The documentation and process conversion measures necessary to comply with this revision shall be completed by 18 January 2013.

INCH–POUND

MIL–PRF–19500/736A
18 October 2012
SUPERSEDING
MIL–PRF–19500/736
5 July 2006

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER DARLINGTON
TYPES 2N7572, 2N7573, AND 2N7574, JAN, JANTX, JANTXV, AND JANS

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

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

1. SCOPE

1.1 Scope. This specification covers the performance requirements for NPN silicon, power darlington transistors. Four levels of product assurance are provided for each device type as specified in MIL–PRF–19500.

1.2 Physical dimensions. The device package style is TO–210AC (formerly TO–61 isolated) in accordance with figure 1.

1.3 Maximum ratings. Unless otherwise specified, $T_C$ = +25°C.

| Types | $P_T$ | | $R_{\theta JC}$ (2) | $V_{CBO}$ and $V_{CEX}$ | $V_{CEO}$ | $V_{EBO}$ | $I_B$ | $I_C$ | $T_J$ and $T_{STG}$ |
|---|---|---|---|---|---|---|---|---|---|
| | $T_A$ = +25°C | $T_C$ = +25°C (1) | | | | | | | |
| | W | W | °C/W | V dc | V dc | V dc | A dc | A dc | °C |
| 2N7572 | 6 | 140 | 1.25 | 350 | 300 | 4.0 | 2.5 | 20 | –65 to +200 |
| 2N7573 | 6 | 140 | 1.25 | 400 | 350 | 4.0 | 2.5 | 20 | –65 to +200 |
| 2N7574 | 6 | 140 | 1.25 | 450 | 400 | 4.0 | 2.5 | 20 | –65 to +200 |

(1) See figure 2 for temperature-power derating curves.
(2) See figure 3 for thermal impedance graph.

Comments, suggestions, or questions on this document should be addressed DLA Land and Maritime ATTN: VAC, P.O. Box 3990, Columbus, OH 43218–3990, or emailed to semiconductor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

1.4 Primary electrical characteristics. Unless otherwise specified, $T_C$ = +25°C.

| Limits | $h_{FE1}$ (1)<br>$V_{CE}$ = 5 V dc<br>$I_C$ = 10 A dc | $h_{FE2}$ (1)<br>$V_{CE}$ = 5V dc<br>$I_C$ = 20 A dc | $V_{BE(sat)}$<br>$I_C$ = 15 A dc<br>$I_B$ = 1.2 A dc | $V_{CE(sat)1}$<br>$I_C$ = 15 A dc<br>$I_B$ = 1.2 A dc |
|---|---|---|---|---|
| | | | V dc | V dc |
| Min | 75 | 50 | | |
| Max | 500 | | 2.6 | 1.5 |

| | $\|h_{fe}\|$ | $C_{obo}$ | Pulse response (2) | | | |
|---|---|---|---|---|---|---|
| Limits | $V_{CE}$ = 10 V dc<br>$I_C$ = 1 A dc<br>f = 1 MHz | $V_{CB}$ = 10 V dc<br>$I_E$ = 0<br>100 KHz < f < 1 MHz | $t_d$ | $t_r$ | $t_s$ | $t_f$ |
| | | pF | µs | µs | µs | µs |
| Min | 25 | | | | | |
| Max | | 375 | 0.1 | 0.3 | 1.2 | 0.3 |

(1) Pulsed (see 4.5.1).
(2) See figure 4 for pulse response circuits.

## 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.dla.mil/quicksearch or https://assist.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.

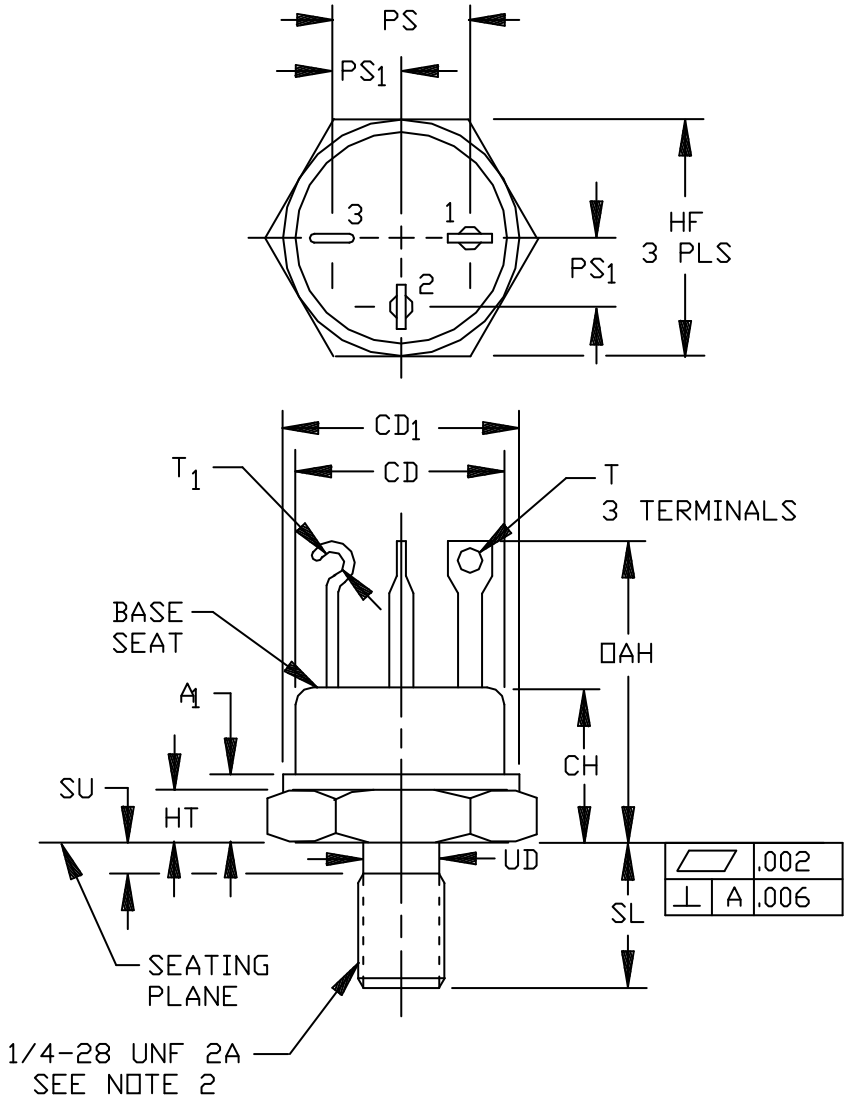



FIGURE 1. Physical dimensions (TO–210AC, formerly TO–61).

| Ltr | Dimension | | | | Notes |
|---|---|---|---|---|---|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| $A_1$ | | .270 | | 6.86 | |
| CD | .570 | .610 | 14.48 | 15.49 | |
| $CD_1$ | .610 | .687 | 15.49 | 17.45 | |
| CH | .325 | .460 | 8.26 | 11.68 | |
| HF | .667 | .687 | 16.94 | 17.45 | |
| HT | .090 | .150 | 2.29 | 3.81 | |
| OAH | .640 | .875 | 16.26 | 22.22 | 3 |
| PS | .340 | .415 | 8.64 | 10.54 | 4, 6 |
| $PS_1$ | .170 | .213 | 4.32 | 5.41 | 4, 6 |
| SL | .422 | .455 | 10.72 | 11.56 | |
| SU | | .090 | | 2.29 | |
| T | .047 | .072 | 1.19 | 1.83 | |
| $T_1$ | .046 | .077 | 1.17 | 1.96 | |
| UD | .220 | .249 | 5.59 | 6.32 | |

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. See NSB Handbook H28, "Screw–Thread Standards for Federal Services".
3. All three terminals.
4. The orientation of the terminals in relation to the hex flats is not controlled.
5. Terminal spacing measured at the base seat only.
6. This dimension applies to the location of the center line of the terminals.
7. Terminal 1 is emitter, terminal 2 is base, and terminal 3 is collector. All leads are isolated from the case.
8. In accordance with ASME Y14.5M, diameters are equivalent to $\phi$x symbology.

FIGURE 1. Physical dimensions (TO–210AC, formerly TO–61) – Continued.

3. REQUIREMENTS

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

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

3.3 Acronyms, symbols, and definitions. The acronyms, symbols, and definitions used herein shall be as specified in MIL–PRF–19500 and as follows:

$I_H$ – The collector current applied to the device under test during the heating period.
$I_M$ – The measurement current applied to forward bias the junction for measurement of $V_{BE}$.
$t_H$ – The duration of the applied heating power pulse.
$t_{SW}$ – Sample window time during which final $V_{BE}$ measurement is made.

3.4 Interface requirements and physical dimensions. The Interface requirements and physical dimensions shall be as specified in MIL–PRF–19500 and on figure 1 (TO–210AC, formerly TO–61 isolated) herein.

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

3.4.2 Polarity. The identification of terminals of the device package shall be as shown on figure 1. Terminal 1 shall be connected to the emitter, terminal 2 shall be connected to the base, and terminal 3 shall be connected to the collector.

3.5 Marking. Marking shall be in accordance with MIL–PRF–19500.

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

3.7 Electrical test requirements. The electrical test requirements shall be as specified in table I.

3.8 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 tables I and II).

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 II tests, the tests specified in table II herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

4.3 Screening (JANS, JANTXV, and JANTX levels only). 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 | JANTX and JANTXV |
| 3c (1) | Thermal impedance (see 4.3.1) | Thermal impedance (see 4.3.1) |
| 9 | $I_{CEX1}$ | $I_{CEX1}$ |
| 11 | $I_{CEX1}$ and $h_{FE2}$,<br>$\Delta I_{CEX1}$ = 100 percent of initial value or 50 nA dc, whichever is greater. | $I_{CEX1}$ and $h_{FE2}$,<br>$\Delta I_{CEX1}$ = 100 percent of initial value or 100 nA dc, whichever is greater. |
| 12 | See 4.3.2 | See 4.3.2 |
| 13 | Subgroups 2 and 3 of table I herein.<br>$\Delta I_{CEX1}$ = 100 percent of initial value or 50 nA dc, whichever is greater.<br>$\Delta h_{FE2}$ = ±15 percent of initial value. | Subgroup 2 of table I herein.<br>$\Delta I_{CEX1}$ = 100 percent of initial value or 100 nA dc, whichever is greater.<br>$\Delta h_{FE2}$ = ±25 percent of initial value. |

(1) This test shall be performed anytime after temperature cycling, screen 3a; JANTX and JANTXV levels do not need to be repeated in screening requirements.

4.3.1 Thermal impedance. The thermal impedance measurements shall be performed in accordance with test method 3131 of MIL–STD–750 using the guidelines in that test method for determining $I_M$, $I_H$, $t_H$, $t_{SW}$, (and $V_H$ where appropriate). The thermal impedance limit used in 4.3, screen 3c, and table I, subgroup 2 shall comply with the thermal impedance graph on figure 3 (less than or equal to the curve value at the same $t_H$ time) and shall be less than the process determined statistical maximum limit as outlined in test method 3131 of MIL–STD–750. Measurement delay time ($t_{MD}$) ≤ 70 μs maximum. See group E inspection (table II, subgroup 4) herein.

4.3.2 Power burn-in conditions. Power burn-in conditions shall be as follows: $T_J$ = +175°C minimum, $V_{CB}$ greater than or equal to 30 V dc; $T_A$ = +30°C maximum.

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

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with table E–V of MIL–PRF–19500 and table I herein. 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 tests and conditions specified for subgroup testing in table E–VIA (JANS) or table E–VIB (JAN, JANTX, and JANTXV) of MIL–PRF–19500 and herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable step of 4.6 herein.

4.4.2.1 Product assurance level JANS (table E–VIA of MIL–PRF–19500).

| Subgroup | Method | Conditions |
|---|---|---|
| B3 | 2037 | Test condition A. |
| B4 | 1037 | 2,000 cycles, adjust power or current to achieve a $\Delta T_J$ = +100°C. |

4.4.2.2 Product assurance levels JAN, JANTX, and JANTXV (table E–VIB of MIL–PRF–19500).

| Subgroup | Method | Conditions |
|---|---|---|
| B3 | 1027 | For eutectic die attach: $V_{CB}$ greater than or equal to 30 V dc; adjust $P_T$ to achieve $T_J$ = +175°C minimum; $T_A$ = +30°C maximum. |
| B3 | 1037 | For solder die attach: 2,000 cycles, $V_{CB}$ greater than or equal to 100 V dc. |

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E–VII of MIL–PRF–19500 and as follows herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable step of 4.6 herein.

| Subgroup | Method | Conditions |
|---|---|---|
| C2 | 2036 | Test condition A; weight = 10 pounds (4.54 Kg); time = 15 s. |
| C2 | 2036 | Test condition D1; torque = 6 inch-ounce (42.4 mN–m); time =15 s. |
| C2 | 2036 | Stud torque, test condition D2; torque = 15 inch-pound (105.9 mN–m); time = 15 s. |
| C5 | 3131 | See 4.3.1, $R_{\theta JC}$ = 1.25°C/W. |
| C6 | 1027 | For eutectic die attach: $V_{CB}$ greater than or equal to 100 V dc; adjust $P_T$ to achieve $T_J$ = +175°C minimum; $T_A$ = +30°C maximum, 1,000 hours minimum. |
| C6 | 1037 | For solder die attach: 6,000 cycles, $V_{CB}$ greater than or equal to 100 V dc. |

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table E–IX of MIL–PRF–19500 and as specified in table II herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable step of 4.6 herein.

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

4.5.1 Pulse response measurements. The conditions for pulse response measurement shall be as specified in section 4 of MIL–STD–750.

4.5.2 Insulation resistance test. Isolation resistance test conditions shall be as follows: Test method 1016 of MIL–STD–750, short collector, emitter and base terminals together. The limit shall be $10^9$ Ω minimum.

4.6 Delta measurements. The requirements for delta measurements for groups B, C, and E shall be as specified below.

| Steps | Inspection (1) (2) (3) (4) (5) | MIL–STD–750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|---|
| | | Method | Conditions | | Min | Max | |
| 1 | Collector to base cutoff current<br><br>2N7572<br>2N7573<br>2N7574 | 3036 | Bias condition D<br><br>$V_{CB}$ = 350 V dc<br>$V_{CB}$ = 400 V dc<br>$V_{CB}$ = 450 V dc | $\Delta I_{CBO}$ | 100 percent of initial value or 100 nA, whichever is greater. | | |
| 2 | Forward – current transfer ratio | 3076 | $V_{CE}$ = 5 V dc; $I_C$ = 20 A dc; pulsed (see 4.5.1) | $\Delta h_{FE2}$ | ±25 percent change from initial reading. | | |
| 3 | Saturation voltage, collector to emitter | 3071 | $I_C$ = 15 A dc; $I_B$ = 1.2 A dc, pulsed (see 4.5.1) | $\Delta V_{CE(sat)1}$ | ±200 mV change from previously measured value. | | |

(1) Devices which exceed the group A limits for this test shall not be acceptable.
(2) The delta electrical measurements for group B, product assurance level JANS, shall be as follows:
   a. In addition to the measurements specified for subgroup 4 of table E–VIA of MIL–PRF–19500, the measurements of steps 1 and 2 of this table shall also be taken.
   b. In addition to the measurements specified for subgroup 5 of table E–VIA of MIL–PRF–19500, the measurements of steps 1 and 2 of this table shall also be taken.
(3) The delta electrical measurements for group B, product assurance levels JAN, JANTX and JANTXV, shall be as follows:
   a. In addition to the measurements specified for subgroup 3 of table E–VIB of MIL–PRF–19500, the measurements of steps 1 and 2 of this table shall also be taken.
   b. In addition to the measurements specified for subgroup 6 of table E–VIB of MIL–PRF–19500, the measurements of step 2 of this table shall also be taken.
(4) The delta electrical measurements for group C, all product assurance levels, shall be as follows:
   a. In addition to the measurements specified for subgroup 3 of table E–VII of MIL–PRF–19500, the measurements of step 1 of this table shall also be taken.
   b. In addition to the measurements specified for subgroup 6 of table E–VII of MIL–PRF–19500, the measurements of steps 1, 2, and 3 of this table shall also be taken.
(5) The delta measurements for group E, all product assurance levels, shall be as follows: In addition to the measurements specified for subgroups 1 and 2 of table E–IX of MIL–PRF–19500, the measurements of all steps of this table shall also be taken.

TABLE I. Group A inspection.

| Inspection 1/ | MIL–STD–750 | | Symbol | Limit | | Unit |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 1 | | | | | | |
| Visual and mechanical examination | 2071 | | | | | |
| Subgroup 2 | | | | | | |
| Thermal impedance 2/ | 3131 | See 4.3.1 | $Z_{\theta JX}$ | | | °C/W |
| Collector to emitter breakdown voltage | 3011 | Bias condition D, $I_C$ = 200 mA dc; pulsed (see 4.5.1) | $V_{(BR)CEO}$ | | | |
| 2N7572 | | | | 300 | | V dc |
| 2N7573 | | | | 350 | | V dc |
| 2N7574 | | | | 400 | | V dc |
| Collector to emitter cutoff current | 3041 | Bias condition A, $V_{BE}$ = –1.5 V dc | $I_{CEX1}$ | | | |
| 2N7572 | | $V_{CE}$ = 350 V dc | | | 0.1 | mA dc |
| 2N7573 | | $V_{CE}$ = 400 V dc | | | 0.1 | mA dc |
| 2N7574 | | $V_{CE}$ = 450 V dc | | | 0.1 | mA dc |
| Collector to emitter cutoff current | 3041 | Bias condition A, $V_{BE}$ = –1.5 V dc | $I_{CEO}$ | | | |
| 2N7572 | | $V_{CE}$ = 300 V dc | | | 0.1 | mA dc |
| 2N7573 | | $V_{CE}$ = 350 V dc | | | 0.1 | mA dc |
| 2N7574 | | $V_{CE}$ = 400 V dc | | | 0.1 | mA dc |
| Collector to base cutoff current | 3036 | Bias condition D; | $I_{CBO}$ | | | |
| 2N7572 | | $V_{CBO}$ = 350 V dc | | | 0.1 | mA dc |
| 2N7573 | | $V_{CBO}$ = 400 V dc | | | 0.1 | mA dc |
| 2N7574 | | $V_{CBO}$ = 450 V dc | | | 0.1 | mA dc |
| Emitter-base cutoff current | 3061 | Bias condition D, $V_{EB}$ = 4 V dc | $I_{EBO}$ | | 300 | mA dc |
| Base emitter voltage | 3066 | Test condition A; $I_C$ = 15 A dc; pulsed (see 4.5.1); $I_B$ = 1.2 A dc | $V_{BE(SAT)}$ | | 2.6 | V dc |
| Saturation voltage; collector to emitter | 3071 | $I_C$ = 15 A dc; pulsed (see 4.5.1) $I_B$ = 1.2 A dc | $V_{CE(SAT)1}$ | | 1.5 | V dc |
| Saturation voltage; collector to emitter | 3071 | $I_C$ = 20 A dc; pulsed (see 4.5.1) $I_B$ = 1.2 A dc | $V_{CE(SAT)2}$ | | 1.7 | V dc |
| Forward-current transfer ratio | 3076 | $V_{CE}$ = 5 V dc; $I_C$ = 10 A dc; pulsed (see 4.5.1) | $h_{FE1}$ | 75 | 500 | |
| Forward-current transfer ratio | 3076 | $V_{CE}$ = 5 V dc; $I_C$ = 20 A dc; pulsed (see 4.5.1) | $h_{FE2}$ | 50 | | |

See footnotes at end of table.

TABLE I. Group A inspection – Continued.

| Inspection 1/ | MIL–STD–750 | | Symbol | Limit | | Unit |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 3 | | | | | | |
| High-temperature operation: | | $T_A$ = +150°C | | | | |
| Collector to emitter cutoff current | 3041 | Bias condition A; $V_{BE}$ = –1.5 V dc | $I_{CEX2}$ | | | |
| 2N7572 | | $V_{CE}$ = 350 V dc | | | 0.1 | mA dc |
| 2N7573 | | $V_{CE}$ = 400 V dc | | | 0.1 | mA dc |
| 2N7574 | | $V_{CE}$ = 400 V dc | | | 0.1 | mA dc |
| Low-temperature operation: | | $T_A$ = –55°C | | | | |
| Forward-current transfer ratio | 3076 | $V_{CE}$ = 5 V dc; $I_C$ = 10 A dc; pulsed (see 4.5.1) | $h_{FE3}$ | 20 | | |
| Subgroup 4 | | | | | | |
| Magnitude of common emitter, small-signal short circuit forward-current transfer ratio | 3306 | $V_{CE}$ = 10 V dc; $I_C$ = 1 A dc; f = 1 MHz | $\|h_{fe}\|$ | 25 | | |
| Open circuit output capacitance | 3236 | $V_{CB}$ = 10 V dc; $I_E$ = 0; 100 kHz ≤ f ≤ 1.0 MHz | $C_{obo}$ | 150 | 375 | pF |
| Pulse response: | 3251 | $V_{CC}$ = 300 V, $I_C$ = 10 A<br>$I_{B1}$ = 0.5 A, $V_{BE(off)}$ = –5 V,<br>tp = 50 µs; see figure 4 | | | | |
| Pulse delay time | | | $t_d$ | | 0.1 | µs |
| Pulse rise time | | | $t_r$ | | 0.3 | µs |
| Pulse storage time | | | $t_s$ | | 1.2 | µs |
| Pulse fall time | | | $t_f$ | | 0.3 | µs |
| Subgroup 5 | | | | | | |
| Safe operating area (continuous dc) | 3051 | $T_C$ = +25°C, t = 1 s; 1 cycle; see figure 5 | | | | |
| Test 1<br>(All device types) | | $V_{CE}$ = 7.0 V dc; $I_C$ = 20 A dc | | | | |

See footnotes at end of table.

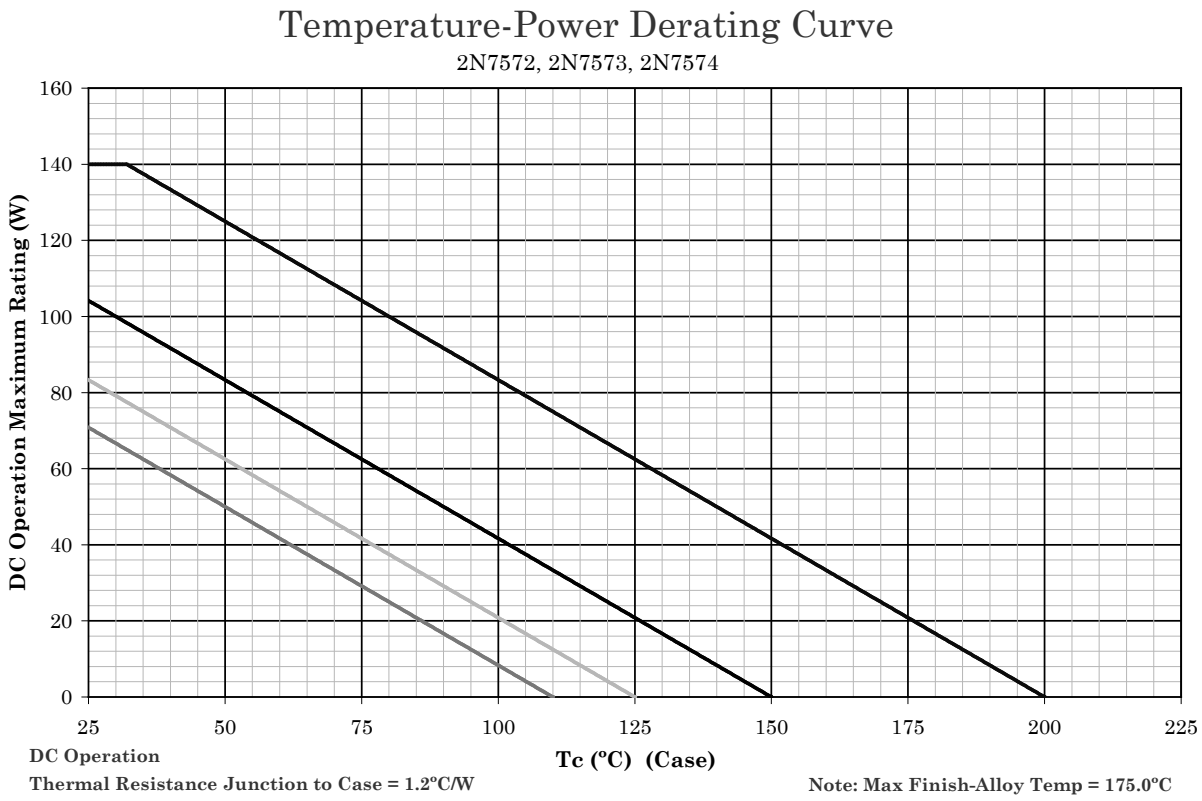
TABLE I. Group A inspection – Continued.

| Inspection 1/ | MIL–STD–750 | | Symbol | Limit | | Unit |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 5 - Continued. | | | | | | |
| Test 2<br>(All device types) | | $V_{CE}$ = 30 V dc; $I_C$ = 1.5 A dc | | | | |
| Test 3<br>(All device types) | | $V_{CE}$ = 100 V dc; $I_C$ = 0.17 A dc | | | | |
| Test 4 | | | | | | |
| 2N7572 | | $V_{CE}$ = 300 V dc; $I_C$ = 25 mA dc | | | | |
| 2N7573 | | $V_{CE}$ = 350 V dc; $I_C$ = 19 mA dc | | | | |
| 2N7574 | | $V_{CE}$ = 400 V dc; $I_C$ = 15 mA dc | | | | |
| Safe operating area (switching); inductive collector to emitter sustaining voltage (clamped at rated $V_{CEO}$) | 3053 | $T_A$ = +25°C, $I_C$ = 2 A, $I_{CB1}$ = 0.1 A, $I_{B2}$ = 0 A, L = 1 mH | $V_{CEO(sus)}$ | | | |
| 2N7572 | | Clamp voltage = 300 V dc | | 300 | | V dc |
| 2N7573 | | Clamp voltage = 350 V dc | | 350 | | V dc |
| 2N7574 | | Clamp voltage = 400 V dc | | 400 | | V dc |
| Safe operating area (switching); inductive collector to emitter sustaining voltage (clamped at rated $V_{CEO}$) | 3053 | $T_A$ = +25°C, $I_C$ = 2 A, $I_{B1}$ = 0.5 A, $V_{BE(off)}$ = 1 V, L = 1 mH | $V_{CEX(sus)}$ | | | |
| 2N7572 | | Clamp voltage = 300 V dc | | 300 | | V dc |
| 2N7573 | | Clamp voltage = 350 V dc | | 350 | | V dc |
| 2N7574 | | Clamp voltage = 400 V dc | | 400 | | V dc |
| Subgroup 6 | | | | | | |
| Not applicable | | | | | | |
| Subgroup 7 | | | | | | |
| Insulation resistance test | 1016 | See 4.5.2. | $R_{ISO}$ | $10^9\Omega$ | | |

1/ For sampling plan see MIL–PRF–19500.
2/ This test required for the following end-point measurements only:
Group B, subgroups 3, 4, and 5 (JANS).
Group B, subgroups 2 and 3 (JAN, JANTX, and JANTXV).
Group C, subgroup 2 and 6.
Group E, subgroup 1.

TABLE II. Group E inspection (all quality levels) – for qualification and re-qualification only.

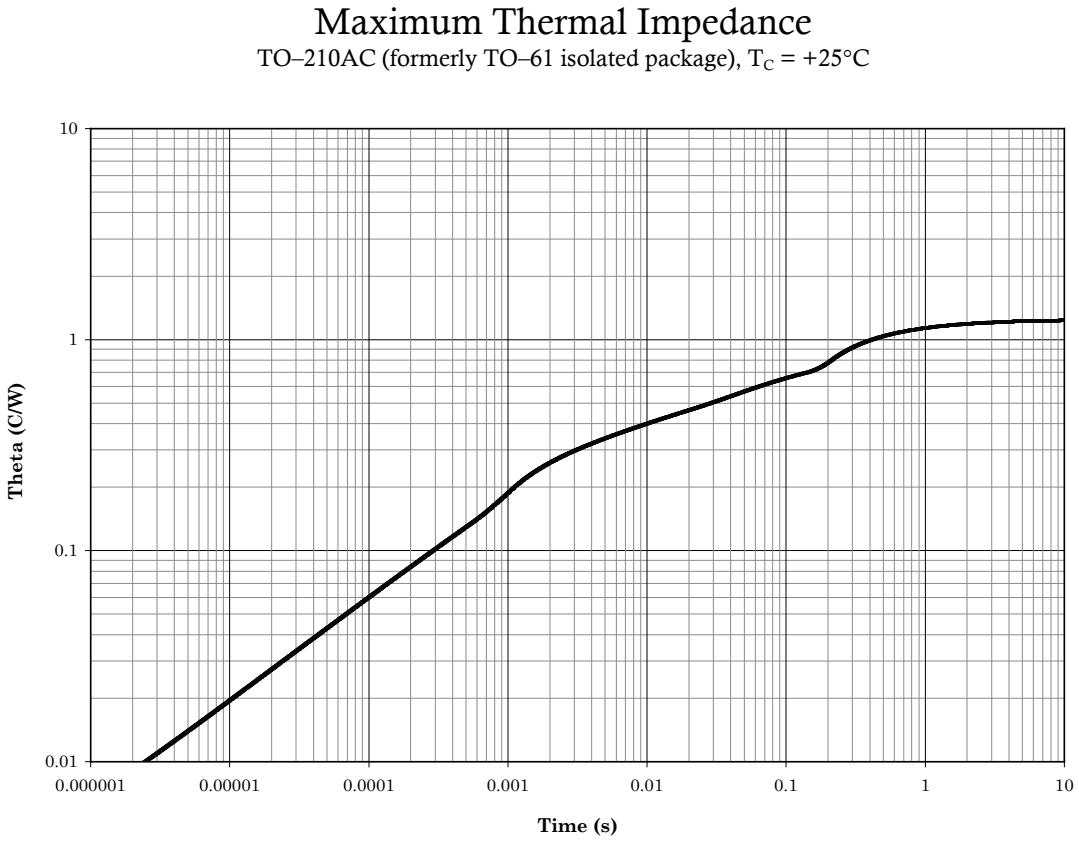
| Inspection | MIL–STD–750 | | Qualification sample plan |
|---|---|---|---|
| | Method | Conditions | |
| Subgroup 1 | | | 45 devices c = 0 |
| Thermal shock (liquid to liquid) | 1056 | 0°C to +100°C, 100 cycles | |
| Hermetic seal<br>Fine leak<br>Gross leak | 1071 | | |
| Electrical measurements | | See table I, subgroup 2 and 4.6 herein. | |
| Subgroup 2 | | | 45 devices c = 0 |
| Blocking life | 1048 | Test temperature $T_A$ = +150°C; $V_{CB}$ = 80 percent of rated; T = 1,000 hours minimum. | |
| Electrical measurements | | See table I, subgroup 2 and 4.6 herein. | |
| Subgroup 4 | | | Sample size N/A |
| Thermal impedance curves | | See MIL–PRF–19500. | |
| Subgroup 5 | | | 15 devices c = 0 |
| Barometric pressure (reduced) | 1001 | Test condition C. See 1.3. | |
| Subgroup 6 | | | 11 devices |
| Electrostatic discharge sensitivity | 1020 | | |
| Subgroup 8 | | | 45 devices c = 0 |
| Reverse voltage leakage stability | 1033 | Condition A for devices ≥ 400 V.<br>Condition B for devices < 400 V. | |




NOTES:

1. All devices are capable of operating at ≤ $T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum $T_J$ allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J$ ≤ +200°C) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at $T_J$ ≤ +150°C, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J$ ≤ +125°C, and +110°C to show power rating where most users want to limit $T_J$ in their application.

FIGURE 2. Temperature-power derating graph.




$R_{\theta JC}$ = 1.25 °C/W max.

FIGURE 3. Thermal impedance graph.

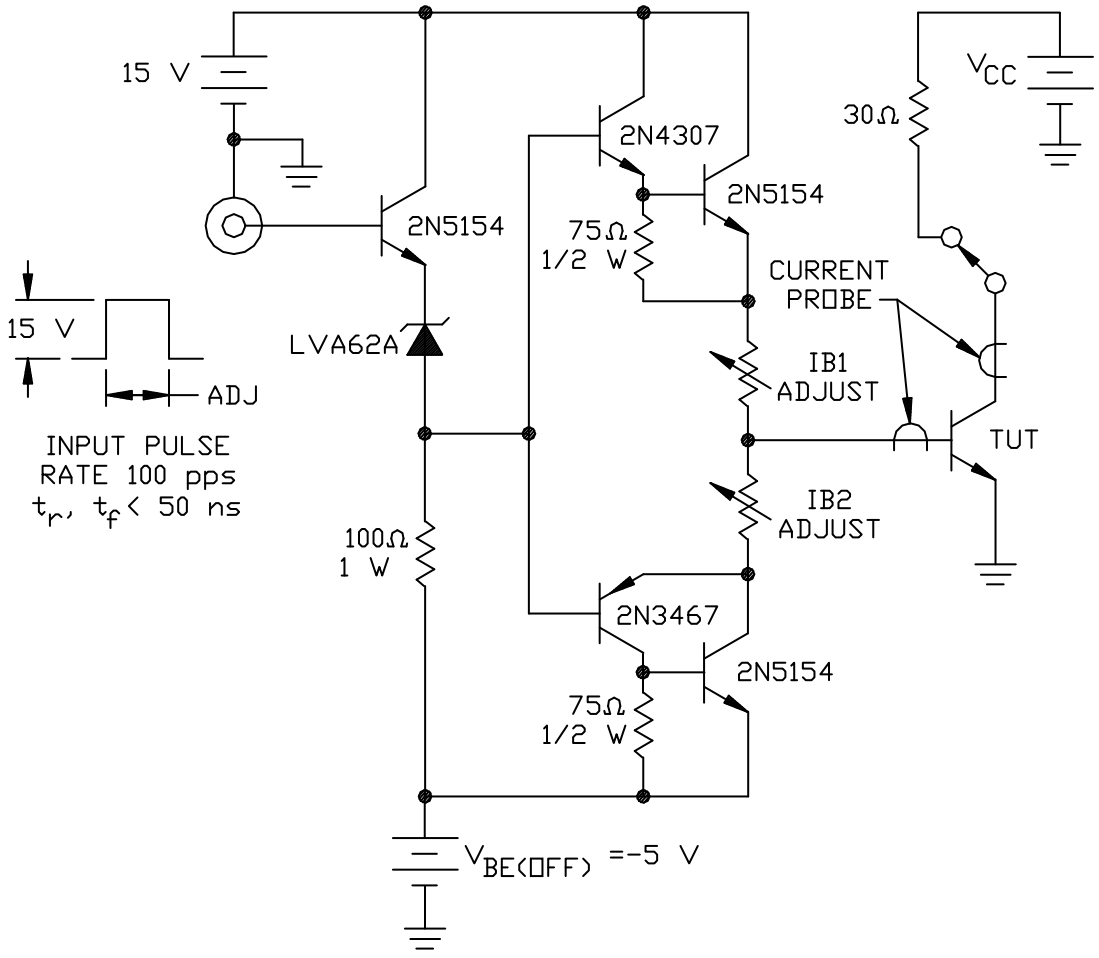



FIGURE 4. Pulse response test circuit.

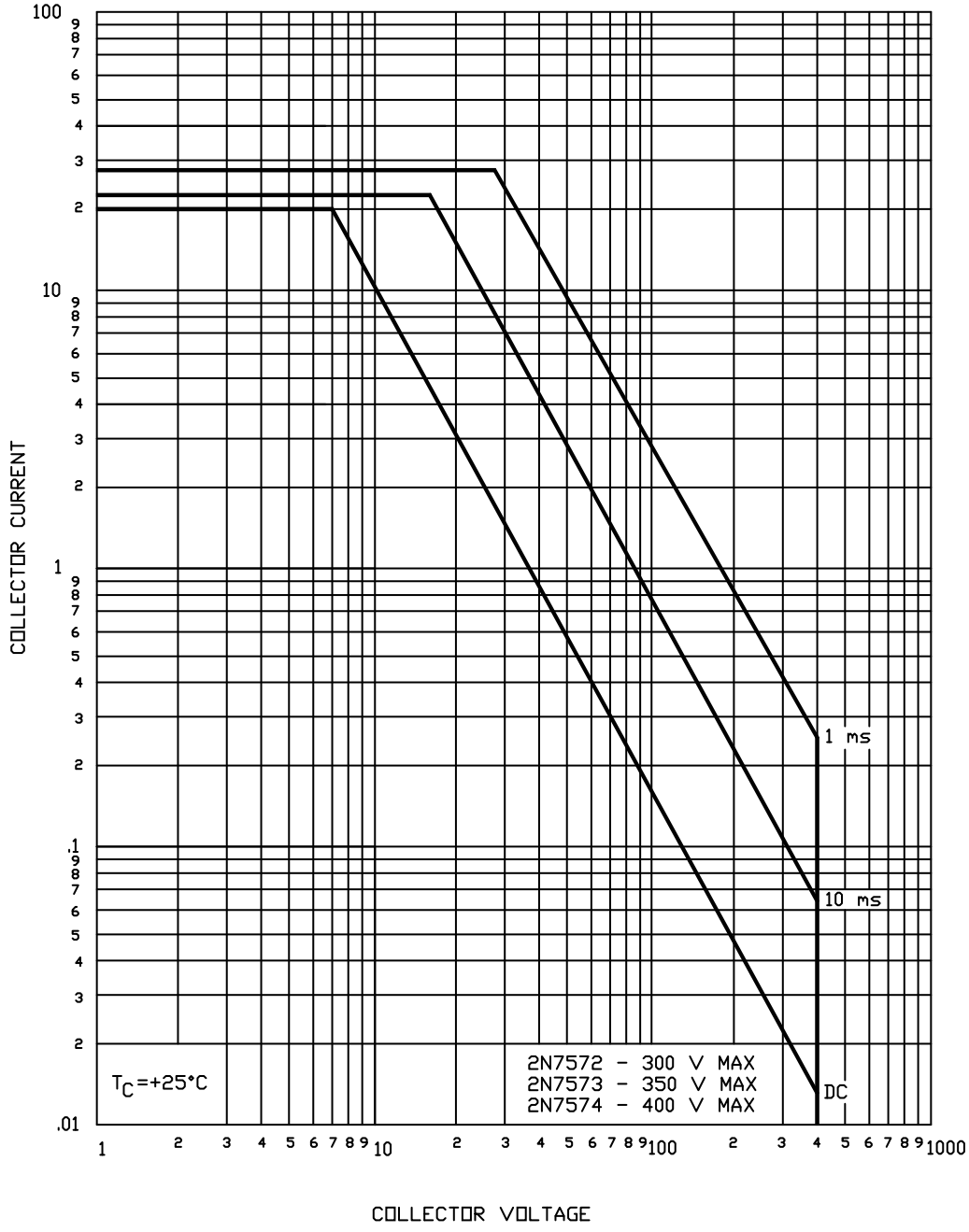



FIGURE 5. Maximum safe operating area graph.

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. Quality level and type designator.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DLA Land and Maritime, ATTN: 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.dla.mil.

6.4 Changes from previous issue. The margins of this specification are marked with vertical lines 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

Review activities:
Army – MI
Air Force – 99

Preparing activity:
DLA – CC

(Project 5961–2012–006)

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