

INCH-POUND

MIL-M-38510/380B

4 October 2004

SUPERSEDING

MIL-M-38510/380A

8 August 1986

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, BIPOLAR, ADVANCED LOW POWER SCHOTTKY TTL,
BINARY COUNTERS, CASCADABLE, MONOLITHIC SILICON

Inactive for new design after 8 July 1997.

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, advanced low power Schottky TTL, binary counters. Two product assurance classes and a choice of case outlines and lead finishes are provided for each type and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).

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	Synchronous 4-bit cascadable binary counter (asynchronous clear)
02	Synchronous 4-bit cascadable binary counter (synchronous clear)
03	Synchronous 4-bit cascadable up/down binary counter
04	Synchronous 4-bit cascadable binary counter with 3-state outputs
05	Synchronous 4-bit cascadable up/down binary counter with 3-state outputs

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>
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
R	GDIP1-T20 or CDIP2-T20	20	Dual-in-line
S	GDFP2-F20 or CDFP3-F20	20	Flat pack
X	CQCC2-N20	20	Square leadless chip carrier
2	CQCC1-N20	20	Square leadless chip carrier

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43218-3990, or emailed to bipolar@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 www.dodssp.daps.mil.

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
Input voltage range	-1.5 V dc at -18 mA to +7.0 V dc
Storage temperature range	-65° to +150°C
Maximum power dissipation, per device (P_D) ^{1/}	
Device types 01 and 02	115 mW
Device type 03	137.5 mW
Device type 04	198 mW
Device type 05	176 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction to case (θ_{JC})	(See MIL-STD-1835)
Junction temperature (T_J) ^{2/}	175°C

1.4 Recommended operating conditions.

Maximum low level output current (I_{OL}):	
Device types 01, 02, and 03	4.0 mA
Device types 04 and 05	12.0 mA
Supply voltage (V_{CC})	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Normalized fanout (each output) ^{3/} :	
At low logic level	10 maximum
At high logic level	20 maximum
Input clock frequency (f_{MAX})	
+25°C;	
Device types 01 and 02	40 MHz
Device types 03, 04, and 05	30 MHz
-55°C/+125°C;	
Device types 01 and 02	35 MHz
Device types 03, 04, and 05	25 MHz
Width of clock pulse (t_P CLOCK)	
+25°C;	
Device types 01 and 02	12.5 ns
Device types 03	15 ns
-55°C/+125°C;	
Device types 01 and 02	14 ns
Device types 03	20 ns
+25°C;	
Device types 04 and 05	16.5 ns
-55°C/+125°C;	
Device types 04 and 05	20 ns
Width of asynchronous clear pulse (t_P ACLR):	
Device types 01, 04, and 05	20 ns

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

^{2/} Maximum junction temperature should not be exceeded except in accordance with allowable short duration burn-in screening condition in accordance with MIL-PRF-38535.

^{3/} The device should fanout in both high and low levels to specified number of inputs of the same device type as that being tested.

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Width of asynchronous load pulse (t_P ALOAD):	
Device type 04	20 ns
Setup times before clock:	
DATA:	
Device types 01, 02, and 03	20 ns
Device types 04 and 05	25 ns
Synchronous clear;	
Low;	
Device types 02, 04, and 05	20 ns
Inactive;	
Device type 02	10 ns
Device types 04 and 05	35 ns
Asynchronous clear;	
Inactive;	
Device types 01, 04, and 05	10 ns
Asynchronous load;	
Inactive;	
Device type 04	10 ns
Synchronous load;	
Low;	
Device types 03, 04, and 05	20 ns
Inactive;	
Device types 04 and 05	35 ns
Enable P/Enable T;	
Low;	
Device types 01, 03, 04, and 05	25 ns
Device type 02	30 ns
High;	
Device types 01, 02, 03, and 04	25 ns
Device type 05	35 ns
Up/down;	
Device type 03	20 ns
Device type 05	35 ns
Hold times (t_{HOLD});	
Device types 01, 02, 03, 04, and 05	0 ns
Case operating temperature range (T_C)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

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

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

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

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.

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 Typical operational sequence. The typical operational sequence 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 and the preparing activity upon request.

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

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

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

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

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

3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 12 (see MIL-PRF-38535, appendix A).

4. VERIFICATION

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

4.2 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. Interim and final electrical test parameters shall be as specified in table II, except interim electrical parameters test prior to burn-in is optional at the discretion of the manufacturer.
- c. Additional screening for space level product shall be as specified in MIL-PRF-38535.

4.3 Qualification inspection. Qualification inspection shall be 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, and D inspections (see 4.4.1 through 4.4.4).

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

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

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified		Device type	Limits		Unit
					Min	Max	
High level output voltage	V _{OH1}	V _{CC} = 4.5 V, V _{IL} = 0.8 V, V _{IH} = 2.0 V	I _{OH} = -400 μA	01, 02, 03	2.5		V
			RCO/CCO	04, 05	2.5		
	V _{OH2}	V _{CC} = 4.5 V, V _{IL} = 0.8 V, V _{IH} = 2.0 V	I _{OH} = -1mA	04, 05	2.4		V
	Q outputs						
Low level output voltage	V _{OL1}	V _{CC} = 4.5 V, V _{IL} = 0.8 V, V _{IH} = 2.0 V	I _{OL} = 4 mA All outputs	01, 02, 03		0.4	V
			I _{OL} = 4 mA RCO/CCO	04, 05		0.4	
	V _{OL2}		I _{OL} = 12 mA Q outputs	04, 05		0.4	V
Input clamp voltage	V _{IC}	V _{CC} = 4.5 V, I _{IN} = -18 mA, T _C = +25°C		All		-1.5	V
Low level input current	I _{IL}	V _{CC} = 5.5 V, V _{IN} = 0.4 V		All	0	-200	μA
High level input current	I _{IH1}	V _{CC} = 5.5 V, V _{IN} = 2.7 V	Load, CLK, or ENT	01, 02		40	μA
			ENT/ENP	04		40	
			All other inputs	All		20	
	I _{IH2}	V _{CC} = 5.5 V, V _{IN} = 7.0 V	Load, CLK, or ENT	01, 02		200	μA
			ENT/ENP	04		200	
			All other inputs	All		100	
Short circuit output	I _{o 1/}	V _{CC} = 5.5 V, V _O = 2.25 V	Q outputs	All	-20	-112	mA
			RCO	01,02,03	-20	-112	
			RCO and CCO	04, 05	-15	-70	
Output current, low level outputs OFF	I _{OZL}	V _{CC} = 5.5 V, V _O = 0.4 V	Q outputs	04, 05		-20	μA
Output current, high level outputs OFF	I _{OZH}	V _{CC} = 5.5 V, V _O = 2.7 V	Q outputs	04, 05		20	μA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Supply current	I _{CC}	V _{CC} = 5.5 V	01, 02 2/		25	mA
			03		25	
Supply current, high level	I _{CCH}	V _{CC} = 5.5 V	04		27	mA
			05		26	
Supply current, low level	I _{CCL}	V _{CC} = 5.5 V	04		33	mA
			05		32	
Supply current, outputs disabled	I _{CCZ}	V _{CC} = 5.5 V	04		36	mA
			05		32	
Maximum input A, clock, or count up frequency	f _{MAX}		03,04,05	25		MHz
			01, 02	35		
Propagation delay time low to high, CLK - Q	t _{PLH1}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, R _L = 500 Ω	01, 02	4	18	ns
			03	5	19	
			04	4	15	
			05	4	17	
Propagation delay time high to low, CLK - Q	t _{PHL1}		01, 02	6	25	ns
			03	5	20	
			04	5	21	
			05	7	18	
Propagation delay time low to high, CLK - RCO	t _{PLH2}		01, 02	5	25	ns
			03	6	25	
			04	9	35	
			05	12	31	
Propagation delay time high to low, CLK - RCO	t _{PHL2}		01, 02	5	25	ns
			03	6	25	
			04	8	29	
			05	10	22	
Propagation delay time low to high, CLK - CCO	t _{PLH3}		04	8	31	ns
			05	5	15	
Propagation delay time high to low, CLK - CCO	t _{PHL3}		04	5	20	ns
			05	6	30	
Propagation delay time low to high, ALOAD - Q	t _{PLH4}		04	10	38	ns
Propagation delay time high to low, ALOAD - Q	t _{PHL4}		04	7	27	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time low to high, ALOAD - RCO	t _{PLH5}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, R _L = 500 Ω	04	15	55	ns
Propagation delay time high to low, ALOAD - RCO	t _{PHL5}		04	12	35	ns
Propagation delay time low to high, ALOAD - CCO	t _{PLH6}		04	25	65	ns
Propagation delay time high to low, ALOAD - CCO	t _{PHL6}		04	12	42	ns
Propagation delay time low to high, DATA - Q	t _{PLH7}		04	8	35	ns
Propagation delay time high to low, DATA - Q	t _{PHL7}		04	7	27	ns
Propagation delay time low to high, ENT - RCO	t _{PLH8}		01, 02	3	16	ns
			03	5	19	
			04	5	20	
			05	6	17	
Propagation delay time high to low, ENT - RCO	t _{PHL8}		01, 02	3	16	ns
		03	3	19		
		04	4	18		
		05	4	17		
Propagation delay time low to high, ENT - CCO	t _{PLH9}	04	12	35	ns	
		05	5	15		
Propagation delay time high to low, ENT - CCO	t _{PHL9}	04	4	15	ns	
		05	9	28		
Propagation delay time low to high, ENP - CCO	t _{PLH10}	04	5	22	ns	
		05	4	14		
Propagation delay time high to low, ENP - CCO	t _{PHL10}	04	4	14	ns	
		05	5	17		
Propagation delay time low to high, U/D - RCO	t _{PLH11}	03	5	25	ns	
		05	9	25		
Propagation delay time high to low, U/D - RCO	t _{PHL11}	03	5	25	ns	
		05	9	23		

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time high to low, CLR - Q	t _{PHL12}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, R _L = 500 Ω	01	8	27	ns
			04	7	28	
			05	9	22	
Propagation delay time high to low, CLR - RCO	t _{PHL13}		01	11	28	ns
Enable time to high level output	t _{PZH}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, R ₁ = R _L = 500 Ω	04	5	24	ns
			05	6	21	
Enable time to low level output	t _{PZL}		04	8	28	ns
			05	11	29	
Disable time from high level	t _{PHZ}		04	2	15	ns
			05	1	8	
Disable time from low level	t _{PLZ}		04	4	20	ns
			05	3	19	

1/ The output conditions have been chosen to produce a current that closely approximates one-half of the true short circuit output current, I_{OS}.

2/ I_{CC} measured:

- (a) With the clock input low, all other inputs high and all outputs open and
- (b) Then again with the clock input low with all other inputs low and all outputs open.

TABLE II. Electrical test requirements.

MIL-PRF-38535 test requirements	Subgroups (see table III)	
	Class S devices	Class B devices
Interim electrical parameters	1	1
Final electrical test parameters	1*, 2, 3, 7, 9, 10, 11	1*, 2, 3, 7, 9
Group A test requirements	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3, 7, 8, 9, 10, 11
Group B electrical test parameters when using the method 5005 QCI option	1, 2, 3, 7, 8, 9, 10, 11	N/A
Group C end-point electrical parameters	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3
Group D end-point electrical parameters	1, 2, 3	1, 2, 3

*PDA applies to subgroup 1.

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

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

- a. End-point electrical parameters shall be as specified in table II herein.
- b. The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

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

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

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

Terminal number	Device types 01 and 02		Device type 03		Device type 04	Device type 05
	Cases E and F	Cases X and 2	Cases E and F	Cases X and 2	Cases R, S, X, 2	Cases R, S, X, 2
1	$\overline{\text{CLR}}$	N/C	$\text{U}/\overline{\text{D}}$	N/C	$\overline{\text{ALOAD}}$	$\text{U}/\overline{\text{D}}$
2	CLK	$\overline{\text{CLR}}$	CLK	$\text{U}/\overline{\text{D}}$	CLK	CLK
3	A	CLK	A	CLK	A	A
4	B	A	B	A	B	B
5	C	B	C	B	C	C
6	D	N/C	D	N/C	D	D
7	ENP	C	$\overline{\text{ENP}}$	C	ENP	$\overline{\text{ENP}}$
8	GND	D	GND	D	$\overline{\text{ACLR}}$	$\overline{\text{ACLR}}$
9	$\overline{\text{LOAD}}$	ENP	$\overline{\text{LOAD}}$	ENP	SCLR	SCLR
10	ENT	GND	$\overline{\text{ENT}}$	GND	GND	GND
11	QD	N/C	QD	N/C	$\overline{\text{SLOAD}}$	$\overline{\text{SLOAD}}$
12	QC	$\overline{\text{LOAD}}$	QC	$\overline{\text{LOAD}}$	ENT	$\overline{\text{ENT}}$
13	QB	ENT	QB	$\overline{\text{ENT}}$	QD	QD
14	QA	QD	$\overline{\text{QA}}$	QD	QC	QC
15	RCO	QC	$\overline{\text{RCO}}$	QC	QB	QB
16	V_{CC}	N/C	V_{CC}	N/C	QA	QA
17		QB		QB	$\overline{\text{G}}$	$\overline{\text{G}}$
18		QA		QA	CCO	$\overline{\text{CCO}}$
19		RCO		RCO	RCO	$\overline{\text{RCO}}$
20		V_{CC}		V_{CC}	V_{CC}	V_{CC}

FIGURE 1. Terminal connections.

DEVICE TYPE 01

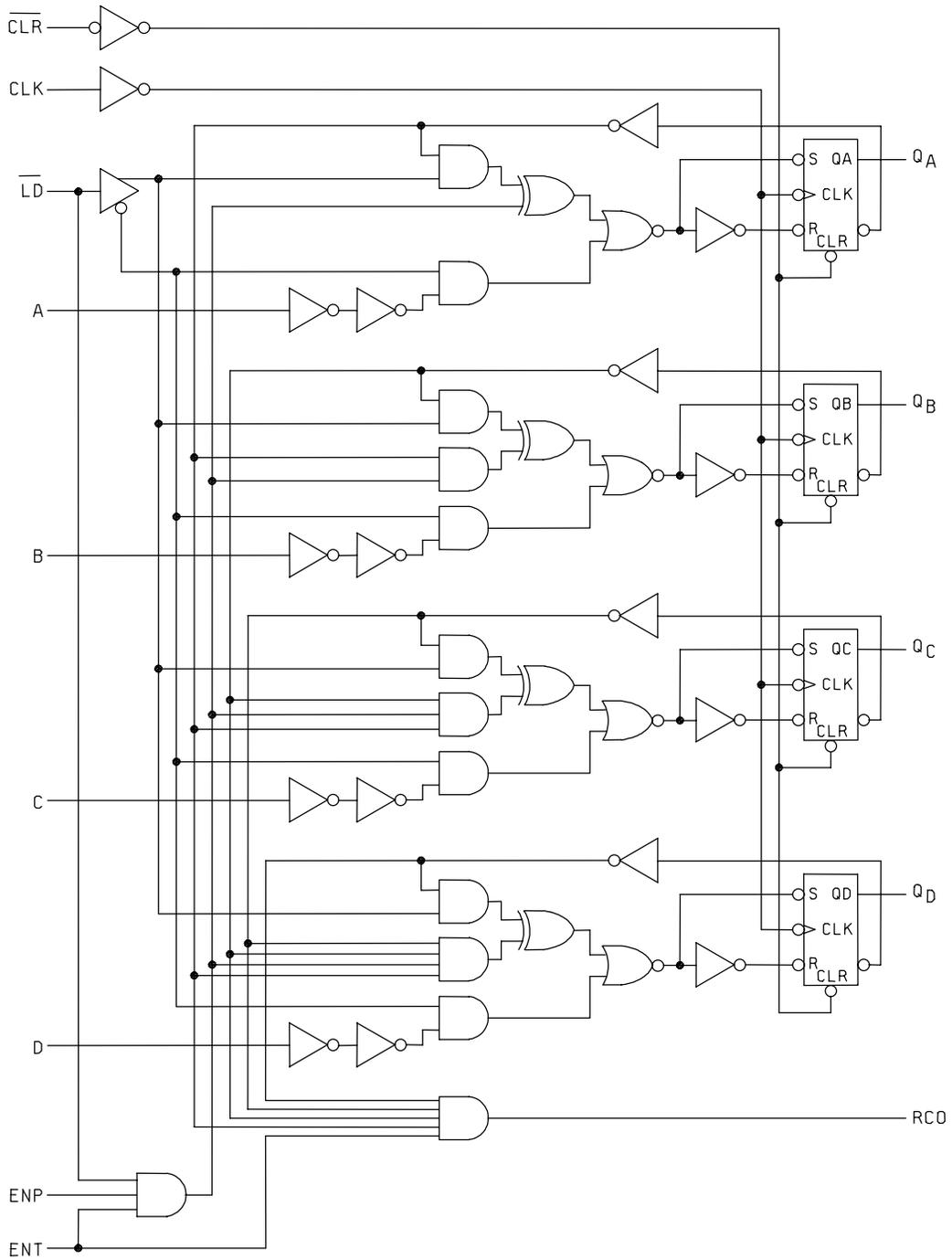


FIGURE 2. Logic diagrams.

DEVICE TYPE 02

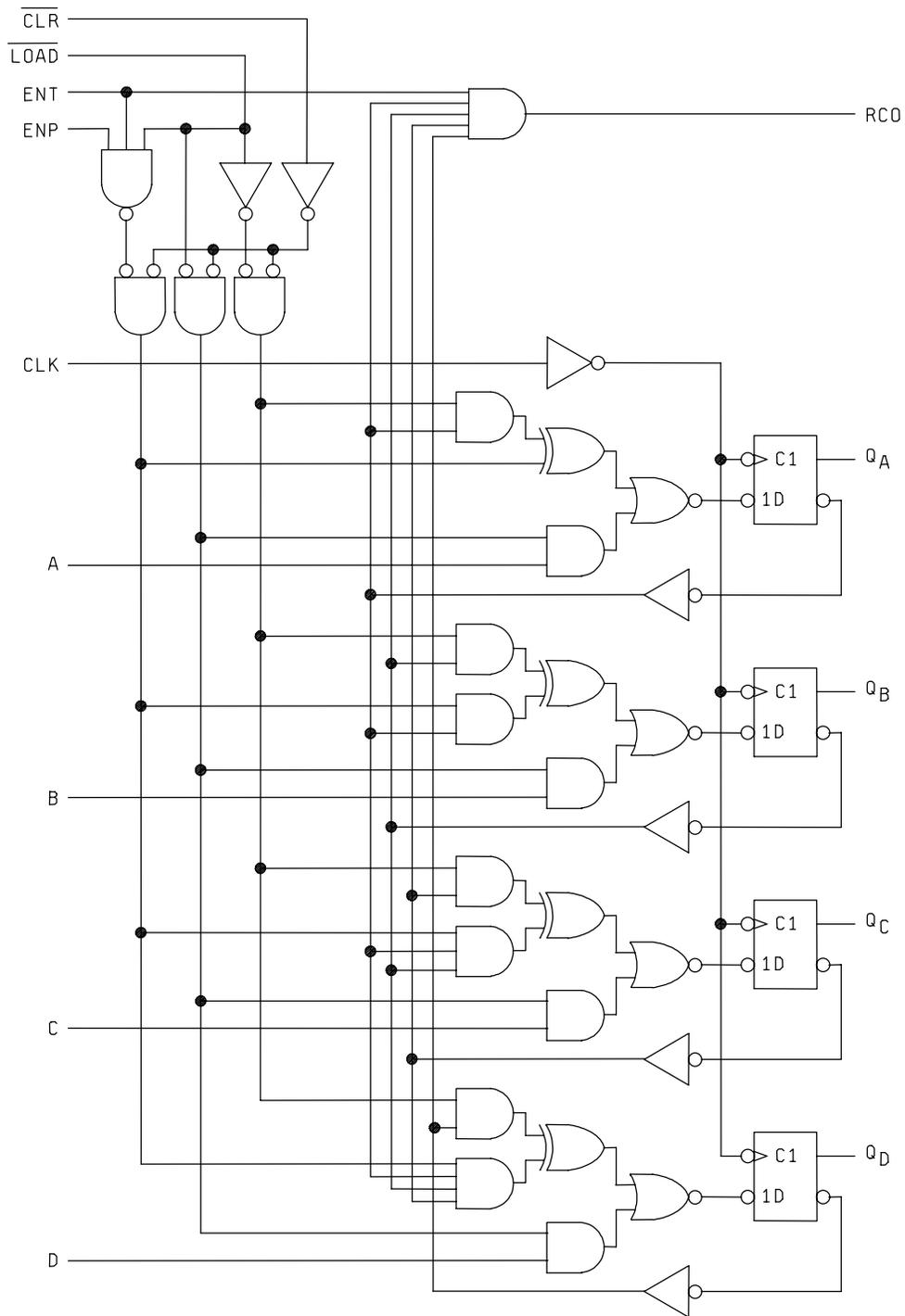


FIGURE 2. Logic diagrams.

DEVICE TYPE 03

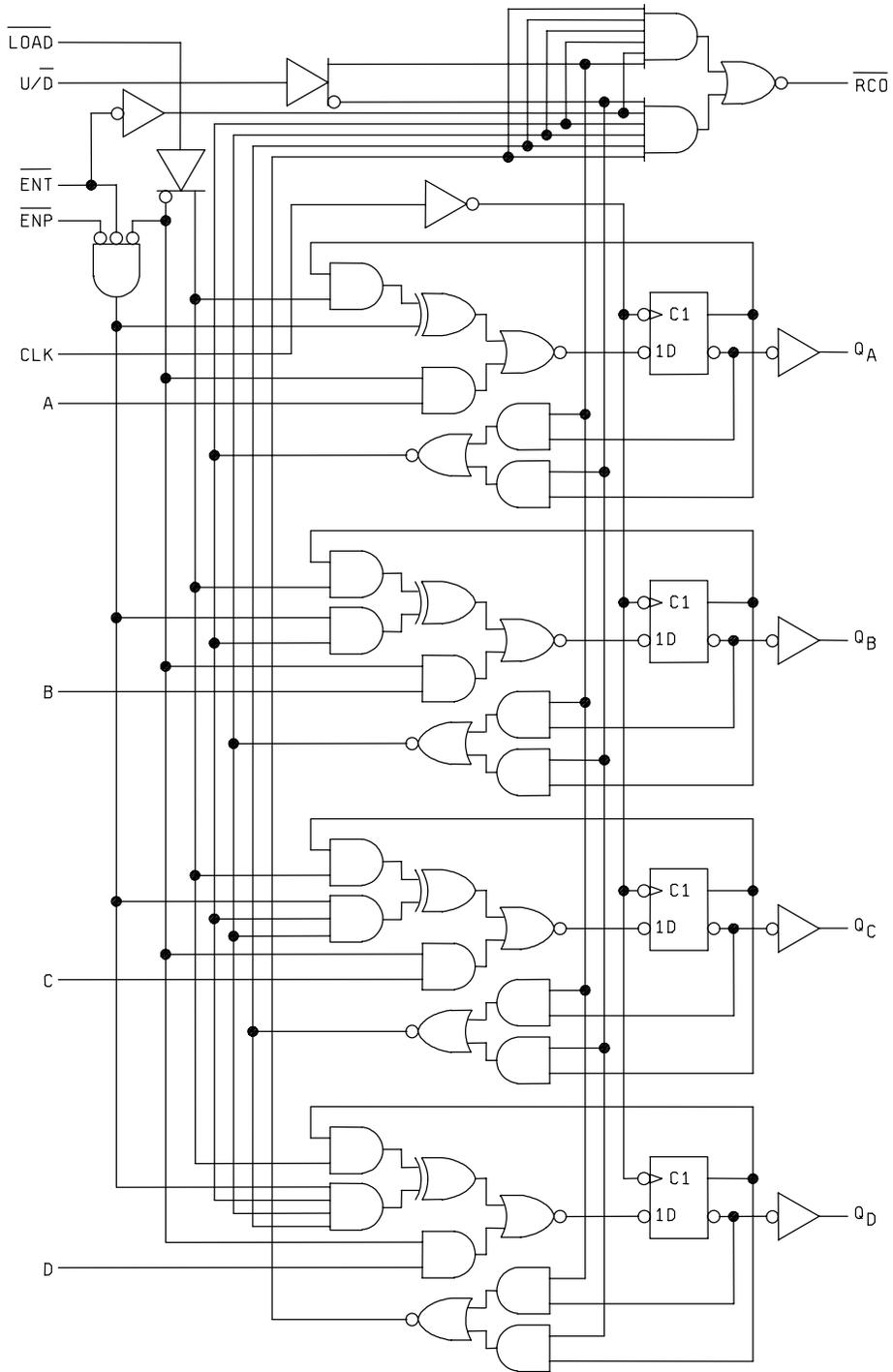


FIGURE 2. Logic diagrams - Continued.

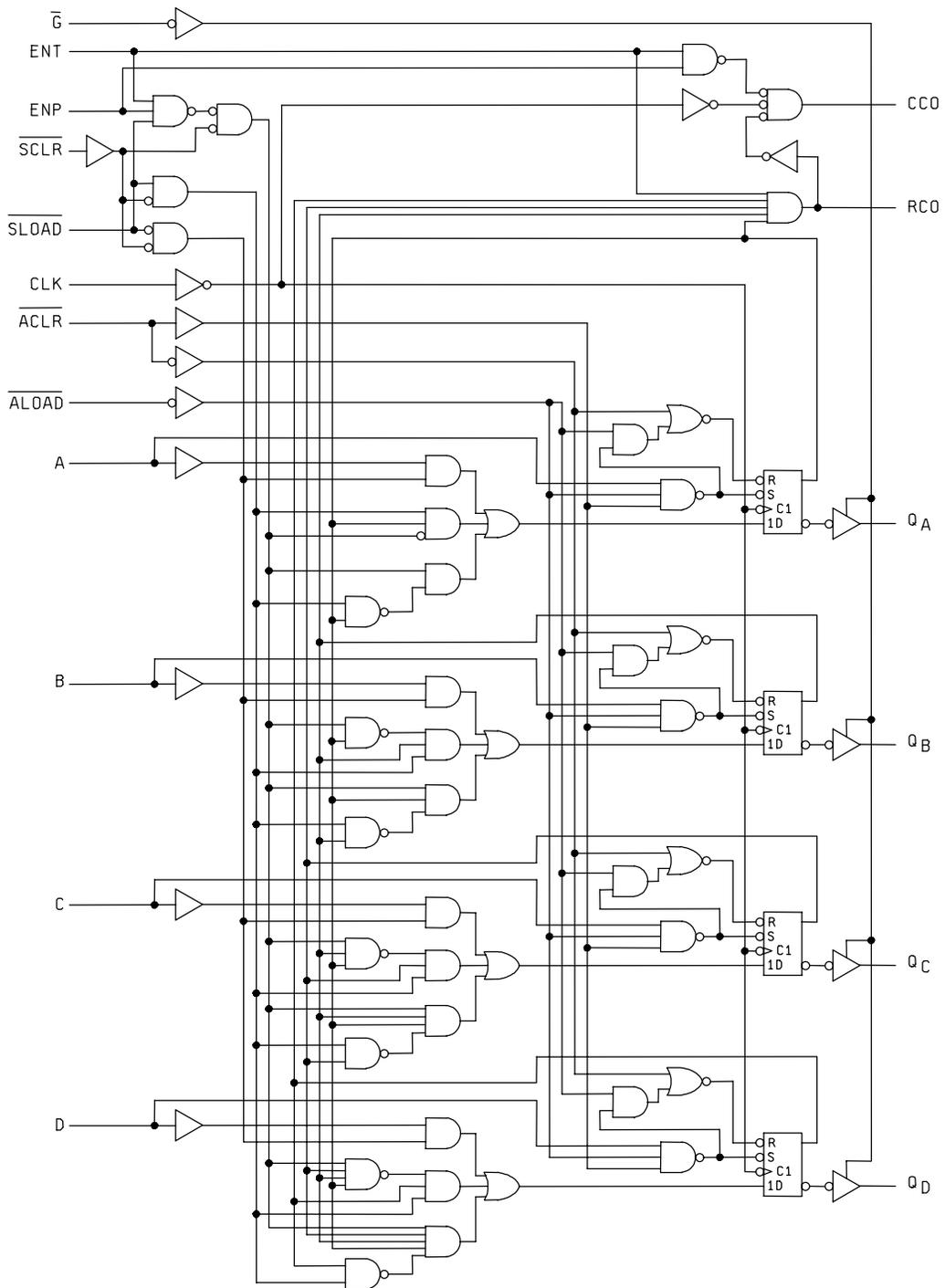


FIGURE 2. Logic diagrams - Continued.

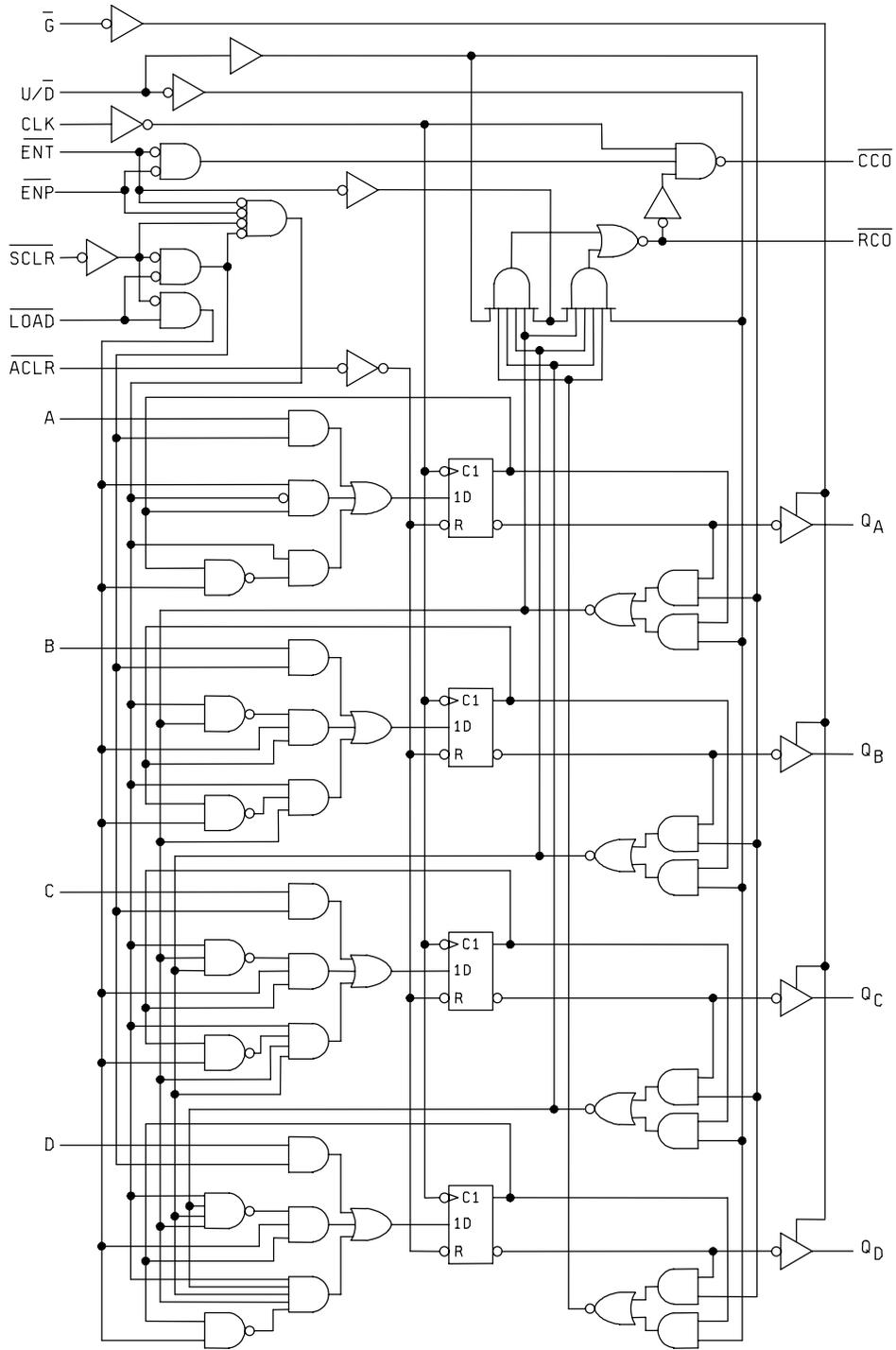


FIGURE 2. Logic diagrams - Continued.

SYNCHRONOUS TRUTH TABLE, DEVICE TYPES 01 AND 02

Inputs at time t _n									Outputs at time t _{n+1}				
Clock	Enable P	Enable T	Load	A	B	C	D	Clear	QA	QB	QC	QD	Carry output (RCO)
CP	L	X	H	X	X	X	X	H	NC	NC	NC	NC	NC
CP	X	L	H	X	X	X	X	H	NC	NC	NC	NC	L
CP	H	H	H	X	X	X	X	H	Previous count plus 1 (note 1)				H if count = 15 L if count < 15
CP	X	H	L	X	X	X	X	H	A	B	C	D	H if count = 15 L if count < 15
CP	X	L	L	X	X	X	X	H	A	B	C	D	L
CP	X	X	X	X	X	X	X	L	L	L	L	L	L

ASYNCHRONOUS TRUTH TABLE, DEVICE TYPE 01

Inputs at time t _n									Outputs at time t _{n+1}				
Clock	Enable P	Enable T	Load	A	B	C	D	Clear	QA	QB	QC	QD	Carry output
X	X	X	X	X	X	X	X	L	L	L	L	L	L

NOTES:

1. See up count sequence table.
2. L = V_{IL} for inputs, V_{OL} for outputs.
3. H = V_{IH} for inputs, V_{OH} for outputs.
4. X = V_{IH} or V_{IL}.
5. CP = Clock pulse.
6. NC = No change.
7. The last line of synchronous truth table does not apply to device type 01.

UP COUNT SEQUENCE TABLE

QA (LSB)	QB	QC	QD (MSB)
L	L	L	L
H	L	L	L
L	H	L	L
H	H	L	L
L	L	H	L
H	L	H	L
L	H	H	L
H	H	H	L
L	L	L	H
H	L	L	H
L	H	L	H
H	H	L	H
L	L	H	H
H	L	H	H
L	H	H	H
H	H	H	H

FIGURE 3. Truth tables.

DEVICE TYPE 03

Operation	Inputs at time t_n									Outputs at time $t_n + 1$				
	Clock	ENP	ENT	Load	A	B	C	D	U/D	QA	QB	QC	QD	RCO
Load	↑	L	L	L	X	X	X	X	X	A	B	C	D	L if count = 15 H if count ≠ 15
Count up	↑	L	L	H	X	X	X	X	H	Previous count plus 1 (note 1)				L if count = 15 H if count ≠ 15
Count down	↑	L	L	H	X	X	X	X	L	Previous count minus 1 (note 2)				L if count = 0 H if count ≠ 0
Inhibit	↑	H	L	H	X	X	X	X	X	No change				No change
	↑	L	H	H	X	X	X	X	L					
	↑	H	H	H	X	X	X	X	L					

COUNT UP SEQUENCE				
QA	QB	QC	QD	RCO
L	L	L	L	H
L	L	L	H	H
L	L	H	L	H
L	L	H	H	H
L	H	L	L	H
L	H	L	H	H
L	H	H	L	H
L	H	H	H	H
H	L	L	L	H
H	L	L	H	H
H	L	H	L	H
H	L	H	H	H
H	H	L	L	H
H	H	L	H	H
H	H	H	L	H
H	H	H	H	L

COUNT DOWN SEQUENCE				
QA	QB	QC	QD	RCO
H	H	H	H	H
H	H	H	L	H
H	H	L	H	H
H	H	L	L	H
H	L	H	H	H
H	L	H	L	H
H	L	L	H	H
H	L	L	L	H
L	H	H	H	H
L	H	H	L	H
L	H	L	H	H
L	H	L	L	H
L	L	H	H	H
L	L	H	L	H
L	L	L	H	H
L	L	L	L	L

FIGURE 3. Truth tables - Continued.

DEVICE TYPE 04

OPERATION	Inputs at time t_n												Outputs at time $t_n + 1$					
	G	ACLR	ALOAD	SCLR	SLOAD	ENT	ENP	CLK	A	B	C	D	QA	QB	QC	QD	RCO	CCO
Q OUTPUTS DISABLED note 2	H	X	X	X	X	X	X	X	X	X	X	X	Z	Z	Z	Z	H if cnt=15 L if cnt \neq 15	note 1
ASYNCHRONOUS CLEAR	L	L	X	X	X	X	X	X	X	X	X	X	L	L	L	L	L	L
ASYNCHRONOUS LOAD	L	H	L	X	X	X	X	X	X	X	X	X	A	B	C	D	H if cnt=15 L if cnt \neq 15	note 1
SYNCHRONOUS CLEAR	L	H	H	L	X	X	X	\uparrow	X	X	X	X	L	L	L	L	L	L
SYNCHRONOUS LOAD	L	H	H	H	L	X	X	\uparrow	X	X	X	X	A	B	C	D	H if cnt=15 L if cnt \neq 15	note 1
COUNT	L	H	H	H	H	H	H	\uparrow	X	X	X	X	Previous count plus 1			H if cnt=15 L if cnt \neq 15	note 1	
INHIBIT COUNTING	L	H	H	H	H	X	L	X	X	X	X	X	No change			H if cnt=15 L if cnt \neq 15	note 1	
	L	H	H	H	H	L	X	X	X	X	X	X						
	L	H	H	H	H	L	L	X	X	X	X	X						

NOTES:

1. CCO produces a high level pulse for a duration equal to that of the low level of the clock when RCO is high and the counter is enabled, otherwise CCO is high.
2. Counting continues.

COUNT UP SEQUENCE					
QA	QB	QC	QD	RCO	CCO
L	L	L	L	L	L
L	L	L	H	L	L
L	L	H	L	L	L
L	L	H	H	L	L
L	H	L	L	L	L
L	H	L	H	L	L
L	H	H	L	L	L
L	H	H	H	L	L
H	L	L	L	L	L
H	L	L	H	L	L
H	L	H	L	L	L
H	L	H	H	L	L
H	H	L	L	L	L
H	H	L	H	L	L
H	H	H	L	L	L
H	H	H	H	H	note 1

FIGURE 3. Truth tables - Continued.

DEVICE TYPE 05

OPERATION	Inputs at time t _n												Outputs at time t _n + 1					
	G	ACLR	SCLR	LOAD	ENT	ENP	U/D	CLK	A	B	C	D	QA	QB	QC	QD	RCO	CCO
Q OUTPUTS DISABLED note 3	H	X	X	X	X	X	X	X	X	X	X	X	Z	Z	Z	Z	L if cnt=15 H if cnt ≠ 15	note 1
ASYNCHRONOUS CLEAR	L	L	X	X	X	X	X	X	X	X	X	X	L	L	L	L	H	H
SYNCHRONOUS CLEAR	L	H	L	X	X	X	X	↑	X	X	X	X	L	L	L	L	H	H
LOAD	L	H	H	L	X	X	X	↑	X	X	X	X	A	B	C	D	L if cnt=15 H if cnt ≠ 15	note 1
COUNT UP	L	H	H	H	L	L	H	↑	X	X	X	X	Previous count plus 1				L if cnt=15 H if cnt ≠ 15	note 1
COUNT DOWN	L	H	H	H	L	L	L	↑	X	X	X	X	Previous count minus 1				L if cnt=15 H if cnt ≠ 15	note 1
INHIBIT COUNT	L	H	H	H	X	H	X	X	X	X	X	X	No change (hold)				note 2	note 1
	L	H	H	H	H	X	X	X	X	X	X	X						
	L	H	H	H	H	H	X	X	X	X	X	X						

NOTES:

1. CCO produces a high level pulse for a duration equal to that of the low level of the clock when RCO is high and the counter is enabled, otherwise CCO is high.
2. RCO produces a low level pulse while the count is 15 when counting up, or while the count is 0 when counting down.
3. Counting continues.

QA	QB	QC	QD	RCO	CCO
L	L	L	L	H	H
L	L	L	H	H	H
L	L	H	L	H	H
L	L	H	H	H	H
L	H	L	L	H	H
L	H	L	H	H	H
L	H	H	L	H	H
L	H	H	H	H	H
H	L	L	L	H	H
H	L	L	H	H	H
H	L	H	L	H	H
H	L	H	H	H	H
H	H	L	L	H	H
H	H	L	H	H	H
H	H	H	L	H	H
H	H	H	H	L	note 1

QA	QB	QC	QD	RCO	CCO
H	H	H	H	H	H
H	H	H	L	H	H
H	H	L	H	H	H
H	H	L	L	H	H
H	L	H	H	H	H
H	L	H	L	H	H
H	L	L	H	H	H
H	L	L	L	H	H
L	H	H	H	H	H
L	H	H	L	H	H
L	H	L	H	H	H
L	H	L	L	H	H
L	L	H	H	H	H
L	L	H	L	H	H
L	L	L	H	H	H
L	L	L	L	L	note 1

FIGURE 3. Truth tables - Continued.

DEVICE TYPES 01 AND 02

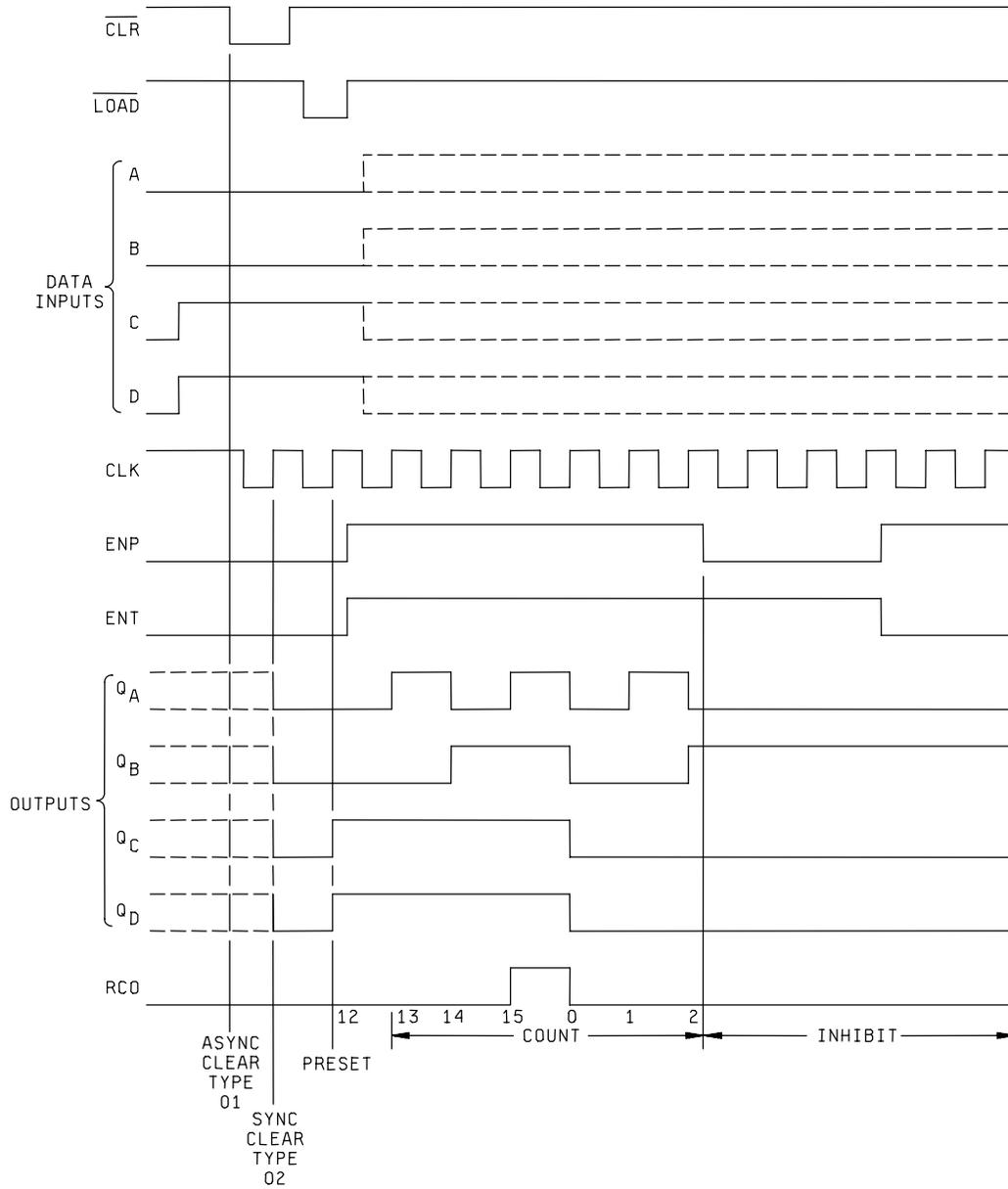


FIGURE 4. Typical operational sequence.

DEVICE TYPE 03

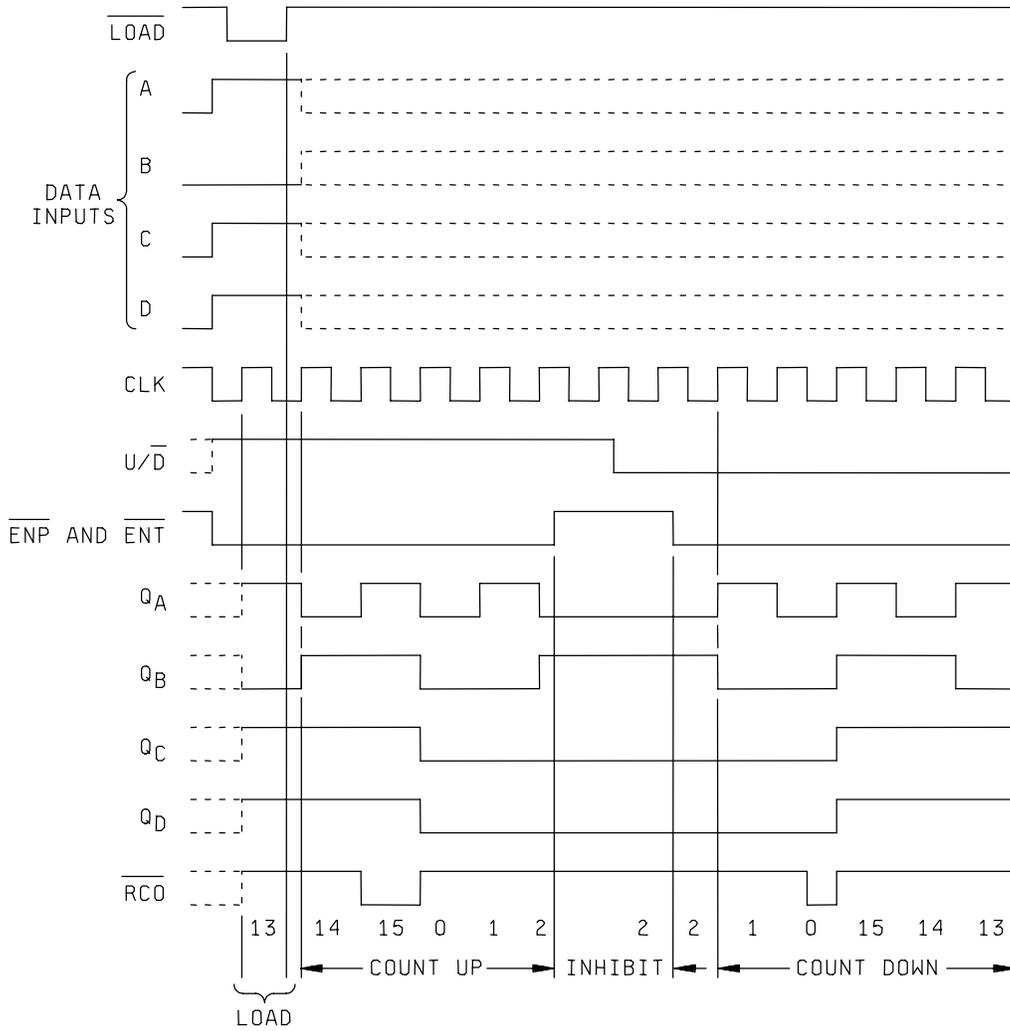


FIGURE 4. Typical operational sequence Continued.

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DEVICE TYPE 04

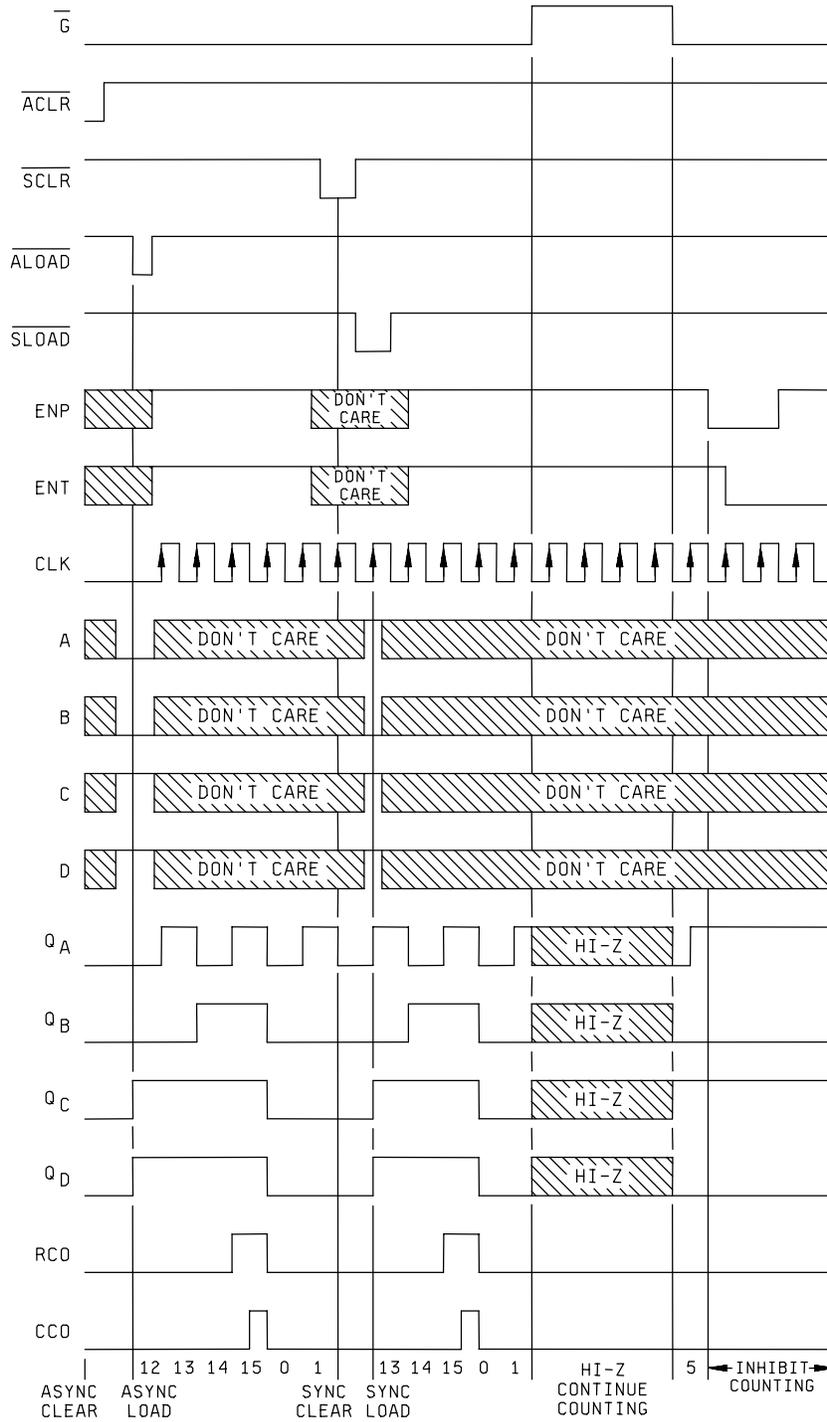


FIGURE 4. Typical operational sequence Continued.

DEVICE TYPE 05

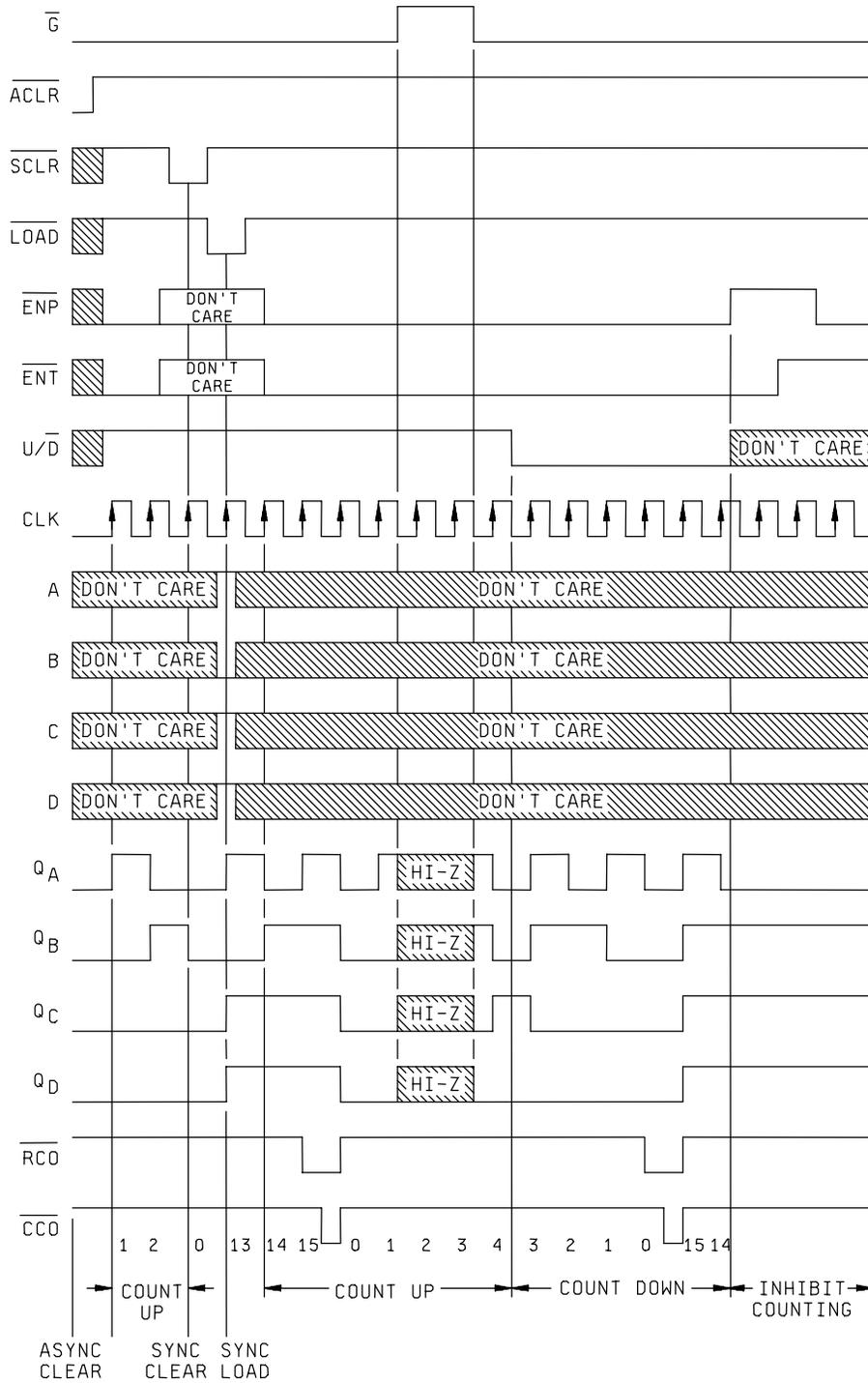
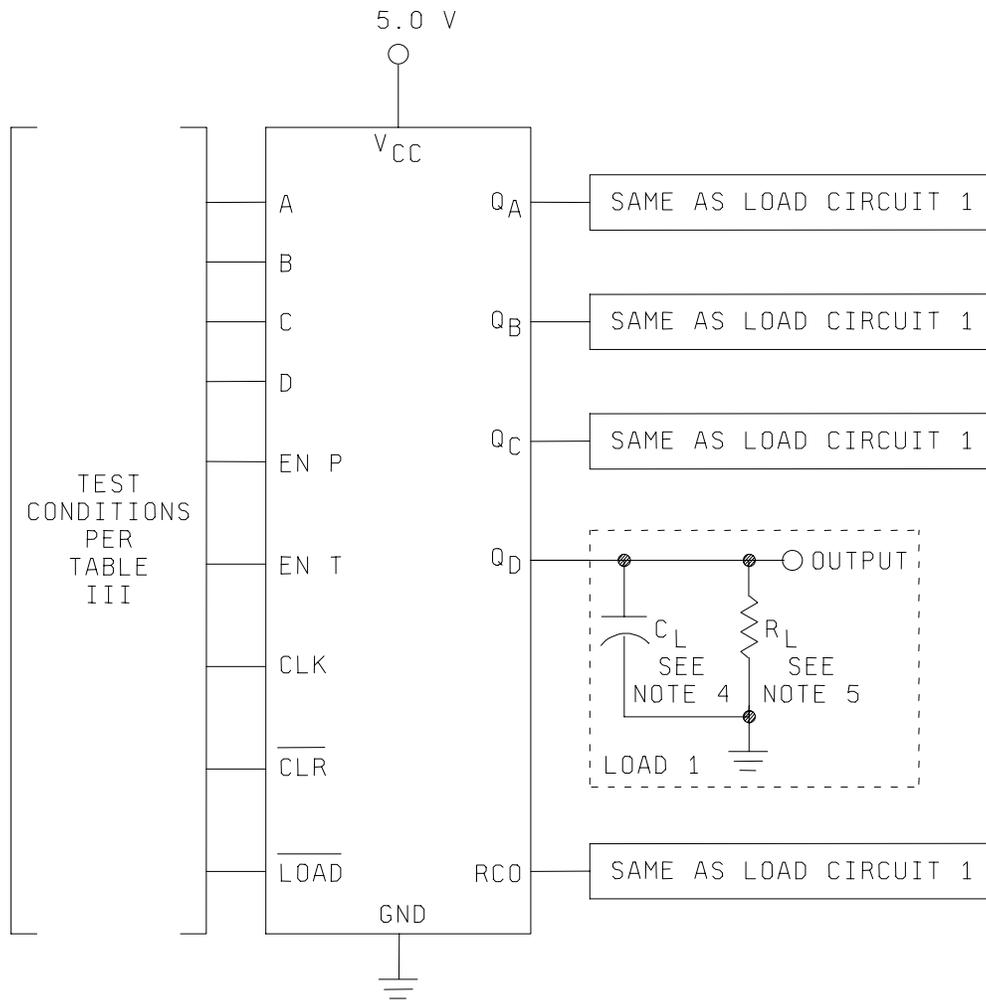


FIGURE 4. Typical operational sequence Continued.



NOTES:

1. Clock input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{CLOCK})} = 14$ ns; $\text{PRR} \leq 1$ MHz.
2. Clear input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{CLEAR})} = 20$ ns.
3. For f_{MAX} , the clock input pulse characteristics are as follows: $t_1 = t_0 = 3 \pm 1.5$ ns; for 25°C , $t_{P(\text{CLOCK})} = 12.5$ ns; $\text{PRR} = 40$ MHz; for $-55/+125^\circ\text{C}$, $t_{P(\text{CLOCK})} = 14.5$ ns; $\text{PRR} = 35$ MHz.
4. $C_L = 50$ pF $\pm 10\%$, including scope probe, wiring, and stray capacitance without package in test fixture.
5. $R_L = 499\Omega \pm 1\%$.
6. Voltage measurements are to be made with respect to network ground terminal.
7. Data and load inputs may be used to preset the device to the required count prior to test.

FIGURE 5. Switching time test circuit and waveforms for device types 01 and 02.

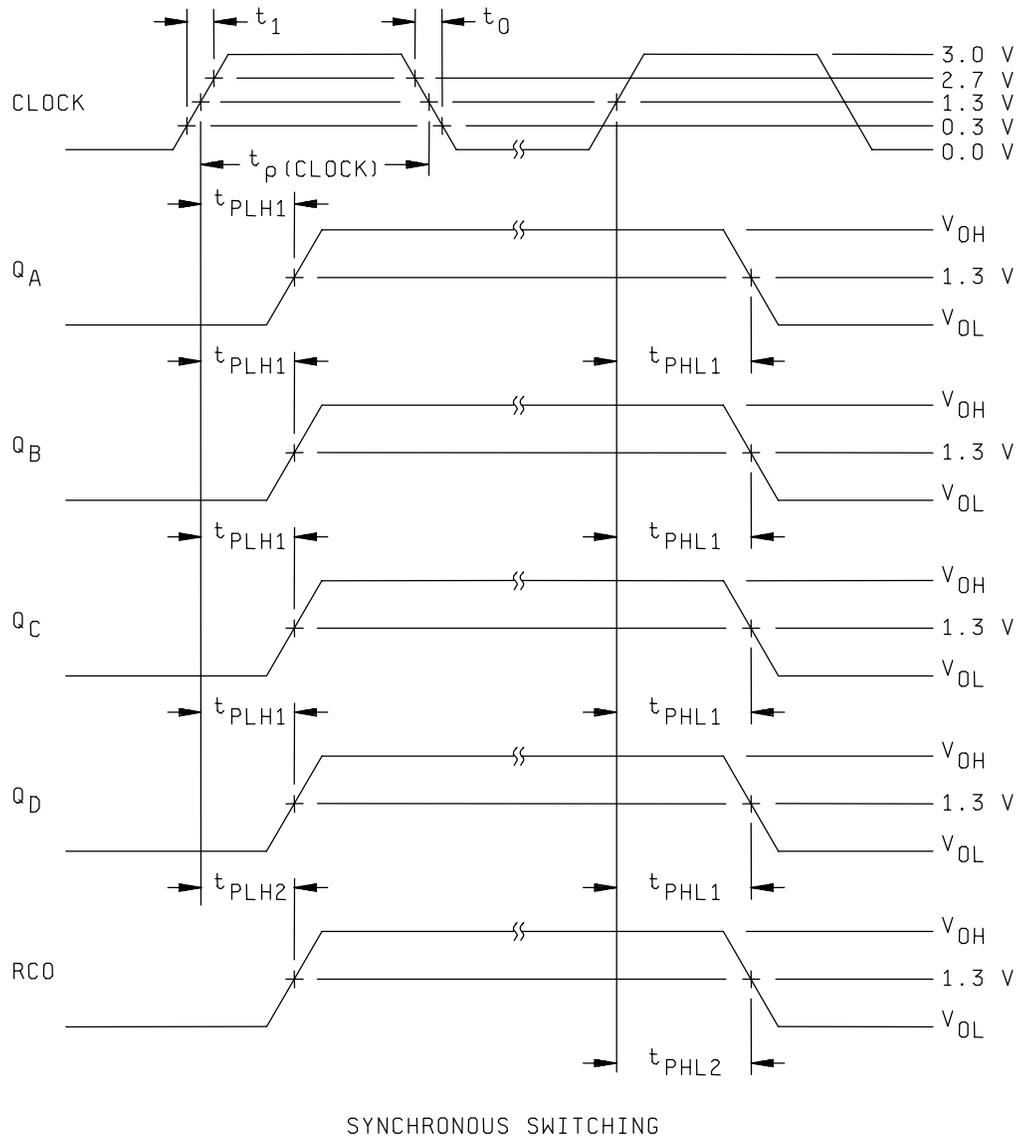
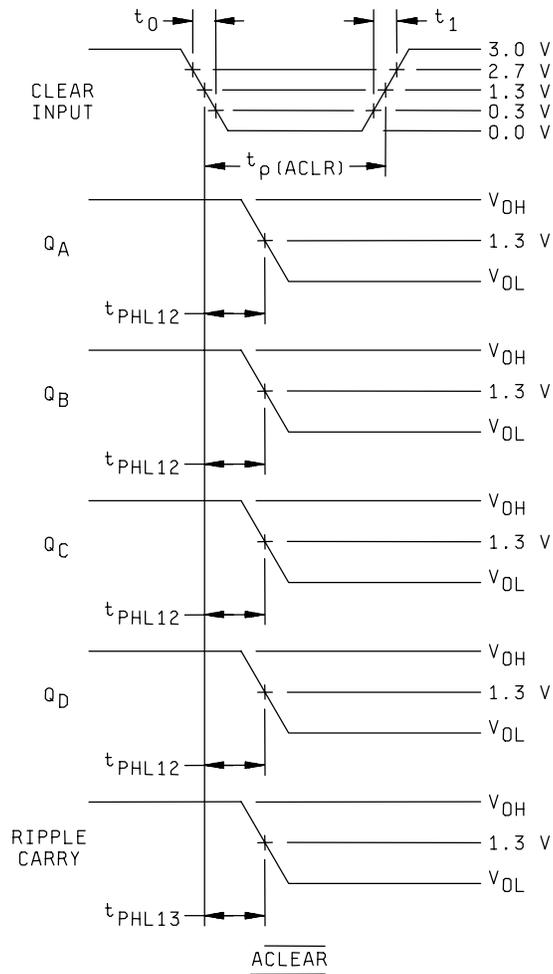


FIGURE 5. Switching time test circuit and waveforms for device types 01 and 02 - Continued.

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DEVICE TYPES 01



DEVICE TYPES 01 AND 02

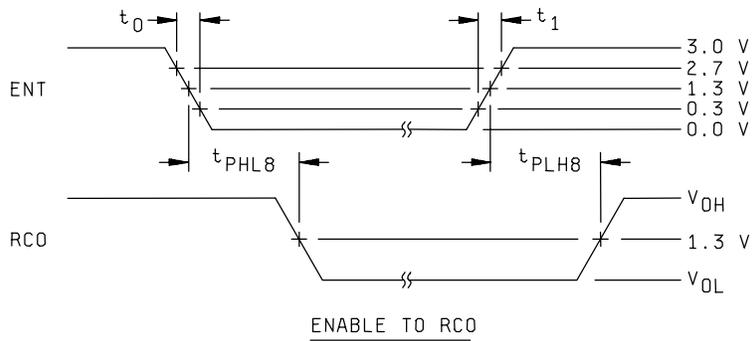
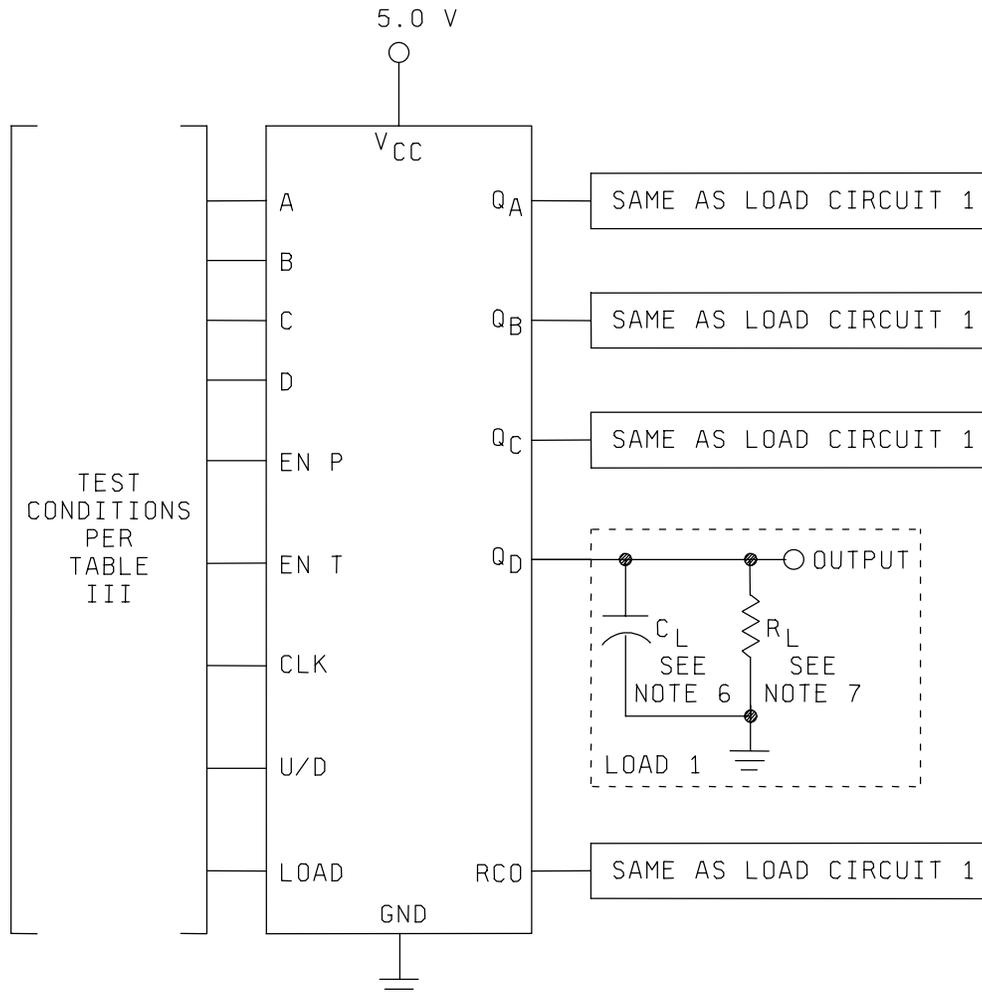


FIGURE 6. Switching time waveforms for device types 01 and 02.



NOTES:

1. Clock input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{CLOCK})} = 20$ ns; $\text{PRR} \leq 1$ MHz.
2. For f_{MAX} , the clock input pulse characteristics are as follows: $t_1 = t_0 = 3 \pm 1.5$ ns; for 25°C , $t_{P(\text{CLOCK})} = 12.5$ ns; $\text{PRR} = 30$ MHz; for $-55/+125^\circ\text{C}$, $t_{P(\text{CLOCK})} = 20$ ns; $\text{PRR} = 25$ MHz.
3. Enable input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns.
4. Up/down input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns.
5. Inputs not under test are at ground.
6. $C_L = 50$ pF $\pm 10\%$, including scope probe, wiring, and stray capacitance without package in test fixture.
7. $R_L = 499\Omega \pm 1\%$.
8. Voltage measurements are to be made with respect to network ground terminal.

FIGURE 7. Switching time test circuit and waveforms for device type 03.

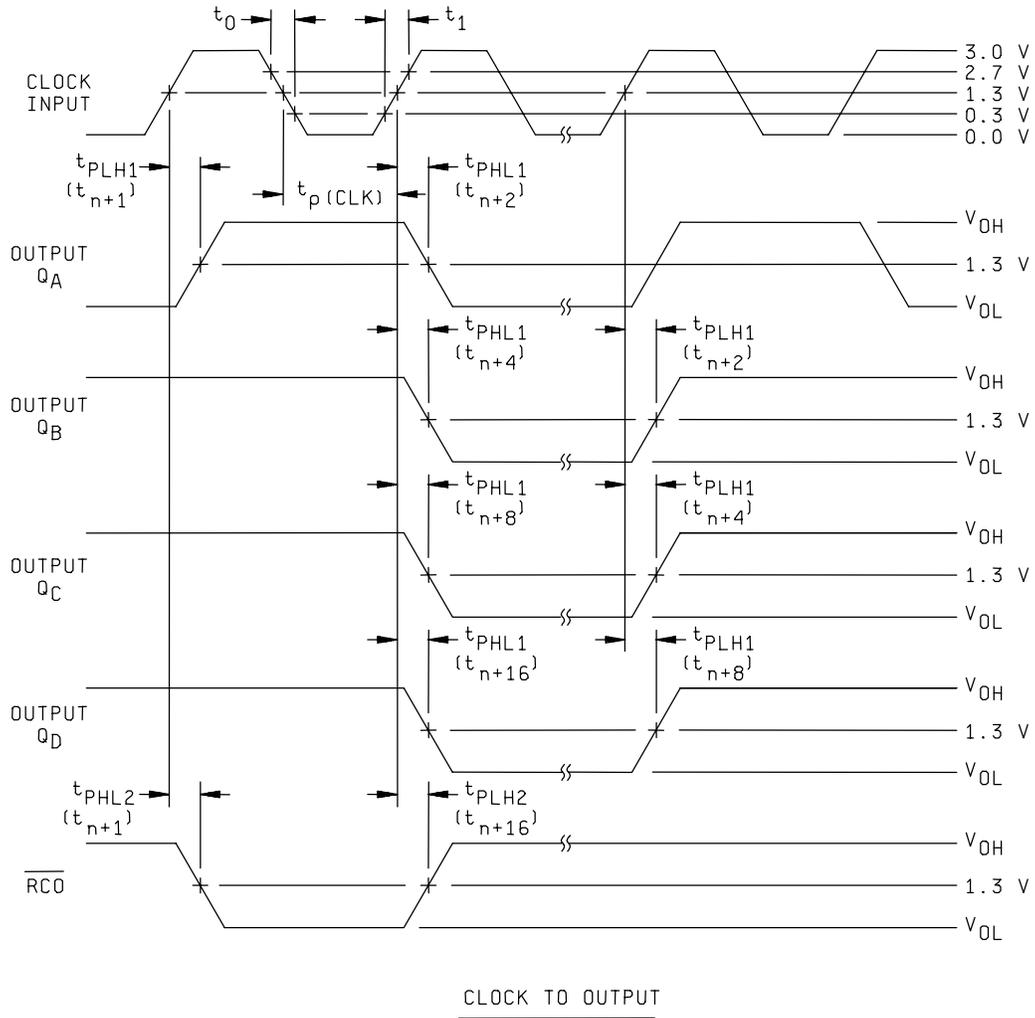


FIGURE 7. Switching time test circuit and waveforms for device type 03 - Continued.

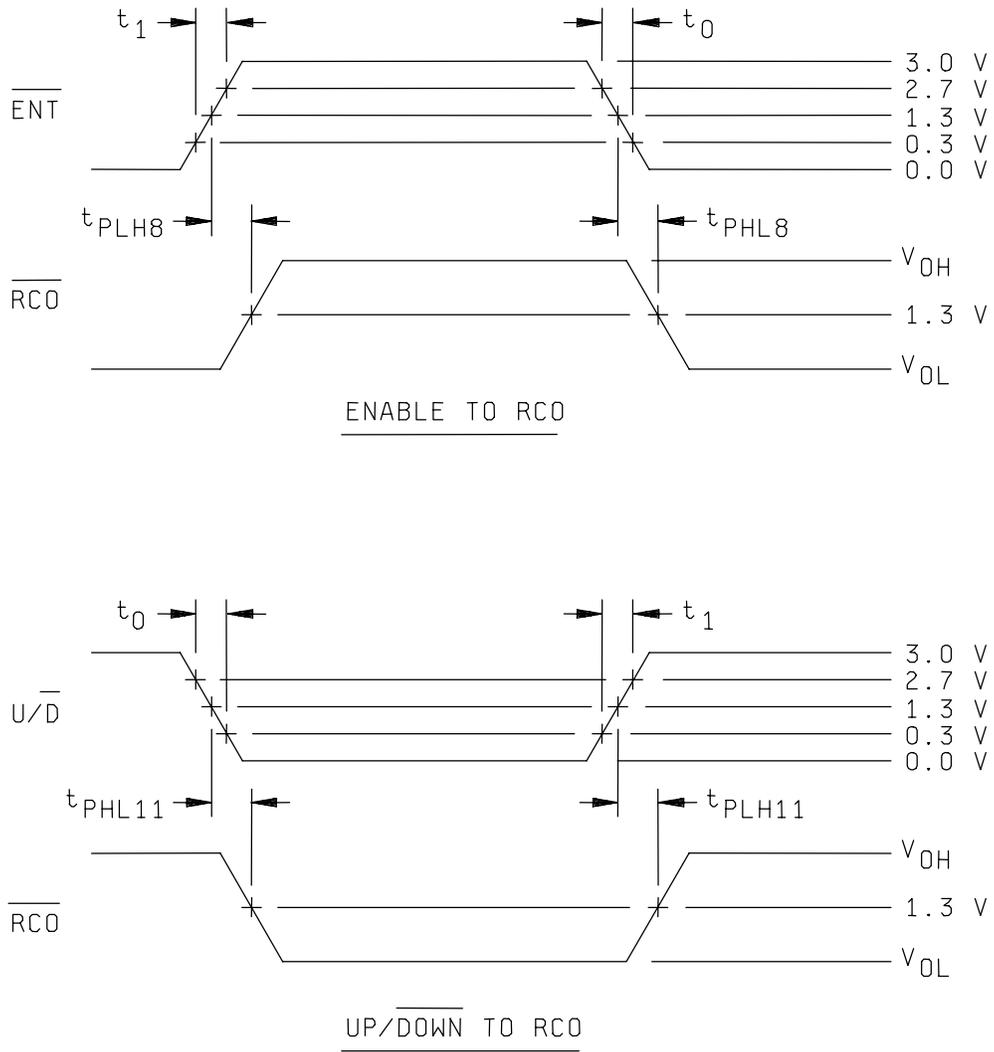
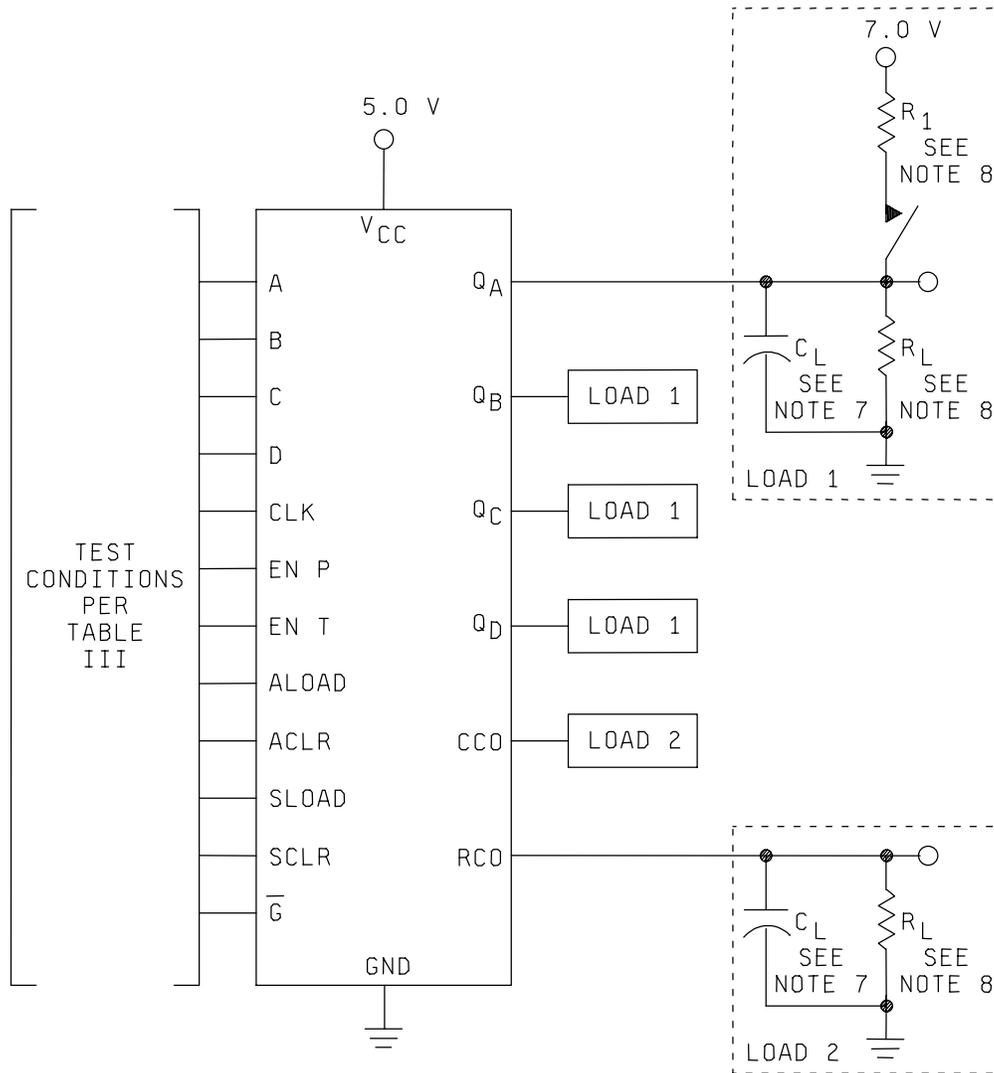


FIGURE 7. Switching time test circuit and waveforms for device type 03 - Continued.



NOTES:

1. Clock input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{CLOCK})} = 20$ ns; $\text{PRR} \leq 1$ MHz.
2. For f_{MAX} , the clock input pulse characteristics are as follows: $t_1 = t_0 = 3 \pm 1.5$ ns; for 25°C , $t_{P(\text{CLOCK})} = 16.5$ ns; $\text{PRR} = 30$ MHz; for $-55/+125^\circ\text{C}$, $t_{P(\text{CLOCK})} = 20$ ns; $\text{PRR} = 25$ MHz.
3. Asynchronous clear/load input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{ACLR/ALOAD})} = 20$ ns.
4. Enable input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{\text{SETUP}} = 25$ ns; $t_{\text{HOLD}} = 0$ ns; $t_{P(\text{ENABLE})} = 25$ ns.
5. Data input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{\text{SETUP}} = 25$ ns; $t_{\text{HOLD}} = 0$ ns; $t_{P(\text{DATA})} = 25$ ns.
6. Output control input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_P = 200$ ns.
7. $C_L = 50$ pF $\pm 10\%$, including scope, probe, wiring, and stray capacitance without package in test fixture.
8. $R_1 = R_L = 499\Omega \pm 1\%$.
9. Voltage measurements are to be made with respect to network ground terminal.

FIGURE 8. Switching time test circuit and waveforms for device type 04.

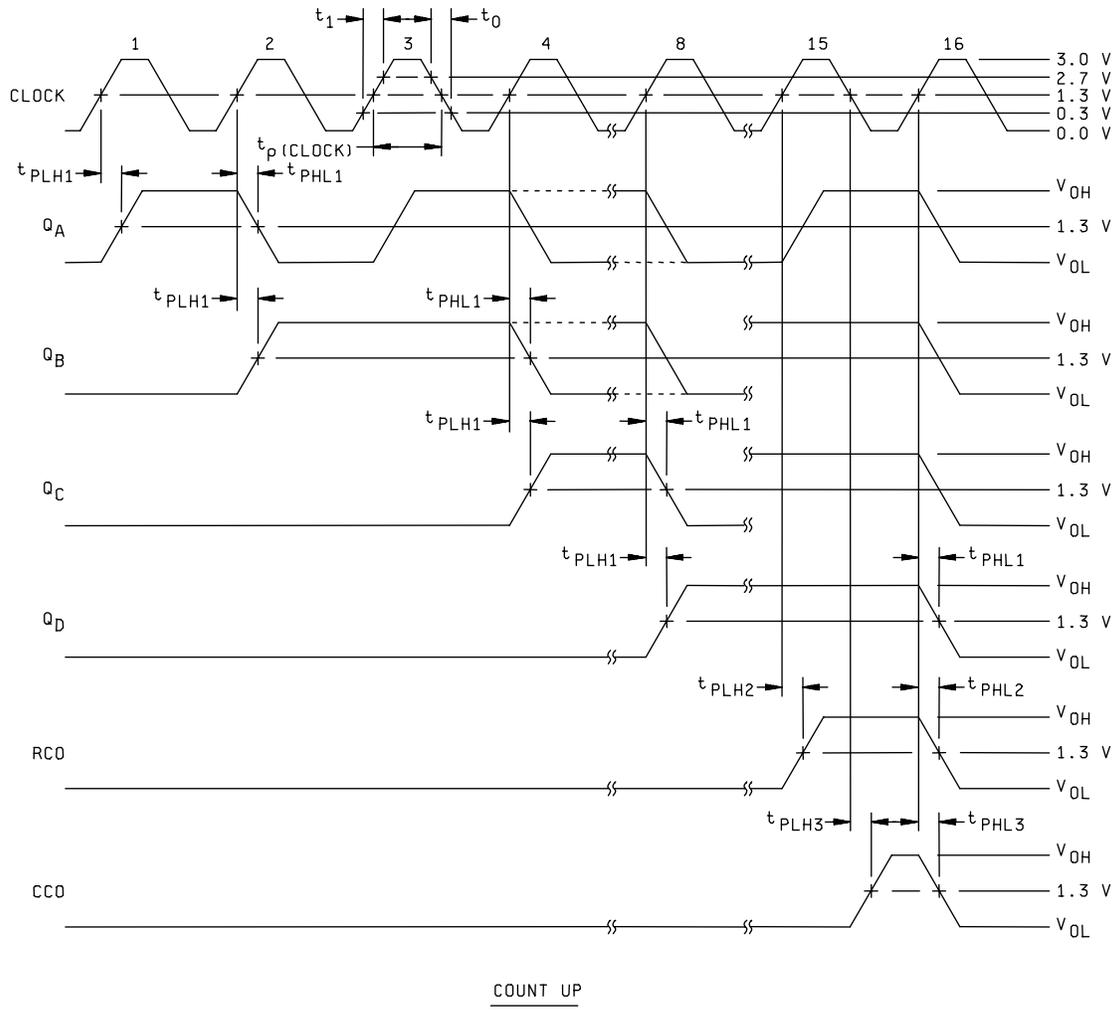


FIGURE 8. Switching time test circuit and waveforms for device type 04 - Continued.

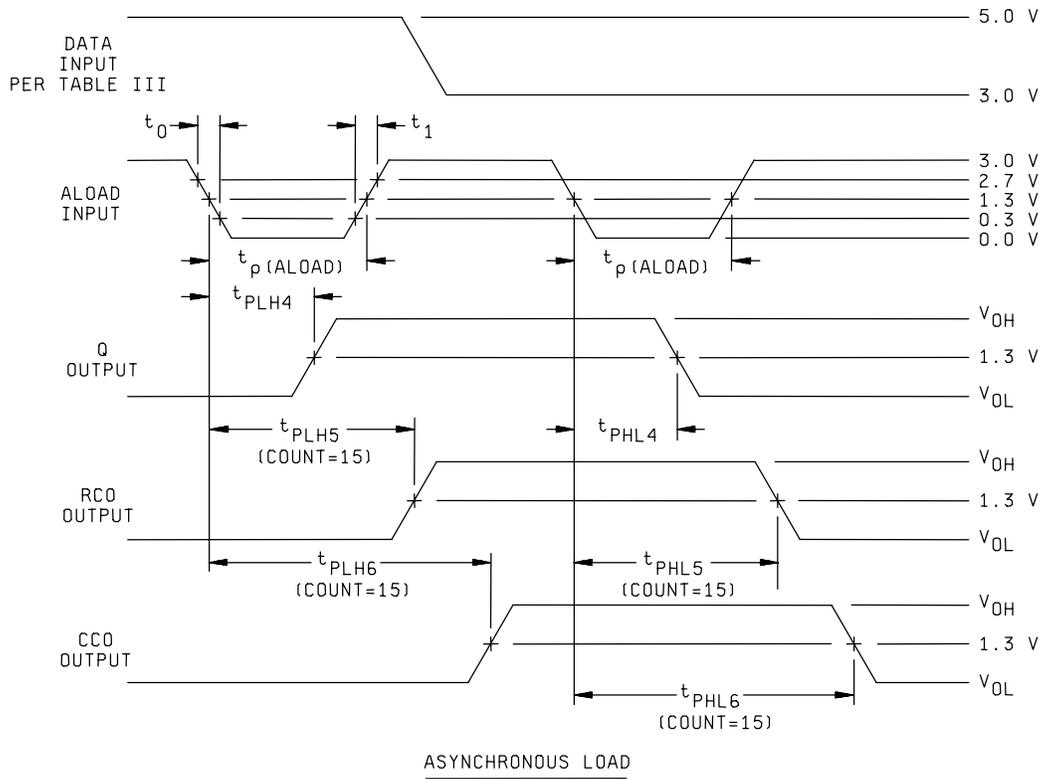


FIGURE 8. Switching time test circuit and waveforms for device type 04 - Continued.

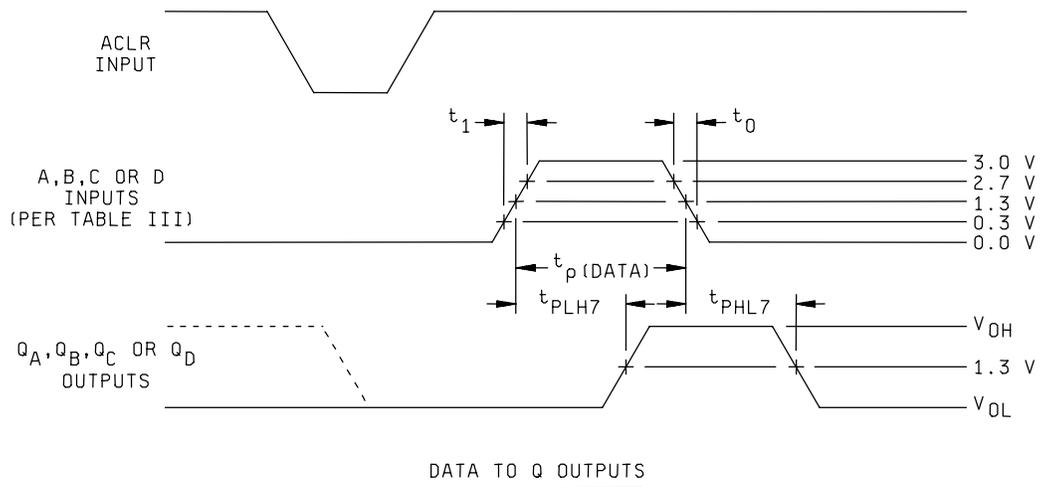


FIGURE 8. Switching time test circuit and waveforms for device type 04 - Continued.

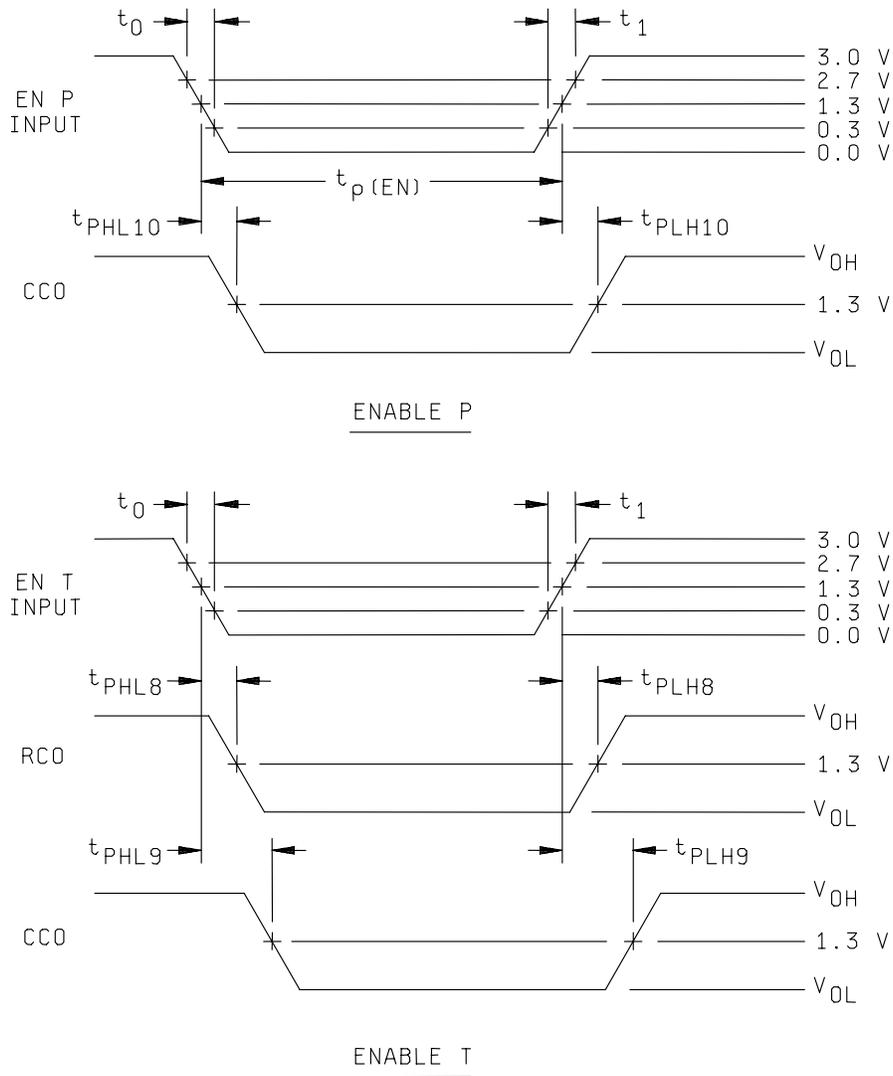


FIGURE 8. Switching time test circuit and waveforms for device type 04 - Continued.

DEVICE TYPE 04

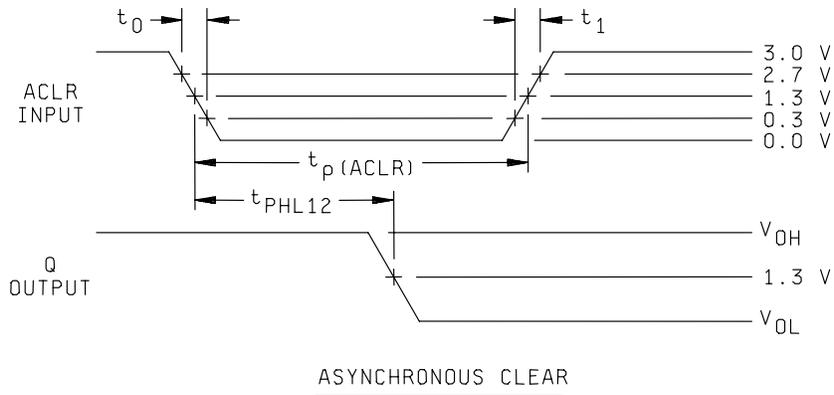
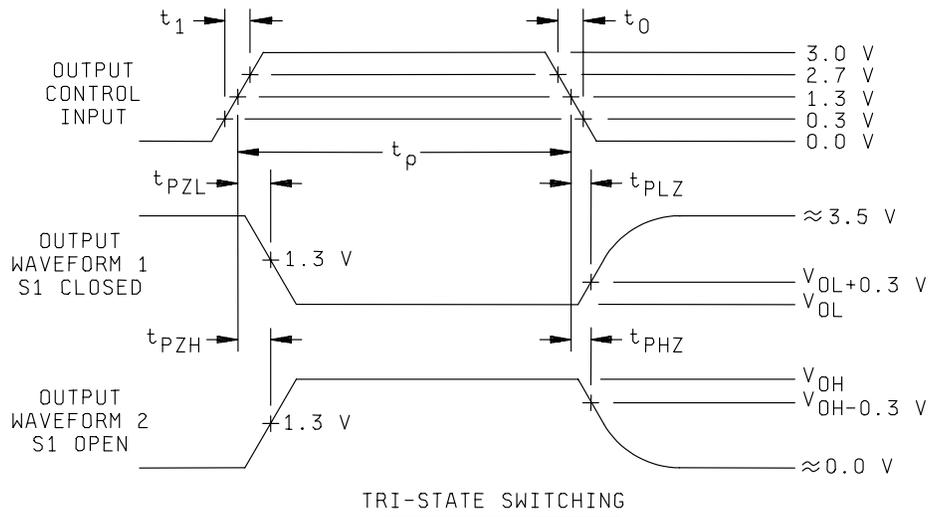
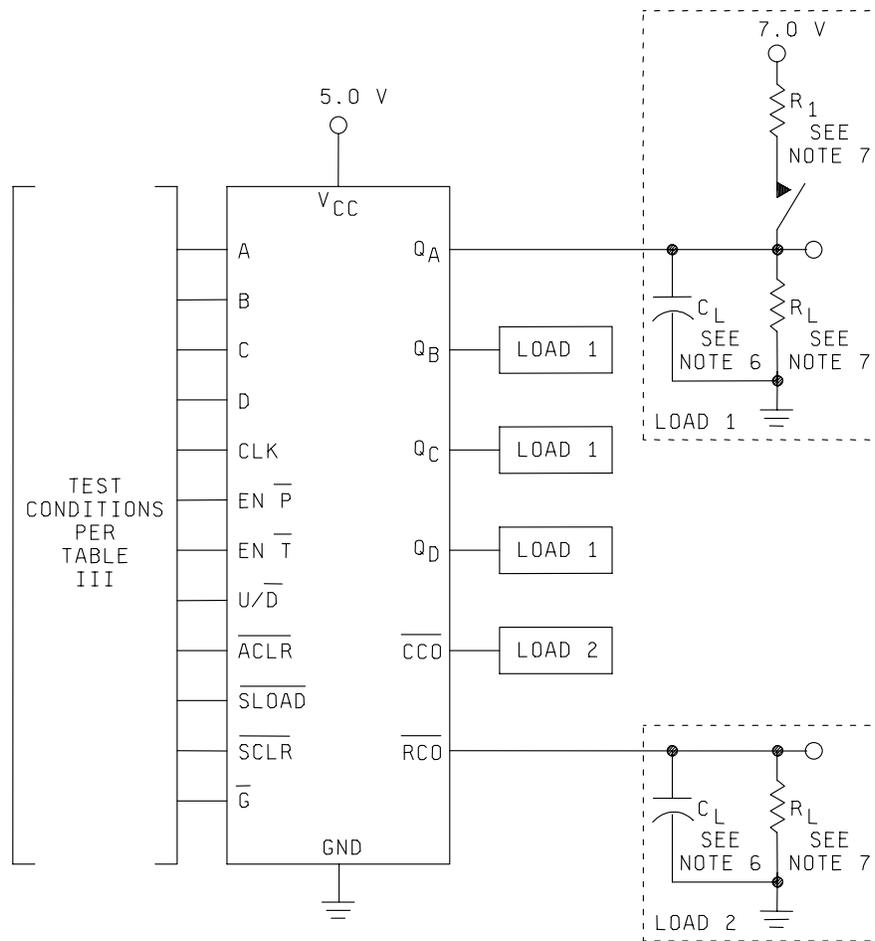


FIGURE 8. Switching time test circuit and waveforms for device type 04 - Continued.



NOTES:

1. Clock input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{CLOCK})} = 20$ ns; $\text{PRR} \leq 1$ MHz.
2. For f_{MAX} , the clock input pulse characteristics are as follows: $t_1 = t_0 = 3 \pm 1.5$ ns; for 25°C , $t_{P(\text{CLOCK})} = 16.5$ ns; $\text{PRR} = 30$ MHz; for $-55/+125^\circ\text{C}$, $t_{P(\text{CLOCK})} = 20$ ns; $\text{PRR} = 25$ MHz.
3. Up/down input pulse characteristics: $t_1 = 6 \pm 1.5$ ns; $t_{\text{SETUP}} = 35$ ns; $t_{\text{HOLD}} = 0$ ns; $t_{P(\text{UP/DOWN})} = 35$ ns.
4. Enable input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; pulse high, $t_{\text{SETUP}} = 35$ ns; $t_{\text{HOLD}} = 0$ ns; $t_{P(\text{ENABLE})} = 35$ ns; pulse low, $t_{\text{SETUP}} = 25$ ns; $t_{P(\text{ENABLE})} = 25$ ns.
5. Asynchronous clear input pulse characteristics: $t_1 = t_0 = 6 \pm 1.5$ ns; $t_{P(\text{ACLR})} = 20$ ns.
6. $C_L = 50$ pF $\pm 10\%$, including scope probe, wiring, and stray capacitance without package in test fixture.
7. $R_1 = R_L = 499\Omega \pm 1\%$.
8. Voltage measurements are to be made with respect to network ground terminal.

FIGURE 9. Switching time test circuit and waveforms for device type 05.

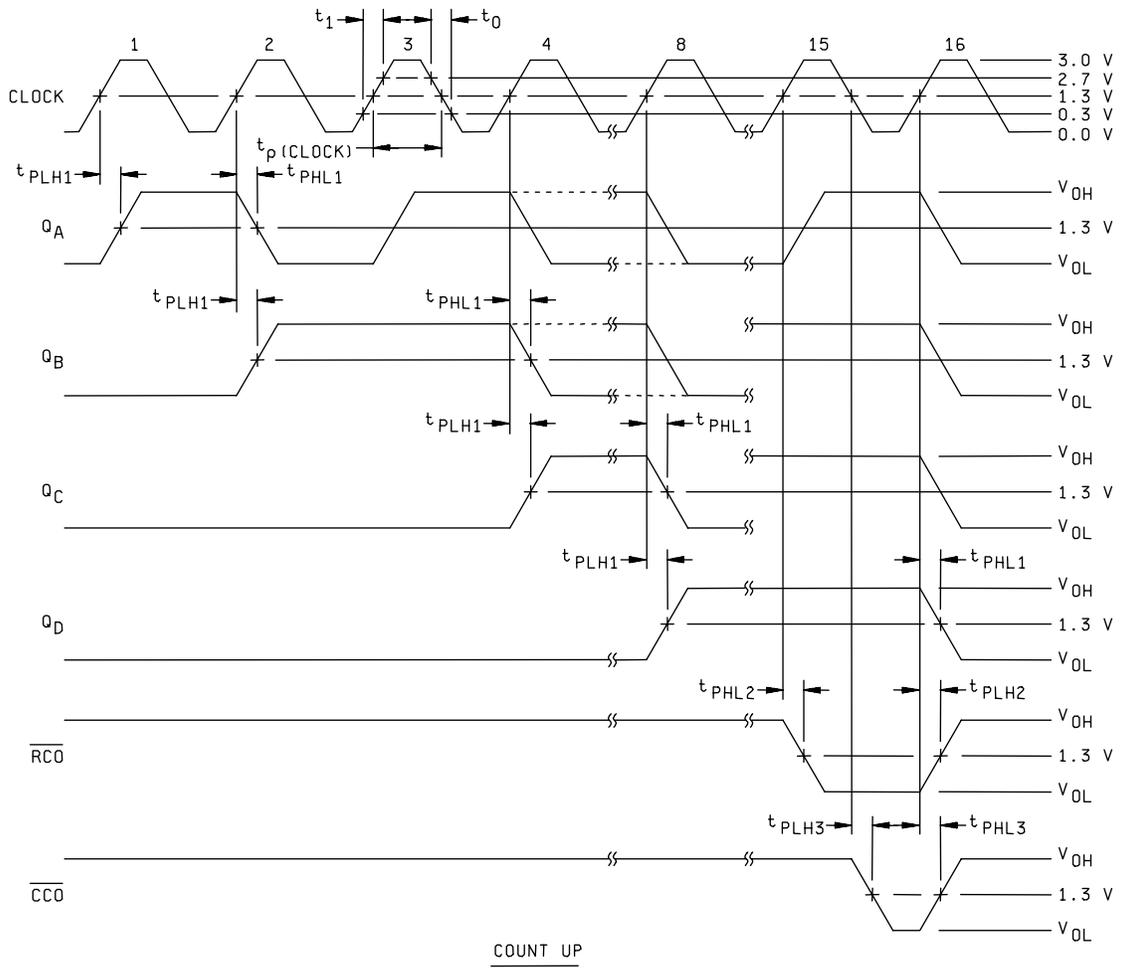


FIGURE 9. Switching time test circuit and waveforms for device type 05 - Continued.

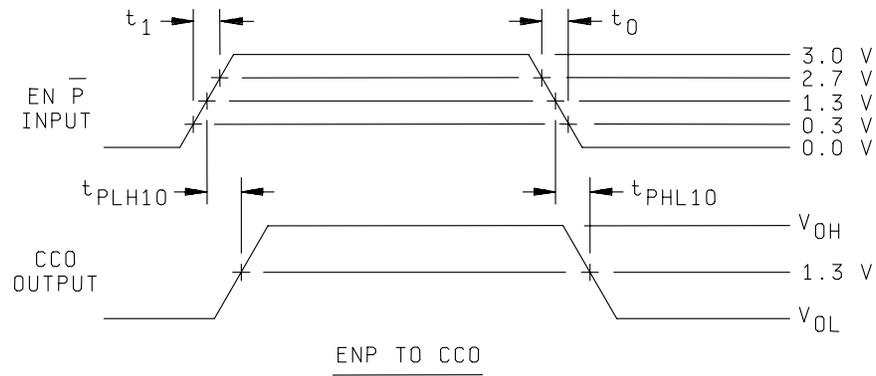
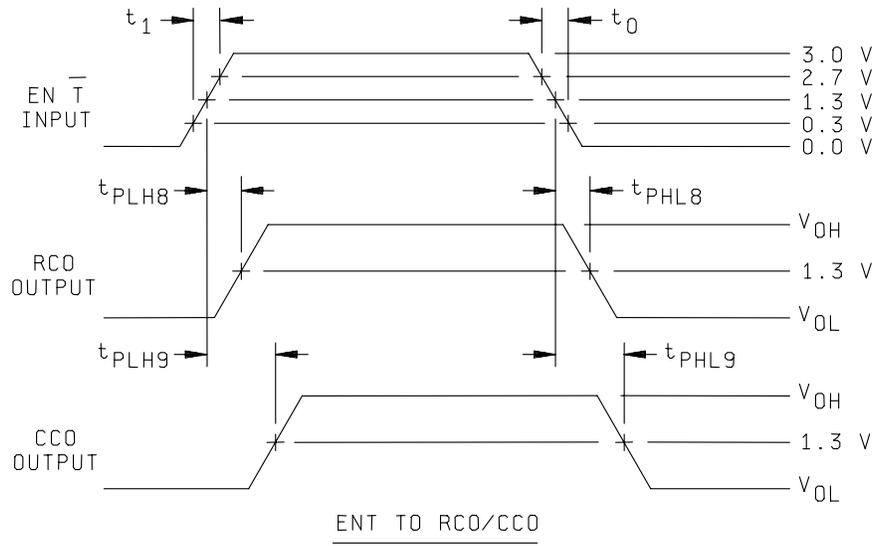


FIGURE 9. Switching time test circuit and waveforms for device type 05 - Continued.

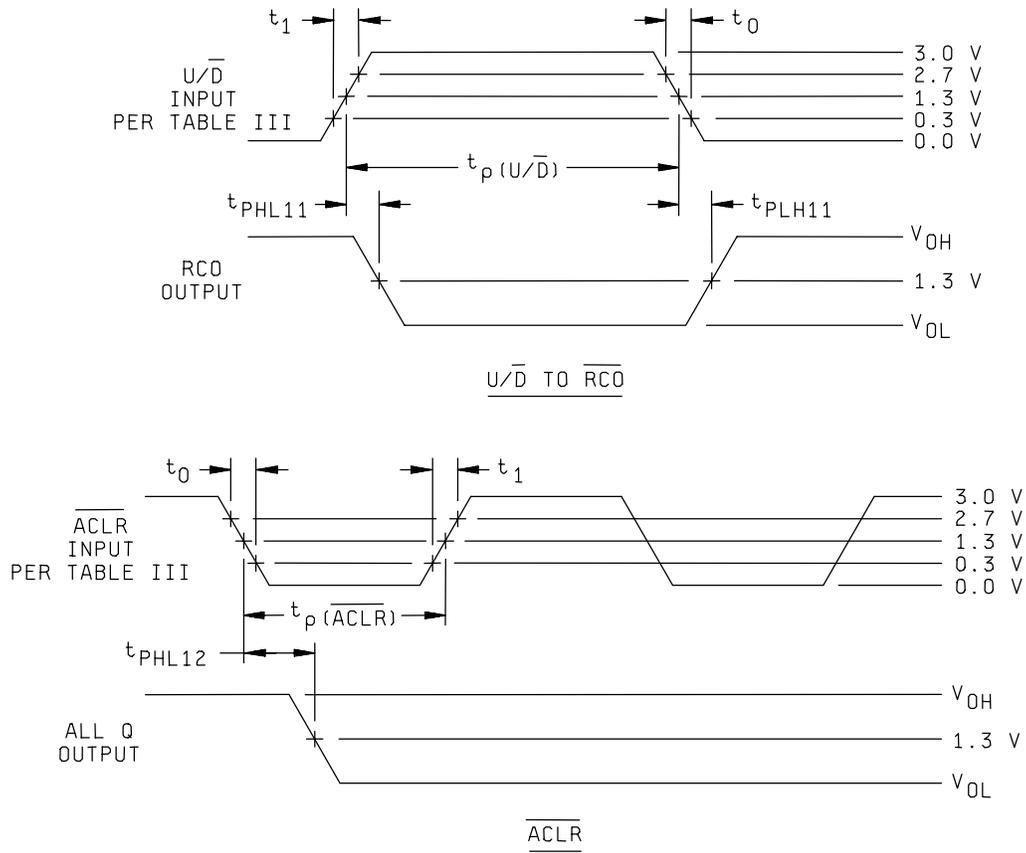


FIGURE 9. Switching time test circuit and waveforms for device type 05 - Continued.

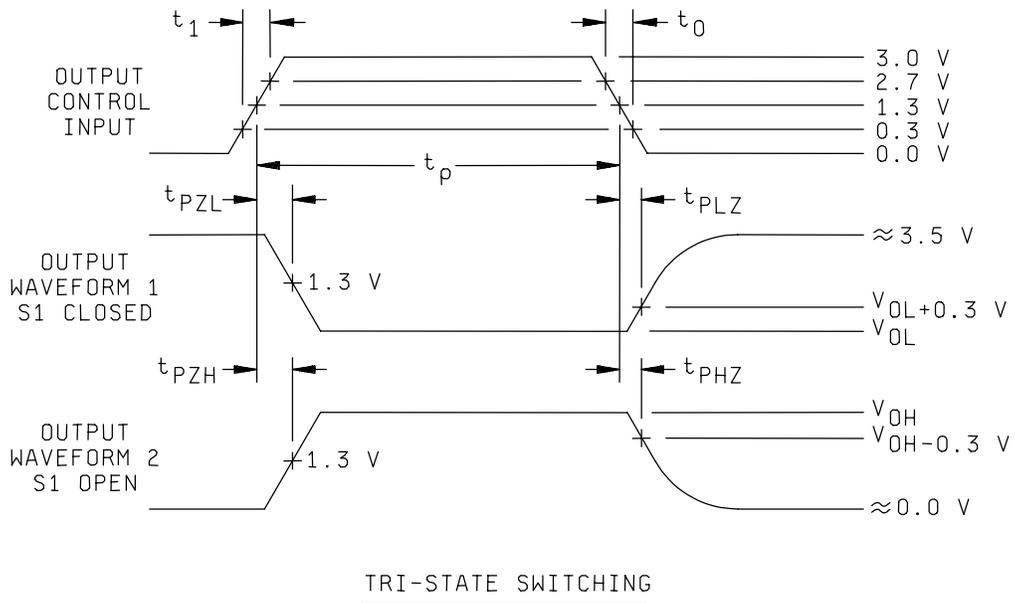


FIGURE 9. Switching time test circuit and waveforms for device type 05 - Continued.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit	
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max		
			Test no.	CLR	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}					
1 T _c = 25°C	V _{OH1}	3006	1	2.0 V	2/				2.0 V	2.0 V	GND	0.8 V	2.0 V	-400 μ A					4.5 V	QD	2.5		V	
			2	"	"			2.0 V		"	"	"	"		-400 μ A					"	QC	"		"
			3	"	"		2.0 V		"	"	"	"	"			-400 μ A				"	QB	"		"
			4	"	"	2.0 V			"	"	"	"	"				-400 μ A			"	QA	"		"
			5	"	"	2.0 V	"	"	"						-400 μ A	"	RCO	"		"				
	V _{OL1}	3007	6	"	"				0.8 V	"	"	"	"	4 mA						"	QD		0.4	"
			7	"	"			0.8 V		"	"	"	"		4 mA					"	QC		"	"
			8	"	"		0.8 V			"	"	"	"			4 mA				"	QB		"	"
			9	"	"	0.8 V				"	"	"	"				4 mA			"	QA		"	"
			10	"	"	0.8 V	0.8 V	0.8 V	0.8 V	"	"	"	"					4 mA		"	RCO		"	"
	V _{IC}		11	-18 mA																"	CLR		-1.5	"
			12		-18 mA															"	CLK		"	"
			13			-18 mA														"	A		"	"
			14				-18 mA													"	B		"	"
			15					-18 mA												"	C		"	"
			16						-18 mA											"	D		"	"
			17							-18 mA										"	ENP		"	"
			18										-18 mA							"	LOAD		"	"
			19											-18 mA						"	ENT		"	"
	I _{IL}	3009	20	0.4 V															5.5 V	CLR	3/	3/	μ A	
			21		0.4 V															"	CLK		"	"
			22			0.4 V														"	A		"	"
			23				0.4 V													"	B		"	"
			24					0.4 V												"	C		"	"
			25						0.4 V											"	D		"	"
			26								0.4 V									"	ENP		"	"
			27										0.4 V							"	LOAD		"	"
	I _{IH1}	3010	28											0.4 V					"	ENT		"	"	
			29		2.7 V															"	CLK		40	"
			30										2.7 V							"	LOAD		"	"
			31											2.7 V						"	ENT		"	"
			32	2.7 V																"	CLR		20	"
			33			2.7 V														"	A		"	"
			34				2.7 V													"	B		"	"
			35					2.7 V												"	C		"	"
			36						2.7 V											"	D		"	"
			37								2.7 V									"	ENP		"	"
	I _{IH2}		38		7.0 V														"	CLK		200	"	
			39										7.0 V							"	LOAD		"	"
			40											7.0 V						"	ENT		"	"
			41	7.0 V																"	CLR		100	"
			42			7.0 V														"	A		"	"
			43				7.0 V													"	B		"	"
			44					7.0 V												"	C		"	"
			45						7.0 V											"	D		"	"
			46							7.0 V										"	ENP		"	"
	I _{O 4/}	3011	47	5.5 V	2/	5.5 V	5.5 V	GND	5.5 V	2.25 V						"	QD	-20	-112	mA				
			48	"	"	"	"	"	"	"	"	"	"	"	2.25 V					"	QC	"	"	"
			49	"	"	"	"	"	"	"	"	"	"	"		2.25 V				"	QB	"	"	"
			50	"	"	"	"	"	"	"	"	"	"	"			2.25 V			"	QA	"	"	"
			51	"	"	"	"	"	"	"	"	"	"	"				2.25 V		"	RCO	5/	5/	"

See footnotes at end of device type 02.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit		
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max			
			Test no.	CLR	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}						
1	I _{CC}	3005	52	5.5 V	2/	5.5 V	GND	GND	5.5 V						5.5 V	V _{CC}		25	mA						
		3005	53	5.5 V	2/	GND	GND	GND	GND	5.5 V	GND	GND	5.5 V						5.5 V	V _{CC}		25	mA		
2	Same tests, terminal conditions, and limits as subgroup 1, except T _C = +125°C and V _I C tests are omitted.																								
3	Same tests, terminal conditions, and limits as subgroup 1, except T _C = -55°C and V _I C tests are omitted.																								
7	Truth table test 6/	3014 Fig. 3	54	B 7/	B	B	B	B	B	B	B	B	B	B	L	L	L	L	L	5.0 V	g/				
55			A 7/	B	B	B	B	B	B	B	B	A	A	A	A	"	"	"	"	"	"	"	"	"	
56			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
57			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
58			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
59			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
60			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
61			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
62			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
63			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
64			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
65			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
66			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
67			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
68			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
69			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
70			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
71			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
72			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
73			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
74			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
75			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
76			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
77			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
78			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
79			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
80			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
81			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
82			"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
83			"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
84	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
85	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
86	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
87	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
88	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
89	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
90	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
91	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
92	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
93	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
94	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
95	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
96	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
97	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
98	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
99	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
100	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
101	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
102	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
103	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
104	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
105	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		

8 Same tests, terminal conditions, and limits as for subgroup 7, except T_C = +125°C and T_C = -55°C.
See footnotes at end of device type 02.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit	
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max		
			Test no.	CLR	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}					
9 T _C = 25°C	f _{MAX 9/}	3003	106	4.5 V	IN							4.5 V	GND						5.0 V	CLK to QA	40		MHz	
	t _{PLH1}	Fig. 5	107	"	"							"	"	"	"				"	CLK to QA	4	15	ns	
		"	108	"	"							"	"	"	"				"	OUT				
		"	109	"	"							"	"	"	"				"	OUT				
		"	110	"	"							"	"	"	"				"	OUT				
	t _{PHL1}	"	111	"	"							"	"	"	"				"	OUT				
		"	112	"	"							"	"	"	"				"	OUT				
		"	113	"	"							"	"	"	"				"	OUT				
		"	114	"	"							"	"	"	"				"	OUT				
	t _{PLH2}	"	115	"	"							"	"	"	"				"	OUT				
	t _{PHL2}	"	116	"	"							"	"	"	"				"	OUT				
	t _{PLH8}	"	117	"	"							"	"	"	"				"	OUT				
	t _{PHL8}	"	118	"	"							"	"	"	"				"	OUT				
	t _{PHL12}	"	119	IN	2/	4.5 V						"	"	GND					"	OUT				
		"	120	"	"		4.5 V					"	"	"					"	OUT				
		"	121	"	"			4.5 V				"	"	"					"	OUT				
		"	122	"	"				4.5 V			"	"	"					"	OUT				
t _{PHL13}	"	123	"	"	4.5 V	4.5 V	4.5 V	4.5 V			"	"	"					"	OUT					
10	f _{MAX 9/}	"	Same tests and terminal conditons as for subgroup 9, except TC = +125°C and limits are as shown.																		35		MHz	
	t _{PLH1}	"																			4	18	ns	
	t _{PHL1}	"																			6	25	"	
	t _{PLH2}	"																			5	"	"	
	t _{PHL2}	"																			5	"	"	
	t _{PLH8}	"																			3	16	"	
	t _{PHL8}	"																			3	16	"	
t _{PHL12}	"	8	27	"																				
t _{PHL13}	"	11	28	"																				
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55°C.																							

See footnotes at end of device type 02.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit		
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max			
			Test no.	CLR	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}						
1 T _c = 25°C	V _{OH1}	3006	1	2.0 V	2/				2.0 V	2.0 V	2.0 V	GND	0.8 V	2.0 V	-400 μ A				4.5 V	QD	2.5		V		
			2	"	"			2.0 V		"	"	"	"	"	"	-400 μ A				"	QC	"	"	"	
			3	"	"		2.0 V		"	"	"	"	"	"	"	"		-400 μ A			"	QB	"	"	"
			4	"	"	2.0 V			"	"	"	"	"	"	"	"			-400 μ A		"	QA	"	"	"
			5	"	"	2.0 V	"	"	"	"	"	"				-400 μ A	"	RCO	"	"	"				
	V _{OL1}	3007	6	"	"				0.8 V	"	"	"	"	"	4 mA					"	QD		0.4	"	
			7	"	"			0.8 V		"	"	"	"	"		4 mA				"	QC		"	"	
			8	"	"		0.8 V			"	"	"	"	"			4 mA			"	QB		"	"	
			9	"	"	0.8 V				"	"	"	"	"				4 mA		"	QA		"	"	
			10	"	"	0.8 V	0.8 V	0.8 V	0.8 V	"	"	"	"	"					4 mA	"	RCO		"	"	
	V _{IC}		11	-18 mA																"	CLR		-1.5	"	
			12		-18 mA															"	CLK		"	"	
			13			-18 mA														"	A		"	"	
			14				-18 mA													"	B		"	"	
			15					-18 mA												"	C		"	"	
			16						-18 mA											"	D		"	"	
			17							-18 mA										"	ENP		"	"	
			18									-18 mA								"	LOAD		"	"	
			19											-18 mA						"	ENT		"	"	
	I _{IL}	3009	20	0.4 V															5.5 V	CLR	3/	3/	μ A		
			21		0.4 V															"	CLK		"	"	
			22			0.4 V														"	A		"	"	
			23				0.4 V													"	B		"	"	
			24					0.4 V												"	C		"	"	
			25						0.4 V											"	D		"	"	
			26								0.4 V									"	ENP		"	"	
			27										0.4 V							"	LOAD		"	"	
	I _{IH1}	3010	28											0.4 V					"	ENT		"	"		
			29		2.7 V															"	CLK		40	"	
			30										2.7 V							"	LOAD		"	"	
			31											2.7 V						"	ENT		"	"	
			32	2.7 V																"	CLR		20	"	
			33			2.7 V														"	A		"	"	
			34				2.7 V													"	B		"	"	
			35					2.7 V												"	C		"	"	
			36						2.7 V											"	D		"	"	
			37								2.7 V									"	ENP		"	"	
	I _{IH2}		38		7.0 V														"	CLK		200	"		
			39										7.0 V							"	LOAD		"	"	
			40											7.0 V						"	ENT		"	"	
			41	7.0 V																"	CLR		100	"	
			42			7.0 V														"	A		"	"	
			43				7.0 V													"	B		"	"	
			44					7.0 V												"	C		"	"	
			45						7.0 V											"	D		"	"	
			46							7.0 V										"	ENP		"	"	
	I _{O 4/}	3011	47	5.5 V	2/	5.5 V	5.5 V	GND	5.5 V	2.25 V						"	QD	-20	-112	mA					
			48	"	"	"	"	"	"	"	"	"	"	"	2.25 V					"	QC	"	"	"	
			49	"	"	"	"	"	"	"	"	"	"	"	"		2.25 V			"	QB	"	"	"	
			50	"	"	"	"	"	"	"	"	"	"	"	"			2.25 V		"	QA	"	"	"	
			51	"	"	"	"	"	"	"	"	"	"	"	"				2.25 V	"	RCO	5/	5/	"	

See footnotes at end of device type 02.

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

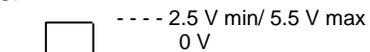
Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max	
			Test no.	CLR	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}				
1	I _{CC}	3005	52	5.5 V	2/	5.5 V	GND	GND	5.5 V						5.5 V	V _{CC}		25	mA				
		3005	53	5.5 V	2/	GND	GND	GND	GND	5.5 V	GND	GND	5.5 V						5.5 V	V _{CC}		25	mA
2	Same tests, terminal conditions, and limits as subgroup 1, except T _C = +125°C and V _I C tests are omitted.																						
3	Same tests, terminal conditions, and limits as subgroup 1, except T _C = -55°C and V _I C tests are omitted.																						
7	Truth table test 6/	3014 Fig. 3	54	B	B	B	B	B	B	B	B	B	B	X	X	X	X	X	5.0 V	g/			
			55	B	A	"	B	"	B	"	B	B	B	L	L	L	L	L	"	"			
			56	B	B	"	"	"	"	"	B	B	B	"	"	"	"	"	"	"	"		
			57	A	"	"	"	"	"	"	B	"	B	"	"	"	"	"	"	"	"		
			58	"	"	"	"	"	"	"	A	"	B	B	"	"	"	"	"	"	"		
			59	"	"	"	"	"	"	"	"	A	B	"	"	"	"	"	"	"	"		
			60	"	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"		
			61	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			62	"	B	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			63	"	A	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"		
			64	"	B	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			65	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			66	"	B	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			67	"	A	"	"	"	"	"	"	"	"	"	"	H	L	L	"	"	"		
			68	"	B	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			69	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			70	"	B	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			71	"	A	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"		
			72	"	B	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			73	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			74	"	B	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			75	"	A	"	"	"	"	"	"	"	"	"	H	L	L	L	"	"	"		
			76	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			77	"	B	"	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"		
			78	"	A	"	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"		
			79	"	B	"	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"		
			80	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"		
			81	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"		
			82	"	A	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"		
			83	"	B	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			84	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			85	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"		
			86	"	A	"	"	"	"	"	"	"	"	"	H	L	L	"	"	"	"		
			87	"	B	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			88	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			89	"	B	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			90	"	A	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"		
			91	"	B	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			92	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	H	"	"		
			93	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"		
			94	"	B	"	"	"	"	"	"	"	B	"	"	"	"	"	L	"	"		
			95	"	A	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"		
			96	"	B	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"		
			97	"	B	"	"	"	"	"	"	"	A	"	"	"	"	"	H	"	"		
			98	"	A	"	"	"	"	"	"	"	"	"	L	L	L	L	"	"	"		
			99	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			100	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			101	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"		
			102	"	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
			103	"	"	"	"	"	"	A	"	"	B	"	"	"	"	"	"	"	"		

See footnotes at end of device type 02.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit	
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max		
			Test no.	CLR	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}					
7	Truth table test 6/	3014 Fig. 3	104	A	A	B	A	A	A	A	B	B	A	H	H	H	L	L	5.0 V	g/				
			105	"	A	B	"	"	"	"	"	A	"	"	"	"	L	L	"	"				
			106	"	B	B	"	"	"	"	"	"	"	"	"	"	L	L	"	"				
			107	"	A	B	"	"	"	"	"	"	"	"	"	"	H	H	"	"				
			108	"	B	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
			109	"	B	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
			110	B	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
			111	"	A	"	"	"	"	"	"	"	"	L	L	L	L	L	"	"				
			112	"	B	"	"	"	"	"	"	"	"	L	L	L	L	L	"	"				
8	Same tests, terminal conditions, and limits as for subgroup 7, except T _c = +125°C and T _c = -55°C.																							
9 T _c = 25°C	f _{MAX} 9/	3003 Fig. 5	113	4.5 V	IN					4.5 V	GND	4.5 V	4.5 V				OUT		5.0 V	CLK to QA	40		MHz	
	t _{PLH1}		114	"	"					"	"	"	"				OUT	OUT	"	CLK to QA	4	15	ns	
			115	"	"					"	"	"	"					OUT	"	CLK to QB	"	"	"	
			116	"	"					"	"	"	"			OUT			"	CLK to QC	"	"	"	
			117	"	"					"	"	"	"		OUT				"	CLK to QD	"	"	"	
	t _{PHL1}		118	"	"					"	"	"	"				OUT		"	CLK to QA	6	20	"	
			119	"	"					"	"	"	"					OUT	"	CLK to QB	"	"	"	
			120	"	"					"	"	"	"			OUT			"	CLK to QC	"	"	"	
			121	"	"					"	"	"	"		OUT				"	CLK to QD	"	"	"	
	t _{PLH2}		122	"	"					"	"	"	"					OUT	"	CLK to RCO	5	"	"	
	t _{DHL2}		123	"	"					"	"	"	"						"	CLK to RCO	5	"	"	
	t _{DHLB}		124	"	"					"	"	"	IN						"	ENT to RCO	3	13	"	
t _{DHL8}		125	"	"					"	"	"	IN						"	ENT to RCO	3	13	"		
10	f _{MAX} 9/	"	Same tests and terminal conditions as for subgroup 9, except T _c = +125°C and limits are as shown.																		35		MHz	
	t _{PLH1}	"																			4	18	ns	
	t _{PHL1}	"																			6	25	"	
	t _{PLH2}	"																			5	"	"	
	t _{DHL2}	"																			5	"	"	
	t _{DHLB}	"																			3	16	"	
	t _{DHL8}	"																			3	16	"	
11	Same tests, terminal conditions and limits as for subgroup 10, except T _c = -55°C.																							

1/ For cases X and 2, pins not referenced are NC.

2/ Apply one clock pulse prior to test as follows:  2.5 V min/ 5.5 V max
0 V

3/ I_{IL} limits shall be as follows:

Test	Device type	Min/Max limits in μ A for circuit		
		A	B	C
I _{IL}	01	0/-200	0/-200	
	02	0/-200	0/-200	

4/ Method 3011 shall be used, except the output voltage shall be as specified herein, and the output current shall be operating rather than short circuit current. The output conditions have been chosen to produce a current that closely approximates one-half of the true short circuit output current I_{OS}.

5/ I_o limits for RCO pin shall be as follows:

Test	Device type	Min/Max limits in μ A for circuit		
		A	B	C
I _{IL} (RCO pin only)	01	-20/-112	-30/-112	
	02	-20/-112	-30/-112	

6/ Only a summary of attributes data is required.

7/ A = 3.0 V minimum, B = 0.0 V or GND; X = don't care.

8/ H > 1.5 V; L < 1.5 V.

9/ The f_{MAX} minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit			
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max				
			Test no.	U/D	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}							
1 T _c = 25°C	V _{OH1}	3006	1	2.0 V	2/	2.0 V				0.8 V	GND	0.8 V	0.8 V							4.5 V	QA	2.5		V		
		"	2	"	"		2.0 V			"	"	"	"								"	QB	"		"	
		"	3	"	"			2.0 V			"	"	"	"							"	QC	"		"	
		"	4	"	"				2.0 V		"	"	"	"							"	QD	"		"	
		"	5	"	"	0.8 V	0.8 V	0.8 V	0.8 V		"	"	"	"								"	RCO	"		"
	V _{OL1}	3007	6	"	"	0.8 V				"	"	"	"								"	QA		0.4	"	
		"	7	"	"		0.8 V			"	"	"	"								"	QB		"	"	
		"	8	"	"			0.8 V		"	"	"	"								"	QC		"	"	
		"	9	"	"				0.8 V		"	"	"		4 mA						"	QD		"	"	
		"	10	"	"	2.0 V	2.0 V	2.0 V	2.0 V		"	"	"	"						4 mA	"	RCO		"	"	
	V _{Ic}			11	-18 mA							"	"								"	U/D		-1.5	"	
				12		-18 mA							"	"								"	CLK		"	"
				13			-18 mA						"	"								"	A		"	"
				14				-18 mA					"	"								"	B		"	"
				15					-18 mA				"	"								"	C		"	"
				16						-18 mA			"	"								"	D		"	"
				17							-18 mA		"	"								"	ENP		"	"
				18									"	"	-18 mA							"	LOAD		"	"
				19									"	"		-18 mA						"	ENT		"	"
	I _{IL}	3009	20	0.4 V								"	"							5.5 V	U/D	3/	3/		μA	
			"	21		0.4 V						"	"								"	CLK		"	"	
			"	22			0.4 V					"	"									"	A		"	"
			"	23				0.4 V				"	"									"	B		"	"
			"	24					0.4 V			"	"									"	C		"	"
			"	25						0.4 V		"	"									"	D		"	"
			"	26							0.4 V		"	"								"	ENP		"	"
			"	27									"	"	0.4 V							"	LOAD		"	"
			"	28									"	"		0.4 V						"	ENT		"	"
	I _{IH1}	3010	29	2.7 V								"	"								"	U/D		20	"	
			"	30		2.7 V						"	"								"	CLK		"	"	
			"	31			2.7 V					"	"								"	A		"	"	
			"	32				2.7 V				"	"								"	B		"	"	
			"	33					2.7 V			"	"								"	C		"	"	
			"	34						2.7 V		"	"								"	D		"	"	
			"	35							2.7 V		"	"							"	ENP		"	"	
			"	36									"	"	2.7 V						"	LOAD		"	"	
			"	37									"	"		2.7 V					"	ENT		"	"	
	I _{IH2}		38	7.0 V								"	"								"	U/D		100	"	
			"	39		7.0 V						"	"								"	CLK		"	"	
			"	40			7.0 V					"	"								"	A		"	"	
			"	41				7.0 V				"	"								"	B		"	"	
			"	42					7.0 V			"	"								"	C		"	"	
			"	43						7.0 V		"	"								"	D		"	"	
			"	44							7.0 V		"	"							"	ENP		"	"	
			"	45									"	"	7.0 V						"	LOAD		"	"	
			"	46									"	"		7.0 V					"	ENT		"	"	

See footnotes at end of device type 03.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit			
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max				
			Test no.	U/D	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{CC}							
1 T _C = 25°C	I _o 4/	3011	47	4.5 V	2/	4.5 V					GND	GND	GND	GND					2.25 V		5.5 V	QA	-20	-112	mA	
		"	48	"	"	"	4.5 V												2.25 V			QB	"	"	"	
		"	49	"	"	"	"	4.5 V								2.25 V							QC	"	"	"
		"	50	"	"	"	"	"	4.5 V														QD	"	"	"
		"	51	"	"	"	GND	GND	GND	4.5 V	GND					2.25 V								RCO	"	"
	I _{CC}	3005	52	"	"	4.5 V	4.5 V	4.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	V _{CC}		25	mA
		3005	53	"	"	GND	GND	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	V _{CC}		25	mA	
2	Same tests, terminal conditions, and limits as subgroup 1, except T _C = +125°C and V _{Ic} tests are omitted.																									
3	Same tests, terminal conditions, and limits as subgroup 1, except T _C = -55°C and V _{Ic} tests are omitted.																									
7 T _C = 25°C	Truth table test 5/	3014	54	A 6/	B 6/	B	B	B	B	B	GND	B	B	X	X	X	X	X	5.0 V	Z/						
		"	55	"	A	"	"	"	"	"	"	"	B	"	L	L	L	L	H	"	"					
		"	56	"	B	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"	"				
		"	57	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	58	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	59	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"				
		"	60	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"				
		"	61	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	62	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	63	"	A	"	"	"	"	"	"	"	"	"	"	"	H	L	L	"	"	"				
		"	64	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"				
		"	65	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	66	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	67	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"				
		"	68	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"				
		"	69	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	70	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	71	"	A	"	"	"	"	"	"	"	"	"	"	H	L	L	L	"	"	"				
		"	72	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"				
		"	73	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	74	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	75	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"				
		"	76	"	B	"	"	"	"	"	"	A	"	"	"	"	"	"	L	"	"	"				
		"	77	"	A	"	"	"	"	"	"	A	"	"	"	"	"	"	L	"	"	"				
		"	78	"	B	"	"	"	"	"	"	B	"	"	"	"	"	"	L	"	"	"				
		"	79	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	80	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
		"	81	"	A	"	"	"	"	"	"	"	"	"	"	"	H	L	L	"	"	"				
		"	82	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"				
		"	83	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"				
"	84	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"						
"	85	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"						
"	86	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"						
"	87	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"						
"	88	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"						
"	89	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	H	"	"						
"	90	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	H	"	"						
"	91	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"						
"	92	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	L	L	L	L	H	"				
"	93	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	L	L	L	L	L	"				
"	94	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	H	H	H	H	H	"				
"	95	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					
"	96	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					
"	97	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					
"	98	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					
"	99	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					
"	100	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					

See footnotes at end of device type 03.

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

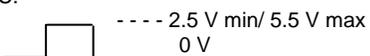
Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit		
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max			
			Test no.	U/D	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{cc}						
7 T _c = 25°C	Truth table test 5/	3014 Fig. 3	101	B 6/	B	A 6/	A	A	A	A	A	GND	A	B	H	H	L	L	H	5.0 V	Z/				
			102	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			103	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			104	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			105	"	B	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"	"		
			106	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			107	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			108	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	H	"	"		
			109	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			110	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			111	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			112	"	A	"	"	"	"	"	"	"	"	"	"	"	L	H	H	H	"	"	"		
			113	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			114	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			115	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			116	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	H	"	"		
			117	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"		
			118	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			119	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"		
			120	"	A	"	"	"	"	"	"	"	"	"	"	"	"	L	H	H	"	"	"		
121	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"					
122	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"					
123	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"					
124	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	H	"	"					
125	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"					
126	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	L	"	"					
127	"	B	"	"	"	"	"	"	"	"	"	"	A	"	"	"	L	H	"	"					
128	"	A	"	"	"	"	"	"	"	"	"	"	A	"	"	"	L	H	"	"					
129	"	B	"	"	"	"	"	"	"	"	"	"	B	"	"	"	L	L	"	"					
8	Same tests, terminal conditions, and limits as for subgroup 7, except T _c = +125°C and T _c = -55°C.																								
9 T _c = 25°C	f _{MAX} 8/	3003 Fig. 7	130	4.5 V	IN					GND	GND	4.5 V	GND						5.0 V	QA	30		MHz		
			131	GND	"								4.5 V	"						"	QA	30		MHz	
	t _{PLH1}	"	132	4.5 V	"	4.5 V						GND	"						"	CLK to QA	5	16	ns		
			133	"	"		4.5 V					"	"							"	CLK to QB	"	"	"	
	t _{PHL1}	"	134	"	"		4.5 V				"	"	"						"	CLK to QC	"	"	"		
			135	"	"			4.5 V				"	"	"	OUT				"	CLK to QD	"	"	"		
	t _{PHL1}	"	136	"	"	GND					"	"	"	"	OUT				"	CLK to QA	"	"	"		
			137	"	"		GND					"	"	"	"				"	CLK to QB	"	"	"		
	t _{PLH2}	"	138	"	"			GND			"	"	"	"		OUT			"	CLK to QC	"	"	"		
			139	"	"				GND			"	"	"	OUT				"	CLK to QD	"	"	"		
	t _{PHL2}	"	140	"	"	GND	GND	GND	GND	"	"	"	"	"				OUT	"	CLK to RCO	6	20	"		
	t _{PHL2}	"	141	"	"	4.5 V	4.5 V	4.5 V	4.5 V	"	"	"	"	"	"	"	"	"	"	"	CLK to RCO	6	20	"	
t _{PLH8}	"	142	"	2/	"	"	"	"	"	"	"	"	IN	"	"	"	"	"	"	ENT to RCO	5	16	"		
t _{PHL8}	"	143	"	"	"	"	"	"	"	"	"	"	IN	"	"	"	"	"	"	ENT to RCO	3	13	"		
t _{PLH11}	"	144	IN	"	GND	GND	GND	GND	"	"	"	"	"	"	"	"	"	"	"	U/D to RCO	5	23	"		
t _{PHL11}	"	145	IN	"	GND	GND	GND	GND	"	"	"	"	"	"	"	"	"	"	"	U/D to RCO	5	19	"		

See footnotes at end of device type 03.

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

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit
			Cases X, 2 1/	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max	
			Test no.	U/D	CLK	A	B	C	D	ENP	GND	LOAD	ENT	QD	QC	QB	QA	RCO	V _{cc}				
10	f _{MAX} 8/	3003	Same tests and terminal conditions as for subgroup 9, except T _c = +125°C and limits are as shown.																	25		MHz	
	t _{PLH1}	Fig. 7																			5	19	ns
	t _{PHL1}	"																			5	20	"
	t _{PLH2}	"																			6	25	"
	t _{PHL2}	"																			6	25	"
	t _{PLH8}	"																			5	19	"
	t _{PHL8}	"																			3	19	"
	t _{PLH11}	"																			5	25	"
	t _{PHL11}	"																			5	25	"
	11	Same tests, terminal conditions, and limits as for subgroup 10, except T _c = -55°C.																					

1/ For cases X and 2, pins not referenced are NC.

2/ Apply one clock pulse prior to test as follows: 

3/ I_{IL} limits shall be as follows:

Test	Min/Max limits in μ A for circuit		
	A	B	C
I _{IL}	0/-200		

4/ Method 3011 shall be used, except the output voltage shall be as specified herein, and the output current shall be operating rather than short circuit current. The output conditions have been chosen to produce a current that closely approximates one-half of the true short circuit output current I_{OS}.

5/ Only a summary of attributes data is required.

6/ A = 3.0 V minimum, B = 0.0 V or GND.

7/ H > 1.5 V; L < 1.5 V.

8/ The f_{MAX} minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit						
																									Test no.	ALOAD		CLK	A	B	C	D	ENP
1 T _c = 25°C	V _{OH1}	3006	1	2.0 V	1/	2.0 V	0.8 V	2.0 V					0.8 V		-400 μ A	4.5 V	RCO	2.5		V													
			2	2.0 V	1/	"	2.0 V	"	"	"	"	"	2.0 V					"	"	-400 μ A	"	CCO	2.5		"								
			3	0.8 V	"	"	"	"	"	"	"	0.8 V	"	"	"	"	0.8 V					"	"	"	"	QA	2.4		"				
			4	"	"	"	2.0 V	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	QB	"		"			
			5	"	"	"	"	2.0 V	"	"	"	"	"	"	"	"	"	"					"	"	"	"	QC	"		"			
			6	"	"	"	"	"	2.0 V	"	"	"	"	"	"	"	"	-1 mA					"	"	"	"	QD	"		"			
	V _{OL1}	3007	7	2.0 V	"	0.8 V	0.8 V	0.8 V	0.8 V	"	"	"	"	"	"	"	"					"	"	4 mA	"	RCO		0.4	"				
			8	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	CCO		"	"	"			
	V _{OL2}	"	"	9	0.8 V	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	QA		"	"	"			
				10	"	"	"	0.8 V	"	"	"	"	"	"	"	"	"	"					"	"	"	"	QB		"	"	"		
				11	"	"	"	"	0.8 V	"	"	"	"	"	"	"	"	"					"	"	"	"	QC		"	"	"		
				12	"	"	"	"	"	0.8 V	"	"	"	"	"	"	"	"	12 mA				12 mA	"	"	"	"	QD		"	"	"	
	V _{IC}	"	"	13	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	ALOAD		-1.5	"			
				14	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	CLK		"	"	"		
				15	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	A		"	"	"	
				16	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	B		"	"	"	
				17	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"	"					"	"	"	"	C		"	"	"	
				18	"	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"	"					"	"	"	"	D		"	"	"	
				19	"	"	"	"	"	"	-18 mA	"	"	"	"	"	"	"	"					"	"	"	"	ENP		"	"	"	
				20	"	"	"	"	"	"	"	-18 mA	"	"	"	"	"	"	"					"	"	"	"	ACL		"	"	"	
				21	"	"	"	"	"	"	"	"	-18 mA	"	"	"	"	"	"					"	"	"	"	SCLR		"	"	"	"
				22	"	"	"	"	"	"	"	"	"	-18 mA	"	"	"	"	"					"	"	"	"	SLOAD		"	"	"	"
				23	"	"	"	"	"	"	"	"	"	"	-18 mA	"	"	"	"					"	"	"	"	ENT		"	"	"	"
				24	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					-18 mA	"	"	"	\bar{G}		"	"	"	"
I _L	3009	25	0.4 V	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	5.5 V	"	ALOAD	2/	2/	μ A					
		26	"	0.4 V	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	CLK		"	"	"			
		27	"	"	0.4 V	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	A		"	"	"			
		28	"	"	"	0.4 V	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	B		"	"	"			
		29	"	"	"	"	0.4 V	"	"	"	"	"	"	"	"	"	"					"	"	"	"	C		"	"	"			
		30	"	"	"	"	"	0.4 V	"	"	"	"	"	"	"	"	"					"	"	"	"	D		"	"	"			
		31	"	"	"	"	"	"	0.4 V	"	"	"	"	"	"	"	"					"	"	"	"	ENP		"	"	"			
		32	"	"	"	"	"	"	"	"	0.4 V	"	"	"	"	"	"					"	"	"	"	ACL		"	"	"	"		
		33	"	"	"	"	"	"	"	"	"	0.4 V	"	"	"	"	"					"	"	"	"	SCLR		"	"	"	"		
		34	"	"	"	"	"	"	"	"	"	"	0.4 V	"	"	"	"					"	"	"	"	SLOAD		"	"	"	"		
		35	"	"	"	"	"	"	"	"	"	"	"	0.4 V	"	"	"					"	"	"	"	ENT		"	"	"	"		
		36	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					0.4 V	"	"	"	\bar{G}		"	"	"	"		
I _{H1}	3010	37	"	"	"	"	"	"	"	2.7 V	"	"	"	"	"	"					"	"	"	"	ENP		40	"					
		38	"	"	"	"	"	"	"	"	"	"	"	"	2.7 V	"					"	"	"	"	ENT		40	"	"				
		39	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	ALOAD		20	"	"			
		40	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	CLK		"	"	"			
		41	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	A		"	"	"			
		42	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	B		"	"	"			
		43	"	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"					"	"	"	"	C		"	"	"			
		44	"	"	"	"	"	2.7 V	"	"	"	"	"	"	"	"	"					"	"	"	"	D		"	"	"			
		45	"	"	"	"	"	"	2.7 V	"	"	"	"	"	"	"	"					"	"	"	"	ACL		"	"	"			
		46	"	"	"	"	"	"	"	"	"	2.7 V	"	"	"	"	"					"	"	"	"	SCLR		"	"	"			
		47	"	"	"	"	"	"	"	"	"	"	2.7 V	"	"	"	"					"	"	"	"	SLOAD		"	"	"			
		48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					2.7 V	"	"	"	\bar{G}		"	"	"			

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.

Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit								
																									Test no.	ALOAD		CLK	A	B	C	D	ENP	ACLR	SCLR
1 T _c = 25°C	I _{IH2}	3010	49								7.0 V												5.5 V	ENP		200	μA								
			50													7.0 V										ENT		200	"						
			51	7.0 V																							ALOAD		100	"					
			52		7.0 V																							CLK		"	"				
			53			7.0 V																							A		"	"			
			54				7.0 V																						B		"	"			
			55					7.0 V																					C		"	"			
			56						7.0 V																				D		"	"			
			57								7.0 V																			ACLR		"	"		
			58												7.0 V															SCLR		"	"		
	59													7.0 V														SLOAD		"	"				
	60																				7.0 V							\bar{G}		"	"				
	I _{o3/}	3011	61	5.5 V	1/	5.5 V	"	GND	5.5 V								GND	2.25 mA	4.5 V	RCO	-15	-70	mA												
			62	"	"	"	5.5 V	5.5 V	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2.25 mA	"	2.25 mA	CCO	-15	-70	"				
			63	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QA	-20	-112	"				
			64	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	"	2.25 mA	"	"	"	"	"	"	"	"	QB	"	"	"			
			65	"	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	"	"	2.25 mA	"	"	"	"	"	"	"	"	QC	"	"	"			
			66	"	"	"	"	"	"	5.5 V	"	"	"	"	"	"	"	"	"	2.25 mA	"	"	"	"	"	"	"	"	QD	"	"	"			
	I _{oZL}		67	2.0 V	"	2.0 V	"	0.8 V	2.0 V	"	"	"	"	"	"	"	"	"	"	"	QA		-20	μA											
			68	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QB		"	"				
			69	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QC		"	"				
			70	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QD		"	"				
	I _{oZH}		71	"	"	0.8 V	"	"	"	"	0.8 V	"	"	"	"	"	"	"	"	"	"	"	QA		20	"									
			72	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QB		"	"				
			73	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QC		"	"				
			74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	QD		"	"				
	I _{cCH}	3005	75	4.5 V	"	4.5 V	"	GND	4.5 V	"	"	"	"	"	"	"	"	"	"	"	V _{CC}		27	mA											
			76	GND	"	GND	"	"	GND	"	"	"	"	"	"	"	"	"	"	"	"	"		33	"										
			77	GND	"	GND	4.5 V	4.5 V	"	"	GND	"	"	"	"	"	"	"	"	"	"	"	"	"		36	"								
	2	Same tests, terminal conditions, and limits as for subgroup 1, except T _c = +125°C and V _{IC} tests are omitted.																																	
3	Same tests, terminal conditions, and limits as for subgroup 1, except T _c = -55°C and V _{IC} tests are omitted.																																		
7 T _c = 25°C	Truth table test 4/	3014 Fig. 3	78	A 5/	B 5/	A	B	B	A	A	B	A	GND	A	A	L	L	L	L	B	L	L	4.5 V	6/											
			79	B	B	"	"	"	"	"	"	"	"	"	"	"	H	L	L	H	"	"	"	"	"	"	"	"	"	"	"	"			
			80	A	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"	"	"	"	"	"	"	"	"	"		
			81	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
			82	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			83	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			84	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			85	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			86	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			87	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			88	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			89	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			90	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			91	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
92	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
93	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
94	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
95	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
96	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
97	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit				
					A	B	C	D	ENP	ACLK	SCLR	GND	SLOAD	ENT	QD	QC	QB	QA	\bar{G}	CCO	RCO	V _{CC}	Min	Max								
7	T _c = 25°C	Truth table test 4/	3014 Fig. 3	98	A 5/	B 5/	A	B	B	A	A	A	A	GND	A	A	L	L	L	H	B	L	L	4.5 V	6/							
				99	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"	"	"				
				100	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"	"	"			
				101	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"	"			
				102	"	B	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
				103	"	A	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
				104	"	B	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"			
				105	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	L	"	"	"	"	"	"			
				106	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"	"			
				107	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"			
				108	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"			
				109	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"	"			
				110	"	B	"	"	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	H	"	"	"	"	"			
				111	"	A	"	"	"	"	"	"	"	"	"	B	"	"	"	"	"	L	L	"	"	"	"	"	"			
				112	"	B	B	A	"	"	"	"	"	"	A	"	B	"	"	"	"	"	"	L	"	"	"	"	"			
				113	"	A	"	"	"	"	"	"	"	"	"	"	"	B	"	"	"	"	"	H	"	"	"	"	"			
				114	"	B	"	"	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	"			
115	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"							
116	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"							
117	"	B	"	"	"	"	"	"	"	"	B	"	"	"	"	"	L	"	L	L	"	"	"	"	"							
8				Same tests, terminal conditions, and limits as for subgroup 7, except T _c = +125°C and T _c = -55°C.																												
9	T _c = 25°C	f _{MAX} 8/ t _{PLH1} t _{PHL1} t _{PLH2} t _{PHL2} t _{PLH3} t _{PHL3} t _{PLH4} t _{PHL4} t _{PLH5} t _{PHL5} t _{PLH6} t _{PHL6}	3003 Fig. 8	118	4.5 V	IN					4.5 V	4.5 V	4.5 V	GND	4.5 V	4.5 V				OUT	GND			5.0 V	QA	25		MHz				
				119	Z/		GND																OUT	"			"	CLK to QA	4	12	ns	
				120	"		GND																				"	CLK to QB	"	"	"	
				121	"			GND													OUT						"	CLK to QC	"	"	"	
				122	"				GND											OUT							"	CLK to QD	"	"	"	
				123	"		4.5 V																OUT				"	CLK to QA	5	18	"	
				124	"			4.5 V															OUT				"	CLK to QB	"	"	"	
				125	"				4.5 V														OUT				"	CLK to QC	"	"	"	
				126	"					4.5 V													OUT				"	CLK to QD	"	"	"	
				127	"			GND	4.5 V	4.5 V																OUT	"	CLK to RCO	9	29	"	
				128	"			4.5 V																		OUT	"	CLK to RCO	8	24	"	
				129	"																				OUT	"	CLK to CCO	8	26	"		
				130	"																				OUT	"	CLK to CCO	5	16	"		
				131	"		IN																	OUT	"		"	ALOAD to QA	10	35	"	
				132	"				4.5 V															OUT	"		"	ALOAD to QB	"	"	"	
				133	"					4.5 V														OUT	"		"	ALOAD to QC	"	"	"	
				134	"						4.5 V													OUT	"		"	ALOAD to QD	"	"	"	
135	"			GND																OUT	"		"	ALOAD to QA	7	23	"					
136	"				GND															OUT	"		"	ALOAD to QB	"	"	"					
137	"					GND														OUT	"		"	ALOAD to QC	"	"	"					
138	"						GND													OUT	"		"	ALOAD to QD	"	"	"					
139	"				4.5 V	4.5 V	4.5 V	4.5 V														OUT	"	ALOAD to RCO	15	42	"					
140	"				GND	GND	GND	GND														OUT	"	ALOAD to RCO	12	30	"					
141	"			GND	4.5 V	4.5 V	4.5 V	4.5 V													OUT	"	"	ALOAD to CCO	25	55	"					
142	"			GND	GND	GND	GND	GND													OUT	"	"	ALOAD to CCO	12	33	"					

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

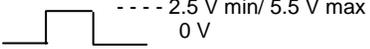
Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit			
																									Test no.	ALOAD		CLK	A	B
9 T _c = 25°C	t _{PLH7}	3003 Fig. 8	143	GND		IN					4.5 V	4.5 V	4.5 V	GND	4.5 V	4.5 V			OUT	GND			5.0 V	A to QA	8	30	ns			
			144	"			IN													OUT				"	B to QB	"	"	"		
			145	"				IN													OUT				"	C to QC	"	"	"	
			146	"							IN							OUT							"	D to QD	"	"	"	
	t _{PHL7}	"	"	147	"		IN														OUT			"	A to QA	7	22	"		
				148	"			IN														OUT			"	B to QB	"	"	"	
				149	"				IN													OUT			"	C to QC	"	"	"	
				150	"							IN											OUT			"	D to QD	"	"	"
	t _{PLH8}	"	151	7/		4.5 V	4.5 V	4.5 V	4.5 V						IN							OUT	"	ENT to RCO	5	16	"			
	t _{PHL8}	"	152	"																		OUT	"	ENT to RCO	4	14	"			
	t _{PLH9}	"	153	"																		OUT	"	ENT to CCO	12	32	"			
	t _{PHL9}	"	154	"																			"	ENT to CCO	4	12	"			
	t _{PLH10}	"	155	"																				"	ENT to CCO	5	18	"		
	t _{PHL10}	"	156	"																				"	ENT to CCO	4	12	"		
	t _{PLH12}	"	"	157	"							4.5 V	IN												"	ACL _R to QA	7	22	"	
				158	"			4.5 V																	"	ACL _R to QB	"	"	"	
				159	"				4.5 V																	"	ACL _R to QC	"	"	"
				160	"					4.5 V									OUT							"	ACL _R to QD	"	"	"
	t _{PZH}	"	"	161	"		4.5 V					4.5 V													"	\bar{G} to QA	5	19	"	
				162	"			4.5 V																		"	\bar{G} to QB	"	"	"
				163	"				4.5 V																	"	\bar{G} to QC	"	"	"
				164	"					4.5 V																"	\bar{G} to QD	"	"	"
	t _{PZL}	"	"	165	"		GND																		"	\bar{G} to QA	8	23	"	
				166	"			GND																		"	\bar{G} to QB	"	"	"
167				"				GND																	"	\bar{G} to QC	"	"	"	
168				"					GND																"	\bar{G} to QD	"	"	"	
t _{PHZ}	"	"	169	"		4.5 V																		"	\bar{G} to QA	2	10	"		
			170	"			4.5 V																		"	\bar{G} to QB	"	"	"	
			171	"				4.5 V																	"	\bar{G} to QC	"	"	"	
			172	"					4.5 V																"	\bar{G} to QD	"	"	"	
t _{PLZ}	"	"	173	"		GND																		"	\bar{G} to QA	4	15	"		
			174	"			GND																		"	\bar{G} to QB	"	"	"	
			175	"				GND																	"	\bar{G} to QC	"	"	"	
			176	"					GND																"	\bar{G} to QD	"	"	"	

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

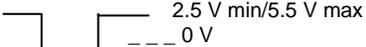
Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2 Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit		
				ALOAD	CLK	A	B	C	D	ENP	ACL \bar{R}	SCLR	GND	SLOAD	ENT	QD	QC	QB	QA	\bar{G}	CCO	RCO	V $_{CC}$		Min	Max			
10	f $_{MAX}$	3003																							25		MHz		
	t $_{PLH1}$	Fig. 8																							4	15	ns		
	t $_{PHL1}$	"																							5	21	"		
	t $_{PLH2}$	"																							9	35	"		
	t $_{PHL2}$	"																							8	29	"		
	t $_{PLH3}$	"																							8	31	"		
	t $_{PHL3}$	"																							5	20	"		
	t $_{PLH4}$	"																								10	38	"	
	t $_{PHL4}$	"																								7	27	"	
	t $_{PLH5}$	"																								15	55	"	
	t $_{PHL5}$	"																								12	35	"	
	t $_{PLH6}$	"																								25	65	"	
	t $_{PHL6}$	"																								12	42	"	
	t $_{PLH7}$	"																								8	35	"	
	t $_{PHL7}$	"																								7	27	"	
	t $_{PLH8}$	"																								5	20	"	
	t $_{PHL8}$	"																								4	18	"	
	t $_{PLH9}$	"																									12	35	"
	t $_{PHL9}$	"																								4	15	"	
	t $_{PLH10}$	"																									5	22	"
t $_{PHL10}$	"																									4	14	"	
t $_{PLH12}$	"																									7	28	"	
t $_{P2H}$	"																									5	24	"	
t $_{P2L}$	"																									8	28	"	
t $_{PHZ}$	"																									2	15	"	
t $_{PLZ}$	"																									4	20	"	
11	Same tests, terminal conditions and limits as for subgroup 10, except T $_C$ = -55°C.																												

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- 1/ Apply one clock pulse prior to test as follows:  2.5 V min/ 5.5 V max
0 V
- 2/ I $_{IL}$ limits shall be as follows:

Test	Min/Max limits in μ A for circuit		
	A	B	C
I $_{IL}$	0/-200		

- 3/ Method 3011 shall be used, except the output voltage shall be as specified herein, and the output current shall be operating rather than short circuit current. The output conditions have been chosen to produce a current that closely approximates one-half of the true short circuit output current I $_{OS}$.
- 4/ Only a summary of attributes data is required.
- 5/ A = 3.0 V minimum, B = 0.0 V or GND.
- 6/ H > 1.5 V; L < 1.5 V.

- 7/ Apply one clock pulse prior to test as follows:  2.5 V min/5.5 V max
0 V

- 8/ The f $_{MAX}$ minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.

MIL-M-38510/380B

TABLE III. Group A inspection for device type 05.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2 Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit					
				U/D	CLK	A	B	C	D	ENP	ACLR	SCLR	GND	SLOAD	ENT	QD	QC	QB	QA	G	CCO	R _{CO}	V _{CC}		Min	Max						
1 T _c = 25°C	V _{OH1}	3006	1	2.0 V	1/	0.8 V	2.0 V	2.0 V	GND	0.8 V						0.8 V	CCO	-400 μA	4.5 V	R _{CO}	2.5		V									
			2			0.8 V													-400 μA		CCO	2.5										
	V _{OH2}		3			2.0 V																			QA	2.4						
			4				2.0 V																			QB						
			5					2.0 V																			QC					
			6						2.0 V																			QD				
	V _{OL1}	3007	7			2.0 V	2.0 V	2.0 V	2.0 V														4 mA		R _{CO}		0.4					
			8			2.0 V	2.0 V	2.0 V	2.0 V														4 mA		CCO							
	V _{OL2}		9			0.8 V																				QA						
			10				0.8 V																				QB					
			11					0.8 V																				QC				
			12						0.8 V																			QD				
	V _{IC}		13	-18 mA																						U/D	-1.5					
			14		-18 mA																						CLK					
			15			-18 mA																						A				
			16				-18 mA																					B				
			17					-18 mA																					C			
			18						-18 mA																				D			
			19							-18 mA																		ENP				
			20								-18 mA																	ACLR				
			21									-18 mA																	SCLR			
			22										-18 mA																SLOAD			
			23											-18 mA															ENT			
			24																			-18 mA							G			
	I _L	3009	25	0.4 V																				5.5 V	U/D	2/	2/	μA				
			26		0.4 V																						CLK					
			27			0.4 V																						A				
			28				0.4 V																					B				
			29					0.4 V																				C				
			30						0.4 V																			D				
			31								0.4 V																	ENP				
			32									0.4 V																ACLR				
			33										0.4 V															SCLR				
			34											0.4 V														SLOAD				
			35												0.4 V													ENT				
			36																			0.4 V						G				
	I _{IH1}	3010	37	2.7 V																					U/D		20					
			38		2.7 V																						CLK					
			39			2.7 V																						A				
			40				2.7 V																					B				
			41					2.7 V																				C				
			42						2.7 V																			D				

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2 Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit							
				U/D	CLK	A	B	C	D	ENP	ACLR	SCLR	GND	SLOAD	ENT	QD	QC	QB	QA	G	CCO	RCO	V _{CC}		Min	Max								
1	I _{IH1}	3010	43								ENP	ACLR	SCLR	GND									V _{CC}	ENP		20	μA							
			44									2.7 V													ACLR									
			45										2.7 V													SCLR								
			46											2.7 V												SLOAD								
			47													2.7 V										ENT								
			48																			2.7 V				G								
	I _{IH2}			49	7.0 V																				U/D		100							
				50		7.0 V																				CLK								
				51			7.0 V																				A							
				52				7.0 V																			B							
				53					7.0 V																			C						
				54						7.0 V																		D						
				55							7.0 V			7.0 V														ENP						
				56											7.0 V													ACLR						
				57												7.0 V												SCLR						
				58													7.0 V											SLOAD						
	59															7.0 V									ENT									
	60																				7.0 V				G									
	I _{IO}	3011		61	5.5 V	1/	GND	GND	GND	GND	5.5 V	5.5 V	5.5 V		GND	5.5 V									RCO	-15	-70	mA						
				62			GND	GND	GND	GND															2.25 mA		CCO	-15	-70					
63						5.5 V														2.25 mA						QA	-20	-112						
64							5.5 V													2.25 mA						QB								
65								5.5 V											2.25 mA								QC							
66										5.5 V								2.25 mA									QD							
I _{OZL}			67	2.0 V		2.0 V				2.0 V	2.0 V	2.0 V		0.8 V	2.0 V										QA		-20	μA						
			68				2.0 V													0.4 V						QB								
			69					2.0 V													0.4 V						QC							
			70						2.0 V									0.4 V									QD							
I _{OZH}			71			0.8 V																				QA		20						
			72				0.8 V																				QB							
			73					0.8 V																				QC						
			74						0.8 V																			QD						
I _{CC}	3005		75	4.5 V		4.5 V		GND	4.5 V										V _{CC}		26	mA												
			76	GND		GND			GND													32												
			77	GND		GND			4.5 V	4.5 V													32											
2	Same tests, terminal conditions, and limits as for subgroup 1, except T _C = +125°C and V _{IC} tests are omitted.																																	
3	Same tests, terminal conditions, and limits as for subgroup 1, except T _C = -55°C and V _{IC} tests are omitted.																																	
7	Truth table test 4/	3014 Fig. 3	78	A 5/	B 5/	B	B	B	B	B	B	B	A	A	GND	A	B	L	L	L	L	B	H	H	4.5 V	6/								
			79		B									A			B																	
			80		A												B																	
			81		B												A																	
			82		A																							H						
			83		B																							H						
			84		A																							L						
85		B																								L								

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit			
				U/D	CLK	A	B	C	D	ENP	ACLK	SCLK	GND	SLOAD	ENT	QD	QC	QB	QA	G	CCO	RCO	V _{CC}		Min	Max				
7	Truth table test 4/	3014 Fig. 3	86	A 5/	A	B 5/	B	B	B	B	B	A	A	GND	A	B	L	L	H	H	B	H	H	4.5 V	6/					
			87		B														L	H	H									
			88		A															H	L	L								
			89		B																	L								
			90		A																	H								
			91		B																		H							
			92		A																H	L								
			93		B																	L								
			94		A																		H							
			95		B																		H							
			96		A														H	L	L	L								
			97		B																		H							
			98		A																		H							
			99		B																		H							
			100		A																H	L								
			101		B																									
			102		A																									
103		B																												
104		A																		H										
105		B																		H										
106		A															H	L	L											
107		B																		L										
108		A																		H										
109		B																		H										
110		A																H	L											
111		B																		L										
112		A																		H										
113		B																			L	L								
114		A													A						H	H								
115		B													A						H	H								
116		A													B						L	L								
117		B														L	L	L	L		H	H								
118		A	B	A	A	A	A							B		L	L	L	L											
119		B	A											B		H	H	H	H											
120		A	B											A						H										
121		B	A																	L										
122		A	B																	L										
123		B	A																	H										
124		A	B																	H										
125		B	A																	L										
126		A	B																	L										
127		B	A														L		H											
128		A	B							A																				
129		B	A							A																				
130		A	B							B																				
131		B	A																	L										
132		A	B																	L										
133		B	A															L	H											
134		A	B																	H										
135		B	A																	L										
136		A	B																	L										
137		B	A													L	H	H	H											
138		A	B																	H										
139		B	A																	L										
140		A	B																	L										
141		B	A															L	H											
142		A	B																	H										
143		B	A																	L										
144		A	B																	L										

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit					
				U/ \bar{D}	CLK	A	B	C	D	ENP	ACLR	SCLR	GND	SLOAD	ENT	QD	QC	QB	QA	\bar{G}	CCO	RCO	V _{CC}		Min	Max						
7 T _c = 25°C	Truth table test 4/	3014 Fig. 3	145	B 5/	A 5/	A	A	A	A		B	A	A	GND	A	B	L	L	H	H	B	H	H	4.5 V	6/							
			146	"	B	"	"	"	"	"	"	B	A	A	GND	"	"	"	"	"	H	"	B	H	"	"	"					
			147	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"	"	"	"				
			148	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"	"	"	"			
			149	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	H	"	"	"	"	"	"	"			
			150	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"	"	"			
			151	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	L	"	"	"			
			152	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	L	L	"	"	"	"			
			153	"	B	"	"	"	"	"	"	"	"	"	"	"	"	A	"	"	"	L	"	H	H	"	"	"	"			
			154	"	A	"	"	"	"	"	"	"	"	"	"	"	"	A	"	"	"	L	"	H	H	"	"	"	"			
			155	"	B	"	"	"	"	"	"	"	"	"	"	"	"	B	"	"	"	L	"	L	L	"	"	"	"			
			156	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	H	"	H	H	"	"	"	"			
			157	"	B	"	"	"	"	"	"	"	"	"	B	"	"	"	"	"	"	H	"	"	"	"	"	"	"			
			158	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"	"	"	"			
			159	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"	"	"	"			
			8	Same tests, terminal conditions, and limits as for subgroup 7, except T _c = +125°C and T _c = -55°C.																												
			9 T _c = 25°C	f _{MAX} Z/	3003 Fig. 9	160	4.5 V	IN					GND	4.5 V	4.5 V	GND	4.5 V	GND				OUT	GND			5.0 V	QA	30			MHz	
						t _{PLH1}	161	"	"	4.5 V				GND	4.5 V	4.5 V	GND	"	"	"	"	"	"	OUT	OUT	"	"	"	CLK to QA	4	13	ns
							162	"	"		4.5 V				"	"	"	"	"	"	"	"	"	"	OUT	OUT	"	"	"	CLK to QB	"	"
	163	"				"			4.5 V			"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	CLK to QC	"	"	"		
	164	"				"				4.5 V		"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	CLK to QD	"	"	"		
	t _{PHL1}	165				"	"	GND				"	"	"	"	"	"	"	"	"	"	OUT	OUT	"	"	"	CLK to QA	7	16	"		
	166	"				"		GND				"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	CLK to QB	"	"	"		
	167	"				"			GND			"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	CLK to QC	"	"	"		
	168	"				"				GND		"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	CLK to QD	"	"	"		
	t _{PLH2}	169				"	"	4.5 V	4.5 V	4.5 V	4.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT	CLK to RCO	2	28	"		
	t _{PHL2}	170				"	"	GND	GND	GND	GND	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT	OUT	CLK to RCO	10	19	"		
	t _{PLH3}	171				"	"	4.5 V	4.5 V	4.5 V	4.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT	"	CLK to CCO	5	13	"		
	t _{PHL3}	172				"	"	4.5 V	4.5 V	4.5 V	4.5 V	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT	"	CLK to CCO	6	25	"		
	t _{PLH8}	173				"	"					"	"	"	"	4.5 V	IN	"	"	"	"	"	"	"	"	OUT	ENT to RCO	6	15	"		
	t _{PHL8}	174				"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	OUT	"	ENT to RCO	4	13	"		
	t _{PLH9}	175				"	"					"	"	"	"	"	"	"	"	"	"	"	"	OUT	"	"	ENT to CCO	5	13	"		
	t _{PHL9}	176				"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	ENT to CCO	9	23	"		
	t _{PLH10}	177				"	"					"	"	"	"	"	"	GND	"	"	"	"	"	"	"	"	ENT to CCO	4	12	"		
	t _{PHL10}	178				"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	ENP to CCO	5	14	"		
	t _{PLH11}	179				IN	"					GND	"	"	"	"	"	"	"	"	"	"	"	"	OUT	"	U/ \bar{D} to RCO	9	23	"		
	t _{PHL11}	180	IN	"					"	"	"	"	"	"	"	"	"	"	"	"	"	OUT	"	U/ \bar{D} to RCO	"	19	"					
	t _{PHL12}	181	4.5 V	1/	4.5 V				"	"	IN	"	GND	"	"	"	"	"	OUT	"	"	"	"	ACLR to QA	"	20	"					
		182	"	"		4.5 V			"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	ACLR to QB	"	"	"					
		183	"	"			4.5 V		"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	ACLR to QC	"	"	"					
		184	"	"				4.5 V	"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	ACLR to QD	"	"	"					
	t _{PZH}	185	"	"	4.5 V				"	"	4.5 V	"	"	"	"	"	"	"	OUT	IN	"	"	"	\bar{G} to QA	6	18	"					
		186	"	"		4.5 V			"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	"	\bar{G} to QB	"	"	"					
		187	"	"			4.5 V		"	"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	\bar{G} to QC	"	"	"					
		188	"	"				4.5 V	"	"	"	"	"	"	"	"	"	"	"	OUT	"	"	"	\bar{G} to QD	"	"	"					

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.8 V; or open).

Subgroup	Symbol	MIL-STD-883 method	Cases R, S, 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Test limits		Unit							
																									Test no.	U/D		CLK	A	B	C	D	ENP	ACL
9	t _{PZL}	3003 Fig. 9	189	4.5 V	1/	GND																		5.0 V	G to QA	11	24	ns						
			190	"	"		GND																							G to QB	"	"	"	
			191	"	"			GND																							G to QC	"	"	"
			192	"	"				GND																						G to QD	"	"	"
	t _{PHZ}	"	"	193	"	"	4.5 V																							G to QA	1	8	"	
				194	"	"		4.5 V																							G to QB	"	"	"
				195	"	"			4.5 V																						G to QC	"	"	"
				196	"	"				4.5 V																						G to QD	"	"
	t _{PLZ}	"	"	197	"	"	GND																							G to QA	3	13	"	
				198	"	"		GND																							G to QB	"	"	"
				199	"	"			GND																						G to QC	"	"	"
				200	"	"				GND																					G to QD	"	"	"
10	f _{MAX}	Same tests and terminal conditions as for subgroup 9, except T _C = +125 °C and limits are as shown.																				25		MHz										
	t _{PLH1}																					4	17	ns										
	t _{PHL1}																					7	18	"										
	t _{PLH2}																					12	31	"										
	t _{PHL2}																					10	22	"										
	t _{PLH3}																					5	15	"										
	t _{PHL3}																					6	30	"										
	t _{PLH8}																					6	17	"										
	t _{PHL8}																					4	17	"										
	t _{PLH9}																					5	15	"										
	t _{PHL9}																					9	28	"										
	t _{PLH10}																					4	14	"										
	t _{PHL10}																					5	17	"										
	t _{PLH11}																					9	25	"										
	t _{PHL11}																					9	23	"										
	t _{PLH12}																					9	22	"										
t _{PZH}																					6	21	"											
t _{PZL}																					11	29	"											
t _{PHZ}																					1	8	"											
t _{PLZ}																					3	19	"											
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55°C.																																	

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- 1/ Apply one clock pulse prior to test as follows:  0 V
- 2/ I_L limits shall be as follows:

Test	Min/Max limits in μ A for circuit		
	A	B	C
I _L	0/-200		

- 3/ Method 3011 shall be used, except the output voltage shall be as specified herein, and the output current shall be operating rather than short circuit current. The output conditions have been chosen to produce a current that closely approximates one-half of the true short circuit output current I_{OS}.
- 4/ Only a summary of attributes data is required.
- 5/ A = 3.0 V minimum, B = 0.0 V or GND.
- 6/ H > 1.5 V; L < 1.5 V.
- 7/ The f_{MAX} minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When 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 command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. PIN and compliance identifier, if applicable (see 1.2).
- c. Requirements for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- d. 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 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 contractor's 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, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

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:

GND	Ground zero voltage potential
CCO	Clocked carry output
I _{IN}	Current flowing into an input terminal
RCO	Ripple carry output
V _{IN}	Voltage level at an input terminal

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

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

Military device type	Generic-industry type
01	54ALS161B
02	54ALS163B
03	54ALS169
04	54ALS561
05	54ALS569

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

TABLE IV. Manufacturers' designations.

Device type	Circuit		
	A	B	C
	Texas Instruments	Motorola Inc.	National Semiconductor/ Fairchild Semiconductor
01	X	X	
02	X	X	
03	X		
04	X		
05	X		

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

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

Preparing activity:
DLA - CC

(Project 5962-2062)

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