The documentation and process conversion measures necessary to comply with this revision shall be completed by 3 February 1998

INCH-POUND

MIL-PRF-19500/474E
3 November 1997
SUPERSEDING
MIL-S-19500/474D
6 September 1988

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, SILICON, MULTIPLE DIODE ARRAYS,
TYPES 1N5768, 1N5770, 1N5772, 1N5774, 1N6100, 1N6101, 1N6496,
1N6506, 1N6507, 1N6508, 1N6509, 1N6510, AND 1N6511
JAN, JANTX, JANTXV, AND JANS

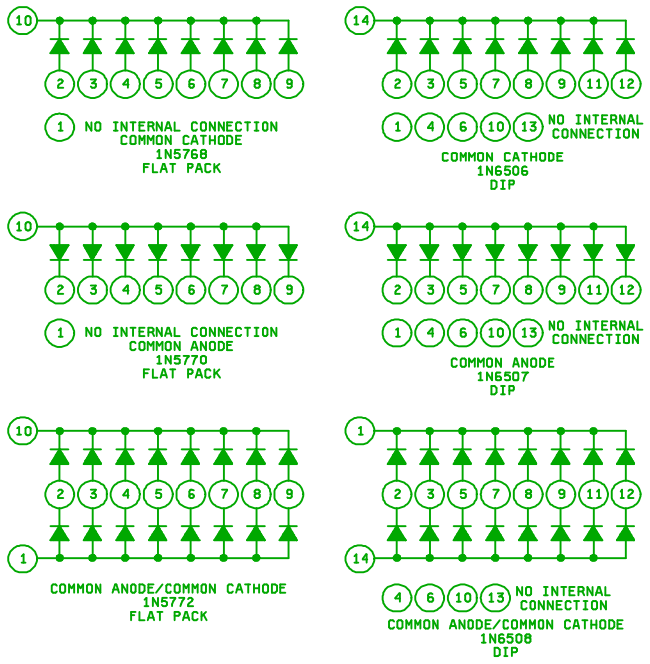
This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

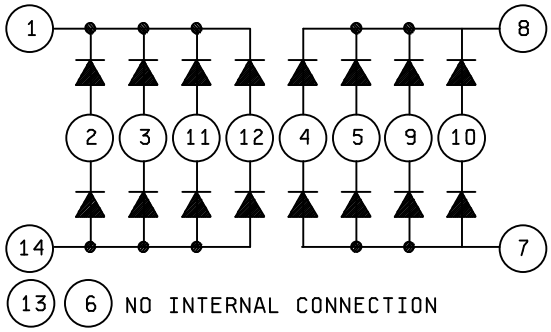
1.1 Scope. This specification covers the performance requirements for silicon, multiple diode arrays. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figures 1, 2, 3, 4, 5, and 6.

1.3 Schematic configurations.

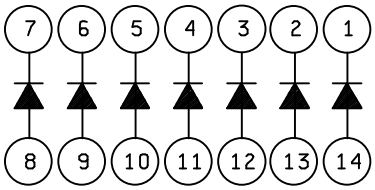



Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement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

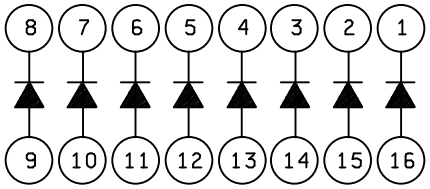



DUAL COMMON ANODE/COMMON CATHODE

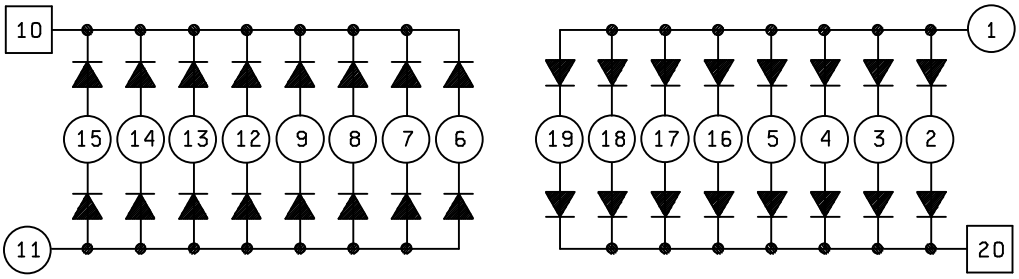
1N5774 FLAT PACK
1N6509 DIP




1N6100 FLAT PACK
1N6511 DIP




1N6106 DIP
1N6510 FLAT PACK




DUAL COMMON ANODE/COMMON CATHODE
1N6496
FLAT PACK

1.4 Maximum ratings.

| Type | $V_{BR(R)}$ 1/ 2/ | $I_0$ 1/ 3/ $T_A$ = +25°C | $I_{FSM}$ 1/ $t_p$ = 1/120 s | $P_T$ 4/ $T_A$ = +25°C | $T_{op}$ | $T_{STG}$ |
|---|---|---|---|---|---|---|
| | V dc | mA dc | mA dc | mW | °C | °C |
| 1N5768 | 60 | 300 | 500 | 500 | -65 to +150 | -65 to +200 |
| 1N5770 | " | " | " | " | " " | " " |
| 1N5772 | " | " | " | " | " " | " " |
| 1N5774 | " | " | " | " | " " | " " |
| 1N6496 | " | " | " | " | " " | " " |
| 1N6506 | " | " | " | 600 | " " | " " |
| 1N6507 | " | " | " | " | " " | " " |
| 1N6508 | " | " | " | " | " " | " " |
| 1N6509 | " | " | " | " | " " | " " |
| 1N6100 | 75 | " | " | 500 | " " | " " |
| 1N6101 | " | " | " | 600 | " " | " " |
| 1N6510 | " | " | " | 500 | " " | " " |
| 1N6511 | " | " | " | 600 | " " | " " |

1/ Each diode.
2/ Pulsed: PW = 100 ms maximum; duty cycle ≤ 20 percent.
3/ Derate at 2.4 mA/°C above +25°C.
4/ Derate at 4.0 mW/°C above +25°C.

1.5 Electrical characteristics, each diode.

| Type | $V_{F1}$ 1/ $I_F$ = 100 mA dc | | $V_{F2}$ 1/ $I_F$ = 500 mA dc | | $I_{R1}$ $V_R$ = 40 V dc | | $C_t$ | | fr $I_F$ = 500 mA dc | | $t_{rr}$ $I_F = I_R$ = 200 mA dc $R_L$ = 100 Ω $i_{rr}$ = 20 mA dc | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V dc | | V dc | | µA dc | | pF | | ns | | ns | |
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| 1N5768 | | 1.0 | | 1.5 | | 0.1 | | 4 | | 40 | | 20 |
| 1N5770 | | " | | " | | " | | 8 | | " | | " |
| 1N5772 | | " | | " | | " | | " | | " | | " |
| 1N5774 | | " | | " | | " | | " | | " | | " |
| 1N6496 | | " | | " | | " | | " | | " | | " |
| 1N6506 | | " | | " | | " | | 4 | | " | | " |
| 1N6507 | | " | | " | | " | | 8 | | " | | " |
| 1N6508 | | " | | " | | " | | " | | " | | " |
| 1N6509 | | " | | " | | " | | " | | " | | " |

| Type | $V_{F1}$ $I_F$ = 100 mA dc | | $I_{R1}$ $V_R$ = 20 V dc | | $C_t$ | | $t_{fr}$ $I_F$ = 100 mA dc | | $t_{rr}$ $I_F = I_R$ = 10 mA dc $R_L$ = 100 Ω $i_{rr}$ = 1 mA dc | |
|---|---|---|---|---|---|---|---|---|---|---|
| | V dc | | nA dc | | pF | | ns | | ns | |
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| 1N6100 | | 1.0 | | 25 | | 4 | | 15 | | 5 |
| 1N6101 | | " | | " | | " | | " | | " |
| 1N6510 | | " | | " | | " | | " | | " |
| 1N6511 | | " | | " | | " | | " | | " |

1/ Pulsed: PW = 300 µs ± 50 µs, duty cycle ≤ 2 percent, 90 µs after leading edge of pulse.

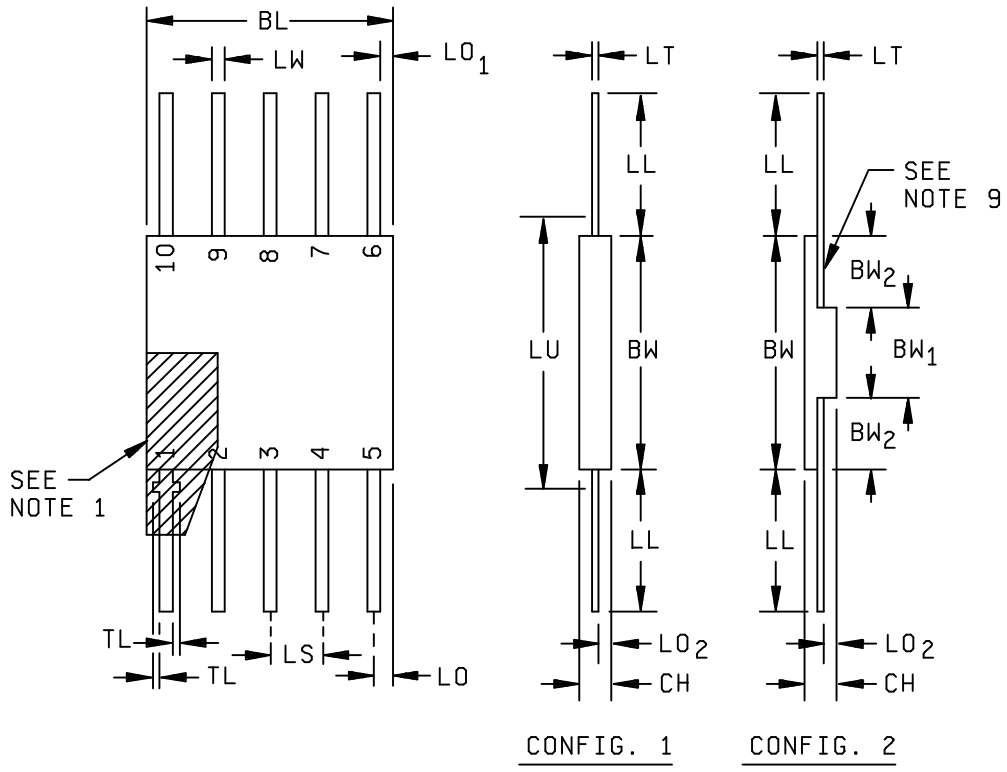


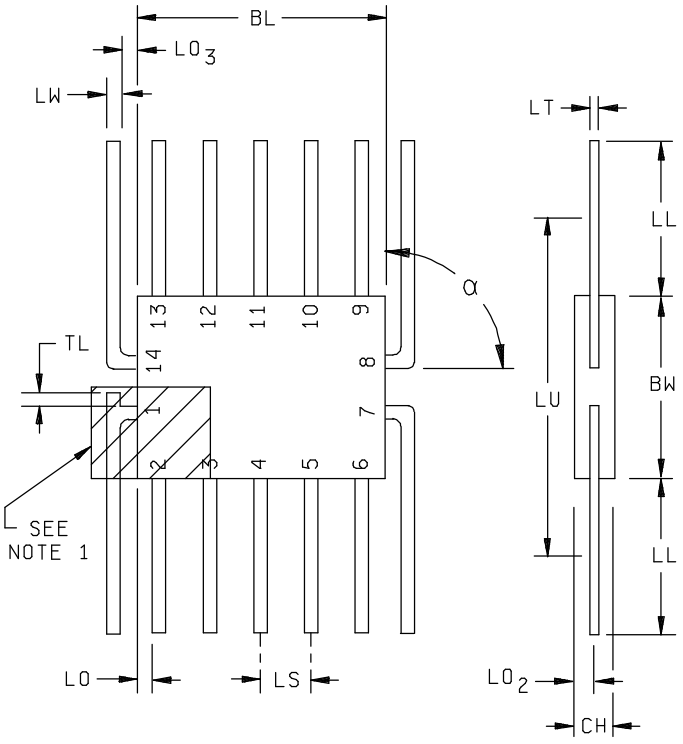

FIGURE 1. Physical dimensions for types 1N5768, 1N5770, and 1N5772.

| Symbol | Inches | | Millimeters | | Notes | Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | | | Min | Max | Min | Max | |
| BL | --- | .290 | --- | 7.37 | 3 | $LO_1$ | .005 | --- | 0.13 | --- | 7, 8 |
| BW | .240 | .260 | 6.10 | 6.60 | | $LO_2$ | .005 | .050 | 0.13 | 1.27 | 2 |
| $BW_1$ | .125 | --- | 3.18 | --- | | LS | .050 BSC | | 1.27 BSC | | 4, 6 |
| $BW_2$ | .030 | --- | 0.76 | --- | | LT | .003 | .006 | 0.08 | 0.15 | 5 |
| CH | .030 | .090 | 0.76 | 2.29 | | LU | --- | .280 | --- | 7.11 | 3 |
| LL | .240 | .370 | 6.10 | 9.40 | | LW | .010 | .019 | 0.25 | 0.48 | 5 |
| LO | --- | .045 | --- | 1.14 | 7 | TL | .008 | .015 | 0.20 | 0.38 | 10 |

NOTES:

1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area shown. The manufacturer's identification shall not be used as a pin 1 identification mark. Alternatively, a tab (dimension TL) may be used to identify pin 1. This tab may be located on either side as shown.
2. Dimensions $LO_2$ shall be measured at the point of exit of the lead from the body. Dimension $LO_2$ shall be .0085 inch (0.216 mm) minimum when lead finish A is solder.
3. These dimensions allow for off-center lid, meniscus, and glass overrun.
4. The basic pin spacing is .050 inch (1.27 mm) between centerlines. Each pin centerline shall be located within ±.005 inch (0.13 mm) of its exact longitudinal position relative to pins 1 and 14.
5. All leads: Increase maximum limit by .003 inch (0.08 mm) measured at the center of the flat, when lead finish is solder.
6. Eight spaces.
7. Applies to all four corners (lead numbers 1, 5, 6, and 10).
8. Dimension LO may be .000 inch (0.00 mm) if lead numbers 1, 5, 6, and 10 bend toward the cavity of the package within one lead's width from the point of entry of the lead into the body. For all bottom-brazed or side-brazed configurations, dimension LO shall be measured from the edge of the furthest extension of the metal pad or lead.
9. Optional configuration. If this configuration is used, no organic or polymeric materials shall be molded to the bottom of the package to cover the leads.
10. Optional, see note 1. If a pin 1 identification mark is used in addition to this tab, the minimum limit of dimension TL does not apply.

FIGURE 1. Physical dimensions for types 1N5768, 1N5770, and 1N5772 - Continued.



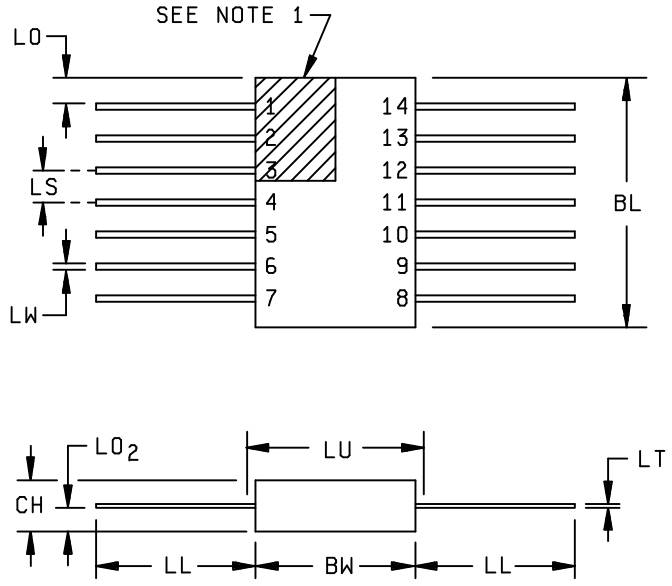

| Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|
| | Min | Max | Min | Max | |
| CH | .030 | .095 | 0.76 | 2.41 | |
| LW | .010 | .019 | 0.25 | 0.48 | 5 |
| LT | .003 | .006 | 0.08 | 0.15 | 5 |
| BL | --- | .280 | --- | 7.11 | 3 |
| BW | .240 | .260 | 6.10 | 6.60 | |
| LU | --- | .280 | --- | 7.11 | 3 |
| LS | .050 BSC | | 1.27 BSC | | 4, 6 |
| TL | .008 | .015 | 0.20 | 0.38 | 9 |
| LL | .250 | .370 | 6.35 | 9.40 | |
| $LO_2$ | .010 | .040 | 0.25 | 1.02 | 2 |
| LO | .005 | --- | 0.13 | --- | 7, 8 |
| $LO_3$ | .004 | --- | 0.10 | --- | 10 |
| α | 30° | 90° | 30° | 90° | 11 |

FIGURE 2. Physical dimensions for types 1N5774 and 1N6100 .

NOTES:

1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area shown. The manufacturer's identification shall not be used as a pin 1 identification mark. Alternatively, a tab (dimensions TL) may be used to identify pin 1. This tab may be located on either side as shown.
2. Dimensions $LO_2$ shall be measured at the point of exit of the lead from the body. Dimension $LO_2$ shall be .0085 inch (0.216 mm) minimum when lead finish A is applied.
3. These dimensions allow for off-center lid, meniscus, and glass overrun.
4. The basic pin spacing is .050 inch (1.27 mm) between centerlines. Each pin centerline shall be located within ±.005 inch (0.13 mm) of its exact longitudinal position relative to pins 1 and 14.
5. All leads: Increase maximum limit by .003 inch (0.08 mm) measured at the center of the flat, when lead finish A is applied.
6. Twelve spaces.
7. Applies to all four corners (lead numbers 2, 6, 9, and 13).
8. Dimensions LO may be .000 inch (0.00 mm) if lead numbers 2, 6, 9, and 13 bend toward the cavity of the package within one lead's width from the point of entry of the lead into the body.
9. Optional, see note 1. If a pin 1 identification mark is used in addition to this tab, the minimum limit of dimension TL does not apply.
10. Applies to lead numbers 1, 7, 8, and 14.
11. Lead configuration is optional within dimension BW except dimensions b and c apply.
12. This package is inactive and shall be replaced with the package on figure 6A.

FIGURE 2. Physical dimensions for types 1N5774 and 1N6100 - Continued.



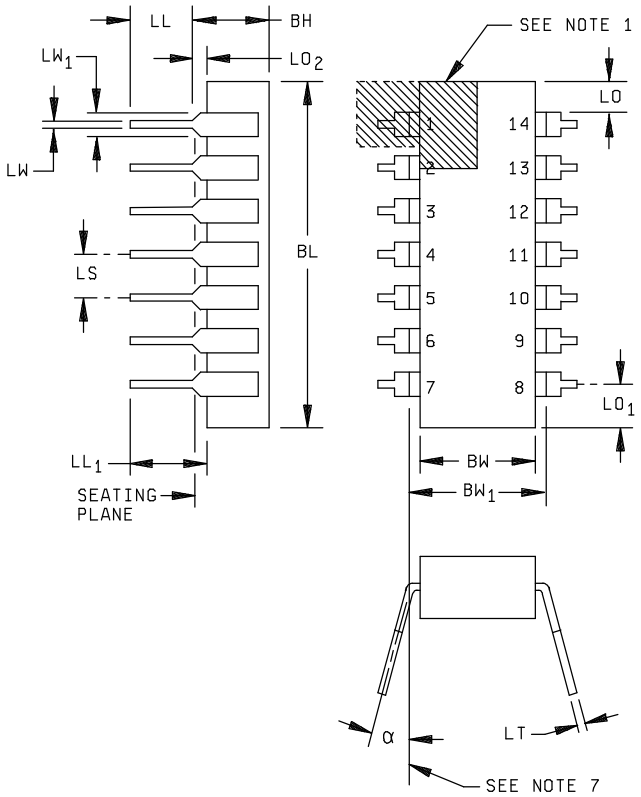

| Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|
| | Min | Max | Min | Max | |
| CH | .045 | 0.85 | 1.14 | 2.16 | |
| LW | .010 | .019 | 0.25 | 0.48 | 5 |
| LT | .003 | .006 | 0.08 | 0.15 | 5 |
| BL | --- | .390 | --- | 9.91 | 3 |
| BW | .235 | .260 | 5.97 | 6.60 | |
| LU | --- | .280 | --- | 7.11 | 3 |
| LS | .050 BSC | | 1.27 BSC | | 4, 6 |
| LL | .250 | .370 | 6.35 | 9.40 | |
| $LO_2$ | .026 | .045 | 0.66 | 1.14 | 2 |
| LO | .005 | --- | 0.13 | --- | 7, 8 |

FIGURE 3. Alternate physical dimensions for types 1N5774 and 1N6100.

NOTES

1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area shown. The manufacturer's identification shall not be used as a pin 1 identification mark.
2. Dimensions $LO_2$ shall be measured at the point of exit of the lead from the body. Dimension $LO_2$ minimum shall be reduced by .0015 inch (0.038 mm) maximum when lead finish is solder.
3. These dimensions allow for off-center lid, meniscus, and glass overrun.
4. The basic pin spacing is .050 inch (1.27 mm) between centerlines. Each pin centerline shall be located within ±.005 inch (0.13 mm) of its exact longitudinal position relative to pins 1 and 14.
5. All leads: Increase maximum limit by .003 inch (0.08 mm) measured at the center of the flat, when lead finish is solder.
6. Twelve spaces.
7. Applies to all four corners.
8. Dimensions LO may be .000 inch (0.00 mm) if lead numbers 1, 7, 8, and 14 bend toward the cavity of the package within one lead's width from the point of entry of the lead into the body.
9. Lead configuration is optional within dimension BW except dimensions LW and LT apply.

FIGURE 3. Alternate physical dimensions for types 1N5774 and 1N6100 - Continued.

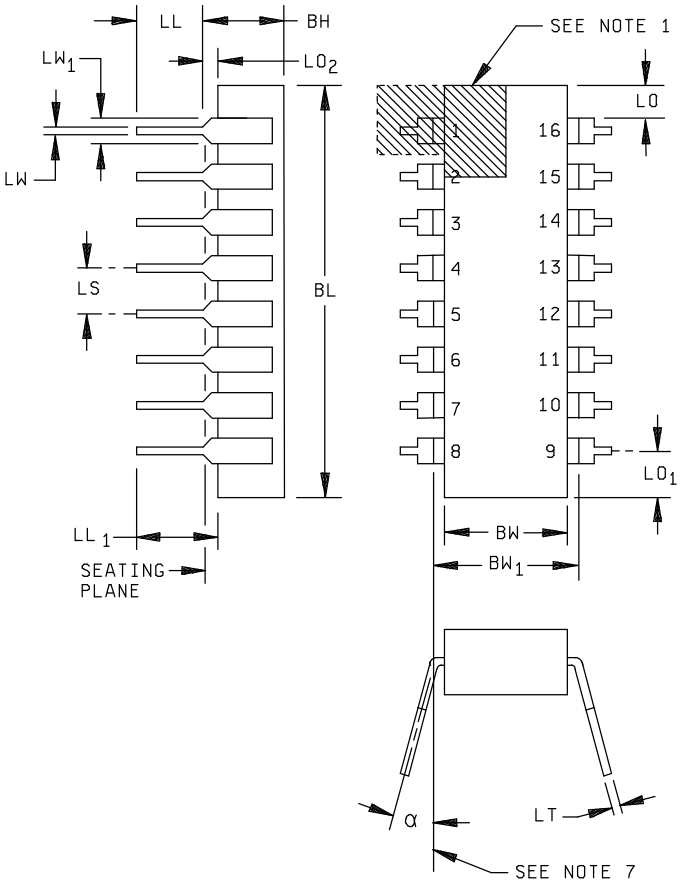



| Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|
| | Min | Max | Min | Max | |
| BH | --- | .200 | --- | 5.08 | |
| LW | .014 | .023 | 0.36 | 0.58 | 8 |
| $LW_1$ | .030 | .070 | 0.76 | 1.78 | 2, 8 |
| LT | .008 | .015 | 0.20 | 0.38 | 8 |
| BL | --- | .785 | --- | 19.94 | 4 |
| BW | .220 | .310 | 5.59 | 7.87 | 4 |
| $BW_1$ | .290 | .320 | 7.37 | 8.13 | 7 |
| LS | .100 BSC | | 2.54 BSC | | 5, 9 |
| LL | .125 | .200 | 3.18 | 5.08 | |
| $LL_1$ | .150 | --- | 3.81 | --- | |
| $LO_2$ | .015 | .060 | 0.38 | 1.52 | 3 |
| $LO_1$ | --- | .098 | --- | 2.49 | 6 |
| LO | .005 | --- | 0.13 | --- | 6 |
| α | 0° | 15° | 0° | 15° | |

NOTES:

1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area shown. The manufacturer's identification shall not be used as a pin 1 identification mark.
2. The minimum limit for dimension $LW_1$ may be .023 inch (0.58 mm) for lead numbers 1, 7, 8, and 14 only.
3. Dimension $LO_2$ shall be measured from the seating plane to the base plane.
4. This dimensions allows for off-center lid, meniscus, and glass overrun.
5. The basic pin spacing is .100 inch (2.54 mm) between centerlines. Each pin centerline shall be located within ±.010 inch (0.25 mm) of its exact longitudinal position relative to pins 1 and 14.
6. Applies to all four corners (lead numbers 1, 7, 8, and 14).
7. Lead center when α is 0°. $BW_1$ shall be measured at the centerline of the leads.
8. All leads: Increase maximum limit by .003 inch (0.08 mm) measured at the center of the flat, when lead finish A is applied. Pointed or round lead ends are allowed.
9. Twelve spaces.
10. No organic or polymeric materials shall be molded to the bottom of the package to cover leads.

FIGURE 4. Physical dimensions for types 1N6506, 1N6507, 1N6508, 1N6509 and 1N6511.

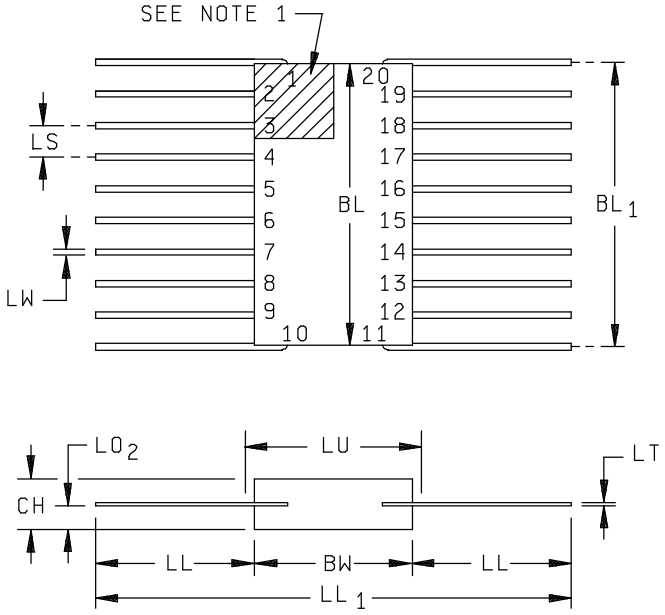



| Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|
| | Min | Max | Min | Max | |
| BH | --- | .200 | --- | 5.08 | |
| LW | .014 | .023 | 0.36 | 0.58 | 8 |
| $LW_1$ | .030 | .070 | 0.76 | 1.78 | 2, 8 |
| LT | .008 | .015 | 0.20 | 0.38 | 8 |
| BL | --- | .785 | --- | 19.94 | 4 |
| BW | .220 | .310 | 5.59 | 7.87 | 4 |
| $BW_1$ | .290 | .320 | 7.37 | 8.13 | 7 |
| LS | .100 BSC | | 2.54 BSC | | 5, 9 |
| LL | .100 | .200 | 2.54 | 5.08 | |
| $LL_1$ | .150 | --- | 3.81 | --- | |
| $LO_2$ | .015 | .060 | 0.38 | 1.52 | 3 |
| $LO_1$ | --- | .098 | --- | 2.49 | 6 |
| LO | .005 | --- | 0.13 | --- | 6 |
| α | 0° | 15° | 0° | 15° | |

NOTES:

1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area shown. The manufacturer's identification shall not be used as a pin 1 identification mark.
2. The minimum limit for dimension $LW_1$ may be .020 inch (0.51 mm) for lead numbers 1, 8, 9, and 16 only.
3. Dimension $LO_2$ shall be measured from the seating plane to the base plane.
4. This dimensions allows for off-center lid, meniscus, and glass overrun.
5. The basic pin spacing is .100 inch (2.54 mm) between centerlines. Each pin centerline shall be located within ±.010 inch (0.25 mm) of its exact longitudinal position relative to pins 1 and 16.
6. Applies to all four corners (lead numbers 1, 8, 9, and 16).
7. Lead center when α is 0°. $BW_1$ shall be measured at the centerline of the leads.
8. All leads: Increase maximum limit by .003 inch (0.08 mm) measured at the center of the flat, when lead finish A is applied. Pointed or round lead ends are allowed.
9. Fourteen spaces.
10. No organic or polymeric materials shall be molded to the bottom of the package to cover leads.

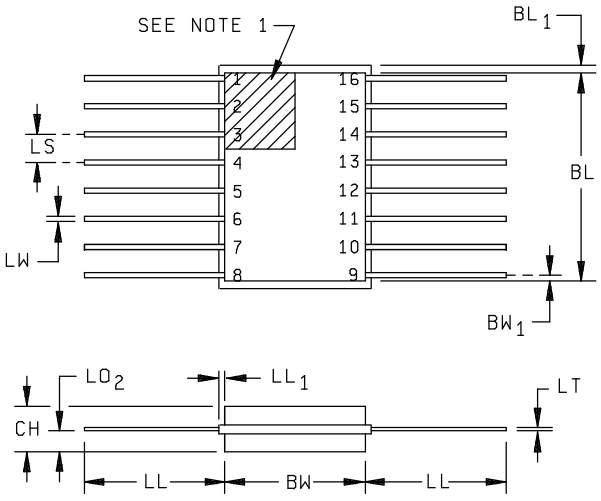
FIGURE 5. Physical dimensions for type 1N6101.




| Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|
| | Min | Max | Min | Max | |
| CH | .045 | .075 | 1.14 | 1.91 | |
| LW | .010 | .015 | 0.25 | 0.38 | |
| LT | .004 | .006 | 0.10 | 0.15 | |
| BL | .255 | .278 | 6.48 | 7.07 | |
| $BL_1$ | --- | .288 | --- | 7.33 | 2 |
| BW | .194 | .200 | 4.93 | 5.09 | |
| LU | --- | .210 | --- | 5.34 | 2 |
| LS | .030 TP | | 0.76 TP | | 3, 5 |
| LL | .285 | .290 | 6.74 | 7.38 | |
| $LL_1$ | .724 | .780 | 18.39 | 19.81 | |
| $LO_2$ | .020 | .025 | 0.50 | 0.64 | 4 |

NOTES:
1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area limited by pin 3 and package center. The manufacturer's identification shall not be used as a pin 1 identification mark.
2. This dimensions allows for off-center lid, meniscus, and glass overrun.
3. The true position pin spacing is located within ±.005 inch (0.13 mm) of its true longitudinal position relative to pins 1 and 20.
4. Dimension $LO_2$ shall be measured at the point of exit of the lead from the body.
5. Eighteen spaces.
6. All leads: Increase maximum limit by .003 inch (0.08 mm) measured at the center of the flat, when lead finish A is applied.

FIGURE 6. Physical dimensions for type 1N6496.




| Symbol | Inches | | Millimeters | | Notes |
|---|---|---|---|---|---|
| | Min | Max | Min | Max | |
| CH | .060 | .085 | 1.52 | 2.16 | |
| LW | .015 | .019 | 0.38 | 0.48 | |
| LT | .003 | .008 | 0.08 | 0.20 | |
| BL | .370 | .400 | 9.40 | 10.16 | |
| $BL_1$ | --- | .020 | --- | 0.51 | 2 |
| BW | .245 | .260 | 6.22 | 6.60 | |
| $BW_1$ | --- | .015 | --- | 0.38 | 2 |
| LS | .050 BSC | | 1.27 BSC | | 3, 5 |
| LL | .250 | .370 | 6.35 | 9.40 | |
| $LL_1$ | .745 | --- | 18.92 | --- | |
| $LO_2$ | .025 | .040 | 0.64 | 1.01 | 4 |

NOTES:
1. Index area: A notch or a pin 1 identification mark shall be located adjacent to pin 1 and shall be within the shaded area limited by pin 3 and package center. The manufacturer's identification shall not be used as a pin 1 identification mark.
2. This dimensions allows for off-center lid, meniscus, and glass overrun.
3. The true position pin spacing is located within ±.005 inch (0.13 mm) of its true longitudinal position relative to pins 1 and 16.
4. Dimension $LO_2$ shall be measured at the point of exit of the lead from the body.
5. Fourteen spaces.

FIGURE 7. Physical dimensions for type 1N6510.

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.

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

$I_{RX}$ - Reverse current for each diode of test section.

$V_{FX}$ - Forward voltage for each diode of test section.

$I_{Ri}$ - Isolation current between any two interconnect pins of adjacent parallel sets of diodes with all other pins open circuited.

3.4 Interface requirements and physical dimension. The interface requirements and physical dimension shall be as specified in MIL-PRF-19500, and figures 1, 2, 3, 4, 5, 6 and 7.

3.4.1 Lead material and finish. Lead material shall be Kovar, F-15 alloy, or alloy 42 as specified in ASTM F-30. Lead finish shall be tinned or gold-plated or solder dipped. Where a choice of lead material of finish is desired, it shall be specified in the contract or purchase order (see 6.2).

3.4.2 Die mounting. Pure glass shall not be used for device mounting. Metal glass die mounting is acceptable with qualifying activity approval for die with area greater than 1,000 square mils.

3.5 Marking. Devices shall be marked as specified in 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.

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. Screening shall be in accordance with 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) | Measurements | |
|---|---|---|
| | JANS level | JANTX and JANTXV levels |
| 1 | MIL-STD-883, method 2010, condition B, | MIL-STD-883, method 2010, condition B (JANTXV only). |
| 9 and 10 | Not applicable | Not applicable |
| 11 | $I_{R1}$ and $V_{F1}$ | $I_{R1}$ and $V_{F1}$ |
| 12 | See 4.3.1. | See 4.3.1. |
| 13 | Subgroups 2 and 3 of table I herein; $\Delta I_{R1}$ = 100 percent of initial reading or 10 nA dc, whichever is greater. $\Delta V_{F1}$ = ± 25 mV dc of initial reading. | Subgroup 2 of table I herein; $\Delta I_{R1}$ = 100 percent of initial reading or ± 25 nA dc, whichever is greater. $\Delta V_{F1}$ = ± 30 mV dc of initial reading. |

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

$T_A$ = +150°C. Time = 72 hours minimum.
$V_R$ = 50 V dc for 1N5768, 1N5770, 1N5772, 1N5774, 1N6496, 1N6506, 1N6507, 1N6508, and 1N6509.
$V_R$ = 60 V dc for 1N6100, 1N6101, 1N6510, and 1N6511.

4.4 Quality conformance inspection. Quality 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 appendix E, table V of MIL-PRF-19500, and table I herein. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table II 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, table VIa (JANS) and table VIb (JAN, JANTX, JANTXV) of MIL-PRF-19500. 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.

| Subgroup | Method | Conditions |
|---|---|---|
| B3 | 2037 | Test condition A |
| B7 | 1027 | $T_A$ = +150°C each diode DC blocking, $V_R$ = 50 V dc. |

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

| Subgroup | Method | Conditions |
|---|---|---|
| B3 | 1027 | DC blocking; $T_A$ = +150°C; $V_R$ = 50 V dc. |
| B4 | 2037 | Test condition A |

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) and delta requirements shall be in accordance with the applicable steps of table II herein.

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

| Subgroup | Method | Conditions |
|---|---|---|
| C2 | 1056 | Test condition A |
| | 2036 | Test condition E; 3 oz weight; three bends of 45° for flat packs; three bends of 15° for dips; omit end leads of configuration 2. |
| C6 | 1026 | $T_A$ = +150°C; $V_R$ = 50 V dc. |

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

4.5.1 Measurement of reverse current for 1N5772, 1N5774, 1N6496 1N6508 and 1N6509. For 1N5772, 1N5774, 1N6496, 1N6508, and 1N6509, the reverse current shall be measured using a circuit which bypasses the shunt resistance through the other diodes not under test, around the current meter. Care should be taken to assure that the voltage drop across the current meter is less than 10 millivolts.

4.5.2 Forward voltage. This parameter shall be measured 90 microseconds after the leading edge of the pulse.

4.5.3 Peak forward voltage. During this test, the maximum shunt capacitance across the diode shall be 19 pF and the equipment bandwidth shall be 80 MHz minimum.

4.5.4 Pin-to-pin capacitance. This parameter is the total pin-to-pin capacitance across each individual diode and may not necessarily represent actual diode capacitance since they are all connected together at either the anode or cathode and these connections represent additional capacitance.

4.5.5 Reverse current ($I_{RX}$) and forward voltage ($V_{FX}$). Each common anode section and each common cathode section shall be tested separately. Each diode in the test section shall be measured individually after the array has reached thermal equilibrium.

4.5.6 Isolation current ($I_R$ ). These devices shall be subjected to the isolation current tests as specified:

a. For types 1N5772, 1N5774, 1N6496, 1N6508, and 1N6509, the bridging current shall be measured by supplying the forcing function to every other interconnect pin and measuring the remaining interconnect pins (excluding common anode and common cathode pins), $I_{Rbr}$. Repeat the test, reversing the polarity of the forcing function.

b. For types 1N6100, 1N6101, 1N6511, and 1N6510, the isolation current shall be measured by applying the forcing function to every other diode (anode and cathode simultaneously) and measuring the remaining diodes (anode and cathode simultaneously), $I_{Rbr}$. Repeat the test, reversing the polarity of the forcing function.

c. For types 1N5774, 1N6496, and 1N6509, the isolation current shall be measured between the individual circuits by applying the forcing function to the anode and cathode of one circuit and measuring to the anode and cathode of other circuit, $I_{Ri}$. Repeat the test, reversing the polarity of the forcing function.

d. For types 1N5768 and 1N6506, the forcing function shall be applied to every other anode and measured on the remaining anodes, $I_{Rbr}$. Repeat the test, reversing the polarity of the forcing function.

e. For types 1N5770 and 1N6509, the forcing function shall be applied to every other cathode and measured on the remaining cathodes, $I_{Rbr}$. Repeat the test, reversing the polarity of the forcing function.

TABLE I. Group A inspection.

| Inspection 1/ | MIL-STD-750 | | Symbol | Limits | | Units |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 1 | | | | | | |
| Visual and mechanical inspection | 2071 | | | | | |
| Subgroup 2 | | | | | | |
| Breakdown voltage | 4021 | | $V_{(BR)}$ | | | |
| 1N5768, 1N5770, 1N5772<br>1N5774, 1N6496, 1N6506<br>1N6507, 1N6508, 1N6509 | | $I_R$ = 10 µA dc;<br>PW = 100 ms maximum<br>duty cycle ≤ 20 percent | | 60 | | V dc |
| 1N6100, 1N6101, 1N6510<br>1N6511 | | $I_R$ = 5 µA dc;<br>PW = 100 ms maximum;<br>duty cycle ≤ 20 percent | | 75 | | V dc |
| Reverse current | 4016 | DC method (see 4.5.1) | | | | |
| All | | $V_R$ = 40 V dc | $I_{R1}$ | | 0.1 | µA dc |
| 1N6100, 1N6101, 1N6510<br>1N6511 | | $V_R$ = 20 V dc | $I_{R2}$ | | 25 | nA dc |
| Forward voltage | 4011 | PW = 300 µs ± 50 µs; duty cycle ≤ 2 percent (see 4.5.2) | | | | |
| All | | $I_F$ = 100 mA dc | $V_{F1}$ | | 10 | V dc |
| 1N5768, 1N5770, 1N5772<br>1N5774, 1N6496, 1N6506<br>1N6507, 1N6508, 1N6509 | | $I_F$ = 500 mA dc | $V_{F2}$ | | 1.5 | V dc |
| Subgroup 3 | | | | | | |
| High temperature operation: | | $T_A$ = +150°C | | | | |
| Reverse current | 4016 | DC method; $V_R$ = 40 V dc | $I_{R3}$ | | 50 | µA dc |
| Low temperature operation: | | $T_A$ = -55°C | | | | |
| Forward voltage | 4011 | $I_F$ = 10 mA dc | $V_{F3}$ | | 1 | V dc |
| Subgroup 4 | | | | | | |
| Forward recovery voltage (peak) | 4026 | PW ≥ 150 ns; $R_S$ = 50Ω;<br>$t_r$ = 10 ns;<br>duty cycle ≤ 2 percent<br>(see 4.5.3) | $V_{F4}$ | | | |
| 1N5768, 1N5770, 1N5772<br>1N5774, 1N6496, 1N6506<br>1N6507, 1N6508, 1N6509 | | $I_F$ = 500 mA | | | 5 | V (pk) |
| 1N6100, 1N6101, 1N6510<br>1N6511 | | $I_F$ = 10 mA | | | 5 | V (pk) |

See footnote at end of table.

TABLE I. Group A inspection - Continued.

| Inspection 1/ | MIL-STD-750 | | Symbol | Limits | | Units |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 4 - Continued | | | | | | |
| Capacitance (pin-to-pin) | 4001 | $V_R$ = O V dc; f = 1 MHz (see 4.5.4) | $C_t$ | | | |
| 1N5770, 1N5772, 1N5774 1N6496, 1N6507, 1N6508 1N6509 | | | | | 8 | pF |
| 1N5768, 1N6100, 1N6101 1N5605, 1N6510, 1N6511 | | | | | 4 | pF |
| Forward recovery time | 4026 | PW ≥ 150 ns; $R_S$ = 50Ω; Duty cycle ≤ 2 percent $t_r$ = 10 ns; $V_{fr}$ = 1.1 $V_F$ | $t_{fr}$ | | | |
| 1N5768, 1N5770, 1N5772 1N5774, 1N6496, 1N6506 1N6507, 1N6508, 1N6509 | | $I_F$ = 500 mA dc | | | 40 | ns |
| 1N6100, 1N6101, 1N6510 1N6511 | | $I_F$ = 100 mA dc | | | 15 | ns |
| Reverse recovery time | 4031 | | $t_{rr}$ | | | |
| 1N5768, 1N5770, 1N5772 1N5774, 1N6496, 1N6506 1N6507, 1N6508, 1N6509 | | Condition B; $I_F$ = $I_R$ = 200 mA; $R_L$ = 100 Ω; $i_{rr}$ = 20 mA | | | 20 | ns |
| 1N6100, 1N6101, 1N6510 1N6511 | | Condition B; $I_F$ = $I_R$ = 10 mA; $R_L$ = 100 Ω; $i_{rr}$ = 1 mA | | | 10 | ns |
| Forward voltage (match) | 4011 | $I_F$ = 10 mA | $V_{F5}$ | | 5 | mV |
| 1N6100, 1N6101, 1N6510 1N6511 | | | | | | |
| Subgroup 5 | | | | | | |
| Not applicable | | | | | | |

See footnote at end of table.

TABLE I. Group A inspection - Continued.

| Inspection 1/ | MIL-STD-750 | | Symbol | Limits | | Units |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 6 | | | | | | |
| Surge current | 4066 | $I_{FSM}$ = 500 mA(pk); 10 surges at 1 per minute; $t_p$ = 1/120 s; choose four diodes from each array in cycles. | | | | |
| Electrical measurements | | See table II, steps 1 and 3. | | | | |
| Subgroup 7 | | | | | | |
| Reverse current (except omit for the following devices.)<br>1N6100, 1N6101, 1N6510 1N6511 | 4016 | DC method; $V_R$ = 40 V dc; $I_F$ = 25 mA dc for each of the other diodes in the test section (see 4.5.5). | $I_{RX}$ | | 10 | µA dc |
| Forward voltage (except omit for the following devices.)<br>1N6100, 1N6101, 1N6510 1N6511 | 4011 | $I_F$ = 25 mA dc; $I_F$ = 25 mA dc for each of the other diodes in the test section (see 4.5.5) | $V_{FX}$ | | 1.0 | V dc |
| Bridging current (all devices) | 4016 | DC method; $V_R$ = +40 V dc and -40 V dc (see 4.5.6a through 4.5.6d) | $I_{Rbr}$ | | 0.8 | mA dc |
| Isolation current<br>1N5774 1N6496 1N6509 | 4016 | DC method; $V_R$ = +40 V dc and -40 V dc (see 4.5.6c) | $I_{Ri}$ | | 0.8 | mA dc |

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

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

| Step | Inspection | MIL-STD-750 | | Symbol | Limits | | Units |
|---|---|---|---|---|---|---|---|
| | | Method | Conditions | | Min | Max | |
| 1. | Reverse current | 4016 | DC method; $V_R$ = 40 V dc | $I_{R1}$ | | 0.1 | µA dc |
| 2. | Reverse current | 4016 | DC method; $V_R$ = 40 V dc | $I_{R1}$ | | 0.2 | µA dc |
| 3. | Forward voltage | 4011 | $I_F$ = 100 mA dc | $V_{F1}$ | | 1.0 | V dc |
| 4. | Forward voltage | 4011 | $I_F$ = 100 mA dc | $V_{F1}$ | | 1.1 | V dc |
| 5. | Reverse current | 4016 | DC method; $V_R$ = 40 V dc | $\Delta I_{R1}$ | | 100 percent of initial reading or ±25 nA dc, whichever is greater. | |
| 6. | Forward voltage | 4011 | $I_F$ = 100 mA dc | $\Delta V_{F1}$ | | ±30 mV dc of initial reading | |

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 and 3.

b. Subgroup 7, see table II herein, steps 1, 3, 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 and 3.

b. Subgroup 3, see table II herein, steps 2 and 4.

c. Subgroup 6, see table II herein, steps 2 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, 3, 5, and 6 (JANS) and steps 1 and 3 (JANTX and JANTXV).

b. Subgroup 3, see table II herein, steps 1, 3, 5, and 6 (JANS) and steps 1 and 3 (JANTX and JANTXV).

c. Subgroup 6, see table II herein, steps 1, 3, 5, and 6 (JANS) and steps 2 and 4 (JANTX and JANTXV).

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-STD-129.

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 Commander, Defense Supply Center Columbus, ATTN: DSCC-VQE, 3990 East Broad Street, Columbus, OH 43216-5000.

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.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 17
NASA - NA

Review activities:
Army - AR, AV, CR, MI, SM
Navy - AS, CG, MC
Air Force - 19, 85, 99

Preparing activity:
DLA - CC

(Project 5961-1663)

**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**<br>MIL-PRF-19500/474E | **2. DOCUMENT DATE (YYMMDD)**<br>971103 |
|---|---|---|

**3. DOCUMENT TITLE**
SEMICONDUCTOR DEVICE, SILICON, MULTIPLE DIODE ARRAYS, TYPES 1N5768, 1N5770, 1N5772, 1N5774, 1N6100, 1N6101, 1N6496, 1N6506, 1N6507, 1N6508, 1N6509, 1N6510, AND 1N6511; 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)<br>(1) Commercial<br>(2) AUTOVON<br>(If applicable) | 7. DATE SUBMITTED<br>(YYMMDD) |

**8. PREPARING ACTIVITY**

| a. NAME Alan Barone | b. TELEPHONE (Include Area Code)<br>(1) Commercial (614) 692-0510<br>(2) AUTOVON 850-0510 |
|---|---|
| c. ADDRESS (Include Zip Code) :<br>Commander, Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000 | **IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:**<br>Defense Quality and Standardization Office<br>5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466<br>Telephone (703) 756-2340 AUTOVON 289-2340 |