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MIL-M-38510/105A
23 January 2006
SUPERSEDING
MIL-M-38510/105
23 December 1980

MILITARY SPECIFICATION

MICROCIRCUITS, LINEAR, CMOS, HIGH LEVEL ANALOG SWITCH WITH DRIVER, MONOLITHIC SILICON

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

| Inactive for new design after 10 July 1995. |
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The requirement 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 silicon, CMOS, monolithic, analog switches. Two product assurance classes and a choice of case outlines and lead finishes are provided 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.4)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 | One-channel, 75 ohm, SPST switch |
| 02 | Two-channel, 75 ohm, SPST switch |
| 03 | One-channel, 75 ohm, SPDT switch |
| 04 | Two-channel, 75 ohm, SPDT switch |
| 05 | One-channel, 75 ohm, DPST switch |
| 06 | Two-channel, 75 ohm, DPST switch |
| 07 | One-channel, 75 ohm, DPDT switch |
| 08 | One-channel, 75 ohm, 4PST switch |

NOTE: A channel is defined as a driver with associated switches.

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

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

| Outline letter | Descriptive designator | Terminals | Package style |
|---|---|---|---|
| A 1/ | GDFP5-F14 or CDFP6-F14 | 14 | Flat pack |
| E | GDIP1-T16 or CDIP2-T16 | 16 | Dual-in-line |
| I | MACY1-X10 | 10 | Can |

1/ Inactive for new design. Acceptable only for use in equipment designed or redesigned on or before 29 November 1986.

| Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, 3990 East Broad St., Columbus, OH 43218-3990, or email linear@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil. |
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1.3 Absolute maximum ratings.

V+ - V- ................................................................................................ 33 V dc
V+ - $V_D$ ............................................................................................. 30 V dc
$V_D$ - V- ............................................................................................. 30 V dc
$V_D$ - $V_S$ ........................................................................................ $\pm$22 V dc
$V_L$ – V- ............................................................................................ 33 V dc
$V_L$ – $V_{IN}$ ................................................................................... 30 V dc
$V_L$ – $V_R$ ....................................................................................... 20 V dc
$V_{IN}$ – $V_R$ .................................................................................. 20 V dc
$V_R$ – V- ........................................................................................... 33 V dc
$V_R$ – $V_{IN}$ .................................................................................. 2 V dc
Current (any terminal except S or D) ................................................. 30 mA
Storage temperature ........................................................................... -65°C to +150°C
Lead temperature (soldering, 60 seconds) ......................................... +300°C
Junction temperature ($T_J$ ) ............................................................ +175°C

1.4 Recommended operating conditions.

+$V_{CC}$ ............................................................................................. +15  V dc
-$V_{CC}$  ............................................................................................ -15 V dc
$V_R$     ............................................................................................... 0 V dc
$V_L$     ............................................................................................... 5 V dc
Ambient operating temperature range ($T_A$) ................................... -55°C $\leq$ $T_A$ $\leq$ +125°C

1.5 Power and thermal characteristics.

| Case outline | Maximum allowable power dissipation  2/ | Maximum  $\theta_{JC}$ 3/ | Maximum  $\theta_{JA}$ |
|---|---|---|---|
| A | 350 mW at $T_A$ = 125°C | 60°C/W | 140°C/W |
| E | 400 mW at $T_A$ = 125°C | 35°C/W | 120°C/W |
| I | 350 mW at $T_A$ = 125°C | 40°C/W | 140°C/W |

2/   All leads welded or soldered to PC board.
3/   Applies only when $T_A$ $\geq$ 75°C.

2. APPLICABLE DOCUMENTS

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

2.1.1 <u>Specifications, standards, and handbooks</u>. 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.

2.2 <u>Order of precedence</u>. In the event of a conflict between the text of this specification and the references cited herein the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.


3. REQUIREMENTS

3.1 <u>Qualification</u>. 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 <u>Item requirements</u>. 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 <u>Design, construction, and physical dimensions</u>. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.

3.3.1 <u>Circuit diagram and terminal connections.</u> The circuit diagram and terminal connections shall be as specified on figure 1.

3.3.2 <u>Schematic circuits</u>. 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 <u>Case outlines.</u> The case outlines shall be as specified in 1.2.3.

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

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

3.5.1 <u>Switch operation</u>.  The analog switches listed below are guaranteed to turn "on" with either a "low" input ( $V_R \leq V_{IL} \leq 0.8$ V ) or "high" input (2.4 V $\leq V_{IH} \leq V_{IL}$ ) as specified below (see figure 1).

| Device types | $V_{IN}$ | Channels ON | | Channels OFF | |
|---|---|---|---|---|---|
| 01 | 2.4 V dc | 1 | | | |
| | 0.8 V dc | | | 1 | |
| 02, 05, 03 | 2.4 V dc | 1, 2 | 1 | | 2 |
| | 0.8 V dc | | 2 | 1, 2 | 1 |
| 04 | 2.4 V dc | 1, 2 | | 3, 4 | |
| | 0.8 V dc | 3, 4 | | 1, 2 | |
| 07 | 2.4 V dc | 2, 3 | | 1, 4 | |
| | 0.8 V dc | 1, 4 | | 2, 3 | |
| 06, 08 | 2.4 V dc | 1, 2, 3, 4 | | | |
| | 0.8 V dc | | | 1, 2, 3, 4 | |

3.6  <u>Electrical test requirements</u>.  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  <u>Marking</u>.  Marking shall be in accordance with MIL-PRF-38535.

3.8  <u>Microcircuit group assignment</u>.  The devices covered by this specification shall be in microcircuit group number 82 (see MIL-PRF-38535, appendix A).

TABLE I.  Electrical performance characteristics.

| Characteristic | Symbol | Conditions $V_{CC} = \pm15$ V, GND = 0 V unless otherwise specified | Temperature range | Device type | Limits | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | | Min | Max | |
| Drain-source ON resistance | $R_{DS}$ | $V_D = -10$ V, $I_S = 10$ mA, see figure 2 | $T_A = -55°C, 25°C$ | All | | 75 | $\Omega$ 1/ |
| | | | $T_A = 125°C$ | | | 150 | |
| | | $V_D = 10$ V, $I_S = -10$ mA, see figure 2 | $T_A = -55°C, 25°C$ | All | | 75 | |
| | | | $T_A = 125°C$ | | | 150 | |
| | | $V_D = -7.5$ V, $V_{CC} = \pm10$ V, $I_S = 10$ mA, see figure 2 | $T_A = -55°C, 25°C$ | All | | 75 | |
| | | | $T_A = 125°C$ | | | 150 | |
| | | $V_D = 7.5$ V, $V_{CC} = \pm10$ V, $I_S = -10$ mA, see figure 2 | $T_A = -55°C, 25°C$ | All | | 75 | |
| | | | $T_A = 125°C$ | | | 150 | |
| Channel ON leakage current | $I_{D(ON)}$ | $V_S = V_D = 10$ V, (see 3.5.1 for $V_{IN}$), see figure 3 | $T_A = -55°C, 125°C$ | All | -200 | 200 | nA |
| | | | $T_A = 25°C$ | | -2 | +2 | |
| | | $V_S = V_D = -10$ V, ( see 3.5.1 for $V_{IN}$), see figure 3 | $T_A = -55°C, 125°C$ | All | -200 | 200 | |
| | | | $T_A = 25°C$ | | -2 | +2 | |
| Drain OFF leakage current | $I_{D(OFF)}$ | $V_D = 10$ V, $V_S = -10$ V, ( see 3.5.1 for $V_{IN}$), see figure 4 | $T_A = -55°C, 125°C$ | All | -100 | 100 | nA |
| | | | $T_A = 25°C$ | | -1 | +1 | |
| | | $V_D = -10$ V, $V_S = 10$ V, ( see 3.5.1 for $V_{IN}$), See figure 4 | $T_A = -55°C, 125°C$ | All | -100 | 100 | |
| | | | $T_A = 25°C$ | | -1 | +1 | |
| Source OFF leakage current | $I_{S(OFF)}$ | $V_D = -10$ V, $V_S = 10$ V, ( see 3.5.1 for $V_{IN}$), see figure 5 | $T_A = -55°C, 125°C$ | All | -100 | 100 | nA |
| | | | $T_A = 25°C$ | | -1 | +1 | |
| | | $V_D = 10$ V, $V_S = -10$ V, ( see 3.5.1 for $V_{IN}$), see figure 5 | $T_A = -55°C, 125°C$ | All | -100 | 100 | |
| | | | $T_A = 25°C$ | | -1 | +1 | |
| Input current, input voltage low | $I_{IL}$ | $V_{IN} = 0$ V, see figure 6 | $T_A = -55°C, 25°C$ | All | -1 | 0 | $\mu$A |
| | | | $T_A = 125°C$ | | -10 | 0 | |
| Input current, input voltage high | $I_{IH}$ | $V_{IN} = 2.4$ V, 5 V, see figure 6 | $T_A = -55°C, 25°C$ | All | 0 | 1 | $\mu$A |
| | | | $T_A = 125°C$ | | 0 | 10 | |

See footnotes at end of table.

TABLE I. <u>Electrical performance characteristics</u> – Continued.

| Test | Symbol | Conditions $V_{CC} = \pm15$ V, GND = 0 V unless otherwise specified | Temperature range | Device type | Limits | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | | Min | Max | |
| Positive supply current | $+I_{CC}$ | $V_{IN} = 0$ V, 5 V see figure 7 | $T_A = -55°C, 25°C$ | All | | 10 | $\mu$A |
| | | | $T_A = 125°C$ | | | 100 | |
| Negative supply current | $-I_{CC}$ | $V_{IN} = 0$ V, 5 V see figure 7 | $T_A = -55°C, 25°C$ | All | -10 | | $\mu$A |
| | | | $T_A = 125°C$ | | -100 | | |
| Logic supply current | $+I_L$ | $V_{IN} = 0$ V, 5 V, see figure 7 | $T_A = -55°C, 25°C$ | All | | 10 | $\mu$A |
| | | | $T_A = 125°C$ | | | 100 | |
| Reference supply current | $+I_R$ | $V_{IN} = 0$ V, 5 V, see figure 7 | $T_A = -55°C, 25°C$ | All | -10 | | $\mu$A |
| | | | $T_A = 125°C$ | | -100 | | |
| Turn ON time | $t_{ON}$ | See figure 8 | $T_A = -55°C$ | All | | 375 | ns |
| | | | $T_A = 25°C$ | | | 450 | |
| | | | $T_A = 125°C$ | | | 550 | |
| Turn OFF time | $t_{OFF}$ | See figure 8 | $T_A = -55°C$ | All | | 250 | ns |
| | | | $T_A = 25°C$ | | | 250 | |
| | | | $T_A = 125°C$ | | | 400 | |
| Single channel isolation | $V_{ISO}$ | $f = 1$ MHz , $V_{GEN} = 1$ $V_{P-P}$, see figure 9 | $T_A = 25°C$ | All | 50 | | dB |
| Crosstalk between channels | $V_{CT}$ | $f = 1$ MHz , $V_{GEN} = 1$ $V_{P-P}$, see figure 10 | $T_A = 25°C$ | All | 50 | | dB |
| Charge transfer error | $V_{CTE}$ | $V_S = $ GND, see figure 11 | $T_A = 25°C$ | All | | 15 | mV |
| Break-before-make time delay | $t_D$ | See figure 12 | $-55°C \leq T_A \leq 125°C$ | 03,04, 07 | 20 | | ns |

See footnotes at end of table.

TABLE I.  Electrical performance characteristics – Continued.

| Test | Symbol | Conditions $V_{CC} = \pm 15$ V, GND = 0 V unless otherwise specified | Temperature range | Device type | Limits | | Unit |
|------|--------|------|------|------|------|------|------|
| Driver input capacitance | $C_A$ | $V_{IN} = 0$ V, see 4.4.1d | $T_A = 25°C$ | All | | 30 | pF |
| Switch input capacitance | $C_{IS}$ | See 4.4.1d, switch off | $T_A = 25°C$ | All | | 20 | pF |
| Switch output capacitance | $C_{OS}$ | See 4.4.1d, switch off | $T_A = 25°C$ | All | | 20 | pF |

1/  The listed resistance limits correspond to the following voltage values:

   75 $\Omega$ correspond to $\pm 9.25$ V and $\pm 6.75$ V;   150 $\Omega$ correspond to $\pm 8.50$ V and $\pm 6.0$ V;  see table III.

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 function as described herein.

4.2  Screening.  Screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and quality 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.  Reverse bias burn-in (method 1015 of MIL-STD-883).  This screen shall apply to class S only.   However, regardless of device class, for devices 03, 04, and 07, an additional burn-in shall be performed with the logic level of the switch drivers opposite that used in the first burn-in.  Ambient temperature ($T_A$) shall be 125°C minimum.  Duration for reverse bias test shall be 24 hours minimum for class S devices, and duration for additional burn-in (class B devices) shall be 160 hours minimum.

   c.  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.

   d.  For class S devices, post dynamic burn-in, or class B devices, post static burn-in, electrical parameter measurements may, at the manufacturer's option, be performed separately or included in the final electrical parameter measurements.

   e.  Additional screening for space level product shall be as specified in MIL-PRF-38535.

TABLE II.  Electrical test requirements.

| MIL-PRF-38535 test requirements | Subgroups (see table III) | |
|---|---|---|
| | Class S devices | Class B devices |
| Interim electrical parameters | 1 | 1 |
| Final electrical test parameters | 1*, 2, 3, 9 | 1*, 2, 3, 9 |
| Group A test requirements | 1,2,3,(4,7)**, 9,10,11, (12,13,14)*** | 1,2,3,(4,7)**, 9,10,11, (12,13,14)*** |
| Group B electrical test parameters when using the method 5005 QCI option | 1,2,3 and table IV delta limits | N/A |
| Group C end-point electrical parameters | 1,2,3 and table IV delta limits | 1 and table IV delta limits |
| Additional electrical subgroups for group C periodic inspections | N/A | (4, 7)**** |
| Group D end-point electrical parameters | 1,2,3 | 1 |
| Additional electrical subgroups for group D periodic inspections | (4,7)***** | None |

*PDA applies to subgroup 1.
**    See 4.4.1e
***   See 4.4.1c
****  See 4.4.3c
***** See 4.4.4b


4.3  Qualification inspection.  Qualification inspection shall be in accordance with MIL-PRF-38535.

4.4  Technology Conformance inspection (TCI).  Technology conformance inspection shall be in accordance with MIL-PRF-38535 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

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

a.  Tests shall be as specified in table II herein.

b.  Subgroups 5, 6, and 8 shall be omitted.

c.  Special subgroups shall be added to group A inspection and shall consist of group A subgroups 12, 13, and 14 as specified in table III herein.  The sample size series for subgroup 12 shall be 5 with no failures allowed, for all classes.  The sample size series for subgroup 13 shall be 7 for all classes.  The sample size series for subgroup 14 shall be 10 for all classes

d.  $C_X$ measurements shall be made only for initial qualification and after process or design changes which may affect capacitance measurements.  Capacitance shall be measured between the designated terminal and ground at the frequency of 1 MHz.  (See method 3012 of MIL-STD-883).  $C_{IS}$ and $C_{OS}$ tests will be measured with the switch off (see 3.5.1).

e.  Subgroups 4 and 7 shall be performed for initial qualification only using a sample of 5 devices for each device type submitted to group A inspection, with no failure allowed.  If not more than 1 failure is found in the first sample of 5, a second sample of 5 is permitted with no further failures allowed.

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.  For device types 03, 04, and 07, life test duration shall be divided equally between forward bias and reverse bias.

    c.  A special subgroup shall be added to group C inspection for class B devices only, and it shall consist of the group A subgroups 4 and 7 as specified in table III herein.  This special subgroup shall be performed on each device type that is qualified from those listed in 1.2.1 herein.  After initial qualification, the special subgroup shall be performed periodically on a single device type selected from those device types previously qualified.  A sample of 5 devices (of the device type to be inspected) shall be chosen and submitted to test with no failures allowed.  If not more than 1 failure is found in the first sample of 5, a second sample of 5 is permitted with no further failures allowed.  When more than one device type is qualified, the single device type selected shall be different device type for each subsequent periodic inspection until all qualified device types have been inspected.  The sequence of single device types shall be repeated to fulfill the periodic inspection requirement.

4.4.4  Group D inspection.  Group D inspection shall be in accordance with table V of MIL-PRF-38535.

    a.  End point electrical parameters shall be as specified in table II herein.

    b.  A special subgroup shall be added to group D inspection for class S devices only, and it shall consist of the group A  subgroups 4 and 7 as specified in table III herein.

    c.  A special subgroup shall be added to group D inspection for class S devices only, and it shall consist of the group A subgroups 4 and 7 as specified in table III herein.  This special subgroup shall be performed on each device type that is qualified from those listed in 1.2.1 herein.  After initial qualification, the special subgroup shall be performed periodically on a single device type selected from those device types previously qualified.  When more than one device type is qualified, the single device type selected shall be different device type for each subsequent periodic inspection until all qualified device types have been inspected.  The sequence of single device types shall be repeated to fulfill the periodic inspection requirements.

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

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

## DEVICE TYPE 01

CASE A



CASE E
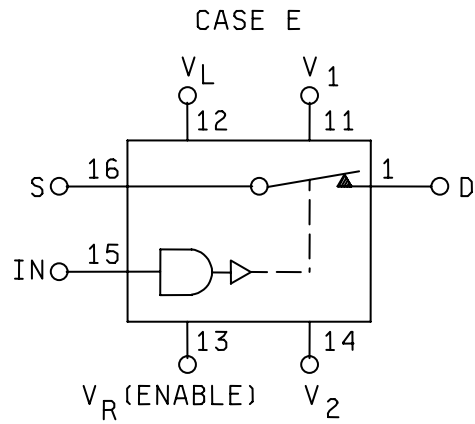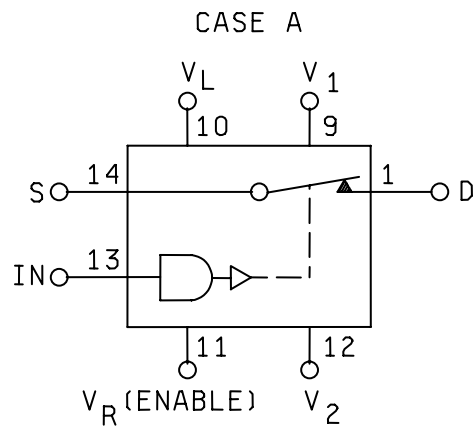


Figure 1.  Terminal connection.

DEVICE TYPE 02

CASE A



CASE E



CASE I
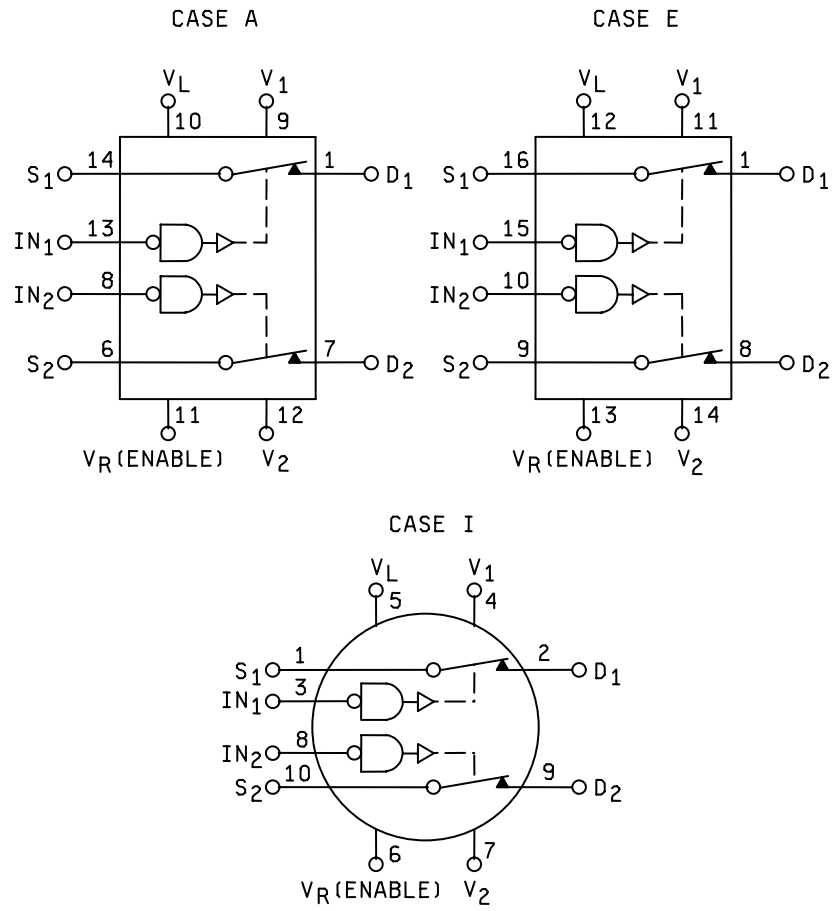


Figure 1.  Terminal connection – continued.

## DEVICE TYPE 03



CASE A                    CASE E

## DEVICE TYPE 04



CASE A                    CASE E
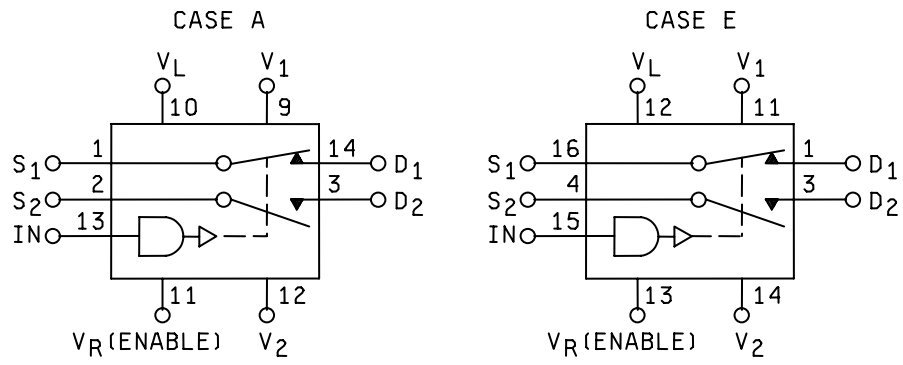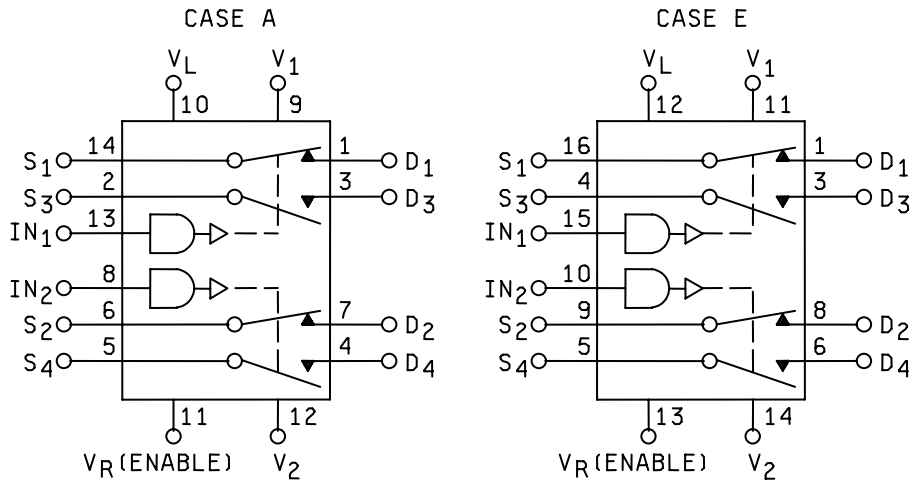
Figure 1.  Terminal connections – Continued.

DEVICE TYPE 05

CASE I



CASE A



CASE E



DEVICE TYPE 06

CASE A



CASE E
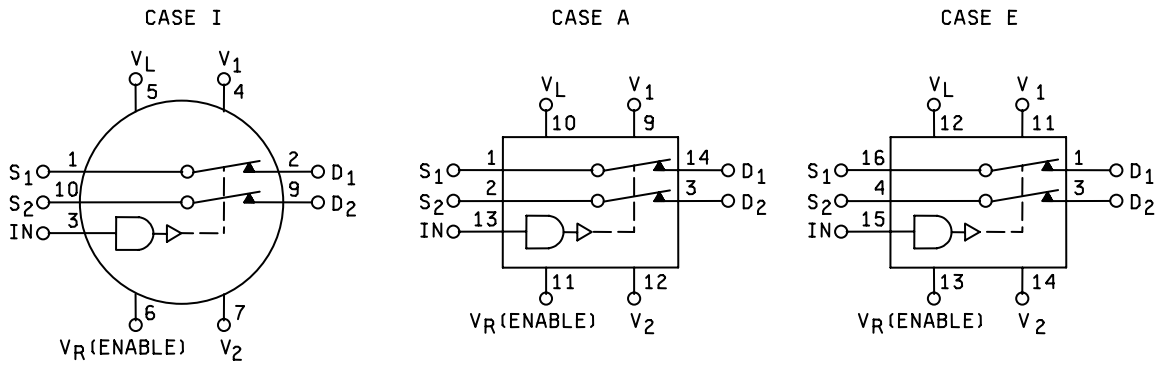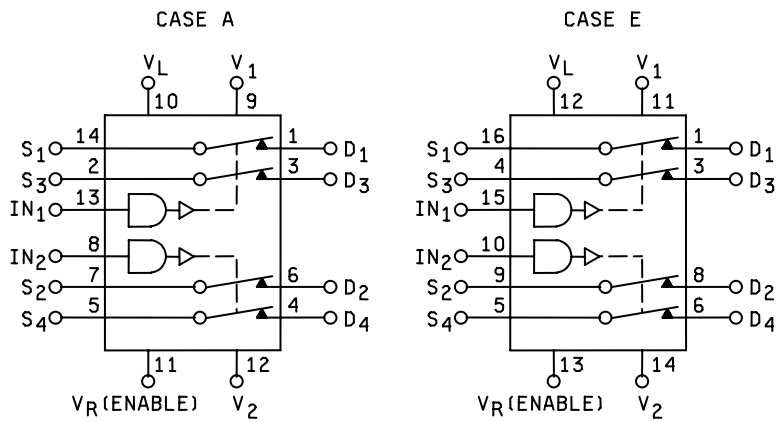


Figure 1.  <u>Terminal connections</u> – Continued.

DEVICE TYPE 07

CASE A                                    CASE E



DEVICE TYPE 08

CASE A                                    CASE E



Figure 1.  Terminal connections – Continued.

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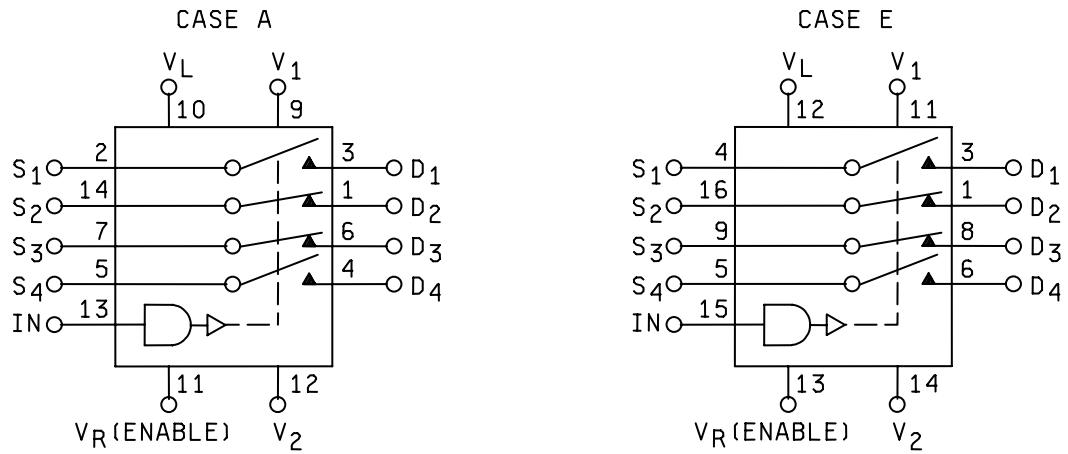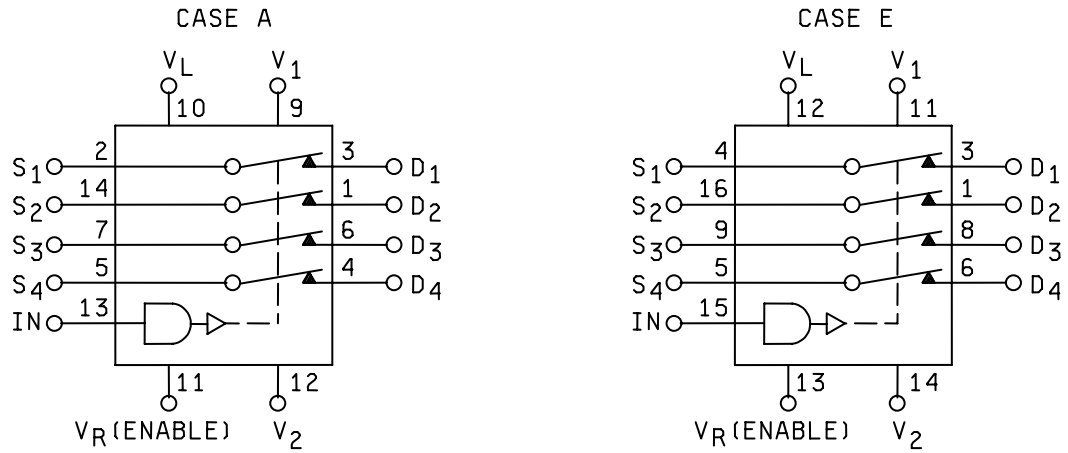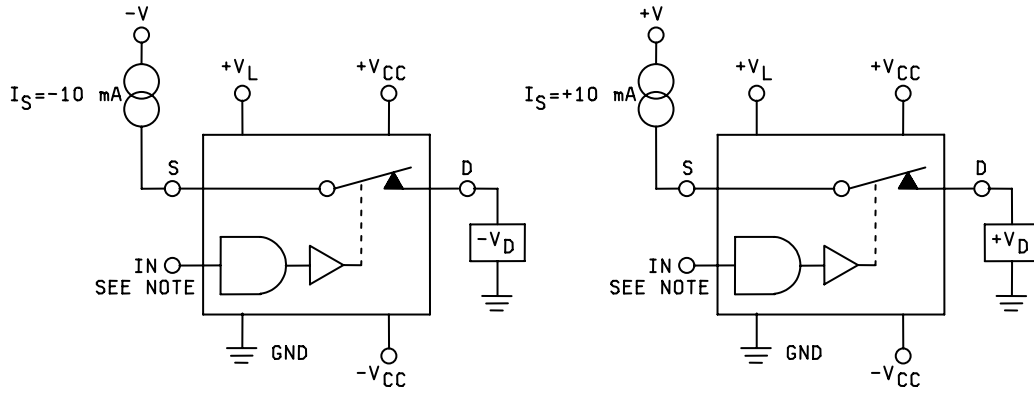
NOTE:  $V_{IN}$ from table I, $R_{DS} = (V_S - V_D)$ / -10 mA          NOTE:  $V_{IN}$ from table I, $R_{DS} = (V_S - V_D)$ / 10 mA

Figure 2.  $R_{DS}$ test circuit.
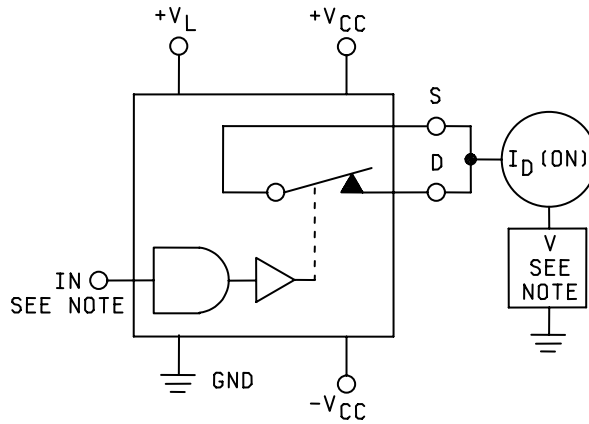
NOTE:  Conditions are from table I.

Figure 3.  $I_{D(on)}$ test circuit.
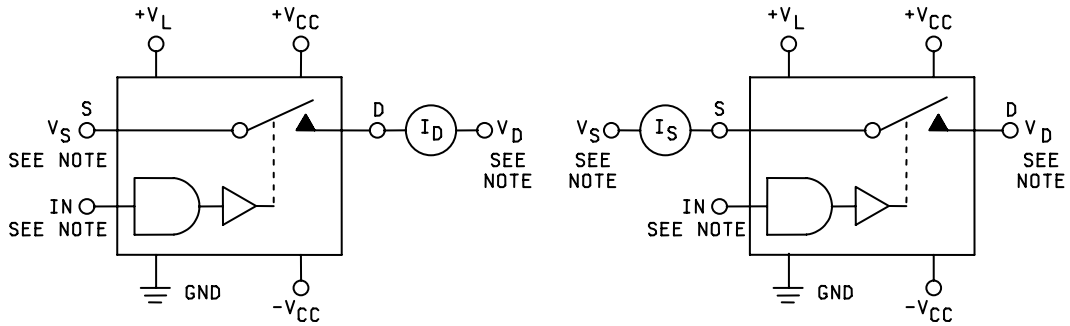
FIGURE 4. $I_{D(off)}$ test circuit.

FIGURE 5. $I_{S(off)}$ test circuit.
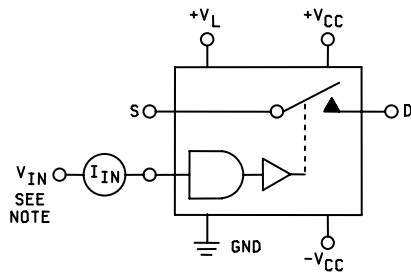
NOTE: Test conditions are from table I.

FIGURE 6. $I_{IL}$, $I_{IH}$ test circuit.

FIGURE 7. I+, I- test circuit.

NOTE: Test conditions are from table I.

$R_L$ = 1 kΩ ±5 %.
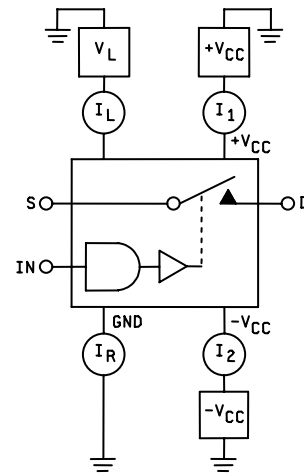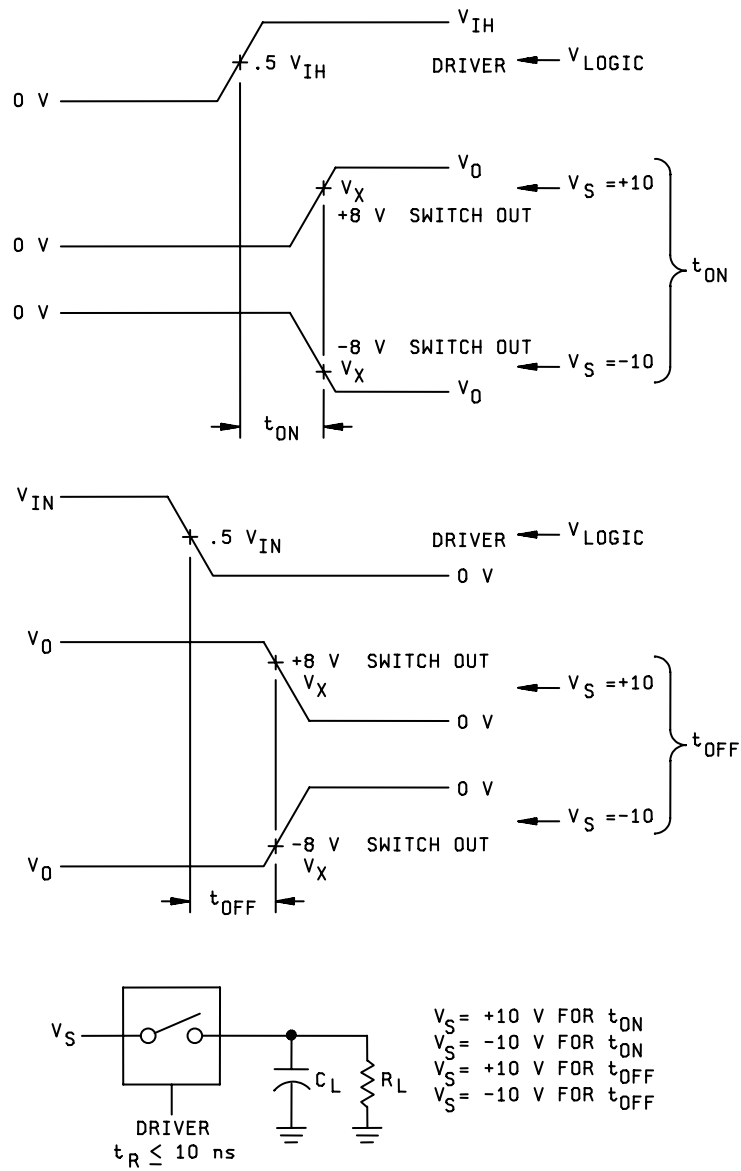
$C_L$ = 95 pF minimum to 200 pF maximum (includes test jig capacitance).

FIGURE 8. Input output waveforms for time delay tests.

NOTES:
1. The logic driver shall have the following characteristics:
    a. $V_{LOGIC}$ = 0 V to +3 V for device types 01 through 08.
    b. Rise time ( 0.3 V to 2.7 V ) $\leq$ 10 ns for device types 01 through 08.
       Fall time ( 2.7 V to 0.3 V ) $\leq$ 10 ns for device types 01 through 08.
2. See 3.5.1 for appropriate switching conditions.
3. $V_{SOURCE}$ ($V_S$) = +10 V and -10 V for $t_{ON}$.
   $V_{SOURCE}$ ($V_S$) = +10 V and -10 V for $t_{OFF}$.
4. $V_X$ = +8 V for +10 V condition in (3), above.
   $V_X$ = -8 V for -10 V condition in (3), above.

FIGURE 8.  <u>Input output waveforms for time delay tests</u> – Continued.
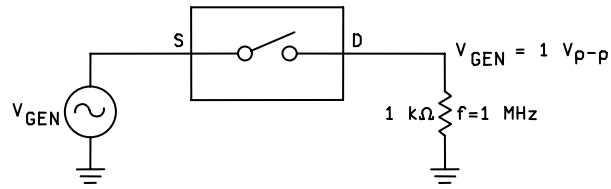
FIGURE 9. Isolation test circuit.
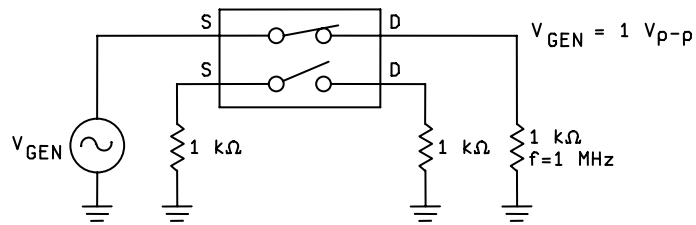
FIGURE 10. Crosstalk test circuit.
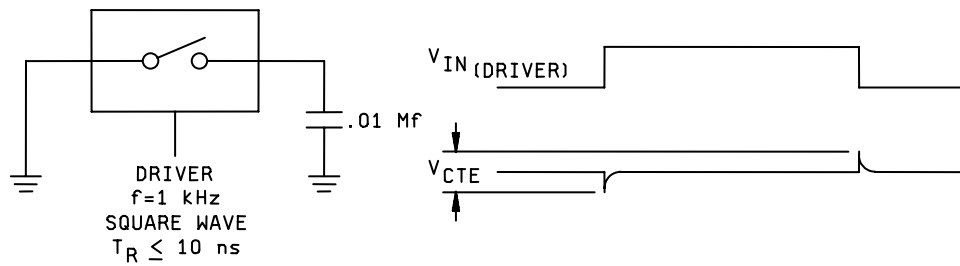
FIGURE 11. Charge transfer error test circuit.

$V_S$

$R_L$  $C_L$

$V_{IN}$

$V_{IN}$

$V_{IN}$

$V_X$

+10 V
8 V

0 V

$t_{D1}$    $t_{D2}$

CONDITION A

$V_X$

0 V

−8 V
−10 V

$t_{D3}$    $t_{D4}$
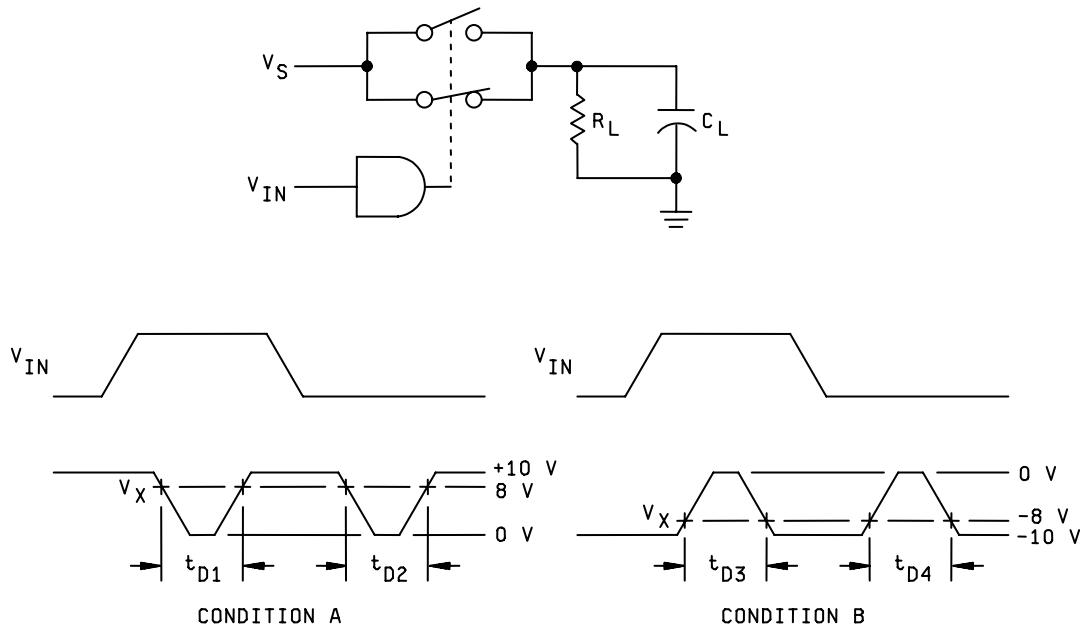
CONDITION B

NOTES:

1. $R_L$ = 1 kΩ ±5%, $C_L$ = 95 pF minimum to 200 pF maximum.

2. $t_{D1}$, $t_{D2}$, $t_{D3}$, and $t_{D4}$ shall be measured.  These measurements shall apply only to device types 03, 04, and 07.
   See 3.5.1 for switch conditions.

3. $V_{SOURCE}$ ($V_S$) = +10 V for condition A (all device types).
   $V_{SOURCE}$ ($V_S$) = -10 V for condition B (all device types).

4. $V_X$ = +8 V for condition A (all device types).
   $V_X$ = -8 V for condition B (all device types).

5. The logic driver shall have the following characteristics:

   a. $V_{LOGIC}$ = 0 V to 3 V for parts 01 through 08.
   b. Rise time (0.3 V to 2.7 V) ≤ 10 ns, for part types 01 through 08.
      Fall time (2.7 V to 0.3 V) ≤ 10 ns, for part types 01 through 08.

FIGURE 12. Break-before-make test circuit.

20
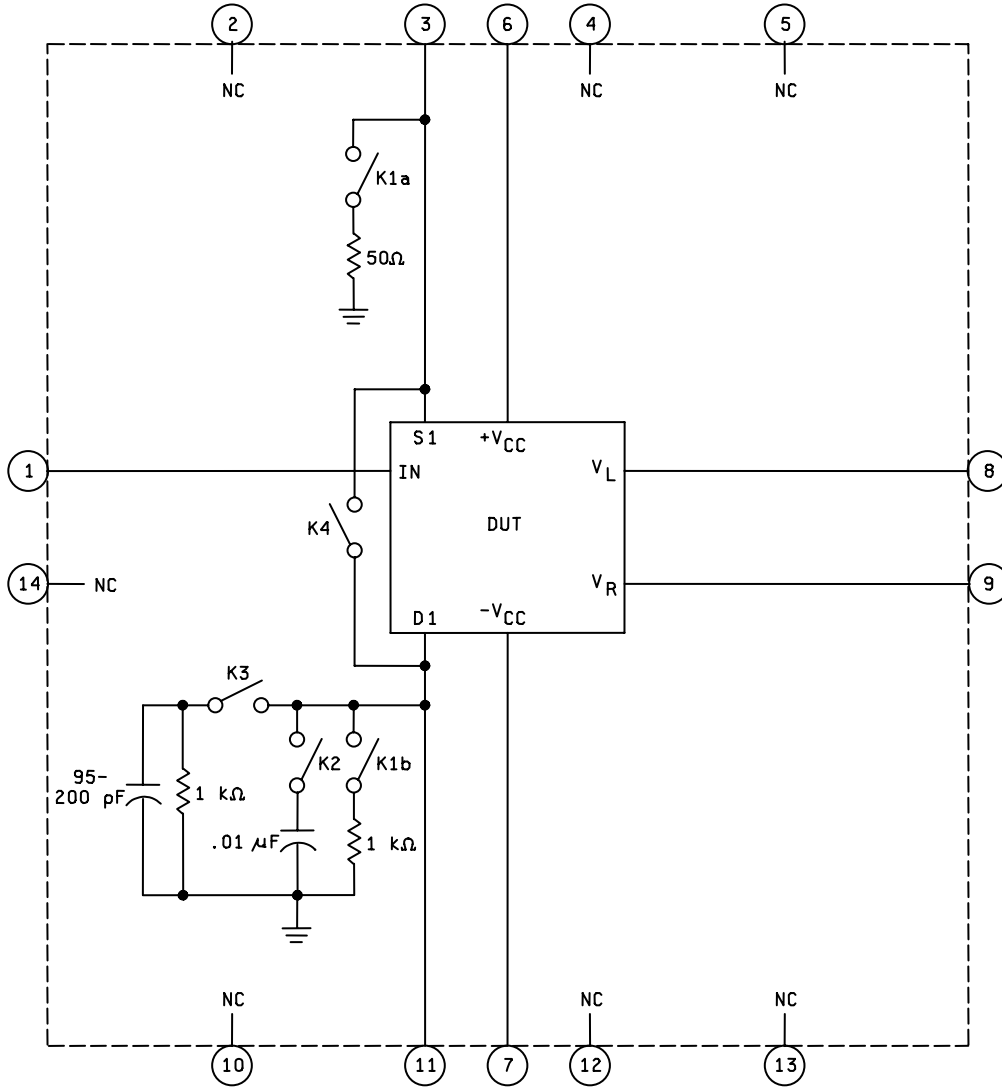
FIGURE 13.  Test circuit (static and dynamic tests) for device type 01.
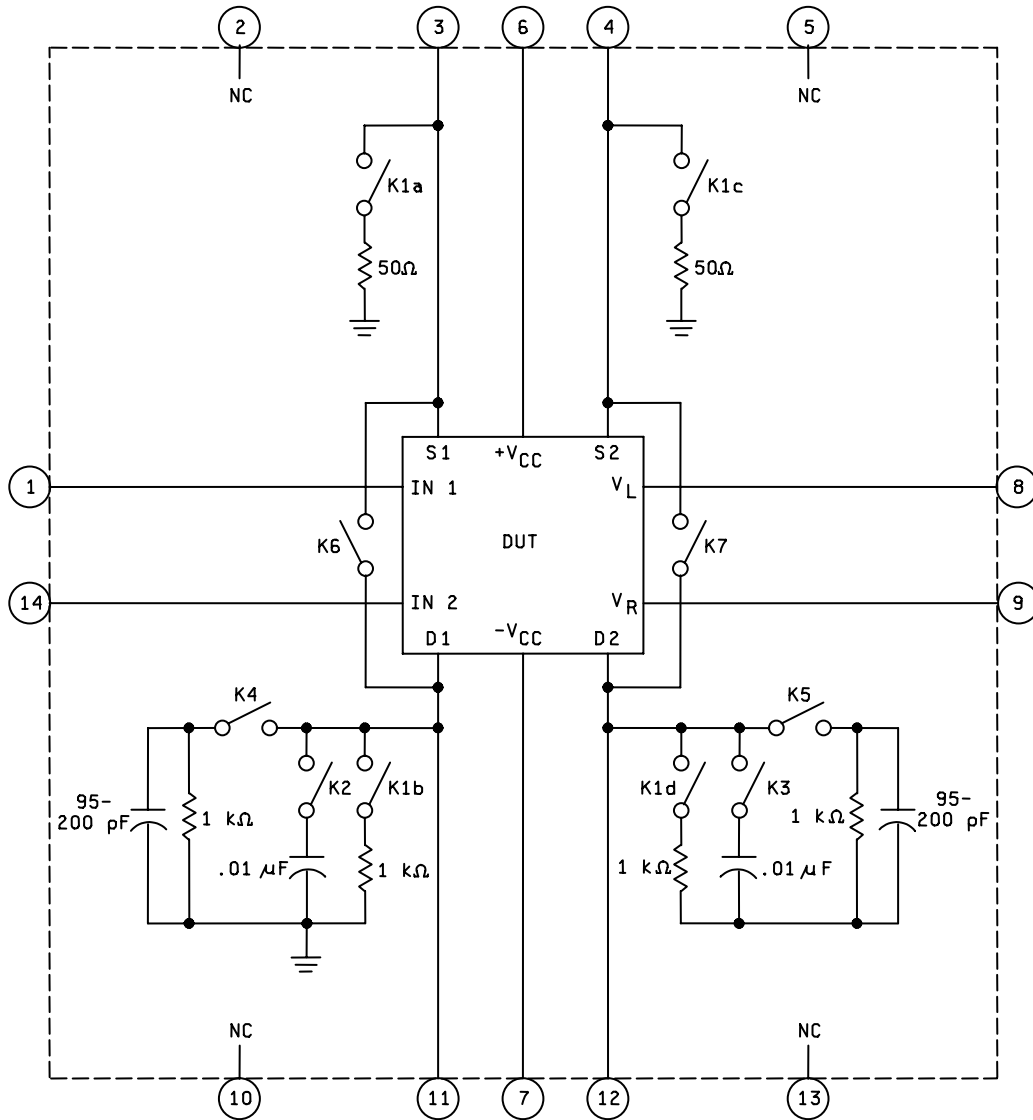
FIGURE 14.  Test circuit (static and dynamic tests) for device type 02.
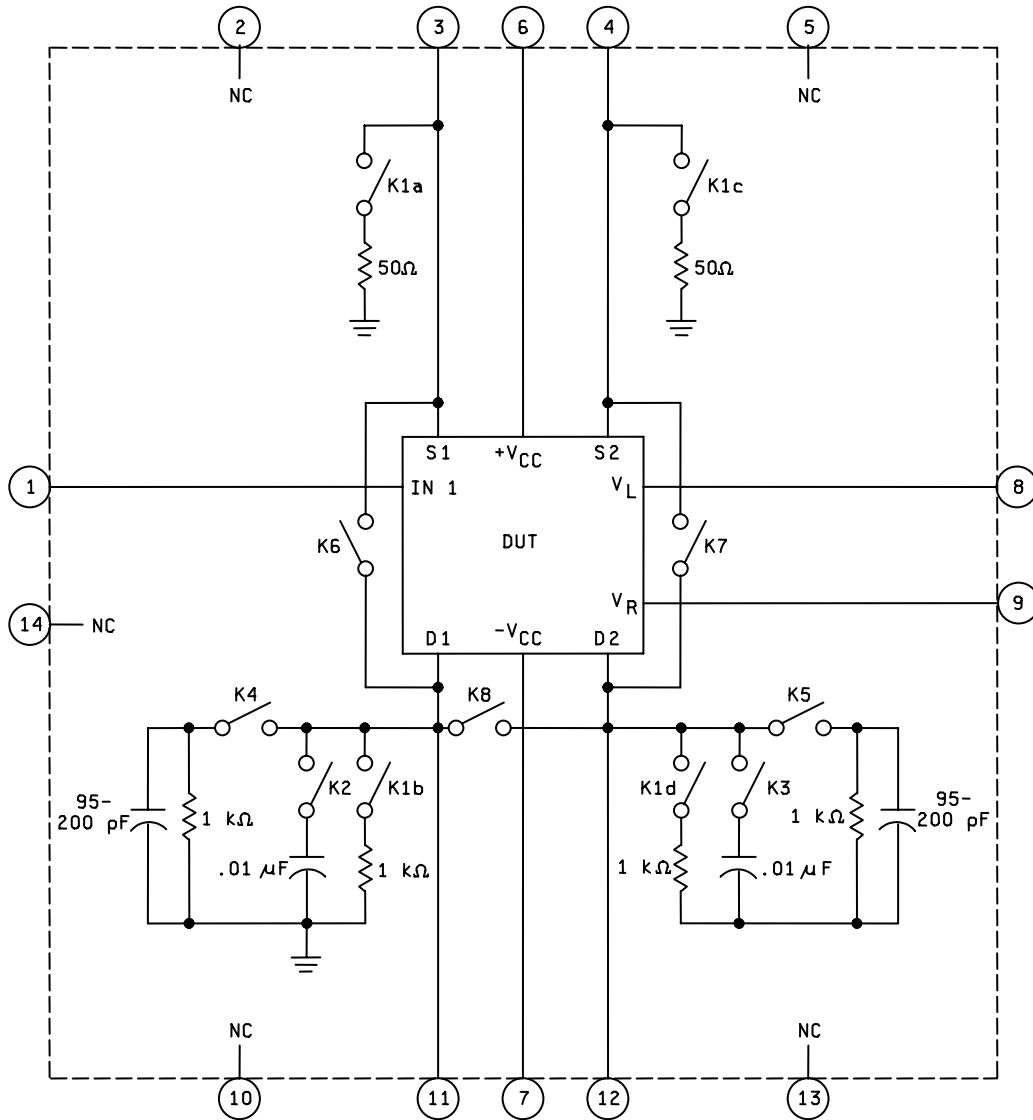
FIGURE 15.  Test circuit (static and dynamic tests) for device types 03 and 05.
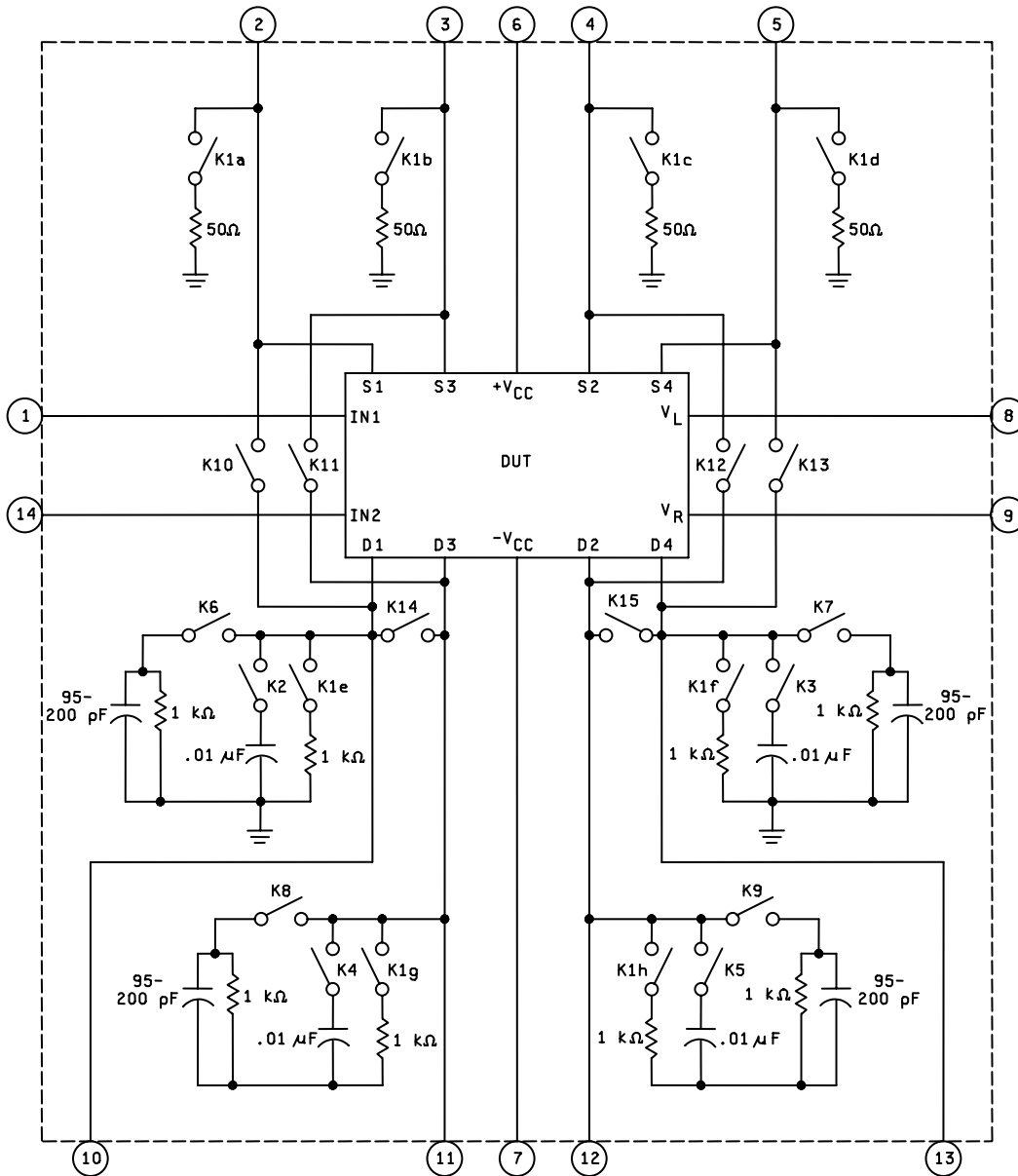
FIGURE 16.  Test circuit (static and dynamic tests) for device types 04 and 06.
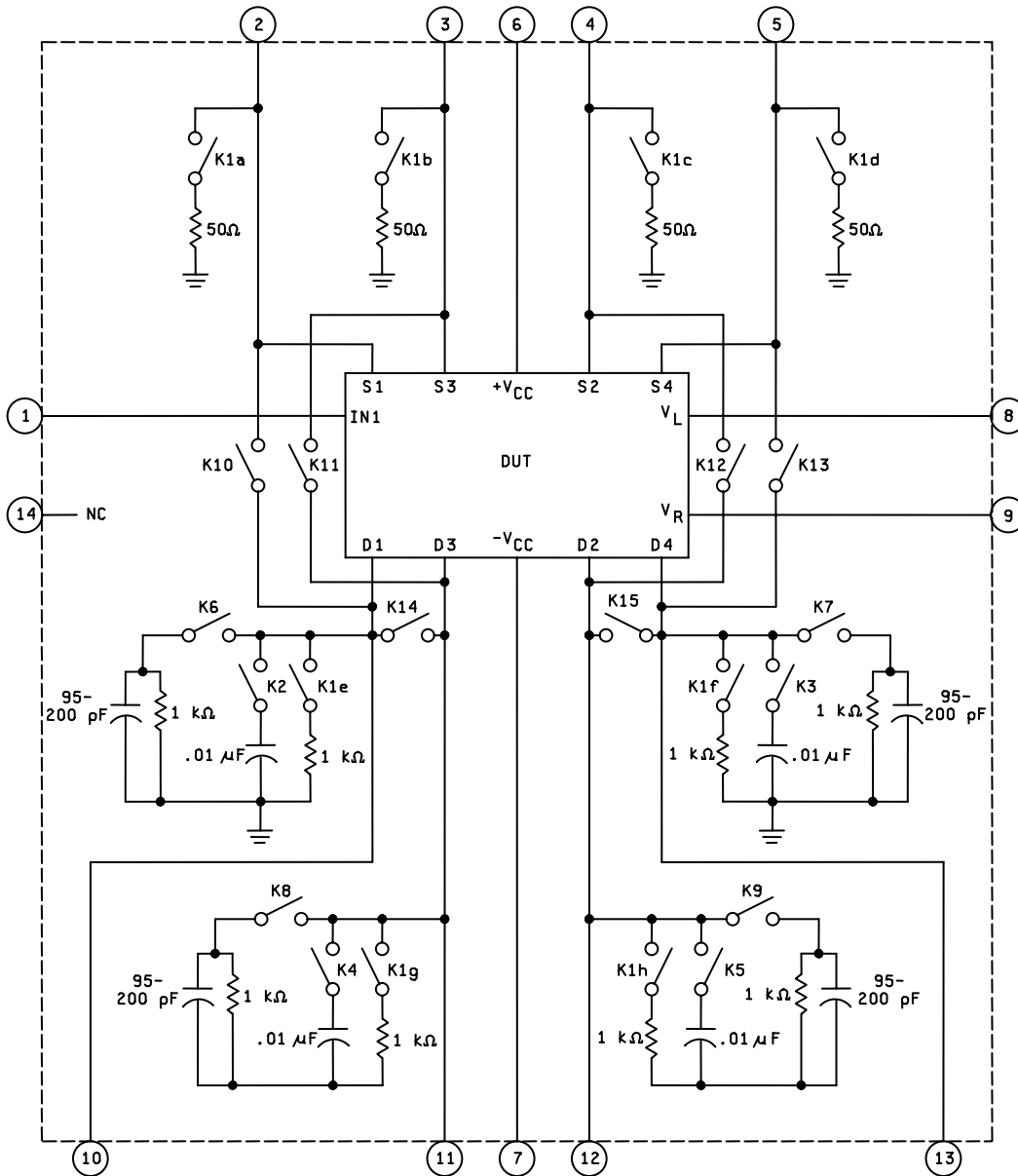
FIGURE 17.  Test circuit (static and dynamic tests) for device types 07 and 08.

TABLE III. Group A inspection for device type 01.

| Symbol | Test number | IN (1) | N.C. (2) | S₁ (3) | N.C. (4) | N.C. (5) | +V_CC (6) | -V_CC (7) | V_L (8) | V_R (9) | N.C. (10) | D₁ (11) | N.C. (12) | N.C. (13) | N.C. (14) | Relays energized | Measured pin number | Min | Max | Min | Max | Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | Subgroup 1 $T_A = 25°C$ | | Subgroup 2 $T_A = 125°C$ | | Subgroup 3 $T_A = -55°C$ | | |
| $R_{DS}$ | 1 | 2.4 V | | 10 mA | | | 15.0 V | -15.0 V | +5.0 V | GND | | -10.0 V | | | | None | 3 | | -9.25 | | -8.50 | | -9.25 | V 2/ |
| " | 2 | " | | -10 mA | | | 15.0 V | -15.0 V | " | " | | 10.0 V | | | | " | 3 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 3 | " | | 10 mA | | | 10.0 V | -10. V | " | " | | -7.5 V | | | | " | 3 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 4 | " | | -10 mA | | | 10.0 V | -10. V | " | " | | 7.5 V | | | | " | 3 | 6.75 | | 6.0 | | 6.75 | | " |
| $I_{D(ON)}$ | 5 | " | | 10.0 V | | | 15.0 V | -15.0 V | " | " | | 10.0 V | | | | K4 | 3 | -2 | 2 | -200 | 200 | -200 | 200 | nA |
| " | 6 | " | | -10.0 V | | | " | " | " | " | | -10.0 V | | | | K4 | 3 | -2 | 2 | -200 | 200 | -200 | 200 | " |
| $I_{D(OFF)}$ | 7 | 0.8 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | None | 11 | -1 | 1 | -100 | 100 | -100 | 100 | " |
| " | 8 | | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 11 | " | " | -100 | 100 | -100 | 100 | " |
| $I_{S(OFF)}$ | 9 | " | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | " | 3 | " | " | -100 | 100 | -100 | 100 | " |
| " | 10 | | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 3 | " | " | -100 | 100 | -100 | 100 | " |
| $I_{IL}$ | 11 | 0.0 V | | | | | " | " | " | " | | | | | | " | 1 | -1 | 0 | -10 | 0 | -1 | 0 | µA |
| $I_{IH}$ | 12 | 2.4 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 13 | 5.0 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| $I_{CC}$ | 14 | 0.0 V | | | | | " | " | " | " | | | | | | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 15 | 5.0 V | | | | | " | " | " | " | | | | | | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| $-I_{CC}$ | 16 | 0.0 V | | | | | " | " | " | " | | | | | | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 17 | 5.0 V | | | | | " | " | " | " | | | | | | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| $+I_L$ | 18 | 0.0 V | | | | | " | " | " | " | | | | | | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 19 | 5.0 V | | | | | " | " | " | " | | | | | | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| $+I_R$ | 20 | 0.0 V | | | | | " | " | " | " | | | | | | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 21 | 5.0 V | | | | | " | " | " | " | | | | | | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |
| | | | | | | | | | | | | | | | | | | Subgroup 4 $T_A = 25°C$ | | Subgroup 7 $T_A = 25°C$ | | Subgroup 9 $T_A = 25°C$ | | |
| $V_{CTE}$ | 22 | IN 3/ | | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K2 | 11 | --- | 15 | | | | | mV |
| $V_{CT}$ | 23 | 0.8 V | | IN 4/ $dB_{CT} = -20 \log(V_{OUT}/V_{IN})$ | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 11 | | | 50 | 3.16 | | | mV_PP dB |
| $V_{ISO}$ | 24 | 2.4 V | | IN 4/ $dB_{ISO} = -20 \log(V_{OUT}/V_{IN})$ | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 11 | | | 50 | 3.16 | | | mV_PP dB |
| $t_{ON}$ | 25 | IN | | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | OUT | | | | K3 | 1 to 11 | | | | | | 450 | ns |
| $t_{OFF}$ | 26 | IN | | IN | | | " | " | " | " | | OUT | | | | K3 | 1 to 11 | | | | | | 250 | ns |
| | | | | | | | | | | | | | | | | | | Subgroup 10 $T_A = 125°C$ | | Subgroup 11 $T_A = -55°C$ | | Subgroup 12 $T_A = 25°C$ | | |
| $t_{ON}$ | 27 | IN | | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | OUT | | | | K3 | 1 to 11 | | 550 | | | | | ns |
| $t_{OFF}$ | 28 | IN | | IN | | | " | " | " | " | | OUT | | | | " | " | | 400 | | | | | " |
| $t_{ON}$ | 29 | IN | | IN | | | " | " | " | " | | OUT | | | | " | " | | | | 375 | | | " |
| $t_{OFF}$ | 30 | IN | | IN | | | " | " | " | " | | OUT | | | | " | " | | | | 250 | | | " |
| $C_A$ | 31 | 0.0 V | | | | | " | " | " | " | | | | | | None | 1 | | | | | | 30 | pF |
| $C_{IS}$ | 32 | | | | | | " | " | " | " | | | | | | " | 3 | | | | | | 20 | " |
| $C_{OS}$ | 33 | | | | | | " | " | " | " | | | | | | " | 11 | | | | | | 20 | " |

See footnotes at end of table.

TABLE III. Group A inspection for device type 02.

| Symbol | Test number | IN1 (1) | N.C. (2) | S1 (3) | S2 (4) | N.C. (5) | +Vcc (6) | -Vcc (7) | VL (8) | VR (9) | N.C. (10) | D1 (11) | D2 (12) | N.C. (13) | IN2 (14) | Relays energized | Measured pin number | SG1 TA=25°C Min | SG1 Max | SG2 TA=125°C Min | SG2 Max | SG3 TA=-55°C Min | SG3 Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $R_{DS}$ | 1 | 2.4 V | | 10 mA | | | 15.0 V | -15.0 V | +5.0 V | GND | | -10.0 V | | | | None | 3 | | -9.25 | | -8.50 | | -9.25 | V 2/ |
| " | 2 | | | | 10 mA | | " | " | " | " | | | -10.0 V | | 2.4 V | " | 4 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 3 | 2.4 V | | -10 mA | | | " | " | " | " | | 10.0 V | 10.0 V | | 2.4 V | " | 3 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 4 | | | | -10 mA | | " | " | " | " | | | 10.0 V | | 2.4 V | " | 4 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 5 | 2.4 V | | 10 mA | | | 10.0 V | -10.0 V | " | " | | -7.5 V | | | | " | 3 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 6 | | | | 10 mA | | " | " | " | " | | | -7.5 V | | 2.4 V | " | 4 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 7 | 2.4 V | | -10 mA | | | " | " | " | " | | 7.5 V | | | | " | 3 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 8 | | | | -10 mA | | " | " | " | " | | | 7.5 V | | 2.4 V | " | 4 | 6.75 | | 6.0 | | 6.75 | | " |
| $I_{D(ON)}$ | 9 | 2.4 V | | 10.0 V | | | 15.0 V | -15.0 V | " | " | | 10.0 V | | | | K6 | 3 | -2 | 2 | -200 | 200 | -200 | 200 | nA |
| " | 10 | | | | 10.0 V | | " | " | " | " | | | 10.0 V | | 2.4 V | K7 | 4 | " | " | " | " | " | " | " |
| " | 11 | 2.4 V | | -10.0 V | | | " | " | " | " | | -10.0 V | | | | K6 | 3 | " | " | " | " | " | " | " |
| " | 12 | | | | -10.0 V | | " | " | " | " | | | -10.0 V | | 2.4 V | K7 | 4 | " | " | " | " | " | " | " |
| $I_{D(OFF)}$ | 13 | 0.8 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | None | 11 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 14 | | | | -10.0 V | | " | " | " | " | | | 10.0 V | | 0.8 V | " | 12 | " | " | " | " | " | " | " |
| " | 15 | 0.8 V | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 11 | " | " | " | " | " | " | " |
| " | 16 | | | | 10.0 V | | " | " | " | " | | | -10.0 V | | 0.8 V | " | 12 | " | " | " | " | " | " | " |
| $I_{S(OFF)}$ | 17 | 0.8 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | None | 3 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 18 | | | | -10.0 V | | " | " | " | " | | | 10.0 V | | 0.8 V | " | 4 | " | " | " | " | " | " | " |
| " | 19 | 0.8 V | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 3 | " | " | " | " | " | " | " |
| " | 20 | | | | 10.0 V | | " | " | " | " | | | -10.0 V | | 0.8 V | " | 4 | " | " | " | " | " | " | " |
| $I_{IL}$ | 21 | 0.0 V | | | | | " | " | " | " | | | | | | " | 1 | -1 | 0 | -10 | 0 | -1 | 0 | μA |
| " | 22 | | | | | | " | " | " | " | | | | | 0.0 V | " | 14 | -1 | 0 | -10 | 0 | -1 | 0 | " |
| $I_{IH}$ | 23 | 2.4 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 24 | | | | | | " | " | " | " | | | | | 2.4 V | " | 14 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 25 | 5.0 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 26 | | | | | | " | " | " | " | | | | | 5.0 V | " | 14 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| $+I_{CC}$ | 27 | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 28 | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| $-I_{CC}$ | 29 | 0.0 V | | | | | " | " | " | " | | | | | 5.0 V | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 30 | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| $+I_L$ | 31 | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 32 | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| $+I_R$ | 33 | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 34 | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |

| Symbol | Test number | IN1 (1) | N.C. (2) | S1 (3) | S2 (4) | N.C. (5) | +Vcc (6) | -Vcc (7) | VL (8) | VR (9) | N.C. (10) | D1 (11) | D2 (12) | N.C. (13) | IN2 (14) | Relays energized | Measured pin number | SG4 TA=25°C Min | SG4 Max | SG7 TA=25°C Min | SG7 Max | SG9 TA=25°C Min | SG9 Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $V_{CTE}$ | 35 | IN 3/ | | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K2 | 11 | --- | 15 | | | | | mV |
| " | 36 | | | | | | " | " | " | " | | | | | IN 3/ | K3 | 12 | --- | 15 | | | | | " |
| $V_{CT}$ | 37 | 0.8 V | | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | 2.4 V | K1 | 12 | | | | | | 3.16 | mVPP |
| " | | | | | $dB_{CT} = -20 \log ( V_{OUT} / V_{IN} )$ | | | | | | | | | | | | | | | | | 50 | | dB |
| $V_{ISO}$ | 38 | 2.4 V | | IN 4/ | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 11 | | | | | | 3.16 | mVPP |
| " | 39 | | | | IN 4/ | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | 2.4 V | K1 | 12 | | | | | | 3.16 | " |
| " | | | | | $dB_{ISO} = -20 \log ( V_{OUT} / V_{IN} )$ | | | | | | | | | | | | | | | | | 50 | | dB |
| $t_{ON}$ | 40 | IN | | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | OUT | | | IN | K4 | 1 to 11 | | | | | | 450 | ns |
| " | 41 | | | | IN | | " | " | " | " | | | OUT | | IN | K5 | 14 to 12 | | | | | | 450 | " |
| $t_{OFF}$ | 42 | IN | | IN | | | " | " | " | " | | OUT | | | IN | K4 | 1 to 11 | | | | | | 250 | ns |
| " | 43 | | | | IN | | " | " | " | " | | | OUT | | IN | K5 | 14 to 12 | | | | | | 250 | " |

See footnotes at end of table.

TABLE III.  <u>Group A inspection for device type 02</u>. – Continued.

| Symbol | Test number | IN1 | N.C. | S₁ | S₂ | N.C. | +V_CC | -V_CC | V_L | V_R | N.C. | D₁ | D₂ | N.C. | IN2 | Relays energized | Measured pin number | Subgroup 10 T_A = 125°C Min | Max | Subgroup 11 T_A = -55°C Min | Max | Subgroup 12 T_A = 25°C Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | | | | | | | | |
| t_ON | 44 | IN | | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | OUT | | | | K4 | 1 to 11 | --- | 550 | | | | | ns |
| " | 45 | | | | IN | | " | " | " | " | | | OUT | | IN | K5 | 14 to 12 | --- | 550 | | | | | " |
| t_OFF | 46 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 1 to 11 | --- | 400 | | | | | " |
| " | 47 | | | | IN | | " | " | " | " | | | OUT | | IN | K5 | 14 to 12 | --- | 400 | | | | | " |
| t_ON | 48 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 1 to 11 | | | --- | 375 | | | " |
| " | 49 | | | | IN | | " | " | " | " | | | OUT | | IN | K5 | 14 to 12 | | | --- | 375 | | | " |
| t_OFF | 50 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 1 to 11 | | | --- | 250 | | | " |
| " | 51 | | | | IN | | " | " | " | " | | | OUT | | IN | K5 | 14 to 12 | | | --- | 250 | | | " |
| C_A | 52 | 0.0 V | | | | | " | " | " | " | | | | | | None | 1 | | | | | --- | 30 | pF |
| " | 53 | | | | | | " | " | " | " | | | | | 0.0 V | " | 14 | | | | | --- | 30 | " |
| C_IS | 54 | | | | | | " | " | " | " | | | | | | " | 3 | | | | | --- | 20 | " |
| " | 55 | | | | | | " | " | " | " | | | | | | " | 4 | | | | | --- | 20 | " |
| C_OS | 56 | | | | | | " | " | " | " | | | | | | " | 11 | | | | | --- | 20 | " |
| " | 57 | | | | | | " | " | " | " | | | | | | " | 12 | | | | | --- | 20 | " |

See notes at end of table.

TABLE III. Group A inspection for device types 03, 05.

| Symbol | Test number | IN 1 6/ | IN 1 7/ | N.C. 2 | S₁ 3 | S₂ 4 | N.C. 5 | +V_CC 6 | -V_CC 7 | V_L 8 | V_R 9 | N.C. 10 | D₁ 11 | D₂ 12 | N.C. 13 | N.C. 14 | Relays energized | Measured pin number | Subgroup 1 T_A = 25°C Min | Max | Subgroup 2 T_A = 125°C Min | Max | Subgroup 3 T_A = -55°C Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R_DS | 1 | 0.8 V | 2.4 V | | | 10 mA | | 15.0 V | -15.0 V | +5.0 V | GND | | | -10.0 V | | | None | 4 | | -9.25 | | -8.50 | | -9.25 | V 2/ |
| " | 2 | 2.4 V | " | | 10 mA | | | " | " | " | " | | -10.0 V | | | | " | 3 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 3 | 0.8 V | " | | | -10 mA | | " | " | " | " | | | 10.0 V | | | " | 4 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 4 | 2.4 V | " | | -10 mA | | | " | " | " | " | | 10.0 V | | | | " | 3 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 5 | 0.8 V | " | | | 10 mA | | 10.0 V | -10.0 V | " | " | | | -7.5 V | | | " | 4 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 6 | 2.4 V | " | | 10 mA | | | " | " | " | " | | -7.5 V | | | | " | 3 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 7 | 0.8 V | " | | | -10 mA | | " | " | " | " | | | 7.5 V | | | " | 4 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 8 | 2.4 V | " | | -10 mA | | | " | " | " | " | | 7.5 V | | | | " | 3 | 6.75 | | 6.0 | | 6.75 | | " |
| I_D(ON) | 9 | 0.8 V | " | | | 10.0 V | | 15.0 V | -15.0 V | " | " | | | 10.0 V | | | K7 | 4 | -2 | 2 | -200 | 200 | -200 | 200 | nA |
| " | 10 | 2.4 V | " | | 10.0 V | | | " | " | " | " | | 10.0 V | | | | K6 | 3 | " | " | " | " | " | " | " |
| " | 11 | 0.8 V | " | | | -10.0 V | | " | " | " | " | | | -10.0 V | | | K7 | 4 | " | " | " | " | " | " | " |
| " | 12 | 2.4 V | " | | -10.0 V | | | " | " | " | " | | -10.0 V | | | | K6 | 3 | " | " | " | " | " | " | " |
| I_D(OFF) | 13 | 0.8 V | 0.8 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | None | 11 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 14 | 2.4 V | " | | | -10.0 V | | " | " | " | " | | | 10.0 V | | | " | 12 | " | " | " | " | " | " | " |
| " | 15 | 0.8 V | " | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 11 | " | " | " | " | " | " | " |
| " | 16 | 2.4 V | " | | | 10.0 V | | " | " | " | " | | | -10.0 V | | | " | 12 | " | " | " | " | " | " | " |
| I_S(OFF) | 17 | 0.8 V | " | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | None | 3 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 18 | 2.4 V | " | | | -10.0 V | | " | " | " | " | | | 10.0 V | | | " | 4 | " | " | " | " | " | " | " |
| " | 19 | 0.8 V | " | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 3 | " | " | " | " | " | " | " |
| " | 20 | 2.4 V | " | | | 10.0 V | | " | " | " | " | | | -10.0 V | | | " | 4 | " | " | " | " | " | " | " |
| I_IL | 21 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 1 | -1 | 0 | -10 | 0 | -1 | 0 | µA |
| I_IH | 22 | 2.4 V | 2.4 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 23 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| +I_CC | 24 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 25 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| -I_CC | 26 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 27 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| +I_L | 28 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 29 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| +I_R | 30 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 31 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |

See footnotes at end of table.

TABLE III. <u>Group A inspection for device types 03, 05</u> – Continued.

| Symbol | Test number | IN (1) | N.C. (2) | S₁ (3) | S₂ (4) | N.C. (5) | +V_CC (6) | -V_CC (7) | V_L (8) | V_R (9) | N.C. (10) | D₁ (11) | D₂ (12) | N.C. (13) | NC (14) | Relays energized | Measured pin number | SG4 (T_A=25°C) Min | SG4 Max | SG7 (T_A=25°C) Min | SG7 Max | SG9 (T_A=25°C) Min | SG9 Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V_CTE | 32 | IN 3/ | | GND | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K2 | 11 | --- | 15 | | | | | mV |
| " | 33 | IN 3/ | | | GND | | " | " | " | " | | | | | | K3 | 12 | --- | 15 | | | | | " |
| V_CT | 34 | 2.4 V | | IN 4/ | | | | | | | | | | | | K1 | 12 | | | | | 50 | 3.16 | mVPP / dB |
| | | | | dB_CT = 20 log ( V_OUT / V_IN ) | | | | | | | | | | | | | | | | | | | | |
| V_ISO | 35 | 2.4 V | | | IN 4/ | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 12 | | | | | | 3.16 | mVPP / dB |
| " | 36 | 0.8 V | | IN 4/ | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 11 | | | | | 50 | 3.16 | " |
| | | | | dB_ISO = -20 log ( V_OUT / V_IN ) | | | | | | | | | | | | | | | | | | | | |
| t_ON | 37 | IN | | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | OUT | | | | K4 | 11 | | | | | | 450 | ns |
| " | 38 | " | | | IN | | " | " | " | " | | | OUT | | | K5 | 12 | | | | | | 450 | " |
| t_OFF | 39 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 11 | | | | | | 250 | " |
| " | 40 | " | | | IN | | " | " | " | " | | | OUT | | | K5 | 12 | | | | | | 250 | " |

| Symbol | Test number | IN (1) | N.C. (2) | S₁ (3) | S₂ (4) | N.C. (5) | +V_CC (6) | -V_CC (7) | V_L (8) | V_R (9) | N.C. (10) | D₁ (11) | D₂ (12) | N.C. (13) | NC (14) | Relays energized | Measured pin number | SG10 (T_A=125°C) Min | SG10 Max | SG11 (T_A=-55°C) Min | SG11 Max | SG12 (T_A=25°C) Min | SG12 Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| t_ON | 41 | IN | | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | OUT | | | | K4 | 11 | --- | 550 | | | | | ns |
| " | 42 | " | | | IN | | " | " | " | " | | | OUT | | | K5 | 12 | --- | 550 | | | | | " |
| t_OFF | 43 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 11 | --- | 400 | | | | | " |
| " | 44 | " | | | IN | | " | " | " | " | | | OUT | | | K5 | 12 | --- | 400 | | | | | " |
| t_ON | 45 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 11 | | | --- | 375 | | | " |
| " | 46 | " | | | IN | | " | " | " | " | | | OUT | | | K5 | 12 | | | --- | 375 | | | " |
| t_OFF | 47 | IN | | IN | | | " | " | " | " | | OUT | | | | K4 | 11 | | | --- | 250 | | | " |
| " | 48 | " | | | IN | | " | " | " | " | | | OUT | | | K5 | 12 | | | --- | 250 | | | " |
| C_A | 49 | 0.0 V | | | | | " | " | " | " | | | | | | None | 1 | | | | | --- | 30 | pF |
| C_IS | 50 | | | | | | " | " | " | " | | | | | | " | 3 | | | | | --- | 20 | " |
| " | 51 | | | | | | " | " | " | " | | | | | | " | 4 | | | | | --- | 20 | " |
| C_OS | 52 | | | | | | " | " | " | " | | | | | | " | 11 | | | | | --- | 20 | " |
| " | 53 | | | | | | " | " | " | " | | | | | | " | 12 | | | | | --- | 20 | " |

| Symbol | Test number | IN (1) | N.C. (2) | S₁ (3) | S₂ (4) | N.C. (5) | +V_CC (6) | -V_CC (7) | V_L (8) | V_R (9) | N.C. (10) | D₁ (11) | D₂ (12) | N.C. (13) | NC (14) | Relays energized | Measured pin number | SG13 (T_A=25°C) Min | SG13 Max | SG14 (T_A=125°C) Min | SG14 Max | SG14 (T_A=-55°C) Min | SG14 Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| t_D 5/ | 54 | IN | | IN | IN | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K4, K8 | 11 | 20 | --- | | | | | ns |
| " | 55 | " | | " | " | | " | " | " | " | | | | | | " | 12 | 20 | --- | | | | | " |
| t_D 5/ | 56 | " | | " | " | | " | " | " | " | | | | | | " | 11 | | | 20 | --- | | | " |
| " | 57 | " | | " | " | | " | " | " | " | | | | | | " | 12 | | | 20 | --- | | | " |
| t_D 5/ | 58 | " | | " | " | | " | " | " | " | | | | | | " | 11 | | | | | 20 | --- | " |
| " | 59 | " | | " | " | | " | " | " | " | | | | | | " | 12 | | | | | 20 | --- | " |

See notes at end of table.

MIL-M-38510/105A

TABLE III. Group A inspection for device types 04, 06.

| Symbol | Test number | Adapter pin number 1/ | | | | | | | | | | | | | | | Relays energized | Measured pin | Test limits | | | | | | Unit |
| | | IN1 | IN1 | S$_1$ | S$_3$ | S$_2$ | S$_4$ | +V$_{CC}$ | -V$_{CC}$ | V$_L$ | V$_R$ | D$_1$ | D$_3$ | D$_2$ | D$_4$ | IN2 | IN2 | | | Subgroup 1 T$_A$ = 25°C | | Subgroup 2 T$_A$ = 125°C | | Subgroup 3 T$_A$ = -55°C | | |
| | | 1 8/ | 1 9/ | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 8/ | 14 9/ | | number | Min | Max | Min | Max | Min | Max | |
| R$_{DS}$ | 1 | 2.4 V | 2.4 V | 10.0 mA | | | | 15.0 V | -15.0 V | +5.0 V | GND | -10.0 V | | | | | | None | 2 | | -9.25 | | -8.50 | | -9.25 | V 2/ |
| " | 2 | 2.4 V | 0.8 V | | 10.0 mA | | | " | " | " | " | | -10.0 V | | | | | " | 3 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 3 | | | | | 10.0 mA | | " | " | " | " | | | -10.0 V | | 2.4 V | 2.4 V | " | 4 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 4 | | | | | | 10.0 mA | " | " | " | " | | | | -10.0 V | 2.4 V | 0.8 V | " | 5 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 5 | 2.4 V | 2.4 V | -10.0 mA | | | | " | " | " | " | 10.0 V | | | | | | " | 2 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 6 | 2.4 V | 0.8 V | | -10.0 mA | | | " | " | " | " | | 10.0 V | | | | | " | 3 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 7 | | | | | -10.0 mA | | " | " | " | " | | | 10.0 V | | 2.4 V | 2.4 V | " | 4 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 8 | | | | | | -10.0 mA | " | " | " | " | | | | 10.0 V | 2.4 V | 0.8 V | " | 5 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 9 | 2.4 V | 2.4 V | 10.0 mA | | | | 10.0 V | -10.0 V | " | " | -7.5 V | | | | | | " | 2 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 10 | 2.4 V | 0.8 V | | 10.0 mA | | | " | " | " | " | | -7.5 V | | | | | " | 3 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 11 | | | | | 10.0 mA | | " | " | " | " | | | -7.5 V | | 2.4 V | 2.4 V | " | 4 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 12 | | | | | | 10.0 mA | " | " | " | " | | | | -7.5 V | 2.4 V | 0.8 V | " | 5 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 13 | 2.4 V | 2.4 V | -10.0 mA | | | | " | " | " | " | 7.5 V | | | | | | " | 2 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 14 | 2.4 V | 0.8 V | | -10.0 mA | | | " | " | " | " | | 7.5 V | | | | | " | 3 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 15 | | | | | -10.0 mA | | " | " | " | " | | | 7.5 V | | 2.4 V | 2.4 V | " | 4 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 16 | | | | | | -10.0 mA | " | " | " | " | | | | 7.5 V | 2.4 V | 0.8 V | " | 5 | 6.75 | | 6.0 | | 6.75 | | " |
| I$_{D(ON)}$ | 17 | 2.4 V | 2.4 V | 10.0 V | | | | 15.0 V | -15.0 V | " | " | 10.0 V | | | | | | K10 | 2 | -2 | 2 | -200 | 200 | -200 | 200 | nA |
| " | 18 | 2.4 V | 0.8 V | | 10.0 V | | | " | " | " | " | | 10.0 V | | | | | K11 | 3 | " | " | " | " | " | " | " |
| " | 19 | | | | | 10.0 V | | " | " | " | " | | | 10.0 V | | 2.4 V | 2.4 V | K12 | 4 | " | " | " | " | " | " | " |
| " | 20 | | | | | | 10.0 V | " | " | " | " | | | | 10.0 V | 2.4 V | 0.8 V | K13 | 5 | " | " | " | " | " | " | " |
| " | 21 | 2.4 V | 2.4 V | -10.0 V | | | | " | " | " | " | -10.0 V | | | | | | K10 | 2 | " | " | " | " | " | " | " |
| " | 22 | 2.4 V | 0.8 V | | -10.0 V | | | " | " | " | " | | -10.0 V | | | | | K11 | 3 | " | " | " | " | " | " | " |
| " | 23 | | | | | -10.0 V | | " | " | " | " | | | -10.0 V | | 2.4 V | 2.4 V | K12 | 4 | " | " | " | " | " | " | " |
| " | 24 | | | | | | -10.0 V | " | " | " | " | | | | -10.0 V | 2.4 V | 0.8 V | K13 | 5 | " | " | " | " | " | " | " |
| I$_{D(OFF)}$ | 25 | 0.8 V | 0.8 V | -10.0 V | | | | " | " | " | " | 10.0 V | | | | | | None | 10 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 26 | 0.8 V | 2.4 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | | " | 11 | " | " | " | " | " | " | " |
| " | 27 | | | | | -10.0 V | | " | " | " | " | | | 10.0 V | | 0.8 V | 0.8 V | " | 12 | " | " | " | " | " | " | " |
| " | 28 | | | | | | -10.0 V | " | " | " | " | | | | 10.0 V | 0.8 V | 2.4 V | " | 13 | " | " | " | " | " | " | " |
| " | 29 | 0.8 V | 0.8 V | 10.0 V | | | | " | " | " | " | -10.0 V | | | | | | " | 10 | " | " | " | " | " | " | " |
| " | 30 | 0.8 V | 2.4 V | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | | " | 11 | " | " | " | " | " | " | " |
| " | 31 | | | | | 10.0 V | | " | " | " | " | | | -10.0 V | | 0.8 V | 0.8 V | " | 12 | " | " | " | " | " | " | " |
| " | 32 | | | | | | 10.0 V | " | " | " | " | | | | -10.0 V | 0.8 V | 2.4 V | " | 13 | " | " | " | " | " | " | " |
| I$_{S(OFF)}$ | 33 | 0.8 V | 0.8 V | -10.0 V | | | | 15.0 V | -15.0 V | +5.0 V | GND | 10.0 V | | | | | | None | 2 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 34 | 0.8 V | 2.4 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | | " | 3 | " | " | " | " | " | " | " |
| " | 35 | | | | | -10.0 V | | " | " | " | " | | | 10.0 V | | 0.8 V | 0.8 V | " | 4 | " | " | " | " | " | " | " |
| " | 36 | | | | | | -10.0 V | " | " | " | " | | | | 10.0 V | 0.8 V | 2.4 V | " | 5 | " | " | " | " | " | " | " |
| " | 37 | 0.8 V | 0.8 V | 10.0 V | | | | " | " | " | " | -10.0 V | | | | | | " | 2 | " | " | " | " | " | " | " |
| " | 38 | 0.8 V | 2.4 V | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | | " | 3 | " | " | " | " | " | " | " |
| " | 39 | | | | | 10.0 V | | " | " | " | " | | | -10.0 V | | 0.8 V | 0.8 V | " | 4 | " | " | " | " | " | " | " |
| " | 40 | | | | | | 10.0 V | " | " | " | " | | | | -10.0 V | 0.8 V | 2.4 V | " | 5 | " | " | " | " | " | " | " |
| I$_{IL}$ | 41 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | | " | 1 | -1 | 0 | -10 | 0 | -1 | 0 | μA |
| " | 42 | | | | | | | " | " | " | " | | | | | 0.0 V | 0.0 V | " | 14 | -1 | 0 | -10 | 0 | -1 | 0 | " |
| I$_{IH}$ | 43 | 2.4 V | 2.4 V | | | | | " | " | " | " | | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 44 | | | | | | | " | " | " | " | | | | | 2.4 V | 2.4 V | " | 14 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 45 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 46 | | | | | | | " | " | " | " | | | | | 5.0 V | 5.0 V | " | 14 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| +I$_{CC}$ | 47 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | 0.0 V | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 48 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | 5.0 V | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| -I$_{CC}$ | 49 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | 0.0 V | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 50 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | 5.0 V | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| +I$_L$ | 51 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | 0.0 V | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 52 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | 5.0 V | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| +I$_R$ | 53 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | 0.0 V | 0.0 V | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 54 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | 5.0 V | 5.0 V | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |

See footnotes at end of table.

TABLE III. Group A inspection for device types 04, 06 – Continued.

| Symbol | Test number | IN1 (1) | S₁ (2) | S₃ (3) | S₂ (4) | S₄ (5) | +VCC (6) | -VCC (7) | VL (8) | VR (9) | D₁ (10) | D₃ (11) | D₂ (12) | D₄ (13) | IN2 (14) | Relays energized | Measured pin number | Min | Max | Min | Max | Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | Subgroup 4 TA=25°C | | | | | | |
| V_CTE | 55 | IN 3/ | GND | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K2 | 10 | | 15 | | | | | mV |
| " | 56 | IN 3/ | | GND | | | " | " | " | " | | | | | | K4 | 11 | | " | | | | | " |
| " | 57 | | | | GND | | " | " | " | " | | | | | IN 3/ | K5 | 12 | | " | | | | | " |
| " | 58 | | | | | GND | " | " | " | " | | | | | IN 3/ | K3 | 13 | | " | | | | | " |
| | | | | | | | | | | | | | | | | | | Subgroup 7 TA=25°C | | Subgroup 9 TA=25°C | | Subgroup 10 TA=125°C | | |
| V_CT | 59 | 2.4 V | IN 4/ | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 12 | | 3.16 | | | | | mV_PP |
| " | 60 | | | | IN 4/ | | " | " | " | " | | | | | 2.4 V | K1 | 10 | | 3.16 | | | | | " |
| | | | | | dB_CT = -20 log ( V_OUT / V_IN ) | | | | | | | | | | | | | 50 | | | | | | dB |
| V_ISO | 61 | 0.8 V | IN 4/ | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 10 | | 3.16 | | | | | mV_PP |
| " | 62 | 0.8 V | | IN 4/ | | | " | " | " | " | | | | | | K1 | 11 | | 3.16 | | | | | " |
| " | 63 | | | | IN 4/ | | " | " | " | " | | | | | 0.8 V | K1 | 12 | | 3.16 | | | | | " |
| " | 64 | | | | | IN 4/ | " | " | " | " | | | | | 0.8 V | K1 | 13 | | 3.16 | | | | | " |
| | | | | | dB_ISO = -20 log ( V_OUT / V_IN ) | | | | | | | | | | | | | 50 | | | | | | dB |
| t_ON | 65 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 450 | ns |
| " | 66 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 450 | " |
| " | 67 | | | | IN | | " | " | " | " | | | OUT | | IN | K9 | 4 to 12 | | | | | | 450 | " |
| " | 68 | | | | | IN | " | " | " | " | | | | OUT | IN | K7 | 5 to 13 | | | | | | 450 | " |
| t_OFF | 69 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 250 | " |
| " | 70 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 250 | " |
| " | 71 | | | | IN | | " | " | " | " | | | OUT | | IN | K9 | 4 to 12 | | | | | | 250 | " |
| " | 72 | | | | | IN | " | " | " | " | | | | OUT | IN | K7 | 5 to 13 | | | | | | 250 | " |
| t_ON | 73 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 550 | ns |
| " | 74 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 550 | " |
| " | 75 | | | | IN | | " | " | " | " | | | OUT | | IN | K9 | 4 to 12 | | | | | | 550 | " |
| " | 76 | | | | | IN | " | " | " | " | | | | OUT | IN | K7 | 5 to 13 | | | | | | 550 | " |
| t_OFF | 77 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 400 | " |
| " | 78 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 400 | " |
| " | 79 | | | | IN | | " | " | " | " | | | OUT | | IN | K9 | 4 to 12 | | | | | | 400 | " |
| " | 80 | | | | | IN | " | " | " | " | | | | OUT | IN | K7 | 5 to 13 | | | | | | 400 | " |
| | | | | | | | | | | | | | | | | | | Subgroup 11 TA=-55°C | | Subgroup 12 TA=25°C | | Subgroup 13 TA=125°C | | |
| t_ON | 81 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | --- | 375 | | | | | ns |
| " | 82 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | --- | 375 | | | | | " |
| " | 83 | | | | IN | | " | " | " | " | | | OUT | | IN | K9 | 4 to 12 | --- | 375 | | | | | " |
| " | 84 | | | | | IN | " | " | " | " | | | | OUT | IN | K7 | 5 to 13 | --- | 375 | | | | | " |
| t_OFF | 85 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | --- | 250 | | | | | " |
| " | 86 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | --- | 250 | | | | | " |
| " | 87 | | | | IN | | " | " | " | " | | | OUT | | IN | K9 | 4 to 12 | --- | 250 | | | | | " |
| " | 88 | | | | | IN | " | " | " | " | | | | OUT | IN | K7 | 5 to 13 | --- | 250 | | | | | " |
| C_A | 89 | 0.0 V | | | | | " | " | " | " | | | | | | None | 1 | | | | | --- | 30 | pF |
| " | 90 | | | | | | " | " | " | " | | | | | 0.0 V | " | 14 | | | | | --- | 30 | " |
| C_IS | 91 | | | | | | " | " | " | " | | | | | | " | 2 | | | | | --- | 20 | " |
| " | 92 | | | | | | " | " | " | " | | | | | | " | 3 | | | | | --- | 20 | " |
| " | 93 | | | | | | " | " | " | " | | | | | | " | 4 | | | | | --- | 20 | " |
| " | 94 | | | | | | " | " | " | " | | | | | | " | 5 | | | | | --- | 20 | " |
| C_OS | 95 | | | | | | " | " | " | " | | | | | | " | 10 | | | | | --- | 20 | " |
| " | 96 | | | | | | " | " | " | " | | | | | | " | 11 | | | | | --- | 20 | " |
| " | 97 | | | | | | " | " | " | " | | | | | | " | 12 | | | | | --- | 20 | " |
| " | 98 | | | | | | " | " | " | " | | | | | | " | 13 | | | | | --- | 20 | " |
| t_D 5/ | 99 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 10 | | | | | 20 | --- | ns |
| " | 100 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 11 | | | | | 20 | --- | " |
| " | 101 | | | | IN | IN | " | " | " | " | | | | | IN | K7, K15 | 12 | | | | | 20 | --- | " |
| " | 102 | | | | IN | IN | " | " | " | " | | | | | IN | K7, K15 | 13 | | | | | 20 | --- | " |

See footnotes at end of table.

TABLE III.  Group A inspection for device types 04, 06 – Continued.

| Symbol | Test number | IN1 | $S_1$ | $S_3$ | $S_2$ | $S_4$ | +$V_{CC}$ | -$V_{CC}$ | $V_L$ | $V_R$ | $D_1$ | $D_3$ | $D_2$ | $D_4$ | IN2 | Relays energized | Measured pin | Subgroup 14 $T_A$ = 125°C Min | Subgroup 14 $T_A$ = 125°C Max | Subgroup 14 $T_A$ = -55°C Min | Subgroup 14 $T_A$ = -55°C Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | number | Min | Max | Min | Max | |
| $t_D$ 5/ | 103 | IN | IN | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K6, K14 | 10 | 20 | --- | | | ns |
| " | 104 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 11 | 20 | --- | | | " |
| " | 105 | | | | IN | IN | " | " | " | " | | | | | IN | K7, K15 | 12 | 20 | --- | | | " |
| " | 106 | | | | IN | IN | " | " | " | " | | | | | IN | K7, K15 | 13 | 20 | --- | | | " |
| $t_D$ 5/ | 107 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 10 | | | 20 | --- | " |
| " | 108 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 11 | | | 20 | --- | " |
| " | 109 | | | | IN | IN | " | " | " | " | | | | | IN | K7, K15 | 12 | | | 20 | --- | " |
| " | 110 | | | | IN | IN | " | " | " | " | | | | | IN | K7, K15 | 13 | | | 20 | --- | " |

See footnotes at end of table.

TABLE III. Group A inspection for device type 07, 08.

| Symbol | Test number | IN 1 10/ | IN 1 11/ | S₁ 2 | S₃ 3 | S₂ 4 | S₄ 5 | +V_CC 6 | -V_CC 7 | V_L 8 | V_R 9 | D₁ 10 | D₃ 11 | D₂ 12 | D₄ 13 | N.C. 14 | Relays energized | Measured pin number | Subgroup 1 T_A = 25°C Min | Max | Subgroup 2 T_A = 125°C Min | Max | Subgroup 3 T_A = -55°C Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R_DS | 1 | 2.4 V | 0.8 V | 10.0 mA | | | | 15.0 V | -15.0 V | +5.0 V | GND | -10.0 V | | | | | None | 2 | | -9.25 | | -8.50 | | -9.25 | V 2/ |
| " | 2 | " | 2.4 V | | 10.0 mA | | | " | " | " | " | | -10.0 V | | | | " | 3 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 3 | " | 2.4 V | | | 10.0 mA | | " | " | " | " | | | -10.0 V | | | " | 4 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 4 | " | 0.8 V | | | | 10.0 mA | " | " | " | " | | | | -10.0 V | | " | 5 | | -9.25 | | -8.50 | | -9.25 | " |
| " | 5 | " | 0.8 V | -10.0 mA | | | | " | " | " | " | 10.0 V | | | | | " | 2 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 6 | " | 2.4 V | | -10.0 mA | | | " | " | " | " | | 10.0 V | | | | " | 3 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 7 | " | 2.4 V | | | -10.0 mA | | " | " | " | " | | | 10.0 V | | | " | 4 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 8 | " | 0.8 V | | | | -10.0 mA | " | " | " | " | | | | 10.0 V | | " | 5 | 9.25 | | 8.50 | | 9.25 | | " |
| " | 9 | " | 0.8 V | 10.0 mA | | | | 10.0 V | -10.0 V | " | " | -7.5 V | | | | | " | 2 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 10 | " | 2.4 V | | 10.0 mA | | | " | " | " | " | | -7.5 V | | | | " | 3 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 11 | " | 2.4 V | | | 10.0 mA | | " | " | " | " | | | -7.5 V | | | " | 4 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 12 | " | 0.8 V | | | | 10.0 mA | " | " | " | " | | | | -7.5 V | | " | 5 | | -6.75 | | -6.0 | | -6.75 | " |
| " | 13 | " | 0.8 V | -10.0 mA | | | | " | " | " | " | 7.5 V | | | | | " | 2 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 14 | " | 2.4 V | | -10.0 mA | | | " | " | " | " | | 7.5 V | | | | " | 3 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 15 | " | 2.4 V | | | -10.0 mA | | " | " | " | " | | | 7.5 V | | | " | 4 | 6.75 | | 6.0 | | 6.75 | | " |
| " | 16 | " | 0.8 V | | | | -10.0 mA | " | " | " | " | | | | 7.5 V | | " | 5 | 6.75 | | 6.0 | | 6.75 | | " |
| I_D(ON) | 17 | " | 0.8 V | 10.0 V | | | | 15.0 V | -15.0 V | " | " | 10.0 V | | | | | K10 | 2 | -2 | 2 | -200 | 200 | -200 | 200 | nA |
| " | 18 | " | 2.4 V | | 10.0 V | | | " | " | " | " | | 10.0 V | | | | K11 | 3 | " | " | " | " | " | " | " |
| " | 19 | " | 2.4 V | | | 10.0 V | | " | " | " | " | | | 10.0 V | | | K12 | 4 | " | " | " | " | " | " | " |
| " | 20 | " | 0.8 V | | | | 10.0 V | " | " | " | " | | | | 10.0 V | | K13 | 5 | " | " | " | " | " | " | " |
| " | 21 | " | 0.8 V | -10.0 V | | | | " | " | " | " | -10.0 V | | | | | K10 | 2 | " | " | " | " | " | " | " |
| " | 22 | " | 2.4 V | | -10.0 V | | | " | " | " | " | | -10.0 V | | | | K11 | 3 | " | " | " | " | " | " | " |
| " | 23 | " | 2.4 V | | | -10.0 V | | " | " | " | " | | | -10.0 V | | | K12 | 4 | " | " | " | " | " | " | " |
| " | 24 | " | 0.8 V | | | | -10.0 V | " | " | " | " | | | | -10.0 V | | K13 | 5 | " | " | " | " | " | " | " |
| I_D(OFF) | 25 | 0.8 V | 2.4 V | -10.0 V | | | | " | " | " | " | 10.0 V | | | | | None | 10 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 26 | " | 0.8 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | " | 11 | " | " | " | " | " | " | " |
| " | 27 | " | 0.8 V | | | -10.0 V | | " | " | " | " | | | 10.0 V | | | " | 12 | " | " | " | " | " | " | " |
| " | 28 | " | 2.4 V | | | | -10.0 V | " | " | " | " | | | | 10.0 V | | " | 13 | " | " | " | " | " | " | " |
| " | 29 | " | 2.4 V | 10.0 V | | | | " | " | " | " | -10.0 V | | | | | " | 10 | " | " | " | " | " | " | " |
| " | 30 | " | 0.8 V | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 11 | " | " | " | " | " | " | " |
| " | 31 | " | 0.8 V | | | 10.0 V | | " | " | " | " | | | -10.0 V | | | " | 12 | " | " | " | " | " | " | " |
| " | 32 | " | 2.4 V | | | | 10.0 V | " | " | " | " | | | | -10.0 V | | " | 13 | " | " | " | " | " | " | " |
| I_S(OFF) | 33 | " | 2.4 V | -10.0 V | | | | " | " | " | " | 10.0 V | | | | | None | 2 | -1 | 1 | -100 | 100 | -100 | 100 | nA |
| " | 34 | " | 0.8 V | | -10.0 V | | | " | " | " | " | | 10.0 V | | | | " | 3 | " | " | " | " | " | " | " |
| " | 35 | " | 0.8 V | | | -10.0 V | | " | " | " | " | | | 10.0 V | | | " | 4 | " | " | " | " | " | " | " |
| " | 36 | " | 2.4 V | | | | -10.0 V | " | " | " | " | | | | 10.0 V | | " | 5 | " | " | " | " | " | " | " |
| " | 37 | " | 2.4 V | 10.0 V | | | | " | " | " | " | -10.0 V | | | | | " | 2 | " | " | " | " | " | " | " |
| " | 38 | " | 0.8 V | | 10.0 V | | | " | " | " | " | | -10.0 V | | | | " | 3 | " | " | " | " | " | " | " |
| " | 39 | " | 0.8 V | | | 10.0 V | | " | " | " | " | | | -10.0 V | | | " | 4 | " | " | " | " | " | " | " |
| " | 40 | " | 2.4 V | | | | 10.0 V | " | " | " | " | | | | -10.0 V | | " | 5 | " | " | " | " | " | " | " |
| I_IL | 41 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 1 | -1 | 0 | -10 | 0 | -1 | 0 | µA |
| I_IH | 42 | 2.4 V | 2.4 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| " | 43 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 1 | 0 | 1 | 0 | 10 | 0 | 1 | " |
| +I_CC | 44 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 45 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 6 | --- | 10 | --- | 100 | --- | 10 | " |
| -I_CC | 46 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 47 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 7 | -10 | --- | -100 | --- | -10 | --- | " |
| +I_L | 48 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| " | 49 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 8 | --- | 10 | --- | 100 | --- | 10 | " |
| +I_R | 50 | 0.0 V | 0.0 V | | | | | " | " | " | " | | | | | | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |
| " | 51 | 5.0 V | 5.0 V | | | | | " | " | " | " | | | | | | " | 9 | -10 | --- | -100 | --- | -10 | --- | " |

See footnotes at end of table.

TABLE III. Group A inspection for device types 07, 08 – Continued.

Adapter pin number 1/ — column assignments: IN1 (pin 1), $S_1$ (2), $S_3$ (3), $S_2$ (4), $S_4$ (5), +$V_{CC}$ (6), -$V_{CC}$ (7), $V_L$ (8), $V_R$ (9), $D_1$ (10), $D_3$ (11), $D_2$ (12), $D_4$ (13), NC (14).

| Symbol | Test number | IN1 | $S_1$ | $S_3$ | $S_2$ | $S_4$ | +$V_{CC}$ | -$V_{CC}$ | $V_L$ | $V_R$ | $D_1$ | $D_3$ | $D_2$ | $D_4$ | NC | Relays energized | Measured pin | Min | Max | Min | Max | Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | Subgroup 4 $T_A$=25°C | | | | | | |
| $V_{CTE}$ | 52 | IN 3/ | | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K2 | 10 | | 15 | | | | | mV |
| " | 53 | IN 3/ | | | | | " | " | " | " | | | | | | K4 | 11 | | " | | | | | " |
| " | 54 | IN 3/ | | | | | " | " | " | " | | | | | | K5 | 12 | | " | | | | | " |
| " | 55 | IN 3/ | | | | | " | " | " | " | | | | | | K3 | 13 | | " | | | | | " |
| | | | | | | | | | | | | | | | | | Subgroup 7 $T_A$=25°C Min/Max | | Subgroup 9 $T_A$=25°C Min/Max | | Subgroup 10 $T_A$=125°C Min/Max | | |
| $V_{CT}$ | 56 | 2.4 V | IN 4/ | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 12 | | 3.16 | | 3.16 | | | mV$_{PP}$ |
| | | $dB_{CT}$ = -20 log ( $V_{OUT}$ / $V_{IN}$ ) | | | | | | | | | | | | | | | | 50 | | | | | | dB |
| " | 57 | 2.4 V | | IN 4/ | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 10 | | 3.16 | | | | | mV$_{PP}$ |
| $V_{ISO}$ | 58 | 0.8 V | | | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K1 | 10 | | 3.16 | | | | | mV$_{PP}$ |
| " | 59 | 0.8 V | | | | | " | " | " | " | | | | | | K1 | 11 | | 3.16 | | | | | " |
| " | 60 | 0.8 V | | | | | " | " | " | " | | | | | | K1 | 12 | | 3.16 | | | | | " |
| " | 61 | 0.8 V | | | | | " | " | " | " | | | | | | K1 | 13 | | 3.16 | | | | | " |
| | | $dB_{ISO}$ = -20 log ( $V_{OUT}$ / $V_{IN}$ ) | | | | | | | | | | | | | | | | 50 | | | | | | dB |
| $t_{ON}$ | 62 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 450 | ns |
| " | 63 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 450 | " |
| " | 64 | IN | | | IN | | " | " | " | " | | | OUT | | | K9 | 4 to 12 | | | | | | 450 | " |
| " | 65 | IN | | | | IN | " | " | " | " | | | | OUT | | K7 | 5 to 13 | | | | | | 450 | " |
| $t_{OFF}$ | 66 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 250 | " |
| " | 67 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 250 | " |
| " | 68 | IN | | | IN | | " | " | " | " | | | OUT | | | K9 | 4 to 12 | | | | | | 250 | " |
| " | 69 | IN | | | | IN | " | " | " | " | | | | OUT | | K7 | 5 to 13 | | | | | | 250 | " |
| $t_{ON}$ | 70 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 550 | ns |
| " | 71 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 550 | " |
| " | 72 | IN | | | IN | | " | " | " | " | | | OUT | | | K9 | 4 to 12 | | | | | | 550 | " |
| " | 73 | IN | | | | IN | " | " | " | " | | | | OUT | | K7 | 5 to 13 | | | | | | 550 | " |
| $t_{OFF}$ | 74 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | | | | | | 400 | " |
| " | 75 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | | | | | | 400 | " |
| " | 76 | IN | | | IN | | " | " | " | " | | | OUT | | | K9 | 4 to 12 | | | | | | 400 | " |
| " | 77 | IN | | | | IN | " | " | " | " | | | | OUT | | K7 | 5 to 13 | | | | | | 400 | " |
| | | | | | | | | | | | | | | | | | | Subgroup 11 $T_A$=-55°C Min/Max | | Subgroup 12 $T_A$=25°C Min/Max | | Subgroup 13 $T_A$=25°C Min/Max | | |
| $t_{ON}$ | 78 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | --- | 375 | | | | | ns |
| " | 79 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | --- | 375 | | | | | " |
| " | 80 | IN | | | IN | | " | " | " | " | | | OUT | | | K9 | 4 to 12 | --- | 375 | | | | | " |
| " | 81 | IN | | | | IN | " | " | " | " | | | | OUT | | K7 | 5 to 13 | --- | 375 | | | | | " |
| $t_{OFF}$ | 82 | IN | IN | | | | 15.0 V | -15.0 V | +5.0 V | GND | OUT | | | | | K6 | 2 to 10 | --- | 250 | | | | | " |
| " | 83 | IN | | IN | | | " | " | " | " | | OUT | | | | K8 | 3 to 11 | --- | 250 | | | | | " |
| " | 84 | IN | | | IN | | " | " | " | " | | | OUT | | | K9 | 4 to 12 | --- | 250 | | | | | " |
| " | 85 | IN | | | | IN | " | " | " | " | | | | OUT | | K7 | 5 to 13 | --- | 250 | | | | | " |
| $C_A$ | 86 | 0.0 V | | | | | " | " | " | " | | | | | | None | 1 | | | --- | 30 | | | pF |
| $C_{IS}$ | 87 | | | | | | " | " | " | " | | | | | | " | 2 | | | --- | 20 | | | " |
| " | 88 | | | | | | " | " | " | " | | | | | | " | 3 | | | --- | 20 | | | " |
| " | 89 | | | | | | " | " | " | " | | | | | | " | 4 | | | --- | 20 | | | " |
| " | 90 | | | | | | " | " | " | " | | | | | | " | 5 | | | --- | 20 | | | " |
| $C_{OS}$ | 91 | | | | | | " | " | " | " | | | | | | " | 10 | | | --- | 20 | | | " |
| " | 92 | | | | | | " | " | " | " | | | | | | " | 11 | | | --- | 20 | | | " |
| " | 93 | | | | | | " | " | " | " | | | | | | " | 12 | | | --- | 20 | | | " |
| " | 94 | | | | | | " | " | " | " | | | | | | " | 13 | | | --- | 20 | | | " |
| $t_D$ 5/ | 95 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 10 | | | | | 20 | --- | ns |
| " | 96 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 11 | | | | | 20 | --- | " |
| " | 97 | IN | | | IN | IN | " | " | " | " | | | | | | K7, K15 | 12 | | | | | 20 | --- | " |
| " | 98 | IN | | | IN | IN | " | " | " | " | | | | | | K7, K15 | 13 | | | | | 20 | --- | " |

See footnotes at end of table.

TABLE III. <u>Group A inspection for device types 07, 08</u> – Continued.

| Symbol | Test number | IN1 | S$_1$ | S$_3$ | S$_2$ | S$_4$ | +V$_{CC}$ | -V$_{CC}$ | V$_L$ | V$_R$ | D$_1$ | D$_3$ | D$_2$ | D$_4$ | IN2 | Relays energized | Measured pin | Subgroup 14 T$_A$ = 125°C Min | Max | Subgroup 14 T$_A$ = -55°C Min | Max | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | number | Min | Max | Min | Max | |
| t$_D$ 5/ | 99 | IN | IN | IN | | | 15.0 V | -15.0 V | +5.0 V | GND | | | | | | K6, K14 | 10 | 20 | --- | | | ns |
| " | 100 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 11 | 20 | --- | | | " |
| " | 101 | IN | | | IN | IN | " | " | " | " | | | | | | K7, K15 | 12 | 20 | --- | | | " |
| " | 102 | IN | | | IN | IN | " | " | " | " | | | | | | K7, K15 | 13 | 20 | --- | | | " |
| t$_D$ 5/ | 103 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 10 | | | 20 | --- | " |
| " | 104 | IN | IN | IN | | | " | " | " | " | | | | | | K6, K14 | 11 | | | 20 | --- | " |
| " | 105 | IN | | | IN | IN | " | " | " | " | | | | | | K7, K15 | 12 | | | 20 | --- | " |
| " | 106 | IN | | | IN | IN | " | " | " | " | | | | | | K7, K15 | 13 | | | 20 | --- | " |

1/  The test circuits used with table III are shown in figure 13, 14, 15, 16, and 17.  The waveforms of figure 8 apply to all device types as specified in table III (see tests for t$_{ON}$ and t$_{OFF}$ ).  The waveforms of figure 12 apply to devices 03, 04, and 07 only as specified in table III.

2/  R$_{DS}$ may be measured differentially with respect to V$_A$.  In case of differentially measured voltages, the table III limits representing voltage drop across the tested switch must be maintained.

3/  The input pulse generator shall have the following characteristics:  V$_{GEN}$ = 0-3 V for all device types: rise time / fall time $\leq$ 10 ns; PRR = 1 kHz at 50 percent duty cycle.

4/  The input generator shall have the following characteristics:  V$_{GEN}$ = 1 V$_{PP}$ at 1 MHz.

5/  Break-before-make test applies to devices 03, 04, and 07 only.

6/  Conditions for device type 03 only.

7/  Conditions for device type 05 only.

8/  Conditions for device type 06 only.

9/  Conditions for device type 04 only.

10/ Conditions for device type 08 only.

11/ Conditions for device type 07 only.

Table IV.  <u>Groups C end point electrical parameters</u>.  ($T_A$ = 25°C, $\pm V_{CC}$ = $\pm$15 V).

| Test | Device types 01 - 08 | | |
| --- | --- | --- | --- |
| | Limits | | Delta |
| | Min | Max | |
| $R_{DS}$ | +9.25 V | -9.25 V | 50 mV |
| $R_{DS}$ | -10.00 V | +10.00 V | 50 mV |
| $I_{S(OFF)}$ | -1 nA | +1 nA | $\pm$0.5 nA |
| $I_{D(OFF)}$ | -1 nA | +1 nA | $\pm$0.5 nA |

5. PACKAGING

5.1 <u>Packaging requirements</u>.  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 personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements.  Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department'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 which may be helpful, but is not mandatory.)

6.1 <u>Intended use.</u>  Microcircuits conforming to this specification are intended for logistic support of existing equipment.

6.2 <u>Acquisition requirements</u>.  Acquisition documents should specify the following:

 a. Title, number, and date of the specification.

 b. PIN and compliance identifier, if applicable (1.2).

 c. Requirements for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.

 d. Requirements for certificate of compliance, if applicable.

 e. Requirements for notification of change of product or process to acquiring activity in addition to notification of the qualifying activity, if applicable.

 f. Requirements for failure analysis (including required test condition of MIL-STD-883, method 5003), corrective action and reporting of results, if applicable.

 g. Requirements for product assurance options.

 h. Requirements for special carriers, lead lengths, or lead forming, if applicable.  These requirements should not affect the part number.  Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.

 i. Requirements for "JAN" marking.

 j. Packaging requirements (see 5.1).

6.3 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, MIL-HDBK-1331, and as follows:.

| | |
|---|---|
| $+V_{CC}$ | Positive supply voltage. |
| $-V_{CC}$ | Negative supply voltage. |
| $+I_{CC}$ | Positive supply current. |
| $-I_{CC}$ | Negative supply current. |
| $V_L$ | Logic supply voltage. |
| $I_L$ | Logic supply current. |
| $R_{DS}$ | Resistance of an "ON" switch. |
| $V_D$ | Drain voltage. |
| $V_S$ | Source voltage. |
| $I_{D(ON)}$ | Leakage current from an "ON" driver into the switch. |
| $I_{D(OFF)}$ | Leakage current into the drain terminal of an "OFF" switch. |
| $I_{S(OFF)}$ | Leakage current into the source terminal of an "OFF" switch. |
| $t_{ON}$ | Switching time as defined in figure 8. |
| $t_{OFF}$ | Switching time as defined in figure 8. |
| $V_{CTE}$ | Charge transfer error. |
| $V_{CT}$ | Crosstalk between switches. |
| $V_{ISO}$ | Isolation from source to drain of a closed switch. |

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

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

| Military device type | Generic-industry type |
|---|---|
| 01 | 5040 |
| 02 | 5041 |
| 03 | 5042 |
| 04 | 5043 |
| 05 | 5044 |
| 06 | 5045 |
| 07 | 5046 |
| 08 | 5047 |

6.8  Changes from previous issue.  Marginal notations is revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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

Preparing activity:
  DLA - CC

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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.