

INCH-POUND

MIL-M-38510/344A

14 April 2004

SUPERSEDING

MIL-M-38510/344

12 June 1986

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, BIPOLAR, ADVANCED SCHOTTKY TTL, DECADE COUNTERS, MONOLITHIC SILICON

Reactivated after 14 April 2004 and may be used for either new or existing design acquisition.

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 Schottky TTL, decade counter microcircuits. 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).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 decade counter (asynchronous master reset)
02	Synchronous 4 - bit decade counter (synchronous reset)
03	Synchronous 4 - bit up/down decade counter (with mode control)
04	Synchronous 4 - bit up/down decade counter (asynchronous master reset)

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
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, 3990 East Broad St., Columbus, OH 43216-5000, or emailed to bipolar@dsccl.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	-1.2 V dc at -18 mA to +7.0 V dc
Storage temperature range	-65° to +150°C
Maximum power dissipation, per device (P_D) <u>1/</u>	
Device types 01, 02, 03, 04	303 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction to case (θ_{JC}):	
Cases E, F, and 2	(See MIL-STD-1835)
Junction temperature (T_J) <u>2/</u>	175°C

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Normalized fanout (each output) <u>3/</u>	
Low logic level	33 maximum
High logic level	50 maximum
Case operating temperature range (T_C)	-55° to +125°C
Width of clock pulse, high ($\overline{PE}$ = high, low)	
Device types 01, 02	5.0 ns minimum
Width of clock pulse, low ($\overline{PE}$ = high)	
Device types 01, 02	8.0 ns minimum
Width of clock pulse, low ($\overline{PE}$ = low)	
Device types 01, 02	6.0 ns minimum
Width of master reset pulse, low	
Device type 01	7.0 ns minimum
Width of $\overline{PL}$ pulse, low	
Device type 03	8.5 ns minimum
Device type 04	7.5 ns minimum
Width of clock pulse, low	
Device type 03	7.0 ns minimum
Width of CPU or CPD pulse, low	
Device type 04	7.0 ns minimum
Width of master reset pulse, high	
Device type 04	6.0 ns minimum
Width of CPU or CPD pulse, low (change of direction)	
Device type 04	12.0 ns minimum
Setup time P_n high to clock pulse	
Device types 01, 02	5.5 ns minimum
Setup time P_n low to clock pulse	
Device types 01, 02	5.5 ns minimum
Setup time $\overline{PE}$ or $\overline{SR}$ high to clock pulse	
Device types 01, 02	13.5 ns minimum
Setup time $\overline{PE}$ or $\overline{SR}$ low to clock pulse	
Device types 01, 02	10.5 ns minimum

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 the specified number of inputs of the same device type as that being tested.

Setup time CEP or CET high to clock pulse	
Device types 01, 02	13.0 ns minimum
Setup time CEP or CET low to clock pulse	
Device types 01, 02	7.5 ns minimum
Setup time $\overline{U}/D$ high to clock pulse	
Device type 03	12.0 ns minimum
Setup time $\overline{U}/D$ low to clock pulse	
Device type 03	12.0 ns minimum
Setup time Pn high to $\overline{PL}$	
Device types 03, 04	6.0 ns minimum
Setup time Pn low to $\overline{PL}$	
Device types 03, 04	6.0 ns minimum
Setup time $\overline{CE}$ low to clock pulse	
Device type 03	10.5 ns minimum
Hold time Pn high to clock pulse	
Device types 01, 02	2.5 ns minimum
Hold time Pn low to clock pulse	
Device types 01, 02	2.5 ns minimum
Hold time $\overline{PE}$ or $\overline{SR}$ high to clock pulse	
Device types 01, 02	2.0 ns minimum
Hold time $\overline{PE}$ or $\overline{SR}$ low to clock pulse	
Device types 01, 02	0.0 ns minimum
Hold time CEP or CET high to clock pulse	
Device types 01, 02	0.0 ns minimum
Hold time CEP or CET low to clock pulse	
Device types 01, 02	0.0 ns minimum
Hold time Pn high to $\overline{PL}$	
Device types 03, 04	2.0 ns minimum
Hold time Pn low to $\overline{PL}$	
Device types 03, 04	2.0 ns minimum
Hold time $\overline{U}/D$ high to clock pulse	
Device type 03	0.0 ns minimum
Hold time $\overline{U}/D$ low to clock pulse	
Device type 03	0.0 ns minimum
Hold time $\overline{CE}$ low to clock pulse	
Device type 03	0.0 ns minimum
Recovery time master reset to clock pulse	
Device type 01	7.0 ns minimum
Recovery time $\overline{PL}$ to clock pulse	
Device type 03	7.5 ns minimum
Recovery time master reset to CPU or CPD	
Device type 04	4.5 ns minimum
Recovery time $\overline{PL}$ to CPU or CPD	
Device type 04	8.0 ns minimum

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE 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 figures 1.

3.3.2 Logic diagram. The logic diagram 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 Schematic circuits. The schematic circuits shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity upon request.

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

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

3.5 Electrical performance characteristics. 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 _{OH}	V _{CC} = 4.5 V, V _{IL} = 0.8 V, I _{OH} = -1.0 mA, V _{IH} = 2.0 V	All	2.5		V
Low level output voltage	V _{OL}	V _{CC} = 4.5 V, I _{OL} = 20 mA, V _{IH} = 2.0 V, V _{IL} = 0.8 V	All		0.5	V
Input clamp voltage	V _{IC}	V _{CC} = 4.5 V, I _{IN} = -18 mA, T _C = 25°C	All		-1.2	V
High level input current	I _{IH1}	V _{CC} = 5.5 V, V _{IN} = 2.7 V	All		20	μA
	I _{IH2}	V _{CC} = 5.5 V, V _{IN} = 7.0 V	All		100	μA
Low level input current	I _{IL1}	V _{CC} = 5.5 V, V _{IL} = 0.5 V	All	-.03	-0.6	mA
	I _{IL2}	V _{CC} = 5.5 V, V _{IL} = 0.5 V	01, 02	-.50	-1.2	mA
	I _{IL3}		03, 04	-.75	-1.8	mA
Short circuit output current <u>1/</u>	I _{OS}	V _{CC} = 5.5 V, V _{OS} = 0 V	All	-60	-150	mA
Supply current	I _{CC}	V _{CC} = 5.5 V	All		55	mA
Maximum count frequency	f _{MAX}	V _{CC} = 5.0 V	All	70		MHz
Propagation delay time, CP to Qn	t _{PLH1}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, See figure 4	03	3.0	9.5	ns
CP to Qn	t _{PHL1}		03	5.0	13.5	ns
CP $\bar{U}/D$ to Qn	t _{PLH1}		04	4.0	10.0	ns
CP $\bar{U}/D$ to Qn	t _{PHL1}		04	5.5	14.0	ns
CP to Qn $\overline{PE}$ = (high)	t _{PLH1}		01, 02	3.5	9.0	ns
CP to Qn $\overline{PE}$ = (high)	t _{PHL1}		01, 02	3.5	11.5	ns
CP to TC	t _{PLH2}		03	6.0	16.5	ns
CP to TC	t _{PHL2}		03	5.0	13.5	ns
CPU to $\overline{TCU}$	t _{PLH2}		04	4.0	10.5	ns
CPU to $\overline{TCU}$	t _{PHL2}		04	3.5	9.5	ns

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

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time, $\overline{PL}$ to Qn	t _{PLH3}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, See figure 4	04	5.0	13.5	ns
$\overline{PL}$ to Qn	t _{PHL3}		04	5.5	15.0	ns
CPD to $\overline{TC}$	t _{PLH4}		04	4.0	10.5	ns
CPD to $\overline{TC}$	t _{PHL4}		04	3.5	9.5	ns
CP to Qn $\overline{PE}$ = (low)	t _{PLH2}		01, 02	3.0	10.0	ns
CP to Qn $\overline{PE}$ = (low)	t _{PHL2}		01, 02	3.0	10.0	ns
CP to $\overline{RC}$	t _{PLH3}		03	3.0	9.5	ns
CP to $\overline{RC}$	t _{PHL3}		03	3.0	9.0	ns
CP to TC	t _{PLH3}		01, 02	4.0	16.5	ns
CP to TC	t _{PHL3}		01, 02	4.0	15.5	ns
Pn to Qn	t _{PLH4}		03	3.0	9.0	ns
Pn to Qn	t _{PHL4}		03	6.0	16.0	ns
Pn to Qn	t _{PLH5}		04	3.0	8.5	ns
Pn to Qn	t _{PHL5}		04	6.0	16.5	ns
CET to TC	t _{PLH4}		01, 02	2.5	9.0	ns
CET to TC	t _{PHL4}		01, 02	2.5	9.0	ns
$\overline{CE}$ to $\overline{RC}$	t _{PLH5}		03	3.0	9.0	ns
$\overline{CE}$ to $\overline{RC}$	t _{PHL5}		03	3.0	9.0	ns
$\overline{MR}$ to Qn	t _{PHL5}		01	5.5	14.0	ns
$\overline{MR}$ to TC	t _{PHL6}		01	4.5	12.5	ns
$\overline{PL}$ to Qn	t _{PLH6}		03	5.0	13.0	ns
$\overline{PL}$ to Qn	t _{PHL6}		03	5.5	14.5	ns

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time, MR to $\overline{\text{TCU}}$	t _{PLH6}	V _{CC} = 5.0 V, C _L = 50 pF ± 10%, See figure 4	04	6.0	15.0	ns
MR to $\overline{\text{TCD}}$	t _{PHL6}		04	6.0	16.0	ns
$\overline{\text{U/D}}$ to $\overline{\text{RC}}$	t _{PLH7}		03	7.0	22.0	ns
$\overline{\text{U/D}}$ to $\overline{\text{RC}}$	t _{PHL7}		03	5.5	14.0	ns
MR to Qn	t _{PHL11}		04	5.5	16.0	ns
$\overline{\text{U/D}}$ to TC	t _{PLH8}		03	4.0	13.5	ns
$\overline{\text{U/D}}$ to TC	t _{PHL8}		03	4.0	12.5	ns
$\overline{\text{PL}}$ to $\overline{\text{TCU}}$	t _{PLH7}		04	7.0	18.5	ns
$\overline{\text{PL}}$ to $\overline{\text{TCU}}$	t _{PHL7}		04	7.0	17.5	ns
$\overline{\text{PL}}$ to $\overline{\text{TCD}}$	t _{PLH8}		04	7.0	18.5	ns
$\overline{\text{PL}}$ to $\overline{\text{TCD}}$	t _{PHL8}		04	7.0	17.5	ns
Pn to $\overline{\text{TCU}}$	t _{PLH9}		04	6.0	16.5	ns
Pn to $\overline{\text{TCU}}$	t _{PHL9}		04	5.5	16.5	ns
Pn to $\overline{\text{TCD}}$	t _{PLH10}		04	6.0	16.5	ns
Pn to $\overline{\text{TCD}}$	t _{PHL10}		04	5.5	16.5	ns

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.

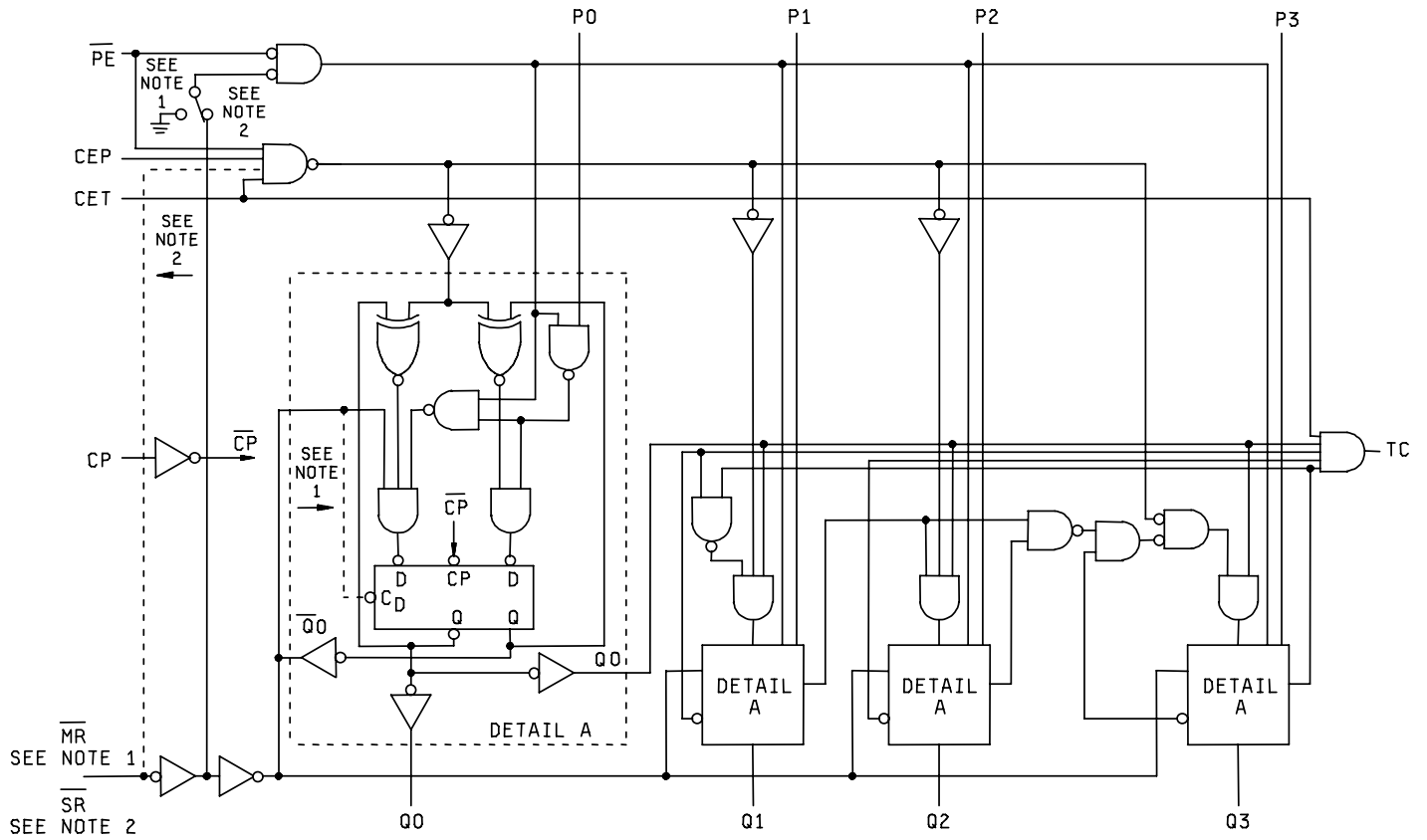
4.5 Methods of inspection. Methods of inspection shall be specified as follows:

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 type 01		Device type 2		Device type 03		Device type 04	
	Case E and F	Case 2	Case E and F	Case 2	Case E and F	Case 2	Case E and F	Case 2
1	$\overline{\text{MR}}$	NC	$\overline{\text{SR}}$	NC	P1	NC	P1	NC
2	CP	$\overline{\text{MR}}$	CP	$\overline{\text{SR}}$	Q1	P1	Q1	P1
3	P0	CP	P0	CP	Q0	Q1	Q0	Q1
4	P1	P0	P1	P0	$\overline{\text{CE}}$	Q0	CPD	Q0
5	P2	P1	P2	P1	$\overline{\text{U/D}}$	$\overline{\text{CE}}$	CPU	CPD
6	P3	NC	P3	NC	Q2	NC	Q2	NC
7	CEP	P2	CEP	P2	Q3	$\overline{\text{U/D}}$	Q3	CPU
8	GND	P3	GND	P3	GND	Q2	GND	Q2
9	$\overline{\text{PE}}$	CEP	$\overline{\text{PE}}$	CEP	P3	Q3	P3	Q3
10	CET	GND	CET	GND	P2	GND	P2	GND
11	Q3	NC	Q3	NC	$\overline{\text{PL}}$	NC	$\overline{\text{PL}}$	NC
12	Q2	$\overline{\text{PE}}$	Q2	$\overline{\text{PE}}$	TC	P3	$\overline{\text{TCU}}$	P3
13	Q1	CET	Q1	CET	$\overline{\text{RC}}$	P2	$\overline{\text{TCD}}$	P2
14	Q0	Q3	Q0	Q3	CP	$\overline{\text{PL}}$	MR	$\overline{\text{PL}}$
15	TC	Q2	TC	Q2	P0	TC	P0	$\overline{\text{TCU}}$
16	V _{CC}	NC	V _{CC}	NC	V _{CC}	NC	V _{CC}	NC
17		Q1		Q1		$\overline{\text{RC}}$		$\overline{\text{TCD}}$
18		Q0		Q0		CP		MR
19		TC		TC		P0		P0
20		V _{CC}		V _{CC}		V _{CC}		V _{CC}

FIGURE 1. Terminal connections.

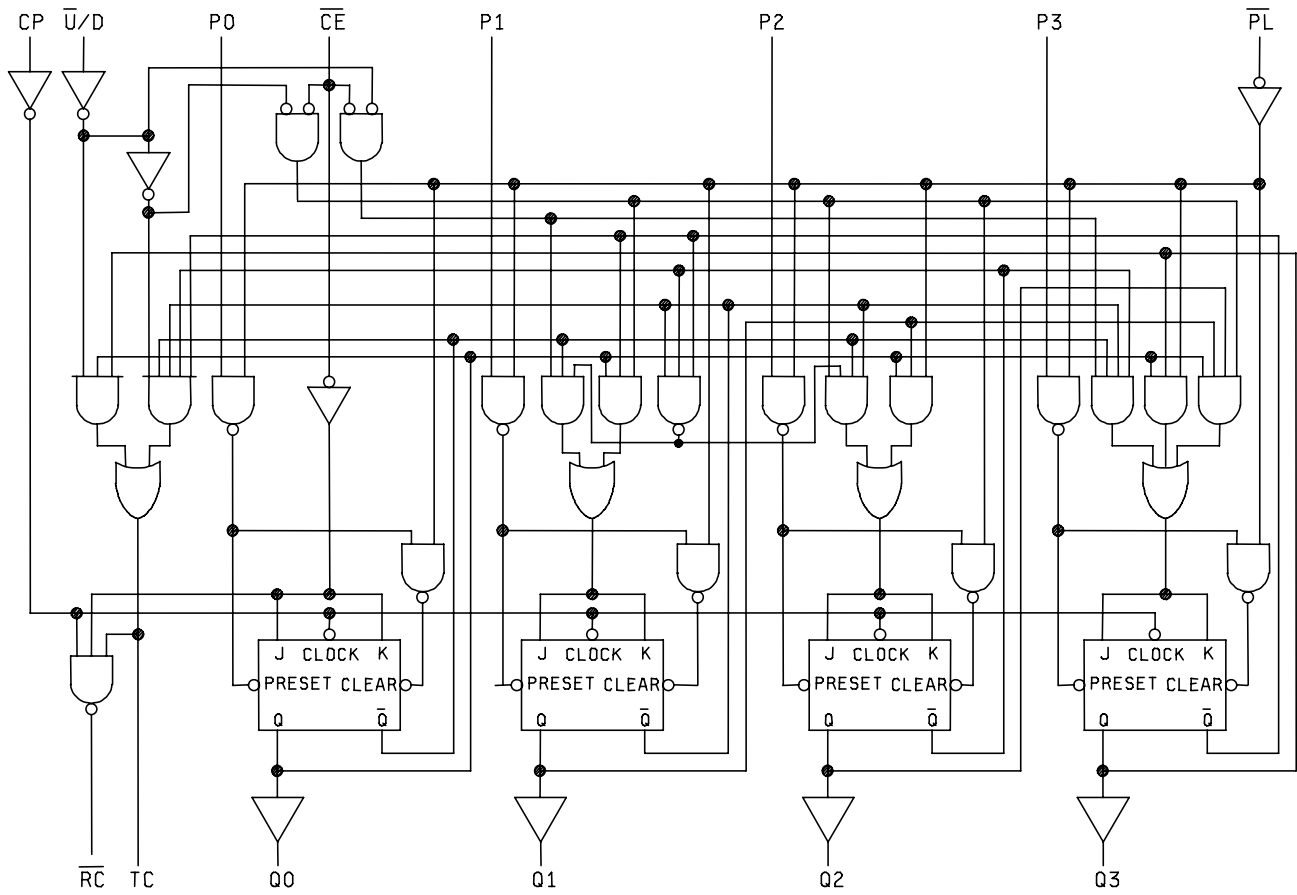
Device types 01 and 03



NOTES:

1. Device type 01
2. Device type 02

FIGURE 2. Logic diagram.

Device type 03FIGURE 2. Logic diagram - Continued.

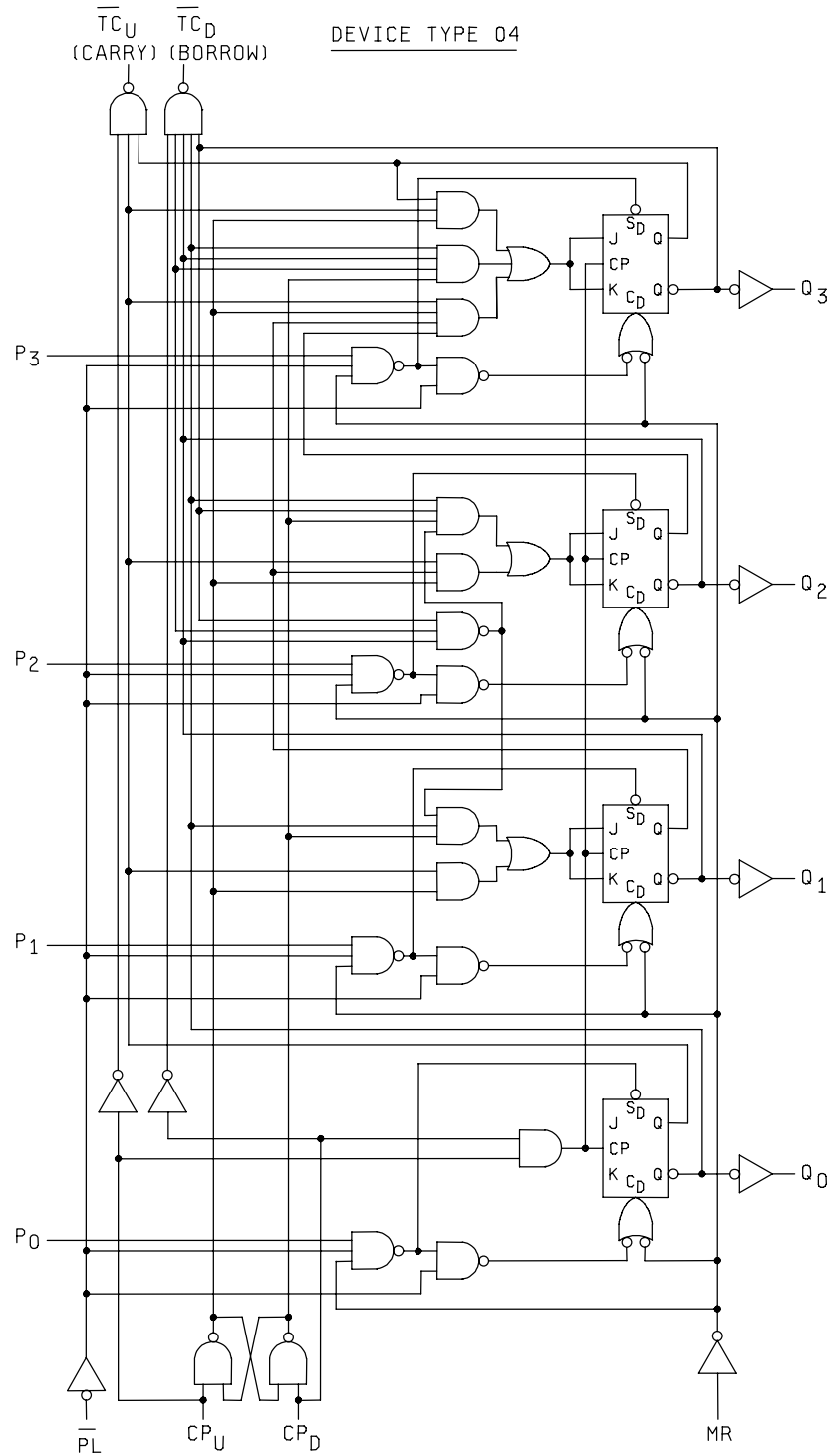


FIGURE 2. Logic diagram - Continued.

Device types 01 and 02

Mode select table

* $\overline{\text{SR}}$	$\overline{\text{PE}}$	CET	CEP	Action on the rising clock edge ($\uparrow$)
L	X	X	X	Reset (clear)
H	L	X	X	Load (Pn - Qn)
H	H	H	H	Count (increment)
H	H	L	X	No change (hold)
H	H	X	L	No change (hold)

* For device type 02
H = High voltage level
L = Low voltage level
X = Immaterial

Device type 03

Mode select table

Inputs				Mode
$\overline{\text{PL}}$	$\overline{\text{CE}}$	$\overline{\text{U/D}}$	CP	
H	L	L	$\uparrow$	Count up
H	L	H	$\uparrow$	Count down
L	X	X	X	Preset (asyn)
H	H	X	X	No change (hold)

RC truth table

Inputs			Output
$\overline{\text{CE}}$	TC*	CP	$\overline{\text{RC}}$
L	H	$\uparrow$	$\uparrow$
H	X	X	H
X	L	X	H

*TC is generated internally
H = High voltage level
L = Low voltage level
X = Immaterial
 $\uparrow$ = Transition from low to high level
 $\uparrow$ = One low level pulse

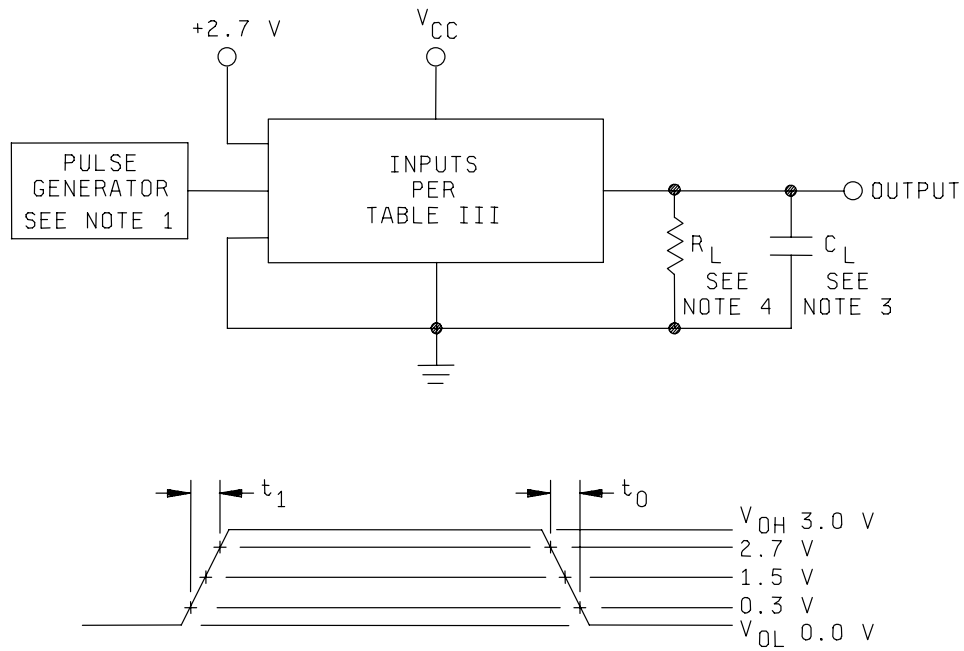
Device type 04

Function table

MR	$\overline{\text{PL}}$	CPU	CPD	Mode
H	X	X	X	Reset (asyn)
L	L	X	X	Preset (asyn)
L	H	H	H	No change
L	H	$\uparrow$	H	Count up
L	H	H	$\uparrow$	Count down

H = High voltage level
L = Low voltage level
X = Immaterial
 $\uparrow$ = Transition from low to high level

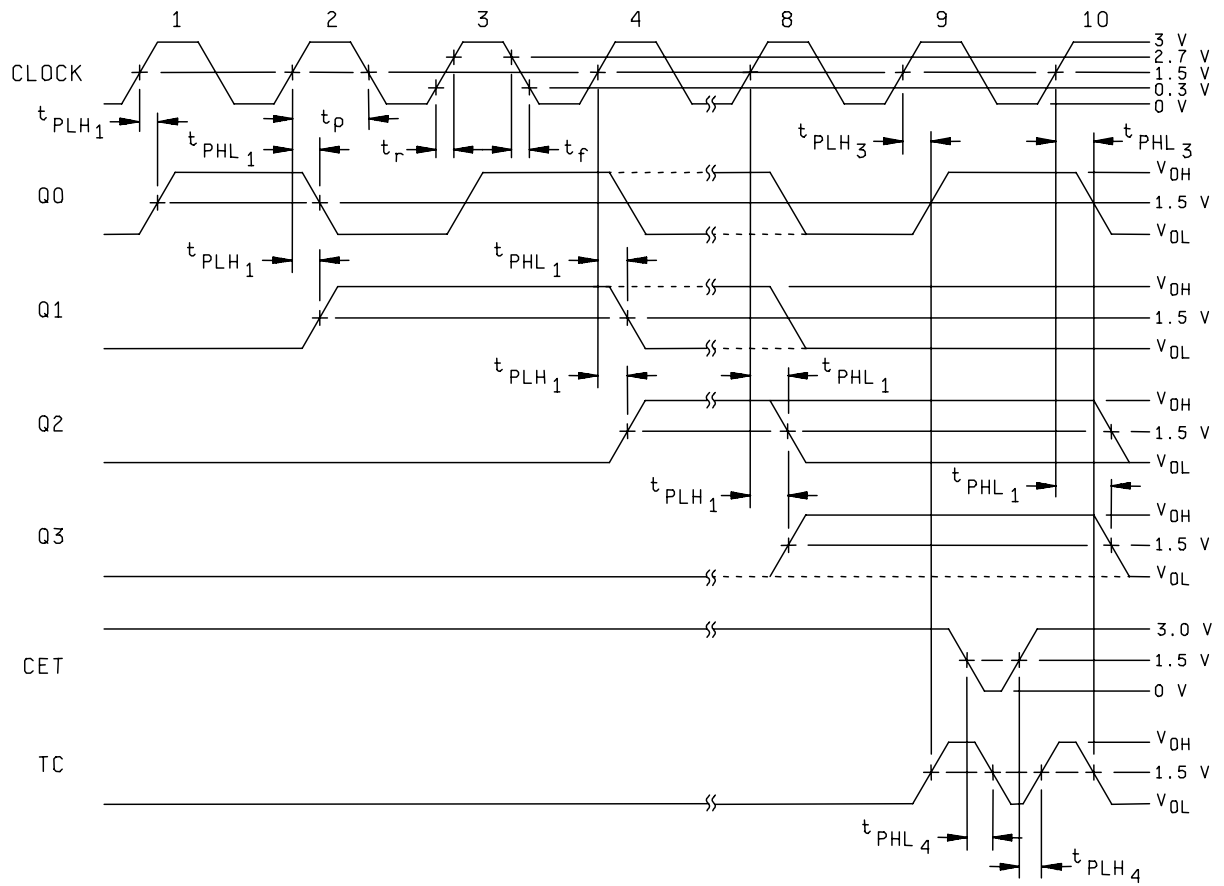
FIGURE 3. Truth tables.



NOTES:

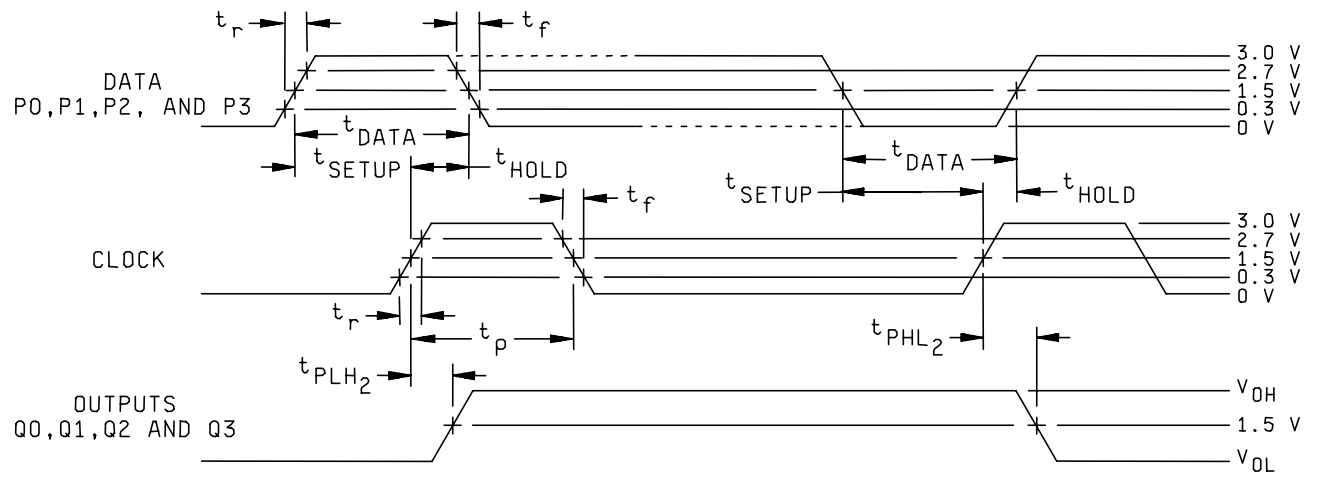
1. Pulse generator has the following characteristics:
 $t_1 = t_0 \leq 2.5 \text{ ns}$, $\text{PRR} \leq 1 \text{ MHz}$, $Z_{\text{OUT}} \cong 50\Omega$.
2. Inputs not under test are at ground or at 2.7 V as specified in table III.
3. $C_L = 50 \text{ pF} \pm 10\%$ including scope probe, wiring, and stray capacitance without package in test fixture.
4. $R_L = 499\Omega \pm 5\%$.
5. Voltage measurements are to be made with respect to network ground terminal.

FIGURE 4. Switching test circuit and waveform for all device types.



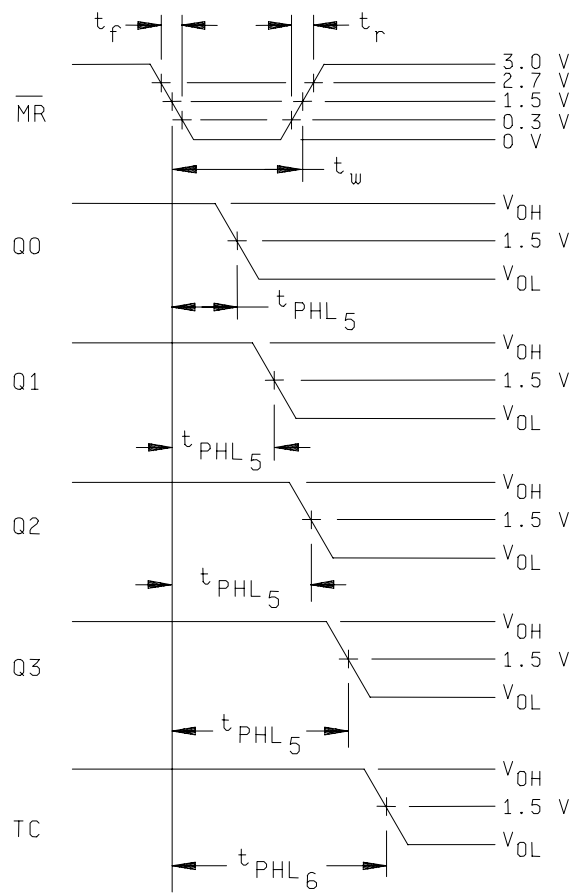
VOLTAGE WAVEFORMS

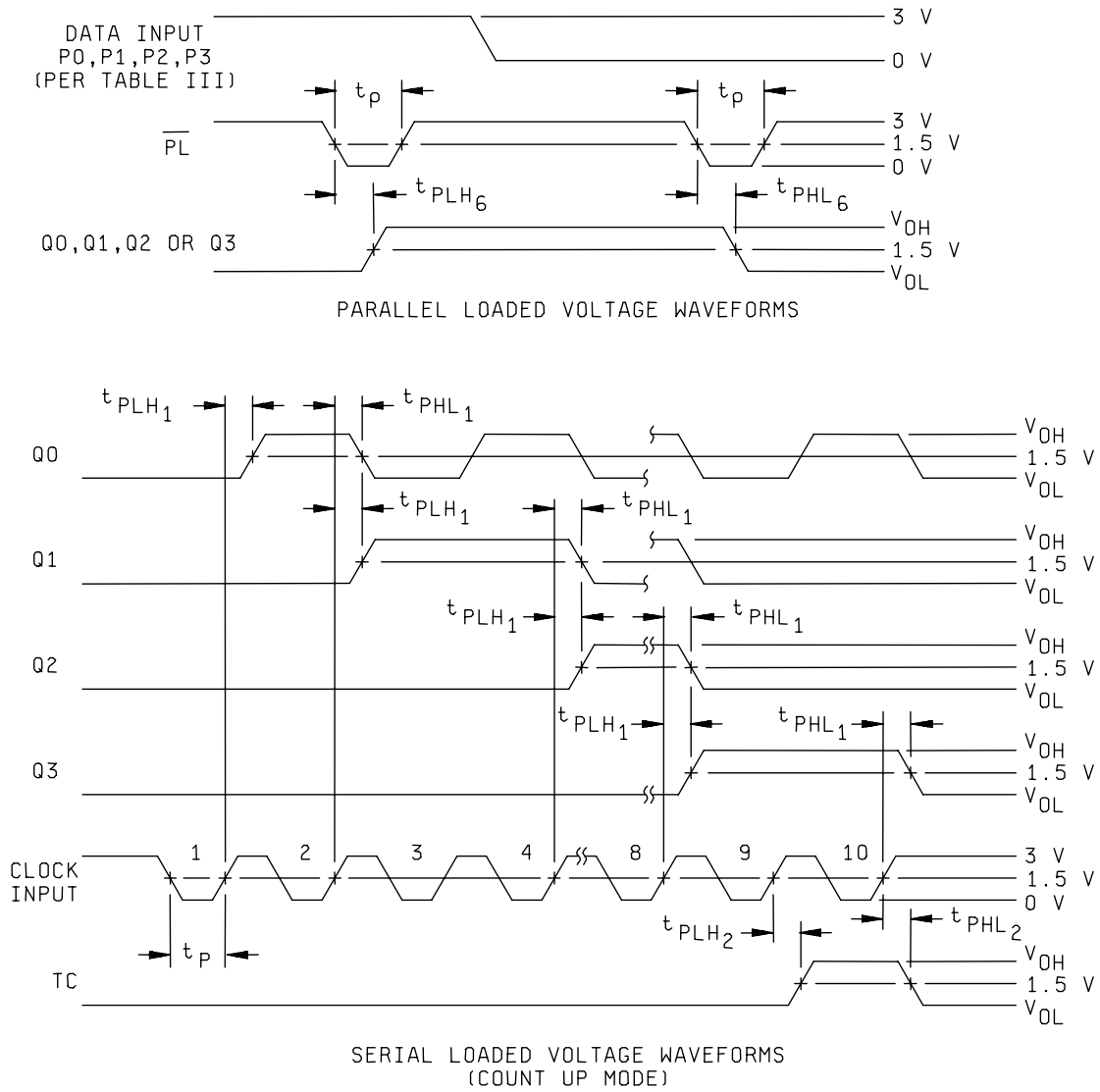
FIGURE 4. Switching time test circuit and waveforms for device types 01 and 02 - Continued.



NOTE: The data pulse generator has the following characteristics: $V_{gen} = 3.0\text{ V}$, $t_r \leq 2.5\text{ ns}$, $t_f \leq 2.5\text{ ns}$, $t_{DATA} = 7.0\text{ ns}$, $t_{SETUP} = 5.0\text{ ns}$, $t_{HOLD} = 2.0\text{ ns}$.

FIGURE 4. Switching time test circuit and waveforms for device types 01 and 02 - Continued.

FIGURE 4. Switching time test circuit and waveforms for device type 01 - Continued.

FIGURE 4. Switching time test circuit and waveforms for device type 03 - Continued.

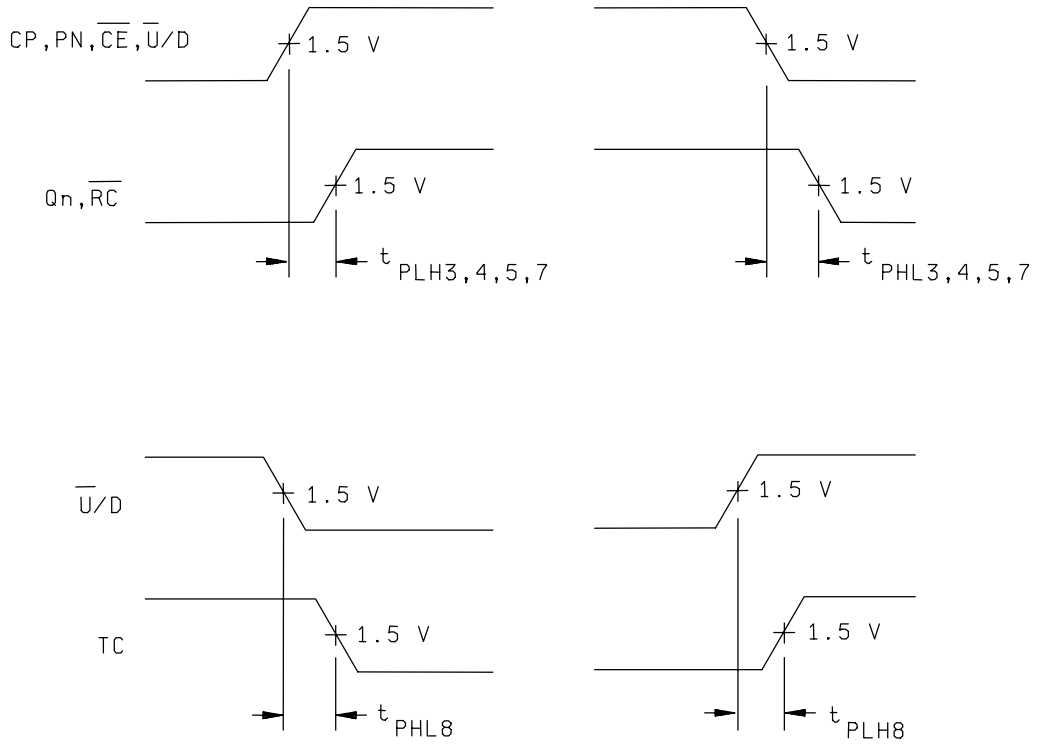
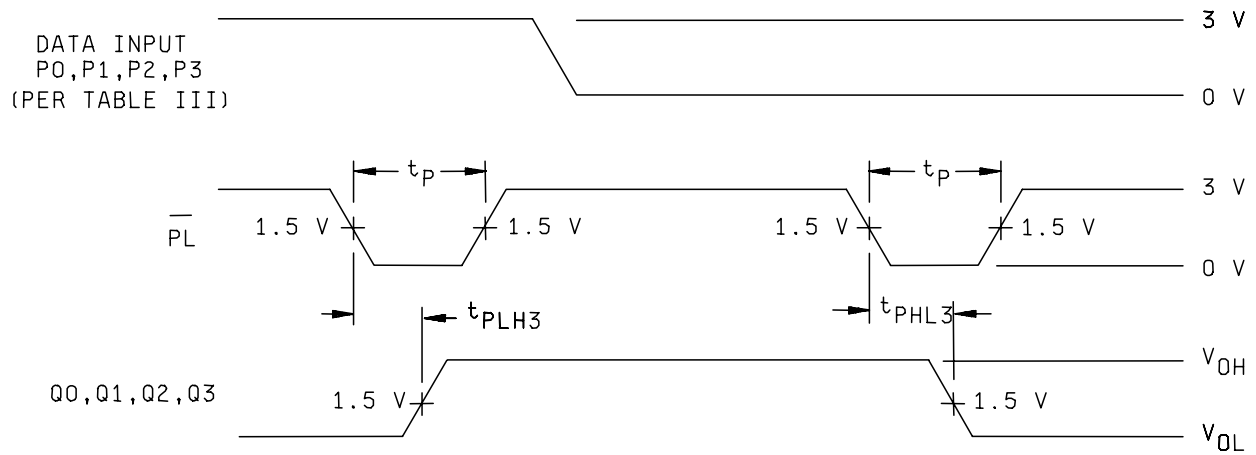
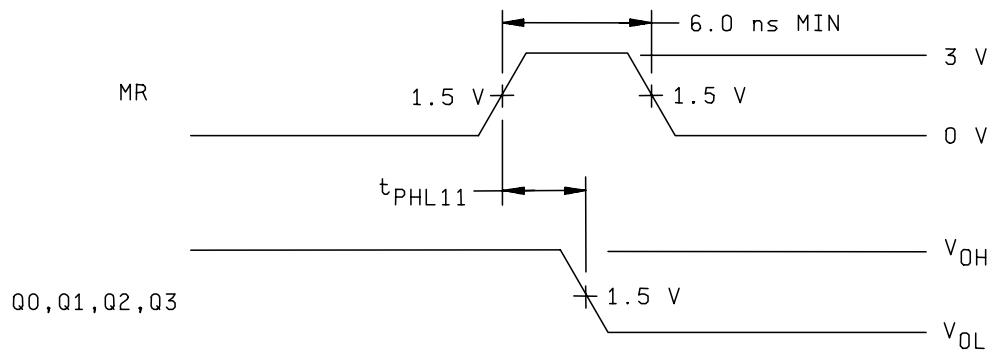


FIGURE 4. Switching time test circuit and waveforms for device type 03 - Continued.

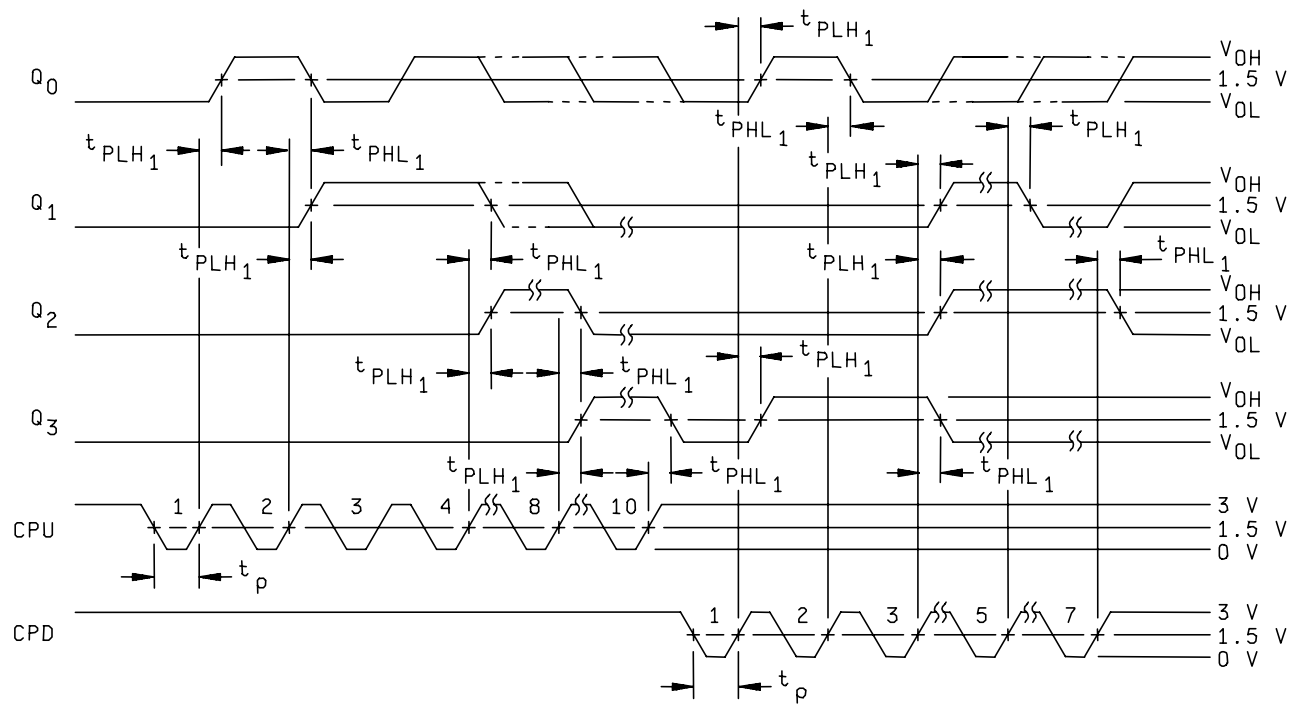


PARALLEL LOADED VOLTAGE WAVEFORMS



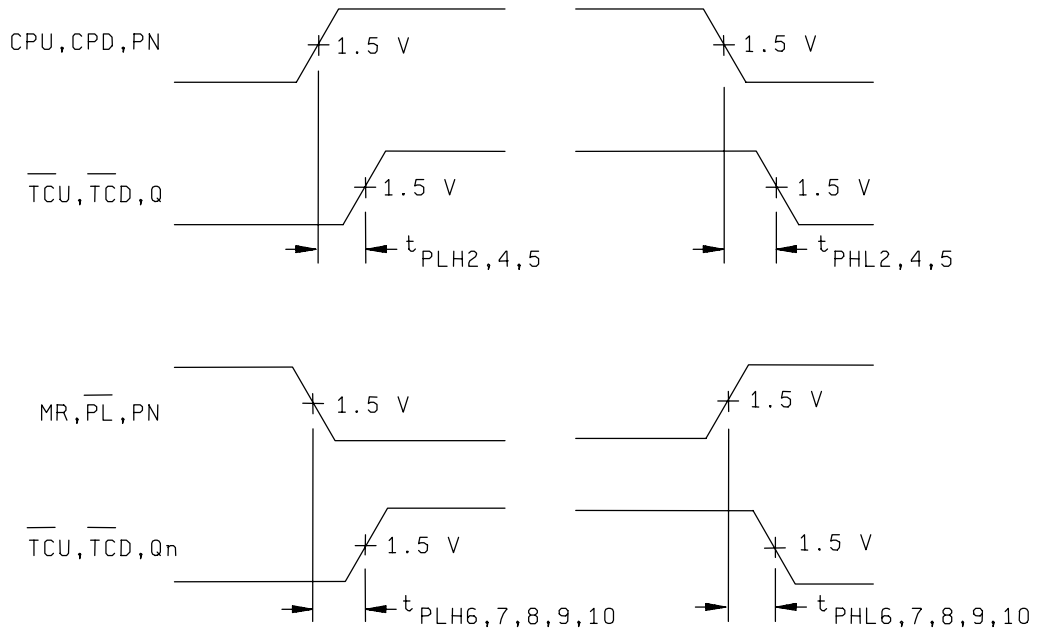
CLEAR SWITCHING VOLTAGE WAVEFORMS

FIGURE 4. Switching time test circuit and waveforms for device type 04 - Continued.



SERIAL LOADED VOLTAGE WAVEFORMS

FIGURE 4. Switching time test circuit and waveforms for device type 04 - Continued.

DEVICE TYPE 04FIGURE 4. Switching time test circuit and waveforms for device type 04 - Continued.

See footnotes at end of table.

[illegible]

TABLE III. Group A inspection for device type 01 - Continued.
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 Case 2 Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Limits		Unit
				MR	CP	P0	P1	P2	P3	CEP	GND	PE	CET	Q3	Q2	Q1	Q0	TC	V _{CC}	Min	Max	
1	I _{OS}	3011	47	2/	2/	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	GND	0.0 V	5.5 V			0.0 V	0.0 V		5.5 V	-60	-150	mA
			48	"	"	"	"	"	"	"	"	"	"			0.0 V			"	"	"	"
			49	"	"	"	"	"	"	"	"	"	"		0.0 V				"	"	"	"
			50	"	"	"	"	"	"	"	"	"	"	0.0 V					"	"	"	"
			51	"	"	"	"	"	"	"	"	"	"	"	"			0.0 V	"	"	"	"
2	CC	3005	52	5.5 V	5.5 V	0.0 V	0.0 V	0.0 V	0.0 V	"	"	5.5 V	"	"				0.0 V	"	"	"	55
3	Same tests, terminal conditions, and limits as subgroup 1, except T _C = +125°C and V _{CC} tests are omitted.																					
7	Functional test	3014	53	B	B	B	B	B	B	B	GND	A	B	L	L	L	L	L	B/	All outputs		
T _C = 25°C			54	A	B	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"	
			55	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			56	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			57	"	A	"	"	"	"	"	"	"	"	"	"	H	L	"	"	"	"	
			58	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			59	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			60	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			61	"	A	"	"	"	"	"	"	"	"	"	H	L	"	"	"	"	"	
			62	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			63	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			64	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			65	"	A	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"	"	
			66	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			67	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			68	"	A	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"	"	
			69	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			70	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			71	"	B	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	
			72	"	A	"	"	"	"	"	"	"	"	H	L	"	"	"	"	"	"	
			73	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			74	"	A	"	"	"	"	"	"	"	"	"	"	"	"	H	"	"	"	
			75	"	A	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"	
			76	"	B	"	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"	
			77	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			78	"	A	"	"	"	"	"	"	"	A	L	"	"	"	"	"	"	"	
			79	"	A	A	A	A	A	"	"	B	B	"	"	"	"	"	"	"	"	
			80	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			81	"	A	"	"	"	"	"	"	"	"	H	"	"	"	"	"	"	"	
			82	"	A	B	B	B	B	"	"	"	"	"	"	"	"	"	"	"	"	
			83	"	B	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"	
			84	"	B	A	"	"	"	"	"	"	B	"	"	"	"	"	"	"	"	
			85	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			86	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			87	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			88	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			89	"	A	"	"	"	"	"	"	"	"	H	"	"	"	"	"	"	"	
			90	"	B	"	"	"	"	"	"	"	A	"	"	"	"	"	"	"	"	
			91	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			92	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			93	B	"	B	A	B	"	"	"	"	"	"	"	"	"	"	"	"	"	
			94	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			95	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
			96	"	A	"	"	"	"	"	"	A	"	H	"	"	"	"	"	"	"	

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.
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 Case 2 1/J	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Limits		Unit							
																				Min	Max								
7 Tc = 25°C	Functional test J	3014	Test no.	MR	CP	P0	P1	P2	P3	CEP	GND	PE	CET	Q3	Q2	Q1	Q0	TC	Vcc	All outputs									
				97	A	B	"	B	A	A	GND	A	A	H	L	L	L	"	g/										
				98	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				99	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				100	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				101	B	B	B	A	"	"	B	"	"	"	"	"	"	"	"			"							
				102	A	B	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				103	"	A	"	"	"	"	"	"	"	H	H	"	"	"	"			"							
				104	"	A	"	"	"	"	"	A	"	"	"	"	"	"	"			"							
				105	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				106	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				107	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				108	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				109	B	B	A	"	"	"	"	B	"	"	"	"	"	"	"			"							
				110	A	B	"	"	"	"	"	"	"	"	"	"	"	"	"			"							
				8	Repeat subgroup 7 tests, at Tc = 125°C and Tc = -55°C.	3003 Imax 5/ 9/ Fig. 4	Test no.	MR	CP	P0	P1	P2	P3	CEP	GND	2.7 V	2.7 V					OUT	OUT		5.0 V	Q0	Q1	Q2	Q3
117	2.7 V	IN																											
118	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
119	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
120	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
121	7/	2/	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
122	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
123	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
124	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
125	"	2.7 V	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
126	"	2/	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
127	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
128	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
129	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
130	2.7 V	"	"					2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
131	"	"	"					"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
132	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
9 Tc = 25°C	PH1 PH1 PH1 PH2 PH2 PH2 PH3 PH3 PH4 PH4 PH5	3003 Imax 5/ 9/ Fig. 4	Test no.	MR	CP	P0	P1	P2	P3	CEP	GND	2.7 V	2.7 V			OUT	OUT		5.0 V	Q0	Q1	Q2	Q3	90			MHz		
				117	2.7 V	IN																							
				118	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				119	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				121	7/	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				122	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				123	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				124	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				125	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				126	"	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				127	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				128	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				129	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				130	2.7 V	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				131	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
132	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
10	PH2 PH2 PH2 PH3 PH3 PH4 PH4 PH5	3003 Imax 5/ 9/ Fig. 4	Test no.	MR	CP	P0	P1	P2	P3	CEP	GND	2.7 V	2.7 V			OUT	OUT		5.0 V	Q0	Q1	Q2	Q3	90			MHz		
				117	2.7 V	IN																							
				118	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				119	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				121	7/	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				122	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				123	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				124	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				125	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				126	"	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				127	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				128	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				129	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				130	2.7 V	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				131	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
132	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
11	PH4 PH4 PH5	3003 Imax 5/ 9/ Fig. 4	Test no.	MR	CP	P0	P1	P2	P3	CEP	GND	2.7 V	2.7 V			OUT	OUT		5.0 V	Q0	Q1	Q2	Q3	90			MHz		
				117	2.7 V	IN																							
				118	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				119	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				121	7/	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				122	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				123	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				124	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				125	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				126	"	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				127	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				128	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				129	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				130	2.7 V	"	"	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
				131	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
132	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
133	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
134	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
135	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
136	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
137	2/	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
138	2.7 V	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"				
139	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"							

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, Case 2 1/	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Limits		Measured terminal	Unit
				Test no.	SR	CP	P0	P1	P2	P3	CEP	GND	$\overline{PE}$	CET	Q3	Q2	Q1	Q0	TC	V _{CC}	Min	Max	
1 T _C = 25°C	V _{OH}	3006	1	5.5 V	SR	2/	2.0 V	2.0 V				GND	0.8 V				-1.0 mA			4.5 V	2.5		V
		"	2	"	"	"	5.5 V	5.5 V	2.0 V			"	"			-1.0 mA				"	"		"
		"	3	"	"	"	"	5.5 V	5.5 V	2.0 V		"	"		-1.0 mA					"	"		"
		"	4	"	"	"	"	5.5 V	5.5 V	5.5 V		"	"		-1.0 mA					"	"		"
		"	5	"	"	"	"	"	5.5 V	5.5 V		"	"	2.0 V				-1.0 mA		"	"		"
	OL	3007	6	"	"	"	"		0.8 V	0.8 V		"	"		20 mA					"	"	0.5	"
		"	7	"	"	"	"		5.5 V	5.5 V		"	"		20 mA					"	"		"
		"	8	"	"	"	0.8 V	0.8 V	5.5 V	5.5 V		"	"				20 mA			"	"		"
		"	9	"	"	"	0.8 V	5.5 V	5.5 V			"	"				20 mA			"	"		"
		"	10	"	"	"	5.5 V	5.5 V			5.5 V	"	"	0.8 V				20 mA		"	"		"
I	I _C		11	-18 mA	5.5 V	"	5.5 V	5.5 V		"	"	"	5.5 V	5.5 V						5.5 V		-1.2	"
			12	5.5 V	-18 mA	"	"	"	"	"	"	"	"	"						"	"		"
			13	"	5.5 V	-18 mA	"	"	"	"	"	"	"	"						"	"		"
			14	"	"	5.5 V	5.5 V	-18 mA	"	"	"	"	"	"						"	"		"
			15	"	"	"	5.5 V	5.5 V	-18 mA	"	"	"	"	"						"	"		"
	IH1	3010	16	"	"	"	"	5.5 V	5.5 V	-18 mA	"	"	"	"						"	"		"
		"	17	"	"	"	"	"	5.5 V	5.5 V	-18 mA	"	"	"						"	"		"
		"	18	"	"	"	"	"	"	"	"	"	-18 mA							"	"		"
		"	19	"	"	"	"	"	"	"	"	"	"	-18 mA						"	"		"
		"	20	2.7 V	"	"	"	"	"	"	"	"	"		-18 mA					"	"		"
I	IH2	"	21	"	2.7 V	"	"	"	"	"	"	"	"							"	20		μA
		"	22	"	"	"	2.7 V	"	"	"	"	"	5.5 V							"	"		"
		"	23	"	"	"	"	2.7 V	"	"	"	"	"							"	"		"
		"	24	"	"	"	"	2.7 V	2.7 V	2.7 V	"	"	"							"	"		"
		"	25	"	"	"	"	"	"	2.7 V	"	"	"							"	"		"
	IL1	3009	26	"	"	"	"	"	"	"	2.7 V	"	0.0 V	0.0 V						"	"		"
		"	27	"	"	"	"	"	"	"	0.0 V	"	2.7 V	0.0 V						"	"		"
		"	28	"	"	"	"	"	"	"	0.0 V	"	0.0 V	2.7 V						"	"		"
		"	29	7.0 V	"	"	"	"	"	"	"	"	"							"	100		"
		"	30	"	7.0 V	"	"	"	"	"	"	"	5.5 V							"	"		"
I	IL2	"	31	"	"	"	7.0 V	"	"	"	"	"	"							"	"		"
		"	32	"	"	"	"	7.0 V	"	"	"	"	"							"	"		"
		"	33	"	"	"	"	"	7.0 V	"	"	"	"							"	"		"
		"	34	"	"	"	"	"	"	7.0 V	"	"	"							"	"		"
		"	35	"	"	"	"	"	"	"	7.0 V	"	0.0 V	0.0 V						"	"		"
	IL2	"	36	"	"	"	"	"	"	"	0.0 V	"	7.0 V	0.0 V						"	"		"
		"	37	"	"	"	"	"	"	"	0.0 V	"	0.0 V	7.0 V						"	"		"
		"	38	"	0.5 V	"	"	"	"	"	"	"	"							"	3/		mA
		"	39	"	"	"	0.5 V	"	"	"	"	"	"							"	"		"
		"	40	"	"	"	"	0.5 V	"	"	"	"	"							"	"		"
I	IL2	"	41	"	"	"	"	"	0.5 V	"	"	"	"							"	"		"
		"	42	"	"	"	"	"	"	0.5 V	"	"	"							"	"		"
		"	43	5.5 V	"	"	"	"	"	"	0.5 V	"	5.5 V	5.5 V						"	"		"
		"	44	0.5 V	"	"	"	"	"	"	5.5 V	"	5.5 V	5.5 V						"	"		"
		"	45	5.5 V	"	"	"	"	"	"	"	"	0.5 V	5.5 V						"	"		"
		"	46 6/	5.5 V	"	"	"	"	"	"	"	"	5.5 V	0.5 V						"	"		"

See footnotes at end of table III.

TABLE III. Group A inspection for device type 02 - Continued.
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 Case 2 J	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit	
																					Min	Max		
1 Tc = 25°C	Ios	3011	47	5.5V	SR																			
			48	"	"			5.5V																
			49	"	"																			
			50	"	"																			
			51	"	"																			
2	Gc	3005	52	5.5V	5.5V	0.0V	0.0V	0.0V	5.5V	5.5V														
			53	5.5V	5.5V	0.0V	0.0V	0.0V	5.5V	5.5V														
3	Same tests, terminal conditions, and limits as subgroup 1, except Tc = +125°C and V1C tests are omitted.																							
7 Tc = 25°C	Functional test J	3014	53	B	B	B	B	B	B	B	GND	A	A	B	L	L	L	L	L	L	8/ "	All outputs		
			54	A	A	"	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"
			55	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			56	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			57	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			58	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			59	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			60	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			61	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			62	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			63	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			64	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			65	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			66	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			67	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			68	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			69	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			70	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			71	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			72	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			73	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			74	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			75	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			76	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			77	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			78	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			79	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			80	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			81	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			82	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			83	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			84	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			85	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			86	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			87	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			88	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			89	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			90	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			91	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			92	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			93	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			94	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			95	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			96	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			97	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			98	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			99	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

See footnotes at end of table III.

TABLE III. Group A inspection for device type 02 - Continued.
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 Case 2 J	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal			Limits		Unit				
																				SR	CP	P0	P1	P2		P3	CEP	GND	PE
7 T _C = 25°C	Functional test J	3014	100	A	A	B	A	B	A	A	GND	B	A	L	L	L	L	L	L	8/	All outputs								
			101	"	B	"	"	"	"	"	"	"	"	"	"	L	"	"	"	"					"	"	"	"	
			102	"	A	"	"	"	"	"	"	"	"	"	"	H	"	"	"	"					"	"	"	"	"
			103	"	A	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"					"	"	"	"	"
			104	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			105	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			106	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			107	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			108	"	B	"	"	"	"	"	"	"	"	B	"	"	"	"	"	"					"	"	"	"	"
			109	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			110	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			111	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			112	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			113	"	A	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"					"	"	"	"	"
			114	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			115	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			116	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			117	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			118	"	B	"	"	"	"	"	"	"	"	B	"	"	"	"	"	"					"	"	"	"	"
			119	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			120	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			121	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			122	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			123	"	A	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"					"	"	"	"	"
			124	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			125	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			126	"	B	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
			127	"	A	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"					"	"	"	"	"
8 9 T _C = 25°C	Repeat subgroup 7 tests, at T _C = +125°C and T _C = -55°C. f _{MAX} 3003 Fig. 4 5/ J	3003 Fig. 4	128	2.7 V	IN					2.7 V	GND	2.7 V	2.7 V				OUT		5.0 V	Q0	Q1	90		MHz					
			129	"	"	"	"	"	"	"	"	"	"	"	"	OUT					"	"	"	"	"				
			130	"	"	"	"	"	"	"	"	"	"	"	"	OUT					"	"	"	"	"				
			131	"	"	"	"	"	"	"	"	"	"	"	"	OUT					"	"	"	"	"				
			PH1	"	132 J/	2/	"	"	"	"	"	"	"	"	"	"	OUT		OUT		"	CP to Q0	Q3	3.5	7.5	ns			
			133	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q1	CP to Q2	"	"	"			
			134	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q3	CP to Q2	"	"	"			
			135	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q1	CP to Q3	"	"	"			
			PH1	"	136	2.7 V	"	"	"	"	"	"	"	"	"	"	OUT		OUT		"	CP to Q0	CP to Q1	10.0	"	"			
			137	"	2/	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q2	CP to Q3	"	"	"			
			138	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q0	CP to Q1	"	"	"			
			139	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q2	CP to Q3	"	"	"			
			PH2	"	140	2.7 V	"	"	2.7 V	"	"	"	"	0.0 V	0.0 V	"	OUT		OUT		"	CP to Q0	CP to Q3	8.5	"	"			
			141	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q1	CP to Q2	"	"	"			
			142	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q0	CP to Q1	"	"	"			
			143	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q2	CP to Q3	"	"	"			
			PH2	"	144	"	"	"	"	"	"	"	"	"	"	"	OUT		OUT		"	CP to Q0	CP to Q1	"	"	"			
			145	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q2	CP to Q3	"	"	"			
			146	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q0	CP to Q1	"	"	"			
			147	"	"	"	"	"	"	"	"	"	"	"	"	"	OUT				"	CP to Q2	CP to Q3	"	"	"			
			148	"	"	"	"	"	"	"	"	"	"	2/	2.7 V	2.7 V				OUT		"	CP to TC	4.5	14.0	"			
			PH3	"	149	"	"	"	"	"	"	"	"	"	"	"					"	"	CP to TC	4.5	14.0	"			
			PH4	"	150	"	"	"	"	"	"	"	"	2/	2.7 V	0.0 V	IN				"	"	CET to TC	2.5	7.5	"			
			PH4	"	151	"	"	"	"	"	"	"	"	2/	2.7 V	0.0 V	IN				"	"	CET to TC	2.5	7.5	"			
			10	Same tests and terminal conditions as for subgroup 9, except T _C = +125°C and use limits from table I.																									
			11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55°C.																									

See footnotes at end of table III.

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, J/	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit			
				2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Min		Max					
1 Tc = 25°C	VOH	3006	Case 2	P1	Q1	Q0	CE	U/D	Q2	Q3	GND	P3	P2	PL	TC	RC	CP	P0	Vcc	Q1	2.5		V			
				2	-1.0 mA	-1.0 mA	2.0 V				GND			0.8 V						2.0 V	4.5 V	Q0			"	
				3			"		-1.0 mA		"	2.0 V									"	Q2			"	
				4			"				-1.0 mA	"	"									"	Q3			"
				5	0.8 V			0.8 V					"	"	0.8 V	"	-1.0 mA		2.0 V	2.0 V	"	TC				"
				6	0.8 V			0.8 V					"	"	"	0.8 V	"		-1.0 mA	2.0 V	"	RC				"
	OL	3007		7	0.8 V	20 mA	2.0 V								"					"	Q1		0.5	"		
				8			"					"				"				0.8 V	"	Q0			"	
				9			"		20 mA		"		0.8 V	"			"				"	Q2			"	
				10			"					"	0.8 V	"			"				"	Q3			"	
				11	0.8 V		"	2.0 V			"	2.0 V	0.8 V	"	20 mA			0.8 V	0.8 V	2.0 V	"	TC			"	
				12	0.8 V		0.8 V	0.8 V			"	2.0 V	0.8 V	"					20 mA	0.8 V	2.0 V	"	RC			"
IC	3022		13	-18 mA		-18 mA													"	P1		-1.2	"			
			14								"									"	CE			"		
			15					-18 mA				"									U/D			"		
			16								"			-18 mA							P3			"		
			17								"				-18 mA						P2			"		
			18								"						-18 mA				PL			"		
2	IH1	3010		19													-18 mA		"	CP			"			
				20								"								-18 mA	"	P0			"	
				21	2.7 V											5.5 V					5.5 V	P1	20		µA	
				22				2.7 V					"									CE			"	
				23					2.7 V				"									U/D			"	
				24									"		2.7 V		5.5 V					P3			"	
	IH2			25										2.7 V	5.5 V					"	P2			"		
				26									"			2.7 V					PL			"		
				27									"						2.7 V		"	CP			"	
				28									"			5.5 V				2.7 V	"	P0			"	
				29	7.0 V								"			5.5 V					"	P1	100		"	
				30			7.0 V						"									CE			"	
3	IL1	3009		31				7.0 V											"	U/D			"			
				32							"	7.0 V		5.5 V							"	P3			"	
				33							"		7.0 V	5.5 V							"	P2			"	
				34							"			7.0 V							"	PL			"	
				35												5.5 V			7.0 V		"	CP			"	
				36												5.5 V				7.0 V	"	P0			"	
	IL3			37	0.5 V									0.0 V						"	P1	3/		"		
				38																	U/D			"		
				39								"	0.5 V		0.0 V						"	P3			"	
				40								"		0.5 V	0.0 V						"	P2			"	
				41								"			0.5 V						"	PL			"	
				42								"							0.5 V		"	CP			"	
43								"				0.0 V				0.5 V	"	P0			"					
44				0.5 V									0.0 V					"	CE			mA				

See footnotes at end of table III.

TABLE III. Group A inspection for device type 03 - Continued.
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
			Case 2 J _I	P1	Q1	Q0	CE	U/D	Q2	Q3	GND	P3	P2	PL	TC	RC	CP	P0	V _{cc}		Min	Max	
1 T _C = 25°C	I _{OS}	3011	45	5.5 V	0.0 V		5.5 V				GND			0.0 V				5.5 V	5.5 V	Q1	-60	-150	mA
		"	46			0.0 V					GND									Q0	"	"	"
		"	47							0.0 V		"	5.5 V							Q2	"	"	"
		"	48								"	5.5 V								Q3	"	"	"
		"	49	0.0 V			0.0 V	0.0 V			"	"	0.0 V		0.0 V	0.0 V		5.5 V	5.5 V	TC	"	"	"
		"	50	0.0 V				0.0 V	0.0 V		"	"	"	0.0 V				0.0 V	5.5 V	5.5 V	RC	"	"
2	G _C	3005	51	0.0 V		0.0 V	0.0 V		"	"	0.0 V	0.0 V	0.0 V	0.0 V			0.0 V	0.0 V	"	V _{CC}		55	"
		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 T _C = 25°C	Functional test J	3014	52	B	L	L	B	B	L	L	GND	B	B	B	L	H	A	B	B	8/	All		
			53	A	H	H			H	H		A	A	A	B	H		A	A			outputs	
			54	A	H	H			H	H		A	A	A	A		H		A				
			55	B	L	L			L	L		B	B	B	L		L		B	B			
			56	B	"	"			"	"		B	B	A				"	B	B			
			57	A	"	H			"	"		A	A				"	"	2/	A			
			58	"	H	L			"	"		"	"	"			"	"	"	"			
			59	"	H	H			"	"		"	"	"			"	"	"	"			
			60	"	L	L			H	"		"	"	"			"	"	"	"			
			61	"	L	H			"	"		"	"	"			"	"	"	"			
			62	"	H	L			"	"		"	"	"			"	"	"	"			
			63	"	H	H			"	"		"	"	"			"	"	"	"			
			64	"	L	L			L	H		"	"	"			"	"	"	"			
			65	"	"	H			"	"		"	"	"			"	"	"	"			
			66	"	"	"			"	"		"	"	"			"	"	"	"			
			67	"	"	L			"	"		"	"	"			"	"	"	"			
			68	"	"	H			"	"		"	"	"			"	"	"	"			
			69	"	"	H			"	"		"	"	"			"	"	"	"			
			70	"	H	L			"	"		"	"	"			"	"	"	"			
			71	"	L	H			"	"		"	"	"			"	"	"	"			
			72	"	"	L			"	"		"	"	"			"	"	"	"			
			73	"	"	"			"	"		"	"	"			"	"	"	"			
			74	"	"	"			"	"		"	"	"			"	"	"	"			
			75	"	"	"			"	"		"	"	"			"	"	"	"			
			76	"	"	"			"	"		"	"	"			"	"	"	"			
			77	"	"	"			"	"		"	"	"			"	"	"	"			
			78	"	"	L			"	"		"	"	"			"	"	"	"			
			79	"	H	H			"	"		"	"	"			"	"	"	"			
			80	"	H	L			"	"		"	"	"			"	"	"	"			
			81	"	"	"			"	"		"	"	"			"	"	"	"			
			82	"	L	L			"	"		"	"	"			"	"	"	"			
			83	"	H	H			"	"		"	"	"			"	"	"	"			
			84	"	H	L			"	"		"	"	"			"	"	"	"			
			85	B	L	"			"	"		"	"	"			"	"	"	"			
			86	B	L	"			"	"		"	"	"			"	"	"	"			
			8	Repeat subgroup 7 at T _C = +125°C and T _C = -55°C.																			

See footnotes at end of table III.

TABLE III. Group A inspection for device type 03 - Continued.
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			
				Case 2 J	Test no.	P1	Q1	Q0	CE	U/D	Q2	Q3	GND	P3	P2	PL	TC	RC	CP		P0	V _{cc}		Min	Max	
9 T _C = 25°C	f _{MAX} 5/	3003 Fig. 4	87			OUT	GND							2.7 V			IN		5.0 V	Q0	90		MHz			
			88			OUT															Q1			"		
			89						OUT												Q2			"		
			90							OUT											Q3			"		
	PLH1			91	0.0 V		OUT					0.0 V	0.0 V	2/				0.0 V		CP to Q0	3.0	7.5	ns			
				92	0.0 V															2.7 V		CP to Q1			"	
				93	2.7 V						OUT											CP to Q2			"	
				94	2.7 V							OUT			2.7 V							CP to Q3			"	
	PHL1			95	0.0 V		OUT						0.0 V							CP to Q0	5.0	11.0	"			
				96	2.7 V										0.0 V							CP to Q1			"	
				97	2.7 V						OUT				2.7 V							CP to Q2			"	
				98	0.0 V							OUT		2.7 V	0.0 V							CP to Q3			"	
	PHL2			99									0.0 V			OUT			0.0 V		CP to TC	6.0	13.0	"		
				100													OUT			2.7 V		CP to TC	5.0	11.0	"	
				101														OUT				CP to RC	3.0	7.5	"	
				102															OUT			CP to RC		7.0	"	
	PLH4			103	2.7 V		OUT	2.7 V	2.7 V			2.7 V	2.7 V	0.0 V				2.7 V	IN		P0 to Q0		7.0	"		
				104	IN																	P1 to Q1			"	
				105	2.7 V						OUT				IN							P2 to Q2			"	
				106								OUT			IN	2.7 V						P3 to Q3			"	
PHL4			107			OUT					2.7 V							IN		P0 to Q0	6.0	13.0	"			
			108	IN															2.7 V		P1 to Q1			"		
			109	2.7 V						OUT				IN							P2 to Q2			"		
			110	2.7 V										2.7 V							P3 to Q3			"		
PLH5			111	0.0 V			IN	0.0 V			2.7 V	0.0 V					OUT	0.0 V		CE to RC	3.0	7.0	"			
			112	0.0 V			IN	0.0 V					0.0 V				OUT	0.0 V			CE to RC	3.0	7.0	"		
			113	2.7 V		OUT	2.7 V	2.7 V					2.7 V	IN				2.7 V			PL to Q0	5.0	11.0	"		
			114																	2.7 V		PL to Q1			"	
PHL6			115																	PL to Q2			"			
			116								OUT										PL to Q3			"		
			117																		PL to Q0	5.5	12.0	"		
			118	0.0 V		OUT														2.7 V		PL to Q1			"	
PLH7			119	2.7 V									0.0 V							PL to Q2			"			
			120	2.7 V						OUT			0.0 V	2.7 V							PL to Q3			"		
			121	0.0 V			0.0 V	IN					2.7 V	0.0 V	2/		OUT				U/D to RC	7.0	18.0	"		
			122										2.7 V				OUT				U/D to RC	5.5	12.0	"		
PHL8			123								0.0 V				OUT			0.0 V		U/D to TC	4.0	10.0	"			
			124										0.0 V				OUT		0.0 V		U/D to TC	4.0	10.0	"		
10	Same tests and terminal conditions as for subgroup 9, except T _C = +125°C and use limits from table I.																									
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55°C.																									

See footnotes at end of table III.

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 E, F	Cases 1 through 16																Measured terminal	Limits		Unit
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Min	Max	
1 Tc = 25°C	V _{OH}	3006	Case 2	P1	Q1	Q0	CPD	CPU	Q2	Q3	GND	P3	P2	PL	TCU	TCB	MR	P0	V _{cc}	2.5		V	
			Test no.	2.0 V	-1.0 mA						GND				0.8 V			0.0 V	2.0 V	4.5 V			
			1																				
			2																				
			3																				
			4																				
	OL		5	0.0 V			2.0 V				-1.0 mA			0.0 V	0.0 V	0.0 V	-1.0 mA	0.8 V	5.5 V				
			6	0.0 V			5.5 V							0.0 V	0.0 V	0.0 V		0.8 V	0.0 V				
			7	0.8 V	20 mA										0.8 V			0.0 V	0.8 V		0.5		
			8																				
			9											0.8 V									
			10	0.0 V				0.8 V		20 mA				0.8 V	0.0 V								
IC	3007	11	0.0 V				5.5 V	0.8 V				5.5 V	0.0 V		20 mA			5.5 V					
		12	0.0 V				5.5 V						0.0 V	0.0 V		20 mA		0.0 V					
		13	-18 mA																				
		14				-18 mA																	
		15					-18 mA																
		16																					
		17																					
		18																					
		19																					
		20																					
		21	2.7 V															-18 mA	5.5 V	20		μA	
		22																					
IH2	3010	23																					
		24																					
		25																					
		26																					
		27																					
		28																					
		29	7.0 V															2.7 V					
		30					7.0 V																
		31																					
		32																					
		33																					
		34																					
IL1	3009	35																					
		36																					
		37	0.5 V															7.0 V					
		38																					
		39																					
		40																					
		41																					
		42																					
		43					0.5 V											0.5 V					
		44					5.5 V																
		IL3																					

See footnotes at end of table III.

TABLE III. Group A inspection for device type 04 - Continued.
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
			Case 2	P1	Q1	Q0	CPD	CPU	Q2	Q3	GND	P3	P2	PL	TCU	TCO	MR	P0	V _{CC}		Min	Max
1	I_{OS}	3011	45	5.5 V	0.0 V									0.0 V			0.0 V	5.5 V	5.5 V	Q1	-60	-150
		"	46	"	"	0.0 V								"			"	5.5 V	"	Q0	"	"
		"	47	"	"				0.0 V				5.5 V	"			"	"	"	Q2	"	"
		"	48	"	"			5.5 V				5.5 V	"	"			"	5.5 V	"	Q3	"	"
		"	49	"	"					0.0 V			"	"	0.0 V		"	"	"	TQJ	"	"
		"	50	0.0 V			5.5 V				"	0.0 V	0.0 V	"		0.0 V	"	0.0 V	"	TQD	"	"
2	V_{CC}	3005	51	5.5 V			5.5 V	5.5 V			"	5.5 V	5.5 V	"			"	5.5 V	"	V _{CC}		55
3	Same tests, terminal conditions, and limits as subgroup 1, except $T_C = +125^\circ\text{C}$ and V_{IC} tests are omitted.																					
7	Functional test	3014	52	A	L	L	A	A	L	L	GND	A	A	A	H	H	A	A	B/	All outputs		
		"	53	"	H	H	"	"	H	H	"	"	"	B	"	"	B	"	"	"		
		"	54	"	"	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"		
		"	55	B	"	"	"	"	"	"	"	B	B	A	"	"	"	B	"	"		
		"	56	"	L	L	"	"	L	L	"	"	"	B	"	"	"	"	"	"		
		"	57	"	"	"	"	"	"	"	"	"	"	A	"	"	"	"	"	"		
		"	58	"	"	"	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	59	"	"	H	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	60	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	61	"	H	L	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	62	"	L	L	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	63	"	"	H	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	64	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	65	"	L	L	"	A	H	"	"	"	"	"	"	"	"	"	"	"		
		"	66	"	"	L	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	67	"	"	H	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	68	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	69	"	H	L	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	70	"	"	L	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	71	"	"	H	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	72	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	73	"	L	L	"	A	L	H	"	"	"	"	"	"	"	"	"	"		
		"	74	"	"	L	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	75	"	"	H	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	76	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	77	"	"	L	"	A	"	L	"	"	"	"	"	"	"	"	"	"		
		"	78	A	L	"	"	"	"	L	"	A	"	"	"	"	"	"	"	"		
		"	79	"	H	"	"	"	"	H	"	"	"	B	"	"	"	"	"	"		
		"	80	"	"	"	"	B	"	"	"	"	"	A	"	"	"	"	"	"		
		"	81	"	"	H	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	82	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	83	"	"	L	"	A	H	L	"	"	"	"	"	"	"	"	"	"		
		"	84	B	"	"	"	"	"	L	"	"	A	"	"	"	"	"	"	"		
		"	85	"	L	"	"	"	"	H	"	"	"	B	"	"	"	"	"	"		
		"	86	"	"	"	"	B	"	"	"	"	"	A	"	"	"	"	"	"		
		"	87	"	"	"	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	88	"	"	H	"	B	"	"	"	"	"	"	"	"	"	"	"	"		
		"	89	"	"	L	"	A	"	"	"	"	"	"	"	"	"	"	"	"		
		"	90	A	"	"	"	"	"	L	"	"	"	"	"	"	"	"	"	"		
		"	91	"	H	"	"	"	"	H	"	"	"	B	"	"	"	"	"	"		
		"	92	"	"	"	"	B	"	"	"	"	"	A	"	"	"	"	"	"		

See footnotes at end of table III.

[illegible]

See footnotes at end of table III.

TABLE III. Group A inspection for device type 04 - Continued.
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
				Test no.	Q1	Q0	CPD	CPU	Q2	Q3	GND	P3	P2	PL	TCU	TCO	MR	P0	V _{cc}		Min	Max	
9 T _C = 25°C	t _{PH1}	3003 Fig. 4	147	0.0 V		OUT	2.7 V	IN			GND	0.0 V	0.0 V	2/			0.0 V	2.7 V	5.0 V	CPU to Q0	5.5	12.5	ns
			148	2.7 V	OUT								0.0 V							CPU to Q1			"
			149	2.7 V					OUT				2.7 V							CPU to Q2			"
			150	2.7 V						OUT		2.7 V	2.7 V							CPU to Q3			"
			151	0.0 V		OUT	IN	2.7 V				0.0 V	0.0 V							CPD to Q0			"
			152	2.7 V	OUT								0.0 V					0.0 V		CPD to Q1			"
			153	0.0 V					OUT				2.7 V							CPD to Q2			"
			154							OUT		2.7 V	0.0 V		OUT					CPD to Q3			"
			155				2.7 V	IN				2.7 V								CPU to TCU	4.0	9.0	"
			156				2.7 V	IN				2.7 V			OUT			2.7 V		CPU to TCU	3.5	8.0	"
			157	0.0 V		OUT	0.0 V	0.0 V				0.0 V	0.0 V	IN			2/	2.7 V		PL to Q0	5.0	11.0	"
			158	2.7 V	OUT								0.0 V					0.0 V		PL to Q1			"
			159	0.0 V					OUT				2.7 V							PL to Q2			"
			160							OUT		2.7 V	0.0 V							PL to Q3			"
			161			OUT						0.0 V					0.0 V			PL to Q0	5.5	13.0	"
			162		OUT															PL to Q1			"
			163						OUT											PL to Q2			"
			164							OUT										PL to Q3			"
			165				IN	2.7 V						2/		OUT				CPD to TCU	4.0	9.0	"
10 T _C = 25°C	t _{PH4}	3003 Fig. 4	166				IN	2.7 V						2/		OUT		2.7 V		CPD to TCU	3.5	8.0	"
			167			OUT	0.0 V	0.0 V						0.0 V				IN		P0 to Q0	3.0	7.0	"
			168	IN	OUT															P1 to Q1			"
			169						OUT				IN							P2 to Q2			"
			170							OUT										P3 to Q3			"
			171			OUT												IN		P0 to Q0	6.0	14.5	"
			172	IN	OUT															P1 to Q1			"
			173						OUT				IN							P2 to Q2			"
			174							OUT										P3 to Q3			"
			175	0.0 V			2.7 V					2.7 V	0.0 V	2/	OUT		IN	2.7 V		MR to TCU		13.5	"
			176				0.0 V	2.7 V						2/		OUT	IN	2.7 V		MR to TCU	6.0	14.5	"
			177				2.7 V	0.0 V						IN	OUT		0.0 V	0.0 V		PL to TCU	7.0	15.5	"
			178				0.0 V	2.7 V								OUT	2/	2.7 V		PL to TCU		15.5	"
			179				2.7 V	0.0 V							OUT		2/	2.7 V		PL to TCU		14.5	"
			180				0.0 V	2.7 V				0.0 V				OUT	0.0 V	0.0 V		PL to TCU		14.5	"

See footnotes at end of table III.

TABLE III. Group A inspection for device type 04 - Continued.
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 Case 2 1/ Test no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Measured terminal	Limits		Unit		
				P1	Q1	Q0	CPD	CPU	Q2	Q3	GND	P3	P2	PL	TCU	TCd	MR	P0	V _{CC}		Min	Max			
9	t _{PUH}	3003 Fig. 4	181	0.0 V			2.7 V	0.0 V				GND	2.7 V	0.0 V	0.0 V	OUT		0.0 V	IN	5.0 V	P0 to TCU	6.0	14.5	ns	
			182	"			"	"				"	"	"	"	"	"	2.7 V	"	"	P3 to TCU	6.0	14.5	"	
			183	"			"	"				2.7 V	"	"	"	"	"	"	IN	"	"	P0 to TCU	5.5	14.0	"
			184	"			"	"				IN	"	"	"	"	"	"	2.7 V	"	"	P3 to TCU	5.5	14.0	"
t	PLH10		185	"			0.0 V	2.7 V			"	0.0 V	"	"		OUT	"	IN	"	"	P0 to TCd	6.0	14.5	"	
			186	IN			"	"				"	"	"	"	"	"	0.0 V	"	"	P1 to TCd	"	"	"	
			187	0.0 V			"	"				"	IN	0.0 V	"	"	"	"	"	"	P2 to TCd	"	"	"	
			188	"			"	"				IN	0.0 V	"	"	"	"	"	"	"	P3 to TCd	"	"	"	
t	PHL10		189	"			"	"			"	0.0 V	"	"	"	"	"	IN	"	"	P0 to TCd	5.5	14.0	"	
			190	IN			"	"				"	"	"	"	"	"	0.0 V	"	"	P1 to TCd	"	"	"	
			191	0.0 V			"	"				"	IN	"	"	"	"	"	"	"	P2 to TCd	"	"	"	
			192	"			"	"				IN	0.0 V	"	"	"	"	"	"	"	P3 to TCd	"	"	"	
t	PHL11		193	"			OUT				"	0.0 V	"	2/		IN	2.7 V	"	"	MR to Q0	5.5	14.5	"		
			194	2.7 V	OUT		"	"			"	"	"	"	"	"	"	0.0 V	"	"	MR to Q1	"	"	"	
			195	0.0 V			"	"		OUT		"	2.7 V	"	"	"	"	"	"	"	MR to Q2	"	"	"	
			196	0.0 V			"	"			OUT		2.7 V	0.0 V	"	"	"	"	"	"	MR to Q3	"	"	"	
10	Same tests and terminal conditions as for subgroup 9, except T _C = +125°C and use limits from table I.																								
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55°C.																								

1/ For case 2, pins not referenced are NC.
2/ Apply one pulse prior to measurement.



3/

Parameter	Device	Circuit	
		A	B
I _{IL1}	All	-0.25/-0.6	-0.03/-0.6
I _{IL2}	01, 02	-0.50/-1.2	-0.50/-1.2
I _{IL3}	03, 04	-0.75/-1.8	-0.75/-1.8

4/ H = 2.5 V, L = 0.5 V, A = 3.0 V minimum; B = 0.0 V or GND.
5/ The f_{MAX} minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.
6/ For types 01 and 02, set outputs to 9th count (P0 = 1, P3 = 1, P1 and P2 = 0).
7/ For types 01 and 02, increment such that measurement of the specified output can occur on the next applied CP.
8/ Perform entire functional testing at V_{CC} = 4.5 V and entire functional testing again at V_{CC} = 5.5 V.
9/ f_{MAX} shall be measured only under the conditions of initial qualification and after process or design changes which may affect this parameter. For all other conditions, f_{MAX} shall be guaranteed, if not tested, to the limits specified in table III, herein.

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
 I_{IN} Current flowing into an input terminal
 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	54F160A
02	54F162A
03	54F190
04	54F192

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	A	B	C
	National Semiconductor/ Fairchild	Motorola Inc.	Signetics Corp.
01	X		
02	X		
03			
04	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 5962-2027)

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.