INCH-POUND

MIL-M-38510/21F
15 February 2006
SUPERSEDING
MIL-M-38510/21E
7 July 2005

MILITARY SPECIFICATION

# MICROCIRCUITS, DIGITAL, BIPOLAR, TTL, LOW POWER, FLIP-FLOPS, MONOLITHIC SILICON

Inactive for new design after 7 September 1995.

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, TTL, low power, bistable logic 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.4).

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

1.2.1 Device types. The device types are as follows:

| Device type | Circuit |
|---|---|
| 01 | R-S master slave flip-flop |
| 02 | J-K master slave flip-flop |
| 03 | Dual J-K master slave flip-flop |
| 04 | Dual J-K master slave flip-flop |
| 05 | Dual D-type edge triggered flip-flop |

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

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

| Outline letter | Descriptive designator | Terminals | Package style |
|---|---|---|---|
| A | GDFP5-F14 or CDFP6-F14 | 14 | Flat pack |
| B | GDFP4-F14 | 14 | Flat pack |
| C | GDIP1-T14 or CDIP2-T14 | 14 | Dual-in-line |
| D | GDFP1-F14 or CDFP2-F14 | 14 | Flat pack |

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@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

1.3 Absolute maximum ratings.

| | |
|---|---|
| Supply voltage range | 0 V dc to 8.0 V dc |
| Input voltage range | 0 V dc to 6.0 V dc |
| Storage temperature range | -65°C to +150°C |
| Maximum power dissipation in accordance with flip-flop ($P_D$) 1/ | 11 mW dc |
| Lead temperature (soldering 10 seconds) | 300°C |
| Thermal resistance, junction-to-case ($\theta_{JC}$) | (See MIL-STD-1835) |
| Junction temperature ($T_J$ ) 2/ | 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 ($V_{IL}$) | 0.7 V dc, except clock input of types 01, 02, 03, and 04 |
| Maximum low level input voltage ($V_{IL}$) | 0.6 V dc, (types 01, 02, 03, and 04) |
| Normalized fanout (each output) 3/ | 10 maximum |
| Width of clock pulse | ≥ 200 ns |
| Width of preset pulse | ≥ 100 ns |
| Width of clear pulse | ≥ 100 ns |
| Input setup time: | |
| Device types 02, 03, and 04 | ≥ Clock pulse width minimum |
| Device type 01 | 100 ns minimum when R, S input data is complementary |
| Device type 01 | ≥ Clock pulse width, minimum when R, S input data is not complementary |
| Device type 05 | 50 ns minimum |
| Input hold time | 10 ns minimum |
| Case operating temperature range ($T_C$ ) | -55°C to 125°C |

2.0 APPLICABLE DOCUMENT

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.

1/ Must withstand the added $P_D$ due to short circuit condition (e.g. $I_{OS}$) at one output for 5 seconds duration.
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/ Device will fanout in both high and low levels to the specified number of inputs of the same device type as that being tested.

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

2.3 Order of precedence. In the event of a conflict between the text of this 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 6.3).

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 Truth tables and logic diagrams. The truth tables and logic diagrams shall be as specified on figure 2.

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

3.3.4 Case outlines. Case outlines shall be as specified in 1.2.3.

3.4 Lead material and finish. 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 1 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 17 (see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

| Test | Symbol | Conditions $-55°C \le T_C \le +125°C$ | Device type | | | | | Limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 01 | 02 | 03 | 04 | 05 | Min | Max | |
| High level output voltage | $V_{OH}$ | $V_{IN}$ = 0.7 V<br>$V_{CC}$ = 4.5 V<br>$I_{OH}$ = -100µA | | | | | | 2.4 | | V |
| Low level input voltage | $V_{OL}$ | $I_{OL}$ = 2 mA<br>$V_{CC}$ = 4.5 V | | | | | | | 0.3 | V |
| Low level input current | $I_{IL1}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 0.3 V | S<br>R | J<br>K | J<br>K | J<br>K | | -43 | -140 | µA |
| Low level input current | $I_{IL2}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 0.3 V | Clock | Clock | Clock | | | -105 | -360 | µA |
| | | | Preset<br>Clear | Preset<br>Clear | Clear | Preset | | -86 | -280 | µA |
| Low level input current | $I_{IL3}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 0.3 V | | | | Clock<br>Clear | | -172 | -560 | µA |
| Low level input current | $I_{IL4}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 0.3 V | | | | | D<br>Preset | -50 | -180 | µA |
| Low level input current | $I_{IL5}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 0.3 V | | | | | Clock<br>Clear | -120 | -360 | µA |
| High level input current | $I_{IH1}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 2.4 V | S<br>R | J<br>K | J<br>K | J<br>K | D | | 10 | µA |
| High level input current | $I_{IH2}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 5.5 V | S<br>R | J<br>K | J<br>K | J<br>K | D | | 100 | µA |
| High level input current | $I_{IH3}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 2.4 V | Clear<br>Preset | Clear<br>Preset | Clear | Preset | Clock<br>Preset | | 200 | µA |
| High level input current | $I_{IH4}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 5.5 V | Clear<br>Preset<br>Clock | Clear<br>Preset<br>Clock | Clock<br>Clear | Preset | Clock<br>Clear | | 200 | µA |
| High level input current | $I_{IH5}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 2.4 V | | | | | Clear | | 30 | µA |
| High level input current | $I_{IH6}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 5.5 V | | | | | Clear | | 300 | µA |
| High level input current | $I_{IH7}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 2.4 V | | | | Clear | | | 40 | µA |

See footnotes at end of table.

TABLE I. Electrical performance characteristics.

| Test | Symbol | Conditions<br>-55°C ≤ $T_C$ ≤ +125°C | Device type | | | | | Limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 01 | 02 | 03 | 04 | 05 | Min | Max | |
| High level input current | $I_{IH8}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 5.5 V | | | | Clock<br>Clear | | | 400 | μA |
| High level input current | $I_{IH9}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 2.4 V | | | | Clock | | 0 | -400 | μA |
| High level input current | $I_{IH10}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 2.4 V | Clock | Clock | Clock | | | 0 | -200 | μA |
| Short circuit output current | $I_{OS}$ | $V_{CC}$ = 5.5 V<br>$V_{IN}$ = 0 1/ | | | | | | -3 | -15 | mA |
| Supply current per flip-flop | $I_{CC}$ | $V_{CC}$ = 5.5 V<br>$V_{IN(clock)}$ = 0 | Types 01, 02, 03, and 04 | | | | | | 1.9 | mA |
| | | | Type 05 | | | | | | 1.5 | mA |
| Maximum clock frequency | $f_{MAX}$ 2/ | $C_L$ = 50 pF<br>$R_L$ = 4 kΩ | | | | | | 2.5 | | MHz |
| Propagation delay to a high level (clear or pre-set to output) | $t_{PLH}$ | | | | | | | 10 | 125 | ns |
| Propagation delay to a low level (clear or pre-set to output) | $t_{PHL}$ | | $V_{IN(clock)}$ = 2.4 V | | | | | 10 | 200 | ns |
| | | | $V_{IN(clock)}$ = 0 V, types 01, 02, 03, and 04 | | | | | 10 | 250 | |
| Propagation delay to a high level (clock to output) | $t_{PLH}$ | | | | | | | 10 | 125 | ns |
| Propagation delay to a low level (clock to output) | $t_{PHL}$ | | | | | | | 10 | 200 | ns |

1/ Not more than one output should be shorted at a time.
2/ $f_{MAX}$, minimum limit specified is the frequency of the input pulse. The output frequency shall be one half of the input frequency.

TABLE II. Electrical test requirements.

| MIL-PRF-38535 Test requirement | Subgroups (see table III) | |
|---|---|---|
| | Class S Devices | Class B Devices |
| Interim electrical parameters | 1 | 1 |
| Final electrical test parameters | 1*, 2, 3, 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 |
| Groups 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. 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 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535.

4.3 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.

4.4 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.

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.

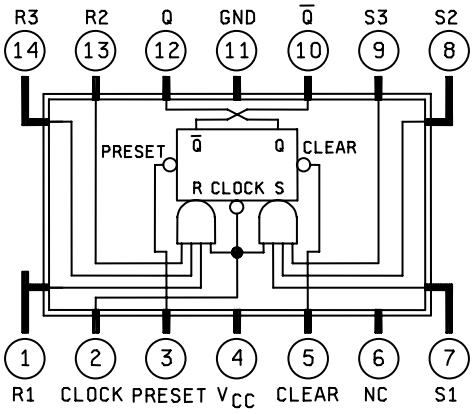
4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods inspection. Methods of inspection shall be as specified in the appropriate tables and as follows:

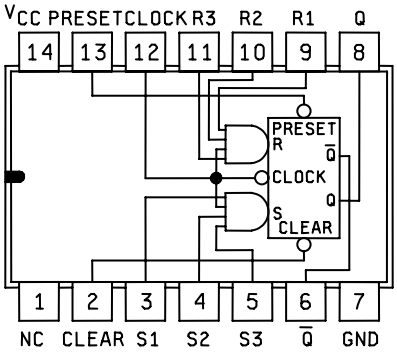
4.5.1 Voltage and current. All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional current and positive when flowing into the referenced terminal.

DEVICE TYPE 01

CASES A,B AND D

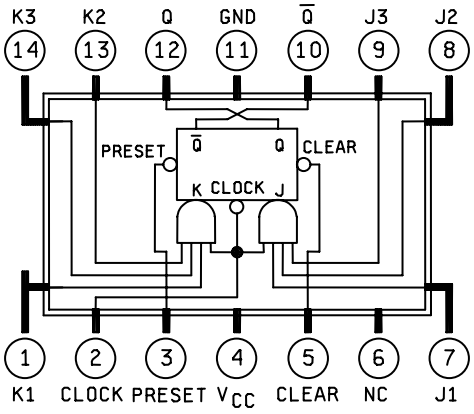



CASE C

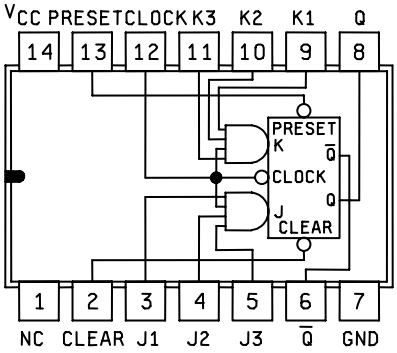



DEVICE TYPE 02

CASES A,B AND D

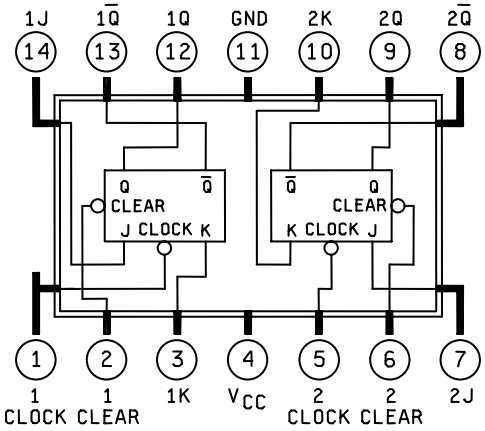



CASE C




DEVICE TYPE 02

CASES A,B AND D




CASE C

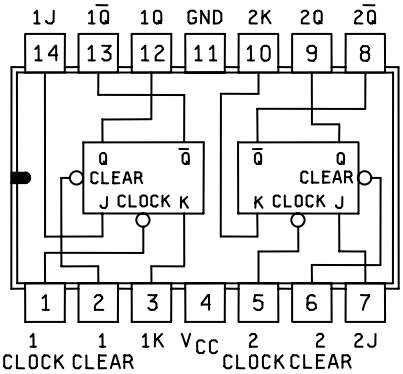
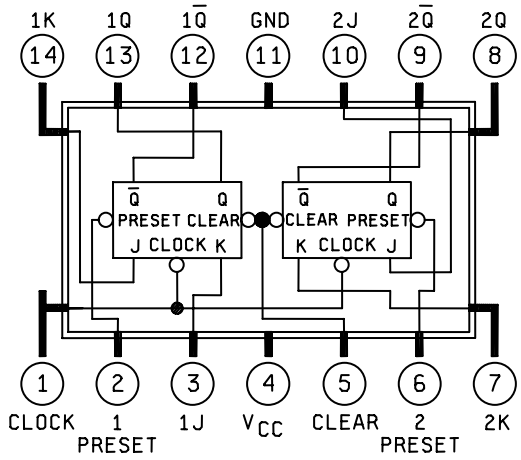


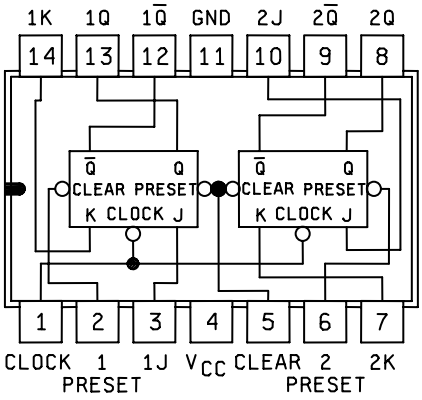

Figure 1. Terminal connections.

DEVICE TYPE 04

CASES A,B AND D

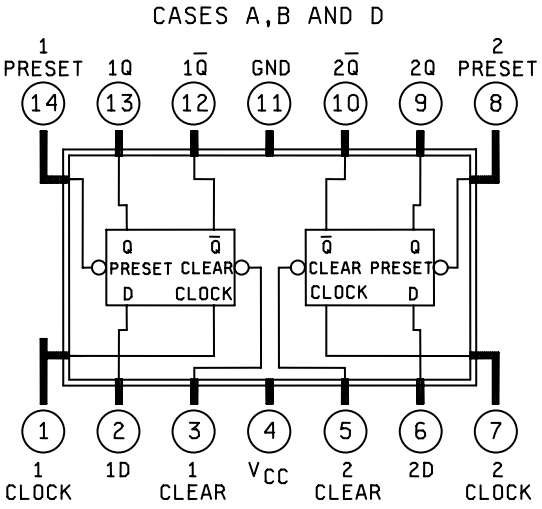



CASE C




DEVICE TYPE 05

CASES A,B AND D




CASE C

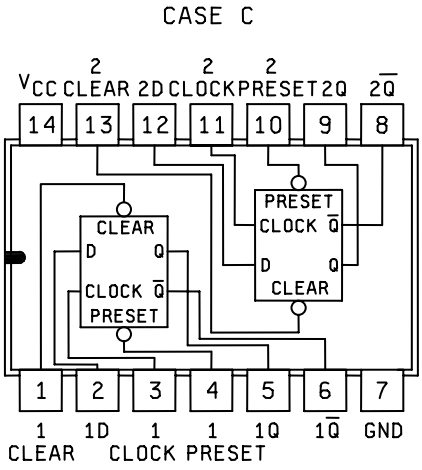



Figure 1. Terminal connections - Continued.

Device type 01

| Truth table | | |
|---|---|---|
| $t_n$ | | $t_{n+1}$ |
| J | K | Q |
| L | L | Qn |
| L | H | L |
| H | L | H |
| H | H | $\overline{Q}n$ |

Positive logic: Low input to preset sets Q to high level
Low input to clear sets Q to low level
Preset and clear are independent of clock

NOTES:
1. J = J1 J2 J3
2. K = K1 K2 K3
3. tn = Bit time before clock pulse.
4. tn+1 = Bit time after clock pulse.

Device type 02

| Truth table | | |
|---|---|---|
| $t_n$ | | $t_{n+1}$ |
| R | S | Q |
| L | L | Qn |
| L | H | H |
| H | L | L |
| H | H | Indeterminate |

Positive logic: Low input to preset sets Q to high level
Low input to clear sets Q to low level
Preset and clear are independent of clock

NOTES:
1. R = R1 R2 R3
2. S = S1 S2 S3
3. tn = Bit time before clock pulse.
4. tn+1 = Bit time after clock pulse.

Description for device types 01 and 02

These flip-flops are based on the master slave principle and each has AND gate inputs for entry into the master section which are controlled by the clock pulse. The clock pulse also regulates the state of the coupling transistors which connect the master and slave sections. The sequence of operation as controlled by the clock pulse is as follows:

1. Isolate slave from master.
2. Enter information from AND gate inputs to master.
3. Disable AND gate inputs.
4. Transfer information from master to slave.

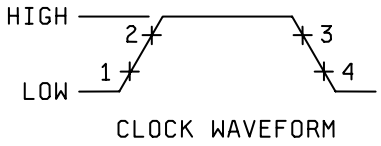



Figure 2. Truth tables and device descriptions.

Device type 03

| Truth table | | |
|---|---|---|
| $t_n$ | | $t_{n+1}$ |
| J | K | Q |
| L | L | Qn |
| L | H | L |
| H | L | H |
| H | H | $\overline{Q}n$ |

Positive logic: Low input to clear sets Q to low level
Clear is independent of clock

NOTES:
1. tn = Bit time before clock pulse.
2. tn+1 = Bit time after clock pulse.

Device type 04

| Truth table | | |
|---|---|---|
| $t_n$ | | $t_{n+1}$ |
| J | K | Q |
| L | L | Qn |
| L | H | L |
| H | L | H |
| H | H | $\overline{Q}n$ |

Positive logic: Low input to preset sets Q to high level
Low input to clear sets Q to low level
Preset and clear are independent of clock

NOTES:
1. tn = Bit time before clock pulse.
2. tn+1 = Bit time after clock pulse.

Description for device types 03 and 04

These flip-flops are based on the master slave principle and each has AND gate inputs for entry into the master section which are controlled by the clock pulse. The clock pulse also regulates the state of the coupling transistors which connect the master and slave sections. The sequence of operation as controlled by the clock pulse is as follows:

1. Isolate slave from master.
2. Enter information from AND gate inputs to master.
3. Disable AND gate inputs.
4. Transfer information from master to slave.

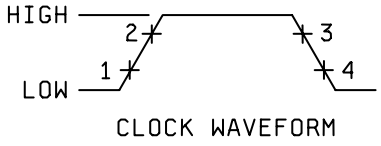



Figure 2. Truth tables and device descriptions- Continued.

Device type 05

| Truth table each flip-flop | | |
|---|---|---|
| $t_n$ | $t_{n+1}$ | |
| Input D | Output Q | Output $\overline{Q}$ |
| L | L | Qn |
| L | H | L |

Positive logic: Low input to preset sets Q to high level
Low input to clear sets Q to low level
Preset and clear are independent of clock

NOTES:

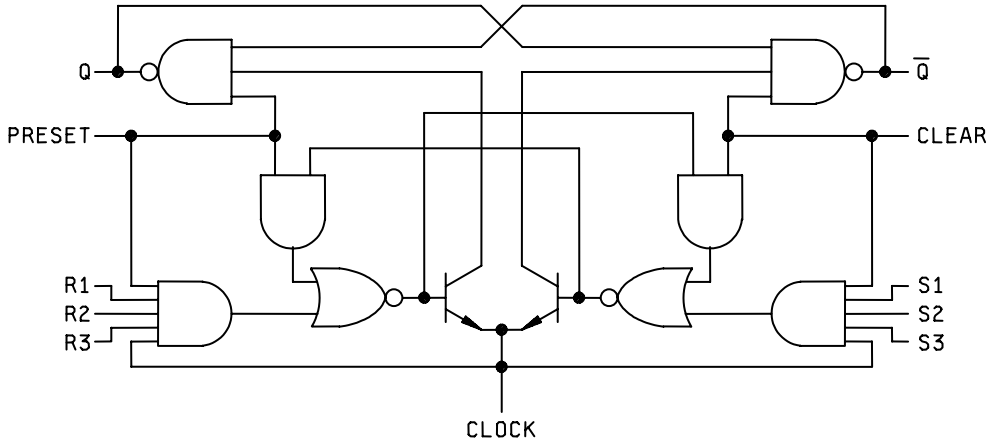
1. tn = Bit time before clock pulse.
2. tn+1 = Bit time after clock pulse.

Description for device type 05

Input information is transferred to the output on the positive edge of the clock pulse. Clock triggering occurs at a voltage level of the clock pulse and is not directly related to the transition time of the positive going pulse. After the clock input threshold voltage has been passed, the data input (D) is locked out.

Figure 2. Truth tables and device descriptions - Continued.

DEVICE TYPE 01




DEVICE TYPE 02

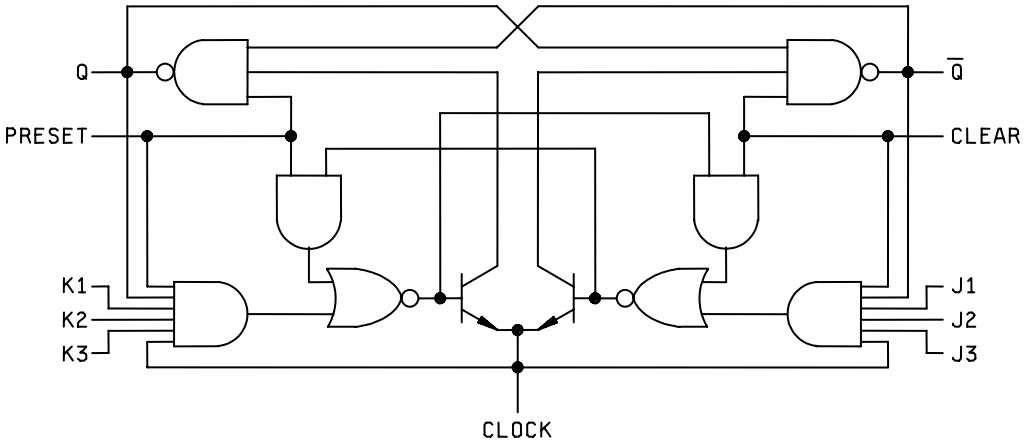
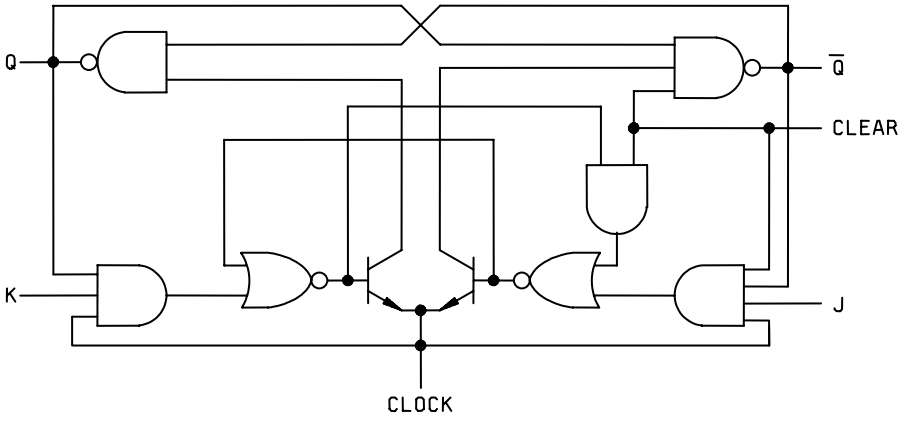



FIGURE 3. Logic diagram for device ty[pes 01, 02, 03, 04, and 05.

DEVICE TYPE 03




DEVICE TYPE 04

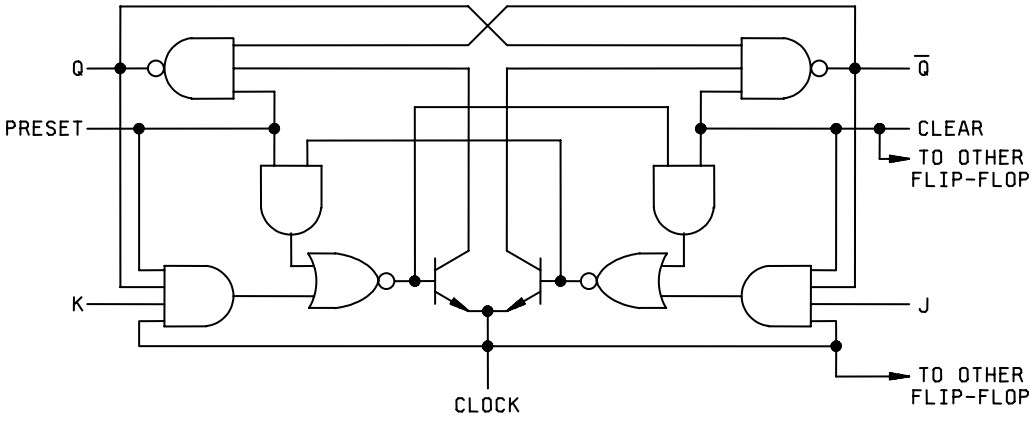



FIGURE 3. Logic diagram for device ty[pes 01, 02, 03, 04, and 05 - Continued.

DEVICE TYPE 05

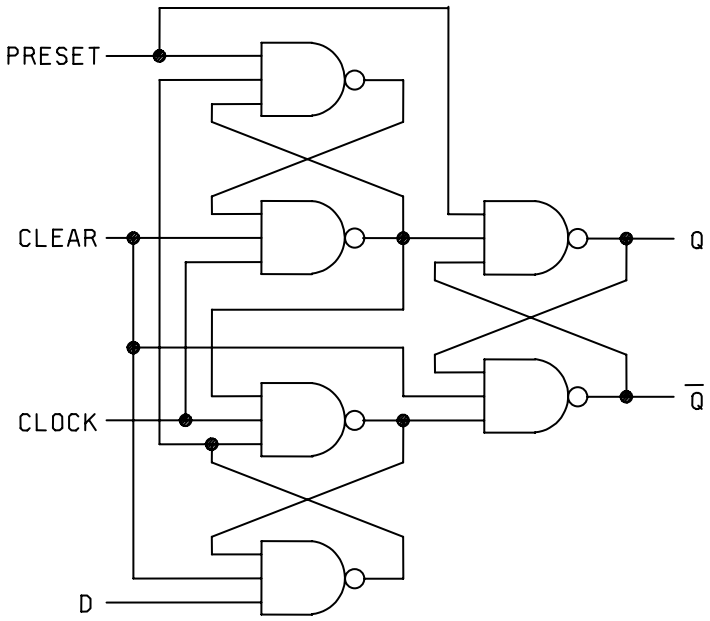
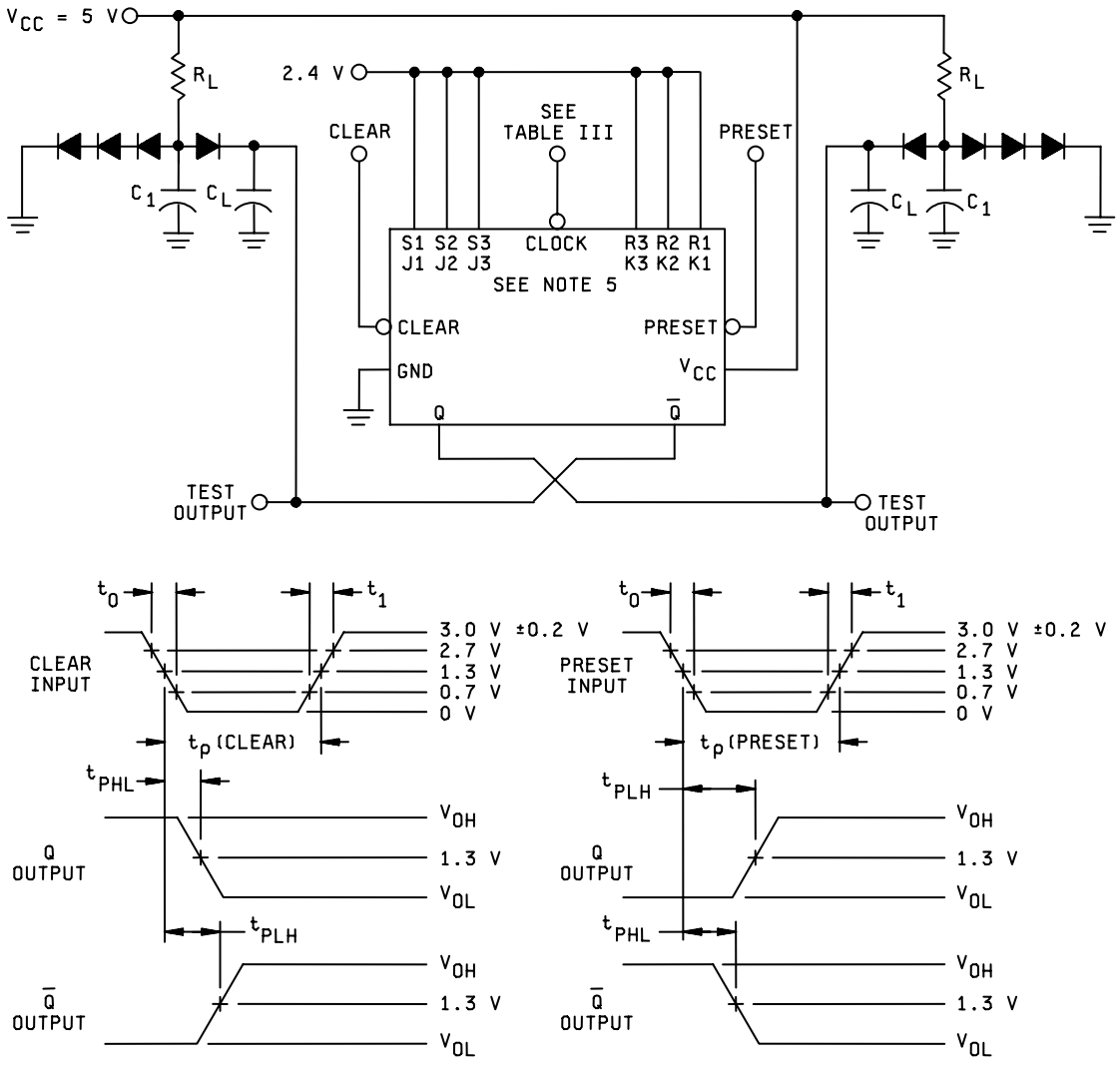



FIGURE 3. Logic diagram for device ty[pes 01, 02, 03, 04, and 05 - Continued.




NOTES:

1/ Clear or preset input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_{P(CLEAR)} = t_{P(PRESET)}$ = 100 ns, PRR = 0.5 MHz and $Z_{OUT} \approx 50\ \Omega$.

2/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

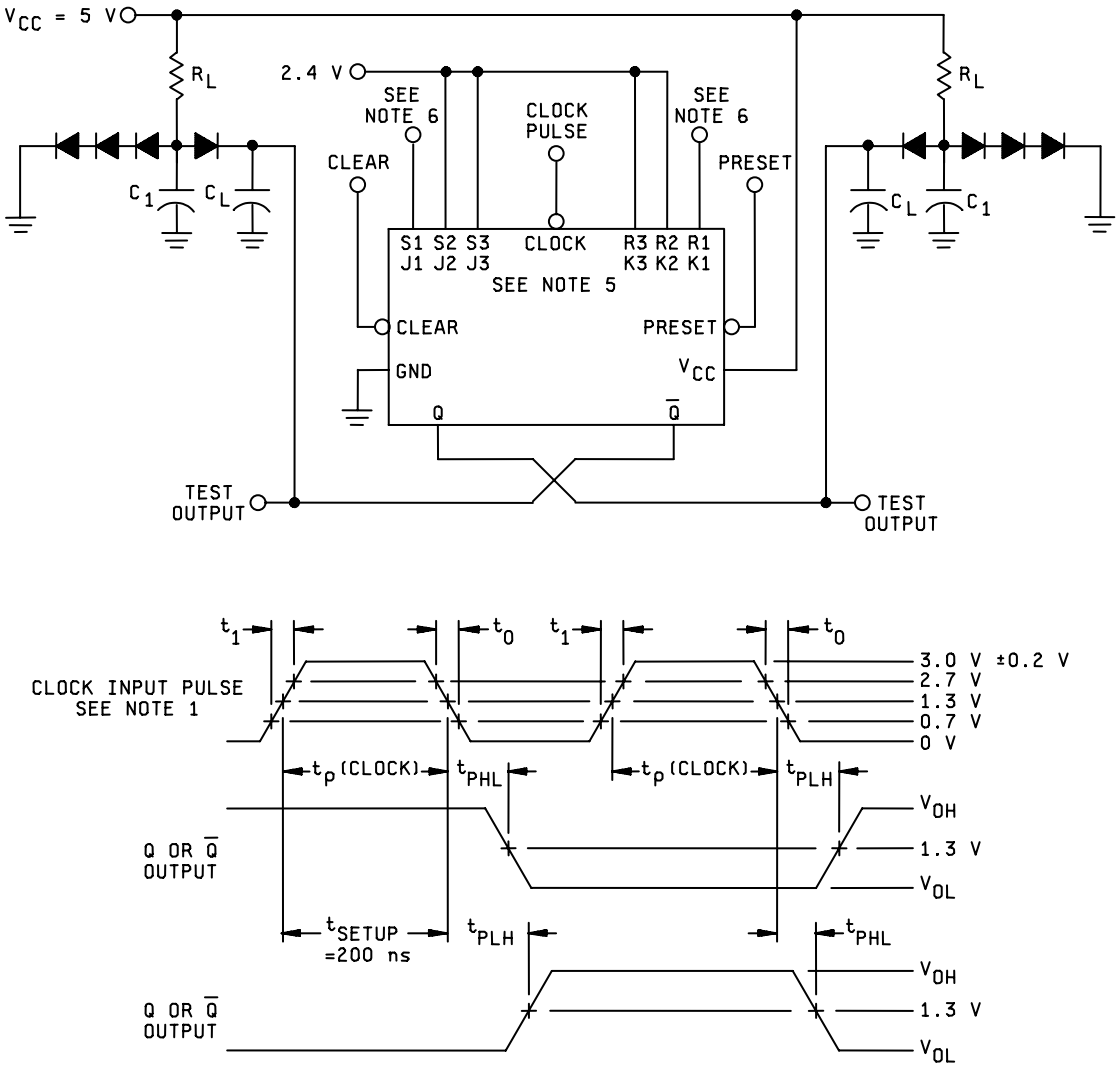
3/ $R_L$ = 4 kΩ ±5% and $C_1$ = 30 pF minimum.

4/ All diodes are 1N916 or equivalent.

5/ R and S inputs apply for device type 01, J and K inputs apply for device type 02.

6/ When testing clear to output switching, preset input shall have a negative pulse; when testing preset to output switching, clear input shall have a negative pulse (see table III).

FIGURE 4. Clear and preset switching test circuit for device type 01 and 02.




NOTES:

1/ Clock input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_P$ = 200 ns, PRR = 0.5 MHz, When testing $f_{MAX}$, PRR = see table III.

2/ All diodes are 1N916 or equivalent.

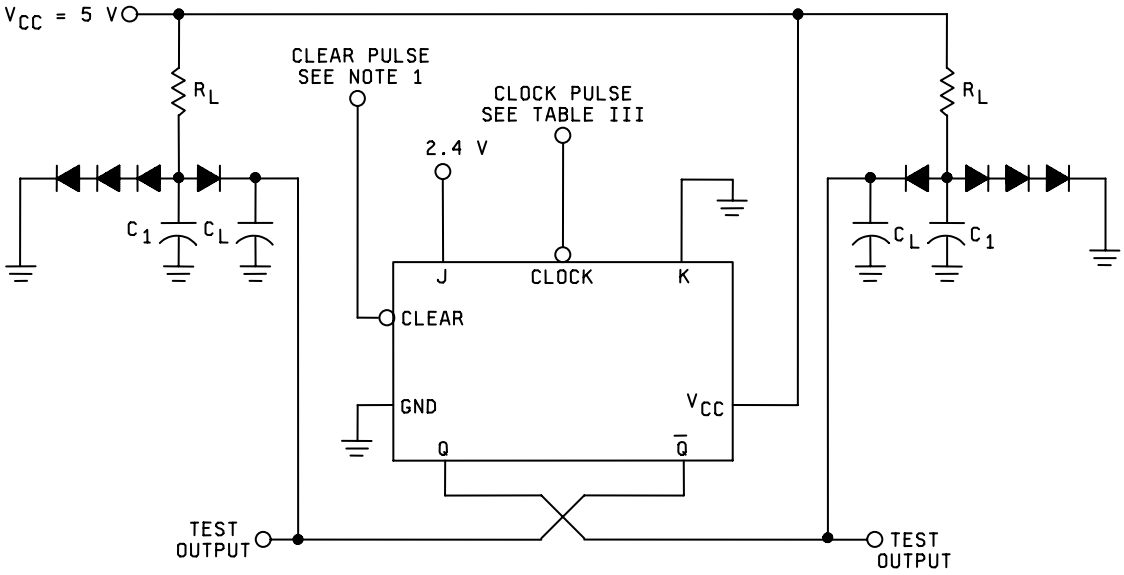
3/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

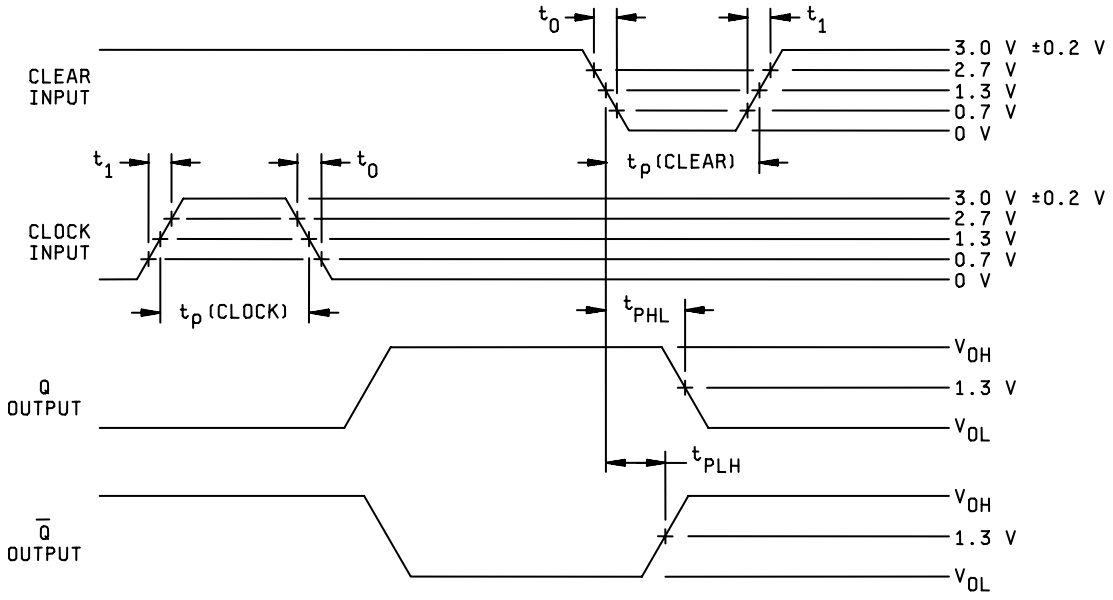
4/ $R_L$ = 4 kΩ ±5% and $C_1$ = 30 pF minimum.

5/ R and S inputs apply for device type 01, J and K inputs apply for device type 02.

6/ R1 input is connected to Q output, S1 input is connected to $\overline{Q}$ output. J1 and K1 inputs are connected to 2.4 V.

FIGURE 5. Synchronous switching test circuit for device types 01 and 02.




NOTES:

1/ Clear input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_{P(CLEAR)}$ = 100 ns, PRR = 0.5 MHz and $Z_{OUT}$ = 50 Ω.

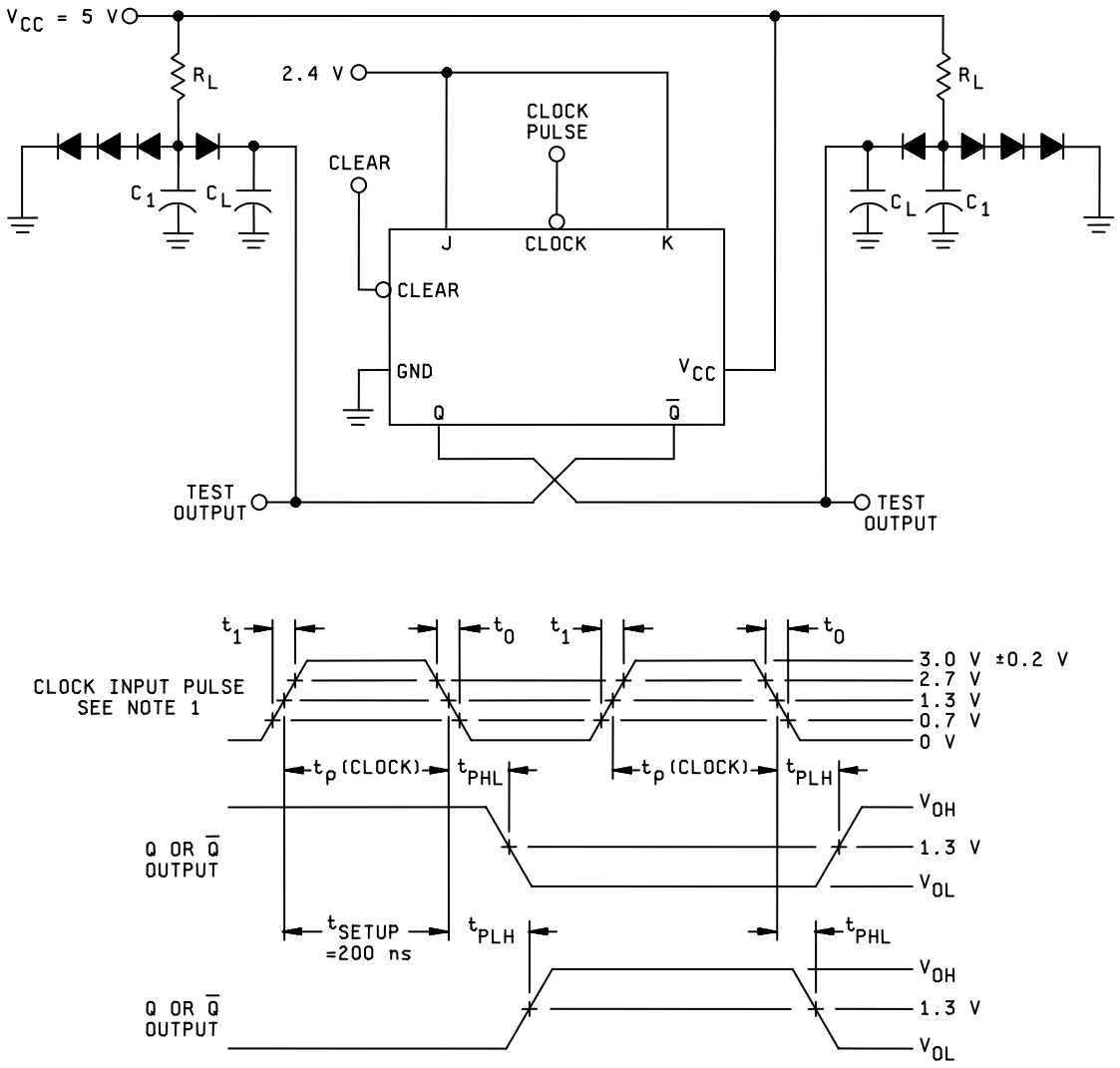
2/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

3/ $R_L$ = 4 kΩ ±5% and $C_1$ = 30 pF minimum.

4/ All diodes are 1N916 or equivalent.

5/ Clock input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_{P(CLOCK)} \geq$ 200 ns, PRR = 0.5 MHz.

FIGURE 6. Clear switching test circuit for device types 03.




NOTES:

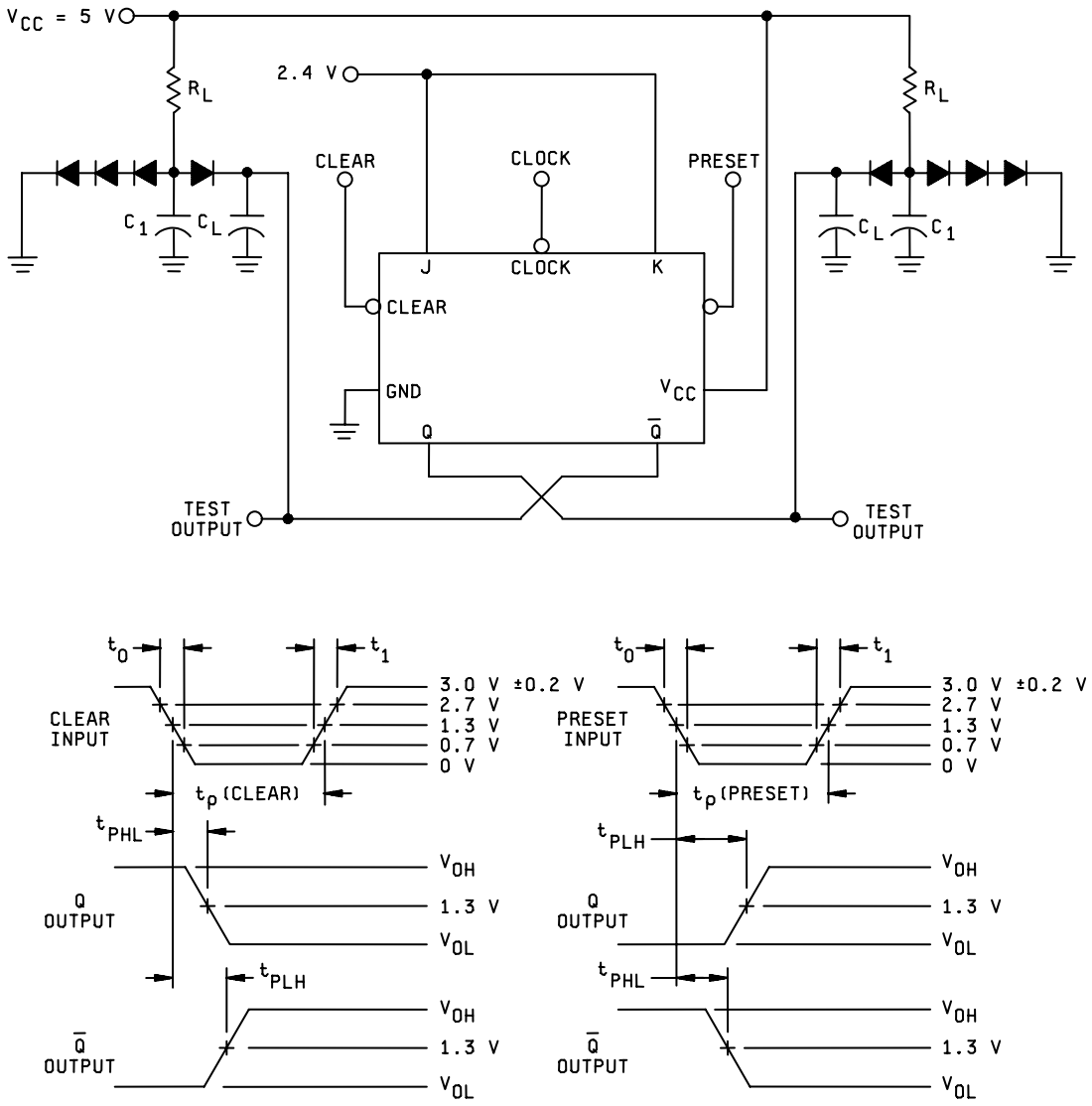
1/ Clock input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_P$ = 200 ns, PRR = 0.5 MHz, when testing $f_{MAX}$, PRR = see table III.

2/ All diodes are 1N916 or equivalent.

3/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

4/ $R_L$ = 4 kΩ ±5% and $C_1$ = 30 pF minimum.

FIGURE 7. Synchronous switching test circuit for device types 03.




NOTES:

1/ Clear or preset input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_{P(CLEAR)}$ = $t_{P(PRESET)}$ = 100 ns, PRR = 0.5 MHz and $Z_{OUT} \approx$ 50 Ω.

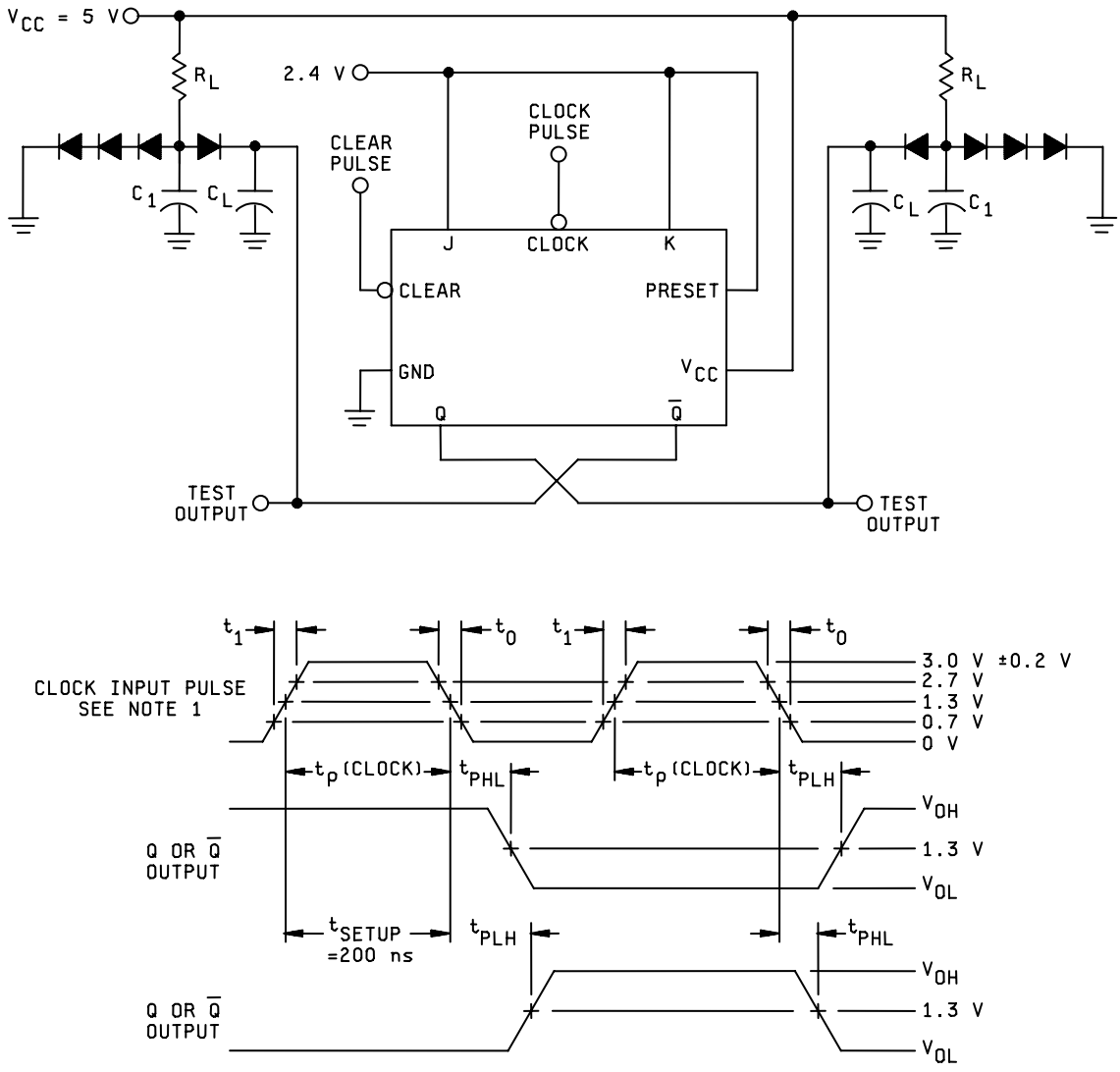
2/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

3/ $R_L$ = 4 kΩ ±5% and $C_1$ = 30 pF minimum.

4/ All diodes are 1N916 or equivalent.

5/ When testing clear to output switching, preset input shall have a negative pulse; when testing preset to output switching, clear input shall have a negative pulse (see table III).

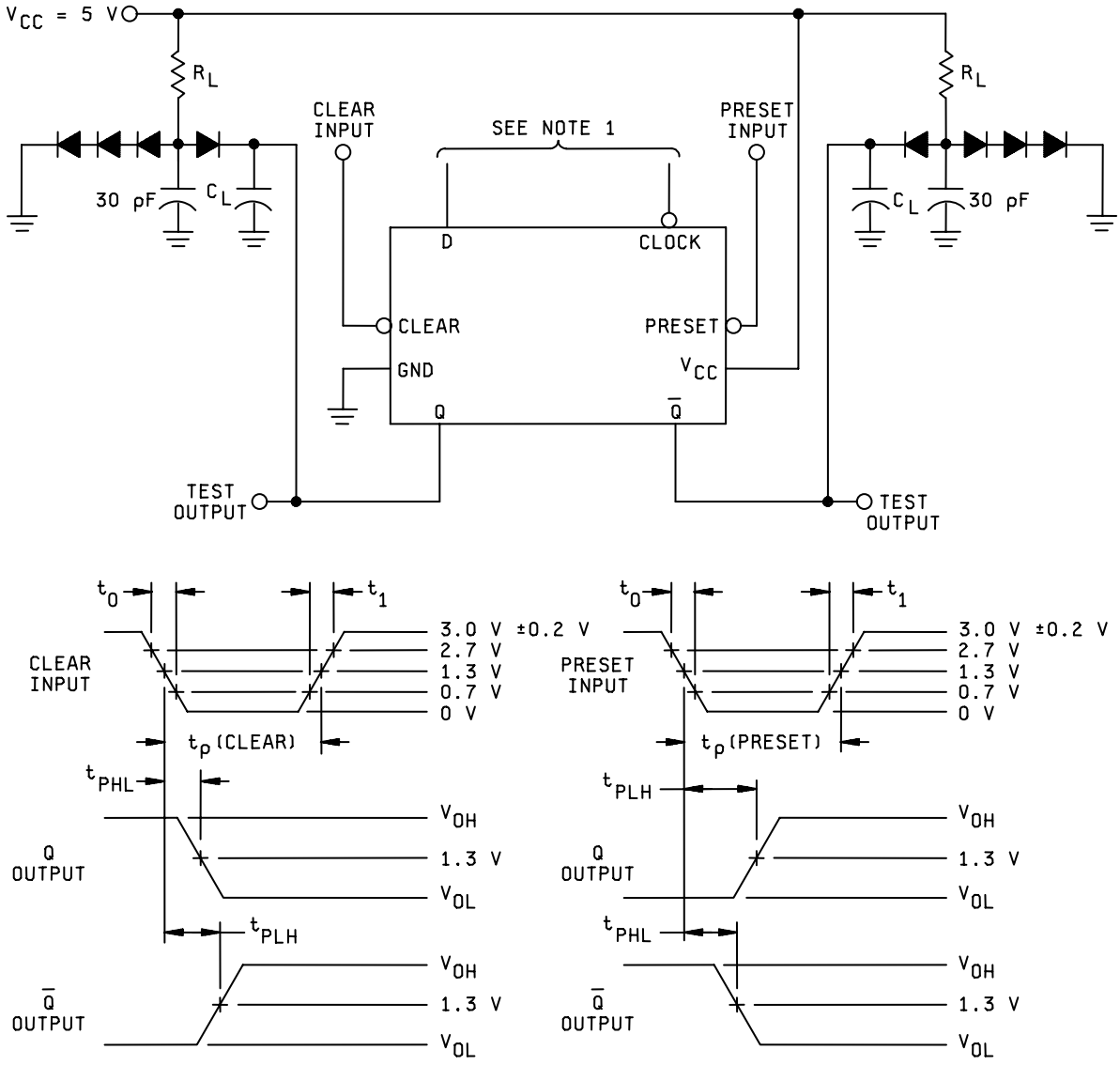
FIGURE 8. Clear and preset switching test circuit for device type 04.




NOTES:

1/ Clock input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_P$ = 200 ns, PRR = 0.5 MHz, when testing $f_{MAX}$, PRR = see table III.
2/ All diodes are 1N916 or equivalent.
3/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.
4/ $R_L$ = 4 kΩ ±5% and $C_1$ = 30 pF minimum.

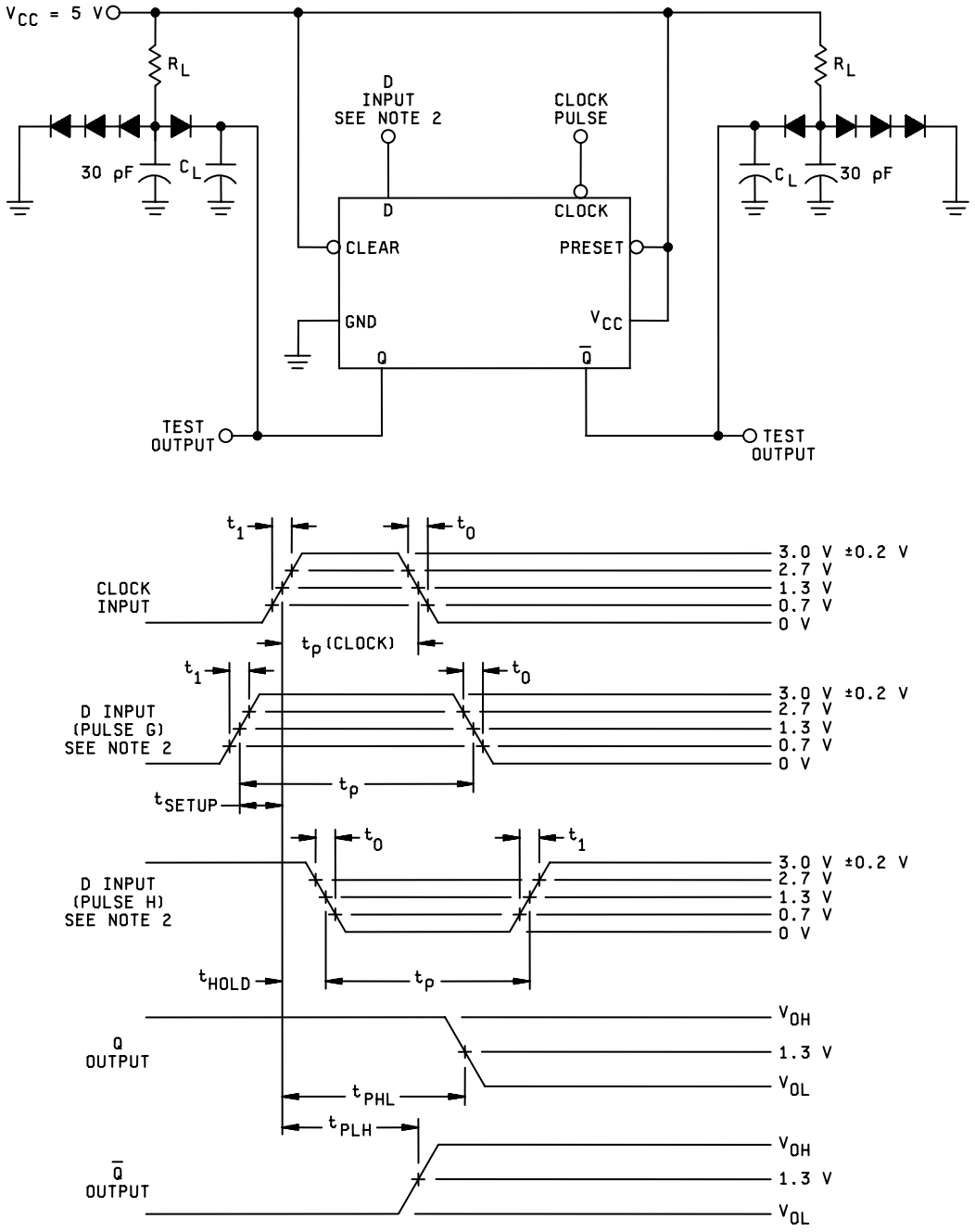
FIGURE 9. Synchronous switching test circuit for device type 04.




NOTES:

1/ Clear and preset inputs dominate regardless of the state of clock or D inputs.
2/ All diodes are 1N916 or equivalent.
3/ Clear or preset input pulse characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_P$ = 100 ns, PRR = 0.5 MHz.
4/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.
5/ $R_L$ = 4 kΩ ±5%.
6/ When testing clear to output switching, preset input shall have a negative pulse; when testing preset to output switching, clear input shall have a negative pulse (see table III).

FIGURE 10. Clear and preset switching test circuit and waveformsfor device type 05.




NOTES:

1/ Clock input pulse has the following characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_P$ = 200 ns, PRR = 0.5 MHz, when testing $f_{MAX}$, PRR = see table III.

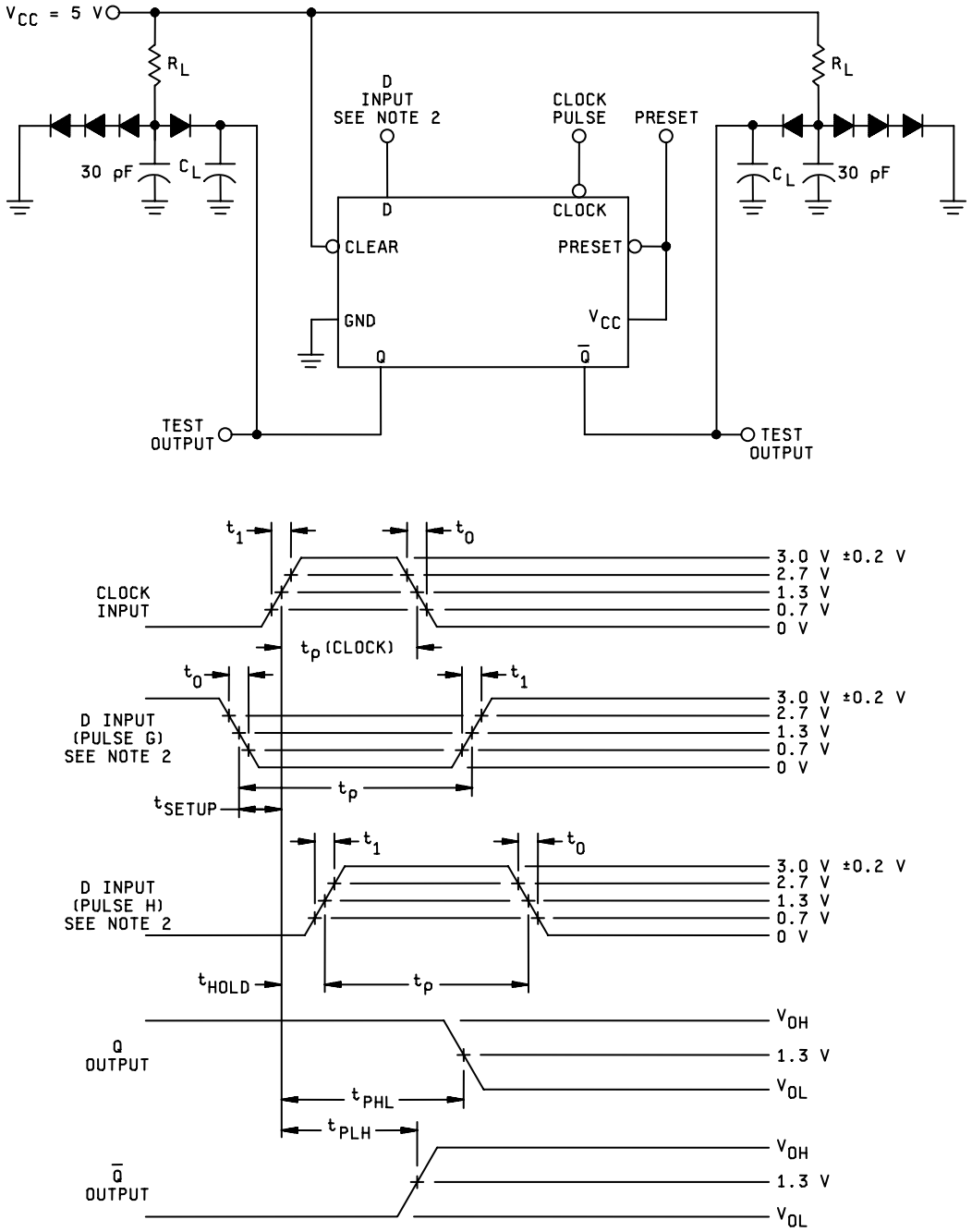
2/ D input (pulse G and pulse H) has the following characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_{SETUP}$ = 50 ns, , $t_P$ = 100 ns and PRR is 50% of the clock PRR.

3/ All diodes are 1N916 or equivalent.

4/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

5/ $R_L$ = 4 kΩ ±5%.

FIGURE 11. Synchronous switching test circuit for device type 05.




NOTES:

1/ Clock input pulse has the following characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_P$ = 200 ns, PRR = 0.5 MHz. When testing $f_{MAX}$, PRR = see table III.

2/ D input (pulse G) has the following characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_{SETUP}$ = 50 ns, $t_P$ = 100 ns and PRR is 50% of the clock PRR. D input (pulse H) has the following characteristics: Vgen = 3.0 V ±0.2 V, $t_0$ = 15 ns, $t_1$ = 15 ns, $t_{HOLD}$ = 10 ns, , $t_P$ = 80 ns and PRR is 50% of the clock PRR.

3/ All diodes are 1N916 or equivalent.

4/ $C_L$ = 50 pF minimum and includes probe and jig capacitance.

5/ $R_L$ = 4 kΩ ±5%.

FIGURE 12. Synchronous switching test circuit for device type 05.

TABLE III. Group A inspection for device type 01. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 9 | 12 | 13 | 14 | 2 | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | | Min | Max | |
| | | | Test no. | R1 | Clock | Preset | $V_{CC}$ | Clear | NC | S1 | S2 | S3 | $\overline{Q}$ | GND | Q | R2 | R3 | | | | |
| 1 $T_C$ =+25°C | $V_{OH}$ | 3006 | 1 | 0.7 V | A | 4.5 V | 4.5 V | 4.5 V | | 2.0 V | 2.0 V | 2.0 V | | GND | -100µA | 0.7 V | 0.7 V | $\overline{Q}$ | 2.4 | | V |
| | | | 2 | 2.0 V | A | 4.5 V | " | 4.5 V | | 0.7 V | 0.7 V | 0.7 V | -100µA | " | | 2.0 V | 2.0 V | Q | " | | " |
| | | | 3 | 4.5 V | 4.5 V | 0.7 V | " | 2.0 V | | 4.5 V | 4.5 V | 4.5 V | | " | -100µA | 4.5 V | 4.5 V | $\overline{Q}$ | " | | " |
| | | | 4 | 4.5 V | 4.5 V | 2.0 V | " | 0.7 V | | 4.5 V | 4.5 V | 4.5 V | -100µA | " | | 4.5 V | 4.5 V | Q | " | | " |
| | $V_{OL}$ | 3007 | 5 | 2.0 V | A | 4.5 V | " | 4.5 V | | 0.7 V | 0.7 V | 0.7 V | | " | 2 mA | 2.0 V | 2.0 V | $\overline{Q}$ | | 0.3 | " |
| | | | 6 | 0.7 V | A | 4.5 V | " | 4.5 V | | 2.0 V | 2.0 V | 2.0 V | 2 mA | " | | 0.7 V | 0.7 V | Q | | " | " |
| | | | 7 | 4.5 V | 4.5 V | 0.7 V | " | 2.0 V | | 4.5 V | 4.5 V | 4.5 V | 2 mA | " | | 4.5 V | 4.5 V | $\overline{Q}$ | | " | " |
| | | | 8 | 4.5 V | " | 2.0 V | " | 0.7 V | | 4.5 V | " | " | | " | 2 mA | 4.5 V | 4.5 V | Q | | " | " |
| | $I_{IL1}$ | 3009 | 9 | | " | | 5.5 V | B | | 0.3 V | " | " | | " | | | | S1 | -43 | -140 | µA |
| | | | 10 | | " | | " | " | | 4.5 V | 0.3 V | " | | " | | | | S2 | " | " | " |
| | | | 11 | | " | | " | " | | 4.5 V | 4.5 V | 0.3 V | | " | | | | S3 | " | " | " |
| | | | 12 | 0.3 V | " | B | " | | | | | | | " | | 4.5 V | 4.5 V | R1 | " | " | " |
| | | | 13 | 4.5 V | " | " | " | | | | | | | " | | 0.3 V | 4.5 V | R2 | " | " | " |
| | | | 14 | " | " | " | " | | | | | | | " | | 4.5 V | 0.3 V | R3 | " | " | " |
| | $I_{IL2}$ | | 15 | " | 0.3 V | " | " | | | 4.5 V | 4.5 V | 4.5 V | | " | | " | 4.5 V | Clock | -120 | -360 | " |
| | | | 16 | " | 0.3 V | | " | B | | " | " | " | | " | | " | " | Clock | -120 | -360 | " |
| | | | 17 | ' | | 0.3 V | " | | | " | " | " | | " | | " | " | Preset | -86 | -280 | " |
| | | | 18 | " | | | " | 0.3 V | | " | " | " | | " | | " | " | Clear | -86 | -280 | " |
| | $I_{IH1}$ | 3010 | 19 | | GND | | " | GND | | 2.4 V | GND | GND | | " | | | | S1 | | 10 | " |
| | | | 20 | | " | | " | " | | GND | 2.4 V | GND | | " | | | | S2 | | " | " |
| | | | 21 | | " | | " | " | | GND | GND | 2.4 V | | " | | | | S3 | | " | " |
| | | | 22 | 2.4 V | " | GND | " | | | | | | | " | | GND | GND | R1 | | " | " |
| | | | 23 | GND | " | " | " | | | | | | | " | | 2.4 V | GND | R2 | | " | " |
| | | | 24 | GND | " | " | " | | | | | | | " | | GND | 2.4 V | R3 | | " | " |
| | $I_{IH2}$ | | 25 | | " | | " | GND | | 5.5 V | GND | GND | | " | | | | S1 | | 100 | " |
| | | | 26 | | " | | " | " | | GND | 5.5 V | GND | | " | | | | S2 | | " | " |
| | | | 27 | | " | | " | " | | GND | GND | 5.5 V | | " | | | | S3 | | " | " |
| | | | 28 | 5.5 V | " | GND | " | | | | | | | " | | GND | GND | R1 | | " | " |
| | | | 29 | GND | " | " | " | | | | | | | " | | 5.5 V | GND | R2 | | " | " |
| | | | 30 | GND | " | " | " | | | | | | | " | | GND | 5.5 V | R3 | | " | " |
| | $I_{IH3}$ | | 31 | | " | | " | 2.4 V | | GND | GND | GND | GND | " | | | | Clear | | 20 | " |
| | $I_{IH3}$ | | 32 | GND | " | 2.4 V | " | | | | | | | " | GND | GND | GND | Preset | | 20 | " |
| | $I_{IH4}$ | | 33 | GND | " | 5.5 V | " | | | | | | | " | GND | GND | GND | Preset | | 200 | " |
| | | | 34 | | " | | " | 5.5 V | | GND | GND | GND | GND | " | | | | Clear | | " | " |
| | | | 35 | GND | 5.5 V | GND | " | | | " | " | " | | " | | GND | GND | Clock | | " | " |
| | | | 36 | " | 5.5 V | | " | GND | | " | " | " | | " | | " | " | Clock | | " | " |
| | $I_{IH10}$ | | 37 | " | 2.4 V | GND | " | | | " | " | " | | " | | " | " | Clock | 0 | -200 | " |
| | $I_{IH10}$ | | 38 | " | 2.4 V | | " | GND | | " | " | " | | " | | " | " | Clock | 0 | -200 | " |
| | $I_{OS}$ | 3011 | 39 | 4.5 V | GND | GND | " | | | 4.5 V | 4.5 V | 4.5 V | | " | GND | 4.5 V | 4.5 V | $\overline{Q}$ | -3 | -15 | mA |
| | $I_{OS}$ | 3011 | 40 | 4.5 V | " | | " | GND | | 4.5 V | 4.5 V | 4.5 V | GND | " | | 4.5 V | 4.5 V | Q | -3 | -15 | " |
| | $I_{CC}$ | 3005 | 41 CKT A | GND | " | GND | " | 4.5 V | | GND | GND | GND | | " | | GND | GND | $V_{CC}$ | | 1.90 | " |
| | | | 41 CKT B | " | " | GND | " | 4.5 V | | " | " | " | | " | | " | " | " | | 1.44 | " |
| | | | 42 CKT A | " | " | 4.5 V | " | GND | | " | " | " | | " | | " | " | " | | 1.90 | " |
| | | | 42 CKT B | " | " | 4.5 V | " | GND | | " | " | " | | " | | " | " | " | | 1.44 | " |
| 2 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$ = +125°C. | | | | | | | | | | | | | | | | | | | | |
| 3 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$ = -55°C. | | | | | | | | | | | | | | | | | | | | |

See footnotes at end of device type 01.

TABLE III. Group A inspection for device type 01 - Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D / Case C / Test no. | 1 / 9 / R1 | 2 / 12 / Clock | 3 / 13 / Preset | 4 / 14 / $V_{CC}$ | 5 / 2 / Clear | 6 / 1 / NC | 7 / 3 / S1 | 8 / 4 / S2 | 9 / 5 / S3 | 10 / 6 / $\overline{Q}$ | 11 / 7 / GND | 12 / 8 / Q | 13 / 10 / R2 | 14 / 11 / R3 | Measured terminal | Test limits Min | Test limits Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 $T_C$=+25°C 2/ 4/ | | | 43 | A | A | A | 4.5 V | B | | A | A | A | H 3/ | GND | L 3/ | A | A | All outputs | H or L as shown 3/ | | |
| | | | 44 | B | A | " | " | A | | " | " | " | H | " | L | " | " | | | | |
| | | | 45 | B | B | " | " | " | | " | " | " | L | " | H | " | " | | | | |
| | | | 46 | A | A | " | " | " | | B | " | " | " | " | " | " | " | | | | |
| | | | 47 | " | B | " | " | " | | B | " | " | " | " | " | " | " | | | | |
| | | | 48 | " | A | " | " | " | | A | " | " | " | " | " | B | " | | | | |
| | | | 49 | " | B | " | " | " | | " | " | " | " | " | " | B | " | | | | |
| | | | 50 | " | A | " | " | " | | " | B | " | " | " | " | A | " | | | | |
| | | | 51 | " | B | " | " | " | | " | B | " | " | " | " | " | " | | | | |
| | | | 52 | " | A | " | " | " | | " | A | " | " | " | " | " | B | | | | |
| | | | 53 | " | B | " | " | " | | " | " | " | " | " | " | " | B | | | | |
| | | | 54 | " | A | " | " | " | | " | " | " | " | " | " | " | A | | | | |
| | | | 55 | " | B | " | " | " | | " | " | " | " | " | " | " | A | | | | |
| | | | 56 | B | A | " | " | " | | B | B | B | " | " | " | B | B | | | | |
| | | | 57 | B | B | " | " | " | | " | " | " | " | " | " | B | B | | | | |
| | | | 58 | A | A | B | " | " | | " | " | " | " | " | " | A | A | | | | |
| | | | 59 | A | B | B | " | " | | " | " | " | " | " | " | A | A | | | | |
| 8 2/ 4/ | Same tests, terminal conditions, and limits as for subgroup 7, except $T_C$ = +125°C and -55°C. | | | | | | | | | | | | | | | | | | | | |
| 9 $T_C$=+25°C | $f_{MAX}$ 5/ $f_{MAX}$ 5/ | (Fig. 6) | 60 / 61 | D / " | IN / IN | 5.0 V / 5.0 V | 5.0 V / " | B / B | | C / " | 2.4 V / " | 2.4 V / " | OUT | GND / " | OUT | 2.4 V / " | 2.4 V / " | Q / Q | 3 / 3 | | MHz / MHz |
| | $t_{PLH}$ | 3003 (Fig. 4) | *62 CKT A | " | 2.4 V | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/$\overline{Q}$ | 10 | 75 | ns |
| | " | | *62 CKT B | " | " | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/Q | " | 50 | " |
| | " | | *63 CKT A | " | " | IN | " | J | | " | " | " | | " | OUT | " | " | Preset/Q | " | 75 | " |
| | " | | *63 CKT B | " | " | IN | " | J | | " | " | " | | " | " | " | " | Preset/Q | " | 50 | " |
| | $t_{PHL}$ | | 64 CKT A | " | GND | J | " | IN | | " | " | " | | " | " | " | " | Clear/Q | " | 200 | " |
| | " | | 64 CKT B | " | " | J | " | IN | | " | " | " | | " | " | " | " | Clear/$\overline{Q}$ | " | 90 | " |
| | " | | 65 CKT A | " | " | IN | " | J | | " | " | " | OUT | " | | " | " | Preset/$\overline{Q}$ | " | 200 | " |
| | " | | 65 CKT B | " | " | IN | " | J | | " | " | " | " | " | | " | " | Preset/$\overline{Q}$ | " | 90 | " |
| | $t_{PLH}$ | 3003 (Fig. 5) | 66 CKT A | " | IN | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/$\overline{Q}$ | " | 75 | " |
| | " | | 66 CKT B | " | " | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/Q | " | 50 | " |
| | " | | 67 CKT A | " | " | 5.0 V | " | J | | " | " | " | | " | OUT | " | " | Clock/Q | " | 75 | " |
| | " | | 67 CKT B | " | " | 5.0 V | " | J | | " | " | " | | " | " | " | " | Clock/Q | " | 50 | " |
| | $t_{PHL}$ | | 68 CKT A | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/Q | " | 150 | " |
| | " | | 68 CKT B | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/$\overline{Q}$ | " | 70 | " |
| | " | | 69 CKT A | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/$\overline{Q}$ | " | 150 | " |
| | " | | 69 CKT B | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/Q | " | 70 | " |

See footnotes at end of device type 01.

TABLE III. Group A inspection for device type 01 - Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D / Case C / Test no. | 1 / 9 / R1 | 2 / 12 / Clock | 3 / 13 / Preset | 4 / 14 / $V_{CC}$ | 5 / 2 / Clear | 6 / 1 / NC | 7 / 3 / S1 | 8 / 4 / S2 | 9 / 5 / S3 | 10 / 6 / $\overline{Q}$ | 11 / 7 / GND | 12 / 8 / Q | 13 / 10 / R2 | 14 / 11 / R3 | Measured terminal | Test limits Min | Test limits Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 $T_C$=+125°C | $f_{MAX}$ 5/ | (Fig. 5) | 70 | D | IN | 5.0 V | 5.0 V | B | | C | 2.4 V | 2.4 V | | GND | OUT | 2.4 V | 2.4 V | Q | 3 | | MHz |
| | $f_{MAX}$ 5/ | | 71 | " | IN | 5.0 V | " | B | | " | " | " | OUT | " | | " | " | $\overline{Q}$ | 3 | | MHz |
| | $t_{PLH}$ | 3003 (Fig. 4) | *72 CKT A | " | 2.4 V | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/$\overline{Q}$ | 10 | 125 | ns |
| | " | | *72 CKT B | " | " | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/Q | " | 65 | " |
| | " | | *73 CKT A | " | " | IN | " | J | | " | " | " | | " | OUT | " | " | Preset/Q | " | 125 | " |
| | " | | *73 CKT B | " | " | IN | " | J | | " | " | " | | " | " | " | " | Preset/Q | " | 65 | " |
| | $t_{PHL}$ | | 74 CKT A | " | GND | J | " | IN | | " | " | " | | " | " | " | " | Clear/Q | " | 250 | " |
| | " | | 74 CKT B | " | " | J | " | IN | | " | " | " | | " | " | " | " | Clear/$\overline{Q}$ | " | 100 | " |
| | " | | 75 CKT A | " | " | IN | " | J | | " | " | " | OUT | " | | " | " | Preset/$\overline{Q}$ | " | 250 | " |
| | " | | 75 CKT B | " | " | IN | " | J | | " | " | " | " | " | | " | " | Preset/$\overline{Q}$ | " | 100 | " |
| | $t_{PLH}$ | 3003 (Fig. 5) | 76 CKT A | " | IN | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/$\overline{Q}$ | " | 125 | " |
| | " | | 76 CKT B | " | " | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/Q | " | 65 | " |
| | " | | 77 CKT A | " | " | 5.0 V | " | J | | " | " | " | | " | OUT | " | " | Clock/Q | " | 125 | " |
| | " | | 77 CKT B | " | " | 5.0 V | " | J | | " | " | " | | " | " | " | " | Clock/Q | " | 65 | " |
| | $t_{PHL}$ | | 78 CKT A | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/Q | " | 200 | " |
| | " | | 78 CKT B | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/$\overline{Q}$ | " | 85 | " |
| | " | | 79 CKT A | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/$\overline{Q}$ | " | 200 | " |
| | " | | 79 CKT B | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/Q | " | 85 | " |
| 11 | Same tests, terminal conditions, and limits as for subgroup 10, except $T_C$= -55°C. | | | | | | | | | | | | | | | | | | | | |

NOTE: A = normal clock pulse, B = momentary GND, then 4.5 V.
C = input connected to $\overline{Q}$ , D = input connected to Q.
J = input pulse $t_p \geq 100$ ns, PRR = 0.5 MHz, $V_{OL}$ = 0 V, $V_{OH}$ = 4.5 V.

1/ Terminal conditions (pins not designated may be H ≥ 2.0 V, or L ≤ 0.8 V, or open).
2/ Tests shall be performed in sequence.
3/ Input voltages shown are: A = 2.4 V minimum and B = 0.4 V maximum.
4/ Output voltages shall be either: (a) H = 2.4 V, minimum and L – 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L ≤ 1.5 V when using a high speed checker single comparator.
5/ $f_{MAX}$, minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.
* These tests are performed at device manufacturer's option.

TABLE III. Group A inspection for device type 02. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 9 | 12 | 13 | 14 | 2 | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | | Min | Max | |
| | | | Test no. | K1 | Clock | Preset | $V_{CC}$ | Clear | NC | J1 | J2 | J3 | $\overline{Q}$ | GND | Q | K2 | K3 | | | | |
| 1<br>$T_C$ = +25°C | $V_{OH}$ | 3006 | 1 | 0.7 V | A | 4.5 V | 4.5 V | 4.5 V | | 2.0 V | 2.0 V | 2.0 V | | GND | -100µA | 0.7 V | 0.7 V | $\overline{Q}$ | 2.4 | | V |
| | | | 2 | 2.0 V | A | 4.5 V | " | 4.5 V | | 0.7 V | 0.7 V | 0.7 V | -100µA | " | | 2.0 V | 2.0 V | Q | " | | " |
| | | | 3 | 4.5 V | 4.5 V | 0.7 V | " | 2.0 V | | 4.5 V | 4.5 V | 4.5 V | | " | -100µA | 4.5 V | 4.5 V | $\overline{Q}$ | " | | " |
| | | | 4 | 4.5 V | 4.5 V | 2.0 V | " | 0.7 V | | 4.5 V | 4.5 V | 4.5 V | -100µA | " | | 4.5 V | 4.5 V | Q | " | | " |
| | $V_{OL}$ | 3007 | 5 | 2.0 V | A | 4.5 V | " | 4.5 V | | 0.7 V | 0.7 V | 0.7 V | | " | 2 mA | 2.0 V | 2.0 V | $\overline{Q}$ | | 0.3 | " |
| | | | 6 | 0.7 V | A | 4.5 V | " | 4.5 V | | 2.0 V | 2.0 V | 2.0 V | 2 mA | " | | 0.7 V | 0.7 V | $\overline{Q}$ | | " | " |
| | | | 7 | 4.5 V | 4.5 V | 0.7 V | " | 2.0 V | | 4.5 V | 4.5 V | | 2 mA | " | | 4.5 V | 4.5 V | Q | | " | " |
| | | | 8 | 4.5 V | " | 2.0 V | " | 0.7 V | | 4.5 V | " | | | " | 2 mA | 4.5 V | 4.5 V | Q | | " | " |
| | $I_{IL1}$ | 3009 | 9 | | " | | 5.5 V | B | | 0.3 V | " | 4.5 V | | " | | | | J1 | -43 | -140 | µA |
| | | | 10 | | " | | " | " | | 4.5 V | 0.3 V | 4.5 V | | " | | | | J2 | " | " | " |
| | | | 11 | | " | | " | " | | 4.5 V | 4.5 V | 0.3 V | | " | | | | J3 | " | " | " |
| | | | 12 | 0.3 V | " | B | " | | | | | | | " | | 4.5 V | 4.5 V | K1 | " | " | " |
| | | | 13 | 4.5 V | " | " | " | | | | | | | " | | 0.3 V | 4.5 V | K2 | " | " | " |
| | | | 14 | " | " | " | " | | | | | | | " | | 4.5 V | 0.3 V | K3 | " | " | " |
| | $I_{IL2}$ | | 15 | " | 0.3 V | " | " | | | 4.5 V | 4.5 V | 4.5 V | | " | | " | 4.5 V | Clock | -105 | -360 | " |
| | | | 16 | " | 0.3 V | | " | B | | " | " | " | | " | | " | " | Clock | -105 | -360 | " |
| | | | 17 | ' | | 0.3 V | " | | | " | " | " | | " | | " | " | Preset | -86 | -280 | " |
| | | | 18 | " | | | " | 0.3 V | | " | " | " | | " | | " | " | Clear | -86 | -280 | " |
| | $I_{IH1}$ | 3010 | 19 | | GND | | " | GND | | 2.4 V | GND | GND | | " | | | | J1 | | 10 | " |
| | | | 20 | | " | | " | " | | GND | 2.4 V | GND | | " | | | | J2 | | " | " |
| | | | 21 | | " | | " | " | | GND | GND | 2.4 V | | " | | | | J3 | | " | " |
| | | | 22 | 2.4 V | " | GND | " | | | | | | | " | | GND | GND | K1 | | " | " |
| | | | 23 | GND | " | " | " | | | | | | | " | | 2.4 V | GND | K2 | | " | " |
| | | | 24 | GND | " | " | " | | | | | | | " | | GND | 2.4 V | K3 | | " | " |
| | $I_{IH2}$ | | 25 | | " | | " | GND | | 5.5 V | GND | GND | | " | | | | J1 | | 100 | " |
| | | | 26 | | " | | " | " | | GND | 5.5 V | GND | | " | | | | J2 | | " | " |
| | | | 27 | | " | | " | " | | GND | GND | 5.5 V | | " | | | | J3 | | " | " |
| | | | 28 | 5.5 V | " | GND | " | | | | | | | " | | GND | GND | K1 | | " | " |
| | | | 29 | GND | " | " | " | | | | | | | " | | 5.5 V | GND | K2 | | " | " |
| | | | 30 | GND | " | " | " | | | | | | | " | | GND | 5.5 V | K3 | | " | " |
| | $I_{IH3}$ | | 31 | | " | | " | 2.4 V | | GND | GND | GND | GND | " | | | | Clear | | 20 | " |
| | $I_{IH3}$ | | 32 | GND | " | 2.4 V | " | | | | | | | " | GND | GND | GND | Preset | | 20 | " |
| | $I_{IH4}$ | | 33 | GND | " | 5.5 V | " | | | | | GND | | " | GND | GND | GND | Preset | | 200 | " |
| | | | 34 | | " | | " | 5.5 V | | GND | GND | " | GND | " | | | | Clear | | " | " |
| | | | 35 | GND | 5.5 V | GND | " | | | " | " | " | | " | | GND | GND | Clock | | " | " |
| | | | 36 | " | 5.5 V | | " | GND | | " | " | " | | " | | " | " | Clock | | " | " |
| | $I_{IH10}$ | | 37 | " | 2.4 V | GND | " | | | " | " | " | | " | | " | " | Clock | 0 | -200 | " |
| | $I_{IH10}$ | | 38 | " | 2.4 V | | " | GND | | " | " | " | | " | | " | " | Clock | 0 | -200 | " |
| | $I_{OS}$ | 3011 | 39 | 4.5 V | GND | GND | " | | | 4.5 V | 4.5 V | 4.5 V | | " | GND | 4.5 V | 4.5 V | $\overline{Q}$ | -3 | -15 | mA |
| | $I_{OS}$ | 3011 | 40 | 4.5 V | " | | " | GND | | 4.5 V | 4.5 V | 4.5 V | GND | " | | 4.5 V | 4.5 V | Q | -3 | -15 | " |
| | $I_{CC}$ | 3005 | 41 CKT A | GND | " | GND | " | 4.5 V | | GND | GND | GND | | " | | GND | GND | VCC | | 1.90 | " |
| | | | 41 CKT B | " | " | GND | " | 4.5 V | | " | " | " | | " | | " | " | " | | 1.44 | " |
| | | | 42 CKT A | " | " | 4.5 V | " | GND | | " | " | " | | " | | " | " | " | | 1.90 | " |
| | | | 42 CKT B | " | " | 4.5 V | " | GND | | " | " | " | | " | | " | " | " | | 1.44 | " |
| 2 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$ = +125°C. | | | | | | | | | | | | | | | | | | | | |
| 3 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$ = -55°C. | | | | | | | | | | | | | | | | | | | | |

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 9 | 12 | 13 | 14 | 2 | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | | Min | Max | |
| | | | Test no. | K1 | Clock | Preset | $V_{CC}$ | Clear | NC | J1 | J2 | J3 | $\overline{Q}$ | GND | Q | K2 | K3 | | | | |
| 7 | | | 43 | B | B | A | 4.5 V | B | B | B | B | B | H 3/ | GND | L 3/ | B | B | All | H or L as shown 3/ | | |
| $T_C$ = +25°C | | | 44 | " | " | B | " | A | " | " | " | " | L | " | H | B | B | outputs | | | |
| 2/ 4/ | | | 45 | " | " | A | " | " | " | " | " | " | " | " | " | A | A | " | | | |
| | | | 46 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 47 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 48 | A | " | " | " | " | " | " | " | " | " | " | " | B | " | " | | | |
| | | | 49 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 50 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 51 | " | B | " | " | " | " | " | " | " | " | " | " | A | B | " | | | |
| | | | 52 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 53 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 54 | " | " | " | " | B | " | " | " | " | H | " | L | " | " | " | | | |
| | | | 55 | B | " | " | " | A | " | " | A | A | " | " | " | B | " | " | | | |
| | | | 56 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 57 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 58 | " | B | " | " | " | " | A | B | " | " | " | " | " | " | " | | | |
| | | | 59 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 60 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 61 | " | B | " | " | " | " | " | A | B | " | " | " | " | " | " | | | |
| | | | 62 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 63 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 64 | A | B | " | " | " | " | " | " | A | " | " | " | A | A | " | | | |
| | | | 65 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 66 | " | B | " | " | " | " | " | " | " | L | " | H | " | " | " | | | |
| | | | 67 | " | A | " | " | " | " | " | " | " | L | " | H | " | " | " | | | |
| | | | 68 | " | B | " | " | " | " | " | " | " | H | " | L | " | " | " | | | |
| | | | 69 | " | B | " | " | B | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 70 | " | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 71 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 72 | " | B | B | " | " | " | " | " | " | " | " | H | " | " | " | | | |
| | | | 73 | A | A | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 74 | " | B | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 75 | " | A | " | " | A | " | " | " | " | L | " | " | " | " | " | | | |
| | | | 76 | " | " | A | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 77 | B | " | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 78 | " | " | " | " | " | " | B | " | " | " | " | " | " | " | " | | | |
| | | | 79 | " | B | " | " | " | " | B | " | " | H | " | L | " | " | " | | | |
| | | | 80 | A | A | " | " | " | " | A | " | " | " | " | " | " | " | " | | | |
| | | | 81 | A | A | " | " | " | " | B | " | " | " | " | " | " | " | " | | | |
| 8 2/ 3/ 4/ | Same tests, terminal conditions, and limits as for subgroup 7, except $T_C$=+125°C and -55°C. | | | | | | | | | | | | | | | | | | | | |

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02 - Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 9 | 12 | 13 | 14 | 2 | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | | Min | Max | |
| | | | Test no. | K1 | Clock | Preset | $V_{CC}$ | Clear | NC | J1 | J2 | J3 | $\overline{Q}$ | GND | Q | K2 | K3 | | | | |
| 9 | $f_{MAX}$ 5/ | (Fig. 5) | 82 | 2.4 V | IN | B | 5.0 V | 5.0 V | | 2.4 V | 2.4 V | 2.4 V | | GND | OUT | 2.4 V | 2.4 V | Q | 3 | | MHz |
| $T_C$ =+25°C | $f_{MAX}$ 5/ | | 83 | " | IN | B | " | 5.0 V | | " | " | " | OUT | " | | " | " | $\overline{Q}$ | 3 | | MHz |
| | $t_{PLH}$ | 3003 | *84 CKT A | " | 2.4 V | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/$\overline{Q}$ | 10 | 75 | ns |
| | " | (Fig. 4) | *84 CKT B | " | " | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/Q | " | 50 | " |
| | " | | *85 CKT A | " | " | IN | " | J | | " | " | " | | " | OUT | " | " | Preset/Q | " | 75 | " |
| | " | | *85 CKT B | " | " | IN | " | J | | " | " | " | | " | " | " | " | Preset/Q | " | 50 | " |
| | $t_{PHL}$ | | 86 CKT A | " | GND | J | " | IN | | " | " | " | | " | " | " | " | Clear/Q | " | 200 | " |
| | " | | 86 CKT B | " | " | J | " | IN | | " | " | " | | " | " | " | " | Clear/$\overline{Q}$ | " | 90 | " |
| | " | | 87 CKT A | " | " | IN | " | J | | " | " | " | OUT | " | | " | " | Preset/$\overline{Q}$ | " | 200 | " |
| | " | | 87 CKT B | " | " | IN | " | J | | " | " | " | " | " | | " | " | Preset/$\overline{Q}$ | " | 90 | " |
| | $t_{PLH}$ | 3003 | 88 CKT A | " | IN | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/$\overline{Q}$ | " | 75 | " |
| | " | (Fig. 5) | 88 CKT B | " | " | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/Q | " | 50 | " |
| | " | | 89 CKT A | " | " | 5.0 V | " | J | | " | " | " | | " | OUT | " | " | Clock/Q | " | 75 | " |
| | " | | 89 CKT B | " | " | 5.0 V | " | J | | " | " | " | | " | " | " | " | Clock/Q | " | 50 | " |
| | $t_{PHL}$ | | 90 CKT A | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/Q | " | 150 | " |
| | " | | 90 CKT B | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/$\overline{Q}$ | " | 70 | " |
| | " | | 91 CKT A | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/$\overline{Q}$ | " | 150 | " |
| | " | | 91 CKT B | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/Q | " | 70 | " |
| 10 | $f_{MAX}$ 5/ | (Fig. 5) | 92 | " | " | B | " | 5.0 V | | " | " | " | | " | OUT | " | " | Q | 2.5 | | MHz |
| $T_C$ =+125°C | $f_{MAX}$ 5/ | | 93 | " | " | B | " | 5.0 V | | " | " | " | OUT | " | | " | " | $\overline{Q}$ | 2.5 | | MHz |
| | $t_{PLH}$ | 3003 | *94 CKT A | " | 2.4 V | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/$\overline{Q}$ | 10 | 125 | ns |
| | " | (Fig. 4) | *94 CKT B | " | " | J | " | IN | | " | " | " | OUT | " | | " | " | Clear/Q | " | 65 | " |
| | " | | *95 CKT A | " | " | IN | " | J | | " | " | " | | " | OUT | " | " | Preset/Q | " | 125 | " |
| | " | | *95 CKT B | " | " | IN | " | J | | " | " | " | | " | " | " | " | Preset/Q | " | 65 | " |
| | $t_{PHL}$ | | 96 CKT A | " | GND | J | " | IN | | " | " | " | | " | " | " | " | Clear/Q | " | 250 | " |
| | " | | 96 CKT B | " | " | J | " | IN | | " | " | " | | " | " | " | " | Clear/$\overline{Q}$ | " | 100 | " |
| | " | | 97 CKT A | " | " | IN | " | J | | " | " | " | OUT | " | | " | " | Preset/$\overline{Q}$ | " | 250 | " |
| | " | | 97 CKT B | " | " | IN | " | J | | " | " | " | " | " | | " | " | Preset/$\overline{Q}$ | " | 100 | " |
| | $t_{PLH}$ | 3003 | 98 CKT A | " | IN | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/$\overline{Q}$ | " | 125 | " |
| | " | (Fig. 5) | 98 CKT B | " | " | J | " | 5.0 V | | " | " | " | " | " | | " | " | Clock/Q | " | 65 | " |
| | " | | 99 CKT A | " | " | 5.0 V | " | J | | " | " | " | | " | OUT | " | " | Clock/Q | " | 125 | " |
| | " | | 99 CKT B | " | " | 5.0 V | " | J | | " | " | " | | " | " | " | " | Clock/Q | " | 65 | " |
| | $t_{PHL}$ | | 100 CKT A | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/Q | " | 200 | " |
| | " | | 100 CKT B | " | " | J | " | 5.0 V | | " | " | " | | " | " | " | " | Clock/$\overline{Q}$ | " | 85 | " |
| | " | | 101 CKT A | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/$\overline{Q}$ | " | 200 | " |
| | " | | 101 CKT B | " | " | 5.0 V | " | J | | " | " | " | OUT | " | | " | " | Clock/Q | " | 85 | " |
| 11 | Same tests, terminal conditions, and limits as for subgroup 10, except $T_C$=-55°C | | | | | | | | | | | | | | | | | | | | |

NOTE: A = normal clock pulse, B = momentary GND, then 4.5 V.
J = input pulse, $t_p \geq 100$ ns, PRR = 0.5 MHz, $V_{OL}$ = 0 V, $V_{OH}$ = 4.5 V.

1/ Terminal conditions (pins not designated may be H ≥ 2.0 V, or L ≤ 0.8 V, or open).
2/ Tests shall be performed in sequence.
3/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L ≤ 1.5 V when using a high speed checker single comparator.
4/ Input voltages shown are: A = 2.4 V minimum and B = 0.4 V maximum.
5/ $f_{MAX}$, minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.
* These tests are performed at device manufacturer's option.

TABLE III. Group A inspection for device type 03. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Test no. | Clock 1 | Clear 1 | K1 | $V_{CC}$ | Clock 2 | Clear 2 | J2 | $\overline{Q}$ 2 | Q2 | K2 | GND | Q1 | $\overline{Q}$ 1 | J1 | | Min | Max | |
| 1<br>$T_C$=+25°C | $V_{OH}$ | 3006 | 1 | A | 4.5 V | 0.7 V | 4.5 V | | | | | | | GND | -100µA | | 2.0 V | $\underline{Q}$1 | 2.4 | | V |
| | | | 2 | A | 4.5 V | 2.0 V | " | | | | | | | " | | -100µA | 0.7 V | $\underline{Q}$1 | " | | " |
| | | | 3 | 4.5 V | 0.7 V | 4.5 V | " | | | | | | | " | | -100µA | 4.5 V | Q1 | " | | " |
| | | | 4 | | | | " | A | 4.5 V | 2.0 V | | -100µA | 0.7 V | " | | | | $\underline{Q}$2 | " | | " |
| | | | 5 | | | | " | A | 4.5 V | 0.7 V | - | | 2.0 V | " | | | | $\underline{Q}$2 | " | | " |
| | | | 6 | | | | " | 4.5 V | 0.7 V | 4.5 V | 100µA | | 4.5 V | " | | | | Q2 | " | | " |
| | | | | | | | | | | | - | | | | | | | | | | |
| | | | | | | | | | | | 100µA | | | | | | | | | | |
| | $V_{OL}$ | 3007 | 7 | A | 4.5 V | 2.0 V | " | | | | | | | " | 2 mA | | 0.7 V | $\underline{Q}$1 | | 0.3 | " |
| | | | 8 | A | 4.5 V | 0.7 V | " | | | | | | | " | | 2 mA | 2.0 V | Q1 | | " | " |
| | | | 9 | 4.5 V | 0.7 V | 4.5 V | " | | | | | | | " | 2 mA | | 4.5 V | Q1 | | " | " |
| | | | 10 | | | | " | A | 4.5 V | 0.7V | | 2 mA | 2.0 V | " | | | | $\underline{Q}$2 | | " | " |
| | | | 11 | | | | " | A | 4.5 V | 2.0V | 2 mA | | 0.7 V | " | | | | Q2 | | " | " |
| | | | 12 | | | | " | 4.5 V | 0.7 V | 4.5 V | | 2 mA | 4.5 V | " | | | | Q2 | | " | " |
| | $I_{IL1}$ | 3009 | 13 | 4.5 V | 4.5 V | | 5.5V | | | | | | | " | E | | 0.3 V | J1 | -43 | -140 | µA |
| | | | 14 | 4.5 V | 4.5 V | 0.3 V | " | | | | | | | " | | E | | K1 | " | " | " |
| | | | 15 | | | | " | 4.5 V | 4.5 V | 0.3 V | | E | | " | | | | J2 | " | " | " |
| | | | 16 | | | | " | 4.5 V | 4.5 V | | E | | 0.3 V | " | | | | K2 | " | " | " |
| | $I_{IL2}$ | | 17 | 4.5 V | 0.3 V | | " | | | | | | | " | | | 4.5 V | Clear 1 | -86 | -280 | " |
| | | | 18 | 0.3 V | B | 4.5 V | " | | | | | | | " | | | 4.5 V | Clock 1 | -120 | -360 | " |
| | | | 19 | | | | " | 4.5 V | 0.3 V | 4.5 V | | | | " | | | | Clear 2 | -86 | -280 | " |
| | | | 20 | | | | " | 0.3 V | B | 4.5 V | | | 4.5 V | " | | | | Clock 2 | -120 | -360 | " |
| | $I_{IH1}$ | 3010 | 21 | GND | GND | | " | | | | | | | " | | | 2.4 V | J1 | | 10 | " |
| | | | 22 | GND | B | 2.4 V | " | | | | | | | " | | | | K1 | | " | " |
| | | | 23 | | | | " | GND | GND | 2.4 V | | | | " | | | | J2 | | " | " |
| | | | 24 | | | | " | GND | B | | | | 2.4 V | " | | | | K2 | | " | " |
| | $I_{IH2}$ | | 25 | GND | GND | | " | | | | | | | " | | | 5.5 V | J1 | | 100 | " |
| | | | 26 | GND | B | 5.5 V | " | | | | | | | " | | | | K1 | | " | " |
| | | | 27 | | | | " | GND | GND | 5.5 V | | | | " | | | | J2 | | " | " |
| | | | 28 | | | | " | GND | B | | | | 5.5 V | " | | | | K2 | | " | " |
| | $I_{IH3}$ | | 29 | GND | 2.4 V | | " | | | | | | | " | | GND | GND | Clear 1 | | 20 | " |
| | $I_{IH3}$ | | 30 | | | | " | GND | 2.4 V | GND | GND | | | " | | | | Clear 2 | | 20 | " |
| | $I_{IH4}$ | | 31 | 5.5 V | GND | GND | " | | | | | | | " | | | GND | Clock 1 | | 200 | " |
| | | | 32 | GND | 5.5 V | | " | | | | | | | " | | GND | GND | Clear 1 | | " | " |
| | | | 33 | | | | " | 5.5 V | GND | GND | | | GND | " | | | | Clock 2 | | " | " |
| | | | 34 | | | | " | GND | 5.5 V | GND | GND | | | " | | | | Clear 2 | | " | " |
| | $I_{IH10}$ | | 35 | 2.4 V | GND | GND | " | | | | | | | " | | | GND | Clock 1 | 0 | -200 | " |
| | $I_{IH10}$ | | 36 | | | | " | 2.4 V | GND | GND | | | GND | " | | | | Clock 2 | 0 | -200 | " |
| | $I_{OS}$ | 3011 | 37 | 2.4 V | GND | 2.4 V | " | | | | | | | " | | GND | 2.4 V | Q1 | -3 | -15 | mA |
| | | 3011** | 38 | A | 2.4 V | GND | " | | | | | | | " | GND | | 2.4 V | Q1 | " | " | " |
| | | 3011** | 39 | | | | " | A | 2.4 V | 2.4 V | | GND | GND | " | | | | $\underline{Q}$2 | " | " | " |
| | | 3011 | 40 | | | | " | 2.4 V | GND | 2.4 V | GND | | 2.4 V | " | | | | Q2 | " | " | " |
| | $I_{CC}$ | 3005 | 41 CKT A | F | 4.5 V | GND | " | F | 4.5 V | 4.5 V | | | GND | " | | | 4.5 V | $V_{CC}$ | | 3.8 | " |
| | | | 41 CKT B | F | 4.5 V | " | " | F | 4.5 V | 4.5 V | | | " | " | | | 4.5 V | " | | 2.88 | " |
| | | | 42 CKT A | GND | GND | " | " | GND | GND | GND | | | " | " | | | GND | " | | 3.8 | " |
| | | | 42 CKT B | GND | GND | " | " | GND | GND | GND | | | " | " | | | GND | " | | 2.88 | " |
| 2 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$=+125°C and $I_{IL2}$ = -50 µA min/-360 µA max for Clock 1 and Clock 2. | | | | | | | | | | | | | | | | | | | | |
| 3 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$=-55°C. | | | | | | | | | | | | | | | | | | | | |

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03. Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Test no. | Clock 1 | Clear 1 | K1 | $V_{CC}$ | Clock 2 | Clear 2 | J2 | $\overline{Q}$ 2 | Q2 | K2 | GND | Q1 | $\overline{Q}$ 1 | J1 | | Min | Max | |
| 7 | | | 43 | B | B | B | 4.5 V | B | B | A | H 3/ | L 3/ | B | GND | L 3/ | H 3/ | A | All outputs | H or L as shown 3/ | | |
| $T_C$=+25°C | | | 44 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| 2/ 4/ | | | 45 | B | " | " | " | B | " | " | " | " | " | " | " | " | " | | | | |
| | | | 46 | B | " | A | " | B | " | " | " | " | A | " | " | " | " | | | | |
| | | | 47 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| | | | 48 | B | " | " | " | B | " | " | " | " | " | " | " | " | " | | | | |
| | | | 49 | B | A | " | " | B | A | " | " | " | " | " | " | " | " | | | | |
| | | | 50 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| | | | 51 | B | " | " | " | B | " | " | L | H | " | " | H | L | " | | | | |
| | | | 52 | A | " | " | " | A | " | " | L | H | " | " | H | L | " | | | | |
| | | | 53 | B | " | " | " | B | " | " | H | L | " | " | L | H | " | | | | |
| | | | 54 | A | " | " | " | A | " | " | H | L | " | " | L | H | " | | | | |
| | | | 55 | B | " | " | " | B | " | " | L | H | " | " | H | L | " | | | | |
| | | | 56 | B | " | B | " | B | " | B | " | " | B | " | " | " | B | | | | |
| | | | 57 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| | | | 58 | B | " | " | " | B | " | " | " | " | " | " | " | " | " | | | | |
| | | | 59 | " | B | " | " | " | B | " | H | L | " | " | L | H | " | | | | |
| | | | 60 | " | A | " | " | " | A | " | " | " | " | " | " | " | " | | | | |
| | | | 61 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| | | | 62 | B | " | " | " | B | " | " | " | " | " | " | " | " | " | | | | |
| | | | 63 | " | " | " | " | B | " | A | " | " | " | " | " | " | A | | | | |
| | | | 64 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| | | | 65 | B | " | " | " | B | " | " | L | H | " | " | H | L | " | | | | |
| | | | 66 | B | " | A | " | B | " | B | " | " | A | " | " | " | B | | | | |
| | | | 67 | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | | |
| | | | 68 | B | " | " | " | B | " | " | H | L | " | " | L | H | " | | | | |
| | | | 69 | A | B | " | " | A | B | A | " | " | " | " | " | " | A | | | | |
| | | | 70 | " | A | " | " | " | A | A | " | " | " | " | " | " | A | | | | |
| | | | 71 | " | " | " | " | " | " | B | " | " | " | " | " | " | B | | | | |
| | | | 72 | " | " | B | " | " | " | " | " | " | B | " | " | " | " | | | | |
| | | | 73 | B | " | B | " | B | " | " | L | H | B | " | H | L | " | | | | |
| | | | 74 | A | " | A | " | A | " | A | " | " | A | " | " | " | A | | | | |
| | | | 75 | " | " | B | " | " | " | A | " | " | B | " | " | " | A | | | | |
| | | | 76 | " | " | " | " | " | " | B | " | " | " | " | " | " | B | | | | |
| | | | 77 | B | " | " | " | B | " | B | H | L | " | " | L | H | B | | | | |
| | | | 78 | A | " | " | " | A | " | A | H | L | " | " | L | H | A | | | | |
| | | | 79 | B | " | " | " | B | " | " | L | H | " | " | H | L | " | | | | |
| | | | 80 | A | " | " | " | A | " | " | L | H | " | " | H | L | " | | | | |
| | | | 81 | A | B | " | " | " | B | " | H | L | " | " | L | H | " | | | | |
| 8 2/ 4/ | Same tests, terminal conditions, and limits as for subgroup 7, except $T_C$=+125°C and -55°C. | | | | | | | | | | | | | | | | | | | | |

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03. Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Test no. | Clock 1 | Clear 1 | K1 | $V_{CC}$ | Clock 2 | Clear 2 | J2 | $\overline{Q}$ 2 | Q2 | K2 | GND | Q1 | $\overline{Q}$ 1 | J1 | | Min | Max | |
| 9 $T_C$=+25°C | $f_{MAX}$ 5/ | (Fig. 7) | 82 | IN | B | 2.4 V | 5.0 V | | | | | | | GND | OUT | | 2.4 V | Clock/Q1 | 3 | | MHz |
| | | | 83 | IN | B | 2.4 V | " | | | | | | | " | | OUT | 2.4 V | Clock/$\overline{Q}$1 | " | | " |
| | | | 84 | | | | " | IN | B | 2.4 V | | OUT | 2.4 V | " | | | | Clock/Q2 | " | | " |
| | | | 85 | | | | " | IN | B | 2.4 V | OUT | | 2.4 V | " | | | | Clock/$\overline{Q}$2 | " | | " |
| | $t_{PLH}$ | 3003 (Fig. 6) | *86 CKT A | IN | IN | GND | " | | | | | | | " | | OUT | 2.4 V | Clear/$\overline{Q}$1 | 10 | 75 | ns |
| | | | *86 CKT B | IN | IN | GND | " | | | | | | | " | | OUT | " | Clear/Q1 | " | 50 | " |
| | | | *87 CKT A | | | | " | IN | IN | 2.4 V | OUT | | GND | " | | | " | Clear/Q2 | " | 75 | " |
| | | | *87 CKT B | | | | " | IN | IN | 2.4 V | OUT | | GND | " | | | " | Clear/$\overline{Q}$2 | " | 50 | " |
| | $t_{PHL}$ | | 88 CKT A | IN | IN | GND | " | | | | | | | " | OUT | | 2.4 V | Clear1/Q1 | " | 200 | " |
| | | | 88 CKT B | IN | IN | GND | " | | | | | | | " | OUT | | 2.4 V | Clear1/Q1 | " | 105 | " |
| | | | 89 CKT A | | | | " | IN | IN | 2.4 V | | OUT | GND | " | | | | Clear2/Q2 | " | 200 | " |
| | | | 89 CKT B | | | | " | IN | IN | 2.4 V | | OUT | GND | " | | | | Clear2/$\overline{Q}$2 | " | 105 | " |
| | | 3003 (Fig. 7) | 90 CKT A | IN | J | 2.4 V | " | | | | | | | " | | OUT | 2.4 V | Clock1/$\overline{Q}$1 | " | 150 | " |
| | | | 90 CKT B | " | " | " | " | | | | | | | " | | OUT | " | Clock1/Q1 | " | 75 | " |
| | | | 91 CKT A | " | " | " | " | | | | | | | " | OUT | | " | Clock1/Q1 | " | 150 | " |
| | | | 91 CKT B | " | " | " | " | | | | | | | " | " | | " | Clock1/Q1 | " | 75 | " |
| | $t_{PLH}$ | 3003 (Fig. 7) | 92 CKT A | " | " | " | " | | | | | | | " | " | | " | Clock1/Q1 | " | 75 | " |
| | | | 92 CKT B | " | " | " | " | | | | | | | " | " | | " | Clock1/$\overline{Q}$1 | " | 50 | " |
| | | | 93 CKT A | " | " | " | " | | | | | | | " | | OUT | " | Clock1/$\overline{Q}$1 | " | 75 | " |
| | | | 93 CKT B | " | " | " | " | | | | | | | " | | OUT | " | Clock1/Q1 | " | 50 | " |
| | | | 94 CKT A | | | | " | IN | J | 2.4 V | | OUT | 2.4 V | " | | | | Clock2/Q2 | " | 75 | " |
| | | | 94 CKT B | | | | " | " | " | " | | OUT | " | " | | | | Clock2/Q2 | " | 50 | " |
| | | | 95 CKT A | | | | " | " | " | " | OUT | | " | " | | | | Clock2/$\overline{Q}$2 | " | 75 | " |
| | | | 95 CKT B | | | | " | " | " | " | " | | " | " | | | | Clock2/Q2 | " | 50 | " |
| | $t_{PHL}$ | | 96 CKT A | | | | " | " | " | " | " | | " | " | | | | Clock2/$\overline{Q}$2 | " | 150 | " |
| | | | 96 CKT B | | | | " | " | " | " | " | | " | " | | | | Clock2/Q2 | " | 75 | " |
| | | | 97 CKT A | | | | " | " | " | " | | OUT | " | " | | | | Clock2/Q2 | " | 150 | " |
| | | | 97 CKT B | | | | " | " | " | " | | OUT | " | " | | | | Clock2/Q2 | " | 75 | " |
| 10 $T_C$=+125°C | $f_{MAX}$ 5/ | (Fig. 7) | 98 | IN | B | 2.4 V | " | | | | | | | " | OUT | | 2.4 V | Clock/$\overline{Q}$1 | 2.5 | | MHz |
| | | | 99 | IN | B | 2.4 V | " | | | | | | | " | | OUT | 2.4 V | Clock/Q1 | " | | " |
| | | | 100 | | | | " | IN | B | 2.4 V | | OUT | 2.4 V | " | | | | Clock/Q2 | " | | " |
| | | | 101 | | | | " | IN | B | 2.4 V | OUT | | 2.4 V | " | | | | Clock/$\overline{Q}$2 | " | | " |
| | $t_{PLH}$ | 3003 (Fig. 6) | *102 CKT A | IN | IN | GND | " | | | | | | | " | | OUT | 2.4 V | Clear1/$\overline{Q}$1 | 10 | 125 | ns |
| | | | *102 CKT B | IN | IN | GND | " | | | | | | | " | | OUT | 2.4 V | Clear1/Q1 | " | 65 | " |
| | | | *103 CKT A | | | | " | IN | IN | 2.4 V | OUT | | GND | " | | | | Clear2/Q2 | " | 125 | " |
| | | | *103 CKT B | | | | " | IN | IN | 2.4 V | OUT | | GND | " | | | | Clear2/$\overline{Q}$2 | " | 65 | " |
| | $t_{PHL}$ | | 104 CKT A | IN | IN | GND | " | | | | | | | " | OUT | | 2.4 V | Clear1/Q1 | " | 250 | " |
| | | | 104 CKT B | IN | IN | GND | " | | | | | | | " | OUT | | 2.4 V | Clear1/Q1 | " | 105 | " |
| | | | 105 CKT A | | | | " | IN | IN | 2.4 V | | OUT | GND | " | | | | Clear2/Q2 | " | 250 | " |
| | | | 105 CKT B | | | | " | IN | IN | 2.4 V | | OUT | GND | " | | | | Clear2/$\overline{Q}$2 | " | 105 | " |
| | | 3003 (Fig. 7) | 106 CKT A | IN | J | 2.4 V | " | | | | | | | " | | OUT | 2.4 V | Clock1/$\overline{Q}$1 | " | 200 | " |
| | | | 106 CKT B | " | " | " | " | | | | | | | " | | OUT | " | Clock1/Q1 | " | 85 | " |
| | | | 107 CKT A | " | " | " | " | | | | | | | " | OUT | | " | Clock1/Q1 | " | 200 | " |
| | | | 107 CKT B | " | " | " | " | | | | | | | " | OUT | | " | Clock1/Q1 | " | 85 | " |

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03. Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | Min | Max | |
| | | | Test no. | Clock 1 | Clear 1 | K1 | $V_{CC}$ | Clock 2 | Clear 2 | J2 | $\overline{Q}$ 2 | Q2 | K2 | GND | Q1 | $\overline{Q}$ 1 | J1 | | | | |
| 10 $T_C$=+125°C | $t_{PLH}$ | 3003 (Fig. 7) | 108 CKT A | IN | J | 2.4 V | 5.0 V | | | | | | | GND | OUT | | 2.4 V | Clock1/Q1 | 10 | 125 | ns |
| | | | 108 CKT B | " | " | " | " | | | | | | | " | OUT | | " | Clock1/$\underline{Q}$1 | " | 65 | " |
| | | | 109 CKT A | " | " | " | " | | | | | | | " | | OUT | " | Clock1/$\underline{Q}$1 | " | 125 | " |
| | | | 109 CKT B | " | " | " | " | | | | | | | " | | OUT | " | Clock1/Q1 | " | 65 | " |
| | | | 110 CKT A | | | | " | IN | J | 2.4 V | | OUT | 2.4 V | " | | | | Clock2/Q2 | " | 125 | " |
| | | | 110 CKT B | | | | " | " | " | " | | OUT | " | " | | | | Clock2/$\underline{Q}$2 | " | 65 | " |
| | | | 111 CKT A | | | | " | " | " | " | OUT | | " | " | | | | Clock2/$\underline{Q}$2 | " | 125 | " |
| | | | 111 CKT B | | | | " | " | " | " | " | | " | " | | | | Clock2/Q2 | " | 65 | " |
| | $t_{PHL}$ | | 112 CKT A | | | | " | " | " | " | " | | " | " | | | | Clock2/$\overline{\underline{Q}}$2 | | 200 | " |
| | | | 112 CKT B | | | | " | " | " | " | " | | " | " | | | | Clock2/$\underline{Q}$2 | | 85 | " |
| | | | 113 CKT A | | | | " | " | " | " | | OUT | " | " | | | | Clock2/$\underline{Q}$2 | | 200 | " |
| | | | 113 CKT B | | | | " | " | " | " | | OUT | " | " | | | | Clock2/Q2 | | 85 | " |
| 11 | Same tests, terminal conditions, and limits as for subgroup 10, except $T_C$ = -55°C. | | | | | | | | | | | | | | | | | | | | |

NOTE: A = normal clock pulse, B = momentary GND, then 4.5 V, E = momentary GND, then open.
F = momentary 4.5 V, then GND. J = input pulse, $t_p \geq 100$ ns, PRR = 0.5 MHz, $V_{OL}$ = 0 V, $V_{OH}$ = 4.5 V.

1/ Terminal conditions (pins not designated may be H ≥ 2.0 V, or L ≤ 0.8 V, or open).
2/ Tests shall be performed in sequence.
3/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L ≤ 1.5 V when using a high speed checker single comparator.
4/ Input voltages shown are: A = 2.4 V minimum and B = 0.4 V maximum.
5/ $f_{MAX}$, minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.
* These tests are performed at device manufacturer's option.
** Test time limit ≤ 100 ns.

TABLE III. Group A inspection for device type 04. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | Min | Max | |
| | | | Test no. | Clock | Preset 1 | J1 | $V_{CC}$ | Clear | Preset 2 | K2 | Q2 | $\overline{Q}$ 2 | J2 | GND | $\overline{Q}$ 1 | Q1 | K1 | | | | |
| 1 $T_C$=+25°C | $V_{OH}$ | 3006 | 1 | A | 4.5 V | 2.0 V | 4.5 V | 4.5 V | | | | | | GND | | -100µA | 0.7 V | Q1 | 2.4 | | V |
| | | | 2 | A | 4.5 V | 0.7 V | " | " | | | | | | " | -100µA | | 2.0 V | Q1 | " | | " |
| | | | 3 | 4.5 V | 0.7 V | 4.5 V | " | " | | | | | | " | | -100µA | 4.5 V | Q1 | " | | " |
| | | | 4 | " | 4.5 V | 4.5 V | " | 0.7 V | | | | | | " | -100µA | | 4.5 V | Q1 | " | | " |
| | | | 5 | " | | | " | 0.7 V | 4.5 V | 4.5 V | | -100µA | 4.5 V | " | | | | Q2 | " | | " |
| | | | 6 | " | | | " | 4.5 V | 0.7 V | 4.5 V | -100µA | | 4.5 V | " | | | | Q2 | " | | " |
| | | | 7 | A | | | " | " | 4.5 V | 2.0 V | | -100µA | 0.7 V | " | | | | Q2 | " | | " |
| | | | 8 | " | | | " | " | 4.5 V | 0.7 V | -100µA | | 2.0 V | " | | | | Q2 | " | | " |
| | $V_{OH}$ | 3007 | 9 | " | 4.5 V | 0.7 V | " | " | | | | | | " | | 2 mA | 2.0 V | Q1 | | 0.3 | " |
| | | | 10 | " | " | 2.0 V | " | " | | | | | | " | 2 mA | | 0.7 V | Q1 | | " | " |
| | | | 11 | 4.5 V | " | 4.5 V | " | 0.7 V | | | | | | " | | 2 mA | 4.5 V | Q1 | | " | " |
| | | | 12 | " | 0.7 V | 4.5 V | " | 4.5 V | | | | | | " | 2 mA | | 4.5 V | Q1 | | " | " |
| | | | 13 | " | | | " | 0.7 V | 4.5 V | 4.5 V | 2 mA | | 4.5 V | " | | | | Q2 | | " | " |
| | | | 14 | " | | | " | 4.5 V | 0.7 V | 4.5 V | | 2 mA | 4.5 V | " | | | | Q2 | | " | " |
| | | | 15 | A | | | " | " | 4.5 V | 2.0 V | 2 mA | | 0.7 V | " | | | | Q2 | | " | " |
| | | | 16 | " | | | " | " | 4.5 V | 0.7 V | | 2 mA | 2.0 V | " | | | | Q2 | | " | " |
| | $I_{IL1}$ | 3009 | 17 | 4.5 V | | 0.3 V | 5.5 V | " | GND | GND | | | GND | " | | E | | J1 | -43 | -140 | µA |
| | | | 18 | " | | | " | " | GND | GND | | | GND | " | E | | 0.3 V | K1 | " | " | " |
| | | | 19 | " | GND | GND | " | " | | | E | | 0.3 V | " | | | GND | J2 | " | " | " |
| | | | 20 | " | GND | GND | " | " | | 0.3 V | | E | | " | | | GND | K2 | " | " | " |
| | $I_{IL2}$ | | 21 | 4.5 V | 0.3 V | | " | | | | | | | " | | | 4.5 V | Preset 1 | -86 | -280 | " |
| | $I_{IL2}$ | | 22 | 4.5 V | | | " | | 0.3 V | 4.5 V | | | | " | | | | Preset 2 | -86 | -280 | " |
| | $I_{IL3}$ | | 23 | 0.3 V | | 4.5 V | " | B | | " | | | 4.5 V | " | | | 4.5 V | Clock | -172 | -560 | " |
| | $I_{IL3}$ | | 24 | 4.5 V | | 4.5 V | " | 0.3 V | | " | | | 4.5 V | " | | | 4.5 V | Clear | -172 | -560 | " |
| | $I_{IH1}$ | 3010 | 25 | GND | B | 2.4 V | " | GND | | | | | | " | | | | J1 | | 10 | " |
| | | | 26 | " | GND | | " | B | | | | | | " | | | 2.4 V | K1 | | " | " |
| | | | 27 | " | | | " | B | GND | 2.4 V | | | | " | | | | K2 | | " | " |
| | | | 28 | " | | | " | GND | B | | | | 2.4 V | " | | | | J2 | | " | " |
| | $I_{IH2}$ | | 29 | " | B | 5.5 V | " | GND | | | | | | " | | | | J1 | | 100 | " |
| | | | 30 | " | GND | | " | B | | | | | | " | | | 5.5 V | K1 | | " | " |
| | | | 31 | " | | | " | B | GND | 5.5 V | | | | " | | | | K2 | | " | " |
| | | | 32 | " | | | " | GND | B | | | | 5.5 V | " | | | | J2 | | " | " |
| | $I_{IH3}$ | | 33 | " | 2.4 V | | " | " | | | | | | " | | | GND | Preset 1 | | 20 | " |
| | $I_{IH3}$ | | 34 | " | | | " | " | 2.4 V | GND | | | | " | | | | Preset 2 | | 20 | " |
| | $I_{IH4}$ | | 35 | " | 5.5 V | | " | " | | | | | | " | | | GND | Preset 1 | | 200 | " |
| | $I_{IH4}$ | | 36 | " | | | " | " | 5.5 V | GND | | | | " | | | | Preset 2 | | 200 | " |
| | $I_{IH7}$ | | 37 | " | GND | GND | " | 2.4 V | GND | | | | GND | " | | | | Clear | | 40 | " |
| | $I_{IH8}$ | | 38 | " | GND | " | " | 5.5 V | GND | | | | " | " | | | | Clear | | 400 | " |
| | $I_{IH9}$ | | 39 | 2.4 V | | " | " | GND | | GND | | | " | " | | | GND | Clock | | -400 | " |
| | $I_{IH8}$ | | 40 | 5.5 V | | " | " | GND | | GND | | | " | " | | | GND | Clock | | 400 | " |
| | $I_{OS}$ | 3011 | 41 | 4.5 V | GND | 4.5 V | " | | | 4.5 V | | | 4.5 V | " | | GND | 4.5 V | Q1 | -3 | -15 | mA |
| | | | 42 | " | | " | " | GND | | " | | | " | " | GND | | " | Q1 | " | " | " |
| | | | 43 | " | | " | " | GND | | " | | GND | " | " | | | " | Q2 | " | " | " |
| | | | 44 | " | | " | " | | GND | " | GND | | " | " | | | " | Q2 | " | " | " |

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.- Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Test no. | Clock | Preset 1 | J1 | $V_{CC}$ | Clear | Preset 2 | K2 | Q2 | $\overline{Q}$ 2 | J2 | GND | $\overline{Q}$ 1 | Q1 | K1 | | Min | Max | |
| 1<br>$T_C$=+25°C | $I_{CC}$ | 3005 | 45 CKT A | GND | 4.5 V | GND | 5.5 V | GND | 4.5 V | GND | | | GND | GND | | | GND | $V_{CC}$ | | 3.80 | mA |
| | | | 45 CKT B | " | 4.5 V | " | " | GND | 4.5 V | " | | | " | " | | | " | " | | 2.88 | " |
| | | | 46 CKT A | " | GND | " | " | 4.5 V | GND | " | | | " | " | | | " | " | | 3.80 | " |
| | | | 46 CKT B | " | GND | " | " | 4.5 V | GND | " | | | " | " | | | " | " | | 2.88 | " |
| 2 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$ = +125°C. | | | | | | | | | | | | | | | | | | | | |
| 3 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$ = -55°C. | | | | | | | | | | | | | | | | | | | | |
| 7<br>$T_C$=+25°C<br>2/ 4/ | | | 47 | A | B | B | 4.5 V | A | B | A | H 3/ | L 3/ | B | GND | L 3/ | H 3/ | A | All outputs | H or L as shown 3/ | | |
| | | | 48 | A | A | " | " | " | A | " | H | L | " | " | L | H | " | " | | | |
| | | | 49 | B | " | " | " | " | " | " | L | H | " | " | H | L | " | " | | | |
| | | | 50 | A | " | " | " | " | " | B | " | " | " | " | " | " | B | " | | | |
| | | | 51 | B | " | " | " | " | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 52 | A | " | A | " | " | " | " | " | " | A | " | " | " | " | " | | | |
| | | | 53 | B | " | " | " | " | " | " | H | L | " | " | L | H | " | " | | | |
| | | | 54 | A | " | " | " | " | " | A | H | L | " | " | L | H | A | " | | | |
| | | | 55 | B | " | " | " | " | " | A | L | H | " | " | H | L | A | " | | | |
| | | | 56 | " | B | B | " | " | B | B | H | L | B | " | L | H | B | " | | | |
| | | | 57 | " | A | B | " | B | A | B | L | H | B | " | H | L | B | " | | | |
| 8 2/ 4/ | Same tests, terminal conditions, and limits as for subgroup 7, except $T_C$ = +125°C and -55°C. | | | | | | | | | | | | | | | | | | | | |
| 9<br>$T_C$=+25°C | $f_{MAX}$ 5/ | (Fig.9) | 58 | IN | 2.4 V | 2.4 V | 5.0 V | B | | | | | | GND | | OUT | 2.4 V | Clock/Q1 | 3 | | MHz |
| | | | 59 | " | 2.4 V | 2.4 V | " | " | | | | | | " | OUT | | 2.4 V | Clock/Q1 | " | | " |
| | | | 60 | " | | | " | " | 2.4 V | 2.4 V | OUT | | 2.4 V | " | | | | Clock/Q2 | " | | " |
| | | | 61 | " | | | " | " | 2.4 V | 2.4 V | | OUT | 2.4 V | " | | | | Clock/Q2 | " | | " |
| | $t_{PLH}$ | 3003 (Fig. 8) | *62 CKT A | 2.4 V | J | 2.4V | " | IN | | | | | | " | OUT | | 2.4 V | Clear/$\overline{Q}$1 | 10 | 75 | ns |
| | | | *62 CKT B | " | J | " | " | IN | | | | | | " | OUT | | " | Clear/Q1 | " | 50 | " |
| | | | *63 CKT A | " | IN | " | " | J | | | | | | " | | OUT | " | Preset 1/Q1 | " | 75 | " |
| | | | *63 CKT B | " | IN | " | " | J | | | | | | " | | OUT | " | Preset 1/Q1 | " | 50 | " |
| | | | *64 CKT A | " | | | " | IN | J | 2.4 V | | OUT | 2.4 V | " | | | | Clear/Q2 | " | 75 | " |
| | | | *64 CKT B | " | | | " | IN | J | " | | OUT | " | " | | | | Clear/Q2 | " | 50 | " |
| | | | *65 CKT A | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 75 | " |
| | | | *65 CKT B | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 50 | " |
| | $t_{PHL}$ | | 66 CKT A | GND | J | 2.4 V | " | IN | | | | | | " | OUT | | 2.4 V | Clear/Q1 | " | 200 | " |
| | | | 66 CKT B | " | J | " | " | IN | | | | | | " | OUT | | " | Clear/Q1 | " | 90 | " |
| | | | 67 CKT A | " | IN | " | " | J | | | | | | " | | OUT | " | Preset 1/Q1 | " | 200 | " |
| | | | 67 CKT B | " | IN | " | " | J | | | | | | " | | OUT | " | Preset 1/Q1 | " | 90 | " |
| | | | 68 CKT A | " | | | " | IN | J | 2.4 V | | OUT | 2.4 V | " | | | | Clear/Q2 | " | 200 | " |
| | | | 68 CKT B | " | | | " | IN | J | " | | OUT | " | " | | | | Clear/Q2 | " | 90 | " |
| | | | 69 CKT A | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 200 | " |
| | | | 69 CKT B | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 90 | " |
| | $t_{PLH}$ | 3003 (Fig. 9) | 70 CKT A | IN | 2.4 V | 2.4 V | " | J | | | | | | " | | OUT | 2.4 V | Clock1/Q1 | " | 75 | " |
| | | | 70 CKT B | " | 2.4 V | " | " | J | | | | | | " | | OUT | " | Clock1/Q1 | " | 50 | " |
| | | | 71 CKT A | " | J | " | " | 4.5 V | | | | | | " | OUT | | " | Clock1/Q1 | " | 75 | " |
| | | | 71 CKT B | " | J | " | " | 4.5 V | | | | | | " | OUT | | " | Clock1/Q1 | " | 50 | " |
| | | | 72 CKT A | " | | | " | J | 2.4 V | 2.4 V | OUT | | 2.4 V | " | | | | Clock2/Q2 | " | 75 | " |
| | | | 72 CKT B | " | | | " | J | 2.4 V | " | OUT | | " | " | | | | Clock2/Q2 | " | 50 | " |
| | | | 73 CKT A | " | | | " | 4.5 V | J | " | | OUT | " | " | | | | Clock2/Q2 | " | 75 | " |
| | | | 73 CKT B | " | | | " | 4.5 V | J | " | | OUT | " | " | | | | Clock2/Q2 | " | 50 | " |

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.- Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,C,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Test no. | Clock | Preset 1 | J1 | $V_{CC}$ | Clear | Preset 2 | K2 | Q2 | $\overline{Q}$ 2 | J2 | GND | $\overline{Q}$ 1 | Q1 | K1 | | Min | Max | |
| 9 | $t_{PLH}$ | 3003 | 74 CKT A | IN | J | 2.4 V | 5.0 V | 4.5 V | | | | | | GND | | OUT | 2.4 V | Clock1/Q1 | 10 | 150 | ns |
| $T_C$=+25°C | | (Fig. 9) | 74 CKT B | " | J | " | " | 4.5 V | | | | | | " | | OUT | " | Clock1/$\overline{Q}$1 | " | 70 | " |
| | | | 75 CKT A | " | 2.4 V | " | " | J | | | | | | " | OUT | | " | Clock1/$\overline{Q}$1 | " | 150 | " |
| | | | 75 CKT B | " | 2.4 V | " | " | J | | | | | | " | OUT | | " | Clock1/Q1 | " | 70 | " |
| | | | 76 CKT A | " | | | " | 4.5 V | J | 2.4 V | OUT | | 2.4 V | " | | | | Clock2/Q2 | " | 150 | " |
| | | | 76 CKT B | " | | | " | 4.5 V | J | " | OUT | | " | " | | | | Clock2/$\overline{Q}$2 | " | 70 | " |
| | | | 77 CKT A | " | | | " | J | 4.5 V | " | | OUT | " | " | | | | Clock2/$\overline{Q}$2 | " | 150 | " |
| | | | 77 CKT B | " | | | " | J | 4.5 V | " | | OUT | " | " | | | | Clock2/Q2 | " | 70 | " |
| 10 | $f_{MAX}$ 5/ | (Fig. 9) | 78 | " | 2.4 V | 2.4 V | " | B | | | | | | " | | OUT | 2.4 V | Clock/$\overline{Q}$1 | 2.5 | | MHz |
| $T_C$=+125°C | | | 79 | " | 2.4 V | 2.4 V | " | " | | | | | | " | OUT | | 2.4 V | Clock/Q1 | " | | " |
| | | | 80 | " | | | " | " | 2.4 V | 2.4 V | OUT | | 2.4 V | " | | | | Clock/$\overline{Q}$2 | " | | " |
| | | | 81 | " | | | " | " | 2.4 V | 2.4 V | | OUT | 2.4 V | " | | | | Clock/$\overline{Q}$2 | " | | " |
| | $t_{PLH}$ | 3003 | *82 CKT A | 2.4 | J | 2.4 V | " | IN | | | | | | " | OUT | | 2.4 V | Clear/$\overline{Q}$1 | 10 | 125 | ns |
| | | (Fig. 8) | *82 CKT B | " | J | " | " | IN | | | | | | " | OUT | | " | Clear/Q1 | " | 65 | " |
| | | | *83 CKT A | " | IN | " | " | J | | | | | | " | | OUT | " | Preset 1/Q1 | " | 125 | " |
| | | | *83 CKT B | " | IN | " | " | J | | | | | | " | | OUT | " | Preset $\overline{1}$/Q1 | " | 65 | " |
| | | | *84 CKT A | " | | | " | IN | J | 2.4 V | | OUT | 2.4 V | " | | | | Clear/$\overline{Q}$2 | " | 125 | " |
| | | | *84 CKT B | " | | | " | IN | J | " | | OUT | " | " | | | | Clear/Q2 | " | 65 | " |
| | | | *85 CKT A | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 125 | " |
| | | | *85 CKT B | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 65 | " |
| | $t_{PHL}$ | | 86 CKT A | GND | J | 2.4 V | " | IN | | | | | | " | | OUT | 2.4 V | Clear/Q1 | " | 250 | " |
| | | | 86 CKT B | " | J | " | " | IN | | | | | | " | | OUT | " | Clear/$\overline{Q}$1 | " | 100 | " |
| | | | 87 CKT A | " | IN | " | " | J | | | | | | " | OUT | | " | Preset 1/$\overline{Q}$1 | " | 250 | " |
| | | | 87 CKT B | " | IN | " | " | J | | | | | | " | OUT | | " | Preset 1/Q1 | " | 100 | " |
| | | | 88 CKT A | " | | | " | IN | J | 2.4 V | | OUT | 2.4 V | " | | | | Clear/Q2 | " | 250 | " |
| | | | 88 CKT B | " | | | " | IN | J | " | | OUT | " | " | | | | Clear/$\overline{Q}$2 | " | 100 | " |
| | | | 89 CKT A | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/$\overline{Q}$2 | " | 250 | " |
| | | | 89 CKT B | " | | | " | J | IN | " | OUT | | " | " | | | | Preset 2/Q2 | " | 100 | " |
| | $t_{PLH}$ | 3003 | 90 CKT A | IN | 2.4 V | 2.4 V | " | J | | | | | | " | | OUT | 2.4 V | Clock/Q1 | " | 125 | ns |
| | | (Fig. 9) | 90 CKT B | " | 2.4 V | " | " | J | | | | | | " | | OUT | " | Clock/$\overline{Q}$1 | " | 65 | " |
| | | | 91 CKT A | " | J | " | " | 4.5 V | | | | | | " | OUT | | " | Clock/$\overline{Q}$1 | " | 125 | " |
| | | | 91 CKT B | " | J | " | " | 4.5 V | | | | | | " | OUT | | " | Clock/Q1 | " | 65 | " |
| | | | 92 CKT A | " | | | " | J | 2.4 V | 2.4 V | OUT | | 2.4 V | " | | | | Clock/Q2 | " | 125 | " |
| | | | 92 CKT B | " | | | " | J | 2.4 V | " | OUT | | " | " | | | | Clock/$\overline{Q}$2 | " | 65 | " |
| | | | 93 CKT A | " | | | " | 4.5 V | J | " | | OUT | " | " | | | | Clock/$\overline{Q}$2 | " | 125 | " |
| | | | 93 CKT B | " | | | " | 4.5 V | J | " | | OUT | " | " | | | | Clock/Q2 | " | 65 | " |
| | $t_{PHL}$ | | 94 CKT A | " | J | 2.4 V | " | 4.5 V | | | | | | " | | OUT | 2.4 V | Clock/Q1 | | 200 | " |
| | | | 94 CKT B | " | J | " | " | 4.5 V | | | | | | " | | OUT | " | Clock/$\overline{Q}$1 | | 85 | " |
| | | | 95 CKT A | " | 2.4 V | " | " | J | | | | | | " | OUT | | " | Clock/$\overline{Q}$1 | | 200 | " |
| | | | 95 CKT B | " | 2.4 V | " | " | J | | | | | | " | OUT | | " | Clock/Q1 | | 85 | " |
| | | | 96 CKT A | " | | | " | 4.5 V | J | 2.4 V | OUT | | 2.4 V | " | | | | Clock/Q2 | | 200 | " |
| | | | 96 CKT B | " | | | " | 4.5 V | J | " | OUT | | " | " | | | | Clock/$\overline{Q}$2 | | 85 | " |
| | | | 97 CKT A | " | | | " | J | 4.5 V | " | | OUT | " | " | | | | Clock/$\overline{Q}$2 | | 200 | " |
| | | | 97 CKT B | " | | | " | J | 4.5 V | " | | OUT | " | " | | | | Clock/Q2 | | 85 | " |
| 11 | Same tests, terminal conditions, and limits as for subgroup 10, except $T_C$=-55°C. | | | | | | | | | | | | | | | | | | | | |

See footnotes on next page.

TABLE III. Group A inspection for device type 04.- Continued. 1/

NOTE: A = normal clock pulse, B = momentary GND, then 4.5 V, E = momentary GND, then open.
J = input pulse, $t_p \geq 100$ ns, $V_{OL} = 0$ V, $V_{OH} = 4.5$ V.

1/ Terminal conditions (pins not designated may be H ≥ 2.0 V, or L ≤ 0.8 V, or open).
2/ Tests shall be performed in sequence.
3/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L ≤ 1.5 V when using a high speed checker single comparator.
4/ Input voltages shown are: A = 2.4 V minimum and B = 0.4 V maximum.
5/ $f_{MAX}$, minimum limit specified is the frequency of the input pulse. The output frequency shall be one-half of the input frequency.
* These tests are performed at device manufacturer's option.

TABLE III. Group A inspection for device type 05. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 3 | 2 | 1 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | | Min | Max | |
| | | | Test no. | Clock 1 | D1 | Clear 1 | $V_{CC}$ | Clear 2 | D2 | Clock 2 | Preset 2 | Q2 | $\overline{Q}$ 2 | GND | $\overline{Q}$ 1 | Q1 | Preset 1 | | | | |
| 1<br>$T_C$=+25°C | $V_{OH}$ | 3006 | 1 | A | 2.0 V | 4.5 V | 4.5 V | | | | | | | GND | | -100µA | 4.5 V | $\overline{Q}$1 | 2.4 | | V |
| | | | 2 | A | 0.7 V | 4.5 V | " | | | | | | | " | -100µA | | 4.5 V | $\overline{Q}$1 | " | | " |
| | | | 3 | | | 0.7 V | " | | | | | | | " | -100µA | | 2.0 V | Q1 | " | | " |
| | | | 4 | | | 2.0 V | " | | | | | | | " | | -100µA | 0.7 V | Q1 | " | | " |
| | | | 5 | | | | " | 4.5 V | 2.0 V | A | 4.5 V | -100µA | | " | | | | $\overline{Q}$2 | " | | " |
| | | | 6 | | | | " | 4.5 V | 0.7 V | A | 4.5 V | | -100µA | " | | | | $\overline{Q}$2 | " | | " |
| | | | 7 | | | | " | 0.7 V | | | 2.0 V | | -100µA | " | | | | Q2 | " | | " |
| | | | 8 | | | | " | 2.0 V | | | 0.7 V | -100µA | | " | | | | Q2 | " | | " |
| | $V_{OL}$ | 3007 | 9 | A | 2.0 V | 4.5 V | " | | | | | | | " | 2 mA | | 4.5 V | $\overline{Q}$1 | | 0.3 | " |
| | | | 10 | A | 0.7 V | 4.5 V | " | | | | | | | " | | 2 mA | 4.5 V | Q1 | | " | " |
| | | | 11 | | | 0.7 V | " | | | | | | | " | | 2 mA | 2.0 V | $\overline{Q}$1 | | " | " |
| | | | 12 | | | 2.0 V | " | | | | | | | " | 2 mA | | 0.7 V | $\overline{Q}$1 | | " | " |
| | | | 13 | | | | " | 4.5 V | 2.0 V | A | 4.5 V | | 2 mA | " | | | | $\overline{Q}$2 | | " | " |
| | | | 14 | | | | " | 4.5 V | 0.7 V | A | 4.5 V | 2 mA | | " | | | | Q2 | | " | " |
| | | | 15 | | | | " | 0.7 V | | | 2.0 V | 2 mA | | " | | | | $\overline{Q}$2 | | " | " |
| | | | 16 | | | | " | 2.0 V | | | 0.7 V | | 2 mA | " | | | | Q2 | | " | " |
| | $I_{IL4}$ | 3009 | 17 | 4.5 V | 0.3 V | 4.5 V | 5.5 V | | | | | | | " | | | GND | D1 | -60 | -180 | µA |
| | | | 18 | GND | GND | 4.5 V | " | | | | | | | " | | | 0.3 V | Preset 1 | " | " | " |
| | | | 19 | | | | " | 4.5 V | 0.3 V | 4.5 V | GND | | | " | | | | D2 | " | " | " |
| | | | 20 | | | | " | 4.5 V | GND | GND | 0.3 V | | | " | | | | Preset 2 | " | " | " |
| | $I_{IL5}$ | | 21 | 0.3 V | GND | 4.5 V | " | | | | | | | " | | | GND | Clock 1 | -120 | -360 | " |
| | | | 22 | 4.5 V | 4.5 V | 0.3 V | " | | | | | | | " | | | 4.5 V | Clear 1 | " | " | " |
| | | | 23 | | | | " | 4.5 V | GND | 0.3 V | GND | | | " | | | | Clock 2 | " | " | " |
| | | | 24 | | | | " | 0.3 V | 4.5 V | 4.5 V | 4.5 V | | | | | | | Clear 2 | " | " | " |
| | $I_{IH1}$ | 3010 | 25 | 4.5 V | 2.4 V | GND | " | | | | | | | " | | | 4.5 V | D1 | | 10 | " |
| | $I_{IH1}$ | | 26 | | | | " | GND | 2.4 V | 4.5 V | 4.5 V | | | " | | | | D2 | | 10 | " |
| | $I_{IH2}$ | | 27 | 4.5 V | 5.5 V | GND | " | | | | | | | " | | | 4.5 V | D1 | | 100 | " |
| | $I_{IH2}$ | | 28 | | | | " | GND | 5.5 V | 4.5 V | 4.5 V | | | " | | | | D2 | | 100 | " |
| | $I_{IH3}$ | | 29 | 2.4 V | 4.5 V | GND | " | | | | | | | " | | | 4.5 V | Clock 1 | | 20 | " |
| | | | 30 | B | 4.5 V | 4.5 V | " | | | | | | | " | | | 2.4 V | Preset 1 | | " | " |
| | | | 31 | | | | " | GND | 4.5 V | 2.4 V | 4.5 V | | | " | | | | Clock 2 | | " | " |
| | | | 32 | | | | " | 4.5 V | 4.5 V | B | 2.4 V | | | " | | | | Preset 2 | | " | " |
| | $I_{IH4}$ | | 33 | 5.5 V | 4.5 V | GND | " | | | | | | | " | | | 4.5 V | Clock 1 | | 200 | " |
| | | | 34 | B | 4.5 V | 4.5 V | " | | | | | | | " | | | 5.5 V | Preset 1 | | " | " |
| | | | 35 | | | | " | GND | 4.5 V | 5.5 V | 4.5 V | | | " | | | | Clock 2 | | " | " |
| | | | 36 | | | | " | 4.5 V | 4.5 V | B | 5.5 V | | | " | | | | Preset 2 | | " | " |
| | $I_{IH5}$ | | 37 | B | GND | 2.4 V | " | | | | | | | " | | | | Clear 1 | | 30 | " |
| | $I_{IH5}$ | | 38 | | | | " | 2.4 V | GND | B | | | | " | | | | Clear 2 | | 30 | " |
| | $I_{IH6}$ | | 39 | B | GND | 5.5 V | " | | | | | | | " | | | | Clear 1 | | 300 | " |
| | $I_{IH6}$ | | 40 | | | | " | 5.5 V | GND | B | | | | " | | | | Clear 2 | | 300 | " |
| | $I_{OS}$ | 3011 | 41 | | | | " | | | | | | | " | | GND | GND | $\overline{Q}$1 | -3 | -15 | mA |
| | | | 42 | | | GND | " | | | | | | | " | GND | | | Q1 | " | " | " |
| | | | 43 | | | | " | | | | GND | GND | | " | | | | $\overline{Q}$2 | " | " | " |
| | | | 44 | | | | " | GND | | | | | GND | " | | | | Q2 | " | " | " |
| | $I_{CC}$ | 3005 | 45 | GND | GND | 4.5 V | " | 4.5 V | GND | GND | GND | | | " | | | GND | $V_{CC}$ | | 3.0 | " |
| | $I_{CC}$ | 3005 | 46 | GND | GND | GND | " | GND | GND | GND | 4.5 V | | | " | | | 4.5 V | $V_{CC}$ | | 3.0 | " |
| 2 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$=+125°C and $I_{IL4}$ = -50 µA min/-180 µA max for Preset 1 and Preset 2. | | | | | | | | | | | | | | | | | | | | |
| 3 | Same tests, terminal conditions and limits as for subgroup 1, except $T_C$=-55°C | | | | | | | | | | | | | | | | | | | | |

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D / Case C / Test no. | 1 / 3 / Clock 1 | 2 / 2 / D1 | 3 / 1 / Clear 1 | 4 / 14 / $V_{CC}$ | 5 / 13 / Clear 2 | 6 / 12 / D2 | 7 / 11 / Clock 2 | 8 / 10 / Preset 2 | 9 / 9 / Q2 | 10 / 8 / $\overline{Q}$ 2 | 11 / 7 / GND | 12 / 6 / $\overline{Q}$ 1 | 13 / 5 / Q1 | 14 / 4 / Preset 1 | Measured terminal | Test limits Min | Test limits Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 $T_C$=+25°C 2/ 3/ | | | 47 | B | B | B | 4.5 V | B | B | B | B | H 4/ | H 4/ | GND | H 4/ | H 4/ | B | All outputs | H or L as shown 3/ | | |
| | | | 48 | " | " | B | " | B | " | " | A | L | " | " | " | L | A | | | | |
| | | | 49 | " | " | A | " | A | " | " | A | L | " | " | " | L | A | " | | | |
| | | | 50 | " | " | " | " | " | " | " | B | H | L | " | L | H | B | " | | | |
| | | | 51 | A | " | " | " | " | " | A | " | " | L | " | L | " | " | " | | | |
| | | | 52 | " | " | B | " | B | " | " | " | " | H | " | H | " | " | " | | | |
| | | | 53 | " | A | " | " | " | A | " | " | " | " | " | " | " | " | " | | | |
| | | | 54 | " | " | " | " | " | " | " | A | L | " | " | " | L | A | " | | | |
| | | | 55 | " | " | A | " | A | " | " | A | L | " | " | " | L | A | " | | | |
| | | | 56 | " | " | " | " | " | " | " | B | H | L | " | L | H | B | " | | | |
| | | | 57 | " | " | " | " | " | " | " | A | " | " | " | " | " | A | " | | | |
| | | | 58 | B | " | " | " | " | " | B | " | " | " | " | " | " | " | " | | | |
| | | | 59 | B | B | " | " | " | B | B | " | " | " | " | " | " | " | " | | | |
| | | | 60 | A | " | " | " | " | " | A | " | L | H | " | H | L | " | " | | | |
| | | | 61 | " | " | " | " | " | " | " | B | H | L | " | L | H | B | " | | | |
| | | | 62 | " | A | B | " | B | A | " | " | " | H | " | H | " | " | " | | | |
| | | | 63 | " | B | " | " | " | B | " | " | " | " | " | " | " | " | " | | | |
| | | | 64 | " | " | " | " | " | " | " | A | L | " | " | " | L | A | " | | | |
| | | | 65 | " | " | A | " | A | " | " | " | " | " | " | " | " | " | " | | | |
| | | | 66 | B | A | " | " | " | A | B | " | " | " | " | " | " | " | " | | | |
| | | | 67 | A | " | " | " | " | " | A | " | H | L | " | L | H | " | " | | | |
| | | | 68 | " | " | " | " | " | " | " | B | " | " | " | " | " | B | " | | | |
| | | | 69 | " | " | " | " | " | " | " | A | " | " | " | " | " | A | " | | | |
| | | | 70 | " | " | B | " | B | " | " | " | L | H | " | H | L | " | " | | | |
| | | | 71 | " | " | A | " | A | " | " | " | L | H | " | H | L | " | " | | | |
| | | | 72 | " | B | " | " | " | B | " | B | H | L | " | L | H | B | " | | | |
| | | | 73 | " | B | " | " | " | B | " | A | H | L | " | L | H | A | " | | | |
| 8 2/ 3/ | Same tests, terminal conditions, and limits as for subgroup 7, except $T_C$=+125°C and -55°C. | | | | | | | | | | | | | | | | | | | | |
| 9 $T_C$=+25°C | $f_{MAX}$ 5/ | (Fig. 12) | 74 | IN | IN(H) | 5.0 V | 5.0 V | | | | | | | GND | | OUT | B | Clock1/Q1 | 3 | | MHz |
| | | | 75 | IN | IN(G) | 5.0 V | " | | | | | | | " | OUT | | B | Clock1/Q1 | " | | " |
| | | | 76 | | | | " | 5.0 V | IN(H) | IN | B | OUT | | " | | | | Clock2/Q2 | " | | " |
| | | | 77 | | | | " | 5.0 V | IN(G) | IN | B | | OUT | " | | | | Clock2/Q2 | " | | " |
| | $t_{PLH}$ | 3003 (Fig. 10) | 78 CKT A | | | IN | " | | | | | | | " | OUT | | J | Clear1/$\overline{Q}$1 | 10 | 75 | ns |
| | | | 78 CKT B | | | IN | " | | | | | | | " | OUT | | J | Clear1/Q1 | " | 65 | " |
| | | | 79 CKT A | | | J | " | | | | | | | " | | OUT | IN | Preset 1/Q1 | " | 75 | " |
| | | | 79 CKT B | | | J | " | | | | | | | " | | OUT | IN | Preset 1/$\overline{Q}$1 | " | 65 | " |
| | | | 80 CKT A | | | | " | IN | | | J | | OUT | " | | | | Clear2/$\overline{Q}$2 | " | 75 | " |
| | | | 80 CKT B | | | | " | IN | | | J | | OUT | " | | | | Clear2/Q2 | " | 65 | " |
| | | | 81 CKT A | | | | " | J | | | IN | OUT | | " | | | | Preset 2/Q2 | " | 75 | " |
| | | | 81 CKT B | | | | " | J | | | IN | OUT | | " | | | | Preset 2/Q2 | " | 65 | " |
| | $t_{PHL}$ | | 82 CKT A | | | IN | " | | | | | | | " | OUT | | J | Clear1/Q1 | " | 150 | " |
| | | | 82 CKT B | | | IN | " | | | | | | | " | OUT | | J | Clear1/$\overline{Q}$1 | " | 100 | " |
| | | | 83 CKT A | | | J | " | | | | | | | " | | OUT | IN | Preset 1/$\overline{Q}$1 | " | 150 | " |
| | | | 83 CKT B | | | J | " | | | | | | | " | | OUT | IN | Preset 1/Q1 | " | 100 | " |
| | | | 84 CKT A | | | | " | IN | | | J | OUT | | " | | | | Clear2/Q2 | " | 150 | " |
| | | | 84 CKT B | | | | " | IN | | | J | OUT | | " | | | | Clear2/$\overline{Q}$2 | " | 100 | " |
| | | | 85 CKT A | | | | " | J | | | IN | | OUT | " | | | | Preset 2/$\overline{Q}$2 | " | 150 | " |
| | | | 85 CKT B | | | | " | J | | | IN | | OUT | " | | | | Preset 2/Q2 | " | 100 | " |

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 3 | 2 | 1 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | | Min | Max | |
| | | | Test no. | Clock 1 | D1 | Clear 1 | $V_{CC}$ | Clear 2 | D2 | Clock 2 | Preset 2 | Q2 | $\overline{Q}$ 2 | GND | $\overline{Q}$ 1 | Q1 | Preset 1 | | | | |
| 9 $T_C$=+25°C | $t_{PLH}$ | 3003 (Fig. 11) | 86 CKT A | IN | IN(G) | B | 5.0 V | | | | | | | GND | | OUT | 5.0 V | Clock1/Q1 | 10 | 100 | ns |
| | | | 86 CKT B | IN | IN(G) | B | " | | | | | | | " | | OUT | 5.0 V | Clock1/Q1 | " | 72 | " |
| | | | 87 CKT A | | | | " | B | IN(G) | IN | 5.0 V | OUT | | " | | | | Clock2/Q2 | " | 100 | " |
| | | | 87 CKT B | | | | " | B | IN(G) | IN | 5.0 V | OUT | | " | | | | Clock2/Q2 | " | 72 | " |
| | $t_{PHL}$ | | 88 CKT A | IN | IN(H) | B | " | | | | | | | " | OUT | | 5.0 V | Clock1/$\overline{Q}$1 | " | 150 | " |
| | | | 88 CKT B | IN | IN(H) | B | " | | | | | | | " | OUT | | 5.0 V | Clock1/Q1 | " | 110 | " |
| | | | 89 CKT A | | | | " | B | IN(H) | IN | 5.0 V | | OUT | " | | | | Clock2/Q2 | " | 150 | " |
| | | | 89 CKT B | | | | " | B | IN(H) | IN | 5.0 V | | OUT | " | | | | Clock2/Q2 | " | 110 | " |
| | $t_{PLH}$ | 3003 (Fig. 12) | 90 CKT A | IN | IN(G) | 5.0 V | " | | | | | | | " | OUT | | B | Clock1/$\overline{Q}$1 | " | 100 | " |
| | | | 90 CKT B | IN | IN(G) | 5.0 V | " | | | | | | | " | OUT | | B | Clock1/Q1 | " | 72 | " |
| | | | 91 CKT A | | | | " | 5.0 V | IN(G) | IN | B | | OUT | " | | | | Clock2/Q2 | " | 100 | " |
| | | | 91 CKT B | | | | " | 5.0 V | IN(G) | IN | B | | OUT | " | | | | Clock2/Q2 | " | 72 | " |
| | $t_{PHL}$ | | 92 CKT A | IN | IN(H) | 5.0 V | " | | | | | | | " | | OUT | B | Clock1/Q1 | " | 150 | " |
| | | | 92 CKT B | IN | IN(H) | 5.0 V | " | | | | | | | " | | OUT | B | Clock1/Q1 | " | 110 | " |
| | | | 93 CKT A | | | | " | 5.0 V | IN(H) | IN | B | OUT | | " | | | | Clock2/Q2 | " | 150 | " |
| | | | 93 CKT B | | | | " | 5.0 V | IN(H) | IN | B | OUT | | " | | | | Clock2/Q2 | " | 110 | " |
| 10 $T_C$=+125°C | $f_{MAX}$ 5/ | (Fig. 11) | 94 | IN | IN(H) | 5.0 V | " | | | | | | | " | | OUT | B | Clock1/Q1 | 2.5 | | MHz |
| | | | 95 | IN | IN(G) | 5.0 V | " | | | | | | | " | OUT | | B | Clock1/Q1 | " | | " |
| | | | 96 | | | | " | 5.0 V | IN(H) | IN | B | OUT | | " | | | | Clock2/Q2 | " | | " |
| | | | 97 | | | | " | 5.0 V | IN(G) | IN | B | | OUT | " | | | | Clock2/Q2 | " | | " |
| | $t_{PLH}$ | 3003 (Fig. 10) | 98 CKT A | | | IN | " | | | | | | | " | OUT | | J | Clear1/Q1 | 10 | 125 | ns |
| | | | 98 CKT B | | | IN | " | | | | | | | " | OUT | | J | Clear1/Q1 | " | 85 | " |
| | | | 99 CKT A | | | J | " | | | | | | | " | | OUT | IN | Preset 1/Q1 | " | 125 | " |
| | | | 99 CKT B | | | J | " | | | | | | | " | | OUT | IN | Preset 1/$\overline{Q}$1 | " | 85 | " |
| | | | 100 CKT A | | | | " | IN | | | J | | OUT | " | | | | Clear2/$\overline{Q}$2 | " | 125 | " |
| | | | 100 CKT B | | | | " | IN | | | J | | OUT | " | | | | Clear2/Q2 | " | 85 | " |
| | | | 101 CKT A | | | | " | J | | | IN | OUT | | " | | | | Preset 2/Q2 | " | 125 | " |
| | | | 101 CKT B | | | | " | J | | | IN | OUT | | " | | | | Preset 2/Q2 | " | 85 | " |

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued. 1/

| Subgroup | Symbol | MIL-STD-883 method | Cases A,B,D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Measured terminal | Test limits | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Case C | 3 | 2 | 1 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | | Min | Max | |
| | | | Test no. | Clock 1 | D1 | Clear 1 | $V_{CC}$ | Clear 2 | D2 | Clock 2 | Preset 2 | Q2 | $\overline{Q}$ 2 | GND | $\overline{Q}$ 1 | Q1 | Preset 1 | | | | |
| 10 $T_C$=+125°C | $t_{PHL}$ | 3003 (Fig. 10) | 102 CKT A | | | IN | 5.0 V | | | | | | | GND | | OUT | J | Clear1/Q1 | 10 | 200 | ns |
| | | | 102 CKT B | | | IN | " | | | | | | | " | | OUT | J | Clear1/$\overline{Q}$1 | " | 120 | " |
| | | | 103 CKT A | | | J | " | | | | | | | " | OUT | | IN | Preset 1/$\overline{Q}$1 | " | 200 | " |
| | | | 103 CKT B | | | J | " | | | | | | | " | OUT | | IN | Preset 1/Q1 | " | 120 | " |
| | | | 104 CKT A | | | | " | IN | | | J | OUT | | " | | | | Clear2/Q2 | " | 200 | " |
| | | | 104 CKT B | | | | " | IN | | | J | OUT | | " | | | | Clear2/$\overline{Q}$2 | " | 120 | " |
| | | | 105 CKT A | | | | " | J | | | IN | | OUT | " | | | | Preset 2/$\overline{Q}$2 | " | 200 | " |
| | | | 105 CKT B | | | | " | J | | | IN | | OUT | " | | | | Preset 2/Q2 | " | 120 | " |
| | $t_{PLH}$ | 3003 (Fig. 11) | 106 CKT A | IN | IN(G) | B | " | | | | | | | " | | OUT | 5.0 V | Clock1/Q1 | " | 150 | " |
| | | | 106 CKT B | IN | IN(G) | B | " | | | | | | | " | | OUT | 5.0 V | Clock1/Q1 | " | 85 | " |
| | | | 107 CKT A | | | | " | B | IN(G) | IN | 5.0 V | OUT | | " | | | | Clock2/Q2 | " | 150 | " |
| | | | 107 CKT B | | | | " | B | IN(G) | IN | 5.0 V | OUT | | " | | | | Clock2/Q2 | " | 85 | " |
| | $t_{PHL}$ | | 108 CKT A | IN | IN(H) | B | " | | | | | | | " | OUT | | 5.0 V | Clock1/$\overline{Q}$1 | " | 200 | " |
| | | | 108 CKT B | IN | IN(H) | B | " | | | | | | | " | OUT | | 5.0 V | Clock1/$\overline{Q}$1 | " | 120 | " |
| | | | 109 CKT A | | | | " | B | IN(H) | IN | 5.0 V | | OUT | " | | | | Clock2/$\overline{Q}$2 | " | 200 | " |
| | | | 109 CKT B | | | | " | B | IN(H) | IN | 5.0 V | | OUT | " | | | | Clock2/$\overline{Q}$2 | " | 120 | " |
| | $t_{PLH}$ | 3003 (Fig. 12) | 110 CKT A | IN | IN(G) | 5.0 V | " | | | | | | | " | OUT | | B | Clock1/$\overline{Q}$1 | " | 150 | " |
| | | | 110 CKT B | IN | IN(G) | 5.0 V | " | | | | | | | " | OUT | | B | Clock1/$\overline{Q}$1 | " | 85 | " |
| | | | 111 CKT A | | | | " | 5.0 V | IN(G) | IN | B | | OUT | " | | | | Clock2/$\overline{Q}$2 | " | 150 | " |
| | | | 111 CKT B | | | | " | 5.0 V | IN(G) | IN | B | | OUT | " | | | | Clock2/Q2 | " | 85 | " |
| | $t_{PHL}$ | | 112 CKT A | IN | IN(H) | 5.0 V | " | | | | | | | " | | OUT | B | Clock1/Q1 | " | 200 | " |
| | | | 112 CKT B | IN | IN(H) | 5.0 V | " | | | | | | | " | | OUT | B | Clock1/Q1 | " | 120 | " |
| | | | 113 CKT A | | | | " | 5.0 V | IN(H) | IN | B | OUT | | " | | | | Clock2/Q2 | " | 200 | " |
| | | | 113 CKT B | | | | " | 5.0 V | IN(H) | IN | B | OUT | | " | | | | Clock2/Q2 | " | 120 | " |
| 11 | Same tests, terminal conditions, and limits as for subgroup 10, except $T_C$=+55°C | | | | | | | | | | | | | | | | | | | | |

NOTE: A = normal clock pulse, B = momentary GND, then 4.5 V,
J = input pulse, $t_p \geq 100$ ns, PRR = 0 MHz, $V_{OL}$ = 0 V, $V_{OH}$ = 4.5 V.

1/ Terminal conditions (pins not designated may be H ≥ 2.0 V, or L ≤ 0.8 V, or open).
2/ Tests shall be performed in sequence.
3/ Input voltages shown are: A = 2.4 V minimum and B = 0.4 V maximum.
4/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L ≤ 1.5 V when using a high speed checker single comparator.
5/ $f_{MAX}$, 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 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

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

6.1 Intended use. Microcircuits conforming to this specification are intended for 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. Requirement for certificate of compliance, if applicable.
e. Requirements for notification of change of product or process to acquiring activity in addition to notification to the qualifying activity, if applicable.
f. Requirements for failure analysis (including required test condition of method 5003), corrective action and reporting of results, if applicable.
g. Requirements for product assurance options.
h. Requirements for carriers, special lead lengths or lead forming, if applicable. These requirements shall 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 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.

6.4 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.

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

GND ..... Electrical ground (common terminal)
$V_{IN}$ ..... Voltage level at an input terminal
$I_{IN}$ ..... Current flowing into an input terminal

6.6 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), lead material and finish A (see 3.4). Longer lead lengths 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.

| Device type | Commercial type |
|---|---|
| 01 | 54L71 |
| 02 | 54L72 |
| 03 | 54L73 |
| 04 | 54L78 |
| 05 | 54L74 |

6.8 Manufacturers' designation. Manufacturers' circuits included in this specification are designated as shown in table IV herein.

TABLE IV. Manufacturers designator.

| Device Types | Texas Instruments | National Semiconductor |
|---|---|---|
| | A | B |
| 01 | | X |
| 02 | | X |
| 03 | | X |
| 04 | | X |
| 05 | | X |

6.9 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship; to the last previous issue.

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

Preparing activity:
DLA - CC

(Project 5962-2006-004)

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