

MIL-PRF-19500/496E

* 1.3 Maximum ratings. Unless otherwise specified, $T_A = +25^\circ\text{C}$. Continued.

| Types | $R_{\theta JA}$ One section | $R_{\theta JA}$ Both sections | $R_{\theta JSP}$ One section | $R_{\theta JSP}$ Both sections | $R_{\theta JPCB}$ One section | $R_{\theta JPCB}$ Both sections |
|--|--------------------------------|----------------------------------|---------------------------------|-----------------------------------|----------------------------------|------------------------------------|
| | $^\circ\text{C/W}$ (2) (3) | $^\circ\text{C/W}$ (2) (3) | $^\circ\text{C/W}$ (2) (3) | $^\circ\text{C/W}$ (2) (3) | $^\circ\text{C/W}$ (2) (3) | $^\circ\text{C/W}$ (2) (3) |
| 2N5795, 2N5796 2N5795A, 2N5796A | 350 350 | <u>290</u> <u>290</u> | | | | |
| 2N5796U, 2N5796UC 2N5796AU, 2N5796AUC | | | 110 110 | 90 90 | 350 350 | 290 290 |

(1) For $T_A \geq 25^\circ\text{C}$, derate linearly 2.86 mW/ $^\circ\text{C}$ one section, 3.43 mW/ $^\circ\text{C}$ total.

(2) For 2N5795, 2N5795A, 2N5796, 2N5796A, 2N5796U, 2N5796AUC, and 2N5796UC devices.

* (3) For thermal impedance curves see figures 4, 5, and 6.

* 1.4 Primary electrical characteristics. Unless otherwise specified, $T_A = +25^\circ\text{C}$.

| | C_{obo} $V_{CB} = 10\text{ V dc}$ $I_E = 0$ $100\text{ kHz} \leq f \leq 1\text{ MHz}$ | $ h_{fe} $ $V_{CE} = 20\text{ V dc}$ $I_C = 20\text{ mA dc}$ $f = 100\text{ MHz}$ | Switching | |
|---------|---|---|-----------|-----------|
| | | | t_{on} | t_{off} |
| Minimum | μF | | ns | ns |
| Maximum | 8.0 | 2.0 10.0 | 50 | 140 |

| Limits | h_{FE1} $V_{CE} = 10\text{ V dc}$ $I_C = 100\ \mu\text{A dc}$ | | h_{FE4} (1) $V_{CE} = 10\text{ V dc}$ $I_C = 150\text{ mA dc}$ | | $V_{CE(SAT)1}$ (1) $I_C = 150\text{ mA dc}$ $I_B = 15\text{ mA dc}$ | $V_{CE(SAT)2}$ (1) $I_C = 500\text{ ma dc}$ $I_B = 50\text{ mA dc}$ | $V_{BE(SAT)1}$ (1) $I_C = 150\text{ mA dc}$ $I_B = 15\text{ mA dc}$ |
|-------------------------------|---|-----|--|-----|---|---|---|
| | Min | Max | Min | Max | V dc | V dc | V dc |
| 2N5795, 2N5795A | 40 | | 40 | 150 | 0.4 | 1.6 | 1.3 |
| 2N5796, U, UC 2N5796A, AUC | 75 | | 100 | 300 | 0.4 | 1.6 | 1.3 |

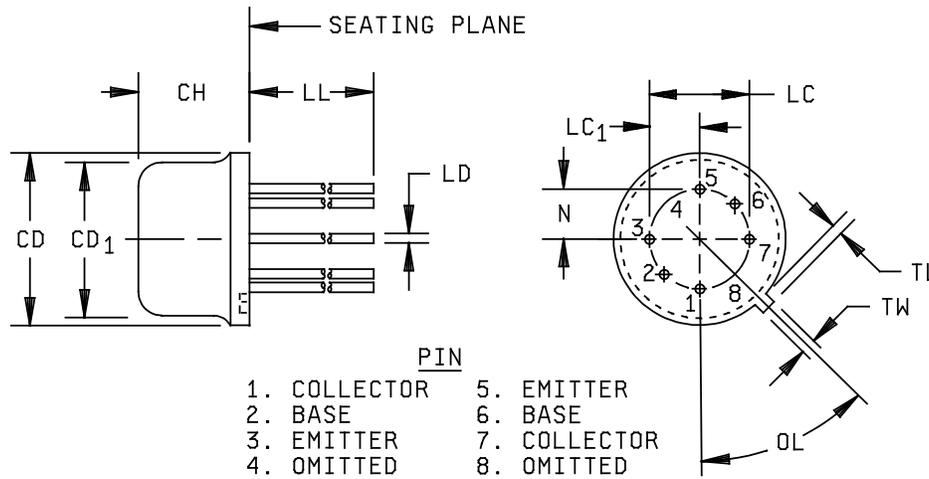
(1) Pulsed see 4.5.1.

* 1.5 Primary electrical matching characteristics of each individual section.

| Limit | $\frac{h_{FE2-1}}{h_{FE2-2}}$ | $\frac{h_{FE3-1}}{h_{FE3-2}}$ | $ V_{BE1} - V_{BE2} $ |
|-----------------------------|--|---|--|
| 2N5795A 2N5796A, UA, AUC | $V_{CE} = 10\text{ V dc};$ $I_C = 1\text{ mA dc}$ (1) | $V_{CE} = 10\text{ V dc};$ $I_C = 10\text{ mA dc}$ (1) | $V_{CE} = 10\text{ V dc};$ $I_C = 1\text{ mA dc}$ |
| Min | 0.9 | 0.9 | mV dc |
| Max | 1.1 | 1.1 | 10 |

(1) The larger number will be replaced in the denominator

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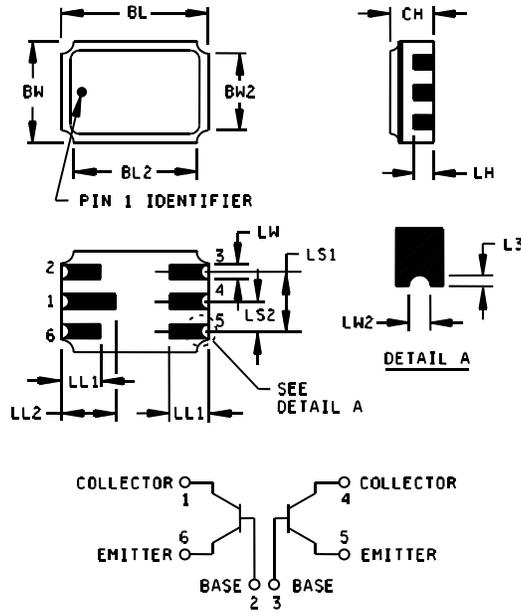


| Symbol | Dimensions | | | | Notes |
|-----------------|------------|------|-------------|------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .335 | .370 | 8.51 | 9.40 | |
| CD ₁ | .305 | .335 | 7.75 | 8.51 | |
| CH | .150 | .185 | 3.81 | 4.70 | |
| LD | .016 | .021 | 0.41 | 0.53 | |
| LC | .200 BSC | | 5.08 BSC | | 4 |
| LC ₁ | .100 BSC | | 2.54 BSC | | 4 |
| LL | .500 | | 12.70 | | |
| TW | .028 | .034 | 0.71 | 0.86 | |
| TL | .029 | .045 | 0.74 | 1.14 | 3 |
| OL | 45° BSC | | 45° BSC | | 6 |
| N | .100 BSC | | 2.54 BSC | | |

NOTES:

1. Dimension are in inches.
2. Millimeters are given for general information only.
3. Measured from maximum diameter of the product.
4. Leads having maximum diameter .019 inch (0.483 mm) measured in gaging plan .054 inch (1.37 mm) + .001 inch (0.025 mm) - .000 inch (0.000 mm) below the seating plane of the product shall be within .007 inch (.178 mm) of their true position relative to a maximum width tab.
5. The product may be measured by direct methods or by gauge.
6. Tab centerline.
7. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions for 2N5795 and 2N5796 (TO-78).



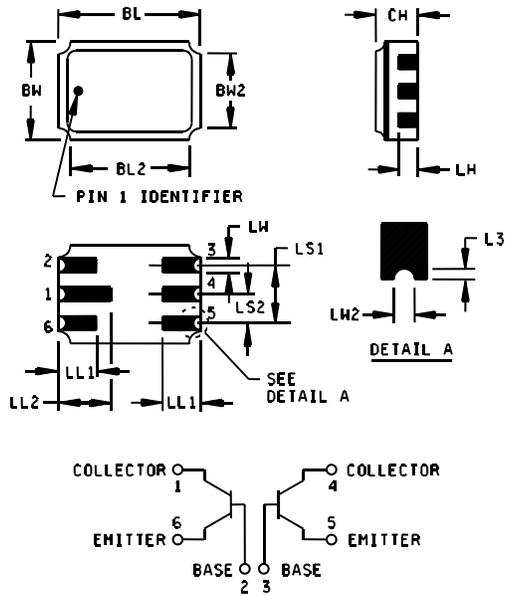
| Symbol | Dimensions | | | |
|-----------------|------------|------|-------------|------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| BL | .240 | .250 | 6.10 | 6.35 |
| BL ₂ | | .250 | | 6.35 |
| BW | .165 | .175 | 4.19 | 4.45 |
| BW ₂ | | .175 | | 4.45 |
| CH | .058 | .100 | 1.47 | 2.54 |
| L ₃ | .003 | .007 | 0.08 | 0.18 |
| LH | .026 | .039 | 0.66 | 0.99 |

| Symbol | Dimensions | | | |
|-----------------|------------|------|-------------|------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| LL ₁ | .060 | .070 | 1.52 | 1.78 |
| LL ₂ | .082 | .098 | 2.08 | 2.49 |
| LS ₁ | .095 | .105 | 2.41 | 2.67 |
| LS ₂ | .045 | .055 | 1.14 | 1.40 |
| LW | .022 | .028 | 0.56 | 0.71 |
| LW ₂ | .006 | .022 | 0.15 | 0.56 |

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimension "CH" controls the overall package thickness.
4. The corner shape (square, notch, radius, etc.) may vary at the manufacturer's option from that shown on the drawing.
5. Dimensions "LW₂" minimum and "L₃" minimum and the appropriate castellation length define an unobstructed three-dimensional space traversing all of the ceramic layers in which a castellation was designed. (Castellations are required on bottom two layers, optional on top ceramic layer.) Dimension "LW₂" maximum and "L₃" maximum define the maximum width and depth of the castellation at any point on its surface. Measurement of these dimensions may be made prior to solder dipping.
6. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 2. Physical dimensions, 2N5796U.



| Symbol | Dimensions | | | |
|-----------------|------------|------|-------------|------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| BL | .240 | .250 | 6.10 | 6.35 |
| BL ₂ | | .250 | | 6.35 |
| BW | .165 | .175 | 4.19 | 4.45 |
| BW ₂ | | .175 | | 4.45 |
| CH | .058 | .115 | 1.47 | 2.92 |
| L ₃ | .003 | .007 | 0.08 | 0.18 |
| LH | .026 | .039 | 0.66 | 0.99 |

| Symbol | Dimensions | | | |
|-----------------|------------|------|-------------|------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| LL ₁ | .060 | .070 | 1.52 | 1.78 |
| LL ₂ | .082 | .098 | 2.08 | 2.49 |
| LS ₁ | .095 | .105 | 2.41 | 2.67 |
| LS ₂ | .045 | .055 | 1.14 | 1.40 |
| LW | .022 | .028 | 0.56 | 0.71 |
| LW ₂ | .006 | .022 | 0.15 | 0.56 |

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimension "CH" controls the overall package thickness and is ceramic.
4. The corner shape (square, notch, radius, etc.) may vary at the manufacturer's option from that shown on the drawing.
5. Dimensions "LW₂" minimum and "L₃" minimum and the appropriate castellation length define an unobstructed three-dimensional space traversing all of the ceramic layers in which a castellation was designed. (Castellations are required on bottom two layers, optional on top ceramic layer.) Dimension "LW₂" maximum and "L₃" maximum define the maximum width and depth of the castellation at any point on its surface. Measurement of these dimensions may be made prior to solder dipping.
6. Lead 4 = collector.
7. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

* FIGURE 3. Physical dimensions, 2N5796UC and 2N5796AUC (ceramic lid).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

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

* (Copies of these documents are available online at <https://assist.daps.dla.mil/quicksearch> or <https://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

3. REQUIREMENTS

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

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

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

$R_{\theta JA}$ Thermal resistance junction to ambient.
 $R_{\theta JC}$ Thermal resistance junction to case.

* 3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and figures 1 (similar to TO-78), 2, and 3 (U, UC, and AUC) herein.

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

3.5 Radiation hardness assurance (RHA). Radiation hardness assurance requirements, PIN designators, and test levels shall be as defined 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, 1.5 and table I.

3.7 Electrical test requirements. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4, 1.5 and table I herein.

3.8 Marking. Marking shall be in accordance with MIL-PRF-19500. At the option of the manufacturer, marking may be omitted from the body, but shall be retained on the initial container. The radiation hardened designator M, D, P, L, R, F, G, or H shall immediately precede (or replace) the device "2N" identifier (depending upon degree of abbreviation required).

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

4. VERIFICATION

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

- a. Qualification inspection (see 4.2).
- b. Screening (see 4.3).
- c. Conformance inspection (see 4.4 and table I, II, and III).

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

4.2.1 Group E qualification. Group E inspection shall be performed for qualification or re-qualification only. In case qualification was awarded to a prior revision of the specification sheet that did not request the performance of table III tests, the tests specified in table III herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

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4.3 Screening (list applicable JANS, JANTX, and JANTXV levels). Screening shall be in accordance with table E-IV of MIL-PRF-19500 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 E-IV of MIL-PRF-19500) | Measurement | |
|--|---|---|
| | JANS level | JANTX and JANTXV levels |
| (1) 3c | Thermal impedance method 3131 of MIL-STD-750 (see 4.3.2) | Thermal impedance method 3131 of MIL-STD-750 (see 4.3.2) |
| 9 | I_{CBO2} and h_{FE4} | Not applicable |
| 10 | 48 hours minimum | 48 hours minimum |
| 11 | I_{CBO2} and h_{FE4} Subgroup 2 of table I herein; $\Delta I_{CBO2} = 100$ percent of initial value or 5 nA dc, whichever is greater. $\Delta h_{FE4} = \pm 15$ percent of initial value | I_{CBO2} and h_{FE4} |
| 12 | See 4.3.1 | See 4.3.1 |
| 13 | Subgroup 2 of table I herein; $\Delta I_{CBO2} = 100$ percent of initial value or 5 nA dc, whichever is greater. $\Delta h_{FE4} = \pm 15$ percent of initial value | Subgroup 2 of table I herein; $\Delta I_{CBO2} = 100$ percent of initial value or 5 nA dc, whichever is greater. $\Delta h_{FE4} = \pm 15$ percent of initial value |

(1) Shall be performed anytime after temperature cycling, screen 3a; and does not need to be repeated in screening requirements.

4.3.1 Burn-in conditions. Burn-in conditions are as follows: $V_{CB} = 10 - 30$ V dc; power shall be applied to achieve $T_J = +135^\circ\text{C}$ minimum using $P_T = 300$ mW each section (600 mW total device). $T_A =$ ambient rated as defined in 1.3. With approval of the qualifying activity and preparing activity, alternate burn-in criteria (hours, bias conditions, T_J , and mounting conditions) may be used. A justification demonstrating equivalence is required. In addition, the manufacturing site's burn-in data and performance history will be essential criteria for burn-in modification approval.

4.3.2 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3131 of MIL-STD-750 using the guidelines in that method for determining I_M , I_H , t_H , t_{SW} (V_C and V_H where appropriate). Measurement delay time (t_{MD}) = 70 μs max. See table III, group E, subgroup 4 herein.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. If alternate screening is being performed in accordance with MIL-PRF-19500, a sample of screened devices shall be submitted to and pass the requirements of subgroup 1 and 2, of table I herein, inspection only (table E-VIb, group B, subgroup 1 is not required to be performed since solderability and resistance to solvents testing is performed in table I herein).

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

* 4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the tests and conditions specified for subgroup testing in table E-VIa (JANS) of MIL-PRF-19500 and 4.4.2.1. Electrical measurements (end-points) and delta requirements shall be in accordance with table I, subgroup 2 and 4.5.2 herein: delta requirements only apply to subgroups B4, and B5. See 4.4.2.2 for JAN, JANTX, and JANTXV group B testing. Electrical measurements (end-points) for JAN, JANTX, and JANTXV shall be after each step in 4.4.2.2 and shall be in accordance with table I, subgroup 2 herein.

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

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|------------------|
|-----------------|---------------|------------------|

| | | |
|----|------|--|
| B4 | 1037 | $V_{CB} = 10 \text{ V dc}$, adjust device current, or power, to achieve a minimum ΔT_J of 100°C . |
|----|------|--|

| | | |
|----|------|---|
| B5 | 1027 | $V_{CB} = 10 \text{ V dc}$; $P_D \geq 100$ percent of maximum rated P_T (see 1.3). (NOTE: If a failure occurs, resubmission shall be at the test conditions of the original sample.) |
|----|------|---|

Option 1: 96 hours minimum sample size in accordance with MIL-PRF-19500, table E-VIa, adjust T_A or P_D to achieve $T_J = +275^\circ\text{C}$ minimum.

Option 2: 216 hours minimum, sample size = 45, $c = 0$; adjust T_A or P_D to achieve a $T_J = +225^\circ\text{C}$ minimum.

4.4.2.2 Group B inspection, (JAN, JANTX, and JANTXV). Separate samples may be used for each step. In the event of a lot failure, the resubmission requirements of MIL-PRF-19500 shall apply. In addition, all catastrophic failures during CI, (conformance inspection), shall be analyzed to the extent possible to identify root cause and corrective action. Whenever a failure is identified as wafer lot or wafer processing related, the entire wafer lot and related devices assembled from the wafer lot shall be rejected unless an appropriate determined corrective action to eliminate the failures mode has been implemented and the devices from the wafer lot are screened to eliminate the failure mode.

| <u>Step</u> | <u>Method</u> | <u>Condition</u> |
|-------------|---------------|------------------|
|-------------|---------------|------------------|

| | | |
|---|------|---|
| 1 | 1026 | Steady-state life: 1,000 hours minimum, $V_{CB} = 10 \text{ V dc}$, power shall be applied to achieve $T_J = +150^\circ\text{C}$ minimum using a minimum of $P_D = 75$ percent of maximum rated P_T as defined in 1.3. $n = 45$ devices, $c = 0$. The sample size may be increased and the test time decreased as long as the devices are stressed for a total of 45,000 device hours minimum, and the actual time of test is at least 340 hours. |
|---|------|---|

| | | |
|---|------|---|
| 2 | 1048 | Blocking life, $T_A = +150^\circ\text{C}$, $V_{CB} = 80$ percent of rated voltage, 48 hours minimum. $n = 45$ devices, $c = 0$. |
|---|------|---|

| | | |
|---|------|---|
| 3 | 1032 | High-temperature life (non-operating), $t = 340$ hours, $T_A = +175^\circ\text{C}$. $n = 22$, $c = 0$. |
|---|------|---|

4.4.2.3 Group B sample selection. Samples selected from group B inspection shall meet all of the following requirements:

- a. For JAN, JANTX, and JANTXV samples shall be selected randomly from a minimum of three wafers (or from each wafer in the lot) from each wafer lot. For JANS, samples shall be selected from each inspection lot. See MIL-PRF-19500.
- b. Shall be chosen from an inspection lot that has been submitted to and passed table I, subgroup 2, conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for life test (subgroups B4 and B5 for JANS, and group B for JAN, JANTX, and JANTXV) may be pulled prior to the application of final lead finish.

* 4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the test and conditions specified for subgroup testing in table E-VII of MIL-PRF-19500, and in 4.4.3.1 (JANS) and 4.4.3.2 (JAN, JANTX, and JANTXV) herein for group C testing. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

* 4.4.3.1 Group C inspection (JANS), table E-VII of MIL-PRF-19500.

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|------------------|
|-----------------|---------------|------------------|

| | | |
|----|------|---|
| C2 | 2036 | Test condition E; (not applicable for U, UC, and AUC device). |
| C5 | 3131 | $R_{\theta JA}$ only, as applicable (see 1.3) and in accordance with thermal impedance curves. |
| C6 | 1026 | 1,000 hours at $V_{CB} = 10$ V dc; power shall be applied to achieve $T_J = +150^\circ\text{C}$ minimum and a minimum of $P_D = 75$ percent of maximum rated P_T as defined in 1.3 $n = 45$, $c = 0$. The sample size may be increased and the test time decreased as long as the devices are stressed for a total of 45,000 device hours minimum, and the actual time of test is at least 340 hours. |

* 4.4.3.2 Group C inspection (JAN, JANTX, and JANTXV), table E-VII of MIL-PRF-19500.

| <u>Subgroup</u> | <u>Method</u> | <u>Condition</u> |
|-----------------|---------------|------------------|
|-----------------|---------------|------------------|

| | | |
|----|------|--|
| C2 | 2036 | Test condition E, (not applicable for U, UC, and AUC devices). |
| C5 | 3131 | $R_{\theta JA}$ only, as applicable (see 1.3) and in accordance with thermal impedance curves. |
| C6 | | Not applicable. |

4.4.3.3 Group C sample selection. Samples for subgroups in group C shall be chosen at random from any inspection lot containing the intended package type and lead finish procured to the same specification which is submitted to and passes table I tests herein for conformance inspection. Testing of a subgroup using a single device type enclosed in the intended package type shall be considered as complying with the requirements for that subgroup.

4.4.4 Group D inspection. Conformance inspection for hardness assured JANS and JANTXV types shall include the group D tests specified in table II herein. These tests shall be performed as required in accordance with MIL-PRF-19500 and method 1019 of MIL-STD-750, for total ionizing dose or method 1017 of MIL-STD-750 for neutron fluence as applicable (see 6.2 herein), except group D, subgroup 2 may be performed separate from other subgroups.

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* 4.4.5 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of MIL-PRF-19500 and as specified in table III herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

4.5 Methods of inspection. Methods of inspection shall be as 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.

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* TABLE I. Group A inspection.

| Inspection <u>1/</u> | MIL-STD-750 | | Symbol | Limit | | Unit |
|---|-------------|---|----------------------|-----------|-----|-------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 1 2/</u> | | | | | | |
| Visual and mechanical examination <u>3/</u> | 2071 | n = 45 devices, c = 0 | | | | |
| Solderability <u>3/ 4/</u> | 2026 | n = 15 leads, c = 0 | | | | |
| Resistance to solvents <u>3/ 4/ 5/</u> | 1022 | n = 15 devices, c = 0 | | | | |
| Temp cycling <u>3/ 4/</u> | 1051 | Test condition C, 25 cycles. n = 22 devices, c = 0 | | | | |
| Hermetic seal <u>4/ 6/</u> Fine leak Gross leak | 1071 | n = 22 devices, c = 0 | | | | |
| Electrical measurements <u>4/</u> | | Table I, subgroup 2 | | | | |
| Bond strength <u>3/ 4/</u> | 2037 | Precondition T _A = +250°C at t = 24 hours or T _A = +300°C at t = 2 hours n = 11 wires, c = 0 | | | | |
| Decap internal visual (design verification) <u>4/</u> | 2075 | n = 4 devices, c = 0 | | | | |
| <u>Subgroup 2</u> | | | | | | |
| Thermal impedance | 3131 | See 4.3.2 | Z _{θJX} | | | °C/W |
| Collector to base cutoff current | 3036 | Bias condition D, V _{CB} = 60 V dc | I _{CB01} | | 10 | μA dc |
| Breakdown voltage, collector to emitter | 3011 | Bias condition D; I _C = 10 mA dc; pulsed (see 4.5.1) | V _{(BR)CEO} | 60 | | V dc |
| Emitter to base cutoff current | 3061 | Bias condition D; V _{EB} = 5 V dc | I _{EBO1} | | 10 | μA dc |
| Collector to base cutoff current | 3036 | Bias condition D; V _{CB} = 50 V dc | I _{CB02} | | 10 | nA dc |
| Emitter to base cutoff current | 3061 | Bias condition D; V _{EB} = 3 V dc | I _{EBO2} | | 100 | nA dc |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | V _{CE} = 10 V dc; I _C = 0.1 mA dc | h _{FE1} | 40 75 | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | V _{CE} = 10 V dc; I _C = 1.0 mA dc | h _{FE2} | 40 100 | | |

See footnotes at end of table.

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* TABLE I. Group A inspection - Continued.

| Inspection <u>1/</u> | MIL-STD-750 | | Symbol | Limit | | Unit |
|---|-------------|--|-------------------------------|-----------|------------|-------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 2</u> - Continued | | | | | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 10 \text{ mA dc};$ pulsed (see 4.5.1) | h_{FE3} | 40 100 | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 150 \text{ mA dc};$ pulsed (see 4.5.1) | h_{FE4} | 40 100 | 150 300 | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 300 \text{ mA dc};$ pulsed (see 4.5.1) | h_{FE5} | 20 50 | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 1.0 \text{ V dc}; I_C = 150 \text{ mA dc};$ pulsed (see 4.5.1) | h_{FE6} | 20 50 | | |
| Collector-emitter saturation voltage | 3071 | $I_C = 150 \text{ mA dc}; I_B = 15 \text{ mA dc}$ pulsed (see 4.5.1) | $V_{CE(sat)1}$ | | 0.4 | V dc |
| Collector-emitter saturation voltage | 3071 | $I_C = 500 \text{ mA dc}; I_B = 50 \text{ mA dc};$ pulsed (see 4.5.1) | $V_{CE(sat)2}$ | | 1.6 | V dc |
| Base-emitter saturation voltage | 3066 | Test condition A; $I_C = 150 \text{ mA dc};$ $I_B = 15 \text{ mA dc};$ pulsed (see 4.5.1) | $V_{BE(sat)1}$ | | 1.3 | V dc |
| Base-emitter saturation voltage | 3066 | Test condition A; $I_C = 500 \text{ mA dc};$ $I_B = 50 \text{ mA dc};$ pulsed (see 4.5.1) | $V_{BE(sat)2}$ | | 2.6 | V dc |
| * Forward-current transfer ratio (gain ratio) 2N5795A, 2N5796A, and 2N5796UCA | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 1 \text{ mA dc};$ pulsed (see 4.5.1) | $\frac{h_{FE2-1}}{h_{FE2-2}}$ | 0.9 | 1.1 | |
| * Forward-current transfer ratio (gain ratio) 2N5795A, 2N5796A, and 2N5796UCA | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 10 \text{ mA dc};$ pulsed (see 4.5.1) | $\frac{h_{FE3-1}}{h_{FE3-2}}$ | 0.9 | 1.1 | |
| * Absolute value of base emitter-voltage differential 2N5795A, 2N5796A, and 2N5796UCA | 3066 | Test condition B; $V_{CE} = 10 \text{ V dc};$ $I_C = 1 \text{ mA dc}$ | $ V_{BE1} - V_{BE2} $ | | 10 | mV dc |

See footnotes at end of table.

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* TABLE I. Group A inspection - Continued.

| Inspection <u>1</u> / | MIL-STD-750 | | Symbol | Limit | | Unit |
|--|-------------|--|---------------|----------|---------|------------------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 3</u> | | | | | | |
| High temperature operation | | $T_A = +150^\circ\text{C}$ | | | | |
| Collector to base cutoff current | 3036 | Bias condition D; $V_{CB} = 50\text{ V dc}$ | I_{CBO3} | | 10 | $\mu\text{A dc}$ |
| Low temperature operation | | $T_A = -55^\circ\text{C}$ | | | | |
| Forward-current transfer ratio | 3076 | $V_{CE} = 10\text{ V dc}; I_C = 150\text{ mA dc}$ | h_{FE7} | 16 40 | | |
| 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | | | | | | |
| <u>Subgroup 4</u> | | | | | | |
| Magnitude of small-signal short-circuit forward current transfer ratio | 3306 | $V_{CE} = 20\text{ V dc}; I_C = 20\text{ mA dc};$ $f = 100\text{ MHz}$ | $ h_{fe} $ | 2 | 10 | |
| Open circuit output capacitance | 3236 | $V_{CB} = 10\text{ V dc}; I_E = 0;$ $100\text{ kHz} \leq f \leq 1\text{ MHz}$ | C_{obo} | | 8 | pF |
| Input capacitance (output open-circuited) | 3240 | $V_{EB} = 2.0\text{ V dc}; I_C = 0;$ $100\text{ kHz} \leq f \leq 1\text{ MHz}$ | C_{ibo} | | 30 | pF |
| Pulse response | 3251 | Test condition A, (see figure 7) | | | | |
| Saturated turn-on time | | $V_{CC} = 30\text{ V dc}; I_C = 150\text{ mA dc};$ $I_{B1} = 15\text{ mA dc},$ $V_{BE(OFF)} = 0.5\text{ V dc}$ | t_{on} | | 50 | ns |
| Saturated turn-off time | | $V_{CC} = 30\text{ V dc}; I_C = 150\text{ mA dc};$ $I_{B1} = I_{B2} = 15\text{ mA dc}$ | t_{off} | | 140 | ns |
| <u>Subgroups 5 and 6</u> | | | | | | |
| Collector one to collector two leakage current | | $V_{(1C-2C)} = \pm 50\text{ V dc}.$ | $1_{(1C-2C)}$ | | ± 1 | nA dc |

See footnotes at end of table.

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* TABLE I. Group A inspection - Continued.

| Inspection <u>1/</u> | MIL-STD-750 | | Symbol | Limit | | Unit |
|--|-------------|---------------------|--------|-------|-----|------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 6</u> Not applicable | | | | | | |
| <u>Subgroup 7</u> Decap internal visual (design verification) | 2075 | n = 1 device, c = 0 | | | | |

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

2/ For resubmission of failed test in subgroup 1 of table I, double the sample size of the failed test or sequence of tests. A failure in table I, subgroup 1 shall not require retest of the entire subgroup. Only the failed test shall be rerun upon submission.

3/ Separate samples may be used.

4/ Not required for JANS devices.

5/ Not required for laser marked devices.

6/ This hermetic seal test is an end-point to temp-cycling in addition to electrical measurements.

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* TABLE II. Group D inspection.

| Inspection <u>1/ 2/ 3/</u> | MIL-STD-750 | | Symbol | Limit | | Unit |
|---|-------------|--|----------------------------|----------------|------------|------------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 1 4/</u> | | | | | | |
| Neutron irradiation | 1017 | Neutron exposure $V_{CES} = 0$ V | | | | |
| Collector to base cutoff current | 3036 | Bias condition D; $V_{CB} = 60$ V dc | I_{CBO1} | | 20 | μ A dc |
| Breakdown voltage, collector to emitter | 3011 | Bias condition D; $I_C = 10$ mA dc; pulsed (see 4.5.1) | $V_{(BR)CEO}$ | 60 | | V dc |
| Emitter to base cutoff current | 3061 | Bias condition D; $V_{EB} = 5$ V dc | I_{EBO1} | | 20 | μ A dc |
| Collector to base cutoff current | 3036 | Bias condition D; $V_{CB} = 50$ V dc | I_{CBO2} | | 20 | nA dc |
| Emitter to base cutoff current | 3061 | Bias condition D; $V_{EB} = 3$ V dc | I_{EBO2} | | 200 | nA dc |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10$ V dc; $I_C = 0.1$ mA dc | $[h_{FE1}] \underline{5/}$ | [20] [37.5] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10$ V dc; $I_C = 1.0$ mA dc | $[h_{FE2}] \underline{5/}$ | [20] [50] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10$ V dc; $I_C = 10$ mA dc | $[h_{FE3}] \underline{5/}$ | [20] [50] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10$ V dc; $I_C = 150$ mA dc | $[h_{FE4}] \underline{5/}$ | [20] [50] | 150 300 | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10$ V dc; $I_C = 300$ mA dc | $[h_{FE5}] \underline{5/}$ | [10] [25] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 1.0$ V dc; $I_C = 150$ mA dc | $[h_{FE6}] \underline{5/}$ | [10] [25] | | |
| Collector-emitter saturation voltage | 3071 | $I_C = 150$ mA dc; $I_B = 15$ mA dc | $V_{CE(sat)1}$ | | .46 | V dc |

See footnotes at end of table.

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* TABLE II. Group D inspection - Continued.

| Inspection <u>1/</u> <u>2/</u> <u>3/</u> | MIL-STD-750 | | Symbol | Limit | | Unit |
|---|-------------|---|-------------------------------------|----------------|------|-------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 1</u> - Continued <u>4/</u> | | | | | | |
| Collector-emitter saturation voltage | 3071 | I _C = 500 mA dc; I _B = 50 mA dc | V _{CE(sat)2} | | 1.84 | V dc |
| Base-emitter saturation voltage | 3066 | Test condition A; I _C = 150 mA dc; I _B = 15 mA dc; pulsed (see 4.5.1) | V _{BE(sat)1} | | 1.50 | V dc |
| Base-emitter saturation voltage | 3066 | Test condition A; I _C = 500 mA dc; I _B = 50 mA dc; pulsed (see 4.5.1) | V _{BE(sat)2} | | 2.99 | V dc |
| * Forward-current transfer ratio (gain ratio) 2N5795A, 2N5796A, and 2N5796UCA | 3076 | V _{CE} = 10 V dc; I _C = 1 mA dc; pulsed (see 4.5.1) | $\frac{h_{FE2-1}}{h_{FE2-2}}$ | 0.8 | 1.2 | |
| * Forward-current transfer ratio (gain ratio) 2N5795A, 2N5796A, and 2N5796UCA | 3076 | V _{CE} = 10 V dc; I _C = 10 mA dc; pulsed (see 4.5.1) | $\frac{h_{FE3-1}}{h_{FE3-2}}$ | 0.8 | 1.2 | |
| * Absolute value of base emitter-voltage differential 2N5795A, 2N5796A, and 2N5796UCA | 3066 | Test condition B; V _{CE} = 10 V dc; I _C = 1 mA dc | V _{BE1} - V _{BE2} | | 20 | mV dc |
| <u>Subgroup 2</u> <u>4/</u> | | | | | | |
| Total dose irradiation | 1019 | Gamma exposure V _{CES} = 40 V; Condition A | | | | |
| Collector to base cutoff current | 3036 | Bias condition D; V _{CB} = 60 V dc | I _{CBO1} | | 20 | μA dc |
| Breakdown voltage, collector to emitter | 3011 | Bias condition D; I _C = 10 mA dc; pulsed (see 4.5.1) | V _{(BR)CEO} | 60 | | V dc |
| Emitter to base cutoff current | 3061 | Bias condition D; V _{EB} = 5 V dc | I _{EBO1} | | 20 | μA dc |
| Collector to base cutoff current | 3036 | Bias condition D; V _{CB} = 50 V dc | I _{CBO2} | | 20 | nA dc |
| Emitter to base cutoff current | 3061 | Bias condition D; V _{EB} = 3 V dc | I _{EBO2} | | 200 | nA dc |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | V _{CE} = 10 V dc; I _C = 0.1 mA dc | [h _{FE1}] <u>5/</u> | [20] [37.5] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | V _{CE} = 10 V dc; I _C = 1.0 mA dc | [h _{FE2}] <u>5/</u> | [20] [50] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | V _{CE} = 10 V dc; I _C = 10 mA dc | [h _{FE3}] <u>5/</u> | [20] [50] | | |

See footnotes at end of table.

* TABLE II. Group D inspection - Continued.

| Inspection <u>1/</u> <u>2/</u> <u>3/</u> | MIL-STD-750 | | Symbol | Limit | | Unit |
|---|-------------|--|-------------------------------|--------------|------------|-------|
| | Method | Conditions | | Min | Max | |
| <u>Subgroup 2</u> - Continued. | | | | | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 150 \text{ mA dc}$ | $[h_{FE4}]$ <u>5/</u> | [20] [50] | 150 300 | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 300 \text{ mA dc}$ | $[h_{FE5}]$ <u>5/</u> | [10] [25] | | |
| Forward-current transfer ratio 2N5795, 2N5795A 2N5796, 2N5796U, 2N5796UC, 2N5796A, 2N5796AUC | 3076 | $V_{CE} = 1.0 \text{ V dc}; I_C = 150 \text{ mA dc}$ | $[h_{FE6}]$ <u>5/</u> | [10] [25] | | |
| Collector-emitter saturation voltage | 3071 | $I_C = 150 \text{ mA dc}; I_B = 15 \text{ mA dc}$ | $V_{CE(sat)1}$ | | .46 | V dc |
| Collector-emitter saturation voltage | 3071 | $I_C = 500 \text{ mA dc}; I_B = 50 \text{ mA dc}$ | $V_{CE(sat)2}$ | | 1.84 | V dc |
| Base-emitter saturation voltage | 3066 | Test condition A; $I_C = 150 \text{ mA dc};$ $I_B = 15 \text{ mA dc};$ pulsed (see 4.5.1) | $V_{BE(sat)1}$ | | 1.50 | V dc |
| Base-emitter saturation voltage | 3066 | Test condition A; $I_C = 500 \text{ mA dc};$ $I_B = 50 \text{ mA dc};$ pulsed (see 4.5.1) | $V_{BE(sat)2}$ | | 2.99 | V dc |
| Forward-current transfer ratio (gain ratio) * 2N5795A, 2N5796A, and 2N5796UCA | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 1 \text{ mA dc};$ pulsed (see 4.5.1) | $\frac{h_{FE2-1}}{h_{FE2-2}}$ | 0.8 | 1.2 | |
| Forward-current transfer ratio (gain ratio) * 2N5795A, 2N5796A, and 2N5796UCA | 3076 | $V_{CE} = 10 \text{ V dc}; I_C = 150 \text{ mA dc};$ pulsed (see 4.5.1) | $\frac{h_{FE3-1}}{h_{FE3-2}}$ | 0.8 | 1.2 | |
| Absolute value of base emitter-voltage differential * 2N5795A, 2N5796A, and 2N5796UCA | 3066 | Test condition B; $V_{CE} = 10 \text{ V dc};$ $I_C = 1 \text{ mA dc}$ | $ V_{BE1} - V_{BE2} $ | | 20 | mV dc |

1/ Tests to be performed on all devices receiving radiation exposure.

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

3/ Electrical characteristics apply to the corresponding AL, UA, UB, and UBC suffix versions unless otherwise noted.

4/ See 6.2.e herein.

5/ See method 1019 of MIL-STD-750 to determine $[h_{FE}]$ by first calculating the delta ($1/h_{FE}$) from the pre- and post-radiation h_{FE} . The $[h_{FE}]$ is not the same as h_{FE} and cannot be measured directly. The $[h_{FE}]$ value can never exceed the pre-radiation minimum h_{FE} that it is based upon.

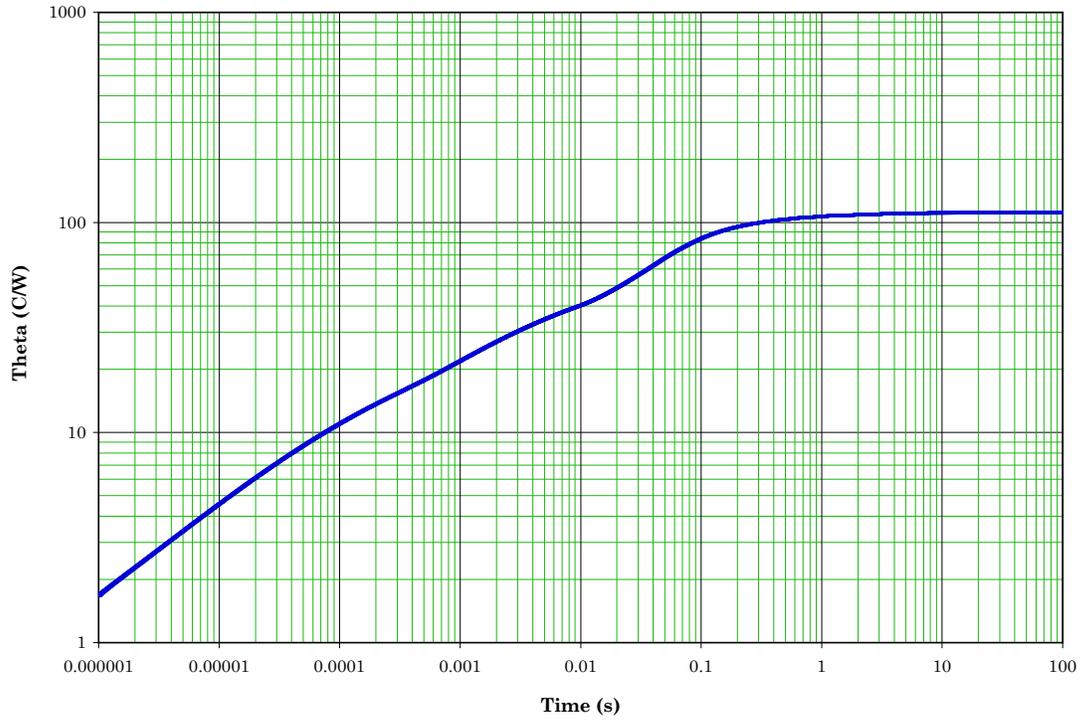
MIL-PRF-19500/496E

* TABLE III. Group E inspection (all quality levels) - for qualification or re-qualification only.

| Inspection | MIL-STD-750 | | Qualification |
|-------------------------------------|-------------|---|---------------------|
| | Method | Conditions | |
| <u>Subgroup 1</u> | | | 45 devices c = 0 |
| Temperature cycling (air to air) | 1051 | Test condition C, 500 cycles. | |
| Hermetic seal | 1071 | | |
| Fine leak | | | |
| Gross leak | | | |
| Electrical measurements | | See table I, subgroup 2 herein. | |
| <u>Subgroup 2</u> | | | 45 devices c = 0 |
| Intermittent life | 1037 | Intermittent operation life: $V_{CB} = 10$ V dc, 6,000 cycles. Adjust device current, or power, to achieve a minimum ΔT_J of +100°C. | |
| Electrical measurements | | See table I, subgroup 2 herein. | |
| <u>Subgroup 4</u> | | | |
| Thermal impedance curves | | See table E-IX of MIL-PRF-19500, group E, subgroup 4. | |
| <u>Subgroup 5</u> | | | |
| Not applicable | | | |
| <u>Subgroup 6</u> | | | 3 devices |
| Electrostatic discharge (ESD) | 1020 | | |
| <u>Subgroup 8</u> | | | 45 devices c = 0 |
| Reverse stability | 1033 | Condition B. | |

Maximum Thermal Impedance

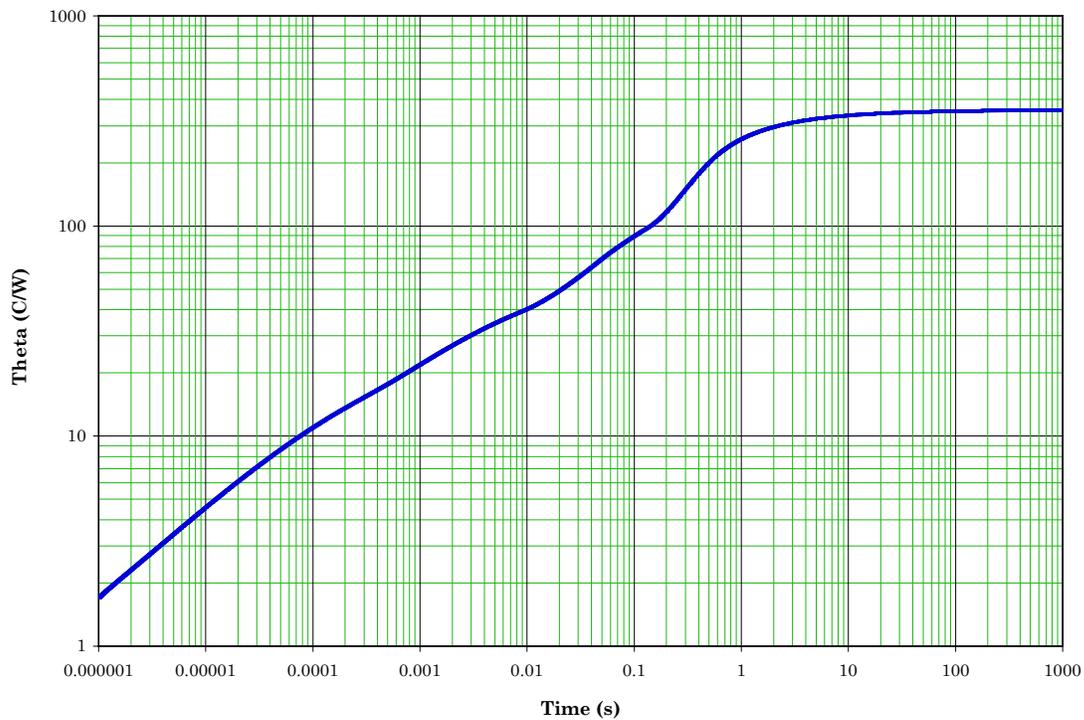
023F Half-Dual Chip LCC6 (U) Theta-JSP (Infinite Mount) Tsp=25C



* FIGURE 4. Thermal impedance graph ($R_{\theta JSP}$) for 2N5796U, 2N5796UC, 2N5796AU, and 2N5796AUC (U and UC).

Maximum Thermal Impedance

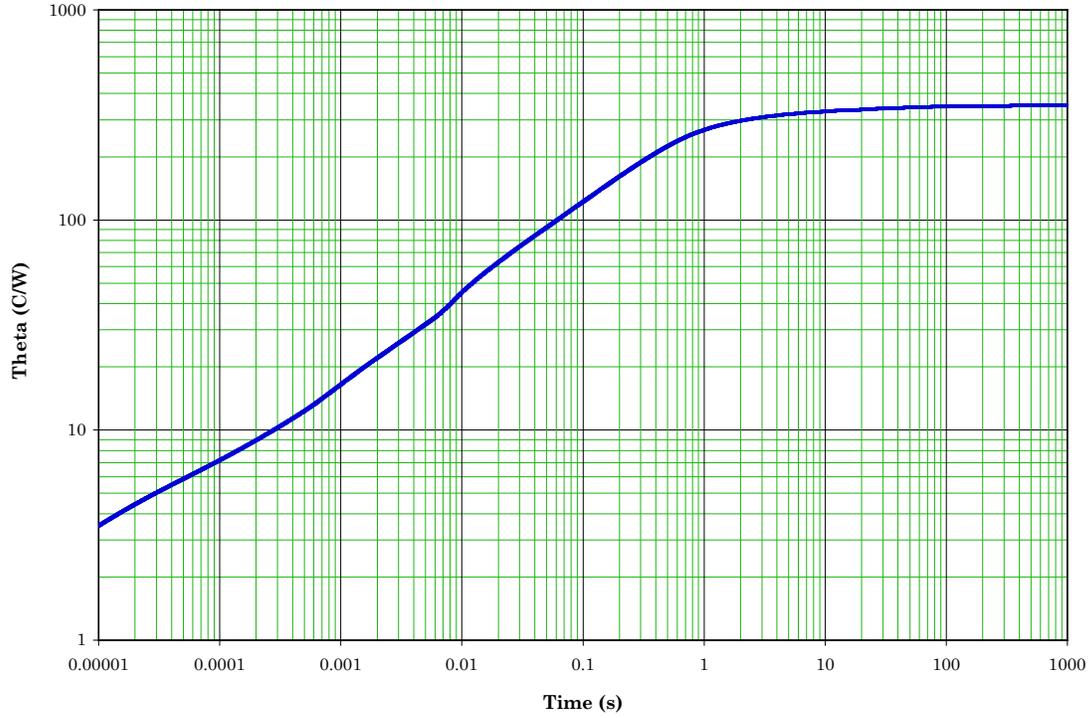
023F Dual Chip LCC6 (U) Theta-JA (FR4 PCB Mount) Ta=25C



* FIGURE 5. Thermal impedance graph ($R_{\theta JPCB}$) for 2N5796U, 2N5796UC, 2N5796AU, and 2N5796AUC (U and UC).

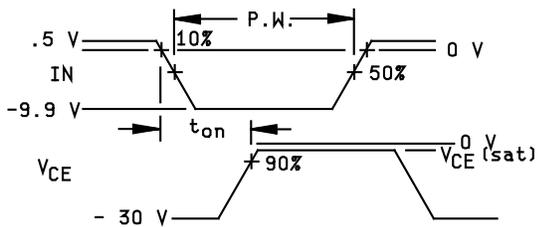
Maximum Thermal Impedance

TO-78 with 023F Chip Thermal Impedance per Side with Other Side Equally Biased

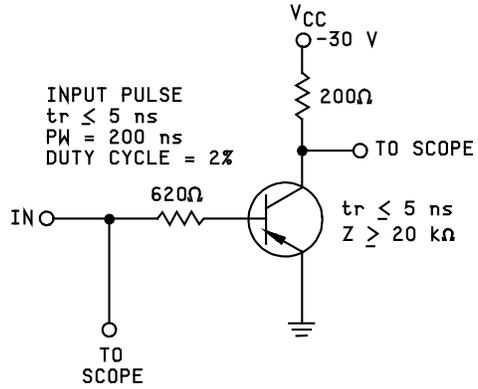


* FIGURE 6. Thermal impedance graph ($R_{\theta JA}$) for 2N5796U, 2N5796UC, 2N5796AU, and 2N5796AUC (U and UC).

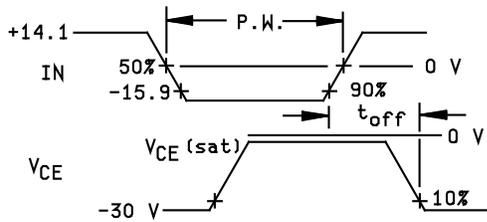
$V_{CC} = -30 \text{ V dc}$
 $V_{EB(\text{off})} = 0.5 \text{ V dc}$
 $I_C \approx -150 \text{ mA dc}$
 $I_B \approx -15 \text{ mA dc}$



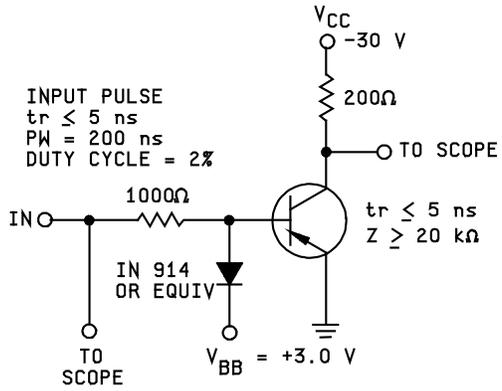
TURN-ON (t_{on}) TIME TEST CIRCUIT



$V_{CC} = -30 \text{ V dc}$
 $I_C \approx -150 \text{ mA dc}$
 $I_{B1} \approx I_{B2} \approx -15 \text{ mA dc}$



TURN-ON (t_{off}) TIME TEST CIRCUIT



* FIGURE 7. Turn-off time test circuits.

5. PACKAGING

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

6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Packaging requirements (see 5.1).
- c. Lead finish (see 3.4.1).
- d. Product assurance level and type designator.
- e. For acquisition of RHA designed devices, table II, subgroup 1 testing of group D is optional. If subgroup 1 testing is desired, it should be specified in the contract.

* 6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center, Columbus, ATTN: DSCC/VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail vqe.chief@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.daps.dla.mil>.

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

Custodians:

Army - CR
Navy - EC
Air Force - 85
NASA - NA
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2009-082)

Review activities:

Army - AR, MI, SM
Navy - AS, MC, OS
Air Force - 19

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