The documentation and process conversion measures necessary to comply with this document shall be completed by 16 December, 2001.

MIL-S-19500/37E
16 September 2001
SUPERSEDING
MIL-S-19500/37D
22 November 1971

MILITARY SPECIFICATION

* SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, LOW-POWER TYPES 2N333, 2N335, 2N336, 2N333A, 2N335A, 2N336A, 2N333T2, 2N335T2, 2N336T2, 2N333LT2, 2N335LT2, 2N336LT2 2N333AT2, 2N335AT2, 2N336AT2, 2N333ALT2, 2N335ALT2, AND 2N336ALT2, JAN

Inactive for new design after 7 June 1999

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 detail requirements for silicon, NPN, low-power transistors.

* 1.2 Physical dimensions. See figure 1 (TO-5 for isolated leads only) and figure 2 (TO-205AA).

* 1.3 Maximum ratings.

| $P_T$ $T_A$ = 25°C | | $V_{CEO}$ | $V_{CBO}$ | $V_{EBO}$ | | $T_{stg}$ | |
|---|---|---|---|---|---|---|---|
| 2N333, T2, LT2<br>2N335, T2, LT2<br>2N336, T2, LT2 | 2N333A, T2, LT2<br>2N335A, T2, LT2<br>2N336A, T2, LT2 | | | 2N333, T2, LT2<br>2N335, T2, LT2<br>2N336, T2, LT2 | 2N333A, T2, LT2<br>2N335A, T2, LT2<br>2N336A, T2, LT2 | 2N333, T2, LT2<br>2N335, T2, LT2<br>2N336, T2, LT2 | 2N333A, T2, LT2<br>2N335A, T2, LT2<br>2N336A, T2, LT2 |
| mW | mW | V dc | V dc | V dc | V dc | °C | °C |
| (1) 150 | (2) 500 | 45 | 45 | 1 | 4 | -65 to +175 | -65 to +175 |

(1) Derate approximately 1 mW/°C for $T_A$ between +25°C and +175°C.
(2) Derate approximately 3.33 mW/°C for $T_A$ between +25°C and +175°C.

* 1.4 Primary electrical characteristics.

| Limits | $h_{fe}$ $V_{CB}$ = 5 V dc, $I_E$ = -1 mA | | | $f_{hfb}$ $V_{CB}$ = 5 V dc $I_E$ = -1 mA dc | $C_{obo}$ $V_{CB}$ = 5 V dc $I_E$ = 0 mA dc 100kHz ≤ f ≤ 1 MHz |
|---|---|---|---|---|---|
| | 2N333, T2, LT2<br>2N333A, T2, LT2 | 2N335, T2, LT2<br>2N335A, T2, LT2 | 2N336, T2, LT2<br>2N336A, T2, LT2 | | |
| | | | | MHz | pF |
| Min | 18 | 37 | 76 | 2.5 | |
| Max | 44 | 90 | 270 | | 15 |

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

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.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
MIL-STD-750 - Test Methods for Semiconductor Devices.

* (Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, 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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

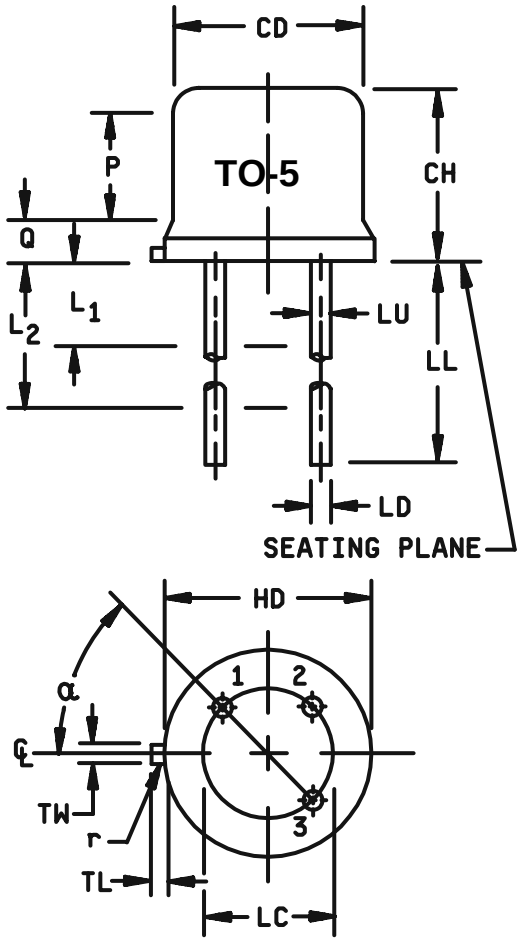
3. REQUIREMENTS

3.1 General. The requirements for acquiring the product described herein shall consist of this document and MIL-PRF-19500.

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

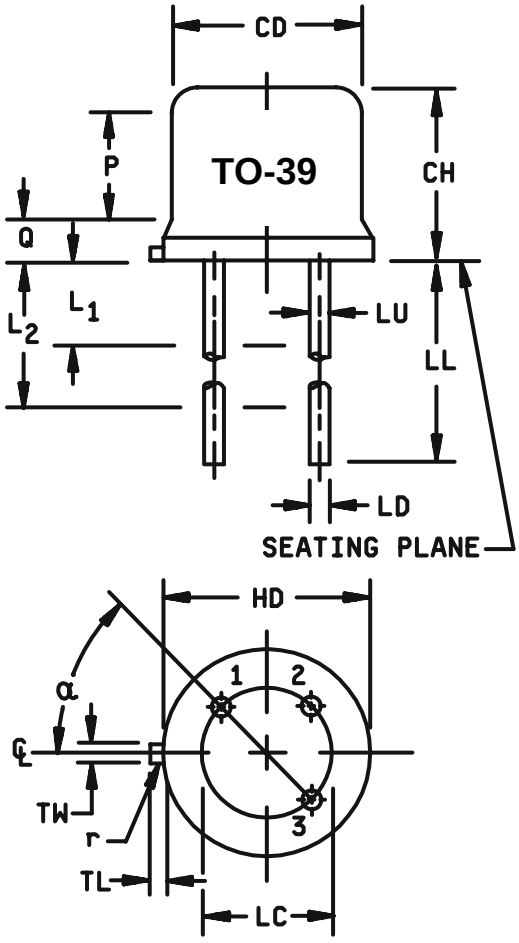
| Symbol | Dimensions | | | | Notes |
|---|---|---|---|---|---|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .305 | .335 | 7.75 | 8.51 | |
| CH | .240 | .260 | 6.10 | 6.60 | |
| HD | .335 | .370 | 8.51 | 9.40 | |
| LC | .200 TP | | 5.08 TP | | 6 |
| LD | .016 | .021 | 0.41 | 0.53 | 7, 8 |
| LL | 1.500 | 1.750 | 38.10 | 44.45 | 7, 8 |
| LU | .016 | .019 | 0.41 | 0.48 | 7, 8 |
| $L_1$ | | .050 | | 1.27 | 7, 8 |
| $L_2$ | .250 | | 6.35 | | 7, 8 |
| Q | | .050 | | 1.27 | 5 |
| TL | .029 | .045 | 0.74 | 1.14 | 3, 4 |
| TW | .028 | .034 | 0.71 | 0.86 | 3 |
| r | | .010 | | 0.25 | 10 |
| α | 45°TP | | 45°TP | | 6 |




NOTES:
1. Dimension are in inches.
2. Metric equivalents are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods.
7. Dimension LU applies between $L_1$ and $L_2$. Dimension LD applies between $L_2$ and minimum. Diameter is uncontrolled in $L_1$ and beyond LL minimum.
8. All leads electrically isolated from the case.
9. Dimension r (radius) applies to both inside corners of tab.
10. In accordance with ANSI Y14.5M, diameters are equivalent to Φx symbology.

* FIGURE 1. Physical dimensions of transistors, types 2N333, 2N333A, 2N335, 2N335A, 2N336, and 2N336A (TO-5).

| Symbol | Dimensions | | | | Notes |
|---|---|---|---|---|---|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .305 | .335 | 7.75 | 8.51 | |
| CH | .240 | .260 | 6.10 | 6.60 | |
| HD | .335 | .370 | 8.51 | 9.40 | |
| LC | .200 TP | | 5.08 TP | | 6 |
| LD | .016 | .021 | 0.41 | 0.53 | 7, 8 |
| LL | .500 | .750 | 12.70 | 19.05 | 7, 8, 12 |
| LU | .016 | .019 | 0.41 | 0.48 | 7, 8 |
| $L_1$ | | .050 | | 1.27 | 7, 8 |
| $L_2$ | .250 | | 6.35 | | 7, 8 |
| Q | | .050 | | 1.27 | 5 |
| TL | .029 | .045 | 0.74 | 1.14 | 3, 4 |
| TW | .028 | .034 | 0.71 | 0.86 | 3 |
| r | | .010 | | 0.25 | 10 |
| α | 45°TP | | 45°TP | | 6 |




NOTES:

1. Dimension are in inches.
2. Metric equivalents are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods.
7. Dimension LU applies between $L_1$ and $L_2$. Dimension LD applies between $L_2$ and minimum. Diameter is uncontrolled in $L_1$ and beyond LL minimum.
8. All three leads.
9. The collector shall be internally connected to the case.
10. Dimension r (radius) applies to both inside corners of tab.
11. In accordance with ANSI Y14.5M, diameters are equivalent to Φx symbology.
12. For "L" suffix devices, dimension LL is 1.50 (38.10 mm) minimum, 1.75 (19.05 mm) maximum.

* FIGURE 2. Physical dimensions of transistors, types 2N333T2, 2N333AT2, 2N335T2, 2N335AT2, 2N336T2, 2N336AT2 2N333LT2, 2N333ALT2, 2N335LT2, 2N335ALT2, 2N336LT2, and 2N336ALT2 (TO-205AD).

* 3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figure 1 and figure 2.

3.4.1 Lead material and finish. Lead material shall be Kovar or Alloy 52. Lead finish shall be gold-plated. (Leads may be tin-coated if specified in the contract or order, and this requirement shall not be construed as adversely affecting the qualified product status of the device, or applicable JAN marking, see 6.2).

3.4.1.1 Selectivity of lead material. Where choice of lead material (see 3.4.1) is desired, it shall be specified in the contract or order (see 6.2).

3.4.2 Terminal-lead length. Terminal-lead length(s) other than that specified in figure 1 may be furnished when so stipulated under contract or order (see 6.2) where the devices covered herein are required directly for particular equipment-circuit installation or for automatic-assembly-technique programs. Where other lead lengths are required and provided, it shall not be construed as adversely affecting the qualified product status of the device, or applicable JAN marking.

* 3.5 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4, and tables I, II, and III.

* 3.6 Electrical test requirements. The electrical test requirements shall be group A as specified herein.

* 3.7 Marking. Marking shall be in accordance with MIL-PRF-19500. At the option of the manufacturer, the following marking may be omitted from the body of the transistor.

a. Country of origin.

b. Manufacturer's identification.

* 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. Conformance inspection (see 4.3).

* 4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified in tables I, II, and III and herein.

* 4.3 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified in groups A, B, and C herein.

4.3.1 Group A inspection. Group A inspection shall consist of the inspections and tests specified in table I.

4.3.2 Group B inspection. Group B inspection shall consist of the inspections and tests specified in table II.

4.3.3 Group C inspection. Group C inspection shall consist of the inspections and tests specified in table III. This inspection shall be conducted on the initial lot and thereafter every 6 months during production.

4.3.4 Groups B and C life-test samples. Sample units that have been subjected to the group B 340-hour life test may be continued on test to 1,000 hours in order to satisfy group C life-test requirements. These sample units shall be predesignated, and shall remain subjected to the group C 1,000-hour acceptance evaluation after they have passed the group B 340-hour acceptance criteria. The cumulative total of failures found during the 340-hour test and during the subsequent interval up to 1,000 hours shall be computed for the 1,000-hour acceptance criteria (see 4.3.3).

4.3.5 Representative lot (groups B and C inspections). At the option of the manufacturer, any of the types 2N333, 2N335, and 2N336 may be used for groups B and C inspections as representative of a lot containing the prototypes, provided the type so selected is in the lot. Any of the types 2N333A, 2N335A, and 2N336A may be used for groups B and C inspections as representative of a lot containing the "A" types, provided the type so selected is in the lot.

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

4.4.1 Resistance to solvents. Transistors shall be tested in accordance with method 215 of MIL-STD-202. The following details shall apply:

a. All areas of the transistor body where marking has been applied shall be brushed.

b. After subjection to the tests, there shall be no evidence of mechanical damage to the device and markings shall have remained legible.

* TABLE I. Group A inspection.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Details | | Min | Max | |
| Subgroup 1 | | | | | | |
| Visual and mechanical examination | 2071 | | | | | |
| Subgroup 2 | | | | | | |
| Collector to emitter cutoff current | 3041 | Bias condition D; $V_{CE}$ = 30 V dc | $I_{CEO}$ | | 1.0 | µA dc |
| Collector to base cutoff current | 3036 | Bias condition D; $V_{CB}$ = 30 V dc | $I_{CBO}$ | | 0.5 | µA dc |
| Breakdown voltage, collector to base | 3001 | Bias condition D; $I_C$ = 50 µA dc | $BV_{CBO}$ | 45 | | V dc |
| Breakdown voltage, collector to emitter | 3011 | Bias condition D; $I_C$ = 1 mA dc | $BV_{CEO}$ | 45 | | V dc |
| Breakdown voltage, collector to emitter | 3011 | Bias condition D; $I_C$ = 100 µA dc | $BV_{CEO}$ | 45 | | V dc |
| Breakdown voltage, emitter to base | 3026 | Bias condition D | $BV_{EBO}$ | | | |
| 2N333, 2N335, 2N336, T2, LT2<br>2N333A, 2N335A, 2N336A, T2, LT2 | | $I_E$ = 10 µA dc<br>$I_E$ = 100 µA dc | | 1.0<br>4.0 | | V dc<br>V dc |
| Collector to emitter voltage (saturated) | | $I_C$ = 5 mA dc | $V_{CE(sat)}$ | | | |
| 2N333, 2N335, 2N336, T2, LT2<br>2N333A, 2N335A, 2N336A, T2, LT2 | | $I_B$ = 2.2 mA dc<br>$I_B$ = 1.0 mA dc | | | 1.0<br>1.0 | V dc<br>V dc |
| Forward-current transfer ratio | 3076 | $V_{CE}$ = 5 V dc; $I_C$ = 10 mA dc | $h_{FE}$ | | | |
| 2N333, 2N333A, T2, LT2<br>2N335 2N335A, T2, LT2<br>2N336, 2N336A, T2, LT2 | | | | 6<br>12<br>25 | 60<br>120<br>275 | |
| Forward-current transfer ratio | 3076 | $V_{CE}$ = 5 V dc; $I_C$ = 100 µA dc | $h_{FE}$ | | | |
| 2N333, 2N333A, T2, LT2<br>2N335 2N335A, T2, LT2<br>2N336, 2N336A, T2, LT2 | | | | 3<br>6<br>15 | | |

* TABLE I. Group A inspection - Continued.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Details | | Min | Max | |
| Subgroup 3 | | | | | | |
| High-temperature operation: | | $T_A$ = +150°C | | | | |
| Collector to base cutoff current | 3036 | Bias condition D; $V_{CB}$ = 30 V dc | $I_{CBO}$ | | 25 | µA dc |
| Low-temperature operation: | | $T_A$ = -65°C | | | | |
| Small-signal short-circuit forward-current transfer ratio | 3206 | $V_{CB}$ = 5 V dc<br>$I_E$ = -1 mA dc | $h_{fe}$ | | | |
| 2n333, 2N333A, T2, LT2<br>2N335 2N335A, T2, LT2<br>2N336, 2N336A, T2, LT2 | | | | 8<br>18<br>35 | | |
| Subgroup 4 | | | | | | |
| Small-signal open-circuit output admittance | 3216 | $V_{CB}$ = 5 V dc;<br>$I_E$ = -1 mA dc | $h_{ob}$ | 0 | 1.2 | µmho |
| Small-signal open-circuit reverse-voltage transfer ratio | 3211 | $V_{CB}$ = 5 V dc;<br>$I_E$ = -1 mA dc | $h_{rb}$ | 0 | $1x10^{-3}$ | |
| Small-signal open-circuit input impedance | 3201 | $V_{CB}$ = 5 V dc;<br>$I_E$ = -1 mA dc | $h_{ib}$ | | | |
| 2N333, 2N333A<br>2N335, 2N335A<br>2N336, 2N336A | | | | 30 | 80 | ohms |
| *For T2, and LT2 only. | | | | 20 | 80 | ohms |
| Small-signal open-circuit forward-current transfer ratio | 3206 | $V_{CB}$ = 5 V dc;<br>$I_E$ = -1 mA dc | $h_{fe}$ | | | |
| 2N333, 2N333A, T2, LT2<br>2N335, 2N335A, T2, LT2<br>2N336, 2N336A, T2, LT2 | | | | 18<br>37<br>76 | 44<br>90<br>270 | |
| Magnitude of common-emitter small-signal short-circuit forward-current transfer ratio | 3306 | $V_{CE}$ = 5 V dc; $I_C$ = 1 mA dc;<br>f = 2.5 MHz | $\lvert h_{fe} \rvert$ | | | |
| 2N333, T2, LT2<br>2N335, T2, LT2<br>2N336, T2, LT2<br>2N333A, T2, LT2<br>2N335A, T2, LT2<br>2N336A, T2, LT2 | | | | | 40<br>60<br>120<br>30<br>30<br>30 | |

* TABLE I. Group A inspection - Continued.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Details | | Min | Max | |
| Subgroup 4 | | | | | | |
| Magnitude of common-emitter small-signal short-circuit forward-current transfer ratio | 3306 | $V_{CE}$ = 5 V dc; $I_C$ = 1 mA dc; f = 10 MHz | $\lvert h_{fe} \rvert$ | | | |
| 2N333, T2, LT2 | | | | | 13 | |
| 2N335, T2, LT2 | | | | | 15 | |
| 2N336, T2, LT2 | | | | | 17 | |
| 2N333A, T2, LT2 | | | | | 13 | |
| 2N335A, T2, LT2 | | | | | 13 | |
| 2N336A, T2, LT2 | | | | | 13 | |
| Small-signal short-circuit forward-current transfer-ratio, cutoff frequency | 3301 | $V_{CB}$ = 5 V dc; $I_E$ = -1 mA dc | $f_{hfb}$ | 2.5 | | MHz |
| Subgroup 5 | | | | | | |
| Open circuit output capacitance | 3236 | $V_{CB}$ = 5 V dc; $V_{sig}$ = 0.1 Vac; 100 kHz ≤ f ≤ 1MHz | $C_{obo}$ | | 15 | pF |
| Noise figure | 3246 | $V_{CB}$ = 5 V dc; $I_E$ = -1 mA dc; f = 1kHz; $R_g$ = 500 ohms | NF | | 30 | dB |

* TABLE II. Group B inspection.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Details | | Min | Max | |
| Subgroup 1 | | | | | | |
| Physical dimensions | 2066 | (See figure 1) | | | | |
| Subgroup 2 | | | | | | |
| Solderability | 2026 | | | | | |
| Thermal shock (temperature cycling) | 1051 | Test condition C, except: 10 cycles; exposure time at temperature extremes = 15 minutes (minimum); and in step 3, $T_{max}$ = +175°C. | | | | |
| Thermal shock (glass strain) | 1056 | Test condition A | | | | |
| Moisture resistance | 1021 | | | | | |
| End points: | | | | | | |
| Collector to base cutoff current | 3036 | Bias condition D; $V_{CB}$ = 30 V dc | $I_{CBO}$ | | 0.5 | µA dc |
| Small-signal short-circuit forward-current transfer ratio | 3206 | $V_{CB}$ = 5 V dc; $I_E$ = -1 mA dc | $h_{fe}$ | | | |
| 2n333, 2N333A, T2, LT2 | | | | 18 | 44 | |
| 2N335 2N335A, T2, LT2 | | | | 37 | 90 | |
| 2N336, 2N336A, T2, LT2 | | | | 76 | 270 | |
| Subgroup 3 | | | | | | |
| Shock (2N333, 2N335, 2N336, T2, LT2) | 2016 | Nonoperating; 500 G; 1 ms; 5 blows in each orientation $X_1$, $Y_1$, $Y_2$, and $Z_1$. | | | | |
| Shock (2N333A, 2N335A, 2N336A, T2, LT2) | 2016 | Nonoperating; 1500 G; approximately 0.5 ms; 5 blows in each orientation $X_1$, $Y_1$, $Y_2$, and $Z_1$. | | | | |
| Vibration, variable frequency | 2056 | Nonoperating | | | | |
| Constant acceleration | 2006 | 20,000 G in each orientation $X_1$, $Y_1$, $Y_2$, and $Z_1$ | | | | |
| End points (Same as subgroup 2) | | | | | | |

* TABLE II. Group B inspection - Continued.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Details | | Min | Max | |
| Subgroup 4 | | | | | | |
| Terminal strength (lead fatigue) | 2036 | Test condition E | | | | |
| End points:<br>Hermetic seal | 1071 | Test conditions G or H for the fine leaks; test conditions A, C, D, or F for gross leaks. | | | $1X10^{-7}$ | atm cc/sec |
| Subgroup 5 | | | | | | |
| Alt atmosphere (corrosion) | 1041 | | | | | |
| Subgroup 6 | | | | | | |
| High temperature life (nonoperating)<br>2N333, 2N335, 2N336, T2, LT2<br>2N333A, 2N335A, 2N336A, T2, LT2 | 1032 | Time = 340 hours (see 4.3.4)<br>$T_{tg}$ = +175°C<br>$T_{tg}$ = +200°C | | | | |
| End points: | | | | | | |
| Collector to base cutoff current | 3036 | Bias condition D;<br>$V_{CB}$ = 30 V dc | $I_{CBO}$ | | 1.0 | µA dc |
| Breakdown voltage, collector to base | 3001 | Bias condition D;<br>$I_C$ = 50 µA dc | $BV_{CBO}$ | 40 | | V dc |
| Forward-current transfer ratio | 3076 | $V_{CE}$ = 5 V dc;<br>$I_C$ = 10 mA dc | $\Delta h_{FE}$ | | ±25 | Percent change from initial recorded value |
| Small-signal short-circuit forward-current transfer ratio | 3206 | $V_{CB}$ = 5 V dc;<br>$I_E$ = -1 mA dc | $h_{fe}$ | | | |
| 2n333, 2N333A, T2, LT2<br>2N335 2N335A, T2, LT2<br>2N336, 2N336A, T2, LT2 | | | | 15<br>30<br>60 | | |
| Subgroup 7 | | | | | | |
| Steady-state operation life (2N333, 2N335, 2N336, T2, LT2) | 1027 | $T_A$ = +125°C; $V_{CB}$ = 20 V dc; P = 50 mW; time = 340 hours (see 4.3.4) | | | | |
| End points:<br>(Same as subgroup 6) | | | | | | |
| Steady-state operation life (2N333A, 2N335A, 2N336A, T2, LT2) | 1027 | $T_A$ = +25°C; $V_{CB}$ = 30 V dc; P = 500 mW; time = 340 hours (see 4.3.4) | | | | |
| End points:<br>(Same as subgroup 6) | | | | | | |

* TABLE III. Group C inspection.

| Inspection | MIL-STD-750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Details | | Min | Max | |
| Subgroup 1 | | | | | | |
| Resistance to solvents | | MIL-STD-202, method 215 (see4.4.1) | | | | |
| Subgroup 2 | | | | | | |
| High temperature life (nonoperating)<br>2N333, 2N335, 2N336, T2, LT2<br>2N333A, 2N335A, 2N336A, T2, LT2 | 1031 | (see 4.3.4)<br>$T_{tsg}$ = +175°C<br>$T_{tsg}$ = +200°C | | | | |
| End points: (Same as subgroup 6 of group B) | | | | | | |
| Subgroup 3 | | | | | | |
| Steady-state operation life (2N333, 2N335, 2N336, T2, LT2) | 1026 | $T_A$ = +125°C;<br>$V_{CB}$ = 20 V dc;<br>P = 50 mW; (see 4.3.4) | | | | |
| End points: (Same as subgroup 6 of group B) | | | | | | |
| Steady-state operation life (2N333A, 2N335A, 2N336A, T2, LT2) | 1026 | $T_A$ = +25°C;<br>$V_{CB}$ = 30 V dc;<br>P = 500 mW; (see 4.3.4) | | | | |
| End points: (Same as subgroup 6 of group B) | | | | | | |

* 5. PACKAGING

* 5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel 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 Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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.)

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

* 6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.

b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).

c. Packaging requirements (see 5.1).

d. Lead finish if other than gold-plated (see 3.4.1).

e. Lead material (see 3.4.1.1).

f. Terminal-lead length if other than as specified on figure 1 (see 3.4.2).

* 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) 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 43216-5000.

* 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 - NW
Air Force - 11
DLA - CC

Review activities:
Army - AR, MI
Navy - AS, MC
Air Force - 19

Preparing activity:
DLA - CC

(Project 5961-2505)

**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-S-19500/37E | 2. DOCUMENT DATE<br>16 September 2001 |
|---|---|---|

3. **DOCUMENT TITLE** SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, LOW-POWER, TYPES 2N333, 2N335, 2N336, 2N333A, 2N335A, 2N336A, 2N333T2, 2N335T2, 2N336T2, 2N333LT2, 2N335LT2, 2N336LT2, 2N333AT2, 2N335AT2, 2N336AT2, 2N333ALT2, 2N335ALT2, AND 2N336ALT2 JAN

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>COMMERCIAL<br>DSN<br>FAX<br>EMAIL | 7. DATE SUBMITTED |

8. PREPARING ACTIVITY

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