

QUALIFICATION  
REQUIREMENTS  
REMOVED

MIL-M-38510/476A(NASA)  
9 August 1983  
SUPERSEDING  
MIL-M-38510/476(NASA)  
30 September 1980

MILITARY SPECIFICATION  
MICROCIRCUITS, DIGITAL, CMOS  
4-BIT BUS BUFFER/SEPARATOR,  
MONOLITHIC SILICON

INACTIVE FOR NEW DESIGN AFTER DATE OF THIS REVISION.

This specification is approved for use by George C. Marshall Space Flight Center, National Aeronautics and Space Administration, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for a monolithic silicon, silicon gate CMOS microcircuit. One product assurance class and a choice of case outlines and lead finishes are provided for each type and are reflected in the complete part number.

1.2 Part number. The part number shall be as specified in MIL-M-38510, except the "JAN" and "J" certification shall not be used.

1.2.1 Device type. The device type shall be as follows:

| Device type | Circuit                                 |
|-------------|-----------------------------------------|
| 01          | 4-bit memory data bus buffer/separator  |
| 02          | 4-bit Input/Output bus buffer/separator |

1.2.2 Device class. The device class shall be the product assurance level as defined in MIL-M-38510.

1.2.3 Case outline. The case outline shall be designated as follows:

| Outline letter | Case outline (see MIL-M-38510, appendix C)       |
|----------------|--------------------------------------------------|
| E              | D-2 (16-lead, 1/4" x 7/8"), dual-in-line package |
| F              | F-5 (16-lead, 1/4" x 3/8"), flat package         |

1.3 Absolute maximum ratings.

|                                                            |           |                                          |
|------------------------------------------------------------|-----------|------------------------------------------|
| Storage temperature range ( $T_{stg}$ )                    | - - - - - | -65°C to +150°C                          |
| Case operating temperature range ( $T_C$ )                 | - - - - - | -55°C to +125°C                          |
| Supply voltage range ( $V_{DD} - V_{SS}$ )                 | - - - - - | -0.5 V dc to +13 V dc                    |
| Maximum power dissipation per package ( $P_D$ ):           |           |                                          |
| For $T_C = -55$ to +100°C                                  | - - - - - | 500 mW                                   |
| For $T_C = +100$ to +125°C                                 | - - - - - | Derate linearly at<br>12 mW/°C to 200 mW |
| Device dissipation per output transistor:                  |           |                                          |
| For $T_C = -55$ to +125°C                                  | - - - - - | 100 mW                                   |
| Input voltage range, all inputs                            | - - - - - | -0.5 V dc to $V_{DD} + 0.5$ V dc         |
| DC input current (any one input)                           | - - - - - | ±10 mA                                   |
| Lead temperature (soldering, 10 seconds):                  |           |                                          |
| At distance 1/16 ± 1/32 inch (1.59 ± 0.79 mm)<br>from case | - - - - - | 265°C                                    |
| Thermal resistance, junction to case ( $\theta_{JC}$ ):    |           |                                          |
| Case E                                                     | - - - - - | 0.0833°C/mW                              |
| Case F                                                     | - - - - - | 0.15°C/mW                                |
| Junction temperature ( $T_J$ )                             | - - - - - | +150°C                                   |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: George C. Marshall Space Flight Center, National Aeronautics and Space Administration, ATTN: EG02, Marshall Space Flight Center, AL 35812, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

#### 1.4 Recommended operating conditions.

|                                              |                                             |
|----------------------------------------------|---------------------------------------------|
| Supply voltage ( $V_{DD} - V_{SS}$ ) - - - - | +4.5 V dc minimum to +11 V dc maximum       |
| Input low ( $V_{IL}$ ) voltage range- - - -  | 0 to +1.5 V dc at $V_{DD} = +5$ V dc;       |
|                                              | 0 to +3 V dc at $V_{DD} = +10$ V dc         |
| Input high ( $V_{IH}$ ) voltage range - - -  | +3.5 V dc to +5 V dc at $V_{DD} = +5$ V dc; |
|                                              | +7 V dc to +10 V dc at $V_{DD} = +10$ V dc  |

## 2. APPLICABLE DOCUMENTS

2.1 Government specifications and standards. Unless otherwise specified, the following specifications and standards, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this specification to the extent specified herein.

### SPECIFICATION

#### MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

### STANDARD

#### MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

## 3. REQUIREMENTS

3.1 Detail specification. The individual item requirements shall be in accordance with MIL-M-38510, and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Logic diagram. The logic diagram shall be as specified on figure 2.

3.2.3 Truth tables and functional description. The functional description shall be as specified in the truth table on figure 3.

3.2.4 Case outlines. The case outlines shall be as specified in MIL-M-38510 and 1.2.3 herein.

3.3 Lead material and finish. The lead material and finish shall be in accordance with MIL-M-38510 (see 6.5).

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

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

TABLE I. Electrical performance characteristics.

| Test                                               | Symbol            | Conditions<br>$V_{SS} = 0 \text{ V}$ , $-55^\circ\text{C} < T_A < 125^\circ\text{C}$<br>Unless otherwise specified      | Device<br>type            | Limits |         | Unit          |    |
|----------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------|--------|---------|---------------|----|
|                                                    |                   |                                                                                                                         |                           | Min    | Max     |               |    |
| Positive clamping input<br>to $V_{DD}$             | $V_{IC(POS)}$     | $T_C = 25^\circ\text{C}$ , $V_{DD} = 0 \text{ V}$<br>$V_{SS} = \text{Open}$ , Output = Open,<br>$I_I = 1 \text{ mA}$    | A11                       |        | 3.0     | V             |    |
| Negative clamping input<br>to $V_{SS}$             | $V_{IC(NEG)}$     | $T_C = 25^\circ\text{C}$ , $V_{DD} = \text{Open}$ ,<br>$V_{SS} = 0 \text{ V}$ , Output = Open,<br>$I_I = -1 \text{ mA}$ | A11                       |        | -3.0    | V             |    |
| Quiescent supply current                           | $I_{SS}$          | Any combination of inputs<br>$V_{DD} = 13.0 \text{ V}$                                                                  | A11                       |        | -100    | $\mu\text{A}$ |    |
| High level output<br>voltage                       | $V_{OH1}$         | $V_{DD} = 10 \text{ V}$ , $I_{OH} \leq 1 \mu\text{A}$<br>(see table III for $V_I$ )                                     | A11                       | 9.95   |         | V             |    |
| Low level output<br>voltage                        | $V_{OL1}$         | $V_{DD} = 10.0 \text{ V}$ , $I_{OL} \leq 1 \mu\text{A}$<br>(see table III for $V_I$ )                                   | A11                       |        | 0.05    | V             |    |
| Output high (source)<br>current                    | $I_{OH1}$         | $V_{DD} = 5.0 \text{ V}$ , $V_{OH1} = 4.6 \text{ V}$                                                                    | A11                       | -1.1   |         | mA            |    |
|                                                    | $I_{OH2}$         | $V_{DD} = 10.0 \text{ V}$ , $V_{OH2} = 9.5 \text{ V}$                                                                   |                           | -2.6   |         |               |    |
| Output low (sink)<br>current                       | $I_{OL1}$         | $V_{DD} = 5.0 \text{ V}$ , $V_{OL1} = 0.4 \text{ V}$                                                                    | A11                       | 1.5    |         | mA            |    |
|                                                    | $I_{OL2}$         | $V_{DD} = 10.0 \text{ V}$ , $V_{OL2} = 0.5 \text{ V}$                                                                   |                           | 2.6    |         |               |    |
| High impedance three-<br>state output leakage      | $I_Z$<br>(high Z) | $V_{DD} = 13.0 \text{ V}$ (see table III<br>for $V_I$ )                                                                 | A11                       |        | $\pm 5$ | $\mu\text{A}$ |    |
| Input current, high                                | $I_{IH}$          | $V_{DD} = 13.0 \text{ V}$ , $V_I = 13.0 \text{ V}$                                                                      | A11                       |        | 1       | $\mu\text{A}$ |    |
| Input current, low                                 | $I_{IL}$          | $V_{DD} = 13.0 \text{ V}$ , $V_I = 0$                                                                                   | A11                       |        | -1      | $\mu\text{A}$ |    |
| Propagation delay high<br>to low                   | $t_{PHL}$         | $C_L = 100 \text{ pF}$ ,<br>$R_L = 200 \text{ k}\Omega$                                                                 | $V_{DD} = 5.0 \text{ V}$  | A11    | 150     | 300           | ns |
|                                                    |                   |                                                                                                                         | $V_{DD} = 10.0 \text{ V}$ | A11    | 9       | 180           | ns |
| Propagation delay low<br>to high                   | $t_{PLH}$         | $C_L = 100 \text{ pF}$ ,<br>$R_L = 100 \text{ k}\Omega$                                                                 | $V_{DD} = 5.0 \text{ V}$  | A11    | 15      | 300           | ns |
|                                                    |                   |                                                                                                                         | $V_{DD} = 10.0 \text{ V}$ | A11    | 9       | 180           | ns |
| Propagation delay high<br>Z to low level           | $t_{PZL}$         | $C_L = 100 \text{ pF}$ ,<br>$R_L = 10 \text{ k}\Omega$                                                                  | $V_{DD} = 5.0 \text{ V}$  | A11    | 15      | 300           | ns |
|                                                    |                   |                                                                                                                         | $V_{DD} = 10.0 \text{ V}$ | A11    | 9       | 180           | ns |
| Propagation delay low<br>Z to high level           | $t_{PZH}$         | $C_L = 100 \text{ pF}$ ,<br>$R_L = 10 \text{ k}\Omega$                                                                  | $V_{DD} = 5.0 \text{ V}$  | A11    | 15      | 300           | ns |
|                                                    |                   |                                                                                                                         | $V_{DD} = 10.0 \text{ V}$ | A11    | 9       | 180           | ns |
| Transition time high<br>to low level<br>(DB or DO) | $t_{THL}$         | $C_L = 100 \text{ pF}$ ,<br>$R_L = 200 \text{ k}\Omega$                                                                 | $V_{DD} = 5.0 \text{ V}$  | A11    |         | 156           | ns |
|                                                    |                   |                                                                                                                         | $V_{DD} = 10.0 \text{ V}$ | A11    |         | 74            | ns |
| Transition time low<br>to high level<br>(DB or DO) | $t_{TLH}$         | $C_L = 100 \text{ pF}$ ,<br>$R_L = 200 \text{ k}\Omega$                                                                 | $V_{DD} = 5.0 \text{ V}$  | A11    |         | 156           | ns |
|                                                    |                   |                                                                                                                         | $V_{DD} = 10.0 \text{ V}$ | A11    |         | 74            | ns |

3.6 Marking. Marking shall be in accordance with MIL-M-38510. At the option of the manufacturer, marking of the country of origin may be omitted from the body of the microcircuit, but shall be retained on the initial container. The "JAN" or "J" certification mark shall not be used.

3.7 Manufacturer eligibility. To be eligible to supply microcircuits to this specification, a manufacturer shall have a manufacturer certification in accordance with MIL-M-38510 for at least one line, not necessarily the line producing the device type described herein.

3.8 Certification. Certification in accordance with MIL-M-38510 is not required for this device.

TABLE II. Electrical test requirements.

| MIL-STD-883<br>test requirements                                                     | Subgroups<br>(table III)<br>unless<br>otherwise<br>specified<br>Class B<br>devices |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Interim electrical parameters<br>(pre burn-in) (method 5004)                         | 1                                                                                  |
| Interim electrical parameters<br>(between static and dynamic)<br>(method 5004)       | N/A                                                                                |
| Final electrical test parameters<br>(method 5004)                                    | 1*,2,7*,8                                                                          |
| Group A test requirements<br>(method 5005)                                           | 1,2,7,8,9                                                                          |
| Group B electrical parameters<br>(method 5005)                                       | None                                                                               |
| Group B $V_{ZAp}$ (method 5005)                                                      | 4.5.2                                                                              |
| Group C end-point electrical parameters<br>(method 5005)                             | 1,2,7,8                                                                            |
| Additional electrical subgroups<br>for group C periodic inspections<br>(method 5005) | 10,11                                                                              |
| Group D end-point electrical parameters<br>(method 5005)                             | 1,2,7,8                                                                            |

\* PDA applies to subgroups 1 and 7 (see 4.2b).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-M-38510 and methods 5005 and 5007, as applicable, of MIL-STD-883, except as modified herein.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following modifications and additional criteria shall apply:

a. Burn-in test (method 1015 of MIL-STD-883).

- (1) The burn-in test as described in 3.1.10 of method 5004 shall be performed as indicated. (3.1.11 and 3.1.12 are not required; 3.1.9 is required for class B devices.)
- (2) For class B devices, dynamic burn-in shall be performed for 160 hours minimum at 125°C ambient temperature, using the circuit shown on figure 4, or equivalent.

- b. The percent defective allowable (PDA) for class B devices shall be 10 percent (or one device, whichever is greater) based on failures from group A, subgroups 1 and 7 (after cooldown) of final electrical test, excluding delta limits, in accordance with method 5004 of MIL-STD-883, and with no intervening electrical measurements. If interim electrical parameter tests are performed prior to burn-in, failures resulting from pre burn-in screening may be excluded from the PDA. If interim electrical parameter tests prior to burn-in are omitted, then all screening failures shall be included in the PDA. The verified failures of group A, subgroups 1 and 7, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent defective for that lot, and the lot shall be accepted or rejected based on the PDA for the applicable device class.
- c. Interim and final electrical 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.

4.3 Qualification inspection. Qualification inspection is not required.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-M-38510. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4). Generic test data (see 6.6) may be used to satisfy the requirements for groups C and D inspections. Quality conformance inspection shall be completed on the specific devices covered by this specification before they are shipped.

4.4.1 Group A inspection. Group A inspection shall be in accordance with table I of method 5005 of MIL-STD-883 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, and 6 of method 5005 of MIL-STD-883 shall be omitted.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of method 5005 of MIL-STD-883. A special subgroup shall be added using a LTPD of 15 for class B. This subgroup shall consist of a high-voltage test of the input protection circuits, VZAP (see 4.5.2).

4.4.3 Group C inspection. Group C inspection shall be in accordance with table III of method 5005 of MIL-STD-883 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test (method 1005 of MIL-STD-883) conditions:
  - (1) Test condition D or E using the circuit shown on figure 4, or equivalent.
  - (2)  $T_A = +125^{\circ}\text{C}$ , minimum.
- c. Subgroups 3 and 4 shall be added to the group C inspection requirements for class B devices, and shall consist of the tests, conditions, and limits as specified for subgroups 10 and 11 of group A.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table IV of method 5005 of MIL-STD-883. End-point electrical parameters shall be as specified in table II herein.

Device types 01 and 02

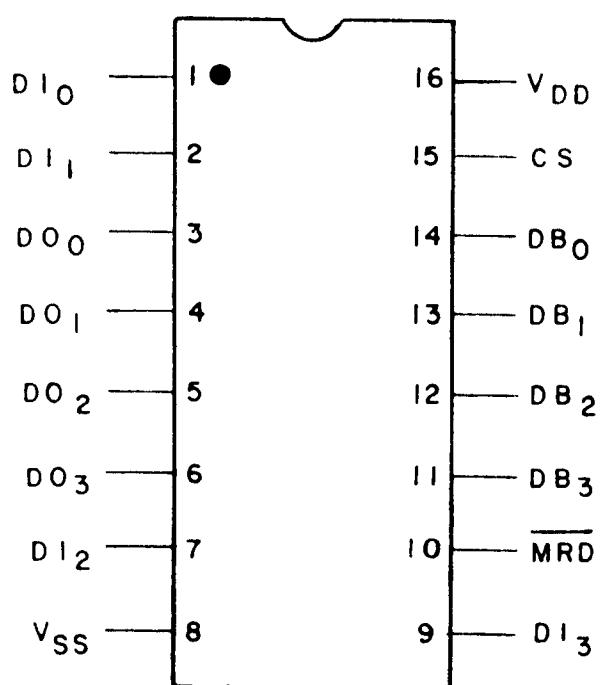
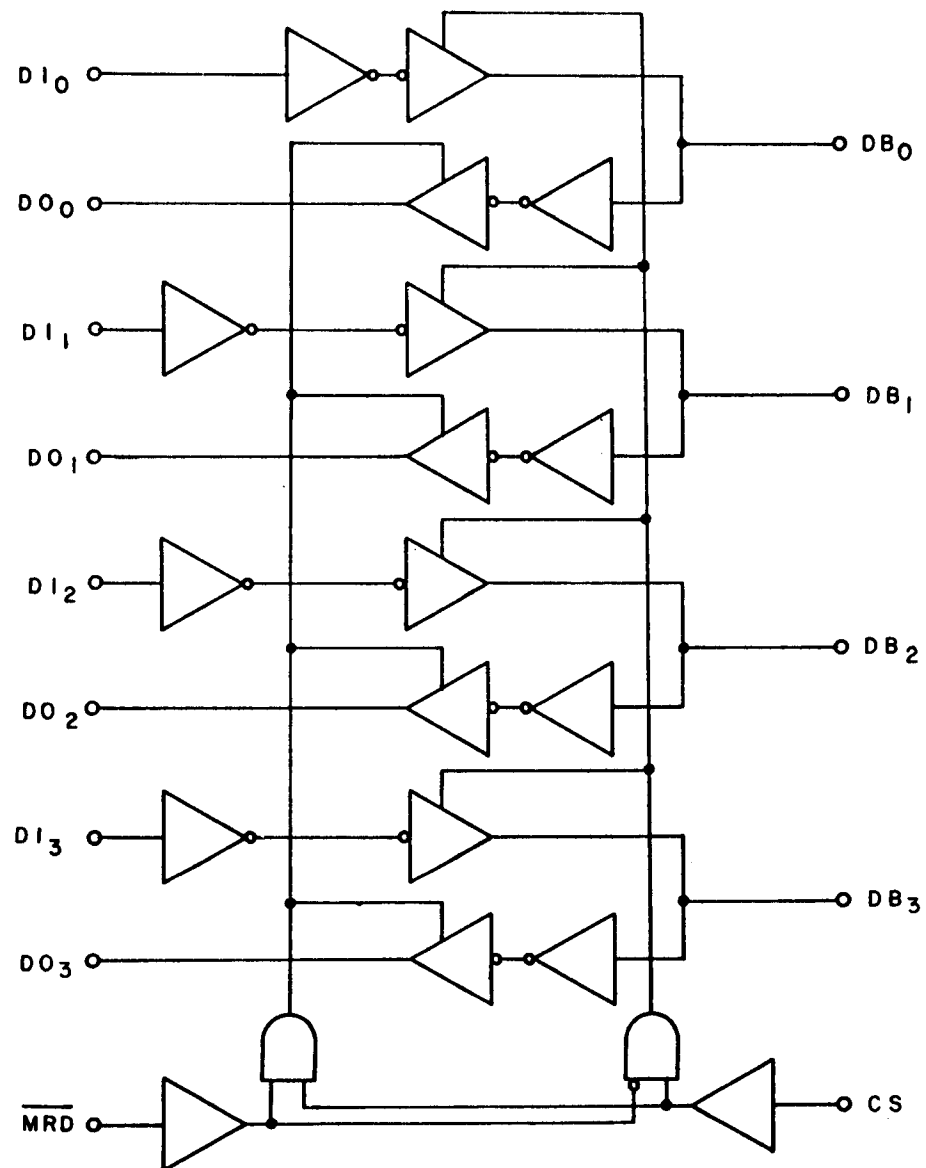


FIGURE 1. Terminal connections.

Device type 01

FIGURE 2. Logic diagram.

Device type 02

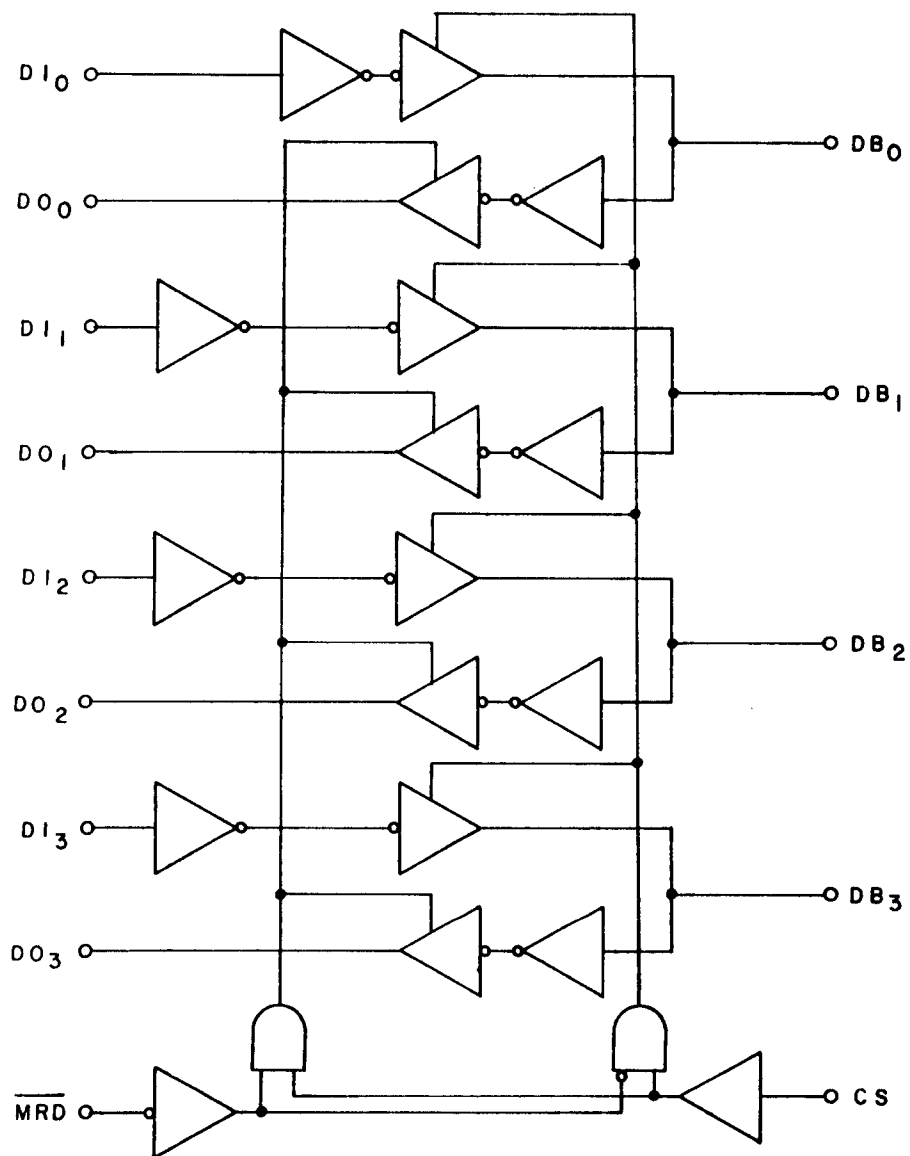


FIGURE 2. Logic diagram - Continued.

Device type 01

| CS | $\overline{\text{MRD}}$ | DATA BUS OUTPUTS<br>(DB 0 - DB 3) | DATA OUTPUTS<br>(DO 0 - DO 3) |
|----|-------------------------|-----------------------------------|-------------------------------|
| L  | X                       | High impedance                    | High impedance                |
| H  | L                       | Data input                        | High impedance                |
| H  | H                       | High impedance                    | Data bus input                |

Device type 02

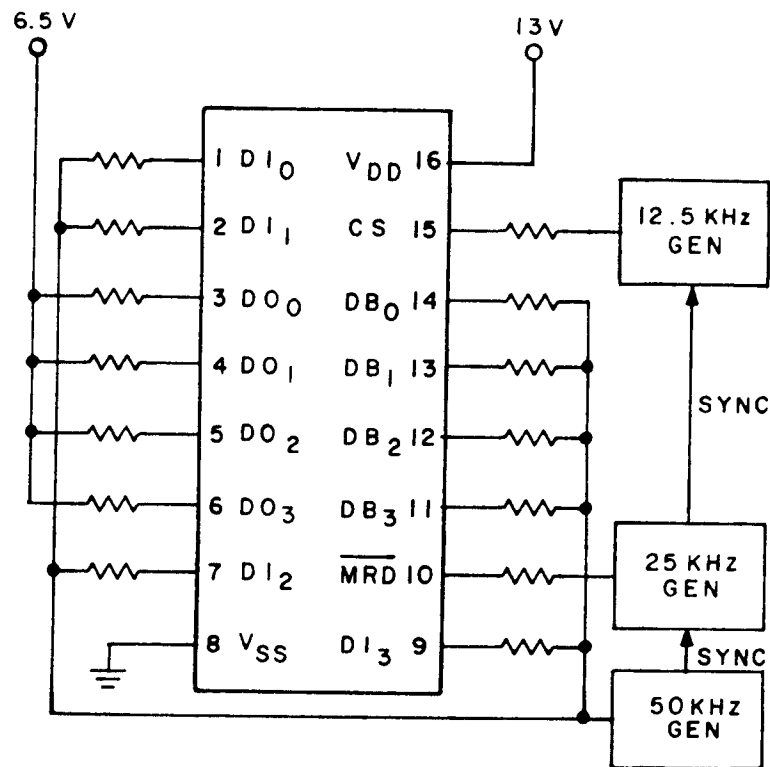
| CS | $\overline{\text{MRD}}$ | DATA BUS OUTPUTS<br>(DB 0 - DB 3) | DATA OUTPUTS<br>(DO 0 - DO 3) |
|----|-------------------------|-----------------------------------|-------------------------------|
| L  | X                       | High impedance                    | High impedance                |
| H  | L                       | High impedance                    | Data bus input                |
| H  | H                       | Data input                        | High impedance                |

## NOTES:

1. L = Low level logic
2. H = High level logic
3. X = Don't care

FIGURE 3. Truth table.

Device types 01 and 02

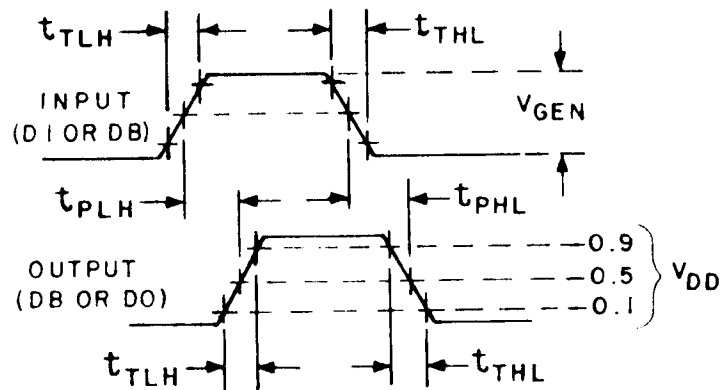
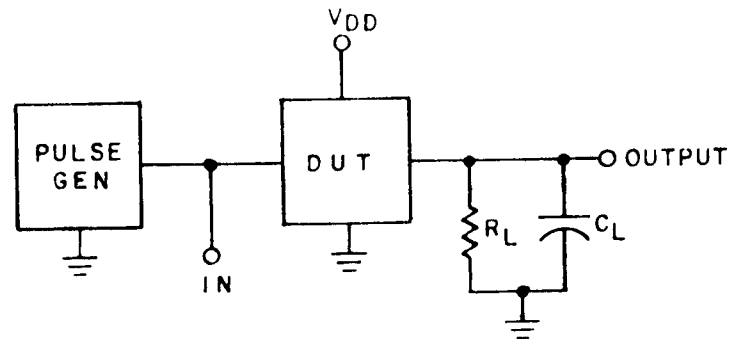


NOTES:

1. All resistor shall be 0-47 kilohms maximum.
2. Input signal requirements:
  - a. Square wave, 50% duty cycle synchronized like a 3-stage divider.
  - b. Voltage = 0 to 13 V  $\pm 2\%$ .
  - c.  $t_{TLH} = t_{THL} \leq 1 \mu s$ .

FIGURE 4. Dynamic burn-in and steady state life test circuit.

## Device types 01 and 02



$$R_L = 200 \text{ k}\Omega \pm 1\%$$

$$C_L = 100 \text{ pF} \pm 5\%$$

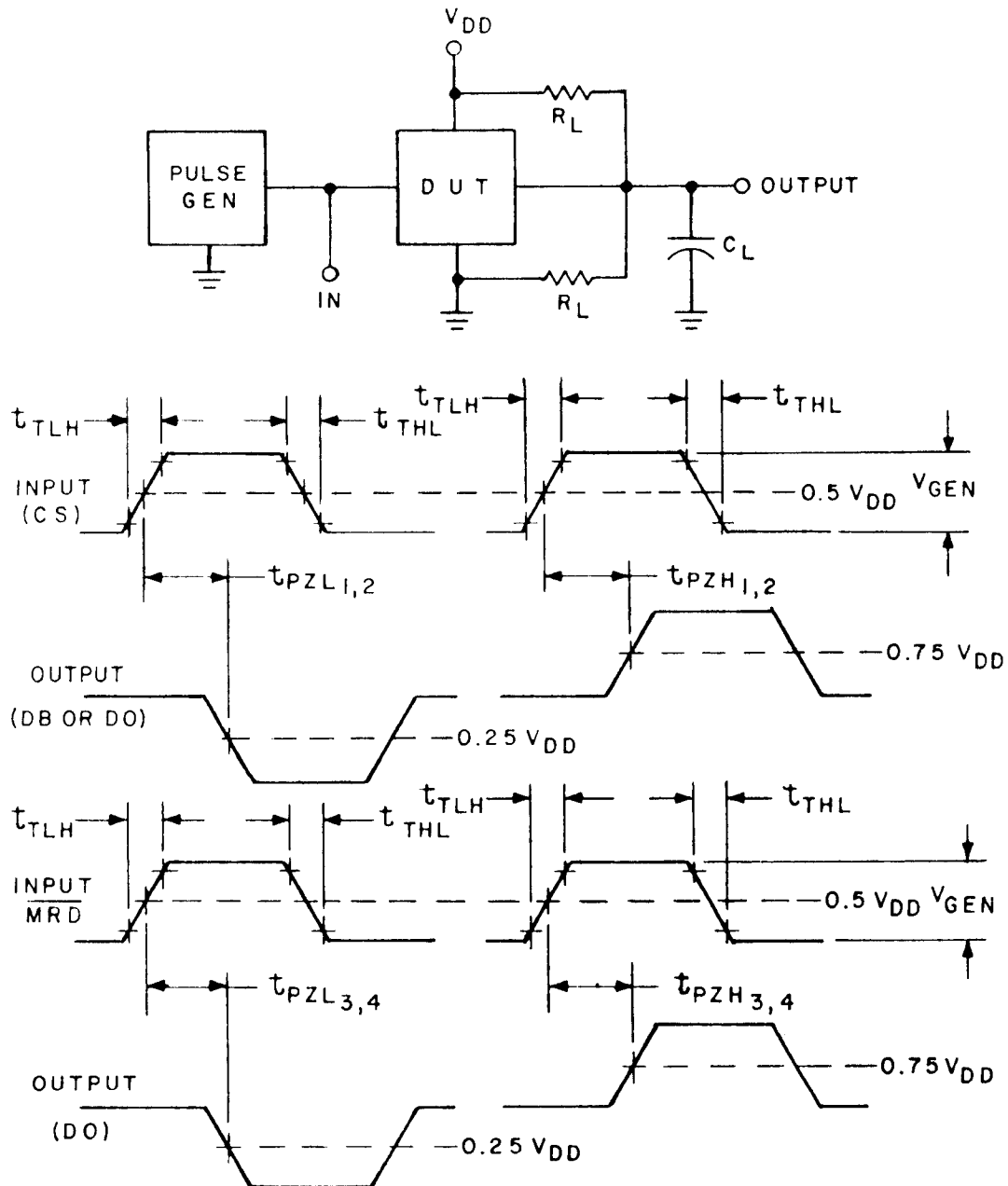
(includes wiring  
and probe capacitance).

## NOTES:

1. The pulse generator has the following characteristics:  
 $V_{GEN} = V_{DD} \pm 1.0\%$ ,  $t_{TLH} = t_{THL} = 10 \pm 2 \text{ ns}$ .
2. See table III for complete terminal connections.

FIGURE 5a. Switching time test circuit and waveforms.

## Device types 01 and 02



$$R_L = 10 \text{ k}\Omega \pm 1\%$$

$$C_L = 100 \text{ pF} \pm 5\%$$

(including wiring  
and probe capacitance).

## NOTES:

1. The pulse generator has the following characteristics:  
 $V_{GEN} = V_{DD} \pm 1.0\%$ ,  $t_{TLH} = t_{THL} = 10 \pm 2 \text{ ns}$ .
2. See table III for complete terminal conditions.

FIGURE 5b. Switching time test circuit and waveforms.

TABLE III. Group A inspection for device type 01.

| Symbol                | MIL-STD-883 method | Cases E, F, Test no. | terminal conditions and limits |        |     |     |     |     |        |                 |     |     | test limits |     |     |     |    |                 | Unit |
|-----------------------|--------------------|----------------------|--------------------------------|--------|-----|-----|-----|-----|--------|-----------------|-----|-----|-------------|-----|-----|-----|----|-----------------|------|
|                       |                    |                      | D10                            | D11    | D00 | D01 | D02 | D03 | D12    | V <sub>SS</sub> | D13 | MR0 | DB3         | DB2 | DB1 | DB0 | CS | V <sub>DD</sub> |      |
|                       |                    |                      | 1                              | 2      | 3   | 4   | 5   | 6   | 7      | 8               | 9   | 10  | 11          | 12  | 13  | 14  | 15 | 16              |      |
| V <sub>IC</sub> (pos) |                    | 1                    | 1 mA                           |        |     |     |     |     | 1 mA   |                 |     |     |             |     |     |     |    | GND             |      |
|                       |                    | 2                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 3                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 4                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 5                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 6                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 7                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 8                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 9                    |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 10                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
| V <sub>IC</sub> (neg) |                    | 11                   | -1 mA                          |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 12                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 13                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 14                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 15                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 16                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 17                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 18                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 19                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 20                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
| I <sub>CS</sub>       | 3005               | 21                   | 13.0 V                         | 13.0 V |     |     |     |     | 13.0 V |                 |     |     |             |     |     |     |    | 13.0 V          |      |
|                       |                    | 22                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 23                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 24                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 25                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 26                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 27                   | 10.0 V                         | 10.0 V |     |     |     |     | 10.0 V |                 |     |     |             |     |     |     |    | 10.0 V          |      |
|                       |                    | 28                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 29                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 30                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
| V <sub>OH1</sub>      | 3006               | 31                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 32                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 33                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 34                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 35                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 36                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 37                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 38                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 39                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 40                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
| V <sub>OL1</sub>      | 3007               | 41                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 42                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 43                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 44                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 45                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 46                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 47                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 48                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 49                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 50                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
| I <sub>OH2</sub>      |                    | 51                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 52                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 53                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 54                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 55                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 56                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 57                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 58                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |
|                       |                    | 59                   |                                |        |     |     |     |     |        |                 |     |     |             |     |     |     |    |                 |      |

See footnotes at end of table.

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

| Symbol           | MIL-STD-883 method | Cases I, F | Terminal conditions and limits |        |        |        |        |        |       |       |     |     |     |     |     |     | Test limits |    |     |                   |                         |     | Unit |                          |     |                          |     |    |    |
|------------------|--------------------|------------|--------------------------------|--------|--------|--------|--------|--------|-------|-------|-----|-----|-----|-----|-----|-----|-------------|----|-----|-------------------|-------------------------|-----|------|--------------------------|-----|--------------------------|-----|----|----|
|                  |                    |            | Test no.                       | DI0    | DI1    | DI00   | DI01   | DI02   | DI03  | DI2   | DI3 | VSS | MRD | DB3 | DB2 | DB1 | DB0         | CS | VDD | Measured terminal | Subgroup 1<br>TC = 25°C |     |      | Subgroup 2<br>TC = 125°C |     | Subgroup 3<br>TC = -55°C |     |    |    |
|                  |                    |            |                                |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | Min                     | Max |      | Min                      | Max | Min                      | Max |    |    |
| IOL1             |                    |            | 59                             | GND    | GND    | 0.4 V  |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DO0                     | 2.1 |      | 1.5                      |     | 2.8                      | mA  |    |    |
|                  |                    |            | 60                             | "      | "      | "      | 0.4 V  |        |       |       |     |     |     |     |     |     |             |    |     |                   | DO1                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 61                             | "      | "      | "      | "      | "      |       |       |     |     |     |     |     |     |             |    |     |                   | DO2                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 62                             | "      | "      | "      | "      | "      | 0.4 V |       |     |     |     |     |     |     |             |    |     |                   | DO3                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 63                             | "      | "      | "      | "      | "      | GND   | 0.4 V |     |     |     |     |     |     |             |    |     |                   | DB3                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 64                             | "      | "      | "      | "      | "      | "     | "     |     |     |     |     |     |     |             |    |     |                   | DB2                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 65                             | "      | "      | "      | "      | "      | "     | "     |     |     |     |     |     |     |             |    |     |                   | DB1                     | "   |      | "                        |     | "                        | "   |    |    |
| IOL2             |                    |            | 66                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DB0               | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 67                             | "      | "      | 0.5 V  |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DO0                     | 3.5 |      | 2.6                      |     | 4.7                      | "   |    |    |
|                  |                    |            | 68                             | "      | "      | "      | 0.5 V  |        |       |       |     |     |     |     |     |     |             |    |     |                   | DO1                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 69                             | "      | "      | "      | "      | 0.5 V  |       |       |     |     |     |     |     |     |             |    |     |                   | DO2                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 70                             | "      | "      | "      | "      | "      |       |       |     |     |     |     |     |     |             |    |     |                   | DO3                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 71                             | "      | "      | "      | "      | "      | GND   | 0.5 V |     |     |     |     |     |     |             |    |     |                   | DB3                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 72                             | "      | "      | "      | "      | "      | "     | "     |     |     |     |     |     |     |             |    |     |                   | DB2                     | "   |      | "                        |     | "                        | "   |    |    |
| IOL3             |                    |            | 73                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DB1               | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 74                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DB0               | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 75                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DB3                     | 1   |      | 5                        |     | 1                        | μA  |    |    |
|                  |                    |            | 76                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DB2                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 77                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DB1                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 78                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DB0                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | IOL4                           |        |        | 79     | 11.0 V | 11.0 V |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     | DB3  | -1                       |     | -5                       |     | -1 | "  |
| 80               | "                  | "          |                                |        |        | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DB2               | "                       |     | "    |                          | "   | "                        |     |    |    |
| 81               | "                  | "          |                                |        |        | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DB1               | "                       |     | "    |                          | "   | "                        |     |    |    |
| 82               | "                  | "          |                                |        |        | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DB0               | "                       |     | "    |                          | "   | "                        |     |    |    |
| 83               | 13.0 V             | GND        |                                |        |        | 13.0 V |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI0                     | .5  |      | 1                        |     | .5                       | "   |    |    |
| 84               | GND                | 13.0 V     |                                |        |        | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI1                     | "   |      | "                        |     | "                        | "   |    |    |
| 85               | "                  | GND        |                                |        |        | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI2                     | "   |      | "                        |     | "                        | "   |    |    |
| IOL5             |                    |            | 86                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | DI3               | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 87                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | MRD               | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 88                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | CS                | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 89                             | GND    | 13.0 V |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI0                     | -5  |      | -1                       |     | -5                       | "   |    |    |
|                  |                    |            | 90                             | 13.0 V | GND    | 13.0 V |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI1                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 91                             | "      | 13.0 V | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI2                     | "   |      | "                        |     | "                        | "   |    |    |
|                  |                    |            | 92                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     |                   | DI3                     | "   |      | "                        |     | "                        | "   |    |    |
| IOL6             |                    |            | 93                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | MRD               | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | 94                             | "      | "      | "      |        |        |       |       |     |     |     |     |     |     |             |    |     | CS                | "                       |     | "    |                          | "   | "                        |     |    |    |
|                  |                    |            | Subgroup 7                     |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     |      |                          |     |                          |     |    |    |
|                  |                    |            | TC = 25°C                      |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     |      |                          |     |                          |     |    |    |
|                  |                    |            | Min Max                        |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     |      |                          |     |                          |     |    |    |
|                  |                    |            | Subgroup 8                     |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     |      |                          |     |                          |     |    |    |
|                  |                    |            | TC = 125°C                     |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     |      |                          |     |                          |     |    |    |
| Min Max          |                    |            |                                |        |        |        |        |        |       |       |     |     |     |     |     |     |             |    |     |                   |                         |     |      |                          |     |                          |     |    |    |
| Functional tests | 3014               |            | 95                             | 3/     | 3/     | 3/     | 3/     | 3/     | 3/    | 3/    | 3/  | 3/  | 3/  | 3/  | 3/  | 3/  | 3/          | 3/ | 3/  | 3/                | 3/                      | 3/  | 3/   | 3/                       | 3/  | 3/                       | 3/  | 3/ | 3/ |
|                  |                    |            | 96                             | 3/     | 3/     | 3/     | 3/     | 3/     | 3/    | 3/    | 3/  | 3/  | 3/  | 3/  | 3/  | 3/  | 3/          | 3/ | 3/  | 3/                | 3/                      | 3/  | 3/   | 3/                       | 3/  | 3/                       | 3/  | 3/ | 3/ |

See footnotes at end of table.

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

| Symbol            | MIL-STD-883C, E, F Test Method | Cases | Terminal Conditions and Limits |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 | Test Limits       |                                      |                                    |                |                |                                        |                |                |                |                                        |                |                |                |      |                 |                 |                 |                 |                 |                 |     |     |     |     |     |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-------------------|--------------------------------|-------|--------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|--------------------------------------|------------------------------------|----------------|----------------|----------------------------------------|----------------|----------------|----------------|----------------------------------------|----------------|----------------|----------------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                   |                                |       | V                              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 | Measured Terminal | Subgroup 9<br>T <sub>C</sub> = 25 °C |                                    |                |                | Subgroup 10<br>T <sub>C</sub> = 125 °C |                |                |                | Subgroup 11<br>T <sub>C</sub> = -55 °C |                |                |                | Unit |                 |                 |                 |                 |                 |                 |     |     |     |     |     |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                   |                                |       | D <sub>0</sub>                 | D <sub>1</sub> | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> | D <sub>5</sub> | D <sub>6</sub> | D <sub>7</sub> | D <sub>8</sub> | D <sub>9</sub> | D <sub>10</sub> | D <sub>11</sub> | D <sub>12</sub> | D <sub>13</sub> | D <sub>14</sub> | D <sub>15</sub> |                   | V <sub>DD</sub>                      | CS                                 | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub>                         | D <sub>3</sub> | D <sub>4</sub> | D <sub>5</sub> | D <sub>6</sub>                         | D <sub>7</sub> | D <sub>8</sub> | D <sub>9</sub> |      | D <sub>10</sub> | D <sub>11</sub> | D <sub>12</sub> | D <sub>13</sub> | D <sub>14</sub> | D <sub>15</sub> | Min | Max | Min | Max | Min | Max |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1                 | 2                              | 3     | 4                              | 5              | 6              | 7              | 8              | 9              | 10             | 11             | 12             | 13             | 14              | 15              | 16              |                 | Min             | Max             | Min               | Max                                  | Min                                | Max            | Min            | Max                                    | Min            | Max            | Min            | Max                                    | Min            | Max            | Min            | Max  | Min             | Max             | Min             | Max             | Min             | Max             | Min | Max | Min | Max |     |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| t <sub>PHL1</sub> | 3003<br>Fig. 5a                | 97    | IN                             | GND            |                |                |                |                | GND            | GND            |                |                |                 |                 |                 |                 | OUT             | V <sub>DD</sub> | 5.0 V             | D <sub>10</sub> to D <sub>80</sub>   | 9                                  | 190            | 15             | 300                                    | 9              | 190            | ns             |                                        |                |                |                |      |                 |                 |                 |                 |                 |                 |     |     |     |     |     |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                   |                                | 98    | GND                            | IN             |                |                |                |                | GND            | "              | "              |                | OUT             |                 |                 |                 |                 | "               | "                 | "                                    | D <sub>11</sub> to D <sub>81</sub> | "              | "              | "                                      | "              | "              | "              | "                                      | "              | "              | "              | "    | "               | "               | "               | "               | "               | "               | "   | "   | "   | "   | "   | "   | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " | " |

See footnotes at end of table.

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

| Symbol            | MIL-STD-883 method | Cases E,F Test no. | Terminal conditions and limits 1 |                 |                 |                 |                 |                 |                 |                 |                 |                 | Test limits     |                 |                   |                        |     |                                      | Unit |                                        |                                        |     |     |
|-------------------|--------------------|--------------------|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|------------------------|-----|--------------------------------------|------|----------------------------------------|----------------------------------------|-----|-----|
|                   |                    |                    | ID <sub>0</sub>                  | ID <sub>1</sub> | ID <sub>2</sub> | ID <sub>3</sub> | ID <sub>4</sub> | ID <sub>5</sub> | ID <sub>6</sub> | ID <sub>7</sub> | ID <sub>8</sub> | ID <sub>9</sub> | CS              | V <sub>DD</sub> | Measured terminal |                        |     | Subgroup 9<br>T <sub>C</sub> = 25 °C |      | Subgroup 10<br>T <sub>C</sub> = 125 °C | Subgroup 11<br>T <sub>C</sub> = -55 °C |     |     |
|                   |                    |                    |                                  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | Min               | Max                    | Min |                                      |      |                                        |                                        | Max | Min |
| t <sub>pZL1</sub> | Fig. 5b            | 129                | GND                              | GND             |                 |                 |                 | GND             | GND             |                 |                 |                 | OUT             | IN              | 5.0 V             | ICS to ID <sub>0</sub> | 10  | 200                                  | 15   | 300                                    | 10                                     | 200 | ns  |
|                   |                    | 130                | "                                | "               |                 |                 |                 | "               | "               |                 |                 |                 | OUT             | "               | "                 | ICS to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 131                | "                                | "               |                 |                 |                 | "               | "               |                 |                 |                 |                 | "               | "                 | ICS to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 132                | "                                | "               |                 |                 |                 | "               | "               | OUT             |                 |                 |                 | "               | "                 | ICS to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 133                | "                                | OUT             |                 |                 |                 | "               | GND             | GND             |                 |                 | GND             | "               | "                 | ICS to ID <sub>3</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 134                | "                                | "               | OUT             |                 |                 | "               | "               |                 |                 | "               | "               | "               | "                 | ICS to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 135                | "                                | "               |                 |                 |                 | "               | "               |                 |                 | "               | "               | "               | "                 | ICS to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 136                | "                                | "               |                 | OUT             |                 | "               | "               |                 |                 | "               | "               | "               | "                 | ICS to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    |                    |                                  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   | ICS to ID <sub>3</sub> |     |                                      |      |                                        |                                        |     |     |
| t <sub>pZL2</sub> | Fig. 8b            | 137                | "                                | "               |                 |                 |                 | GND             |                 |                 |                 |                 | OUT             | "               | 10.0 V            | ICS to ID <sub>0</sub> | 5   | 100                                  | 9    | 180                                    | 5                                      | 100 | "   |
|                   |                    | 138                | "                                | "               |                 |                 |                 | "               | "               |                 |                 |                 | OUT             | "               | "                 | ICS to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 139                | "                                | "               |                 |                 |                 | "               | "               |                 |                 |                 |                 | "               | "                 | ICS to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 140                | "                                | "               |                 |                 |                 | "               | "               |                 |                 |                 |                 | "               | "                 | ICS to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 141                | "                                | OUT             |                 |                 |                 | "               | GND             | GND             |                 |                 | GND             | "               | "                 | ICS to ID <sub>3</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 142                | "                                | "               |                 |                 |                 | "               | "               | "               |                 | "               | "               | "               | "                 | ICS to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 143                | "                                | "               | OUT             |                 |                 | "               | "               | "               |                 | "               | "               | "               | "                 | ICS to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 144                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 | "               | "               | "               | "                 | ICS to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    |                    |                                  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   | ICS to ID <sub>3</sub> |     |                                      |      |                                        |                                        |     |     |
| t <sub>pZL3</sub> |                    | 145                | "                                | OUT             |                 |                 |                 | IN              | "               | "               |                 |                 | "               | "               | 5.0 V             | MRD to ID <sub>0</sub> | 10  | 200                                  | 15   | 300                                    | 10                                     | 200 | "   |
|                   |                    | 146                | "                                | "               | OUT             |                 |                 | "               | "               | "               |                 | "               | "               | "               | "                 | MRD to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 147                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 | "               | "               | "               | "                 | MRD to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 148                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 | "               | "               | "               | "                 | MRD to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    |                    |                                  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   | MRD to ID <sub>3</sub> |     |                                      |      |                                        |                                        |     |     |
| t <sub>pZL4</sub> |                    | 149                | "                                | OUT             |                 |                 |                 | "               | "               | "               |                 |                 | "               | "               | 10.0 V            | MRD to ID <sub>0</sub> | 5   | 100                                  | 9    | 180                                    | 5                                      | 100 | "   |
|                   |                    | 150                | "                                | "               | OUT             |                 |                 | "               | "               | "               |                 | "               | "               | "               | "                 | MRD to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 151                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 | "               | "               | "               | "                 | MRD to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 152                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 | "               | "               | "               | "                 | MRD to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    |                    |                                  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   | MRD to ID <sub>3</sub> |     |                                      |      |                                        |                                        |     |     |
| t <sub>pZL1</sub> |                    | 153                | V <sub>DD</sub>                  | V <sub>DD</sub> |                 |                 |                 | V <sub>DD</sub> | GND             | GND             |                 |                 | GND             | IN              | 15.0 V            | ICS to ID <sub>0</sub> | 10  | 200                                  | 15   | 300                                    | 10                                     | 200 | "   |
|                   |                    | 154                | "                                | "               |                 |                 |                 | "               | "               | GND             |                 |                 | OUT             | "               | "                 | ICS to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 155                | "                                | "               |                 |                 |                 | "               | "               | OUT             |                 |                 | GND             | "               | "                 | ICS to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 156                | "                                | "               |                 |                 |                 | "               | "               | GND             |                 |                 | GND             | "               | "                 | ICS to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 157                | "                                | OUT             |                 |                 |                 | V <sub>DD</sub> | V <sub>DD</sub> | V <sub>DD</sub> |                 |                 | V <sub>DD</sub> | "               | "                 | ICS to ID <sub>3</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 158                | "                                | "               | OUT             |                 |                 | "               | "               | "               |                 |                 | "               | "               | "                 | ICS to ID <sub>0</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 159                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 |                 | "               | "               | "                 | ICS to ID <sub>1</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |
|                   |                    | 160                | "                                | "               |                 | OUT             |                 | "               | "               | "               |                 |                 | "               | "               | "                 | ICS to ID <sub>2</sub> | "   | "                                    | "    | "                                      | "                                      | "   | "   |

See footnotes at end of table.

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

| Symbol   | MIL-STD-883 method | Cases E,F | Terminal conditions and limits |     |     |     |     |     |     |     |     |     |     |     |     |       |             |             | Test limits       |             |             |             |             |     | Unit |             |
|----------|--------------------|-----------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------------|-------------|-------------------|-------------|-------------|-------------|-------------|-----|------|-------------|
|          |                    |           | DI0                            | DI1 | DO0 | DO1 | DO2 | DO3 | DI2 | VSS | DI3 | MRD | DB3 | DB2 | DB1 | DB0   | CS          | VDD         | Measured terminal |             | Subgroup 9  |             | Subgroup 10 |     |      | Subgroup 11 |
|          |                    |           |                                |     |     |     |     |     |     |     |     |     |     |     |     |       |             |             | TC = 25 °C        | TC = 125 °C | TC = 125 °C | TC = -55 °C |             |     |      |             |
| Test no. | 1                  | 2         | 3                              | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16    | Min         | Max         | Min               | Max         | Min         | Max         | Min         | Max | Min  | Max         |
| tpZH2    | Fig. 5b            | 161       | VDD                            |     |     |     | VDD | GND | VDD | GND |     |     |     | OUT |     | IN    | 10.0 V      | CS to IDB0  | 5                 | 100         | 9           | 180         | 5           | 100 | ns   |             |
|          | "                  | 162       | "                              |     |     |     | "   | "   | "   | "   |     | OUT |     |     | "   | "     | CS to IDB1  | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 163       | "                              |     |     |     | "   | "   | "   | "   |     |     |     |     | "   | "     | CS to IDB2  | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 164       | "                              |     |     |     | "   | "   | "   | "   | OUT |     |     |     | "   | "     | CS to IDB3  | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 165       | "                              | OUT |     |     | "   | "   | "   | VDD | VDD | VDD | VDD | VDD | "   | "     | CS to IDB0  | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 166       | "                              |     | OUT |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | CS to IDB1  | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 167       | "                              |     |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | CS to IDB2  | "           | "                 | "           | "           | "           | "           | "   |      |             |
| tpZH3    | "                  | 168       | "                              |     |     | OUT | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | CS to IDB3  | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 169       | "                              | OUT |     |     | "   | "   | "   | IN  | "   | "   | "   | "   | VDD | 5.0 V | MRD to IDB0 | 10          | 200               | 15          | 300         | 10          | 200         | "   |      |             |
|          | "                  | 170       | "                              |     | OUT |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | MRD to IDB1 | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 171       | "                              |     |     | OUT | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | MRD to IDB2 | "           | "                 | "           | "           | "           | "           | "   |      |             |
| tpZH4    | "                  | 172       | "                              |     |     | OUT | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | MRD to IDB3 | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 173       | "                              | OUT |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | 10.0 V      | MRD to IDB0 | 5                 | 100         | 9           | 180         | 5           | 100 | "    |             |
|          | "                  | 174       | "                              |     | OUT |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | MRD to IDB1 | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 175       | "                              |     |     | OUT | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | MRD to IDB2 | "           | "                 | "           | "           | "           | "           | "   |      |             |
| tTLH1    | 3004 Fig. 5a       | 176       | "                              |     |     |     |     |     |     |     |     |     |     |     |     |       | MRD to IDB3 | "           | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 177       | IN                             | GND |     |     | GND | GND | GND | GND | OUT | OUT | OUT | OUT | OUT | "     | 5.0 V       | DB0         | 112               | "           | "           | "           | "           | 80  |      |             |
|          | "                  | 178       | GND                            | IN  |     |     | IN  | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB1         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 179       | "                              | "   |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB2         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 180       | "                              |     |     |     | GND | "   | IN  | "   | OUT | IN  | IN  | IN  | IN  | "     | "           | DB3         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 181       | "                              |     | OUT |     | "   | "   | GND | VDD | "   | IN  | IN  | IN  | IN  | "     | "           | DB0         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 182       | "                              |     |     | OUT | "   | "   | "   | "   | IN  | IN  | IN  | IN  | IN  | "     | "           | DB1         | "                 | "           | "           | "           | "           | "   |      |             |
| tTLH2    | "                  | 183       | "                              |     |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB2         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 184       | "                              |     |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB3         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 185       | IN                             | GND |     |     | "   | "   | "   | GND | "   | "   | "   | "   | "   | "     | "           | DB0         | 56                | "           | "           | "           | "           | 44  |      |             |
|          | "                  | 186       | "                              | IN  |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB1         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 187       | "                              | GND |     |     | IN  | "   | IN  | "   | OUT | OUT | OUT | OUT | OUT | "     | "           | DB2         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 188       | "                              |     | OUT |     | GND | "   | GND | VDD | "   | IN  | IN  | IN  | IN  | "     | "           | DB3         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 189       | "                              |     |     | OUT | "   | "   | "   | "   | "   | IN  | IN  | IN  | IN  | "     | "           | DB0         | "                 | "           | "           | "           | "           | "   |      |             |
| tTLH1    | "                  | 190       | "                              |     |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB1         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 191       | "                              |     |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB2         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 192       | "                              |     |     |     | "   | "   | "   | "   | "   | "   | "   | "   | "   | "     | "           | DB3         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 193       | IN                             | GND |     |     | "   | "   | "   | GND | "   | OUT | OUT | OUT | OUT | "     | 5.0 V       | DB0         | 112               | "           | "           | "           | "           | 80  |      |             |
|          | "                  | 194       | "                              | IN  |     |     | IN  | "   | "   | "   | "   | OUT | OUT | OUT | OUT | "     | "           | DB1         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 195       | "                              | GND |     |     | GND | "   | IN  | "   | "   | IN  | IN  | IN  | IN  | "     | "           | DB2         | "                 | "           | "           | "           | "           | "   |      |             |
|          | "                  | 196       | "                              |     | OUT |     | "   | "   | GND | VDD | "   | IN  | IN  | IN  | IN  | "     | "           | DB3         | "                 | "           | "           | "           | "           | "   |      |             |

See footnotes at end of table.

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

| MIL-<br>Symbol                       | Cases<br>E, F<br>Test<br>method | terminal conditions and limits |     |     |     |     |     |     |     |     |     |     |     |     |     |     | test limits |                      |                          |                            |                            |     | Unit |
|--------------------------------------|---------------------------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|----------------------|--------------------------|----------------------------|----------------------------|-----|------|
|                                      |                                 | D10                            | D11 | D00 | D01 | D02 | D03 | D12 | VSS | D13 | MRD | D03 | D02 | D01 | D00 | CS  | VDD         | Measured<br>terminal | Subgroup 9<br>TC = 25 °C | Subgroup 10<br>TC = 125 °C | Subgroup 11<br>TC = -55 °C |     |      |
|                                      |                                 | 1                              | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16          |                      | Min                      | Max                        | Min                        | Max |      |
| t <sub>PLH2</sub><br>3004<br>Fig. 5a | 201                             | IN                             | GND |     |     |     |     |     | GND | GND | GND |     |     | OUT | OUT | VDD | 10.0 V      | DB0                  | 56                       | 74                         | 44                         | ns  |      |
|                                      | 202                             | GND                            | IN  |     |     |     |     |     | GND | "   | "   |     |     | OUT |     | "   | "           | DB1                  | "                        | "                          | "                          | "   |      |
|                                      | 203                             | "                              | GND |     |     |     |     |     | "   | "   | "   |     |     |     |     | "   | "           | DB2                  | "                        | "                          | "                          | "   |      |
|                                      | 204                             | "                              | "   | OUT |     |     |     |     | IN  | "   | OUT |     |     |     |     | "   | "           | DB3                  | "                        | "                          | "                          | "   |      |
|                                      | 205                             | "                              | "   |     | OUT |     |     |     | GND | VDD |     |     | IN  |     |     | "   | "           | D00                  | "                        | "                          | "                          | "   |      |
|                                      | 206                             | "                              | "   |     |     | OUT |     |     | "   | "   | IN  |     |     |     |     | "   | "           | D01                  | "                        | "                          | "                          | "   |      |
|                                      | 207                             | "                              | "   |     |     |     | OUT |     | "   | "   |     |     |     |     |     | "   | "           | D02                  | "                        | "                          | "                          | "   |      |
|                                      | 208                             | "                              | "   |     |     |     |     |     | "   | "   | IN  |     |     |     |     | "   | "           | D03                  | "                        | "                          | "                          | "   |      |

See footnotes at end of table.

TABLE III. Group A Inspection for device type 02.

| Symbol    | ML-STD-883 method | Cases E, F, Test no. | Terminal conditions and limits 1/ |        |       |       |     |     |     |     |     |     |     |     |     |     | Test limits |     |                   |                       |      |                        | Unit |                        |     |     |
|-----------|-------------------|----------------------|-----------------------------------|--------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|-----|-------------------|-----------------------|------|------------------------|------|------------------------|-----|-----|
|           |                   |                      | DI0                               | DI1    | DO0   | DO1   | DO2 | DO3 | DI2 | VSS | DI3 | MRD | DB3 | DB2 | DB1 | DB0 | CS          | VDD | Measured terminal | Subgroup 1 TC = 25 °C |      | Subgroup 2 TC = 125 °C |      | Subgroup 3 TC = -55 °C |     |     |
|           |                   |                      |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | Min                   | Max  | Min                    |      | Max                    | Min | Max |
| VIC (pos) |                   | 1                    | 1 mA                              |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI0                   | 3.0  |                        |      |                        |     | V   |
|           |                   | 2                    | 1 mA                              |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI1                   | "    |                        |      |                        |     | "   |
|           |                   | 3                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI2                   | "    |                        |      |                        |     | "   |
|           |                   | 4                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI3                   | "    |                        |      |                        |     | "   |
|           |                   | 5                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | MRD                   | "    |                        |      |                        |     | "   |
|           |                   | 6                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB3                   | "    |                        |      |                        |     | "   |
|           |                   | 7                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB2                   | "    |                        |      |                        |     | "   |
|           |                   | 8                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB1                   | "    |                        |      |                        |     | "   |
|           |                   | 9                    |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB0                   | "    |                        |      |                        |     | "   |
|           |                   | 10                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | CS                    | "    |                        |      |                        |     | "   |
| VIC (neg) |                   | 11                   | -1 mA                             |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI0                   | -3.0 |                        |      |                        |     | "   |
|           |                   | 12                   | -1 mA                             |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI1                   | "    |                        |      |                        |     | "   |
|           |                   | 13                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI2                   | "    |                        |      |                        |     | "   |
|           |                   | 14                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DI3                   | "    |                        |      |                        |     | "   |
|           |                   | 15                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | MRD                   | "    |                        |      |                        |     | "   |
|           |                   | 16                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB3                   | "    |                        |      |                        |     | "   |
|           |                   | 17                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB2                   | "    |                        |      |                        |     | "   |
|           |                   | 18                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB1                   | "    |                        |      |                        |     | "   |
|           |                   | 19                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB0                   | "    |                        |      |                        |     | "   |
|           |                   | 20                   |                                   |        |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | CS                    | "    |                        |      |                        |     | "   |
| ISS       | 3005              | 21                   | 13.0 V                            | 13.0 V |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | VSS                   | -20  | -100                   |      | -20                    | μA  |     |
|           |                   | 22                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | "                     | "    | "                      | "    | "                      | "   |     |
|           |                   | 23                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | "                     | "    | "                      | "    | "                      | "   |     |
|           |                   | 24                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | "                     | "    | "                      | "    | "                      | "   |     |
|           |                   | 25                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | "                     | "    | "                      | "    | "                      | "   |     |
|           |                   | 26                   | GND                               | GND    |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | "                     | "    | "                      | "    | "                      | "   |     |
| VOH1      | 3006              | 27                   | 10.0 V                            | 10.0 V |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO0                   | 9.95 | 9.95                   |      | 9.95                   | V   |     |
|           |                   | 28                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 29                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 30                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 31                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 32                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 33                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 34                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB0                   | "    | "                      | "    | "                      | "   |     |
| VOL1      | 3007              | 35                   | GND                               | GND    |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO0                   | .05  | .05                    |      | .05                    | "   |     |
|           |                   | 36                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 37                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 38                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 39                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 40                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 41                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 42                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB0                   | "    | "                      | "    | "                      | "   |     |
| IOH1      |                   | 43                   | VDD                               | VDD    | 4.6 V |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO0                   | -1.5 | -1.1                   |      | -2.1                   | mA  |     |
|           |                   | 44                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 45                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 46                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 47                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 48                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 49                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 50                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB0                   | "    | "                      | "    | "                      | "   |     |
| IOH2      |                   | 51                   | "                                 | "      | 9.5 V | 9.5 V |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO0                   | -3.5 | -2.6                   |      | -4.9                   | "   |     |
|           |                   | 52                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 53                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 54                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DO3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 55                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB3                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 56                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB2                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 57                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB1                   | "    | "                      | "    | "                      | "   |     |
|           |                   | 58                   | "                                 | "      |       |       |     |     |     |     |     |     |     |     |     |     |             |     |                   | DB0                   | "    | "                      | "    | "                      | "   |     |

See footnotes at end of table.

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

| Symbol           | MIL-STD-883 method | Cases E,F test no.                           | Terminal conditions and limits 1/      |                                             |                                          |                                          |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        | Measured terminal                         | Test limits                            |                                        |                                        |                                       |              |                           | Unit |     |     |     |  |
|------------------|--------------------|----------------------------------------------|----------------------------------------|---------------------------------------------|------------------------------------------|------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|---------------------------------------|--------------|---------------------------|------|-----|-----|-----|--|
|                  |                    |                                              | DI0                                    | DI1                                         | DO0                                      | DO1                                      | DO2                                    | DO3                                    | DI2                                    | VSS                                    | DI3                                    | MRD                                    | DB3                                    | DB2                                    | DB1                                    | DB0                                    | CS                                     |                                           | VDD                                    | Subgroup 1<br>TC = 25 °C               |                                        | Subgroup 2<br>TC = 125 °C             |              | Subgroup 3<br>TC = -55 °C |      |     |     |     |  |
|                  |                    |                                              |                                        |                                             |                                          |                                          |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                           |                                        | Min                                    | Max                                    | Min                                   | Max          | Min                       |      | Max | Min | Max |  |
| IOL1             |                    | 59<br>60<br>61<br>62<br>63<br>64<br>65<br>66 | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>"      | 0.4 V<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 0.4 V<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | VDD<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 5.0 V<br>"<br>"<br>"<br>"<br>"<br>"<br>"  | 2.1<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 1.5<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 2.8<br>"<br>"<br>"<br>"<br>"<br>"<br>" | mA<br>"<br>"<br>"<br>"<br>"<br>"<br>" |              |                           |      |     |     |     |  |
| IOL2             |                    | 67<br>68<br>69<br>70<br>71<br>72<br>73<br>74 | "<br>"<br>"<br>"<br>"<br>"<br>"<br>"   | "<br>"<br>"<br>"<br>"<br>"<br>"<br>"        | 0.5 V<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 0.5 V<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | GND<br>"<br>"<br>"<br>"<br>"<br>"<br>" | "<br>"<br>"<br>"<br>"<br>"<br>"        | 10.0 V<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 3.5<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 2.6<br>"<br>"<br>"<br>"<br>"<br>"<br>" | 4.7<br>"<br>"<br>"<br>"<br>"<br>"<br>" | "<br>"<br>"<br>"<br>"<br>"<br>"       |              |                           |      |     |     |     |  |
| IZH<br>(HT Z)    |                    | 75<br>76<br>77<br>78                         | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                            | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | GND<br>"<br>"<br>"                     | 13.0 V<br>"<br>"<br>"                     | 1<br>"<br>"                            | 5<br>"<br>"                            | 1<br>"<br>"                            | 1<br>"<br>"                           | μA<br>"<br>" |                           |      |     |     |     |  |
| IZL<br>(HT Z)    |                    | 79<br>80<br>81<br>82                         | 11.0 V<br>"<br>"<br>"                  | 11.0 V<br>"<br>"<br>"                       | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                          | -1<br>"<br>"<br>"                      | -5<br>"<br>"<br>"                      | -1<br>"<br>"                           | -1<br>"<br>"                          | "<br>"<br>"  |                           |      |     |     |     |  |
| IIL<br>2/        | 3010               | 83<br>84<br>85<br>86<br>87<br>88             | 13.0 V<br>GND<br>"<br>"<br>"<br>"      | GND<br>13.0 V<br>GND<br>"<br>"<br>"         | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | GND<br>"<br>"<br>"                     | "<br>"<br>"<br>"                          | 1<br>"<br>"                            | 1<br>"<br>"                            | 1<br>"<br>"                            | 1<br>"<br>"                           | "<br>"       |                           |      |     |     |     |  |
| IIL<br>2/        | 3009               | 89<br>90<br>91<br>92<br>93<br>94             | "<br>13.0 V<br>GND<br>13.0 V<br>"<br>" | 13.0 V<br>13.0 V<br>GND<br>13.0 V<br>"<br>" | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                         | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                       | "<br>"<br>"<br>"                          | -1<br>"<br>"                           | -5<br>"<br>"                           | -1<br>"<br>"                           | -1<br>"<br>"                          | "<br>"       |                           |      |     |     |     |  |
| Functional tests | 3014               | 95                                           | 3/                                     | 3/                                          | 3/                                       | 3/                                       | 3/                                     | 3/                                     | GND                                    | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 14.5 V                                    | A11 outputs                            | 3/                                     | 3/                                     | 3/                                    | 3/           | 3/                        |      |     |     |     |  |
|                  | 3014               | 96                                           | 3/                                     | 3/                                          | 3/                                       | 3/                                       | 3/                                     | 3/                                     | GND                                    | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 3/                                     | 13.0 V                                    | A11 outputs                            | 3/                                     | 3/                                     | 3/                                    | 3/           | 3/                        |      |     |     |     |  |
|                  |                    |                                              | Subgroup 7<br>TC = 25 °C               |                                             |                                          |                                          |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        | Subgroup 8<br>TC = 125 °C                 |                                        |                                        |                                        |                                       |              | Subgroup 9<br>TC = -55 °C |      |     |     |     |  |

See footnotes at end of table.

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

| Symbol            | MIL-STD-883 method | Cases E, F | Terminal conditions and limits |                 |                  |                  |                  |                  |                 |                  |     |                  |                  |                  |                  |     |                 |                                      | Test limits |                                      |     |                                        |     |                                        | Unit |
|-------------------|--------------------|------------|--------------------------------|-----------------|------------------|------------------|------------------|------------------|-----------------|------------------|-----|------------------|------------------|------------------|------------------|-----|-----------------|--------------------------------------|-------------|--------------------------------------|-----|----------------------------------------|-----|----------------------------------------|------|
|                   |                    |            | ID <sub>0</sub>                | ID <sub>1</sub> | ID <sub>00</sub> | ID <sub>01</sub> | ID <sub>02</sub> | ID <sub>03</sub> | V <sub>SS</sub> | ID <sub>13</sub> | HRD | ID <sub>03</sub> | ID <sub>02</sub> | ID <sub>01</sub> | ID <sub>00</sub> | CS  | V <sub>DD</sub> | Measured terminal                    |             | Subgroup 9<br>T <sub>C</sub> = 25 °C |     | Subgroup 10<br>T <sub>C</sub> = 125 °C |     | Subgroup 11<br>T <sub>C</sub> = -55 °C |      |
|                   |                    |            |                                |                 |                  |                  |                  |                  |                 |                  |     |                  |                  |                  |                  |     |                 | Min                                  | Max         | Min                                  | Max | Min                                    | Max |                                        |      |
| t <sub>PHL1</sub> | 3003 Fig. 5a       | 97         | IN                             | GND             |                  |                  |                  | GND              | GND             | V <sub>DD</sub>  |     |                  |                  |                  | OUT              | OUT | OUT             | ID <sub>10</sub> to ID <sub>00</sub> | 9           | 190                                  | 15  | 300                                    | 9   | 190                                    | ns   |
|                   |                    | 98         | GND                            | IN              |                  |                  |                  | GND              | GND             | "                |     |                  |                  |                  | OUT              |     |                 | ID <sub>11</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 99         | "                              | GND             |                  |                  |                  | "                | IN              | "                |     |                  |                  |                  | OUT              |     |                 | ID <sub>12</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 100        | "                              | "               |                  |                  |                  | "                | GND             | "                |     |                  |                  |                  |                  |     |                 | ID <sub>13</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 101        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  | IN               |     |                 | ID <sub>00</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 102        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>01</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 103        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 104        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>00</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
| t <sub>PHL2</sub> |                    | 105        | IN                             | GND             |                  |                  |                  | "                | "               | V <sub>DD</sub>  |     |                  |                  |                  | OUT              | OUT | OUT             | ID <sub>10</sub> to ID <sub>00</sub> | 5           | 100                                  | 9   | 180                                    | 5   | 100                                    | "    |
|                   |                    | 106        | GND                            | IN              |                  |                  |                  | "                | "               | "                |     |                  |                  |                  | OUT              |     |                 | ID <sub>01</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 107        | "                              | GND             |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 108        | "                              | "               |                  |                  |                  | IN               | OUT             | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 109        | "                              | "               |                  |                  |                  | GND              | GND             | "                |     |                  |                  |                  | IN               |     |                 | ID <sub>00</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 110        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>01</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 111        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 112        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>00</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
| t <sub>PLH1</sub> |                    | 113        | IN                             | GND             |                  |                  |                  | "                | "               | V <sub>DD</sub>  |     |                  |                  |                  | OUT              | OUT | OUT             | ID <sub>10</sub> to ID <sub>00</sub> | 9           | 190                                  | 15  | 300                                    | 9   | 190                                    | "    |
|                   |                    | 114        | GND                            | IN              |                  |                  |                  | "                | "               | "                |     |                  |                  |                  | OUT              |     |                 | ID <sub>01</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 115        | "                              | GND             |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 116        | "                              | "               |                  |                  |                  | IN               | OUT             | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 117        | "                              | "               |                  |                  |                  | "                | GND             | "                |     |                  |                  |                  | IN               |     |                 | ID <sub>00</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 118        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>01</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 119        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 120        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>00</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
| t <sub>PLH2</sub> |                    | 121        | IN                             | GND             |                  |                  |                  | "                | "               | V <sub>DD</sub>  |     |                  |                  |                  | OUT              | OUT | OUT             | ID <sub>10</sub> to ID <sub>00</sub> | 5           | 100                                  | 9   | 180                                    | 5   | 100                                    | "    |
|                   |                    | 122        | GND                            | IN              |                  |                  |                  | "                | "               | "                |     |                  |                  |                  | OUT              |     |                 | ID <sub>01</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 123        | "                              | GND             |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 124        | "                              | "               |                  |                  |                  | IN               | OUT             | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 125        | "                              | "               |                  |                  |                  | "                | GND             | "                |     |                  |                  |                  | IN               |     |                 | ID <sub>00</sub> to ID <sub>01</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 126        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>01</sub> to ID <sub>02</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 127        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>02</sub> to ID <sub>03</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |
|                   |                    | 128        | "                              | "               |                  |                  |                  | "                | "               | "                |     |                  |                  |                  |                  |     |                 | ID <sub>03</sub> to ID <sub>00</sub> | "           | "                                    | "   | "                                      | "   | "                                      | "    |

See footnotes at end of table.

TABLE III. Group A Inspection for device type 02 - Continued.

| Symbol | MIL-STD-883 Test method | Cases E, F | Terminal conditions and limits |     |     |     |     |     |     |     |     |     |     |     |     | Test limits |           |                   |                       |     |                         | Unit |                         |     |     |
|--------|-------------------------|------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|-----------|-------------------|-----------------------|-----|-------------------------|------|-------------------------|-----|-----|
|        |                         |            | IO0                            | IO1 | IO0 | IO1 | IO2 | IO3 | PRD | IO3 | VSS | IO3 | IO2 | IO1 | IO0 | CS          | VDD       | Measured terminal | Subgroup 9 TC = 25 °C |     | Subgroup 10 TC = 125 °C |      | Subgroup 11 TC = -55 °C |     |     |
|        |                         |            |                                |     |     |     |     |     |     |     |     |     |     |     |     |             |           |                   | Min                   | Max | Min                     |      | Max                     | Min | Max |
| tpZL1  | Fig. 5b                 | 129        | GND                            | GND |     |     |     |     | GND | GND | VDD |     |     |     | OUT | IN          | 15.0 V    | CS to IO0         | 10                    | 200 | 15                      | 300  | 10                      | 200 | ns  |
|        |                         | 130        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | OUT | "   | "           | CS to IO1 | "                 | "                     | "   | "                       | "    | "                       | "   |     |
|        |                         | 131        | "                              | "   |     |     |     |     | "   | "   | "   |     |     |     |     | "           | "         | CS to IO2         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 132        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | OUT | "   | "           | "         | CS to IO3         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 133        | "                              | "   | OUT |     |     |     | GND | GND | GND |     |     | GND | GND | "           | "         | CS to IO0         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 134        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO1         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 135        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO2         | "                     | "   | "                       | "    | "                       | "   | "   |
| tpZL2  |                         | 136        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO3         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 137        | "                              | "   |     |     |     |     | "   | "   | VDD |     |     | OUT | "   | "           | 10.0 V    | CS to IO0         | 5                     | 100 | 9                       | 180  | 5                       | 100 | "   |
|        |                         | 138        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | OUT | "   | "           | "         | CS to IO1         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 139        | "                              | "   |     |     |     |     | "   | "   | "   |     |     |     | "   | "           | "         | CS to IO2         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 140        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | OUT | "   | "           | "         | CS to IO3         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 141        | "                              | "   | OUT |     |     |     | GND | GND | GND |     |     | GND | GND | "           | "         | CS to IO0         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 142        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO1         | "                     | "   | "                       | "    | "                       | "   | "   |
| tpZL3  |                         | 143        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO2         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 144        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO3         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 145        | "                              | "   | OUT |     |     |     | "   | "   | IN  |     |     | "   | "   | VDD         | 5.0 V     | PRD to IO0        | 10                    | 200 | 15                      | 300  | 10                      | 200 | "   |
|        |                         | 146        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO1        | "                     | "   | "                       | "    | "                       | "   | "   |
| tpZL4  |                         | 147        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO2        | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 148        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO3        | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 149        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO0        | 5                     | 100 | 9                       | 180  | 5                       | 100 | "   |
|        |                         | 150        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO1        | "                     | "   | "                       | "    | "                       | "   | "   |
| tpZH1  |                         | 151        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO2        | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 152        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | PRD to IO3        | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 153        | VDD                            | VDD |     |     |     |     | VDD | VDD | VDD |     |     | OUT | IN  | 5.0 V       | CS to IO0 | 10                | 200                   | 15  | 300                     | 10   | 200                     | "   |     |
|        |                         | 154        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | OUT | GND | "           | "         | CS to IO1         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 155        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | GND | "   | "           | "         | CS to IO2         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 156        | "                              | "   |     |     |     |     | "   | "   | "   |     |     | GND | "   | "           | "         | CS to IO3         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 157        | "                              | "   | OUT |     |     |     | GND | VDD | VDD |     |     | VDD | VDD | "           | "         | CS to IO0         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 158        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO1         | "                     | "   | "                       | "    | "                       | "   | "   |
|        |                         | 159        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | CS to IO2 | "                 | "                     | "   | "                       | "    | "                       | "   |     |
|        |                         | 160        | "                              | "   | OUT |     |     |     | "   | "   | "   |     |     | "   | "   | "           | "         | CS to IO3         | "                     | "   | "                       | "    | "                       | "   | "   |

See footnotes at end of table.

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

| Symbol            | MIL-STD-883  | Cases             | Terminal conditions and limits |     |     |      |      |      |      |     |      |     |     |     |     |     |     |           | Test limits       |                          |            |                            | Unit |                            |     |     |     |   |
|-------------------|--------------|-------------------|--------------------------------|-----|-----|------|------|------|------|-----|------|-----|-----|-----|-----|-----|-----|-----------|-------------------|--------------------------|------------|----------------------------|------|----------------------------|-----|-----|-----|---|
|                   |              |                   | ID10                           | ID1 | ID0 | ID01 | ID02 | ID03 | ID12 | VSS | ID13 | WRD | DB3 | DB2 | DB1 | DB0 | CS  | VDD       | Measured terminal | Subgroup 9<br>TC = 25 °C |            | Subgroup 10<br>TC = 125 °C |      | Subgroup 11<br>TC = -55 °C |     |     |     |   |
|                   |              |                   |                                |     |     |      |      |      |      |     |      |     |     |     |     |     |     |           |                   | Min                      | Max        | Min                        |      | Max                        | Min | Max |     |   |
|                   | Test method  | no.               | 1                              | 2   | 3   | 4    | 5    | 6    | 7    | 8   | 9    | 10  | 11  | 12  | 13  | 14  | 15  | 16        |                   |                          |            |                            |      |                            |     |     |     |   |
| t <sub>pZH2</sub> | Fig. 5b      | 161               | VDD                            | VDD |     |      |      |      | VDD  | GND | VDD  | VDD |     |     |     | OUT | IN  | 10.0 V    | CS to DB0         | 5                        | 100        | 9                          | 180  | 5                          | 100 | ns  |     |   |
|                   |              | 162               | "                              | "   |     |      |      |      | "    | "   | "    | "   |     | OUT |     |     | "   | CS to DB1 | "                 | "                        | "          | "                          | "    | "                          | "   |     |     |   |
|                   |              | 163               | "                              | "   |     |      |      |      | "    | "   | "    | "   |     | OUT |     |     | "   | "         | CS to DB1         | "                        | "          | "                          | "    | "                          | "   |     |     |   |
|                   |              | 164               | "                              | "   |     |      |      |      | "    | "   | "    | "   |     | OUT |     |     | "   | "         | CS to DB2         | "                        | "          | "                          | "    | "                          | "   |     |     |   |
|                   |              | 165               | "                              | "   | OUT |      |      |      | "    | "   | "    | GND | VDD | VDD | VDD | VDD | "   | "         | CS to DB3         | "                        | "          | "                          | "    | "                          | "   |     |     |   |
|                   |              | 166               | "                              | "   |     | OUT  |      |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | CS to DO0         | "                        | "          | "                          | "    | "                          | "   |     |     |   |
|                   |              | 167               | "                              | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | CS to DO1         | "                        | "          | "                          | "    | "                          | "   |     |     |   |
| t <sub>pZH3</sub> |              | 168               | "                              | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | CS to DO2         | "                        | "          | "                          | "    | "                          | "   |     |     |   |
|                   |              | 169               | "                              | "   | OUT |      |      |      | "    | "   | "    | IN  | "   | "   | "   | "   | "   | VDD       | WRD to DO0        | 10                       | 200        | 15                         | 300  | 10                         | 200 | "   |     |   |
|                   |              | 170               | "                              | "   |     | OUT  |      |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | WRD to DO1        | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 171               | "                              | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | WRD to DO1        | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 172               | "                              | "   |     |      |      | OUT  |      | "   | "    | "   | "   | "   | "   | "   | "   | "         | WRD to DO2        | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | t <sub>pZH4</sub> |                                | 173 | "   | "    | OUT  |      |      |     | "    | "   | "   | "   | "   | "   | "   | "         | "                 | "                        | WRD to DO3 | 5                          | 100  | 9                          | 180 | 5   | 100 | " |
|                   |              |                   |                                | 174 | "   | "    |      | OUT  |      |     | "    | "   | "   | "   | "   | "   | "   | "         | "                 | "                        | WRD to DO3 | "                          | "    | "                          | "   | "   | "   | " |
| 175               | "            |                   |                                | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | WRD to DO3        | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
| 176               | "            |                   |                                | "   |     |      |      | OUT  |      | "   | "    | "   | "   | "   | "   | "   | "   | "         | WRD to DO3        | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
| t <sub>tHL1</sub> | 3004 Fig. 5a |                   |                                | 177 | IN  | GND  |      |      |      |     | GND  | "   | GND | VDD |     |     | OUT | OUT       | "                 | 5.0 V                    | DB0        |                            | 112  |                            | 156 |     | 80  | " |
|                   |              |                   |                                | 178 | "   | GND  |      |      |      |     | "    | "   | "   | "   | OUT |     |     | OUT       | "                 | "                        | DB1        | "                          | "    | "                          | "   | "   | "   |   |
|                   |              |                   |                                | 179 | "   | "    |      |      |      |     | "    | "   | IN  | "   | "   | OUT |     |           | "                 | "                        | DB2        | "                          | "    | "                          | "   | "   | "   |   |
|                   |              | 180               | "                              | "   |     |      |      |      | GND  | "   | GND  | "   | "   | "   | IN  |     | IN  | "         | "                 | DB3                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 181               | "                              | "   |     | OUT  |      |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | "                 | DO0                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 182               | "                              | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | "                 | DO1                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 183               | "                              | "   |     |      |      | OUT  |      | "   | "    | "   | "   | "   | IN  |     | "   | "         | "                 | DO2                      | "          | "                          | "    | "                          | "   | "   |     |   |
| t <sub>tHL2</sub> |              | 184               | "                              | "   |     |      |      | OUT  | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | DO3               | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 185               | IN                             | IN  |     |      |      |      | GND  | "   | "    | "   | VDD |     |     | OUT | OUT | "         | 10.0 V            | DB0                      |            | 56                         |      | 74                         | 44  | "   |     |   |
|                   |              | 186               | GND                            | GND |     |      |      |      | "    | "   | "    | "   | "   | OUT |     |     | OUT | "         | "                 | DB1                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 187               | "                              | IN  |     |      |      |      | "    | "   | "    | "   | "   | "   | OUT |     | "   | "         | "                 | DB2                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 188               | "                              | GND |     |      |      |      | "    | "   | IN   | "   | "   | "   | "   | IN  | IN  | "         | "                 | DB3                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 189               | "                              | "   | OUT |      |      |      | GND  | "   | GND  | "   | "   | "   | IN  |     | "   | "         | "                 | DO0                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 190               | "                              | "   |     | OUT  |      |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | "                 | DO1                      | "          | "                          | "    | "                          | "   | "   |     |   |
| t <sub>tHL1</sub> |              | 191               | "                              | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | IN  |     | "   | "   | "         | "                 | DO2                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 192               | "                              | "   |     |      |      | OUT  |      | "   | "    | "   | "   | "   | "   | "   | "   | "         | "                 | DO3                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 193               | IN                             | IN  |     |      |      |      | "    | "   | "    | "   | VDD |     |     | OUT | OUT | "         | 5.0 V             | DB0                      |            | 112                        |      | 156                        | 80  | "   |     |   |
|                   |              | 194               | GND                            | GND |     |      |      |      | "    | "   | "    | "   | "   | OUT |     |     | OUT | "         | "                 | DB1                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 195               | "                              | "   | OUT |      |      |      | "    | "   | IN   | "   | "   | "   | "   | IN  | IN  | "         | "                 | DB2                      | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 196               | "                              | "   |     | OUT  |      |      | "    | "   | "    | GND | "   | "   | "   | "   | "   | "         | "                 | DB3                      | "          | "                          | "    | "                          | "   | "   | "   |   |
|                   |              | 197               | "                              | "   |     |      | OUT  |      | "    | "   | "    | "   | "   | "   | IN  |     | "   | "         | "                 | DO0                      | "          | "                          | "    | "                          | "   | "   |     |   |
| t <sub>tHL1</sub> |              | 198               | "                              | "   |     |      |      | OUT  | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | DO1               | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 199               | "                              | "   |     |      |      |      | "    | "   | "    | "   | "   | "   | "   | "   | "   | "         | DO2               | "                        | "          | "                          | "    | "                          | "   | "   |     |   |
|                   |              | 200               | "                              | "   |     |      |      | OUT  |      | "   | "    | "   | "   | IN  |     | "   | "   | "         | DO3               | "                        | "          | "                          | "    | "                          | "   | "   |     |   |

See footnotes at end of table.

TABLE III. Group A Inspection for device type 02 - Continued.

| Symbol            | MIL-STD-883 method | Cases E, F test no. | terminal conditions and limits 1/ |      |      |      |      |      |      |     |      |     |     |     |     |     |     | test limits |                                   |     |                            |     |                            | Unit |     |   |
|-------------------|--------------------|---------------------|-----------------------------------|------|------|------|------|------|------|-----|------|-----|-----|-----|-----|-----|-----|-------------|-----------------------------------|-----|----------------------------|-----|----------------------------|------|-----|---|
|                   |                    |                     | ID10                              | ID11 | ID00 | ID01 | ID02 | ID03 | ID12 | VSS | ID13 | WRD | DB3 | DB2 | DB1 | DB0 | CS  | VDD         | Subgroup 9<br>terminal TC = 25 °C |     | Subgroup 10<br>TC = 125 °C |     | Subgroup 11<br>TC = -55 °C |      |     |   |
|                   |                    |                     | 1                                 | 2    | 3    | 4    | 5    | 6    | 7    | 8   | 9    | 10  | 11  | 12  | 13  | 14  | 15  | 16          | Min                               | Max | Min                        | Max | Min                        |      | Max |   |
| t <sub>TLH2</sub> | 3004               | 201                 | IN                                | GND  |      |      |      |      |      | GND | GND  | VDD |     |     |     | GND | GND | GND         | 10.0 V                            | DB0 | 56                         |     | 74                         | 44   | ns  |   |
|                   | Fig. 5a            | 202                 | GND                               | IN   |      |      |      |      |      | GND | "    | "   | "   |     |     |     | "   | "           | "                                 | "   | DB1                        | "   | "                          | "    | "   | " |
|                   | "                  | 203                 | "                                 | GND  |      |      |      |      |      | "   | "    | "   |     | OUT |     |     | "   | "           | "                                 | "   | DB2                        | "   | "                          | "    | "   | " |
|                   | "                  | 204                 | "                                 | "    |      |      |      |      |      | IN  | IN   | "   |     |     |     |     | "   | "           | "                                 | "   | DB3                        | "   | "                          | "    | "   | " |
|                   | "                  | 205                 | "                                 | "    |      |      |      |      |      | GND | GND  | GND |     |     |     |     | "   | "           | "                                 | "   | DO0                        | "   | "                          | "    | "   | " |
|                   | "                  | 206                 | "                                 | "    |      |      |      |      |      | "   | "    | "   |     | IN  |     |     | "   | "           | "                                 | "   | DO1                        | "   | "                          | "    | "   | " |
|                   | "                  | 207                 | "                                 | "    |      |      |      |      |      | "   | "    | "   |     |     |     |     | "   | "           | "                                 | "   | DO2                        | "   | "                          | "    | "   | " |
|                   | "                  | 208                 | "                                 | "    |      |      |      |      |      | "   | "    | "   | IN  |     |     |     | "   | "           | "                                 | "   | DO3                        | "   | "                          | "    | "   | " |

1/ Pins not designated may be high level logic, low level logic, or open. Exceptions are as follows: VIC(pdg) tests the VSS terminal shall be open; VIC(neg) tests, the VDD terminal shall be open; I<sub>SS</sub> tests, DO and DB terminals shall be open.

2/ Leakage current tests (I<sub>SS</sub>, I<sub>IL</sub>, I<sub>IH</sub>, and I<sub>Z</sub>) subgroup 3, are not required for 100 percent screening (final electricals).

3/ Perform a functional test using the test pattern and expected outputs shown below. Input levels shall be 0 = VSS and 1 = VDD. Output levels shall be VOL = VSS +0.50 V max and VQH = VDD -0.5 V min.

DEVICE TYPE 02

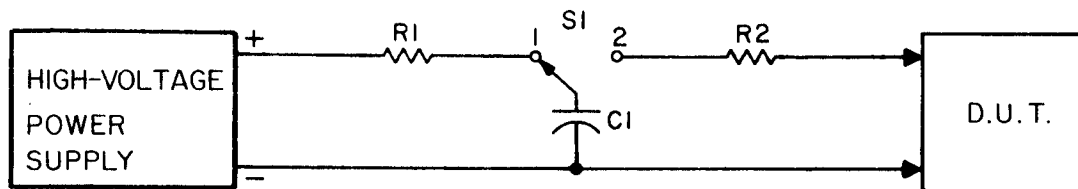
X = DENOTES HIGH IMPEDANCE STATE.

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

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

4.5.2 High voltage ( $V_{ZAP}$ ) test of input protection circuits. Unless otherwise specified, all input terminals (up to a maximum of four) of the device under test (DUT), shall be subjected to a voltage pulse from a 100 pF source charged to 400 V. This destructive test shall be conducted as follows using the test circuit on figure 6.

- a. Measure  $I_{IL}$  and  $I_{IH}$  at the inputs selected, as stated above, at 25°C and  $V_{DD} = 13$  V. Also measure  $I_{SS}$  at 25°C and  $V_{DD} = 13$  V. These measurements shall be made in accordance with table III. The test limit for a single terminal measurement of  $I_{IL}$  and  $I_{IH}$  shall be 500 nA maximum.



NOTES:

1.  $V_{ZAP} = 400$  V minimum charge on C1  
 $10\text{ m}\Omega < R1 < 50\text{ M}\Omega$ .
2.  $R2 = 1.5\text{ k}\Omega$ .
3.  $C1 = 100\text{ pF}$
4. S1 = Hg-wetter "bounceless" relay.

FIGURE 6. High voltage ( $V_{ZAP}$ ) test circuit.

- b. With S1 in position 1, charge C1 to 400 V. With S1 in position 2 apply the test voltage ( $V_{ZAP}$ ) to the same terminal selected for leakage current measurements. Apply  $V_{ZAP}$  in a three pulse sequence as follows:

- (1) Input (-) to  $V_{DD}$
- (2) Input (+) to  $V_{SS}$
- (3) Input (+) to output

- c. Within 24 hours repeat the  $I_{SS}$ ,  $I_{IL}$  and  $I_{IH}$  measurements on the same terminals as performed above. At this time a DUT exhibiting leakage currents in excess of the specified limits is defective.

4.6 Data reporting. When specified in the acquisition document, a copy of the following data, as applicable, shall be supplied.

- a. Attributes data for all screening tests (see 4.2) and variables data for all dynamic burn-in, and steady state life tests (see 4.4.3).
- b. The quality conformance inspection data (see 4.4).
- c. Final electrical parameters data (see 4.2c).

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510. These devices require electrostatic protection.

## 6. NOTES

6.1 Notes. The notes specified in MIL-M-38510 are applicable to this specification.

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

6.3 Ordering data. The acquisition document should specify the following:

- a. Complete part number (see 1.2).
- b. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- c. Requirements for certificate of compliance, if applicable.
- d. Requirements for notification of change of product or process to the contracting activity, if applicable.
- e. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action and reporting of results, if applicable.
- f. Requirements for product assurance options.
- g. Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements shall not apply to direct purchase by or direct shipment to the Government.

6.4 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-M-38510, MIL-STD-1331, and as follows:

|                    |           |                                                                                                                                                                                  |
|--------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GND-               | - - - - - | Ground. Zero voltage potential.                                                                                                                                                  |
| TA -               | - - - - - | Free air temperature.                                                                                                                                                            |
| t <sub>THL</sub> - | - - - - - | Fall time. Time duration which the amplitude of the trailing edge of the input forcing condition or waveform is decreasing from 90 to 10 percent of the maximum amplitude.       |
| t <sub>TLH</sub> - | - - - - - | Rise time. Time duration during which the amplitude of the leading edge of the input forcing condition or waveform is increasing from 10 to 90 percent of the maximum amplitude. |
| VDD-               | - - - - - | Positive supply voltage.                                                                                                                                                         |
| VSS-               | - - - - - | Negative supply voltage.                                                                                                                                                         |
| ISS-               | - - - - - | Quiescent supply current.                                                                                                                                                        |

6.5 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) and lead material and finish C (see 3.3). Longer length leads and lead forming shall not affect the part number.

6.6 Generic test data. Generic test data may be used to satisfy the requirements of 4.4.3. Group C generic test data shall be on date codes no more than one year old and on a die in the same microcircuit group (see appendix E of MIL-M-38510) with the same material, design and process and from the same plant as the die represented. Group D (see 4.4.4) generic data shall be on date codes no more than one year old and on the same package type (see terms, definitions, and symbols of MIL-M-38510) and from the same plant as the package represented. The vendor is required to retain the generic data for a period of not less than 36 months from the date of shipment.

6.7 Substitutability. The cross-reference information herein 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 shall 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-M-38510.

| <u>Military device</u><br><u>type</u> | <u>Generic-industry</u><br><u>type</u> |
|---------------------------------------|----------------------------------------|
| 01                                    | 1856                                   |
| 02                                    | 1857                                   |

6.8 Handling. CMOS devices should be handled with certain precautions to avoid damage due to accumulation of static charge. Input protection devices have been designed in the ship to minimize the effect of this static buildup. However, the following handling practices are recommended:

- a. Devices should be handled on benches with conductive and grounded surfaces.
- b. Ground test equipment and tools.
- c. Do not handle devices by the leads.
- d. Store devices in conductive carriers or conductive foam.
- e. Avoid use of plastic, rubber, or silk in areas where CMOS devices are handled.
- f. Maintain relative humidity above 50 percent, if practical.

6.9 Ordering guidance. Since the qualification and certification requirements have been removed from the specification, orders may be placed immediately.

6.10 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodian:  
NASA - NA

Review activity:  
DLA - ES

Agent:  
DLA - ES

Preparing activity:  
NASA - NA

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