

The documentation and process conversion measures necessary to comply with this revision shall be completed by 2 February 1999

INCH-POUND

MIL-PRF-19500/575B
 2 November 1998
 SUPERSEDING
 MIL-S-19500/575A
 30 September 1993

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, HIGH VOLTAGE POWER RECTIFIER,
 FAST RECOVERY, TYPES 1N6512 THROUGH 1N6519, 1N6512US THROUGH 1N6519US
 JAN, JANTX, JANTXV, AND JANS

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

1. SCOPE

1.1 Scope. This specification covers the performance requirements for silicon, high voltage, fast recovery power rectifier diodes. Four levels of product assurance are provided for each device as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figures 1 and 2.

1.3 Maximum ratings.

| Types | V _{RWM} | I _{FSM} t _p = 8.3 ms | I _O | | t _{rr} | T _{STG} | T _J | R _{θJL} L = .25 | R _{θJT} 3/ |
|------------------|------------------|--|------------------------------|-------------------------------|-----------------|------------------|----------------|-----------------------------|------------------------|
| | | | T _A = +55°C 1/ | T _A = +100°C 2/ | | | | | |
| | V _{dc} | A (pk) | A _{dc} | A _{dc} | ns | °C | °C | °C/W | °C/W |
| 1N6512, 1N6512US | 1,500 | 100 | 1.5 | 1.0 | 70 | -65 to +200 | -65 to +175 | 12 | 4 |
| 1N6513, 1N6513US | 2,000 | 100 | 1.5 | 1.0 | 70 | -65 to +200 | -65 to +175 | 12 | 4 |
| 1N6514, 1N6514US | 2,500 | 60 | 1.0 | 0.65 | 70 | -65 to +200 | -65 to +175 | 12 | 4 |
| 1N6515, 1N6515US | 3,000 | 60 | 1.0 | 0.65 | 70 | -65 to +200 | -65 to +175 | 12 | 4 |
| 1N6516, 1N6516US | 4,000 | 40 | 0.75 | 0.5 | 70 | -65 to +200 | -65 to +175 | 12 | 5 |
| 1N6517, 1N6517US | 5,000 | 40 | 0.75 | 0.5 | 70 | -65 to +200 | -65 to +175 | 12 | 5 |
| 1N6518, 1N6518US | 7,500 | 25 | 0.5 | 0.35 | 70 | -65 to +200 | -65 to +175 | 12 | 5 |
| 1N6519, 1N6519US | 10,000 | 25 | 0.5 | 0.35 | 70 | -65 to +200 | -65 to +175 | 12 | 5 |

1/ Derate linearly for +55°C ≤ T_A ≤ +100°C. I_O at T_A = +55°C to I_O at T_A = +100°C.

2/ Derate linearly for +100°C ≤ T_A ≤ +175°C. I_O at T_A = +100°C to I_O at T_A = +0°C.

3/ R_{θJT} is junction to tab thermal impedance with "US" suffix identification, i.e., 1N6512US. Surface mount types, see figure 2.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

1.4 Primary electrical characteristics.

| Types | V _{RWM} | I _O T _A = +55°C | I _{R1} T _A = +25°C | V _{F1} at I _O | C at V _R = 50 V F _O = 1 kHz | Barometric pressure (reduced) t = 1 minute (minimum) |
|------------------|------------------|--|---|---|---|---|
| | <u>V dc</u> | <u>A dc</u> | <u>μA dc</u> | <u>V (pk)</u> | <u>pF</u> | <u>mmHg</u> |
| 1N6512, 1N6512US | 1,500 | 1.5 | 1.0 | 3.5 | 25 | 8 |
| 1N6513, 1N6513US | 2,000 | 1.5 | 1.0 | 3.5 | 25 | 8 |
| 1N6514, 1N6514US | 2,500 | 1.0 | 1.0 | 6.0 | 20 | 8 |
| 1N6515, 1N6515US | 3,000 | 1.0 | 1.0 | 6.0 | 20 | 8 |
| 1N6516, 1N6516US | 4,000 | 0.75 | 1.0 | 8.0 | 16 | 8 |
| 1N6517, 1N6517US | 5,000 | 0.75 | 1.0 | 8.0 | 16 | 8 |
| 1N6518, 1N6518US | 7,500 | 0.5 | 1.0 | 13.0 | 8 | 8 |
| 1N6519, 1N6519US | 10,000 | 0.5 | 1.0 | 13.0 | 8 | 8 |

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 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-19500 - Semiconductor Devices, General Specification for.

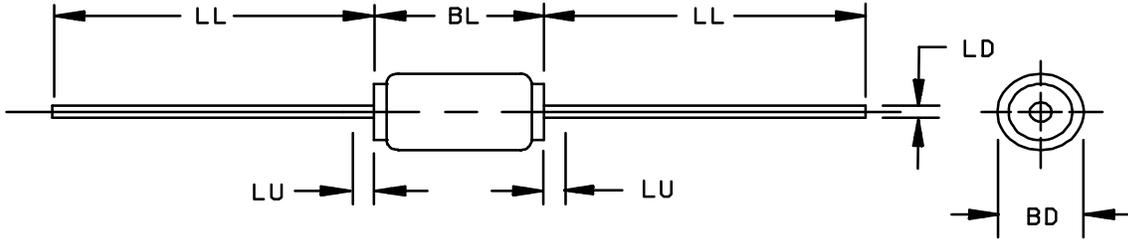
STANDARD

MILITARY

MIL-STD-750 - Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

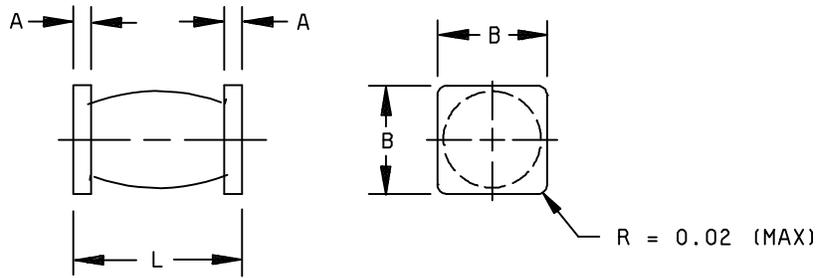


| PIN | Dimensions | | | | | | | | | | | | | | | |
|--------|------------|------|-------------|------|--------|-----|-------------|------|--------|------|-------------|------|--------|------|-------------|------|
| | BL | | | | LL | | | | LD | | | | BD | | | |
| | Inches | | Millimeters | | Inches | | Millimeters | | Inches | | Millimeters | | Inches | | Millimeters | |
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| 1N6512 | 0.25 | 0.31 | 6.35 | 7.87 | 1.0 | 1.3 | 25.4 | 33.0 | .037 | .043 | 0.94 | 1.09 | .155 | .215 | 3.94 | 5.46 |
| 1N6513 | 0.25 | 0.31 | 6.35 | 7.87 | " | " | " | " | " | " | " | " | " | " | " | " |
| 1N6514 | 0.27 | 0.33 | 6.86 | 8.38 | " | " | " | " | " | " | " | " | " | " | " | " |
| 1N6515 | 0.27 | 0.33 | 6.86 | 8.38 | " | " | " | " | " | " | " | " | " | " | " | " |
| 1N6516 | 0.29 | 0.35 | 7.37 | 8.9 | " | " | " | " | " | " | " | " | " | " | " | " |
| 1N6517 | 0.29 | 0.35 | 7.37 | 8.9 | " | " | " | " | " | " | " | " | " | " | " | " |
| 1N6518 | 0.34 | 0.40 | 8.64 | 10.2 | " | " | " | " | " | " | " | " | " | " | " | " |
| 1N6519 | 0.34 | 0.40 | 8.64 | 10.2 | " | " | " | " | " | " | " | " | " | " | " | " |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The specified lead diameter applies in the zone between 0.05 inch (1.27 mm) from the body to the end of the lead. Outside of this zone lead shall not exceed the body diameter.
4. Dimension LU defines region of uncontrolled diameter 0.050 inches max (1.27 mm).

FIGURE 1. Physical dimensions (for non-US suffix devices only).



| PIN | Dimensions | | | | | | | | | | | |
|----------|------------|-------|-------------|------|--------|------|-------------|------|--------|------|-------------|------|
| | L | | | | A | | | | B | | | |
| | Inches | | Millimeters | | Inches | | Millimeters | | Inches | | Millimeters | |
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| 1N6512US | 0.225 | 0.245 | 5.72 | 6.22 | .026 | .036 | 0.66 | 0.91 | .170 | .180 | 4.32 | 4.57 |
| 1N6513US | 0.225 | 0.245 | 5.72 | 6.22 | " | " | " | " | " | " | " | " |
| 1N6514US | 0.245 | 0.265 | 6.22 | 6.73 | " | " | " | " | " | " | " | " |
| 1N6515US | 0.245 | 0.265 | 6.22 | 6.73 | " | " | " | " | " | " | " | " |
| 1N6516US | 0.265 | 0.285 | 6.73 | 7.24 | " | " | " | " | " | " | " | " |
| 1N6517US | 0.265 | 0.285 | 6.73 | 7.24 | " | " | " | " | " | " | " | " |
| 1N6518US | 0.325 | 0.345 | 8.26 | 8.76 | " | " | " | " | " | " | " | " |
| 1N6519US | 0.325 | 0.345 | 8.26 | 8.76 | " | " | " | " | " | " | " | " |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Dimensions are pre-solder dip.

FIGURE 2. Physical dimensions (surface mount devices).

3. REQUIREMENTS

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

3.2 Associated specification. The individual item performance requirements shall be in accordance with MIL-PRF-19500, and as specified herein.

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

3.4 Interface requirements and physical dimensions. The interface requirements and physical dimensions for the purpose of interchangeability shall be as specified on figures 1 and 2 herein. Plastic packages are prohibited. The US Government's preferred system of measurement is the metric SI system. However, since this item was originally designed using inch-pound units of measurement, in the event of conflict between the metric and inch-pound units, the inch-pound units shall take precedence.

3.4.1 Lead material and finish. Lead material shall be type C, 99.9 percent silver or copper in accordance with MIL-STD-1276. Lead finish shall be in accordance with MIL-PRF-19500 and MIL-STD-750. 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 in a manner and using materials which enable the diodes to meet the applicable requirements of MIL-PRF-19500 and this document.

3.4.2.1 Surface mount. The surface mount (US) version shall be considered structurally identical to the non surface mount version except for lead attach.

3.5 Marking. Devices shall be marked as specified in MIL-PRF-19500.

3.5.1 Marking for surface mount (US) devices. Surface mount (US) suffix parts are to be marked with the polarity identification. Initial container package marking will be in accordance with MIL-PRF-19500.

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.

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).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500.

4.3 Screening (JAN, JANTX, JANTXV, and JANS levels only). Screening shall be in accordance with of MIL-PRF-19500 (appendix E, table IV), and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

| Screen (see appendix E, table IV of MIL-PRF-19500) | Measurement | |
|--|--|--|
| | JANS | JANTX and JANTXV levels |
| 1/ | Surge, see 4.3.2 | Surge, see 4.3.2 |
| 9 | I_{R1} and V_{F1} | Not applicable |
| 11 | I_{R1} and V_{F1} ; ΔI_{R1} and ΔV_{F1} , see table II herein | I_{R1} and V_{F1} |
| 12 | See 4.3.1 | See 4.3.1 |
| 13 | Subgroups 2 and 3 of table I herein: ΔI_{R1} and ΔV_{F1} , see table II herein ; I_{R1} and V_{F1} | Subgroup 2 of table I herein; ΔI_{R1} , ΔV_{F1} see table II herein. I_{R1} and V_{F1} |

1/ Surge screening shall be performed anytime after screen 3 and before screen 10.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: Method 1038, condition B of MIL-STD-750, T_A = room ambient as defined in the general requirements in 4.5 of MIL-STD-750, $V_{RWM} = 1,000$; $f \geq 60$ Hz.

| Types | I_O (A dc) |
|--------------------------------------|--------------|
| 1N6512, 1N6512US 1N6513, 1N6513US | 1.5 |
| 1N6514, 1N6514US 1N6515, 1N6515US | 1.0 |
| 1N6516, 1N6516US 1N6517, 1N6517US | 0.75 |
| 1N6518, 1N6518US 1N6519, 1N6519US | 0.5 |

4.3.2 Surge screening. MIL-STD-750, method 4066; $T_A = +25^\circ\text{C}$, $V_{RWM} = 0$. Six surges. Apply $20 \times I_O$ rated at $T_A = 55^\circ\text{C}$, 8.3 ms.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500 appendix E, table V, and table I herein

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, tables Via (JANS) and Vlb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table II herein.

4.4.2.1 Group B inspection, appendix E, table VIa (JANS) of MIL-PRF-19500.

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|--|
| B3 | 4066 | I_O at $T_A = 55^\circ\text{C}$, $I_{FSM} = \text{rated } I_{FSM}$, see 1.3, one surge, 8.3 ms, $V_{RWM} = 0 \text{ V}$. |
| B4 | 1037 | See 4.3.1, $t_{on} = t_{off} = 3$ minutes minimum, 2,000 cycles. |
| B5 | 1027 | $T_A = +150^\circ\text{C}$ minimum, $I_O = \text{rated } I_O$ (see 1.3) or adjust I_O and T_A as required to achieve $T_J = +275^\circ\text{C}$ for a minimum of 96 hours at $V_{RWM} = 1,000 \text{ V}$. |
| B6 | 4081 | $T_A = +25^\circ\text{C}$; $R_{\theta JL} = \text{rated } R_{\theta JL}$ (see 1.3); $R_{\theta JT} = \text{rated } R_{\theta JT}$ (see 1.3). |

4.4.2.2 Group B inspection, appendix E table VIb (JAN, JANTX, and JANTXV of MIL-PRF-19500).

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|---|
| B2 | 4066 | $I_O = I_O$ at $T_A = 55^\circ\text{C}$ one surge, 8.3 ms; $I_{FSM} = \text{rated } I_{FSM}$ (see 1.3), $V_{RWM} = 0 \text{ V}$. |
| B4 | 1027 | $T_A = \text{room ambient}$ as defined in the general requirements in 4.5 of MIL-STD-750 minimum, $I_O = \text{rated } I_O$ (see 4.3.1); adjust I_O or T_A as required to achieve $T_J \geq +125^\circ\text{C}$, $V_{RWM} = 1,000 \text{ V}$. |
| B5 | 4081 | $T_A = +25^\circ\text{C}$; $R_{\theta JL} = \text{rated } R_{\theta JL}$ (see 1.3); $R_{\theta JT} = \text{rated } R_{\theta JT}$ (see 1.3). |

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 VII of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table II herein.

4.4.3.1 Group C inspection, appendix E, table VII of MIL-PRF-19500.

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|---|
| C2 | 2036 | Test condition A, weight = 20 lbs, $t = 30\text{s}$. |
| C5 | 1001 | $V_R = \text{rated } V_R$ (see 1.3), pressure = 8 mmHg, $t = 1$ minute (minimum), sampling plan = 22 devices, $c = 0$. |
| C6 | 1027 | $T_A = +25^\circ\text{C}$ minimum, $I_O = \text{rated } I_O$ (see 4.3.1) $I_O = \text{rated } I_O$; adjust I_O or T_A as required to achieve $T_J \geq +125^\circ\text{C}$, $V_{RWM} = 1,000 \text{ V}$. |

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

4.5.1 Pulse measurements. Conditions for pulse measurement shall be as specified in section 4 of MIL-STD-750.

4.5.2 Inspection of conditions. Unless otherwise specified, all inspections shall be conducted at an ambient $T_A = +25^\circ\text{C} \pm 3^\circ\text{C}$.

4.5.3 Reverse-recovery time. The reverse recovery time shall be measured in the circuit on figure 3 or an equivalent circuit. The recovery conditions shall be 0.5 A forward current to 1.0 A reverse current. The reverse recovery time is defined as the time the rectifier begins to conduct in the reverse direction (crosses $I = \text{zero}$) until the reverse current decays to -0.25 A. The point of contact on the leads shall be no less than .375 inch (9.52 mm) from the diode body for leaded devices. Point of contact shall be the mounting surface for surface mounted devices with "U" suffixes.

TABLE I. Group A inspection.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|--------------------------------------|-------------|--|--------------|-----------------|------|------------------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 1</u> | | | | | | |
| Visual and mechanical inspection | 2071 | | | | | |
| <u>Subgroup 2</u> | | | | | | |
| Forward voltage | 4011 | | V_{F1} | | | |
| 1N6512, 1N6512US 1N6513, 1N6513US | | $I_F = 1.5 \text{ A}$ | | | 3.5 | V dc |
| 1N6514, 1N6514US 1N6515, 1N6515US | | $I_F = 1.0 \text{ A}$ | | | 6.0 | V dc |
| 1N6516, 1N6516US 1N6515, 1N6515US | | $I_F = 0.75 \text{ A}$ | | | 8.0 | V dc |
| 1N6518, 1N6518US 1N6519, 1N6519US | | $I_F = 0.5 \text{ A}$ | | | 13.0 | V dc |
| Reverse current leakage | 4016 | DC method; $V_R = \text{rated } V_R$ (see 1.3) | I_{R1} | | 1.0 | $\mu\text{A dc}$ |
| Breakdown voltage | 4021 | $I_R = 50 \mu\text{A}$ | $V_{(BR)R1}$ | | | |
| 1N6512, 1N6512US 1N6513, 1N6513US | | | | 1,650 2,200 | | V dc |
| 1N6514, 1N6514US 1N6515, 1N6515US | | | | 2,750 3,300 | | V dc |
| 1N6516, 1N6516US 1N6517, 1N6517US | | | | 4,400 5,500 | | V dc |
| 1N6518, 1N6518US 1N6519, 1N6519US | | | | 8,250 11,000 | | V dc |
| <u>Subgroup 3</u> | | | | | | |
| High temperature operation: | | $T_A = +150^\circ\text{C}$ | | | | |
| Reverse current leakage | 4016 | DC method; $V_R = \text{rated } V_R$ (see 1.3) | I_{R2} | | 500 | $\mu\text{A dc}$ |

See footnote at end of table.

TABLE I. Group A inspection - Continued.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|--|-------------|--|--------------|--------|---|------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 3 - Continued</u> | | | | | | |
| Low temperature operation: | | $T_A = -55^\circ\text{C}$ | | | | |
| Forward voltage | 4011 | | V_{F2} | | | |
| 1N6512, 1N6512US 1N6513, 1N6513US | | $I_F = 1.5 \text{ A}$ | | | 5.6 | V dc |
| 1N6514, 1N6514US 1N6515, 1N6515US | | $I_F = 1.0 \text{ A}$ | | | 9.6 | V dc |
| 1N6516, 1N6516US 1N6517, 1N6517US | | $I_F = 0.75 \text{ A}$ | | | 12.8 | V dc |
| 1N6518, 1N6518US 1N6519, 1N6519US | | $I_F = 0.5 \text{ A}$ | | | 20.8 | V dc |
| Breakdown voltage | 4021 | $I_R = 50 \mu\text{A}$ | $V_{(BR)R2}$ | | | V dc |
| 1N6512, 1N6512US 1N6513, 1N6513US 1N6514, 1N6514US 1N6515, 1N6515US 1N6516, 1N6516US 1N6517, 1N6517US 1N6518, 1N6518US 1N6519, 1N6519US | | | | | 1,500 2,000 2,500 3,000 4,000 5,000 7,500 10,000 | |
| <u>Subgroup 4</u> | | | | | | |
| Reverse recovery time | | See 4.5.3 and figure 3 | t_{rr} | | 70 | ns |
| Capacitance | 4001 | $V_R = 50 \text{ V dc}; 1 \text{ kHz} \leq f \leq 100 \text{ kHz}$ | C | | | |
| 1N6512, 1N6512US 1N6513, 1N6513US | | | | | 25 | pF |
| 1N6514, 1N6514US 1N6515, 1N6515US | | | | | 20 | pF |
| 1N6516, 1N6516US 1N6517, 1N6517US | | | | | 16 | pF |
| 1N6518, 1N6518US 1N6519, 1N6519US | | | | | 8 | pF |
| <u>Subgroups 5, 6, and 7</u> | | | | | | |
| Not applicable | | | | | | |

1/ For sampling plan, see MIL-PRF-19500.

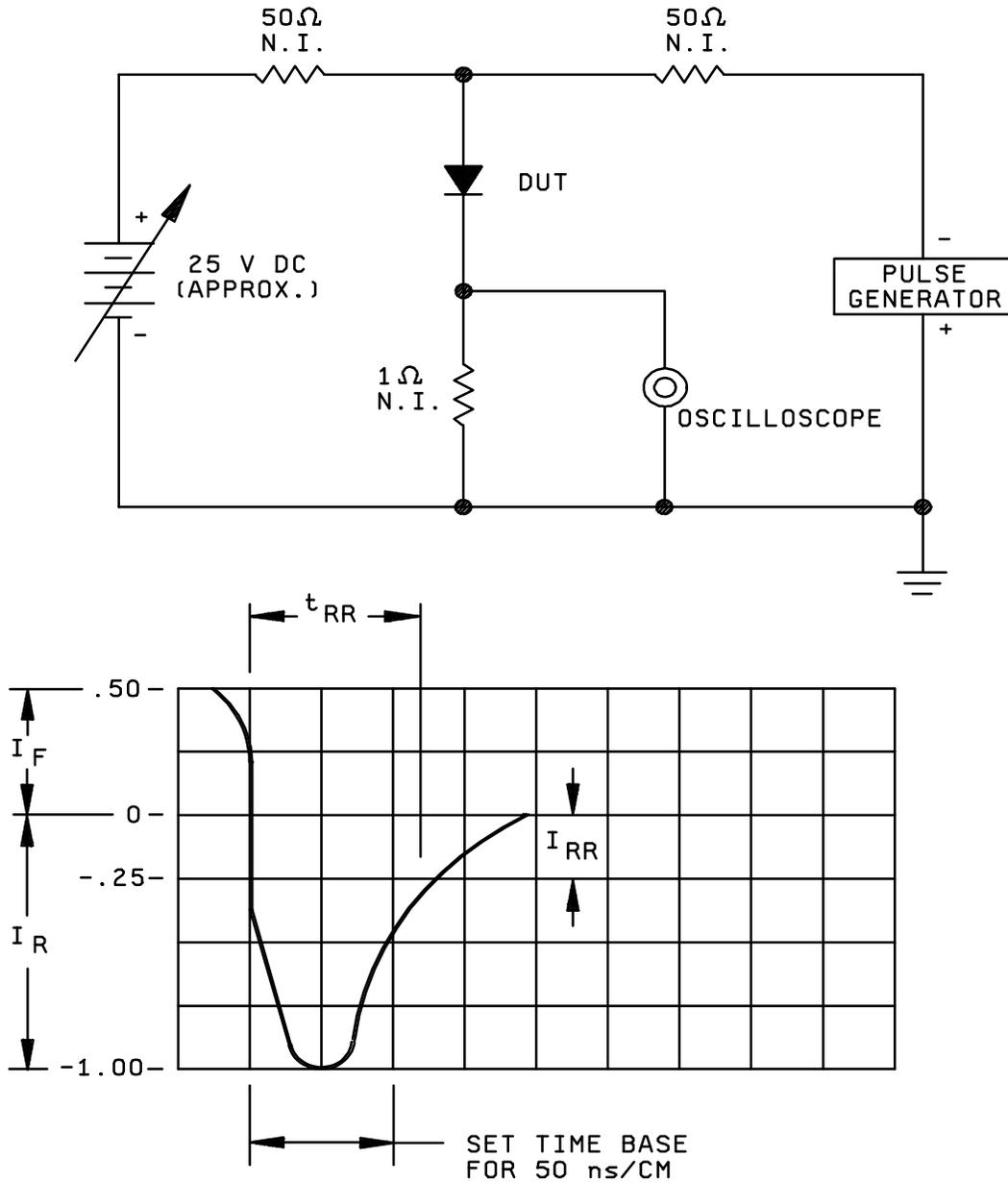
TABLE II. Groups B and C electrical measurements. 1/ 2/ 3/

| Step | Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|------|--------------------------------------|-------------|--|-----------------|-----------|---|------------------|
| | | Method | Conditions | | Min | Max | |
| 1. | Forward voltage | 4011 | Pulsed (see 4.5.1) | V_{F1} | | | |
| | 1N6512, 1N6512US 1N6513, 1N6513US | | $I_F = 1.5 \text{ A}$ | | | 3.5 | V (pk) |
| | 1N6514, 1N6514US 1N6515, 1N6515US | | $I_F = 1.0 \text{ A}$ | | | 6.0 | V (pk) |
| | 1N6516, 1N6516US 1N6517, 1N6517US | | $I_F = 0.75 \text{ A}$ | | | 8.0 | V (pk) |
| | 1N6518, 1N6518US 1N6519, 1N6519US | | $I_F = 0.5 \text{ A}$ | | 13.0 | V (pk) | |
| 2. | Reverse current | 4016 | DC method, $V_R = \text{rated } V_R$ (see 1.3) | I_{R1} | | 1.0 | $\mu\text{A dc}$ |
| 3. | Reverse recovery time | | See 4.5.3 and figure 3 | t_{rr} | | 70 | ns |
| 4. | Capacitance | 4001 | $V_R = 50 \text{ V dc}$, $1 \text{ kHz} \leq f \leq 100 \text{ kHz}$ | C | | | |
| | 1N6512, 1N6512US 1N6513, 1N6513US | | | | | 25 | pF |
| | 1N6514, 1N6514US 1N6515, 1N6515US | | | | | 20 | pF |
| | 1N6516, 1N6516US 1N6517, 1N6517US | | | | | 16 | pF |
| | 1N6518, 1N6518US 1N6519, 1N6519US | | 8 | pF | | | |
| 5. | Forward voltage | 4011 | Pulsed (see 4.5.1) | ΔV_{F1} | | | |
| | 1N6512, 1N6512US 1N6513, 1N6513US | | $I_F = 1.5 \text{ A}$ | | | ± 0.2 | V (pk) |
| | 1N6514, 1N6514US 1N6515, 1N6515US | | $I_F = 1.0 \text{ A}$ | | | ± 0.4 | V (pk) |
| | 1N6516, 1N6516US 1N6517, 1N6517US | | $I_F = 0.75 \text{ A}$ | | | ± 0.8 | V (pk) |
| | 1N6518, 1N6518US 1N6519, 1N6519US | | $I_F = 0.5 \text{ A}$ | | ± 1.2 | V (pk) | |
| 6. | Reverse current | 4016 | DC method | ΔI_{R1} | | $\pm 250 \text{ nA dc}$ or 100 percent, whichever is greater. | |

See footnotes at top of next page.

TABLE II. Groups B and C electrical measurements - Continued. 1/ 2/ 3/

- 1/ The electrical measurements for appendix E, table VIa (JANS) of MIL-PRF-19500 are as follows:
- a. Subgroup 3, see table II herein, steps 1, 2, 3, 4, 5, and 6.
 - b. Subgroup 4, see table II herein, steps 1, 2, 3, 4, 5, and 6.
 - c. Subgroup 5, see table II herein, steps 1, 2, 3, 4, 5, and 6.
- 2/ The electrical measurements for appendix E, table VIb (JANTX and JANTXV) of MIL-PRF-19500 are as follows:
- a. Subgroup 2, see table II herein, steps 1, 2, and 3.
 - b. Subgroup 3, see table II herein, steps 1, 2, 3, and 4.
 - c. Subgroup 6, see table II herein, steps 1, 2, 3, and 4.
- 3/ The electrical measurements for appendix E, table VII of MIL-PRF-19500 are as follows:
- a. Subgroup 2, see table II herein, steps 1, 2, 3, 4, 5, and 6 (JANS); and steps 1, 2, and 3 (JANTX and JANTXV).
 - b. Subgroup 3, see table II herein, steps 2 and 3.
 - c. Subgroup 6, see table II herein, steps 1, 2, 3, 4, 5, and 6 (JANS); and steps 1, 2, 3, 4, and 5 (JANTX and JANTXV).



NOTES:

1. Oscilloscope-rise time ≤ 7 ns; input impedance = 1 megohm; 22 pF.
2. Pulse generator - rise time ≤ 10 ns; source impedance 50 ohms.
3. Recovery time shall be measured on the above circuit and with equipment as shown. The pulse generator shall have a pulse repetition frequency of 1 kHz and a pulse width of 200 ns recovery conditions .50 A forward current to 1.00 A reverse current. Recovery time measured when rectifier recovers to .25 A.

FIGURE 3. Reverse recovery time test circuit and characteristic nomograph.

5. PACKAGING

5.1 Packaging. Packaging shall prevent mechanical damage of the devices during shipping and handling and shall not be detrimental to the device. When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

5.2 Marking. Unless otherwise specified (see 6.2), marking shall be in accordance with MIL-PRF-19500.

6. NOTES

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

6.1 Notes. The notes specified in MIL-PRF-19500 are applicable to this specification.

6.2 Acquisition requirements. See MIL- PRF-19500.

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 Products List QPL No.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 purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, DSCC - VQE, 3990 E. Broad Street, Columbus, OH 43216.

6.4 Supersession information. Devices covered by this specification supersedes the manufacturers' and users' Part or Identifying Number (PIN). This information in no way implies that manufacturers' PIN are suitable as a substitute for the military PIN.

| PIN | Manufacturer's CAGE code | Manufacturer's and user's PIN |
|--------|--------------------------|-------------------------------|
| 1N6512 | 36378 | 1008611 |
| | 26916 | 019-006069-001 |
| | 94117 | 194078P1 |
| | | 194078P2 |
| | 14482 | 711773-005 |
| | 60211 | Z15UFG |
| | | RZ110 |
| 1N6513 | 9062 | 86A0095-6 |
| | 26916 | 019-006069-002 |
| | 94117 | 194078P4 |
| | 14482 | 711773-008 |
| | 60211 | RZ192 |
| | | Z20UFG |
| | | RZ112 |
| 1N6514 | 58260 | 13079891 |
| | 26916 | 019-006069-003 |
| | 94117 | 194078P5 |
| | 14482 | 711773-011 |
| | 60211 | Z25FG |
| | | Z25UFG |
| | | RZ113 |

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| PIN | Manufacturer's CAGE code | Manufacturer's and user's PIN |
|--------|---|---|
| 1N6515 | 26916 94117 14482 60211 | 019-006069-004 194078P6 711773-015 Z30UFG Z30FG RZ114 |
| 1N6516 | 23280 9062 26916 94117 64597 14482 60211 | 4-21347 86A00095-1 019-006069-005 194078P7 7117072 711773-017 Z40UFG RZ164 RZ115 Z40FG |
| 1N6517 | 27206 55939 9062 95542 26916 49956 94117 64597 96214 23426 14482 60211 | 10015 7013153 86A0095-4 86A0095-5 941-107 019-006069-006 G333393-1 G339357 194078P8 206823 2881055 28047-1 711773-018 RZ107 RZ172 RZ184 RZ185 Z50UFG Z50FG RZ160 RZ133 RZ116 RZ138 RZ131 |

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| PIN | Manufacturer's CAGE code | Manufacturer's and user's PIN |
|--------|---|---|
| 1N6518 | 28527 26916 91447 14482 60211 | 3131489 019-006069-007 194078P9 711773-020 RZ117 Z60UFG Z60FG |
| 1N6519 | 9062 95542 26916 49956 94117 64572 14482 60211 | 86A0095-2 86A0095-3 941-107 019-006069-008 019-006069-009 G333393-2 G339358 G339855 194078P10 194078P11 10548305 711773-025 RZ163 RZ183 Z80UFG Z100UFG RZ161 RZ135 RZ151 RZ118 RZ119 Z80FG Z100FG |

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