sub>		Subgroup 9 T <sub>C</sub> =25°C		Subgroup 10 T <sub>C</sub> =125°C		Subgroup 11 T <sub>C</sub> =-55°C			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	Min	Max	Min	Max		
			Test no.																								
t <sub>PHL1</sub>	3003 Fig. 4	136	GND	IN				OUT		GND		GND						IN	5.0V	Clock to Q	13	632	18	840	13	632	ns
t <sub>PHL2</sub>		137	GND	IN					OUT	GND		GND						IN	5.0V	Clock to $\bar{Q}$	"	632	"	840	"	632	ns
t <sub>PHL3</sub>		138	GND	IN							GND	OUT	GND							5.0V	Clock to Delayed clock	"	263	"	350	"	263
t <sub>PLH4</sub>	3003 Fig. 4	139	IN	IN						GND		5.0V							5.0V	Clock to Q	13	632	18	840	13	632	ns
t <sub>PLH1</sub>		140	GND	"				OUT		"		GND						IN	"	Clock to Q	"	"	"	"	"	"	"
t <sub>PLH2</sub>		141	GND	"				OUT		OUT	"	GND						IN	"	Clock to $\bar{Q}$	"	"	"	"	"	"	"
t <sub>PLH3</sub>		142	GND	"							"	OUT	GND							"	Clock to Delayed clock	"	263	"	350	"	263
t <sub>PLH4</sub>	3004 Fig. 4	143	IN	"			OUT			"		5.0V							"	Clock to Q	"	632	"	840	"	632	"
t <sub>THL1</sub>		144	GND	"			OUT			"		GND						IN	"	Q	10	210	14	280	10	210	"
t <sub>THL2</sub>		145	"	"				OUT		"		"						IN	"	$\bar{Q}$	"	210	"	280	"	210	"
t <sub>THL3</sub>		146	"	"						"	OUT	"							"	Delayed clock	"	150	"	200	"	150	"
t <sub>TLH1</sub>		147	"	"				OUT		"		"						IN	"	Q	"	210	"	280	"	210	"
t <sub>TLH2</sub>		148	"	"					OUT	"		"						IN	"	$\bar{Q}$	"	210	"	280	"	210	"
t <sub>TLH3</sub>		149	"	"						"	OUT	"							"	Delayed clock	"	150	"	200	"	150	"
f <sub>CL</sub> (max) 13/	150	151	"	"			OUT		"	OUT	"						IN	"	Clock	"						μs	
		152	"	"			OUT		"		"						IN	"	"	"	.94	"	1.25	"	.94	"	
		153	IN	"			OUT		"		"	5.0V						"	"	"	"	"	"	"	"	"	
		154	IN	"			OUT		"		"	5.0V						"	"	"	"	"	"	"	"	"	

See footnotes on next page.

TABLE III. Group A inspection for device type 55 – Continued.

- 1/ Terminals not designated may be “HIGH” level logic, “LOW” level logic, or open except as follows:  $V_{IC(POS)}$  tests; the  $V_{SS}$  terminal shall be open.  $V_{IC(NEG)}$  tests; the  $V_{DD}$  terminal shall be open.  $I_{SS}$  test, the output terminal shall be open.
- 2/ The  $I_{SS}$  tests shall be performed in sequence.
- 3/ Apply a single clock pulse;  $V_{IN} = 0$  V dc to  $V_{DD}$ .
- 4/ Apply clock pulse:  $V_{IN} = 0$  V dc to  $V_{DD}$ , until proper output state is achieved.
- 5/  $V_{IH}$  and  $V_{IL}$  tests are performed by repeating the truth table tests (numbers 115 through 135) using the input and output conditions follows:

Test	$V_{DD}$	Input		Output	
		H	L	H	L
$V_{IH1}$ $V_{IL1}$	5.0V	3.5V	1.5V	4.5V min	0.5V max
$V_{IH2}$ $V_{IL2}$	10.0V	7.0V	3.0V	9.0V min	1.0V max
$V_{IH3}$ $V_{IL3}$	15.0V	11.0V	4.0V	13.5V min	1.5V max

- 6/ The device manufacturer may, at his option, measure  $I_{IL}$  and  $I_{IH}$  at °C for each individual input or measure all inputs together.
- 7/ See 4.4.1c.
- 8/ Test numbers 115 through 135 shall be run in sequence.
- 9/ For all test conditions, delayed clock ( $C_{LD}$ ) is clock delayed by two inverters.

- 10/ The output voltage limits for each temperature are “H” =  $V_{DD} - 0.5$  V min and “L” =  $V_{SS} + 0.5$  V max.
- 11/ The functional test shall be performed at  $V_{IH}$  and  $V_{DD} \leq 5.0$  V dc and  $\geq 18.0$  V dc.
- 12/ Apply 59 clock pulses:  $V_{IN} = 0$  V dc to  $V_{DD}$ ,  $t_p = 500$  ns (min) and  $t_{TLH} = t_{THL} = 10$  ns  $\pm 10\%$ .
- 13/ The maximum clock frequency ( $f_{CL}$ ) requirement is considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.









TABLE III. Group A inspection for device type 56 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U	Terminal conditions and limits 1/																				Measured terminal	Test limits						Unit																													
			Symbol	B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4		A5	A6	A7	A8	V <sub>DD</sub>	Subgroup 1 T <sub>C</sub> = 25°C		Subgroup 2 T <sub>C</sub> = 125°C		Subgroup 3 T <sub>C</sub> = -55°C																										
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		20	21	22	23	24	Min		Max	Min	Max	Min	Max																								
I <sub>IL2</sub>	3009	169	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	18.0V	A/S						nA																									
		170	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																									
		171	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																								
		172	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																							
		173	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																							
		174	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
		175	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
		176	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
		177	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		178	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
																								Subgroup 4 T <sub>C</sub> = 25°C																																			
C <sub>i</sub>	3012	179									Z/	Z/		GND												GND	AE							pF																									
		180												"												"	Serial In							"																									
		181												"												"	A/B								"																								
		182												"	Z/											"	P/S								"																								
		183												"												"	A/S								"																								
184												"												"	Clock									"																									
																								Subgroup 7 T <sub>C</sub> = 25°C				Subgroup 8 T <sub>C</sub> = 125°C		Subgroup 8 T <sub>C</sub> = -55°C																													
Truth table test g/	3014	185									5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	All outputs																															
		186	L	H	L	H	L	H	L	H	L	H	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	"																															
		187	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
		188	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		189	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		190	H	L	H	L	H	L	H	L	H	L	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
		191	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		192	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		193	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																				
		194	L	H	L	H	L	H	L	H	L	H	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		195	H	L	H	L	H	L	H	L	H	L	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		196	L	H	L	H	L	H	L	H	L	H	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																				
		197	L	H	L	H	L	H	L	H	L	H	GND	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		198	L	H	L	H	L	H	L	H	L	H	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		199	"	"	"	"	"	"	"	"	"	"	GND	GND	5.0V	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		200	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	GND	5.0V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		201	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		202	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		203	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		204	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		205	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																				
206	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
207	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
208	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	5.0V	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																							
209	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
210	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
211	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																						
																								Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C																															
t <sub>PHL1</sub>	3003 Fig. 4	212									5.0V			GND	5.0V	GND	IN	IN								5.0V	Clock to B1	13	737	18	980	13	737	ns																									
		213									"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																							
		214									"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					
		215									"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"																					

See footnotes at end of device type 56.



TABLE III. Group A inspection for device type 56 – Continued.

Symbol	MIL-STD-883 method	Cases J,K,U	Terminal conditions and limits 1/																						Measured terminal	Test limits						Unit				
			Symbol	B8	B7	B6	B5	B4	B3	B2	B1	AE	Serial In	A/B	V <sub>SS</sub>	P/S	A/S	Clock	A1	A2	A3	A4	A5	A6		A7	A8	V <sub>DD</sub>	Subgroup 9 T <sub>C</sub> = 25°C		Subgroup 10 T <sub>C</sub> = 125°C		Subgroup 11 T <sub>C</sub> = -55°C			
			Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		22	23	24	Min	Max	Min		Max	Min	max	
t <sub>THL1</sub>	3004 Fig. 4	276									5.0V			GND	5.0V	GND	IN	IN									5.0V	B1	10	210	14	280	10	210	ns	
		277																	IN	IN								B2								
		278																			IN								B3							
		279																				IN								B4						
		280																					IN							B5						
		281																						IN						B6						
		282																							IN					B7						
		283	OUT	OUT																						IN				B8						
t <sub>TLH1</sub>		284																IN	IN									B1								
		285																		IN									B2							
		286																			IN								B3							
		287																				IN								B4						
		288																					IN							B5						
		289																						IN						B6						
		290																							IN					B7						
		291	OUT	OUT																						IN				B8						
t <sub>THL2</sub>		292																OUT	OUT									A1								
		293																		OUT									A2							
		294																			OUT								A3							
		295																				OUT								A4						
		296																					OUT							A5						
		297																						OUT						A6						
		298																							OUT					A7						
		299	IN	IN																						OUT				A8						
t <sub>TLH2</sub>		300																OUT	OUT									A1								
		301																		OUT									A2							
		302																			OUT									A3						
		303																				OUT								A4						
		304																					OUT							A5						
		305																						OUT						A6						
		306																							OUT					A7						
		307	IN	IN																						OUT				A8						
f <sub>CL</sub> (max) 10/	308	309										IN			GND			OUT	OUT									Clock						μs		
		310																		OUT																
		311																			OUT															
		312																				OUT														
		313																					OUT													
		314																						OUT												
		315																							OUT											
		316																								OUT										
		317																									OUT									
		318																										OUT								
		319																																		
		320																																		
		321																																		
		322																																		
		323	OUT	OUT																																

See footnotes on next page.

TABLE III. Group A inspection for device type 56 – 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;  $I_{SS}$  tests, the output terminals shall be open;  $I_{IH1}$  tests, the undesignated terminals shall be open.
- 2/ In device type 56, circuit B, all terminals except 12 and 14, are inputs connected to gate structures; therefore, the table III,  $V_{IC(POS)}$  and  $V_{IC(NEG)}$  tests shall be expanded to include testing terminals 1 through 8 and 16 through 23.
- 3/ The  $I_{SS}$  test measurements shall be performed in sequence.
- 4/ Apply clock pulse  $V_{IN} = 0$  V dc to  $V_{DD}$  until proper output state is achieved.
- 5/  $V_{IH}$  and  $V_{IL}$  tests are performed by repeating the truth table tests (numbers 185 through 211) using the input and output conditions as follows:

Test	$V_{DD}$	Input		Output	
		H	L	H	L
$V_{IH1}$	5.0V	3.5V	1.5V	4.5V	0.5V
$V_{IL1}$				min	max
$V_{IH2}$	10.0V	7.0V	3.0V	9.0V	1.0V
$V_{IL2}$				min	max
$V_{IH3}$	15.0V	11.0V	4.0V	13.5V	1.5V
$V_{IL3}$				min	max

- 6/ The device manufacturer may, at his option, measure  $I_{IL}$  and  $I_{IH}$  at 25°C for individual input or measure all inputs together.
- 7/ See 4.4.1c.
- 8/ The truth table tests shall be performed in sequence.
- 9/ The truth table test shall be performed at  $V_{IH}$  and  $V_{DD} \leq 5$  V dc and  $\geq 18$  V dc.  $L = V_{SS} + 0.50$  V dc maximum and  $H = V_{DD} - 0.5$  V dc minimum.
- 10/ The maximum clock frequency ( $f_{CL}$ ) requirements are considered met if proper output state changes occur with the pulse repetition period set to that given in the limits column.

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  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ; then, electrical parameter end-point measurements shall be performed.

TABLE IV. Delta limits at 25°C.

Parameter <u>1/</u>	Device types					
	01	02	03	04	05	06
$I_{SS}$	$\pm 60$ nA	$\pm 100$ nA	$\pm 100$ nA	$\pm 100$ nA	$\pm 400$ nA	$\pm 100$ nA
$V_{OL1}$	$\pm 0.04$ V	$\pm 0.04$ V	$\pm 0.04$ V	$\pm 0.04$ V	$\pm 0.04$ V	$\pm 0.04$ V
$V_{OH1}$	$\pm 0.08$ V	$\pm 0.08$ V	$\pm 0.08$ V	$\pm 0.08$ V	$\pm 0.08$ V	$\pm 0.08$ V

Parameter <u>1/</u>	Device types					
	51	52	53	54	55	56
$I_{SS}$	$\pm 60$ nA	$\pm 100$ nA	$\pm 100$ nA	$\pm 100$ nA	$\pm 400$ nA	$\pm 100$ nA
$I_{OL1}$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$
$I_{OH1}$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$	$\pm 15\%$

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

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.

- Before irradiation, selected samples shall be assembled in qualified packages and pass the governing electrical parameters (group A subgroup 1 at  $25^{\circ}\text{C}$ ) and also be subjected to the threshold-voltage test in table VII in order to calculate the delta threshold ( $\Delta V_T$ ) after irradiation.
- 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  $25^{\circ}\text{C}$ , after exposure. The start and completion of the end-point electrical parameter measurements shall not exceed 2 hours following irradiation.
- Threshold-voltage test circuit conditions shall be as specified in table VII and on figure 5. 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.
- 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	
		01-06	51-56
$V_{TN}$	0.3 V min	10 V	10 V
$V_{TP}$	2.8 V max	10 V	10 V
$\Delta V_T$	1.4 V max	10 V	10 V
$I_{SS}$	100 x max limit	15 V	18 V
$t_{PLH}$	1.35 x max limit	5 V	5 V
$t_{PHL}$	1.35 x max limit	5 V	5 V

TABLE VI. Bias during exposure to radiation.

Device type	Pin connections <sup>1/</sup>		
	$V_{DD} = 10$ V dc (through a 30 k $\Omega$ to 60 k $\Omega$ resistor)	$V_{SS} = GND$	$V_{DD} = 10$ V dc
01, 51	1, 3, 4, 5, 6	7	14
02, 52	1, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15	8	16
03, 53	1, 6, 7, 9, 14, 15	8	16
04, 54	1, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15	8	16
05, 55	1, 2, 10, 15	8	16
06, 56	9, 10, 11, 13, 14, 15	12	24

<sup>1/</sup> Pins not designated are open or tied to 10 V dc through a 30 k $\Omega$  to 60 k $\Omega$  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 materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system commands. 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.

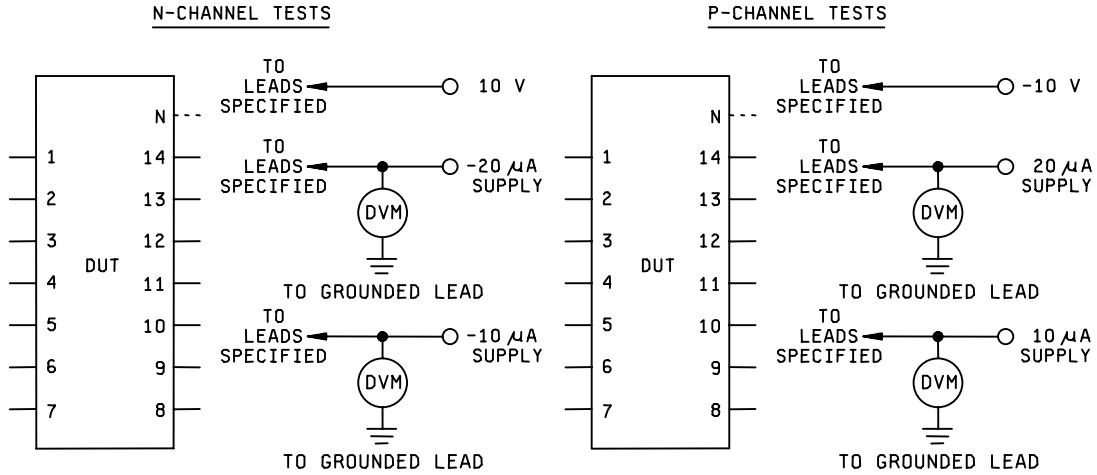


FIGURE 5. Threshold-voltage test circuit.

TABLE VII. Threshold-voltage test circuit conditions.

Device	GND	10 V	$V_{TN}$ measured at		GND	-10 V	$V_{TP}$ measured at	
			-20 $\mu$ A supply	-10 $\mu$ A supply			20 $\mu$ A supply	10 $\mu$ A supply
01, 51	3	14	1, 4, 5, 6, 7		3	1, 4, 5, 6, 7	14	
02, 52	10	16	1, 4, 5, 6, 7, 8, 9, 11, 13, 14, 15		10	1, 4, 5, 6, 7, 8, 9, 11, 13, 14, 15	16	
03, 53	1	16	6, 7, 8, 9, 14, 15		1	6, 7, 8, 9, 14, 15	16	
04, 54	10	16	1, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15		10	1, 4, 5, 6, 7, 8, 9, 11, 13, 14, 15	16	
05, 55	2	1, 10, 15, 16	8		2	1, 8, 10, 15	16	
06, 56	10	9, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24		12	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15		24

## 6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. PIN and compliance identifier, if applicable (see 1.2).
- c. Requirements for delivery of one copy of the 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:

$C_I$ .....	Input terminal-to-GND capacitance.
GND .....	Ground zero voltage potential.
$T_A$ .....	Free air temperature.
$V_{IC(pos)}$ .....	Positive clamping input to $V_{DD}$ .
$V_{IC(neg)}$ .....	Negative clamping input to $V_{SS}$ .
$V_{DD}$ .....	Positive supply voltage.
$V_{SS}$ .....	Negative supply voltage.
$I_{SS}$ .....	Quiescent supply current.



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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	4006A
02	4014A
03	4015A
04	4021A
05	4031A
06	4034A
51	4006B
52	4014B
53	4015B
54	4021B
55	4031B
56	4034B

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 5962-2080)

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 <http://assist.daps.dla.mil>.