

The documentation and process conversion measures necessary to comply with this revision shall be completed by 1 July 2002.

MIL-PRF-19500/397G  
 1 April 2002  
 SUPERSEDING  
 MIL-PRF-19500/397F  
 21 April 2000

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON  
 TYPES 2N3743, 2N4930, AND 2N4931  
 JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC

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

1. SCOPE

1.1 Scope. This specification covers the performance requirements for PNP, silicon, high-voltage transistor. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500. Two levels of product assurance for die are provided for each unencapsulated device type as specified in MIL-PRF-19500

\* 1.2 Physical dimensions. See figure 1 (TO-39) and figures 2 and 3 for JANHC and JANKC (die) dimensions.

1.3 Maximum ratings.

Type	$P_T$ (1) $T_A = +25^\circ\text{C}$	$P_T$ (2) $T_C = +25^\circ\text{C}$	$V_{CBO}$	$V_{EBO}$	$V_{CEO}$	$I_C$	$T_J$ and $T_{STG}$
	<u>W</u>	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>mA dc</u>	<u>°C</u>
2N3743	1.0	5	300	5	300	200	-65 to +200
2N4930	1.0	5	200	5	200	200	-65 to +200
2N4931	1.0	5	250	5	250	200	-65 to +200

- (1) Derate linearly at 5.71 mW/°C above  $T_A > +25^\circ\text{C}$ .
- (2) Derate linearly at 28.6 mW/°C above  $T_C > +25^\circ\text{C}$ .

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAC, Post Office 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.

1.4 Primary electrical characteristics at  $T_A = +25^\circ\text{C}$ .

Limits	$ h_{fe} $	$h_{FE1}$ (1)	$h_{FE4}$ (1)	$V_{BE(sat)2}$ (1)	$V_{CE(sat)1}$ (1)	$C_{obo}$
	$I_C = 10 \text{ mA dc}$ $V_{CE} = 20 \text{ V dc}$ $f = 20 \text{ MHz}$	$I_C = 0.1 \text{ mA dc}$ $V_{CE} = 10 \text{ V dc}$	$I_C = 30 \text{ mA dc}$ $V_{CE} = 10 \text{ V dc}$	$I_C = 30 \text{ mA dc}$ $I_B = 3 \text{ mA dc}$	$I_C = 30 \text{ mA dc}$ $I_B = 3 \text{ mA dc}$	$I_E = 0$ $V_{CB} = 20 \text{ V dc}$ $f \geq 0.1 \text{ MHz}$
Min	2.0	30	50	<u>V dc</u>	<u>V dc</u>	<u>pF</u>
Max	8.0		200	1.2	1.2	15

(1) Pulsed (see 4.5.1).

## 2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATION

## DEPARTMENT OF DEFENSE

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

## STANDARD

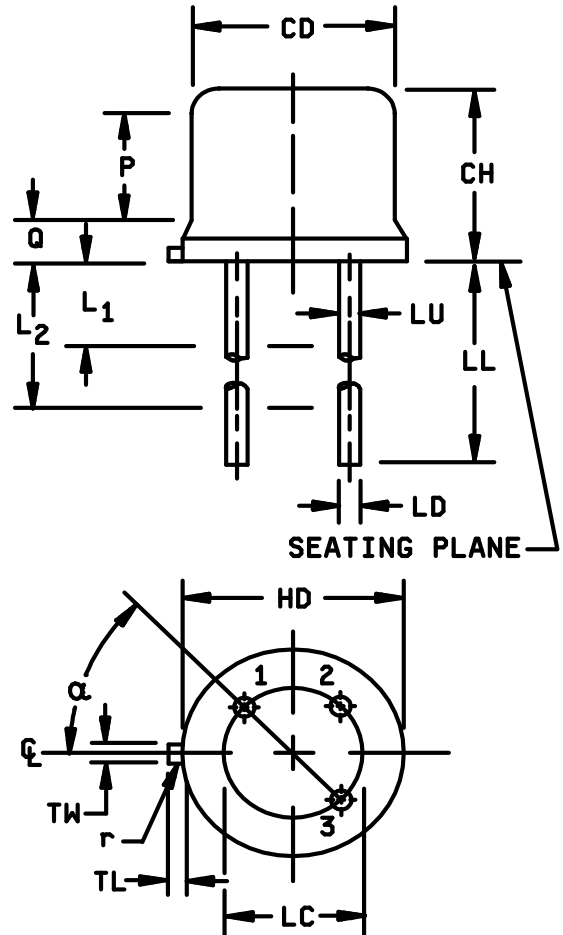
## DEPARTMENT OF DEFENSE

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 (except for related associated specifications or specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

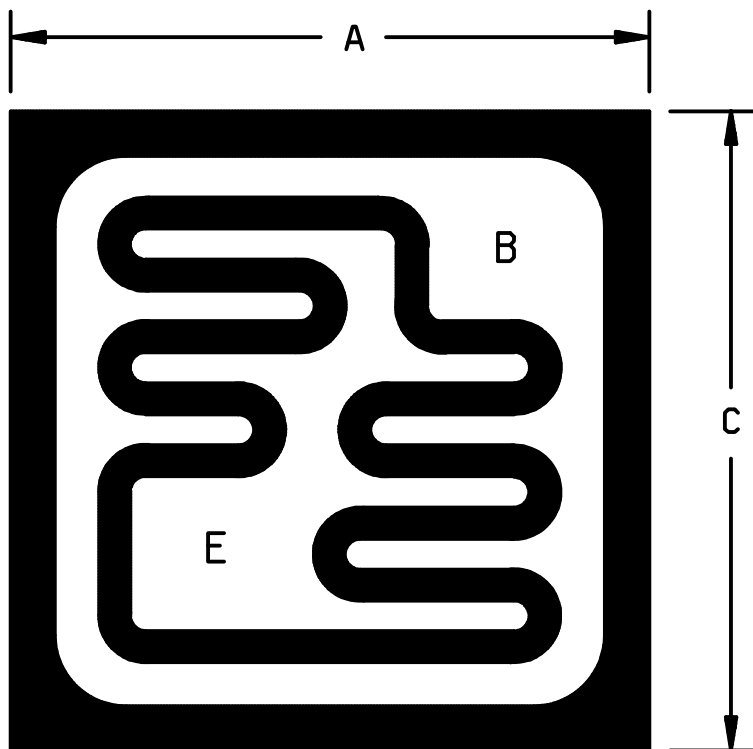
Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.240	.260	6.12	6.60	
HD	.335	.370	8.51	9.40	
LC	.200 TP		5.08 TP		7
LD	.016	.019	0.41	0.48	8,9
LL	0.500	0.750	12.7	19.0	
LU	.016	.019	0.41	0.48	8,9
L1		.050		1.27	8,9
L2	.250		6.35		8,9
P	.100		2.54		6
Q		.030		0.76	5
TL	.029	.045	0.74	1.14	3,4
TW	.028	.034	0.71	0.86	3, 4
r		.010		0.25	
$\alpha$	45° TP		45° TP		



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. CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. 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 or by the gauge and gauging procedure.
8. Dimension LU applies between L<sub>1</sub> and L<sub>2</sub>. Dimension LD applies between L<sub>2</sub> and LL minimum. Diameter is uncontrolled in L<sub>1</sub> and beyond LL minimum.
9. All three leads.
10. The collector shall be internally connected to the case.
11. Dimension r (radius) applies to both inside corners of tab.
12. In accordance with ANSI Y14.5M, diameters are equivalent to  $\phi$ x symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.

FIGURE 1. Physical dimensions (TO-39).

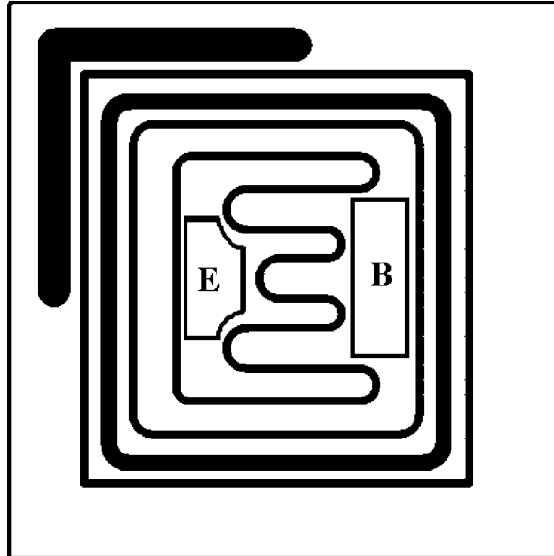


Letter	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.041	.041	1.04	1.04
C	.041	.041	1.04	1.04

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The physical characteristics of the die are:
  - Thickness: .006 inch (0.15 mm) to .012 inch (0.30 mm).
  - Top metal: Aluminum 17,500 Å minimum, 20,000 Å nominal.
  - Back metal: Gold 2,500 Å minimum, 3,000 Å nominal.
  - Back side: Collector.
  - Bonding pad: B = .004 inch (0.10 mm) x .005 inch (0.13 mm).
  - E = .004 inch (0.10 mm) x .0055 inch (0.14 mm).

FIGURE 2. JANHC and JANKC (A-version) die dimensions.



1. Chip size: 40 x 40 mils  $\pm$  1 mil.
2. Chip thickness: 10  $\pm$  1.5 mil.
3. Top metal: Aluminum 15,000 $\text{\AA}$  minimum, 18,000 $\text{\AA}$  nominal.
4. Back metal:
  - A. Al/Ti/Ni/Ag 12k $\text{\AA}$ /3k $\text{\AA}$ /7k $\text{\AA}$ /7k $\text{\AA}$  min., 15k $\text{\AA}$ /5k $\text{\AA}$ /10k $\text{\AA}$ /10k $\text{\AA}$  nom.
  - B. Gold 2,500 $\text{\AA}$  minimum, 3,000 $\text{\AA}$  nominal.
  - C. Eutectic Mount – No Gold.
5. Backside: Collector
6. Bonding pad: B = 6 x 8 mils, E = 6 x 4 mils.

FIGURE 3. JANHNC and JANKC (B-version) die dimensions.

### 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.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figure 1 (TO-39) and figures 2 and 3 for JANHC and JANKC (die) 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 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.

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

3.8 Marking. Marking shall be in accordance with MIL-PRF-19500, except for the UB suffix package. Marking on the UB package shall consist of an abbreviated part number, the date code, and the manufacturers symbol or logo. The prefixes JAN, JANTX, JANTXV, and JANS can be abbreviated as J, JX, JV, and JS respectively. The "2N" prefix and the "UB" suffix can also be omitted.

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).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and table II herein.

\* 4.2.1 JANHC and JANKC qualification. JANHC and JANKC qualification inspection shall be in accordance with MIL-PRF-19500.

\* 4.2.2 Group E qualification. Group E qualification shall be performed herein for qualification or requalification only. In case qualification was awarded to a prior revision of the associated specification that did not request the performance of table II tests, the tests specified in table II herein shall be performed by the first inspection lot to this revision to maintain qualification.

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\* 4.3 Screening (JANS, JANTX, and JANTXV levels only). Screening shall be in accordance with table 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 IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
3c	Thermal impedance, method 3131 of MIL-STD-750.	Thermal impedance, method 3131 of MIL-STD-750.
9	$I_{CBO1}$	Not applicable
11	$I_{CBO1}$ and $h_{FE4}$ $\Delta I_{CBO1} = 100$ percent of initial value or 50 nA dc, whichever is greater	$I_{CBO1}$ and $h_{FE4}$
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein; $\Delta I_{CBO1} = 100$ percent of initial value or 50 nA dc, whichever is greater; $\Delta h_{FE4} = \pm 15$ percent	Subgroup 2 of table I herein; $\Delta I_{CBO1} = 100$ percent of initial value or 50 nA dc, whichever is greater; $\Delta h_{FE4} = \pm 20$ percent

\* 4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:  $V_{CB} \geq 30$  V dc,  $T_A = +30^\circ\text{C} \pm 5^\circ\text{C}$ . NOTE: No heatsink or forced air cooling on the devices shall be permitted.  $P_T$  adjusted to achieve  $T_J$  of  $+175^\circ\text{C}$  minimum.

\* 4.3.2 Screening (JANHC and JANKC). Screening of JANHC and JANKC die shall be in accordance with MIL-PRF-19500, "Discrete Semiconductor Die/Chip Lot Acceptance". Burn-in duration for the JANKC level follows JANS requirements; the JANHC follows JANTX requirements.

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 MIL-PRF-19500, and table I herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein.

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

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B4	1037	$V_{CE} = 30$ V dc, 2,000 cycles.
B5	1027	(NOTE: If a failure occurs, resubmission shall be at the test conditions of the original sample). $V_{CB} = 10$ V dc; $P_D \geq 100$ percent of maximum rated $P_T$ (see 1.3).  Option 1: 96 hours minimum, sample size in accordance with table VIa of MIL-PRF-19500, adjust $T_A$ or $P_D$ to achieve $T_J = +275^\circ\text{C}$ minimum.  Option 2: 216 hours, sample size = 45, $c = 0$ ; adjust $T_A$ or $P_D$ to achieve $T_J = +225^\circ\text{C}$ minimum.

4.4.2.2 Group B inspection, (JAN, JANTX, and JANTXV). 1/

<u>Step</u>	<u>Method</u>	<u>Condition</u>
1	1039	Steady-state life: Test condition B, 340 hours, $V_{CB} = 10$ to 30 V dc, $T_J = 175^\circ\text{C}$ min. No heat sink shall be permitted. $n = 45$ devices, $c = 0$ .
2	1039	The steady-state life test of step 1 shall be extended to 1,000 hours for each die design. Samples shall be selected from a wafer lot every twelve months of wafer production, however, group B shall not be required more than once for any single wafer lot. $n = 45$ , $c = 0$ .
3	1032	High-temperature life (non-operating), $T_A = +200^\circ\text{C}$ . $n = 22$ , $c = 0$ .

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. Must be chosen from an inspection lot that has been submitted to and passed group A, 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 conditions specified for subgroup testing in table 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 group A, subgroup 2.

<sup>1/</sup> Separate samples may be used for each step. In the event of a group B failure, the manufacturer may double the sample size from either the failed assembly lot or from another assembly lot from the same wafer lot. If the new "assembly lot" option is exercised, the failed assembly lot shall be scrapped.



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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E.
C6	1026	$V_{CB} = 10$ to 30 V dc; $T_J = + 175^\circ\text{C}$ minimum. No heat sink or forced-air cooling on the devices shall be permitted.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E.
C5	3131	See 4.5.2.
C6		Not applicable

4.4.3.3 Group C sample selection. Samples for subgroups in group C shall be chosen at random from any lot containing the intended package type and lead finish procured to the same specification which is submitted to and passes group A tests 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 E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table IX of MIL-PRF-19500 and as specified 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.

\* 4.5.2. Thermal resistance. Thermal resistance measurements shall be conducted in accordance with method 3131 of MIL-STD-750. The limit of  $R_{\theta JC(max)}$  shall be  $35^\circ\text{C/W}$ .

- a.  $I_M$  measurement ..... 10 mA.
- b.  $V_{CE}$  measurement voltage (same as  $V_H$ ) ..... 25 V dc.
- c.  $I_H$  collector heating current ..... 0.2 A dc.
- d.  $V_H$  collector-emitter heating voltage ..... 25 V dc.
- e.  $t_H$  heating time ..... 1 second minimum.
- f.  $t_{MD}$  measurement delay time ..... 50  $\mu\text{s}$  maximum.
- g.  $t_{SW}$  sampling window time ..... 10  $\mu\text{s}$  maximum.

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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 <u>3/ 4/ 5/</u> solvent	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/</u>	1071	n = 22 devices, c = 0				
Fine leak Gross leak						
Electrical measurements <u>4/</u>		Group A, subgroup 2				
Bond strength <u>3/ 4/</u>	2037	Precondition T <sub>A</sub> = +250°C at t = 24 hrs or T <sub>A</sub> = +300°C at t = 2 hrs, n = 11 wires, c = 0				
<u>Subgroup 2</u>						
Breakdown voltage, collector to base	3001	Bias condition D, I <sub>C</sub> = 100 μA dc	V <sub>(BR)CBO</sub>			
2N3743				300		V dc
2N4930				200		V dc
2N4931				250		V dc
Breakdown voltage, collector to emitter	3011	Pulsed (see 4.5.1), bias condition D, I <sub>C</sub> = 1.0 mA dc	V <sub>(BR)CEO</sub>			
2N3743				300		V dc
2N4930				200		V dc
2N4931				250		V dc
Breakdown voltage, emitter to base	3026	Bias condition D, I <sub>E</sub> = 100 μA dc	V <sub>(BR)EBO</sub>	5		V dc

See footnotes at end of table.

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						
Collector to base cutoff current 2N3743 2N4930 2N4931	3036	Bias condition D, $I_E = 0$  $V_{CB} = 250$ V dc $V_{CB} = 150$ V dc $V_{CB} = 200$ V dc	$I_{CBO1}$		250	nA
Emitter to base cutoff current	3061	Bias condition D, $V_{EB} = 4$ V dc	$I_{EBO}$		150	nA dc
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 0.1$ mA dc, $V_{CE} = 10$ V dc	$h_{FE1}$	30		
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 1.0$ mA dc, $V_{CE} = 10$ V dc	$h_{FE2}$	40		
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 10$ mA dc, $V_{CE} = 10$ V dc	$h_{FE3}$	40		
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 30$ mA dc, $V_{CE} = 10$ V dc	$h_{FE4}$	50	200	
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 50$ mA dc, $V_{CE} = 20$ V dc	$h_{FE5}$	30		
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1), $I_C = 30$ mA dc, $I_B = 3$ mA dc	$V_{CE(sat)1}$		1.2	V dc
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1), $I_C = 10$ mA dc, $I_B = 1$ mA dc	$V_{CE(sat)2}$		1.0	V dc
Base emitter voltage (saturated)	3066	Test condition A, $I_C = 10$ mA dc, $I_B = 1$ mA dc, pulsed (see 4.5.1)	$V_{BE(sat)1}$		1.0	V dc
Base emitter voltage (saturated)	3066	Test condition A, $I_C = 30$ mA dc, $I_B = 3$ mA dc, pulsed (see 4.5.1)	$V_{BE(sat)2}$		1.2	V dc

See footnotes at end of table.

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:		$T_A = +125^\circ\text{C}$				
Collector to base cutoff current 2N3743 2N4930 2N4931	3036	Bias condition D $V_{CB} = 250\text{ V dc}$ $V_{CB} = 150\text{ V dc}$ $V_{CB} = 200\text{ V dc}$	$I_{CBO2}$		100	$\mu\text{A dc}$
Low-temperature operation:		$T_A = -55^\circ\text{C}$				
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 30\text{ mA dc}$ , $V_{CE} = 10\text{ V dc}$	$h_{FE6}$	25		
<u>Subgroup 4</u>						
Open circuit (output capacitance)	3236	$V_{CB} = 20\text{ V dc}$ , $I_E = 0$ , $f \geq 0.1\text{ MHz}$	$C_{obo}$		15	pF
Input capacitance (output open circuited)	3240	$V_{EB} = 1\text{ V dc}$ , $I_C = 0$ , $f \geq 0.1\text{ MHz}$	$C_{ibo}$		400	pF
Small-signal current gain	3306	$V_{CE} = 20\text{ V dc}$ , $I_C = 10\text{ mA dc}$ , $f = 20\text{ MHz}$	$ h_{fe} $	2	8	
Small-signal current gain	3206	$V_{CE} = 10\text{ V dc}$ , $I_C = 10\text{ mA dc}$ , $f = 1\text{ kHz}$	$h_{fe}$	30	300	
<u>Subgroup 5</u>						
Safe operating area (dc operation)	3051	$T_C = +25^\circ\text{C}$ , $t \geq 1\text{ second}$ , 1 cycle				
Test 1		$I_C = 50\text{ mA dc}$ , $V_{CE} = 20\text{ V dc}$				
Test 2		$I_C = 10\text{ mA dc}$ , $V_{CE} = 100\text{ V dc}$				
Test 3						
2N3743		$I_C = 3.3\text{ mA dc}$ , $V_{CE} = 300\text{ V dc}$				
2N4930		$I_C = 5\text{ mA dc}$ , $V_{CE} = 200\text{ V dc}$				
2N4931		$I_C = 4\text{ mA dc}$ , $V_{CE} = 250\text{ V dc}$				
Electrical measurements		See table I, group A, subgroup 2 herein				

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

2/ For resubmission of failed subgroup A1, double the sample size of the failed test or sequence of tests.

3/ Separate samples may be used.

4/ Not required for JANS.

5/ Not required for laser marked devices.

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\* TABLE II. Group E inspection (all quality levels) – for 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			
Fine leak Gross leak	1071		
Electrical measurements		See group A, subgroup 2 herein.	
<u>Subgroup 2</u>			45 devices c = 0
Intermittent life	1037	V <sub>CB</sub> = 10 V dc, 6,000 cycles.	
Electrical measurements		See group A, subgroup 2 herein.	
<u>Subgroup 3 and 4</u>			
Not applicable			
<u>Subgroup 5</u>			5 devices c = 0
Barometric pressure (2N3743 and 2N4931 only)	1001	Pressure = 8 mmHG, normal mounting, t = 60 seconds minimum.	
<u>Subgroup 6 and 7</u>			
Not applicable			
<u>Subgroup 8</u>			45 devices c = 0
Reverse stability	1033	Condition A for devices ≥ 400 V Condition B for devices < 400 V	

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 Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 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 2.2.1).
- c. The lead finish as specified (see 3.4.1).
- d. Type designation and quality assurance level.
- e. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified 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 Substitution information. Devices from this specification supersedes the following commercial Part or Identifying Number (PIN). This information in no way implies that manufacturers' PIN's are suitable as a substitute for the military PIN.

Military PIN	Superseded commercial types
2N3743	SUN1446H, SS4238H
2N4930	SUN1446H, SS5152H
2N4931	SUN1446H, ST1390H, ST147H

6.5 Suppliers of JANHC and JANKC die. The qualified die suppliers with the applicable letter version (example, JANHCA2N3743) will be identified on the qualified manufacturer's list.

JANC ordering information		
PIN	Manufacturers	
	33178	43611
2N3743	JANHCA2N3743, JANKCA2N3743	JANHCB2N3743, JANKCB2N3743
2N4930	JANHCA2N4930, JANKCA2N4930	JANHCB2N4930, JANKCB2N4930
2N4931	JANHCA2N4931, JANKCA2N4931	JANHCB2N4931, JANKCB2N4931

6.6 Changes from previous issue. The margins of this revision are marked with an asterisk 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 - 11  
 NASA - NA  
 DLA - CC

Preparing activity:  
 DLA - CC  
 (Project 5961-2560)

Review activities:  
 Army - AR, AV, MI  
 Navy - AS, MC  
 Air Force - 19, 71

**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.

<b>I RECOMMEND A CHANGE:</b>	1. DOCUMENT NUMBER MIL-PRF-19500/397G	2. DOCUMENT DATE 1 April 2002
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**1. DOCUMENT TITLE**  
SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON TYPES 2N3743, 2N4930, AND 2N4931 JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC

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

5. REASON FOR RECOMMENDATION

6. SUBMITTER

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

8. PREPARING ACTIVITY

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