

The documentation and process conversion measures necessary to comply with this revision shall be completed by 21 October 1992

INCH-POUND

MIL-S-19500/369B
 21 October 1991
 SUPERSEDING
 MIL-S-19500/369A
 30 October 1973

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER
 TYPE: 2N3441, JANTX

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 NPN, silicon, power transistor. One level of product assurance are provided for each device type as specified in MIL-S-19500.

1.2 Physical dimensions. See figure 1 (TO-66).

1.3 Maximum ratings. $R_{\theta JC} = 7^{\circ}\text{C/W}$; $R_{\theta JA} = 58.5^{\circ}\text{C/W}$.

P_T								
$T_A = +25^{\circ}\text{C}$ 1/	$T_C = +25^{\circ}\text{C}$ 2/	V_{CBO}	V_{CEO}	V_{EBO}	V_{CER}	I_B	I_C	T_{stg} and T_J
<u>W</u>	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>A dc</u>	<u>°C</u>
3.0	25	160	140	7.0	150	2.0	3.0	-65 to +200

1/ Derate linearly 17.1 mW/°C for $T_A > +25^{\circ}\text{C}$.

2/ Derate linearly 143 mW/°C for $T_C > +25^{\circ}\text{C}$.

1.4 Primary electrical characteristics.

	h_{fe}	$ h_{fe} $	h_{fe}	$V_{CE(sat)}$	Pulse response	
	$V_{CE} = 4\text{ V dc}$ $I_C = 0.5\text{ A dc}$	$V_{CE} = 4\text{ V dc}$ $I_C = 0.5\text{ A dc}$ $f = 100\text{ MHz}$	$V_{CE} = 4\text{ V dc}$ $I_C = 0.5\text{ A dc}$	$I_C = 0.5\text{ A dc}$ $I_B = 50\text{ mA dc}$	t_{on}	t_{off}
				<u>V dc</u>	<u>μs</u>	<u>μs</u>
Min	25	4	15	---	---	---
Max	100	40	100	1	8	15

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Electronics Supply Center, ATTN: DESC-ECT, 1507 Wilmington Pike, Dayton, OH 45444-5280, by using the Standardization Document Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5961

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 shall be 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

MILITARY

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

STANDARD

MILITARY

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

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 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 Detail specification. The individual item requirements shall be in accordance with MIL-S-19500, and as specified herein.

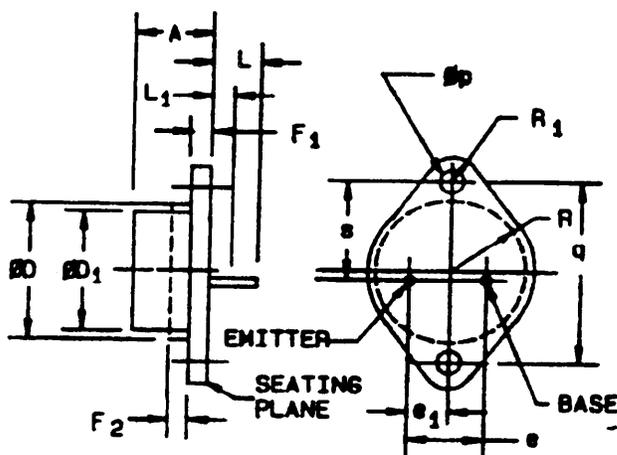
3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-S-19500.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-S-19500, and figure 1 herein.

3.3.1 Lead material and finish. Lead material shall be Kovar or Alloy 52. Lead finish shall be gold, or tin, or solder. A copper core is permitted. Where a choice of lead material or finish is desired, it shall be specified in the contract or purchase order (see 6.2).

3.4 Marking. Marking shall be in accordance with MIL-S-19500, except at the option of the manufacturer, the following marking may be omitted from the body of the device:

- a. Country of origin.
- b. Manufacturer's identification.



Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
A	.250	.340	6.35	8.64	
ϕ_b	.028	.034	0.71	0.86	5, 9
ϕ_0	---	.620	---	15.75	3
ϕ_{01}	.470	.500	11.94	12.70	3
e	.190	.210	4.83	5.33	4
e_1	.093	.107	2.36	2.72	4
F1	.050	.075	1.27	1.91	3
F2	---	.050	---	1.27	3
L	.360	.500	9.14	12.70	5
L1	---	.050	---	1.27	5, 9
ϕ_p	.142	.152	3.61	3.86	7
q	.958	.962	24.33	24.43	
R	---	.350	---	8.89	
R1	.115	.145	2.92	3.68	6
s	.570	.590	14.48	14.99	4

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Body contour is optional within zone defined by ϕ_b .
4. These dimensions shall be measured at points .050 inch (1.27 mm) to .055 inch (1.40 mm) below seating plane. When gauge is not used, measurement shall be made at seating plane.
5. Both terminals.
6. At both ends.
7. Two holes.
8. The collector shall be electrically connected to the case.
9. ϕ_b applies between L1 and L. Diameter is uncontrolled in L1.

FIGURE 1. Physical dimensions.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-S-19500, and as specified herein.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-S-19500, and as specified herein in table IV herein.

4.3 Screening (JANTX level only). Screening shall be in accordance with MIL-S-19500 (table II), 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 II of MIL-S-19500)	Measurement
	JANTX Level
9	Not applicable
11	I_{CEX1} and h_{FE3}
12	Burn-in (see 4.3.1)
13	$\Delta I_{CEX} = 100$ percent of initial value or $100 \mu A$ dc; whichever is greater. $\Delta h_{FE3} = \pm 25$ percent Subgroup 2 table I herein.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

$$T_A = +30^\circ C \pm 5^\circ C.$$

$$V_{CB} \geq 100 \text{ V dc.}$$

$$T_J = +187.5^\circ C \pm 12.5^\circ C.$$

NOTE: No heatsink or forced air cooling on the devices shall be permitted.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-S-19500, and as specified herein.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-S-19500, and table I herein. (End-point electrical measurements shall be in accordance with the applicable steps of table V herein.)

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IVb (JANTX) of MIL-S-19500, and table II herein. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table V herein.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table V of MIL-S-19500, and table III herein. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table V herein.

4.4.4 Groups A, B, C, and E electrical end-point measurements. See table V for groups A, B, C, and E electrical end-point measurements.

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 MIL-STD-750, method 3131. The following details shall apply:

- a. I_H measurement - - - - - 10 mA.
- b. V_{CE} measurement voltage - - - - - 4 V dc.
- c. I_H collector heating current - - - - - 3 A.
- d. V_H collector-emitter heating voltage - - - - - 4 V dc.
- e. t_H heating time - - - - - Steady-state (see MIL-STD-750, method 3131 for definitions).
- f. t_{HD} measurement delay time - - - - - 20 μ s.
- g. t_{SW} sample window time - - - - - 10 μ s maximum.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Breakdown voltage, collector to base	3011	Bias condition D; pulsed (see 4.5.1), $I_C = 100 \text{ mA dc}$	$V_{(BR)CEO}$	140		V dc
Breakdown voltage, collector to emitter	3011	Bias condition B; $I_C = 100 \text{ mA dc}$, $R_{BE} = 100\Omega$, pulsed (see 4.5.1)	$V_{(BR)CER}$	150		V dc
Breakdown voltage, collector to emitter	3011	Bias condition A; $I_C = 100 \text{ mA dc}$, $V_{BE} = -1.5 \text{ V dc}$, pulsed (see 4.5.1)	$V_{(BR)CEX}$	160		V dc
Emitter to base current	3061	Bias condition D; $V_{EB} = 7.0 \text{ V dc}$	I_{EBO}		1	mA dc
Collector-emitter cutoff current	3041	Bias condition A; $V_{BE} = -1.5 \text{ V dc}$, $V_{CE} = 140 \text{ V dc}$	I_{CEX1}		1	mA dc
Base emitter voltage (nonsaturated)	3066	Test condition B; pulsed (see 4.5.1), $I_C = 0.5 \text{ A dc}$, $V_{CE} = 4.0 \text{ V dc}$	V_{BE}		1.7	V dc
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1) $I_C = 0.5 \text{ A dc}$, $I_B = 50 \text{ mA dc}$	$V_{CE(sat)}$		1	V dc
Forward current transfer ratio	3076	$V_{CE} = 4 \text{ V dc}$, $I_C = 50 \text{ mA dc}$, pulsed (see 4.5.1)	h_{FE1}	50		
Forward current transfer ratio	3076	$V_{CE} = 4 \text{ V dc}$, $I_C = 0.5 \text{ A dc}$, pulsed (see 4.5.1)	h_{FE2}	25	100	
Forward current transfer ratio	3076	$V_{CE} = 4 \text{ V dc}$, $I_C = 1 \text{ A dc}$, pulsed (see 4.5.1)	h_{FE3}	10		

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3						
High temperature operation		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current	3041	Bias condition A; $V_{BE} = -1.5\text{ V dc},$ $V_{CE} = 140\text{ V dc}$	I_{CEX}		5	mA dc
Low temperature operation		$T_A = -65^\circ\text{C}$				
Forward current transfer ratio	3076	$V_{CE} = 4\text{ V dc},$ $I_C = 0.5\text{ A dc},$ pulsed (see 4.5.1)	h_{FE4}	15		
Subgroup 4						
Pulse response transfer ratio	3251	Test condition A; except test circuit and pulse requirements in accordance with figure 2 herein				
Turn-on time		$V_{CC} = 30\text{ V dc},$ (see figure 2); $I_C = 0.5\text{ A dc},$ $I_B = 50\text{ mA dc}$	t_{on}		8	μs
Turn-off time		$V_{CC} = 30\text{ V dc},$ (see figure 2); $I_C = 0.5\text{ A dc},$ $I_{B1} = -I_{B2} = 50\text{ mA dc}$	t_{off}		15	μs
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 4\text{ V dc},$ $I_C = 0.5\text{ A dc},$ $f = 100\text{ kHz}$	$ h_{fe} $	4	40	
Open circuit (output capacitance)	3236	$V_{CB} = 10\text{ V dc},$ $I_E = 0,$ $100\text{ kHz} \leq f \leq 1\text{ MHz}$	C_{obo}		300	pF
Small-signal short circuit forward-current transfer ratio	3206	$V_{CE} = 4\text{ V dc},$ $I_C = 0.5\text{ A dc},$	h_{fe}	15	100	

See footnote 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 5</u>						
Safe operating area (dc operation)	3051	$T_C = +25^\circ\text{C}$, $t = 1 \text{ s}$, 1 cycle, see figure 3				
Test 1		$I_C = 3 \text{ A dc}$, $V_{CE} = 8.33 \text{ V dc}$				
Test 2		$I_C = 833 \text{ mA dc}$, $V_{CE} = 30 \text{ V dc}$				
Test 3		$I_C = 178.5 \text{ mA dc}$, $V_{CE} = 140 \text{ V dc}$				
<u>Subgroups 6 and 7</u>						
Not applicable						

1/ For sample plan, see MIL-S-19500.

TABLE II. Group B inspection for JANTX devices.

Inspection ^{1/}	MIL-STD-750	
	Method	Conditions
<u>Subgroup 1</u> ^{2/}		
Solderability	2026	
Resistance to solvents	1022	
<u>Subgroup 2</u>		
Thermal shock (temperature cycling)	1051	
Hermetic seal	1071	
Fine leak Gross leak		
Electrical measurements		See table V, steps 1 and 3
<u>Subgroup 3</u>		
Steady-state operation life	1026	$T_J = 187.5^\circ\text{C} \pm 12.5^\circ\text{C};$ $T_A = 25^\circ\text{C} \pm 5^\circ\text{C};$ $V_{CB} \geq 24 \text{ V dc}$
Electrical measurements		See table V, steps 2, 3, 5, and 6
<u>Subgroup 4</u>		
Decap internal visual (design verification)	2075	
Bond strength	2037	Test condition A. All internal leads for each device shall be pulled separately.
<u>Subgroup 5</u>		
Not applicable		

See footnotes at end of table.

TABLE II. Group B inspection for JANTX devices - Continued.

Inspection <u>1/</u>	MIL-STD-750	
	Method	Conditions
<u>Subgroup 6</u>		
High temperature life (nonoperating)	1032	$T_{stg} = +200^{\circ}\text{C}$
Electrical measurements		See table V, steps 2, 3, and 5
<u>Subgroup 7</u>		
Safe operating area (switching)	3053	Load condition C; (unclamped inductive load), (see figure 4) $T_c = +25^{\circ}\text{C}$; duty cycle $\leq 10\%$; $R_1 = 0.1\Omega$, $t_r = t_f \leq 500 \text{ ns}$
Test 1		$t_p = 10 \text{ ms}$, (vary to obtain I_G); $V_{BB2} = 1.5 \text{ V dc}$, $R_{BB1} = 5\Omega$; $L = 5 \text{ mH}$ <u>3/</u> , $V_{BB1} = 10 \text{ V dc}$, $R_{BB2} = 100\Omega$, $V_{CC} = 10 \text{ V dc}$, $I_C = 3 \text{ A dc}$
Test 2		$t_p = 10 \text{ ms}$, (vary to obtain I_C); $V_{BB2} = 1.5 \text{ V dc}$, $R_{BB1} = 50\Omega$; $L = 100 \text{ mH}$ <u>4/</u> , $V_{BB1} = 10 \text{ V dc}$, $R_{BB2} = 100\Omega$, $V_{CC} = 10 \text{ V dc}$, $I_C = 0.5 \text{ A dc}$
Safe operating area (clamped switching) (destructive)	3053	Load condition B (see figure 4); $T_A = +25^{\circ}\text{C}$; $L = 20 \text{ mH}$ <u>5/</u> , $V_{CC} = 50 \text{ V dc}$; $I_C = 3 \text{ A dc}$ $R_{BB1} = 5\Omega$, $V_{BB1} = 10 \text{ V dc}$; Clamp voltage = 140 V dc; $R_{BB2} = 100\Omega$, $V_{BB2} = 1.5 \text{ V dc}$
Electrical measurements		Table V, steps 1 and 3

1/ For sample plan, see MIL-S-19500.

2/ A separate sample may be pulled for each test.

3/ $L = 5 \text{ mH}$ (Two Super Electric Corporation type S16884 in parallel or equivalent, dc resistance $\leq 0.1\Omega$).

4/ $L = 100 \text{ mH}$ (Two Triad C48U in series: 80 mH winding and 20 mH winding or equivalent, dc resistance $\leq 1\Omega$).

5/ $L = 20 \text{ mH}$ (Triad C48U or equivalent, dc resistance $\leq 0.1\Omega$).

TABLE III. Group C inspection (all quality levels).

Inspection <u>1/</u>	MIL-STD-750	
	Method	Conditions
<u>Subgroup 1</u>		
Physical dimensions	2066	See figure 1
<u>Subgroup 2</u>		
Thermal shock (glass strain)	1056	Test condition B
Terminal strength (tension)	2036	Test condition A; weight = 10 pounds, time = 15 s
Hermetic seal	1071	
Fine leak		
Gross leak		
Moisture resistance	1021	
Electrical measurements		See table V, steps 1 and 3
<u>Subgroup 3</u>		
Shock	2016	
Vibration, variable frequency	2056	10 G
Constant acceleration	2006	
Electrical measurements		See table V, steps 1 and 3
<u>Subgroup 4</u>		
Salt atmosphere (corrosion)	1041	
<u>Subgroup 5</u>		
Not applicable		
<u>Subgroup 6</u>		
Steady-state operation life	1026	$T_J = 187.5^\circ\text{C} \pm 12.5^\circ\text{C};$ $T_A = 25^\circ\text{C} \pm 5^\circ\text{C};$ $V_{CB} \geq 24 \text{ V dc}$
Electrical measurements		See table V, steps 1, 3, 5, and 6

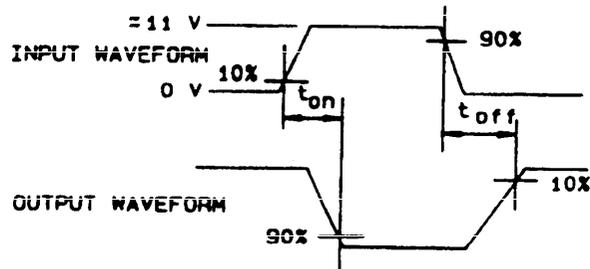
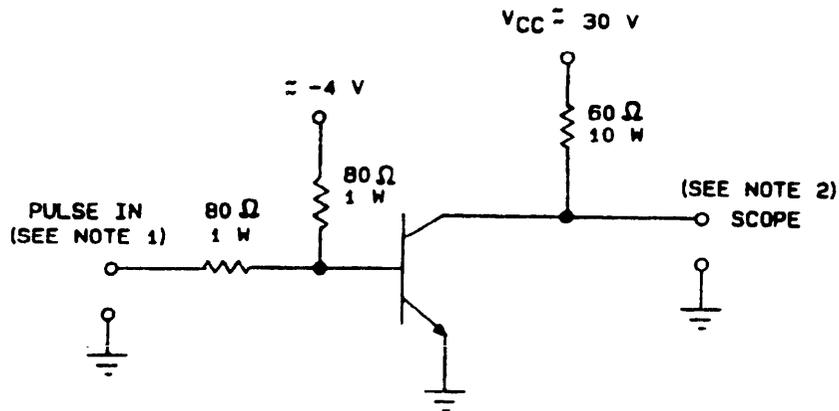
1/ For sample plan, see MIL-S-19500.

TABLE IV. Group E inspection (all quality levels) for qualification only.

Inspection <u>1/</u>	MIL-STD-750		Qualification conformance inspection
	Method	Conditions	
<u>Subgroup 1</u>			22 devices, c = 1
Thermal shock temperature cycling	1051	100 cycles	
Electrical measurements		See table V, steps 1, 2, 3, and 6	
<u>Subgroup 2</u>			22 devices, c = 1
Steady-state dc	1039 or	Condition A; 340 hours	
Blocking life	1049		
Electrical measurements		See table V, steps 1, 4, 5, and 6	
<u>Subgroup 3</u>			3 devices, c = 0
Destructive physical analysis	2102	Photos of cross sections shall be submitted in the qualification report. Vendors shall retain duplicate photos.	
<u>Subgroup 4</u>			22 devices, c = 1
Thermal resistance	3131	$R_{\theta JC} = 7^{\circ}\text{C/W}$ maximum. (See 4.5.2)	
<u>Subgroup 5</u>			
Not applicable			
<u>Subgroup 6</u>			
Not applicable			

TABLE V. Groups A, B, C, and E electrical end-point measurements.

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector to emitter cutoff current	3041	Bias condition A; $V_{BE} = -1.5$ V dc, $V_{CE} = 140$ V dc	I_{CEX1}		1.0	μ A dc
2.	Emitter to base cutoff current	3041	Bias condition D; $V_{EB} = 7$ V dc	E_{B0}		2	μ A·dc
3.	Forward current transfer ratio	3076	$V_{CE} = 4$ V dc, $I_C = 0.5$ A dc, pulsed (see 4.5.1)	h_{FE2}	25	100	
4.	Collector to emitter cutoff current	3041	Bias condition A; $V_{BE} = 1.5$ V dc, $V_{CE} = 140$ V dc	ΔI_{CEX2}	100 percent of initial value or 100 μ A dc, whichever is greater.		
5.	Forward current transfer ratio	3076	$V_{CE} = 4$ V dc, $I_C = 0.5$ A dc, pulsed (see 4.5.1)	Δh_{FE3}	± 25 percent change in initial recorded value.		
6.	Thermal resistance	3131	See 4.5.2	$R_{\theta JC}$		7°C/W	



NOTES:

1. The rise time (t_r) and fall time (t_f) of the applied pulse shall be each $\leq 20\ \text{ns}$; duty cycle ≤ 2 percent; generator source impedance shall be $50\ \Omega$; pulse width = $20\ \mu\text{s}$.
2. Output sampling oscilloscope: $Z_{in} \geq 100\ \text{k}\Omega$; $C_{in} \leq 50\ \text{pF}$; rise time $\leq 20\ \text{ns}$.

FIGURE 2. Pulse response test circuit.

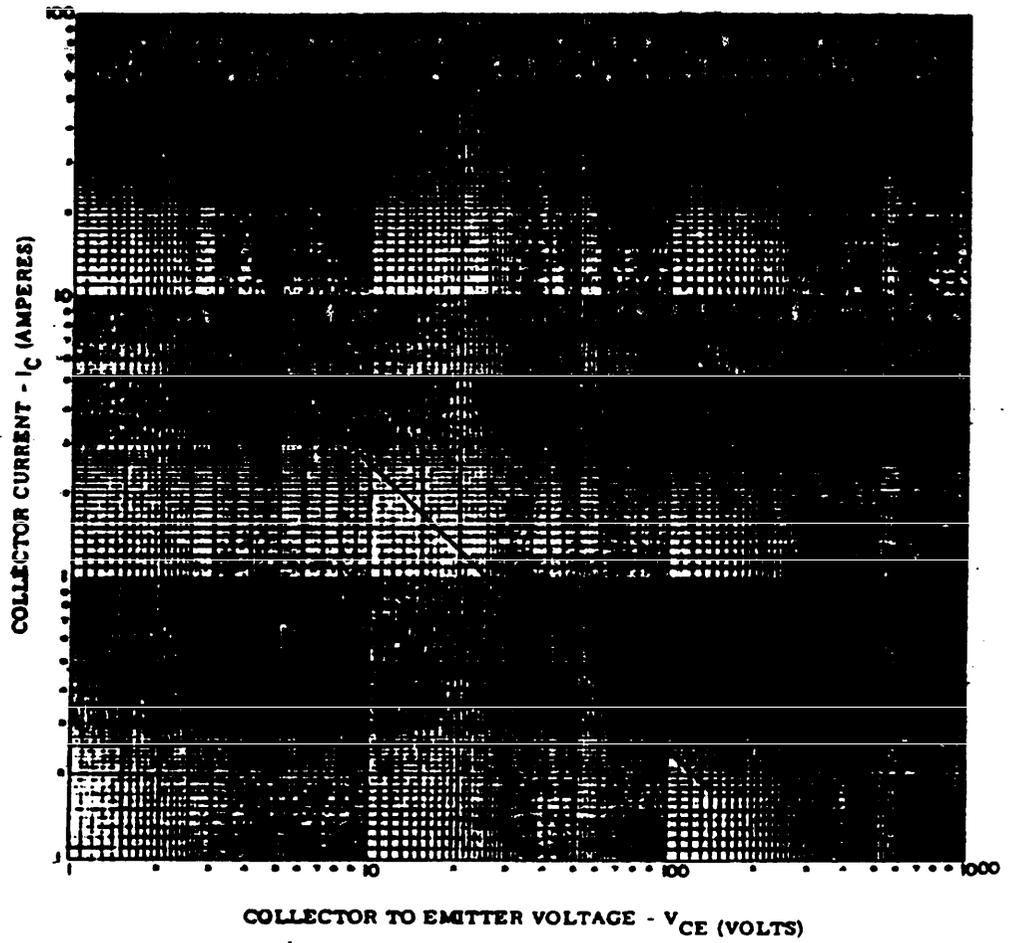


FIGURE 3. Maximum safe operating area graph (continuous dc).

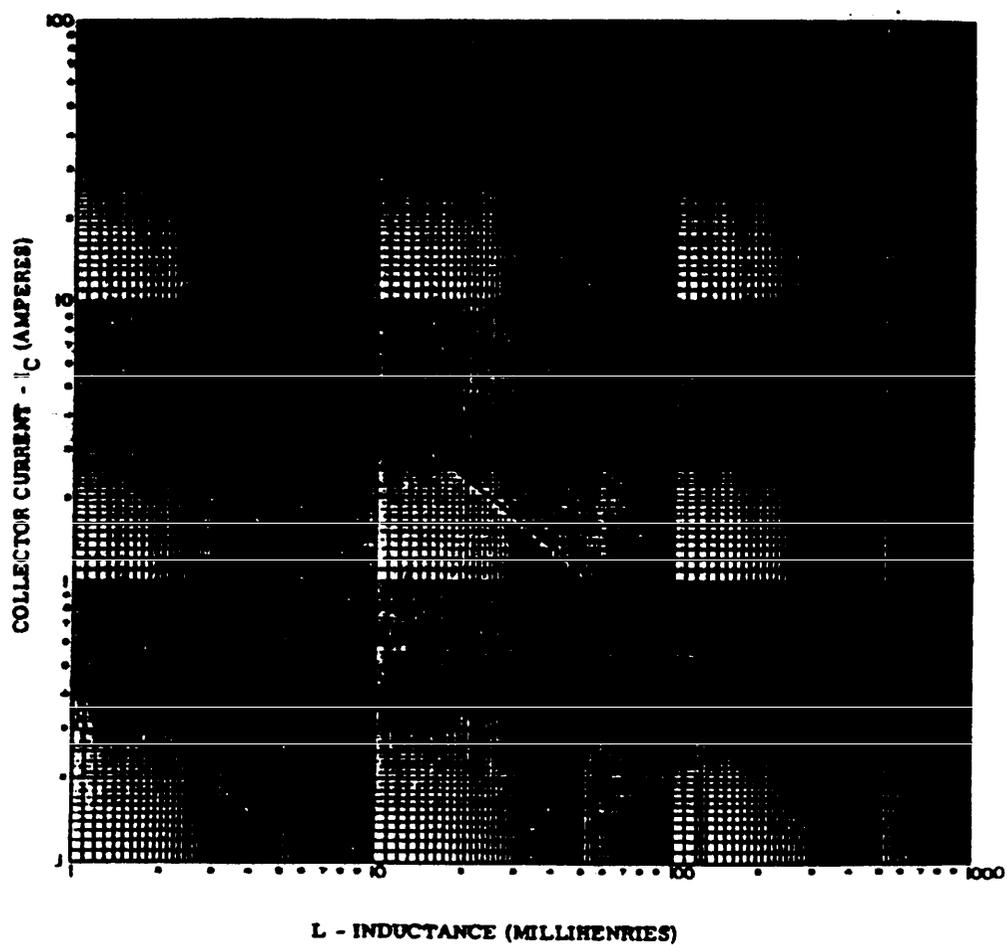


FIGURE 4. Safe operating area for switching between saturation and cutoff (unclamped inductive load).

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-S-19500.

6. NOTES

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

6.1 Notes. The notes specified in MIL-S-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of the specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).

6.3 Substitution information. Devices covered by this specification are substitutable for the manufacturer's and user's part number. This information in no way implies that manufacturer's part numbers are suitable as a substitute for the Part or Identifying Number (PIN). The term PIN is equivalent to the term (part number, identification number, and type designator) which was previously used in this specification.

6.3.1 JANTX substitution. JANTX devices shall be a direct replacement for JAN marked devices (Example: Substitute JANTX2N3441 for JAN2N3441).

6.4 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

CONCLUDING MATERIAL

Custodians:

Army - ER
Navy - EC
Air Force - 17
NASA - NA

Review activities:

Army - AR, MI
Air Force - 19, 80
DLA - ES

User activities:

Army - AV, SM
Navy - AS, CG, MC, OS, SH
Air Force - 13

Preparing activity:

Navy - EC

Agent:

DLA - ES

(Project 5961-1178)

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.

1. RECOMMEND A CHANGE	1. DOCUMENT NUMBER MIL-S-19500/369B	2. DOCUMENT DATE (YYMMDD)
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3. DOCUMENT TITLE Semiconductor Device, Transistor, NPN, silicon, Power, Type 2N3441, JANTX

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

5. REASON FOR RECOMMENDATION

6. SUBMITTER	7. DATE SUBMITTED (YYMMDD)
a. NAME	b. TELEPHONE (Include Area Code)
c. ADDRESS (Include Zip Code)	(1) Commercial
	(2) AUTOVON

8. PREPARING ACTIVITY	
a. NAME Mr. Alan Barone	b. TELEPHONE (Include Area Code) (513) 296-6048
c. ADDRESS (Include Zip Code) Defense Electronics Supply Center ATTN: DESC-ECT, 1507 Wilmington Pike, Dayton, Ohio 45444-5280	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340

