

documentation and process conversion measures necessary to comply with this revision shall be completed by 21 November 1999.

INCH-POUND

MIL-PRF-19500/114F
21 August 1999
SUPERSEDING
MIL-S-19500/114E
26 September 1980

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, VOLTAGE REGULATOR B AND RB TYPES,
1N2804 THROUGH 1N2811, 1N2813, 1N2814, 1N2816, 1N2818 THROUGH
1N2820, 1N2822 THROUGH 1N2827, 1N2829, 1N2831 THROUGH 1N2838, 1N2840 THROUGH 1N2846,
1N4557 THROUGH 1N4562, 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. The specification covers the performance requirements for 50 watt, silicon voltage regulator diodes: B type (standard polarity); RB type (reverse polarity). Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1. (TO-3).

1.3 Maximum ratings. Maximum ratings are as shown in columns 4, 8, and 10 of table III herein and as follows:

$P_T = 50 \text{ W}$ at $T_C \geq +75^\circ\text{C}$, Derate at $0.5 \text{ W}/^\circ\text{C}$ above $T_C \geq +75^\circ\text{C}$.

$-65^\circ\text{C} \leq T_{op} \leq 175^\circ\text{C}$; $-65^\circ\text{C} \leq T_{STG} \leq 200^\circ\text{C}$.

1.4 Primary electrical characteristics. Primary electrical characteristics are as shown in columns 2, 9, 12, and 13 of table III and as follows:

Thermal resistance ($R_{\theta JC}$): $2.0^\circ\text{C}/\text{W}$ maximum.

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 section 3 and 4 of this specification, whether or not they are listed.

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-VAC, 3990 East Broad St., Columbus, OH 43216-5000, by using the addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

2.1.1 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 Defense Automated Printing Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

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

3. REQUIREMENTS

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

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

3.3 Interface requirements and physical dimensions. The Interface requirements and physical dimensions shall be as specified in MIL-PRF-19500 and herein. Current density of internal conductors shall be as specified in MIL-PRF-19500.

3.3.1 Polarity. Standard units (B) shall have the anode connected to the base. The two pins shall be connected internally. Reversed units (RB) shall have the cathode connected to the base.

3.3.2 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 contract or purchase order (see 6.2).

3.3.3 RB types. Reversed (cathode to base) units shall be marked with an "R" preceding the "B" in the type designation and with a contrasting dot on the base plate.

3.4 Marking. Marking shall be in accordance with MIL-PRF-19500.

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

3.6 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

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

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).

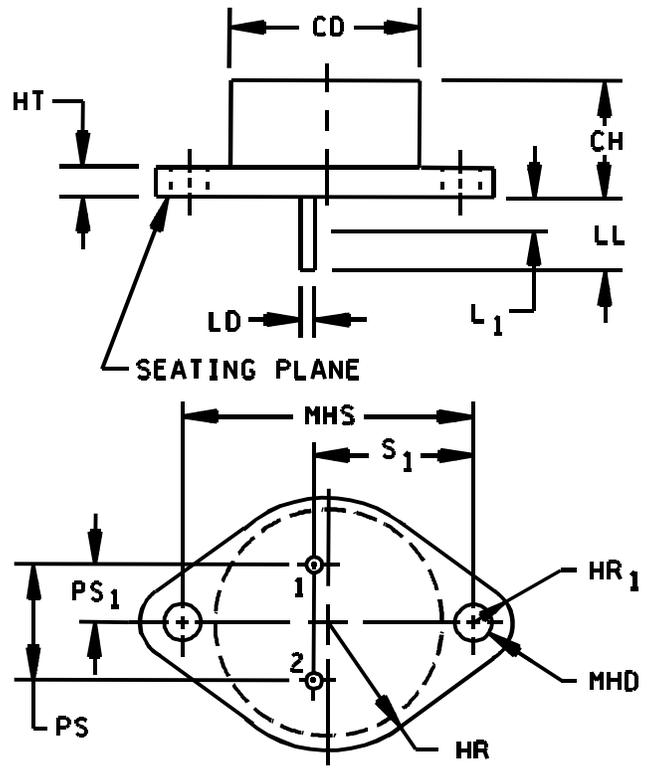


FIGURE 1. Physical dimensions. (Similar to TO-3)

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| Ltr | Dimensions | | | | Notes |
|-----------------|------------|-------|-------------|-------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CH | 0.270 | 0.380 | 6.86 | 9.65 | |
| LD | 0.048 | 0.053 | 0.97 | 1.35 | |
| CD | | 0.875 | | 22.23 | |
| PS | 0.420 | 0.440 | 10.67 | 11.18 | 3 |
| PS ₁ | 0.205 | 0.225 | 5.21 | 5.72 | 3 |
| HT | 0.060 | 0.135 | 1.52 | 3.43 | |
| LL | 0.312 | 0.500 | 7.92 | 12.70 | |
| LL ₁ | | 0.050 | | 1.27 | |
| MHD | 0.151 | 0.165 | 3.84 | 4.09 | |
| MHS | 1.177 | 1.197 | 29.90 | 30.40 | |
| HR | 0.495 | 0.525 | 12.57 | 13.34 | |
| HR ₁ | 0.131 | 0.188 | 3.33 | 4.78 | |
| S ₁ | 0.655 | 0.675 | 16.64 | 17.15 | |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. These dimensions should be measured at points 0.050 inch (1.27 mm) +0.005 inch (0.13 mm) -0.000 inch (0.00 mm) below seating plane.
4. The seating plane of the header shall be flat within 0.001 inch (0.03 mm) concave to 0.004 inch (0.10 mm) convex 0.001 inch (0.03 mm) concave to 0.006 inch (0.15 mm) convex overall.
5. Pins 1 and 2 are internally connected with an internal jumper..
6. Devices with B suffix have the anode internally connected to the case and devices with RB suffix (reverse polarity) have the cathode internally connected to the case.

FIGURE 1. Physical dimensions. (Similar to TO-3) continued.

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

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

4.3 Screening. Screening shall be in accordance with MIL-PRF-19500 (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 table IV of MIL-PRF-19500) | Measurement | |
|--|---|--|
| | JANS level | JANTX and JANTXV levels |
| 9 | I_{R1} and V_Z (for devices with $V_Z(NOM) \geq 10$ Vdc; see column 2 of table III) | Not applicable |
| 11 | I_{R1} and V_Z ; $\Delta I_{R1} = 100$ percent of initial value or $2 \mu A$ dc, whichever is greater; $\Delta V_Z = \pm 1$ percent of initial value (for devices with $V_Z(NOM) \geq 10$ V dc; see column 2 of table III). | I_{R1} and V_Z |
| 12 | See 4.3.1 | See 4.3.1 |
| 13 | Subgroups 2 (except forward voltage test) and 3 of table I herein; $\Delta I_{R1} = 100$ percent of initial value or $2 \mu A$ dc, whichever is greater, $\Delta V_Z = \pm 1$ percent of initial value. | Subgroup 2 (except forward voltage test) of table I herein; $\Delta I_{R1} = 100$ percent of initial value or $2 \mu A$ dc, whichever is greater, $\Delta V_Z = \pm 1$ percent of initial value. |

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

I_Z : Column 14 of table III at a $T_C = 150^\circ C$.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. Group A inspection shall be performed on each subplot.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500, and table I herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VIa (JANS) and table VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and paragraphs 4.4.2.1 and 4.4.2.2 herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

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

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|--|
| B4 | 1037 | I_Z = Column 8 of table III; $T_C = 30 \pm 3^\circ\text{C}$; $t_{on} = t_{off} = 3$ minutes minimum for 2,000 cycles. |
| B5 | 1027 | I_Z = Column 14 of table III for 96 hours; $T_A = 125^\circ\text{C}$ or adjusted, as required, to give an average lot; $T_J = 275^\circ\text{C}$. |
| B6 | 4081 | $R_{\theta JC} = 2.0^\circ\text{C/W}$ maximum $T_C = 30 \pm 3^\circ\text{C}$. For purposes of this test "junction to case" shall be used in lieu of "junction to lead" and $R_{\theta JC}$ shall be used in lieu of $R_{\theta JL}$. The case shall be the reference point for calculation of junction to case thermal resistance ($R_{\theta JC}$). The mounting arrangement shall be with heat sink to case. |

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

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|--|
| B2 | 1051 | I_{ZSM} = column 10 of table III. |
| B3 | 1027 | $T_C = 150^\circ\text{C}$; I_Z = column 14 of table III. |
| B5 | 4081 | $R_{\theta JC} = 2.0^\circ\text{C/W}$ maximum $T_C = 30 \pm 3^\circ\text{C}$ For purposes of this test "junction to case" shall be used in lieu of "junction to lead" and $R_{\theta JC}$ shall be used in lieu of $R_{\theta JL}$. The case shall be the reference point for calculation of junction to case thermal resistance ($R_{\theta JC}$). The mounting arrangement shall be with heat sink to case. |

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500 and as follows. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

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

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> | <u>Max limits</u> | <u>Unit</u> |
|-----------------|---------------|---|------------------------|---------------------|
| C5 | | Not applicable | | |
| C6 | 1026 | $T_C = 150^\circ\text{C}$; I_Z = Column 14 of table III. | | |
| C8 | 4071 | α_{VZ} JAN, JANTX, and JANTXV levels only I_Z = column 5 of table V; $T_1 = 30 \pm 3^\circ\text{C}$, $T_2 = T_1 + 100^\circ\text{C}$ each subplot. $n = 22$, $c = 0$ | Column 13 of table III | $\%/^\circ\text{C}$ |
| C9 | | Voltage regulation (see 4.5.2), each subplot. $n = 22$, $c = 0$ | Column 9 of table III. | V dc |

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

4.5.1 Surge current I_{ZSM} . The currents specified in column 10 of table III shall be applied in the reverse direction and shall be superimposed on the current (I_Z = column 5 of table III) a total of five surges at 1 minute intervals. Each individual surge shall be a 1/2 square wave pulse of 1/120 second duration or a 1/2 sine wave with the same effective (rms) current.

4.5.2 Voltage regulation $V_{Z(\text{reg})}$. A current at 10 percent of I_Z (column 8 of table III herein) shall be maintained until thermal equilibrium is obtained and the V_Z shall be noted. The current shall then be increased to a level of 50 percent of I_Z (column 8 of table III herein) and maintained at this level until thermal equilibrium is obtained, at which time the voltage change shall not exceed column 9 of table III. During this test, the case temperature (T_C) of the diode shall be equal to $30 \pm 3^\circ\text{C}$.

4.5.3 Regulator voltage. The test current (column 5 of table III) shall be applied until thermal equilibrium is obtained. During this test, the case temperature (T_C) of the diode shall be equal to $30 \pm 3^\circ\text{C}$.

4.5.4 Temperature coefficient of regulator voltage (αV_Z). The device shall be temperature stabilized with current applied prior to reading regulator voltage at the specified case temperatures.

4.5.5 Inspection condition. Unless otherwise specified herein, all inspections shall be made at case temperature (T_C) of $30 \pm 3^\circ\text{C}$

4.5.6 Test ratings. Test ratings shall be as shown in table III. Type numbers with the suffix "RB" shall have identical requirements as shown in table III for the corresponding B type except the polarity shall be as specified in 3.3.1 herein.

4.5.7 Reverse current. The specified reverse voltage shall be applied to pin 1 and pin 2 separately and the reverse current measured at each pin.

TABLE I. Group A inspection.

| Inspection <u>1/</u> | 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 | $I_F = 10 \text{ A dc}$ | V_F | | 1.5 | V dc |
| Reverse current | 4016 | $V_R =$ column 11 of table III; DC method (see 4.5.7) | I_{R1} | | Column 12 of table III | $\mu\text{A dc}$ |
| Regulator voltage | 4022 | $I_Z =$ column 5 of table III | V_Z | Column 3 of table III | Column 4 of table III | V dc |
| <u>Subgroup 3</u> | | | | | | |
| High temperature operation: | | $T_A = 150^\circ\text{C}$ | | | | |
| Reverse current | 4016 | $V_R =$ column 11 of table III; DC method | I_{R2} | | Column 15 of table III | $\mu\text{A dc}$ |
| <u>Subgroup 4</u> | | | | | | |
| Small-signal breakdown impedance | 4051 | $I_Z =$ column 5 of table III; $I_{\text{sig}} = 10$ percent of I_Z | Z_Z | | Column 6 of table III | ohms |
| Knee impedance | 4051 | $I_{ZK} = 5 \text{ mA dc};$ $I_{\text{sig}} = 10$ percent of I_Z | Z_{ZK} | | Column 7 of table III | ohms |
| <u>Subgroup 5</u> | | | | | | |
| Not applicable | | | | | | |
| <u>Subgroup 6</u> | | JANS level only | | | | |
| Surge current (see 4.5.1) | 4066 | $I_{ZSM} =$ Column 10 of table III | | | | |
| End point electrical measurements | | See table I, subgroup 2 herein | | | | |
| <u>Subgroup 7</u> | | | | | | |
| Not applicable | | | | | | |
| <u>Subgroup 8</u> | | JANS level only $n = 22, c = 0$ | | | | |
| Voltage regulation (see 4.5.2) | | | $V_{Z(\text{reg})}$ | | Column 9 of table III | V dc |
| Temperature coefficient of regulator voltage (see 4.5.4) | 4071 | $I_Z =$ column 5 of table III; $T_1 = 30 \pm 3^\circ\text{C}, T_2 = T_1 + 100^\circ\text{C}$ | α_{VZ} | | Column 13 of table III | $\%/^\circ\text{C}$ |

1/ For JANS, all devices required by the specified sampling plan shall be subjected to subgroups 2, 3, and 4 combined.

TABLE II. Groups A, B and C delta electrical measurements. 2/ 3/

| Step | Inspection 4/ | MIL-STD-750 | | Symbol | Limits | | Unit |
|------|-----------------|-------------|-------------------------|-----------------|--------|-----|---|
| | | Method | Conditions | | Min | Max | |
| 1. | Forward voltage | 4011 | $I_F = 10 \text{ A dc}$ | ΔV_F 1/ | | | $\pm 50 \text{ mV dc change from previously measured value.}$ |

1/ Devices which exceed the group A limits for this test shall not be accepted.

2/ The delta electrical measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:

- a. Subgroup 3, see table II herein, step 1.
- b. Subgroup 4, see table II herein, step 1.
- c. Subgroup 5, see table II herein, step 1.

3/ The delta electrical measurements for table VII of MIL-PRF-19500 are as follows:

- a. Subgroup 2, see table II herein, step 1 (JANS).
- b. Subgroup 3, see table II herein, step 1 (JANS).
- c. Subgroup 6, see table II herein, step 1.

TABLE III. Characteristics and ratings.

| Col 1 | Col 2 | Col 3 | Col 4 | Col 5 | Col 6 | Col 7 | Col 8 | Col 9 | Col 10 | Col 11 | Col 12 | Col 13 | Col 14 | Col 15 |
|---------------------------|-----------------------|-----------------------|-----------------------|---|-----------------------------|-----------------------------------|---|--|---|-----------------------------------|---------------------------------------|--|--|--|
| Voltage group (see 4.5.6) | V _Z Nom | V _Z Min | V _Z Max | I _Z Test current T _C = 30°C | Z _Z Impedance | Z _{ZK} Knee impedance | I _Z Max dc current T _C = 30°C | V _Z (reg) Voltage regulation | I _{ZSM} T _C = 30°C | V _R Reverse voltage | I _{R1} Reverse current dc | α _{VZ} Temperature coefficient | I _Z Max dc current T _C = 150°C | I _{R2} Reverse current T _A = 150°C |
| | volts | volts | volts | mA dc | ohms | ohms | mA dc | volts | A dc | volts | μA dc | %/°C | mA dc | μA dc |
| 1N4557B, RB | 3.9 | 3.70 | 4.09 | 3,200 | 0.16 | 400 | 10,000 | 0.66 | 40.0 | 0.5 | 150 | -.050 | 3,200 | 1/ |
| 1N4558B, RB | 4.3 | 4.08 | 4.51 | 2,900 | 0.16 | 500 | 9,000 | 0.58 | 38.0 | 0.5 | 150 | -.035 | 2,950 | |
| 1N4559B, RB | 4.7 | 4.46 | 4.93 | 2,650 | 0.12 | 600 | 8,000 | 0.40 | 35.0 | 1.0 | 100 | ± .015 | 2,650 | |
| 1N4560B, RB | 5.1 | 4.84 | 5.35 | 2,450 | 0.12 | 650 | 7,500 | 0.36 | 32.0 | 1.0 | 20 | .035 | 2,450 | |
| 1N4561B, RB | 5.6 | 5.32 | 5.88 | 2,250 | 0.12 | 900 | 7,000 | 0.34 | 30.0 | 1.0 | 20 | .050 | 2,250 | |
| 1N4562B, RB | 6.2 | 5.89 | 6.51 | 2,000 | 0.14 | 1,000 | 6,500 | 0.36 | 25.0 | 2.0 | 20 | .055 | 2,000 | 1/ |
| 1N2804B, RB | 6.8 | 6.46 | 7.14 | 1,850 | 0.2 | 70 | 7,000 | 0.4 | 37.0 | 4.5 | 150 | .057 | 1,850 | 1,000 |
| 1N2805B, RB | 7.5 | 7.13 | 7.87 | 1,700 | 0.3 | 70 | 6,360 | 0.5 | 33.0 | 5.0 | 100 | .067 | 1,700 | 750 |
| 1N2806B, RB | 8.2 | 7.79 | 8.61 | 1,500 | 0.4 | 70 | 5,800 | 0.6 | 29.0 | 5.4 | 50 | .070 | 1,500 | 500 |
| 1N2807B, RB | 9.1 | 8.65 | 9.55 | 1,370 | 0.5 | 70 | 5,240 | 0.7 | 26.5 | 6.1 | 25 | .075 | 1,370 | 400 |
| 1N2808B, RB | 10 | 9.50 | 10.50 | 1,200 | 0.6 | 80 | 4,760 | 0.9 | 24.0 | 6.7 | 25 | .081 | 1,200 | 300 |
| 1N2809B, RB | 11 | 10.45 | 11.55 | 1,100 | 0.8 | 80 | 4,330 | 1.0 | 21.5 | 8.4 | 10 | .085 | 1,100 | 200 |
| 1N2810B, RB | 12 | 11.40 | 12.60 | 1,000 | 1.0 | 80 | 3,970 | 1.1 | 20.0 | 9.1 | 10 | .079 | 1,000 | 200 |
| 1N2811B, RB | 13 | 12.35 | 13.65 | 960 | 1.1 | 80 | 3,750 | 1.2 | 18.5 | 9.9 | 10 | .080 | 960 | 200 |
| 1N2813B, RB | 15 | 14.25 | 15.75 | 830 | 1.4 | 80 | 3,170 | 1.5 | 15.5 | 11.4 | 10 | .082 | 830 | 200 |
| 1N2814B, RB | 16 | 15.20 | 16.80 | 780 | 1.6 | 80 | 2,970 | 1.6 | 14.75 | 12.2 | 10 | .083 | 780 | 200 |
| 1N2816B, RB | 18 | 17.10 | 18.90 | 700 | 2.0 | 80 | 2,640 | 1.9 | 12.75 | 13.7 | 10 | .085 | 700 | 200 |
| 1N2818B, RB | 20 | 19.00 | 21.00 | 630 | 2.4 | 80 | 2,380 | 2.3 | 11.75 | 15.2 | 10 | .086 | 630 | 200 |
| 1N2819B, RB | 22 | 20.90 | 23.10 | 570 | 2.5 | 80 | 2,160 | 2.5 | 10.5 | 16.7 | 10 | .087 | 570 | 200 |
| 1N2820B, RB | 24 | 22.80 | 25.20 | 520 | 2.6 | 80 | 1,980 | 2.6 | 9.75 | 18.2 | 10 | .088 | 520 | 200 |
| 1N2822B, RB | 27 | 25.65 | 28.35 | 460 | 2.8 | 90 | 1,760 | 2.9 | 8.25 | 20.6 | 10 | .090 | 460 | 200 |
| 1N2823B, RB | 30 | 28.50 | 31.50 | 420 | 3.0 | 90 | 1,590 | 3.0 | 7.75 | 22.8 | 10 | .091 | 420 | 200 |
| 1N2824B, RB | 33 | 31.35 | 34.65 | 380 | 3.2 | 90 | 1,440 | 3.2 | 7.25 | 25.1 | 10 | .092 | 380 | 200 |
| 1N2825B, RB | 36 | 34.20 | 37.80 | 350 | 3.5 | 90 | 1,320 | 3.4 | 6.5 | 27.4 | 10 | .093 | 350 | 200 |
| 1N2826B, RB | 39 | 37.10 | 40.90 | 320 | 4.0 | 90 | 1,220 | 3.6 | 5.88 | 29.7 | 10 | .094 | 320 | 200 |

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See footnotes at end of table.

TABLE III. Characteristics and ratings - Continued.

| Col 1 | Col 2 | Col 3 | Col 4 | Col 5 | Col 6 | Col 7 | Col 8 | Col 9 | Col 10 | Col 11 | Col 12 | Col 13 | Col 14 | Col 15 |
|------------------------------|----------------|----------------|----------------|--------------------------------------|----------------|-----------------|--|---------------------|----------------------|-----------------|--------------------|-------------------------|---|--|
| Voltage group (see 4.5.6) | V _Z | V _Z | V _Z | I _Z | Z _Z | Z _{ZK} | I _Z | V _{Z(reg)} | I _{ZSM} | V _R | I _{R1} | α _{VZ} | I _Z | I _{R2} |
| | Nom | Min | Max | Test current T _C =30°C | Impedance | Knee impedance | Max dc current T _C =30°C | Voltage regulation | T _C =30°C | Reverse voltage | Reverse current dc | Temperature coefficient | Max dc current T _C =150°C | Reverse current T _A =150°C |
| | volts | volts | volts | mA dc | ohms | ohms | mA dc | volts | A dc | volts | A dc | %/°C | mA dc | A dc |
| 1N2827B, RB | 43 | 40.90 | 45.10 | 290 | 4.5 | 90 | 1,110 | 3.8 | 5.38 | 32.7 | 10 | .095 | 290 | 200 |
| 1N2829B, RB | 47 | 44.65 | 49.35 | 270 | 5.0 | 100 | 1,020 | 4.0 | 4.90 | 35.8 | 10 | .095 | 270 | 200 |
| 1N2831B, RB | 51 | 48.45 | 53.55 | 245 | 5.2 | 100 | 930 | 4.4 | 4.63 | 38.8 | 10 | .096 | 245 | 200 |
| 1N2832B, RB | 56 | 53.20 | 58.80 | 220 | 6.0 | 110 | 850 | 4.75 | 4.13 | 42.6 | 10 | .096 | 220 | 200 |
| 1N2833B, RB | 62 | 58.90 | 65.10 | 200 | 7.0 | 120 | 770 | 5.0 | 3.68 | 47.1 | 10 | .097 | 200 | 200 |
| 1N2834B, RB | 68 | 64.60 | 71.40 | 180 | 8 | 140 | 700 | 5.5 | 3.35 | 51.7 | 10 | .097 | 180 | 200 |
| 1N2835B, RB | 75 | 71.25 | 78.75 | 170 | 9 | 150 | 640 | 5.75 | 3.00 | 56.0 | 10 | .098 | 170 | 200 |
| 1N2836B, RB | 82 | 77.90 | 86.10 | 150 | 11 | 160 | 580 | 6.25 | 2.75 | 62.2 | 10 | .098 | 150 | 200 |
| 1N2837B, RB | 91 | 86.45 | 95.55 | 140 | 15 | 180 | 530 | 6.75 | 2.35 | 69.2 | 10 | .099 | 140 | 200 |
| 1N2838B, RB | 100 | 95.0 | 105.0 | 120 | 20 | 200 | 480 | 7.5 | 2.25 | 76.0 | 10 | .100 | 120 | 200 |
| 1N2840B, RB | 110 | 104.5 | 115.5 | 110 | 30 | 220 | 430 | 9.0 | 2.05 | 83.6 | 10 | .100 | 110 | 200 |
| 1N2841B, RB | 120 | 114.0 | 126.0 | 100 | 40 | 240 | 400 | 9.5 | 1.88 | 91.2 | 10 | .100 | 100 | 200 |
| 1N2842B, RB | 130 | 123.5 | 136.5 | 95 | 50 | 275 | 370 | 10.0 | 1.73 | 98.8 | 10 | .100 | 95 | 200 |
| 1N2843B, RB | 150 | 142.5 | 157.5 | 85 | 75 | 400 | 320 | 12.0 | 1.50 | 114.0 | 10 | .100 | 85 | 200 |
| 1N2844B, RB | 160 | 152.0 | 168.0 | 80 | 80 | 450 | 300 | 13.0 | 1.43 | 121.6 | 10 | .100 | 80 | 200 |
| 1N2845B, RB | 180 | 171.0 | 189.0 | 68 | 90 | 525 | 260 | 14.5 | 1.25 | 136.8 | 10 | .100 | 68 | 200 |
| 1N2846B, RB | 200 | 190.0 | 210.0 | 65 | 100 | 600 | 240 | 16.0 | 1.10 | 152.0 | 10 | .100 | 65 | 200 |

1/ This test is not applicable for devices 1N4557B, RB through 1N4562B, RB

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ML-PRF-19500/14F

PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements should be as specified in the contract or order (see 6.2). 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.

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. Acquisition documents must specify the following:

- a. Issue of DODISS to be cited in the solicitation (see 2.2.1).
- b. The lead finish as specified (see 3.3.2).
- c. Type designation and quality assurance level.
- d. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturer's 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 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, Columbus, OH 43216.

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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

Preparing activity:
DLA-CC

(Project 5961-2145)

Review activities:
Army – AR, MR, SM
Navy – AS, CG, MC, SH
Air Force - 13, 19

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

| | | |
|------------------------------|--|----------------------------|
| I RECOMMEND A CHANGE: | 1. DOCUMENT NUMBER MIL-PRF-19500/114F | 2. DOCUMENT DATE 990821 |
| | | |

3. **DOCUMENT TITLE**
SEMICONDUCTOR DEVICE, DIODE, SILICON, VOLTAGE REGULATOR B AND RB TYPES, 1N2804 THROUGH 2811, 1N2813, 1N2814, 1N2816, 1N2818 THROUGH 1N2820, 1N2822 THROUGH 1N2827, 1N2829, 1N2831 THROUGH 1N2838, 1N2840 THROUGH 1N2846, 1N4557 THROUGH 1N4562, JAN, JANTX, JANTXV, AND JANS

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

| | | |
|---------------------------------------|---|-------------------|
| a. NAME (Last, First, Middle initial) | b. ORGANIZATION | |
| c. ADDRESS (Include Zip Code) | d. TELEPHONE (Include Area Code) COMMERCIAL DSN FAX EMAIL | 7. DATE SUBMITTED |

8. PREPARING ACTIVITY

| | |
|---|---|
| a. Point of Contact Alan Barone | b. TELEPHONE Commercial DSN FAX EMAIL 614-692-0510 850-0510 614-692-6939 alan_barone@dsc.c.dla.mil |
| c. ADDRESS Defense Supply Center Columbus, ATTN: DSCC-VAC, 3990 East Broad Street, Columbus, OH 43216-5000 | IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman, Suite 2533, Fort Belvoir, VA 22060-6221 Telephone (703) 767-6888 DSN 427-6888 |