

The documentation and process conversion measures necessary to comply with this document shall be completed by 20 May 2002.

INCH-POUND

MIL-PRF-19500/399D  
20 February 2002  
SUPERSEDING  
MIL-PRF-19500/399C  
29 May 2001

## PERFORMANCE SPECIFICATION

### SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, SWITCHING TYPE 2N3960 AND 2N3960UB 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 NPN silicon, switching transistors. Four levels of product assurance are provided for each device type and two levels for unencapsulated chips as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figures 1 (TO-18), figure 2 (UB), and figure 3 (JANHC, JANKC).

1.3 Maximum ratings.

$P_T$ (1) $T_A = +25^\circ\text{C}$	$V_{CBO}$	$V_{CEO}$	$V_{EBO}$	$T_J$ and $T_{STG}$
<u>mW</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>°C</u>
400	20	12	4.5	-65 to +200

(1) Derate linearly 2.3 mW/°C above  $T_A = +25^\circ\text{C}$ .

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: 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.

1.4 Primary electrical characteristics.

Limits	$h_{FE}$		$V_{CE(sat)}$		$C_{obo}$	$ h_{fe} $	$V_{BE}$	
	$V_{CE} = 1.0 \text{ V dc}$ $I_C = 1.0 \text{ mA dc}$	$V_{CE} = 1.0 \text{ V dc}$ $I_C = 10 \text{ mA dc}$	$I_C = 1.0 \text{ mA dc}$ $I_B = 0.1 \text{ mA dc}$	$I_C = 30 \text{ mA dc}$ $I_B = 3.0 \text{ mA dc}$	$V_{CB} = 4 \text{ V dc}$ $I_E = 0$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$V_{CE} = 4 \text{ V dc},$ $I_C = 5.0 \text{ mA dc}$ $f = 100 \text{ MHz}$	$I_C = 1.0 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$	$I_C = 30 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$
Min Max	40	60 300	<u>V dc</u> 0.2	<u>V dc</u> 0.3	<u>pF</u> 2.5	13	<u>V dc</u> 0.8	<u>V dc</u> 1.0

## 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

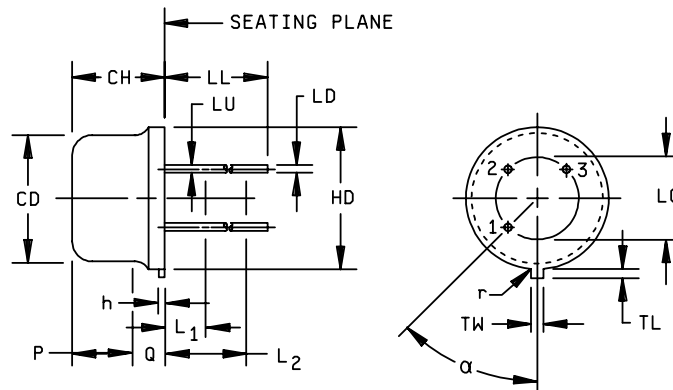
## DEPARTMENT OF DEFENSE

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 Service (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.

MIL-PRF-19500/399D

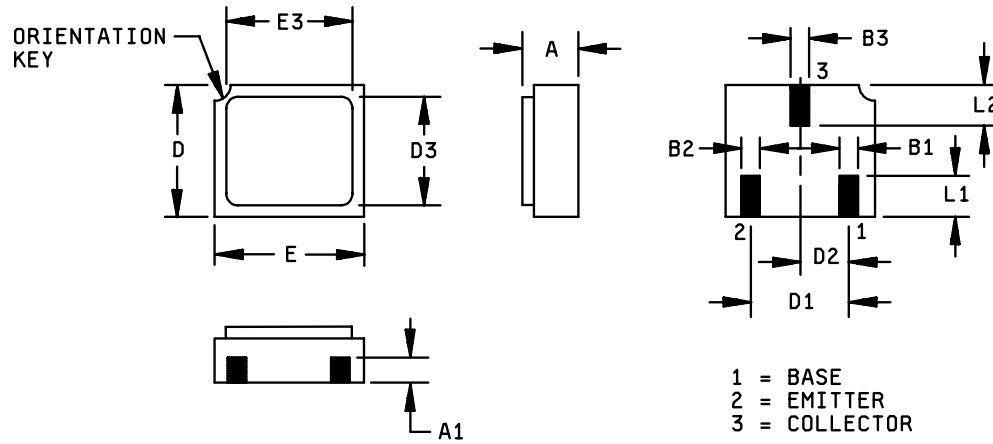


Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.178	.195	4.52	4.95	
CH	.170	.210	4.32	5.33	
HD	.209	.230	5.31	5.84	
LC	.100 TP		2.54 TP		6
LD	.016	.021	0.41	0.53	7,11
LL	.500	.750	12.70	19.05	7
LU	.016	.019	0.41	0.48	12
L1		.050		1.27	7
L2	.250		6.35		7
TL	.028	.048	0.71	1.22	3
TW	.036	.046	0.91	1.17	9
P	.100		2.54		5
Q		.040		1.02	4
r		.010		0.25	10
α	45° TP		45° TP		6

NOTES:

1. Dimensions are in inches. Lead 1 is emitter, lead 2 is base, and case is collector.
2. Metric equivalents are given for general information only.
3. Symbol TL is measured from HD maximum.
4. Details of outline in this zone are optional.
5. Symbol CD shall not vary more than .010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
6. Leads at gauge plane .054 inch (1.37 mm) +.001 inch (0.03 mm) -.000 inch (0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) relative to tab. Device may be measured by direct methods or by gauge.
7. Symbol LD applies between L<sub>1</sub> and L<sub>2</sub>. Dimension LD applies between L<sub>2</sub> and LL minimum.
8. Lead number three is electrically connected to case.
9. Beyond r maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
10. Symbol r applied to both inside corners of tab.
11. Measured in a zone beyond .250 (6.35 mm) from the seating plane.
12. Measured in the zone between .050 (1.27 mm) and .250 (6.35 mm) from the seating plane.
13. In accordance with ANSI Y14.5M, diameters are equivalent to  $\phi$ x symbology.

FIGURE 1. Physical dimensions.

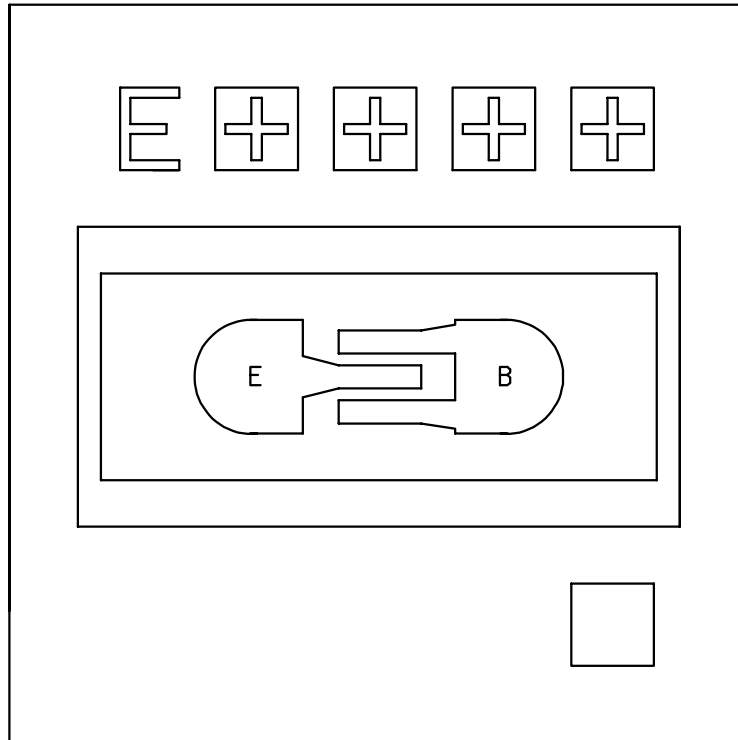


Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
A	.046	.056	0.97	1.42	
A1	.017	.035	0.43	0.89	
B1	.016	.024	0.41	0.61	
B2	.016	.024	0.41	0.61	
B3	.016	.024	0.41	0.61	
D	.085	.108	2.41	2.74	
D1	.071	.079	1.81	2.01	
D2	.035	.039	0.89	0.99	
D3	.085	.108	2.41	2.74	
E	.115	.128	2.82	3.25	
E3		.128		3.25	
L1	.022	.038	0.56	0.96	
L2	.022	.038	0.56	0.96	

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 2. Physical dimensions, surface mount (UB version).



Die size:	.016 x .016 inch (0.4064 x 0.4064 mm).
Die thickness:	.008 ±.0016 inch (0.2032 ±0.04064 mm).
Base pad:	.0027 x .0027 inch 0.06858 x 0.06858 mm).
Emitter pad:	.0027 x .0027 inch.
Back metal:	Gold, 6500 ±1950 Ang.
Top metal:	Aluminum, 17500 ±2500 Ang.
	Back side: Collector.
Glassivation:	SiO <sub>2</sub> , 7500 ±1500 Ang.

FIGURE 3. JANHC and JANKC (A-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. The interface and physical dimensions shall be as specified in MIL-PRF-19500 and figures 1 (TO-18), figure 2 (UB), and figure 3 (JANHC, JANKC).

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

3.6. Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

3.7. 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 .

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).

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

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

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	$I_{CEX2}$ and $h_{FE2}$	Not applicable
10	$V_{CB} = 12 \text{ V}$	$V_{CB} = 12 \text{ V}$
11	$I_{CEX2}$ and $h_{FE2}$ $\Delta I_{CEX2} = 100$ percent of initial value or 2 nA dc, whichever is greater; $\Delta h_{FE2} = \pm 20$ percent.	$I_{CEX2}$ and $h_{FE2}$
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein; $\Delta I_{CEX2} = 100$ percent of initial value or 2 nA dc, whichever is greater; $\Delta h_{FE2} = \pm 20$ percent.	Subgroup 2 of table I herein; $\Delta I_{CEX2} = 100$ percent of initial value or 2 nA dc, whichever is greater; $\Delta h_{FE2} = \pm 20$ percent.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:  $V_{CB} = 10 \text{ V}$  dc, power shall be  $P_T = 400 \text{ mW}$ .

4.3.2 Screening (JANHNC 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.

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, group A, 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 VIa (JANS) and table 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 table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein; they apply to subgroups B4 and B5 (JANS) and subgroups 1, 2, 3 (JAN, JANTX, JANTXV).

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

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B4	1037	$V_{CB} = 10$ V dc.
* B5	1027	$V_{CB} = 10$ V dc; 1,000 hours at 75 percent of maximum rated power shall be applied and ambient temperature adjusted to achieve $T_J = +150^\circ\text{C}$ minimum. $N = 45$ , $c = 0$ .

4.4.2.2 Group B inspection, (JAN, JANTX, and JANTXV). Separate samples may be used for each step. In the event of a group B failure, the manufacturer may pull a new sample at double 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.

<u>Step</u>	<u>Method</u>	<u>Condition</u>
1	1027	Steady-state life: Test condition B, 340 hours, $V_{CB} = 10$ V dc, power shall be applied to the device to achieve $T_J = +150^\circ\text{C}$ minimum, and minimum $P_D = 75$ percent of max rated $P_T$ (see 1.3 herein); $n = 45$ , $c = 0$ .
2	1027	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. Group B, step 2 shall not be required more than once for any single wafer lot. $n = 45$ , $c = 0$ .
3	1032	High- temperature life (non-operating), $T_A = +200^\circ\text{C}$ , $t = 340$ hours, $n = 22$ , $c = 0$ .

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

- 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.
- 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 tests and 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) and delta requirements shall be in accordance with group A, subgroup 2 and table II herein. Delta requirements apply to subgroup C6.

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

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C2	2036	Test condition E, not applicable to UB.
C6	1026	$V_{CB} = 10$ V dc, 1,000 hours; maximum rated power shall be applied and ambient temperature adjusted to achieve $T_J = +150^\circ\text{C}$ minimum $n = 45$ devices, $c = 0$ . For small lots, $n = 12$ devices, $c = 0$ .



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, (method 2036 not applicable for UB devices).
C6	1026	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 group A tests for conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for C6 life test may be pulled prior to the application of final lead finish. 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 the applicable steps of table III herein; except,  $Z_{\theta JX}$  need not be performed.

4.5 Method 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.

## MIL-PRF-19500/399D

TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1 2/</u>						
Visual and mechanical inspection <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/</u> Fine leak Gross leak	1071	n = 22 devices, c = 0				
Electrical measurements <u>4/</u>		Group A, subgroup 2				
Bond strength <u>3/ 4/</u>	2037	Precondition $T_A = +250^\circ\text{C}$ at t = 24 hrs or $T_A = +300^\circ\text{C}$ at t = 2 hrs n = 11 wires, c = 0				
<u>Subgroup 2</u>						
Collector to base cutoff current	3036	Bias condition D, $V_{CB} = 20 \text{ V dc}$	$I_{CBO}$		10	$\mu\text{A dc}$
Emitter to base cutoff current	3061	Bias condition D, $V_{EB} = 4.5 \text{ V dc}$	$I_{EBO}$		10	$\mu\text{A dc}$
Breakdown voltage, collector to emitter	3011	Bias condition D, $I_C = 10 \mu\text{A dc}$ , pulsed (see 4.5.1)	$V_{(BR)CEO}$	12		V dc
Collector to emitter cutoff current	3041	Bias condition A; $V_{CE} = 10 \text{ V dc}$ , $V_{BE} = 0.4 \text{ V dc}$	$I_{CEX1}$		1.0	$\mu\text{A dc}$
Collector to emitter cutoff current	3041	Bias condition A; $V_{CE} = 10 \text{ V dc}$ , $V_{BE} = 2.0 \text{ V dc}$	$I_{CEX2}$		5.0	nA dc
Forward-current transfer ratio	3076	$V_{CE} = 1 \text{ V dc}$ ; $I_C = 1.0 \text{ mA dc}$	$h_{FE1}$	40		

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued						
Forward-current transfer ratio	3076	$V_{CE} = 1 \text{ V dc}; I_C = 10 \text{ mA dc}$ , pulsed (see 4.5.1)	$h_{FE2}$	60	300	
Forward-current transfer ratio	3076	$V_{CE} = 1 \text{ V dc}; I_C = 30 \text{ mA dc}$ ; pulsed (see 4.5.1)	$h_{FE3}$	30		
Collector to emitter saturated voltage	3071	$I_C = 1.0 \text{ mA dc}; I_B = 0.1 \text{ mA dc}$	$V_{CE(sat)1}$		0.2	V dc
Collector to emitter saturated voltage	3071	$I_C = 30 \text{ mA dc}; I_B = 3.0 \text{ mA dc}$ , pulsed (see 4.5.1)	$V_{CE(sat)2}$		0.3	V dc
Base emitter voltage (nonsaturated)	3066	Test condition B, $V_{CE} = 1.0 \text{ V dc}$ , $I_C = 1.0 \text{ mA dc}$	$V_{BE1}$		0.8	V dc
Base emitter voltage (nonsaturated)	3066	Test condition B, $V_{CE} = 1.0 \text{ V dc}$ , $I_C = 30 \text{ mA dc}$	$V_{BE2}$		1.0	V dc
<u>Subgroup 3</u>						
High-temperature operation:		$T_A = +150^{\circ}\text{C}$				
Collector to emitter cutoff current	3041	Bias condition A; $V_{CE} = 10 \text{ V dc}$ , $V_{EB} = 2 \text{ V dc}$	$I_{CEX3}$		5.0	$\mu\text{A dc}$
Low-temperature operation:		$T_A = -55^{\circ}\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = 1.0 \text{ V dc}; I_C = 10 \text{ mA dc}$ ; pulsed (see 4.5.1)	$h_{FE4}$	30		

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u>						
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 4 \text{ V dc}; I_C = 5.0 \text{ mA dc}; f = 100 \text{ MHz}$	$ h_{fe1} $	13		
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 4 \text{ V dc}; I_C = 10 \text{ mA dc}; f = 100 \text{ MHz}$	$ h_{fe2} $	14		
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 4 \text{ V dc}; I_C = 30 \text{ mA dc}; f = 100 \text{ MHz}$	$ h_{fe3} $	12		
Open circuit output capacitance	3236	$V_{CB} = 4 \text{ V dc}; I_E = 0; 100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$C_{obo}$		2.5	pF
Input capacitance (output open-circuited)	3240	$V_{EB} = 0.5 \text{ V}, I_C = 0, 100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$C_{ibo}$		2.5	pF
<u>Subgroups 5, 6, and 7</u>						
Not applicable						

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

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

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TABLE II. Groups B, and C delta measurements.

Step	Inspection	MIL-STD-750		Symbol	Limit		Unit
		Method	Conditions		Min	Max	
1.	Forward current transfer ratio	3076	$V_{CE} = 1.0 \text{ V dc}; I_C = 10 \text{ mA dc};$ pulsed (see 4.5.1)	$\Delta h_{FE2}$	$\pm 20$ percent change from initial value		

\*TABLE III. 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	1071		
Fine leak Gross leak			
Electrical measurements		See group A, subgroup 2 and 4.5.3 herein.	
<u>Subgroup 2</u>			45 devices c = 0
Intermittent life	1037	Intermittent operation life: VCB = 10 V dc; 6,000 cycles.	
Electrical measurements		See group A, subgroup 2 and 4.5.3 herein.	
<u>Subgroup 3, 4, 5, 6, and 7</u>			
Not applicable			
<u>Subgroup 8</u>			45 devices c = 0
Reverse stability	1033	Condition A $\geq 400 \text{ V}$ Condition B $< 400 \text{ V}$	

## 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 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 2.2.1).
- 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-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 43216-5000.

6.4 Suppliers of JANHC and JANKC die. The qualified JANHC and JANKC suppliers with the applicable letter version (example JANHCA2N3960) will be identified on the QPL.

Die ordering information	
PIN	Manufacturer
	34156
2N3960	JANHCA2N3960 JANKCA2N3960

\* 6.5 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 - 11  
DLA - CC

Preparing activity:  
DLA - CC

(Project 5961-2557)

Review activities:

Army - AR, MI  
Navy - AS, MC  
Air Force - 19, 71

**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL****INSTRUCTIONS**

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**I RECOMMEND A CHANGE:**

1. DOCUMENT NUMBER  
MIL-PRF-19500/399D

2. DOCUMENT DATE  
20 February 2002

**3. DOCUMENT TITLE**

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, SWITCHING TYPE 2N3960 AND 2N3960UB JAN, JANTX, JANTXV, 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**

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