PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, LOW LEVEL VOLTAGE-REFERENCE
TEMPERATURE COMPENSATED, TYPES 1N935B-1, 1N937B-1, 1N938B-1, 1N939B-1, AND 1N940B-1,
LEADED AND SURFACE MOUNT PACKAGES, QUALITY LEVELS JAN, JANTX, JANTXV, AND JANS,
RADIATION HARDENED (TOTAL DOSE ONLY)

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

The requirements for acquiring the product described herein
shall consist of this specification sheet and MIL-PRF-19500.

1. SCOPE

1.1 Scope. This specification covers the performance requirements for 9.0 volts ±5 percent, silicon, low bias
current, temperature compensated voltage-reference diodes. Four levels of product assurance (JAN, JANTX,
JANTXV, and JANS) are provided for each encapsulated device type as specified in MIL-PRF-19500. Seven levels
of radiation hardened (total ionizing dose only) product assurance are provided for quality levels JANTXV and JANS
as specified in MIL-PRF-19500.

1.2 Package outlines. The device package outlines are as follows: axial leaded packages (DO-204AA or DO-
204AH) in accordance with figure 1 and surface mount version (DO-213AA) in accordance with figure 2.

1.3 Maximum ratings. Unless otherwise specified TA = +25°C.

<table>
<thead>
<tr>
<th>Type</th>
<th>ΔVz (1) (voltage – temperature stability)</th>
<th>Zz (1)</th>
<th>Vz (1)</th>
<th>IR (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mV dc</td>
<td>ohms</td>
<td>volts</td>
<td>µA</td>
</tr>
<tr>
<td>1N935B-1, 1N935BUR-1</td>
<td>184</td>
<td>20</td>
<td>8.55</td>
<td>9.45</td>
</tr>
<tr>
<td>1N937B-1, 1N937BUR-1</td>
<td>37</td>
<td>20</td>
<td>8.55</td>
<td>9.45</td>
</tr>
<tr>
<td>1N938B-1, 1N938BUR-1</td>
<td>19</td>
<td>20</td>
<td>8.55</td>
<td>9.45</td>
</tr>
<tr>
<td>1N939B-1, 1N939BUR-1</td>
<td>9</td>
<td>20</td>
<td>8.55</td>
<td>9.45</td>
</tr>
<tr>
<td>1N940B-1, 1N940BUR-1</td>
<td>3.7</td>
<td>20</td>
<td>8.55</td>
<td>9.45</td>
</tr>
</tbody>
</table>

(1) To guarantee voltage-temperature stability, it is necessary to maintain the proper Iz = 7.5 mA dc.

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime,
VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dla.mil. Since contact
information can change, you may want to verify the currency of this address information using the ASSIST Online
1.5 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.4 for PIN construction example and 6.5 for a list of available PINs.

1.5.1 JAN certification mark and quality level. The quality level designators for encapsulated devices that are applicable for this specification sheet from the lowest to the highest level are as follows: "JAN", "JANTX", "JANTXV", and "JANS".

1.5.2 Device type. The designation system for the devices covered by this specification sheet is as follows.

1.5.2.1 First number and first letter symbols. The devices of this specification sheet use the first number and letter symbols "1N".

1.5.2.2 Second number symbols. The second number symbols for the devices covered by this specification sheet are as follows: "935", "937", "938", "939", and "940".

1.5.3 Suffix symbols. The following suffix symbol(s) are incorporated into the PINs for this specification sheet.

1.5.3.1 Voltage tolerance. The first suffix letter "B" indicates a modified version of the diode that have a nominal voltage tolerance of 5 percent over the basic numbered (non-suffix) device.

1.5.3.2 Package designators. The suffix symbols (or lack thereof) that designate the package outline for the devices covered by this specification sheet are as follows.

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A blank</td>
<td>A blank designator identifies that the package is a DO-204AA or DO-204AH (formerly DO-7 or DO-35) in accordance with figure 1.</td>
</tr>
<tr>
<td>UR</td>
<td>A &quot;UR&quot; designator identifies that the package is a DO-213AB surface mount package in accordance with figure 2.</td>
</tr>
</tbody>
</table>

1.5.3.3 Metallurgical bond. The last suffix symbol "-1" designates the diode construction (see 3.4.2).

1.5.4 Radiation hardness assurance (RHA) designator. For quality levels JANTXV and JANS, the RHA levels that are applicable for this specification sheet from lowest to highest are as follows: "M", "D", "L", "R", "F", "G", and "H".

1.5.5 Lead finish. The lead finishes applicable to this specification sheet are listed on QPDSIS-19500.
NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Package contour optional within BD and length BL. Heat slugs, if any, shall be included within this cylinder but shall not be subject to minimum limit of BD.
3. Within this zone, lead diameter may vary to allow for lead finishes and irregularities, other than heat slugs.
4. In accordance with ASME Y14.5M, diameters are equivalent to $\phi$ symbology.

FIGURE 1. Physical dimensions for DO-204AA or DO-204AH (1N935B-1, 1N937B-1 through 1N940B-1).
NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. In accordance with ASME Y14.5M, diameters are equivalent to $\phi$x symbology.

FIGURE 2. Physical dimensions for DO-213AA (1N935BUR-1, 1N937BUR-1 through 1N940BUR-1).
2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS


DEPARTMENT OF DEFENSE STANDARDS


(Copies of these documents are available online at https://quicksearch.dla.mil.)

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

3. REQUIREMENTS

3.1 General. The individual item requirements shall be as specified in MIL-PRF-19500 and as modified herein.

3.2 Qualification. Devices furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturer’s list (QML) before contract award (see 4.2 and 6.3).

3.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500.

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500 and figures 1 and 2 herein.

3.4.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4.2 Diode construction. These devices shall be constructed to comply with the dash-one construction requirements of MIL-PRF-19500 utilizing either a category I or II metallurgical bond as defined in MIL-PRF-19500.
3.5 Marking. Marking shall be in accordance with MIL-PRF-19500.

3.5.1 Marking of "UR" version devices. For "UR" version devices only, all marking (except polarity) may be omitted from the body, but shall be retained on the initial container.

3.5.2 Polarity. The polarity shall be indicated with a contrasting color band to denote the cathode end or alternately with a minimum of three contrasting color dots spaced evenly around the periphery at the cathode end.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4 and table I herein.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in 4.4.2 and 4.4.3.

3.8 RHA requirements. The requirements and test levels for RHA shall be as defined in MIL-PRF-19500 and herein.

3.9 Workmanship. Semiconductor devices shall be processed in such a manner as to be uniform in quality and shall be free from other defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.2).

b. Screening (see 4.3).

c. Conformance inspection (see 4.4).

4.1.1 Sampling inspection. Sampling inspection shall be in accordance with MIL-PRF-19500 and as specified herein, except that lot accumulation period shall be 3 months in lieu of 6 weeks.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.2.1 Group E inspection. Group E inspection shall be conducted in accordance with MIL-PRF-19500 and 4.4.5 herein.

4.2.2 Radiation hardened devices. See MIL-PRF-19500 and 4.4.4 herein.
4.3 Screening (Quality levels JANS, JANTXV, and JANTX only). Screening shall be in accordance with table E-IV of MIL-PRF-19500, appendix E and as specified herein. Specified electrical measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

<table>
<thead>
<tr>
<th>Screen</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANS level</td>
<td>JANTXV and JANTX level</td>
</tr>
<tr>
<td>3b</td>
<td>Not applicable</td>
</tr>
<tr>
<td>3c</td>
<td>Not applicable</td>
</tr>
<tr>
<td>4</td>
<td>Not applicable</td>
</tr>
<tr>
<td>5</td>
<td>Not applicable</td>
</tr>
<tr>
<td>6</td>
<td>Not applicable</td>
</tr>
<tr>
<td>9</td>
<td>Not applicable</td>
</tr>
<tr>
<td>10</td>
<td>Not applicable</td>
</tr>
<tr>
<td>11</td>
<td>Required $V_Z$, $Z_Z$</td>
</tr>
<tr>
<td>12</td>
<td>Required see 4.3.1</td>
</tr>
<tr>
<td>13</td>
<td>Required Subgroups 2 and 3 of table I herein; $\Delta Z_Z \leq \pm 15%$ of initial reading, $T_A = +25^\circ C \pm 2^\circ C$, $\Delta V_Z \leq \pm 0.004$ V dc from initial value for 1N935B-1, 1N935BUR-1, 1N937B-1, and 1N937BUR-1; $\Delta V_Z \leq \pm 0.003$ V dc from initial value for 1N938B-1, 1N938BUR-1, 1N939B-1, and 1N939BUR-1; $\Delta V_Z \leq \pm 0.002$ V dc from initial value for 1N940B-1, 1N940BUR-1</td>
</tr>
</tbody>
</table>

4.3.1 Power burn-in conditions. Power burn-in conditions shall be as follows: $I_Z = 7.5$ mA dc, $\pm 0.75$ mA dc, $T_A = +150^\circ C, +5^\circ C, -0^\circ C$.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with table E-V of MIL-PRF-19500 and table I herein.
4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with 4.4.2.1 for quality level JANS and 4.4.2.2 for quality levels JAN, JANTX, and JANTXV.

4.4.2.1 Quality level JANS. Group B inspection for quality level JANS shall be conducted in accordance with the conditions specified for subgroup testing in table E–VIA of MIL-PRF-19500 and herein. For purposes of JANS inspection, a single device type shall be defined as devices from a single wafer lot (for each die type used in the construction). The conformance inspection sample shall be selected from the part category with the lowest $\Delta V_z$ rating in the inspection lot.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Method</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3</td>
<td>1056</td>
<td>Test condition A, 25 cycles.</td>
</tr>
<tr>
<td>B3</td>
<td>4066</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>B4</td>
<td>1037</td>
<td>$I_z = 25$ mA dc at $T_A =$ room ambient; $t_{on} = t_{off} = 30$ seconds minimum for 4,000 cycles. Forced air cooling allowed during off cycle.</td>
</tr>
<tr>
<td>B5</td>
<td>1027</td>
<td>$I_{zm} = 50$ mA dc for 96 hours. $T_A = +75^\circ C$, adjust $T_A$ to achieve $T_J = +200^\circ C$ minimum.</td>
</tr>
<tr>
<td>B6</td>
<td></td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

4.4.2.2 Quality levels JAN, JANTX and JANTXV. Group B inspection for quality levels JAN, JANTX, and JANTXV shall be conducted in accordance with the conditions specified in table E-VIB of MIL-PRF-19500 and herein.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Method</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>4066</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>B3</td>
<td>1027</td>
<td>$I_z = 7.5$ mA dc, $\pm 0.75$ mA dc, $T_A = +150^\circ C$, $+5^\circ C$, $-0^\circ C$.</td>
</tr>
<tr>
<td>B5</td>
<td></td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table E-VII of MIL-PRF-19500.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Method</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>1056</td>
<td>Test condition A, 25 cycles.</td>
</tr>
<tr>
<td>C2</td>
<td>2036</td>
<td>Tension: Test condition A; 10 pounds (4.54 kg) weight, $t = 15 \pm 3$ seconds; Lead fatigue: Test condition E. Tension and lead fatigue test are not applicable to surface mount &quot;UR&quot; version devices.</td>
</tr>
<tr>
<td>C5</td>
<td></td>
<td>Not applicable.</td>
</tr>
<tr>
<td>C6</td>
<td>1026</td>
<td>$I_z = 7.5$ mA dc, $T_A = +100^\circ C$ minimum (see 4.5.2).</td>
</tr>
<tr>
<td>C7</td>
<td></td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>
4.4.4  **Group D inspection.** Group D inspection shall be conducted in accordance with table E-VIII of MIL-PRF-19500 and table II herein. Submitted lots for group D sample inspection must be constructed using one homogeneous wafer lot for the Zener and one wafer lot for the compensating die, as also described in the Design and Construction form 36D (see table II herein) submitted to the qualifying activity.

4.4.5  **Group E inspection.** Group E inspection shall be conducted in accordance with the conditions specified for subgroup tests in table E-IX of MIL-PRF-19500 and table III herein.

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

4.5.1  **Voltage-temperature stability.** The breakdown voltage of each diode type shall be measured in accordance with 4.5.3 and recorded at each of the specified temperatures. The lowest measured voltage shall be subtracted from the highest measured voltage for each diode. The difference value obtained shall not exceed the specified $\Delta V_z$ for each diode type.

4.5.2  **Reference voltage time stability.** The breakdown voltage shall be measured in accordance with 4.5.3 prior to life testing, at 340 hours, and at the conclusion of the life test as shown in table IV herein. The 340-hour reading shall be compared with the 0-hour reading and the 1,000-hour reading compared with the 340-hour reading. The change in breakdown voltage shall not exceed the limits specified. The test temperature for breakdown voltage shall be the same as the specified ambient life test temperature (see table IV herein).

4.5.3  **Reference voltage.** The reference voltage test shall be performed in accordance with test method 4022 of MIL-STD-750. The test current shall be applied until thermal equilibrium is attained (15 seconds minimum) prior to reading the reference voltage. For this test, the diode shall be suspended by its leads with mounting clips whose inside edge is located between .375 inch (9.53 mm) and .500 inch (12.70 mm) inch from the body and the mounting clips shall be maintained at the specified temperature. This measurement may be performed after a shorter time following application of the test current than that which provides thermal equilibrium if correlation to stabilized readings can be established to the satisfaction of the Government.
TABLE I. Group A inspection.

<table>
<thead>
<tr>
<th>Inspection 1/</th>
<th>MIL-STD-750 Method</th>
<th>Conditions</th>
<th>Symbol</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgroup 1</td>
<td>Visual and mechanical examination</td>
<td>2071</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subgroup 2</td>
<td>Reference voltage</td>
<td>4022</td>
<td>$I_Z = 7.5 \pm 0.01 \text{ mA dc (see 4.5.3)}$</td>
<td>$V_Z$</td>
<td>8.55</td>
</tr>
<tr>
<td></td>
<td>Small-signal breakdown impedance</td>
<td>4051</td>
<td>$I_Z = 7.5 \pm 0.01 \text{ mA dc, } I_{\text{sig}} = 0.75 \text{ mA ac}$</td>
<td>$Z_Z$</td>
<td>20.0</td>
</tr>
<tr>
<td>Subgroup 3</td>
<td>Voltage-temperature stability</td>
<td>4022</td>
<td>$I_Z = 7.5 \pm 0.01 \text{ mA dc, } T_A \pm 2^\circ\text{C} = -55^\circ\text{C}, 0^\circ\text{C}, +25^\circ\text{C}, +75^\circ\text{C}, +150^\circ\text{C}$ (see 4.5.1)</td>
<td>$\Delta V_Z$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1N935B-1, 1N935BUR-1</td>
<td></td>
<td></td>
<td>184.0</td>
<td>mV dc</td>
</tr>
<tr>
<td></td>
<td>1N937B-1, 1N937BUR-1</td>
<td></td>
<td></td>
<td>37.0</td>
<td>mV dc</td>
</tr>
<tr>
<td></td>
<td>1N938B-1, 1N938BUR-1</td>
<td></td>
<td></td>
<td>19.0</td>
<td>mV dc</td>
</tr>
<tr>
<td></td>
<td>1N939B-1, 1N939BUR-1</td>
<td></td>
<td></td>
<td>9.0</td>
<td>mV dc</td>
</tr>
<tr>
<td></td>
<td>1N940B-1, 1N940BUR-1</td>
<td></td>
<td></td>
<td>3.7</td>
<td>mV dc</td>
</tr>
<tr>
<td>Subgroups 4, 5, and 6</td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subgroup 7</td>
<td>Reverse current leakage</td>
<td>4016</td>
<td>DC method; $V_R = 6.0 \text{ V dc}$</td>
<td>$I_R$</td>
<td>10.0</td>
</tr>
</tbody>
</table>

1/ For sampling plan, see MIL-PRF-19500.
TABLE II. Group D inspection.

<table>
<thead>
<tr>
<th>Inspection Method</th>
<th>MIL-STD-750 Symbol</th>
<th>Pre-irradiation limits 3/</th>
<th>Post-irradiation limits 3/</th>
<th>ΔVz 4/</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
</tr>
</tbody>
</table>

1/ For sampling plan, see MIL-PRF-19500.
2/ Group D qualification may be performed anytime prior to lot formation.
3/ The limits listed are for quality levels JANS and JANTEXV of RHA levels "M", "D", "L", "R", "F", "G", and "H".
4/ Pre-irradiation to post-irradiation change.

Subgroup 1
Not applicable

Subgroup 2
Steady-state total dose irradiation

1019

Iz = 7.5 ±0.01 mA dc, condition A

Reference voltage

4022

Iz = 7.5 ±0.01 mA dc (see 4.5.3)

Vz

8.55

9.45

8.55

9.45

V dc

Small-signal breakdown impedance

4051

Iz = 7.5 ±0.01 mA dc

Zz

20

20

ohms

Reverse current Leakage

4016

DC method, VR = 6.0 V dc

Ir

10.0

10.0

µA dc

Voltage-temperature stability

4022

Iz = 7.5 ±0.01 mA dc, TA = +25°C ±2°C (see 4.5.1)

ΔVz

±4.0

mV

1N935B-1, 1N935BUR-1

±3.5

mV

1N937B-1, 1N937BUR-1

±3.0

mV

1N938B-1, 1N938BUR-1

±2.5

mV

1N939B-1, 1N939BUR-1

±1.5

mV

1N940B-1, 1N940BUR-1
### TABLE III. Group E inspection qualification and requalification (all product assurance levels).

<table>
<thead>
<tr>
<th>Inspection</th>
<th>MIL-STD-750</th>
<th>Sampling plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgroup 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature cycling</td>
<td>Method</td>
<td>Conditions</td>
</tr>
<tr>
<td></td>
<td>1051</td>
<td>500 cycles.</td>
</tr>
<tr>
<td>Electrical measurements</td>
<td></td>
<td>45 devices, c = 0</td>
</tr>
<tr>
<td>Subgroup 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steady-state operation life</td>
<td>Method</td>
<td>Conditions</td>
</tr>
<tr>
<td></td>
<td>1038</td>
<td>Condition B, 1,000 hours (see 4.3.1)</td>
</tr>
<tr>
<td>Electrical measurements</td>
<td></td>
<td>45 devices, c = 0</td>
</tr>
<tr>
<td>Subgroups 4, 5, 6, and 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subgroup 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance to glass cracking</td>
<td>Method</td>
<td>Conditions</td>
</tr>
<tr>
<td></td>
<td>1057</td>
<td>Step stress to destruction by increasing cycles or up to a maximum of 25 cycles.</td>
</tr>
</tbody>
</table>

### TABLE IV. Reference voltage time stability.

<table>
<thead>
<tr>
<th>Inspection</th>
<th>MIL-STD-750</th>
<th>Symbol</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Method</td>
<td>Conditions</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Reference-voltage time stability</td>
<td>4022</td>
<td>$T_a = +100^\circ\text{C} \pm 2^\circ\text{C}$</td>
<td>7</td>
<td>mV dc</td>
</tr>
<tr>
<td>1N935B-1, 1N935BUR-1</td>
<td></td>
<td>$I_Z = 7.5 \pm 0.01 \text{mA dc}$ (see 4.5.2)</td>
<td>7</td>
<td>mV dc</td>
</tr>
<tr>
<td>1N937B-1, 1N937BUR-1</td>
<td></td>
<td>(0 to 340 hours)</td>
<td>6</td>
<td>mV dc</td>
</tr>
<tr>
<td>1N938B-1, 1N938BUR-1</td>
<td></td>
<td>(340 to 1,000 hours)</td>
<td>5</td>
<td>mV dc</td>
</tr>
<tr>
<td>1N939B-1, 1N939BUR-1</td>
<td></td>
<td>(0 to 340 hours)</td>
<td>3</td>
<td>mV dc</td>
</tr>
<tr>
<td>1N940B-1, 1N940BUR-1</td>
<td></td>
<td>(340 to 1,000 hours)</td>
<td>3</td>
<td>mV dc</td>
</tr>
</tbody>
</table>
5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point’s packaging activities within the Military Service or Defense Agency, or within the Military Service’s system commands. Packaging data retrieval is available from the managing Military Department’s or Defense Agency’s automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory. The notes specified in MIL-PRF-19500 are applicable to this specification.)

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Packaging requirements (see 5.1).

c. Lead finish (see 3.4.1).

d. The complete PIN, see 1.5 and 6.4.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DLA Land and Maritime, VQE, P.O. Box 3990, Columbus, OH 43216-3990 or e-mail vqe.chief@dia.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at https://qpldocs.dla.mil.

6.4 PIN construction example. The PINs for encapsulated and unencapsulated devices and are constructed using the following forms.

6.4.1 Non-RHA devices. The PINs for encapsulated devices are constructed using the following form.

JANTXV 1N 940 B UR–1

JAN certification mark and quality level (see 1.5.1)

First number and first letter symbols (see 1.5.2.1)

Second number symbols (see 1.5.2.2)

Suffix symbol for voltage tolerance (see 1.5.3.1)

Suffix symbols for package designator and metallurgical bond (see 1.5.3.2 and 1.5.3.3)
6.4.2 **RHA devices.** The PINs for RHA devices are constructed using the following form.

```
JAN certification mark and quality level (see 1.5.1.2)  JANS  M  1N  940  B  -1
RHA level designator (see 1.5.5)  
First number and first letter symbols (see 1.5.2.1)  
Second number symbols (see 1.5.2.2)  
Suffix symbol for voltage tolerance (see 1.5.3.1)  
Suffix symbols for package designator and metallurgical bond (see 1.5.3.2 and 1.5.3.3)
```

6.5 **List of PINs.**

6.5.1 **Non-RHA devices.** The following is a list of possible PINs available for non-RHA devices covered by this specification sheet.

- **PINs for devices in a axial package**
  - JAN1N935B-1
  - JAN1N937B-1
  - JAN1N938B-1
  - JAN1N939B-1
  - JAN1N940B-1

- **PINs for devices in a UR package**
  - JAN1N935BUR-1
  - JAN1N937BUR-1
  - JAN1N938BUR-1
  - JAN1N939BUR-1
  - JAN1N940BUR-1

6.5.2 **RHA devices.** The following is a list of possible PINs available for RHA devices covered by this specification sheet.

- **PINs for devices in axial and UR packages (1)**
  - JANTXV#1N935B-1
  - JANTXV#1N937B-1
  - JANTXV#1N938B-1
  - JANTXV#1N939B-1
  - JANTXV#1N940B-1

(1) The number sign (#) represents one of seven RHA designators available on this specification sheet ("M", "D", "L", "R", "F", "G", or "H").
6.6 Substitution information.

6.6.1 Substitution of radiation hardened devices. See MIL-PRF-19500.

6.6.2 Substitutability of dash one (-1) devices. The non-dash-one devices that were in previous revisions of this document have been deleted from this specification as of MIL-PRF-19500/156K, dated 20 July 1999. The dash-one (-1) devices are a direct substitute for non dash-one devices and are preferred. The following table shows the direct substitutability.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1N935B-1</td>
<td>1N935B</td>
</tr>
<tr>
<td>1N937B-1</td>
<td>1N937B</td>
</tr>
<tr>
<td>1N938B-1</td>
<td>1N938B</td>
</tr>
<tr>
<td>1N939B-1</td>
<td>1N939B</td>
</tr>
<tr>
<td>1N940B-1</td>
<td>1N940B</td>
</tr>
</tbody>
</table>

6.6.3 Substitution of $\Delta V_Z$ device types. The device types within this series with higher type numbers (lower $\Delta V_Z$) are a direct one-way substitution for lower type numbers (higher $\Delta V_Z$).

6.7 Request for new types and configurations. Requests for new device types or configurations for inclusions in this specification sheet should be submitted to: DLA Land and Maritime, ATTN: VAC, Post Office Box 3990, Columbus, OH 43218-3990 or by electronic mail at Semiconductor@dla.mil or by facsimile (614) 693–1642 or DSN 850–6939.

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

Custodians: Preparing activity:
Army - CR DLA - CC
Navy - EC (Project 5961-2019-001)
Air Force - 85
NASA - NA
DLA - CC

Review activities:
Army - AR, MI, SM
Navy - AS, MC
Air Force - 19

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.